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Request for grant of a European patent

For official use only		
1 Application number:	MKEY	**MKEY - EP16191360.3**
2 Date of receipt (Rule 35(2) EPC):	DREC	**DREC - 29 Sep 2016**
3 Date of receipt at EPO (Rule 35(4) EPC):	RENA	
4 Date of filing:		

5 Grant of European patent, and examination of the application under Article 94, are hereby requested. ☒

5.1 The applicant waives his right to be asked whether he wishes to proceed further with the application (Rule 70(2)) ☐

Procedural language: en

Description and/or claims filed in: en

6 Applicant's or representative's reference: 27S8343,12EP42

Applicant 1

7-1 Name: BESTWAY INFLATABLES & MATERIAL CORP

8-1 Address:
NO.3065 CAO AN ROAD
SHANGHAI 201812
China

14.1 The/Each applicant hereby declares that he is an entity or a natural person under Rule 6(4) EPC. ☐

Representative 1

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INTEX EX. 1038, Pg. 1
Intex Recreation v. Bestway Inflatables

Inventor(s)

23 Inventor details filed separately ☒

24 **Title of invention**

Title of invention: INFLATABLE BED

25 **Declaration of priority (Rule 52)**

A declaration of priority is hereby made for the following applications

	State	Filing date	Kind	Application number:	Search results under Rule 141(1) are attached
Priority 01	CN	13.01.2016	ap	201610020533.5	☐
Priority 02	CN	13.01.2016	um	201620031074.6	☐

25.2 This application is a complete translation of the previous application ☒ CN201620031074.6

25.3 It is not intended to file a (further) declaration of priority ☐

26 **Reference to a previously filed application**

27 **Divisional application** ☐

28 **Article 61(1)(b) application** ☐

29 **Claims**

Number of claims: 40

29.1 ☒ as attached

29.2 ☐ as in the previously filed application (see Section 26.2)

29.3 ☐ The claims will be filed later

30 **Figures**

It is proposed that the abstract be published together with figure No. 7

31 **Designation of contracting states**

All the contracting states party to the EPC at the time of filing of the European patent application are deemed to be designated (see Article 79(1)).

32 **Different applicants for different contracting states**

33 Extension/Validation

This application is deemed to be a request to extend the effects of the European patent application and the European patent granted in respect of it to all non-contracting states to the EPC with which extension or validation agreements are in force on the date on which the application is filed. However, the request is deemed withdrawn if the extension fee or the validation fee, whichever is applicable, is not paid within the prescribed time limit.

33.1 It is intended to pay the extension fee(s) for the following state(s):

33.2 It is intended to pay the validation fee(s) for the following state(s):

34 Biological material

38 Nucleotide and amino acid sequences

The European patent application contains a sequence listing as part of the description ☐

The sequence listing is attached in computer-readable format in accordance with WIPO Standard ST.25 ☐

The sequence listing is attached in PDF format ☐

Further indications

39 Additional copies of the documents cited in the European search report are requested

Number of additional sets of copies:

40 Refund of the search fee under to Article 9 of the Rules relating to Fees is requested ☐

Application or publication number of earlier search report:

42 Payment

Mode of payment: Debit from deposit account

The European Patent Office is hereby authorised, to debit from the deposit account with the EPO any fees and costs indicated on the fees section below.

Currency: EUR

Deposit account number: 28070083

Account holder: BUGNION S.P.A.

43 Refunds

Any refunds should be made to EPO deposit account: 28070083

Account holder: BUGNION S.P.A.

Fees	Factor applied	Fee schedule	Amount to be paid
001 Filing fee - EP direct - online	1	120.00	120.00
002 Fee for a European search - Applications filed on/after 01.07.2005	1	1 300.00	1 300.00
015 Claims fee - For the 16th to the 50th claim	25	235.00	5 875.00
015e Claims fee - For the 51st and each subsequent claim	0	585.00	0.00
501 Additional filing fee for the 36th and each subsequent page	2	15.00	30.00
Total:		EUR	7 325.00

44-A Forms		Details:	System file name:
A-1	Request		as ep-request.pdf
A-2	1. Designation of inventor	1. Inventor	as f1002-1.pdf

44-B Technical documents		Original file name:	System file name:
B-1	Specification	TEXT INTENDED FOR PROCEEDING.pdf Description; 40 claims; 24 figure(s); abstract	SPECEPO-1.pdf

44-C Other documents	Original file name:	System file name:

45 General authorisation:

46 Signature(s)

Place:

Date: **29 September 2016**

Signed by: **Simona Inchingalo 42182**

Representative name: **Simona INCHINGALO**

Capacity: **(Representative)**

INTEX EX. 1038, Pg. 4
Intex Recreation v. Bestway Inflatables

Drawings

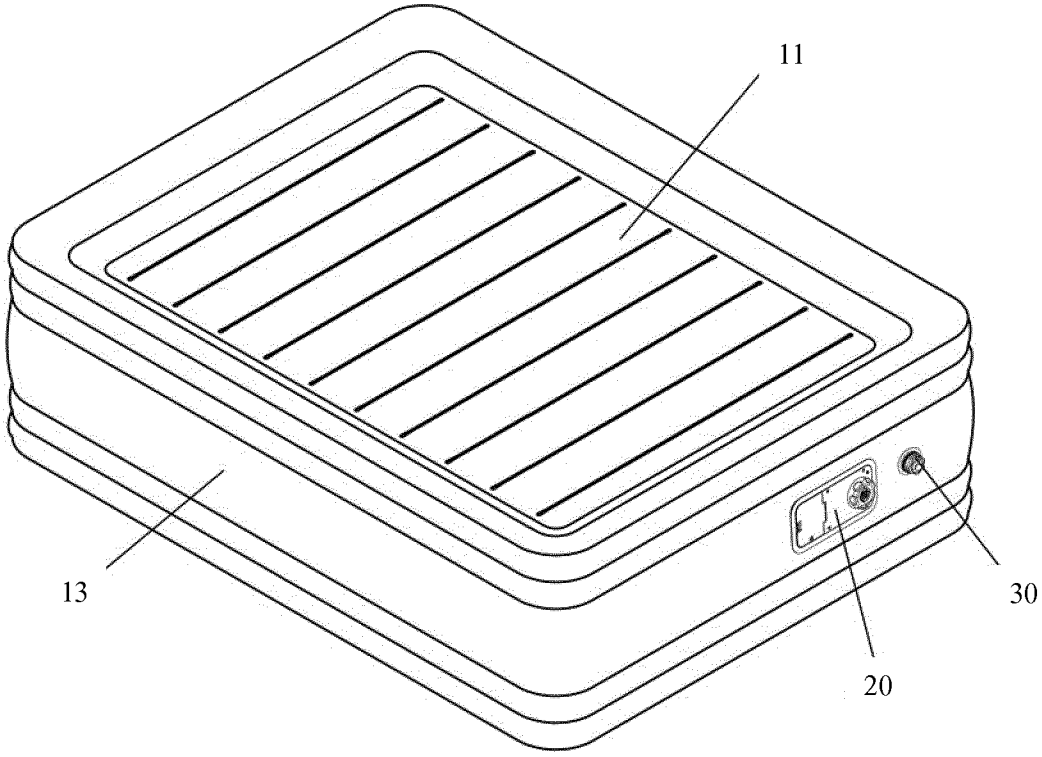


Fig. 1

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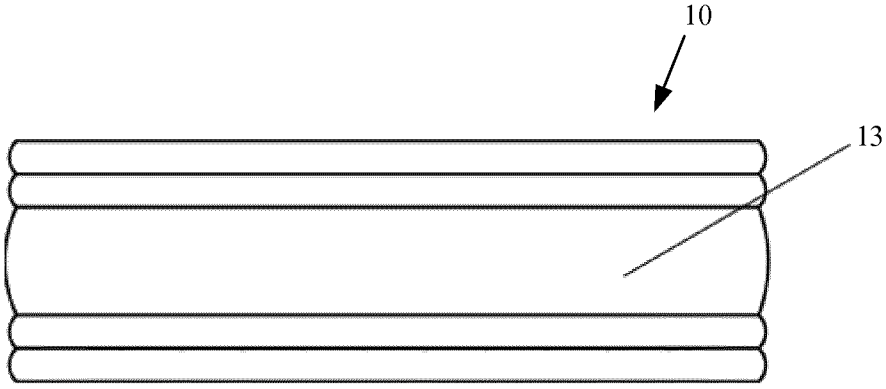


Fig. 2

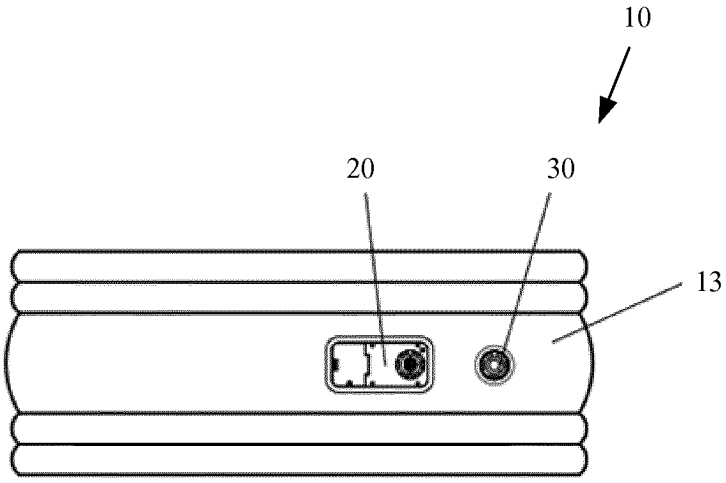


Fig. 3

INTEX EX. 1038, Pg. 6
Intex Recreation v. Bestway Inflatables

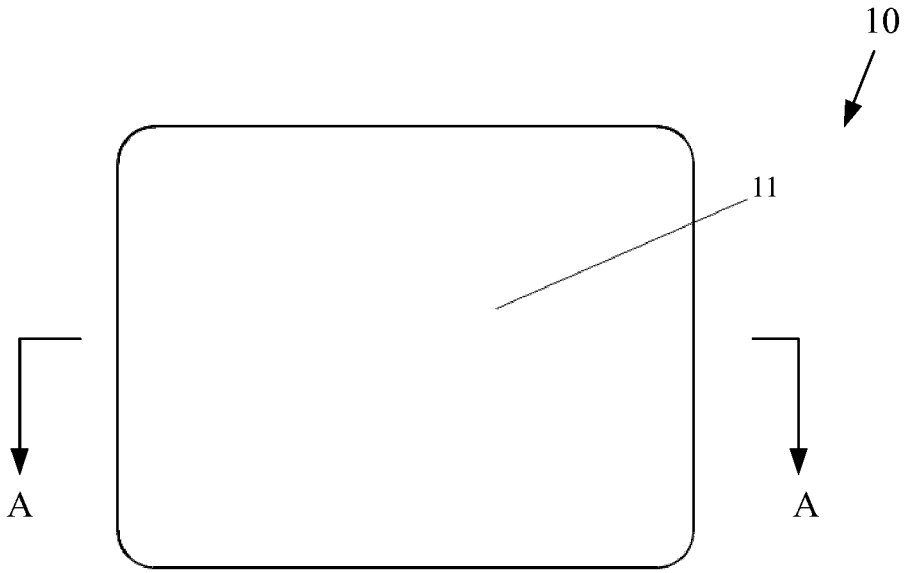


Fig. 4

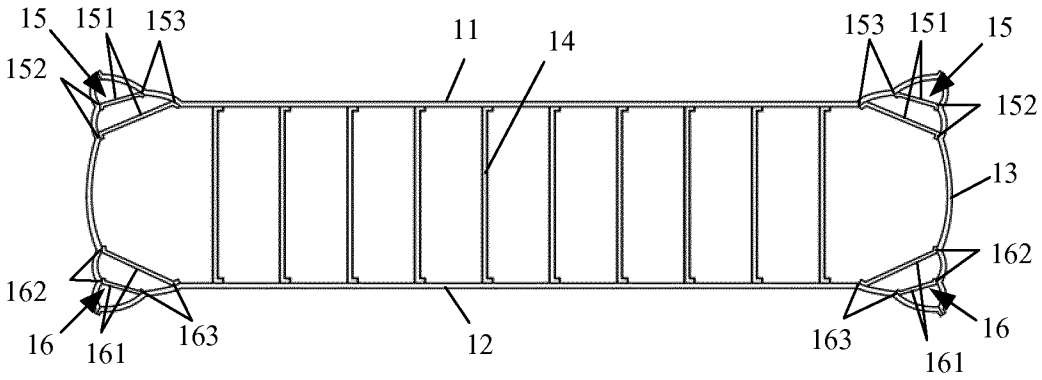


Fig. 5

INTEX EX. 1038, Pg. 7
Intex Recreation v. Bestway Inflatables

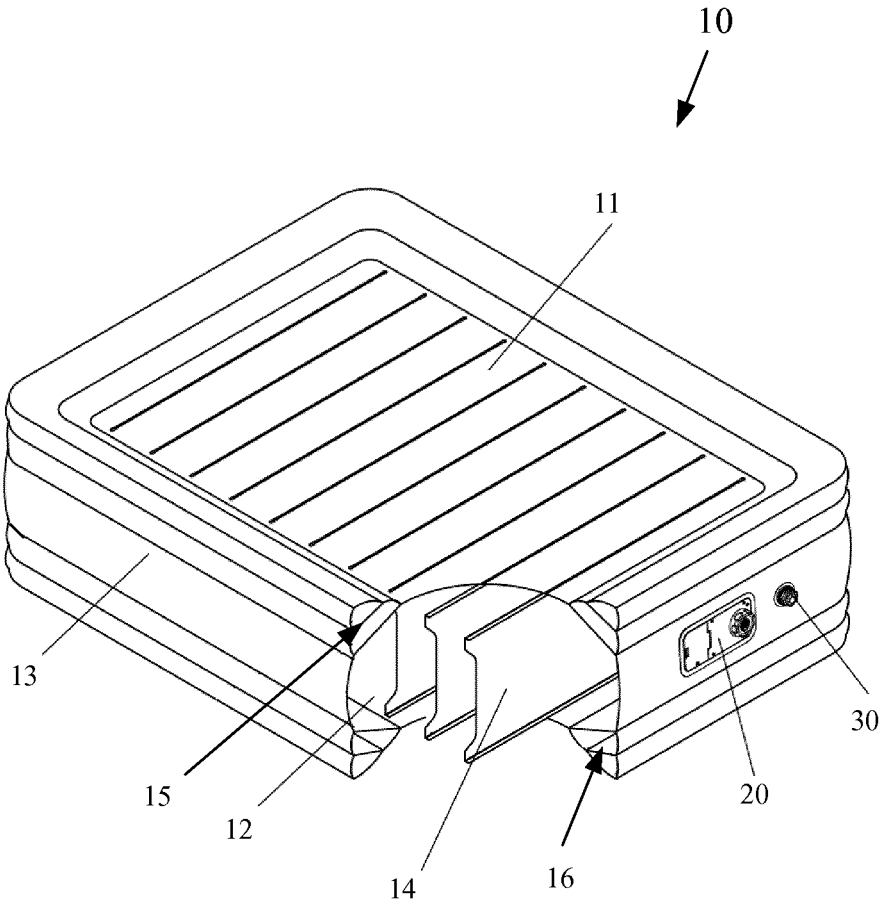


Fig. 6

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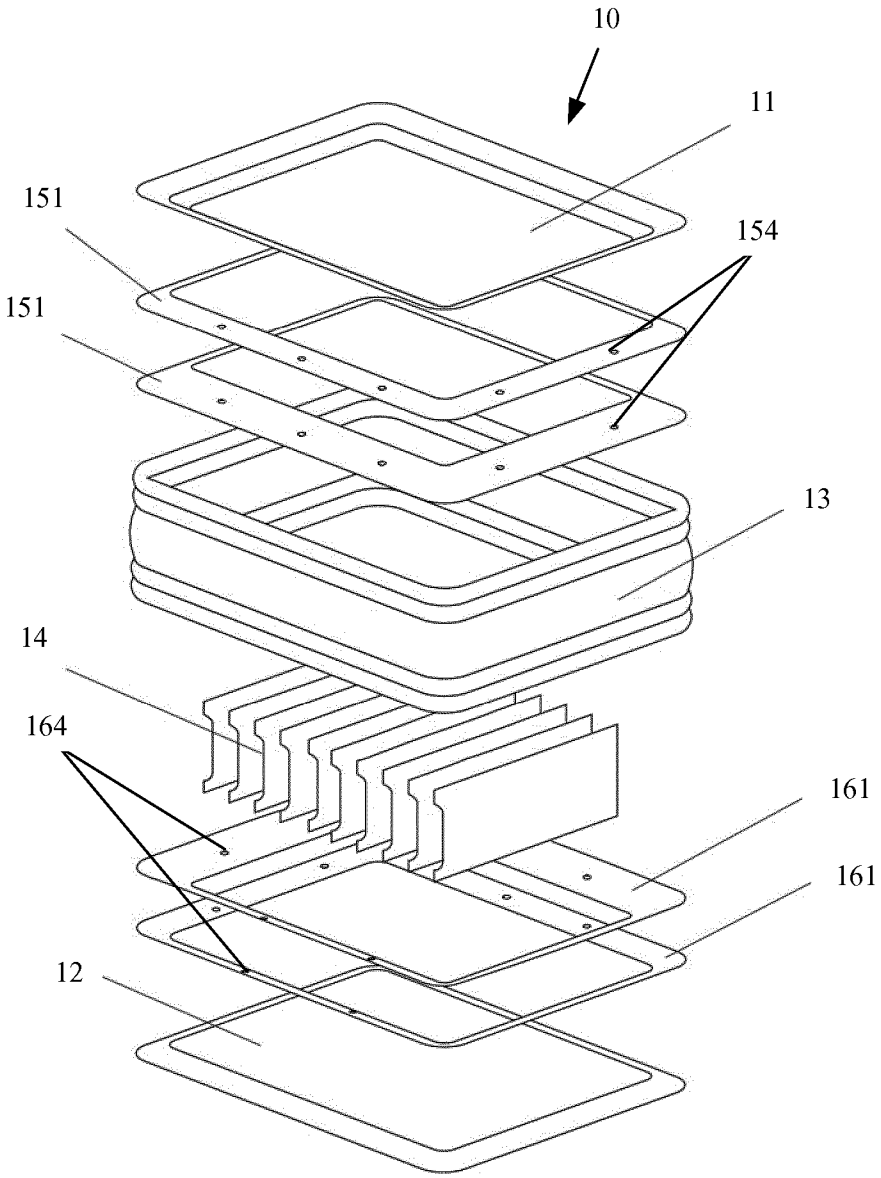


Fig. 7

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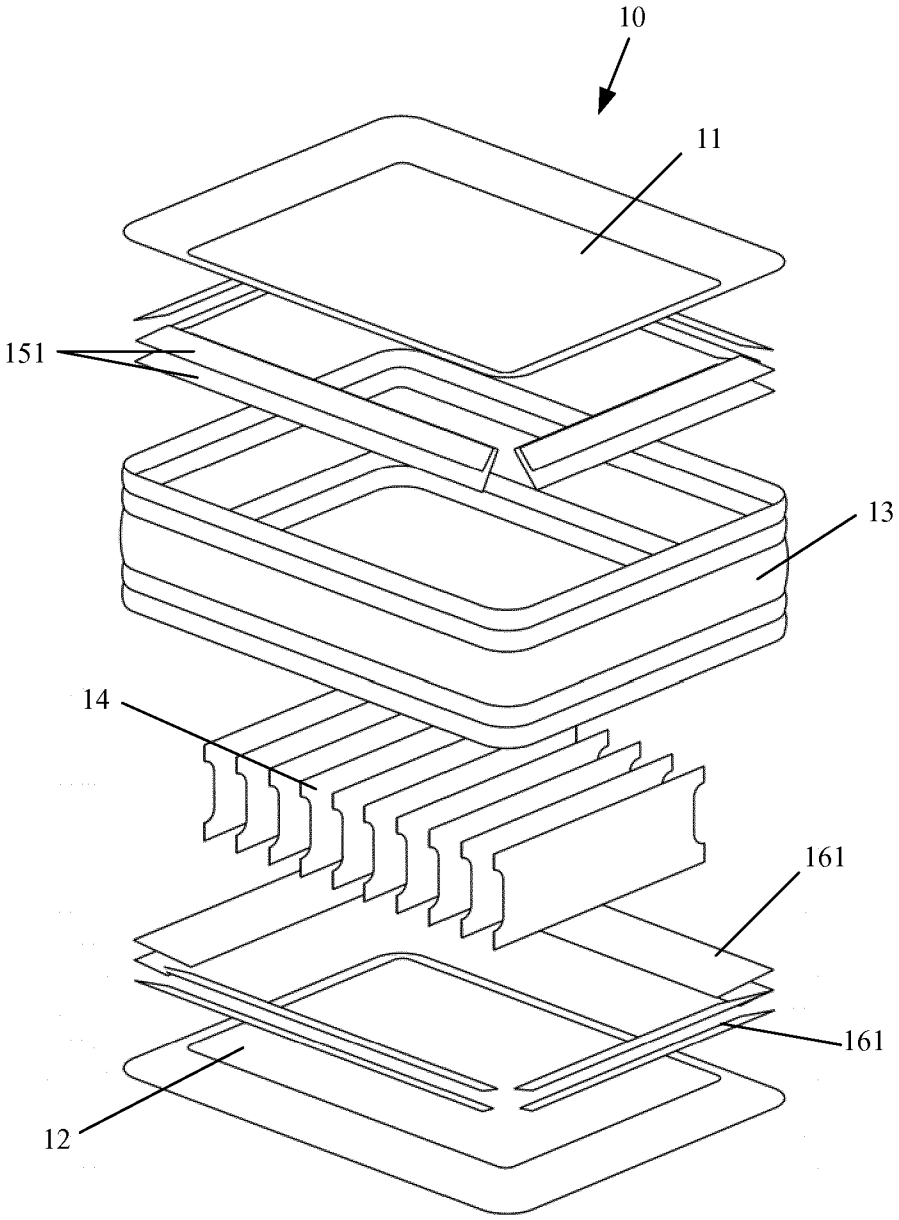


Fig. 8

INTEX EX. 1038, Pg. 10
Intex Recreation v. Bestway Inflatables

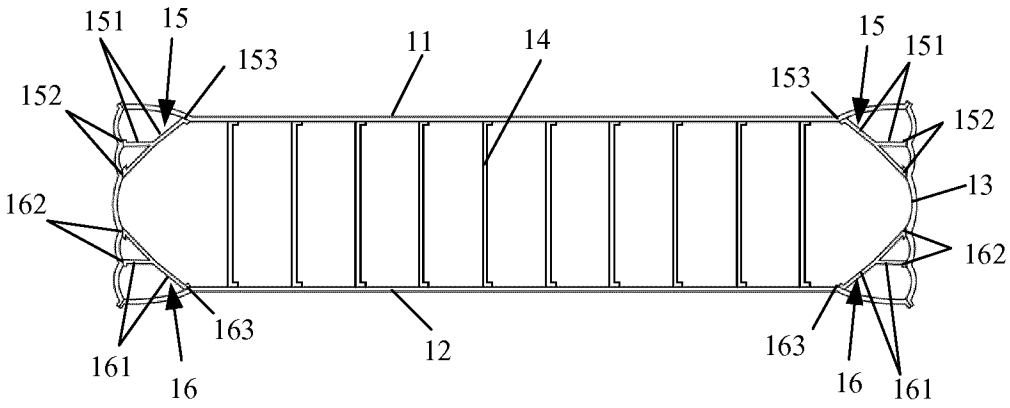


Fig. 9

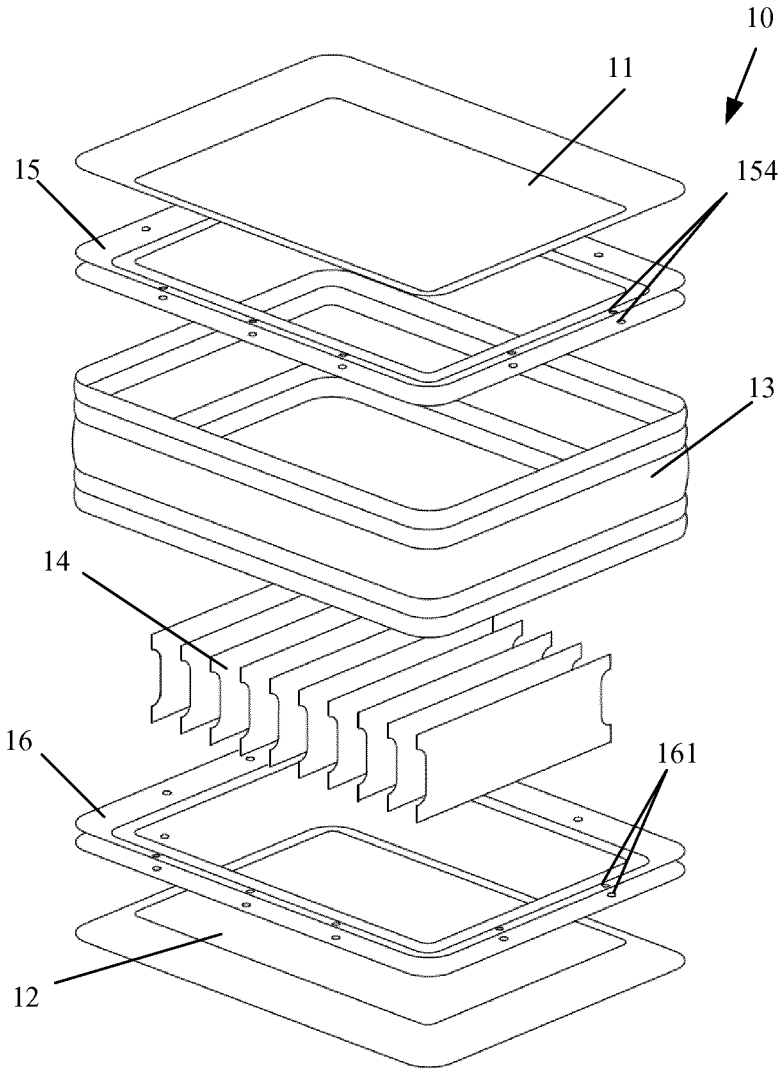


Fig. 10

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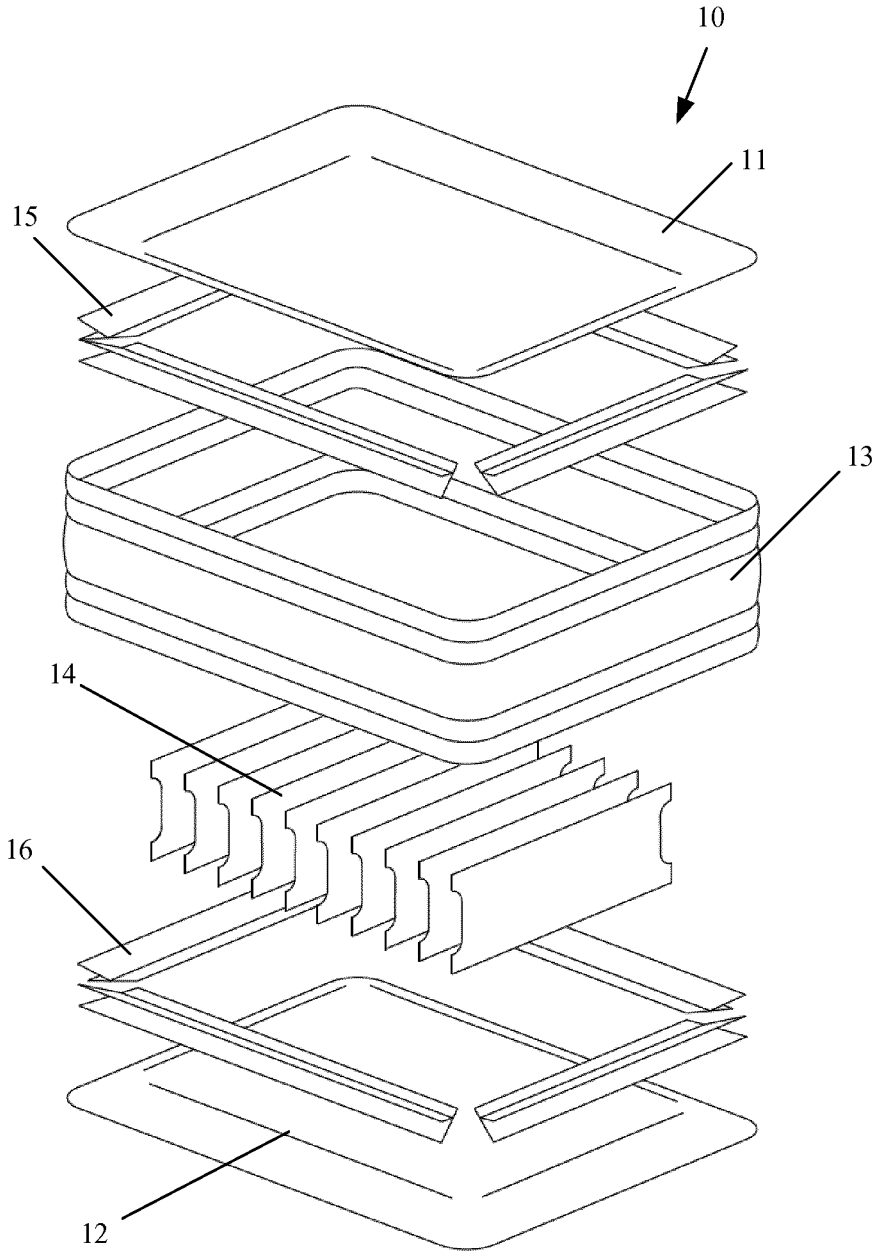


Fig. 11

INTEX EX. 1038, Pg. 12
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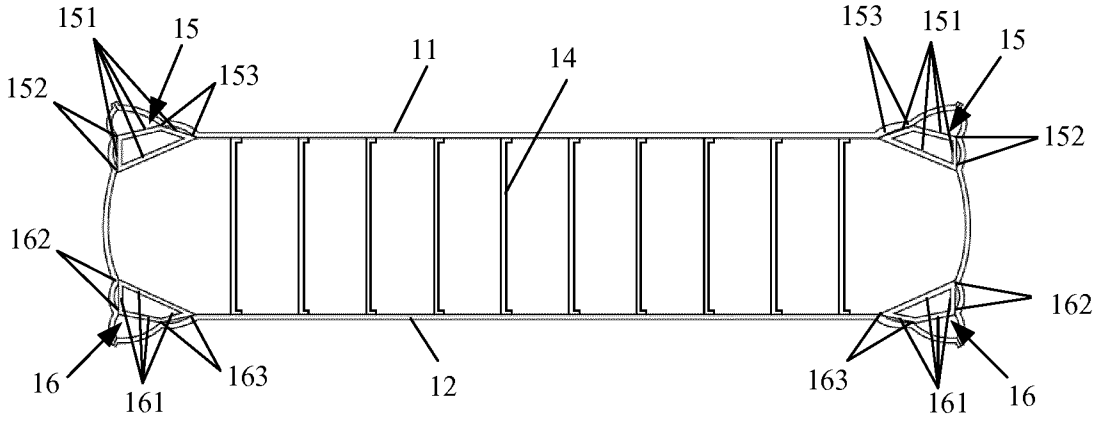


Fig. 12

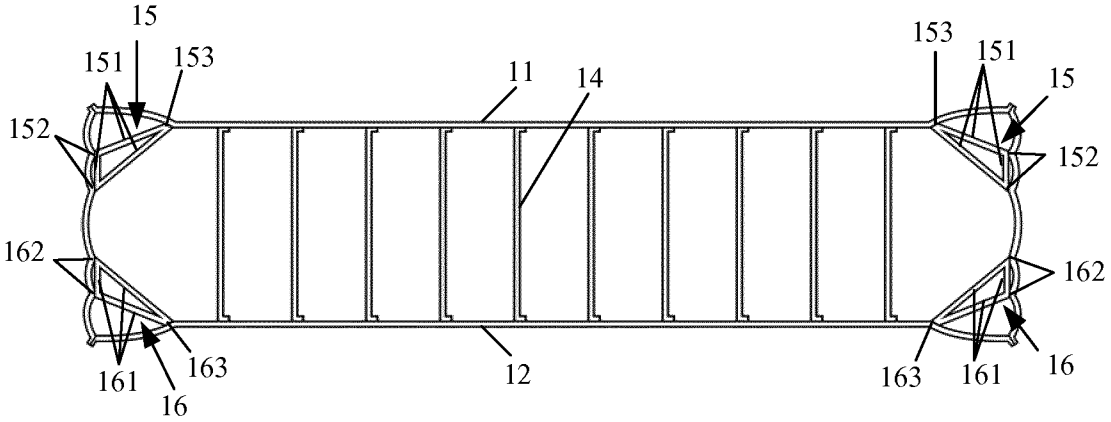


Fig. 13

INTEX EX. 1038, Pg. 13
Intex Recreation v. Bestway Inflatables

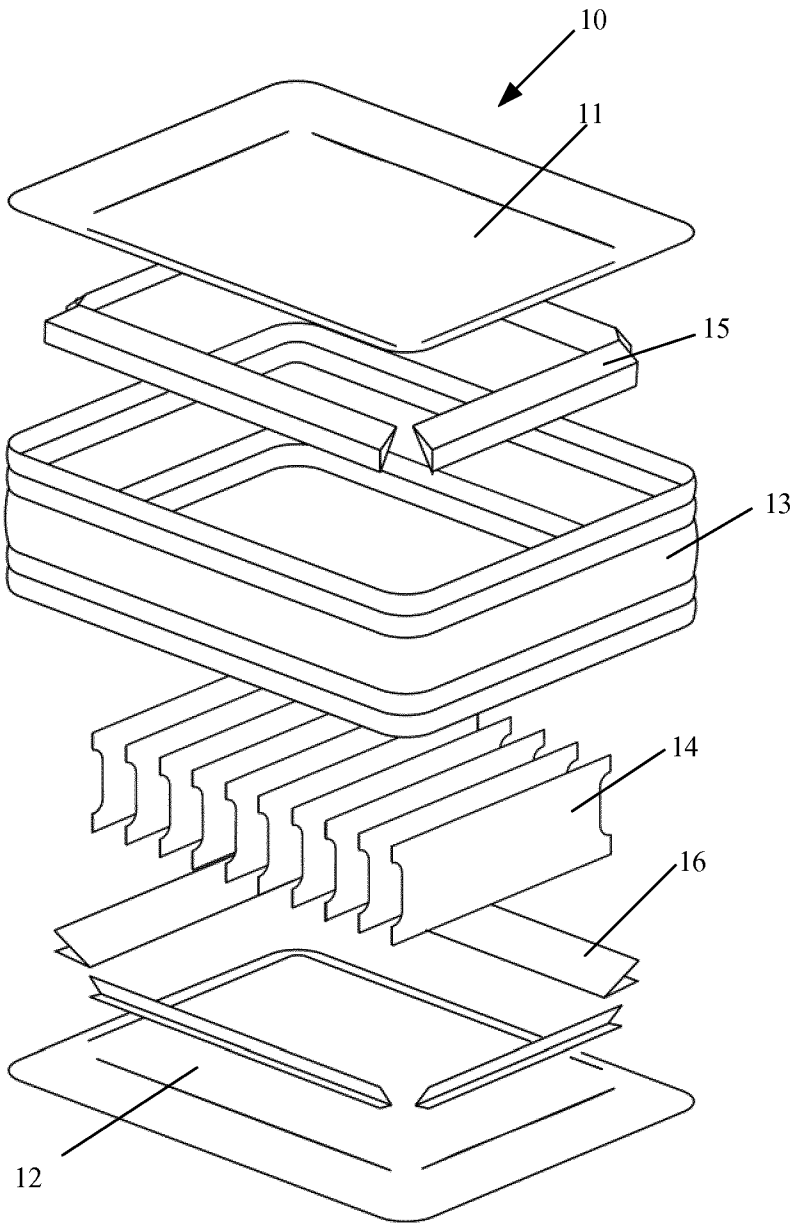


Fig. 14

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Intex Recreation v. Bestway Inflatables

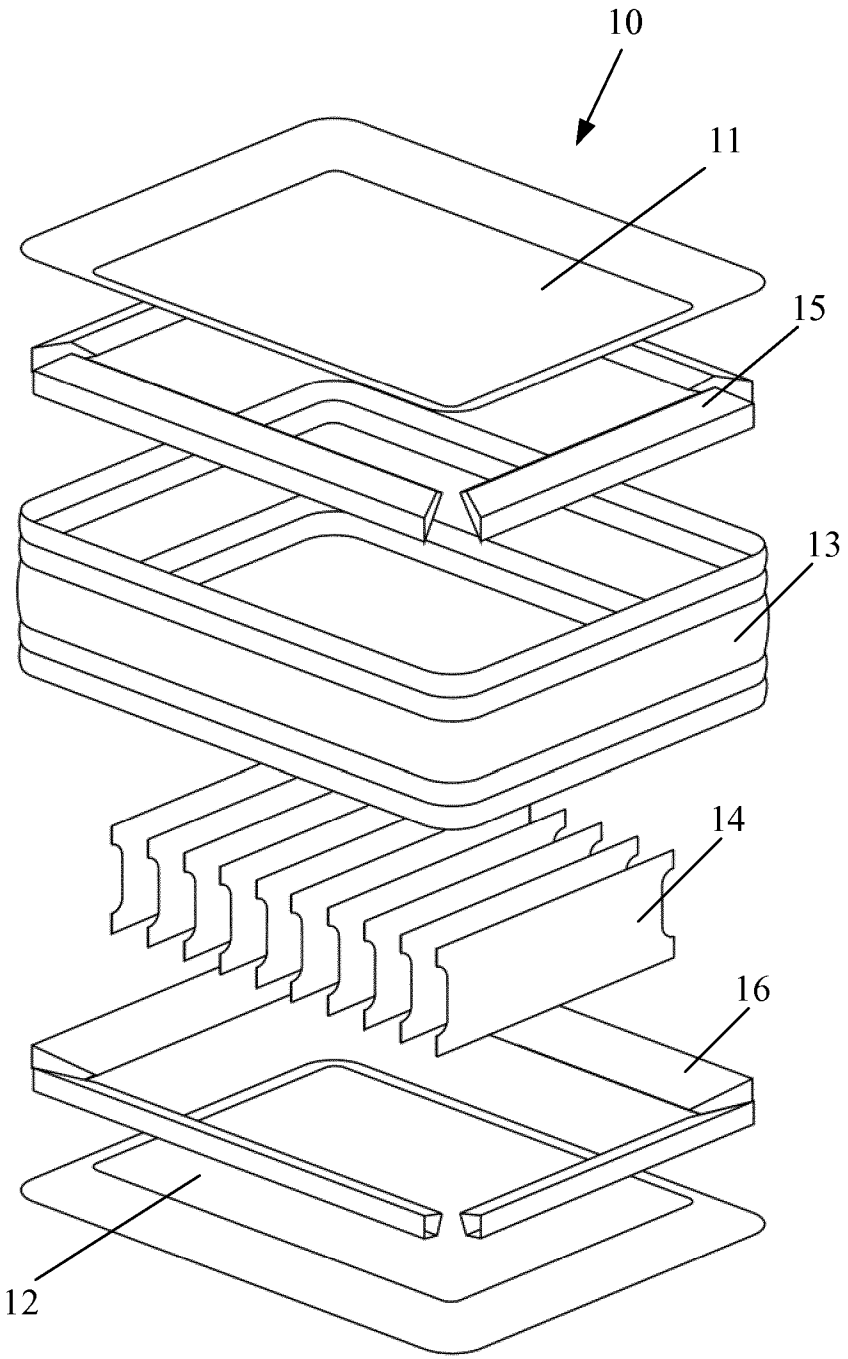


Fig. 15

INTEX EX. 1038, Pg. 15
Intex Recreation v. Bestway Inflatables

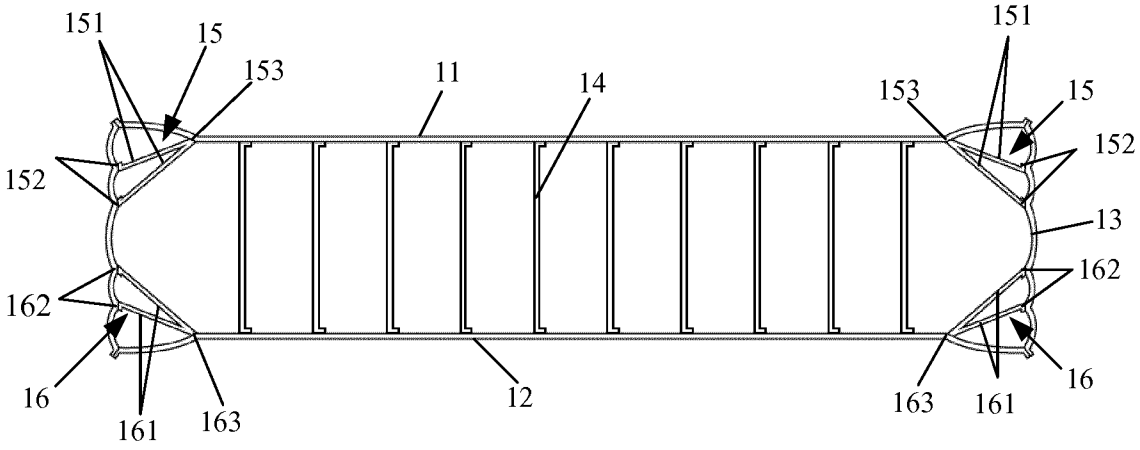


Fig. 16

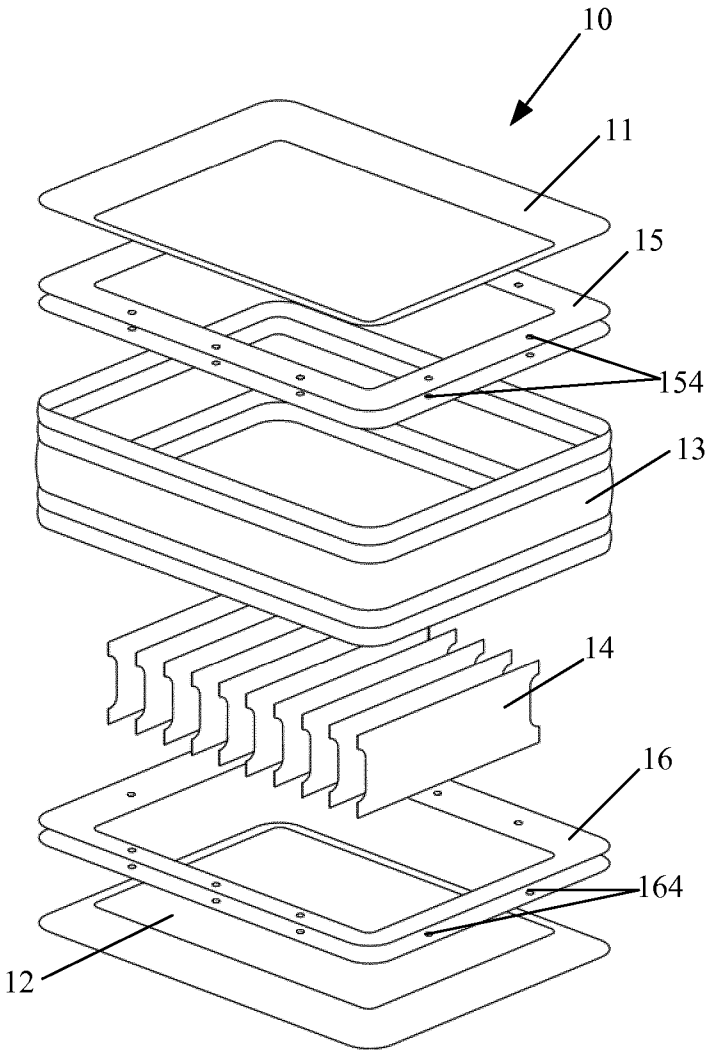


Fig. 17

INTEX EX. 1038, Pg. 16
Intex Recreation v. Bestway Inflatables

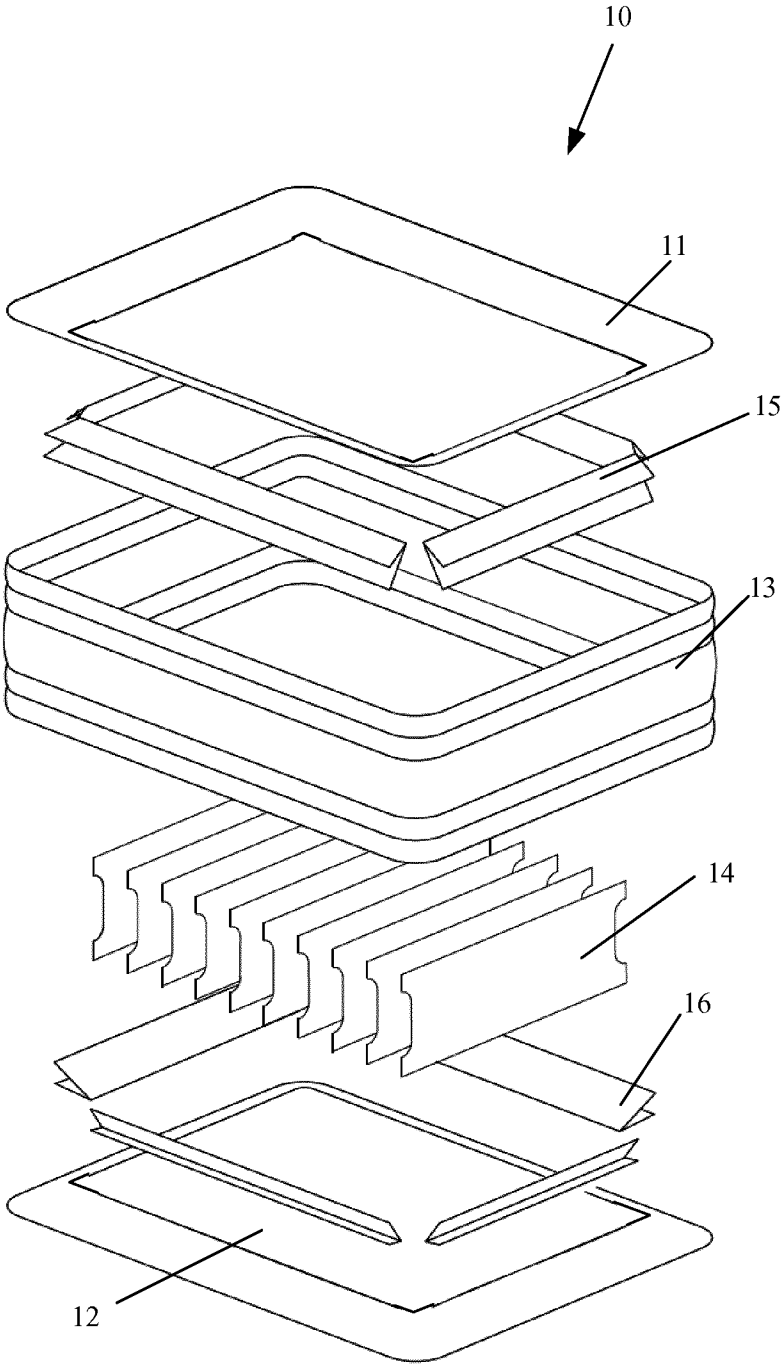


Fig. 18

INTEX EX. 1038, Pg. 17
Intex Recreation v. Bestway Inflatables

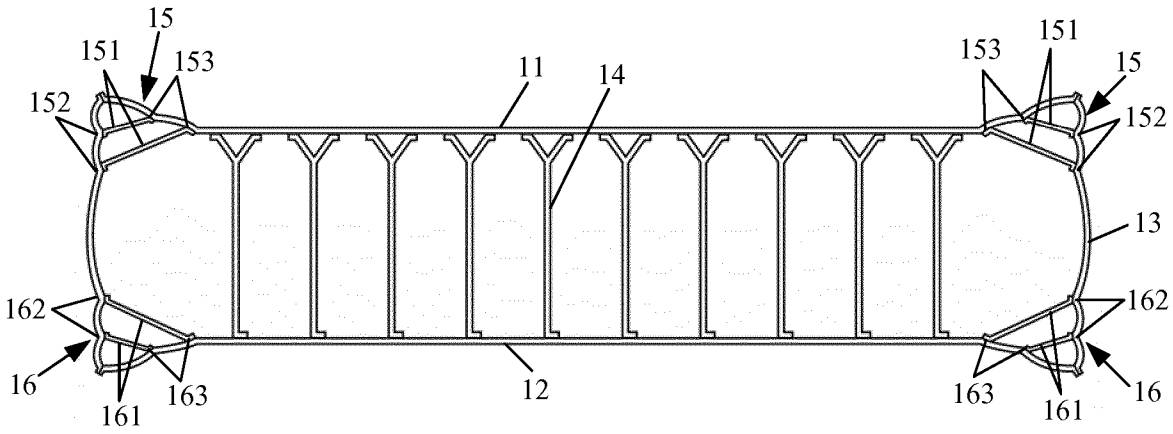


Fig. 19

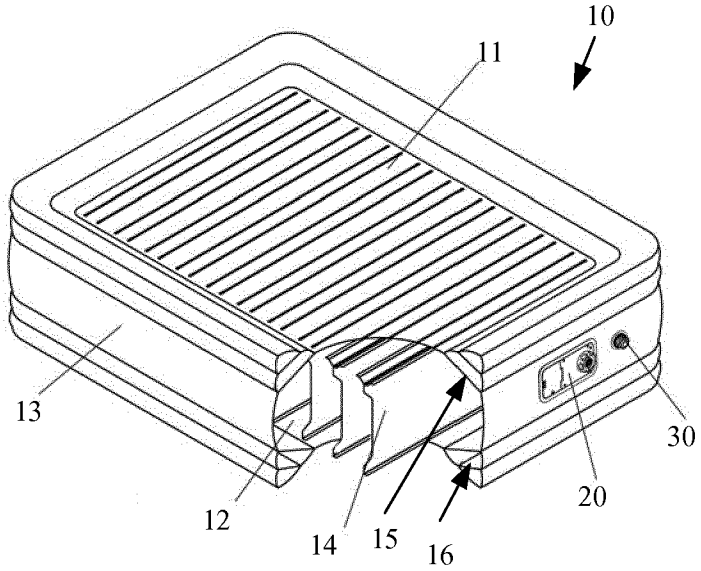


Fig. 20

INTEX EX. 1038, Pg. 18
Intex Recreation v. Bestway Inflatables

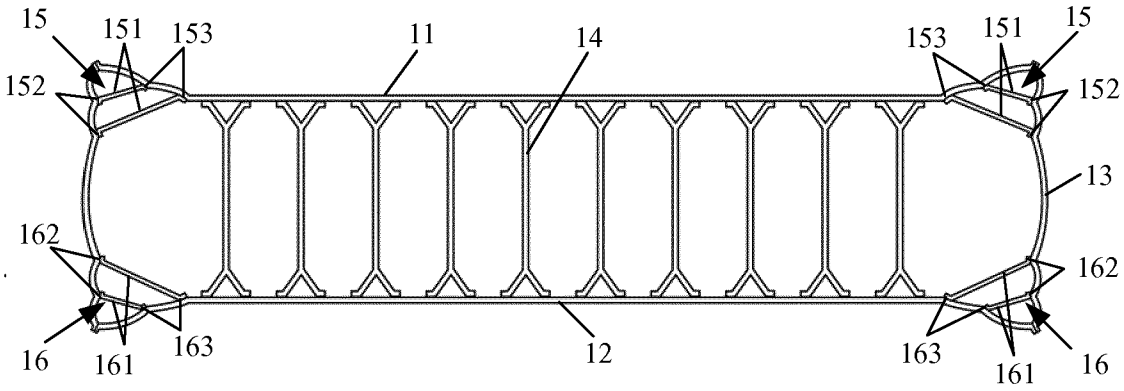


Fig. 21

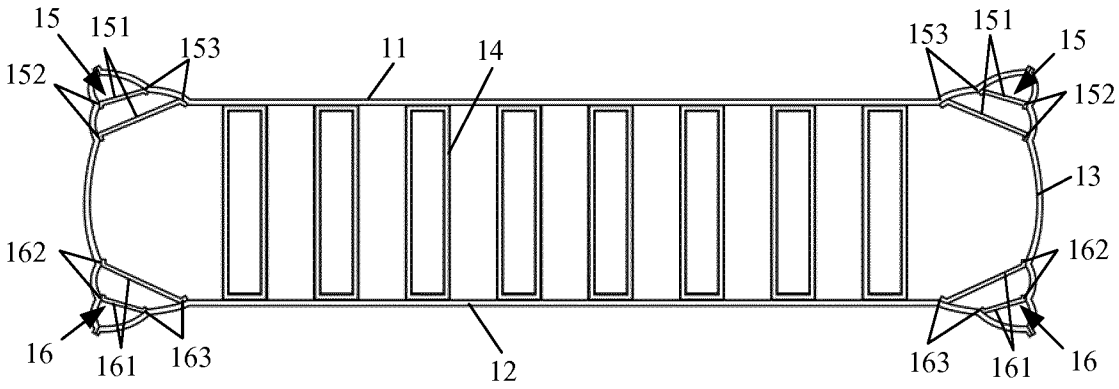


Fig. 22

INTEX EX. 1038, Pg. 19
Intex Recreation v. Bestway Inflatables

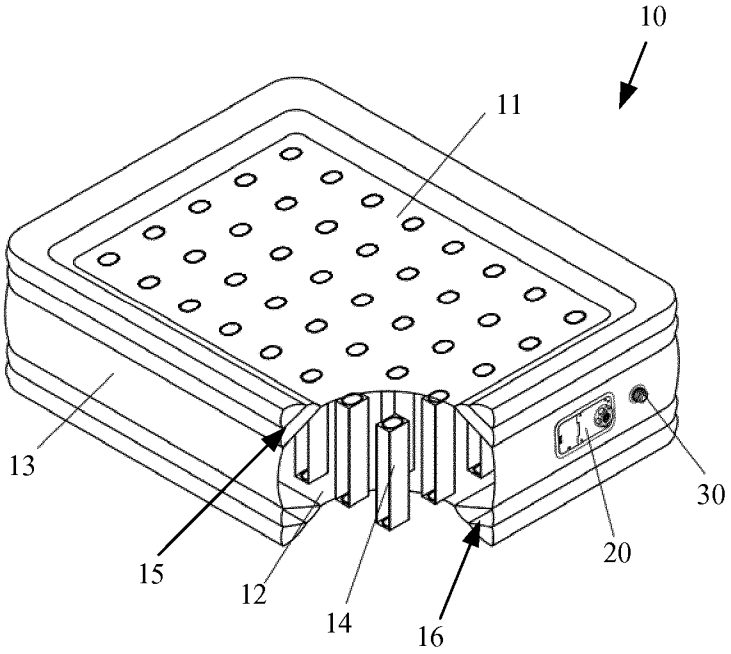


Fig. 23

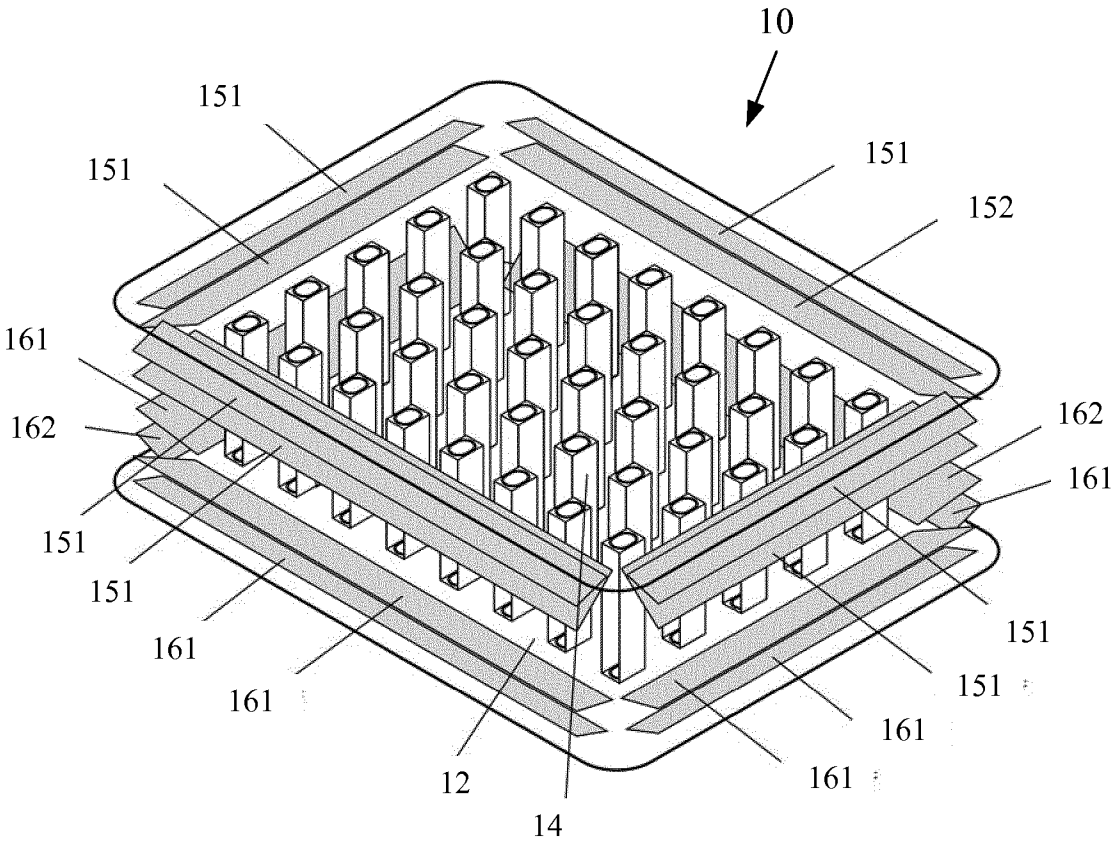


Fig. 24

INTEX EX. 1038, Pg. 20
Intex Recreation v. Bestway Inflatables

Form 1002 - 1: Public inventor(s)

Designation of inventor 123

User reference: 27S8343,12EP42
Application No:

Public

	Inventor	
	Name:	LIU Feng
	Address:	NO.3065 CAO AN ROAD SHANGHAI 201812 China
	The applicant has acquired the right to the European patent:	As employer

Signature(s)

Place:

Date: **29 September 2016**

Signed by: **Simona Inchingalo 42182**

Representative name: **Simona INCHINGALO**

Capacity: **(Representative)**

INTEX EX. 1038, Pg. 21
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INFLATABLE BED

CROSS REFERENCE

[0001] This application claims the benefit and priority of Chinese Application No. 201610020533.5, filed January 13, 2016. The entire disclosures of each of the above applications are incorporated herein by reference.

FIELD OF THE INVENTION

[0002] The present invention relates to inflatable beds or inflatable mattresses, and more specifically, to an inflatable bed, the structure of which is configured to limit the outward bulging or deformation of a side wall.

BACKGROUND

[0003] Currently, inflatable beds and inflatable mattresses have been very popular. The inflatable beds and inflatable mattresses have the advantages of light weight, easy to carry and store, etc., and thus are widely used in various occasions. For example, household inflatable beds and inflatable mattresses can often be used as temporary beds for visiting guests. In addition, the inflatable beds and inflatable mattresses are very suitable for use in outdoor camping.

[0004] Conventionally, the inflatable beds and inflatable mattresses are generally made of PVC sheet, PU sheet, or the like, and have various different structures, in which a typical mechanism is that using a top sheet, a bottom sheet, and a side wall coupled to the top sheet and the bottom sheet to form an inflatable air chamber. Tensioning structures, which are coupled to the top sheet and the bottom sheet and are arranged at an interval, are disposed in the air chamber, so as to form a shape having a certain height and a substantially flat upper surface for people to lie on.

[0005] Among the existing inflatable beds and inflatable mattresses, some have a larger height, whereby the side walls of the inflatable beds and inflatable mattresses after being inflated are susceptible to bulge and deform, affecting the appearance of the inflatable beds and inflatable mattresses. And, the bulging and deformation of the inflatable beds and inflatable mattresses may also result in the decay of air pressure in the air chamber, such that the inflatable beds and inflatable mattresses are softened, reducing the comfort of the inflatable beds and inflatable mattresses.

[0006] Therefore, in order to solve the above-mentioned problem of bulging of the side walls, in some inflatable beds and inflatable mattresses, a middle sheet is arranged between the top

sheet and the bottom sheet and is coupled to the side walls. In the inflatable beds and inflatable mattresses of such a structure, although the problem of bulging and deformation of the side walls is slightly improved, the desired result still cannot be achieved. Moreover, since tensioning structures have to be arranged between the middle sheet and the top sheet and between the middle sheet and the bottom sheet, the manufacturing process of the inflatable beds and inflatable mattresses becomes more complicated, that is to say, more plastic sheet is required.

[0007] Furthermore, in the prior art, the inflatable beds and inflatable mattresses with a relatively large height have a defect in its stability. When a user lies on or seats near the edge of the inflatable beds and inflatable mattresses, the inflatable beds and inflatable mattresses are susceptible to roll over. In order to improve the stability, an inflatable stabilization tube is arranged on the outer periphery of the bottom sheet of the inflatable bed in U.S. Patent US 6671910. However, such a structure will not only affect the aesthetic appearance of the inflatable bed, but also brings inconvenience to the user.

SUMMARY

[0008] The technical problem to be solved by the present invention is to provide an inflatable bed, in order to overcome the defects of easy occurrence of bulging and deformation of the side walls of the inflatable beds and inflatable mattresses, poor stability of the inflatable beds and inflatable mattresses, and susceptibility of roll-over in the prior art.

[0009] The above-mentioned technical problems are solved according to the present invention by providing an inflatable bed, comprising a top sheet and a bottom sheet, which are disposed vertically at an interval, at least one side wall, at least one first tensioning structure, and at least one support structure.

[0010] An upper edge of said side wall is coupled to an outer edge of said top sheet. A lower edge of said side wall is coupled to an outer edge of said bottom sheet, and an air chamber is formed between said top sheet, said bottom sheet and said side wall.

[0011] The at least one first tensioning structure is arranged in said air chamber. An upper end and a lower end of said first tensioning structure are respectively coupled to said top sheet and said bottom sheet.

[0012] The at least one support structure is arranged in said air chamber. Said support structure is arranged in a longitudinal direction of at least one of said side walls. At least two outside edges of said support structure are respectively coupled to the side wall adjacent thereto, and at

least one inside edge of said support structure is coupled to the top sheet or bottom sheet adjacent thereto.

[0013] Preferably, said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent thereto, and at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent thereto.

[0014] The at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent thereto, and at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent thereto.

[0015] Preferably, said second tensioning structure and said third tensioning structure are respectively provided with a plurality of air holes, through which an airflow passage is formed in said air chamber.

[0016] Preferably, said second tensioning structure and said third tensioning structure are disposed at an interval in a perpendicular direction.

[0017] Preferably, said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams, are respectively coupled to the side wall adjacent thereto and said top sheet, and the at least two first I-beams, are disposed at an interval.

[0018] Preferably, said third tensioning structure comprises at least two second I-beams,, an outside edge and an inside edge of each of said second I-beams, are respectively coupled to the side wall adjacent thereto and said bottom sheet, and the at least two second I-beams, are disposed at an interval.

[0019] Preferably, said second tensioning structure comprises at least one first Y-beam,, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent thereto, and an inside edge is coupled to said top sheet.

[0020] Preferably, said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent thereto, and an inside edge is coupled to said bottom sheet.

[0021] Preferably, said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent thereto, and at least one inside edge is coupled to said top sheet.

[0022] Preferably, said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent thereto, and at least one inside edge is coupled to said bottom sheet.

[0023] Preferably, said second tensioning structure comprises at least one first V- beam, wherein two outside edges of said first V- beam are respectively coupled to the side wall adjacent thereto, and an inside edge is coupled to said top sheet.

[0024] Preferably, said third tensioning structure comprises at least one second V- beam, wherein two outside edges of said second V- beam are respectively coupled to the side wall adjacent thereto, and an inside edge is coupled to said bottom sheet.

[0025] Preferably, said at least two first I-beams are arranged spaced apart from each other at a lower surface of said top sheet.

[0026] Preferably, said at least two second I- beams are arranged spaced apart from each other at an upper surface of said bottom sheet.

[0027] Preferably, said at least two first I- beams are arranged at an interval on an inner surface of said side wall in a perpendicular direction.

[0028] Preferably, said at least two second I- beams are arranged at an interval on the inner surface of said side wall in a perpendicular direction.

[0029] Preferably, the two outside edges of said at least one first Y- beam is arranged at an interval on an inner surface of said side wall in a perpendicular direction.

[0030] Preferably, the two outside edges of said at least one second Y- beam are arranged at an interval on the inner surface of said side wall in a perpendicular direction.

[0031] Preferably, said at least two outside edges of said at least one first tubular beam, which are coupled to the side wall adjacent thereto, are arranged at an interval on an inner surface of said side wall in a perpendicular direction.

[0032] Preferably, said at least two outside edges of said at least one second tubular beam, which are coupled to the side wall adjacent thereto, are arranged at an interval on the inner surface of said side wall in a perpendicular direction.

[0033] Preferably, the two outside edges of said at least one first V-beam is arranged at an interval on an inner surface of said side wall in a perpendicular direction.

[0034] Preferably, the two outside edges of said at least one second V-beam is arranged at an interval on an inner surface of said side wall in a perpendicular direction.

[0035] Preferably, said at least two first I-beams as a whole are of a continuous annular structure or a segmental annular structure.

[0036] Preferably, said at least two second I-beams as a whole are of a continuous annular structure or a segmental annular structure.

[0037] Preferably, said at least one first Y-bam as a whole is of a continuous annular structure or a segmental annular structure.

[0038] Preferably, said at least one second Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

[0039] Preferably, said at least one first tubular beam as a whole is of a segmental annular structure.

[0040] Preferably, said at least one second tubular beam as a whole is of a segmental annular structure.

[0041] Preferably, said at least one first V-bream as a whole is of a continuous annular structure or a segmental annular structure.

[0042] Preferably, said at least one second V-beam as a whole is of a continuous annular structure or a segmental annular structure.

[0043] Preferably, said first tensioning structure is one or more beams selected from I-beams, coil beams, Y-beams or X-beams.

[0044] Preferably, said first tensioning structure, said second tensioning structure and said third tensioning structure are all made of thermoplastic plastic sheet.

[0045] Preferably, one or more of said first tensioning structure, said second tensioning structure and said third tensioning structure at least partially comprise mesh, laminated plastic sheet or a threads.

[0046] Preferably, two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite plastic strips, and said mesh and said threads are sandwiched between the two opposite plastic strips.

[0047] Preferably, two side surfaces of said mesh or said threads are at least partially coupled integrally with an U-shaped plastic strip, and said mesh and said threads are sandwiched between the U-shaped plastic strip.

[0048] Preferably, said first tensioning structure is coupled to said top and bottom sheets by means of high-frequency welding; said second tensioning structure is coupled to said top sheet and said side wall by means of high-frequency welding; and said third tensioning structure is coupled to said bottom sheet and said side wall by means of high-frequency welding.

[0049] Preferably, the height where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the height where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

[0050] Preferably, the height where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the height where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

[0051] Preferably, said inflatable bed further comprises a built-in air pump, which is arranged on said side wall and is located between a lower edge of said second tensioning structure and an upper edge of said third tensioning structure for inflating said air chamber.

[0052] Preferably, said inflatable bed further comprises an air valve, which is arranged on said side wall for the inflation and deflation of said inflatable bed.

[0053] The positive effects of the present invention lie in the following aspects.

[0054] The inflatable bed of the present invention overcomes the defect of outward bulging and deformation of the side walls of the inflatable beds and inflatable mattresses having a relatively large height in prior art, making their appearance more attractive. The inflatable beds and inflatable mattresses have a good stability, which overcomes the problem of susceptibility of roll-over in the prior art. Furthermore, the inflatable bed of the present invention can also prevent the user from rolling down during use.

BRIEF DESCRIPTION OF THE DRAWINGS

[0055] The above-mentioned and other features, properties and advantages of the present invention will become more apparent from the following description of embodiments with reference to the accompany drawings, in which:

[0056] Fig. 1 is a perspective view of an inflatable bed according to the present invention.

[0057] Fig. 2 is a front view of the inflatable bed according to the present invention.

[0058] Fig. 3 is a right view of the inflatable bed according to the present invention.

[0059] Fig. 4 is a top view of the inflatable bed according to the present invention.

[0060] Fig. 5 is a sectional view of a first embodiment taken along line A-A in Fig. 4.

[0061] Fig. 6 is a schematic structural partially sectional view of the first embodiment of the inflatable bed according to the present invention.

[0062] Fig. 7 is a first exploded view of the first embodiment of the inflatable bed according to the present invention.

[0063] Fig. 8 is a second exploded view of the first embodiment of the inflatable bed according to the present invention.

[0064] Fig. 9 is a sectional view of a second embodiment taken along line A-A in Fig. 4.

[0065] Fig. 10 is a first exploded view of the second embodiment of the inflatable bed according to the present invention.

[0066] Fig. 11 is a second exploded view of the second embodiment of the inflatable bed according to the present invention.

[0067] Fig. 12 is a first sectional view of a third embodiment taken along line A-A in Fig. 4.

[0068] Fig. 13 is a second sectional view of the third embodiment taken along line A-A in Fig. 4.

[0069] Fig. 14 is a first exploded view of the third embodiment of the inflatable bed according to the present invention.

[0070] Fig. 15 is a second exploded view of the third embodiment of the inflatable bed according to the present invention.

[0071] Fig. 16 is a sectional view of a fourth embodiment taken along line A-A in Fig. 4.

[0072] Fig. 17 is a first exploded view of the fourth embodiment of the inflatable bed according to the present invention.

[0073] Fig. 18 is a second exploded view of the fourth embodiment of the inflatable bed according to the present invention.

[0074] Fig. 19 is a sectional view of a fifth embodiment taken along line A-A in Fig. 4.

[0075] Fig. 20 is a schematic structural partially sectional view of the fifth embodiment of the inflatable bed according to the present invention.

[0076] Fig. 21 is a sectional view of a sixth embodiment taken along line A-A in Fig. 4.

[0077] Fig. 22 is a sectional view of a seventh embodiment taken along line A-A in Fig. 4.

[0078] Fig. 23 is a schematic structural partially sectional view of the seventh embodiment of the inflatable bed according to the present invention.

[0079] Fig. 24 is a schematic view of the interior structure of the seventh embodiment of the inflatable bed according to the present invention.

DETAILED DESCRIPTION

[0080] The present invention will be further described below in conjunction with detailed embodiments and the accompanying drawings. More details are provided in the following detailed description in order for the present invention to be fully understood. However, the

present invention can be implemented in various ways other than those described herein. A person skilled in the art can make similar analogy and modification according to the practical applications without departing from the spirit of the present invention, and therefore the contents of the detailed embodiments herein should not be construed as limiting to the scope of the present invention.

[0081] Embodiment 1:

[0082] Fig. 1 is a perspective view of an inflatable bed according to the present invention. Fig. 2 is a front view of the inflatable bed according to the present invention. Fig. 3 is a right view of the inflatable bed according to the present invention. Fig. 4 is a top view of the inflatable bed according to the present invention. Fig. 5 is a sectional view of a first embodiment taken along line A-A in Fig. 4. Fig. 6 is a schematic structural partially sectional view of the first embodiment of the inflatable bed according to the present invention. Fig. 7 is an exploded view of the first embodiment of the inflatable bed according to the present invention.

[0083] As shown in Figs. 1-7, an inflatable bed 10 is disclosed in the first embodiment according to the present invention, which comprises a top sheet 11, a bottom sheet 12, at least one side wall 13, at least one first tensioning structure 14 and at least one support structure. The bottom sheet 12 and the top sheet 11 are disposed vertically at an interval, an upper edge of the side wall 13 is coupled to an outer edge of the top sheet 11, a lower edge of the side wall 13 is coupled to an outer edge of the bottom sheet 12, and an air chamber is formed between the top sheet 11, the bottom sheet 12 and the side wall 13. Moreover, the first tensioning structure 14 is arranged in the air chamber, and an upper end and a lower end of the first tensioning structure 14 are respectively coupled to the top sheet 11 and the bottom sheet 12. This has the effects of limiting the respective upward and downward bulging of the top sheet 11 and the bottom sheet 12 by means of the first tensioning structure 14 after said air chamber is inflated. In particular, both the top sheet 11 and the bottom sheet 12 may be configured as a two-layer structure, which can be formed with different patterns by mutually welding at least two sheets. Alternatively, a sponge structure is further sandwiched in the two-layer structure.

[0084] Said support structure is arranged in said air chamber herein, said support structure is arranged in the longitudinal direction of at least one of the side walls 13, at least two outside edges of said support structure are respectively coupled to the side wall 13 adjacent thereto, and at least one inside edge of said support structure is coupled to the top sheet 11 or bottom sheet 12 adjacent thereto.

[0085] Preferably, said support structure comprises a second tensioning structure 15 and a third tensioning structure 16. At least two outside edges of the second tensioning structure 15 are respectively coupled to the side wall 13 adjacent thereto, and at least one inside edge of the second tensioning structure is coupled to the top sheet 11 adjacent thereto. The second tensioning structure 15 is configured to limit the upward and lateral bulging of the top sheet 11 and the side wall 13 after said air chamber is inflated.

[0086] Moreover, at least two outside edges of the third tensioning structure 16 are respectively coupled to the side wall 13 adjacent thereto, and at least one inside edge of the third tensioning structure 16 is coupled to the adjacent bottom sheet 12. The third tensioning structure 16 is configured to limit the respective downward and lateral bulging of the bottom sheet 12 and the side wall 13 after said air chamber is inflated.

[0087] In this embodiment, the second tensioning structure 15 comprises at least two first I-beams 151, one outside edge 152 of each first I-beams 151 is coupled to the side wall 13 adjacent thereto, the other inside edge 153 is coupled to the top sheet 11 adjacent thereto, and the at least two first I-beams 151 are disposed at an interval. The third tensioning structure 16 comprises at least two second I-beams 161, one outside edge 162 of each second I-beam 161 is coupled to the side wall 13 adjacent thereto, the other inside edge 163 is coupled to the bottom sheet 12 adjacent thereto, and the at least two second I-beams 151 are disposed at an interval. In this embodiment, the numbers of first I-beams 151 and second I-beams 161 are both two by way of example, but their numbers are not limited by this embodiment, and may be more than two, which also fall within the scope of protection of the present invention.

[0088] The second tensioning structure 15 and the third tensioning structure 16 are preferably disposed at an interval in a perpendicular direction. In this embodiment, for example, the second tensioning structure 15 and the third tensioning structure 16 divide the respective side wall 13 into five sections, so that the second tensioning structure 15 is configured to limit the upward and lateral bulging of the top sheet 11 and the side wall 13 after said air chamber is inflated, and the third tensioning structure 16 is configured to limit the respective downward and lateral bulging of the bottom sheet 12 and the side wall 13 after said air chamber is inflated.

[0089] Of course, the second tensioning structure 15 and the third tensioning structure 16 may also divide the respective side wall 13 into a multi-section structure, such as a four- or six-section structure; this embodiment is merely exemplary and the present invention is not limited thereto, and all the structures with four or more sections fall within the scope of protection of the present invention.

[0090] Further, the at least two first I-beams 151 are arranged spaced apart from each other at a lower surface of the top sheet 11, and the at least two second I-beams 161 are arranged spaced apart from each other at an upper surface of the bottom sheet 12. The at least two first I-beams 151 are arranged at an interval on an inner surface of the side wall 13 in a perpendicular direction. The at least two second I-beams 161 are arranged at an interval on the inner surface of the side wall 13 in a perpendicular direction.

[0091] Furthermore, the at least two first I-beams 151 as a whole are of a continuous annular structure or a segmental annular structure. The at least two second I-beams 161 as a whole are of a continuous annular structure or a segmental annular structure. Moreover, the at least two first I-beams 151 are provided with air holes 154, and an airflow passage is formed in said air chamber through the air holes 154. The at least two second I-beams 161 are provided with air holes 164, and an airflow passage is formed in said air chamber through the air holes 164 (as shown in Figs. 7 and 8).

[0092] The first tensioning structure 14 of the present invention may employ one or more beams selected from I-beams, coil beams, Y-beams or X-beams. Moreover, the first tensioning structure 14, the second tensioning structure 15 and the third tensioning structure 16 may be all made of thermoplastic plastic sheet, and one or more of the first tensioning structure 14, the second tensioning structure 15 and the third tensioning structure 16 at least partially comprise mesh, laminated plastic sheet or threads.

[0093] The structures thereof may take various forms. For example, two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite s plastic strips, and said mesh and said threads are sandwiched between the two opposite plastic strips.

[0094] As another example, two side surfaces of said mesh f or said threads are at least partially coupled integrally with an U-shaped plastic strip, and said mesh and said threads are sandwiched between the U-shaped plastic strip. These connecting structures can be used to effectively manufacture the beams required by the inflatable bed in the present invention; the solution in this embodiment is merely exemplary and the present invention is not limited thereto, and any other structure, which can implement the beam, falls within the scope of protection of the present invention.

[0095] On the basis of the structure of the above beams, in order to ensure a firm connection between the components, the first tensioning structure 14 is coupled to the top sheet 11 and the bottom sheet 12 by means of high-frequency welding. Similarly, the second tensioning structure 15 is coupled to the top sheet 11 and the side wall 13 by means of high-frequency welding. The

third tensioning structure 16 is coupled to the bottom sheet 12 and the side wall 13 by means of high-frequency welding.

[0096] In the inflatable bed of the present invention formed of the aforementioned structure, the height where the top sheet 11 thereof is located in the inside part of an upper edge of the second tensioning structure 15 is lower than the height where the top sheet 11 is located in the outside part of the upper edge of the second tensioning structure 15. The height where the bottom sheet 12 is located in the inside part of a lower edge of the third tensioning structure 16 is lower than the height where the bottom sheet 12 is located in the outside part of the lower edge of the third tensioning structure 16.

[0097] Furthermore, the inflatable bed 10 further comprises a built-in air pump 20, and the built-in air pump 20 is arranged on the side wall 13 and is located between a lower edge of the second tensioning structure 15 and an upper edge of the third tensioning structure 16 for inflating said air chamber. Moreover, the inflatable bed 10 further comprises an air valve 30, and the air valve 30 is arranged on the side wall 13 for the inflation and deflation of the inflatable bed 10.

[0098] Embodiment 2:

[0099] Fig. 9 is a sectional view of a second embodiment taken along line A-A in Fig. 4. Fig. 10 is a first exploded view of the second embodiment of the inflatable bed of the present invention. Fig. 11 is a second exploded view of the second embodiment of the inflatable bed of the present invention.

[00100] As shown in Figs. 9-11, the structure of this embodiment is substantially the same as that of the first embodiment, except that the second tensioning structure 15 comprises at least one first Y-beam 151, wherein two outside edges 152 of the first Y-beam 151 are respectively coupled to the side wall 13 adjacent thereto, and the other inside edge 153 is coupled to the top sheet 11. Similarly, the third tensioning structure 16 comprises at least one second Y-beam 161, wherein two outside edges 162 of the second Y-beam 161 are respectively coupled to the side wall 13 adjacent thereto, and the other inside edge 163 is coupled to the bottom sheet 12.

[00101] The second tensioning structure 15 and the third tensioning structure 16 are preferably disposed at an interval in a perpendicular direction. In this embodiment, the second tensioning structure 15 and the third tensioning structure 16 divide the respective side wall 13 into five sections, so that the second tensioning structure 15 is configured to limit the upward and lateral bulging of the top sheet 11 and the side wall 13 after said air chamber is inflated, and the third tensioning structure 16 is configured to limit the respective downward and lateral bulging of the bottom sheet 12 and the side wall 13 after said air chamber is inflated.

[00102] Of course, the second tensioning structure 15 and the third tensioning structure 16 may also divide the respective side wall 13 into a multi-section structure, such as a four- or six-section structure; this embodiment is merely exemplary and the present invention is not limited thereto, and all the structures with four or more sections fall within the scope of protection of the present invention.

[00103] Further, the two outside edges 152 of the at least one first Y-beam 151 are arranged at an interval on an inner surface of the side wall 13 in a perpendicular direction. The two outside edges 162 of the at least one second Y-beam 161 are arranged at an interval on the inner surface of the side wall 13 in a perpendicular direction.

[00104] Furthermore, the at least one first Y-beam 151 as a whole is of a continuous annular structure or a segmental annular structure. The at least one second Y-beam 161 as a whole is of a continuous annular structure or a segmental annular structure. Moreover, the at least one first Y-beam 151 is further provided with air holes 154, and an airflow passage is formed in said air chamber through the air holes 154. The at least one second Y-beam 161 is further provided with air holes 164, and an airflow passage is formed in said air chamber through the air holes 164 (as shown in Figs. 10 and 11).

[00105] Embodiment 3:

[00106] Fig. 12 is a first sectional view of a third embodiment taken along line A-A in Fig. 4. Fig. 13 is a second sectional view of the third embodiment taken along line A-A in Fig. 4. Fig. 14 is a first exploded view of the third embodiment of the inflatable bed of the present invention. Fig. 15 is a second exploded view of the third embodiment of the inflatable bed of the present invention.

[00107] As shown in Figs. 12-15, the structure of this embodiment is substantially the same as that of the first embodiment, except that the second tensioning structure 15 comprises at least one first tubular beam 151, wherein the first tubular beam 151 has at least two outside edges 152 respectively coupled to the side wall 13 adjacent thereto, and at least one inside edge 153 is coupled to the top sheet 11. The third tensioning structure 16 comprises at least one second tubular beam 161, wherein the second tubular beam 161 has at least two outside edges 162 respectively coupled to the side wall 13 adjacent thereto, and at least one inside edge 163 is coupled to the bottom sheet 12. The first tubular beam 151 and the second tubular beam 161 herein may be of various tubular structures, such as a triangular tubular structure, or a quadrilateral tubular structure (as shown in Figs. 13 and 14).

[00108] Beam 151, which are coupled to the wall 13 adjacent thereto, are arranged at an interval on an inner surface of the side wall 13 in a perpendicular direction. The at least two outside edges 162 of the at least one second tubular beam 161, which are coupled to the wall 13 adjacent thereto, are arranged at an interval on an inner surface of the side wall 13 in a perpendicular direction.

[00109] The at least one first tubular beam 151 herein as a whole is of a segmental annular structure. The at least one second tubular beam 161 as a whole is of a segmental annular structure (as shown in Figs. 13 and 14).

[00110] The second tensioning structure 15 and the third tensioning structure 16 are preferably disposed at an interval in a perpendicular direction. In this embodiment, the second tensioning structure 15 and the third tensioning structure 16 divide the respective side wall 13 into five sections, so that the second tensioning structure 15 is configured to limit the upward and lateral bulging of the top sheet 11 and the side wall 13 after said air chamber is inflated, and the third tensioning structure 16 is configured to limit the respective downward and lateral bulging of the bottom sheet 12 and the side wall 13 after said air chamber is inflated.

[00111] Of course, the second tensioning structure 15 and the third tensioning structure 16 may also divide the respective side wall 13 into a multi-section structure, such as a four- or six-section structure; this embodiment is merely exemplary and the present invention is not limited thereto, and all the structures with four or more sections fall within the scope of protection of the present invention.

[00112] Embodiment 4:

[00113] Fig. 16 is a sectional view of a fourth embodiment taken along line A-A in Fig. 4. Fig. 17 is a first exploded view of the fourth embodiment of the inflatable bed of the present invention. Fig. 18 is a second exploded view of the fourth embodiment of the inflatable bed of the present invention.

[00114] As shown in Figs. 16-18, the structure of this embodiment is substantially the same as that of the first embodiment, except that the second tensioning structure 15 comprises at least one first V-beam 151, wherein two outside edges 152 of the first V-beam 151 are respectively coupled to the side wall 13 adjacent thereto, and the other inside edge 153 is coupled to the top sheet 11. The third tensioning structure 16 comprises at least one second V-beam 161, wherein two outside edges 162 of the second V-beam 161 are respectively coupled to the side wall 13 adjacent thereto, and the other inside edge 163 is coupled to the top sheet 11.

[00115] Further, the two outside edges 152 of the at least one first V-beam 151 are arranged at an interval on an inner surface of the side wall 13 in a perpendicular direction. The two outside edges 162 of the at least one second VV-beam 161 are arranged at an interval on the inner surface of the side wall 13 in a perpendicular direction.

[00116] Furthermore, the at least one first V-beam 151 as a whole is of a continuous annular structure or a segmental annular structure. The at least one second V-beam 161 as a whole is of a continuous annular structure or a segmental annular structure. Moreover, the at least one first V-beam 151 is provided with air holes 154, and an airflow passage is formed in said air chamber through the air holes 154. The at least one second V-shaped drawstring V-beam 161 is provided with air holes 164, and an airflow passage is formed in said air chamber through the air holes 164.

[00117] The second tensioning structure 15 and the third tensioning structure 16 are preferably disposed at an interval in a perpendicular direction. In this embodiment, the second tensioning structure 15 and the third tensioning structure 16 divide the respective side wall 13 into five sections, so that the second tensioning structure 15 is configured to limit the upward and lateral bulging of the top sheet 11 and the side wall 13 after said air chamber is inflated, and the third tensioning structure 16 is configured to limit the respective downward and lateral bulging of the bottom sheet 12 and the side wall 13 after said air chamber is inflated.

[00118] Of course, the second tensioning structure 15 and the third tensioning structure 16 may also divide the respective side wall 13 into a multi-section structure, such as a four- or six-section structure; this embodiment is merely exemplary and the present invention is not limited thereto, and all the structures with four or more sections fall within the scope of protection of the present invention.

[00119] Embodiment 5:

[00120] Fig. 19 is a sectional view of a fifth embodiment taken along line A-A in Fig. 4. Fig. 20 is a schematic structural partially sectional view of the fifth embodiment of the inflatable bed of the present invention.

[00121] As shown in Figs. 19 and 20, the structure of this embodiment is substantially the same as that of the first embodiment, except that the first tensioning structure 14 employs a Y-beam, and the upper and lower ends of the first tensioning structure 14 are respectively coupled to the top sheet 11 and the bottom sheet 12. Several beams in the first tensioning structure 14 are arranged spaced apart from each other. The upper end of each beam of the first tensioning structure 14 takes the form of a fork and is coupled to and supports the top sheet 11,

and the lower end takes the form of an I-beam and is downwardly coupled to the bottom sheet 12. After said air chamber is inflated, such a structure can effectively limit the respective upward and downward bulging of the top sheet 11 and the bottom sheet 12.

[00122] Embodiment 6:

[00123] Fig. 21 is a sectional view of a sixth embodiment taken along line A-A in Fig. 4.

[00124] As shown in Fig. 21, the structure of this embodiment is substantially the same as that of the fifth embodiment, except that the first tensioning structure 14 employs an X-shaped drawstring at the upper and lower ends, and the upper and lower ends of the first tensioning structure 14 are respectively coupled to the top sheet 11 and the bottom sheet 12. Several drawstrings in the first tensioning structure 14 are arranged spaced apart from each other. The upper end of each drawstring of the first tensioning structure 14 takes the form of a folk and is upwardly coupled to the top sheet 11, and the lower end also takes the form of a folk and is downwardly coupled to the bottom sheet 12. After said air chamber is inflated, such a structure can limit the respective upward and downward bulging of the top sheet 11 and the bottom sheet 12 more effectively.

[00125] Embodiment 7:

[00126] Fig. 22 is a sectional view of a seventh embodiment taken along line A-A in Fig. 4. Fig. 23 is a schematic structural partially sectional view of the seventh embodiment of the inflatable bed of the present invention. Fig. 24 is a schematic view of the interior structure of the seventh embodiment of the inflatable bed of the present invention.

[00127] As shown in Figs. 22-24, the structure of this embodiment is substantially the same as that of the first embodiment, except that all the drawstrings in the first tensioning structure 14 employ coil beams, and the upper and lower ends of each beam of the first tensioning structure 14 are respectively coupled to the top sheet 11 and the bottom sheet 12. Several beams in the first tensioning structure 14 are arranged spaced apart from each other. After said air chamber is inflated, this structure can effectively limit the respective upward and downward bulging of the top sheet 11 and the bottom sheet 12.

[00128] According to the description of the aforementioned structures, the structural variations in the embodiments may arbitrarily combined, and are not limited to the particular embodiments described above, i.e., the number of beams contained in the second tensioning structure 15 and the number of beams contained in the third tensioning structure 16 are unlimited, which can be adjusted according to actual requirements.

[00129] Similarly, the connection between the beams in the second tensioning structure 15 and the connection between the beams in the third tensioning structure 16 are also not limited to the aforementioned embodiments, as long as the side wall 13 is divided into at least five (or equal to or greater than four) sections, for example, the number of beams in the second tensioning structure 15 and that in the third tensioning structure 16 as well as the connection thereof can be changed so as to divide the side wall 13 into multiple sections such as six or seven sections.

[00130] Of course, the structures of the first tensioning structure 14 can be commonly used in each case, and likewise serve to support the top sheet 11 and the bottom sheet 12, effectively limiting the respective upward and downward bulging of the top sheet 11 and the bottom sheet 12.

[00131] In summary, the inflatable bed of the present invention can limit the outward bulging or deformation of the side wall of the inflatable bed by using various types of tensioning structures. The structure of the inflatable bed of the present invention effectively overcomes the defect of outward bulging and deformation of the side walls of the inflatable beds and inflatable mattresses having a relatively large height in prior art, making their appearance more attractive. The inflatable beds and inflatable mattresses have a good stability, which overcomes the problem of susceptibility of roll-over in the prior art. Furthermore, the inflatable bed of the present invention can also prevent the user from rolling down during use.

[00132] While the particular embodiments of the present invention have been described, a person skilled in the art should understand that these are merely illustrative, and that the scope of protection of the present invention is defined by the appended claims. Various alterations or modifications can be made by a person skilled in the art to these embodiments without departing from the principle and substance of the present invention; however, these alterations and modifications all fall within the scope of protection of the invention.

CLAIMS

What is claimed is:

1. An inflatable bed, comprising:

a top sheet and a bottom sheet disposed vertically at an interval;

at least one side wall, an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges of said support structure being respectively coupled to the side wall adjacent, at least one inside edge of said support structure being coupled to the top sheet or bottom sheet adjacent.

2. The inflatable bed according to claim 1, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent; and

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent.

3. The inflatable bed according to claim 2, wherein said second tensioning structure and said third tensioning structure are respectively provided with a plurality of air holes, through which an airflow passage is formed in said air chamber.

4. The inflatable bed according to claim 2, wherein said second tensioning structure and said third tensioning structure are disposed at an interval in a perpendicular direction.

5. The inflatable bed according to claim 2, wherein said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams are respectively coupled to said side wall and said top sheet adjacent, the at least two first I-beams are disposed at an interval.

6. The inflatable bed according to claim 2, wherein said third tensioning structure comprises at least two second I-beams, an outside edge and an inside edge of each of said second

I-beams are respectively coupled to the side wall and said bottom sheet adjacent, the at least two second I-beams are disposed at an interval.

7. The inflatable bed according to claim 2, wherein said second tensioning structure comprises at least one first Y-beam, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.

8. The inflatable bed according to claim 2, wherein said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

9. The inflatable bed according to claim 2, wherein said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said top sheet.

10. The inflatable bed according to claim 2, wherein said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said bottom sheet.

11. The inflatable bed according to claim 2, wherein said second tensioning structure comprises at least one first V-beam, wherein two outside edges of said first V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.

12. The inflatable bed according to claim 2, wherein said third tensioning structure comprises at least one second V-beam, wherein two outside edges of said second V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

13. The inflatable bed according to claim 5, wherein said at least two first I-beams are spaced apart from each other at a lower surface of said top sheet.

14. The inflatable bed according to claim 6, wherein said at least two second I-beams are spaced apart from each other at an upper surface of said bottom sheet.

15. The inflatable bed according to claim 5, wherein said at least two first I-beams are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

16. The inflatable bed according to claim 6, wherein said at least two second are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

17. The inflatable bed according to claim 7, wherein the two outside edges of said at least one first Y-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

18. The inflatable bed according to claim 8, wherein the two outside edges of said at least one second Y-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

19. The inflatable bed according to claim 9, wherein said at least two outside edges of said at least one first tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

20. The inflatable bed according to claim 10, wherein said at least two outside edges of said at least one second tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

21. The inflatable bed according to claim 11, wherein the two outside edges of said at least one first V-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

22. The inflatable bed according to claim 12, wherein the two outside edges of said at least one second V-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

23. The inflatable bed according to claim 5, wherein said at least two first V-beams as a whole are of a continuous annular structure or a segmental annular structure.

24. The inflatable bed according to claim 6, wherein said at least two second I-beam as a whole are of a continuous annular structure or a segmental annular structure.

25. The inflatable bed according to claim 7, wherein said at least one first Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

26. The inflatable bed according to claim 8, wherein said at least one second Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

27. The inflatable bed according to claim 9, wherein said at least one first tubular beam as a whole is of a segmental annular structure.

28. The inflatable bed according to claim 10, wherein said at least one second tubular beam as a whole is of a segmental annular structure.

29. The inflatable bed according to claim 11, wherein said at least one first V-beam as a whole is of a continuous annular structure or a segmental annular structure.

30. The inflatable bed according to claim 12, wherein said at least one second V-beam as a whole is of a continuous annular structure or a segmental annular structure.

31. The inflatable bed according to claim 1, wherein said first tensioning structure is one or more beams selected from I-beams, coil beams, Y-beams or X-beams.

32. The inflatable bed according to claim 2, wherein said first tensioning structure, said second tensioning structure and said third tensioning structure are all made of thermoplastic plastic sheet.

33. The inflatable bed according to claim 2, wherein one or more of said first tensioning structure, said second tensioning structure and said third tensioning structure at least partially comprise mesh, laminated plastic sheet or a threads.

34. The inflatable bed according to claim 33, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite plastic strips, said mesh and said threads are sandwiched between the two opposite plastic strips.

35. The inflatable bed according to claim 33, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with an U-shaped plastic strip, said mesh and said threads are sandwiched between the U-shaped plastic strip.

36. The inflatable bed according to claim 2, wherein said first tensioning structure is coupled to said top and bottom sheets by means of high-frequency welding; said second tensioning structure is coupled to said top sheet and said side wall by means of high-frequency welding; and said third tensioning structure is coupled to said bottom sheet and said side wall by means of high-frequency welding.

37. The inflatable bed according to claim 2, wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

38. The inflatable bed according to claim 2, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

39. The inflatable bed according to claim 2, wherein said inflatable bed further comprises a built-in air pump, which is disposed on said side wall and is located between a lower edge of said second tensioning structure and an upper edge of said third tensioning structure for inflating said air chamber.

40. The inflatable bed according to claim 1, wherein said inflatable bed further comprises an air valve, which is disposed on said side wall for the inflation and deflation of said inflatable bed.

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Acknowledgement of receipt

We hereby acknowledge receipt of your request for grant of a European patent as follows:

Submission number	4680720
Application number	EP16191360.3
File No. to be used for priority declarations	EP16191360
Date of receipt	29 September 2016
Your reference	27S8343,12EP42
Applicant	BESTWAY INFLATABLES & MATERIAL CORP
Country	CN
Title	INFLATABLE BED
Documents submitted	package-data.xml application-body.xml SPECEPO-1.pdf\TEXT INTENDED FOR PROCEEDING.pdf (37 p.) ep-request.xml ep-request.pdf (4 p.) f1002-1.pdf (1 p.)
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Correction by the EPO of errors in debit instructions filed by eOLF

Errors in debit instructions filed by eOLF that are caused by the editing of Form 1038E entries or the continued use of outdated

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/European Patent Office/

ABSTRACT

An inflatable bed is provided. The inflatable bed comprises a top sheet and a bottom sheet disposed vertically at an interval, at least one side wall, at least one first tensioning structure and at least one support structure. An upper edge of said side wall is coupled to an outer edge of said top sheet. A lower edge of said side wall is coupled to an outer edge of said bottom sheet. An upper end and a lower end of said first tensioning structure are respectively coupled to said top sheet and said bottom sheet. Said support structure is disposed in a longitudinal direction of at least one of said side walls. At least two outside edges of said support structure are respectively coupled to the side wall adjacent. At least one inside edge of said support structure is coupled to the top sheet or bottom sheet adjacent.

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证　明

本证明之附件是向本局提交的下列专利申请文件副本。

申　　请　　号：201610020533.5

申　请　类　型：发明专利

发明 创造 名称：充气床

申　　请　　日：2016 年 01 月 13 日

申　　请　　人：上海荣威塑胶工业有限公司

发明人或设计人：刘峰

局长

申长雨

2016 年 11 月 29 日

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权 利 要 求 书

1、一种充气床，其特征在于，所述充气床包括：

顶片和底片，所述底片与所述顶片上下间隔布置；

至少一侧壁，所述侧壁的上边缘与所述顶片的外边缘连接，所述侧壁的下边缘与所述底片的外边缘连接，所述顶片、所述底片和所述侧壁之间形成一个气室；

至少一第一拉带结构，所述第一拉带结构设置在所述气室内，且所述第一拉带结构的上下两端分别与所述顶片和所述底片连接；以及

至少一支撑结构，设置在所述气室内，所述支撑结构沿至少一所述侧壁的长度方向设置，所述支撑结构中至少两个外侧边缘分别与相邻的所述侧壁连接，所述支撑结构中至少一个内侧边缘与相邻的所述顶片或所述底片连接。

2、如权利要求 1 所述的充气床，其特征在于，所述支撑结构包括第二拉带结构和第三拉带结构，所述第二拉带结构中至少两个外侧边缘与相邻的所述侧壁连接，所述第二拉带结构中至少一个内侧边缘与相邻的所述顶片连接；以及

所述第三拉带结构中至少两个外侧边缘与相邻的所述侧壁连接，所述第三拉带结构中至少一个内侧边缘与相邻的所述底片连接。

3、如权利要求 2 所述的充气床，其特征在于，所述第二拉带结构和所述第三拉带结构上分别设有多个气孔，所述气室通过所述气孔形成空气流通。

4、如权利要求 2 所述的充气床，其特征在于，所述第二拉带结构和所述第三拉带结构在垂直方向间隔布置。

5、如权利要求 2 所述的充气床，其特征在于，所述第二拉带结构包括至少两个第一 I 型拉带，每一所述第一 I 型拉带的外侧边缘和内侧边缘分别与相邻的所述侧壁和所述顶片连接，且至少两个所述第一 I 型拉带间隔布置。

6、如权利要求 2 所述的充气床，其特征在于，所述第三拉带结构包括至少

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两个第二 I 型拉带，每一所述第二 I 型拉带的外侧边缘和内侧边缘分别与相邻的所述侧壁和所述底片连接，且至少两个所述第二 I 型拉带间隔布置。

7、如权利要求 2 所述的充气床，其特征在于，所述第二拉带结构包括至少一个第一 Y 型拉带，其中，所述第一 Y 型拉带的两个外侧边缘分别与相邻的所述侧壁连接，一内侧边缘与所述顶片连接。

8、如权利要求 2 所述的充气床，其特征在于，所述第三拉带结构包括至少一个第二 Y 型拉带，其中，所述第二 Y 型拉带的两个外侧边缘分别与相邻的所述侧壁连接，一内侧边缘与所述底片连接。

9、如权利要求 2 所述的充气床，其特征在于，所述第二拉带结构包括至少一个第一管型拉带，所述第一管型拉带上具有至少两个外侧边缘分别与相邻的所述侧壁连接，且至少一内侧边缘与所述顶片连接。

10、如权利要求 2 所述的充气床，其特征在于，所述第三拉带结构包括至少一个第二管型拉带，所述第二管型拉带上具有至少两个外侧边缘分别与相邻的所述侧壁连接，且至少一内侧边缘与所述底片连接。

11、如权利要求 2 所述的充气床，其特征在于，所述第二拉带结构包括至少一个第一 V 型拉带，其中，所述第一 V 型拉带的两个外侧边缘分别与相邻的所述侧壁连接，且一内侧边缘与所述顶片连接。

12、如权利要求 2 所述的充气床，其特征在于，所述第三拉带结构包括至少一个第二 V 型拉带，其中，所述第二 V 型拉带的两个外侧边缘分别与相邻的所述侧壁连接，且一内侧边缘与所述底片连接。

13、如权利要求 5 所述的充气床，其特征在于，所述至少两个第一 I 型拉带相互间隔地排布于所述顶片的下表面。

14、如权利要求 6 所述的充气床，其特征在于，所述至少两个第二 I 型拉

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带相互间隔地排布于所述底片的上表面。

15、如权利要求 5 所述的充气床，其特征在于，所述至少两个第一 I 型拉带在所述侧壁的内表面上沿垂直方向间隔排布。

16、如权利要求 6 所述的充气床，其特征在于，所述至少两个第二 I 型拉带在所述侧壁的内表面上沿垂直方向间隔排布。

17、如权利要求 7 所述的充气床，其特征在于，所述至少一个第一 Y 型拉带的两个外侧边缘在所述侧壁的内表面上沿垂直方向间隔排布。

18、如权利要求 8 所述的充气床，其特征在于，所述至少一个第二 Y 型拉带的两个外侧边缘在所述侧壁的内表面上沿垂直方向间隔排布。

19、如权利要求 9 所述的充气床，其特征在于，所述至少一个第一管型拉带与相邻的所述侧壁连接的所述至少两个外侧边缘在所述侧壁的内表面上沿垂直方向间隔排布。

20、如权利要求 10 所述的充气床，其特征在于，所述至少一个第二管型拉带与相邻的所述侧壁连接的所述至少两个外侧边缘在所述侧壁的内表面上沿垂直方向间隔排布。

21、如权利要求 11 所述的充气床，其特征在于，所述至少一个第一 V 型拉带的两个外侧边缘在所述侧壁的内表面上沿垂直方向间隔排布。

22、如权利要求 12 所述的充气床，其特征在于，所述至少一个第二 V 型拉带的两个外侧边缘在所述侧壁的内表面上沿垂直方向间隔排布。

23、如权利要求 5 所述的充气床，其特征在于，所述至少两个第一 I 型拉带整体为一个闭合的环形结构或一个间断的环形结构。

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24、如权利要求 6 所述的充气床，其特征在于，所述至少两个第二 I 型拉带整体为一个闭合的环形结构或一个间断的环形结构。

25、如权利要求 7 所述的充气床，其特征在于，所述至少一个第一 Y 型拉带整体为一个闭合的环形结构或一个间断的环形结构。

26、如权利要求 8 所述的充气床，其特征在于，所述至少一个第二 Y 型拉带整体为一个闭合的环形结构或一个间断的环形结构。

27、如权利要求 9 所述的充气床，其特征在于，所述至少一个第一管型拉带整体为一个间断的环形结构。

28、如权利要求 10 所述的充气床，其特征在于，所述至少一个第二管型拉带整体为一个间断的环形结构。

29、如权利要求 11 所述的充气床，其特征在于，所述至少一个第一 V 型拉带整体为一个闭合的环形结构或一个间断的环形结构。

30、如权利要求 12 所述的充气床，其特征在于，所述至少一个第二 V 型拉带整体为一个闭合的环形结构或一个间断的环形结构。

31、如权利要求 1 所述的充气床，其特征在于，所述第一拉带结构为直拉带、圆孔拉带、Y 型拉带或 X 型拉带其中一种拉带或多种拉带。

32、如权利要求 2 所述的充气床，其特征在于，所述第一拉带结构、所述第二拉带结构及所述第三拉带结构均采用热塑性塑胶布制成。

33、如权利要求 2 所述的充气床，其特征在于，所述第一拉带结构、所述第二拉带结构及所述第三拉带结构中的一个或多个至少部分地包括网布、夹网布或者线体。

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34、如权利要求 33 所述的充气床，其特征在于，所述网布或者所述线体至少部分两侧表面分别与两片相对的胶布片条连接为一体，所述网布和所述线体夹设于两片相对的胶布条之间。

35、如权利要求 33 所述的充气床，其特征在于，所述网布、或者所述线体至少部分两侧表面与 U 型胶布片条连接为一体，所述网布和所述线体夹设于所述 U 型胶布条中间。

36、如权利要求 2 所述的充气床，其特征在于，所述第一拉带结构通过高频焊接的方式与所述顶片和所述底片连接；所述第二拉带结构通过高频焊接的方式与所述顶片和所述侧壁连接；所述第三拉带结构通过高频焊接的方式与所述底片和所述侧壁连接。

37、如权利要求 2 所述的充气床，其特征在于，所述顶片位于所述第二拉带结构的上边缘内侧部分的高度低于所述顶片位于所述第二拉带结构的上边缘外侧部分的高度。

38、如权利要求 2 所述的充气床，其特征在于，所述底片位于所述第三拉带结构的下边缘内侧部分的高度低于所述底片位于所述第三拉带结构的下边缘外侧部分的高度。

39、如权利要求 2 所述的充气床，其特征在于，所述充气床还包括内置气泵，所述内置气泵设置在所述侧壁上，且位于所述第二拉带结构的下边缘和所述第三拉带结构的上边缘之间，用以供所述气室充气。

40、如权利要求 1 所述的充气床，其特征在于，所述充气床还包括气阀，所述气阀设置在所述侧壁上，用于所述充气床的充气或放气。

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说　　明　　书

充气床

技术领域

本发明涉及充气床或充气床垫领域，特别涉及一种充气床，其结构设置为可限制侧壁向外膨胀或变形。

背景技术

目前，充气床和充气床垫已经非常流行。充气床和充气床垫具有重量轻、便于携带和收藏等优点，因而被广泛应用于各种不同的场合。例如，在家庭充气床和充气床垫通常可以作为临时的床，供来访的客人使用。另外还非常适合在户外野营时使用。

在现有技术中，充气床和充气床垫一般由 PVC 胶布、PU 胶布等制成，且具有许多不同的结构，其中比较典型的机构是由顶片、底片，以及与顶片和底片相连接的侧壁构成可充气的气室。在气室内部设有连接顶片和底片且间隔排列的拉带，以构成具有一定高度且上表面大致平坦的可供人躺在上面的形状。

在现有的充气床和充气床垫中，有的具有较高的高度，充气床和充气床垫充气后的侧壁容易膨胀和变形，影响到充气床和充气床垫外观的美观，充气床和充气床垫的膨胀和变形也会造成气室内的气压衰减，使得充气床和充气床垫偏软降低了充气床和充气床垫的舒适性。

因此，为了解决上述侧壁膨胀的问题，有的充气床和充气床垫在顶片和底片之间设置了中层片，并将中层片与侧壁连接。这种结构的充气床和充气床垫虽然使侧壁膨胀和变形的问题略有改善，但仍然没有达到理想的效果。而且由于顶片与中层片之间，以及中层片与底片之间都需要设置连接拉带，使得充气床和充气床垫的制造过程更加复杂，即所需胶布也更多。

另外，在现有技术中，高度较高的充气床和充气床垫存在稳定性方面的缺陷。当用户躺在或者坐在靠近充气床和充气床垫的边缘处时，充气床和充气床垫容易发生侧翻。为了改善其稳定性，美国专利 US 6671910 在充气床底片的外围设置了充气的稳定管。然而，这种结构不仅会影响充气床的外观美观，也给用户带来了使用的不便。

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发明内容

本发明要解决的技术问题是为了克服现有技术中充气床和充气床垫的侧壁容易膨胀、变形以及充气床和充气床垫稳定性差，容易侧翻的缺陷，提供一种充气床。

本发明是通过下述技术方案来解决上述技术问题的：一种充气床，其特点在于，所述充气床包括： 顶片和底片，所述底片与所述顶片上下间隔布置；

至少一侧壁，所述侧壁的上边缘与所述顶片的外边缘连接，所述侧壁的下边缘与所述底片的外边缘连接，所述顶片、所述底片和所述侧壁之间形成一个气室；

至少一第一拉带结构，所述第一拉带结构设置在所述气室内，且所述第一拉带结构的上下两端分别与所述顶片和所述底片连接；以及

至少一支撑结构，设置在所述气室内，所述支撑结构沿至少一所述侧壁的长度方向设置，所述支撑结构中至少两个外侧边缘分别与相邻的所述侧壁连接，所述支撑结构中至少一个内侧边缘与相邻的所述顶片或所述底片连接。

较佳地，所述支撑结构包括第二拉带结构和第三拉带结构，所述第二拉带结构中至少两个外侧边缘与相邻的所述侧壁连接，所述第二拉带结构中至少一个内侧边缘与相邻的所述顶片连接；以及

所述第三拉带结构中至少两个外侧边缘与相邻的所述侧壁连接，所述第三拉带结构中至少一个内侧边缘与相邻的所述底片连接。

较佳地，所述第二拉带结构和所述第三拉带结构上分别设有多个气孔，所述气室通过所述气孔形成空气流通。

较佳地，所述第二拉带结构和所述第三拉带结构在垂直方向间隔布置。

较佳地，所述第二拉带结构包括至少两个第一 I 型拉带，每一所述第一 I 型拉带的外侧边缘和内侧边缘分别与相邻的所述侧壁和所述顶片连接，且至少两个所述第一 I 型拉带间隔布置。

较佳地，所述第三拉带结构包括至少两个第二 I 型拉带，每一所述第二 I 型拉带的外侧边缘和内侧边缘分别与相邻的所述侧壁和所述底片连接，且至少两个所述第二 I 型拉带间隔布置。

较佳地，所述第二拉带结构包括至少一个第一 Y 型拉带，其中，所述第一 Y 型拉带的两个外侧边缘分别与相邻的所述侧壁连接，一内侧边缘与所述顶片

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连接。

较佳地，所述第三拉带结构包括至少一个第二 Y 型拉带，其中，所述第二 Y 型拉带的两个外侧边缘分别与相邻的所述侧壁连接，一内侧边缘与所述底片连接。

较佳地，所述第二拉带结构包括至少一个第一管型拉带，所述第一管型拉带上具有至少两个外侧边缘分别与相邻的所述侧壁连接，且至少一内侧边缘与所述顶片连接。

较佳地，所述第三拉带结构包括至少一个第二管型拉带，所述第二管型拉带上具有至少两个外侧边缘分别与相邻的所述侧壁连接，且至少一内侧边缘与所述底片连接。

较佳地，所述第二拉带结构包括至少一个第一 V 型拉带，其中，所述第一 V 型拉带的两个外侧边缘分别与相邻的所述侧壁连接，且一内侧边缘与所述顶片连接。

较佳地，所述第三拉带结构包括至少一个第二 V 型拉带，其中，所述第二 V 型拉带的两个外侧边缘分别与相邻的所述侧壁连接，且一内侧边缘与所述底片连接。

较佳地，所述至少两个第一 I 型拉带相互间隔地排布于所述顶片的下表面。

较佳地，所述至少两个第二 I 型拉带相互间隔地排布于所述底片的上表面。

较佳地，所述至少两个第一 I 型拉带在所述侧壁的内表面上沿垂直方向间隔排布。

较佳地，所述至少两个第二 I 型拉带在所述侧壁的内表面上沿垂直方向间隔排布。

较佳地，所述至少一个第一 Y 型拉带的两个外侧边缘在所述侧壁的内表面上沿垂直方向间隔排布。

较佳地，所述至少一个第二 Y 型拉带的两个外侧边缘在所述侧壁的内表面上沿垂直方向间隔排布。

较佳地，所述至少一个第一管型拉带与相邻的所述侧壁连接的所述至少两个外侧边缘在所述侧壁的内表面上沿垂直方向间隔排布。

较佳地，所述至少一个第二管型拉带与相邻的所述侧壁连接的所述至少两个外侧边缘在所述侧壁的内表面上沿垂直方向间隔排布。

较佳地，所述至少一个第一 V 型拉带的两个外侧边缘在所述侧壁的内表面

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上沿垂直方向间隔排布。

较佳地，所述至少一个第二 V 型拉带的两个外侧边缘在所述侧壁的内表面上沿垂直方向间隔排布。

较佳地，所述至少两个第一 I 型拉带整体为一个闭合的环形结构或一个间断的环形结构。

较佳地，所述至少两个第二 I 型拉带整体为一个闭合的环形结构或一个间断的环形结构。

较佳地，所述至少一个第一 Y 型拉带整体为一个闭合的环形结构或一个间断的环形结构。

较佳地，所述至少一个第二 Y 型拉带整体为一个闭合的环形结构或一个间断的环形结构。

较佳地，所述至少一个第一管型拉带整体为一个间断的环形结构。

较佳地，所述至少一个第二管型拉带整体为一个间断的环形结构。

较佳地，所述至少一个第一 V 型拉带整体为一个闭合的环形结构或一个间断的环形结构。

较佳地，所述至少一个第二 V 型拉带整体为一个闭合的环形结构或一个间断的环形结构。

较佳地，所述第一拉带结构为直拉带、圆孔拉带、Y 型拉带或 X 型拉带其中一种拉带或多种拉带。

较佳地，所述第一拉带结构、所述第二拉带结构及所述第三拉带结构均采用热塑性塑胶布制成。

较佳地，所述第一拉带结构、所述第二拉带结构及所述第三拉带结构中的一个或多个至少部分地包括网布、夹网布或者线体。

较佳地，所述网布或者所述线体至少部分两侧表面分别与两片相对的胶布片条连接为一体，所述网布和所述线体夹设于两片相对的胶布条之间。

较佳地，所述网布、或者所述线体至少部分两侧表面与 U 型胶布片条连接为一体，所述网布和所述线体夹设于所述 U 型胶布条中间。

较佳地，所述第一拉带结构通过高频焊接的方式与所述顶片和所述底片连接；所述第二拉带结构通过高频焊接的方式与所述顶片和所述侧壁连接；所述第三拉带结构通过高频焊接的方式与所述底片和所述侧壁连接。

较佳地，所述顶片位于所述第二拉带结构的上边缘内侧部分的高度低于所

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述顶片位于所述第二拉带结构的上边缘外侧部分的高度。

较佳地，所述底片位于所述第三拉带结构的下边缘内侧部分的高度低于所述底片位于所述第三拉带结构的下边缘外侧部分的高度。

较佳地，所述充气床还包括内置气泵，所述内置气泵设置在所述侧壁上，且位于所述第二拉带结构的下边缘和所述第三拉带结构的上边缘之间，用以供所述气室充气。

较佳地，所述充气床还包括气阀，所述气阀设置在所述侧壁上，用于所述充气床的充气或放气。

本发明的积极进步效果在于：

本发明充气床克服了现有技术中具有较高高度的充气床和充气床垫侧壁向外膨胀变形的缺陷，外观更加美观。其具有很好的稳定性，克服了现有技术的充气床和充气床垫容易侧翻的问题。此外，本发明充气床还可以防止用户在使用过程中滚落。

附图说明

本发明上述的以及其他的特征、性质和优势将通过下面结合附图和实施例的描述而变的更加明显，在附图中相同的附图标记始终表示相同的特征，其中：

图 1 为本发明充气床的立体图。

图 2 为本发明充气床的主视图。

图 3 为本发明充气床的右视图。

图 4 为本发明充气床的俯视图。

图 5 为图 4 中沿 A-A 线剖开的实施例一的剖视图。

图 6 为本发明充气床的实施例一的局部解剖结构示意图。

图 7 为本发明充气床的实施例一的爆炸图一。

图 8 为本发明充气床的实施例一的爆炸图二。

图 9 为图 4 中沿 A-A 线剖开的实施例二的剖视图。

图 10 为本发明充气床的实施例二的爆炸图一。

图 11 为本发明充气床的实施例二的爆炸图二。

图 12 为图 4 中沿 A-A 线剖开的实施例三的剖视图一。

图 13 为图 4 中沿 A-A 线剖开的实施例三的剖视图二。

图 14 为本发明充气床的实施例三的爆炸图一。

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图 15 为本发明充气床的实施例三的爆炸图二。

图 16 为图 4 中沿 A-A 线剖开的实施例四的剖视图。

图 17 为本发明充气床的实施例四的爆炸图一。

图 18 为本发明充气床的实施例四的爆炸图二。

图 19 为图 4 中沿 A-A 线剖开的实施例五的剖视图。

图 20 为本发明充气床的实施例五的局部解剖结构示意图。

图 21 为图 4 中沿 A-A 线剖开的实施例六的剖视图。

图 22 为图 4 中沿 A-A 线剖开的实施例七的剖视图。

图 23 为本发明充气床的实施例七的局部解剖结构示意图。

图 24 为本发明充气床的实施例七的内部结构示意图。

具体实施方式

为让本发明的上述目的、特征和优点能更明显易懂，以下结合附图对本发明的具体实施方式作详细说明。

在下面的描述中阐述了很多具体细节以便于充分理解本发明，但是本发明还可以采用其它不同于在此描述的其它方式来实施，因此本发明不受下面公开的具体实施例的限制。

实施例一：

图 1 为本发明充气床的立体图。图 2 为本发明充气床的主视图。图 3 为本发明充气床的右视图。图 4 为本发明充气床的俯视图。图 5 为图 4 中沿 A-A 线剖开的实施例一的剖视图。图 6 为本发明充气床的实施例一的局部解剖结构示意图。图 7 为本发明充气床的实施例一的爆炸图。

如图 1 至图 7 所示，本发明的实施例一中公开了一种充气床 10，其包括顶片 11、底片 12、至少一侧壁 13、至少一第一拉带结构 14 及至少一支撑结构。其中，底片 12 与顶片 11 上下间隔布置，侧壁 13 的上边缘与顶片 11 的外边缘连接，侧壁 13 的下边缘与底片 12 的外边缘连接，顶片 11、底片 12 和侧壁 13 之间形成一个气室。同时将第一拉带结构 14 设置在所述气室内，且第一拉带结构 14 的上下两端分别与顶片 11 和底片 12 连接。其作用在于，当所述气室充气后，通过第一拉带结构 14 来限制顶片 11 和底片 12 分别向上和向下膨胀。特别地，顶片 11 和底片 12 均可以设置为双层结构，所述双层结构可以通过至少两个两片相互焊接以形成不同的图案。或者进一步地，在所述双层结构中还

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夹设有海绵的结构。

此处的所述支撑结构设置在所述气室内，所述支撑结构沿至少一侧壁 13 的长度方向设置，所述支撑结构中至少两个外侧边缘分别与相邻的侧壁 13 连接，所述支撑结构中至少一个内侧边缘与相邻的顶片 11 或底片 12 连接。

优选地，所述支撑结构包括第二拉带结构 15 和第三拉带结构 16。其中，第二拉带结构 15 中至少两个外侧边缘与相邻的侧壁 13 连接，第二拉带结构中至少一个内侧边缘与相邻的顶片 11 连接。第二拉带结构 15 设置为当所述气室充气后限制顶片 11 和侧壁 13 向上和侧向膨胀。

同时，第三拉带结构 16 中至少两个外侧边缘与相邻的侧壁 13 连接，第三拉带结构 16 中至少一个内侧边缘与相邻的底片 12 连接。第三拉带结构 16 设置为当所述气室充气后分别限制底片 12 和侧壁 13 向下和侧向膨胀。

在本实施例中，第二拉带结构 15 包括至少两个第一 I 型拉带 151，每一第一 I 型拉带 151 的一个外侧边缘 152 与相邻的侧壁 13 连接，另一个内侧边缘 153 与相邻的顶片 11 连接，且至少两个第一 I 型拉带 151 间隔布置。第三拉带结构 16 包括至少两个第二 I 型拉带 161，每一第二 I 型拉带 161 的一个外侧边缘 162 与相邻的侧壁 13 连接，另一个内侧边缘 163 与相邻的底片 12 连接，且至少两个第二 I 型拉带 151 间隔布置。本实施例中第一 I 型拉带 151 和第二 I 型拉带 161 均以两个为例，但其数量并不受本实施例限制，其可以采用多于两个的数量，均属于本发明的保护范围内。

第二拉带结构 15 和第三拉带结构 16 优选地设置为在垂直方向间隔布置。例如本实施例中第二拉带结构 15 和第三拉带结构 16 将对应的侧壁 13 分隔成五段式，从而使第二拉带结构 15 设置为当所述气室充气后，限制顶片 11 和侧壁 13 向上和侧向膨胀，使第三拉带结构 16 设置为当所述气室充气后，分别限制底片 12 和侧壁 13 向下和侧向膨胀。

当然，第二拉带结构 15 和第三拉带结构 16 也可以将对应的侧壁 13 分割成四段式、六段式等多段式结构，本实施例仅为举例，并不局限于此，其他大于等于四段式的结构都属于本发明的保护范围内。

进一步地，至少两个第一 I 型拉带 151 相互间隔地排布于顶片 11 的下表面，且至少两个第二 I 型拉带 161 相互间隔地排布于底片 12 的上表面。至少两个第一 I 型拉带 151 在侧壁 13 的内表面上沿垂直方向间隔排布。至少两个第二 I 型拉带 161 在侧壁 13 的内表面上沿垂直方向间隔排布。

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此处，至少两个第一 I 型拉带 151 整体为一个闭合的环形结构或一个间断的环形结构。至少两个第二 I 型拉带 161 整体为一个闭合的环形结构或一个间断的环形结构。同时，在至少两个第一 I 型拉带 151 上设有气孔 154，使所述气室通过气孔 154 形成空气流通。至少两个第二 I 型拉带 161 设有气孔 164，使所述气室通过气孔 164 形成空气流通（如图 7 和图 8 所示）。

本发明中的第一拉带结构 14 可以采用直拉带、圆孔拉带、Y 型拉带或 X 型拉带其中一种拉带或多种拉带。同时，第一拉带结构 14、第二拉带结构 15 及第三拉带结构 16 均可以采用热塑性塑胶布制成，且第一拉带结构 14、第二拉带结构 15 及第三拉带结构 16 中的一个或多个至少部分地包括网布、夹网布或者线体。

其结构形式可以采用多种方式。例如，所述网布或者所述线体至少部分两侧表面分别与两片相对的胶布片条连接为一体，所述网布和所述线体夹设于两片相对的胶布条之间。

再例如，所述网布、或者所述线体至少部分两侧表面与 U 型胶布片条连接为一体，所述网布和所述线体夹设于所述 U 型胶布条中间。这些连接结构都可以有效地制成本发明充气床所需的拉带，这里仅为举例，但不局限于本实施例中的方案，其他可实现拉带形式的结构均在本发明的保护范围内。

在上述拉带的结构基础上，为了保证各个部件之间的牢固连接，第一拉带结构 14 通过高频焊接的方式连接在顶片 11 和底片 12 之间。同理，第二拉带结构 15 也通过高频焊接的方式连接在顶片 11 和侧壁 13 之间。第三拉带结构 16 通过高频焊接的方式连接在底片 12 和侧壁 13 之间。

通过上述结构形成的本发明充气床，其顶片 11 位于第二拉带结构 15 的上边缘内侧部分的高度低于顶片 11 位于第二拉带结构 15 的上边缘外侧部分的高度。底片 12 位于第三拉带结构 16 的下边缘内侧部分的高度低于底片 12 位于第三拉带结构 16 的下边缘外侧部分的高度。

此外，在充气床 10 上还包括内置气泵 20，将内置气泵 20 设置在侧壁 13 上，且位于第二拉带结构 15 的下边缘和第三拉带结构 16 的上边缘之间，用以供所述气室充气。同时，在充气床 10 上还设置有气阀 30，将气阀 30 设置在侧壁 13 上，用以供充气床 10 的充气或放气。

实施例二：

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图 9 为图 4 中沿 A-A 线剖开的实施例二的剖视图。图 10 为本发明充气床的实施例二的爆炸图一。图 11 为本发明充气床的实施例二的爆炸图二。

如图 9 至图 11 所示，本实施例的结构与实施例一基本相同，其不同之处在于：第二拉带结构 15 包括至少一个第一 Y 型拉带 151，其中第一 Y 型拉带 151 的两个外侧边缘 152 分别与相邻的侧壁 13 连接，另一个内侧边缘 153 与顶片 11 连接。同理，第三拉带结构 16 包括至少一个第二 Y 型拉带 161，其中第二 Y 型拉带 161 的两个外侧边缘 162 分别与相邻的侧壁 13 连接，另一个内侧边缘 163 与底片 12 连接。

第二拉带结构 15 和第三拉带结构 16 优选地设置为在垂直方向间隔布置。本实施例中的第二拉带结构 15 和第三拉带结构 16 将对应的侧壁 13 分隔成五段式，从而将第二拉带结构 15 设置为当所述气室充气后，限制顶片 11 和侧壁 13 向上和侧向膨胀，将第三拉带结构 16 设置为当所述气室充气后，分别限制底片 12 和侧壁 13 向下和侧向膨胀。

当然，第二拉带结构 15 和第三拉带结构 16 也可以将对应的侧壁 13 分割成四段式、六段式等多段式结构，本实施例仅为举例，并不局限于此，其他大于等于四段式的结构都属于本发明的保护范围内。

进一步地，至少一个第一 Y 型拉带 151 的两个外侧边缘 152 在侧壁 13 的内表面上沿垂直方向间隔排布。至少一个第二 Y 型拉带 161 的两个外侧边缘 162 在侧壁 13 的内表面上沿垂直方向间隔排布。

此处，至少一个第一 Y 型拉带 151 整体为一个闭合的环形结构或一个间断的环形结构。至少一个第二 Y 型拉带 161 整体为一个闭合的环形结构或一个间断的环形结构。同时，至少一个第一 Y 型拉带 151 上还设有气孔 154，使所述气室通过气孔 154 形成空气流通。至少一个第二 Y 型拉带 161 上还设有气孔 164，使所述气室通过气孔 164 形成空气流通（如图 10 和图 11 所示）。

实施例三：

图 12 为图 4 中沿 A-A 线剖开的实施例三的剖视图一。图 13 为图 4 中沿 A-A 线剖开的实施例三的剖视图二。图 14 为本发明充气床的实施例三的爆炸图一。图 15 为本发明充气床的实施例三的爆炸图二。

如图 12 至图 15 所示，本实施例的结构与实施例一基本相同，其不同之处在于：第二拉带结构 15 包括至少一个第一管型拉带 151，其中第一管型拉带

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151 上具有至少两个外侧边缘 152 分别与相邻的侧壁 13 连接，且至少另一个内侧边缘 153 与顶片 11 连接。第三拉带结构 16 包括至少一个第二管型拉带 161，第二管型拉带 161 上具有至少两个外侧边缘 162 分别与相邻的侧壁 13 连接，且至少另一个内侧边缘 163 与底片 12 连接。此处的第一管型拉带 151 和第二管型拉带 161 可以采用多种管型结构，例如呈三角形的管型结构，呈四边形的管型结构（如图 13 和图 14 所示）。

进一步地，至少一个第一管型拉带 151 与相邻的侧壁 13 连接的至少两个外侧边缘 152 在侧壁 13 的内表面上沿垂直方向间隔排布。至少一个第二管型拉带 161 与相邻的侧壁 13 连接的至少两个外侧边缘 162 在侧壁 13 的内表面上沿垂直方向间隔排布。

此处，至少一个第一管型拉带 151 整体为一个间断的环形结构。至少一个第二管型拉带 161 整体为一个间断的环形结构（如图 13 和图 14 所示）。

第二拉带结构 15 和第三拉带结构 16 优选地设置为在垂直方向间隔布置。本实施例中的第二拉带结构 15 和第三拉带结构 16 将对应的侧壁 13 分隔成五段式，从而将第二拉带结构 15 设置为当所述气室充气后，限制顶片 11 和侧壁 13 向上和侧向膨胀，将第三拉带结构 16 设置为当所述气室充气后，分别限制底片 12 和侧壁 13 向下和侧向膨胀。

当然，第二拉带结构 15 和第三拉带结构 16 也可以将对应的侧壁 13 分割成四段式、六段式等多段式结构，本实施例仅为举例，并不局限于此，其他大于等于四段式的结构都属于本发明的保护范围内。

实施例四：

图 16 为图 4 中沿 A-A 线剖开的实施例四的剖视图。图 17 为本发明充气床的实施例四的爆炸图一。图 18 为本发明充气床的实施例四的爆炸图二。

如图 16 至图 18 所示，本实施例的结构与实施例一基本相同，其不同之处在于：第二拉带结构 15 包括至少一个第一 V 型拉带 151，其中第一 V 型拉带 151 的两个外侧边缘 152 分别与相邻的侧壁 13 连接，且另一内侧边缘 153 与顶片 11 连接。第三拉带结构 16 包括至少一个第二 V 型拉带 161，其中第二 V 型拉带 161 的两个外侧边缘 162 分别与相邻的侧壁 13 连接，且另一内侧边缘 163 与顶片 11 连接。

进一步地，至少一个第一 V 型拉带 151 的两个外侧边缘 152 在侧壁 13 的

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内表面上沿垂直方向间隔排布。至少一个第二V型拉带161的两个外侧边缘162在侧壁13的内表面上沿垂直方向间隔排布。

此处，至少一个第一V型拉带151整体为一个闭合的环形结构或一个间断的环形结构。至少一个第二V型拉带161整体为一个闭合的环形结构或一个间断的环形结构。同时，至少一个第一V型拉带151上设有气孔154，使所述气室通过气孔154形成空气流通。至少一个第二V型拉带161上设有气孔164，使所述气室通过气孔164形成空气流通。

第二拉带结构15和第三拉带结构16优选地设置为在垂直方向间隔布置。本实施例中的第二拉带结构15和第三拉带结构16将对应的侧壁13分隔成五段式，从而将第二拉带结构15设置为当所述气室充气后，限制顶片11和侧壁13向上和侧向膨胀，将第三拉带结构16设置为当所述气室充气后，分别限制底片12和侧壁13向下和侧向膨胀。

当然，第二拉带结构15和第三拉带结构16也可以将对应的侧壁13分割成四段式、六段式等多段式结构，本实施例仅为举例，并不局限于此，其他大于等于四段式的结构都属于本发明的保护范围内。

实施例五：

图19为图4中沿A-A线剖开的实施例五的剖视图。图20为本发明充气床的实施例五的局部解剖结构示意图。

如图19和图20所示，本实施例的结构与实施例一基本相同，其不同之处在于：第一拉带结构14采用Y型拉带，且第一拉带结构14的上下两端分别与顶片11和底片12连接。第一拉带结构14中若干拉带之间相互间隔排布。第一拉带结构14中每一个拉带的上端呈分叉型，连接支撑顶片11，下端为直拉带型，向下连接底片12。当所述气室充气后，这种结构可以更有效地限制顶片11和底片12分别向上和向下膨胀。

实施例六：

图21为图4中沿A-A线剖开的实施例六的剖视图。

如图21所示，本实施例的结构与实施例五基本相同，其不同之处在于：第一拉带结构14采用上下两端都呈X型的拉带，并且第一拉带结构14的上下两端分别与顶片11和底片12连接。第一拉带结构14中若干拉带之间相互间隔

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排布。第一拉带结构 14 中每一个拉带的上端呈分叉型，向上连接顶片 11，下端同样也呈分叉型，向下连接底片 12。当所述气室充气后，这种结构可以更有效地限制顶片 11 和底片 12 分别向上和向下膨胀。

实施例七：

图 22 为图 4 中沿 A-A 线剖开的实施例七的剖视图。图 23 为本发明充气床的实施例七的局部解剖结构示意图。图 24 为本发明充气床的实施例七的内部结构示意图。

如图 22 至图 24 所示，本实施例的结构与实施例一基本相同，其不同之处在于：第一拉带结构 14 中的若干拉带均采用圆孔拉带，且第一拉带结构 14 中每一个拉带的上下两端分别与顶片 11 和底片 12 连接。第一拉带结构 14 中若干拉带之间相互间隔排布。当所述气室充气后，其可以有效地限制顶片 11 和底片 12 分别向上和向下膨胀。

根据上述结构描述，上述各实施例之间的结构变化可以任意组合，并不受上述具体实施例的限制，即有关第二拉带结构 15 包含拉带的数量和第三拉带结构 16 包含拉带的数量不受限制，根据实际需求进行调整。

同理，第二拉带结构 15 中若干拉带之间的连接方式，以及第三拉条结构 16 中若干拉带之间的连接方式也不受上述实施例的局限，只要将侧壁 13 分隔成至少五段式（或大于等于四段）的形式即可，例如可以通过改变第二拉带结构 15 和第三拉条结构 16 中包含拉带的数量及连接方式将侧壁 13 分隔成六段、七段等多段形式。

当然，有关第一拉带结构 14 的结构形式可以在各种情况下通用，同样起到支撑顶片 11 和底片 12 的作用，有效限制顶片 11 和底片 12 分别向上和向下膨胀。

综上所述，本发明充气床通过采用各种类型的拉带结构，可以限制充气床的侧壁向外膨胀或变形。本发明充气床的结构有效地克服了现有技术中具有较高高度的充气床和充气床垫侧壁向外膨胀变形的缺陷，外观更加美观。其具有很好的稳定性，克服了现有技术的充气床和充气床垫容易侧翻的问题。此外，本发明充气床还可以防止用户在使用过程中滚落。

虽然以上描述了本发明的具体实施方式，但是本领域的技术人员应当理解，这些仅是举例说明，本发明的保护范围是由所附权利要求书限定的。本领域的

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技术人员在不背离本发明的原理和实质的前提下，可以对这些实施方式作出多种变更或修改，但这些变更和修改均落入本发明的保护范围。

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说 明 书 附 图

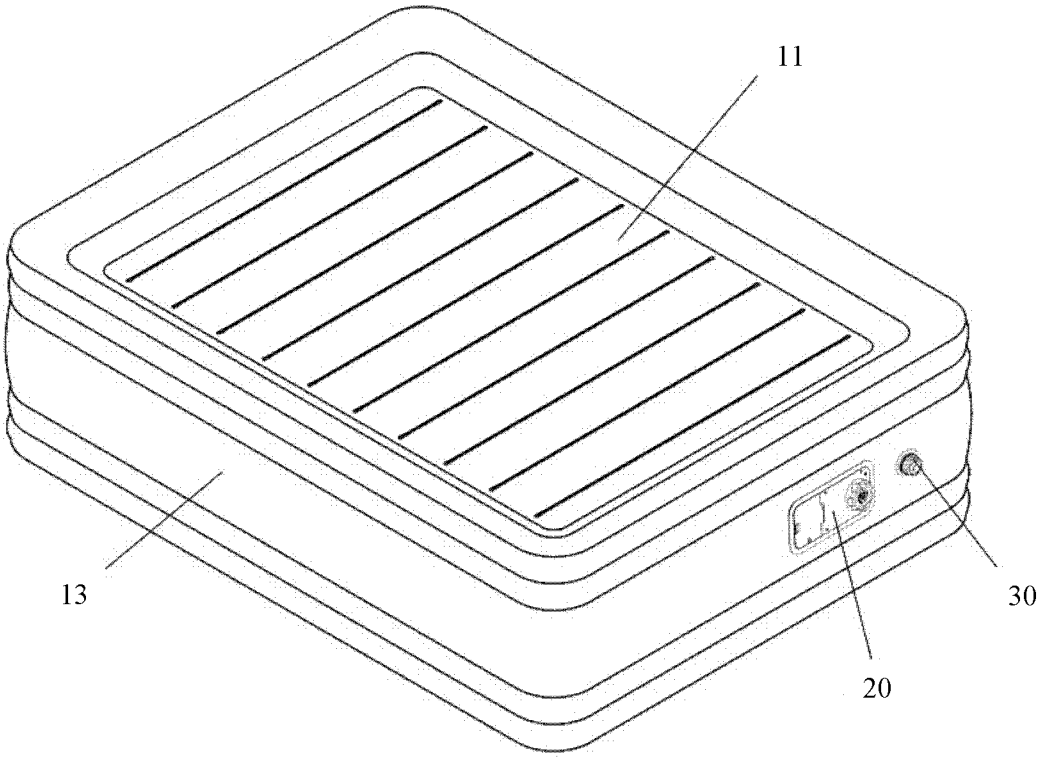


图 1

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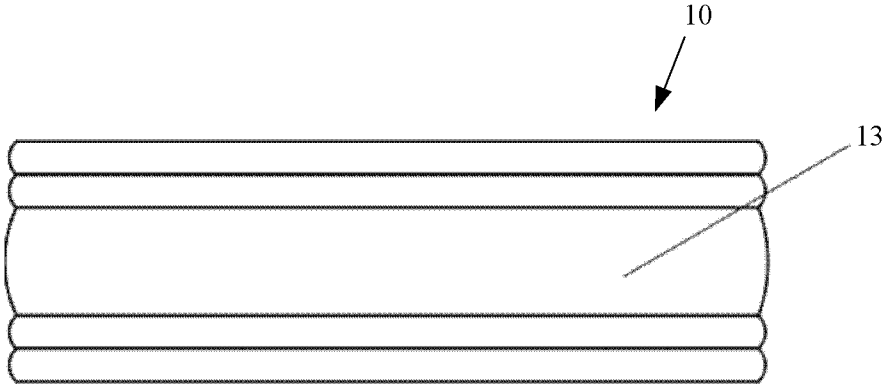


图 2

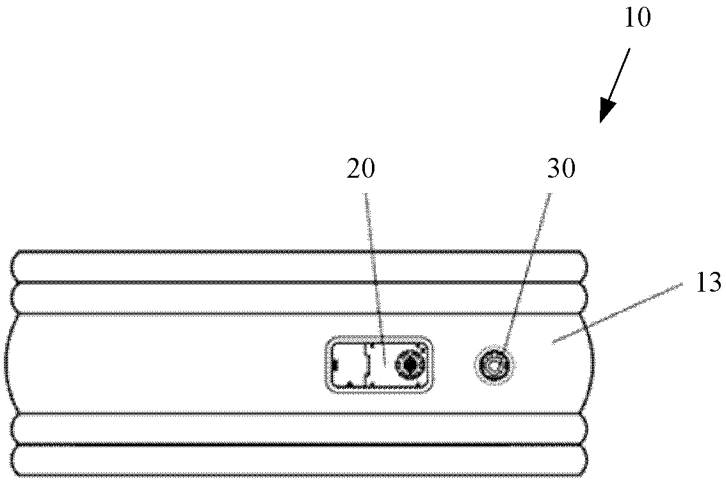


图 3

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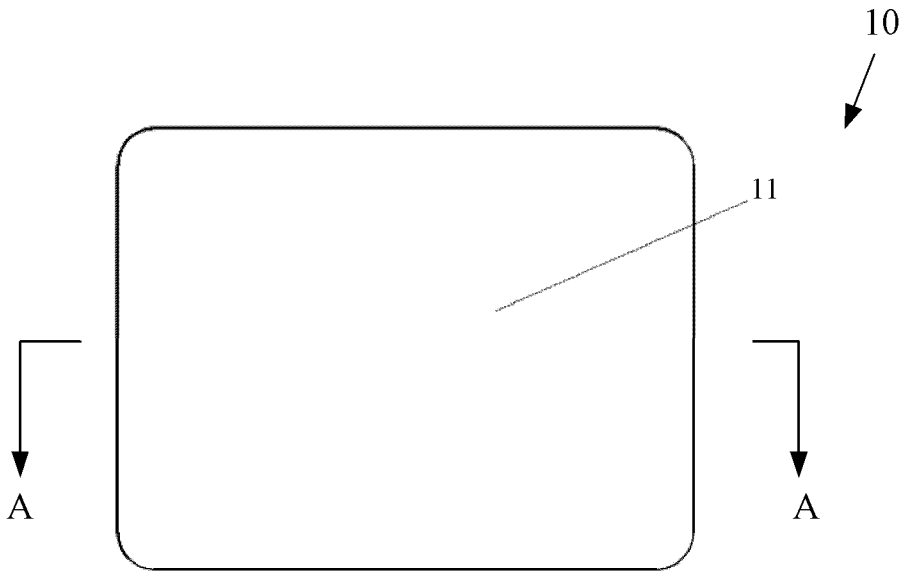


图 4

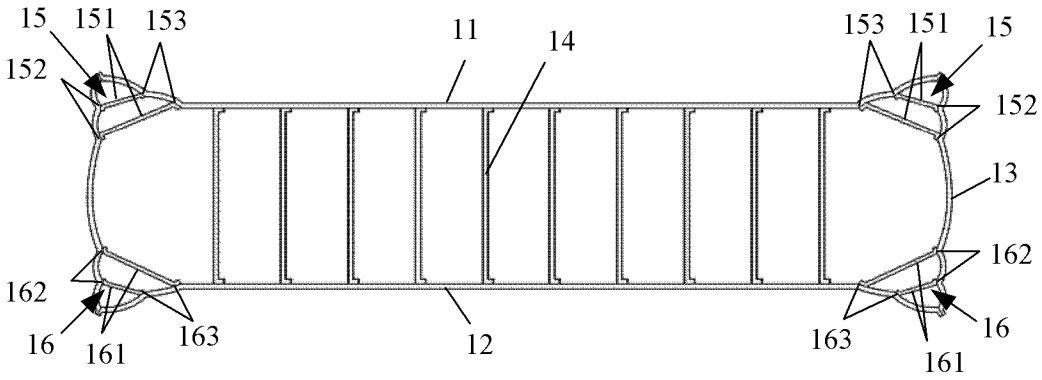


图 5

INTEX EX. 1038, Pg. 66
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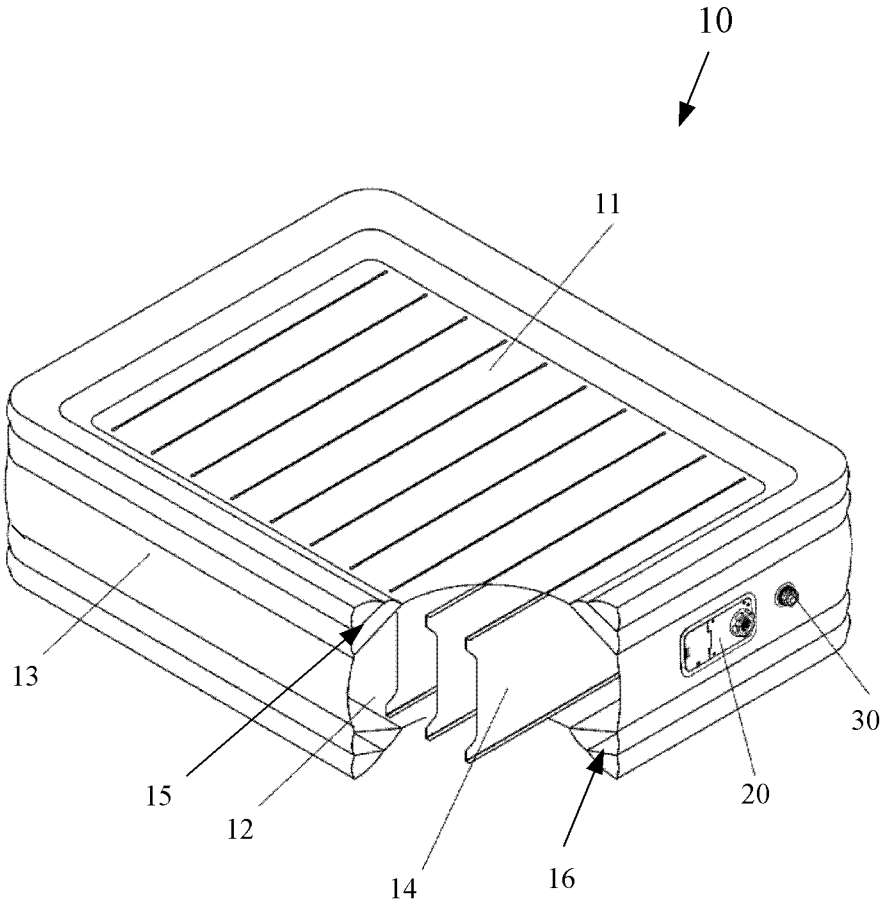


图 6

INTEX EX. 1038, Pg. 67
Intex Recreation v. Bestway Inflatables

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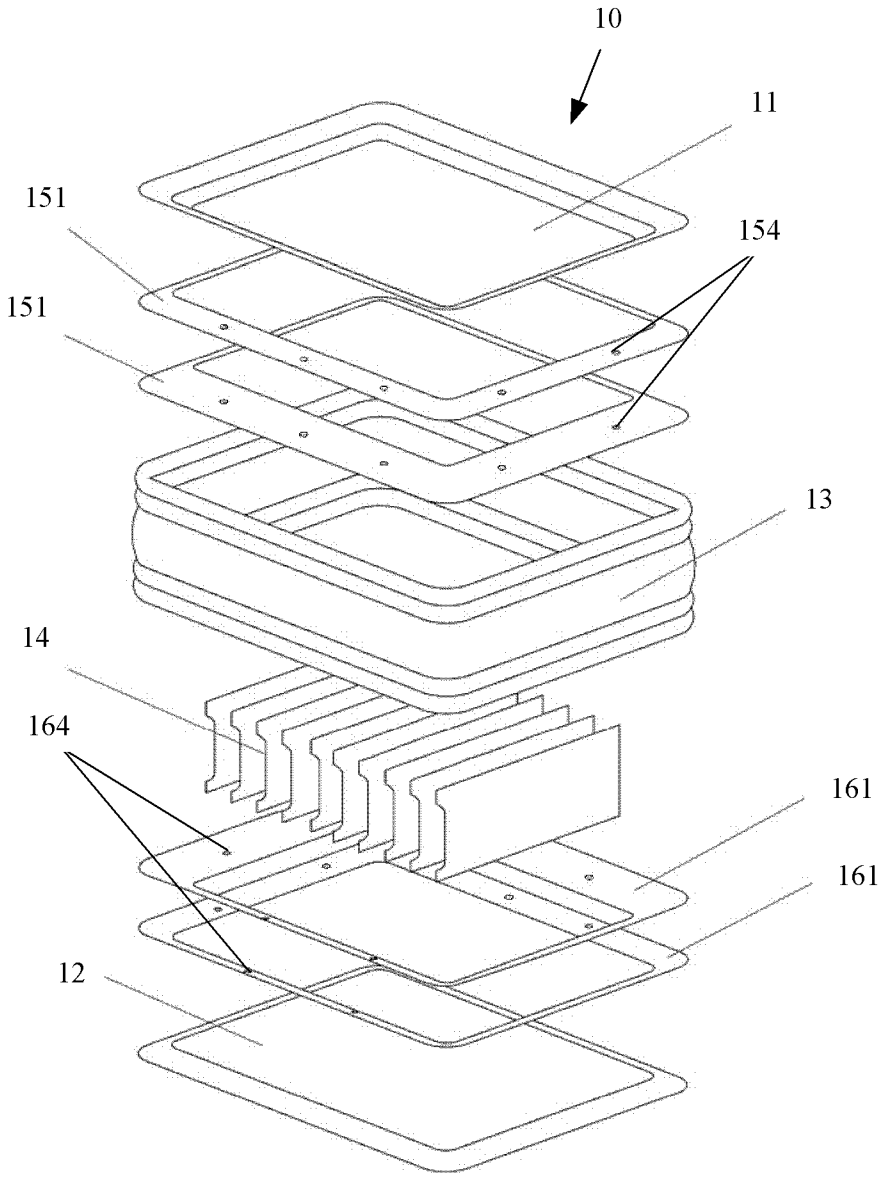


图 7

INTEX EX. 1038, Pg. 68
Intex Recreation v. Bestway Inflatables

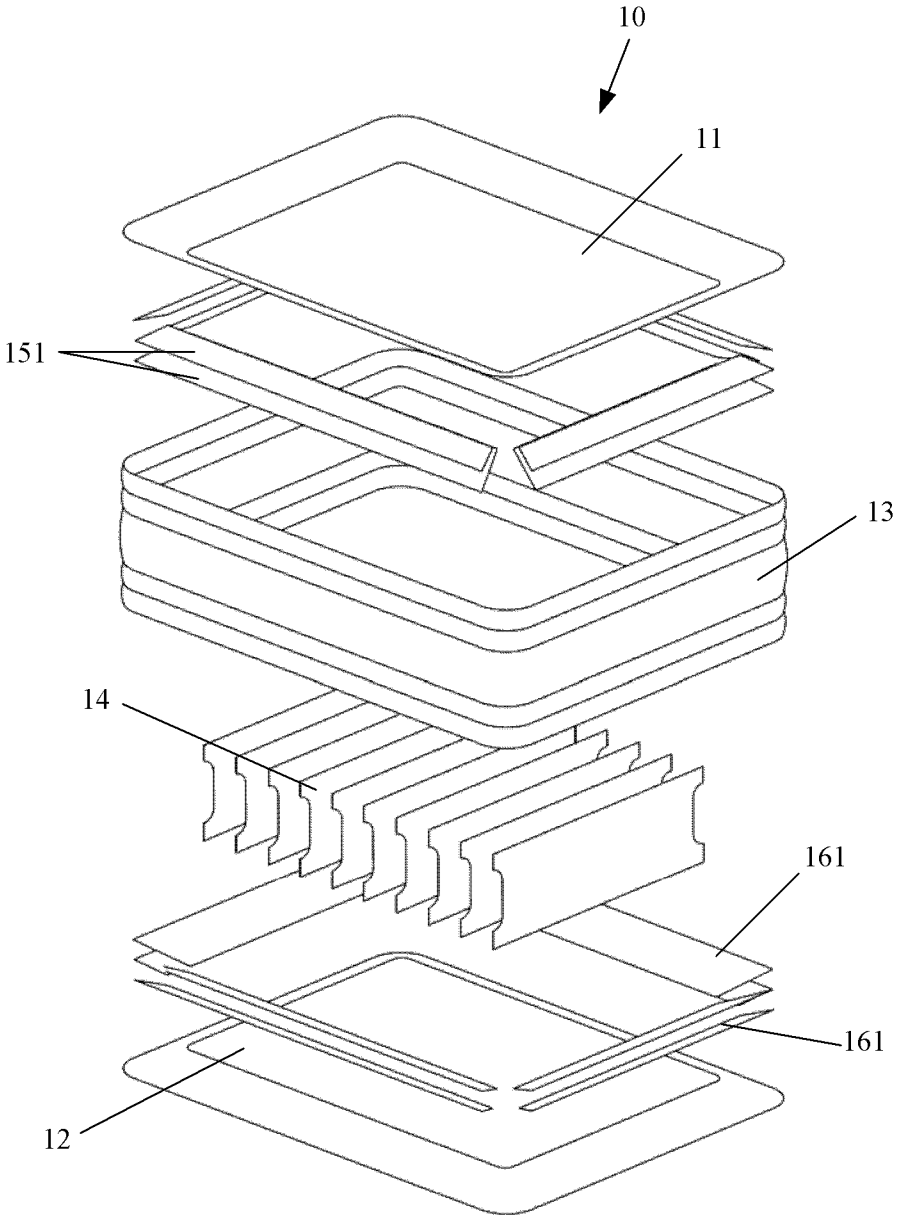


图 8

INTEX EX. 1038, Pg. 69
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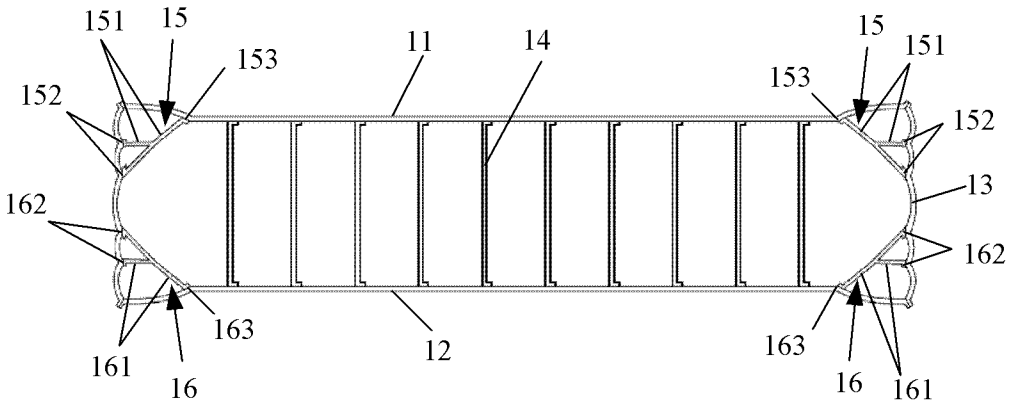


图 9

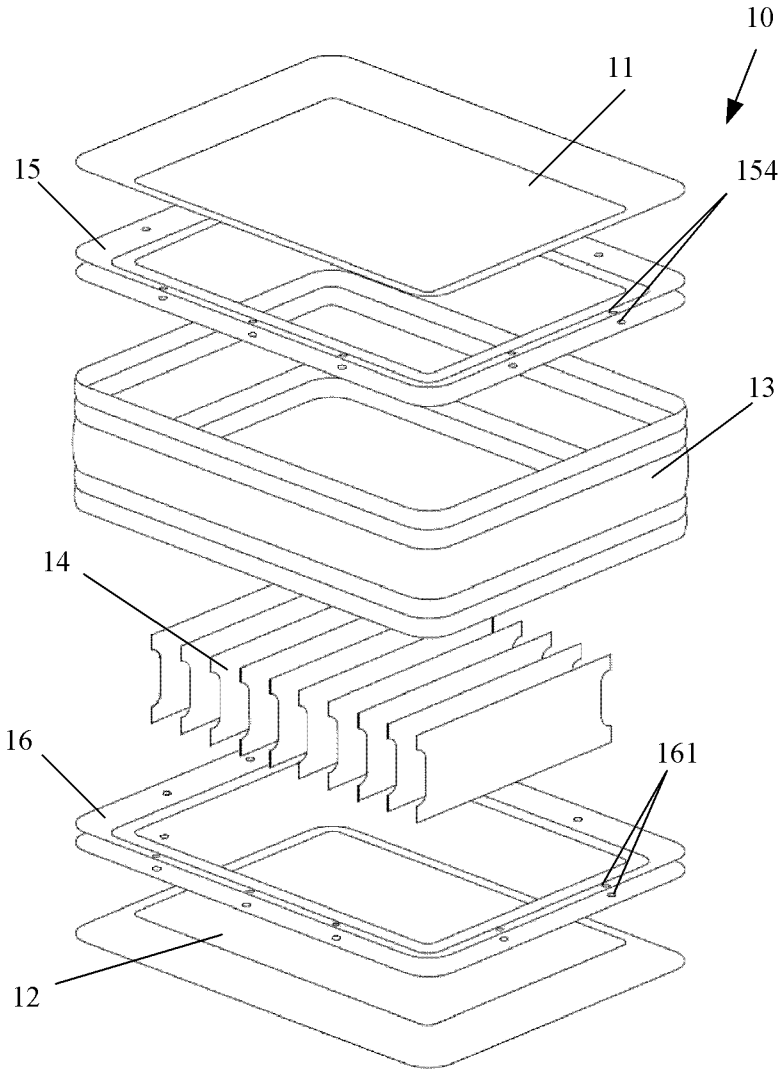


图 10

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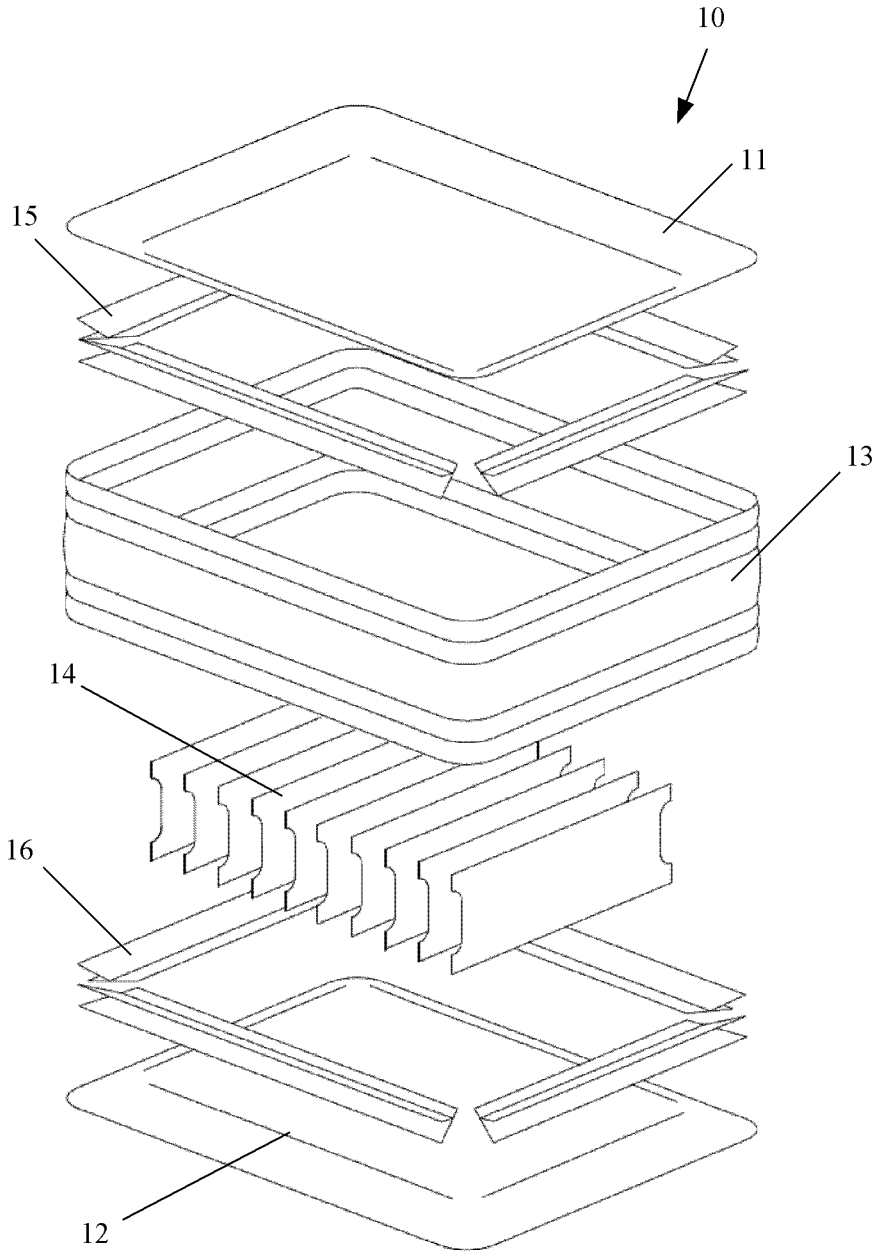


图 11

INTEX EX. 1038, Pg. 71
Intex Recreation v. Bestway Inflatables

2016100205335

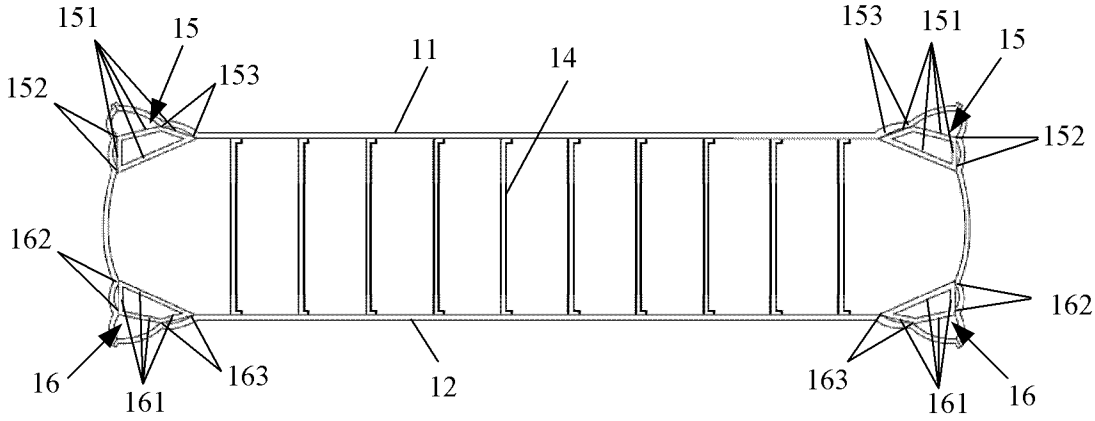


图 12

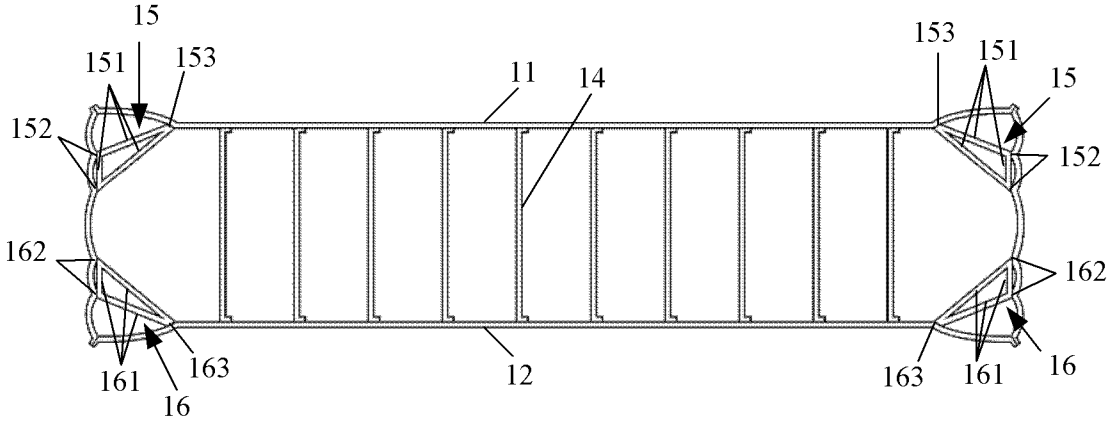


图 13

INTEX EX. 1038, Pg. 72
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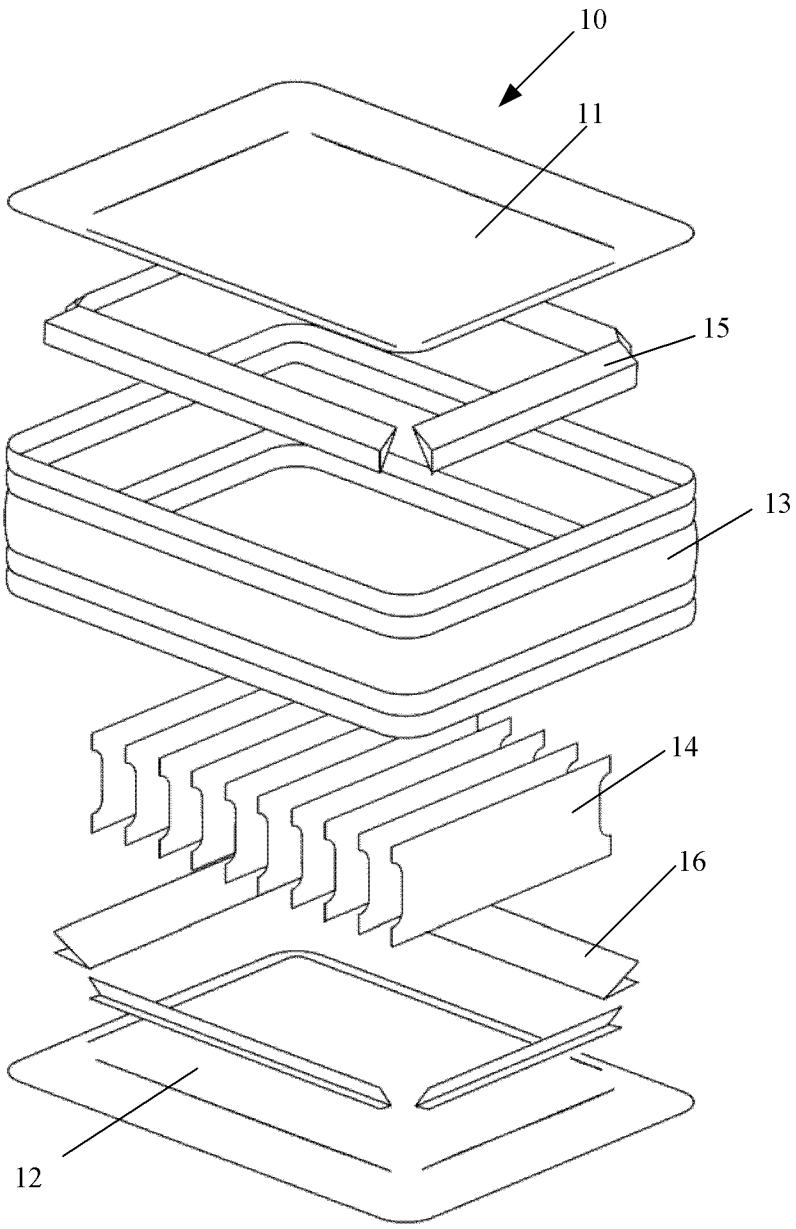


图 14

INTEX EX. 1038, Pg. 73
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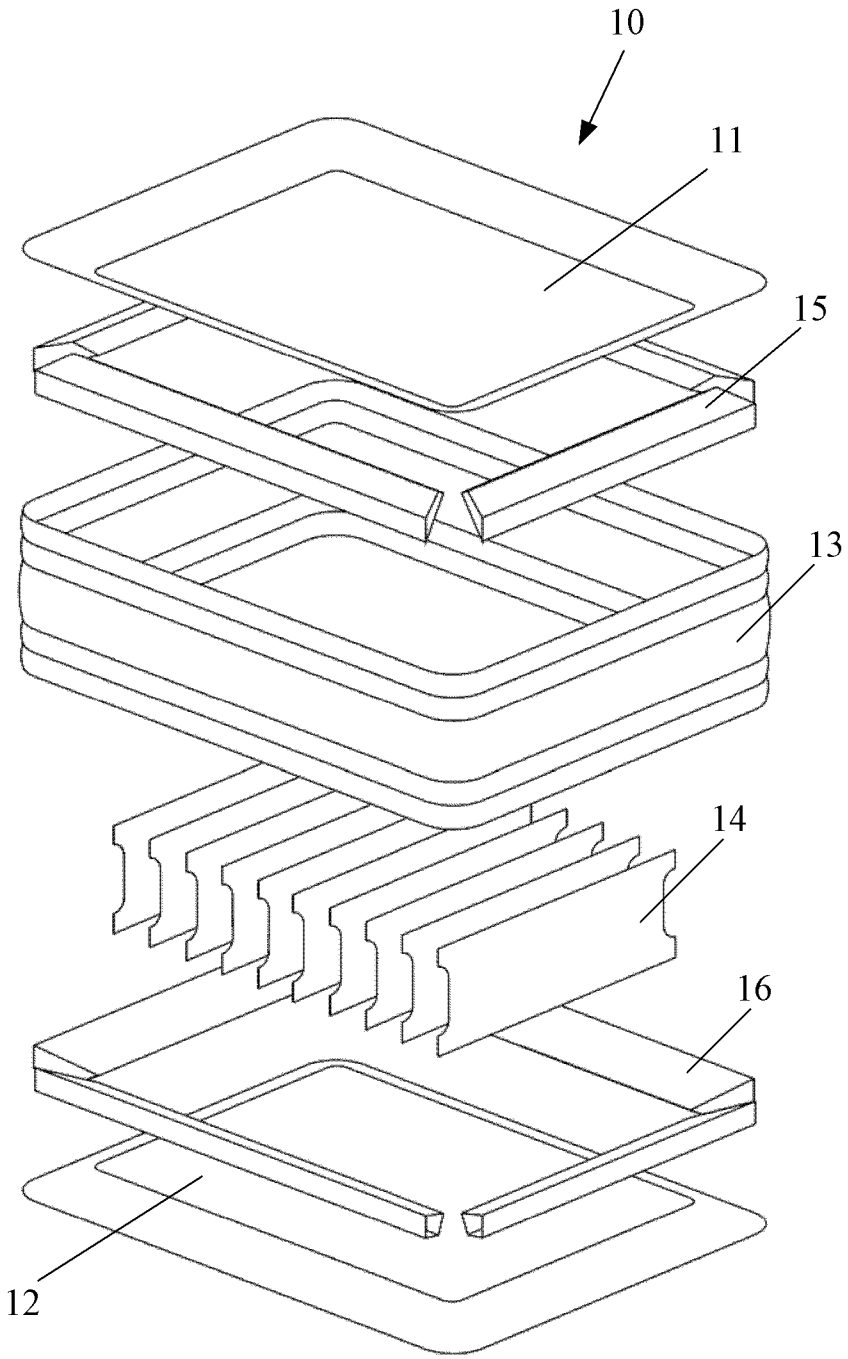


图 15

INTEX EX. 1038, Pg. 74
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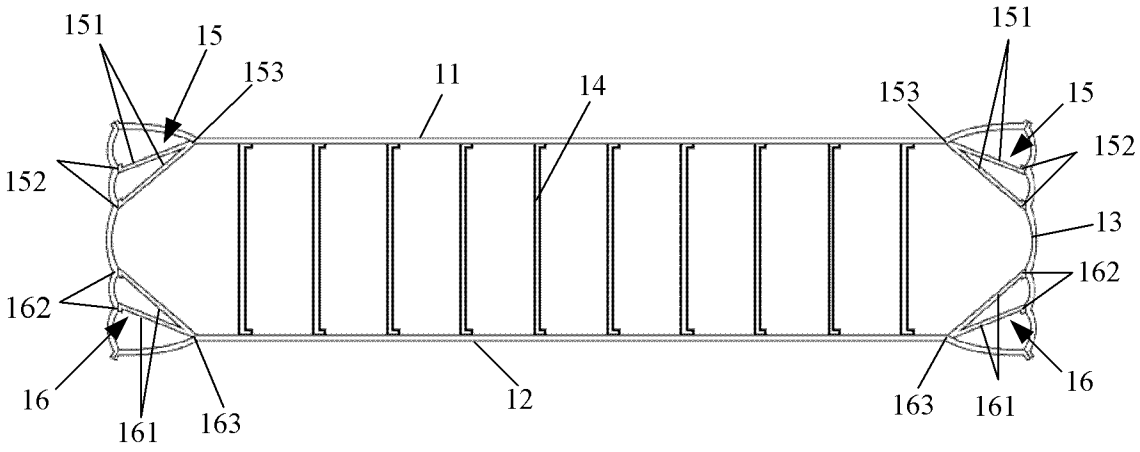


图 16

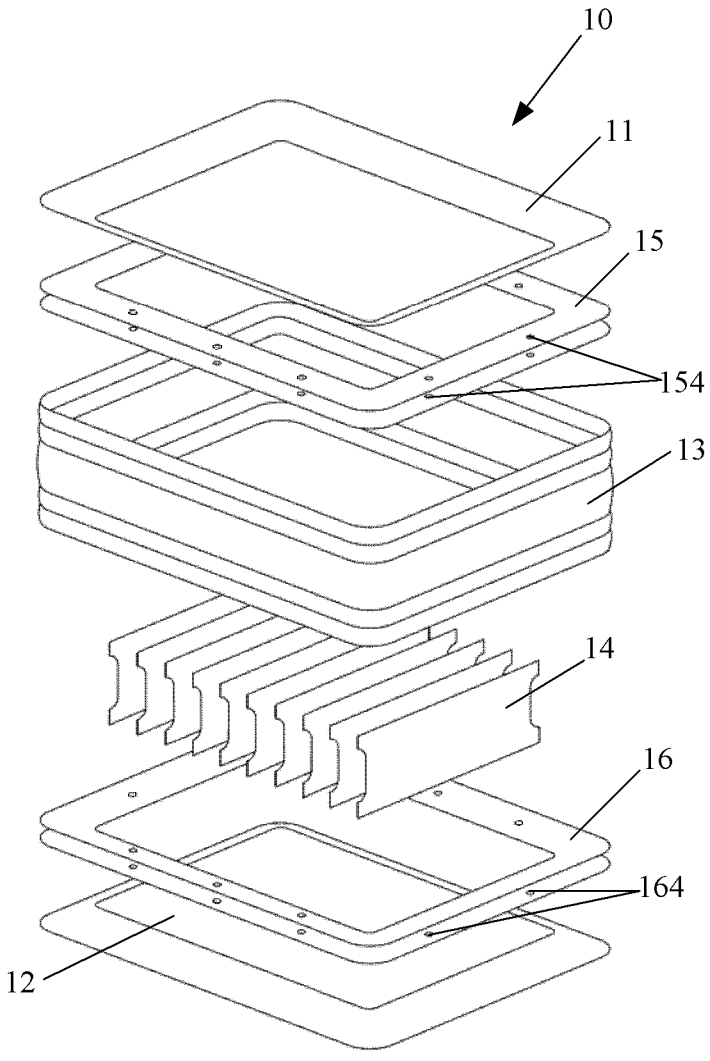


图 17

INTEX EX. 1038, Pg. 75
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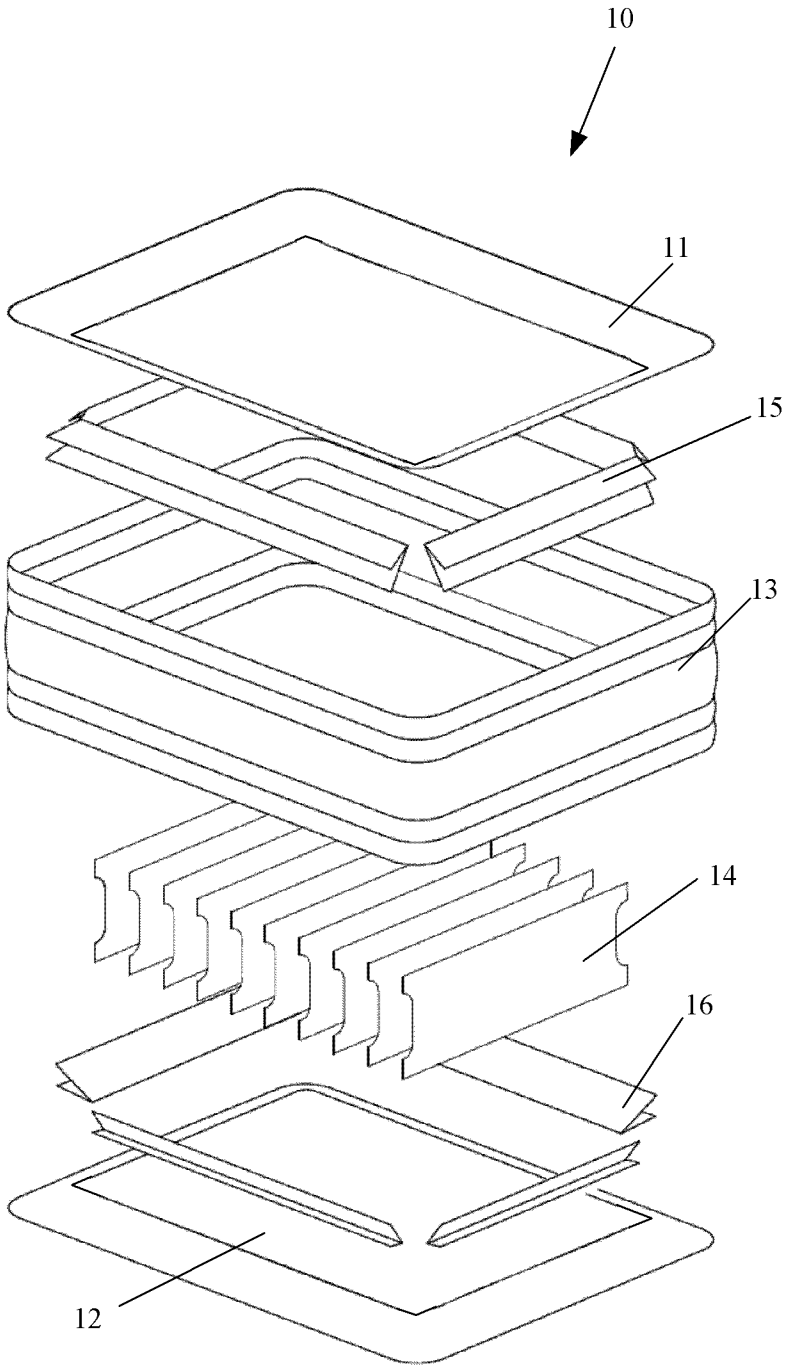


图 18

INTEX EX. 1038, Pg. 76
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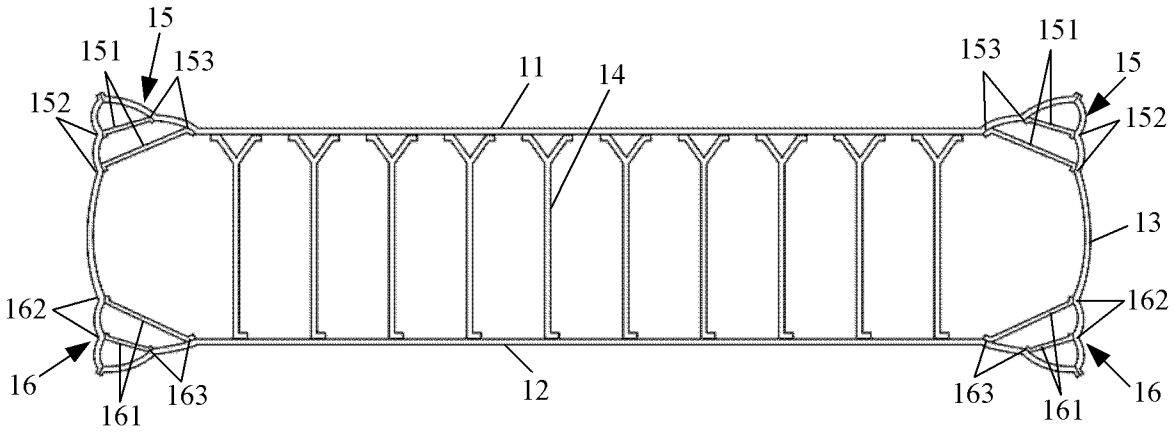


图 19

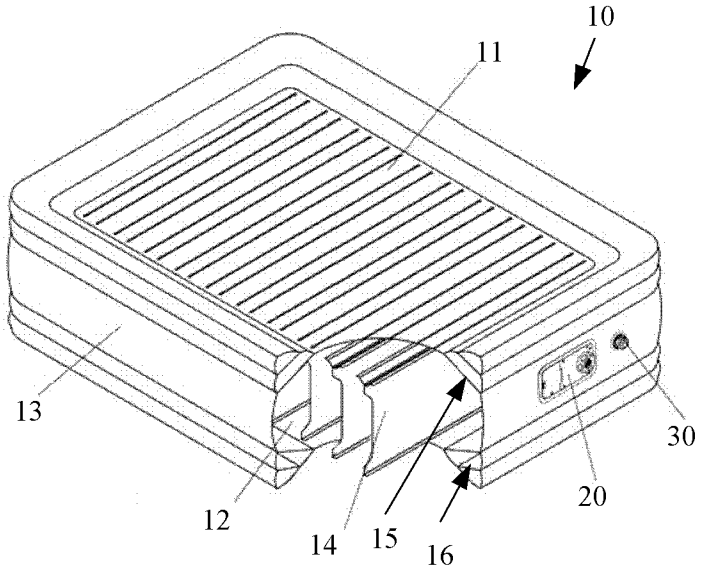


图 20

INTEX EX. 1038, Pg. 77
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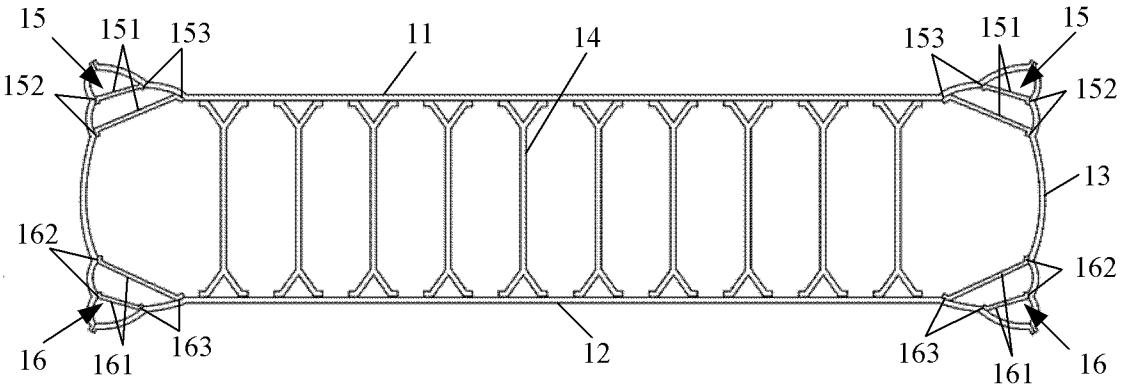


图 21

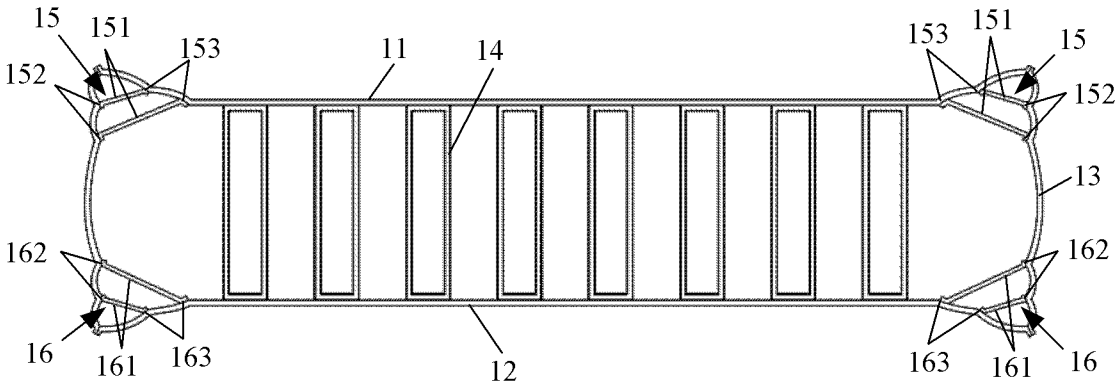


图 22

INTEX EX. 1038, Pg. 78
Intex Recreation v. Bestway Inflatables

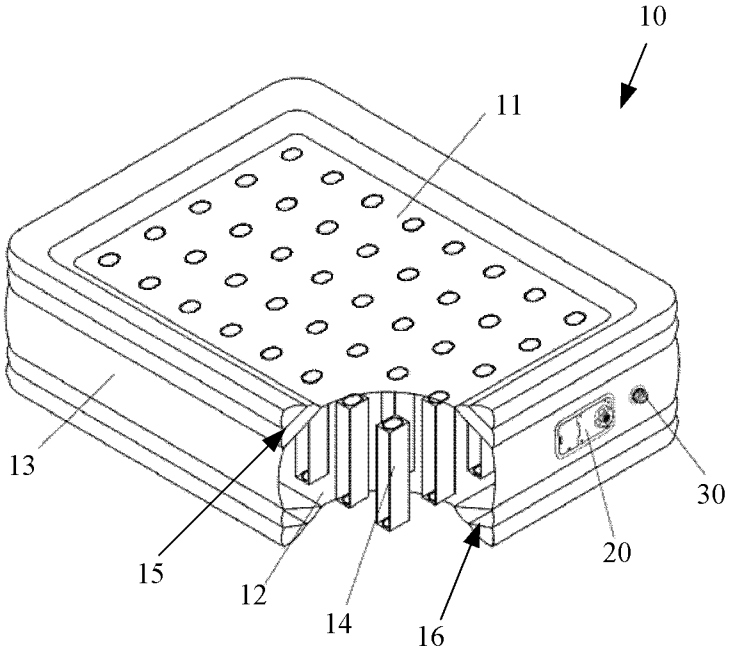


图 23

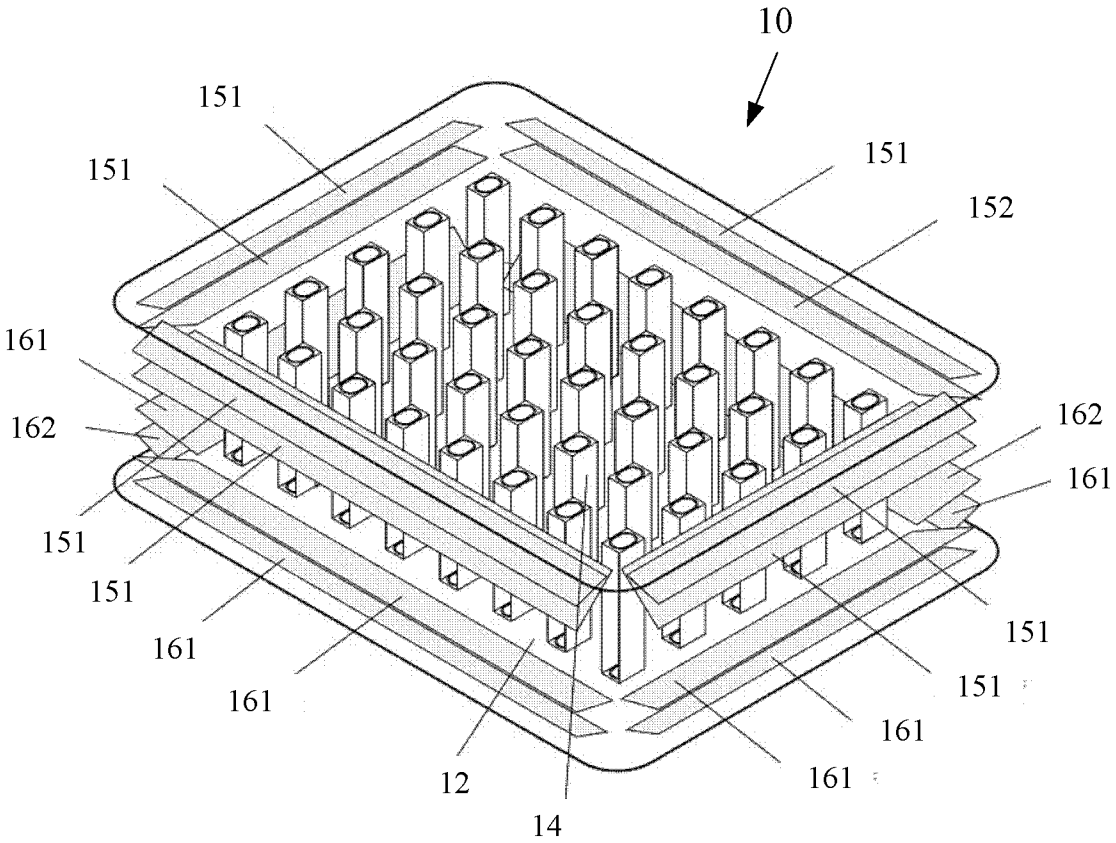


图 24

INTEX EX. 1038, Pg. 79
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证　明

本证明之附件是向本局提交的下列专利申请文件副本。

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申　请　类　型：实用新型专利

发明 创造 名称：充气床

申　　请　　日：2016 年 01 月 13 日

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权 利 要 求 书

1、一种充气床，其特征在于，所述充气床包括：

顶片和底片，所述底片与所述顶片上下间隔布置；

至少一侧壁，所述侧壁的上边缘与所述顶片的外边缘连接，所述侧壁的下边缘与所述底片的外边缘连接，所述顶片、所述底片和所述侧壁之间形成一个气室；

至少一第一拉带结构，所述第一拉带结构设置在所述气室内，且所述第一拉带结构的上下两端分别与所述顶片和所述底片连接；以及

至少一支撑结构，设置在所述气室内，所述支撑结构沿至少一所述侧壁的长度方向设置，所述支撑结构中至少两个外侧边缘分别与相邻的所述侧壁连接，所述支撑结构中至少一个内侧边缘与相邻的所述顶片或所述底片连接。

2、如权利要求 1 所述的充气床，其特征在于，所述支撑结构包括第二拉带结构和第三拉带结构，所述第二拉带结构中至少两个外侧边缘与相邻的所述侧壁连接，所述第二拉带结构中至少一个内侧边缘与相邻的所述顶片连接；以及

所述第三拉带结构中至少两个外侧边缘与相邻的所述侧壁连接，所述第三拉带结构中至少一个内侧边缘与相邻的所述底片连接。

3、如权利要求 2 所述的充气床，其特征在于，所述第二拉带结构和所述第三拉带结构上分别设有多个气孔，所述气室通过所述气孔形成空气流通。

4、如权利要求 2 所述的充气床，其特征在于，所述第二拉带结构和所述第三拉带结构在垂直方向间隔布置。

5、如权利要求 2 所述的充气床，其特征在于，所述第二拉带结构包括至少两个第一 I 型拉带，每一所述第一 I 型拉带的外侧边缘和内侧边缘分别与相邻的所述侧壁和所述顶片连接，且至少两个所述第一 I 型拉带间隔布置。

6、如权利要求 2 所述的充气床，其特征在于，所述第三拉带结构包括至少

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两个第二 I 型拉带，每一所述第二 I 型拉带的外侧边缘和内侧边缘分别与相邻的所述侧壁和所述底片连接，且至少两个所述第二 I 型拉带间隔布置。

7、如权利要求 2 所述的充气床，其特征在于，所述第二拉带结构包括至少一个第一 Y 型拉带，其中，所述第一 Y 型拉带的两个外侧边缘分别与相邻的所述侧壁连接，一内侧边缘与所述顶片连接。

8、如权利要求 2 所述的充气床，其特征在于，所述第三拉带结构包括至少一个第二 Y 型拉带，其中，所述第二 Y 型拉带的两个外侧边缘分别与相邻的所述侧壁连接，一内侧边缘与所述底片连接。

9、如权利要求 2 所述的充气床，其特征在于，所述第二拉带结构包括至少一个第一管型拉带，所述第一管型拉带上具有至少两个外侧边缘分别与相邻的所述侧壁连接，且至少一内侧边缘与所述顶片连接。

10、如权利要求 2 所述的充气床，其特征在于，所述第三拉带结构包括至少一个第二管型拉带，所述第二管型拉带上具有至少两个外侧边缘分别与相邻的所述侧壁连接，且至少一内侧边缘与所述底片连接。

11、如权利要求 2 所述的充气床，其特征在于，所述第二拉带结构包括至少一个第一 V 型拉带，其中，所述第一 V 型拉带的两个外侧边缘分别与相邻的所述侧壁连接，且一内侧边缘与所述顶片连接。

12、如权利要求 2 所述的充气床，其特征在于，所述第三拉带结构包括至少一个第二 V 型拉带，其中，所述第二 V 型拉带的两个外侧边缘分别与相邻的所述侧壁连接，且一内侧边缘与所述底片连接。

13、如权利要求 5 所述的充气床，其特征在于，所述至少两个第一 I 型拉带相互间隔地排布于所述顶片的下表面。

14、如权利要求 6 所述的充气床，其特征在于，所述至少两个第二 I 型拉

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带相互间隔地排布于所述底片的上表面。

15、如权利要求 5 所述的充气床，其特征在于，所述至少两个第一 I 型拉带在所述侧壁的内表面上沿垂直方向间隔排布。

16、如权利要求 6 所述的充气床，其特征在于，所述至少两个第二 I 型拉带在所述侧壁的内表面上沿垂直方向间隔排布。

17、如权利要求 7 所述的充气床，其特征在于，所述至少一个第一 Y 型拉带的两个外侧边缘在所述侧壁的内表面上沿垂直方向间隔排布。

18、如权利要求 8 所述的充气床，其特征在于，所述至少一个第二 Y 型拉带的两个外侧边缘在所述侧壁的内表面上沿垂直方向间隔排布。

19、如权利要求 9 所述的充气床，其特征在于，所述至少一个第一管型拉带与相邻的所述侧壁连接的所述至少两个外侧边缘在所述侧壁的内表面上沿垂直方向间隔排布。

20、如权利要求 10 所述的充气床，其特征在于，所述至少一个第二管型拉带与相邻的所述侧壁连接的所述至少两个外侧边缘在所述侧壁的内表面上沿垂直方向间隔排布。

21、如权利要求 11 所述的充气床，其特征在于，所述至少一个第一 V 型拉带的两个外侧边缘在所述侧壁的内表面上沿垂直方向间隔排布。

22、如权利要求 12 所述的充气床，其特征在于，所述至少一个第二 V 型拉带的两个外侧边缘在所述侧壁的内表面上沿垂直方向间隔排布。

23、如权利要求 5 所述的充气床，其特征在于，所述至少两个第一 I 型拉带整体为一个闭合的环形结构或一个间断的环形结构。

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24、如权利要求 6 所述的充气床，其特征在于，所述至少两个第二 I 型拉带整体为一个闭合的环形结构或一个间断的环形结构。

25、如权利要求 7 所述的充气床，其特征在于，所述至少一个第一 Y 型拉带整体为一个闭合的环形结构或一个间断的环形结构。

26、如权利要求 8 所述的充气床，其特征在于，所述至少一个第二 Y 型拉带整体为一个闭合的环形结构或一个间断的环形结构。

27、如权利要求 9 所述的充气床，其特征在于，所述至少一个第一管型拉带整体为一个间断的环形结构。

28、如权利要求 10 所述的充气床，其特征在于，所述至少一个第二管型拉带整体为一个间断的环形结构。

29、如权利要求 11 所述的充气床，其特征在于，所述至少一个第一 V 型拉带整体为一个闭合的环形结构或一个间断的环形结构。

30、如权利要求 12 所述的充气床，其特征在于，所述至少一个第二 V 型拉带整体为一个闭合的环形结构或一个间断的环形结构。

31、如权利要求 1 所述的充气床，其特征在于，所述第一拉带结构为直拉带、圆孔拉带、Y 型拉带或 X 型拉带其中一种拉带或多种拉带。

32、如权利要求 2 所述的充气床，其特征在于，所述第一拉带结构、所述第二拉带结构及所述第三拉带结构均采用热塑性塑胶布制成。

33、如权利要求 2 所述的充气床，其特征在于，所述第一拉带结构、所述第二拉带结构及所述第三拉带结构中的一个或多个至少部分地包括网布、夹网布或者线体。

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34、如权利要求 33 所述的充气床，其特征在于，所述网布或者所述线体至少部分两侧表面分别与两片相对的胶布片条连接为一体，所述网布和所述线体夹设于两片相对的胶布条之间。

35、如权利要求 33 所述的充气床，其特征在于，所述网布、或者所述线体至少部分两侧表面与 U 型胶布片条连接为一体，所述网布和所述线体夹设于所述 U 型胶布条中间。

36、如权利要求 2 所述的充气床，其特征在于，所述第一拉带结构通过高频焊接的方式与所述顶片和所述底片连接；所述第二拉带结构通过高频焊接的方式与所述顶片和所述侧壁连接；所述第三拉带结构通过高频焊接的方式与所述底片和所述侧壁连接。

37、如权利要求 2 所述的充气床，其特征在于，所述顶片位于所述第二拉带结构的上边缘内侧部分的高度低于所述顶片位于所述第二拉带结构的上边缘外侧部分的高度。

38、如权利要求 2 所述的充气床，其特征在于，所述底片位于所述第三拉带结构的下边缘内侧部分的高度低于所述底片位于所述第三拉带结构的下边缘外侧部分的高度。

39、如权利要求 2 所述的充气床，其特征在于，所述充气床还包括内置气泵，所述内置气泵设置在所述侧壁上，且位于所述第二拉带结构的下边缘和所述第三拉带结构的上边缘之间，用以供所述气室充气。

40、如权利要求 1 所述的充气床，其特征在于，所述充气床还包括气阀，所述气阀设置在所述侧壁上，用于所述充气床的充气或放气。

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说　　明　　书

充气床

技术领域

本实用新型涉及充气床或充气床垫领域，特别涉及一种充气床，其结构设置为可限制侧壁向外膨胀或变形。

背景技术

目前，充气床和充气床垫已经非常流行。充气床和充气床垫具有重量轻、便于携带和收藏等优点，因而被广泛应用于各种不同的场合。例如，在家庭充气床和充气床垫通常可以作为临时的床，供来访的客人使用。另外还非常适合在户外野营时使用。

在现有技术中，充气床和充气床垫一般由 PVC 胶布、PU 胶布等制成，且具有许多不同的结构，其中比较典型的机构是由顶片、底片，以及与顶片和底片相连接的侧壁构成可充气的气室。在气室内部设有连接顶片和底片且间隔排列的拉带，以构成具有一定高度且上表面大致平坦的可供人躺在上面的形状。

在现有的充气床和充气床垫中，有的具有较高的高度，充气床和充气床垫充气后的侧壁容易膨胀和变形，影响到充气床和充气床垫外观的美观，充气床和充气床垫的膨胀和变形也会造成气室内的气压衰减，使得充气床和充气床垫偏软降低了充气床和充气床垫的舒适性。

因此，为了解决上述侧壁膨胀的问题，有的充气床和充气床垫在顶片和底片之间设置了中层片，并将中层片与侧壁连接。这种结构的充气床和充气床垫虽然使侧壁膨胀和变形的问题略有改善，但仍然没有达到理想的效果。而且由于顶片与中层片之间，以及中层片与底片之间都需要设置连接拉带，使得充气床和充气床垫的制造过程更加复杂，即所需胶布也更多。

另外，在现有技术中，高度较高的充气床和充气床垫存在稳定性方面的缺陷。当用户躺在或者坐在靠近充气床和充气床垫的边缘处时，充气床和充气床垫容易发生侧翻。为了改善其稳定性，美国专利 US 6671910 在充气床底片的外围设置了充气的稳定管。然而，这种结构不仅会影响充气床的外观美观，也给用户带来了使用的不便。

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实用新型内容

本实用新型要解决的技术问题是为了克服现有技术中充气床和充气床垫的侧壁容易膨胀、变形以及充气床和充气床垫稳定性差，容易侧翻的缺陷，提供一种充气床。

本实用新型是通过下述技术方案来解决上述技术问题的：一种充气床，其特点在于，所述充气床包括： 顶片和底片，所述底片与所述顶片上下间隔布置；

至少一侧壁，所述侧壁的上边缘与所述顶片的外边缘连接，所述侧壁的下边缘与所述底片的外边缘连接，所述顶片、所述底片和所述侧壁之间形成一个气室；

至少一第一拉带结构，所述第一拉带结构设置在所述气室内，且所述第一拉带结构的上下两端分别与所述顶片和所述底片连接；以及

至少一支撑结构，设置在所述气室内，所述支撑结构沿至少一所述侧壁的长度方向设置，所述支撑结构中至少两个外侧边缘分别与相邻的所述侧壁连接，所述支撑结构中至少一个内侧边缘与相邻的所述顶片或所述底片连接。

较佳地，所述支撑结构包括第二拉带结构和第三拉带结构，所述第二拉带结构中至少两个外侧边缘与相邻的所述侧壁连接，所述第二拉带结构中至少一个内侧边缘与相邻的所述顶片连接；以及

所述第三拉带结构中至少两个外侧边缘与相邻的所述侧壁连接，所述第三拉带结构中至少一个内侧边缘与相邻的所述底片连接。

较佳地，所述第二拉带结构和所述第三拉带结构上分别设有多个气孔，所述气室通过所述气孔形成空气流通。

较佳地，所述第二拉带结构和所述第三拉带结构在垂直方向间隔布置。

较佳地，所述第二拉带结构包括至少两个第一 I 型拉带，每一所述第一 I 型拉带的外侧边缘和内侧边缘分别与相邻的所述侧壁和所述顶片连接，且至少两个所述第一 I 型拉带间隔布置。

较佳地，所述第三拉带结构包括至少两个第二 I 型拉带，每一所述第二 I 型拉带的外侧边缘和内侧边缘分别与相邻的所述侧壁和所述底片连接，且至少两个所述第二 I 型拉带间隔布置。

较佳地，所述第二拉带结构包括至少一个第一 Y 型拉带，其中，所述第一

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Y 型拉带的两个外侧边缘分别与相邻的所述侧壁连接，一内侧边缘与所述顶片连接。

较佳地，所述第三拉带结构包括至少一个第二 Y 型拉带，其中，所述第二 Y 型拉带的两个外侧边缘分别与相邻的所述侧壁连接，一内侧边缘与所述底片连接。

较佳地，所述第二拉带结构包括至少一个第一管型拉带，所述第一管型拉带上具有至少两个外侧边缘分别与相邻的所述侧壁连接，且至少一内侧边缘与所述顶片连接。

较佳地，所述第三拉带结构包括至少一个第二管型拉带，所述第二管型拉带上具有至少两个外侧边缘分别与相邻的所述侧壁连接，且至少一内侧边缘与所述底片连接。

较佳地，所述第二拉带结构包括至少一个第一 V 型拉带，其中，所述第一 V 型拉带的两个外侧边缘分别与相邻的所述侧壁连接，且一内侧边缘与所述顶片连接。

较佳地，所述第三拉带结构包括至少一个第二 V 型拉带，其中，所述第二 V 型拉带的两个外侧边缘分别与相邻的所述侧壁连接，且一内侧边缘与所述底片连接。

较佳地，所述至少两个第一 I 型拉带相互间隔地排布于所述顶片的下表面。

较佳地，所述至少两个第二 I 型拉带相互间隔地排布于所述底片的上表面。

较佳地，所述至少两个第一 I 型拉带在所述侧壁的内表面上沿垂直方向间隔排布。

较佳地，所述至少两个第二 I 型拉带在所述侧壁的内表面上沿垂直方向间隔排布。

较佳地，所述至少一个第一 Y 型拉带的两个外侧边缘在所述侧壁的内表面上沿垂直方向间隔排布。

较佳地，所述至少一个第二 Y 型拉带的两个外侧边缘在所述侧壁的内表面上沿垂直方向间隔排布。

较佳地，所述至少一个第一管型拉带与相邻的所述侧壁连接的所述至少两个外侧边缘在所述侧壁的内表面上沿垂直方向间隔排布。

较佳地，所述至少一个第二管型拉带与相邻的所述侧壁连接的所述至少两个外侧边缘在所述侧壁的内表面上沿垂直方向间隔排布。

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较佳地，所述至少一个第一 V 型拉带的两个外侧边缘在所述侧壁的内表面上沿垂直方向间隔排布。

较佳地，所述至少一个第二 V 型拉带的两个外侧边缘在所述侧壁的内表面上沿垂直方向间隔排布。

较佳地，所述至少两个第一 I 型拉带整体为一个闭合的环形结构或一个间断的环形结构。

较佳地，所述至少两个第二 I 型拉带整体为一个闭合的环形结构或一个间断的环形结构。

较佳地，所述至少一个第一 Y 型拉带整体为一个闭合的环形结构或一个间断的环形结构。

较佳地，所述至少一个第二 Y 型拉带整体为一个闭合的环形结构或一个间断的环形结构。

较佳地，所述至少一个第一管型拉带整体为一个间断的环形结构。

较佳地，所述至少一个第二管型拉带整体为一个间断的环形结构。

较佳地，所述至少一个第一 V 型拉带整体为一个闭合的环形结构或一个间断的环形结构。

较佳地，所述至少一个第二 V 型拉带整体为一个闭合的环形结构或一个间断的环形结构。

较佳地，所述第一拉带结构为直拉带、圆孔拉带、Y 型拉带或 X 型拉带其中一种拉带或多种拉带。

较佳地，所述第一拉带结构、所述第二拉带结构及所述第三拉带结构均采用热塑性塑胶布制成。

较佳地，所述第一拉带结构、所述第二拉带结构及所述第三拉带结构中的一个或多个至少部分地包括网布、夹网布或者线体。

较佳地，所述网布或者所述线体至少部分两侧表面分别与两片相对的胶布片条连接为一体，所述网布和所述线体夹设于两片相对的胶布条之间。

较佳地，所述网布、或者所述线体至少部分两侧表面与 U 型胶布片条连接为一体，所述网布和所述线体夹设于所述 U 型胶布条中间。

较佳地，所述第一拉带结构通过高频焊接的方式与所述顶片和所述底片连接；所述第二拉带结构通过高频焊接的方式与所述顶片和所述侧壁连接；所述第三拉带结构通过高频焊接的方式与所述底片和所述侧壁连接。

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较佳地，所述顶片位于所述第二拉带结构的上边缘内侧部分的高度低于所述顶片位于所述第二拉带结构的上边缘外侧部分的高度。

较佳地，所述底片位于所述第三拉带结构的下边缘内侧部分的高度低于所述底片位于所述第三拉带结构的下边缘外侧部分的高度。

较佳地，所述充气床还包括内置气泵，所述内置气泵设置在所述侧壁上，且位于所述第二拉带结构的下边缘和所述第三拉带结构的上边缘之间，用以供所述气室充气。

较佳地，所述充气床还包括气阀，所述气阀设置在所述侧壁上，用于所述充气床的充气或放气。

本实用新型的积极进步效果在于：

本实用新型充气床克服了现有技术中具有较高高度的充气床和充气床垫侧壁向外膨胀变形的缺陷，外观更加美观。其具有很好的稳定性，克服了现有技术的充气床和充气床垫容易侧翻的问题。此外，本实用新型充气床还可以防止用户在使用过程中滚落。

附图说明

本实用新型上述的以及其他的特征、性质和优势将通过下面结合附图和实施例的描述而变的更加明显，在附图中相同的附图标记始终表示相同的特征，其中：

图 1 为本实用新型充气床的立体图。

图 2 为本实用新型充气床的主视图。

图 3 为本实用新型充气床的右视图。

图 4 为本实用新型充气床的俯视图。

图 5 为图 4 中沿 A-A 线剖开的实施例一的剖视图。

图 6 为本实用新型充气床的实施例一的局部解剖结构示意图。

图 7 为本实用新型充气床的实施例一的爆炸图一。

图 8 为本实用新型充气床的实施例一的爆炸图二。

图 9 为图 4 中沿 A-A 线剖开的实施例二的剖视图。

图 10 为本实用新型充气床的实施例二的爆炸图一。

图 11 为本实用新型充气床的实施例二的爆炸图二。

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图 12 为图 4 中沿 A-A 线剖开的实施例三的剖视图一。

图 13 为图 4 中沿 A-A 线剖开的实施例三的剖视图二。

图 14 为本实用新型充气床的实施例三的爆炸图一。

图 15 为本实用新型充气床的实施例三的爆炸图二。

图 16 为图 4 中沿 A-A 线剖开的实施例四的剖视图。

图 17 为本实用新型充气床的实施例四的爆炸图一。

图 18 为本实用新型充气床的实施例四的爆炸图二。

图 19 为图 4 中沿 A-A 线剖开的实施例五的剖视图。

图 20 为本实用新型充气床的实施例五的局部解剖结构示意图。

图 21 为图 4 中沿 A-A 线剖开的实施例六的剖视图。

图 22 为图 4 中沿 A-A 线剖开的实施例七的剖视图。

图 23 为本实用新型充气床的实施例七的局部解剖结构示意图。

图 24 为本实用新型充气床的实施例七的内部结构示意图。

具体实施方式

为让本实用新型的上述目的、特征和优点能更明显易懂，以下结合附图对本实用新型的具体实施方式作详细说明。

在下面的描述中阐述了很多具体细节以便于充分理解本实用新型，但是本实用新型还可以采用其它不同于在此描述的其它方式来实施，因此本实用新型不受下面公开的具体实施例的限制。

实施例一：

图 1 为本实用新型充气床的立体图。图 2 为本实用新型充气床的主视图。图 3 为本实用新型充气床的右视图。图 4 为本实用新型充气床的俯视图。图 5 为图 4 中沿 A-A 线剖开的实施例一的剖视图。图 6 为本实用新型充气床的实施例一的局部解剖结构示意图。图 7 为本实用新型充气床的实施例一的爆炸图。

如图 1 至图 7 所示，本实用新型的实施例一中公开了一种充气床 10，其包括顶片 11、底片 12、至少一侧壁 13、至少一第一拉带结构 14 及至少一支撑结构。其中，底片 12 与顶片 11 上下间隔布置，侧壁 13 的上边缘与顶片 11 的外边缘连接，侧壁 13 的下边缘与底片 12 的外边缘连接，顶片 11、底片 12 和侧壁 13 之间形成一个气室。同时将第一拉带结构 14 设置在所述气室内，且第一拉带结构 14 的上下两端分别与顶片 11 和底片 12 连接。其作用在于，当所述

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气室充气后，通过第一拉带结构 14 来限制顶片 11 和底片 12 分别向上和向下膨胀。特别地，顶片 11 和底片 12 均可以设置为双层结构，所述双层结构可以通过至少两个两片相互焊接以形成不同的图案。或者进一步地，在所述双层结构中还夹设有海绵的结构。

此处的所述支撑结构设置在所述气室内，所述支撑结构沿至少一侧壁 13 的长度方向设置，所述支撑结构中至少两个外侧边缘分别与相邻的侧壁 13 连接，所述支撑结构中至少一个内侧边缘与相邻的顶片 11 或底片 12 连接。

优选地，所述支撑结构包括第二拉带结构 15 和第三拉带结构 16。其中，第二拉带结构 15 中至少两个外侧边缘与相邻的侧壁 13 连接，第二拉带结构中至少一个内侧边缘与相邻的顶片 11 连接。第二拉带结构 15 设置为当所述气室充气后限制顶片 11 和侧壁 13 向上和侧向膨胀。

同时，第三拉带结构 16 中至少两个外侧边缘与相邻的侧壁 13 连接，第三拉带结构 16 中至少一个内侧边缘与相邻的底片 12 连接。第三拉带结构 16 设置为当所述气室充气后分别限制底片 12 和侧壁 13 向下和侧向膨胀。

在本实施例中，第二拉带结构 15 包括至少两个第一 I 型拉带 151，每一第一 I 型拉带 151 的一个外侧边缘 152 与相邻的侧壁 13 连接，另一个内侧边缘 153 与相邻的顶片 11 连接，且至少两个第一 I 型拉带 151 间隔布置。第三拉带结构 16 包括至少两个第二 I 型拉带 161，每一第二 I 型拉带 161 的一个外侧边缘 162 与相邻的侧壁 13 连接，另一个内侧边缘 163 与相邻的底片 12 连接，且至少两个第二 I 型拉带 151 间隔布置。本实施例中第一 I 型拉带 151 和第二 I 型拉带 161 均以两个为例，但其数量并不受本实施例限制，其可以采用多于两个的数量，均属于本实用新型的保护范围内。

第二拉带结构 15 和第三拉带结构 16 优选地设置为在垂直方向间隔布置。例如本实施例中第二拉带结构 15 和第三拉带结构 16 将对应的侧壁 13 分隔成五段式，从而使第二拉带结构 15 设置为当所述气室充气后，限制顶片 11 和侧壁 13 向上和侧向膨胀，使第三拉带结构 16 设置为当所述气室充气后，分别限制底片 12 和侧壁 13 向下和侧向膨胀。

当然，第二拉带结构 15 和第三拉带结构 16 也可以将对应的侧壁 13 分割成四段式、六段式等多段式结构，本实施例仅为举例，并不局限于此，其他大于等于四段式的结构都属于本实用新型的保护范围内。

进一步地，至少两个第一 I 型拉带 151 相互间隔地排布于顶片 11 的下表面，

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且至少两个第二 I 型拉带 161 相互间隔地排布于底片 12 的上表面。至少两个第一 I 型拉带 151 在侧壁 13 的内表面上沿垂直方向间隔排布。至少两个第二 I 型拉带 161 在侧壁 13 的内表面上沿垂直方向间隔排布。

此处，至少两个第一 I 型拉带 151 整体为一个闭合的环形结构或一个间断的环形结构。至少两个第二 I 型拉带 161 整体为一个闭合的环形结构或一个间断的环形结构。同时，在至少两个第一 I 型拉带 151 上设有气孔 154，使所述气室通过气孔 154 形成空气流通。至少两个第二 I 型拉带 161 设有气孔 164，使所述气室通过气孔 164 形成空气流通（如图 7 和图 8 所示）。

本实用新型中的第一拉带结构 14 可以采用直拉带、圆孔拉带、Y 型拉带或 X 型拉带其中一种拉带或多种拉带。同时，第一拉带结构 14、第二拉带结构 15 及第三拉带结构 16 均可以采用热塑性塑胶布制成，且第一拉带结构 14、第二拉带结构 15 及第三拉带结构 16 中的一个或多个至少部分地包括网布、夹网布或者线体。

其结构形式可以采用多种方式。例如，所述网布或者所述线体至少部分两侧表面分别与两片相对的胶布片条连接为一体，所述网布和所述线体夹设于两片相对的胶布条之间。

再例如，所述网布、或者所述线体至少部分两侧表面与 U 型胶布片条连接为一体，所述网布和所述线体夹设于所述 U 型胶布条中间。这些连接结构都可以有效地制成本实用新型充气床所需的拉带，这里仅为举例，但不局限于本实施例中的方案，其他可实现拉带形式的结构均在本实用新型的保护范围内。

在上述拉带的结构基础上，为了保证各个部件之间的牢固连接，第一拉带结构 14 通过高频焊接的方式连接在顶片 11 和底片 12 之间。同理，第二拉带结构 15 也通过高频焊接的方式连接在顶片 11 和侧壁 13 之间。第三拉带结构 16 通过高频焊接的方式连接在底片 12 和侧壁 13 之间。

通过上述结构形成的本实用新型充气床，其顶片 11 位于第二拉带结构 15 的上边缘内侧部分的高度低于顶片 11 位于第二拉带结构 15 的上边缘外侧部分的高度。底片 12 位于第三拉带结构 16 的下边缘内侧部分的高度低于底片 12 位于第三拉带结构 16 的下边缘外侧部分的高度。

此外，在充气床 10 上还包括内置气泵 20，将内置气泵 20 设置在侧壁 13 上，且位于第二拉带结构 15 的下边缘和第三拉带结构 16 的上边缘之间，用以供所述气室充气。同时，在充气床 10 上还设置有气阀 30，将气阀 30 设置在侧

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壁 13 上，用以供充气床 10 的充气或放气。

实施例二：

图 9 为图 4 中沿 A-A 线剖开的实施例二的剖视图。图 10 为本实用新型充气床的实施例二的爆炸图一。图 11 为本实用新型充气床的实施例二的爆炸图二。

如图 9 至图 11 所示，本实施例的结构与实施例一基本相同，其不同之处在于：第二拉带结构 15 包括至少一个第一 Y 型拉带 151，其中第一 Y 型拉带 151 的两个外侧边缘 152 分别与相邻的侧壁 13 连接，另一个内侧边缘 153 与顶片 11 连接。同理，第三拉带结构 16 包括至少一个第二 Y 型拉带 161，其中第二 Y 型拉带 161 的两个外侧边缘 162 分别与相邻的侧壁 13 连接，另一个内侧边缘 163 与底片 12 连接。

第二拉带结构 15 和第三拉带结构 16 优选地设置为在垂直方向间隔布置。本实施例中的第二拉带结构 15 和第三拉带结构 16 将对应的侧壁 13 分隔成五段式，从而将第二拉带结构 15 设置为当所述气室充气后，限制顶片 11 和侧壁 13 向上和侧向膨胀，将第三拉带结构 16 设置为当所述气室充气后，分别限制底片 12 和侧壁 13 向下和侧向膨胀。

当然，第二拉带结构 15 和第三拉带结构 16 也可以将对应的侧壁 13 分割成四段式、六段式等多段式结构，本实施例仅为举例，并不局限于此，其他大于等于四段式的结构都属于本实用新型的保护范围内。

进一步地，至少一个第一 Y 型拉带 151 的两个外侧边缘 152 在侧壁 13 的内表面上沿垂直方向间隔排布。至少一个第二 Y 型拉带 161 的两个外侧边缘 162 在侧壁 13 的内表面上沿垂直方向间隔排布。

此处，至少一个第一 Y 型拉带 151 整体为一个闭合的环形结构或一个间断的环形结构。至少一个第二 Y 型拉带 161 整体为一个闭合的环形结构或一个间断的环形结构。同时，至少一个第一 Y 型拉带 151 上还设有气孔 154，使所述气室通过气孔 154 形成空气流通。至少一个第二 Y 型拉带 161 上还设有气孔 164，使所述气室通过气孔 164 形成空气流通（如图 10 和图 11 所示）。

实施例三：

图 12 为图 4 中沿 A-A 线剖开的实施例三的剖视图一。图 13 为图 4 中沿

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A-A 线剖开的实施例三的剖视图二。图 14 为本实用新型充气床的实施例三的爆炸图一。图 15 为本实用新型充气床的实施例三的爆炸图二。

如图 12 至图 15 所示，本实施例的结构与实施例一基本相同，其不同之处在于：第二拉带结构 15 包括至少一个第一管型拉带 151，其中第一管型拉带 151 上具有至少两个外侧边缘 152 分别与相邻的侧壁 13 连接，且至少另一个内侧边缘 153 与顶片 11 连接。第三拉带结构 16 包括至少一个第二管型拉带 161，第二管型拉带 161 上具有至少两个外侧边缘 162 分别与相邻的侧壁 13 连接，且至少另一个内侧边缘 163 与底片 12 连接。此处的第一管型拉带 151 和第二管型拉带 161 可以采用多种管型结构，例如呈三角形的管型结构，呈四边形的管型结构（如图 13 和图 14 所示）。

进一步地，至少一个第一管型拉带 151 与相邻的侧壁 13 连接的至少两个外侧边缘 152 在侧壁 13 的内表面上沿垂直方向间隔排布。至少一个第二管型拉带 161 与相邻的侧壁 13 连接的至少两个外侧边缘 162 在侧壁 13 的内表面上沿垂直方向间隔排布。

此处，至少一个第一管型拉带 151 整体为一个间断的环形结构。至少一个第二管型拉带 161 整体为一个间断的环形结构（如图 13 和图 14 所示）。

第二拉带结构 15 和第三拉带结构 16 优选地设置为在垂直方向间隔布置。本实施例中的第二拉带结构 15 和第三拉带结构 16 将对应的侧壁 13 分隔成五段式，从而将第二拉带结构 15 设置为当所述气室充气后，限制顶片 11 和侧壁 13 向上和侧向膨胀，将第三拉带结构 16 设置为当所述气室充气后，分别限制底片 12 和侧壁 13 向下和侧向膨胀。

当然，第二拉带结构 15 和第三拉带结构 16 也可以将对应的侧壁 13 分割成四段式、六段式等多段式结构，本实施例仅为举例，并不局限于此，其他大于等于四段式的结构都属于本实用新型的保护范围内。

实施例四：

图 16 为图 4 中沿 A-A 线剖开的实施例四的剖视图。图 17 为本实用新型充气床的实施例四的爆炸图一。图 18 为本实用新型充气床的实施例四的爆炸图二。

如图 16 至图 18 所示，本实施例的结构与实施例一基本相同，其不同之处在于：第二拉带结构 15 包括至少一个第一 V 型拉带 151，其中第一 V 型拉带

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151 的两个外侧边缘 152 分别与相邻的侧壁 13 连接，且另一内侧边缘 153 与顶片 11 连接。第三拉带结构 16 包括至少一个第二 V 型拉带 161，其中第二 V 型拉带 161 的两个外侧边缘 162 分别与相邻的侧壁 13 连接，且另一内侧边缘 163 与顶片 11 连接。

进一步地，至少一个第一 V 型拉带 151 的两个外侧边缘 152 在侧壁 13 的内表面上沿垂直方向间隔排布。至少一个第二 V 型拉带 161 的两个外侧边缘 162 在侧壁 13 的内表面上沿垂直方向间隔排布。

此处，至少一个第一 V 型拉带 151 整体为一个闭合的环形结构或一个间断的环形结构。至少一个第二 V 型拉带 161 整体为一个闭合的环形结构或一个间断的环形结构。同时，至少一个第一 V 型拉带 151 上设有气孔 154，使所述气室通过气孔 154 形成空气流通。至少一个第二 V 型拉带 161 上设有气孔 164，使所述气室通过气孔 164 形成空气流通。

第二拉带结构 15 和第三拉带结构 16 优选地设置为在垂直方向间隔布置。本实施例中的第二拉带结构 15 和第三拉带结构 16 将对应的侧壁 13 分隔成五段式，从而将第二拉带结构 15 设置为当所述气室充气后，限制顶片 11 和侧壁 13 向上和侧向膨胀，将第三拉带结构 16 设置为当所述气室充气后，分别限制底片 12 和侧壁 13 向下和侧向膨胀。

当然，第二拉带结构 15 和第三拉带结构 16 也可以将对应的侧壁 13 分割成四段式、六段式等多段式结构，本实施例仅为举例，并不局限于此，其他大于等于四段式的结构都属于本实用新型的保护范围内。

实施例五：

图 19 为图 4 中沿 A-A 线剖开的实施例五的剖视图。图 20 为本实用新型充气床的实施例五的局部解剖结构示意图。

如图 19 和图 20 所示，本实施例的结构与实施例一基本相同，其不同之处在于：第一拉带结构 14 采用 Y 型拉带，且第一拉带结构 14 的上下两端分别与顶片 11 和底片 12 连接。第一拉带结构 14 中若干拉带之间相互间隔排布。第一拉带结构 14 中每一个拉带的上端呈分叉型，连接支撑顶片 11，下端为直拉带型，向下连接底片 12。当所述气室充气后，这种结构可以更有效地限制顶片 11 和底片 12 分别向上和向下膨胀。

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实施例六：

图 21 为图 4 中沿 A-A 线剖开的实施例六的剖视图。

如图 21 所示，本实施例的结构与实施例五基本相同，其不同之处在于：第一拉带结构 14 采用上下两端都呈 X 型的拉带，并且第一拉带结构 14 的上下两端分别与顶片 11 和底片 12 连接。第一拉带结构 14 中若干拉带之间相互间隔排布。第一拉带结构 14 中每一个拉带的上端呈分叉型，向上连接顶片 11，下端同样也呈分叉型，向下连接底片 12。当所述气室充气后，这种结构可以更有效地限制顶片 11 和底片 12 分别向上和向下膨胀。

实施例七：

图 22 为图 4 中沿 A-A 线剖开的实施例七的剖视图。图 23 为本实用新型充气床的实施例七的局部解剖结构示意图。图 24 为本实用新型充气床的实施例七的内部结构示意图。

如图 22 至图 24 所示，本实施例的结构与实施例一基本相同，其不同之处在于：第一拉带结构 14 中的若干拉带均采用圆孔拉带，且第一拉带结构 14 中每一个拉带的上下两端分别与顶片 11 和底片 12 连接。第一拉带结构 14 中若干拉带之间相互间隔排布。当所述气室充气后，其可以有效地限制顶片 11 和底片 12 分别向上和向下膨胀。

根据上述结构描述，上述各实施例之间的结构变化可以任意组合，并不受上述具体实施例的限制，即有关第二拉带结构 15 包含拉带的数量和第三拉带结构 16 包含拉带的数量不受限制，根据实际需求进行调整。

同理，第二拉带结构 15 中若干拉带之间的连接方式，以及第三拉条结构 16 中若干拉带之间的连接方式也不受上述实施例的局限，只要将侧壁 13 分隔成至少五段式（或大于等于四段）的形式即可，例如可以通过改变第二拉带结构 15 和第三拉条结构 16 中包含拉带的数量及连接方式将侧壁 13 分隔成六段、七段等多段形式。

当然，有关第一拉带结构 14 的结构形式可以在各种情况下通用，同样起到支撑顶片 11 和底片 12 的作用，有效限制顶片 11 和底片 12 分别向上和向下膨胀。

综上所述，本实用新型充气床通过采用各种类型的拉带结构，可以限制充气床的侧壁向外膨胀或变形。本实用新型充气床的结构有效地克服了现有技术

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中具有较高高度的充气床和充气床垫侧壁向外膨胀变形的缺陷，外观更加美观。其具有很好的稳定性，克服了现有技术的充气床和充气床垫容易侧翻的问题。此外，本实用新型充气床还可以防止用户在使用过程中滚落。

虽然以上描述了本实用新型的具体实施方式，但是本领域的技术人员应当理解，这些仅是举例说明，本实用新型的保护范围是由所附权利要求书限定的。本领域的技术人员在不背离本实用新型的原理和实质的前提下，可以对这些实施方式作出多种变更或修改，但这些变更和修改均落入本实用新型的保护范围。

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说　明　书　附　图

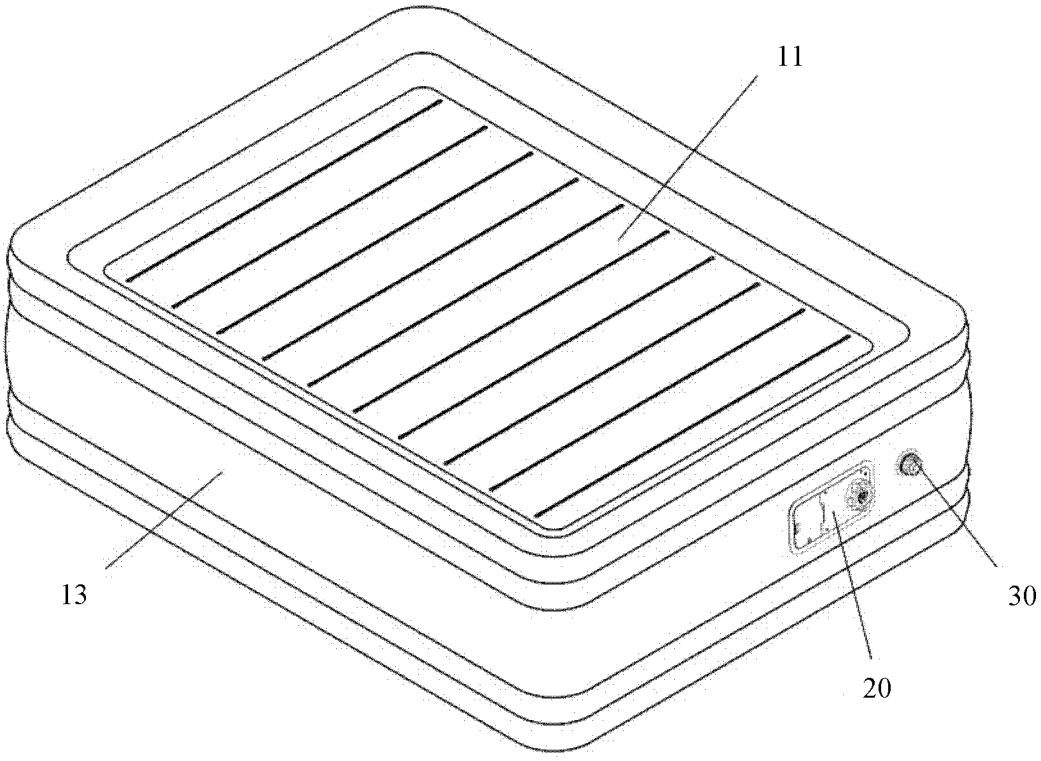


图 1

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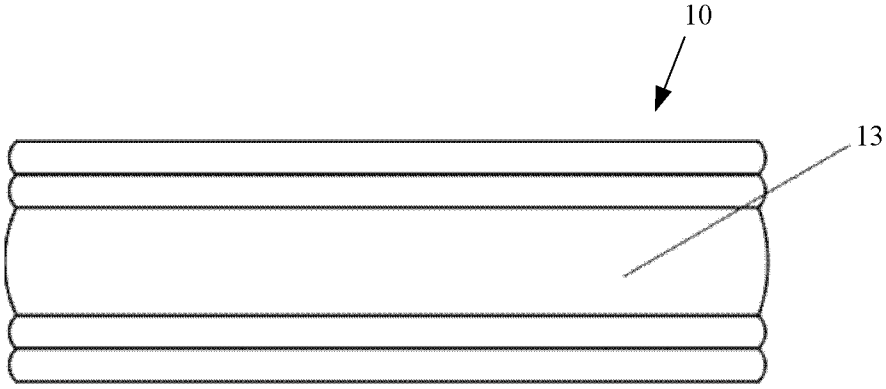


图 2

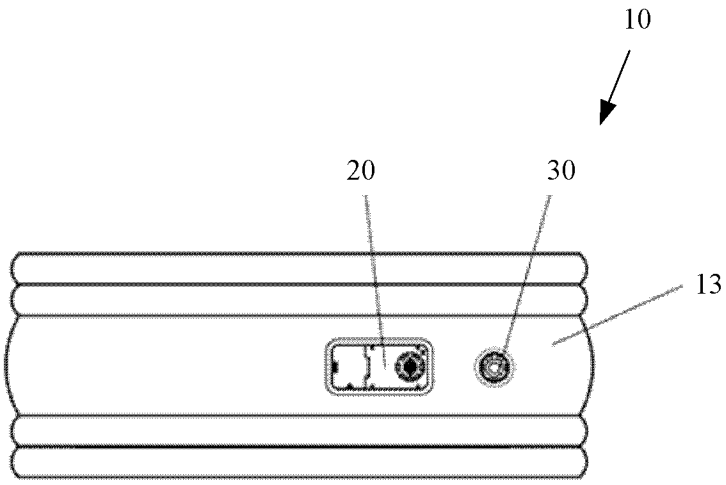


图 3

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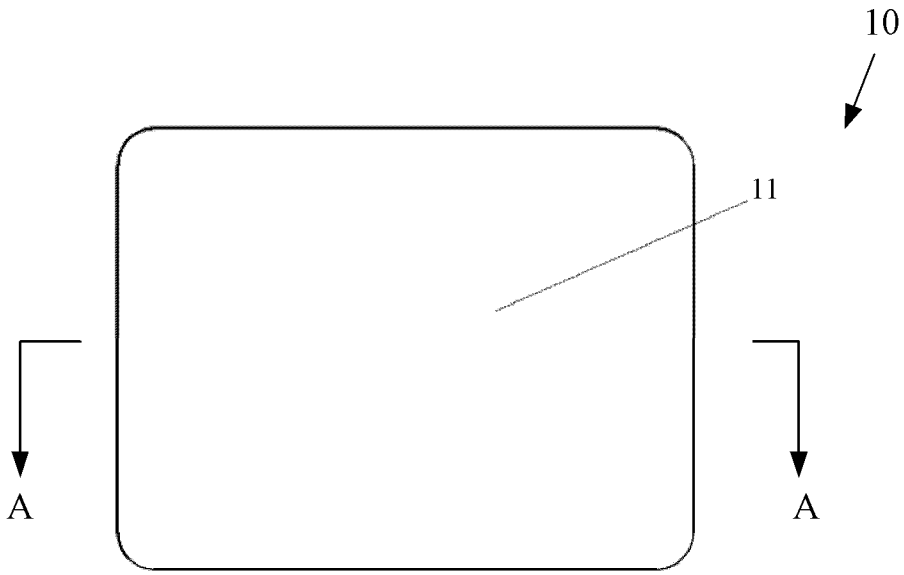


图 4

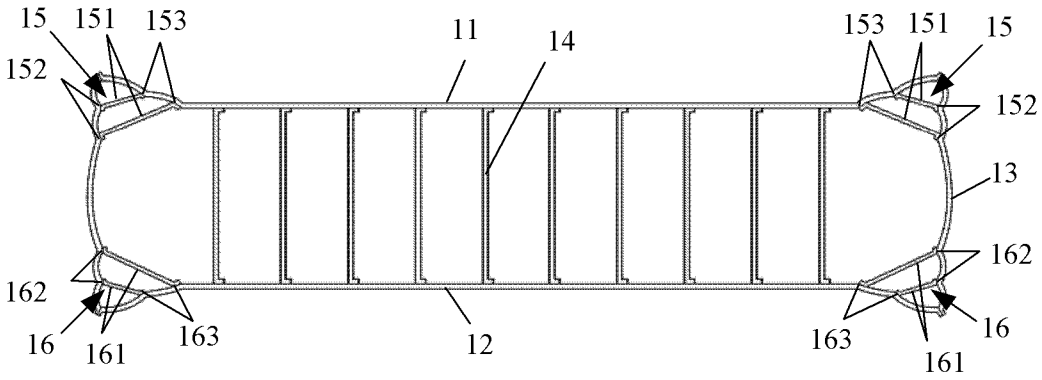


图 5

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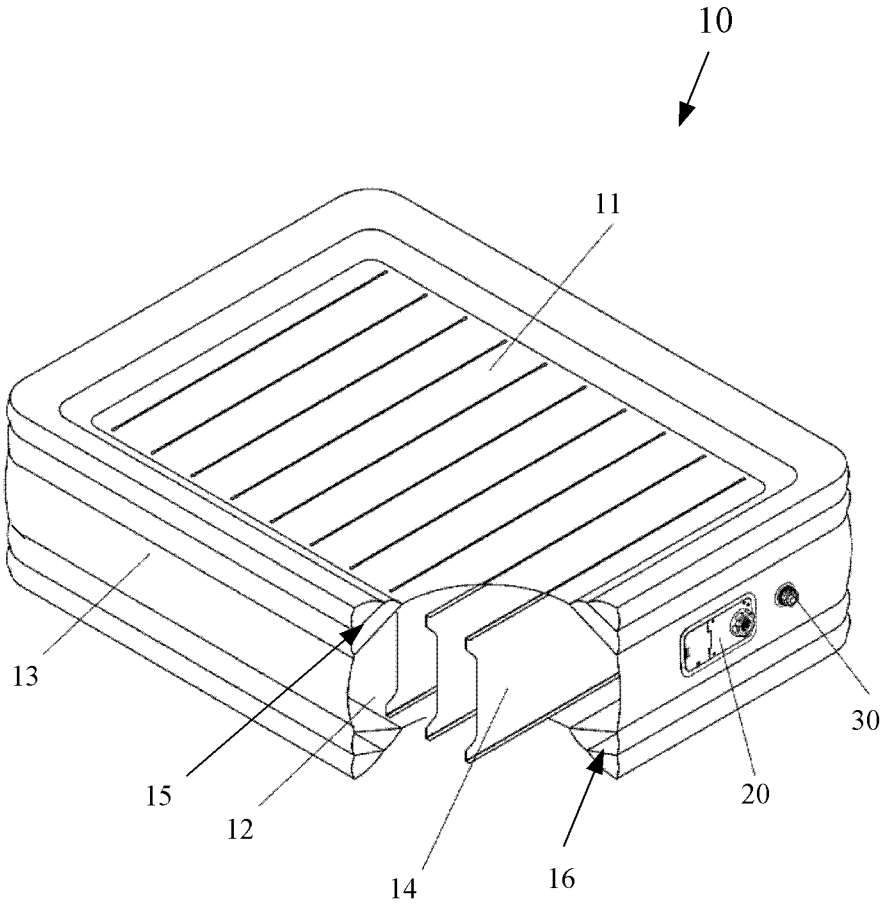


图 6

INTEX EX. 1038, Pg. 102
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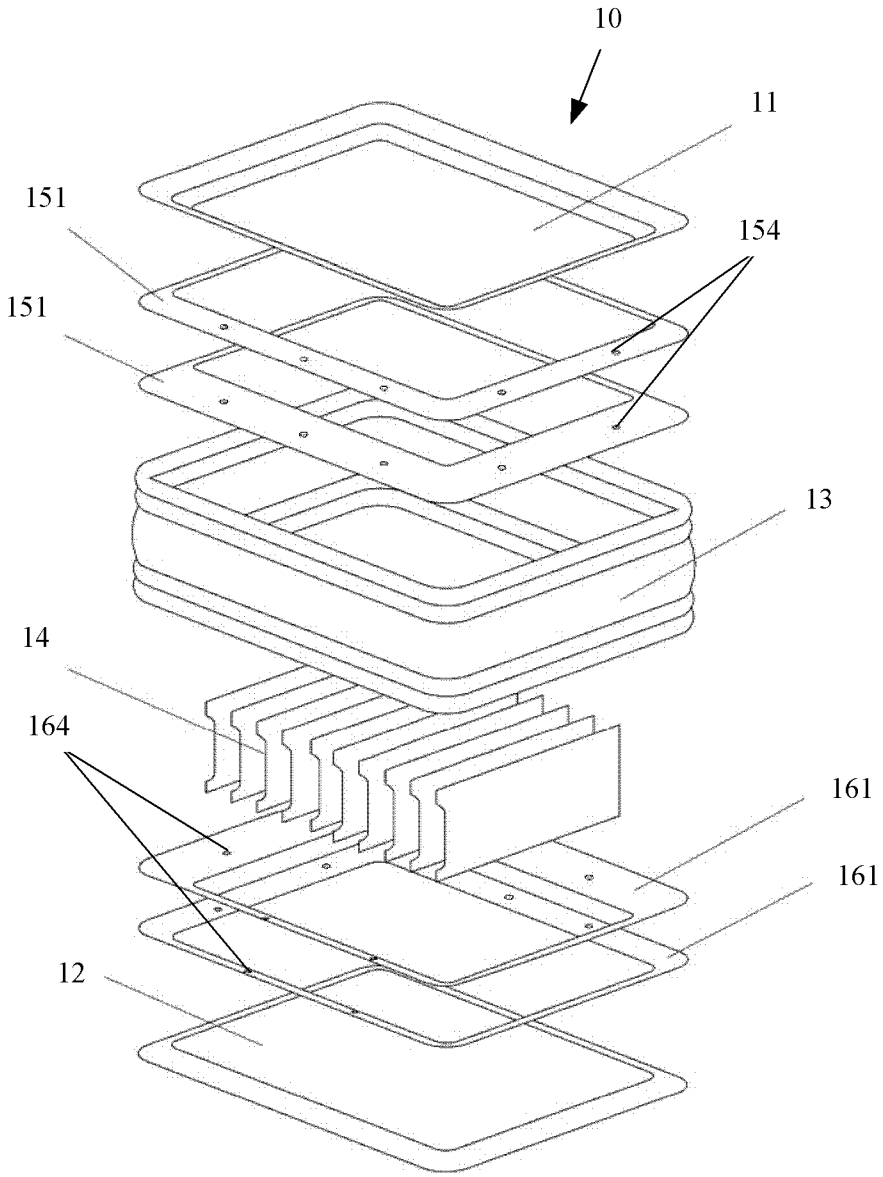


图 7

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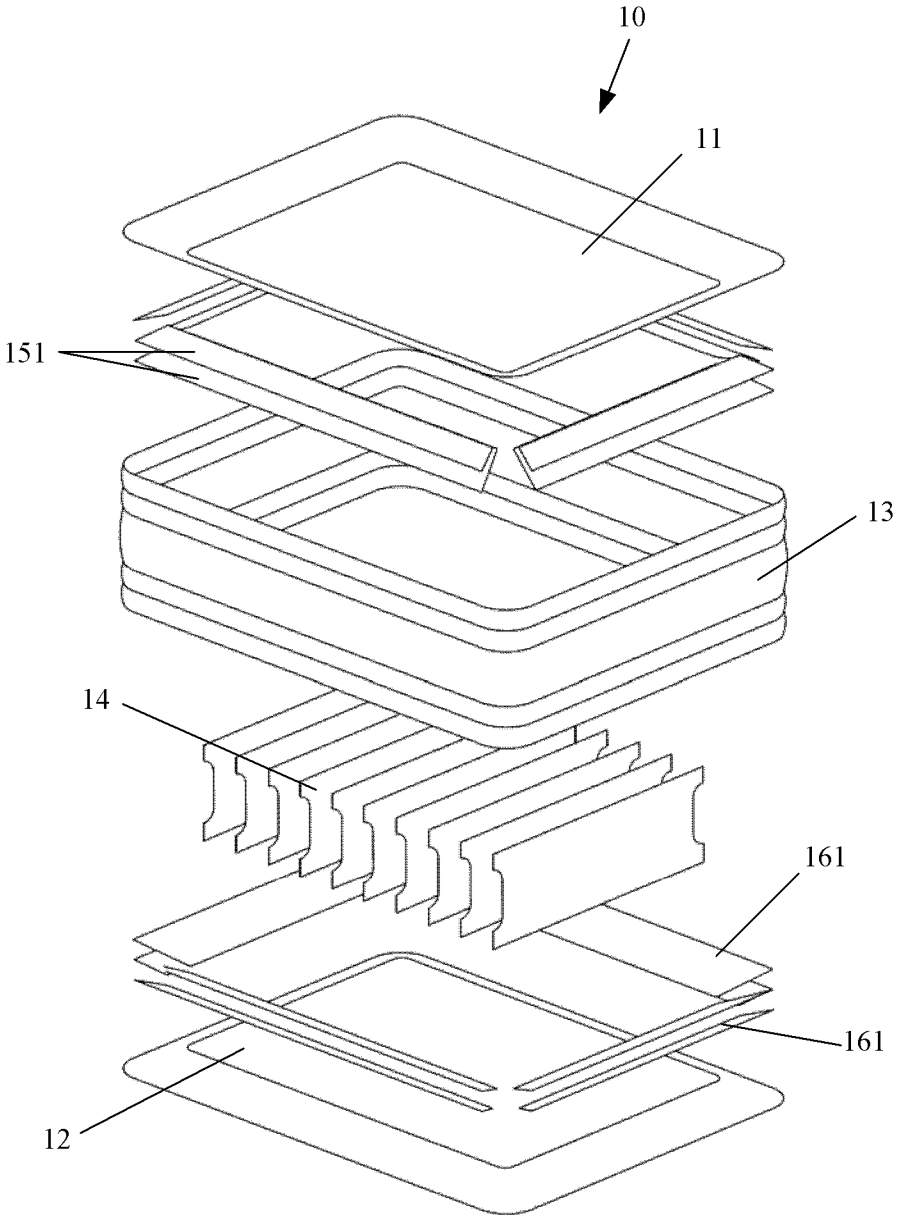


图 8

INTEX EX. 1038, Pg. 104
Intex Recreation v. Bestway Inflatables

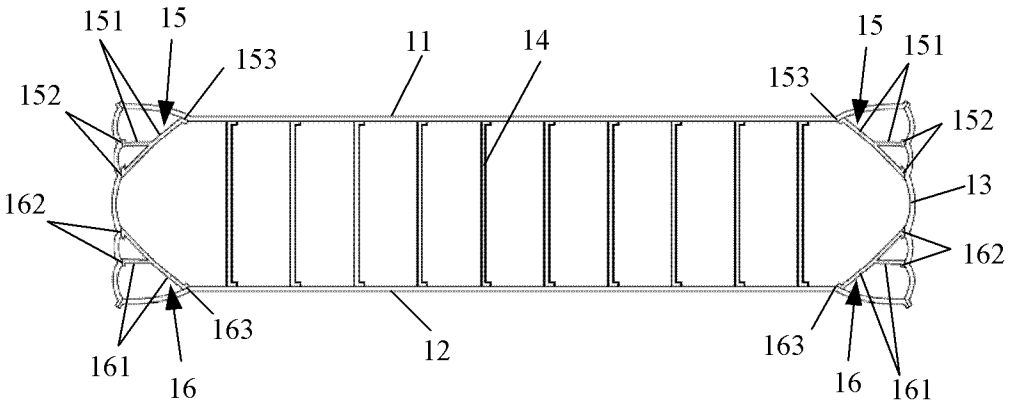


图 9

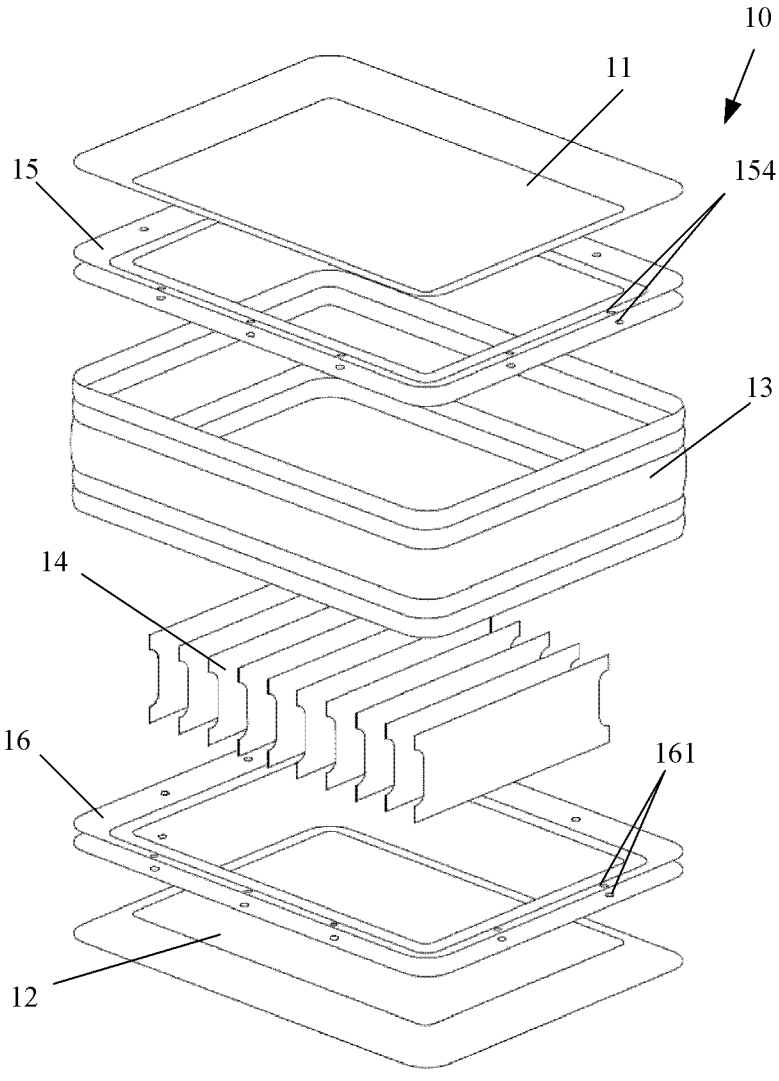


图 10

INTEX EX. 1038, Pg. 105
Intex Recreation v. Bestway Inflatables

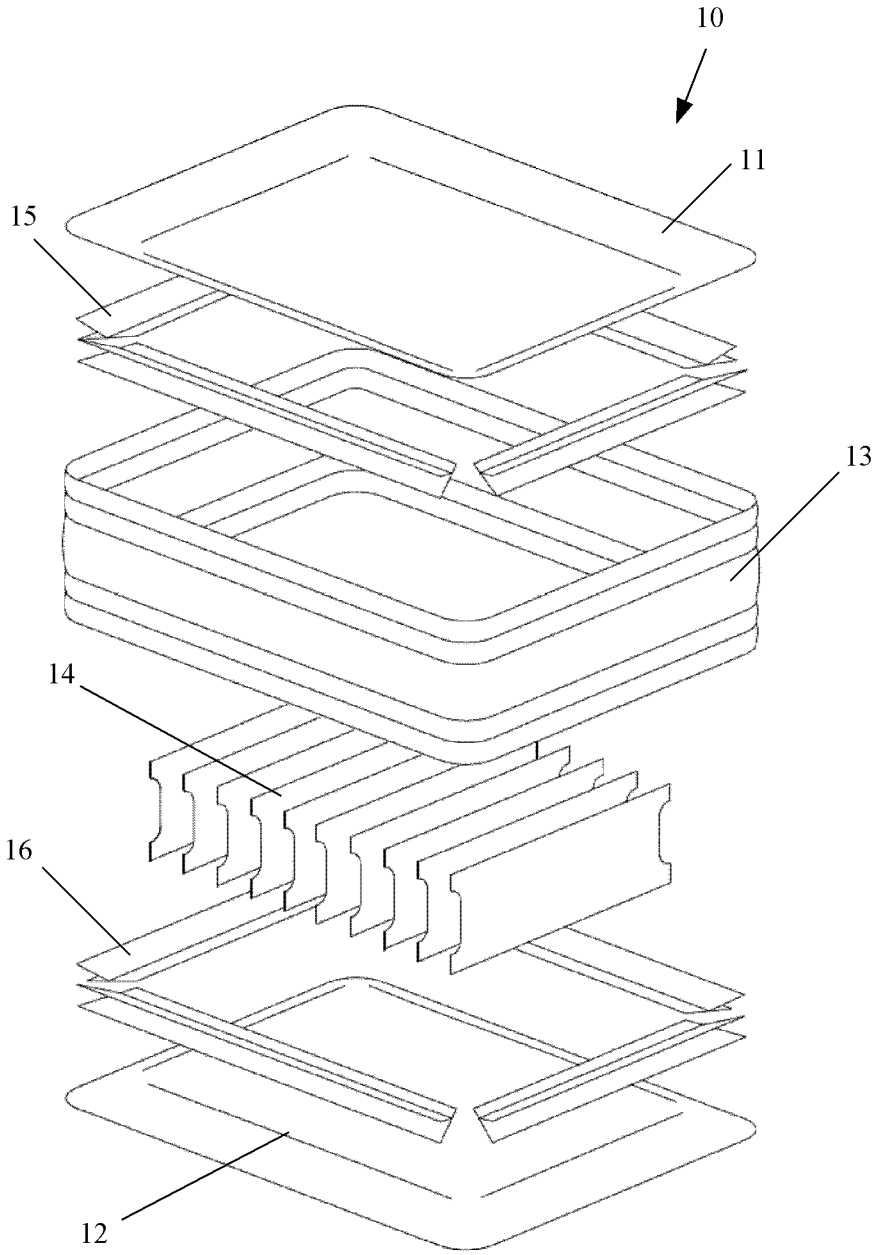


图 11

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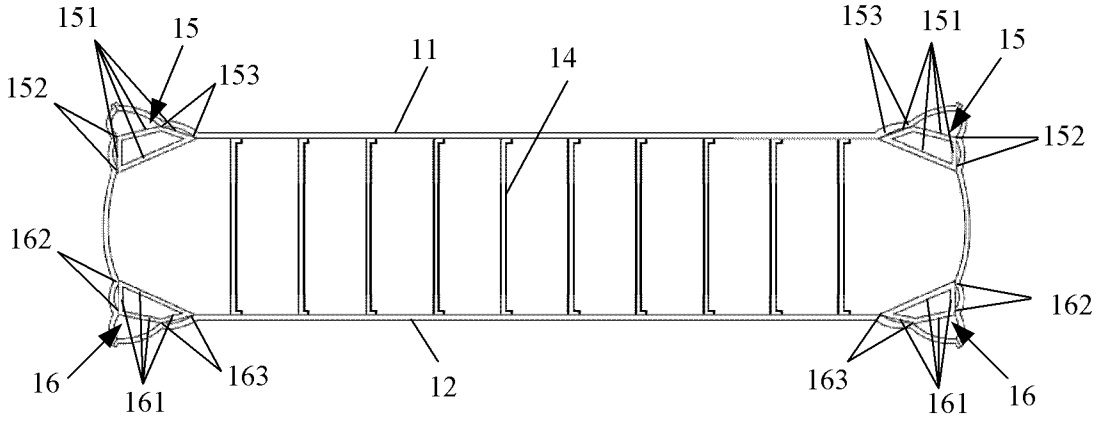


图 12

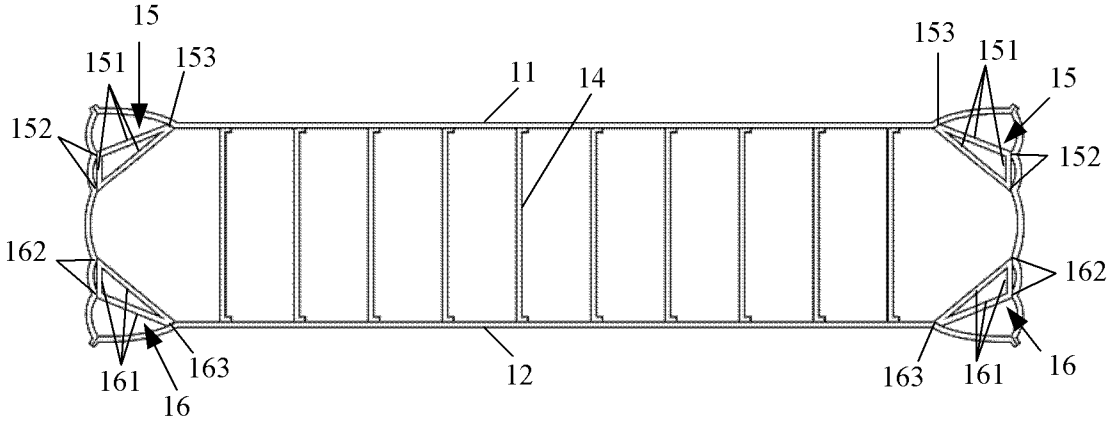


图 13

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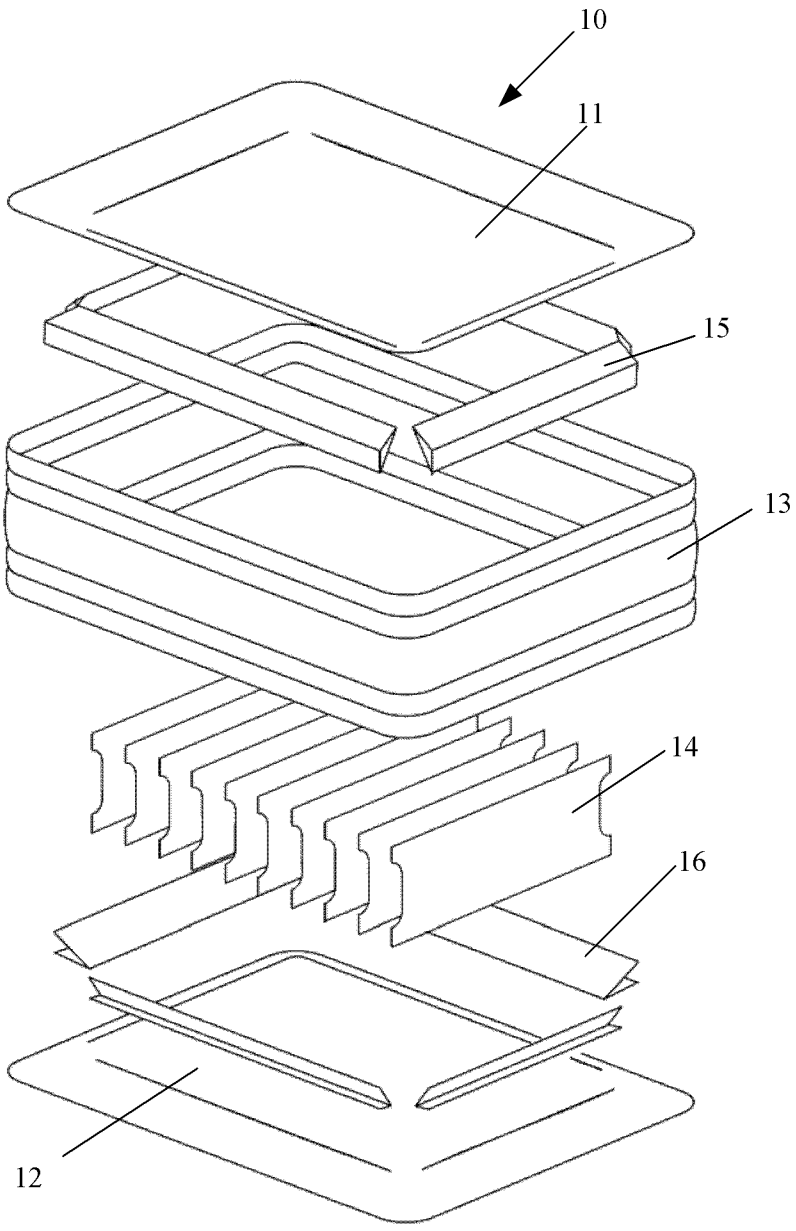


图 14

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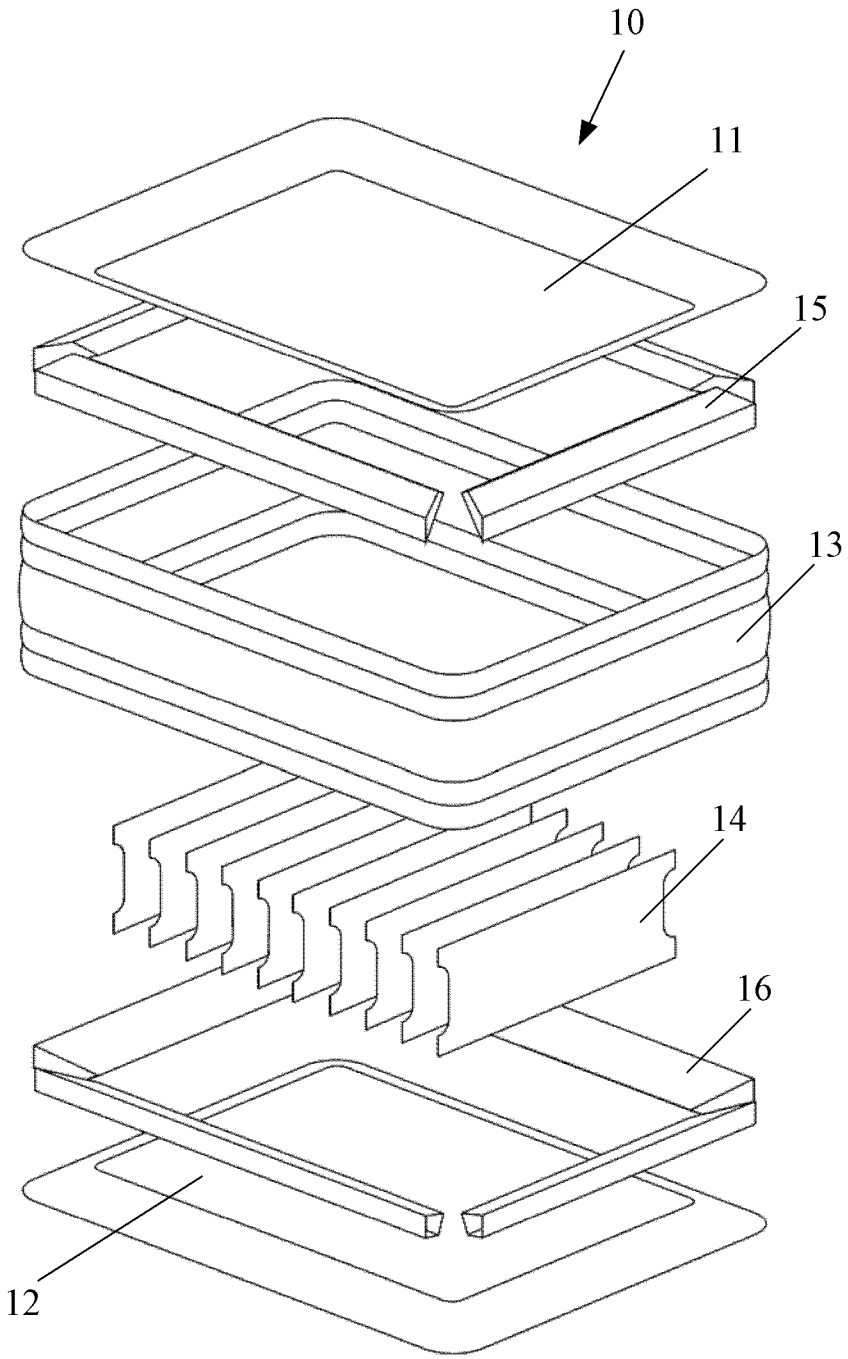


图 15

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Intex Recreation v. Bestway Inflatables

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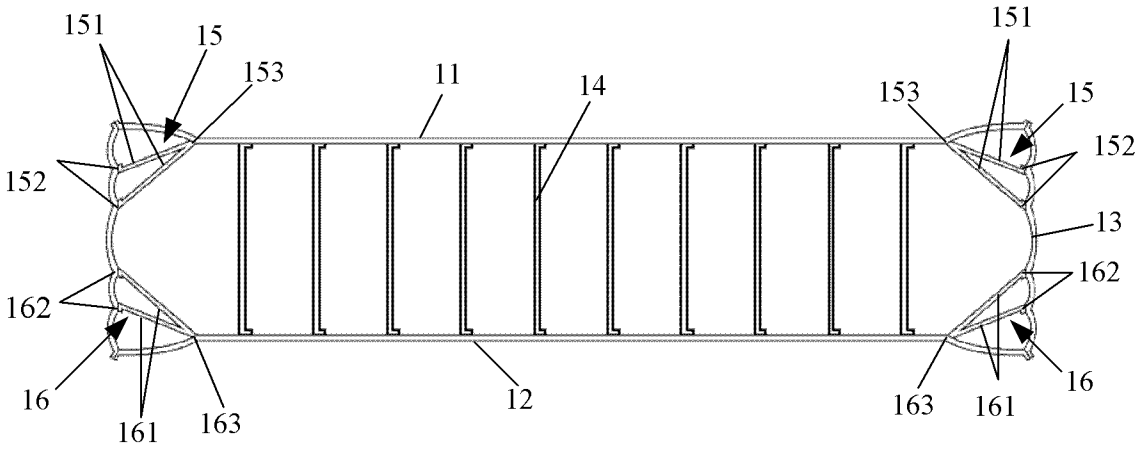


图 16

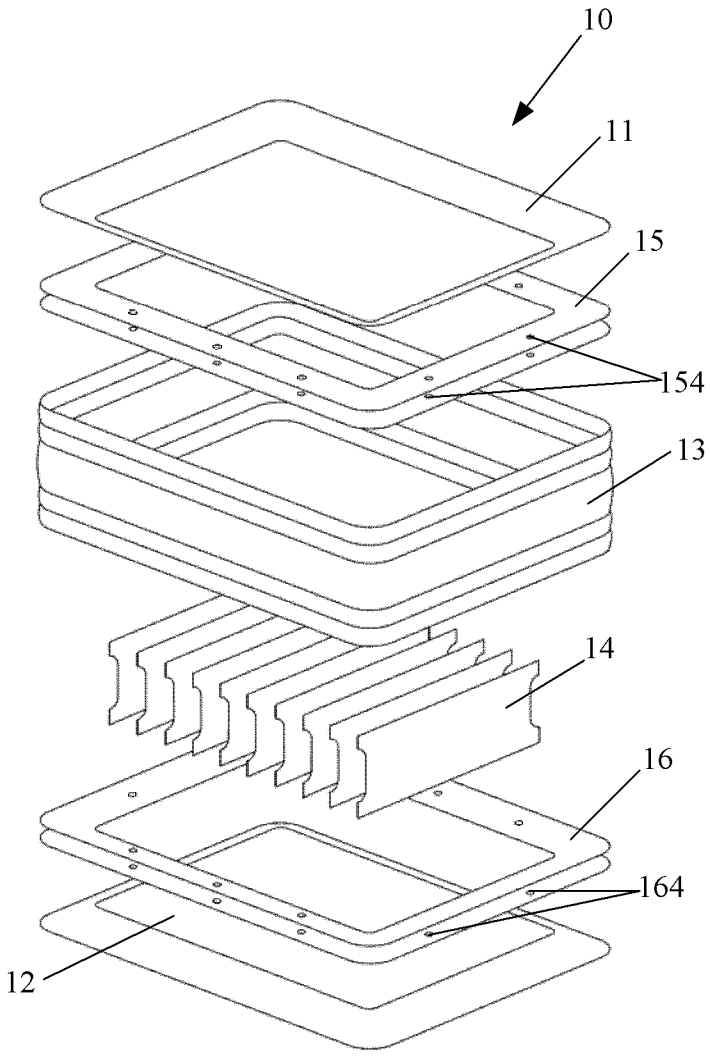


图 17

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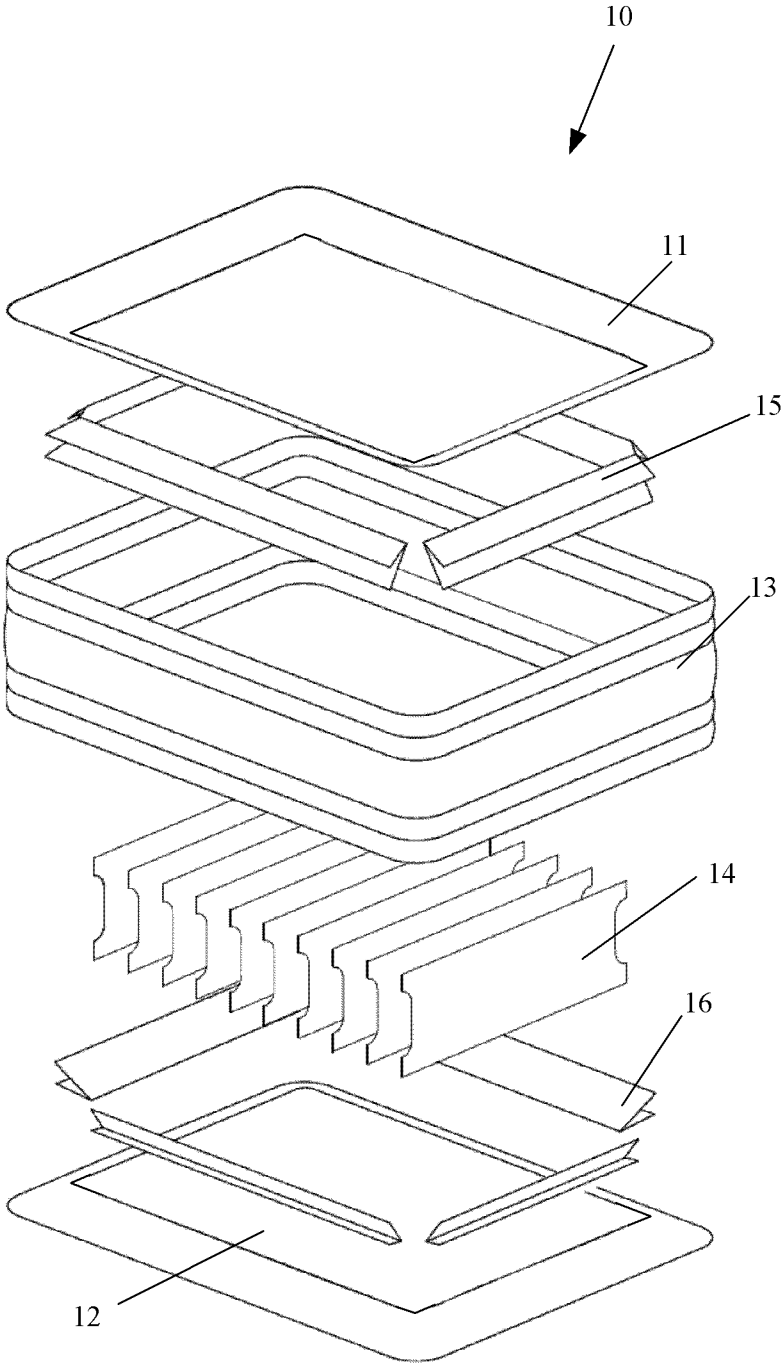


图 18

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2016200310746

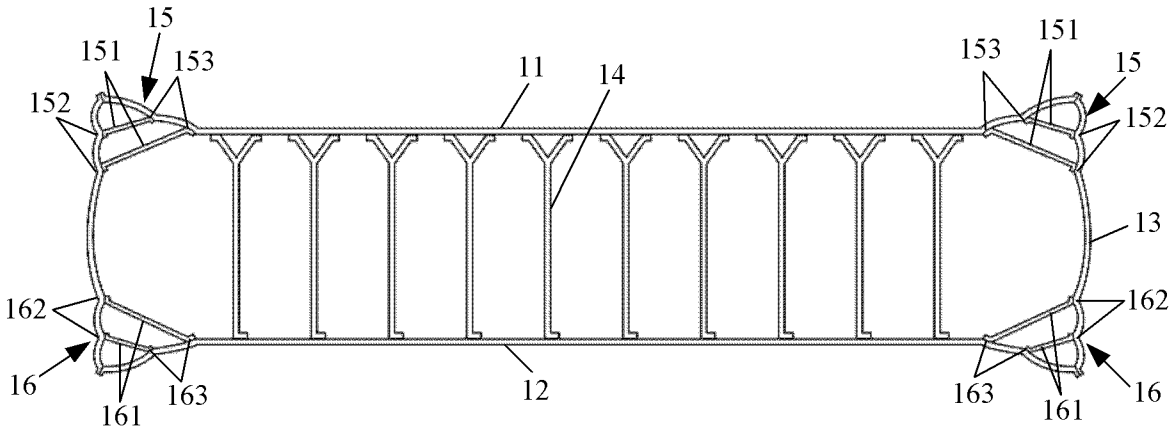


图 19

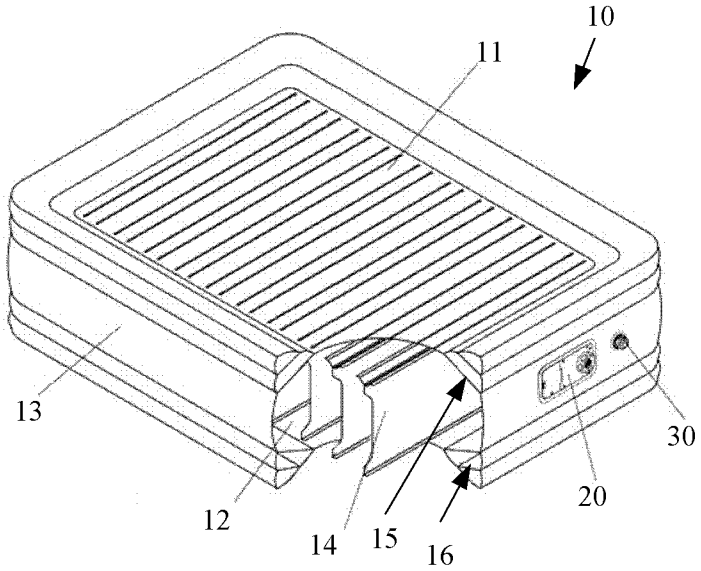


图 20

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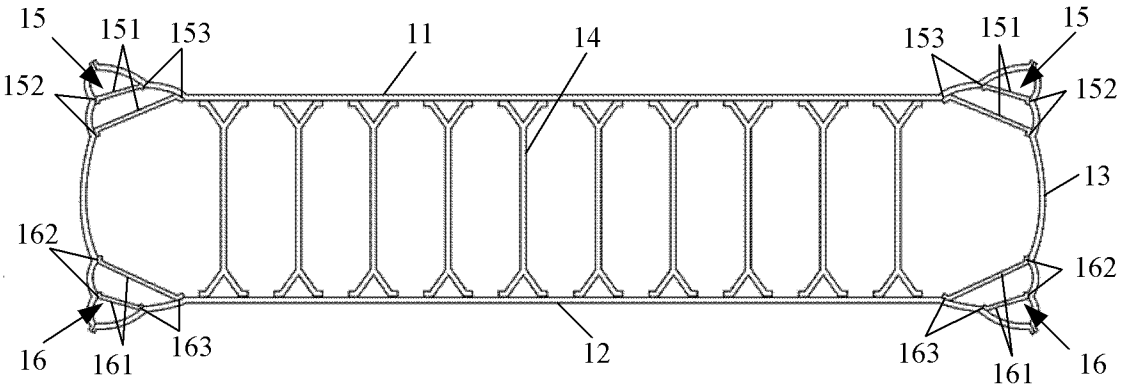

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图 21

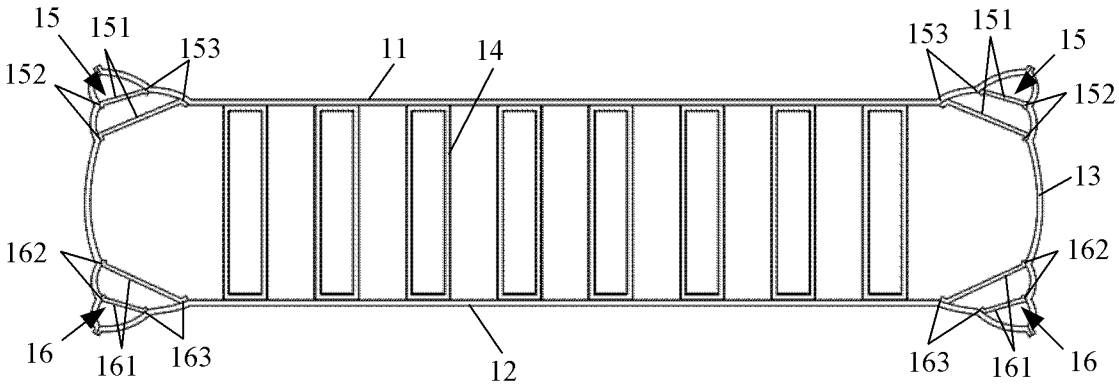

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图 22

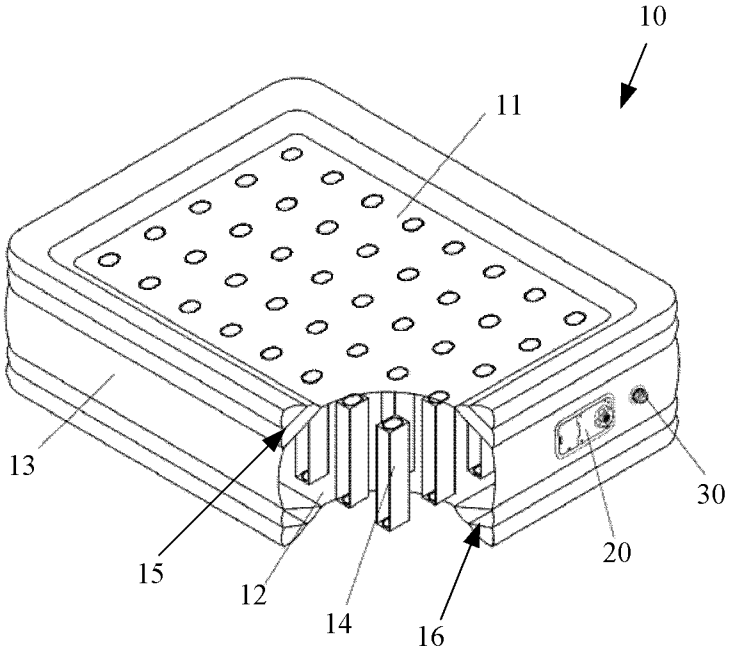


图 23

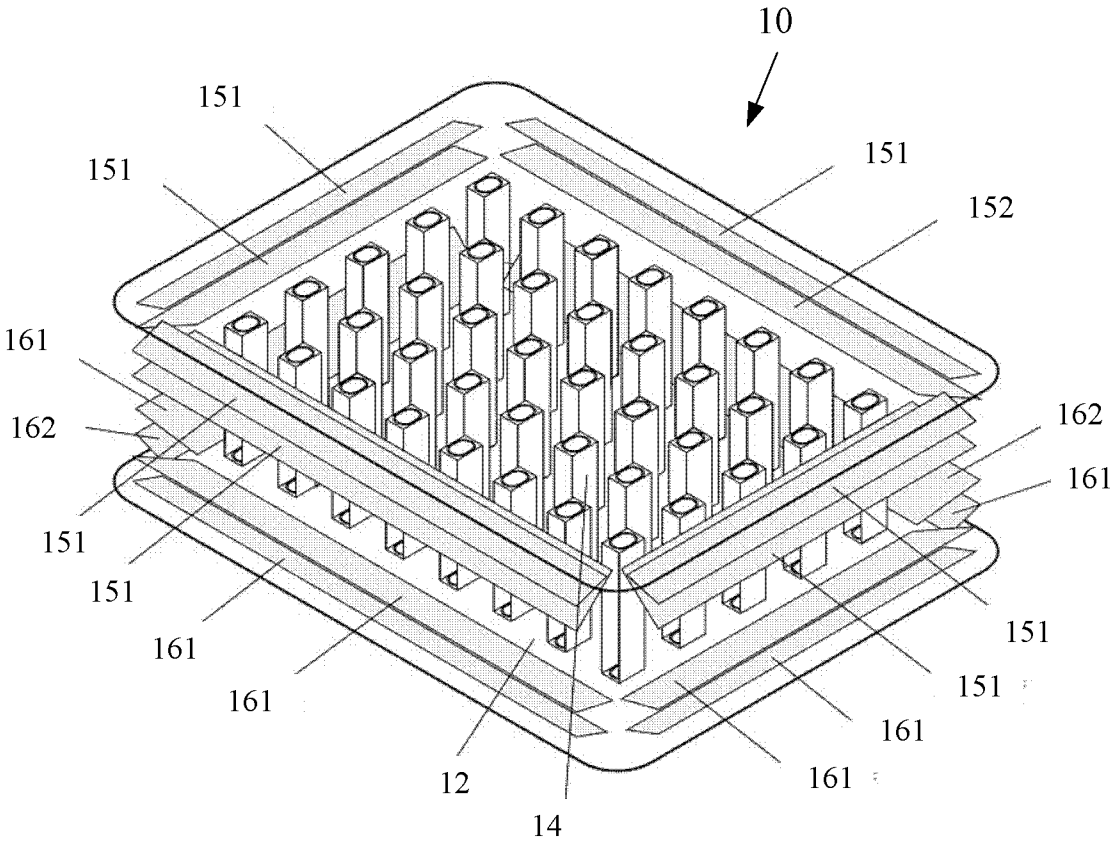


图 24

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Date
07.12.16

Reference	Application No./Patent No.
27S8343,12EP42	16191360.3 - 1653
Applicant/Proprietor	
Bestway Inflatables & Material Corp	

Communication pursuant to the Decision of the President of the European Patent Office dated 9 August 2012 on the filing of priority documents (OJ EPO 2012, 492)

Please be informed that the priority document(s) listed below has (have) been included in the file of the above-mentioned European patent application (R. 53(2) EPC).

State:	Date of filing:	Application number:
CN	13.01.16	CNA201610020533
CN	13.01.16	CNU201620031074

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Europäisches Patentamt
European Patent Office
Office européen des brevets

Application No.: 16191360.3

The search has started on 10.05.17 (see Notice from the European Patent Office dated 03/2013, OJ EPO 2013, 153).

Receiving Section

ABSTRACT / ZUSAMMENFASSUNG / ABRÉGÉ

16191360.3

An inflatable bed (10) is provided. The inflatable bed comprises a top sheet and a bottom sheet (11,12) disposed vertically at an interval, at least one side wall (13), at least one first tensioning structure (14) and at least one support structure (15,16). An upper edge of said side wall is coupled to an outer edge of said top sheet. A lower edge of said side wall is coupled to an outer edge of said bottom sheet. An upper end and a lower end of said first tensioning structure are respectively coupled to said top sheet and said bottom sheet. Said support structure is disposed in a longitudinal direction of at least one of said side walls. At least two outside edges of said support structure are respectively coupled to the side wall adjacent. At least one inside edge of said support structure is coupled to the top sheet or bottom sheet adjacent.

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Information on Search Strategy - **Pilot phase (see OJ 2015, A86)**
The type of information contained in this sheet may change during the pilot for improving the usefulness of this new service.

Application Number

EP 16 19 1360

TITLE: INFLATABLE BED

APPLICANT: Bestway Inflatables & Material Corp

IPC CLASSIFICATION: A47C27/08, A47C27/16

EXAMINER: Lehe, Jörn

CONSULTED DATABASES: EPODOC, WPI

CLASSIFICATION SYMBOLS DEFINING EXTENT OF THE SEARCH:

IPC:

CPC: A47C27/087, A47C27/16, A47C27/081

FI/F-TERMS:

KEYWORDS OR OTHER ELEMENTS FEATURING THE INVENTION:

EPO FORM P04A42

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 16 19 1360

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2013/145560 A1 (CHEN YUAN-CHEN [TW]) 13 June 2013 (2013-06-13)	1,31,40	INV. A47C27/08 A47C27/16
A	* paragraph [0031] - paragraph [0070]; figures 1-9 *	2-30, 32-39	
A	US 2009/165211 A1 (SONG RONG-JYH [TW] ET AL) 2 July 2009 (2009-07-02) * paragraph [0009] - paragraph [0019]; figures 1-4 *	2	

TECHNICAL FIELDS SEARCHED (IPC)

A47C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	11 May 2017	Lehe, Jörn

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 16 19 1360

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

11-05-2017

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2013145560 A1	13-06-2013	CN 202681275 U	23-01-2013
		US 2013145560 A1	13-06-2013
US 2009165211 A1	02-07-2009	CN 201097864 Y	13-08-2008
		US 2009165211 A1	02-07-2009

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

The examination is being carried out on the **following application documents**

Description, Pages

1-16 as originally filed

Claims, Numbers

1-40 as originally filed

Drawings, Sheets

1/16-16/16 as originally filed

*****

1. Reference is made to the following documents; the numbering will be adhered to in the rest of the procedure.

D1 US 2013/145560 A1 (CHEN YUAN-CHEN [TW]) 13 June 2013 (2013-06-13)

D2 US 2009/165211 A1 (SONG RONG-JYH [TW] ET AL) 2 July 2009 (2009-07-02)

2. The present application does not meet the criteria of Article 52(1) EPC, because the subject-matter of claim is not new in the sense of Article 54(1) and (2) EPC.

The document D1 (Fig. 6 or Fig. 9) discloses (the references in parentheses applying to this document):

An inflatable bed, comprising:

- a top sheet and a bottom sheet (112,114) disposed vertically at an interval;

- at least one side wall (116), an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;
- at least one first tensioning structure (120) disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and
- at least one support structure (150a,190) disposed in said air chamber,
- said support structure being disposed in a longitudinal direction of at least one of said side walls,
- at least two outside edges of said support structure being respectively coupled to the side wall (fig. 9: outside edges of 150a and 190 are coupled to side wall 116) adjacent,
- at least one inside edge of said support structure (150a) being coupled to the top sheet (112) or bottom sheet adjacent.

3. Dependent claims 31 and 40 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the EPC in respect of novelty or inventive step, for the following reasons:

- claim 31 (not inventive): obvious design option
- claim 40 (not new): D1 shows a valve (170)

4. The combination of the features of dependent claim 2 is neither known from, nor rendered obvious by, the available prior art.

*****

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Questions about this communication ?
Contact Customer Services at www.epo.org/contact

Inchingalo, Simona
Bugnion S.p.A.
Viale Lancetti, 17
20158 Milano
ITALIE

Date
22.05.17

Reference	Application No./Patent No.
27S8343,12EP42	16191360.3 - 1653
Applicant/Proprietor	
Bestway Inflatables & Material Corp	

Communication

The extended European search report is enclosed.

The extended European search report includes, pursuant to Rule 62 EPC, the European search report (R. 61 EPC) or the partial European search report/ declaration of no search (R. 63 EPC) and the European search opinion.

Copies of documents cited in the European search report are attached.

☑ 0 additional set(s) of copies of such documents is (are) enclosed as well.

The following have been approved:

☐ Abstract ☑ Title

☑ The Abstract was modified and the definitive text is attached to this communication.

The following figure(s) will be published together with the abstract: 7

Refund of search fee
If applicable under Article 9 Rules relating to fees, a separate communication from the Receiving Section on the refund of the search fee will be sent later.

Should you wish to further prosecute this application in the examination phase, your attention is drawn to the provisions of Rule 70a EPC. An invitation to respond to the extended European search report will be issued once the date of publication of the European search report has been mentioned in the European Patent Bulletin (R. 69(1), R. 70(2) EPC).

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INTEX EX. 1038, Pg. 123
Intex Recreation v. Bestway Inflatables

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Inchingalo, Simona
Bugnion S.p.A.
Viale Lancetti, 17
20158 Milano
ITALIE

Date
21.06.17

Reference	Application No./Patent No.
27S8343,12EP42	16191360.3 - 1653 / 3192401
Applicant/Proprietor	
Bestway Inflatables & Material Corp	

Notification of European publication number and information on the application of Article 67(3) EPC

You are hereby informed that the technical preparations for the publication of the above-mentioned European patent application have been completed.

The application will be published on 19.07.17 with the European search report.
The publication number is: 3192401.
The publication will be mentioned in European Patent Bulletin number 2017/29.
(**http://bulletin.european-patent-office.org**).

Provisional protection under Article 67(1) and (2) EPC in the individual contracting states becomes effective when the conditions referred to in Article 67(3) EPC have been fulfilled. Provisional protection in the individual extension and validation states is governed by the national laws of the countries concerned. For more details, see Chapter III of the EPO brochure "National Law relating to the EPC" (**www.epo.org/law-practice/legal-texts/national-law.html**), which also contains information about the extension and validation system. Further information can also be found in the Official Journal of the European Patent Office.

The title of the invention in the three official languages of the European Patent Office is worded as follows:

AUFBLASBARES BETT
INFLATABLE BED
LIT GONFLABLE

In all future communications to the EPO, please quote the application number as indicated above, i.e. including the final four figures (which identify the Directorate responsible for the subsequent procedure).

Remark
The publication can be downloaded, free of charge, from the EPO publication server **https://data.epo.org/publication-server/** or can be ordered from the Vienna sub-office upon payment of a fee (see Decision of the President of the EPO dated 12 July 2007 concerning the form of publication of European patent applications, European search reports and European patent specifications, Special edition No. 3, OJ EPO 2007, 97).

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Intex Recreation v. Bestway Inflatables

Note concerning renewal fees
Under Article 86 EPC renewal fees shall be paid to the EPO for the European patent application. These fees shall be due in respect of the third and each subsequent year, calculated from the date of filing. Due account should be taken that the EPO will not send invoices or reminders to pay any fees in due time.

Accelerated prosecution of European patent applications
Applicants wishing to accelerate proceedings before the EPO may file a request according to the programme for accelerated prosecution of European patent applications - "PACE" (OJ EPO 2010, 352). EPO Form 1005 is available on the EPO website (www.epo.org) for this purpose.

Receiving Section



INTEX EX. 1038, Pg. 125
Intex Recreation v. Bestway Inflatables

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Questions about this communication ?
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Inchingalo, Simona
Bugnion S.p.A.
Viale Lancetti, 17
20158 Milano
ITALIE

Date
24.07.17

Reference	Application No./Patent No.
27S8343,12EP42	16191360.3 - 1653 / 3192401
Applicant/Proprietor	
Bestway Inflatables & Material Corp	

Communication pursuant to Rule 69 EPC - reminder concerning payment of the designation fee (Art. 79(2) EPC) and of the examination fee (Art. 94(1) EPC) - and invitation pursuant to Rule 70a(1) EPC

The date on which the European Patent Bulletin mentions the publication of the European search report for the above-mentioned European patent application is: 19.07.17.

Your attention is drawn to Article 79(2) and Rule 39(1) EPC as well as Article 94(1), Rule 70(1) and Rule 70a(1) EPC, according to which within **six months** of the above-mentioned publication date of the search report

- the designation fee must be paid,
- the request for examination must be filed and the examination fee must be paid,
- comments on the objections raised in the opinion accompanying the European search report and/or any amendments to the description, claims and drawings correcting any deficiencies noted in the opinion must be filed (R. 70a(1), 137(2) EPC; Guidelines for Examination in the EPO, B-XI, 8).

1. Payment of the designation fee and of the examination fee

The current designation fee for one or more Contracting States designated is: EUR 585,00

The current examination fee is: EUR 1635,00

If the written request for examination is filed in an admissible non-EPO language in accordance with Article 14(4) EPC, a reduction of the examination fee according to Rule 6(3) EPC applies.

For European patent applications filed on or after 01.04.2014, the reduction applies only if the applicant(s) has (have) declared to be an entity or a natural person within the meaning of Rule 6(4) EPC (Decision of the Administrative Council of 13 December 2013, OJ EPO 2014, A4).

If the designation fee and the examination fee are not paid within the period laid down in Rule 39(1) and Rule 70(1) EPC, the application **will be deemed to be withdrawn** (R. 39(2) and Art. 94(2) EPC).

Any extension or validation fees are also payable within the above-mentioned period.

2. Comments on the opinion accompanying the European search report and filing of amendments

Should the reply to the invitation pursuant to Rule 70a(1) EPC be filed in an admissible non-EPO language, a translation is to be submitted within one month of its filing (R. 6(2) EPC).

If filing amendments, you must identify them and indicate the basis for them in the application as filed. Failure to meet either requirement may lead to a communication from the Examining Division requesting that you correct this deficiency (R. 137(4) EPC).

Should you not comply with this invitation within the time limit, the application **will be deemed to be withdrawn** in accordance with Rule 70a(3) EPC.

Note to users of the automatic debiting procedure
Unless the EPO receives prior instructions to the contrary, the examination fee and the designation fee will be debited on the last day of the period for payment. For further details see the Arrangements for the automatic debiting procedure, supplementary publication 3 - OJ EPO 2015.

Important information concerning fee amounts
Following any amendment to the Rules relating to Fees, the amount(s) mentioned in this communication may be different from the amount(s) **actually due on the date of payment.** The latest version of the Schedule of fees and expenses, published as a Supplement to the Official Journal of the EPO, is also available on the EPO website (**www.epo.org**) and can be found under **www.epo.org/schedule-of-fees**, which allows the viewing, downloading and searching for individual fee amounts, both current and previous.
Please note that procedural fees are usually adjusted every two years, on even years, with effect from 1 April.

Payments by cheque delivered or sent direct to the EPO are no longer accepted as from 1 April 2008 (see OJ EPO 2007, 626).

Note concerning renewal fees
Under Article 86 EPC renewal fees shall be paid to the EPO for the European patent application. These fees shall be due in respect of the third and each subsequent year, calculated from the date of filing. Due account should be taken that the EPO will not send invoices or reminders to pay any fees in due time.

Receiving Section



INTEX EX. 1038, Pg. 127
Intex Recreation v. Bestway Inflatables

Europäisches Patentamt
European Patent Office
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Letter accompanying subsequently filed items

Representative:

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The document(s) listed below is (are) subsequently filed documents pertaining to the following application:

Application number and/or EP publication number	EP16191360.3
Reference	27M9223.12EP42
Procedural phase	Search
Name of represented party	Bestway Inflatables & Material Corp

	Description of document	Original file name	Assigned file name
1	Reply to search opinion/written opinion/IPER	27.M9223.12.EP.42@2018-01-19_Uff _Com_A_(Reply EESR).pdf	WOREPLY-1.pdf
2	Amended claims (clean copy)	27.M9223.12.EP.42@ameded claims_clean copy.pdf	CLMS-1.pdf
3	Amended claims with annotations	27.M9223.12.EP.42@ameded claims_working copy.pdf	CLMS-HWA-1.pdf
4	Amended description with annotations	27.M9223.12.EP.42@ameded descripion pages 1 and 14_working copy.pdf	DESC-HWA-1.pdf
5	Amended description (clean copy)	27.M9223.12.EP.42@ameded description pages 1 and 14_clean copy.pdf	DESC-1.pdf

	Fees	Factor applied	Fee schedule	Amount to be paid
15-1	005e Designation fee - For all contracting States designated for applications filed on/after 01.04.2009	1	585.00	585.00
15-2	006 Examination fee for applications filed on/after 01.07.2005	1	1 635.00	1 635.00
	Total:		**EUR**	**2 220.00**

	Payment	
1	Mode of payment	Debit from deposit account
	Currency:	EUR
	The European Patent Office is hereby authorised, to debit from the deposit account with the EPO any fees and costs indicated on the fees page.	
	Deposit account number:	28070083

INTEX EX. 1038, Pg. 128
Intex Recreation v. Bestway Inflatables

	Account holder:	BUGNION S.P.A.
2	Refund/Reimburserment	
	Reimbursement (if any) to be made to EPO deposit account:	28070083
	Account holder:	BUGNION S.P.A.

Signature 1

Place:

Date: **19 January 2018**

Signed by: **/116105/**

Capacity: **Representative 1**

Smart card certificate 1

Common name: **Simona Inchingalo 42182**

EPO ID: **42182**

Issued by: **European Patent Office CA G2**

INTEX EX. 1038, Pg. 129
Intex Recreation v. Bestway Inflatables

50th Anniversary

BUGNION S.p.A.
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Our Ref. 27.M9223.12.EP.42 **Your Ref.** 100680-0391 Milan, January 19, 2018

RE. European patent application
Application No. 16191360.3 filed on September 29, 2016
In the name of BESTWAY INFLATABLES & MATERIAL CORP.

Dear Sirs,

The present letter is in reply to the Extended European Search Report issued on May 22, 2017 and to the following communication under Rule 69 and Rule 70a(1) EPC. The mention of the publication of the European Search Report on the European Patent Bulletin of the present application is July 19, 2017.

Dealing with the objections raised in the opinion accompanying the EESR, the Applicant requests for the examination of the present application and submits what follows in reply.

The following documents have been cited in the search report:

D1) US 2013/145560 (considered as X)

D2) US 2009/165211 (considered as A)

AMENDMENTS

The Examiner stated that the present application doesn't meet the requirements of Article 52(1) EPC, because the subject matter of claim 1 is not new in the sense of Art. 54(1) and (2) EPC in the light of D1.

B

On point 4 of the Written Opinion, the Examiner has stated that the features of dependent claim 2 is neither known from, nor rendered obvious by, the available prior art.

Therefore, in order to overcome the Examiner's objections, claim 1 has been amended including the technical features of original claim 2.

Consequently, claim 2 has been deleted and claims 3-40 have been renumbered into claims 2-39 and amended in their dependencies, where necessary.

No new matter has been added, as required by Article 123(2) EPC, since the support for such an amendment is fully contained in original specification in claim 2.

Minor amendments have been carried out also to original claim 16, now claim 15, and to description, paragraph [0115], in order to amend only typo errors.

No new matter has been added making such amendments, as required by Article 123(2) EPC.

In particular, original claim 16 has been amended including the word "I-beams" which for an oversight has been missed in claim 16 (*The inflatable bed according to claim 6, wherein said at least two second **I-beams** are disposed at an interval on the inner surface of said side wall in a perpendicular direction*).

Paragraph [0115] has been amended deleting the letter "V" which was erroneously typed twice (*Further, the two outside edges 152 of the at least one first V-beam 151 are arranged at an interval on an inner surface of the side wall 13 in a perpendicular direction. The two outside edges 162 of the at least one second VV-beam 161 are arranged at an interval on the inner surface of the side wall 13 in a perpendicular direction*).

Finally, prior art documents D1 and D2 have been identified in the description so complying with Rule 42(1)(b) EPC.

NOVELTY AND INVENTIVE STEP

The Examiner has objected neither novelty nor inventive step of claim 2.

B

Amended claim 1 now include the technical features of originally new and inventive claim 2. Indeed, none of the cited prior art documents shows the combination of the technical features now cited in amended claim 1.

Therefore, amended claim 1 is felt now to be patentable.

Moreover, also the combination of one of these cited documents with the common general knowledge of a skilled person would bring to the claimed invention.

Thus, the subject matter of amended claim 1 is new over D1 and involves an inventive step in view of a combination of D1 and D2 and therefore it is considered to be patentable.

Claims 2-39, depending on new and inventive claim 1, are felt to be patentable too.

Conclusions

In view of the above amendments and remarks, reconsideration of the application is respectfully requested.

Should the Examining Division disagree with the above amendments and envisage refusal of the application, oral proceedings are respectfully requested.

The Applicant hereby reserves his right to file divisional application(s) for any subject-matter which may seems abandoned by the above amendment and remarks.

Yours sincerely,

Bugnion SpA
Ing. Simona Inchingalo

Enclosures:

- Amended claims: clean and working copy
- Amended pages 1 and 14 of the description: clean and working copy

INFLATABLE BED

CROSS REFERENCE

[0001] This application claims the benefit and priority of Chinese Application No. 201610020533.5, filed January 13, 2016. The entire disclosures of each of the above applications are incorporated herein by reference.

FIELD OF THE INVENTION

[0002] The present invention relates to inflatable beds or inflatable mattresses, and more specifically, to an inflatable bed, the structure of which is configured to limit the outward bulging or deformation of a side wall.

BACKGROUND

[0003] Currently, inflatable beds and inflatable mattresses have been very popular. The inflatable beds and inflatable mattresses have the advantages of light weight, easy to carry and store, etc., and thus are widely used in various occasions. For example, household inflatable beds and inflatable mattresses can often be used as temporary beds for visiting guests. In addition, the inflatable beds and inflatable mattresses are very suitable for use in outdoor camping. Examples of such inflatable beds and inflatable mattresses can be found in documents US 2013/145560 and US 2009/165211.

[0004] Conventionally, the inflatable beds and inflatable mattresses are generally made of PVC sheet, PU sheet, or the like, and have various different structures, in which a typical mechanism is that using a top sheet, a bottom sheet, and a side wall coupled to the top sheet and the bottom sheet to form an inflatable air chamber. Tensioning structures, which are coupled to the top sheet and the bottom sheet and are arranged at an interval, are disposed in the air chamber, so as to form a shape having a certain height and a substantially flat upper surface for people to lie on.

[0005] Among the existing inflatable beds and inflatable mattresses, some have a larger height, whereby the side walls of the inflatable beds and inflatable mattresses after being inflated are susceptible to bulge and deform, affecting the appearance of the inflatable beds and inflatable mattresses. And, the bulging and deformation of the inflatable beds and inflatable mattresses may also result in the decay of air pressure in the air chamber, such that the inflatable beds and inflatable mattresses are softened, reducing the comfort of the inflatable beds and inflatable mattresses.

[0006] Therefore, in order to solve the above-mentioned problem of bulging of the side walls, in some inflatable beds and inflatable mattresses, a middle sheet is arranged between the top

[00115] Further, the two outside edges 152 of the at least one first V-beam 151 are arranged at an interval on an inner surface of the side wall 13 in a perpendicular direction. The two outside edges 162 of the at least one second V~~V~~-beam 161 are arranged at an interval on the inner surface of the side wall 13 in a perpendicular direction.

[00116] Furthermore, the at least one first V-beam 151 as a whole is of a continuous annular structure or a segmental annular structure. The at least one second V-beam 161 as a whole is of a continuous annular structure or a segmental annular structure. Moreover, the at least one first V-beam 151 is provided with air holes 154, and an airflow passage is formed in said air chamber through the air holes 154. The at least one second V-shaped drawstring V-beam 161 is provided with air holes 164, and an airflow passage is formed in said air chamber through the air holes 164.

[00117] The second tensioning structure 15 and the third tensioning structure 16 are preferably disposed at an interval in a perpendicular direction. In this embodiment, the second tensioning structure 15 and the third tensioning structure 16 divide the respective side wall 13 into five sections, so that the second tensioning structure 15 is configured to limit the upward and lateral bulging of the top sheet 11 and the side wall 13 after said air chamber is inflated, and the third tensioning structure 16 is configured to limit the respective downward and lateral bulging of the bottom sheet 12 and the side wall 13 after said air chamber is inflated.

[00118] Of course, the second tensioning structure 15 and the third tensioning structure 16 may also divide the respective side wall 13 into a multi-section structure, such as a four- or six-section structure; this embodiment is merely exemplary and the present invention is not limited thereto, and all the structures with four or more sections fall within the scope of protection of the present invention.

[00119] Embodiment 5:

[00120] Fig. 19 is a sectional view of a fifth embodiment taken along line A-A in Fig. 4. Fig. 20 is a schematic structural partially sectional view of the fifth embodiment of the inflatable bed of the present invention.

[00121] As shown in Figs. 19 and 20, the structure of this embodiment is substantially the same as that of the first embodiment, except that the first tensioning structure 14 employs a Y-beam, and the upper and lower ends of the first tensioning structure 14 are respectively coupled to the top sheet 11 and the bottom sheet 12. Several beams in the first tensioning structure 14 are arranged spaced apart from each other. The upper end of each beam of the first tensioning structure 14 takes the form of a fork and is coupled to and supports the top sheet 11,

INFLATABLE BED

CROSS REFERENCE

[0001] This application claims the benefit and priority of Chinese Application No. 201610020533.5, filed January 13, 2016. The entire disclosures of each of the above applications are incorporated herein by reference.

FIELD OF THE INVENTION

[0002] The present invention relates to inflatable beds or inflatable mattresses, and more specifically, to an inflatable bed, the structure of which is configured to limit the outward bulging or deformation of a side wall.

BACKGROUND

[0003] Currently, inflatable beds and inflatable mattresses have been very popular. The inflatable beds and inflatable mattresses have the advantages of light weight, easy to carry and store, etc., and thus are widely used in various occasions. For example, household inflatable beds and inflatable mattresses can often be used as temporary beds for visiting guests. In addition, the inflatable beds and inflatable mattresses are very suitable for use in outdoor camping. Examples of such inflatable beds and inflatable mattresses can be found in documents US 2013/145560 and US 2009/165211.

[0004] Conventionally, the inflatable beds and inflatable mattresses are generally made of PVC sheet, PU sheet, or the like, and have various different structures, in which a typical mechanism is that using a top sheet, a bottom sheet, and a side wall coupled to the top sheet and the bottom sheet to form an inflatable air chamber. Tensioning structures, which are coupled to the top sheet and the bottom sheet and are arranged at an interval, are disposed in the air chamber, so as to form a shape having a certain height and a substantially flat upper surface for people to lie on.

[0005] Among the existing inflatable beds and inflatable mattresses, some have a larger height, whereby the side walls of the inflatable beds and inflatable mattresses after being inflated are susceptible to bulge and deform, affecting the appearance of the inflatable beds and inflatable mattresses. And, the bulging and deformation of the inflatable beds and inflatable mattresses may also result in the decay of air pressure in the air chamber, such that the inflatable beds and inflatable mattresses are softened, reducing the comfort of the inflatable beds and inflatable mattresses.

[0006] Therefore, in order to solve the above-mentioned problem of bulging of the side walls, in some inflatable beds and inflatable mattresses, a middle sheet is arranged between the top

[00115] Further, the two outside edges 152 of the at least one first V-beam 151 are arranged at an interval on an inner surface of the side wall 13 in a perpendicular direction. The two outside edges 162 of the at least one second V-beam 161 are arranged at an interval on the inner surface of the side wall 13 in a perpendicular direction.

[00116] Furthermore, the at least one first V-beam 151 as a whole is of a continuous annular structure or a segmental annular structure. The at least one second V-beam 161 as a whole is of a continuous annular structure or a segmental annular structure. Moreover, the at least one first V-beam 151 is provided with air holes 154, and an airflow passage is formed in said air chamber through the air holes 154. The at least one second V-shaped drawstring V-beam 161 is provided with air holes 164, and an airflow passage is formed in said air chamber through the air holes 164.

[00117] The second tensioning structure 15 and the third tensioning structure 16 are preferably disposed at an interval in a perpendicular direction. In this embodiment, the second tensioning structure 15 and the third tensioning structure 16 divide the respective side wall 13 into five sections, so that the second tensioning structure 15 is configured to limit the upward and lateral bulging of the top sheet 11 and the side wall 13 after said air chamber is inflated, and the third tensioning structure 16 is configured to limit the respective downward and lateral bulging of the bottom sheet 12 and the side wall 13 after said air chamber is inflated.

[00118] Of course, the second tensioning structure 15 and the third tensioning structure 16 may also divide the respective side wall 13 into a multi-section structure, such as a four- or six-section structure; this embodiment is merely exemplary and the present invention is not limited thereto, and all the structures with four or more sections fall within the scope of protection of the present invention.

[00119] Embodiment 5:

[00120] Fig. 19 is a sectional view of a fifth embodiment taken along line A-A in Fig. 4. Fig. 20 is a schematic structural partially sectional view of the fifth embodiment of the inflatable bed of the present invention.

[00121] As shown in Figs. 19 and 20, the structure of this embodiment is substantially the same as that of the first embodiment, except that the first tensioning structure 14 employs a Y-beam, and the upper and lower ends of the first tensioning structure 14 are respectively coupled to the top sheet 11 and the bottom sheet 12. Several beams in the first tensioning structure 14 are arranged spaced apart from each other. The upper end of each beam of the first tensioning structure 14 takes the form of a fork and is coupled to and supports the top sheet 11,

CLAIMS

What is claimed is:

1. An inflatable bed, comprising:

a top sheet and a bottom sheet disposed vertically at an interval;

at least one side wall, an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges of said support structure being respectively coupled to the side wall adjacent, at least one inside edge of said support structure being coupled to the top sheet or bottom sheet adjacent,

wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent; and

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent.

~~2. The inflatable bed according to claim 1, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent; and~~

~~at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent.~~

~~3~~2. The inflatable bed according to claim ~~2~~1, wherein said second tensioning structure and said third tensioning structure are respectively provided with a plurality of air holes, through which an airflow passage is formed in said air chamber.

43. The inflatable bed according to claim 21, wherein said second tensioning structure and said third tensioning structure are disposed at an interval in a perpendicular direction.

54. The inflatable bed according to claim 21, wherein said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams are respectively coupled to said side wall and said top sheet adjacent, the at least two first I-beams are disposed at an interval.

65. The inflatable bed according to claim 21, wherein said third tensioning structure comprises at least two second I-beams, an outside edge and an inside edge of each of said second I-beams are respectively coupled to the side wall and said bottom sheet adjacent, the at least two second I-beams are disposed at an interval.

76. The inflatable bed according to claim 21, wherein said second tensioning structure comprises at least one first Y-beam, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.

87. The inflatable bed according to claim 21, wherein said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

98. The inflatable bed according to claim 21, wherein said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said top sheet.

109. The inflatable bed according to claim 21, wherein said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said bottom sheet.

1110. The inflatable bed according to claim 21, wherein said second tensioning structure comprises at least one first V-beam, wherein two outside edges of said first V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.

1211. The inflatable bed according to claim 21, wherein said third tensioning structure comprises at least one second V-beam, wherein two outside edges of said second V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

1312. The inflatable bed according to claim 54, wherein said at least two first I-beams are spaced apart from each other at a lower surface of said top sheet.

1413. The inflatable bed according to claim 65, wherein said at least two second I-beams are spaced apart from each other at an upper surface of said bottom sheet.

~~15~~14. The inflatable bed according to claim ~~5~~4, wherein said at least two first I-beams are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

~~16~~15. The inflatable bed according to claim ~~6~~5, wherein said at least two second I-beams are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

~~17~~16. The inflatable bed according to claim ~~7~~6, wherein the two outside edges of said at least one first Y-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

~~18~~17. The inflatable bed according to claim ~~8~~7, wherein the two outside edges of said at least one second Y-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

~~19~~18. The inflatable bed according to claim ~~9~~8, wherein said at least two outside edges of said at least one first tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

~~20~~19. The inflatable bed according to claim ~~10~~9, wherein said at least two outside edges of said at least one second tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

~~21~~20. The inflatable bed according to claim ~~11~~10, wherein the two outside edges of said at least one first V-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

~~22~~21. The inflatable bed according to claim ~~12~~11, wherein the two outside edges of said at least one second V-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

~~23~~22. The inflatable bed according to claim ~~5~~4, wherein said at least two first V-beams as a whole are of a continuous annular structure or a segmental annular structure.

~~24~~23. The inflatable bed according to claim ~~6~~5, wherein said at least two second I-beam as a whole are of a continuous annular structure or a segmental annular structure.

~~25~~24. The inflatable bed according to claim ~~7~~6, wherein said at least one first Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

~~26~~25. The inflatable bed according to claim ~~8~~7, wherein said at least one second Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

~~27~~26. The inflatable bed according to claim ~~9~~8, wherein said at least one first tubular beam as a whole is of a segmental annular structure.

~~28~~27. The inflatable bed according to claim ~~10~~9, wherein said at least one second tubular beam as a whole is of a segmental annular structure.

~~29~~28. The inflatable bed according to claim ~~11~~10, wherein said at least one first V-beam as a whole is of a continuous annular structure or a segmental annular structure.

~~30~~29. The inflatable bed according to claim ~~12~~11, wherein said at least one second V-beam as a whole is of a continuous annular structure or a segmental annular structure.

~~31~~30. The inflatable bed according to claim 1, wherein said first tensioning structure is one or more beams selected from I-beams, coil beams, Y-beams or X-beams.

~~32~~31. The inflatable bed according to claim ~~2~~1, wherein said first tensioning structure, said second tensioning structure and said third tensioning structure are all made of thermoplastic plastic sheet.

~~33~~32. The inflatable bed according to claim ~~2~~1, wherein one or more of said first tensioning structure, said second tensioning structure and said third tensioning structure at least partially comprise mesh, laminated plastic sheet or a threads.

~~34~~33. The inflatable bed according to claim ~~33~~32, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite plastic strips, said mesh and said threads are sandwiched between the two opposite plastic strips.

~~35~~34. The inflatable bed according to claim ~~33~~32, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with an U-shaped plastic strip, said mesh and said threads are sandwiched between the U-shaped plastic strip.

~~36~~35. The inflatable bed according to claim ~~2~~1, wherein said first tensioning structure is coupled to said top and bottom sheets by means of high-frequency welding; said second tensioning structure is coupled to said top sheet and said side wall by means of high-frequency welding; and said third tensioning structure is coupled to said bottom sheet and said side wall by means of high-frequency welding.

~~37~~36. The inflatable bed according to claim ~~2~~1, wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

~~38~~37. The inflatable bed according to claim ~~2~~1, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

~~39~~38. The inflatable bed according to claim ~~2~~1, wherein said inflatable bed further comprises a built-in air pump, which is disposed on said side wall and is located between a lower edge of said second tensioning structure and an upper edge of said third tensioning structure for inflating said air chamber.

~~40~~39. The inflatable bed according to claim 1, wherein said inflatable bed further comprises an air valve, which is disposed on said side wall for the inflation and deflation of said inflatable bed.

CLAIMS

What is claimed is:

1. An inflatable bed, comprising:

a top sheet and a bottom sheet disposed vertically at an interval;

at least one side wall, an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges of said support structure being respectively coupled to the side wall adjacent, at least one inside edge of said support structure being coupled to the top sheet or bottom sheet adjacent,

wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent; and

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent.

2. The inflatable bed according to claim 1, wherein said second tensioning structure and said third tensioning structure are respectively provided with a plurality of air holes, through which an airflow passage is formed in said air chamber.

3. The inflatable bed according to claim 1, wherein said second tensioning structure and said third tensioning structure are disposed at an interval in a perpendicular direction.

4. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams are respectively coupled to said side wall and said top sheet adjacent, the at least two first I-beams are disposed at an interval.

5. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least two second I-beams, an outside edge and an inside edge of each of said second

I-beams are respectively coupled to the side wall and said bottom sheet adjacent, the at least two second I-beams are disposed at an interval.

6. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first Y-beam, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.

7. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

8. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said top sheet.

9. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said bottom sheet.

10. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first V-beam, wherein two outside edges of said first V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.

11. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second V-beam, wherein two outside edges of said second V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

12. The inflatable bed according to claim 4, wherein said at least two first I-beams are spaced apart from each other at a lower surface of said top sheet.

13. The inflatable bed according to claim 5, wherein said at least two second I-beams are spaced apart from each other at an upper surface of said bottom sheet.

14. The inflatable bed according to claim 4, wherein said at least two first I-beams are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

15. The inflatable bed according to claim 5, wherein said at least two second I-beams are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

16. The inflatable bed according to claim 6, wherein the two outside edges of said at least one first Y-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

17. The inflatable bed according to claim 7, wherein the two outside edges of said at least one second Y-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

18. The inflatable bed according to claim 8, wherein said at least two outside edges of said at least one first tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

19. The inflatable bed according to claim 9, wherein said at least two outside edges of said at least one second tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

20. The inflatable bed according to claim 10, wherein the two outside edges of said at least one first V-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

21. The inflatable bed according to claim 11, wherein the two outside edges of said at least one second V-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

22. The inflatable bed according to claim 4, wherein said at least two first V-beams as a whole are of a continuous annular structure or a segmental annular structure.

23. The inflatable bed according to claim 5, wherein said at least two second I-beam as a whole are of a continuous annular structure or a segmental annular structure.

24. The inflatable bed according to claim 6, wherein said at least one first Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

25. The inflatable bed according to claim 7, wherein said at least one second Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

26. The inflatable bed according to claim 8, wherein said at least one first tubular beam as a whole is of a segmental annular structure.

27. The inflatable bed according to claim 9, wherein said at least one second tubular beam as a whole is of a segmental annular structure.

28. The inflatable bed according to claim 10, wherein said at least one first V-beam as a whole is of a continuous annular structure or a segmental annular structure.

29. The inflatable bed according to claim 11, wherein said at least one second V-beam as a whole is of a continuous annular structure or a segmental annular structure.

30. The inflatable bed according to claim 1, wherein said first tensioning structure is one or more beams selected from I-beams, coil beams, Y-beams or X-beams.

31. The inflatable bed according to claim 1, wherein said first tensioning structure, said second tensioning structure and said third tensioning structure are all made of thermoplastic plastic sheet.

32. The inflatable bed according to claim 1, wherein one or more of said first tensioning structure, said second tensioning structure and said third tensioning structure at least partially comprise mesh, laminated plastic sheet or a threads.

33. The inflatable bed according to claim 32, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite plastic strips, said mesh and said threads are sandwiched between the two opposite plastic strips.

34. The inflatable bed according to claim 32, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with an U-shaped plastic strip, said mesh and said threads are sandwiched between the U-shaped plastic strip.

35. The inflatable bed according to claim 1, wherein said first tensioning structure is coupled to said top and bottom sheets by means of high-frequency welding; said second tensioning structure is coupled to said top sheet and said side wall by means of high-frequency welding; and said third tensioning structure is coupled to said bottom sheet and said side wall by means of high-frequency welding.

36. The inflatable bed according to claim 1, wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

37. The inflatable bed according to claim 1, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

38. The inflatable bed according to claim 1, wherein said inflatable bed further comprises a built-in air pump, which is disposed on said side wall and is located between a lower edge of said second tensioning structure and an upper edge of said third tensioning structure for inflating said air chamber.

39. The inflatable bed according to claim 1, wherein said inflatable bed further comprises an air valve, which is disposed on said side wall for the inflation and deflation of said inflatable bed.

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Acknowledgement of receipt

We hereby acknowledge receipt of the following subsequently filed document(s):

Submission number	5975965
Application number	EP16191360.3
Date of receipt	19 January 2018
Filing Office	European Patent Office, The Hague
Procedural phase	Search
Your reference	27M9223.12EP42
Documents submitted	package-data.xml ep-cms-sfd-request.pdf (2 p.) CLMS-1.pdf\27.M9223.12.EP.42@ameded claims_clean copy.pdf (4 p.) DESC-HWA-1.pdf\27.M9223.12.EP.42@ameded descripion pages 1 and 14_working copy.pdf (2 p.) ep-cms-sfd-request.xml WOREPLY-1.pdf\27.M9223.12.EP.42@2018-01-19_Uff_Com_A_(Reply EESR).pdf (3 p.) CLMS-HWA-1.pdf\27.M9223.12.EP.42@ameded claims_working copy.pdf (5 p.) DESC-1.pdf\27.M9223.12.EP.42@ameded description pages 1 and 14_clean copy.pdf (2 p.)
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Date
02.02.2018

Reference	Application No./Patent No.
27S8343,12EP42	16191360.3 - 1011 / 3192401

Applicant/Proprietor
Bestway Inflatables & Material Corp

Invitation to file a copy of search results or a statement of non-availability pursuant to Rule 70b(1) EPC

You are hereby requested to file, within a period of **two months** from notification of this invitation,

- a copy of the results of any search carried out by the authority with which the previous application/s from which priority is claimed was/were filed,

or

- a statement indicating that the said search results are not available to you.

The previous application/s concerned is/are the following:

CNA201610020533
CNU201620031074

If this information is not filed in due time the European patent application shall be deemed to be withdrawn (Rule 70b(2) EPC, Article 124(2) EPC).

If the present application is a European divisional application:

You need not to reply to the present invitation provided that all relevant search results have already been filed with respect to the parent application.

You need to reply to the present invitation if a statement of non-availability has been filed with respect to the parent application.

For the Examining Division

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Registered letter
EPO Form 2913 01.11 (26/01/18)

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Intex Recreation v. Bestway Inflatables

50th Anniversary

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Our Ref. 27.M9223.12.EP.42 **Milan**, March 16, 2018

RE: European Patent Application No. **16191360.3**
in the name of **BESTWAY INFLATABLES & MATERIAL CORP.**

REPLY TO THE OFFICE COMMUNICATION DATED 2.2.2018

Dear Sirs,

This is in response to the communication under R70b(1)EPC, dated February 2, 2018

Please be informed that the search report of the Chinese priority application No. 201610020533 as required by R141(1)EPC is not available.

The Chinese priority application No. 201620031074 is a Chinese utility model patent, , so the Search Results will not be issued

Yours Sincerely,

Simona Inchingalo
(Representative for the Applicant)

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European Patent Office
Office européen des brevets

Letter accompanying subsequently filed items

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The document(s) listed below is (are) subsequently filed documents pertaining to the following application:

Application number and/or EP publication number	EP16191360.3
Reference	27M9223.12EP42
Procedural phase	Examination
Name of represented party	Bestway Inflatables & Material Corp

	Description of document	Original file name	Assigned file name
1	Reply to a communication under rule 70b EPC	27.M9223.12.EP.42-Non-Availability_of_search_results-on_PRIORITY.pdf	PRSR-REPLY-1.pdf

Signature 1

Place:

Date: **16 March 2018**

Signed by: **/116105/**

Capacity: **Representative 1**

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Common name: **Simona Inchingalo 42182**

EPO ID: **42182**

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Intex Recreation v. Bestway Inflatables

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Acknowledgement of receipt

We hereby acknowledge receipt of the following subsequently filed document(s):

Submission number	6146496	
Application number	EP16191360.3	
Date of receipt	16 March 2018	
Filing Office	European Patent Office, The Hague	
Procedural phase	Examination	
Your reference	27M9223.12EP42	
Documents submitted	package-data.xml ep-cms-sfd-request.pdf (1 p.)	ep-cms-sfd-request.xml PRSR-REPLY-1.pdf\27.M9223.12.EP.42-Non-Availability_of_search_results-on_PRIORITY.pdf (1 p.)
Submitted by	CN=secure.epoline.org,OU=PDIS,O=European Patent Office,C=NL	
Method of submission	Online	
Date and time receipt generated	16 March 2018, 12:41 (CET)	
Message Digest	1F:49:BE:70:A8:CF:24:8C:A9:47:AB:52:31:2E:D8:E4:BF:96:84:A1	

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Application No.: 16191360.3

Substantive examination has started on 20.03.18 (see Notice from the European Patent Office dated 29.01.2013, OJ EPO 2013, 153).

For the Examining Division

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157591EP

INFLATABLE BED

CROSS REFERENCE

[0001] This application claims the benefit and priority of Chinese Application No. 201610020533.5, filed January 13, 2016.

FIELD OF THE INVENTION

[0002] The present invention relates to inflatable beds or inflatable mattresses, and more specifically, to an inflatable bed, the structure of which is configured to limit the outward bulging or deformation of a side wall.

BACKGROUND

[0003] Currently, inflatable beds and inflatable mattresses have been very popular. The inflatable beds and inflatable mattresses have the advantages of light weight, easy to carry and store, etc., and thus are widely used in various occasions. For example, household inflatable beds and inflatable mattresses can often be used as temporary beds for visiting guests. In addition, the inflatable beds and inflatable mattresses are very suitable for use in outdoor camping. Examples of such inflatable beds and inflatable mattresses can be found in documents US 2013/145560 and US 2009/165211.

[0004] Conventionally, the inflatable beds and inflatable mattresses are generally made of PVC sheet, PU sheet, or the like, and have various different structures, in which a typical mechanism is that using a top sheet, a bottom sheet, and a side wall coupled to the top sheet and the bottom sheet to form an inflatable air chamber. Tensioning structures, which are coupled to the top sheet and the bottom sheet and are arranged at an interval, are disposed in the air chamber, so as to form a shape having a certain height and a substantially flat upper surface for people to lie on.

[0005] Among the existing inflatable beds and inflatable mattresses, some have a larger height, whereby the side walls of the inflatable beds and inflatable mattresses after being inflated are susceptible to bulge and deform, affecting the appearance of the inflatable beds and inflatable mattresses. And, the bulging and deformation of the inflatable beds and inflatable mattresses may also result in the decay of air pressure in the air chamber, such that the inflatable beds and inflatable mattresses are softened, reducing the comfort of the inflatable beds and inflatable mattresses.

[0006] Therefore, in order to solve the above-mentioned problem of bulging of the side walls, in some inflatable beds and inflatable mattresses, a middle sheet is arranged between the top

sheet and the bottom sheet and is coupled to the side walls. In the inflatable beds and inflatable mattresses of such a structure, although the problem of bulging and deformation of the side walls is slightly improved, the desired result still cannot be achieved. Moreover, since tensioning structures have to be arranged between the middle sheet and the top sheet and between the middle sheet and the bottom sheet, the manufacturing process of the inflatable beds and inflatable mattresses becomes more complicated, that is to say, more plastic sheet is required.

[0007] Furthermore, in the prior art, the inflatable beds and inflatable mattresses with a relatively large height have a defect in its stability. When a user lies on or seats near the edge of the inflatable beds and inflatable mattresses, the inflatable beds and inflatable mattresses are susceptible to roll over. In order to improve the stability, an inflatable stabilization tube is arranged on the outer periphery of the bottom sheet of the inflatable bed in U.S. Patent US 6671910. However, such a structure will not only affect the aesthetic appearance of the inflatable bed, but also brings inconvenience to the user.

SUMMARY

[0008] The technical problem to be solved by the present invention is to provide an inflatable bed, in order to overcome the defects of easy occurrence of bulging and deformation of the side walls of the inflatable beds and inflatable mattresses, poor stability of the inflatable beds and inflatable mattresses, and susceptibility of roll-over in the prior art.

[0009] The above-mentioned technical problems are solved according to the present invention by providing an inflatable bed, comprising a top sheet and a bottom sheet, which are disposed vertically at an interval, at least one side wall, at least one first tensioning structure, and at least one support structure.

[0010] An upper edge of said side wall is coupled to an outer edge of said top sheet. A lower edge of said side wall is coupled to an outer edge of said bottom sheet, and an air chamber is formed between said top sheet, said bottom sheet and said side wall.

[0011] The at least one first tensioning structure is arranged in said air chamber. An upper end and a lower end of said first tensioning structure are respectively coupled to said top sheet and said bottom sheet.

[0012] The at least one support structure is arranged in said air chamber. Said support structure is arranged in a longitudinal direction of at least one of said side walls. At least two outside edges of said support structure are respectively coupled to the side wall adjacent thereto, and at

least one inside edge of said support structure is coupled to the top sheet or bottom sheet adjacent thereto.

[0013] According to the invention as defined in claim 1,

said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent thereto, and at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent thereto.

[0014] The at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent thereto, and at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent thereto.

[0015] Preferably, said second tensioning structure and said third tensioning structure are respectively provided with a plurality of air holes, through which an airflow passage is formed in said air chamber.

[0016] Preferably, said second tensioning structure and said third tensioning structure are disposed at an interval in a perpendicular direction.

[0017] Preferably, said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams, are respectively coupled to the side wall adjacent thereto and said top sheet, and the at least two first I-beams, are disposed at an interval.

[0018] Preferably, said third tensioning structure comprises at least two second I-beams,, an outside edge and an inside edge of each of said second I-beams, are respectively coupled to the side wall adjacent thereto and said bottom sheet, and the at least two second I-beams, are disposed at an interval.

[0019] Preferably, said second tensioning structure comprises at least one first Y-beam,, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent thereto, and an inside edge is coupled to said top sheet.

[0020] Preferably, said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent thereto, and an inside edge is coupled to said bottom sheet.

[0021] Preferably, said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent thereto, and at least one inside edge is coupled to said top sheet.

[0022] Preferably, said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent thereto, and at least one inside edge is coupled to said bottom sheet.

[0023] Preferably, said second tensioning structure comprises at least one first V- beam, wherein two outside edges of said first V- beam are respectively coupled to the side wall adjacent thereto, and an inside edge is coupled to said top sheet.

[0024] Preferably, said third tensioning structure comprises at least one second V- beam, wherein two outside edges of said second V- beam are respectively coupled to the side wall adjacent thereto, and an inside edge is coupled to said bottom sheet.

[0025] Preferably, said at least two first I-beams are arranged spaced apart from each other at a lower surface of said top sheet.

[0026] Preferably, said at least two second I- beams are arranged spaced apart from each other at an upper surface of said bottom sheet.

[0027] Preferably, said at least two first I- beams are arranged at an interval on an inner surface of said side wall in a perpendicular direction.

[0028] Preferably, said at least two second I- beams are arranged at an interval on the inner surface of said side wall in a perpendicular direction.

[0029] Preferably, the two outside edges of said at least one first Y- beam is arranged at an interval on an inner surface of said side wall in a perpendicular direction.

[0030] Preferably, the two outside edges of said at least one second Y- beam are arranged at an interval on the inner surface of said side wall in a perpendicular direction.

[0031] Preferably, said at least two outside edges of said at least one first tubular beam, which are coupled to the side wall adjacent thereto, are arranged at an interval on an inner surface of said side wall in a perpendicular direction.

[0032] Preferably, said at least two outside edges of said at least one second tubular beam, which are coupled to the side wall adjacent thereto, are arranged at an interval on the inner surface of said side wall in a perpendicular direction.

[0033] Preferably, the two outside edges of said at least one first V-beam is arranged at an interval on an inner surface of said side wall in a perpendicular direction.

[0034] Preferably, the two outside edges of said at least one second V-beam is arranged at an interval on an inner surface of said side wall in a perpendicular direction.

[0035] Preferably, said at least two first I-beams as a whole are of a continuous annular structure or a segmental annular structure.

[0036] Preferably, said at least two second I-beams as a whole are of a continuous annular structure or a segmental annular structure.

[0037] Preferably, said at least one first Y-bam as a whole is of a continuous annular structure or a segmental annular structure.

[0038] Preferably, said at least one second Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

[0039] Preferably, said at least one first tubular beam as a whole is of a segmental annular structure.

[0040] Preferably, said at least one second tubular beam as a whole is of a segmental annular structure.

[0041] Preferably, said at least one first V-bream as a whole is of a continuous annular structure or a segmental annular structure.

[0042] Preferably, said at least one second V-beam as a whole is of a continuous annular structure or a segmental annular structure.

[0043] Preferably, said first tensioning structure is one or more beams selected from I-beams, coil beams, Y-beams or X-beams.

[0044] Preferably, said first tensioning structure, said second tensioning structure and said third tensioning structure are all made of thermoplastic plastic sheet.

[0045] Preferably, one or more of said first tensioning structure, said second tensioning structure and said third tensioning structure at least partially comprise mesh, laminated plastic sheet or a threads.

[0046] Preferably, two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite plastic strips, and said mesh and said threads are sandwiched between the two opposite plastic strips.

[0047] Preferably, two side surfaces of said mesh or said threads are at least partially coupled integrally with an U-shaped plastic strip, and said mesh and said threads are sandwiched between the U-shaped plastic strip.

[0048] Preferably, said first tensioning structure is coupled to said top and bottom sheets by means of high-frequency welding; said second tensioning structure is coupled to said top sheet and said side wall by means of high-frequency welding; and said third tensioning structure is coupled to said bottom sheet and said side wall by means of high-frequency welding.

[0049] Preferably, the height where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the height where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

[0050] Preferably, the height where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the height where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

[0051] Preferably, said inflatable bed further comprises a built-in air pump, which is arranged on said side wall and is located between a lower edge of said second tensioning structure and an upper edge of said third tensioning structure for inflating said air chamber.

[0052] Preferably, said inflatable bed further comprises an air valve, which is arranged on said side wall for the inflation and deflation of said inflatable bed.

[0053] The positive effects of the present invention lie in the following aspects.

[0054] The inflatable bed of the present invention overcomes the defect of outward bulging and deformation of the side walls of the inflatable beds and inflatable mattresses having a relatively large height in prior art, making their appearance more attractive. The inflatable beds and inflatable mattresses have a good stability, which overcomes the problem of susceptibility of roll-over in the prior art. Furthermore, the inflatable bed of the present invention can also prevent the user from rolling down during use.

BRIEF DESCRIPTION OF THE DRAWINGS

[0055] The above-mentioned and other features, properties and advantages of the present invention will become more apparent from the following description of embodiments with reference to the accompany drawings, in which:

[0056] Fig. 1 is a perspective view of an inflatable bed according to the present invention.

[0057] Fig. 2 is a front view of the inflatable bed according to the present invention.

[0058] Fig. 3 is a right view of the inflatable bed according to the present invention.

[0059] Fig. 4 is a top view of the inflatable bed according to the present invention.

[0060] Fig. 5 is a sectional view of a first embodiment taken along line A-A in Fig. 4.

[0061] Fig. 6 is a schematic structural partially sectional view of the first embodiment of the inflatable bed according to the present invention.

[0062] Fig. 7 is a first exploded view of the first embodiment of the inflatable bed according to the present invention.

[0063] Fig. 8 is a second exploded view of the first embodiment of the inflatable bed according to the present invention.

[0064] Fig. 9 is a sectional view of a second embodiment taken along line A-A in Fig. 4.

[0065] Fig. 10 is a first exploded view of the second embodiment of the inflatable bed according to the present invention.

[0066] Fig. 11 is a second exploded view of the second embodiment of the inflatable bed according to the present invention.

[0067] Fig. 12 is a first sectional view of a third embodiment taken along line A-A in Fig. 4.

[0068] Fig. 13 is a second sectional view of the third embodiment taken along line A-A in Fig. 4.

[0069] Fig. 14 is a first exploded view of the third embodiment of the inflatable bed according to the present invention.

[0070] Fig. 15 is a second exploded view of the third embodiment of the inflatable bed according to the present invention.

[0071] Fig. 16 is a sectional view of a fourth embodiment taken along line A-A in Fig. 4.

[0072] Fig. 17 is a first exploded view of the fourth embodiment of the inflatable bed according to the present invention.

[0073] Fig. 18 is a second exploded view of the fourth embodiment of the inflatable bed according to the present invention.

[0074] Fig. 19 is a sectional view of a fifth embodiment taken along line A-A in Fig. 4.

[0075] Fig. 20 is a schematic structural partially sectional view of the fifth embodiment of the inflatable bed according to the present invention.

[0076] Fig. 21 is a sectional view of a sixth embodiment taken along line A-A in Fig. 4.

[0077] Fig. 22 is a sectional view of a seventh embodiment taken along line A-A in Fig. 4.

[0078] Fig. 23 is a schematic structural partially sectional view of the seventh embodiment of the inflatable bed according to the present invention.

[0079] Fig. 24 is a schematic view of the interior structure of the seventh embodiment of the inflatable bed according to the present invention.

DETAILED DESCRIPTION

[0080] The present invention will be further described below in conjunction with detailed embodiments and the accompanying drawings. More details are provided in the following detailed description in order for the present invention to be fully understood. However, the

present invention can be implemented in various ways other than those described herein. A person skilled in the art can make similar analogy and modification according to the practical applications without departing from the spirit of the present invention, and therefore the contents of the detailed embodiments herein should not be construed as limiting to the scope of the present invention.

[0081] Embodiment 1:

[0082] Fig. 1 is a perspective view of an inflatable bed according to the present invention. Fig. 2 is a front view of the inflatable bed according to the present invention. Fig. 3 is a right view of the inflatable bed according to the present invention. Fig. 4 is a top view of the inflatable bed according to the present invention. Fig. 5 is a sectional view of a first embodiment taken along line A-A in Fig. 4. Fig. 6 is a schematic structural partially sectional view of the first embodiment of the inflatable bed according to the present invention. Fig. 7 is an exploded view of the first embodiment of the inflatable bed according to the present invention.

[0083] As shown in Figs. 1-7, an inflatable bed 10 is disclosed in the first embodiment according to the present invention, which comprises a top sheet 11, a bottom sheet 12, at least one side wall 13, at least one first tensioning structure 14 and at least one support structure. The bottom sheet 12 and the top sheet 11 are disposed vertically at an interval, an upper edge of the side wall 13 is coupled to an outer edge of the top sheet 11, a lower edge of the side wall 13 is coupled to an outer edge of the bottom sheet 12, and an air chamber is formed between the top sheet 11, the bottom sheet 12 and the side wall 13. Moreover, the first tensioning structure 14 is arranged in the air chamber, and an upper end and a lower end of the first tensioning structure 14 are respectively coupled to the top sheet 11 and the bottom sheet 12. This has the effects of limiting the respective upward and downward bulging of the top sheet 11 and the bottom sheet 12 by means of the first tensioning structure 14 after said air chamber is inflated. In particular, both the top sheet 11 and the bottom sheet 12 may be configured as a two-layer structure, which can be formed with different patterns by mutually welding at least two sheets. Alternatively, a sponge structure is further sandwiched in the two-layer structure.

[0084] Said support structure is arranged in said air chamber herein, said support structure is arranged in the longitudinal direction of at least one of the side walls 13, at least two outside edges of said support structure are respectively coupled to the side wall 13 adjacent thereto, and at least one inside edge of said support structure is coupled to the top sheet 11 or bottom sheet 12 adjacent thereto.

[0085] Preferably, said support structure comprises a second tensioning structure 15 and a third tensioning structure 16. At least two outside edges of the second tensioning structure 15 are respectively coupled to the side wall 13 adjacent thereto, and at least one inside edge of the second tensioning structure is coupled to the top sheet 11 adjacent thereto. The second tensioning structure 15 is configured to limit the upward and lateral bulging of the top sheet 11 and the side wall 13 after said air chamber is inflated.

[0086] Moreover, at least two outside edges of the third tensioning structure 16 are respectively coupled to the side wall 13 adjacent thereto, and at least one inside edge of the third tensioning structure 16 is coupled to the adjacent bottom sheet 12. The third tensioning structure 16 is configured to limit the respective downward and lateral bulging of the bottom sheet 12 and the side wall 13 after said air chamber is inflated.

[0087] In this embodiment, the second tensioning structure 15 comprises at least two first I-beams 151, one outside edge 152 of each first I-beams 151 is coupled to the side wall 13 adjacent thereto, the other inside edge 153 is coupled to the top sheet 11 adjacent thereto, and the at least two first I-beams 151 are disposed at an interval. The third tensioning structure 16 comprises at least two second I-beams 161, one outside edge 162 of each second I-beam 161 is coupled to the side wall 13 adjacent thereto, the other inside edge 163 is coupled to the bottom sheet 12 adjacent thereto, and the at least two second I-beams 151 are disposed at an interval. In this embodiment, the numbers of first I-beams 151 and second I-beams 161 are both two by way of example, but their numbers are not limited by this embodiment, and may be more than two, which also fall within the scope of protection of the present invention.

[0088] The second tensioning structure 15 and the third tensioning structure 16 are preferably disposed at an interval in a perpendicular direction. In this embodiment, for example, the second tensioning structure 15 and the third tensioning structure 16 divide the respective side wall 13 into five sections, so that the second tensioning structure 15 is configured to limit the upward and lateral bulging of the top sheet 11 and the side wall 13 after said air chamber is inflated, and the third tensioning structure 16 is configured to limit the respective downward and lateral bulging of the bottom sheet 12 and the side wall 13 after said air chamber is inflated.

[0089] Of course, the second tensioning structure 15 and the third tensioning structure 16 may also divide the respective side wall 13 into a multi-section structure, such as a four- or six-section structure; this embodiment is merely exemplary and the present invention is not limited thereto, and all the structures with four or more sections fall within the scope of protection of the present invention.

[0090] Further, the at least two first I-beams 151 are arranged spaced apart from each other at a lower surface of the top sheet 11, and the at least two second I-beams 161 are arranged spaced apart from each other at an upper surface of the bottom sheet 12. The at least two first I-beams 151 are arranged at an interval on an inner surface of the side wall 13 in a perpendicular direction. The at least two second I-beams 161 are arranged at an interval on the inner surface of the side wall 13 in a perpendicular direction.

[0091] Furthermore, the at least two first I-beams 151 as a whole are of a continuous annular structure or a segmental annular structure. The at least two second I-beams 161 as a whole are of a continuous annular structure or a segmental annular structure. Moreover, the at least two first I-beams 151 are provided with air holes 154, and an airflow passage is formed in said air chamber through the air holes 154. The at least two second I-beams 161 are provided with air holes 164, and an airflow passage is formed in said air chamber through the air holes 164 (as shown in Figs. 7 and 8).

[0092] The first tensioning structure 14 of the present invention may employ one or more beams selected from I-beams, coil beams, Y-beams or X-beams. Moreover, the first tensioning structure 14, the second tensioning structure 15 and the third tensioning structure 16 may be all made of thermoplastic plastic sheet, and one or more of the first tensioning structure 14, the second tensioning structure 15 and the third tensioning structure 16 at least partially comprise mesh, laminated plastic sheet or threads.

[0093] The structures thereof may take various forms. For example, two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite s plastic strips, and said mesh and said threads are sandwiched between the two opposite plastic strips.

[0094] As another example, two side surfaces of said mesh f or said threads are at least partially coupled integrally with an U-shaped plastic strip, and said mesh and said threads are sandwiched between the U-shaped plastic strip. These connecting structures can be used to effectively manufacture the beams required by the inflatable bed in the present invention; the solution in this embodiment is merely exemplary and the present invention is not limited thereto, and any other structure, which can implement the beam, falls within the scope of protection of the present invention.

[0095] On the basis of the structure of the above beams, in order to ensure a firm connection between the components, the first tensioning structure 14 is coupled to the top sheet 11 and the bottom sheet 12 by means of high-frequency welding. Similarly, the second tensioning structure 15 is coupled to the top sheet 11 and the side wall 13 by means of high-frequency welding. The

third tensioning structure 16 is coupled to the bottom sheet 12 and the side wall 13 by means of high-frequency welding.

[0096] In the inflatable bed of the present invention formed of the aforementioned structure, the height where the top sheet 11 thereof is located in the inside part of an upper edge of the second tensioning structure 15 is lower than the height where the top sheet 11 is located in the outside part of the upper edge of the second tensioning structure 15. The height where the bottom sheet 12 is located in the inside part of a lower edge of the third tensioning structure 16 is lower than the height where the bottom sheet 12 is located in the outside part of the lower edge of the third tensioning structure 16.

[0097] Furthermore, the inflatable bed 10 further comprises a built-in air pump 20, and the built-in air pump 20 is arranged on the side wall 13 and is located between a lower edge of the second tensioning structure 15 and an upper edge of the third tensioning structure 16 for inflating said air chamber. Moreover, the inflatable bed 10 further comprises an air valve 30, and the air valve 30 is arranged on the side wall 13 for the inflation and deflation of the inflatable bed 10.

[0098] Embodiment 2:

[0099] Fig. 9 is a sectional view of a second embodiment taken along line A-A in Fig. 4. Fig. 10 is a first exploded view of the second embodiment of the inflatable bed of the present invention. Fig. 11 is a second exploded view of the second embodiment of the inflatable bed of the present invention.

[00100] As shown in Figs. 9-11, the structure of this embodiment is substantially the same as that of the first embodiment, except that the second tensioning structure 15 comprises at least one first Y-beam 151, wherein two outside edges 152 of the first Y-beam 151 are respectively coupled to the side wall 13 adjacent thereto, and the other inside edge 153 is coupled to the top sheet 11. Similarly, the third tensioning structure 16 comprises at least one second Y-beam 161, wherein two outside edges 162 of the second Y-beam 161 are respectively coupled to the side wall 13 adjacent thereto, and the other inside edge 163 is coupled to the bottom sheet 12.

[00101] The second tensioning structure 15 and the third tensioning structure 16 are preferably disposed at an interval in a perpendicular direction. In this embodiment, the second tensioning structure 15 and the third tensioning structure 16 divide the respective side wall 13 into five sections, so that the second tensioning structure 15 is configured to limit the upward and lateral bulging of the top sheet 11 and the side wall 13 after said air chamber is inflated, and the third tensioning structure 16 is configured to limit the respective downward and lateral bulging of the bottom sheet 12 and the side wall 13 after said air chamber is inflated.

[00102] Of course, the second tensioning structure 15 and the third tensioning structure 16 may also divide the respective side wall 13 into a multi-section structure, such as a four- or six-section structure; this embodiment is merely exemplary and the present invention is not limited thereto, and all the structures with four or more sections fall within the scope of protection of the present invention.

[00103] Further, the two outside edges 152 of the at least one first Y-beam 151 are arranged at an interval on an inner surface of the side wall 13 in a perpendicular direction. The two outside edges 162 of the at least one second Y-beam 161 are arranged at an interval on the inner surface of the side wall 13 in a perpendicular direction.

[00104] Furthermore, the at least one first Y-beam 151 as a whole is of a continuous annular structure or a segmental annular structure. The at least one second Y-beam 161 as a whole is of a continuous annular structure or a segmental annular structure. Moreover, the at least one first Y-beam 151 is further provided with air holes 154, and an airflow passage is formed in said air chamber through the air holes 154. The at least one second Y-beam 161 is further provided with air holes 164, and an airflow passage is formed in said air chamber through the air holes 164 (as shown in Figs. 10 and 11).

[00105] Embodiment 3:

[00106] Fig. 12 is a first sectional view of a third embodiment taken along line A-A in Fig. 4. Fig. 13 is a second sectional view of the third embodiment taken along line A-A in Fig. 4. Fig. 14 is a first exploded view of the third embodiment of the inflatable bed of the present invention. Fig. 15 is a second exploded view of the third embodiment of the inflatable bed of the present invention.

[00107] As shown in Figs. 12-15, the structure of this embodiment is substantially the same as that of the first embodiment, except that the second tensioning structure 15 comprises at least one first tubular beam 151, wherein the first tubular beam 151 has at least two outside edges 152 respectively coupled to the side wall 13 adjacent thereto, and at least one inside edge 153 is coupled to the top sheet 11. The third tensioning structure 16 comprises at least one second tubular beam 161, wherein the second tubular beam 161 has at least two outside edges 162 respectively coupled to the side wall 13 adjacent thereto, and at least one inside edge 163 is coupled to the bottom sheet 12. The first tubular beam 151 and the second tubular beam 161 herein may be of various tubular structures, such as a triangular tubular structure, or a quadrilateral tubular structure (as shown in Figs. 13 and 14).

[00108] Beam 151, which are coupled to the wall 13 adjacent thereto, are arranged at an interval on an inner surface of the side wall 13 in a perpendicular direction. The at least two outside edges 162 of the at least one second tubular beam 161, which are coupled to the wall 13 adjacent thereto, are arranged at an interval on an inner surface of the side wall 13 in a perpendicular direction.

[00109] The at least one first tubular beam 151 herein as a whole is of a segmental annular structure. The at least one second tubular beam 161 as a whole is of a segmental annular structure (as shown in Figs. 13 and 14).

[00110] The second tensioning structure 15 and the third tensioning structure 16 are preferably disposed at an interval in a perpendicular direction. In this embodiment, the second tensioning structure 15 and the third tensioning structure 16 divide the respective side wall 13 into five sections, so that the second tensioning structure 15 is configured to limit the upward and lateral bulging of the top sheet 11 and the side wall 13 after said air chamber is inflated, and the third tensioning structure 16 is configured to limit the respective downward and lateral bulging of the bottom sheet 12 and the side wall 13 after said air chamber is inflated.

[00111] Of course, the second tensioning structure 15 and the third tensioning structure 16 may also divide the respective side wall 13 into a multi-section structure, such as a four- or six-section structure; this embodiment is merely exemplary and the present invention is not limited thereto, and all the structures with four or more sections fall within the scope of protection of the present invention.

[00112] Embodiment 4:

[00113] Fig. 16 is a sectional view of a fourth embodiment taken along line A-A in Fig. 4. Fig. 17 is a first exploded view of the fourth embodiment of the inflatable bed of the present invention. Fig. 18 is a second exploded view of the fourth embodiment of the inflatable bed of the present invention.

[00114] As shown in Figs. 16-18, the structure of this embodiment is substantially the same as that of the first embodiment, except that the second tensioning structure 15 comprises at least one first V-beam 151, wherein two outside edges 152 of the first V-beam 151 are respectively coupled to the side wall 13 adjacent thereto, and the other inside edge 153 is coupled to the top sheet 11. The third tensioning structure 16 comprises at least one second V-beam 161, wherein two outside edges 162 of the second V-beam 161 are respectively coupled to the side wall 13 adjacent thereto, and the other inside edge 163 is coupled to the top sheet 11.

[00115] Further, the two outside edges 152 of the at least one first V-beam 151 are arranged at an interval on an inner surface of the side wall 13 in a perpendicular direction. The two outside edges 162 of the at least one second V-beam 161 are arranged at an interval on the inner surface of the side wall 13 in a perpendicular direction.

[00116] Furthermore, the at least one first V-beam 151 as a whole is of a continuous annular structure or a segmental annular structure. The at least one second V-beam 161 as a whole is of a continuous annular structure or a segmental annular structure. Moreover, the at least one first V-beam 151 is provided with air holes 154, and an airflow passage is formed in said air chamber through the air holes 154. The at least one second V-shaped drawstring V-beam 161 is provided with air holes 164, and an airflow passage is formed in said air chamber through the air holes 164.

[00117] The second tensioning structure 15 and the third tensioning structure 16 are preferably disposed at an interval in a perpendicular direction. In this embodiment, the second tensioning structure 15 and the third tensioning structure 16 divide the respective side wall 13 into five sections, so that the second tensioning structure 15 is configured to limit the upward and lateral bulging of the top sheet 11 and the side wall 13 after said air chamber is inflated, and the third tensioning structure 16 is configured to limit the respective downward and lateral bulging of the bottom sheet 12 and the side wall 13 after said air chamber is inflated.

[00118] Of course, the second tensioning structure 15 and the third tensioning structure 16 may also divide the respective side wall 13 into a multi-section structure, such as a four- or six-section structure; this embodiment is merely exemplary and the present invention is not limited thereto, and all the structures with four or more sections fall within the scope of protection of the present invention.

[00119] Embodiment 5:

[00120] Fig. 19 is a sectional view of a fifth embodiment taken along line A-A in Fig. 4. Fig. 20 is a schematic structural partially sectional view of the fifth embodiment of the inflatable bed of the present invention.

[00121] As shown in Figs. 19 and 20, the structure of this embodiment is substantially the same as that of the first embodiment, except that the first tensioning structure 14 employs a Y-beam, and the upper and lower ends of the first tensioning structure 14 are respectively coupled to the top sheet 11 and the bottom sheet 12. Several beams in the first tensioning structure 14 are arranged spaced apart from each other. The upper end of each beam of the first tensioning structure 14 takes the form of a fork and is coupled to and supports the top sheet 11,

and the lower end takes the form of an I-beam and is downwardly coupled to the bottom sheet 12. After said air chamber is inflated, such a structure can effectively limit the respective upward and downward bulging of the top sheet 11 and the bottom sheet 12.

[00122] Embodiment 6:

[00123] Fig. 21 is a sectional view of a sixth embodiment taken along line A-A in Fig. 4.

[00124] As shown in Fig. 21, the structure of this embodiment is substantially the same as that of the fifth embodiment, except that the first tensioning structure 14 employs an X-shaped drawstring at the upper and lower ends, and the upper and lower ends of the first tensioning structure 14 are respectively coupled to the top sheet 11 and the bottom sheet 12. Several drawstrings in the first tensioning structure 14 are arranged spaced apart from each other. The upper end of each drawstring of the first tensioning structure 14 takes the form of a folk and is upwardly coupled to the top sheet 11, and the lower end also takes the form of a folk and is downwardly coupled to the bottom sheet 12. After said air chamber is inflated, such a structure can limit the respective upward and downward bulging of the top sheet 11 and the bottom sheet 12 more effectively.

[00125] Embodiment 7:

[00126] Fig. 22 is a sectional view of a seventh embodiment taken along line A-A in Fig. 4. Fig. 23 is a schematic structural partially sectional view of the seventh embodiment of the inflatable bed of the present invention. Fig. 24 is a schematic view of the interior structure of the seventh embodiment of the inflatable bed of the present invention.

[00127] As shown in Figs. 22-24, the structure of this embodiment is substantially the same as that of the first embodiment, except that all the drawstrings in the first tensioning structure 14 employ coil beams, and the upper and lower ends of each beam of the first tensioning structure 14 are respectively coupled to the top sheet 11 and the bottom sheet 12. Several beams in the first tensioning structure 14 are arranged spaced apart from each other. After said air chamber is inflated, this structure can effectively limit the respective upward and downward bulging of the top sheet 11 and the bottom sheet 12.

[00128] According to the description of the aforementioned structures, the structural variations in the embodiments may arbitrarily combined, and are not limited to the particular embodiments described above, i.e., the number of beams contained in the second tensioning structure 15 and the number of beams contained in the third tensioning structure 16 are unlimited, which can be adjusted according to actual requirements.

[00129] Similarly, the connection between the beams in the second tensioning structure 15 and the connection between the beams in the third tensioning structure 16 are also not limited to the aforementioned embodiments, as long as the side wall 13 is divided into at least five (or equal to or greater than four) sections, for example, the number of beams in the second tensioning structure 15 and that in the third tensioning structure 16 as well as the connection thereof can be changed so as to divide the side wall 13 into multiple sections such as six or seven sections.

[00130] Of course, the structures of the first tensioning structure 14 can be commonly used in each case, and likewise serve to support the top sheet 11 and the bottom sheet 12, effectively limiting the respective upward and downward bulging of the top sheet 11 and the bottom sheet 12.

[00131] In summary, the inflatable bed of the present invention can limit the outward bulging or deformation of the side wall of the inflatable bed by using various types of tensioning structures. The structure of the inflatable bed of the present invention effectively overcomes the defect of outward bulging and deformation of the side walls of the inflatable beds and inflatable mattresses having a relatively large height in prior art, making their appearance more attractive. The inflatable beds and inflatable mattresses have a good stability, which overcomes the problem of susceptibility of roll-over in the prior art. Furthermore, the inflatable bed of the present invention can also prevent the user from rolling down during use.

[00132] While the particular embodiments of the present invention have been described, a person skilled in the art should understand that these are merely illustrative, and that the scope of protection of the present invention is defined by the appended claims. Various alterations or modifications can be made by a person skilled in the art to these embodiments without departing from the principle and substance of the present invention; however, these alterations and modifications all fall within the scope of protection of the invention.

CLAIMS

What is claimed is:

1. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152,162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153,163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent; and

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent.

2. The inflatable bed according to claim 1, wherein said second tensioning structure and said third tensioning structure are respectively provided with a plurality of air holes, through which an airflow passage is formed in said air chamber.

3. The inflatable bed according to claim 1, wherein said second tensioning structure and said third tensioning structure are disposed at an interval in a perpendicular direction.

4. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams are respectively coupled to said side wall and said top sheet adjacent, the at least two first I-beams are disposed at an interval.

5. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least two second I-beams, an outside edge and an inside edge of each of said second

I-beams are respectively coupled to the side wall and said bottom sheet adjacent, the at least two second I-beams are disposed at an interval.

6. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first Y-beam, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.

7. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

8. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said top sheet.

9. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said bottom sheet.

10. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first V-beam, wherein two outside edges of said first V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.

11. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second V-beam, wherein two outside edges of said second V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

12. The inflatable bed according to claim 4, wherein said at least two first I-beams are spaced apart from each other at a lower surface of said top sheet.

13. The inflatable bed according to claim 5, wherein said at least two second I-beams are spaced apart from each other at an upper surface of said bottom sheet.

14. The inflatable bed according to claim 4, wherein said at least two first I-beams are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

15. The inflatable bed according to claim 5, wherein said at least two second I-beams are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

16. The inflatable bed according to claim 6, wherein the two outside edges of said at least one first Y-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

17. The inflatable bed according to claim 7, wherein the two outside edges of said at least one second Y-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

18. The inflatable bed according to claim 8, wherein said at least two outside edges of said at least one first tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

19. The inflatable bed according to claim 9, wherein said at least two outside edges of said at least one second tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

20. The inflatable bed according to claim 10, wherein the two outside edges of said at least one first V-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

21. The inflatable bed according to claim 11, wherein the two outside edges of said at least one second V-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

22. The inflatable bed according to claim 4, wherein said at least two first V-beams as a whole are of a continuous annular structure or a segmental annular structure.

23. The inflatable bed according to claim 5, wherein said at least two second I-beam as a whole are of a continuous annular structure or a segmental annular structure.

24. The inflatable bed according to claim 6, wherein said at least one first Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

25. The inflatable bed according to claim 7, wherein said at least one second Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

26. The inflatable bed according to claim 8, wherein said at least one first tubular beam as a whole is of a segmental annular structure.

27. The inflatable bed according to claim 9, wherein said at least one second tubular beam as a whole is of a segmental annular structure.

28. The inflatable bed according to claim 10, wherein said at least one first V-beam as a whole is of a continuous annular structure or a segmental annular structure.

29. The inflatable bed according to claim 11, wherein said at least one second V-beam as a whole is of a continuous annular structure or a segmental annular structure.

30. The inflatable bed according to claim 1, wherein said first tensioning structure is one or more beams selected from I-beams, coil beams, Y-beams or X-beams.

31. The inflatable bed according to claim 1, wherein said first tensioning structure, said second tensioning structure and said third tensioning structure are all made of thermoplastic plastic sheet.

32. The inflatable bed according to claim 1, wherein one or more of said first tensioning structure, said second tensioning structure and said third tensioning structure at least partially comprise mesh, laminated plastic sheet or a threads.

33. The inflatable bed according to claim 32, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite plastic strips, said mesh and said threads are sandwiched between the two opposite plastic strips.

34. The inflatable bed according to claim 32, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with an U-shaped plastic strip, said mesh and said threads are sandwiched between the U-shaped plastic strip.

35. The inflatable bed according to claim 1, wherein said first tensioning structure is coupled to said top and bottom sheets by means of high-frequency welding; said second tensioning structure is coupled to said top sheet and said side wall by means of high-frequency welding; and said third tensioning structure is coupled to said bottom sheet and said side wall by means of high-frequency welding.

36. The inflatable bed according to claim 1, wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

37. The inflatable bed according to claim 1, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

38. The inflatable bed according to claim 1, wherein said inflatable bed further comprises a built-in air pump, which is disposed on said side wall and is located between a lower edge of said second tensioning structure and an upper edge of said third tensioning structure for inflating said air chamber.

39. The inflatable bed according to claim 1, wherein said inflatable bed further comprises an air valve, which is disposed on said side wall for the inflation and deflation of said inflatable bed.

157591.vsd

Drawings

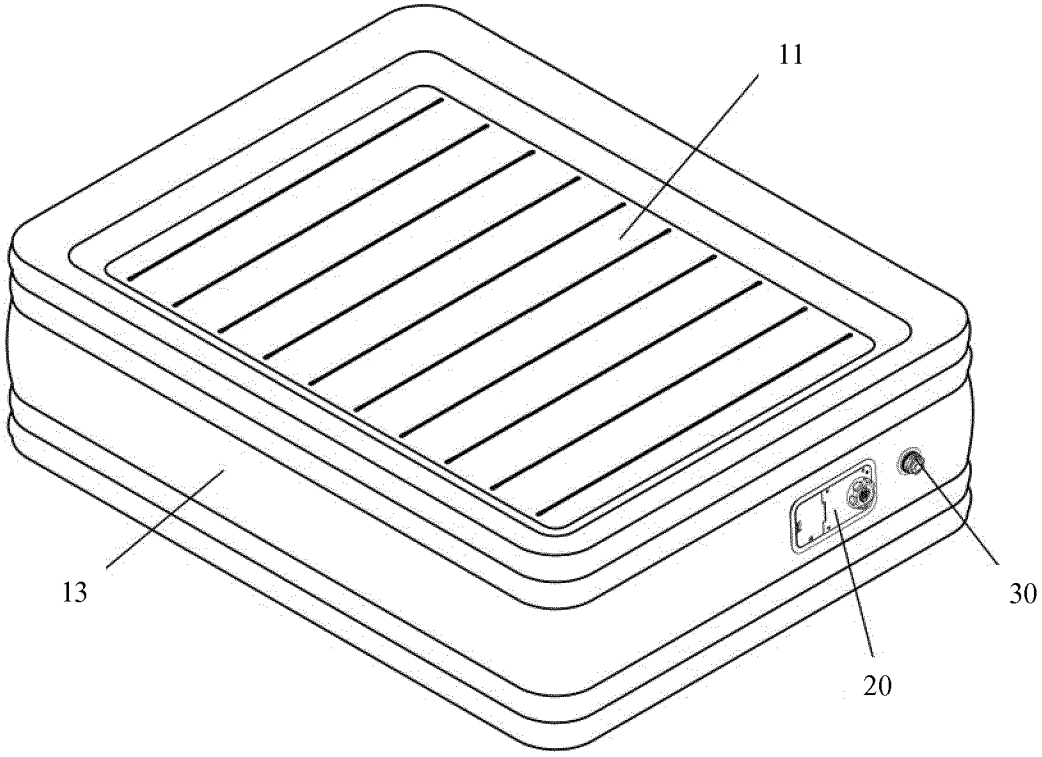


Fig. 1

INTEX EX. 1038, Pg. 172
Intex Recreation v. Bestway Inflatables

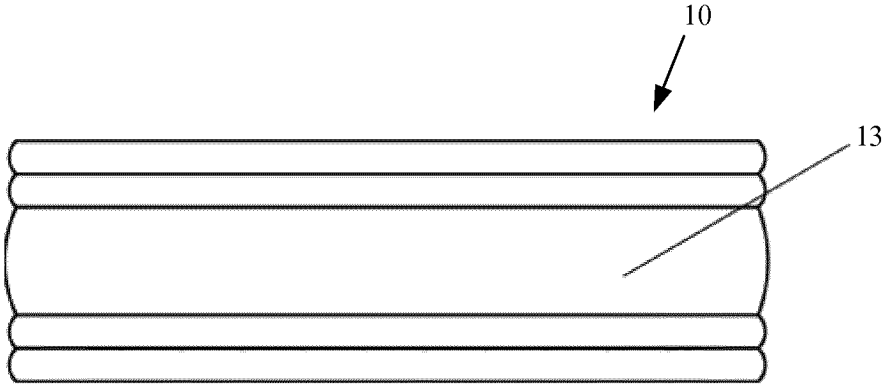


Fig. 2

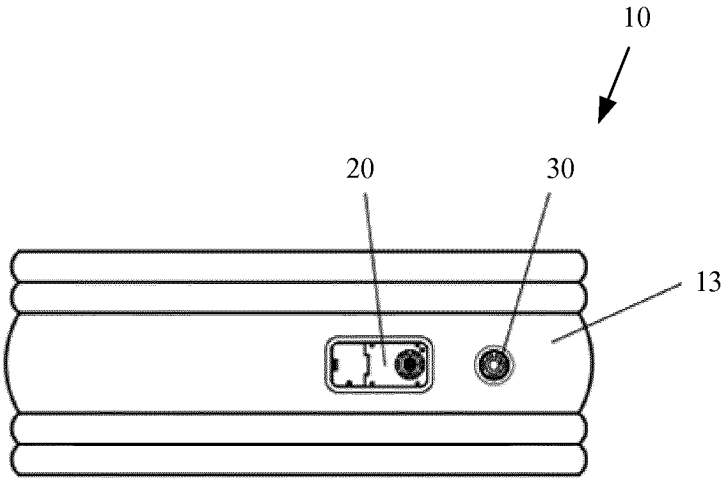


Fig. 3

INTEX EX. 1038, Pg. 173
Intex Recreation v. Bestway Inflatables

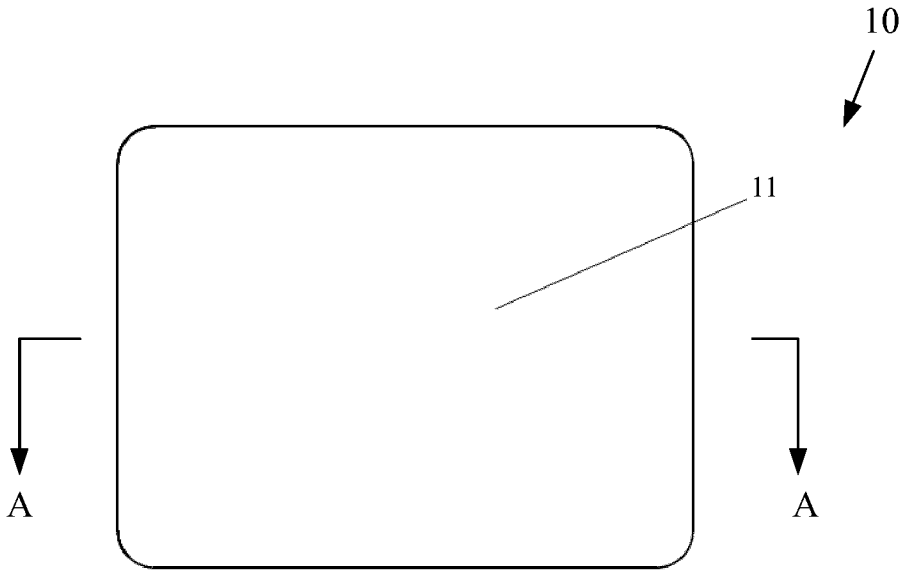


Fig. 4

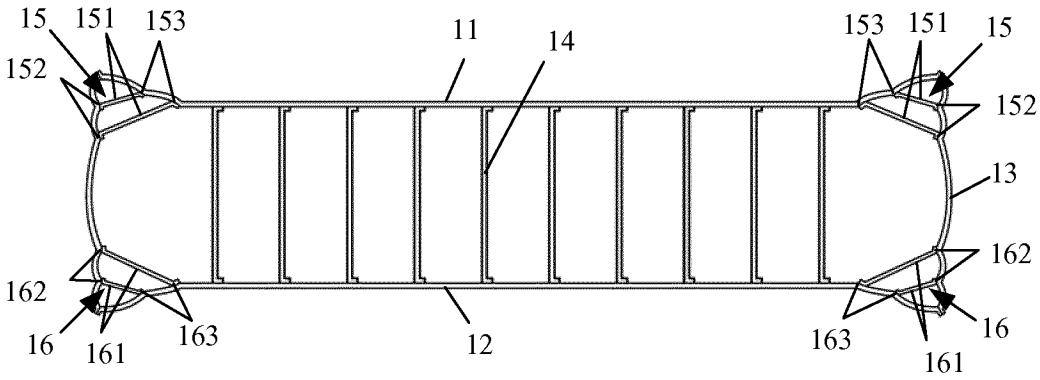


Fig. 5

INTEX EX. 1038, Pg. 174
Intex Recreation v. Bestway Inflatables

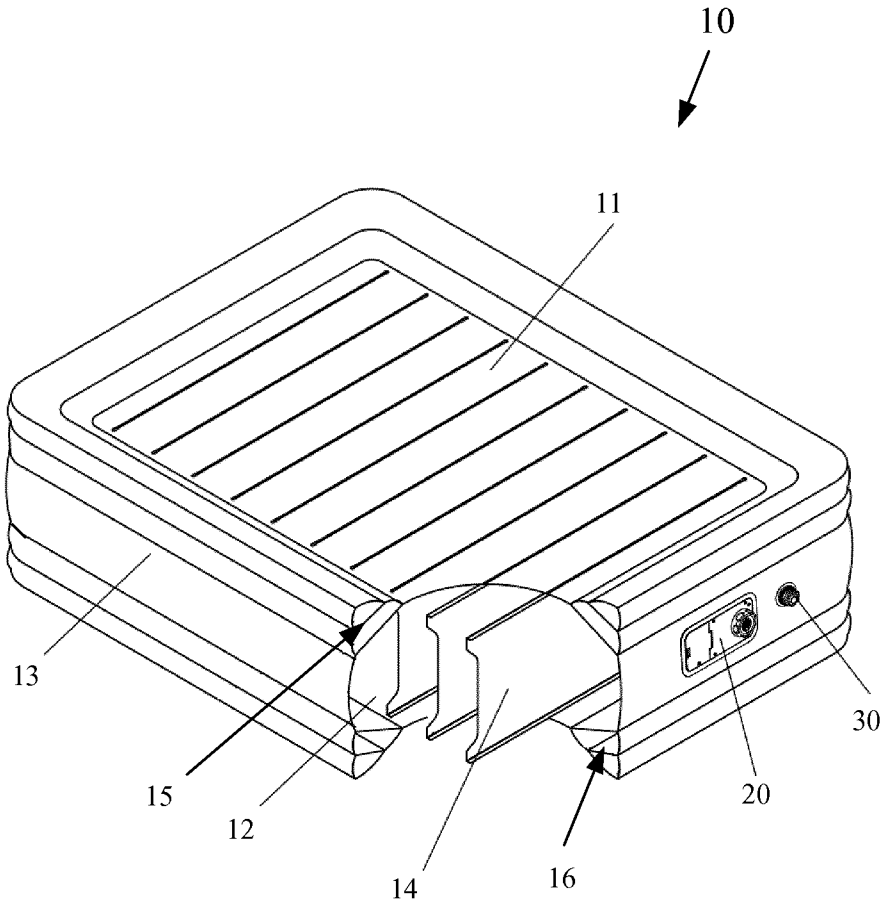


Fig. 6

INTEX EX. 1038, Pg. 175
Intex Recreation v. Bestway Inflatables

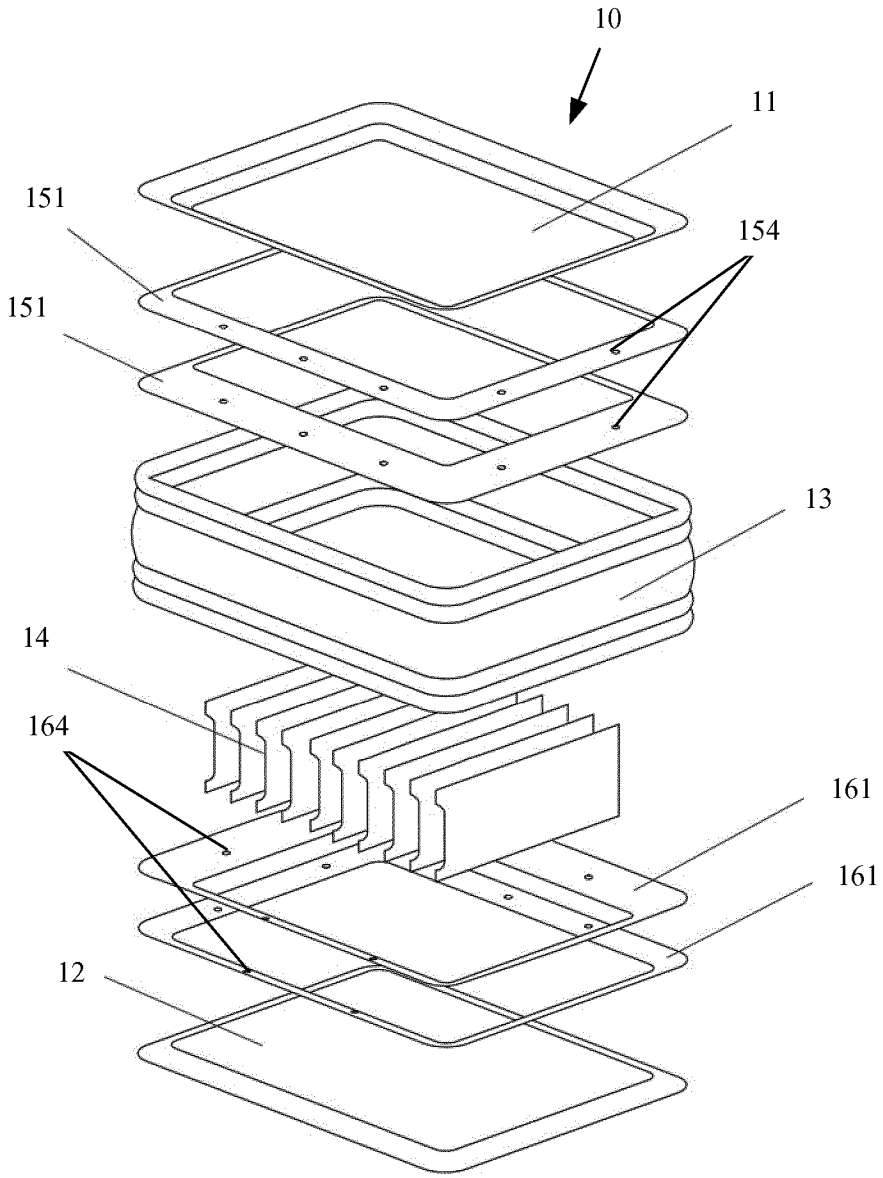


Fig. 7

INTEX EX. 1038, Pg. 176
Intex Recreation v. Bestway Inflatables

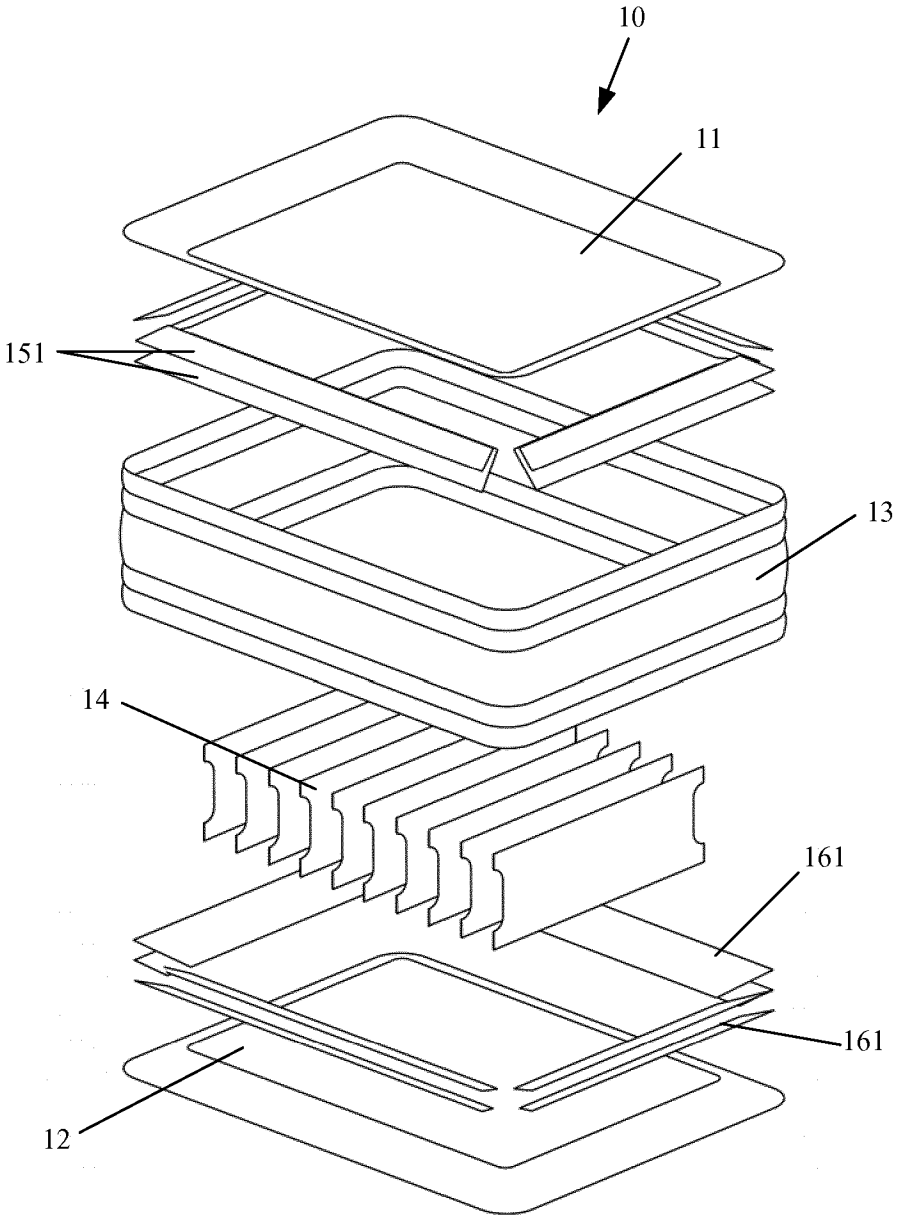


Fig. 8

INTEX EX. 1038, Pg. 177
Intex Recreation v. Bestway Inflatables

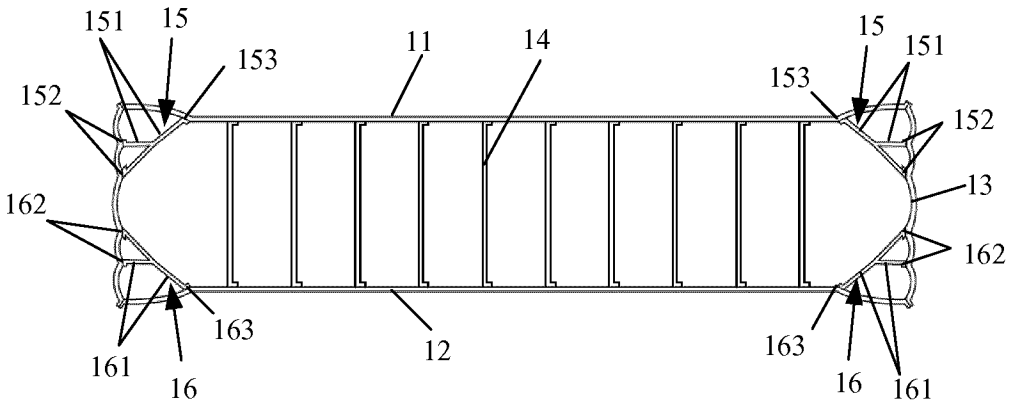


Fig. 9

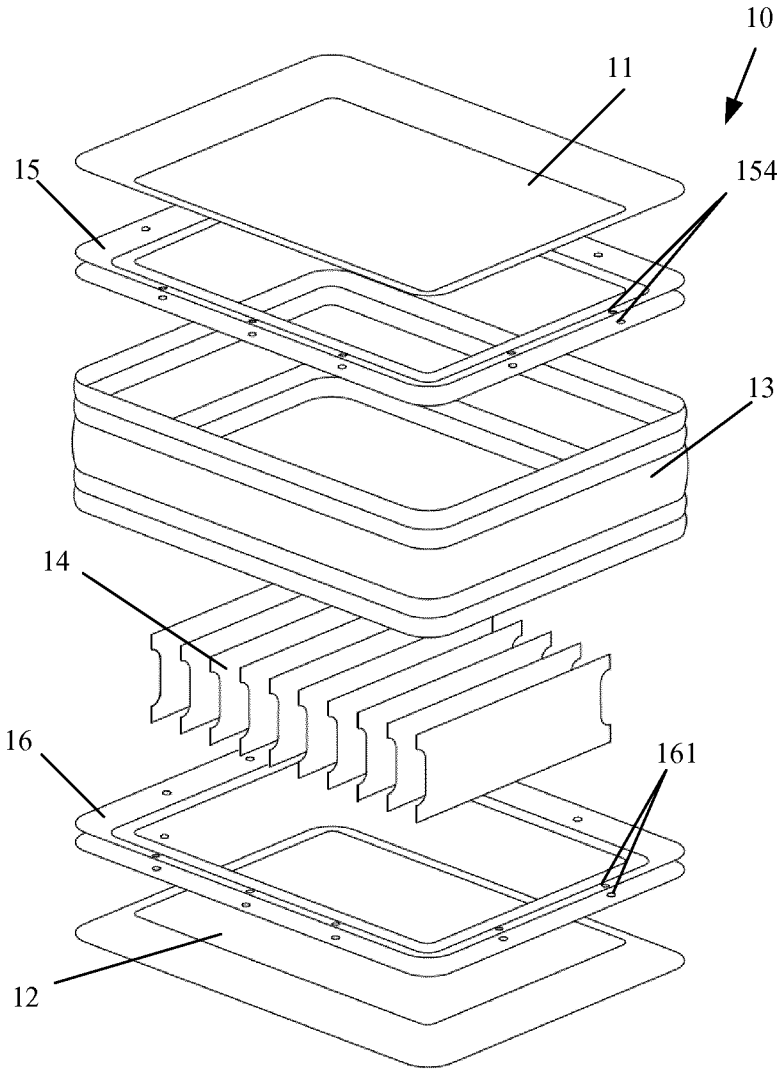


Fig. 10

INTEX EX. 1038, Pg. 178
Intex Recreation v. Bestway Inflatables

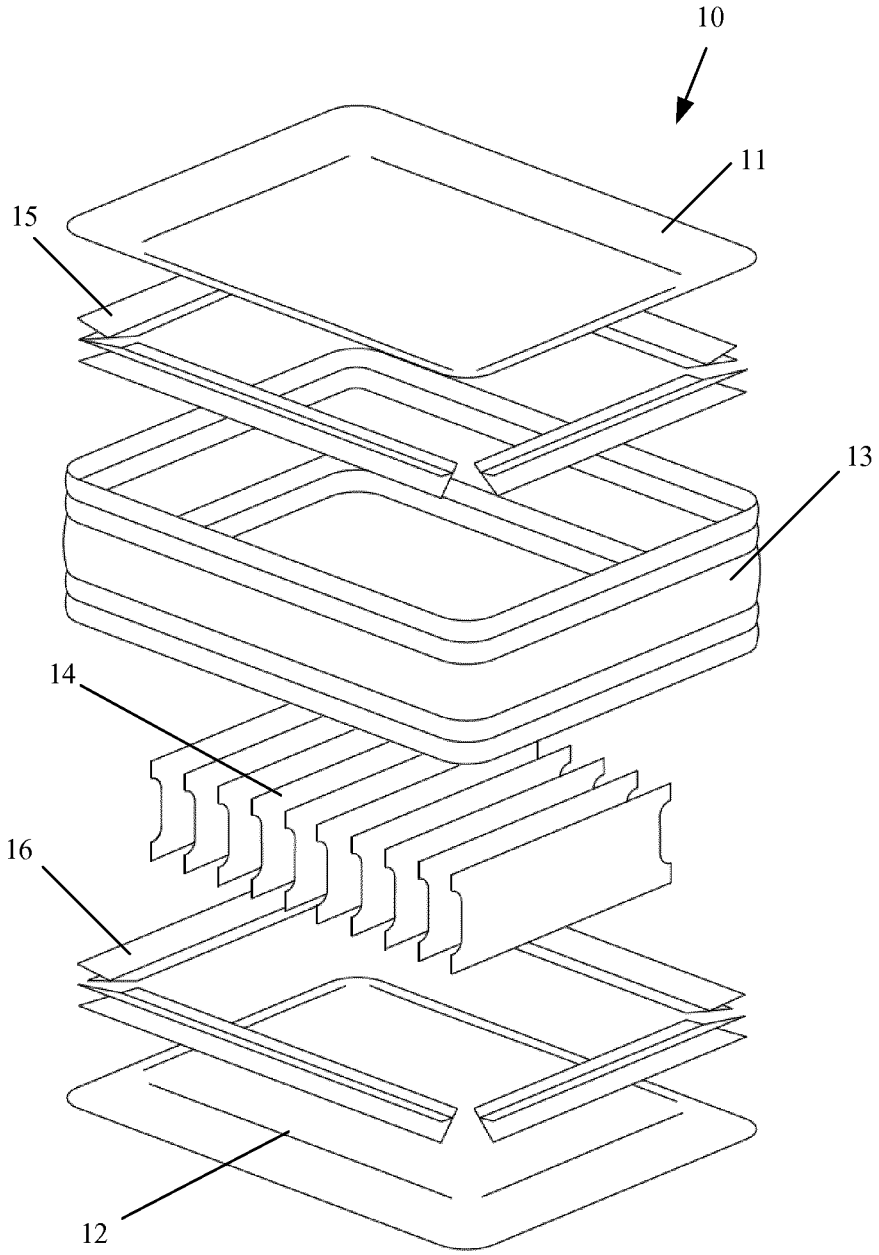


Fig. 11

INTEX EX. 1038, Pg. 179
Intex Recreation v. Bestway Inflatables

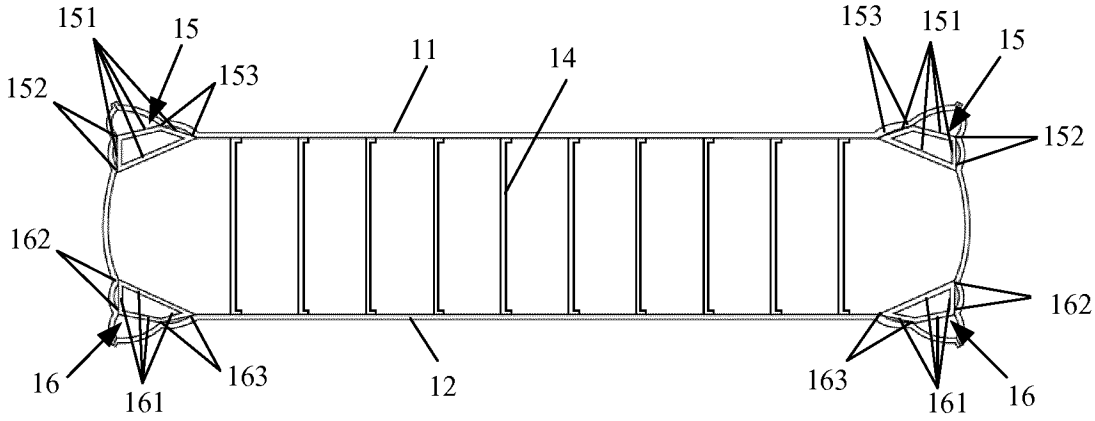


Fig. 12

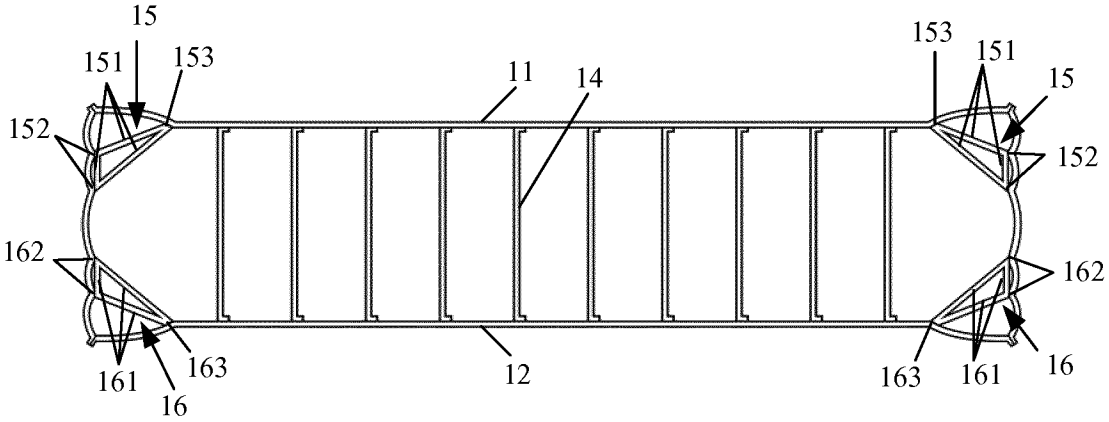


Fig. 13

INTEX EX. 1038, Pg. 180
Intex Recreation v. Bestway Inflatables

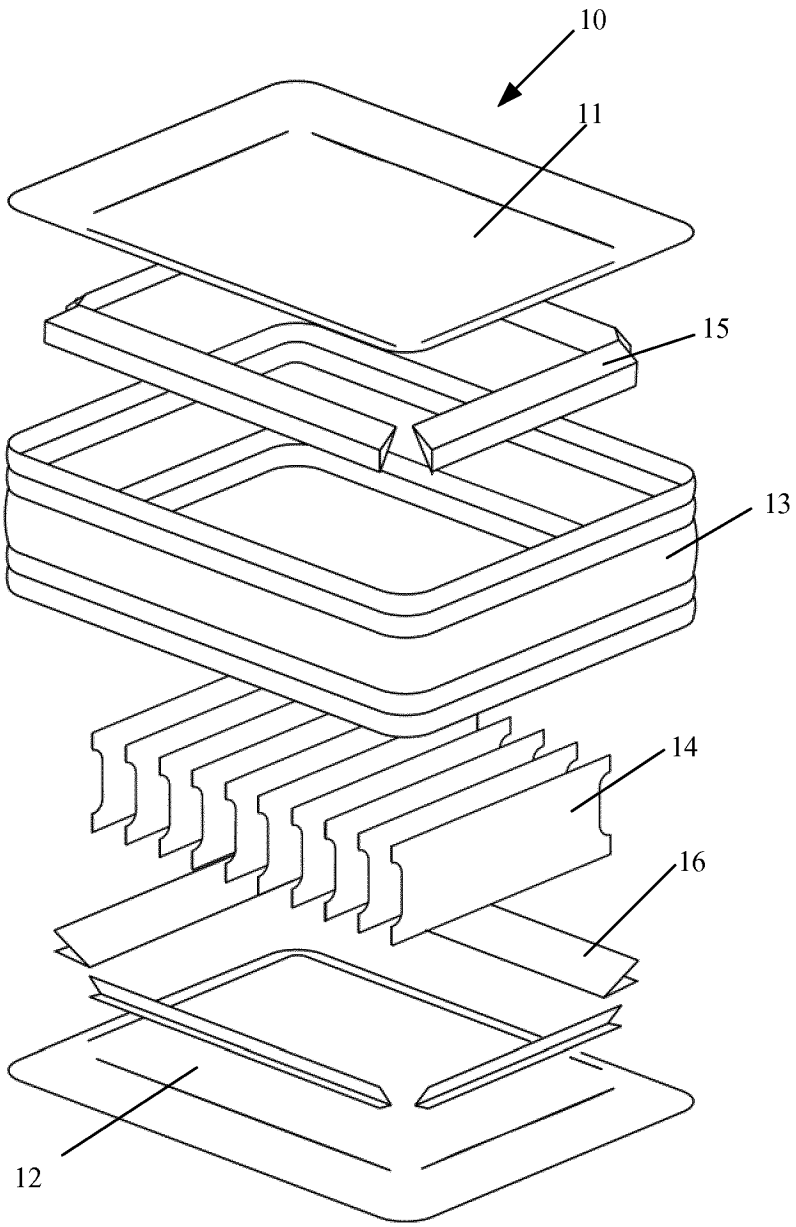


Fig. 14

INTEX EX. 1038, Pg. 181
Intex Recreation v. Bestway Inflatables

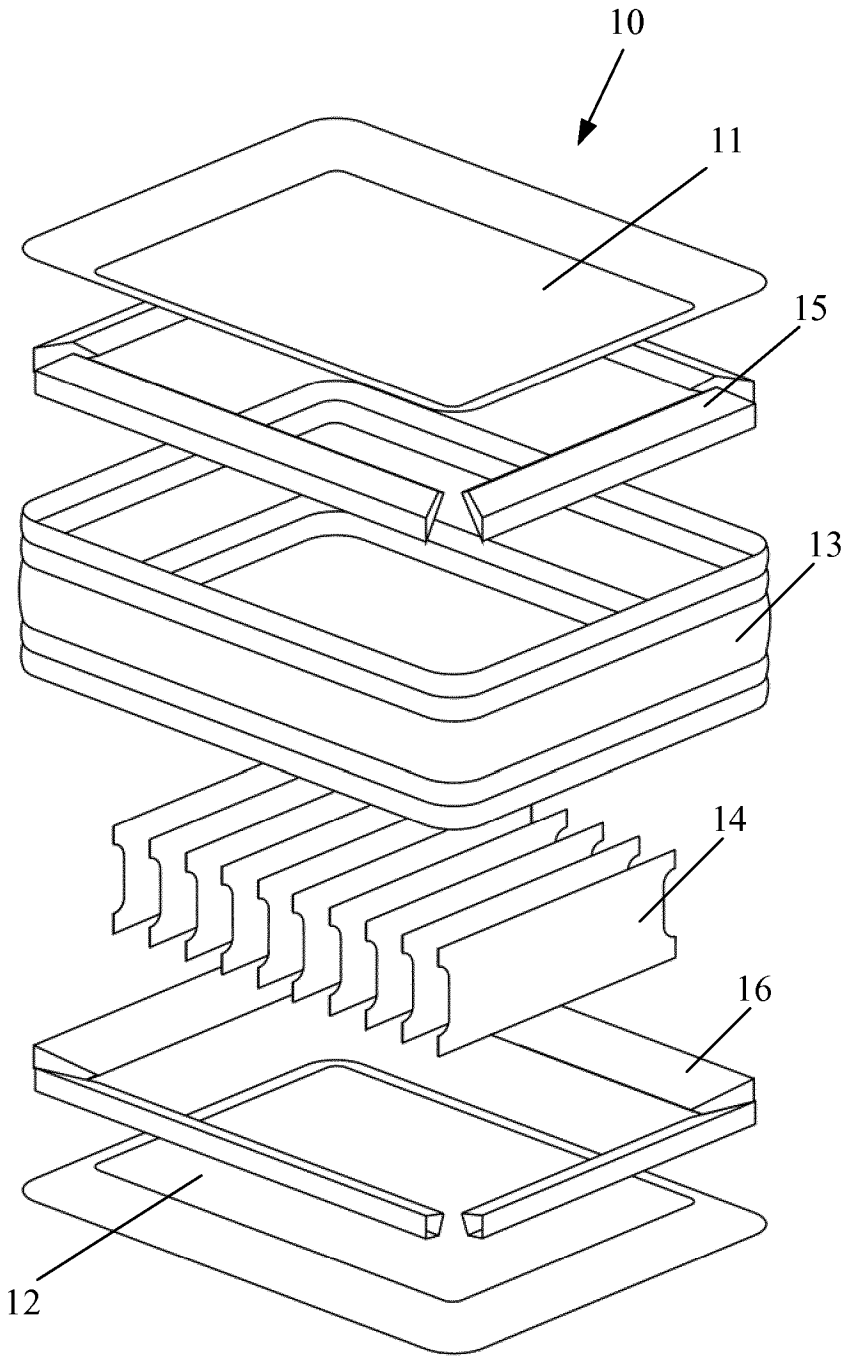


Fig. 15

INTEX EX. 1038, Pg. 182
Intex Recreation v. Bestway Inflatables

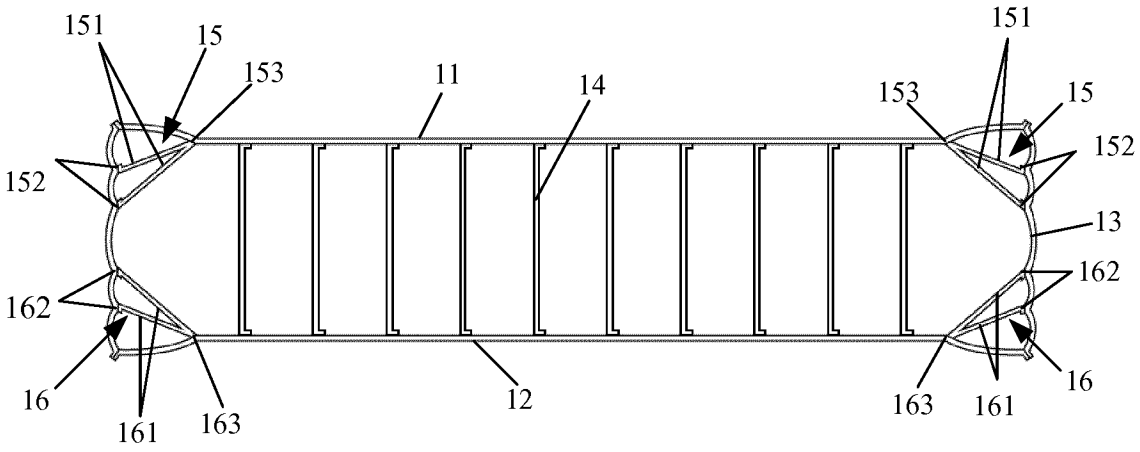


Fig. 16

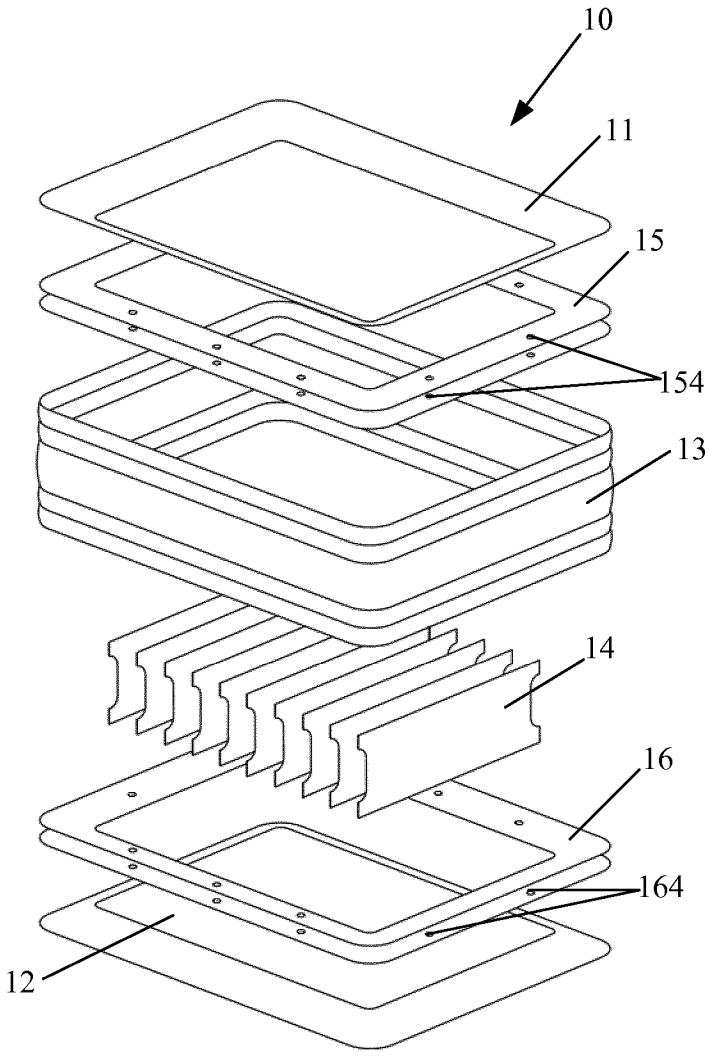


Fig. 17

INTEX EX. 1038, Pg. 183
Intex Recreation v. Bestway Inflatables

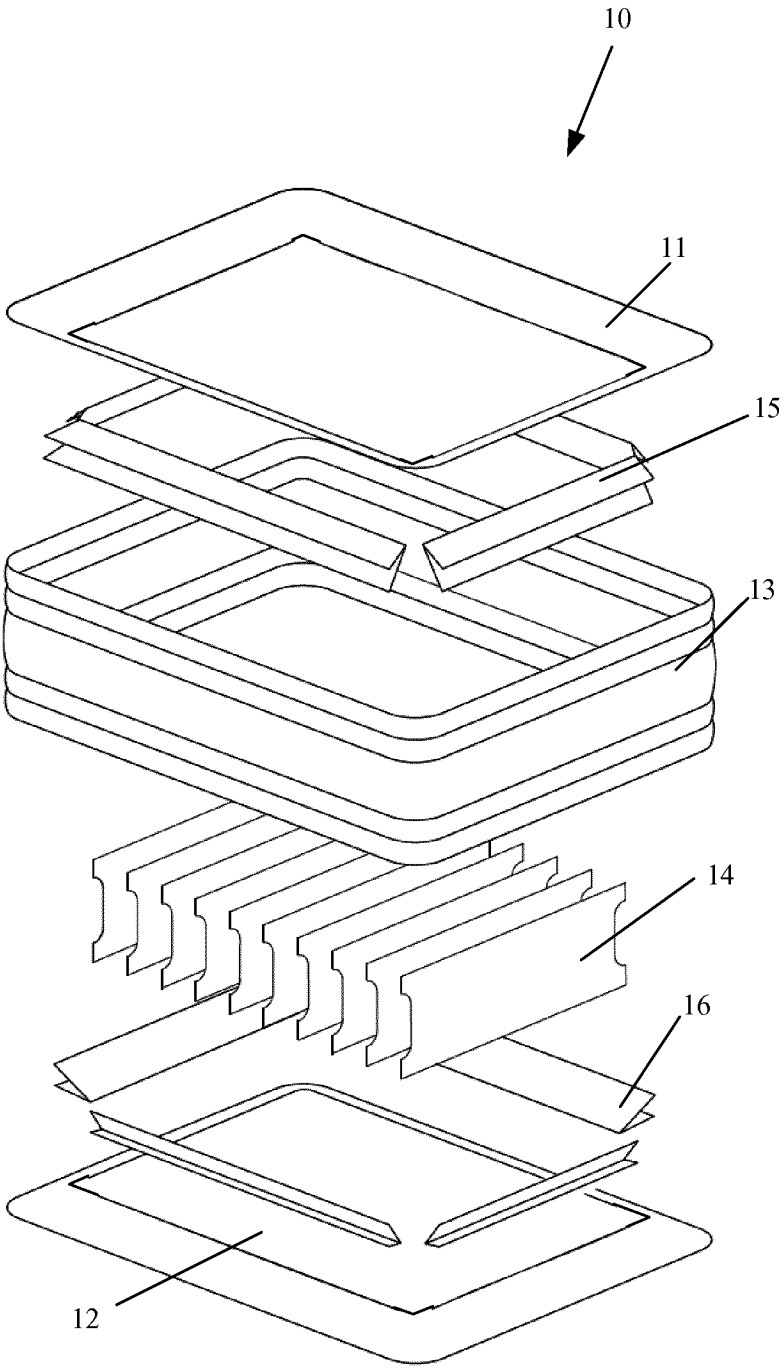


Fig. 18

INTEX EX. 1038, Pg. 184
Intex Recreation v. Bestway Inflatables

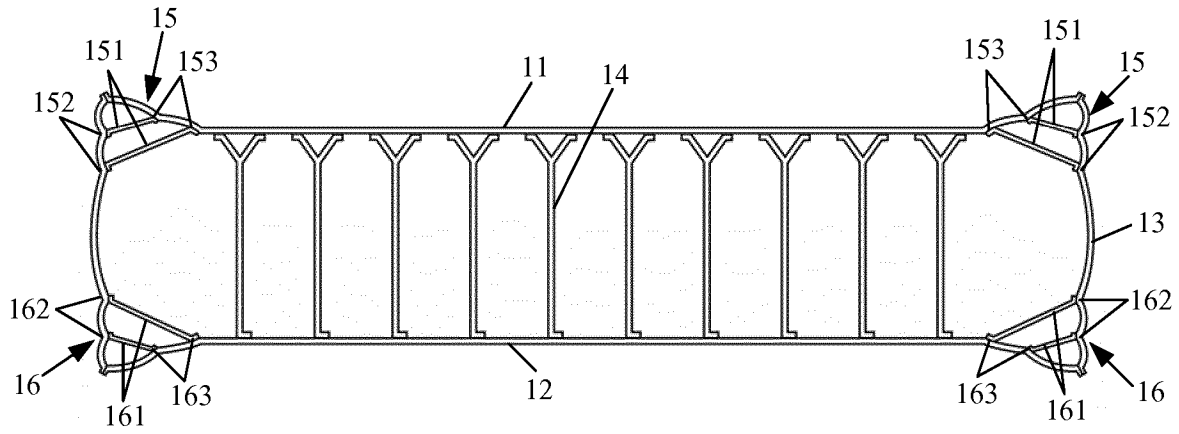


Fig. 19

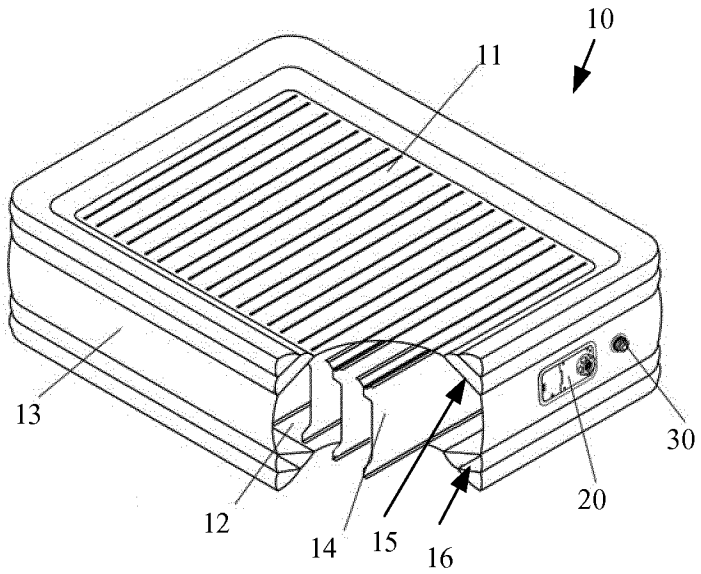


Fig. 20

INTEX EX. 1038, Pg. 185
Intex Recreation v. Bestway Inflatables

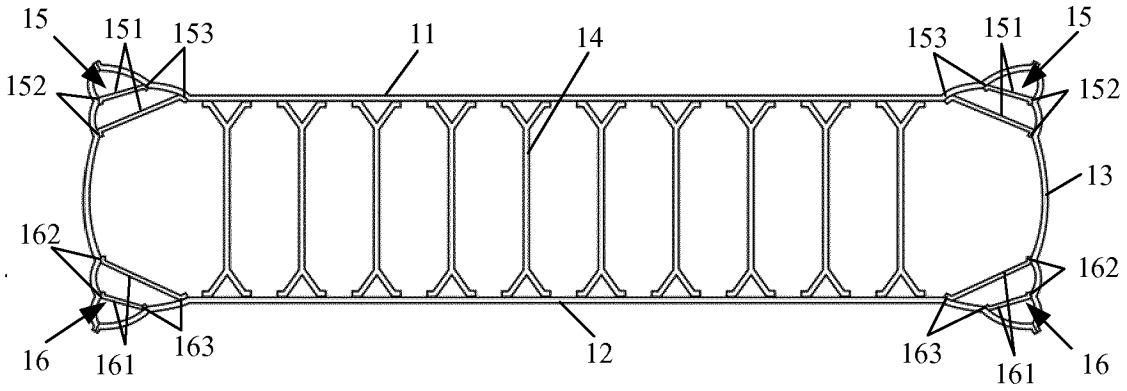


Fig. 21

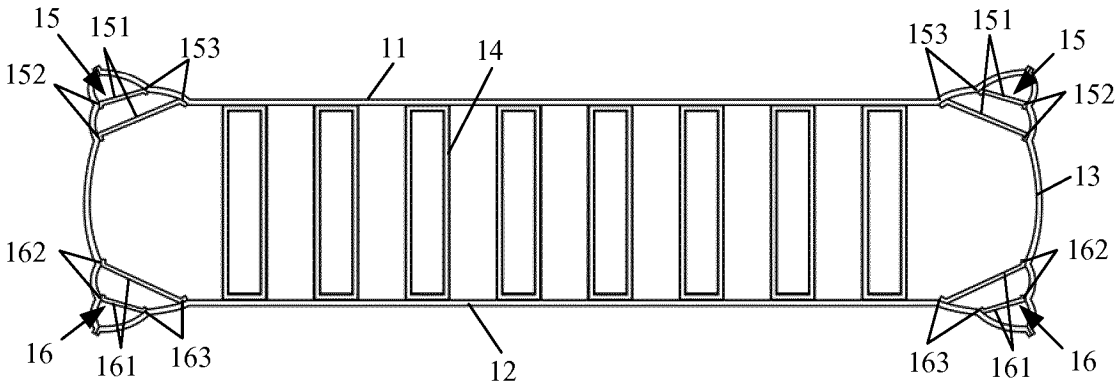


Fig. 22

INTEX EX. 1038, Pg. 186
Intex Recreation v. Bestway Inflatables

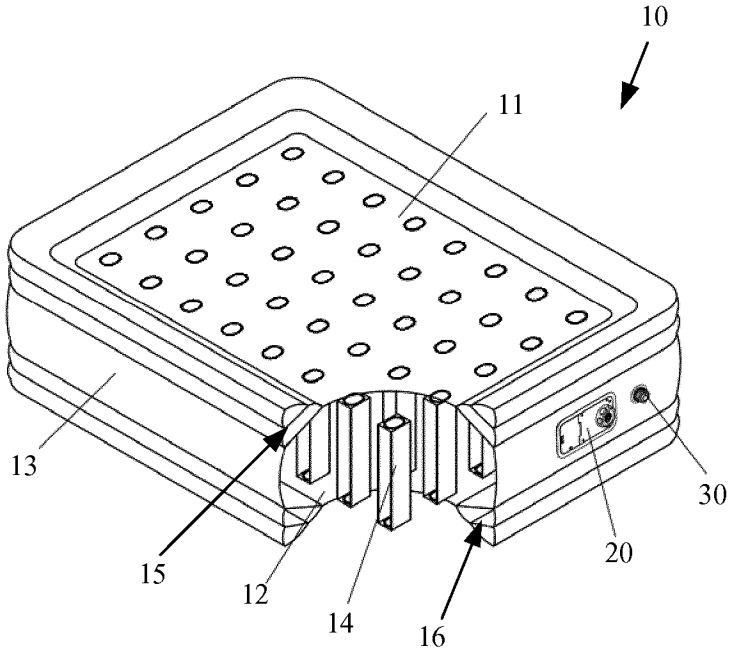


Fig. 23

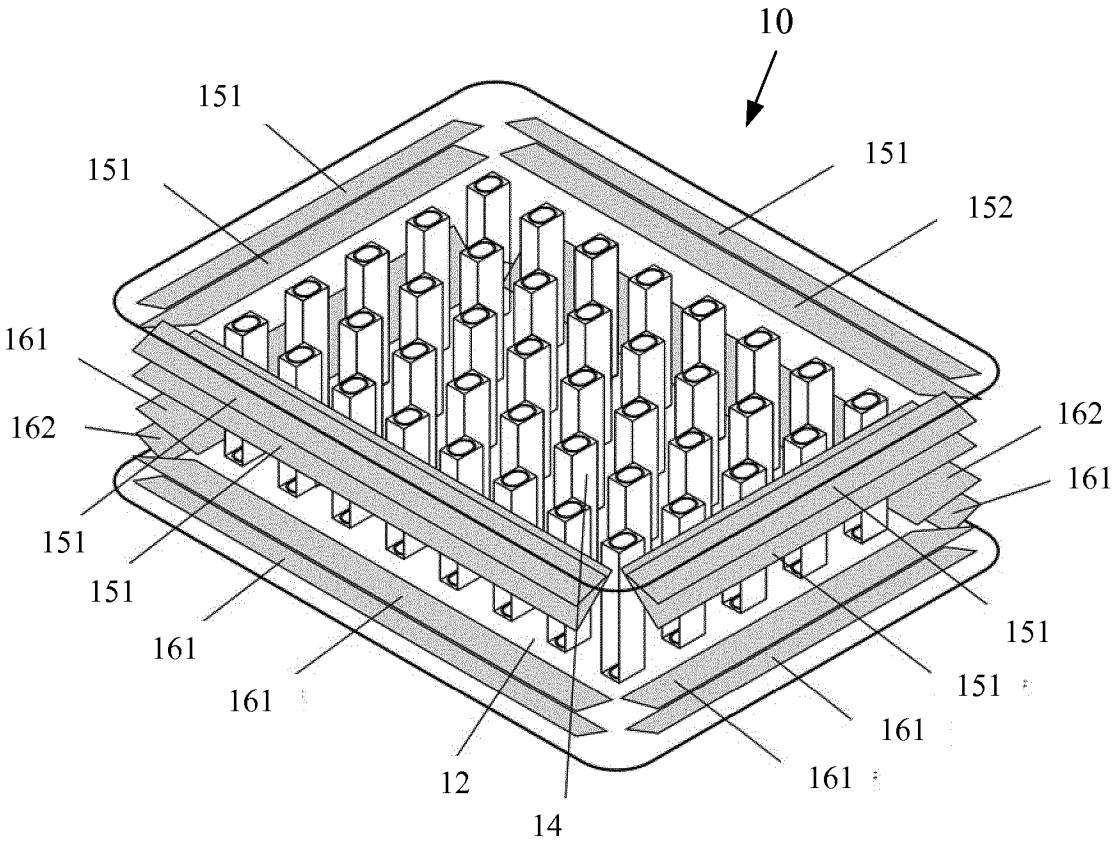


Fig. 24

INTEX EX. 1038, Pg. 187
Intex Recreation v. Bestway Inflatables

157591EP

INFLATABLE BED

CROSS REFERENCE

[0001] This application claims the benefit and priority of Chinese Application No. 201610020533.5, filed January 13, 2016. ~~The entire disclosures of each of the above applications are incorporated herein by reference~~.

FIELD OF THE INVENTION

[0002] The present invention relates to inflatable beds or inflatable mattresses, and more specifically, to an inflatable bed, the structure of which is configured to limit the outward bulging or deformation of a side wall.

BACKGROUND

[0003] Currently, inflatable beds and inflatable mattresses have been very popular. The inflatable beds and inflatable mattresses have the advantages of light weight, easy to carry and store, etc., and thus are widely used in various occasions. For example, household inflatable beds and inflatable mattresses can often be used as temporary beds for visiting guests. In addition, the inflatable beds and inflatable mattresses are very suitable for use in outdoor camping. Examples of such inflatable beds and inflatable mattresses can be found in documents US 2013/145560 and US 2009/165211.

[0004] Conventionally, the inflatable beds and inflatable mattresses are generally made of PVC sheet, PU sheet, or the like, and have various different structures, in which a typical mechanism is that using a top sheet, a bottom sheet, and a side wall coupled to the top sheet and the bottom sheet to form an inflatable air chamber. Tensioning structures, which are coupled to the top sheet and the bottom sheet and are arranged at an interval, are disposed in the air chamber, so as to form a shape having a certain height and a substantially flat upper surface for people to lie on.

[0005] Among the existing inflatable beds and inflatable mattresses, some have a larger height, whereby the side walls of the inflatable beds and inflatable mattresses after being inflated are susceptible to bulge and deform, affecting the appearance of the inflatable beds and inflatable mattresses. And, the bulging and deformation of the inflatable beds and inflatable mattresses may also result in the decay of air pressure in the air chamber, such that the inflatable beds and inflatable mattresses are softened, reducing the comfort of the inflatable beds and inflatable mattresses.

[0006] Therefore, in order to solve the above-mentioned problem of bulging of the side walls, in some inflatable beds and inflatable mattresses, a middle sheet is arranged between the top

sheet and the bottom sheet and is coupled to the side walls. In the inflatable beds and inflatable mattresses of such a structure, although the problem of bulging and deformation of the side walls is slightly improved, the desired result still cannot be achieved. Moreover, since tensioning structures have to be arranged between the middle sheet and the top sheet and between the middle sheet and the bottom sheet, the manufacturing process of the inflatable beds and inflatable mattresses becomes more complicated, that is to say, more plastic sheet is required.

[0007] Furthermore, in the prior art, the inflatable beds and inflatable mattresses with a relatively large height have a defect in its stability. When a user lies on or seats near the edge of the inflatable beds and inflatable mattresses, the inflatable beds and inflatable mattresses are susceptible to roll over. In order to improve the stability, an inflatable stabilization tube is arranged on the outer periphery of the bottom sheet of the inflatable bed in U.S. Patent US 6671910. However, such a structure will not only affect the aesthetic appearance of the inflatable bed, but also brings inconvenience to the user.

SUMMARY

[0008] The technical problem to be solved by the present invention is to provide an inflatable bed, in order to overcome the defects of easy occurrence of bulging and deformation of the side walls of the inflatable beds and inflatable mattresses, poor stability of the inflatable beds and inflatable mattresses, and susceptibility of roll-over in the prior art.

[0009] The above-mentioned technical problems are solved according to the present invention by providing an inflatable bed, comprising a top sheet and a bottom sheet, which are disposed vertically at an interval, at least one side wall, at least one first tensioning structure, and at least one support structure.

[0010] An upper edge of said side wall is coupled to an outer edge of said top sheet. A lower edge of said side wall is coupled to an outer edge of said bottom sheet, and an air chamber is formed between said top sheet, said bottom sheet and said side wall.

[0011] The at least one first tensioning structure is arranged in said air chamber. An upper end and a lower end of said first tensioning structure are respectively coupled to said top sheet and said bottom sheet.

[0012] The at least one support structure is arranged in said air chamber. Said support structure is arranged in a longitudinal direction of at least one of said side walls. At least two outside edges of said support structure are respectively coupled to the side wall adjacent thereto, and at

least one inside edge of said support structure is coupled to the top sheet or bottom sheet adjacent thereto.

[0013] According to the invention as defined in claim 1, ~~Preferably,~~ said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent thereto, and at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent thereto.

[0014] The at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent thereto, and at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent thereto.

[0015] Preferably, said second tensioning structure and said third tensioning structure are respectively provided with a plurality of air holes, through which an airflow passage is formed in said air chamber.

[0016] Preferably, said second tensioning structure and said third tensioning structure are disposed at an interval in a perpendicular direction.

[0017] Preferably, said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams, are respectively coupled to the side wall adjacent thereto and said top sheet, and the at least two first I-beams, are disposed at an interval.

[0018] Preferably, said third tensioning structure comprises at least two second I-beams,, an outside edge and an inside edge of each of said second I-beams, are respectively coupled to the side wall adjacent thereto and said bottom sheet, and the at least two second I-beams, are disposed at an interval.

[0019] Preferably, said second tensioning structure comprises at least one first Y-beam,, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent thereto, and an inside edge is coupled to said top sheet.

[0020] Preferably, said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent thereto, and an inside edge is coupled to said bottom sheet.

[0021] Preferably, said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent thereto, and at least one inside edge is coupled to said top sheet.

[0022] Preferably, said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent thereto, and at least one inside edge is coupled to said bottom sheet.

[0023] Preferably, said second tensioning structure comprises at least one first V- beam, wherein two outside edges of said first V- beam are respectively coupled to the side wall adjacent thereto, and an inside edge is coupled to said top sheet.

[0024] Preferably, said third tensioning structure comprises at least one second V- beam, wherein two outside edges of said second V- beam are respectively coupled to the side wall adjacent thereto, and an inside edge is coupled to said bottom sheet.

[0025] Preferably, said at least two first I-beams are arranged spaced apart from each other at a lower surface of said top sheet.

[0026] Preferably, said at least two second I- beams are arranged spaced apart from each other at an upper surface of said bottom sheet.

[0027] Preferably, said at least two first I- beams are arranged at an interval on an inner surface of said side wall in a perpendicular direction.

[0028] Preferably, said at least two second I- beams are arranged at an interval on the inner surface of said side wall in a perpendicular direction.

[0029] Preferably, the two outside edges of said at least one first Y- beam is arranged at an interval on an inner surface of said side wall in a perpendicular direction.

[0030] Preferably, the two outside edges of said at least one second Y- beam are arranged at an interval on the inner surface of said side wall in a perpendicular direction.

[0031] Preferably, said at least two outside edges of said at least one first tubular beam, which are coupled to the side wall adjacent thereto, are arranged at an interval on an inner surface of said side wall in a perpendicular direction.

[0032] Preferably, said at least two outside edges of said at least one second tubular beam, which are coupled to the side wall adjacent thereto, are arranged at an interval on the inner surface of said side wall in a perpendicular direction.

[0033] Preferably, the two outside edges of said at least one first V-beam is arranged at an interval on an inner surface of said side wall in a perpendicular direction.

[0034] Preferably, the two outside edges of said at least one second V-beam is arranged at an interval on an inner surface of said side wall in a perpendicular direction.

[0035] Preferably, said at least two first I-beams as a whole are of a continuous annular structure or a segmental annular structure.

[0036] Preferably, said at least two second I-beams as a whole are of a continuous annular structure or a segmental annular structure.

[0037] Preferably, said at least one first Y-bam as a whole is of a continuous annular structure or a segmental annular structure.

[0038] Preferably, said at least one second Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

[0039] Preferably, said at least one first tubular beam as a whole is of a segmental annular structure.

[0040] Preferably, said at least one second tubular beam as a whole is of a segmental annular structure.

[0041] Preferably, said at least one first V-bream as a whole is of a continuous annular structure or a segmental annular structure.

[0042] Preferably, said at least one second V-beam as a whole is of a continuous annular structure or a segmental annular structure.

[0043] Preferably, said first tensioning structure is one or more beams selected from I-beams, coil beams, Y-beams or X-beams.

[0044] Preferably, said first tensioning structure, said second tensioning structure and said third tensioning structure are all made of thermoplastic plastic sheet.

[0045] Preferably, one or more of said first tensioning structure, said second tensioning structure and said third tensioning structure at least partially comprise mesh, laminated plastic sheet or a threads.

[0046] Preferably, two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite plastic strips, and said mesh and said threads are sandwiched between the two opposite plastic strips.

[0047] Preferably, two side surfaces of said mesh or said threads are at least partially coupled integrally with an U-shaped plastic strip, and said mesh and said threads are sandwiched between the U-shaped plastic strip.

[0048] Preferably, said first tensioning structure is coupled to said top and bottom sheets by means of high-frequency welding; said second tensioning structure is coupled to said top sheet and said side wall by means of high-frequency welding; and said third tensioning structure is coupled to said bottom sheet and said side wall by means of high-frequency welding.

[0049] Preferably, the height where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the height where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

[0050] Preferably, the height where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the height where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

[0051] Preferably, said inflatable bed further comprises a built-in air pump, which is arranged on said side wall and is located between a lower edge of said second tensioning structure and an upper edge of said third tensioning structure for inflating said air chamber.

[0052] Preferably, said inflatable bed further comprises an air valve, which is arranged on said side wall for the inflation and deflation of said inflatable bed.

[0053] The positive effects of the present invention lie in the following aspects.

[0054] The inflatable bed of the present invention overcomes the defect of outward bulging and deformation of the side walls of the inflatable beds and inflatable mattresses having a relatively large height in prior art, making their appearance more attractive. The inflatable beds and inflatable mattresses have a good stability, which overcomes the problem of susceptibility of roll-over in the prior art. Furthermore, the inflatable bed of the present invention can also prevent the user from rolling down during use.

BRIEF DESCRIPTION OF THE DRAWINGS

[0055] The above-mentioned and other features, properties and advantages of the present invention will become more apparent from the following description of embodiments with reference to the accompany drawings, in which:

[0056] Fig. 1 is a perspective view of an inflatable bed according to the present invention.

[0057] Fig. 2 is a front view of the inflatable bed according to the present invention.

[0058] Fig. 3 is a right view of the inflatable bed according to the present invention.

[0059] Fig. 4 is a top view of the inflatable bed according to the present invention.

[0060] Fig. 5 is a sectional view of a first embodiment taken along line A-A in Fig. 4.

[0061] Fig. 6 is a schematic structural partially sectional view of the first embodiment of the inflatable bed according to the present invention.

[0062] Fig. 7 is a first exploded view of the first embodiment of the inflatable bed according to the present invention.

[0063] Fig. 8 is a second exploded view of the first embodiment of the inflatable bed according to the present invention.

[0064] Fig. 9 is a sectional view of a second embodiment taken along line A-A in Fig. 4.

[0065] Fig. 10 is a first exploded view of the second embodiment of the inflatable bed according to the present invention.

[0066] Fig. 11 is a second exploded view of the second embodiment of the inflatable bed according to the present invention.

[0067] Fig. 12 is a first sectional view of a third embodiment taken along line A-A in Fig. 4.

[0068] Fig. 13 is a second sectional view of the third embodiment taken along line A-A in Fig. 4.

[0069] Fig. 14 is a first exploded view of the third embodiment of the inflatable bed according to the present invention.

[0070] Fig. 15 is a second exploded view of the third embodiment of the inflatable bed according to the present invention.

[0071] Fig. 16 is a sectional view of a fourth embodiment taken along line A-A in Fig. 4.

[0072] Fig. 17 is a first exploded view of the fourth embodiment of the inflatable bed according to the present invention.

[0073] Fig. 18 is a second exploded view of the fourth embodiment of the inflatable bed according to the present invention.

[0074] Fig. 19 is a sectional view of a fifth embodiment taken along line A-A in Fig. 4.

[0075] Fig. 20 is a schematic structural partially sectional view of the fifth embodiment of the inflatable bed according to the present invention.

[0076] Fig. 21 is a sectional view of a sixth embodiment taken along line A-A in Fig. 4.

[0077] Fig. 22 is a sectional view of a seventh embodiment taken along line A-A in Fig. 4.

[0078] Fig. 23 is a schematic structural partially sectional view of the seventh embodiment of the inflatable bed according to the present invention.

[0079] Fig. 24 is a schematic view of the interior structure of the seventh embodiment of the inflatable bed according to the present invention.

DETAILED DESCRIPTION

[0080] The present invention will be further described below in conjunction with detailed embodiments and the accompanying drawings. More details are provided in the following detailed description in order for the present invention to be fully understood. However, the

present invention can be implemented in various ways other than those described herein. A person skilled in the art can make similar analogy and modification according to the practical applications without departing from the spirit of the present invention, and therefore the contents of the detailed embodiments herein should not be construed as limiting to the scope of the present invention.

[0081] Embodiment 1:

[0082] Fig. 1 is a perspective view of an inflatable bed according to the present invention. Fig. 2 is a front view of the inflatable bed according to the present invention. Fig. 3 is a right view of the inflatable bed according to the present invention. Fig. 4 is a top view of the inflatable bed according to the present invention. Fig. 5 is a sectional view of a first embodiment taken along line A-A in Fig. 4. Fig. 6 is a schematic structural partially sectional view of the first embodiment of the inflatable bed according to the present invention. Fig. 7 is an exploded view of the first embodiment of the inflatable bed according to the present invention.

[0083] As shown in Figs. 1-7, an inflatable bed 10 is disclosed in the first embodiment according to the present invention, which comprises a top sheet 11, a bottom sheet 12, at least one side wall 13, at least one first tensioning structure 14 and at least one support structure. The bottom sheet 12 and the top sheet 11 are disposed vertically at an interval, an upper edge of the side wall 13 is coupled to an outer edge of the top sheet 11, a lower edge of the side wall 13 is coupled to an outer edge of the bottom sheet 12, and an air chamber is formed between the top sheet 11, the bottom sheet 12 and the side wall 13. Moreover, the first tensioning structure 14 is arranged in the air chamber, and an upper end and a lower end of the first tensioning structure 14 are respectively coupled to the top sheet 11 and the bottom sheet 12. This has the effects of limiting the respective upward and downward bulging of the top sheet 11 and the bottom sheet 12 by means of the first tensioning structure 14 after said air chamber is inflated. In particular, both the top sheet 11 and the bottom sheet 12 may be configured as a two-layer structure, which can be formed with different patterns by mutually welding at least two sheets. Alternatively, a sponge structure is further sandwiched in the two-layer structure.

[0084] Said support structure is arranged in said air chamber herein, said support structure is arranged in the longitudinal direction of at least one of the side walls 13, at least two outside edges of said support structure are respectively coupled to the side wall 13 adjacent thereto, and at least one inside edge of said support structure is coupled to the top sheet 11 or bottom sheet 12 adjacent thereto.

[0085] Preferably, said support structure comprises a second tensioning structure 15 and a third tensioning structure 16. At least two outside edges of the second tensioning structure 15 are respectively coupled to the side wall 13 adjacent thereto, and at least one inside edge of the second tensioning structure is coupled to the top sheet 11 adjacent thereto. The second tensioning structure 15 is configured to limit the upward and lateral bulging of the top sheet 11 and the side wall 13 after said air chamber is inflated.

[0086] Moreover, at least two outside edges of the third tensioning structure 16 are respectively coupled to the side wall 13 adjacent thereto, and at least one inside edge of the third tensioning structure 16 is coupled to the adjacent bottom sheet 12. The third tensioning structure 16 is configured to limit the respective downward and lateral bulging of the bottom sheet 12 and the side wall 13 after said air chamber is inflated.

[0087] In this embodiment, the second tensioning structure 15 comprises at least two first I-beams 151, one outside edge 152 of each first I-beams 151 is coupled to the side wall 13 adjacent thereto, the other inside edge 153 is coupled to the top sheet 11 adjacent thereto, and the at least two first I-beams 151 are disposed at an interval. The third tensioning structure 16 comprises at least two second I-beams 161, one outside edge 162 of each second I-beam 161 is coupled to the side wall 13 adjacent thereto, the other inside edge 163 is coupled to the bottom sheet 12 adjacent thereto, and the at least two second I-beams 151 are disposed at an interval. In this embodiment, the numbers of first I-beams 151 and second I-beams 161 are both two by way of example, but their numbers are not limited by this embodiment, and may be more than two, which also fall within the scope of protection of the present invention.

[0088] The second tensioning structure 15 and the third tensioning structure 16 are preferably disposed at an interval in a perpendicular direction. In this embodiment, for example, the second tensioning structure 15 and the third tensioning structure 16 divide the respective side wall 13 into five sections, so that the second tensioning structure 15 is configured to limit the upward and lateral bulging of the top sheet 11 and the side wall 13 after said air chamber is inflated, and the third tensioning structure 16 is configured to limit the respective downward and lateral bulging of the bottom sheet 12 and the side wall 13 after said air chamber is inflated.

[0089] Of course, the second tensioning structure 15 and the third tensioning structure 16 may also divide the respective side wall 13 into a multi-section structure, such as a four- or six-section structure; this embodiment is merely exemplary and the present invention is not limited thereto, and all the structures with four or more sections fall within the scope of protection of the present invention.

[0090] Further, the at least two first I-beams 151 are arranged spaced apart from each other at a lower surface of the top sheet 11, and the at least two second I-beams 161 are arranged spaced apart from each other at an upper surface of the bottom sheet 12. The at least two first I-beams 151 are arranged at an interval on an inner surface of the side wall 13 in a perpendicular direction. The at least two second I-beams 161 are arranged at an interval on the inner surface of the side wall 13 in a perpendicular direction.

[0091] Furthermore, the at least two first I-beams 151 as a whole are of a continuous annular structure or a segmental annular structure. The at least two second I-beams 161 as a whole are of a continuous annular structure or a segmental annular structure. Moreover, the at least two first I-beams 151 are provided with air holes 154, and an airflow passage is formed in said air chamber through the air holes 154. The at least two second I-beams 161 are provided with air holes 164, and an airflow passage is formed in said air chamber through the air holes 164 (as shown in Figs. 7 and 8).

[0092] The first tensioning structure 14 of the present invention may employ one or more beams selected from I-beams, coil beams, Y-beams or X-beams. Moreover, the first tensioning structure 14, the second tensioning structure 15 and the third tensioning structure 16 may be all made of thermoplastic plastic sheet, and one or more of the first tensioning structure 14, the second tensioning structure 15 and the third tensioning structure 16 at least partially comprise mesh, laminated plastic sheet or threads.

[0093] The structures thereof may take various forms. For example, two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite s plastic strips, and said mesh and said threads are sandwiched between the two opposite plastic strips.

[0094] As another example, two side surfaces of said mesh f or said threads are at least partially coupled integrally with an U-shaped plastic strip, and said mesh and said threads are sandwiched between the U-shaped plastic strip. These connecting structures can be used to effectively manufacture the beams required by the inflatable bed in the present invention; the solution in this embodiment is merely exemplary and the present invention is not limited thereto, and any other structure, which can implement the beam, falls within the scope of protection of the present invention.

[0095] On the basis of the structure of the above beams, in order to ensure a firm connection between the components, the first tensioning structure 14 is coupled to the top sheet 11 and the bottom sheet 12 by means of high-frequency welding. Similarly, the second tensioning structure 15 is coupled to the top sheet 11 and the side wall 13 by means of high-frequency welding. The

third tensioning structure 16 is coupled to the bottom sheet 12 and the side wall 13 by means of high-frequency welding.

[0096] In the inflatable bed of the present invention formed of the aforementioned structure, the height where the top sheet 11 thereof is located in the inside part of an upper edge of the second tensioning structure 15 is lower than the height where the top sheet 11 is located in the outside part of the upper edge of the second tensioning structure 15. The height where the bottom sheet 12 is located in the inside part of a lower edge of the third tensioning structure 16 is lower than the height where the bottom sheet 12 is located in the outside part of the lower edge of the third tensioning structure 16.

[0097] Furthermore, the inflatable bed 10 further comprises a built-in air pump 20, and the built-in air pump 20 is arranged on the side wall 13 and is located between a lower edge of the second tensioning structure 15 and an upper edge of the third tensioning structure 16 for inflating said air chamber. Moreover, the inflatable bed 10 further comprises an air valve 30, and the air valve 30 is arranged on the side wall 13 for the inflation and deflation of the inflatable bed 10.

[0098] Embodiment 2:

[0099] Fig. 9 is a sectional view of a second embodiment taken along line A-A in Fig. 4. Fig. 10 is a first exploded view of the second embodiment of the inflatable bed of the present invention. Fig. 11 is a second exploded view of the second embodiment of the inflatable bed of the present invention.

[00100] As shown in Figs. 9-11, the structure of this embodiment is substantially the same as that of the first embodiment, except that the second tensioning structure 15 comprises at least one first Y-beam 151, wherein two outside edges 152 of the first Y-beam 151 are respectively coupled to the side wall 13 adjacent thereto, and the other inside edge 153 is coupled to the top sheet 11. Similarly, the third tensioning structure 16 comprises at least one second Y-beam 161, wherein two outside edges 162 of the second Y-beam 161 are respectively coupled to the side wall 13 adjacent thereto, and the other inside edge 163 is coupled to the bottom sheet 12.

[00101] The second tensioning structure 15 and the third tensioning structure 16 are preferably disposed at an interval in a perpendicular direction. In this embodiment, the second tensioning structure 15 and the third tensioning structure 16 divide the respective side wall 13 into five sections, so that the second tensioning structure 15 is configured to limit the upward and lateral bulging of the top sheet 11 and the side wall 13 after said air chamber is inflated, and the third tensioning structure 16 is configured to limit the respective downward and lateral bulging of the bottom sheet 12 and the side wall 13 after said air chamber is inflated.

[00102] Of course, the second tensioning structure 15 and the third tensioning structure 16 may also divide the respective side wall 13 into a multi-section structure, such as a four- or six-section structure; this embodiment is merely exemplary and the present invention is not limited thereto, and all the structures with four or more sections fall within the scope of protection of the present invention.

[00103] Further, the two outside edges 152 of the at least one first Y-beam 151 are arranged at an interval on an inner surface of the side wall 13 in a perpendicular direction. The two outside edges 162 of the at least one second Y-beam 161 are arranged at an interval on the inner surface of the side wall 13 in a perpendicular direction.

[00104] Furthermore, the at least one first Y-beam 151 as a whole is of a continuous annular structure or a segmental annular structure. The at least one second Y-beam 161 as a whole is of a continuous annular structure or a segmental annular structure. Moreover, the at least one first Y-beam 151 is further provided with air holes 154, and an airflow passage is formed in said air chamber through the air holes 154. The at least one second Y-beam 161 is further provided with air holes 164, and an airflow passage is formed in said air chamber through the air holes 164 (as shown in Figs. 10 and 11).

[00105] Embodiment 3:

[00106] Fig. 12 is a first sectional view of a third embodiment taken along line A-A in Fig. 4. Fig. 13 is a second sectional view of the third embodiment taken along line A-A in Fig. 4. Fig. 14 is a first exploded view of the third embodiment of the inflatable bed of the present invention. Fig. 15 is a second exploded view of the third embodiment of the inflatable bed of the present invention.

[00107] As shown in Figs. 12-15, the structure of this embodiment is substantially the same as that of the first embodiment, except that the second tensioning structure 15 comprises at least one first tubular beam 151, wherein the first tubular beam 151 has at least two outside edges 152 respectively coupled to the side wall 13 adjacent thereto, and at least one inside edge 153 is coupled to the top sheet 11. The third tensioning structure 16 comprises at least one second tubular beam 161, wherein the second tubular beam 161 has at least two outside edges 162 respectively coupled to the side wall 13 adjacent thereto, and at least one inside edge 163 is coupled to the bottom sheet 12. The first tubular beam 151 and the second tubular beam 161 herein may be of various tubular structures, such as a triangular tubular structure, or a quadrilateral tubular structure (as shown in Figs. 13 and 14).

[00108] Beam 151, which are coupled to the wall 13 adjacent thereto, are arranged at an interval on an inner surface of the side wall 13 in a perpendicular direction. The at least two outside edges 162 of the at least one second tubular beam 161, which are coupled to the wall 13 adjacent thereto, are arranged at an interval on an inner surface of the side wall 13 in a perpendicular direction.

[00109] The at least one first tubular beam 151 herein as a whole is of a segmental annular structure. The at least one second tubular beam 161 as a whole is of a segmental annular structure (as shown in Figs. 13 and 14).

[00110] The second tensioning structure 15 and the third tensioning structure 16 are preferably disposed at an interval in a perpendicular direction. In this embodiment, the second tensioning structure 15 and the third tensioning structure 16 divide the respective side wall 13 into five sections, so that the second tensioning structure 15 is configured to limit the upward and lateral bulging of the top sheet 11 and the side wall 13 after said air chamber is inflated, and the third tensioning structure 16 is configured to limit the respective downward and lateral bulging of the bottom sheet 12 and the side wall 13 after said air chamber is inflated.

[00111] Of course, the second tensioning structure 15 and the third tensioning structure 16 may also divide the respective side wall 13 into a multi-section structure, such as a four- or six-section structure; this embodiment is merely exemplary and the present invention is not limited thereto, and all the structures with four or more sections fall within the scope of protection of the present invention.

[00112] Embodiment 4:

[00113] Fig. 16 is a sectional view of a fourth embodiment taken along line A-A in Fig. 4. Fig. 17 is a first exploded view of the fourth embodiment of the inflatable bed of the present invention. Fig. 18 is a second exploded view of the fourth embodiment of the inflatable bed of the present invention.

[00114] As shown in Figs. 16-18, the structure of this embodiment is substantially the same as that of the first embodiment, except that the second tensioning structure 15 comprises at least one first V-beam 151, wherein two outside edges 152 of the first V-beam 151 are respectively coupled to the side wall 13 adjacent thereto, and the other inside edge 153 is coupled to the top sheet 11. The third tensioning structure 16 comprises at least one second V-beam 161, wherein two outside edges 162 of the second V-beam 161 are respectively coupled to the side wall 13 adjacent thereto, and the other inside edge 163 is coupled to the top sheet 11.

[00115] Further, the two outside edges 152 of the at least one first V-beam 151 are arranged at an interval on an inner surface of the side wall 13 in a perpendicular direction. The two outside edges 162 of the at least one second V-beam 161 are arranged at an interval on the inner surface of the side wall 13 in a perpendicular direction.

[00116] Furthermore, the at least one first V-beam 151 as a whole is of a continuous annular structure or a segmental annular structure. The at least one second V-beam 161 as a whole is of a continuous annular structure or a segmental annular structure. Moreover, the at least one first V-beam 151 is provided with air holes 154, and an airflow passage is formed in said air chamber through the air holes 154. The at least one second V-shaped drawstring V-beam 161 is provided with air holes 164, and an airflow passage is formed in said air chamber through the air holes 164.

[00117] The second tensioning structure 15 and the third tensioning structure 16 are preferably disposed at an interval in a perpendicular direction. In this embodiment, the second tensioning structure 15 and the third tensioning structure 16 divide the respective side wall 13 into five sections, so that the second tensioning structure 15 is configured to limit the upward and lateral bulging of the top sheet 11 and the side wall 13 after said air chamber is inflated, and the third tensioning structure 16 is configured to limit the respective downward and lateral bulging of the bottom sheet 12 and the side wall 13 after said air chamber is inflated.

[00118] Of course, the second tensioning structure 15 and the third tensioning structure 16 may also divide the respective side wall 13 into a multi-section structure, such as a four- or six-section structure; this embodiment is merely exemplary and the present invention is not limited thereto, and all the structures with four or more sections fall within the scope of protection of the present invention.

[00119] Embodiment 5:

[00120] Fig. 19 is a sectional view of a fifth embodiment taken along line A-A in Fig. 4. Fig. 20 is a schematic structural partially sectional view of the fifth embodiment of the inflatable bed of the present invention.

[00121] As shown in Figs. 19 and 20, the structure of this embodiment is substantially the same as that of the first embodiment, except that the first tensioning structure 14 employs a Y-beam, and the upper and lower ends of the first tensioning structure 14 are respectively coupled to the top sheet 11 and the bottom sheet 12. Several beams in the first tensioning structure 14 are arranged spaced apart from each other. The upper end of each beam of the first tensioning structure 14 takes the form of a fork and is coupled to and supports the top sheet 11,

and the lower end takes the form of an I-beam and is downwardly coupled to the bottom sheet 12. After said air chamber is inflated, such a structure can effectively limit the respective upward and downward bulging of the top sheet 11 and the bottom sheet 12.

[00122] Embodiment 6:

[00123] Fig. 21 is a sectional view of a sixth embodiment taken along line A-A in Fig. 4.

[00124] As shown in Fig. 21, the structure of this embodiment is substantially the same as that of the fifth embodiment, except that the first tensioning structure 14 employs an X-shaped drawstring at the upper and lower ends, and the upper and lower ends of the first tensioning structure 14 are respectively coupled to the top sheet 11 and the bottom sheet 12. Several drawstrings in the first tensioning structure 14 are arranged spaced apart from each other. The upper end of each drawstring of the first tensioning structure 14 takes the form of a folk and is upwardly coupled to the top sheet 11, and the lower end also takes the form of a folk and is downwardly coupled to the bottom sheet 12. After said air chamber is inflated, such a structure can limit the respective upward and downward bulging of the top sheet 11 and the bottom sheet 12 more effectively.

[00125] Embodiment 7:

[00126] Fig. 22 is a sectional view of a seventh embodiment taken along line A-A in Fig. 4. Fig. 23 is a schematic structural partially sectional view of the seventh embodiment of the inflatable bed of the present invention. Fig. 24 is a schematic view of the interior structure of the seventh embodiment of the inflatable bed of the present invention.

[00127] As shown in Figs. 22-24, the structure of this embodiment is substantially the same as that of the first embodiment, except that all the drawstrings in the first tensioning structure 14 employ coil beams, and the upper and lower ends of each beam of the first tensioning structure 14 are respectively coupled to the top sheet 11 and the bottom sheet 12. Several beams in the first tensioning structure 14 are arranged spaced apart from each other. After said air chamber is inflated, this structure can effectively limit the respective upward and downward bulging of the top sheet 11 and the bottom sheet 12.

[00128] According to the description of the aforementioned structures, the structural variations in the embodiments may arbitrarily combined, and are not limited to the particular embodiments described above, i.e., the number of beams contained in the second tensioning structure 15 and the number of beams contained in the third tensioning structure 16 are unlimited, which can be adjusted according to actual requirements.

[00129] Similarly, the connection between the beams in the second tensioning structure 15 and the connection between the beams in the third tensioning structure 16 are also not limited to the aforementioned embodiments, as long as the side wall 13 is divided into at least five (or equal to or greater than four) sections, for example, the number of beams in the second tensioning structure 15 and that in the third tensioning structure 16 as well as the connection thereof can be changed so as to divide the side wall 13 into multiple sections such as six or seven sections.

[00130] Of course, the structures of the first tensioning structure 14 can be commonly used in each case, and likewise serve to support the top sheet 11 and the bottom sheet 12, effectively limiting the respective upward and downward bulging of the top sheet 11 and the bottom sheet 12.

[00131] In summary, the inflatable bed of the present invention can limit the outward bulging or deformation of the side wall of the inflatable bed by using various types of tensioning structures. The structure of the inflatable bed of the present invention effectively overcomes the defect of outward bulging and deformation of the side walls of the inflatable beds and inflatable mattresses having a relatively large height in prior art, making their appearance more attractive. The inflatable beds and inflatable mattresses have a good stability, which overcomes the problem of susceptibility of roll-over in the prior art. Furthermore, the inflatable bed of the present invention can also prevent the user from rolling down during use.

[00132] While the particular embodiments of the present invention have been described, a person skilled in the art should understand that these are merely illustrative, and that the scope of protection of the present invention is defined by the appended claims. Various alterations or modifications can be made by a person skilled in the art to these embodiments without departing from the principle and substance of the present invention; however, these alterations and modifications all fall within the scope of protection of the invention.

CLAIMS

What is claimed is:

1. An inflatable bed (10), ~~bed,~~ comprising:

a top sheet (11) ~~sheet~~ and a bottom sheet (12) ~~sheet~~ disposed vertically at an interval;

at least one side wall (13), ~~wall,~~ an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152,162) ~~edges~~ of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153,163) ~~edge~~ of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent; and

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent.

2. The inflatable bed according to claim 1, wherein said second tensioning structure and said third tensioning structure are respectively provided with a plurality of air holes, through which an airflow passage is formed in said air chamber.

3. The inflatable bed according to claim 1, wherein said second tensioning structure and said third tensioning structure are disposed at an interval in a perpendicular direction.

4. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams are respectively coupled to said side wall and said top sheet adjacent, the at least two first I-beams are disposed at an interval.

5. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least two second I-beams, an outside edge and an inside edge of each of said second

I-beams are respectively coupled to the side wall and said bottom sheet adjacent, the at least two second I-beams are disposed at an interval.

6. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first Y-beam, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.

7. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

8. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said top sheet.

9. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said bottom sheet.

10. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first V-beam, wherein two outside edges of said first V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.

11. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second V-beam, wherein two outside edges of said second V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

12. The inflatable bed according to claim 4, wherein said at least two first I-beams are spaced apart from each other at a lower surface of said top sheet.

13. The inflatable bed according to claim 5, wherein said at least two second I-beams are spaced apart from each other at an upper surface of said bottom sheet.

14. The inflatable bed according to claim 4, wherein said at least two first I-beams are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

15. The inflatable bed according to claim 5, wherein said at least two second I-beams are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

16. The inflatable bed according to claim 6, wherein the two outside edges of said at least one first Y-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

17. The inflatable bed according to claim 7, wherein the two outside edges of said at least one second Y-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

18. The inflatable bed according to claim 8, wherein said at least two outside edges of said at least one first tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

19. The inflatable bed according to claim 9, wherein said at least two outside edges of said at least one second tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

20. The inflatable bed according to claim 10, wherein the two outside edges of said at least one first V-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

21. The inflatable bed according to claim 11, wherein the two outside edges of said at least one second V-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

22. The inflatable bed according to claim 4, wherein said at least two first V-beams as a whole are of a continuous annular structure or a segmental annular structure.

23. The inflatable bed according to claim 5, wherein said at least two second I-beam as a whole are of a continuous annular structure or a segmental annular structure.

24. The inflatable bed according to claim 6, wherein said at least one first Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

25. The inflatable bed according to claim 7, wherein said at least one second Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

26. The inflatable bed according to claim 8, wherein said at least one first tubular beam as a whole is of a segmental annular structure.

27. The inflatable bed according to claim 9, wherein said at least one second tubular beam as a whole is of a segmental annular structure.

28. The inflatable bed according to claim 10, wherein said at least one first V-beam as a whole is of a continuous annular structure or a segmental annular structure.

29. The inflatable bed according to claim 11, wherein said at least one second V-beam as a whole is of a continuous annular structure or a segmental annular structure.

30. The inflatable bed according to claim 1, wherein said first tensioning structure is one or more beams selected from I-beams, coil beams, Y-beams or X-beams.

31. The inflatable bed according to claim 1, wherein said first tensioning structure, said second tensioning structure and said third tensioning structure are all made of thermoplastic plastic sheet.

32. The inflatable bed according to claim 1, wherein one or more of said first tensioning structure, said second tensioning structure and said third tensioning structure at least partially comprise mesh, laminated plastic sheet or a threads.

33. The inflatable bed according to claim 32, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite plastic strips, said mesh and said threads are sandwiched between the two opposite plastic strips.

34. The inflatable bed according to claim 32, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with an U-shaped plastic strip, said mesh and said threads are sandwiched between the U-shaped plastic strip.

35. The inflatable bed according to claim 1, wherein said first tensioning structure is coupled to said top and bottom sheets by means of high-frequency welding; said second tensioning structure is coupled to said top sheet and said side wall by means of high-frequency welding; and said third tensioning structure is coupled to said bottom sheet and said side wall by means of high-frequency welding.

36. The inflatable bed according to claim 1, wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

37. The inflatable bed according to claim 1, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

38. The inflatable bed according to claim 1, wherein said inflatable bed further comprises a built-in air pump, which is disposed on said side wall and is located between a lower edge of said second tensioning structure and an upper edge of said third tensioning structure for inflating said air chamber.

39. The inflatable bed according to claim 1, wherein said inflatable bed further comprises an air valve, which is disposed on said side wall for the inflation and deflation of said inflatable bed.

157591.vsd

Drawings

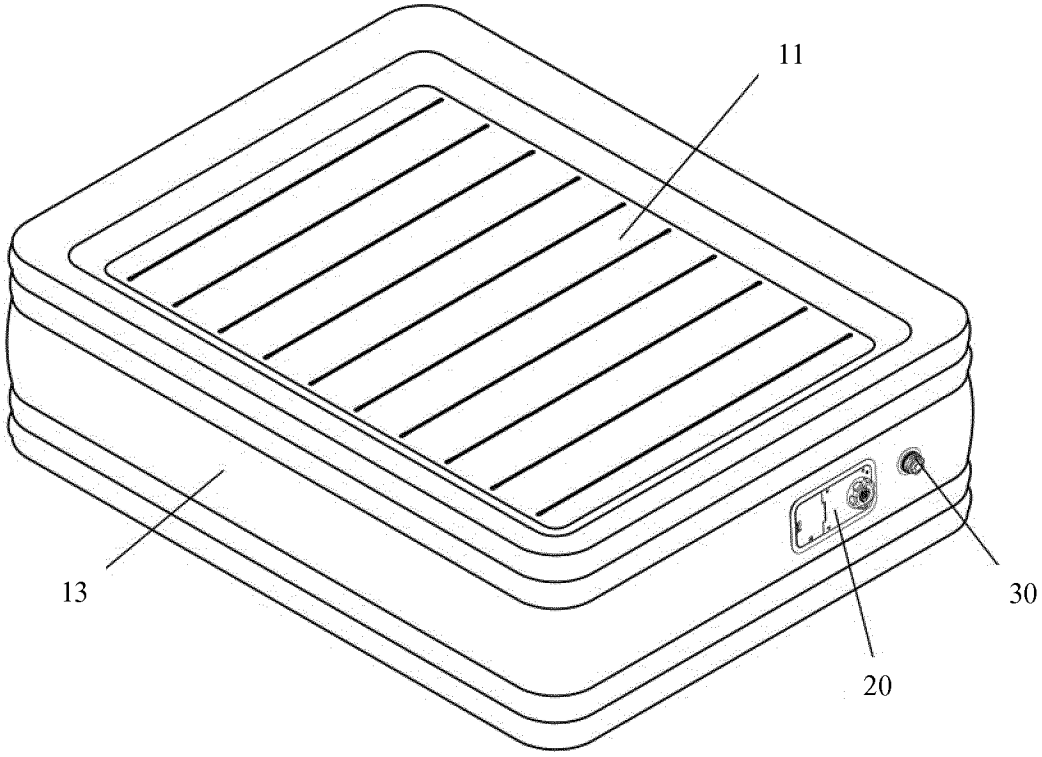


Fig. 1

INTEX EX. 1038, Pg. 208
Intex Recreation v. Bestway Inflatables

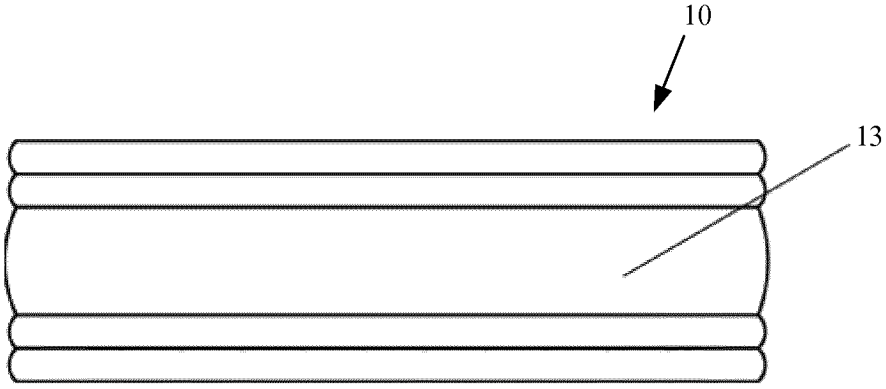


Fig. 2

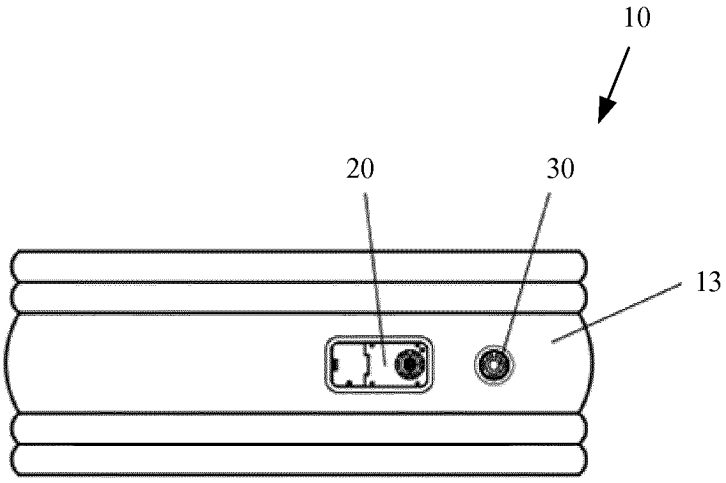


Fig. 3

INTEX EX. 1038, Pg. 209
Intex Recreation v. Bestway Inflatables

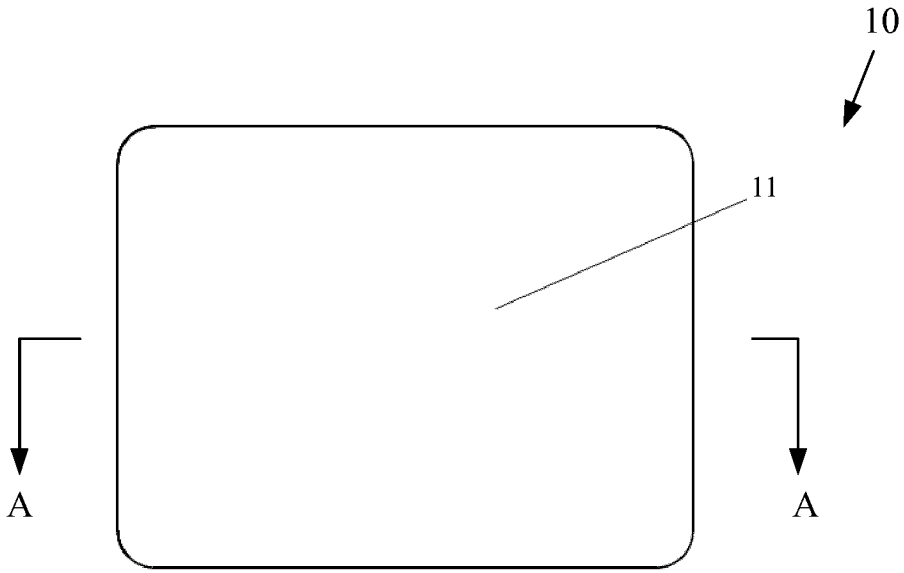


Fig. 4

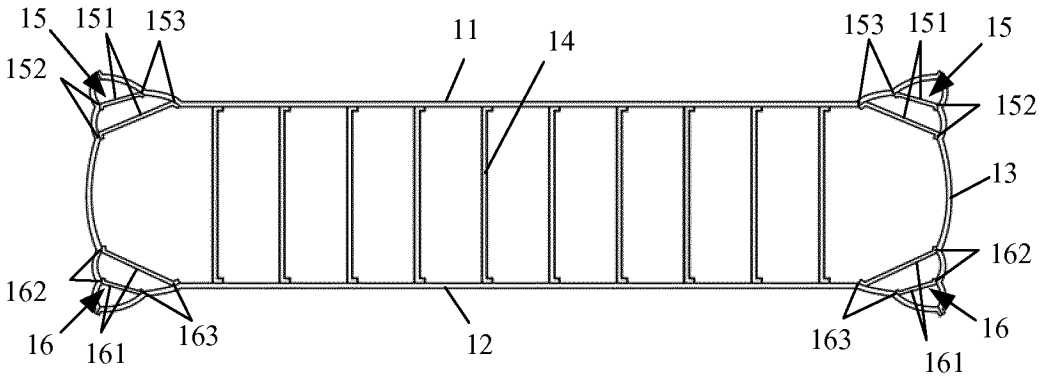


Fig. 5

INTEX EX. 1038, Pg. 210
Intex Recreation v. Bestway Inflatables

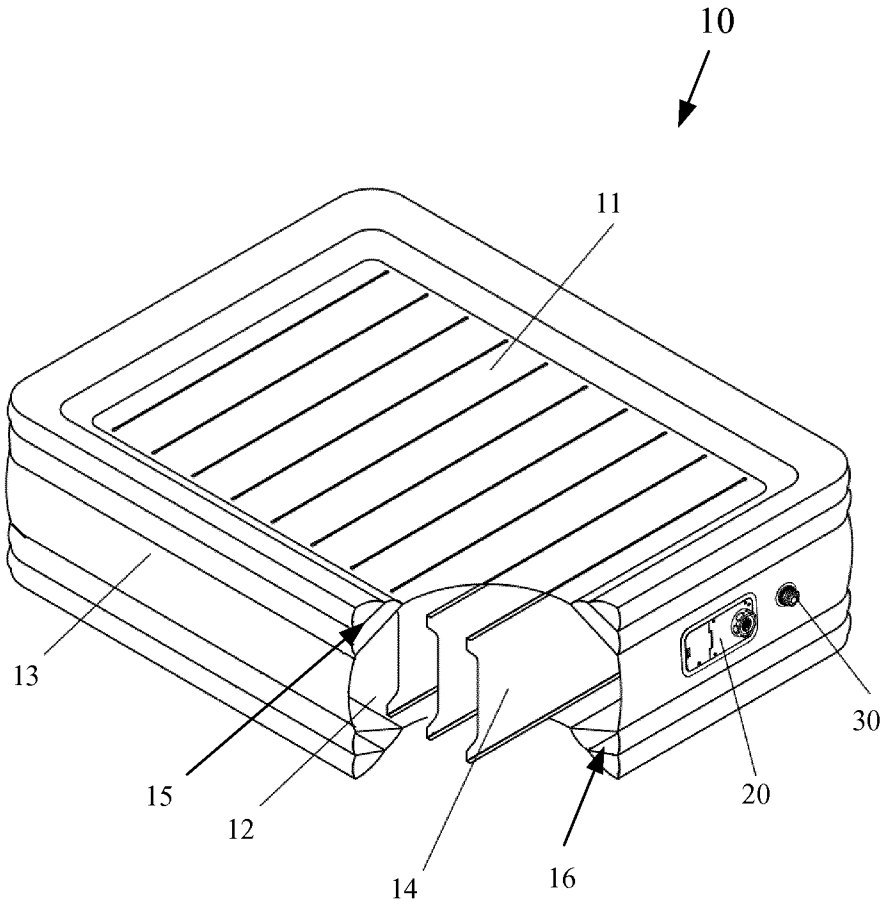


Fig. 6

INTEX EX. 1038, Pg. 211
Intex Recreation v. Bestway Inflatables

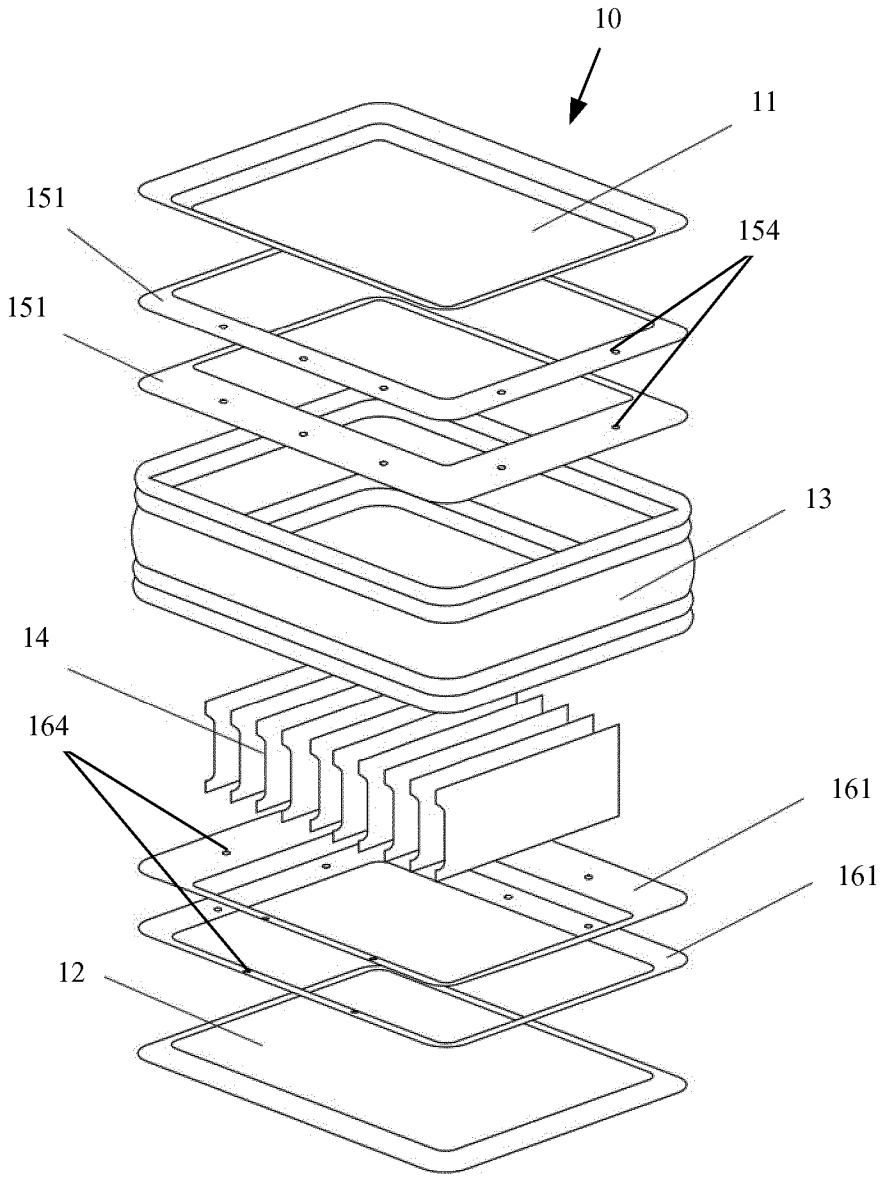


Fig. 7

INTEX EX. 1038, Pg. 212
Intex Recreation v. Bestway Inflatables

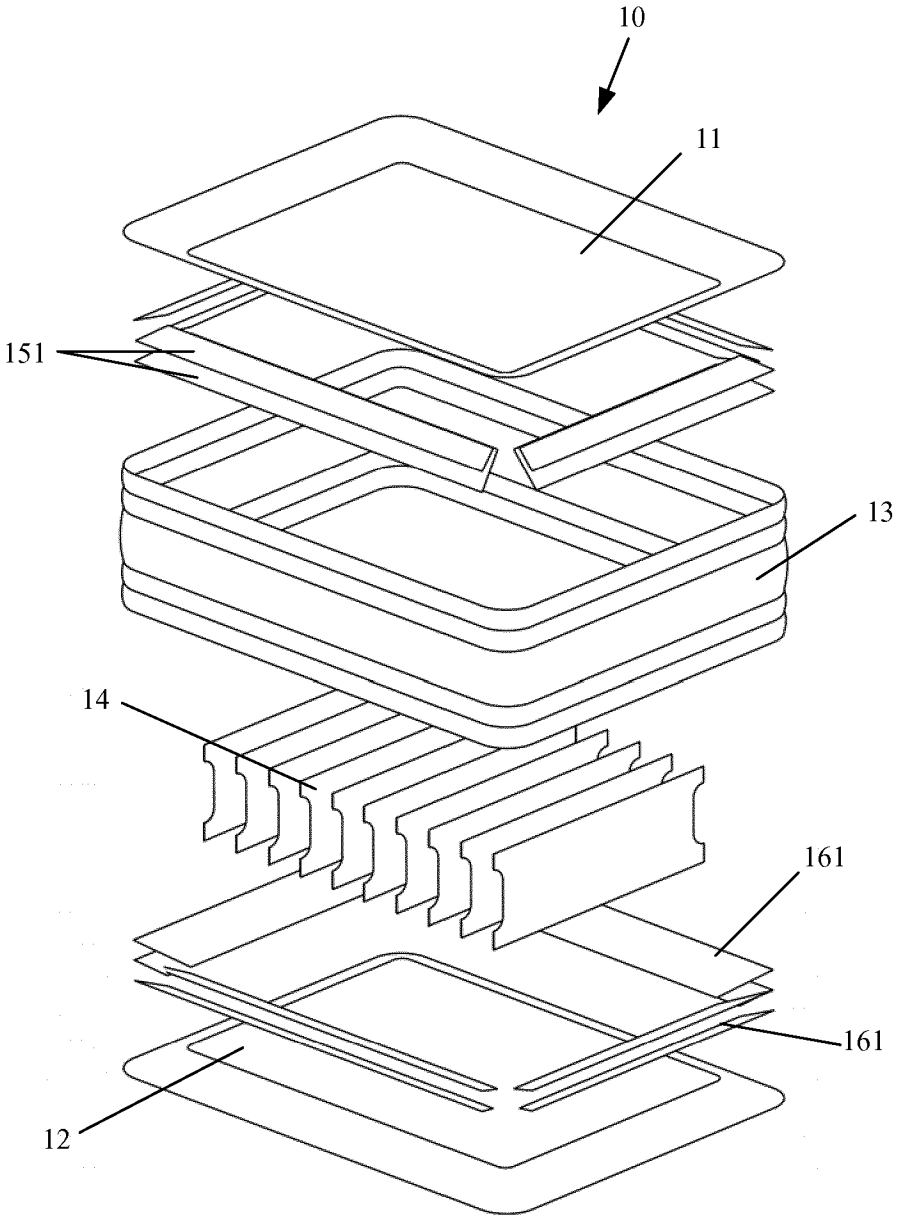


Fig. 8

INTEX EX. 1038, Pg. 213
Intex Recreation v. Bestway Inflatables

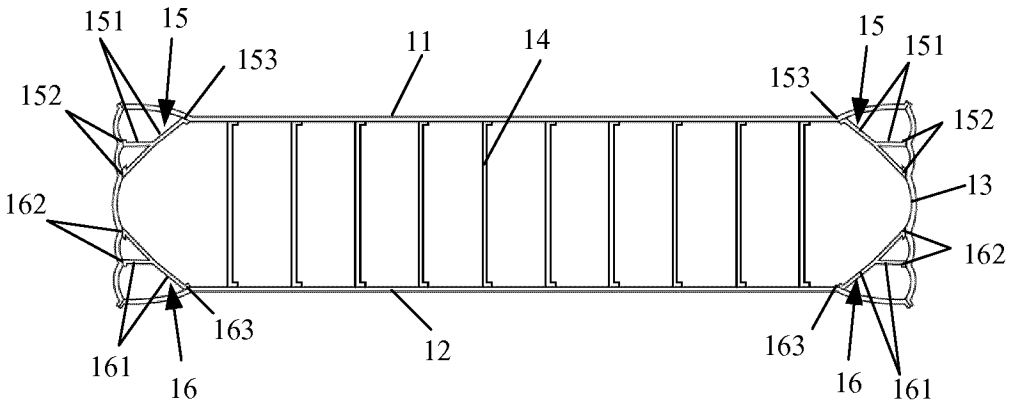


Fig. 9

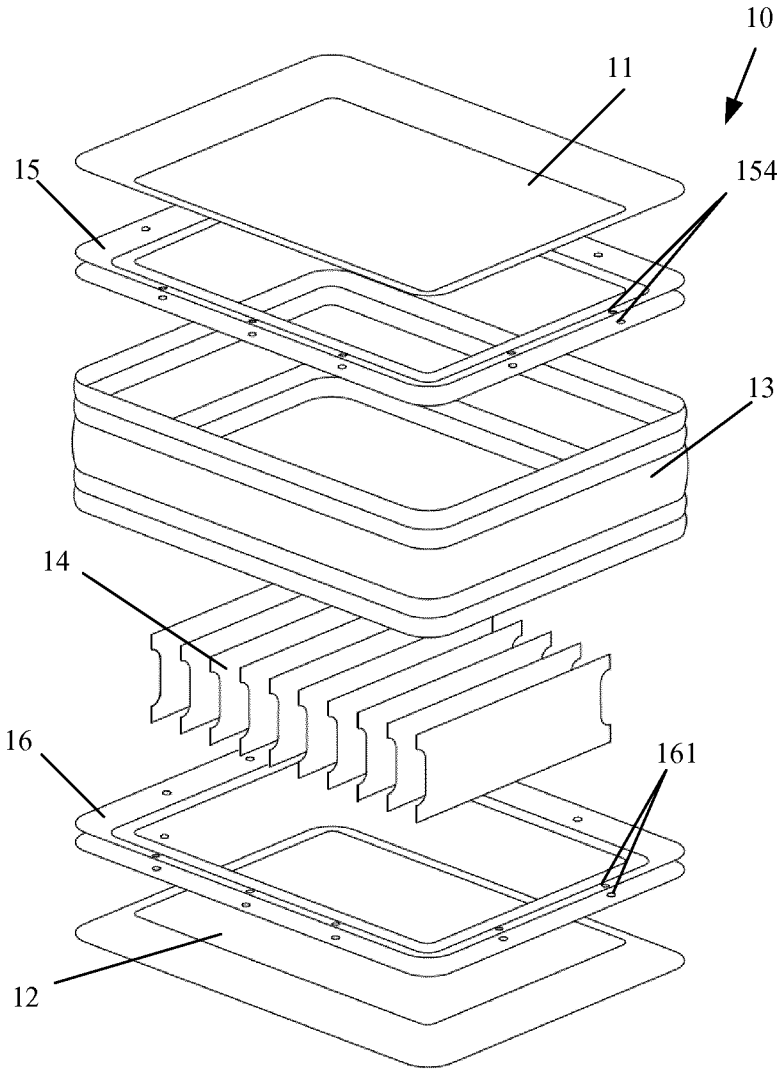


Fig. 10

INTEX EX. 1038, Pg. 214
Intex Recreation v. Bestway Inflatables

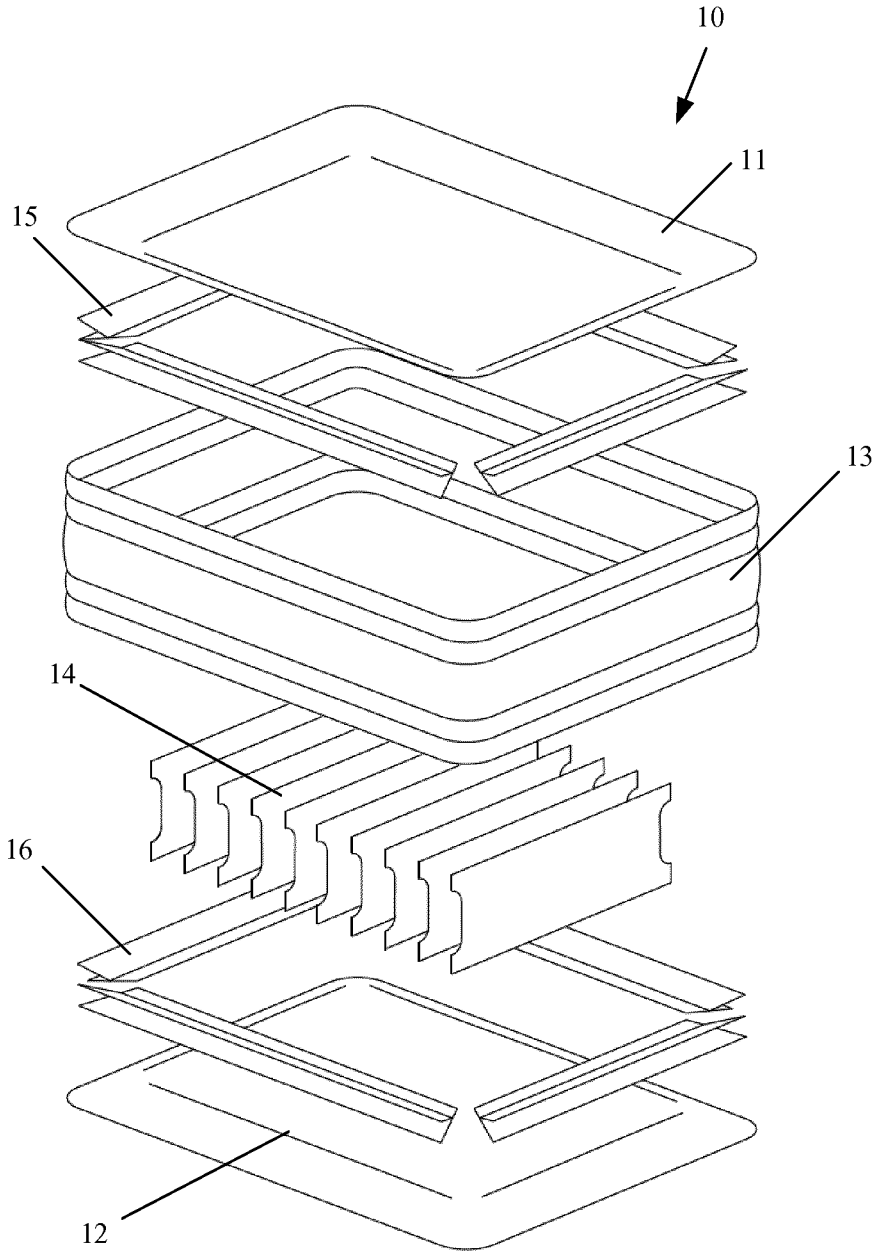


Fig. 11

INTEX EX. 1038, Pg. 215
Intex Recreation v. Bestway Inflatables

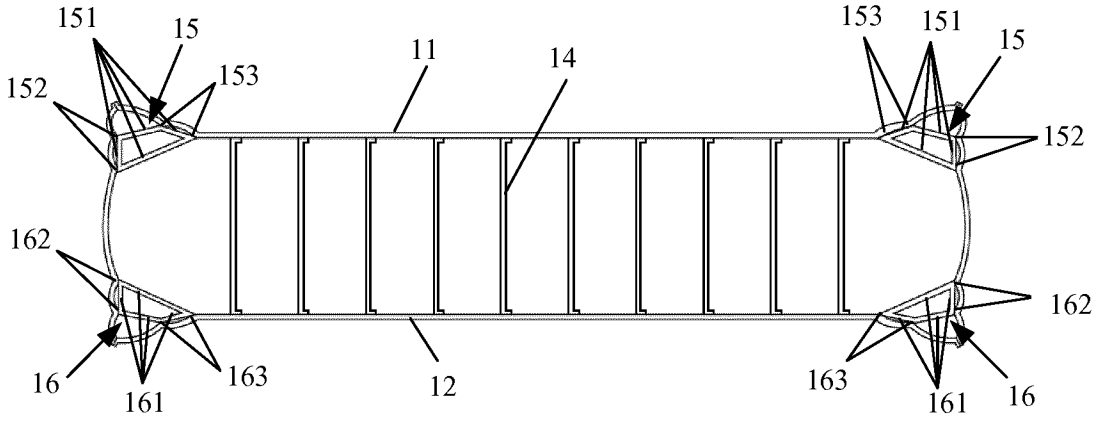


Fig. 12

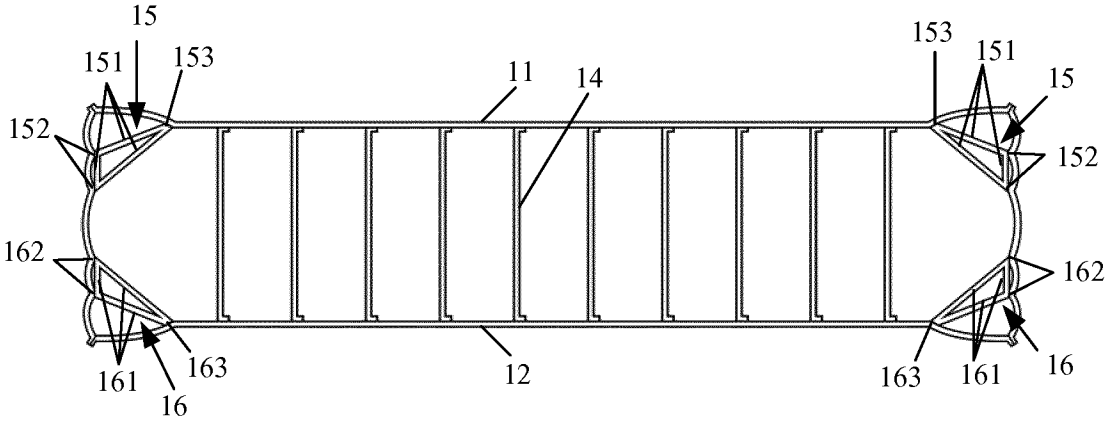


Fig. 13

INTEX EX. 1038, Pg. 216
Intex Recreation v. Bestway Inflatables

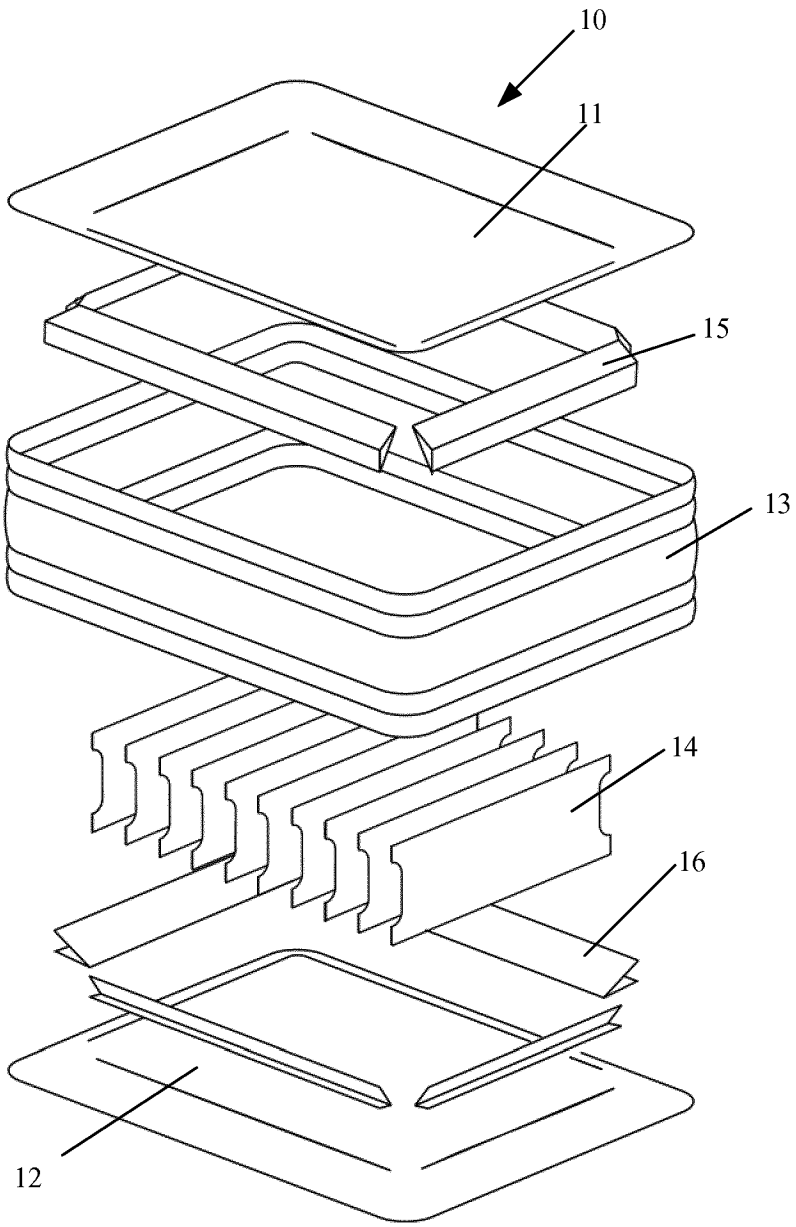


Fig. 14

INTEX EX. 1038, Pg. 217
Intex Recreation v. Bestway Inflatables

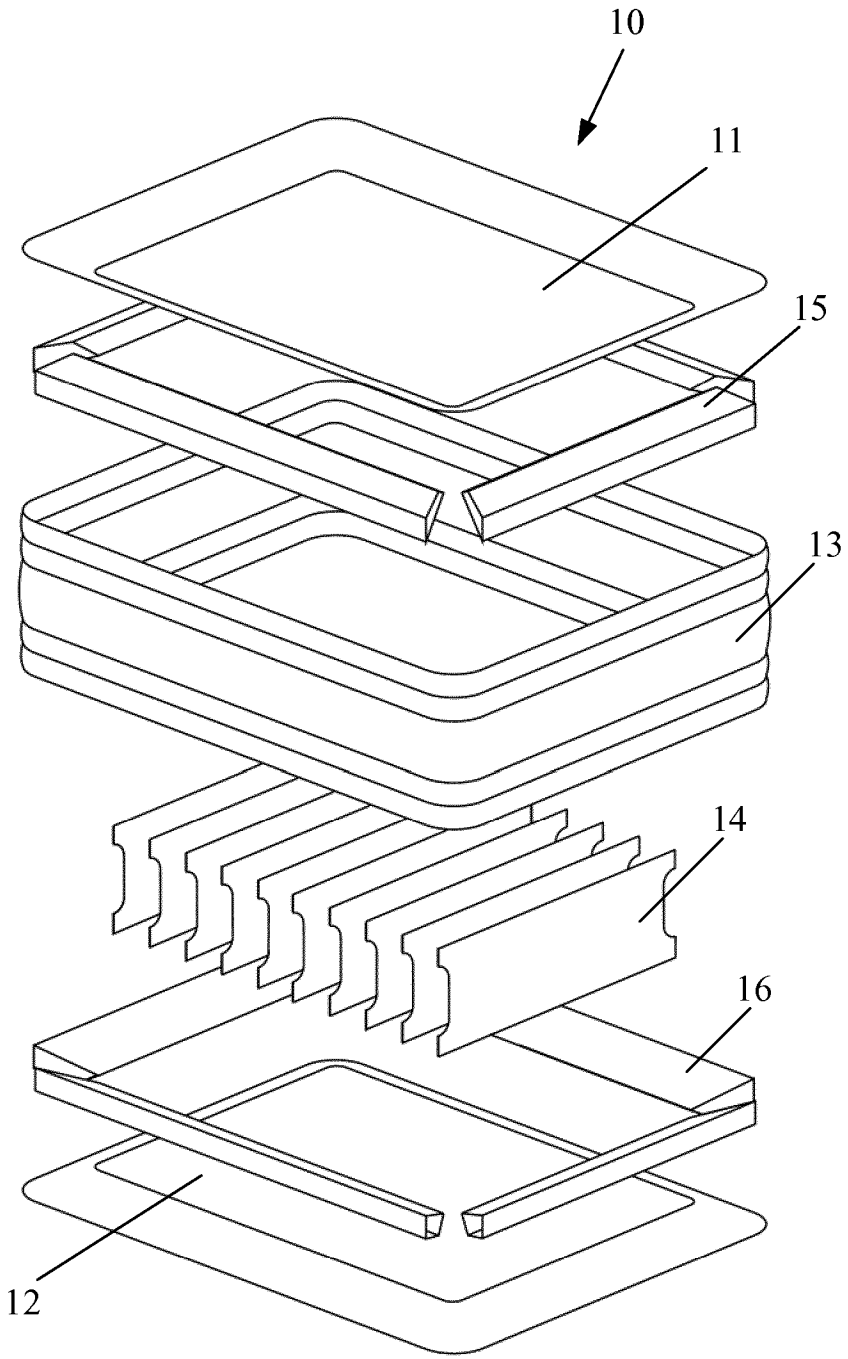


Fig. 15

INTEX EX. 1038, Pg. 218
Intex Recreation v. Bestway Inflatables

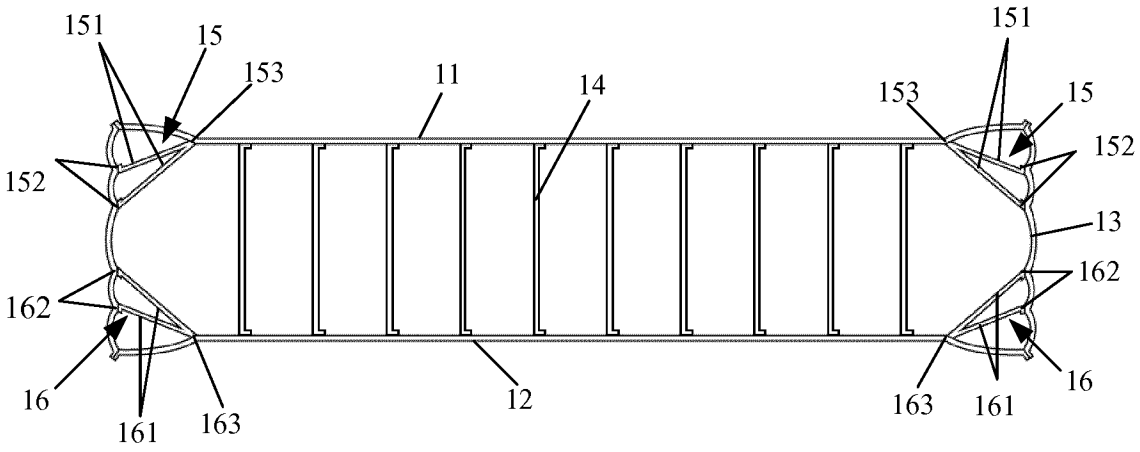


Fig. 16

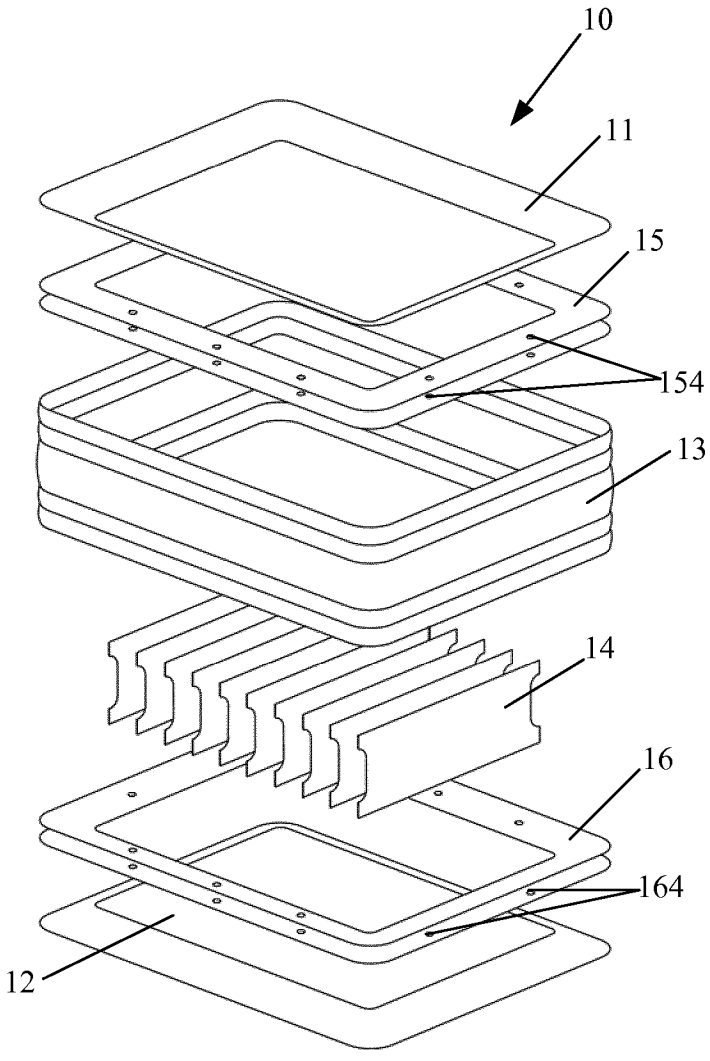


Fig. 17

INTEX EX. 1038, Pg. 219
Intex Recreation v. Bestway Inflatables

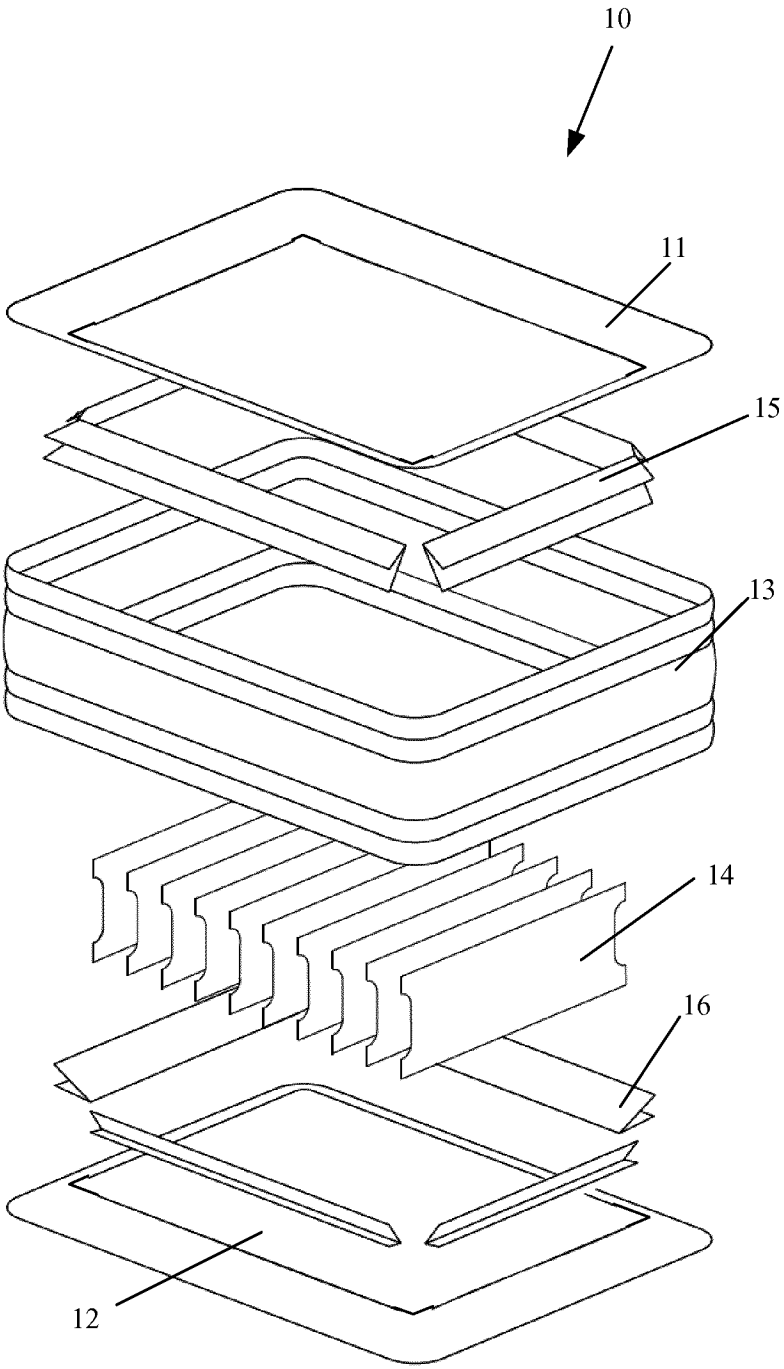


Fig. 18

INTEX EX. 1038, Pg. 220
Intex Recreation v. Bestway Inflatables

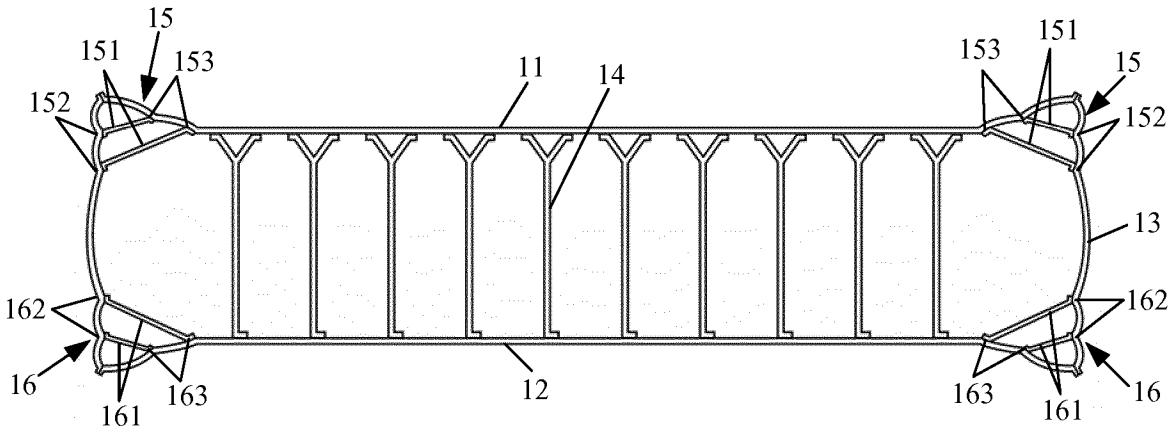


Fig. 19

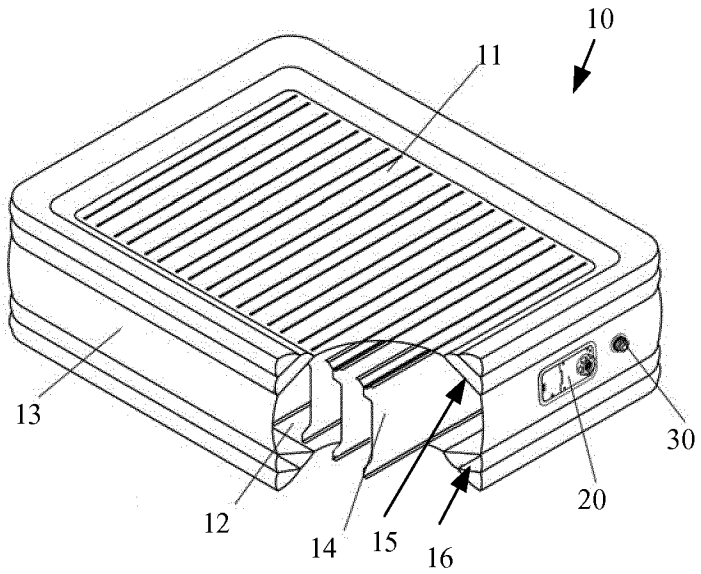


Fig. 20

INTEX EX. 1038, Pg. 221
Intex Recreation v. Bestway Inflatables

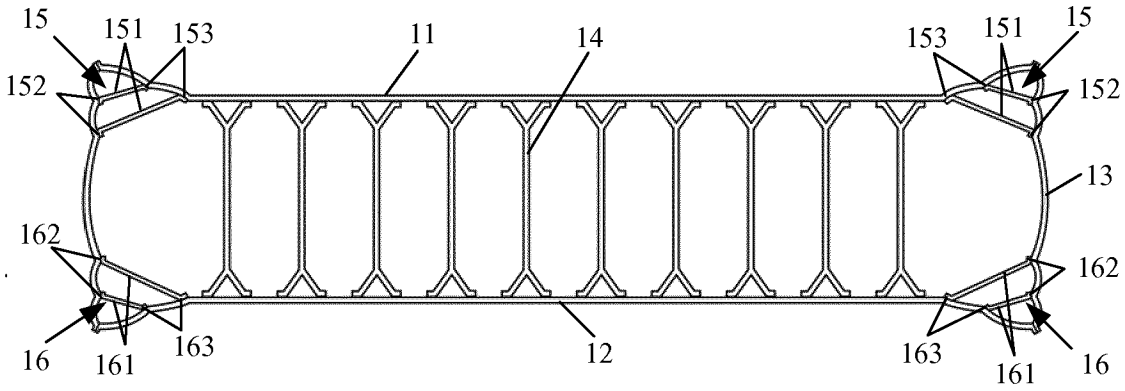


Fig. 21

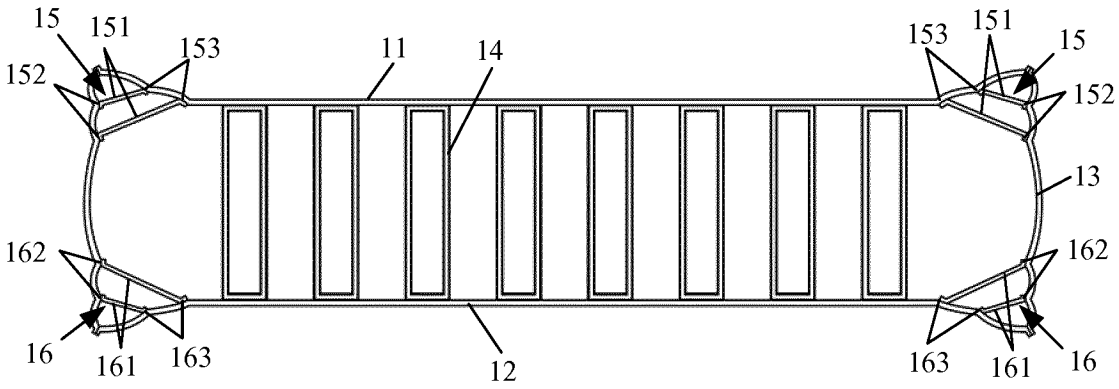


Fig. 22

INTEX EX. 1038, Pg. 222
Intex Recreation v. Bestway Inflatables

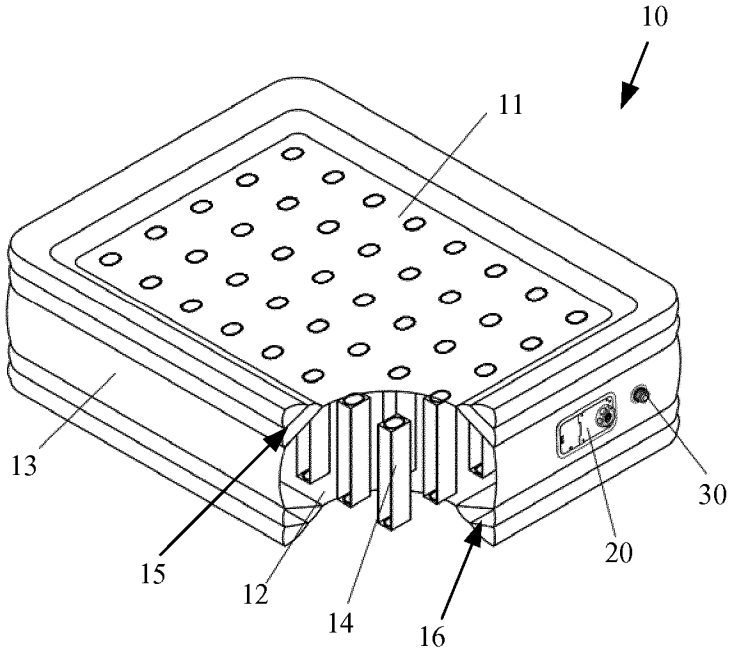


Fig. 23

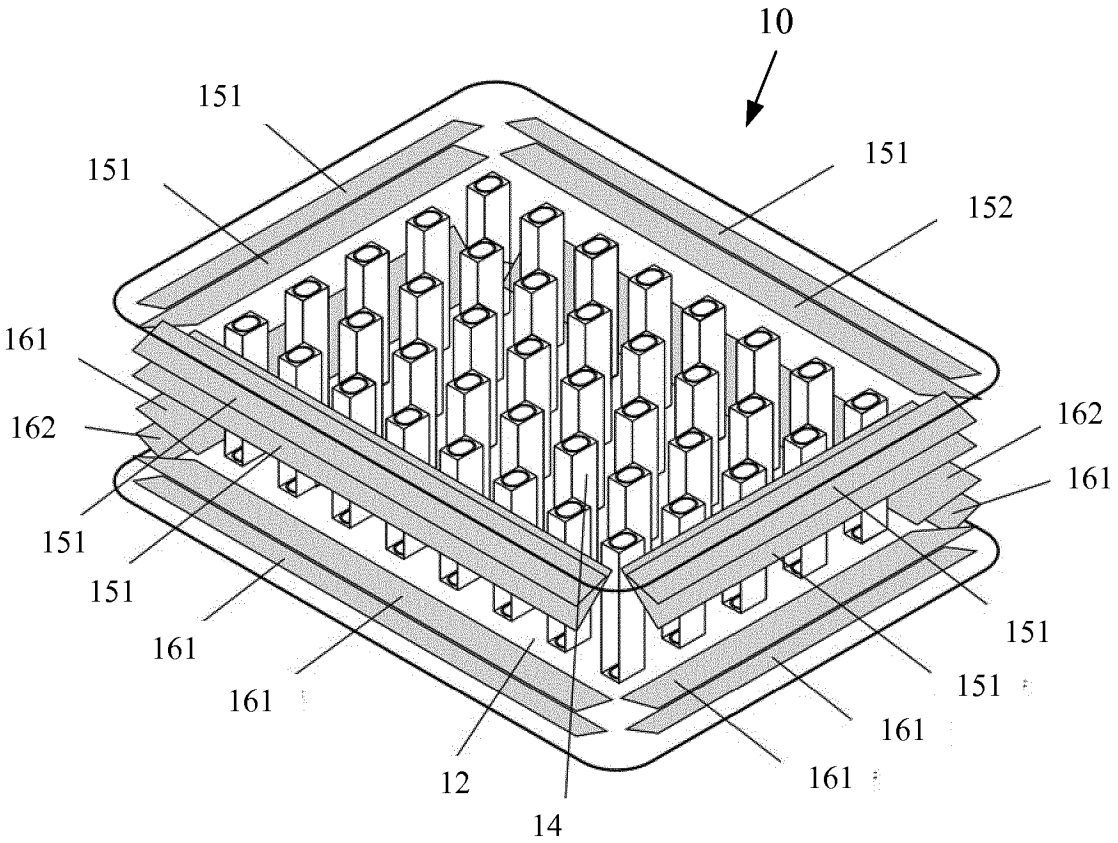


Fig. 24

INTEX EX. 1038, Pg. 223
Intex Recreation v. Bestway Inflatables

Europäisches Patentamt
European Patent Office
Office européen des brevets

European Patent Office
Postbus 5818
2280 HV Rijswijk
NETHERLANDS
Tel: +31 70 340 2040
Fax: +31 70 340 3016

Application No.: 16 191 360.3

IV.2. Patent classification

The classification has been changed. It now is as follows:

INV. A47C27/08 A47C27/16

IV.3. Title of the invention

The title indicated on the published patent application remains unchanged. It reads as follows:

AUFBLASBARES BETT

INFLATABLE BED

LIT GONFLABLE

IV.4. Documentation

Date 13/4/2018

Beugeling, Leo
Chairman

Lehé, Jörn
1st examiner

Amghar, Norddin
2nd examiner

Enclosure(s):

INTEX EX. 1038, Pg. 224
Intex Recreation v. Bestway Inflatables

Europäisches Patentamt
European Patent Office
Office européen des brevets

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Formalities Officer
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Tel: +31 70 340 - 3672
or call
+31 (0)70 340 45 00

Application No.	Ref.	Date
16 191 360.3 - 1011	27S8343,12EP42	07.05.2018
Applicant Bestway Inflatables & Material Corp		

Communication under Rule 71(3) EPC

1. Intention to grant

You are informed that the examining division intends to grant a European patent on the basis of the above application, with the text and drawings and the related bibliographic data as indicated below.

A copy of the relevant documents is enclosed.

1.1 In the text for the Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

Description, Pages

2-13, 15, 16	as originally filed	
1, 14	filed in electronic form on	19-01-2018

Claims, Numbers

1-39	filed in electronic form on	19-01-2018

Drawings, Sheets

1/16-16/16	as originally filed

With the following amendments to the above-mentioned documents proposed by the division

Description, Pages	1, 3
Claims, Numbers	1

Comments

DESCRIPTION
Page 1: deletion of "incorporated by reference", since not essential (Guidelines F-III 8.)
Page 3: Rule 42(1)c) EPC
CLAIMS
Page 1, Claim 1: rule 43 (7) EPC

1.2 Bibliographic data

The title of the invention in the three official languages of the European Patent Office, the international patent classification, the designated contracting states, the registered name(s) of the applicant(s) and the other bibliographic data are shown on **EPO Form 2056** (enclosed).

2. Invitation

You are invited, **within a non-extendable period of four months** of notification of this communication,

2.1 to EITHER approve the text communicated above and verify the bibliographic data (Rule 71(5) EPC)

(1) by filing a translation of the claim(s) in the other two official languages of the EPO

	Fee code	EUR
(2a) by paying the fee for grant including the fee for publication:	**007**	925.00
minus any amount already paid (Rule 71a(5) EPC):		0.00
	Total amount:	925.00
(3) by paying additional claims fees under Rule 71(4) EPC; number of claims fees payable: 0	**016**	0.00
minus any amount already paid (Rule 71a(5) EPC):		0.00
	Total amount:	0.00

Important: If the translations of the claims and fees have already been filed and paid respectively in reply to a previous communication under Rule 71(3) EPC, e.g. in the case of resumption of examination after approval (see Guidelines C-V, 6), **agreement as to the text to be granted** (Rule 71a(1) EPC) must be expressed within the same time limit (e.g. by approving the text and verifying the bibliographic data, by confirming that grant proceedings can go ahead with the documents on file and/or by stating which translations of the claims already on file are to be used).

Note 1: See "Notes concerning fee payments" below.
Note 2: Any overpaid "minus" amounts will be refunded when the decision to grant (EPO Form 2006A) has been issued.
Note 3: For the calculation of the grant fee under Article 2(2), No. 7, RFees (old fee structure), the number of pages is determined on the basis of a clean copy of the application documents, in which text deleted as a result of any amendments by the examining division is not shown. Such clean copy is made available via on-line file inspection only.

2.2 OR, in the case of disapproval, to request reasoned amendments or corrections to the text communicated above or keep to the latest text submitted by you (Rule 71(6) EPC).

In this case the translations of the claims and fee payments mentioned under point 2.1 above are NOT due.

The terms "amendment(s)" and "correction(s)" refer only to amendments or corrections of the application documents and not of other documents (e.g. bibliographic data, the designation of the inventor, etc.).

If filing amendments, you must identify them and indicate the basis for them in the application as filed. Failure to meet either requirement may lead to a communication from the examining division requesting that you correct this deficiency (Rule 137(4) EPC).

2.3 Bibliographic data

Where you request a change or correction of bibliographic data in response to the Rule 71(3) communication, this will **not** cause the sending of a further communication under Rule 71(3) EPC. You will still have to pay the fees and file translations in reply to the Rule 71(3) communication in the case of 2.1 above, unless you also file a reasoned request for amendments or corrections in response to the Rule 71(3) communication (see case 2.2 above).

3. Loss of rights

If neither of the two possible actions above (see points 2.1 or 2.2) is performed in due time, the European patent application will be deemed to be withdrawn (Rule 71(7) EPC).

4. Further procedure

4.1 In the case of point 2.1 above

4.1.1 The decision to grant the European patent will be issued, and the **mention of the grant** of the patent will be published in the European Patent Bulletin, if the requirements concerning the translation of the claims and the payment of all fees are fulfilled and there is agreement as to the text to be granted (Rule 71a(1) EPC).

Note on payment of the renewal fee:
If a renewal fee becomes due before the next possible date for publication of the mention of the grant of the European patent, publication will be effected only after the renewal fee and any additional fee have been paid (Rule 71a(4) EPC).

Under Article 86(2) EPC, the obligation to pay renewal fees to the European Patent Office terminates with the payment of the renewal fee due in respect of the year in which the mention of the grant of the European patent is published.

Note on payment of the designation fee(s):
If the designation fee(s) become(s) due after the communication under Rule 71(3) EPC, the mention of the grant of the European patent will not be published until these fees have been paid (Rule 71a(3) EPC).

4.1.2 After publication, the **European patent specification** can be downloaded free of charge from the EPO publication server https://data.epo.org/publication-server.

4.1.3 Filing of translations in the contracting states

As regards translation requirements prescribed by the contracting states under Article 65(1) EPC, please consult the website of the European Patent Office
www.epo.org ➞Law & practice ➞Legal texts, National law relating to the EPC
www.epo.org ➞Law & practice ➞All Legal texts ➞London Agreement

In the case of a valid extension or validation

As regards translation requirements prescribed by the extension or validation states, please consult the website of the European Patent Office
www.epo.org ➞Law & practice ➞Legal texts, National law relating to the EPC

Failure to supply a prescribed translation in a contracting state, or in an extension or validation state may result in the patent being deemed to be void *ab initio* in the state concerned (Art. 65(3) EPC).

4.2 In the case of 2.2 above

If the present communication under Rule 71(3) EPC is based on an auxiliary request and, within the time limit, you maintain the main request or a higher ranking request which is not allowable, the application will be refused (Art. 97(2) EPC).

If the examining division gives its consent to the requested amendments or corrections, it will issue a new communication under Rule 71(3) EPC; otherwise, it shall resume the examination proceedings (Rule 71(6) EPC).

5. Filing of a divisional application

Any divisional application relating to this European patent application must be filed directly with the European Patent Office in Munich, The Hague or Berlin and will be in the language of the proceedings for the present application, or if the latter was not in an official language of the EPO, the divisional application may be filed in the language of the present application as filed (see Article 76(1) and Rule 36(2) EPC). Any such divisional application must be filed while the present application is still pending (Rule 36(1) EPC; Guidelines A-IV, 1.1.1).

6. Notes concerning fee payments

6.1 Making payments

For payments made via deposit account, please note that as from 1 December 2017 debit orders will only be carried out if filed in an electronically processable format (xml), using an accepted means of filing as laid down in the Arrangements for deposit accounts (ADA), published in the Supplementary publication in the Official Journal.

All relevant information related to the modes of payment of fees to the EPO can be retrieved from the EPO website at "**Making Payments**".

6.2 Information concerning fee amounts

Procedural fees are usually adjusted every two years, on even years, with effect from 1 April. Therefore, before making a payment, parties should verify the amounts actually due on the date of payment using the applicable version of the Schedule of fees and expenses, published as a Supplement to the Official Journal of the EPO, available on the EPO website (**www.epo.org**) at **www.epo.org/schedule-of-fees**. The "Schedule of fees" table allows the viewing, downloading and searching of individual fee amounts, both current and previous.

6.3 Note to users of the automatic debiting procedure

The fee for grant, including the fee for publication, and any additional claims fees due under Rule 71(4) EPC will be debited automatically on the date of filing of the translations of the claims, or on the last day of the period of this communication. However, if the designation fee(s) become(s) due as set out in Rule 71a(3) EPC and/or a renewal fee becomes due as set out in Rule 71a(4) EPC, these should be paid separately by another permitted way of payment in order not to delay the publication of the mention of the grant. The same applies in these circumstances to the payment of extension and validation fees. The same applies in these circumstances to the payment of extension and validation fees.

Note: If a waiver is expressed in response to a Rule 71(3) communication (see OJ EPO 2015, A52), the fee for grant, including the fee for publication/printing, and any additional claims fees will not be debited automatically. These fees must be paid separately by another means of payment allowed under the Rules relating to Fees.

Examining Division:

Chairman: Beugeling, Leo
2nd Examiner: Amghar, Norddin
1st Examiner: Lehe, Jörn

Carl, Iris
For the Examining Division
Tel. No.: +31 70 340 - 3672 **Branch at The Hague**

Enclosures: Text intended for grant

EPO Form 2056

INTEX EX. 1038, Pg. 229
Intex Recreation v. Bestway Inflatables

Europäisches Patentamt
European Patent Office
Office européen des brevets

European Patent Office
Postbus 5818
2280 HV Rijswijk
NETHERLANDS
Tel: +31 70 340 2040
Fax: +31 70 340 3016

Annex to EPO Form 2004, Communication pursuant to Rule 71(3) EPC

Bibliographical data of European patent application No. 16 191 360.3

For the intended grant of the European patent, the bibliographical data are set out below, for information:

Title of invention:	- AUFBLASBARES BETT - INFLATABLE BED - LIT GONFLABLE
Classification:	INV. A47C27/08 A47C27/16
Date of filing:	29.09.2016
Priority claimed:	CN / 13.01.2016 / CNA201610020533 CN / 13.01.2016 / CNU201620031074
Contracting States* for which fees have been paid:	AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Extension States* for which fees have been paid:	
Validation States* for which fees have been paid:	
Applicant(s):**	Bestway Inflatables & Material Corp No.3065 Cao An Road Shanghai 201812 CN
Inventor(s):	LIU, Feng No.3065 Cao An Road Shanghai, 201812 CN

*)	If the time limit for the payment of designation fees according to Rule 39(1) EPC has not yet expired and the applicant has not withdrawn any designation, **all Contracting States/Extension States/Validation States** are currently still deemed to be designated. See also Rule 71a(3) EPC and, if applicable, the above Note to users of the automatic debiting procedure.
**)	If two or more applicants have designated different Contracting States, this is indicated here.

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Letter accompanying subsequently filed items

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The document(s) listed below is (are) subsequently filed documents pertaining to the following application:

Application number and/or EP publication number	EP16191360.3
Reference	27M9223.12EP42
Procedural phase	All procedures
Name of represented party	Bestway Inflatables & Material Corp

	Description of document	Original file name	Assigned file name
1	French translation of the claims	27.M9223,12.EP.42_FR.pdf	CLMSTRAN-FR.pdf
2	German translation of the claims	27.M9223,12.EP.42_DE-1.pdf	CLMSTRAN-DE.pdf

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P a t e n t a n s p r ü c h e:

1. Aufblasbares Bett (10), umfassend:
eine obere Platte (11) und eine untere Platte (12), die vertikal in einem Abstand angeordnet sind;
mindestens eine Seitenwand (13), wobei eine obere Kante der Seitenwand mit einer äußeren Kante der oberen Platte gekoppelt ist, eine untere Kante der Seitenwand mit einer äußeren Kante der unteren Platte gekoppelt ist, eine Luftkammer, die zwischen der oberen Platte, der unteren Platte und der Seitenwand ausgebildet ist;
mindestens eine erste Spannstruktur, die in der Luftkammer angeordnet ist, wobei ein oberes Ende und ein unteres Ende der ersten Spannstruktur jeweils mit der oberen und der unteren Platte gekoppelt sind; und
mindestens eine Tragstruktur, die in der Luftkammer angeordnet ist, wobei die Tragstruktur in einer Längsrichtung mindestens einer der Seitenwände angeordnet ist, wobei mindestens zwei Außenkanten (152, 162) der Tragstruktur jeweils mit der benachbarten Seitenwand gekoppelt sind, wobei mindestens eine Innenkante (153, 163) der Tragstruktur mit der oberen benachbarten Platte oder der unteren Platte gekoppelt ist,
wobei die Tragstruktur eine zweite Spannstruktur und eine dritte Spannstruktur umfasst, mindestens zwei Außenkanten der zweiten Spannstruktur jeweils mit der benachbarten Seitenwand gekoppelt sind, mindestens eine Innenkante der zweiten Spannstruktur mit der benachbarten oberen Platte gekoppelt ist; und
mindestens zwei Außenkanten der dritten Spannstruktur jeweils mit der benachbarten Seitenwand gekoppelt sind, mindestens eine Innenkante der dritten Spannstruktur mit der benachbarten unteren Platte gekoppelt ist.

2. Aufblasbares Bett nach Anspruch 1, wobei die zweite Spannstruktur und die dritte Spannstruktur jeweils mit einer Vielzahl von Luftlöchern versehen sind, durch die ein Luftstromdurchgang in der Luftkammer gebildet wird.

3. Aufblasbares Bett nach Anspruch 1, wobei die zweite Spannstruktur und die dritte Spannstruktur in einem Abstand in einer senkrechten Richtung angeordnet sind.

4. Aufblasbares Bett nach Anspruch 1, wobei die zweite Spannstruktur mindestens zwei erste I-Träger umfasst, wobei eine Außenkante und eine Innenkante jedes der ersten I-Träger jeweils mit der Seitenwand und der benachbarten oberen Platte gekoppelt sind, die mindestens zwei ersten I-Träger in einem Abstand angeordnet sind.

5. Aufblasbares Bett nach Anspruch 1, wobei die dritte Spannstruktur mindestens zwei zweite I-Träger umfasst, wobei eine Außenkante und eine Innenkante jedes der zweiten I-Träger jeweils mit der benachbarten Seitenwand und der unteren Platte gekoppelt sind, die mindestens zwei der zweiten I-Träger in einem Abstand angeordnet sind.

6. Aufblasbares Bett nach Anspruch 1, wobei die zweite Spannstruktur mindestens einen ersten Y-Träger umfasst, wobei zwei Außenkanten des ersten Y-Trägers jeweils mit der benachbarten Seitenwand gekoppelt sind, eine Innenkante mit der oberen Platte gekoppelt ist.

7. Aufblasbares Bett nach Anspruch 1, wobei die dritte Spannstruktur mindestens einen zweiten Y-Träger umfasst, wobei zwei Außenkanten des zweiten Y-Trägers jeweils mit der benachbarten Seitenwand gekoppelt sind,

eine Innenkante mit der unteren Kante gekoppelt ist.

8. Aufblasbares Bett nach Anspruch 1, wobei die zweite Spannstruktur mindestens einen ersten rohrförmigen Träger umfasst, der mindestens zwei Außenkanten aufweist, die jeweils mit der benachbarten Seitenwand gekoppelt sind, mindestens eine Innenkante mit der oberen Platte gekoppelt ist.

9. Aufblasbares Bett nach Anspruch 1, wobei die dritte Spannstruktur mindestens einen zweiten rohrförmigen Träger umfasst, der mindestens zwei Außenkanten aufweist, die jeweils mit der benachbarten Seitenwand gekoppelt sind, mindestens eine Innenkante mit der unteren Platte gekoppelt ist.

10. Aufblasbares Bett nach Anspruch 1, wobei die zweite Spannstruktur mindestens einen ersten V-Träger umfasst, wobei zwei Außenkanten des ersten V-Trägers jeweils mit der benachbarten Seitenwand gekoppelt sind, eine Innenkante mit der oberen Platte gekoppelt ist.

11. Aufblasbares Bett nach Anspruch 1, wobei die dritte Spannstruktur mindestens einen zweiten V-Träger umfasst, wobei zwei Außenkanten des zweiten V-Trägers jeweils mit der benachbarten Seitenwand gekoppelt sind, eine Innenkante mit der unteren Platte gekoppelt ist.

12. Aufblasbares Bett nach Anspruch 4, wobei die mindestens zwei ersten I-Träger an einer unteren Fläche der oberen Platte voneinander beabstandet sind.

13. Aufblasbares Bett nach Anspruch 5, wobei die mindestens zwei zweiten I-Träger an einer oberen Fläche der unteren Platte voneinander beabstandet sind.

14. Aufblasbares Bett nach Anspruch 4, wobei die mindestens zwei ersten I-Träger in einem Abstand auf einer Innenfläche der Seitenwand in einer senkrechten Richtung angeordnet sind.

15. Aufblasbares Bett nach Anspruch 5, wobei die mindestens zwei zweiten I-Träger in einem Abstand auf der Innenfläche der Seitenwand in einer senkrechten Richtung angeordnet sind.

16. Aufblasbares Bett nach Anspruch 6, wobei die beiden Außenkanten des mindestens einen ersten Y-Trägers in einem Abstand auf einer Innenfläche der Seitenwand in einer senkrechten Richtung angeordnet sind.

17. Aufblasbares Bett nach Anspruch 7, wobei die zwei Außenkanten des mindestens einen zweiten Y-Trägers in einem Abstand auf der Innenfläche der Seitenwand in einer senkrechten Richtung angeordnet sind.

18. Aufblasbares Bett nach Anspruch 8, wobei die mindestens zwei Außenkanten des mindestens einen ersten rohrförmigen Trägers, die mit der benachbarten Seitenwand gekoppelt sind, in einem Abstand auf einer Innenfläche der Seitenwand in einer senkrechten Richtung angeordnet sind.

19. Aufblasbares Bett nach Anspruch 9, wobei die mindestens zwei Außenkanten des mindestens einen zweiten rohrförmigen Trägers, die mit der benachbarten Seitenwand gekoppelt sind, in einem Abstand auf der Innenfläche der Seitenwand in einer senkrechten Richtung angeordnet sind.

20. Aufblasbares Bett nach Anspruch 10, wobei die zwei Außenkanten des mindestens einen ersten V-Trägers in einem Abstand auf einer Innenfläche der Seitenwand in einer senkrechten Richtung angeordnet sind.

21. Aufblasbares Bett nach Anspruch 11, wobei die zwei Außenkanten des mindestens einen zweiten V-Trägers in einem Abstand auf der Innenfläche der Seitenwand in einer senkrechten Richtung angeordnet sind.

22. Aufblasbares Bett nach Anspruch 4, wobei die mindestens zwei ersten V-Träger insgesamt eine durchgehende ringförmige Struktur oder eine segmentale ringförmige Struktur aufweisen.

23. Aufblasbares Bett nach Anspruch 5, wobei der mindestens zweite I-Träger insgesamt eine durchgehende ringförmige Struktur oder eine segmentale ringförmige Struktur aufweisen.

24. Aufblasbares Bett nach Anspruch 6, wobei der mindestens eine erste Y-Träger insgesamt eine durchgehende ringförmige Struktur oder eine segmentale ringförmige Struktur aufweist.

25. Aufblasbares Bett nach Anspruch 7, wobei der eine mindestens zweite Y-Träger insgesamt eine durchgehende ringförmige Struktur oder eine segmentale ringförmige Struktur aufweist.

26. Aufblasbares Bett nach Anspruch 8, wobei der mindestens eine erste rohrförmige Träger insgesamt eine segmentale ringförmige Struktur aufweist.

27. Aufblasbares Bett nach Anspruch 9, wobei der

mindestens eine zweite rohrförmige Träger insgesamt eine segmentale ringförmige Struktur aufweist.

28. Aufblasbares Bett nach Anspruch 10, wobei der mindestens eine erste V-Träger insgesamt eine durchgehende ringförmige Struktur oder eine segmentale ringförmige Struktur aufweisen.

29. Aufblasbares Bett nach Anspruch 11, wobei der eine mindestens zweite V-Träger insgesamt eine durchgehende ringförmige Struktur oder eine segmentale ringförmige Struktur aufweist.

30. Aufblasbares Bett nach Anspruch 1, wobei die erste Spannstruktur ein oder mehrere Träger ist, die aus I-Trägern, Coil-Trägern, Y-Trägern oder X-Trägern ausgewählt wird/werden.

31. Aufblasbares Bett nach Anspruch 1, wobei die erste Spannstruktur, die zweite Spannstruktur und die dritte Spannstruktur alle aus thermoplastischer Kunststoffolie bestehen.

32. Aufblasbares Bett nach Anspruch 1, wobei eine oder mehrere der ersten Spannstruktur, der zweiten Spannstruktur und der dritten Spannstruktur mindestens teilweise Netz, laminierte Kunststoffolie oder Fäden umfassen.

33. Aufblasbares Bett nach Anspruch 32, wobei zwei Seitenflächen des Netzes oder der Fäden mindestens teilweise einstückig mit zwei gegenüberliegenden Kunststoffstreifen gekoppelt sind, wobei das Netz und die Fäden zwischen den zwei gegenüberliegenden Kunststoffstreifen eingeschlossen sind.

34. Aufblasbares Bett nach Anspruch 32, wobei zwei Seitenflächen des Netzes oder der Fäden mindestens teilweise einstückig mit einem U-förmigen Kunststoffstreifen gekoppelt sind, wobei das Netz und die Fäden zwischen dem U-förmigen Kunststoffstreifen eingeschlossen sind.

35. Aufblasbares Bett nach Anspruch 1, wobei die erste Spannstruktur mit der oberen und unteren Platte mittels Hochfrequenzschweißens gekoppelt ist; die zweite Spannstruktur mit der oberen Platte und der Seitenwand mittels Hochfrequenzschweißens gekoppelt ist; und die dritte Spannstruktur mit der unteren Platte und der Seitenwand mittels Hochfrequenzschweißen gekoppelt ist.

36. Aufblasbares Bett nach Anspruch 1, wobei die Stelle, an der sich die obere Platte im inneren Teil einer oberen Kante der zweiten Spannstruktur befindet, niedriger ist als die Stelle, an der sich die obere Platte im äußeren Teil der oberen Kante der zweiten Spannstruktur befindet.

37. Aufblasbares Bett nach Anspruch 1, wobei die Stelle, an der sich die untere Platte im inneren Teil einer unteren Kante der dritten Spannstruktur befindet, niedriger ist als die Stelle, an der sich die untere Platte im äußeren Teil der unteren Kante der dritten Spannstruktur befindet.

38. Aufblasbares Bett nach Anspruch 1, wobei das aufblasbare Bett ferner eine eingebaute Luftpumpe umfasst, die an der Seitenwand angeordnet ist und sich zwischen einer unteren Kante der zweiten Spannstruktur und einer oberen Kante der dritten Spannstruktur zum

Aufblasen der Luftkammer befindet.

39. Aufblasbares Bett nach Anspruch 1, wobei das aufblasbare Bett ferner ein Luftventil umfasst, das an der Seitenwand zum Aufblasen und Deflation des aufblasbaren Bettes angeordnet ist.

R e v e n d i c a t i o n s :

1. Lit gonflable (10), comprenant
une feuille supérieure (11) et une feuille inférieure (12) disposées verticalement à un certain intervalle ;
au moins une cloison latérale (13), un bord supérieur de ladite cloison latérale étant couplé à un bord extérieur de ladite feuille supérieure, un bord inférieur de ladite cloison latérale étant couplé à un bord extérieur de ladite feuille inférieure, une chambre à air formée entre ladite feuille supérieure, ladite feuille inférieure et ladite cloison latérale ;
au moins une première structure de tension disposée dans ladite chambre à air, une extrémité supérieure et une extrémité inférieure de ladite première structure de tension étant respectivement couplées à ladite feuille supérieure et à ladite feuille inférieure ; et
au moins une structure de support disposée dans ladite chambre à air, ladite structure de support étant disposée dans une direction longitudinale d'au moins une desdites cloisons latérales, au moins deux bords extérieurs (152, 162) de ladite structure de support étant respectivement couplés à la cloison latérale adjacente, au moins un bord intérieur (153, 163) de ladite structure de support étant couplé à la feuille supérieure adjacente ou à la feuille inférieure adjacente,
dans lequel ladite structure de support comprend une seconde structure de tension et une troisième structure de tension, au moins deux bords extérieurs de ladite seconde structure de tension sont respectivement couplés à la cloison latérale adjacente, au moins un bord intérieur de la seconde structure de tension est couplé à la feuille supérieure adjacente ; et
au moins deux bords extérieurs de ladite troisième

structure de tension sont respectivement couplés à la cloison latérale adjacente, au moins un bord intérieur de ladite troisième structure de tension est couplé à la feuille inférieure adjacente.

2. Lit gonflable selon la revendication 1, dans lequel ladite seconde structure de tension et ladite troisième structure de tension sont respectivement pourvues d'une pluralité d'orifices d'air, à travers lesquels un passage d'écoulement d'air est formé dans ladite chambre à air.

3. Lit gonflable selon la revendication 1, dans lequel ladite seconde structure de tension et ladite troisième structure de tension sont disposées à un certain intervalle dans une direction perpendiculaire.

4. Lit gonflable selon la revendication 1, dans lequel ladite seconde structure de tension comprend au moins deux premières traverses en I, un bord extérieur et un bord intérieur de chacune desdites premières traverses en I sont respectivement couplés à ladite cloison latérale adjacente et à ladite feuille supérieure adjacente, les au moins deux premières traverses en I sont disposées à un certain intervalle.

5. Lit gonflable selon la revendication 1, dans lequel ladite troisième structure de tension comprend au moins deux secondes traverses en I, un bord extérieur et un bord intérieur de chacune desdites secondes traverses en I sont respectivement couplés à la cloison latérale adjacente et à ladite feuille inférieure adjacente, les au moins deux secondes traverses en I sont disposées à un certain intervalle.

6. Lit gonflable selon la revendication 1, dans lequel ladite seconde structure de tension comprend au moins une première traverse en Y, dans lequel deux bords extérieurs de ladite première traverse en Y sont respectivement couplés à la cloison latérale adjacente, un bord intérieur est couplé à ladite feuille supérieure.

7. Lit gonflable selon la revendication 1, dans lequel ladite troisième structure de tension comprend au moins une seconde traverse en Y, dans lequel deux bords extérieurs de ladite seconde traverse en Y sont respectivement couplés à la cloison latérale adjacente, un bord intérieur est couplé à ladite feuille inférieure.

8. Lit gonflable selon la revendication 1, dans lequel ladite seconde structure de tension comprend au moins une première traverse tubulaire, comportant au moins deux bords extérieurs respectivement couplés à la cloison latérale adjacente, au moins un bord intérieur est couplé à ladite feuille supérieure.

9. Lit gonflable selon la revendication 1, dans lequel ladite troisième structure de tension comprend au moins une seconde traverse tubulaire, comprenant au moins deux bords extérieurs respectivement couplés à la cloison latérale adjacente, au moins un bord intérieur est couplé à ladite feuille inférieure.

10. Lit gonflable selon la revendication 1, dans lequel ladite seconde structure de tension comprend au moins une première traverse en V, dans lequel deux bords extérieurs de ladite première traverse en V sont respectivement couplés à la cloison latérale adjacente,

un bord intérieur est couplé à ladite feuille supérieure.

11. Lit gonflable selon la revendication 1, dans lequel ladite troisième structure de tension comprend au moins une seconde traverse en V, dans lequel deux bords extérieurs de ladite seconde traverse en V sont respectivement couplés à la cloison latérale adjacente, un bord intérieur est couplé à ladite feuille inférieure.

12. Lit gonflable selon la revendication 4, dans lequel lesdites au moins deux premières traverses en I sont espacées l'une de l'autre en correspondance d'une surface inférieure de ladite feuille supérieure.

13. Lit gonflable selon la revendication 5, dans lequel lesdites au moins deux secondes traverses en I sont espacées l'une de l'autre en correspondance d'une surface supérieure de ladite feuille inférieure.

14. Lit gonflable selon la revendication 4, dans lequel lesdites au moins deux premières traverses en I sont disposées à un certain intervalle sur une surface intérieure de ladite cloison latérale dans une direction perpendiculaire.

15. Lit gonflable selon la revendication 5, dans lequel lesdites au moins deux secondes traverses en I sont disposées à un certain intervalle sur la surface intérieure de ladite cloison latérale dans une direction perpendiculaire.

16. Lit gonflable selon la revendication 6, dans lequel les deux bords extérieurs de ladite au moins une

première traverse en Y sont disposés à un certain intervalle sur une surface intérieure de ladite cloison latérale dans une direction perpendiculaire.

17. Lit gonflable selon la revendication 7, dans lequel les deux bords extérieurs de ladite au moins une seconde traverse en Y sont disposées à un certain intervalle sur la surface intérieure de ladite cloison latérale dans une direction perpendiculaire.

18. Lit gonflable selon la revendication 8, dans lequel lesdits au moins deux bords extérieurs de ladite au moins une première traverse tubulaire, étant couplés à la cloison latérale adjacente, sont disposés à un certain intervalle sur une surface intérieure de ladite cloison latérale dans une direction perpendiculaire.

19. Lit gonflable selon la revendication 9, dans lequel lesdits au moins deux bords extérieurs de ladite au moins une seconde traverse tubulaire, étant couplés à la cloison latérale adjacente, sont disposés à un certain intervalle sur la surface intérieure de ladite cloison latérale dans une direction perpendiculaire.

20. Lit gonflable selon la revendication 10, dans lequel les deux bords extérieurs de ladite au moins une première traverse en V sont disposés à un certain intervalle sur une surface intérieure de ladite cloison latérale dans une direction perpendiculaire.

21. Lit gonflable selon la revendication 11, dans lequel les deux bords extérieurs de ladite au moins une seconde traverse en V sont disposés à un certain intervalle sur la surface intérieure de ladite cloison latérale dans une direction perpendiculaire.

22. Lit gonflable selon la revendication 4, dans lequel lesdites au moins deux premières traverses en V, dans leur ensemble, ont une structure annulaire continue ou une structure annulaire segmentaire.

23. Lit gonflable selon la revendication 5, dans lequel lesdites au moins deux secondes traverses en I, dans leur ensemble, ont une structure annulaire continue ou une structure annulaire segmentaire.

24. Lit gonflable selon la revendication 6, dans lequel ladite au moins une première traverse en Y, dans son ensemble, a une structure annulaire continue ou une structure annulaire segmentaire.

25. Lit gonflable selon la revendication 7, dans lequel ladite au moins une seconde traverse en Y, dans son ensemble, a une structure annulaire continue ou une structure annulaire segmentaire.

26. Lit gonflable selon la revendication 8, dans lequel ladite au moins une première traverse tubulaire, dans son ensemble, a une structure annulaire segmentaire.

27. Lit gonflable selon la revendication 9, dans lequel ladite au moins une seconde traverse tubulaire, dans son ensemble, a une structure annulaire segmentaire.

28. Lit gonflable selon la revendication 10, dans lequel ladite au moins une première traverse en V, dans son ensemble, a une structure annulaire continue ou une structure annulaire segmentaire.

29. Lit gonflable selon la revendication 11, dans

lequel ladite au moins une seconde traverse en V, dans son ensemble, a une structure annulaire continue ou une structure annulaire segmentaire.

30. Lit gonflable selon la revendication 1, dans lequel ladite première structure de tension est une ou plusieurs traverses sélectionnée(s) à partir des traverses en I, des traverses à spirales, des traverses en Y ou des traverses en X.

31. Lit gonflable selon la revendication 1, dans lequel ladite première structure de tension, ladite seconde structure de tension et ladite troisième structure de tension sont toutes composées d'une feuille plastique thermoplastique.

32. Lit gonflable selon la revendication 1, dans lequel une ou plusieurs desdites première structure de tension, seconde structure de tension et troisième structure de tension comprennent au moins en partie un maillage, une feuille plastique stratifiée ou un filetage.

33. Lit gonflable selon la revendication 32, dans lequel deux surfaces latérales dudit maillage ou dudit filetage sont au moins partiellement couplées de façon solidaire à deux bandes plastiques opposées, ledit maillage et ledit filetage sont pris en sandwich entre les deux bandes plastiques opposées.

34. Lit gonflable selon la revendication 32, dans lequel deux surfaces latérales dudit maillage ou dudit filetage sont au moins partiellement couplées de façon solidaire à une bande plastique en U, ledit maillage et ledit filetage sont pris en sandwich entre la bande

plastique en U.

35. Lit gonflable selon la revendication 1, dans lequel ladite première structure de tension est couplée auxdites feuilles supérieure et inférieure au moyen d'un soudage par haute fréquence ; ladite seconde structure de tension est couplée à ladite feuille supérieure et à ladite cloison latérale au moyen d'un soudage par haute fréquence ; et ladite troisième structure de tension est couplée à ladite feuille inférieure et à ladite cloison latérale au moyen d'un soudage par haute fréquence.

36. Lit gonflable selon la revendication 1, dans lequel l'emplacement où ladite feuille supérieure est située dans la partie intérieure d'un bord supérieur de ladite seconde structure de tension est plus bas que l'emplacement où ladite feuille supérieure est située dans la partie extérieure du bord supérieur de ladite seconde structure de tension.

37. Lit gonflable selon la revendication 1, dans lequel l'emplacement où ladite feuille inférieure est située dans la partie intérieure d'un bord inférieur de ladite troisième structure de tension est plus bas que l'emplacement où ladite feuille inférieure est située dans la partie extérieure du bord inférieur de ladite troisième structure de tension.

38. Lit gonflable selon la revendication 1, dans lequel ledit lit gonflable comprend de plus une pompe à air intégrée étant disposée sur ladite cloison latérale et située entre un bord inférieur de ladite seconde structure de tension et un bord supérieur de ladite troisième structure de tension pour gonfler ladite

chambre à air.

39. Lit gonflable selon la revendication 1, dans lequel ledit lit gonflable comprend de plus un clapet d'air étant disposé sur ladite cloison latérale pour le gonflage ou le dégonflage dudit lit gonflable.

Europäisches Patentamt
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Acknowledgement of receipt

We hereby acknowledge receipt of the following subsequently filed document(s):

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Date
23.08.18

Reference	Application No./Patent No.
27S8343,12EP42	16191360.3 - 1011 / 3192401

Applicant/Proprietor
Bestway Inflatables & Material Corp

Decision to grant a European patent pursuant to Article 97(1) EPC

Following examination of European patent application No. 16191360.3 a European patent with the title and the supporting documents indicated in the communication pursuant to Rule 71(3) EPC (EPO Form 2004C) or in the information (EPO Form 2004W, cf. Notice from the EPO dated 8 June 2015, OJ EPO 2015, A52) dated 07.05.18 is hereby granted in respect of the designated Contracting States.

Patent No. : 3192401
Date of filing : 29.09.16
Priority claimed : 13.01.16/CNA201610020533
13.01.16/CNU201620031074

Designated Contracting States and Proprietor(s) : AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Bestway Inflatables & Material Corp
No.3065 Cao An Road
Shanghai 201812/CN

This decision will take effect on the date on which the European Patent Bulletin mentions the grant (Art. 97(3) EPC).

The mention of the grant will be published in European Patent Bulletin 18/38 of 19.09.18.

Examining Division

Lehe J Amghar N Beugeling G

Europäisches Patentamt • European Patent Office • Office européen des brevets

Registered letter
EPO Form 2006A 07.15 (16/08/18)

to EPO postal service 17.08.18

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ANMERKUNG ZUR ENTSCHEIDUNG ÜBER DIE ERTEILUNG
EINES EUROPÄISCHEN PATENTS (EPA Form 2006)

1. **EPA Informationsbroschüre "Nationales Recht zum EPÜ"**
Diese Broschüre enthält nützliche Informationen zu den formalen Erfordernissen und den Handlungen, die vor den Patentbehörden der Vertragsstaaten vorzunehmen sind, um Rechte in diesen Staaten zu erlangen. Da diese Handlungen einem ständigen Wandel unterworfen sind, sollte immer nur die neueste Ausgabe der Broschüre benutzt werden. Nachträgliche Informationen werden im Amtsblatt veröffentlicht.

2. **Übersetzung der europäischen Patentschrift nach Artikel 65 (1) des Europäischen Patentübereinkommens**
Sie werden erneut darauf hingewiesen, dass bestimmte Vertragsstaaten nach Artikel 65 (1) EPÜ eine Übersetzung der europäischen Patentschrift verlangen; hierauf wird in der Mitteilung gemäß Regel 71 (5) EPÜ verwiesen. Die Nichteinreichung dieser Übersetzung kann zur Folge haben, dass das Patent in dem betreffenden Staat/in den betreffenden Staaten als von Anfang an nicht eingetreten gilt. Weitere Einzelheiten entnehmen Sie bitte der oben genannten Broschüre.

3. **Zahlung von Jahresgebühren für europäische Patente**
Nach Artikel 141 EPÜ können "nationale" Jahresgebühren für das europäische Patent für die Jahre erhoben werden, die an das Jahr anschließen, in dem der Hinweis auf die Erteilung des europäischen Patents im "Europäischen Patentblatt" bekanntgemacht wird. Weitere Einzelheiten entnehmen Sie bitte der oben genannten Broschüre.

NOTE RELATING TO THE DECISION TO GRANT A
EUROPEAN PATENT (EPO Form 2006)

1. **EPO Information Brochure "National law relating to the EPC"**
This brochure provides useful information regarding formal requirements and the steps to be taken before the patent authorities of the Contracting States in order to acquire rights in those states. Since the necessary steps are subject to change the latest edition of the brochure should always be used. Subsequent information is published in the Official Journal.

2. **Translation of the European patent application under Article 65(1) of the European Patent Convention**
Your attention is again drawn to the requirements regarding translation of the European patent specification laid down by a number of Contracting States under Article 65(1) EPC, to which reference is made in the communication under Rule 71(5) EPC. Failure to supply such translation(s) may result in the patent being deemed to be void "ab initio" in the State(s) in question. For further details you are recommended to consult the above-mentioned brochure.

3. **Payment of renewal fees for European patents**
Under Article 141 EPC "national" renewal fees in respect of a European patent may be imposed for the years which follow that in which the mention of the grant of the European patent is published in the "European Patent Bulletin". For further details you are recommended to consult the above-mentioned brochure.

REMARQUE RELATIVE A LA DECISION DE DELIVRANCE
D'UN BREVET EUROPEEN (OEB Form 2006)

1. **Brochure d'information de l'OEB "Droit national relatif à la CBE"**
Cette brochure fournit d'utiles renseignements sur les conditions de forme requises et sur les actes à accomplir auprès des offices de brevet des Etats contractants aux fins d'obtenir des droits dans les Etats contractants. Etant donné que les actes indispensables sont susceptibles de modifications, il serait bon de toujours consulter la dernière édition de la brochure. Toute information ultérieure est publiée au Journal Officiel.

2. **Traduction du fascicule du brevet européen en vertu de l'article 65(1) de la Convention sur le brevet européen**
Votre attention est de nouveau attirée sur l'obligation faite par certains États contractants, en vertu de l'article 65(1) CBE, de fournir une traduction du fascicule du brevet européen, à laquelle il est fait référence dans la notification établie conformément à la règle 71(5) CBE. Si la(les) traduction(s) n'est(ne sont) pas fournie(s), le brevet européen peut, dès l'origine, être réputé sans effet dans cet(ces) Etat(s). Pour plus de détails, nous vous renvoyons à la brochure susmentionnée.

3. **Paiement des taxes annuelles pour le brevet européen**
Conformément à l'article 141 CBE des taxes annuelles "nationales" dues au titre du brevet européen peuvent être perçues pour les années suivant celle au cours de laquelle la mention de la délivrance du brevet européen est publiée au "Bulletin européen des brevets. Pour plus de détails, nous vous renvoyons à la brochure susmentionnée.

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01.10.18

Reference	Application No./Patent No.
27S8343,12EP42	16191360.3 - 1011 / 3192401
Applicant/Proprietor	
Bestway Inflatables & Material Corp	

Transmission of the certificate for a European patent pursuant to Rule 74 EPC

The certificate for a European patent is herewith transmitted.

The European patent specification can be downloaded from the EPO publication server **https://data.epo.org/publication-server/** (see OJ EPO 2005, 126).

Note:
A corrected title page of the European patent specification will be published, if the bibliographic data have been changed after completion of the technical preparations.

For the Examining Division

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CABLE-STAYED REINFORCEMENT STRUCTURE FOR AIR CHAMBER OF INFLATABLE PRODUCT

APPLICATION NO.: CN201320042268.2 FILLING DATE: JAN.25TH, 2013

TECHNICAL FIELD

The utility model relates to a structure of an inflatable product, and in particular to a cable-stayed reinforcement structure for an air chamber of an inflatable product.

BACKGROUND

Inflatable products, such as airbeds, are featured by being easy to use, light weighted, easy to move, and easy to fold and carry, making them a suitable choice when used as a temporary or non-fixed bed. Inflated beds with smaller bed thickness after inflation are generally used outdoors. If the comfort of the inflatable bed is to be improved to be comparable to that of household beds, the thickness of the inflatable bed after inflation must be as high as that of a general bed, and the structure must also be relatively stable to ensure the flatness of the bed surface.

As shown in FIG. 1, the airbed with a height of a general bed is usually formed by superimposing two independent air chambers A and B in order to prevent the circumference of the bed from overly protruding and to provide a supporting force and the shape-keeping strength of the air cavity. That is, a middle piece C has to be provided such that two air cavities are formed by two independent shrouds connecting to the middle piece and, respectively, an upper piece and a lower piece. Respective sets of belts are arranged in the two air cavities to form a bed shape. Such a structure necessarily has the following disadvantages.

1. The material cost is high. Due to the provision of the middle piece to facilitate the shaping and the function of the bed, it not only increases the consumption of the material but also increases the weight of the bed.

2. The drawbelts in the two independent air cavities need to be welded separately, which invisibly increases the complexity of the production of the bed, thus leading to a high production cost.

SUMMARY

It is an object of the utility model to provide a cable-stayed reinforcement structure for an air chamber of an inflatable product, which may prevent the periphery of the product from overly protruding to affect the aesthetic appearance of the product while ensuring the height and strength of the product, and may effectively reduce the material cost and the production cost.

To achieve this, the solutions of the present utility model are as follows.

A cable-stayed reinforcement structure for an air chamber of an inflatable product, comprising an upper piece, a lower piece, a plurality of drawbelts and a wrapping piece, two ends of each of the drawbelts being respectively connected to a lower surface of the upper piece and an upper surface of the lower piece, and upper and lower sides of the wrapping piece being respectively connected with a periphery of the upper piece and a periphery of the lower piece to form the inflatable product having an air chamber; characterized in that it further comprises a side wrapping belt, one end of the side wrapping belt being connected to a middle of an inner surface of the wrapping piece, and the other end being connected to the lower surface of the upper piece near the periphery or the upper surface of the lower piece near the periphery.

The side wrapping belt is an integral ring-shaped drawbelt formed by ring-shaped plastic strips at both ends connecting with a plurality of cables, wherein a plastic strip is fixed at a middle of the plurality of cables, the ring-shaped plastic strips at both ends of the side wrapping belt are respectively connected to the upper piece and the lower piece, and the plastic strip at the middle is connected to a middle of an inner surface of the wrapping piece.

The side wrapping belt is an integral ring-shaped drawbelt formed by ring-shaped plastic strips at both ends connecting with a plurality of cables, the plastic strip at one end of the side wrapping belt being connected to a middle of an inner surface of the wrapping piece, the other end being connected to the upper piece and the lower piece.

Each of the drawbelts is a belt corresponding to a width or length of the bed and

is formed by plastic strips at both ends connecting with a plurality of cables, the plastic strips at both ends being welded to the upper piece and the lower piece, respectively.

A ring-shaped upper suction piece and a ring-shaped lower suction piece are respectively disposed between the upper piece and the wrapping piece and between the lower piece and the wrapping piece, the upper piece being connected to an upper periphery of the wrapping piece through the ring-shaped upper suction piece, the lower piece being connected to a lower periphery of the wrapping piece through the ring-shaped lower suction piece.

With the above solutions, the utility model not only prevents the wrapping piece from overly protruding to affect the strength and appearance of the product but also effectively reduces the material cost and production cost, by the side wrapping belt provided connecting the middle of the wrapping piece of the inflatable product and the upper piece or/and lower piece so as to achieve a traction and position restriction on the middle of the wrapping piece of the inflatable product with a relatively large height.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a conventional article;

FIG. 2 is an exploded perspective view of a first embodiment of the present utility model;

FIG. 3 is a schematic view of the appearance of the first embodiment of the present utility model;

FIG. 4 is a partial cross-sectional view showing the first embodiment of the present utility model;

FIG. 5 is an exploded perspective view of a second embodiment of the present utility model;

FIG. 6 is a schematic view of the appearance of the second embodiment of the present utility model; and

FIG. 7 is a partial cross-sectional view showing the second embodiment of the

present utility model.

DETAILED DESCRIPTION

As shown in FIGS. 2 to 7, the utility model discloses a cable-stayed reinforcement structure for an air chamber of an inflatable product, in particular, a rectangular inflatable product, which structure includes an upper piece 1, a lower piece 2, a plurality of drawbelts 3 and a wrapping piece 4, as well as a side wrapping belt 5. Two ends of each of the drawbelts 3 are respectively connected to a lower surface of the upper piece 1 and an upper surface of the lower piece 2, and upper and lower sides of the wrapping piece 4 are respectively connected with a periphery of the upper piece 1 and a periphery of the lower piece 2, thereby forming an inflatable product having an air chamber, with one end of the side wrapping belt 5 connected to a middle of an inner surface of the wrapping piece 4, and the other end connected to the lower surface of the upper piece 1 near the periphery or the upper surface of the lower piece 2 near the periphery.

The following is an illustration of the inflatable product by taking an airbed as an example, but the inflatable product is not limited thereto.

As shown in FIGS. 2, 3 and 4, in the first embodiment of the present utility model, each of the drawbelts 3 is a belt corresponding to the width or length of the bed, which is formed by plastic strips 31 at both ends connecting with a plurality of cables 32, with the plastic strips 31 used for welding with the upper piece 1 and the lower piece 2, and the cables 32 for bearing a strong traction force. The side wrapping belt 5 is an integral ring-shaped drawbelt, which is formed by ring-shaped plastic strips 51 at both ends connecting with a plurality of cables 52, with a plastic strip 53 being fixed in the middle of the plurality of cables 52, so that the ring-shaped plastic strips 51 at both ends of the side wrapping belt 5 are respectively connected to the upper piece 1 and the lower piece 2, and the plastic strip 53 in the middle are connected to a middle of an inner surface of the wrapping piece 4.

first embodiment

Here, the provision of the side wrapping belt 5 is such that the middle portion of the wrapping piece 4 is further pinched to be concave to ensure the aesthetics of the

periphery of the airbed having a relatively large height and an air cavity, to prevent the periphery from overly protruding, and, at the same time, to ensure the strength of the periphery of the bed and the support strength of the bed as a whole.

In order to improve the aesthetics of the bed, a ring-shaped upper suction piece 11 and a ring-shaped lower suction piece 21 are respectively disposed between the upper piece 1 and the wrapping piece 4 and between the lower piece 2 and the wrapping piece 4. That is, the upper piece 1 is connected with the upper periphery of the wrapping piece 4 through the ring-shaped upper suction piece 11, and the lower piece 2 is connected with the lower periphery of the wrapping piece 4 through the ring-shaped lower suction piece 21.

As shown in FIGS. 5, 6 and 7, in the second embodiment of the present utility model, each of the drawbelts 3 is also a belt corresponding to the width or length of the bed, which is also formed by plastic strips 31 at both ends connecting with a plurality of cables 32, with the plastic strips 31 used for welding with the upper piece 1 and the lower piece 2, and the cables 32 for bearing a strong traction force. The side wrapping belt 5 is an integral ring-shaped drawbelt, which is formed by ring-shaped plastic strips 51 at both ends connecting with a plurality of cables 52. The plastic strip 51 at one end of the wrapping belt 5 is connected to a middle of an inner surface of the wrapping piece 4, and the other end is connected to the upper piece 1 and the lower piece 2. Therefore, the airbed having a relatively large height and an air cavity is prevented from having an overly protruding periphery, and the strength of the periphery of the bed and the support strength of the bed as a whole are ensured.

second embodiment

Likewise, in order to improve the aesthetics of the bed, a ring-shaped upper suction piece 11 and a ring-shaped lower suction piece 21 are respectively disposed between the upper piece 1 and the wrapping piece 4 and between the lower piece 2 and the wrapping piece 4. That is, the upper piece 1 is connected with the upper periphery of the wrapping piece 4 through the ring-shaped upper suction piece 11, and the lower piece 2 is connected with the lower periphery of the wrapping piece 4 through the ring-shaped lower suction piece 21.

It should be noted that the drawbelt 3 and the side wrapping belt 5 in the above

first and second embodiments are not limited to the structure of the plastic strips and the plurality of cables, and that they can alternatively be implemented with a linear drawbelt or a cylindrical drawbelt of an integral plastic piece as long as they satisfy the requirements of the internal pressure of the inflatable product.

alternative corner belts

In summary, by connecting the middle of the wrapping piece 4 of the inflatable product and the upper piece 1 or/and lower piece 2 so as to achieve a traction and position restriction on the middle of the wrapping piece 4 of the inflatable product with a relatively large height, the utility model not only prevents the wrapping piece from overly protruding to affect the strength and appearance of the product but also effectively reduces the material cost and production cost.

What is claimed is:

1. A cable-stayed reinforcement structure for an air chamber of an inflatable product, comprising an upper piece, a lower piece, a plurality of drawbelts and a wrapping piece, two ends of each of the drawbelts being respectively connected to a lower surface of the upper piece and an upper surface of the lower piece, and upper and lower sides of the wrapping piece being respectively connected with a periphery of the upper piece and a periphery of the lower piece to form the inflatable product having an air chamber; characterized in that it further comprises a side wrapping belt, one end of the side wrapping belt being connected to a middle of an inner surface of the wrapping piece, and the other end being connected to the lower surface of the upper piece near the periphery or the upper surface of the lower piece near the periphery.

2. The cable-stayed reinforcement structure for an air chamber of an inflatable product according to claim 1, wherein the side wrapping belt is an integral ring-shaped drawbelt formed by ring-shaped plastic strips at both ends connecting with a plurality of cables, wherein a plastic strip is fixed at a middle of the plurality of cables, the ring-shaped plastic strips at both ends of the side wrapping belt are respectively connected to the upper piece and the lower piece, and the plastic strip at the middle is connected to a middle of an inner surface of the wrapping piece.

3. The cable-stayed reinforcement structure for an air chamber of an inflatable product according to claim 1, wherein the side wrapping belt is an integral ring-shaped drawbelt formed by ring-shaped plastic strips at both ends connecting with a plurality of cables, the plastic strip at one end of the side wrapping belt being connected to a middle of an inner surface of the wrapping piece, the other end being connected to the upper piece and the lower piece.

4. The cable-stayed reinforcement structure for an air chamber of an inflatable product according to claim 1, 2 or 3, wherein each of the drawbelts is a belt corresponding to a width or length of the bed and is formed by plastic strips at both ends connecting with a plurality of cables, the plastic strips at both ends being welded

to the upper piece and the lower piece, respectively.

5. The cable-stayed reinforcement structure for an air chamber of an inflatable product according to claim 4, wherein a ring-shaped upper suction piece and a ring-shaped lower suction piece are respectively disposed between the upper piece and the wrapping piece and between the lower piece and the wrapping piece, the upper piece being connected to an upper periphery of the wrapping piece through the ring-shaped upper suction piece, the lower piece being connected to a lower periphery of the wrapping piece through the ring-shaped lower suction piece.

ABSTRACT

The utility model discloses a cable-stayed reinforcement structure for an air chamber of an inflatable product, which includes an upper piece, a lower piece, a plurality of drawbelts and a wrapping piece. Two ends of each of the drawbelts being respectively connected to a lower surface of the upper piece and an upper surface of the lower piece, and upper and lower sides of the wrapping piece being respectively connected with a periphery of the upper piece and a periphery of the lower piece to form the inflatable product having an air chamber; characterized in that it further comprises a side wrapping belt, one end of the side wrapping belt being connected to a middle of an inner surface of the wrapping piece, and the other end being connected to the lower surface of the upper piece near the periphery or the upper surface of the lower piece near the periphery. By the side wrapping belt provided connecting the middle of the wrapping piece of the inflatable product and the upper piece or/and lower piece so as to achieve a traction and position restriction on the middle of the wrapping piece of the inflatable product with a relatively large height, the utility model not only prevents the wrapping piece from overly protruding to affect the strength and appearance of the product but also effectively reduces the material cost and production cost.

US007039972B2

(12) **United States Patent**
Chaffee

(10) **Patent No.: US 7,039,972 B2**
(45) **Date of Patent: May 9, 2006**

(54) **INFLATABLE DEVICE WITH RECESSED FLUID CONTROLLER AND MODIFIED ADJUSTMENT DEVICE**

(76) Inventor: **Robert B. Chaffee**, 78 Montgomery St., Boston, MA (US) 02116

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 51 days.

(21) Appl. No.: **09/859,706**

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(65) **Prior Publication Data**

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Related U.S. Application Data

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(51) **Int. Cl.**
A47C 27/08 (2006.01)

(52) **U.S. Cl.** **5/706**; 5/655.3

(58) **Field of Classification Search** 5/710, 5/713, 655.3, 711, 708, 706; 297/284.6; 137/565.16, 565.18
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,451,136	A		4/1923	Allnut
3,026,909	A		3/1962	Boteler
3,068,494	A		12/1962	Pinkwater
3,099,386	A		7/1963	Pieper
3,112,502	A	*	12/1963	Forsberg 5/708
3,142,850	A		8/1964	De Boer
3,505,695	A		4/1970	Bishaf et al.
3,563,676	A		2/1971	Coovert et al.
3,995,653	A	*	12/1976	Mackal et al. 137/234
4,080,105	A		3/1978	Connell
4,146,069	A		3/1979	Angarola et al.
4,146,070	A		3/1979	Angarola et al.
4,213,745	A		7/1980	Roberts
4,225,989	A		10/1980	Corbett et al.

(Continued)

FOREIGN PATENT DOCUMENTS

DE 44 13 445 A1 10/1995

(Continued)

OTHER PUBLICATIONS

Imaginair by aero, Instruction Manual, Dec. 1999, Imaginair Incorporated, Wauconda, IL, USA.

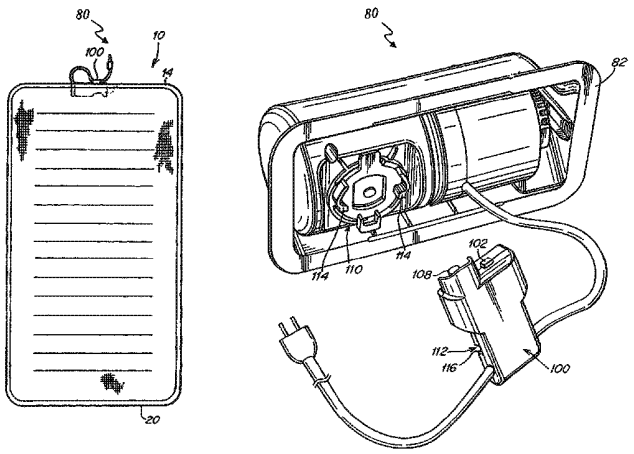
(Continued)

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(57) **ABSTRACT**

The application is related to inflatable devices, and, more specifically, to an inflatable device with a recessed fluid controller and improved adjustment device. In one embodiment, the application is directed to an inflatable device comprising a substantially fluid impermeable bladder and a fluid controller comprising an electrically powered pump at least partly positioned within the bladder. In another embodiment, the application is directed to a combination of a fluid controller comprising an electrically powered pump and an inflatable device. The combination comprises the fluid controller connected to the inflatable device such that the exterior profile of the fluid controller and inflated inflatable device in combination is essentially the same as the exterior profile of the inflated inflatable device. In another embodiment, the application is directed to an inflatable system comprising a substantially fluid impermeable bladder and a fluid controller comprising pump in fluid communication with the bladder. The fluid controller further comprises a first locking mechanism and a adjustment device including a second locking mechanism sized and adapted to reversibly mate with the first locking mechanism.

40 Claims, 6 Drawing Sheets



U.S. PATENT DOCUMENTS

4,521,166	A		6/1985	Phillips
4,678,014	A		7/1987	Owen et al.
4,678,410	A		7/1987	Kullen
4,692,091	A		9/1987	Ritenour
4,711,275	A	*	12/1987	Ford et al. 141/95
4,734,017	A		3/1988	Levin
4,829,616	A		5/1989	Walker
4,862,533	A		9/1989	Adams, III
4,890,344	A		1/1990	Walker
4,897,890	A		2/1990	Walker
4,977,633	A		12/1990	Chaffee
4,986,738	A	*	1/1991	Kawasaki et al. 417/304
4,990,060	A	*	2/1991	Cheng-Chung 417/84
5,051,060	A		9/1991	Fleischmann et al.
5,068,933	A		12/1991	Sexton
5,144,708	A		9/1992	Pekar
5,170,522	A	*	12/1992	Walker 5/615
5,203,808	A	*	4/1993	Ide 5/672
5,249,319	A		10/1993	Higgs
5,267,363	A		12/1993	Chaffee
5,406,661	A		4/1995	Pekar
5,494,418	A		2/1996	Moriya et al.
5,598,593	A	*	2/1997	Wolfe 5/710
5,727,270	A		3/1998	Cope et al.
5,746,873	A	*	5/1998	Graf 156/274.4
5,857,841	A		1/1999	Kobayashi et al.
5,890,882	A	*	4/1999	Feldman 417/411
5,893,609	A	*	4/1999	Schmidt 297/284.6
5,903,941	A	*	5/1999	Shafer et al. 318/601
5,904,172	A	*	5/1999	Gifft et al. 137/224
6,099,248	A		8/2000	Mumm et al.
6,108,844	A		8/2000	Kraft et al.
6,129,524	A		10/2000	Woollenweber et al.
6,206,654	B1		3/2001	Cassidy
6,237,653	B1		5/2001	Chaffee
D446,284	S		8/2001	Chaffee
6,287,095	B1	*	9/2001	Saputo et al. 417/472
6,296,459	B1		10/2001	Saputo et al.
6,332,760	B1	*	12/2001	Chung 417/239
6,483,264	B1		11/2002	Shafer et al.
6,530,751	B1		3/2003	Song et al.
6,543,073	B1	*	4/2003	Wu 5/713
6,565,315	B1		5/2003	Bertels et al.
6,571,412	B1	*	6/2003	Wu 5/658
6,659,737	B1		12/2003	Bader et al.
6,679,686	B1	*	1/2004	Wang 417/423.1
6,709,246	B1	*	3/2004	Boyd 417/423.1
6,722,306	B1	*	4/2004	Wang 114/345
6,733,254	B1	*	5/2004	Yen 417/423.1
6,793,469	B1	*	9/2004	Chung 417/411
6,836,914	B1	*	1/2005	Tsai 5/713
2001/0026763	A1	*	10/2001	Chung 417/360
2002/0194678	A1	*	12/2002	Chung 5/713
2003/0003001	A1		1/2003	Chaffee
2003/0024050	A1		2/2003	Boso et al.
2003/0099560	A1	*	5/2003	Wang 417/423.1
2003/0215340	A1	*	11/2003	Chung 417/229
2004/0037717	A1	*	2/2004	Wang 417/411
2004/0241014	A1	*	12/2004	Yen 417/360
2005/0047923	A1	*	3/2005	Li et al. 417/44.9
2005/0118046	A1	*	6/2005	Wang 417/423.15
2005/0186097	A1	*	8/2005	Wang 417/423.3

FOREIGN PATENT DOCUMENTS

DE	297 21 150 U1		2/1998
DE	29721150 U1		2/1998
JP	05137809 A	*	6/1993
WO	WO 93/05684		1/1993
WO	WO 03/093709 A1		5/2003

OTHER PUBLICATIONS

Imaginair Aero Product Catalog, 2000 Imaginair Incorporated, Wauconda, Il, USA.

Supreme Fast-Fill, 2000 Intex Recreation Corpl, Long Beach, CA, USA.

U. S. Appl. No. 10/113,836, filed Apr. 1, 2002.

* cited by examiner

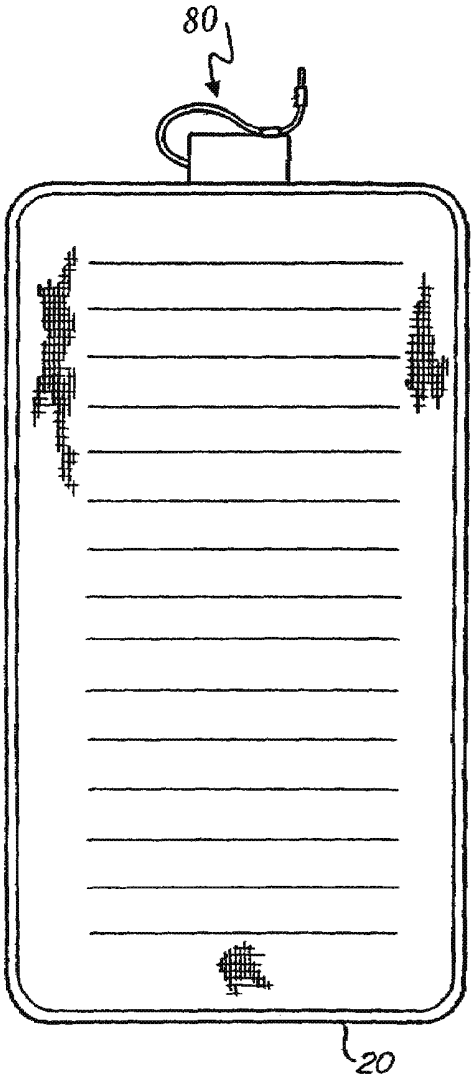


Fig. 1
(PRIOR ART)

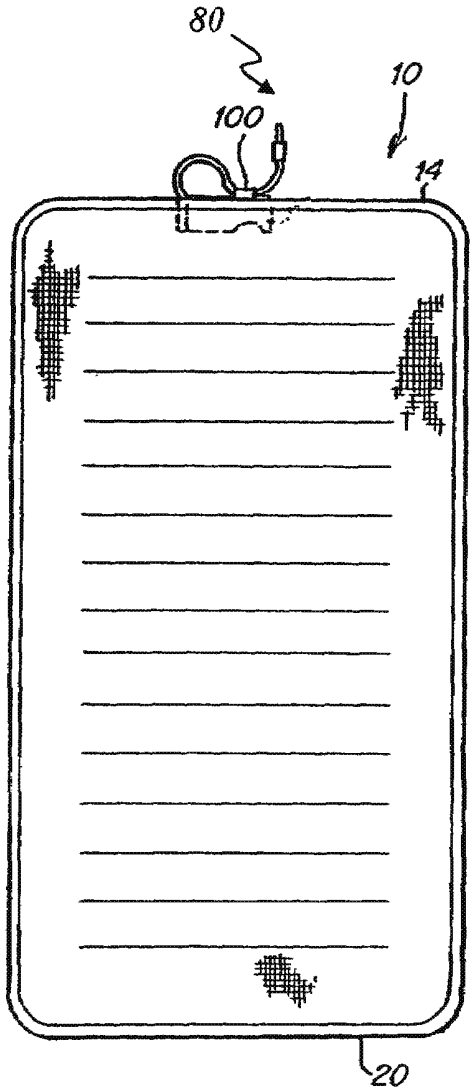


Fig. 2

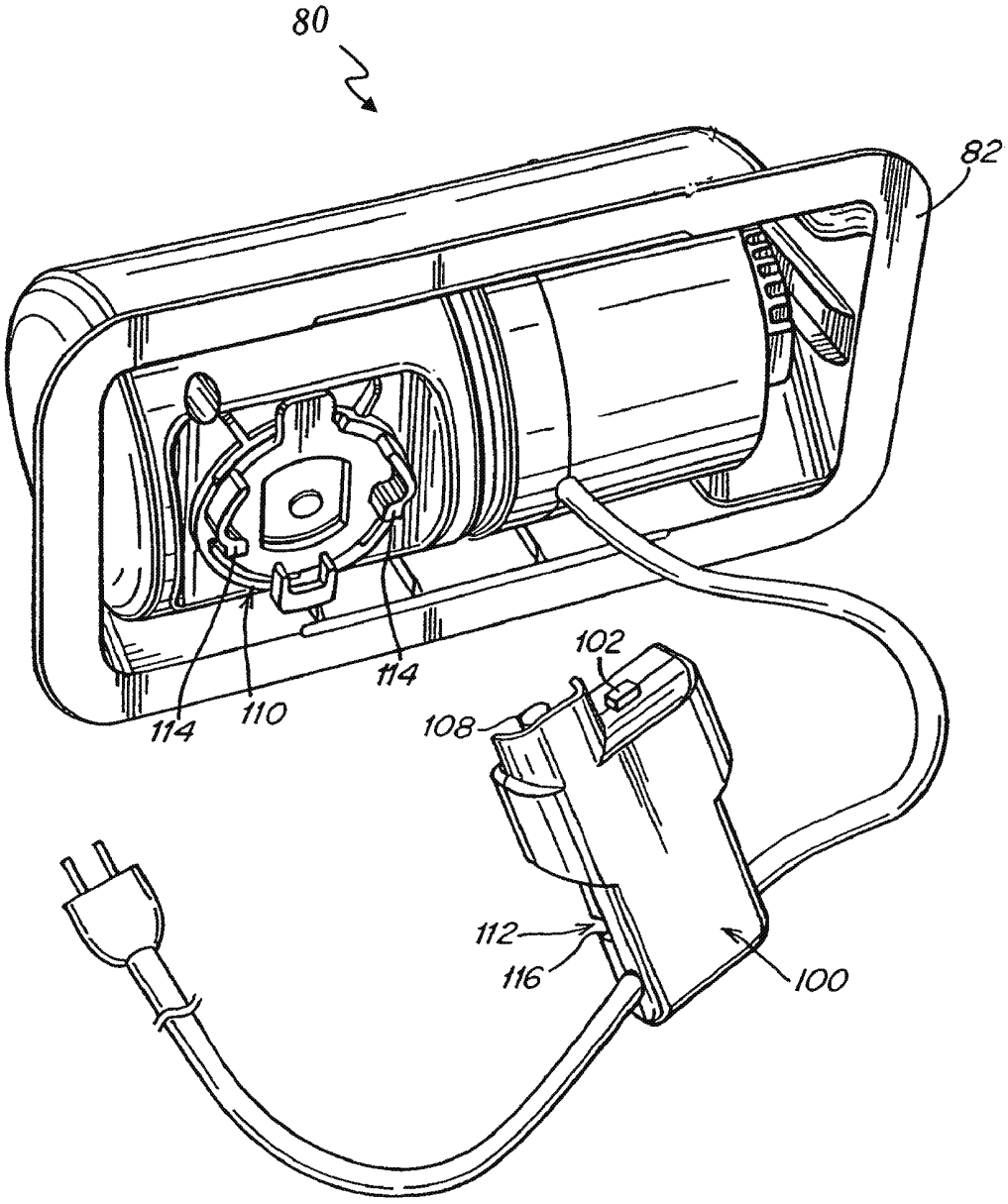


Fig. 3

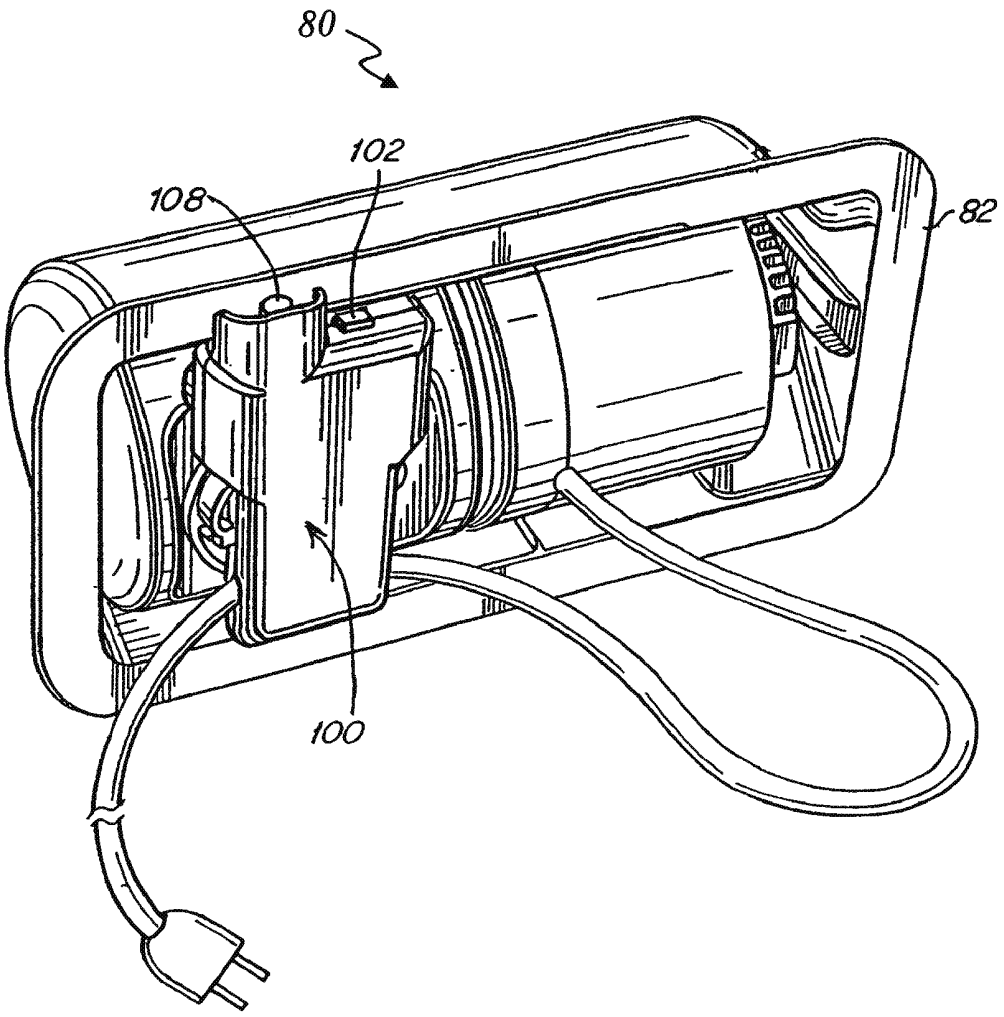


Fig. 4

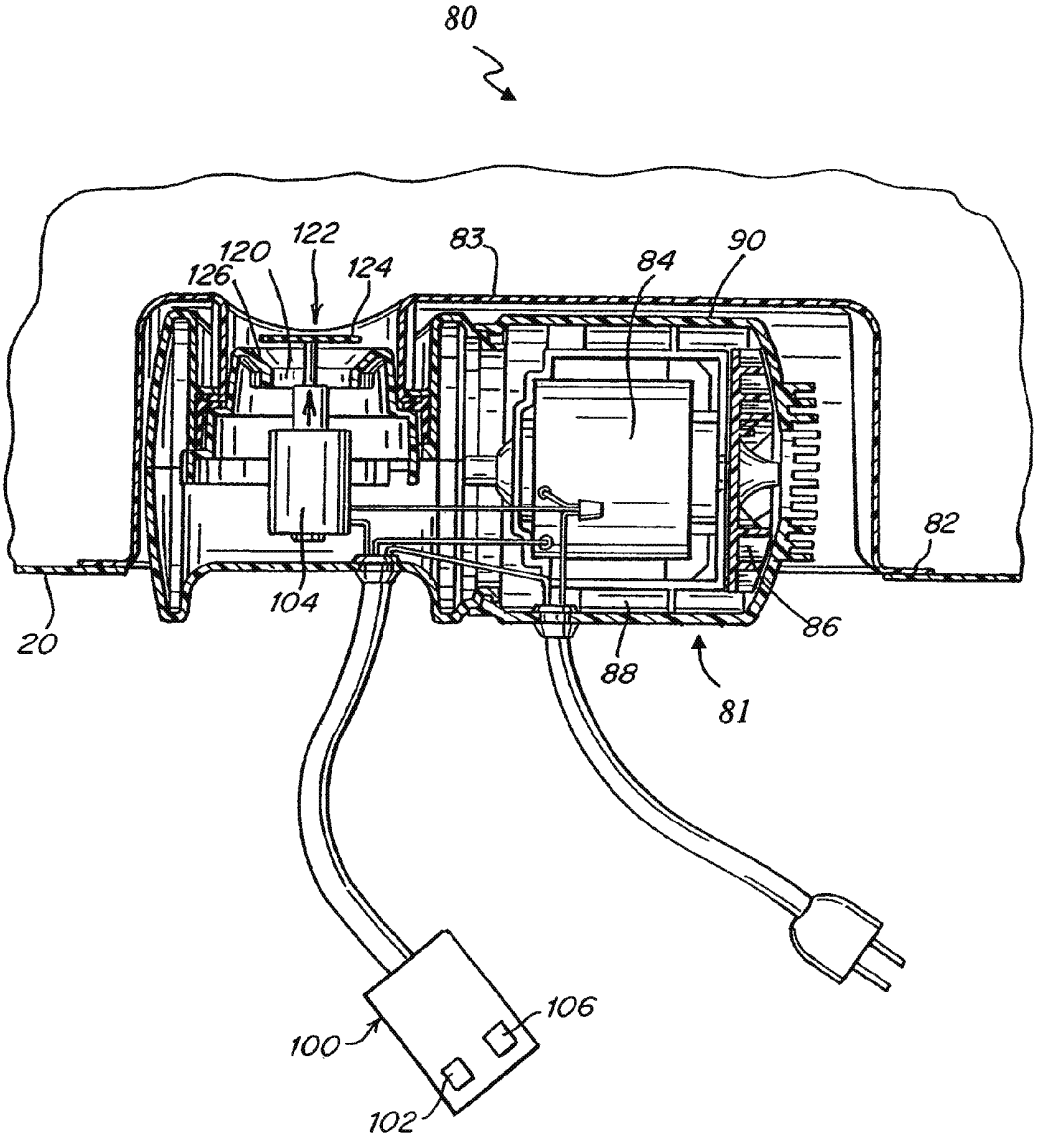


Fig. 5

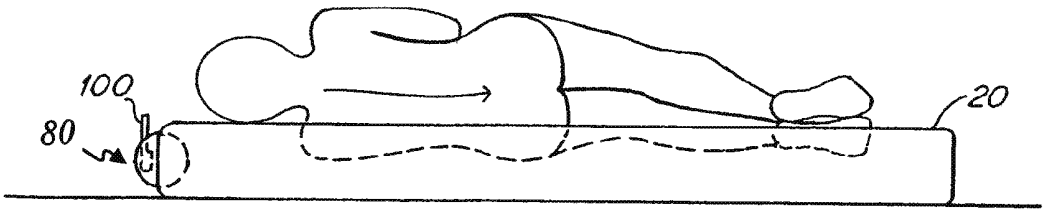


Fig. 6

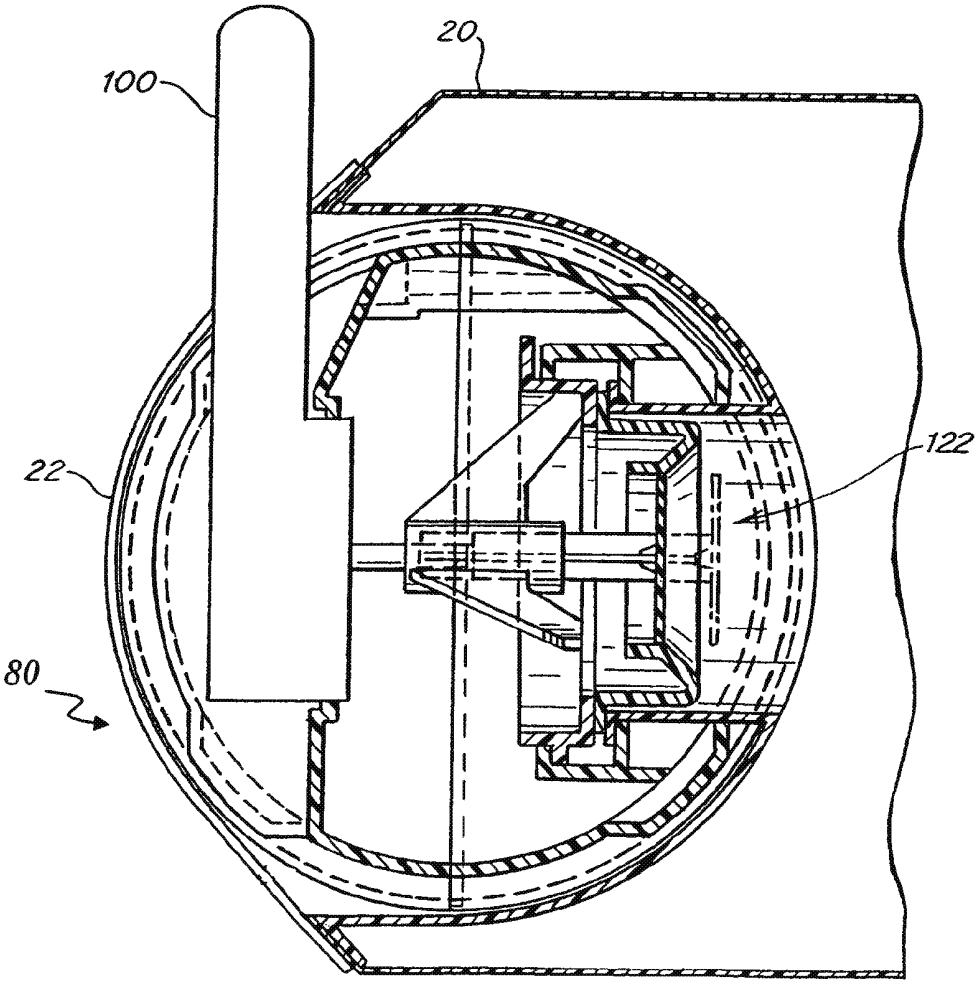


Fig. 7

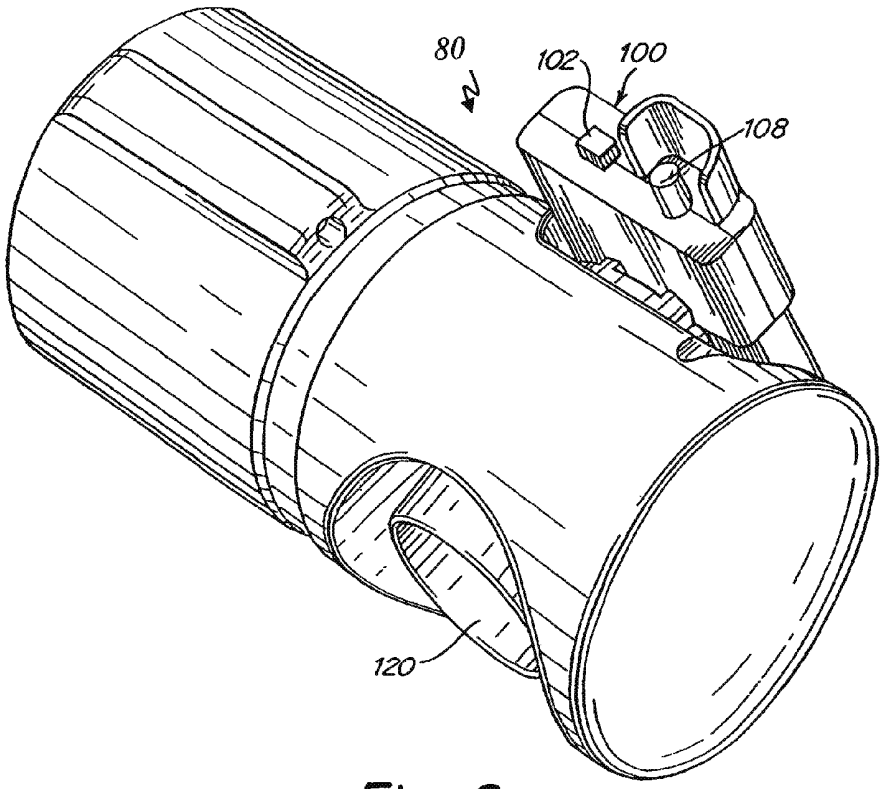


Fig. 8

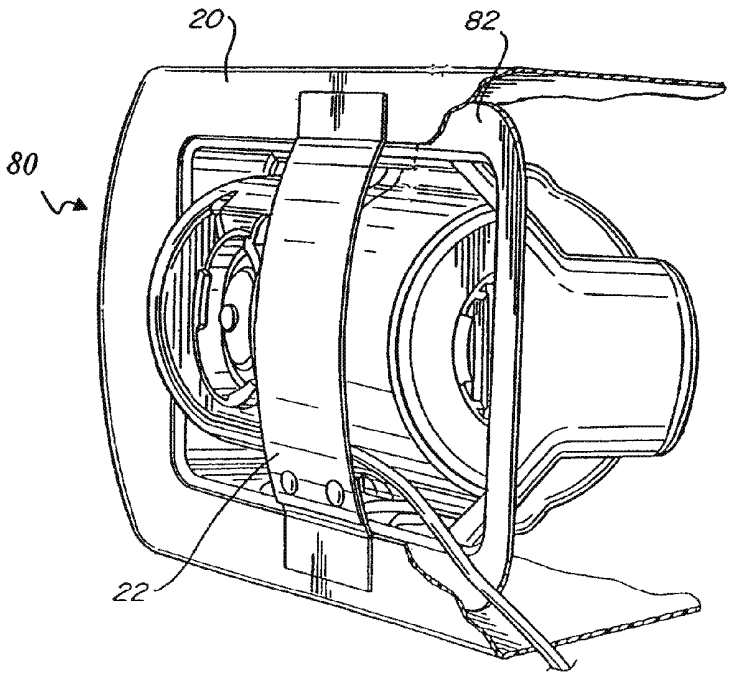


Fig. 9

INFLATABLE DEVICE WITH RECESSED FLUID CONTROLLER AND MODIFIED ADJUSTMENT DEVICE

This application claims priority to U.S. Provisional Patent Application Ser. No. 60/204,836, filed May 17, 2000 and to U.S. Provisional Patent Application Ser. No. 60/280,040, filed Mar. 30, 2001.

BACKGROUND

1. Field of the Application

The application is related to inflatable devices, and, more specifically, to an inflatable device with a recessed fluid controller and modified adjustment device.

2. Description of the Related Art

Inflatable devices are used in a variety of contexts, such as where buoyancy or a cushioned support is needed, where space is limited or portability is desired. For example, inflatable mattresses, cushions and other body supports are used for applications such as camping, hospital bedding, and both occasional and everyday bedding in the home. Such inflatable devices have the additional advantage that the degree of inflation of the support can be adjusted to provide selective support of an irregular object, such as a person. Other examples of inflatable devices include boats, rafts and other devices for use in the water.

A variety of methods are known for providing a fluid, such as air, to inflate an inflatable device. Typically, a pump is used to supply fluid to an orifice in the inflatable device. In most instances, fluid is introduced into inflatable devices through an inlet that may be sealed to retain fluid within the inflatable device. The inlet may also serve as an outlet for deflating the inflatable device. A pump for use with an inflatable device may include a motor that drives an impeller, moving the fluid into, or out of, the inflatable device. Motorized pumps may be powered by electricity. Typically, such electricity is provided by a connection to standard house current or, where portability is desired, batteries.

One known inflatable device is illustrated in FIG. **1**. This inflatable device is adapted for use as a mattress and includes a bladder **20** constructed to contain air in the shape of a mattress. The inflatable device also includes a fluid controller **80** connected to bladder **20** comprising a pump adapted to inflate bladder **20** when connected to household electric current. One such pump is described in U.S. Pat. No. 5,267,363, herein incorporated by reference.

SUMMARY

In one embodiment, the application is directed to an inflatable device comprising a substantially fluid impermeable bladder and a fluid controller comprising an electrically powered pump at least partly positioned within the bladder.

In another embodiment, the application is directed to a combination of a fluid controller comprising an electrically powered pump and an inflatable device. The combination comprises the fluid controller connected to the inflatable device such that the exterior profile of the fluid controller and inflated inflatable device in combination is essentially the same as the exterior profile of the inflated inflatable device.

In another embodiment, the application is directed to an inflatable system comprising a substantially fluid impermeable bladder and a fluid controller comprising a pump in fluid communication with the bladder. The fluid controller further comprises a first locking mechanism and an adjustment device including a second locking mechanism sized and adapted to reversibly mate with the first locking mechanism.

In another embodiment, the application is directed to an inflatable device, comprising a substantially fluid impermeable bladder and a fluid controller. The fluid controller comprises an electrically powered pump, a self-sealing valve, and an adjustment device. The adjustment device comprises a first switch electrically connected to the pump and a power source such that the first switch may selectively energize the pump, and a second switch electrically connected to a power source and electro-mechanically connected to a valve of the fluid controller such that it may selectively open the valve.

The term "recess" is defined herein as an indentation. For example, a recess in a bladder may comprise an indentation in a wall of the bladder, in which an object (e.g., a fluid controller) may be located.

The term "profile of a bladder" is defined herein as an outermost outline of the bladder, exclusive of any irregularities. For example, the profile of the bladder **20** is illustrated in FIG. **2** by solid line **14**. The profile excludes any recess in bladder **20** in which fluid controller **80** may be disposed.

BRIEF DESCRIPTION OF DRAWINGS

The foregoing and other advantages of the application will be more fully appreciated with reference to the following drawings in which:

FIG. **1** is a top, plan view of a prior art inflatable device;

FIG. **2** is a top, plan view of an inflatable device according to one embodiment of the application;

FIG. **3** is a perspective, plan view of a fluid controller according to one embodiment of the application;

FIG. **4** is a perspective, plan view of a fluid controller according to another embodiment of the application;

FIG. **5** is a top, cross-sectional view of one embodiment of the application;

FIG. **6** is a side, cross-sectional view of another embodiment of the application;

FIG. **7** is a side, cross-sectional view of another embodiment of the application;

FIG. **8** is a perspective, plan view of another embodiment of the application; and

FIG. **9** is a perspective, plan view of another embodiment of the application.

DETAILED DESCRIPTION

The application is directed to an inflatable device with a recessed fluid controller and modified adjustment device. As used herein, a fluid controller is a device capable of regulating fluid flow and may include various components, such as a housing, valve, fluid conduit, pump, and the like. In one embodiment, the application is directed to an inflatable device including a substantially fluid impermeable bladder and a fluid controller comprising an electrically powered pump at least partly positioned within the bladder. As used herein, an object, such as a fluid controller, that is "positioned within" a bladder occupies a portion of the volume that would normally be occupied by the bladder, but need not be within the wall of the bladder. For example, a fluid controller could be located within a recess in the wall of a bladder and be "positioned within" the bladder, as this term is defined and used herein.

Referring now to the figures, and, in particular FIG. **2**, one embodiment of an inflatable device according to the application will be described by way of example. The embodiment illustrated in FIG. **2** includes an inflatable device **10** having a substantially fluid impermeable bladder **20** and a fluid controller **80** comprising an electrically powered pump at least partly positioned within bladder **20**.

Bladder **20** may be constructed in any manner and of any material(s) capable of retaining a desired fluid under a degree of pressure necessary for its intended application. For example, bladder **20** may be constructed of a substantially fluid impermeable barrier and may be shaped in accordance with its intended use. Where bladder **20** is intended for use as a mattress, bladder **20** may be constructed in the shape and thickness of a conventional mattress.

Bladder **20** may include internal structure, such as ribs or partitions. For example, bladder **20** may be divided into two or more separate fluid containing compartments. Bladder **20** may also include internal structure to control the movement of fluid within bladder **20**. For example, bladder **20** may include baffles or walls within bladder **20** to improve the flow of fluid when bladder **20** is inflated or deflated.

A wall of bladder **20** may be any thickness required to substantially contain a fluid under pressures at which bladder **20** will be used. A thickness of the wall of bladder **20** may depend upon material from which bladder **20** is constructed. For example, more durable or elastic materials may not require the wall of bladder **20** to be as thick as less durable or elastic materials. Typically, the wall of bladder **20** may be 4–16 mils thick for polyvinyl chloride (PVC) film and polyurethane materials.

Bladder **20** may be constructed of any material or materials capable of substantially containing a fluid and forming a bladder **20** strong enough to withstand a pressure at which bladder **20** is to be used. For example, bladder **20** may be constructed of a polymeric material, such as a thermoplastic. Bladder **20** may be constructed from a relatively inexpensive, easy to work with and durable material. Some example materials include polyvinyl chloride (PVC) film and polyester. The manner of making bladder **20** may depend on its material of construction and configuration, as will be recognized by one of ordinary skill in the art.

Bladder **20** may include additional materials to improve the utility and comfort of bladder **20**. For example, bladder **20** may include outer layers or coatings for durability, support or comfort. In some embodiments, bladder **20** may be coated with a material that is more pleasant to the touch than the material from which bladder **20** is constructed. Where inflatable device **10** is for use in supporting a person, bladder **20** may also include a layer to provide additional comfort, particularly where the person is to contact bladder **20**. For example, bladder **20** may include a comfort layer. The comfort layer may be located on any surface of bladder **20** that may come into contact with a user of inflatable device **10**. The comfort layer may improve the texture and feel of bladder **20** and, further, may allow air and moisture to pass between a person and bladder **20**, preventing discomfort.

Fluid controller **80** may be constructed in any manner and using any materials that allow fluid controller **80** to control the flow of fluid into and/or out of bladder **20**. In one embodiment, fluid controller **80** includes a pump **81** that may be constructed in any manner and using any materials that allow it to inflate and/or deflate bladder **20**. For example, as illustrated in FIG. **5**, the pump **81** may be a conventional fluid pump including a motor **84** that drives an impeller **86** moving air into, or out of, bladder **20**. Where the pump includes motor **84**, motor **84** may be powered by electricity. Electricity may be provided by a connection to standard house current or, where portability is desired, by batteries. Other types of pumps, such as diaphragm pumps, may also be used so long as they allow the pump to inflate bladder **20** to within a desired pressure range, which may include a pressure range that can be adjusted by, for example, another fluid pumping device, such as someone blowing into a conventional valve stem within the bladder, a foot pump, and the like.

Fluid controller **80** may direct fluid flow in any manner consistent with its construction. For example, where fluid controller **80** includes a pump **81** with motor **84** and impeller **86**, impeller **86** may draw fluid into, or out of, bladder **20** through a conduit **88**. In some embodiments, conduit **88** may be positioned between motor **84** and a housing **90**, as an annulus. For example, in the embodiment illustrated in FIG. **5**, fluid controller **80** includes a housing **90** that surrounds the inner workings of the pump. Housing **90** may also serve, for example, to protect the inner workings of the pump and to provide a connection between fluid controller **80** and bladder **20**.

Preferably, where a pump is included in fluid controller **80**, the pump is able to inflate bladder **20** in a relatively short time period, such as in less than a minute for an inflatable mattress. The pump may be designed to include an appropriately powerful fluid moving mechanism to achieve a desired pumping time to fill a particular inflatable device. The pump also may be small and consume as little power as possible. Low power consumption is particularly desirable where the pump is to be powered by batteries, as it may extend battery life. The pump may also be configured to be quiet in operation. A balance of pumping capacity, size, power consumption, noise generation and cost may be selected for a particular application as will be recognized by those of skill in the art.

Fluid controller **80** may be constructed of any material or materials that allow it to function as desired. Typical materials of construction of the various components of fluid controller **80** will vary with the nature of fluid controller **80** and any pump and are known to those of skill in the art.

Fluid controller **80** may be connected to bladder **20** in any manner that allows a pump to supply bladder **20** with fluid, inhibits undesired escape of fluid from bladder **20** and does not interfere with the use of bladder **20**. For example, inflatable device **10** may be constructed with at least a portion of fluid controller **80** positioned within bladder **20**. Where fluid controller **80** is positioned at least partially within bladder **20**, fluid controller **80** will not interfere with the use of inflatable device **10**. In one embodiment, the exterior profile (total volume and shape) of the fluid controller and inflated device in combination are essentially the same as the exterior profile of the inflated device absent the combination, thus reducing the opportunity for fluid controller **80** to impact or interfere with the use of inflatable device **10**. For example, where fluid controller **80** is located substantially within bladder **20** in a mattress application, it allows an inflatable standard sized mattress to fit into a standard sized bed frame. Where fluid controller **80** is located within bladder **20**, it may be sized such that it will not come into contact with bladder **20** when bladder **20** is inflated, except at the point(s) of connection.

Where at least a portion of fluid controller **80** is positioned within bladder **20**, it may be comected to bladder **20** in any manner that will not interfere with the use of inflatable device **10** or allow undesired escape of fluid from bladder **20**. For example, bladder **20** may be adhered or sealed to a

portion of fluid controller **80**, such as with an adhesive or heat seal. In one embodiment, an outlet **120** (illustrated in FIG. **8**) of fluid controller **80** is sealed to bladder **20**.

Fluid controller **80** may include structure to facilitate connection to bladder **20**. for example, fluid controller **80** may include a portion adapted to connect to bladder **20**, such as a flange **82** as illustrated in FIGS. **3**–**5**. Flange **82** may, for example, extend from housing **90** or may be a separate component connected to housing **90**. As best seen in FIG. **5**, flange **82** may include additional structure, such as a fluid impermeable wall **83**, that may allow it to perform other functions in fluid controller **80** in addition to providing a connection point for bladder **20**. Where flange **82** is connected to housing **90**, it may be connected anywhere and in any manner that allows it to fluid tightly connect fluid controller **80** and bladder **20**. For example, where flange **82** includes a fluid impermeable wall **83**, flange **82** may be connected to housing **90** at or near outlet **120** from housing **90**.

Flange **82** may be constructed of any material that allows it to durably and fluid tightly connect fluid controller **80** to bladder **20**. For example, flange **82** may be constructed of a material that is more flexible than housing **90**, but less flexible than bladder **20**, bridging the flexibility gap between the two structures and resulting in a durable seal that may be performed, for example, by heat sealing. One example of a suitable material of construction of flange **82** is PVC. The thickness of flange **82** may also affect its flexibility, with thinner flanges generally being more flexible than thicker flanges. Thus the thickness of flange **82** may be selected to provide a desired flexibility with a given material.

Where flange **82** connects to housing **90** or another portion of fluid controller **80**, it is preferred that such connection be reversible. For example flange **82** may snap or screw together with another portion of fluid controller **80**. Additional structure may be included to promote a fluid seal between flange **82** and the remainder of fluid controller **80**. For example, a seal, such as an o-ring, may be placed between flange **82** and the remainder of fluid controller **80**. It is also possible to construct the inflatable device such that bladder **20** and fluid controller **80** are reversibly connected, rather than two portions of fluid controller **80** being reversibly connected. In either case, the reversible connection allows the removal of portions of fluid controller **80** for repair or replacement, preventing the entire inflatable device from having to be disposed of in the event of a failure of one component.

Bladder **20** may also include structure to facilitate the connection between bladder **20** and fluid controller **80**. For example, bladder **20** may have a portion constructed to facilitate connection of fluid controller **80** to bladder **20**, such as a retainer **22** as illustrated in FIGS. **7** and **13**. Retainer **22** may be constructed in any manner that will facilitate connection between bladder **20** and fluid controller **80**, such as by mechanically supporting fluid controller **80**. For example, retainer **22** may be constructed as a strap positioned across fluid controller **80**.

It will now be clear that fluid controller **80** may be positioned within bladder **20** in a variety of ways. For example, fluid controller **80** may include a flange **82** that positions it at least partially within bladder **20**. The size and shape of flange **82** may be selected to control the portion of pump **81** that is positioned within bladder **20**. Alternatively, bladder **20** may include a recess and fluid controller **80** may be positioned within the recess and attached to bladder only at a pump outlet, or at other locations within the recess.

Fluid controller **80** may be operated by any conventional control mechanism, such as a conventional power switch. Fluid controller **80** may also include a structure for controlling fluid controller **80**, such a as an adjustment device **100**. Adjustment device **100** may be separate or separable from fluid controller **80** to allow fluid controller **80** to be controlled remotely. In one embodiment, adjustment device **100** is a hand-held device for controlling fluid controller **80**.

Adjustment device **100** may include structure for controlling the operation of fluid controller **80**. For example, adjustment device **100** may include a conventional power switch **102** that energizes and de-energizes a pump within fluid controller **80**. Switch **102** may be any of the many well-known mechanisms for selectively connecting two conductors to supply electricity to a point of use. Switch **102** may allow the pump to be energized such that it inflates bladder **20**. Adjustment device **100** may also include structure that directs the deflation of bladder **20**. For example, a second switch may reverse the direction of the pump to deflate bladder **20**. In some embodiments, fluid controller **80** may incorporate a valve which must be opened to allow deflation of bladder **20**. In these embodiments, adjustment device **100** may also include structure to mechanically or electro-mechanically open a valve to allow deflation of bladder **20**. For example, a switch **106** may act upon a mechanical opening mechanism or activate a solenoid **104** to open a valve, such as valve **122**, and allow deflation of bladder **20**. In one embodiment, the valve that is opened is a self-sealing valve, meaning that it is held closed, at least in part, by pressure within bladder **20**. For example, a self sealing valve may include a diaphragm **124** that is urged against a valve seat **126** by fluid pressure from within bladder **20**. Optionally, switch **106** may also energize the pump to withdraw fluid from bladder **20**.

In one embodiment, adjustment device **100** is connectable to fluid controller **80**. In this embodiment, adjustment device **100** may be connected to fluid controller **80** at a conveniently located position such that it is easily found, particularly when inflatable device **10** is in use. For example, where inflatable device **10** is a bed, fluid controller **80** may be located at the head of the bed such that adjustment device **100** may be connected thereto for easy access when the bed is in use. Any control elements on adjustment device **100**, such as switches **102**, **106** or a button **108** may be located on adjustment device **100** for easy access. For example, the control elements may be located on a top portion of adjustment device **100**, as illustrated in FIG. **4**. Attachment of adjustment device **100** to fluid controller **80** may also facilitate deflation of bladder **20** with adjustment device **100**. For example, where a valve must be opened to deflate bladder **20**, adjustment device **100** may be in mechanical communication with fluid controller **80** to disengage the valve. In one embodiment, a button **108** on adjustment device **100** may be in mechanical communication with fluid controller **80** to open a valve.

The connection between adjustment device **100** and fluid controller **80** may be secure. For example, in one embodiment, adjustment device **100** reversibly locks to fluid controller **80**. Where adjustment device **100** locks to fluid controller **80**, adjustment device **100** and fluid controller **80** may include mating locking mechanisms **110**, **112**. Locking mechanisms **110** and **112** may be constructed in any manner and using any material(s) that allow locking mechanisms **110**, **112** to reversibly lock together. By "lock" it is meant that two mechanisms fit together in such a way that a force must be overcome to separate them. In one embodiment, one locking mechanism **110** includes one or more spring latches

114 that mate with impressions 116 in other locking mechanism 112. Either locking mechanism 110, 112 may be located on either of adjustment device 100 or fluid controller 80.

Having thus described certain embodiments of the inflatable device of the application, various alterations, modifications and improvements will be apparent to those of ordinary skill in the art. Such alterations, variations and improvements are intended to be within the spirit and scope of the application. Accordingly, the foregoing description is by way of example and is not intended to be limiting. The application is limited only as defined in the following claims and the equivalents thereto.

What is claimed is:

1. An inflatable device, comprising:
- a substantially fluid impermeable bladder; and
- a fluid controller comprising an electrically powered pump, the pump being disposed at least partially within a profile of the bladder, and the fluid controller being coupled to the inflatable bladder in a position, and in the position the fluid controller being adapted to permit air to exit the bladder through the fluid controller and to be provided to the bladder through the fluid controller; and
- wherein the fluid controller is permanently coupled to the bladder.

2. The inflatable device of claim 1, wherein the fluid controller is constructed and arranged such that a majority of the fluid controller is positioned within the profile of the bladder.

3. The inflatable device of claim 2, wherein the fluid controller is constructed and arranged such that substantially all of the fluid controller is positioned within the profile of the bladder.

4. The inflatable device of claim 1, wherein the fluid controller comprises a housing.

5. The inflatable device of claim 4, wherein the housing comprises a flange impermeably connected to the bladder.

6. The inflatable device of claim 1, wherein the fluid controller comprises a flange impermeably connected to the bladder.

7. The inflatable device of claim 6, wherein the flange comprises a fluid impermeable wall that connects to a housing of the inflatable device.

8. The inflatable device of claim 7, wherein the flange is in contact with the housing at an outlet of the housing.

9. The inflatable device of claim 6, wherein a remainder of the fluid controller is constructed and arranged to be removable from the flange.

10. The inflatable device of claim 1, wherein the fluid controller comprises a first locking mechanism and an adjustment device including a second locking mechanism sized and adapted to mate with the first locking mechanism.

11. The inflatable device of claim 10, wherein the adjustment device further comprises:
- a first switch electrically connected to the pump and a power source such that the first switch may selectively energize the pump; and
- a second switch mechanically connected to a valve of the fluid controller such that it may selectively open the valve;
- wherein the first switch and second switch are in fixed proximity to one another.

12. The inflatable device of claim 11, wherein the adjustment device further comprises a top portion and the first switch and the second switch are positioned on the top portion.

13. The inflatable device of claim 1, further comprising an adjustment device, including:
- a first switch electrically connected to the pump and a power source such that the first switch may selectively energize the pump; and
- a second switch electrically connected to a power source and electro-mechanically connected to a valve of the fluid controller such that it may selectively open the valve.

14. The inflatable device of claim 13, wherein the electro-mechanical connection comprises a solenoid.

15. The inflatable device of claim 1, wherein the fluid controller comprises a valve and a member connected to the valve that moves the valve between an open and a closed position.

16. The inflatable device of claim 15, wherein the member is adapted to be actuated by a switch on an adjustment device.

17. The inflatable device of claim 6, wherein the flange comprises a recess.

18. The inflatable device of claim 1, wherein a recess is formed by the fluid controller.

19. The inflatable device of claim 1, wherein the pump is at least partially positioned within a recess in the wall of the bladder.

20. The inflatable device of claim 1, wherein the pump is entirely external to the bladder.

21. The inflatable device of claim 1, wherein the pump is externally accessible.

22. The inflatable device of claim 1, further comprising a flange impermeably connected to the bladder, the flange forming a recess, wherein the pump is at least partially positioned within the profile of the bladder.

23. The inflatable device of claim 1, wherein the pump is at least partially external to the bladder.

24. The inflatable device of claim 1, wherein the bladder is shaped and sized so as to form a mattress.

25. The inflatable device of claim 1, wherein the fluid controller comprises a valve through which the air exits the bladder.

26. An inflatable system, comprising:
- a substantially fluid impermeable bladder; and
- a fluid controller comprising:
  - a pump in fluid communication with the bladder through a valve and comprising a first locking mechanism; and
  - an adjustment device including a first switch mechanically connected to the valve and adapted to mechanically actuate the valve, and a second locking mechanism sized and adapted to mate with the first locking mechanism; and
- wherein the pump is an electrically powered pump and wherein substantially all of the fluid controller is positioned within the profile of the bladder.

27. The inflatable system of claim 26, wherein the adjustment device further comprises:
- a top portion;
- a second switch having a first position and a second position, positioned on the top portion and electrically connected to the pump and a power source; and
- wherein the first switch is positioned on the top portion.

28. The inflatable system of claim 26 wherein the bladder includes a recess sized and configured to accommodate at least a portion of the fluid controller.

29. The inflatable system of claim 26, wherein the fluid controller includes a housing and the housing includes a flange that connects to the bladder.

30. The inflatable system of claim 26, wherein the bladder is shaped and sized so as to form a mattress.

31. An inflatable device, comprising:

a substantially fluid impermeable bladder;

a fluid controller comprising:

an electrically powered pump, and

a self-sealing valve; and

an adjustment device, comprising:

a first switch electrically connected to the pump and an at least one power source such that the first switch may selectively energize the pump, and

a second switch electrically connected to the at least one power source and electro-mechanically connected to the self-sealing valve of the fluid controller, such that it may selectively open the self-sealing valve.

32. The inflatable device of claim 31, wherein the electro-mechanical connection comprises a solenoid.

33. The inflatable device of claim 31, wherein the bladder is shaped and sized so as to form a mattress.

34. An inflatable device, comprising:

an inflatable bladder; and

a fluid controller including an electrically powered pump, the fluid controller being at least partially positioned within a profile of the bladder such that the exterior profile of the fluid controller and inflatable bladder in combination is essentially the same as the exterior profile of the inflatable bladder, at least a portion of the fluid controller that is positioned within the profile of the bladder being accessible from the exterior of the bladder, and the fluid controller being adapted to permit exhaustion of air from the bladder through the fluid controller; and

wherein the fluid controller is permanently connected to the bladder.

35. An inflatable device, comprising:

an inflatable bladder; and

a fluid controller including an electrically powered pump, the fluid controller being at least partially positioned within a profile of the bladder such that the exterior profile of the fluid controller and inflatable bladder in combination is essentially the same as the exterior profile of the inflatable bladder, at least a portion of the fluid controller that is positioned within the profile of the bladder being accessible from the exterior of the bladder, and the fluid controller being adapted to permit exhaustion of air from the bladder through the fluid controller; and

wherein the fluid controller comprises:

a valve, and

a user interface mechanically coupled to the valve, the user interface being adapted to permit a user to mechanically manipulate the valve.

36. An inflatable device, comprising:

an inflatable bladder; and

a fluid controller including an electrically powered pump, the fluid controller being at least partially positioned within a profile of the bladder such that the exterior profile of the fluid controller and inflatable bladder in combination is essentially the same as the exterior profile of the inflatable bladder, at least a portion of the fluid controller that is positioned within the profile of the bladder being accessible from the exterior of the bladder, and the fluid controller being adapted to permit exhaustion of air from the bladder through the fluid controller; and

wherein the pump is at least partially accessible from the exterior of the bladder.

37. An inflatable device, comprising:

an inflatable bladder; and

a fluid controller including an electrically powered pump, the fluid controller being at least partially positioned within a profile of the bladder such that the exterior profile of the fluid controller and inflatable bladder in combination is essentially the same as the exterior profile of the inflatable bladder, at least a portion of the fluid controller that is positioned within the profile of the bladder being accessible from the exterior of the bladder, and the fluid controller being adapted to permit exhaustion of air from the bladder through the fluid controller; and

wherein the pump is at least partially accessible from the exterior of the bladder.

38. An inflatable device, comprising:

an inflatable bladder; and

a fluid controller including an electrically powered pump, the fluid controller being at least partially positioned within a profile of the bladder such that the exterior profile of the fluid controller and inflatable bladder in combination is essentially the same as the exterior profile of the inflatable bladder, at least a portion of the fluid controller that is positioned within the profile of the bladder being accessible from the exterior of the bladder, and the fluid controller being adapted to permit exhaustion of air from the bladder through the fluid controller; and

wherein the bladder forms a mattress.

39. An inflatable device, comprising:

an inflatable bladder; and

a fluid controller including an electrically powered pump, the fluid controller being at least partially positioned within a profile of the bladder such that the exterior profile of the fluid controller and inflatable bladder in combination is essentially the same as the exterior profile of the inflatable bladder, at least a portion of the fluid controller that is positioned within the profile of the bladder being accessible from the exterior of the bladder, and the fluid controller being adapted to permit exhaustion of air from the bladder through the fluid controller; and

wherein the fluid controller comprises a valve through which the air exits the bladder.

40. An inflatable device, comprising:

a substantially fluid-impermeable bladder; and

a fluid controller comprising an electrically powered pump, the fluid controller being permanently connected to the bladder, and the fluid controller being at least partially positioned within a profile of the bladder such that the external profile of the fluid controller and bladder in combination is essentially the same as the exterior profile of the bladder alone, at least a portion of the fluid controller being accessible from the exterior of the bladder, and the fluid controller being adapted to permit exhaustion of air from the bladder through the fluid controller; and

wherein the fluid controller comprises a valve through which the air exits the bladder.

* * * * *

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(12)实用新型专利

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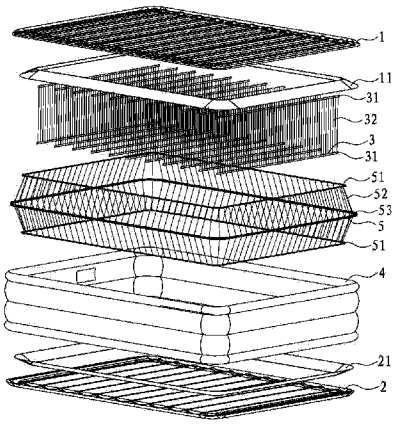
权利要求书1页 说明书3页 附图7页

(54)实用新型名称

充气产品气室斜拉固定结构

(57)摘要

本实用新型公开了一种充气产品气室斜拉固定结构，其包括一上片、一下片、复数个拉带及一围片，各拉带的两端是分别连接于上片的下表面及下片的上表面，同时围片的上下边分别与上片的周缘及下片的周缘连接后构成一具有充气室的充气产品；其中还包括有侧围拉带，侧围拉带的一端是连接于围片内表面的中部，另一端是连接于上片近周缘的下表面或下片近周缘的上表面上。通过设置的侧围拉带连接充气产品围片的中部与上片或/和下片，实现对具有较高高度的充气产品的围片中部达到一牵引限位作用，不仅防止围片外凸较多而影响产品的强度及美观，而且有效降低了产品材料成本及制作成本。



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1. 一种充气产品气室斜拉固定结构，其包括一上片、一下片、复数个拉带及一围片，各拉带的两端是分别连接于上片的下表面及下片的上表面，同时围片的上下边分别与上片的周缘及下片的周缘连接后构成一具有充气室的充气产品；其特征在于：还包括有侧围拉带，侧围拉带的一端是连接于围片内表面的中部，另一端是连接于上片近周缘的下表面或下片近周缘的上表面上。

2. 如权利要求 1 所述的充气产品气室斜拉固定结构，其特征在于：所述侧围拉带为一整体的环形拉带，其由两端的环形塑胶片条连接复数根线体构成，其中在复数根线体的中部再固定有一塑胶片条，侧围拉带两端的环形塑胶片条是分别连接上片与下片，而中部的塑胶片条是连接于围片内表面的中部。

3. 如权利要求 1 所述的充气产品气室斜拉固定结构，其特征在于：所述侧围拉带为一整体的环形拉带，其由两端的环形塑胶片条连接复数根线体构成，此侧围拉带一端的塑胶片条连接于围片内表面的中部，另一端是连接于上片与下片上。

4. 如权利要求 1、2 或 3 所述的充气产品气室斜拉固定结构，其特征在于：所述的各拉带为对应床体宽度或长度的带体，拉带是由两端的塑胶片条连接复数根线体构成，两端的塑胶片条分别与上片及下片焊接。

5. 如权利要求 4 所述的充气产品气室斜拉固定结构，其特征在于：所述上片与围片及下片与围片之间还分别设有一环形上吸地片及一环形下吸地片，即上片通过环形上吸地片与围片的上周缘连接在一起，而下片通过环形下吸地片与围片的下周缘连接在一起。

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充气产品气室斜拉固定结构

技术领域

[0001] 本实用新型是关于一种充气产品结构，特别是指一种充气产品气室斜拉加固结构。

背景技术

[0002] 充气产品，如充气床具有易使用、重量轻容易移动，及收藏携带方便的特性，使得其作为临时性或是非固定式的床体使用时是相当适宜的选择。而充气后床体厚度较小的充气床一般均是户外使用较多，若要增进充气床的舒适性以媲美家庭使用的床铺时，充气床充气后的厚度则必须如一般床铺的高度，且要保证床面的平整，同时结构亦必须较稳固。

[0003] 配合图 1 所示，具有床铺高度的充气床，为防止床周外凸较大及支撑力度，以及充气腔内定型强度，通常是采用两个独立气室 A、B 叠加而成，即需要设置中层片体 C，由两个独立围带分别连接此中层片体 C 及上下片体构成两个充气腔，在两充气腔内分别设置拉带组以形成床体造型。如此结构必然存在如下缺点 ；

[0004] 1、材料成本高，由于中层片体的设置是便于定型及提高床体的功能，该中层片体的设置不仅增加了材料的需求量，同时亦增加了床体的重量。

[0005] 2、两个独立气腔内的拉带需分别焊接，无形中增加了床体制作的繁琐，因而制作成本亦居高不下。

实用新型内容

[0006] 本实用新型的目的是提供一种充气产品气室斜拉固定结构，其在保证产品高度、强度的同时防止产品周缘外凸过多而影响产品的美观性，并可有效减少材料成本及制作成本。

[0007] 为实现上述目的，本实用新型的解决方案是 ：

[0008] 一种充气产品气室斜拉固定结构，其包括一上片、一下片、复数个拉带及一围片，各拉带的两端是分别连接于上片的下表面及下片的上表面，同时围片的上下边分别与上片的周缘及下片的周缘连接后构成一具有充气室的充气产品 ；其中 ：还包括有侧围拉带，侧围拉带的一端是连接于围片内表面的中部，另一端是连接于上片近周缘的下表面或下片近周缘的上表面上。

[0009] 所述侧围拉带为一整体的环形拉带，其由两端的环形塑胶片条连接复数根线体构成，其中在复数根线体的中部再固定有一塑胶片条，侧围拉带两端的环形塑胶片条是分别连接上片与下片，而中部的塑胶片条是连接于围片内表面的中部。

[0010] 所述侧围拉带为一整体的环形拉带，其由两端的环形塑胶片条连接复数根线体构成，此侧围拉带一端的塑胶片条连接于围片内表面的中部，另一端是连接于上片与下片上。

[0011] 所述的各拉带为对应床体宽度或长度的带体，拉带是由两端的塑胶片条连接复数根线体构成，两端的塑胶片条分别与上片及下片焊接。

[0012] 所述上片与围片及下片与围片之间还分别设有一环形上吸地片及一环形下吸地

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片，即上片通过环形上吸地片与围片的上周缘连接在一起，而下片通过环形下吸地片与围片的下周缘连接在一起。

[0013] 采用上述方案后，本实用新型通过设置的侧围拉带连接充气产品围片的中部与上片或 / 和下片，实现对具有较高高度的充气产品的围片中部达到一牵引限位作用，不仅防止围片外凸较多而影响产品的强度及美观，而且有效降低了产品材料成本及制作成本。

附图说明

[0014] 图 1 为习用品的立体外观图；

[0015] 图 2 为本实用新型实施例 1 的立体分解图；

[0016] 图 3 为本实用新型实施例 1 的外观示意图；

[0017] 图 4 为本实用新型实施例 1 的局部剖视示意图；

[0018] 图 5 为本实用新型实施例 2 的立体分解图；

[0019] 图 6 为本实用新型实施例 2 的外观示意图；

[0020] 图 7 为本实用新型实施例 2 的局部剖视示意图。

具体实施方式

[0021] 配合图 2 至图 7 所示，本实用新型揭示了一种充气产品气室斜拉固定结构，特别是针对矩形的充气产品，其包括一上片 1、一下片 2、复数个拉带 3 及一围片 4，还包括有侧围拉带 5，各拉带 3 的两端是分别连接于上片 1 的下表面及下片 2 的上表面，同时围片 4 的上下边分别与上片 1 的周缘及下片 2 的周缘连接后，便构成一具有充气室的充气产品，而侧围拉带 5 的一端是连接于围片 4 内表面的中部，另一端是连接于上片 1 近周缘的下表面或下片 2 近周缘的上表面上。

[0022] 以下充气产品是以充气床为例进行说明，并不局限于充气床。

[0023] 如图 2、3、4 所示的本实用新型实施例 1，其中的各拉带 3 为对应床体宽度或长度的带体，拉带 3 是由两端的塑胶片条 31 连接复数根线体 32 构成，塑胶片条 31 用于与上片 1 及下片 2 的焊接，而线体 32 承拉较强的牵引力；而侧围拉带 5 为一整体的环形拉带，其由两端的环形塑胶片条 51 连接复数根线体 52 构成，其中在复数根线体 52 的中部再固定有一塑胶片条 53，如此侧围拉带 5 两端的环形塑胶片条 51 是分别连接上片 1 与下片 2，而中部的塑胶片条 53 是连接于围片 4 内表面的中部。

[0024] 此处侧围拉带 5 的设置是令围片 4 的中部进一步受到牵制，使其内凹，以保证具有较高高度并具一个充气腔的充气床其周缘的美观性，以防止周缘外凸较多，同时保证床体周缘的强度及床体整体的支撑强度。

[0025] 为提高床体的美观性，在上片 1 与围片 4 及下片 2 与围片 4 之间还分别设有一环形上吸地片 11 及一环形下吸地片 21，即上片 1 通过环形上吸地片 11 与围片 4 的上周缘连接在一起，而下片 2 通过环形下吸地片 21 与围片 4 的下周缘连接在一起。

[0026] 如图 5、6、7 所示的本实用新型的实施例 2，其中的各拉带 3 同样为对应床体宽度或长度的带体，拉带 3 同样是由两端的塑胶片条 31 连接复数根线体 32 构成，塑胶片条 31 用于与上片 1 及下片 2 的焊接，而线体 32 承接较强的牵引力；而侧围拉带 5 为一整体的环形拉带，其由两端的环形塑胶片条 51 连接复数根线体 52 构成，此侧围拉带 5 一端的塑胶片条

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51 连接于围片 4 内表面的中部，另一端是连接于上片 1 与下片 2 上，如此防止具有较高高度并具一个充气腔的充气床其周缘外凸较大，保证床体周缘的强度及床体整体的支撑强度。

[0027] 同样为提高床体的美观性，在上片 1 与围片 4 及下片 2 与围片 4 之间还分别设有一环形上吸地片 11 及一环形下吸地片 21，即上片 1 通过环形上吸地片 11 与围片 4 的上周缘连接在一起，而下片 2 通过环形下吸地片 21 与围片 4 的下周缘连接在一起。

[0028] 此处需说明的是，上述实施例 1、2 的拉带 3 及侧围拉带 5 并不局限于此塑胶片条与复数根线体的结构，亦可采用整体塑胶片的线性拉带或柱状拉带同样可以实施，只要其可满足充气产品内压的要求即可。

[0029] 综上所述，本实用新型通过设置连接充气产品围片 4 的中部与上片 1 或 / 和下片 2，实现对具有较高高度的充气产品围片 4 中部达到一牵引限位作用，不仅防止围片外凸较多而影响产品的强度及美观，而且有效降低了产品材料成本及制作成本。

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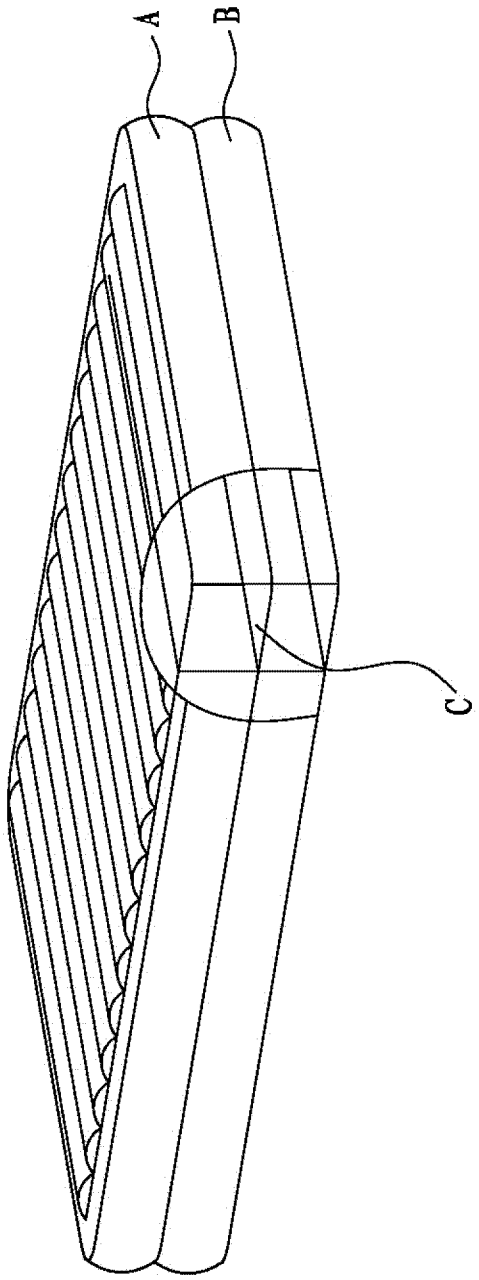


图 1

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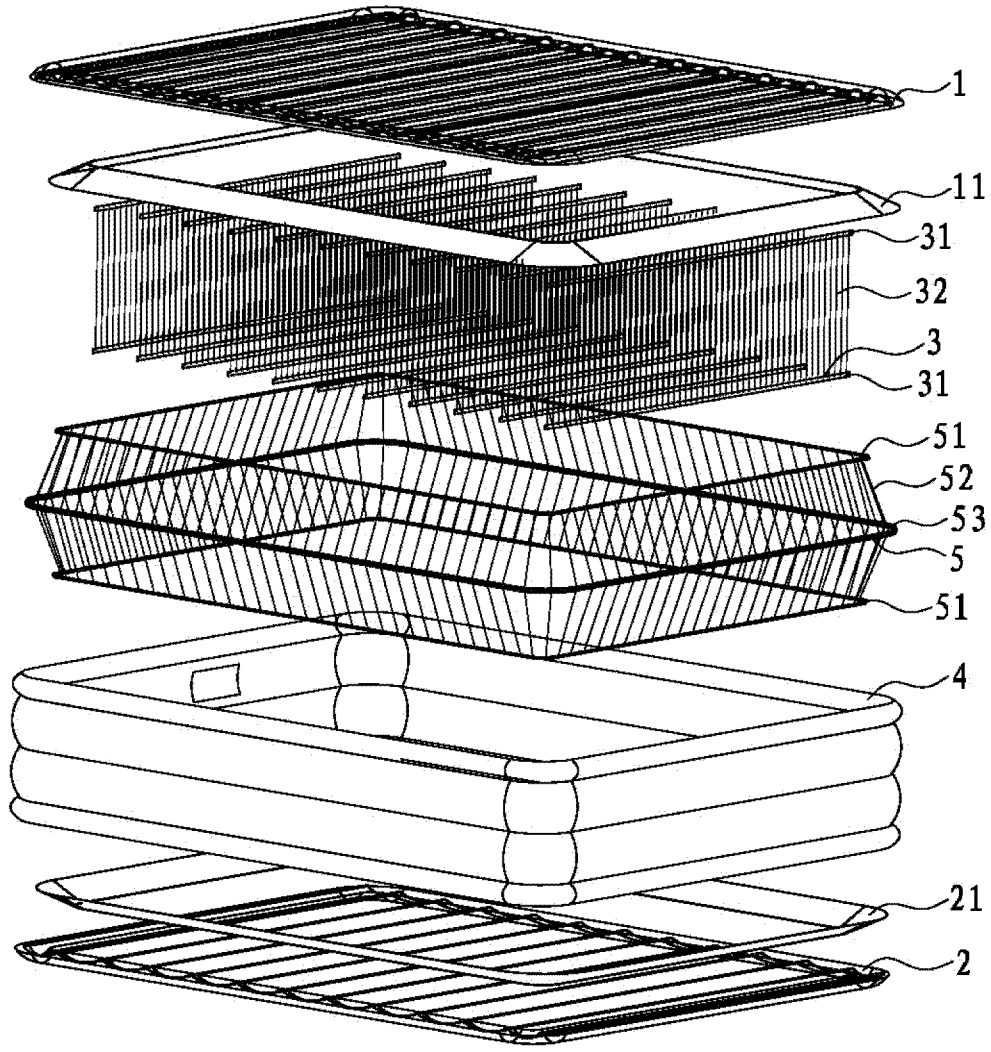


图 2

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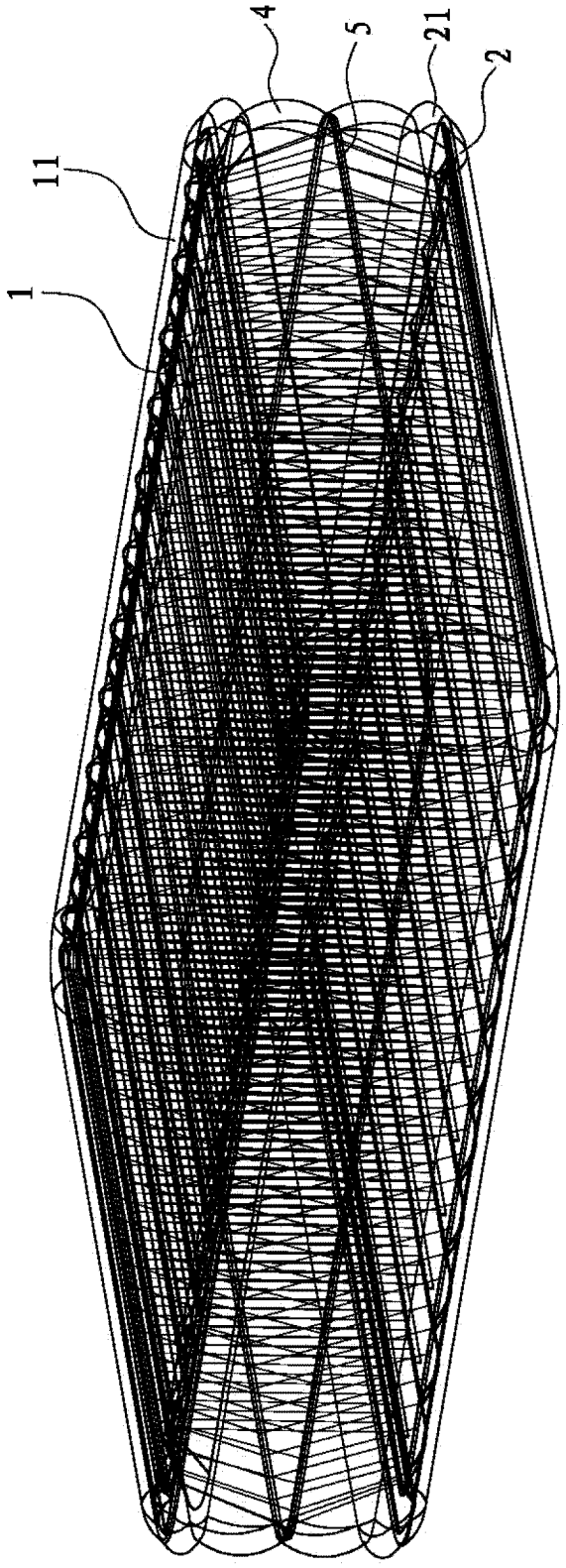


图 3

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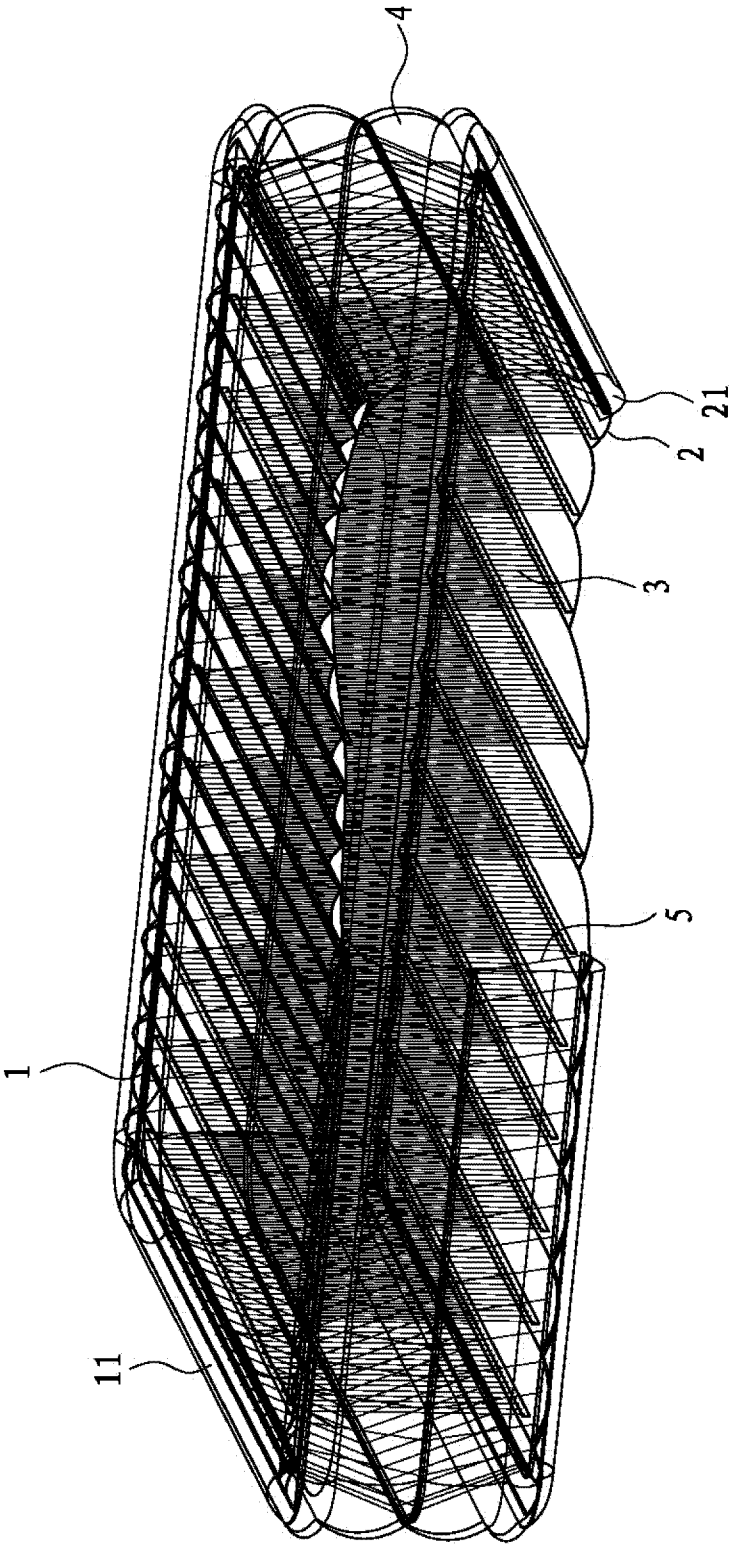


图 4

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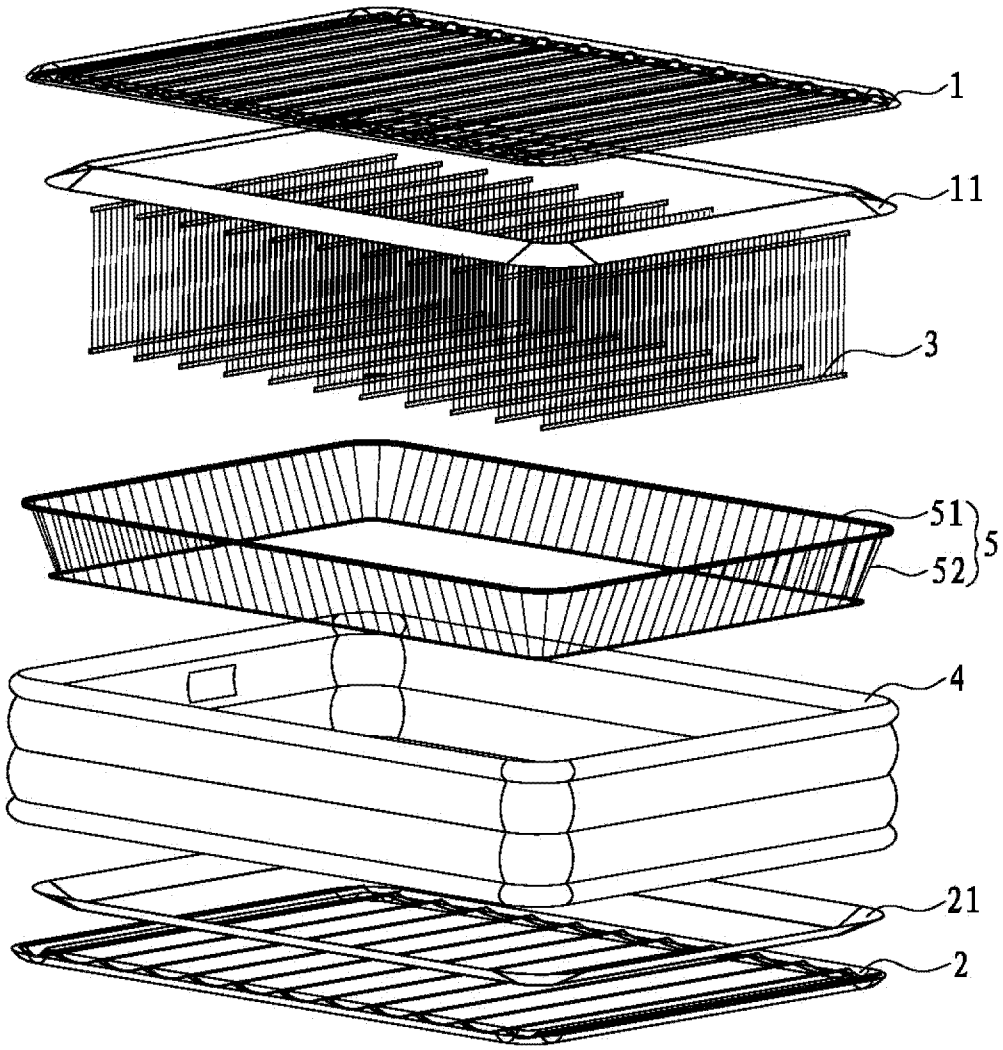


图 5

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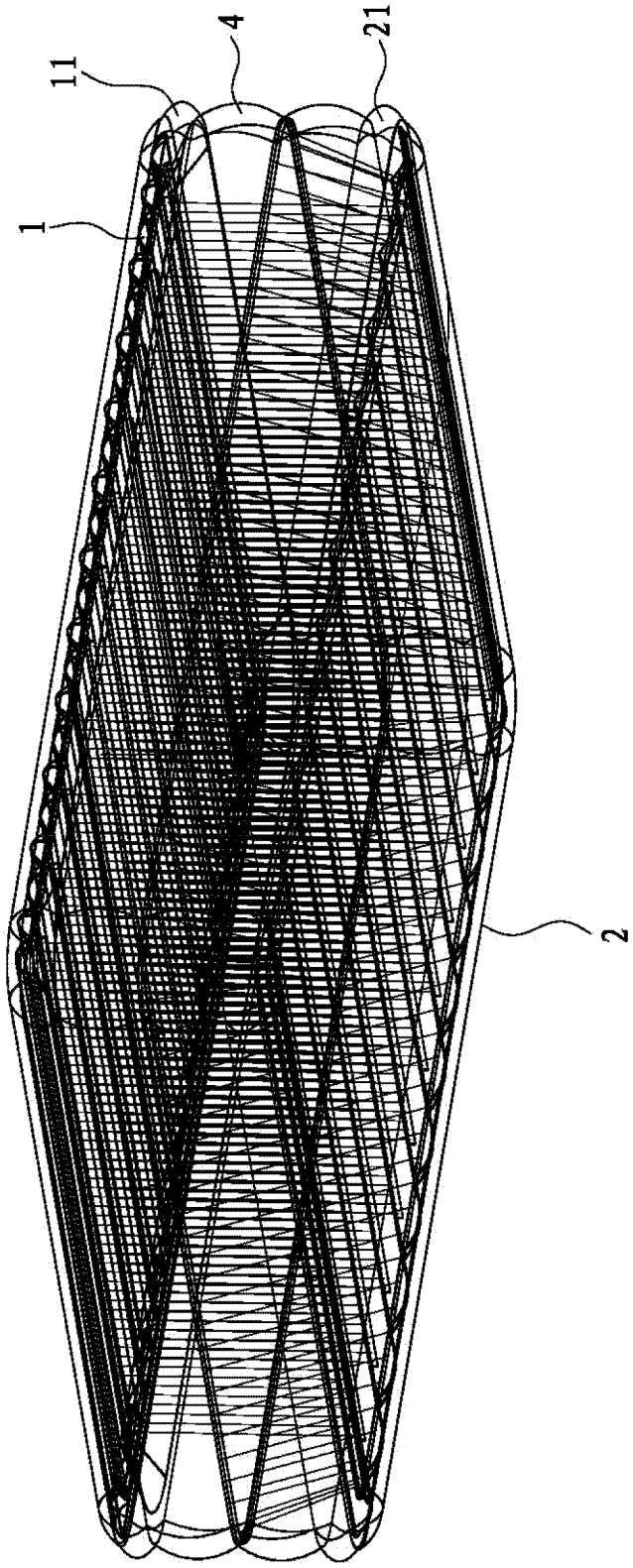


图 6

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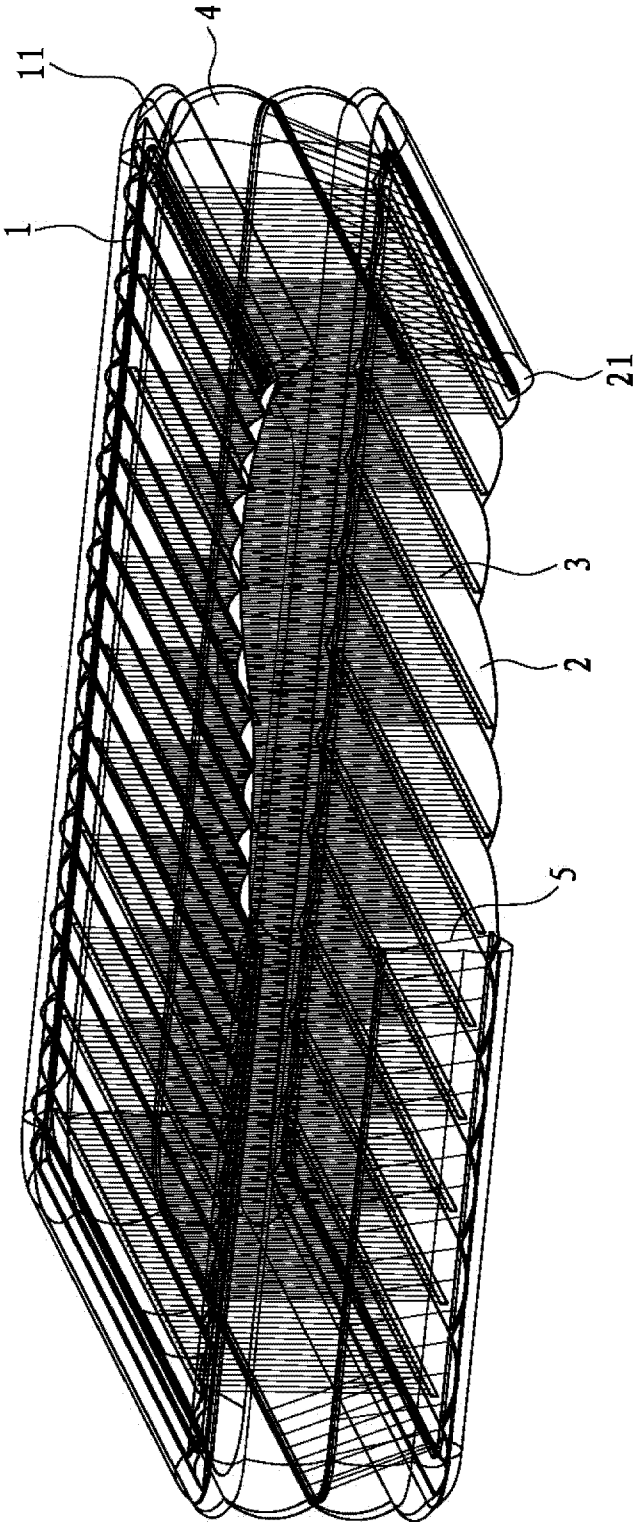


图 7

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(54) **MULTI-CHAMBER INFLATABLE DEVICE**

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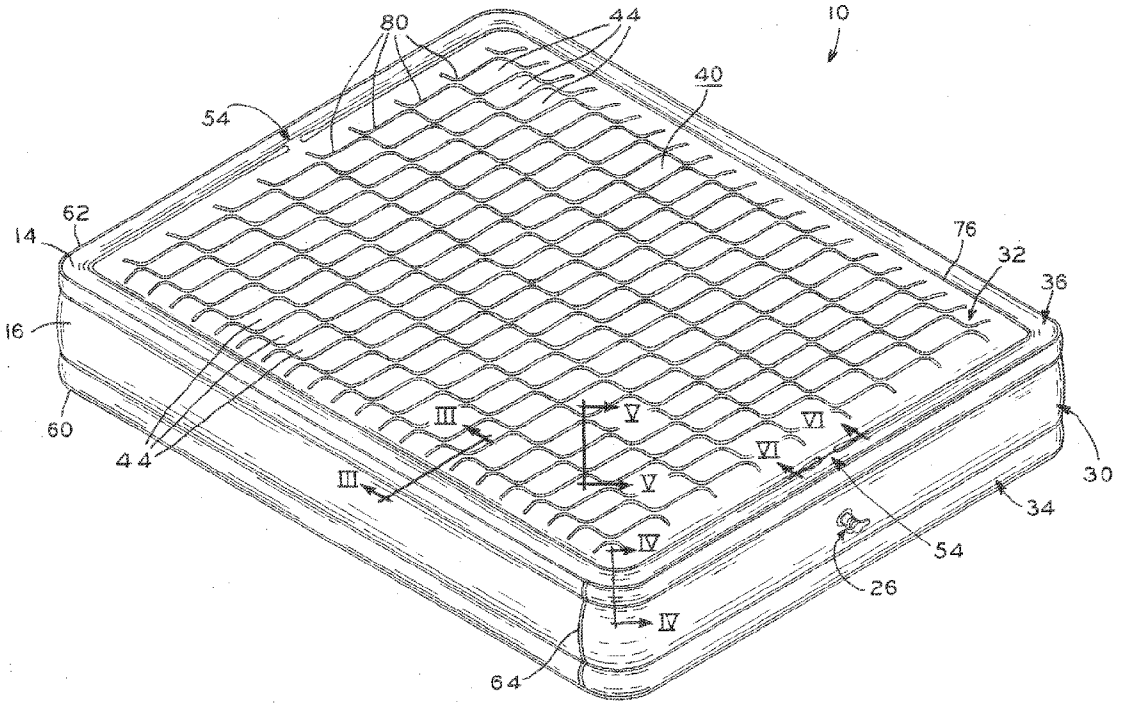
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(52) **U.S. Cl.**

CPC ***A47C 27/10*** (2013.01); ***A47C 27/081*** (2013.01)

(57) **ABSTRACT**

A multi-chamber inflatable mattress includes a main air chamber, upper and lower peripheral air chambers, and an upper air chamber. The main air chamber includes internal tensioning structures which cooperate with a bottom mattress panel and a lower intermediate panel to provide a generally box-shaped, mattress-sized inflatable structure upon pressurization. A second, upper intermediate panel cooperates with a top mattress panel to define an upper air chamber which defines the sleeping surface. The main air chamber receives pressurized fluid directly from a valve, while the lower and upper peripheral air chambers are in direct fluid communication with the main air chamber but not the valve. The upper air chamber is in direct fluid communication with the upper peripheral air chamber, but not the main chamber or valve.



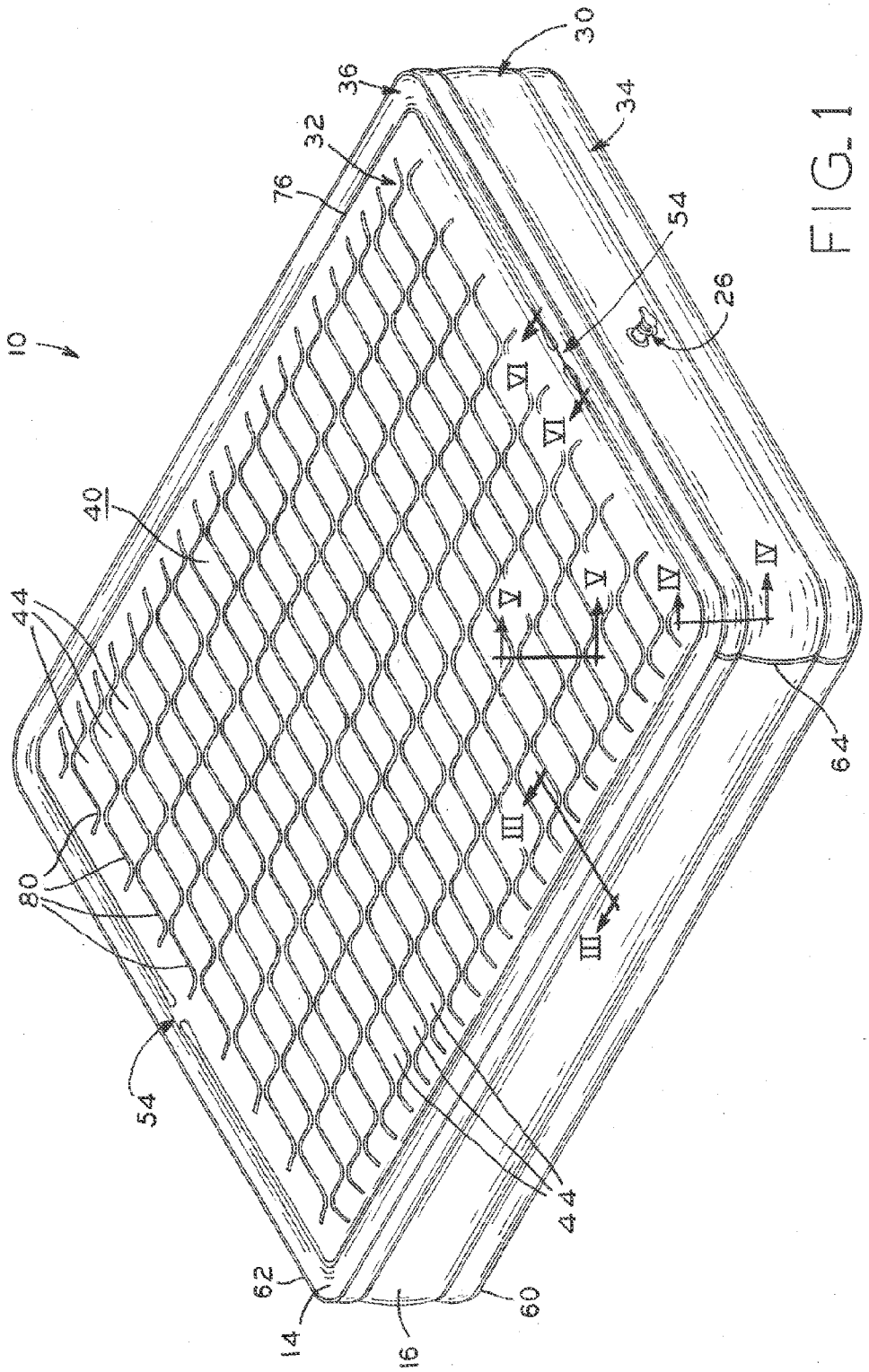


FIG. 1

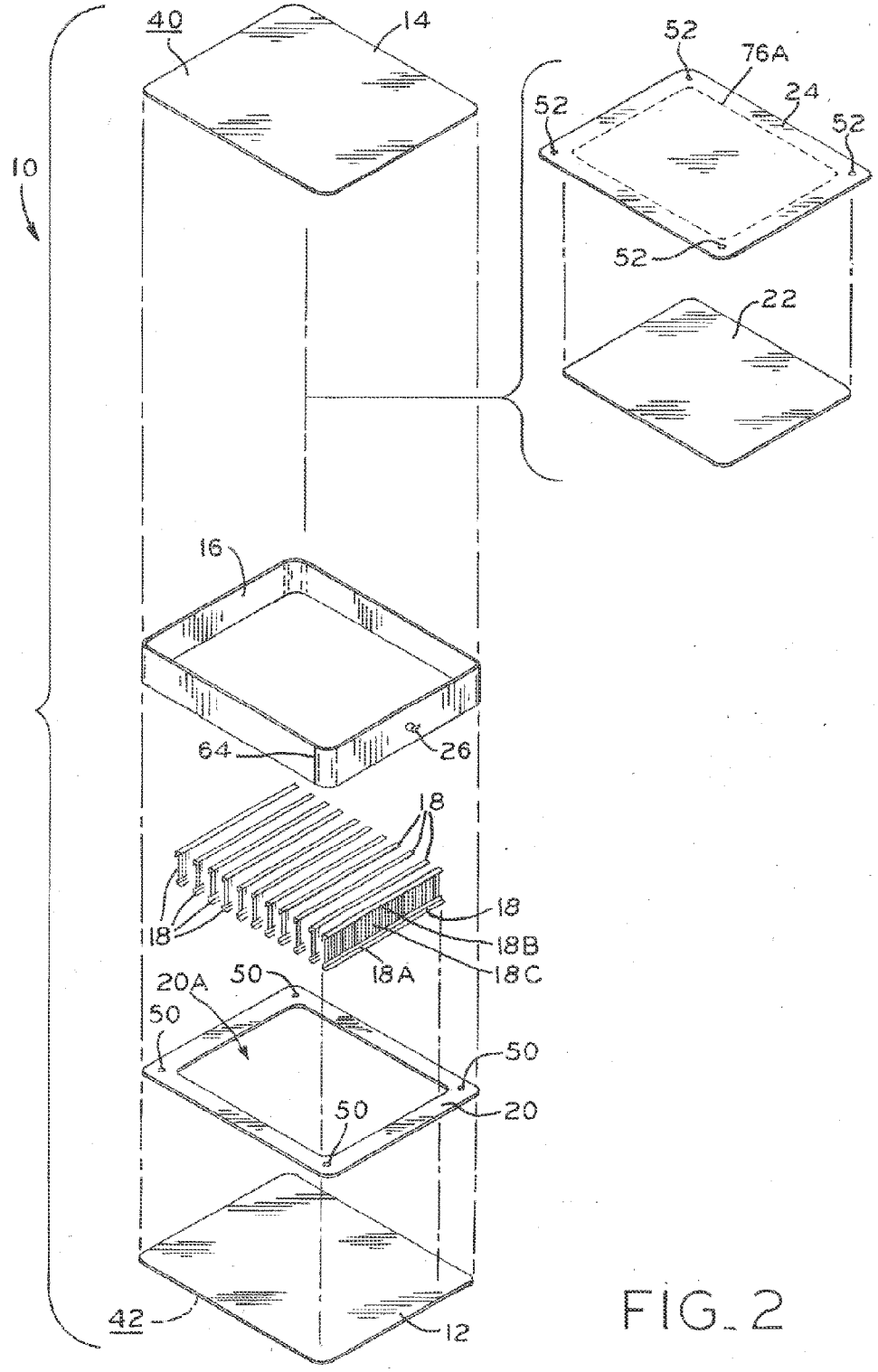

40
14
10
52
76A
24
52
52
52
22
16
64
26
18
18
18
18B
18A
18C
20A
50
50
50
50
20
42
12

FIG. 2

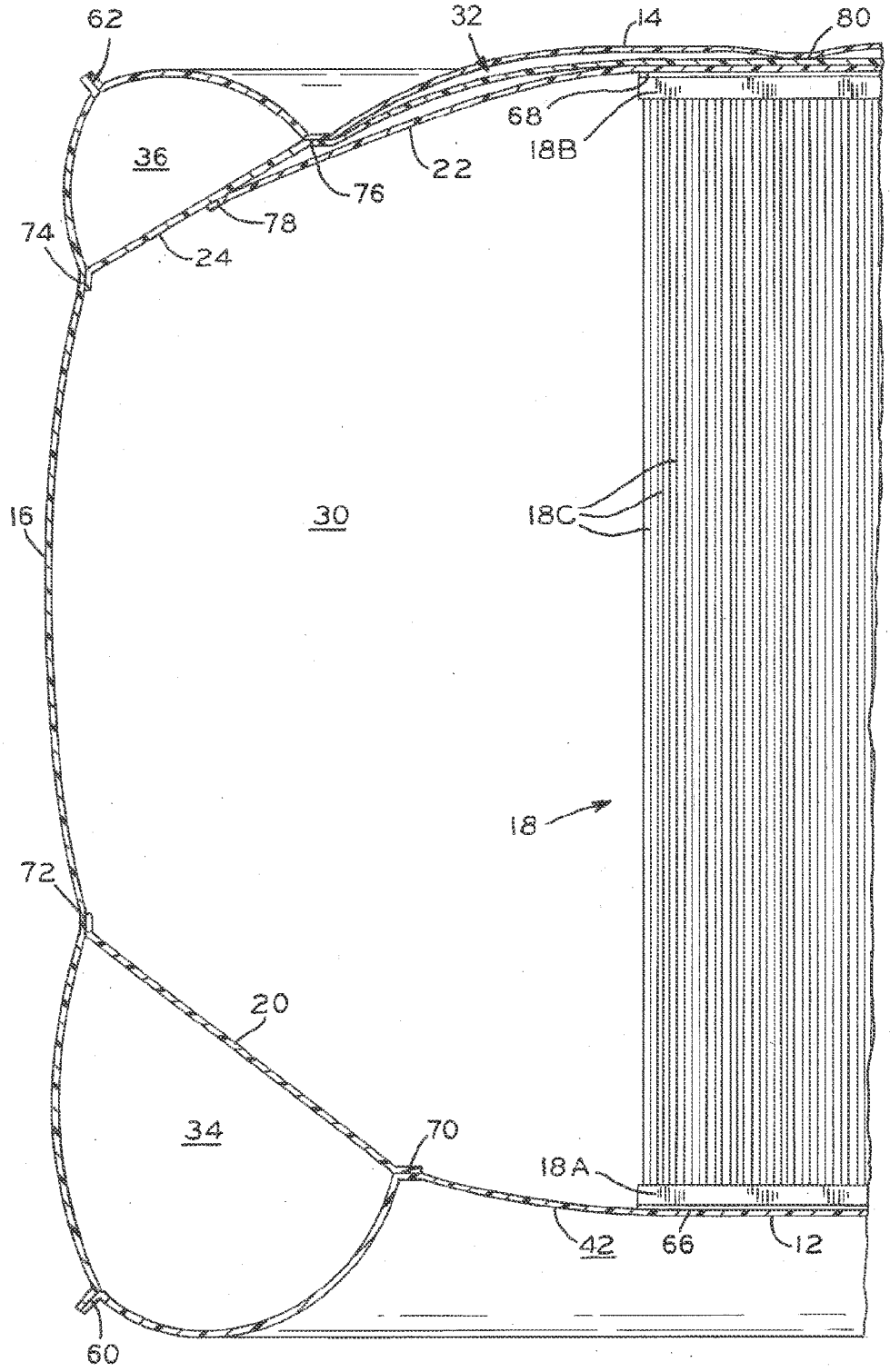

62
32
14
80
68
18B
36
22
76
78
74
24
16
30
18C
18
72
20
34
70
18A
42
66
12
60

FIG. 3

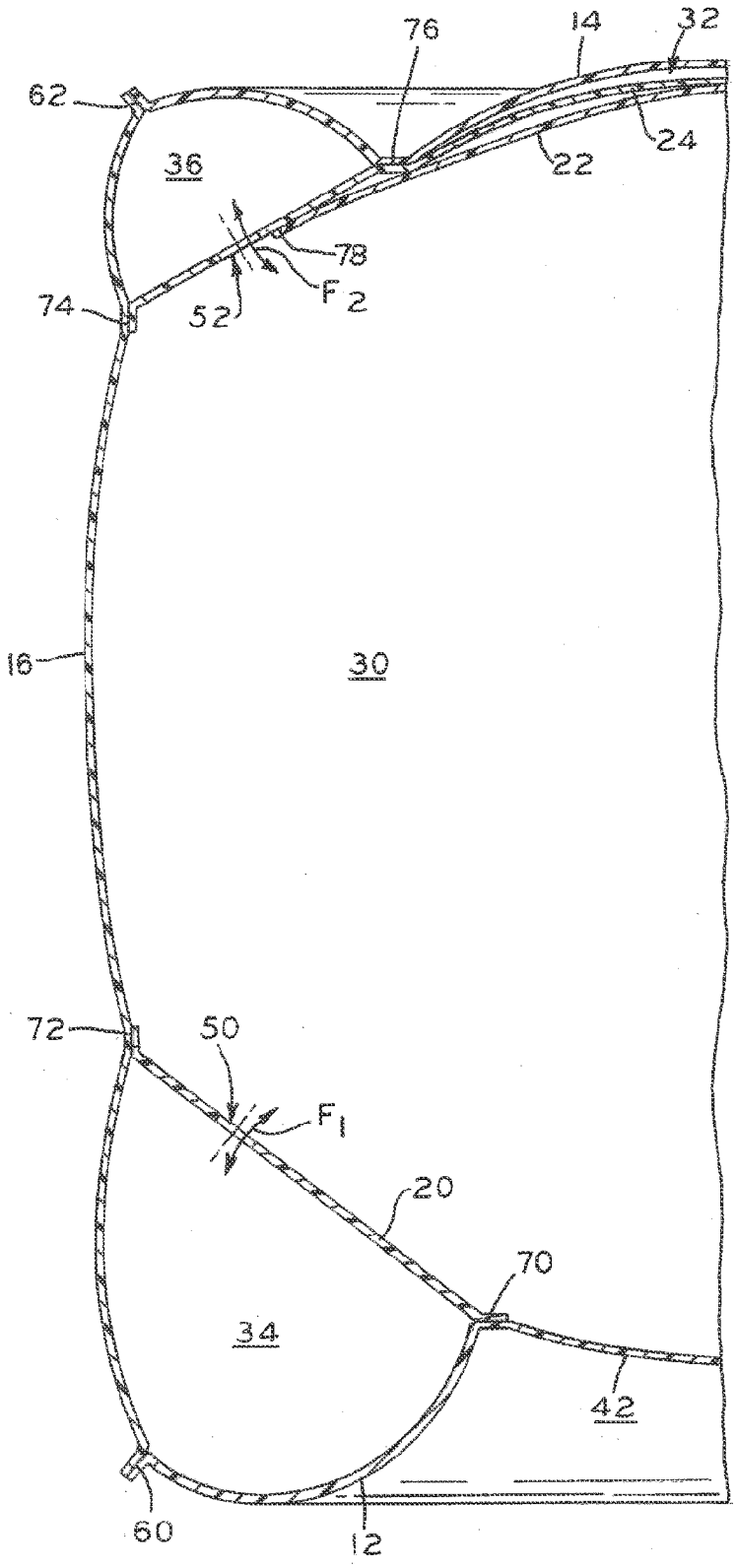


FIG_4

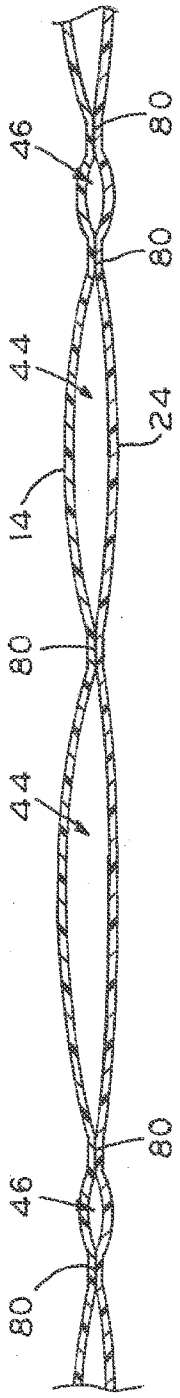


FIG. 5

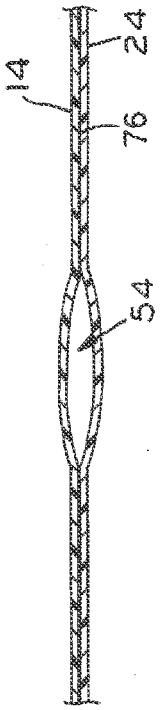


FIG. 6

MULTI-CHAMBER INFLATABLE DEVICE

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority under 35 U.S.C. §119 to Chinese Patent Application No. 201420029512.6, filed Jan. 17, 2014 and entitled "A Double Chamber Air Bed Structure", the entire disclosure of which is hereby incorporated by reference herein. This application is a continuation-in-part of U.S. Design patent application Ser. No. 29/502,063, filed Sep. 11, 2014 and entitled "Inflatable Mattress", the entire disclosure of which is hereby incorporated by reference herein.

BACKGROUND

[0002] 1. Technical Field

[0003] The present disclosure relates to an inflatable product structure and, in particular, to an inflatable mattress with multiple air chambers served from a single inflation valve.

[0004] 2. Description of the Related Art

[0005] Inflatable products are lightweight, easy to transport and require minimal space for storage. Inflatable product technologies have been used for various outdoor items, household goods, and toys, including inflatable mattresses.

[0006] A traditional inflatable mattress includes bottom and top panels forming the top and bottom surfaces of the mattress respectively, joined by a peripheral mattress panel to form a substantially air tight internal cavity which can be inflated into the shape of a mattress. In order to maintain generally flat upper and lower surfaces similar to a regular mattress, the upper and lower mattress panels may be joined to one another within the air cavity, such as by tension bands or other internal structures.

[0007] Some air mattress designs utilize multiple air chambers which, when pressurized, define additional shapes and features of the mattress. For example, some inflatable mattress designs feature a "double-chamber" construction including lower and upper chambers, in which the upper chamber provides a sleeping surface while the lower chamber provides a ground engaging surface. In some cases, the upper and lower chambers are in fluid communication with one another such that both chambers are inflatable and deflatable via a single valve.

SUMMARY

[0008] The present disclosure provides a multi-chamber inflatable mattress including a main air chamber, upper and lower peripheral air chambers, and an upper air chamber. The main air chamber includes internal tensioning structures which cooperate with a bottom mattress panel and a lower intermediate panel to provide a generally box-shaped, mattress-sized inflatable structure upon pressurization. A second, upper intermediate panel cooperates with a top mattress panel to define an upper air chamber which defines the sleeping surface. The lower peripheral air chamber is formed at the periphery of the ground contacting surface of the mattress, and is shaped to provide stability. Similarly, the upper peripheral chamber is formed at the periphery of the upper or sleeping surface of the mattress and provides a ridge around the sleeping surface for user security. The main air chamber receives pressurized fluid directly from a valve, while the lower and upper peripheral air chambers are in direct fluid communication with the main air chamber but not the valve. The upper air chamber is in direct fluid communication with the upper peripheral air chamber, but not the main chamber or valve.

[0009] In one form thereof, the present disclosure provides a multi-chamber inflatable mattress including: a bottom panel; a top panel spaced from the bottom panel and defining an upper sleeping surface of the mattress; a peripheral panel bonded to the bottom panel and the top panel to define an internal mattress cavity; an upper intermediate panel disposed between the top panel and the bottom panel; a lower intermediate panel disposed between the bottom panel and the upper intermediate panel; a valve in fluid communication with the internal mattress cavity such that the mattress can be inflated and deflated via the valve; a main air chamber bounded by the bottom panel, the top panel and the peripheral panel, the main air chamber in direct fluid communication with an ambient atmosphere via the valve; an upper peripheral air chamber disposed at a periphery of the top panel, the upper peripheral air chamber in direct fluid communication with the main air chamber and in secondary fluid communication with the ambient atmosphere; and an upper air chamber disposed between the top panel and the upper intermediate panel, the upper air chamber in direct fluid communication with the upper peripheral air chamber, in secondary fluid communication with the main air chamber and in tertiary fluid communication with the ambient atmosphere.

[0010] In another form thereof, the present disclosure provides a multi-chamber inflatable mattress including: a main air chamber defined by a ground-contacting surface and a peripheral wall extending upwardly from the ground-contacting surface, the main air chamber in direct fluid communication with an ambient atmosphere via a valve disposed in the peripheral wall; an upper air chamber disposed above the main air chamber with least two intermediate panels between the main air chamber and the upper air chamber, the upper air chamber defined by a sleeping surface; and an upper peripheral air chamber disposed at a periphery of an upper edge of the peripheral wall of the main air chamber, the upper peripheral air chamber in direct fluid communication with the main air chamber and in secondary fluid communication with the ambient atmosphere, the upper air chamber in direct fluid communication with the upper peripheral air chamber, in secondary fluid communication with the main air chamber and in tertiary fluid communication with the ambient atmosphere.

[0011] In yet another form thereof, the present disclosure provides a multi-chamber inflatable mattress including: a main air chamber; an upper peripheral air chamber; an upper air chamber; first means for inflating and deflating the main air chamber, said first means placing the main air chamber in direct fluid communication with an ambient atmosphere; second means for inflating and deflating the upper peripheral air chamber, said second means placing the upper peripheral air chamber in secondary fluid communication with the ambient atmosphere; and third means for inflating and deflating the upper air chamber, said third means placing the upper air chamber in tertiary fluid communication with the ambient atmosphere.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The above-mentioned and other features and advantages of this disclosure, and the manner of attaining them, will become more apparent and the invention itself will be better

understood by reference to the following description of an embodiment of the invention taken in conjunction with the accompanying drawings, wherein:

[0013] FIG. **1** is a perspective view of a mattress made in accordance with the present disclosure, illustrating the sleeping surface thereof when pressurized;

[0014] FIG. **2** is an exploded view of the mattress shown in FIG. **1**;

[0015] FIG. **3** is an elevation, cross-section view, taken along the line III-III of FIG. **1**, illustrating respective air chambers of the inflatable mattress;

[0016] FIG. **4** is an elevation, cross-section view, taken along line IV-IV of FIG. **1**, illustrating fluid communication apertures from the main air chamber to the lower and upper peripheral air chambers;

[0017] FIG. **5** is an elevation, partial cross-section view taken along line V-V of FIG. **1**, illustrating air pockets and fluid communication channels which cooperate to define the sleeping surface of the mattress; and

[0018] FIG. **6** is an elevation, partial cross-section view taken along the line VI-VI of FIG. **1**, illustrating a fluid communication channel between the upper peripheral air chamber and upper air chamber of the mattress.

[0019] Corresponding reference characters indicate corresponding parts throughout the several views. The exemplification set out herein illustrates an exemplary embodiment of the present invention, and such exemplification is not to be construed as limiting the scope of the invention in any manner.

DETAILED DESCRIPTION

[0020] Turning now to FIG. **1**, inflatable mattress **10** is illustrated in a fully inflated, ready-to-use configuration. As described in detail below, mattress **10** is a "double chamber" type design in which main air chamber **30** defines a majority of the height and overall shape of mattress **10**, and upper air chamber **32** is disposed above main air chamber **30** and provides for the overall structure and feel of upper sleeping surface **40** of mattress **10**. In addition, mattress **10** includes a lower peripheral air chamber **34** extending around the periphery of mattress **10** adjacent a lower, ground contacting surface **42** (FIG. **3**).

[0021] Lower peripheral air chamber **34** (FIG. **3**) provides a stable peripheral structure at the base of mattress **10** to prevent an undesirable rolling or buckling of the mattress sidewall, e.g., when a user sits on an edge of upper surface **40**. Similarly, upper peripheral air chamber **36** (FIG. **3**) extends around the outer periphery of upper surface **40**, and provides a raised ridge-like structure to aid in the comfortable retention of a user on upper surface **40**. In particular, upper peripheral air chamber **36** interrupts what might otherwise be a gradual downward sloping of upper surface **40** around the edges of mattress **10**, thereby inhibiting any rolling or buckling the mattress sidewall **16** when a user is near an edge of upper surface **40**.

[0022] A single valve **26** located in one side of mattress **10** is used to inflate all of the air chambers **30**, **32**, **34**, **36** of mattress **10**. Valve **26** places the main air chamber **30** in direct fluid communication with the ambient atmosphere, such that main air chamber **30** can be directly pressurized via valve **26**. By contrast, the lower and upper peripheral air chambers **34**, **36** are in secondary fluid communication with the ambient atmosphere, via valve **26** and fluid communication apertures **50** and **52** respectively (as shown in FIG. **4** and further described below), while upper air chamber **32** is in tertiary fluid communication with the ambient atmosphere via apertures **52** and fluid communication channels **54** (shown in FIGS. **1** and **6** and also described further below).

[0023] For purposes of the present disclosure, "direct fluid communication" means fluid communication across a single barrier, such as a single sidewall formed by one of the various panels which form mattress **10** (further described below). "Secondary fluid communication" means fluid communication which must traverse two spatially separate structures, such as a first panel and a second panel which is spaced from the first panel, or two spaced-apart portions of a single panel. Similarly, "tertiary fluid communication" means fluid communication which occurs across three spatially separate structures, such as three spatially separate mattress panels or three spaced-apart portions of a single panel, or some combination thereof

[0024] Turning now to FIG. **2**, an exploded view of mattress **10** illustrating its constituent parts is provided. The overall internal volume of mattress **10** is enclosed by bottom panel **12**, top panel **14** and peripheral panel **16**. In particular, a lower edge of peripheral panel **16** is hermetically bonded to the peripheral edge of bottom panel **12** at weld **60** (FIG. **1**), while the opposing upper edge of peripheral panel **16** is hermetically bonded to the peripheral edge of top panel **14** at weld **62** (FIG. **1**). When valve **26** is closed, bottom and top panels **12**, **14** cooperate with peripheral panel **16** to define a hermetically sealed internal cavity of mattress **10** including air chambers **30**, **32**, **34** and **36**. In an exemplary embodiment, peripheral panel **16** is formed from a strip of material whose ends are bonded at weld **64**. Although welds formed by heating two adjacent materials to a melting or near-melting temperature are described herein as the method for joining two separate structures of mattress **10**, it is contemplated that other methods, such as adhesive bonding, may also be used.

[0025] In order to provide the substantially box-shaped, mattress-like form of mattress **10**, a series of tensioning assemblies **18** are positioned within the sealed cavity of mattress **10** and welded to bottom and top panels **12** and **14**. In an exemplary embodiment, each tensioning assembly **18** includes a lower weld strip **18***a* bonded to bottom panel **12** at weld **66** (FIG. **3**), upper weld strip **18***b* bonded to lower intermediate panel **22** (shown in FIG. **3** and described in further detail below), and a plurality of tension cords **18***c* with lower and upper ends bonded to weld strips **18***a*, **18***b* respectively. When mattress **10** is inflated, the tendency of bottom and top panels **12** and **14** to form a "balloon" shape with convex lower and upper surfaces **42**, **40** is counteracted by the tension in cords **18***c*, such that tensioning assemblies **18** cooperate to provide the generally rectangular mattress like shape of inflatable mattress **10** with substantially flat upper and lower surfaces **40**, **42**.

[0026] Further discussion of an exemplary embodiment of tensioning assemblies **18** in the context of an inflatable mattress can be found in International Patent Application Publication No. WO 2013/130117, filed Jun. 12, 2012 and entitled "Internal Tensioning Structure Useable with Inflatable Devices," and in U.S. patent application Ser. No. 14/444,453, filed Jul. 28, 2014 and entitled "Method for Producing an Inflatable Product," and U.S. patent application Ser. No. 14/444,337, filed Jul. 28, 2014 and entitled "Method for Producing an Air Mattress," all of which are commonly assigned with the present application, the entire disclosures of which are hereby expressly incorporated herein by reference.

[0027] As best seen in FIGS. **3** and **4**, mattress **10** includes lower peripheral panel **20**, which cooperates with bottom panel **12** and peripheral panel **16** to define lower peripheral air chamber **34**. As shown in FIG. **2**, lower peripheral panel **20** is formed as a generally rectangular sheet of material having approximately the same outer peripheral dimensions as bottom panel **12**, and has a large central aperture **20**A having a corresponding rectangular shape. The outer periphery and central aperture **20**A of panel **20** cooperate to define a rectangular strip of material of a substantially constant width around its periphery, as illustrated. Lower peripheral panel **20** is bonded along its inner peripheral edge to bottom panel **12** at weld **70**, while the outer peripheral edge of panel **20** is affixed to peripheral panel **16** at weld **72**. Both of welds **70** and **72** extend around the entire periphery of panels **12**, **16** and **20** thereby forming lower peripheral air chamber **34** around the entire lower periphery of mattress **10**. Thus, lower peripheral air chamber **34** is bounded by bottom panel **12**, peripheral panel **16** and lower peripheral panel **20**, in cooperation with welds **60**, **70** and **72** extending around the peripheral extent of mattress **10**.

[0028] In order to provide for pressurization of lower peripheral air chamber **34**, lower peripheral panel **20** includes fluid communication apertures **50**, as shown in FIG. **2**. In the illustrated embodiment, apertures **50** are provided at each of the four corners of the rectangular shape of panel **20**, in order to promote even air inflows during inflation to the entire periphery of peripheral air chamber **34**. Of course, it is contemplated that additional fluid communication apertures **50** may be provided, or that as few as one aperture **50** may be provided as required or desired for a particular application. As shown in FIG. **4**, aperture **50** allows for the flow F_1 of fluid (e.g., air) from main air chamber **30** to lower peripheral air chamber **34** during inflation of mattress **10**, as well as a reverse fluid flow from chamber **34** to chamber **30** during deflation. Thus, air flowing through valve **26** is in direct fluid communication with main air chamber **30**, and in secondary fluid communication with lower peripheral air chamber **34** via aperture **50**.

[0029] Upper air chamber **32** and upper peripheral air chamber **36** are bounded by one or both of lower and upper intermediate panels **22** and **24**, shown in FIG. **2**, in cooperation with top panel **14** and peripheral panel **16**. Upper intermediate panel **24** has an outer periphery defining a size and shape substantially the same as top panel **14**, i.e., generally rectangular. The outer peripheral edge of upper intermediate panel **24** is affixed to peripheral panel **16**, as shown in FIG. **3**, along weld **74**, which extends around the entire periphery of upper intermediate panel **24** and peripheral panel **16**, in similar fashion to weld **72** between lower peripheral panel **20** and peripheral panel **16** as described above. Upper intermediate panel **24** further defines an interior weld path **76***a* as shown in FIG. **2**, which is a location spaced substantially evenly inwardly from the outer periphery of panel **24** where weld **76** provides affixation of panel **24** to top panel **14** (FIG. **3**).

[0030] Upper peripheral air chamber **36** is bounded by top panel **14**, peripheral mattress panel **16** and upper intermediate panel **24**, in cooperation with welds **62**, **74** and **76** extending around the peripheral extent of mattress **10**. Similar to lower peripheral panel **20**, upper intermediate panel **24** includes fluid communication apertures **52** at each corner thereof, as shown in FIG. **2**. Apertures **52** allow secondary fluid communication between main air chamber **30** and upper peripheral air chamber **36**, in the form of fluid flow F_2 (FIG. **4**).

[0031] Upper air chamber **32** is disposed beneath top panel **14**, and is generally bounded by top panel **14** at its upper end and upper intermediate panel **24** at is lower end (see, e.g., FIG. **5**). Weld **76** forms the peripheral boundary of upper air chamber **32**. However, as described in further detail below, weld **76** is interrupted at one or more locations, illustratively two mutually opposed locations, in order to form fluid communication channels **54** (FIG. **6**) to facilitate fluid flow from upper peripheral air chamber **36** to upper air chamber **32**.

[0032] Lower intermediate panel **22** has a shape which generally corresponds to the shape of upper intermediate panel **24**, except lower intermediate panel **22** is somewhat smaller. Thus, the outer edge of lower intermediate panel **22** is affixed to a lower surface of upper intermediate panel **24** at weld **78**, which extends around the entire periphery of lower intermediate panel **22** and is inset from the outer periphery of upper intermediate panel **24**. In an exemplary embodiment, this inset is substantially constant around the entire outer periphery of panels **22**, **24**. As shown in FIG. **3**, weld **78** may be located between weld **74** and weld **76**, both horizontally and vertically. As noted above and illustrated in FIG. **3**, upper weld strips **18***b* of tensioning assemblies **18** are affixed to lower intermediate panel **22** via welds **68**. The presence of lower intermediate panel **22** allows welds **68** to be made at a material interface not in direct contact or physical abutment with a majority of sleeping surface **40**, such that any surface irregularities which might result from the presence of welds **68** will not be felt by a user of mattress **10**.

[0033] Although upper intermediate panel **24** is shown as a single, monolithic sheet of material, it is contemplated that other arrangements could be utilized within the scope of the present disclosure. For example, upper intermediate panel could be formed from a strip of material cut into a rectangular shape, similar to bottom panel **12**, with a central panel similar to lower intermediate panel **22** bonded to the interior periphery of the strip to fill in its aperture.

[0034] Turning again to FIG. **1**, sleeping surface **40** of upper air chamber **32** has a "quilted" pattern appearance arising from a plurality of zigzag welds **80** arranged as illustrated. Further depiction and graphical description of an exemplary form of zigzag welds **80** can be found in U.S. Design application Ser. No. 29/502,063, filed Sep. 11, 2014 and entitled "Inflatable Mattress", which is commonly assigned with the present application, the entire disclosure of which is hereby incorporated by reference herein.

[0035] As best seen in FIG. **5**, upper air chamber **32** is formed in the space between top panel **14** and upper intermediate panel **24**, and within the boundary circumscribed by upper weld **76** between panels **14** and **24** (FIG. **1**). Pressurized fluid (e.g., air) enters upper air chamber **32** via fluid communication channels **54**, formed by a pair of mutually opposed interruptions in weld **76**. As noted above, air entering through valve **26** flows into main air chamber **30**, and then into upper peripheral air chamber **36** via fluid communication apertures **52**. As pressurized air occupies upper peripheral air chamber **36**, it is allowed to flow through channels **54** into upper air chamber **32**. Thus, upper air chamber **32** is in tertiary fluid communication with valve **26**, because air arriving to upper air chamber **32** flows from valve **26** via main air chamber **30** and upper peripheral air chamber **36**. By contrast and as noted above, upper peripheral air chamber **36** is in secondary fluid communication with valve **26** while main air chamber **30** is in direct fluid communication therewith.

[0036] As best seen in FIG. **1**, zigzag welds **80** are formed within the boundary of upper air chamber **32** established by the peripheral weld **76**. Zigzag welds **80** each define alternating lateral and longitudinal sections joined by respective radiused transitions. Neighboring pairs of these radiused transitions are arranged facing one another such that neighboring pairs of zigzag welds **80** form pockets **44** substantially bounded by mutually opposed pairs of lateral and longitudinal weld sections, as illustrated. Each of pockets **44** presents a generally rectangular appearance with two opposing open corners adjacent the radiused transitions of welds **80**. These opposing corners cooperate to define pocket fluid channels **46** (FIG. **5**), which allow air to flow diagonally between adjacent pockets **44** through a gap between neighboring welds **80**.

[0037] Thus, as air enters upper air chamber **32** via fluid communication channel **54** (FIG. **1**), the air infiltrates each of pockets **44** via pocket fluid channels **46**. Diagonally neighboring pairs of pockets **44**, a plurality of which are formed by each neighboring pair of zigzag welds **80**, are all in direct fluid communication with one another via fluid communication channels **54**.

[0038] In this way, sleeping surface **40** is defined by a quilted arrangement of inflated pockets **44**, all of which are relatively flat and spaced away from lower intermediate panel **22** and its welds **68** (described in further detail above). Meanwhile, upper peripheral air chamber **36** provides a ridged boundary around the periphery of sleeping surface **40**, presenting a physical barrier to any downward slope of sleeping surface **40** around the edges of mattress **10**, thereby providing stability and security for users of mattress **10**.

[0039] While this disclosure has been described as having exemplary designs, the present disclosure can be further modified within the spirit and scope of this disclosure. This application is therefore intended to cover any variations, uses, or adaptations of the disclosure using its general principles. Further, this application is intended to cover such departures from the present disclosure as come within known or customary practice in the art to which this disclosure pertains and which fall within the limits of the appended claims.

What is claimed is:

1. A multi-chamber inflatable mattress comprising:

a bottom panel;

a top panel spaced from the bottom panel and defining an upper sleeping surface of the mattress;

a peripheral panel bonded to the bottom panel and the top panel to define an internal mattress cavity;

an upper intermediate panel disposed between the top panel and the bottom panel;

a lower intermediate panel disposed between the bottom panel and the upper intermediate panel;

a valve in fluid communication with the internal mattress cavity such that the mattress can be inflated and deflated via the valve;

a main air chamber bounded by the bottom panel, the top panel and the peripheral panel, the main air chamber in direct fluid communication with an ambient atmosphere via the valve;

an upper peripheral air chamber disposed at a periphery of the top panel, the upper peripheral air chamber in direct fluid communication with the main air chamber and in secondary fluid communication with the ambient atmosphere; and

an upper air chamber disposed between the top panel and the upper intermediate panel, the upper air chamber in direct fluid communication with the upper peripheral air chamber, in secondary fluid communication with the main air chamber and in tertiary fluid communication with the ambient atmosphere.

2. The multi-chamber inflatable mattress of claim **1**, wherein the upper air chamber is bounded by the top panel, the upper intermediate panel and a peripheral weld formed between the top panel and the upper intermediate panel, the peripheral weld having at least one interruption forming a fluid communication channel with the upper peripheral air chamber.

3. The multi-chamber inflatable mattress of claim **2**, wherein the upper air chamber includes a plurality of zigzag welds formed between the top panel and the upper intermediate panel and within the boundary of the peripheral weld.

4. The multi-chamber inflatable mattress of claim **3**, wherein the plurality of zigzag welds define alternating lateral and longitudinal sections joined by respective radiused transitions, such that neighboring pairs of the plurality of zigzag welds define air pockets within the upper air chamber.

5. The multi-chamber inflatable mattress of claim **4**, wherein neighboring pairs of pockets formed by the neighboring pairs of zigzag welds are in fluid communication with one another via fluid communication channels formed between neighboring pairs of the radiused transitions.

6. The multi-chamber inflatable mattress of claim **1**, wherein the upper peripheral air chamber is bounded by the top panel, the peripheral panel and the upper intermediate panel.

7. The multi-chamber inflatable mattress of claim **1**, wherein the upper intermediate panel includes at least one fluid communication aperture positioned to allow fluid flow between the main air chamber and the upper peripheral air chamber.

8. The multi-chamber inflatable mattress of claim **1**, further comprising a lower peripheral air chamber disposed at a periphery of the bottom panel, the lower peripheral air chamber in secondary fluid communication with the valve and direct fluid communication with the main air chamber.

9. The multi-chamber inflatable mattress of claim **8**, further comprising a lower peripheral panel formed as a rectangular strip of material defining an inner periphery and an outer periphery, the inner periphery bonded to the bottom panel, the outer periphery bonded to the peripheral panel, wherein the lower peripheral air chamber is bounded by the bottom panel, the peripheral panel and the lower peripheral panel.

10. The multi-chamber inflatable mattress of claim **9**, wherein the lower peripheral panel includes at least one fluid communication aperture positioned to allow fluid flow between the main air chamber and the lower peripheral air chamber, whereby air flowing through the valve is in direct fluid communication with the main air chamber and in secondary fluid communication with the lower peripheral air chamber via the aperture.

11. The multi-chamber inflatable mattress of claim **1**, wherein the upper intermediate panel has an outer periphery defining a size and shape substantially the same as the top panel.

12. The multi-chamber inflatable mattress of claim **1**, further comprising at least one tensioning assembly positioned within the internal mattress cavity and bonded to the bottom panel and the lower intermediate panel.

13. The multi-chamber inflatable mattress of claim **12**, wherein the at least one tensioning assembly comprises:

a lower weld strip bonded to the bottom panel;
an upper weld strip bonded to the lower intermediate panel; and
a plurality of tension cords each having a lower end bonded to the lower weld strip and an upper end bonded to the upper weld strip.

14. A multi-chamber inflatable mattress comprising:
a main air chamber defined by a ground-contacting surface and a peripheral wall extending upwardly from the ground-contacting surface, the main air chamber in direct fluid communication with an ambient atmosphere via a valve disposed in the peripheral wall;
an upper air chamber disposed above the main air chamber with least two intermediate panels between the main air chamber and the upper air chamber, the upper air chamber defined by a sleeping surface; and
an upper peripheral air chamber disposed at a periphery of an upper edge of the peripheral wall of the main air chamber, the upper peripheral air chamber in direct fluid communication with the main air chamber and in secondary fluid communication with the ambient atmosphere,
the upper air chamber in direct fluid communication with the upper peripheral air chamber, in secondary fluid communication with the main air chamber and in tertiary fluid communication with the ambient atmosphere.

15. The multi-chamber inflatable mattress of claim **14**, further comprising a lower peripheral air chamber disposed at a periphery of the ground-contacting surface, the lower peripheral air chamber in direct fluid communication with the main air chamber and secondary fluid communication with the ambient atmosphere.

16. The multi-chamber inflatable mattress of claim **14**, wherein the upper air chamber includes a plurality of zigzag welds forming pockets in a quilted pattern.

17. The multi-chamber inflatable mattress of claim **14**, further comprising a plurality of tensioners disposed in the main air chamber and operable to impart a box-shape to the inflatable mattress.

18. A multi-chamber inflatable mattress comprising:
a main air chamber;
an upper peripheral air chamber;
an upper air chamber;
first means for inflating and deflating the main air chamber, said first means placing the main air chamber in direct fluid communication with an ambient atmosphere;
second means for inflating and deflating the upper peripheral air chamber, said second means placing the upper peripheral air chamber in secondary fluid communication with the ambient atmosphere; and
third means for inflating and deflating the upper air chamber, said third means placing the upper air chamber in tertiary fluid communication with the ambient atmosphere.

19. The multi-chamber inflatable mattress of claim **18**, further comprising:
a lower peripheral air chamber;
fourth means for inflating and deflating the lower peripheral air chamber, said fourth means placing the lower peripheral air chamber in secondary fluid communication with the ambient atmosphere.

20. The multi-chamber inflatable mattress of claim **18**, further comprising tensioning means for imparting a box-shape to the inflatable mattress.

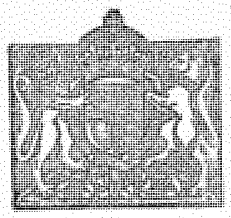
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RESERVE COPY

Note.—The application for a Patent has become void.

This print shows the Specification as it became open to public inspection on Dec. 10, 1934, under Section 91 (4) (a) of the Patents and Designs Acts, 1907 to 1932.

PATENT SPECIFICATION



Application Date: Nov. 21, 1933. No. 32506/33. **434,098**

Specification not Accepted

COMPLETE SPECIFICATION

Improvements in or relating to Pneumatic Bags or Mattresses

We, P. B. Cow & Company, Limited, a company organised under the laws of Great Britain, of Factory Square, Streatham Common, London, S.W. 16, Kurt Landau, Austrian citizen, of 7, Landesgerichtsstrasse, Vienna, Austria, and Ludwig Siebel, Austrian citizen, of 8, Schottenring, Vienna, Austria, Assignees in part of the said Kurt Landau, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to pneumatic bags or mattresses which are especially adapted for use as a bed or couch for purposes of sunbathing, camping, motoring etc.

According to the invention a pneumatic bag or mattress comprises a hollow bag of airtight material having substantially transverse connecting members extending a length less than the width of the bag and connecting the upper and lower surfaces of the bag, to prevent the ballooning thereof on inflation of the bag.

Preferably each connecting member is in the form of a strip or wall of rubberized fabric or the like sewn to the bag, the perforations caused by the sewing being sealed for example by strips of airtight material secured thereto by adhesive. Preferably also the connecting member nearest the head end of the bag is at such distance therefrom as to leave an area which on inflation of the bag is adapted to form a head cushion. The strips of fabric may however be replaced by transverse rows of threads or cords.

An embodiment of the invention is illustrated in the accompanying drawing, in which:

Figure 1 is a horizontal section of a mattress.

Figure 2 a longitudinal section on the line 2—2 of figure 1.

Figure 3 a section on the line 3—3 of figure 1, and

Figure 4 a detail.

The bag *a*, which is shown in the drawing in its inflated condition, has internal connecting members or walls *b* which are in a perpendicular or oblique direction to the longitudinal direction of the rectangular or approximately rectangular bag and only extend over a part of the bag width. Further walls connecting these walls together may be provided as shown in dotted lines in figure 1 at *e*. These walls are fastened to the upper and lower surfaces of the bag and the wall *b* nearest to the head end of the bag is fitted at such a distance from the end that on the inflation of the bag by the air tube *c* a head cushion *d* is formed.

The walls *b* which prevent a bag on inflation from ballooning, may be formed of rubberised fabric secured for example to the bag surfaces by sewing as shown in figure 4 by means of one or more raised seams *g*. To cover the perforations in the walls *a* due to the stitches *g*, strips *h* of air-tight material are stuck on along the seams. Alternatively the walls may be formed of cords arranged in transverse rows having their ends fastened to the upper and lower parts of the bag.

It will be noticed owing to the walls or strips extending only over a portion of the width of the mattress that on inflation of the bag a certain degree of ballooning will recur at the edges, see figure 3, which is desirable in order to prevent the user from rolling off the mattress.

The air tube may conveniently be provided with a valve so that the mattress may be inflated by a pump of the cycle or motor type. A mattress according to the invention will, when deflated, roll or fold up into a neat and compact parcel very convenient for carriage so that it may be used for such purposes as camping, or

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motoring, cycling or walking tours, sunbathing on the beach, or for aquatic sport.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A pneumatic bag or mattress comprising a hollow bag of airtight material having substantially transverse connecting members extending a length less than the width of the bag and connecting the upper and lower surfaces of the bag to prevent ballooning thereof on inflation of the bag.

2. A pneumatic bag or mattress as claimed in claim 1 in which the connecting member closest to the head end of the bag is at such distance therefrom as to leave an arrangement which on inflation of the mattress, is adapted to form a head cushion.

3. A pneumatic bag or mattress as claimed in claims 1 and 2 in which the connecting members are formed of rubberised fabric.

4. A pneumatic bag or mattress as claimed in any of the preceding claims in which the connecting members are secured by sewing to the surfaces of the bag by means of raised seams, the stitch holes being covered by strips of airtight material, substantially as described.

5. An arrangement as claimed in any of the preceding claims in which the connecting members are themselves further connected by obliquely extending strips.

6. A pneumatic mattress substantially as described and illustrated with reference to the accompanying drawing.

Dated this 21st day of November, 1933.

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W.C. 2.

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Fig.1.

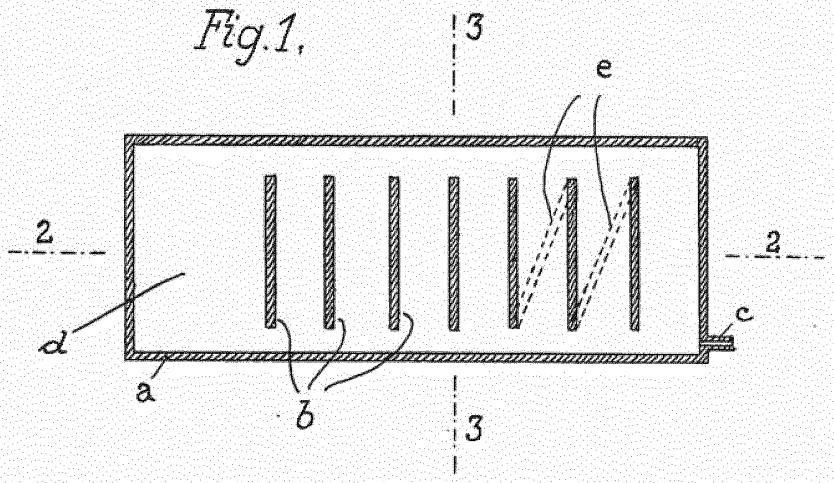


Fig.2.

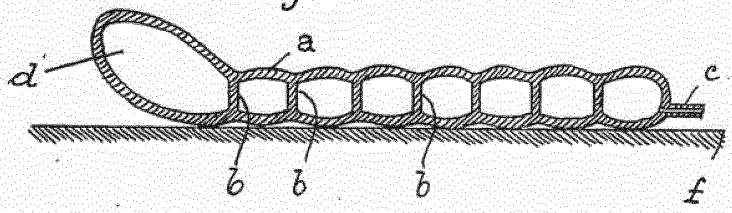


Fig.3.

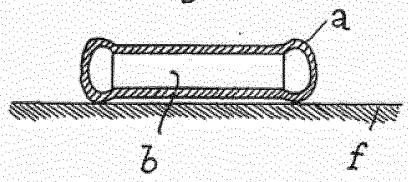
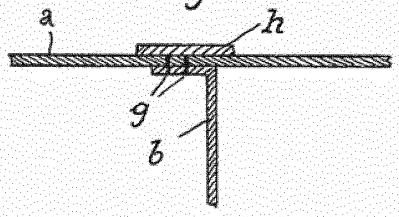


Fig.4.



Malby & Sons, Photo-Lith.

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US006701559B2

(12) **United States Patent**
Boso et al.

(10) **Patent No.: US 6,701,559 B2**
(45) **Date of Patent: Mar. 9, 2004**

(54) **INCREASED HEIGHT INFLATABLE SUPPORT SYSTEM**

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(73) Assignee: **Aero Products International, Inc.**, Wauconda, IL (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(22) Filed: **Aug. 1, 2001**

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(52) **U.S. Cl.** **5/739**; 5/711; 5/713; 5/424

(58) **Field of Search** 5/706, 710, 711, 5/712, 713, 739, 424, 732

(56) **References Cited**

U.S. PATENT DOCUMENTS

388,037	A		8/1888	Hargin
625,114	A		5/1899	MacSpadden
679,519	A		7/1901	Smith
918,391	A		4/1909	Taarud
1,185,684	A		6/1916	Kraft et al.
1,263,599	A		4/1918	Poole
1,451,136	A		8/1923	Allnutt
1,576,211	A	*	3/1926	O'Kane 5/710
1,944,466	A		1/1934	Rubin 5/348
2,059,226	A		11/1936	Gates 5/347
2,064,695	A		12/1936	Sipe 152/12
2,112,641	A		3/1938	Wheaton 277/61
2,288,889	A		7/1942	Costello 273/65
2,369,736	A		2/1945	Hurt 5/348
2,372,218	A		3/1945	Manson et al. 5/348
2,415,150	A		2/1947	Stein 5/348
2,549,597	A		4/1951	Harris et al. 5/348
2,573,375	A		10/1951	Winstead 230/32
2,604,641	A		7/1952	Reed 5/349
2,614,272	A	*	10/1952	Morner 5/655.3
2,701,579	A		2/1955	Hasselquist 137/223
2,741,780	A		4/1956	Kimbrig 5/348
2,767,735	A		10/1956	Darling 137/527
2,842,783	A		7/1958	Druck 5/348
2,949,927	A		8/1960	Mackal 137/223
3,026,909	A		3/1962	Boteler 137/793
3,042,941	A		7/1962	Marcus 5/348
3,068,494	A		12/1962	Pinkwater 5/348
3,099,386	A		7/1963	Pieper 230/117
3,123,336	A		3/1964	Price 251/331
3,128,480	A		4/1964	Lineback 5/348
3,142,850	A		8/1964	De Boer 9/11
3,155,991	A		11/1964	Dunham 5/348
3,208,721	A		9/1965	McHugh 251/331
3,403,696	A		10/1968	Pynchon 137/516.13
3,505,695	A		4/1970	Bishaf et al. 5/348
3,511,472	A		5/1970	Zimmerman 251/285
3,536,071	A		10/1970	Ferrando 128/142.5

(List continued on next page.)

FOREIGN PATENT DOCUMENTS

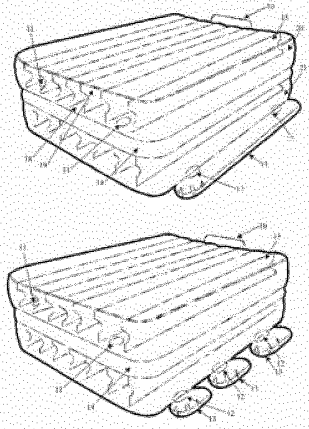
EP	0 317 021 A1	5/1989
GB	841736	7/1960
GB	2 050 844 A	1/1981
IT	359340	2/1938
WO	WO 93/05684	4/1993

Primary Examiner—Michael F. Trettel
(74) *Attorney, Agent, or Firm*—Brinks Hofer Gilson & Lione

(57) **ABSTRACT**

An increased height inflatable support system consisting of two or more vertically stacked chambers. Such a support system can have one or more stabilizer bars attached to said support system, to help keep said support system from rolling over. In addition, the present invention introduces the concept of using a support chamber to provide additional strength at junctions between said vertically stacked chambers. Additionally, fabric, padding, or flocking may be added to one or more surfaces of an upper chamber to improve overall support system comfort.

16 Claims, 9 Drawing Sheets



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U.S. PATENT DOCUMENTS

3,563,676 A		2/1971	Coovert et al.	417/410
3,600,727 A		8/1971	Williams	5/348
3,772,717 A	*	11/1973	Yuen et al.	5/422
3,785,395 A		1/1974	Andreasson	137/223
3,790,975 A		2/1974	Philipp et al.	5/349
3,798,686 A		3/1974	Gaiser	5/343
3,831,628 A		8/1974	Kintner et al.	
3,840,922 A		10/1974	Morrison et al.	5/348 R
3,864,766 A		2/1975	Prete, Jr.	5/337
3,877,092 A		4/1975	Gaiser	5/343
3,973,588 A		8/1976	Holst	137/854
3,983,907 A		10/1976	Sorensen	137/223
3,995,653 A		12/1976	Mackal et al.	137/234
4,025,974 A		5/1977	Lea et al.	5/367
4,078,580 A		3/1978	Rudle	137/625.66
4,080,105 A		3/1978	Connell	417/26
4,099,773 A		7/1978	Chang	297/270
4,146,069 A		3/1979	Angarola et al.	141/68
4,146,070 A		3/1979	Angarola et al.	141/68
4,149,285 A		4/1979	Stanton	5/347
4,169,295 A		10/1979	Darling	5/450
4,176,681 A		12/1979	Mackal	137/516.29
4,225,989 A		10/1980	Corbett et al.	5/453
4,371,999 A		2/1983	Reid	5/457
4,442,838 A		4/1984	Samson et al.	128/369
4,478,587 A		10/1984	Mackal	441/41
4,488,323 A		12/1984	Colburn	5/460
4,521,166 A		6/1985	Phillips	417/478
4,579,141 A		4/1986	Arff	137/223
4,594,743 A	*	6/1986	Owen et al.	5/111
4,644,597 A		2/1987	Walker	5/449
4,678,014 A		7/1987	Owen et al.	141/67
4,712,574 A		12/1987	Perrott	136/217
4,734,017 A		3/1988	Levin	417/366
4,766,628 A		8/1988	Walker	5/449
4,815,153 A	*	3/1989	Bleser et al.	5/98.1
4,829,616 A		5/1989	Walker	5/453
4,862,533 A		9/1989	Adams, III	5/413
4,896,389 A		1/1990	Chamberland	5/453
4,897,890 A		2/1990	Walker	5/453
4,970,741 A		11/1990	Spina	5/417
4,977,633 A		12/1990	Chaffee	5/453
4,982,466 A		1/1991	Higgins et al.	5/453
5,052,894 A		10/1991	Rimington	417/44
5,068,933 A		12/1991	Sexton	5/441
5,079,785 A		1/1992	Garcia	5/431
5,109,560 A		5/1992	Uetake	5/453
5,111,838 A		5/1992	Langston	137/233
5,343,889 A		9/1994	Jaw	137/232
5,598,593 A	*	2/1997	Wolfe	5/710
5,960,495 A		10/1999	Hsu et al.	5/706
6,076,214 A		6/2000	Klimenko	5/710
6,108,844 A	*	8/2000	Kraft et al.	5/732
6,161,902 A		12/2000	Lieberman	297/452.41
6,240,584 B1	*	6/2001	Perez et al.	5/713

* cited by examiner

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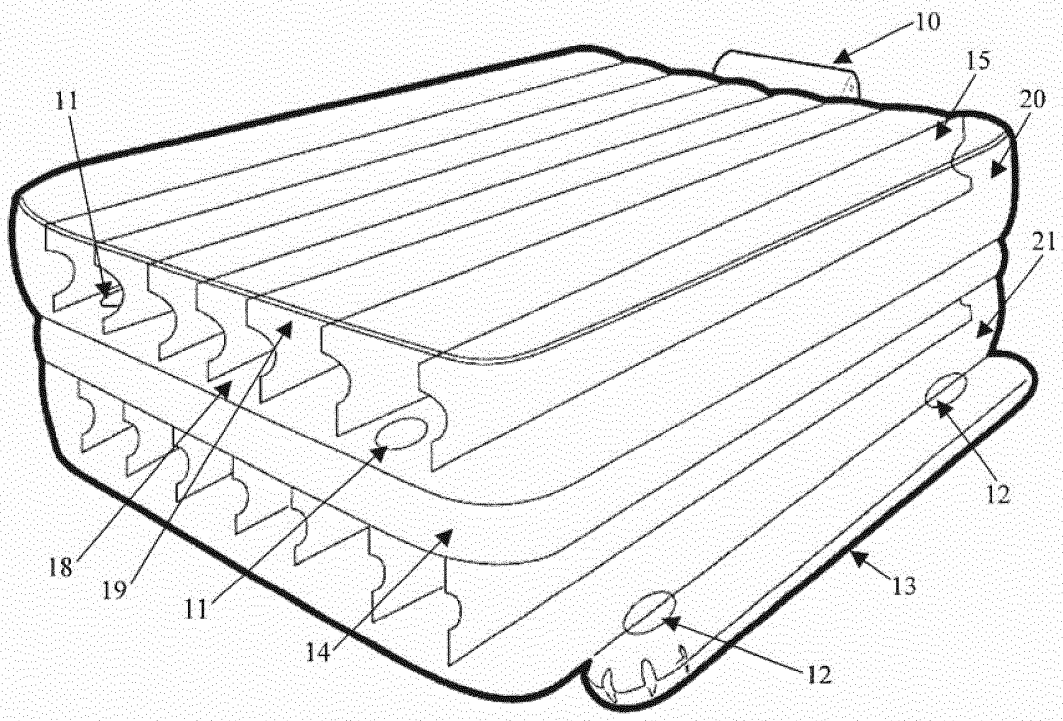


Figure 1

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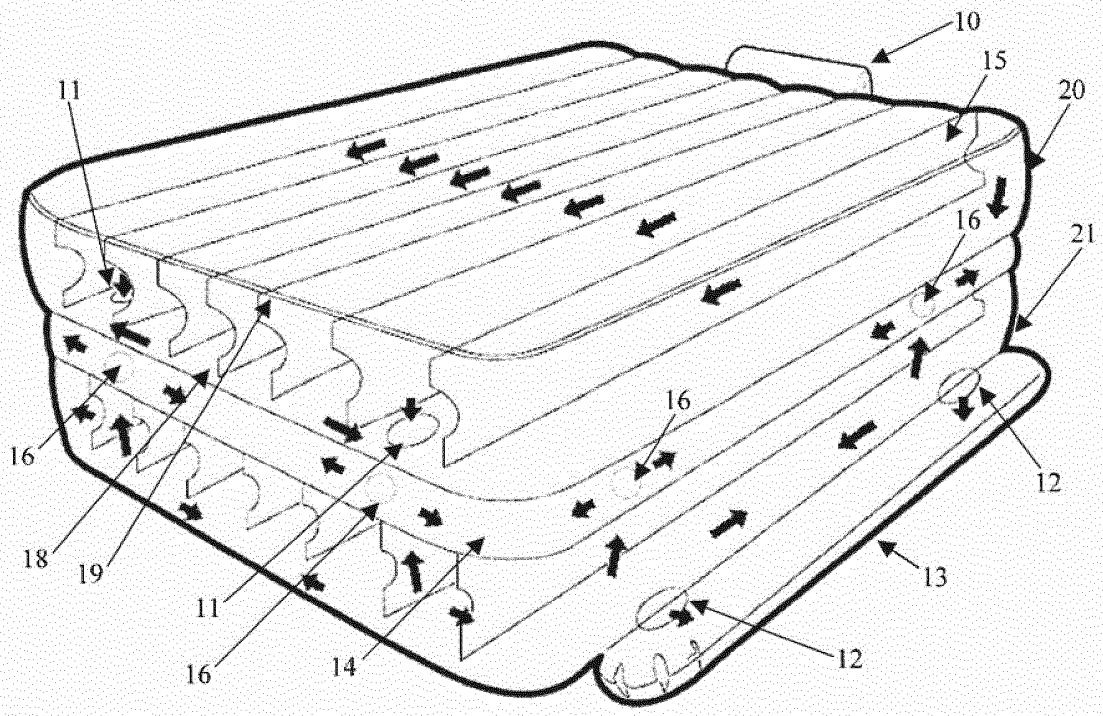


Figure 2

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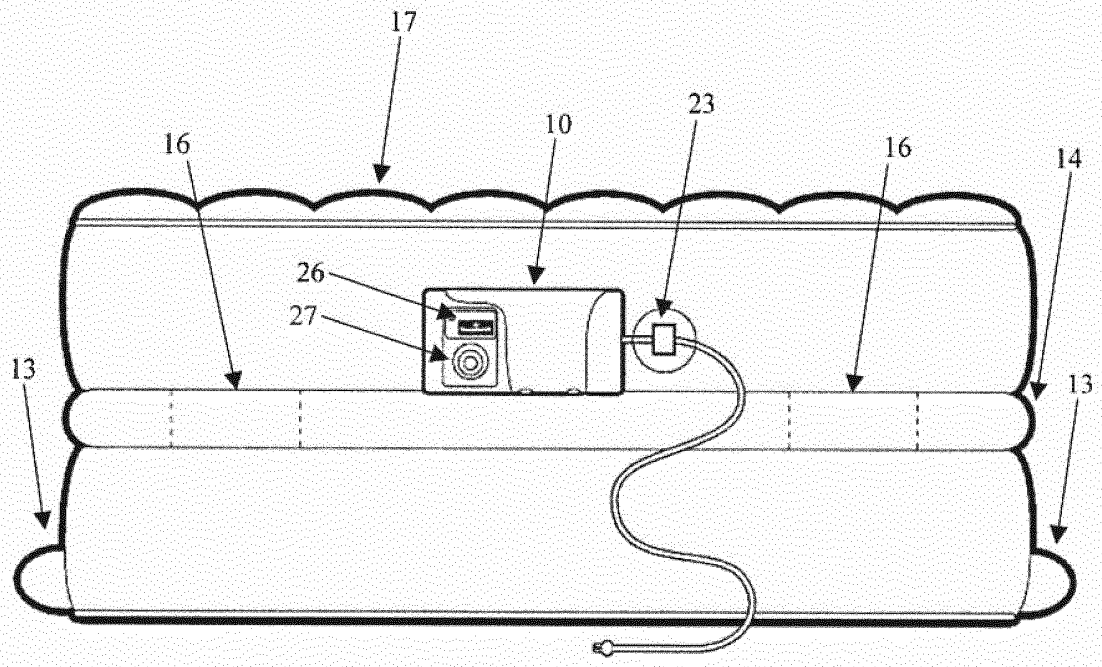


Figure 3

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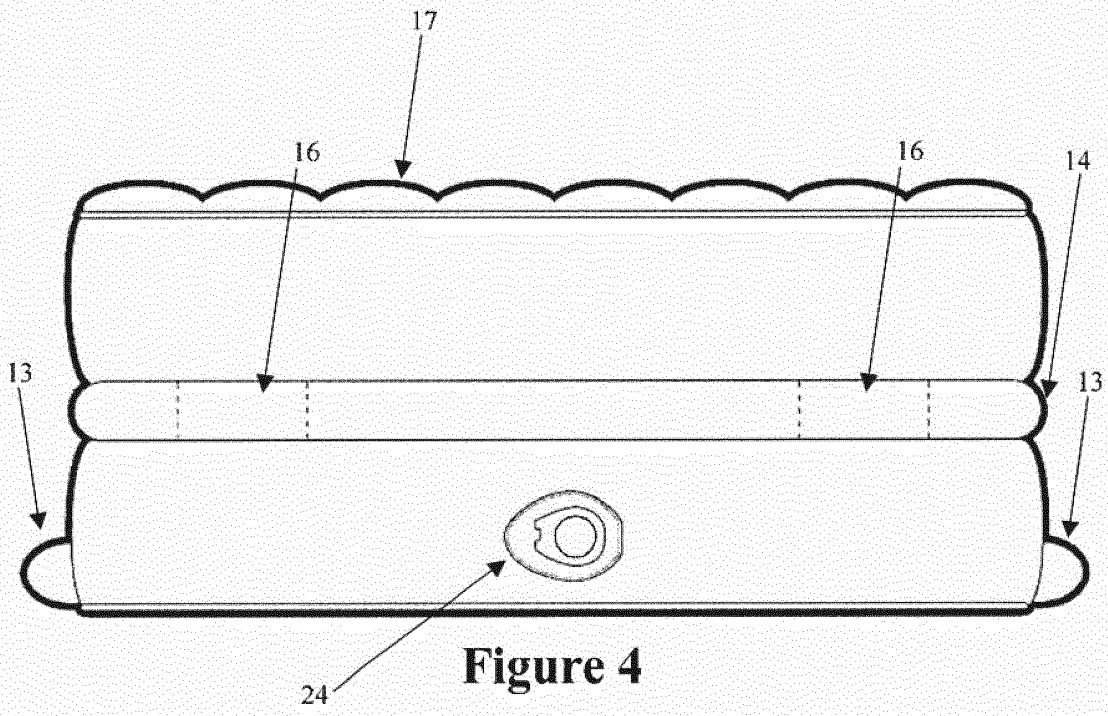


Figure 4

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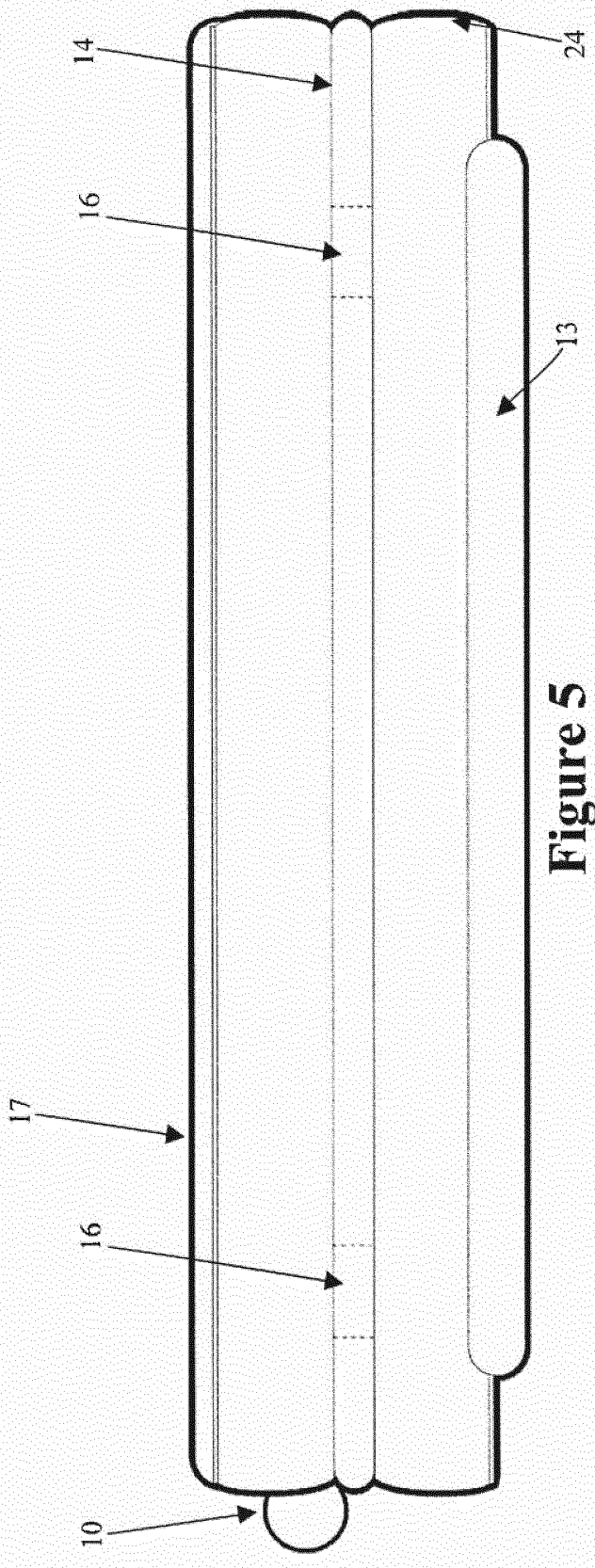


Figure 5

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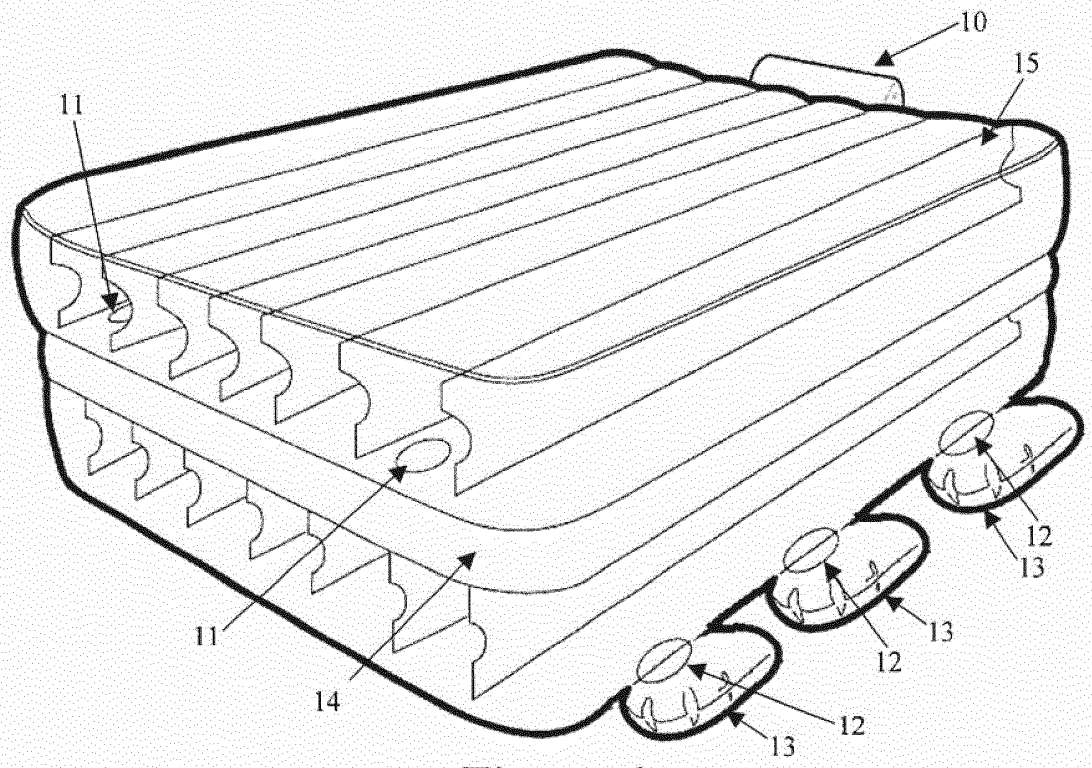


Figure 6

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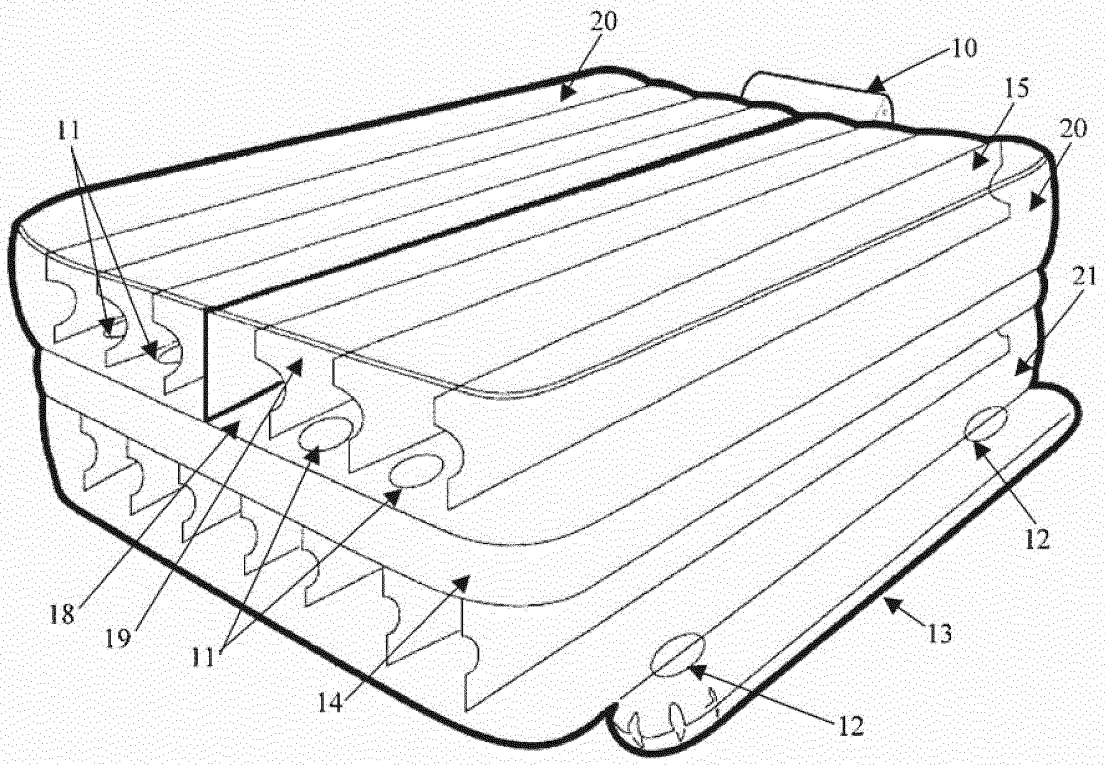


Figure 7

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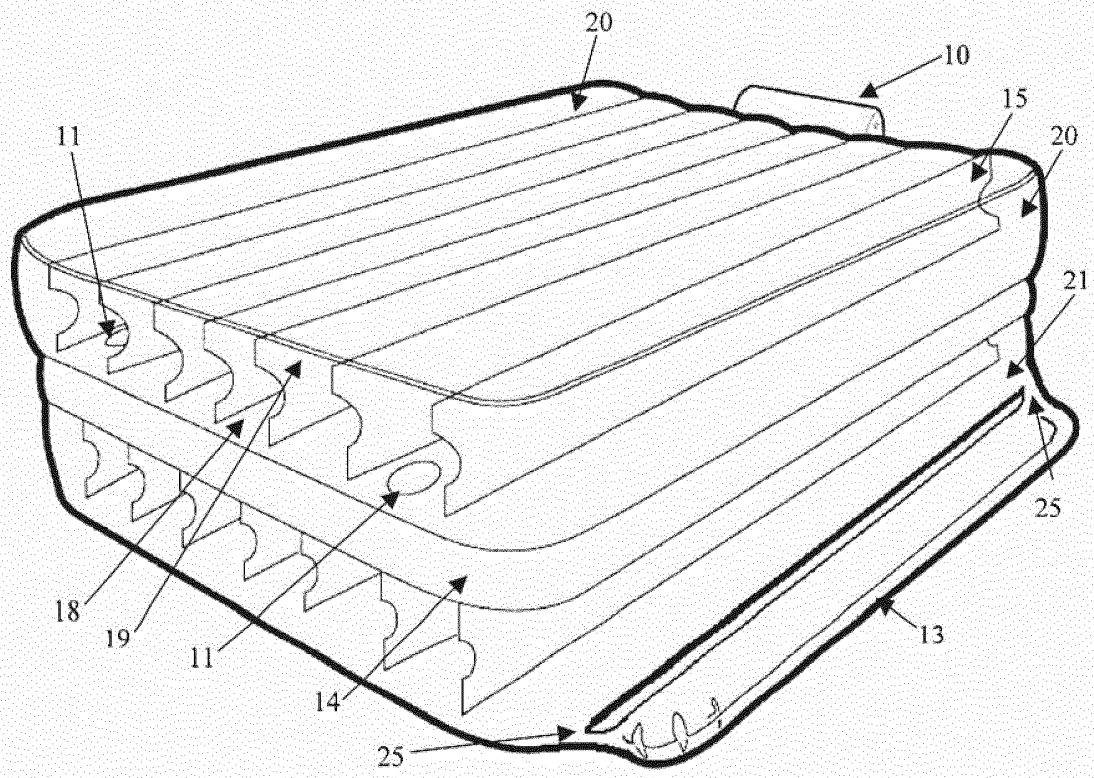


Figure 8

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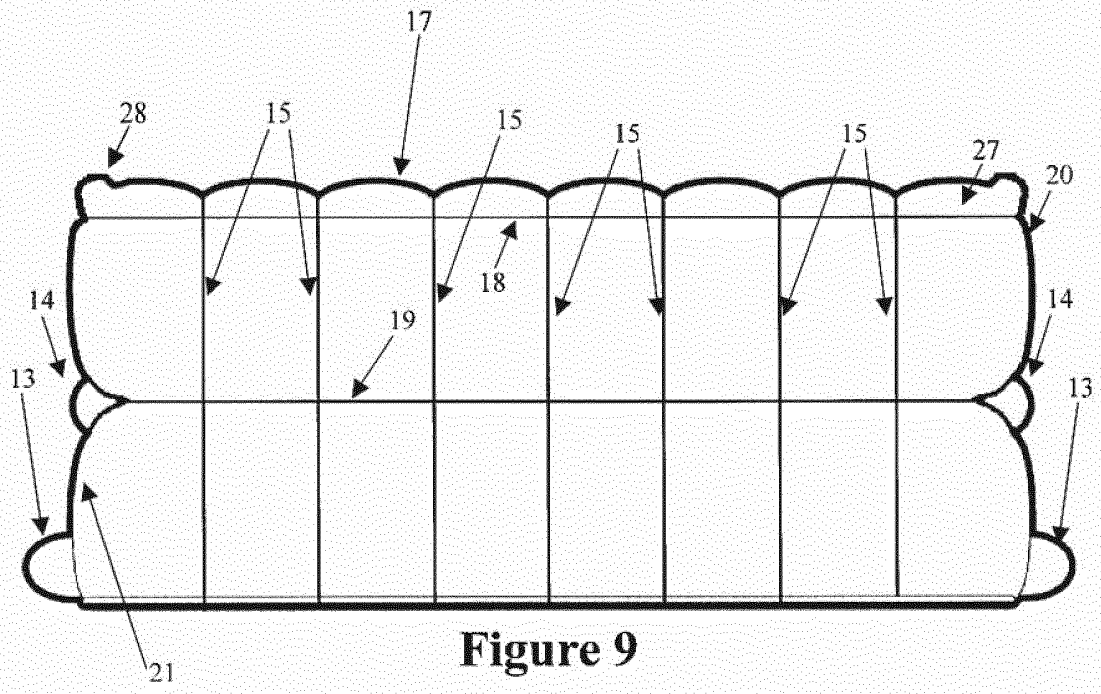


Figure 9

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INCREASED HEIGHT INFLATABLE SUPPORT SYSTEM

FIELD OF THE INVENTION

The present invention relates to the field of inflatable support systems, which may include air mattresses and inflation control thereof.

BACKGROUND OF THE INVENTION

Most everyone has faced the need for an extra bed or mattress at some time in their life. Air mattresses, originally introduced many years ago, have allowed homeowners and others to provide their guests with a surface more comfortable than sleeping on the floor, while not imposing the same storage requirements on the homeowner as traditional mattresses.

While air mattresses are a significant improvement over sleeping on the ground or curled up on a sofa, the mattresses still have many problems. For example, original air mattress designs were often clunky and uncomfortable, the manufacturing techniques and materials used resulted in poor air retention, the inflation and deflation systems employed with such mattresses often required significant time and effort, and the mattresses tended to provide only marginal support.

Some in the prior art, such as U.S. Pat. No. 4,977,633, issued to Robert B. Chaffee on Dec. 18, 1990 ("the Chaffee patent"), and U.S. Pat. No. 5,960,495, issued to Yaw-Yuan Hsu, et al. on Oct. 5, 1999 ("the Hsu patent"), have attempted to address some of these shortcomings. By way of example, the Chaffee patent teaches the use of a large, manually operated pressure release valve to speed deflation. The Chaffee patent also teaches the inclusion of a small cylinder around which a deflated bed can be rolled, further simplifying deflation. This same arrangement also allows the bed to automatically unroll while being inflated, which also simplifies the inflation process. The Chaffee patent also illustrates the inclusion of an electric motor, which speeds the inflation process.

The Hsu patent attempts to address some of the comfort problems typically associated with air mattresses. The Hsu patent uses tube beams inside a mattress to provide additional lateral load support. These tube beams are separate structures which are added to the inside of the mattress and are attached to the upper and lower mattress surfaces through a sinusoidal sealing pattern in an attempt to provide further rigidity to the mattress.

Despite advances in the art, no one marketed an inflatable mattress that approximates the height of a traditional bed. Instead, a person sleeping on one of these mattresses still has the perception of sleeping on the floor. In addition, getting into and out of such a bed can be difficult, especially for an elderly or disabled person. An inflatable mattress that more closely approximates the dimensions of a traditional bed would therefore be advantageous.

Another problem commonly encountered by inflatable mattress users is the propensity for such mattresses to roll over. Rollovers are not only a problem with inflatable mattresses, but with all lightweight support surfaces, such as inflatable furniture. Some in the prior art, such as U.S. Pat. No. 6,161,902, issued to Marvin S. Lieberman on Dec. 19, 2000 (the Lieberman patent); the "Game Day Minute Chair" by Aero Products International, Inc. of Wauconda, Ill.; and the "Retro Air Chair" by Intex Recreation Corporation of Long Beach, Calif., have used multiple, inflatable cylindrical tubes to improve the stability of inflatable chairs.

While the stabilization methods employed in the prior art can improve overall chair stability, each has shortcomings, especially when applied to other support systems. For example, the Lieberman patent teaches the installation of a U shaped inflatable tube underneath the front of a chair and a small, inflatable tube which extends along and is immovably attached to the rear base of the chair. Each of these tubes is also inflated separately from and to a higher pressure than the body of the chair. The increased pressure of these tubes strengthens the base of the chair, thus reducing the likelihood of rollover. While this approach has some merit, the introduction of separately inflatable tubes means added work for the consumer, who must move an inflation device from one valve to another until the chair is properly filled.

The Game Day Minute Chair and Retro Air Chair apply alternative stabilization techniques. In both cases, two small, inflatable stabilizer bars, no more than fifteen inches long and approximately six inches in diameter when inflated, are attached to the base of the chair to increase the surface area covered by the chair. These stabilizer bars are attached to the chair through narrow, short inflator tubes(three and one half inches long by one and one half inches wide in the case of the Game Day Minute Chair). The inflator tubes allow the stabilizer bars to be in fluid communication with the chair bodies and to be filled with air as the chair is filled. The increased surface area created by the combination of the inflator tubes and the stabilizer bars provides more stability by distributing the weight over a larger area.

As with the Lieberman patent, the shape and position of the stabilizer bars employed on these chairs also strengthens the chair body where the stabilizer bars contact the chair. However, such strengthening is only provided to areas adjacent to the tubes. While this may be practical for inflatable support systems with smaller weight bearing surfaces, such as chairs, a few, relatively short stabilizer bars will not provide stability for larger inflatable support systems, such as inflatable mattresses.

Another problem faced by inflatable support systems of the prior art is structural stability of the sides of the support system. The shape of the side tends to distort as weight is applied at or near the edge of the support system. Such distortion can cause a person to slip or fall from the support surface, increasing potential liability on the part of the support system manufacturer. Obviously, this becomes increasingly significant as the height of the support system is increased. A means of improving the structural stability of the side of the mattress is therefore preferable as height is increased.

SUMMARY OF THE INVENTION

Accordingly, the present invention is directed to an increased height inflatable support system that substantially obviates one or more of the problems due to limitations and disadvantages of the related art.

An object of the present invention is to improve the structural stability of the support system sides.

Another object of the invention is to reduce the likelihood of support system rolling over.

A further object of the invention is to increase overall support system height to more closely approximate the height of a standard bed.

Additional features and advantages of the invention will be set forth in the description which follows, and in part will be apparent from the description, or may be learned by practice of the invention. The objectives and other advantages of the invention will be realized and attained by the

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structure particularly pointed out in the written description and claims hereof as well as the appended drawings.

A preferred embodiment of the present invention is an increased height inflatable mattress. This increased height can improve the perceived comfort of the mattress, as it allows a user to feel more like they are sleeping on a traditional bed. The increased height is achieved by vertically stacking two or more inflatable chambers. In a preferred embodiment, these stacked chambers are in fluid communication with each other, such that all chambers can be inflated from a single valve. In an alternative embodiment, the stacked chambers may be separately inflatable.

A preferred embodiment of the present invention addresses the shortcomings of the prior art by including one or more stabilizer bars and one or more support chambers. Stabilizer bars reduce the likelihood of support system rollovers by effectively increasing the surface area across which weight added to a support system is distributed. In a preferred embodiment, stabilizer bars are flexibly attached to a support system along one or more sides, and at or near the bottom of the support system. In one embodiment, stabilizer bars can be in fluid communication with the support system, thereby allowing the stabilizer bars to be inflated as the support system is inflated. In an alternative embodiment, stabilizer bars may be comprised of separately inflatable chambers. In still another embodiment, stabilizer bars may be constructed such that a rigid or semi-rigid material, such as, but not limited to, plastic or cardboard, can be engaged into a holder, such as a sleeve, attached to the support system.

The support chamber portion of the preferred embodiment is an inflatable chamber which is attached to the side walls of the support system. In one embodiment, support chambers can be attached at any chamber junctions within a support system. The shape and position of the support chambers allows the support chambers to reinforce chamber junction edges, thereby increasing the strength of the overall support system.

In a preferred embodiment, all inflatable chambers of the support system are in either direct or indirect fluid communication with other chambers of the support system. This can allow the support system to be inflated from a single motor, with the simple flip of a switch. In an alternative embodiment, some or all inflatable chambers may be separately inflatable, thereby allowing each chamber to be filled to a unique pressure.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the description serve to explain the principles of the invention.

In the drawings:

FIG. **1** is a perspective view of the internal structure of a mattress embodiment of the present invention.

FIG. **2** is a perspective view of the internal structure of a mattress embodiment of the present invention also illustrating air flow inside said mattress.

FIG. **3** is a front planar view of a mattress embodiment of the present invention.

FIG. **4** is a rear planar view of a mattress embodiment of the present invention.

FIG. **5** is a side planar view of a mattress embodiment of the present invention.

FIG. **6** is a perspective view of an alternative mattress embodiment of the present invention employing multiple stabilizer bars.

FIG. **7** is a perspective view of an alternative mattress embodiment of the present invention employing multiple upper chambers.

FIG. **8** is a perspective view of an alternative mattress embodiment of the present invention in which the illustrated stabilizer bar is in fluid communication with the lower chamber through a series of tubes.

FIG. **9** is a cross-sectional view of the mattress embodiment of the present invention illustrated in FIG. **4**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings.

FIG. **1** is a perspective view of the internal structure of a mattress embodiment of the present invention. As FIG. **1** illustrates, the presently preferred embodiment is comprised of two support chambers, **20** and **21**, stacked vertically. In the embodiment illustrated in FIG. **1**, upper chamber **20** is constructed with side gussets approximately ten inches high, and lower chamber **21** is constructed with side gussets approximately fifteen inches high. It should be clear to one skilled in the art that alternative side gusset heights and chamber arrangements could be substituted without departing from the spirit and scope of the present invention. By way of example, FIG. **7** illustrates the use of multiple upper chambers.

As FIG. **1** illustrates, a motorized pump **10** is attached to upper chamber **20**. Pump **10** should be powerful enough to fill the entire support system with a gas or fluid, such as air, such that upper chamber **20** can provide comfortable support to a user. Inflation of the support system can begin by pressing a button on or near pump **10**, as is illustrated by button **23** in FIG. **3**. Pump **10** may automatically stop inflating the support system when the pressure within the support system reaches a limit selectable by a user. In addition, should a user desire to gradually decrease the pressure within the support system, a user simply activates a push-button valve, illustrated as valve **27** in FIG. **3**. Pump **10** may also monitor support system air pressure and automatically add additional air if the pressure falls below a level selected by a user.

Air entering upper chamber **20** may flow to lower chamber **21** through a series of reinforced holes **11**. In the embodiment illustrated in FIG. **1**, holes **12** allow stabilizer bars **13** to be in fluid communication with lower chamber **21**. FIG. **1** also illustrates the use of support chamber **14** to reinforce the junction between upper chamber **20** and lower chamber **21**. In the preferred support system embodiment illustrated in FIG. **9**, chamber **14** runs circumferentially around the support system at the junction between upper chamber **20** and lower chamber **21**.

Again referring to FIG. **1**, upper chamber **20**, lower chamber **21**, stabilizer bars **13**, and support chamber **14** are preferably made from heavy weight (preferably 18 gauge) polyvinylchloride (PVC) or other watertight and airtight material. PVC may be preferably attached to PVC or other

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material by electronically "welding" the PVC to the other material, although other attachment means, such through a chemical bond or by stitching edges of each sheet together, may also be used. Such an attachment means may be used, for example, to join the top of a chamber with the side of a chamber or to add a layer of fabric, padding, flocking, or other material (collectively "fabric") to the PVC.

Within upper chamber **20** and lower chamber **21**, PVC strips **15** can be attached to the inner surface of the top and bottom of each chamber, illustrated as **18** and **19**. Such PVC strips **15** create channels, which help to shape and structurally reinforce upper chamber **20** and lower chamber **21**. It should be apparent to one skilled in the art that alternative chamber support architectures, such as the "coil construction" technique known in the art, may be employed without departing from the spirit or scope of the present invention.

FIG. **2** is a perspective view of the internal structure of a mattress embodiment of the present invention, also illustrating the flow of air or other fluid inside said mattress. As FIG. **2** illustrates, air enters the support system at pump **10** and travels through the channels created by PVC strips **15** within upper chamber **20**. PVC strips **15** are preferably shaped such that air is able to flow past the ends of PVC strips **15**, thereby allowing air to circulate within upper chamber **20** and lower chamber **21**.

As upper chamber **20** inflates, air can enter lower chamber **21** through holes **11**. A preferred embodiment uses four such holes, each of which is approximately three quarters of an inch in diameter. Each hole **11** is substantially centered within a circular weld four inches in diameter, where such a weld can also serve to attach upper chamber **20** to lower chamber **21**. It should be obvious to one skilled in the art that other hole arrangements, including, but not limited to, fewer holes of a larger size, or more holes of a smaller size, may also be used.

While such alternative hole arrangements may be used, it was found during product development that the placement of holes **11** is important for proper durability and inflation. Specifically, it was found that placing holes **11** in the outermost channel of upper chamber **20** tended to result in tears along PVC strips **15** in lower chamber **21**. Locating holes **11** in the second channel from the end has proved to generate the least number of tears in PVC strips **15** while stilling allowing rapid inflation of both upper chamber **20** and lower chamber **21**.

As lower chamber **21** inflates, air can also flow into stabilizer bars **13**. In the embodiment illustrated in FIG. **2**, air can flow into and out of stabilizer bars **13** through a series of holes **12**. FIG. **8** illustrates a preferred stabilizer bar embodiment, in which stabilizer bar **13** is in fluid communication with lower chamber **21** through two short tubes **25**. While the position of tubes **25** does not impact the ability of stabilizer bar **13** to inflate, tubes **25** are preferably located approximately one and one half inches from the ends of stabilizer bar **13**. As illustrated in both FIG. **2** and FIG. **8**, stabilizer bars **13** are flexibly attached to the side gusset of lower chamber **21**, preferably near the bottom of the side gusset.

While FIG. **2** illustrates the use of a single stabilizer bar of a length substantially equal to the length of the support system, alternative stabilizer bar arrangements can also be envisioned. For example, FIG. **6** provides an alternative perspective view of a mattress embodiment of the present invention employing multiple stabilizer bars. It should be noted that, unlike the stabilizer bars used in the prior art, the stabilizer bar arrangements employed by the present invention provide stabilization along almost the entire length of at least one side of the support system.

FIG. **2** also illustrates a preferred inflation means for support chamber **14**. As FIG. **2** illustrates, support chamber **14** is in fluid communication with lower chamber **21** through a series of holes **16**. In a preferred embodiment, holes **16** are approximately three quarters of an inch in diameter, and are substantially centered in reinforced PVC.

In an alternative embodiment, support chamber **14** may receive air from upper chamber **20**. In still another embodiment, support chamber **14** may be in fluid communication with both upper chamber **20** and lower chamber **21**. In yet another embodiment, support chamber **14** may be separately inflatable, thereby allowing support chamber **14** to be inflated to a pressure greater than the pressure in the remaining support system.

FIG. **3** is a front planar view of a mattress embodiment of the present invention. As FIG. **3** illustrates, an one or more layers of fabric **17** may be added to the outside of upper chamber **20** in a preferred support system embodiment. While it is preferred that fabric **17** be laminated to upper chamber **20**, additional attachment means, such as, but not limited to, chemical adhesives, electronic welding, or sewing, may also be used.

FIG. **4** is a rear planar view of a mattress embodiment of the present invention which highlights valve **24**. In the embodiment illustrated in FIG. **4**, valve **24** is located substantially in the center of lower chamber **21** at the end opposite from which pump **10** is attached to upper chamber **20**. This arrangement is preferred, as it allows the weight of the support system to force air through valve **24**. This, in turn, allows the support system to be quickly deflated for storage. The arrangement of valve **24** with respect to pump **10** is more clearly illustrated in FIG. **5**.

FIG. **7** is an alternative perspective view of a mattress embodiment of the present invention, illustrating the use of multiple upper chambers **20**. In the embodiment illustrated in FIG. **7**, said upper chambers can be in fluid communication with lower chamber **21**. In an alternative embodiment, upper chambers **20** may be separately inflatable, allowing users to select a desired firmness for each upper chamber. In this embodiment, air from pump **10** may be redirected into either or both upper chambers **20** by enabling or disabling one or more valves **26** connected to each chamber (illustrated in FIG. **3**).

FIG. **9** is a cross-sectional view of the mattress embodiment of the present invention illustrated in FIG. **4**. In addition to illustrating a preferred stabilizer chamber **14** embodiment, FIG. **9** also illustrates the use of an additional chamber **27**. In this embodiment, chamber **27** does not have a side gusset, which results in a rounded outer edge **28**. In addition, chamber **27** has dimensions substantially equal to those of chamber **20**. Chamber **27** can also be welded to give chamber **27** a quilted appearance, and chamber **27** can be covered with flocking or other material to give chamber **27** a velvety soft texture. Through the addition of such a chamber **27**, support system as a whole can more closely approximate the look and feel of a traditional bed.

Through the arrangements set forth above, the present invention provides an increased height support system that yields increased comfort, added stability, and improved structural integrity over the prior art.

While the invention has been described in detail and with reference to specific embodiments thereof, it will be apparent to those skilled in the art that various changes and modifications can be made therein without departing from

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the spirit and scope thereof. Thus, it is intended that the present invention cover the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

What is claimed is:

1. An inflatable mattress with at least one inflatable stabilizer bar attached to at least one side of the mattress near the bottom support surface of the mattress, where the at least one stabilizer bar is of a size substantially equal to or greater than the length of a side of the mattress and of a height less than the height of the mattress, and where the at least one stabilizer bar is in fluid communication with the inflatable mattress.

2. The inflatable mattress of claim **1**, wherein said inflatable mattress comprises a top chamber in fluid communication with a bottom chamber, each of said chambers having a top layer, a bottom layer and a side gusset.

3. The inflatable mattress of claim **2**, wherein there are a plurality of stabilizer bars.

4. The inflatable mattress of claim **2**, wherein said at least one stabilizer bar is in fluid communication with said bottom chamber.

5. The inflatable mattress of claim **4**, further comprising a series of parallel channels defined within said bottom chamber.

6. The inflatable mattress of claim **5**, further comprising a series of parallel channels defined within said top chamber.

7. The inflatable mattress of claim **5**, wherein said parallel channels are formed from material attached to the inner surfaces of said top layer and said bottom layer of said bottom chamber.

8. The inflatable mattress of claim **6**, wherein said parallel channels are formed from material attached to the inner surfaces of said top layer and said bottom layer of said top chamber.

9. The inflatable mattress of claim **7**, wherein said material forming said channels in said bottom chamber is PVC.

10. The inflatable mattress of claim **8**, wherein said material forming said channels in said top chamber is PVC.

11. The inflatable mattress of claim **10**, further comprising at least one pressure control device capable of controlling the firmness of said top and bottom chambers.

12. An inflatable mattress with a plurality of inflatable stabilizer bars attached to at least one side of the mattress near the bottom support surface of the mattress, where the sum total of the stabilizer bar lengths is substantially equal to or greater than the length of a side of the mattress, the height of each of the stabilizer bars is less than the height of the mattress, and the stabilizer bars are in fluid communication with the inflatable mattress.

13. The inflatable mattress of claim **12**, wherein said inflatable mattress includes four sides, said sides comprising two parallel long sides and two parallel short sides.

14. The inflatable mattress of claim **13**, wherein said stabilizer bars are attached to at least said long parallel sides.

15. The inflatable mattress of claim **14**, wherein said stabilizer bars are attached to at least three sides of said mattress.

16. The inflatable mattress of claim **15**, wherein said stabilizer bars are attached to four sides of said mattress.

* * * * *

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UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 6,701,559 B2
DATED : March 9, 2004
INVENTOR(S) : Karen L. Boso et al.

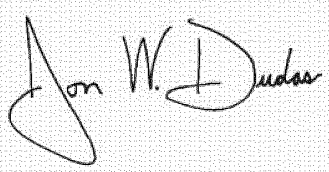
It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title page,
Item [75], Inventors, delete "Woodstock," and substitute -- Fox River, -- in its place.

Column 5,
Line 44, delete "stilling" and substitute -- still -- in its place.

Signed and Sealed this

Twenty-fourth Day of August, 2004



JON W. DUDAS
Director of the United States Patent and Trademark Office

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US006568013B2

(12) **United States Patent**
Perez et al.

(10) **Patent No.: US 6,568,013 B2**
(45) **Date of Patent: May 27, 2003**

(54) **FLUID MATTRESS ASSEMBLY WITH CHECK VALVES**

(75) Inventors: **Timothy W. Perez**, James Island, SC (US); **Sohrab Soltani**, Charleston, SC (US); **James J. Romano**, James Island, SC (US)

(73) Assignee: **Hill-Rom Services, Inc.**, Wilmington, DE (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/152,436**

(22) Filed: **May 21, 2002**

(65) **Prior Publication Data**

US 2002/0133883 A1 Sep. 26, 2002

Related U.S. Application Data

(63) Continuation of application No. 09/873,540, filed on Jun. 4, 2001, now Pat. No. 6,418,579, which is a continuation of application No. 09/479,353, filed on Jan. 7, 2000, now Pat. No. 6,240,584.

(60) Provisional application No. 60/115,116, filed on Jan. 8, 1999.

(51) **Int. Cl.**[7] **A47C 27/08**

(52) **U.S. Cl.** **5/710**; 5/713

(58) **Field of Search** 5/713, 710, 708, 5/706, 655.3

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,730,752	A	10/1929	Withers
2,245,909	A	6/1941	Enfiajian
2,604,641	A	7/1952	Reed
2,997,100	A	8/1961	Morris
3,068,494	A	12/1962	Pinkwater
3,583,008	A	6/1971	Edwards
3,772,717	A	11/1973	Yuen et al.
3,978,530	A	9/1976	Amarantos
4,042,988	A	8/1977	Holliday

(List continued on next page.)

FOREIGN PATENT DOCUMENTS

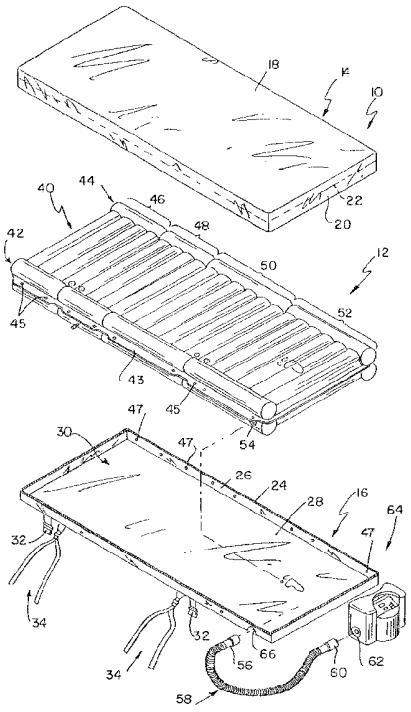
DE	295 21 505	1/1998
DE	297 17 204	12/1998
EP	1 151 698 A2	7/2001
GB	769792	3/1957
GB	2 092 439	8/1982
GB	2 267 217	12/1993

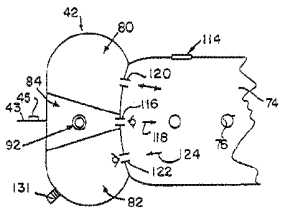
Primary Examiner—Alexander Grosz
(74) *Attorney, Agent, or Firm*—Bose McKinney & Evans LLP

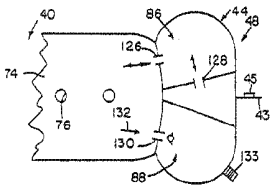
(57) **ABSTRACT**

A mattress assembly including an inflatable central support portion and a side bolster. A check valve is configured to prevent fluid flow from at least a portion of the side bolster to the central support portion.

27 Claims, 6 Drawing Sheets







U.S. PATENT DOCUMENTS

4,306,322	A	12/1981	Young et al.
4,525,885	A	7/1985	Hunt et al.
4,541,135	A	9/1985	Karpov
4,644,597	A	2/1987	Walker
4,708,167	A	11/1987	Koyanagi
4,788,729	A	12/1988	Walker
4,803,744	A	2/1989	Peck et al.
4,944,060	A	7/1990	Peery et al.
4,949,414	A	8/1990	Thomas et al.
4,982,466	A	1/1991	Higgins et al.
4,986,738	A	1/1991	Kawasaki et al.
5,022,110	A	6/1991	Stroh
5,052,067	A	10/1991	Thomas et al.
5,062,167	A	11/1991	Thomas et al.
5,067,189	A	11/1991	Weedling et al.
5,073,999	A	12/1991	Thomas et al.
5,095,568	A	3/1992	Thomas et al.
5,103,519	A	4/1992	Hasty
5,121,513	A	6/1992	Thomas et al.
5,182,826	A	2/1993	Thomas et al.
5,251,349	A	10/1993	Thomas et al.
5,325,551	A	7/1994	Tappel et al.
5,367,728	A	11/1994	Chang
5,483,709	A	1/1996	Foster et al.
5,539,942	A	7/1996	Melou
5,561,873	A	10/1996	Weedling
5,564,142	A	10/1996	Liu
5,634,225	A	6/1997	Miller, Sr. et al.
5,655,239	A	8/1997	Caparon et al.
5,701,622	A	12/1997	Biggie et al.
5,729,853	A	3/1998	Thompson
5,787,531	A	8/1998	Pepe
5,794,288	A	8/1998	Soltani et al.
5,830,780	A	11/1998	Dennison et al.
6,085,372	A	7/2000	James et al.
6,178,578	B1	1/2001	Soltani et al.
6,202,672	B1	3/2001	Ellis et al.

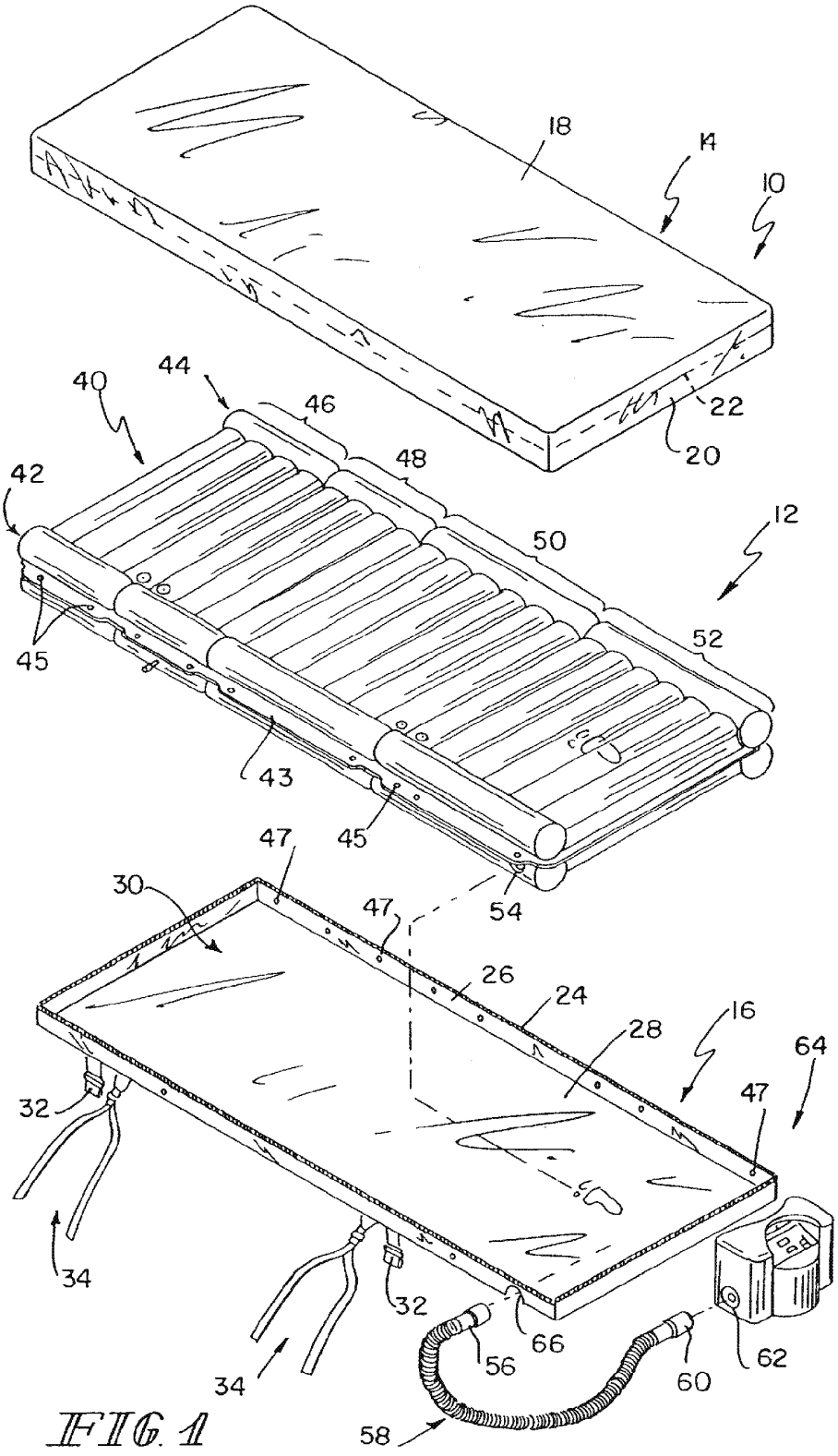

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FIG. 1

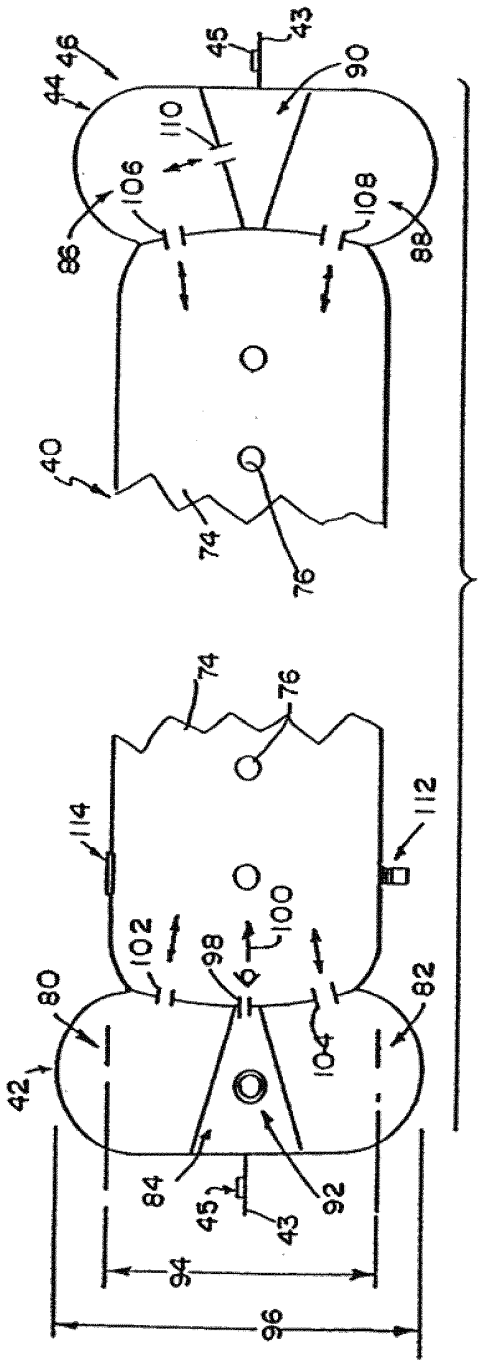

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FIG. 2

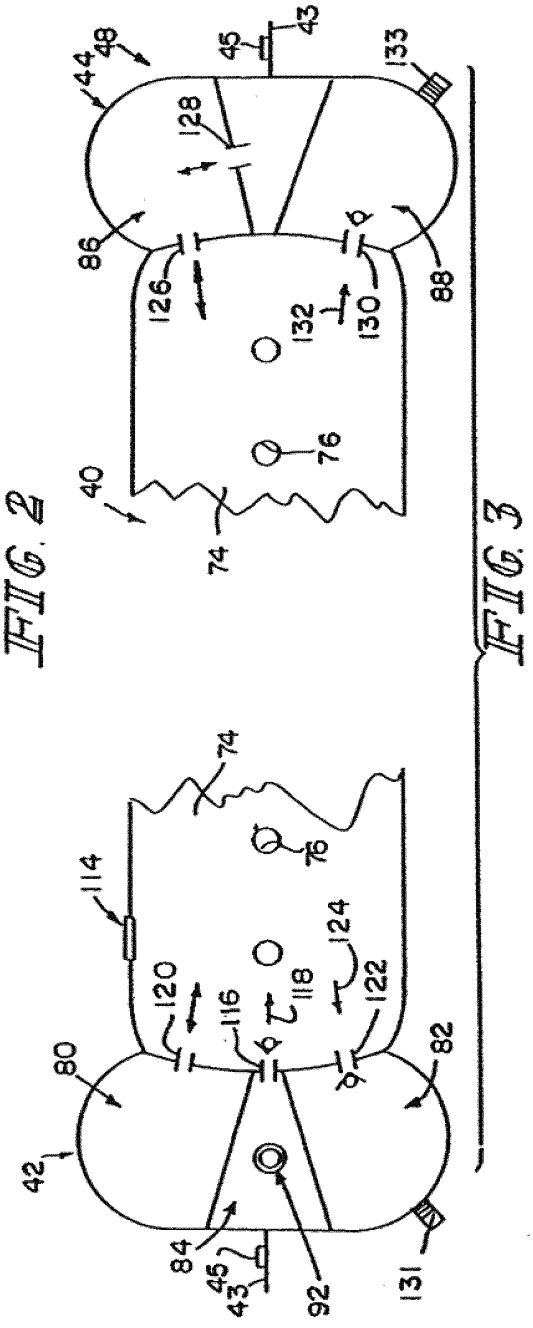

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FIG. 3

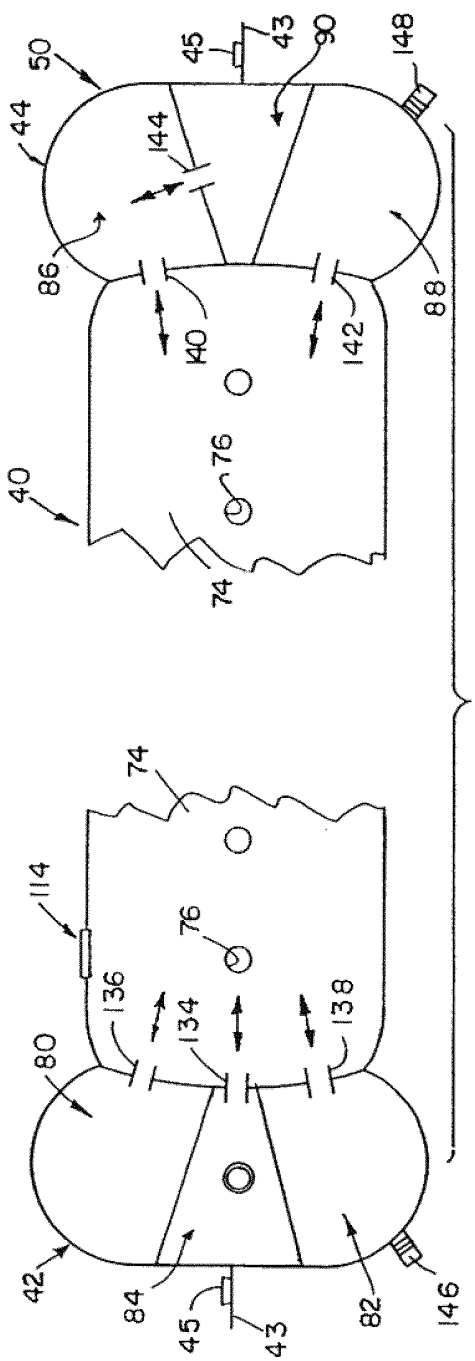

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FIG. 4

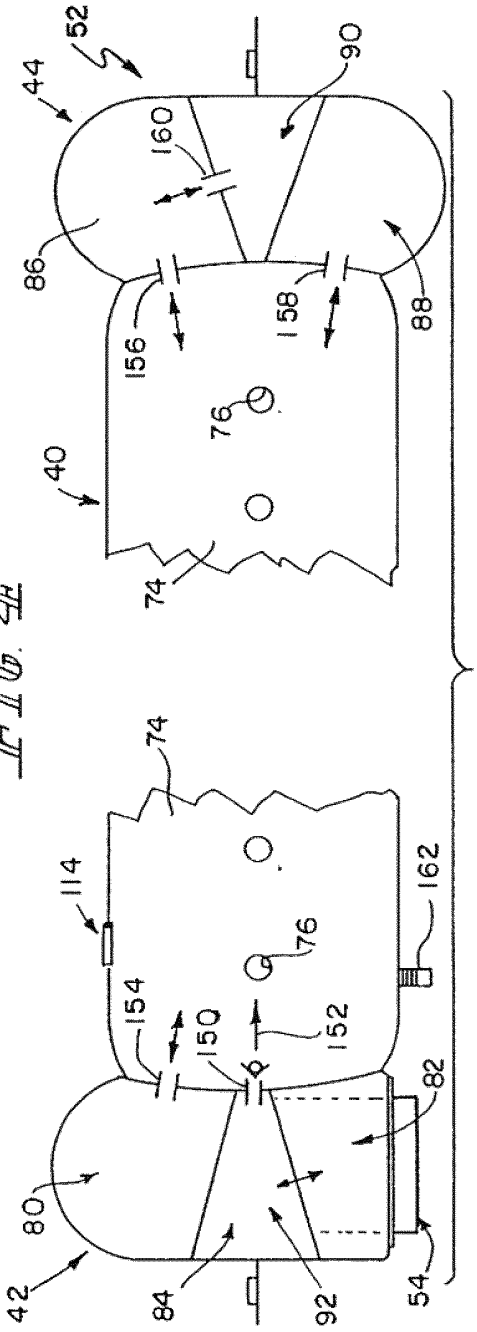

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FIG. 5

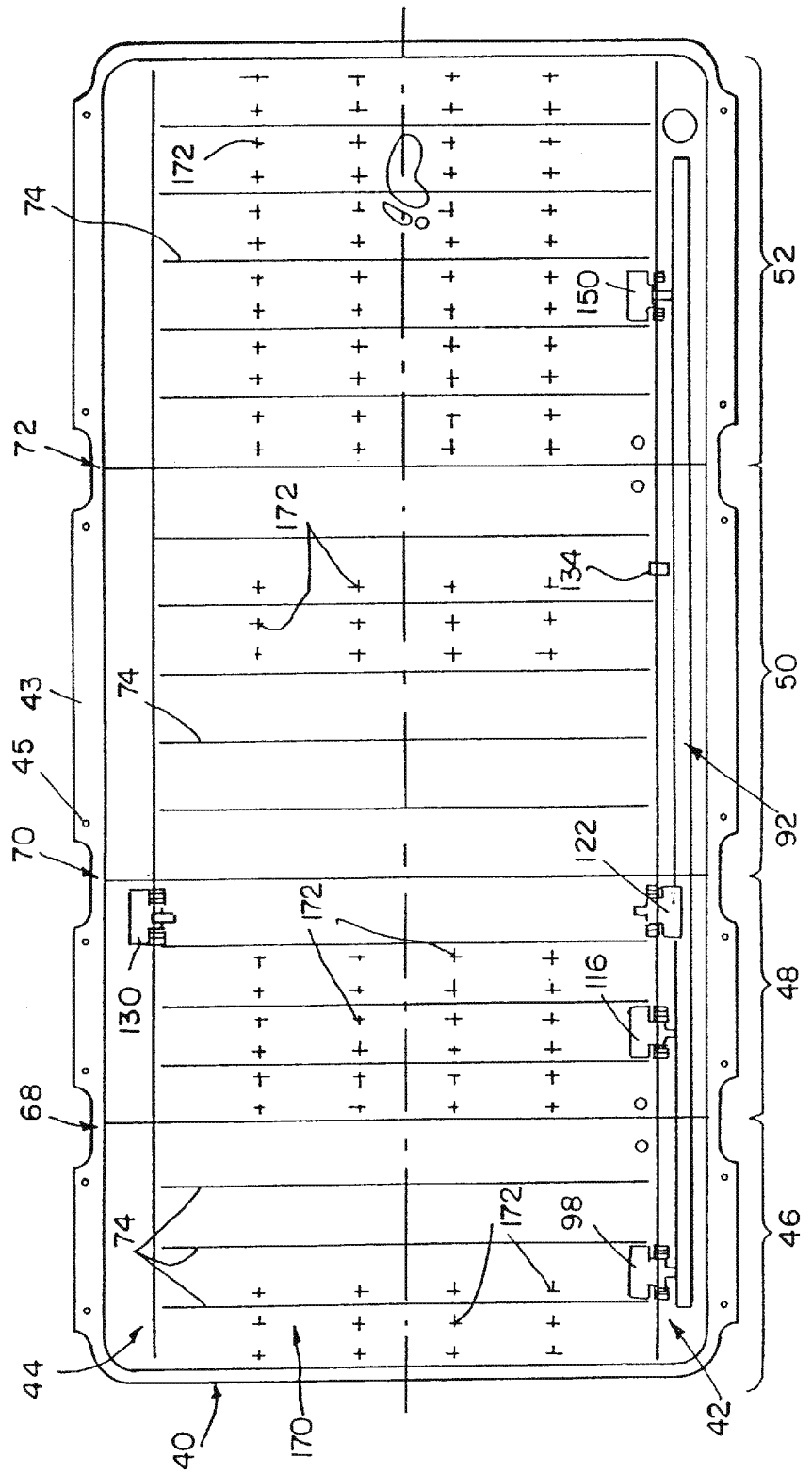

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FIG. 6

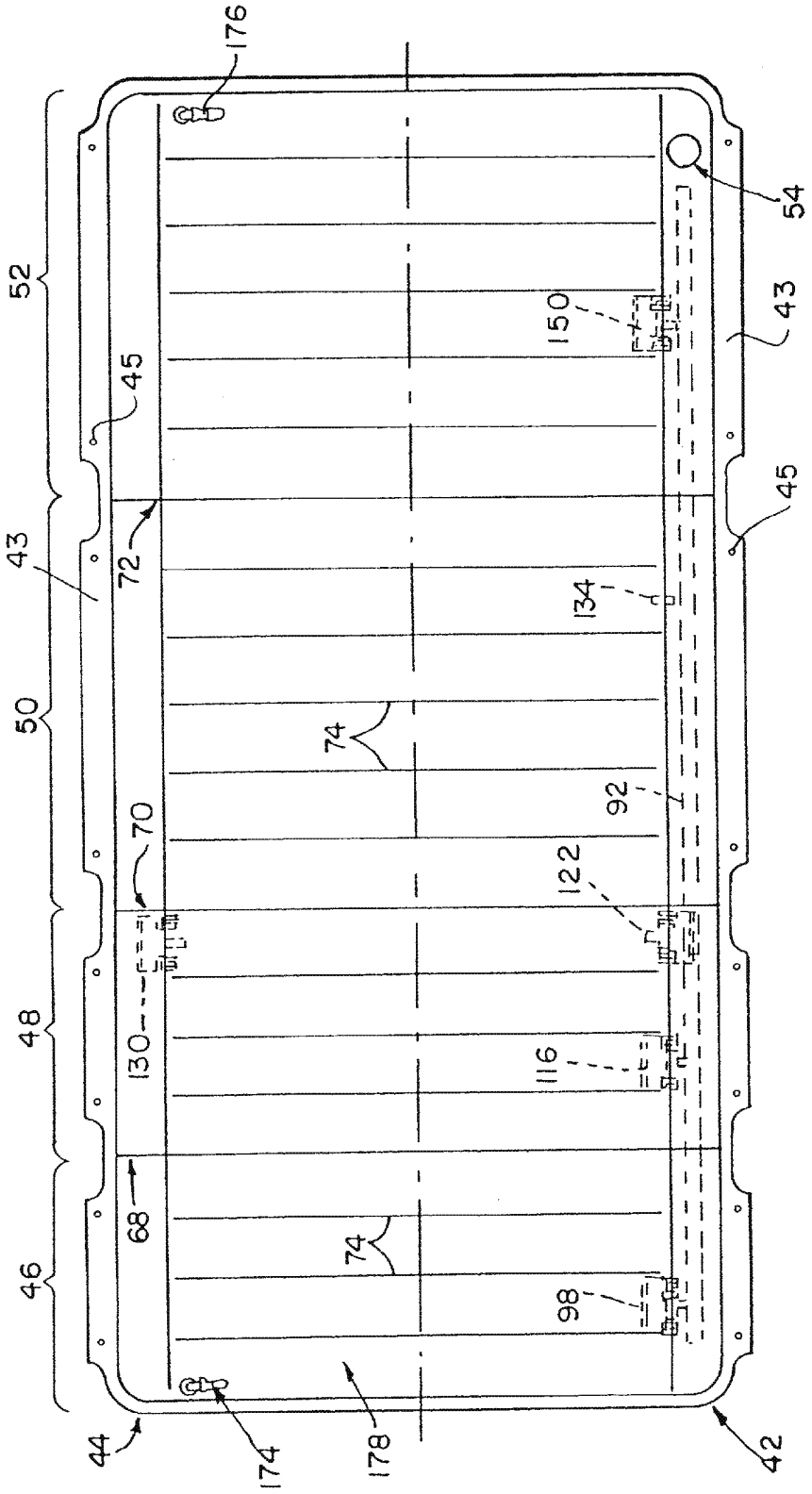

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FIG. 7

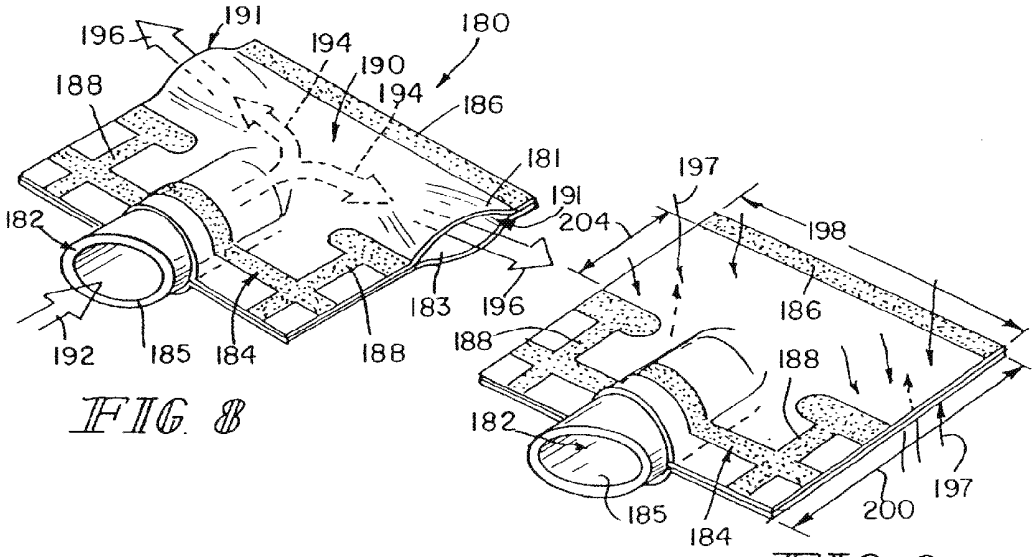


FIG. 8

FIG. 9

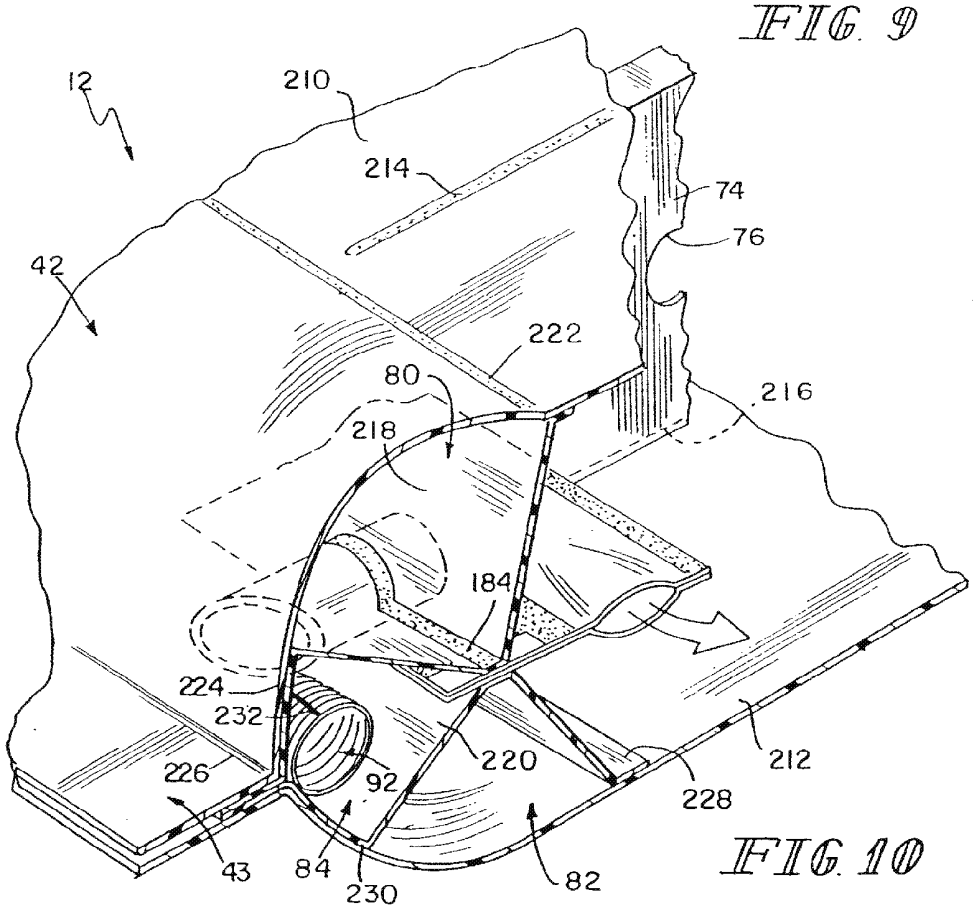


FIG. 10

FLUID MATTRESS ASSEMBLY WITH CHECK VALVES

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. patent application Ser. No. 09/873,540, filed Jun. 4, 2001 now U.S. Pat. No. 6,418,579, which is a continuation of U.S. patent application Ser. No. 09/479,353, filed Jan. 7, 2000, now U.S. Pat. No. 6,240,584, which claims the benefit of U.S. provisional application Ser. No. 60/115,116, filed Jan. 8, 1999, the disclosures of which are expressly incorporated by reference herein.

BACKGROUND AND SUMMARY OF THE INVENTION

The present invention relates to a mattress, a mattress overlay, or a mattress replacement assembly including an air cushion having air zones for supporting a person, and to a pressure control assembly for controlling the pressure of pressurized fluid contained by the air zones of the air cushion. The present invention further relates to a mattress assembly including a check valve configured to control air flow between a central support portion and a side bolster.

Some mattresses, mattress overlays, or mattress replacement systems (hereinafter mattresses) are provided with air sacks to support a person and to provide adjustable firmness characteristics. These air mattresses include one, or several air sacks that are inflated to different pressures to adjust the firmness in selective regions or zones of the mattress. One such mattress is illustrated in U.S. Pat. No. 5,794,288, entitled PRESSURE CONTROL ASSEMBLY FOR AN AIR MATTRESS, which is herein incorporated by reference.

It is desirable for an air mattress to provide different pressure zones of support for a person on the mattress while maintaining sufficient pressure along opposite side edges of the mattress to provide support when the person sits or rests along one of the side edges. In the illustrated embodiment, each air zone is in fluid communication with a manifold having an interior region that is maintained at a constant pressure. The constant pressure of the pressurizing fluid within the manifold may be the same as or may be different from the pressure of pressurized fluid within at least one of the air zones. The illustrated air cushion also includes first and second side bolsters filled with air that extend along opposite sides of the air cushion to help retain a person on the air cushion.

In an illustrated embodiment of the present invention, a mattress assembly comprises an inflatable central support portion having a head end, a foot end, a first side and a second side, and first and second side bolsters coupled to the first and second sides, respectively. The first and second side bolsters each have at least two chambers extending along a longitudinal axis of the first and second side bolsters. At least one of the chambers is a manifold in fluid communication with the central support portion. The manifold is configured to be coupled to an air supply to supply air to the central support portion and the other chambers.

Also in the illustrated embodiment, the inflatable central support and the first and second side bolsters are formed from a plurality of separately inflatable zones. The plurality of zones include a head zone, a shoulder zone, a seat zone, and a foot zone. The illustrated first and second side bolsters each include a top chamber, a central chamber, and a bottom chamber. The central chamber of the first side bolster is illustratively the manifold extending along the first side of the central support portion. The central chamber of the first side bolster is in fluid communication which each of the plurality of zones of the central support portion. The zones of the top and bottom chambers of the of the first and second side bolsters are each in fluid communication with the central support portion through a restricted flow orifice. Illustratively, the zones of the central chamber of the second side bolster are coupled to the top chambers of the second side bolster through a restricted flow orifice. Also illustratively, the bottom chambers in the shoulder zone of the of the first and second side bolsters are coupled to the central support portion by check valves which permit air flow from the central support portion into the bottom chambers in the shoulder zone and prevent air flow from the bottom chambers in the shoulder zone into the central support portion.

Further in the illustrated embodiment, the manifold in the head zone, the shoulder zone, and the foot zone is coupled to the central support portion by check valves which permit air flow from the manifold into the central support portion, and prevent air flow from the central support portion into the head zone, the shoulder zone, and the foot zone of the manifold. Illustratively, each check valve includes a top sheet, a bottom sheet disposed substantially parallel to the top sheet, an outlet defined between the top sheet and the bottom sheet, and at least one seal configured to secure the top sheet and the bottom sheet around a tube to provide an inlet.

Additional features and advantages of the invention will become apparent to those skilled in the art upon consideration of the following detailed description of an illustrated embodiment exemplifying the best mode of carrying out the invention as presently perceived.

BRIEF DESCRIPTION OF THE DRAWINGS

The detailed description particularly refers to the accompanying figures in which:

FIG. **1** is an exploded perspective view of a mattress assembly of the present invention including an air cushion having a plurality of separate air zones, top coverlet, a bottom cover, and a blower configured to be coupled to the air cushion;

FIG. **2** is a sectional view taken through a head zone of the air cushion;

FIG. **3** is a sectional view taken through a shoulder zone of the air cushion;

FIG. **4** is a sectional view taken through a seat zone of the air cushion;

FIG. **5** is a sectional view taken through a foot zone of the air cushion;

FIG. **6** is a top plan view of the air cushion of FIG. **1**;

FIG. **7** is a bottom plan view of the air cushion;

FIG. **8** is a perspective view of a check valve of the present invention in an open orientation to permit air flow from a manifold into a central support portion of the air cushion;

FIG. **9** is a perspective view of the check valve of FIG. **8** illustrating the check valve in a closed position; and

FIG. **10** is a perspective view of a portion of the air cushion illustrating a plurality of chambers within a side bolster located adjacent to a support zone of the air cushion.

DETAILED DESCRIPTION OF THE DRAWINGS

Referring now to the drawings, FIG. **1** illustrates a mattress assembly **10** including an air cushion **12** configured to

be located between a top coverlet **14** and a bottom cover **16**. Illustratively, top coverlet **14** includes a top surface **18** and a side flap **20**. A zipper **22** extends around the coverlet **14** beneath the flap **20**. Zipper **22** is configured to be coupled to a zipper **24** of bottom cover **16** so that the flap **20** extends downwardly over zipper **24**. Zipper **24** is coupled to a side wall **26** of cover **16** which extends upwardly from a bottom surface **28**. Coverlet **14** and bottom cover **16** cooperate to define an interior region **30** for receiving the air cushion **12**. Buckles **32** are coupled to opposite sides of cover **16** to secure the mattress assembly **10** to a box spring or a support deck. In addition, bottom cover **16** includes tie straps **34** which may also be used to secure the mattress assembly **10** to a support deck.

Air cushion **12** includes a side flap **43** adjacent each side bolster **42** and **44**. Snaps **45** are located on each flap **43**. Snaps **45** are configured to mate with snaps **47** on side wall **26** of bottom cover **16**. It is understood that other suitable fasteners, such as Velcro fasteners, ties, etc. may be used instead of snaps **45** and **47**.

Air cushion **12** includes a middle or central support portion **40** which provides a sleep surface for a person resting on the mattress. Air cushion **12** also includes side tubes or bolsters **42** and **44** located on opposite sides of the central support portion **40**. Air cushion **12** is illustratively divided into separate air zones including a head zone **46**, a shoulder zone **48**, a seat zone **50**, and a foot zone **52**. A hose fitting **54** is coupled to the side bolster **42** in the foot zone **52**. Fitting **54** is configured to be coupled to a connector **56** on air hose **58**. A connector **60** on the opposite end of hose **58** is configured to be coupled to an outlet **62** of a blower **64**. Connector **56** extends through an aperture **66** formed in bottom cover **16** and into the hose fitting **54** to supply air from the blower **64** to the air cushion **12** as discussed in detail below.

Each of the air zones **46**, **48**, **50**, and **52** are separated by a solid divider wall **68**, **70**, and **72** as best illustrated in FIG. **6**. The central support portion **40** further includes baffles **74** located within each zone. Baffles **74** include apertures **76** which permit air flow through the baffles **74**.

First side bolster **42** includes a top chamber **80**, a bottom chamber **82**, and a central manifold **84**. Second side bolster **44** includes a top chamber **86**, a bottom chamber **88**, and a central chamber **90**. Top and bottom chambers **80** and **82** of side bolster **42** are divided into separate zones by dividers **68**, **70**, and **72** shown in FIG. **6**. Manifold **84** extends continuously through the first side bolster **42** so that manifold **84** supplies air from the blower **64** to each of the separate air zones **46**, **48**, **50**, and **52** of the air cushion **12**. A split corrugated hose **92** extends through the manifold **84** to prevent opposite side walls of the manifold **84** from collapsing together to block air flow through one of the air zones.

As shown in FIG. **5**, inlet air from blower **64** passes through hose **58** and hose fitting **54** into bottom chamber **82** of foot zone **52**. Bottom chamber **82** is in fluid communication with manifold **84** within foot zone **52**. Therefore, air flows through the manifold **84** along the entire side bolster **42**.

Referring now to FIG. **2**, the configuration of the head zone **46** of the air cushion **12** is illustrated. The central support portion **40** has a thickness illustrated by dimension **94**. Side bolsters **42** and **44** have a thickness illustrated by dimension **96** which is greater than the thickness of the support portion **40**. The increased thickness of side bolsters **42** and **44** helps to maintain a person on the air cushion **12**. The top and bottom chambers of the side bolsters **42**, **44** simulate a rectangular shape and provide an increased sleep surface area compared to a single round side bolster chamber.

In head zone **46**, air from manifold **84** passes into central support portion **40** through a check valve **98** in the direction of arrow **100** to supply the central support portion **40** with air from the blower **64**. Air from central support portion **40** passes through a restricted flow orifice **102** into top chamber **80** and through a restricted flow orifice **104** into bottom chamber **82** of side bolster **42**. In addition, air from central portion **40** passes through a restricted flow orifice **106** into top chamber **86** of side bolster **44** and through restricted flow orifice **108** into bottom chamber **88** of side bolster **44**. Air also passes from top chamber **86** to central chamber **90** of side bolster **44** through a restricted flow orifice **110**. Illustratively, orifices **102**, **104**, **106**, **108**, and **110** all have a size of ⅛ inch. A dump valve **112** is coupled to central portion **40** to permit the head zone **46** to be deflated quickly. A test port **114** is also coupled to central support portion **40**. Test port **114** is configured to receive a needle to check the pressure within zone **46**.

FIG. **3** illustrates the configuration of the air cushion **12** in the shoulder zone **48**. Air from the manifold **84** passes through a check valve **116** into central support portion **40** in the direction of arrow **118**. Air from central support portion **40** flows into top chamber **80** of side bolster **42** through an orifice **120**. Air from central support portion **40** also passes through a check valve **122** into bottom chamber **82** of side bolster **42** in the direction of arrow **124**. In addition, air from central support portion **40** passes into top chamber **86** of side bolster **44** through a restricted flow orifice **126**. Air from chamber **86** passes into central chamber **90** through orifice **128**. Air also passes from central support portion **40** through a check valve **130** into bottom chamber **88** of side bolster **44** in the direction of arrow **132**. Illustratively, orifices **120**, **126**, and **128** have a dimension of ⅛ inch. Dump valves **131** and **133** are coupled to bottom chambers **82** and **88**, respectively, of shoulder zone **48**.

Check valves **122** and **130** permit air to enter bottom chambers **82** and **88**, respectively. However, air cannot pass back through check valves **122** and **130** into the central support portion **40**. Therefore, these bottom chambers **82** and **88** within shoulder zone **48** remain at relatively high pressure to provide additional support in bolsters **42** and **44** within the shoulder zone. As the weight of the patient increases, the pressure within bottom chambers **82** and **88** within shoulder zone **48** also increases.

FIG. **4** illustrates the configuration of the air cushion **12** within the seat zone **50**. Air manifold **84** is coupled to central support portion **40** by an orifice **134**. Illustratively, orifice **134** has a dimension of ⅜ inch. Therefore, the pressure within central support portion **40** of seat zone **50** is maintained at substantially the air manifold pressure. Air passes from central support portion **40** into top chamber **80** and bottom chamber **82** of side bolster **42** through restricted flow orifices **136** and **138**, respectively. Air also passes from central support portion **40** into top chamber **86** and bottom chamber **88** of side bolster **44** through restricted flow orifices **140** and **142**, respectively. Air passes from top chamber **86** to central chamber **90** of side bolster **44** through a restrictive flow orifice **144**. Illustratively, orifices **136**, **138**, **140**, **142**, and **144** each have a dimension of ⅛ inch. Dump valves **146** and **148** are coupled to bottom chambers **82** and **88**, respectively. A test port **114** is coupled to central support portion **40**.

A configuration of foot zone **52** of air cushion **12** is illustrated in FIG. **5**. Air manifold **84** is coupled to central

support portion **40** of foot zone **52** by a check valve **150** so that air flows from manifold **84** into central support portion **40** in the direction of arrow **152**. Air passes from central support portion **40** into top chamber **80** of side bolster **42** through restricted flow orifice **154**. Air also passes into top chamber **86** and the bottom chamber **88** of side bolster **44** through restrictive flow orifices **156** and **158**, respectively. Air flows from top chamber **86** to central chamber **90** of side bolster **44** through restricted flow orifice **160**. Illustratively, orifices **154**, **156**, **158**, and **160** have a dimension of ⅛ inch. A dump valve **162** is coupled to central support portion **40** within foot zone **52**. A test port **114** is also coupled to central support portion **40** within foot zone **52**.

Air pressure within each of the air zones **46**, **48**, **50**, and **52** is controlled by the number of micro holes **172** formed in a top surface **170** of each zone of the central support portion **40**. Illustratively, head zone **46** includes 12-16 micro holes **172**, shoulder zone **48** includes 20-24 micro holes, seat zone **50** includes 12 micro holes, and foot zone **52** includes 36-48 micro holes. The number of micro holes **172** in each zone **46**, **48**, **50**, and **52** controls the pressure within the zone since the same manifold pressure from air manifold **84** is supplied to each zone. Therefore, pressure within the zones **46**, **48**, **50**, and **52** can be established at a desired level by altering the size or number of micro holes **172** formed in top surface **170** of central support surface **40**. In another embodiment, a separate orifice is coupled to the central support portion **40** in each zone to adjust the air flow out of the zone without micro holes being formed in the top surface **170**. As shown in FIG. 7, bleeder valves **174**, **176** are coupled to a bottom surface **178** of air cushion **12** in communication with the head zone **46** and foot zone **52**. Bleeder valves **174**, **176** further reduce the pressure in head zone **46** and foot zone **52**. When bleeder valves **174**, **176** are used, micro holes **172** are not used to vent head zone **46** and foot zone **52**.

The side bolsters **42** and **44** help retain a person on the central support portion **40** as the person moves toward an edge of the mattress. Since air flow out of the side bolsters **42**, **44** is restricted, air cannot rush to an opposite side of the air cushion **12** as the person moves toward a side of the air cushion **12**. The number of micro holes **172** is illustratively selected so that the seat zone **50** has the highest pressure. Shoulder zone **48** illustratively has the next highest pressure. Head zone **46** and foot zone **52** have the lowest pressures.

The mattress assembly **10** of the present invention may be used as a mattress overlay or as a mattress replacement. Typically, the thickness of the mattress overlay is less than the thickness for a mattress replacement air cushion. If desired, such as in a mattress replacement situation, the orifices **138** and **142** of seat zone **50** may be replaced with check valves such as illustrated by check valves **122** and **130** in FIG. **3** so that air is forced into bottom chambers **82** and **88** based on the weight of the patient. If such check valves are used, air cannot return from bottom chambers **82** and **88** of the seat zone **50** to the central portion **40** as discussed with regard to FIG. **3**. Therefore, this embodiment would provide additional stiffness for the side bolsters **42**,**44**.

FIGS. **8** and **9** illustrate an air flow structure or check valve **180** of the present invention. Check valve **180** is illustratively formed from two sheets **181**, **183** of high temperature urethane material having a thickness of about 0.008 inch. The thickness may be less if desired. The sheets are seam sealed to an air zone surface around a tube **182** by seams **184**. Tube **182** includes an angle cut end **185** to reduce the likelihood that the tube **182** will be sealed by a portion of manifold **84**. Seals such as RF welds are also provided at locations **186** and **188** to provide a generally T-shaped open region **190** between the sheets **181**, **183** of the valve **180**. Open region **190** has air outlet openings **191** which are not sealed by seams. Air can flow through the tube **182** in the direction of arrow **192**. Air the passes into region **190** as illustrated by arrows **194** in FIG. **8** and exits the valve **180** through openings **191** as illustrated by arrows **196**. The sheets **181**, **183** of valve **180** collapse and block air flow through the region **190** in the direction of arrows **197** to provide a check valve as shown in FIG. **9**. Dimension **198** of valve **180** is illustratively 3.250 inches. Dimension **200** of valve **180** is illustratively 2.375 inches. Dimension **204** of valve **180** is illustratively 1.000 inch.

Additional details of the air cushion **12** are illustrated in FIG. **10**. Air cushion **12** includes a top sheet of material **210** and a bottom sheet of material **212** which extend across the entire width of the air cushion **12**. Baffles **74** are coupled to top sheet **210** and bottom sheet **212** by seams **214** and **216**, respectively. Air cushions **212** further include upper and lower interior sheets of material **218** and **220** which form the side bolsters **42** and **44**. Only one side bolster **42** is illustrated in FIG. **10**.

Upper sheet **218** is coupled to top sheet **210** by seam **222**. Sheet **218** is also coupled to top sheet **210** at a spaced-apart location **224** to define the top chamber **80** of bolster **42**. Sheets **210**, **212**, **218**, and **220** are all coupled together by seam **222** adjacent flap **43**. Lower sheet **220** is coupled to bottom sheet **212** by seam **228**. Lower sheet **220** is also coupled to upper sheet **218** by seam **184**. Illustratively, the check valve **180** is coupled to the top and bottom sheets **218** and **220** as shown in FIG. **10**.

Lower sheet **220** is also coupled to bottom sheet **212** at a location **230** spaced apart from seam **228** to define bottom chamber **82** of bolster **42**. Manifold **84** is formed between upper and lower sheets **218** and **220** between seams **184**, **224**, **226**, and **230**.

Hose **92** extends through manifold **84** as shown in FIG. **10** to prevent the sheets **218** and **220** which form manifold **84** from collapsing against each other to seal the manifold **84**. Tube **92** is split along its length as shown by split **232**. Therefore, air can flow through the tube **92** and through the split portion **232**. In other words, tube **92** provides structural support within the manifold **84** to hold the manifold **84** open. It is understood that other structural support members such as springs, etc. which permit air flow through the support member may be used in accordance with the present invention.

Although the invention has been described in detail with reference to certain illustrated embodiments, variations and modifications exist within the scope and spirit of the invention as defined by the following claims.

What is claimed is:

1. A mattress assembly comprising:

an inflatable central support portion having a head end, a foot end, a first side and a second side;

a side bolster coupled to the first side of the central support portion;

a manifold extending substantially parallel to the side bolster, the manifold being configured to be coupled to a fluid supply to supply fluid to the central support portion and the side bolster; and

a check valve being configured to provide fluid flow from the central support portion to the side bolster and to prevent fluid flow from at least a portion of the side bolster to the central support portion.

2. The mattress assembly of claim 1, further comprising a second check valve being configured to provide fluid flow

from the manifold to the central support portion and to prevent fluid flow from the central support portion to at least a portion of the manifold.

3. The mattress assembly of claim **1**, wherein the side bolster includes at least two chambers extending along a longitudinal axis of the side bolster, at least one of the chambers being the manifold.

4. The mattress assembly of claim **1**, wherein the check valve includes a top sheet, a bottom sheet disposed substantially parallel to the top sheet, an outlet defined between the top sheet and the bottom sheet, and at least one seal configured to secure the top sheet and the bottom sheet relative to the side bolster and to position the outlet in the side bolster.

5. The mattress assembly of claim **4**, wherein the check valve further includes a tube, the top and bottom sheets being sealed around the tube to provide an air inlet.

6. The mattress assembly of claim **4**, wherein the top and bottom sheets cooperate to define two air openings located within the side bolster.

7. The mattress assembly of claim **1**, wherein the inflatable central support portion and the side bolster are formed from a plurality of separately inflatable zones.

8. The mattress assembly of claim **7**, wherein the plurality of zones include a head zone, a shoulder zone, a seat zone, and a foot zone.

9. The mattress assembly of claim **8**, wherein a plurality of micro-holes are formed in a top surface of at least one of the head zone, the shoulder zone, the seat zone, and the foot zone of the inflatable central portion.

10. The mattress assembly of claim **1**, further comprising a bottom cover located underneath the inflatable central support portion and the side bolster, and a top coverlet located above the inflatable central support portion and the side bolster.

11. The mattress assembly of claim **1**, further comprising a plurality of baffles located within an interior region of the central support portion, the baffles being formed to include at least one aperture to permit air flow through the baffles.

12. A mattress assembly comprising:

an inflatable central support portion including a first side and a second side;

a first side bolster extending longitudinally and coupled to the first side of the central support portion;

a second side bolster extending longitudinally and coupled to the second side of the central support portion; and

a plurality of check valves coupled to the first and second side bolsters, the plurality of check valves being configured to provide fluid flow from the central support portion to the first and second side bolsters, and to prevent fluid flow from at least a portion of the first and second side bolsters to the central support portion.

13. The mattress assembly of claim **12**, further comprising a plurality of check valves being configured to provide fluid flow from the first and second side bolsters to the central support portion, and to prevent fluid flow from the central support portion to at least a portion of the first and second side bolsters.

14. The mattress assembly of claim **12**, wherein the plurality of check valves each include a top sheet, a bottom sheet disposed substantially parallel to the top sheet, an outlet defined between the top sheet and the bottom sheet, and at least one seal configured to secure the top sheet and the bottom sheet and to position the outlet in one of the first and second side bolsters.

15. The mattress assembly of claim **14**, wherein the check valve further includes a tube, the top and bottom sheets being sealed around the tube to provide an air inlet.

16. The mattress assembly of claim **12**, wherein the inflatable central support and the first and second side bolsters are formed from a plurality of separately inflatable zones.

17. The mattress assembly of claim **16**, wherein the plurality of zones include a head zone, a shoulder zone, a seat zone, and a foot zone.

18. A mattress assembly comprising:

a middle portion configured to receive air from an air supply and to be inflated thereby, the middle portion having two lateral sides;

a pair of side tubes each attached to a respective side of the middle portion; and

the middle portion supporting air flow structures configured to transmit air from the middle portion to the side tubes, the air flow structures being configured to block air flow therethrough from at least a portion of the side tubes to the middle portion so that, when the middle portion loses air pressure and deflates, the side tubes remain at least partially inflated.

19. The mattress assembly of claim **18**, wherein the air flow structures include check valves.

20. The mattress assembly of claim **19**, wherein the plurality of check valves each include a top sheet, a bottom sheet disposed substantially parallel to the top sheet, an outlet defined between the top sheet and the bottom sheet, and at least one seal configured to secure the top sheet and the bottom sheet and to position the outlet in one of the side tubes.

21. The mattress assembly of claim **20**, wherein the check valve further includes a tube, the top and bottom sheets being sealed around the tube to provide an air inlet.

22. The mattress assembly of claim **18**, wherein the middle portion and the side tubes are formed from a plurality of separately inflatable zones.

23. The mattress assembly of claim **22**, wherein the plurality of zones include a head zone, a shoulder zone, a seat zone, and a foot zone.

24. A mattress assembly comprising:

an inflatable central support portion including first and second sides;

a side bolster coupled to at least one of the first and second sides; and

a check valve configured to permit fluid flow into and to prevent fluid flow out of at least a portion of the side bolster, the check valve including a top sheet, a bottom sheet disposed substantially parallel to the top sheet, an outlet defined between the top sheet and the bottom sheet, and at least one seal configured to secure the top sheet and the bottom sheet relative to the side bolster and to position the outlet in the side bolster.

25. The mattress assembly of claim **24**, wherein the check valve further includes a tube, the top and bottom sheets being sealed around the tube to provide an air inlet within the central support portion.

26. The mattress assembly of claim **24**, wherein the top sheet and the bottom sheet of the check valve are secured to the side bolster.

27. The mattress assembly of claim **26**, further comprising at least one elongated seam separating the central support portion and the side bolster, the at least one seam securing at least one of the top sheet and the bottom sheet of the check valve to the side bolster.

* * * * *

US005669091A

United States Patent [19]

Chung

[11] Patent Number: 5,669,091

[45] Date of Patent: Sep. 23, 1997

[54] STRUCTURE OF WATER BED

[76] Inventor: **Ming-Chun Chung**, 7F, No. 22, Alley 3, Lane 227, Nung An Street, Taipei, Taiwan

[21] Appl. No.: **616,189**

[22] Filed: **Mar. 15, 1996**

[51] **Int. Cl.**[6] **A47C 27/10**

[52] **U.S. Cl.** **5/687**; 5/665

[58] **Field of Search** 5/451, 452, 455, 5/449, 450, 665, 678, 680, 681, 682, 683, 687

[56] **References Cited**

U.S. PATENT DOCUMENTS

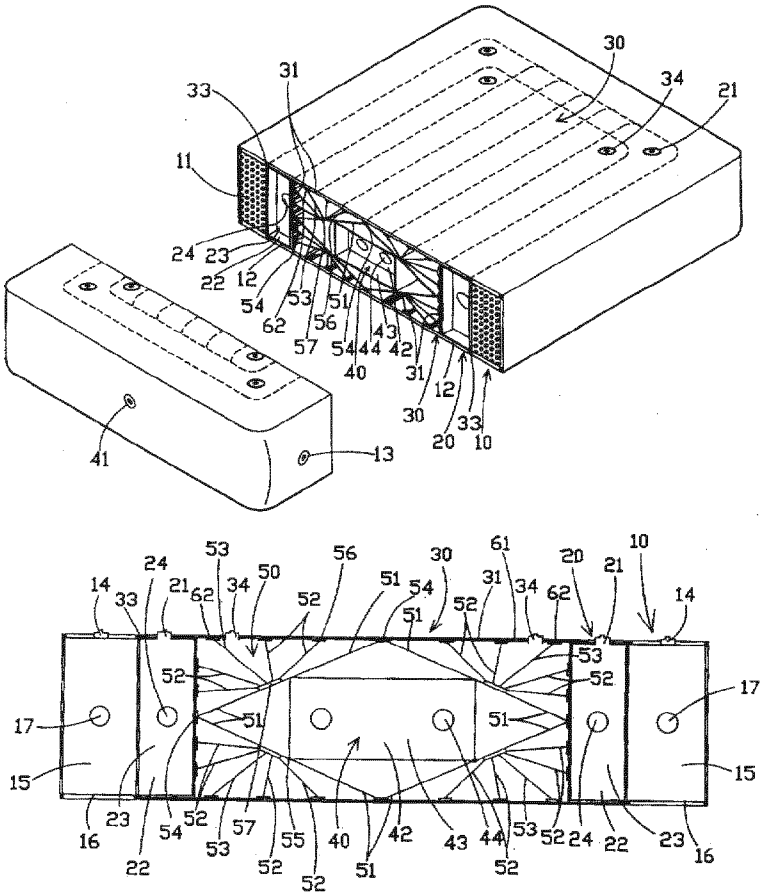
4,558,476	12/1985	Linder	5/451
4,638,518	1/1987	Barbulla	5/452
4,727,607	3/1988	Nystad	5/451
5,065,465	11/1991	Nystad	5/451
5,513,400	5/1996	Turner	5/451

Primary Examiner—Alexander Grosz
Attorney, Agent, or Firm—Beveridge, DeGrandi, Weilacher & Young, L.L.P.

[57] **ABSTRACT**

A water bed which includes a soft frame; a peripheral air bag mounted within the soft frame; a water bag mounted within the soft frame and surrounded by the peripheral air bag, the water bag comprising three pairs of opposing plastic lining walls sealed together, at least one water valve for permitting water to be filled into the water bag, and a plurality of through holes through the plastic lining walls for the passing of water, the plastic lining walls including a top plastic lining wall and a bottom plastic lining wall, each of the top plastic lining wall and bottom plastic lining wall of the water bag having two sealing lines at two opposite sides respectively sealed to respective outer side edges of a respective sides of the periphery air bag; an intermediate air bag mounted within the water bag, the intermediate air bag comprising at least one air valve extending out of the water bag and the soft frame, a plurality of partition stretchers, each of the partition stretchers having at least one air hole, and a plurality of air chambers separated by the partition stretchers and communicating with one another by the air holes of the partition stretchers; a plurality of stretcher sheets respectively mounted inside the water bag and sealed to the plastic lining walls of the water bag and the periphery of the internal air bag; and a water-tight outer layer covered around the soft frame, the peripheral air bag, and the water bag.

5 Claims, 10 Drawing Sheets



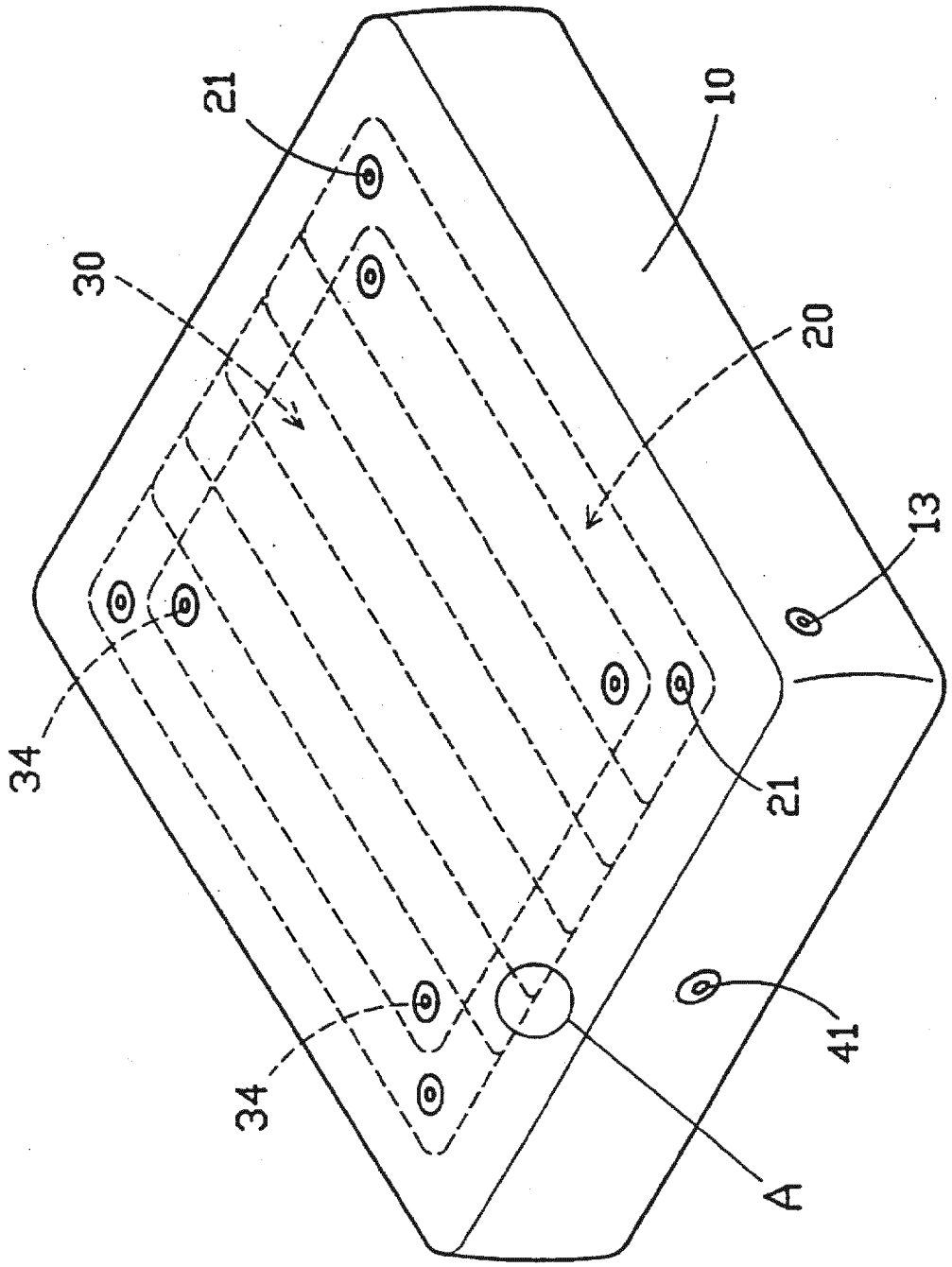


FIG.1

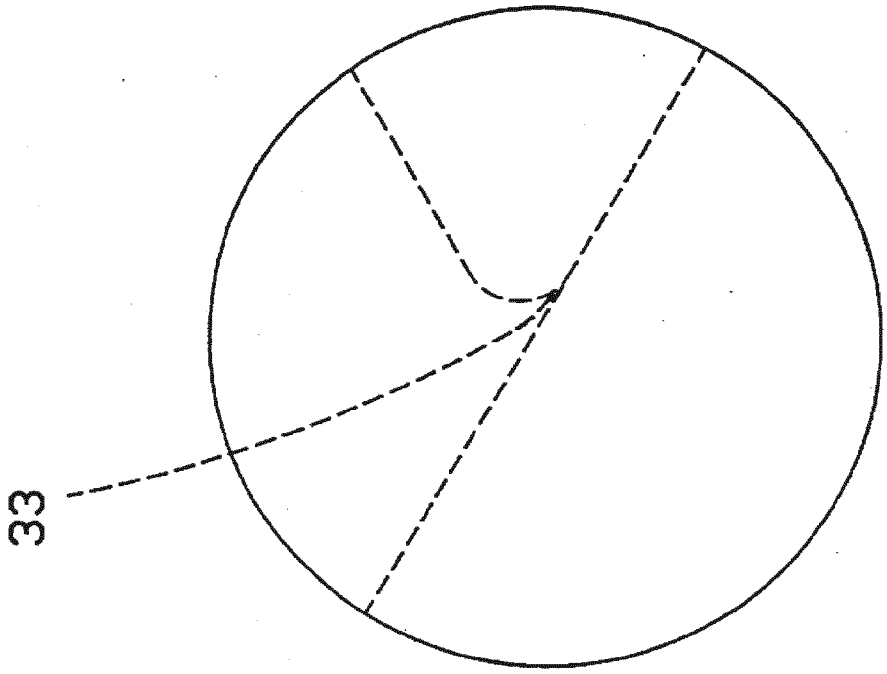


FIG.1A

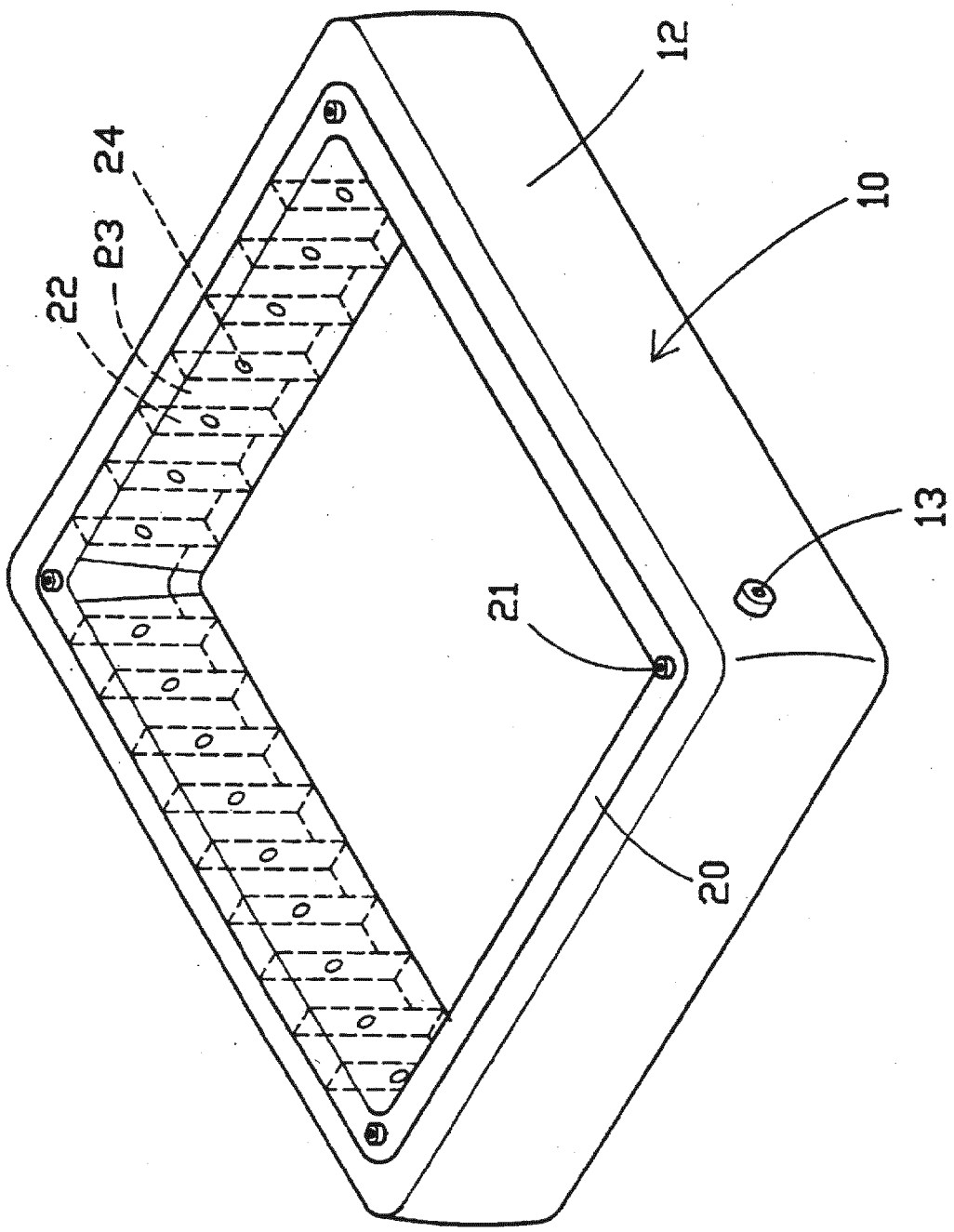


FIG.2

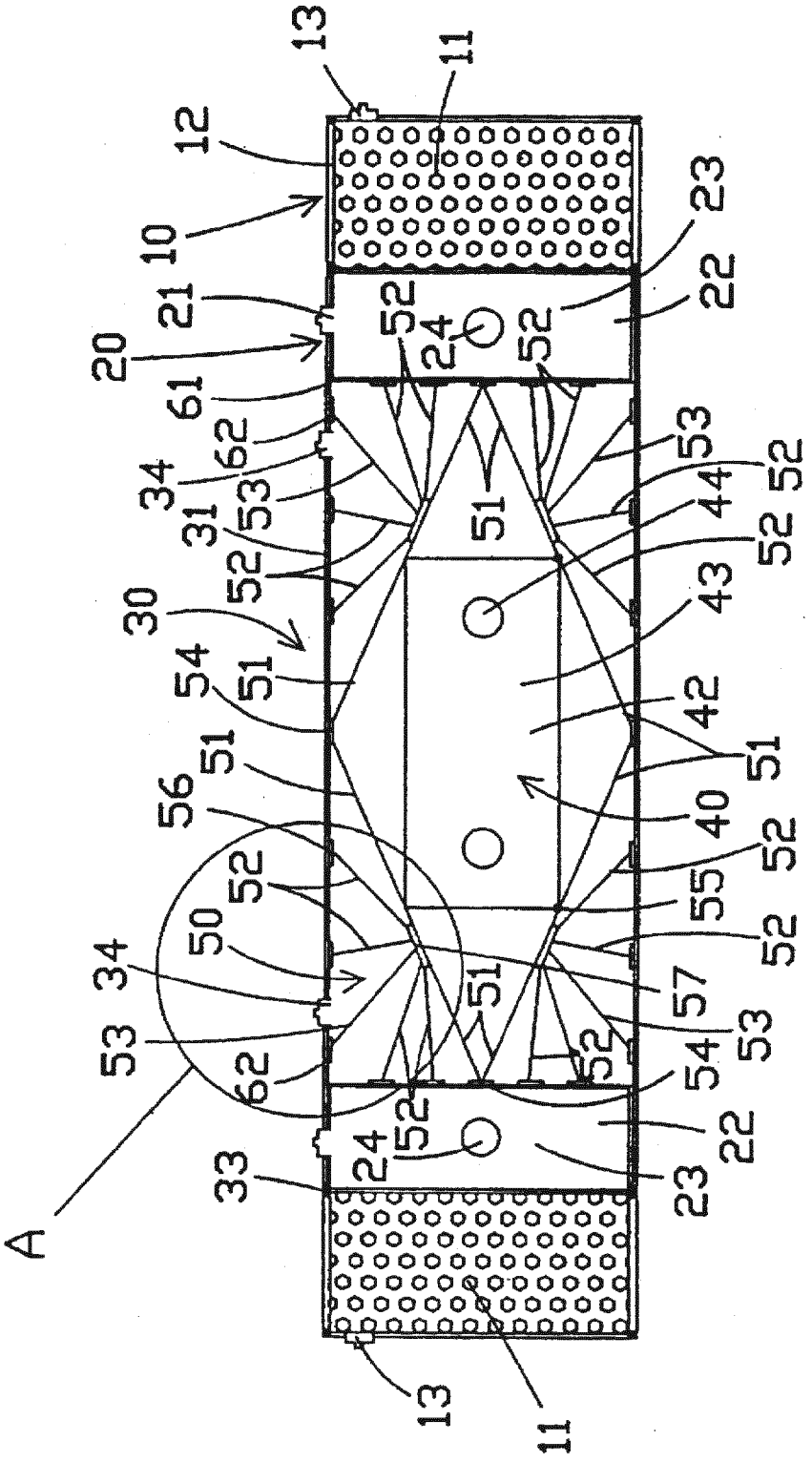

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FIG.3

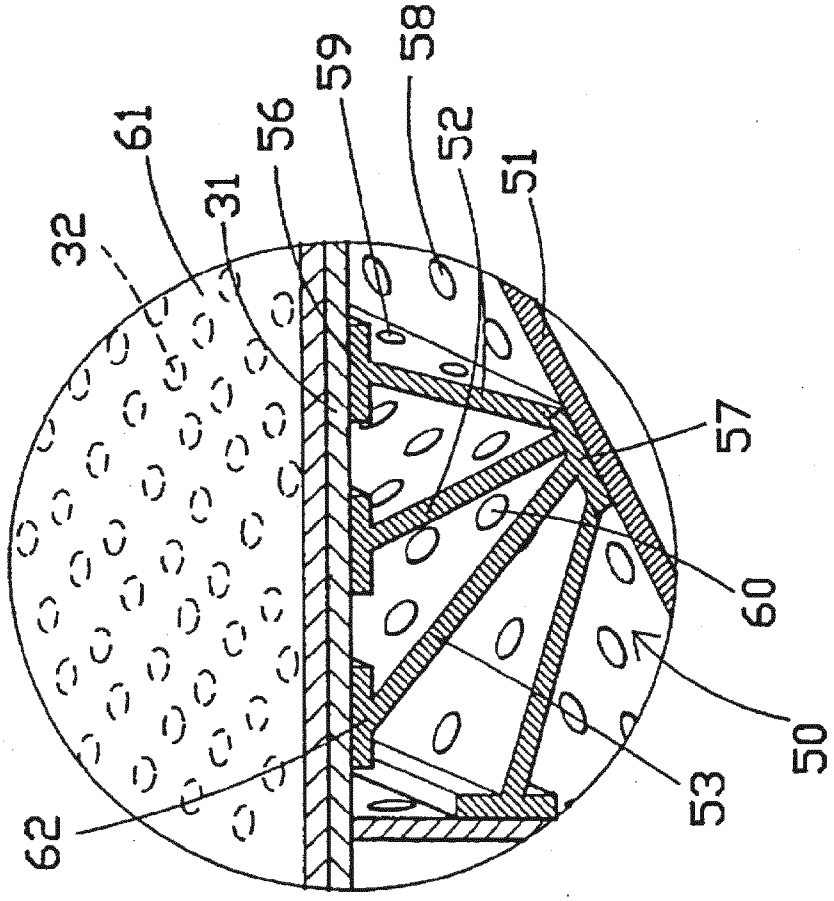


FIG.3A

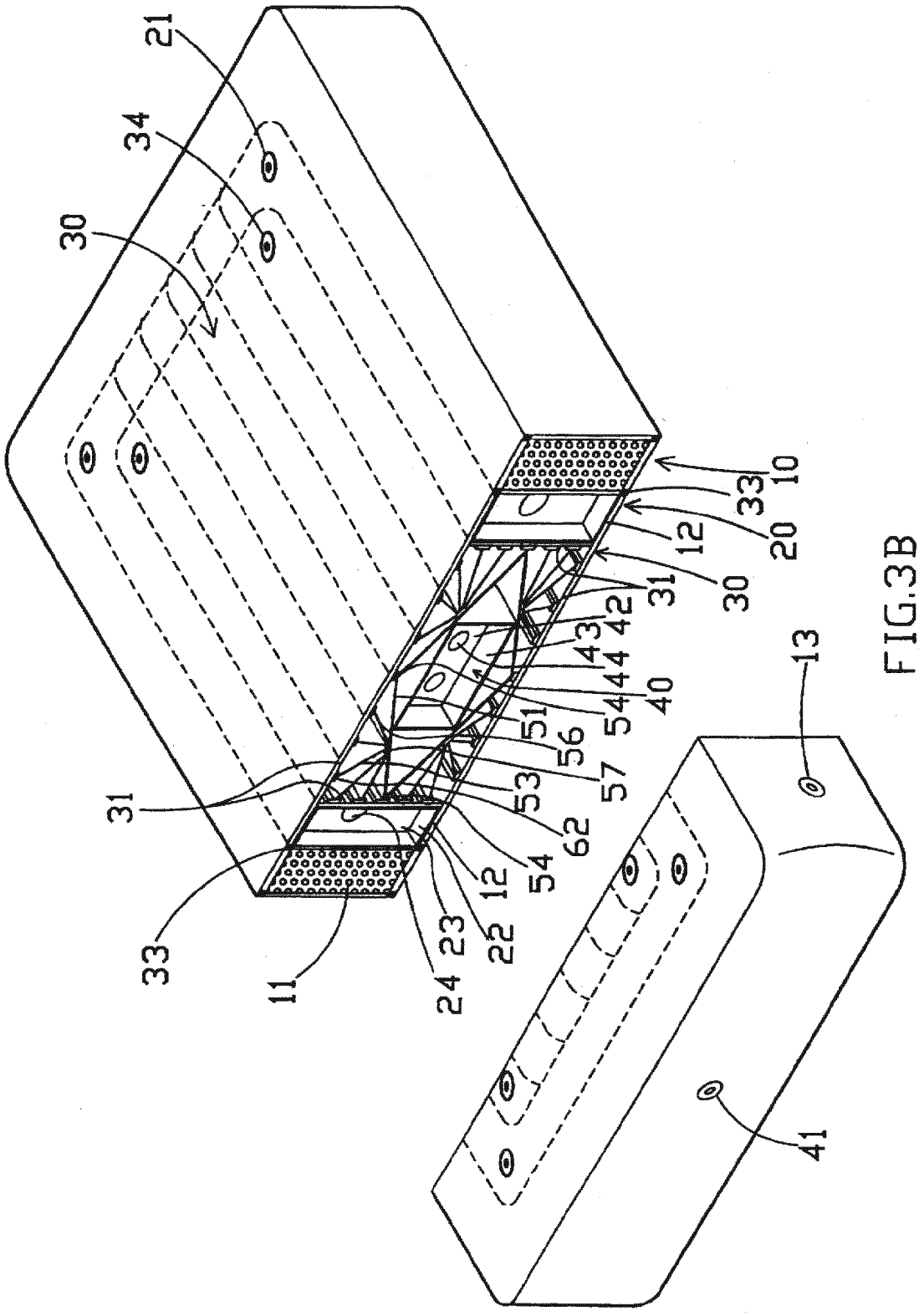

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FIG.3B

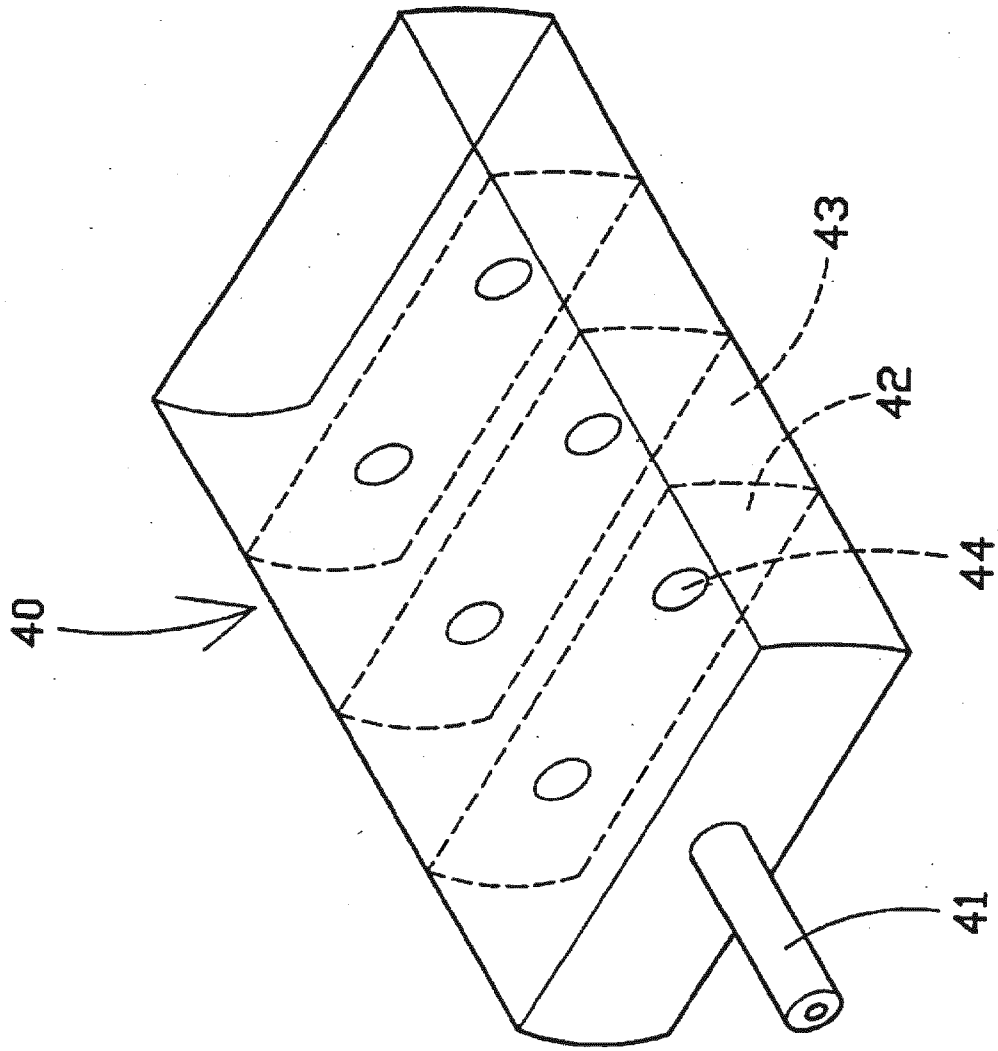


FIG.4

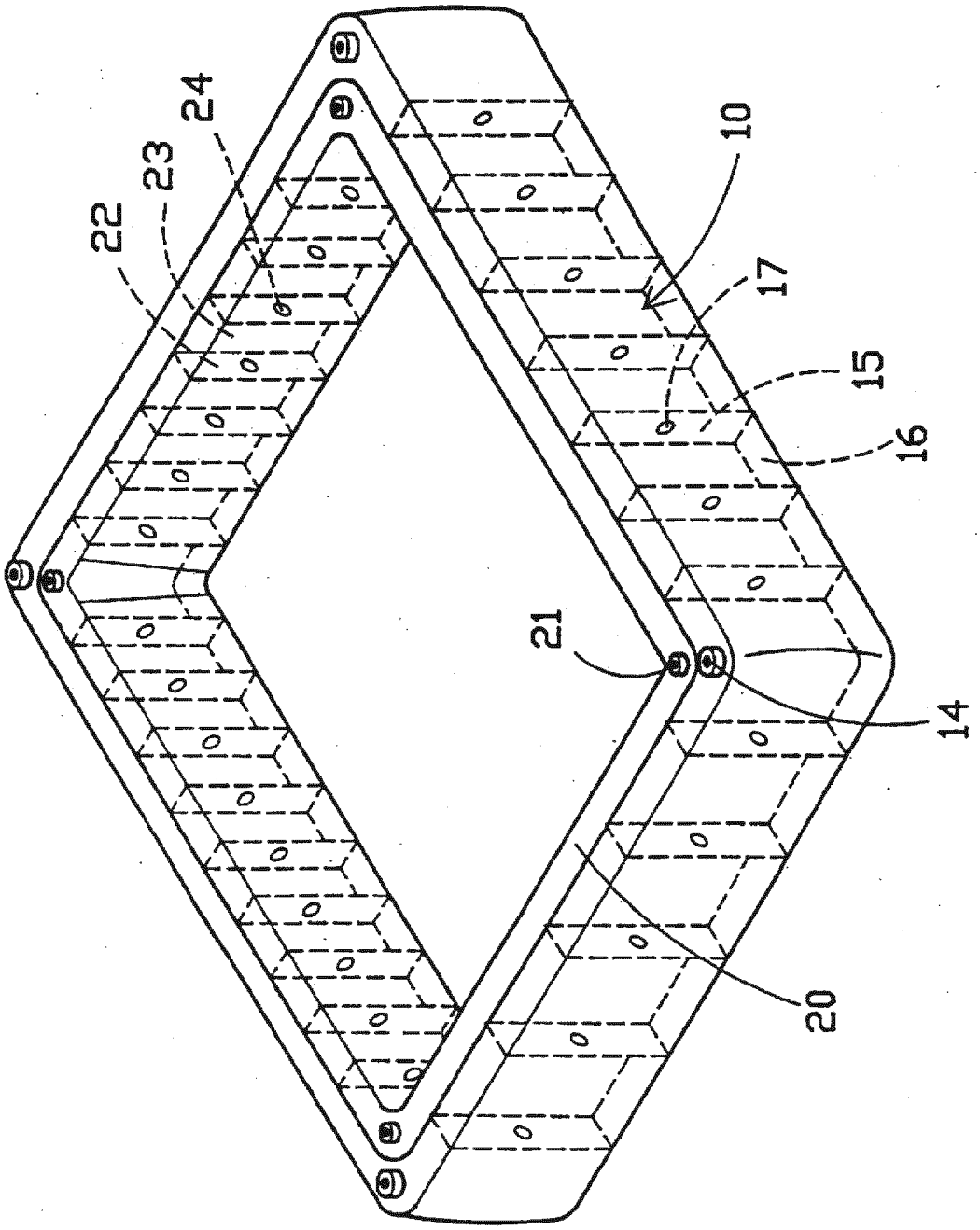


FIG.5

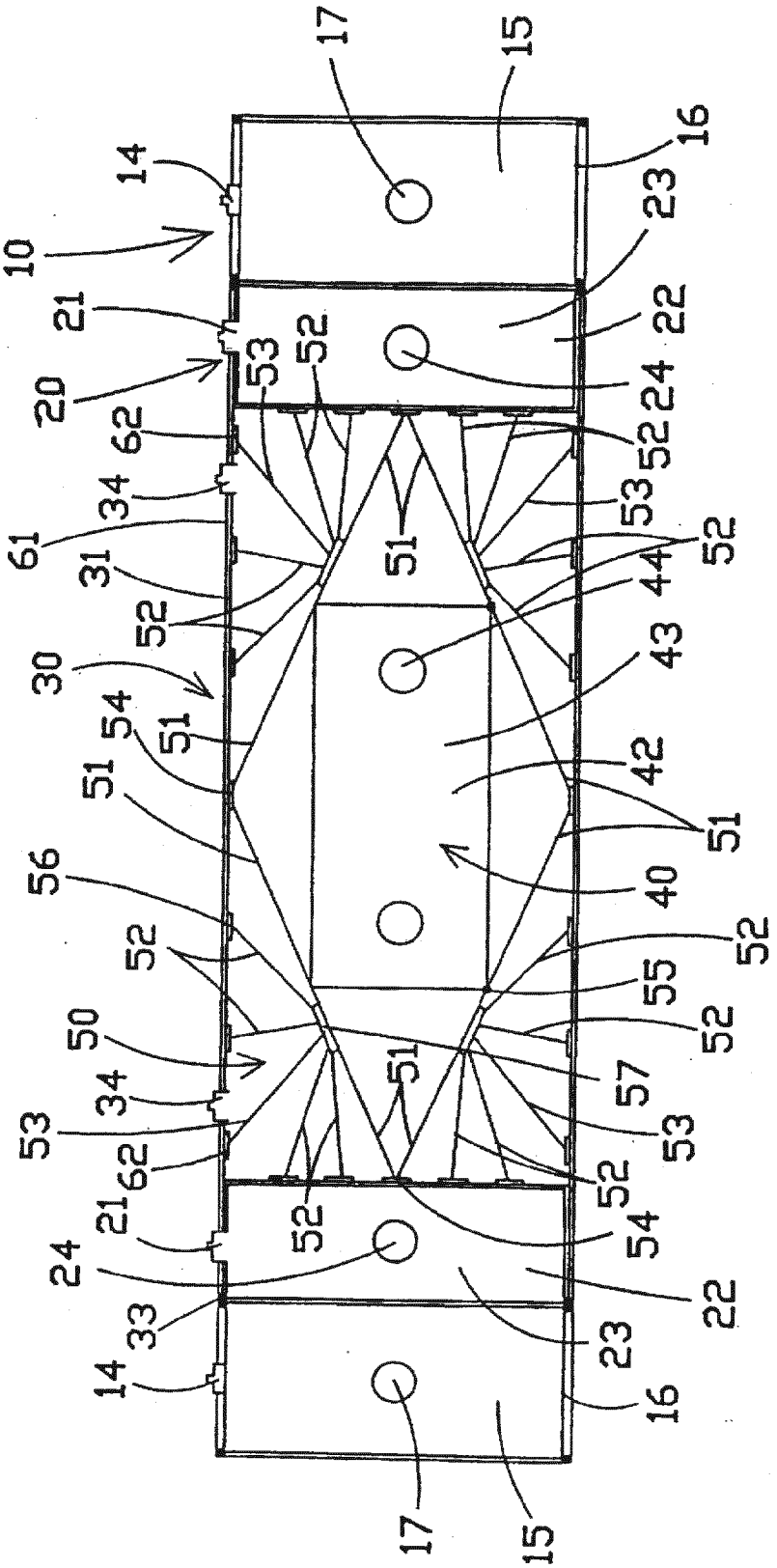

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FIG.6

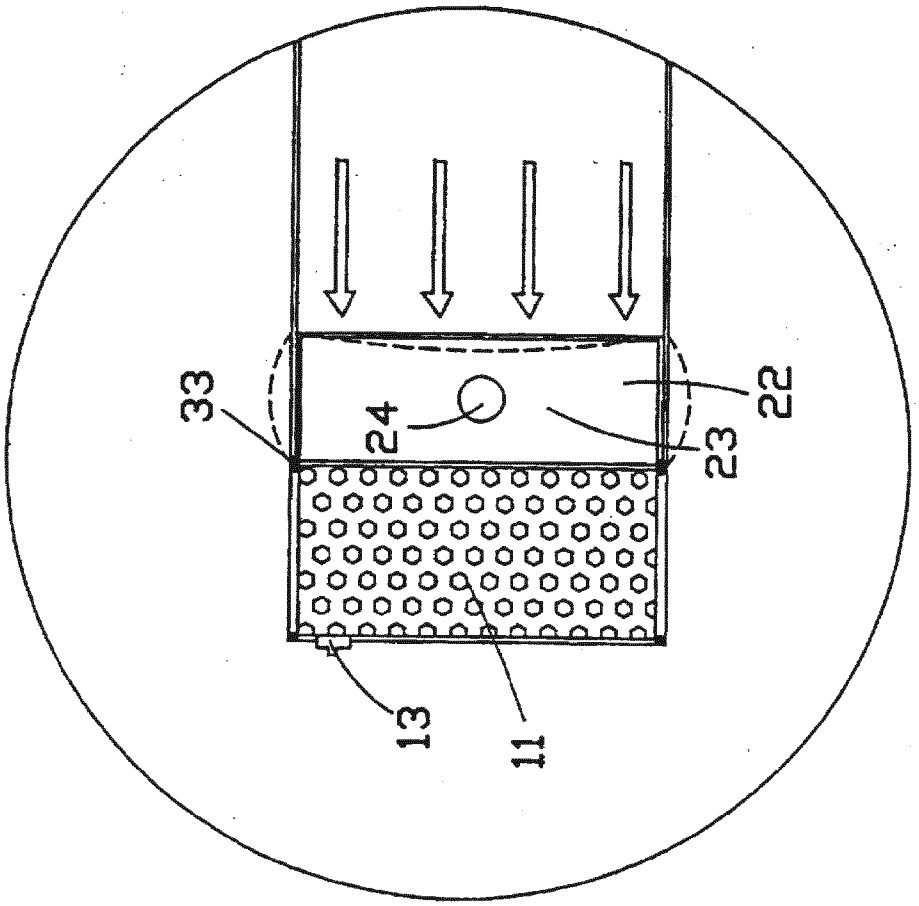


FIG.7

STRUCTURE OF WATER BED

BACKGROUND OF THE INVENTION

The present invention relates to water beds, and relates more particularly to such a water bed which comprises a soft frame, a peripheral air bag mounted within the soft frame, a water bag mounted within the soft frame and surrounded by the peripheral air bag, and an internal air bag mounted within the water bag to buffer water waves.

Various water beds have been disclosed, and have appeared on the market. However, regular water beds tend to vibrate when the user lies on it or leaves away from it. Furthermore, the stiffness of these water beds cannot be conveniently adjusted when filled up with water. There is known another type of water bed which has a peripheral air bag mounted within the frame around the water bag. The stiffness of this type of water bed can be conveniently adjusted by changing the inside air pressure of the peripheral air bag. However, this type of water bed is still not satisfactory in function because the peripheral air bag tend to be deformed when inflated, and its sealing area tends to be torn up.

SUMMARY OF THE INVENTION

The present invention has been accomplished to provide a water bed which eliminates the aforesaid drawbacks. It is one object of the present invention to provide a water bed which holds the water bag in shape when in use. It is another object of the present invention to provide a water bed which has means to buffer the movement of water in the water bag thereof. It is still another object of the present invention to provide a water bed which effectively prevents loss of heat energy when the water bag thereof is heated. It is still another object of the present invention to provide a water bed which can be conveniently adjusted to change the stiffness to the desired level. It is still another object of the present invention to provide a water bed which is durable in use.

According to one aspect of the present invention, the water bed comprises a soft frame; a peripheral air bag mounted within the soft frame; a water bag mounted within the soft frame and surrounded by the peripheral air bag, the water bag comprising three pairs of opposing plastic lining walls sealed together, at least one water valve for permitting water to be filled into the water bag, and a plurality of through holes through the plastic lining walls for the passing of water, the plastic lining walls including a top plastic lining wall and a bottom plastic lining wall, each of the top plastic lining wall and bottom plastic lining wall of the water bag having two sealing lines at two opposite sides respectively sealed to respective outer side edges of a respective sides of the periphery air bag; an intermediate air bag mounted within the water bag, the intermediate air bag comprising at least one air valve extending out of the water bag and the soft frame, a plurality of partition stretchers, each of the partition stretchers having at least one air hole, and a plurality of air chambers separated by the partition stretchers and communicating with one another by the air holes of the partition stretchers; a plurality of stretcher sheets respectively mounted inside the water bag and sealed to the plastic lining walls of the water bag and the periphery of the internal air bag; and a water-tight outer layer covered around the soft frame, the peripheral air bag, and the water bag.

According to another aspect of the present invention, the soft frame can be made in two forms. In one form, the soft frame comprises a hollow plastic cover layer stuffed with stuffing material. In the other form, the soft frame is an air bag defined by a plurality of partition stretchers thereof into a plurality of air chambers respectively communicating with one another by air holes on the partition stretchers.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** an elevational view of a water bed according to the present invention;

FIG. **1A** is an enlarged view of a part of FIG. **1**;

FIG. **2** shows the peripheral air bag mounted within the frame according to the present invention;

FIG. **3** is a cross sectional view of the water bed shown in FIG. **1**;

FIG. **3A** is an enlarged view of a part of FIG. **3**;

FIG. **3B** is a cross sectional perspective view of the water bed shown in FIGS. **1** and **3**.

FIG. **4** is a perspective view of the internal air bag according to the present invention;

FIG. **5** is a perspective view of the frame and the periphery air bag according to a second embodiment of the present invention;

FIG. **6** is a cross sectional view of the water bed of the second embodiment of the present invention; and

FIG. **7** is a partial in section of FIG. **3**, showing the pressure sideways water waves buffered by the peripheral air bag according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to Figures from 1 to **4**, a water bed in accordance with the present invention is generally comprised of a soft frame **10**, a peripheral air bag **20**, a water bag **30**, and internal air bag **40**, and stretcher sheets **50**.

The frame **10** has a recessed structure, which holds the peripheral air bag **20** and the water bag **30** within the peripheral air bag **20**, comprised of a hollow plastic cover layer **12**, and stuffing material **11** stuffed in the plastic covering **12**. The stuffing material **11** can be sponge or any suitable material having the same springy power or density. A plurality of air valves **13** are mounted in the plastic covering **12** of the frame **10**, so that air can be driven into the frame **10** to regulate the stiffness of the frame **10**. The stuffing material **11** also serves as heat-insulative means to stop heat energy from escaping the water bag **30**.

The peripheral air bag **20** is mounted within the recessed frame **10**, having a plurality of air valves **21** at the top in each corner, and a plurality of partition stretchers **22** connected between opposing inside walls and defining the inside space of the peripheral air bag **20** into a plurality of air chambers **23**. Each of the partition stretchers **22** has at least one air hole **24** which permits air to circulate through the air chambers **23**. The partition stretchers **22** support the periphery air bag **20** in the desired shape when the periphery air bag **20** is inflated. The partition stretchers **22** can have a square shape, triangular shape, rectangular shape, or any of a variety of shapes.

The water bag **30** is mounted within the peripheral air bag **20** inside the frame **10**, having three pairs of opposing plastic lining walls **31** sealed together, a plurality of water valves **34** at the top for permitting water to be filled into the water bag **30**, and a plurality of through holes **32** through the plastic lining walls **31** for the passing of water to prevent the plastic lining walls **31** from being excessively stretched. The top and bottom plastic lining walls **31** of the water bag **30** have

respective sealing lines **33** respectively sealed to the outer side edges of the top and bottom sides of the periphery air bag **20** (see FIG. **7**). When the peripheral air bag **20** is inflated, the top and bottom sides of the peripheral air bag **20** are stretched outwards and closely attached to the top and bottom plastic lining walls **31** of the water bag **30**, therefore the pressure of downward water waves and sideways water waves are prohibited from forcing the sealing lines **33** of the plastic lining walls **30** apart from the top and bottom sides of the peripheral air bag **20**.

The internal air bag **40** is mounted within the water bag **30**, having an air valve **41** extending to the outside of the the water bed for permitting air to be driven into the internal air bag **40**, and a plurality of partition stretchers **42** connected between opposing inside walls and defining the inside space of the internal air bag **40** into a plurality of air chambers **43**. Each of the partition stretchers **42** has at least one air hole **44**, which permits air to circulate through the air chambers **43**. The partition stretchers **42** support the internal air bag **40** in the desired shape when the internal air bag **40** is inflated. They can be made of square shape, triangular shape, rectangular shape, or any of a variety of shapes.

The stretcher sheets (generally designated by reference number **50**) are sealed to the plastic lining walls **31** of the water bag **30** on the inside around the internal air bag **40**, including a four first stretcher sheets **51**, four sets of second stretcher sheets **52**, and four third stretcher sheets **53**. As best seen in FIGS. **3A** and **3B**, the stretcher sheets **50** run the length of the water bag **30**. The four first stretcher sheets **50** are respectively sealed to the plastic lining walls **31** of the water bag **30** at sealing lines **54**, and connected into a rhombic structure to hold the internal air bag **40** on the inside. Two of the first stretcher sheets **51** have a respective sealing line **55** respectively sealed to two opposing bottom side edges of the internal air bag **40**. The second stretcher sheets **52** are respectively connected between a common sealing line **57** at each of the first stretcher sheets **51** and respective sealing lines **56** at the plastic lining walls **31** of the water bag **30**. The four third stretcher sheets **53** are respectively connected between the sealing lines **57** at the first stretcher sheets **51**, and respective sealing lines **62** at the plastic lining walls **31** of the air bag **40**. The stretcher sheets **51**, **52**, **53** have respective through holes **58**, **59**, **60** for the passing of water. Furthermore, a water-tight outer layer **61** is covered around the frame **10**, the peripheral air bag **20**, and the water bag **30**.

When the user lies on the water bag **30**, the peripheral air bag **20** absorbs water waves to prevent the sealing lines **33** of the plastic lining walls **31** from being torn up. Therefore, the water bag **30** does not wear with use quickly.

As stated, the water bag **30** is supported within the peripheral air bag **20**, and the internal air bag **40** is mounted within the water bag. When the peripheral air bag **20** and the internal air bag **40** are inflated by driving air into the air valves **41**, **21**, the stiffness of the water bag **30** is increased. By means of opening the air valves **21**, **41** to release air from the peripheral air bag **20** and the internal air bag **40**, the stiffness of the water bag **30** is reduced. Therefore, the stiffness of the water bag **30** can be regulated by changing the inside air pressure of the peripheral air bag **20** and the internal air bag **40**.

Furthermore, because the internal air bag **40** is mounted inside the water bag **30**, it will not be damaged easily. The internal air bag **40** serves also as a buffer means which lessens water waves. Therefore, the water bag **30** can be maintained stable. When the user lines on the water bed or leaves from it, water is forced to pass through the through holes **58**, **59**, **60** of the stretcher sheets **50**, and the stretcher sheets **50** are vibrated to lessen water waves. Therefore, the stretcher sheets **50** and the internal air bag **40** act as buffer means to present water from being forced to move in a rush.

FIGS. **5** and **6** show an alternate form of the present invention, in which the frame **10** is made in the form of an air bag having a plurality of air valves **14** at the top for permitting air to be driven into the inside space of the frame **10**, and a plurality of partition stretchers **15** connected between opposing inside walls and defining the inside space of the frame **10** into a plurality of air chambers **16**. Each of the partition stretchers **15** has at least one air hole **17** which permits air to circulate through the air chambers **16**. The partition stretchers **15** support the frame **10** in the desired shape when the frame **10** is inflated. The partition stretchers **15** can have a square shape, triangular shape, rectangular shape, or any of a variety of shapes.

It is to be understood that the drawings are designed for purposes of illustration only, and are not intended as a definition of the limits and scope of the invention disclosed.

What the invention claimed is:

1. A bed comprising:

a soft frame;

a peripheral air bag mounted within said soft frame;

a water bag mounted within said soft frame and surrounded by said peripheral air bag, said water bag including at least one water valve for permitting water flow into and out of said water bag, and said water bag being defined in part by a top plastic lining wall and a bottom plastic lining wall, said top and said bottom plastic lining walls of said water bag being sealably connected at two opposite sides to outer side edges of said peripheral air bag;

an intermediate air bag mounted within said water bag, said intermediate air bag including at least one air valve extending out of said water bag and said soft frame, and a plurality of air bag partition stretchers, each of said air bag partition stretchers having at least one air hole defined therein, said air bag partition stretchers defining a plurality of air chambers in communication with one another through said air holes of said partition stretchers;

a plurality of stretcher sheets respectively mounted inside said water bag and sealably connected between said water bag and said internal air bag; and

a water-tight outer layer covering said soft frame, said peripheral air bag, and said water bag.

2. The water bed of claim **1** wherein

said stretcher sheets include four first stretcher sheets sealed together into a rhombic structure and supporting said internal air bag, and said four first stretcher sheets being sealed to said water bag, two of said four first stretcher sheets being sealably connected to two opposing bottom side edges of said internal air bag,

a plurality of second stretcher sheets sealably connected to, respectively, said first stretcher sheets and said water bag, and

four third stretcher sheets sealably connected to, respectively, said first stretcher sheets and said water bag.

3. The water bed of claim **1** wherein

said soft frame comprises a hollow plastic cover layer having stuffing material disposed therein.

4. The water bed of claim 1 wherein

said soft frame is an air bag having a plurality of partition stretchers defining said air bag into a plurality of air chambers, said air chambers respectively communicating with one another by air holes defined in said partition stretchers of said soft frame.

5. The water bed of claim 1 wherein

said peripheral air bag includes at least one air valve disposed in a corner on a top side thereof, and a plurality of peripheral air bag partition stretchers connected between opposing inside walls thereof and defining the inside space of said peripheral air bag into a plurality of air chambers, each of said peripheral air bag partition stretchers of said peripheral air bag having at least one air hole, which permits air to circulate through said air chambers of said peripheral air bag.

* * * * *

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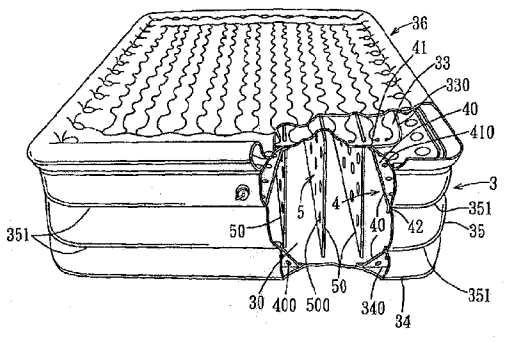
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(73) **Titulaire(s) :**

(74) **Mandataire(s) :** REGIMBEAU.

(54) LIT GONFLABLE.

(57) Un lit gonflable comprend un corps de lit gonflable (3) présentant une couche supérieure (33), une couche inférieure (34), et une couche de bordure (35) reliant entre elles les périphéries des couches supérieure et inférieure (33, 34) et agissant conjointement avec les couches supérieure et inférieure (33, 34) pour définir un espace gonflable (30). Une unité formant une ceinture de renforcement (4, 4a, 4b, 4c) est disposée dans l'espace gonflable (30) dans le corps de lit gonflable (3), et relie entre elles la couche de bordure (35) du corps de lit gonflable (3) et au moins une des couches supérieure et inférieure (33, 34) du corps de lit gonflable (3).



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INTEX EX. 1038, Pg. 344
Intex Recreation v. Bestway Inflatables

LIT GONFLABLE

Cette demande de brevet revendique la priorité de la demande de brevet chinois n° 200720139672.6, déposée le 4 avril 2007.

La présente invention concerne un lit gonflable, plus particulièrement un lit gonflable présentant un aspect multicouche.

La figure 1 illustre un lit gonflable conventionnel qui comprend un corps de lit gonflable 1 qui présente une couche supérieure 11, une couche inférieure 12, une couche de bordure 13 reliant entre elles les périphéries des couches supérieure et inférieure 11, 12 et agissant conjointement avec les couches supérieure et inférieure 11, 12 pour définir un espace gonflable 10, et deux couches intermédiaires 14 disposées à distance dans l'espace gonflable 10 dans le corps de lit gonflable 1 et parallèlement aux couches supérieure et inférieure 11, 12 du corps de lit gonflable 1. Les périphéries des couches intermédiaires 14 sont solidement fixées à la couche de bordure 13 par thermosoudure, formant ainsi deux lignes de soudure bouclées 131 sur la couche de bordure 13 du corps de lit gonflable 1. Par conséquent, le corps de lit gonflable 1 présente un aspect à trois couches. Deux couches quelconques adjacentes parmi la couche supérieure 11, les couches intermédiaires 14 et la couche inférieure 12 sont reliées entre elles par une pluralité de ceintures verticales 2.

Dans une telle configuration, les deux couches intermédiaires 14 sont utilisées pour obtenir l'aspect à trois couches du corps de lit gonflable 1. D'autre part, chacune des ceintures verticales 2 doit être soudée entre les deux couches adjacentes correspondantes parmi la couche supérieure 11, les

couches intermédiaires 14 et la couche inférieure 12, ce qui complique la procédure de fabrication.

Par conséquent, l'objet de la présente invention est de proposer un lit gonflable qui présente un aspect multicouche et qui peut être facilement fabriqué à un coût relativement bas.

Selon la présente invention, un lit gonflable comprend :

un corps de lit gonflable présentant une couche supérieure, une couche inférieure, et une couche de bordure reliant entre elles les périphéries des couches supérieure et inférieure et agissant conjointement avec les couches supérieure et inférieure pour définir un espace gonflable ; et

une unité formant ceinture de renforcement disposée dans l'espace gonflable dans le corps de lit gonflable et reliant entre elles la couche de bordure du corps de lit gonflable et au moins une des couches supérieure et inférieure du corps de lit gonflable.

D'autres caractéristiques et avantages de la présente invention ressortiront de la description détaillée qui va suivre des modes de réalisation préférés en faisant référence aux dessins d'accompagnement, parmi lesquels :

La figure 1 est une vue en perspective partiellement en écorché d'un lit gonflable conventionnel ;

la figure 2 est une vue en perspective partiellement en écorché représentant le premier mode de réalisation préféré d'un lit gonflable selon la présente invention ;

la figure 3 est une vue en coupe fragmentaire schématique représentant le deuxième mode de réalisation préféré d'un lit gonflable selon la présente invention ;

la figure 4 est une vue en coupe fragmentaire schématique représentant le troisième mode de réalisation préféré d'un lit gonflable selon la présente invention ; et

la figure 5 est une vue en coupe fragmentaire schématique représentant le quatrième mode de réalisation préféré d'un lit gonflable selon la présente invention.

Avant d'aborder la description détaillée de la présente invention, il est important de noter que des éléments identiques sont désignés par des numéros de référence identiques tout au long de la description.

En faisant référence à la figure 2, le premier mode de réalisation préféré d'un lit gonflable selon la présente invention est représenté avec un corps de lit gonflable 3, une première unité formant une ceinture de renforcement 4, et une seconde unité formant ceinture de renforcement 5.

Le corps de lit gonflable 3 présente une couche supérieure 33, une couche inférieure 34, et une couche de bordure 35 reliant entre elles les périphéries des couches supérieure et inférieure 33, 34 et agissant conjointement avec les couches supérieure et inférieure 33, 34 pour définir un espace gonflable 30.

La première unité formant ceinture de renforcement 4 est disposée dans ledit espace gonflable 30 dans le corps de lit gonflable 3. Dans ce mode de réalisation, la première unité formant une ceinture de renforcement 4 comprend deux ceintures bouclées biseautées 40, dont chacune présente des périphéries interne et externe 41, 42. Les périphéries externes 42 des ceintures bouclées biseautées 40 sont solidement fixées à la couche de bordure 35 du corps de lit gonflable 3 par thermosoudure, et sont disposées à distance l'une de l'autre, formant ainsi deux lignes de soudure bouclées

351 sur la couche de bordure 35 du corps de lit gonflable 3. Les périphéries internes 41 des ceintures bouclées biseautées 40 sont fixées solidement et respectivement aux couches supérieure et inférieure 33, 34 du corps de lit gonflable 3 par thermosoudure. Chacune des ceintures bouclées biseautées 40 est pourvue d'une pluralité de trous de passage 400.

La seconde unité formant une ceinture de renforcement 5 est disposée dans l'espace gonflable 30 dans le corps de lit gonflable 3, et relie entre elles les couches supérieure et inférieure 33, 34 du corps de lit gonflable 3. Dans ce mode de réalisation, la seconde unité formant ceinture de renforcement 5 comprend une pluralité de ceintures verticales parallèles 50. Chacune des ceintures verticales 50 présente des côtés supérieur et inférieur qui sont fixés solidement et respectivement aux couches supérieure et inférieure 33, 34 du corps de lit gonflable 3 par thermosoudure, et est pourvue d'une pluralité de trous de passage 500.

De plus, le lit gonflable comprend en outre une couche supplémentaire 36 solidement fixée par-dessus la couche supérieure 33 du corps de lit gonflable 3 à des fins de confort. Cependant, puisque la couche supplémentaire 36 n'est pas nécessaire et puisque la caractéristique de la présente invention ne réside pas dans la couche supplémentaire 36, ladite couche n'est pas décrite en détail dans le présent document à des fins de brièveté.

Puisque les deux lignes de soudure 351 sont formées sur la couche de bordure 35 du corps de lit gonflable 3, le corps de lit gonflable 3 présente un aspect à trois couches.

La figure 3 illustre le deuxième mode de réalisation préféré d'un corps de lit gonflable selon

la présente invention, lequel est une modification du premier mode de réalisation préféré. A la différence du précédent mode de réalisation, la première unité formant une ceinture de renforcement 4a présente une seule ceinture bouclée biseautée 40a qui présente des périphéries interne et externe 41a, 42a fixées solidement et respectivement à la couche supérieure 33 et à la couche de bordure 35 du corps de lit gonflable 3 par thermosoudure, formant ainsi une ligne de soudure bouclée 35a sur la couche de bordure 35 du corps de lit gonflable 3. Par conséquent, le corps de lit gonflable 3 présente un aspect à deux couches.

La figure 4 illustre le troisième mode de réalisation préféré d'un lit gonflable selon la présente invention, lequel est une modification du premier mode de réalisation préféré. Dans ce mode de réalisation, la première unité formant une ceinture de renforcement 4b présente deux ceintures bouclées biseautées 40b, dont chacune présente des périphéries interne et externe 41b, 42b. Les périphéries internes 41b des ceintures bouclées biseautées 40b sont fixées solidement et respectivement aux couches supérieure et inférieure 33, 34 du corps de lit gonflable 3 par thermosoudure. Les périphéries externes 42b des ceintures bouclées biseautées 40b sont reliées d'un seul tenant l'une à l'autre, et sont solidement fixées à la couche de bordure 35 du corps de lit gonflable 3 par thermosoudure, formant ainsi une ligne de soudure bouclée 351b sur la couche de bordure 35 du corps de lit gonflable 3.

Le lit gonflable comprend en outre deux ceintures bouclées auxiliaires 6 disposées horizontalement dans l'espace gonflable 30 dans le corps de lit gonflable 3. Chacune des ceintures bouclées auxiliaires 6 est pourvue d'une pluralité de trous de passage 60, et

présente des périphéries interne et externe 61, 62 qui sont fixées solidement et respectivement à une ceinture correspondante parmi les ceintures bouclées biseautées 40b de la première unité formant une ceinture de renforcement 4b et la couche de bordure 35 du corps de lit gonflable 3 par thermosoudure, formant ainsi deux secondes lignes de soudure bouclées 352 sur la couche de bordure 35 du corps de lit gonflable 3.

Puisque la première ligne de soudure 351b et les deux secondes lignes de soudure 352 sont formées sur la couche de bordure 35 du corps de lit gonflable 3, le corps de lit gonflable 3 présente un aspect à quatre couches.

La figure 5 illustre le quatrième mode de réalisation préféré d'un lit gonflable selon la présente invention, lequel est une modification du troisième mode de réalisation préféré. Dans ce mode de réalisation, les périphéries externes 42c des ceintures bouclées biseautées 40c sont disposées à distance les unes des autres, formant ainsi deux premières lignes de soudure 351c sur la couche de bordure 35 du corps de lit gonflable 3. Par conséquent, puisque les deux premières lignes de soudure 351c et les deux secondes lignes de soudure 352 sont formées sur la couche de bordure 35 du corps de lit gonflable 3, le corps de lit gonflable 3 présente un aspect à cinq couches.

En résumé, en raison de la présence de la première unité formant une ceinture de renforcement 4, 4a, 4b, 4c et des ceintures bouclées auxiliaires 6, le lit gonflable de la présente invention peut être fabriqué en présentant un aspect multicouche à un coût relativement bas en comparaison avec l'art antérieur. En outre, la première unité formant une ceinture de renforcement 4, 4a, 4b, 4c, la seconde unité formant une ceinture de renforcement 5 et les ceintures

bouclées auxiliaires 6 sont facilement assemblées au corps de lit gonflable 3. Le lit gonflable de la présente invention peut donc être facilement fabriqué.

REVENDICATIONS

1. Lit gonflable caractérisé par :

un corps de lit gonflable (3) présentant une couche supérieure (33), une couche inférieure (34), et une couche de bordure (35) reliant entre elles les périphéries desdites couches supérieure et inférieure (33, 34) et agissant conjointement avec lesdites couches supérieure et inférieure (33, 34) pour définir un espace gonflable (30) ; et

une première unité formant une ceinture de renforcement (4, 4a, 4b, 4c) disposée dans ledit espace gonflable (30) dans ledit corps de lit gonflable (3) et reliant entre elles ladite couche de bordure (35) dudit corps de lit gonflable (3) et au moins une desdites couches supérieure et inférieure (33, 34) dudit corps de lit gonflable (3).

2. Lit gonflable selon la revendication 1, caractérisé en outre par une seconde unité formant une ceinture de renforcement (5) disposée dans ledit espace gonflable (30) dans ledit corps de lit gonflable (3) et reliant entre elles lesdites couches supérieure et inférieure (33, 34) dudit corps de lit gonflable (3).

3. Lit gonflable selon la revendication 2, caractérisé en outre en ce que ladite seconde unité formant une ceinture de renforcement (5) comprend une pluralité de ceintures verticales parallèles (50), dont chacune présente des côtés supérieur et inférieur fixés solidement et respectivement auxdites couches supérieure et inférieure (33, 34) dudit corps de lit gonflable (3).

4. Lit gonflable selon la revendication 3, caractérisé en outre en ce que chacune desdites ceintures verticales (50) de ladite seconde unité formant une ceinture de renforcement (5) est pourvue d'une pluralité de trous de passage (500).

5. Lit gonflable selon la revendication 1, caractérisé en ce que ladite première unité formant une ceinture de renforcement (4a) comprend une seule ceinture bouclée biseautée (40a) qui présente une périphérie interne (41a) solidement fixée à ladite couche supérieure (33) dudit corps de lit gonflable (3), et une périphérie externe (42a) solidement fixée à ladite couche de bordure (35) dudit corps de lit gonflable (3).

6. Lit gonflable selon la revendication 5, caractérisé en outre en ce que ladite ceinture bouclée biseautée (40a) de ladite première unité formant une ceinture de renforcement (4a) est pourvue d'une pluralité de trous de passage (400a).

7. Lit gonflable selon la revendication 1, dans lequel ladite première unité formant une ceinture de renforcement (4, 4a, 4c) comprend deux ceintures bouclées biseautées (40, 40b, 40c), dont chacune présente des périphéries interne et externe (41, 41b, 41c ; 42, 42b, 42c), lesdites périphéries externes (42, 42b, 42c) desdites ceintures bouclées biseautées (40, 40b, 40c) étant solidement fixées à ladite couche de bordure (35) dudit corps de lit gonflable (3), lesdites périphéries internes (41, 41b, 41c) desdites ceintures bouclées biseautées (40, 40b, 40c) étant fixées solidement et respectivement auxdites couches

supérieure et inférieure (33, 34) dudit corps de lit gonflable (3).

8. Lit gonflable selon la revendication 7, caractérisé en outre en ce que chacune desdites ceintures bouclées biseautées (40, 40b, 40c) de ladite première unité formant une ceinture de renforcement (4, 4b, 4c) est pourvue d'une pluralité de trous de passage (400, 400b, 400c).

9. Lit gonflable selon la revendication 7, caractérisé en outre en ce que lesdites périphéries externes (42b) desdites ceintures bouclées biseautées (40b) de ladite première unité formant ceinture de renforcement (4b) sont reliées d'un seul tenant l'une à l'autre.

10. Lit gonflable selon la revendication 7, caractérisé en outre par deux ceintures bouclées auxiliaires (6) disposées horizontalement dans ledit espace gonflable (30) dans ledit corps de lit gonflable (3), chacune desdites ceintures bouclées auxiliaires (6) présentant des périphéries interne et externe (61, 62) qui sont fixées solidement et respectivement à une ceinture correspondante parmi lesdites ceintures bouclées biseautées (40b, 40c) de ladite première unité formant une ceinture de renforcement (4b, 4c) et ladite couche de bordure (35) dudit corps de lit gonflable (3).

11. Lit gonflable selon la revendication 10, caractérisé en outre en ce que chacune desdites ceintures bouclées auxiliaires (6) est pourvue d'une pluralité de trous de passage (60).

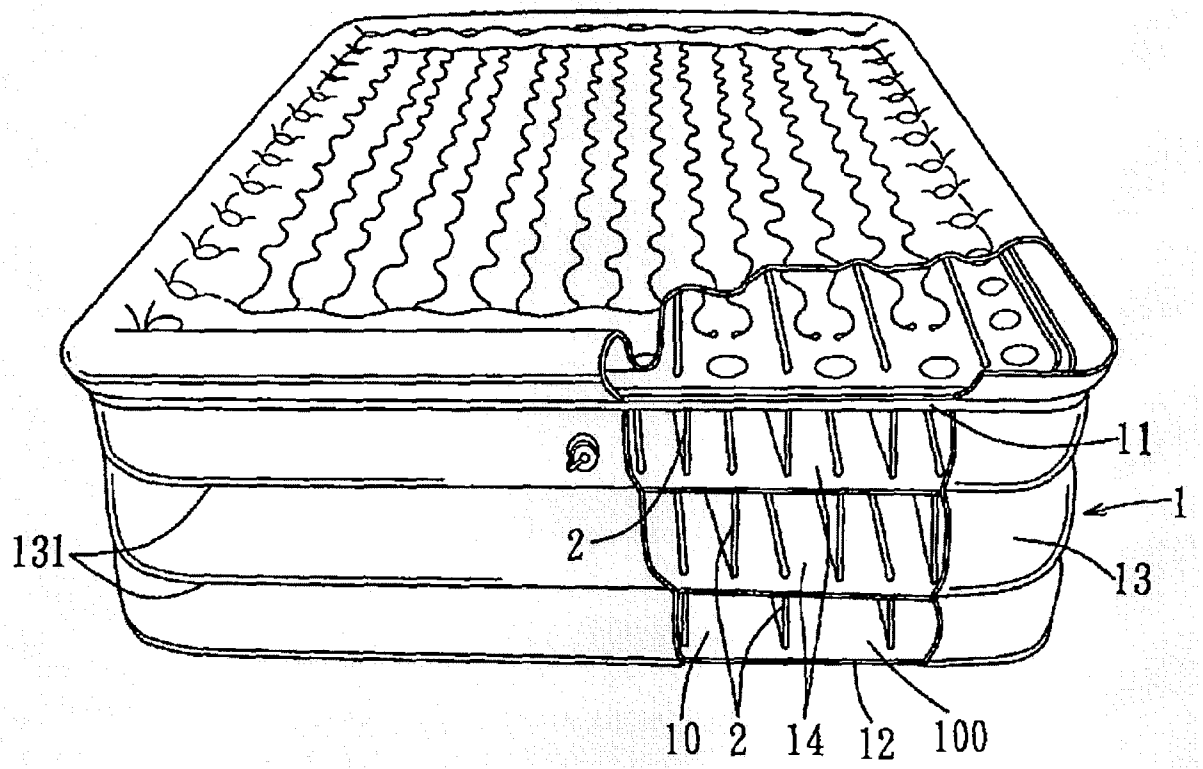


FIG. 1 ART ANTÉRIEUR

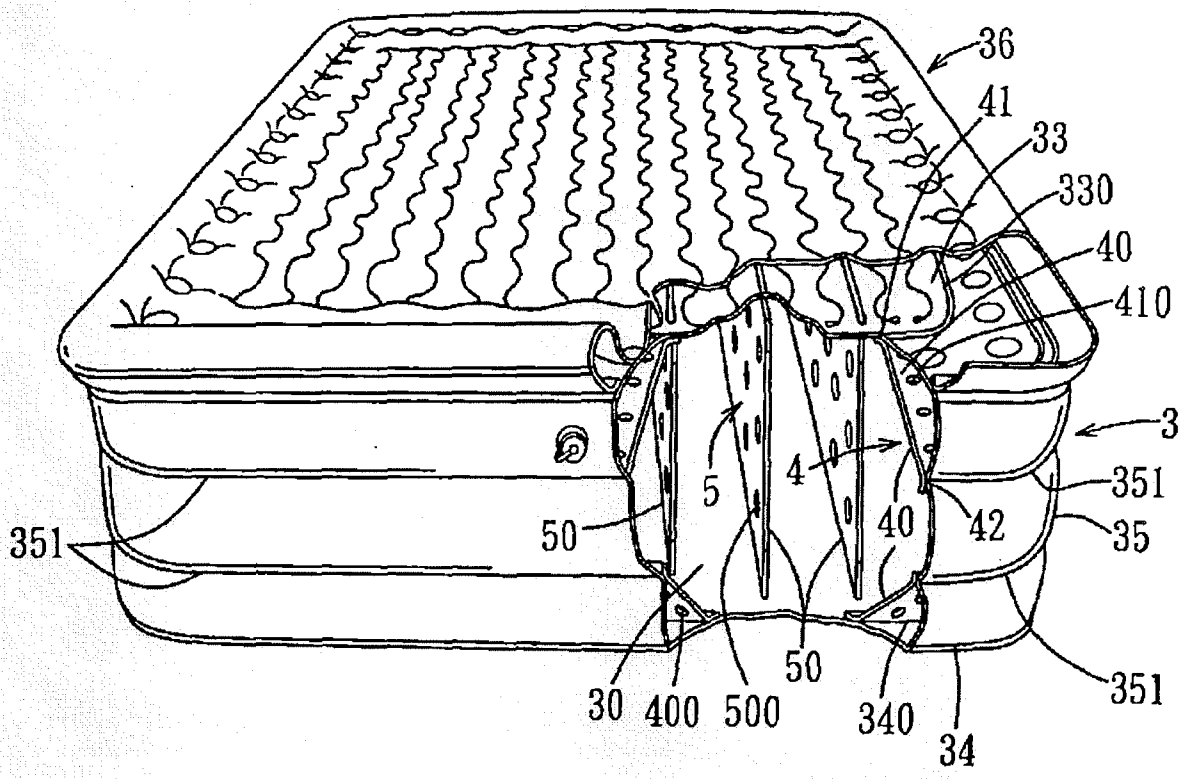


FIG. 2

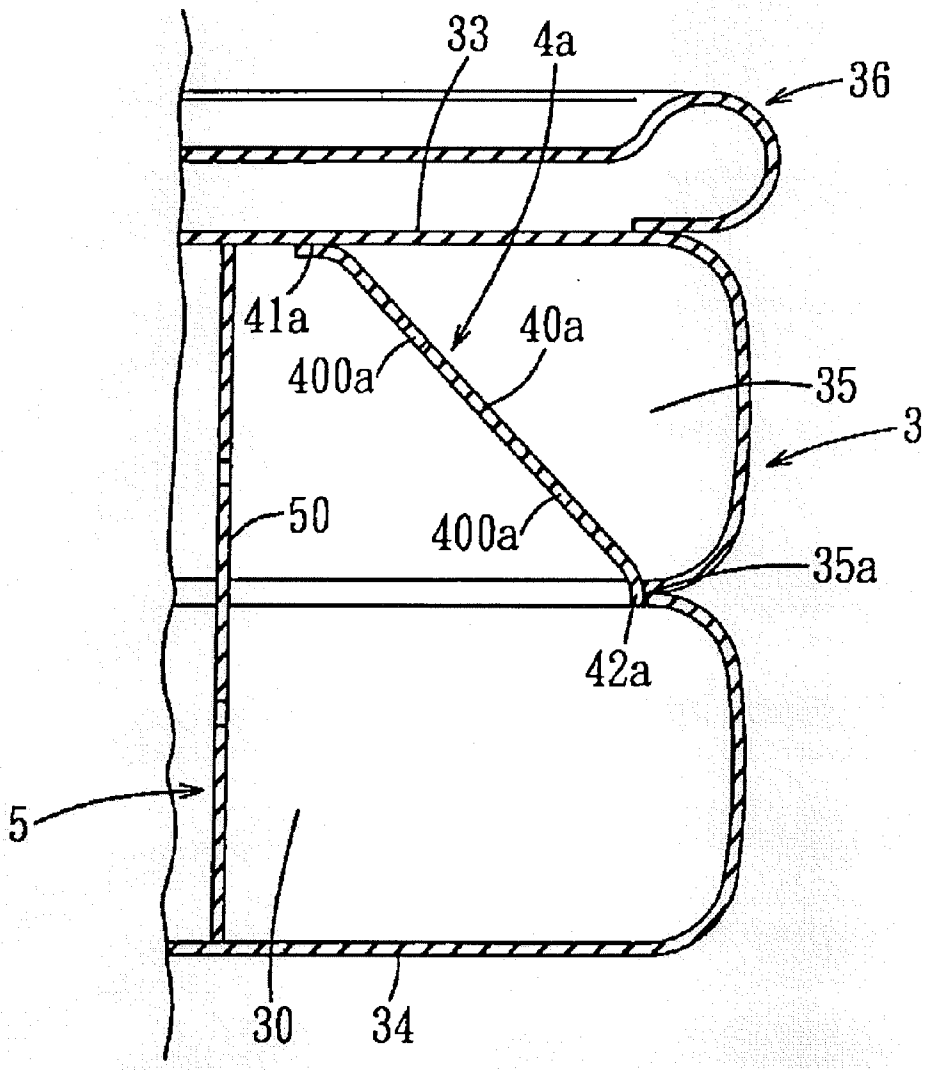


FIG. 3

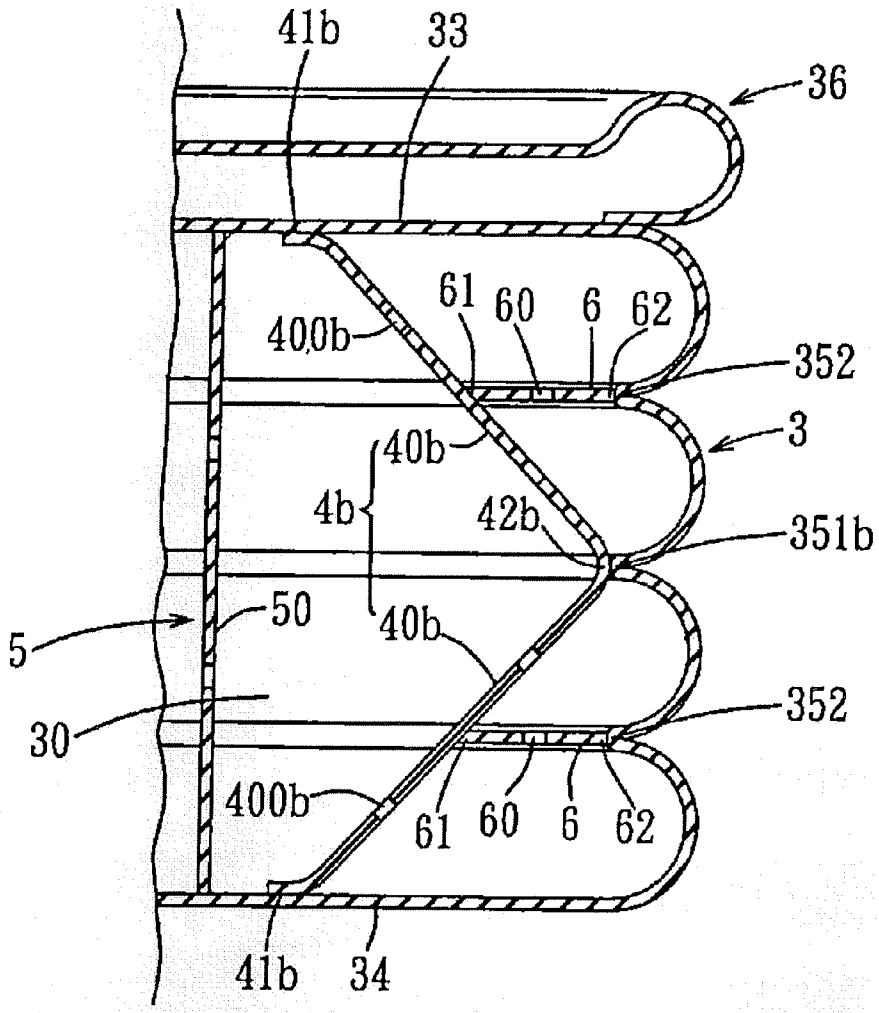

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352
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40b
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42b
351b
50
5
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400b
61
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6
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41b
34

FIG. 4

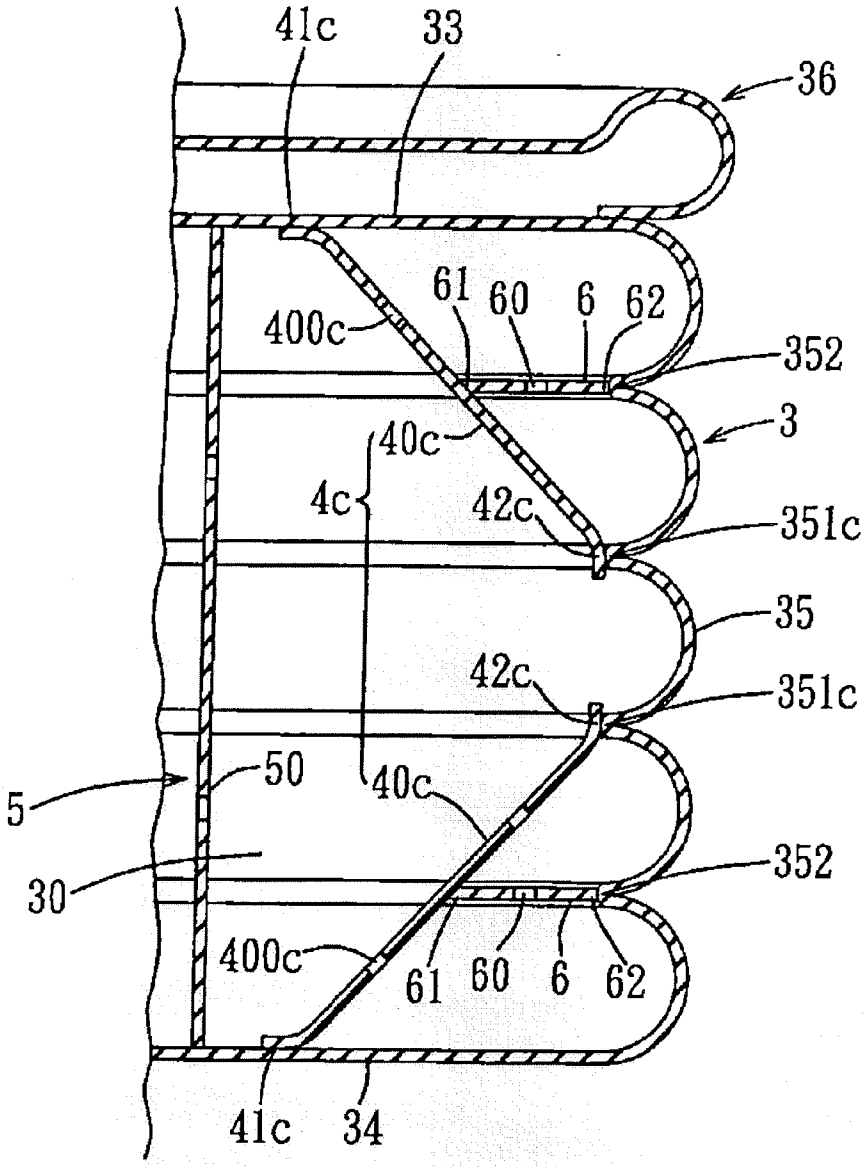

41c
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4c
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42c
351c
50
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40c
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30
400c
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41c
34

FIG. 5

US 20150335164A1

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(12) **Patent Application Publication**

(10) **Pub. No.: US 2015/0335164 A1**

(43) **Pub. Date: Nov. 26, 2015**

Liu

(54) **INTERNAL SUPPORTS FOR INFLATABLE PRODUCTS**

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(72) Inventor: **Feng Liu**, Shanghai (CN)

(21) Appl. No.: **14/566,075**

(22) Filed: **Dec. 10, 2014**

Related U.S. Application Data

(60) Provisional application No. 62/002,727, filed on May 23, 2014.

Publication Classification

(51) **Int. Cl.**

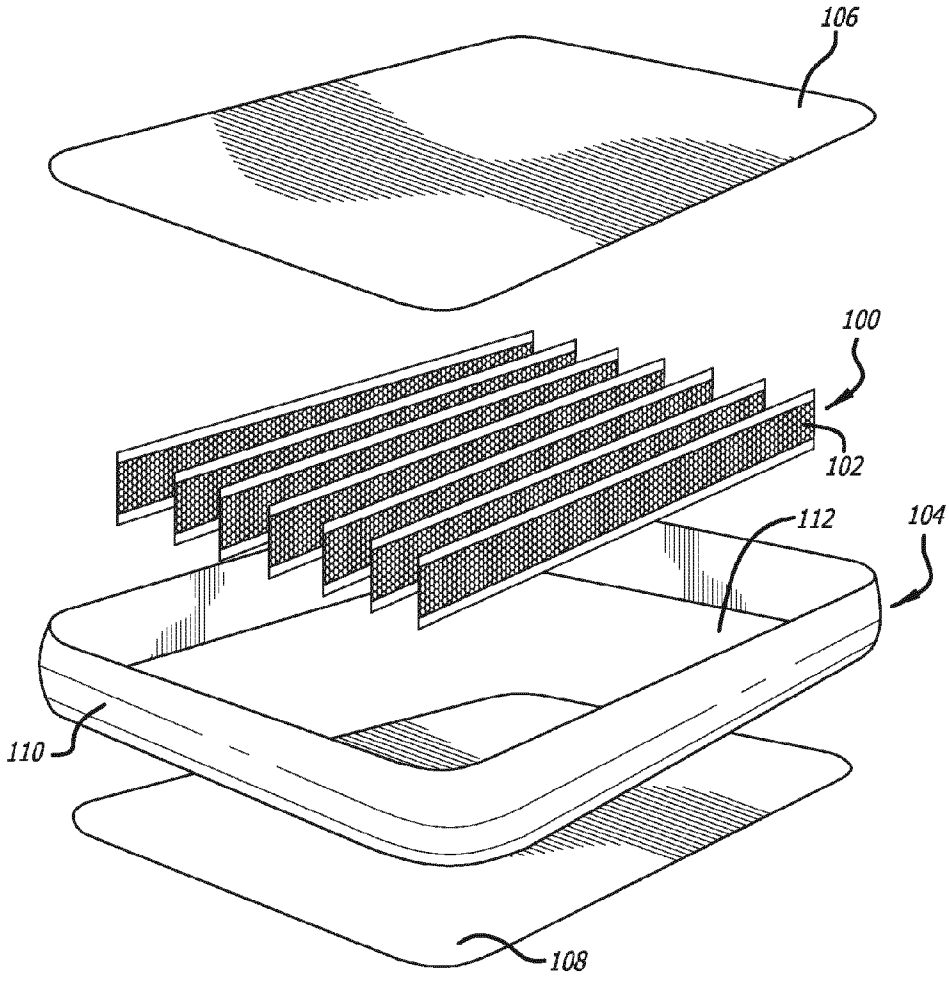
A47C 27/08	(2006.01)
A63H 33/00	(2006.01)
E04H 4/00	(2006.01)
A47C 4/54	(2006.01)

(52) **U.S. Cl.**

CPC *A47C 27/081* (2013.01); *A47C 4/54* (2013.01); *A63H 33/00* (2013.01); *E04H 4/00* (2013.01)

(57) **ABSTRACT**

A tensioning structure for use in inflatable products is provided. The inflatable structure may include a first plastic sheet, a second plastic sheet spaced apart from the first plastic sheet, and an inflatable air chamber defined by the first plastic sheet and the second plastic sheet. A plurality of tensioning structures may be disposed within the air chamber. Each tensioning structure may include a panel made of a single sheet of porous material, a first weld sheet affixed to a first end of the panel and affixed to the first plastic sheet, and a second weld sheet affixed to a second end of the panel opposite the first weld sheet and affixed to the second plastic sheet.



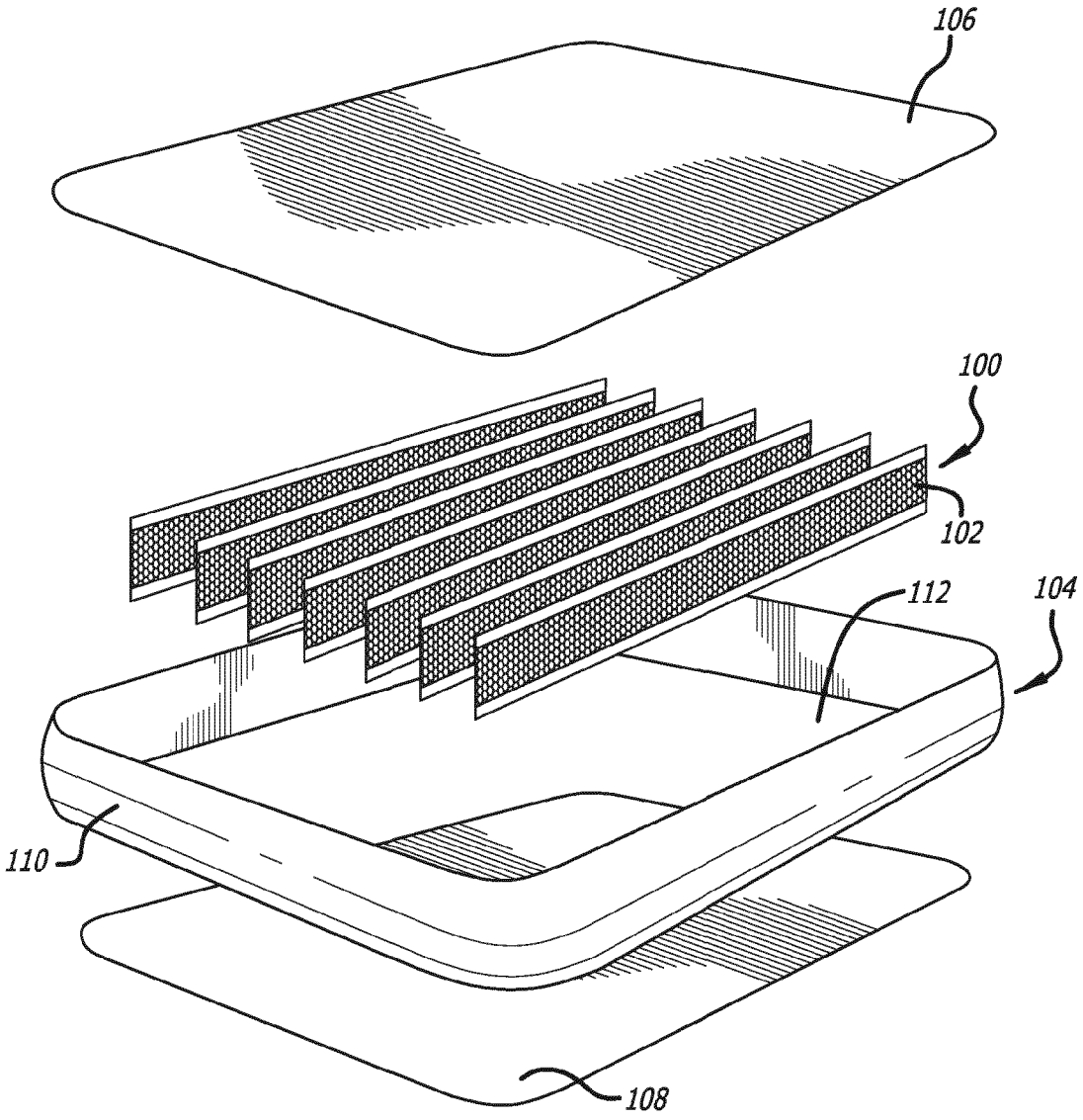
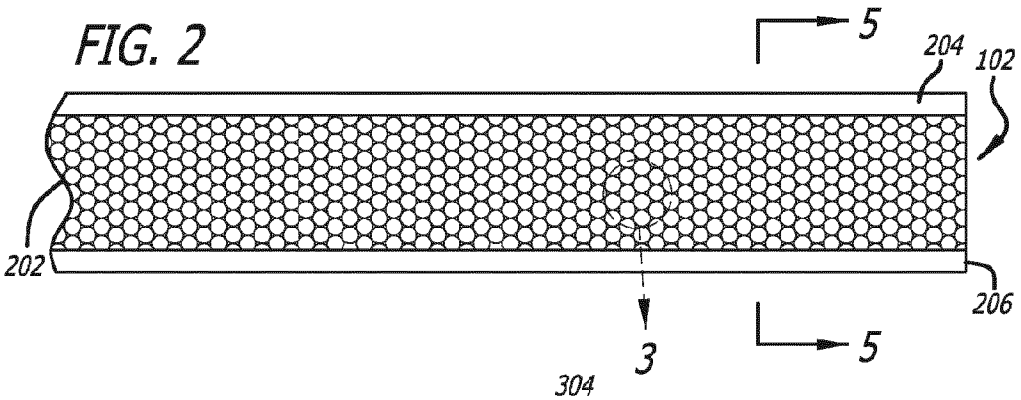


FIG. 1

FIG. 2



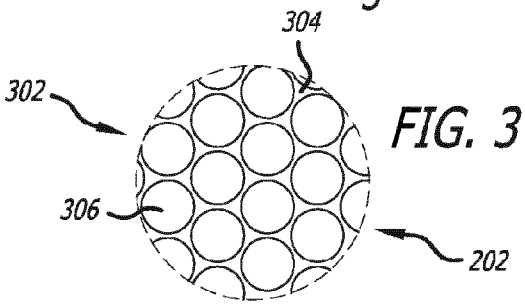


FIG. 3

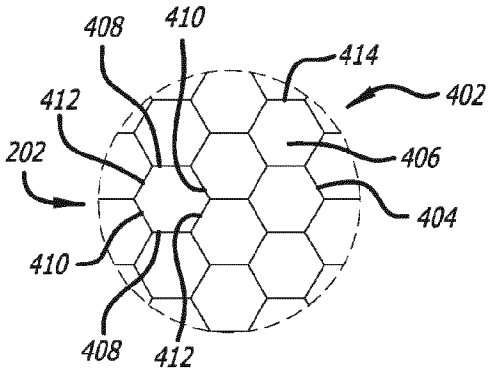


FIG. 4A

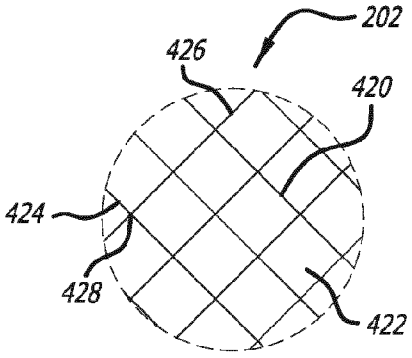


FIG. 4B

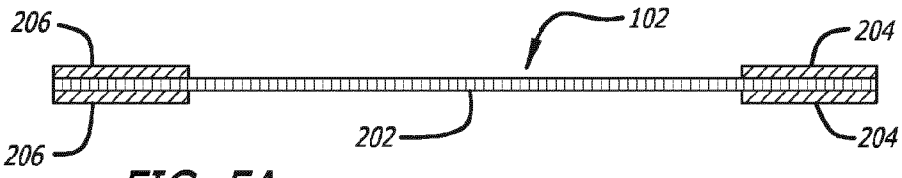


FIG. 5A

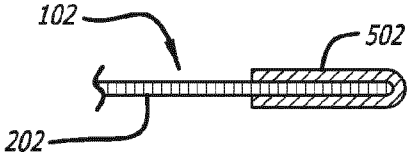


FIG. 5B

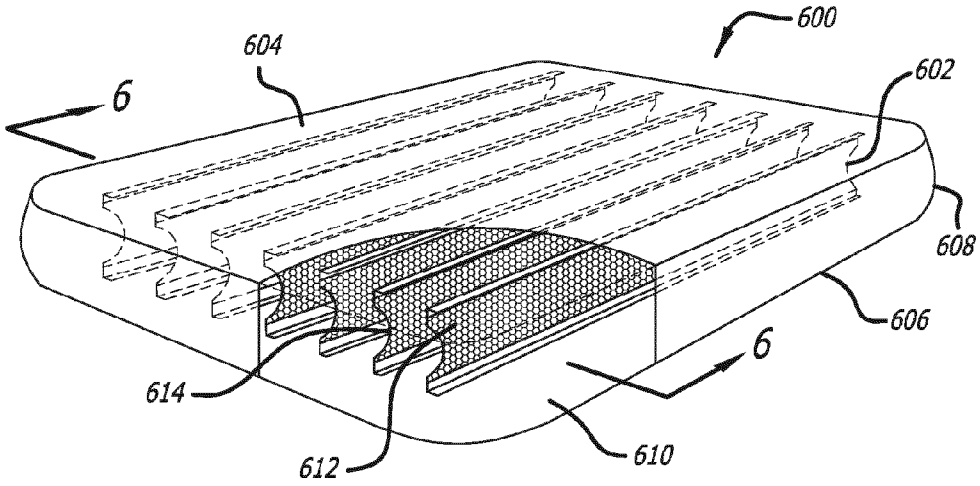

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FIG. 6A

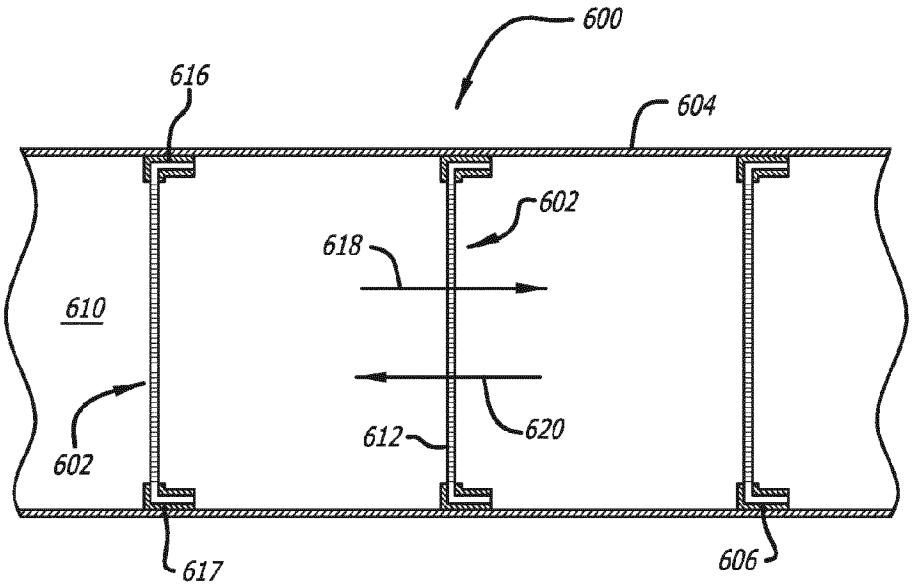

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FIG. 6B

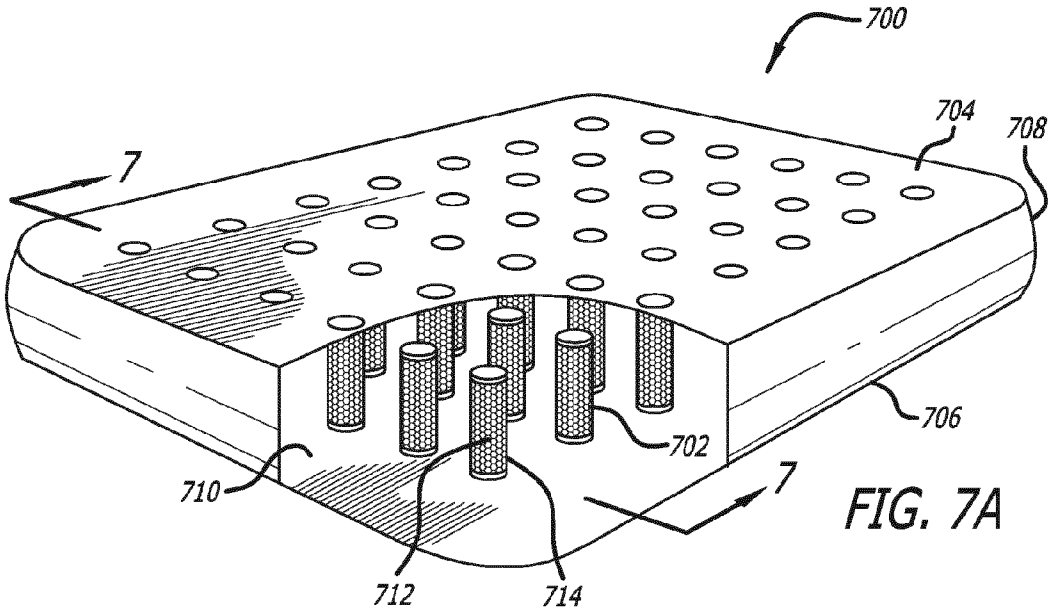


FIG. 7A

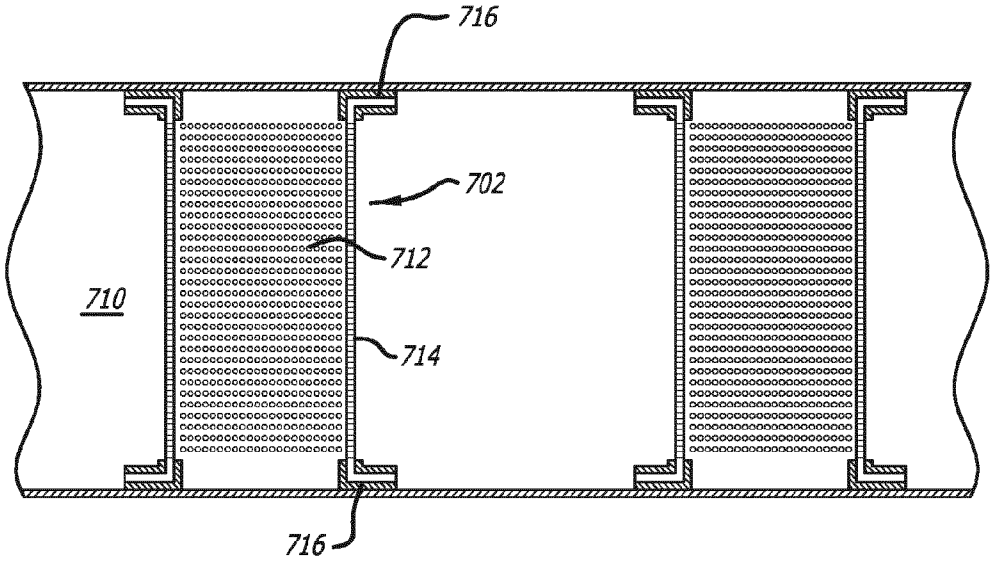


FIG. 7B

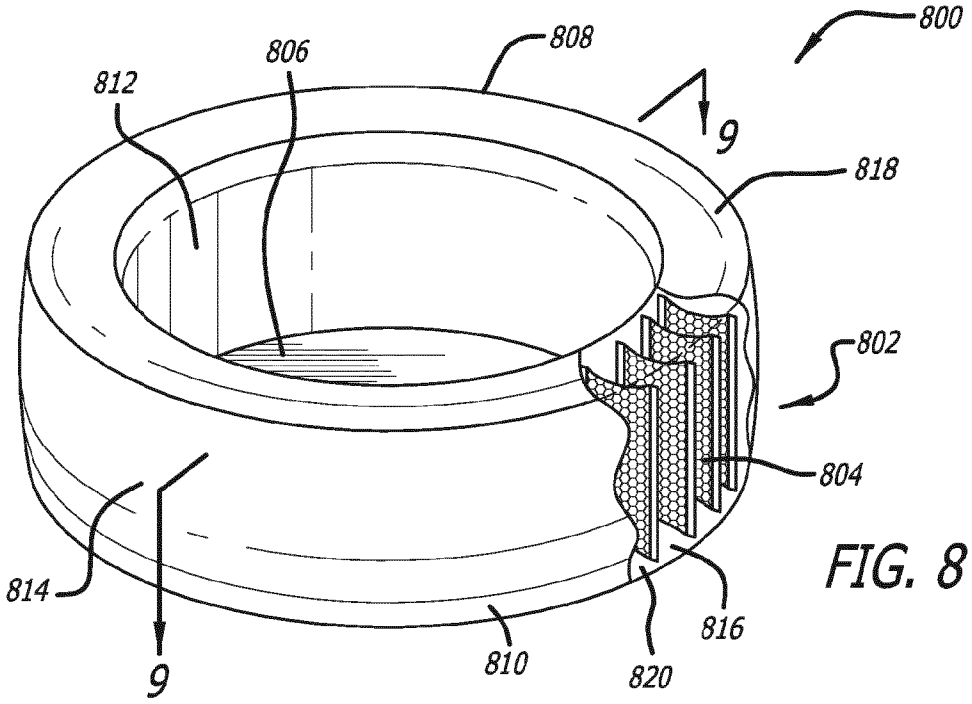

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FIG. 8

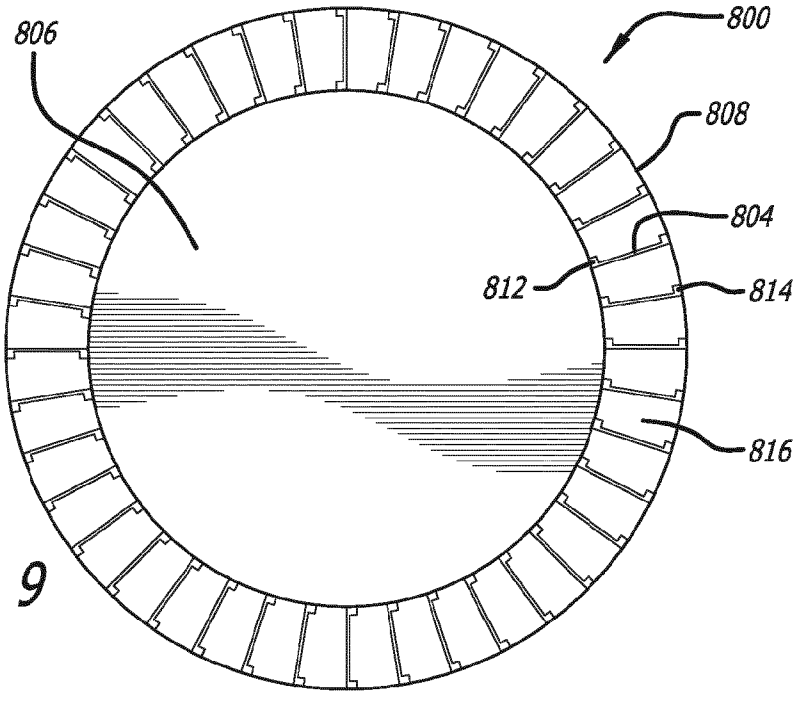

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FIG. 9

INTERNAL SUPPORTS FOR INFLATABLE PRODUCTS

RELATED APPLICATIONS

[0001] This application claims priority of U.S. application Ser. No. 62/002,727, filed on May 23, 2014, titled INTERNAL SUPPORTS FOR INFLATABLE STRUCTURES, which application is incorporated in its entirety by reference in this application.

BACKGROUND INFORMATION

[0002] 1. Field of Invention

[0003] The present disclosure relates to inflatable products and, in particular, to an inflatable product incorporating a durable tensioning structure that is light in weight and low in cost.

[0004] 2. Background

[0005] Inflatable products such as inflatable toy structures, inflatable beds, inflatable sofas, inflatable pools and the like are well known in the art. Such products are typically light in weight, easy to pack and store, and easy to carry.

[0006] Most inflatable products utilize internal structures in order to form the product into its intended, predetermined shape upon inflation. For example, air beds may incorporate one or more coil-beams or I-beams within the inflatable cavity of the bed. These beams are generally disposed at various locations within the inflatable cavity to shape the bed as the inflatable cavity is pressurized. The beams prevent the air bed from expanding evenly on all sides, similar to that of a balloon. More particularly, in order to maintain the generally rectangular shape of the air bed, these beams may join, for example, upper and lower surfaces of the air bed to one another to restrict their separation during inflation.

[0007] The number and spacing of the beams is proportional to the sharpness of the rectangularity of the inflated product. In other words, the greater the number and/or linear extent of the beams within the inflatable cavity, the "flatter" the bed surfaces become.

[0008] In conventional inflatable products, such as the air beds described above, the beam structures are typically made of plastic or PVC sheets with a sufficient thickness to ensure that external loads are spread and concomitant tensile stresses are reduced in the product material. As such, conventional inflatable structures utilizing plastic beam structures may meet their desired load requirements by varying the thickness of the beams. This contributes to increased weight of the inflatable product. Similarly, an increase in the thickness and/or spatial density of the beams also increases the compressed/folded volume of the deflated inflatable structure.

[0009] Beam structures made of a solid PVC sheet generally are not strong enough to withstand high pressure loads generated during inflation. Such structures are easily deformed once stretched beyond their elastic limit. This contorts the shape and weakens the strength of the inflatable structure. Further, such beam structures may also rip or tear along seams coupling the beam structures to, for example, the upper and lower surfaces of the inflatable structure if the inflatable structure is over-inflated.

[0010] Accordingly, a need therefore exists for a tensioning structure suited for inflatable products that is durable, yet lightweight and easy to manufacture.

SUMMARY

[0011] A tensioning structure for use in an inflatable product is provided. In one example, the inflatable product includes a first sheet, a second sheet disposed opposite the first sheet, where the first sheet and second sheet are spaced apart to define a gap therebetween, and where at least one tensioning structure spans the gap between the first sheet and the second sheet. The tensioning structure may include a panel made of a single sheet of porous material, where the panel includes a first end and an opposing second end. The tensioning structure may further include a first coupling affixed to the first end of the panel, where the first coupling is also coupled to the first sheet, and a second coupling affixed to the second end of the panel, where the second coupling is also coupled to the second sheet.

[0012] The panel may be made of material having an open cell mesh construction. In one implementation, the open cell mesh construction comprises an array of evenly spaced, hexagon-shaped apertures. In another implementation, the open cell mesh construction comprises an array of evenly spaced, circular-shaped apertures.

[0013] The first weld sheet and the second weld sheet may each include a first strip of material affixed to a front surface of the panel and a second strip of material affixed to a back surface of the panel. In other implementations, the first weld sheet and the second weld sheet may each include a single strip of material folded about the ends of the panel such that one end of the strip of material is affixed to a front surface of the panel and the opposite end of the strip of material is affixed to a back surface of the panel. In yet another implementation, the first end of the panel and the second end of the panel may be coated with PVC or other durable material having favorable bonding characteristics to form coating layers that are coupled to the first sheet and the second sheet.

[0014] In a second example, the inflatable product may include a first plastic sheet, a second plastic sheet spaced apart from the first plastic sheet, an inflatable air chamber defined by the first plastic sheet and the second plastic sheet, and a plurality of tensioning structures disposed within the air chamber, where each tensioning structure is coupled between the first wall and the second wall. Each of the plurality of tensioning structures may include a panel made of a single sheet of porous material, a first weld sheet affixed to a first end of the panel and affixed to the first plastic sheet, and a second weld sheet affixed to a second end of the panel opposite the first weld sheet and affixed to the second plastic sheet.

[0015] In a third example, the inflatable product may include a first wall, a second wall spaced apart from the first wall, an inflatable air chamber defined by the first wall and second wall, and a plurality of tensioning structures disposed within the air chamber, where each tensioning structure is coupled between the first wall and the second wall. Each of the plurality of tensioning structures may include a panels made of single sheet of porous material, a first weld sheet affixed to a first end of the panel and affixed to the first sheet, and a second weld sheet affixed to a second end of the panel opposite the first weld sheet and affixed to the second sheet.

[0016] A method for producing an inflatable product is further provided. The method includes the steps of providing a first sheet made of weldable material, and providing a second sheet made of weldable material, where the first sheet is spaced apart from the first sheet to define a gap therebetween. The method further includes the step of providing at least one tensioning structure spanning the gap between the first sheet

and the second sheet, where the at least one tensioning structure includes a tensile sheet made of porous material. The tensile sheet includes a first end and an opposing second end. A first weld strip is applied along the first end of the tensile sheet and a second weld strip is applied along the second end of the tensile sheet, where the first weld sheet is coupled to the first sheet and the second weld sheet is coupled to the second sheet.

[0017] In one implementation, the inflatable product is an air mattress having an upper sheet, a lower sheet, and a side wall. In the implementation, the method further comprises the steps of creating an inflatable chamber defined by the upper sheet, the lower sheet, and the side wall by coupling the side wall to the upper sheet and coupling the side wall to the lower sheet; and providing a valve in communication with the inflatable chamber to facilitate inflation and deflation of the air mattress.

[0018] In another implementation, the inflatable product is an inflatable spa having an inner wall, an outer wall, a top wall, and a bottom wall. In this implementation, the method further includes the steps of creating an inflatable chamber defined by the inner wall, the outer wall, the top wall, and the bottom wall by coupling the inner wall, the top wall, and the bottom wall, and coupling the outer wall to the top wall and the bottom wall; and providing a valve in communication with the inflatable chamber to facilitate inflation and deflation of the inflatable spa.

[0019] Other devices, apparatus, systems, methods, features and advantages of the disclosure will be or will become apparent to one with skill in the art upon examination of the following figures and detailed description. It is intended that all such additional systems, methods, features and advantages be included within this description, and be protected by the accompanying claims.

BRIEF DESCRIPTION OF THE FIGURES

[0020] The present disclosure may be better understood by referring to the following figures. The components in the figures are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the disclosure. In the figures, like reference numerals designate corresponding parts throughout the different views.

[0021] FIG. **1** is an exploded perspective view of one example of an air mattress incorporating a tensioning structure in accordance with the teachings of the present disclosure.

[0022] FIG. **2** is a FIG. **3** is a front view of an I-beam structure **102** incorporated into the air mattress of FIG. **1**.

[0023] FIG. **3** is an exploded view illustrating a circular mesh construction of the I-beam structure of FIG. **2**.

[0024] FIG. **4**A is an exploded view illustrating a skeletal hexagonal cellular mesh construction of the I-beam structure of FIG. **2**.

[0025] FIG. **4**B is an exploded view illustrating a third example of a mesh construction of an I-beam structure in accordance with the teachings of the present disclosure.

[0026] FIG. **5**A is a cross-sectional view of the I-beam structure taken along line **5-5** of FIG. **2**.

[0027] FIG. **5**B is a partial cross-sectional view of a second example of an I-beam structure in accordance with the teachings of the present disclosure.

[0028] FIG. **6**A is a perspective view of a second example of an air mattress incorporating a tensioning structure in accordance with the teachings of the present disclosure.

[0029] FIG. **6**B is a partial cross-sectional view illustrating the construction of the air mattress of FIG. **6**A taken along line **6-6** of FIG. **6**A.

[0030] FIG. **7**A is a perspective view of a third example of an air mattress incorporating a tensioning structure in accordance with the teachings of the present disclosure.

[0031] FIG. **7**B is a partial cross-sectional view illustrating the construction of the air mattress of FIG. **7**A taken along line **7-7** of FIG. **7**A.

[0032] FIG. **8** an exploded perspective view of an example of an inflatable pool incorporating a tensioning structure in accordance with the teachings of the present disclosure.

[0033] FIG. **9** is cross-sectional view illustrating the construction of the inflatable pool of FIG. **8** taken along line **9-9** of FIG. **8**.

DETAILED DESCRIPTION

[0034] FIGS. **1-9** illustrate examples of different implementations of tensioning structures **100** employed in inflatable objects. The tensioning structures give shape to inflatable objects, such as inflatable couches, beds, waterslides, structures, or swimming pools. The tensioning structures are lightweight and occupy minimal volume when the inflatable objects are deflated and packed away, while also functioning as strong and durable internal supports upon inflation and use of the inflatable object.

[0035] An exemplary tensioning structure in accordance with the present disclosure utilizes thin, flexible I-beam structures that join two areas of fabric to one another. The I-beam structures comprise open cell or mesh material and are firmly connected at their ends to adjacent fabric by an intermediate material, such as a strip of plastic. The intermediate material is in turn firmly attached to the fabric. The area of contact between the intermediate material and the I-beam structure may be adjusted to impart a connection strength commensurate with the tensile strength of the I-beam structure. Similarly, the area of contact between the intermediate material and the adjacent fabric may also be manipulated to impart a fabric/tensioning structure connection strength commensurate with the aggregate tensile strength of all of the I-beams comprising the inflatable object.

[0036] Various tensioning structures are described in detail below. It is contemplated that any of the tensioning structures described herein may be used in any inflatable product, either alone, as a group, or in combination with one another as required or desired for a particular design. In addition, it is contemplated that tensioning structures in accordance with the present disclosure can be used in other contexts, such as in camping, recreational, entertainment, amusement, extreme sports, fall-arrest safety and fire rescue equipment, or in any other context where a lightweight, inflatable structure is needed.

[0037] In one exemplary application shown in FIGS. **1-5**B, the tensioning structures **100** may include one or more I-beam support structures **102** incorporated into an inflatable product, such as an inflatable air mattress **104**. The air mattress **104** may include a top sheet **106**, a ground-contacting bottom sheet **108**, and a flexible sidewall **110**. The flexible sidewall **110** may be fixedly connected or welded to the peripheries of the top sheet **106** and the bottom sheet **108** to form an inflatable chamber **112**. Within the inflatable chamber **112**, the I-beam structures **102** may be attached to inner surfaces of the top sheet **106** and bottom sheet **108**. The I-beam structures

102, collectively, form channels that help shape and structurally reinforce the inflatable chamber **112**.

[0038] The top sheet **106**, bottom sheet **108**, and sidewall **110** may be constructed of plastic, polyvinyl chloride (PVC), thermoplastic rubber (TPR), polyethylene vinyl acetate (PEVA), ethylene vinyl acetate (EVA), thermoplastic polyurethane elastomer (TPU), neoprene-coated fabric, or any other suitable material. In some implementations, the top sheet **106** may be overlaid with a layer of fabric, padding, flocking, or other material to provide a sleeping surface for the user. One or more air valves (not shown) may be provided and coupled, for example, to the sidewall **110** for inflating and deflating the inflatable chamber **112**.

[0039] Although air mattress **104** is shown as a single layer, the present disclosure may also apply to mattresses having multiple layers (e.g., double layers). In addition to mattresses, tensioning structures of the present disclosure may be used in other inflatable products such as inflatable boats, inflatable islands, floatation devices, swimming pools, inflatable slides, and any other inflatable devices.

[0040] FIG. **2** is a front view of the I-beam structure **102**. The I-beam structure **102** may be generally rectangular in shape and include a panel **202** made of a material having fibers that form an open cell mesh construction where the cells may be shaped, cut, or otherwise formed into various geometrical shapes. The I-beam structure **102** acts as a retention member, and functions to limit the outward expansion of the top and bottom sheets **106** and **108** (for example, into a balloon shape) when the mattress **104** is filled with air. This type of retention is well known to those skilled in the art of inflatable devices, such as floating devices, air mattresses, and the like. Accordingly, although I-beam retention members are shown herein, other retention members can be used in accordance with the present disclosure, including tufted beam structures, coil-beam structures, X-beam structures, and the like. It is noted that, regardless of the type of retention structure used, the shape and comfort of the inflatable chamber will be directly dependent upon the number of retention structures used therein.

[0041] As illustrated in FIG. **3**, the panel **202** may comprise a circular mesh array **302**. The mesh array **302** may be formed from a plurality of fibers **304** that define a plurality of pores or apertures **306** therebetween. While the apertures **306** are illustrated in FIG. **3** as being circular in shape, in other implementations, the fibers **304** may define a plurality of apertures **306** having other geometric shapes, for example, hexagonal or triangular-shaped apertures **306**. When the mattress **104** (FIG. **1**) is inflated, thereby engaging one or more of the I-beam structures **102**, the fibers **304** may be placed in tension to maintain the shape and prevent over-expansion or "ballooning" of the mattress **104**.

[0042] The fibers **304** may be bundled or arranged in a staggered grid pattern to form a lattice of evenly spaced, circular-shaped apertures **306**. The apertures **306** may be spaced apart and arranged at regular intervals to provide the panel **202** (FIG. **2**) with a substantially constant tensile strength.

[0043] Referring now to FIG. **4**A, the panel **202** may comprise a skeletal hexagonal cellular mesh array **402**. The mesh array **402** may be formed from a plurality of fibers **404** that define a plurality of pores or apertures **406** therebetween.

[0044] The mesh array **402** may include a first set of spaced-apart and parallel fiber members **408**, a second set of spaced-apart and parallel fiber members **410**, and a third set of spaced-apart and parallel fiber members **412**. The first, second and third set of fiber members **408**, **410**, and **412** intersect each other in transverse relation such that, together, they form a plurality of hexagon-shaped apertures **406**.

[0045] The fibers **404** may be bundled or arranged in a staggered grid pattern to form a lattice of, evenly spaced, hexagon-shaped apertures **406**. The fiber members **408**, **410**, and **412** may be spaced apart at regular intervals to provide the panel **202** (FIG. **2**) with a substantially constant tensile strength.

[0046] In some implementations, as shown in FIGS. **3** and **4**A, the fibers **304**, **404** may comprise a cloth or cast screen or mesh of fabric such as cloth, nylon, polyester or other durable material. In other implementations, fiber bundles **414** may be constructed by knotting or weaving together strands of materials such as twine, wire, string, or threads.

[0047] In another example, as shown in FIG. **4**B, the panel **202** may be formed from a plurality of ligaments or frame members **420** that define a plurality of pores or open cells **422** therebetween. The frame members **420** may be arranged in a grid pattern, including a first set of spaced-apart and parallel frame members **424** and a second set of spaced-apart and parallel frame members **426**. In this grid pattern, the first set of frame members **424** is transverse to the second set of frame members **426** such that the first set of frame members **424** intersects the second set of frame members **426** at a junction **428**. In example shown in FIG. **4**A, the first set of frame members **424** intersects the second set of frame members **426** to form a lattice of, evenly spaced, diamond-shaped open cells **422**. Adjacent frame members **420** may be spaced apart at regular intervals to provide the panel **202** with a substantially constant tensile strength. The size and shape of each open cell **422** may vary depending on the thickness and orientation of the surrounding frame members **424**, **426**.

[0048] In some implementations, the frame members **420** may comprise a cloth or cast screen or mesh of fabric such as nylon, polyester or other durable material. In other implementations, frame members **420** may be constructed by knotting or weaving together strands of materials such as twine, wire, string, or threads.

[0049] Turning back to FIG. **2**, each I-beam structure **102** may include weld strips **204** and **206** connected to upper and lower ends of the panel **202**. The upper and lower weld strips **204** and **206** are in turn welded to the top sheet **106** and bottom sheet **108**, respectively, such that forces urging the top sheet **106** and bottom sheet **108** apart are encountered by tension in the open cell structure of the panel **202**.

[0050] FIG. **5**A is a cross section of the I-beam structure **102** taken along line **2**-**2** of FIG. **2**. As shown, and briefly described above, the structure **102** may be manufactured as a dual layer structure using a pair of weld strips **204** and **206**, both above and below the panel **202**. The weld strips **204** and **206** may comprise relatively thin strips of plastic, PVC, or other durable material. For example, the weld strips **204** and **206** may be constructed to a thickness of 0.20 mm-0.40 mm and a width of 20 mm-40 mm; however, the dimensions of the weld strips may vary depending on the size and inflation pressure of the inflatable product.

[0051] The use of two mutually opposed weld strips **204** and **206** employs a gripping action to "sandwich" the panel **202** therebetween, thereby contributing to a high-strength coupling interface. The weld strips **204** and **206** may be affixed to the panel **202** using suitable coupling techniques, such as radio-frequency (RF) welding, hot-air coupling (e.g.,

melting or welding), adhering (e.g., gluing) or other means known in the art. When implemented in an inflatable product, the resulting dual-layer tensioning structure **100** has improved strength and can be welded to the top sheet **106** and bottom sheet **108**, on either side (see e.g., FIG. **6**B).

[0052] In other implementations, as shown in FIG. **5**B, a single weld strip **502** may be used and folded about the lateral ends of the panel **202** such that one end of the weld strip is affixed to a bottom surface of the panel **202** and the opposite end of the strip is affixed to a top surface of the panel **202**. In another implementation, one end of the weld strip **502** may be affixed to a surface of the panel **202**, while an opposing end the weld strip **502** may be coupled to a corresponding top sheet **106** or bottom sheet **108**. In yet another implementation, the end regions covered by welds strips **204** and **206** in FIG. **2** may, alternatively, be coated by a plastic or PVC coating or coating of another suitable material, thus forming coating layers that may be welded to the top sheet **106** and bottom sheet **108**, respectively.

[0053] FIG. **6**A is a perspective view showing a second example of an implementation of the present disclosure where the tensioning structures includes a number of I-beam structures **602** used in an inflatable structure such as an air mattress **600**. The mattress **600** includes a sleeping surface at top sheet **604**, and a ground-contacting bottom sheet **606**. The mattress **600** further includes a sidewall **608** that is fixedly connected or welded to the peripheries of the top sheet **604** and the bottom sheet **606** to form an inflatable chamber **610**. In this example, the I-beam structures **602** may include an open cell mesh fabric **612** having one or more cut-outs **614** such that air may flow past the ends of structures **602**.

[0054] FIG. **6**B is a cross-sectional view of the air mattress **600** of FIG. **6**A. As shown, weld strips **616** and **617** affixed along the lateral ends of the mesh fabric **612** are bent to a substantially 90° angle at opposite ends of the fabric **612**, such that each lateral end of the I-beam structure **602** may be coupled between the top sheet **604** and the bottom sheet **606** of the air mattress **600** by, for example, sewing, stitching, RF welding, hot-air coupling, adhering, or other means known in the art. Because each I-beam structure **602** is air permeable, due to the open cell structure of the mesh fabric **612**, pressurized air flowing into the inflatable chamber **610** is permitted to freely flow from one portion of the chamber to an adjoining portion of the chamber during inflation or deflation, as illustrated by arrows **618** and **620**. Further, the open cell structure of the mesh fabric **612** provides tension for maintaining the shape of the air mattress **600** as internal pressure increases, thereby preventing the air mattress **600** from expanding evenly on all sides, similar to a balloon.

[0055] FIG. **7**A is perspective view showing a third example of an implementation of the present disclosure where the tensioning structures includes a plurality of coil-beam structures **702** used in an inflatable structure such as an air mattress **700**. In this example, the mattress **700** includes a top sheet **704** and a bottom sheet **706**. The mattress **700** further includes a sidewall **708** that is fixedly connected or welded to the peripheries of the top sheet **704** and bottom sheet **706** to form an inflatable chamber **710**. The coil-beam structures **702** may comprise an open cell mesh fabric **712**.

[0056] FIG. **7**B is a cross-sectional view of the air mattress **700** of FIG. **7**A. As illustrated in FIGS. **7**A and **7**B, the coil-beam structures **702** are arranged in an annular fashion to form a closed columnar structure **714**. Weld strips **716** may be affixed to axial ends of each columnar structure **714** and flared outwards (i.e., bent outwards forming a substantially 90° angle) such that weld strips **716** may be coupled to the top sheet **704** and the bottom sheet **706** of the inflatable mattress **700**.

[0057] FIG. **8** is a perspective view of an inflatable pool **800** incorporating another example of an implementation of the present disclosure. In this example, the tensioning structures **802** may include a plurality of I-beam structures **804**, each having an open cell mesh construction, incorporated into the inflatable pool **800**. The inflatable pool **800** may include a base sheet **806** with a circular edge and an inflatable hollow annular wall **808** coupled thereabout by, for example, sewing, stitching, heat or weld coupling. The wall **808** may comprise a hollow shell having an oval, circular, or rectangular shape or the like. There may be further provided a reinforcing ring-shaped inflatable base member **810** coupled to the bottom end of the wall **808**. The base sheet **806**, annular wall **808**, and base member **810** may be constructed of a gas impervious, heat-sealable plastic material, such as PVC or other water-tight and airtight material. The inflatable pool **800** may further incorporate other components not shown or described herein, such as water pumps, valves, piping, and motors known in the art.

[0058] FIG. **9** is a cross-sectional view taken along line **9**-**9** of FIG. **8**. As shown both in FIGS. **8** and **9**, the annular wall **808** may include an inner wall **812**, an outer wall **814**, and an interior annular cavity **816**. The interior annular cavity **816** is defined by the spacing between the inner and outer sidewalls **812** and **814** when the pool **800** is inflated. The pool **800** may be inflated through one or more air valves (not shown) formed in one of the sidewalls **812**, **814**.

[0059] Ends of each I-beam structure **804** may be glued, welded, or otherwise adhered to the inner wall **812** and the outer wall **814** of the annular wall **808**, respectively. The I-beam structures **804** may be coupled to the inner wall **812** and the outer wall **814** by an intermediate material, such as the weld strips (i.e., **204**, **206**, **502**, and **716**) described above, or other suitable means. The I-beam structures **804** may extend radially between the inner wall **812** and the outer wall **814** at spaced intervals of, for example, 15° to form a series of I-beam supports around the circumference of the interior annular cavity **816**.

[0060] The open cell mesh construction of the I-beam structures **804** permits air admitted through the air valve to communicate with all points around the circumference of the annular cavity **816**. In some implementations, the I-beam structures **804** may not extend to the top and/or bottom edges **818** and **820** of the annular wall **808** to provide an additional means for air admitted through the air valve to communicate with all points around the circumference of the annular cavity **816**. The I-beam structures **804** provide increased support and strength to the inflated pool **800** so that water of substantial depths can be supported within the pool **800** before the sidewall **812** and **814** deform.

[0061] The open cell mesh construction of the tensioning structures of the present disclosure provide a weight savings over tensioning structures presently used in inflatable products that comprise solid pieces of material. The construction of the fibers comprising the mesh structure enables tension stresses to be distributed more effectively throughout the tensioning structure. Tensioning structures of the present disclosure are capable of withstanding high tension forces and are adapted to maintain the desired shape and structural integrity of the inflatable product even after surfaces of the inflat-

able product have been stretched beyond their elastic limit. Tensioning structures of the present disclosure are simple in structure, easy to manufacture, durable, and low in production cost. Tensioning structures of the present disclosure are, further, capable of withstanding high inflation pressure values; thus providing the support surface(s) of the product with an appropriate hardness to provide support and comfort to the user.

[0062] In general, terms such as "coupled to," and "configured for coupling to," and "secured to," and "configured for securing to" and "in communication with" (for example, a first component is "coupled to" or "is configured for coupling to" or is "configured for securing to" or is "in communication with" a second component) are used herein to indicate a structural, functional, mechanical, electrical, signal, optical, magnetic, electromagnetic, ionic or fluidic relationship between two or more components or elements. As such, the fact that one component is said to be in communication with a second component is not intended to exclude the possibility that additional components may be present between, and/or operatively associated or engaged with, the first and second components.

[0063] The present disclosure may be used in any application where a lightweight, packable structure is needed to join two pieces of material that are urged away from one another in use. Although the previous description illustrates particular examples of various implementations, the present disclosure is not limited to the foregoing illustrative examples. A person skilled in the art is aware that the disclosure as defined by the appended claims and their equivalents can be applied in various further implementations and modifications. In particular, a combination of the various features of the described implementations is possible, as far as these features are not in contradiction with each other. Accordingly, the foregoing description of implementations has been presented for purposes of illustration and description. Modifications and variations are possible in light of the above description.

What is claimed is:

1. An inflatable product comprising:

a first sheet;

a second sheet disposed opposite the first sheet, the first sheet and the second sheet being spaced apart to define a gap therebetween; and

at least one tensioning structure spanning the gap between the first sheet and the second sheet, the tensioning structure comprising:

a panel made of a single sheet of porous material, the panel having a first end and an opposing second end;

a first coupling affixed to the first end of the panel, the first coupling being coupled to the first sheet; and

a second coupling affixed to the second end of the panel, the second coupling being coupled to the second sheet.

2. The inflatable product of claim **1**, wherein the panel is made of material having an open cell mesh construction.

3. The inflatable product of claim **2**, wherein the open cell mesh construction comprises an array of evenly spaced, hexagon-shaped apertures.

4. The inflatable product of claim **2**, wherein the open cell mesh construction comprises an array of evenly spaced, circular-shaped apertures.

5. The inflatable product of claim **1**, wherein the first coupling and the second coupling each comprise a first strip of material affixed to a front surface of the panel and a second strip of material affixed to a back surface of the panel.

6. The inflatable product of claim **1**, wherein the first coupling and the second coupling each comprise a single strip of material folded about the ends of the panel such that one end of the strip of material is affixed to a front surface of the panel and the opposite end of the strip of material is affixed to a back surface of the panel.

7. The inflatable product of claim **1**, wherein the first end of the panel and the second end of the panel are coated with PVC or other durable material having favorable bonding characteristics to form coating layers, wherein the coating layers are coupled to the first sheet and the second sheet.

8. The inflatable product of claim **1**, wherein the at least one tensioning structure is arranged in an annular fashion to form a closed columnar structure.

9. An inflatable product comprising:

a first plastic sheet;

a second plastic sheet spaced apart from the first plastic sheet;

an inflatable air chamber defined by the first plastic sheet and the second plastic sheet; and

a plurality of tensioning structures disposed within the air chamber, where each tensioning structure is coupled between the first plastic sheet and the second plastic sheet, the plurality of tensioning structures comprising:

a panel made of a single sheet of porous material, the panel having a first end and an opposing second end;

a first weld sheet affixed to the first end of the panel, the first weld sheet being coupled to the first plastic sheet; and

a second weld sheet affixed to the second end of the panel, the second weld sheet being coupled to the second plastic sheet.

10. The inflatable product of claim **9**, wherein the panel is made of material having an open cell mesh construction.

11. The inflatable product of claim **10**, wherein the open cell mesh construction comprises an array of evenly spaced, hexagon-shaped apertures.

12. The inflatable product of claim **10**, wherein the open cell mesh construction comprises an array of evenly spaced, circular-shaped apertures.

13. The inflatable product of claim **9**, wherein the first weld sheet and the second weld sheet each comprise a first strip of material affixed to a front surface of the panel and a second strip of material affixed to a back surface of the panel.

14. The inflatable product of claim **9**, wherein the first weld sheet and the second weld sheet each comprise a single strip of material folded about the ends of the panel such that one end of the strip of material is affixed to a front surface of the panel and the opposite end of the strip of material is affixed to a back surface of the panel.

15. The inflatable product of claim **9**, wherein the first end of the panel and the second end of the panel are coated with PVC or other durable material having favorable bonding characteristics to form coating layers, wherein the coating layers are coupled to the first sheet and the second sheet.

16. The inflatable product of claim **9**, wherein the at least one tensioning structure is arranged in an annular fashion to form a closed columnar structure.

17. The inflatable product of claim **9**, wherein the plurality of tensioning structures are spaced apart and arranged substantially parallel to one another.

18. An inflatable product comprising:
a first wall;
a second wall spaced apart from the first wall;
an inflatable air chamber defined by the first wall and the second wall; and
a plurality of tensioning structures disposed within the air chamber, where each tensioning structure is coupled between the first wall and the second wall, the plurality of tensioning structures comprising:
a panel made of single sheet of porous material, the panel having a first end and an opposing second end;
a first weld sheet affixed to the first end of the panel and coupled to the first sheet; and
a second weld sheet affixed to the second end of the panel and coupled to the second sheet.

19. The inflatable product of claim **18**, wherein the panel is made of material having an open cell mesh construction.

20. The inflatable product of claim **18**, wherein the open cell mesh construction comprises an array of evenly spaced, hexagon-shaped apertures.

21. The inflatable product of claim **19**, wherein the open cell mesh construction comprises an array of evenly spaced, circular-shaped apertures.

22. The inflatable product of claim **18**, wherein the first weld sheet and the second weld sheet each comprise a first strip of material affixed to a front surface of the panel and a second strip of material affixed to a back surface of the panel.

23. The inflatable product of claim **18**, wherein the first weld sheet and the second weld sheet each comprise a single strip of material folded about the ends of the panel such that one end of the strip of material is affixed to a front surface of the panel and the opposite end of the strip of material is affixed to a back surface of the panel.

24. The inflatable product of claim **18**, wherein the first end of the panel and the second end of the panel are coated with PVC or other durable material having favorable bonding characteristics to form coating layers, wherein the coating layers are coupled to the first wall and the second wall.

25. The inflatable product of claim **18**, wherein the at least one tensioning structure is arranged in an annular fashion to form a closed columnar structure.

26. The inflatable product of claim **18**, wherein the plurality of tensioning structures are spaced apart and arranged substantially parallel to one another.

27. The inflatable product of claim **18**, wherein the plurality of tensioning structures are radially arranged within the inflatable chamber at spaced intervals.

28. The inflatable product of claim **18**, wherein the first wall is concentric to the second wall.

29. A method for producing an inflatable product, the method comprising the steps of:
providing a first sheet made of weldable material;
providing a second sheet made of weldable material, the first sheet being spaced apart from the first sheet to define a gap therebetween;
providing at least one tensioning structure spanning the gap between the first sheet and the second sheet, the at least one tensioning structure including a tensile sheet made of porous material, the tensile sheet having a first end and an opposing second end;
applying a first weld strip along the first end of the tensile sheet;
applying a second weld strip along the second end of the tensile sheet;
coupling the first weld sheet to the first sheet; and
coupling the second weld sheet to the second sheet.

30. The method of claim **29**, where the inflatable product is an air mattress having an upper sheet, a lower sheet, and a side wall, the method further comprising the steps of:
creating an inflatable chamber defined by the upper sheet, the lower sheet, and the side wall by coupling the side wall to the upper sheet, and coupling the side wall to the lower sheet; and
providing a valve in communication with the inflatable chamber to facilitate inflation and deflation of the air mattress.

31. The method of claim **29**, where the inflatable product is an inflatable spa having an inner wall, an outer wall, a top wall, and a bottom wall, the method further comprising the steps of:
creating an inflatable chamber defined by the inner wall, the outer wall, the top wall, and the bottom wall by coupling the inner wall the top wall and the bottom wall, and coupling the outer wall to the top wall and the bottom wall; and
providing a valve in communication with the inflatable chamber to facilitate inflation and deflation of the inflatable spa.

32. The method of claim **29**, wherein the tensile sheet is made of material having an open cell mesh construction.

33. The method of claim **32**, wherein the open cell mesh construction comprises an array of evenly spaced, hexagon-shaped apertures.

34. The method of claim **32**, wherein the open cell mesh construction comprises an array of evenly spaced, circular-shaped apertures.

35. The method of claim **29**, further comprising the steps of:
coating the first end and the second end of the tensile sheet with PVC or other durable material having favorable bonding characteristics to form coating layers; and
coupling the coating layers to the first sheet and the second sheet.

* * * * *

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(54) **BEAM CONSTRUCTION OF AIR MATTRESS**

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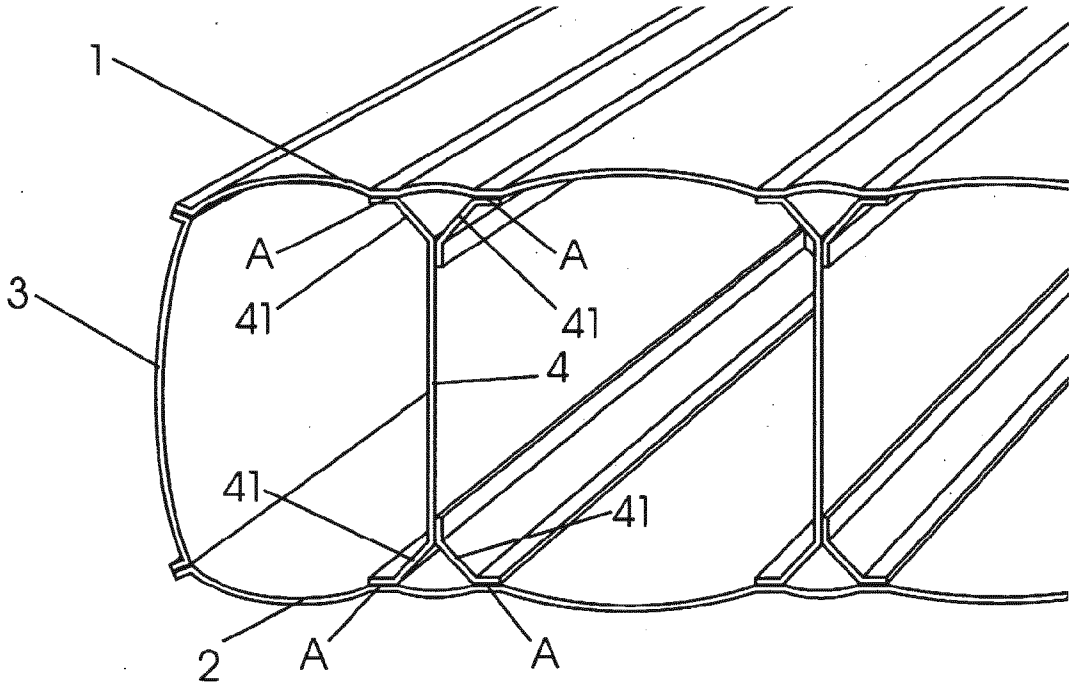
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A47C 27/08 (2006.01)

(52) **U.S. Cl.** **5/706**

(57) **ABSTRACT**

The beam construction of an air mattress includes a top sheet, a bottom sheet, and a periphery sheet. Beams are used to connect the top sheet and the bottom sheet. It is further characterized by both ends of the beam having at least one end that has two extended side-parts, with the surface of the extended side-parts connecting with the top sheet or the bottom sheet. The cross-section of the beam may a substantially "I" shape, a substantially "T" shape, a substantially "X" shape, or a substantially "Y" shape. The advantage of this present utility model is that it has created a connecting area between the beam and the top sheet and the bottom sheet, thus reducing the pulling force at the seam and ensuring the durability of the air mattress.



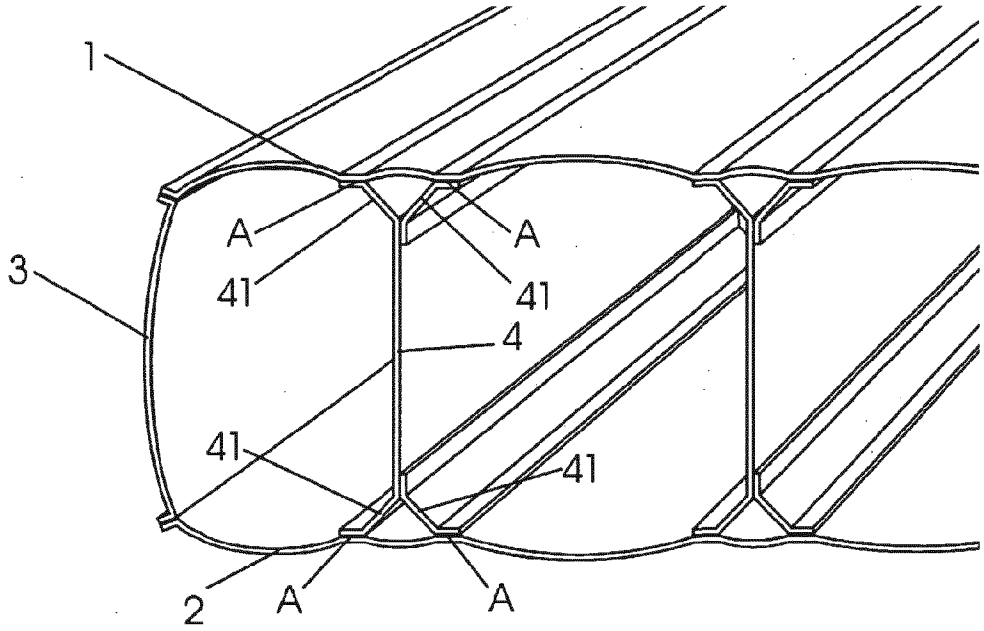


FIG. 1

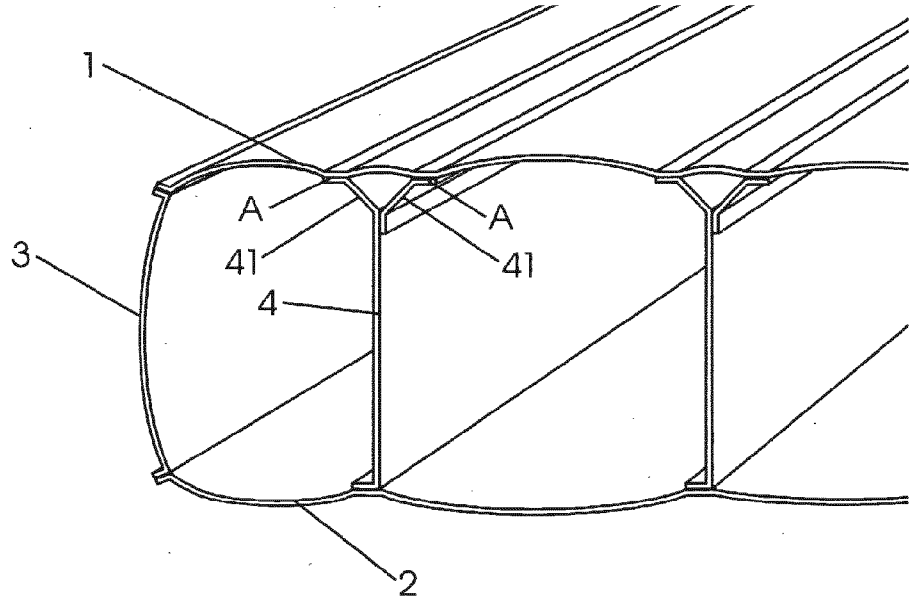


FIG. 2

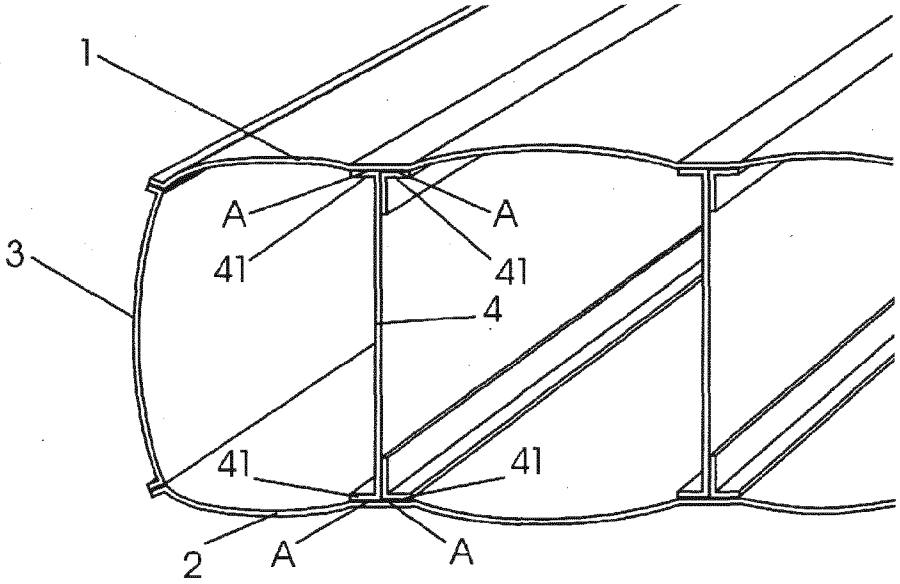


FIG. 3

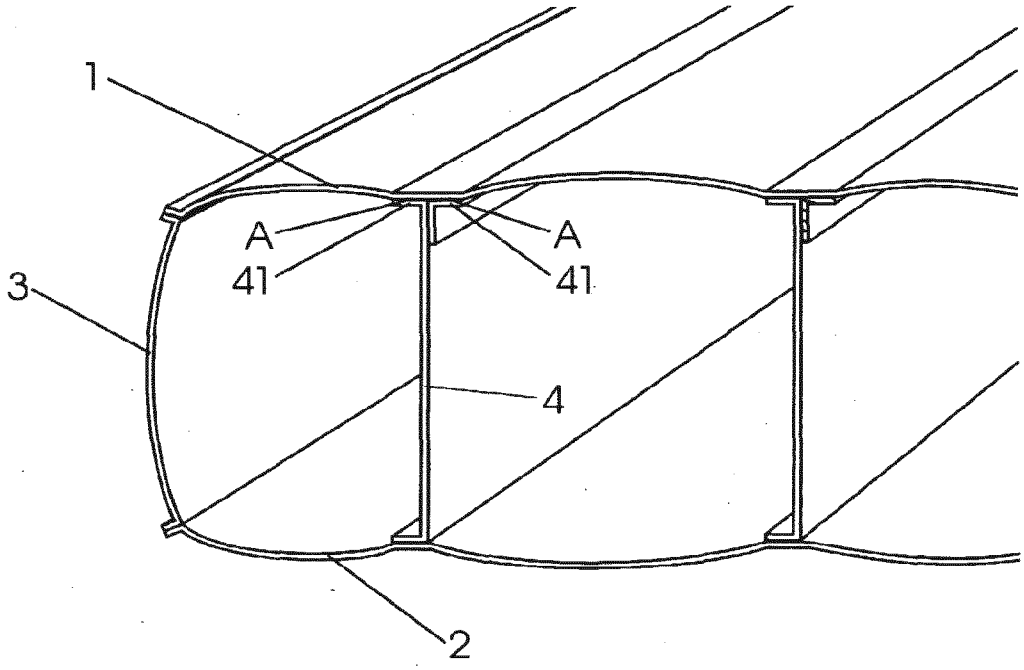


FIG. 4

BEAM CONSTRUCTION OF AIR MATTRESS

FIELD OF THE INVENTION

[0001] The present utility model relates to one kind of air mattresses, and particularly to the beam construction of air mattresses.

BACKGROUND OF THE INVENTION

[0002] At present, air mattresses are becoming more and more popular in the market, because they have the advantages of being easily carried and conveniently stored, in addition to being comfortable. People not only use them as spare beds at home, but also for camping and for leisure. The traditional air mattress generally uses an I-shaped or an S-shaped beam, where both ends of the beam may connect with a top sheet and a bottom sheet, respectively. Generally, the beam's section shape is in the form of a "]" or a "Z". A vertical direction pulling force is created against the top sheet and the bottom sheet after inflation, with more force being exerted at the seam where the beams and the top sheet or the bottom sheet connect. The place where the beams and the top sheet or the bottom sheet connect may easily come apart or be torn apart, especially when the interior air pressure value in the air mattress is high, and damage may occur when stronger exterior forces are exerted, which causes a sudden increase in the interior air pressure value. In order to resolve the problems mentioned above, measures have been taken to add extra beams or use thicker material to enhance the strength of the top sheet and the bottom sheet. Although the possibility of damage to the air mattress has been reduced using these methods, production costs have increased greatly.

SUMMARY OF THE INVENTION

[0003] The purpose of the present utility model is to provide a beam construction for a kind of air mattress in view of the flaws that exist in the current technology.

[0004] The present utility model mainly comprises a top sheet, a bottom sheet, and a periphery sheet. Beams are used to connect the top sheet and the bottom sheet. The present utility model is characterized by both ends of the beam having at least one end that can extend to two sides, with the surface of the extending part connecting with the top sheet or the bottom sheet separately. The cross-section of the beam may assume the form of an "I," a "⊥," an "H," or a "T."

[0005] Compared with the beams of the current and existing technology, the advantage of the present utility model is that it has an added connecting area between the beams and the top sheet and the bottom sheet, thus reducing the pulling force exerted at the seam and ensuring the durability of the air mattress.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] FIG. **1** illustrates the cross-section of this new beam construction has a substantially "H" shape.

[0007] FIG. **2** illustrates the cross-section of this new beam construction has a substantially "T" shape.

[0008] FIG. **3** illustrates the cross-section of this new beam construction has a substantially "I" shape.

[0009] FIG. **4** illustrates the cross-section of this new beam construction has a substantially "⊥" shape.

[0010] The following reference numbers and designations will be used in the figures and the "Description of the Embodiments" to indicate like elements: 1. top sheet; 2. bottom sheet; 3. periphery sheet; 4. beam; 41. extending parts; and A. welded joints.

DESCRIPTION OF THE EMBODIMENTS

[0011] As shown in FIG. **1**, a beam **4** has a substantially "H" shape cross-section. The two ends of beam **4** have extending parts **41** that are connected with a top sheet **1** or a bottom sheet **2**, respectively, by adoption of high-frequency welding. After inflation, beam **4** of the air mattress exerts pulling forces against the top sheet **1** and the bottom sheet **2** through both ends of the extending parts **41**. The pulling forces against the top sheet 1 and the bottom sheet **2** are dispersed. Simultaneously, the extending parts **41** connected with both ends of beam **4** protect the welded joints A. The place where beam **4** connects with the top sheet **1** or the bottom sheet **2** will not easily peel off or be torn away when pulling forces are brought from vertical directions, even when the interior air pressure value in the air mattress is high, or when stronger exterior forces are exerted, which causes a sudden increase of interior air pressure value.

[0012] The embodiment shown in FIG. **2** is similar to the embodiment shown in FIG. **1**, except that the cross-section of beam **4** has a substantially "T" shape. While the beam **4** has only upper ends that can extend to both sides, which connect with the top sheet **1**, this mainly increases the reliability of the seam where beam **4** and the top sheet **1** are connected. The lower end has an extending part **41** that connects with the bottom sheet **2**.

[0013] The embodiment shown in FIG. **3** is similar to the embodiment shown in FIG. **1**, except that the cross-section of beam **4** has a substantially "I" shape. While the beam **4** has upper ends that can extend to both sides, which connect with the top sheet **1**, this mainly increases the reliability of the seam where beam **4** and the top sheet **1** are connected. The lower end has two extending parts **41** that connect with the bottom sheet **2**.

[0014] The embodiment shown in FIG. **4** is similar to the embodiment shown in FIG. **1**, except that the cross-section of beam **4** has a substantial "⊥" shape. While the beam **4** has only upper ends that can extend to both sides, which connect with the top sheet **1**, this mainly increases the reliability of the seam where beam **4** and the top sheet **1** are connected. The lower end has only one extending part **41** that connects with the bottom sheet **2**.

What is claimed is:

1. An air mattress comprising a top sheet, a bottom sheet, a periphery sheet, and beams connected between the top sheet and the bottom sheet, wherein both ends of each beam have at least one end having two extended side-parts, with the surface of the extended side-part connecting with the top sheet or the bottom sheet, and wherein each beam has a cross-section having a shape selected from a group consisting of a substantially "I" shape, a substantially "⊥" shape, a substantially "H" shape, or a substantially "T" shape.

* * * * *

US009254047B1

(12) **United States Patent**
Schermel et al.

(10) **Patent No.: US 9,254,047 B1**
(45) **Date of Patent: Feb. 9, 2016**

(54) **REINFORCED VINYL AIR MATTRESS**

(76) Inventors: **William Schermel**, Mississauga (CA); **Ferdinand Schermel**, Port Colbourne (CA)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1785 days.

(21) Appl. No.: **11/485,929**

(22) Filed: **Jul. 14, 2006**

(51) **Int. Cl.**
A47C 27/08 (2006.01)

(52) **U.S. Cl.**
CPC ***A47C 27/083*** (2013.01); ***A47C 27/082*** (2013.01)

(58) **Field of Classification Search**
CPC A47C 27/00; A47C 27/08; A47C 27/081; A47C 27/082; A47C 27/083; A47C 27/084
USPC 5/711, 710, 712, 713, 655.3, 706, 932
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,025,975	A *	5/1977	Phillips et al.	5/686
4,766,628	A *	8/1988	Walker	5/706
4,890,344	A *	1/1990	Walker	5/713
5,815,865	A *	10/1998	Washburn et al.	5/713
5,991,949	A *	11/1999	Miller et al.	5/710
6,065,166	A *	5/2000	Sharrock et al.	5/630
6,378,152	B1 *	4/2002	Washburn et al.	5/713
6,550,086	B2 *	4/2003	Boyd	5/706
6,709,246	B2 *	3/2004	Boyd	417/423.1
6,786,355	B2 *	9/2004	Chirnomas	221/9
6,971,133	B2 *	12/2005	See	5/706
2002/0124320	A1 *	9/2002	Washburn et al.	5/713
2003/0101516	A1 *	6/2003	Hsu et al.	5/710
2004/0133987	A1 *	7/2004	Reeder et al.	5/713
2007/0284384	A1 *	12/2007	Chirnomas	221/9
2008/0022460	A1 *	1/2008	Yang	5/706

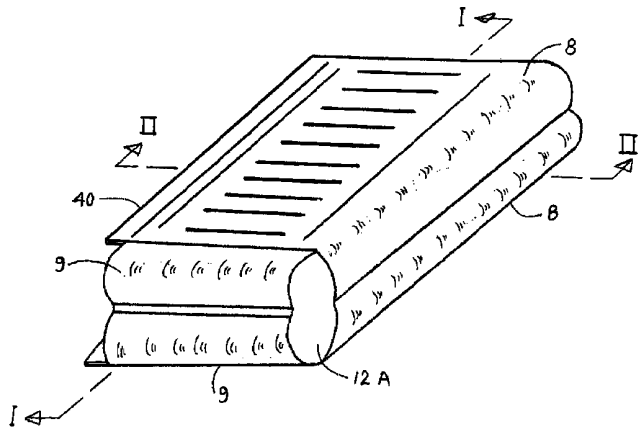
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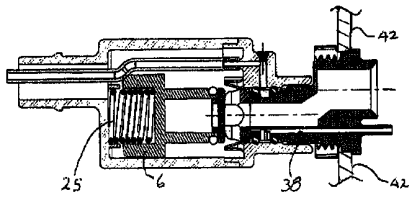
Primary Examiner — Gilbert Lee

(57) **ABSTRACT**

A structural design and weld fabrication method for reinforced vinyl by eliminating butt seams, leaving 100% lap seams, as well as low cost, high strength internal beams for use in high quality air bed mattresses and all inflatable items.

2 Claims, 23 Drawing Sheets





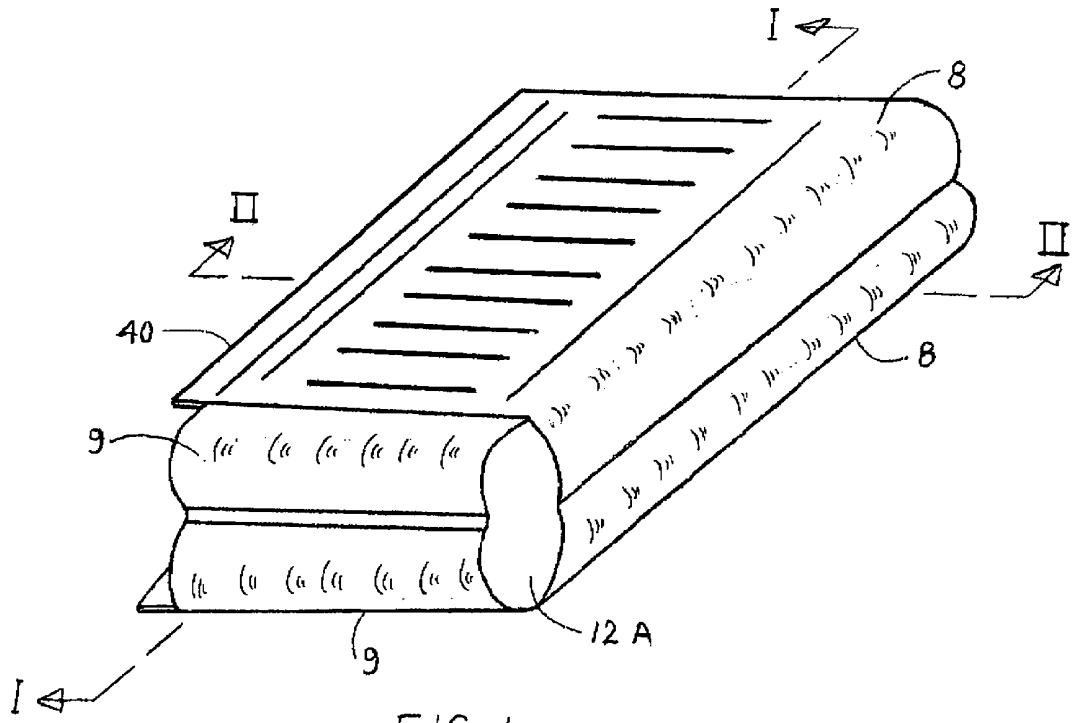


FIG 1

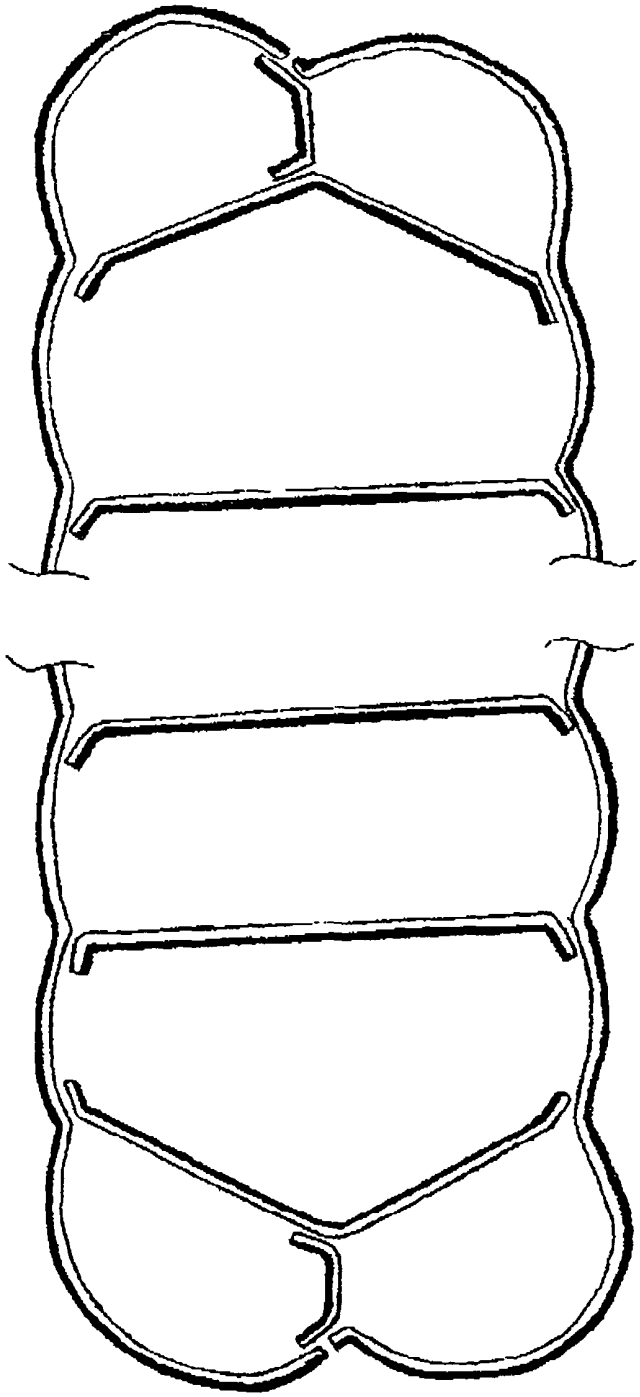


FIG 2 SECTION II

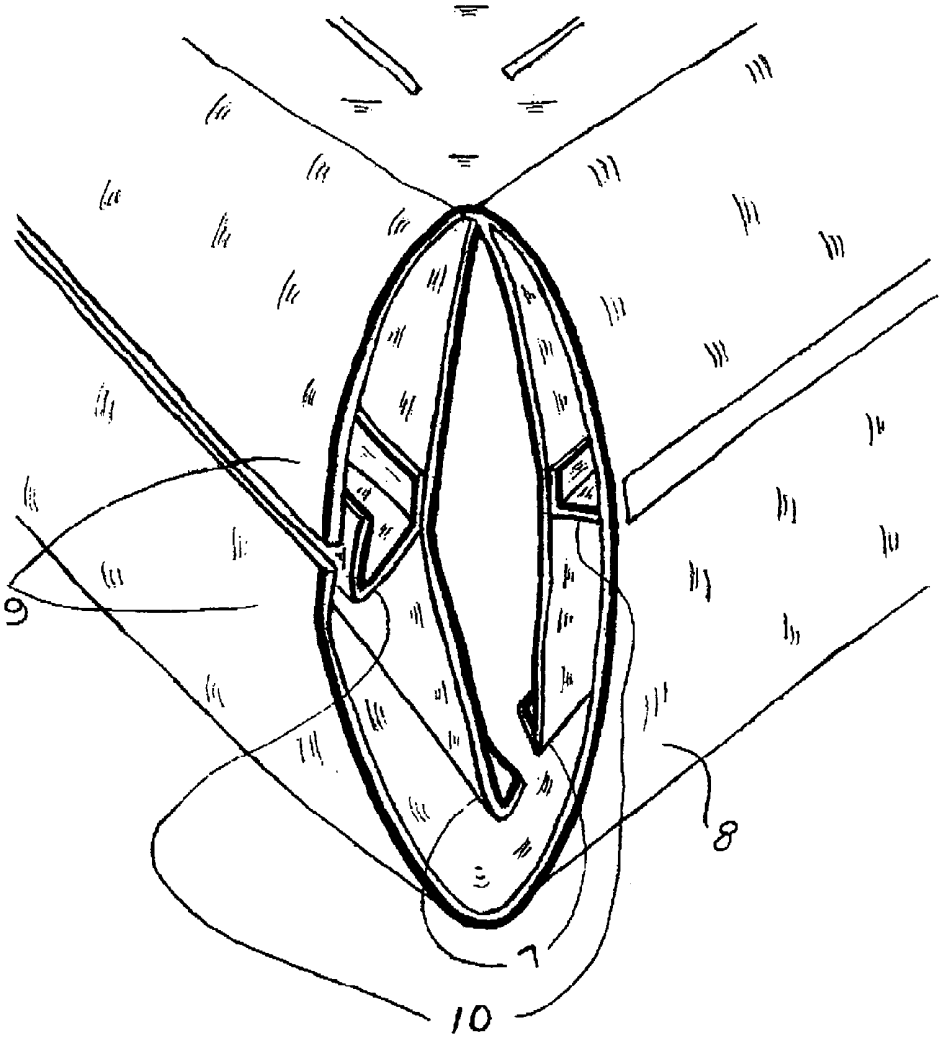


FIG 3

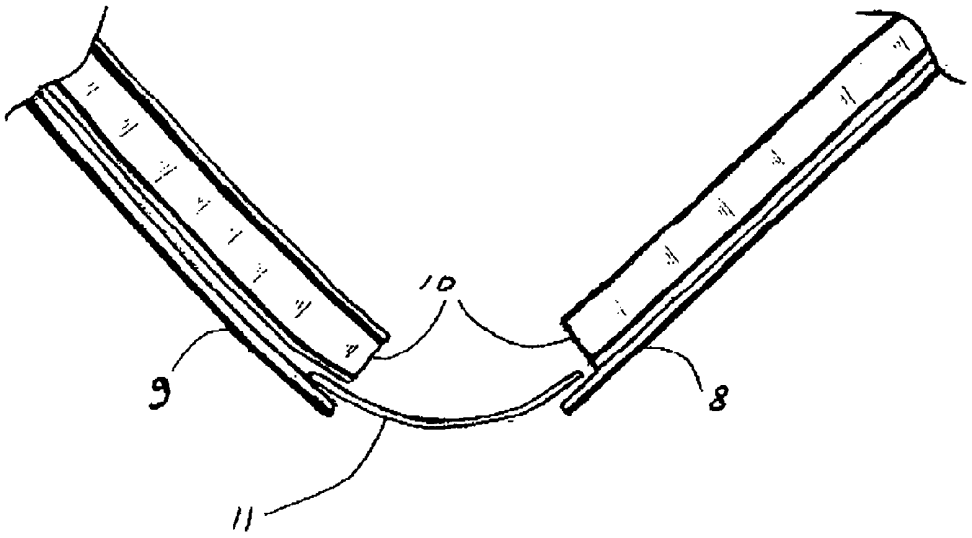


FIG 4

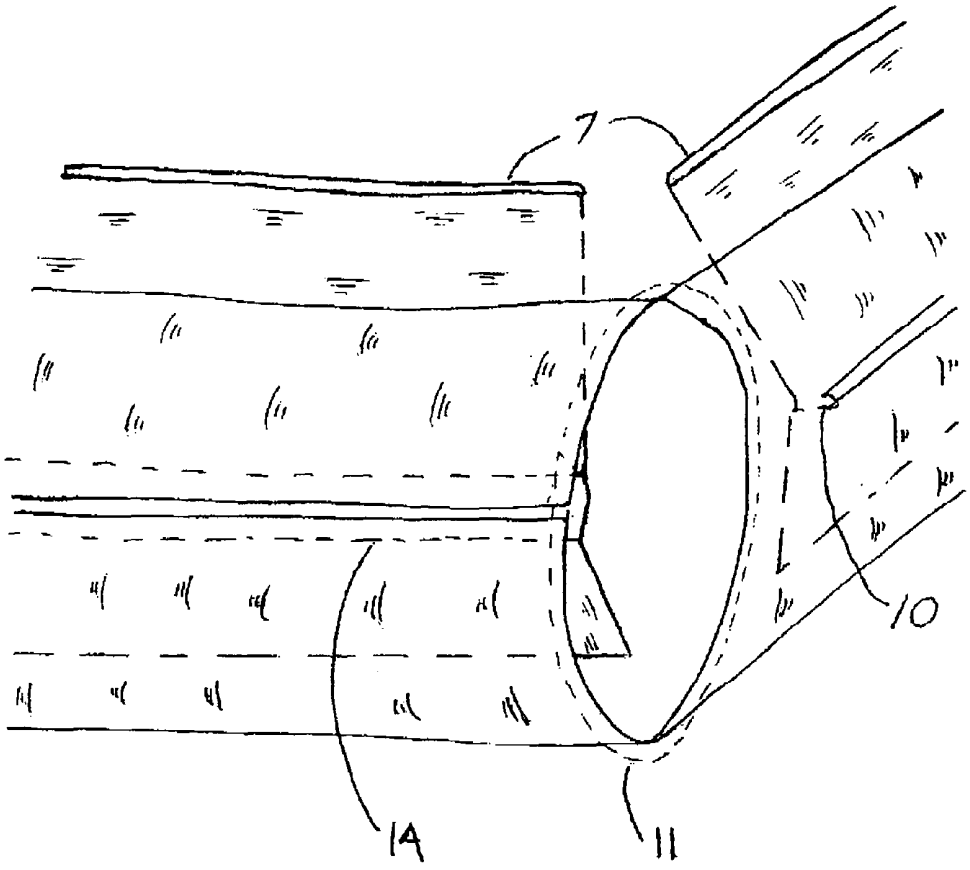


FIG 5

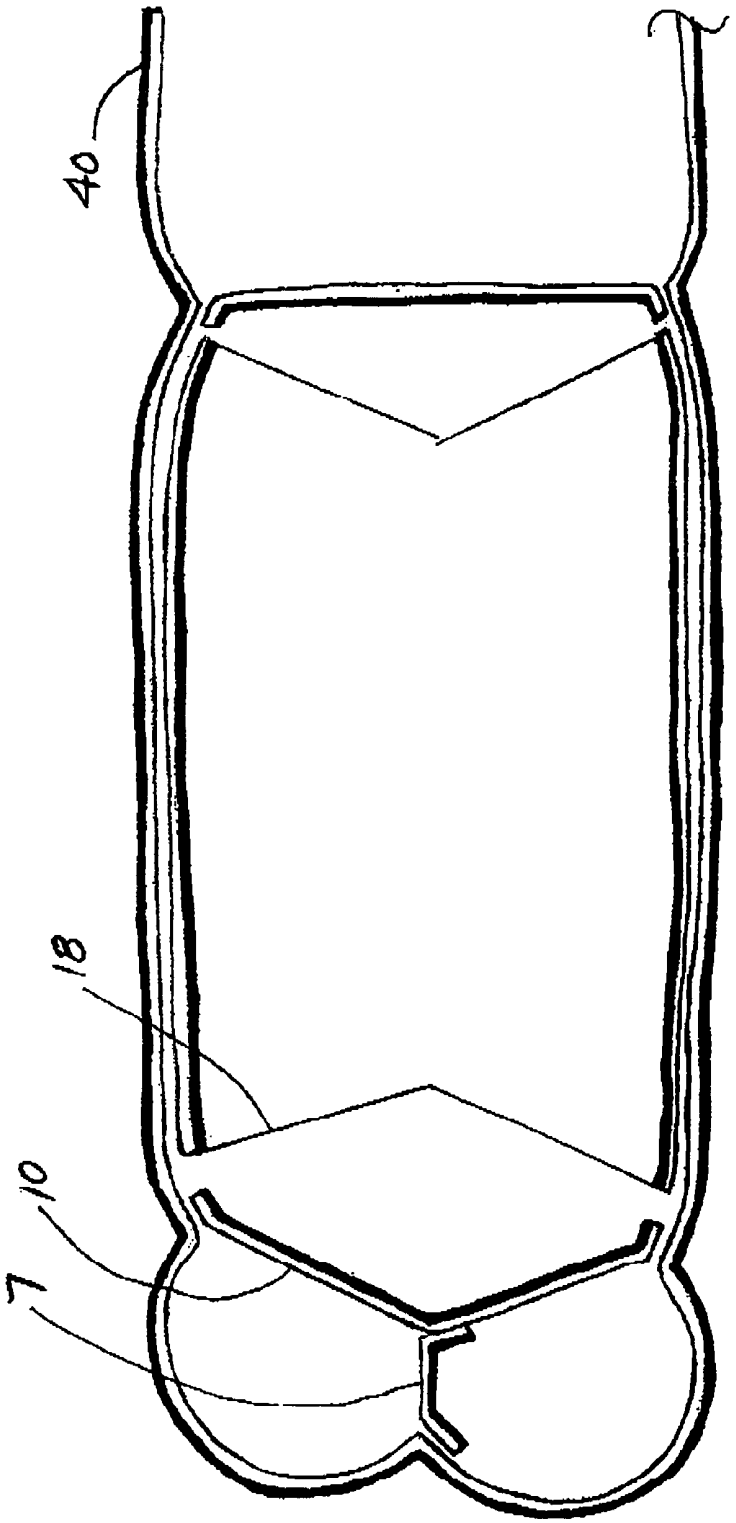


FIG 6

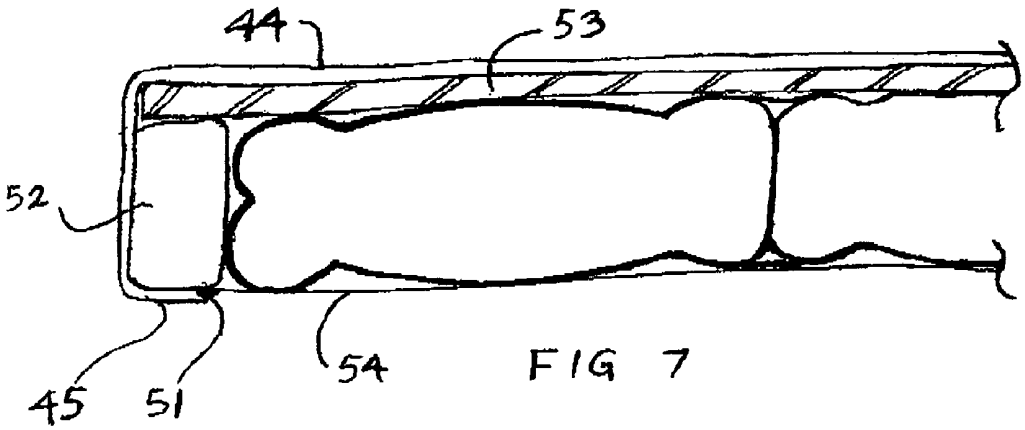


FIG 7

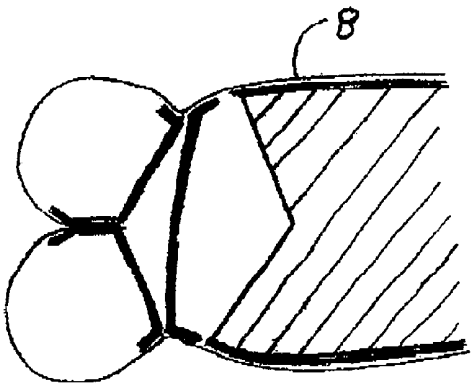
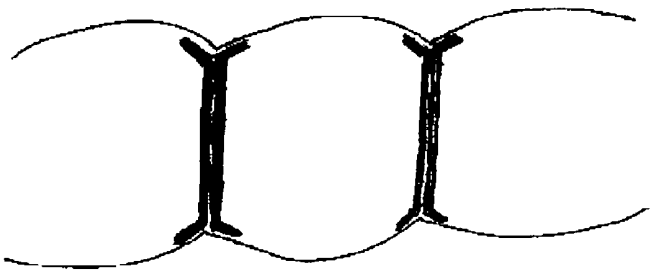


FIG 8

FIG 9



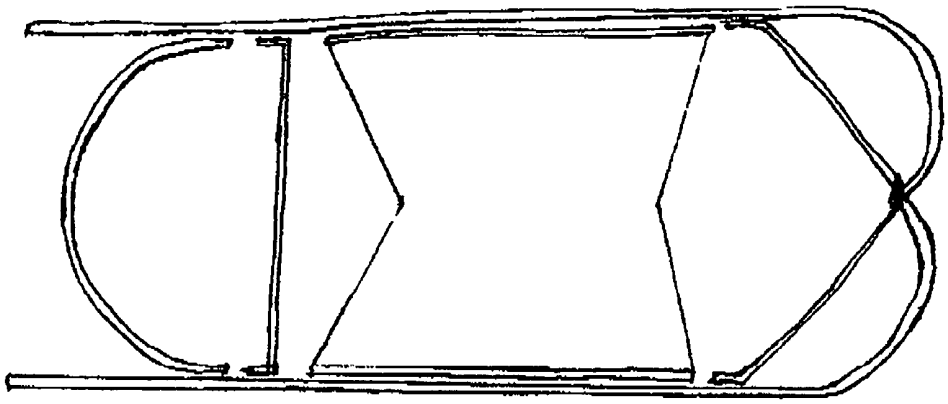


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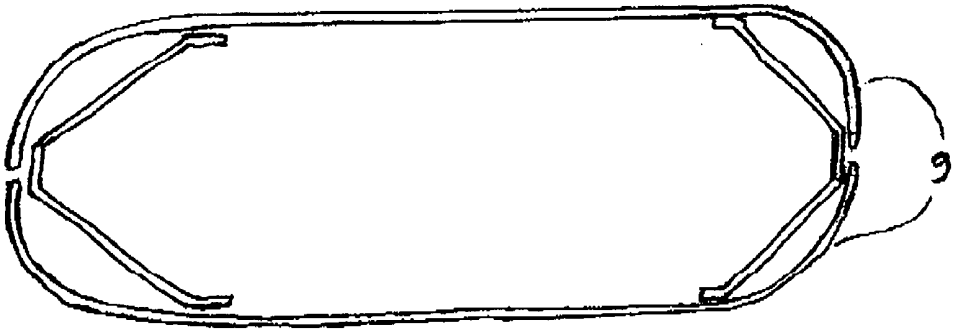


FIG 11

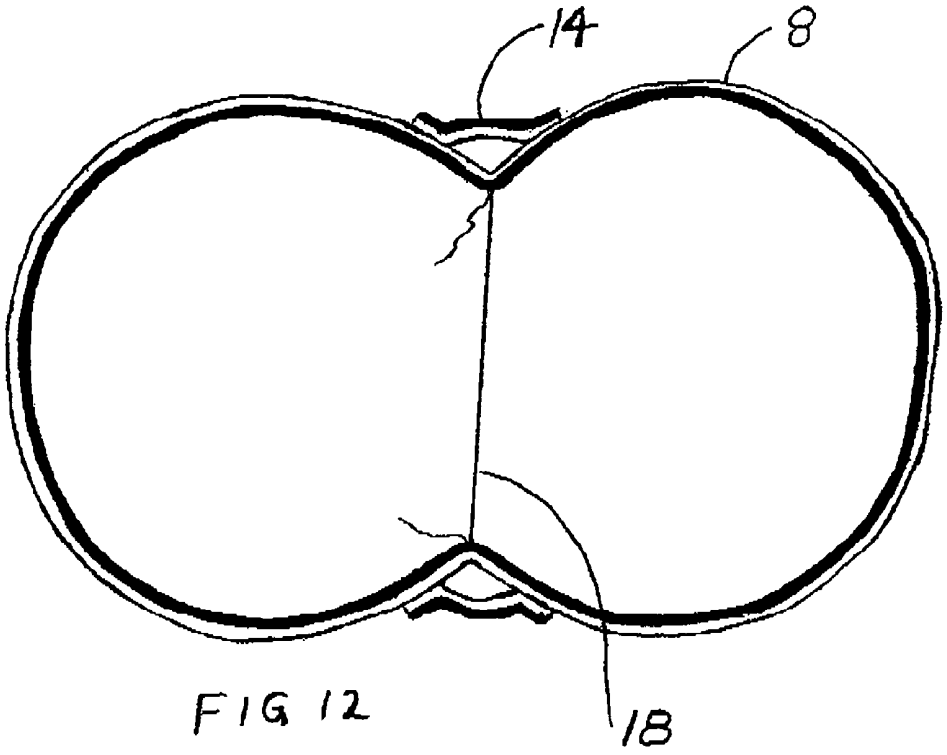


FIG 12

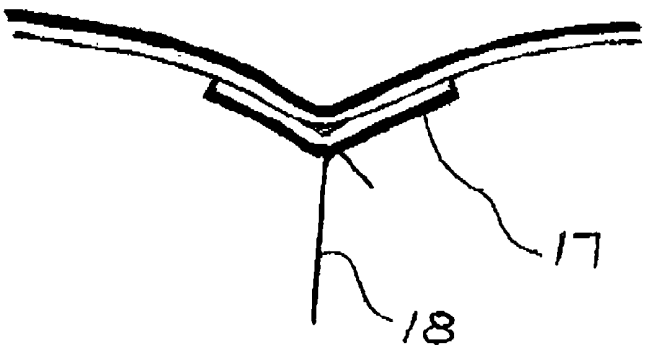


FIG 13

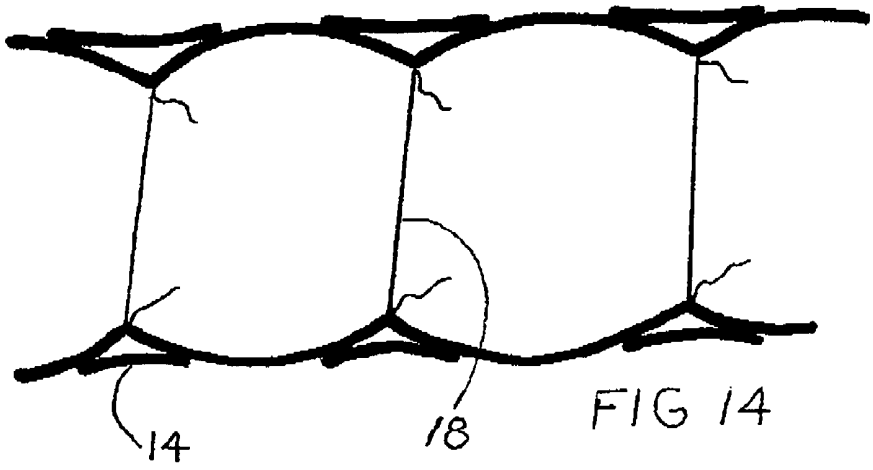


FIG 14

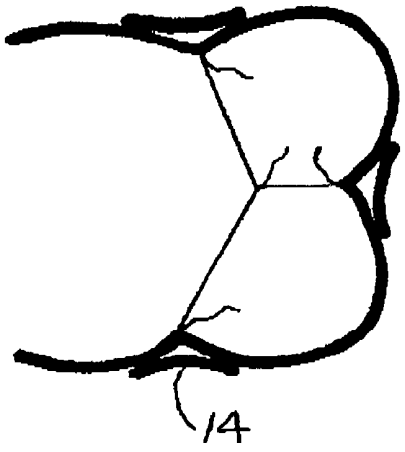


FIG 15

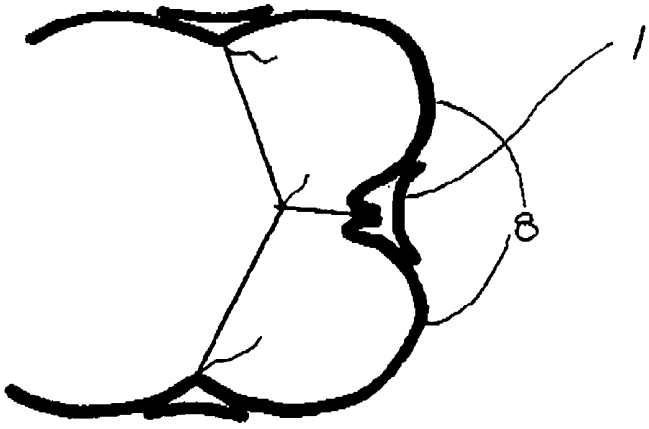


FIG 16

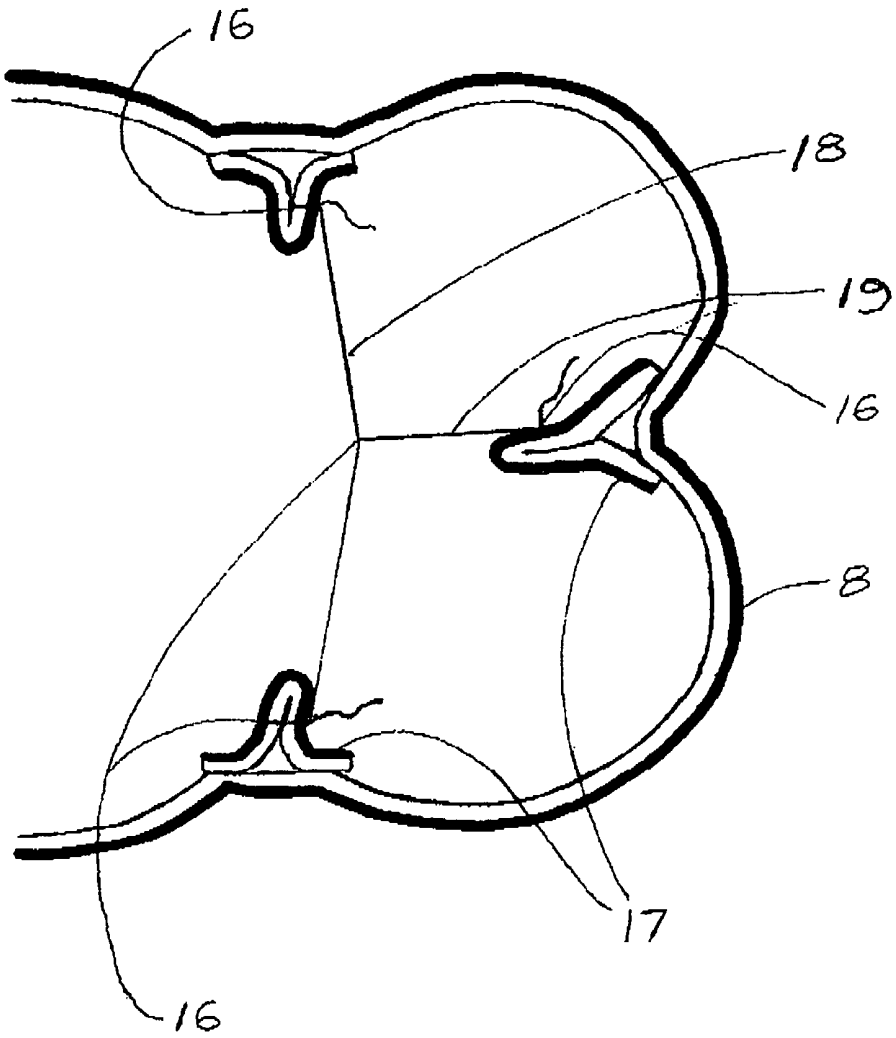


FIG 17

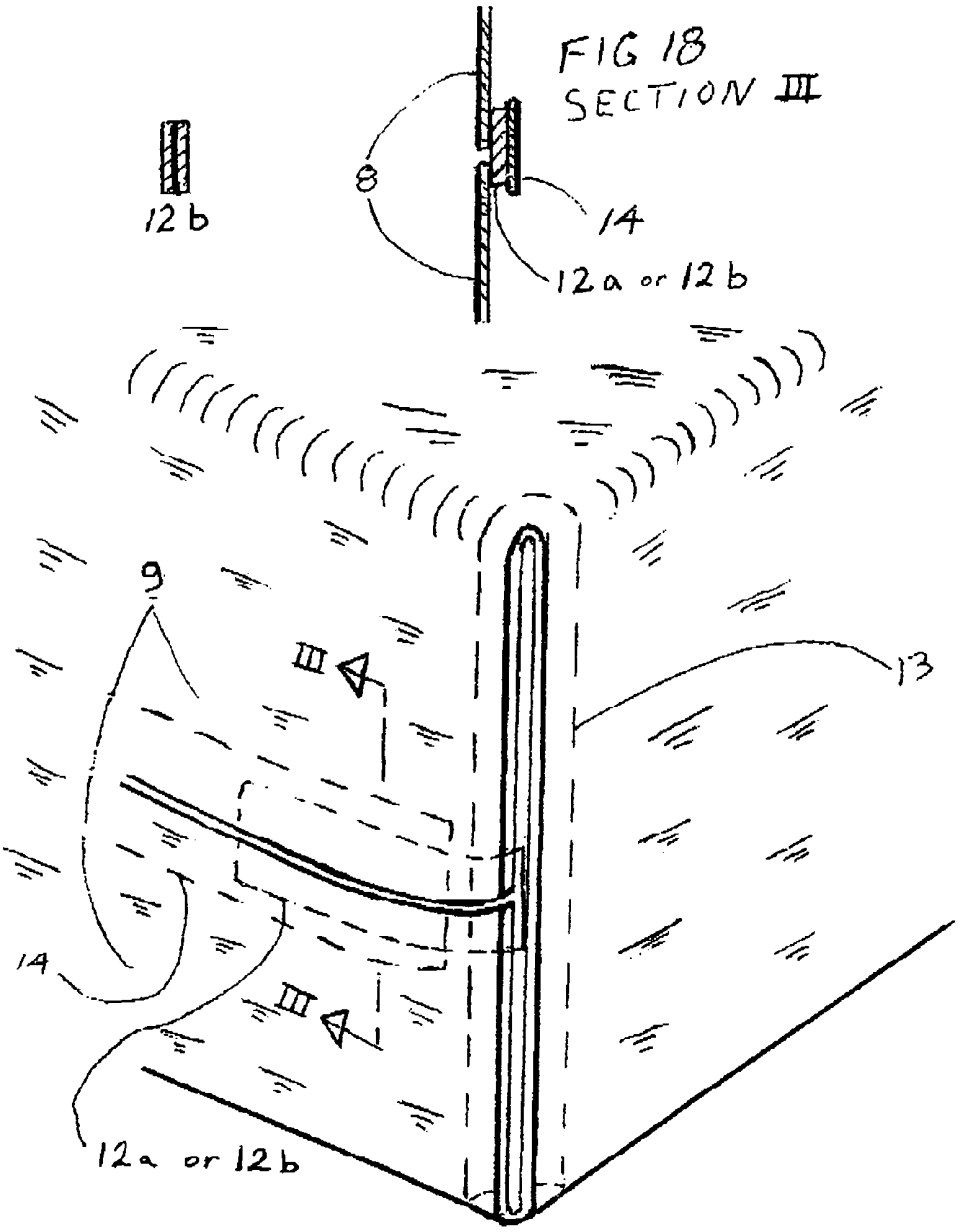


FIG 19

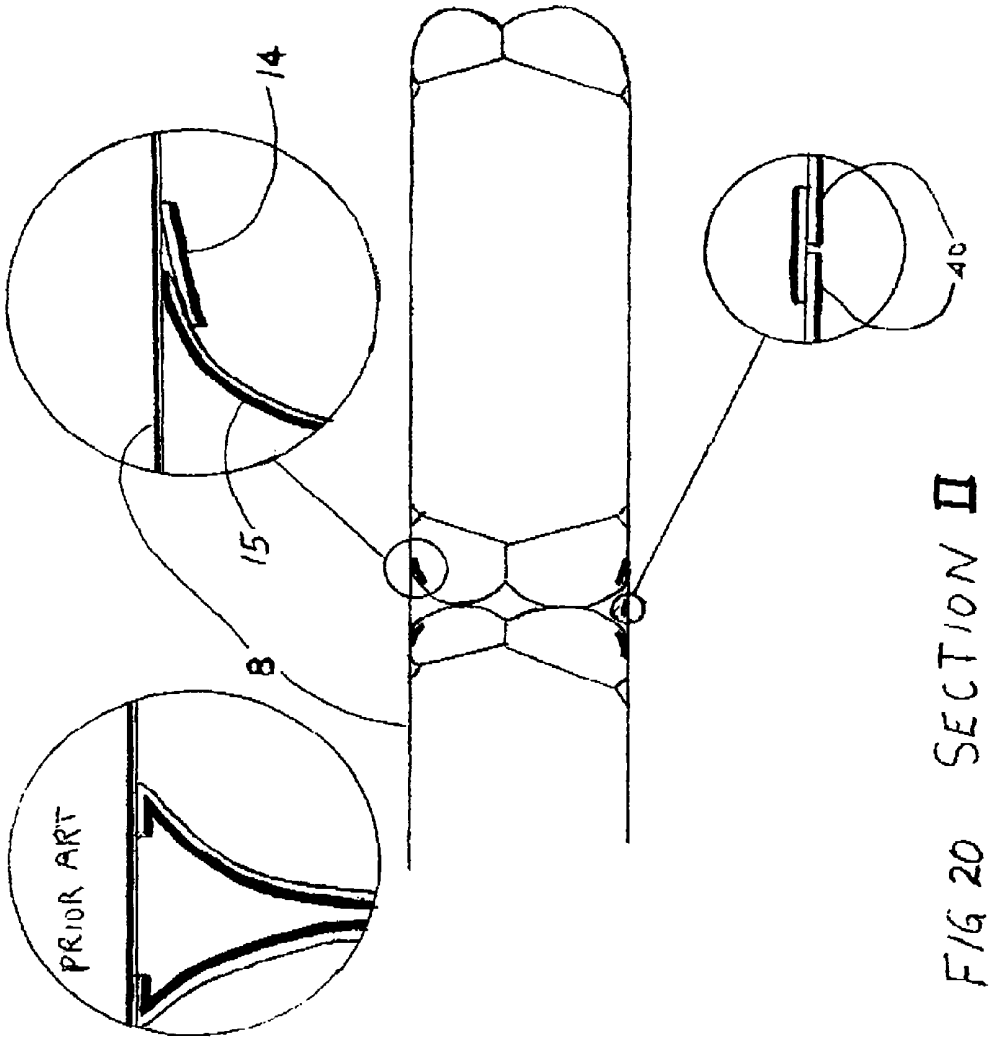


FIG 20 SECTION II

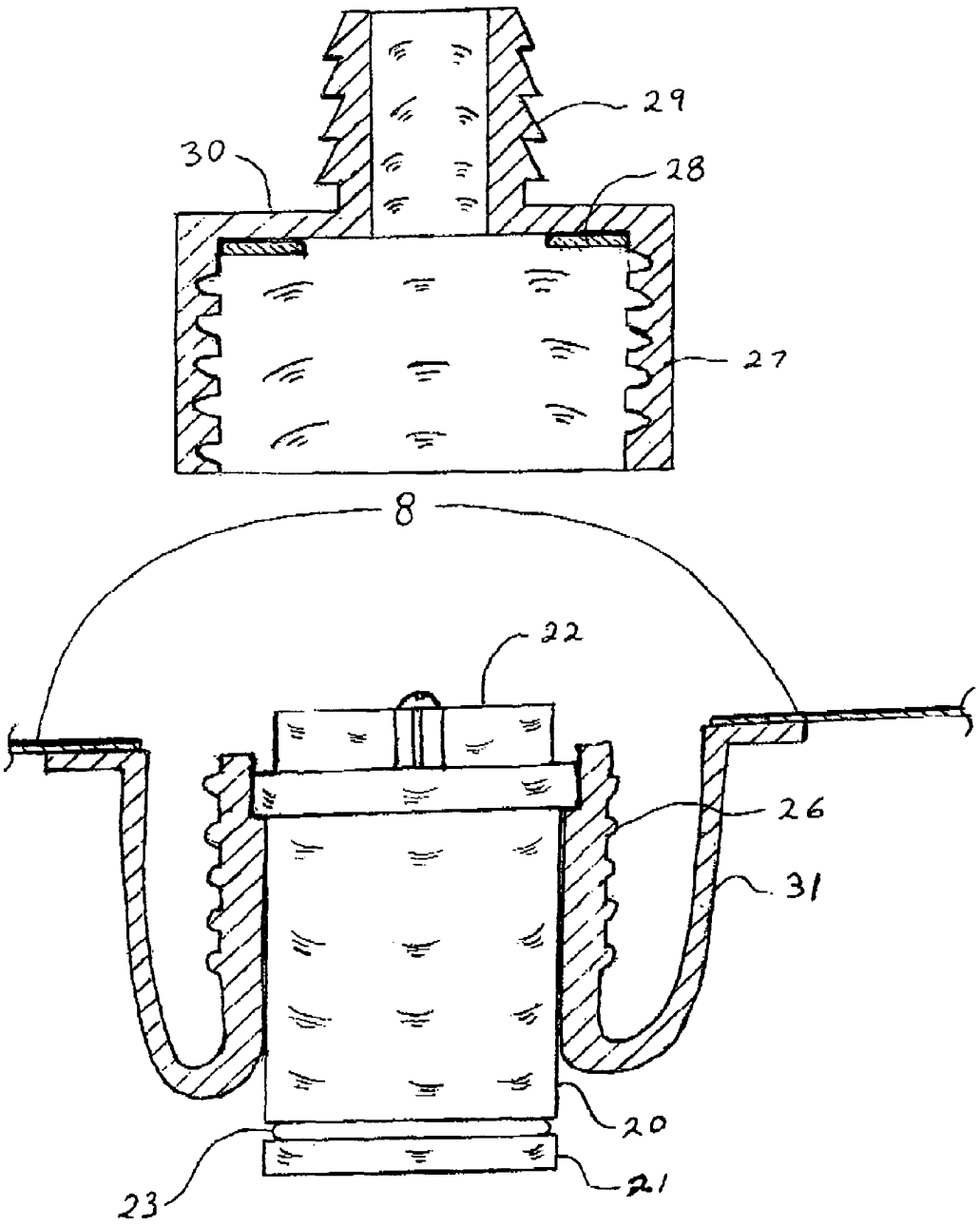


FIG 21

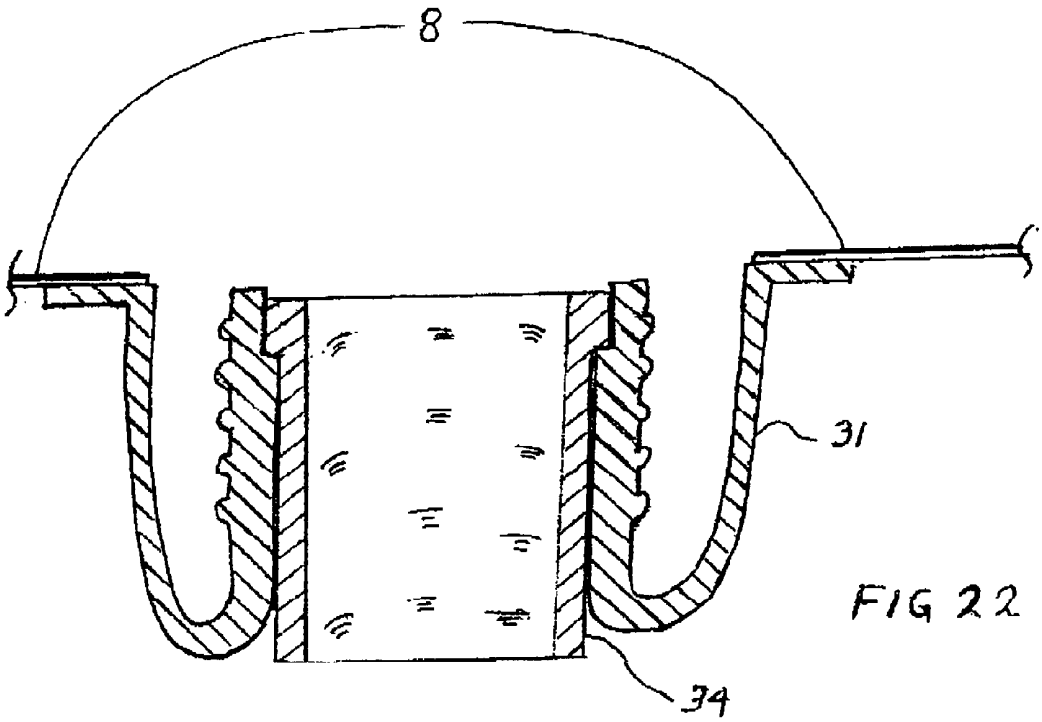


FIG 22

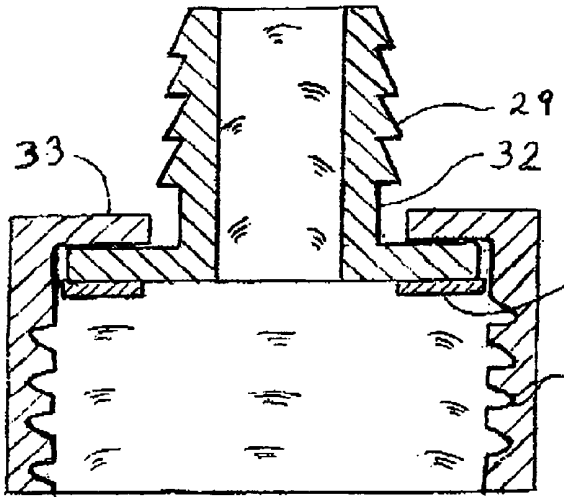


FIG 23

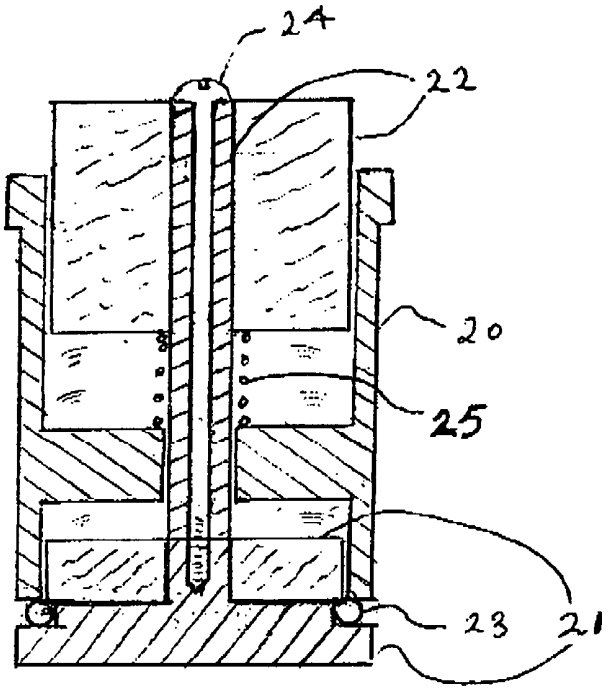


FIG 24

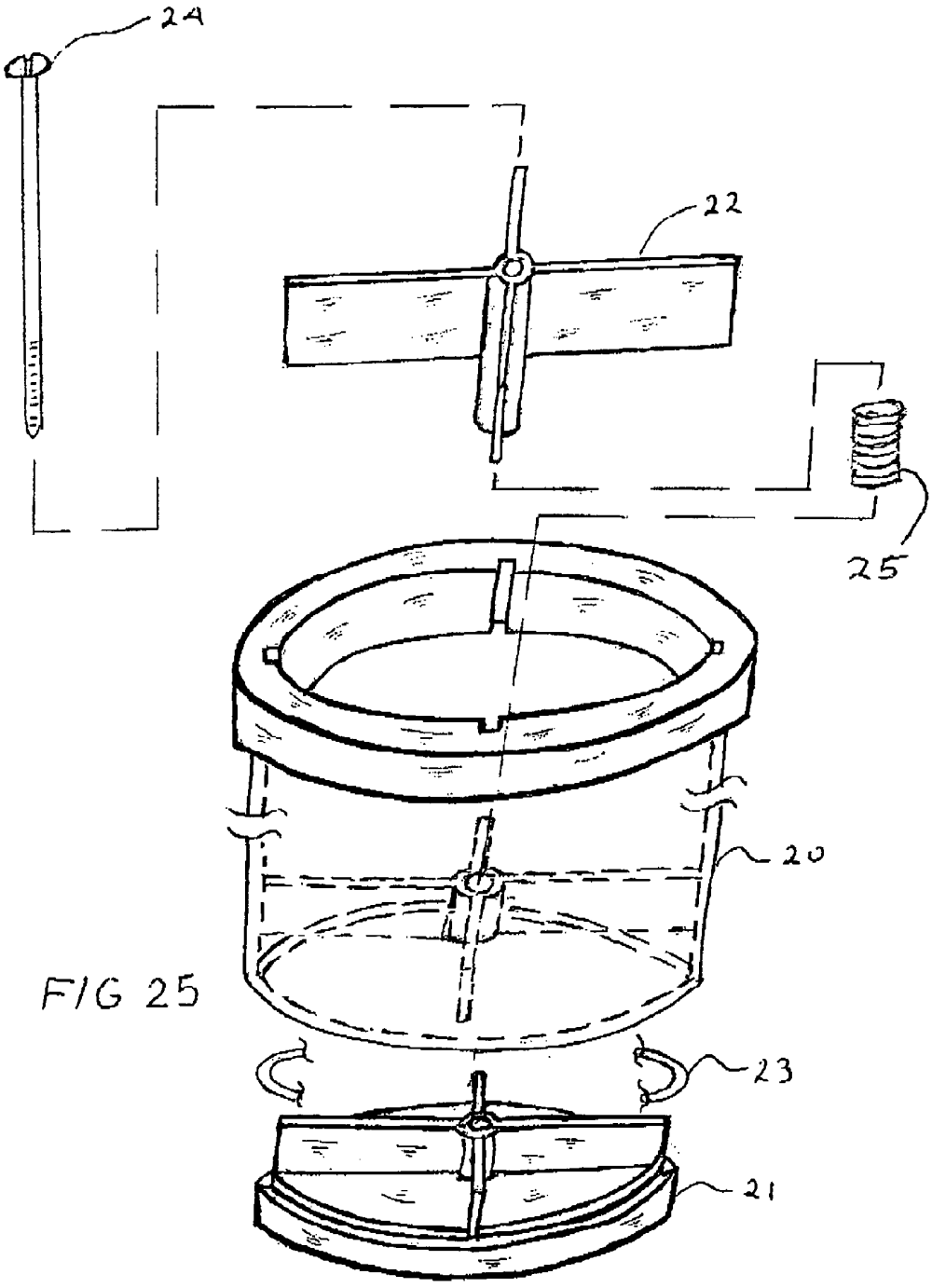


FIG 25

FIG 26

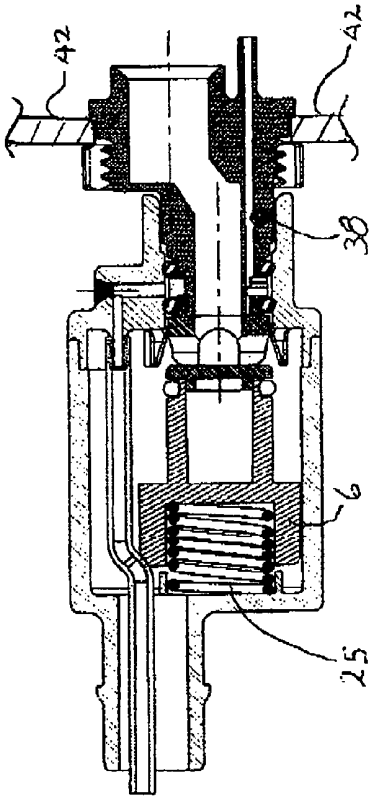


FIG 27

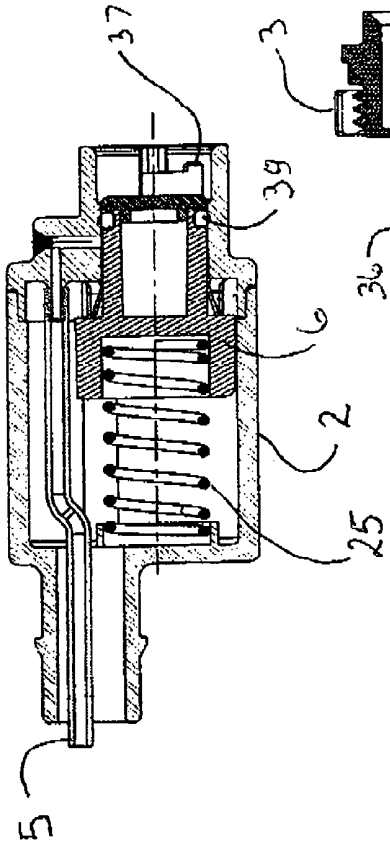
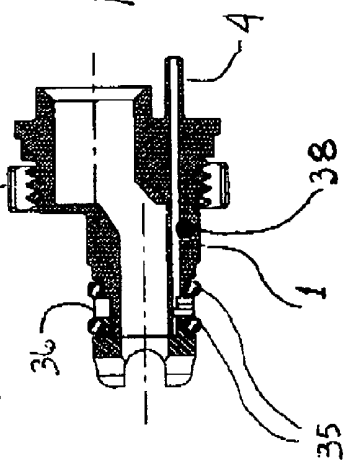


FIG 28



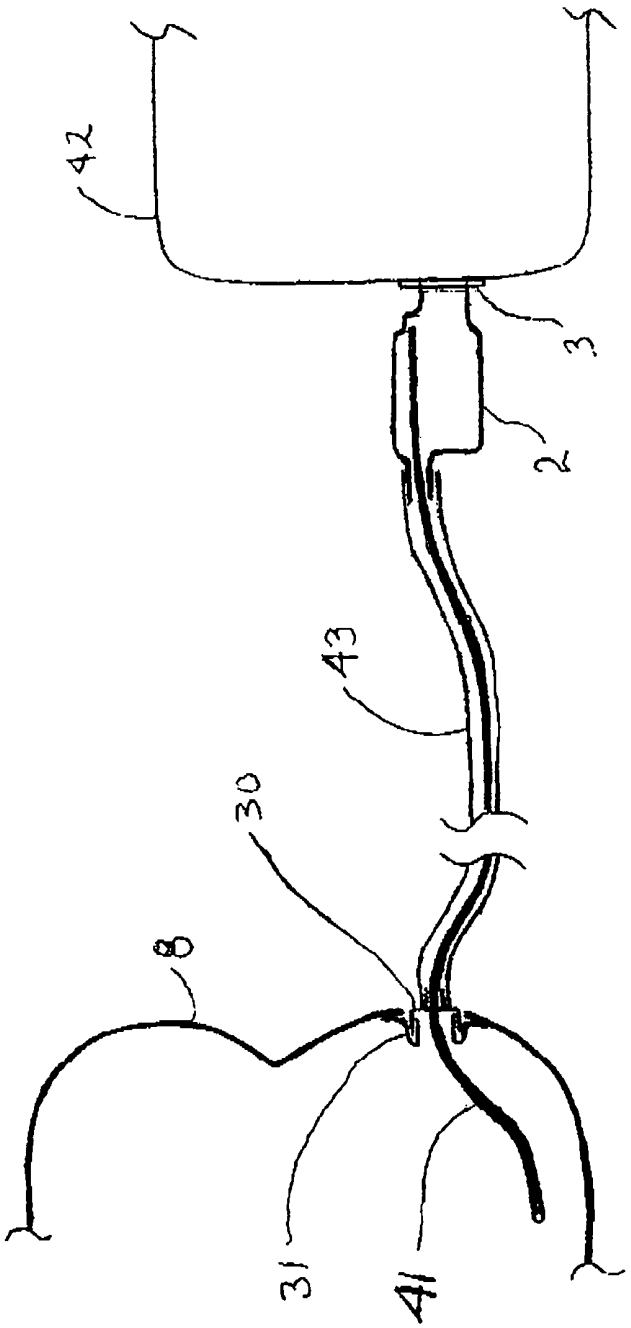


FIG 29

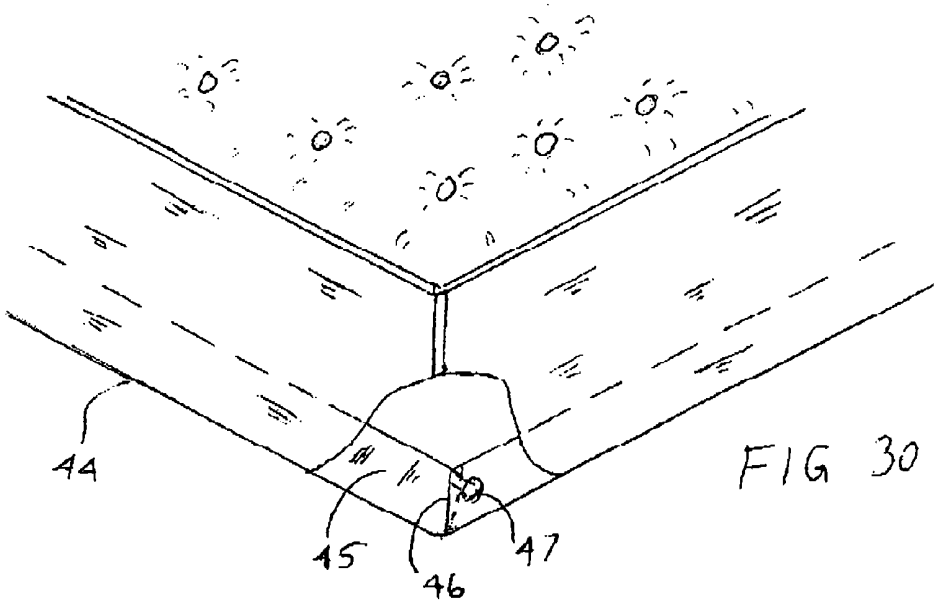


FIG 30

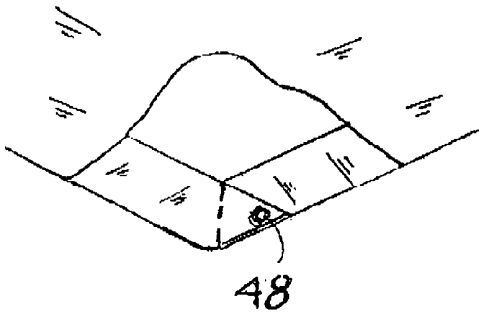
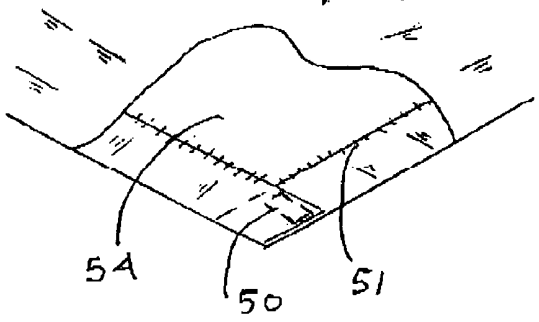


FIG 31

FIG 32



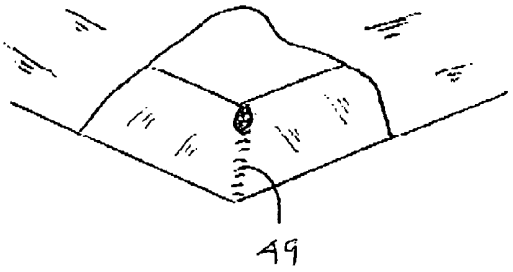


FIG 33

FIG 34

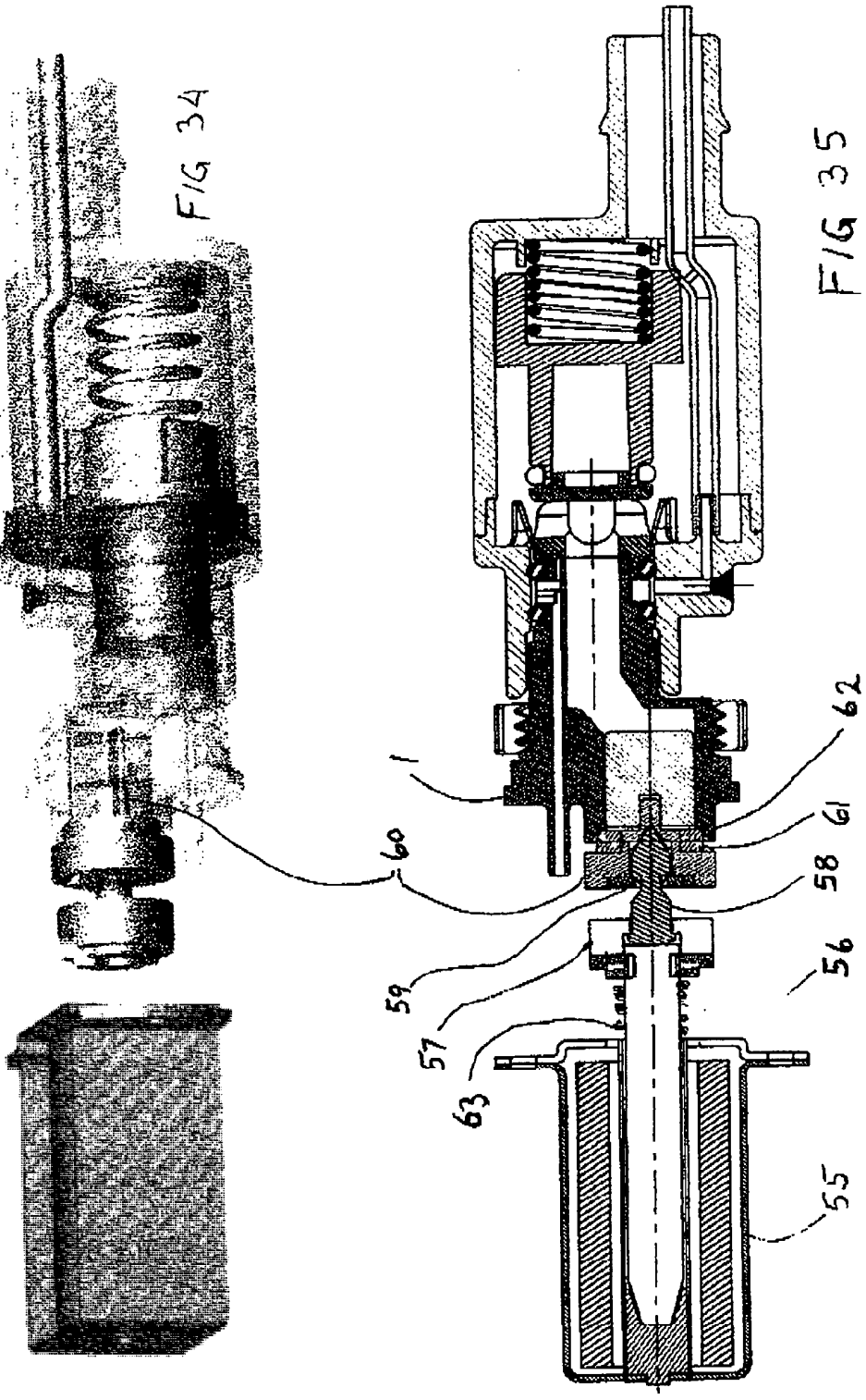


FIG 35

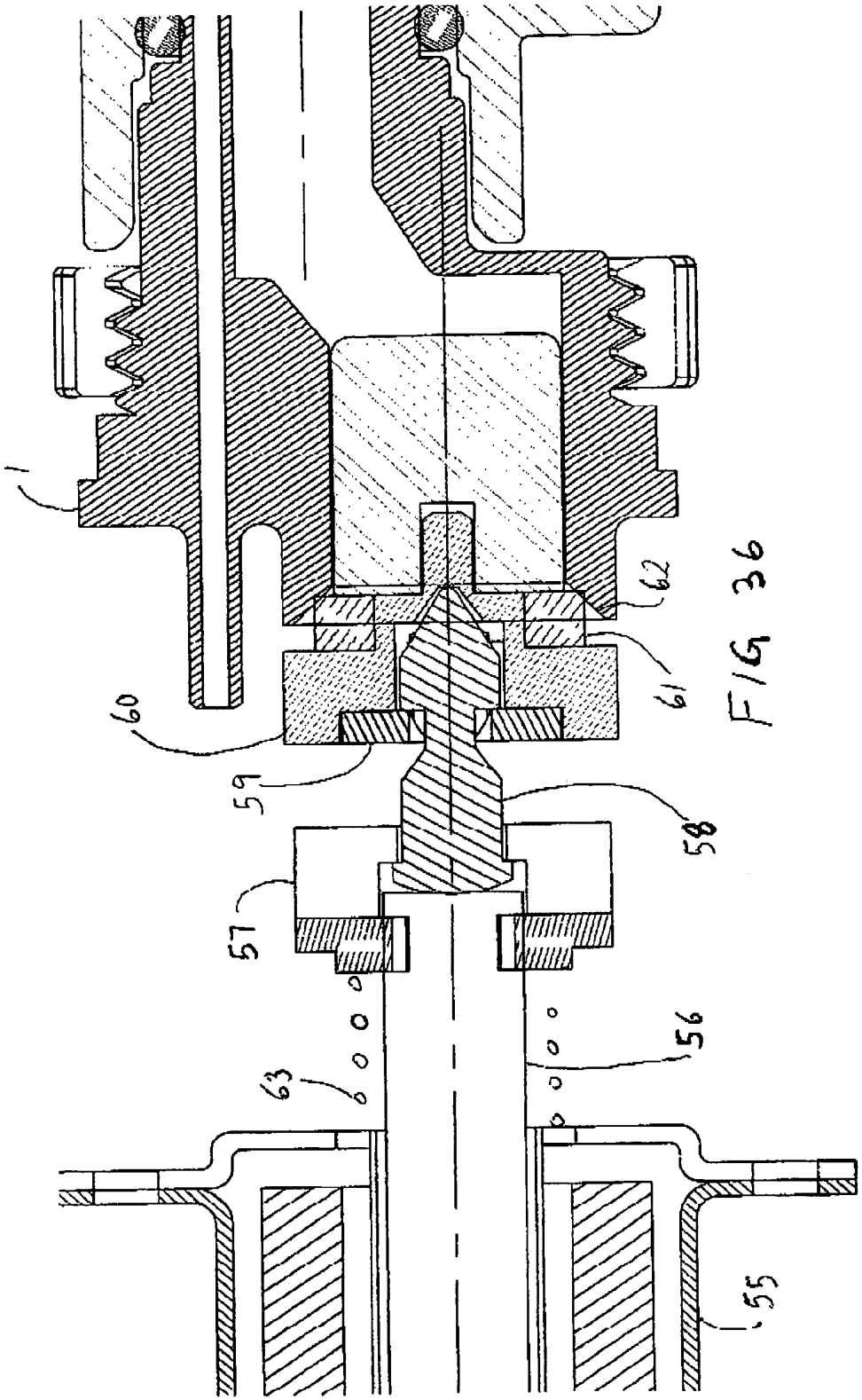


FIG 36

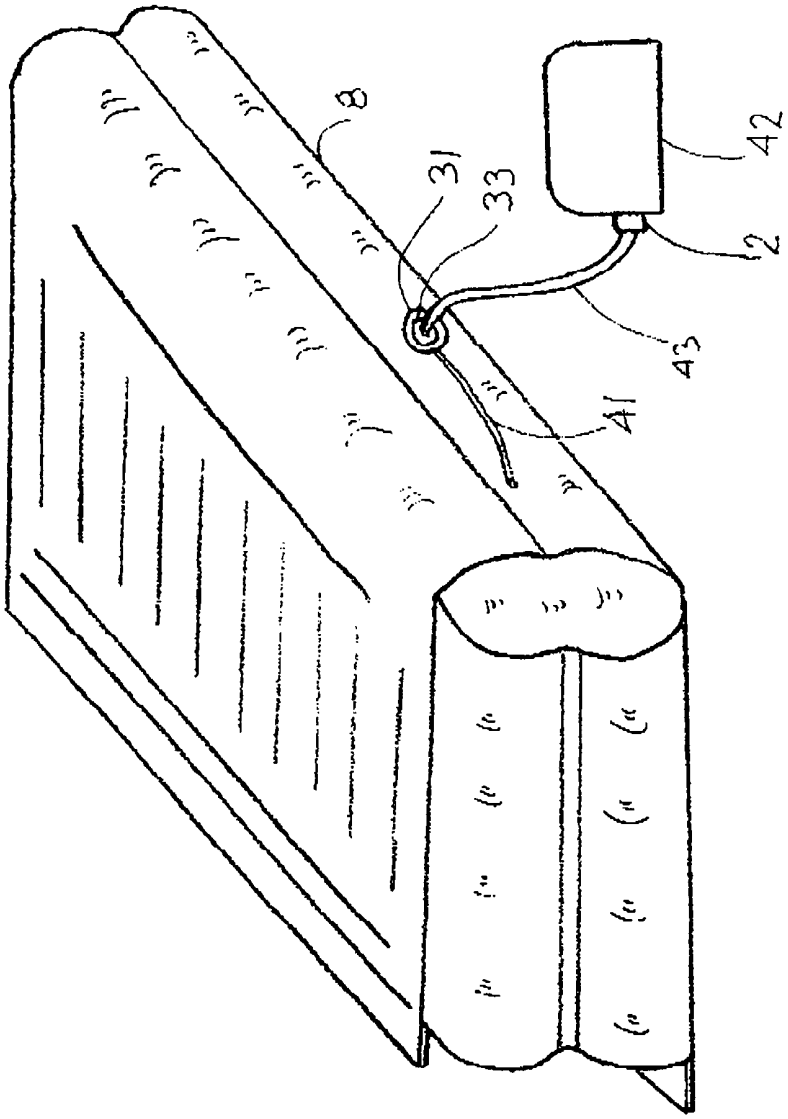


FIG 37

REINFORCED VINYL AIR MATTRESS

CROSS REFERENCE TO RELATED APPLICATIONS

The U.S. Pat. Nos. to:
(Bauhoffer U.S. Pat. No. 59,945)
(Arens U.S. Pat. No. 2,000,873)
(Perry U.S. Pat. No. 2,345,421)
(Perry U.S. Pat. No. 2,360,715)
(Nail U.S. Pat. No. 2,987,735)
(Nail U.S. Pat. No. 3,705,429)
(Nail U.S. Pat. No. 3,740,095)
(Howorth U.S. Pat. No. 3,778,851)
(Philipp U.S. Pat. No. 3,790,975)
(Reid U.S. Pat. No. 4,371,999)
(Chamberland U.S. Pat. No. 4,896,389)
(Barnett U.S. Pat. No. 5,010,608) disclose prior art air beds having beams for support.
(McCarthy U.S. Pat. No. 5,906,019)

BACKGROUND

1. Field of Invention

This invention relates to a structural design for inflatable objects using 100% reinforced vinyl with 100% lap seams allowing high strength by eliminating butt seams and making low cost I-beams for use in inflatable items such as air mattresses.

2. Background of the Invention

The standard method for fabricating inflatable objects made with flexible vinyl or polyurethane materials such as air mattresses, inflatable rafts, toys, etc., is by joining all the seams by means of radio frequency (RF) heat sealing. Within the industry the majority of the seams are made with seams called butt welds. As greater strength and reliability for the welds due to use and higher pressures, lap seams were preferred over butt seams. It is known that butt seams will provide only 70 to 80% of the material strength and lap seams can provide 100% of the material strength for non-reinforced vinyl.

Reinforced material, primarily one sided reinforced material, allows for stronger product and can handle higher pressures and greater durability (double sided reinforced vinyl is thick and expensive to produce). The industry problem when using one sided reinforced material is being able to do lap seams for all the joints. This is because the limitation that only the smooth non-reinforced surfaces of the materials could be sealed to each other and still have the matted texture on the outside for the entire surface of the product. It would be possible to have the matted on the outside on say the top surface and smooth on the bottom surface of the mattress and have the smooth sides facing each other to form a lap seam along perimeter of the sides, but the corners would still need the butt welds for both top and bottom. Welding to the rougher reinforced surface would not work in the RF sealing process. The industry has never been able to find a method to weld without avoiding the butt seam. Even if a method was found, the internal I-beams required butt welds that would peel and result in bulging of the mattress or tear at the end of the I-beam resulting in a leak, hence there was no net gain in durability. Fundamentally, there are a number of links in the burst strength chain to produce a high pressure mattress. The additional cost and as well as no perceived need for the higher pressure deterred the development of such a product. As well, the comfortable sleeping pressure is usually under 1 p.s.i. The market conditions have changed since the higher material costs relative to the cheap foreign labour in conjunction with a high end or high quality type of air bed, have inspired the applicant to pursue this invention.

Therefore to produce an inflatable product with 100% lap seams when using 100% one sided reinforced materials has not been accomplished up to this time.

This invention is a novel way of designing inflatable reinforced vinyl objects to eliminate butt seams, which tends to weaken the product, and replace the butt seams with lap seams. The invention also overcomes weakness in the C-beam type of construction with the addition of I-beams in reinforced vinyl as well as non reinforced vinyl. This entails a combination of sewn I-beams made from two strips of reinforced vinyl for flange, and as well as low cost fabrics for the web of the beam. The 3 materials are sewn together to form an I-beam. The flanges are sealed to the top and bottom of the inflatable structure. This divides the tensile load over 2 welds and will make the seam act as a lap seam rather than a butt seam due to the angular direction of the peel force. The peel force in the single weld C-beam used to shape the object, has the peel force perpendicular to the surface rather than the applicant's design which reduces the resultant peel force angle, as well as reducing it by half due to the Y or I shape double weld area to the outer surface. The sewn fabric web of the beam provides the necessary strength and is cheaper than the cost of vinyl.

Typically for air mattresses and inflatable toys, the strength was limited to the strength of the butt seam. Even with lap seams in areas where the seam could be used there would normally always be some areas required to use a butt seam for the final closing or for the corners of a structure. These devices would fail over time from abuse causing high pressures, such as jumping or dropping on the bed causing a short high pressure that incrementally peels or stretches a weak point of a butt weld.

The high quality air mattresses and inflatable rafts were made of cloth and vulcanized rubber for this reason. Reinforced vinyl has been very limited due to the failure of the C-beam weld is no stronger than as with non reinforced vinyl, and failure would result along this C-beam or the butt weld, and not the outer vinyl. The additional cost of reinforced vinyl did not produce a superior product.

Currently, there are two types of air mattresses: a coil air mattress and an I-beam air mattress. These air mattresses are made of plain or flocked PVC sheeting. The flocking material used on air beds with flocked PVC is a non-woven material and consequently the flocking does not promote the strength, durability, or puncture resistance of the air mattress. The PVC sheeting has a coil or an I-beam air mattress joined by the use of butt seams.

Discussion of McCarthy

The object McCarthy's invention is to provide; an air mattress having oval beams for rigid, underlying support thus eliminating stress points at the end of an I-beam, an air mattress having a comfortable top sheet made of PVC backed textile fabric material, and to add corner strips or patches to obtain the superior lap type seams at the corners. The flocking or woven top sheet is to prevent plasticizer migration from the inner top sheet.

McCarthy does not have a mattress made of reinforced vinyl, but rather a cloth or flocked material laminated onto the vinyl and non-reinforced vinyl bottom lap seamed to the top. This top laminated material is cut back from the edge to allow welding at the seams, including the corner strips. The applicant does not require this additional preparation, but is able to used flocked or reinforced vinyl and either reversed smooth surface out/in construction, heavy gauge smooth patch, or

reinforced double smooth sided patch to achieve the same or better resultant lap weld. McCarthy still has butt welds for the underlying support, but has at least reduced the end point stress by using oval beams that are butt welded to the top and bottom sheets. His conclusion brings him to the conventional design in the assumption that there is no need to use the higher strength reinforced vinyl since the failure will be due to the butt welds on the oval beam peeling from the top or bottom sheet resulting in bulges, or tearing resulting in leaks. The applicant has eliminated the weak links of butt welds in the beams, seams and corners, while using an all-reinforced vinyl construction, and is thus able to fully realize the additional strength of the reinforced vinyl.

OBJECTS AND ADVANTAGES

1. This invention is a mattress with made from reinforced vinyl material or matted texture finish on one side and smooth weldable surface on the other, designed to eliminate all butt weld seams from the external joints or seams, resulting in an increase in ultimate burst pressure from 3 p.s.i. to 9 p.s.i. for the same material. This realizes the advantage of the stronger reinforced material rather than the limitation of the butt weld burst strength.
2. By using low cost fabric for the I beams and squaring beams instead of reinforced vinyl in conjunction with sewing and sewing area patch (to seal the holes of the stitches), burst pressure is increased by replacing the traditional butt weld with a sewn seam and a sewing area patch to seal it, as well as material cost reduction. The patch also flattens the indent made by the beams by providing an inflated web which spans the valley created by the tension of the beam.
3. Vinyl flanges and reinforced vinyl flanges of I-beams double the welded area and create 2 welds instead of one butt weld where the beam is welded to the outer surface. The tight or short distance directs the tensile force of now 2 welds in shear or lap configuration rather than the single perpendicular peeling force of a single butt weld. These flanges also allow low cost fabric to be used for the web of the I-beam rather than the more expensive reinforced vinyl and eliminate butt welds from the inner members. The elimination of the inner I beam welds as well as the external butt seam welds allow the burst strength or the reinforced vinyl to be realized as the failure mode.
4. To provide a sensor that measures pressure in the mattress without having electrical or hermetic feed through mattress ports by means of tube within the hose and an easy to install connector design that allows for disconnection from the pump without deflation occurring. This eliminates having to provide and install a separate external hose and or electrical sensor wires between the controls and the mattress by combining these with the hose/pump connector, which is usually installed by the consumer. The sensor hose is able to accurately measure the mattress pressure while the air pump is pumping in order allow the mattress pressure memory function of the control to operate properly without overshooting or having to stop for pressure measurement reading to reach the desired mattress pressure. This is because the pressure near the pump is higher than in the mattress when the air pump is pumping. A self aligning low pressure valve seals a square profile section o-ring against of the beveled seat of the pump connection.
5. Use of a double smooth reinforced vinyl for corner patches to allow welding of reinforced vinyl main body of the mattress.
6. Using a extendable type of mattress port to allow easy attachment of hose to mattress as well as add a disconnect valve and provide a large enough opening to remove the lap seam tooling once the final weld is made. It also prevents an obstruction projecting past the surface of the mattress besides a hose and allows the hose to angle in the desired direction which is sometimes along the side of the mattress and not perpendicular to the side.
7. Cover relief by providing one or more perimeter relief fastener for ease of assembly of cover over mattress and/or foam edge rails. The zipper can be easily zipper closed or zipper eliminated because the lower perimeter fabric can be made wider to hold the air core and still be slipped over the mattress components.
8. double sided reinforced vinyl patch or thick non-reinforced vinyl patch for sealing **3** intersecting edges of reinforced vinyl allows reduction in material costs as compared to a whole mattress made of thick or double sided reinforced vinyl.
9. The reinforced vinyl seam patch allows similar sides to be inward or outward, rather than say the top to have smooth side out and the bottom to have smooth side in so a lap seam can be welded smooth to smooth side. This enhances desired uniform finish texture and appearance.
10. The combination of reinforced seam patch, and union patch make the fully lap seam reinforced construction possible for the outer surface and allows for the top and/or bottom to extend a flap while still having a lap seam. The prior art method has the side join at 90 degrees or greater in order to have sides of a double mattress without an soft spot between them (see FIG. **20** PRIOR ART enlargement).
11. a method for producing a squared mattress edge using reinforced vinyl and conventional butt welds in areas of the mattress where the butt weld is not the failure mode.

The air mattress is inflated with air and expands to produce a sleeping support surface for everyday use. The air mattress is constructed for use with foam frames and provides novel aspects not before provided by prior art air mattresses.

While very simple forms of the invention have been described, it will be understood that the invention has wide application and various modifications of structure may be made by those skilled in the art without departing from the spirit of the invention or scope of the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1**—shows half of a double mattress air core made of reinforced vinyl

FIG. **2**—is a cross section view along of FIG. **1**. The heavy lines represent the rough reinforced surface of the vinyl and the light line and space between lines represent the smooth side (this pictorial representation will apply to all drawings). The beams are a butt weld and a squared mattress edge with lap seam is shown.

FIG. **3**—shows the radius corner design using non-reinforced vinyl corner.

FIG. **4**—shows a top view of FIG. **3**

FIG. **5**—assembled view of corner

FIG. **6**—shows a mattress squared edge structure

FIG. **7**—shows the side by side mattress assembly

FIG. **8**—shows an alternative embodiment mattress squared edge structure

FIG. **9**—shows I beam configuration alternative embodiment

FIG. **10**—shows non squared interior side

FIG. **11**—shows lap seamed edges welded to squaring beam

FIG. **12**—shows the basic weld and beam configuration with low cost fabric beam sewn to the hermetically sealed exterior top and bottom surface and the reinforced vinyl seam patch

FIG. **13**—shows an alternative embodiment to the butt welded beams

FIG. **14**—shows typical configuration in an air core of multiple beams but using the sewn beam design

FIG. **15**—shows squared edge using the sewn beam for the horizontal squaring beam.

FIG. **16** shows an alternative method for the sewn squaring beam

FIG. **17**—shows squaring edge construction without patches

FIG. **18**—Section III-III shows weld patch configuration

FIG. **19**—shows a three face intersection and patch configuration.

FIG. **20**—is the section II-II from FIG. **1** and shows the weld configuration for the flap area.

FIG. **21**—shows a non swivel mattress connector and mattress port sectional view with mattress port disconnect valve.

FIG. **22**—shows a mattress port insert which is seated inside the body of the mattress port

FIG. **23**—shows a swivel mattress connector

FIG. **24**—is a sectional view of a mattress disconnect valve

FIG. **25**—is an exploded view of a mattress disconnect valve.

FIG. **26**—shows the hose connector with pressure sensor line secured to pump connection

FIG. **27**—shows the hose connector with pressure sensor line in its closed position

FIG. **28**—shows the pump connection

FIG. **29**—is an assembly drawing showing the pressure sensor line protrusion into the mattress.

FIG. **30**—shows an air bed cover with perimeter button and loop

FIG. **31**—a snap or Velcro alternative embodiment instead of button and overlapping of the lower perimeter.

FIG. **32**—shows an elastic material **50** alternative embodiment and a perimeter zipper

FIG. **33**—shows a release zipper alternative embodiment and a wider base perimeter

FIG. **34**—is a three dimensional transparent view of valve solenoid, self aligning valve, pump connection, and hose connection with pressure sensor line

FIG. **35**—is a view of the pump valve

FIG. **36**—is an enlargement of the valve of FIG. **35**

FIG. **37** is an assembly view of the pump and pressure sensor line in the air core

DEFINITION OF TERMS

reinforced vinyl refers to a vinyl or PVC (polyvinyl chloride) or other polyurethane sheet or other materials that are radio frequency weldable, having nylon or other similar thread like reinforcement having laminated or produced with a single sided smooth vinyl surface on one side, which is also the weldable side, and the (rougher) fiber reinforced surface on the other side

double sided reinforced vinyl—is the same as reinforced vinyl refers but with both sides smooth vinyl or PVC with the reinforcement material between, so that it is weldable on both surfaces. This is more expensive and complicated manufacturing process than the one sided material.

low cost fabric beam

is internal beam made from one or more reinforced vinyl flanges to be welded and a fabric or any other low cost non-weldable material that forms the web of the beam which is sewn to the flange or other web. The web may also be vinyl or reinforced vinyl that can be sewn or welded to the flange.

reinforced vinyl seam patch—is a strip of reinforced vinyl that has it's smooth side welded to the smooth sides of adjoining edges of the reinforced vinyl of the outer surface. (this patch may also be a thick non-reinforced vinyl)

union patch—is a piece of double sided reinforced vinyl or thick non-reinforced vinyl that seals the intersection of 3 or more adjoining edges of the reinforced vinyl outer surface. non-reinforced heavy gauge vinyl patch **12***a*. and double sided reinforced vinyl **12***b*, are both union patches

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. **1**—preferred embodiment of the invention showing half of a double mattress air core made of reinforced vinyl, except the corners are made of a heavy gauge vinyl or preferred double sided reinforced vinyl **12***b*. The outer air core is also totally constructed using lap or flat seam welds. There are no butt welds. The edges are squared using a single horizontal center beam or reinforced edge beam **7**

FIG. **2**—is a cross section view along I-I of FIG. **1** having a reduced length for clarity. The heavy lines represent the rough reinforced surface of the vinyl and the light lines and space between lines represent the smooth side (this pictorial representation will apply to all drawings). The beams in this figure are made of reinforced vinyl as well, and use a butt weld at each end no butt welds a method for producing a squared mattress edge using reinforced vinyl and conventional butt welds in was of the mattress where the butt weld is not the failure mode.

FIG. **3**—shows the radius corner design using non-reinforced vinyl corner. The corner **11** is omitted from the drawing. Both the top and bottom outer surface end tab **9** has each edge welded as a lap seam along the reinforced squaring beam **10** so that these edges are abutted, not overlapping each other. The side of the mattress is shown as a continuous part of the top and bottom outer surface **8**. The other side may be similar for a single mattress or use the double mattress linking method (FIG. **20**). The reinforced squaring beam **10** is welded to the smooth side of the reinforced edge beam **7**, which in turn has it's upper and lower edges butt welded to the to the smooth inner surface of the top and bottom outer surface **8**. If butt seams are to be eliminated from this configuration, then the external lap seam is located above or below the beam weld using the weld configuration of say FIG. **12** or FIG. **13**.

FIG. **4**—shows a top view of FIG. **3** showing the non-reinforced heavy gauge vinyl corner **11** or position relative to both reinforced squaring beam **10** with end of mattress on the left and side of mattress on the right side of the drawing. The corner may also be a double sided reinforced vinyl patch.

FIG. **5**—is similar to FIG. **3** but an assembled view and one of the reinforced edge beam **7** (left one) does not have a reinforced squaring beam **10** uses **7** as part of a reinforced vinyl seam patch **14**

FIG. **6**—shows a mattress squared edge structure (left side). The right side is the same but flap **40** and continuous bottom shown which would be the bottom for an adjoining air core. A low cost fabric beam **18** (front view) is shown. **18** could also be reinforced vinyl.

FIG. **7**—shows the side by side position from either the head or foot view of the mattress with a foam layer **53** on top of the air cores and cover **44** assembled over mattress components for a double air core. The cover is pulled over the components and then the perimeter fastener **48** of the lower perimeter **45** is secured. The perimeter zipper **51** is closed to secure the mattress.

FIG. **8**—same as FIG. **6** but shows alternative embodiment squaring configuration. Smooth side of the vinyl welded to smooth side of top and bottom outer surface **8**

FIG. **9**—shows I beam configuration alternative embodiment using to back to back C-beams that may or may not be welded together.

FIG. **10**—shows non squared interior side

FIG. **11**—shows lap seamed edges welded to squaring beam

FIG. **12**—shows the basic weld and beam configuration with low cost fabric beam **18** sewn to the hermetically sealed exterior top and bottom surface **8** and then the reinforced vinyl seam patch **14** welded to **8** to seal the holes created by the sewing stitches. The patch can also be non reinforced vinyl and provides a more flat sleeping surface. The volume inside the patch **14** and surface **8** is inflated by leakage through the stitch holes or can have larger holes cut through **8** for rapid inflation and deflation. The patch **14** extends past the end of the beam **18** to enclose the entire sewn area.

FIG. **13**—shows an alternative embodiment to the butt welded beams that improve burst limit. The smooth surface of the reinforced vinyl of the outer surface of the core is on the inside and is welded to the smooth side of the reinforced vinyl flange **17** near to both sides of the stitch to the low cost fabric beam **18**. The force of the peel is less than perpendicular as is typical in butt welds, and by welding close to sewing stitch the peel force is in shear as typically found in lap welds.

FIG. **14**—shows typical configuration in an air core of multiple beams but using the sewn beam design of FIG. **13** having smooth weldable surfaces welded to each other.

FIG. **15**—shows a squared edge using the sewn beam for the horizontal squaring beam.

FIG. **16** shows an alternative method for the sewn squaring beam to also have the top and bottom outer surface **8** parting seam for the top and bottom to be sewn and then sealed by reinforced vinyl seam patch **14**.

FIG. **17**—shows squaring edge construction without patches with a small volume between the top and bottom outer surface **8** and reinforced vinyl flange **17** which does not have ends sewn for inflation and deflation purposes.

FIG. **18**—Section III-III shows the smooth surfaces to be welded to smooth surfaces using non-reinforced heavy gauge vinyl patch **12***a*, or a double side reinforced vinyl **12***b*. **12***b* is smooth on both outer sides and can be substituted for **12***a*. which is hence sandwiched between top and bottom outer surface **8** and reinforced vinyl seam patch **14**. The small size of the patch does not add significant material cost.

FIG. **19**—shows a three face or edge intersection area non-reinforced heavy gauge vinyl patch. **12***a*, or a double side reinforced vinyl **12***b* is used to seal this area without reducing the overall burst pressure. Four corner intersection is similar but extends **12***a* or **12***b* to go between fourth corner. The horizontal seam may be located higher or lower or at the corner. The reinforced vinyl corner **13** is welded with to the smooth side over patch **12***a* or **12***b* which is hence sandwiched between top and bottom outer surface end tab **9** and reinforced vinyl corner **13**.

FIG. **20**—is the section II-II from FIG. **1** and shows the weld configuration for the flap area. The top flap shows a continuous top vinyl for two mattresses. The bottom shows independent flaps welded together. The top may also be independent flaps welded, as well as the bottom continuous. The end intersection of the weld with a third face for the top enlarged view is similar to the weld technique shown in the intersection of FIG. **19** and would require a patch **12***a* or **12** *b* to seal at the intersection of bottom outer surface end tab **15**, reinforced vinyl seam patch **14**, and top and bottom outer surface **8**. The bottom enlarged view does not require sealing since it is between the two mattresses.

FIG. **21**—shows a non swivel mattress connector **30** sectional view that would thread onto mattress port thread **26** of the mattress port **31**. The flange of the port is welded to the outer surface **8** and may be pulled outward to extend past the surface of the mattress for threading. The washer **28** will be compressed to seal against the rim of the mattress port **31** at the same time pushing valve stem **22** inward (downward) opening the disconnect valve which is seated inside the body of the mattress port **31**, giving the walls and rim of **31** radial structural support.

FIG. **22**—shows a mattress port insert **34** which is seated inside the body of the mattress port **31**, giving the walls and rim of **31** radial structural support. The washer **28** of a non-swivel mattress connector **30** will be compressed to seal against the rim of the mattress port **31**.

FIG. **23**—shows a swivel mattress connector **33** which is interchangeable with non-swivel mattress connector **30**. This would prevent hose twist if the hoses are not preassembled like the non-swivel connector application.

FIG. **24**—is a sectional view of a mattress disconnect valve which seats in the mattress port **31**. The disconnect valve housing **20** is seated inside the body of the mattress port **31**, giving the walls and rim of **31** radial structural support. The spring **25** push the disconnect valve plate **21** against the disconnect valve seal **23** when the non swivel mattress connector **30** is removed. When the **30** is threaded on to the mattress port thread **26**, the washer **28** pushes the disconnect valve stem **22** inward and opens the valve.

FIG. **25**—is an exploded view of a mattress disconnect valve.

FIG. **26**—shows the hose connector with pressure sensor line **2** secured to pump connection **1**. The spring **25** is compressed allowing the disconnect plug **6** to become unseated opening the main airway as well as the pressure sensor airway. The twist lock projection **38** holds and locks the hose connector **2** to the pump after pushed, twisted, and when released, it is locked by twist lock slot **37**.

FIG. **27**—shows the hose connector with pressure sensor line **2** in its closed position with spring **25** extended pushing disconnect plug **6** into the housing and sealing disconnect seal **39** to housing and disconnect plug **6**. The pressure sensor airway is also sealed. A small diameter hose is secured over hose connection pressure line hose barb **5** prior to the air hose being secured to the hose barb during manufacture.

FIG. **28**—shows the pump connection **1** not mounted in the air pump **42** housing. The pump connector nut **3** secures pump connection **1** to the pump housing as shown in FIG. **26**. The two o-rings **35** seal the pressure sensor airway from the air pressure in the air hose and form part of the pressure sensor airway **36**.

FIG. **29**—is an assembly drawing showing the pressure sensor line (or small diameter hose) **41** running inside of the air hose **43** and its protrusion into the mattress.

FIG. **30**—shows a air bed cover **44** with a lower perimeter **45** which is used to form a grip edge for the cover to hold it in place. A perimeter release **46** allows the inner edge of the lower perimeter **45** to be opened for ease of assembly so that

the lower perimeter can slip over the mattress components and then be secured by perimeter button **47**.

FIG. **31**—is similar to FIG. **30** but has perimeter fastener **48** such as a snap or Velcro as well as showing an overlapping of the lower perimeter.

FIG. **32**—is similar to FIG. **30** but has an elastic material **50** to allow for ease of assembly and also shows a perimeter zipper **51** which closes the entire cover

FIG. **33**—is similar to FIG. **30** but shows a release zipper **49** instead of a fastener as well as a wider base perimeter which is made possible due to the perimeter release mechanism.

FIG. **34**—is a transparent view to show the detail of the plunger **60** having an + cross section to allow air to flow past but also align the plunger and valve seat **62**. This view clarifies details of the various components.

FIG. **35**—is a view of the valve solenoid coil **55**, which pulls solenoid rod **56** when powered to open valve compressing valve spring **63** by pulling on solenoid coupling **57** which pulls on alignment coupling **58** against plunger washer **59** which is glued to plunger **60**. The plunger **60** aligns the square o-ring **61**, which seals against the beveled valve seat **62** of the pump connection **1**. The cornered edge of the square o-ring **61** forms a hermetically sensitive low pressure seal when pressed against the beveled valve seat **62**. The parts of the valve, especially the alignment coupling, have clearance in them to allow the plunger to align the square o-ring **61** with the valve seat **62**

FIG. **36**—is an enlargement of the valve of FIG. **35**

FIG. **37** is an assembly view of the pump **42** having hose connector with pressure sensor line **2** connected to it. The pressure sensor line **41** is located inside of air hose **43** which is connected to swivel mattress connector **33** which is secured to mattress port **31**. The pressure sensor line **41** protrudes into the air core **8** to allow a pressure reading of the inside of the air core **8** to reach the pressure sensor in the pump **42**.

Operation

The tooling that will that is used to perform the final closing lap weld is designed to be small enough to be removed through the mattress port. Other tooling can be removed through larger seams prior to welding them.

shows the side by side position from either the head or foot view of the mattress with a foam layer **53** on top of the air cores and cover **44** assembled over mattress components for a double air core. The cover is pulled over the components and then the perimeter fastener **48** of the lower perimeter **45** is secured. The perimeter zipper **51** is closed to secure the mattress.

FIG. **21** shows a non swivel mattress connector **30** sectional view that is threaded onto mattress port thread **26** of the mattress port **31**. The flange of the port is welded to the outer surface **8** and may be pulled outward to extend past the surface of the mattress for threading. The non swivel mattress connector **30** is rotated clockwise on mattress connector thread to attach until washer **28** will be compressed to seal against the rim of the mattress port **31** at the same time pushing valve stem **22** inward (downward) opening the disconnect valve which is seated inside the body of the mattress port **31**, giving the walls and rim of **31** radial structural support.

FIG. **24**—is a sectional view of a mattress disconnect valve which seats in the mattress port **31**. The disconnect valve housing **20** is seated inside the body of the mattress port **31**, giving the walls and rim of **31** radial structural support. The spring **25** push the disconnect valve plate **21** against the disconnect valve seal **23** when the non swivel mattress connector **30** is removed. When the **30** is threaded on to the mattress port thread **26**, the washer **28** pushes the disconnect valve stem **22** inward and opens the valve. FIG. **26**—shows hose connector with pressure sensor line **2** secured to pump connection **1**. The spring **25** is compressed allowing the disconnect plug **6** to become unseated opening the main airway as well as the pressure sensor airway. The twist lock projection **38** holds and locks the hose connector **2** to the pump after pushed, twisted, and when released, it is locked by twist lock slot **37**.

FIG. **30**—shows a air bed cover **44** with a lower perimeter **45** which is used to form a grip edge for the cover to hold it in place. A perimeter release **46** allows the inner edge of the lower perimeter **45** to be opened for ease of assembly so that the lower perimeter can slip over the mattress components such as the foam edge rails and air mattress, and then be secured by perimeter button **47**. After secured the perimeter zipper **51** can be easily zipped closed.

REFERENCE NUMERALS IN DRAWINGS

1. pump connection
2. hose connector with pressure sensor line
3. pump connector nut
4. pump connector pressure line hose barb
5. hose connection pressure line hose barb
6. disconnect plug
7. reinforced edge beam
8. top and bottom outer surface
9. top and bottom outer surface end tab
10. reinforced squaring beam
11. non-reinforced heavy gauge vinyl corner
12*a*. non-reinforced heavy gauge vinyl patch.
12*b*. double sided reinforced vinyl
13. reinforced vinyl corner
14. reinforced vinyl seam patch
15. bottom outer surface end tab
16. thread stitching
17. reinforced vinyl flange
18. low cost fabric beam
19. low cost fabric squaring beam
20. disconnect valve housing
21. disconnect valve plate
22. disconnect valve stem
23. disconnect valve seal
24. valve screw
25. spring
26. mattress port thread
27. mattress connector thread
28. washer
29. hose barb
30. non-swivel mattress connector
31. mattress port
32. swivel mattress connector shank
33. swivel mattress connector
34. mattress port insert
35. o-ring
36. pressure sensor airway
37. twist lock slot
38. twist lock projection
39. disconnect seal
40. flap
41. pressure sensor line (or small diameter hose)
42. air pump
43. air hose
44. air bed cover
45. lower perimeter
46. perimeter release

47. perimeter button
48. perimeter fastener
49. release zipper
50. elastic material
51. perimeter zipper
52. foam edge support
53. foam pad
54. lower cover
55. valve solenoid coil
56. solenoid rod
57. solenoid coupling
58 alignment coupling
59. plunger washer
60. plunger
61 square o-ring
62. beveled valve seat
63. valve spring

CONCLUSIONS, RAMIFICATIONS AND SCOPE

To fully realize the advantage of the stronger reinforced material rather than the limitation of the butt weld burst strength an increase in ultimate burst pressure from 3 p.s.i. (pound per square inch) to 9 p.s.i. for the same material, the applicant has shown a novel method for producing not only a high quality air mattress but a method for achieving rigid inflatable objects. This method will open up new products such inflatable docks, toys, hang gliders etc., now that structural strength in terms of rigidity and hardness can be obtained using a relatively low cost method and material as compared to say rubber raft construction.

The applicant takes a novel approach by sewing through the outer hermetic surface and the patching the sewn area allowing use of a low cost fabric for I-beams and squaring beams to be sewn instead of butt welded reinforced vinyl, while at the same time producing a stronger attachment, flatter surface and reducing material costs.

Vinyl flanges, reinforced vinyl flanges and sewn flanges of I-beams double the welded area and directs the tensile force of now 2 welds in shear or lap configuration rather than the single perpendicular peeling force of a single butt weld.

The dynamic pressure measurement during pumping to obtain a preset pressure is achieved by running a separate pressure line inside the feed line, reducing the assembly complication and without having a separate mattress port and hose connections.

A high quality air bed that is easy to assemble is produced having significant and novel improvements such as to the cover, by adding perimeter relief fastener, and such as easy to use disconnects that do not protrude

The union patch or thick non-reinforced vinyl patch for sealing **3** intersecting edges of reinforced vinyl solves is a novel way to eliminate butt welds in reinforced vinyl mattresses and also allow for flaps or continuous tops and bottoms of outer covers.

Accordingly, the reader will see that the features of this reinforced vinyl air mattress invention utilizes the strength of reinforced vinyl by eliminating butt seams and using novel I-beam construction methods can also be used in any inflatable product. Thus the scope of the invention should be determined by the appended claims and their legal equivalents, rather than by the examples given.

I claim:

1. An inflatable mattress comprising; an air bladder, a pressure sensor line, a pressure sensor, an air pump, a mattress port, and an air hose, having said mattress port sealed to said air bladder and having said air hose connected to said mattress port and at one end, and connected to said air pump, forming a pump connection, at other end of said air hose, wherein; one end of said pressure sensor line is connected to said pressure sensor and said pressure sensor line is routed through said formed pump connection and into and through internal wall of said air hose and extending through said air hose connected to said air mattress and through said mattress port into said mattress whereby said pressure sensor reads the air pressure within said mattress while pumping.

2. The inflatable mattress of claim **1** further comprising; a thin walled extendable connection port having said port welded to surface of said air bladder, an insert and a port connector having end of said air hose attached wherein; said insert is placed in said thin walled connection port and said port connector secures said port connector with attached said air hose to said thin walled connection port whereby said thin walled port can be retracted flush with said air bladder surface and whereby said air hose can be positioned along outer surface of said air bladder.

* * * * *

United States Patent [19]

Santo

[11] **Patent Number: 4,941,223**

[45] **Date of Patent: Jul. 17, 1990**

[54] **WATERBED MATTRESS MARGINAL PERIMETER AIR SUPPORT AND METHOD OF MANUFACTURE THEREOF**

[76] Inventor: **Philip J. Santo**, 12 Mountain Rd., Rochester, N.Y. 14625

[21] Appl. No.: **158,640**

[22] Filed: **Feb. 19, 1988**

[51] **Int. Cl.**[5] **A47C 27/08**

[52] **U.S. Cl.** **5/452**; 5/451; 156/217

[58] **Field of Search** 5/451, 452, 450, 444; 156/217

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,513,463	4/1985	Santo	5/452
4,700,419	10/1987	Santo	5/452

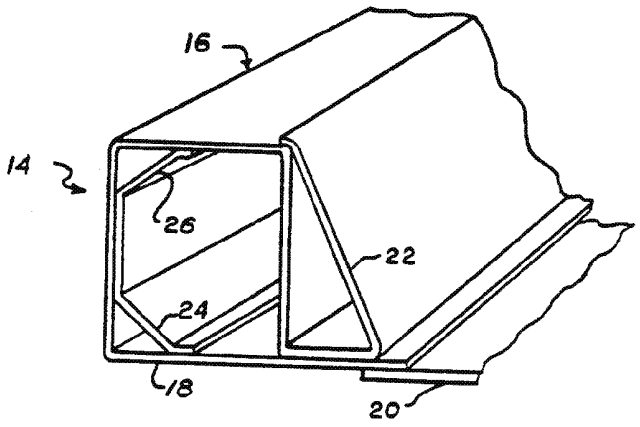
Primary Examiner—Alexander Grosz

Attorney, Agent, or Firm—Lawrence P. Kessler

[57] **ABSTRACT**

An improved construction for an air perimeter support for the marginal perimeter of a waterbed mattress, and the method for manufacturing such improved air perimeter support. The improved air perimeter support includes a first sheet of flexible, substantially dimensionally stable material folded back on itself and joined together at a location spaced from the longitudinal marginal side edges thereof to form an elongated chamber, of substantially rectangular cross-section, intermediate the marginal side edges. One longitudinal marginal side edge is again folded back and joined to the chamber at the wall opposite the wall formed by the other longitudinal marginal side edge. A second sheet of flexible, substantially dimensionally stable material, is located in the interior of the elongated chamber and joined to at least three adjacent walls of the chamber starting with the the wall to which the one longitudinal marginal side edge is joined and going around said chamber opposite to the fold of the one longitudinal marginal side edge.

9 Claims, 3 Drawing Sheets



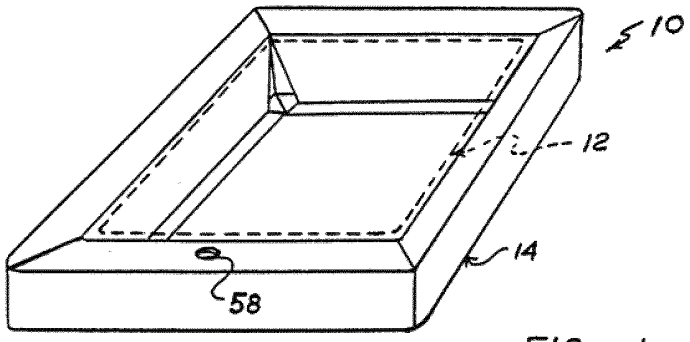


FIG. 1

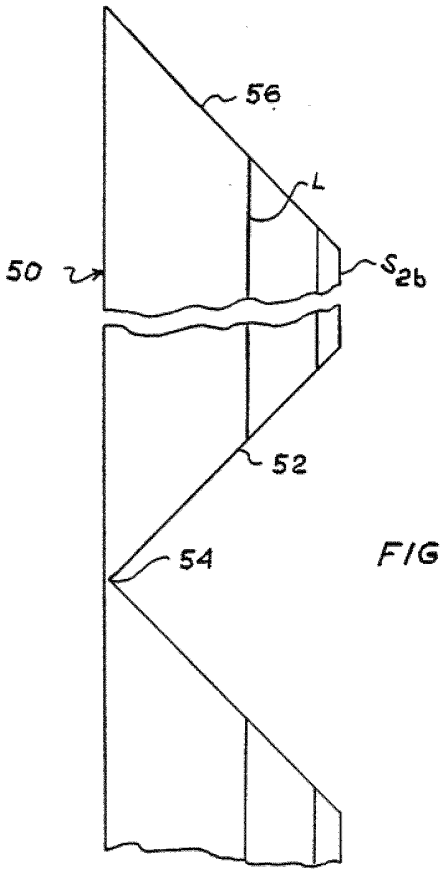


FIG. 6

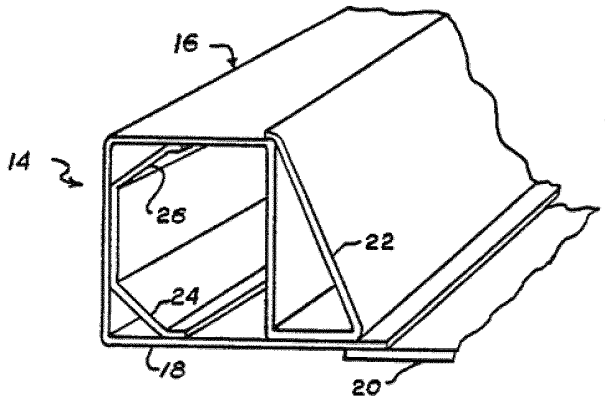


FIG. 2

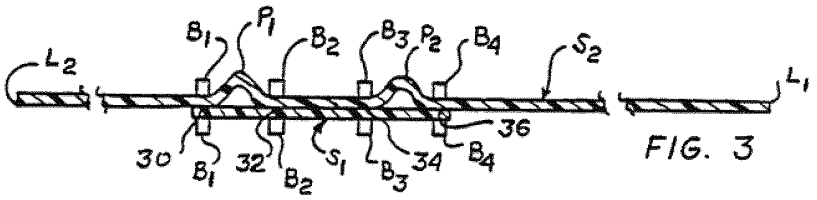


FIG. 3

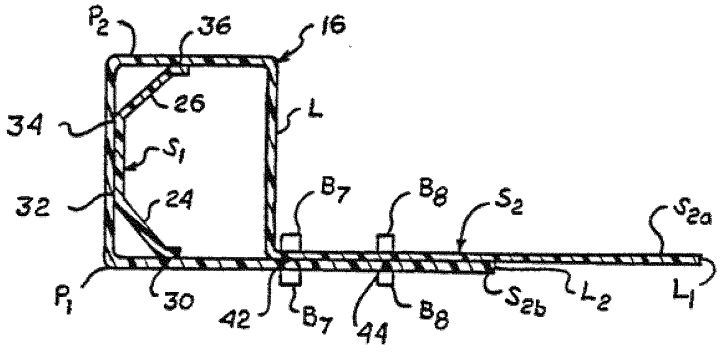


FIG. 4

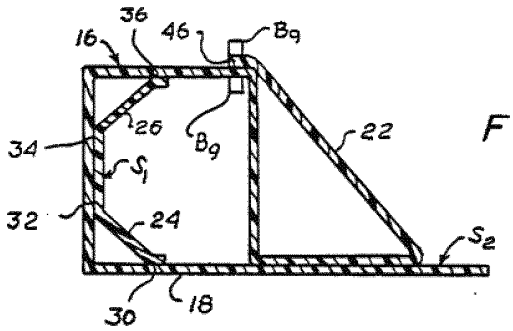


FIG. 5

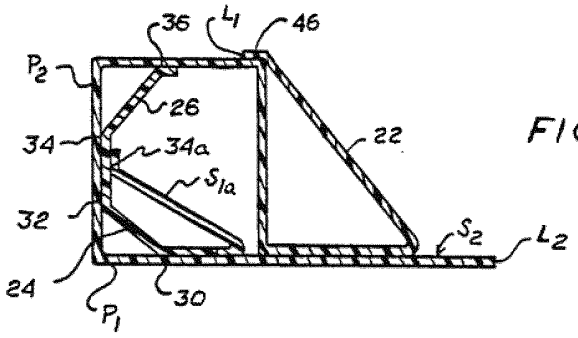


FIG. 7

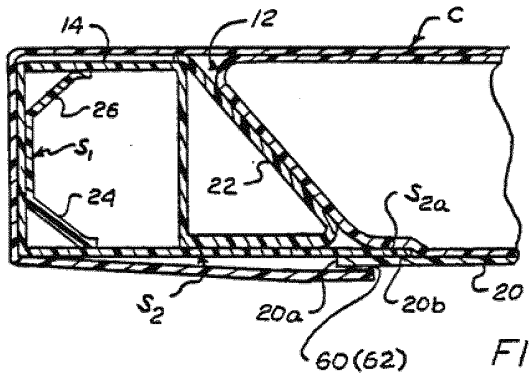


FIG. 8

WATERBED MATTRESS MARGINAL PERIMETER AIR SUPPORT AND METHOD OF MANUFACTURE THEREOF

BACKGROUND OF THE INVENTION

This invention relates in general to an air perimeter support for waterbed mattresses, and more particularly to a marginal perimeter support of simplified construction and the metod of manufacture for such air perimeter support.

In my recent U.S. Pat. No. 4,513,463 (issued Apr. 30, 1985), I have disclosed a new and improved air perimeter support for the marginal perimeter of a waterbed mattress in a floatation sleep system. Such air perimeter support employs a cantilevered member extending from the top portion of the air perimeter support to a location beneath the waterbed mattress. As a result of the particular location of such member, the weight of the mattress is utilized to create a force on the air perimeter support to retain such support in effective marginal perimeter support relation with the mattress. This force also serves to maintain the shape of the air perimeter support (i.e., prevents bowing out of the air perimeter support). Additionally, the air perimeter support includes a plurality of internal struts which are particularly located to maintain the cross-sectional shape of the air perimeter support so that its overall external configuration is substantially rectilinear. This gives the air perimeter support a highly desireable appearance similar to that of conventional bedding, such as a box spring and stuffed mattress.

Construction of this patented air perimeter support involves joining (such as by heat sealing) of individual elements of the air perimeter support together in a step-by-step process to build up a complete unit. While such construction provides a suitable air perimeter support product, it is heavily dependent on intensive manual labor, which materially adds to the cost of such product.

SUMMARY OF THE INVENTION

This invention is directed to an improved construction for an air perimeter support for the marginal perimeter of a waterbed mattress, and the method for manufacturing such improved air perimeter support. The improved air perimeter support includes a first sheet of flexible, substantially dimensionally stable material folded back on itself and joined together at a location spaced from the longitudinal marginal side edges thereof to form an elongated chamber, of substantially rectangular cross-section, intermediate the marginal side edges. One longitudinal marginal side edge is again folded back and joined to the chamber at the wall opposite the wall formed by the other longitudinal marginal side edge. A second sheet of flexible, substantially dimensionally stable material, is located in the interior of the elongated chamber and joined to at least three adjacent walls of the chamber starting with the wall to which the one longitudinal marginal side edge is joined and going around said chamber opposite to the fold of the one longitudinal marginal side edge.

The invention, and its objects and advantages, will become more apparent in the detailed description of the preferred embodiment presented below.

BRIEF DESCRIPTION OF THE DRAWINGS

In the detailed description of the preferred embodiments of the invention presented below, reference is made to the accompanying drawings, in which:

FIG. **1** is a view, in perspective, of a floatation sleep system including the improved air perimeter support for the waterbed mattress thereof according to this invention;

FIG. **2** is a cross-sectional view , in perspective and on an enlarged scale, of a portion of the improved air perimeter support of FIG. **1**;

FIGS. **3** through **5** are side elevational views, in cross-section, respectively depicting the steps, according to this invention, for manufacturing the improved air perimeter support shown in FIG. **1**;

FIG. **6** is a top plan view of an elongated arrangement from which the improved air perimeter support is finally constructed;

FIG. **7** is an end view, in cross-section, of an alternate embodiment of the air perimeter support according to this invention; and

FIG. **8** is an end view, in cross-section, of a portion of the air perimeter support according to this invention, with a bottom sheet and cover attached thereto.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the accompanying drawings, FIG. **1** show a floatation sleep system, designated generally by the numeral **10**, including a waterbed mattress **12** and an improved air perimeter support **14**, according to this invention, for the marginal perimeter of such mattress. The air perimeter support **14** is an improved construction of the air perimeter support of my aforementioned U.S. Pat. No. 4,513,463, and functions to support the marginal perimeter of the mattress **12** and maintain its shape in the same manner as fully described in such patent. The function of the air perimeter support is described herein only to the extent necessary for a complete understanding of this invention.

The air perimeter support **14**, as best shown in FIG. **2** comprises an air chamber **16**, defined by a sheet **18** of flexible, substantially dimensionally stable material. The air chamber **16**, which is adapted to surround the marginal perimeter of the waterbed mattress **12**, has a sheet **20** connected to the bottom of the air chamber extending beneath the mattress. A cantilever member **22** extends from the top of the air chamber **16** and is connected to the sheet **20** at a location such that the weight of the waterbed mattress contained in the cavity of the air perimeter support **14** over the sheet **20** acts on the cantilever member to create a force which retains the air perimeter support in effective marginal perimeter support relation with the mattress and maintains the shape of the air perimeter support. A plurality of internal struts **24**, **26** are connected to the interior walls of the air chamber **16** at particular locations to maintain the cross-sectional shape so that the overall external configuration of the air frame **14** is substantially rectilinear.

According to this invention, the improved construction for the air perimeter support **14** involves a substantial reduction in the number of its component parts which, in turn, enables the air perimeter support to be manufactured in an improved manner which substantially reduces the intensive manual labor previously required for its production. As can be readily seen in

FIG. 2, the sheet 18 defining the air chamber 16 and the cantilever member 22 are in fact formed from one sheet of material. Similarly, the internal struts 24, 26 are formed of one sheet of material.

With only two sheets of material comprising the basic air perimeter chamber 14, such chamber can be simply constructed in the following manner. A first elongated sheet S_1 (see FIG. 3) is laid out on a flat surface. A second elongated sheet S_2 of substantially greater width is laid out on the flat surface over the sheet S_1. Two portions P_1, P_2 of the sheet S_2 are drawn substantially together by hand, or by any suitable mechanical clamping mechanism. A plurality of elongated pairs of joining members, such as resistance bars B_1–B_4 of typical heat sealing equipment, are placed in juxtaposition with the sandwiched sheets S_1 and S_2. Bars B_1 and B_4 are located adjacent to the longitudinal marginal side edges L_1, L_2 of the sheet S_1, and the bars B_2 and B_3 are respectively located on the inside margin of the projections P_1 and P_2. The bars are then actuated to heat seal the sheets S_1 and S_2 together along the appropriately located lines 30–36. Of course, other methods of joining the sheets along the appropriately located lines, such as glueing for example, are suitable for use with this invention, as long as they provide a reliable airtight seal therebetween.

Thereafter, sheet S_2 is folded back on itself so that a loop L is formed with sheet S_1 located internally thereof, and marginal edge S_2 extends over marginal edge S_{2b} (see FIG. 4). As a result of the sealing of sheets S_1 and S_2 along the lines 30–36, the loop L will take a substantially rectilnear cross-sectional configuration with the projections P_1 and P_2 assuming a substantially right angle shape; and the segments of sheet S_1 respectively between lines 30 and 32 and between lines 34 and 36 form the internal struts 24 and 26 which serve to maintain the rectilinearity of the air chamber 16 (loop L). Pairs of heat sealing bars B_7 and B_8 are then placed in juxtaposition with the overlapped portion of the sheet S_2, with the bars B_7 located at the base of the loop L where the portions of the sheet S_2 come back together and bars B_8 located on the side of the bars B_7 opposite the loop L. The bars B_7 and B_8 are actuated to heat seal the overlapped portions of the sheet S_2 together along the appropriately located lines 42, 44. If it is desired to further insure rectilinearity of the air chamber, prior to sealing the overlapped portions of sheet S_2, an elongated portion S_1 of sheet S_1 is looped back and sealed to itself along the line 34*a* between lines 32 and 34 (see FIG. 7).

Subsequently, marginal edge S_2 is again folded back on itself to locate such edge adjacent to the top of loop L (see FIG. 5). A pair of heat sealing bars B is then placed in juxtaposition with the location of the marginal edge S_2 over the loop L, and the bars are actuated to heat seal such marginal edge to the loop along the appropriately located line 46. In this manner, the portion of the sheet S_2 extending from the marginal edge S_2 toward the marginal edge S_{2b} forms the cantilever member 22.

In order to complete the construction of the air perimeter support 14, the elongated arrangement 50 (see FIG. 6) formed in the above manner is cut to a length of the desired external perimeter of the support. Such external perimeter length can be standardized for the various standard sizes of floatation sleep system mattresses. A series of V-shaped cutouts 52 are made in the elongated arrangement 50 extending from the marginal edge S_{2b} through the loop L but not through the vertical wall to which the sheet S_1 is sealed. The apexes 54 of the cutouts 52 are spaced apart respective distances corresponding to the desired longitudinal dimensions of the sides of the air perimeter support. The ends 56 of the elongated arrangement 50 are respectively notched so that when the arrangement is folded at the apexes 54, the ends 56 mate to form the desired rectangular configuration for the air perimeter support 14. The ends 56 and cutouts 52 can then be sealed in any well known manner to complete the air chamber 16. Finally, a valve 58 is sealed in the a wall of the air chamber 16 to enable the chamber to be selectively pressurized, and the bottom sheet 20 is attached, along its marginal edges, to the marginal edge S_{2a} to complete the construction of the air perimeter support 14.

In the alternative, the elongated arrangement 50 can be cut to form standard length sections corresponding to desired longitudinal dimensions of the respective sides of standard sized air perimeter supports. The ends of such sections are respectively notched as described above. Accordingly, selected sections can then be sealed together in any well known manner to complete an air perimeter support of desired perimeter dimension.

It should be noted that the bottom sheet 20 may be formed with a portion 20*a* extending beyond the lines 20*b*, along which the sheet is sealed to the marginal edges S_{2a}, and within the vertical projection of the interior wall of the loop L (see FIG. 8). The portion 20*a* includes a fastening member 60 on the under side thereof, which is mateable with a complementary fastening member 62. The fastening member 62 is attached to a marginal edge of a decorative cover adapted to be placed over the assembled air perimeter support 14 and the waterbed mattress 12 contained therewithin. The fastening members 60, 62 may be of the hook and loop type for example. The weight of the water in the mattress assures that the fastening members are substantially locked in place.

The invention has been described in detail with particular reference to a preferred embodiment thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention.

I claim:

1. An air perimeter support for supporting the marginal perimeter of a waterbed mattress, said air perimeter support comprising:

a first elongated sheet of flexible, substantially dimensionally stable material folded back on itself and joined together at a location spaced from the longitudinal marginal side edges thereof to form an elongated chamber, of substantially rectangular cross-section, intermediate said longitudinal marginal side edges, one longitudinal marginal side edge being again folded back and joined to said chamber at the wall opposite the wall formed by the material adjacent to the other longitudinal marginal side edge; and

a second sheet of flexible, substantially dimensionally stable material, said second sheet being located in the interior of said elongated chamber and joined to at least three adjacent walls of said chamber starting with the said wall to which said one longitudinal marginal side edge is joined, and going around said chamber opposite to the fold of said one longitudinal marginal side edge.

2. The invention of claim 1 wherein assemblies of said first and second sheets are of appropriate lengths corresponding to lengths of sides of a desired external perimeter of said air perimeter support, and selected lengths are sealed together to form said air perimeter support.

3. The invention of claim 2 further including a bottom sheet attached to said formed assemblies, said bottom sheet having a portion extending beyond the line of attachment between said sheet and said assemblies, said portion including means for releasably attaching a cover for said air perimeter and waterbed mattress.

4. The invention of claim 1 wherein the assembly of said first and second sheets is of a length corresponding to the length of a desired external perimeter of said air perimeter support, said assembly defining a plurality of cutouts spaced apart a distance corresponding to the lengths of the sides of said support so that edges of said cutouts can be sealed together to form said air perimeter support.

5. A method for manufacturing an air perimeter support for supporting the marginal perimeter of a waterbed mattress, said method comprising the steps of:

(1) on a substantially flat surface, overlaying an elongated flexible, substantially dimensionally stable sheet of a first width with an elongated flexible, substantially dimensionally stable sheet of a second width greater than the width of said first sheet;

(2) gathering two spaced apart portions of said second sheet intermediate and substantially parallel to the longitudinal marginal side edges thereof so that said portions are spaced from said first sheet;

(3) sealing said second sheet to said first sheet along substantially parallel lines respectively on either side of said gathered portions of said second sheet;

(4) folding said second sheet back on itself with one longitudinal marginal side edge overlying the other longitudinal marginal side edge to form a loop with first sheet being internal of said loop;

(5) sealing together portions of said second sheet along a line at the base of said loop;

(6) sealing together portions of said second sheet along a line parallel to said line at the base of said loop and between said line at the base of said loop and said longitudinal marginal side edge;

(7) folding one longitudinal marginal side edge back to the top of said loop; and

(8) sealing said one longitudinal marginal side edge to the top of said loop to form an elongated arrangement.

6. The invention of claim 5 wherein the sealing steps (5) and (6) are accomplished at substantially the same time.

7. The invention of claim 5, further including the steps of cutting said formed elongated arrangement to a plurality of lengths corresponding respectively to lengths of portions of the external perimeter of the air perimeter support, and joining such cut ends together.

8. The invention of claim 7 further including the step of attaching a bottom sheet to said joined assembly of elongated arrangement lengths.

9. The invention of claim 5 further including the steps of cutting said formed elongated arrangement to a length corresponding to the length of the desired external perimeter of the air perimeter support; oppositely notching the ends of said elongated arrangement; providing a series of V-shaped cutouts in said elongated assembly intermediate said notched ends at intervals between said notched ends spaced apart so that the distance between the apexes of respective cutouts correspond to the desired longitudinal dimensions of the sides of said air perimeter support; and joining such notched ends together.

* * * * *

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(54) Title: INTERNAL TENSIONING STRUCTURE USABLE WITH INFLATABLE DEVICES

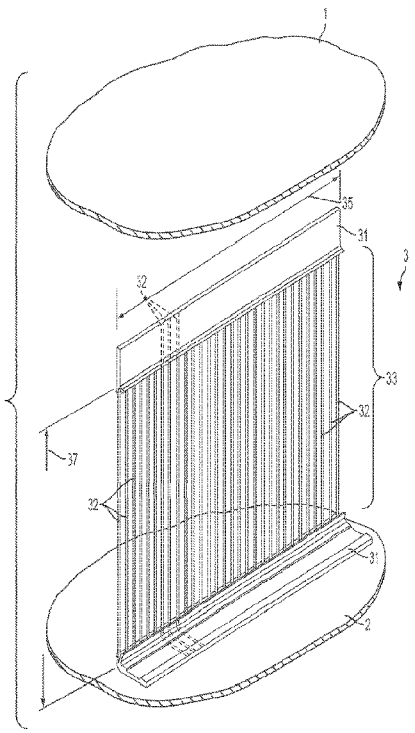


FIG. 1

(57) Abstract: An internal tensioning structure for use in an inflatable product fulfills the basic function of maintaining two adjacent inflatable surfaces in a desired geometric arrangement when the inflatable product is pressurized. The tensioning structure is formed by connecting a pair of plastic strips sheets via spaced-apart strands, such as strings or wires. When pulled taut, the strands provide a high tensile strength between the two opposed plastic strips. At the same time, the plastic strips facilitate a strong, long-lasting weld between the tensioning structure and the inflatable product.

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INTERNAL TENSIONING STRUCTURE USABLE WITH INFLATABLE DEVICES

BACKGROUND

1. Technical Field.

[0001] The present disclosure relates to an inflatable product structure, and in particular to an inflatable product structure which is light in weight and low in cost.

2. Description of the Related Art.

[0002] Inflatable products, are light in weight, easy to house, and easy to carry. Such products technologies have been used for outdoor items and toys, as well as various household goods including inflatable beds, inflatable sofas and the like.

[0003] Many inflatable products utilize internal structures in order to form the product into its intended, predetermined shape upon inflation. For example, one type of inflatable bed, referred to as a wave-shaped, straight-strip or I-shaped inflatable bed, may include a tension-band type internal structure arranged along wave-shaped, straight-line or I-shaped pathways within the internal cavity. Another type of inflatable bed, referred to as a column-type inflatable bed, has tension bands arranged into honeycomb-shaped or cylindrical structures within the inflatable cavity.

[0004] These internal tension-band structures disposed in the cavity of the inflatable bed give shape to the bed as internal pressure increases, thereby preventing the inflatable bed from expanding evenly on all sides in the manner of a balloon. More particularly, in order to maintain an inflatable bed as a rectangular shape, the tension bands join the upper and lower surfaces of the inflatable bed to one another. To allow passage of pressurized air to both sides of these joining structures, the tension bands may be formed as belts stretching between the upper and lower surfaces, or as vertical expanses of material with air columns formed therein. The number and spacing of the tension bands is proportional to the sharpness of the rectangularity of the inflated product. That is to say, a greater number and/or linear extent of tension bands within the pressurized cavity results in a more "flat" bed surface.

[0005] In conventional inflatable products such as the inflatable beds described above, the tension bands are made of PVC sheets with a sufficient thickness to ensure spreading of force and concomitant reductions in stress in the product material. For example, the tension bands of known inflatable beds or sofas may have a thickness of about 0.36 mm. For some known water carrier devices, such as inflatable swimming pools, the internal tension bands may have a thickness of about 0.38 mm, while "sandwich" type inflatable swimming pools may have a thickness of 0.7-0.8 mm.

[0006] Thus, conventional inflatable structures utilizing belt- or sheet-like PVC tension bands meet the force requirements of the product by varying the thickness of the tension bands. However, where continuous plastic strips or belts are utilized, such tension bands contribute to increased weight of the inflatable product. Similarly, an increase in thickness and/or spatial density of solid-strip tension bands also increases the compressed/folded volume of the deflated inflatable structure.

SUMMARY

[0007] The present disclosure provides an internal tensioning structure for use in an inflatable product, and a method for producing the same. The tensioning structure fulfills the basic function of maintaining two adjacent inflatable surfaces in a desired geometric arrangement when the inflatable product is pressurized. The tensioning structure is formed by connecting a pair of plastic strips sheets via spaced-apart strands, such as strings or wires. When pulled taut, the strands provide a high tensile strength between the two opposed plastic strips. At the same time, the plastic strips facilitate a strong, long-lasting weld between the tensioning structure and the inflatable product.

[0008] Various configurations of the tensioning structure are contemplated within the scope of the present disclosure. In one embodiment, a pair of parallel plastic strips has a plurality of strands extending therebetween to connect the plastic strips to one another, with the strands substantially parallel to one another and substantially perpendicular to the plastic strips. In another embodiment, a similar arrangement of two parallel plastic strips are connected by a plurality of strands with each adjacent pair of such strands converging to a point at one of the plastic strips in a "V" configuration. Either embodiment may be incorporated into a tensioning structure with one of

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a number of geometric arrangements within the inflatable cavity, such as linear, cylindrical, wave-shaped, etc.

[0009] According to one embodiment thereof, the present disclosure provides an inflatable product comprising: a first sheet and a second sheet disposed opposite the first sheet, the first and second sheets spaced apart to define a gap when the inflatable product is inflated. The inflatable product further includes a tensioning structure having a gap portion spanning the gap between the first sheet and the second sheet to maintain a spatial relationship between the first and second sheets when the inflatable product is inflated. The gap portion has an extent measured along the surface of at least one of the first sheet and the second sheet. The gap portion occupies a volume and has an operable area occupied by gap portion of the tensioning structure defined as the total area of the gap between the first sheet and the second sheet, as measured along the extent of the gap portion of the tensioning structure. The gap portion of the tensioning structure defines an operable area-to-volume ratio of at least 10 square millimeters per cubic millimeter.

[0010] According to another embodiment thereof, the present disclosure provides an inflatable product comprising: a first sheet and a second sheet disposed opposite the first sheet. The first and second sheets are spaced apart to define a gap when the inflatable product is inflated. The inflatable product further includes a tensioning structure having a gap portion spanning the gap between the first sheet and the second sheet to maintain a spatial relationship between the first and second sheets when the inflatable product is inflated. The gap portion has an extent measured along the surface of at least one of the first sheet and the second sheet. The gap portion has an operable area occupied by gap portion of the tensioning structure defined as the total area of the gap between the first sheet and the second sheet, as measured along the extent of the gap portion of the tensioning structure. The gap portion of the tensioning structure has a total weight such that the tensioning structure defines an operable area-to-weight ratio of at least 6,000 square centimeters per kilogram.

[0011] According to another embodiment thereof, the present disclosure provides an inflatable product comprising: a first sheet and a second sheet disposed opposite the first sheet. The first and second sheets are spaced apart to define a gap when the inflatable product is inflated; The inflatable product further comprises a tensioning structure having a gap portion spanning the gap between the first sheet and the second sheet to maintain a spatial relationship between the first

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and second sheets when the inflatable product is inflated. The gap portion of the tensioning structure has an average thickness of less than 0.125 millimeters.

[0012] According to yet another embodiment thereof, the present disclosure provides an inflatable product comprising: a first sheet; a second sheet disposed opposite the first sheet, the first and second sheets spaced apart to define a gap; a tensioning structure spanning the gap between the first sheet and the second sheet, the tensioning structure comprising: a plurality of strands uniformly spaced apart and arranged substantially parallel to one another; and a plurality of weld strips spaced apart from one another and substantially perpendicular to the plurality of strands, each of the plurality of weld strips affixed to each of the plurality of strands, and each of the plurality of weld strips affixed to at least one of the first sheet and the second sheet.

[0013] According to still another embodiment thereof, the present disclosure provides an inflatable product comprising: a first sheet; a second sheet disposed opposite the first sheet, the first and second sheets spaced apart to define a gap; a tensioning structure spanning the gap between the first sheet and the second sheet, the tensioning structure comprising: a plurality of strands uniformly spaced apart and arranged in parallel; and a first weld sheet having the plurality of strands affixed to an upper surface of the first weld sheet.

[0014] According to still another embodiment thereof, the present disclosure provides an inflatable product comprising: a first sheet; a second sheet disposed opposite the first sheet, the first and second sheets spaced apart to define a gap; a tensioning structure spanning the gap between the first sheet and the second sheet, the tensioning structure comprising: an upper weld strip; a lower weld strip arranged substantially parallel to the upper weld strip and spaced apart from the upper weld strip span the gap between the first sheet and the second sheet; and a plurality of end-to-end V-shaped strands arranged between weld strips, each of the V-shaped strands having upper and lower ends fixed to the upper and lower weld strips, respectively.

[0015] According to still another embodiment thereof, the present disclosure provides an inflatable product comprising: a first sheet; a second sheet disposed opposite the first sheet, the first and second sheets spaced apart to define a gap, the first sheet and the second sheet cooperating to at least partially bound an inflatable chamber; a plurality of tensioning structures welded to respective inner surfaces of the first and second sheets such that the plurality of tensioning structure span the gap, each of the plurality of tensioning structures comprising: an upper weld

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strip affixed to one of the first sheet and the second sheet; a lower weld strip affixed to the other of the first sheet and the second sheet; and a plurality of strands connecting the upper and lower weld strips to one another.

[0016] According to still another embodiment thereof, the present invention provides an inflatable product comprising: a first sheet; a second sheet disposed opposite the first sheet, the first and second sheets spaced apart to define a gap, the first sheet and the second sheet cooperating to at least partially bound an inflatable chamber; a plurality of tensioning structures welded to inner surfaces of the first and second sheets such that the plurality of tensioning structures span the gap, each of the plurality of tensioning structures comprising: a weld sheet; a plurality of strands, and the plurality of strands substantially evenly spaced and arranged substantially parallel to one another, the plurality of strands affixed to the weld sheet; and a weld strip affixed to each end of the weld sheet such that a longitudinal extent of the weld strip is substantially perpendicular to the plurality of strands, respective ends of the plurality of strands are affixed to the weld strip, and each of the weld strips are welded to one of the first sheet and the second sheet.

[0017] According to still another embodiment thereof, the present invention provides a method for producing a tensioning structure of an inflatable product, the method comprising: arranging at least one of a welder and an adhesive device downstream of a strand guide; supplying a plurality of strands to the welder or the adhesive device via the strand guide, such that the supplied strands are substantially uniformly spaced apart and arranged substantially parallel to one another; positioning weld strips on a first die of the welder or gluing device, the weld strips having a longitudinal extent corresponding to an overall width of the plurality of strands; advancing a second die of the welder or gluing device into an operable position in which the first and second dies are disposed at opposing sides of the weld strips, activating the welder or gluing device to fixedly connect the weld strips to the plurality of strands, such that the weld strips are affixed to the plurality of strands in a spaced apart and substantially parallel arrangement, and such that the weld strips are substantially perpendicular to the plurality of strands.

[0018] According to still another embodiment thereof, the present invention provides a method for producing a tensioning structure of an inflatable product comprises: arranging a hot roller downstream of a strand guide; supplying a plurality of strands to the hot roller via the strand guide, such that the supplied strands are substantially uniformly spaced apart and arranged

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substantially parallel to one another; arranging a conveying roller downstream of the strand guide, the conveying roller operable to deliver at least one weld sheet to the hot roller, the at least one weld sheet having a width corresponding to an overall width of the plurality of strands; and passing the plurality of strands and the at least one weld sheet through the hot roller, such that the plurality of strands become affixed to the at least one weld sheet.

[0019] According to still another embodiment thereof, the present invention provides a method for producing a tensioning structure, the method comprising: arranging a first pair of weld strips parallel to one another on a joining device; wrapping at least one continuous strand around a plurality of members arranged along a pair of rows adjacent the first pair of weld strips, respectively, each of the pair of rows of members offset with respect to the other of the pair of rows of members, the step of wrapping comprising alternating between the pair of rows, such that the at least one continuous strand forms a plurality of end-to-end V-shaped strands; and using the joining device to join the first pair of weld strips to the plurality of strands at respective V-shaped corners formed by the at least one continuous strand, such that the tensioning structure has a tensile strength along a direction perpendicular to a longitudinal extent of the first pair of weld strips.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The above mentioned and other features and advantages of this disclosure, and the manner of attaining them, will become more apparent and the invention itself will be better understood by reference to the following description of embodiments of the invention taken in conjunction with the accompanying drawings, wherein:

[0021] Fig. 1 is an exploded, perspective view of an inflatable structure incorporating a tensioning structure made in accordance with the present disclosure;

[0022] Fig. 2 is an enlarged perspective view of the tensioning structure shown in Fig. 1;

[0023] Fig. 3 is an exploded, perspective view of an inflatable bed incorporating tensioning structures made in accordance with the present disclosure;

[0024] Fig. 4 is an assembled view of the inflatable bed of Fig. 3, in which the inflatable bed material is made transparent to show the internal arrangement of the tensioning structures;

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[0025] Fig. 5 is an exploded, perspective view of an inflatable bed incorporating an alternative geometric arrangement of tensioning structures made in accordance with the present disclosure;

[0026] Fig. 6 is an assembled view of the inflatable bed of Fig. 5, in which the inflatable bed material is made transparent to show the internal spatial arrangement of the tensioning structures;

[0027] Fig. 7 is a perspective view of an apparatus for producing bulk material for the tensioning structures shown in Figs. 3-6;

[0028] Fig. 8 is an exploded, perspective view showing a first embodiment of the bulk material created by the apparatus of Fig. 7;

[0029] Fig. 9 is a perspective view showing a first embodiment of the bulk material created by the apparatus of Fig. 7;

[0030] Fig. 10 is a perspective view showing a second embodiment of the bulk material created by the apparatus of Fig. 7;

[0031] Fig. 11 is a perspective view showing a second embodiment of the bulk material created by the apparatus of Fig. 7;

[0032] Fig. 12 is an exploded, perspective view of a first alternative tensioning structure made in accordance with the present disclosure;

[0033] Fig. 13 is an assembled, perspective view of the first alternative tensioning structure shown in Fig. 12;

[0034] Fig. 14 is an exploded, perspective view of a second alternative tensioning structure made in accordance with the present disclosure;

[0035] Fig. 15 is an exploded, perspective view of a third alternative tensioning structure made in accordance with the present disclosure;

[0036] Fig. 16 is an assembled, perspective view of the third alternative tensioning structure shown in Fig. 15;

[0037] Fig. 17 is an exploded, perspective view of a fourth alternative tensioning structure made in accordance with the present disclosure;

[0038] Fig. 18 is an exploded, perspective view of a fifth alternative tensioning structure made in accordance with the present disclosure;

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[0039] Fig. 19 is an assembled, perspective view of the fifth alternative tensioning structure shown in Fig. 18;

[0040] Fig. 20 is an exploded, perspective view of an inflatable bed incorporating alternative tensioning structures made in accordance with the present disclosure;

[0041] Fig. 21 is an assembled view of the inflatable bed of Fig. 22, in which the inflatable bed material is made transparent to show the internal arrangement of the tensioning structures;

[0042] Fig. 22 is an exploded, perspective view of an inflatable bed incorporating an alternative tensioning structures made in accordance with the present disclosure, configured in an alternative geometric arrangement;

[0043] Fig. 23 is an assembled view of the inflatable bed of Fig. 22, in which the inflatable bed material is made transparent to show the internal spatial arrangement of the tensioning structures;

[0044] Fig. 24 is a perspective view of an apparatus for producing bulk material for the first through fifth alternative tensioning structures shown in Figs. 12-19;

[0045] Fig. 25 is an exploded, perspective view of a sixth alternative tensioning structure made in accordance with the present disclosure;

[0046] Fig. 26 is an assembled, perspective view of the sixth alternative tensioning structure shown in Fig. 25;

[0047] Fig. 27 is an exploded, perspective view of an inflatable bed incorporating the sixth alternative tensioning structure shown in Fig. 25;

[0048] Fig. 28 is an assembled view of the inflatable bed of Fig. 27, in which the inflatable bed material is made transparent to show the internal arrangement of the tensioning structures;

[0049] Fig. 29 is a perspective view of an apparatus for producing bulk material for the sixth alternative tensioning structures shown in Figs. 25-28;

[0050] Fig. 30 is an exploded, perspective view of a seventh alternative tensioning structure made in accordance with the present disclosure;

[0051] Fig. 31 is an assembled, perspective view of the seventh alternative tensioning structure shown in Fig. 30;

[0052] Fig. 32 is a perspective view of an apparatus for producing bulk material for the seventh alternative tensioning structures shown in Figs. 30 and 31;

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[0053] Fig. 33 is a top plan view of portions of tensioning structures bunched together during a welding process;

[0054] Fig. 34 is a top plan view of portions of a tensioning structure collapsed when the mattress is deflated for storage or shipment;

[0055] Fig. 35 is a view similar to Fig. 33 showing portions of tensioning structures with strands placed in piles during a welding process; and

[0056] Fig. 36 is a view similar to Fig. 33 showing portions of tensioning structures shifted relative to each other during a welding process.

[0057] Corresponding reference characters indicate corresponding parts throughout the several views. The exemplifications set out herein illustrate exemplary embodiments of the present invention, and such exemplifications are not to be construed as limiting the scope of the invention in any manner.

DETAILED DESCRIPTION

[0058] The present disclosure provides tensioning structures which give shape to inflatable devices, such as inflatable couches, beds or swimming pools. The tensioning structures are lightweight and occupy minimal volume when the device is deflated and packed away, while also functioning as a strong and durable internal support upon inflation and use of the inflatable device.

[0059] An exemplary tensioning structure in accordance with the present disclosure utilizes thin and flexible string- or wire-like strands which join two areas of fabric to one another. The strands are firmly connected to the adjacent fabric via an intermediate material, such as a strip or sheet, and the intermediate material is in turn firmly connected to the fabric. The area of contact between intermediate material and the attached strands may be manipulated to impart a connection strength commensurate with the tensile strength of the strand. Similarly, the area of contact between the intermediate material and the adjacent fabric may also be manipulated to impart a fabric/tensioning structure connection strength commensurate with the aggregate tensile strength of all strands in the tensioning structure.

[0060] Various tensioning structures and methods of manufacturing the same are described in detail below. It is contemplated that any of the present described tensioning structures

may be used in any inflatable product, either alone, as a group or in combination with one another as required or desired for a particular design. In addition, it is contemplated that tensioning structures in accordance with the present disclosure can be used in other contexts, such as in camping equipment, or in any other context where a lightweight, packable structure is needed to join two pieces of material that are urged away from one another in use.

1. Weld Strips Joined By Spaced-Apart Strands.

[0061] Turning now to Figs. 1 and 2, tensioning structure 3 is shown joining upper material 1 to lower material 2. In the illustrated embodiment, tensioning structure 3 includes upper and lower weld strips 31 connected to one another by a plurality of substantially parallel strands 32 that define a gap portion extending between a gap between upper and lower sheets 1, 2. The upper and lower weld strips 31 are in turn welded to the upper material 1 and the lower material 2, respectively, such that forces urging upper and lower materials 1, 2 are encountered by tension in strands 32.

[0062] Optionally, reinforcing strands 5 (Fig. 3) may be provided along the longitudinal extent of weld strip 31 (i.e., substantially perpendicular to strands 32). Reinforcing strands 5, when provided, may be coupled to tensile strands 32, such as by folding strands 32 over reinforcing strands 5, tying strands 5, 32 to one another, or adhesively securing strands 5, 32 to one another. When so coupled, reinforcing strands 5 provide additional surface area contact with weld strips 31 and thereby improve the resistance of securing strands 5 to pulling free from weld strips 31. In addition, the presence of reinforcing strands 32 within weld strips 31 improves the tensile strength of weld strips 31 along their longitudinal extents.

[0063] The plurality of strands 32 in the tensioning structure 3 as shown in Figs. 1 and 2 are arranged such that the strands 32 are substantially parallel to one another when strands 32 are pulled taut (i.e., when weld strips 31 are drawn away from one another). In addition, adjacent pairs of strands 32 may have even intervals therebetween, such that a substantially constant tensile strength of tensioning structure 3 is maintained across the longitudinal extent of weld strips 31. In an exemplary embodiment, strands 32 may extend along the entire width of weld strips 31, as illustrated in Figs. 1 and 2, such that a large area of contact between strands 32 and weld strips 31

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is achieved. For clarity, Figs. 1 and 2 illustrate only a limited number of strands 32 affixed to strips 31 in this way, it being appreciated that all strands 32 in a tensioning structure 3 may be so affixed.

[0064] In one exemplary application shown in Figs. 3 and 4, a number of tensioning structures 3 are used in an inflatable structure such as air mattress 10, which includes a sleeping surface at upper material 1 and a ground-contacting surface at lower material 2. Annular side band 4 is fixedly connected or welded to the peripheries of the upper material 1 and the lower material 2 to form an inflatable chamber. A valve 6 may be provided to facilitate inflation and deflation of the mattress 10.

[0065] Although mattress 10 is shown as a single layer, double layers may also be provided. Additional mattress features may also be provided such as those shown in US Patent No. 7,591,036 titled Air-Inflated Mattress, the entire disclosure of which is expressly incorporated by reference herein. In addition to mattresses, tensioning structure may be used in other inflatable products such as inflatable boats, inflatable islands, floatation devices, swimming pools, inflatable slides, and any other inflatable devices.

[0066] Each of the plurality of tensioning structures 3 is welded to respectively opposed portions of the inner surfaces of upper and lower materials 1, 2, as described in detail above. As shown in Figs. 3 and 4, the tensioning structure 3 of the illustrated embodiment defines an overall longitudinal extent (that is, along the longitudinal direction of weld strips 31) corresponding to the width or length of the sleeping and ground-contacting materials 1, 2 of mattress 10.

[0067] As noted above, tensioning structures 3 are connected to upper and lower material 1, 2 by weld strips 31. Such welding is accomplished by abutting one of weld strips 31 to one of upper and lower materials 1, 2 and then applying heat to melt and fuse the material of weld strips 31 to the abutting material. In an exemplary embodiment, weld strips 31 and upper and lower material 1, 2 are both made of PVC, and the welding process is accomplished by applying 105 degree Celsius heat for approximately 0.5 seconds. Upper and lower sheets 1, 2 and weld strips 31 have thicknesses ranging from 0.15 to 1.0 millimeters with 0.34 millimeters being preferred for upper and lower sheets 1, 2 and 0.18 millimeters being preferred for weld strips 31. Weld strips 31 are preferably 12.7 millimeters wide and may range from 1 to 100 millimeters wide. The PVC used preferably has a tensile strength ranging from at least 7 kgf/cm to 73 kgf/cm and a density

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ranging from 0.8-2.5 grams per centimeter cubed with a preferred density of 1.5 grams per centimeter cubed.

[0068] In Figs. 3 and 4, tensioning structures 3 are welded to upper and lower material 1, 2 along a substantially linear path, with the plurality of structures 3 substantially parallel to one another and equally spaced across materials 1, 2. However, it is contemplated that the welding geometry may take any other suitable geometry, such as a wave-like path, I-shaped path, Z-shaped path or V-shaped path. One exemplary alternative geometry is a cylindrical or columnar arrangement, as illustrated in Figs. 5 and 6. In this arrangement, upper and lower weld strips 31 are each connected at their ends in an end-to-end manner to form an arcuate ring, such as a circular ring as illustrated. The plurality of strands 32 between the upper and lower weld strips 31 thus form a closed columnar periphery, thereby forming the body of a column. Upon assembly of inflatable bed 10, this column is welded to upper and lower materials 1, 2 in a similar fashion as described herein with respect to linearly arranged tensioning structure 3.

[0069] When mattress 10 is inflated, the introduction of pressurized air into the cavity of mattress urges upper and lower materials 1, 2 apart from one another. When sufficiently pressurized, strands 32 become taut and tensioning structures 3 prevent any further spreading apart of upper and lower materials 1, 2 in the vicinity of each tensioning structure 3. Further pressurization causes further tensile stress within tensioning structures 3, and additional forces on the weld between tensioning structures 3 and the adjacent material.

[0070] In an exemplary embodiment of mattress 10, tensioning structure 3 includes as few as one strand every two centimeters, 1, 2, 3, 4, strands per centimeter of longitudinal extent of weld strips 31, or as much as 5, 10, 15, 20, 30, 40, 50, or more strands per centimeter, or may have any number of strands per centimeter within any range defined by any of the foregoing values. According to the preferred embodiment, there is about 2.8 millimeters between strands (i.e., 3.6 strands per centimeter). Strands 32 may be made of regular cotton, polyester, nylon thread made of multiple filaments twisted together, of the type typically used in clothing seams, or any other strand types. These regular threads provide substantial tensile strength at a very low cost. According to alternative embodiments, strands 32 may be woven together to form a fabric. According to another embodiment, non-woven fabric may be used to form the portion of tensioning structure 3 extending through the gap between sheets 1, 2.

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[0071] According to the present disclosure, the threads may range from diameters of 0.1 to 1.0 millimeters. According to the preferred embodiment, the thread has a diameter of 0.2 millimeters. According to the present disclosure, the tensile strength of the threads may range from 0.2 kgf to 10kgf per thread. According to the preferred embodiment, the tensile strength of the thread is 3kgf per thread. According to the preferred embodiment, the threads have a density range from 0.01 to .3 grams per meter. According the preferred embodiment, the threads are 0.085 grams per meter. Of course, it is appreciated that other materials could be used, such as monofilament lines, metal wires or cables, plastic and the like.

[0072] The above-described exemplary arrangement of tensioning structure 3 yields a strong finished product suitable for use in a wide variety of inflatable products. In exemplary embodiments, tensioning structure 3 has strands 32 with an overall axial span between 5 centimeters and 65 centimeters, rendering strands 32 suitable to span a correspondingly sized gap formed between the spaced-apart weld strips 31. Therefore, this exemplary embodiment is suitable for use in mattress 10 having an inflated thickness approximately equal to the axial span of strands 32. This exemplary embodiment further uses the regular thread material noted above with a strand density in the ranges given above. The resulting exemplary tensioning structure 3 has an overall tensile strength between 5.9 and 23.3 kgf per linear centimeter (where linear centimeters are measured along the longitudinal extent of weld strips 31).

[0073] When mattress 10 is inflated, tensioning structure defines an operable area along its longitudinal extent and across the gap between upper and lower materials 1, 2. More particularly, the area occupied by tensioning structure 3 is defined as the total area of the gap between the material sheets joined by tensioning structure 3, with such gap measured along the longitudinal extent of the tensioning structure such that the measured area is inclusive of each of the plurality of strands 32. Where tensioning structure 3 is linearly arranged and upper and lower materials 1, 2 are parallel to one another (as shown, for example, in Figs. 3 and 4), this area is simply the longitudinal extent of tensioning structure 3 multiplied by the space between upper and lower materials 1 and 2. Where tensioning structure 3 takes a non-linear path (such as the columnar, arcuate path shown in Figs. 5 and 6, for example), or upper and lower materials 1 and 2 are non-parallel, the above-described method for measuring area still results in an accurate operable area.

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[0074] The above-described exemplary arrangement of tensioning structure 3 achieves high tensile strength while promoting light weight and low packed volume of the finished inflatable product. According to the present disclosure, strands 32 and the area between strands 32 define a gap portion 33 (see Fig. 1) of tensioning structure 3 spanning the gap between upper and lower materials/sheets 1, 2 that maintains a spatial relationship between the first and second sheets when mattress 10 is inflated. As shown in Fig. 1, the collection of strands 32 that define this gap portion 33 having an extent 35 measured along the surface of at least one of first sheet 1 and second sheet 2. Strands 32 of this gap portion 33 of tension structure 3 collectively occupy a volume. Gap portion 33 has an operable area defined by extent 35 of gap portion 33 (also closely approximate to a length of weld strips 31) and length 37 of strands 32. The operable area is occupied by strands 32 of tensioning structure 3 and defines a total area of the gap between first sheet 1 and second sheet 2, as measured along extent 35 of gap portion 33 of tensioning structure 3. For example, if strands 32 of an example tension structure have a length 37 of 100 millimeters between first and second sheets 1, 2 and extent 35 of gap portion 33 is 100 millimeters, the operable area of gap portion 33 defined by strands 32 is 10,000 square millimeters. Assuming that there are 3.6 strands per centimeter, there will be 3,571 millimeters of strands 32 within the 10,000 square millimeter operable area. If strands 32 have a diameter of 0.2 millimeters, the total volume occupied by strands 32 will be 112.2 millimeters cubed. In this example, gap portion 33 of tensioning structure 3 defines an operable area-to-volume ratio of 89.13 millimeters squared per millimeters cubed (ex. 10,000 millimeter squared/112.2 millimeters cubed). According to the present disclosure, the operable area-to-volume ratio may range from 10 to 3,000 millimeters squared per millimeter cubed.

[0075] Because of use of strands 32 rather than PVC sheets, the overall weight of mattress 10 can also be reduced. Gap portion 33 of tensioning structure 3 defined by strands 32 has a total weight and operable area, as discussed above. In the above example, the operable area was 10,000 square millimeters (100 millimeters by 100 millimeters) and there were 3.6 strands per centimeter. This results in 3,571 millimeters of thread. At a density of 0.085 grams per meter of thread, the total thread will weigh 0.304 grams. As a result, an operable area-to-weight ratio will be about 32,941 square millimeters per gram (or 329,412 square centimeters per kilogram) in the preferred embodiment (ex. 10,000 square millimeters/0.304 grams). According to some embodiments of the

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present disclosure, the operable area-to-weight ratio is between 8,000 and 5,000,000 square centimeters per kilogram. According to other embodiments, the operable area-to-weight ratio is between 12,500 and 2,500,000 square centimeters per kilogram. According to other embodiments, the operable area-to-weight ratio is between 20,000 and 1,000,000 square centimeters per kilogram.

[0076] Because of use of strands 32 rather than PVC sheets, the average thickness of gap portion 33 of tensioning structure 3 extending between first and second sheets 1, 2 can also be reduced. Gap portion 33 of tensioning structure 3 defined by strands 32 has an average thickness and operable area, as discussed above. The average thickness is reduced by the nominally circular cross section of strands 32 and the gaps between each strand 32.

[0077] For example, the maximum thickness of gap portion 33 is the diameter of strands 32 (0.2 millimeters in the above example). The minimum thickness of gap portion 33 is zero in unoccupied areas between strands 32. When averaged over the total area of gap portion 33 occupied by strands 32 and the total area of gap portion 33 without strands 33, the average thickness is less than the diameter of strands 32. Furthermore, if the distance between strands 32 is increased, the average thickness decreases because more of gap portion 33 is unoccupied by strands (i.e., the amount of gap portion 33 with zero thickness increases, which decreases the average thickness of gap portion 33).

[0078] In the above example, the operable area was 10,000 square millimeters (100 millimeters by 100 millimeters) and there were 3.6 strands per centimeter (or 2.8 millimeter from strand 32 to strand 32). In contrast to the maximum thickness of a circular thread, which is the diameter, the average thickness of a circular thread is pi*diameter/4. Using strands 32 with a diameter of 0.2 millimeters, results in average thickness of 0.157 millimeters for each strand 32. Because of the gaps between strands 32, the average thickness of gap portion 33 defined by strands 32 and the gaps therebetween is 0.0112 millimeters (i.e. 2.8 millimeters between strands 32 has a thickness of zero, which reduces the average thickness of gap portion 33 to much less than the average thickness of strands 32). According to some embodiments of the present disclosure, the average thickness of the gap portion of tensioning structure 3 is between 0.0003 to 0.1 millimeters. According to other embodiments, the average thickness is between 0.001 and 0.05 millimeters. According to other embodiments, the average thickness is between 0.005 and 0.02 millimeters.

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[0079] Turning now to Fig. 7, an apparatus 20 suitable for manufacturing tensioning structure 3 is shown. To operate apparatus 20 to this end, a plurality of strands 32 are provided from a bulk thread supply 11, which may be a yarn stand containing several spools of yarn for example. Thread supply 11 continuously delivers the plurality of strands 32 via strand guide A, which includes a plurality of apertures through which individual strands 32 pass after delivery from thread supply 11 and before incorporation into bulk tensioning structure material 30 (shown in Fig. 9 and described below). Strand guide A maintains uniform spacing of strands 32 from one another, and arranges strands 32 parallel to one another such that the plurality of strands 32 are substantially planar. The width of weld strips 31, the distance between neighboring pairs of weld strips 31, and the spacing between neighboring pairs of strands 32 can be set to any values as required or desired by an intended use, such as in a particular inflatable product.

[0080] These planar, parallel and even spaced strands 32 are then passed in to welder 40, as shown in Fig. 7. Welder 40 may be a thermofusion device, using heat to join two plastic materials together, or may be a high-frequency welder, in which electromagnetic waves take advantage of excitable chemical dipoles in the plastic material to soften and join the materials to one another. Moreover, any suitable welding method may be employed by welder 40, as required or desired for a particular material and process. Another alternative is to forego a welding process and use adhesive to join strands 32 to weld strips 31. Where adhesive connection is utilized, welder 40 may be replaced by a similarly arranged adhesive device, such as a gluing device. Yet another alternative is to utilize a sewing machine to mechanically join weld strips 31 to strands 32. Moreover, weld strips 31 need not be welded to upper or lower materials 1, 2, and the term "weld strip" as used herein refers to any strip of material suitable for affixation to another material, whether by application of heat, application of adhesive, mechanical joining methods such as sewing and riveting, or any other suitable method.

[0081] Weld strips 31, having a length corresponding to the width of the arranged plurality of strands 32, are positioned on lower dies B1 of welder 40. Strands 32 are advanced over weld strips 31 as illustrated, and upper dies B2 are then lowered into contact with weld strips 31. Energy (i.e., heat or electromagnetic waves) is applied to fixedly connect the weld strip 31 with each of the plurality of strands 32 such that the respective strands 32 are fixed in the spaced apart and parallel

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configuration dictated by strand guide A. When so fixed, bulk material 30 (Fig. 9) is complete and ready for use.

[0082] The finished bulk material 30 may then be delivered to a take-up device (not shown), such as a spool or roll. This allows bulk material 30 to be continuously produced and stored for later use. Bulk material 30 can be converted into tensioning structure 3 (Fig. 2) by cutting down the center of weld strip 31. Tensioning structure 3 can then be applied to various inflatable products by trimming the length and width thereof according to the dimensions of the product.

[0083] As noted above, reinforcement strand 5 may be added to tensioning structure 3 to further improve the strength thereof, including the tensile strength of weld strips 31. To add at least one reinforcement strand 5 to bulk material 30, reinforcement strands 5 are arranged perpendicular to the plurality of strands 32, and abutting the respective weld strips 31. Upper die B2 of welder 40 is pressed down to fixedly connect the weld strips 31 to both reinforcement strands 5 and the plurality of strands 32, as described above. Reinforcement strands 5 are illustrated in Fig. 3 but omitted from Fig. 4 for clarity.

[0084] As shown in Fig. 4, tensioning structures 30 are positioned within band 4 and welded to upper and lower sheet 1, 2. Although shown as perpendicular to sheets 1, 2 in Fig. 4, after welding, weld strips 31 lay flat on sheets 1, 2 after welding as shown in the lower portion of Fig. 1. Similarly, in mattresses 10 of Figs. 6, 21, 23, and 28, weld strips 31 are shown perpendicular to sheets 1, 2, but will lay flat on sheets 1, 2 upon welding as shown in the lower portion of Fig. 1.

[0085] As illustrated in Figs. 8 and 9, bulk material 30 (Fig. 9) may be formed using a single layer of weld strips 31 connecting to strands 32. In another exemplary embodiment shown in Figs. 10 and 11, bulk material 30 may be manufactured as a dual layer structure using a pair of weld strips both above and below strands 32. The use of two mutually opposed weld strips employs a gripping action to "trap" or capture the strands 32 therebetween, thereby contributing to a high-strength coupling interface. When implemented in an inflatable product, the resulting dual-layer tensioning structure 3 has improved strength and can be welded to upper or lower material 1, 2 (Figs. 1, 3 and 4) on either side. As shown in Figs. 10 and 11 and discussed above, at least one reinforcement strand 5 may also be captured between the weld strips 31.

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2. Sheet-Backed Tensioning Structures with Affixed Strands.

[0086] An alternatively arranged tensioning structure is shown in Figs. 12 and 13 as tensioning structure 103. Structure 103 is substantially similar to tensioning structure 3 described above, with reference numerals of structure 103 analogous to the reference numerals used in structure 3, except with 100 added thereto. Elements of structure 103 correspond to similar elements denoted by corresponding reference numerals of structure 3, except as otherwise noted.

[0087] Tensioning structure 103 includes a plurality of strands 32 which are evenly spaced and arranged substantially parallel to one another, in a similar fashion to tensioning structure 3 described above. However, tensioning structure 103 includes weld sheet 131 in place of weld strips 31 of structure 3. Rather than affixing the ends of strands 32 to weld strips 31, the entire length of strands 32 are affixed to weld sheet 131. Weld sheet 131 serves to provide for proper positioning and protection of the plurality of strands 32, such as to avoid knotting or damage of strands 32 during practical use. However, because tensioning structure 103 includes strands 32 embedded therein, weld sheet 131 does not need to bear significant tensile loads and can be kept to a minimal thickness. For example, weld sheet 131 may be 0.10 millimeters in thickness.

[0088] In Figs. 12 and 13, a single weld sheet 131 is used, though other arrangements are contemplated. Fig. 14, for example, illustrates tensioning structure 103 (Fig. 13) with an extra weld sheet 131 applied opposite the first weld sheet 131. Similar to the embodiment of tensioning structure 3 using mutually opposed weld strips 31 (Figs. 10 and 11), the mutually opposed weld sheets 131 may be used to encapsulate strands 32.

[0089] Figs. 15 and 16 illustrate tensioning structure 203, which is substantially similar to tensioning structure 3 described above, with reference numerals of structure 203 analogous to the reference numerals used in structure 3, except with 200 added thereto. Elements of structure 203 correspond to similar elements denoted by corresponding reference numerals of structure 3, except as otherwise noted. However, structure 203 represents a hybrid approach combining elements of tensioning structures 3 and 103, in which a plurality of weld strips 31 are used to encapsulate a portion of strands 32 between strips 31 and weld sheet 131. The addition of weld strips 31 to the weld sheet 131 improves the strength of the weld connection between tensioning structure 203 and

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the adjacent product material (e.g., upper and/or lower material 1, 2 of inflatable bed 10 shown in Figs. 2 and 3).

[0090] Figs. 17 illustrates tensioning structure 303, which is substantially similar to tensioning structure 3 described above, with reference numerals of structure 303 analogous to the reference numerals used in structure 3, except with 300 added thereto. Elements of structure 303 correspond to similar elements denoted by corresponding reference numerals of structure 3, except as otherwise noted. Moreover, structure 303 incorporates all the elements of tensioning structure 203 but adds a second, lower layer of weld strips 31 attached to weld sheet 131 opposite the first, upper layer of weld strips 31. Thus, there is a dual-layer structure of opposing weld strips 31 further augmenting weld sheet 131, rendering tensioning structure 303 very strong and robust both along the extent of strands 32 and at the weld between strands 32 and the adjacent material, e.g., material 1, 2 of inflatable bed 10 (Figs. 3 and 4).

[0091] Turning to Figs. 18 and 19, yet another tensioning structure 403 is illustrated. Tensioning structure 403 is substantially similar to tensioning structure 3 described above, with reference numerals of structure 403 analogous to the reference numerals used in structure 3, except with 400 added thereto. Elements of structure 403 correspond to similar elements denoted by corresponding reference numerals of structure 3, except as otherwise noted. However, the plurality of strands 32 used in structure 403 are discontinuous. As shown in Figs. 13 and 14, the plurality of strands 32 may be trimmed to any desired length, and then affixed to weld sheet 131 by hot pressing. Upon installation into an inflatable product use, the affixed strands 32 may be cut to length, and welded into place as described above. Thus, using tensioning structures 403 has the potential to reduce consumption of the material used for strands 32 and avoid unnecessary waste thereo, thereby lower material cost.

[0092] Optionally, as shown in Fig. 20, each end of the weld sheet 131 (i.e., at the ends of strands 32) may include a reinforcing strand 5 arranged similarly to tensioning structure 3 discussed above. Reinforcing strands 5 are omitted from Fig. 21 for clarity.

[0093] The sheet-backed embodiments illustrated as tensioning structures 103, 203, 303 and 403 in Figs. 12-19 may be integrated into an inflatable device in a similar fashion as tensioning structures 3 described above. For example, Figs. 20 and 21 illustrate integration of tensioning

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structures 103 into inflatable bed 10, which is accomplished by the same method as described above.

[0094] Tensioning structures 103, 203, 303 and 403 may also be formed into a variety of geometric configurations, as discussed above with respect to tensioning structure 3. These configurations include a wave-like path, I-shaped path, Z-shaped path or V-shaped path. As illustrated in Figs. 22 and 23, is a cylindrical or columnar arrangement may also be utilized. In this arrangement, weld sheet 131 (and upper and lower weld strips 31, if present) is connected at its ends in an end-to-end manner to form an arcuate ring, such as a circular ring as illustrated. The plurality of strands 32 between thus cooperate with the material of weld sheet 131 to form a closed columnar periphery, thereby forming the body of a column. The axial ends of this columnar structure can then be welded to upper material 1 and lower material 2, respectively, of inflatable bed 10.

[0095] Turning now to Fig. 24, an apparatus 120 suitable for manufacturing tensioning structures 103, 203, 303 or 403 is shown. Operation of apparatus 120 is accomplished by first supplying a plurality of strands 32 from a yarn stand or other stock of yard, as described above with respect to apparatus 20. Strands 32 are continuously delivered via strand guide A, described above, which provides uniformly spaced apart and parallel strands 32 to the downstream welder 140.

[0096] Welder 140 includes a conveying roller C downstream of strand guide A, which continuously delivers a weld sheet 131 of width sufficient to correspond to the width of the plurality of strands 32. Downstream of roller C, the plurality of strands 32 are near to or abutting weld sheet 131.

[0097] The plurality of strands 32 and weld sheet 131 then advance together through hot roller D, which heats and compresses the material such that strands 32 become fixed to the softened material of weld sheet 131. After passage through roller D, tensioning structure 103 as shown in Fig. 13 is complete. The bulk material for tensioning structure 103 may be wound onto a take-up spool for later cutting into a tensioning structure 103 of appropriate size for a particular application.

[0098] When the thus tensioning structure 103 is applied to an inflatable product such as inflatable bed 10 (Figs. 21 and 22), the weld sheet 131 may have a relatively small thickness given

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the level of internal pressure (and, therefore, tension) expected to be encountered by structure 103 during inflation and use of the product. For example, the thickness may be reduced by 20%-40% with respect known internal tensioning structures lacking strands 32. Because strands 32 are positioned and configured to bear the tensile loads applied to tensioning structure 103, weld sheet 131 need only provide for proper positioning and protection of the plurality of strands 32, such as to avoid knotting or damage of strands 32 during practical use. In one exemplary embodiment, the thickness of weld sheet 131 may be as small as 0.10 millimeters.

[0099] Where a second weld sheet 131 is added to tensioning structure 103, as shown in Fig. 14 and described above, a second roller C (not shown) may be provided opposite the illustrated roller C of Fig. 24, such that rollers C are disposed on either side of strands 32. Both sheets 131 are then passed through the hot pressing roller D, capturing strands 32 between the two layers of plastic sheets.

[00100] Where a plurality of weld strips 31 are added to create tensioning structure 203, as shown in Figs. 15 and 16 and described above, a finished tensioning structure 103 made using apparatus 120 may be further processed using apparatus 20 as shown in Fig. 7 and described above. After the intermediate sheeted product equivalent to tensioning structure 103 exiting from hot rollers D, weld strips 31 may be added to one or both sides of the intermediate sheeted product. At least one reinforcement strand 5 may be added as required or desired, such that reinforcement strands 5 are perpendicular to the plurality of strands 32, as described in detail above.

[00101] Where weld strips 31 are added to both sides of a sheeted intermediate product to create tensioning structure 303, a process similar to the above may be employed in which an intermediate sheeted product exits rollers D and receives additional weld strips 31. However, weld strips 31 are added to both sides instead of to a single side, in accordance with the method of manufacturing a dual-layer version of bulk material 30 using welder 40 as described above. Of course, at least one reinforcement strand 5 may be added in a similar fashion as previously described.

3. Weld Strips Joined By V-Shaped Strands.

[00102] An alternatively arranged tensioning structure is shown in Figs. 25 and 26 as tensioning structure 503. Structure 503 is substantially similar to tensioning structure 3 described

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above, with reference numerals of structure 503 analogous to the reference numerals used in structure 3, except with 500 added thereto. Elements of structure 503 correspond to similar elements denoted by corresponding reference numerals of structure 3, except as otherwise noted.

[00103] However, strand 532 in tensioning structure 503 have a staggered, V-shaped arrangement, and may be formed from a single strand wound back and forth rather than a plurality of separate and discrete strands as used in tensioning structure 3 for example. As described below in the context of the method of manufacture of tensioning structure 503, strand 532 may be a single, continuous strand woven between weld strips 31, 31', with the point of each "V" affixed to at least one of the weld strips 31, 31'.

[00104] Turning now to Fig. 29, an apparatus 220 suitable for manufacturing tensioning structure 503 is shown. Operation of apparatus 220 is accomplished by disposing a lower pair of weld strips 31 such that the lower pair are substantially parallel and spaced apart upon joining device 540. In the illustrated embodiment, weld strips 31 are unspooled from rolls of weld strip material contained within a pair of unreeling devices 550.

[00105] Next, continuous strand 532 is wrapped successively around a set of adjacent hook-shaped members 541 disposed at either side of joining device 540, with the plurality of hook-shaped members 541 arranged in two respective rows corresponding to the location of the previously-placed lower pair of weld strips 31. In an exemplary embodiment, hook-shaped members 541 are uniformly spaced from one another and arranged at the outer sides of lower pair of weld strips 31, with each row of hook-shaped members 541 offset with respect to the other row. With this arrangement, the continuous strand 532 forms a plurality of end-to-end "V" shaped strands when wrapped around successive hook-shaped members 541 in alternating rows thereof, as shown. That is to say, the corner of each "V" is formed at a respective hook-shaped members 541, and successive corners traced along continuous strand 532 will alternate between rows of hook-shaped members 541.

[00106] Next, a second pair of weld strips 31' are positioned over the first pair of weld strips 31, respectively, and are clamped thereto such that each "V" shaped corner formed by strand 532 is disposed between one of the first pair of weld strips 31 and the abutting one of the second pair of weld strips 31'. The second pair of weld strips 31' may also be unspooled from unreeling devices 550.

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[00107] Finally, the abutting pairs of weld strips 31, 31' are joined to one another and to strand 532, such as by welding or by one of the other attachment methods discussed above. For example, weld strips 31, 31', may be joined by a high frequency welder or another thermofusion device. It is also contemplated that strand 532 can be fixed to weld strips 31, 31', and weld strips 31 can be fixed to weld strips 31', by adhesive or by sewing.

[00108] As with other tensioning structures discussed above, tensioning structure 503 may be produced and stored in bulk and later applied to various inflatable products. The length and width of tensioning structure 503 may be trimmed to accommodate the internal length or width of the inflatable product.

[00109] In one alternative embodiment, it may be not necessary to provide the second layer of weld strips 31', and instead to fix only the first layer of weld strips 31 to the strand 532. Fixing strand 532 to the single layer of weld strips 31 may be accomplished in a similar fashion to the single-layer weld strip and weld sheet embodiments described above.

[00110] Turning to Figs. 30-32 tensioning structure 503 may also be provided with at least one reinforcement strand 5 extending along the longitudinal extent of at least one of weld strips 31, 31'. Similar to the uses of reinforcement strands 5 in the embodiments described above, reinforcement strands 5 may be arranged on one of the lower pair of weld strips 31 and/or between the lower and upper pairs of weld strips 31, 31'.

[00111] A tensioning structure in accordance with the present disclosure, including tensioning structures 3, 103, 203, 303, 403 and 503 discussed above, has a high tensile strength along the axial extent of the strands 32, 532 extending between respective weld strips and/or along weld sheets. This high tensile strength is complemented with a full-strength weld between the adjacent material of an inflatable product, which is facilitated by the full surface-area contact provided by the weld strip and/or weld sheet interface between strands 32, 532 and such adjacent material. In this way, the tensioning structure performs well an internal structure of the inflatable product, while facilitating an overall reduction in weight and deflated/folded volume of the inflatable product. For example, a loose arrangement of strands 32 is significantly lighter than a one-piece sheet of comparable size and tensile strength.

[00112] Where weld sheets 131 are employed, such sheets act to ensure a consistent position and arrangement of the plurality of strands 32 (or 532), thereby prevent such strands from

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becoming wound or otherwise entangled with one another. Meanwhile, weld strips 31 can be utilized to provide a robust structure for welding the tensioning structure into the inflatable product, thereby ensuring that the high tensile strength offered by the strands of the tensioning structure is fully realized. In addition, the use of weld sheet 131 can significantly reduce the weight of the entire inflatable product with respect to a traditional, relatively thicker one-piece sheet which is also responsible for handling tensile loading. In other words, weld sheet 131 reduces by 20%-40% in thickness with respect to an existing tensioning structures having comparable thicknesses of 0.36 mm to 0.8 mm as noted above.

[00113] As illustrated in Fig. 33, tensioning structures 3 have a distance 39 between adjacent tensioning structures 3. As discussed above, strands 32 have a length 37 that approximates a height 37 of tensioning structures 3 when mattress 10 is inflated. During construction of typical mattresses using PVC tensioning structures (not shown), the height of PVC tensioning structures is practically limited by the distance between adjacent PVC tensioning structures. This limitation is the result of the typical manufacturing process wherein the PVC tensioning structures are all aligned on a lower sheet 2 and simultaneously welded to lower sheet 2. If the PVC tensioning structures are too tall, they will overlap adjacent PVC tensioning structures causing adjacent PVC tensioning structures to be welded together and resulting in dysfunctional PVC tensioning structures. To increase the height of PVC tensioning structures, the PVC tensioning structures may be folded in half along their length while one edge is being welded. By folding the PVC tensioning structure, the maximum height may be increased to slightly less than twice the distance between adjacent PVC tensioning structures (ex. 15 millimeters less than twice the height of the PVC tensioning structure). Providing more than one fold is impracticable.

[00114] Because gap portions 33 of tensioning structures 3 are made of strands 32 rather than typical PVC sheets discussed above, they are much more flexible than typical PVC tensioning structures. As a result of this flexibility, mattresses 10 can be readily manufactured having heights 37 greater than twice distance 39 between adjacent tensioning structures 3.

[00115] During manufacture, weld strips 31 of each of the plurality of tensioning structures 3 are aligned in their respective position for welding to lower sheet 1. The other weld strip 31 of these tensioning structures 3 are moved adjacent to the weld strip 31 to be welded as shown in Fig. 33. Because of their flexibility, strands 32 bunch on top of themselves or on top of nearby strands

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32 allowing multiple layers of strands 32 to readily lie on top of one another. By allowing multiple layers of strands 32 to lie on top of each other, height 37 of tensioning structures 3 can be greater than twice distance 39 between tensioning structures 3. According to embodiments, length 37 of strands 32 may be 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6 or more times longer than distance 39 between tensioning structures 3.

[00116] As shown in Fig. 33, loops 41 form in strands 32 during bunching and portions of strands 32 may be positioned under weld strip 31 that is currently not being welded. Although each strand 32 shown in Fig. 33 only has one loop 41 and is only overlapping one other strand 32, each strand 32 may have multiple loops 41 and may overlap multiple other strands 32, particularly when the distance between stands 32 along weld strips 31 is shorter than that illustrated in Fig. 33.

[00117] In addition to the bunching arrangement shown in Fig. 33 to facilitate welding of weld strips 31 to lower sheet 2, other orientations of long strands 32 can be used to prevent a portion of one tensioning structure 3 from overlapping an adjacent tensioning structure 3 during welding. For example, as shown in Fig. 35, strands may be collected in piles 43 to account for moving welds strips 31 of each tensioning structure 3 adjacent each other. The turns of piles 43 account for the decreased distance between weld strips 31 when weld strips 31 are moved together. According to another example, weld strips 31 of each tensioning structure 3 are shifted along the extent or length of tensioning structures 3 as shown in Fig. 36. The shifting results in strands 32 forming acute angles with weld strips 31 and accounts for the decreased distance between weld strips 31. By accommodating strands 32 that are longer than the distance between adjacent tensioning structures 3, tensioning structures 3 may be made taller without interfering with the process of welding tensioning structures 3 to upper and lower sheets 1, 2. As mentioned above, strands 32 may be longer than shown in Figs. 33-36. With such longer strands 32, more or larger loops 41(Fig. 33), larger and/or taller piles 43 (Fig. 35), or greater shifting (Fig. 36) may be used to accommodate the longer strands 32 to avoid tensioning structures 3 overlapping during welding.

[00118] When prepared for shipping or storage, mattresses 10 are deflated. During deflation, strands 32 may bunch as shown in Fig. 33. Further, strands 32 from adjacent tensioning structures 3 will contact each other and may become interleaved with strands 32 from one tensioning structure 3 positioned between strands 32 of another tensioning structure. Further, because strands 32 are very flexible, they collapse readily when contacted by other structures when

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mattress 10 is deflated for shipping or storage. For example, when strands 32 contact upper or lower sheets 1, 2 when deflated, they comply to upper and lower sheets 1, 2 to allow upper and lower sheets 1, 2 to compact more closely. At least partially because of this compaction, the overall deflated volume of mattress 10 is reduced when compared to mattresses using PVC sheet tensioning structures. When collapsed, strands 32 from a tensioning structure 3 may become interleaved with strands 32 from the same tensioning structure 32, loops 41 may form, piles 43 may form, and/or strands 32 may become angled to weld strips 31 in a manner similar to that shown in Fig. 36.

[00119] As shown in Fig. 34, when collapsed, strands 32 may be oriented in different directions with some overlapping as shown in the bottom two strands 32 and other following substantially the same direction as shown in the top three strands 32. Some strands 32 collapse in directions that are not perpendicular to the extent of weld strips 31. For example, the lowest-most strand 32 in Fig. 34 leaves left-most weld strip 31 is a perpendicular direction to this weld strip 31, turns up to be parallel to this weld strip 31, returns to perpendicular to this weld strip 31, turns down to be parallel to this weld strip 31, and then loops under this weld strip 31 to attached to the other weld strip 31 in a perpendicular direction to the other weld strip 31. According to some embodiments, the overall folded or deflated volume of mattress 10 may be 8-25% less than comparable mattresses with PVC sheet tensioning structures. According to the preferred embodiment, the volume is about 16% less.

[00120] A tensioning structure in accordance with the present disclosure is also a low-cost option for imparting a desired structure and shape to an inflatable device. For example, a large reduction in PVC material may be achieved by use of the present tensioning structure, as compared to a one-piece sheet of comparable size and tensile strength.

[00121] While the disclosure has been described as having exemplary designs, the present disclosure can be further modified within the spirit and scope of this invention. This application is therefore intended to cover any variations, uses or adaptations of the disclosure using its general principles. Further, this application is intended to cover such departures from the present disclosure as come within known or customary practice in the art to which this disclosure pertains.

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WHAT IS CLAIMED IS:

1. An inflatable product comprising:

a first sheet;

a second sheet disposed opposite the first sheet, the first and second sheets spaced apart to define a gap when the inflatable product is inflated; and

a tensioning structure having a gap portion spanning the gap between the first sheet and the second sheet to maintain a spatial relationship between the first and second sheets when the inflatable product is inflated, the gap portion having an extent measured along the surface of at least one of the first sheet and the second sheet, the gap portion occupying a volume and having an operable area occupied by gap portion of the tensioning structure defined as the total area of the gap between the first sheet and the second sheet, as measured along the extent of the gap portion of the tensioning structure, the gap portion of the tensioning structure defines an operable area-to-volume ratio of at least 10 square millimeters per cubic millimeter.

2. The inflatable product of claim 1, wherein the gap portion of the tensioning structure includes a plurality of strands extending between the first and second sheets.

3. The inflatable product of claim 2, wherein the plurality of strands comprises between 0.5 and 50 strands per centimeter as measured along the extent of the tensioning structure.

4. The inflatable product of claim 3, wherein the gap portion has an average thickness of less than 0.05 millimeters.

5. The inflatable product of claim 2, wherein the plurality of strands have a tensile strength equal to at least 0.2kgf/strand.

6. The inflatable product of claim 2, wherein the plurality of strands are substantially parallel to one another and define a substantially even spacing therebetween.

7. The inflatable product of claim 2, wherein the plurality of strands comprises a plurality of twisted, multifilament threads.

8. The inflatable product of claim 2, wherein the tensioning structure further includes a first weld strip affixed to one of the first sheet and the second sheet and a second weld strip disposed opposite the first weld strip and affixed to the other of the first sheet and the second sheet, and the plurality of strands is affixed to the first and second weld strips.

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9. The inflatable product of claim 8, wherein the weld strips have a thickness between 0.1 to 1 millimeters.

10. The inflatable product of claim 8, wherein the inflatable product is an air mattress.

11. The inflatable product of claim 8, wherein the tensioning structure further comprises a weld sheet disposed in the gap between the at least two weld strips, the plurality of strands affixed to the weld sheet whereby the weld sheet maintains a desired spacing between the plurality of strands and prevents the plurality of strands from becoming entangled.

12. The inflatable product of claim 8, wherein the at least two weld strips of the tensioning structure comprises a pair of lower weld strips and an opposed pair of upper weld strips positioned to abut the pair of lower weld strips, opposing ends of the plurality of strands are captured between the pair of lower weld strips and the pair of upper weld strips.

13. The inflatable product of claim 8, wherein first and second sheets and the first and second weld strips consist of PVC sheets and the strands have a diameter less than the thickness of the first and second sheets.

14. The inflatable product of claim 8, wherein the operable area-to-volume ratio is between 25 and 1000 square millimeters per cubic millimeter.

15. The inflatable product of claim 14, wherein the operable area-to-volume ratio is between 40 and 500 square millimeters per cubic millimeter.

16. The inflatable product of claim 15, wherein the operable area-to-volume ratio is between 50 and 250 square millimeters per cubic millimeter.

17. The inflatable product of claim 1, wherein the operable area-to-volume ratio is less than 3000 square millimeters per cubic millimeter.

18. An inflatable product comprising:

a first sheet;

a second sheet disposed opposite the first sheet, the first and second sheets spaced apart to define a gap when the inflatable product is inflated; and

a tensioning structure having a gap portion spanning the gap between the first sheet and the second sheet to maintain a spatial relationship between the first and second sheets when the inflatable product is inflated, the gap portion having an extent measured along the surface of at least one of the first sheet and the second sheet, the gap portion having an operable area occupied

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by gap portion of the tensioning structure defined as the total area of the gap between the first sheet and the second sheet, as measured along the extent of the gap portion of the tensioning structure, the gap portion of the tensioning structure having a total weight such that the tensioning structure defines an operable area-to-weight ratio of at least 6,000 square centimeters per kilogram.

19. The inflatable product of claim 18, wherein the gap portion of the tensioning structure includes a plurality of strands extending between the first and second sheets.

20. The inflatable product of claim 19, wherein the inflatable product is an air mattress.

21. The inflatable product of claim 19, wherein the tensioning structure further includes a first weld strip affixed to one of the first sheet and the second sheet and a second weld strip disposed opposite the first weld strip and affixed to the other of the first sheet and the second sheet, and the plurality of strands is affixed to the first and second weld strips.

22. The inflatable product of claim 21, wherein the plurality of strands comprises between 0.5 and 50 strands per centimeter as measured along the extent of the tensioning structure.

23. The inflatable product of claim 22, wherein the gap portion has an average thickness of less than 0.05 millimeters.

24. The inflatable product of claim 21, wherein the plurality of strands have a tensile strength equal to at least 0.2kgf/strand.

25. The inflatable product of claim 21, wherein the plurality of strands are substantially parallel to one another and define a substantially even spacing therebetween.

26. The inflatable product of claim 21, wherein the weld strips have a thickness between 0.1 to 1 millimeters.

27. The inflatable product of claim 21, wherein the tensioning structure further comprises a weld sheet disposed in the gap between the at least two weld strips, the plurality of strands affixed to the weld sheet whereby the weld sheet maintains a desired spacing between the plurality of strands and prevents the plurality of strands from becoming entangled.

28. The inflatable product of claim 21, wherein the at least two weld strips of the tensioning structure comprises a pair of lower weld strips and an opposed pair of upper weld strips positioned to abut the pair of lower weld strips, opposing ends of the plurality of strands are captured between the pair of lower weld strips and the pair of upper weld strips.

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29. The inflatable product of claim 21, wherein first and second sheets and the first and second weld strips consist of PVC sheets and the strands have a diameter less than the thickness of the first and second sheets.

30. The inflatable product of claim 21, wherein the operable area-to-weight ratio is between 8,000 and 5,000,000 square centimeters per kilogram.

31. The inflatable product of claim 30, wherein the operable area-to-weight ratio is between 12,500 and 2,500,000 square centimeters per kilogram.

32. The inflatable product of claim 31, wherein the operable area-to-weight ratio is between 20,000 and 1,000,000 square centimeters per kilogram.

33. The inflatable product of claim 19, wherein the plurality of strands comprises a plurality of twisted, multifilament threads.

34. The inflatable product of claim 18, wherein the operable area-to- weight ratio of is less than 2,500,000 square centimeters per kilogram.

35. An inflatable product comprising:

a first sheet;

a second sheet disposed opposite the first sheet, the first and second sheets spaced apart to define a gap when the inflatable product is inflated; and

a tensioning structure having a gap portion spanning the gap between the first sheet and the second sheet to maintain a spatial relationship between the first and second sheets when the inflatable product is inflated, the gap portion of the tensioning structure having an average thickness of less than 0.125 millimeters.

36. The inflatable product of claim 35, wherein the tensioning structure includes a plurality of strands extending between the first and second sheets.

37. The inflatable product of claim 36, wherein the inflatable product is an air mattress.

38. The inflatable product of claim 36, wherein the tensioning structure further includes a first weld strip affixed to one of the first sheet and the second sheet and a second weld strip disposed opposite the first weld strip and affixed to the other of the first sheet and the second sheet, and the plurality of strands is affixed to the first and second weld strips.

39. The inflatable product of claim 38, wherein the plurality of strands comprises between 0.5 and 50 strands per centimeter as measured along the extent of the tensioning structure.

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40. The inflatable product of claim 38, wherein the plurality of strands have a tensile strength equal to at least 0.2kgf/strand.

41. The inflatable product of claim 38, wherein the plurality of strands are substantially parallel to one another and define a substantially even spacing therebetween.

42. The inflatable product of claim 38, wherein the weld strips have a thickness between 0.1 to 1 millimeters.

43. The inflatable product of claim 38, wherein the tensioning structure further comprises a weld sheet disposed in the gap between the at least two weld strips, the plurality of strands affixed to the weld sheet whereby the weld sheet maintains a desired spacing between the plurality of strands and prevents the plurality of strands from becoming entangled.

44. The inflatable product of claim 38, wherein the at least two weld strips of the tensioning structure comprises a pair of lower weld strips and an opposed pair of upper weld strips positioned to abut the pair of lower weld strips, opposing ends of the plurality of strands are captured between the pair of lower weld strips and the pair of upper weld strips.

45. The inflatable product of claim 38, wherein first and second sheets and the first and second weld strips consist of PVC sheets and the strands have a diameter less than the thickness of the first and second sheets.

46. The inflatable product of claim 38, wherein the average thickness of the tensioning structure is between 0.0003 to 0.1 millimeters.

47. The inflatable product of claim 46, wherein the average thickness of the tensioning structure is between 0.001 to 0.05 millimeters.

48. The inflatable product of claim 47, wherein the average thickness of the tensioning structure is between 0.005 to 0.02 millimeters.

49. The inflatable product of claim 36, wherein the plurality of strands comprises a plurality of twisted, multifilament threads.

50. The inflatable product of claim 35, wherein the average thickness of the tensioning structure is less than 0.03 millimeters.

51. An inflatable product comprising:

a first sheet;

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a second sheet disposed opposite the first sheet, the first and second sheets spaced apart to define a gap;

a tensioning structure spanning the gap between the first sheet and the second sheet, the tensioning structure comprising:

a plurality of strands uniformly spaced apart and arranged substantially parallel to one another; and

a plurality of weld strips spaced apart from one another and substantially perpendicular to the plurality of strands, each of the plurality of weld strips affixed to each of the plurality of strands, and each of the plurality of weld strips affixed to at least one of the first sheet and the second sheet.

52. The inflatable product of claim 51, wherein the plurality of weld strips comprise upper and lower weld strips disposed on opposing sides of the plurality of strands, the strands affixed to and captured between the upper and lower weld strips.

53. The inflatable product of claim 51, wherein the tensioning structure further comprises a weld sheet defining a width corresponding to an overall width of the plurality of strands, the plurality of strands affixed to the weld sheet, and at least one of the plurality of weld strips affixed to a first side of the weld sheet.

54. The inflatable product of claim 53, wherein another of the plurality of weld strips is affixed to a second side of the weld sheet opposite the first side.

55. The inflatable product of claim 53, wherein the weld sheet comprises a continuous piece of material extending across the plurality of strands.

56. The inflatable product of claim 51, wherein the tensioning structure further comprises at least one reinforcement strand disposed substantially perpendicular to the plurality of strands, the at least one reinforcement strand fixed to at least one of the plurality of weld strips.

57. The inflatable product of claim 51, wherein the plurality of strands comprise a plurality of twisted filaments.

58. An inflatable product comprising:

a first sheet;

a second sheet disposed opposite the first sheet, the first and second sheets spaced apart to define a gap;

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a tensioning structure spanning the gap between the first sheet and the second sheet, the tensioning structure comprising:

a plurality of strands uniformly spaced apart and arranged in parallel; and

a first weld sheet having the plurality of strands affixed to an upper surface of the first weld sheet.

59. The inflatable product of claim 58, wherein the tensioning structure further comprises a second weld sheet disposed opposite the first weld sheet, the plurality of strands captured between the first and second weld sheets when the first and second weld sheets which are affixed to one another.

60. The inflatable product of claim 58, wherein the each of the plurality of strands comprise a plurality of twisted filaments, and the first weld sheet comprises a continuous piece of material extending across the plurality of strands.

61. An inflatable product comprising:

a first sheet;

a second sheet disposed opposite the first sheet, the first and second sheets spaced apart to define a gap;

a tensioning structure spanning the gap between the first sheet and the second sheet, the tensioning structure comprising:

an upper weld strip;

a lower weld strip arranged substantially parallel to the upper weld strip and spaced apart from the upper weld strip to span the gap between the first sheet and the second sheet; and

a plurality of end-to-end V-shaped strands arranged between weld strips, each of the V-shaped strands having upper and lower ends fixed to the upper and lower weld strips, respectively.

62. The inflatable product of claim 61, wherein the tensioning structure further comprises a second pair of weld strips arranged to capture the upper and lower ends of the V-shaped strands between the upper and lower weld strips and the second pair of weld strips, respectively.

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63. The inflatable product of claim 61, wherein the tensioning structure further comprises at least one reinforcement strand disposed along a longitudinal extend of at least one of the upper and lower weld strips.

64. The inflatable product of claim 63, wherein the at least one reinforcement strand comprises a plurality of twisted filaments.

65. The inflatable product of claim 61, wherein the plurality of V-shaped strands comprise a plurality of twisted filaments.

66. The inflatable product of claim 61, wherein the upper and lower weld strips are delivered from a continuous roll of weld strip material.

67. The inflatable product of claim 61, wherein the plurality of end-to-end V-shaped strands are formed from a single, continuous strand.

68. An inflatable product comprising:

a first sheet;

a second sheet disposed opposite the first sheet, the first and second sheets spaced apart to define a gap, the first sheet and the second sheet cooperating to at least partially bound an inflatable chamber;

a plurality of tensioning structures welded to respective inner surfaces of the first and second sheets such that the plurality of tensioning structure span the gap, each of the plurality of tensioning structures comprising:

an upper weld strip affixed to one of the first sheet and the second sheet;

a lower weld strip affixed to the other of the first sheet and the second sheet; and

a plurality of strands connecting the upper and lower weld strips to one another.

69. The inflatable product of claim 68, wherein the plurality of tensioning structures further comprise at least one reinforcing strand, the reinforcing strand disposed along a longitudinal extent of at least one of the upper and lower weld strips.

70. The inflatable product of claim 68, wherein the plurality of tensioning structures are welded to the inner surfaces of the first and second sheets along a linear path, and the upper and lower weld strips define a longitudinal extent corresponding to at least one of a width of the inflatable product and a length of the inflatable product.

71. The inflatable product of claim 68, wherein the plurality of strands of the plurality

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of tensioning structures are arranged substantially parallel to one another, with even spacing between neighboring pairs of the plurality of strands.

72. The inflatable product of claim 68, wherein the plurality of strands of the plurality of tensioning structures are arranged in a staggered, V-shaped arrangement with even intervals between respective pairs of the plurality of strands.

73. The inflatable product of claim 68, wherein at least one weld sheet is arranged between the upper and lower weld strips and along the plurality of strands, the at least one weld sheet affixed to at least a portion of the plurality of strands.

74. The inflatable product of claim 68, wherein ends of the upper and lower weld strips are connected to one another such that each of the plurality of tensioning structures forms a columnar body.

75. An inflatable product comprising:

a first sheet;

a second sheet disposed opposite the first sheet, the first and second sheets spaced apart to define a gap, the first sheet and the second sheet cooperating to at least partially bound an inflatable chamber;

a plurality of tensioning structures welded to inner surfaces of the first and second sheets such that the plurality of tensioning structures span the gap, each of the plurality of tensioning structures comprising:

a weld sheet;

a plurality of strands, and the plurality of strands substantially evenly spaced and arranged substantially parallel to one another, the plurality of strands affixed to the weld sheet; and

a weld strip affixed to each end of the weld sheet such that a longitudinal extent of the weld strip is substantially perpendicular to the plurality of strands, respective ends of the plurality of strands are affixed to the weld strip, and each of the weld strips are welded to one of the first sheet and the second sheet.

76. The inflatable product of claim 75, wherein the plurality of tensioning structures further comprise at least one reinforcing strand, the reinforcing strand disposed along the longitudinal extent of the weld strip.

77. The inflatable product of claim 75, wherein the plurality of tensioning structures

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are welded to the inner surfaces of the first and second sheets along a linear path.

78. The inflatable product of claim 75, wherein ends of the weld strip are connected to one another such that each of the plurality of tensioning structures forms a columnar body.

79. A method for producing a tensioning structure of an inflatable product, the method comprising:

arranging at least one of a welder and an adhesive device downstream of a strand guide;

supplying a plurality of strands to the welder or the adhesive device via the strand guide, such that the supplied strands are substantially uniformly spaced apart and arranged substantially parallel to one another;

positioning weld strips on a first die of the welder or gluing device, the weld strips having a longitudinal extent corresponding to an overall width of the plurality of strands;

advancing a second die of the welder or gluing device into an operable position in which the first and second dies are disposed at opposing sides of the weld strips,

activating the welder or gluing device to fixedly connect the weld strips to the plurality of strands, such that the weld strips are affixed to the plurality of strands in a spaced apart and substantially parallel arrangement, and such that the weld strips are substantially perpendicular to the plurality of strands.

80. The method of claim 79, wherein the steps of supplying, positioning, advancing and activating result in creation of bulk material suitable for producing a plurality of the tensioning structures.

81. The method of claim 80, further comprising delivering the bulk material to a take-up device.

82. The method of claim 79, wherein the steps of supplying a plurality of strands comprises continuously delivering the plurality of strands to the welder.

83. The method of claim 79, further comprising:

arranging at least one reinforcement strand substantially perpendicular to the plurality of strands and along the longitudinal extent of the respective weld strips, the step of arranging at least one reinforcement strand before the step of advancing a second die; and

fixedly connecting the at least one reinforcement strand to at least one of the weld strips.

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84. The method of claim 83, wherein the step of fixedly connecting occurs during the step of activating the welder.

85. A method for producing a tensioning structure of an inflatable product comprises:

arranging a hot roller downstream of a strand guide;

supplying a plurality of strands to the hot roller via the strand guide, such that the supplied strands are substantially uniformly spaced apart and arranged substantially parallel to one another;

arranging a conveying roller downstream of the strand guide, the conveying roller operable to deliver at least one weld sheet to the hot roller, the at least one weld sheet having a width corresponding to an overall width of the plurality of strands; and

passing the plurality of strands and the at least one weld sheet through the hot roller, such that the plurality of strands become affixed to the at least one weld sheet.

86. The method of claim 85, wherein the steps of supplying and passing result in creation of bulk material suitable for producing a plurality of the tensioning structures, the method further comprising:

delivering the bulk material to a take-up device.

87. The method of claim 85, further comprising the steps of:

arranging one of a welder and an adhesive device downstream of the strand guide;

supplying the plurality of strands to the welder or the adhesive device;

positioning weld strips on a first die of the welder or gluing device;

advancing a second die of the welder or gluing device into an operable position in which the first and second dies are disposed at opposing sides of the weld strips,

activating the welder or gluing device to fixedly connect the weld strips to at least one of the plurality of strands and the at least one weld sheet, such that the weld strips are affixed to the at least one of the plurality of strands and the at least one weld sheet in a spaced apart and substantially parallel arrangement, and such that the weld strips are substantially perpendicular to the plurality of strands.

88. The method of claim 87, further comprising:

arranging at least one reinforcement strand substantially perpendicular to the plurality of strands and along a longitudinal extent of the respective weld strips, the step of arranging at least one reinforcement strand before the step of advancing a second die; and

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fixedly connecting the at least one reinforcement strand to at least one of the weld strips.

89. A method for producing a tensioning structure, the method comprising:

arranging a first pair of weld strips parallel to one another on a joining device;

wrapping at least one continuous strand around a plurality of members arranged along a pair of rows adjacent the first pair of weld strips, respectively, each of the pair of rows of members offset with respect to the other of the pair of rows of members,

the step of wrapping comprising alternating between the pair of rows, such that the at least one continuous strand forms a plurality of end-to-end V-shaped strands; and

using the joining device to join the first pair of weld strips to the plurality of strands at respective V-shaped corners formed by the at least one continuous strand, such that the tensioning structure has a tensile strength along a direction perpendicular to a longitudinal extent of the first pair of weld strips.

90. The method of claim 89, further comprising the step of:

arranging a second pair of weld strips in abutting relationship with the first pair of weld strips, the step of arranging after the step of wrapping such that respective V-shaped corners of the at least one continuous strand are clamped interposed between the first pair of weld strips and the second pair of weld strips prior to the step of using the joining device.

91. The method of claim 90, further comprising placing at least one reinforcement strand between at least one of the first pair of weld strips and a respective abutting one of the second pair of weld strips, such that the at least one reinforcement strand extends along the longitudinal extent the at least one of the first pair of weld strips.

92. The method of claim 89, wherein the joining device comprises at least one of a high frequency welder, a thermofusion device, an adhesive device, or a sewing machine.

93. The method of claim 89, wherein the plurality of members are uniformly spaced along each of the pair of rows, respectively, and the plurality of members arranged near outer edges of the first pair of weld strips.

94. The method of claim 89, wherein the members are hook-shaped.

95. An inflatable product comprising:

a first sheet;

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a second sheet disposed opposite the first sheet, the first and second sheets spaced apart to define a gap when the inflatable product is inflated; and

a plurality of tensioning structures positioned to maintain a spatial relationship between the first and second sheets when the inflatable product is inflated, each of the tensioning structures having a first weld attaching the tensioning structure to the first sheet and a second weld strip attaching the tensioning structure to the second sheet, the first and second welds being separated by a distance greater than twice the distance between adjacent tensioning structures when the inflatable product is operably inflated.

96. The inflatable product of claim 95, wherein the tensioning structures include a plurality of strands extending between the first and second welds.

97. The inflatable product of claim 96, wherein the tensioning structures include weld strips including the first and second welds and the weld strips and first and second sheets are made of the same material type.

98. An inflatable product comprising:

a first sheet;

a second sheet disposed opposite the first sheet, the first and second sheets spaced apart to define a gap when the inflatable product is inflated; and

a plurality of tensioning structures positioned to maintain a spatial relationship between the first and second sheets when the inflatable product is inflated, each of the tensioning structures having a gap portion extending between the first and second sheets having a uniform thickness, the first and second sheets being separated by a distance greater than twice the distance between adjacent tensioning structures when the inflatable product is operably inflated.

99. The inflatable product of claim 98, wherein the tensioning structures include a plurality of strands extending between the first and second sheets.

100. The inflatable product of claim 99, wherein the tensioning structures include weld strips including welds attached to the first and second sheets and the weld strips and first and second sheets are made of a like material.

101. An inflatable product comprising:

a first sheet;

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a second sheet disposed opposite the first sheet, the first and second sheets spaced apart to define a gap when the inflatable product is inflated; and

a plurality of tensioning structures positioned to maintain a spatial relationship between the first and second sheets when the inflatable product is inflated, the tensioning structures being interleaved with each other when the inflatable product is deflated.

102. The inflatable product of claim 101, wherein the tensioning structures include a plurality of strands extending between the first and second sheets.

103. The inflatable product of claim 102, wherein the tensioning structures include weld strips including welds attached to the first and second sheets and the weld strips and first and second sheets are made of a like material.

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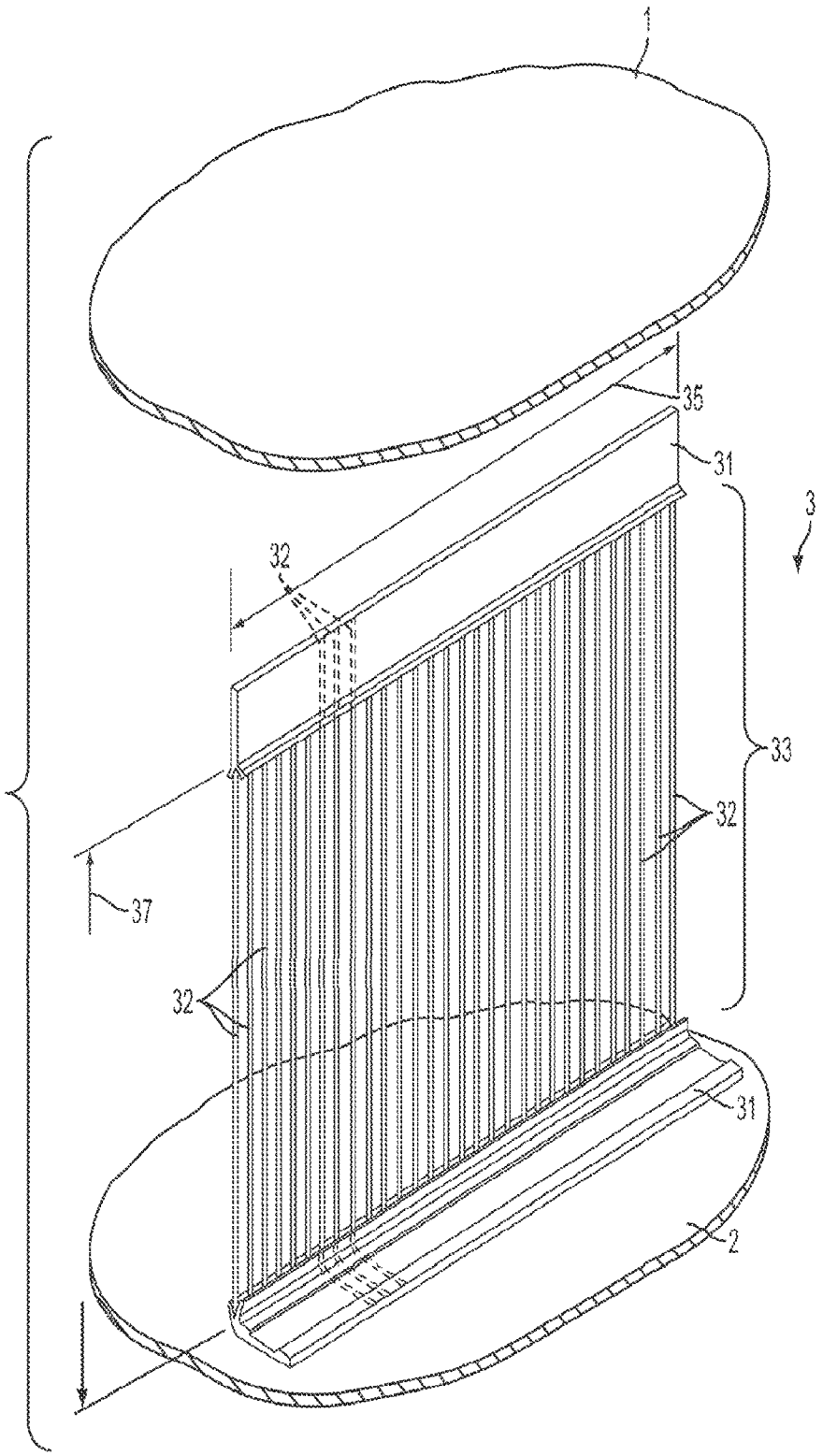


FIG. 1

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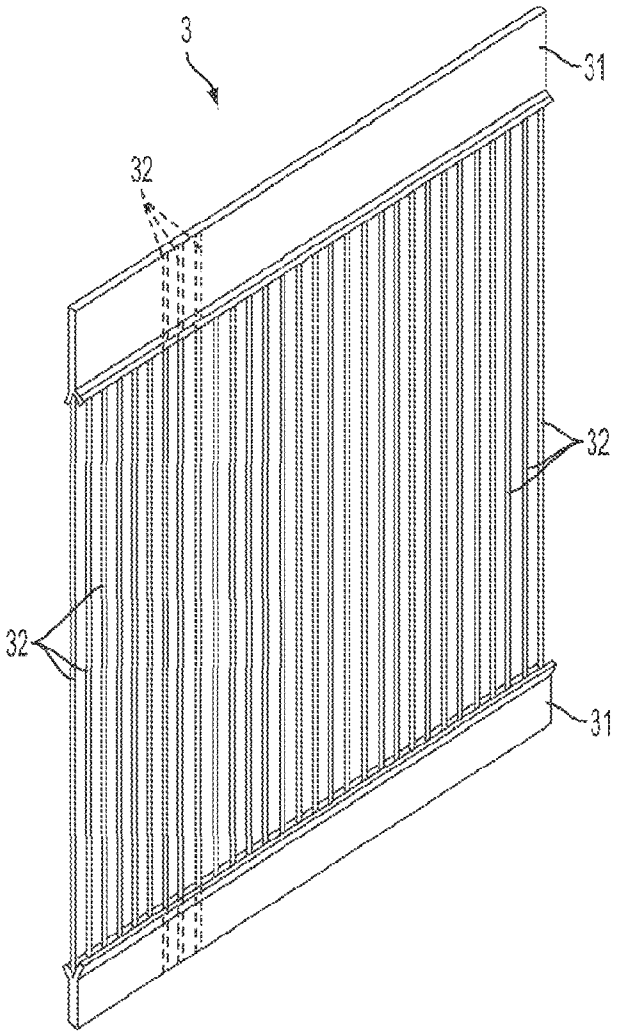


FIG. 2

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Intex Recreation v. Bestway Inflatables

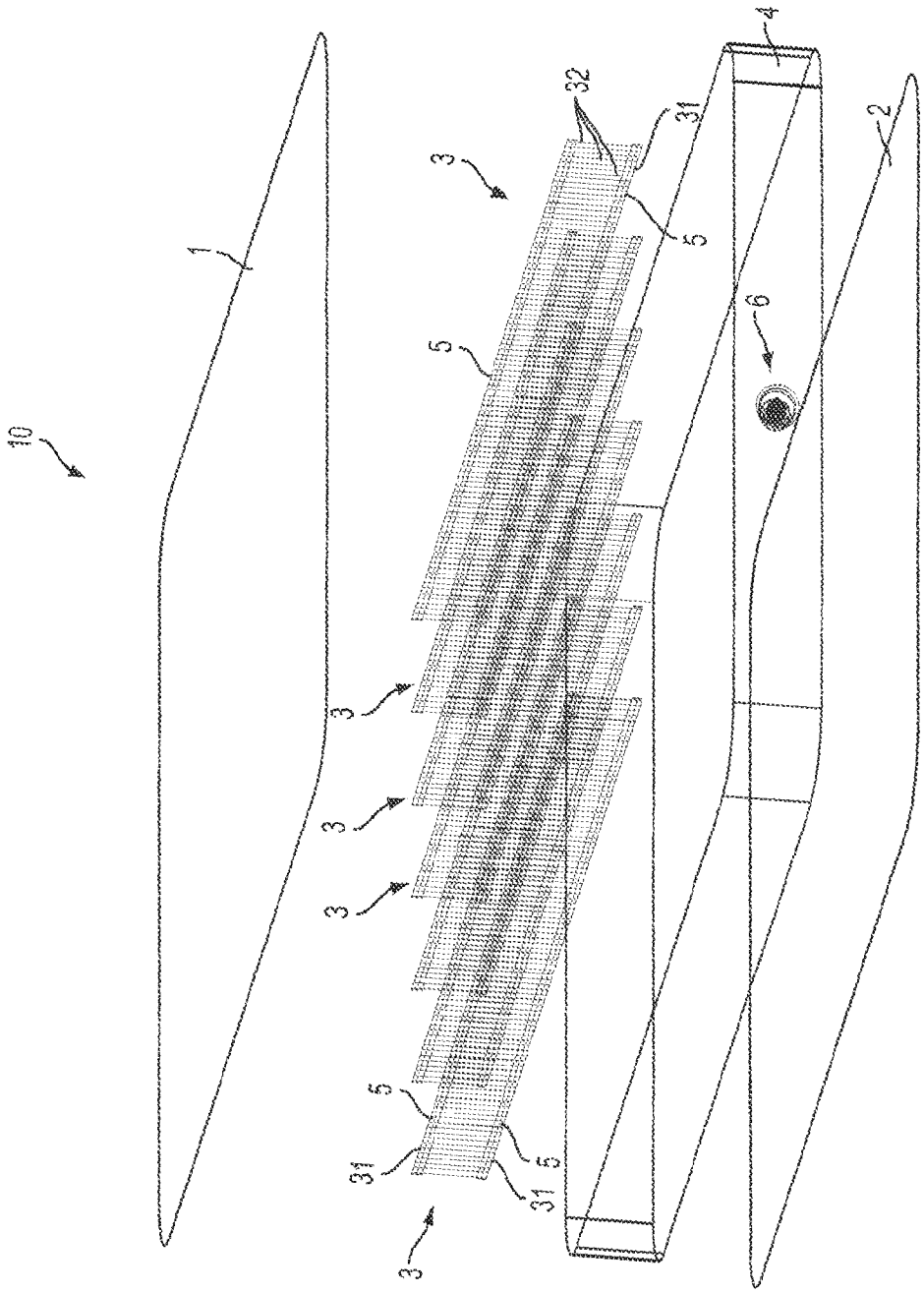


FIG. 3

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Intex Recreation v. Bestway Inflatables

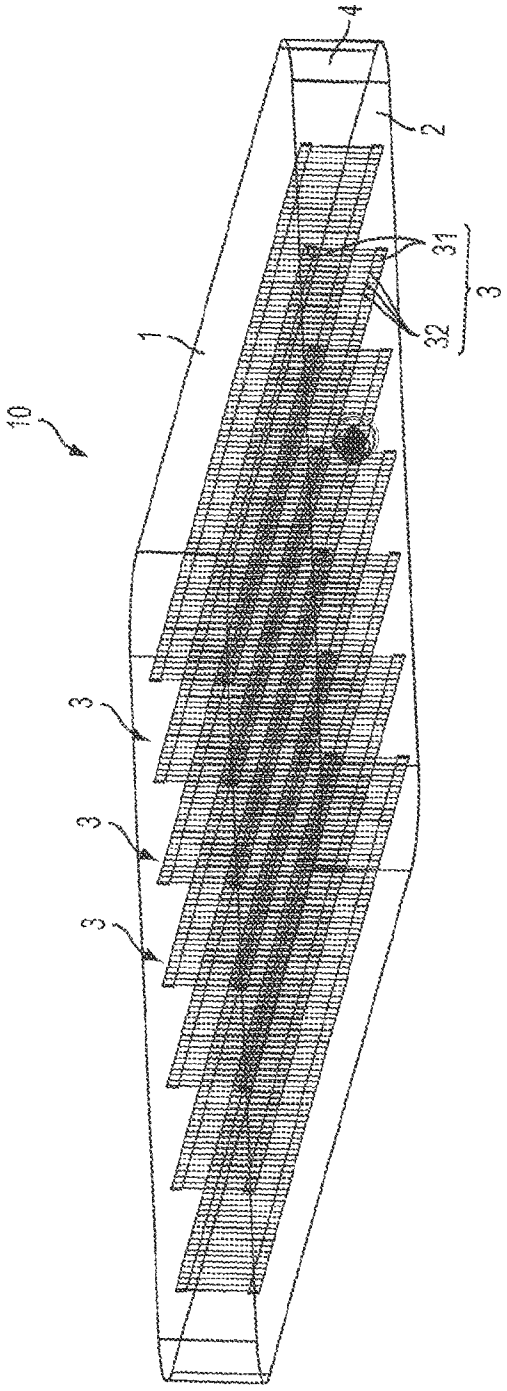


FIG. 4

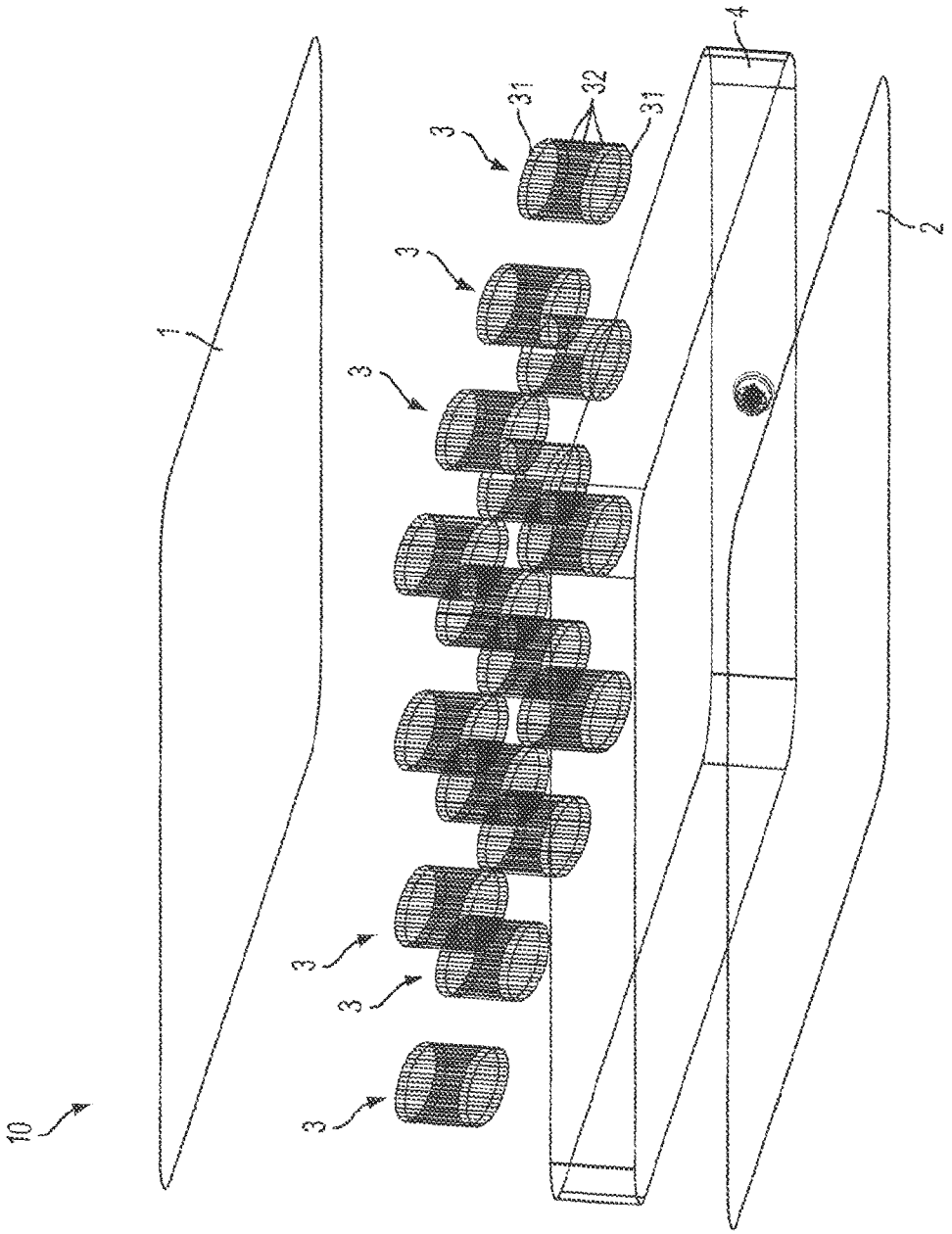


FIG. 5

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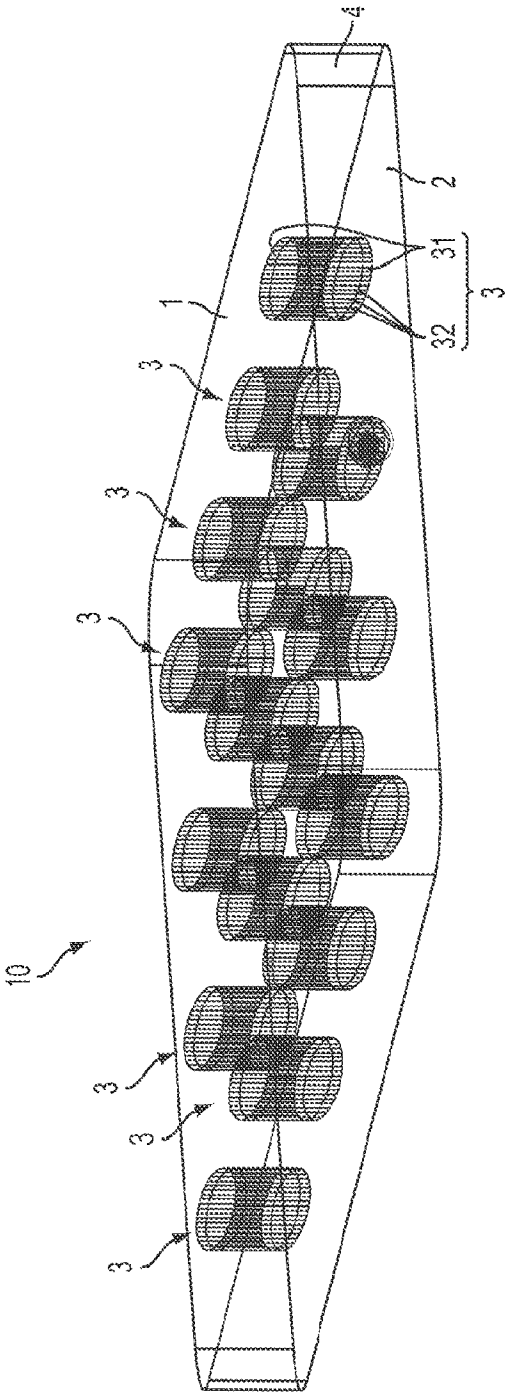


FIG. 6

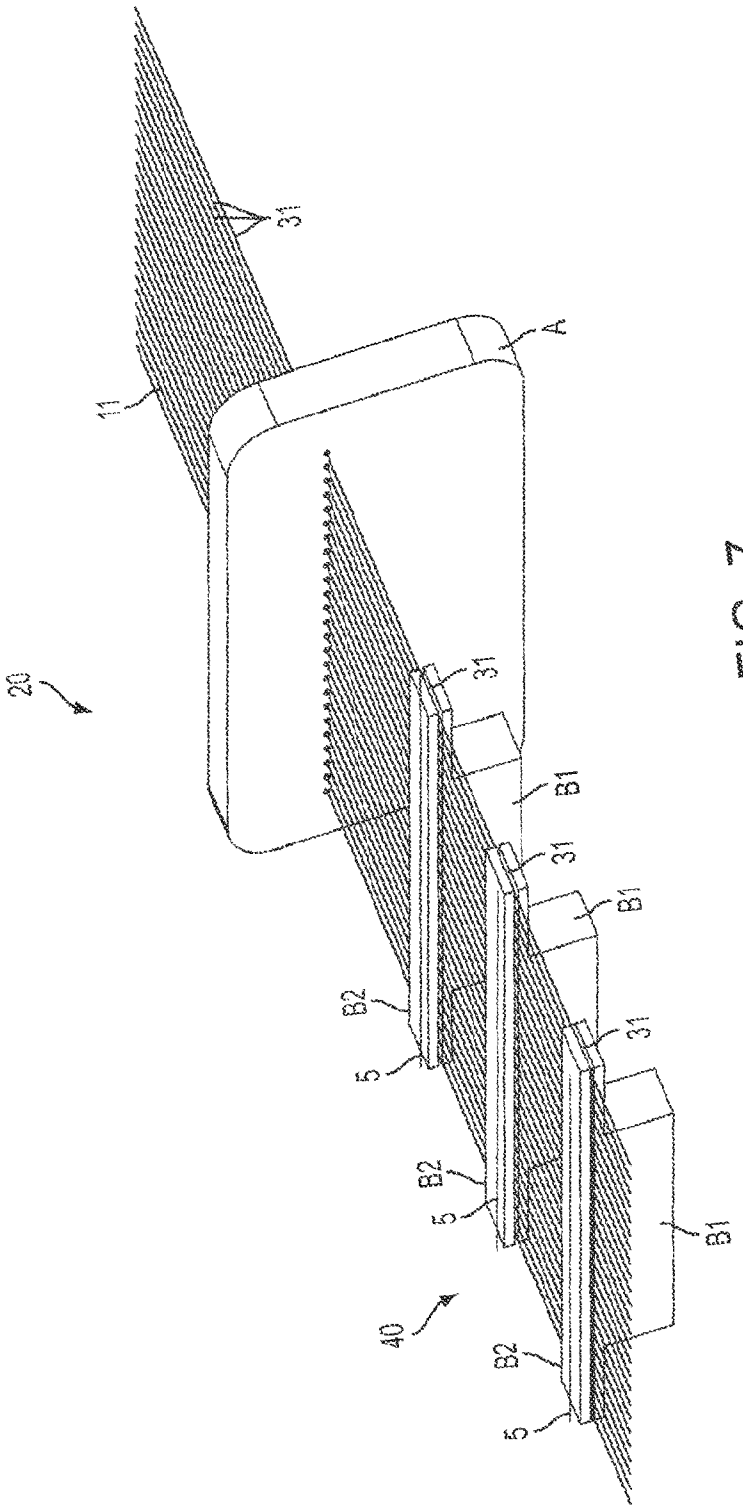


FIG. 7

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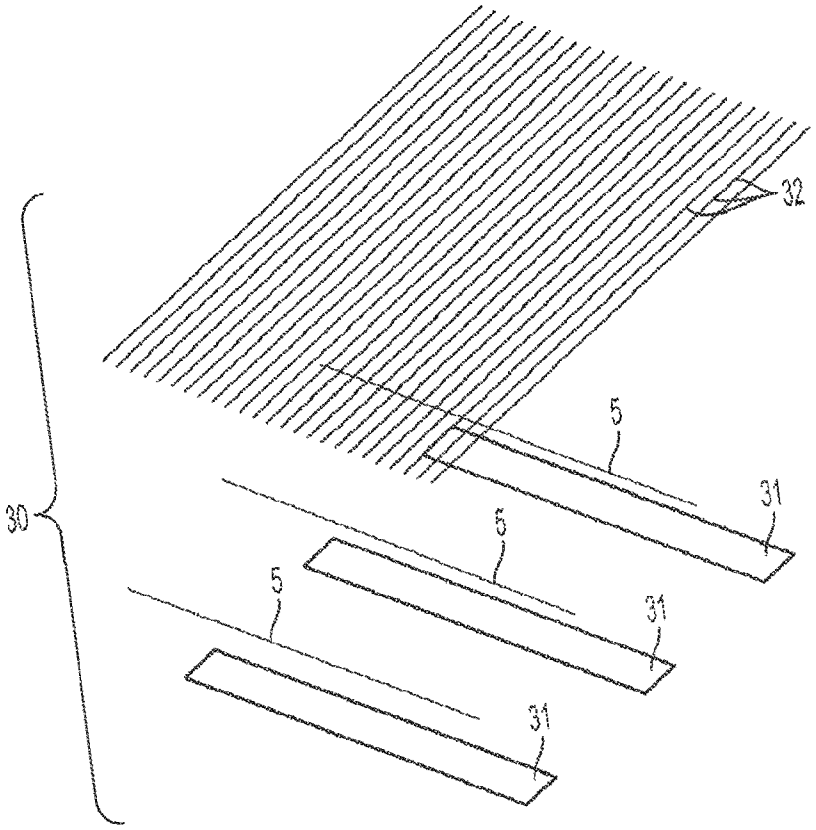


FIG. 8

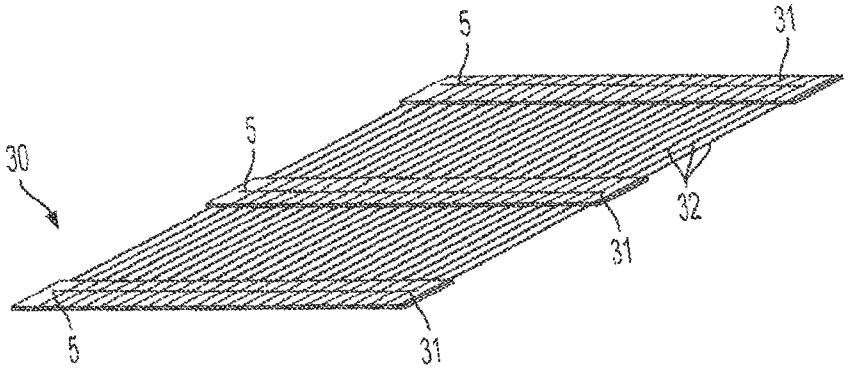


FIG. 9

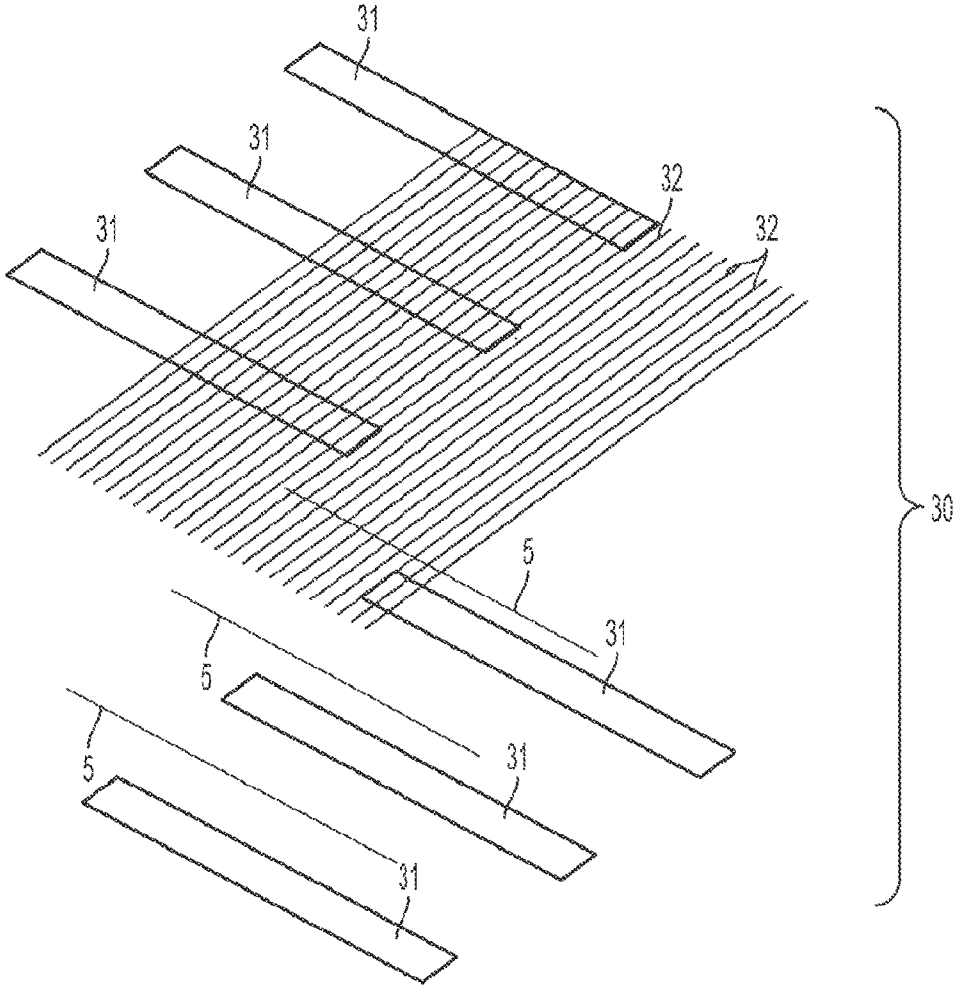


FIG. 10

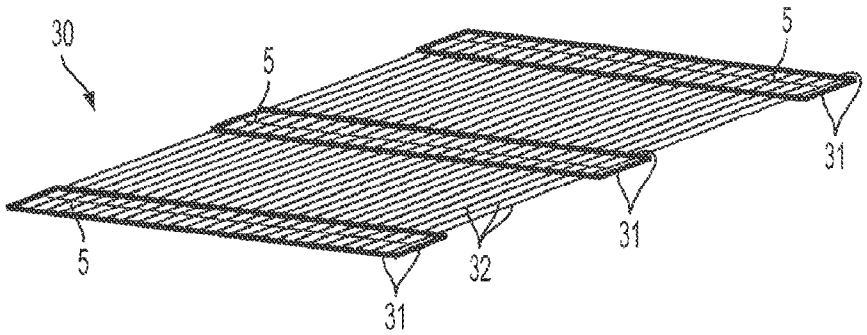


FIG. 11

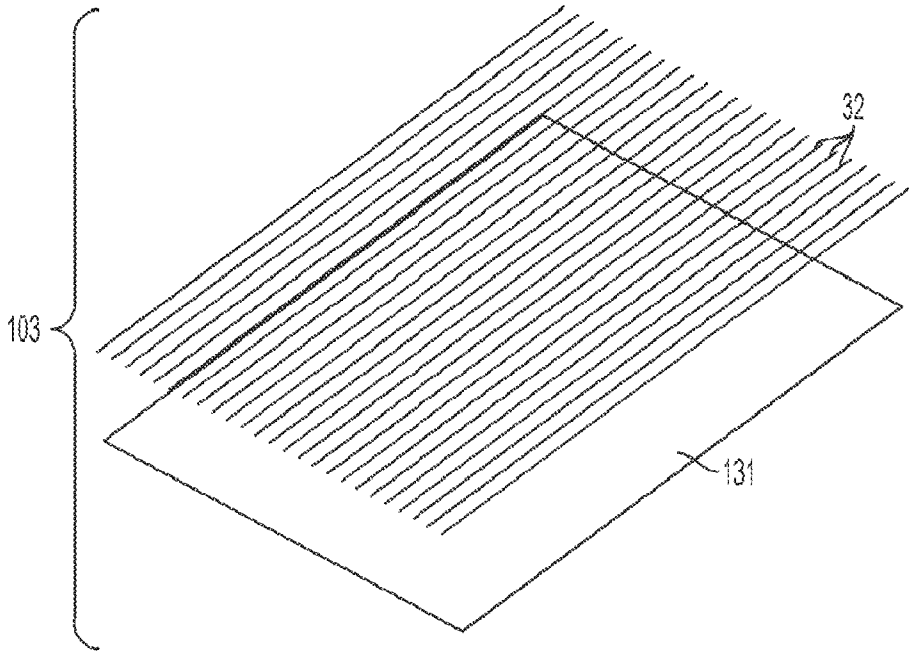


FIG. 12

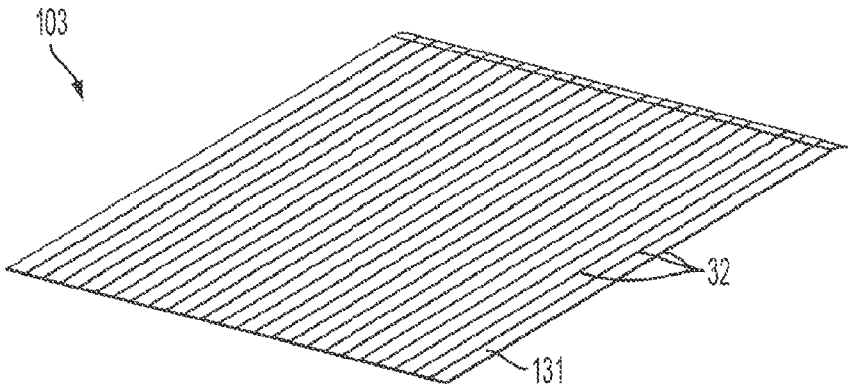


FIG. 13

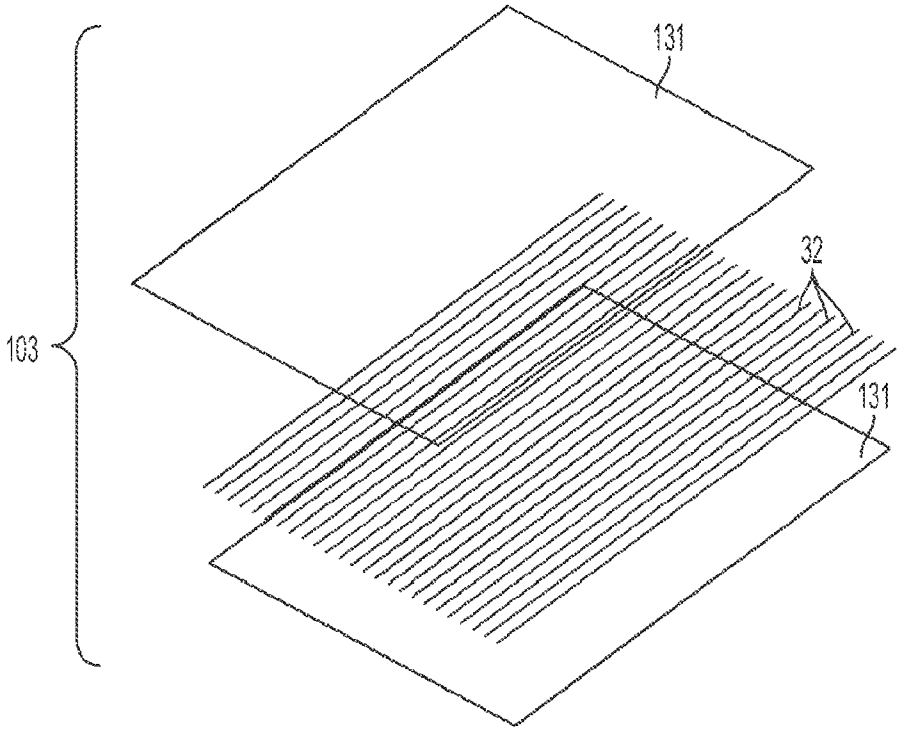


FIG. 14

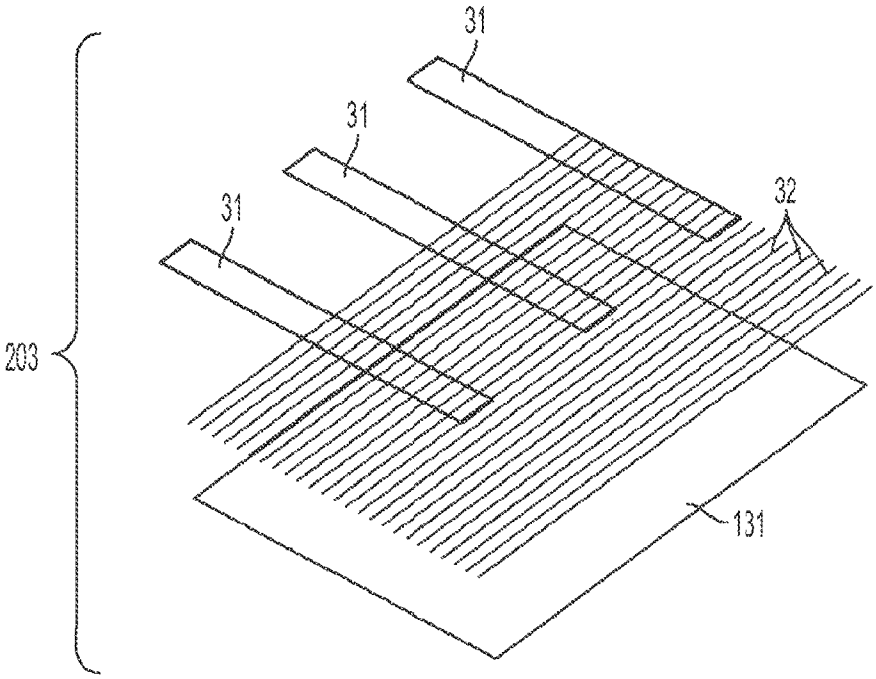


FIG. 15

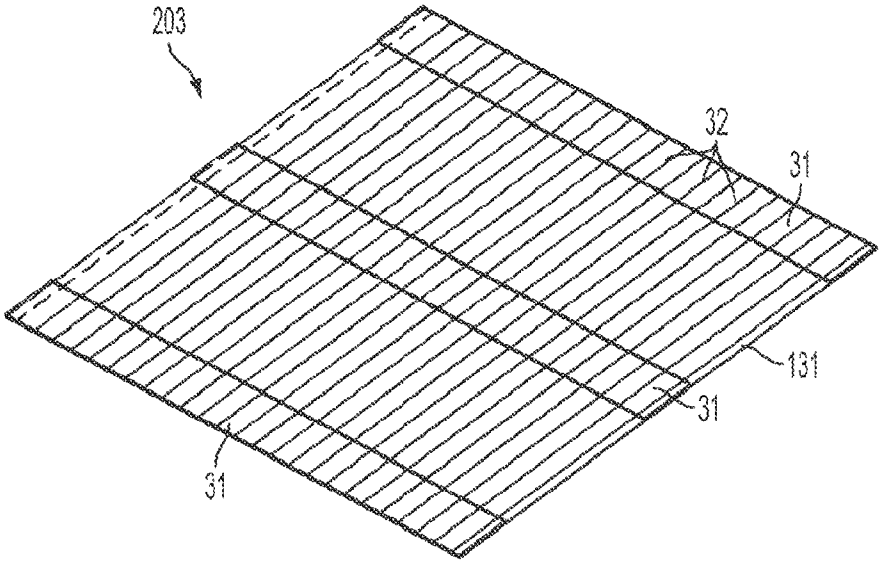


FIG. 16

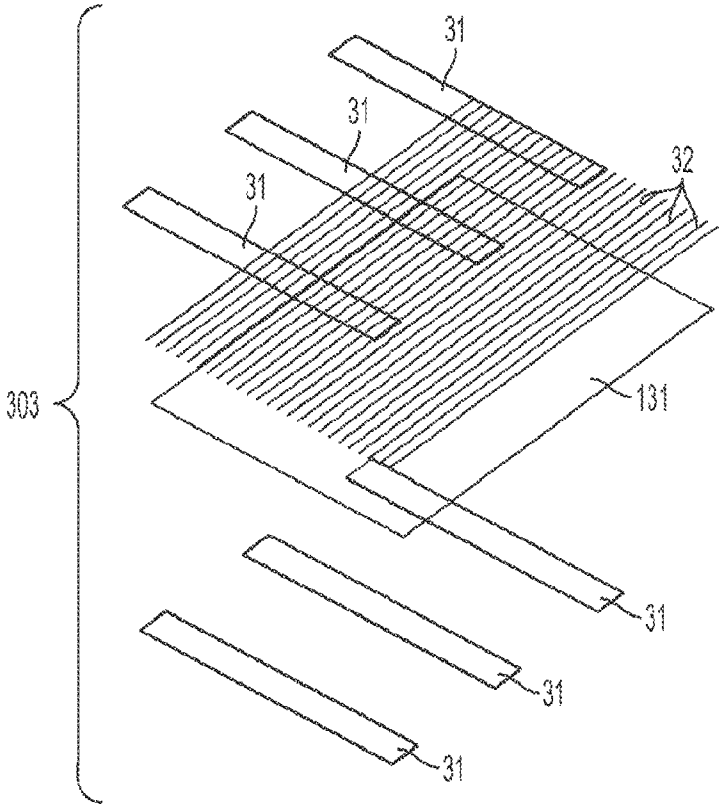


FIG. 17

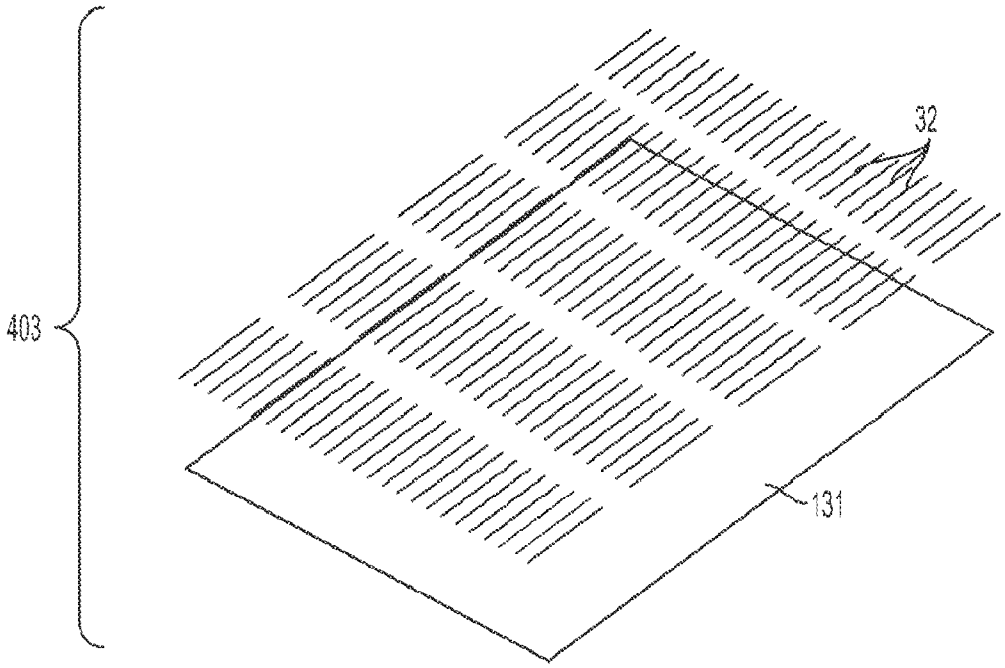


FIG. 18

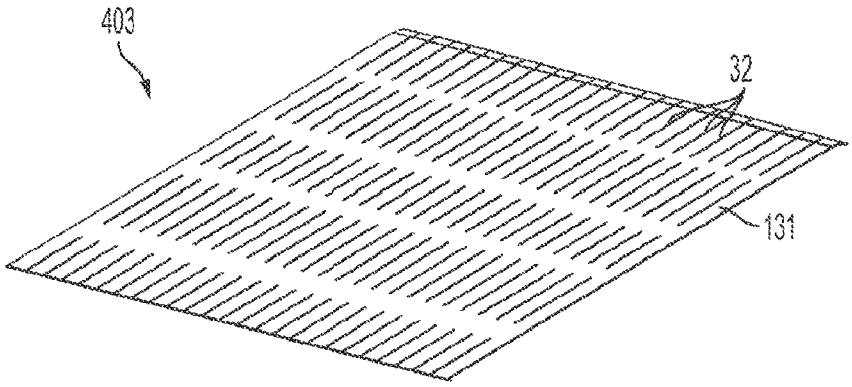


FIG. 19

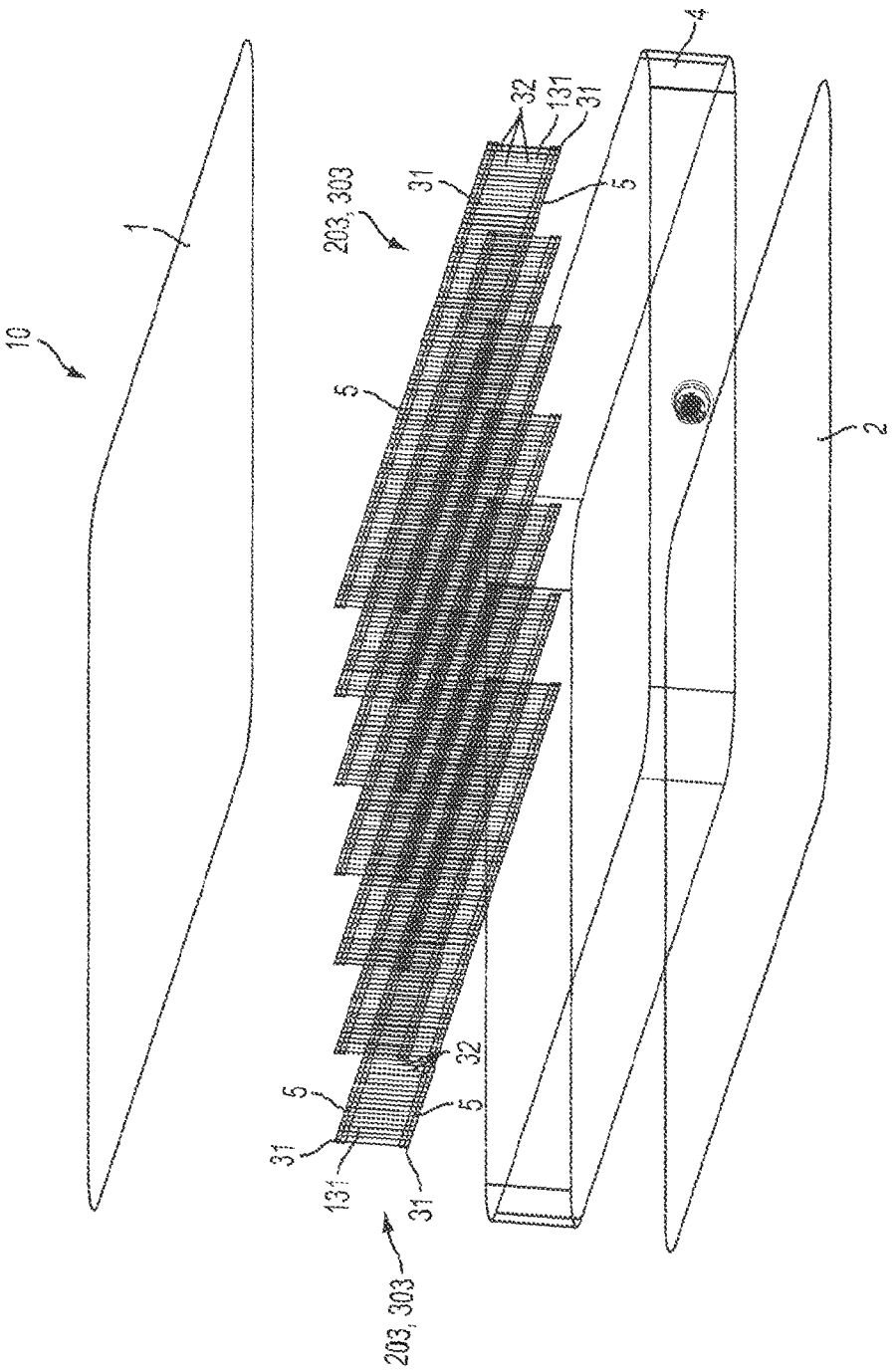


FIG. 20

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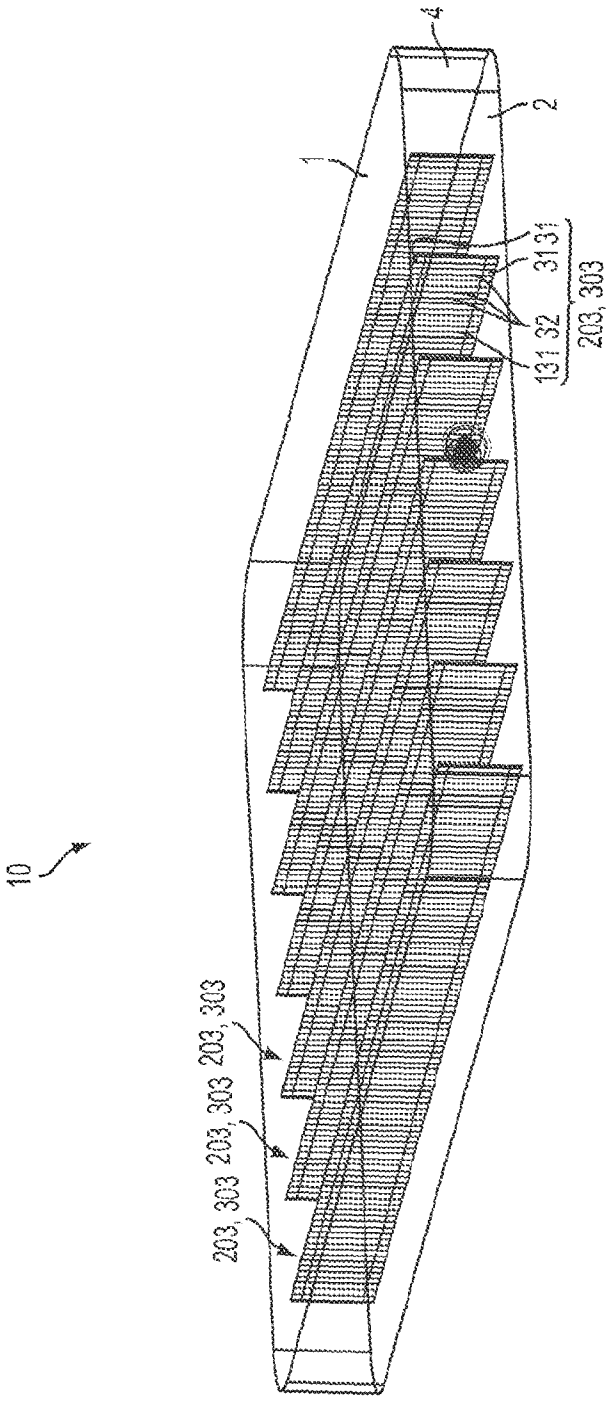


FIG. 21

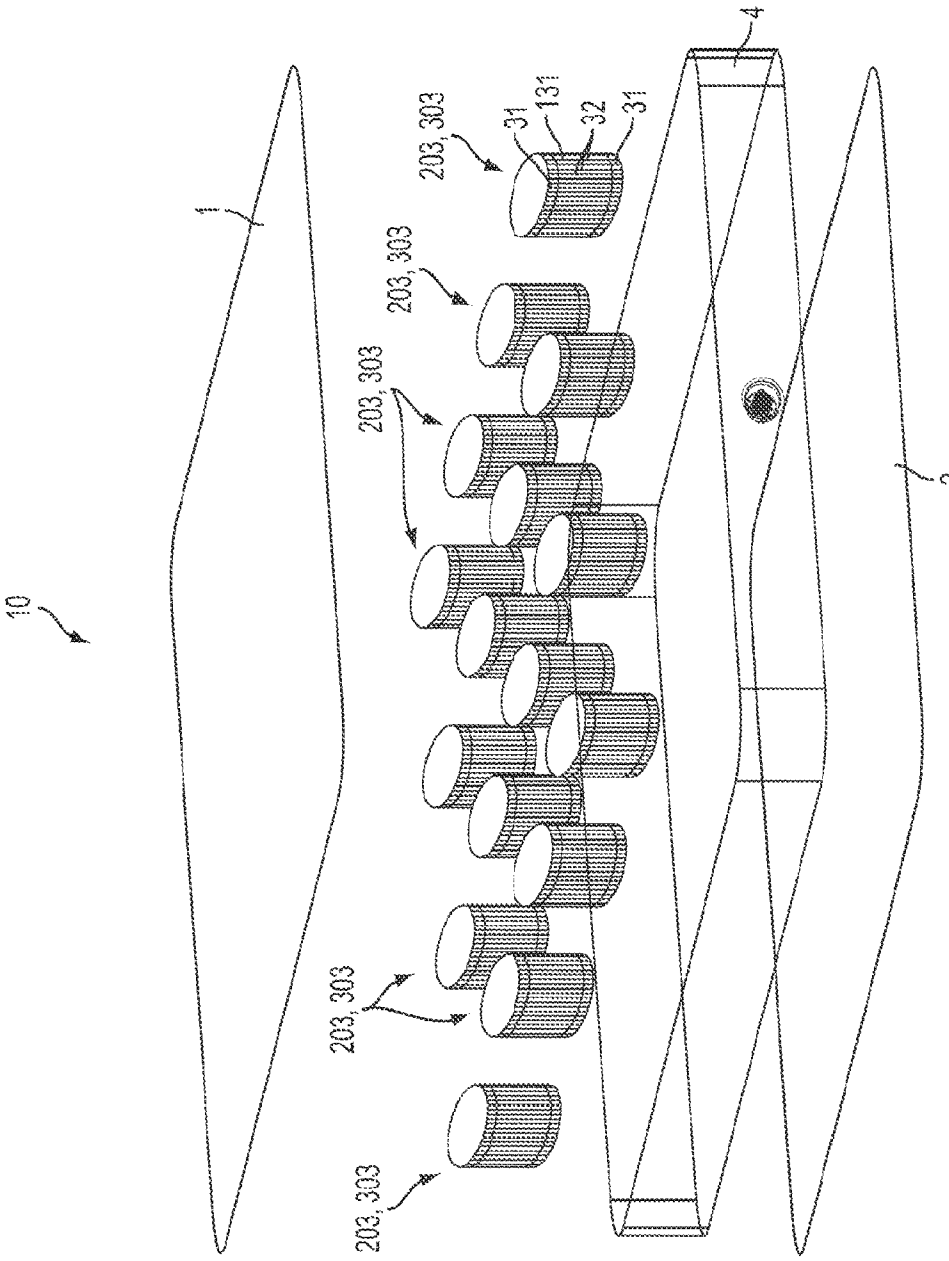

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203, 303
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FIG. 22

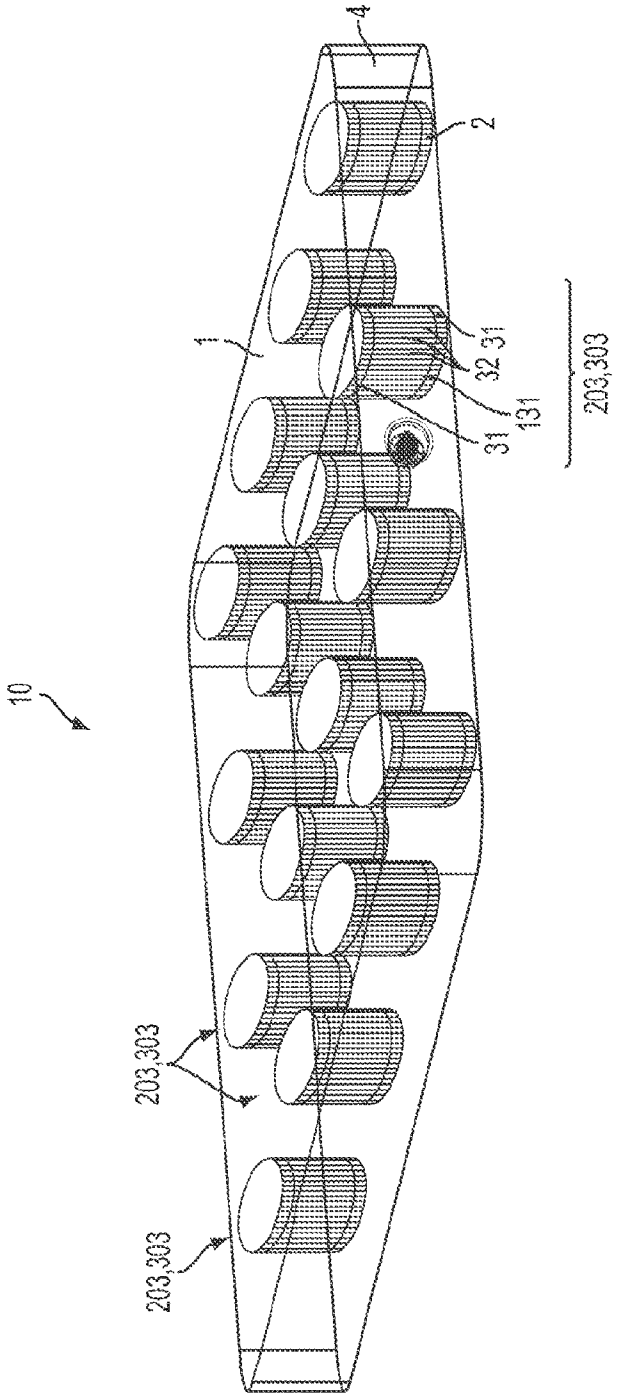


FIG. 23

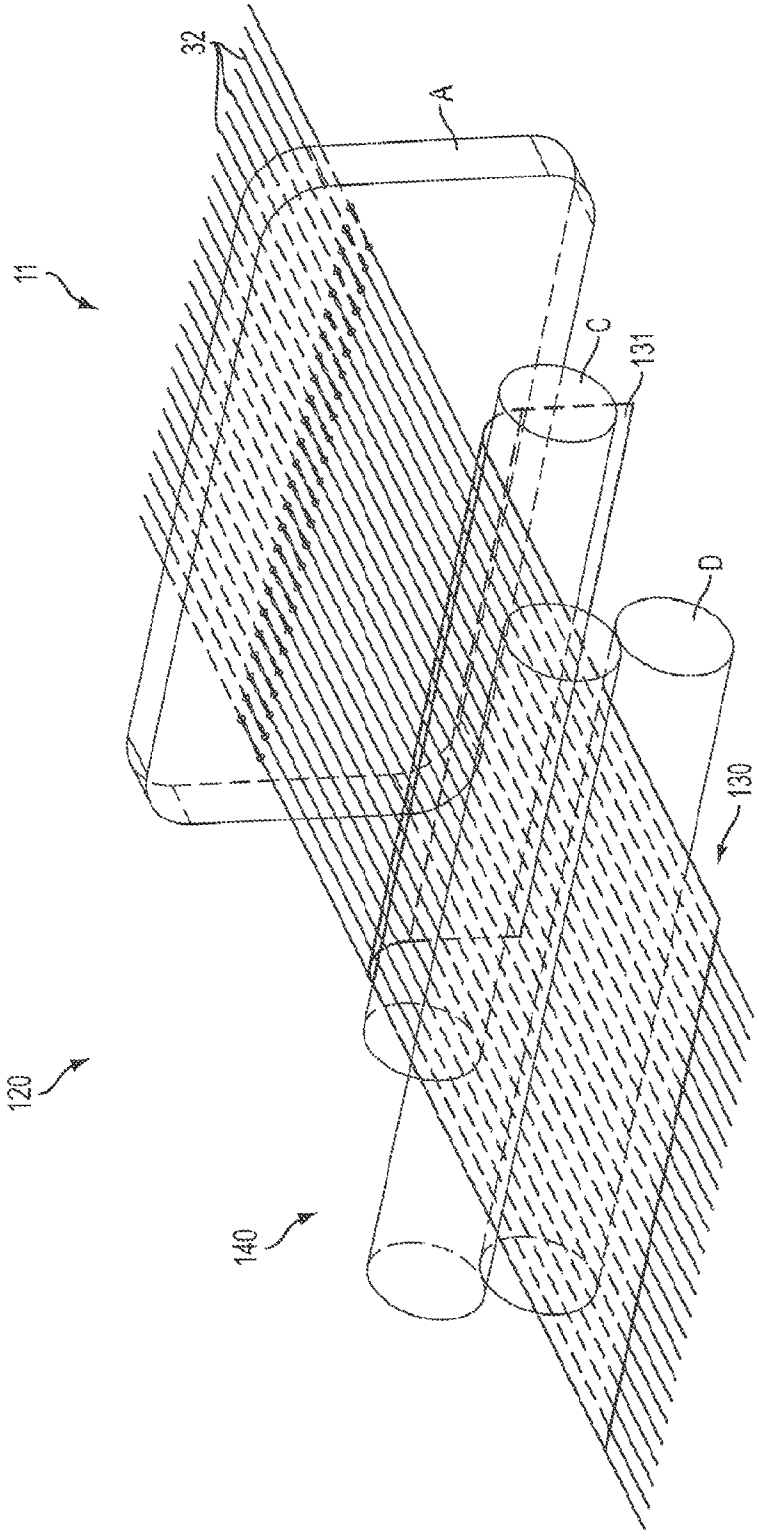


FIG. 24

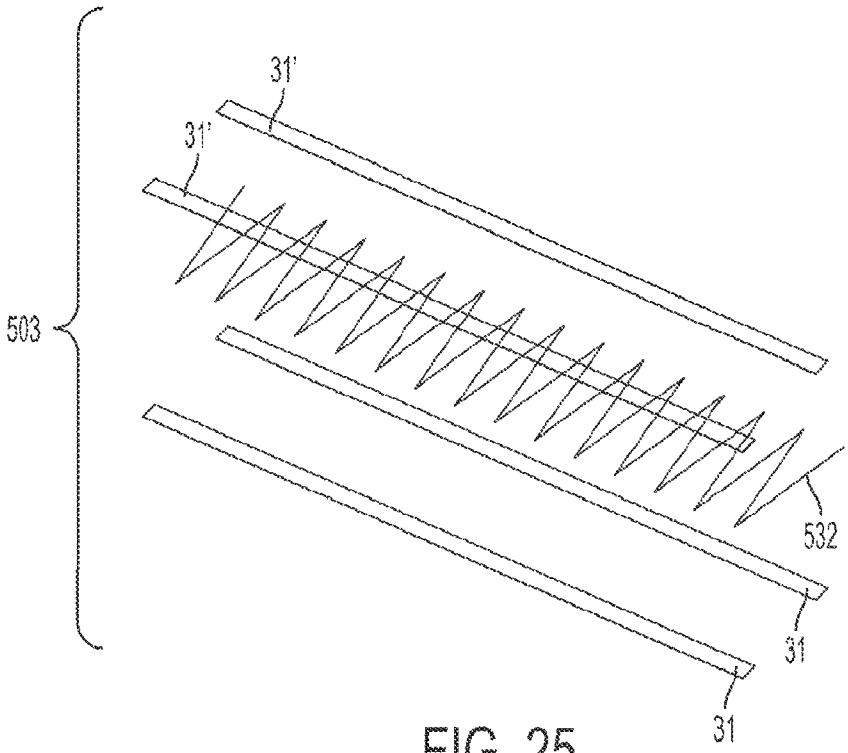


FIG. 25

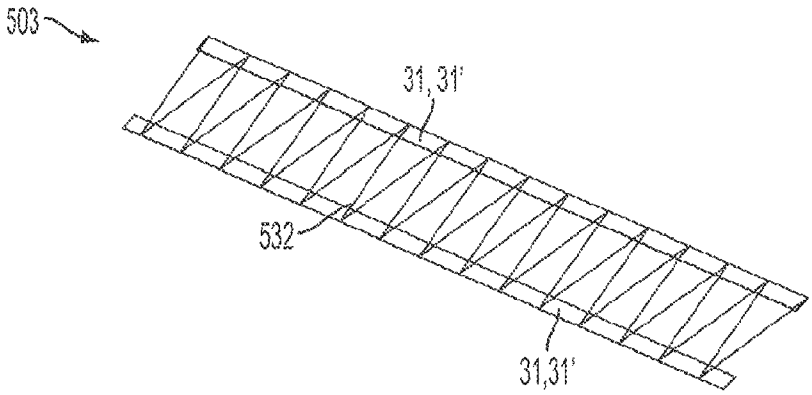


FIG. 26

INTEX EX. 1038, Pg. 475
Intex Recreation v. Bestway Inflatables

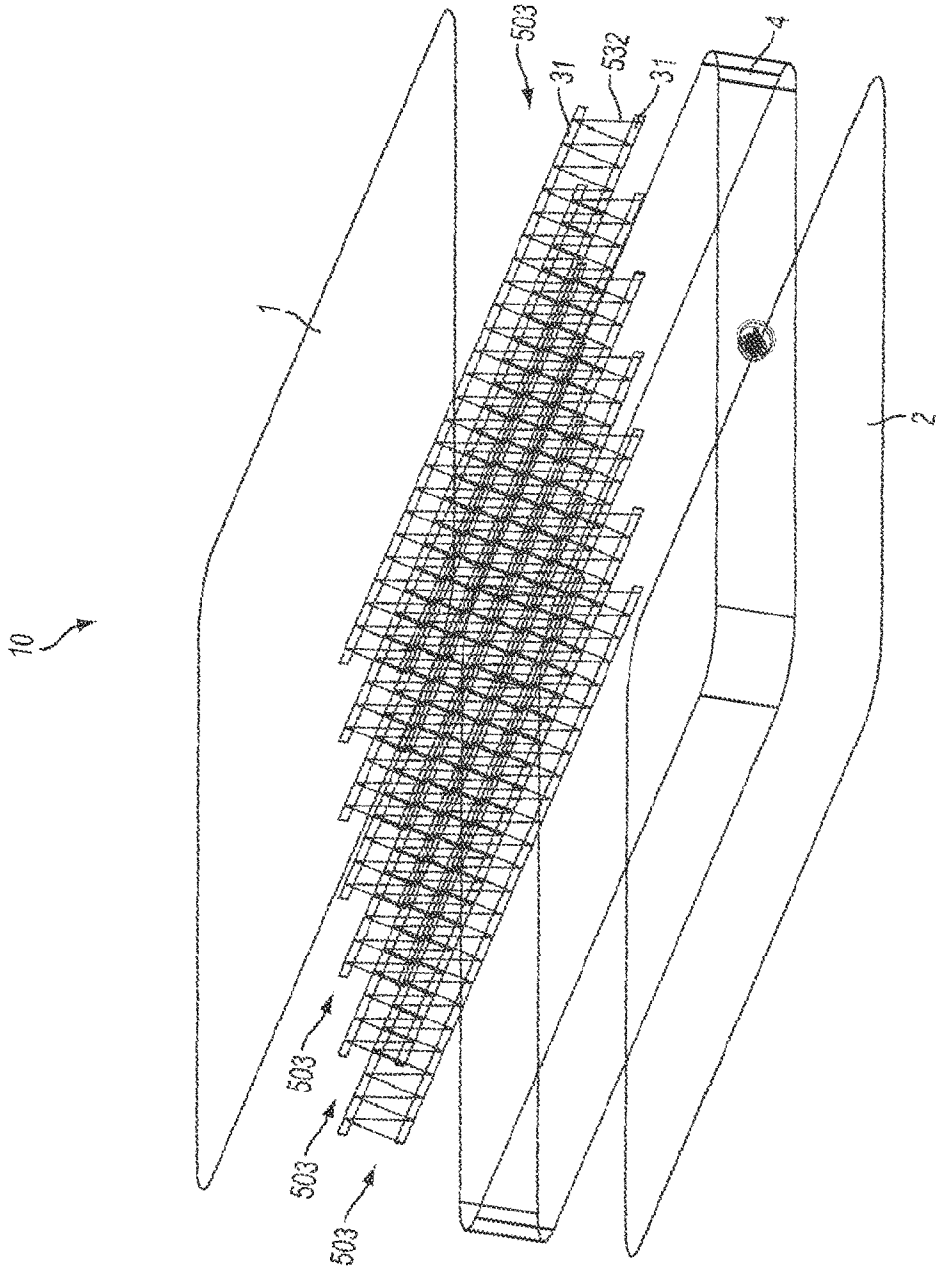


FIG. 27

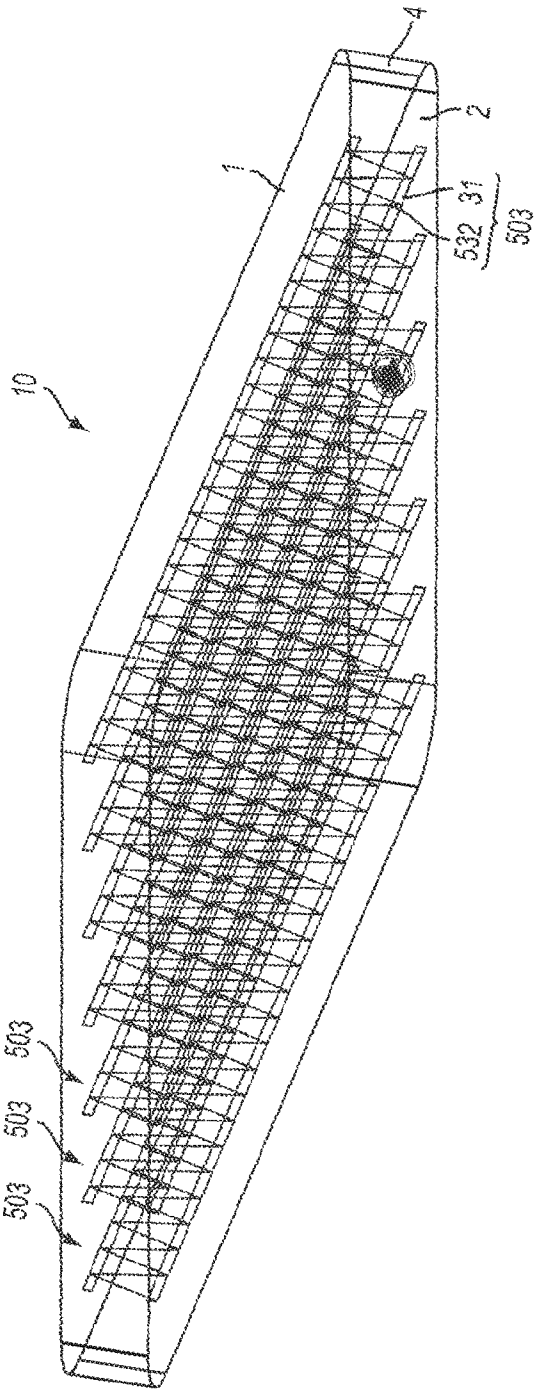


FIG. 28

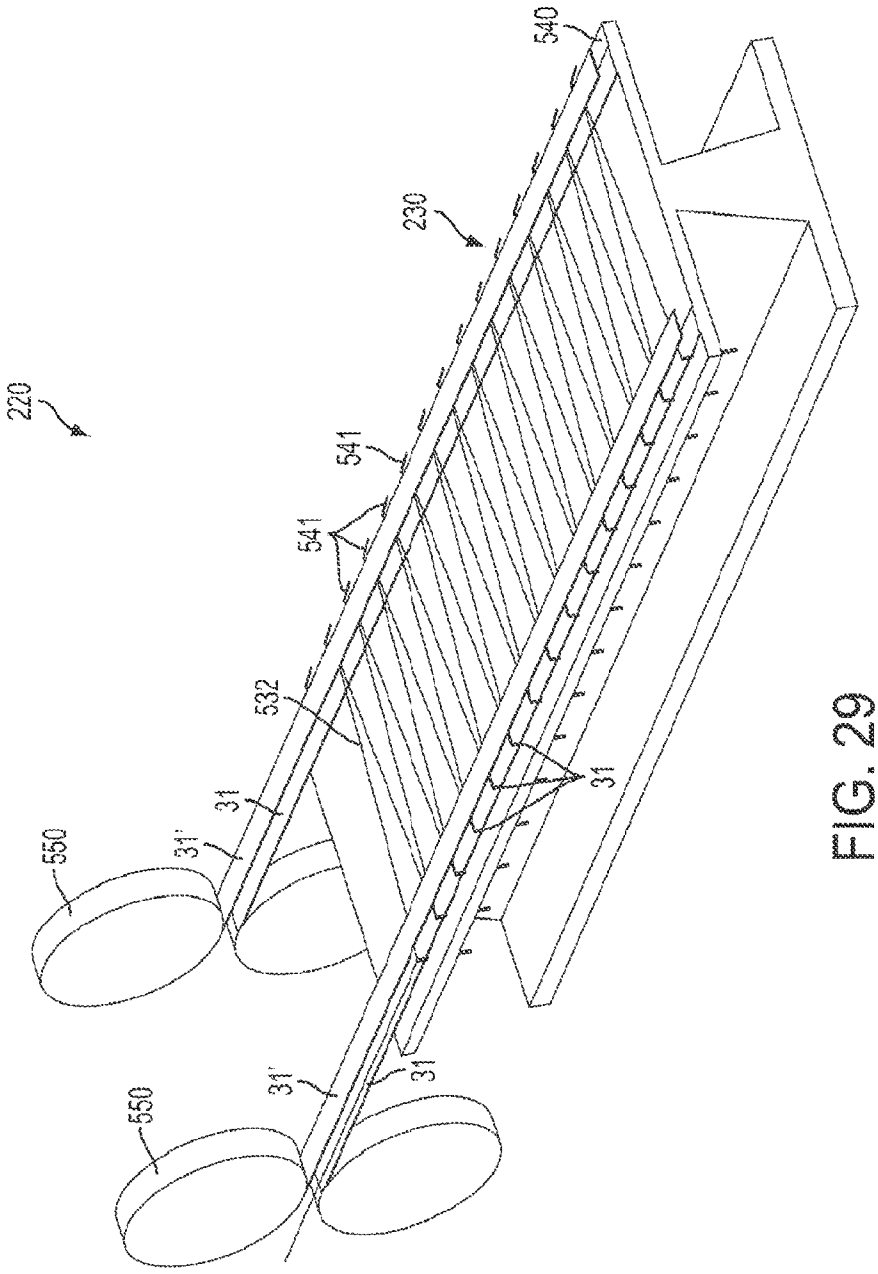


FIG. 29

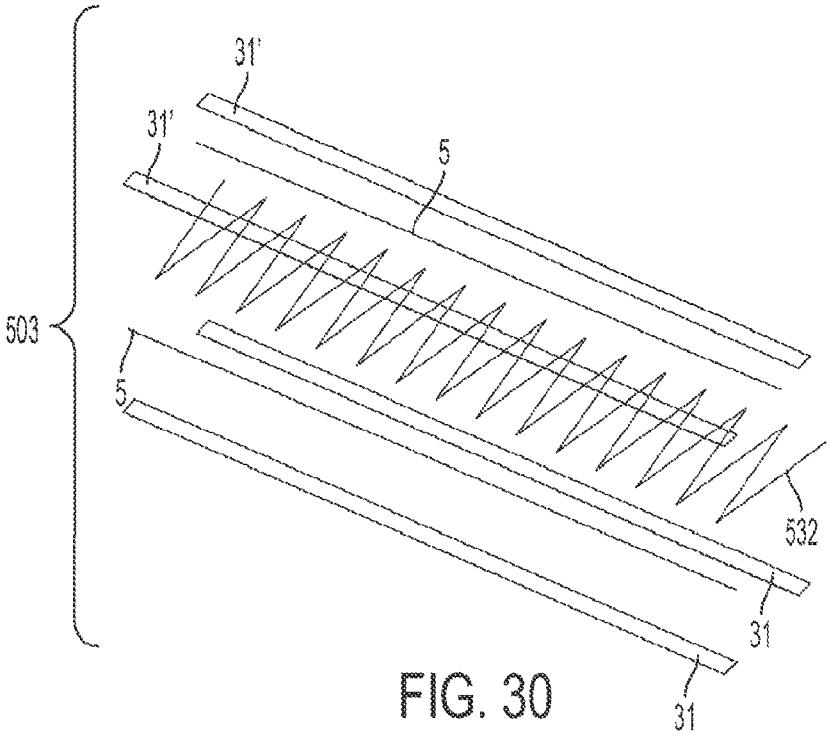


FIG. 30

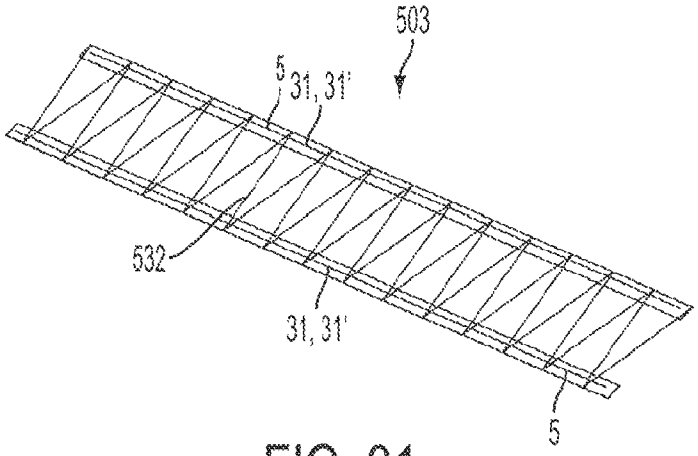


FIG. 31

INTEX EX. 1038, Pg. 479
Intex Recreation v. Bestway Inflatables

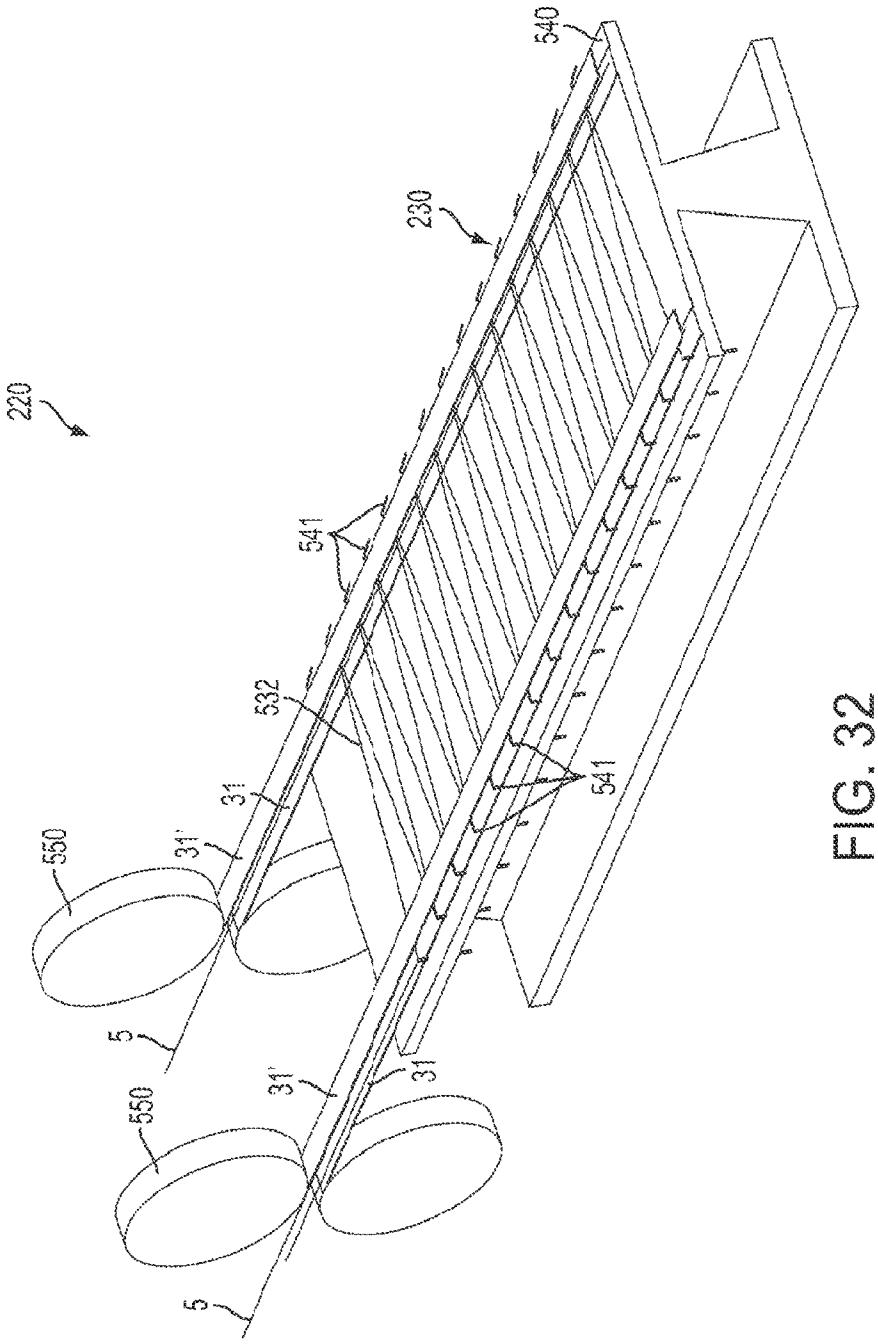


FIG. 32

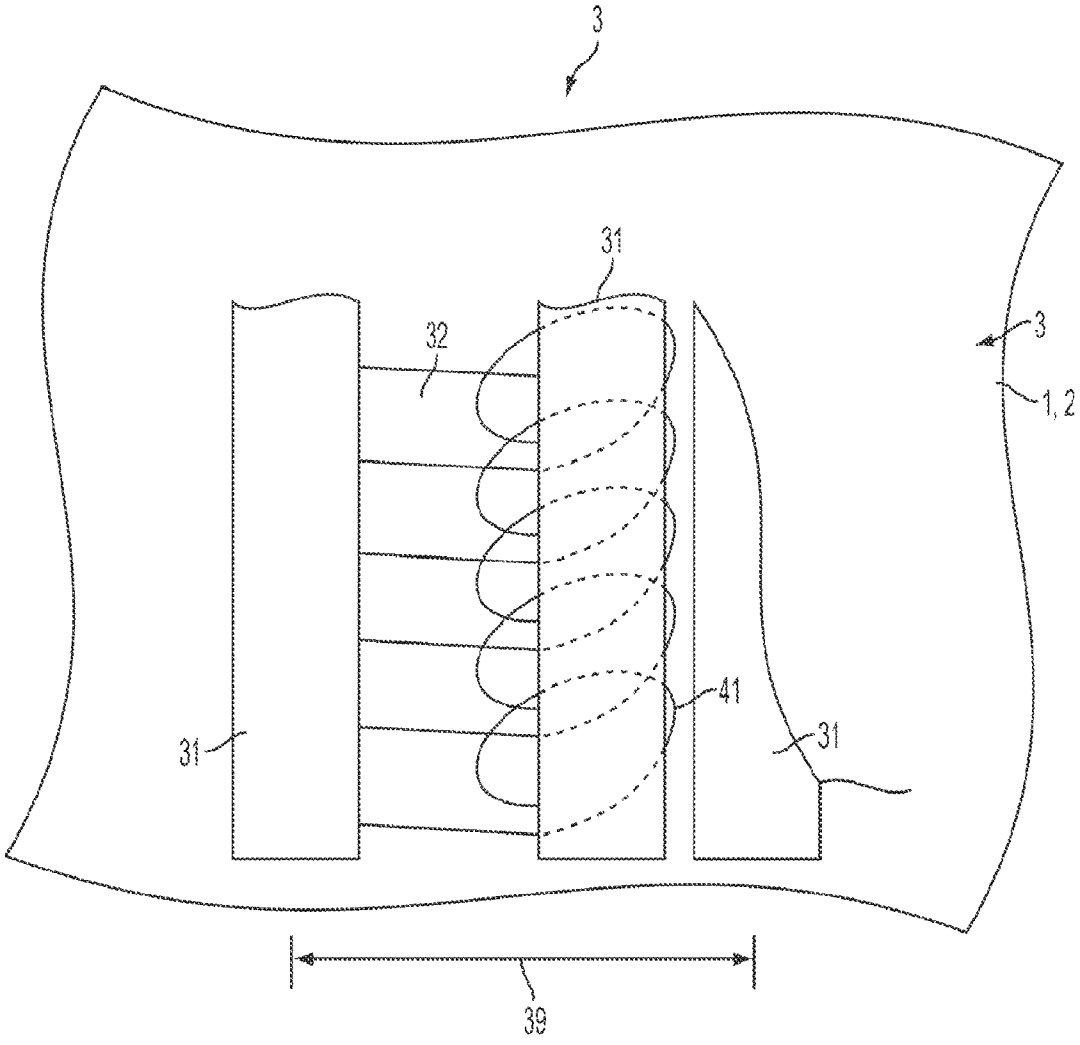


FIG. 33

INTEX EX. 1038, Pg. 481
Intex Recreation v. Bestway Inflatables

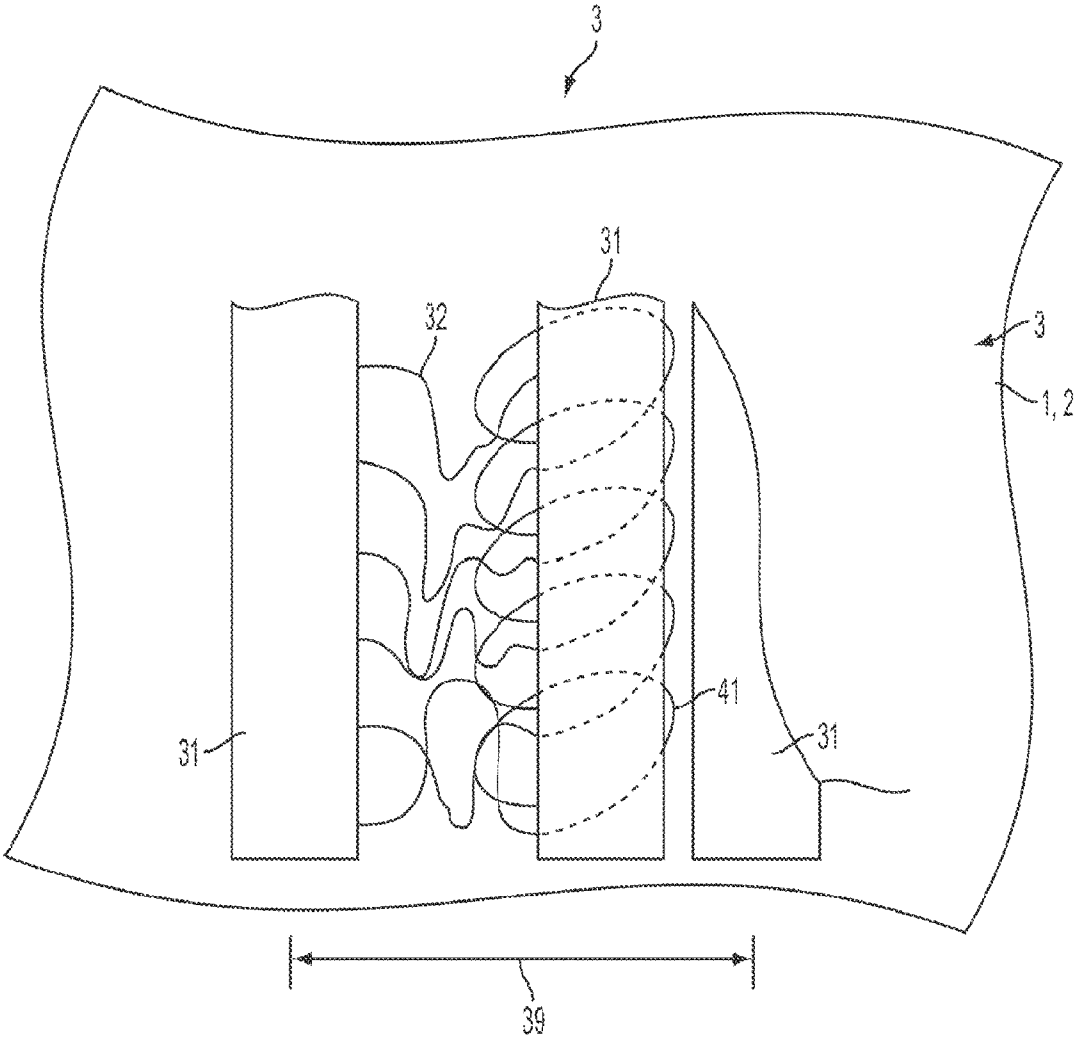


FIG. 34

INTEX EX. 1038, Pg. 482
Intex Recreation v. Bestway Inflatables

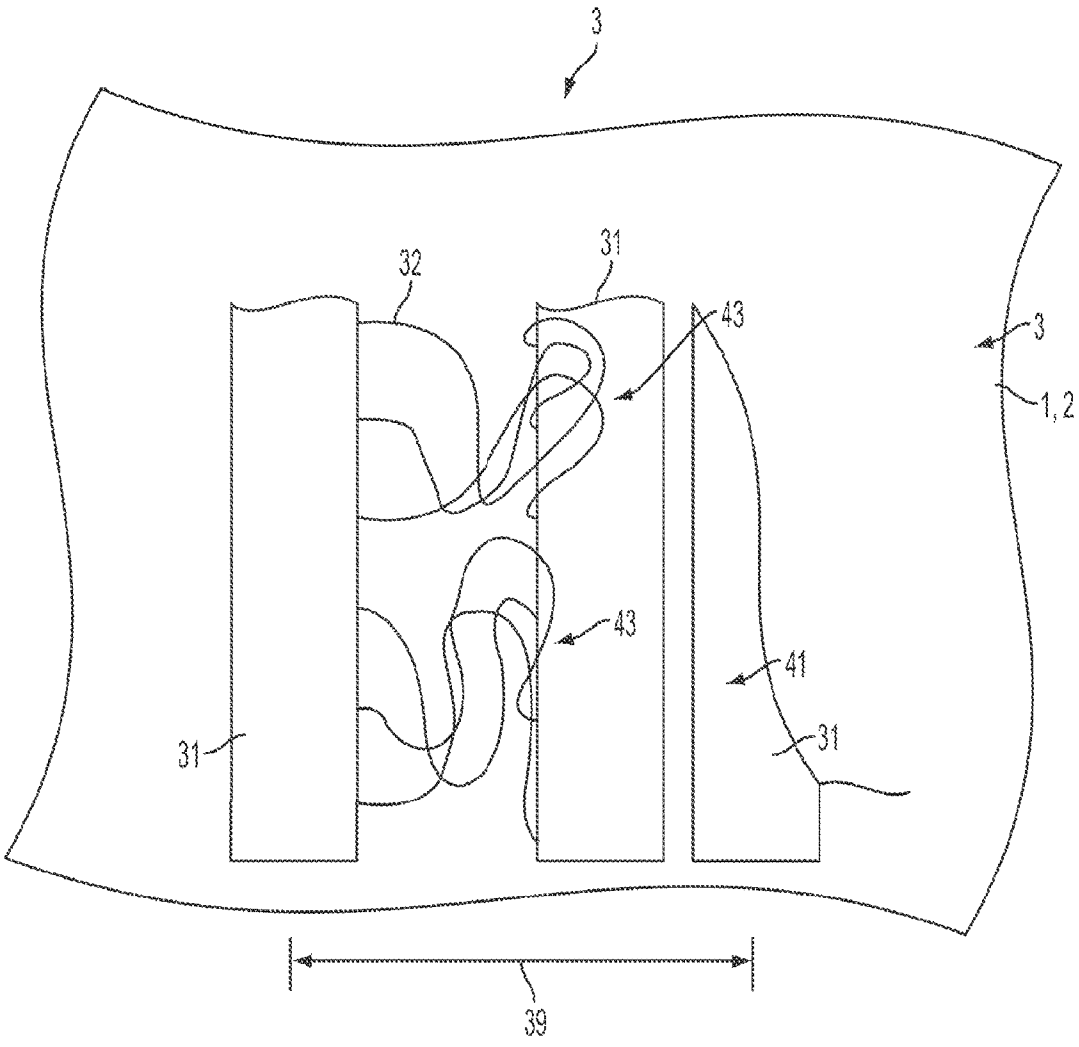


FIG. 35

INTEX EX. 1038, Pg. 483
Intex Recreation v. Bestway Inflatables

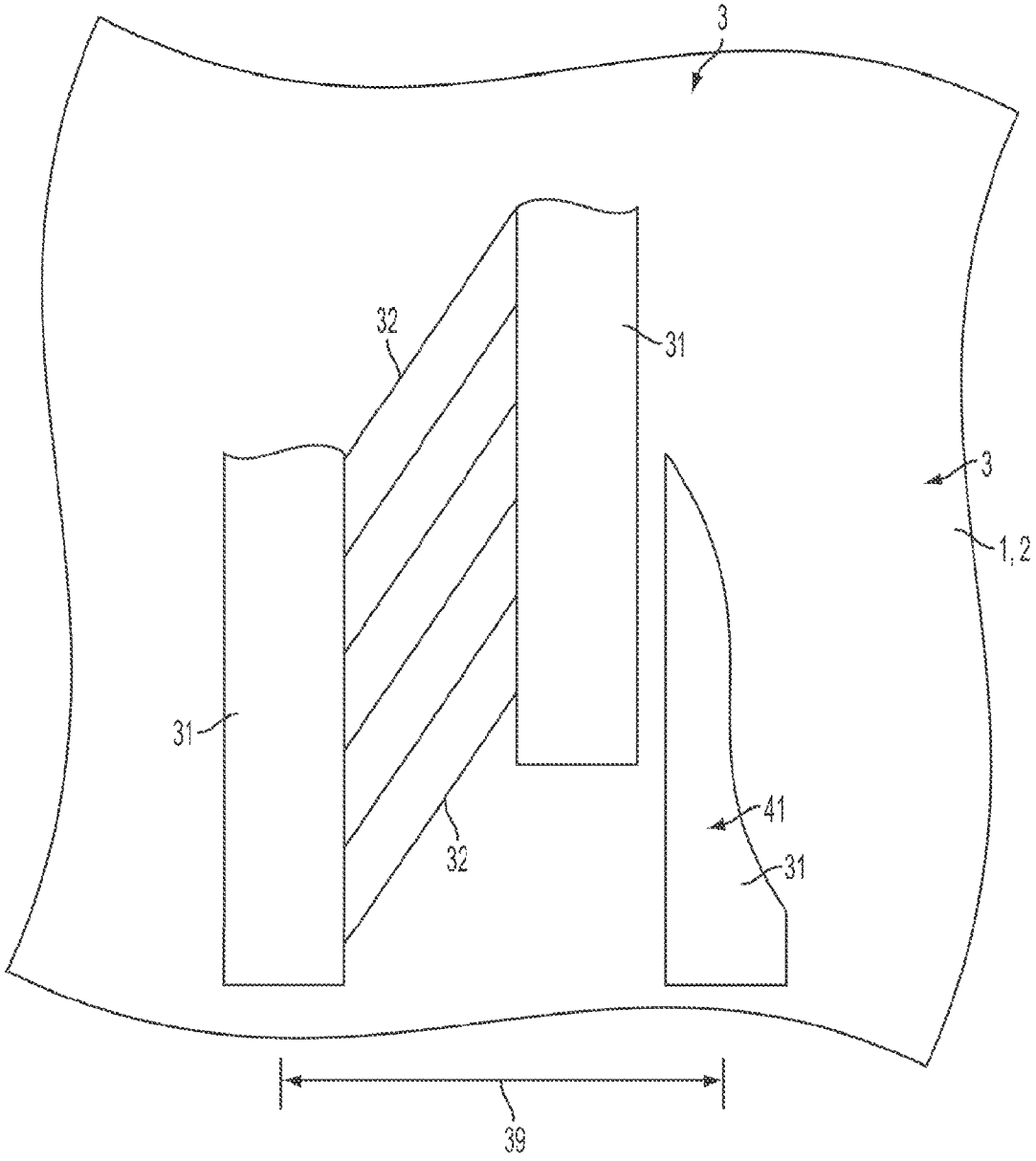


FIG. 36

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/042079

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - A47C 27/10 (2012.01)
USPC - 5/706
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - A47C 21/00, 27/08, 27/10; B63B 7/08 (2012.01)
USPC - 5/681, 706, 710, 711, 720, 721, 727, 728, 729; 28/158; 139/410; 156/145, 147, 285, 308.4

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PatBase, Google Patents, Google

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X -- Y	US 7,254,853 B1 (KIM) 14 August 2007 (14.08.2007) entire document	1-11, 13-27, 29-43, 45-50, 58 --- 12, 28, 44, 51-57, 61- 65, 67-69, 70-78, 96-97, 99, 100, 102, 103
X -- Y	US 818,321 A (WHALL) 17 April 1906 (17.04.1906) entire document	95, 98, 101 --- 12, 28, 44, 51-55, 57, 62, 68-78, 96, 97, 99, 100, 102, 103
Y	US 3,008,213 A (FOSTER et al) 14 November 1961 (14.11.1961) entire document	56, 61-65, 67, 69, 72, 76
A	US 2,753,573 A (BARKER) 10 July 1956 (10.07.1956) entire document	1-78, 95-103
A	US 5,249,323 A (KIKUCHI et al) 05 October 1993 (05.10.1993) entire document	1-78, 95-103

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
09 October 2012	18 OCT 2012
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/042079

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

SEE CONTINUATION SHEET ATTACHED

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
claims 1-78 and 95-103

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/US2012/042079

(CONTINUATION OF BOX III)

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees need to be paid.

Group I, claims 1-78 and 95-103 are drawn to an inflatable product.

Group II, claims 79-94 are drawn to a methods of making a tensioning device.

The inventions listed in Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1, because under PCT Rule 13.2 they lack the same or corresponding special technical features for the following reasons:

The special technical features of Group I, an inflatable product including a first sheet, second sheet, weld strands, and tensioning structure including a plurality of strands, are not present in Group II; and the special technical features of Group II, a method of making a tensioning device including the steps of: arranging weld and adhesive devices, supplying a plurality of strands, positioning weld strips, advancing one or more dies, and an adhesive device to orient one or more strands, arranging a hot roller and delivering a weld sheet; and wrapping of continuous strands around a plurality of members are not present in Group I.

Groups I and II share the technical features of using a tensioning device including a plurality of strands with weld strips and weld sheets. However, these shared technical features do not represent a contribution over the prior art. Specifically, US 7,254,853 B1 to Kim teaches an inflatable product (air mattress body 10 at Fig. 5; see also Col. 2, Lns. 6-8) including a tensioning device (plurality of threads 14 attached to sheets 11 and 12 as seen in Fig. 5 act as a tensioning structure, Col. 1, Lns. 41-51) including a plurality of strands (plurality of fiber threads 14 as seen in Fig. 5; Col. 3, Lns. 25-30) with weld strips (strips 11a and 12a which are formed at sheets 11 and 12 respectively as seen in Fig. 5, Col. 2, Lns. 59-63; see also Para. [0080] of Applicant's specification wherein it is stated "weld strips 31 need not be welded to upper or lower materials 1, 2, and the term "weld strip" as used herein refers to any strip of material suitable for affixation to another material, whether by application of heat, application of adhesive, mechanical joining methods such as sewing and riveting, or any other suitable method") and weld sheets (sheets 11 and 12 are capable of attaching to strips 11a and 12a respectively, Col. 2, Lns. 59-63; see also Para. [0080] of Applicant's specification).

Since none of the special technical features of the Group I and II inventions are found in more than one of the inventions, unity is lacking.

US006671910B2

(12) **United States Patent**
Hsu et al.

(10) **Patent No.: US 6,671,910 B2**
(45) **Date of Patent: Jan. 6, 2004**

(54) **INFLATABLE BED**

(75) Inventors: **Yaw-Yuan Hsu**, Taipei (TW); **Chin-Hsiang Pan**, Taipei (TW)

(73) Assignee: **Intex Recreation Corp.**, Long Beach, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/007,681**

(22) Filed: **Dec. 5, 2001**

(65) **Prior Publication Data**

US 2003/0101516 A1 Jun. 5, 2003

(51) **Int. Cl.**[7] **A47C 27/10**
(52) **U.S. Cl.** **5/710**; 5/711
(58) **Field of Search** 5/710, 711, 712, 5/713, 706, 644, 654, 655.3, 932

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,604,641	A	*	7/1952	Reed	5/710 X
3,644,949	A	*	2/1972	Diamond	5/644 X
3,978,530	A	*	9/1976	Amarantos	5/710 X
4,389,742	A	*	6/1983	DeWitt	5/654
4,504,989	A	*	3/1985	Maltz	5/655.3
4,639,960	A	*	2/1987	Quillen et al.	5/710
4,685,163	A	*	8/1987	Quillen et al.	5/644 X
4,724,558	A	*	2/1988	Reiff	5/655.3 X
4,964,183	A	*	10/1990	LaForce, Jr.	5/710 X
5,044,030	A	*	9/1991	Balaton	5/710
5,247,712	A	*	9/1993	Williams	4/585
5,421,044	A	*	6/1995	Steensen	5/710
5,561,873	A	*	10/1996	Weedling	5/711
5,699,569	A	*	12/1997	Schwarz-Zohrer	5/655
5,729,840	A	*	3/1998	Wu	4/588
5,890,245	A	*	4/1999	Klearman et al.	5/710 X
6,073,291	A	*	6/2000	Davis	5/711
6,076,214	A	*	6/2000	Klimenko	5/710
D464,225	S	*	10/2002	Boso et al.	D6/604
2003/0024050	A1	*	2/2003	Boso et al.	5/711
2003/0101516	A1	*	6/2003	Hsu et al.	5/710

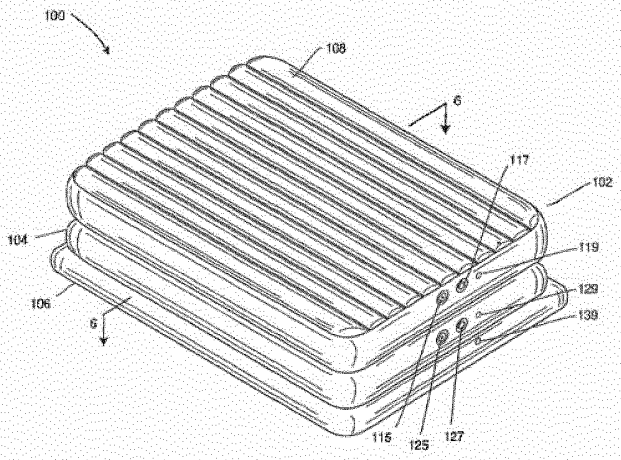
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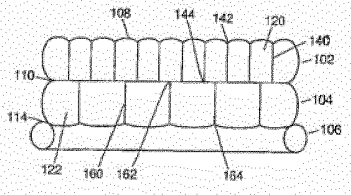
Primary Examiner—Robert G. Santos
(74) *Attorney, Agent, or Firm*—Lewis, Brisbois, Bisgaard & Smith LLP

(57) **ABSTRACT**

An inflatable bed includes an inflatable mattress that is attached to the top surface of an inflatable air box spring. An inflatable, stabilizing tube is attached to the bottom of the air box spring to provide additional stability and height by increasing the footprint of the inflatable bed. The interiors of the inflatable mattress and air box spring contain a plurality of I-beam structures arranged longitudinally to provide further support and stability. Alternatively, the inflatable mattress is separate and detachable and can be fastened to the top surface of the air box spring. An additional stabilizing tube is attached to the periphery of the top surface of the air box spring to cradle and support the detachable inflatable mattress.

15 Claims, 6 Drawing Sheets





INTEX EX.1009
Intex v. Bestway, IPR2019-00434

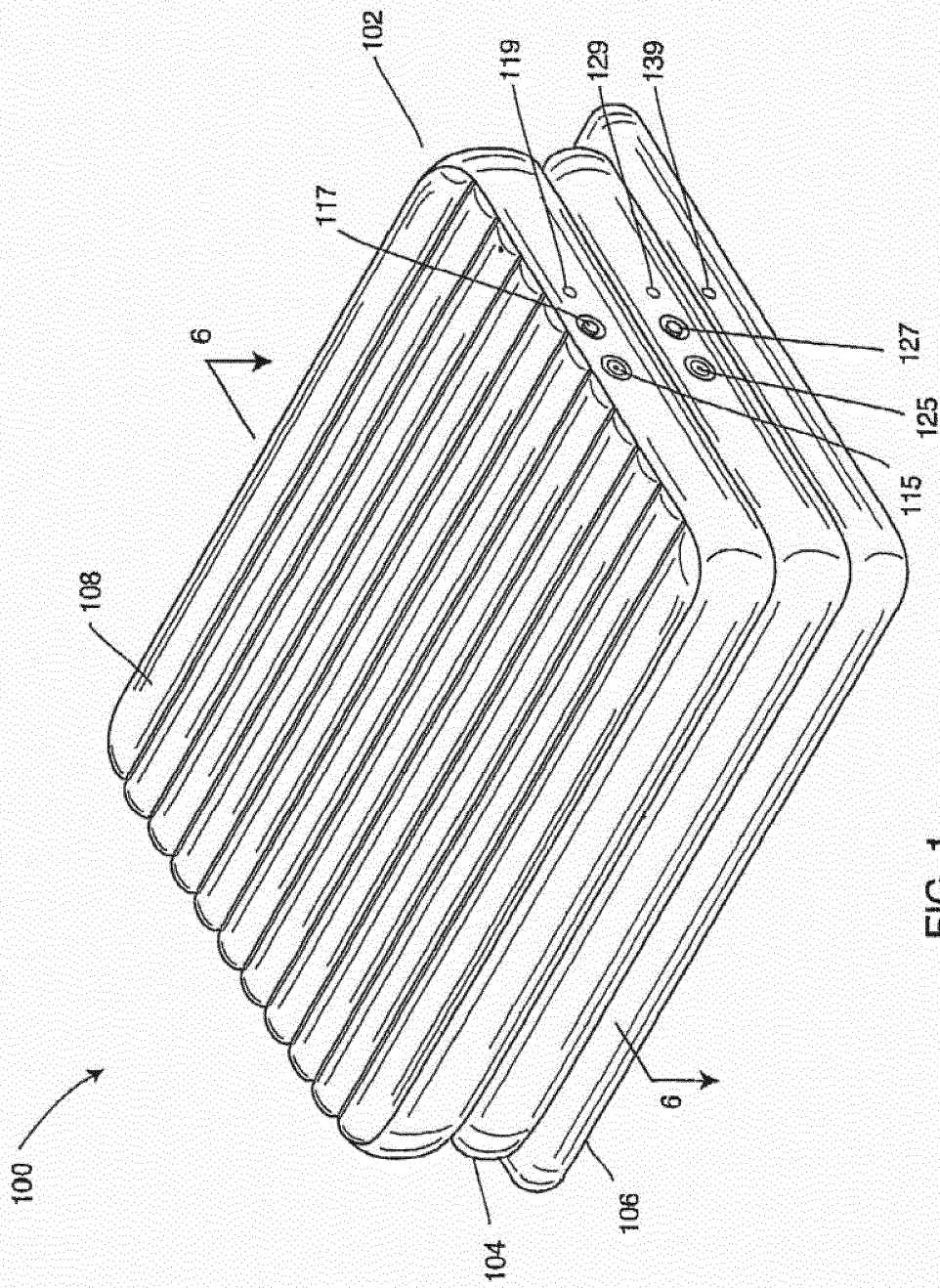


FIG. 1

INTEX EX. 1009
Intex v. Bestway, IPR2019-00434
INTEX EX. 1038, Pg. 489
Intex Recreation v. Bestway Inflatables

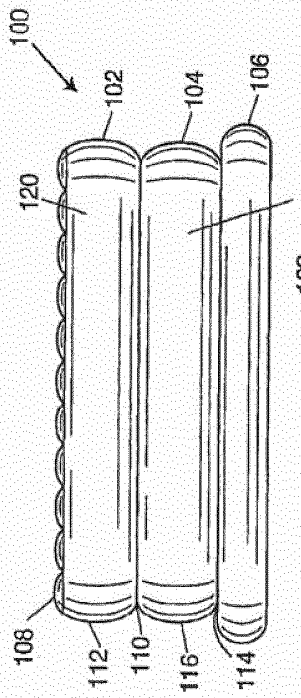


FIG. 3

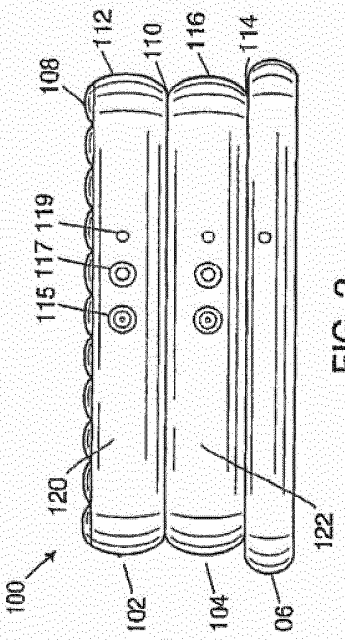


FIG. 2

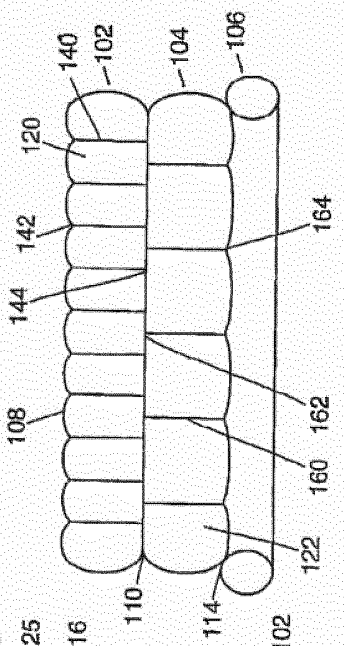


FIG. 6

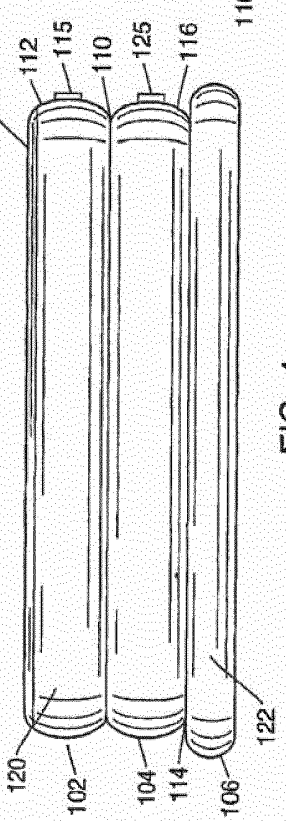


FIG. 4

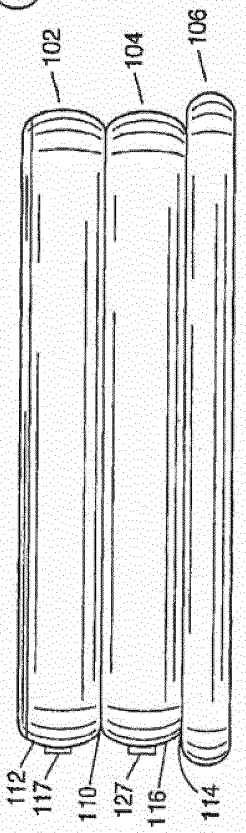


FIG. 5

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Intex v. Bestway, IPR2019-00434
INTEX EX. 1038, Pg. 490
Intex Recreation v. Bestway Inflatables

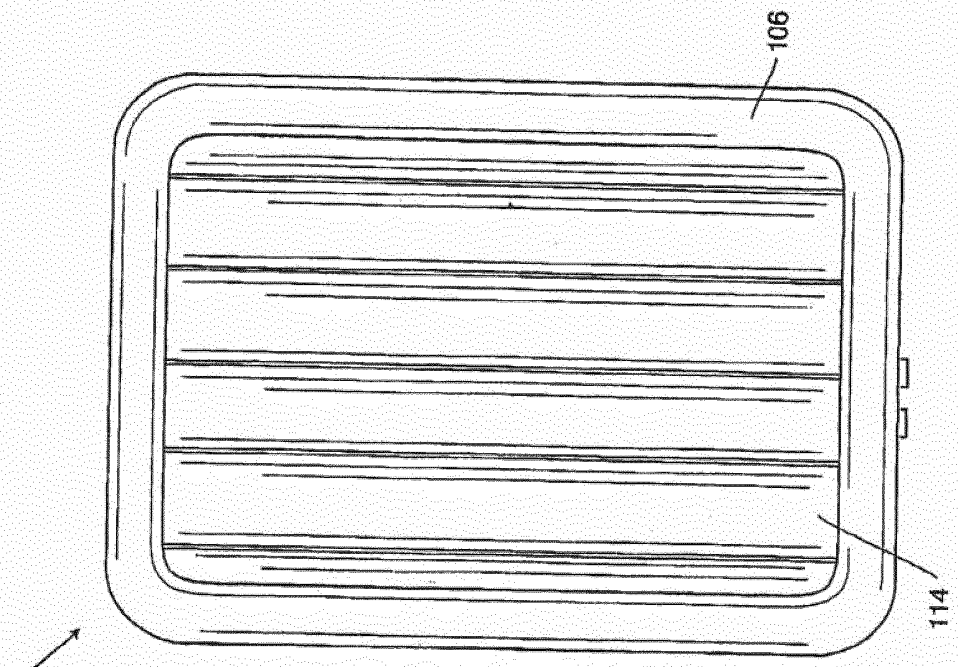


FIG. 8

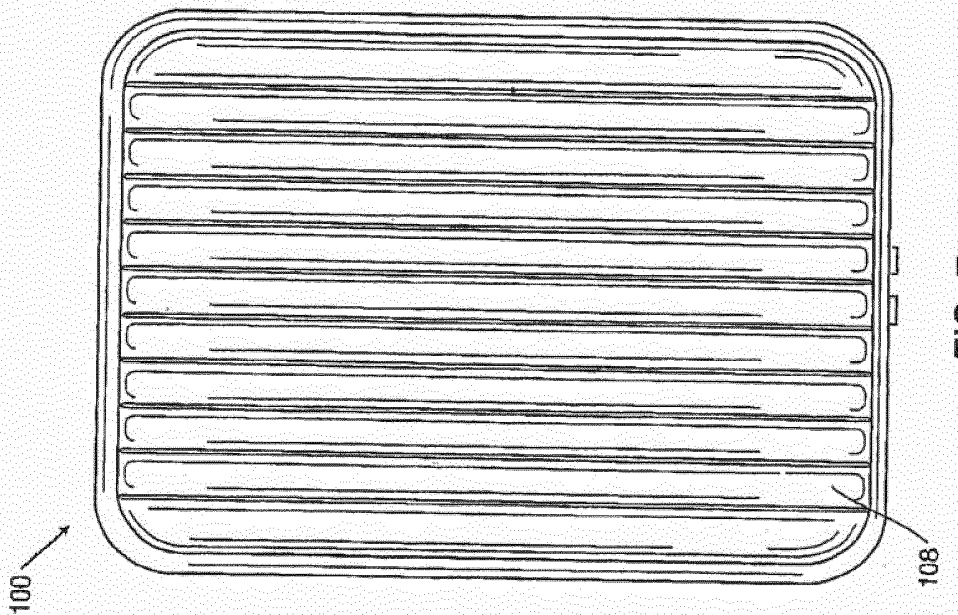


FIG. 7

INTEX EX. 1038, Pg. 491
Intex Recreation v. Bestway Inflatables
INTEX EX. 1009
Intex v. Bestway, IPR2019-00434

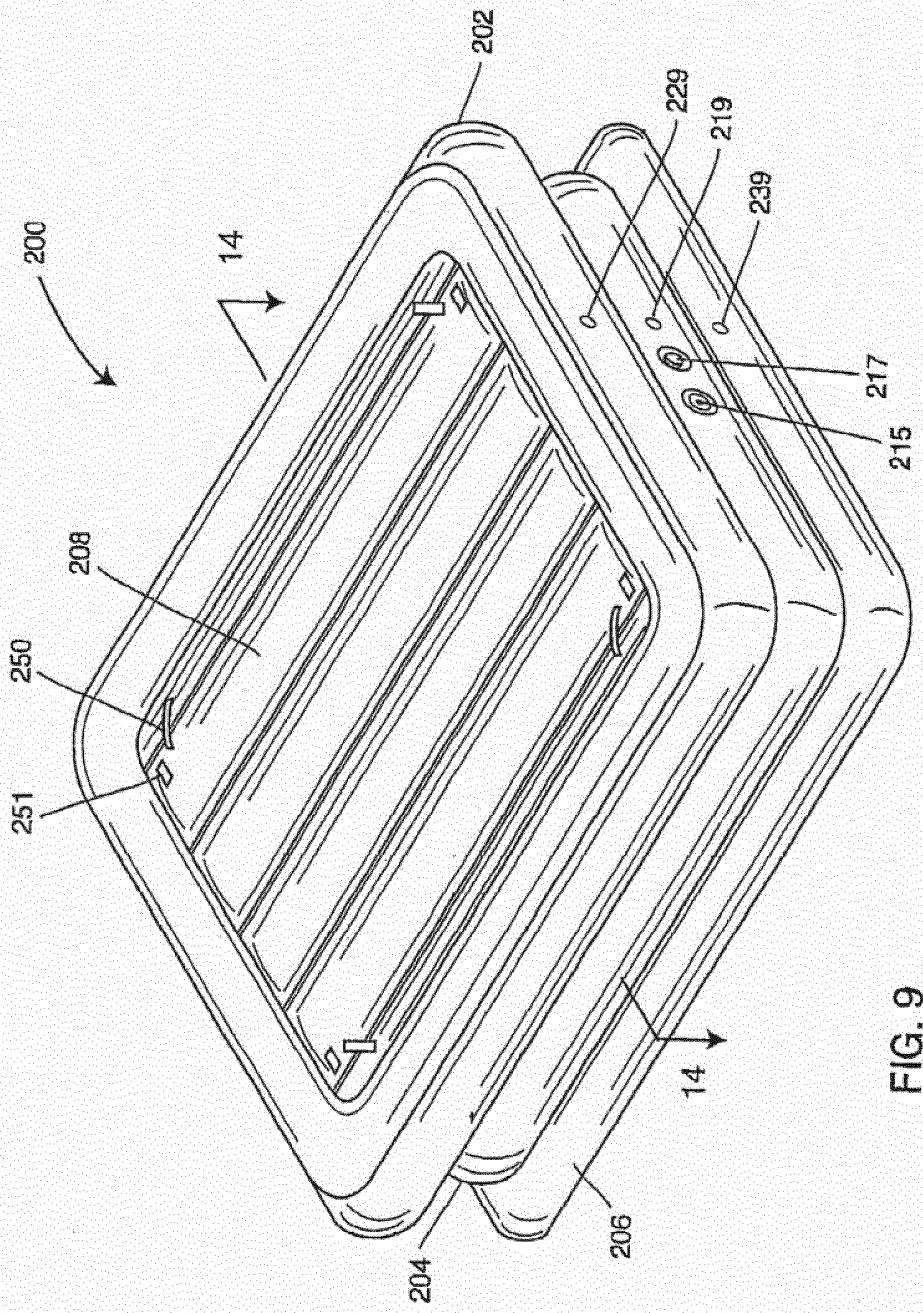


FIG. 9

INTEX EX. 1009
Intex v. Bestway, IPR2019-00434
INTEX EX. 1038, Pg. 492
Intex Recreation v. Bestway Inflatables

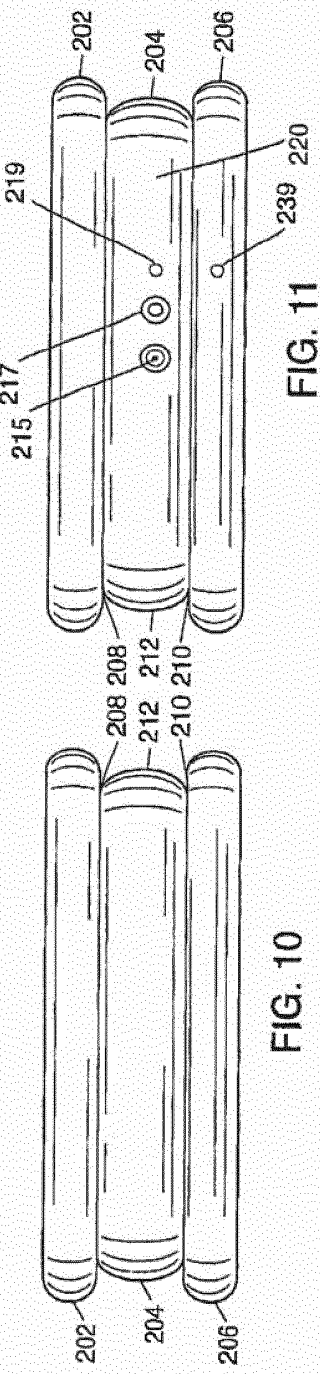


FIG. 11

FIG. 10

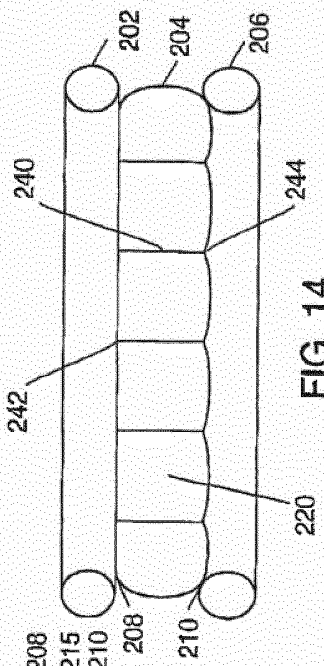


FIG. 14

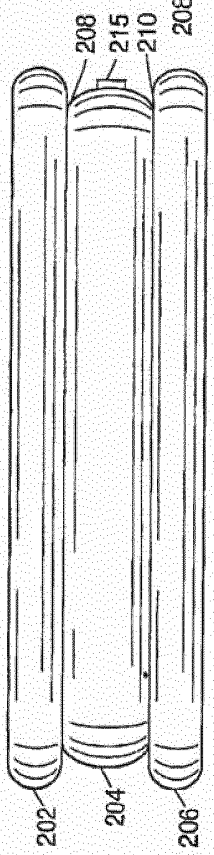


FIG. 12

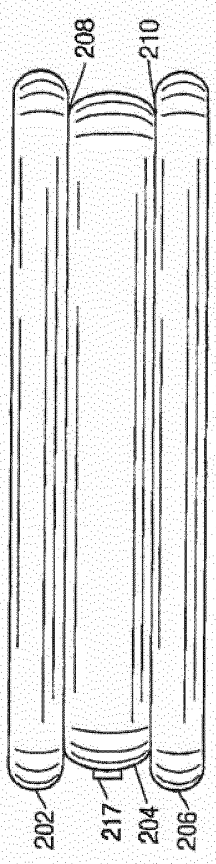


FIG. 13

INTEX EX. 1009
Intex v. Bestway, IPR2019-00434
INTEX EX. 1038, Pg. 493
Intex Recreation v. Bestway Inflatables

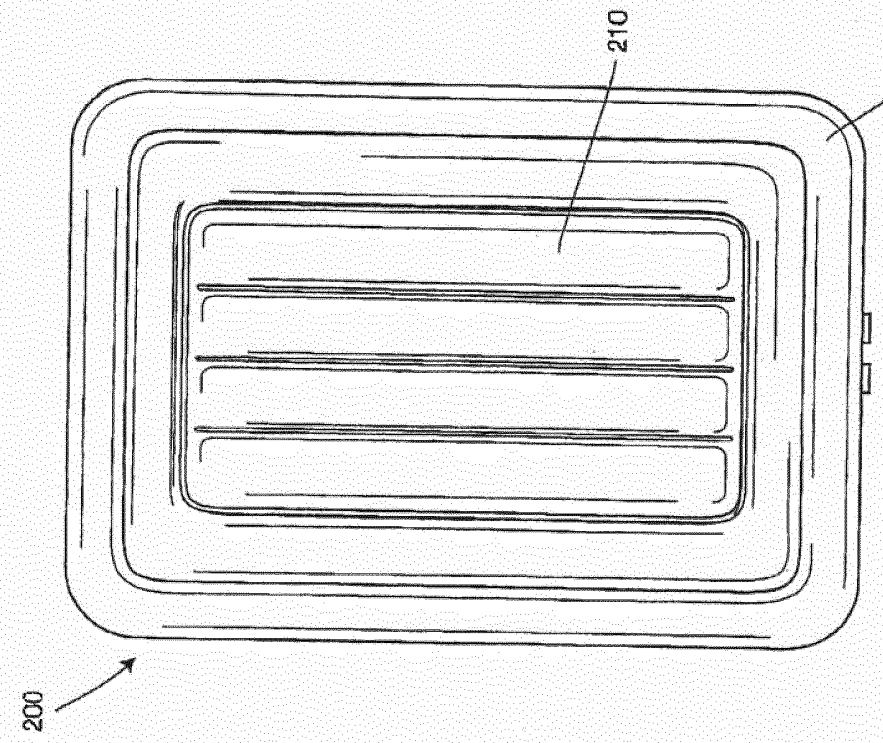


FIG. 16

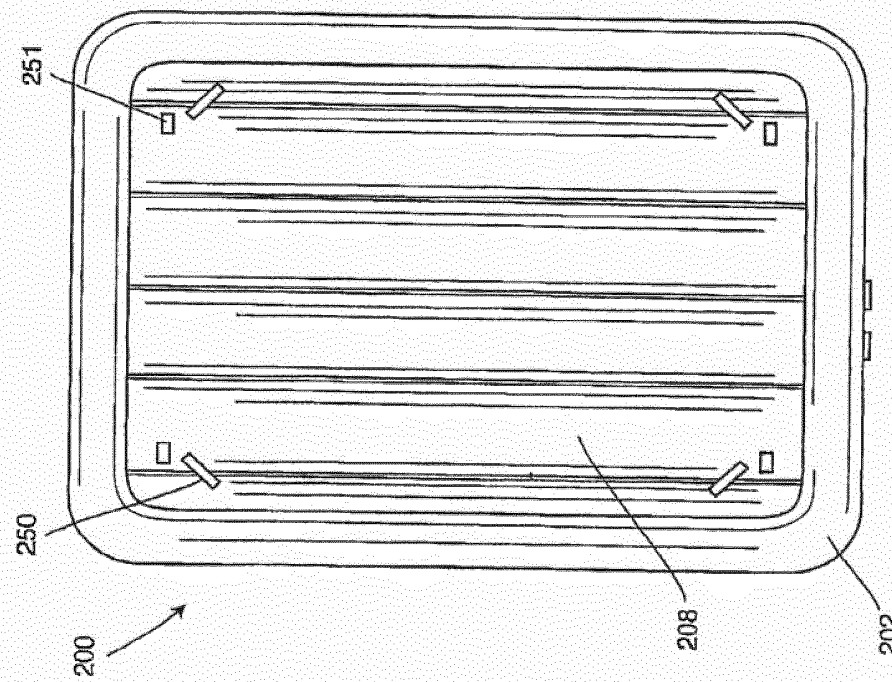


FIG. 15

INTEX EX. 1038, Pg. 494
Intex Recreation v. Bestway Inflatables
INTEX EX. 1038
Intex v. Bestway, IPR2019-00434

INFLATABLE BED

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an inflatable bed, and more particularly, to a combination of an air mattress, an air box spring, and stabilizing tubes.

2. Description of the Related Art

Air mattresses have enjoyed wide popularity for a number of reasons. When not in use, the air mattress is capable of being deflated to a substantially two-dimensional geometry which can be folded compactly and stored and transported quite easily. When inflated, air mattresses provide the user with a generally high level of comfort as the user is literally supported upon a cushion of air isolating the user from what would be an otherwise uncomfortable sleeping surface such as natural terrain encountered on a typical camping excursion.

However, there are several disadvantages to the use of conventional inflatable air mattresses. Such mattresses situate users in undesirably close proximity to the ground surface and often do not provide a sufficiently comfortable sleeping surface. In conventional bedding, a box spring is placed underneath a mattress to support the mattress and provide additional comfort and insulation to the user. Without a box spring, a sleeping surface provided only by a mattress may be uncomfortably firm and the coldness retained by the ground surface underneath is transferred to the user via the mattress. Since air mattresses provide much less insulation than conventional mattresses from cold, hard surfaces, such as a campground, an additional layer would be required for both insulation and comfort.

Another disadvantage of conventional air mattresses is that there is insufficient height for the mattress to act as a suitable sitting surface and a sleeping surface for elderly individuals. Conventional bedding, which includes a mattress and a box spring, is of adequate height to provide a comfortable sitting surface and facilitates the process for elderly individuals to get in and out of bed. To utilize conventional air mattresses as a sitting surface, the user must expend much more energy in lowering and raising his body. For the elderly, a greater and taxing effort of getting into and out of bed is required.

To compensate for these disadvantages, prior art has suggested the use of separate but attached chambers to increase the height. However, increased height in inflatable bedding results in instability when weight is applied to the periphery of the top surface of the bedding. If a user sits on one corner of the air mattress, the air mattress is likely to tilt up and unsettle any objects and the user off of the mattress. Therefore, there is a need for an inflatable bed that conveniently provides a raised and stable sleeping surface. There is also a need for an inflatable bed that allows the user to attach an inflatable mattress to a base by means such as hook and loop means should the user choose to do so.

SUMMARY OF THE INVENTION

Accordingly, the present invention is directed to an inflatable bed that substantially obviates one or more of the problems due to limitations and disadvantages of the related art.

It is an object of the present invention to provide an inflatable bed which characteristically creates a generally stable, comfortable and raised sleeping surface.

It is a further object of the present invention to provide an inflatable bed that reduces heat loss by the user to the ground surface by reducing the surface contact area of the bottom surface of the bed with the ground surface.

It is another object of the present invention to provide an inflatable bed that is easily and quickly inflated and deflated, and able to be stored conveniently.

It is another object of the present invention to provide an inflatable bed that is aesthetically pleasing, secure, and comfortable to use.

An object of an alternative embodiment of the present invention is to provide an inflatable bed that allows the user to determine the height and firmness of the sleeping surface.

Additional features and advantages of the invention will be set forth in the description which follows, and in part will be apparent from the description, or may be learned by practice of the invention. The objectives and other advantages of the invention will be realized and attained by the structure particularly pointed out in the written description and claims hereof as well as the appended drawings.

To achieve these and other advantages and in accordance with the purpose of the present invention, as embodied and broadly described, an inflatable bed comprises an inflatable mattress with a top layer sealed to a bottom layer through a wall, wherein the bottom and top layers and the wall define an outer frame of the inflatable mattress; an inflatable box spring with a top layer sealed to a bottom layer through a wall, wherein the bottom and top layers and the wall define an outer frame of the inflatable box spring; and a stabilizing tube attached around a periphery of an outer frame of the bottom layer of the inflatable box spring to provide further stability.

According to one aspect of the present invention, the bottom layer of the inflatable mattress is the same as the top layer of the air box spring.

According to another aspect of the present invention, a plurality of I-beam sealing structures are longitudinally disposed between and are attached to a bottom surface of the top layer and a top surface of the bottom layer of the inflatable mattress. In addition, a plurality of I-beam sealing structures are longitudinally disposed between and are attached to a bottom surface of the top layer and a top surface of the bottom layer of the inflatable box spring.

According to another aspect of the present invention, an outer periphery of the stabilizing tube is larger than an outer periphery of the inflatable box spring to provide stability.

According to another embodiment of the present invention, an inflatable bed comprises an inflatable mattress with a top layer sealed to a bottom layer through a wall, wherein the bottom and top layers and the wall define an outer frame of the inflatable mattress; an inflatable box spring with a top layer sealed to a bottom layer through a wall, wherein the bottom and top layers and the wall define an outer frame of the inflatable box spring; a first stabilizing tube attached to the periphery of an outer surface of the top layer of the inflatable box spring to provide stability to the inflatable mattress disposed on the inflatable box spring; and a second stabilizing tube attached to a periphery of an outer surface of the bottom layer of the air box spring to provide further stability. Preferably, the inflatable mattress is detachable from the inflatable box spring.

According to one aspect of the present invention, the inflatable mattress includes loop fasteners disposed on the bottom surface of the inflatable mattress. The inflatable box spring further includes hook and loop fasteners and corre-

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sponding straps disposed on the top surface of the box spring so as to fasten to the corresponding loop fasteners disposed on the bottom surface of the inflatable mattress.

According to another aspect of the present invention, an outer periphery of the second stabilizing tube is larger than an outer periphery of the inflatable box spring to provide stability.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory and are intended to provide a further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention.

FIG. **1** illustrates a perspective view of an inflatable bed according to a first embodiment of the present invention;

FIG. **2** illustrates a frontal view of the first embodiment of the present invention;

FIG. **3** illustrates a posterior view of the first embodiment of the present invention;

FIG. **4** illustrates a right side view of the first embodiment according to the present invention;

FIG. **5** illustrates a left side view of the first embodiment according to the present invention;

FIG. **6** illustrates a cross-sectional view of the first embodiment of the present invention;

FIG. **7** illustrates a top plan view of the first embodiment of the present invention;

FIG. **8** illustrates a bottom plan view of the first embodiment of the present invention;

FIG. **9** illustrates a perspective view of an inflatable bed according to the second embodiment of the present invention;

FIG. **10** illustrates a posterior view of the second embodiment of the present invention;

FIG. **11** illustrates a frontal view of the second embodiment of the present invention;

FIG. **12** illustrates a right side view of the second embodiment according to the present invention;

FIG. **13** illustrates a left side view of the second embodiment according to the present invention;

FIG. **14** illustrates a cross-sectional view of the second embodiment of the present invention;

FIG. **15** illustrates a top plan view of the second embodiment of the present invention; and

FIG. **16** illustrates a bottom plan view of the second embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to the drawings, and in particular to FIGS. **1–16** thereof, an inflatable bed embodying the principles and concepts of the present invention will be described.

FIG. **1** illustrates a perspective view of the inflatable bed **100** according to the first embodiment of the present invention. FIGS. **2** and **3** illustrate frontal and posterior views, respectively, of the inflatable bed **100**. FIGS. **4** and **5** illustrate right side and left side views, respectively, of the inflatable bed **100**.

Referring to FIGS. **1–5**, the inflatable bed **100** comprises a top inflatable mattress **102**, an air or inflatable box spring **104** attached underneath to the inflatable mattress **102**, and an airtight stabilizing tube **106** attached to the periphery of the bottom surface of the air box spring **104**. The inner perimeter of the stabilizing tube **106** is equivalent to the outer perimeter of the air box spring **104**. The vertical direction arrows **6** in FIG. **1** refer to FIG. **6**, which depicts the cross-sectional view of the inflatable bed.

The inflatable mattress **102** is comprised of a top layer **108** that is sealed to a bottom layer **110** through a wall **112**. These three components define the outer frame of the air mattress **102** and create an airtight chamber **120**. The bottom layer **110** is shared by the top layer of the air box spring **104**. Preferably, the bottom layer **110** is the top layer of the air box spring **104**. The outer frame of the air box spring **104** comprises a top layer **110** that is sealed to a bottom layer **114** through a wall **116**, thereby creating an airtight chamber **122**. Preferably, the wall **116** is of greater length than the wall **112**. The stabilizing tube **106** is attached to the outer periphery of the bottom layer **114** of the air box spring **104** by radio frequency sealing (RF) or other means known to one of ordinary skill in the art. The air mattress **102**, the air box spring **104**, and the stabilizing tube **106** are not in gaseous or fluid communication with each other.

In the preferred embodiment, the material for all layers **108**, **110**, **114**, walls **112** and **116**, and stabilizing tube **106** are comprised of a flexible and resilient material, such as polyvinyl chloride sheeting (typically referred to as PVC), thermoplastic impregnated cloth or other materials known to one of ordinary skill in the art. The edges of the walls **112**, **116** are fused with the top and bottom layers **108**, **110**, **114** using such process as radio frequency (RF) sealing or other process known to one of ordinary skill in the art. The stabilizing tube **106** is fused to the periphery of the bottom surface of the air box spring **104** using RF sealing or other processes known to one of ordinary skill in the art. Alternatively, the stabilizing tube **106** may be fastened to the air box spring **104** by using any suitable fastener known to one of ordinary skill in the art, such as zippers, snaps, hook and loop fasteners or the like.

On the front side surface of the air mattress **102**, there are located an inlet valve **115**, an outlet valve **117**, and a bi-directional valve **119**, which are in gaseous or fluid communication with the chamber **120**. On the front side surface of the air box spring **104**, there are located an inlet valve **125**, an outlet valve **127**, and a bi-directional valve **129**, which are in gaseous or fluid communication with the chamber **122**. On the front side surface of the stabilizing tube **106**, there is located a bi-directional valve **139**. Preferably, the inlet valves **115**, **125** are standard safety valves commercially available and known to those skilled in the art. Such valves are one-way valves, or self-sealing, which allow air flow into the chambers. A forceful stream of air from a foot pump, hand pump, compressed air container and the like can be introduced into the chambers **120** and **122** through these valves **115** and **125**, respectively. In operation, the inlet safety valves are typically used to adjust the desired degree of inflation of the chambers. Preferably, the outlet valves **117** and **127**, which are used to deflate the chambers, have wide openings for fast deflation. The bi-directional valves **119**, **129**, and **139** are used to manually adjust the volume of air in the chambers and the stabilizing tube and preferably have narrow openings for manipulating inflation and deflation. The structure of all of the valves, and the means by which they are connected to the surfaces, are commonly known to one of ordinary skill in the art.

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The stabilizing tube **106** preferably contains only a bi-directional valve due its relatively smaller volume than that of the inflatable mattress **102** or the air box spring **104**. The footprint of the inflatable mattress **102** is identical to that of the air box spring **104**. By only situating the inflatable mattress **102** above the air box spring **104**, the resulting structure is unstable. A user that places significant weight on the periphery of the top surface of the inflatable mattress would cause the entire structure to tilt up and pitch articles on the mattress and the user in the direction of the weight. Therefore, the purpose of attaching the stabilizing tube **106** to the outer periphery of the air box spring **104** is to provide stability to the inflatable bed **100** by increasing the footprint size of the inflatable bed **100**.

The stabilizing tube **106**, when inflated, preferably creates a larger footprint of the inflatable bed **100** than what would result without it. The increased footprint area results from the stabilizing tube **106** completely hemming the perimeter of the air box spring **104** at the bottom edge. The stabilizing tube **106** can be attached to the air box spring **104** by using such process as RF sealing or other process known to one of ordinary skill in the art or be fastened by using any suitable fastener known to one of ordinary skill in the art, such as zippers, snaps, hook and loop fasteners or the like. The increased footprint area results in a larger base for the inflatable bed, thereby providing additional stability.

The stabilizing tube **106** in effect also recesses the bottom layer **114** of the air box spring **104**, thereby preferably creating an open cavity. The presence of the stabilizing tube **106** also decreases the surface contact area of the inflatable bed **100** with the ground surface. Instead of the inflatable bed **100** resting on the bottom layer **114** of the air box spring **104**, the inflatable bed **100** is now at least partially supported by the stabilizing tube **106**. The surface contact area of the stabilizing tube **106** is significantly less than the surface area of the bottom layer **114** of the air box spring **104**. Consequently, heat loss and firmness of the sleeping surface are greatly diminished.

FIG. **6** illustrates a cross-sectional view of the inflatable bed **100**, showing the inner features. Within the chamber **120** of the inflatable mattress **102** is a series of longitudinally disposed vertical partitions or I-beam structures **140**, which are heat or RF welded at **142** and **144** between the top layer **108** and bottom layer **110** defining the chamber **120** along their entire lengths. The I-beam structures **140** act as retention members and function to limit the outward expansion of the top and bottom layers **108**, **110** of the chamber **120** and to absorb the weight differences created by the user. This type of retention member is well known to one of ordinary skill in the art of inflation devices, such as floatation devices. Alternatively, although I-beam retention members are shown, other retention members may be used in the present invention, including coil-like beam, tube-like beam, column-like beam, quilt beam and the like. In the preferred embodiment, there are approximately 8 to 12 I-beam structures **140** for a queen size mattress.

Also, in FIG. **6**, another series of longitudinally disposed vertical partitions or I-beam structures **160**, which are heat or RF welded at **162** and **164** between the layer **110** and bottom layer **114** defining the chamber **122**. The purpose of these I-beam structures **160** is equivalent to that of the structures **140** described above. In the preferred embodiment, there are approximately 4 to 8 I-beam structures **160** for a queen size box spring.

FIGS. **7** and **8** illustrate the top and bottom plan views, respectively, of the inflatable bed **100** in the preferred embodiment. In FIG. **7**, the top layer **108** of the inflatable mattress **102** is shown with ridges created by the I-beam structures **140**. The I-beam structures **160** in the chamber **122** create ridges on the bottom layer **114** of the air box spring **104**, as seen in FIG. **8**. These ridges provide additional comfort to the user. Also, the stabilizing tube **106** is shown to fully surround the air box spring **104** in both FIGS. **7** and **8**.

FIGS. **9–16** illustrate an inflatable bed **200** according to a second embodiment of the present invention. A main difference between the first and second embodiments of the present invention is that the inflatable mattress, present in FIGS. **1–8**, is not depicted since it is separate and detachable from the inflatable bed **200**. The second embodiment allows the user to utilize the inflatable bed **200** with or without the inflatable mattress should space be limited or additional firmness be desired. FIG. **9** illustrates a perspective view of the inflatable bed **200** of the second embodiment of the present invention. FIGS. **10** and **11** illustrate posterior and frontal views, respectively, of the inflatable bed **200**. FIGS. **12** and **13** illustrate right side and left side views, respectively, of the inflatable bed **200**.

Referring to FIGS. **9–13**, where the separate and detachable inflatable mattress is not shown, the inflatable bed **200** comprises a first airtight stabilizing tube **202** attached to the periphery of the top surface of the air box spring **204**, and a second airtight stabilizing tube **206** attached to the periphery of the bottom surface of the air box spring **204**. The inner perimeters of the stabilizing tube **202**, **206** are preferably equivalent to the outer perimeter of the air box spring **204**. The outer frame of the air box spring **204** comprises a top layer **208** sealed to a bottom layer **210** through a wall **212**, thereby creating a chamber **220**. The interior of the first stabilizing tubes **202** is in gaseous or fluid communication with the chamber **220** of the air box spring **204**, whereas the interior of the second stabilizing tube **206** is not in gaseous or fluid communication with the chamber **220**. The vertical direction arrows **14** in FIG. **9** refer to FIG. **14**, which depicts the cross-sectional view of the inflatable bed **200**.

In the second embodiment, material for layers **208**, **210**, wall **212**, and stabilizing tubes **202**, **206** are comprised of a flexible and resilient material, such as polyvinyl chloride sheeting (typically referred to as PVC), thermoplastic impregnated cloth or other materials known to one of ordinary skill in the art. The edges of the wall **212** are fused with the top and bottom layers **208**, **210** using such process as RF sealing or other process known to one of ordinary skill in the art.

On the front side surface of the air box spring **204**, there are located an inlet valve **215**, an outlet valve **217**, and a bi-directional valve **219**, which are in gaseous or fluid communication with the chamber **220**. On the front side surface of the second stabilizing tube **206**, there is located a bi-directional valve **239**. The bi-directional valves **219** and **239** are self-sealing, which allows air flow into the chambers (but must be pinched to allow air flow out of the chamber). Preferably, the inlet valve **215** is a standard safety valve commercially available and known to those of skill in the art. A forceful stream of air from a foot pump, hand pump, compressed air container and the like can be introduced into the chamber **220** through this valve **215**. In operation, the inlet safety valve is typically used to adjust the desired degree of inflation of the chamber. Preferably, the outlet valve **217**, which is used to deflate the chamber **220**, has a wide opening for fast deflation. The bi-directional valves **219** and **239** are used to manually micro-adjust the volume of air in the chamber **220** and the stabilizing tubes and

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preferably have narrow openings for manipulating inflation and deflation. The structure of all of the valves, and the means by which they are connected to the surfaces, are commonly known to one of ordinary skill in the art.

In FIG. **9**, the stabilizing tube **206** contains only the single bi-directional valve **239** due to its relatively smaller volumes than that of the air box spring **204**. The purpose of the second stabilizing tube **206** is to provide stability and lessen the surface contact area of the inflatable bed, such as described above in the preferred embodiment. The purpose of the first stabilizing tube **202** is to provide stability for the separate and detachable inflatable mattress. The first stabilizing tube **202** in effect recesses the top surface of the air box spring **204**, thereby creating a cavity in which the separate and detachable inflatable mattress is to be placed.

Unlike in the first embodiment where the inflatable mattress **102** is immobile because it shares a layer **110** with the air box spring **104**, the separate and detachable inflatable mattress in the second embodiment is attached by straps **250** located at the edges of the top layer **208** of the air box spring **204**, preferably in the corners. The straps **250** are preferably fused to the edge of the air box spring **204** by RF sealing. These straps **250** are then inserted into and through loops in corresponding areas on the bottom surface of the inflatable mattress. The ends of the straps **250** are then fastened to the top surface of the air box spring **204** by using any suitable fastener known to one of ordinary skill in the art, such as zippers, snaps, hook and loop fasteners or the like. Preferably, the ends of the straps **250** are fastened to the top surface of the air box spring **204** using hook and loop fasteners **251**. Therefore, the ends of the straps **250** contain the corresponding fastening device to comply with the fastener **251**. Once the inflatable mattress is fastened onto the top surface of the air box spring **204** by using the straps **250**, the first stabilizing tube **202** acts as a cradle to further secure the inflatable mattress from sliding off the air box spring **204**.

FIG. **14** illustrates a cross-sectional view of the inflatable bed **200**, showing the inner features. Within the chamber **220** of the air box spring **204** is a series of longitudinally disposed vertical partitions or I-beam structures **240**, which are heat or RF welded at **242** and **244** between the top layer **208** and bottom layer **210** defining the chamber **220** along their entire lengths. The I-beam structures **240** act as retention members and function to limit the outward expansion of the top and bottom layers **208**, **210** of the chamber **220**, to support the separate and detachable inflatable mattress and to absorb the weight differences created by the user. This type of retention member is well known to one of ordinary skill in the art of inflation devices, such as floatation devices. Alternatively, although I-beam retention members are shown, other retention members may be used in the present invention, including coil-like beam, tube-like beam, column-like beam, quilt beam and the like. In the preferred embodiment, there are approximately 4 to 8 I-beam structures **240** for a queen size air box spring.

FIGS. **15** and **16** illustrate the top and bottom plan views, respectively, of the inflatable bed **200** of the alterative embodiment. In FIG. **15**, the straps **250** and the hook and loop fasteners **251** are shown preferably in the corners of the top surface of the air box spring **204** to maximize the effectiveness of securing the inflatable mattress.

It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention cover the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

What is claimed is:

1. An inflatable bed comprising:

an inflatable mattress with a top layer sealed to a bottom layer through a wall, wherein the bottom and top layers and the wall define an outer frame of the inflatable mattress;

an inflatable box spring with a top layer sealed to a bottom layer through a wall, wherein the bottom and top layers and the wall define an outer frame of the inflatable box spring; and

a stabilizing tube attached around a periphery of an outer frame of the bottom layer of the inflatable box spring to provide further stability wherein an outer periphery of the stabilizing tube is larger than the outer periphery of the inflatable box spring, and wherein an open cavity is formed between the bottom layer of the inflatable box spring and the stabilizing tube for decreasing the surface contact area between the inflatable box spring and a ground surface.

2. The inflatable bed of claim **1**, wherein the bottom layer of the inflatable mattress is the same as the top layer of the inflatable box spring.

3. The inflatable bed of claim **1**, wherein a plurality of I-beam sealing structures are longitudinally disposed between and are attached to a bottom surface of the top layer and a top surface of the bottom layer of the inflatable mattress.

4. The inflatable bed of claim **1**, wherein a plurality of I-beam sealing structures are longitudinally disposed between and are attached to a bottom surface of the top layer and a top surface of the bottom layer of the inflatable box spring.

5. The inflatable bed of claim **1**, wherein the inflatable mattress further comprises an inlet to inflate and an outlet to deflate the inflatable mattress.

6. The inflatable bed of claim **1**, wherein the inflatable box spring further comprises an inlet to inflate and an outlet to deflate the inflatable box spring.

7. The inflatable bed of claim **1**, wherein the stabilizing tube further comprises an inlet to inflate and deflate the stabilizing tube.

8. An inflatable bed comprising:

an inflatable mattress with a top layer sealed to a bottom layer through a wall, wherein the bottom and top layers and the wall define an outer frame of the inflatable mattress and wherein the inflatable mattress includes loop fasteners disposed on the bottom surface of the inflatable mattress;

an inflatable box spring with a top layer sealed to a bottom layer through a wall, wherein the bottom and top layers and the wall define an outer frame of the inflatable box spring;

a first stabilizing tube attached to the periphery of an outer surface of the top layer of the inflatable box spring to provide stability to the inflatable mattress disposed on the inflatable box spring; and

a second stabilizing tube attached to a periphery of an outer surface of the bottom layer of the inflatable box spring to provide further stability.

9. The inflatable bed of claim **8**, wherein the inflatable box spring further includes hook and loop fasteners and corresponding straps disposed on the top surface of the box spring so as to fasten to the corresponding loop fasteners disposed on the bottom surface of the inflatable mattress.

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10. The inflatable bed of claim 8, wherein the inflatable mattress is detachable from the inflatable box spring.

11. The inflatable bed of claim 8, wherein the first stabilizing tube is in gaseous communication with the inflatable box spring.

12. The inflatable bed of claim 8, wherein the second stabilizing tube further comprises an inlet to inflate and deflate the second stabilizing tube.

13. The inflatable bed of claim 8, wherein an outer periphery of the second stabilizing tube is larger than an outer periphery of the inflatable box spring to provide stability.

14. An inflatable bed for use with an inflatable mattress, comprising:

an inflatable box spring with a top layer sealed to a bottom layer through a wall, wherein the bottom and top layers and the wall define an outer frame of the inflatable box spring;

a first stabilizing tube attached to the periphery of an outer surface of the top layer of the inflatable box spring to provide stability to an inflatable mattress disposed on the inflatable box spring; and

a second stabilizing tube attached to a periphery of an outer surface of the bottom layer of the inflatable box spring to provide further stability wherein an outer periphery of the second stabilizing tube is larger than the outer periphery of the inflatable box spring, and wherein an open cavity is formed between the bottom layer of the inflatable box spring and the second stabilizing tube for decreasing the surface contact area between the inflatable box spring and a ground surface.

15. The inflatable bed of claim 14, wherein the first stabilizing tube is in gaseous communication with the inflatable box spring.

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17 June 2019

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Germany

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Dear Sirs

Opposition against European Patent No. 3192401 ("the Patent")
Of Bestway Inflatables and Materials Corp
On behalf of Intex Recreation Corp. ("the Opponent")
Our ref: M/P19609.EP01/JMV/JJAB

We, the Representatives of the opponent, are hereby submitting a Notice of Opposition under Article 99 EPC against the above mentioned European Patent (hereinafter referred to as "the opposed Patent" or "the Patent"). The mention of the grant of the Patent was published in European Patent Bulletin 18/38 of 19 September 2018. For ease of reference, details of the opposed Patent are listed below:

European Patent number:	EP 3192401
Patent proprietor:	Bestway Inflatables & Material Corp
Title:	Inflatable Bed
EP application number:	16191360.3
Priority claimed:	13.01.16 – CNA201610020533
	13.01.16 – CNU201620031074
Grant date:	19 September 2018

The opposition fee of 785 EUR is being paid from our deposit account no. 2805.0007 in the name of Reddie & Grose LLP. In the event that these fees are not received or are underpaid, you are hereby authorised to remove the necessary amount from our deposit account no. 2805.0007.

1. Requests

1.1 – It is requested to revoke the opposed Patent in its entirety.

1.2 – In the event that the Opposition Division does not revoke the opposed Patent on consideration of these written submissions, a communication containing the preliminary opinion of the Opposition Division, and Oral Proceedings in accordance with Art. 116 EPC are hereby requested.

1.3 – The Opponent reserves the right to file further written submissions and requests at a later date.

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Reddie & Grose LLP is a limited liability partnership registered in England and Wales with registered number OC360746, and registered office address The White Chapel Building, 10 Whitechapel High Street, London E1 8QS. Regulated by the Intellectual Property Regulation Board (IPREG).

1.4 - The present Opposition is filed on the grounds of Article 100(a) and 100(b) EPC. The subject matter of the opposed Patent is not novel in accordance with Art 54 EPC and/or does not involve an inventive step according to Art. 56 EPC. Also the Patent does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

2. References

We submit and refer to the following documents:

E1 - CN 203137719 U (Intex Ind. Xiamen Co Ltd)

E2 – Translation of CN 203137719 U

E3 – US 2007/0277324 (Liu, Feng)

E4 – US 9,254,047 (Schermel et al.)

E5 – US 4,941,223 (Santo, Philip J)

E6 – US 5,669,091 (Chung, Ming-Chun)

E7 – US 2015/0335164 (Liu, Feng)

E8 – WO 2013/130117 (Intex Recreation Corporation)

E9 – FR 2 914 545 (Song Rong)

E10 – GB 434,098 (P. B. Cow & Co Ltd)

E11 – US 6,568,013 (Perez et al.)

E12 – US 6,671,910 (Hsu et al.)

E13 – US 6,701,559 (Boso et al.)

E14 – US 7,039,972 (Chaffee, Robert B)

E15 – US 2015/0201760 (Lin et al.)

Copies of the above referenced documents are enclosed.

3. Grounds for Opposition

3.1 - Summary

As discussed in more detail below, it is submitted that:

- The Patent does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, and is therefore contrary to Article 100(b) EPC

- Independent claim 1 lacks novelty over E1 and is therefore contrary to Article 54 EPC

- Dependent claims 2 – 39 lack novelty/and or an inventive step over E1 either on its own or in combination with the other cited prior art, and are therefore contrary to Articles 54 and 56 EPC

We shall consider the novelty and inventive step of each claim in turn, and then consider sufficiency.

3.2 - Novelty and Inventive Step

3.2.1 - Claim 1

Claim 1 of the Patent reads as follows (Roman numerals added for ease of reference):

An inflatable bed (10), comprising:

i) a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

ii) at least one side wall (13), an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet,

iii) an air chamber formed between said top sheet, said bottom sheet and said side wall;

iv) at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

v) at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls,

vi) at least two outside edges (152,162) of said support structure being respectively coupled to the side wall adjacent,

vii) at least one inside edge (153,163) of said support structure being coupled to the top sheet or bottom sheet adjacent,

viii) wherein said support structure comprises a second tensioning structure and a third tensioning structure,

ix) at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent,

x) at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

xi) *and at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent,*

xii) *at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent.*

E1 discloses all the features of claim 1. The features of E1 corresponding to all the features i) to xii) of claim 1 are outlined below:

i) the upper piece 1, and the lower piece 2 – see page 4, lines 5-7 of E2; Fig 2 of E1

ii) the wrapping piece 4, […] and upper and lower sides of the wrapping piece 4 are respectively connected with a periphery of the upper piece 1 and periphery of the lower piece 2 – see page 4, lines 7 & 9-11 of E2.

iii) thereby forming an inflatable product having an air chamber – see page 4, lines 11-12 of E2.

iv) a plurality of drawbelts 3 […] Two ends of each of the drawbelts 3 are respectively connected to a lower surface of the upper piece 1 and an upper surface of the lower piece 2 – see page 4, lines 7-9 of E2; Fig 2 of E1.

v) The side wrapping belt 5; and a ring-shaped upper suction piece 11 and a ring shaped lower suction piece 21 – see page 4, line 22 and page 5, lines 4-5 of E2; Fig 2 of E1. The side wrapping belt 5 and the ring shaped pieces act together to create a support structure.

vi) The plastic strip 53 is connected to a middle of an inner surface of the wrapping piece 4. This is one outside edge. See page 4, lines 22-28 of E2 and Fig 2 of E1.

The ring shaped upper suction piece 11 and a ring-shaped lower suction piece 21 are respectively disposed between the upper piece and the wrapping piece 4 and between the lower piece and the wrapping piece. Where the upper or lower suction piece meets the side wall is the second outside edge. See page 5, lines 4-10 of E2 and Fig 2 of E1.

vii) The ring-shaped upper suction piece 11 and the ring-shaped lower suction piece 21 are respectively disposed between the upper piece 1 and the wrapping piece 4 and between the lower piece 2 and the wrapping piece 4. Where the upper or lower suction piece meets the upper or lower sheet is an inside edge. See page 5, lines 4-7 of E2.

Also the ring shaped plastic strips 51 at both ends of the side wrapping belt are respectively connected to the upper piece 1 and the lower piece 2. Plastic strips 51 are an inside edge. See page 4, lines 25-27 of E2.

viii) The second tensioning structure is made from both the cables 52 as well as the upper suction piece 11. The third tensioning structure is made from both the cables 52 as well as the lower suction piece 21.

ix) The at least two outside edges of the second tensioning structure coupled to the side wall, are the plastic strip 53 and the outside edge of upper suction piece 11 as discussed in point vi).

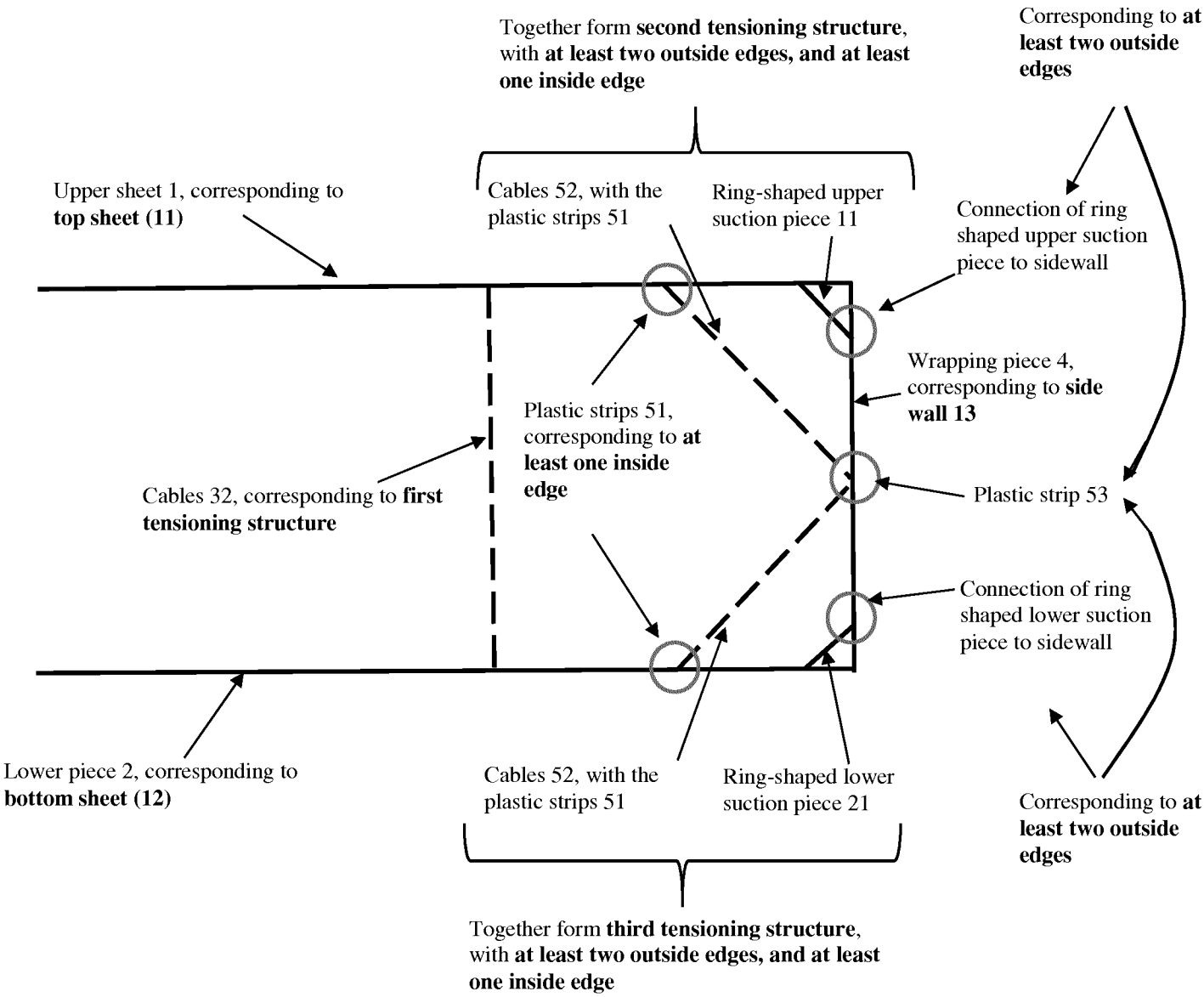
x) The at least one inside edge of the second tensioning structure can be either the plastic strip 51, or the inside edge of the upper suction piece 11 as discussed in point vii).

xi) The at least two outside edges of the third tensioning structure coupled to the side wall, are the plastic strip 53 and the outside edge of lower suction piece 21 as discussed in point vi).

xii) The at least one inside edge of the third tensioning structure can be either the plastic strip 51, or the inside edge of the lower suction piece 21 as discussed in point vii).

For the ease of reference of the Opposition Division we have prepared and copy on the next page a figure showing the support structures of E1. This is marked with those features of E1 which correspond to features (i) to (xii) of claim 1 of the Patent.

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Independent claim 1 lacks novelty and is therefore not patentable under Article 54 EPC.

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3.2.2 – Claim 2

Claim 2 states:

> *The inflatable bed according to claim 1, wherein said second tensioning structure and said third tensioning structure are respectively provided with a plurality of air holes, through which an airflow passage is formed in said air chamber.*

A plurality of air holes in the second and third tensioning structure is disclosed in E1. Support structure 5 of E1, which forms a portion of the second and third tensioning structure is formed with cables 52 spanning the distance between strips 51 and 52. The space between these cables is a 'plurality of air holes' as claimed.

Dependent claim 2 therefore lacks novelty.

3.2.3 – Claim 3

Claim 3 states,

> *The inflatable bed according to claim 1, wherein said second tensioning structure and said third tensioning structure are disposed at an interval in a perpendicular direction.*

Although it is undefined as to what the second or third tensioning structures are perpendicular, it is assumed the intended meaning is they are perpendicular to each other.

The upper support structure of E1 includes upper suction piece 11 and the upper portion of the support structure 5. The lower support structure of E1 includes lower suction piece 21 and the lower part of the support structure 5. As shown in Fig 2 of E1, these support structures form an angle that is substantially perpendicular.

Further, E15 discloses tensioning structures and their use in corners (See Figs. 3 and 4). It is evident from Figures 3 and 4 of E15 that the upper and lower tensioning structures, corresponding to the second and third tensioning structures of the Patent, are disposed at an interval. Hence it would be obvious to modify the tensioning structures of E1 to be disposed at an interval.

Claim 3 therefore lacks an inventive step.

3.2.4 – Claim 4

Claim 4 states:

> *The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams are respectively coupled to said side wall and said top sheet adjacent, the at least two first I-beams are disposed at an interval.*

E1 discloses the same structure as in claim 4. One of the first I-beams is the upper corner piece 11, and a second I-beam is the upper portion of the support structure 5. Fig. 2 and Fig. 4 of E1 show the two I-beams are spaced apart, i.e. 'disposed at an interval'.

Dependent claim 4 therefore lacks novelty.

3.2.5 - Claim 5

Claim 5 states:

> *The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least two second I-beams, an outside edge and an inside edge of each of said second I-beams are respectively coupled to the side wall and said bottom sheet adjacent, the at least two second I-beams are disposed at an interval.*

The analysis above for Claim 4 applies equally to claim 5, as E1 discloses a lower support structure that is the same as the upper support structure.

Claim 5 therefore lacks novelty.

3.2.6 - Claim 6

Claim 6 states:

> *The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first Y-beam, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.*

Y-beams are well known as internal tensioning structures for inflatable beds. E3 discloses using a Y-shaped tensioning structure in inflatable mattresses (see figure 2 of E3). Y-beams are also used for connection with bracing the sidewall of an inflatable bed, as shown in Figure 6 of E4.

It would therefore be obvious to the skilled person, to modify E1 to a structure that is within the scope of Claim 6.

Claim 6 therefore lacks an inventive step.

3.2.7 - Claim 7

Claim 7 states:

> *The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.*

It is well known that corner braces can be used at the upper and lower corners of a mattress. Therefore, as discussed with respect to claim 6, it would be obvious to modify E1 to a structure that is within the scope of claim 7.

Claim 7 therefore lacks an inventive step.

3.2.8 - Claim 8

Claim 8 states:

> *The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said top sheet.*

Using tubular beams for corner braces is known from E5. E5 discloses using tubular beams as a supporting structure with an inflated area. Although the bed in question is a water bed it has an 'air perimeter chamber 14'. Looking at Figure 7 of E5, an embodiment is seen where S1a loops back on itself and is sealed at point 34a. The resulting shape is tubular.

Accordingly, it would be obvious to modify E1 to include tubular beams and this fall into the scope of claim 8.

Claim 8 therefore lacks an inventive step.

3.2.9 - Claim 9

Claim 9 states:

> *The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said bottom sheet.*

It is well known that corner braces can be used at the upper and lower corners of a mattress. Therefore, as discussed with respect to claim 8, it would be obvious to modify E1 to contain tubular beams which falls within the scope of claim 9.

Claim 9 therefore lacks an inventive step.

3.2.10 - Claim 10

Claim 10 states:

> *The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first V-beam, wherein two outside edges of said first V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.*

V-beams for use as bracing in inflatable beds is known from E6. It would be obvious to modify E1 to include V-beams as a tensioning structure.

Claim 10 therefore lacks an inventive step.

3.2.11 - Claim 11

Claim 11 states:

> *The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second V-beam, wherein two outside edges of said second V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.*

It is known that corner braces are used at the upper and lower corners of an inflatable mattress. Therefore as discussed with respect to claim 10, it would be obvious to modify E1 to use V-beams and thus come under the scope of claim 11.

Claim 11 therefore lacks an inventive step.

3.2.12 - Claim 12

Claim 12 reads as follows:

> *The inflatable bed according to claim 4, wherein said at least two first I-beams are spaced apart from each other at a lower surface of said top sheet.*

E1 discloses the upper suction piece 11 and the upper part of wrapping belt 5. These are the two 'first I-beams' and they are spaced apart at their connection points to the upper sheet 1.

Claim 12 therefore lacks novelty.

3.2.13 - Claim 13

Claim 13 reads:

> *The inflatable bed according to claim 5, wherein said at least two second I-beams are spaced apart from each other at an upper surface of said bottom sheet*

E1 discloses the lower suction piece 21 and the lower part of wrapping belt 5. These are the two second I-beams and they are spaced apart at their connection points to the lower piece 2.

Claim 13 therefore lacks novelty.

3.2.14 - Claim 14

Claim 14 reads:

> *The inflatable bed according to claim 4, wherein said at least two first I-beams are disposed at an interval on an inner surface of said side wall in a perpendicular direction.*

E1 discloses the upper suction piece 11 and the upper part of wrapping belt 5. These are the two 'first I-beams' and they are spaced apart when connecting to the wrapping piece 4 (i.e. side wall).

Claim 14 therefore lacks novelty.

3.2.15 - Claim 15

Claim 15 reads:

> *The inflatable bed according to claim 5, wherein said at least two second I-beams are disposed at an interval on the inner surface of said side wall in a perpendicular direction.*

E1 discloses the lower suction piece 21 and the lower part of wrapping belt 5. These are the two 'second I-beams' and they are spaced apart when connecting to the wrapping piece 4 (i.e. side wall).

Claim 15 therefore lacks novelty.

3.2.16 - Claim 16

Claim 16 reads:

> *The inflatable bed according to claim 6, wherein the two outside edges of said at least one first Y-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.*

As discussed with respect to claim 6, it is obvious to modify the support structure of E1 to use a Y-beam. Further, it is obvious when modifying E1 to use a Y-beam to have the at least two edges disposed at an interval on the side wall.

Claim 16 therefore lacks an inventive step.

3.2.17 - Claim 17

Claim 17 reads:

> *The inflatable bed according to claim 7, wherein the two outside edges of said at least one second Y-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.*

As discussed with respect to claim 7, it is obvious to modify the support structure E1 to use a Y-beam. Further, it is obvious when modifying E1 to use a Y-beam to have two the at least edges disposed at an interval on the side wall.

Claim 17 therefore lacks an inventive step.

3.2.18 - Claim 18

Claim 18 reads:

> *The inflatable bed according to claim 8, wherein said at least two outside edges of said at least one first tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on an inner surface of said side wall in a perpendicular direction.*

As discussed with respect to claim 8, it is obvious to modify the support structure of E1 to use a tubular beam. Further, it is obvious when modifying E1 to use a tubular beam with at least two outside edges, to dispose said two outside edges at an interval.

Claim 18 therefore lacks an inventive step.

3.2.19 - Claim 19

Claim 19 reads:

> *The inflatable bed according to claim 9, wherein said at least two outside edges of said at least one second tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on the inner surface of said side wall in a perpendicular direction.*

As discussed with respect to claim 9, it is obvious to modify the support structure of E1 to use a tubular beam. Further, it is obvious when modifying E1 to use a tubular beam with at least two outside edges, to dispose said two outside edges at an interval.

Claim 19 therefore lacks an inventive step.

3.2.20 - Claim 20

Claim 20 reads:

> *The inflatable bed according to claim 10, wherein the two outside edges of said at least one first V-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.*

As discussed with respect to claim 10, it is obvious to modify the support structure of E1 to use a V-beam. Further, it is obvious when modifying E1 to use a V-beam to have the at least two edges disposed at an interval on the side wall.

Claim 20 therefore lacks an inventive step.

3.2.21 - Claim 21

Claim 21 reads:

> *The inflatable bed according to claim 11, wherein the two outside edges of said at least one second V-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.*

As discussed with respect to claim 11, it is obvious to modify the support structure of E1 to use a V-beam. Further, it is obvious when modifying E1 to use a V-beam to have the at least two edges disposed at an interval on the side wall.

Claim 21 therefore does not contain an inventive step.

3.2.22 - Claim 22

Claim 22 reads:

> *The inflatable bed according to claim 4, wherein said at least two first V-beams as a whole are of a continuous annular structure or a segmental annular structure.*

As the claim is dependent on claim 4, we shall interpret the claim as if 'V-beams' is a typographical error and the Patentee intended the claim to refer to 'I-beams'.

E1 discloses that the upper suction piece 11 and side wrapping piece 5, which comprises cables 52, have an annular or ring shaped structure. See for example Fig 2 of E1, and page 4, line 22 to page 5, line 7 of E2. These are the corresponding features for the two first I-beams.

Claim 22 therefore lacks novelty.

3.2.23 - Claim 23

Claim 23 reads:

> *The inflatable bed according to claim 5, wherein said at least two second I-beam as a whole are of a continuous annular structure or a segmental annular structure.*

E1 discloses that the lower suction piece 21 and side wrapping piece 5, which comprises cables 52, have an annular or ring shaped structure. See for example Fig 2 of E1, and page 4, line 22 to page 5, line 7 of E2. These are the corresponding features for the two second I-beams.

Claim therefore 23 lacks novelty.

3.2.24 - Claim 24

Claim 24 reads:

> *The inflatable bed according to claim 6, wherein said at least one first Y-beam as a whole is of a continuous annular structure or a segmental annular structure.*

As discussed with respect to claim 6, it is obvious to modify E1 to use Y-beams for corner bracing. As shown with claim 23, E1 discloses the second tensioning structure having an annular structure. Therefore the modification of E1 to use Y-beams, where the Y-beam has an annular structure is also obvious.

Claim 24 therefore lacks an inventive step.

3.2.25 - Claim 25

Claim 25 reads:

> *The inflatable bed according to claim 7, wherein said at least one second Y-beam as a whole is of a continuous annular structure or a segmental annular structure.*

As discussed with respect to claim 7, it is obvious to modify E1 to use Y-beams for corner bracing. As shown with claim 24, E1 discloses the third tensioning structure having an annular structure. Therefore the modification of E1 to use Y-beams, where the Y-beam has an annular structure is also obvious.

Claim 25 therefore lacks an inventive step.

3.2.26 - Claim 26

Claim 26 reads:

> *The inflatable bed according to claim 8, wherein said at least one first tubular beam as a whole is of a segmental annular structure.*

As discussed with respect to claim 8, it is obvious to modify E1 to use tubular beams for corner bracing. As shown with claim 23, E1 discloses the second tensioning structure having an annular structure. Therefore the modification of E1 to use tubular beams, where the tubular beam has an annular structure is also obvious.

Claim 26 therefore lacks an inventive step.

3.2.27 - Claim 27

Claim 27 reads:

> *The inflatable bed according to claim 9, wherein said at least one second tubular beam as a whole is of a segmental annular structure.*

As discussed with respect to claim 9, it is obvious to modify E1 to use tubular beams for corner bracing. As shown with claim 24, E1 discloses the third tensioning structure having an annular structure. Therefore the modification of E1 to use tubular beams, where the tubular beam has an annular structure is also obvious.

Claim 27 therefore lacks an inventive step.

3.2.28 - Claim 28

Claim 28 reads:

> *The inflatable bed according to claim 10, wherein said at least one first V-beam as a whole is of a continuous annular structure or a segmental annular structure.*

As discussed with respect to claim 10, it is obvious to modify E1 to use V-beams for corner bracing. As shown with claim 23, E1 discloses the second tensioning structure having an annular structure. Therefore the modification of E1 to use V-beams, where the V-beam has an annular structure is also obvious.

Claim 28 therefore lacks an inventive step.

3.2.29 - Claim 29

Claim 29 reads:

> *The inflatable bed according to claim 11, wherein said at least one second V-beam as a whole is of a continuous annular structure or a segmental annular structure.*

As discussed with respect to claim 11, it is obvious to modify E1 to use V-beams for corner bracing. As shown with claim 24, E1 discloses the third tensioning structure having an annular structure. Therefore the modification of E1 to use V-beams, where the V-beam has an annular structure is also obvious.

Claim 29 therefore lacks an inventive step.

3.2.30 - Claim 30

Claim 30 states:

> *The inflatable bed according to claim 1, wherein said first tensioning structure is one or more beams selected from I-beams, coil beams, Y-beams or X-beams.*

These features are well known in the art. E1 discloses an I beam structure used as a first tensioning structure. See Fig 2 of E1 and page 4, lines 18 to 22 of E2, where it has *"plastic strips 31 at both ends connecting with a plurality of cables 32, with the plastic strips 31 used for welding with the upper piece 1 and the lower piece 2".*

E8 discloses cylindrical (i.e. coil beam) tensioning structures (see Paragraph [0003], also reference numeral 3 of Fig 5).

E4 discloses Y-beam and X-beam tensioning structures for inflatable mattresses (See Fig 1 and Fig 2).

Claim 30 therefore is not novel and does not include an inventive step.

3.2.31 - Claim 31

Claim 31 reads as follows:

> *The inflatable bed according to claim 1, wherein said first tensioning structure, said second tensioning structure and said third tensioning structure are all made of thermoplastic plastic sheet.*

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E1 discloses the use of thermoplastic plastic sheet as the material for tensioning structures. The tensioning structures contain, 'Plastic strips 31' (present in the first tensioning structure) and 'ring shaped plastic strips 51', 'plastic strips 53' (present in the second and third tensioning structure). These plastic strips are welded to the upper piece and lower piece (see claim 4 of E2), which makes them inherently thermoplastic.

Claim 31 is therefore not novel.

3.2.32 - Claim 32

Claim 32 states:

> *The inflatable bed according to claim 1, wherein one or more of said first tensioning structure, said second tensioning structure and said third tensioning structure at least partially comprise mesh, laminated plastic sheet or a threads.*

E1 discloses using a plurality of cables 32, 52 (i.e. threads). These form the first, second and third tensioning structure.

Claim 32 therefore lacks novelty.

3.2.33 - Claim 33

Claim 33 states:

> *The inflatable bed according to claim 32, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite plastic strips, said mesh and said threads are sandwiched between the two opposite plastic strips.*

It is well known in the prior art to manufacture tensioning structures with mesh or threads between plastic strips. E8 discloses threads as tensioning structures, with the threads being sandwiched between pairs of 'weld strips'. (See Fig 10 & 11 and paragraph [0085] of E8).
E7 also shows a mesh between two plastic strips 204 (See Fig 5A and Paragraph [0050] of E7).
It would be obvious to modify the inflatable mattress of E1 to incorporate the tensioning structures of E8 or E7.

Claim 33 therefore lacks an inventive step.

3.2.34 - Claim 34

Claim 34 states:

> *The inflatable bed according to claim 32, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with an U-shaped plastic strip, said mesh and said threads are sandwiched between the U-shaped plastic strip.*

E7 discloses using U-shaped weld strips 502 sandwiching the mesh panel 202. (See Fig 5B and paragraph [0052] of E7). It would be obvious to modify the inflatable mattress of E1 to incorporate the tensioning structures of E7.

Claim 34 therefore lacks an inventive step.

3.2.35 - Claim 35

Claim 35 states:

> *The inflatable bed according to claim 1, wherein said first tensioning structure is coupled to said top and bottom sheets by means of high-frequency welding; said second tensioning structure is coupled to said top sheet and said side wall by means of high-frequency welding; and said third tensioning structure is coupled to said bottom sheet and said side wall by means of high-frequency welding.*

High frequency welding is well known as a common technique for connecting material parts of inflatable mattresses. See for example E3, paragraph [0011]. It would be obvious to use high frequency welding to connect the features of E1.

Claim 35 therefore does not include an inventive step.

3.2.36 - Claim 36

Claim 36 states:

> *The inflatable bed according to claim 1, wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.*

Claim 36 is not readily understandable. It is assumed the claim refers to a 'depression', where at the corner of the inflatable mattress there is a rim. For example in Fig 5 of the Patent, the 'outside' point 153 is higher than the 'inside' point 153.

This is well known in the field of inflatable mattresses. It can be seen in Fig 3 of E1. Further evidence can be found in E9, E10 and E11.

Claim 36 therefore is not novel.

3.2.37 - Claim 37

Claim 37 states:

> *The inflatable bed according to claim 1, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.*

As with claim 36, claim 37 is not readily understandable. Further the figures of the Patent suggest the 'inside part' of the bottom sheet should be *higher* than the 'outside part'. Of course this would be relative to the direction of the mattress which is undefined.

In any case, the 'depression' of inflatable mattresses is often found on both sides. Figure 4 of E1 shows this. It can also be seen in E10 and E11.

Claim 37 therefore lacks an inventive step.

3.2.38 - Claim 38

Claim 38 states:

> *The inflatable bed according to claim 1, wherein said inflatable bed further comprises a built-in air pump, which is disposed on said side wall and is located between a lower edge of said second tensioning structure and an upper edge of said third tensioning structure for inflating said air chamber.*

Built in air-pumps are well known in the field of inflatable mattresses. E13 (Fig 3) and E14 (entire document) for example disclose air-pumps disposed on the sidewall. It would be obvious to modify E1 to incorporate an air pump of E14.

Claim 38 therefore lacks an inventive step.

3.2.29 - Claim 39

Claim 39 states:

> *The inflatable bed according to claim 1, wherein said inflatable bed further comprises an air valve, which is disposed on said side wall for the inflation and deflation of said inflatable bed.*

Air valves are commonly used with inflatable mattresses for inflation and deflation. They can be seen in E7 (paragraph [0038]), as well as E12 (Fig 1) and E13 (Fig 4). It would be obvious to modify the inflatable mattress of E1 to include an air valve.

Claim 39 therefore lacks an inventive step.

3.3 - Sufficiency

3.3.1 – Claim 1

Article 100(b) states:

> *Opposition may only be filed on the grounds that:*
> *the European patent does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art;*

Claim 1 provides (emphasis added):

An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13), an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet,

an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, ***said support structure being disposed in a longitudinal direction of at least one of said side walls****,*

at least two outside edges (152,162) of said support structure being respectively coupled to the side wall adjacent,

at least one inside edge (153,163) of said support structure being coupled to the top sheet or bottom sheet adjacent,

wherein said support structure comprises a second tensioning structure and a third tensioning structure,

at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent,

at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

and at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent,

at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent.

Claim 1 recites that the support structure is longitudinal (i.e. parallel to the side wall). However all the described embodiments have a support structure which is and must be transverse to the side wall with the outside edges coupled to the side wall and the inside edge coupled to a top or bottom wall. The support structure is a bracing element and provides support in the transverse direction.

The Patent does not disclose “the invention in a manner sufficiently clear and complete” for a skilled man to make an inflatable bed with a longitudinal support structure having the outside and inside edges as defined in claim 1.

3.3.2 – Claims 36 & 37

Claim 36 states:

The inflatable bed according to claim 1, wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the

location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

Claim 37 states:

The inflatable bed according to claim 1, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

When assessing novelty and inventive step for claims 36 and 37, broad assumptions were made about their meaning. However it is submitted that they are completely ambiguous, to the effect that it would be completely impossible for the skilled person to carry out the invention therein.

Claims 36 and 37 therefore do not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

4. Conclusion

For at-least the above reasons, the subject matter of claims 1-39 is not novel nor involves an inventive step, contrary to the requirements of Articles 54 and 56 EPC.

The Patent also does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

This Notice of Opposition justifies the request to revoke the patent in its entirety.

Yours faithfully



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Europäisches Patentamt
European Patent Office
Office européen des brevets

Notice of opposition to a European patent

I. Patent opposed

Patent No.	EP3192401
Application No.	EP16191360.3
Date of mention of the grant in the European Patent Bulletin (Art. 97(3), Art. 99(1) EPC)	19 September 2018
Title of the invention	INFLATABLE BED

II. Proprietor of the patent

first named in the patent specification	Bestway Inflatables & Materials Corp
Opponent's or representative's reference	MP19609.EP01/JV

III. Opponent

Name	Intex Recreation Corp.
Address:	4001 Via Oro Avenue Suite 210 Long Beach CA California 90810 United States of America
State of residence or of principal place of business	United States of America
Multiple opponents (see additional sheet)	☐

IV. Authorisation

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Multiple representatives (see additional sheet) ☐

Authorisation(s)

is/are enclosed ☐

has/have been registered under No. ☐

V. Opposition is filed against

the patent as a whole ☒

claim(s) No(s).

VI. Grounds for opposition:

Opposition is based on the following grounds:

(a) the subject-matter of the European patent opposed is not patentable (Art. 100(a) EPC) because:

- it is not new (Art. 52(1); Art. 54 EPC) ☒
- it does not involve an inventive step (Art. 52(1); Art. 56 EPC) ☒
- patentability is excluded on other grounds, namely articles ☐

(b) the patent opposed does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Art. 100(b) EPC; see Art. 83 EPC). ☒

(c) the subject-matter of the patent opposed extends beyond the content of the application/of the earlier application as filed (Art. 100(c) EPC, see Art. 123(2) EPC). ☐

VII. Facts (Rule 76(2)(c) EPC)

presented in support of the opposition are submitted herewith on an attached document ☒

VIII. Other requests:

IX. Evidence presented

D1	Other evidence	original file name: CN203137719U Intex Prior Art - Translation.pdf attached as: Evidence-Tran-1.pdf
D10	Patent document	US7039972 (B2) , 09.05.2006 original file name: US7039972 - pump.pdf attached as: Published-Evidence-9.pdf
D11	Patent document	US9254047 (B1) , 09.02.2016 original file name: US9254047 - Y-shaped side brace.pdf attached as: Published-Evidence-10.pdf
D12	Patent document	US20070277324 (A1) , 06.12.2007 original file name: US20070277324 Bestway Y beam.pdf attached as: Published-Evidence-11.pdf
D13	Patent document	US20150201760 (A1) , 23.07.2015 original file name: US 20150201760A1.pdf attached as: Published-Evidence-12.pdf
D14	Patent document	US20150335164 (A1) , 26.11.2015 original file name: US 20150335164 - Bestway Internal Support.pdf attached as: Published-Evidence-13.pdf
D15	Patent document	WO2013130117 (A1) , 06.09.2013 original file name: WO 2013130117A1 - Durabeam.pdf attached as: Published-Evidence-14.pdf
D2	Patent document	CN203137719 (U) , 21.08.2013 original file name: CN203137719U - Intex Prior Art.pdf attached as: Published-Evidence-1.pdf
D3	Patent document	FR2914545 (A3) , 10.10.2008 original file name: FR2914545A3 - depression.pdf attached as: Published-Evidence-2.pdf
D4	Patent document	GB434098 (A) , 10.12.1934 original file name: GB434098A - depression.pdf attached as: Published-Evidence-3.pdf
D5	Patent document	US4941223 (A) , 17.07.1990 original file name: US4941223 - corner braces, tubular.pdf attached as: Published-Evidence-4.pdf
D6	Patent document	US5669090 (A) , 23.09.1997 original file name: US5669091 V-shaped corner braces - Chung.pdf attached as: Published-Evidence-5.pdf
D7	Patent document	US6568013 (B2) , 27.05.2003 original file name: US6568013 - depression.pdf attached as: Published-Evidence-6.pdf
D8	Patent document	US6671910 (B2) , 06.01.2004 original file name: US6671910 - Valve.pdf attached as: Published-Evidence-7.pdf

D9 Patent document

US6701559 (B2) , 09.03.2004
original file name: US6701559 - Pump & Valve.pdf
attached as: Published-Evidence-8.pdf

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Intex Recreation v. Bestway Inflatables

X. Payment

Method of payment: Debit from deposit account

The European Patent Office is hereby authorised, to debit from the deposit account with the EPO any fees and costs indicated in the fees section below.

Currency: EUR

Deposit account number: 28050007

Account holder: Reddie & Grose LLP

Refunds

Any refunds should be made to EPO deposit account: 28050007

Account holder: Reddie & Grose LLP

Fees

	Factor applied	Fee schedule	Amount to be paid
010 Opposition fee	1	785.00	785.00
Total:		EUR	785.00

A Forms

	Details:	System file name:
A-1	Form for notice of opposition	ep-oppo.pdf

B Attached document files

	Original file name:	System file name:
B-1 1. Facts and arguments	MP19609.EP01 Filed Notice of Opposition 17.06.2019.pdf	OPPO.pdf

C Attached evidence files

	Original file name:	System file name:
C-1 1. Patent document	CN203137719U - Intex Prior Art.pdf	Published-Evidence-1.pdf
C-2 2. Patent document	FR2914545A3 - depression.pdf	Published-Evidence-2.pdf
C-3 3. Patent document	GB434098A - depression.pdf	Published-Evidence-3.pdf
C-4 4. Patent document	US4941223 - corner braces, tubular.pdf	Published-Evidence-4.pdf
C-5 5. Patent document	US5669091 V-shaped corner braces - Chung.pdf	Published-Evidence-5.pdf
C-6 6. Patent document	US6568013 - depression.pdf	Published-Evidence-6.pdf

C-7	7. Patent document	US6671910 - Valve.pdf	Published-Evidence-7.pdf
C-8	8. Patent document	US6701559 - Pump & Valve.pdf	Published-Evidence-8.pdf
C-9	9. Patent document	US7039972 - pump.pdf	Published-Evidence-9.pdf
C-10	10. Patent document	US9254047 - Y-shaped side brace.pdf	Published-Evidence-10.pdf
C-11	11. Patent document	US20070277324 Bestway Y beam.pdf	Published-Evidence-11.pdf
C-12	12. Patent document	US 20150201760A1.pdf	Published-Evidence-12.pdf
C-13	13. Patent document	US 20150335164 - Bestway Internal Support.pdf	Published-Evidence-13.pdf
C-14	14. Patent document	WO 2013130117A1 - Durabeam.pdf	Published-Evidence-14.pdf
C-15	1. Translation of a citation	CN203137719U Intex Prior Art - Translation.pdf	Evidence-Tran-1.pdf

Signature of opponent or representative

Place	**London**
Date:	**17 June 2019**
Signed by:	**Jan Vleck 22779**
Representative name:	**Jan VLECK**
Capacity:	**(Representative)**

Europäisches Patentamt
European Patent Office
Office européen des brevets

Acknowledgement of receipt

We hereby acknowledge receipt of the Notice of Opposition:

Submission number	7579547
Application number	EP16191360.3
Patent number	EP3192401
Date of receipt	17 June 2019
Your reference	MP19609.EP01/JV
Opponent	Intex Recreation Corp.
Title	INFLATABLE BED

Documents submitted

package-data.xml	ep-opposition-data.xml
ep-oppo.pdf (6 p.)	OPPO.pdf\MP19609.EP01 Filed Notice of Opposition 17.06.2019.pdf (20 p.)
Published-Evidence-1.pdf\CN203137719U - Intex Prior Art.pdf (12 p.)	Published-Evidence-2.pdf\FR2914545A3 - depression.pdf (16 p.)
Published-Evidence-3.pdf\GB434098A - depression.pdf (3 p.)	Published-Evidence-4.pdf\US4941223 - corner braces, tubular.pdf (7 p.)
Published-Evidence-5.pdf\US5669091 V-shaped corner braces - Chung.pdf (14 p.)	Published-Evidence-6.pdf\US6568013 - depression.pdf (12 p.)
Published-Evidence-7.pdf\US6671910 - Valve.pdf (12 p.)	Published-Evidence-8.pdf\US6701559 - Pump & Valve.pdf (16 p.)
Published-Evidence-9.pdf\US7039972 - pump.pdf (13 p.)	Published-Evidence-10.pdf\US9254047 - Y-shaped side brace.pdf (30 p.)
Published-Evidence-11.pdf\US20070277324 Bestway Y beam.pdf (6 p.)	Published-Evidence-12.pdf\US20150201760A1.pdf (11 p.)

INTEX EX. 1038, Pg. 526
Intex Recreation v. Bestway Inflatables

Published-Evidence-13.pdf\US 20150335164 - Bestway Internal Support.pdf (12 p.) Evidence-Tran-1.pdf\CN203137719U Intex Prior Art - Translation.pdf (9 p.)	Published-Evidence-14.pdf\WO 2013130117A1 - Durabeam.pdf (73 p.)

Submitted by	CN=Jan Vleck 22779
Method of submission	Online
Date and time receipt generated	17 June 2019, 16:52 (CEST)
Message Digest	44:F0:14:5C:8A:F2:FE:B5:53:73:83:3F:7A:F6:35:AF:34:39:01:80

Correction by the EPO of errors in debit instructions filed by eOLF
Errors in debit instructions filed by eOLF that are caused by the editing of Form 1038E entries or the continued use of outdated software (all forms) may be corrected automatically by the EPO, leaving the payment date unchanged (see decision T 152/82, OJ EPO 1984, 301 and point 6.3 ff ADA, Supplement to OJ EPO 10/2007).

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Intex Recreation v. Bestway Inflatables

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Stolk, René

Inchingalo, Simona
Bugnion S.p.A.
Viale Lancetti, 17
20158 Milano
ITALIE

Date
27.06.2019

Reference	Application No./Patent No.
27S8343,12EP42	16191360.3 - 1011 / 3192401

Applicant/Proprietor
Bestway Inflatables & Material Corp

Communication of a notice of opposition

You are hereby informed of a notice of opposition to the European patent specified above (see attached copy in the enclosure). The documents specified as patent documents in the notice of opposition are available for inspection via the European Patent Register at **www.epo.org/register**. Should you wish to receive these documents in paper format, they will be supplied to you free of charge if specifically requested on receipt of this communication (see OJ EPO 2009, 434).

If oral proceedings are to take place, parties are advised to check the electronic file via European Patent Register in advance of the hearing to ensure they are in possession of all relevant documents.

An invitation to file observations and to file amendments, where appropriate, to the description, claims and drawings (R. 79(1) EPC) will be issued separately.

The period within which such observations may be filed will not be fixed until the following conditions are met:

(a) the opposition period has expired;

(b) the notice of opposition has been examined for certain formal requirements (R. 77 EPC).

For the Opposition Division

Europäisches Patentamt • European Patent Office • Office européen des brevets •

Enclosure: Notice of opposition OI: Intex Recreation Corp.,Long Beach, CA, USA. , grounds + CN-ranslation

INTEX EX. 1038, Pg. 528
IPR2020-00956
Intex Recreation v. Bestway Inflatables

Europäisches Patentamt
European Patent Office
Office européen des brevets

Notice of opposition to a European patent

I. Patent opposed

Patent No.	EP3192401
Application No.	EP16191360.3
Date of mention of the grant in the European Patent Bulletin (Art. 97(3), Art. 99(1) EPC)	19 September 2018
Title of the invention	INFLATABLE BED

II. Proprietor of the patent

first named in the patent specification	Bestway Inflatables & Materials Corp
Opponent's or representative's reference	MP19609.EP01/JV

III. Opponent

Name	Intex Recreation Corp.
Address:	4001 Via Oro Avenue Suite 210 Long Beach CA California 90810 United States of America
State of residence or of principal place of business	United States of America
Multiple opponents (see additional sheet)	☐

IV. Authorisation

1. Representative

	VLECK, Mr. Jan
Company:	Reddie & Grose LLP
Registration No.:	1.8
Address of place of business	10 Whitechapel High Street London Greater London E1 8QS United Kingdom
Telephone/Fax	442072420901 / 442072423290
E-mail:	epo@reddie.co.uk

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Intex Recreation v. Bestway Inflatables

Multiple representatives (see additional sheet) ☐

Authorisation(s)

is/are enclosed ☐

has/have been registered under No. ☐

V. Opposition is filed against

the patent as a whole ☒

claim(s) No(s).

VI. Grounds for opposition:

Opposition is based on the following grounds:

(a) the subject-matter of the European patent opposed is not patentable (Art. 100(a) EPC) because:

- it is not new (Art. 52(1); Art. 54 EPC) ☒
- it does not involve an inventive step (Art. 52(1); Art. 56 EPC) ☒
- patentability is excluded on other grounds, namely articles ☐

(b) the patent opposed does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Art. 100(b) EPC; see Art. 83 EPC). ☒

(c) the subject-matter of the patent opposed extends beyond the content of the application/of the earlier application as filed (Art. 100(c) EPC, see Art. 123(2) EPC). ☐

VII. Facts (Rule 76(2)(c) EPC)

presented in support of the opposition are submitted herewith on an attached document ☒

VIII. Other requests:

IX. Evidence presented

D1	Other evidence	original file name: CN203137719U Intex Prior Art - Translation.pdf attached as: Evidence-Tran-1.pdf
D10	Patent document	US7039972 (B2) , 09.05.2006 original file name: US7039972 - pump.pdf attached as: Published-Evidence-9.pdf
D11	Patent document	US9254047 (B1) , 09.02.2016 original file name: US9254047 - Y-shaped side brace.pdf attached as: Published-Evidence-10.pdf
D12	Patent document	US20070277324 (A1) , 06.12.2007 original file name: US20070277324 Bestway Y beam.pdf attached as: Published-Evidence-11.pdf
D13	Patent document	US20150201760 (A1) , 23.07.2015 original file name: US 20150201760A1.pdf attached as: Published-Evidence-12.pdf
D14	Patent document	US20150335164 (A1) , 26.11.2015 original file name: US 20150335164 - Bestway Internal Support.pdf attached as: Published-Evidence-13.pdf
D15	Patent document	WO2013130117 (A1) , 06.09.2013 original file name: WO 2013130117A1 - Durabeam.pdf attached as: Published-Evidence-14.pdf
D2	Patent document	CN203137719 (U) , 21.08.2013 original file name: CN203137719U - Intex Prior Art.pdf attached as: Published-Evidence-1.pdf
D3	Patent document	FR2914545 (A3) , 10.10.2008 original file name: FR2914545A3 - depression.pdf attached as: Published-Evidence-2.pdf
D4	Patent document	GB434098 (A) , 10.12.1934 original file name: GB434098A - depression.pdf attached as: Published-Evidence-3.pdf
D5	Patent document	US4941223 (A) , 17.07.1990 original file name: US4941223 - corner braces, tubular.pdf attached as: Published-Evidence-4.pdf
D6	Patent document	US5669090 (A) , 23.09.1997 original file name: US5669091 V-shaped corner braces - Chung.pdf attached as: Published-Evidence-5.pdf
D7	Patent document	US6568013 (B2) , 27.05.2003 original file name: US6568013 - depression.pdf attached as: Published-Evidence-6.pdf
D8	Patent document	US6671910 (B2) , 06.01.2004 original file name: US6671910 - Valve.pdf attached as: Published-Evidence-7.pdf

D9 Patent document

US6701559 (B2) , 09.03.2004
original file name: US6701559 - Pump & Valve.pdf
attached as: Published-Evidence-8.pdf

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Intex Recreation v. Bestway Inflatables

X. Payment

Method of payment	Debit from deposit account

The European Patent Office is hereby authorised, to debit from the deposit account with the EPO any fees and costs indicated in the fees section below.

Currency:	EUR
Deposit account number:	28050007
Account holder:	Reddie & Grose LLP

Refunds

Any refunds should be made to EPO deposit account:	28050007
Account holder:	Reddie & Grose LLP

Fees

	Factor applied	Fee schedule	Amount to be paid
010 Opposition fee	1	785.00	785.00
Total:		EUR	785.00

A Forms

	Details:	System file name:
A-1	Form for notice of opposition	ep-oppo.pdf

B Attached document files

	Original file name:	System file name:
B-1 1. Facts and arguments	MP19609.EP01 Filed Notice of Opposition 17.06.2019.pdf	OPPO.pdf

C Attached evidence files

	Original file name:	System file name:
C-1 1. Patent document	CN203137719U - Intex Prior Art.pdf	Published-Evidence-1.pdf
C-2 2. Patent document	FR2914545A3 - depression.pdf	Published-Evidence-2.pdf
C-3 3. Patent document	GB434098A - depression.pdf	Published-Evidence-3.pdf
C-4 4. Patent document	US4941223 - corner braces, tubular.pdf	Published-Evidence-4.pdf
C-5 5. Patent document	US5669091 V-shaped corner braces - Chung.pdf	Published-Evidence-5.pdf
C-6 6. Patent document	US6568013 - depression.pdf	Published-Evidence-6.pdf

C-7	7. Patent document	US6671910 - Valve.pdf	Published-Evidence-7.pdf
C-8	8. Patent document	US6701559 - Pump & Valve.pdf	Published-Evidence-8.pdf
C-9	9. Patent document	US7039972 - pump.pdf	Published-Evidence-9.pdf
C-10	10. Patent document	US9254047 - Y-shaped side brace.pdf	Published-Evidence-10.pdf
C-11	11. Patent document	US20070277324 Bestway Y beam.pdf	Published-Evidence-11.pdf
C-12	12. Patent document	US 20150201760A1.pdf	Published-Evidence-12.pdf
C-13	13. Patent document	US 20150335164 - Bestway Internal Support.pdf	Published-Evidence-13.pdf
C-14	14. Patent document	WO 2013130117A1 - Durabeam.pdf	Published-Evidence-14.pdf
C-15	1. Translation of a citation	CN203137719U Intex Prior Art - Translation.pdf	Evidence-Tran-1.pdf

Signature of opponent or representative

Place	**London**
Date:	**17 June 2019**
Signed by:	**Jan Vleck 22779**
Representative name:	**Jan VLECK**
Capacity:	**(Representative)**

17 June 2019

European Patent Office
D-80298 Munich
Germany

BY E-FILING ONLY

Dear Sirs

Opposition against European Patent No. 3192401 ("the Patent")
Of Bestway Inflatables and Materials Corp
On behalf of Intex Recreation Corp. ("the Opponent")
Our ref: M/P19609.EP01/JMV/JJAB

We, the Representatives of the opponent, are hereby submitting a Notice of Opposition under Article 99 EPC against the above mentioned European Patent (hereinafter referred to as "the opposed Patent" or "the Patent"). The mention of the grant of the Patent was published in European Patent Bulletin 18/38 of 19 September 2018. For ease of reference, details of the opposed Patent are listed below:

European Patent number:	EP 3192401
Patent proprietor:	Bestway Inflatables & Material Corp
Title:	Inflatable Bed
EP application number:	16191360.3
Priority claimed:	13.01.16 – CNA201610020533
	13.01.16 – CNU201620031074
Grant date:	19 September 2018

The opposition fee of 785 EUR is being paid from our deposit account no. 2805.0007 in the name of Reddie & Grose LLP. In the event that these fees are not received or are underpaid, you are hereby authorised to remove the necessary amount from our deposit account no. 2805.0007.

1. Requests

1.1 – It is requested to revoke the opposed Patent in its entirety.

1.2 – In the event that the Opposition Division does not revoke the opposed Patent on consideration of these written submissions, a communication containing the preliminary opinion of the Opposition Division, and Oral Proceedings in accordance with Art. 116 EPC are hereby requested.

1.3 – The Opponent reserves the right to file further written submissions and requests at a later date.

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Reddie & Grose LLP is a limited liability partnership registered in England and Wales with registered number OC360746, and registered office address The White Chapel Building, 10 Whitechapel High Street, London E1 8QS. Regulated by the Intellectual Property Regulation Board (IPREG).

1.4 - The present Opposition is filed on the grounds of Article 100(a) and 100(b) EPC. The subject matter of the opposed Patent is not novel in accordance with Art 54 EPC and/or does not involve an inventive step according to Art. 56 EPC. Also the Patent does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

2. References

We submit and refer to the following documents:

E1 - CN 203137719 U (Intex Ind. Xiamen Co Ltd)

E2 – Translation of CN 203137719 U

E3 – US 2007/0277324 (Liu, Feng)

E4 – US 9,254,047 (Schermel et al.)

E5 – US 4,941,223 (Santo, Philip J)

E6 – US 5,669,091 (Chung, Ming-Chun)

E7 – US 2015/0335164 (Liu, Feng)

E8 – WO 2013/130117 (Intex Recreation Corporation)

E9 – FR 2 914 545 (Song Rong)

E10 – GB 434,098 (P. B. Cow & Co Ltd)

E11 – US 6,568,013 (Perez et al.)

E12 – US 6,671,910 (Hsu et al.)

E13 – US 6,701,559 (Boso et al.)

E14 – US 7,039,972 (Chaffee, Robert B)

E15 – US 2015/0201760 (Lin et al.)

Copies of the above referenced documents are enclosed.

3. Grounds for Opposition

3.1 - Summary

As discussed in more detail below, it is submitted that:

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Intex Recreation v. Bestway Inflatables

- The Patent does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, and is therefore contrary to Article 100(b) EPC

- Independent claim 1 lacks novelty over E1 and is therefore contrary to Article 54 EPC

- Dependent claims 2 – 39 lack novelty/and or an inventive step over E1 either on its own or in combination with the other cited prior art, and are therefore contrary to Articles 54 and 56 EPC

We shall consider the novelty and inventive step of each claim in turn, and then consider sufficiency.

3.2 - Novelty and Inventive Step

3.2.1 - Claim 1

Claim 1 of the Patent reads as follows (Roman numerals added for ease of reference):

An inflatable bed (10), comprising:

i) a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

ii) at least one side wall (13), an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet,

iii) an air chamber formed between said top sheet, said bottom sheet and said side wall;

iv) at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

v) at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls,

vi) at least two outside edges (152,162) of said support structure being respectively coupled to the side wall adjacent,

vii) at least one inside edge (153,163) of said support structure being coupled to the top sheet or bottom sheet adjacent,

viii) wherein said support structure comprises a second tensioning structure and a third tensioning structure,

ix) at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent,

x) at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

xi) and at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent,

xii) at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent.

E1 discloses all the features of claim 1. The features of E1 corresponding to all the features i) to xii) of claim 1 are outlined below:

i) the upper piece 1, and the lower piece 2 – see page 4, lines 5-7 of E2; Fig 2 of E1

ii) the wrapping piece 4, […] and upper and lower sides of the wrapping piece 4 are respectively connected with a periphery of the upper piece 1 and periphery of the lower piece 2 – see page 4, lines 7 & 9-11 of E2.

iii) thereby forming an inflatable product having an air chamber – see page 4, lines 11-12 of E2.

iv) a plurality of drawbelts 3 […] Two ends of each of the drawbelts 3 are respectively connected to a lower surface of the upper piece 1 and an upper surface of the lower piece 2 – see page 4, lines 7-9 of E2; Fig 2 of E1.

v) The side wrapping belt 5; and a ring-shaped upper suction piece 11 and a ring shaped lower suction piece 21 – see page 4, line 22 and page 5, lines 4-5 of E2; Fig 2 of E1. The side wrapping belt 5 and the ring shaped pieces act together to create a support structure.

vi) The plastic strip 53 is connected to a middle of an inner surface of the wrapping piece 4. This is one outside edge. See page 4, lines 22-28 of E2 and Fig 2 of E1.

The ring shaped upper suction piece 11 and a ring-shaped lower suction piece 21 are respectively disposed between the upper piece and the wrapping piece 4 and between the lower piece and the wrapping piece. Where the upper or lower suction piece meets the side wall is the second outside edge. See page 5, lines 4-10 of E2 and Fig 2 of E1.

vii) The ring-shaped upper suction piece 11 and the ring-shaped lower suction piece 21 are respectively disposed between the upper piece 1 and the wrapping piece 4 and between the lower piece 2 and the wrapping piece 4. Where the upper or lower suction piece meets the upper or lower sheet is an inside edge. See page 5, lines 4-7 of E2.

Also the ring shaped plastic strips 51 at both ends of the side wrapping belt are respectively connected to the upper piece 1 and the lower piece 2. Plastic strips 51 are an inside edge. See page 4, lines 25-27 of E2.

viii) The second tensioning structure is made from both the cables 52 as well as the upper suction piece 11. The third tensioning structure is made from both the cables 52 as well as the lower suction piece 21.

ix) The at least two outside edges of the second tensioning structure coupled to the side wall, are the plastic strip 53 and the outside edge of upper suction piece 11 as discussed in point vi).

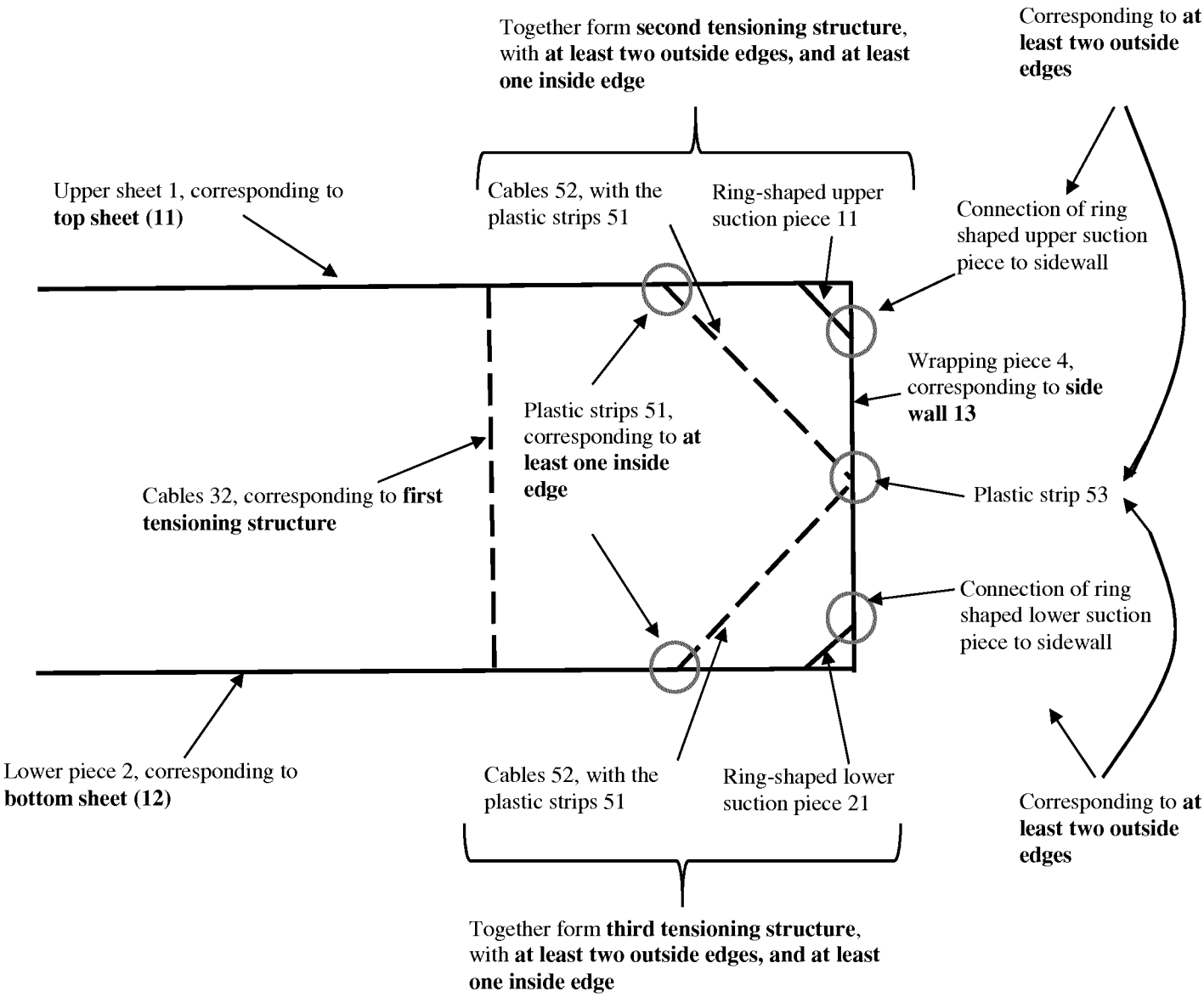
x) The at least one inside edge of the second tensioning structure can be either the plastic strip 51, or the inside edge of the upper suction piece 11 as discussed in point vii).

xi) The at least two outside edges of the third tensioning structure coupled to the side wall, are the plastic strip 53 and the outside edge of lower suction piece 21 as discussed in point vi).

xii) The at least one inside edge of the third tensioning structure can be either the plastic strip 51, or the inside edge of the lower suction piece 21 as discussed in point vii).

For the ease of reference of the Opposition Division we have prepared and copy on the next page a figure showing the support structures of E1. This is marked with those features of E1 which correspond to features (i) to (xii) of claim 1 of the Patent.

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Independent claim 1 lacks novelty and is therefore not patentable under Article 54 EPC.

3.2.2 – Claim 2

Claim 2 states:

> *The inflatable bed according to claim 1, wherein said second tensioning structure and said third tensioning structure are respectively provided with a plurality of air holes, through which an airflow passage is formed in said air chamber.*

A plurality of air holes in the second and third tensioning structure is disclosed in E1. Support structure 5 of E1, which forms a portion of the second and third tensioning structure is formed with cables 52 spanning the distance between strips 51 and 52. The space between these cables is a 'plurality of air holes' as claimed.

Dependent claim 2 therefore lacks novelty.

3.2.3 – Claim 3

Claim 3 states,

> *The inflatable bed according to claim 1, wherein said second tensioning structure and said third tensioning structure are disposed at an interval in a perpendicular direction.*

Although it is undefined as to what the second or third tensioning structures are perpendicular, it is assumed the intended meaning is they are perpendicular to each other.

The upper support structure of E1 includes upper suction piece 11 and the upper portion of the support structure 5. The lower support structure of E1 includes lower suction piece 21 and the lower part of the support structure 5. As shown in Fig 2 of E1, these support structures form an angle that is substantially perpendicular.

Further, E15 discloses tensioning structures and their use in corners (See Figs. 3 and 4). It is evident from Figures 3 and 4 of E15 that the upper and lower tensioning structures, corresponding to the second and third tensioning structures of the Patent, are disposed at an interval. Hence it would be obvious to modify the tensioning structures of E1 to be disposed at an interval.

Claim 3 therefore lacks an inventive step.

3.2.4 – Claim 4

Claim 4 states:

> *The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams are respectively coupled to said side wall and said top sheet adjacent, the at least two first I-beams are disposed at an interval.*

E1 discloses the same structure as in claim 4. One of the first I-beams is the upper corner piece 11, and a second I-beam is the upper portion of the support structure 5. Fig. 2 and Fig. 4 of E1 show the two I-beams are spaced apart, i.e. 'disposed at an interval'.

Dependent claim 4 therefore lacks novelty.

3.2.5 - Claim 5

Claim 5 states:

> *The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least two second I-beams, an outside edge and an inside edge of each of said second I-beams are respectively coupled to the side wall and said bottom sheet adjacent, the at least two second I-beams are disposed at an interval.*

The analysis above for Claim 4 applies equally to claim 5, as E1 discloses a lower support structure that is the same as the upper support structure.

Claim 5 therefore lacks novelty.

3.2.6 - Claim 6

Claim 6 states:

> *The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first Y-beam, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.*

Y-beams are well known as internal tensioning structures for inflatable beds. E3 discloses using a Y-shaped tensioning structure in inflatable mattresses (see figure 2 of E3). Y-beams are also used for connection with bracing the sidewall of an inflatable bed, as shown in Figure 6 of E4.

It would therefore be obvious to the skilled person, to modify E1 to a structure that is within the scope of Claim 6.

Claim 6 therefore lacks an inventive step.

3.2.7 - Claim 7

Claim 7 states:

> *The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.*

It is well known that corner braces can be used at the upper and lower corners of a mattress. Therefore, as discussed with respect to claim 6, it would be obvious to modify E1 to a structure that is within the scope of claim 7.

Claim 7 therefore lacks an inventive step.

3.2.8 - Claim 8

Claim 8 states:

> *The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said top sheet.*

Using tubular beams for corner braces is known from E5. E5 discloses using tubular beams as a supporting structure with an inflated area. Although the bed in question is a water bed it has an 'air perimeter chamber 14'. Looking at Figure 7 of E5, an embodiment is seen where S1a loops back on itself and is sealed at point 34a. The resulting shape is tubular.

Accordingly, it would be obvious to modify E1 to include tubular beams and this fall into the scope of claim 8.

Claim 8 therefore lacks an inventive step.

3.2.9 - Claim 9

Claim 9 states:

> *The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said bottom sheet.*

It is well known that corner braces can be used at the upper and lower corners of a mattress. Therefore, as discussed with respect to claim 8, it would be obvious to modify E1 to contain tubular beams which falls within the scope of claim 9.

Claim 9 therefore lacks an inventive step.

3.2.10 - Claim 10

Claim 10 states:

> *The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first V-beam, wherein two outside edges of said first V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.*

V-beams for use as bracing in inflatable beds is known from E6. It would be obvious to modify E1 to include V-beams as a tensioning structure.

Claim 10 therefore lacks an inventive step.

3.2.11 - Claim 11

Claim 11 states:

> *The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second V-beam, wherein two outside edges of said second V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.*

It is known that corner braces are used at the upper and lower corners of an inflatable mattress. Therefore as discussed with respect to claim 10, it would be obvious to modify E1 to use V-beams and thus come under the scope of claim 11.

Claim 11 therefore lacks an inventive step.

3.2.12 - Claim 12

Claim 12 reads as follows:

> *The inflatable bed according to claim 4, wherein said at least two first I-beams are spaced apart from each other at a lower surface of said top sheet.*

E1 discloses the upper suction piece 11 and the upper part of wrapping belt 5. These are the two 'first I-beams' and they are spaced apart at their connection points to the upper sheet 1.

Claim 12 therefore lacks novelty.

3.2.13 - Claim 13

Claim 13 reads:

> *The inflatable bed according to claim 5, wherein said at least two second I-beams are spaced apart from each other at an upper surface of said bottom sheet*

E1 discloses the lower suction piece 21 and the lower part of wrapping belt 5. These are the two second I-beams and they are spaced apart at their connection points to the lower piece 2.

Claim 13 therefore lacks novelty.

3.2.14 - Claim 14

Claim 14 reads:

> *The inflatable bed according to claim 4, wherein said at least two first I-beams are disposed at an interval on an inner surface of said side wall in a perpendicular direction.*

E1 discloses the upper suction piece 11 and the upper part of wrapping belt 5. These are the two 'first I-beams' and they are spaced apart when connecting to the wrapping piece 4 (i.e. side wall).

Claim 14 therefore lacks novelty.

3.2.15 - Claim 15

Claim 15 reads:

> *The inflatable bed according to claim 5, wherein said at least two second I-beams are disposed at an interval on the inner surface of said side wall in a perpendicular direction.*

E1 discloses the lower suction piece 21 and the lower part of wrapping belt 5. These are the two 'second I-beams' and they are spaced apart when connecting to the wrapping piece 4 (i.e. side wall).

Claim 15 therefore lacks novelty.

3.2.16 - Claim 16

Claim 16 reads:

> *The inflatable bed according to claim 6, wherein the two outside edges of said at least one first Y-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.*

As discussed with respect to claim 6, it is obvious to modify the support structure of E1 to use a Y-beam. Further, it is obvious when modifying E1 to use a Y-beam to have the at least two edges disposed at an interval on the side wall.

Claim 16 therefore lacks an inventive step.

3.2.17 - Claim 17

Claim 17 reads:

> *The inflatable bed according to claim 7, wherein the two outside edges of said at least one second Y-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.*

As discussed with respect to claim 7, it is obvious to modify the support structure E1 to use a Y-beam. Further, it is obvious when modifying E1 to use a Y-beam to have two the at least edges disposed at an interval on the side wall.

Claim 17 therefore lacks an inventive step.

3.2.18 - Claim 18

Claim 18 reads:

> *The inflatable bed according to claim 8, wherein said at least two outside edges of said at least one first tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on an inner surface of said side wall in a perpendicular direction.*

As discussed with respect to claim 8, it is obvious to modify the support structure of E1 to use a tubular beam. Further, it is obvious when modifying E1 to use a tubular beam with at least two outside edges, to dispose said two outside edges at an interval.

Claim 18 therefore lacks an inventive step.

3.2.19 - Claim 19

Claim 19 reads:

> *The inflatable bed according to claim 9, wherein said at least two outside edges of said at least one second tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on the inner surface of said side wall in a perpendicular direction.*

As discussed with respect to claim 9, it is obvious to modify the support structure of E1 to use a tubular beam. Further, it is obvious when modifying E1 to use a tubular beam with at least two outside edges, to dispose said two outside edges at an interval.

Claim 19 therefore lacks an inventive step.

3.2.20 - Claim 20

Claim 20 reads:

> *The inflatable bed according to claim 10, wherein the two outside edges of said at least one first V-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.*

As discussed with respect to claim 10, it is obvious to modify the support structure of E1 to use a V-beam. Further, it is obvious when modifying E1 to use a V-beam to have the at least two edges disposed at an interval on the side wall.

Claim 20 therefore lacks an inventive step.

3.2.21 - Claim 21

Claim 21 reads:

> *The inflatable bed according to claim 11, wherein the two outside edges of said at least one second V-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.*

As discussed with respect to claim 11, it is obvious to modify the support structure of E1 to use a V-beam. Further, it is obvious when modifying E1 to use a V-beam to have the at least two edges disposed at an interval on the side wall.

Claim 21 therefore does not contain an inventive step.

3.2.22 - Claim 22

Claim 22 reads:

> *The inflatable bed according to claim 4, wherein said at least two first V-beams as a whole are of a continuous annular structure or a segmental annular structure.*

As the claim is dependent on claim 4, we shall interpret the claim as if 'V-beams' is a typographical error and the Patentee intended the claim to refer to 'I-beams'.

E1 discloses that the upper suction piece 11 and side wrapping piece 5, which comprises cables 52, have an annular or ring shaped structure. See for example Fig 2 of E1, and page 4, line 22 to page 5, line 7 of E2. These are the corresponding features for the two first I-beams.

Claim 22 therefore lacks novelty.

3.2.23 - Claim 23

Claim 23 reads:

> *The inflatable bed according to claim 5, wherein said at least two second I-beam as a whole are of a continuous annular structure or a segmental annular structure.*

E1 discloses that the lower suction piece 21 and side wrapping piece 5, which comprises cables 52, have an annular or ring shaped structure. See for example Fig 2 of E1, and page 4, line 22 to page 5, line 7 of E2. These are the corresponding features for the two second I-beams.

Claim therefore 23 lacks novelty.

3.2.24 - Claim 24

Claim 24 reads:

> *The inflatable bed according to claim 6, wherein said at least one first Y-beam as a whole is of a continuous annular structure or a segmental annular structure.*

As discussed with respect to claim 6, it is obvious to modify E1 to use Y-beams for corner bracing. As shown with claim 23, E1 discloses the second tensioning structure having an annular structure. Therefore the modification of E1 to use Y-beams, where the Y-beam has an annular structure is also obvious.

Claim 24 therefore lacks an inventive step.

3.2.25 - Claim 25

Claim 25 reads:

> *The inflatable bed according to claim 7, wherein said at least one second Y-beam as a whole is of a continuous annular structure or a segmental annular structure.*

As discussed with respect to claim 7, it is obvious to modify E1 to use Y-beams for corner bracing. As shown with claim 24, E1 discloses the third tensioning structure having an annular structure. Therefore the modification of E1 to use Y-beams, where the Y-beam has an annular structure is also obvious.

Claim 25 therefore lacks an inventive step.

3.2.26 - Claim 26

Claim 26 reads:

> *The inflatable bed according to claim 8, wherein said at least one first tubular beam as a whole is of a segmental annular structure.*

As discussed with respect to claim 8, it is obvious to modify E1 to use tubular beams for corner bracing. As shown with claim 23, E1 discloses the second tensioning structure having an annular structure. Therefore the modification of E1 to use tubular beams, where the tubular beam has an annular structure is also obvious.

Claim 26 therefore lacks an inventive step.

3.2.27 - Claim 27

Claim 27 reads:

> *The inflatable bed according to claim 9, wherein said at least one second tubular beam as a whole is of a segmental annular structure.*

As discussed with respect to claim 9, it is obvious to modify E1 to use tubular beams for corner bracing. As shown with claim 24, E1 discloses the third tensioning structure having an annular structure. Therefore the modification of E1 to use tubular beams, where the tubular beam has an annular structure is also obvious.

Claim 27 therefore lacks an inventive step.

3.2.28 - Claim 28

Claim 28 reads:

> *The inflatable bed according to claim 10, wherein said at least one first V-beam as a whole is of a continuous annular structure or a segmental annular structure.*

As discussed with respect to claim 10, it is obvious to modify E1 to use V-beams for corner bracing. As shown with claim 23, E1 discloses the second tensioning structure having an annular structure. Therefore the modification of E1 to use V-beams, where the V-beam has an annular structure is also obvious.

Claim 28 therefore lacks an inventive step.

3.2.29 - Claim 29

Claim 29 reads:

> *The inflatable bed according to claim 11, wherein said at least one second V-beam as a whole is of a continuous annular structure or a segmental annular structure.*

As discussed with respect to claim 11, it is obvious to modify E1 to use V-beams for corner bracing. As shown with claim 24, E1 discloses the third tensioning structure having an annular structure. Therefore the modification of E1 to use V-beams, where the V-beam has an annular structure is also obvious.

Claim 29 therefore lacks an inventive step.

3.2.30 - Claim 30

Claim 30 states:

> *The inflatable bed according to claim 1, wherein said first tensioning structure is one or more beams selected from I-beams, coil beams, Y-beams or X-beams.*

These features are well known in the art. E1 discloses an I beam structure used as a first tensioning structure. See Fig 2 of E1 and page 4, lines 18 to 22 of E2, where it has *"plastic strips 31 at both ends connecting with a plurality of cables 32, with the plastic strips 31 used for welding with the upper piece 1 and the lower piece 2".*

E8 discloses cylindrical (i.e. coil beam) tensioning structures (see Paragraph [0003], also reference numeral 3 of Fig 5).

E4 discloses Y-beam and X-beam tensioning structures for inflatable mattresses (See Fig 1 and Fig 2).

Claim 30 therefore is not novel and does not include an inventive step.

3.2.31 - Claim 31

Claim 31 reads as follows:

> *The inflatable bed according to claim 1, wherein said first tensioning structure, said second tensioning structure and said third tensioning structure are all made of thermoplastic plastic sheet.*

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E1 discloses the use of thermoplastic plastic sheet as the material for tensioning structures. The tensioning structures contain, 'Plastic strips 31' (present in the first tensioning structure) and 'ring shaped plastic strips 51', 'plastic strips 53' (present in the second and third tensioning structure). These plastic strips are welded to the upper piece and lower piece (see claim 4 of E2), which makes them inherently thermoplastic.

Claim 31 is therefore not novel.

3.2.32 - Claim 32

Claim 32 states:

> *The inflatable bed according to claim 1, wherein one or more of said first tensioning structure, said second tensioning structure and said third tensioning structure at least partially comprise mesh, laminated plastic sheet or a threads.*

E1 discloses using a plurality of cables 32, 52 (i.e. threads). These form the first, second and third tensioning structure.

Claim 32 therefore lacks novelty.

3.2.33 - Claim 33

Claim 33 states:

> *The inflatable bed according to claim 32, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite plastic strips, said mesh and said threads are sandwiched between the two opposite plastic strips.*

It is well known in the prior art to manufacture tensioning structures with mesh or threads between plastic strips. E8 discloses threads as tensioning structures, with the threads being sandwiched between pairs of 'weld strips'. (See Fig 10 & 11 and paragraph [0085] of E8).
E7 also shows a mesh between two plastic strips 204 (See Fig 5A and Paragraph [0050] of E7).
It would be obvious to modify the inflatable mattress of E1 to incorporate the tensioning structures of E8 or E7.

Claim 33 therefore lacks an inventive step.

3.2.34 - Claim 34

Claim 34 states:

> *The inflatable bed according to claim 32, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with an U-shaped plastic strip, said mesh and said threads are sandwiched between the U-shaped plastic strip.*

E7 discloses using U-shaped weld strips 502 sandwiching the mesh panel 202. (See Fig 5B and paragraph [0052] of E7). It would be obvious to modify the inflatable mattress of E1 to incorporate the tensioning structures of E7.

Claim 34 therefore lacks an inventive step.

3.2.35 - Claim 35

Claim 35 states:

> *The inflatable bed according to claim 1, wherein said first tensioning structure is coupled to said top and bottom sheets by means of high-frequency welding; said second tensioning structure is coupled to said top sheet and said side wall by means of high-frequency welding; and said third tensioning structure is coupled to said bottom sheet and said side wall by means of high-frequency welding.*

High frequency welding is well known as a common technique for connecting material parts of inflatable mattresses. See for example E3, paragraph [0011]. It would be obvious to use high frequency welding to connect the features of E1.

Claim 35 therefore does not include an inventive step.

3.2.36 - Claim 36

Claim 36 states:

> *The inflatable bed according to claim 1, wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.*

Claim 36 is not readily understandable. It is assumed the claim refers to a 'depression', where at the corner of the inflatable mattress there is a rim. For example in Fig 5 of the Patent, the 'outside' point 153 is higher than the 'inside' point 153.

This is well known in the field of inflatable mattresses. It can be seen in Fig 3 of E1. Further evidence can be found in E9, E10 and E11.

Claim 36 therefore is not novel.

3.2.37 - Claim 37

Claim 37 states:

> *The inflatable bed according to claim 1, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.*

As with claim 36, claim 37 is not readily understandable. Further the figures of the Patent suggest the 'inside part' of the bottom sheet should be *higher* than the 'outside part'. Of course this would be relative to the direction of the mattress which is undefined.

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In any case, the 'depression' of inflatable mattresses is often found on both sides. Figure 4 of E1 shows this. It can also be seen in E10 and E11.

Claim 37 therefore lacks an inventive step.

3.2.38 - Claim 38

Claim 38 states:

> *The inflatable bed according to claim 1, wherein said inflatable bed further comprises a built-in air pump, which is disposed on said side wall and is located between a lower edge of said second tensioning structure and an upper edge of said third tensioning structure for inflating said air chamber.*

Built in air-pumps are well known in the field of inflatable mattresses. E13 (Fig 3) and E14 (entire document) for example disclose air-pumps disposed on the sidewall. It would be obvious to modify E1 to incorporate an air pump of E14.

Claim 38 therefore lacks an inventive step.

3.2.29 - Claim 39

Claim 39 states:

> *The inflatable bed according to claim 1, wherein said inflatable bed further comprises an air valve, which is disposed on said side wall for the inflation and deflation of said inflatable bed.*

Air valves are commonly used with inflatable mattresses for inflation and deflation. They can be seen in E7 (paragraph [0038]), as well as E12 (Fig 1) and E13 (Fig 4). It would be obvious to modify the inflatable mattress of E1 to include an air valve.

Claim 39 therefore lacks an inventive step.

3.3 - Sufficiency

3.3.1 – Claim 1

Article 100(b) states:

> *Opposition may only be filed on the grounds that:*
> *the European patent does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art;*

Claim 1 provides (emphasis added):

An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13), an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet,

an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, ***said support structure being disposed in a longitudinal direction of at least one of said side walls****,*

at least two outside edges (152,162) of said support structure being respectively coupled to the side wall adjacent,

at least one inside edge (153,163) of said support structure being coupled to the top sheet or bottom sheet adjacent,

wherein said support structure comprises a second tensioning structure and a third tensioning structure,

at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent,

at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

and at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent,

at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent.

Claim 1 recites that the support structure is longitudinal (i.e. parallel to the side wall). However all the described embodiments have a support structure which is and must be transverse to the side wall with the outside edges coupled to the side wall and the inside edge coupled to a top or bottom wall. The support structure is a bracing element and provides support in the transverse direction.

The Patent does not disclose “the invention in a manner sufficiently clear and complete” for a skilled man to make an inflatable bed with a longitudinal support structure having the outside and inside edges as defined in claim 1.

3.3.2 – Claims 36 & 37

Claim 36 states:

The inflatable bed according to claim 1, wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the

location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

Claim 37 states:

The inflatable bed according to claim 1, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

When assessing novelty and inventive step for claims 36 and 37, broad assumptions were made about their meaning. However it is submitted that they are completely ambiguous, to the effect that it would be completely impossible for the skilled person to carry out the invention therein.

Claims 36 and 37 therefore do not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

4. Conclusion

For at-least the above reasons, the subject matter of claims 1-39 is not novel nor involves an inventive step, contrary to the requirements of Articles 54 and 56 EPC.

The Patent also does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

This Notice of Opposition justifies the request to revoke the patent in its entirety.

Yours faithfully



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CABLE-STAYED REINFORCEMENT STRUCTURE FOR AIR CHAMBER OF INFLATABLE PRODUCT

APPLICATION NO.: CN201320042268.2 FILLING DATE: JAN.25TH, 2013

TECHNICAL FIELD

The utility model relates to a structure of an inflatable product, and in particular to a cable-stayed reinforcement structure for an air chamber of an inflatable product.

BACKGROUND

Inflatable products, such as airbeds, are featured by being easy to use, light weighted, easy to move, and easy to fold and carry, making them a suitable choice when used as a temporary or non-fixed bed. Inflated beds with smaller bed thickness after inflation are generally used outdoors. If the comfort of the inflatable bed is to be improved to be comparable to that of household beds, the thickness of the inflatable bed after inflation must be as high as that of a general bed, and the structure must also be relatively stable to ensure the flatness of the bed surface.

As shown in FIG. 1, the airbed with a height of a general bed is usually formed by superimposing two independent air chambers A and B in order to prevent the circumference of the bed from overly protruding and to provide a supporting force and the shape-keeping strength of the air cavity. That is, a middle piece C has to be provided such that two air cavities are formed by two independent shrouds connecting to the middle piece and, respectively, an upper piece and a lower piece. Respective sets of belts are arranged in the two air cavities to form a bed shape. Such a structure necessarily has the following disadvantages.

1. The material cost is high. Due to the provision of the middle piece to facilitate the shaping and the function of the bed, it not only increases the consumption of the material but also increases the weight of the bed.

2. The drawbelts in the two independent air cavities need to be welded separately, which invisibly increases the complexity of the production of the bed, thus leading to a high production cost.

SUMMARY

It is an object of the utility model to provide a cable-stayed reinforcement structure for an air chamber of an inflatable product, which may prevent the periphery of the product from overly protruding to affect the aesthetic appearance of the product while ensuring the height and strength of the product, and may effectively reduce the material cost and the production cost.

To achieve this, the solutions of the present utility model are as follows.

A cable-stayed reinforcement structure for an air chamber of an inflatable product, comprising an upper piece, a lower piece, a plurality of drawbelts and a wrapping piece, two ends of each of the drawbelts being respectively connected to a lower surface of the upper piece and an upper surface of the lower piece, and upper and lower sides of the wrapping piece being respectively connected with a periphery of the upper piece and a periphery of the lower piece to form the inflatable product having an air chamber; characterized in that it further comprises a side wrapping belt, one end of the side wrapping belt being connected to a middle of an inner surface of the wrapping piece, and the other end being connected to the lower surface of the upper piece near the periphery or the upper surface of the lower piece near the periphery.

The side wrapping belt is an integral ring-shaped drawbelt formed by ring-shaped plastic strips at both ends connecting with a plurality of cables, wherein a plastic strip is fixed at a middle of the plurality of cables, the ring-shaped plastic strips at both ends of the side wrapping belt are respectively connected to the upper piece and the lower piece, and the plastic strip at the middle is connected to a middle of an inner surface of the wrapping piece.

The side wrapping belt is an integral ring-shaped drawbelt formed by ring-shaped plastic strips at both ends connecting with a plurality of cables, the plastic strip at one end of the side wrapping belt being connected to a middle of an inner surface of the wrapping piece, the other end being connected to the upper piece and the lower piece.

Each of the drawbelts is a belt corresponding to a width or length of the bed and

is formed by plastic strips at both ends connecting with a plurality of cables, the plastic strips at both ends being welded to the upper piece and the lower piece, respectively.

A ring-shaped upper suction piece and a ring-shaped lower suction piece are respectively disposed between the upper piece and the wrapping piece and between the lower piece and the wrapping piece, the upper piece being connected to an upper periphery of the wrapping piece through the ring-shaped upper suction piece, the lower piece being connected to a lower periphery of the wrapping piece through the ring-shaped lower suction piece.

With the above solutions, the utility model not only prevents the wrapping piece from overly protruding to affect the strength and appearance of the product but also effectively reduces the material cost and production cost, by the side wrapping belt provided connecting the middle of the wrapping piece of the inflatable product and the upper piece or/and lower piece so as to achieve a traction and position restriction on the middle of the wrapping piece of the inflatable product with a relatively large height.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a conventional article;

FIG. 2 is an exploded perspective view of a first embodiment of the present utility model;

FIG. 3 is a schematic view of the appearance of the first embodiment of the present utility model;

FIG. 4 is a partial cross-sectional view showing the first embodiment of the present utility model;

FIG. 5 is an exploded perspective view of a second embodiment of the present utility model;

FIG. 6 is a schematic view of the appearance of the second embodiment of the present utility model; and

FIG. 7 is a partial cross-sectional view showing the second embodiment of the

present utility model.

DETAILED DESCRIPTION

As shown in FIGS. 2 to 7, the utility model discloses a cable-stayed reinforcement structure for an air chamber of an inflatable product, in particular, a rectangular inflatable product, which structure includes an upper piece 1, a lower piece 2, a plurality of drawbelts 3 and a wrapping piece 4, as well as a side wrapping belt 5. Two ends of each of the drawbelts 3 are respectively connected to a lower surface of the upper piece 1 and an upper surface of the lower piece 2, and upper and lower sides of the wrapping piece 4 are respectively connected with a periphery of the upper piece 1 and a periphery of the lower piece 2, thereby forming an inflatable product having an air chamber, with one end of the side wrapping belt 5 connected to a middle of an inner surface of the wrapping piece 4, and the other end connected to the lower surface of the upper piece 1 near the periphery or the upper surface of the lower piece 2 near the periphery.

The following is an illustration of the inflatable product by taking an airbed as an example, but the inflatable product is not limited thereto.

first embodiment

As shown in FIGS. 2, 3 and 4, in the first embodiment of the present utility model, each of the drawbelts 3 is a belt corresponding to the width or length of the bed, which is formed by plastic strips 31 at both ends connecting with a plurality of cables 32, with the plastic strips 31 used for welding with the upper piece 1 and the lower piece 2, and the cables 32 for bearing a strong traction force. The side wrapping belt 5 is an integral ring-shaped drawbelt, which is formed by ring-shaped plastic strips 51 at both ends connecting with a plurality of cables 52, with a plastic strip 53 being fixed in the middle of the plurality of cables 52, so that the ring-shaped plastic strips 51 at both ends of the side wrapping belt 5 are respectively connected to the upper piece 1 and the lower piece 2, and the plastic strip 53 in the middle are connected to a middle of an inner surface of the wrapping piece 4.

Here, the provision of the side wrapping belt 5 is such that the middle portion of the wrapping piece 4 is further pinched to be concave to ensure the aesthetics of the

periphery of the airbed having a relatively large height and an air cavity, to prevent the periphery from overly protruding, and, at the same time, to ensure the strength of the periphery of the bed and the support strength of the bed as a whole.

In order to improve the aesthetics of the bed, a ring-shaped upper suction piece 11 and a ring-shaped lower suction piece 21 are respectively disposed between the upper piece 1 and the wrapping piece 4 and between the lower piece 2 and the wrapping piece 4. That is, the upper piece 1 is connected with the upper periphery of the wrapping piece 4 through the ring-shaped upper suction piece 11, and the lower piece 2 is connected with the lower periphery of the wrapping piece 4 through the ring-shaped lower suction piece 21.

As shown in FIGS. 5, 6 and 7, in the second embodiment of the present utility model, each of the drawbelts 3 is also a belt corresponding to the width or length of the bed, which is also formed by plastic strips 31 at both ends connecting with a plurality of cables 32, with the plastic strips 31 used for welding with the upper piece 1 and the lower piece 2, and the cables 32 for bearing a strong traction force. The side wrapping belt 5 is an integral ring-shaped drawbelt, which is formed by ring-shaped plastic strips 51 at both ends connecting with a plurality of cables 52. The plastic strip 51 at one end of the wrapping belt 5 is connected to a middle of an inner surface of the wrapping piece 4, and the other end is connected to the upper piece 1 and the lower piece 2. Therefore, the airbed having a relatively large height and an air cavity is prevented from having an overly protruding periphery, and the strength of the periphery of the bed and the support strength of the bed as a whole are ensured.

second embodiment

Likewise, in order to improve the aesthetics of the bed, a ring-shaped upper suction piece 11 and a ring-shaped lower suction piece 21 are respectively disposed between the upper piece 1 and the wrapping piece 4 and between the lower piece 2 and the wrapping piece 4. That is, the upper piece 1 is connected with the upper periphery of the wrapping piece 4 through the ring-shaped upper suction piece 11, and the lower piece 2 is connected with the lower periphery of the wrapping piece 4 through the ring-shaped lower suction piece 21.

It should be noted that the drawbelt 3 and the side wrapping belt 5 in the above

first and second embodiments are not limited to the structure of the plastic strips and the plurality of cables, and that they can alternatively be implemented with a linear drawbelt or a cylindrical drawbelt of an integral plastic piece as long as they satisfy the requirements of the internal pressure of the inflatable product.

alternative corner belts

In summary, by connecting the middle of the wrapping piece 4 of the inflatable product and the upper piece 1 or/and lower piece 2 so as to achieve a traction and position restriction on the middle of the wrapping piece 4 of the inflatable product with a relatively large height, the utility model not only prevents the wrapping piece from overly protruding to affect the strength and appearance of the product but also effectively reduces the material cost and production cost.

What is claimed is:

1. A cable-stayed reinforcement structure for an air chamber of an inflatable product, comprising an upper piece, a lower piece, a plurality of drawbelts and a wrapping piece, two ends of each of the drawbelts being respectively connected to a lower surface of the upper piece and an upper surface of the lower piece, and upper and lower sides of the wrapping piece being respectively connected with a periphery of the upper piece and a periphery of the lower piece to form the inflatable product having an air chamber; characterized in that it further comprises a side wrapping belt, one end of the side wrapping belt being connected to a middle of an inner surface of the wrapping piece, and the other end being connected to the lower surface of the upper piece near the periphery or the upper surface of the lower piece near the periphery.

2. The cable-stayed reinforcement structure for an air chamber of an inflatable product according to claim 1, wherein the side wrapping belt is an integral ring-shaped drawbelt formed by ring-shaped plastic strips at both ends connecting with a plurality of cables, wherein a plastic strip is fixed at a middle of the plurality of cables, the ring-shaped plastic strips at both ends of the side wrapping belt are respectively connected to the upper piece and the lower piece, and the plastic strip at the middle is connected to a middle of an inner surface of the wrapping piece.

3. The cable-stayed reinforcement structure for an air chamber of an inflatable product according to claim 1, wherein the side wrapping belt is an integral ring-shaped drawbelt formed by ring-shaped plastic strips at both ends connecting with a plurality of cables, the plastic strip at one end of the side wrapping belt being connected to a middle of an inner surface of the wrapping piece, the other end being connected to the upper piece and the lower piece.

4. The cable-stayed reinforcement structure for an air chamber of an inflatable product according to claim 1, 2 or 3, wherein each of the drawbelts is a belt corresponding to a width or length of the bed and is formed by plastic strips at both ends connecting with a plurality of cables, the plastic strips at both ends being welded

to the upper piece and the lower piece, respectively.

5. The cable-stayed reinforcement structure for an air chamber of an inflatable product according to claim 4, wherein a ring-shaped upper suction piece and a ring-shaped lower suction piece are respectively disposed between the upper piece and the wrapping piece and between the lower piece and the wrapping piece, the upper piece being connected to an upper periphery of the wrapping piece through the ring-shaped upper suction piece, the lower piece being connected to a lower periphery of the wrapping piece through the ring-shaped lower suction piece.

ABSTRACT

The utility model discloses a cable-stayed reinforcement structure for an air chamber of an inflatable product, which includes an upper piece, a lower piece, a plurality of drawbelts and a wrapping piece. Two ends of each of the drawbelts being respectively connected to a lower surface of the upper piece and an upper surface of the lower piece, and upper and lower sides of the wrapping piece being respectively connected with a periphery of the upper piece and a periphery of the lower piece to form the inflatable product having an air chamber; characterized in that it further comprises a side wrapping belt, one end of the side wrapping belt being connected to a middle of an inner surface of the wrapping piece, and the other end being connected to the lower surface of the upper piece near the periphery or the upper surface of the lower piece near the periphery. By the side wrapping belt provided connecting the middle of the wrapping piece of the inflatable product and the upper piece or/and lower piece so as to achieve a traction and position restriction on the middle of the wrapping piece of the inflatable product with a relatively large height, the utility model not only prevents the wrapping piece from overly protruding to affect the strength and appearance of the product but also effectively reduces the material cost and production cost.

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Date
04.07.2019

Reference	Application No./Patent No.
MP19609.EP01/JV OPPO 01	16191360.3 - 1011 / 3192401
Applicant/Proprietor	
Bestway Inflatables & Material Corp	

Communication of further notices of opposition pursuant to Rule 79(2) EPC

No further opposition has been filed.

If oral proceedings are to take place, parties are advised to check the electronic file via the European Patent Register at **www.epo.org/register** in advance of the hearing to ensure that they are in possession of all relevant documents. (OJ EPO 2009, 434)

A copy of the communication pursuant to Rule 79(1) EPC sent to the proprietor of the patent is enclosed for your information.

The observations of the patent proprietor on the notice of opposition will be communicated to the opponent without delay. A time limit for reply will be fixed if the Opposition Division considers this expedient.

If no reply to a communication is received within the time limit set, the proceedings will be continued. Your attention is drawn to Article 114(2) EPC.

For the Opposition Division

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Intex Recreation v. Bestway Inflatables

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04.07.2019

Reference	Application No./Patent No.
27S8343,12EP42	16191360.3 - 1011 / 3192401
Applicant/Proprietor	
Bestway Inflatables & Material Corp	

Communication of notices of opposition (R. 79(1) EPC)

Notice of opposition has been filed within the opposition period by:

01.
Intex Recreation Corp.
4001 Via Oro Avenue, Suite 210
Long Beach, CA 90810
ETATS-UNIS D'AMERIQUE

The notice of opposition indicated above has already been communicated to you.

You are requested to file your observations within a period of **four months** from notification of this communication.

You may also file amendments, where appropriate, to the description, claims and drawings within the period specified. One set of these documents is to be filed.

If you introduced documents which have not yet been mentioned during the proceedings, your attention is drawn to Rule 83 EPC.

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Our Ref. 23.B6256.12.EP.42

Milano, October 30, 2019

RE.: **Opposition against European Patent no. 3192401** issued Sep 19, 2018
for: INFLATABLE BED
in the name of: BESTWAY INFLATABLES & MATERIAL CORP.

Dear Sirs,

This is a substantive response of the Patentee to the Notice of Opposition filed by INTEX RECREATION CORP. (the Opponent) against the European Patent EP3192401 (the Patent) granted in the name of BESTWAY INFLATABLES & MATERIAL CORP (the Patentee)

The Opponent's arguments will be considered in detail below. For the sake of simplicity, the Opponent's numbering system is fully maintained in the present response, namely with respect to the chapters and paragraphs of the arguments, to the prior art documents (**E1** to **E15**) and to the features of claim 1 (*i* to *xii*).

1. Requests

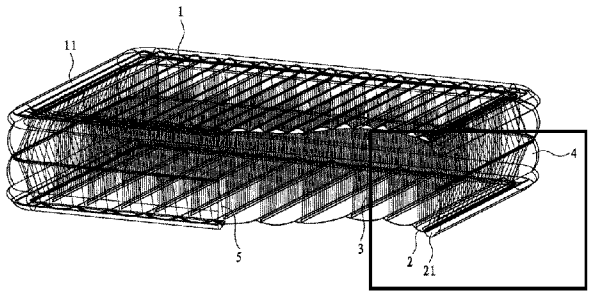
1.1 - It is requested that the opposed Patent be maintained.
1.2 - In case the Opposition Division does not intend to allow petition 1, oral proceedings under Art. 116 EPC are respectfully requested.
1.3 - The Patentee reserves the right to file further written submissions.

3. Grounds for Opposition

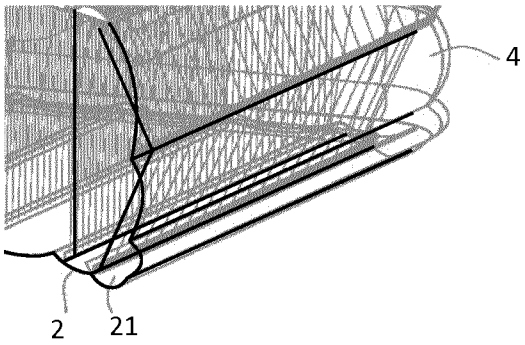
3.2.1 Claim 1

After having considered the Opponent's arguments and the cited references in depth, the Patentee would like to point out the following.
E1 actually fails to disclose the combination of features listed in Claim 1. In particular, **E1** fails to disclose features *vi*, *ix* and *xi* as listed on pages 3-4 of the Notice of Opposition. Contrary to what is stated by the Opponent, according to the technical information unambiguously derivable from **E1**,

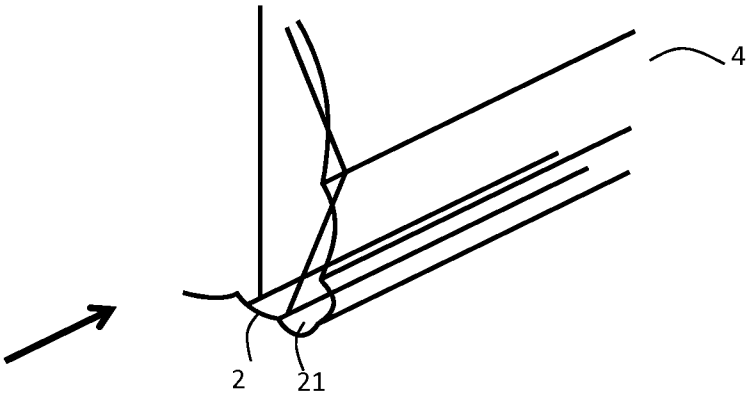
the *ring-shaped upper suction piece 11* and the *ring-shaped lower suction piece 21* are not part of any tensioning structure.
Since the figures of **E1** are quite confused due to the quantity of lines the one close to the other, some graphic elaborations are reported below of Figure 4, in order to provide evidence of the fact that the *ring-shaped lower suction piece 21* is not part of any tensioning structure. Of course, *mutatis mutandis,* the same applies to the *ring-shaped upper suction piece 11*.



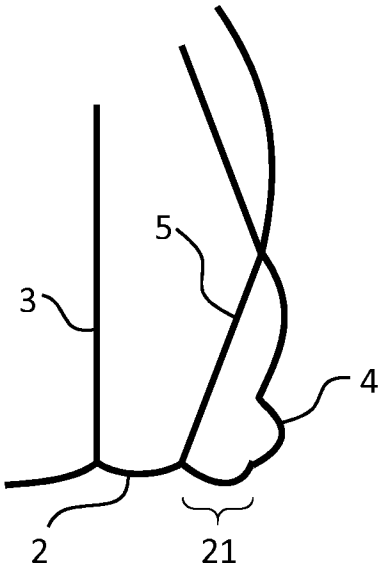
Picture 1 - Figure 4 of E1; the box indicates the detail considered in the following



Picture 2 - detail of Figure 4 of E1; original lines have been lightened and thick black lines have been added in order to render the structures of the bed more evident



Picture 3 - detail of Figure 4; the (confused) background has been removed in order to render the structures of the bed even more evident. The arrow shows the direction of sight in the sketch reported below.

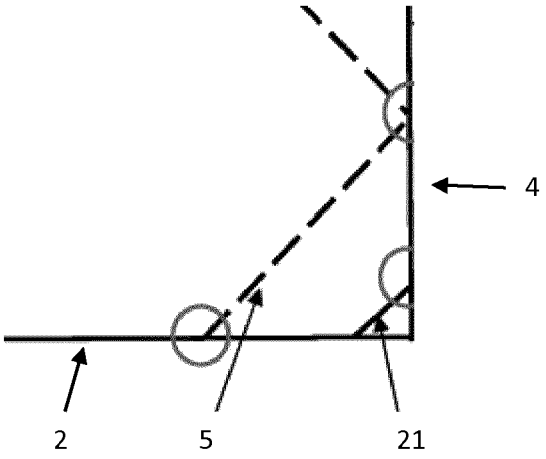


Picture 4 - Sketch of the structure of E1 as derived from Figure 4 of E1 itself

As can be seen in the sketch of Picture 4 on the left, the *ring-shaped lower suction piece 21* is not part of the tensioning structures.
The sketch of Picture 4 seems to be the only correct interpretation of the structure of **E1**, at least for two reasons.
Firstly, the description of **E1** (here considered through the translation provided by the Opponent as **E2**), perfectly fits the structure of Picture 4:

> "*In order to improve the aesthetics of the bed, a ring-shaped upper suction piece 11 and a ring-shaped lower suction piece 21 are respectively disposed between the upper piece 1 and the wrapping piece 4 and between the lower piece 2 and the wrapping piece 4. That is, the upper piece 1 is connected with the upper periphery of the wrapping piece 4 through the ring-shaped upper suction piece 11, and the lower piece 2 is connected with the lower periphery of the wrapping piece 4 through the ring-shaped lower suction piece 21*." (see **E2**, page 5, lines 4-10 – emphasis added).

On the contrary, the same portion of the description of **E1** considered above, does not apply to the structure of **E1** as interpreted by the Opponent, according to the sketch provided on page 6 of the Notice of Opposition. Picture 5 copies the detail of such sketch which corresponds to the one reported above in Picture 4. In the structure of Picture 5, the *ring-shaped lower suction piece 21* can hardly be considered *"...between the lower piece 2 and the wrapping piece 4..."*. Moreover, in the same structure, the *lower piece 2 is connected with the lower periphery of the wrapping piece 4* directly (in the corner), rather than being connected "*...through the ring-shaped lower suction piece 21*" as reported in the description of **E1**.



Picture 5 - Sketch of the structure of E1 as interpreted and reported by the Opponent

Secondly, the structure of Picture 5 is not plausible since it provides a completely closed volume defined by the triangle in the corner. As a matter of fact, contrary to the *wrapping belt 5* (which is made of a *plurality of cables 52*), the *ring-shaped lower suction piece 21* is described as a continuous wall, without any hole (see in particular figures 2 and 5 of **E1**). Accordingly, if the structure of **E1** was actually as depicted in Figure 5, then the space defined by the triangle in the corner would be actually closed, i.e. without any possibility of being inflated/deflated. This is simply impossible in a bed which is intended for being wholly inflated/deflated as desired by the user. By the way, the structure depicted in Picture 4 does not provide any closed volume and can be easily inflated/deflated as desired by the user.

The same arguments reported above apply, *mutatis mutandis,* to the second embodiment of **E1** shown in figures 5-7. In particular, the same reasoning reported above can be carried out with respect to figure 7, which is similar to figure 4, leading to the same conclusions.

Thus, it is clear that **E1** fails to disclose at least features *vi*, *ix* and *xi* of claim 1; in particular, the inflatable bed of **E1** fails to disclose that:

vi) *at least two outside edges of said support structure being respectively coupled to the side wall adjacent;*
ix) *at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent;*
xi) *and at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent.*

Accordingly, claim 1 is novel over the prior art.
The fact that each tensioning structure has two outside edges coupled to the side wall implies a better control on the actual shape of the bed in its inflated state.
Accordingly, claim 1 also implies an inventive step over the prior art.

Of course, Claims 2 to 37 are novel and inventive as well, at least because they depend directly or indirectly on claim 1 which is novel and inventive. However, most dependent claims relate to further technical features which can imply *per se* further differences and further advantages with respect to the prior art.
Patentability of such dependent claims is considered in detail in the following.

3.2.2 – Claim 2

Wrapping belt 5 actually comprises *air holes* since it is made of a *plurality of cables 52*. Conversely, the *ring-shaped lower suction piece 21* does not comprise any *air hole*. This is why (see above § 3.2.1) the Patentee considers that the *ring-shaped lower suction piece 21* is not part of any tensioning structure.

3.2.3 – Claim 3

Claim 3 introduces the reference to the *perpendicular direction* which is used in many claims and which is considered undefined by the Opponent. The Patentee points out that, in view of the whole Patent, a clear and unambiguous interpretation of such feature can be obtained for sure, at least when keeping in mind that *the patent must be construed by a mind willing to understand not a mind desirous of misunderstanding* (**T190/99**). The *perpendicular direction* is the direction (for example *vertical*) which is perpendicular to the main plane of the bed (usually *horizontal*). Accordingly, the actual meaning of claim 3 is that the second tensioning structure and the third tensioning structure are spaced the one from the other in the vertical direction. The same interpretation should be given to the same feature as reported in the other claims.
In **E1**, the second tensioning structure and the third tensioning structure (both constituted by the same *wrapping belt 5*) converge in the same point on the lateral wall (*wrapping piece 4*). Accordingly, the second tensioning structure and the third tensioning structure are not spaced the one from the other in the vertical direction or, which is the same, the second tensioning structure and the third tensioning structure *are not disposed at an interval in a perpendicular direction*.

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Further, **E15** can even disclose tensioning structures which are spaced the one from the other in the vertical direction. However, the overall structure of **E15**, which is different from the Patent, is also completely different from **E1**, such that no combination with **E1** is possible.
Accordingly, Claim 3 is both novel and inventive, even *per se*.

3.2.4 – Claim 4

As considered above in depth with reference to claim 1, the *second tensioning structure* of **E1** comprises one element only, i.e. the upper portion of the *wrapping belt 5*. Thus, as can be clearly seen in Picture 4, the *second tensioning structure* of **E1** comprises only one I-beam.
Accordingly, Claim 4 is both novel and inventive, even *per se*.

3.2.5 – Claim 5

As considered above in depth with reference to claim 1, the *third tensioning structure* of **E1** comprises one element only, i.e. the lower portion of the *wrapping belt 5*. Thus, as can be clearly seen in Picture 4, the *third tensioning structure* of **E1** comprises only one I-beam.
Accordingly, Claim 5 is both novel and inventive, even *per se*.

3.2.6 – Claim 6

E3 does not comprise any *support structure* at the peripheral portion, as intended by the Patent. Accordingly, the Y-beams of **E3** are not part of any *support structure,* they actually connect the *top sheet* and the *bottom sheet*. The combination of **E3** and **E1**, if any, would lead to modify the *drawbelts 3* so as to arrange them in a Y-beam configuration rather than in their actual I-beam configuration.
Maybe **E4** could even disclose a *support structure* comprising some Y-beams, but such Y-beams are arranged in a completely different manner with respect to the Patent. In particular, according to **E4**, two ends of each Y-beam are connected to the *top sheet* and to the *bottom sheet*, respectively, while the third end only is connected to the side wall. The combination of **E4** and **E1**, if any, would lead to modify the *wrapping belt 5* so as to arrange it in a Y-beam configuration rather than in its actual V-beam configuration.
Accordingly, Claim 6 is both novel and inventive, even *per se*.

3.2.7 – Claim 7

E3 does not comprise any *support structure* at the peripheral portion, as intended by the Patent. Accordingly, the Y-beams of **E3** are not part of any *support structure,* they actually connect the *top sheet* and the *bottom sheet*. The combination of **E3** and **E1**, if any, would lead to modify the *drawbelts 3* so as to arrange them in a Y-beam configuration rather than in their actual I-beam configuration.
Maybe **E4** could even disclose a *support structure* comprising some Y-beams, but such Y-beams are arranged in a completely different manner with respect to the Patent. In particular, according to **E4**, two ends of each Y-beam are connected to the *top sheet* and to the *bottom sheet*, respectively, while the third end only is connected to the side wall. The combination of **E4** and **E1**, if any, would lead to modify the *wrapping belt 5* so as to arrange it in a Y-beam configuration rather than in its actual V-beam configuration.
Accordingly, Claim 7 is both novel and inventive, even *per se*.

3.2.8 – Claim 8

E5 could even disclose a *tubular beam*, but it actually relates to a different technical field (i.e. water beds) where very different technical problems are addressed, such that the skilled person would have never looked at **E5** in order to modify **E1**.
Moreover, **E5** clearly shows structures which, due to their specific aims, are asymmetric with respect to their horizontal mid-plane. No suggestion is given about the possibility of rendering the structures symmetric. In particular, Figure 7 of **E5** shows a structure in which the *tubular beam* is coupled to the side wall and to the *bottom* sheet. Conversely, claim 8 recites that the tubular beam is connected to the side wall and to the *top* sheet. The combination of **E5** and **E1**, if any, would not lead to modify the *second tensioning structure*.
Accordingly, Claim 8 is both novel and inventive, even *per se*.

3.2.9 – Claim 9

E5 could even disclose a *tubular beam*, but it actually relates to a different technical field where very different technical problems are addressed, such that the skilled person would have never looked at **E5** in order to modify **E1**.
Accordingly, Claim 9 is both novel and inventive, even *per se*.

3.2.10 – Claim 10

E6 could even disclose a *V-beams*, but it actually relates to a different technical field (i.e. water beds) where very different technical problems are addressed, such that the skilled person would have never looked at **E6** in order to modify **E1**.
Moreover, **E6** clearly shows a quite complicated structure in which many *V-beams* are used in the center portion of the bed, while no *support structure* is provided at the peripheral portion as intended by the Patent. Accordingly, a combination of **E6** and **E1**, if any, would lead to modify the center portion provided with the *drawbelts 3* rather than the peripheral portion, such that the *wrapping belt 5* of D1 would have remained unchanged.
Accordingly, Claim 10 is both novel and inventive, even *per se*.

3.2.11 – Claim 11

E6 could even disclose a *V-beams*, but it actually relates to a different technical field (i.e. water beds) where very different technical problems are addressed, such that the skilled person would have never looked at **E6** in order to modify **E1**.
Moreover, **E6** clearly shows a quite complicated structure in which many *V-beams* are used in the center portion of the bed, while no *support structure* is provided at the peripheral portion as intended by the Patent. Accordingly, a combination of **E6** and **E1**, if any, would lead to modify the center portion provided with the *drawbelts 3* rather than the peripheral portion, such that the *wrapping belt 5* of D1 would have remained unchanged.
Accordingly, Claim 11 is both novel and inventive, even *per se*.

3.2.12 – Claim 12

As considered above with reference to claims 1 and 4, the *second tensioning structure* of **E1** comprises one I-beam only, such that it can't disclose the features of claim 12 in any manner.

Accordingly, Claim 12 is both novel and inventive, even *per se*.

3.2.13 – Claim 13

As considered above with reference to claims 1 and 5, the *third tensioning structure* of **E1** comprises one I-beam only, such that it can't disclose the features of claim 13 in any manner.
Accordingly, Claim 13 is both novel and inventive, even *per se.*

3.2.14 – Claim 14

As considered above with reference to claims 1 and 4, the *second tensioning structure* of **E1** comprises one I-beam only, such that it can't disclose the features of claim 14 in any manner.
Accordingly, Claim 14 is both novel and inventive, even *per se*.

3.2.15 – Claim 15

As considered above with reference to claims 1 and 5, the *third tensioning structure* of **E1** comprises one I-beam only, such that it can't disclose the features of claim 15 in any manner.
Accordingly, Claim 15 is both novel and inventive, even *per se*.

3.2.16 – Claim 16

As considered above with reference to claim 6:

- **E1** does not disclose any Y-beam;
- **E3** discloses Y-beams connecting the top sheet to the bottom sheet; and
- **E4** discloses Y-beams arranged in such a manner that one end only is connected to the side wall.

In other words, no combination of the cited documents can lead to the features of claim 16.
Accordingly, Claim 16 is both novel and inventive, even *per se*.

3.2.17 – Claim 17

As considered above with reference to claim 7:

- **E1** does not disclose any Y-beam;
- **E3** discloses Y-beams connecting the top sheet to the bottom sheet; and
- **E4** discloses Y-beams arranged in such a manner that one end only is connected to the side wall.

In other words, no combination of the cited documents can lead to the features of claim 17.
Accordingly, Claim 17 is both novel and inventive, even *per se*.

3.2.18 – Claim 18

As considered above with reference to Claim 8, **E5** relates to a different technical field, such that the skilled person would have never looked at **E5** in order to modify **E1**.
Moreover, Figure 7 of **E5** shows a structure in which the *tubular beam* is coupled to the side wall and to the *bottom* sheet, rather than to the *top* sheet. The combination of **E5** and **E1**, if any, would not lead to the structure of Claim 18.
Accordingly, Claim 18 is both novel and inventive, even *per se.*

3.2.19 – Claim 19

As considered above with reference to Claim 9, **E5** relates to a different technical field, such that the skilled person would have never looked at **E5** in order to modify **E1**.
Accordingly, Claim 19 is both novel and inventive, even *per se.*

3.2.20 – Claim 20

As considered above with reference to Claim 10, **E6** relates to a different technical field, such that the skilled person would have never looked at **E5** in order to modify **E1**.
Moreover, **E6** shows many *V-beams* in the center portion of the bed, while no *support structure* is provided at the peripheral portion as intended by the Patent. Accordingly, the combination of **E6** and **E1**, if any, would not lead to the structure of Claim 20.
Accordingly, Claim 20 is both novel and inventive, even *per se.*

3.2.21 – Claim 21

As considered above with reference to Claim 11, **E6** relates to a different technical field, such that the skilled person would have never looked at **E5** in order to modify **E1**.
Moreover, **E6** shows many *V-beams* in the center portion of the bed, while no *support structure* is provided at the peripheral portion as intended by the Patent. Accordingly, the combination of **E6** and **E1**, if any, would not lead to the structure of Claim 21.
Accordingly, Claim 21 is both novel and inventive, even *per se.*

3.2.22 – Claim 22

Claim 22 depends on Claim 4. Since, as considered above, **E1** does not disclose the features of Claim 4, it can't disclose the features of Claim 22 to a greater extent.
Accordingly, Claim 22 is both novel and inventive.

3.2.23 – Claim 23

Claim 23 depends on Claim 5. Since, as considered above, **E1** does not disclose the features of Claim 5, it can't disclose the features of Claim 23 to a greater extent.
Accordingly, Claim 23 is both novel and inventive.

3.2.24 – Claim 24

Claim 24 depends on Claim 6. As considered above, Claim 6 is not obvious in view of any combination of the cited documents **E1**, **E3** and **E4**. Thus, Claim 24 is also not obvious, in view of the same documents, to a greater extent.
Accordingly, Claim 24 is both novel and inventive.

3.2.25 – Claim 25

Claim 25 depends on Claim 7. As considered above, Claim 7 is not obvious in view of any combination of the cited documents **E1**, **E3** and **E4**. Thus, Claim 25 is also not obvious, in view of the same documents, to a greater extent.

Accordingly, Claim 25 is both novel and inventive.

3.2.26 – Claim 26

Claim 26 depends on Claim 8. As considered above, Claim 8 is not obvious in view of the combination, if any, of the cited documents **E1** and **E5**. Thus, Claim 26 is also not obvious, in view of the same documents, to a greater extent.
Accordingly, Claim 26 is both novel and inventive.

3.2.27 – Claim 27

Claim 27 depends on Claim 9. As considered above, Claim 9 is not obvious in view of the combination, if any, of the cited documents **E1** and **E5**. Thus, Claim 27 is also not obvious, in view of the same documents, to a greater extent.
Accordingly, Claim 27 is both novel and inventive.

3.2.28 – Claim 28

Claim 28 depends on Claim 10. As considered above, Claim 10 is not obvious in view of the combination, if any, of the cited documents **E1** and **E6**. Thus, Claim 28 is also not obvious, in view of the same documents, to a greater extent.
Accordingly, Claim 28 is both novel and inventive.

3.2.29 – Claim 29

Claim 29 depends on Claim 11. As considered above, Claim 11 is not obvious in view of the combination, if any, of the cited documents **E1** and **E5**. Thus, Claim 29 is also not obvious, in view of the same documents, to a greater extent.
Accordingly, Claim 29 is both novel and inventive.

3.2.30 – Claim 30

As considered above, **E4** discloses Y-beams, but such Y-beams are part of the *support structure* (provided at the peripheral portion of the bed) rather than being part of the *first tensioning structure* (provided in the center portion of the bed) as recited by Claim 30.
Moreover, **E4** dos not disclose any X-beam.
Accordingly, with respect to Y-beams and to X-beams, Claim 30 is both novel and inventive.

3.2.32 – Claim 32

E1 discloses tensioning structures made of a *plurality of cables*, i.e. *threads*. Conversely, **E1** fails to disclose tensioning structures made of *mesh* and/or *laminated plastic sheets*.
Accordingly, with respect to *mesh* and/or *laminated plastic sheets*, Claim 32 is both novel and inventive over **E1**.

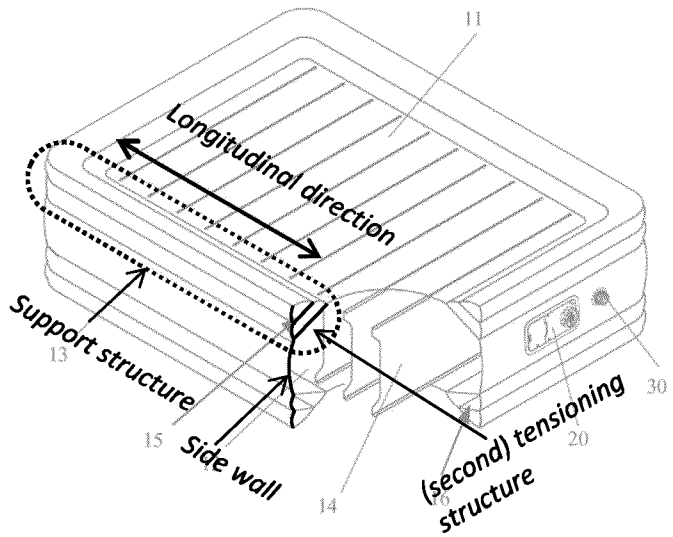
3.2.38 – Claim 38

E13 and **E14** disclose built-in air pumps. However, as considered above (see e.g. § 3.2.3), in the structure of **E1** the second tensioning structure and the third tensioning structure (both constituted by the same *wrapping belt 5*) converge in the same point on the lateral wall (*wrapping piece 4*). Accordingly, in **E1** there is no gap between the lower edge of the second tensioning structure and the upper edge of the third tensioning structure. Thus, differently from what is stated by the Opponent, it is not obvious to modify **E1** to incorporate an air pump as recited by Claim 38.
Accordingly, Claim 29 is both novel and inventive, even *per se.*

3.3 – Sufficiency

As a general remark, the arguments provided in this paragraph by the Opponent appear to be particularly specious, since the established Case Law of the EPO (at least since decision **T292/85**) clearly states that *an invention is sufficiently disclosed if at least one way is clearly indicated enabling the person skilled in the art to carry out the invention.*
The description and the drawings of the Patent provide many different ways to carry out the invention, thus fully meeting the patentability requirements. Specific comments are reported below.

3.3.1 – Claim 1



Picture 6 – Graphic elaboration of Fig. 6 of the Patent clearly disclosing the features contested by the Opponent

As can be seen in Picture 6 on the left, the claimed *support structure* as a whole (encircled by the dashed line) is *disposed in a longitudinal direction of at least one of said side walls* of the bed. At the same time, the *outside edges* of the second (and third) *tensioning structures,* which are part of the *support structure,* are coupled to the side wall adjacent.
As can be seen, no contradiction arises at all and the Patent does disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, thus fulfilling the requirements of the EPC.

3.3.2 – Claims 36 & 37

The Notice of Opposition itself provided an interpretation of Claims 36 and 37 while arguing about their alleged lack of patentability. Moreover, it is clear that even if such dependent claims were ambiguous, anyway many other embodiments of the invention would have been effectively disclosed, thus fulfilling the requirements of the EPC.

4. Conclusions

In view of the arguments reported above, the Patentee would like to reach the following conclusions:

4.1 - It is requested that the Opposed Patent be maintained as granted.
4.2 - In case the Opposition Division does not intend to allow petition 1, oral proceedings under Art. 116 EPC are respectfully requested.

Finally we kindly ask you to change the representative from

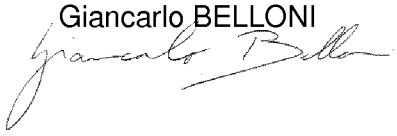
Simona INCHINGALO
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To

Giancarlo BELLONI
C/O Bugnion Spa
Via Lancetti 17
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Yours sincerely,

Bugnion SpA
Giancarlo BELLONI



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Letter accompanying subsequently filed items

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The document(s) listed below is (are) subsequently filed documents pertaining to the following application:

Application number and/or EP publication number	EP16191360.3 - EP3192401
Reference	23B6256,12EP42
Procedural phase	Opposition
Name of represented party	Bestway Inflatables & Material Corp.

	Description of document	Original file name	Assigned file name
1	Reply to notice(s) of opposition	23.B6256.12.EP.42@(ResponseToOpposition).pdf	OBSO3.pdf

Signature 1

Place:

Date: **30 October 2019**

Signed by: **/Giancarlo Belloni/**

Capacity: **Representative 1**

Smart card certificate 1

Common name: **Giancarlo Belloni 34360**

EPO ID: **34360**

Issued by: **European Patent Office CA G2**

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Acknowledgement of receipt

We hereby acknowledge receipt of the following subsequently filed document(s):

Submission number	8005337	
Application number	EP16191360.3	
Patent number	EP3192401	
Date of receipt	30 October 2019	
Filing Office	European Patent Office, The Hague	
Procedural phase	Opposition	
Your reference	23B6256,12EP42	
Documents submitted	package-data.xml ep-cms-sfd-request.pdf (1 p.)	ep-cms-sfd-request.xml OBSO3.pdf\23.B6256.12.EP.42@(ResponseToOpposition).pdf (11 p.)
Submitted by	CN=secure.epoline.org	
Method of submission	Online	
Date and time receipt generated	30 October 2019, 12:04 (CET)	
Message Digest	DD:F9:DA:FB:4C:04:C2:24:66:96:CC:5B:25:BA:EA:AF:F1:28:9A:3D	

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Date: 05.11.2019

Reference	Application No./Patent No.
MP19609.EP01/JV OPPO 01	16191360.3 - 1011 / 3192401
Applicant/Proprietor: Bestway Inflatables & Material Corp	

BRIEF COMMUNICATION

Subject:
- ☐ Your letter of
- ☐ Our telephone conversation of
- ☒ Communication of 04.07.19
- ☐

Enclosure(s):
- ☒ Letter from the proprietor of the patent of 30.10.19
- ☐ Letter from the opponent of
- ☐ Copy (copies)

Communication:

☐ A letter from the opponent /proprietor was received on ..... . The documents specified as patent documents in this letter are available via the European Patent Register at **www.epo.org/register.** Should you wish to receive these documents in paper format, they will be supplied to you free of charge if specifically requested on receipt of this communication (OJ EPO 2009, 434).

☐

For the Opposition Division

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☐ **Registered letter**

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Our Ref. 23.B6256.12.EP.42

Milano, October 30, 2019

RE.: **Opposition against European Patent no. 3192401** issued Sep 19, 2018
for: INFLATABLE BED
in the name of: BESTWAY INFLATABLES & MATERIAL CORP.

Dear Sirs,

This is a substantive response of the Patentee to the Notice of Opposition filed by INTEX RECREATION CORP. (the Opponent) against the European Patent EP3192401 (the Patent) granted in the name of BESTWAY INFLATABLES & MATERIAL CORP (the Patentee)

The Opponent's arguments will be considered in detail below. For the sake of simplicity, the Opponent's numbering system is fully maintained in the present response, namely with respect to the chapters and paragraphs of the arguments, to the prior art documents (**E1** to **E15**) and to the features of claim 1 (*i* to *xii*).

1. Requests

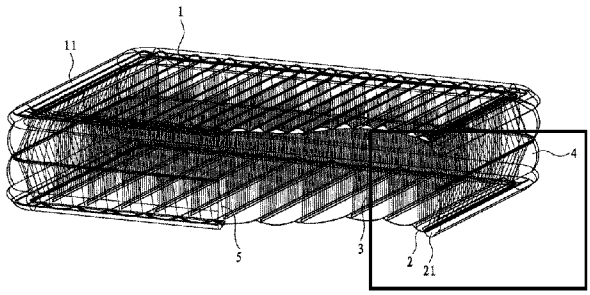
1.1 - It is requested that the opposed Patent be maintained.
1.2 - In case the Opposition Division does not intend to allow petition 1, oral proceedings under Art. 116 EPC are respectfully requested.
1.3 - The Patentee reserves the right to file further written submissions.

3. Grounds for Opposition

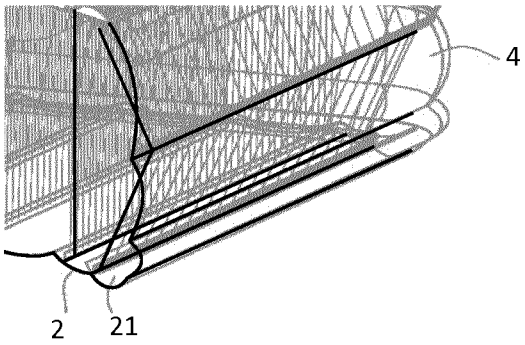
3.2.1 Claim 1

After having considered the Opponent's arguments and the cited references in depth, the Patentee would like to point out the following.
E1 actually fails to disclose the combination of features listed in Claim 1. In particular, **E1** fails to disclose features *vi*, *ix* and *xi* as listed on pages 3-4 of the Notice of Opposition. Contrary to what is stated by the Opponent, according to the technical information unambiguously derivable from **E1**,

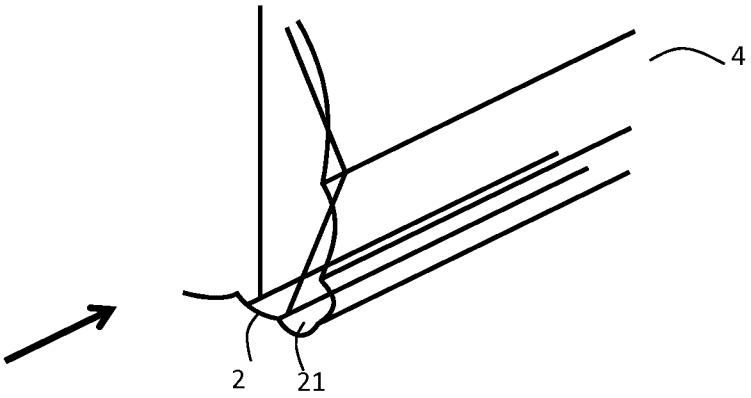
the *ring-shaped upper suction piece 11* and the *ring-shaped lower suction piece 21* are not part of any tensioning structure.
Since the figures of **E1** are quite confused due to the quantity of lines the one close to the other, some graphic elaborations are reported below of Figure 4, in order to provide evidence of the fact that the *ring-shaped lower suction piece 21* is not part of any tensioning structure. Of course, *mutatis mutandis,* the same applies to the *ring-shaped upper suction piece 11*.



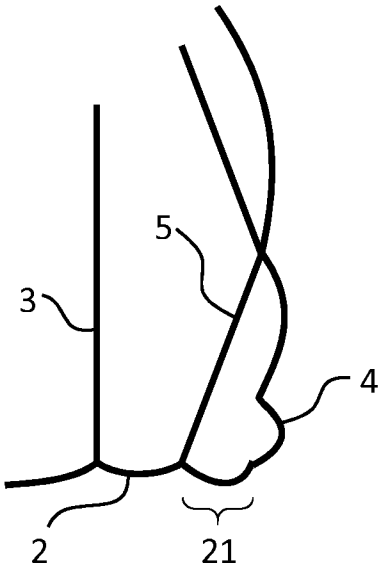
Picture 1 - Figure 4 of E1; the box indicates the detail considered in the following



Picture 2 - detail of Figure 4 of E1; original lines have been lightened and thick black lines have been added in order to render the structures of the bed more evident



Picture 3 - detail of Figure 4; the (confused) background has been removed in order to render the structures of the bed even more evident. The arrow shows the direction of sight in the sketch reported below.

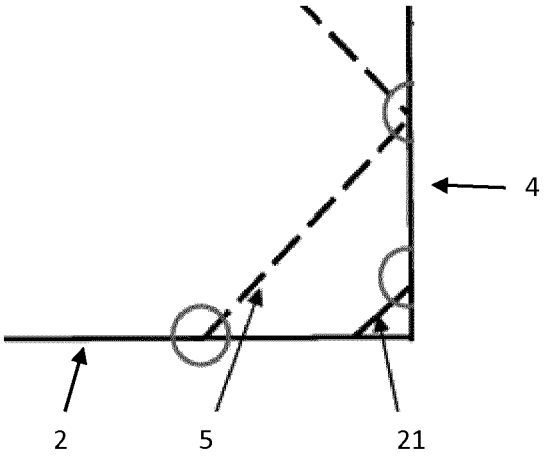


Picture 4 - Sketch of the structure of E1 as derived from Figure 4 of E1 itself

As can be seen in the sketch of Picture 4 on the left, the *ring-shaped lower suction piece 21* is not part of the tensioning structures.
The sketch of Picture 4 seems to be the only correct interpretation of the structure of **E1**, at least for two reasons.
Firstly, the description of **E1** (here considered through the translation provided by the Opponent as **E2**), perfectly fits the structure of Picture 4:

> "*In order to improve the aesthetics of the bed, a ring-shaped upper suction piece 11 and a ring-shaped lower suction piece 21 are respectively disposed between the upper piece 1 and the wrapping piece 4 and between the lower piece 2 and the wrapping piece 4. That is, the upper piece 1 is connected with the upper periphery of the wrapping piece 4 through the ring-shaped upper suction piece 11, and the lower piece 2 is connected with the lower periphery of the wrapping piece 4 through the ring-shaped lower suction piece 21*." (see **E2**, page 5, lines 4-10 – emphasis added).

On the contrary, the same portion of the description of **E1** considered above, does not apply to the structure of **E1** as interpreted by the Opponent, according to the sketch provided on page 6 of the Notice of Opposition. Picture 5 copies the detail of such sketch which corresponds to the one reported above in Picture 4. In the structure of Picture 5, the *ring-shaped lower suction piece 21* can hardly be considered *"...between the lower piece 2 and the wrapping piece 4..."*. Moreover, in the same structure, the *lower piece 2 is connected with the lower periphery of the wrapping piece 4* directly (in the corner), rather than being connected "*...through the ring-shaped lower suction piece 21*" as reported in the description of **E1**.



Picture 5 - Sketch of the structure of E1 as interpreted and reported by the Opponent

Secondly, the structure of Picture 5 is not plausible since it provides a completely closed volume defined by the triangle in the corner. As a matter of fact, contrary to the *wrapping belt 5* (which is made of a *plurality of cables 52*), the *ring-shaped lower suction piece 21* is described as a continuous wall, without any hole (see in particular figures 2 and 5 of **E1**). Accordingly, if the structure of **E1** was actually as depicted in Figure 5, then the space defined by the triangle in the corner would be actually closed, i.e. without any possibility of being inflated/deflated. This is simply impossible in a bed which is intended for being wholly inflated/deflated as desired by the user. By the way, the structure depicted in Picture 4 does not provide any closed volume and can be easily inflated/deflated as desired by the user.

The same arguments reported above apply, *mutatis mutandis,* to the second embodiment of **E1** shown in figures 5-7. In particular, the same reasoning reported above can be carried out with respect to figure 7, which is similar to figure 4, leading to the same conclusions.

Thus, it is clear that **E1** fails to disclose at least features *vi*, *ix* and *xi* of claim 1; in particular, the inflatable bed of **E1** fails to disclose that:

vi) *at least two outside edges of said support structure being respectively coupled to the side wall adjacent;*
ix) *at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent;*
xi) *and at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent.*

Accordingly, claim 1 is novel over the prior art.
The fact that each tensioning structure has two outside edges coupled to the side wall implies a better control on the actual shape of the bed in its inflated state.
Accordingly, claim 1 also implies an inventive step over the prior art.

Of course, Claims 2 to 37 are novel and inventive as well, at least because they depend directly or indirectly on claim 1 which is novel and inventive. However, most dependent claims relate to further technical features which can imply *per se* further differences and further advantages with respect to the prior art.
Patentability of such dependent claims is considered in detail in the following.

3.2.2 – Claim 2

Wrapping belt 5 actually comprises *air holes* since it is made of a *plurality of cables 52*. Conversely, the *ring-shaped lower suction piece 21* does not comprise any *air hole*. This is why (see above § 3.2.1) the Patentee considers that the *ring-shaped lower suction piece 21* is not part of any tensioning structure.

3.2.3 – Claim 3

Claim 3 introduces the reference to the *perpendicular direction* which is used in many claims and which is considered undefined by the Opponent. The Patentee points out that, in view of the whole Patent, a clear and unambiguous interpretation of such feature can be obtained for sure, at least when keeping in mind that *the patent must be construed by a mind willing to understand not a mind desirous of misunderstanding* (**T190/99**). The *perpendicular direction* is the direction (for example *vertical*) which is perpendicular to the main plane of the bed (usually *horizontal*). Accordingly, the actual meaning of claim 3 is that the second tensioning structure and the third tensioning structure are spaced the one from the other in the vertical direction. The same interpretation should be given to the same feature as reported in the other claims.
In **E1**, the second tensioning structure and the third tensioning structure (both constituted by the same *wrapping belt 5*) converge in the same point on the lateral wall (*wrapping piece 4*). Accordingly, the second tensioning structure and the third tensioning structure are not spaced the one from the other in the vertical direction or, which is the same, the second tensioning structure and the third tensioning structure *are not disposed at an interval in a perpendicular direction*.

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Further, **E15** can even disclose tensioning structures which are spaced the one from the other in the vertical direction. However, the overall structure of **E15**, which is different from the Patent, is also completely different from **E1**, such that no combination with **E1** is possible.
Accordingly, Claim 3 is both novel and inventive, even *per se*.

3.2.4 – Claim 4

As considered above in depth with reference to claim 1, the *second tensioning structure* of **E1** comprises one element only, i.e. the upper portion of the *wrapping belt 5*. Thus, as can be clearly seen in Picture 4, the *second tensioning structure* of **E1** comprises only one I-beam.
Accordingly, Claim 4 is both novel and inventive, even *per se*.

3.2.5 – Claim 5

As considered above in depth with reference to claim 1, the *third tensioning structure* of **E1** comprises one element only, i.e. the lower portion of the *wrapping belt 5*. Thus, as can be clearly seen in Picture 4, the *third tensioning structure* of **E1** comprises only one I-beam.
Accordingly, Claim 5 is both novel and inventive, even *per se*.

3.2.6 – Claim 6

E3 does not comprise any *support structure* at the peripheral portion, as intended by the Patent. Accordingly, the Y-beams of **E3** are not part of any *support structure,* they actually connect the *top sheet* and the *bottom sheet*. The combination of **E3** and **E1**, if any, would lead to modify the *drawbelts 3* so as to arrange them in a Y-beam configuration rather than in their actual I-beam configuration.
Maybe **E4** could even disclose a *support structure* comprising some Y-beams, but such Y-beams are arranged in a completely different manner with respect to the Patent. In particular, according to **E4**, two ends of each Y-beam are connected to the *top sheet* and to the *bottom sheet*, respectively, while the third end only is connected to the side wall. The combination of **E4** and **E1**, if any, would lead to modify the *wrapping belt 5* so as to arrange it in a Y-beam configuration rather than in its actual V-beam configuration.
Accordingly, Claim 6 is both novel and inventive, even *per se*.

3.2.7 – Claim 7

E3 does not comprise any *support structure* at the peripheral portion, as intended by the Patent. Accordingly, the Y-beams of **E3** are not part of any *support structure,* they actually connect the *top sheet* and the *bottom sheet*. The combination of **E3** and **E1**, if any, would lead to modify the *drawbelts 3* so as to arrange them in a Y-beam configuration rather than in their actual I-beam configuration.
Maybe **E4** could even disclose a *support structure* comprising some Y-beams, but such Y-beams are arranged in a completely different manner with respect to the Patent. In particular, according to **E4**, two ends of each Y-beam are connected to the *top sheet* and to the *bottom sheet*, respectively, while the third end only is connected to the side wall. The combination of **E4** and **E1**, if any, would lead to modify the *wrapping belt 5* so as to arrange it in a Y-beam configuration rather than in its actual V-beam configuration.
Accordingly, Claim 7 is both novel and inventive, even *per se*.

3.2.8 – Claim 8

E5 could even disclose a *tubular beam*, but it actually relates to a different technical field (i.e. water beds) where very different technical problems are addressed, such that the skilled person would have never looked at **E5** in order to modify **E1**.
Moreover, **E5** clearly shows structures which, due to their specific aims, are asymmetric with respect to their horizontal mid-plane. No suggestion is given about the possibility of rendering the structures symmetric. In particular, Figure 7 of **E5** shows a structure in which the *tubular beam* is coupled to the side wall and to the *bottom* sheet. Conversely, claim 8 recites that the tubular beam is connected to the side wall and to the *top* sheet. The combination of **E5** and **E1**, if any, would not lead to modify the *second tensioning structure*.
Accordingly, Claim 8 is both novel and inventive, even *per se*.

3.2.9 – Claim 9

E5 could even disclose a *tubular beam*, but it actually relates to a different technical field where very different technical problems are addressed, such that the skilled person would have never looked at **E5** in order to modify **E1**.
Accordingly, Claim 9 is both novel and inventive, even *per se*.

3.2.10 – Claim 10

E6 could even disclose a *V-beams*, but it actually relates to a different technical field (i.e. water beds) where very different technical problems are addressed, such that the skilled person would have never looked at **E6** in order to modify **E1**.
Moreover, **E6** clearly shows a quite complicated structure in which many *V-beams* are used in the center portion of the bed, while no *support structure* is provided at the peripheral portion as intended by the Patent. Accordingly, a combination of **E6** and **E1**, if any, would lead to modify the center portion provided with the *drawbelts 3* rather than the peripheral portion, such that the *wrapping belt 5* of D1 would have remained unchanged.
Accordingly, Claim 10 is both novel and inventive, even *per se*.

3.2.11 – Claim 11

E6 could even disclose a *V-beams*, but it actually relates to a different technical field (i.e. water beds) where very different technical problems are addressed, such that the skilled person would have never looked at **E6** in order to modify **E1**.
Moreover, **E6** clearly shows a quite complicated structure in which many *V-beams* are used in the center portion of the bed, while no *support structure* is provided at the peripheral portion as intended by the Patent. Accordingly, a combination of **E6** and **E1**, if any, would lead to modify the center portion provided with the *drawbelts 3* rather than the peripheral portion, such that the *wrapping belt 5* of D1 would have remained unchanged.
Accordingly, Claim 11 is both novel and inventive, even *per se*.

3.2.12 – Claim 12

As considered above with reference to claims 1 and 4, the *second tensioning structure* of **E1** comprises one I-beam only, such that it can't disclose the features of claim 12 in any manner.

Accordingly, Claim 12 is both novel and inventive, even *per se*.

3.2.13 – Claim 13

As considered above with reference to claims 1 and 5, the *third tensioning structure* of **E1** comprises one I-beam only, such that it can't disclose the features of claim 13 in any manner.
Accordingly, Claim 13 is both novel and inventive, even *per se.*

3.2.14 – Claim 14

As considered above with reference to claims 1 and 4, the *second tensioning structure* of **E1** comprises one I-beam only, such that it can't disclose the features of claim 14 in any manner.
Accordingly, Claim 14 is both novel and inventive, even *per se*.

3.2.15 – Claim 15

As considered above with reference to claims 1 and 5, the *third tensioning structure* of **E1** comprises one I-beam only, such that it can't disclose the features of claim 15 in any manner.
Accordingly, Claim 15 is both novel and inventive, even *per se*.

3.2.16 – Claim 16

As considered above with reference to claim 6:

- **E1** does not disclose any Y-beam;
- **E3** discloses Y-beams connecting the top sheet to the bottom sheet; and
- **E4** discloses Y-beams arranged in such a manner that one end only is connected to the side wall.

In other words, no combination of the cited documents can lead to the features of claim 16.
Accordingly, Claim 16 is both novel and inventive, even *per se*.

3.2.17 – Claim 17

As considered above with reference to claim 7:

- **E1** does not disclose any Y-beam;
- **E3** discloses Y-beams connecting the top sheet to the bottom sheet; and
- **E4** discloses Y-beams arranged in such a manner that one end only is connected to the side wall.

In other words, no combination of the cited documents can lead to the features of claim 17.
Accordingly, Claim 17 is both novel and inventive, even *per se*.

3.2.18 – Claim 18

As considered above with reference to Claim 8, **E5** relates to a different technical field, such that the skilled person would have never looked at **E5** in order to modify **E1**.
Moreover, Figure 7 of **E5** shows a structure in which the *tubular beam* is coupled to the side wall and to the *bottom* sheet, rather than to the *top* sheet. The combination of **E5** and **E1**, if any, would not lead to the structure of Claim 18.
Accordingly, Claim 18 is both novel and inventive, even *per se.*

3.2.19 – Claim 19

As considered above with reference to Claim 9, **E5** relates to a different technical field, such that the skilled person would have never looked at **E5** in order to modify **E1**.
Accordingly, Claim 19 is both novel and inventive, even *per se.*

3.2.20 – Claim 20

As considered above with reference to Claim 10, **E6** relates to a different technical field, such that the skilled person would have never looked at **E5** in order to modify **E1**.
Moreover, **E6** shows many *V-beams* in the center portion of the bed, while no *support structure* is provided at the peripheral portion as intended by the Patent. Accordingly, the combination of **E6** and **E1**, if any, would not lead to the structure of Claim 20.
Accordingly, Claim 20 is both novel and inventive, even *per se.*

3.2.21 – Claim 21

As considered above with reference to Claim 11, **E6** relates to a different technical field, such that the skilled person would have never looked at **E5** in order to modify **E1**.
Moreover, **E6** shows many *V-beams* in the center portion of the bed, while no *support structure* is provided at the peripheral portion as intended by the Patent. Accordingly, the combination of **E6** and **E1**, if any, would not lead to the structure of Claim 21.
Accordingly, Claim 21 is both novel and inventive, even *per se.*

3.2.22 – Claim 22

Claim 22 depends on Claim 4. Since, as considered above, **E1** does not disclose the features of Claim 4, it can't disclose the features of Claim 22 to a greater extent.
Accordingly, Claim 22 is both novel and inventive.

3.2.23 – Claim 23

Claim 23 depends on Claim 5. Since, as considered above, **E1** does not disclose the features of Claim 5, it can't disclose the features of Claim 23 to a greater extent.
Accordingly, Claim 23 is both novel and inventive.

3.2.24 – Claim 24

Claim 24 depends on Claim 6. As considered above, Claim 6 is not obvious in view of any combination of the cited documents **E1**, **E3** and **E4**. Thus, Claim 24 is also not obvious, in view of the same documents, to a greater extent.
Accordingly, Claim 24 is both novel and inventive.

3.2.25 – Claim 25

Claim 25 depends on Claim 7. As considered above, Claim 7 is not obvious in view of any combination of the cited documents **E1**, **E3** and **E4**. Thus, Claim 25 is also not obvious, in view of the same documents, to a greater extent.

Accordingly, Claim 25 is both novel and inventive.

3.2.26 – Claim 26

Claim 26 depends on Claim 8. As considered above, Claim 8 is not obvious in view of the combination, if any, of the cited documents **E1** and **E5**. Thus, Claim 26 is also not obvious, in view of the same documents, to a greater extent.
Accordingly, Claim 26 is both novel and inventive.

3.2.27 – Claim 27

Claim 27 depends on Claim 9. As considered above, Claim 9 is not obvious in view of the combination, if any, of the cited documents **E1** and **E5**. Thus, Claim 27 is also not obvious, in view of the same documents, to a greater extent.
Accordingly, Claim 27 is both novel and inventive.

3.2.28 – Claim 28

Claim 28 depends on Claim 10. As considered above, Claim 10 is not obvious in view of the combination, if any, of the cited documents **E1** and **E6**. Thus, Claim 28 is also not obvious, in view of the same documents, to a greater extent.
Accordingly, Claim 28 is both novel and inventive.

3.2.29 – Claim 29

Claim 29 depends on Claim 11. As considered above, Claim 11 is not obvious in view of the combination, if any, of the cited documents **E1** and **E5**. Thus, Claim 29 is also not obvious, in view of the same documents, to a greater extent.
Accordingly, Claim 29 is both novel and inventive.

3.2.30 – Claim 30

As considered above, **E4** discloses Y-beams, but such Y-beams are part of the *support structure* (provided at the peripheral portion of the bed) rather than being part of the *first tensioning structure* (provided in the center portion of the bed) as recited by Claim 30.
Moreover, **E4** dos not disclose any X-beam.
Accordingly, with respect to Y-beams and to X-beams, Claim 30 is both novel and inventive.

3.2.32 – Claim 32

E1 discloses tensioning structures made of a *plurality of cables*, i.e. *threads*. Conversely, **E1** fails to disclose tensioning structures made of *mesh* and/or *laminated plastic sheets*.
Accordingly, with respect to *mesh* and/or *laminated plastic sheets*, Claim 32 is both novel and inventive over **E1**.

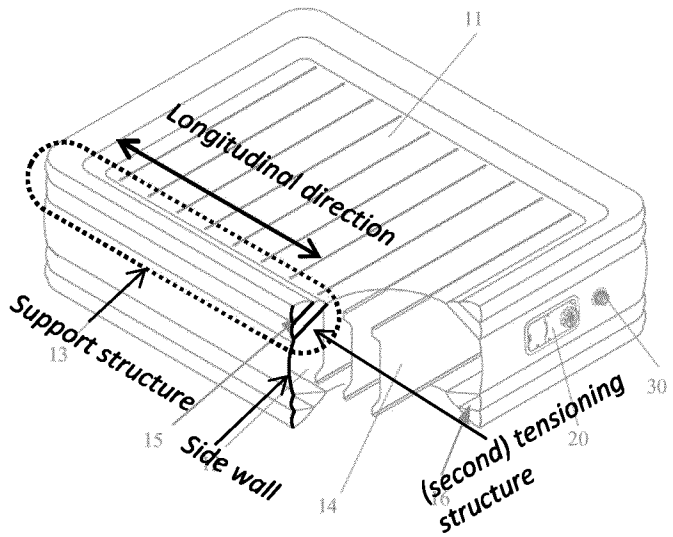
3.2.38 – Claim 38

E13 and **E14** disclose built-in air pumps. However, as considered above (see e.g. § 3.2.3), in the structure of **E1** the second tensioning structure and the third tensioning structure (both constituted by the same *wrapping belt 5*) converge in the same point on the lateral wall (*wrapping piece 4*). Accordingly, in **E1** there is no gap between the lower edge of the second tensioning structure and the upper edge of the third tensioning structure. Thus, differently from what is stated by the Opponent, it is not obvious to modify **E1** to incorporate an air pump as recited by Claim 38.
Accordingly, Claim 29 is both novel and inventive, even *per se.*

3.3 – Sufficiency

As a general remark, the arguments provided in this paragraph by the Opponent appear to be particularly specious, since the established Case Law of the EPO (at least since decision **T292/85**) clearly states that *an invention is sufficiently disclosed if at least one way is clearly indicated enabling the person skilled in the art to carry out the invention.*
The description and the drawings of the Patent provide many different ways to carry out the invention, thus fully meeting the patentability requirements. Specific comments are reported below.

3.3.1 – Claim 1



Picture 6 – Graphic elaboration of Fig. 6 of the Patent clearly disclosing the features contested by the Opponent

As can be seen in Picture 6 on the left, the claimed *support structure* as a whole (encircled by the dashed line) is *disposed in a longitudinal direction of at least one of said side walls* of the bed. At the same time, the *outside edges* of the second (and third) *tensioning structures,* which are part of the *support structure,* are coupled to the side wall adjacent.
As can be seen, no contradiction arises at all and the Patent does disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, thus fulfilling the requirements of the EPC.

3.3.2 – Claims 36 & 37

The Notice of Opposition itself provided an interpretation of Claims 36 and 37 while arguing about their alleged lack of patentability. Moreover, it is clear that even if such dependent claims were ambiguous, anyway many other embodiments of the invention would have been effectively disclosed, thus fulfilling the requirements of the EPC.

4. Conclusions

In view of the arguments reported above, the Patentee would like to reach the following conclusions:

4.1 - It is requested that the Opposed Patent be maintained as granted.
4.2 - In case the Opposition Division does not intend to allow petition 1, oral proceedings under Art. 116 EPC are respectfully requested.

Finally we kindly ask you to change the representative from

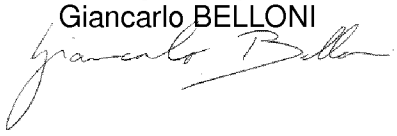
Simona INCHINGALO
C/O Bugnion Spa
Via Lancetti 17
20158 Milano

To

Giancarlo BELLONI
C/O Bugnion Spa
Via Lancetti 17
20158 Milano

Yours sincerely,

Bugnion SpA
Giancarlo BELLONI



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European Patent Office
Office européen des brevets

European Patent Office
80298 MUNICH
GERMANY

Questions about this communication ?
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Belloni, Giancarlo
Bugnion S.p.A.
Viale Lancetti 17
20158 Milano
ITALIE

Date
06.11.19

Reference	Application No./Patent No.
27S8343,12EP42	16191360.3 - 1011 / 3192401

Applicant/Proprietor
Bestway Inflatables & Material Corp

Communication of amended entries concerning the representative (R. 143(1)(h) EPC)

As requested, for the above-mentioned European patent application / European patent the entries concerning the representative have been amended as follows:

Belloni, Giancarlo
Bugnion S.p.A.
Viale Lancetti 17
20158 Milano
IT

The amendment will be recorded in the Register of European Patents.

Important note for EPO deposit account holders

If you would like to have fee refunds credited to a deposit account held with the EPO, you should ensure that you provide clear and up-to-date refund instructions to this effect, using one of the permitted electronic means of filing (see Arrangements for deposit accounts).

For the Opposition Division

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Van der Meer, Sandra

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The White Chapel Building
10 Whitechapel High Street
London E1 8QS
ROYAUME UNI

Date
06.11.19

Reference	Application No./Patent No.
MP19609.EP01/JV OPPO 01	16191360.3 - 1011 / 3192401
Applicant/Proprietor	
Bestway Inflatables & Material Corp	

BRIEF COMMUNICATION

Subject:
- ☐ Your letter of
- ☐ Our telephone conversation of
- ☐ Communication of
- ☐

Enclosure(s):
- ☐ Letter from the proprietor of the patent of
- ☐ Letter from the opponent of
- ☒ Copy (copies) EPO Form 2548

Communication:

☐ A letter from the opponent /proprietor was received on ..... . The documents specified as patent documents in this letter are available via the European Patent Register at **www.epo.org/register.** Should you wish to receive these documents in paper format, they will be supplied to you free of charge if specifically requested on receipt of this communication (OJ EPO 2009, 434).

☐

For the Opposition Division

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☐ **Registered letter**

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Vleck, Jan Montagu
Reddie & Grose LLP
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London E1 8QS
ROYAUME UNI

Date
28.05.2020

Reference	Application No./Patent No.
MP19609.EP01/JV OPPO 01	16191360.3 - 1011 / 3192401
Applicant/Proprietor	
Bestway Inflatables & Material Corp	

Summons to attend oral proceedings pursuant to Rule 115(1) EPC

You are hereby summoned to attend oral proceedings arranged in connection with the above-mentioned European patent.

The matters to be discussed are set out in the communication accompanying this summons (EPO Form 2906).

The oral proceedings, which will be public, will take place before the opposition division

on 14.01.21 at 09.00 hrs in Room H3.5 at the EPO in Rijswijk
Rijswijk New Main, Patentlaan 2, NL-2288 EE Rijswijk (ZH)

You are asked to report at the reception desk, Patentlaan 2, in good time before the starting time mentioned above. The dedicated waiting area will be indicated to you on site.

No changes to the date of the oral proceedings can be made, except on serious grounds (see OJ EPO 1/2009, 68). If you do not appear as summoned, the oral proceedings may continue without you (R. 115(2) EPC, see also OJ EPO 10/2008, 471).

Your attention is drawn to Rule 4 EPC, regarding the language of the oral proceedings, and to the Special edition No. 3 OJ EPO 2007, L.1., concerning the filing of authorisations for company employees and lawyers acting as representatives before the EPO.

The final date for making written submissions and/or amendments (R. 116 EPC) is 13.11.20.

1st Examiner:	2nd Examiner:	Chairman:
Lehe, Jörn	Kus, Slawomir	Bitton, Alexandre

For the Opposition Division

Annexes:
Confirmation of receipt (Form 2936)
Rule 4 EPC (EPC Form 2043)
Communication (EPO Form 2906)

Registered letter
EPO Form 2310 07.19 [ORAL03=H035] (19/05/20)

to EPO postal service 19.05.20

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Intex Recreation v. Bestway Inflatables

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Bugnion S.p.A.
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to EPO postal service 19.05.20

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Wichtige Hinweise zur mündlichen Verhandlung

Das Europäische Patentamt verfügt über keine eigenen Dolmetscher. Diese müssen im Bedarfsfall von außerhalb, teilweise sogar aus anderen Ländern, beigezogen werden, was mit einem hohen Aufwand an Kosten und organisatorischen Vorbereitungen verbunden ist. Muss ein Verhandlungstermin kurzfristig abberaumt werden, können Kosten für bestellte Dolmetscher nicht mehr vermieden werden.

Es wird daher gebeten, eine Simultanübersetzung nur bei wirklichem Bedarf in Anspruch zu nehmen. Es wäre wünschenswert, wenn sich die Beteiligten (zweckmäßigerweise gleichzeitig mit der Terminabstimmung) auf die Benutzung einer Amtssprache einigen könnten. Bei Verständigungsschwierigkeiten sind die Mitglieder der Einspruchsabteilung bereit zu helfen.

Die von den Verfahrensbeteiligten bevorzugte (abgestimmte) Verhandlungssprache und ggf. eine notwendige Simultanübersetzung sind dem Amt möglichst vor der in Regel 4(1) EPÜ angegebenen Frist mitzuteilen.

☐ Verfahrenssprache ist **Deutsch**

Von der/dem/den Einsprechenden wurde

☐ Englisch

☐ Französisch benutzt.

Es wird um eilige Mitteilung - möglichst per Telefax an den zuständigen Formalprüfer - gebeten,

möglichst bis

Datum **13.11.20**

1. welche Sprache(n) Sie in der mündlichen Verhandlung verwenden (**Sprechen**)
2. aus welcher Sprache Sie eine Simultanübersetzung benötigen (**Hören**).

Important information concerning oral proceedings

The European Patent Office has no interpreters of its own. When interpreters are needed they have to be brought in from outside, sometimes even from other countries, which is costly and involves considerable organisation. If oral proceedings have to be cancelled at short notice, the cost of interpreters already engaged still has to be borne.

Please therefore make use of simultaneous interpreting facilities only where strictly necessary. If possible the parties should agree on an official language for the proceedings, preferably at the time when they arrange a date. The members of the Opposition Division will be willing to help should any communication problems arise.

The EPO should be told if possible before the period mentioned in Rule 4 (1) EPC which language the parties prefer (agree on) and whether simultaneous interpreting facilities are required.

☒ Language of the proceedings is **English**

The language used by the opponent/s was English

☐ German

☐ French.

Please inform us urgently - where possible by fax addressed to the formalities officer concerned -

if possible by

Date **13.11.20**

1. which language(s) you intend to use during the oral proceedings (**Speaking**)
2. from which language you need simultaneous interpretation (**Listening**).

Très important Procédure orale

L'Office européen des brevets ne dispose pas de son propre service d'interprètes. Aussi faut-il appel le cas échéant à des interprètes de l'extérieur, qui viennent même parfois de l'étranger, ce qui occasionne de frais élevés et demande un grand travail d'organisation. Si la date d'une procédure orale doit être annulée au dernier moment, il n'est plus possible d'éviter les frais d'interprètes.

Les parties à une procédure sont donc priées de ne demander une traduction simultanée qu'en cas de réel besoin. Il serait souhaitable qu'elles puissent se mettre d'accord en même temps qu'elles conviennent de la date sur l'utilisation d'une langue officielle comme langue des débats. Si les parties éprouvent des difficultés de compréhension lors des débats, les membres de la division d'opposition sont disposés à leur prêter leur assistance.

L'Office doit être avisé si possible avant le début du délai mentionné dans la règle 4(1) CBE de la langue préférée par les parties pour le déroulement des débat (et sur laquelle elles se sont préalablement mises d'accord) et de la nécessité éventuelle d'une traduction simultanée.

☐ La langue de la procédure est le **français**

La langue utilisée par l'opposant/les opposants était

☐ l'allemand

☐ l'anglais.

Prière d'indiquer d'urgence à l'agent des formalités compétent si possible par téléfax

si possible jusqu'au

Date **13.11.20**

1. quelle(s) langue(s) vous utiliserez au cours de la procédure orale (**pour parler**)
2. à partir de quelle langue vous aurez besoin d'une traduction simultanée (**pour écouter**).

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Sollten Sie Ihren Antrag auf mündliche Verhandlung zurückziehen oder zum anberaumten Verhandlungstermin nicht erscheinen wollen bzw. aus wichtigem Grund daran gehindert sein, werden Sie gebeten,

- **unverzüglich das Amt - möglichst per Telefax - davon zu benachrichtigen, wobei das Schriftstück mit einem deutlichen Vermerk "Dringend, mündliche Verhandlung am ..." oder sinngemäß gekennzeichnet sein sollte;**
- **in dringenden Fällen** (weniger als 1 Monat vor dem Verhandlungstermin) zusätzlich **auch dem/die anderen Verfahrensbeteiligten** bzw. ihre(n) Vertreter auf schnellstem Weg **direkt zu unterrichten.**

In jedem solchen Fall obliegt der Einspruchsabteilung die Entscheidung, ob die Verhandlung durchgeführt oder abberaumt wird. Es wird jedoch darauf hingewiesen, dass einem Verfahrensbeteiligten, der eine nicht rechtzeitige oder unterbliebene Benachrichtigung zu verantworten hat, die dadurch den anderen Beteiligten verursachten Kosten auferlegt werden können (Art. 104 EPÜ).

Hinweis auf Regel 4 EPÜ

Regel 4
Sprache im mündlichen Verfahren

(1) Jeder an einem mündlichen Verfahren vor dem Europäischen Patentamt Beteiligte kann sich anstelle der Verfahrenssprache einer anderen Amtssprache des Europäischen Patentamts bedienen, sofern er dies dem Europäischen Patentamt spätestens einen Monat vor dem angesetzten Termin mitgeteilt hat oder selbst für die Übersetzung in die Verfahrenssprache sorgt. Jeder Beteiligte kann sich einer Amtssprache eines Vertragsstaats bedienen, sofern er selbst für die Übersetzung in die Verfahrenssprache sorgt. Von diesen Vorschriften kann das Europäische Patentamt Ausnahmen zulassen.

Should you decide to withdraw your request for oral proceedings or not wish to attend on the date set, or if for some special reason you are unable to do so, you are requested

- **to notify the EPO immediately, where possible by fax, marking the document clearly with the words "Urgent, oral proceedings on ..." or similar;**
- **in urgent cases** (less than one month before the date set for the proceedings), additionally to **notify the other party/parties** and/or their representative(s) **direct as rapidly as possible.**

In all such cases the Opposition Division will decide whether the proceedings are to go ahead or be cancelled. You should however note that costs incurred by the other parties may be charged to a party who either fails to notify them or does not do so in good time (Article 104 EPC).

Attention is drawn to Rule 4 EPC

Rule 4
Language in oral proceedings

(1) Any party to oral proceedings before the European Patent Office may use an official language of the European Patent Office other than the language of the proceedings, if such party gives notice to the European Patent Office at least one month before the date of such oral proceedings or provides for interpretation into the language of the proceedings. Any party may use an official language of a Contracting State, if he provides for interpretation into the language of the proceedings. The European Patent Office may permit derogations from these provisions.

Si vous retirez votre requête tendant à recourir à la procédure orale ou si vous ne souhaitez pas vous présenter à la date fixée pour la procédure orale ou ne pouvez vous y présenter pour une raison sérieuse, veuillez

- **en faire avis sans retard à l'Office, si possible par téléfax, en partant sur votre communication clairement la mention "Urgent, procédure orale le ..." ou une indication similaire;**
- **dans les cas urgents** (moins d'un mois avant la date fixée pour la procédure orale) **en faire avis également directement** pas la voie la plus rapide à **l'autre/aux autres partie(s)** ou bien à son/leurs mandataire(s).

Il appartient alors à la division d'opposition de décider si la procédure orale aura lieu ou non. Il est néanmoins souligné que les frais causés aux autres parties par une partie qui est responsable de l'omission d'un tel avis ou de ce que cet avis n'a pas été fait en temps utile peuvent être mis à la charge de cette partie (art. 104 CBE).

Rappel de la Règle 4 CBE

Règle 4
Langues admissibles lors de la procédure orale

(1) Toute partie à une procédure orale devant l'Office européen des brevets peut utiliser une langue officielle de l'Office européen des brevets autre que la langue de la procédure, à condition soit d'en aviser l'Office européen des brevets un mois au moins avant la date de la procédure orale, soit d'assurer l'interprétation dans la langue de la procédure. Toute partie peut utiliser une langue officielle de l'un des Etats contractants à condition d'assurer l'interprétation dans la langue de la procédure. L'Office européen des brevets peut autoriser des dérogations aux présentes dispositions.

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(2) Die Bediensteten des Europäischen Patentamts können sich im mündlichen Verfahren anstelle der Verfahrenssprache einer anderen Amtssprache des Europäischen Patentamts bedienen.

(2) In the course of oral proceedings, employees of the European Patent Office may use an official language of the European Patent Office other than the language of the proceedings.

(2) Au cours de la procédure orale, les agents de l'Office européen des brevets peuvent utiliser une langue officielle de l'Office européen des brevets autre que la langue de la procédure.

(3) In der Beweisaufnahme können sich die zu vernehmenden Beteiligten, Zeugen oder Sachverständigen, die sich in einer Amtssprache des Europäischen Patentamts oder eines Vertragsstaats nicht hinlänglich ausdrücken können, einer anderen Sprache bedienen. Erfolgt die Beweisaufnahme auf Antrag eines Beteiligten, so werden die Beteiligten, Zeugen oder Sachverständigen mit Erklärungen, die sie in einer anderen Sprache als in einer Amtssprache des Europäischen Patentamts abgeben, nur gehört, sofern dieser Beteiligte selbst für die Übersetzung in die Verfahrenssprache sorgt. Das Europäische Patentamt kann jedoch die Übersetzung in eine seiner anderen Amtssprachen zulassen.

(3) Where evidence is taken, any party, witness or expert to be heard who is unable to express himself adequately in an official language of the European Patent Office or of a Contracting State may use another language. Where evidence is taken upon request of a party, parties, witnesses or experts expressing themselves in a language other than an official language of the European Patent Office shall be heard only if that party provides for interpretation into the language of the proceedings. The European Patent Office may, however, permit interpretation into one of its other official languages.

(3) Lors de l'instruction, les parties, témoins ou experts appelés à être entendus, qui ne possèdent pas une maîtrise suffisante d'une langue officielle de l'Office européen des brevets ou d'un Etat contractant, peuvent utiliser une autre langue. Si la mesure d'instruction est ordonnée sur requête d'une partie, les parties, témoins ou experts qui s'expriment dans une langue autre qu'une langue officielle de l'Office européen des brevets ne sont entendus que si cette partie assure l'interprétation dans la langue de la procédure. L'Office européen des brevets peut toutefois autoriser l'interprétation dans l'une de ses autres langues officielles.

(4) Mit Einverständnis aller Beteiligten und des Europäischen Patentamts kann jede Sprache verwendet werden.

(4) If the parties and the European Patent Office agree, any language may be used.

(4) Sous réserve de l'accord des parties et de l'Office européen des brevets, toute langue peut être utilisée.

(5) Das Europäische Patentamt übernimmt, soweit erforderlich, auf seine Kosten die Übersetzung in die Verfahrenssprache und gegebenenfalls in seine anderen Amtssprachen, sofern ein Beteiligter nicht selbst für die Übersetzung zu sorgen hat.

(5) The European Patent Office shall, if necessary, provide at its own expense interpretation into the language of the proceedings, or, where appropriate, into its other official languages, unless such interpretation is the responsibility of one of the parties.

(5) L'Office européen des brevets assure à ses frais, en tant que de besoin, l'interprétation dans la langue de la procédure, ou, le cas échéant, dans ses autres langues officielles, à moins que cette interprétation ne doive être assurée par l'une des parties.

(6) Erklärungen von Bediensteten des Europäischen Patentamts, Beteiligten, Zeugen und Sachverständigen, die in einer Amtssprache des Europäischen Patentamts abgegeben werden, werden in dieser Sprache in die Niederschrift aufgenommen. Erklärungen in einer anderen Sprache werden in der Amtssprache aufgenommen, in die sie übersetzt worden sind. Änderungen einer europäischen Patentanmeldung oder eines europäischen Patents werden in der Verfahrenssprache in die Niederschrift aufgenommen.

(6) Statements by employees of the European Patent Office, parties, witnesses or experts, made in an official language of the European Patent Office, shall be entered in the minutes in that language. Statements made in any other language shall be entered in the official language into which they are translated. Amendments to a European patent application or European patent shall be entered in the minutes in the language of the proceedings.

(6) Les interventions des agents de l'Office européen des brevets, des parties, témoins et experts faites dans une langue officielle de l'Office européen des brevets sont consignées au procès-verbal dans cette langue. Les interventions faites dans une autre langue sont consignées dans la langue officielle dans laquelle elles sont traduites. Les modifications apportées à une demande de brevet européen ou à un brevet européen sont consignées au procès verbal dans la langue de la procédure.

INTEX EX. 1038, Pg. 599
Intex Recreation v. Bestway Inflatables

1. The opponent requested the revocation of the patent as a whole. The patentee requested the rejection of the opposition. Both parties requested oral proceedings in the event that the opposition division intends to take a decision against their requests.

2. The documents used in this opposition procedure will be numbered according to the numbering given by the opponent as follows:

E1 - CN 203137719 U

E2 - Translation of CN 203137719 U

E3 - US 2007/0277324 (Liu, Feng)

E4 - US 9,254,047 (Schermel et al.)

E5 - US 4,941,223 (Santo, Philip J)

E6 - US 5,669,091 (Chung, Ming-Chun)

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E8 - WO 2013/130117 (Intex Recreation Corporation)

E9 - FR 2 914 545 (Song Rong)

E10 - GB 434,098 (P. B. Cow & Co Ltd)

E11 - US 6,568,013 (Perez et al.)

E12-US 6,671,910 (Hsu et al.)

E13 - US 6,701,559 (Boso et al.)

E14- US 7,039,972 (Chaffee, Robert B)

E15 - US 2015/0201760 (Lin et al.)

3. The claim-analysis by the opponent is adopted as follows:

i	An inflatable bed (10), comprising: a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;
ii	at least one side wall (13), an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet,
iii	an air chamber formed between said top sheet, said bottom sheet and said side wall;

iv	at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and
v	at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls,
vi	at least two outside edges (152,162) of said support structure being respectively coupled to the side wall adjacent,
vii	at least one inside edge (153,163) of said support structure being coupled to the top sheet or bottom sheet adjacent,
viii	wherein said support structure comprises a second tensioning structure and a third tensioning structure,
ix	at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent,
x	at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent; and
xi	at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent,
xii	at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent.

4. During the oral proceedings, it will be discussed whether:

- the invention is disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Art. 100(b) EPC);
- the subject-matter of claim 1 as granted is new (Art. 100(a), Art. 54 EPC) in view of E1.

5. Preliminary non-binding opinion of the opposition-division

5.1. Article 100(b) EPC (sufficiency of disclosure)

The opponent had argued that according to claim 1, the support structure must be parallel to the side wall. He further argued that no embodiment was disclosed which would show this feature.

The opposition-division is of the opinion, that the support structure in figure 5 of the patent is in fact disposed in a longitudinal direction of the side wall, since it has an extension in the direction of the side wall.

The opposition-division therefore considers that the invention as defined by the features of claim 1 is sufficiently disclosed for it to be carried out by a person skilled in the art.

The opposition-division is however of the opinion that the skilled person is not enable to obtain a product as defined in claims 36 and 37. There seems to be no embodiment showing an inflatable bed:

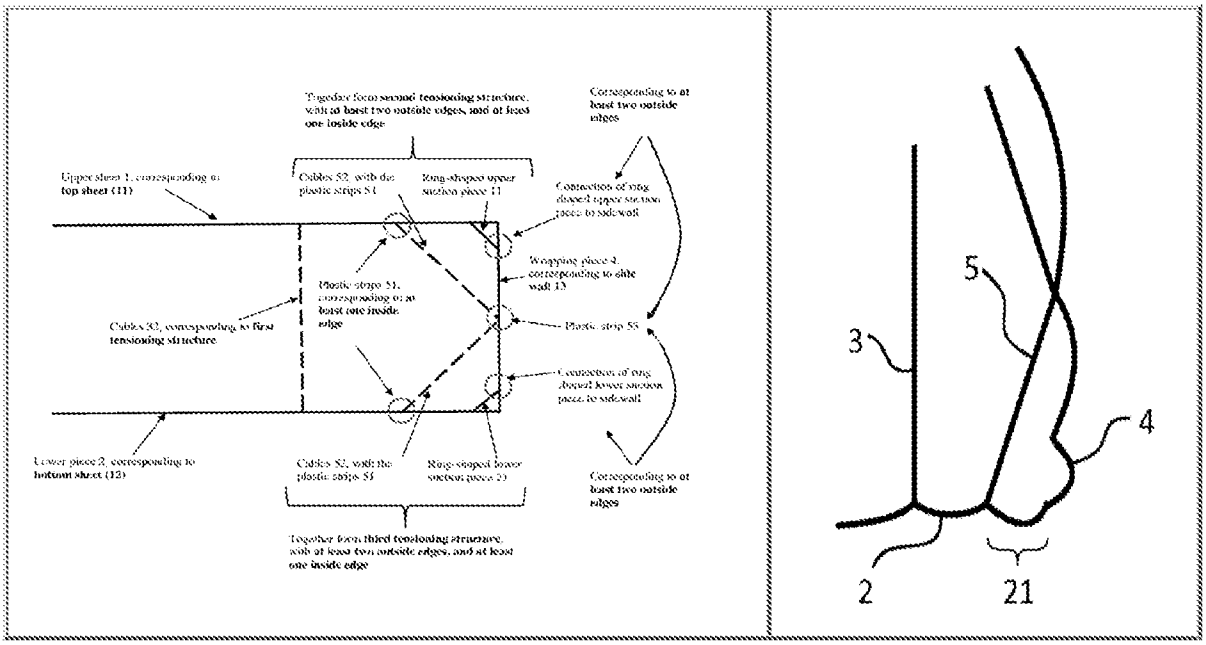
- (claim 36) wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.
- (claim 37) wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

The ground of opposition as defined in Article 100(b) EPC in relation to claims 36 and 37 seems to prejudice the maintenance of the patent.

5.2. Article 100(a) EPC

During Oral Proceedings it will have to be established, if in E1 the upper and lower suction piece (11,21) are to be considered as tensioning structure as defined in claim 1. This appears to depend mainly on the interpretation of what is disclosed in E1 (figures 2-4) being reflected by the sketches of the opponent and the proprietor.

Disclosure of E1 according to the opponent	Disclosure of E1 according to the proprietor



The opposition-division is of the preliminary opinion that it is not unambiguously derivable from figures 2-4 of E1 and the relevant parts of the translation, that the suction piece connects side wall (4) and bottom sheet (2) as shown in the sketch of the opponent. The interpretation of the proprietor appears to be possible as well. The opposition-division therefore considers that the subject-matter of claim 1 is new.

The ground of opposition as defined in Article 100(a) EPC does not seem to prejudice the maintenance of the patent.

INTEX EX. 1038, Pg. 603
Intex Recreation v. Bestway Inflatables

Europäisches Patentamt
European Patent Office
Office européen des brevets

European Patent Office
80298 MUNICH
GERMANY

Questions about this communication ?
Contact Customer Services at www.epo.org/contact

Formalities officer
Pasturel, Chloe

Vleck, Jan Montagu
Reddie & Grose LLP
The White Chapel Building
10 Whitechapel High Street
London E1 8QS
ROYAUME UNI

Date: 28.05.2020

Reference		Application No./Patent No.
MP19609.EP01/JV	OPPO 01	16191360.3 - 1011 / 3192401
Applicant/Proprietor: Bestway Inflatables & Material Corp		

EPA/EPO/OEB Formblatt/Form/Formulaire : 2310

Empfangsbescheinigung über den Zugang des vorstehend bezeichneten Schriftstücks
Acknowledgement of receipt of the document specified above
Récépissé du document spécifié ci-dessus

Unter Bezugnahme auf die Mitteilung im ABl EPA 7/2010, 377 wird gebeten, die Empfangsbescheinigung mit Empfangsdatum und Unterschrift zu versehen und **umgehend** an das EPA zurückzusenden:

With reference to the Notice in OJ EPO 7/2010, 377, you are requested to date and sign the acknowledgement of receipt and return it to the EPO **immediately**:

Conformément au communiqué paru au JO OEB 7/2010, 377, vous êtes prié d'indiquer sur le récépissé la date de réception du document, de signer le récépissé et de le renvoyer **sans délai** à l' OEB:

- **über die Online-Dienste des EPA** (als Anlage zu EPA Form 1038) / **through EPO Online Services** (as annex to EPO Form 1038) / **par les services en ligne de l'OEB** (en tant que pièce jointe au formulaire OEB 1038),
- **per Fax / by fax / par téléfax (+49 (0) 89 2399-4465 or +31 (0) 70 340-3016)**
- oder per Post / or by post / ou par courrier.

Empfangen am / Received on / Reçu le :

Unterschrift / Signature:

Empfangsberechtigter/authorised recipient/
le destinataire ou la personne dûment mandatée

Rücksende-Adresse / Return address / Adresse de retour
(Umschlag / envelope / enveloppe ISO C4 / DL / C6/C5 / C6)

Europäisches Patentamt
80298 MÜNCHEN
DEUTSCHLAND

Rücksende-Adresse / Return address / Adresse de retour

EPA/EPO/OEB Form 2936 08.10

INTEX EX. 1038, Pg. 604
CP02294
Intex Recreation v. Bestway Inflatables

Europäisches Patentamt
European Patent Office
Office européen des brevets

European Patent Office
80298 MUNICH
GERMANY

Questions about this communication ?
Contact Customer Services at www.epo.org/contact

Vleck, Jan Montagu
Reddie & Grose LLP
The White Chapel Building
10 Whitechapel High Street
London E1 8QS
ROYAUME UNI

Date
28.05.2020

Reference	Application No./Patent No.
MP19609.EP01/JV OPPO 01	16191360.3 - 1011 / 3192401
Applicant/Proprietor	
Bestway Inflatables & Material Corp	

Summons to attend oral proceedings pursuant to Rule 115(1) EPC

You are hereby summoned to attend oral proceedings arranged in connection with the above-mentioned European patent.

The matters to be discussed are set out in the communication accompanying this summons (EPO Form 2906).

The oral proceedings, which will be public, will take place before the opposition division

on 14.01.21 at 09.00 hrs in Room H3.5 at the EPO in Rijswijk
Rijswijk New Main, Patentlaan 2, NL-2288 EE Rijswijk (ZH)

You are asked to report at the reception desk, Patentlaan 2, in good time before the starting time mentioned above. The dedicated waiting area will be indicated to you on site.

No changes to the date of the oral proceedings can be made, except on serious grounds (see OJ EPO 1/2009, 68). If you do not appear as summoned, the oral proceedings may continue without you (R. 115(2) EPC, see also OJ EPO 10/2008, 471).

Your attention is drawn to Rule 4 EPC, regarding the language of the oral proceedings, and to the Special edition No. 3 OJ EPO 2007, L.1., concerning the filing of authorisations for company employees and lawyers acting as representatives before the EPO.

The final date for making written submissions and/or amendments (R. 116 EPC) is 13.11.20.

1st Examiner:	2nd Examiner:	Chairman:
Lehe, Jörn	Kus, Slawomir	Bitton, Alexandre

For the Opposition Division

Annexes:
Confirmation of receipt (Form 2936)
Rule 4 EPC (EPC Form 2043)
Communication (EPO Form 2906)

Registered letter
to EPO postal service 19.05.20

INTEX EX. 1038, Pg. 605
Intex Recreation v. Bestway Inflatables

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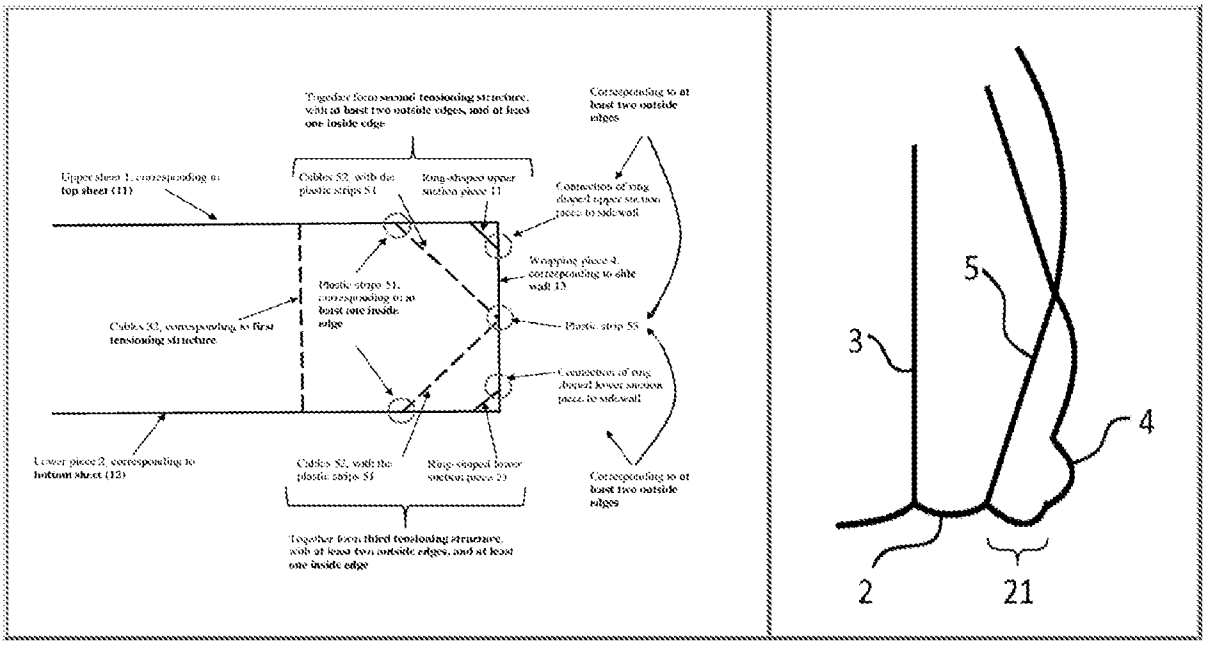
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INTEX EX. 1038, Pg. 609
Intex Recreation v. Bestway Inflatables

Europäisches Patentamt
European Patent Office
Office européen des brevets

Wichtige Hinweise zur mündlichen Verhandlung

Das Europäische Patentamt verfügt über keine eigenen Dolmetscher. Diese müssen im Bedarfsfall von außerhalb, teilweise sogar aus anderen Ländern, beigezogen werden, was mit einem hohen Aufwand an Kosten und organisatorischen Vorbereitungen verbunden ist. Muss ein Verhandlungstermin kurzfristig abberaumt werden, können Kosten für bestellte Dolmetscher nicht mehr vermieden werden.

Es wird daher gebeten, eine Simultanübersetzung nur bei wirklichem Bedarf in Anspruch zu nehmen. Es wäre wünschenswert, wenn sich die Beteiligten (zweckmäßigerweise gleichzeitig mit der Terminabstimmung) auf die Benutzung einer Amtssprache einigen könnten. Bei Verständigungsschwierigkeiten sind die Mitglieder der Einspruchsabteilung bereit zu helfen.

Die von den Verfahrensbeteiligten bevorzugte (abgestimmte) Verhandlungssprache und ggf. eine notwendige Simultanübersetzung sind dem Amt möglichst vor der in Regel 4(1) EPÜ angegebenen Frist mitzuteilen.

☐ Verfahrenssprache ist **Deutsch**

Von der/dem/den Einsprechenden wurde

☐ Englisch

☐ Französisch benutzt.

Es wird um eilige Mitteilung - möglichst per Telefax an den zuständigen Formalprüfer - gebeten,

möglichst bis

Datum **13.11.20**

1. welche Sprache(n) Sie in der mündlichen Verhandlung verwenden (**Sprechen**)
2. aus welcher Sprache Sie eine Simultanübersetzung benötigen (**Hören**).

Important information concerning oral proceedings

The European Patent Office has no interpreters of its own. When interpreters are needed they have to be brought in from outside, sometimes even from other countries, which is costly and involves considerable organisation. If oral proceedings have to be cancelled at short notice, the cost of interpreters already engaged still has to be borne.

Please therefore make use of simultaneous interpreting facilities only where strictly necessary. If possible the parties should agree on an official language for the proceedings, preferably at the time when they arrange a date. The members of the Opposition Division will be willing to help should any communication problems arise.

The EPO should be told if possible before the period mentioned in Rule 4 (1) EPC which language the parties prefer (agree on) and whether simultaneous interpreting facilities are required.

☒ Language of the proceedings is **English**

The language used by the opponent/s was English

☐ German

☐ French.

Please inform us urgently - where possible by fax addressed to the formalities officer concerned -

if possible by

Date **13.11.20**

1. which language(s) you intend to use during the oral proceedings (**Speaking**)
2. from which language you need simultaneous interpretation (**Listening**).

Très important Procédure orale

L'Office européen des brevets ne dispose pas de son propre service d'interprètes. Aussi faut-il appel le cas échéant à des interprètes de l'extérieur, qui viennent même parfois de l'étranger, ce qui occasionne de frais élevés et demande un grand travail d'organisation. Si la date d'une procédure orale doit être annulée au dernier moment, il n'est plus possible d'éviter les frais d'interprètes.

Les parties à une procédure sont donc priées de ne demander une traduction simultanée qu'en cas de réel besoin. Il serait souhaitable qu'elles puissent se mettre d'accord en même temps qu'elles conviennent de la date sur l'utilisation d'une langue officielle comme langue des débats. Si les parties éprouvent des difficultés de compréhension lors des débats, les membres de la division d'opposition sont disposés à leur prêter leur assistance.

L'Office doit être avisé si possible avant le début du délai mentionné dans la règle 4(1) CBE de la langue préférée par les parties pour le déroulement des débat (et sur laquelle elles se sont préalablement mises d'accord) et de la nécessité éventuelle d'une traduction simultanée.

☐ La langue de la procédure est le **français**

La langue utilisée par l'opposant/les opposants était

☐ l'allemand

☐ l'anglais.

Prière d'indiquer d'urgence à l'agent des formalités compétent si possible par téléfax

si possible jusqu'au

Date **13.11.20**

1. quelle(s) langue(s) vous utiliserez au cours de la procédure orale (**pour parler**)
2. à partir de quelle langue vous aurez besoin d'une traduction simultanée (**pour écouter**).

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Intex Recreation v. Bestway Inflatables

Soliten Sie Ihren Antrag auf mündliche Verhandlung zurückziehen oder zum anberaumten Verhandlungstermin nicht erscheinen wollen bzw. aus wichtigem Grund daran gehindert sein, werden Sie gebeten,

- **unverzüglich das Amt - möglichst per Telefax - davon zu benachrichtigen, wobei das Schriftstück mit einem deutlichen Vermerk "Dringend, mündliche Verhandlung am ..." oder sinngemäß gekennzeichnet sein sollte;**
- **in dringenden Fällen** (weniger als 1 Monat vor dem Verhandlungstermin) zusätzlich **auch dem/die anderen Verfahrensbeteiligten** bzw. ihre(n) Vertreter auf schnellstem Weg **direkt zu unterrichten.**

In jedem solchen Fall obliegt der Einspruchsabteilung die Entscheidung, ob die Verhandlung durchgeführt oder abberaumt wird. Es wird jedoch darauf hingewiesen, dass einem Verfahrensbeteiligten, der eine nicht rechtzeitige oder unterbliebene Benachrichtigung zu verantworten hat, die dadurch den anderen Beteiligten verursachten Kosten auferlegt werden können (Art. 104 EPÜ).

Hinweis auf Regel 4 EPÜ

Regel 4
Sprache im mündlichen Verfahren

(1) Jeder an einem mündlichen Verfahren vor dem Europäischen Patentamt Beteiligte kann sich anstelle der Verfahrenssprache einer anderen Amtssprache des Europäischen Patentamts bedienen, sofern er dies dem Europäischen Patentamt spätestens einen Monat vor dem angesetzten Termin mitgeteilt hat oder selbst für die Übersetzung in die Verfahrenssprache sorgt. Jeder Beteiligte kann sich einer Amtssprache eines Vertragsstaats bedienen, sofern er selbst für die Übersetzung in die Verfahrenssprache sorgt. Von diesen Vorschriften kann das Europäische Patentamt Ausnahmen zulassen.

Should you decide to withdraw your request for oral proceedings or not wish to attend on the date set, or if for some special reason you are unable to do so, you are requested

- **to notify the EPO immediately, where possible by fax, marking the document clearly with the words "Urgent, oral proceedings on ..." or similar;**
- **in urgent cases** (less than one month before the date set for the proceedings), additionally to **notify the other party/parties** and/or their representative(s) **direct as rapidly as possible.**

In all such cases the Opposition Division will decide whether the proceedings are to go ahead or be cancelled. You should however note that costs incurred by the other parties may be charged to a party who either fails to notify them or does not do so in good time (Article 104 EPC).

Attention is drawn to Rule 4 EPC

Rule 4
Language in oral proceedings

(1) Any party to oral proceedings before the European Patent Office may use an official language of the European Patent Office other than the language of the proceedings, if such party gives notice to the European Patent Office at least one month before the date of such oral proceedings or provides for interpretation into the language of the proceedings. Any party may use an official language of a Contracting State, if he provides for interpretation into the language of the proceedings. The European Patent Office may permit derogations from these provisions.

Si vous retirez votre requête tendant à recourir à la procédure orale ou si vous ne souhaitez pas vous présenter à la date fixée pour la procédure orale ou ne pouvez vous y présenter pour une raison sérieuse, veuillez

- **en faire avis sans retard à l'Office, si possible par téléfax, en partant sur votre communication clairement la mention "Urgent, procédure orale le ..." ou une indication similaire;**
- **dans les cas urgents** (moins d'un mois avant la date fixée pour la procédure orale) **en faire avis également directement** pas la voie la plus rapide à **l'autre/aux autres partie(s)** ou bien à son/leurs mandataire(s).

Il appartient alors à la division d'opposition de décider si la procédure orale aura lieu ou non. Il est néanmoins souligné que les frais causés aux autres parties par une partie qui est responsable de l'omission d'un tel avis ou de ce que cet avis n'a pas été fait en temps utile peuvent être mis à la charge de cette partie (art. 104 CBE).

Rappel de la Règle 4 CBE

Règle 4
Langues admissibles lors de la procédure orale

(1) Toute partie à une procédure orale devant l'Office européen des brevets peut utiliser une langue officielle de l'Office européen des brevets autre que la langue de la procédure, à condition soit d'en aviser l'Office européen des brevets un mois au moins avant la date de la procédure orale, soit d'assurer l'interprétation dans la langue de la procédure. Toute partie peut utiliser une langue officielle de l'un des Etats contractants à condition d'assurer l'interprétation dans la langue de la procédure. L'Office européen des brevets peut autoriser des dérogations aux présentes dispositions.

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Intex Recreation v. Bestway Inflatables

(2) Die Bediensteten des Europäischen Patentamts können sich im mündlichen Verfahren anstelle der Verfahrenssprache einer anderen Amtssprache des Europäischen Patentamts bedienen.

(2) In the course of oral proceedings, employees of the European Patent Office may use an official language of the European Patent Office other than the language of the proceedings.

(2) Au cours de la procédure orale, les agents de l'Office européen des brevets peuvent utiliser une langue officielle de l'Office européen des brevets autre que la langue de la procédure.

(3) In der Beweisaufnahme können sich die zu vernehmenden Beteiligten, Zeugen oder Sachverständigen, die sich in einer Amtssprache des Europäischen Patentamts oder eines Vertragsstaats nicht hinlänglich ausdrücken können, einer anderen Sprache bedienen. Erfolgt die Beweisaufnahme auf Antrag eines Beteiligten, so werden die Beteiligten, Zeugen oder Sachverständigen mit Erklärungen, die sie in einer anderen Sprache als in einer Amtssprache des Europäischen Patentamts abgeben, nur gehört, sofern dieser Beteiligte selbst für die Übersetzung in die Verfahrenssprache sorgt. Das Europäische Patentamt kann jedoch die Übersetzung in eine seiner anderen Amtssprachen zulassen.

(3) Where evidence is taken, any party, witness or expert to be heard who is unable to express himself adequately in an official language of the European Patent Office or of a Contracting State may use another language. Where evidence is taken upon request of a party, parties, witnesses or experts expressing themselves in a language other than an official language of the European Patent Office shall be heard only if that party provides for interpretation into the language of the proceedings. The European Patent Office may, however, permit interpretation into one of its other official languages.

(3) Lors de l'instruction, les parties, témoins ou experts appelés à être entendus, qui ne possèdent pas une maîtrise suffisante d'une langue officielle de l'Office européen des brevets ou d'un Etat contractant, peuvent utiliser une autre langue. Si la mesure d'instruction est ordonnée sur requête d'une partie, les parties, témoins ou experts qui s'expriment dans une langue autre qu'une langue officielle de l'Office européen des brevets ne sont entendus que si cette partie assure l'interprétation dans la langue de la procédure. L'Office européen des brevets peut toutefois autoriser l'interprétation dans l'une de ses autres langues officielles.

(4) Mit Einverständnis aller Beteiligten und des Europäischen Patentamts kann jede Sprache verwendet werden.

(4) If the parties and the European Patent Office agree, any language may be used.

(4) Sous réserve de l'accord des parties et de l'Office européen des brevets, toute langue peut être utilisée.

(5) Das Europäische Patentamt übernimmt, soweit erforderlich, auf seine Kosten die Übersetzung in die Verfahrenssprache und gegebenenfalls in seine anderen Amtssprachen, sofern ein Beteiligter nicht selbst für die Übersetzung zu sorgen hat.

(5) The European Patent Office shall, if necessary, provide at its own expense interpretation into the language of the proceedings, or, where appropriate, into its other official languages, unless such interpretation is the responsibility of one of the parties.

(5) L'Office européen des brevets assure à ses frais, en tant que de besoin, l'interprétation dans la langue de la procédure, ou, le cas échéant, dans ses autres langues officielles, à moins que cette interprétation ne doive être assurée par l'une des parties.

(6) Erklärungen von Bediensteten des Europäischen Patentamts, Beteiligten, Zeugen und Sachverständigen, die in einer Amtssprache des Europäischen Patentamts abgegeben werden, werden in dieser Sprache in die Niederschrift aufgenommen. Erklärungen in einer anderen Sprache werden in der Amtssprache aufgenommen, in die sie übersetzt worden sind. Änderungen einer europäischen Patentanmeldung oder eines europäischen Patents werden in der Verfahrenssprache in die Niederschrift aufgenommen.

(6) Statements by employees of the European Patent Office, parties, witnesses or experts, made in an official language of the European Patent Office, shall be entered in the minutes in that language. Statements made in any other language shall be entered in the official language into which they are translated. Amendments to a European patent application or European patent shall be entered in the minutes in the language of the proceedings.

(6) Les interventions des agents de l'Office européen des brevets, des parties, témoins et experts faites dans une langue officielle de l'Office européen des brevets sont consignées au procès-verbal dans cette langue. Les interventions faites dans une autre langue sont consignées dans la langue officielle dans laquelle elles sont traduites. Les modifications apportées à une demande de brevet européen ou à un brevet européen sont consignées au procès verbal dans la langue de la procédure.

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European Patent Office
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Contact Customer Services at www.epo.org/contact

Formalities officer
Pasturel, Chloe

Belloni, Giancarlo
Bugnion S.p.A.
Viale Lancetti 17
20158 Milano
ITALIE

Date: 28.05.2020

Reference	Application No./Patent No.
27S8343,12EP42	16191360.3 - 1011 / 3192401

Applicant/Proprietor: Bestway Inflatables & Material Corp

EPA/EPO/OEB Formblatt/Form/Formulaire : 2310

Empfangsbescheinigung über den Zugang des vorstehend bezeichneten Schriftstücks
Acknowledgement of receipt of the document specified above
Récépissé du document spécifié ci-dessus

Unter Bezugnahme auf die Mitteilung im ABl EPA 7/2010, 377 wird gebeten, die Empfangsbescheinigung mit Empfangsdatum und Unterschrift zu versehen und **umgehend** an das EPA zurückzusenden:

With reference to the Notice in OJ EPO 7/2010, 377, you are requested to date and sign the acknowledgement of receipt and return it to the EPO **immediately**:

Conformément au communiqué paru au JO OEB 7/2010, 377, vous êtes prié d'indiquer sur le récépissé la date de réception du document, de signer le récépissé et de le renvoyer **sans délai** à l' OEB:

- **über die Online-Dienste des EPA** (als Anlage zu EPA Form 1038) / **through EPO Online Services** (as annex to EPO Form 1038) / **par les services en ligne de l'OEB** (en tant que pièce jointe au formulaire OEB 1038),
- **per Fax / by fax / par téléfax (+49 (0) 89 2399-4465 or +31 (0) 70 340-3016)**
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Empfangsberechtigter/authorised recipient/
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INTEX EX. 1038, Pg. 613
CP02294
Intex Recreation v. Bestway Inflatables

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27S8343,12EP42	16191360.3 - 1011 / 3192401
Applicant/Proprietor	
Bestway Inflatables & Material Corp	

Summons to attend oral proceedings pursuant to Rule 115(1) EPC

You are hereby summoned to attend oral proceedings arranged in connection with the above-mentioned European patent.

The matters to be discussed are set out in the communication accompanying this summons (EPO Form 2906).

The oral proceedings, which will be public, will take place before the opposition division

on 14.01.21 at 09.00 hrs in Room H3.5 at the EPO in Rijswijk
Rijswijk New Main, Patentlaan 2, NL-2288 EE Rijswijk (ZH)

You are asked to report at the reception desk, Patentlaan 2, in good time before the starting time mentioned above. The dedicated waiting area will be indicated to you on site.

No changes to the date of the oral proceedings can be made, except on serious grounds (see OJ EPO 1/2009, 68). If you do not appear as summoned, the oral proceedings may continue without you (R. 115(2) EPC, see also OJ EPO 10/2008, 471).

Your attention is drawn to Rule 4 EPC, regarding the language of the oral proceedings, and to the Special edition No. 3 OJ EPO 2007, L.1., concerning the filing of authorisations for company employees and lawyers acting as representatives before the EPO.

The final date for making written submissions and/or amendments (R. 116 EPC) is 13.11.20.

1st Examiner:	2nd Examiner:	Chairman:
Lehe, Jörn	Kus, Slawomir	Bitton, Alexandre

For the Opposition Division

Annexes:
Confirmation of receipt (Form 2936)
Rule 4 EPC (EPC Form 2043)
Communication (EPO Form 2906)

Registered letter
EPO Form 2310 07.19 [ORAL03=H035] (19/05/20)

to EPO postal service 19.05.20

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Intex Recreation v. Bestway Inflatables

1. The opponent requested the revocation of the patent as a whole. The patentee requested the rejection of the opposition. Both parties requested oral proceedings in the event that the opposition division intends to take a decision against their requests.

2. The documents used in this opposition procedure will be numbered according to the numbering given by the opponent as follows:

E1 - CN 203137719 U

E2 - Translation of CN 203137719 U

E3 - US 2007/0277324 (Liu, Feng)

E4 - US 9,254,047 (Schermel et al.)

E5 - US 4,941,223 (Santo, Philip J)

E6 - US 5,669,091 (Chung, Ming-Chun)

E7 - US 2015/0335164 (Liu, Feng)

E8 - WO 2013/130117 (Intex Recreation Corporation)

E9 - FR 2 914 545 (Song Rong)

E10 - GB 434,098 (P. B. Cow & Co Ltd)

E11 - US 6,568,013 (Perez et al.)

E12-US 6,671,910 (Hsu et al.)

E13 - US 6,701,559 (Boso et al.)

E14- US 7,039,972 (Chaffee, Robert B)

E15 - US 2015/0201760 (Lin et al.)

3. The claim-analysis by the opponent is adopted as follows:

i	An inflatable bed (10), comprising: a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;
ii	at least one side wall (13), an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet,
iii	an air chamber formed between said top sheet, said bottom sheet and said side wall;

iv	at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and
v	at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls,
vi	at least two outside edges (152,162) of said support structure being respectively coupled to the side wall adjacent,
vii	at least one inside edge (153,163) of said support structure being coupled to the top sheet or bottom sheet adjacent,
viii	wherein said support structure comprises a second tensioning structure and a third tensioning structure,
ix	at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent,
x	at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent; and
xi	at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent,
xii	at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent.

4. During the oral proceedings, it will be discussed whether:

- the invention is disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Art. 100(b) EPC);
- the subject-matter of claim 1 as granted is new (Art. 100(a), Art. 54 EPC) in view of E1.

5. Preliminary non-binding opinion of the opposition-division

5.1. Article 100(b) EPC (sufficiency of disclosure)

The opponent had argued that according to claim 1, the support structure must be parallel to the side wall. He further argued that no embodiment was disclosed which would show this feature.

The opposition-division is of the opinion, that the support structure in figure 5 of the patent is in fact disposed in a longitudinal direction of the side wall, since it has an extension in the direction of the side wall.

The opposition-division therefore considers that the invention as defined by the features of claim 1 is sufficiently disclosed for it to be carried out by a person skilled in the art.

The opposition-division is however of the opinion that the skilled person is not enable to obtain a product as defined in claims 36 and 37. There seems to be no embodiment showing an inflatable bed:

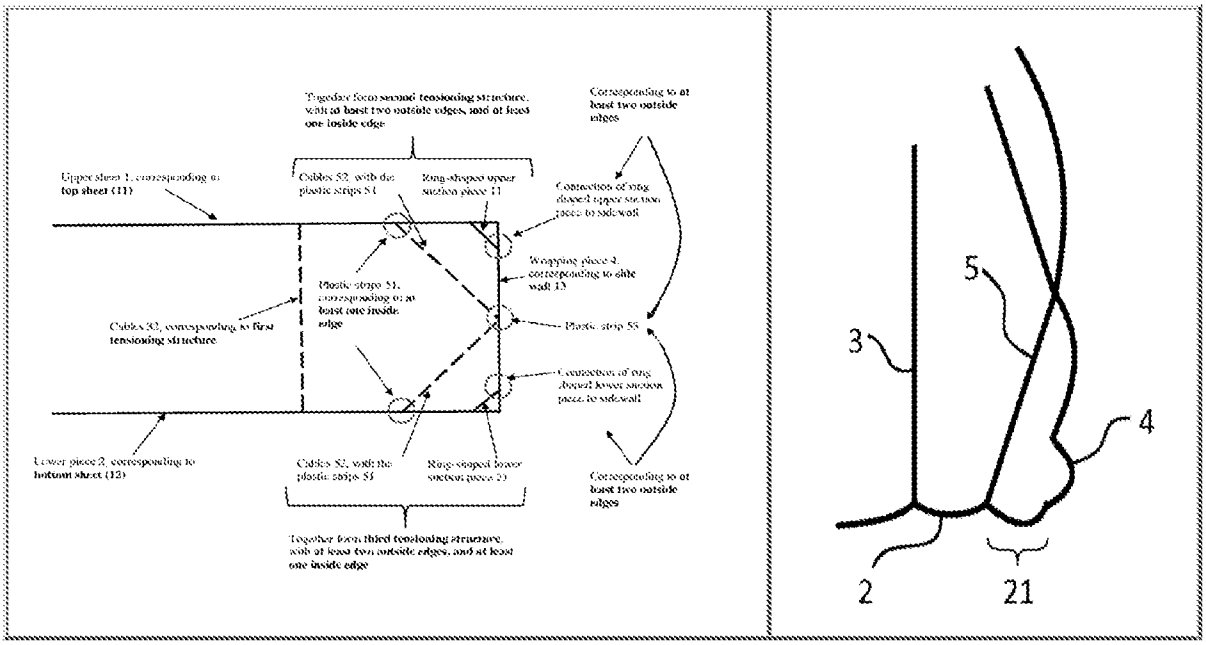
- (claim 36) wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.
- (claim 37) wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

The ground of opposition as defined in Article 100(b) EPC in relation to claims 36 and 37 seems to prejudice the maintenance of the patent.

5.2. Article 100(a) EPC

During Oral Proceedings it will have to be established, if in E1 the upper and lower suction piece (11,21) are to be considered as tensioning structure as defined in claim 1. This appears to depend mainly on the interpretation of what is disclosed in E1 (figures 2-4) being reflected by the sketches of the opponent and the proprietor.

Disclosure of E1 according to the opponent	Disclosure of E1 according to the proprietor



The opposition-division is of the preliminary opinion that it is not unambiguously derivable from figures 2-4 of E1 and the relevant parts of the translation, that the suction piece connects side wall (4) and bottom sheet (2) as shown in the sketch of the opponent. The interpretation of the proprietor appears to be possible as well. The opposition-division therefore considers that the subject-matter of claim 1 is new.

The ground of opposition as defined in Article 100(a) EPC does not seem to prejudice the maintenance of the patent.

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Wichtige Hinweise zur mündlichen Verhandlung

Das Europäische Patentamt verfügt über keine eigenen Dolmetscher. Diese müssen im Bedarfsfall von außerhalb, teilweise sogar aus anderen Ländern, beigezogen werden, was mit einem hohen Aufwand an Kosten und organisatorischen Vorbereitungen verbunden ist. Muss ein Verhandlungstermin kurzfristig abberaumt werden, können Kosten für bestellte Dolmetscher nicht mehr vermieden werden.

Es wird daher gebeten, eine Simultanübersetzung nur bei wirklichem Bedarf in Anspruch zu nehmen. Es wäre wünschenswert, wenn sich die Beteiligten (zweckmäßigerweise gleichzeitig mit der Terminabstimmung) auf die Benutzung einer Amtssprache einigen könnten. Bei Verständigungsschwierigkeiten sind die Mitglieder der Einspruchsabteilung bereit zu helfen.

Die von den Verfahrensbeteiligten bevorzugte (abgestimmte) Verhandlungssprache und ggf. eine notwendige Simultanübersetzung sind dem Amt möglichst vor der in Regel 4(1) EPÜ angegebenen Frist mitzuteilen.

☐ Verfahrenssprache ist **Deutsch**

Von der/dem/den Einsprechenden wurde

☐ Englisch

☐ Französisch benutzt.

Es wird um eilige Mitteilung - möglichst per Telefax an den zuständigen Formalprüfer - gebeten,

möglichst bis

Datum **13.11.20**

1. welche Sprache(n) Sie in der mündlichen Verhandlung verwenden (**Sprechen**)
2. aus welcher Sprache Sie eine Simultanübersetzung benötigen (**Hören**).

Important information concerning oral proceedings

The European Patent Office has no interpreters of its own. When interpreters are needed they have to be brought in from outside, sometimes even from other countries, which is costly and involves considerable organisation. If oral proceedings have to be cancelled at short notice, the cost of interpreters already engaged still has to be borne.

Please therefore make use of simultaneous interpreting facilities only where strictly necessary. If possible the parties should agree on an official language for the proceedings, preferably at the time when they arrange a date. The members of the Opposition Division will be willing to help should any communication problems arise.

The EPO should be told if possible before the period mentioned in Rule 4 (1) EPC which language the parties prefer (agree on) and whether simultaneous interpreting facilities are required.

☒ Language of the proceedings is **English**

The language used by the opponent/s was English

☐ German

☐ French.

Please inform us urgently - where possible by fax addressed to the formalities officer concerned -

if possible by

Date **13.11.20**

1. which language(s) you intend to use during the oral proceedings (**Speaking**)
2. from which language you need simultaneous interpretation (**Listening**).

Très important Procédure orale

L'Office européen des brevets ne dispose pas de son propre service d'interprètes. Aussi faut-il appel le cas échéant à des interprètes de l'extérieur, qui viennent même parfois de l'étranger, ce qui occasionne de frais élevés et demande un grand travail d'organisation. Si la date d'une procédure orale doit être annulée au dernier moment, il n'est plus possible d'éviter les frais d'interprètes.

Les parties à une procédure sont donc priées de ne demander une traduction simultanée qu'en cas de réel besoin. Il serait souhaitable qu'elles puissent se mettre d'accord en même temps qu'elles conviennent de la date sur l'utilisation d'une langue officielle comme langue des débats. Si les parties éprouvent des difficultés de compréhension lors des débats, les membres de la division d'opposition sont disposés à leur prêter leur assistance.

L'Office doit être avisé si possible avant le début du délai mentionné dans la règle 4(1) CBE de la langue préférée par les parties pour le déroulement des débat (et sur laquelle elles se sont préalablement mises d'accord) et de la nécessité éventuelle d'une traduction simultanée.

☐ La langue de la procédure est le **français**

La langue utilisée par l'opposant/les opposants était

☐ l'allemand

☐ l'anglais.

Prière d'indiquer d'urgence à l'agent des formalités compétent si possible par téléfax

si possible jusqu'au

Date **13.11.20**

1. quelle(s) langue(s) vous utiliserez au cours de la procédure orale (**pour parler**)
2. à partir de quelle langue vous aurez besoin d'une traduction simultanée (**pour écouter**).

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Intex Recreation v. Bestway Inflatables

Sollten Sie Ihren Antrag auf mündliche Verhandlung zurückziehen oder zum anberaumten Verhandlungstermin nicht erscheinen wollen bzw. aus wichtigem Grund daran gehindert sein, werden Sie gebeten,

- **unverzüglich das Amt - möglichst per Telefax - davon zu benachrichtigen, wobei das Schriftstück mit einem deutlichen Vermerk "Dringend, mündliche Verhandlung am ..." oder sinngemäß gekennzeichnet sein sollte;**
- **in dringenden Fällen** (weniger als 1 Monat vor dem Verhandlungstermin) zusätzlich **auch dem/die anderen Verfahrensbeteiligten** bzw. ihre(n) Vertreter auf schnellstem Weg **direkt zu unterrichten.**

In jedem solchen Fall obliegt der Einspruchsabteilung die Entscheidung, ob die Verhandlung durchgeführt oder abberaumt wird. Es wird jedoch darauf hingewiesen, dass einem Verfahrensbeteiligten, der eine nicht rechtzeitige oder unterbliebene Benachrichtigung zu verantworten hat, die dadurch den anderen Beteiligten verursachten Kosten auferlegt werden können (Art. 104 EPÜ).

Hinweis auf Regel 4 EPÜ

Regel 4
Sprache im mündlichen Verfahren

(1) Jeder an einem mündlichen Verfahren vor dem Europäischen Patentamt Beteiligte kann sich anstelle der Verfahrenssprache einer anderen Amtssprache des Europäischen Patentamts bedienen, sofern er dies dem Europäischen Patentamt spätestens einen Monat vor dem angesetzten Termin mitgeteilt hat oder selbst für die Übersetzung in die Verfahrenssprache sorgt. Jeder Beteiligte kann sich einer Amtssprache eines Vertragsstaats bedienen, sofern er selbst für die Übersetzung in die Verfahrenssprache sorgt. Von diesen Vorschriften kann das Europäische Patentamt Ausnahmen zulassen.

Should you decide to withdraw your request for oral proceedings or not wish to attend on the date set, or if for some special reason you are unable to do so, you are requested

- **to notify the EPO immediately, where possible by fax, marking the document clearly with the words "Urgent, oral proceedings on ..." or similar;**
- **in urgent cases** (less than one month before the date set for the proceedings), additionally to **notify the other party/parties** and/or their representative(s) **direct as rapidly as possible.**

In all such cases the Opposition Division will decide whether the proceedings are to go ahead or be cancelled. You should however note that costs incurred by the other parties may be charged to a party who either fails to notify them or does not do so in good time (Article 104 EPC).

Attention is drawn to Rule 4 EPC

Rule 4
Language in oral proceedings

(1) Any party to oral proceedings before the European Patent Office may use an official language of the European Patent Office other than the language of the proceedings, if such party gives notice to the European Patent Office at least one month before the date of such oral proceedings or provides for interpretation into the language of the proceedings. Any party may use an official language of a Contracting State, if he provides for interpretation into the language of the proceedings. The European Patent Office may permit derogations from these provisions.

Si vous retirez votre requête tendant à recourir à la procédure orale ou si vous ne souhaitez pas vous présenter à la date fixée pour la procédure orale ou ne pouvez vous y présenter pour une raison sérieuse, veuillez

- **en faire avis sans retard à l'Office, si possible par téléfax, en partant sur votre communication clairement la mention "Urgent, procédure orale le ..." ou une indication similaire;**
- **dans les cas urgents** (moins d'un mois avant la date fixée pour la procédure orale) **en faire avis également directement** pas la voie la plus rapide à **l'autre/aux autres partie(s)** ou bien à son/leurs mandataire(s).

Il appartient alors à la division d'opposition de décider si la procédure orale aura lieu ou non. Il est néanmoins souligné que les frais causés aux autres parties par une partie qui est responsable de l'omission d'un tel avis ou de ce que cet avis n'a pas été fait en temps utile peuvent être mis à la charge de cette partie (art. 104 CBE).

Rappel de la Règle 4 CBE

Règle 4
Langues admissibles lors de la procédure orale

(1) Toute partie à une procédure orale devant l'Office européen des brevets peut utiliser une langue officielle de l'Office européen des brevets autre que la langue de la procédure, à condition soit d'en aviser l'Office européen des brevets un mois au moins avant la date de la procédure orale, soit d'assurer l'interprétation dans la langue de la procédure. Toute partie peut utiliser une langue officielle de l'un des Etats contractants à condition d'assurer l'interprétation dans la langue de la procédure. L'Office européen des brevets peut autoriser des dérogations aux présentes dispositions.

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(2) Die Bediensteten des Europäischen Patentamts können sich im mündlichen Verfahren anstelle der Verfahrenssprache einer anderen Amtssprache des Europäischen Patentamts bedienen.

(2) In the course of oral proceedings, employees of the European Patent Office may use an official language of the European Patent Office other than the language of the proceedings.

(2) Au cours de la procédure orale, les agents de l'Office européen des brevets peuvent utiliser une langue officielle de l'Office européen des brevets autre que la langue de la procédure.

(3) In der Beweisaufnahme können sich die zu vernehmenden Beteiligten, Zeugen oder Sachverständigen, die sich in einer Amtssprache des Europäischen Patentamts oder eines Vertragsstaats nicht hinlänglich ausdrücken können, einer anderen Sprache bedienen. Erfolgt die Beweisaufnahme auf Antrag eines Beteiligten, so werden die Beteiligten, Zeugen oder Sachverständigen mit Erklärungen, die sie in einer anderen Sprache als in einer Amtssprache des Europäischen Patentamts abgeben, nur gehört, sofern dieser Beteiligte selbst für die Übersetzung in die Verfahrenssprache sorgt. Das Europäische Patentamt kann jedoch die Übersetzung in eine seiner anderen Amtssprachen zulassen.

(3) Where evidence is taken, any party, witness or expert to be heard who is unable to express himself adequately in an official language of the European Patent Office or of a Contracting State may use another language. Where evidence is taken upon request of a party, parties, witnesses or experts expressing themselves in a language other than an official language of the European Patent Office shall be heard only if that party provides for interpretation into the language of the proceedings. The European Patent Office may, however, permit interpretation into one of its other official languages.

(3) Lors de l'instruction, les parties, témoins ou experts appelés à être entendus, qui ne possèdent pas une maîtrise suffisante d'une langue officielle de l'Office européen des brevets ou d'un Etat contractant, peuvent utiliser une autre langue. Si la mesure d'instruction est ordonnée sur requête d'une partie, les parties, témoins ou experts qui s'expriment dans une langue autre qu'une langue officielle de l'Office européen des brevets ne sont entendus que si cette partie assure l'interprétation dans la langue de la procédure. L'Office européen des brevets peut toutefois autoriser l'interprétation dans l'une de ses autres langues officielles.

(4) Mit Einverständnis aller Beteiligten und des Europäischen Patentamts kann jede Sprache verwendet werden.

(4) If the parties and the European Patent Office agree, any language may be used.

(4) Sous réserve de l'accord des parties et de l'Office européen des brevets, toute langue peut être utilisée.

(5) Das Europäische Patentamt übernimmt, soweit erforderlich, auf seine Kosten die Übersetzung in die Verfahrenssprache und gegebenenfalls in seine anderen Amtssprachen, sofern ein Beteiligter nicht selbst für die Übersetzung zu sorgen hat.

(5) The European Patent Office shall, if necessary, provide at its own expense interpretation into the language of the proceedings, or, where appropriate, into its other official languages, unless such interpretation is the responsibility of one of the parties.

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(6) Erklärungen von Bediensteten des Europäischen Patentamts, Beteiligten, Zeugen und Sachverständigen, die in einer Amtssprache des Europäischen Patentamts abgegeben werden, werden in dieser Sprache in die Niederschrift aufgenommen. Erklärungen in einer anderen Sprache werden in der Amtssprache aufgenommen, in die sie übersetzt worden sind. Änderungen einer europäischen Patentanmeldung oder eines europäischen Patents werden in der Verfahrenssprache in die Niederschrift aufgenommen.

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Intex Recreation v. Bestway Inflatables

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Formalities officer
Pasturel, Chloe

Date: 28.05.2020

Reference	Application No./Patent No.
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Applicant/Proprietor: Bestway Inflatables & Material Corp	

EPA/EPO/OEB Formblatt/Form/Formulaire : 2310

Empfangsbescheinigung über den Zugang des vorstehend bezeichneten Schriftstücks
Acknowledgement of receipt of the document specified above
Récépissé du document spécifié ci-dessus

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- **über die Online-Dienste des EPA** (als Anlage zu EPA Form 1038) / **through EPO Online Services** (as annex to EPO Form 1038) / **par les services en ligne de l'OEB** (en tant que pièce jointe au formulaire OEB 1038),
- **per Fax / by fax / par téléfax (+49 (0) 89 2399-4465 or +31 (0) 70 340-3016)**
- oder per Post / or by post / ou par courrier.

Empfangen am / Received on / Reçu le :

5/6/2020

Unterschrift / Signature:

Empfangsberechtigter/authorised recipient/
le destinataire ou la personne dûment mandatée

Rücksende-Adresse / Return address / Adresse de retour
(Umschlag / envelope / enveloppe ISO C4 / DL / C6/C5 / C6)

Europäisches Patentamt
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INTEX EX. 1038, Pg. 622
Intex Recreation v. Bestway Inflatables

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Date
27.07.2020

Reference		Application No./Patent No.
MP19609.EP01/JV	OPPO 01	16191360.3 - 1011 / 3192401
Applicant/Proprietor		
Bestway Inflatables & Material Corp		

Missing advice of delivery

Subject: Decision of
Summons to oral proceedings dated 28.05.2020
Communication of

No advice of delivery has been received. Please acknowledge the receipt of the above-mentioned document

- **through EPO Online Services (as annex to EPO Form 1038)**
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For the Opposition Division

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Registered letter
EPO Form 2937 06.10 (22/07/20)

INTEX EX. 1038, Pg. 623
CP02294
Intex Recreation v. Bestway Inflatables

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Letter accompanying subsequently filed items

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The document(s) listed below is (are) subsequently filed documents pertaining to the following application:

Application number	16191360.3
Applicant's or representative's reference	M/P19609.EP01

	Description of document	Original file name	Assigned file name
1	Acknowledgement	MP19609.EP01 - ack receipt of summons - 05.08.2020.pdf	ADVOFDELIVRY-1.pdf

	Payment	
1	Method of payment	Not specified

Signatures

Place:	**LONDON, UK**
Date:	**05 August 2020**
Signed by:	**Joshua Parsi Mendiola 65949**
Representative name:	**Joshua PARSI MENDIOLA**
Capacity:	**(Representative)**

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Intex Recreation v. Bestway Inflatables

REDDIE & GROSE

5 August 2020
5

European Patent Office
D-80298 Munich
Germany

BY E-FILING ONLY

Dear Sirs

Opposition against European Patent No. 3192401 ("the Patent")
Of Bestway Inflatables and Materials Corp
On behalf of Intex Recreation Corp. ("the Opponent")
Our ref: M/P19609.EP01/JMV/JP

We hereby acknowledge receipt of the Summons to Oral Proceedings dated 28 May 2020.

Yours faithfully

[Electronically signed]

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Europäisches Patentamt
European Patent Office
Office européen des brevets

Acknowledgement of receipt

We hereby acknowledge receipt of the following subsequently filed document(s):

Submission number	8894353
Application number	EP16191360.3
Date of receipt	05 August 2020
Receiving Office	European Patent Office, The Hague
Your reference	M/P19609.EP01
Applicant	All applicants as on file
Documents submitted	package-data.xml epf1038.pdf (1 p.) ep-sfd-request.xml ADVOFDELIVRY-1.pdf\MP19609.EP01 - ack receipt of summons - 05.08.2020.pdf (1 p.)
Submitted by	CN=Joshua Parsi Mendiola 65949
Method of submission	Online
Date and time receipt generated	05 August 2020, 23:42 (CEST)
Message Digest	E6:31:62:E6:1B:A1:04:CA:B4:A9:F8:1B:C0:A0:EB:98:8B:E1:8D:B2

/European Patent Office/

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CMS submission

EUROPEAN PATENT OFFICE
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Our Ref. 23.B6256.12.EP.42

Milan, September 30, 2020

RE.: **Opposition against European Patent no. 3192401** issued Sep 19, 2018
for: INFLATABLE BED
in the name of: BESTWAY INFLATABLES & MATERIAL CORP.

Dear Sirs,

This is a response of the Patentee to the preliminary opinion issued by the Opposition Division on 28 may 2020, together with the summons to attend oral proceedings. The Patentee takes this opportunity for filing three auxiliary requests to be considered in case the main request (i.e. the total rejection of the opposition and the maintenance of the patent EP3192401 as granted) should not be allowed.

According to a friendly approach, this response is filed well before the final date for filing written submissions and/or amendments, which is set on 13 November 2020.

5.1 Article 100(b) EPC (sufficiency of disclosure) – claims 36 and 37

According to the preliminary opinion of the Opposition Division, the skilled person is not able to obtain a product as defined in original claims 36 and 37. On this point the Patentee would like to comment as follows.

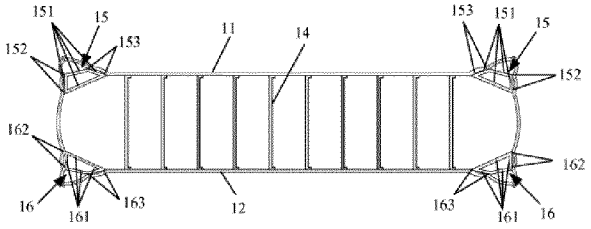
Claim 36

Original claim 36 recites:

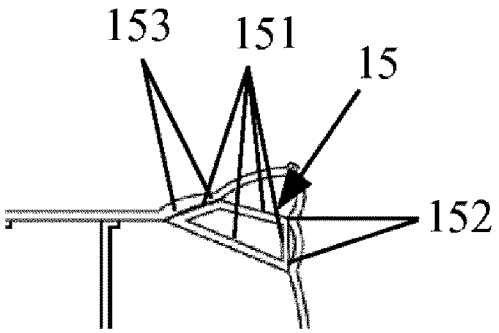
> *The inflatable bed according to claim 1, wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.*

The actual meaning of such claim can be easily understood by making specific reference to the embodiment of fig. 12, where the *second tensioning structure* clearly comprises an *upper edge*. Maybe a better translation could have been available for this element, however it is clear from fig. 12 (see the annotated detail below) that such *upper edge* has an *inside part* (on the left, toward the

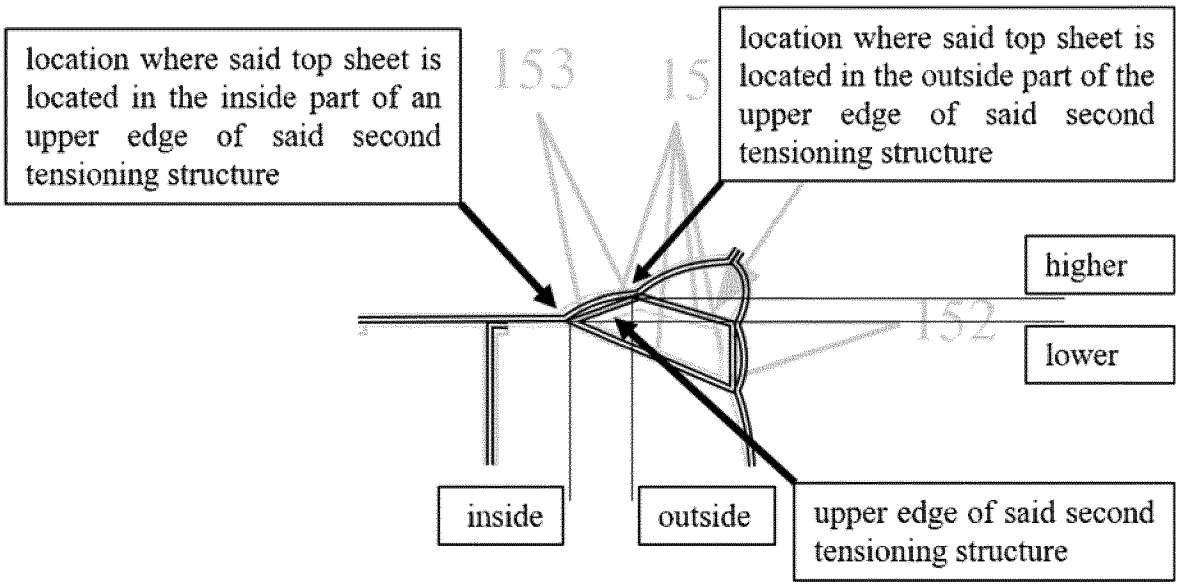
center of the air bed) and an *outside part* (on the right, away from the center of the air bed). Both such *inside part* and *outside part* are in contact with the *top sheet*. Claim 36 provides a relative positioning for these parts.



Embodiment of Fig. 12



Detail of the *second tensioning structure*



Annotated detail of the *second tensioning structure*

A similar interpretation can be given also for the other embodiments of the invention in which the *second tensioning structure* contacts the *top sheet* in two different points, see for example the embodiments of figures 5, 19, 21 and 22.

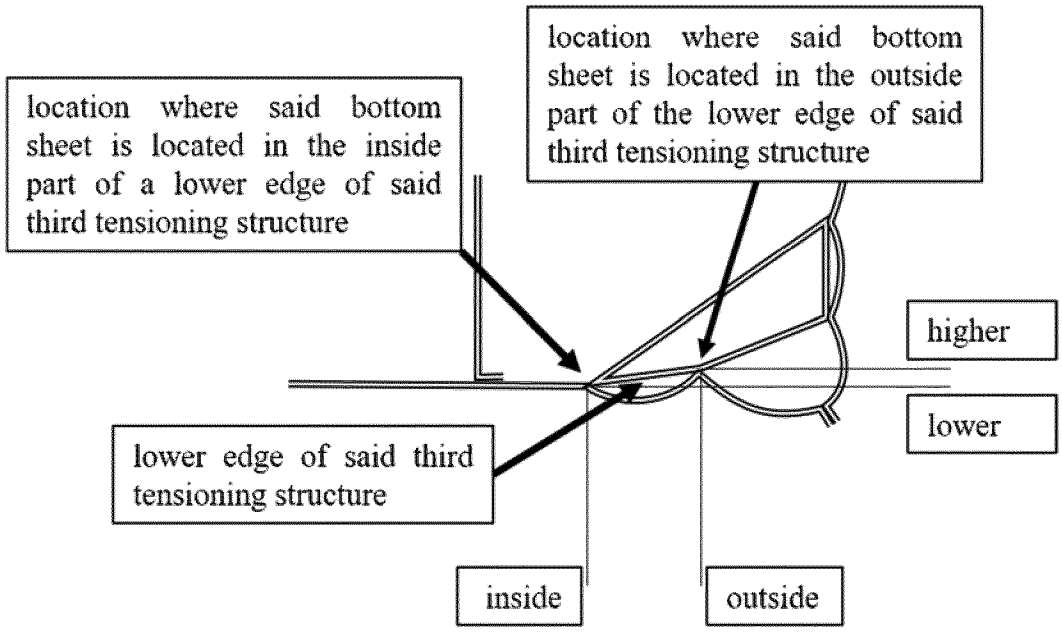
Accordingly, the Patentee strongly believes that claim 36 can be maintained as granted.

Claim 37

Original claim 37 recites:

> *The inflatable bed according to claim 1, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.*

Preferred interpretation - The actual meaning of such claim can be understood by making reference to an additional embodiment which is not shown in the original figures of the patent. A relevant detail of such additional embodiment is schematically shown below, in a manner similar to the one adopted above for the detail of fig. 12. The schematic view shows the detail of the third tensioning structure and of the bottom sheet.



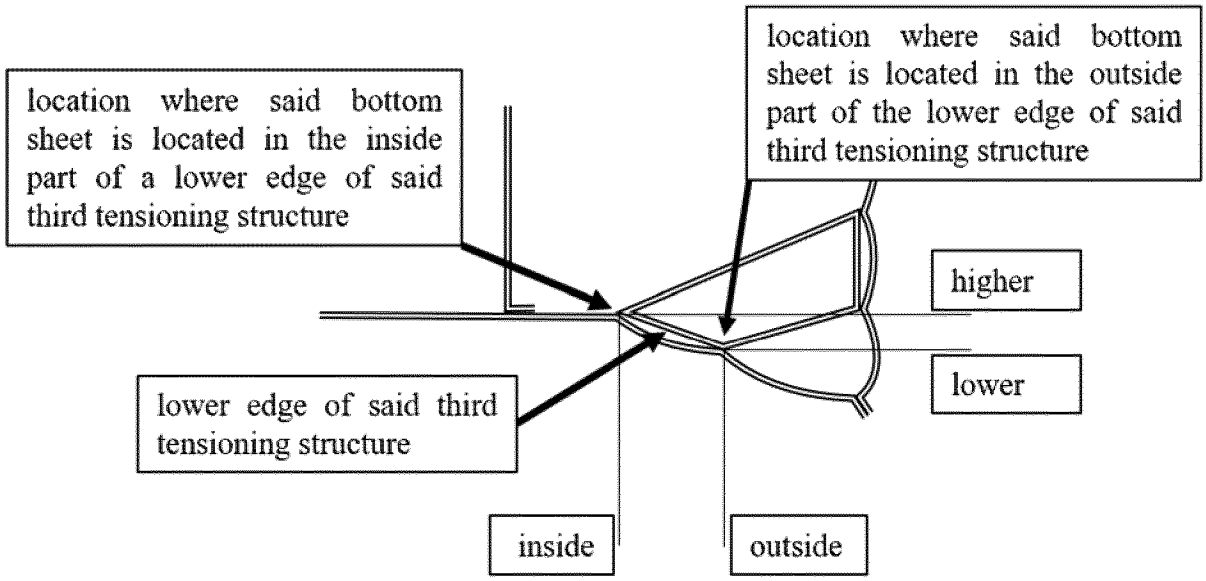
Preferred interpretation **of claim 37:**
Annotated detail of the *third tensioning structure* of an additional embodiment

According to the Patentee's opinion, the above additional embodiment is perfectly comprised within the scope of the invention and can be easily obtained by the skilled person by following the teachings provided in the patent about the other embodiments. Accordingly, the Patentee strongly believes that claim 37 can be maintained as granted.

Alternative interpretation - Should the Opposition Division disagree with the interpretation given above by the Patentee, another interpretation is available for claim 37. According to such alternative interpretation, claim 37 can be considered as symmetrically turning claim 36 upside down and

relating to the *third tensioning structure* rather than to the *second tensioning structure*. Since, according to such interpretation, claim 37 has to symmetrically correspond to claim 36, an error can be found and corrected in an obvious manner (according to Rule 139 EPC), so as to let it recite:

> *The inflatable bed according to claim 1, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is ~~lower~~higher than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.*



***Alternative interpretation* of claim 37:**
Annotated detail of the *third tensioning structure* of the embodiment of fig. 12

Accordingly, the Patentee believes that claim 37 can be maintained as amended above.

In view of the arguments above, in the Patentee's opinion original claim 36 can be maintained as granted, original claim 37 can be maintained as granted (preferred solution) or in amended form (if needed). However, as a precautionary measure, the Patentee would like to point out that original claims 36 and 37 can even be deleted in case the Opposition Division fully disagree.

AUXILIARY REQUESTS

As already pointed out, the Main Request of the Patentee is the rejection of the opposition and the maintenance of patent EP3192401 as granted. However, as a precautionary measure, the Patentee files three auxiliary requests to be considered in case the main request should not be allowed. The three auxiliary requests (all attached both in a clean copy and in a copy with annotations) are briefly explained below.

1st Auxiliary Request

According to the 1st Auxiliary Request, four new independent claims are filed, obtained as follows:

- New claim 1 originates from original claims 1+4+5;
- New claim 2 originates from original claims 1+6+7;
- New claim 3 originates from original claims 1+8+9; and
- New claim 4 originates from original claims 1+10+11.

All the other dependent claims have been amended in their numbering and in their dependencies. In particular:

- Original claims 2-3, 30-32 and 35-39, which depended directly on original claim 1, became new claims 5-6, 25-27 and 30-34 and depend now on any one of the independent claims 1 to 4.
- Original claims 12-15 and 22-23, which depended on original claims 4 and 5, became new claims 7-10 and 17-18 and depend now on new independent claim 1.
- Original claims 16-17 and 24-25, which depended on original claims 6 and 7, became new claims 11-12 and 19-20 and depend now on new independent claim 2.
- Original claims 18-19 and 26-27, which depended on original claims 8 and 9, became new claims 13-14 and 21-22 and depend now on new independent claim 3.
- Original claims 20-21 and 28-29, which depended on original claims 10 and 11, became new claims 15-16 and 23-24 and depend now on new independent claim 4.

Accordingly, the new amendments of the 1st Auxiliary Request fully meet the requirements of Article 123(2) EPC.

2nd Auxiliary Request

According to the 2nd Auxiliary Request, claim 1 has been amended by introducing in it the following technical feature: *the second tensioning structure and the third tensioning structure divide the respective side wall into five sections.* Such technical feature is repeatedly disclosed in the description, with respect to all the embodiments of the invention, see in particular:

- § [0063] and fig. 5 for Embodiment 1;
- § [0075] and fig. 9 for Embodiment 2;
- § [0083] and fig. 12 for Embodiment 3;
- § [0089] and fig. 16 for Embodiment 4;
- fig. 19 for Embodiment 5;
- fig. 21 for Embodiment 6; and
- fig. 22 for Embodiment 7.

All the subsequent claims remain unamended.

Accordingly, the new amendments of the 2nd Auxiliary Request fully meet the requirements of Article 123(2) EPC.

3rd Auxiliary Request

The 3rd Auxiliary Request represent the union of the 1st and 2nd Auxiliary Request. In other words, the new technical feature of the 2nd Auxiliary Request is introduced in all the independent claims 1 to 4 of the 1st Auxiliary Request. All the subsequent dependent claims are the same as those of the 1st Auxiliary Request.

Accordingly, the new amendments of the 3rd Auxiliary Request fully meet the requirements of Article 123(2) EPC.

CONCLUSIONS

In view of the arguments reported above, the Patentee would like to list the requests in hierarchical order:

Main Request; or
1st Auxiliary Request; or
2nd Auxiliary Request; or
3rd Auxiliary Request.

For any Request listed above, a further embodiment could be deletion of original claims 36 and 37 (new claims 31 and 32 in the 1st and 3rd Auxiliary Requests), if needed for maintaining the patent.

Yours sincerely,

Bugnion SpA
Giancarlo BELLONI

Europäisches Patentamt
European Patent Office
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Letter accompanying subsequently filed items

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The document(s) listed below is (are) subsequently filed documents pertaining to the following application:

Application number and/or EP publication number	EP16191360.3
Reference	23B6256,12EP42
Procedural phase	All procedures
Name of represented party	Bestway Inflatables & Material Corp.

	Description of document	Original file name	Assigned file name
1	Letter dealing with oral proceedings	23.B6256,12.EP.42-FilingAuxReq.pdf	ORAL.pdf
2	Amended claims (clean copy)	23.B6256,12.EP.42-1stAuxReq(Clean Copy).pdf	CLMS-1.pdf
3	Amended claims with annotations	23.B6256,12.EP.42-1stAuxReq(WithAnnotations).pdf	CLMS-HWA-1.pdf
4	Amended claims (clean copy)	23.B6256,12.EP.42-2ndAuxReq(CleanCopy).pdf	CLMS-2.pdf
5	Amended claims with annotations	23.B6256,12.EP.42-2ndAuxReq(With Annotations).pdf	CLMS-HWA-2.pdf
6	Amended claims (clean copy)	23.B6256,12.EP.42-3rdAuxReq(Clean Copy).pdf	CLMS-3.pdf
7	Amended claims with annotations	23.B6256,12.EP.42-3rdAuxReq(WithAnnotations).pdf	CLMS-HWA-3.pdf

Signature 1

Place:

Date: **30 September 2020**

Signed by: **/Giancarlo BELLONI/**

Capacity: **Representative 1**

Smart card certificate 1

Common name: **Giancarlo Belloni 34360**

EPO ID: **34360**

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Intex Recreation v. Bestway Inflatables

Issued by: European Patent Office CA G2

INTEX EX. 1038, Pg. 634
Intex Recreation v. Bestway Inflatables

AMENDED CLAIMS – 3RD AUXILIARY REQUEST (WITH ANNOTATIONS)

What is claimed is:

1. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent; ~~and~~

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent;

wherein said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams are respectively coupled to said side wall and said top sheet adjacent, the at least two first I-beams are disposed at an interval;

wherein said third tensioning structure comprises at least two second I-beams, an outside edge and an inside edge of each of said second I-beams are respectively coupled to the side wall and said bottom sheet adjacent, the at least two second I-beams are disposed at an interval; and

wherein the second tensioning structure and the third tensioning structure divide the respective side wall into five sections.

2. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent;

wherein said second tensioning structure comprises at least one first Y-beam, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet;

wherein said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet; and

wherein the second tensioning structure and the third tensioning structure divide the respective side wall into five sections.

3. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

wherein said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said top sheet;

wherein said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said bottom sheet; and

wherein the second tensioning structure and the third tensioning structure divide the respective side wall into five sections.

4. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent;

wherein said second tensioning structure comprises at least one first V-beam, wherein two outside edges of said first V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet;

wherein said third tensioning structure comprises at least one second V-beam, wherein two outside edges of said second V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet; and

wherein the second tensioning structure and the third tensioning structure divide the respective side wall into five sections.

~~2~~5. The inflatable bed according to any one of claims 1 to 4, wherein said second tensioning structure and said third tensioning structure are respectively provided with a plurality of air holes, through which an airflow passage is formed in said air chamber.

~~3~~6. The inflatable bed according to any one of claims 1 to 4, wherein said second tensioning structure and said third tensioning structure are disposed at an interval in a perpendicular direction.

~~4. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams are respectively coupled to said side wall and said top sheet adjacent, the at least two first I-beams are disposed at an interval.~~

~~5. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least two second I-beams, an outside edge and an inside edge of each of said second I-beams are respectively coupled to the side wall and said bottom sheet adjacent, the at least two second I-beams are disposed at an interval.~~

~~6. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first Y-beam, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.~~

~~7. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.~~

~~8. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said top sheet.~~

~~9. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said bottom sheet.~~

~~10. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first V-beam, wherein two outside edges of said first V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.~~

~~11. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second V-beam, wherein two outside edges of said second V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.~~

~~12~~7. The inflatable bed according to claim 41, wherein said at least two first I-beams are spaced apart from each other at a lower surface of said top sheet.

~~13~~8. The inflatable bed according to claim ~~5~~1, wherein said at least two second I-beams are spaced apart from each other at an upper surface of said bottom sheet.

~~14~~9. The inflatable bed according to claim 41, wherein said at least two first I-beams are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

~~15~~10. The inflatable bed according to claim ~~5~~1, wherein said at least two second I-beams are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

~~16~~11. The inflatable bed according to claim ~~6~~2, wherein the two outside edges of said at least one first Y-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

~~17~~12. The inflatable bed according to claim ~~7~~2, wherein the two outside edges of said at least one second Y-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

~~18~~13. The inflatable bed according to claim ~~8~~3, wherein said at least two outside edges of said at least one first tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

~~19~~14. The inflatable bed according to claim ~~9~~3, wherein said at least two outside edges of said at least one second tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

~~20~~15. The inflatable bed according to claim ~~10~~4, wherein the two outside edges of said at least one first V-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

~~21~~16. The inflatable bed according to claim ~~11~~4, wherein the two outside edges of said at least one second V-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

~~22~~17. The inflatable bed according to claim 41, wherein said at least two first V-beams as a whole are of a continuous annular structure or a segmental annular structure.

~~23~~18. The inflatable bed according to claim ~~5~~1, wherein said at least two second I-beam as a whole are of a continuous annular structure or a segmental annular structure.

~~24~~19. The inflatable bed according to claim ~~6~~2, wherein said at least one first Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

~~25~~20. The inflatable bed according to claim ~~7~~2, wherein said at least one second Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

~~26~~21. The inflatable bed according to claim ~~8~~3, wherein said at least one first tubular beam as a whole is of a segmental annular structure.

~~27~~22. The inflatable bed according to claim ~~9~~3, wherein said at least one second tubular beam as a whole is of a segmental annular structure.

~~28~~23. The inflatable bed according to claim ~~10~~4, wherein said at least one first V-beam as a whole is of a continuous annular structure or a segmental annular structure.

~~29~~24. The inflatable bed according to claim ~~11~~4, wherein said at least one second V-beam as a whole is of a continuous annular structure or a segmental annular structure.

~~30~~25. The inflatable bed according to any one of claims 1 to 4, wherein said first tensioning structure is one or more beams selected from I-beams, coil beams, Y-beams or X-beams.

~~31~~26. The inflatable bed according to any one of claims 1 to 4, wherein said first tensioning structure, said second tensioning structure and said third tensioning structure are all made of thermoplastic plastic sheet.

~~32~~27. The inflatable bed according to any one of claims 1 to 4, wherein one or more of said first tensioning structure, said second tensioning structure and said third tensioning structure at least partially comprise mesh, laminated plastic sheet or a threads.

~~33~~28. The inflatable bed according to claim ~~32~~27, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite plastic strips, said mesh and said threads are sandwiched between the two opposite plastic strips.

~~34~~29. The inflatable bed according to claim ~~32~~27, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with an U-shaped plastic strip, said mesh and said threads are sandwiched between the U-shaped plastic strip.

~~35~~30. The inflatable bed according to any one of claims 1 to 4, wherein said first tensioning structure is coupled to said top and bottom sheets by means of high-frequency welding; said second tensioning structure is coupled to said top sheet and said side wall by

means of high-frequency welding; and said third tensioning structure is coupled to said bottom sheet and said side wall by means of high-frequency welding.

~~36~~31. The inflatable bed according to any one of claims 1 to 4, wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

~~37~~32. The inflatable bed according to any one of claims 1 to 4, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

~~38~~33. The inflatable bed according to any one of claims 1 to 4, wherein said inflatable bed further comprises a built-in air pump, which is disposed on said side wall and is located between a lower edge of said second tensioning structure and an upper edge of said third tensioning structure for inflating said air chamber.

~~39~~34. The inflatable bed according to any one of claims 1 to 4, wherein said inflatable bed further comprises an air valve, which is disposed on said side wall for the inflation and deflation of said inflatable bed.

AMENDED CLAIMS – 2ND AUXILIARY REQUEST (WITH ANNOTATIONS)

What is claimed is:

1. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent; ~~and~~

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent; and

wherein the second tensioning structure and the third tensioning structure divide the respective side wall into five sections.

2. The inflatable bed according to claim 1, wherein said second tensioning structure and said third tensioning structure are respectively provided with a plurality of air holes, through which an airflow passage is formed in said air chamber.

3. The inflatable bed according to claim 1, wherein said second tensioning structure and said third tensioning structure are disposed at an interval in a perpendicular direction.

4. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams are respectively coupled to said side wall and said top sheet adjacent, the at least two first I-beams are disposed at an interval.

5. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least two second I-beams, an outside edge and an inside edge of each of said second I-beams are respectively coupled to the side wall and said bottom sheet adjacent, the at least two second I-beams are disposed at an interval.

6. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first Y-beam, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.

7. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

8. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said top sheet.

9. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said bottom sheet.

10. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first V-beam, wherein two outside edges of said first V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.

11. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second V-beam, wherein two outside edges of said second V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

12. The inflatable bed according to claim 4, wherein said at least two first I-beams are spaced apart from each other at a lower surface of said top sheet.

13. The inflatable bed according to claim 5, wherein said at least two second I-beams are spaced apart from each other at an upper surface of said bottom sheet.

14. The inflatable bed according to claim 4, wherein said at least two first I-beams are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

15. The inflatable bed according to claim 5, wherein said at least two second I-beams are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

16. The inflatable bed according to claim 6, wherein the two outside edges of said at least one first Y-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

17. The inflatable bed according to claim 7, wherein the two outside edges of said at least one second Y-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

18. The inflatable bed according to claim 8, wherein said at least two outside edges of said at least one first tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

19. The inflatable bed according to claim 9, wherein said at least two outside edges of said at least one second tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

20. The inflatable bed according to claim 10, wherein the two outside edges of said at least one first V-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

21. The inflatable bed according to claim 11, wherein the two outside edges of said at least one second V-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

22. The inflatable bed according to claim 4, wherein said at least two first V-beams as a whole are of a continuous annular structure or a segmental annular structure.

23. The inflatable bed according to claim 5, wherein said at least two second I-beam as a whole are of a continuous annular structure or a segmental annular structure.

24. The inflatable bed according to claim 6, wherein said at least one first Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

25. The inflatable bed according to claim 7, wherein said at least one second Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

26. The inflatable bed according to claim 8, wherein said at least one first tubular beam as a whole is of a segmental annular structure.

27. The inflatable bed according to claim 9, wherein said at least one second tubular beam as a whole is of a segmental annular structure.

28. The inflatable bed according to claim 10, wherein said at least one first V-beam as a whole is of a continuous annular structure or a segmental annular structure.

29. The inflatable bed according to claim 11, wherein said at least one second V-beam as a whole is of a continuous annular structure or a segmental annular structure.

30. The inflatable bed according to claim 1, wherein said first tensioning structure is one or more beams selected from I-beams, coil beams, Y-beams or X-beams.

31. The inflatable bed according to claim 1, wherein said first tensioning structure, said second tensioning structure and said third tensioning structure are all made of thermoplastic plastic sheet.

32. The inflatable bed according to claim 1, wherein one or more of said first tensioning structure, said second tensioning structure and said third tensioning structure at least partially comprise mesh, laminated plastic sheet or a threads.

33. The inflatable bed according to claim 32, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite plastic strips, said mesh and said threads are sandwiched between the two opposite plastic strips.

34. The inflatable bed according to claim 32, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with an U-shaped plastic strip, said mesh and said threads are sandwiched between the U-shaped plastic strip.

35. The inflatable bed according to claim 1, wherein said first tensioning structure is coupled to said top and bottom sheets by means of high-frequency welding; said second tensioning structure is coupled to said top sheet and said side wall by means of high-frequency welding; and said third tensioning structure is coupled to said bottom sheet and said side wall by means of high-frequency welding.

36. The inflatable bed according to claim 1, wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

37. The inflatable bed according to claim 1, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

38. The inflatable bed according to claim 1, wherein said inflatable bed further comprises a built-in air pump, which is disposed on said side wall and is located between a lower edge of said second tensioning structure and an upper edge of said third tensioning structure for inflating said air chamber.

39. The inflatable bed according to claim 1, wherein said inflatable bed further comprises an air valve, which is disposed on said side wall for the inflation and deflation of said inflatable bed.

AMENDED CLAIMS – 1ST AUXILIARY REQUEST (WITH ANNOTATIONS)

What is claimed is:

1. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent; ~~and~~

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent;

wherein said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams are respectively coupled to said side wall and said top sheet adjacent, the at least two first I-beams are disposed at an interval; and

wherein said third tensioning structure comprises at least two second I-beams, an outside edge and an inside edge of each of said second I-beams are respectively coupled to the side wall and said bottom sheet adjacent, the at least two second I-beams are disposed at an interval.

2. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent;

wherein said second tensioning structure comprises at least one first Y-beam, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet; and

wherein said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

3. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are

respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

wherein said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said top sheet; and

wherein said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said bottom sheet.

4. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent;

wherein said second tensioning structure comprises at least one first V-beam, wherein two outside edges of said first V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet; and

wherein said third tensioning structure comprises at least one second V-beam, wherein two outside edges of said second V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

~~2~~5. The inflatable bed according to any one of claims 1 to 4, wherein said second tensioning structure and said third tensioning structure are respectively provided with a plurality of air holes, through which an airflow passage is formed in said air chamber.

~~3~~6. The inflatable bed according to any one of claims 1 to 4, wherein said second tensioning structure and said third tensioning structure are disposed at an interval in a perpendicular direction.

~~4. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams are respectively coupled to said side wall and said top sheet adjacent, the at least two first I-beams are disposed at an interval.~~

~~5. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least two second I-beams, an outside edge and an inside edge of each of said second I-beams are respectively coupled to the side wall and said bottom sheet adjacent, the at least two second I-beams are disposed at an interval.~~

~~6. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first Y-beam, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.~~

~~7. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.~~

~~8. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said top sheet.~~

~~9. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said bottom sheet.~~

~~10. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first V-beam, wherein two outside edges of said first V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.~~

~~11. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second V-beam, wherein two outside edges of said second V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.~~

~~12~~7. The inflatable bed according to claim ~~4~~1, wherein said at least two first I-beams are spaced apart from each other at a lower surface of said top sheet.

~~13~~8. The inflatable bed according to claim ~~5~~1, wherein said at least two second I-beams are spaced apart from each other at an upper surface of said bottom sheet.

~~14~~9. The inflatable bed according to claim 41, wherein said at least two first I-beams are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

~~15~~10. The inflatable bed according to claim ~~5~~1, wherein said at least two second I-beams are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

~~16~~11. The inflatable bed according to claim ~~6~~2, wherein the two outside edges of said at least one first Y-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

~~17~~12. The inflatable bed according to claim ~~7~~2, wherein the two outside edges of said at least one second Y-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

~~18~~13. The inflatable bed according to claim ~~8~~3, wherein said at least two outside edges of said at least one first tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

~~19~~14. The inflatable bed according to claim ~~9~~3, wherein said at least two outside edges of said at least one second tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

~~20~~15. The inflatable bed according to claim ~~10~~4, wherein the two outside edges of said at least one first V-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

~~21~~16. The inflatable bed according to claim ~~11~~4, wherein the two outside edges of said at least one second V-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

~~22~~17. The inflatable bed according to claim 41, wherein said at least two first V-beams as a whole are of a continuous annular structure or a segmental annular structure.

~~23~~18. The inflatable bed according to claim ~~5~~1, wherein said at least two second I-beam as a whole are of a continuous annular structure or a segmental annular structure.

~~24~~19. The inflatable bed according to claim ~~6~~2, wherein said at least one first Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

~~25~~20. The inflatable bed according to claim ~~7~~2, wherein said at least one second Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

~~26~~21. The inflatable bed according to claim ~~8~~3, wherein said at least one first tubular beam as a whole is of a segmental annular structure.

~~27~~22. The inflatable bed according to claim ~~9~~3, wherein said at least one second tubular beam as a whole is of a segmental annular structure.

~~28~~23. The inflatable bed according to claim ~~10~~4, wherein said at least one first V-beam as a whole is of a continuous annular structure or a segmental annular structure.

~~29~~24. The inflatable bed according to claim ~~11~~4, wherein said at least one second V-beam as a whole is of a continuous annular structure or a segmental annular structure.

~~30~~25. The inflatable bed according to any one of claims 1 to 4, wherein said first tensioning structure is one or more beams selected from I-beams, coil beams, Y-beams or X-beams.

~~31~~26. The inflatable bed according to any one of claims 1 to 4, wherein said first tensioning structure, said second tensioning structure and said third tensioning structure are all made of thermoplastic plastic sheet.

~~32~~27. The inflatable bed according to any one of claims 1 to 4, wherein one or more of said first tensioning structure, said second tensioning structure and said third tensioning structure at least partially comprise mesh, laminated plastic sheet or a threads.

~~33~~28. The inflatable bed according to claim ~~32~~27, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite plastic strips, said mesh and said threads are sandwiched between the two opposite plastic strips.

~~34~~29. The inflatable bed according to claim ~~32~~27, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with an U-shaped plastic strip, said mesh and said threads are sandwiched between the U-shaped plastic strip.

~~35~~30. The inflatable bed according to any one of claims 1 to 4, wherein said first tensioning structure is coupled to said top and bottom sheets by means of high-frequency welding; said second tensioning structure is coupled to said top sheet and said side wall by means of high-frequency welding; and said third tensioning structure is coupled to said bottom sheet and said side wall by means of high-frequency welding.

~~36~~31. The inflatable bed according to any one of claims 1 to 4, wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

~~37~~32. The inflatable bed according to any one of claims 1 to 4, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

~~38~~33. The inflatable bed according to any one of claims 1 to 4, wherein said inflatable bed further comprises a built-in air pump, which is disposed on said side wall and is located between a lower edge of said second tensioning structure and an upper edge of said third tensioning structure for inflating said air chamber.

~~39~~34. The inflatable bed according to any one of claims 1 to 4, wherein said inflatable bed further comprises an air valve, which is disposed on said side wall for the inflation and deflation of said inflatable bed.

AMENDED CLAIMS – 1ST AUXILIARY REQUEST

What is claimed is:

1. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent;

wherein said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams are respectively coupled to said side wall and said top sheet adjacent, the at least two first I-beams are disposed at an interval; and

wherein said third tensioning structure comprises at least two second I-beams, an outside edge and an inside edge of each of said second I-beams are respectively coupled to the side wall and said bottom sheet adjacent, the at least two second I-beams are disposed at an interval.

2. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent;

wherein said second tensioning structure comprises at least one first Y-beam, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet; and

wherein said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

3. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are

respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

wherein said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said top sheet; and

wherein said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said bottom sheet.

4. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent;

wherein said second tensioning structure comprises at least one first V-beam, wherein two outside edges of said first V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet; and

wherein said third tensioning structure comprises at least one second V-beam, wherein two outside edges of said second V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

5. The inflatable bed according to any one of claims 1 to 4, wherein said second tensioning structure and said third tensioning structure are respectively provided with a plurality of air holes, through which an airflow passage is formed in said air chamber.

6. The inflatable bed according to any one of claims 1 to 4, wherein said second tensioning structure and said third tensioning structure are disposed at an interval in a perpendicular direction.

7. The inflatable bed according to claim 1, wherein said at least two first I-beams are spaced apart from each other at a lower surface of said top sheet.

8. The inflatable bed according to claim 1, wherein said at least two second I-beams are spaced apart from each other at an upper surface of said bottom sheet.

9. The inflatable bed according to claim 1, wherein said at least two first I-beams are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

10. The inflatable bed according to claim 1, wherein said at least two second I-beams are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

11. The inflatable bed according to claim 2, wherein the two outside edges of said at least one first Y-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

12. The inflatable bed according to claim 2, wherein the two outside edges of said at least one second Y-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

13. The inflatable bed according to claim 3, wherein said at least two outside edges of said at least one first tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

14. The inflatable bed according to claim 3, wherein said at least two outside edges of said at least one second tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

15. The inflatable bed according to claim 4, wherein the two outside edges of said at least one first V-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

16. The inflatable bed according to claim 4, wherein the two outside edges of said at least one second V-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

17. The inflatable bed according to claim 1, wherein said at least two first V-beams as a whole are of a continuous annular structure or a segmental annular structure.

18. The inflatable bed according to claim 1, wherein said at least two second I-beam as a whole are of a continuous annular structure or a segmental annular structure.

19. The inflatable bed according to claim 2, wherein said at least one first Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

20. The inflatable bed according to claim 2, wherein said at least one second Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

21. The inflatable bed according to claim 3, wherein said at least one first tubular beam as a whole is of a segmental annular structure.

22. The inflatable bed according to claim 3, wherein said at least one second tubular beam as a whole is of a segmental annular structure.

23. The inflatable bed according to claim 4, wherein said at least one first V-beam as a whole is of a continuous annular structure or a segmental annular structure.

24. The inflatable bed according to claim 4, wherein said at least one second V-beam as a whole is of a continuous annular structure or a segmental annular structure.

25. The inflatable bed according to any one of claims 1 to 4, wherein said first tensioning structure is one or more beams selected from I-beams, coil beams, Y-beams or X-beams.

26. The inflatable bed according to any one of claims 1 to 4, wherein said first tensioning structure, said second tensioning structure and said third tensioning structure are all made of thermoplastic plastic sheet.

27. The inflatable bed according to any one of claims 1 to 4, wherein one or more of said first tensioning structure, said second tensioning structure and said third tensioning structure at least partially comprise mesh, laminated plastic sheet or a threads.

28. The inflatable bed according to claim 27, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite plastic strips, said mesh and said threads are sandwiched between the two opposite plastic strips.

29. The inflatable bed according to claim 27, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with an U-shaped plastic strip, said mesh and said threads are sandwiched between the U-shaped plastic strip.

30. The inflatable bed according to any one of claims 1 to 4, wherein said first tensioning structure is coupled to said top and bottom sheets by means of high-frequency welding; said second tensioning structure is coupled to said top sheet and said side wall by means of high-frequency welding; and said third tensioning structure is coupled to said bottom sheet and said side wall by means of high-frequency welding.

31. The inflatable bed according to any one of claims 1 to 4, wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

32. The inflatable bed according to any one of claims 1 to 4, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

33. The inflatable bed according to any one of claims 1 to 4, wherein said inflatable bed further comprises a built-in air pump, which is disposed on said side wall and is located between a lower edge of said second tensioning structure and an upper edge of said third tensioning structure for inflating said air chamber.

34. The inflatable bed according to any one of claims 1 to 4, wherein said inflatable bed further comprises an air valve, which is disposed on said side wall for the inflation and deflation of said inflatable bed.

AMENDED CLAIMS – 2ND AUXILIARY REQUEST

What is claimed is:

1. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent; and

wherein the second tensioning structure and the third tensioning structure divide the respective side wall into five sections.

2. The inflatable bed according to claim 1, wherein said second tensioning structure and said third tensioning structure are respectively provided with a plurality of air holes, through which an airflow passage is formed in said air chamber.

3. The inflatable bed according to claim 1, wherein said second tensioning structure and said third tensioning structure are disposed at an interval in a perpendicular direction.

4. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams are respectively coupled to said side wall and said top sheet adjacent, the at least two first I-beams are disposed at an interval.

5. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least two second I-beams, an outside edge and an inside edge of each of said second I-beams are respectively coupled to the side wall and said bottom sheet adjacent, the at least two second I-beams are disposed at an interval.

6. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first Y-beam, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.

7. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

8. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said top sheet.

9. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said bottom sheet.

10. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first V-beam, wherein two outside edges of said first V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.

11. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second V-beam, wherein two outside edges of said second V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

12. The inflatable bed according to claim 4, wherein said at least two first I-beams are spaced apart from each other at a lower surface of said top sheet.

13. The inflatable bed according to claim 5, wherein said at least two second I-beams are spaced apart from each other at an upper surface of said bottom sheet.

14. The inflatable bed according to claim 4, wherein said at least two first I-beams are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

15. The inflatable bed according to claim 5, wherein said at least two second I-beams are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

16. The inflatable bed according to claim 6, wherein the two outside edges of said at least one first Y-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

17. The inflatable bed according to claim 7, wherein the two outside edges of said at least one second Y-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

18. The inflatable bed according to claim 8, wherein said at least two outside edges of said at least one first tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

19. The inflatable bed according to claim 9, wherein said at least two outside edges of said at least one second tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

20. The inflatable bed according to claim 10, wherein the two outside edges of said at least one first V-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

21. The inflatable bed according to claim 11, wherein the two outside edges of said at least one second V-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

22. The inflatable bed according to claim 4, wherein said at least two first V-beams as a whole are of a continuous annular structure or a segmental annular structure.

23. The inflatable bed according to claim 5, wherein said at least two second I-beam as a whole are of a continuous annular structure or a segmental annular structure.

24. The inflatable bed according to claim 6, wherein said at least one first Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

25. The inflatable bed according to claim 7, wherein said at least one second Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

26. The inflatable bed according to claim 8, wherein said at least one first tubular beam as a whole is of a segmental annular structure.

27. The inflatable bed according to claim 9, wherein said at least one second tubular beam as a whole is of a segmental annular structure.

28. The inflatable bed according to claim 10, wherein said at least one first V-beam as a whole is of a continuous annular structure or a segmental annular structure.

29. The inflatable bed according to claim 11, wherein said at least one second V-beam as a whole is of a continuous annular structure or a segmental annular structure.

30. The inflatable bed according to claim 1, wherein said first tensioning structure is one or more beams selected from I-beams, coil beams, Y-beams or X-beams.

31. The inflatable bed according to claim 1, wherein said first tensioning structure, said second tensioning structure and said third tensioning structure are all made of thermoplastic plastic sheet.

32. The inflatable bed according to claim 1, wherein one or more of said first tensioning structure, said second tensioning structure and said third tensioning structure at least partially comprise mesh, laminated plastic sheet or a threads.

33. The inflatable bed according to claim 32, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite plastic strips, said mesh and said threads are sandwiched between the two opposite plastic strips.

34. The inflatable bed according to claim 32, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with an U-shaped plastic strip, said mesh and said threads are sandwiched between the U-shaped plastic strip.

35. The inflatable bed according to claim 1, wherein said first tensioning structure is coupled to said top and bottom sheets by means of high-frequency welding; said second tensioning structure is coupled to said top sheet and said side wall by means of high-frequency welding; and said third tensioning structure is coupled to said bottom sheet and said side wall by means of high-frequency welding.

36. The inflatable bed according to claim 1, wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

37. The inflatable bed according to claim 1, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

38. The inflatable bed according to claim 1, wherein said inflatable bed further comprises a built-in air pump, which is disposed on said side wall and is located between a lower edge of said second tensioning structure and an upper edge of said third tensioning structure for inflating said air chamber.

39. The inflatable bed according to claim 1, wherein said inflatable bed further comprises an air valve, which is disposed on said side wall for the inflation and deflation of said inflatable bed.

AMENDED CLAIMS – 3RD AUXILIARY REQUEST

What is claimed is:

1. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent;

wherein said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams are respectively coupled to said side wall and said top sheet adjacent, the at least two first I-beams are disposed at an interval;

wherein said third tensioning structure comprises at least two second I-beams, an outside edge and an inside edge of each of said second I-beams are respectively coupled to the side wall and said bottom sheet adjacent, the at least two second I-beams are disposed at an interval; and

wherein the second tensioning structure and the third tensioning structure divide the respective side wall into five sections.

2. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent;

wherein said second tensioning structure comprises at least one first Y-beam, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet;

wherein said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet; and

wherein the second tensioning structure and the third tensioning structure divide the respective side wall into five sections.

3. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

wherein said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said top sheet;

wherein said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said bottom sheet; and

wherein the second tensioning structure and the third tensioning structure divide the respective side wall into five sections.

4. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent;

wherein said second tensioning structure comprises at least one first V-beam, wherein two outside edges of said first V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet;

wherein said third tensioning structure comprises at least one second V-beam, wherein two outside edges of said second V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet; and

wherein the second tensioning structure and the third tensioning structure divide the respective side wall into five sections.

5. The inflatable bed according to any one of claims 1 to 4, wherein said second tensioning structure and said third tensioning structure are respectively provided with a plurality of air holes, through which an airflow passage is formed in said air chamber.

6. The inflatable bed according to any one of claims 1 to 4, wherein said second tensioning structure and said third tensioning structure are disposed at an interval in a perpendicular direction.

7. The inflatable bed according to claim 1, wherein said at least two first I-beams are spaced apart from each other at a lower surface of said top sheet.

8. The inflatable bed according to claim 1, wherein said at least two second I-beams are spaced apart from each other at an upper surface of said bottom sheet.

9. The inflatable bed according to claim 1, wherein said at least two first I-beams are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

10. The inflatable bed according to claim 1, wherein said at least two second I-beams are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

11. The inflatable bed according to claim 2, wherein the two outside edges of said at least one first Y-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

12. The inflatable bed according to claim 2, wherein the two outside edges of said at least one second Y-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

13. The inflatable bed according to claim 3, wherein said at least two outside edges of said at least one first tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

14. The inflatable bed according to claim 3, wherein said at least two outside edges of said at least one second tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

15. The inflatable bed according to claim 4, wherein the two outside edges of said at least one first V-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

16. The inflatable bed according to claim 4, wherein the two outside edges of said at least one second V-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

17. The inflatable bed according to claim 1, wherein said at least two first V-beams as a whole are of a continuous annular structure or a segmental annular structure.

18. The inflatable bed according to claim 1, wherein said at least two second I-beam as a whole are of a continuous annular structure or a segmental annular structure.

19. The inflatable bed according to claim 2, wherein said at least one first Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

20. The inflatable bed according to claim 2, wherein said at least one second Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

21. The inflatable bed according to claim 3, wherein said at least one first tubular beam as a whole is of a segmental annular structure.

22. The inflatable bed according to claim 3, wherein said at least one second tubular beam as a whole is of a segmental annular structure.

23. The inflatable bed according to claim 4, wherein said at least one first V-beam as a whole is of a continuous annular structure or a segmental annular structure.

24. The inflatable bed according to claim 4, wherein said at least one second V-beam as a whole is of a continuous annular structure or a segmental annular structure.

25. The inflatable bed according to any one of claims 1 to 4, wherein said first tensioning structure is one or more beams selected from I-beams, coil beams, Y-beams or X-beams.

26. The inflatable bed according to any one of claims 1 to 4, wherein said first tensioning structure, said second tensioning structure and said third tensioning structure are all made of thermoplastic plastic sheet.

27. The inflatable bed according to any one of claims 1 to 4, wherein one or more of said first tensioning structure, said second tensioning structure and said third tensioning structure at least partially comprise mesh, laminated plastic sheet or a threads.

28. The inflatable bed according to claim 27, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite plastic strips, said mesh and said threads are sandwiched between the two opposite plastic strips.

29. The inflatable bed according to claim 27, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with an U-shaped plastic strip, said mesh and said threads are sandwiched between the U-shaped plastic strip.

30. The inflatable bed according to any one of claims 1 to 4, wherein said first tensioning structure is coupled to said top and bottom sheets by means of high-frequency welding; said second tensioning structure is coupled to said top sheet and said side wall by means of high-frequency welding; and said third tensioning structure is coupled to said bottom sheet and said side wall by means of high-frequency welding.

31. The inflatable bed according to any one of claims 1 to 4, wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

32. The inflatable bed according to any one of claims 1 to 4, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

33. The inflatable bed according to any one of claims 1 to 4, wherein said inflatable bed further comprises a built-in air pump, which is disposed on said side wall and is located between a lower edge of said second tensioning structure and an upper edge of said third tensioning structure for inflating said air chamber.

34. The inflatable bed according to any one of claims 1 to 4, wherein said inflatable bed further comprises an air valve, which is disposed on said side wall for the inflation and deflation of said inflatable bed.

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BRIEF COMMUNICATION

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Letter accompanying subsequently filed items

Representative:

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The document(s) listed below is (are) subsequently filed documents pertaining to the following application:

Application number and/or EP publication number	EP16191360.3
Reference	23B6256,12EP42
Procedural phase	All procedures
Name of represented party	Bestway Inflatables & Material Corp.

	Description of document	Original file name	Assigned file name
1	Letter dealing with oral proceedings	23.B6256,12.EP.42-FilingAuxReq.pdf	ORAL.pdf
2	Amended claims (clean copy)	23.B6256,12.EP.42-1stAuxReq(Clean Copy).pdf	CLMS-1.pdf
3	Amended claims with annotations	23.B6256,12.EP.42-1stAuxReq(WithAnnotations).pdf	CLMS-HWA-1.pdf
4	Amended claims (clean copy)	23.B6256,12.EP.42-2ndAuxReq(CleanCopy).pdf	CLMS-2.pdf
5	Amended claims with annotations	23.B6256,12.EP.42-2ndAuxReq(With Annotations).pdf	CLMS-HWA-2.pdf
6	Amended claims (clean copy)	23.B6256,12.EP.42-3rdAuxReq(Clean Copy).pdf	CLMS-3.pdf
7	Amended claims with annotations	23.B6256,12.EP.42-3rdAuxReq(WithAnnotations).pdf	CLMS-HWA-3.pdf

Signature 1

Place:

Date: **30 September 2020**

Signed by: **/Giancarlo BELLONI/**

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Smart card certificate 1

Common name: **Giancarlo Belloni 34360**

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Intex Recreation v. Bestway Inflatables

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INTEX EX. 1038, Pg. 672
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Milan, September 30, 2020

RE.: **Opposition against European Patent no. 3192401** issued Sep 19, 2018
for: INFLATABLE BED
in the name of: BESTWAY INFLATABLES & MATERIAL CORP.

Dear Sirs,

This is a response of the Patentee to the preliminary opinion issued by the Opposition Division on 28 may 2020, together with the summons to attend oral proceedings. The Patentee takes this opportunity for filing three auxiliary requests to be considered in case the main request (i.e. the total rejection of the opposition and the maintenance of the patent EP3192401 as granted) should not be allowed.

According to a friendly approach, this response is filed well before the final date for filing written submissions and/or amendments, which is set on 13 November 2020.

5.1 Article 100(b) EPC (sufficiency of disclosure) – claims 36 and 37

According to the preliminary opinion of the Opposition Division, the skilled person is not able to obtain a product as defined in original claims 36 and 37. On this point the Patentee would like to comment as follows.

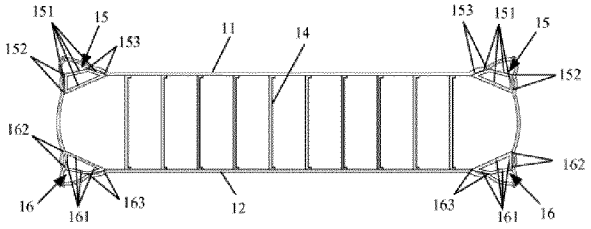
Claim 36

Original claim 36 recites:

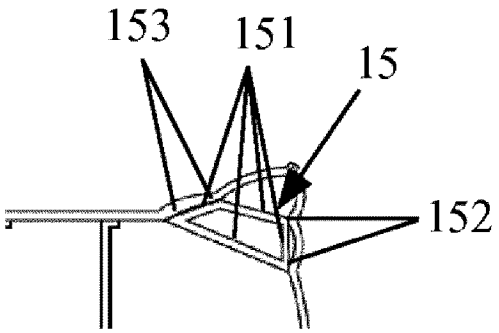
> *The inflatable bed according to claim 1, wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.*

The actual meaning of such claim can be easily understood by making specific reference to the embodiment of fig. 12, where the *second tensioning structure* clearly comprises an *upper edge*. Maybe a better translation could have been available for this element, however it is clear from fig. 12 (see the annotated detail below) that such *upper edge* has an *inside part* (on the left, toward the

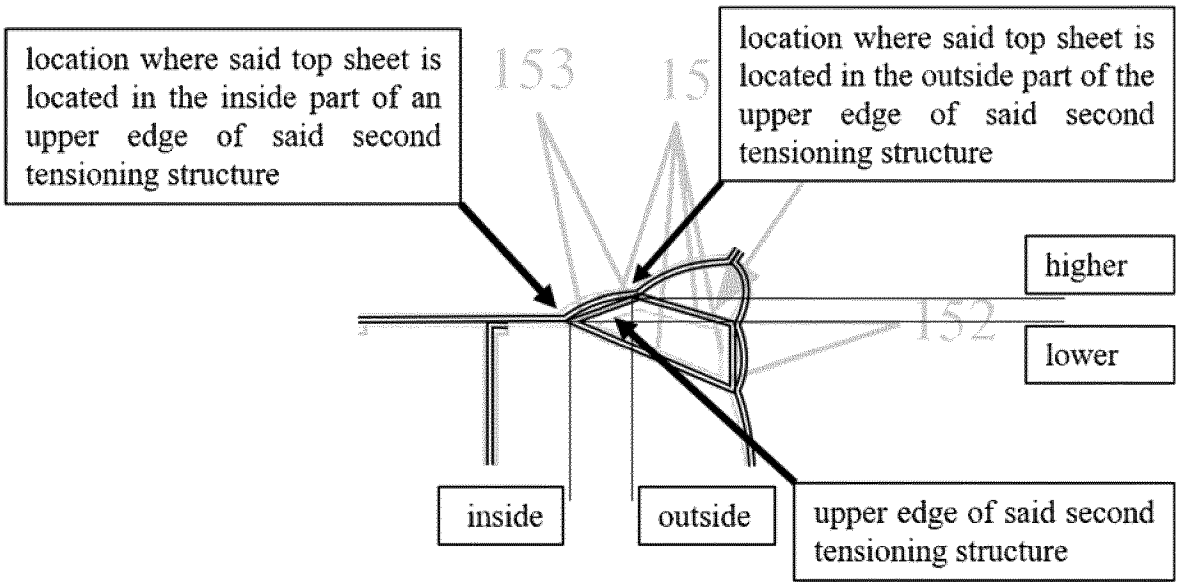
center of the air bed) and an *outside part* (on the right, away from the center of the air bed). Both such *inside part* and *outside part* are in contact with the *top sheet*. Claim 36 provides a relative positioning for these parts.



Embodiment of Fig. 12



Detail of the *second tensioning structure*



Annotated detail of the *second tensioning structure*

A similar interpretation can be given also for the other embodiments of the invention in which the *second tensioning structure* contacts the *top sheet* in two different points, see for example the embodiments of figures 5, 19, 21 and 22.

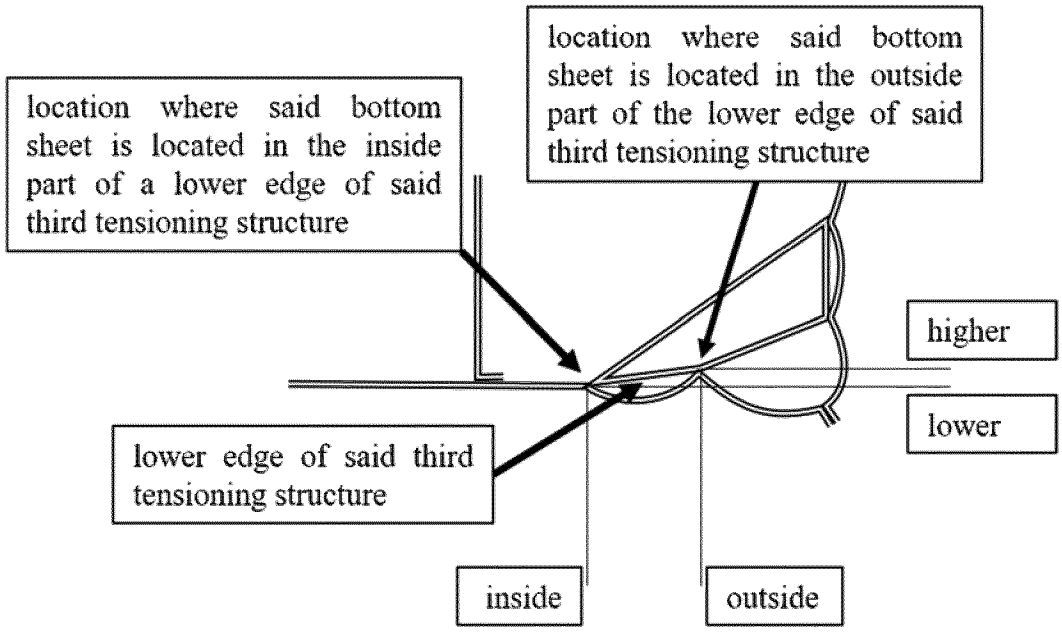
Accordingly, the Patentee strongly believes that claim 36 can be maintained as granted.

Claim 37

Original claim 37 recites:

> *The inflatable bed according to claim 1, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.*

Preferred interpretation - The actual meaning of such claim can be understood by making reference to an additional embodiment which is not shown in the original figures of the patent. A relevant detail of such additional embodiment is schematically shown below, in a manner similar to the one adopted above for the detail of fig. 12. The schematic view shows the detail of the third tensioning structure and of the bottom sheet.



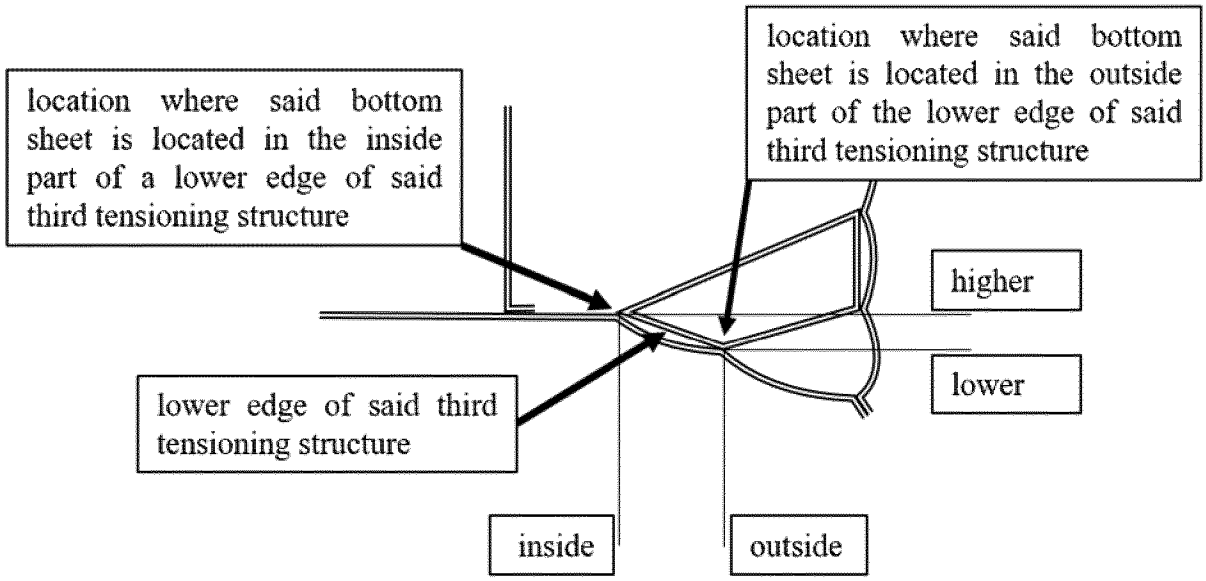
Preferred interpretation **of claim 37:**
Annotated detail of the *third tensioning structure* of an additional embodiment

According to the Patentee's opinion, the above additional embodiment is perfectly comprised within the scope of the invention and can be easily obtained by the skilled person by following the teachings provided in the patent about the other embodiments. Accordingly, the Patentee strongly believes that claim 37 can be maintained as granted.

Alternative interpretation - Should the Opposition Division disagree with the interpretation given above by the Patentee, another interpretation is available for claim 37. According to such alternative interpretation, claim 37 can be considered as symmetrically turning claim 36 upside down and

relating to the *third tensioning structure* rather than to the *second tensioning structure*. Since, according to such interpretation, claim 37 has to symmetrically correspond to claim 36, an error can be found and corrected in an obvious manner (according to Rule 139 EPC), so as to let it recite:

> *The inflatable bed according to claim 1, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is ~~lower~~higher than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.*



***Alternative interpretation* of claim 37:**
Annotated detail of the *third tensioning structure* of the embodiment of fig. 12

Accordingly, the Patentee believes that claim 37 can be maintained as amended above.

In view of the arguments above, in the Patentee's opinion original claim 36 can be maintained as granted, original claim 37 can be maintained as granted (preferred solution) or in amended form (if needed). However, as a precautionary measure, the Patentee would like to point out that original claims 36 and 37 can even be deleted in case the Opposition Division fully disagree.

AUXILIARY REQUESTS

As already pointed out, the Main Request of the Patentee is the rejection of the opposition and the maintenance of patent EP3192401 as granted. However, as a precautionary measure, the Patentee files three auxiliary requests to be considered in case the main request should not be allowed. The three auxiliary requests (all attached both in a clean copy and in a copy with annotations) are briefly explained below.

1st Auxiliary Request

According to the 1st Auxiliary Request, four new independent claims are filed, obtained as follows:

- New claim 1 originates from original claims 1+4+5;
- New claim 2 originates from original claims 1+6+7;
- New claim 3 originates from original claims 1+8+9; and
- New claim 4 originates from original claims 1+10+11.

All the other dependent claims have been amended in their numbering and in their dependencies. In particular:

- Original claims 2-3, 30-32 and 35-39, which depended directly on original claim 1, became new claims 5-6, 25-27 and 30-34 and depend now on any one of the independent claims 1 to 4.
- Original claims 12-15 and 22-23, which depended on original claims 4 and 5, became new claims 7-10 and 17-18 and depend now on new independent claim 1.
- Original claims 16-17 and 24-25, which depended on original claims 6 and 7, became new claims 11-12 and 19-20 and depend now on new independent claim 2.
- Original claims 18-19 and 26-27, which depended on original claims 8 and 9, became new claims 13-14 and 21-22 and depend now on new independent claim 3.
- Original claims 20-21 and 28-29, which depended on original claims 10 and 11, became new claims 15-16 and 23-24 and depend now on new independent claim 4.

Accordingly, the new amendments of the 1st Auxiliary Request fully meet the requirements of Article 123(2) EPC.

2nd Auxiliary Request

According to the 2nd Auxiliary Request, claim 1 has been amended by introducing in it the following technical feature: *the second tensioning structure and the third tensioning structure divide the respective side wall into five sections.* Such technical feature is repeatedly disclosed in the description, with respect to all the embodiments of the invention, see in particular:

- § [0063] and fig. 5 for Embodiment 1;
- § [0075] and fig. 9 for Embodiment 2;
- § [0083] and fig. 12 for Embodiment 3;
- § [0089] and fig. 16 for Embodiment 4;
- fig. 19 for Embodiment 5;
- fig. 21 for Embodiment 6; and
- fig. 22 for Embodiment 7.

All the subsequent claims remain unamended.

Accordingly, the new amendments of the 2nd Auxiliary Request fully meet the requirements of Article 123(2) EPC.

3rd Auxiliary Request

The 3rd Auxiliary Request represent the union of the 1st and 2nd Auxiliary Request. In other words, the new technical feature of the 2nd Auxiliary Request is introduced in all the independent claims 1 to 4 of the 1st Auxiliary Request. All the subsequent dependent claims are the same as those of the 1st Auxiliary Request.

Accordingly, the new amendments of the 3rd Auxiliary Request fully meet the requirements of Article 123(2) EPC.

CONCLUSIONS

In view of the arguments reported above, the Patentee would like to list the requests in hierarchical order:

Main Request; or
1st Auxiliary Request; or
2nd Auxiliary Request; or
3rd Auxiliary Request.

For any Request listed above, a further embodiment could be deletion of original claims 36 and 37 (new claims 31 and 32 in the 1st and 3rd Auxiliary Requests), if needed for maintaining the patent.

Yours sincerely,

Bugnion SpA
Giancarlo BELLONI

AMENDED CLAIMS – 1ST AUXILIARY REQUEST

What is claimed is:

1. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent;

wherein said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams are respectively coupled to said side wall and said top sheet adjacent, the at least two first I-beams are disposed at an interval; and

wherein said third tensioning structure comprises at least two second I-beams, an outside edge and an inside edge of each of said second I-beams are respectively coupled to the side wall and said bottom sheet adjacent, the at least two second I-beams are disposed at an interval.

2. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent;

wherein said second tensioning structure comprises at least one first Y-beam, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet; and

wherein said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

3. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are

respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

wherein said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said top sheet; and

wherein said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said bottom sheet.

4. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent;

wherein said second tensioning structure comprises at least one first V-beam, wherein two outside edges of said first V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet; and

wherein said third tensioning structure comprises at least one second V-beam, wherein two outside edges of said second V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

5. The inflatable bed according to any one of claims 1 to 4, wherein said second tensioning structure and said third tensioning structure are respectively provided with a plurality of air holes, through which an airflow passage is formed in said air chamber.

6. The inflatable bed according to any one of claims 1 to 4, wherein said second tensioning structure and said third tensioning structure are disposed at an interval in a perpendicular direction.

7. The inflatable bed according to claim 1, wherein said at least two first I-beams are spaced apart from each other at a lower surface of said top sheet.

8. The inflatable bed according to claim 1, wherein said at least two second I-beams are spaced apart from each other at an upper surface of said bottom sheet.

9. The inflatable bed according to claim 1, wherein said at least two first I-beams are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

10. The inflatable bed according to claim 1, wherein said at least two second I-beams are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

11. The inflatable bed according to claim 2, wherein the two outside edges of said at least one first Y-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

12. The inflatable bed according to claim 2, wherein the two outside edges of said at least one second Y-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

13. The inflatable bed according to claim 3, wherein said at least two outside edges of said at least one first tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

14. The inflatable bed according to claim 3, wherein said at least two outside edges of said at least one second tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

15. The inflatable bed according to claim 4, wherein the two outside edges of said at least one first V-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

16. The inflatable bed according to claim 4, wherein the two outside edges of said at least one second V-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

17. The inflatable bed according to claim 1, wherein said at least two first V-beams as a whole are of a continuous annular structure or a segmental annular structure.

18. The inflatable bed according to claim 1, wherein said at least two second I-beam as a whole are of a continuous annular structure or a segmental annular structure.

19. The inflatable bed according to claim 2, wherein said at least one first Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

20. The inflatable bed according to claim 2, wherein said at least one second Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

21. The inflatable bed according to claim 3, wherein said at least one first tubular beam as a whole is of a segmental annular structure.

22. The inflatable bed according to claim 3, wherein said at least one second tubular beam as a whole is of a segmental annular structure.

23. The inflatable bed according to claim 4, wherein said at least one first V-beam as a whole is of a continuous annular structure or a segmental annular structure.

24. The inflatable bed according to claim 4, wherein said at least one second V-beam as a whole is of a continuous annular structure or a segmental annular structure.

25. The inflatable bed according to any one of claims 1 to 4, wherein said first tensioning structure is one or more beams selected from I-beams, coil beams, Y-beams or X-beams.

26. The inflatable bed according to any one of claims 1 to 4, wherein said first tensioning structure, said second tensioning structure and said third tensioning structure are all made of thermoplastic plastic sheet.

27. The inflatable bed according to any one of claims 1 to 4, wherein one or more of said first tensioning structure, said second tensioning structure and said third tensioning structure at least partially comprise mesh, laminated plastic sheet or a threads.

28. The inflatable bed according to claim 27, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite plastic strips, said mesh and said threads are sandwiched between the two opposite plastic strips.

29. The inflatable bed according to claim 27, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with an U-shaped plastic strip, said mesh and said threads are sandwiched between the U-shaped plastic strip.

30. The inflatable bed according to any one of claims 1 to 4, wherein said first tensioning structure is coupled to said top and bottom sheets by means of high-frequency welding; said second tensioning structure is coupled to said top sheet and said side wall by means of high-frequency welding; and said third tensioning structure is coupled to said bottom sheet and said side wall by means of high-frequency welding.

31. The inflatable bed according to any one of claims 1 to 4, wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

32. The inflatable bed according to any one of claims 1 to 4, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

33. The inflatable bed according to any one of claims 1 to 4, wherein said inflatable bed further comprises a built-in air pump, which is disposed on said side wall and is located between a lower edge of said second tensioning structure and an upper edge of said third tensioning structure for inflating said air chamber.

34. The inflatable bed according to any one of claims 1 to 4, wherein said inflatable bed further comprises an air valve, which is disposed on said side wall for the inflation and deflation of said inflatable bed.

AMENDED CLAIMS – 2ND AUXILIARY REQUEST

What is claimed is:

1. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent; and

wherein the second tensioning structure and the third tensioning structure divide the respective side wall into five sections.

2. The inflatable bed according to claim 1, wherein said second tensioning structure and said third tensioning structure are respectively provided with a plurality of air holes, through which an airflow passage is formed in said air chamber.

3. The inflatable bed according to claim 1, wherein said second tensioning structure and said third tensioning structure are disposed at an interval in a perpendicular direction.

4. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams are respectively coupled to said side wall and said top sheet adjacent, the at least two first I-beams are disposed at an interval.

5. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least two second I-beams, an outside edge and an inside edge of each of said second I-beams are respectively coupled to the side wall and said bottom sheet adjacent, the at least two second I-beams are disposed at an interval.

6. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first Y-beam, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.

7. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

8. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said top sheet.

9. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said bottom sheet.

10. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first V-beam, wherein two outside edges of said first V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.

11. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second V-beam, wherein two outside edges of said second V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

12. The inflatable bed according to claim 4, wherein said at least two first I-beams are spaced apart from each other at a lower surface of said top sheet.

13. The inflatable bed according to claim 5, wherein said at least two second I-beams are spaced apart from each other at an upper surface of said bottom sheet.

14. The inflatable bed according to claim 4, wherein said at least two first I-beams are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

15. The inflatable bed according to claim 5, wherein said at least two second I-beams are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

16. The inflatable bed according to claim 6, wherein the two outside edges of said at least one first Y-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

17. The inflatable bed according to claim 7, wherein the two outside edges of said at least one second Y-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

18. The inflatable bed according to claim 8, wherein said at least two outside edges of said at least one first tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

19. The inflatable bed according to claim 9, wherein said at least two outside edges of said at least one second tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

20. The inflatable bed according to claim 10, wherein the two outside edges of said at least one first V-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

21. The inflatable bed according to claim 11, wherein the two outside edges of said at least one second V-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

22. The inflatable bed according to claim 4, wherein said at least two first V-beams as a whole are of a continuous annular structure or a segmental annular structure.

23. The inflatable bed according to claim 5, wherein said at least two second I-beam as a whole are of a continuous annular structure or a segmental annular structure.

24. The inflatable bed according to claim 6, wherein said at least one first Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

25. The inflatable bed according to claim 7, wherein said at least one second Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

26. The inflatable bed according to claim 8, wherein said at least one first tubular beam as a whole is of a segmental annular structure.

27. The inflatable bed according to claim 9, wherein said at least one second tubular beam as a whole is of a segmental annular structure.

28. The inflatable bed according to claim 10, wherein said at least one first V-beam as a whole is of a continuous annular structure or a segmental annular structure.

29. The inflatable bed according to claim 11, wherein said at least one second V-beam as a whole is of a continuous annular structure or a segmental annular structure.

30. The inflatable bed according to claim 1, wherein said first tensioning structure is one or more beams selected from I-beams, coil beams, Y-beams or X-beams.

31. The inflatable bed according to claim 1, wherein said first tensioning structure, said second tensioning structure and said third tensioning structure are all made of thermoplastic plastic sheet.

32. The inflatable bed according to claim 1, wherein one or more of said first tensioning structure, said second tensioning structure and said third tensioning structure at least partially comprise mesh, laminated plastic sheet or a threads.

33. The inflatable bed according to claim 32, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite plastic strips, said mesh and said threads are sandwiched between the two opposite plastic strips.

34. The inflatable bed according to claim 32, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with an U-shaped plastic strip, said mesh and said threads are sandwiched between the U-shaped plastic strip.

35. The inflatable bed according to claim 1, wherein said first tensioning structure is coupled to said top and bottom sheets by means of high-frequency welding; said second tensioning structure is coupled to said top sheet and said side wall by means of high-frequency welding; and said third tensioning structure is coupled to said bottom sheet and said side wall by means of high-frequency welding.

36. The inflatable bed according to claim 1, wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

37. The inflatable bed according to claim 1, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

38. The inflatable bed according to claim 1, wherein said inflatable bed further comprises a built-in air pump, which is disposed on said side wall and is located between a lower edge of said second tensioning structure and an upper edge of said third tensioning structure for inflating said air chamber.

39. The inflatable bed according to claim 1, wherein said inflatable bed further comprises an air valve, which is disposed on said side wall for the inflation and deflation of said inflatable bed.

AMENDED CLAIMS – 3RD AUXILIARY REQUEST

What is claimed is:

1. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent;

wherein said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams are respectively coupled to said side wall and said top sheet adjacent, the at least two first I-beams are disposed at an interval;

wherein said third tensioning structure comprises at least two second I-beams, an outside edge and an inside edge of each of said second I-beams are respectively coupled to the side wall and said bottom sheet adjacent, the at least two second I-beams are disposed at an interval; and

wherein the second tensioning structure and the third tensioning structure divide the respective side wall into five sections.

2. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent;

wherein said second tensioning structure comprises at least one first Y-beam, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet;

wherein said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet; and

wherein the second tensioning structure and the third tensioning structure divide the respective side wall into five sections.

3. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

wherein said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said top sheet;

wherein said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said bottom sheet; and

wherein the second tensioning structure and the third tensioning structure divide the respective side wall into five sections.

4. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent;

wherein said second tensioning structure comprises at least one first V-beam, wherein two outside edges of said first V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet;

wherein said third tensioning structure comprises at least one second V-beam, wherein two outside edges of said second V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet; and

wherein the second tensioning structure and the third tensioning structure divide the respective side wall into five sections.

5. The inflatable bed according to any one of claims 1 to 4, wherein said second tensioning structure and said third tensioning structure are respectively provided with a plurality of air holes, through which an airflow passage is formed in said air chamber.

6. The inflatable bed according to any one of claims 1 to 4, wherein said second tensioning structure and said third tensioning structure are disposed at an interval in a perpendicular direction.

7. The inflatable bed according to claim 1, wherein said at least two first I-beams are spaced apart from each other at a lower surface of said top sheet.

8. The inflatable bed according to claim 1, wherein said at least two second I-beams are spaced apart from each other at an upper surface of said bottom sheet.

9. The inflatable bed according to claim 1, wherein said at least two first I-beams are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

10. The inflatable bed according to claim 1, wherein said at least two second I-beams are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

11. The inflatable bed according to claim 2, wherein the two outside edges of said at least one first Y-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

12. The inflatable bed according to claim 2, wherein the two outside edges of said at least one second Y-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

13. The inflatable bed according to claim 3, wherein said at least two outside edges of said at least one first tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

14. The inflatable bed according to claim 3, wherein said at least two outside edges of said at least one second tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

15. The inflatable bed according to claim 4, wherein the two outside edges of said at least one first V-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

16. The inflatable bed according to claim 4, wherein the two outside edges of said at least one second V-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

17. The inflatable bed according to claim 1, wherein said at least two first V-beams as a whole are of a continuous annular structure or a segmental annular structure.

18. The inflatable bed according to claim 1, wherein said at least two second I-beam as a whole are of a continuous annular structure or a segmental annular structure.

19. The inflatable bed according to claim 2, wherein said at least one first Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

20. The inflatable bed according to claim 2, wherein said at least one second Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

21. The inflatable bed according to claim 3, wherein said at least one first tubular beam as a whole is of a segmental annular structure.

22. The inflatable bed according to claim 3, wherein said at least one second tubular beam as a whole is of a segmental annular structure.

23. The inflatable bed according to claim 4, wherein said at least one first V-beam as a whole is of a continuous annular structure or a segmental annular structure.

24. The inflatable bed according to claim 4, wherein said at least one second V-beam as a whole is of a continuous annular structure or a segmental annular structure.

25. The inflatable bed according to any one of claims 1 to 4, wherein said first tensioning structure is one or more beams selected from I-beams, coil beams, Y-beams or X-beams.

26. The inflatable bed according to any one of claims 1 to 4, wherein said first tensioning structure, said second tensioning structure and said third tensioning structure are all made of thermoplastic plastic sheet.

27. The inflatable bed according to any one of claims 1 to 4, wherein one or more of said first tensioning structure, said second tensioning structure and said third tensioning structure at least partially comprise mesh, laminated plastic sheet or a threads.

28. The inflatable bed according to claim 27, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite plastic strips, said mesh and said threads are sandwiched between the two opposite plastic strips.

29. The inflatable bed according to claim 27, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with an U-shaped plastic strip, said mesh and said threads are sandwiched between the U-shaped plastic strip.

30. The inflatable bed according to any one of claims 1 to 4, wherein said first tensioning structure is coupled to said top and bottom sheets by means of high-frequency welding; said second tensioning structure is coupled to said top sheet and said side wall by means of high-frequency welding; and said third tensioning structure is coupled to said bottom sheet and said side wall by means of high-frequency welding.

31. The inflatable bed according to any one of claims 1 to 4, wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

32. The inflatable bed according to any one of claims 1 to 4, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

33. The inflatable bed according to any one of claims 1 to 4, wherein said inflatable bed further comprises a built-in air pump, which is disposed on said side wall and is located between a lower edge of said second tensioning structure and an upper edge of said third tensioning structure for inflating said air chamber.

34. The inflatable bed according to any one of claims 1 to 4, wherein said inflatable bed further comprises an air valve, which is disposed on said side wall for the inflation and deflation of said inflatable bed.

AMENDED CLAIMS – 1ST AUXILIARY REQUEST (WITH ANNOTATIONS)

What is claimed is:

1. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent; ~~and~~

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent;

wherein said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams are respectively coupled to said side wall and said top sheet adjacent, the at least two first I-beams are disposed at an interval; and

wherein said third tensioning structure comprises at least two second I-beams, an outside edge and an inside edge of each of said second I-beams are respectively coupled to the side wall and said bottom sheet adjacent, the at least two second I-beams are disposed at an interval.

2. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent;

wherein said second tensioning structure comprises at least one first Y-beam, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet; and

wherein said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

3. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are

respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

wherein said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said top sheet; and

wherein said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said bottom sheet.

4. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent;

wherein said second tensioning structure comprises at least one first V-beam, wherein two outside edges of said first V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet; and

wherein said third tensioning structure comprises at least one second V-beam, wherein two outside edges of said second V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

~~2~~5. The inflatable bed according to any one of claims 1 to 4, wherein said second tensioning structure and said third tensioning structure are respectively provided with a plurality of air holes, through which an airflow passage is formed in said air chamber.

~~3~~6. The inflatable bed according to any one of claims 1 to 4, wherein said second tensioning structure and said third tensioning structure are disposed at an interval in a perpendicular direction.

~~4. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams are respectively coupled to said side wall and said top sheet adjacent, the at least two first I-beams are disposed at an interval.~~

~~5. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least two second I-beams, an outside edge and an inside edge of each of said second I-beams are respectively coupled to the side wall and said bottom sheet adjacent, the at least two second I-beams are disposed at an interval.~~

~~6. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first Y-beam, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.~~

~~7. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.~~

~~8. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said top sheet.~~

~~9. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said bottom sheet.~~

~~10. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first V-beam, wherein two outside edges of said first V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.~~

~~11. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second V-beam, wherein two outside edges of said second V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.~~

~~12~~7. The inflatable bed according to claim ~~4~~1, wherein said at least two first I-beams are spaced apart from each other at a lower surface of said top sheet.

~~13~~8. The inflatable bed according to claim ~~5~~1, wherein said at least two second I-beams are spaced apart from each other at an upper surface of said bottom sheet.

~~14~~9. The inflatable bed according to claim 41, wherein said at least two first I-beams are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

~~15~~10. The inflatable bed according to claim ~~5~~1, wherein said at least two second I-beams are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

~~16~~11. The inflatable bed according to claim ~~6~~2, wherein the two outside edges of said at least one first Y-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

~~17~~12. The inflatable bed according to claim ~~7~~2, wherein the two outside edges of said at least one second Y-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

~~18~~13. The inflatable bed according to claim ~~8~~3, wherein said at least two outside edges of said at least one first tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

~~19~~14. The inflatable bed according to claim ~~9~~3, wherein said at least two outside edges of said at least one second tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

~~20~~15. The inflatable bed according to claim ~~10~~4, wherein the two outside edges of said at least one first V-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

~~21~~16. The inflatable bed according to claim ~~11~~4, wherein the two outside edges of said at least one second V-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

~~22~~17. The inflatable bed according to claim 41, wherein said at least two first V-beams as a whole are of a continuous annular structure or a segmental annular structure.

~~23~~18. The inflatable bed according to claim ~~5~~1, wherein said at least two second I-beam as a whole are of a continuous annular structure or a segmental annular structure.

~~24~~19. The inflatable bed according to claim ~~6~~2, wherein said at least one first Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

~~25~~20. The inflatable bed according to claim ~~7~~2, wherein said at least one second Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

~~26~~21. The inflatable bed according to claim ~~8~~3, wherein said at least one first tubular beam as a whole is of a segmental annular structure.

~~27~~22. The inflatable bed according to claim ~~9~~3, wherein said at least one second tubular beam as a whole is of a segmental annular structure.

~~28~~23. The inflatable bed according to claim ~~10~~4, wherein said at least one first V-beam as a whole is of a continuous annular structure or a segmental annular structure.

~~29~~24. The inflatable bed according to claim ~~11~~4, wherein said at least one second V-beam as a whole is of a continuous annular structure or a segmental annular structure.

~~30~~25. The inflatable bed according to any one of claims 1 to 4, wherein said first tensioning structure is one or more beams selected from I-beams, coil beams, Y-beams or X-beams.

~~31~~26. The inflatable bed according to any one of claims 1 to 4, wherein said first tensioning structure, said second tensioning structure and said third tensioning structure are all made of thermoplastic plastic sheet.

~~32~~27. The inflatable bed according to any one of claims 1 to 4, wherein one or more of said first tensioning structure, said second tensioning structure and said third tensioning structure at least partially comprise mesh, laminated plastic sheet or a threads.

~~33~~28. The inflatable bed according to claim ~~32~~27, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite plastic strips, said mesh and said threads are sandwiched between the two opposite plastic strips.

~~34~~29. The inflatable bed according to claim ~~32~~27, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with an U-shaped plastic strip, said mesh and said threads are sandwiched between the U-shaped plastic strip.

~~35~~30. The inflatable bed according to any one of claims 1 to 4, wherein said first tensioning structure is coupled to said top and bottom sheets by means of high-frequency welding; said second tensioning structure is coupled to said top sheet and said side wall by means of high-frequency welding; and said third tensioning structure is coupled to said bottom sheet and said side wall by means of high-frequency welding.

~~36~~31. The inflatable bed according to any one of claims 1 to 4, wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

~~37~~32. The inflatable bed according to any one of claims 1 to 4, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

~~38~~33. The inflatable bed according to any one of claims 1 to 4, wherein said inflatable bed further comprises a built-in air pump, which is disposed on said side wall and is located between a lower edge of said second tensioning structure and an upper edge of said third tensioning structure for inflating said air chamber.

~~39~~34. The inflatable bed according to any one of claims 1 to 4, wherein said inflatable bed further comprises an air valve, which is disposed on said side wall for the inflation and deflation of said inflatable bed.

AMENDED CLAIMS – 2ND AUXILIARY REQUEST (WITH ANNOTATIONS)

What is claimed is:

1. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent; ~~and~~

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent; and

wherein the second tensioning structure and the third tensioning structure divide the respective side wall into five sections.

2. The inflatable bed according to claim 1, wherein said second tensioning structure and said third tensioning structure are respectively provided with a plurality of air holes, through which an airflow passage is formed in said air chamber.

3. The inflatable bed according to claim 1, wherein said second tensioning structure and said third tensioning structure are disposed at an interval in a perpendicular direction.

4. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams are respectively coupled to said side wall and said top sheet adjacent, the at least two first I-beams are disposed at an interval.

5. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least two second I-beams, an outside edge and an inside edge of each of said second I-beams are respectively coupled to the side wall and said bottom sheet adjacent, the at least two second I-beams are disposed at an interval.

6. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first Y-beam, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.

7. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

8. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said top sheet.

9. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said bottom sheet.

10. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first V-beam, wherein two outside edges of said first V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.

11. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second V-beam, wherein two outside edges of said second V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.

12. The inflatable bed according to claim 4, wherein said at least two first I-beams are spaced apart from each other at a lower surface of said top sheet.

13. The inflatable bed according to claim 5, wherein said at least two second I-beams are spaced apart from each other at an upper surface of said bottom sheet.

14. The inflatable bed according to claim 4, wherein said at least two first I-beams are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

15. The inflatable bed according to claim 5, wherein said at least two second I-beams are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

16. The inflatable bed according to claim 6, wherein the two outside edges of said at least one first Y-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

17. The inflatable bed according to claim 7, wherein the two outside edges of said at least one second Y-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

18. The inflatable bed according to claim 8, wherein said at least two outside edges of said at least one first tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

19. The inflatable bed according to claim 9, wherein said at least two outside edges of said at least one second tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

20. The inflatable bed according to claim 10, wherein the two outside edges of said at least one first V-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

21. The inflatable bed according to claim 11, wherein the two outside edges of said at least one second V-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

22. The inflatable bed according to claim 4, wherein said at least two first V-beams as a whole are of a continuous annular structure or a segmental annular structure.

23. The inflatable bed according to claim 5, wherein said at least two second I-beam as a whole are of a continuous annular structure or a segmental annular structure.

24. The inflatable bed according to claim 6, wherein said at least one first Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

25. The inflatable bed according to claim 7, wherein said at least one second Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

26. The inflatable bed according to claim 8, wherein said at least one first tubular beam as a whole is of a segmental annular structure.

27. The inflatable bed according to claim 9, wherein said at least one second tubular beam as a whole is of a segmental annular structure.

28. The inflatable bed according to claim 10, wherein said at least one first V-beam as a whole is of a continuous annular structure or a segmental annular structure.

29. The inflatable bed according to claim 11, wherein said at least one second V-beam as a whole is of a continuous annular structure or a segmental annular structure.

30. The inflatable bed according to claim 1, wherein said first tensioning structure is one or more beams selected from I-beams, coil beams, Y-beams or X-beams.

31. The inflatable bed according to claim 1, wherein said first tensioning structure, said second tensioning structure and said third tensioning structure are all made of thermoplastic plastic sheet.

32. The inflatable bed according to claim 1, wherein one or more of said first tensioning structure, said second tensioning structure and said third tensioning structure at least partially comprise mesh, laminated plastic sheet or a threads.

33. The inflatable bed according to claim 32, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite plastic strips, said mesh and said threads are sandwiched between the two opposite plastic strips.

34. The inflatable bed according to claim 32, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with an U-shaped plastic strip, said mesh and said threads are sandwiched between the U-shaped plastic strip.

35. The inflatable bed according to claim 1, wherein said first tensioning structure is coupled to said top and bottom sheets by means of high-frequency welding; said second tensioning structure is coupled to said top sheet and said side wall by means of high-frequency welding; and said third tensioning structure is coupled to said bottom sheet and said side wall by means of high-frequency welding.

36. The inflatable bed according to claim 1, wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

37. The inflatable bed according to claim 1, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

38. The inflatable bed according to claim 1, wherein said inflatable bed further comprises a built-in air pump, which is disposed on said side wall and is located between a lower edge of said second tensioning structure and an upper edge of said third tensioning structure for inflating said air chamber.

39. The inflatable bed according to claim 1, wherein said inflatable bed further comprises an air valve, which is disposed on said side wall for the inflation and deflation of said inflatable bed.

AMENDED CLAIMS – 3RD AUXILIARY REQUEST (WITH ANNOTATIONS)

What is claimed is:

1. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent; ~~and~~

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent;

wherein said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams are respectively coupled to said side wall and said top sheet adjacent, the at least two first I-beams are disposed at an interval;

wherein said third tensioning structure comprises at least two second I-beams, an outside edge and an inside edge of each of said second I-beams are respectively coupled to the side wall and said bottom sheet adjacent, the at least two second I-beams are disposed at an interval; and

wherein the second tensioning structure and the third tensioning structure divide the respective side wall into five sections.

2. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent;

wherein said second tensioning structure comprises at least one first Y-beam, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet;

wherein said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet; and

wherein the second tensioning structure and the third tensioning structure divide the respective side wall into five sections.

3. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

wherein said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said top sheet;

wherein said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said bottom sheet; and

wherein the second tensioning structure and the third tensioning structure divide the respective side wall into five sections.

4. An inflatable bed (10), comprising:

a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;

at least one side wall (13),

an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet, an air chamber formed between said top sheet, said bottom sheet and said side wall;

at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and

at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls, at least two outside edges (152, 162) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (153, 163) of said support structure being coupled to the top sheet or bottom sheet adjacent, wherein said support structure comprises a second tensioning structure and a third tensioning structure, at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent;

at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent;

wherein said second tensioning structure comprises at least one first V-beam, wherein two outside edges of said first V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet;

wherein said third tensioning structure comprises at least one second V-beam, wherein two outside edges of said second V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet; and

wherein the second tensioning structure and the third tensioning structure divide the respective side wall into five sections.

~~2~~5. The inflatable bed according to any one of claims 1 to 4, wherein said second tensioning structure and said third tensioning structure are respectively provided with a plurality of air holes, through which an airflow passage is formed in said air chamber.

~~3~~6. The inflatable bed according to any one of claims 1 to 4, wherein said second tensioning structure and said third tensioning structure are disposed at an interval in a perpendicular direction.

~~4. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least two first I-beams, an outside edge and an inside edge of each of said first I-beams are respectively coupled to said side wall and said top sheet adjacent, the at least two first I-beams are disposed at an interval.~~

~~5. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least two second I-beams, an outside edge and an inside edge of each of said second I-beams are respectively coupled to the side wall and said bottom sheet adjacent, the at least two second I-beams are disposed at an interval.~~

~~6. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first Y-beam, wherein two outside edges of said first Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.~~

~~7. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second Y-beam, wherein two outside edges of said second Y-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.~~

~~8. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said top sheet.~~

~~9. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second tubular beam, which has at least two outside edges respectively coupled to the side wall adjacent, at least one inside edge is coupled to said bottom sheet.~~

~~10. The inflatable bed according to claim 1, wherein said second tensioning structure comprises at least one first V-beam, wherein two outside edges of said first V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said top sheet.~~

~~11. The inflatable bed according to claim 1, wherein said third tensioning structure comprises at least one second V-beam, wherein two outside edges of said second V-beam are respectively coupled to the side wall adjacent, an inside edge is coupled to said bottom sheet.~~

~~12~~7. The inflatable bed according to claim 41, wherein said at least two first I-beams are spaced apart from each other at a lower surface of said top sheet.

~~13~~8. The inflatable bed according to claim ~~5~~1, wherein said at least two second I-beams are spaced apart from each other at an upper surface of said bottom sheet.

~~14~~9. The inflatable bed according to claim 41, wherein said at least two first I-beams are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

~~15~~10. The inflatable bed according to claim ~~5~~1, wherein said at least two second I-beams are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

~~16~~11. The inflatable bed according to claim ~~6~~2, wherein the two outside edges of said at least one first Y-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

~~17~~12. The inflatable bed according to claim ~~7~~2, wherein the two outside edges of said at least one second Y-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

~~18~~13. The inflatable bed according to claim ~~8~~3, wherein said at least two outside edges of said at least one first tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

~~19~~14. The inflatable bed according to claim ~~9~~3, wherein said at least two outside edges of said at least one second tubular beam, which are coupled to the side wall adjacent, are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

~~20~~15. The inflatable bed according to claim ~~10~~4, wherein the two outside edges of said at least one first V-beam are disposed at an interval on an inner surface of said side wall in a perpendicular direction.

~~21~~16. The inflatable bed according to claim ~~11~~4, wherein the two outside edges of said at least one second V-beam are disposed at an interval on the inner surface of said side wall in a perpendicular direction.

~~22~~17. The inflatable bed according to claim 41, wherein said at least two first V-beams as a whole are of a continuous annular structure or a segmental annular structure.

~~23~~18. The inflatable bed according to claim ~~5~~1, wherein said at least two second I-beam as a whole are of a continuous annular structure or a segmental annular structure.

~~24~~19. The inflatable bed according to claim ~~6~~2, wherein said at least one first Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

~~25~~20. The inflatable bed according to claim ~~7~~2, wherein said at least one second Y-beam as a whole is of a continuous annular structure or a segmental annular structure.

~~26~~21. The inflatable bed according to claim ~~8~~3, wherein said at least one first tubular beam as a whole is of a segmental annular structure.

~~27~~22. The inflatable bed according to claim ~~9~~3, wherein said at least one second tubular beam as a whole is of a segmental annular structure.

~~28~~23. The inflatable bed according to claim ~~10~~4, wherein said at least one first V-beam as a whole is of a continuous annular structure or a segmental annular structure.

~~29~~24. The inflatable bed according to claim ~~11~~4, wherein said at least one second V-beam as a whole is of a continuous annular structure or a segmental annular structure.

~~30~~25. The inflatable bed according to any one of claims 1 to 4, wherein said first tensioning structure is one or more beams selected from I-beams, coil beams, Y-beams or X-beams.

~~31~~26. The inflatable bed according to any one of claims 1 to 4, wherein said first tensioning structure, said second tensioning structure and said third tensioning structure are all made of thermoplastic plastic sheet.

~~32~~27. The inflatable bed according to any one of claims 1 to 4, wherein one or more of said first tensioning structure, said second tensioning structure and said third tensioning structure at least partially comprise mesh, laminated plastic sheet or a threads.

~~33~~28. The inflatable bed according to claim ~~32~~27, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with two opposite plastic strips, said mesh and said threads are sandwiched between the two opposite plastic strips.

~~34~~29. The inflatable bed according to claim ~~32~~27, wherein two side surfaces of said mesh or said threads are at least partially coupled integrally with an U-shaped plastic strip, said mesh and said threads are sandwiched between the U-shaped plastic strip.

~~35~~30. The inflatable bed according to any one of claims 1 to 4, wherein said first tensioning structure is coupled to said top and bottom sheets by means of high-frequency welding; said second tensioning structure is coupled to said top sheet and said side wall by

means of high-frequency welding; and said third tensioning structure is coupled to said bottom sheet and said side wall by means of high-frequency welding.

~~36~~31. The inflatable bed according to any one of claims 1 to 4, wherein the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure is lower than the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

~~37~~32. The inflatable bed according to any one of claims 1 to 4, wherein the location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than the location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

~~38~~33. The inflatable bed according to any one of claims 1 to 4, wherein said inflatable bed further comprises a built-in air pump, which is disposed on said side wall and is located between a lower edge of said second tensioning structure and an upper edge of said third tensioning structure for inflating said air chamber.

~~39~~34. The inflatable bed according to any one of claims 1 to 4, wherein said inflatable bed further comprises an air valve, which is disposed on said side wall for the inflation and deflation of said inflatable bed.

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Formalities officer
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Date
26.10.2020

Reference	OPPO 01	Application No./Patent No.
MP19609.EP01/JV		16191360.3 - 1011 / 3192401
Applicant/Proprietor		
Bestway Inflatables & Material Corp.		

BRIEF COMMUNICATION

Oral Proceedings on 14.01.21

Subject:
- ☐ Letter from the proprietor of the patent of
- ☐ Letter from the opponent of

Communication:
- ☐ The summons to attend oral proceedings / taking of evidence on 14.01.21 has been cancelled.
- ☐ The procedure will be continued in writing.
- ☐ The date fixed for oral proceedings is maintained.
- ☐ A new date will be set later.
- ☒ In preparation of the oral proceedings we would ask for your reply to the three questions stated in the annex by 13.11.2020.

Please take note.

For the Opposition Division

Europäisches Patentamt • European Patent Office • Office européen des brevets

Registered letter
EPO Form 2310A 12.07 (21/10/20)

INTEX EX. 1038, Pg. 713
CP02294
Intex Recreation v. Bestway Inflatables

Important information concerning oral proceedings
This annex provisionally replaces former EPO Form 2043 (Rule 4 EPC)

Très important – procédure orale
Cette annexe remplace provisoirement l'ancien formulaire 2043 de l'OEB (règle 4 CBE)

Wichtige Hinweise zur mündlichen Verhandlung
Diese Anlage ersetzt vorübergehend EPA Form 2043 (Regel 4 EPÜ)

(1) In opposition, oral proceedings may be held by videoconference if all parties to be summoned and the opposition division give their consent. We would, therefore, ask you whether you would agree to the oral proceedings being held as a videoconference.

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(3) In order to properly organise the upcoming oral proceedings, we would ask that you supply us with information regarding your need for simultaneous interpretation (Rule 4 EPC). Please let us know which language(s) you intend to use during the proceedings (speaking) and for which language you would require simultaneous interpretation (listening).

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Date
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Reference	Application No./Patent No.
27S8343,12EP42	16191360.3 - 1011 / 3192401

Applicant/Proprietor
Bestway Inflatables & Material Corp.

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For the Opposition Division

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Registered letter
EPO Form 2310A 12.07 (21/10/20)

INTEX EX. 1038, Pg. 716
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---

(1) Lors d'une opposition, la procédure orale pourra être tenue par visioconférence, si toutes les parties y étant conviées et la division d'opposition sont d'accord. Veuillez-donc nous indiquer si vous acceptez que la procédure orale soit tenue par visio-conférence.

(2) Du fait de la tenue de la procédure orale dans les locaux de l'OEB et en raison des mesures barrières de distanciation physique, un nombre limité de places sera disponible dans les salles de procédure orale. La réservation de la salle de procédure sera faite en prévoyant la présence de deux participants par partie. Dans le cas où cette prévision s'avérerait insuffisante, et que vous devriez assister à la procédure avec plus d'une personne vous accompagnant, veuillez-en informer l'OEB.

(3) Pour nous permettre de réserver la salle adaptée à la procédure prévue, nous vous demandons de bien vouloir nous préciser les informations concernant vos besoins en matière de traduction simultanée (règle 4 CBE). Veuillez nous indiquer quelle(s) langue(s) vous avez l'intention d'utiliser pendant la procédure (parlée(s)) et pour quelle langue vous requérez une traduction simultanée (écoute).

---

(1) Im Einspruchsverfahren können mündliche Verhandlungen als Videokonferenz durchgeführt werden, wenn alle zu ladenden Parteien und die Einspruchsabteilung damit einverstanden sind. Wir möchten deshalb bei Ihnen anfragen, ob Sie einer Durchführung besagter mündlicher Verhandlung als Videokonferenz zustimmen.

(2) Bei im Europäischen Patentamt durchgeführten mündlichen Verhandlungen und infolge der Regeln zur räumlichen Distanzierung steht in den Sitzungssälen nur eine eingeschränkte Zahl von Sitzplätzen zur Verfügung. Aufgrund unserer Erfahrung gehen wir davon aus, dass Sie mit maximal zwei Personen an der Verhandlung teilnehmen werden. Entsprechend wird die Raumreservierung vorgenommen, sollten Sie uns nicht mitteilen, dass Sie beabsichtigen, mit weiteren Personen an der mündlichen Verhandlung teilzunehmen.

(3) Um die Räume für die anstehenden mündlichen Verhandlungen sachgerecht einzuplanen, möchten wir Sie um Information über Ihren Bedarf an Simultanübersetzung bitten (Regel 4 EPÜ). Bitte teilen Sie uns mit, welche Sprache(n) Sie in der mündlichen Verhandlung verwenden (Sprechen) und aus welcher Sprache Sie eine Simultanübersetzung benötigen (Hören).

FOREIGN DEPARTMENT
V.le Lancetti, 17 - 20158 Milano (Italy)
Tel. +39 02693031 - Fax +39 0269303555
fordep@bugnion.eu (Trademarks)
fordep-patent@bugnion.eu (Patents)

EUROPEAN PATENT OFFICE
Bayerstr. 34
80335 MUNICH
GERMANY

Our Ref. 27.D8235A.12.EP.42 **Milan**, November 12, 2020

RE: European Patent Application No. **16191360.3**
in the name of **BESTWAY INFLATABLES & MATERIAL CORP.**

Dear Sirs,

The present letter is to kindly request the EPO to record in the Register of the European Patents the change of Representative

from:

BELLONI Giancarlo
c/o BUGNION S.P.A.
Viale Lancetti, 17
20158 MILANO (MI)
ITALY

to

INCHINGALO Simona
c/o BUGNION S.P.A.
Viale Lancetti, 17
20158 MILANO (MI)
ITALY

with reference to the above mentioned patent application.

****

In response to the brief communication dated October 26, 2020 we confirm that Ms. Simona INCHINGALO will attend the oral hearing by videoconference.

Mr. Dario Aldè, who works for Bugnion SpA and is European Patent Attorney, will attend the oral hearing too. Mr Simone Zesi, who works for Bestway Europe, could be attend to the oral hearing too as technical expert.

INTEX EX. 1038, Pg. 719
Intex Recreation v. Bestway Inflatables

We confirm that we intend to use the language of the proceedings (English) during the oral proceedings and request simultaneous interpretation into English if a language other than English is employed.

Yours sincerely,

Simona Inchingalo
Representative for the Applicant

Europäisches Patentamt
European Patent Office
Office européen des brevets

Letter accompanying subsequently filed items

Representative:

Giancarlo BELLONI
BUGNION S.P.A.
Via Vincenzo Lancetti, 17
20158 MILANO
Italy

Phone: +39-02693031
Fax: +39-0269303501
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80298 Munich
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Tel. +49(0)89 2399-0 | Fax -4465

P.O. Box 5818
NL-2280 HV Rijswijk
Netherlands
Tel. +31(0)70 340-2040 | Fax -3016

10958 Berlin
Germany
Tel. +49(0)30 25901-0 | Fax -840

The document(s) listed below is (are) subsequently filed documents pertaining to the following application:

Application number and/or EP publication number	EP16191360.3
Reference	23B6256,12EP42
Procedural phase	All procedures
Name of represented party	Bestway Inflatables & Material Corp.

	Description of document	Original file name	Assigned file name
1	Letter dealing with oral proceedings	27.D8235A.12.EP.42-letter.pdf	ORAL.pdf

Signature 1

Place:

Date: **12 November 2020**

Signed by: **/Simona INCHINGALO/**

Capacity: **(Representative)**

Smart card certificate 1

Common name: **Elio Tansini 2393**

EPO ID: **2393**

Issued by: **European Patent Office CA G2**

INTEX EX. 1038, Pg. 721
Intex Recreation v. Bestway Inflatables

Europäisches Patentamt
European Patent Office
Office européen des brevets

Acknowledgement of receipt

We hereby acknowledge receipt of the following subsequently filed document(s):

Submission number	9206365	
Application number	EP16191360.3	
Date of receipt	12 November 2020	
Filing Office	European Patent Office, The Hague	
Procedural phase	All procedures	
Your reference	23B6256,12EP42	
Documents submitted	package-data.xml ep-cms-sfd-request.pdf (1 p.)	ep-cms-sfd-request.xml ORAL.pdf\27.D8235A.12.EP.42-letter.pdf (2 p.)
Submitted by	CN=secure.epoline.org	
Method of submission	Online	
Date and time receipt generated	12 November 2020, 16:44 (CET)	
Message Digest	FB:79:C5:07:B8:5D:9B:E4:AD:4E:7D:C3:1E:91:03:E2:E3:1D:39:55	

/European Patent Office/

REDDIE & GROSE

12 November 2020

European Patent Office
D-80298 Munich
Germany

BY E-FILING ONLY

Dear Sirs

European Patent No. 3192401 (the "Patent")
Opposition against EP 3192401 of Bestway Inflatables & Materials Corp (the "Patentee")
On behalf of Intex Recreation Corp. (the "Opponent")
Our ref: M/P19609.EP01/JMV/JP

We write with reference to the following communications: (i) the 'Summons to attend oral proceedings' communication dated 28 May 2020 and (ii) the brief communication dated 26 October 2020 concerning the Oral Proceedings currently scheduled on 14 January 2021 at the EPO's Rijswijk premises in the Netherlands.

With reference to communication (i), the Opponent respectfully maintains the grounds of opposition and supporting arguments set out in the Notice of Opposition filed on 17 June 2019. We intend to expand on such arguments at the Oral Proceedings. In accordance with the submissions put forward in the Notice of Opposition, the Opponent maintains the request that the Patent be revoked in its entirety.

With reference to communication (ii), we hereby provide the following answers to the annexed questions:

1) the Opponent does not agree to Oral Proceedings being held as a videoconference;

2) in the case of Oral Proceedings being held at the premises of the EPO, it is currently intended for two persons to attend on behalf of the Opponent; and

3) the Opponent intends to use English (speaking) during the Oral Proceedings and will need simultaneous interpretation into English (listening) if a language other than English is used by another party at the Oral Proceedings.

Yours faithfully

[Electronically signed]

PARSI MENDIOLA, Joshua
PROFESSIONAL REPRESENTATIVE
General email: epo@reddie.co.uk
Direct email for urgent communications: joshua.parsi@reddie.co.uk

Europäisches Patentamt
European Patent Office
Office européen des brevets

Submission in opposition proceedings
made following summons to attend oral proceedings

Representative:

Mr. Joshua PARSI MENDIOLA
Reddie & Grose LLP
10 Whitechapel High Street
London Greater London E1 8QS
United Kingdom

Phone: 442072420901
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P.O. Box 5818
NL-2280 HV Rijswijk
Netherlands
Tel. +31(0)70 340-2040 | Fax -3016

10958 Berlin
Germany
Tel. +49(0)30 25901-0 | Fax -840

- representing the opponent(s):	Intex Recreation Corp.
Opponent/representative's reference	M/P19609.EP01

The information given below is pertaining to the following patent in opposition proceedings:

Patent No.	EP3192401
Application No.	EP16191360.3
Date of mention of the grant in the European Patent Bulletin (Art. 97(3), Art. 99(1) EPC)	19 September 2018
Title of the invention	INFLATABLE BED
Proprietor of the patent	Bestway Inflatables & Material Corp.

Requests:

- Interpreting is requested in the following languages:
  - listening in: **English**
  - speaking in: **English**

Documents attached:

	Description of document	Original file name	Assigned file name
1	Any annexes (other than citation) to an opposition letter - Reply to Summons - 13 11 20	MP19609.EP01 - Reply to Summons - 13.11.2020.pdf	OTHER-1.pdf

Payment

1	Method of payment	Not specified

		Currency:	EUR

Signatures

Place:	**LONDON, UK**
Date:	**13 November 2020**
Signed by:	**Joshua Parsi Mendiola 65949**
Representative name:	**Joshua PARSI MENDIOLA**
Capacity:	**(Representative)**

Europäisches Patentamt
European Patent Office
Office européen des brevets

Acknowledgement of receipt

We hereby acknowledge receipt of the following submission by the opponent:

Submission number	9209307	
Application number	EP16191360.3	
Patent number	EP3192401	
Date of receipt	13 November 2020	
Your reference	M/P19609.EP01	
Opponent	Intex Recreation Corp.	
Title	INFLATABLE BED	
Documents submitted	package-data.xml ep-oppo.pdf (2 p.)	ep-opposition-data.xml OTHER-1.pdf\MP19609.EP01 - Reply to Summons - 13.11.2020.pdf (1 p.)
Submitted by	CN=Joshua Parsi Mendiola 65949	
Method of submission	Online	
Date and time receipt generated	13 November 2020, 13:49 (CET)	
Message Digest	05:B6:C5:81:93:CB:D1:C4:4E:44:76:37:C9:02:E2:77:2A:F4:A0:A9	

/European Patent Office/

INTEX EX. 1038, Pg. 726
Intex Recreation v. Bestway Inflatables

Europäisches Patentamt
European Patent Office
Office européen des brevets

European Patent Office
80298 MUNICH
GERMANY

Questions about this communication ?
Contact Customer Services at www.epo.org/contact

Inchingalo, Simona
Bugnion S.p.A.
Viale Lancetti, 17
20158 Milano
ITALIE

Date
18.11.20

Reference	Application No./Patent No.
27D8343A,12EP42	16191360.3 - 1011 / 3192401

Applicant/Proprietor
Bestway Inflatables & Material Corp.

Communication of amended entries concerning the representative (R. 143(1)(h) EPC)

As requested, for the above-mentioned European patent application / European patent the entries concerning the representative have been amended as follows:

Inchingalo, Simona
Bugnion S.p.A.
Viale Lancetti, 17
20158 Milano
IT

The amendment will be recorded in the Register of European Patents.

Important note for EPO deposit account holders

If you would like to have fee refunds credited to a deposit account held with the EPO, you should ensure that you provide clear and up-to-date refund instructions to this effect, using one of the permitted electronic means of filing (see Arrangements for deposit accounts).

For the Opposition Division

Europäisches Patentamt • European Patent Office • Office européen des brevets •

INTEX EX. 1038, Pg. 727
YG03567
Intex Recreation v. Bestway Inflatables

Europäisches Patentamt
European Patent Office
Office européen des brevets

European Patent Office
80298 MUNICH
GERMANY

Questions about this communication ?
Contact Customer Services at www.epo.org/contact

Formalities officer
Gouby, Yannik

Vleck, Jan Montagu
Reddie & Grose LLP
The White Chapel Building
10 Whitechapel High Street
London E1 8QS
ROYAUME UNI

Date 18.11.2020

Reference	OPPO 01	Application No./Patent No.
MP19609.EP01/JV		16191360.3 - 1011 / 3192401
Applicant/Proprietor		
Bestway Inflatables & Material Corp.		

BRIEF COMMUNICATION

Subject:
- ☐ Your letter of
- ☐ Our telephone conversation of
- ☐ Communication of
- ☐

Enclosure(s):
- ☒ Letter from the proprietor of the patent of 12.11.2020
- ☐ Letter from the opponent of
- ☒ Copy (copies) F2548 Dated 18.11.2020

Communication:

☐ A letter from the opponent /proprietor was received on ..... . The documents specified as patent documents and as non-patent literature in this letter are available for inspection via the European Patent Register at www.epo.org/register. **www.epo.org/register.** Should you wish to receive these documents in paper format, they will be supplied to you free of charge if specifically requested on receipt of this communication (OJ EPO 2020, A106).

☐

For the Opposition Division

Europäisches Patentamt • European Patent Office • Office européen des brevets

☐ **Registered letter**

INTEX EX. 1038, Pg. 728
YG03567
Intex Recreation v. Bestway Inflatables

Europäisches Patentamt
European Patent Office
Office européen des brevets

European Patent Office
80298 MUNICH
GERMANY

Questions about this communication ?
Contact Customer Services at www.epo.org/contact

Inchingalo, Simona
Bugnion S.p.A.
Viale Lancetti, 17
20158 Milano
ITALIE

Date
18.11.20

Reference	Application No./Patent No.
27D8343A,12EP42	16191360.3 - 1011 / 3192401

Applicant/Proprietor
Bestway Inflatables & Material Corp.

Communication of amended entries concerning the representative (R. 143(1)(h) EPC)

As requested, for the above-mentioned European patent application / European patent the entries concerning the representative have been amended as follows:

Inchingalo, Simona
Bugnion S.p.A.
Viale Lancetti, 17
20158 Milano
IT

The amendment will be recorded in the Register of European Patents.

Important note for EPO deposit account holders

If you would like to have fee refunds credited to a deposit account held with the EPO, you should ensure that you provide clear and up-to-date refund instructions to this effect, using one of the permitted electronic means of filing (see Arrangements for deposit accounts).

For the Opposition Division

Europäisches Patentamt • European Patent Office • Office européen des brevets •

INTEX EX. 1038, Pg. 729
YG03567
Intex Recreation v. Bestway Inflatables

FOREIGN DEPARTMENT
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fordep@bugnion.eu (Trademarks)
fordep-patent@bugnion.eu (Patents)

EUROPEAN PATENT OFFICE
Bayerstr. 34
80335 MUNICH
GERMANY

Our Ref. 27.D8235A.12.EP.42 **Milan**, November 12, 2020

RE: European Patent Application No. **16191360.3**
in the name of **BESTWAY INFLATABLES & MATERIAL CORP.**

Dear Sirs,

The present letter is to kindly request the EPO to record in the Register of the European Patents the change of Representative

from:

BELLONI Giancarlo
c/o BUGNION S.P.A.
Viale Lancetti, 17
20158 MILANO (MI)
ITALY

to

INCHINGALO Simona
c/o BUGNION S.P.A.
Viale Lancetti, 17
20158 MILANO (MI)
ITALY

with reference to the above mentioned patent application.

****

In response to the brief communication dated October 26, 2020 we confirm that Ms. Simona INCHINGALO will attend the oral hearing by videoconference.

Mr. Dario Aldè, who works for Bugnion SpA and is European Patent Attorney, will attend the oral hearing too. Mr Simone Zesi, who works for Bestway Europe, could be attend to the oral hearing too as technical expert.

INTEX EX. 1038, Pg. 730
Intex Recreation v. Bestway Inflatables

We confirm that we intend to use the language of the proceedings (English) during the oral proceedings and request simultaneous interpretation into English if a language other than English is employed.

Yours sincerely,

Simona Inchingalo
Representative for the Applicant

Europäisches Patentamt
European Patent Office
Office européen des brevets

European Patent Office
80298 MUNICH
GERMANY

Questions about this communication ?
Contact Customer Services at www.epo.org/contact

Formalities officer
Gouby, Yannik

Inchingalo, Simona
Bugnion S.p.A.
Viale Lancetti, 17
20158 Milano
ITALIE

Date: 18.11.2020

Reference	Application No./Patent No.
27D8343A,12EP42	16191360.3 - 1011 / 3192401

Applicant/Proprietor
Bestway Inflatables & Material Corp.

BRIEF COMMUNICATION

Subject:
- ☐ Your letter of
- ☐ Our telephone conversation of
- ☐ Communication of
- ☐

Enclosure(s):
- ☐ Letter from the proprietor of the patent of
- ☒ Letter from the opponent O1 of 13.11.2020
- ☐ Copy (copies)

Communication:

☐ A letter from the opponent /proprietor was received on ..... . The documents specified as patent documents and as non-patent literature in this letter are available for inspection via the European Patent Register at www.epo.org/register. **www.epo.org/register.** Should you wish to receive these documents in paper format, they will be supplied to you free of charge if specifically requested on receipt of this communication (OJ EPO 2020, A106).

☐

For the Opposition Division

Europäisches Patentamt • European Patent Office • Office européen des brevets

☐ **Registered letter**

INTEX EX. 1038, Pg. 732
YG03567
Intex Recreation v. Bestway Inflatables

REDDIE & GROSE

12 November 2020

European Patent Office
D-80298 Munich
Germany

BY E-FILING ONLY

Dear Sirs

European Patent No. 3192401 (the "Patent")
Opposition against EP 3192401 of Bestway Inflatables & Materials Corp (the "Patentee")
On behalf of Intex Recreation Corp. (the "Opponent")
Our ref: M/P19609.EP01/JMV/JP

We write with reference to the following communications: (i) the 'Summons to attend oral proceedings' communication dated 28 May 2020 and (ii) the brief communication dated 26 October 2020 concerning the Oral Proceedings currently scheduled on 14 January 2021 at the EPO's Rijswijk premises in the Netherlands.

With reference to communication (i), the Opponent respectfully maintains the grounds of opposition and supporting arguments set out in the Notice of Opposition filed on 17 June 2019. We intend to expand on such arguments at the Oral Proceedings. In accordance with the submissions put forward in the Notice of Opposition, the Opponent maintains the request that the Patent be revoked in its entirety.

With reference to communication (ii), we hereby provide the following answers to the annexed questions:

1) the Opponent does not agree to Oral Proceedings being held as a videoconference;

2) in the case of Oral Proceedings being held at the premises of the EPO, it is currently intended for two persons to attend on behalf of the Opponent; and

3) the Opponent intends to use English (speaking) during the Oral Proceedings and will need simultaneous interpretation into English (listening) if a language other than English is used by another party at the Oral Proceedings.

Yours faithfully

[Electronically signed]

PARSI MENDIOLA, Joshua
PROFESSIONAL REPRESENTATIVE
General email: epo@reddie.co.uk
Direct email for urgent communications: joshua.parsi@reddie.co.uk

Europäisches Patentamt
European Patent Office
Office européen des brevets

European Patent Office
80298 MUNICH
GERMANY

Questions about this communication ?
Contact Customer Services at www.epo.org/contact

Formalities officer
Gouby, Yannik

Vleck, Jan Montagu
Reddie & Grose LLP
The White Chapel Building
10 Whitechapel High Street
London E1 8QS
ROYAUME UNI

Date 01.12.2020

Reference	OPPO 01	Application No./Patent No.
MP19609.EP01/JV		16191360.3 - 1011 / 3192401
Applicant/Proprietor		
Bestway Inflatables & Material Corp.		

BRIEF COMMUNICATION

Oral Proceedings on 14.01.21

Subject:
- ☐ Letter from the proprietor of the patent of
- ☐ Letter from the opponent of

Communication:
- ☐ The summons to attend oral proceedings / taking of evidence on 14.01.21 has been cancelled.
- ☐ The procedure will be continued in writing.
- ☐ The date fixed for oral proceedings is maintained.
- ☐ A new date will be set later.
- ☒

The oral proceedings will be held as a videoconference. Please find attached important information concerning the connection details to be used. Please provide us with the requested information by 14.12.2020.

Please take note.

For the Opposition Division

Europäisches Patentamt • European Patent Office • Office européen des brevets

Registered letter
EPO Form 2310A 12.07 (26/11/20)

INTEX EX. 1038, Pg. 734
YG03567
Intex Recreation v. Bestway Inflatables

In accordance with the Decision of the President of the EPO of 10 November 2020, the oral proceedings in opposition in the above-mentioned case will be held by videoconference. The date and time of the oral proceedings remain unchanged.

The videoconference platform for the oral proceedings is Zoom.

Technical details
The EPO supports the following technologies for connecting to oral proceedings in opposition via Zoom:

- Zoom desktop client installation on Windows (version 5.2.1, i.e. 44052.0816 or higher), Mac OS (version 4.5.3261.0825 or higher)
- Zoom mobile app for iOS (version 4.5.0 [3261.0825] or higher) or Android (version 4.5.3261.0825 or higher)
- Zoom web client (Chromium Edge 80 or higher; Google Chrome 53.0.2785 or higher; Firefox 76 or higher; Internet Explorer 10 or higher; Safari 10.0.602.1.50 or higher) for oral proceedings **without** simultaneous interpretation.

Please note that

- **the Zoom web client cannot be used for oral proceedings involving simultaneous interpretation**
- the Zoom web client allows you to join a Zoom meeting or webinar without downloading any plugins or software. However, the web client has limited features (e.g. you will only be able to see the active speaker; see https://support.zoom.us/ for further information)
- you should inform the opposition division in advance if you intend to use the Zoom web client.

Bandwidth
You should have at least 2 Mbps of free up- and download bandwidth.

Camera
We recommend that you use a good quality webcam (HD 720p or above), preferably a PTZ (pan-tilt-zoom) model.

Audio
Please use a high-quality audio device, e.g. a USB microphone (clip-on or standalone) and speakers or a USB headset with integrated microphone, with a frequency response of at least 125 Hz to 15 000 Hz and an echo-cancelling function.

Test call
Users are strongly advised to perform a test call before the date of the oral proceedings and to do this in good time, i.e. at least ten working days beforehand (ideally two-to-three weeks in advance). Owing to the possibility of software updates, it is not recommended to perform the test call any more than a month in advance.

To arrange a test call, contact the EPO ServiceLine (telephone +31 70 340 4444 or email to serviceline@epo.org). They will schedule a 30-minute test session (offered on Mondays to Fridays, between 11.00 and 16.00 hrs CET) and send you an invitation with the connection details for the call.

The purpose of the test is to check that

- the connection is stable and that both audio and video are of adequate quality
- the presentation of content is possible in both directions
- if applicable, access to multiple voice channels is available for simultaneous interpretation.

Please supply the EPO with the following information as soon as possible:

- name and telephone number of the contact person, and
- email address to which the EPO should send the connection details.

This data will not be made available publicly.

Identity check
For identification at the oral proceedings, you can file a copy of your ID (national identification document, passport or EPO badge) using one of the EPO's online filing options up to two days before the oral proceedings.

Otherwise, on the day of the oral proceedings, you can show your ID to the camera either in the public meeting room or to a member of the division in a separate (non-public) meeting room.

Alternatively, you can send a copy of your ID to the opposition division at the email address provided to the parties at the beginning of the oral proceedings.

The first name plus last name and photo should be clearly visible. Other information on the ID can be hidden if desired, as long as it is possible to see that it is official ID. For data protection reasons, copies of ID sent by email are deleted and not included in the file, while copies submitted by online filing are put in the non-public part of the file.

For more information on data protection, please refer to these guidelines.

IMPORTANT
Please inform the EPO without delay if you have not received the videoconference connection details at least ten days before the scheduled date of the oral proceedings.

Europäisches Patentamt
European Patent Office
Office européen des brevets

European Patent Office
80298 MUNICH
GERMANY

Questions about this communication ?
Contact Customer Services at www.epo.org/contact

Inchingalo, Simona
Bugnion S.p.A.
Viale Lancetti, 17
20158 Milano
ITALIE

Formalities officer
Gouby, Yannik

Date
01.12.2020

Reference	Application No./Patent No.
27D8343A,12EP42	16191360.3 - 1011 / 3192401

Applicant/Proprietor
Bestway Inflatables & Material Corp.

BRIEF COMMUNICATION

Oral Proceedings on 14.01.21

Subject:
- ☐ Letter from the proprietor of the patent of
- ☐ Letter from the opponent of

Communication:
- ☐ The summons to attend oral proceedings / taking of evidence on 14.01.21 has been cancelled.
- ☐ The procedure will be continued in writing.
- ☐ The date fixed for oral proceedings is maintained.
- ☐ A new date will be set later.
- ☑

The oral proceedings will be held as a videoconference. Please find attached important information concerning the connection details to be used. Please provide us with the requested information by 14.12.2020.

Please take note.

For the Opposition Division

Europäisches Patentamt • European Patent Office • Office européen des brevets

Registered letter
EPO Form 2310A 12.07 (26/11/20)

INTEX EX. 1038, Pg. 737
YG03567
Intex Recreation v. Bestway Inflatables

In accordance with the Decision of the President of the EPO of 10 November 2020, the oral proceedings in opposition in the above-mentioned case will be held by videoconference. The date and time of the oral proceedings remain unchanged.

The videoconference platform for the oral proceedings is Zoom.

Technical details
The EPO supports the following technologies for connecting to oral proceedings in opposition via Zoom:

- Zoom desktop client installation on Windows (version 5.2.1, i.e. 44052.0816 or higher), Mac OS (version 4.5.3261.0825 or higher)
- Zoom mobile app for iOS (version 4.5.0 [3261.0825] or higher) or Android (version 4.5.3261.0825 or higher)
- Zoom web client (Chromium Edge 80 or higher; Google Chrome 53.0.2785 or higher; Firefox 76 or higher; Internet Explorer 10 or higher; Safari 10.0.602.1.50 or higher) for oral proceedings **without** simultaneous interpretation.

Please note that

- **the Zoom web client cannot be used for oral proceedings involving simultaneous interpretation**
- the Zoom web client allows you to join a Zoom meeting or webinar without downloading any plugins or software. However, the web client has limited features (e.g. you will only be able to see the active speaker; see https://support.zoom.us/ for further information)
- you should inform the opposition division in advance if you intend to use the Zoom web client.

Bandwidth
You should have at least 2 Mbps of free up- and download bandwidth.

Camera
We recommend that you use a good quality webcam (HD 720p or above), preferably a PTZ (pan-tilt-zoom) model.

Audio
Please use a high-quality audio device, e.g. a USB microphone (clip-on or standalone) and speakers or a USB headset with integrated microphone, with a frequency response of at least 125 Hz to 15 000 Hz and an echo-cancelling function.

Test call
Users are strongly advised to perform a test call before the date of the oral proceedings and to do this in good time, i.e. at least ten working days beforehand (ideally two-to-three weeks in advance). Owing to the possibility of software updates, it is not recommended to perform the test call any more than a month in advance.

To arrange a test call, contact the EPO ServiceLine (telephone +31 70 340 4444 or email to serviceline@epo.org). They will schedule a 30-minute test session (offered on Mondays to Fridays, between 11.00 and 16.00 hrs CET) and send you an invitation with the connection details for the call.

The purpose of the test is to check that

- the connection is stable and that both audio and video are of adequate quality
- the presentation of content is possible in both directions
- if applicable, access to multiple voice channels is available for simultaneous interpretation.

Please supply the EPO with the following information as soon as possible:

- name and telephone number of the contact person, and
- email address to which the EPO should send the connection details.

This data will not be made available publicly.

Identity check
For identification at the oral proceedings, you can file a copy of your ID (national identification document, passport or EPO badge) using one of the EPO's online filing options up to two days before the oral proceedings.

Otherwise, on the day of the oral proceedings, you can show your ID to the camera either in the public meeting room or to a member of the division in a separate (non-public) meeting room.

Alternatively, you can send a copy of your ID to the opposition division at the email address provided to the parties at the beginning of the oral proceedings.

The first name plus last name and photo should be clearly visible. Other information on the ID can be hidden if desired, as long as it is possible to see that it is official ID. For data protection reasons, copies of ID sent by email are deleted and not included in the file, while copies submitted by online filing are put in the non-public part of the file.

For more information on data protection, please refer to these guidelines.

IMPORTANT
Please inform the EPO without delay if you have not received the videoconference connection details at least ten days before the scheduled date of the oral proceedings.

8 December 2020

European Patent Office
D-80298 Munich
Germany

BY E-FILING ONLY

URGENT

Dear Sirs

European Patent No. 3192401 (the "Patent")
Opposition against EP 3192401 of Bestway Inflatables & Materials Corp (the "Patentee")
On behalf of Intex Recreation Corp. (the "Opponent")
Our ref: M/P19609.EP01/JMV/JP

We write with reference to the brief communication dated 1 December 2020 concerning the oral proceedings scheduled on 14 January 2021, which states that oral proceedings will be held as a videoconference (ViCo).

Such a communication follows our letter dated 13 November 2020, which was filed in response to the brief communication dated 26 October 2020 requesting the Opponent's reply to three questions listed in an annexed document. Such questions were asked in accordance with the Decision of the President of the EPO of 14 April 2020 (OJ EPO 2020, A41), to which the Opponent explicitly stated that it did not agree to oral proceedings being held as a videoconference.

An annex to the brief communication dated 1 December 2020 refers to the Decision of the President of the EPO of 10 November (OJ EPO 2020, A121). This recent communication appears to be reliant on Article 2(1) of the Decision of the President of the EPO of 10 November, which states that *"oral proceedings before opposition divisions are held by videoconference"*.

However, Article 10 of the Decision of the President of the EPO of 10 November expressly states that *"this decision enters into force on **4 January 2021**"*. Thus, until 3 January 2021, the principles set out in the previous Decision – the Decision of the President of the EPO of 14 April 2020 – should still stand, namely those set out in Article 2(1) of such a Decision, which expressly recites that *"oral proceedings before opposition divisions may be held by videoconference at the discretion of the opposition division and **with the agreement of all parties**"*. Article 9 of the Decision of the President of the EPO of 10 November also confirms this: *"When this decision enters into force, the decision of the President of the European Patent Office dated 14 April 2020 concerning the pilot project for oral proceedings by videoconference before opposition divisions (OJ EPO 2020, A41) will cease to have effect"*.

Despite the Opponent's lack of agreement to oral proceedings being held as a videoconference, the brief communication dated 1 December 2020 stating that oral proceedings will be held as a ViCo has nevertheless been issued. The Opponent submits that such a further communication does not comply with Article 2(1) of the Decision of the President of the EPO of 14 April 2020, which has been in force since 4 May 2020 (see Article 10) and, in accordance with the Article 10 of the Decision of the President

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of the EPO of 10 November, should be in force until 3 January 2021. We also refer to Article 9 of the Decision of the President of the EPO of 10 November.

In addition, at oral proceedings, the Opponent intends to rely on the demonstration of an object made in accordance with the prior art in order to assist with carefully conveying the observations raised in the Notice of Opposition. Such a demonstration would be very difficult to reproduce in a videoconference environment, where the Patentee and the Opposition Division would not be able to physically inspect the object in person.

Accordingly, the Opponent requests that (i) the oral proceedings scheduled as a ViCo on 14 January 2021 be cancelled and that (ii) a new date for in-person oral proceedings be scheduled, when it is appropriate to do so under the current global circumstances.

The above requests should not be construed as the Opponent's withdrawal of its original request for oral proceedings in accordance with Article 116 EPC. For the avoidance of doubt, the Opponent's original request for oral proceedings (see request 1.2. on page 1 of the Notice of Opposition) is maintained.

In view of the upcoming holidays, we look forward to hearing from the EPO on an urgent basis in the form of a communication confirming the cancellation of the 14 January oral proceedings scheduled to be held as a videoconference.

Further, we kindly request that the current details of the Opponent's representative be amended to the following:

Parsi Mendiola, Joshua
Reddie & Grose LLP
The White Chapel Building
10 Whitechapel High Street
London E1 8QS / GB

Yours faithfully

[Electronically signed]

PARSI MENDIOLA, Joshua
PROFESSIONAL REPRESENTATIVE
General email: epo@reddie.co.uk
Direct email for urgent communications: joshua.parsi@reddie.co.uk

Europäisches Patentamt
European Patent Office
Office européen des brevets

Submission in opposition proceedings
made following summons to attend oral proceedings

Representative:

Mr. Joshua PARSI MENDIOLA
Reddie & Grose LLP
10 Whitechapel High Street
London Greater London E1 8QS
United Kingdom

Phone: 442072420901
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Netherlands
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10958 Berlin
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Tel. +49(0)30 25901-0 | Fax -840

- representing the opponent(s):	Intex Recreation Corp.
Opponent/representative's reference	M/P19609.EP01

The information given below is pertaining to the following patent in opposition proceedings:

Patent No.	EP3192401
Application No.	EP16191360.3
Date of mention of the grant in the European Patent Bulletin (Art. 97(3), Art. 99(1) EPC)	19 September 2018
Title of the invention	INFLATABLE BED
Proprietor of the patent	Bestway Inflatables & Material Corp.

Requests:

- Oral proceedings are hereby requested.
- The Opponent requests that (i) the oral proceedings scheduled as a ViCo on 14 January 2021 be cancelled and that (ii) a new date for in-person oral proceedings be scheduled.

Documents attached:

	Description of document	Original file name	Assigned file name
1	Any annexes (other than citation) to an opposition letter - Letter regarding Oral Proceedings	MP19609.EP01 - EPO - 08.12.20.pdf	OTHER-1.pdf

Payment

1	Method of payment	Not specified
	Currency:	EUR

Signatures

Place:	**LONDON, UK**
Date:	**08 December 2020**
Signed by:	**Joshua Parsi Mendiola 65949**
Representative name:	**Joshua PARSI MENDIOLA**
Capacity:	**(Representative)**

Europäisches Patentamt
European Patent Office
Office européen des brevets

Acknowledgement of receipt

We hereby acknowledge receipt of the following submission by the opponent:

Submission number	9290123
Application number	EP16191360.3
Patent number	EP3192401
Date of receipt	08 December 2020
Your reference	M/P19609.EP01
Opponent	Intex Recreation Corp.
Title	INFLATABLE BED
Documents submitted	package-data.xml ep-oppo.pdf (2 p.) ep-opposition-data.xml OTHER-1.pdf\MP19609.EP01 - EPO - 08.12.20.pdf (2 p.)
Submitted by	CN=Joshua Parsi Mendiola 65949
Method of submission	Online
Date and time receipt generated	08 December 2020, 17:14 (CET)
Message Digest	45:9E:9F:27:AE:A6:B4:FC:C5:42:3E:97:E8:35:85:29:14:B5:F9:62

/European Patent Office/

INTEX EX. 1038, Pg. 744
Intex Recreation v. Bestway Inflatables

Europäisches Patentamt
European Patent Office
Office européen des brevets

Letter accompanying subsequently filed items

Representative:

Simona INCHINGALO
BUGNION S.P.A.
Viale Lancetti, 17
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Tel. +31(0)70 340-2040 | Fax -3016

10958 Berlin
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Tel. +49(0)30 25901-0 | Fax -840

The document(s) listed below is (are) subsequently filed documents pertaining to the following application:

Application number and/or EP publication number	EP16191360.3
Reference	23B6256,12EP42
Procedural phase	All procedures
Name of represented party	Bestway Inflatables & Material Corp.

	Description of document	Original file name	Assigned file name
1	Letter dealing with oral proceedings	23.B6256.12.EP.42@2020-12-14_Uff _Com_A_(Information for EPO).pdf	ORAL.pdf

Signature 1

Place:

Date: **14 December 2020**

Signed by: **/Simona INCHINGALO/**

Capacity: **Representative 1**

Smart card certificate 1

Common name: **Elio Tansini 2393**

EPO ID: **2393**

Issued by: **European Patent Office CA G2**

INTEX EX. 1038, Pg. 745
Intex Recreation v. Bestway Inflatables

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European Patent Office
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European Patent Office
80298 MUNICH
GERMANY

Questions about this communication ?
Contact Customer Services at www.epo.org/contact

Formalities officer
Van der Meer, Sandra

Parsi Mendiola, Joshua
Reddie & Grose LLP
The White Chapel Building
10 Whitechapel High Street
London E1 8QS
ROYAUME UNI

Date
14.12.2020

Reference		Application No./Patent No.
MP19609.EP01/JV	OPPO 01	16191360.3 - 1011 / 3192401
Applicant/Proprietor		
Bestway Inflatables & Material Corp.		

Communication of amended entries in the Register of European Patents

It is confirmed that, according to the request dated 08.12.2020

1. ☐ the name
   ☐ the address
   ☐ of the (co-)applicant / patentee,
   ☐ of the opponent

   as from , has/have been amended as follows:

2. ☒ the appointment of a representative
   ☐ the authorisation
   ☐ the withdrawal from representation
   ☐

   has/have been registered as from 08.12.2020

Enclosure(s):

For the Opposition Division / For the Legal Division *)

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*) See note.

INTEX EX. 1038, Pg. 746
SV01794
Intex Recreation v. Bestway Inflatables

Note
This communication is issued by/for the department with whom responsibility lies. The Legal Division is responsible for the registration of transfers, changes of name (Articles 71, 72 and 74 EPC and Rules 22 and 85 EPC) as well as for the rectification of the designation of the inventor (Rule 21 EPC) (see Decision of the President of the EPO, OJ EPO 2013, 600). In all other cases, the Opposition Division is responsible.

INTEX EX. 1038, Pg. 747
Intex Recreation v. Bestway Inflatables

Europäisches Patentamt
European Patent Office
Office européen des brevets

Acknowledgement of receipt

We hereby acknowledge receipt of the following subsequently filed document(s):

Submission number	9306809	
Application number	EP16191360.3	
Date of receipt	14 December 2020	
Filing Office	European Patent Office, The Hague	
Procedural phase	All procedures	
Your reference	23B6256,12EP42	
Documents submitted	package-data.xml ep-cms-sfd-request.pdf (1 p.)	ep-cms-sfd-request.xml ORAL.pdf\23.B6256.12.EP.42@2020-12-14_Uff_Com_A_(Information for EPO).pdf (2 p.)
Submitted by	CN=secure.epoline.org	
Method of submission	Online	
Date and time receipt generated	14 December 2020, 09:46 (CET)	
Message Digest	A8:67:BD:5B:E9:8A:CC:DD:9D:29:98:A8:E2:BC:4A:26:24:40:02:EC	

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European Patent Office
80298 MUNICH
GERMANY

Questions about this communication ?
Contact Customer Services at www.epo.org/contact

Inchingalo, Simona
Bugnion S.p.A.
Viale Lancetti, 17
20158 Milano
ITALIE

Formalities officer
Gouby, Yannik

Date
15.12.2020

Reference	Application No./Patent No.
27D8343A,12EP42	16191360.3 - 1011 / 3192401
Applicant/Proprietor	
Bestway Inflatables & Material Corp.	

BRIEF COMMUNICATION

Subject:
- ☐ Your letter of
- ☐ Our telephone conversation of
- ☐ Communication of
- ☐

Enclosure(s):
- ☐ Letter from the proprietor of the patent of
- ☒ Letter from the opponent O1 of 08.12.2020.
- ☒ Copy (copies) F2575 dated 14.12.2020.

Communication:

☐ A letter from the opponent /proprietor was received on ..... . The documents specified as patent documents and as non-patent literature in this letter are available for inspection via the European Patent Register at www.epo.org/register. **www.epo.org/register.** Should you wish to receive these documents in paper format, they will be supplied to you free of charge if specifically requested on receipt of this communication (OJ EPO 2020, A106).

☐

For the Opposition Division

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☐ **Registered letter**

INTEX EX. 1038, Pg. 749
YG03567
Intex Recreation v. Bestway Inflatables

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European Patent Office
80298 MUNICH
GERMANY

Questions about this communication ?
Contact Customer Services at www.epo.org/contact

Formalities officer
Van der Meer, Sandra

Parsi Mendiola, Joshua
Reddie & Grose LLP
The White Chapel Building
10 Whitechapel High Street
London E1 8QS
ROYAUME UNI

Date
14.12.2020

Reference		Application No./Patent No.
MP19609.EP01/JV	OPPO 01	16191360.3 - 1011 / 3192401
Applicant/Proprietor		
Bestway Inflatables & Material Corp.		

Communication of amended entries in the Register of European Patents

It is confirmed that, according to the request dated 08.12.2020

1. ☐ the name
   ☐ the address
   ☐ of the (co-)applicant / patentee,
   ☐ of the opponent

   as from , has/have been amended as follows:

2. ☒ the appointment of a representative
   ☐ the authorisation
   ☐ the withdrawal from representation
   ☐

   has/have been registered as from 08.12.2020

Enclosure(s):

For the Opposition Division / For the Legal Division *)

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*) See note.

INTEX EX. 1038, Pg. 750
SV01794
Intex Recreation v. Bestway Inflatables

Note
This communication is issued by/for the department with whom responsibility lies. The Legal Division is responsible for the registration of transfers, changes of name (Articles 71, 72 and 74 EPC and Rules 22 and 85 EPC) as well as for the rectification of the designation of the inventor (Rule 21 EPC) (see Decision of the President of the EPO, OJ EPO 2013, 600). In all other cases, the Opposition Division is responsible.

INTEX EX. 1038, Pg. 751
Intex Recreation v. Bestway Inflatables

8 December 2020

European Patent Office
D-80298 Munich
Germany

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URGENT

Dear Sirs

European Patent No. 3192401 (the "Patent")
Opposition against EP 3192401 of Bestway Inflatables & Materials Corp (the "Patentee")
On behalf of Intex Recreation Corp. (the "Opponent")
Our ref: M/P19609.EP01/JMV/JP

We write with reference to the brief communication dated 1 December 2020 concerning the oral proceedings scheduled on 14 January 2021, which states that oral proceedings will be held as a videoconference (ViCo).

Such a communication follows our letter dated 13 November 2020, which was filed in response to the brief communication dated 26 October 2020 requesting the Opponent's reply to three questions listed in an annexed document. Such questions were asked in accordance with the Decision of the President of the EPO of 14 April 2020 (OJ EPO 2020, A41), to which the Opponent explicitly stated that it did not agree to oral proceedings being held as a videoconference.

An annex to the brief communication dated 1 December 2020 refers to the Decision of the President of the EPO of 10 November (OJ EPO 2020, A121). This recent communication appears to be reliant on Article 2(1) of the Decision of the President of the EPO of 10 November, which states that *"oral proceedings before opposition divisions are held by videoconference"*.

However, Article 10 of the Decision of the President of the EPO of 10 November expressly states that *"this decision enters into force on **4 January 2021**"*. Thus, until 3 January 2021, the principles set out in the previous Decision – the Decision of the President of the EPO of 14 April 2020 – should still stand, namely those set out in Article 2(1) of such a Decision, which expressly recites that *"oral proceedings before opposition divisions may be held by videoconference at the discretion of the opposition division and **with the agreement of all parties**"*. Article 9 of the Decision of the President of the EPO of 10 November also confirms this: *"When this decision enters into force, the decision of the President of the European Patent Office dated 14 April 2020 concerning the pilot project for oral proceedings by videoconference before opposition divisions (OJ EPO 2020, A41) will cease to have effect"*.

Despite the Opponent's lack of agreement to oral proceedings being held as a videoconference, the brief communication dated 1 December 2020 stating that oral proceedings will be held as a ViCo has nevertheless been issued. The Opponent submits that such a further communication does not comply with Article 2(1) of the Decision of the President of the EPO of 14 April 2020, which has been in force since 4 May 2020 (see Article 10) and, in accordance with the Article 10 of the Decision of the President

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VAT: GB 243 9087 49

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of the EPO of 10 November, should be in force until 3 January 2021. We also refer to Article 9 of the Decision of the President of the EPO of 10 November.

In addition, at oral proceedings, the Opponent intends to rely on the demonstration of an object made in accordance with the prior art in order to assist with carefully conveying the observations raised in the Notice of Opposition. Such a demonstration would be very difficult to reproduce in a videoconference environment, where the Patentee and the Opposition Division would not be able to physically inspect the object in person.

Accordingly, the Opponent requests that (i) the oral proceedings scheduled as a ViCo on 14 January 2021 be cancelled and that (ii) a new date for in-person oral proceedings be scheduled, when it is appropriate to do so under the current global circumstances.

The above requests should not be construed as the Opponent's withdrawal of its original request for oral proceedings in accordance with Article 116 EPC. For the avoidance of doubt, the Opponent's original request for oral proceedings (see request 1.2. on page 1 of the Notice of Opposition) is maintained.

In view of the upcoming holidays, we look forward to hearing from the EPO on an urgent basis in the form of a communication confirming the cancellation of the 14 January oral proceedings scheduled to be held as a videoconference.

Further, we kindly request that the current details of the Opponent's representative be amended to the following:

Parsi Mendiola, Joshua
Reddie & Grose LLP
The White Chapel Building
10 Whitechapel High Street
London E1 8QS / GB

Yours faithfully

[Electronically signed]

PARSI MENDIOLA, Joshua
PROFESSIONAL REPRESENTATIVE
General email: epo@reddie.co.uk
Direct email for urgent communications: joshua.parsi@reddie.co.uk

In response to the letter of the Opponent received on 8.12.2020, the opposition-division informs the Opponent that the Oral Proceedings scheduled 14.01.2021 will take place as planned in the form of a VICO.

The Opponent has argued that the decision of the President of 10.11.2020 only enters into force on 04.01.2021 therefore decision of 14.04.2020 would still apply and agreement of all parties is still needed.

The opposition-division cannot follow this reasoning, since the VICO takes place 14.01.2021, therefore decision of president OP as VICO entering into force 04.01.2021 is applicable.

In his letter dated 8.12.2020, the Opponent has further referred to a demonstration of an object made in accordance with the prior art. This demonstration was argued to be difficult in a videoconference environment.

The opposition-division will treat this late-filed request during the Oral Proceedings of 14.1.2021 - including the admissibility of this request. If this request is considered admissible and a demonstration turns out to be inappropriate for a videoconference environment, the opposition-division will adjourn the Oral Proceedings.

Europäisches Patentamt
European Patent Office
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European Patent Office
80298 MUNICH
GERMANY

Questions about this communication ?
Contact Customer Services at www.epo.org/contact

Formalities officer
Gouby, Yannik

Parsi Mendiola, Joshua
Reddie & Grose LLP
The White Chapel Building
10 Whitechapel High Street
London E1 8QS
ROYAUME UNI

Date: 22.12.2020

Reference	OPPO 01	Application No./Patent No.
MP19609.EP01/JV		16191360.3 - 1011 / 3192401
Applicant/Proprietor		
Bestway Inflatables & Material Corp.		

BRIEF COMMUNICATION

Subject:
- ☐ Your letter of
- ☐ Our telephone conversation of
- ☐ Communication of
- ☐

Enclosure(s):
- ☐ Letter from the proprietor of the patent of
- ☐ Letter from the opponent of
- ☒ Copy (copies) F2906O.

Communication:

☐ A letter from the opponent /proprietor was received on ..... . The documents specified as patent documents and as non-patent literature in this letter are available for inspection via the European Patent Register at www.epo.org/register. **www.epo.org/register.** Should you wish to receive these documents in paper format, they will be supplied to you free of charge if specifically requested on receipt of this communication (OJ EPO 2020, A106).

☐

For the Opposition Division

Europäisches Patentamt • European Patent Office • Office européen des brevets

☐ **Registered letter**

INTEX EX. 1038, Pg. 755
YG03567
Intex Recreation v. Bestway Inflatables

In response to the letter of the Opponent received on 8.12.2020, the opposition-division informs the Opponent that the Oral Proceedings scheduled 14.01.2021 will take place as planned in the form of a VICO.

The Opponent has argued that the decision of the President of 10.11.2020 only enters into force on 04.01.2021 therefore decision of 14.04.2020 would still apply and agreement of all parties is still needed.

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European Patent Office
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European Patent Office
80298 MUNICH
GERMANY

Questions about this communication ?
Contact Customer Services at www.epo.org/contact

Formalities officer
Gouby, Yannik

Inchingalo, Simona
Bugnion S.p.A.
Viale Lancetti, 17
20158 Milano
ITALIE

Date: 22.12.2020

Reference	Application No./Patent No.
27D8343A,12EP42	16191360.3 - 1011 / 3192401

Applicant/Proprietor
Bestway Inflatables & Material Corp.

BRIEF COMMUNICATION

Subject:
- ☐ Your letter of
- ☐ Our telephone conversation of
- ☐ Communication of
- ☐

Enclosure(s):
- ☐ Letter from the proprietor of the patent of
- ☐ Letter from the opponent of
- ☒ Copy (copies) F2906O.

Communication:

☐ A letter from the opponent /proprietor was received on ..... . The documents specified as patent documents and as non-patent literature in this letter are available for inspection via the European Patent Register at www.epo.org/register. **www.epo.org/register.** Should you wish to receive these documents in paper format, they will be supplied to you free of charge if specifically requested on receipt of this communication (OJ EPO 2020, A106).

☐

For the Opposition Division

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☐ **Registered letter**

INTEX EX. 1038, Pg. 757
YG03567
Intex Recreation v. Bestway Inflatables

In response to the letter of the Opponent received on 8.12.2020, the opposition-division informs the Opponent that the Oral Proceedings scheduled 14.01.2021 will take place as planned in the form of a VICO.

The Opponent has argued that the decision of the President of 10.11.2020 only enters into force on 04.01.2021 therefore decision of 14.04.2020 would still apply and agreement of all parties is still needed.

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The opposition-division will treat this late-filed request during the Oral Proceedings of 14.1.2021 - including the admissibility of this request. If this request is considered admissible and a demonstration turns out to be inappropriate for a videoconference environment, the opposition-division will adjourn the Oral Proceedings.

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DESCRIPTION FR2914545A3

10 INFLATABLE BED

[0001]

14 INFLATABLE BED This patent application claims priority from Chinese Patent Application No. 200720139672.6, filed on April 4, 2007. The present invention relates to an inflatable bed, more particularly an inflatable bed having a multi-layered appearance. Figure 1 illustrates a conventional inflatable bed which comprises an inflatable bed body 1 which has an upper layer 11, a lower layer 12, a border layer 13 interconnecting the peripheries of the upper and lower layers 11, 12 and acting in conjunction with the upper and lower layers 11, 12 to define an inflatable space 10., and two intermediate layers 14 arranged at a distance in the inflatable space 10 in the inflatable bed body 1 and parallel to the upper and lower layers 11, 12 of the inflatable bed body inflatable bed 1. The peripheries of the intermediate layers 14 are firmly attached to the border layer 13 by heat sealing, thus forming two looped weld lines 131 on the border layer 13 of the inflatable bed body 1.

25 Therefore, the inflatable bed body 1 has a three-layered appearance. Any two adjacent layers among the upper layer 11, the intermediate layers 14 and the lower layer 12 are connected to each other by a plurality of vertical belts 2. In such a configuration, the two intermediate layers 14 are used to achieve the three-layer appearance of the inflatable bed body 1. On the other hand, each of the vertical belts 2 must be welded between the two corresponding adjacent layers among the upper layer 11, the intermediate layers 14 and the lower layer 12, which complicates the manufacturing procedure. Therefore, the object of the present invention is to provide an inflatable bed which has a multi-layered appearance and which can be easily manufactured at a relatively low cost. According to the present invention, an inflatable bed comprises: an inflatable bed body having an upper layer, a lower layer, and a border layer interconnecting the peripheries of the upper and lower layers and acting in conjunction with the upper and lower layers to define an inflatable space; and a reinforcement belt unit disposed in the inflatable space in the inflatable bed body and interconnecting the edge layer of the

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inflatable bed body and at least one of the upper and lower layers of the inflatable bed body.

39 Further features and advantages of the present invention will become apparent from the following detailed description of preferred embodiments with reference to the accompanying drawings, among which: Figure 1 is a partially cutaway perspective view of a bed conventional inflatable; Fig. 2 is a partially cutaway perspective view showing the first preferred embodiment of an inflatable bed according to the present invention; Fig. 3 is a schematic fragmentary sectional view showing the second preferred embodiment of an inflatable bed according to the present invention; Fig. 4 is a schematic fragmentary sectional view showing the third preferred embodiment of an inflatable bed according to the present invention; and Fig. 5 is a schematic fragmentary sectional view showing the fourth preferred embodiment of an inflatable bed according to the present invention. Before turning to the detailed description of the present invention, it is important to note that like elements are designated by like reference numerals throughout the description.

51 Referring to Figure 2, the first preferred embodiment of an inflatable bed according to the present invention is shown with an inflatable bed body 3, a first unit forming a reinforcement belt 4, and a second belt unit forming a reinforcement belt. reinforcement 5. The inflatable bed body 3 has an upper layer 33, a lower layer 34, and a border layer 35 interconnecting the peripheries of the upper and lower layers 33, 34 and acting in conjunction with the upper and lower layers 33, 34 to define an inflatable space 30. The first reinforcement belt unit 4 is disposed in said inflatable space 30 in the inflatable bed body 3. In this embodiment, the first unit forming a reinforcement belt 4 comprises two beveled buckled belts 40, each of which has inner and outer peripheries 41, 42. The outer peripheries 42 of the beveled buckle belts 40 are securely attached to the edging layer 35 of the inflatable bed body 3 by heat sealing, and are spaced apart from each other, thus forming two looped weld lines 351 on the bottom. border layer 35 of the inflatable bed body 3.

63 The internal peripheries 41 of the beveled buckled belts 40 are firmly fixed and respectively to the upper and lower layers 33, 34 of the inflatable bed body 3 by heat sealing. Each of the beveled buckle belts 40 is provided with a plurality of passage holes 400. The second reinforcing belt unit 5 is disposed in the inflatable space in the inflatable bed body 3, and interconnects the upper and lower layers 33, 34 of the inflatable bed body 3. In this embodiment, the second reinforcement belt unit comprises a plurality of parallel vertical belts 50. Each of the vertical belts has upper and lower sides which are securely attached to the upper and lower layers 33, 34 of the inflatable bed body 3 by heat sealing, respectively, and is provided with a plurality of passage holes 500. Additionally, the inflatable bed further includes an additional layer 36 securely attached over the top layer 33 of the inflatable bed body 3 for comfort.

74 However, since the additional layer 36 is not necessary and since the characteristic of the present invention does not reside in the additional layer 36, said layer is not described in detail in this document for the sake of brevity. Since the two weld lines 351 are formed on the border layer 35 of the inflatable bed body 3, the inflatable bed body 3 has a three-layered appearance. Figure 3 illustrates the second preferred embodiment of an inflatable bed body according to the present invention, which is a modification of the first preferred embodiment. Unlike the previous

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embodiment, the first reinforcing belt unit 4a has a single beveled buckle belt 40a which has inner and outer peripheries 41a, 42a firmly attached and respectively to the top layer 33 and to the border layer. 35 of the inflatable bed body 3 by heat sealing, thus forming a looped weld line 35a on the border layer 35 of the inflatable bed body 3.

84 Therefore, the inflatable bed body 3 has a two-layered appearance. Figure 4 illustrates the third preferred embodiment of an inflatable bed according to the present invention, which is a modification of the first preferred embodiment. In this embodiment, the first reinforcing belt unit 4b has two beveled buckled belts 40b, each of which has inner and outer peripheries 41b, 42b. The internal peripheries 41b of the bevelled buckled belts 40b are firmly fixed and respectively to the upper and lower layers 33, 34 of the inflatable bed body 3 by heat sealing. The outer peripheries 42b of the beveled buckle belts 40b are integrally connected to each other, and are securely attached to the edging layer 35 of the inflatable bed body 3 by heat sealing, thereby forming a loop weld line. 351b on the border layer 35 of the inflatable bed body 3.

93 The inflatable bed further comprises two auxiliary buckle belts 6 disposed horizontally in the inflatable space 30 in the inflatable bed body 3. Each of the auxiliary buckle belts 6 is provided with a plurality of through holes 60, and has inner and outer peripheries 61, 62 which are securely and respectively attached to a corresponding one of the beveled buckle belts 40b of the first unit forming a reinforcement belt 4b and the edging layer 35 of the inflatable bed body 3 by heat sealing, thus forming two second looped welds 352 on the edging layer 35 of the inflatable bed body 3. Since the first weld line 351b and the two second weld lines 352 are formed on the edge layer 35 of the inflatable bed body 3, the inflatable bed body 3 has a four-layered appearance. Figure 5 illustrates the fourth preferred embodiment of an inflatable bed according to the present invention, which is a modification of the third preferred embodiment.

103 In this embodiment, the outer peripheries 42c of the beveled buckle belts 40c are spaced apart from each other, thus forming two first weld lines 351c on the edge layer 35 of the inflatable bed body 3. Therefore, since the first two weld lines 351c and the two second weld lines 352 are formed on the edge layer 35 of the inflatable bed body 3, the inflatable bed body 3 has a five-layered appearance. In summary, due to the presence of the first reinforcing belt forming unit 4, 4a, 4b, 4c and the auxiliary buckled belts 6, the inflatable bed of the present invention can be manufactured having a multi-layered appearance at a relatively low cost. low in comparison with the prior art. Further, the first reinforcing belt unit 4, 4a, 4b, 4c, the second reinforcing belt unit 5 and the auxiliary buckled belts 6 are easily assembled to the inflatable bed body 3.

113 The inflatable bed of the present invention can therefore be easily manufactured.

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CLAIMS FR2914545A3

1.

13 Inflatable bed characterized by: an inflatable bed body (3) having an upper layer (33), a lower layer (34), and a border layer (35) interconnecting the peripheries of said upper and lower layers (33, 34) and acting in conjunction with said upper and lower layers (33, 34) to define an inflatable space (30); and a first unit forming a reinforcing belt (4, 4a, 4b, 4c) disposed in said inflatable space (30) in said inflatable bed body (3) and interconnecting said edge layer (35) of said bed body inflatable (3) and at least one of said upper and lower layers (33, 34) of said inflatable bed body (3).

2.

23 An inflatable bed according to claim 1, further characterized by a second reinforcing belt unit (5) disposed in said inflatable space (30) in said inflatable bed body (3) and interconnecting said upper and lower layers (33). , 34) of said inflatable bed body (3).

3.

29 An inflatable bed according to claim 2, further characterized in that said second reinforcing belt unit (5) comprises a plurality of parallel vertical belts (50), each of which has upper and lower sides securely attached to and respectively said upper layers. and lower (33, 34) of said inflatable bed body (3).

4.

36 An inflatable bed according to claim 3, further characterized in that each of said vertical belts (50) of said second reinforcing belt unit (5) is provided with a plurality of passage holes (500).

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5.

41 Inflatable bed according to claim 1, characterized in that said first reinforcing belt unit (4a) comprises a single beveled buckle belt (40a) which has an inner periphery (41a) securely attached to said top layer (33) of said body inflatable bed (3), and an outer periphery (42a) securely attached to said edge layer (35) of said inflatable bed body (3).

6.

48 An inflatable bed according to claim 5, further characterized in that said beveled buckle belt (40a) of said first reinforcing belt unit (4a) is provided with a plurality of through holes (400a).

7.

53 An inflatable bed according to claim 1, wherein said first reinforcing belt unit (4, 4a; 4c) comprises two beveled buckled belts (40, 40b, 40c), each of which has inner and outer peripheries (41, 41b, 41c; 42, 42b, 42c), said outer peripheries (42, 42b, 42c) of said beveled buckle belts (40, 40b, 40c) being securely attached to said edge layer (35) of said inflatable bed body (3), said inner peripheries (41, 41b, 41c) of said beveled buckle belts (40, 40b, 40c) being securely and respectively attached to said upper and lower layers (33, 34) of said inflatable bed body (3).

8.

63 An inflatable bed according to claim 7, further characterized in that each of said beveled buckled belts (40, 40b, 40c) of said first reinforcing belt unit (4, 4b, 4c) is provided with a plurality of passage (400, 400b, 400c).

9.

69 An inflatable bed according to claim 7, further characterized in that said outer peripheries (42b) of said beveled buckle belts (40b) of said first reinforcement belt unit (4b) are integrally connected one to the other. other.

10.

75 An inflatable bed according to claim 7, further characterized by two auxiliary buckle belts (6) disposed horizontally in said inflatable space (30) in said inflatable bed body (3), each of said auxiliary buckle belts (6) having inner peripheries and outer (61, 62) which are securely and respectively attached to a corresponding one of said beveled buckle belts (40b, 40c) of said first reinforcing belt unit (4b, 4c) and said border layer (35) of said body inflatable bed (3).

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11.

83 An inflatable bed according to claim 10, further characterized in that each of said auxiliary buckle belts (6) is provided with a plurality of passage holes (60).

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(22) Filed: **Jul. 4, 2012**

Related U.S. Application Data

(60) Provisional application No. 61/570,255, filed on Dec. 13, 2011.

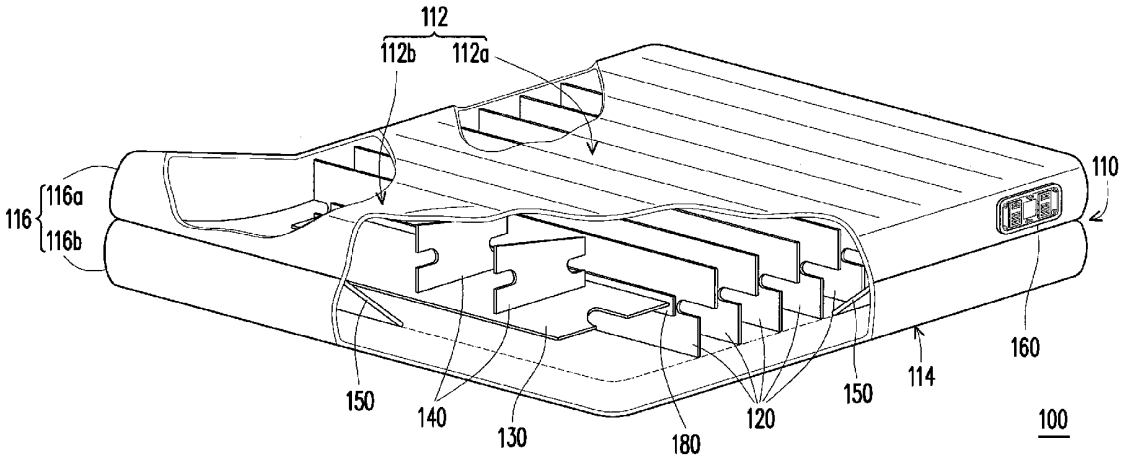
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A47C 27/08 (2006.01)

(52) **U.S. Cl.**
USPC **5/711**

(57) **ABSTRACT**

An air mattress including an inflatable compartment, strips, a connecting sheet and pillow strips is provided. The inflatable compartment includes a top wall, a bottom wall and a side wall surrounding peripheries of the top wall and the bottom wall. The strips are air-pervious and disposed in the inflatable compartment, wherein the strips are connected between the bottom wall and the top wall and located in a lying portion of the top wall. The connecting sheet is air-pervious and disposed in the inflatable compartment and facing a pillow portion of the top wall, wherein the connecting sheet is connected between the side wall and the strips adjacent to the pillow portion. The pillow strips are air-pervious and disposed in the inflatable compartment, wherein the pillow strips are connected between the connecting sheet and the pillow portion of the top wall.



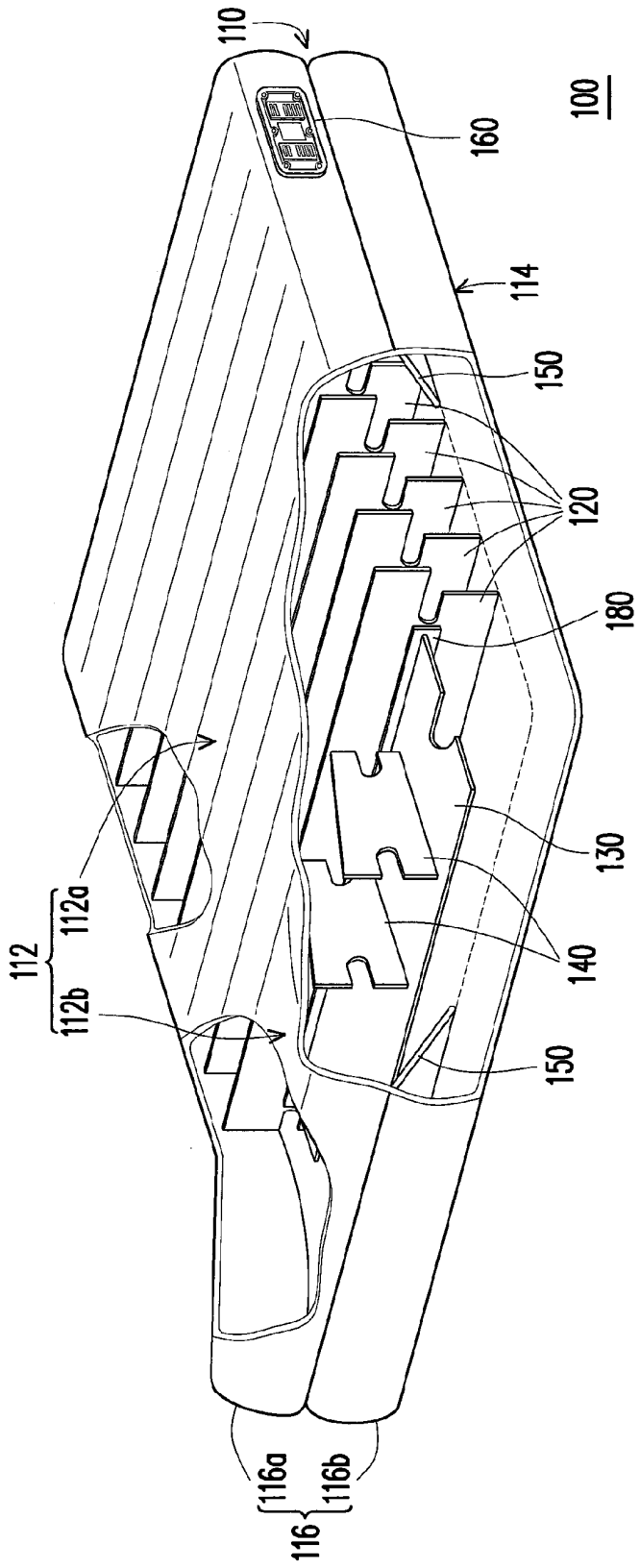

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FIG. 1

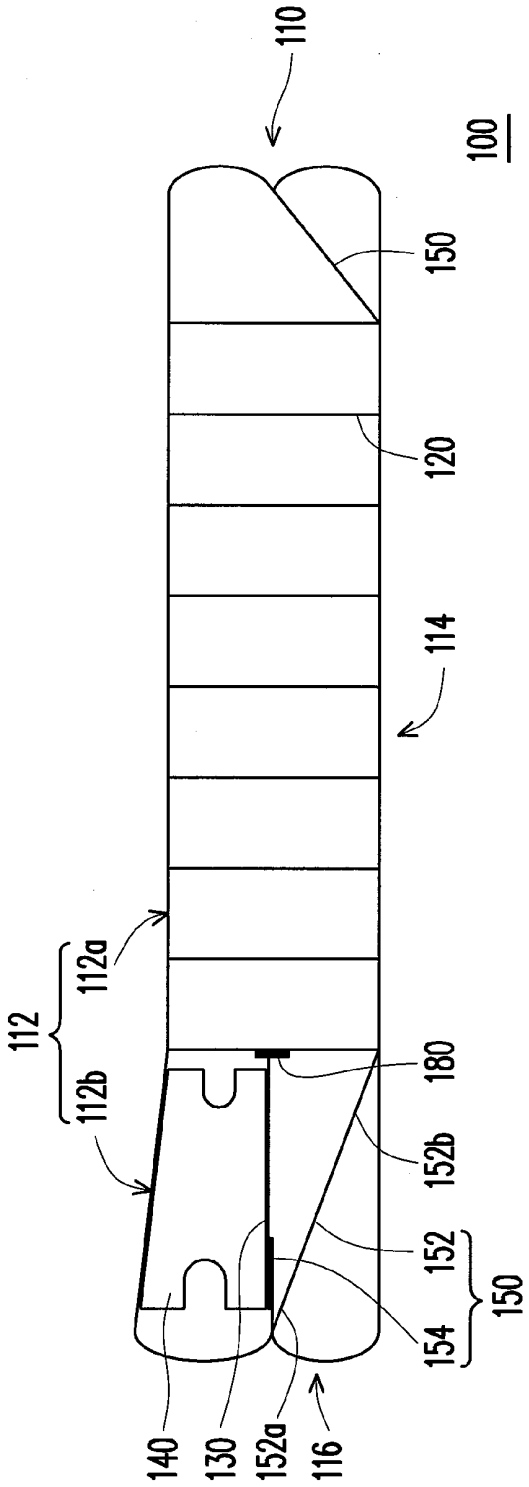

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FIG. 2

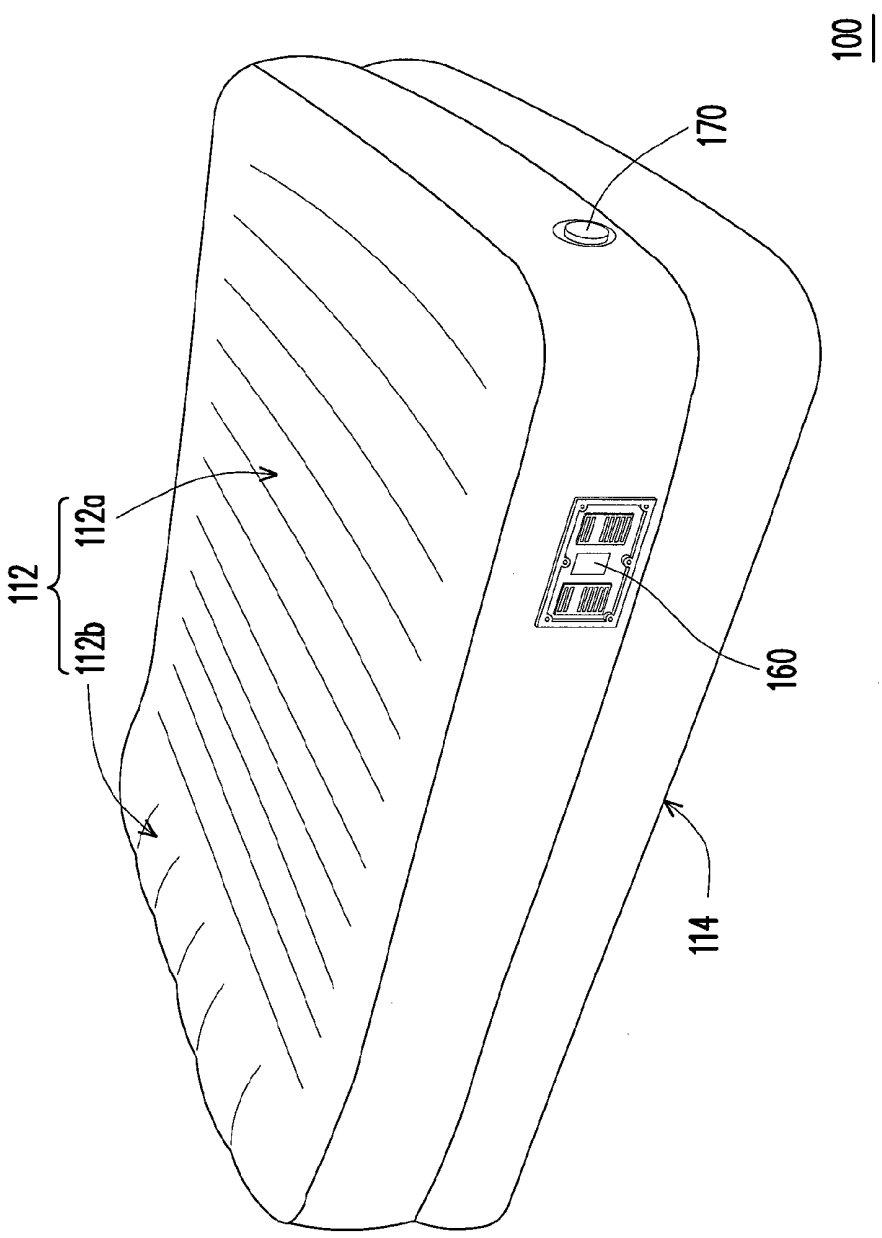


FIG. 3

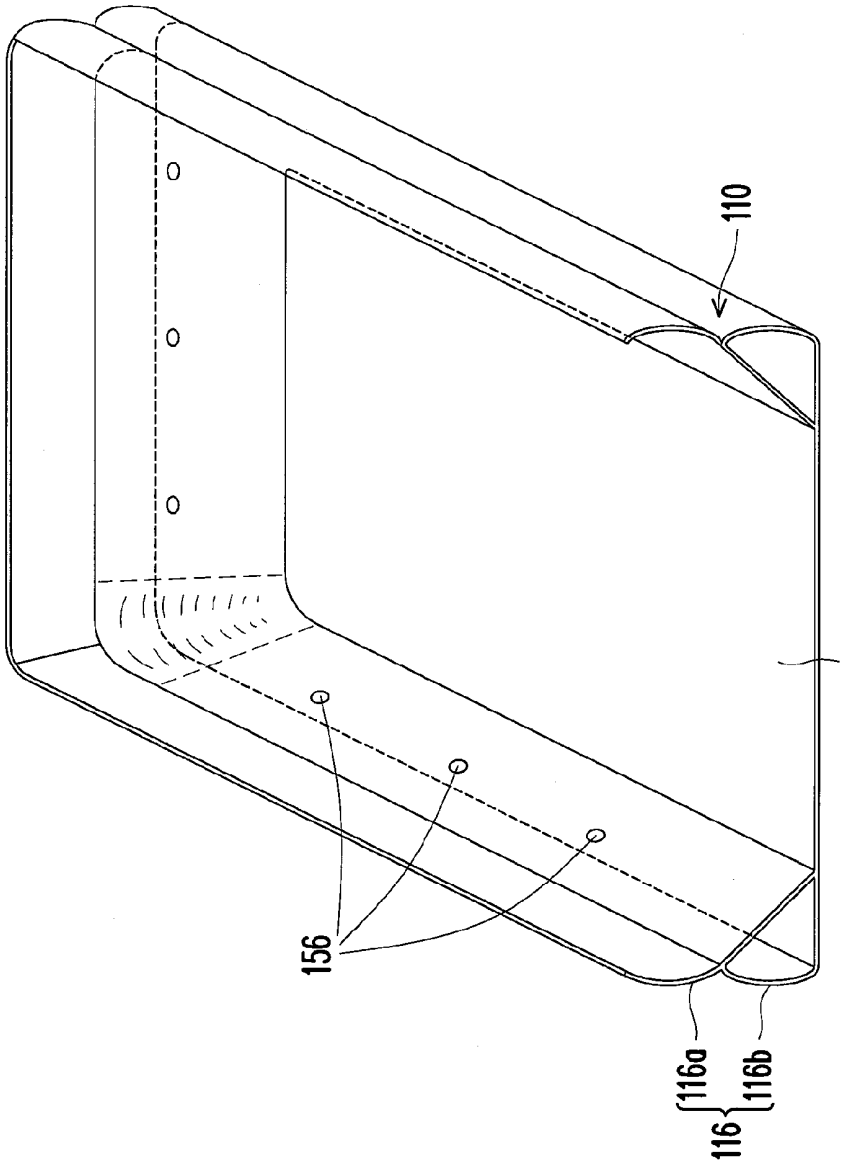


FIG. 4

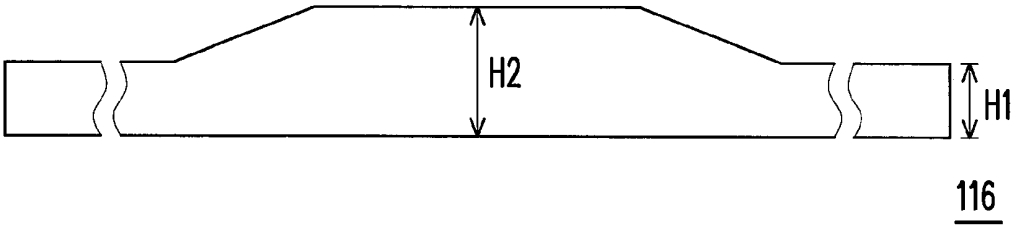


FIG. 5A

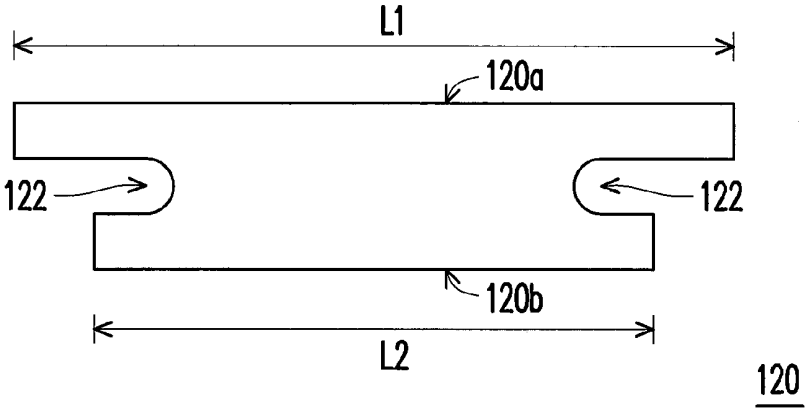


FIG. 5B

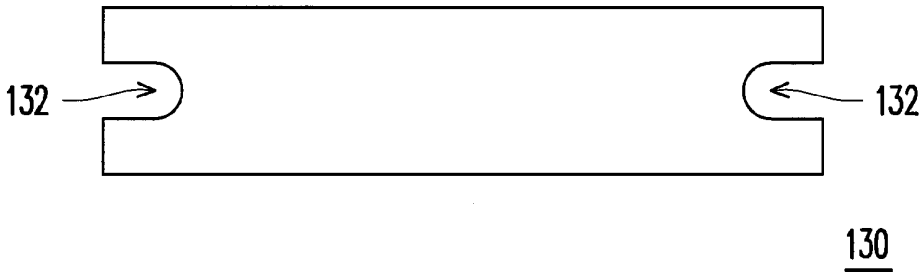


FIG. 5C

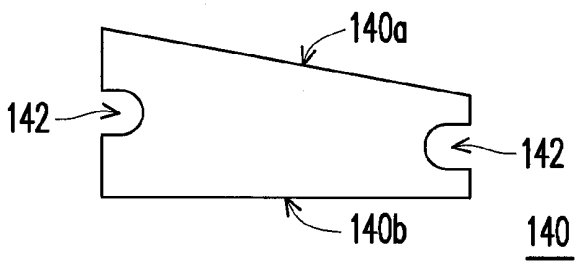


FIG. 5D

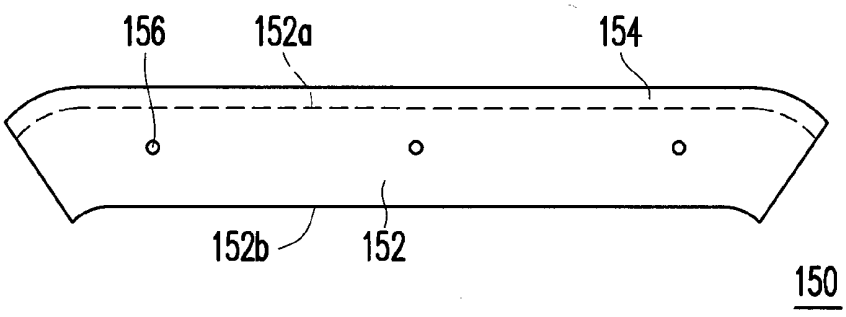


FIG. 5E

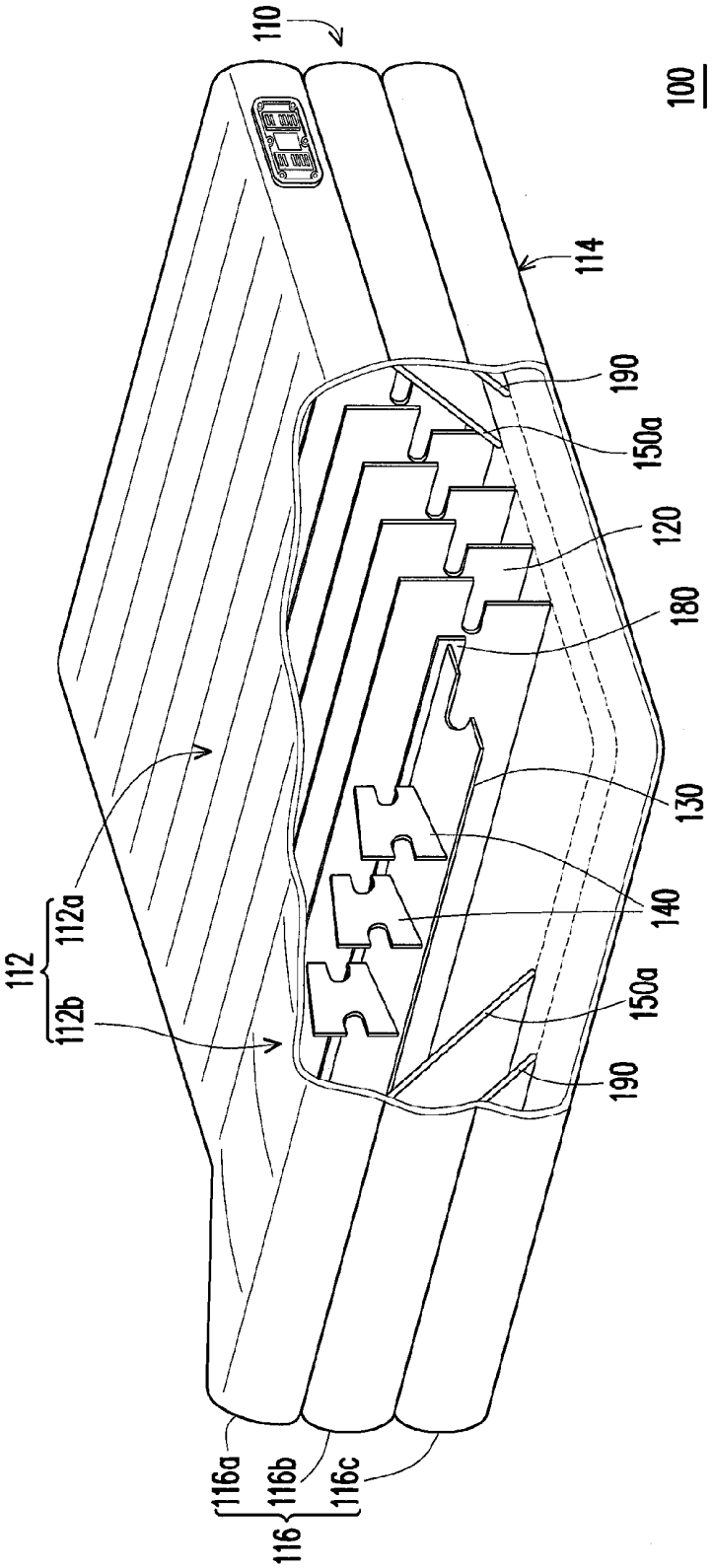

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FIG. 6

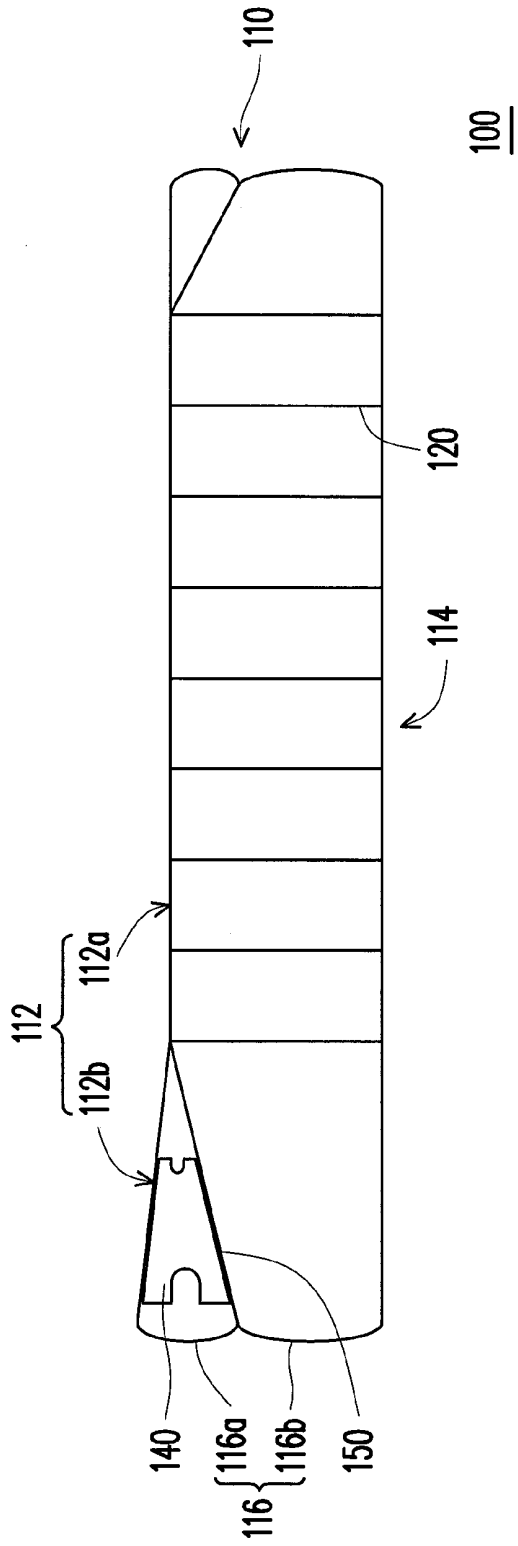


FIG. 7

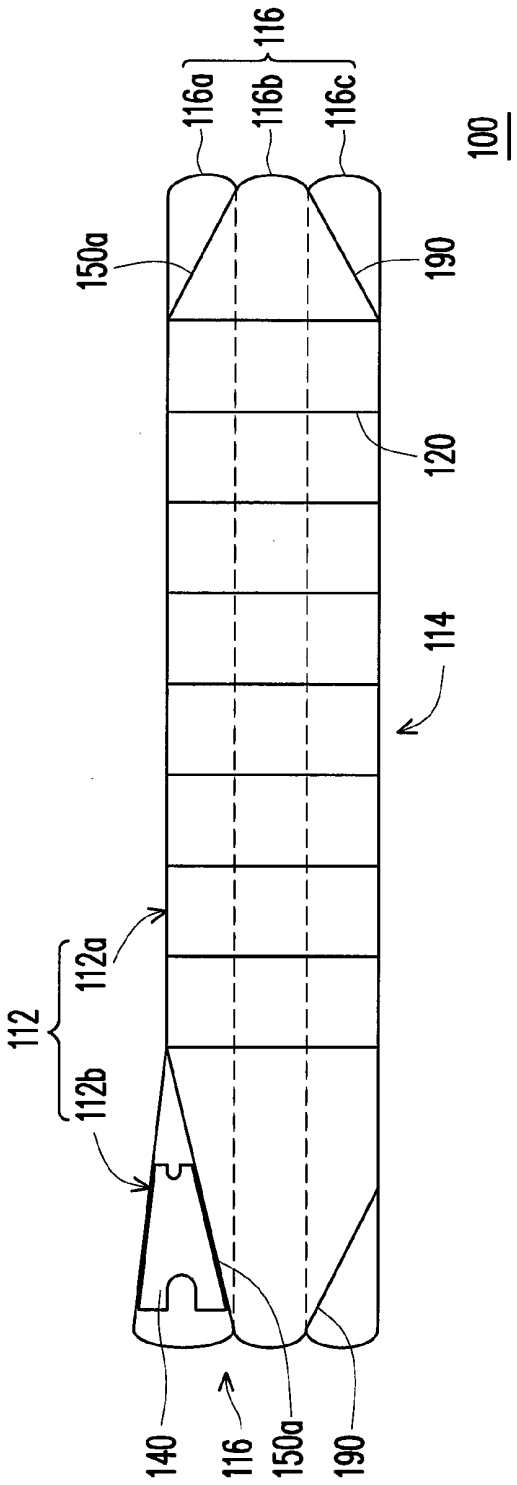

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FIG. 8

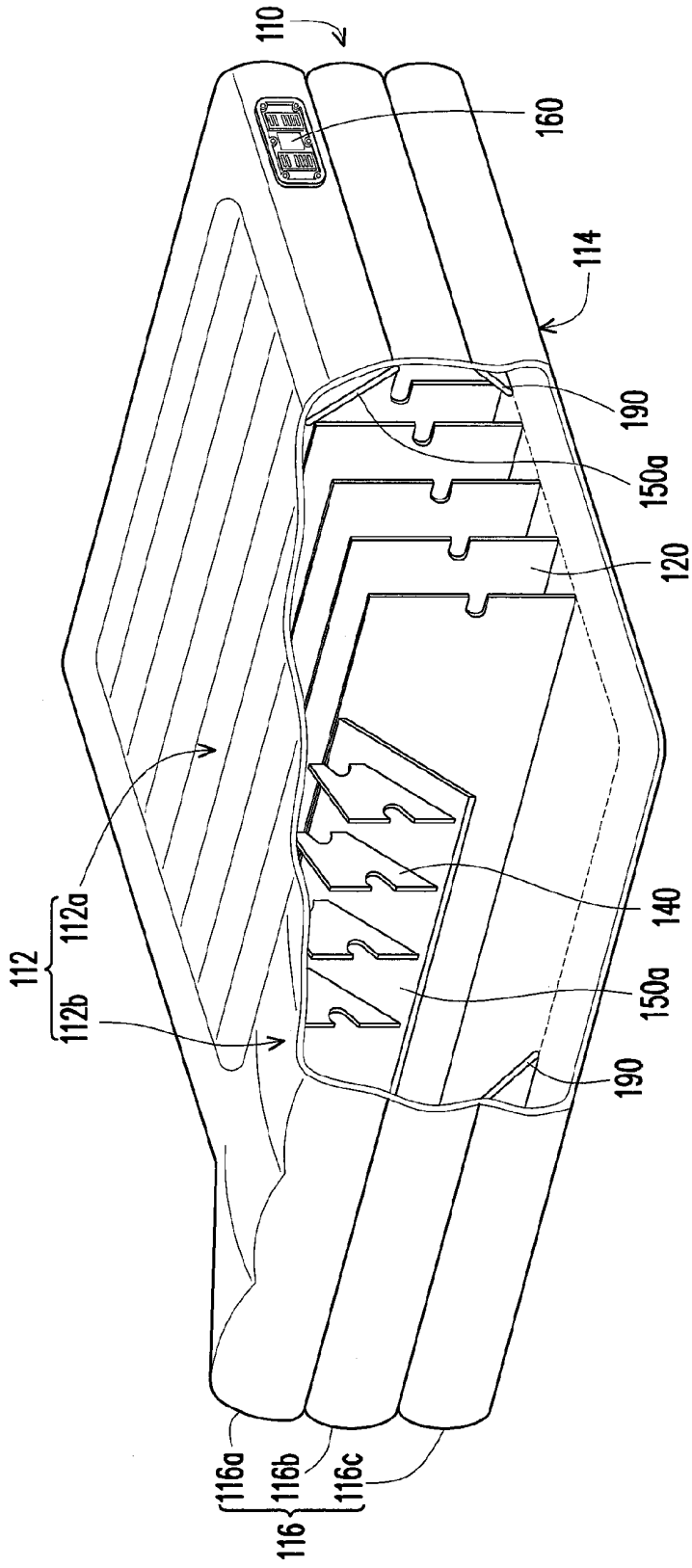

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FIG. 9

AIR MATTRESS

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the priority benefit of U.S. provisional application Ser. No. 61/570,255, filed Dec. 13, 2011. The entirety of the above-mentioned patent application is hereby incorporated by reference herein and made a part of this specification.

BACKGROUND OF THE INVENTION

[0002] 1. Field of Invention

[0003] The present invention generally relates to an air mattress, and more particularly, to an air mattress has a pillow strips to provide pillow portion.

[0004] 2. Description of Related Art

[0005] Conventional air mattresses (air beds) are convenient to carry outdoor, since users can use them to take a rest and before use just inflating the air mattress is needed. Air mattresses generally include strips so as to stretch the inner walls of the air mattresses after inflated.

[0006] The aforementioned air mattresses are only single-layered structures. If the air mattress needs to increase an extra layer structure, the conventional method is to assemble two single-layered air mattresses to form a two-layered structure. However, this assembling method would become inefficient if air mattresses having more than two layers are required. Or even if they are assembled, individually inflating each of the air mattresses is necessary and causes great inconvenience. In addition, after conventional the air mattresses are inflated, users need to specially prepare pillows since there is no pillow formed on the top wall of the air mattress, and it may also cause great inconvenience.

SUMMARY OF THE INVENTION

[0007] The present invention provides an air mattress having pillow strips for increasing comfort.

[0008] An exemplary embodiment of the present invention provides an air mattress including an inflatable compartment, strips, a connecting sheet and pillow strips. The inflatable compartment includes a top wall, a bottom wall and a side wall surrounding peripheries of the top wall and the bottom wall. The strips are air-pervious and disposed in the inflatable compartment, wherein the strips are connected between the bottom wall and a lying portion of the top wall. The connecting sheet is air-pervious and disposed in the inflatable compartment and facing a pillow portion of the top wall, wherein the connecting sheet is connected between the side wall and the strips adjacent to the pillow portion. The pillow strips are air-pervious and disposed in the inflatable compartment, wherein the pillow strips are connected between the connecting sheet and the pillow portion of the top wall.

[0009] An exemplary embodiment of the present invention provides an air mattress including an inflatable compartment, strips, a peripheral strip and pillow strips. The inflatable compartment includes a top wall, a bottom wall and a side wall surrounding peripheries of the top wall and the bottom wall. The top wall includes a pillow portion and a lying portion. The strips are air-pervious and disposed in the inflatable compartment, wherein the strips are connected between the bottom wall and a lying portion of the top wall. The peripheral strip is air-pervious and disposed in the inflatable compartment. The peripheral strip surrounds the strips and connected between the side wall and the top wall, so that the side wall is formed into a first layer portion and a second layer portion. The pillow strips are air-pervious and disposed in the inflatable compartment, wherein the pillow strips are connected between the peripheral strip and the pillow portion of the top wall.

[0010] According to an exemplary embodiment of the present invention, a height of the side wall adjacent to the pillow portion of the top wall is greater than a height of the side wall adjacent to the lying portion of the top wall.

[0011] According to an exemplary embodiment of the present invention, a top end and a bottom end of each of the strips are respectively connected to the top wall and the bottom wall, a length of the top end is greater than a length of the bottom end, and each of the strips has a recess at each side.

[0012] According to an exemplary embodiment of the present invention, the peripheral strip has a recess at each side.

[0013] According to an exemplary embodiment of the present invention, the air mattress further includes an inflating device. The inflating device is disposed on the side wall.

[0014] An exemplary embodiment of the present invention provides an air mattress including an inflatable compartment, strips, a first peripheral strip, a second peripheral strip and pillow strips. The inflatable compartment includes a top wall, a bottom wall and a side wall surrounding peripheries of the top wall and the bottom wall. The top wall includes a pillow portion and a lying portion. The strips are air-pervious and disposed in the inflatable compartment, wherein the strips are connected between the bottom wall and the lying portion of the top wall. The first peripheral strip and the second peripheral strip are air-pervious and disposed in the inflatable compartment. The first peripheral strip surrounds the strips and connected between the side wall and the top wall, and peripheral strip surrounds the strips and connected between the side wall and the bottom wall, so that the side wall is formed into a first layer portion, a second layer portion and a third layer portion. The pillow strips are air-pervious and disposed in the inflatable compartment, wherein the pillow strips are connected between the first peripheral strip, the second peripheral strip and the pillow portion of the top wall.

[0015] According to an exemplary embodiment of the present invention, a height of the side wall adjacent to the pillow portion of the top wall is greater than a height of the side wall adjacent to the lying portion of the top wall.

[0016] According to an exemplary embodiment of the present invention, a top end and a bottom end of each of the strips are respectively connected to the top wall and the bottom wall, and a length of the top end is greater than a length of the bottom end, and each of the strips has a recess at each side.

[0017] According to an exemplary embodiment of the present invention, each of the pillow strips has a recess at each side.

[0018] According to an exemplary embodiment of the present invention, the air mattress further includes an inflating device. The inflating device is disposed on the side wall.

[0019] According to an exemplary embodiment of the present invention, the air mattress further includes a peripheral strip. The peripheral strip is air-pervious, disposed in the inflatable compartment and surrounds the strips and connected between the bottom wall and the side wall, so that the side wall is formed into a first layer portion and a second layer portion.

[0020] According to an exemplary embodiment of the present invention, the air mattress further includes a first peripheral strip and a second peripheral strip. The first peripheral strip and the second peripheral strip are air-pervious, disposed in the inflatable compartment and surround the strips and respectively connected between the bottom wall and the side wall, so that the side wall is formed into a first layer portion, a second layer portion and a third layer portion.

[0021] According to an exemplary embodiment of the present invention, a height of the side wall adjacent to the pillow portion of the top wall is greater than a height of the side wall adjacent to the lying portion of the top wall.

[0022] According to an exemplary embodiment of the present invention, a top end and a bottom end of each of the strips are respectively connected to the top wall and the bottom wall, and a length of the top end is greater than a length of the bottom end, and each of the strips has a recess at each side.

[0023] According to an exemplary embodiment of the present invention, the connecting sheet has a recess at each side, and each of the pillow strips has a recess at each side.

[0024] According to an exemplary embodiment of the present invention, the peripheral strip has a dragging portion and a reserved portion extending from the upper end of the dragging portion. The upper end and the lower end of the dragging portion are respectively connected to the side wall and the bottom wall, and a portion of the reserved portion is connected to the connecting sheet.

[0025] According to an exemplary embodiment of the present invention, the first peripheral strip has a dragging portion and a reserved portion extending from the upper end of the dragging portion. The upper end and the lower end of the dragging portion are respectively connected to the side wall and the bottom wall, and at least a portion of the reserved portion is connected to the connecting sheet.

[0026] According to an exemplary embodiment of the present invention, the air mattress further includes a reinforcing sheet. The reinforcing sheet is disposed on the strip adjacent to the pillow portion and connected to the connecting sheet.

[0027] According to an exemplary embodiment of the present invention, the air mattress further includes an inflating device. The inflating device is disposed on the side wall.

[0028] In light of the above, comfort and convenience of the air mattress of the embodiment of present invention is increased because of the design of inner structure of pillow portion of the air mattress, wherein the top wall of the air mattress is formed with a lying portion and a pillow portion protruded from the lying portion due to the side wall designed with different heights. Accordingly, the user can pillow on the pillow portion of the top wall when lying on the air mattress and does not need to prepare any other pillow or something having pillow function. Furthermore, since pillow strips are added in the pillow portion, the surface of the pillow portion of the air mattress is comparatively smooth and it increases great comfort to the user.

[0029] In order to make the aforementioned and other features and advantages of the present invention more comprehensible, several embodiments accompanied with figures are described in detail below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] The accompanying drawings constituting a part of this specification are incorporated herein to provide a further understanding of the invention. Here, the drawings illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention.

[0031] FIG. **1** is a perspective view of an air mattress according to an exemplary embodiment of the present invention.

[0032] FIG. **2** is a schematic cross-sectional view along the length direction of the air mattress of FIG. **1**.

[0033] FIG. **3** is a perspective view of the air mattress of FIG. **1** in another viewing angle.

[0034] FIG. **4** schematically shows a perspective view of a portion of the air mattress of FIG. **1**.

[0035] FIG. **5**A shows the expanded view of the side wall of FIG. **1**.

[0036] FIG. **5**B shows the expanded view of a strip of FIG. **1**.

[0037] FIG. **5**C shows the expanded view of the connecting sheet of FIG. **1**.

[0038] FIG. **5**D shows the expanded view of a pillow strip of FIG. **1**.

[0039] FIG. **5**E shows the expanded view of a peripheral strip of FIG. **1**.

[0040] FIG. **6** is a perspective view of an air mattress according to another exemplary embodiment of the present invention.

[0041] FIG. **7** is a cross-sectional view of an air mattress along the length direction according to another exemplary embodiment of the present invention.

[0042] FIG. **8** is a cross-sectional view of an air mattress along the length direction according to another exemplary embodiment of the present invention.

[0043] FIG. **9** is a schematic perspective view of the air mattress of FIG. **8**.

DESCRIPTION OF EMBODIMENTS

[0044] FIG. **1** is a perspective view of an air mattress according to an exemplary embodiment of the present invention. FIG. **2** is a schematic cross-sectional view along the longitudinal direction of the air mattress of FIG. **1**. Referring to FIG. **1** and FIG. **2**, in the embodiment, the air mattress **100** includes an inflatable compartment **110**, strips **120**, a connecting sheet **130** and pillow strips **140**. The inflatable compartment **110** is formed by a top wall **112**, a bottom wall **114** and a side wall **116** surrounding thereto, wherein the side wall **116** surrounds the peripheries of the top wall **112** and the bottom wall **114**. In the embodiment, the strips **120**, the connecting sheet **130** and the pillow strips **140** are disposed in the inflatable compartment **110**. The strips **120** are arranged substantially parallel to the width direction of the air mattress **100** and respectively connected between the bottom wall **114** and the lying portion **112***a* of the top wall **112**.

[0045] Specifically, in order to form the comparatively higher pillow portion on the air mattress **100**, the side wall **116** (referring to FIG. **5**A) of the embodiment is designed to have regions with different heights. Thus, when the side wall **116** and the top wall **112** are jointed to each other, the middle protruding region of the side wall **116** may provide the top wall **112** a larger inflated space, so as to form the pillow portion **112***b*, wherein the height H**2** of the side wall **116** adjacent to the pillow portion **112***b* is greater than the height H**1** of the side wall **116** adjacent to the lying portion **112***a*.

[0046] In such configuration, due to the different heights of the side wall **116**, the lying portion **112***a* and the pillow portion **112***b* protruded from the lying portion **112***a* can be

formed on the top wall **112** of the air mattress **100**. Accordingly, the user can pillow on the pillow portion **112***b* of the top wall **112** when lying on the air mattress **100** and does not need to prepare any other pillow or something having pillow function. However, when the inflatable compartment **110** of the air mattress **100** is inflated and if the pillow portion **112***b* is not fixed by using specific structures in the inflatable compartment **110**, the surface of the pillow portion **112***b* may be too inflated to be stable and it may further cause inconvenience for users to lie thereon.

[0047] In the embodiment, the pillow strips **140** and the connecting sheet **130** are used so that the surface of the pillow portion **112***b* of the air mattress **100** may comparatively be leveled and the comfort can be increased. It is further described with examples in the following.

[0048] The connecting sheet **130** faces the pillow portion **112***b* of the top wall **112** and connected between the side wall **116** and the strip **120** nearest to the pillow portion **112***b*. Moreover, the strips **140** are arranged substantially parallel to the length direction of the air mattress **100** and respectively connected between the pillow portion **112***b* of the top wall **112** and the connecting sheet **130**. Therefore, through the design of the pillow strips **140** and the connecting sheet **130**, the pillow portion **112***b* may not be too inflated, thus the surface of the pillow portion **112***b* may relatively be more stable and the comfort of the air mattress **100** can be greatly improved.

[0049] In addition, each of the strips **120** (referring to FIG. **5**B), the connecting sheet **130** (referring to FIG. **5**C) and the pillow strips **140** (referring to FIG. **5**D) has a recess **122**, **132**, **142** at each side. Therefore, the air within the inflatable compartment **110** may pass through among the recesses **122**, **132**, **142**, the two not jointed sides of the strips **120**, the two not jointed sides of the connecting sheet **130** and the two not jointed sides of the pillow strips **140**, so that the strips **120**, the connecting sheet **130** and the pillow strips **140** are air-pervious. Accordingly, the air within the inflatable compartment **110** can flow and no air-flow prevention is caused within the inflatable compartment **110**.

[0050] In addition, the inflatable compartment **110** is made by an air-impermeable material, for example a plastic material such as polyvinyl. Thus, after the inflatable compartment **110** of the air mattress **100** is inflated, the air cannot leak out and is maintained within the inflatable compartment **110**. In addition, the strips **120**, the connecting sheet **130**, the pillow strips **140** and other components may be made by the aforementioned polyvinyl or other materials.

[0051] FIG. **3** is a perspective view of the air mattress of FIG. **1** in another viewing angle. In the embodiment, the air mattress **100** further includes an inflating device **160** and a deflating valve **170** respectively disposed on the side wall **116**. Accordingly, the air mattress **100** can be inflated through the inflating device **160**. On the other hand, the air of the inflatable compartment **110** of the air mattress **100** can be deflated through the deflating valve **170**, when the air mattress **100** is not used. In other embodiments, inflating device and/or deflating valve can be disposed on the side wall **116** of the air mattress **100** as required.

[0052] FIG. **4** schematically shows a perspective view of a portion of the air mattress of FIG. **1**. Herein the top wall **112**, the strips **120**, the connecting sheet **130** and the pillow strips **140** of FIG. **1** and FIG. **2** are omitted in FIG. **4**, in order to clearly illustrate the corresponding relation between the components. Referring to FIG. **2** and FIG. **4**, in the embodiment, the air mattress **100** further includes four peripheral strips **150** respectively disposed in the inflatable compartment **110**. Each of the peripheral strips **150** is incliningly connected between the bottom wall **114** and the side wall **116**, and the peripheral strips **150** are connected to each other and surround the strips **120**. In other embodiments, the quantity of the peripheral strips **150** may be other suitable number and the peripheral strips are connected to each other and surround the strips **120**, or only one integrated peripheral strip **150** may surround the strips **120**, but the present invention is not limited thereto. On the other hand, another end of each of the peripheral strips **150** is connected to the corresponding side wall **116**, so that the side wall **116** is formed into a first layer portion **116***a* and a second layer portion **116***b*. In other words, through the peripheral strips **150**, the user can obtain the side wall **116** with a double-layered structure and no need to stack an extra mattress onto the air mattress **100**.

[0053] More specifically, as shown in FIG. **2**, each of the peripheral strips **150** has a dragging portion **152** and a reserved portion **154** extending from the upper end **152***a* of the dragging portion **152**. The upper end **152***a* of the dragging portion **152** and the lower end **152***b* of the dragging portion **152** are connected to the side wall **116** and the bottom wall **114**, respectively. At least a portion of the reserved portion **154** is connected to the connecting sheet **130**. The method of the reserved portion **154** connecting to the connecting sheet **130** is not limited in the present invention, for example by adhesive bonding method or thermal welding method. For example, the reserved portion **154** is connected to the connecting sheet **130** by using the thermal welding method so that the connection can be more stable. Thus, the connection between the reserved portion **154** and the connecting sheet **130** is hard to break, after the air mattress **100** is inflated.

[0054] In the present embodiment, the air mattress **100** further includes a reinforcing sheet **180** (as shown in FIG. **2**). The reinforcing sheet **180** is disposed on the strip **120** adjacent to the pillow portion **112***b* and connected to the connecting sheet **130**. In the embodiment, the method of the reinforcing sheet **180** connecting to the connecting sheet **130** is not limited in the present invention, for example by adhesive bonding method or thermal welding method. For example, the reinforcing sheet **180** is connected to the connecting sheet **130** by using the thermal welding method so that the connection can be more stable. Thus, the connection between the reinforcing sheet **180** and the connecting sheet **130** is hard to break, after the air mattress **100** is inflated.

[0055] The shapes of the aforementioned side wall **116**, the strip **120**, the connecting sheet **130**, the pillow strips **140** and the peripheral strips **150** are not limited in the present invention and described accompanying with figures in the following. FIG. **5**A shows the expanded view of the side wall of FIG. **1**. FIG. **5**B shows the expanded view of a strip of FIG. **1**. FIG. **5**C shows the expanded view of the connecting sheet of FIG. **1**. FIG. **5**D shows the expanded view of a pillow strip of FIG. **1**. FIG. **5**E shows the expanded view of a peripheral strip of FIG. **1**. Referring to FIG. **5**A, FIG. **1**, FIG. **2** and FIG. **3**, in the embodiment, the height H**2** of the side wall **116** of the adjacent to the pillow portion **112***b* is greater than the height H**1** of the side wall **116** adjacent to the lying portion **112***a*.

[0056] Next, referring to FIG. **5**B, FIG. **1** and FIG. **2**, the upper edge **120***a* of each of the strips **120** and the lower edge **120***b* of each of the strips **120** are connected to the top wall **112** and the bottom wall **114**, respectively. Each of the strips **120** has a recess **122** substantially in a half-circle shape at

each side. In the embodiment, the length L1 of the upper edge **120***a* of each of the strips **120** is greater than the length L2 of the lower edge **120***b* of each of the strips **120**. Thus, after the lower edge **120***b* of each of the strips is connected to the bottom wall **114**, some extra space may still be left for the peripheral strip **150** to surround thereon. In addition, each of the strips **120** is connected between the top wall **112** and the bottom wall **114**, and after the air mattress **100** is inflated, the recesses **122** formed at two sides of each strip **120** may buff the tensile force of the top wall **112** and the bottom wall **114** exerting on the strips **120**. Thus, after the inflatable compartment **110** of the air mattress **100** is inflated, the design of the recesses **122** disposed on two sides of each of the strips **120** may greatly prevent the strips **120** connected between the edges **120***a*, **120***b* of the top wall **112** and the bottom wall **114** from being extracted from the top wall **112** and the bottom wall **114** connected therebetween or the strips **120** from being broken.

[0057] Referring to FIG. **5**C, FIG. **1** and FIG, **2** together, in the embodiment, the connecting sheet **130** has a substantially-half-circle shaped recess **132** at each side. After the air mattress **100** is inflated, the recesses **132** of the connecting sheet **130** may buff the tensile force of the side wall **116** and adjacent the strips **120** exerting thereon. Thus, after the inflatable compartment **110** of the air mattress **100** is inflated, the design of the recesses **132** disposed on two sides of the connecting sheet **130** may greatly prevent the connecting sheet **130** from being extracted from the side wall **116** and/or the strips **120** connected therebetween or the connecting sheet **130** from being broken. Similarly, as shown in FIG. **5**D, the recesses **142** of the pillow strips **140** may buff the tensile force of the pillow portion **112***b* and the connecting sheet **130** exerting on the pillow strips **140**. Thus, after the inflatable compartment **110** of the air mattress **100** is inflated, the design of the recesses **142** disposed on two sides of each of the pillow strips **140** may greatly prevent the pillow strips **140** from being extracted from the pillow portion **112***b* and the connecting sheet **130** connected therebetween or the pillow strips **140** from being broken. In addition, the length direction of the edge **140***a* of each of the pillow strips **140** is tilted to the length direction of another edge **140***b* of each of the pillow strips **140**.

[0058] Referring to FIG. **5**E, FIG. **1** and FIG. **2**, the peripheral strip **150** has a plurality of through holes **156**. Therefore, the air within the inflatable compartment **110** may flow through the through holes **156**, so that the peripheral strip **150** is air-pervious and may not cause the air-flow prevention within the inflatable compartment **110**. However, besides the through holes **156** may not cause air-flow prevention within the inflating compartment **110**, the through holes **156** may also provide damping to the peripheral strip **150** from being exerted by tensile force of the bottom wall **114** and the side wall **116**. Thus, after the inflatable compartment **110** of the air mattress **100** is inflated, the design of the through holes **156** may greatly prevent the peripheral strip **150** from being extracted from the bottom wall **114** and/or the side wall **116** connected therebetween or the peripheral strip **150** from being broken.

[0059] FIG. **6** is a perspective view of an air mattress according to another exemplary embodiment of the present invention. Referring to FIG. **6**, in the air mattress **100** of the embodiment, the strips **120**, the connecting sheet **130** and the pillow strips **140** are air-pervious and disposed in the inflatable compartment **110**. The strips **120** are arranged substantially parallel to the width direction of the air mattress **100** and respectively connected between the bottom wall **114** and the lying portion **112***a* of the top wall **112**. The connecting sheet **130** faces the pillow portion **112***b* of the top wall **112** and connected between the side wall **116** and the strip **120** nearest to the pillow portion **112***b*. The pillow strips **140** are arranged substantially parallel to the length direction of the air mattress **100** and connected between the connecting sheet **130** and the pillow portion **112***b* of the top wall **112**.

[0060] In the embodiment, the air mattress **100** further includes a first peripheral strip **150***a* and a second peripheral strip **190**, wherein the first peripheral strip **150***a* and the second peripheral strip **190** are connected to the side wall **116** and have different heights. The peripheral strips **150***a* are air-pervious disposed in the inflatable compartment **110** and surround the strips **120**. The lower ends of the first peripheral strip **150***a* and the second peripheral strip **190** are incliningly connected to the bottom wall **114**, and the upper ends are respectively connected to the side wall **116** with different heights, so that the side wall **116** is formed into a first layer portion **116***a*, a second layer portion **116***b* and a third layer portion **116***c*. Thus, through the first peripheral strip **150***a* and the second peripheral strip **190**, the air mattress **100** can formed into a side wall **116** with three-layered structure.

[0061] The functions and shapes of the reinforcing sheet **180** shown in FIG. **6** and the aforementioned side wall **116**, strips **120**, connecting sheet **130**, pillow strips **140**, first peripheral strip **150***a* and second peripheral strip **190** are similar or the same to the functions and shapes of the reinforcing sheet, side wall, strips, connecting sheet, pillow strips and peripheral strip of the air mattress of the aforementioned first embodiment shown in FIG. **1**, thus the detailed description of the design can be referred to FIG. **1**, FIG. **2**, FIG. **3** and FIG. **5**A to FIG. **5**E, and it is not repeated herein.

[0062] The aforementioned first embodiment shown in FIG. **1** and second embodiment shown in FIG. **6**, as shown in FIG. **5**C, through the connecting sheet **130** disposed horizontally, each of the pillow strips **140** is connected to the pillow portion **112***b* of the top wall **112** and the connecting sheet **130**. However, the present invention is not limited thereto, and examples are described accompanying with figures in the following.

[0063] FIG. **7** is a cross-sectional view of an air mattress along the length direction according to another exemplary embodiment of the present invention. Referring to FIG. **7**, the air mattress **100** includes an inflatable compartment **110**, a plurality of strips **120**, a peripheral strip **150** and a plurality of pillow strips **140**, wherein the strips **120**, the peripheral strip **150** and the pillow strips **140** are air-pervious disposed in the inflatable compartment **110**. The inflatable compartment **110** includes a top wall **112**, a bottom wall **114** and a side wall **116** surrounding peripheries of the top wall **112** and the bottom wall **114**.

[0064] As mentioned, the top wall **112** includes a pillow portion **112***b* and a lying portion **112***a*. The strips **120** are arranged substantially parallel to the width direction of the air mattress **100** and respectively connected between the bottom wall **114** and the lying portion **112***a* of the top wall **112**. In the embodiment, the peripheral strip **150** surrounds the strips **120** and incliningly connected between the side wall **116** and the top wall **112**, so that the side wall **116** is formed into a first layer portion **116***a* and a second layer portion **116***b*. The pillow strips **140** are arranged substantially parallel to the

length direction of the air mattress **100** and directly connected between the peripheral strip **150** and the pillow portion **112***b* of the top wall **112**.

[0065] In the embodiment, as shown in FIG. **7**, the air mattress **100** has no connecting sheet disposed therein as the above mentioned embodiments, thus the lower edge of each of the pillow strips **140** are connected to the peripheral strip **150** instead of being connected to the connecting sheet. The air mattress **100** of the embodiment can make the pillow strips **140** fixed without the connecting sheet. In the embodiment, the peripheral strip **150** is incliningly connected between the side wall **116** and the top wall **112**, in order that the side wall **116** is formed into two layer portions **116***a* and **116***b*. Accordingly, by such configuration, compared to the above mentioned embodiments, the air mattress **100** of the present embodiment can save the material and manufacturing cost and labor of the connecting sheet and the reinforcing sheet, and the appearance of the air mattress **100** can be more artistic.

[0066] No connecting sheet and reinforcing sheet are included in the present embodiment. In addition, the functions and shapes of the side wall **116**, strips **120**, pillow strips **140**, peripheral strip **150** are similar or the same to the functions and shapes of the side wall, strips, pillow strips and peripheral strip of the air mattress of the aforementioned first embodiment (referred to FIG. **1**), thus the detailed description of the design can be referred to FIG. **1**, FIG. **2**, FIG. **3** and FIG. **5**A to FIG. **5**E, and it is not repeated herein. However, it has to be noted that the height of the pillow strips **140** is smaller located relatively nearer to the connecting location of the peripheral strip **150** and the top wall **112**, since the lower edge of each of the strips **140** is directly connected on the peripheral strip **150**.

[0067] In addition, in the embodiment as shown in FIG. **7** and other embodiments, quantity of the peripheral strip with different heights connected to the side wall is not limited in the present invention. In other words, quantity of the layer structure formed by the side wall is not limited in the air mattress of other embodiments of the present invention, and examples are described accompanying with figures in the following.

[0068] FIG. **8** is a cross-sectional view of an air mattress along the length direction according to another exemplary embodiment of the present invention. FIG. **9** is a schematic perspective view of the air mattress of FIG. **8**. Referring to FIG. **8** and FIG. **9**, the air mattress **100** includes an inflatable compartment **110**, a plurality of strips **120**, a first peripheral strip **150***a*, a second peripheral strip **190** and a plurality of pillow strips **140**, wherein the strips **120**, the first peripheral strip **150***a*, the second peripheral strip **190** and the pillow strips **140** are air-pervious disposed in the inflatable compartment **110**. The inflatable compartment **110** includes a top wall **112**, a bottom wall **114** and a side wall **116** surrounding peripheries of the top wall **112** and the bottom wall **114**. The top wall **112** includes a pillow portion **112***b* and a lying portion **112***a*. The strips **120** are arranged substantially parallel to the width direction of the air mattress **100** and respectively connected between the bottom wall **114** and the lying portion **112***a* of the top wall **112**.

[0069] As mentioned above, the first peripheral strip **150***a* surrounds the strips **120** and incliningly connected between the side wall **116** and the top wall **112**. The pillow strips **140** are arranged substantially parallel to the length direction of the air mattress **100** and directly connected between the first peripheral strip **150***a* and the pillow portion **112***b* of the top wall **112**. The second peripheral **190** surrounds the strips **120** and incliningly connected between the side wall **116** and the bottom wall **114**, wherein the position of the lower edge of the first peripheral strip **150***a* connected to the side wall **116** is higher than the position of the upper edge of the second peripheral strip **190** connected to the side wall **116**, thus the side wall **116** is formed into a first layer portion **116***a*, a second layer portion **116***b* and a third layer portion **116***c*.

[0070] Similarly, the functions and shapes of the side wall **116**, strips **120**, pillow strips **140**, first peripheral strip **150***a* and second peripheral strip **190** are similar or the same to the functions and shapes of the side wall, strips, pillow strips and peripheral strip of the air mattress of the embodiment shown in FIG. **7**, thus the detailed description of the design can be referred to FIG. **7** and related FIG. **1**, FIG. **2**, FIG. **3** and FIG. **5**A to FIG. **5**E, and it is not repeated herein. However, it has to be noted that the height of the pillow strips **140** is smaller located relatively nearer to the connecting location of the first peripheral strip **150***a* and the top wall **112**, since the lower edge of each of the strips **140** is directly connected on the first peripheral strip **150***a*.

[0071] In light of the above, comfort and convenience of the air mattress of the embodiment of present invention is increased because of the design of inner structure of pillow portion of the air mattress, wherein the top wall of the air mattress is formed with a lying portion and a pillow portion protruded from the lying portion due to the side wall designed with different heights. Accordingly, the user can pillow on the pillow portion of the top wall when lying on the air mattress and does not need to prepare any other pillow or something having pillow function. Furthermore, since pillow strips are added in the pillow portion, the surface of the pillow portion of the air mattress is comparatively smooth and it increases great comfort to the user.

[0072] Moreover, through the disposing of the at least one peripheral strip, the air mattress can easily form a side wall with multi-layered structure without necessary of stacking an extra mattress. Herein when more than one peripheral strip is used to respectively surround the side wall and connected to positions of different height, then the air mattress having the side wall with more-than-three-layered structure can easily be formed.

[0073] Although the invention has been described with reference to the embodiments thereof, it will be apparent to one of the ordinary skills in the art that modifications to the described embodiments may be made without departing from the spirit of the invention. Accordingly, the scope of the invention will be defined by the attached claims not by the above detailed description.

What is claimed is:

1. An air mattress, comprising:

an inflatable compartment comprising a top wall, a bottom wall and a side wall surrounding peripheries of the top wall and the bottom wall;

a plurality of strips air-pervious and disposed in the inflatable compartment, wherein the strips are connected between the bottom wall and a lying portion of the top wall;

a connecting sheet air-pervious, disposed in the inflatable compartment and facing a pillow portion of the top wall, wherein the connecting sheet is connected between the side wall and the strips adjacent to the pillow portion; and

a plurality of pillow strips air-pervious and disposed in the inflatable compartment, wherein the pillow strips are connected between the connecting sheet and the pillow portion of the top wall.

2. The air mattress as claimed in claim **1**, further comprising a peripheral strip, wherein the peripheral strip is air-pervious, disposed in the inflatable compartment, surrounding the strips and connected between the bottom wall and the side wall, so that the side wall is formed into a first layer portion and a second layer portion.

3. The air mattress as claimed in claim **1**, further comprising a first peripheral strip and a second peripheral strip, wherein the first peripheral strip and the second peripheral strip are air-pervious, disposed in the inflatable compartment, surrounding the strips and respectively connected between the bottom wall and the side wall, so that the side wall is formed into a first layer portion, a second layer portion and a third layer portion.

4. The air mattress as claimed in claim **1**, wherein a height of the side wall adjacent to the pillow portion of the top wall is greater than a height of the side wall adjacent to the lying portion of the top wall.

5. The air mattress as claimed in claim **1**, wherein a top end and a bottom end of each of the strips are respectively connected to the top wall and the bottom wall, a length of the top end is greater than a length of the bottom end, and each of the strips has a recess at each side.

6. The air mattress as claimed in claim **1**, wherein the connecting sheet has a recess at each side, and each of the pillow strips has a recess at each side.

7. The air mattress as claimed in claim **2**, wherein the peripheral strip has a dragging portion and a reserved portion extending from an upper end of the dragging portion, a upper end of the dragging end and a lower end of the dragging end are respectively connected to the side wall and the bottom wall, and a portion of the reserved portion is connected to the connecting sheet.

8. The air mattress as claimed in claim **3**, wherein the first peripheral strip has a dragging portion and a reserved portion extending from an upper end of the dragging portion, a upper end of the dragging end and a lower end of the dragging end are respectively connected to the side wall and the bottom wall, and a portion of the reserved portion is connected to the connecting sheet.

9. The air mattress as claimed in claim **1**, further comprising a reinforcing sheet, wherein the reinforcing sheet is disposed on the strip adjacent to the pillow portion and connected to the connecting sheet.

10. The air mattress as claimed in claim **1**, further comprising an inflating device disposed on the side wall.

11. An air mattress, comprising:

an inflatable compartment comprising a top wall, a bottom wall and a side wall surrounding peripheries of the top wall and the bottom wall, wherein the top wall comprises a pillow portion and a lying portion;

a plurality of strips air-pervious and disposed in the inflatable compartment, wherein the strips are connected between the bottom wall and the lying portion of the top wall;

a peripheral strip air-pervious, disposed in the inflatable compartment and surrounding the strips and connected between the side wall and the top wall, so that the side wall is formed into a first layer portion and a second layer portion; and

a plurality of pillow strips air-pervious and disposed in the inflatable compartment, wherein the pillow strips are connected between the peripheral strip and the pillow portion of the top wall.

12. The air mattress as claimed in claim **11**, wherein a height of the side wall adjacent to the pillow portion of the top wall is greater than a height of the side wall adjacent to the lying portion of the top wall.

13. The air mattress as claimed in claim **11**, wherein a top end and a bottom end of each of the strips are respectively connected to the top wall and the bottom wall, a length of the top end is greater than a length of the bottom end, and each of the strips has a recess at each side.

14. The air mattress as claimed in claim **11**, wherein each of the pillow strips has a recess at each side.

15. The air mattress as claimed in claim **11**, further comprising an inflating device disposed on the side wall.

16. An air mattress, comprising:

an inflatable compartment, comprising a top wall, a bottom wall and a side wall surrounding peripheries of the top wall and the bottom wall, wherein the top wall comprises a pillow portion and a lying portion;

a plurality of strips air-pervious and disposed in the inflatable compartment, wherein the strips are connected between the bottom wall and the lying portion of the top wall;

a first peripheral strip and a second peripheral strip air-pervious and disposed in the inflatable compartment, wherein the first peripheral strip surrounds the strips and respectively connected between the side wall and the top wall, and the second peripheral strip surrounds the strips and respectively connected between the side wall and the bottom wall, so that the side wall is formed into a first layer portion, a second layer portion and a third layer portion; and

a plurality of pillow strips air-pervious and disposed in the inflatable compartment, wherein the pillow strips are connected between the peripheral strip and the pillow portion of the top wall.

17. The air mattress as claimed in claim **16**, wherein a height of the side wall adjacent to the pillow portion of the top wall is greater than a height of the side wall adjacent to the lying portion of the top wall.

18. The air mattress as claimed in claim **16**, wherein a top end and a bottom end of each of the strips are respectively connected to the top wall and the bottom wall, a length of the top end is greater than a length of the bottom end, and each of the strips has a recess at each side.

19. The air mattress as claimed in claim **16**, wherein each of the pillow strips has a recess at each side.

20. The air mattress as claimed in claim **16**, further comprising an inflating device disposed on the side wall.

* * * * *

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(54) **INFLATABLE BED**

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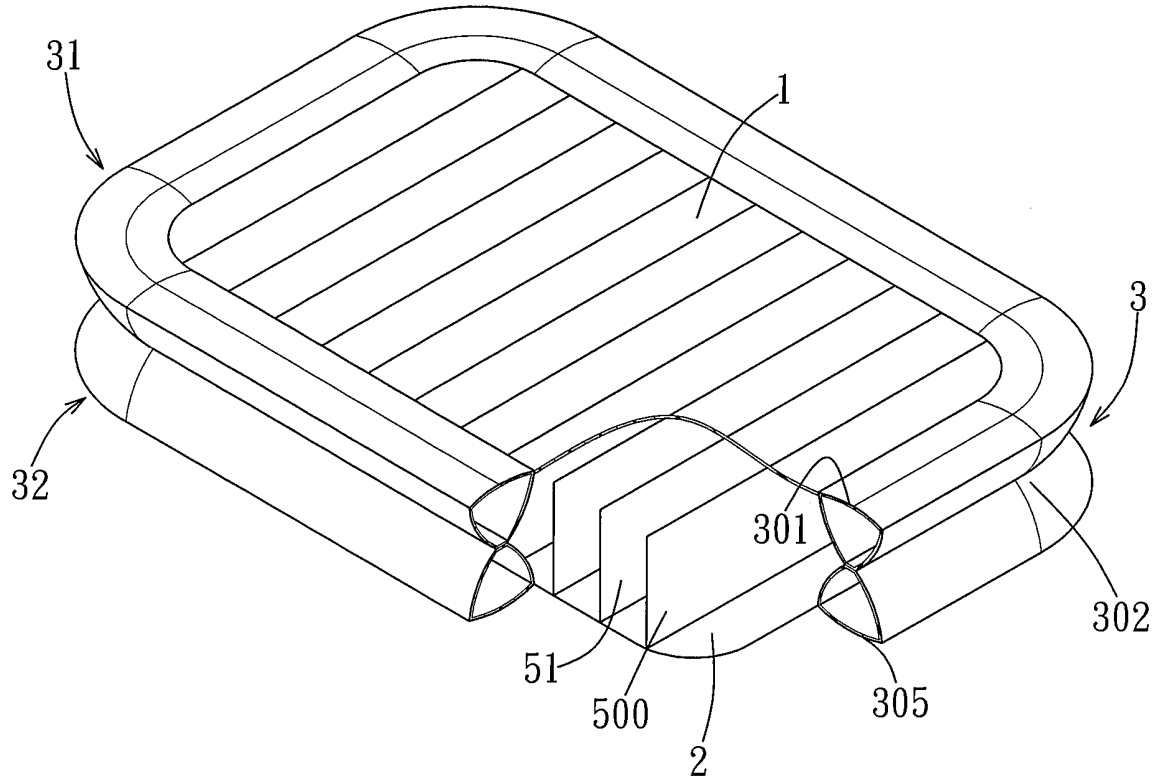
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(57) **ABSTRACT**

An inflatable bed includes a top sheet, a bottom sheet, an endless surrounding belt, and a plurality of pull belts. The surrounding belt cooperates with the top and bottom sheets to define an inflatable space. The surrounding belt has a bow tie shaped cross-section and includes vertically opposite upper and lower hollow portions. The upper hollow portion has a first surrounding surface confronting the inflatable space and connected to a periphery of the top sheet. The lower hollow portion has a second surrounding surface confronting the inflatable space and connected to a periphery of the bottom sheet. The pull belts are disposed in the inflatable space. Each of the pull belts has opposite top and bottom edges connected respectively to the top and bottom sheets.



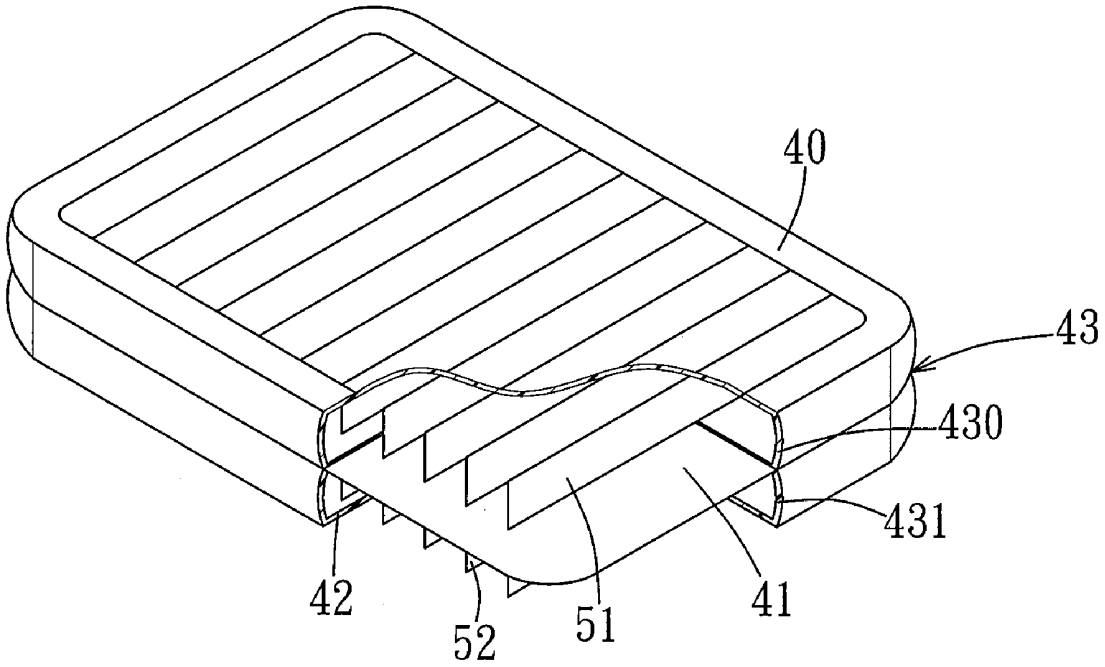


FIG. 1
PRIOR ART

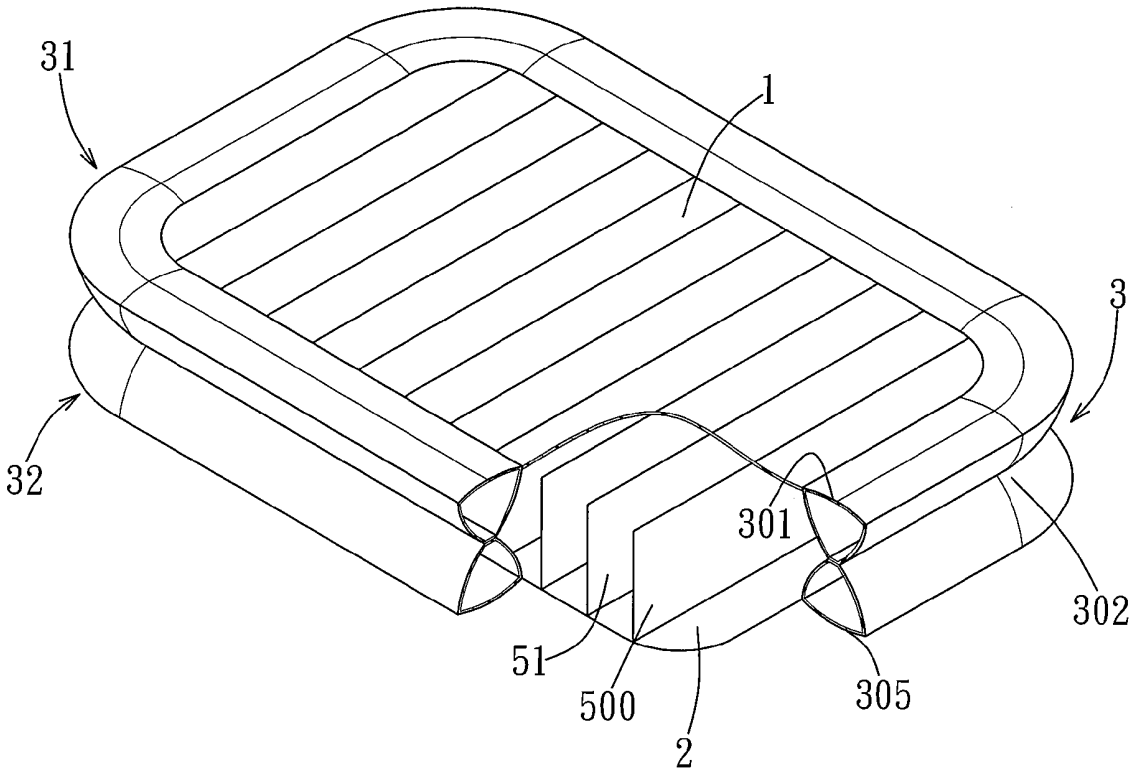


FIG. 2

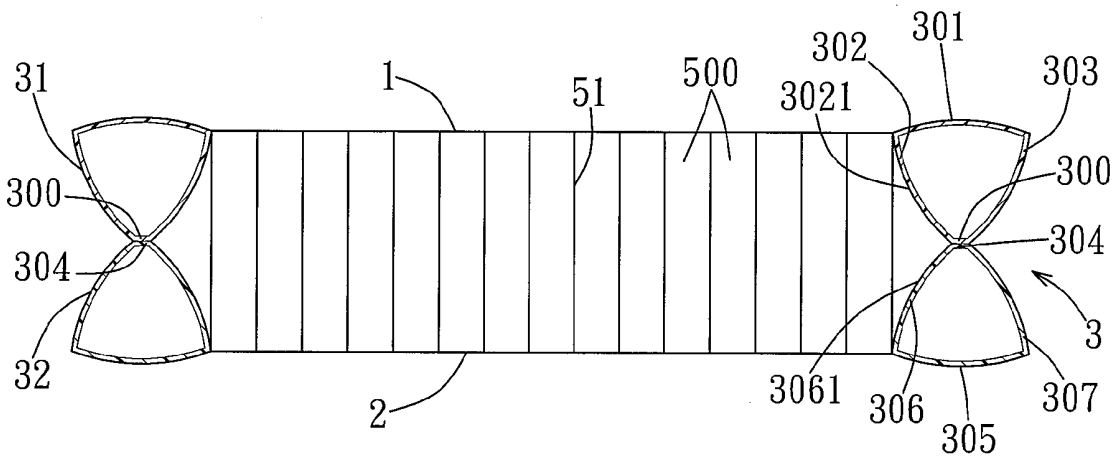

31
1
51
500
302
301
303
3021
300
300
304
304
3
32
2
3061
306
305
307

FIG. 3

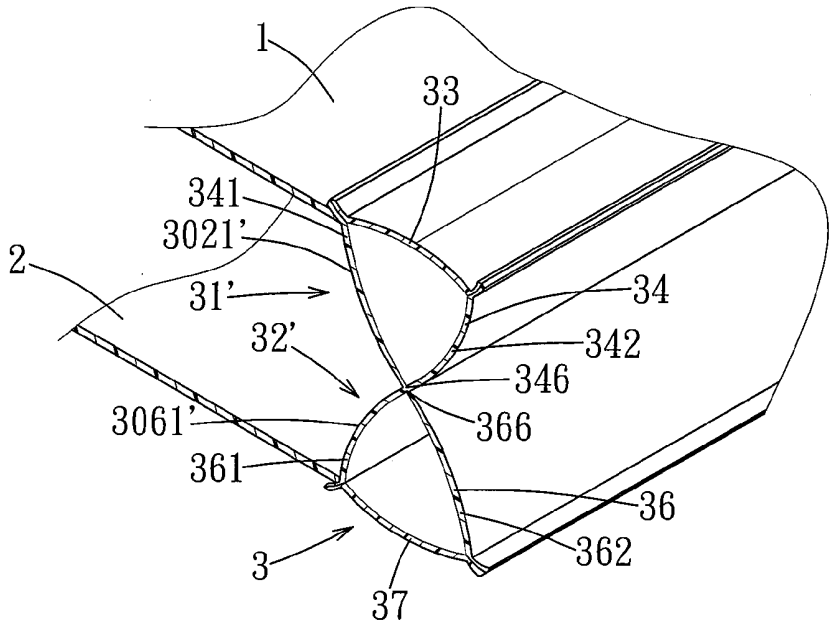

1
33
341
3021'
2
31'
34
32'
342
346
3061'
366
361
36
362
3
37

FIG. 4

INFLATABLE BED

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority of Chinese Application No. 200720194045.2, filed on Nov. 7, 2007.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The invention relates to an inflatable bed, more particularly to an inflatable bed having a simple structure and sufficient structural strength.

[0004] 2. Description of the Related Art

[0005] As shown in FIG. **1**, a conventional inflatable bed includes a top sheet **40**, a bottom sheet **42** spaced apart from the top sheet **40**, a middle sheet **41** parallel to and disposed between the top and bottom sheets **40**, **42**, and a surrounding sheet **43** having a top sheet portion **430** that interconnects peripheries of the top and middle sheets **40**, **41** and that cooperates with the top and middle sheets **40**, **41** to define an upper inflatable space thereamong, and a lower sheet portion **431** that is connected to the top sheet portion **430**, that interconnects peripheries of the middle and bottom sheets **41**, **42**, and that cooperates with the middle and bottom sheets **41**, **42** to define a lower inflatable space thereamong. The conventional inflatable bed further includes a plurality of upper pull belts **51** disposed in the upper inflatable space, and a plurality of lower pull belts **52** disposed in the lower inflatable space. Each of the upper pull belts **51** has vertically opposite top and bottom edges that are connected respectively to the top and middle sheets **40**, **41**. Each of the lower pull belts **52** has vertically opposite top and bottom edges that are connected respectively to the middle and bottom sheets **41**, **42**. The presence of the middle sheet **41** results in a double-layer structure of the conventional inflatable bed, and the upper and lower pull belts **51**, **52** provide sufficient structural strength when the conventional inflatable bed is inflated. However, processes for interconnecting the middle sheet **41** and the surrounding sheet **43**, the upper pull belts **51** and the top and middle sheets **40**, **41**, as well as the lower pull belts **52** and the middle and bottom sheets **41**, **42** are relatively time-consuming and inconvenient, thereby resulting in a relatively high manufacturing cost of the conventional inflatable bed.

SUMMARY OF THE INVENTION

[0006] Therefore, the object of the present invention is to provide an inflatable bed that has a multilayer appearance, a relatively simple structure and sufficient structural strength.

[0007] Accordingly, an inflatable bed of the present invention comprises a top sheet, a bottom sheet, an endless surrounding belt, and a plurality of pull belts. The surrounding belt interconnects peripheries of the top and bottom sheets, and cooperates with the top and bottom sheets to define an inflatable space thereamong. The surrounding belt has a bow tie shaped cross-section and includes vertically opposite upper and lower hollow portions. The upper hollow portion has a first surrounding surface that confronts the inflatable space and that is connected to the periphery of the top sheet. The lower hollow portion has a second surrounding surface that confronts the inflatable space and that is connected to the periphery of the bottom sheet. The pull belts are disposed in the inflatable space. Each of the pull belts has opposite top and bottom edges that are connected respectively to the top and bottom sheets.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] Other features and advantages of the present invention will become apparent in the following detailed description of the preferred embodiments with reference to the accompanying drawings, of which:

[0009] FIG. **1** is a partly cutaway perspective view of a conventional inflatable bed;

[0010] FIG. **2** is a partly cutaway perspective view of a first preferred embodiment of an inflatable bed according to the invention;

[0011] FIG. **3** is a sectional view of the first preferred embodiment; and

[0012] FIG. **4** is a fragmentary, partly sectional, perspective view of a second preferred embodiment of the inflatable bed according to the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0013] Before the present invention is described in greater detail, it should be noted that like elements are denoted by the same reference numerals throughout the disclosure.

[0014] As shown in FIGS. **2** and **3**, the first preferred embodiment of an inflatable bed according to the present invention comprises a top sheet **1**, a bottom sheet **2**, an endless surrounding belt **3**, and a plurality of pull belts **51**.

[0015] The top and bottom sheets **1**, **2** are disposed parallel to each other.

[0016] The surrounding belt **3** interconnects peripheries of the top and bottom sheets **1**, **2**, and cooperates with the top and bottom sheets **1**, **2** to define an inflatable space **500** thereamong. The surrounding belt **3** has a bow tie shaped cross-section and includes vertically opposite upper and lower hollow portions **31**, **32**. In this embodiment, each of the upper and lower hollow portions **31**, **32** is in a form of an endless tube and has a generally trapezoid cross-section. The upper hollow portion **31** of the surrounding belt **3** has a top wall **301**, a bottom wall **300** disposed under and shorter than the top wall **301**, an inner surrounding wall **302** interconnecting inner peripheries of the top and bottom walls **301**, **300** and formed with a first surrounding surface **3021** that confronts the inflatable space **500** and that is connected to the periphery of the top sheet **1**, and an outer surrounding wall **303** interconnecting outer peripheries of the top and bottom walls **301**, **300** and spaced apart from the inner surrounding wall **302** of the upper hollow portion **31**. The lower hollow portion **32** of the surrounding belt **3** has a top wall **304** coupled to the bottom wall **300** of the upper hollow portion **31** of the surrounding belt **3**, a bottom wall **305** disposed under and wider than the top wall **304**, an inner surrounding wall **306** interconnecting inner peripheries of the top and bottom walls **304**, **305** and formed with a second surrounding surface **3061** that confronts the inflatable space **500** and that is connected to the periphery of the bottom sheet **2**, and an outer surrounding wall **307** interconnecting outer peripheries of the top and bottom walls **304**, **305** and spaced apart from the inner surrounding wall **306** of the lower hollow portion **32**. In this embodiment, the periphery of the top sheet **1** is connected to the first surrounding surface **3021** of the inner surrounding wall **302** of the upper hollow portion **31** of the surrounding belt **3** at a position adjacent to the top wall **301** of the upper hollow portion **31**, and the periphery of the bottom sheet **2** is connected to the second surrounding surface **3061** of the inner surrounding

wall **306** of the lower hollow portion **32** of the surrounding belt **3** at a position adjacent to the bottom wall **305** of the lower hollow portion **32**.

[0017] The pull belts **51** are disposed in the inflatable space **500** and are parallel to each other. Each of the pull belts **51** has vertically opposite top and bottom edges that are connected respectively to the top and bottom sheets **1**, **2**. The pull belts **51** provide sufficient structural strength when the inflatable bed is inflated.

[0018] Although this preferred embodiment of the inflatable bed has a double-layer appearance, it has a simpler structure than that of the aforementioned prior art by omitting the middle sheet **42**. Moreover, since each of the pull belts **51** is connected directly to the top and bottom sheets **1**, **2**, the process of connecting the pull belts **51** to the top and bottom sheets **1**, **2** is simpler than that of the prior art, thereby resulting in a lower manufacturing cost of the inflatable bed of this invention. Furthermore, when the inflatable bed of this embodiment is inflated, the top wall **301** of the upper hollow portion **31** of the surrounding belt **3** will slightly swell out to serve as a bed rail around the top sheet **1**, thereby enhancing safety of the inflatable bed of this invention.

[0019] Referring to FIG. **4**, the second preferred embodiment of the inflatable bed according to the present invention has a structure similar to that of the first embodiment. The main difference between this embodiment and the previous embodiment resides in the configuration of the surrounding belt **3**. The surrounding belt **3** of this embodiment includes vertically opposite upper and lower hollow portions **31'**, **32'**. The upper hollow portion **31'** of the surrounding belt **3** is in a form of an endless tube, and includes a generally V-shaped first plate **34** and a top plate **33**. The first plate **34** has a middle segment **346**, an inner surrounding segment **341** extending from a side of the middle segment **346** and formed with a first surrounding surface **3021'** to which the top sheet **1** is coupled, and an outer surrounding segment **342** extending from an opposite side of the middle segment **346**. The top plate **33** is coupled to upper ends of the inner and outer surrounding segments **341**, **342** of the first plate **34**. The lower hollow portion **32'** of the surrounding belt **3** is also in a form of an endless tube, and includes a generally inverted V-shaped second plate **36** and a bottom plate **37**. The second plate **36** has a middle segment **366** coupled to the middle segment **346** of the first plate **34** of the upper hollow portion **31'** of the surrounding belt **3**, an inner surrounding segment **361** extending from a side of the middle segment **366** and formed with a second surrounding surface **3061'** to which the bottom sheet **2** is coupled, and an outer surrounding segment **362** extending from an opposite side of the middle segment **366**. The bottom plate **37** is coupled to lower ends of the inner and outer surrounding segments **361**, **362** of the second plate **36**. The second preferred embodiment has the same advantages as those of the first preferred embodiment.

[0020] While the present invention has been described in connection with what are considered the most practical and preferred embodiments, it is understood that this invention is not limited to the disclosed embodiments but is intended to cover various arrangements included within the spirit and scope of the broadest interpretation so as to encompass all such modifications and equivalent arrangements.

What is claimed is:

1. An inflatable bed comprising:

a top sheet;

a bottom sheet;

an endless surrounding belt interconnecting peripheries of said top and bottom sheets, and cooperating with said top and bottom sheets to define an inflatable space thereamong, said surrounding belt having a bow tie shaped cross-section and including vertically opposite upper and lower hollow portions, said upper hollow portion having a first surrounding surface that confronts said inflatable space and that is connected to the periphery of said top sheet, said lower hollow portion having a second surrounding surface that confronts said inflatable space and that is connected to the periphery of said bottom sheet; and

a plurality of pull belts disposed in said inflatable space, each of said pull belts having opposite top and bottom edges that are connected respectively to said top and bottom sheets.

2. The inflatable bed as claimed in claim **1**, wherein:

each of said upper and lower hollow portions of said surrounding belt is in a form of an endless tube and has a generally trapezoid cross-section;

said upper hollow portion of said surrounding belt has a top wall, a bottom wall disposed under and shorter than said top wall of said upper hollow portion, an inner surrounding wall that interconnects inner peripheries of said top and bottom walls of said upper hollow portion and that is formed with said first surrounding surface, and an outer surrounding wall that interconnects outer peripheries of said top and bottom walls of said upper hollow portion and that is spaced apart from said inner surrounding wall of said upper hollow portion;

said lower hollow portion of said surrounding belt has a top wall coupled to said bottom wall of said upper hollow portion of said surrounding belt, a bottom wall disposed under and wider than said top wall of said lower hollow portion, an inner surrounding wall that interconnects inner peripheries of said top and bottom walls of said lower hollow portion and that is formed with said second surrounding surface, and an outer surrounding wall that interconnects outer peripheries of said top and bottom walls of said lower hollow portion and that is spaced apart from said inner surrounding wall of said lower hollow portion.

3. The inflatable bed as claimed in claim **1**, wherein:

said upper hollow portion of said surrounding belt is in a form of an endless tube, and includes

a generally V-shaped first plate that has a middle segment, an inner surrounding segment extending from a side of said middle segment and formed with said first surrounding surface, and an outer surrounding segment extending from an opposite side of said middle segment, and

a top plate that is coupled to upper ends of said inner and outer surrounding segments of said first plate; and

said lower hollow portion of said surrounding belt is in a form of an endless tube, and includes

a generally inverted V-shaped second plate that has a middle segment coupled to said middle segment of said first plate of said upper hollow portion of said surrounding belt, an inner surrounding segment extending from a side of said middle segment of said second plate and formed with said second surrounding surface, and an outer surrounding segment extending from an opposite side of said middle segment of said second plate, and

a bottom plate that is coupled to lower ends of said inner and outer surrounding segments of said second plate.

* * * * *

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GERMANY

Our Ref. 23.B6256.12.EP.42

Milan, January 12, 2021

Re: European Patent No. 3192401
in the name of **BESTWAY INFLATABLES & MATERIAL CORP.**

INFORMATION REQUIRED FOR ORAL PROCEEDINGS

Dear Sirs,

Further to our letter dated December 14, 2020, we enclose herewith the documents for the Identity check of the persons that will attend the Oral Proceedings scheduled on January 14, 2021:

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and

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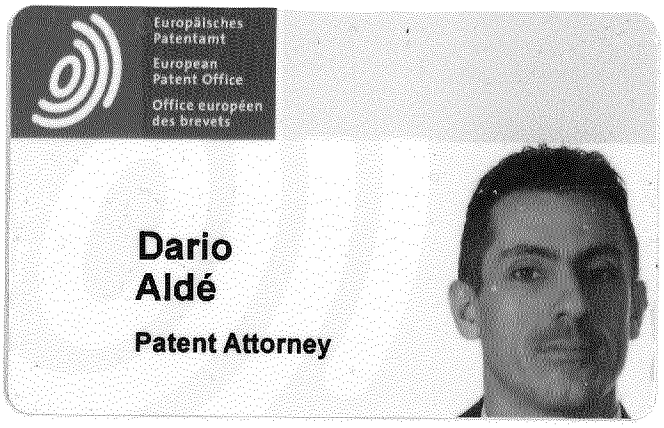
Yours Sincerely,

Simona Inchingalo
Representative for the Applicant

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Intex Recreation v. Bestway Inflatables


Europäisches Patentamt
European Patent Office
Office européen des brevets
Simona Inchingalo
Patent Attorney


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European Patent Office
Office européen des brevets
Dario
Aldé
Patent Attorney

12 January 2021

European Patent Office
D-80298 Munich
Germany

BY E-FILING

Dear Sirs

European Patent No. 3192401 (the "Patent")
Opposition against EP 3192401 of Bestway Inflatables & Materials Corp (the "Patentee")
On behalf of Intex Recreation Corp. (the "Opponent")
Our ref: M/P19609.EP01/JMV/JP

We are writing with reference to the oral proceedings scheduled on 14 January 2021.

The undersigned attorney will represent the Opponent at the oral proceedings and will be making oral submissions in English on behalf of the Opponent. An email address and a direct work contact number for the undersigned attorney can be found below.

In addition, Ms. Joanne Pham, of Reddie & Grose LLP, will be present in the oral proceedings to assist the undersigned attorney, but will not be making any oral submissions. Joanne Pham's email address is joanne.pham@reddie.co.uk. If it is required, it is kindly requested that the Zoom invitation to join the oral proceedings by videoconference be extended to Ms. Joanne Pham.

We further enclose the following documents so that they are formally introduced into the opposition procedure:

- **E9a** – an English-language translation derived from EspaceNet of the description and claims of E9 (FR 2914545);
- **E16** – US 2013/0145560 A1, which is mentioned in the Patent's description and was cited in the search report as D1; and
- **E17** – US 2009/0165211 A1, which is mentioned in the Patent's description and was cited in the search report as D2.

We also wish to inform all parties participating at the oral proceedings that we may share content using the 'Share Screen' function on Zoom, in order to assist the Opposition Division and the Patentee with understanding any aspects of the Opponent's oral submissions.

Yours faithfully

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Reddie & Grose LLP is a limited liability partnership registered in England and Wales with registered number OC360746, and registered office address The White Chapel Building, 10 Whitechapel High Street, London E1 8QS. Regulated by the Intellectual Property Regulation Board (IPREG).

[Electronically signed]

PARSI MENDIOLA, Joshua
PROFESSIONAL REPRESENTATIVE

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Europäisches Patentamt
European Patent Office
Office européen des brevets

Submission in opposition proceedings
made following summons to attend oral proceedings

Representative:

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- representing the opponent(s):	Intex Recreation Corp.
Opponent/representative's reference	M/P19609.EP01

The information given below is pertaining to the following patent in opposition proceedings:

Patent No.	EP3192401
Application No.	EP16191360.3
Date of mention of the grant in the European Patent Bulletin (Art. 97(3), Art. 99(1) EPC)	19 September 2018
Title of the invention	INFLATABLE BED
Proprietor of the patent	Bestway Inflatables & Material Corp.

Documents attached:

	Description of document	Original file name	Assigned file name
1	Any annexes (other than citation) to an opposition letter - Letter with information prior to oral proceedings	MP19609.EP01 - Letter to EPO (ahead of OPs) - 12.01.2021.pdf	OTHER-1.pdf

Evidence filed subsequently:

E16	Patent document	US2013/0145560 (A1) , 13.06.2013 original file name: E16 - US20130145560A1.pdf attached as: Published-Evidence-1.pdf
E17	Patent document	US2009/0165211 (A1) , 02.07.2009 original file name: E17 - US20090165211A1.pdf

		attached as: Published-Evidence-2.pdf
E9a	Other evidence	original file name: E9a - EN translation of FR2914545.pdf attached as: Evidence-Tran-1.pdf

Payment

1	Method of payment	Not specified
	Currency:	EUR

Signatures

Place:	**LONDON, UK**
Date:	**12 January 2021**
Signed by:	**Joshua Parsi Mendiola 65949**
Representative name:	**Joshua PARSI MENDIOLA**
Capacity:	**(Representative)**

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Acknowledgement of receipt

We hereby acknowledge receipt of the following submission by the opponent:

Submission number	9388749
Application number	EP16191360.3
Patent number	EP3192401
Date of receipt	12 January 2021
Your reference	M/P19609.EP01
Opponent	Intex Recreation Corp.
Title	INFLATABLE BED
Documents submitted	package-data.xml ep-oppo.pdf (2 p.) Published-Evidence-1.pdf\E16 - US20130145560A1.pdf (17 p.) Evidence-Tran-1.pdf\E9a - EN translation of FR2914545.pdf (6 p.) ep-opposition-data.xml OTHER-1.pdf\MP19609.EP01 - Letter to EPO (ahead of OPs) - 12.01.2021.pdf (2 p.) Published-Evidence-2.pdf\E17 - US20090165211A1.pdf (6 p.)
Submitted by	CN=Joshua Parsi Mendiola 65949
Method of submission	Online
Date and time receipt generated	12 January 2021, 12:01 (CET)
Message Digest	AE:1D:63:16:4F:7F:0F:30:33:6B:88:E8:E6:C1:8D:21:CD:24:BD:24

/European Patent Office/

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Intex Recreation v. Bestway Inflatables

Europäisches Patentamt
European Patent Office
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Application No.

16191360.3

INFORMATION

The oral proceedings of: 14.01.21

Resulted in:

☐ The European patent is revoked because at least one ground for opposition prejudices the maintenance of the European patent (Art. 101(2) EPC)

☐ The European patent is revoked because, account being taken of the amendments made by the patent proprietor during opposition proceedings, the patent and the invention to which it relates were found not to meet the requirements of the EPC (Art. 101(3)(b) EPC).

☒ The opposition(s) is/are rejected (Art. 101(2) EPC).

☐ Account being taken of the amendments made by the patent proprietor during the opposition proceedings, the patent and the invention to which it relates are found to meet the requirements of European Patent Convention (Art. 101(3)(a) EPC).

☐ Amendments filed during oral proceedings are annexed.

☐ Other:

15.1.2021
Date

Signature

NB: this form is provided for the sake of information only. The written decision prevails.

28/05/2020

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Intex Recreation v. Bestway Inflatables

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GERMANY

Questions about this communication ?
Contact Customer Services at www.epo.org/contact

Formalities officer
Suero Gallego, Veronica

Parsi Mendiola, Joshua
Reddie & Grose LLP
The White Chapel Building
10 Whitechapel High Street
London E1 8QS
ROYAUME UNI

Date: 03.02.2021

Reference		Application No./Patent No.
MP19609.EP01/JV	OPPO 01	16191360.3 - 1011 / 3192401
Applicant/Proprietor: Bestway Inflatables & Material Corp.		

EPA/EPO/OEB Formblatt/Form/Formulaire : 2330

Empfangsbescheinigung über den Zugang des vorstehend bezeichneten Schriftstücks
Acknowledgement of receipt of the document specified above
Récépissé du document spécifié ci-dessus

Unter Bezugnahme auf die Mitteilung im ABl EPA 7/2010, 377 wird gebeten, die Empfangsbescheinigung mit Empfangsdatum und Unterschrift zu versehen und **umgehend** an das EPA zurückzusenden:

With reference to the Notice in OJ EPO 7/2010, 377, you are requested to date and sign the acknowledgement of receipt and return it to the EPO **immediately**:

Conformément au communiqué paru au JO OEB 7/2010, 377, vous êtes prié d'indiquer sur le récépissé la date de réception du document, de signer le récépissé et de le renvoyer **sans délai** à l' OEB:

- **über die Online-Dienste des EPA** (als Anlage zu EPA Form 1038) / **through EPO Online Services** (as annex to EPO Form 1038) / **par les services en ligne de l'OEB** (en tant que pièce jointe au formulaire OEB 1038),
- **per Fax / by fax / par téléfax (+49 (0) 89 2399-4465 or +31 (0) 70 340-3016)**
- oder per Post / or by post / ou par courrier.

Empfangen am / Received on / Reçu le :

Unterschrift / Signature:

Empfangsberechtigter/authorised recipient/
le destinataire ou la personne dûment mandatée

Rücksende-Adresse / Return address / Adresse de retour
(Umschlag / envelope / enveloppe ISO C4 / DL / C6/C5 / C6)

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DEUTSCHLAND

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EPA/EPO/OEB Form 2936 08.10

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VS31524
Intex Recreation v. Bestway Inflatables

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Application No. / Patent No.	Ref.	Date
16 191 360.3 - 1011 / 3 192 401 /	MP19609.EP01/JV	03.02.2021
Proprietor Bestway Inflatables & Material Corp.		

Decision rejecting the opposition (Art. 101(2) EPC)

The Opposition Division - at the oral proceedings dated 14.01.2021 - has decided:

The opposition(s) against the European patent EP-B- 3 192 401 is/are rejected.
The reasons for the decision are enclosed.

Possibility of appeal
This decision is open to appeal. Attention is drawn to the attached text of Articles 106 to 108 and Rules 97 to 98 EPC.

Opposition Division:

Chairman:	Krasenbrink, B
2nd Examiner:	Kus, Slawomir
1st Examiner:	Lehe, Jörn

Suero Gallego, V
Formalities Officer
Tel. No.: +31 70 340-2078 **Branch at The Hague**

Enclosure(s): 15 page(s) reasons for the decision (Form 2916)
Wording of Articles 106 - 108 and Rules 97 - 98 EPC (Form 2019)
Minutes of oral proceedings

to EPO postal service: 27.01.21

I. Summary of Facts and Submissions

1 European patent 3 192 401 having the title "INFLATABLE BED" is based upon European patent application No. 16 191 360.3 filed on 29-09-2016. It claims priority of CN 201610020533 filed on 13-01-2016.

The mention of the grant of the patent has been published in the European Patent Bulletin of 19-09-2018. Proprietor of the patent is
Bestway Inflatables & Material Corp.
No. 3065 Cao An Road
Shanghai 201812
CN.

2 A notice of opposition has been filed by
Intex Recreation Corp.
4001 Via Oro Avenue, Suite 210
Long Beach, CA 90810
US
on 17-06-2019.
The Opponent requests revocation of the patent in its entirety based on Articles 100(a) and 100(b) EPC.

3 The following evidence has been submitted:

E1 - CN 203137719 U

E2 - Translation of CN 203137719 U

E3 - US 2007/0277324 (Liu, Feng)

E4 - US 9,254,047 (Schermel et al.)

E5 - US 4,941,223 (Santo, Philip J)

E6 - US 5,669,091 (Chung, Ming-Chun)

E7 - US 2015/0335164 (Liu, Feng)

E8 - WO 2013/130117 (Intex Recreation Corporation)

E9 - FR 2 914 545 (Song Rong)

E9a - English translation of E9

E10 - GB 434,098 (P. B. Cow & Co Ltd)

E11 - US 6,568,013 (Perez et al.)

E12-US 6,671,910 (Hsu et al.)

E13 - US 6,701,559 (Boso et al.)

E14- US 7,039,972 (Chaffee, Robert B)

E15 - US 2015/0201760 (Lin et al.)

E16 - US2013/0145560 A1

E17 - US2009/0165211 A1

E18 - Powerpoint presentation filed during Oral Proceedings

4 In a letter received on 30-10-2019, the proprietor requested the rejection of the opposition (Article 101(2) EPC).

5 On 28-05-2020 the opposition division issued a summons to attend oral proceedings on 14-01-2021.

6 In a letter received on 30-9-2020 the proprietor gives further arguments and filed three auxiliary requests.

7 In a letter received on 30-9-2020, the opponent requests to cancel the oral proceedings scheduled as a ViCo on 14-1-2021 and to schedule a new date for in-person oral proceedings.

8 With office-communication dated 17-12-2020, the opposition-division informs the parties that the oral proceedings will be held on 14-1-2021 in the form of a ViCo as planned and gives reasons for this.

9 In a letter received on 12-1-2021, the opponent files documents E9a, E16 and E17.

10 On 14-01-2021, oral proceedings were held.

11 The decision is based on the patent as granted.

12 The feature-analysis of claim 1 and the references used in this decision are as follows:

i	An inflatable bed (10), comprising: a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;
ii	at least one side wall (13), an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet,

iii	an air chamber formed between said top sheet, said bottom sheet and said side wall;
iv	at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and
v	at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls,
vi	at least two outside edges (152,162) of said support structure being respectively coupled to the side wall adjacent,
vii	at least one inside edge (153,163) of said support structure being coupled to the top sheet or bottom sheet adjacent,
viii	wherein said support structure comprises a second tensioning structure and a third tensioning structure,
ix	at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent,
x	at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent; and
xi	at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent,
xii	at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent.

II. Reasons for the decision

1. Admissibility of the Opposition

The opposition is admissible because it meets all the requirements of Articles 99(1) and 100 EPC and Rules 3(1) and 76(1)(2) EPC.

2. Article 100(b) EPC

Claim 1:

The opponent had argued that according to claim 1, the support structure must be parallel to the side wall. He further argued that no embodiment was disclosed which would show this feature.

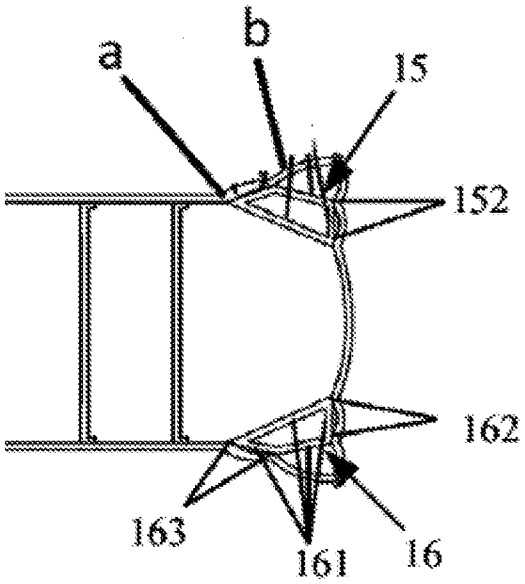
The opposition-division is of the opinion, that the support structure in figure 5 of the patent is in fact disposed in a longitudinal direction of the side wall, since it has an extension in the direction of the side wall.

The opposition-division therefore considers that the invention as defined by the features of claim 1 is sufficiently disclosed for it to be carried out by a person skilled in the art.

Claims 36 and 37

The opponent had argued that claims 36 and 37 are completely ambiguous to the effect that it would be impossible for the person skilled in art to carry them out.

The opposition-division cannot follow this reasoning. In relation to parts of fig. 12 (see below with references "a" and "b" added) the opposition-division is of the following opinion:



Location (a) refers to the:

- the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure.

This location is lower than location (b):

- the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

The reasoning for claim 37 is equivalent, but relates to the bottom sheet.

The opposition-division considers that an invention is in principle sufficiently disclosed if at least one way is clearly indicated enabling the person skilled in the art to carry out the invention (see Case-Law II.C.5.2). The invention as defined in claim 36 and 37 is therefore sufficiently disclosed for it to be carried out by a person skilled in the art.

The opposition division there considers that the ground of opposition according to Article 100(b) EPC does not prejudice the maintenance of the patent.

3. Article 100 (a) EPC

3.1. Admissibility (Rule 116(1) EPC)

3.1.1 Admissibility of E18 and admissibility of new Novelty-objections based on E1 and E18

The opponent has brought forward during the oral proceedings for the first time new interpretations of E1, additional to an interpretation brought forward in the written procedure. Based on each of these different interpretations of E1, he contested the novelty of the subject-matter of claim 1. To support and clarify these different interpretations of E1, the opponent has filed a powerpoint-presentation (E18) during the oral proceedings. The proprietor contested the admissibility of this presentation, arguing that this presentation was late-filed, that it could have been filed earlier and that he would be taken by surprise. He further argued that E18 contained also subject-matter based on E9, E16 and E17.

The opposition-division does not follow this reasoning in relation to the references of E18 to E1. In relation to E1 the document E18 does not refer to any undiscussed embodiments and is just intended as a visual help for interpreting E1. This is not seen as surprising by the opposition-division, but rather as helpful. The novelty objections based on the newly introduced interpretations of E1 are further considered as prima facie relevant. The novelty objections based on the newly introduced interpretations and

the parts of E18 which refer to E1 and to the opposed patent are therefore admitted into the procedure (Rule 116 (1) (EPC). This concerns slides 2-5 and 9-13. The question of admissibility of slides 6-8 was not addressed.

3.1.2 Late-filed novelty attack based on E9 (late-filed fact).

The opponent had contested novelty based on E9. He argued that this attack was only made during oral proceedings for the first time, because he was assigned to take care of this opposition-case at a very late stage.

The proprietor requested not to admit this attack into the procedure.

The opposition-division does not admit the late filed novelty-objection based on E9 into the proceedings (Rule 116(1) EPC). Prima facie, the opposition-division cannot identify an "edge of said side wall being coupled to an outer edge of said top sheet". Figure 5 of E9, see below, only shows a rounded continuous structure which connects side wall (3) to top sheet (33). Therefore already feature (ii) of claim 1 is not disclosed in E9, which is therefore prima facie not relevant for assessing novelty.

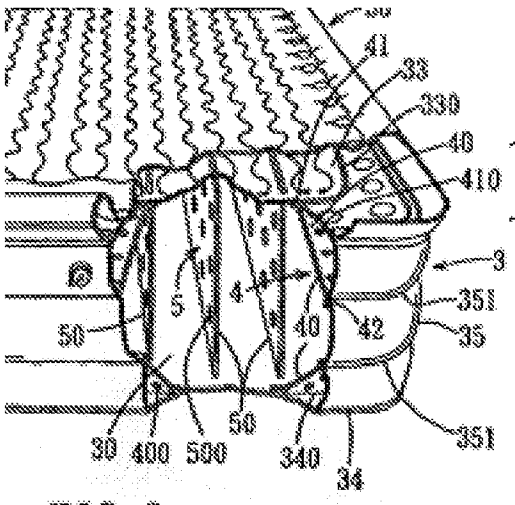


FIG. 2

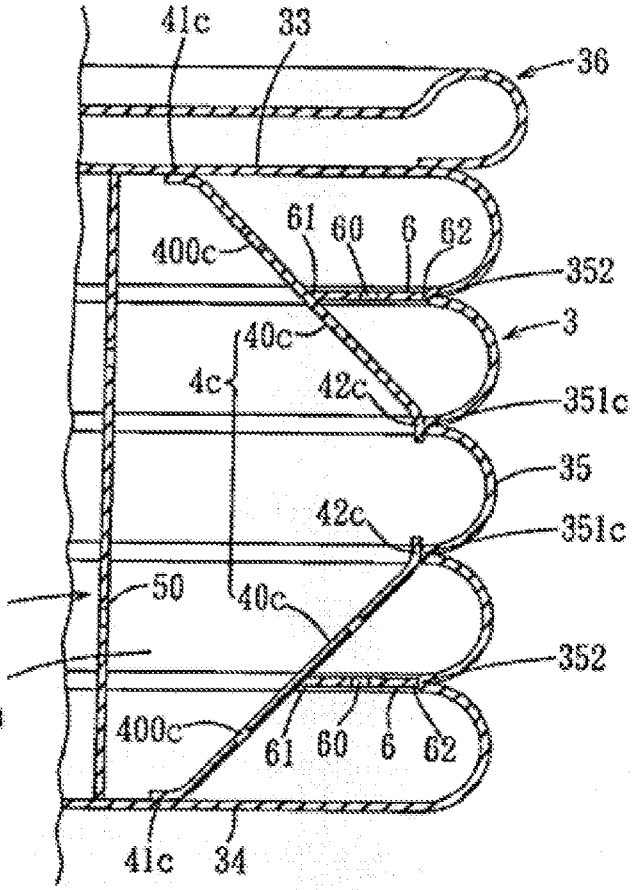


FIG. 5

3.1.3 Late-filed document E16

The opponent requested to admit E16, since it was prima facie relevant in relation to novelty of claim 1. The document E16 was further filed two days before the oral proceedings, on 12-1-2021. This should be considered as not very late filing.

The proprietor requested not to admit E16 into the procedure.

The opposition-division does not admit E16 into the proceedings (Rule 116(1) EPC). The opposition-division considers that the filing of E16 only two days before the oral proceedings is still considered as very late. During filing it was further not indicated that this document was considered as being relevant for novelty. This makes it difficult for the other party to prepare a reply to the attack. The opposition-division is further of the opinion that E16 does not disclose "at least two outside edges" (features (ix) and (xi) of claim 1) of the second and third tensioning structure. The opponent had indicated (190) of Fig. 9 in E16 as outside edge, arguing that there was an edge (190) on the long side and on the short side (see figure below), making it "at least two". The opposition-division already did not follow such an interpretation for E1. For E16 a new assessment prima facie does not appear to lead to any other outcome.

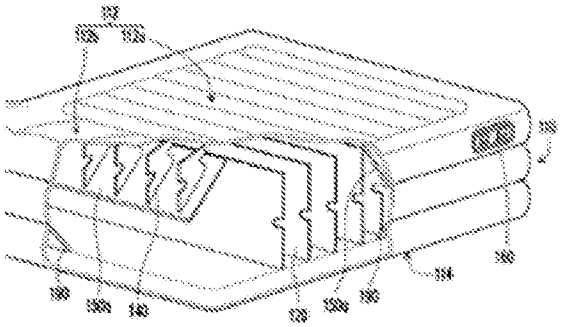


FIG. 9

3.1.4 Model

During oral proceedings, the opponent requested to file a model during the oral proceedings in order clarify the disclosure of E1, figure 2. As reason for the late filing of this request the opponent mentioned that he was assigned to this opposition only at a late stage.

The opposition-division does not admit the model into the proceedings (Rule 116 (1) (EPC)). A studying of a model is considered as not being helpful for the interpretation of E1, since the ambiguities in the disclosure of E1 would still persist. The opposition-division is further of the opinion that the opponent has made himself perfectly clear

about his interpretation of the disclosure of E1, especially by filing E18. Lastly it is to be considered as putting the proprietor in a difficult position, since they have not had the chance to prepare a reaction to the presentation of this model.

3.1.5 Late-filed attack in relation to inventive step based on E1+E9 (late-filed fact)

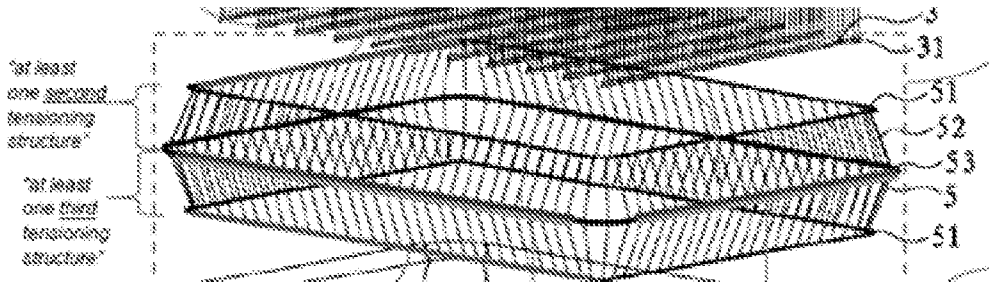
The proprietor argued that the combination of E1 with E9 was never mentioned before and therefore surprising. This late filed fact should not be admitted into the procedure.

The opposition-division does not follow this reasoning. E1 was already discussed in detail in the written procedure with respect to novelty. It must be expected by the proprietor that starting from E1 the opponent would argue that other documents - already present in the proceedings - would clarify the disclosure of E1. The late-filed objection in relation to inventive step based on E1+E9 is therefore admissible (Rule 116(1) EPC).

3.2. Novelty (Article 54 EPC)

3.2.1 The opponent argued that E1 could be read in three different ways, which would all disclose the features of claim 1. E1 first interpretation:

The opponent argued that plastic strip (53) shown in Figure 2 of E1 implicitly has an upper edge and a lower edge (as indicated in E18), since every three-dimensional body a has outer boundaries, which are to be considered as edges. The upper edge of (53) together with the upper cables (52) and upper strip (51) would form the second tensioning structure. The lower edge of (51) together with the lower cables (52) and lower strip (51) would form the third tensioning structure. This interpretation is shown in the figure below which is taken from E18, second slide.

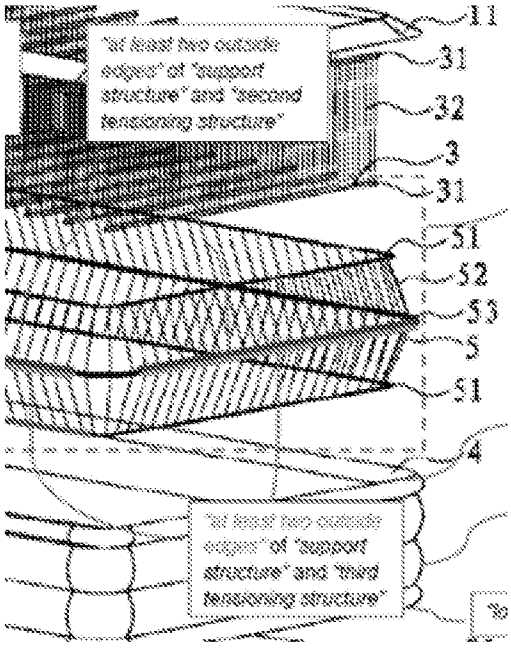


The opponent further argued that the plastic strip (53) had a rectangular shape and that each side of this rectangle represents and edge of the tensioning structure. This interpretation is shown in the figure below, which is taken from E18, second slide. Therefore E1 discloses (feature ix):

- "at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent"

And E1 further discloses (feature xi):

- "at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent"



The opposition-division cannot follow this interpretation of E1.

The opposition-division considers it as unreasonable to split the plastic strip (53) into an upper edge and a lower edge as foreseen by the opponent. The geometry of plastic strip (53) is not recognizable in E1. Therefore strip (53) could have a circular cross-section for which the opposition-division considers that a circular geometry has no edge at all. Therefore assigning the upper part of strip (53) to the second tensioning structure and the assigning lower part of strip (53) to the third tensioning structure (as argued by the opponent) appears to be a reading purely for artificially creating two edges, which in E1 are not disclosed. Reading two edges into a geometry which is not visible would not fall within the normal understanding of the word "edge" by the person skilled in the art.

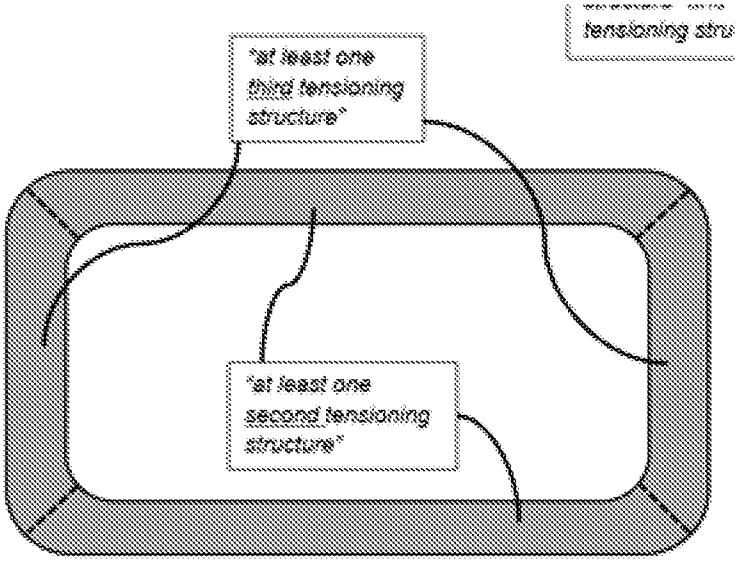
The opposition-division considers it as unreasonable to interpret two sides of the plastic strip (53) as two separate outside edges, as required by features (ix) and (xi) of claim 1. The opposition-division is of the opinion that strip (53) is one single strip going

completely around a circumference. Whereas the plastic strip therefore might have four "sides" it seems unreasonable to says that it has "at least two outside edges". Edges are neither mentioned in the description, nor appearing in the drawings, nor are considered to be implicit.

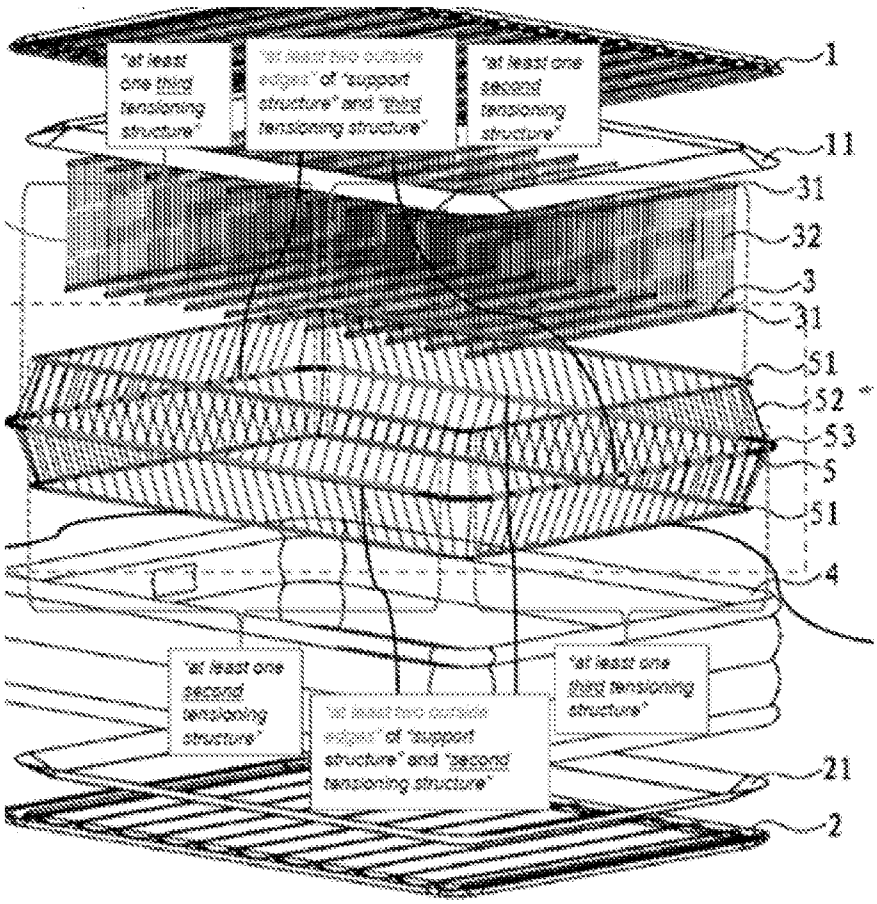
The opposition-division therefore considers that E1 does not disclose features (ix) and (xi) of claim 1.

3.2.2 E1 - second interpretation:

The opponent argued that the two long sides of element (5) could be read as second tensioning element and the two short sides as third tensioning element, as shown in the figure below from slide 3 of E18.



The opponent argued further that the outer side of plastic strip (53) could be read as "outside edges". Since two short sides and two long sides were present, this would lead to two outside edges of the second tensioning structure and two outside edges of the third tensioning structure, as shown in the figure below from slide 3 of E18.



The opposition-division cannot follow this reasoning. The opposition-division considers it as unreasonable to interpret two sides of the plastic strip (53) as two separate outside edges, as required by features (ix) and (xi) of claim 1. The opposition-division is of the opinion that strip (53) is one single strip going completely around a circumference. Whereas the plastic strip therefore might have four "sides" it seems unreasonable to says that it has "at least two outside edges". Edges are neither mentioned in the description, nor appearing in the drawings, nor are considered to be implicit.

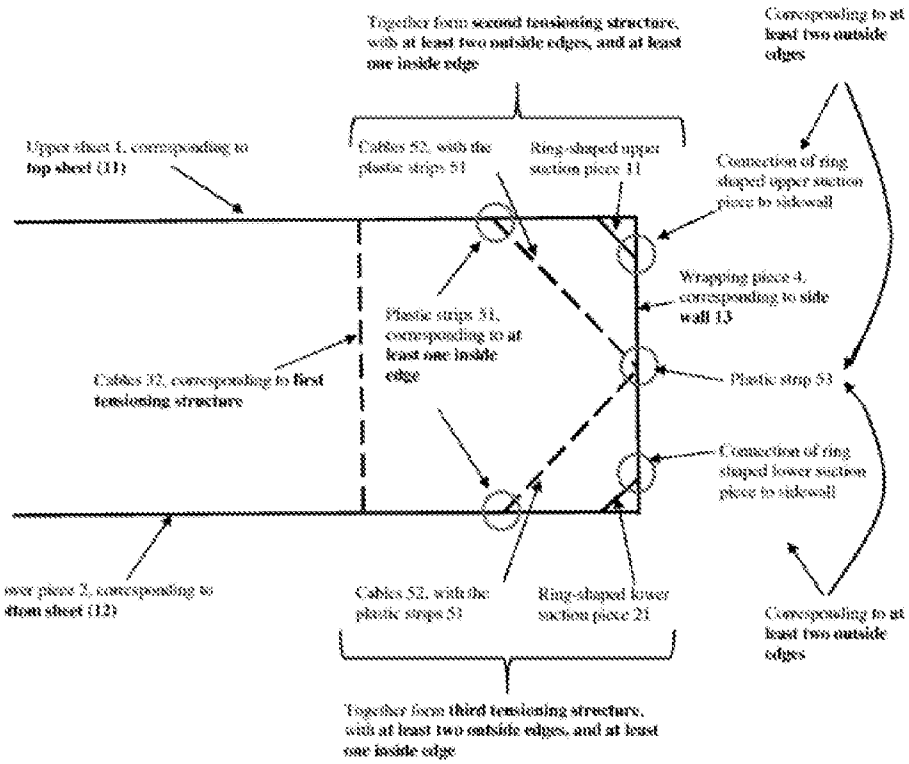
The opposition-division is further of the opinion that two opposite sides long sides of the wrapping belt (5) would not be considered as one tensioning structure by the person skilled in the art, since this structure is interrupted by the short sides. Therefore in consequence, it seems unreasonable to artificially assign each long side of plastic strip (53) as "outside edge".

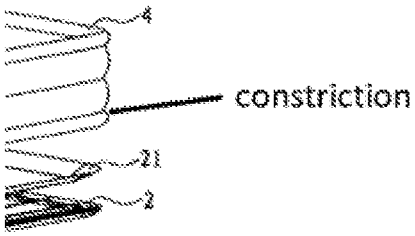
The opposition-division therefore considers that E1 does not disclose features (ix) and (xi) of claim 1.

3.2.3 E1 - third interpretation:

The opponent argued that the "suction piece" (11) and (21) can be read as being the second "outside edge" of the second and third tensioning structure, as shown in the opponents drawing (from the notice of opposition) below.

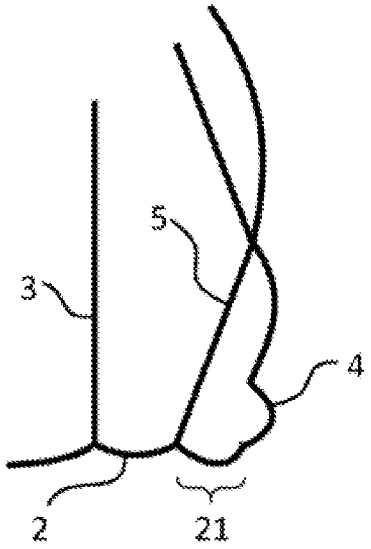
The opponent further argued that it was clear that the ring-shaped lower suction piece was attached to the inside of the side wall, due to the constriction visible on figure 2,3 and 4 of D1 (see figure on the right, below). He further argued that the exploded view in figure 2 leads to such an interpretation of E1.



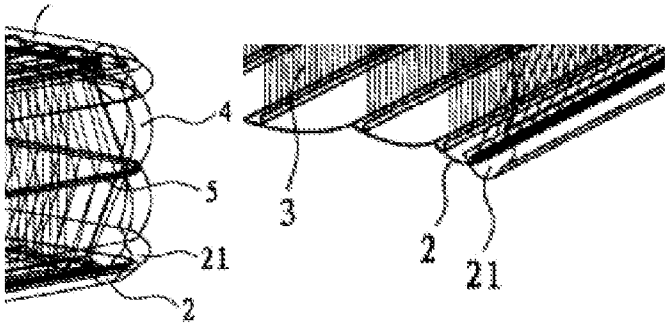


The opposition-division cannot follow this reasoning, since t remains doubtful if in E1 the ring-shaped lower suction piece (21) passes on the inside of the air chamber as shown in the drawing of th e opponent. As argued by the proprietor (see figure provided by the proprietor below), suction piece (21) could also pass on the outer side of the air

chamber. In this case the lower edge of the side wall would not be coupled to an outer edge of the bottom sheet, which means that feature (ii) of claim 1 would not be present in E1.



The opposition-division is further of the opinion that whereas the exploded view in figure 2 gives the impression that suction piece (21) passes on the inside, figures 3 (see below) has a reference to (21) which seems to be on the outside of the bed. Figure 4 (see below) also relates to (21) and appears to confirm that (21) passes on the outside.



(parts of figures 3 and 4 of E1)

The opposition-division is further of the opinion that the description (translation page 5, 2nd paragraph) is not conclusive on this matter, since it only mentions that the lower suction piece 21 is disposed between lower piece 2 and wrapping piece 4. This however is the case for both interpretations.

In summary, the opposition-division comes to the conclusion that both interpretations of the the disclosure of E1 are equally possible. For this reason the opposition-division considers that in E1 there is no direct and unambiguous disclosure of features (ix) and (xi) of claim 1. The subject-matter of claim 1 is therefor new (Article 54 EPC).

3.3 Inventive step (Article 56 EPC)

combination E1 with E9:

The opponent argues that since the disclosure of E1 is ambiguous in relation to the features (ix) and (xi) of claim 1, the person skilled in the art would turn to E9 looking for clarification on what is likely to be disclosed in E1. As a technical problem he defined "how to prevent overprotrusion / overbulging of the side wall". This technical problem was confirmed by the present patent-publication, see paragraph 6,7 and 63. E1 also mentions as a problem "improving aesthetics", which is to be considered as a clear pointer to look for a solution for the problem.

The opposition-division cannot follow this reasoning. E9 appears to be of a completely different construction compared to E1. Whereas E1 (see figure 2 below) has cables (51) (see translation, page 4) for connecting top sheet and side wall, E9 (see figure 5 below) discloses a belt (4) ("ceinture") for this purpose. Whereas the tensioning structure in E1 has two connection-points (51) and (21) to the lower sheet, the tensioning structure of E9 only has one single connection point at (41c), see figures below. Further, the opposition-division cannot identify an "edge of said side wall being coupled to an outer edge of said top sheet" in E9, whereas this feature seem to be present in E1. Figure 5 of E9 only shows a rounded continuous structure which connects side wall (3) to top sheet (33).

The opposition-division is therefore of the opinion that the person skilled in the art would not turn to E9 for solving the technical problem as defined by the opponent.

The opposition-division is therefore of the opinion that the subject-matter of claim 1 involves an inventive step (Article 56 EPC).

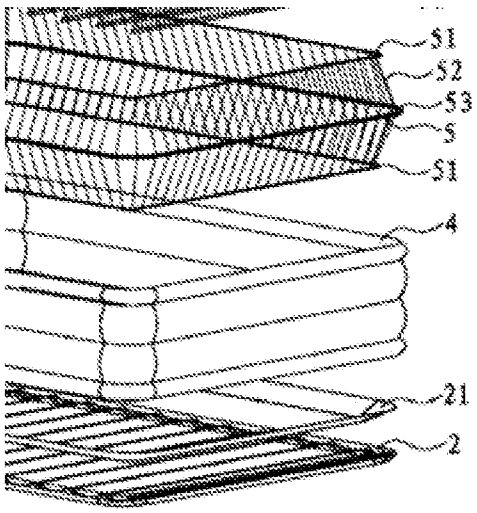


图 2

3.4 The opposition division therefore considers that the ground of opposition according to Article 100(a) EPC does not prejudice the maintenance of the patent.

III. Conclusion

None of the grounds of opposition prejudices maintenance of the patent as granted. The opposition is rejected (Art. 101(2) EPC).

Article 106
Decisions subject to appeal

(1) An appeal shall lie from decisions of the Receiving Section, Examining Divisions, Opposition Divisions and the Legal Division. It shall have suspensive effect.

(2) A decision which does not terminate proceedings as regards one of the parties can only be appealed together with the final decision, unless the decision allows a separate appeal.

(3) The right to file an appeal against decisions relating to the apportionment or fixing of costs in opposition proceedings may be restricted in the Implementing Regulations.

Rule 97
Appeal against apportionment and fixing of costs

(1) The apportionment of costs of opposition proceedings cannot be the sole subject of an appeal.

(2) A decision fixing the amount of costs of opposition proceedings cannot be appealed unless the amount exceeds that of the fee for appeal.

Rule 98
Surrender or lapse of the patent

The decision of an Opposition Division may be appealed even if the European patent has been surrendered in all the designated Contracting States or has lapsed in all those States.

Article 107
Persons entitled to appeal and to be parties to appeal proceedings

Any party to proceedings adversely affected by a decision may appeal. Any other parties to the proceedings shall be parties to the appeal proceedings as of right.

Article 108
Time limit and form

Notice of appeal shall be filed, in accordance with the Implementing Regulations, at the European Patent Office within **two months** of notification of the decision. Notice of appeal shall not be deemed to have been filed until the fee for appeal has been paid. Within **four months** of notification of the decision, a statement setting out the grounds of appeal shall be filed in accordance with the Implementing Regulations.

Further information concerning the filing of an appeal

(a) Notice of appeal can be filed in accordance with Rule 1 and Rule 2(1) EPC, by delivery by hand, by post, or by technical means of communication. The filing has to comply with the details and conditions and, where appropriate, any special formal or technical requirements laid down by the President of the European Patent Office (R. 99(3) EPC).

(b) The addresses of the filing offices of the European Patent Office are as follows:

(i) European Patent Office
D-80298 Munich
Germany

Fax: +49 89 2399-4465

(ii) European Patent Office
Postbus 5818
NL-2280 HV Rijswijk (ZH)
The Netherlands

Fax: +31 70 340-3016

(iii) European Patent Office
D-10958 Berlin
Germany

Fax: +49 30 259 01-840

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Intex Recreation v. Bestway Inflatables

(c) The notice of appeal must contain the name and address of the appellant in accordance with the provisions of Rule 41(2)(c) EPC, an indication of the decision impugned, and a request defining the subject of the appeal. In the statement of grounds of appeal the appellant shall indicate the reasons for setting aside the decision impugned, or the extent to which it is to be amended, and the facts and evidence on which the appeal is based (R. 99(1) and (2) EPC). The notice of appeal and any subsequent submissions stating the grounds for appeal must be signed (R. 50(3) EPC).

(d) The fee for appeal is laid down in the Rules relating to Fees. The schedule of fees and expenses of the EPO or a reference to the current version is regularly published in the Official Journal of the European Patent Office under the heading "Guidance for the payment of fees, expenses and prices". Fee information is also published on the EPO website under www.epo.org/ fees.

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UNITED KINGDOM

Application No. / Patent No.	Ref.	Date
16 191 360.3 - 1011 / 3 192 401 /	MP19609.EP01/JV	03.02.2021
Proprietor Bestway Inflatables & Material Corp.		

Provision of a copy of the minutes in accordance with Rule 124(4) EPC

The attached copy of the minutes of the oral proceedings is sent to you in accordance with Rule 124(4) EPC.

Europäisches Patentamt • European Patent Office • Office européen des brevets

Suero Gallego, V
Formalities Officer
Tel. No.: +31 70 340 - 2078 **Branch at The Hague**

Enclosure(s): Copy of the minutes (Form 2309)

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Application No.: 16 191 360.3

Patent No.: EP-B-3 192 401

Minutes of the oral proceedings before the OPPOSITION DIVISION

The proceedings were public.

Proceedings opened on 13.01.2021 at 09:00 hours

Present as members of the opposition division:

Chairman:	Krasenbrink, B
1st member:	Lehe, Jörn
2nd member:	Kus, Slawomir
Minute writer:	Kus, Slawomir

Present as or for the party or parties:

- For the Proprietor(s): Bestway Inflatables & Material Corp.

  - Ms. Simona Inchingalo - European Patent Attorney
  - Mr. Aldè - European Patent Attorney

- For the Opponent 1: Intex Recreation Corp.

  - Mr. Joshua Parsi Mendiola - European Patent Attorney
  accompanied by
  - Ms. Joanne Pham - assisting Mr. Parsi of Reddie & Grose LLP

The identity of the person/s (as well as, if applicable, that of the witness or witnesses) and, where necessary, the authorisation to represent/authority to act were checked.

Essentials of the oral proceedings and relevant statements of the parties:

1.0. The chairman opened the oral proceedings at 09:00, introduced the division and identified the persons attending the oral proceedings.

1.1. The chairman asked the parties to confirm the present requests.

1.2. The parties confirmed their requests as mentioned in the written procedure.

2.0. Sufficiency of the disclosure (Article 100(b) EPC).

2.1. The chairman asked the parties to present their arguments concerning sufficiency of disclosure.

2.2. The opponent informed that he already expressed all arguments in the written procedure and that he does not wish to add more arguments.

2.3. The proprietor also stated that he does not have any more comments.

2.4. The chairman of the Opposition Division interrupted the oral proceedings from 9:25-9:30. After resuming the oral proceedings, the chairman informed the parties that the ground according to Article 100(b) EPC does not prejudice the maintenance of the granted patent.

3.0. Admissibility of the novelty objections regarding E1 in view of E18

3.1. The opponent argued that the subject-matter of claim 1 is not novel over E1. In the written procedure he used an interpretation of E1 according to E18 slide 4. Additional to this interpretation of E1 he introduced during the Oral Proceedings two further interpretations of E1 (according to E18 slide 2 and according to E18 slide 3). To support his reasoning, the opponent used the presentation E18. This presentation was first only presented by the ShareScreen functionality, later by sharing the presentation with the Opposition Division and the proprietor. The Opposition Division and the proprietor have been given time to familiarize with E18 and the further interpretations of E1.

3.2. The proprietor argued that the two further interpretations of E1 (according to E18 slide 2 and E18 slide 3) are introduced for the first time in the Oral Proceedings, that they are late filed, and that they are not prima facie relevant. Therefore, he requested not to admit the novelty objections based on these further interpretations of E1 into the procedure.

3.3. The proprietor requested for the same reasons not to admit the presentation E18 into the procedure.

3.4. The opponent provided arguments to admit E18 and the novelty objections based on the new interpretations of E1 into the procedure.

3.5. Since E18 also comprises other slides not referring to E1, the chairman clarified that the discussion regarding the admittance of E18 refers only to the slides of E18 which refer to E1.

3.6. Several breaks were provided for giving the parties preparation time and the opposition division deliberation time (9:40-9:45, 9:45-10:00, 10:30-10:35). After the last break for deliberation from 10:45-11:00, the chairman of the Opposition Division informed the parties that the novelty objections based on the further interpretations of E1 and the presentation E18, when it refers to E1, are admitted into the procedure.

4.0. Novelty (Article 100(a) EPC and Article 54 EPC) of claim 1 in view of E1

4.1. The opponent argued that the subject-matter of claim 1 is not novel over E1 interpreted according to slide 2 of E18. He argued that the support structure 5 could be interpreted as two separate upper and lower structures having each a separate outside edge formed by plastic strip 53.

4.2. The proprietor argued that the there is only one plastic strip 53, which cannot be artificially divided in two entities to form two separate upper and lower structures.

4.3. The chairman of the Opposition Division interrupted the oral proceedings from 11:15-11:20. After resuming the oral proceedings, the chairman informed the parties about the opposition division's opinion that the subject-matter of claim 1 is novel over E1 interpreted according to slide 2 of E18.

4.4. The opponent argued that the subject-matter of claim 1 is not novel over E1 interpreted according to slide 3 of E18. The opponent argued that the support structure 5 could be interpreted as two separate longer and shorter side structures.

4.5. The proprietor argued that the there is only one structure 5, which cannot be artificially divided in two shorter side and longer side structures.

4.6. The chairman of the Opposition Division interrupted the oral proceedings from 11:30-11:45. After resuming the oral proceedings, the chairman informed the parties about the opposition division's opinion that the subject-matter of claim 1 is novel over E1 interpreted according to slide 3 of E18.

4.7. The opponent argued that the subject-matter of claim 1 is not novel over E1 interpreted according to slide 4 of E18. He argued that the ring shaped element 21 should be interpreted according to the exploded view of figure 2 of E1 as being placed between the bottom sheet 2 and the inside wall 4, forming at the lower inside wall 4 a connection kink.

4.8. The proprietor argued that the argument of the opponent is only one of the possible interpretations of figure 2 of E1. He referred to the translated description E2 of E1 on page 5, line 4, which discloses the ring shaped element 21 providing improved aesthetics of the mattress, therefore the element 21 should be located outside of the inner chamber of the mattress.

4.9. To support his reasoning, the opponent proposed to show a physical model of the mattress of E1 which he had manufactured.

4.10. The proprietor requested not to admit this model into the procedure, since it is late filed and not prima facie relevant.

4.11. The chairman of the Opposition Division interrupted the oral proceedings from 12:20-12:25. After resuming the oral proceedings, the chairman informed the parties that the physical model is not admitted to the procedure.

4.12. The chairman of the Opposition Division interrupted the oral proceedings from 12:30-12:40. After resuming the oral proceedings, the chairman informed the parties about the opposition division's opinion that the subject-matter of claim 1 is novel over E1 interpreted according to slide 4 of E18.

4.13. The chairman of the Opposition Division interrupted the oral proceedings from 12:45-13:30.

5.0. E9

5.1. The opponent argued that the subject-matter of claim 1 is not novel over E9.

5.2. The proprietor requested not to admit this novelty objection into the procedure since this objection has not been raised before. He argued that said objection is late filed and not prima facie relevant.

5.3. Both parties presented their arguments concerning the prima facie relevance.

5.4. The chairman of the Opposition Division interrupted the oral proceedings from 13:55- 14:10. After resuming the oral proceedings, the chairman informed the parties about the opposition division's opinion that said novelty objection is not admitted into the procedure since E9 does prima facie not disclose all features of claim 1.

6.0. E16

6.1. The opponent argued that the subject-matter of claim 1 is not novel over E16.

6.2. The proprietor requested not to admit the document E16 into the procedure since it has been filed only a few days in advance of the Oral Proceedings. He argued that mentioning of E16 in the introductory part of the patent's description does not make it automatically part of the procedure and that E16 is not prima facie relevant.

6.3. Both parties presented their arguments concerning E16.

6.4. The chairman of the Opposition Division interrupted the oral proceedings from 14:25- 14:35. After resuming the oral proceedings, the chairman informed the parties about the opposition division's opinion that E16 is not admitted into the procedure since it is prima facie not relevant for the assessment of novelty of claim 1.

7.0. Inventive Step (Article 100(a) EPC and Article 56 EPC)

7.1. The opponent argued that the subject-matter of claim 1 is not inventive starting from E1 in combination with E9.

7.2. The proprietor requested not to admit this inventive step objection into the procedure since this objection has not been raised before. He argued that said objection is late filed and not prima facie relevant.

7.3. Both parties presented their arguments regarding the admissibility of said inventive step objection.

7.4. The chairman of the Opposition Division interrupted the oral proceedings from 14:40-14:45 After resuming the oral proceedings, the chairman informed the parties about the opposition division's opinion that the inventive step objection is admitted into the procedure.

7.5. Both parties presented their arguments concerning the inventive step combination of E1 with E9.

7.6. The chairman of the Opposition Division interrupted the oral proceedings from 14:50- 14:55. After resuming the oral proceedings, the chairman informed the parties about the opposition division's opinion that the combination of E1 with E9 is not prejudicial to an inventive step of the subject-matter of claim 1.

8.0. The parties did not have any further remarks or requests.

8.1. The chairman of the Opposition Division asked the parties whether the oral proceedings were run well in a technical sense. The parties acknowledged that the oral proceedings have run well without any major technical issues.

8.2. The chairman announced the decision of the opposition division to reject the opposition and to maintain the patent as granted (Art. 101(2) EPC).

8.3. The chairman referred to the right to file an appeal according to Article 106 EPC.

8.4. The proceedings were closed at 15.15.

After deliberation of the opposition division,

- the chairman announced the following **decision** :

"The opposition is rejected."

Regarding the reasons for the decision, the chairman referred to:

Article 101(2) EPC, second sentence: the grounds for opposition mentioned in Article 100 EPC do not prejudice the maintenance of the patent as granted.

The chairman **closed the oral proceedings** on 13.01.2021 at 15:15 hours.

signed: signed:

Krasenbrink, B Kus, Slawomir

. . . . . .
Chairman

. . . . . .
Minute Writer

Enclosure(s):

First peripheral strip 150a has 4 outside edges (purple) and 4 inside edges (light blue) – accordingly, the first peripheral strip has *"at least two outside edges"* and *"at least one inside edge"*

Second peripheral strip 190 has 4 outside edges (green) and 4 inside edges (light blue) – accordingly, the second peripheral strip has *"at least two outside edges"* and *"at least one inside edge"*

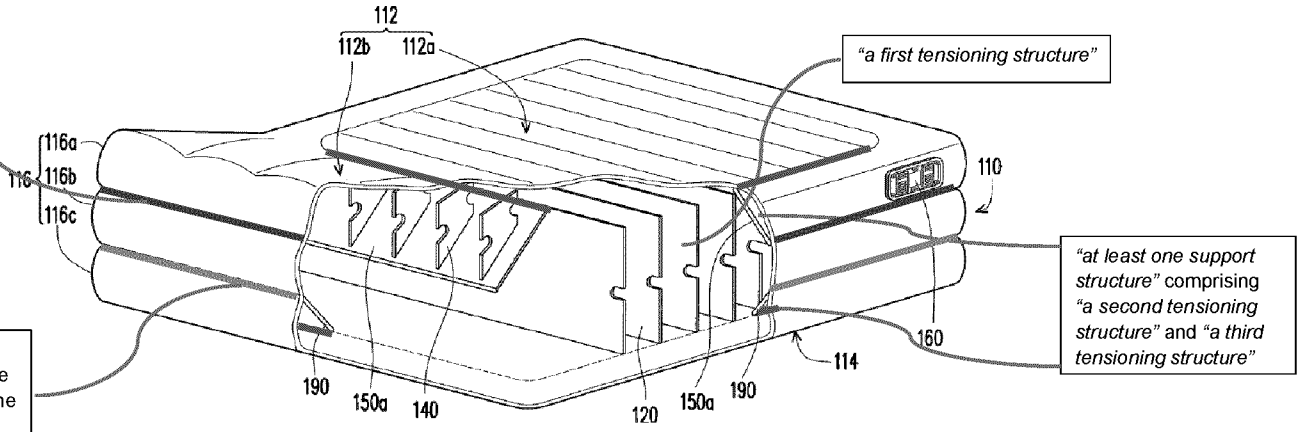
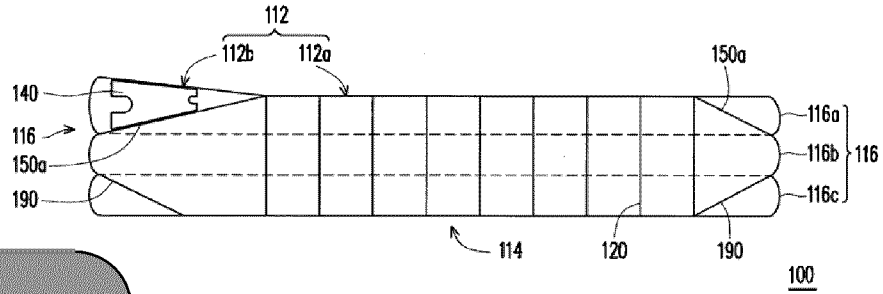
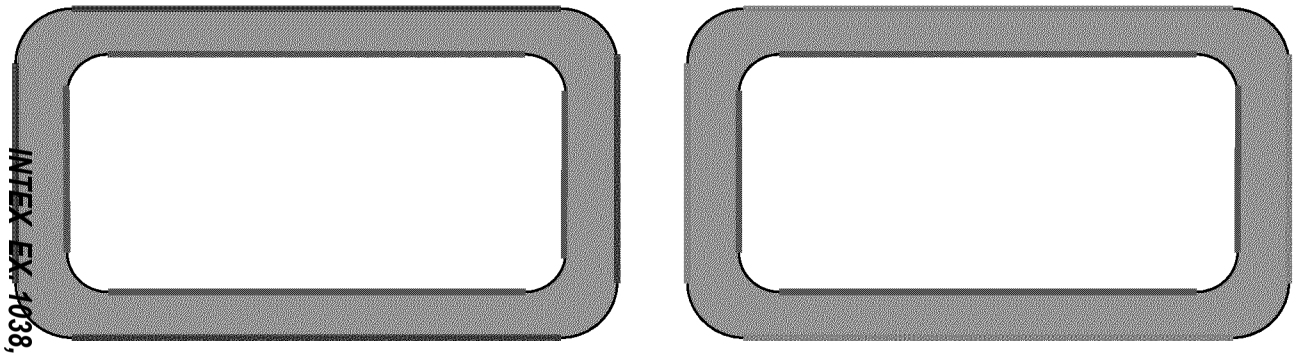


FIG. 9



Source(s): Figures 8 & 9 of E16



INTEX EX. 1038, Pg. 825
Intex Recreation v. Bestway Inflatables

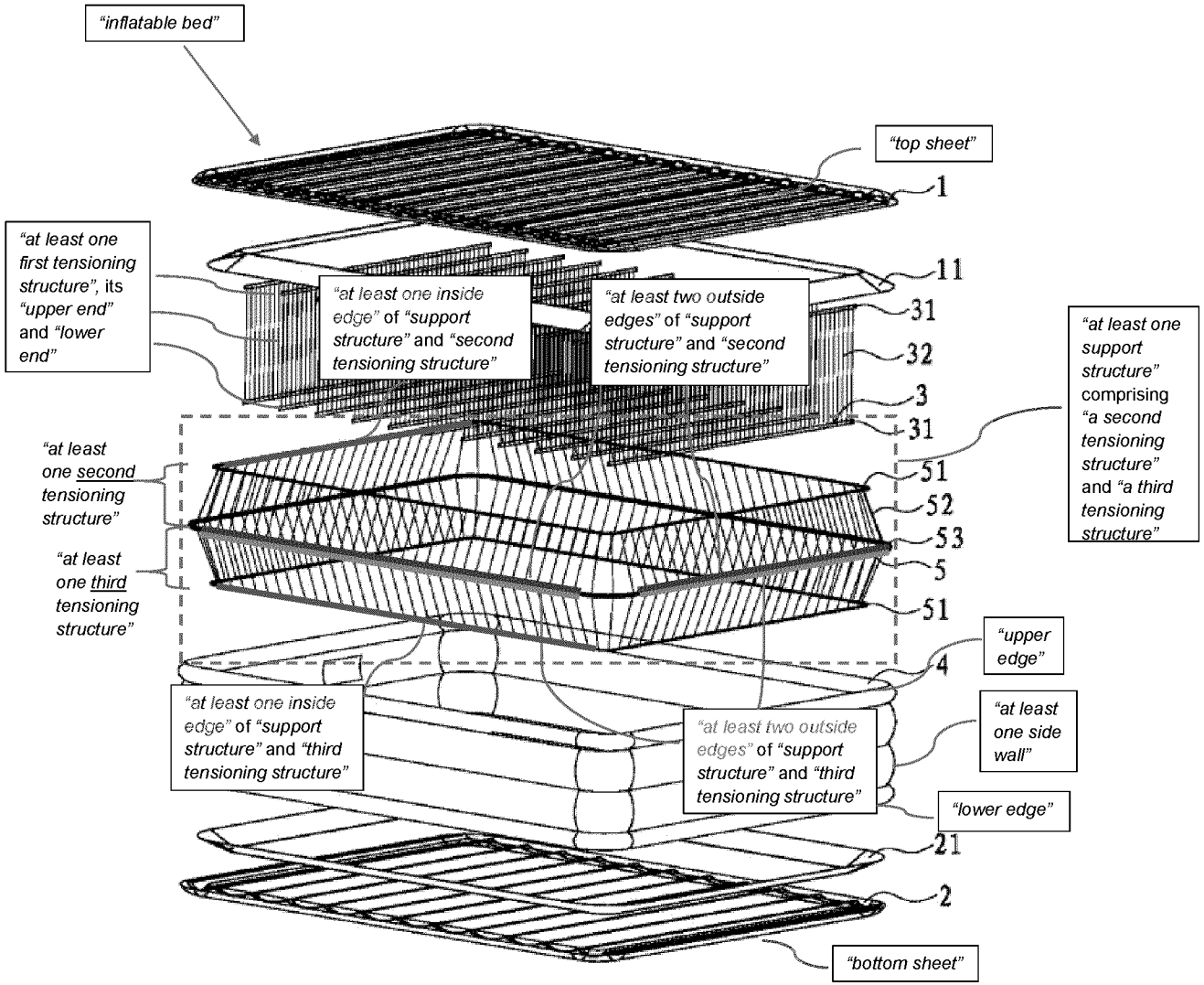
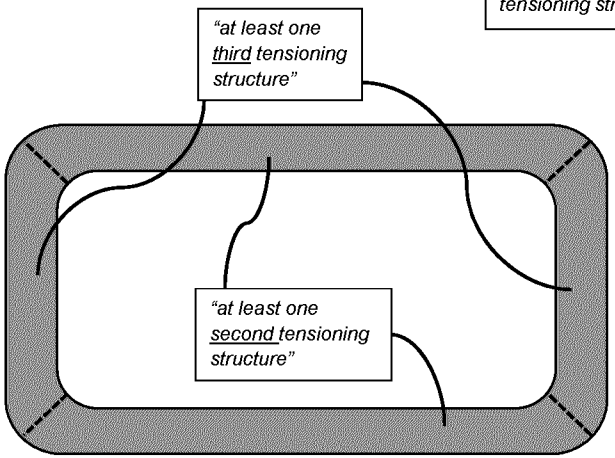


图 2

Source(s): Figure 2 of E1



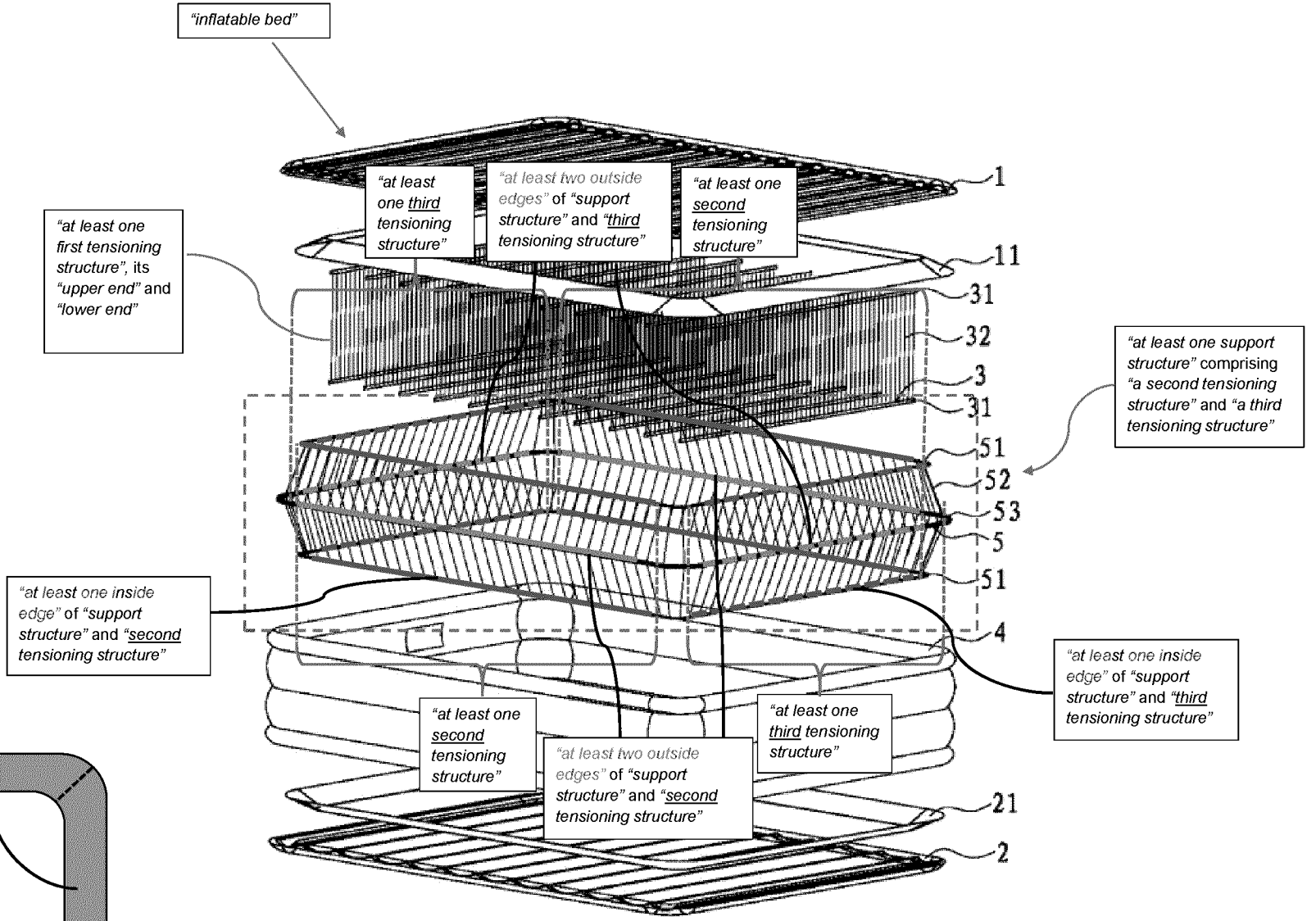
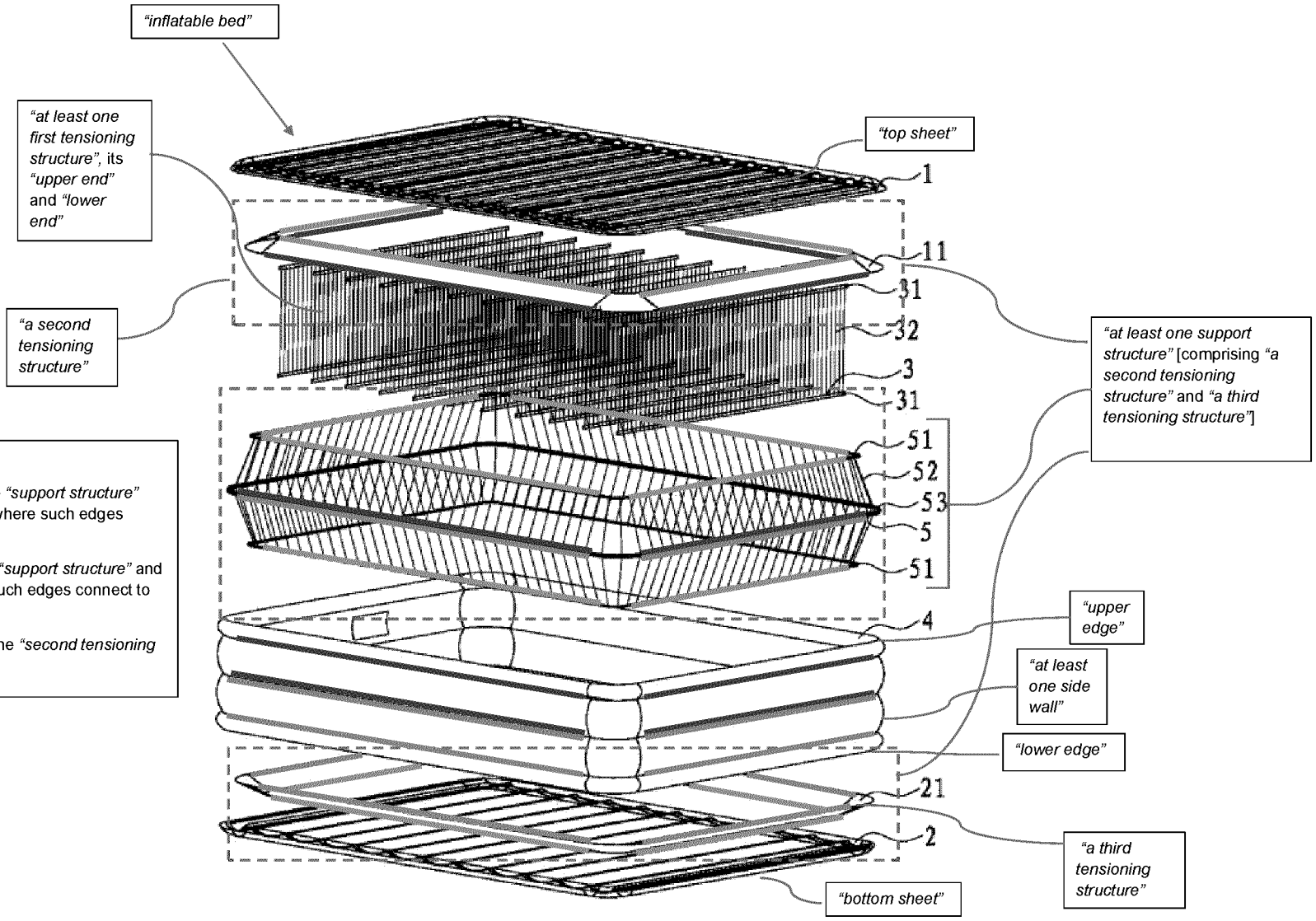


图 2

Source(s): Figure 2 of E1



LEGEND

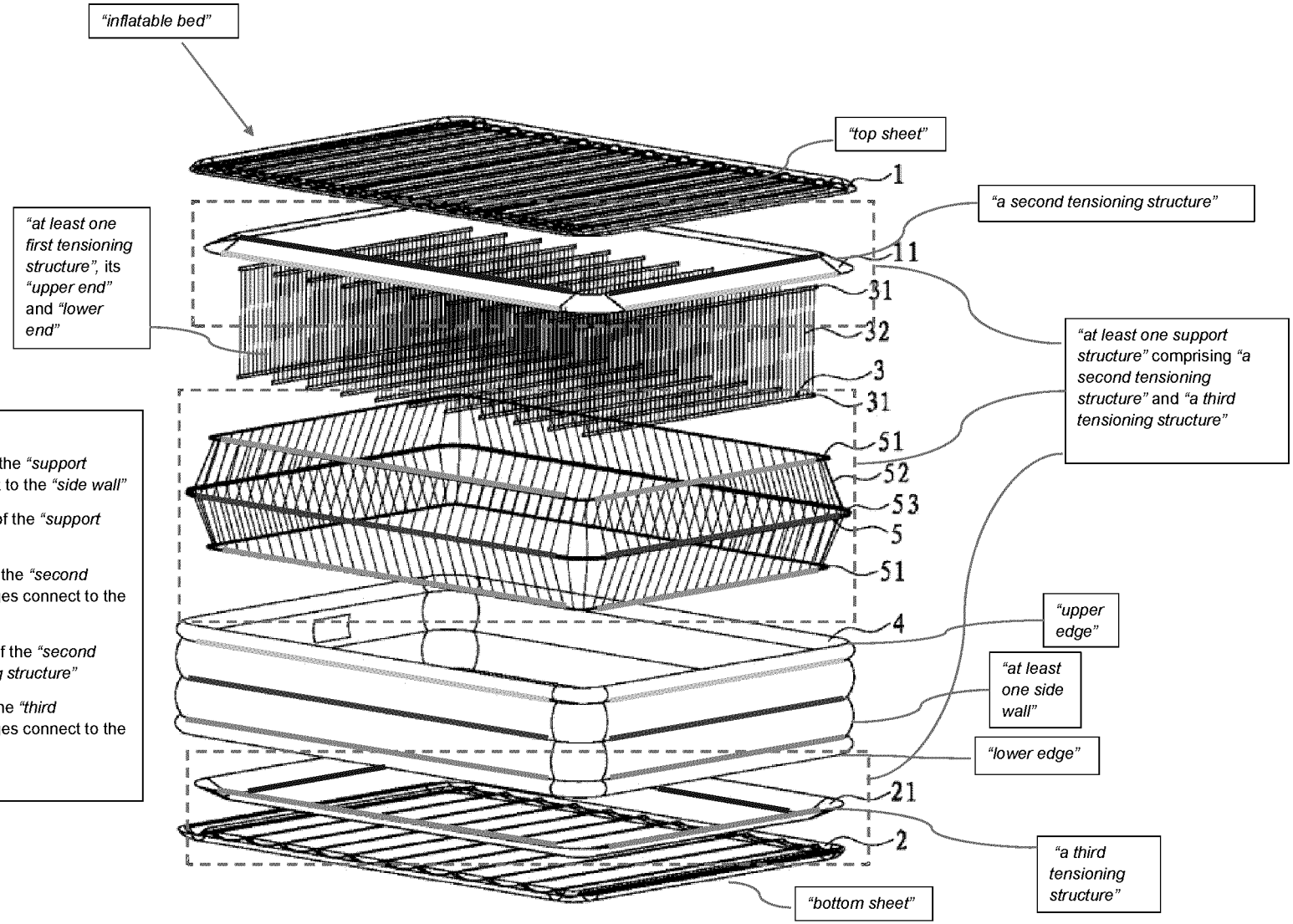
PURPLE: *"at least two outside edges"* of the *"support structure"* and the *"second tensioning structure"*, and where such edges connect to the *"side wall"*

GREEN: *"at least two outside edges"* of the *"support structure"* and the *"third tensioning structure"*, and where such edges connect to the *"side wall"*

LIGHT BLUE: *"at least one inside edge"* of the *"second tensioning structure"* and *"third tensioning structure"*

圖 2

Source(s): Figure 2 of E1



LEGEND

PURPLE: *"at least two outside edges"* of the *"support structure"* and where such edges connect to the *"side wall"*

LIGHT BLUE: *"at least one inside edge"* of the *"support structure"*

YELLOW: *"at least two outside edges"* of the *"second tensioning structure"* and where such edges connect to the *"side wall"*

DARK BLUE: *"at least one inside edge"* of the *"second tensioning structure"* and *"third tensioning structure"*

GREEN: *"at least two outside edges"* of the *"third tensioning structure"* and where such edges connect to the *"side wall"*

图 2

Source(s): Figure 2 of E1

First peripheral strip 150a has at least 4 outside edges (purple) and 4 inside edges (light blue) – accordingly, the first peripheral strip has *"at least two outside edges"* and *"at least one inside edge"*

Second peripheral strip 190 has at least 4 outside edges (green) and 4 inside edges (light blue) – accordingly, the second peripheral strip has *"at least two outside edges"* and *"at least one inside edge"*

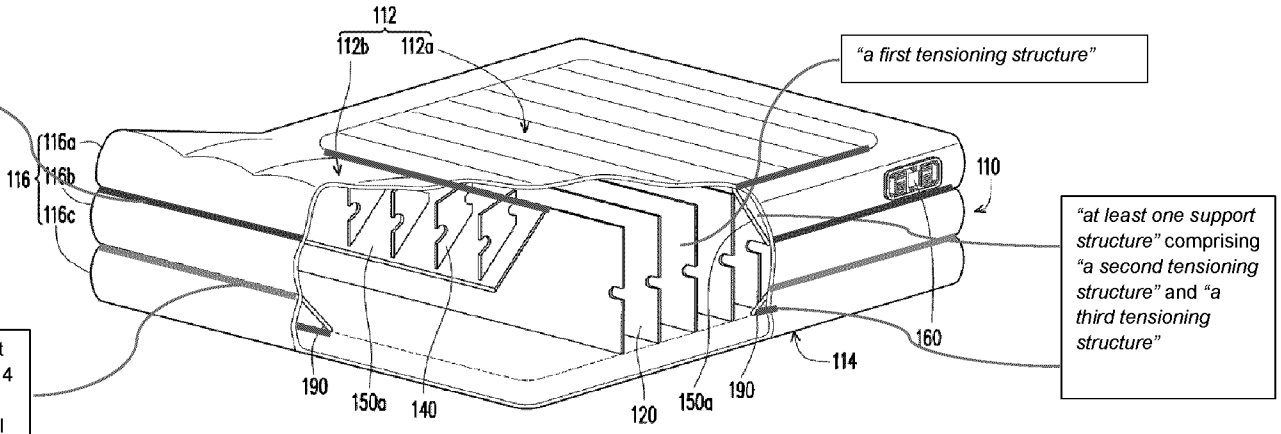
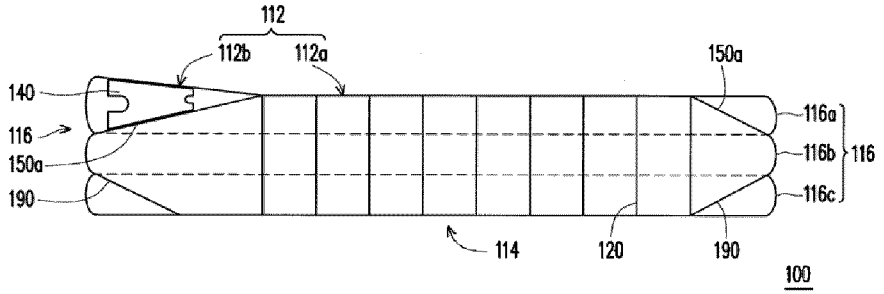


FIG. 9



Source(s): Figures 8 & 9 of E16

INTEX EX. 1038, Pg. 830
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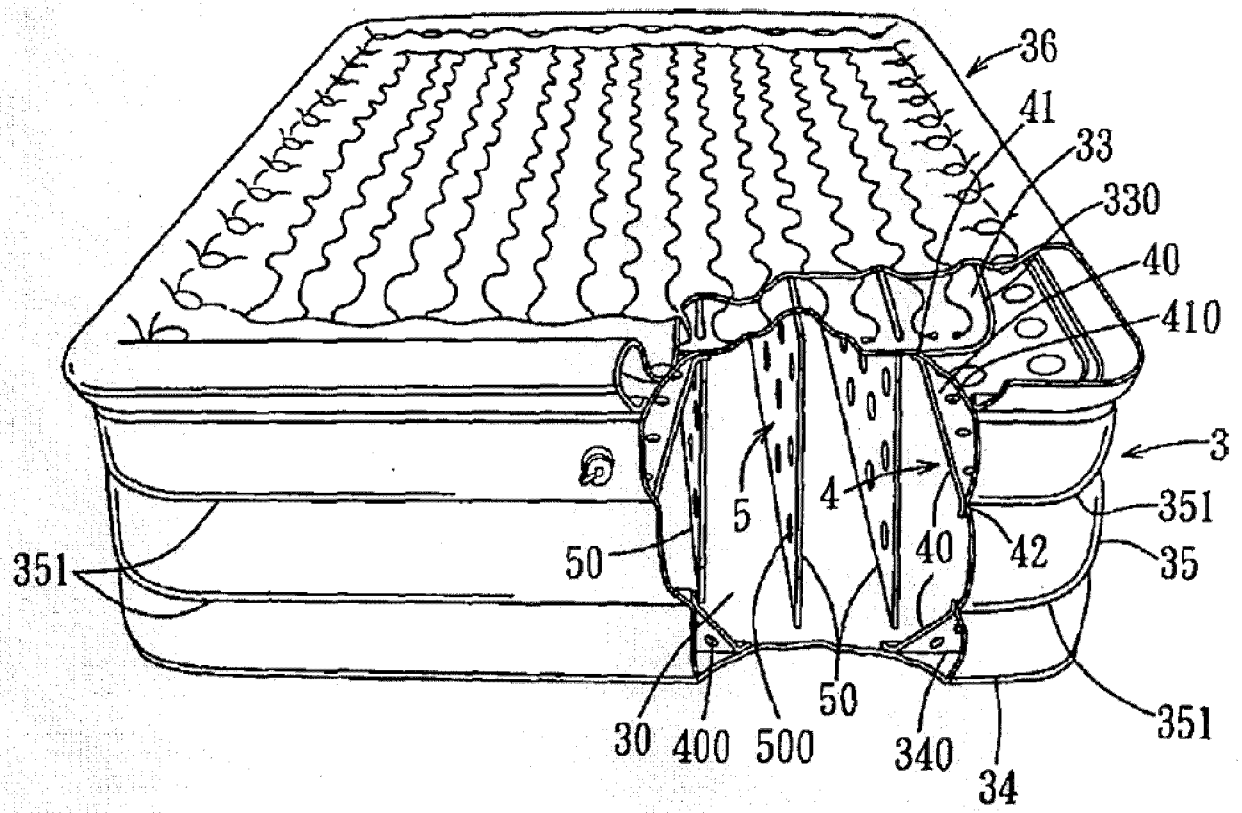


FIG. 2

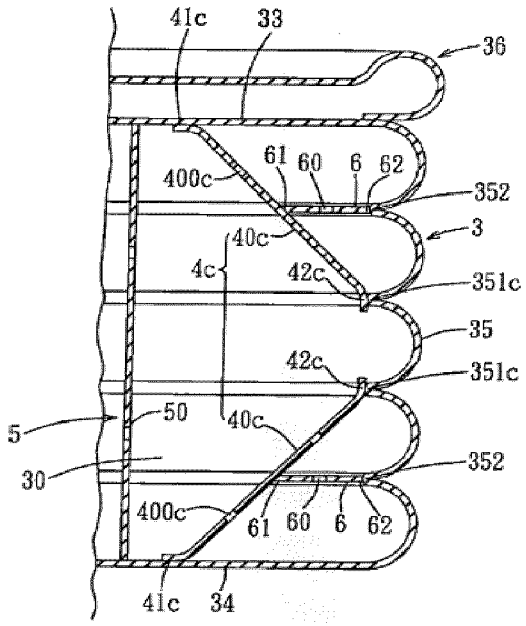


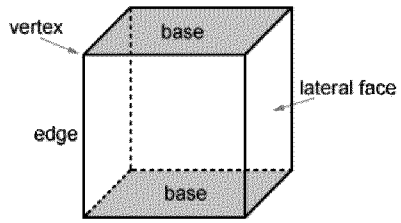
FIG. 5

Source(s): Figures 2 & 5 of E9

INTEX EX. 1038, Pg. 831
Intex Recreation v. Bestway Inflatables

Characteristics of a cube

The six identical faces of a cube are often categorized as four lateral faces and two bases. An edge of a cube is a line segment formed by the intersection of two adjacent faces. A vertex of a cube is the point of intersection of three edges.



A cube has the following characteristics:

- A cube has 6 faces, 12 edges, and 8 vertices. The 6 faces are identical squares. The 12 edges are equal in length.

Source: https://www.math.net/cube

INTEX EX. 1038, Pg. 832
Intex Recreation v. Bestway Inflatables

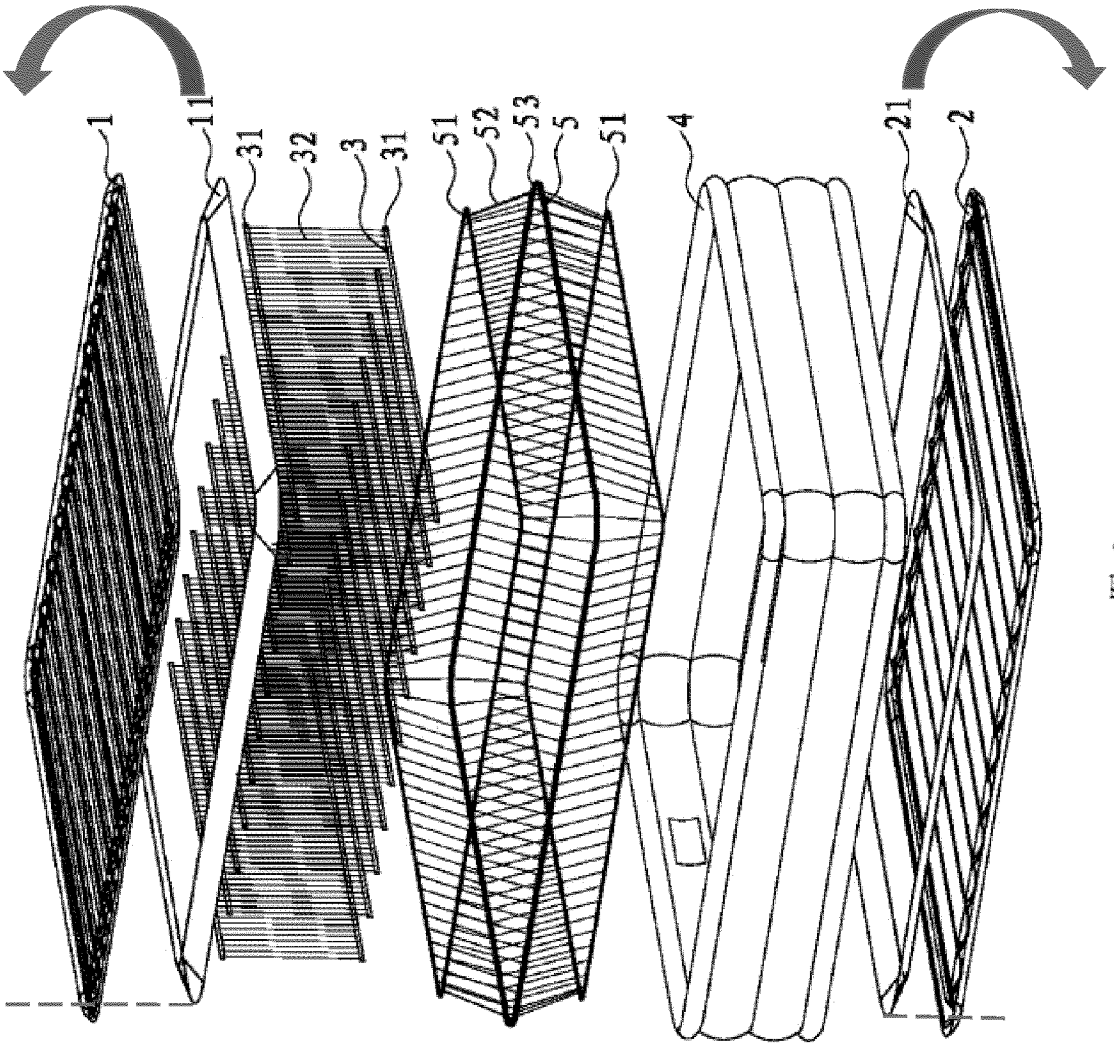
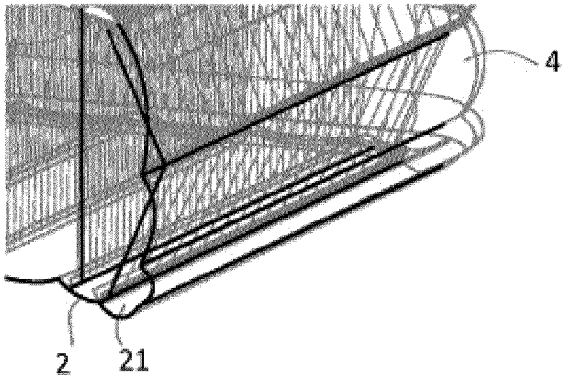
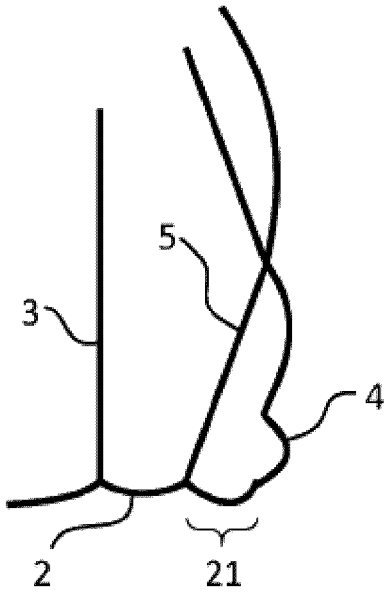


图 2

Source(s): Figure 2 of E1



Picture 2 - detail of Figure 4 of E1; original lines have been lightened and thick black lines have been added in order to render the structures of the bed more evident



Picture 4 - Sketch of the structure of E1 as derived from Figure 4 of E1 itself

Source(s): Pages 2 & 3, Patentee's written submissions of 9th November 2019

INTEX EX. 1038, Pg. 834
Intex Recreation v. Bestway Inflatables

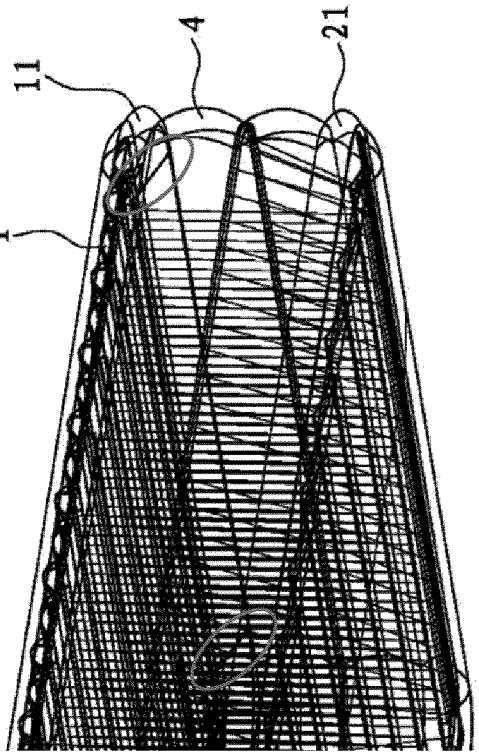


Figure 3 of E1

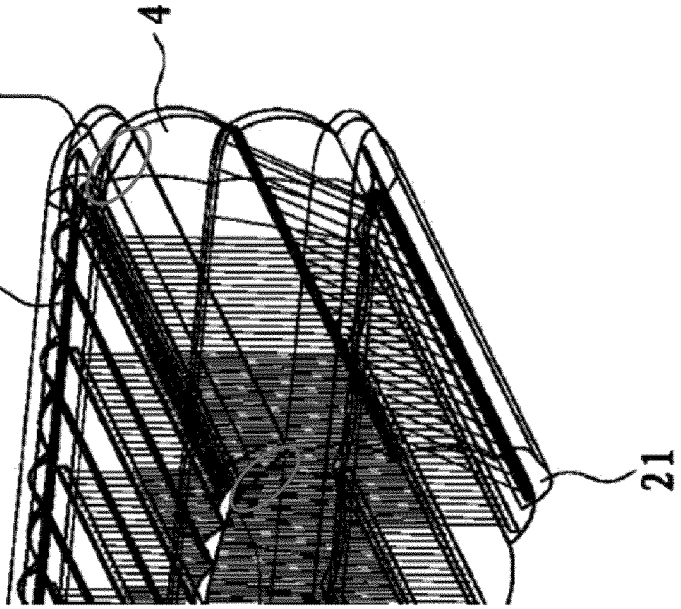
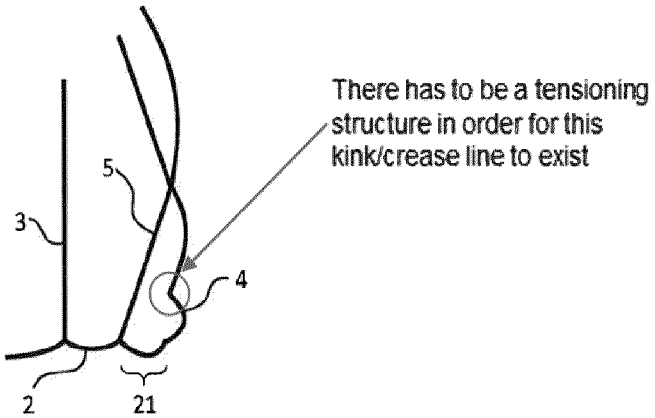


Figure 4 of E1



Picture 4 - Sketch of the structure of E1 as derived from Figure 4 of E1 itself

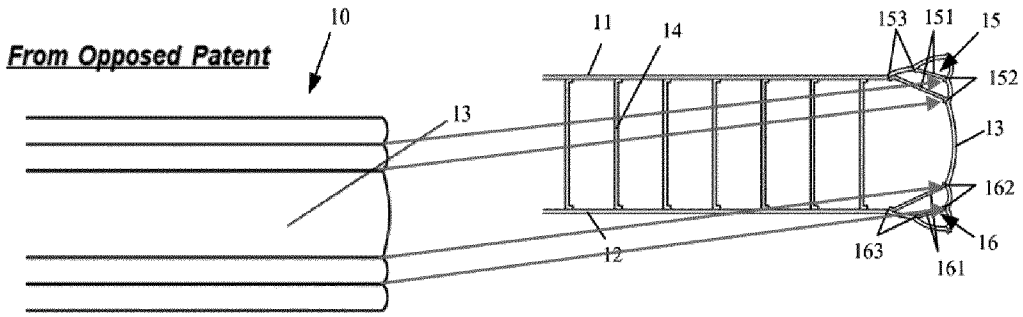
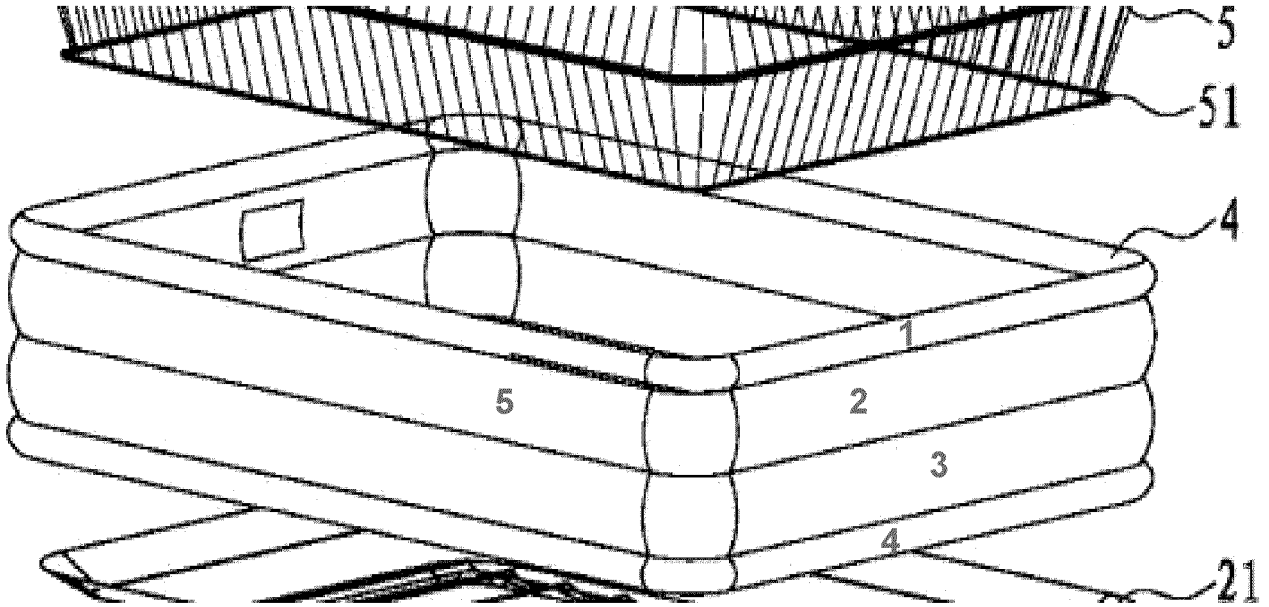


Fig. 2

Fig. 5

Source(s): Figures 2 & 5 of the Patent

INTEX EX. 1038, Pg. 836
Intex Recreation v. Bestway Inflatables



Source(s): Figure 2 of E1

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Formalities officer
Suero Gallego, Veronica

Inchingalo, Simona
Bugnion S.p.A.
Viale Lancetti, 17
20158 Milano
ITALIE

Date: 03.02.2021

Reference	Application No./Patent No.
27D8343A,12EP42	16191360.3 - 1011 / 3192401

Applicant/Proprietor: Bestway Inflatables & Material Corp.

EPA/EPO/OEB Formblatt/Form/Formulaire : 2330

Empfangsbescheinigung über den Zugang des vorstehend bezeichneten Schriftstücks
Acknowledgement of receipt of the document specified above
Récépissé du document spécifié ci-dessus

Unter Bezugnahme auf die Mitteilung im ABl EPA 7/2010, 377 wird gebeten, die Empfangsbescheinigung mit Empfangsdatum und Unterschrift zu versehen und **umgehend** an das EPA zurückzusenden:

With reference to the Notice in OJ EPO 7/2010, 377, you are requested to date and sign the acknowledgement of receipt and return it to the EPO **immediately**:

Conformément au communiqué paru au JO OEB 7/2010, 377, vous êtes prié d'indiquer sur le récépissé la date de réception du document, de signer le récépissé et de le renvoyer **sans délai** à l' OEB:

- **über die Online-Dienste des EPA** (als Anlage zu EPA Form 1038) / **through EPO Online Services** (as annex to EPO Form 1038) / **par les services en ligne de l'OEB** (en tant que pièce jointe au formulaire OEB 1038),
- **per Fax / by fax / par téléfax (+49 (0) 89 2399-4465 or +31 (0) 70 340-3016)**
- oder per Post / or by post / ou par courrier.

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ITALIE

Formalities Officer
Name: Suero Gallego, V
Tel: +31 70 340 - 2078
or call
+31 (0)70 340 45 00

Application No. / Patent No.	Ref.	Date
16 191 360.3 - 1011 / 3 192 401 /	27D8343A,12EP42	03.02.2021
Proprietor Bestway Inflatables & Material Corp.		

Decision rejecting the opposition (Art. 101(2) EPC)

The Opposition Division - at the oral proceedings dated 14.01.2021 - has decided:

The opposition(s) against the European patent EP-B- 3 192 401 is/are rejected.
The reasons for the decision are enclosed.

Possibility of appeal
This decision is open to appeal. Attention is drawn to the attached text of Articles 106 to 108 and Rules 97 to 98 EPC.

Opposition Division:

Chairman:	Krasenbrink, B
2nd Examiner:	Kus, Slawomir
1st Examiner:	Lehe, Jörn

Suero Gallego, V
Formalities Officer
Tel. No.: +31 70 340-2078 **Branch at The Hague**

Enclosure(s): 15 page(s) reasons for the decision (Form 2916)
Wording of Articles 106 - 108 and Rules 97 - 98 EPC (Form 2019)
Minutes of oral proceedings

to EPO postal service: 27.01.21

I. Summary of Facts and Submissions

1 European patent 3 192 401 having the title "INFLATABLE BED" is based upon European patent application No. 16 191 360.3 filed on 29-09-2016. It claims priority of CN 201610020533 filed on 13-01-2016.

The mention of the grant of the patent has been published in the European Patent Bulletin of 19-09-2018. Proprietor of the patent is
Bestway Inflatables & Material Corp.
No. 3065 Cao An Road
Shanghai 201812
CN.

2 A notice of opposition has been filed by
Intex Recreation Corp.
4001 Via Oro Avenue, Suite 210
Long Beach, CA 90810
US
on 17-06-2019.
The Opponent requests revocation of the patent in its entirety based on Articles 100(a) and 100(b) EPC.

3 The following evidence has been submitted:

E1 - CN 203137719 U

E2 - Translation of CN 203137719 U

E3 - US 2007/0277324 (Liu, Feng)

E4 - US 9,254,047 (Schermel et al.)

E5 - US 4,941,223 (Santo, Philip J)

E6 - US 5,669,091 (Chung, Ming-Chun)

E7 - US 2015/0335164 (Liu, Feng)

E8 - WO 2013/130117 (Intex Recreation Corporation)

E9 - FR 2 914 545 (Song Rong)

E9a - English translation of E9

E10 - GB 434,098 (P. B. Cow & Co Ltd)

E11 - US 6,568,013 (Perez et al.)

E12-US 6,671,910 (Hsu et al.)

E13 - US 6,701,559 (Boso et al.)

E14- US 7,039,972 (Chaffee, Robert B)

E15 - US 2015/0201760 (Lin et al.)

E16 - US2013/0145560 A1

E17 - US2009/0165211 A1

E18 - Powerpoint presentation filed during Oral Proceedings

4 In a letter received on 30-10-2019, the proprietor requested the rejection of the opposition (Article 101(2) EPC).

5 On 28-05-2020 the opposition division issued a summons to attend oral proceedings on 14-01-2021.

6 In a letter received on 30-9-2020 the proprietor gives further arguments and filed three auxiliary requests.

7 In a letter received on 30-9-2020, the opponent requests to cancel the oral proceedings scheduled as a ViCo on 14-1-2021 and to schedule a new date for in-person oral proceedings.

8 With office-communication dated 17-12-2020, the opposition-division informs the parties that the oral proceedings will be held on 14-1-2021 in the form of a ViCo as planned and gives reasons for this.

9 In a letter received on 12-1-2021, the opponent files documents E9a, E16 and E17.

10 On 14-01-2021, oral proceedings were held.

11 The decision is based on the patent as granted.

12 The feature-analysis of claim 1 and the references used in this decision are as follows:

i	An inflatable bed (10), comprising: a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;
ii	at least one side wall (13), an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet,

iii	an air chamber formed between said top sheet, said bottom sheet and said side wall;
iv	at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and
v	at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls,
vi	at least two outside edges (152,162) of said support structure being respectively coupled to the side wall adjacent,
vii	at least one inside edge (153,163) of said support structure being coupled to the top sheet or bottom sheet adjacent,
viii	wherein said support structure comprises a second tensioning structure and a third tensioning structure,
ix	at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent,
x	at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent; and
xi	at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent,
xii	at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent.

II. Reasons for the decision

1. Admissibility of the Opposition

The opposition is admissible because it meets all the requirements of Articles 99(1) and 100 EPC and Rules 3(1) and 76(1)(2) EPC.

2. Article 100(b) EPC

Claim 1:

The opponent had argued that according to claim 1, the support structure must be parallel to the side wall. He further argued that no embodiment was disclosed which would show this feature.

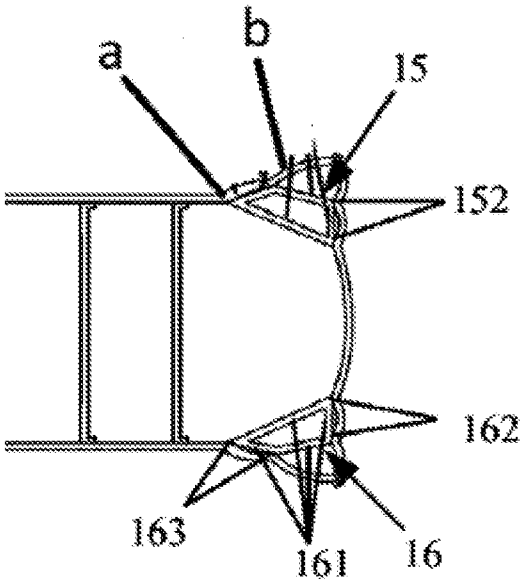
The opposition-division is of the opinion, that the support structure in figure 5 of the patent is in fact disposed in a longitudinal direction of the side wall, since it has an extension in the direction of the side wall.

The opposition-division therefore considers that the invention as defined by the features of claim 1 is sufficiently disclosed for it to be carried out by a person skilled in the art.

Claims 36 and 37

The opponent had argued that claims 36 and 37 are completely ambiguous to the effect that it would be impossible for the person skilled in art to carry them out.

The opposition-division cannot follow this reasoning. In relation to parts of fig. 12 (see below with references "a" and "b" added) the opposition-division is of the following opinion:



Location (a) refers to the:

- the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure.

This location is lower than location (b):

- the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

The reasoning for claim 37 is equivalent, but relates to the bottom sheet.

The opposition-division considers that an invention is in principle sufficiently disclosed if at least one way is clearly indicated enabling the person skilled in the art to carry out the invention (see Case-Law II.C.5.2). The invention as defined in claim 36 and 37 is therefore sufficiently disclosed for it to be carried out by a person skilled in the art.

The opposition division there considers that the ground of opposition according to Article 100(b) EPC does not prejudice the maintenance of the patent.

3. Article 100 (a) EPC

3.1. Admissibility (Rule 116(1) EPC)

3.1.1 Admissibility of E18 and admissibility of new Novelty-objections based on E1 and E18

The opponent has brought forward during the oral proceedings for the first time new interpretations of E1, additional to an interpretation brought forward in the written procedure. Based on each of these different interpretations of E1, he contested the novelty of the subject-matter of claim 1. To support and clarify these different interpretations of E1, the opponent has filed a powerpoint-presentation (E18) during the oral proceedings. The proprietor contested the admissibility of this presentation, arguing that this presentation was late-filed, that it could have been filed earlier and that he would be taken by surprise. He further argued that E18 contained also subject-matter based on E9, E16 and E17.

The opposition-division does not follow this reasoning in relation to the references of E18 to E1. In relation to E1 the document E18 does not refer to any undiscussed embodiments and is just intended as a visual help for interpreting E1. This is not seen as surprising by the opposition-division, but rather as helpful. The novelty objections based on the newly introduced interpretations of E1 are further considered as prima facie relevant. The novelty objections based on the newly introduced interpretations and

the parts of E18 which refer to E1 and to the opposed patent are therefore admitted into the procedure (Rule 116 (1) (EPC). This concerns slides 2-5 and 9-13. The question of admissibility of slides 6-8 was not addressed.

3.1.2 Late-filed novelty attack based on E9 (late-filed fact).

The opponent had contested novelty based on E9. He argued that this attack was only made during oral proceedings for the first time, because he was assigned to take care of this opposition-case at a very late stage.

The proprietor requested not to admit this attack into the procedure.

The opposition-division does not admit the late filed novelty-objection based on E9 into the proceedings (Rule 116(1) EPC). Prima facie, the opposition-division cannot identify an "edge of said side wall being coupled to an outer edge of said top sheet". Figure 5 of E9, see below, only shows a rounded continuous structure which connects side wall (3) to top sheet (33). Therefore already feature (ii) of claim 1 is not disclosed in E9, which is therefore prima facie not relevant for assessing novelty.

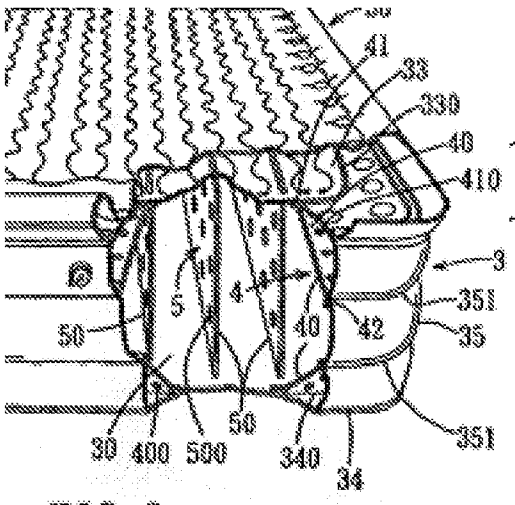


FIG. 2

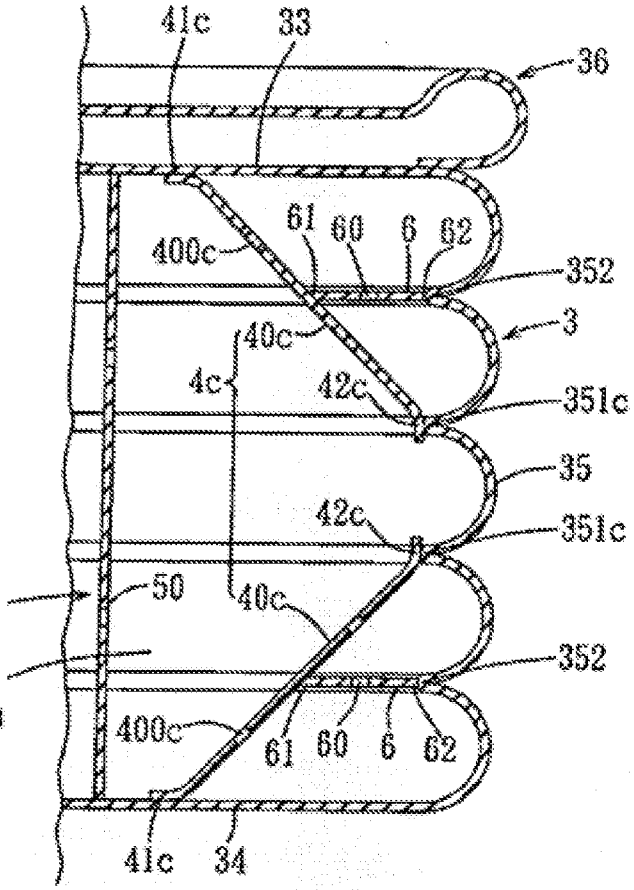


FIG. 5

3.1.3 Late-filed document E16

The opponent requested to admit E16, since it was prima facie relevant in relation to novelty of claim 1. The document E16 was further filed two days before the oral proceedings, on 12-1-2021. This should be considered as not very late filing.

The proprietor requested not to admit E16 into the procedure.

The opposition-division does not admit E16 into the proceedings (Rule 116(1) EPC). The opposition-division considers that the filing of E16 only two days before the oral proceedings is still considered as very late. During filing it was further not indicated that this document was considered as being relevant for novelty. This makes it difficult for the other party to prepare a reply to the attack. The opposition-division is further of the opinion that E16 does not disclose "at least two outside edges" (features (ix) and (xi) of claim 1) of the second and third tensioning structure. The opponent had indicated (190) of Fig. 9 in E16 as outside edge, arguing that there was an edge (190) on the long side and on the short side (see figure below), making it "at least two". The opposition-division already did not follow such an interpretation for E1. For E16 a new assessment prima facie does not appear to lead to any other outcome.

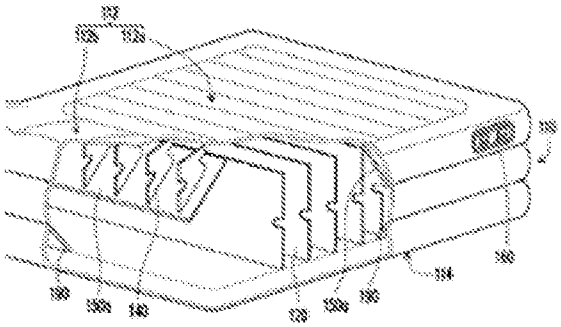


FIG. 9

3.1.4 Model

During oral proceedings, the opponent requested to file a model during the oral proceedings in order clarify the disclosure of E1, figure 2. As reason for the late filing of this request the opponent mentioned that he was assigned to this opposition only at a late stage.

The opposition-division does not admit the model into the proceedings (Rule 116 (1) (EPC)). A studying of a model is considered as not being helpful for the interpretation of E1, since the ambiguities in the disclosure of E1 would still persist. The opposition-division is further of the opinion that the opponent has made himself perfectly clear

about his interpretation of the disclosure of E1, especially by filing E18. Lastly it is to be considered as putting the proprietor in a difficult position, since they have not had the chance to prepare a reaction to the presentation of this model.

3.1.5 Late-filed attack in relation to inventive step based on E1+E9 (late-filed fact)

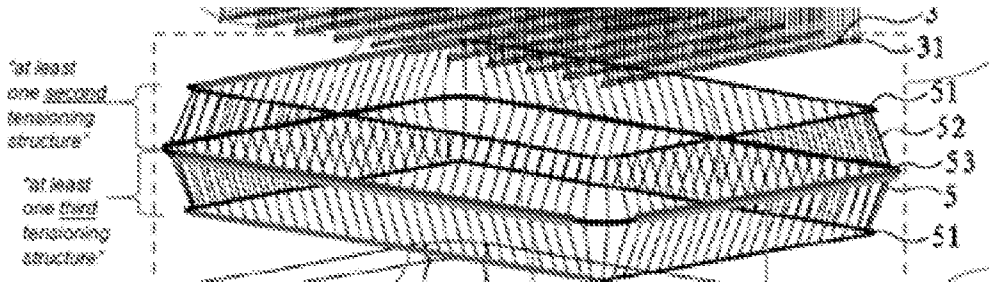
The proprietor argued that the combination of E1 with E9 was never mentioned before and therefore surprising. This late filed fact should not be admitted into the procedure.

The opposition-division does not follow this reasoning. E1 was already discussed in detail in the written procedure with respect to novelty. It must be expected by the proprietor that starting from E1 the opponent would argue that other documents - already present in the proceedings - would clarify the disclosure of E1. The late-filed objection in relation to inventive step based on E1+E9 is therefore admissible (Rule 116(1) EPC).

3.2. Novelty (Article 54 EPC)

3.2.1 The opponent argued that E1 could be read in three different ways, which would all disclose the features of claim 1. E1 first interpretation:

The opponent argued that plastic strip (53) shown in Figure 2 of E1 implicitly has an upper edge and a lower edge (as indicated in E18), since every three-dimensional body a has outer boundaries, which are to be considered as edges. The upper edge of (53) together with the upper cables (52) and upper strip (51) would form the second tensioning structure. The lower edge of (51) together with the lower cables (52) and lower strip (51) would form the third tensioning structure. This interpretation is shown in the figure below which is taken from E18, second slide.

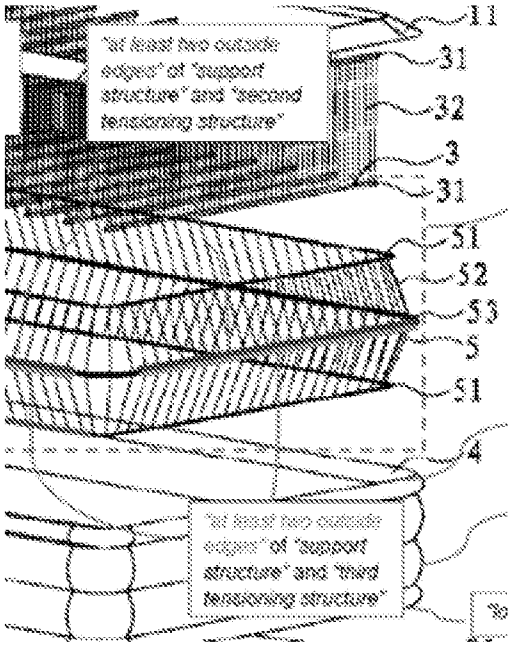


The opponent further argued that the plastic strip (53) had a rectangular shape and that each side of this rectangle represents and edge of the tensioning structure. This interpretation is shown in the figure below, which is taken from E18, second slide. Therefore E1 discloses (feature ix):

- "at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent"

And E1 further discloses (feature xi):

- "at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent"



The opposition-division cannot follow this interpretation of E1.

The opposition-division considers it as unreasonable to split the plastic strip (53) into an upper edge and a lower edge as foreseen by the opponent. The geometry of plastic strip (53) is not recognizable in E1. Therefore strip (53) could have a circular cross-section for which the opposition-division considers that a circular geometry has no edge at all. Therefore assigning the upper part of strip (53) to the second tensioning structure and the assigning lower part of strip (53) to the third tensioning structure (as argued by the opponent) appears to be a reading purely for artificially creating two edges, which in E1 are not disclosed. Reading two edges into a geometry which is not visible would not fall within the normal understanding of the word "edge" by the person skilled in the art.

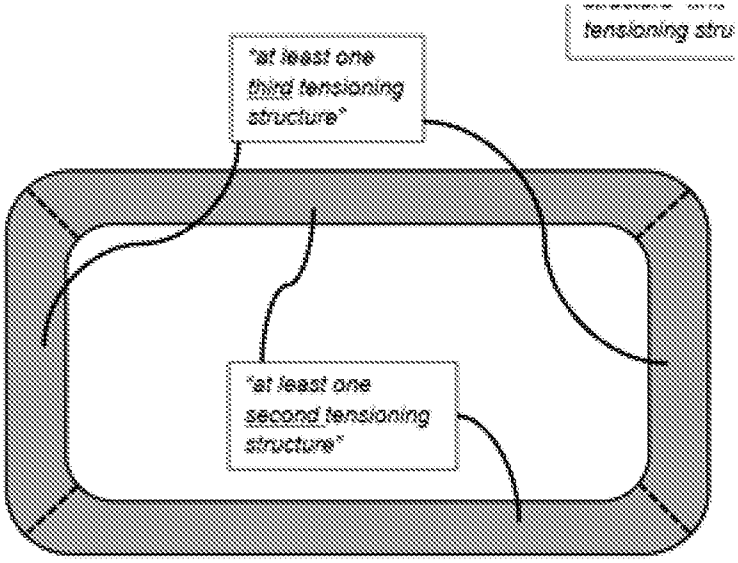
The opposition-division considers it as unreasonable to interpret two sides of the plastic strip (53) as two separate outside edges, as required by features (ix) and (xi) of claim 1. The opposition-division is of the opinion that strip (53) is one single strip going

completely around a circumference. Whereas the plastic strip therefore might have four "sides" it seems unreasonable to says that it has "at least two outside edges". Edges are neither mentioned in the description, nor appearing in the drawings, nor are considered to be implicit.

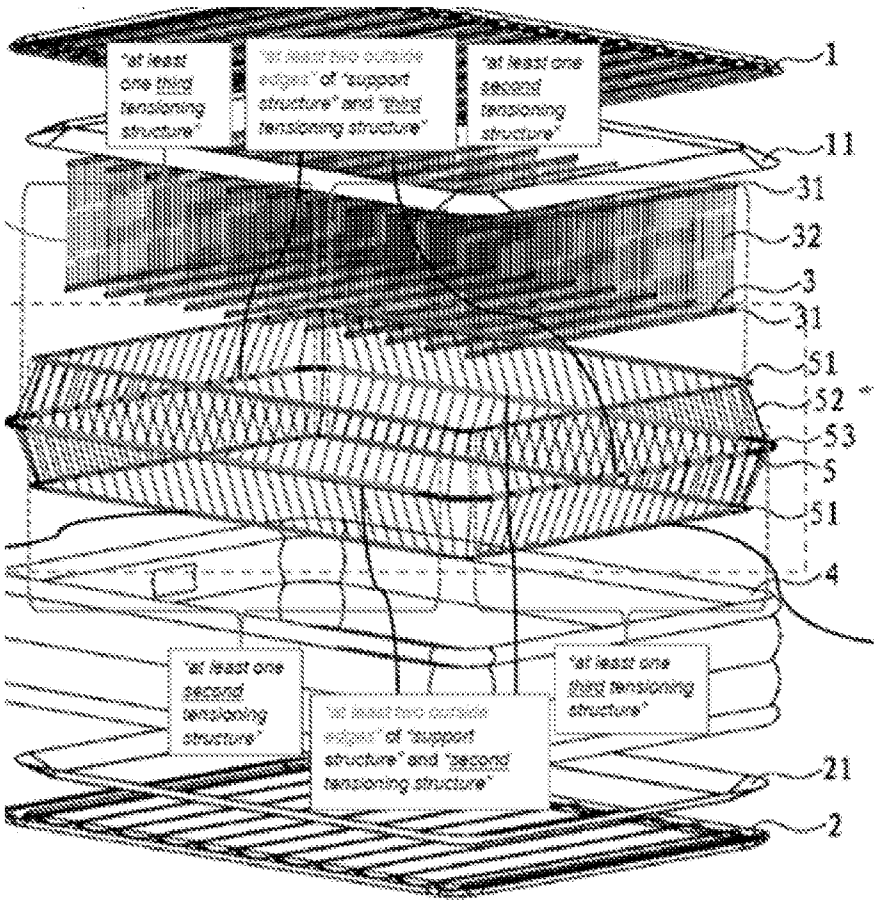
The opposition-division therefore considers that E1 does not disclose features (ix) and (xi) of claim 1.

3.2.2 E1 - second interpretation:

The opponent argued that the two long sides of element (5) could be read as second tensioning element and the two short sides as third tensioning element, as shown in the figure below from slide 3 of E18.



The opponent argued further that the outer side of plastic strip (53) could be read as "outside edges". Since two short sides and two long sides were present, this would lead to two outside edges of the second tensioning structure and two outside edges of the third tensioning structure, as shown in the figure below from slide 3 of E18.



The opposition-division cannot follow this reasoning. The opposition-division considers it as unreasonable to interpret two sides of the plastic strip (53) as two separate outside edges, as required by features (ix) and (xi) of claim 1. The opposition-division is of the opinion that strip (53) is one single strip going completely around a circumference. Whereas the plastic strip therefore might have four "sides" it seems unreasonable to says that it has "at least two outside edges". Edges are neither mentioned in the description, nor appearing in the drawings, nor are considered to be implicit.

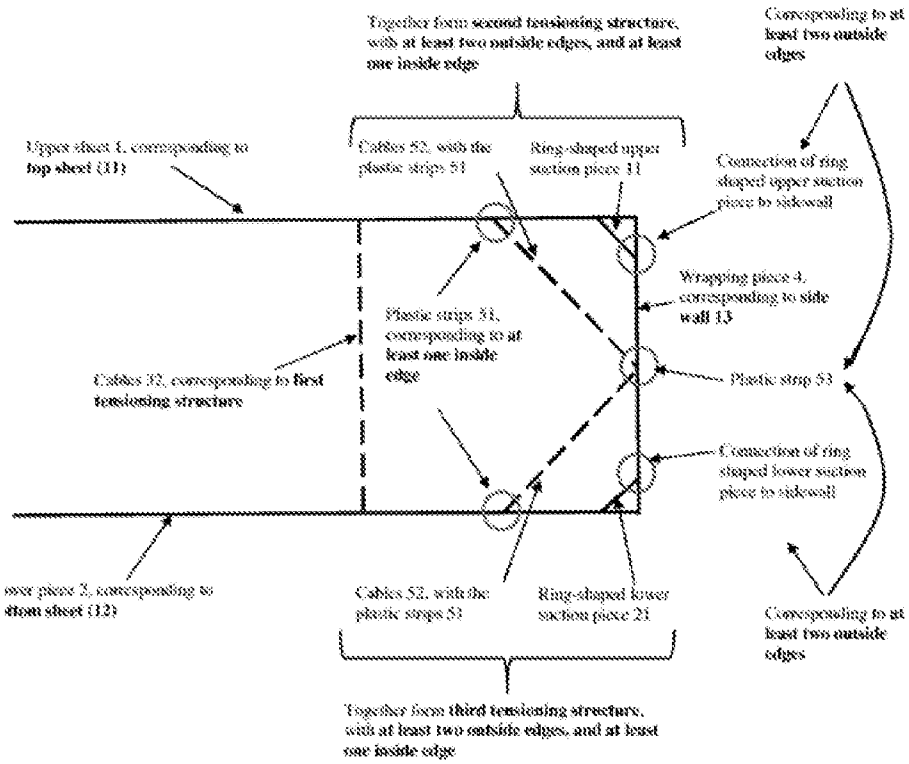
The opposition-division is further of the opinion that two opposite sides long sides of the wrapping belt (5) would not be considered as one tensioning structure by the person skilled in the art, since this structure is interrupted by the short sides. Therefore in consequence, it seems unreasonable to artificially assign each long side of plastic strip (53) as "outside edge".

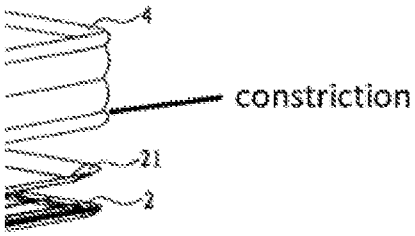
The opposition-division therefore considers that E1 does not disclose features (ix) and (xi) of claim 1.

3.2.3 E1 - third interpretation:

The opponent argued that the "suction piece" (11) and (21) can be read as being the second "outside edge" of the second and third tensioning structure, as shown in the opponents drawing (from the notice of opposition) below.

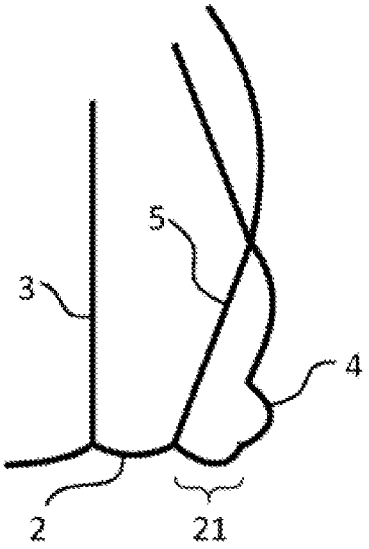
The opponent further argued that it was clear that the ring-shaped lower suction piece was attached to the inside of the side wall, due to the constriction visible on figure 2,3 and 4 of D1 (see figure on the right, below). He further argued that the exploded view in figure 2 leads to such an interpretation of E1.



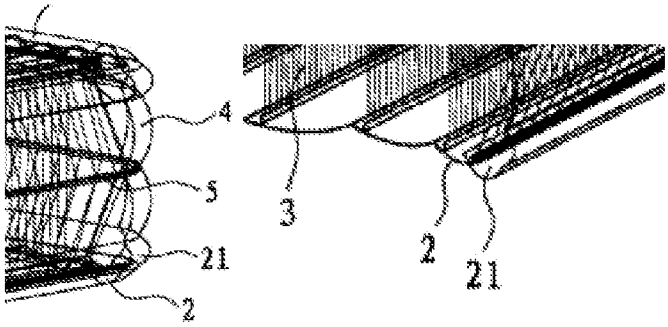


The opposition-division cannot follow this reasoning, since t remains doubtful if in E1 the ring-shaped lower suction piece (21) passes on the inside of the air chamber as shown in the drawing of th e opponent. As argued by the proprietor (see figure provided by the proprietor below), suction piece (21) could also pass on the outer side of the air

chamber. In this case the lower edge of the side wall would not be coupled to an outer edge of the bottom sheet, which means that feature (ii) of claim 1 would not be present in E1.



The opposition-division is further of the opinion that whereas the exploded view in figure 2 gives the impression that suction piece (21) passes on the inside, figures 3 (see below) has a reference to (21) which seems to be on the outside of the bed. Figure 4 (see below) also relates to (21) and appears to confirm that (21) passes on the outside.



(parts of figures 3 and 4 of E1)

The opposition-division is further of the opinion that the description (translation page 5, 2nd paragraph) is not conclusive on this matter, since it only mentions that the lower suction piece 21 is disposed between lower piece 2 and wrapping piece 4. This however is the case for both interpretations.

In summary, the opposition-division comes to the conclusion that both interpretations of the the disclosure of E1 are equally possible. For this reason the opposition-division considers that in E1 there is no direct and unambiguous disclosure of features (ix) and (xi) of claim 1. The subject-matter of claim 1 is therefor new (Article 54 EPC).

3.3 Inventive step (Article 56 EPC)

combination E1 with E9:

The opponent argues that since the disclosure of E1 is ambiguous in relation to the features (ix) and (xi) of claim 1, the person skilled in the art would turn to E9 looking for clarification on what is likely to be disclosed in E1. As a technical problem he defined "how to prevent overprotrusion / overbulging of the side wall". This technical problem was confirmed by the present patent-publication, see paragraph 6,7 and 63. E1 also mentions as a problem "improving aesthetics", which is to be considered as a clear pointer to look for a solution for the problem.

The opposition-division cannot follow this reasoning. E9 appears to be of a completely different construction compared to E1. Whereas E1 (see figure 2 below) has cables (51) (see translation, page 4) for connecting top sheet and side wall, E9 (see figure 5 below) discloses a belt (4) ("ceinture") for this purpose. Whereas the tensioning structure in E1 has two connection-points (51) and (21) to the lower sheet, the tensioning structure of E9 only has one single connection point at (41c), see figures below. Further, the opposition-division cannot identify an "edge of said side wall being coupled to an outer edge of said top sheet" in E9, whereas this feature seem to be present in E1. Figure 5 of E9 only shows a rounded continuous structure which connects side wall (3) to top sheet (33).

The opposition-division is therefore of the opinion that the person skilled in the art would not turn to E9 for solving the technical problem as defined by the opponent.

The opposition-division is therefore of the opinion that the subject-matter of claim 1 involves an inventive step (Article 56 EPC).

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Intex Recreation v. Bestway Inflatables

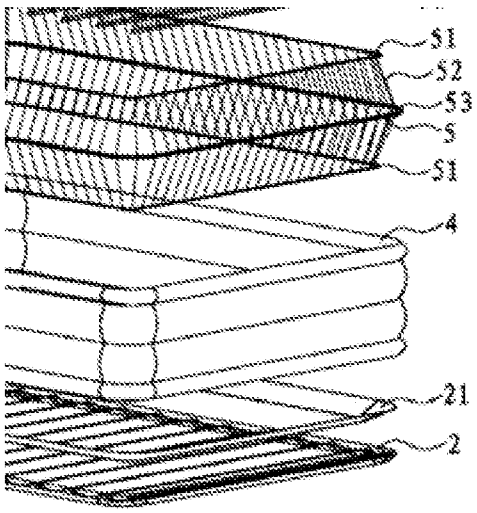


图 2

3.4 The opposition division therefore considers that the ground of opposition according to Article 100(a) EPC does not prejudice the maintenance of the patent.

III. Conclusion

None of the grounds of opposition prejudices maintenance of the patent as granted. The opposition is rejected (Art. 101(2) EPC).

INTEX EX. 1038, Pg. 855
Intex Recreation v. Bestway Inflatables

Article 106
Decisions subject to appeal

(1) An appeal shall lie from decisions of the Receiving Section, Examining Divisions, Opposition Divisions and the Legal Division. It shall have suspensive effect.

(2) A decision which does not terminate proceedings as regards one of the parties can only be appealed together with the final decision, unless the decision allows a separate appeal.

(3) The right to file an appeal against decisions relating to the apportionment or fixing of costs in opposition proceedings may be restricted in the Implementing Regulations.

Rule 97
Appeal against apportionment and fixing of costs

(1) The apportionment of costs of opposition proceedings cannot be the sole subject of an appeal.

(2) A decision fixing the amount of costs of opposition proceedings cannot be appealed unless the amount exceeds that of the fee for appeal.

Rule 98
Surrender or lapse of the patent

The decision of an Opposition Division may be appealed even if the European patent has been surrendered in all the designated Contracting States or has lapsed in all those States.

Article 107
Persons entitled to appeal and to be parties to appeal proceedings

Any party to proceedings adversely affected by a decision may appeal. Any other parties to the proceedings shall be parties to the appeal proceedings as of right.

Article 108
Time limit and form

Notice of appeal shall be filed, in accordance with the Implementing Regulations, at the European Patent Office within **two months** of notification of the decision. Notice of appeal shall not be deemed to have been filed until the fee for appeal has been paid. Within **four months** of notification of the decision, a statement setting out the grounds of appeal shall be filed in accordance with the Implementing Regulations.

Further information concerning the filing of an appeal

(a) Notice of appeal can be filed in accordance with Rule 1 and Rule 2(1) EPC, by delivery by hand, by post, or by technical means of communication. The filing has to comply with the details and conditions and, where appropriate, any special formal or technical requirements laid down by the President of the European Patent Office (R. 99(3) EPC).

(b) The addresses of the filing offices of the European Patent Office are as follows:

(i) European Patent Office
D-80298 Munich
Germany

Fax: +49 89 2399-4465

(ii) European Patent Office
Postbus 5818
NL-2280 HV Rijswijk (ZH)
The Netherlands

Fax: +31 70 340-3016

(iii) European Patent Office
D-10958 Berlin
Germany

Fax: +49 30 259 01-840

(c) The notice of appeal must contain the name and address of the appellant in accordance with the provisions of Rule 41(2)(c) EPC, an indication of the decision impugned, and a request defining the subject of the appeal. In the statement of grounds of appeal the appellant shall indicate the reasons for setting aside the decision impugned, or the extent to which it is to be amended, and the facts and evidence on which the appeal is based (R. 99(1) and (2) EPC). The notice of appeal and any subsequent submissions stating the grounds for appeal must be signed (R. 50(3) EPC).

(d) The fee for appeal is laid down in the Rules relating to Fees. The schedule of fees and expenses of the EPO or a reference to the current version is regularly published in the Official Journal of the European Patent Office under the heading "Guidance for the payment of fees, expenses and prices". Fee information is also published on the EPO website under www.epo.org/ fees.

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Application No. / Patent No.	Ref.	Date
16 191 360.3 - 1011 / 3 192 401 /	27D8343A,12EP42	03.02.2021
Proprietor Bestway Inflatables & Material Corp.		

Provision of a copy of the minutes in accordance with Rule 124(4) EPC

The attached copy of the minutes of the oral proceedings is sent to you in accordance with Rule 124(4) EPC.

Europäisches Patentamt • European Patent Office • Office européen des brevets

Suero Gallego, V
Formalities Officer
Tel. No.: +31 70 340 - 2078 **Branch at The Hague**

Enclosure(s): Copy of the minutes (Form 2309)

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EPO Form 2042 12.07TRI

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Tel: +31 70 340 2040
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Application No.: 16 191 360.3

Patent No.: EP-B-3 192 401

Minutes of the oral proceedings before the OPPOSITION DIVISION

The proceedings were public.

Proceedings opened on 13.01.2021 at 09:00 hours

Present as members of the opposition division:

Chairman:	Krasenbrink, B
1st member:	Lehe, Jörn
2nd member:	Kus, Slawomir
Minute writer:	Kus, Slawomir

Present as or for the party or parties:

- For the Proprietor(s): Bestway Inflatables & Material Corp.

  - Ms. Simona Inchingalo - European Patent Attorney
  - Mr. Aldè - European Patent Attorney

- For the Opponent 1: Intex Recreation Corp.

  - Mr. Joshua Parsi Mendiola - European Patent Attorney
  accompanied by
  - Ms. Joanne Pham - assisting Mr. Parsi of Reddie & Grose LLP

The identity of the person/s (as well as, if applicable, that of the witness or witnesses) and, where necessary, the authorisation to represent/authority to act were checked.

Essentials of the oral proceedings and relevant statements of the parties:

1.0. The chairman opened the oral proceedings at 09:00, introduced the division and identified the persons attending the oral proceedings.

1.1. The chairman asked the parties to confirm the present requests.

1.2. The parties confirmed their requests as mentioned in the written procedure.

2.0. Sufficiency of the disclosure (Article 100(b) EPC).

2.1. The chairman asked the parties to present their arguments concerning sufficiency of disclosure.

2.2. The opponent informed that he already expressed all arguments in the written procedure and that he does not wish to add more arguments.

2.3. The proprietor also stated that he does not have any more comments.

2.4. The chairman of the Opposition Division interrupted the oral proceedings from 9:25-9:30. After resuming the oral proceedings, the chairman informed the parties that the ground according to Article 100(b) EPC does not prejudice the maintenance of the granted patent.

3.0. Admissibility of the novelty objections regarding E1 in view of E18

3.1. The opponent argued that the subject-matter of claim 1 is not novel over E1. In the written procedure he used an interpretation of E1 according to E18 slide 4. Additional to this interpretation of E1 he introduced during the Oral Proceedings two further interpretations of E1 (according to E18 slide 2 and according to E18 slide 3). To support his reasoning, the opponent used the presentation E18. This presentation was first only presented by the ShareScreen functionality, later by sharing the presentation with the Opposition Division and the proprietor. The Opposition Division and the proprietor have been given time to familiarize with E18 and the further interpretations of E1.

3.2. The proprietor argued that the two further interpretations of E1 (according to E18 slide 2 and E18 slide 3) are introduced for the first time in the Oral Proceedings, that they are late filed, and that they are not prima facie relevant. Therefore, he requested not to admit the novelty objections based on these further interpretations of E1 into the procedure.

3.3. The proprietor requested for the same reasons not to admit the presentation E18 into the procedure.

3.4. The opponent provided arguments to admit E18 and the novelty objections based on the new interpretations of E1 into the procedure.

3.5. Since E18 also comprises other slides not referring to E1, the chairman clarified that the discussion regarding the admittance of E18 refers only to the slides of E18 which refer to E1.

3.6. Several breaks were provided for giving the parties preparation time and the opposition division deliberation time (9:40-9:45, 9:45-10:00, 10:30-10:35). After the last break for deliberation from 10:45-11:00, the chairman of the Opposition Division informed the parties that the novelty objections based on the further interpretations of E1 and the presentation E18, when it refers to E1, are admitted into the procedure.

4.0. Novelty (Article 100(a) EPC and Article 54 EPC) of claim 1 in view of E1

4.1. The opponent argued that the subject-matter of claim 1 is not novel over E1 interpreted according to slide 2 of E18. He argued that the support structure 5 could be interpreted as two separate upper and lower structures having each a separate outside edge formed by plastic strip 53.

4.2. The proprietor argued that the there is only one plastic strip 53, which cannot be artificially divided in two entities to form two separate upper and lower structures.

4.3. The chairman of the Opposition Division interrupted the oral proceedings from 11:15-11:20. After resuming the oral proceedings, the chairman informed the parties about the opposition division's opinion that the subject-matter of claim 1 is novel over E1 interpreted according to slide 2 of E18.

4.4. The opponent argued that the subject-matter of claim 1 is not novel over E1 interpreted according to slide 3 of E18. The opponent argued that the support structure 5 could be interpreted as two separate longer and shorter side structures.

4.5. The proprietor argued that the there is only one structure 5, which cannot be artificially divided in two shorter side and longer side structures.

4.6. The chairman of the Opposition Division interrupted the oral proceedings from 11:30-11:45. After resuming the oral proceedings, the chairman informed the parties about the opposition division's opinion that the subject-matter of claim 1 is novel over E1 interpreted according to slide 3 of E18.

4.7. The opponent argued that the subject-matter of claim 1 is not novel over E1 interpreted according to slide 4 of E18. He argued that the ring shaped element 21 should be interpreted according to the exploded view of figure 2 of E1 as being placed between the bottom sheet 2 and the inside wall 4, forming at the lower inside wall 4 a connection kink.

4.8. The proprietor argued that the argument of the opponent is only one of the possible interpretations of figure 2 of E1. He referred to the translated description E2 of E1 on page 5, line 4, which discloses the ring shaped element 21 providing improved aesthetics of the mattress, therefore the element 21 should be located outside of the inner chamber of the mattress.

4.9. To support his reasoning, the opponent proposed to show a physical model of the mattress of E1 which he had manufactured.

4.10. The proprietor requested not to admit this model into the procedure, since it is late filed and not prima facie relevant.

4.11. The chairman of the Opposition Division interrupted the oral proceedings from 12:20-12:25. After resuming the oral proceedings, the chairman informed the parties that the physical model is not admitted to the procedure.

4.12. The chairman of the Opposition Division interrupted the oral proceedings from 12:30-12:40. After resuming the oral proceedings, the chairman informed the parties about the opposition division's opinion that the subject-matter of claim 1 is novel over E1 interpreted according to slide 4 of E18.

4.13. The chairman of the Opposition Division interrupted the oral proceedings from 12:45-13:30.

5.0. E9

5.1. The opponent argued that the subject-matter of claim 1 is not novel over E9.

5.2. The proprietor requested not to admit this novelty objection into the procedure since this objection has not been raised before. He argued that said objection is late filed and not prima facie relevant.

5.3. Both parties presented their arguments concerning the prima facie relevance.

5.4. The chairman of the Opposition Division interrupted the oral proceedings from 13:55- 14:10. After resuming the oral proceedings, the chairman informed the parties about the opposition division's opinion that said novelty objection is not admitted into the procedure since E9 does prima facie not disclose all features of claim 1.

6.0. E16

6.1. The opponent argued that the subject-matter of claim 1 is not novel over E16.

6.2. The proprietor requested not to admit the document E16 into the procedure since it has been filed only a few days in advance of the Oral Proceedings. He argued that mentioning of E16 in the introductory part of the patent's description does not make it automatically part of the procedure and that E16 is not prima facie relevant.

6.3. Both parties presented their arguments concerning E16.

6.4. The chairman of the Opposition Division interrupted the oral proceedings from 14:25- 14:35. After resuming the oral proceedings, the chairman informed the parties about the opposition division's opinion that E16 is not admitted into the procedure since it is prima facie not relevant for the assessment of novelty of claim 1.

7.0. Inventive Step (Article 100(a) EPC and Article 56 EPC)

7.1. The opponent argued that the subject-matter of claim 1 is not inventive starting from E1 in combination with E9.

7.2. The proprietor requested not to admit this inventive step objection into the procedure since this objection has not been raised before. He argued that said objection is late filed and not prima facie relevant.

7.3. Both parties presented their arguments regarding the admissibility of said inventive step objection.

7.4. The chairman of the Opposition Division interrupted the oral proceedings from 14:40-14:45 After resuming the oral proceedings, the chairman informed the parties about the opposition division's opinion that the inventive step objection is admitted into the procedure.

7.5. Both parties presented their arguments concerning the inventive step combination of E1 with E9.

7.6. The chairman of the Opposition Division interrupted the oral proceedings from 14:50- 14:55. After resuming the oral proceedings, the chairman informed the parties about the opposition division's opinion that the combination of E1 with E9 is not prejudicial to an inventive step of the subject-matter of claim 1.

8.0. The parties did not have any further remarks or requests.

8.1. The chairman of the Opposition Division asked the parties whether the oral proceedings were run well in a technical sense. The parties acknowledged that the oral proceedings have run well without any major technical issues.

8.2. The chairman announced the decision of the opposition division to reject the opposition and to maintain the patent as granted (Art. 101(2) EPC).

8.3. The chairman referred to the right to file an appeal according to Article 106 EPC.

8.4. The proceedings were closed at 15.15.

After deliberation of the opposition division,

- the chairman announced the following **decision** :

"The opposition is rejected."

Regarding the reasons for the decision, the chairman referred to:

Article 101(2) EPC, second sentence: the grounds for opposition mentioned in Article 100 EPC do not prejudice the maintenance of the patent as granted.

The chairman **closed the oral proceedings** on 13.01.2021 at 15:15 hours.

signed: signed:

Krasenbrink, B Kus, Slawomir

. . . . . .
Chairman

. . . . . .
Minute Writer

Enclosure(s):

First peripheral strip 150a has 4 outside edges (purple) and 4 inside edges (light blue) – accordingly, the first peripheral strip has *"at least two outside edges"* and *"at least one inside edge"*

Second peripheral strip 190 has 4 outside edges (green) and 4 inside edges (light blue) – accordingly, the second peripheral strip has *"at least two outside edges"* and *"at least one inside edge"*

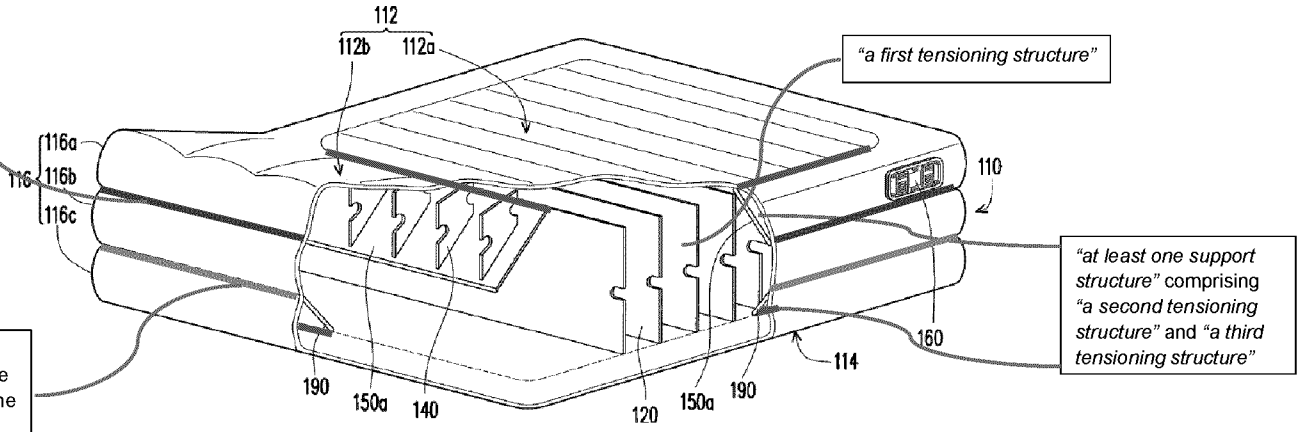
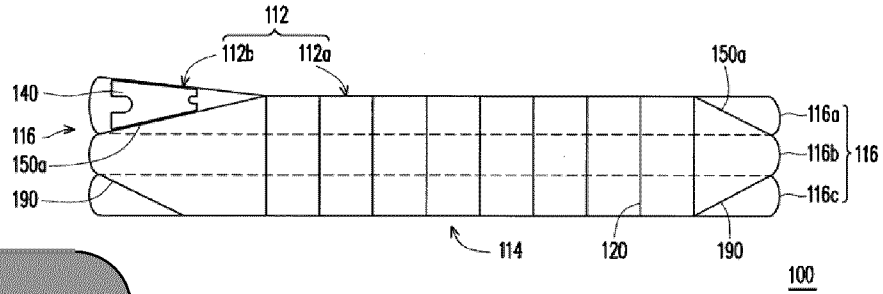
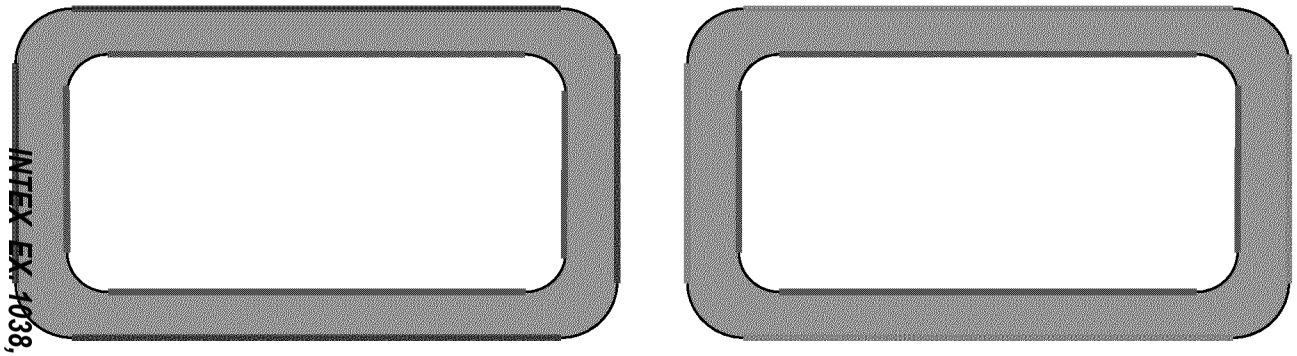


FIG. 9



Source(s): Figures 8 & 9 of E16



INTEX EX. 1038, Pg. 866
Intex Recreation v. Bestway Inflatables

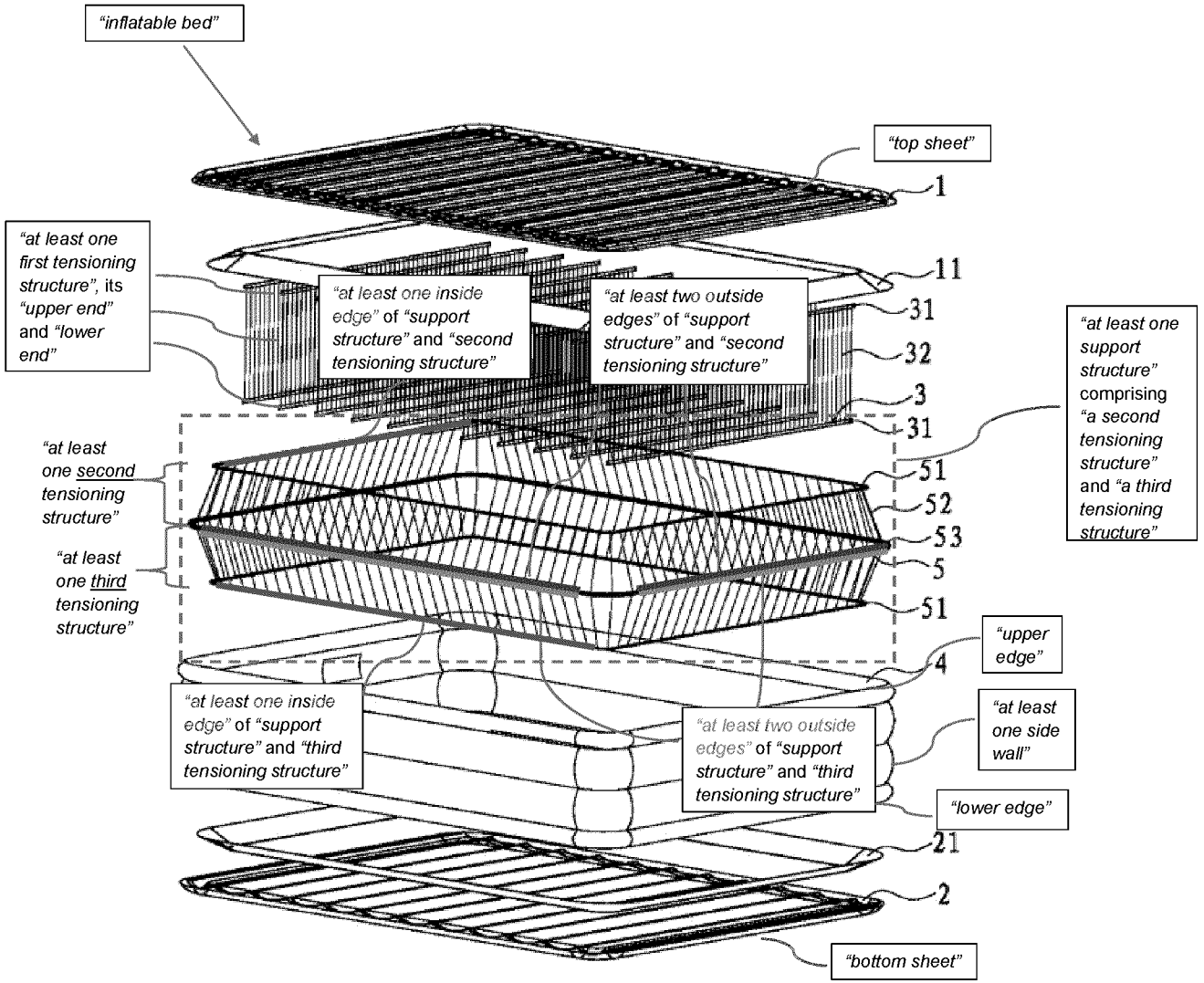


图 2

Source(s): Figure 2 of E1

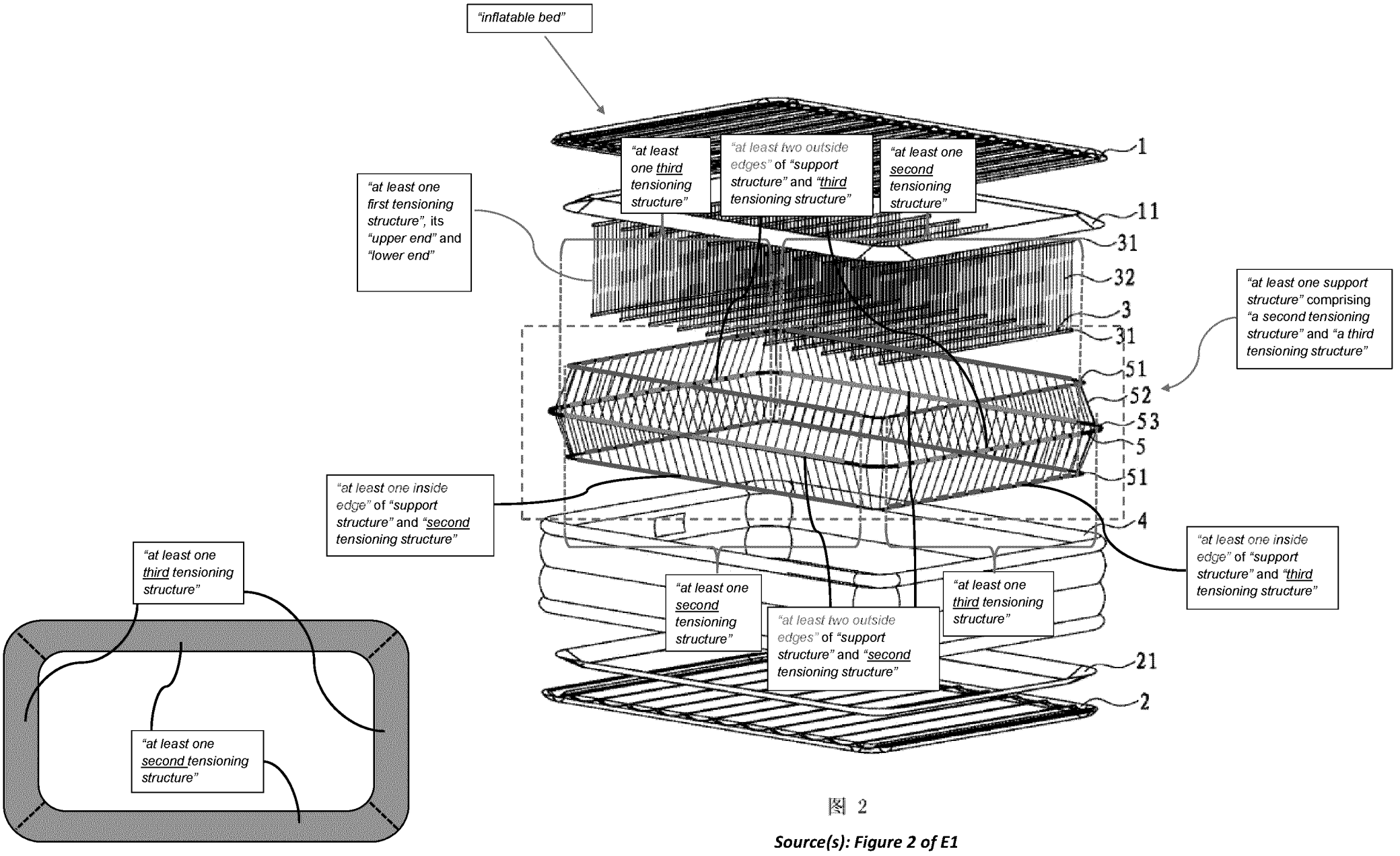


图 2

Source(s): Figure 2 of E1

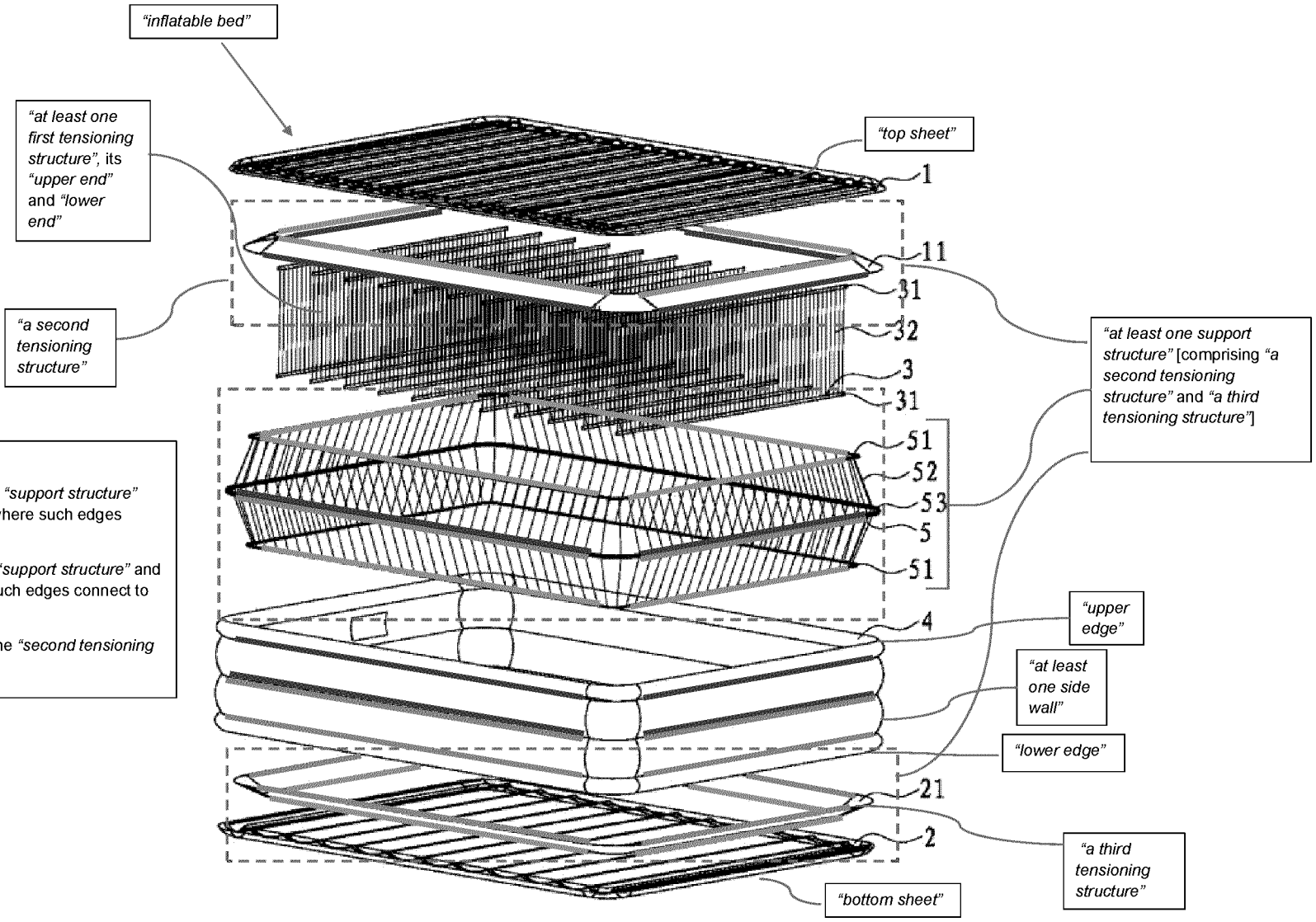
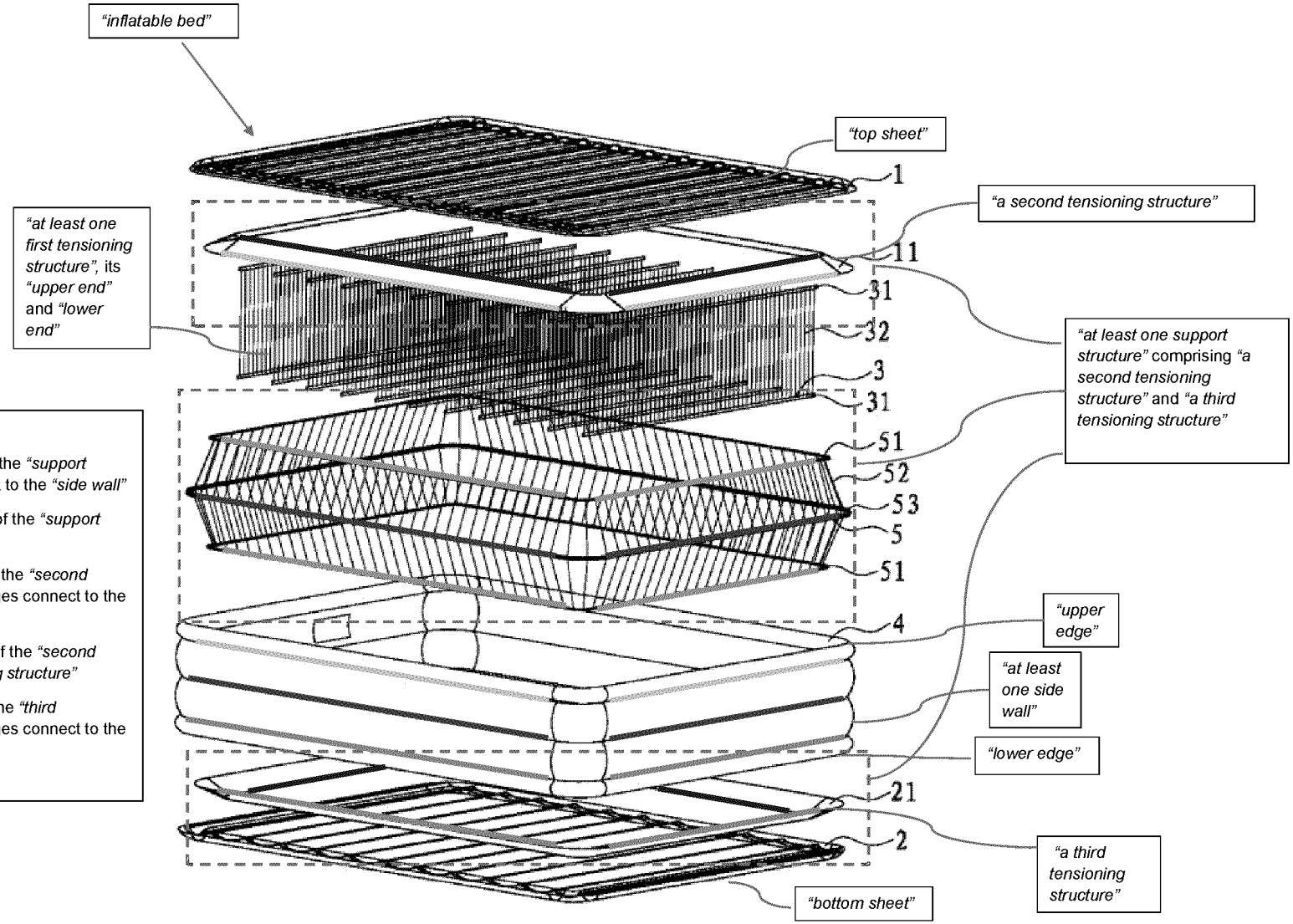


圖 2

Source(s): Figure 2 of E1



LEGEND

PURPLE: *"at least two outside edges"* of the *"support structure"* and where such edges connect to the *"side wall"*

LIGHT BLUE: *"at least one inside edge"* of the *"support structure"*

YELLOW: *"at least two outside edges"* of the *"second tensioning structure"* and where such edges connect to the *"side wall"*

DARK BLUE: *"at least one inside edge"* of the *"second tensioning structure"* and *"third tensioning structure"*

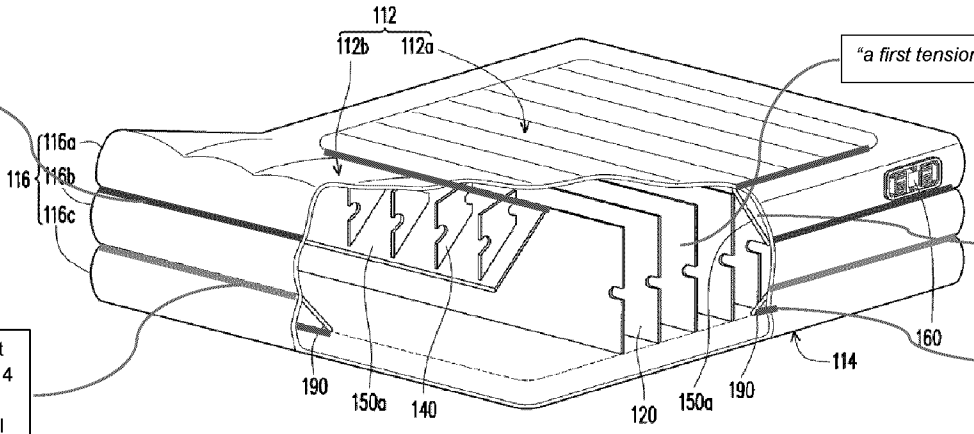
GREEN: *"at least two outside edges"* of the *"third tensioning structure"* and where such edges connect to the *"side wall"*

图 2

Source(s): Figure 2 of E1

First peripheral strip 150a has at least 4 outside edges (purple) and 4 inside edges (light blue) – accordingly, the first peripheral strip has *"at least two outside edges"* and *"at least one inside edge"*

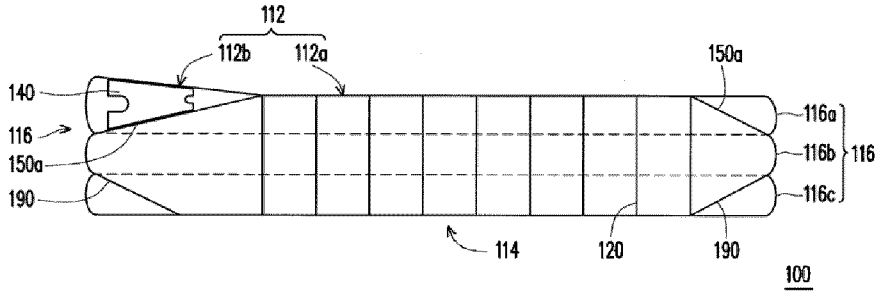
Second peripheral strip 190 has at least 4 outside edges (green) and 4 inside edges (light blue) – accordingly, the second peripheral strip has *"at least two outside edges"* and *"at least one inside edge"*



"a first tensioning structure"

"at least one support structure" comprising *"a second tensioning structure"* and *"a third tensioning structure"*

FIG. 9



Source(s): Figures 8 & 9 of E16

INTEX EX. 1038, Pg. 871
Intex Recreation v. Bestway Inflatables

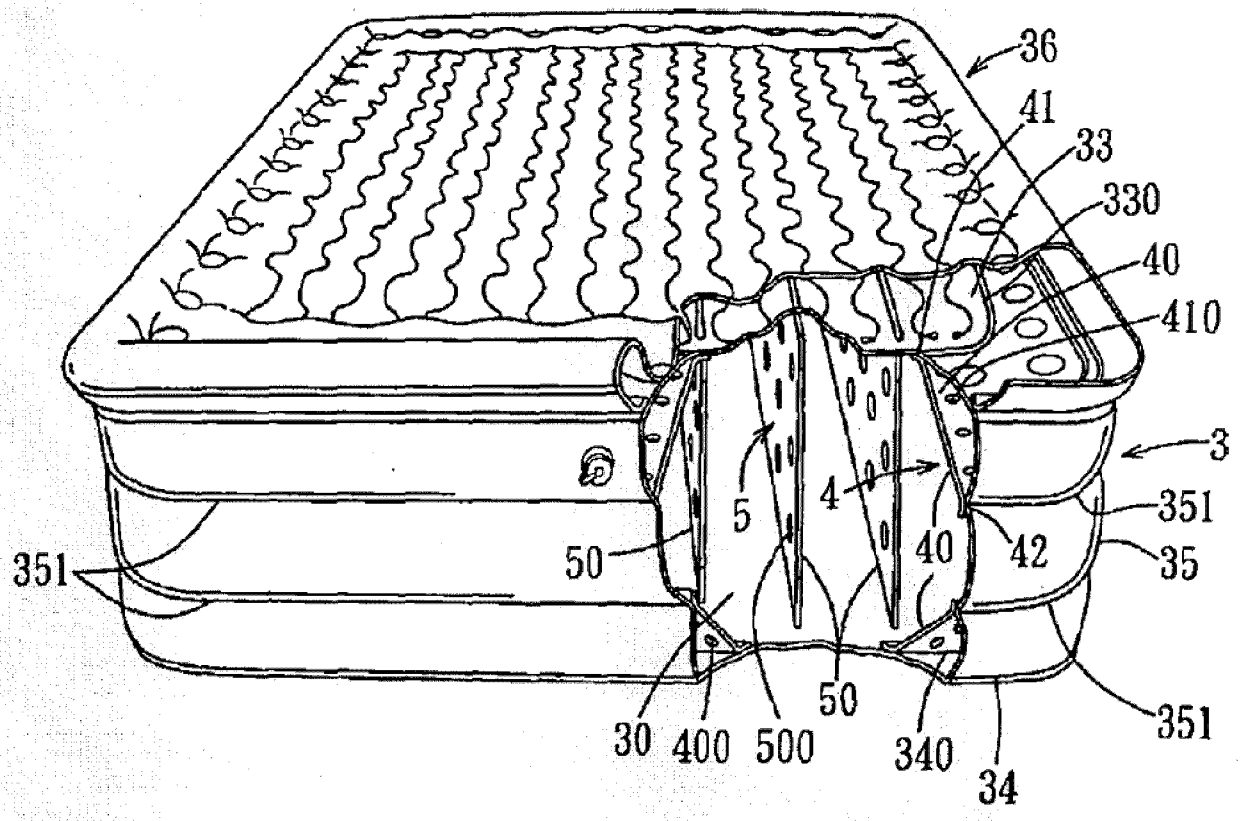


FIG. 2

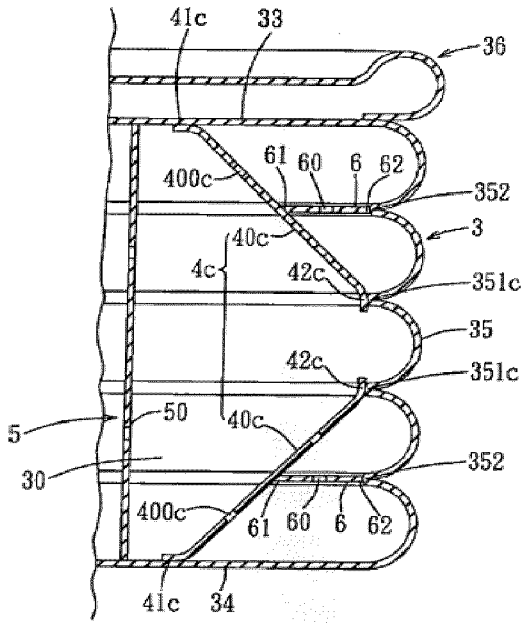


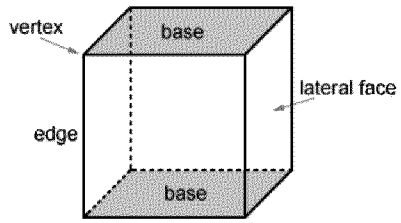
FIG. 5

Source(s): Figures 2 & 5 of E9

INTEX EX. 1038, Pg. 872
Intex Recreation v. Bestway Inflatables

Characteristics of a cube

The six identical faces of a cube are often categorized as four lateral faces and two bases. An edge of a cube is a line segment formed by the intersection of two adjacent faces. A vertex of a cube is the point of intersection of three edges.



A cube has the following characteristics:

- A cube has 6 faces, 12 edges, and 8 vertices. The 6 faces are identical squares. The 12 edges are equal in length.

Source: https://www.math.net/cube

INTEX EX. 1038, Pg. 873
Intex Recreation v. Bestway Inflatables

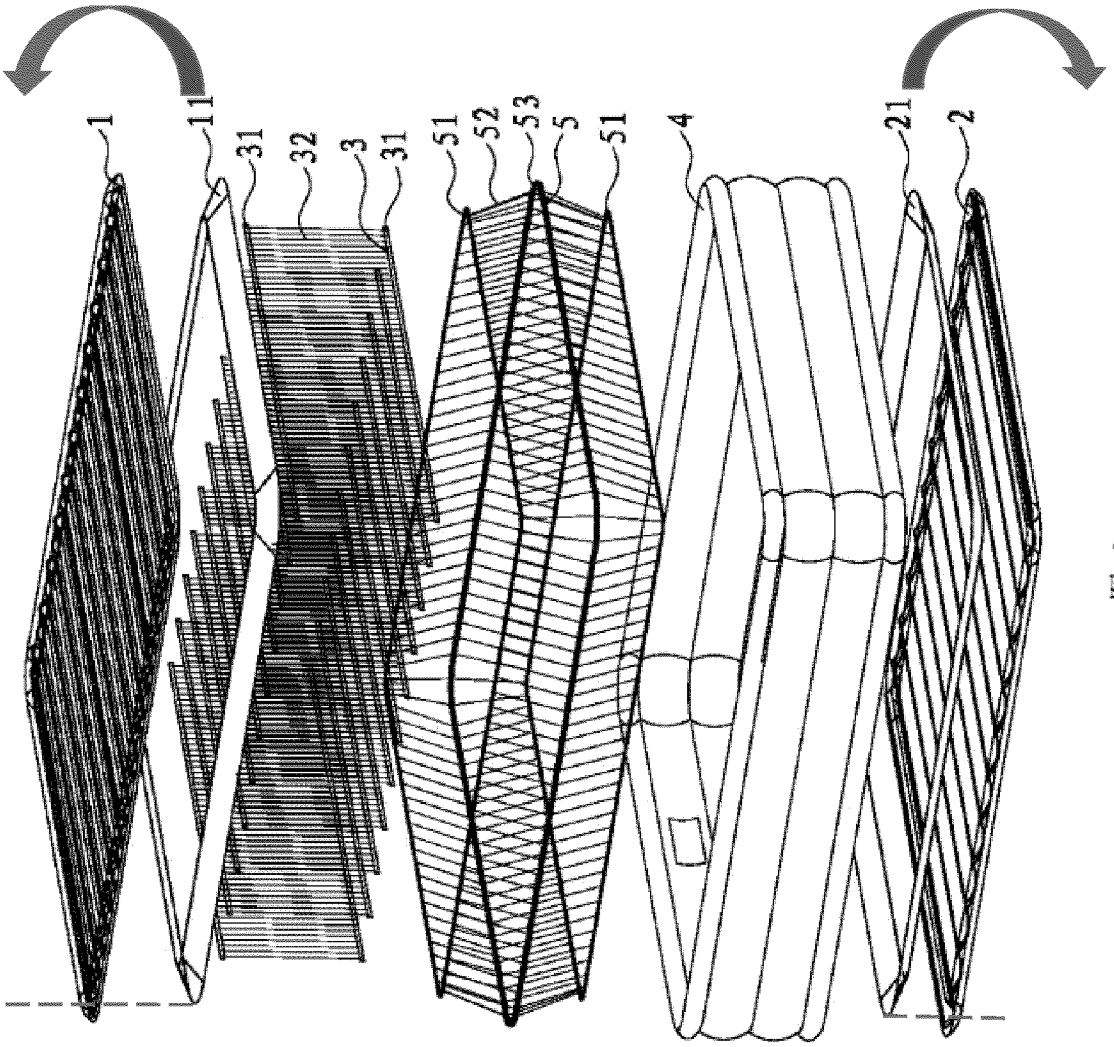
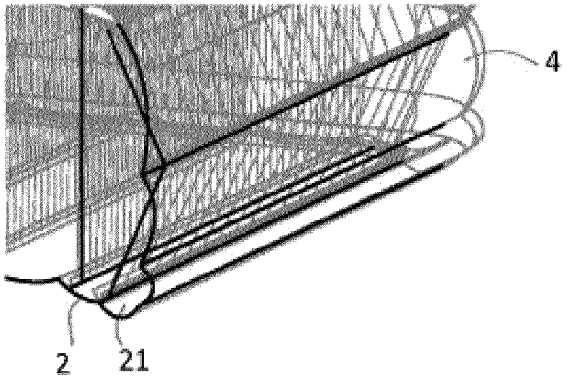
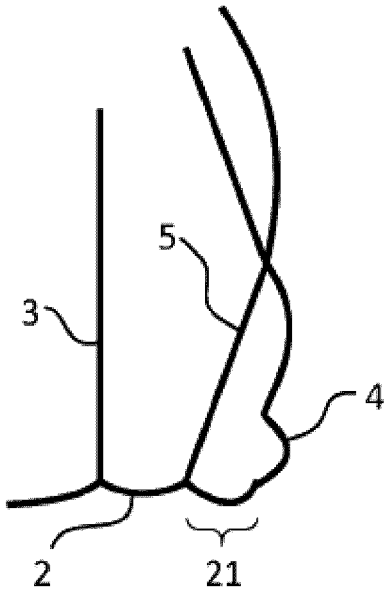


图 2

Source(s): Figure 2 of E1



Picture 2 - detail of Figure 4 of E1; original lines have been lightened and thick black lines have been added in order to render the structures of the bed more evident



Picture 4 - Sketch of the structure of E1 as derived from Figure 4 of E1 itself

Source(s): Pages 2 & 3, Patentee's written submissions of 9th November 2019

INTEX EX. 1038, Pg. 875
Intex Recreation v. Bestway Inflatables

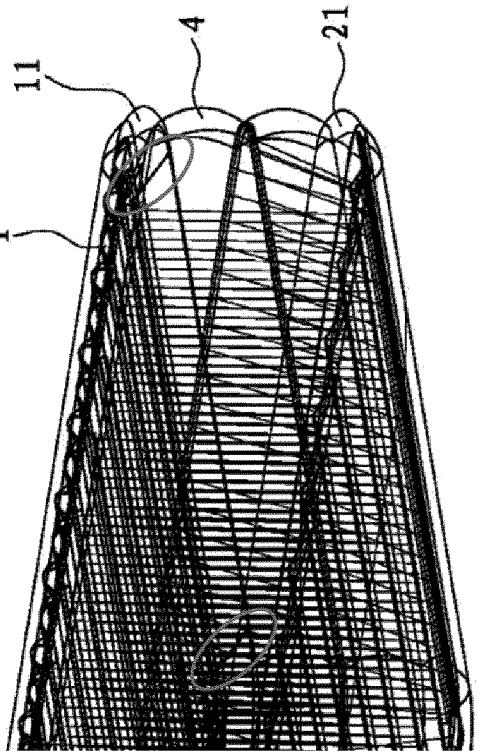


Figure 3 of E1

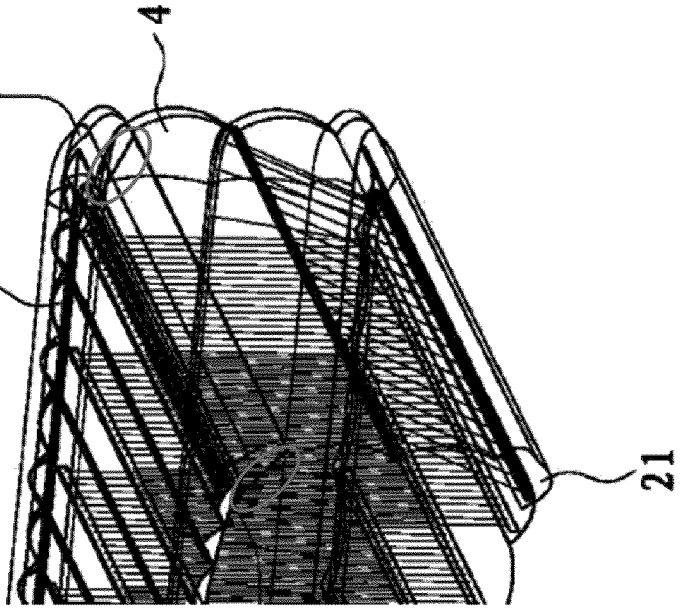
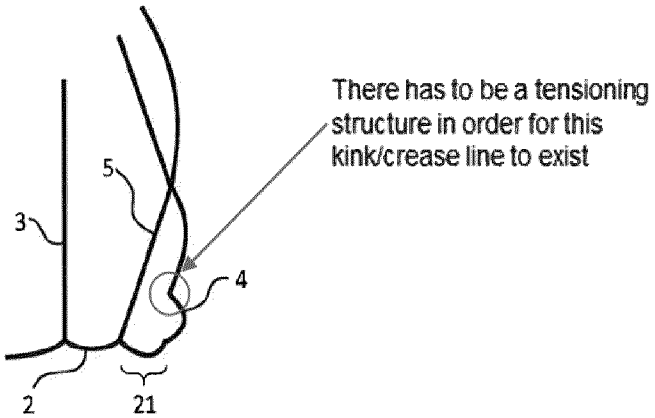


Figure 4 of E1



Picture 4 - Sketch of the structure of E1 as derived from Figure 4 of E1 itself

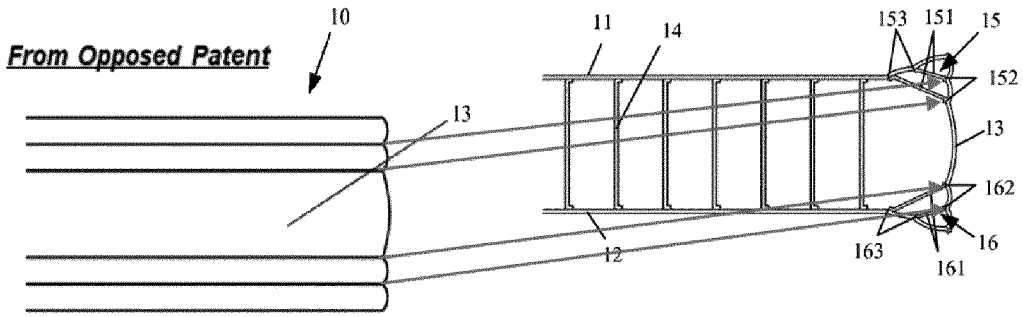
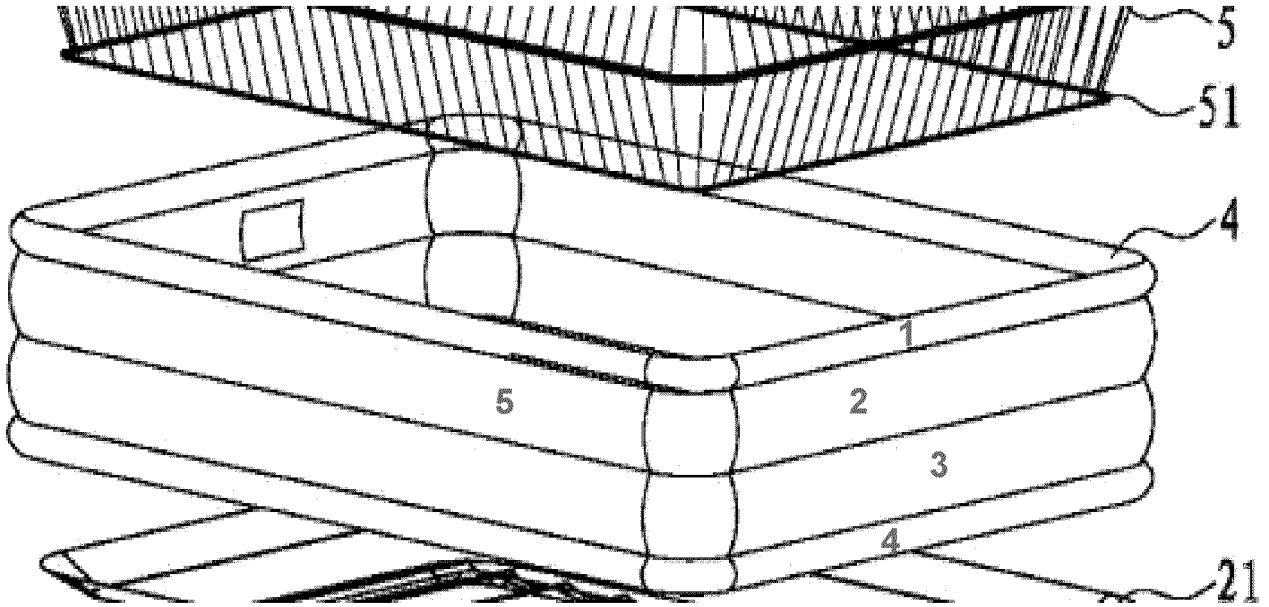


Fig. 2

Fig. 5

Source(s): Figures 2 & 5 of the Patent

INTEX EX. 1038, Pg. 877
Intex Recreation v. Bestway Inflatables



Source(s): Figure 2 of E1

INTEX EX. 1038, Pg. 878
Intex Recreation v. Bestway Inflatables

First peripheral strip 150a has 4 outside edges (purple) and 4 inside edges (light blue) – accordingly, the first peripheral strip has *"at least two outside edges"* and *"at least one inside edge"*

Second peripheral strip 190 has 4 outside edges (green) and 4 inside edges (light blue) – accordingly, the second peripheral strip has *"at least two outside edges"* and *"at least one inside edge"*

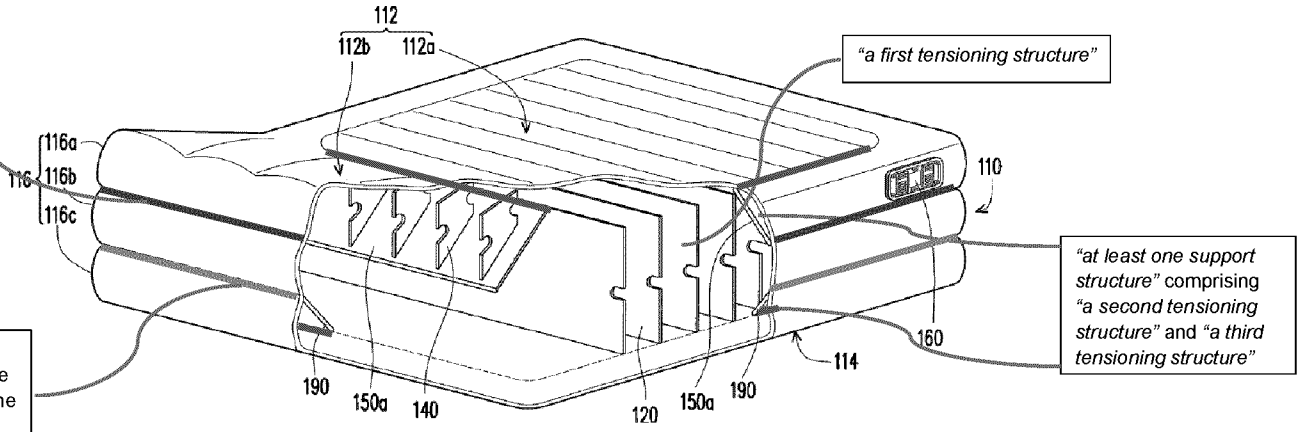
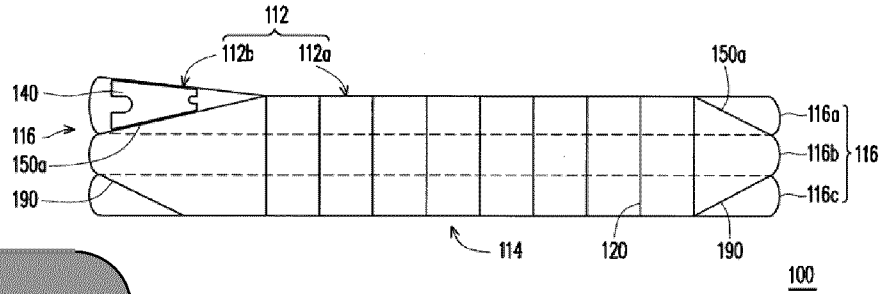
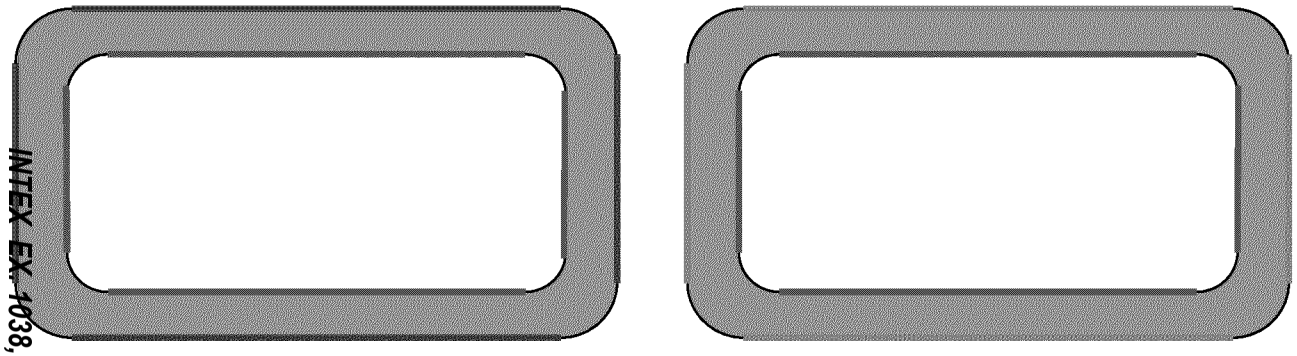


FIG. 9



Source(s): Figures 8 & 9 of E16



INTEX EX. 1038, Pg. 879
Intex Recreation v. Bestway Inflatables

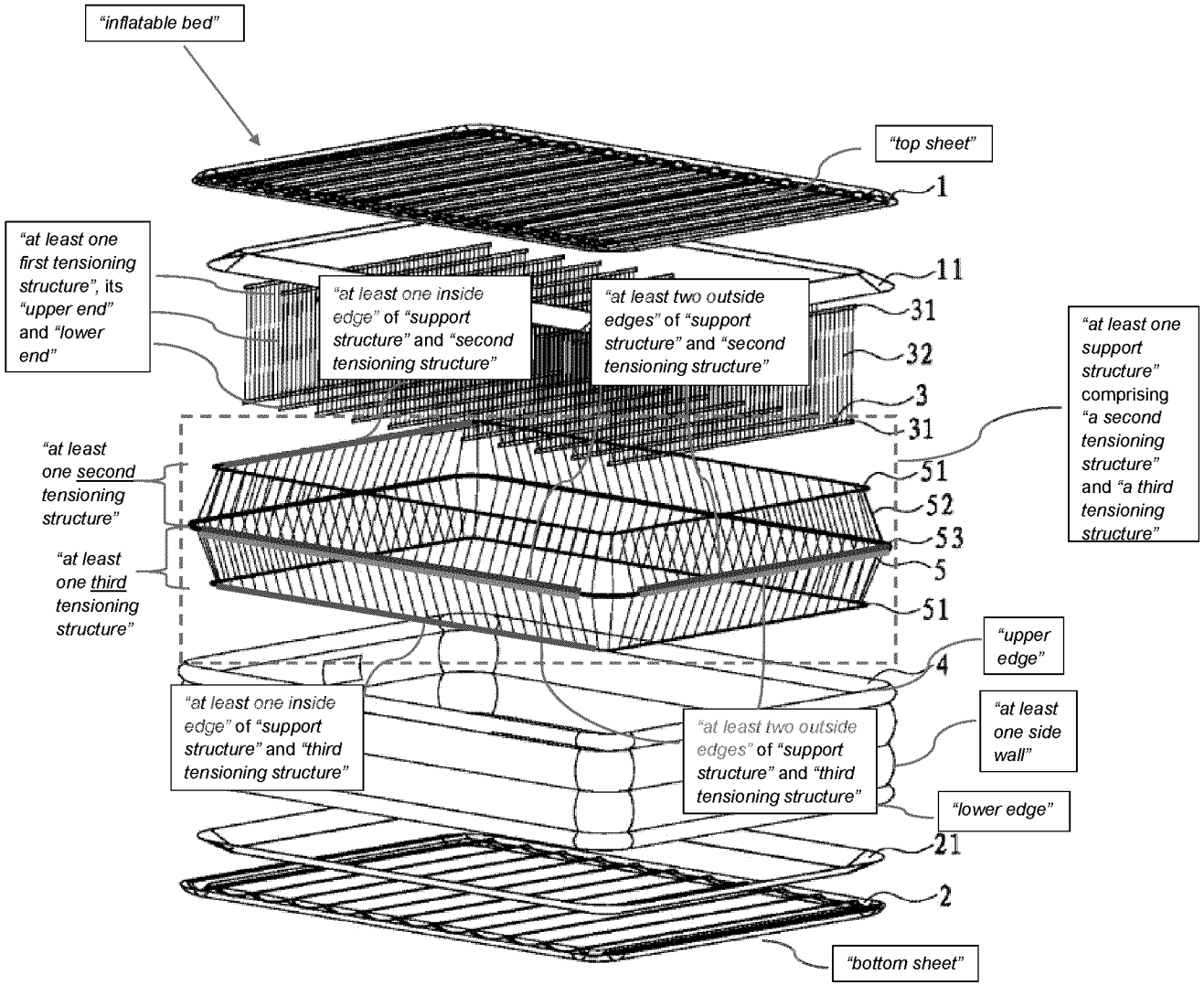


图 2

Source(s): Figure 2 of E1

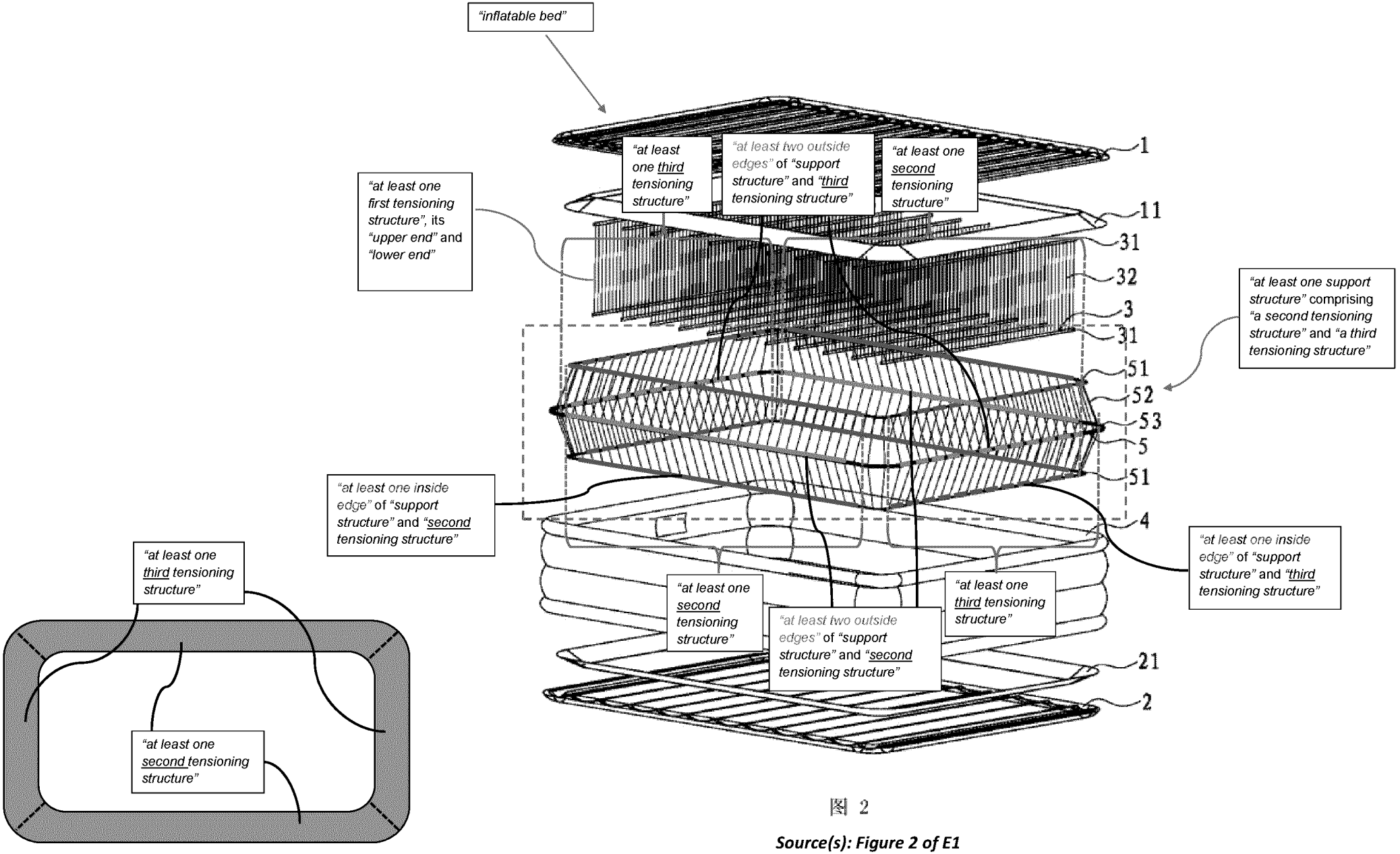


图 2

Source(s): Figure 2 of E1

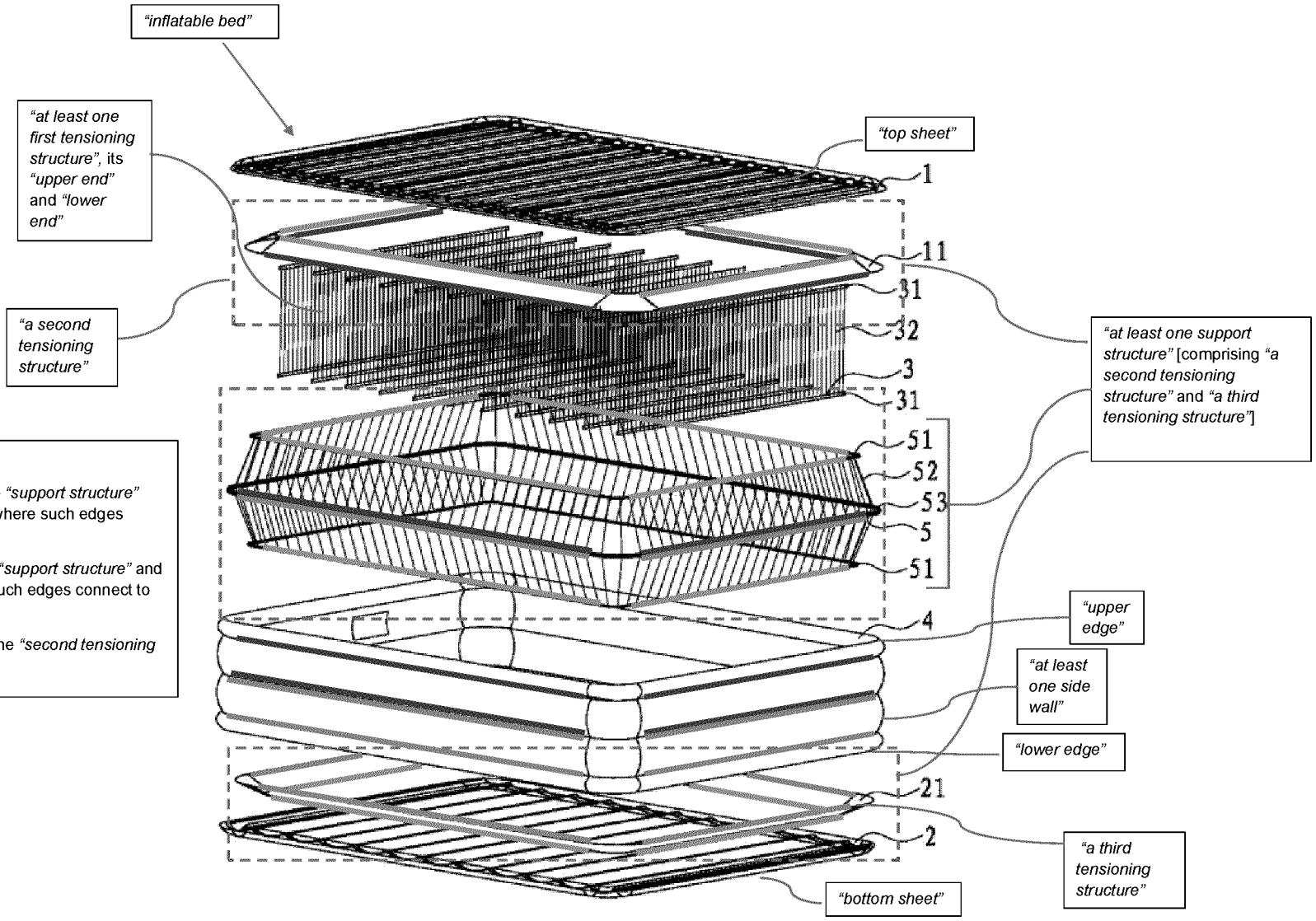


圖 2

Source(s): Figure 2 of E1

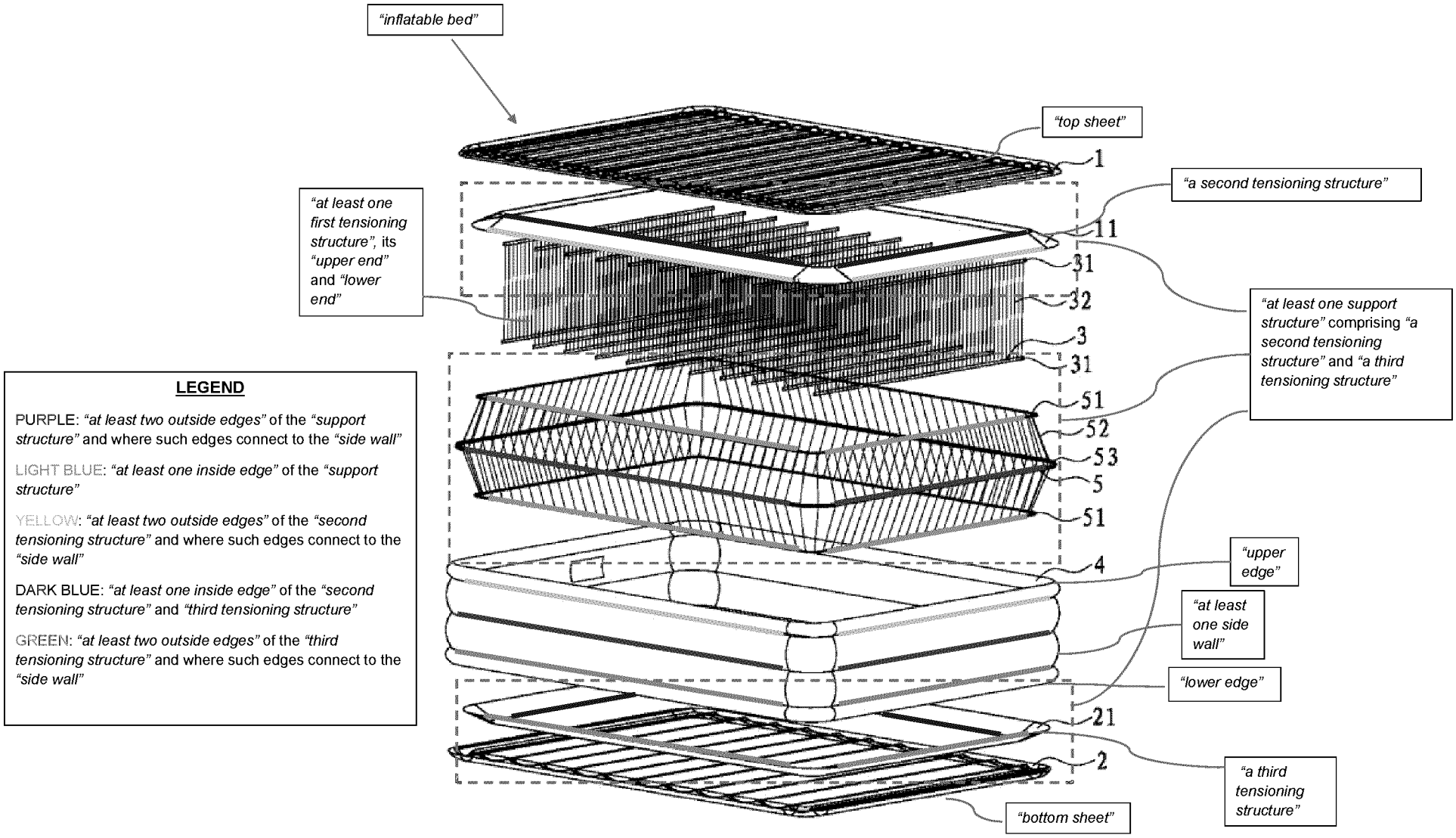
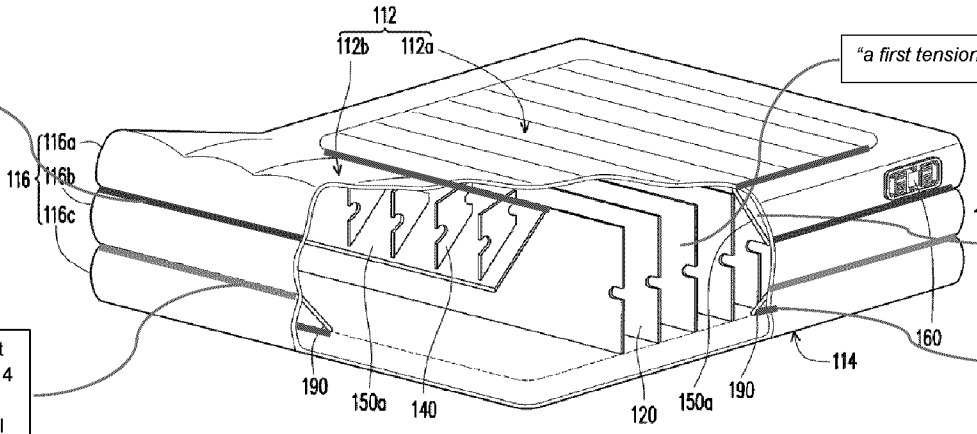


图 2

Source(s): Figure 2 of E1

First peripheral strip 150a has at least 4 outside edges (purple) and 4 inside edges (light blue) – accordingly, the first peripheral strip has *"at least two outside edges"* and *"at least one inside edge"*

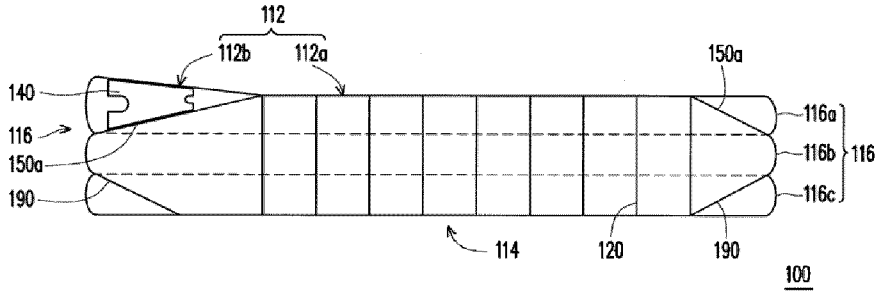
Second peripheral strip 190 has at least 4 outside edges (green) and 4 inside edges (light blue) – accordingly, the second peripheral strip has *"at least two outside edges"* and *"at least one inside edge"*



"a first tensioning structure"

"at least one support structure" comprising *"a second tensioning structure"* and *"a third tensioning structure"*

FIG. 9



Source(s): Figures 8 & 9 of E16

INTEX EX. 1038, Pg. 884
Intex Recreation v. Bestway Inflatables

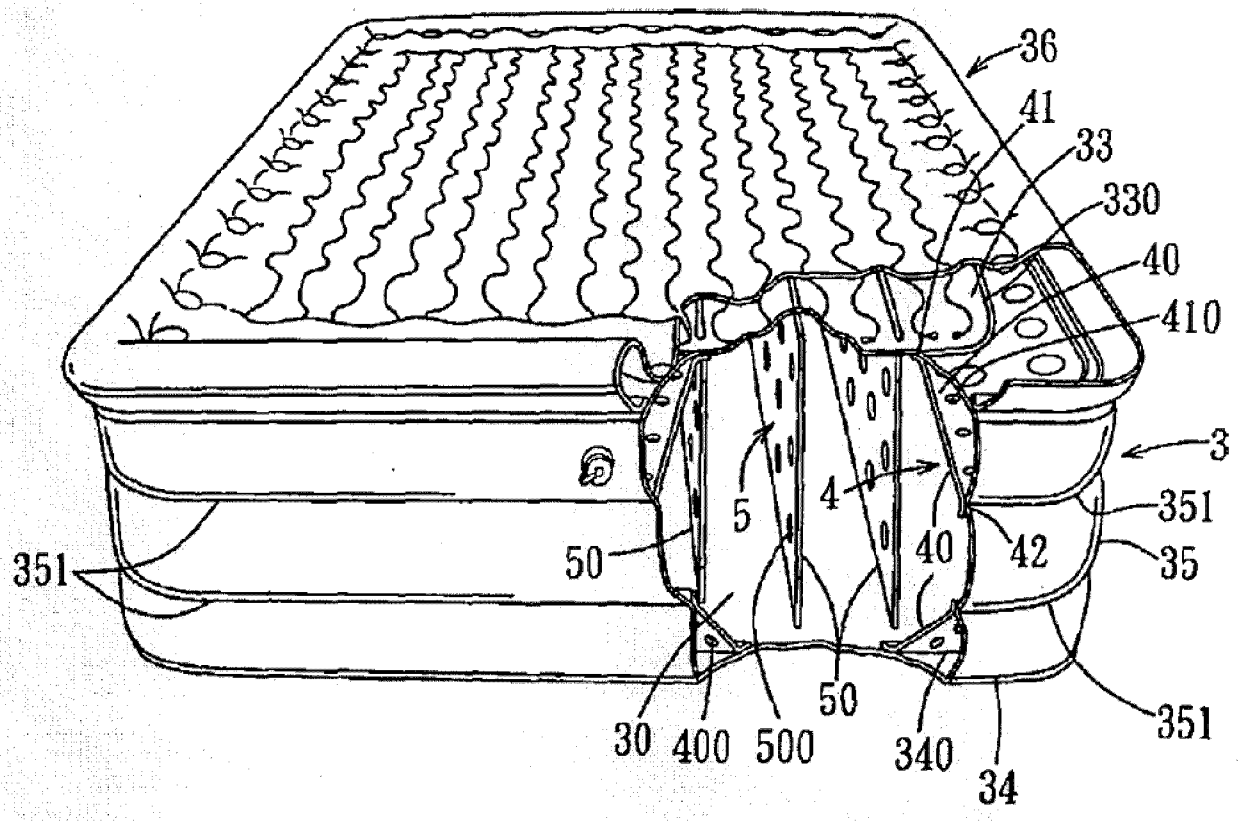


FIG. 2

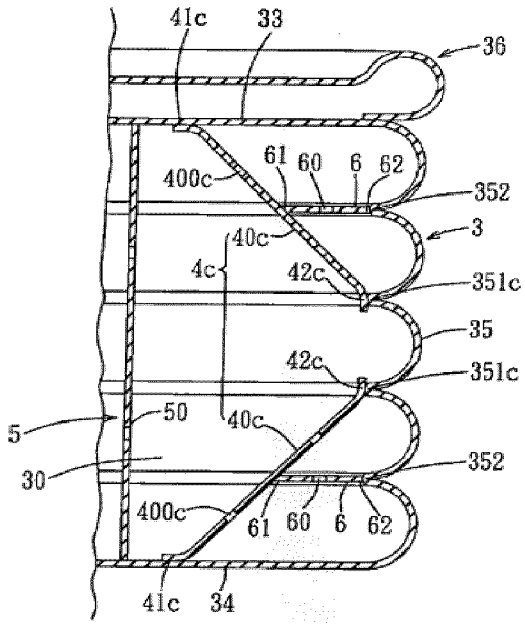


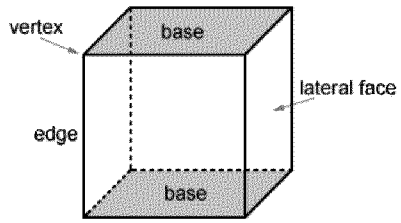
FIG. 5

Source(s): Figures 2 & 5 of E9

INTEX EX. 1038, Pg. 885
Intex Recreation v. Bestway Inflatables

Characteristics of a cube

The six identical faces of a cube are often categorized as four lateral faces and two bases. An edge of a cube is a line segment formed by the intersection of two adjacent faces. A vertex of a cube is the point of intersection of three edges.



A cube has the following characteristics:

- A cube has 6 faces, 12 edges, and 8 vertices. The 6 faces are identical squares. The 12 edges are equal in length.

Source: https://www.math.net/cube

INTEX EX. 1038, Pg. 886
Intex Recreation v. Bestway Inflatables

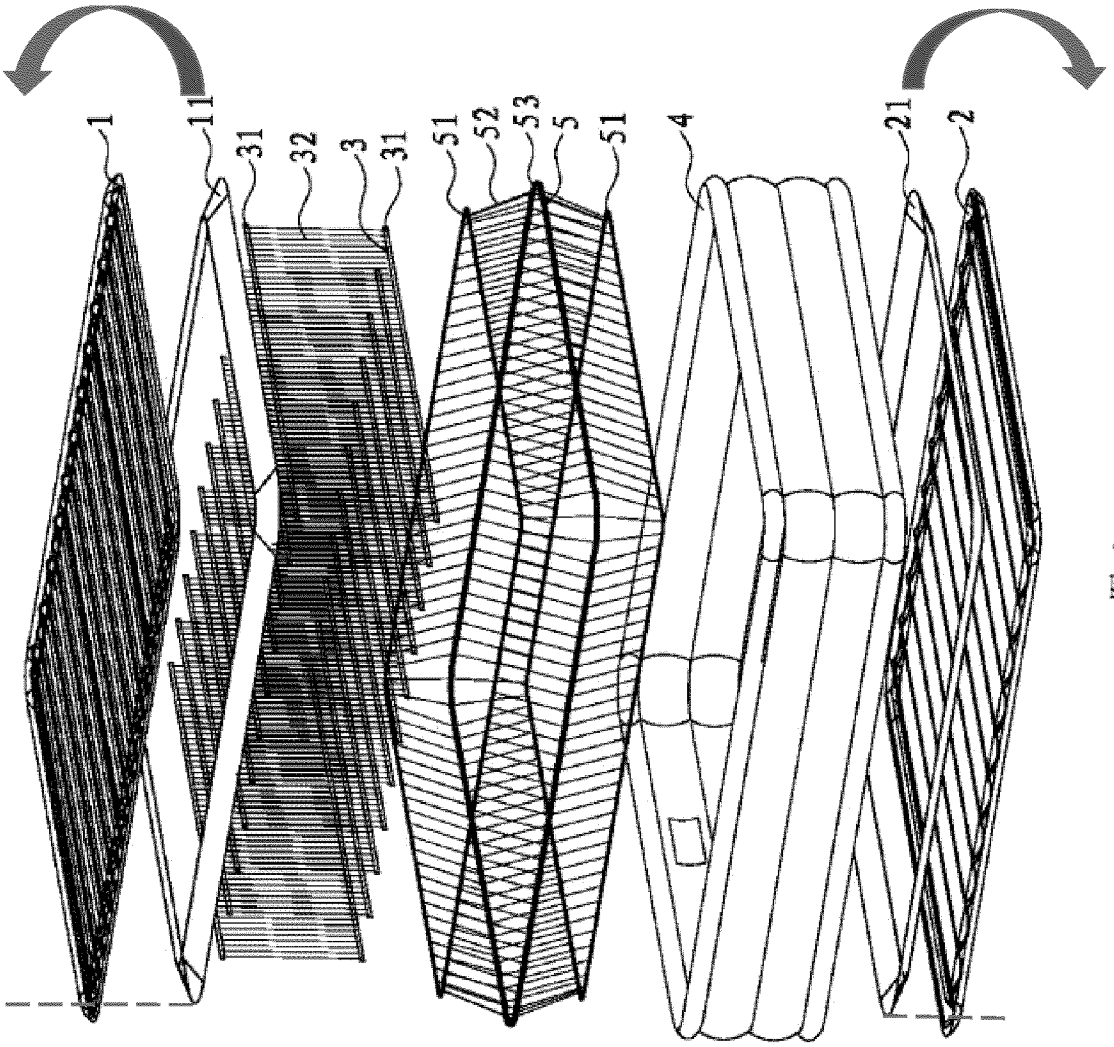
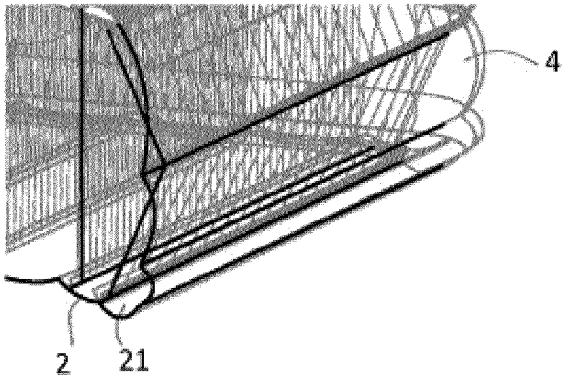
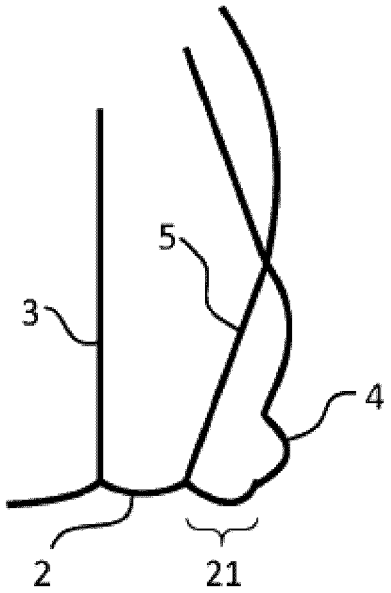


图 2

Source(s): Figure 2 of E1



Picture 2 - detail of Figure 4 of E1; original lines have been lightened and thick black lines have been added in order to render the structures of the bed more evident



Picture 4 - Sketch of the structure of E1 as derived from Figure 4 of E1 itself

Source(s): Pages 2 & 3, Patentee's written submissions of 9th November 2019

INTEX EX. 1038, Pg. 888
Intex Recreation v. Bestway Inflatables

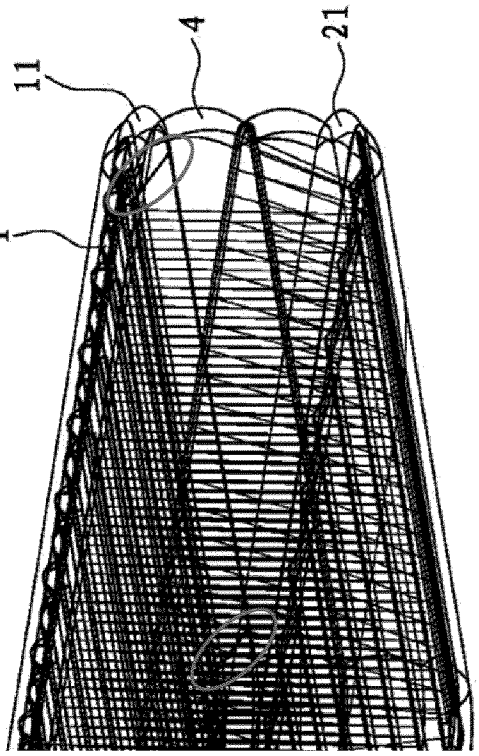


Figure 3 of E1

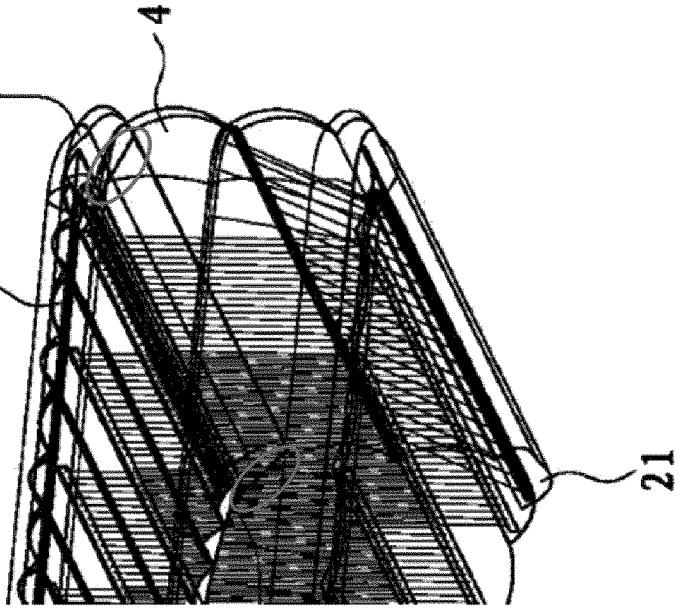
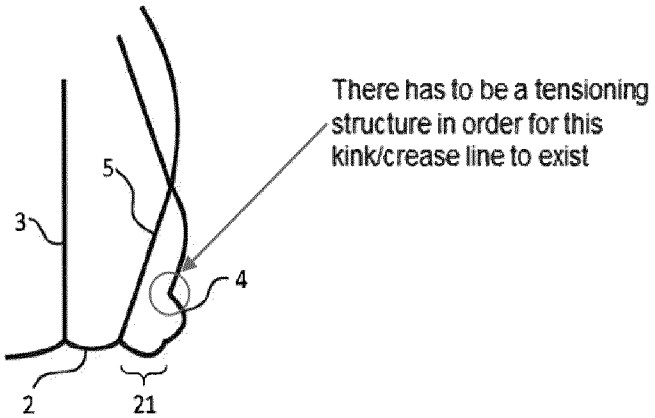


Figure 4 of E1



Picture 4 - Sketch of the structure of E1 as derived from Figure 4 of E1 itself

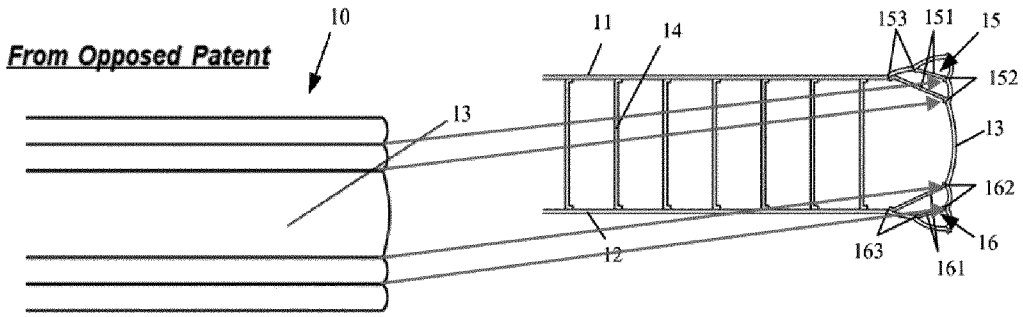
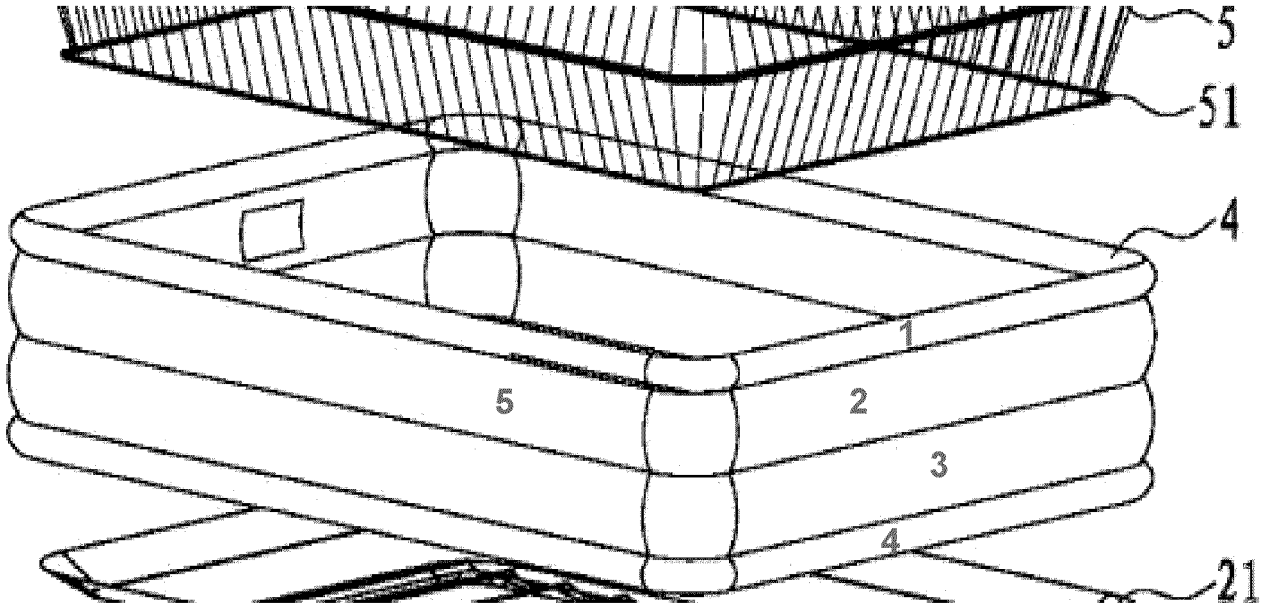


Fig. 2

Fig. 5

Source(s): Figures 2 & 5 of the Patent

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Source(s): Figure 2 of E1

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Application No. / Patent No.	Ref.	Date
16 191 360.3 - 1011 / 3 192 401 /	27D8343A,12EP42	03.02.2021
Proprietor Bestway Inflatables & Material Corp.		

Provision of a copy of the minutes in accordance with Rule 124(4) EPC

The attached copy of the minutes of the oral proceedings is sent to you in accordance with Rule 124(4) EPC.

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Suero Gallego, V
Formalities Officer
Tel. No.: +31 70 340 - 2078 **Branch at The Hague**

Enclosure(s): Copy of the minutes (Form 2309)

Registered Letter
EPO Form 2042 12.07TRI

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Application No.: 16 191 360.3

Patent No.: EP-B-3 192 401

Minutes of the oral proceedings before the OPPOSITION DIVISION

The proceedings were public.

Proceedings opened on 13.01.2021 at 09:00 hours

Present as members of the opposition division:

Chairman:	Krasenbrink, B
1st member:	Lehe, Jörn
2nd member:	Kus, Slawomir
Minute writer:	Kus, Slawomir

Present as or for the party or parties:

- For the Proprietor(s): Bestway Inflatables & Material Corp.

  - Ms. Simona Inchingalo - European Patent Attorney
  - Mr. Aldè - European Patent Attorney

- For the Opponent 1: Intex Recreation Corp.

  - Mr. Joshua Parsi Mendiola - European Patent Attorney
  accompanied by
  - Ms. Joanne Pham - assisting Mr. Parsi of Reddie & Grose LLP

The identity of the person/s (as well as, if applicable, that of the witness or witnesses) and, where necessary, the authorisation to represent/authority to act were checked.

Essentials of the oral proceedings and relevant statements of the parties:

After deliberation of the opposition division,

- the chairman announced the following **decision**:

"The opposition is rejected."

Regarding the reasons for the decision, the chairman referred to:

Article 101(2) EPC, second sentence: None of the grounds for opposition mentioned in Article 100 EPC prejudices the maintenance of the patent as granted.

The chairman **closed the oral proceedings** on 13.01.2021 at 15:15 hours.

. . . . . .
Krasenbrink, B
Chairman

. . . . . .
Kus, Slawomir
Minute Writer

Annex(es):

After deliberation of the opposition division,

- the chairman announced the following **decision** :

"The opposition is rejected."

Regarding the reasons for the decision, the chairman referred to:

Article 101(2) EPC, second sentence: the grounds for opposition mentioned in Article 100 EPC do not prejudice the maintenance of the patent as granted.

The chairman **closed the oral proceedings** on 13.01.2021 at 15:15 hours.

signed: signed:

Krasenbrink, B Kus, Slawomir

. . . . . .
Chairman

. . . . . .
Minute Writer

Enclosure(s):

Article 106
Decisions subject to appeal

(1) An appeal shall lie from decisions of the Receiving Section, Examining Divisions, Opposition Divisions and the Legal Division. It shall have suspensive effect.

(2) A decision which does not terminate proceedings as regards one of the parties can only be appealed together with the final decision, unless the decision allows a separate appeal.

(3) The right to file an appeal against decisions relating to the apportionment or fixing of costs in opposition proceedings may be restricted in the Implementing Regulations.

Rule 97
Appeal against apportionment and fixing of costs

(1) The apportionment of costs of opposition proceedings cannot be the sole subject of an appeal.

(2) A decision fixing the amount of costs of opposition proceedings cannot be appealed unless the amount exceeds that of the fee for appeal.

Rule 98
Surrender or lapse of the patent

The decision of an Opposition Division may be appealed even if the European patent has been surrendered in all the designated Contracting States or has lapsed in all those States.

Article 107
Persons entitled to appeal and to be parties to appeal proceedings

Any party to proceedings adversely affected by a decision may appeal. Any other parties to the proceedings shall be parties to the appeal proceedings as of right.

Article 108
Time limit and form

Notice of appeal shall be filed, in accordance with the Implementing Regulations, at the European Patent Office within **two months** of notification of the decision. Notice of appeal shall not be deemed to have been filed until the fee for appeal has been paid. Within **four months** of notification of the decision, a statement setting out the grounds of appeal shall be filed in accordance with the Implementing Regulations.

Further information concerning the filing of an appeal

(a) Notice of appeal can be filed in accordance with Rule 1 and Rule 2(1) EPC, by delivery by hand, by post, or by technical means of communication. The filing has to comply with the details and conditions and, where appropriate, any special formal or technical requirements laid down by the President of the European Patent Office (R. 99(3) EPC).

(b) The addresses of the filing offices of the European Patent Office are as follows:

(i) European Patent Office
D-80298 Munich
Germany

Fax: +49 89 2399-4465

(ii) European Patent Office
Postbus 5818
NL-2280 HV Rijswijk (ZH)
The Netherlands

Fax: +31 70 340-3016

(iii) European Patent Office
D-10958 Berlin
Germany

Fax: +49 30 259 01-840

(c) The notice of appeal must contain the name and address of the appellant in accordance with the provisions of Rule 41(2)(c) EPC, an indication of the decision impugned, and a request defining the subject of the appeal. In the statement of grounds of appeal the appellant shall indicate the reasons for setting aside the decision impugned, or the extent to which it is to be amended, and the facts and evidence on which the appeal is based (R. 99(1) and (2) EPC). The notice of appeal and any subsequent submissions stating the grounds for appeal must be signed (R. 50(3) EPC).

(d) The fee for appeal is laid down in the Rules relating to Fees. The schedule of fees and expenses of the EPO or a reference to the current version is regularly published in the Official Journal of the European Patent Office under the heading "Guidance for the payment of fees, expenses and prices". Fee information is also published on the EPO website under www.epo.org/ fees.

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Application No.: 16 191 360.3

Patent No.: EP-B- 3 192 401

A copy of the communication (communication, decision, minutes) was printed for and notified to each of the following representatives/parties:

Inchingalo, Simona
Bugnion S.p.A.
Viale Lancetti, 17
20158 Milano
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01
Parsi Mendiola, Joshua
Reddie & Grose LLP
The White Chapel Building
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London E1 8QS
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Intex Recreation v. Bestway Inflatables

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INTEX EX. 1038, Pg. 899
Intex Recreation v. Bestway Inflatables

I. Summary of Facts and Submissions

1 European patent 3 192 401 having the title "INFLATABLE BED" is based upon European patent application No. 16 191 360.3 filed on 29-09-2016. It claims priority of CN 201610020533 filed on 13-01-2016.

The mention of the grant of the patent has been published in the European Patent Bulletin of 19-09-2018. Proprietor of the patent is
Bestway Inflatables & Material Corp.
No. 3065 Cao An Road
Shanghai 201812
CN.

2 A notice of opposition has been filed by
Intex Recreation Corp.
4001 Via Oro Avenue, Suite 210
Long Beach, CA 90810
US
on 17-06-2019.
The Opponent requests revocation of the patent in its entirety based on Articles 100(a) and 100(b) EPC.

3 The following evidence has been submitted:

E1 - CN 203137719 U

E2 - Translation of CN 203137719 U

E3 - US 2007/0277324 (Liu, Feng)

E4 - US 9,254,047 (Schermel et al.)

E5 - US 4,941,223 (Santo, Philip J)

E6 - US 5,669,091 (Chung, Ming-Chun)

E7 - US 2015/0335164 (Liu, Feng)

E8 - WO 2013/130117 (Intex Recreation Corporation)

E9 - FR 2 914 545 (Song Rong)

E9a - English translation of E9

E10 - GB 434,098 (P. B. Cow & Co Ltd)

E11 - US 6,568,013 (Perez et al.)

E12-US 6,671,910 (Hsu et al.)

E13 - US 6,701,559 (Boso et al.)

E14- US 7,039,972 (Chaffee, Robert B)

E15 - US 2015/0201760 (Lin et al.)

E16 - US2013/0145560 A1

E17 - US2009/0165211 A1

E18 - Powerpoint presentation filed during Oral Proceedings

4 In a letter received on 30-10-2019, the proprietor requested the rejection of the opposition (Article 101(2) EPC).

5 On 28-05-2020 the opposition division issued a summons to attend oral proceedings on 14-01-2021.

6 In a letter received on 30-9-2020 the proprietor gives further arguments and filed three auxiliary requests.

7 In a letter received on 30-9-2020, the opponent requests to cancel the oral proceedings scheduled as a ViCo on 14-1-2021 and to schedule a new date for in-person oral proceedings.

8 With office-communication dated 17-12-2020, the opposition-division informs the parties that the oral proceedings will be held on 14-1-2021 in the form of a ViCo as planned and gives reasons for this.

9 In a letter received on 12-1-2021, the opponent files documents E9a, E16 and E17.

10 On 14-01-2021, oral proceedings were held.

11 The decision is based on the patent as granted.

12 The feature-analysis of claim 1 and the references used in this decision are as follows:

i	An inflatable bed (10), comprising: a top sheet (11) and a bottom sheet (12) disposed vertically at an interval;
ii	at least one side wall (13), an upper edge of said side wall being coupled to an outer edge of said top sheet, a lower edge of said side wall being coupled to an outer edge of said bottom sheet,

iii	an air chamber formed between said top sheet, said bottom sheet and said side wall;
iv	at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure being respectively coupled to said top sheet and said bottom sheet; and
v	at least one support structure disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls,
vi	at least two outside edges (152,162) of said support structure being respectively coupled to the side wall adjacent,
vii	at least one inside edge (153,163) of said support structure being coupled to the top sheet or bottom sheet adjacent,
viii	wherein said support structure comprises a second tensioning structure and a third tensioning structure,
ix	at least two outside edges of said second tensioning structure are respectively coupled to the side wall adjacent,
x	at least one inside edge of said second tensioning structure is coupled to the top sheet adjacent; and
xi	at least two outside edges of said third tensioning structure are respectively coupled to the side wall adjacent,
xii	at least one inside edge of said third tensioning structure is coupled to the bottom sheet adjacent.

II. Reasons for the decision

1. Admissibility of the Opposition

The opposition is admissible because it meets all the requirements of Articles 99(1) and 100 EPC and Rules 3(1) and 76(1)(2) EPC.

2. Article 100(b) EPC

Claim 1:

The opponent had argued that according to claim 1, the support structure must be parallel to the side wall. He further argued that no embodiment was disclosed which would show this feature.

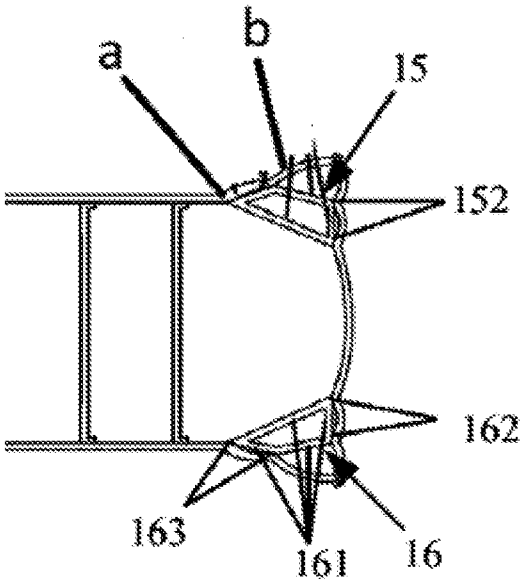
The opposition-division is of the opinion, that the support structure in figure 5 of the patent is in fact disposed in a longitudinal direction of the side wall, since it has an extension in the direction of the side wall.

The opposition-division therefore considers that the invention as defined by the features of claim 1 is sufficiently disclosed for it to be carried out by a person skilled in the art.

Claims 36 and 37

The opponent had argued that claims 36 and 37 are completely ambiguous to the effect that it would be impossible for the person skilled in art to carry them out.

The opposition-division cannot follow this reasoning. In relation to parts of fig. 12 (see below with references "a" and "b" added) the opposition-division is of the following opinion:



Location (a) refers to the:

- the location where said top sheet is located in the inside part of an upper edge of said second tensioning structure.

This location is lower than location (b):

- the location where said top sheet is located in the outside part of the upper edge of said second tensioning structure.

The reasoning for claim 37 is equivalent, but relates to the bottom sheet.

The opposition-division considers that an invention is in principle sufficiently disclosed if at least one way is clearly indicated enabling the person skilled in the art to carry out the invention (see Case-Law II.C.5.2). The invention as defined in claim 36 and 37 is therefore sufficiently disclosed for it to be carried out by a person skilled in the art.

The opposition division there considers that the ground of opposition according to Article 100(b) EPC does not prejudice the maintenance of the patent.

3. Article 100 (a) EPC

3.1. Admissibility (Rule 116(1) EPC)

3.1.1 Admissibility of E18 and admissibility of new Novelty-objections based on E1 and E18

The opponent has brought forward during the oral proceedings for the first time new interpretations of E1, additional to an interpretation brought forward in the written procedure. Based on each of these different interpretations of E1, he contested the novelty of the subject-matter of claim 1. To support and clarify these different interpretations of E1, the opponent has filed a powerpoint-presentation (E18) during the oral proceedings. The proprietor contested the admissibility of this presentation, arguing that this presentation was late-filed, that it could have been filed earlier and that he would be taken by surprise. He further argued that E18 contained also subject-matter based on E9, E16 and E17.

The opposition-division does not follow this reasoning in relation to the references of E18 to E1. In relation to E1 the document E18 does not refer to any undiscussed embodiments and is just intended as a visual help for interpreting E1. This is not seen as surprising by the opposition-division, but rather as helpful. The novelty objections based on the newly introduced interpretations of E1 are further considered as prima facie relevant. The novelty objections based on the newly introduced interpretations and