

体实施例的限制。

[0081] 实施例一：

[0082] 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。

[0083] 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。

[0084] 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。

[0085] 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。

[0086] 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。

[0087] 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161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。

[0088] 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。

[0089] 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。

[0090] 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。

[0091] 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)。

[0092] 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。

[0093] 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。

[0094] 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。

[0095] 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。

[0096] 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。

[0097] 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。

[0098] 实施例二:

[0099] 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。

[0100] 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。

[0101] 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。

[0102] 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。

[0103] 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。

[0104] 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)。

[0105] 实施例三:

[0106] 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。

[0107] 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)。

[0108] 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。

[0109] 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)。

[0110] 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。

[0111] 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。

[0112] 实施例四:

[0113] 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

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。

[0114] 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。

[0115] 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。

[0116] 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。

[0117] 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。

[0118] 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。

[0119] 实施例五:

[0120] 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。

[0121] 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。

[0122] 实施例六:

[0123] 图21为图4中沿A-A线剖开的实施例六的剖视图。

[0124] 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。

[0125] 实施例七:

[0126] 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。

[0127] 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。

[0128] 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。

[0129] 同理,第二拉带结构15中若干拉带之间的连接方式,以及第三拉带结构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和第三拉带结构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。

[0130] 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。

[0131] 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。

[0132] 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。

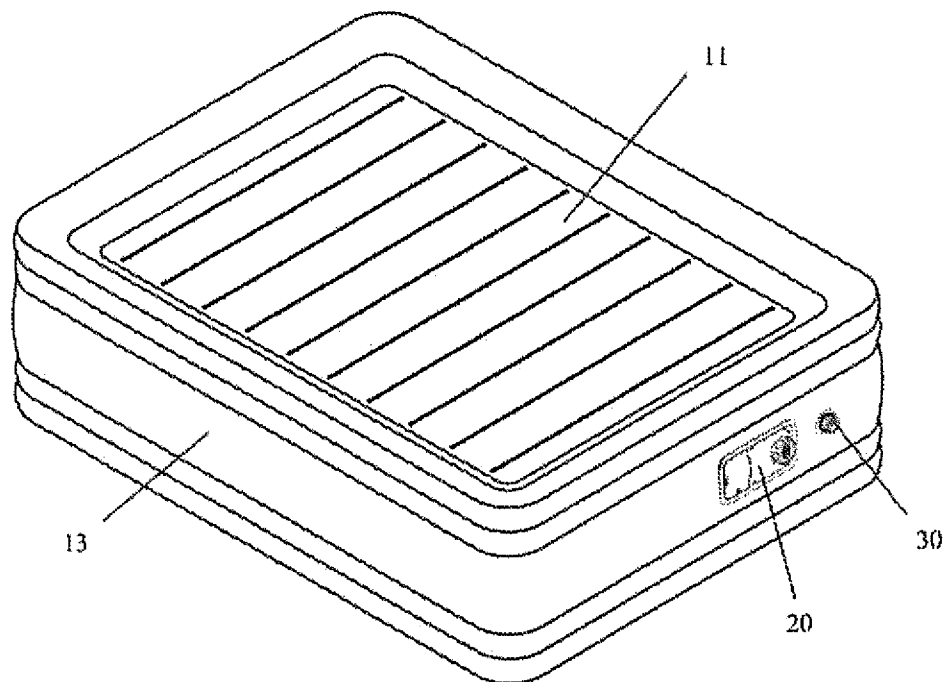


图1

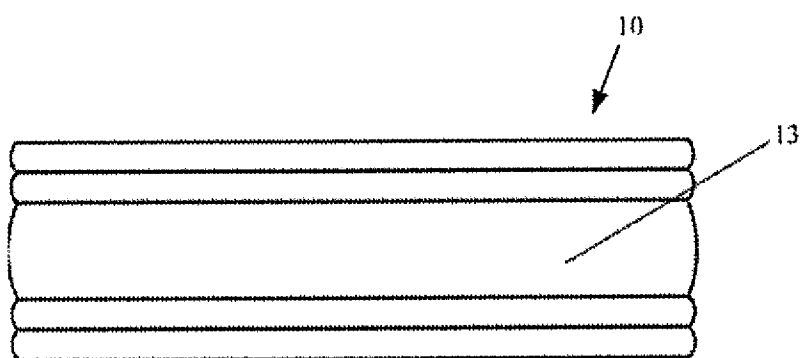


图2

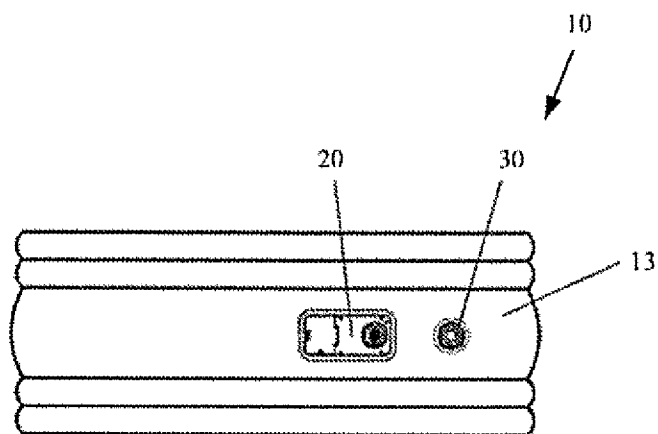


图3

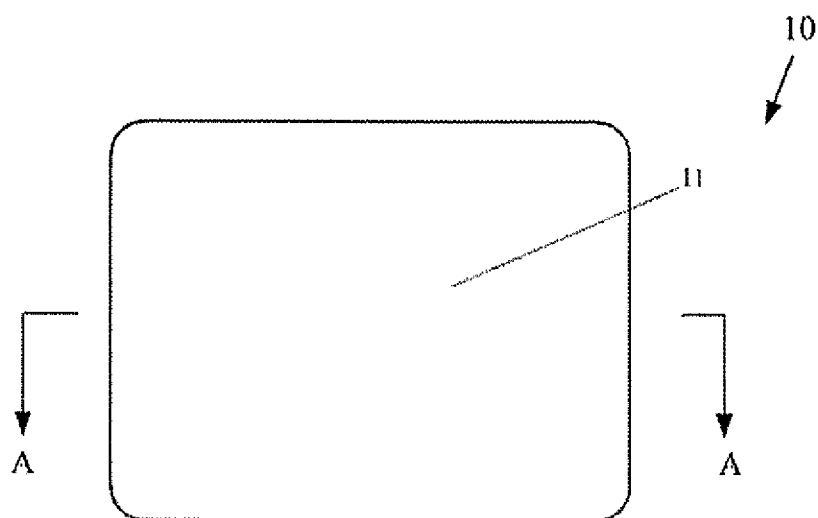


图4

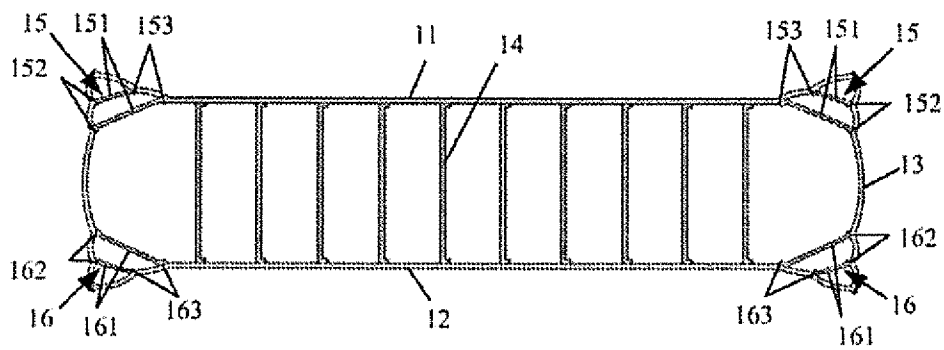
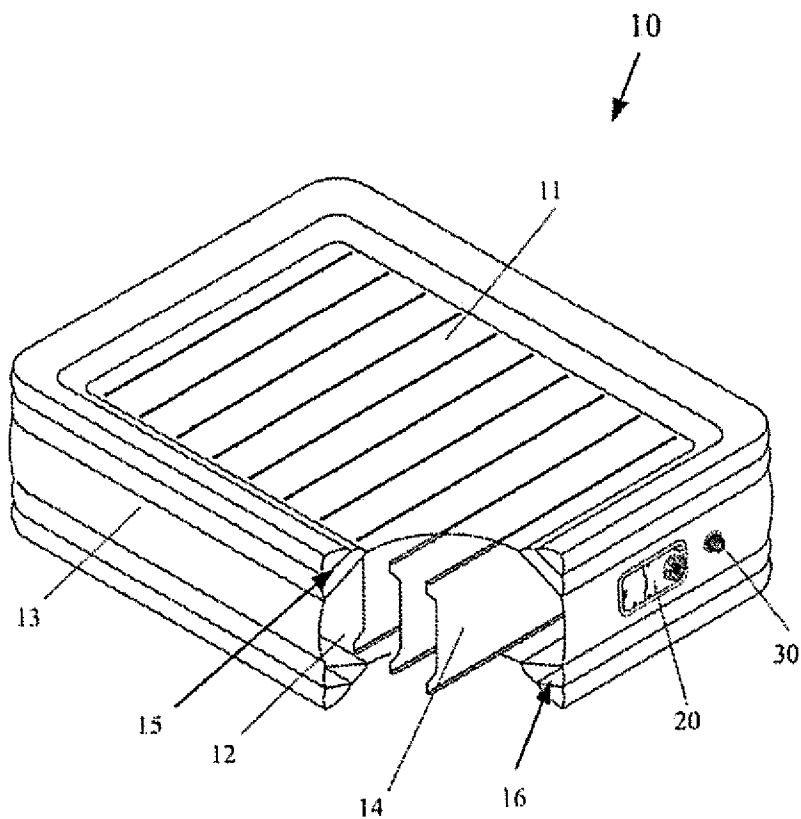


图5

15



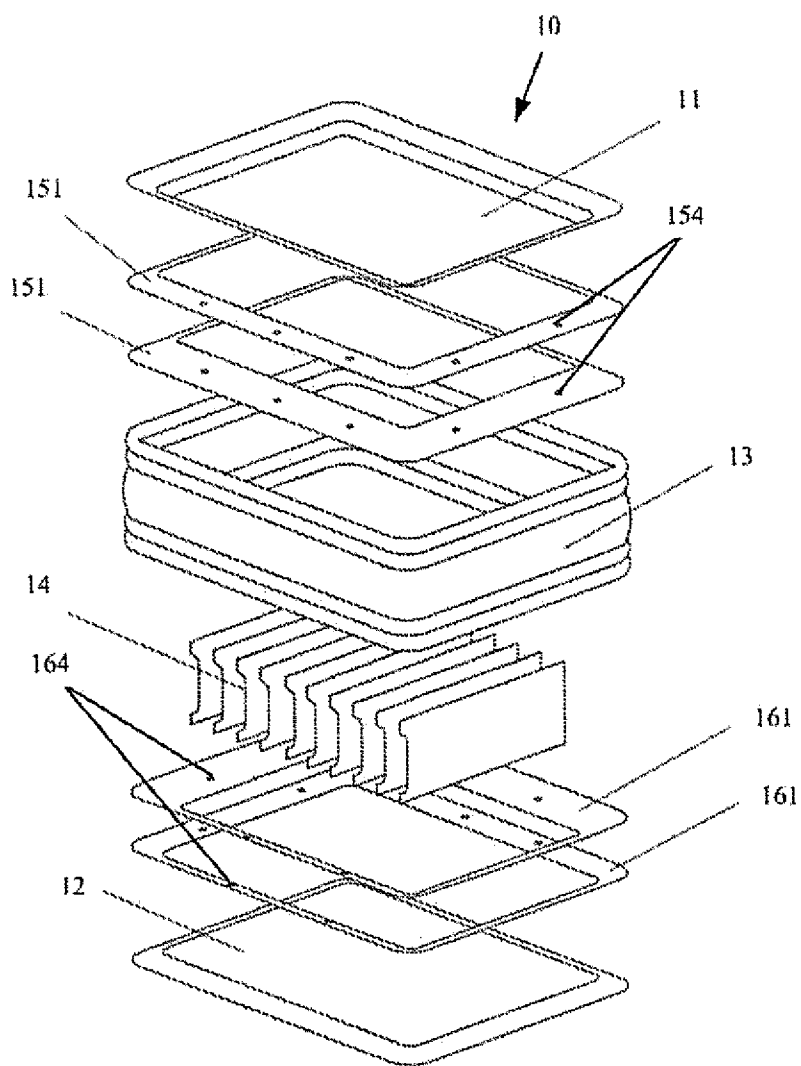


图7

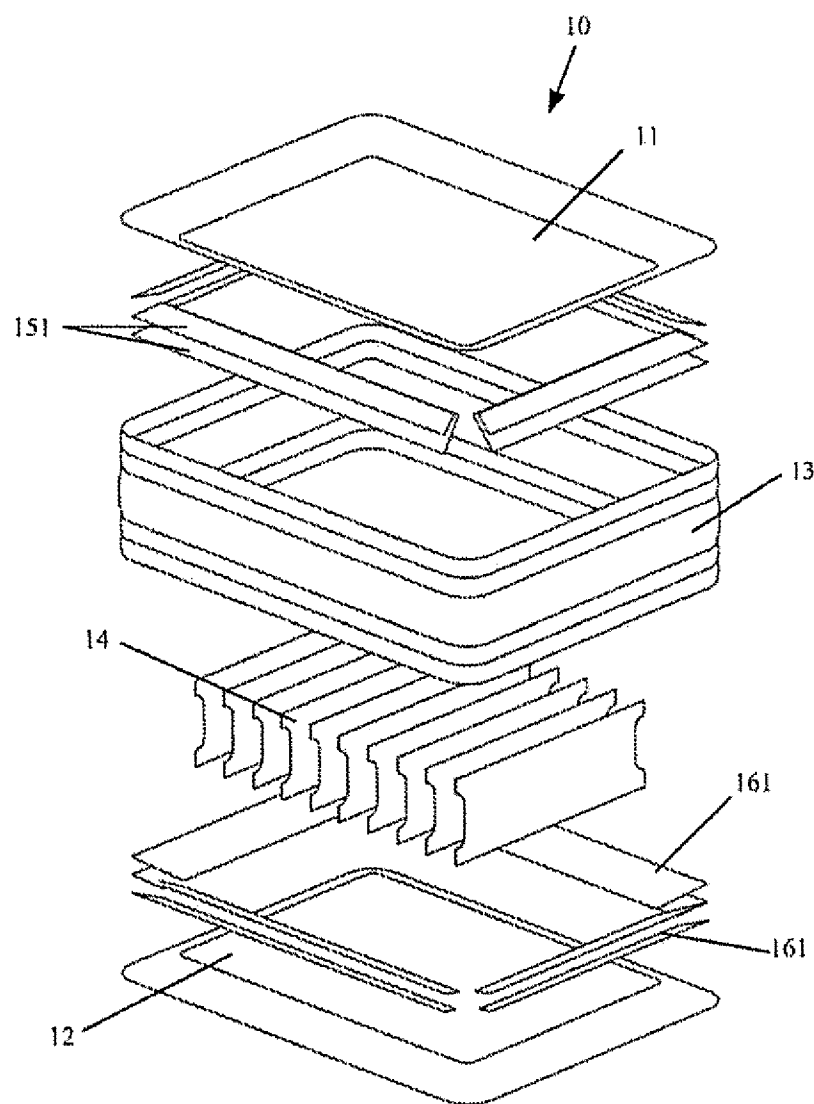


图8

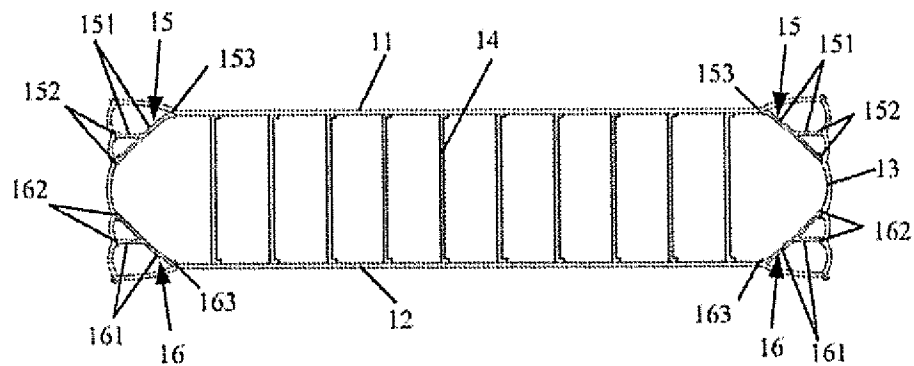


图9

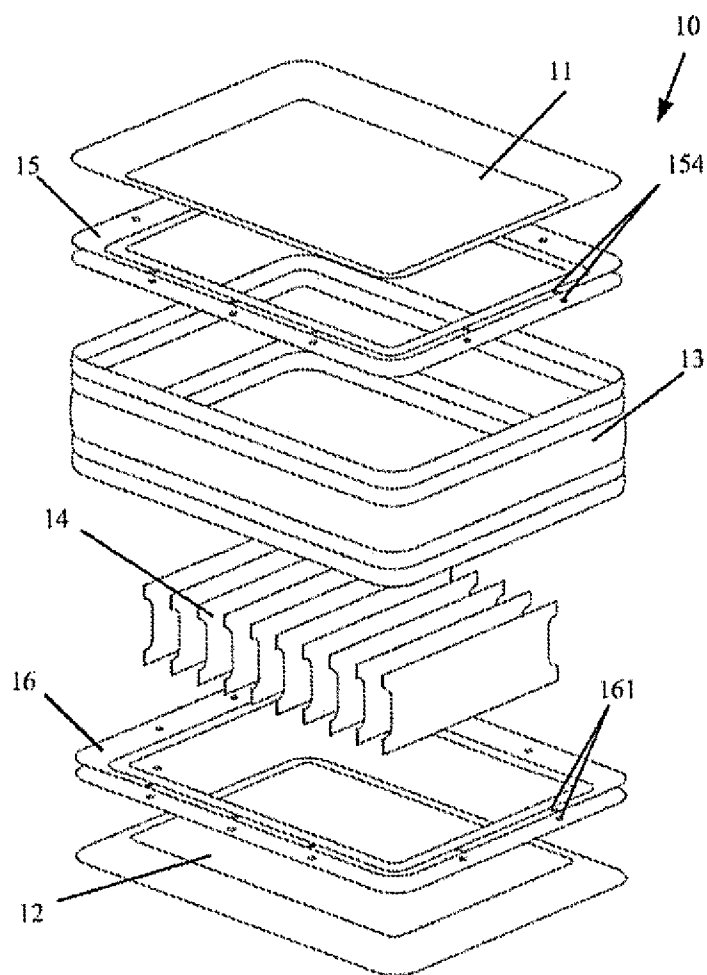


图10

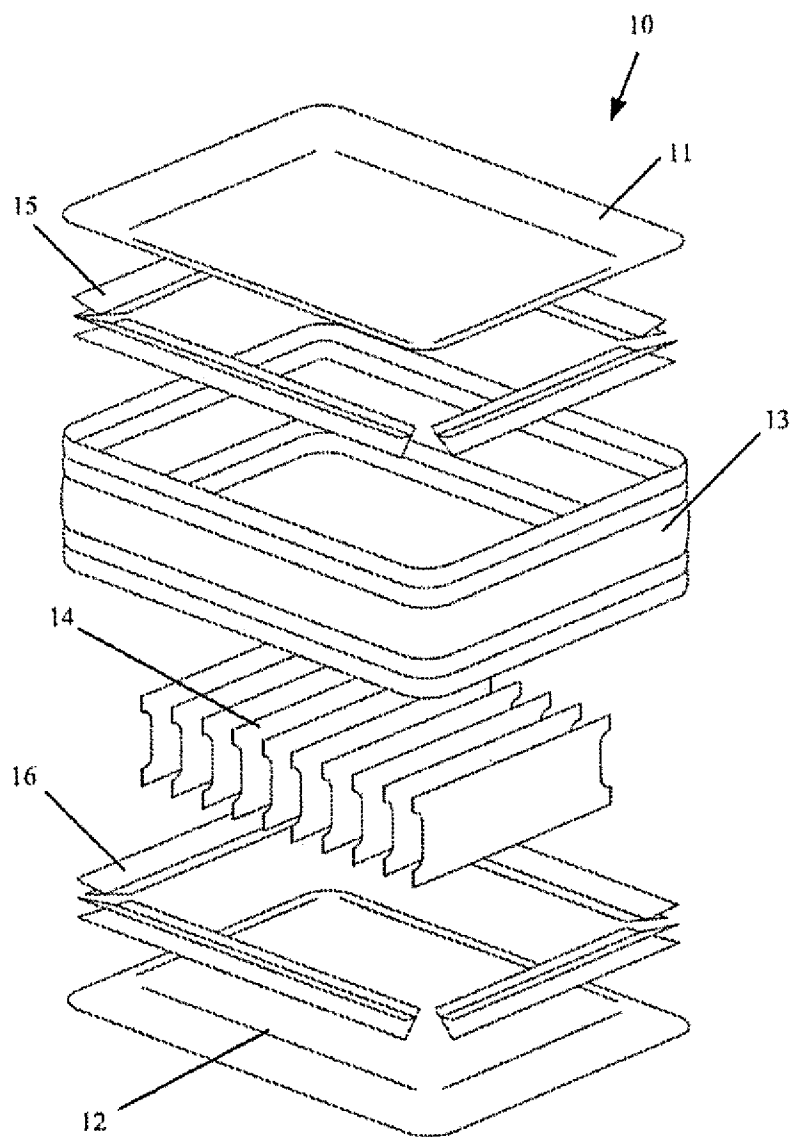


图11

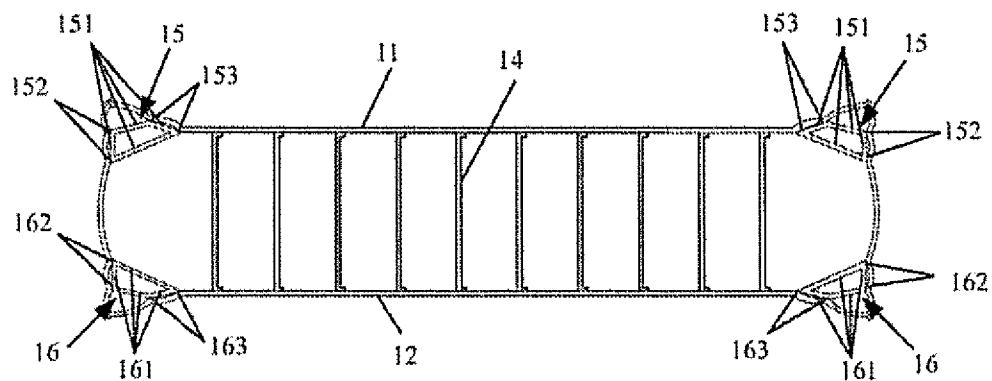


图12

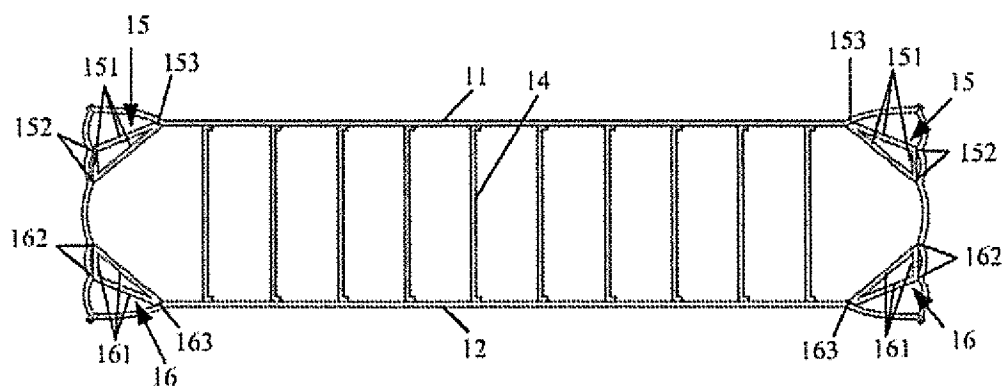


图13

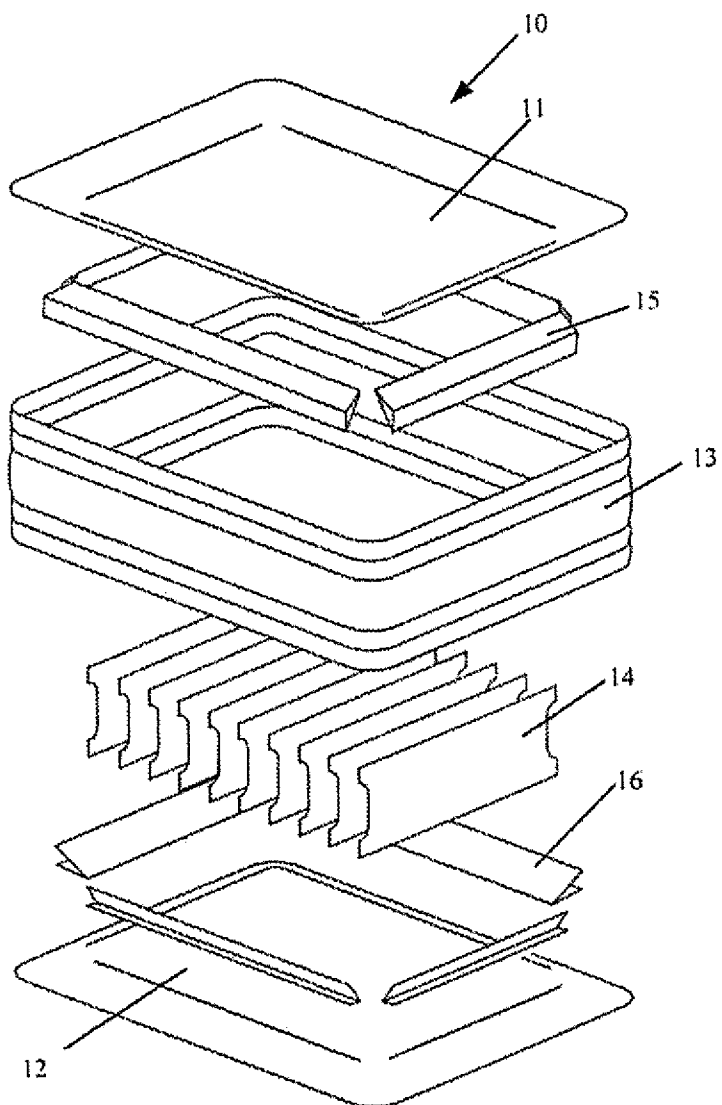


图14

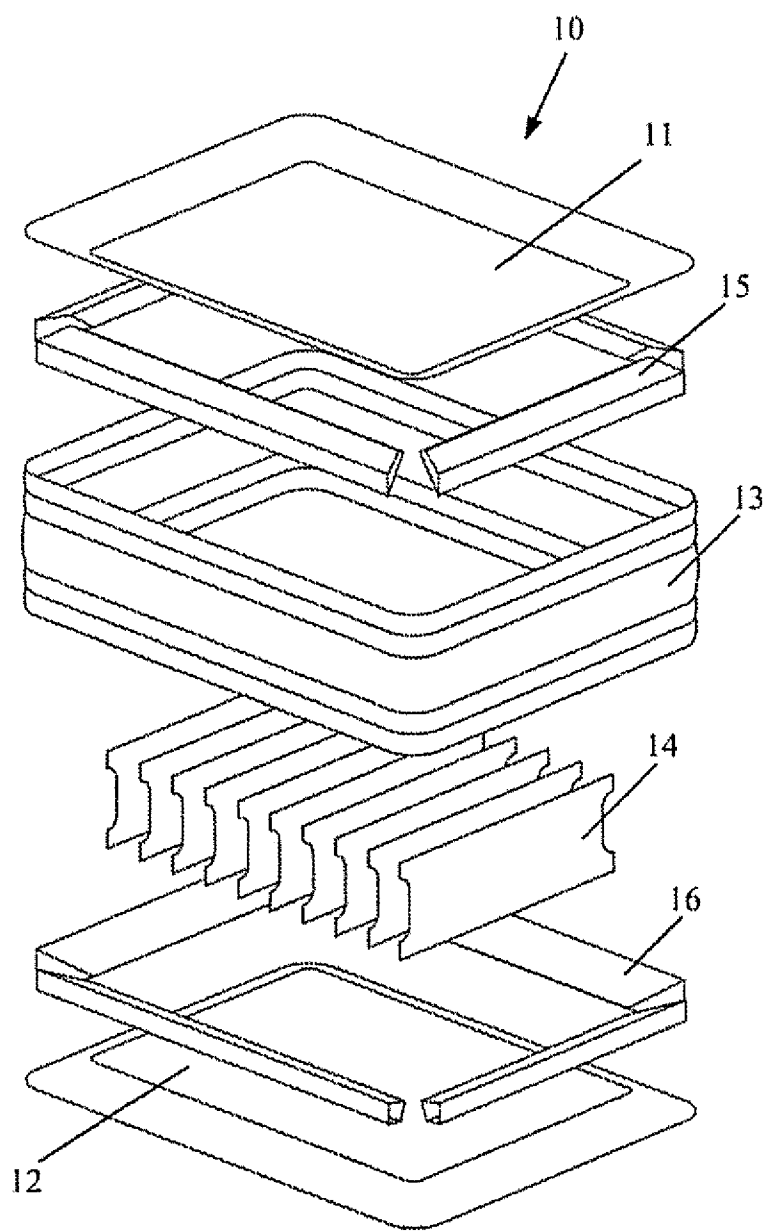


图15

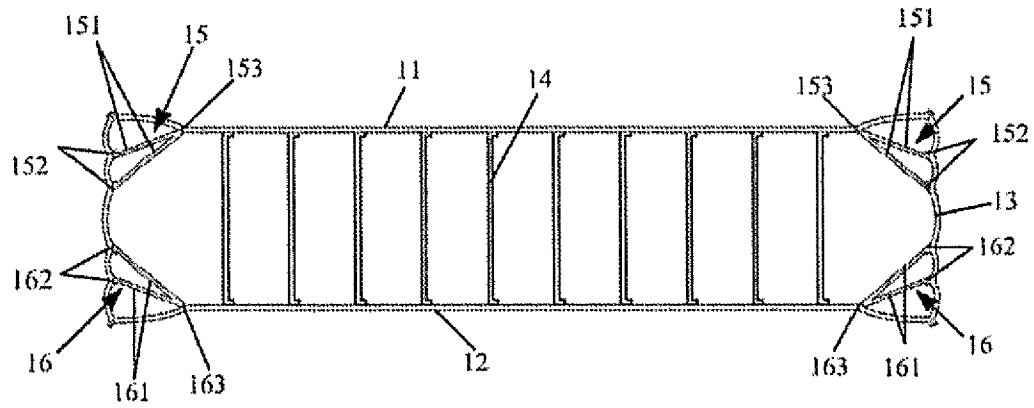


图16

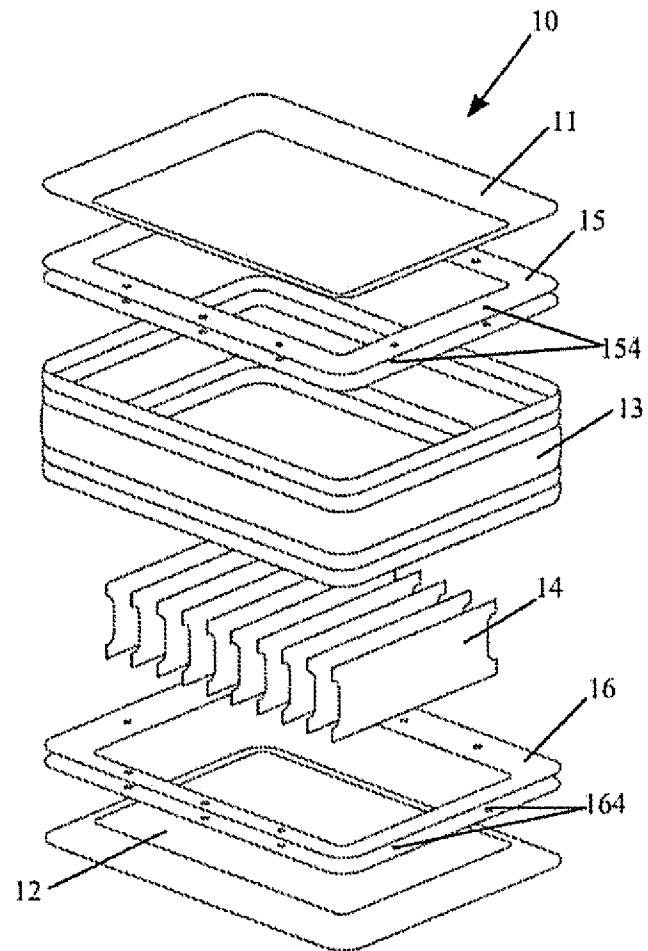


图17

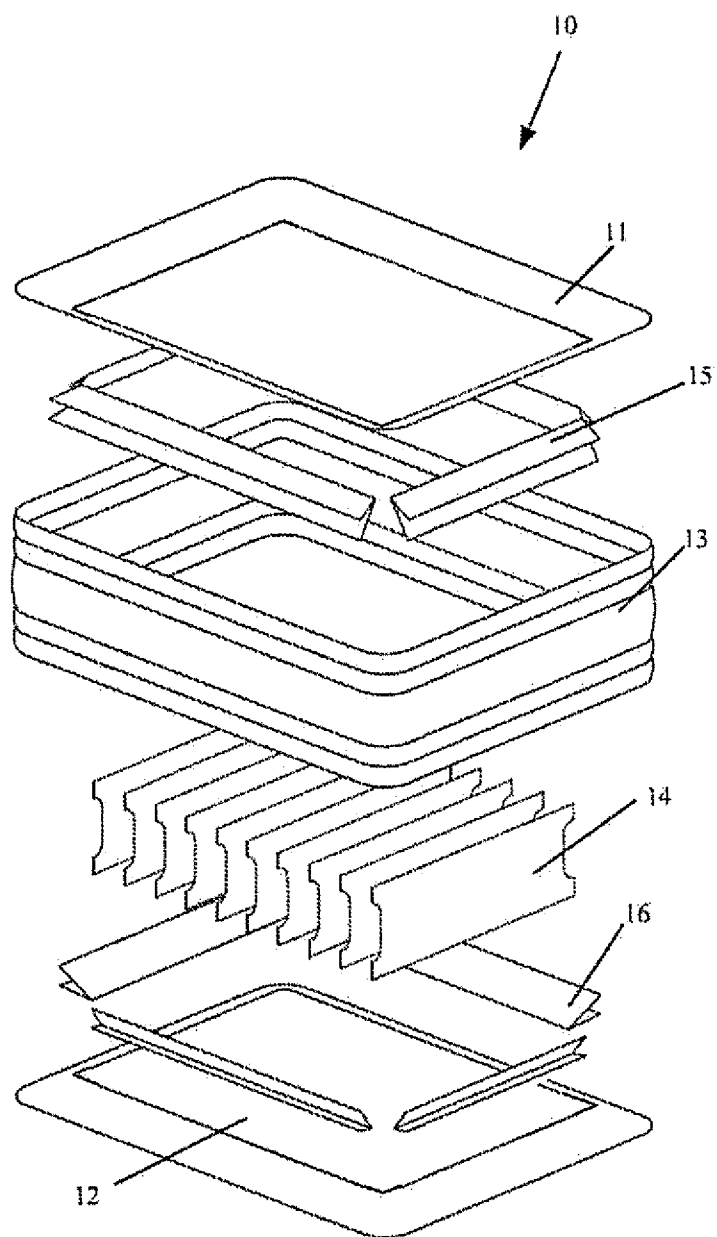


图18

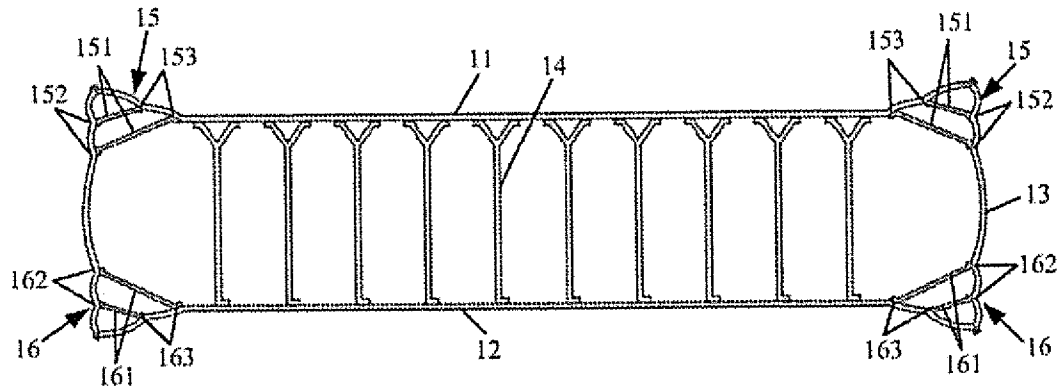


图19

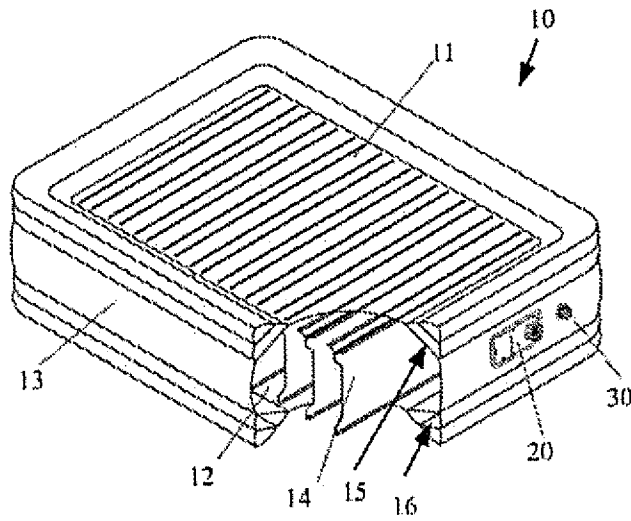


图20

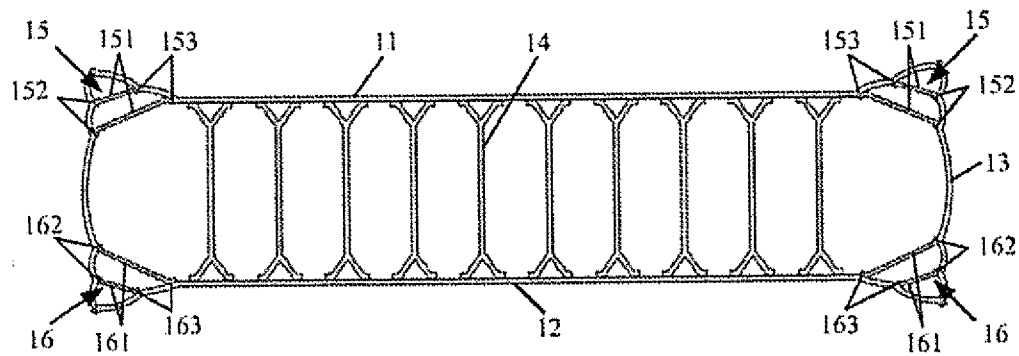


图21

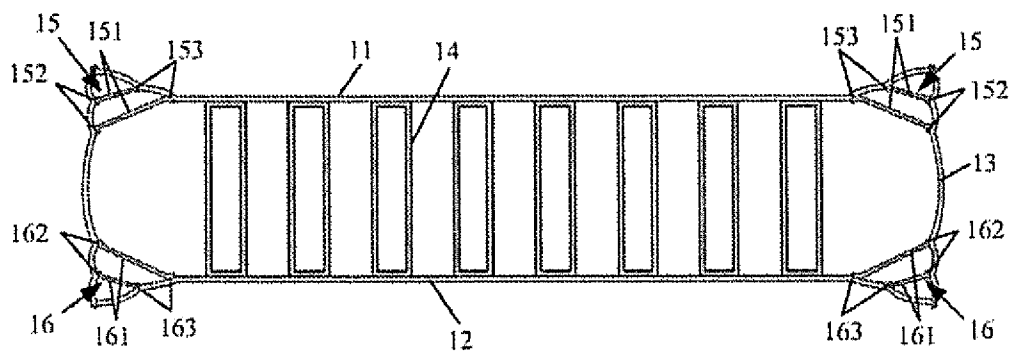


图22

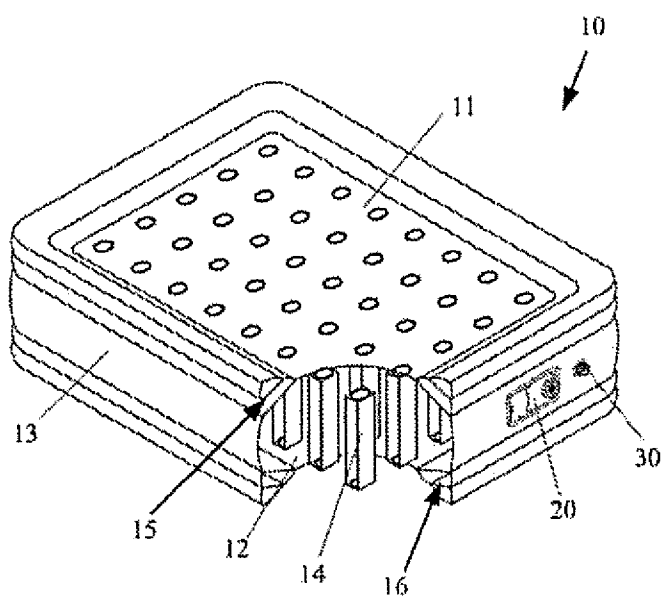


图23

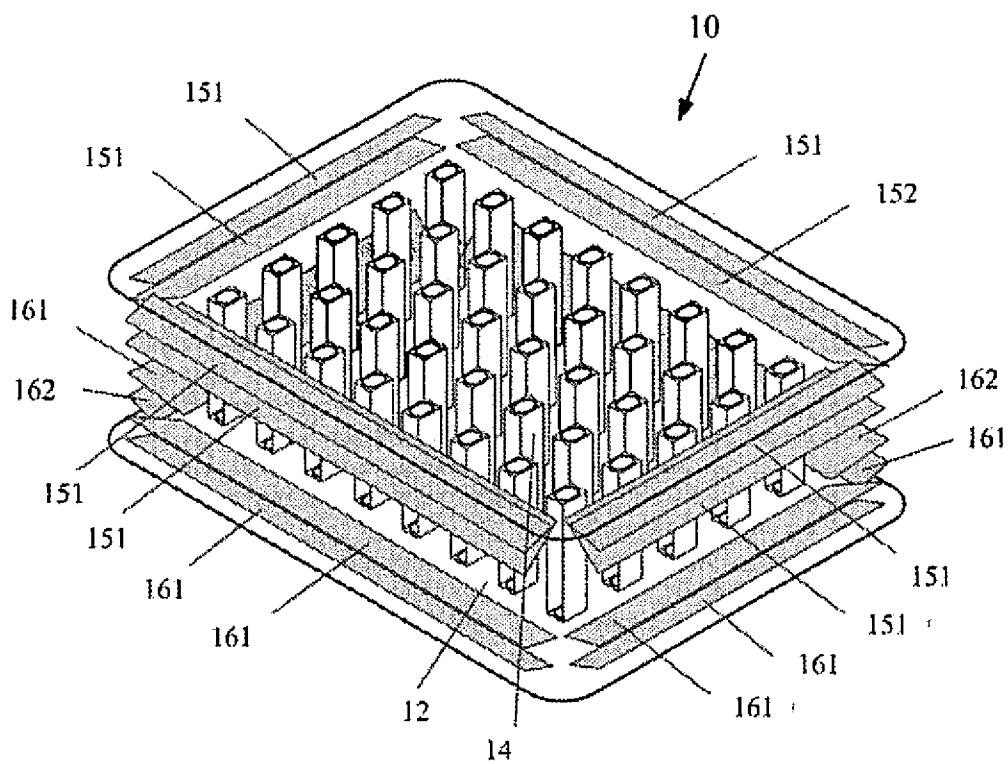


图24

Electronic Acknowledgement Receipt

EFS ID:	36128516
Application Number:	15280513
International Application Number:	
Confirmation Number:	1875
Title of Invention:	INFLATABLE BED
First Named Inventor/Applicant Name:	Feng LIU
Customer Number:	35161
Filer:	Nan Jiang/Karen Hopf
Filer Authorized By:	Nan Jiang
Attorney Docket Number:	81610.00147
Receipt Date:	28-MAY-2019
Filing Date:	29-SEP-2016
Time Stamp:	15:28:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	81610147_IDS.pdf	1035539	no	4
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INTEX EX. 1003, Pg. 330

Intex Recreation v. Bestway Inflatables

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2	Foreign Reference	81610147CN202751069.pdf	4244587 c4fcb08a88919c92f6e04047a30615d8a8d41fe0	no	7
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8	Other Reference-Patent/App/Search documents	81610147EPSearchReport.pdf	1092413	no	2
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Information:					
Total Files Size (in bytes):			53186425		
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Electronic Acknowledgement Receipt

EFS ID:	36409433
Application Number:	15280513
International Application Number:	
Confirmation Number:	1875
Title of Invention:	INFLATABLE BED
First Named Inventor/Applicant Name:	Feng LIU
Customer Number:	35161
Filer:	Nan Jiang/Karen Hopf
Filer Authorized By:	Nan Jiang
Attorney Docket Number:	81610.00147
Receipt Date:	25-JUN-2019
Filing Date:	29-SEP-2016
Time Stamp:	18:46:08
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Response to Election / Restriction Filed	81610147ResponseRestriction.pdf	115502 0d9cc97e60bc2902a88129a3690e0cddfdcf11e3	no	3

Warnings:

Information:	
Total Files Size (in bytes):	115502
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Confirmation No. 1875

Application No.: 15/280,513
Filing Date: September 29, 2016
Inventors: Feng LIU
Group Art Unit: 3673
Examiner: Kurilla, Eric. J.
Title: INFLATABLE BED
Attorney Docket No. 81610.00147

RESPONSE TO RESTRICTION REQUIREMENT

Commissioner of Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Dear Examiner Kurilla:

In response to the Restriction Requirement mailed on April 25, 2019, please consider the remarks below. Applicant believes there are no fees due for this document; however, if any fees are due, the Patent Office is authorized to charge or refund any fee deficiency or excess to Deposit Account No. 04-1061 in the name of Dickinson Wright PLLC.

Remarks begin on page 2 of this paper.

REMARKS

Reconsideration of this application in view of the following remarks is respectfully requested.

Restriction Requirement

The Examiner states that the subject patent application contains claims directed to the following patentably distinct species:

- Species I) Figures 5-8 (Claims 3-6, 13-16, 23 and 24);
- Species II) Figures 9-11 (Claims 7-8, 17-18, 25 and 26);
- Species III) Figures 12-15 (Claims 9-10, 19-20, 27 and 28);
- Species IV) Figures 16-18 (Claims 11-12, 21-22, 29 and 30);
- Species V) Figures 19-20 (Claim 31);
- Species VI) Figure 21 (Claim 31); and
- Species VII) Figures 22-24 (Claim 31).

In response to the Restriction Requirement, applicant hereby elects to prosecute claims 1-6, 13-16, 23-24, and 32-40 directed to Species I as represented by Figures 5-8. This election is made without traverse. Accordingly, claims 7-12, 17-22, and 25-31 have been withdrawn. Applicant reserves the right to prosecute any claims directed to the non-elected species II, III, IV, V, VI, and VII, as well as any other claims supported by the application, as originally filed, in one or more continuation and/or divisional application.

Conclusion

In light of the above remarks, it is respectfully submitted that applicant has responded in a fully satisfactory manner to all matters at issue in this application, and this application is now in condition for allowance. In this regard, applicant has made every effort to comply with the requirements set forth in the Restriction Requirement as well as the statutory requirements. Accordingly, applicant respectfully requests that the Examiner allow the pending claims and pass the application to issuance. If the Examiner believes that personal communication will expedite prosecution of this application, the undersigned welcomes a telephone conference at (248) 433-7216.

The Patent Office is authorized to charge or refund any fee deficiency or excess to Deposit Account No. 04-1061 in the name of Dickinson Wright PLLC.

Favorable consideration and allowance of this application is respectfully requested

Respectfully submitted,

Dickinson Wright PLLC
Attorneys for Applicants

Date: June 25, 2019

By: /Nan Jiang/
Nan Jiang
Reg. No. 73,350

Dickinson Wright, PLLC.
2600 W. Big Beaver Road, Suite 300
Troy, Michigan 48084-3312
(248) 433-7216

REMARKS

Reconsideration of this application in view of the following remarks is respectfully requested.

Restriction Requirement

The Examiner states that the subject patent application contains claims directed to the following patentably distinct species:

- Species I) Figures 5-8 (Claims 3-6, 13-16, 23 and 24);
- Species II) Figures 9-11 (Claims 7-8, 17-18, 25 and 26);
- Species III) Figures 12-15 (Claims 9-10, 19-20, 27 and 28);
- Species IV) Figures 16-18 (Claims 11-12, 21-22, 29 and 30);
- Species V) Figures 19-20 (Claim 31);
- Species VI) Figure 21 (Claim 31); and
- Species VII) Figures 22-24 (Claim 31).

In response to the Restriction Requirement, applicant hereby elects to prosecute claims 1-6, 13-16, 23-24, and 32-40 directed to Species I as represented by Figures 5-8. This election is made without traverse. Accordingly, claims 7-12, 17-22, and 25-31 have been withdrawn. Applicant reserves the right to prosecute any claims directed to the non-elected species II, III, IV, V, VI, and VII, as well as any other claims supported by the application, as originally filed, in one or more continuation and/or divisional application.

Conclusion

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The Patent Office is authorized to charge or refund any fee deficiency or excess to Deposit Account No. 04-1061 in the name of Dickinson Wright PLLC.

Favorable consideration and allowance of this application is respectfully requested

Respectfully submitted,

Dickinson Wright PLLC
Attorneys for Applicants

Date: June 25, 2019

By: /Nan Jiang/
Nan Jiang
Reg. No. 73,350

Dickinson Wright, PLLC.
2600 W. Big Beaver Road, Suite 300
Troy, Michigan 48084-3312
(248) 433-7216

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	15280513
	Filing Date	2016-09-29
	First Named Inventor	Feng LIU
	Art Unit	3673
	Examiner Name	Eric J. KURILLA
	Attorney Docket Number	81610.00147

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	4941223		1990-07-17	Santo	
	2	5669091		1997-09-23	Chung	
	3	6568013		2003-05-27	Perez, et al.	
	4	7039972		2006-05-09	Chaffee	
	5	9254047		2016-02-09	Schermel, et al.	

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Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20070277324		2007-12-06	Bestway Inflatables & Material Corp.	

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	15280513
Filing Date	2016-09-29
First Named Inventor	Feng LIU
Art Unit	3673
Examiner Name	Eric J. KURILLA
Attorney Docket Number	81610.00147

2	20150201760	2015-07-23	Intex Recreation Corporation
3	20150335164	2015-11-26	Bestway Inflatables & Material Corp.

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Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ² i	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1	2914545	FR		2008-10-10	Song Rong		
	2	434098	GB		1933-11-21	P.B. Cow & Company		
	3	2013130117	WO		2013-09-06	Intex Recreation Corporation		

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵
	1	Communication of a notice of opposition dated 27/06/2019 (27 June 2019) on related European patent application 16191360.3 issued by the European Patent Office / Opposition Division	

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number		15280513
Filing Date		2016-09-29
First Named Inventor	Feng LIU	
Art Unit		3673
Examiner Name	Eric J. KURILLA	
Attorney Docket Number		81610.00147

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	15280513
Filing Date	2016-09-29
First Named Inventor	Feng LIU
Art Unit	3673
Examiner Name	Eric J. KURILLA
Attorney Docket Number	81610.00147

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Allen J. Moss/	Date (YYYY-MM-DD)	2019-08-28
Name/Print	Allen J. Moss	Registration Number	38,567

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



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Bibliographic data: FR2914545 (A3) — 2008-10-10

Inflatable bed, has body with upper layer, lower layer and bordering layer and upper and lower layer acts together to define inflated space and reinforcing belt unit is arranged in inflatable space in inflatable bed body

Inventor(s): YEN TSUNG PING; SONG RONG JYH ± (YEN TSUNG PING, ; SONG RONG JYH)

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Abstract of FR2914545 (A3)

The bed has a body (3) with an upper layer (33), a lower layer (34) and a bordering layer (35), the edge areas (41,42) of the upper and lower layer are interconnected. The upper and lower layer acts together to define an inflated space (30). The reinforcing belt unit (4) is arranged in the inflatable space in the inflatable bed body (3). The bordering layer of the inflatable bed body and the upper and lower layer of the inflatable bed body are interconnected.

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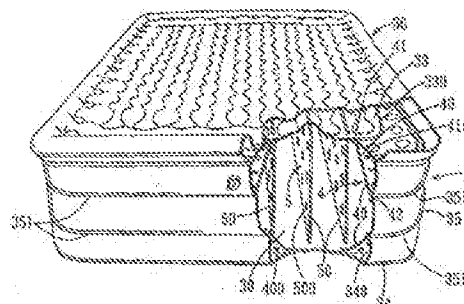
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⑤④ LIT GONFLABLE.

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).



FR 2 914 545 - A3



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

5 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
10 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
15 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.
20

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
25 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
30 l'autre, formant ainsi deux lignes de soudure bouclées
35

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
5 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
10 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
15 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
20 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
25 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
30 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
35 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
5 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
10 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
15 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,
20 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).

25
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
30 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
5 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
10 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
15 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
20 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
25 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
30 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).

5 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).

10

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).

30

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).

35

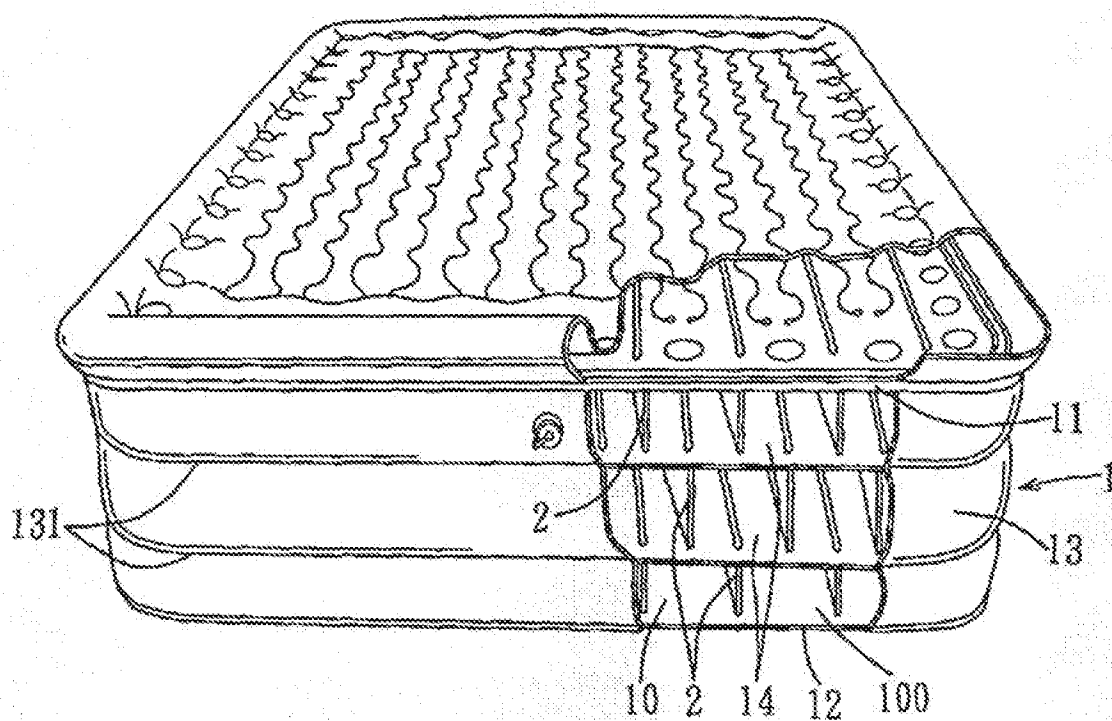


FIG. 1 ART ANTÉRIEUR

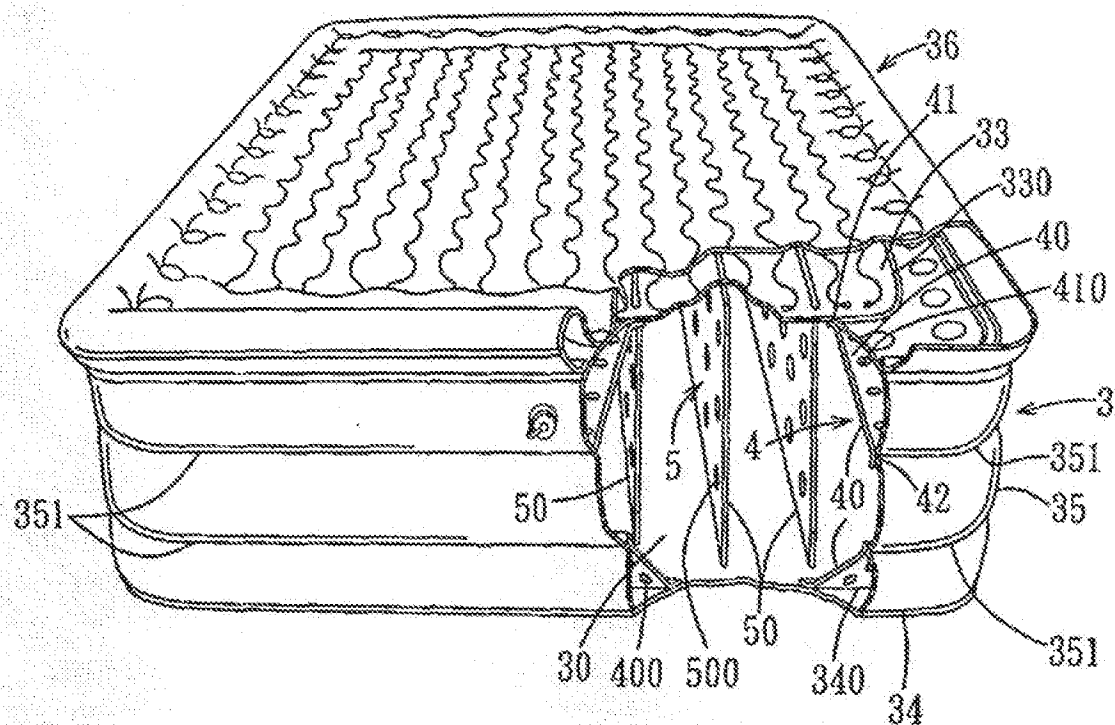


FIG. 2

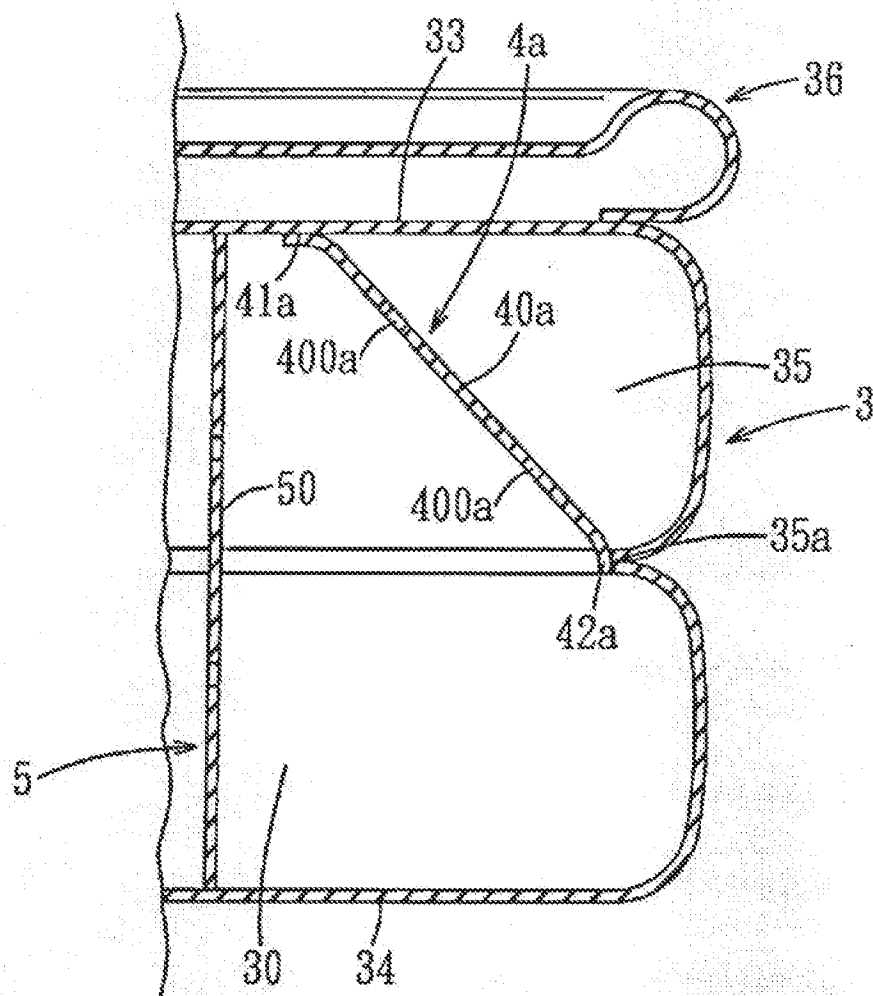


FIG. 3

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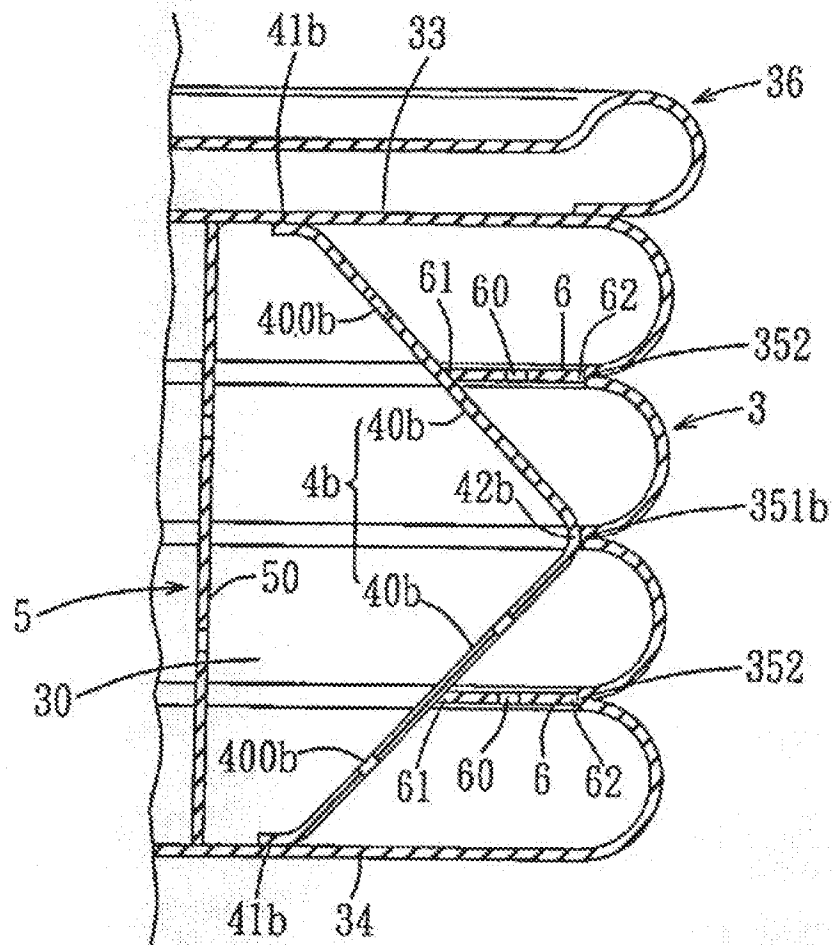


FIG. 4

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, 5 KURT LAMDAU, Austrian citizen, of 7, Landesgerichtsstrasse, Vienna, Austria, and LUDWIG SIEBER, Austrian citizen, of 8, Schottenring, Vienna, Austria, Assignees in part of the said KURT LAMDAU, 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:—

15 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 20 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 sur- 25 faces 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 rubberised fabric or the like sewn to the bag, 30 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 35 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.

40 An embodiment of the invention is illustrated in the accompanying drawing, in which:

Figure 1 is a horizontal section of a mattress.

45 Figure 2 a longitudinal section on the line 2—3 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 50 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 55 width. Further walls connecting these walls together may be provided as shown in dotted lines in figure 1 at *c*. These walls are fastened to the upper and lower 60 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 *e* a head 65 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 70 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 75 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 80 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 85 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 90 very convenient for carriage so that it may be used for such purposes as camping, or

motoring, cycling or walking tours, sun-bathing 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.
(Sgd.) CARPMAELS & RANSFORD,
Agents for Applicants,
24, Southampton Buildings, London,
W.C. 2.

Leamington Spa: Printed for His Majesty's Stationary Office, by the Courier Press.—1933.

Fig. 1.

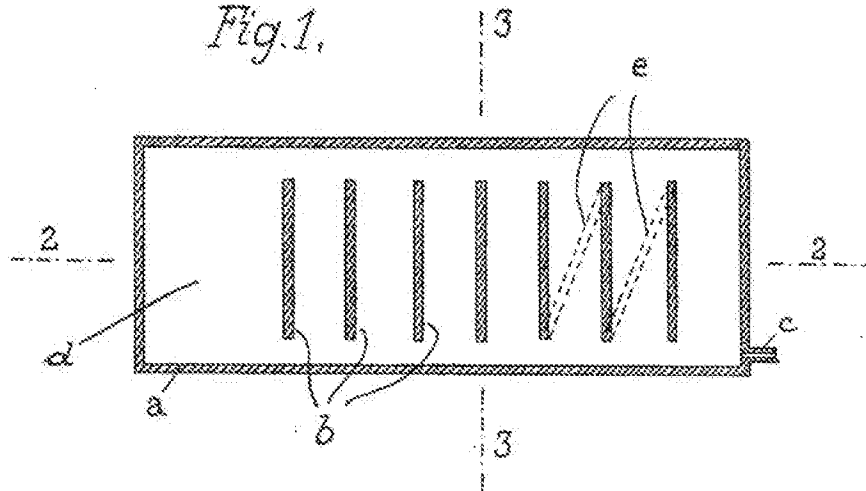


Fig. 2.

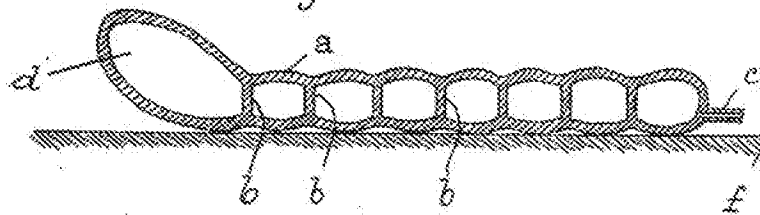


Fig. 3.

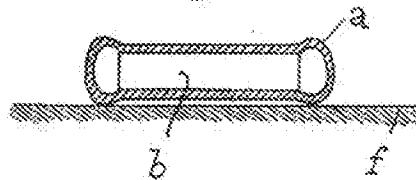
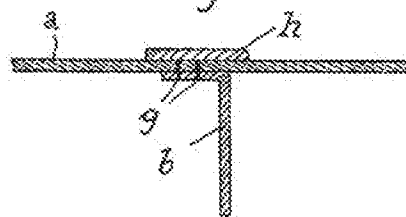


Fig. 4.



Malby & Sons, Photo-Lith.



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201210053183.X 2 March 2012 (02.03.2012) CN

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(54) Title: **INTERNAL TENSIONING STRUCTURE USABLE WITH INFLATABLE DEVICES**

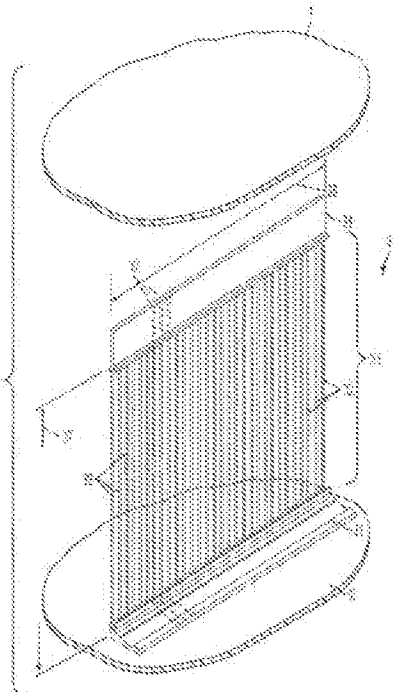


FIG. 1

(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

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BACKGROUND

1. Technical Field.

[0001] The present disclosure relates to an inflatable product structure, and in particular to
10 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
15 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
20 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
25 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
30 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
5 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.
10 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
20 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
25 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
30 "V" configuration. Either embodiment may be incorporated into a tensioning structure with one of

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

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

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

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;

[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;

[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;

5 [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;

10 [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;

15 [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;

25 [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;

[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;

5 [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
10 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

15 [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
20 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
25 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

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

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.

[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.

[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

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 $\pi \cdot \text{diameter} / 4$. 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.

[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

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.

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

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 thereof, 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

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, 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

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

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.

[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

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

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
5 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
10 when the distance between strands 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
15 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
20 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
25 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,
30 because strands 32 are very flexible, they collapse readily when contacted by other structures when

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
5 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
10 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 in 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
15 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
20 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
25 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.

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
5 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
10 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
15 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.
- 20 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
25 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.

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
5 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
10 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
20 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;

25 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
30 least one of the first sheet and the second sheet, the gap portion 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 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.

5 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
10 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
15 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.

20 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
25 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.

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
5 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.

10 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:

15 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
20 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.

25 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
30 between 0.5 and 50 strands per centimeter as measured along the extent of the tensioning structure.

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.

5 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.

10 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.

15 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.

20 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.

25 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;

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:

5 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.

10 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;

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.

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

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
5 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
10 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
15 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:

20 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
25 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.

30 77. The inflatable product of claim 75, wherein the plurality of tensioning structures

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
5 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;

10 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
15 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
20 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.

25 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.

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;
5 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
10 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:

15 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;
20 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
25 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
30 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.

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;

5 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

10 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:

15 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 20 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 25 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;

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;

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
5 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
10 second sheets are made of a like material.

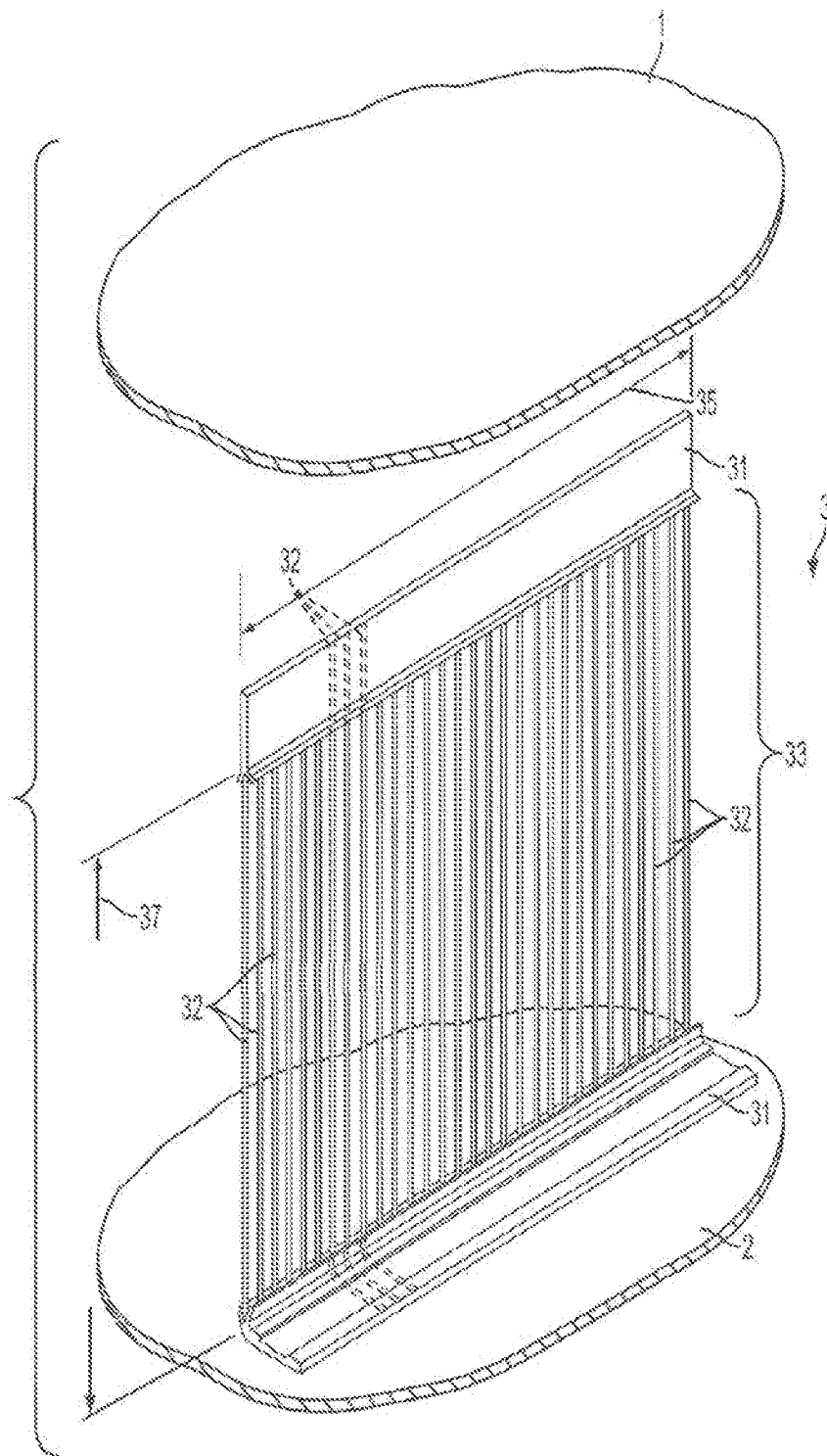


FIG. 1

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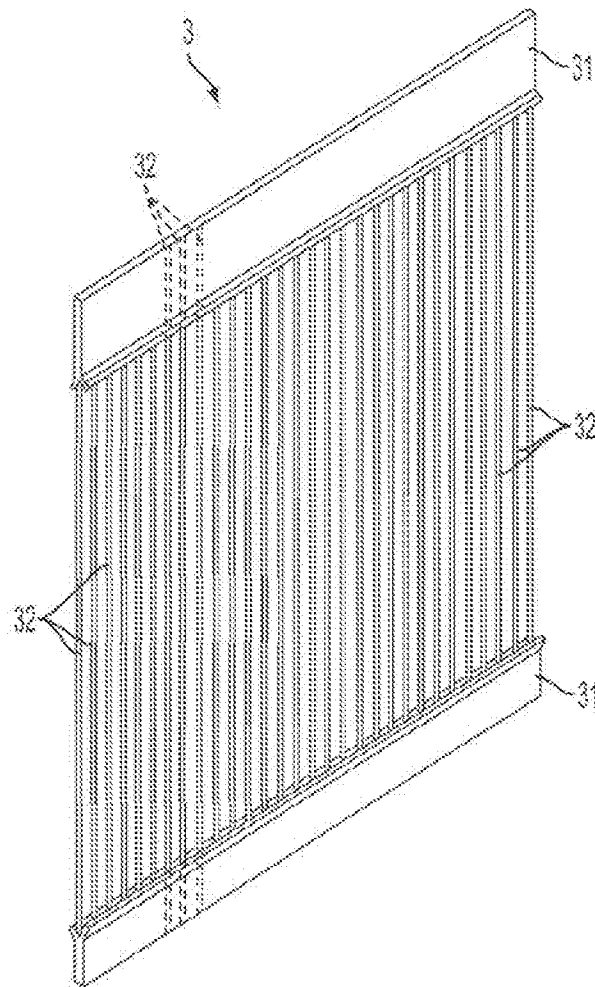


FIG. 2

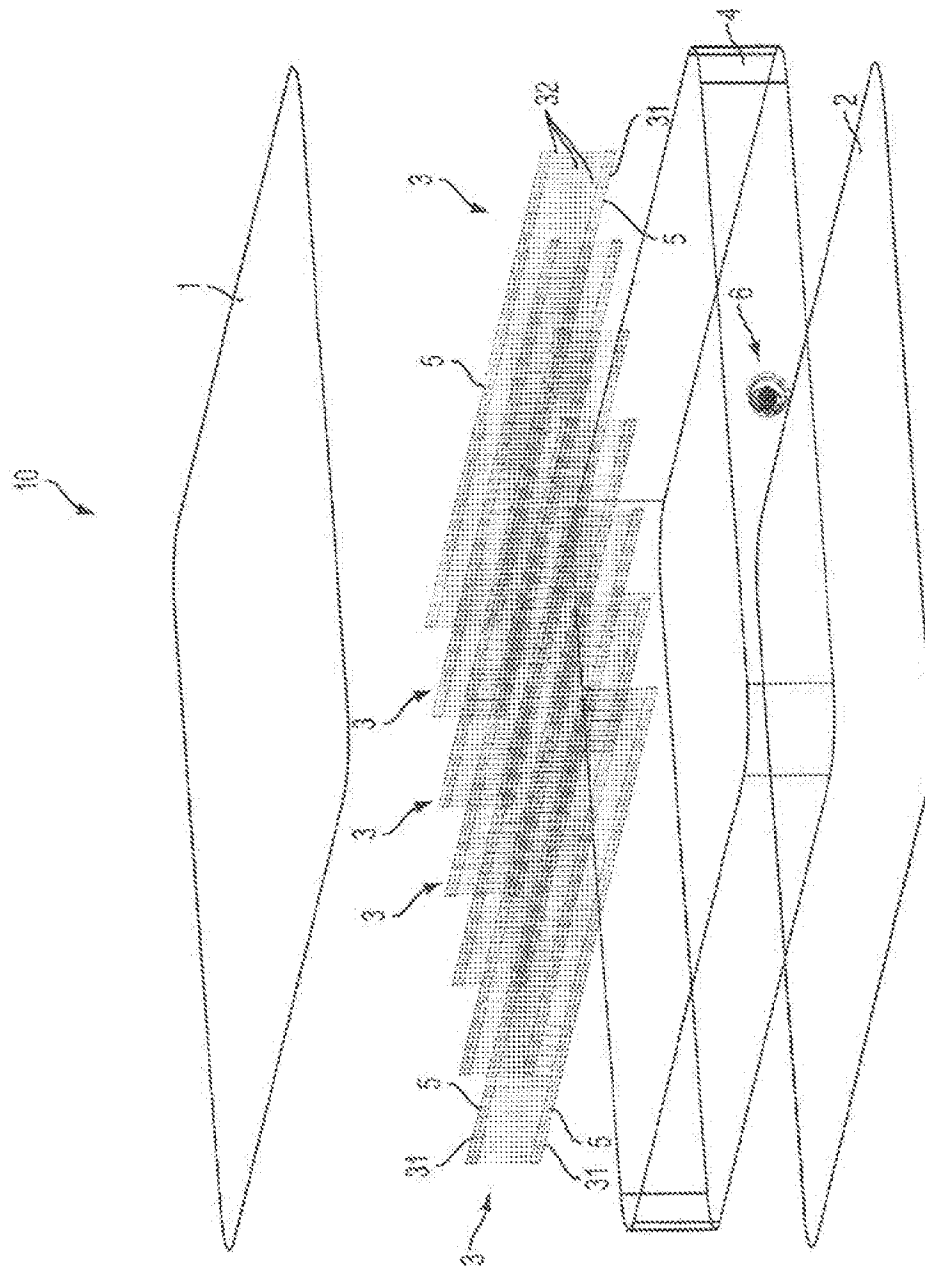


FIG. 3

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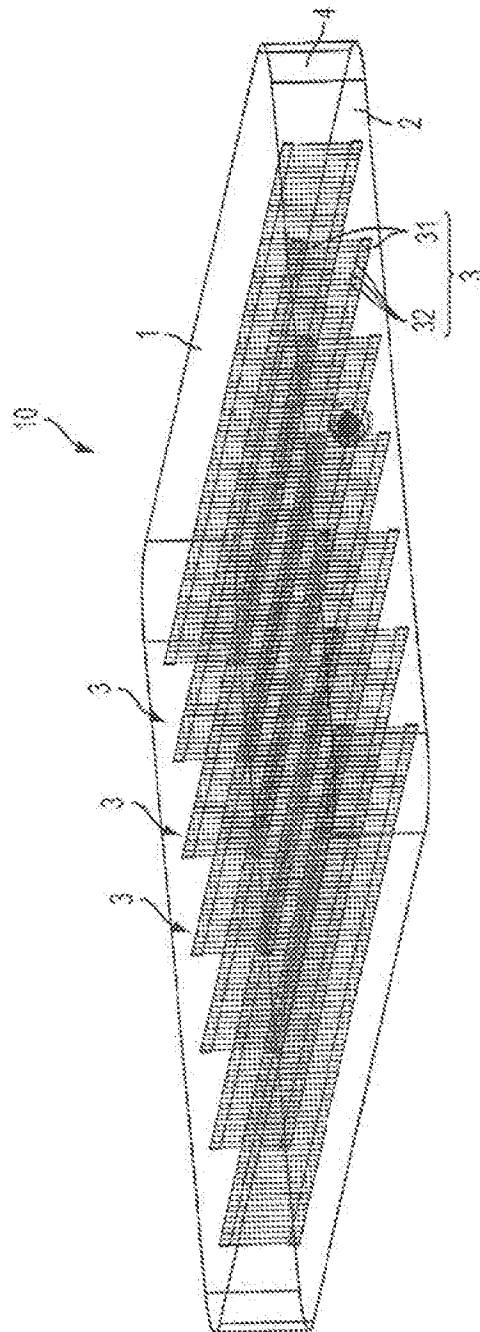


FIG. 4

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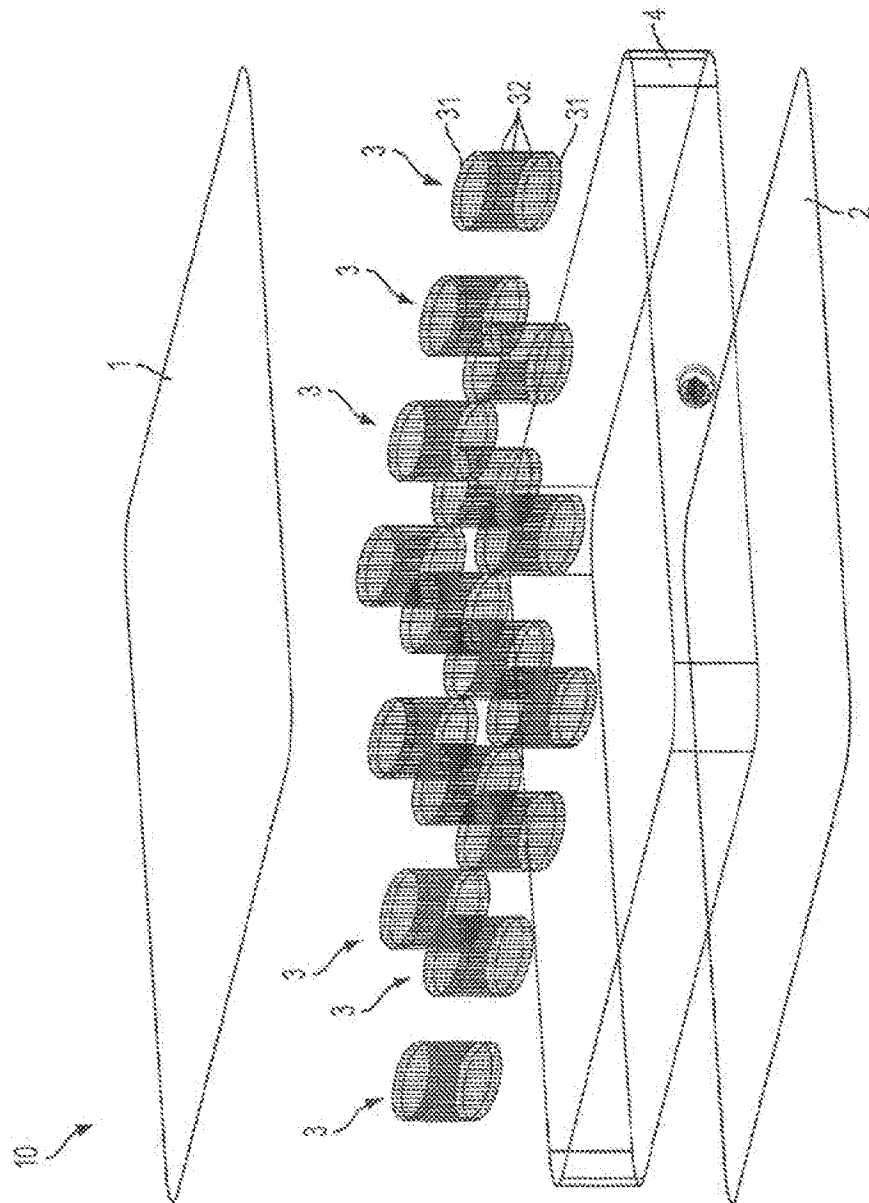


FIG. 5

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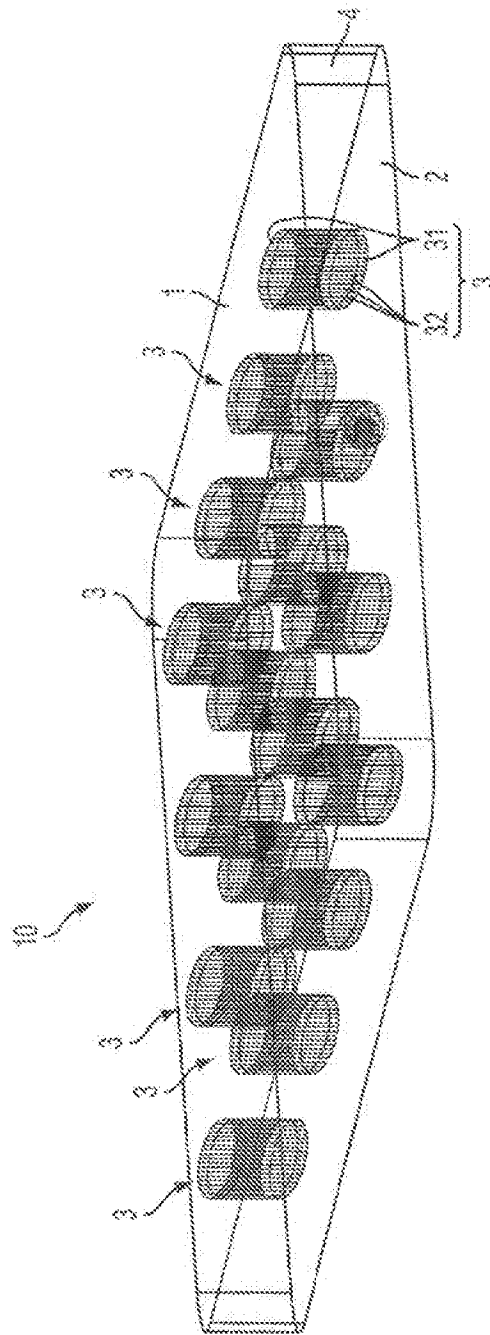


FIG. 6

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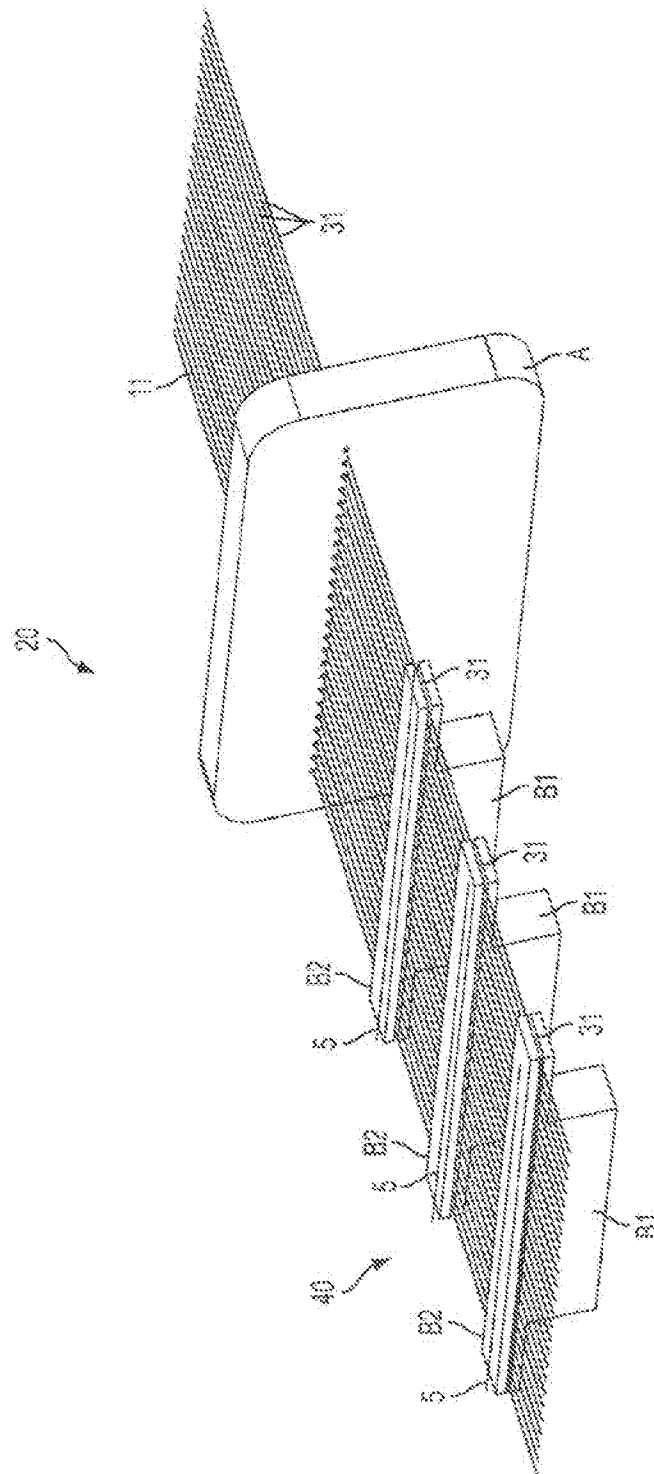


FIG. 7

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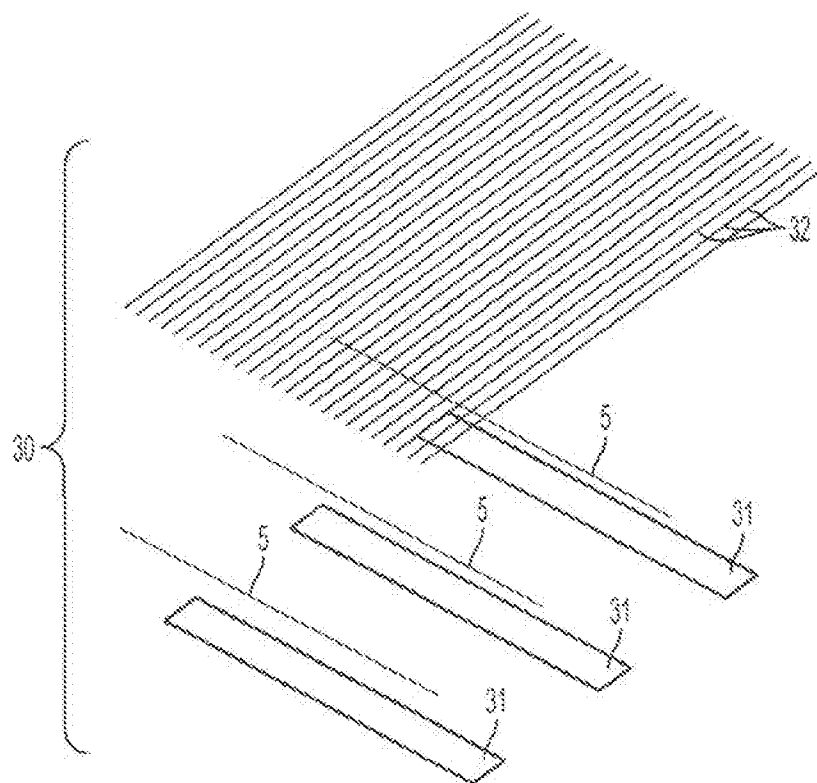


FIG. 8

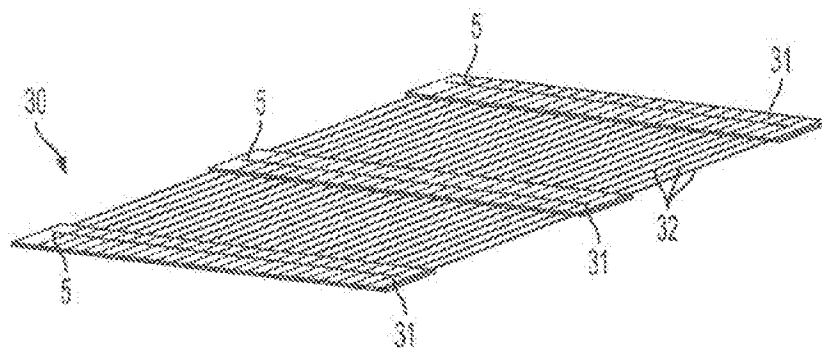


FIG. 9

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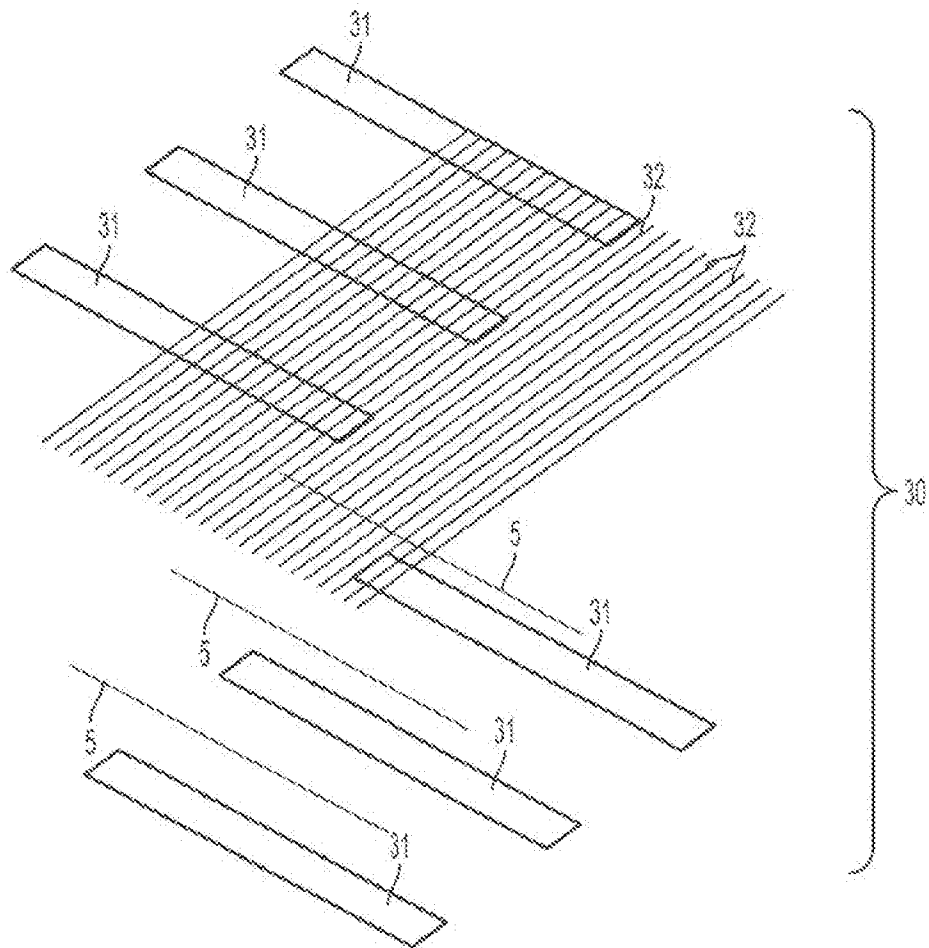


FIG. 10

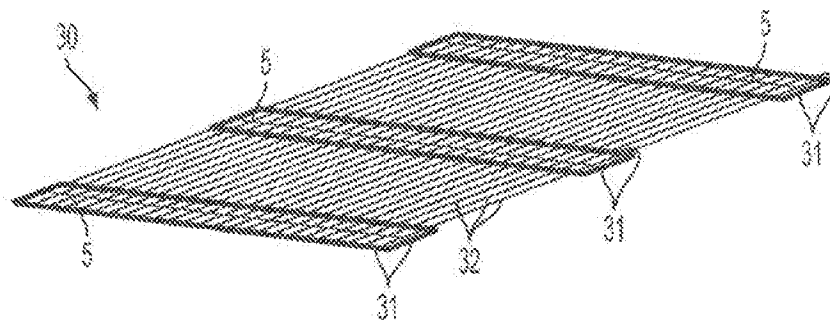


FIG. 11

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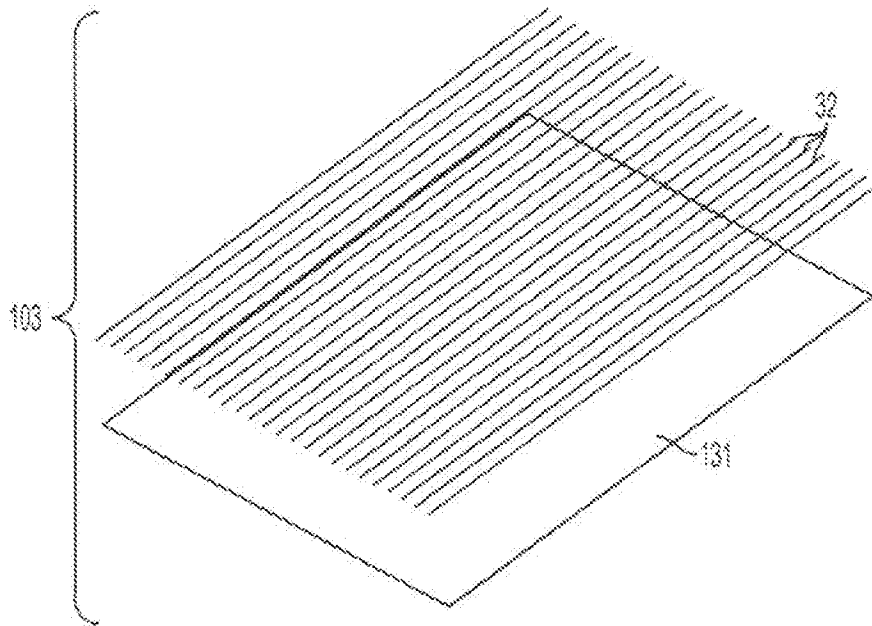


FIG. 12

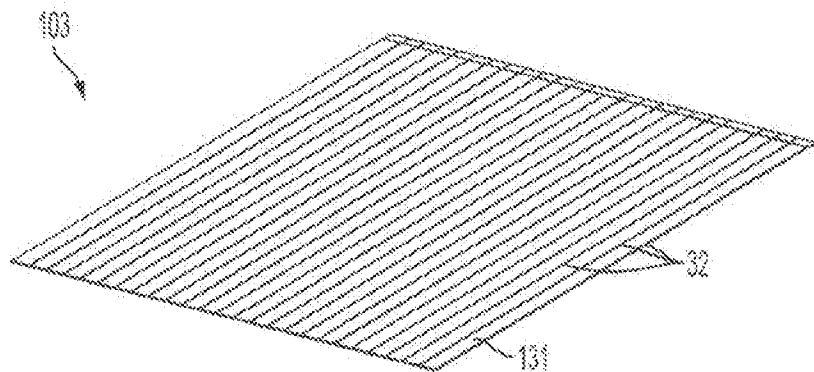


FIG. 13

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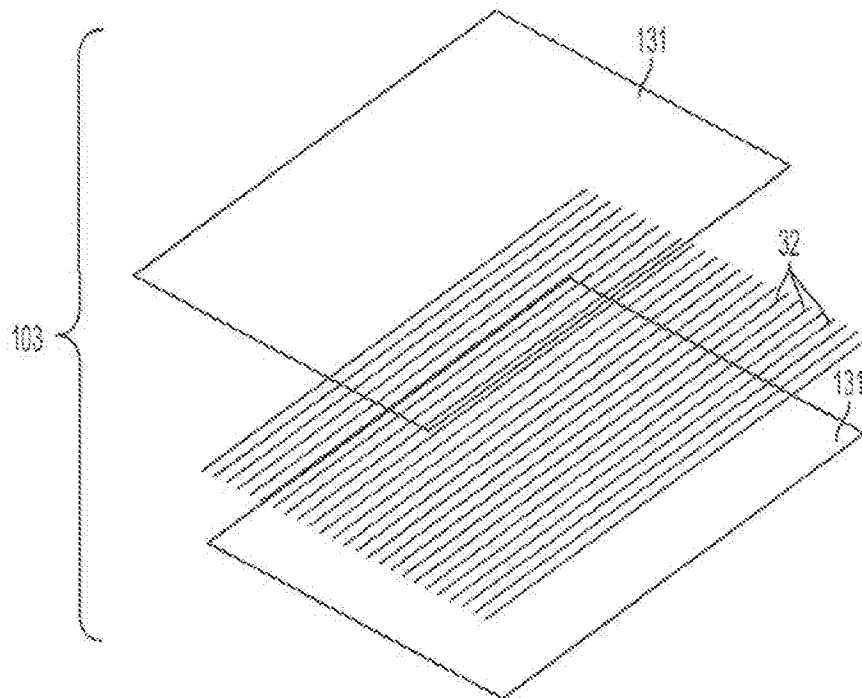


FIG. 14

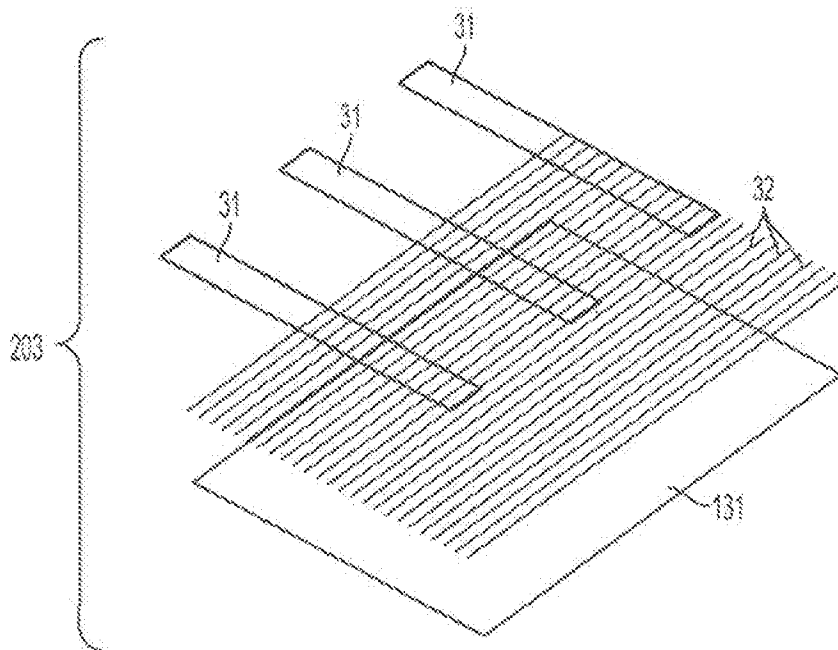


FIG. 15

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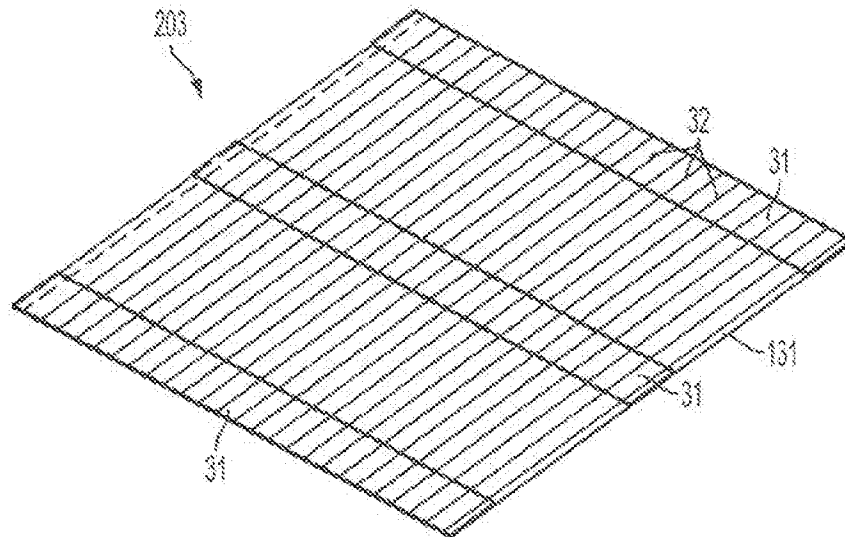


FIG. 16

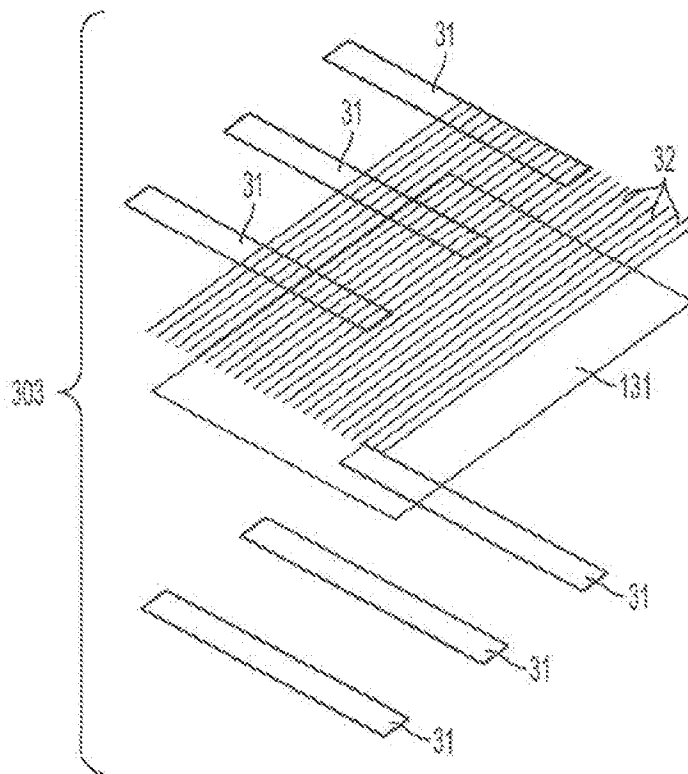


FIG. 17

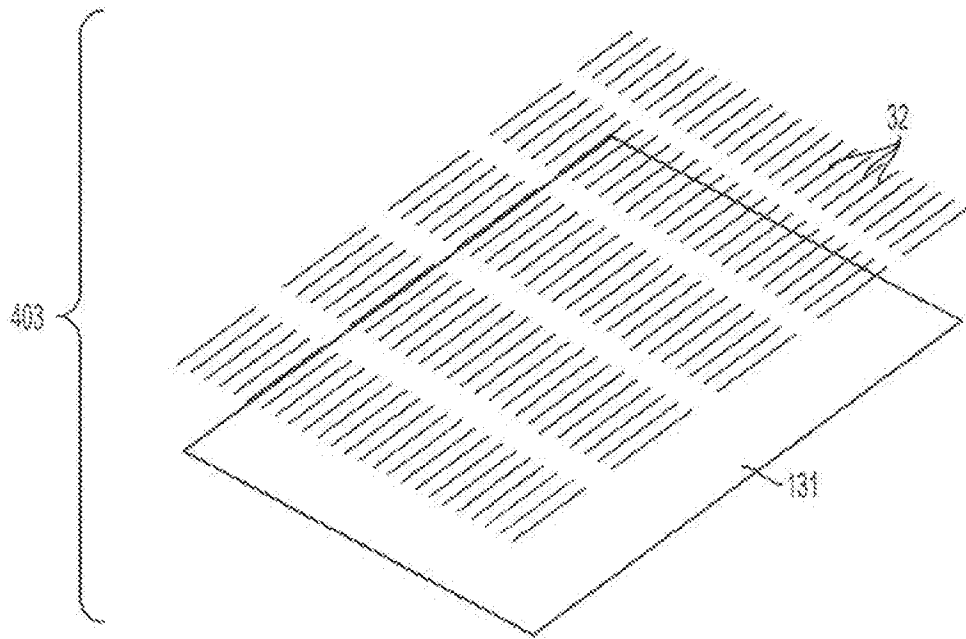


FIG. 18

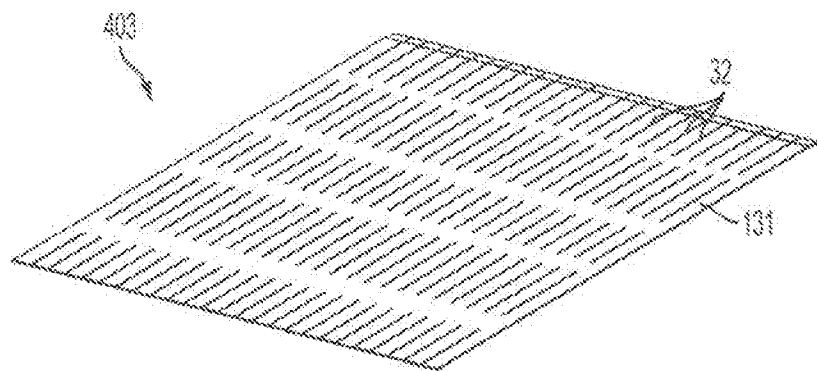
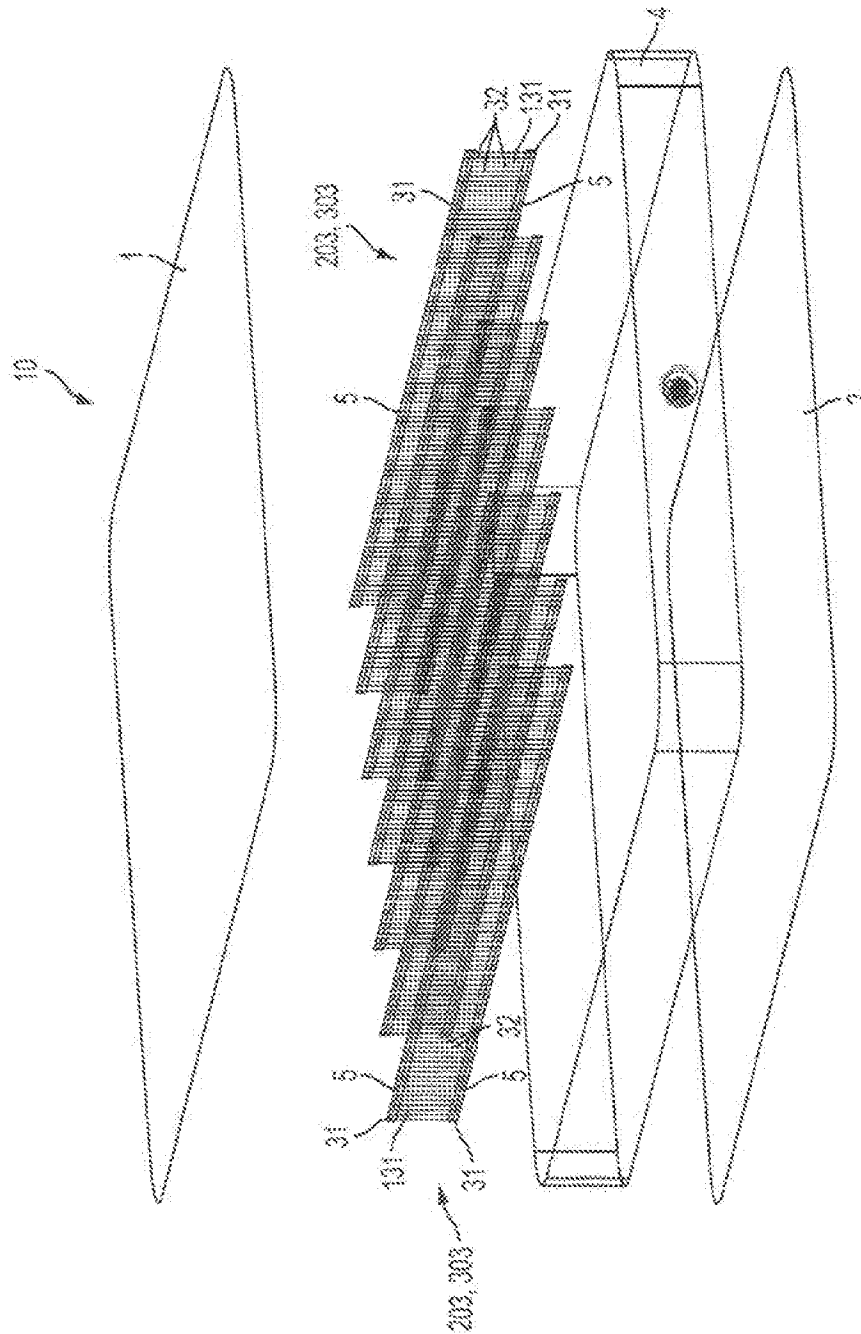


FIG. 19



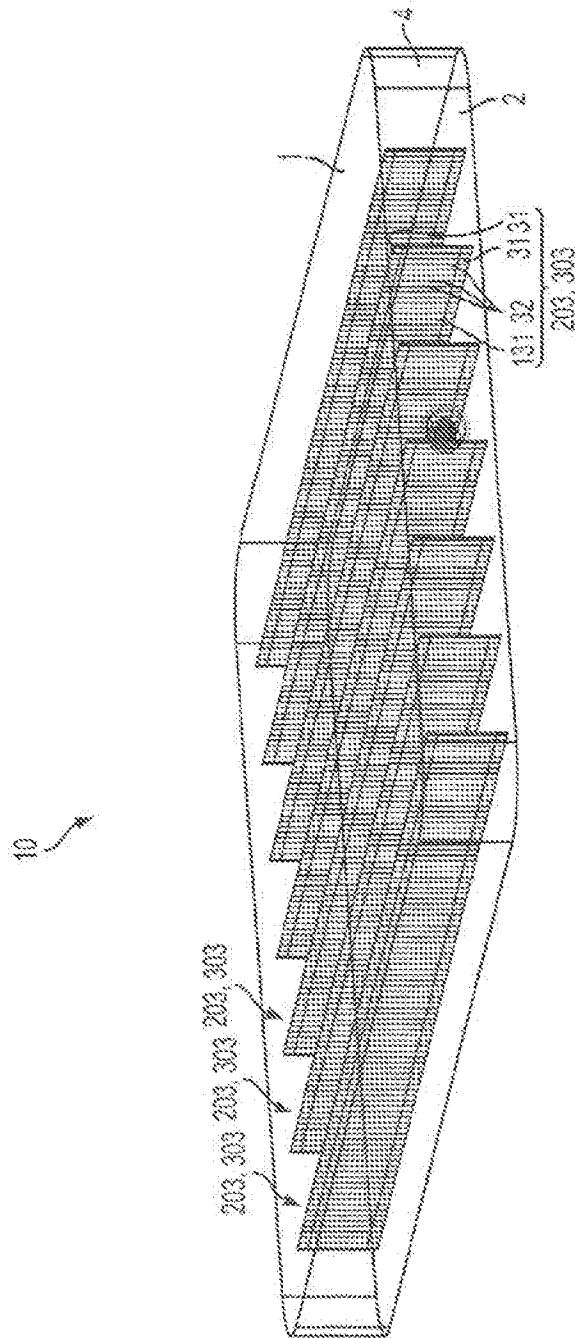


FIG. 21

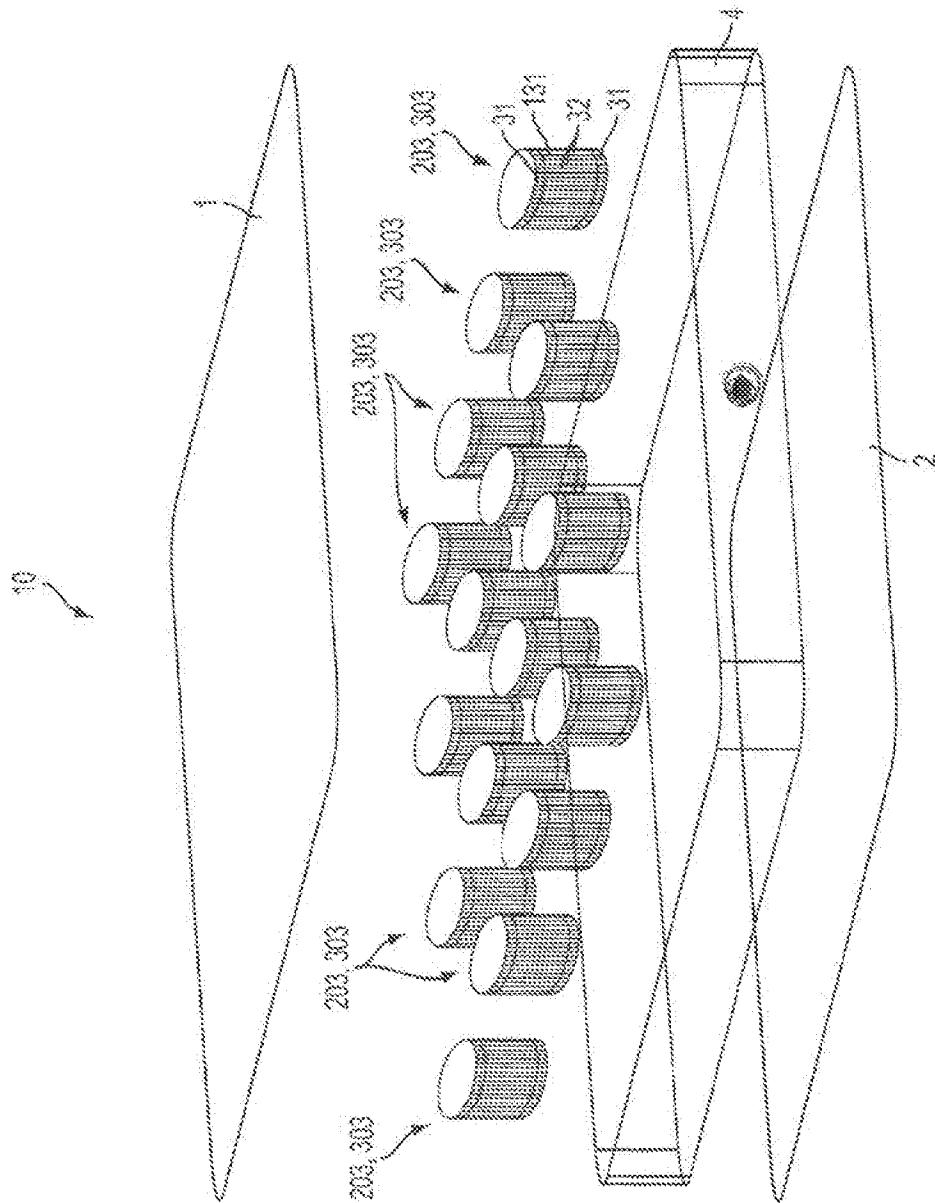


FIG. 22

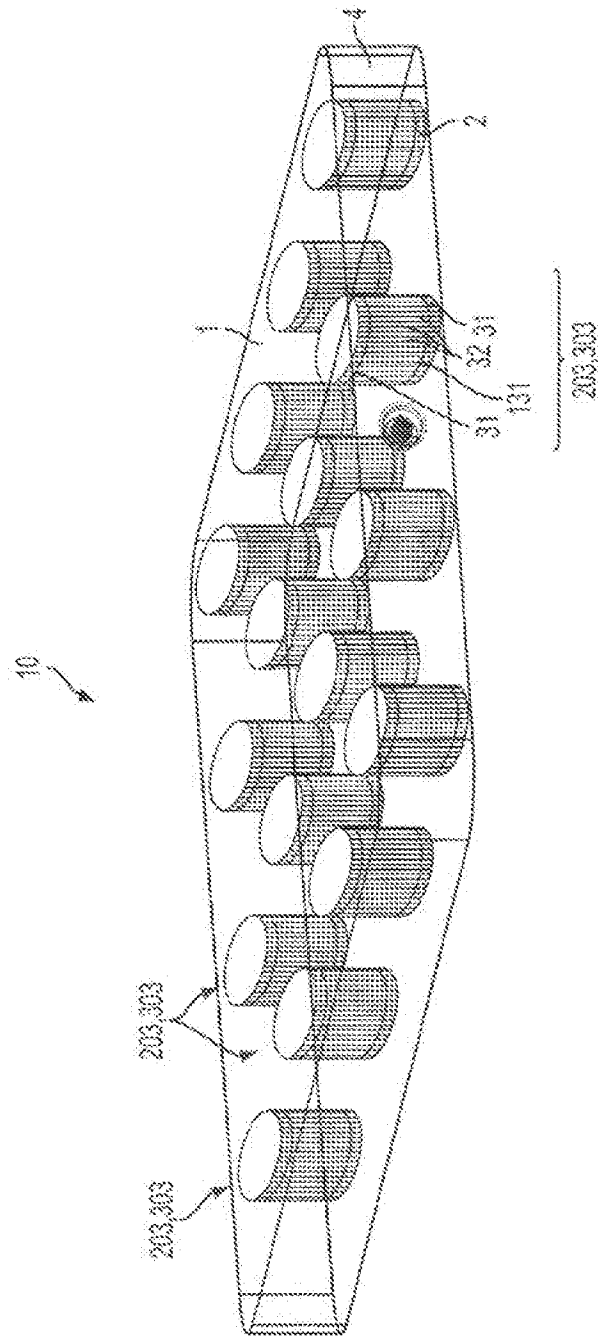


FIG. 23

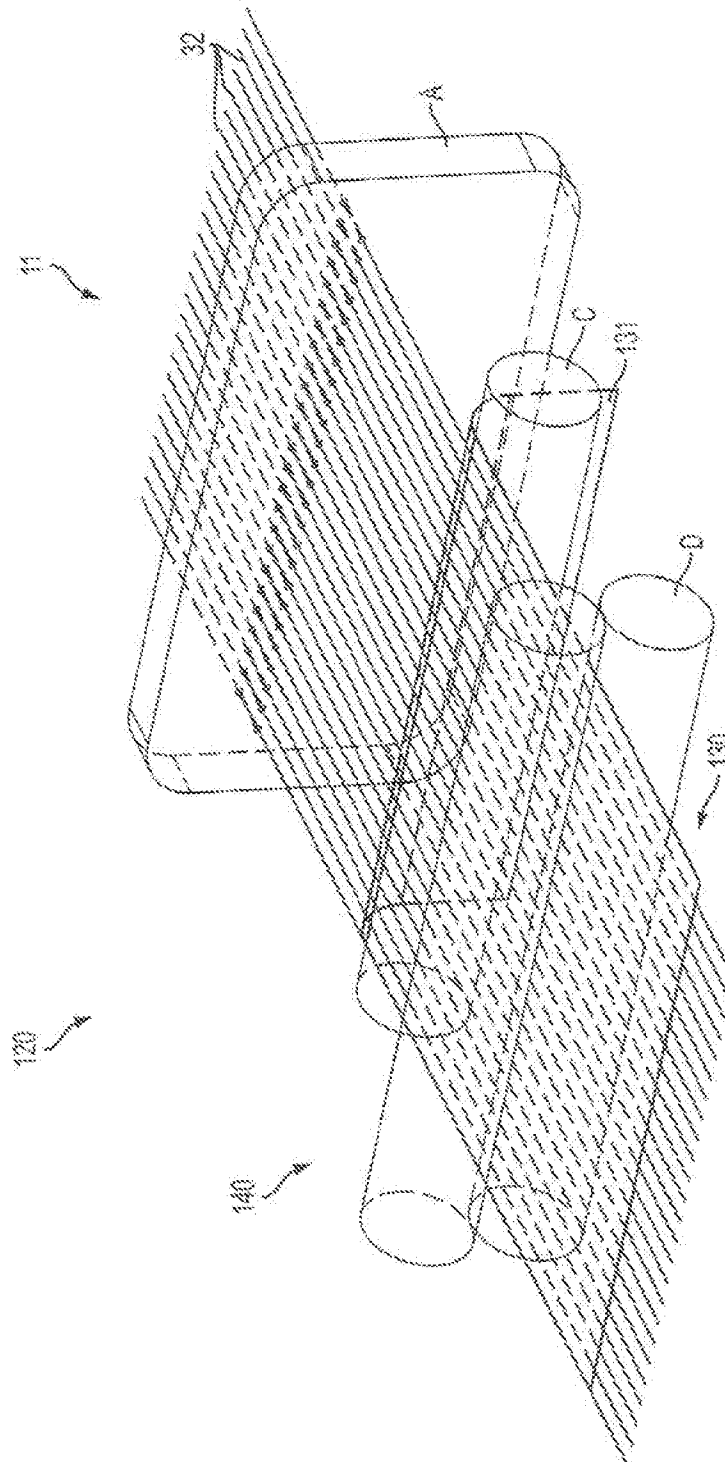


FIG. 24

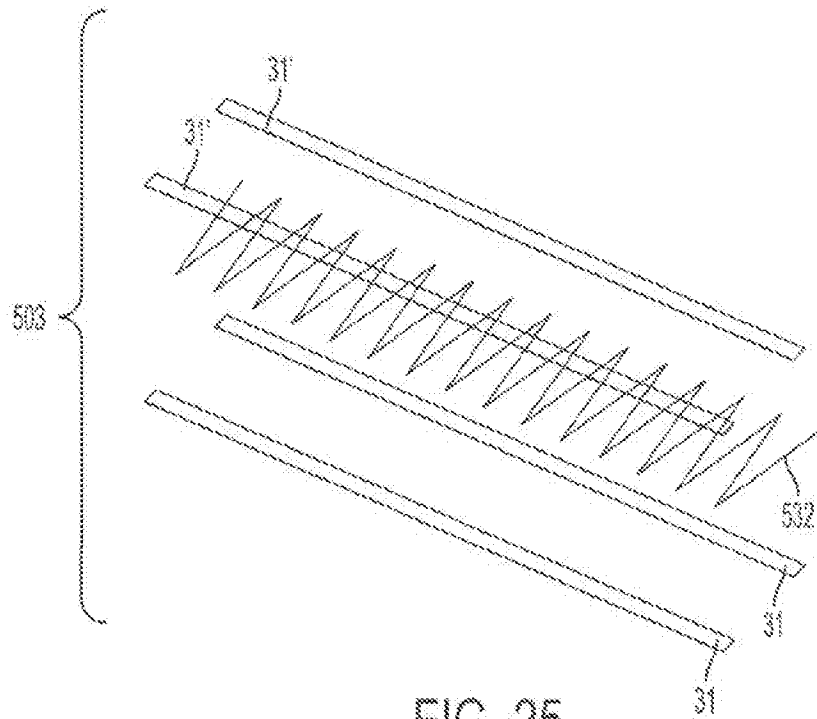


FIG. 25

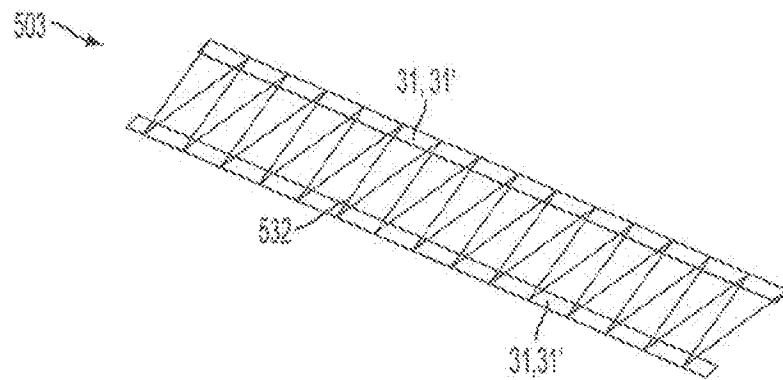


FIG. 26

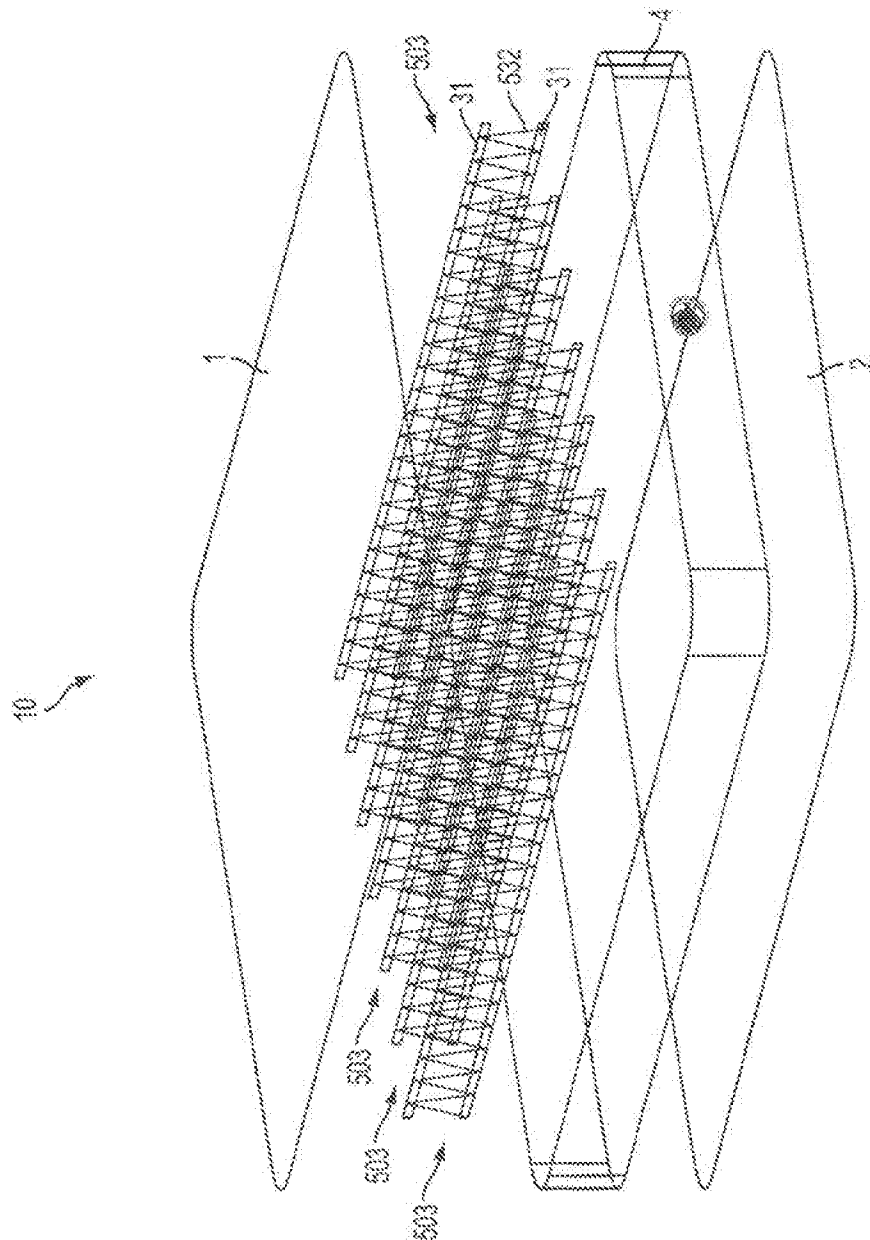


FIG. 27

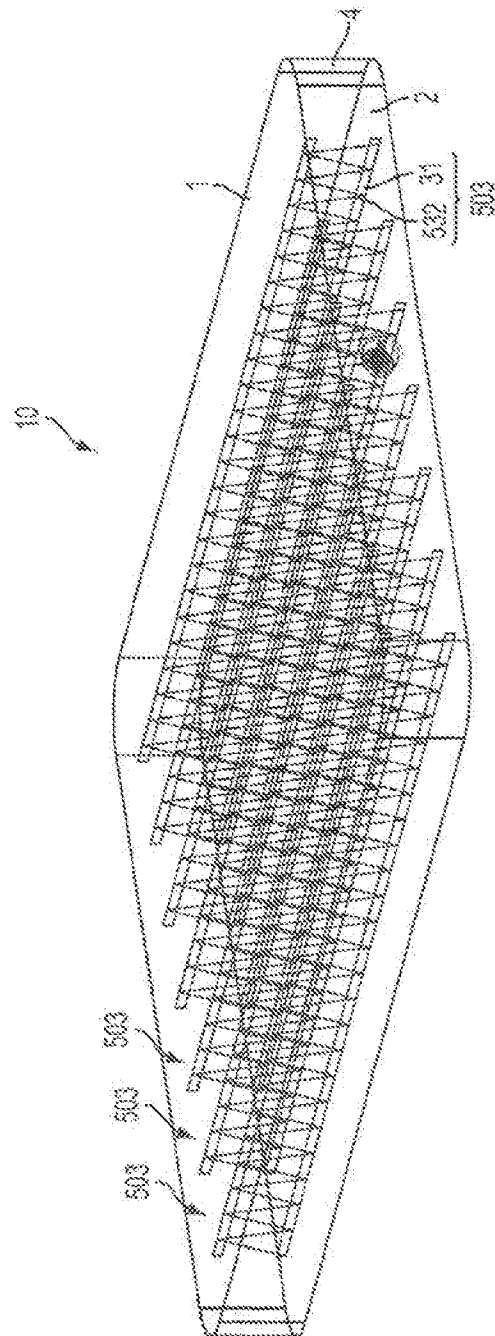


FIG. 28

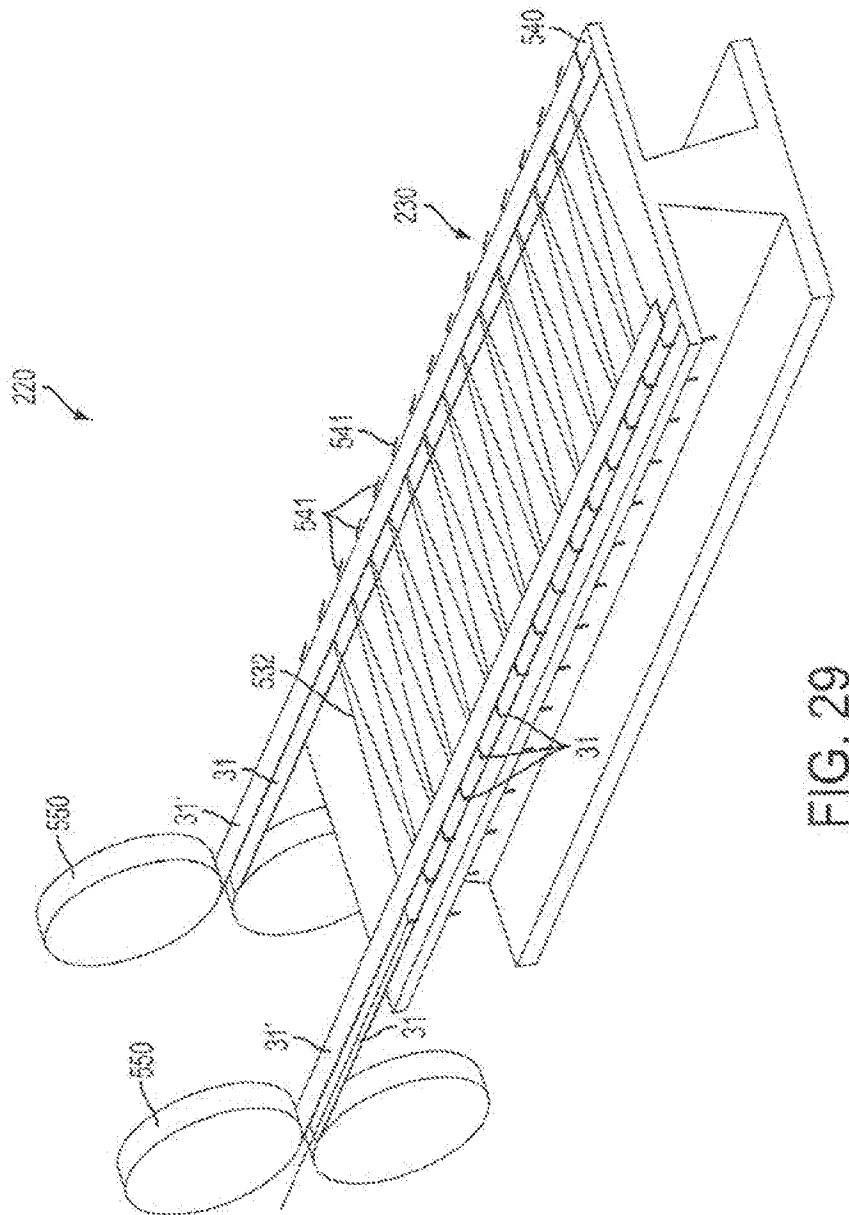
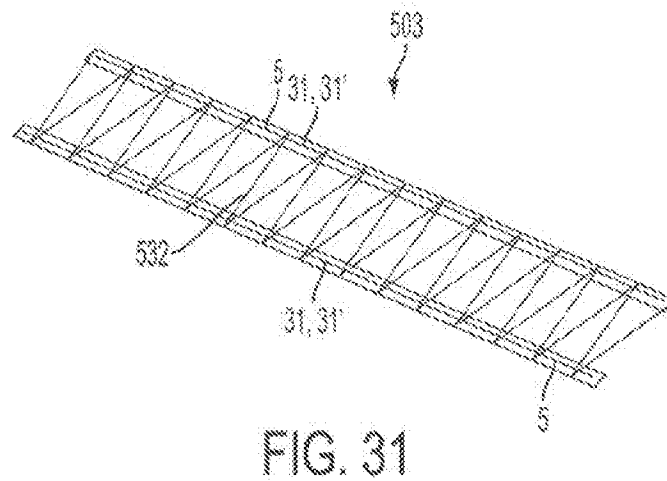
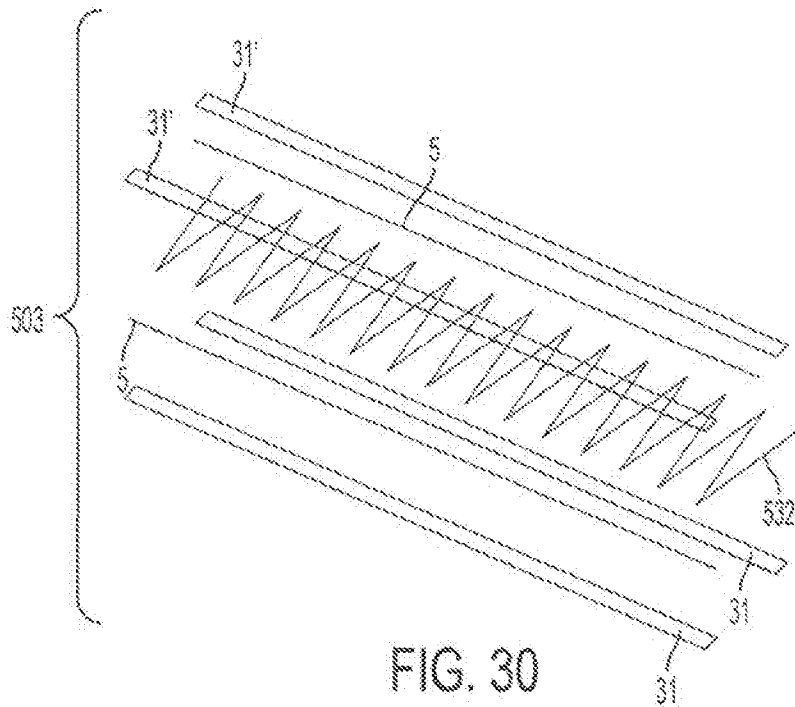


FIG. 29



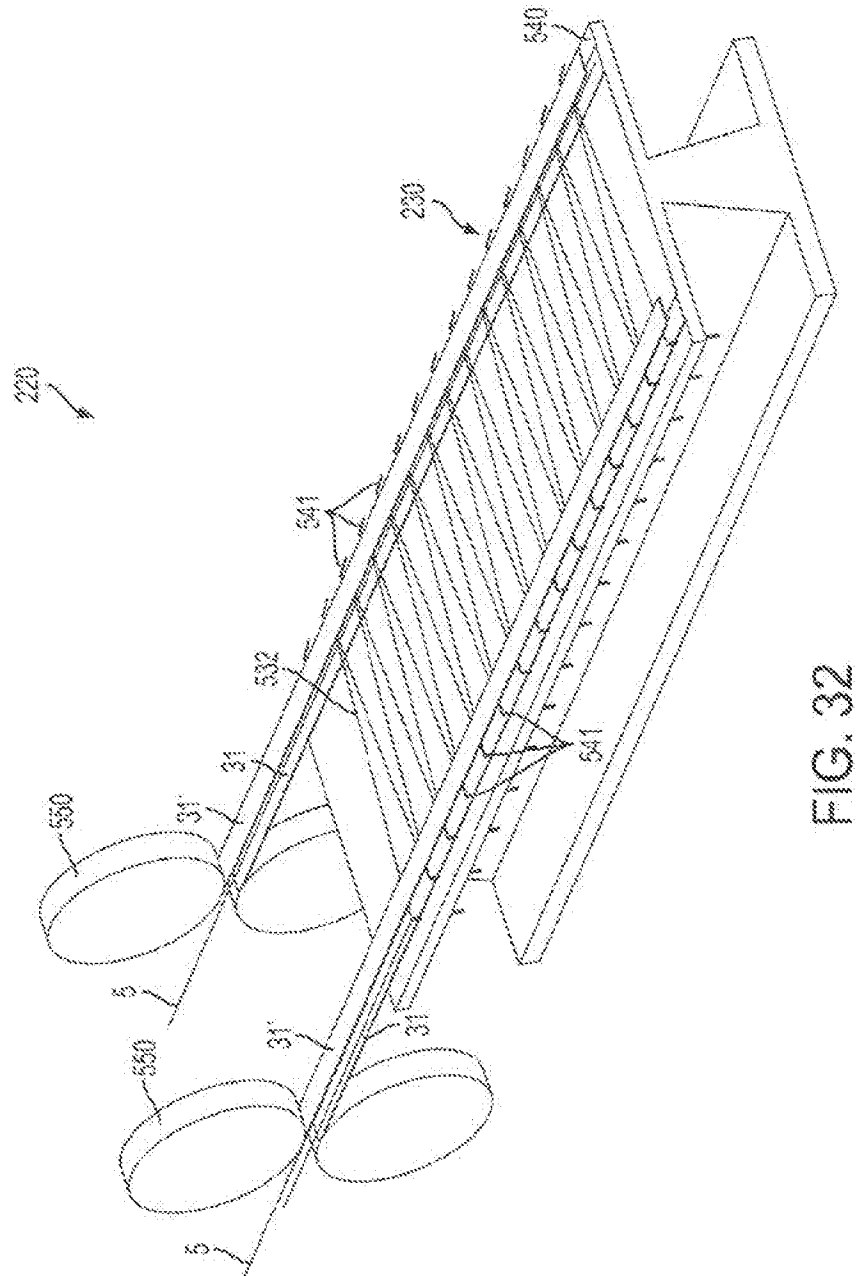


FIG. 32

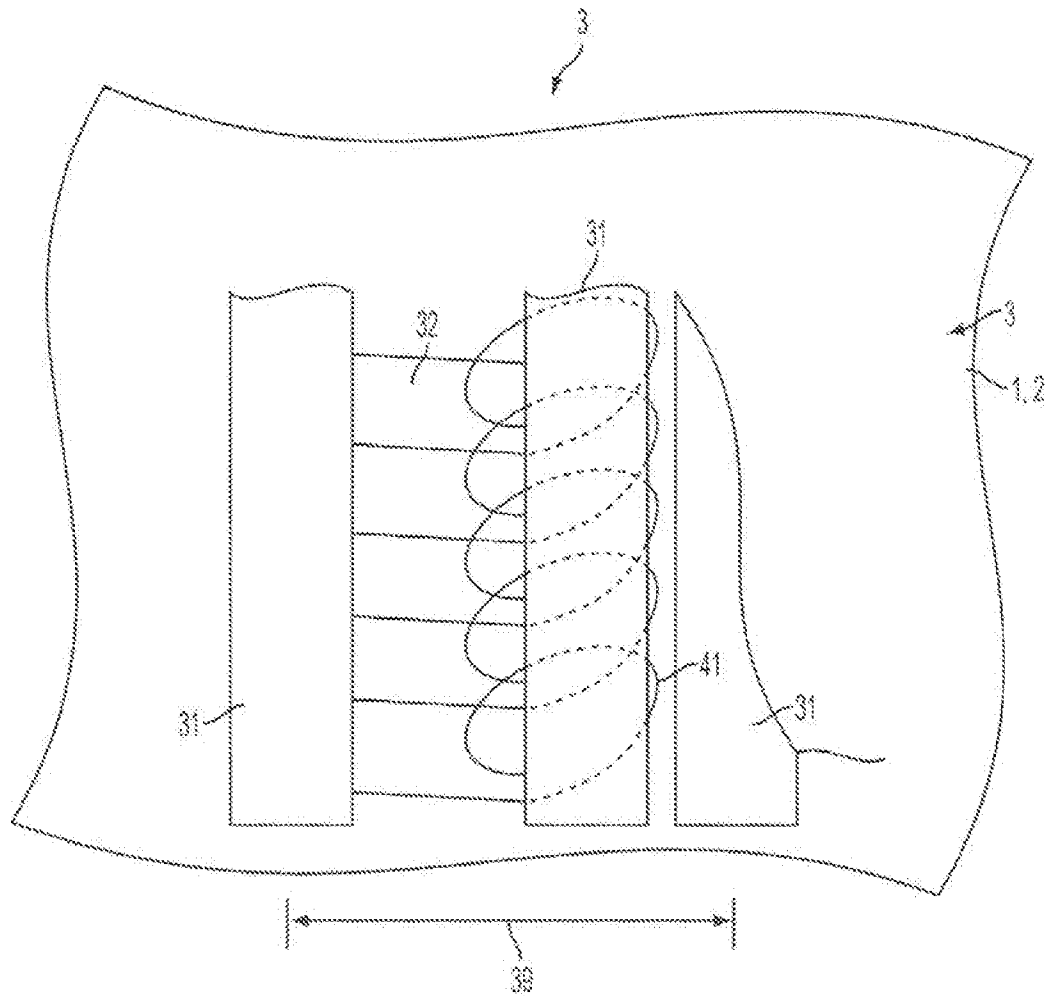


FIG. 33

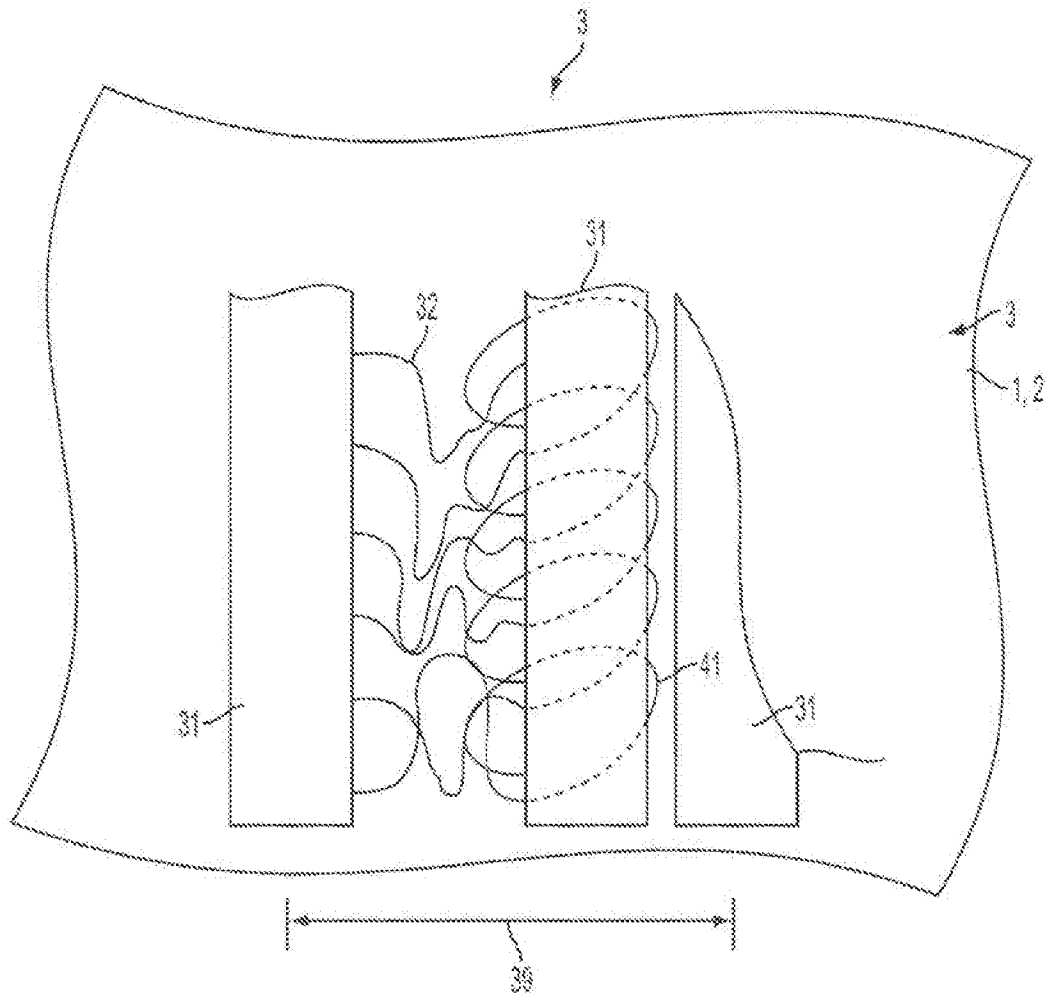


FIG. 34

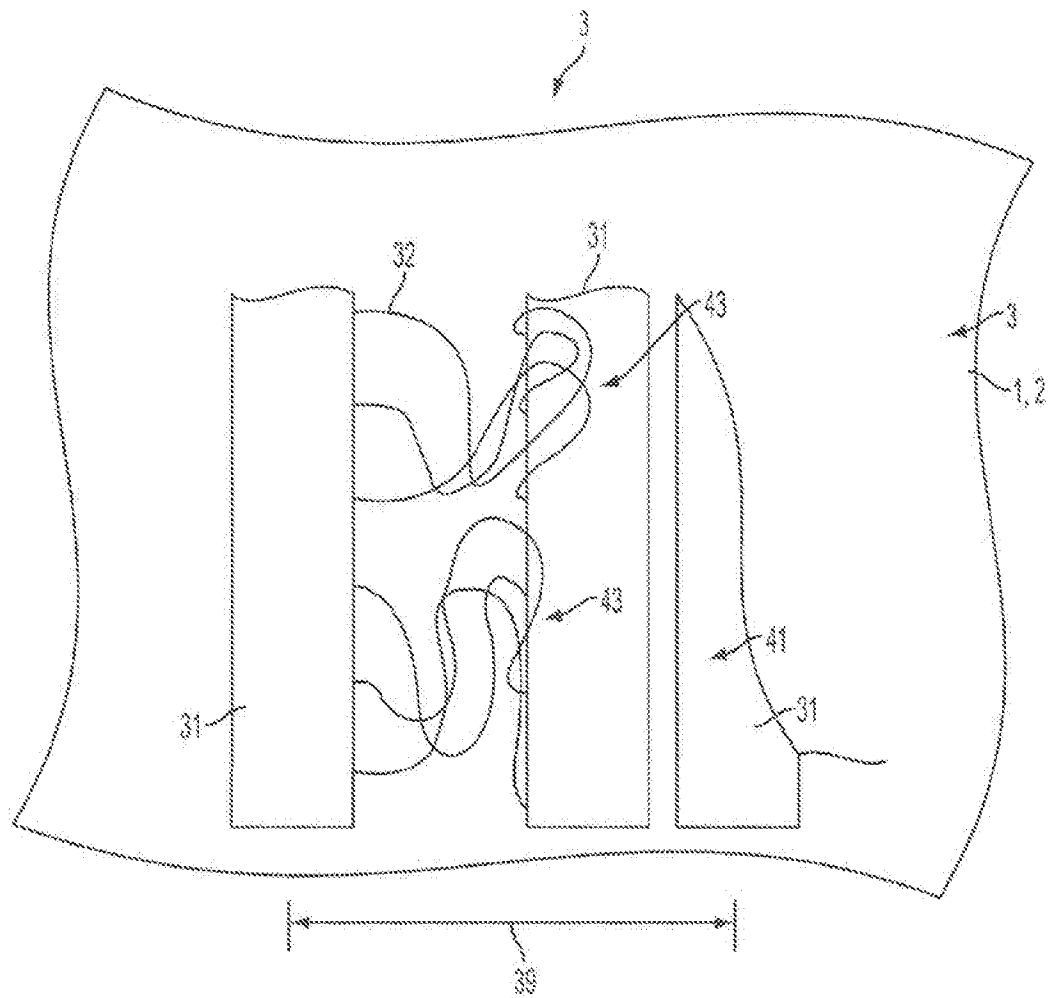


FIG. 35

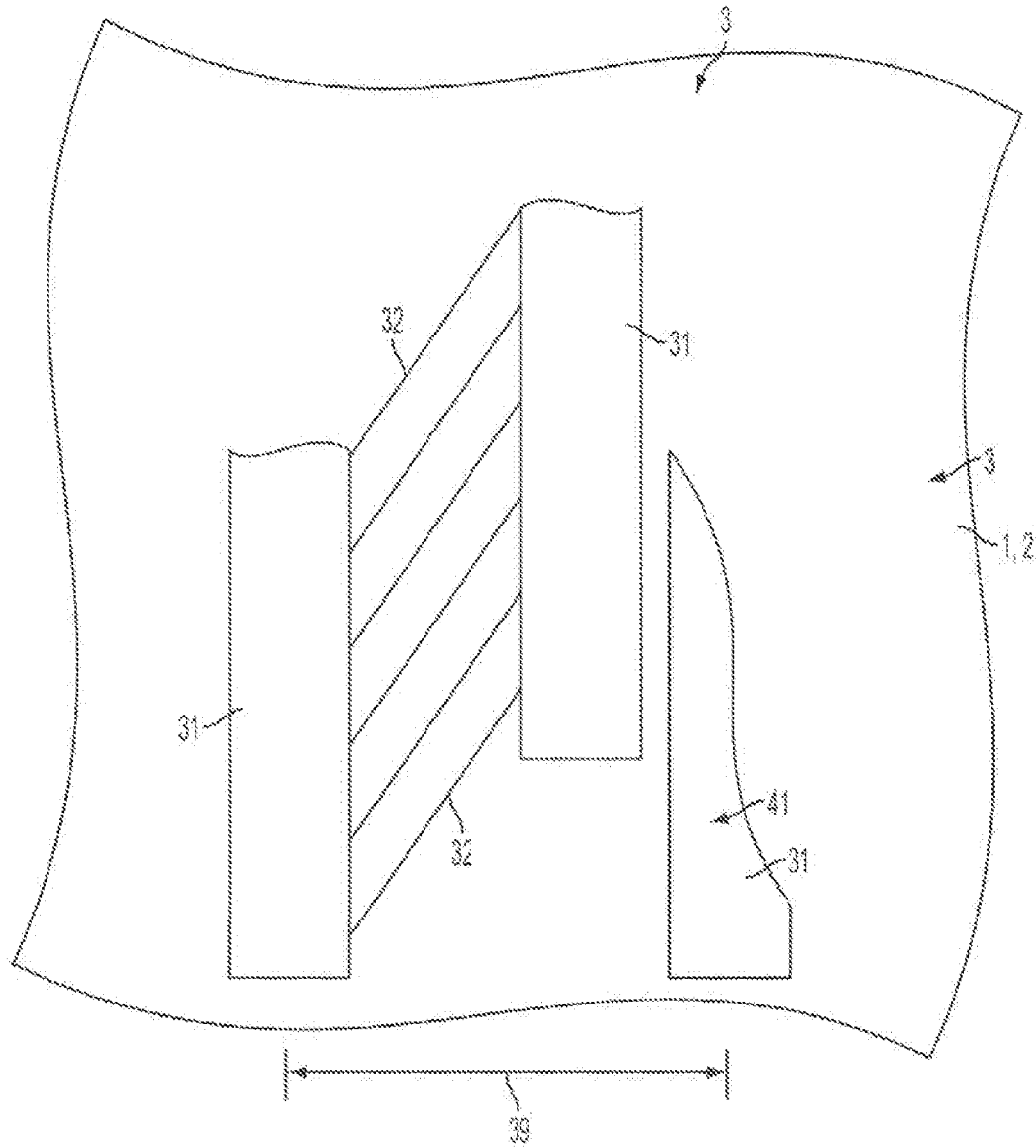


FIG. 36

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2012/042079

A. CLASSIFICATION OF SUBJECT MATTER

IPC(B) - 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(B) - 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	US 7,254,853 B1 (KIM) 14 August 2007 (14.08.2007) entire document	1-11, 13-27, 29-43, 45-50, 58
-		
Y		12, 28, 44, 51-57, 61-65, 67-69, 70-78, 96-97, 99, 100, 102, 103
X	US 818,321 A (WHALL) 17 April 1906 (17.04.1906) entire document	95, 98, 101
-		
Y		12, 28, 44, 51-55, 57, 62, 65-78, 96, 97, 99, 100, 102, 103
Y	US 3,008,213 A (FOSTER et al) 14 November 1961 (14.11.1961) entire document	58, 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

09 October 2012

Date of mailing of the international search report

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. Copenhaver

PCT Helpdesk: 571-272-4300

PCT OSP: 571-272-1775

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.

Form PCT/ISA/210 (continuation of first sheet (2)) (July 2009)

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.

Electronic Acknowledgement Receipt

EFS ID:	37010293
Application Number:	15280513
International Application Number:	
Confirmation Number:	1875
Title of Invention:	INFLATABLE BED
First Named Inventor/Applicant Name:	Feng LIU
Customer Number:	35161
Filer:	Allen Jeffrey Moss/David Hernandez
Filer Authorized By:	Allen Jeffrey Moss
Attorney Docket Number:	81610.00147
Receipt Date:	28-AUG-2019
Filing Date:	29-SEP-2016
Time Stamp:	18:31:00
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	updated_IDS.pdf	1034890	no	5
			3c869763b1074c67d5a68c10a7dc6d35ac1700aa		

Warnings:

INTEX EX. 1003, Pg. 438

Intex Recreation v. Bestway Inflatables

Information:					
2	Foreign Reference	FR2914545A3.pdf	2199630	no	17
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Information:					
3	Foreign Reference	GB434098A.pdf	505140	no	3
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Information:					
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Information:					
5	Non Patent Literature	Communication_of_a_notice_of_opposition_161913603.pdf	5079983	no	36
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Warnings:					
Information:					
Total Files Size (in bytes):			19646106		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/280,513	09/29/2016	Feng LIU	81610.00147	1875
35161	7590	10/08/2019	EXAMINER	
DICKINSON WRIGHT PLLC			KURILLA, ERIC J	
1825 Eye St., NW			ART UNIT	
Suite 900			PAPER NUMBER	
WASHINGTON, DC 20006			3673	
			NOTIFICATION DATE	DELIVERY MODE
			10/08/2019	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

dwpatents@dickinsonwright.com

Notice of Pre-AIA or AIA Status

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Election/Restrictions

2. Applicant's election without traverse of Species I (Figs. 5-8) in the reply filed on 06/25/2019 is acknowledged.

3. Claims 7-12, 17-22, and 25-31 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 06/25/2019.

Claim Rejections - 35 USC § 112

4. The following is a quotation of 35 U.S.C. 112(b):
(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 4, 15, and 16 recite a reference to some "perpendicular direction" without providing any frame of reference as to what the "perpendicular direction" is perpendicular to. Therefore, it is unclear what direction is required by "perpendicular direction".

6. Claim 23 recites the limitation "said at least two first V-beams" (emphasis added). There is insufficient antecedent basis for this limitation in the claim. Examiner is assuming this limitation to be —said at least two first I-beams—.

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7. Claims 37 and 38 recite the limitation “the location”. There is insufficient antecedent basis for this limitation in the claims.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale or otherwise available to the public before the effective filing date of the claimed invention.

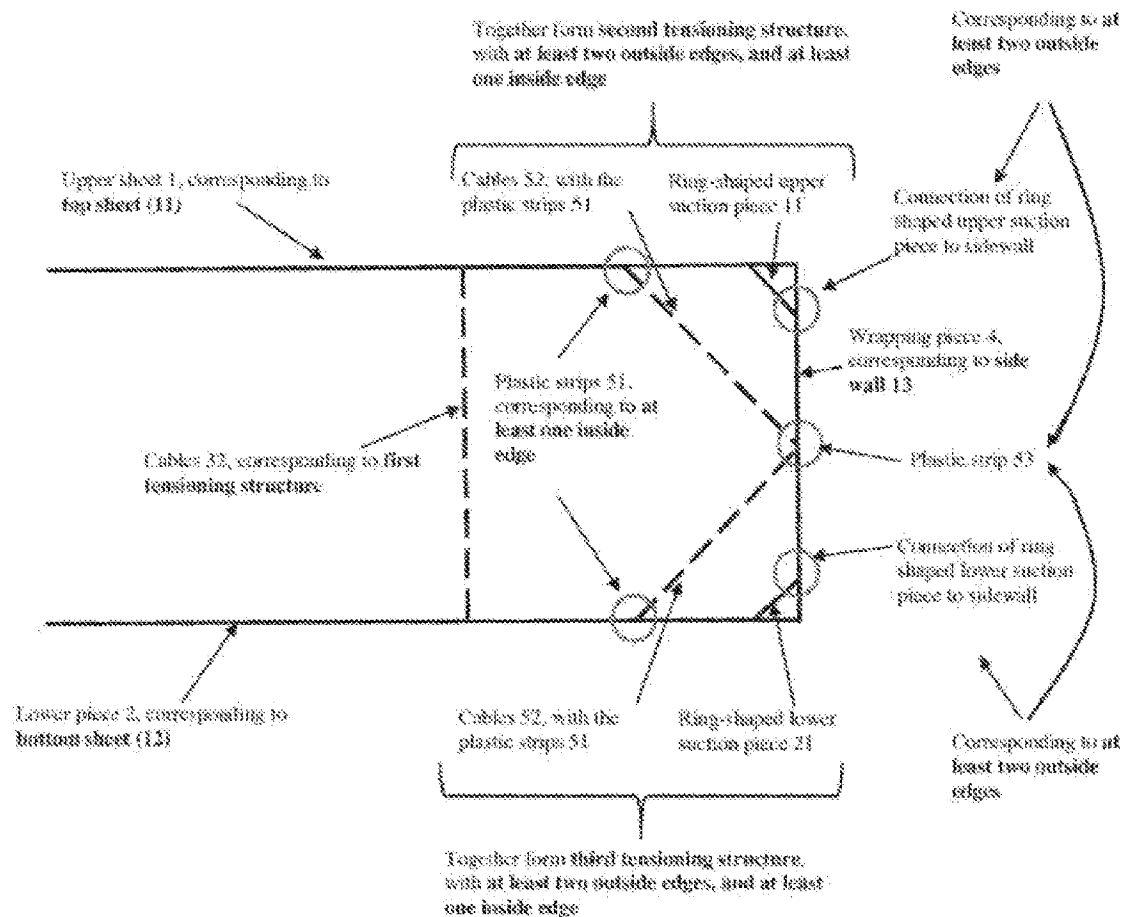
9. Claim(s) 1-6, 13-16, 23, 24, 32, 33, 37, and 38 is/are rejected under 35 U.S.C. 102(a)(1) as being anticipated by Lin (CN 203137719).

Regarding Claim 1, Lin discloses an inflatable bed (Fig. 1), comprising: a top sheet (1) and a bottom sheet (2) disposed vertically at an interval; at least one side wall (4), an upper edge of said side wall being coupled to an outer edge of said top sheet (see Fig. 3), a lower edge of said side wall being coupled to an outer edge of said bottom sheet (see Fig. 3), an air chamber formed between said top sheet, said bottom sheet and said side wall (see page 4, Lines 7 and 9-11 of English translation filed 08/28/2019 by Applicant); at least one first tensioning structure disposed in said air chamber, an upper end and a lower end of said first tensioning structure (3) being respectively coupled to said top sheet and said bottom sheet; and at least one support structure (5) disposed in said air chamber, said support structure being disposed in a longitudinal direction of at least one of said side walls (see Fig. 2), at least two outside edges (52 and where 11 and 21 meet sidewall 4) of said support structure being respectively coupled to the side wall adjacent, at least one inside edge (where 11 and 21 meet upper and lower

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sheet) of said support structure being coupled to the top sheet or bottom sheet adjacent.

Generally speaking, Examiner agrees with the sectional view Figure provided in the Notice of Opposition filed as NPL on 08/28/2019 by the Applicant, which has been reproduced below.



Regarding Claim 2, Lin discloses wherein said support structure comprises a second tensioning structure (52 and 11) and a third tensioning structure (52 and 21), at least two outside edges (53 and 11) of said second tensioning structure are respectively coupled to the side wall adjacent, at least one inside edge (51 or inside edge of 11) of said second tensioning structure is coupled to the top sheet adjacent; and at least two outside edges (53 and 21) of said third tensioning structure are respectively coupled to the side wall adjacent, at least one

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inside edge (51 or inside edge of 21) of said third tensioning structure is coupled to the bottom sheet adjacent.

Regarding Claim 3, Lin discloses 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 (see space between cables 52 in Fig. 2 which constitutes a "plurality of air holes").

Regarding Claim 4, Lin discloses wherein said second tensioning structure and said third tensioning structure are disposed at an interval in a perpendicular direction (see Figure provided above). The second and third tensioning structures are spaced vertically which is perpendicular to the longitudinal orientation of each tensioning structure.

Regarding Claim 5, Lin discloses wherein said second tensioning structure comprises at least two first I-beams (upper corner piece 11 and upper portion of support structure 5), 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 (see Fig. 2).

Regarding Claim 6, Lin discloses wherein said third tensioning structure comprises at least two second I-beams (lower corner piece 21 and lower portion of support structure 5), 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.

Regarding Claim 13, Lin discloses wherein said at least two first I-beams are spaced apart from each other at a lower surface of said top sheet (upper corner piece 11 and upper portion of support structure 5 are spaced at their connection points to the top sheet).

Regarding Claim 14, Lin discloses wherein said at least two second I-beams are spaced apart from each other at an upper surface of said bottom sheet (lower corner piece 21 and lower portion of support structure 5 are spaced at their connection points to the bottom sheet).

Regarding Claim 15, Lin discloses 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 (upper corner piece 11 and upper portion of support structure 5 are spaced at an interval on the inner surface of side wall 4).

Regarding Claim 16, Lin discloses wherein said at least two second are disposed at an interval on the inner surface of said side wall in a perpendicular direction (lower corner piece 21 and lower portion of support structure 5 are spaced at an interval on the inner surface of side wall 4).

Regarding Claim 23, Lin discloses wherein said at least two first I-beams as a whole are of a continuous annular structure or a segmental annular structure (see upper corner piece 11 and upper portion of support structure 5, which comprises cables 52, have an annular or ring shaped structure. See Fig. 2 and page 4, line 22 to page 5 line 7 of the English translation).

Regarding Claim 24, Lin discloses wherein said at least two second I-beams as a whole are of a continuous annular structure or a segmental annular structure (see lower corner piece

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11 and lower portion of support structure 5, which comprises cables 52, have an annular or ring shaped structure. See Fig. 2 and page 4, line 22 to page 5 line 7 of the English translation).

Regarding Claim 32, Lin discloses wherein said first tensioning structure, said second tensioning structure and said third tensioning structure are all made of thermoplastic plastic sheet (see plastic strips 31, 51, and 53 that are welded to upper and lower pieces, thus inherently being thermoplastic).

Regarding Claim 33, Lin discloses 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 (see cables 32 or 52 which would constitute "threads").

Regarding Claim 37, Lin discloses 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 (see Fig. 3).

Regarding Claim 38, Lin discloses 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 (see Fig. 4)

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention

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and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 34-36, 39, and 40 is/are rejected under 35 U.S.C. 103 as being unpatentable over

Lin in view Official Notice.

Regarding Claim 34, Lin fails to disclose 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. Examiner takes Official Notice that it is well known in the art to manufacture two side surfaces of a mesh or threads with at least partially coupled integrally with two opposite plastic strips, said mesh and said threads are sandwiched between the two opposite plastic strips. For instance, see Figs. 10 and 11 and para. [0085] of **WO 2013/0130117**. It would have been obvious to one having ordinary skill in the art at the time the invention was filed to modify Lin as required by Claim 34. The motivation would have been to incorporate additional tensioning structures, therefore adding further stability to the inflatable bed of Lin.

Regarding Claim 35, Lin fails to disclose 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. Examiner takes Official Notice that it is well known in the art to manufacture two side surfaces of a mesh or threads with at least partially coupled integrally with an U-shaped plastic strip, said mesh and said threads are sandwiched between the U-shaped plastic strip. For instance, see Fig. 5B and para. [0052] of **US 2015/0335164**. It would have been obvious to one having ordinary skill in the art at the time the invention was filed to modify Lin as required by Claim 35. The motivation would have

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been to incorporate additional tensioning structures, therefore adding further stability to the inflatable bed of Lin.

Regarding Claim 36, Lin fails to disclose 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. Claim 36 is interpreted to be a product-by-process claim. “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” [citations omitted] See MPEP 2113. Nevertheless, high-frequency welding is a common technique for joining materials of an inflatable mattress. See para. [0011] of **US 2007/0277324**.

Regarding Claim 39, Lin fails to disclose 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. Examiner takes Official Notice that built-in air pumps are well known within the art. See e.g. Fig. 3 of **US 6,701,559** and **US 7,039,972** for air pumps disposed in a sidewall. It would have been obvious to one having ordinary skill in the art at the time the invention was filed to incorporate a built-in air pump into Lin as required by Claim 39 for the purpose of increasing convenience to inflate Lin’s mattress.

Regarding Claim 40, Lin fails to disclose 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. Examiner takes Official Notice that air valves, such as the one required in Claim 40, are well known within the art. See e.g. para. [0038] of US 2015/0335164, Fig. 1 of US 6,671,910, and Fig. 4 of US 6,701,559. It would be obvious to modify Lin with an air valve as required by Claim 40 in order to easily facilitate inflation of Lin's mattress, and also allow for deflation so that the mattress may be stored more easily.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See attached PTO-892.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ERIC J KURILLA whose telephone number is (571)270-7294. The examiner can normally be reached on 7AM-6PM.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Cuomo can be reached on 571-272-6856. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 3673

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ERIC J KURILLA/

Primary Examiner, Art Unit 3673

<i>Notice of References Cited</i>	Application/Control No. 15/280,513		Applicant(s)/Patent Under Reexamination LIU, Feng	
	Examiner ERIC J KURILLA		Art Unit 3673	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20130228268-A1	09-2013	Lin; Hua Hsiang	A47C27/081	156/166
*	B	US-20150147503-A1	05-2015	Lin; Hua Hsiang	B32B7/12	428/35.7
*	C	US-20170273472-A1	09-2017	LIU; Feng	A47C27/081	1/1
*	D	US-20150201760-A1	07-2015	Lin; Hua Hsiang	A47C27/087	5/710
*	E	US-20150335164-A1	11-2015	Liu; Feng	A47C27/081	428/12
*	F	US-20070124864-A1	06-2007	Lau; Vincent W.S.	A47C27/081	5/711
*	G	US-4558476-A	12-1985	Linder; Philip C.	A47C27/081	5/682
*	H	US-3008213-A	11-1961	FOSTER BOUTWELL H	A47C27/081	28/158
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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	V	
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	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

<i>Search Notes</i> 	Application/Control No. 15/280,513	Applicant(s)/Patent Under Reexamination LIU, Feng
	Examiner ERIC J KURILLA	Art Unit 3673

CPC - Searched*		
Symbol	Date	Examiner
A47C27/081, A47C27/087	10/01/2019	EK

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Inventor name search	10/01/2019	EK
EAST text search	10/01/2019	EK

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/ERIC J KURILLA/ Primary Examiner, Art Unit 3673	
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT Form PTO-1449 (Modified) (Use several sheets if necessary)				COMPLETE IF KNOWN	
				Application Number	15/280,513
				Confirmation Number	1875
				Filing Date	September 29, 2016
				First Named Inventor	Feng LIU
				Group Art Unit	3673
Examiner Name	Robert G. SANTOS				
Sheet	1	of	1	Attorney Docket No.	100680-0427

U.S. PATENT DOCUMENTS						
Examiner Initials*	Cite No.	U.S. Patent or Application		Name of Patentee or Inventor of Cited Document	Date of Publication or Filing Date of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		NUMBER	Kind Code (if known)			
	1.	~~2009/165211~~ ~~2009/0165211~~	A1	Rong-Jyh et al.	07-02-2009	
	2.	~~2013/145560~~ ~~2013/0145560~~	A1	~~Rong-Jyh et al.~~ CHEN	06-13-2013	

FOREIGN PATENT DOCUMENTS								
Exami ner Initials*	Cite No.	Foreign Patent or Application			Name of Patentee or Applicant of Cited Document	Date of Publication or Filing Date of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T
		Office	NUMBER	Kind Code (if known)				

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Exami ner Initials*	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume issue number(s), publisher, city and/or country where published.

EXAMINER /ERIC J KURILLA/ DM_US 88811453-1.100680.0427	DATE CONSIDERED 10/01/2019
*EXAMINER: Initial if reference considered, whether or not criteria is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to application(s).	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH /E J K/

INTEX EX. 1003, Pg. 454
Intex Recreation v. Bestway Inflatables

Doc code: IDS

PTO/SB/08a (02-18)

Doc description: Information Disclosure Statement (IDS) Filed

Approved for use through 11/30/2020. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)

Application Number	15280513
Filing Date	2016-09-29
First Named Inventor	Feng LIU
Art Unit	3673
Examiner Name	Eric J. KURILLA
Attorney Docket Number	81610.00147

U.S.PATENTS

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Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	4941223		1990-07-17	Santo	
	2	5669091		1997-09-23	Chung	
	3	6568013		2003-05-27	Perez, et al.	
	4	7039972		2006-05-09	Chaffee	
	5	9254047		2016-02-09	Schermel, et al.	

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Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20070277324		2007-12-06	Bestway Inflatables & Material Corp.	

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Attorney Docket Number	81610.00147

2	20150201760	2015-07-23	Intex Recreation Corporation
3	20150335164	2015-11-26	Bestway Inflatables & Material Corp.

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1	2914545	FR		2008-10-10	Song Rong		
	2	434098	GB		1933-11-21	P.B. Cow & Company		
	3	2013130117	WO		2013-09-06	Intex Recreation Corporation		

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NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵
	1	Communication of a notice of opposition dated 27/06/2019 (27 June 2019) on related European patent application 16191360.3 issued by the European Patent Office / Opposition Division	

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EXAMINER SIGNATURE

Examiner Signature	/ERIC J KURILLA/	Date Considered	10/01/2019
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¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

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Art Unit	3673
Examiner Name	Eric J. KURILLA
Attorney Docket Number	81610.00147

CERTIFICATION STATEMENT

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☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Allen J. Moss/	Date (YYYY-MM-DD)	2019-08-28
Name/Print	Allen J. Moss	Registration Number	38,567

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Doc code: IDS

PTO/SB/08a (03-15)

Doc description: Information Disclosure Statement (IDS) Filed

Approved for use through 07/31/2016. OMB 0651-0031

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**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**
(Not for submission under 37 CFR 1.99)

Application Number	15280513
Filing Date	2016-09-29
First Named Inventor	Feng LIU
Art Unit	3673
Examiner Name	SANTOS
Attorney Docket Number	09548.1303US01

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	7530128		2009-05-12	Hsin-Tsai WU	
	2	7337485		2008-03-04	Andrew T. METZGER	
	3	7165283		2007-01-23	BOSO et al.	
	4	6996867		2006-02-14	BOSO et al.	
	5	6971134		2005-12-06	Hsin-Tsai WU	
	6	6754926		2004-06-29	Cheng-Chung WANG	
	7	6701559		2004-03-09	BOSO et al.	
	8	6671910		2004-01-06	HSU et al.	

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Art Unit	3673
Examiner Name	SANTOS
Attorney Docket Number	09548.1303US01

9	4541135	1985-09-17	Victor KARPOV
10	2360715	1944-10-17	Perry George HOUGH

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1		20050273938		2005-12-15	METZGER et al.	
2		20030101516		2003-06-05	HSU et al.	

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1			

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Attorney Docket Number	09548.1303US01

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EXAMINER SIGNATURE

Examiner Signature	/ERIC J KURILLA/	Date Considered	10/01/2019
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See attached certification statement.

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☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/rongcyang/	Date (YYYY-MM-DD)	2016-12-21
Name/Print	Rong Yang	Registration Number	71641

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Art Unit	3673
Examiner Name	Eric J. Kurilla
Attorney Docket Number	081610.00147

U.S.PATENTS						Remove
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	1	202751069	CN	U	2013-02-27	Intex Industries Xiamen Co., Ltd.		×
	2	203137719	CN	U	2013-08-21	Intex Industries Xiamen Co., Ltd.		☒
	3	201045987	CN	Y	2008-04-16	Rongzhi Song		☒

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Examiner Name	Eric J. Kurilla
Attorney Docket Number	081610.00147

4	205457538	CN	U	2016-08-17	Shanghai Bestway Inflatables & Material Corp.	☒
5	103110297	CN	A	2013-05-22	Intex Industries Xiamen Co., Ltd.	☒
6	2706070	CN	Y	2005-06-29	Mignda Plastic Xiamen Co., Ltd.	☒
7	2904820	CN	Y	2007-05-30	Shanghai Bestway Inflatables	☒

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NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵
	1	European Search Report dated May 11, 2017	
	2	SIPO Search Report dated January 30, 2019	☒

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EXAMINER SIGNATURE

Examiner Signature	/ERIC J KURILLA/	Date Considered	10/01/2019
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Signature	/Nan Jiang/	Date (YYYY-MM-DD)	2019-05-28
Name/Print	Nan Jiang	Registration Number	73350

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	22	("20070277324" "6568013" "4941223" "2360715" "4541135" "20150335164" "5669091" "20050273938" "6701559" "7165283" "7530128" "7039972" "6671910" "9254047" "20030101516" "7337485" "6971134" "6996867" "20150201760" "6754926").PN.	US-PGPUB; USPAT; USOCR; EPO	OR	ON	2019/10/01 14:27
L2	6	((("20150335164") or ("6671910") or ("6701559") or ("7039972") or ("20070277324") or ("20130130117"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/10/01 14:29
L3	6	((("20150335164") or ("6671910") or ("6701559") or ("7039972") or ("20070277324") or ("20130130117"))).PN.	US-PGPUB; USPAT; USOCR; EPO	OR	OFF	2019/10/01 14:29
L4	1	L3 not L1	US-PGPUB; USPAT; USOCR; EPO	OR	ON	2019/10/01 14:29
L5	0	((("2009165211") or ("2013145560"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/10/01 14:32
L6	2	((("20090165211") or ("20130145560"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/10/01 14:32
L7	1620	(A47C27/081).CPC.	US-PGPUB; USPAT; USOCR; EPO	OR	ON	2019/10/01 14:37
L8	1719	(A47C27/081, A47C27/087).CPC.	US-PGPUB; USPAT; USOCR; EPO	OR	ON	2019/10/01 14:37
L9	218	(tension\$3) and L8	US-PGPUB; USPAT; USOCR; EPO	OR	ON	2019/10/01 14:44
L10	8	(US-20130228268-\$ or US-20150147503-\$ or US-20170273472-\$ or US-20150201760-\$ or US-20150335164-\$ or US-20070124864-\$).did. or (US-4558476-\$).did. or (US-3008213-\$).did.	US-PGPUB; USPAT; USOCR	OR	ON	2019/10/01 14:46

EAST Search History (Interference)

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Electronic Acknowledgement Receipt

EFS ID:	38242387
Application Number:	15280513
International Application Number:	
Confirmation Number:	1875
Title of Invention:	INFLATABLE BED
First Named Inventor/Applicant Name:	Feng LIU
Customer Number:	35161
Filer:	Nan Jiang/Karen Hopf
Filer Authorized By:	Nan Jiang
Attorney Docket Number:	81610.00147
Receipt Date:	08-JAN-2020
Filing Date:	29-SEP-2016
Time Stamp:	17:28:07
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment/Req. Reconsideration-After Non-Final Reject	81610147Amendment.pdf	297841	no	15
			6dd4f75c837e7ba2d966d0726a34348d0fa062f3		

Warnings:

INTEX EX. 1003, Pg. 471

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Information:	
Total Files Size (in bytes):	297841
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Confirmation No. 1875

Application No.: 15/280,513
Filing Date: September 29, 2016
Inventors: Feng LIU
Group Art Unit: 3673
Examiner: Kurilla, Eric J.
Title: Inflatable Bed
Attorney Docket No. 81610.00147

AMENDMENT AND RESPONSE TO NON-FINAL OFFICE ACTION

Mailstop: Amendment
Commissioner of Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Dear Examiner Kurilla:

In response to the Non-Final Office Action mailed on October 8, 2019 (“Office Action”), please amend the application and consider the remarks, as set forth below. Applicant believes there are no fees due for this document; however, if any fees are due, the Patent Office is authorized to charge or refund any fee deficiency or excess to Deposit Account No. 04-1061 in the name of Dickinson Wright PLLC.

Amendments to the Claims begin on page **2** of this paper.

Remarks begin on page **11** of this paper.

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in this application:

What is claimed is:

1. (Currently Amended) 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 said at least one side wall, at least one inside edge of said second tensioning structure is coupled to said top sheet; and

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

2. (Cancelled)

3. (Currently Amended) 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.

4. (Currently Amended) The inflatable bed according to claim [[2]] 1, wherein said second tensioning structure and said third tensioning structure are disposed ~~at an interval in a perpendicular direction.~~

5. (Currently Amended) The inflatable bed according to claim [[2]] 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.

6. (Currently Amended) The inflatable bed according to claim [[2]] 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.

7. (Withdrawn – Currently Amended) The inflatable bed according to claim [[2]] 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.

8. (Withdrawn – Currently Amended) The inflatable bed according to claim [[2]] 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.

9. (Withdrawn – Currently Amended) The inflatable bed according to claim [[2]] 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.

10. (Withdrawn – Currently Amended) The inflatable bed according to claim [[2]] 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.

11. (Withdrawn – Currently Amended) The inflatable bed according to claim [[2]] 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.

12. (Withdrawn – Currently Amended) The inflatable bed according to claim [[2]] 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.

13. (Original) 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. (Original) 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. (Currently Amended) 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. (Currently Amended) 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. (Withdrawn) 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. (Withdrawn) 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. (Withdrawn) 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. (Withdrawn) 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. (Withdrawn) 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. (Withdrawn) 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. (Currently Amended) The inflatable bed according to claim 5, wherein said at least two first [[V]] I-beams as a whole are of a continuous annular structure or a segmental annular structure.

24. (Original) 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. (Withdrawn) 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. (Withdrawn) 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. (Withdrawn) 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. (Withdrawn) 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. (Withdrawn) 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. (Withdrawn) 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. (Withdrawn) 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. (Currently Amended) 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. (Currently Amended) 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. (Original) 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. (Original) 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. (Currently Amended) 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. (Currently Amended) The inflatable bed according to claim [[2]] 1, wherein [[the]] a 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. (Currently Amended) The inflatable bed according to claim [[2]] 1, wherein [[the]] a location where said bottom sheet is located in the inside part of a lower edge of said third tensioning structure is lower than [[the]] a location where said bottom sheet is located in the outside part of the lower edge of said third tensioning structure.

39. (Currently Amended) 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. (Original) 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.

REMARKS

Following entry of the proposed Amendment, Claims 1 and 3-40 are pending, with claim 1 being independent. Claims 7-12, 17-22, and 25-31 are withdrawn from examination. Claims 1, 3-12, 15-16, 23, 32-33, and 36-39 have been amended. Claim 2 has been cancelled, without prejudice or disclaimer. Reconsideration of the application in view of the present Amendments and Remarks is respectfully requested.

Rejections under 35 U.S.C. §112

The Office Action rejects claims 4, 15, and 16 under 35 U.S.C. §112 as allegedly unclear. In response, Applicant amends claims 4, 15, and 16 and removes the phrase “in a perpendicular direction” from claims 4, 15, and 16. Applicant respectfully submits that the amendments to claims 4, 15, and 16 traverse this rejection. Reconsideration and withdrawal of the rejection of claims 4, 15, and 16 is therefore respectfully requested.

The Office Action rejects claim 23 under 35 U.S.C. §112 as allegedly indefinite due to insufficient antecedent basis. In response, Applicant amends claim 23 to recite “said at least two first I-beam.” Applicant respectfully submits that the amendment to claim 23 traverses this rejection. Reconsideration and withdrawal of the rejection of claim 23 is therefore respectfully requested.

The Office Action rejects claims 37 and 38 under 35 U.S.C. §112 as allegedly indefinite due to insufficient antecedent basis. In response, Applicant amends claims 37 and 38 to recite “a location.” Applicant respectfully submits that the amendments to claims 37 and 38 traverse this rejection. Reconsideration and withdrawal of the rejection of claims 37 and 38 is therefore respectfully requested.

Claim Rejections under 35 U.S.C. §102

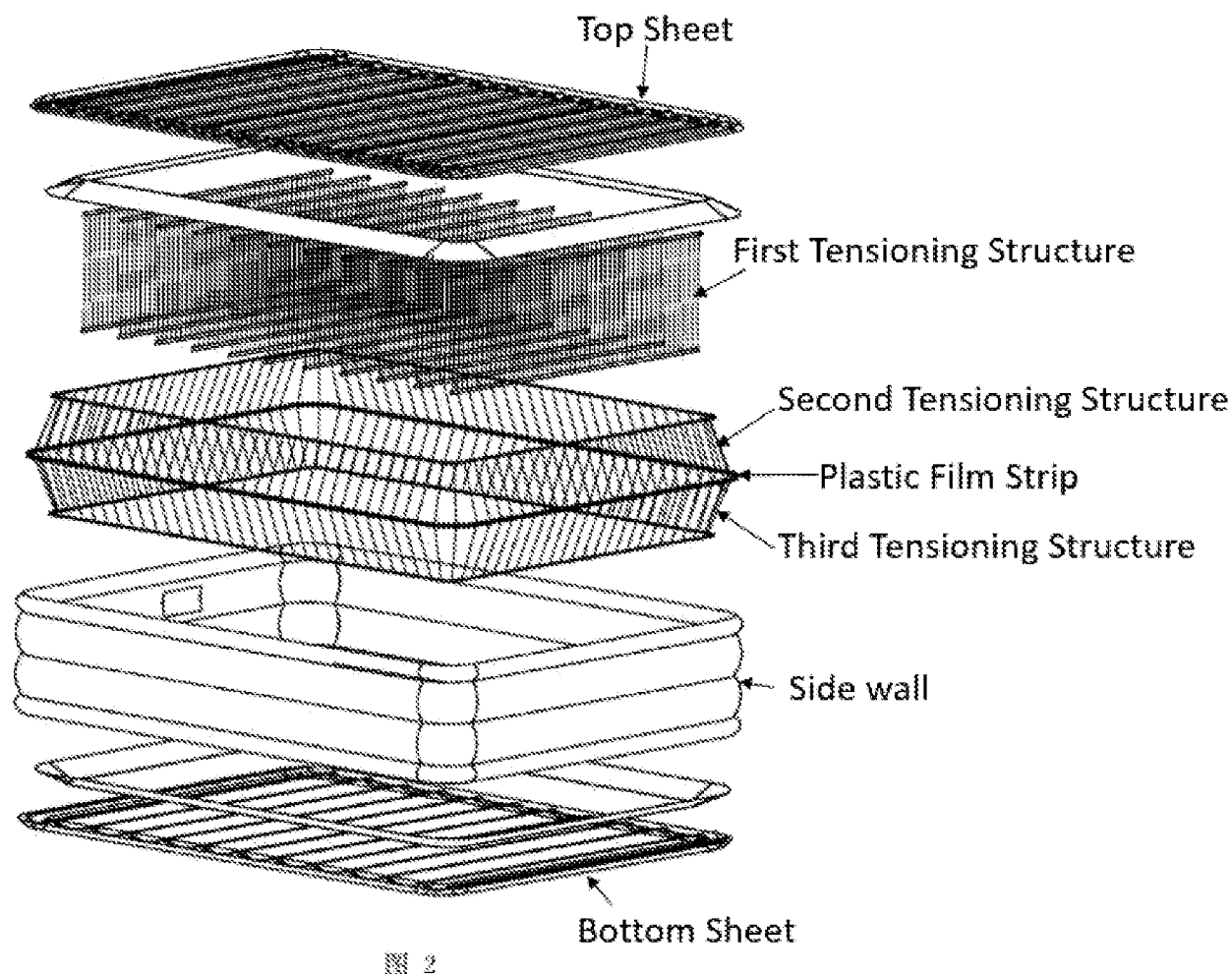
The Office Action rejects Claims 1-6, 13-16, 23, 24, 32, 33, 37, and 38 under 35 U.S.C. §102(a)(1) as being anticipated by Chinese patent CN203137719 (“Lin”). Applicant respectfully disagrees with these rejections; however, in an effort to expedite the successful resolution of this case, applicant amends independent claim 1 to recite the following limitations:

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 said at least one side wall, at least one inside edge of said second tensioning structure is coupled to said top sheet; and”

2) “wherein at least two outside edges of said third tensioning structure are respectively coupled to said at least one side wall, at least one inside edge of said third tensioning structure is coupled to said bottom sheet.”

Support for these amendments can be found original dependent claim 2 and Figure 5 in the specification. No new matter has been added.

To address the Office’s rejections, as illustrated in the annotated Figure 2 of Lin below, applicant notes that Lin discloses an inflatable bed. The inflatable bed has a top sheet **1** and a bottom sheet **2**. A side wall **4** couples to the top sheet **1** and the bottom sheet **2** connecting the top sheet **1** and the bottom sheet **2** to one another. A first tensioning structure **3** connects to the top sheet **1** and the bottom sheet **2**. A second tensioning structure **52** wherein the second tensioning structure **52** is coupled to the side wall **4** and the top sheet **1**. A third tensioning structure wherein the third tensioning structure is coupled to the side wall **4** and the bottom sheet **2**. The second tensioning structure **52** and the third tensioning structure are coupled to one another via a plastic film strip **53**.



Annotated Figure 2 of Lin

In other words, Lin fails to disclose “wherein at least two outside edges of said third tensioning structure are respectively coupled to said at least one side wall, at least one inside edge of said third tensioning structure is coupled to said bottom sheet” as recited in the newly amended independent claim 1. Thus, for at least the reasons above, applicant respectfully submits that independent claim 1, at least as amended, distinguish over the cited reference Lin. Reconsideration and withdrawal of the rejection of independent claim 1 under 35 U.S.C. §102 is respectfully requested.

Claims 3-6, 13-16, 23-24, 32-33, and 37-38 depend or ultimately depend on independent claim 1 and thus, all are allowable over the cited references for at least the same reasons. Accordingly, reconsideration and withdrawal of the rejections of claims 3-6, 13-16, 23-24, 32-33, and 37-38 are respectfully requested.

Claim Rejections under 35 U.S.C. §103

The Office Action rejects claims 34-36 and 39-40 as being unpatentably over Lin in view of Official Notice. Applicant respectfully disagrees with these rejections, however, in an effort to expedite the successful resolution of this case, applicant has filed the above-identified amendments which distinguish the present invention from the cited references and the Official notice. Accordingly, applicant respectfully requests the Office to reconsider and withdrawal of the rejections of claims 34-36 and 39-40 are respectfully requested.

Conclusion

It is respectfully submitted that applicant has responded in a fully satisfactory manner to all matters at issue in this application, and that this application is now in condition for allowance. Accordingly, applicant respectfully requests that the Examiner pass the application to issuance. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 433-7200. Favorable consideration and allowance of this application is respectfully requested.

Respectfully submitted,

Dickinson Wright PLLC
Attorneys for Applicants

Date January 8, 2020

By: /Nan Jiang/

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 15/280,513		Filing Date 09/29/2016		☐ To be Mailed		
ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO										
APPLICATION AS FILED - PART I										
		(Column 1)	(Column 2)							
FOR		NUMBER FILED	NUMBER EXTRA	RATE (\$)		FEE (\$)				
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))		N/A	N/A	N/A						
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))		N/A	N/A	N/A						
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		N/A	N/A	N/A						
TOTAL CLAIMS (37 CFR 1.16(i))		minus 20 =	*	x \$80 =						
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 =	*	x \$420 =						
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).								
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL						
APPLICATION AS AMENDED - PART II										
		(Column 1)	(Column 2)	(Column 3)						
AMENDMENT	01/08/2020	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	* 39	Minus	** 40	= 0	x \$ 100 =		0		
	Independent (37 CFR 1.16(h))	* 1	Minus	*** 3	= 0	x \$ 460 =		0		
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE		0		
		(Column 1)	(Column 2)	(Column 3)						
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	*	Minus	**	=	x \$ 0 =				
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x \$ 0 =				
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE				
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.						LIE				
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".						/TARA A WASHINGTON/				
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".										
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EXAMINER

KURILLA, ERIC J

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3673

DATE MAILED: 02/20/2020

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/280,513	09/29/2016	Feng LIU	81610.00147	1875

TITLE OF INVENTION: INFLATABLE BED

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1000	\$0.00	\$0.00	\$1000	05/20/2020

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

35161 7590 02/20/2020
DICKINSON WRIGHT PLLC
1825 EYE ST., NW
SUITE 900
WASHINGTON, DC 20006

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

	(Typed or printed name)
	(Signature)
	(Date)

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15/280,513	09/29/2016	Feng LIU	81610.00147	1875

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APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1000	\$0.00	\$0.00	\$1000	05/20/2020

EXAMINER	ART UNIT	CLASS-SUBCLASS
KURILLA, ERIC J	3673	005-709000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

1 _____

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☐ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☐ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/280,513	09/29/2016	Feng LIU	81610.00147	1875
35161	7590	02/20/2020	EXAMINER	
DICKINSON WRIGHT PLLC			KURILLA, ERIC J	
1825 EYE ST., NW			ART UNIT	
SUITE 900			PAPER NUMBER	
WASHINGTON, DC 20006			3673	

DATE MAILED: 02/20/2020

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation of the law.

Notice of Allowability	Application No. 15/280,513	Applicant(s) LIU, Feng	
	Examiner ERIC J KURILLA	Art Unit 3673	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment filed 01/08/2020.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 1,3-6,13-16,23-24 and 32-40. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov**.

4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a) ☒ All b) ☐ Some *c) ☐ None of the:

1. ☒ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)	5. ☒ Examiner's Amendment/Comment
2. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.	6. ☐ Examiner's Statement of Reasons for Allowance
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.	7. ☐ Other _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____.	

/ERIC J KURILLA/ Primary Examiner, Art Unit 3673	
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Election/Restrictions

1. This application is in condition for allowance except for the presence of claims 7-12, 17-22 and 25-31 directed to a Species non-elected without traverse. Accordingly, claims 7-12, 17-22, and 25-31 have been cancelled.

EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

Claim 4: The inflatable bed according to claim 1, wherein said second tensioning structure and said third tensioning structure are disposed at an interval.

Cancel Claims 7-12, 17-22, and 25-31.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ERIC J KURILLA whose telephone number is (571)270-7294. The examiner can normally be reached on 7AM-6PM.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Cuomo can be reached on 571-272-6856. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <https://ppair-my.uspto.gov/pair/PrivatePair>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ERIC J KURILLA/
Primary Examiner, Art Unit 3673

Issue Classification 	Application/Control No. 15/280,513	Applicant(s)/Patent Under Reexamination LIU, Feng
	Examiner ERIC J KURILLA	Art Unit 3673

CPC						
Symbol					Type	Version
A47C	/	27	/	081	F	2013-01-01
A47C	/	27	/	087	I	2013-01-01
A47C	/	27	/	16	I	2013-01-01

CPC Combination Sets				
Symbol		Type	Set	Ranking
	/			

NONE (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 20	
/ERIC J KURILLA/ Primary Examiner, Art Unit 3673 (Primary Examiner) _____ (Date) _____		22 January 2020 O.G. Print Claim(s) 1	O.G. Print Figure 7

Issue Classification 	Application/Control No. 15/280,513	Applicant(s)/Patent Under Reexamination LIU, Feng
	Examiner ERIC J KURILLA	Art Unit 3673

INTERNATIONAL CLASSIFICATION			
CLAIMED			
A47C27/08	/	27	/ 08
A47C27/16	/	27	/ 16

NON-CLAIMED			
/		/	

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/ERIC J KURILLA/ Primary Examiner, Art Unit 3673 (Primary Examiner)	22 January 2020 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 7

Issue Classification 	Application/Control No. 15/280,513	Applicant(s)/Patent Under Reexamination LIU, Feng
	Examiner ERIC J KURILLA	Art Unit 3673

☐ Claims renumbered in the same order as presented by applicant
 ☐ CPA
 ☐ T.D.
 ☐ R.1.47

CLAIMS															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	7	23	19	39										
2	3	11	24	20	40										
3	4	12	32												
4	5	13	33												
8	6	14	34												
5	13	15	35												
9	14	16	36												
6	15	17	37												
10	16	18	38												

NONE (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 20	
/ERIC J KURILLA/ Primary Examiner, Art Unit 3673 (Primary Examiner) _____ (Date) _____		22 January 2020 (Date)	O.G. Print Claim(s) 1 O.G. Print Figure 7

<i>Search Notes</i> 	Application/Control No. 15/280,513	Applicant(s)/Patent Under Reexamination LIU, Feng
	Examiner ERIC J KURILLA	Art Unit 3673

CPC - Searched*		
Symbol	Date	Examiner
A47C27/081, A47C27/087	10/01/2019	EK

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Inventor name search	10/01/2019	EK
EAST text search	10/01/2019	EK
Updated search	01/22/2020	EK

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
	See EAST printout	01/22/2020	EK

/ERIC J KURILLA/ Primary Examiner, Art Unit 3673	
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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	22	("20070277324" "6568013" "4941223" "2360715" "4541135" "20150335164" "5669091" "20050273938" "6701559" "7165283" "7530128" "7039972" "6671910" "9254047" "20030101516" "7337485" "6971134" "6996867" "20150201760" "6754926").PN.	US-PGPUB; USPAT; USOCR; EPO	OR	ON	2019/10/01 14:27
S2	6	((("20150335164") or ("6671910") or ("6701559") or ("7039972") or ("20070277324") or ("20130130117"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/10/01 14:29
S3	6	((("20150335164") or ("6671910") or ("6701559") or ("7039972") or ("20070277324") or ("20130130117"))).PN.	US-PGPUB; USPAT; USOCR; EPO	OR	OFF	2019/10/01 14:29
S4	1	S3 not S1	US-PGPUB; USPAT; USOCR; EPO	OR	ON	2019/10/01 14:29
S5	0	((("2009165211") or ("2013145560"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/10/01 14:32
S6	2	((("20090165211") or ("20130145560"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/10/01 14:32
S7	1620	(A47C27/081).CPC.	US-PGPUB; USPAT; USOCR; EPO	OR	ON	2019/10/01 14:37
S8	1719	(A47C27/081, A47C27/087).CPC.	US-PGPUB; USPAT; USOCR; EPO	OR	ON	2019/10/01 14:37
S9	218	(tension\$3) and S8	US-PGPUB; USPAT; USOCR; EPO	OR	ON	2019/10/01 14:44
S10	8	(US-20130228268-\$ or US-20150147503-\$ or US-20170273472-\$ or US-20150201760-\$ or US-20150335164-\$ or US-20070124864-\$).did. or (US-4558476-\$).did. or (US-3008213-\$).did.	US-PGPUB; USPAT; USOCR	OR	ON	2019/10/01 14:46

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	3	(inflat\$4 and bed and sheet and top and side and wall and tension\$3 and support).CLM.	US-PGPUB; USPAT	OR	ON	2020/01/22 14:01

1/ 22/ 2020 2:03:27 PM
C:\ Users\ ekurilla\ Documents\ EAST\ Workspaces\ 15280513.wsp

Bibliographic Data

Application No: 15/280,513

Foreign Priority claimed: ☒ Yes ☐ No

35 USC 119 (a-d) conditions met: ☒ Yes ☐ No ☐ Met After Allowance

Verified and Acknowledged:

/ERIC J KURILLA/

Examiner's Signature

Initials

Title:

INFLATABLE BED

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
09/29/2016	005	3673	81610.00147
RULE			

APPLICANTS

BESTWAY INFLATABLES & MATERIAL CORP., Shanghai, CHINA

INVENTORS

Feng LIU Shanghai, CHINA

CONTINUING DATA

FOREIGN APPLICATIONS

CHINA 201610020533.5 01/13/2016

CHINA 201620031074.6 01/13/2016

IF REQUIRED, FOREIGN LICENSE GRANTED**

10/12/2016

STATE OR COUNTRY

CHINA

ADDRESS

DICKINSON WRIGHT PLLC

1825 EYE ST., NW

SUITE 900

WASHINGTON, DC 20006

UNITED STATES

FILING FEE RECEIVED

\$3,200

INFORMATION DISCLOSURE STATEMENT BY APPLICANT Form PTO-1449 (Modified) (Use several sheets if necessary)				COMPLETE IF KNOWN	
				Application Number	15/280,513
				Confirmation Number	1875
				Filing Date	September 29, 2016
				First Named Inventor	Feng LIU
				Group Art Unit	3673
Examiner Name	Robert G. SANTOS				
Sheet	1	of	1	Attorney Docket No.	100680-0427

U.S. PATENT DOCUMENTS						
Examiner Initials*	Cite No.	U.S. Patent or Application		Name of Patentee or Inventor of Cited Document	Date of Publication or Filing Date of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		NUMBER	Kind Code (if known)			
/E.J.K./	1.	~~2009/165211~~ 2009/0165211	A1	Rong-Jyh et al.	07-02-2009	
/E.J.K./	2.	2013/145560 ~~2013/0145660~~	A1	~~Rong-Jyh et al.~~ CHEN	06-13-2013	

FOREIGN PATENT DOCUMENTS								
Exami ner Initials*	Cite No.	Foreign Patent or Application			Name of Patentee or Applicant of Cited Document	Date of Publication or Filing Date of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T
		Office	NUMBER	Kind Code (if known)				

OTHER NON PATENT LITERATURE DOCUMENTS		
Exami ner Initials*	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume issue number(s), publisher, city and/or country where published.

EXAMINER /ERIC J KURILLA/ DM_US 88811453-1.100680.0427	DATE CONSIDERED 10/01/2019
*EXAMINER: Initial if reference considered, whether or not criteria is in conformance with MPEP 609. Draw line through citation if not in conformance <u>and</u> not considered. Include copy of this form with next communication to application(s).	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH /E.J.K./

INTEX EX. 1003, Pg. 503
Intex Recreation v. Bestway Inflatables

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

35161 7590 02/20/2020
DICKINSON WRIGHT PLLC
1825 EYE ST., NW
SUITE 900
WASHINGTON, DC 20006

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/280,513	09/29/2016	Feng LIU	81610.00147	1875

TITLE OF INVENTION: INFLATABLE BED

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1000	\$0.00	\$0.00	\$1000	05/20/2020

EXAMINER	ART UNIT	CLASS-SUBCLASS
KURILLA, ERIC J	3673	005-709000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1. AJ Moss

2. Dickinson Wright PLLC

3. _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

BESTWAY INFLATABLES & MATERIAL CORP.

SHANGHAI, CHINA

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☒ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 04-1061

5. Change in Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /NAN JIANG/

Date May 20, 2020

Typed or printed name NAN JIANG

Registration No. 73350

Electronic Patent Application Fee Transmittal				
Application Number:		15280513		
Filing Date:		29-Sep-2016		
Title of Invention:		INFLATABLE BED		
First Named Inventor/Applicant Name:		Feng LIU		
Filer:		Nan Jiang/Karen Hopf		
Attorney Docket Number:		81610.00147		
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
UTILITY APPL ISSUE FEE	1501	1	1000	1000

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1000

Electronic Acknowledgement Receipt

EFS ID:	39500404
Application Number:	15280513
International Application Number:	
Confirmation Number:	1875
Title of Invention:	INFLATABLE BED
First Named Inventor/Applicant Name:	Feng LIU
Customer Number:	35161
Filer:	Nan Jiang/Karen Hopf
Filer Authorized By:	Nan Jiang
Attorney Docket Number:	81610.00147
Receipt Date:	20-MAY-2020
Filing Date:	29-SEP-2016
Time Stamp:	22:21:27
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 1000
RAM confirmation Number	E20205JM24029094
Deposit Account	041061
Authorized User	Karen Hopf

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.16 (National application filing, search, and examination fees)

37 CFR 1.17 (Patent application and reexamination processing fees)

INTEX EX. 1003, Pg. 507

Intex Recreation v. Bestway Inflatables

37 CFR 1.19 (Document supply fees)
 37 CFR 1.20 (Post Issuance fees)
 37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	81610_00147_IssueFeeTransmittal.pdf	372479	no	1
			e9cb99db5bada49d6e7e5c2a2d391b99a0b85e0f		

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	29848	no	2
			861494eb6be55b72e0cf8032f7ab39cbb692f3bc		

Warnings:

Information:

Total Files Size (in bytes):	402327
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)

Application Number	15280513
Filing Date	2016-09-29
First Named Inventor	Feng LIU
Art Unit	3673
Examiner Name	Eric J. KURILLA
Attorney Docket Number	81610.00147

Change(s) applied
to document,

/D.M./

4/13/2020

2	20150201760	2015-07-23	Lin, et al. ~~Intex Recreation Corporation~~
3	20150335164	2015-11-26	Liu ~~Bestway Inflatables & Material Corp~~

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1	2914545	FR		2008-10-10	Song Rong		
	2	434098	GB		1933-11-21	P.B. Cow & Company		
	3	2013130117	WO		2013-09-06	Intex Recreation Corporation		

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵
	1	Communication of a notice of opposition dated 27/06/2019 (27 June 2019) on related European patent application 16191360.3 issued by the European Patent Office / Opposition Division	

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/ERIC J KURILLA/	Date Considered	10/01/2019
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Doc code: IDS

PTO/SB/08a (02-18)

Doc description: Information Disclosure Statement (IDS) Filed

Approved for use through 11/30/2020. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)

Application Number	15280513
Filing Date	2016-09-29
First Named Inventor	Feng LIU
Art Unit	3673
Examiner Name	Eric J. KURILLA
Attorney Docket Number	81610.00147

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	4941223		1990-07-17	Santo	
	2	5669091		1997-09-23	Chung	
	3	6568013		2003-05-27	Perez, et al.	
	4	7039972		2006-05-09	Chaffee	
	5	9254047		2016-02-09	Schermel, et al.	

If you wish to add additional U.S. Patent citation information please click the Add button.

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U.S.PATENT APPLICATION PUBLICATIONS						Remove
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
Change(s) applied to document, /D.M./	1	20070277324		2007-12-06	~~Bestway Inflatables & Material Corp.~~ Liu	

4/13/2020



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/280,513	06/23/2020	10687633	81610.00147	1875

35161 7590 06/03/2020
DICKINSON WRIGHT PLLC
1825 EYE ST., NW
SUITE 900
WASHINGTON, DC 20006

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment is 716 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Feng LIU, Shanghai, CHINA;
BESTWAY INFLATABLES & MATERIAL CORP., Shanghai, CHINA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
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In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been
 filed in the U.S. District Court Central District of California on the following

☐ Trademarks or ☒ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO. 2:22-cv-00406	DATE FILED 1/19/2022	U.S. DISTRICT COURT Central District of California
PLAINTIFF BESTWAY (USA), INC., and BESTWAY INFLATABLES & MATERIAL CORP.		DEFENDANT INTEX RECREATION CORP., INTEX DEVELOPMENT COMPANY LTD., INTEX MARKETING LTD., and INTEX INDUSTRIES (XIAMEN) CO., LTD.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 10,687,633	6/23/2020	BESTWAY INFLATABLES & MATERIAL CORP.
2		
3		
4		
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
-------	-------------------	------

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
 Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

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