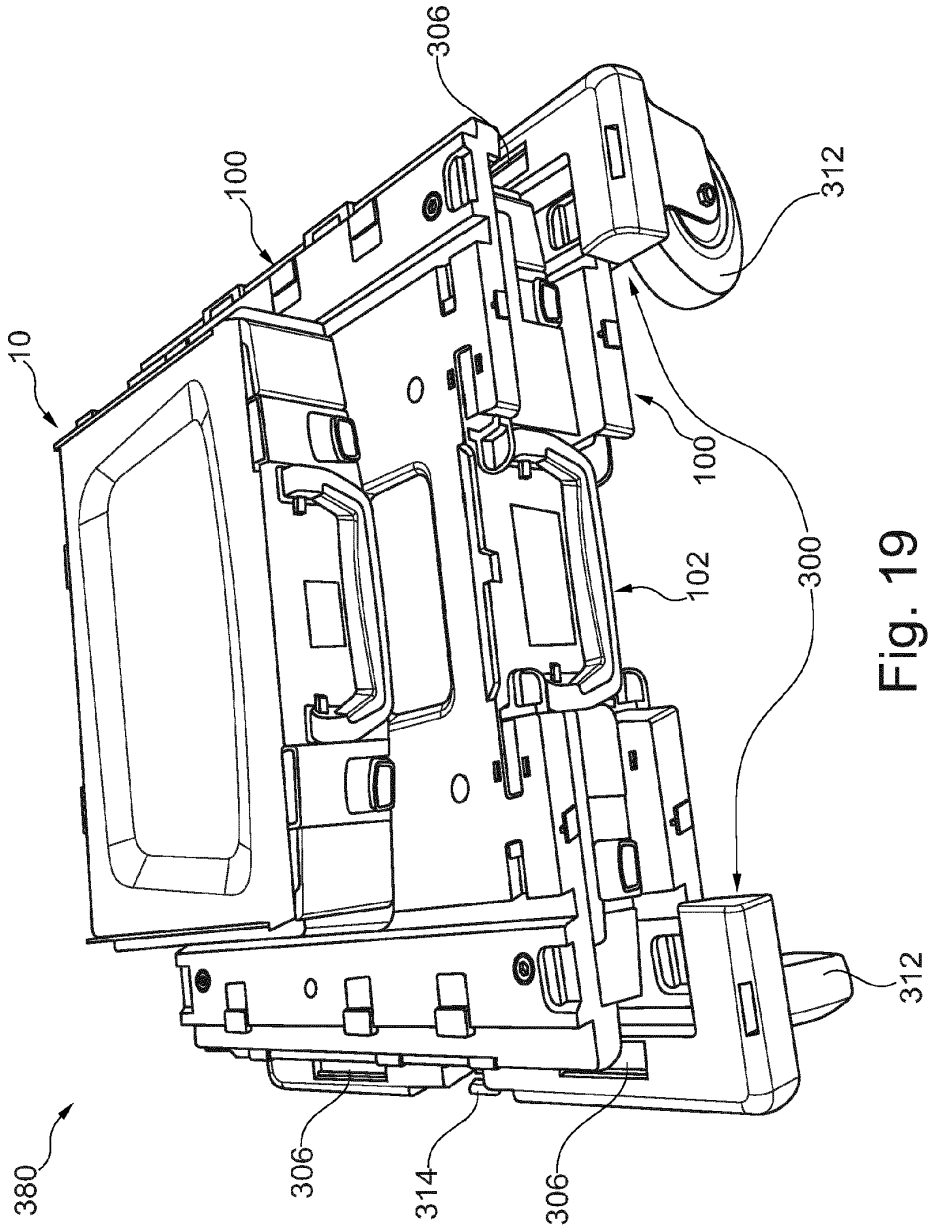


Fig. 19

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2002 - Page 1066
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01400

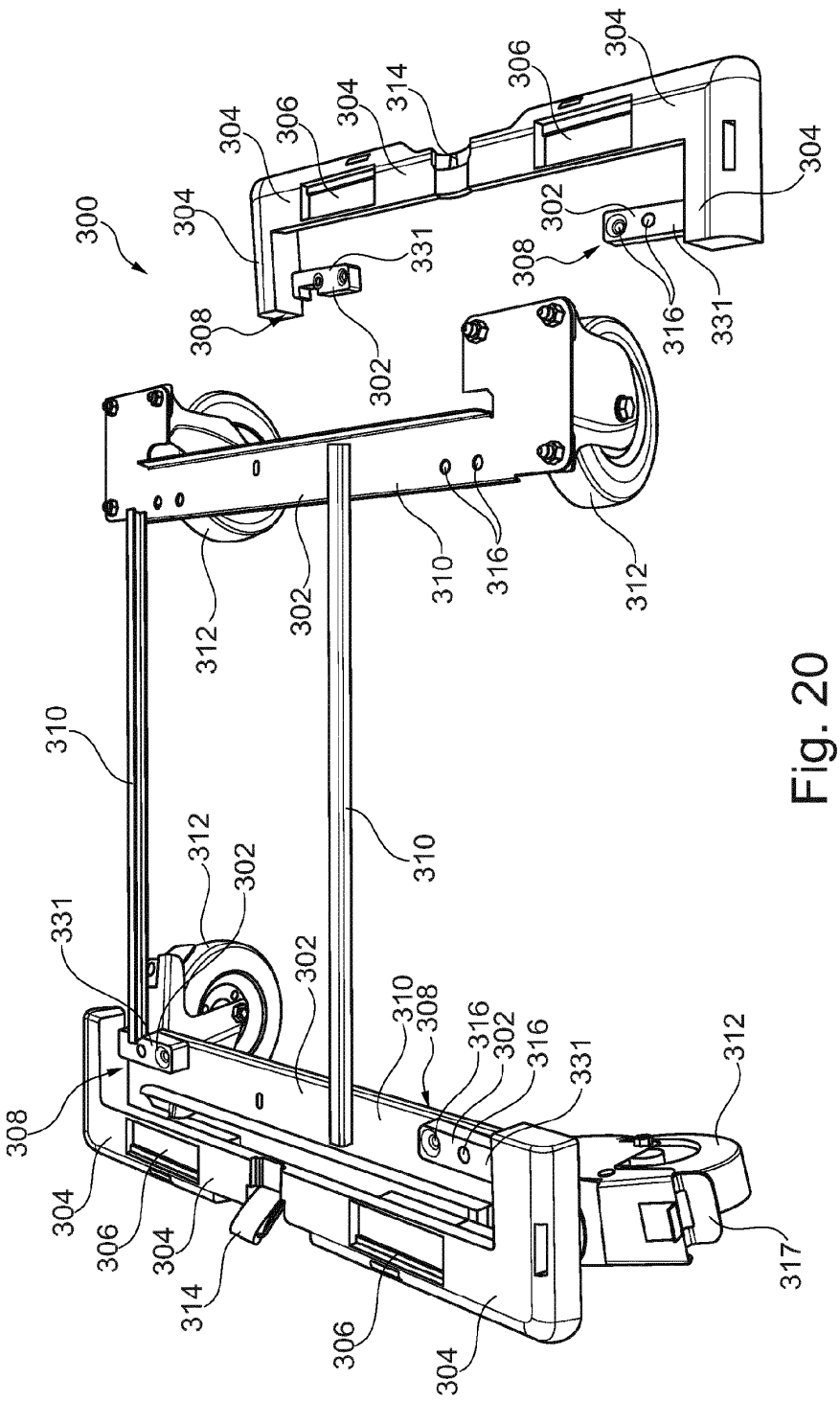


Fig. 20

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2002 - Page 1067
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01400

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPÄISCHER RECHERCHENBERICHT

Nummer der Anmeldung
EP 16 18 4463

EINSCHLÄGIGE DOKUMENTE

Kategorie	Kennzeichnung des Dokuments mit Angabe, soweit erforderlich, der maßgeblichen Teile	Betrifft Anspruch	KLASSIFIKATION DER ANMELDUNG (IPC)
X	WO 2014/177830 A1 (TOOLSTREAM LTD [GB]) 6. November 2014 (2014-11-06) * Seite 1, Absatz 1 * * Seite 9, Absatz 4 - Seite 17, Absatz 1 * * Abbildungen * -----	1-12	INV. B25H3/02
X	EP 2 253 432 A2 (STANLEY WORKS ISRAEL [IL]) 24. November 2010 (2010-11-24) * Absatz [0001] * * Absatz [0008] - Absatz [0024] * * Abbildungen * -----	1-15	
X	US 2014/375181 A1 (BAR-EREZ SHARON [IL] ET AL) 25. Dezember 2014 (2014-12-25) * Absatz [0002] * * Absatz [0049] - Absatz [0053] * * Absatz [0094] - Absatz [0113] * * Abbildungen * -----	1-15	
A	WO 2014/125488 A2 (KETER PLASTIC LTD [IL]) 21. August 2014 (2014-08-21) * Seite 1, Absatz 1 * * Seite 27, Absatz 2 - Seite 30, Zeile 4 * * Abbildungen * -----	1-15	RECHERCHIERTE SACHGEBIETE (IPC) B25H
A	US 7 367 571 B1 (NICHOLS GREGORY ALAN [US]) 6. Mai 2008 (2008-05-06) * Spalte 1, Zeile 21 - Zeile 25 * * Spalte 3, Zeile 10 - Zeile 67 * * Abbildungen * -----	1-15	
A	EP 2 456 341 A1 (KAERCHER GMBH & CO KG ALFRED [DE]) 30. Mai 2012 (2012-05-30) * Absatz [0001] - Absatz [0002] * * Absatz [0007] - Absatz [0045] * * Abbildungen * -----	1-15	
	-/--		

Der vorliegende Recherchenbericht wurde für alle Patentansprüche erstellt

Recherchenort	Abschlußdatum der Recherche	Prüfer
Den Haag	31. Januar 2017	van Woerden, N

KATEGORIE DER GENANNTEN DOKUMENTE

X : von besonderer Bedeutung allein betrachtet
Y : von besonderer Bedeutung in Verbindung mit einer anderen Veröffentlichung derselben Kategorie
A : technologischer Hintergrund
O : nichtschriftliche Offenbarung
P : Zwischenliteratur

T : der Erfindung zugrunde liegende Theorien oder Grundsätze
E : älteres Patentdokument, das jedoch erst am oder nach dem Anmeldedatum veröffentlicht worden ist
D : in der Anmeldung angeführtes Dokument
L : aus anderen Gründen angeführtes Dokument

& : Mitglied der gleichen Patentfamilie, übereinstimmendes Dokument

EPO FORM 1503 03.82 (P04C03)

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2002 - Page 1068
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01400

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPÄISCHER RECHERCHENBERICHT

Nummer der Anmeldung
EP 16 18 4463

EINSCHLÄGIGE DOKUMENTE

Kategorie	Kennzeichnung des Dokuments mit Angabe, soweit erforderlich, der maßgeblichen Teile	Betrifft Anspruch	KLASSIFIKATION DER ANMELDUNG (IPC)
A	WO 2011/103635 A1 (DEMAIN TECHNOLOGY PTY LTD [AU]; VAN DER LINDE BENJAMIN LUKE [AU]; SCRI) 1. September 2011 (2011-09-01) * das ganze Dokument * -----	1-15	

RECHERCHIERTE SACHGEBIETE (IPC)

Der vorliegende Recherchenbericht wurde für alle Patentansprüche erstellt

Recherchenort	Abschlußdatum der Recherche	Prüfer
Den Haag	31. Januar 2017	van Woerden, N

KATEGORIE DER GENANNTEN DOKUMENTE

X : von besonderer Bedeutung allein betrachtet
Y : von besonderer Bedeutung in Verbindung mit einer anderen Veröffentlichung derselben Kategorie
A : technologischer Hintergrund
O : nichtschriftliche Offenbarung
P : Zwischenliteratur

T : der Erfindung zugrunde liegende Theorien oder Grundsätze
E : älteres Patentdokument, das jedoch erst am oder nach dem Anmeldedatum veröffentlicht worden ist
D : in der Anmeldung angeführtes Dokument
L : aus anderen Gründen angeführtes Dokument

& : Mitglied der gleichen Patentfamilie, übereinstimmendes Dokument

EPO FORM 1503 03.82 (P04C03)

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2002 - Page 1069
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01400

ANHANG ZUM EUROPÄISCHEN RECHERCHENBERICHT ÜBER DIE EUROPÄISCHE PATENTANMELDUNG NR. EP 16 18 4463

In diesem Anhang sind die Mitglieder der Patentfamilien der im obengenannten europäischen Recherchenbericht angeführten Patentdokumente angegeben.
Die Angaben über die Familienmitglieder entsprechen dem Stand der Datei des Europäischen Patentamts am
Diese Angaben dienen nur zur Unterrichtung und erfolgen ohne Gewähr.

31-01-2017

Im Recherchenbericht angeführtes Patentdokument	Datum der Veröffentlichung	Mitglied(er) der Patentfamilie	Datum der Veröffentlichung
WO 2014177830 A1	06-11-2014	AU 2014261254 A1	29-01-2015
		CN 104540647 A	22-04-2015
		EP 2872296 A1	20-05-2015
		GB 2517640 A	25-02-2015
		US 2015174756 A1	25-06-2015
		WO 2014177830 A1	06-11-2014
EP 2253432 A2	24-11-2010	AU 2010201747 A1	02-12-2010
		CA 2702102 A1	15-11-2010
		EP 2253432 A2	24-11-2010
		IL 205523 A	30-11-2014
		US 2010290877 A1	18-11-2010
US 2014375181 A1	25-12-2014	US 2014375181 A1	25-12-2014
		US 2015336710 A1	26-11-2015
		US 2016046309 A1	18-02-2016
WO 2014125488 A2	21-08-2014	CA 2900916 A1	21-08-2014
		CN 105121763 A	02-12-2015
		EP 2956606 A2	23-12-2015
		US 2015376917 A1	31-12-2015
		WO 2014125488 A2	21-08-2014
US 7367571 B1	06-05-2008	KEINE	
EP 2456341 A1	30-05-2012	CN 102469899 A	23-05-2012
		DK 2456341 T3	18-11-2013
		EP 2456341 A1	30-05-2012
		RU 2012105755 A	27-08-2013
		US 2012180250 A1	19-07-2012
		WO 2011009480 A1	27-01-2011
WO 2011103635 A1	01-09-2011	AU 2011220337 A1	11-10-2012
		CA 2828226 A1	01-09-2011
		CN 102844155 A	26-12-2012
		EP 2539113 A1	02-01-2013
		JP 2013520324 A	06-06-2013
		WO 2011103635 A1	01-09-2011

EPO FORM P0461

Für nähere Einzelheiten zu diesem Anhang : siehe Amtsblatt des Europäischen Patentamts, Nr.12/82

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2002 - Page 1070
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01400

IN DER BESCHREIBUNG AUFGEFÜHRTE DOKUMENTE

Diese Liste der vom Anmelder aufgeführten Dokumente wurde ausschließlich zur Information des Lesers aufgenommen und ist nicht Bestandteil des europäischen Patentdokumentes. Sie wurde mit größter Sorgfalt zusammengestellt; das EPA übernimmt jedoch keinerlei Haftung für etwaige Fehler oder Auslassungen.

In der Beschreibung aufgeführte Patentdokumente

- EP 2315701 A **[0002]**
- DE 19900361 **[0002]**
- EP 1238602 A **[0002]**

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2002 - Page 1071
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01400

(12) UK Patent (19) GB (11) 2 047 181 B

(54) Title of invention

Container for handling or storing articles

(51) INT CL^3; **B62B 3/00**

(21) Application No
8009597

(22) Date of filing
21 Mar 1980

(30) Priority data

(31) **7910789**

(32) **27 Apr 1979**

(33) **France (FR)**

(43) Application published
26 Nov 1980

(45) Patent published
2 Feb 1983

(52) Domestic classification
B7B TN
B8H QG
U1S 1723 1727 B7B B8H

(56) Documents cited
None

(58) Field of search
B7B
B8H
E2A

(73) Proprietor
Ateliers Reunis,
(France),
13 rue de la Mairie,
Schiltigheim,
Bas-Rhin,
France.

(72) Inventors
Marc Levy-Joseph

(74) Agents
Matthews Haddan and Co.,
Haddan House,
33 Elmfield Road,
Bromley,
Kent BR1 1SU.

GB 2 047 181 B

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2002 - Page 1072
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01400

Fig:1

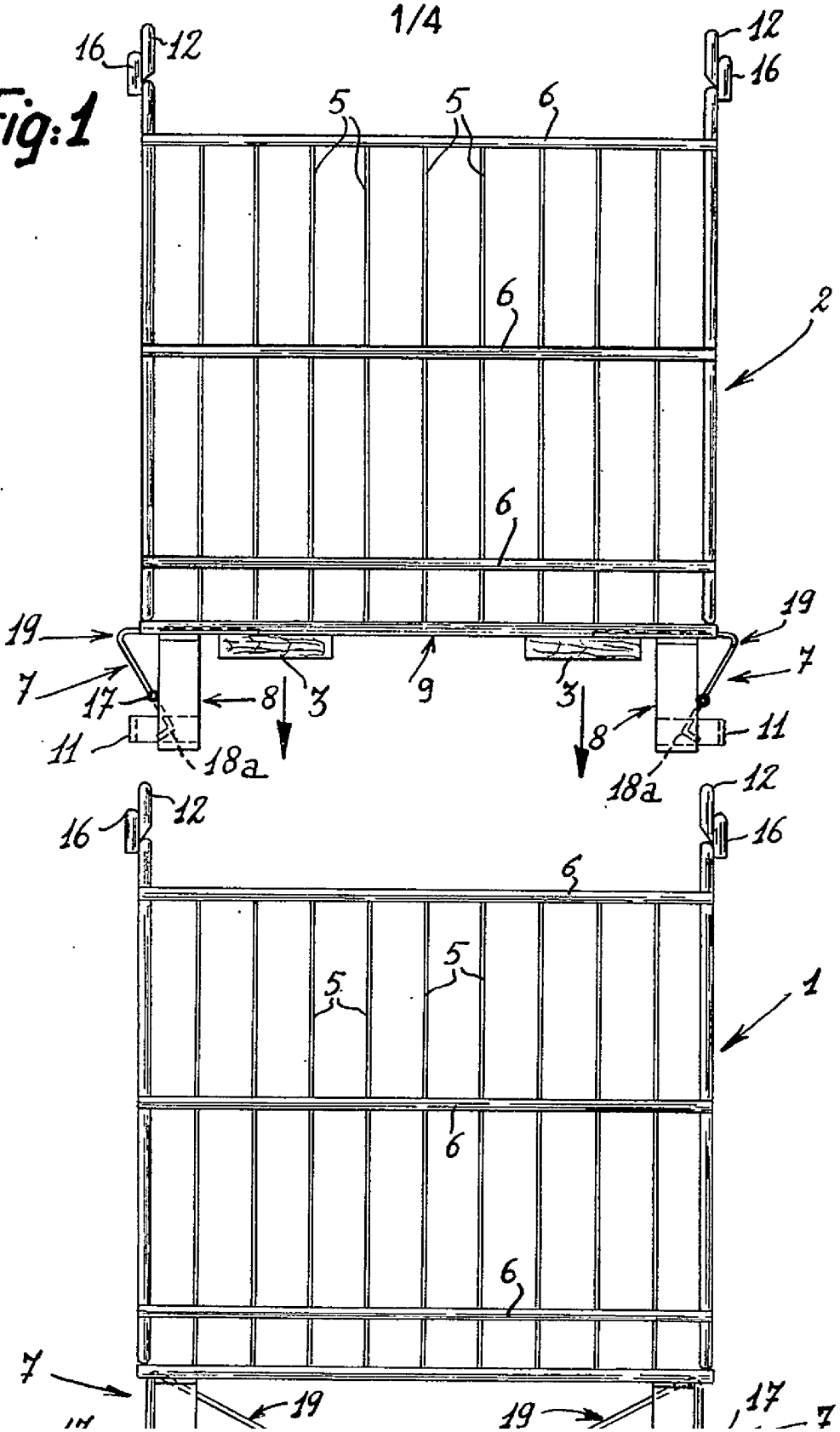
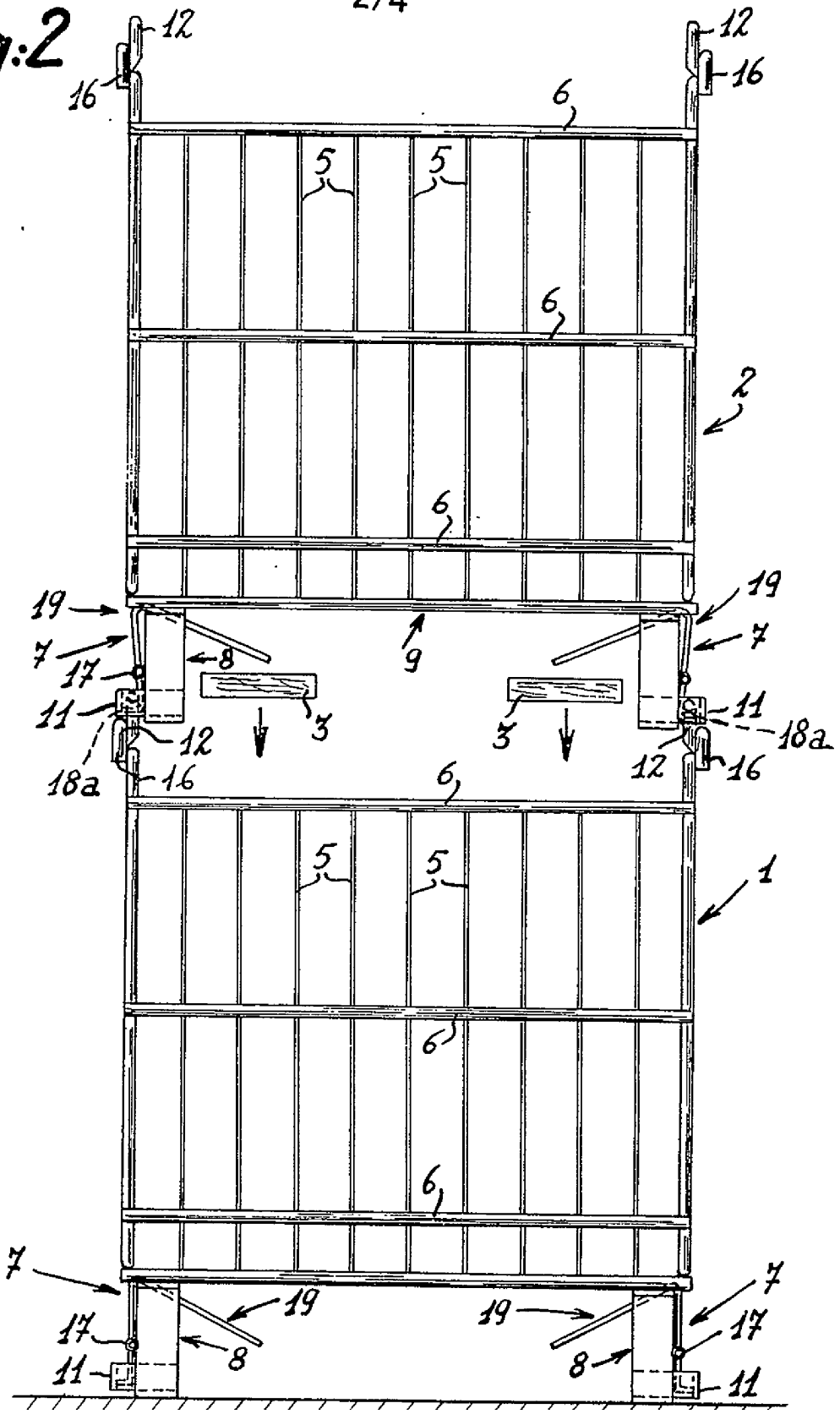

16
12
5
5
6
12
16
2
6
6
19
19
7
7
17
8
3
9
3
8
11
11
18a
18a
12
16
16
12
6
5
5
1
6
6
7
19
19
17
7

Fig:2


12
16
6
5
5
6
2
6
19
19
7
7
17
8
9
11
11
3
3
12
18a
12
16
18a
6
5
5
1
6
6
7
7
19
19
17
17
8
8
11
11

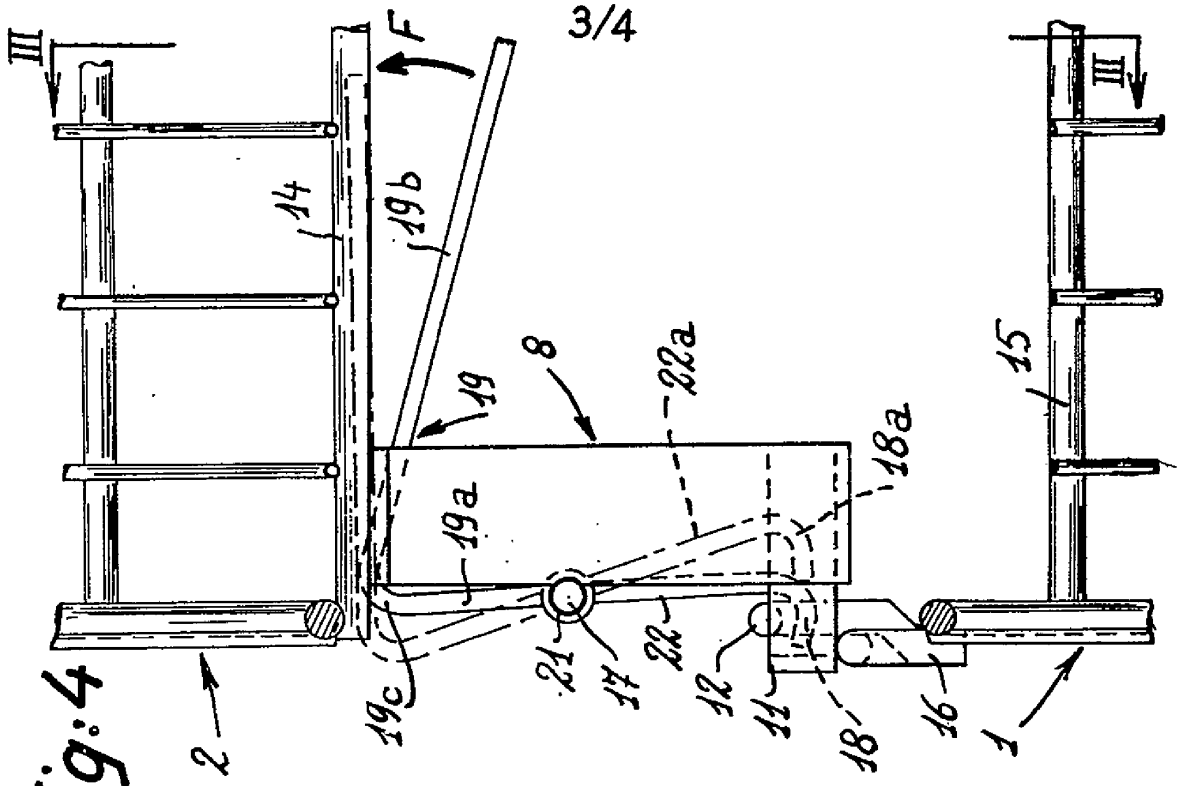

III
F
14
19b
19
8
22a
18a
15
19a
19c
21
17
22
12
11
18
16
1
2

Fig.4

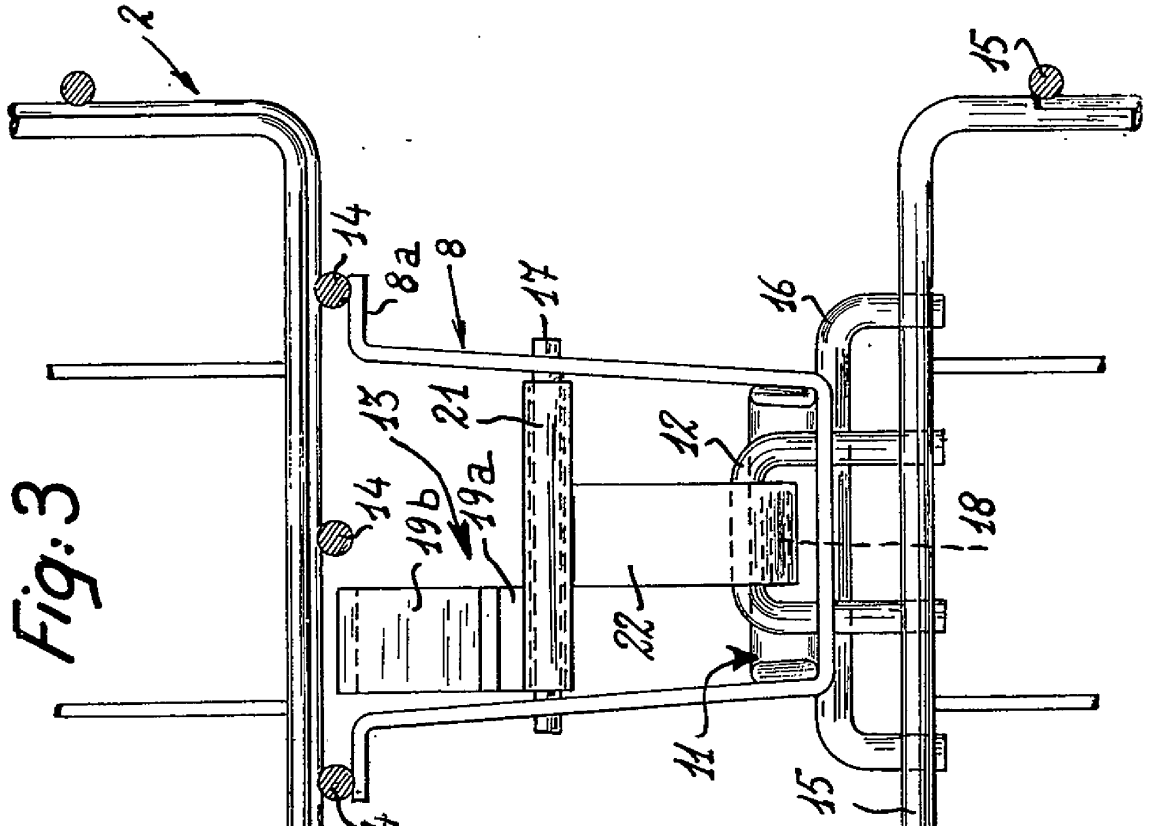
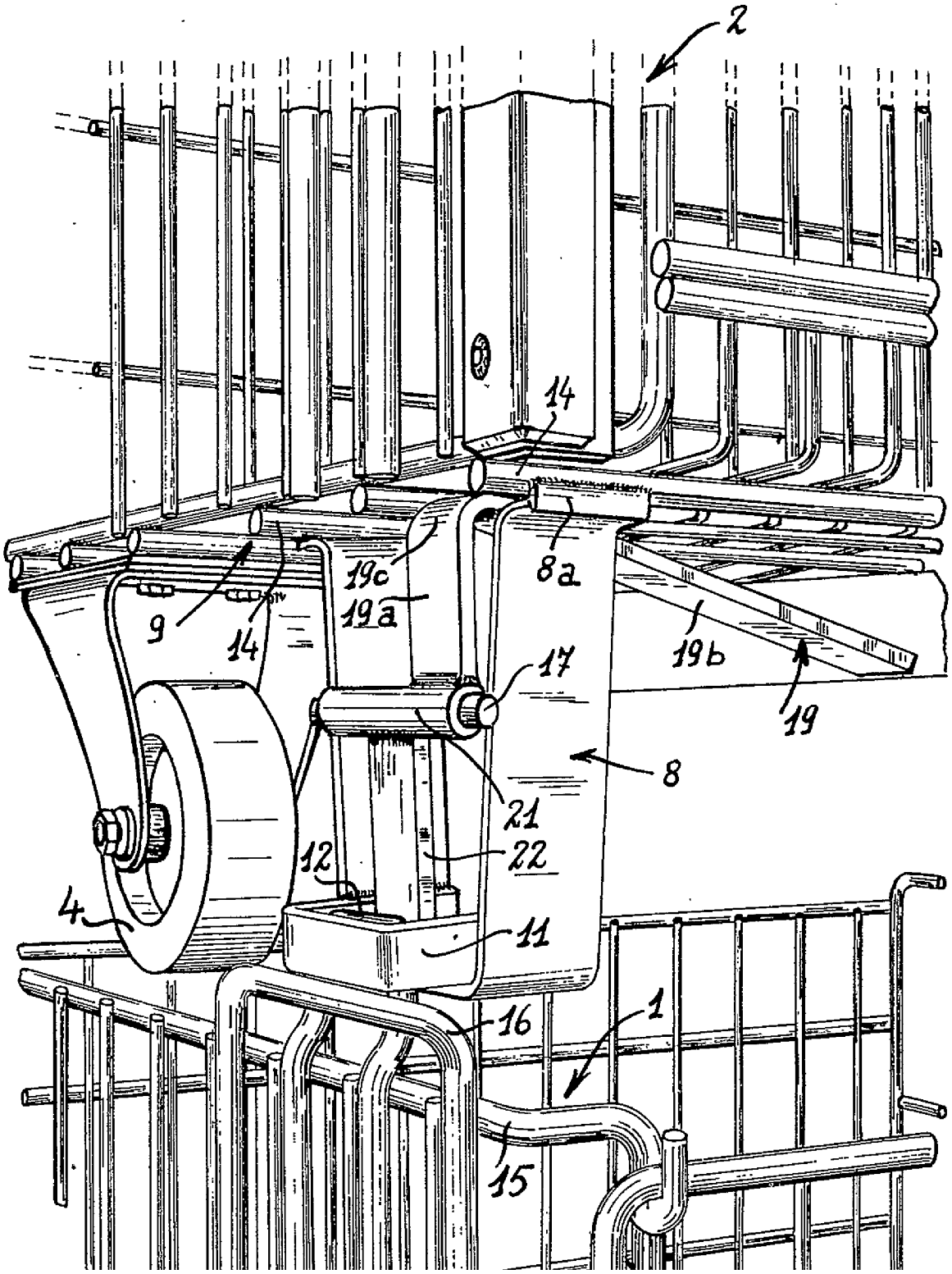

2
15
14
8a
8
17
16
13
21
12
14
19b
19a
18
22
11
15

Fig.3

Fig. 5



Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2002 - Page 1076
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01400

SPECIFICATION

Container for handling or storing articles

The present invention relates to a container for handling or storing articles such as non-rolling baskets, rolling carts, and the like. It is known that such containers are provided at their bottom with four legs or shoes when these structures (designated hereinafter by the generic term "container") have to be superposed to one another to form vertical piles. The function of these legs is to enable the stacked container to bear upon the underlying supporting container, and furthermore these containers are provided at their top with adequate support means adapted to receive the legs of the next overlying container.

In the case of rolling containers, the legs have a reduced height to permit the movement of the container. This vertical difference between the legs and the wheels of the cart or rolling crate is more or less pronounced according to the floor unevennesses to be encountered in actual use, so as to avoid any detrimental frictional contacts or shocks with obstacles likely to arise on the path of the travelling container. Under static pile-up conditions the essential requirements, consisting simply in properly positioning the stacked containers in relation to one another, are safely met by using these known superposing means.

In contrast thereto, when it is desired to move an assembly comprising at least two stacked containers either by pulling them, if they are provided with casters, or by using a fork-lift truck if they are simply supported by legs, the superposition devices must be capable of reliably holding the assembly to prevent the topmost containers from tipping.

It is therefore the primary object of the present invention to provide means for locking the upper container in its stacked position, thus permitting the safe handling of an assembly of at least two stacked containers while eliminating any risk of tipping the upper-most containers during the transport.

According to the present invention we provide a container for handling or storing articles having means for connecting it to a lower container comprising at least two systems disposed at opposed corners of the container, each locking system comprising a leg rigidly assembled with the bottom of the container, this leg being provided at its lower end with a strap adapted to fit around an anchoring member rigid with the lower container, so as to lock laterally the upper container, and a locking member pivotally mounted to the leg in order to lock automatically, in the vertical direction and by simple gravity, the strap of this leg about the anchoring member of the lower container when the upper container is stacked upon the lower container.

According to a typical form of embodiment of the invention, the shoe has substantially the shape of a vertical "U", and the strap has substantially the shape of a horizontal "U" and is secured to the base of the relevant leg, so that the anchoring member of about a horizontal pivot rod secured across the leg and comprises an end hook adapted to engage the aforesaid anchoring member and to lock the stacked container thereon as a consequence of the free pivotal movement or tipping of the locking member about said pivot rod.

Thus, when the container or cart provided with at least two systems of this character, dsposed at two diagonally opposed corners of the bottom of the container or cart, is piled upon another similar container or car, the straps are caused to fit around the corresponding pivot rod, and the locking member is caused to pivot about the rod, so that its hook portion will penetrate into the anchoring member and into the strap, whereby the upper container is firmly locked in relation to the lower container by means of said locking hooks.

According to a preferred form of embodiment, the locking member comprises above the end hook a bent lever having its lower portion rigid with a transverse socket rotatably mounted about the pivot rod secured to the shoe, and a rocker rigid with the socket and formed at its lower end with the aforesaid locking hook. In this arrangement, the bent lever extends at right angles to the axis of rotation and its length is sufficient for automaically causing the locking member assembly to tilt by gravity about the pivot rod to the locking position in which the end hook fits into the anchoring member and abutes the strap.

Under these conditions, it is evident that during the stacking operation the locking member must be held in its release position, with the hook member retracted in relation to the anchoring member, so that the strap can fit around this member. When the upper container is laid uppon the support means of the lower container, the locking members are allowed to drop and tilted by simple gravity until the corresponding hooks assume their locking positions.

The stacked upper container is thus firmly anchored to the lower or supporting container so that the assembly can safely b moved either by pulling same, in the case of rolling carts, or by hoisting by means of handling forks in the case of non-rollig containers.

Other features and advantages characterizing this invention will appear as the following detailed description proceeds with reference to the accompanying drawings illustrating diagrammatically by way of example a typical form of embodiment of the stacking and interlocking device according to the present invention. In the drawings:

Figure 1 is an elevational view showing two stacked containers, the upper one being shown somewhat spaced above the lower or bottom container by suitable hoisting means such as a fork-lift truck;

Figure 2 is an elevational view similar to Figure 1, showing the upper container supported by, and locked in relation to, the lower container;

Figure 3 is enlarged view taken in the direction of the arrow III-III of Figure 4, showing means for locking the stacking device equipping each container

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2002 - Page 1077
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01400

of the lower container;

Figure 4 is a side elevational view showing the locking device of Figure 3, the locking member being shown in phantom lines in its retracted position, and

Figure 5 is a fragmentary perspective view of adjacent top and bottom corners of stacked containers, the upper container being provided with a locking system of the type illustrated in Figures 1 to 4.

Referring first to Figure 1, overlying the lower container 1 is a similar container 2 to be stacked thereupon, this upper container 2 being held in the position illustrated by the fork arms 3 of a lift truck (not shown). In the example illustrated and described herein, the containers 1 and 2 are of the rolling basket type provided with casters 4 shown in Figure 5 and omitted from the other views in order to avoid any undue complication in the drawing. These containers are of the crate or skeleton type currently used for handling and storing miscellaneous articles in shops, stores or warehouses. In a manner known per se, the walls of these containers or rolling baskets or crates consist of metal wire netting comprising vertical wires 5 to which horizontal wires 6 are welded to constitute the side walls and the bottom of a rectangular parallelipipedic container 1, 2.

Each container 1, 2 is provided with a device permitting the stacking and interlocking thereof on another similar container. This device, as shown in the exemplary form of embodiment shown in the accompanying drawings, comprises four locking systems 7 for locking the stacked or upper container in relation to the underlying container, each system being disposed at one corner of the bottom of the container 1 or 2.

More particularly, each locking system 7 comprises firstly a leg 8 rigidly secured to the bottom wall 9 of container 1, 2 and supporting at its lower end a strap 11 adapted to fit around an anchoring member 12 rigid with the underlying container, and a locking member 13 pivoted to the leg 8 so as to lock automatically the strap 11 about the anchoring member 12 when the upper container 2 is stacked upon the lower container 1.

In the example illustrated, the leg 8 consists of a substantially vertical U-shaped member without outwardly bent upper ends 8*a* welded to a pair of registering transverse horizontal metal wires 14 of the bottom structure 9 (Figure 3).

The strap 11 is a U-shaped member disposed substantially horizontally, with its side arms positioned between the side walls of leg 8 and at the base thereof, the strap 11 being secured to the leg 8 by welding, in this example, and so positioned as to protrude laterally and outwardly from the leg 8, thus permitting the ingress of anchoring member 12 into this strap.

The anchoring member 12 consists of a bridge piece having the shape of an inverted U and its side arms welded to an upper horizontal wire 15 of the lower container 1. In addition, the bridge piece 12 is associated with an elongated support 16 rigid with wire 15 thereof, so that the corresponding strap 11 of the upper container can bear directly upon this support 16.

The locking member 13 is fulcrumed about a horizontal pivot rod 17 secured across the leg 8, substantially at mid-height and to the outer edges of the leg sides; this locking member 13 further comprises a lower end hook 18 adapted to engage the anchoring member 12 beneath the transverse horizontal element thereof, thus safely locking the upper stacked container (2, in the example illustrated in the drawing) on its support 16, simply as a consequence of the free tilting movement of locking member 13 about pivot rod 17.

In fact, this locking member 13 comprises, above the upwardly bent end hook 18, an extension in the form of a lever 19 having a relatively short arm 19*a* and an elongated arm 19*b* forming a predetermined angle between them, the shorter arm 19*a* being rigid at its lower end with a transverse horizontal socket 21 rotatably mounted on pivot rod 17. The socket 21 is rigid in turn with a rocker 22 having its lower end bent to constitute said locking or retaining hook 18, said rocker 22 being set off laterally in relation to the bent lever 19, as clearly shown in Figure 3. The lever 19 extends substantially at right angles to the pivot rod 17 and the length of its inwardly directed elongated arm 19*b* is sufficient for causing the locking member assembly 13 to tilt automatically by gravity about the pivot rod 17 to the locking position in which the hook portion 18 engages from beneath the horizontal element of the anchoring bridge piece 12, and eventually abutes the strap 11 (Figures 4 and 5).

The angular relationship between the elongated arm 19*b* and the short arm 19*a* is less than 90° and so determined that when the elongated arm 19*b* is moved upwards in the direction of the arrow F of Figure 4 from its locking position, substantially up to the level of the bottom 9 of the corresponding container, the rocker 22 and its hook 18 are pivoted to a retracted position inside the leg 8, as shown in phantom lines at 22*a* and 18*a* in Figure 4. In this retracted position, it will be seen that after having pivoted about the pivot rod 17 through an angle equal to the angular amplitude of the upward movement of said elongated arm 19*b*, the locking hook 18*a* is released from the anchoring member 12 and thus the upper or stacked container 2 can be lifted off the lower or supporting container 1.

In the example described hereinabove it is assumed that the leg 8 consists of a piece of flat iron bent to a U configuration with slightly divaricated side arms, but it will readily occur to those conversant with the art that this leg could be made in any other equivalent or known manner.

Preferably, the bent lever 19 is positioned between a air of adjacent transverse wires 14 of the bottom 9, so that these wires cannot interfere with its tilting movement from one to the other of its end positions, whereby the bent portion 19*c* of lever 19 can be disposed substantially level with the wires 14 (Figure 3).

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2002 - Page 1078
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01400

locking systems 7 disposed at the four corners thereof, respectively, and at its top with four corresponding pairs of coupled elements, comprising each an anchoring bridge piece 12 and an elongated support 16, adapted to be engaged by and to support the upper stacked container.

The stacking device, comprising the four locking systems 7 and its matching bearing and anchoring members 12 and 16, operates as follows:

Assuming that the lower container 1 lies on the floor, the four locking members 13 of its stacking and interlocking device are held by gravity their lower or locking position (see Figures 1 and 2), due to the weight of their elongated arms 19b holding the end hooks 18 in abutment against the straps 11 in a locking position, as already explained in the foregoing.

To stack another container 2 upon this container 1, the fork arms 3 of a fork-lift truck are inserted under the bottom 9 and the truck is actuated to bring the container 2 to a position in which it overlies the first container 1, as shown in Figure 1, with the four straps 11 disposed just above the corresponding anchoring bridge pieces 12 of lower container 1. Fork means 3 are positioned under the four levers 19 and raised so that the elongated arms 19*b* therof are moved to their upper portion (shown in phantom lines in Figures 1, 2 and 4), and that the four hooks 18 are retracted correlatively between the sides of legs 8, thus permitting of fitting the four straps 11 about the four bridge pieces 12 and bringing said straps into bearing engagement with the elongated support members 16 of the lower container 1.

When the forks 3 are subsequently lowered (Figure 2), the elongated arms 19*b* are allowed to drop by gravity, thus causing the locking members 13 to tilt about their pivot rods 17 to the positions shown in Figures 2 to 5, in which the hooks 18 engage from beneath the horizontal elements of anchoring members 12 until they abute the transverse elements of straps 11, at the end of the rotatonal movement of levers 19 and rockers 22 about said pivot rods 17.

The upper container 2 now superposed to the lower container 1 is thus safely anchored to the latter by virtue of its four locking members 13 cooperating with the four corresponding anchoring members 12 or container 1. Thus, any risk of tipping the upper container 2 during the handling of the two superposed and interlocked containers 1, 2 is safely avoided.

The invention should not be construed as being limited by the specific form of embodiment described hereinabove and illustrated in the accompanying drawings, since various modifications and changes may be brought thereto without departing from the basic principles of the invention. Thus, non-rolling containers provided only withlegs 8 may be equipped with the device of this invention, and the number of locking systems 7 in the stacked position may be reduced to only two disposed diagonally at opposed corners of the base 9. Likewise, the legs 8 may be secured to the metal wires of the base 9, or more generally to the base of the example illustrated). The straps 11 may also be fastened to the legs 8 by using any other suitable means, in lieu of welding, for example by means of screws or rivets.

CLAIMS

1. A container for handling or storing articles having means for connecting it to a lower container comprising at least two locking systems disposed at opposed corners of the container, each locking system comprising a leg rigidly assembled with the bottom of the container, this leg being provided at its lower end with a strap adapted to fit around an anchoring member rigid with the lower container, so as to lock laterally the upper container, and a locking member pivotally mounted to the leg in order to lock automatically, in the vertical direction and by simple gravity, the strap of this leg about the anchoring member of the lower container when the upper container is stacked upon the lower container.

2. A container according to claim 1, wherein the leg has substantially the shape of a vertical "U" and the strap has substantially the shape of a horizonatl "U" so secured to the base of the leg that the anchoring member of the lower container can penetrate into this strap, the locking member, pivotally mounted above a horizontal pivot rod secured transversally to the leg, being provided with an end hook adapted to engage the anchoring member so as to lock the upper container to its support as a consequence of the simple gravity-controlled tilting movement of the locking member about the pivot rod.

3. A container according to claim 2, wherein the upper end of the container has an anchoring member consisting of a bridge piece of which the transverse element can be engaged from underneath by the corresponding locking hook of the locking system of an upper container.

4. A container according to any of claims 2 or 3, characterized in that the locking member comprises above its end hook a bent lever of which the lower portion is rigid with a transverse socket rotatably mounted about the pivot rod secured to the leg, and an rocker rigid with the socket and terminating at its lower end with a locking hook, the bent lever extending at right angles to the pivot axis and having a length sufficient to cause the locking member assembly to tilt about the pivot rod by gravity to its locking position in which the hook penetrates into the anchoring member and abuts the strap.

5. A container according to claim 4, wherein the bent lever is comprised or a relatively short arm rigid with the socket and of an elongated arm, set in a predetermined angular relationships, whereby raising the elongated arm substantially to the level of the bottom of the container will cause the rocker to tilt and its end hook to assume a retracted position inside the leg, in which the hook is released from the anchoring member and the container can be lifted off the lower container.

6. A container according to any of claims 3 to 5.

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2002 - Page 1079
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01400

container, whereby the strap of the corresponding system for locking an upper container can bear upon this support.

7. A container according to any of claims 1 to 6, wherein the leg consists of a flat iron bent to a "U" shape and has its upper ends rigidly assembled with the base of the container, for example by welding, and the corresponding strap consists of a separate element fastened to the leg by welding, screwing or riveting.

8. Device for stacking up and interlocking handling containers substantially as described with reference to the accompanying drawings.

Printed for Her Majesty's Stationery Office, by Croydon Printing Company Limited, Croydon, Surrey, 1983.
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2002 - Page 1080
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01400

(12) UK Patent Application (19) GB (11) 2 406 331 (13) A

(43) Date of A Publication 30.03.2005

(21) Application No: 0322207.2

(22) Date of Filing: 23.09.2003

(71) Applicant(s):
Julian Clifford Jeffries
423 Barnacres Road, Nash Mills,
HEMEL HEMPSTEAD, Hertfordshire,
HP3 8JR, United Kingdom

(72) Inventor(s):
Julian Clifford Jeffries

(74) Agent and/or Address for Service:
Julian Clifford Jeffries
423 Barnacres Road, Nash Mills,
HEMEL HEMPSTEAD, Hertfordshire,
HP3 8JR, United Kingdom

(51) INT CL[7]:
B25H 3/02 , A47L 9/00

(52) UK CL (Edition X):
B8P PP
A4F FC
U1S S1679

(56) Documents Cited:

GB 2330521 A	**GB 2226009 A**
GB 0669893 A	**EP 0916302 A3**
US 3099398 A	**US 2534122 A**

(58) Field of Search:
UK CL (Edition W) **A4F** FC, **B8P** PAX PP
INT CL[7] **A47L** 9/00, **B25H** 3/00 3/02 3/04 3/06
Other: **ONLINE:WPI,EPODOC,JAPIO**

(54) Abstract Title: **Toolbox and vacuum cleaner**

(57) A toolbox comprises a first housing module (1) for accommodating tools and a second housing module (2) within which is housed a vacuum cleaner the first module (1) lying against and being demountably coupled to the second module (2) so that the user may conveniently carry the vacuum cleaner assembled together with the first module (1) and, when required, the second module (2) may be demounted from the first module to enable the vacuum cleaner to be used wholly independently of the first module.

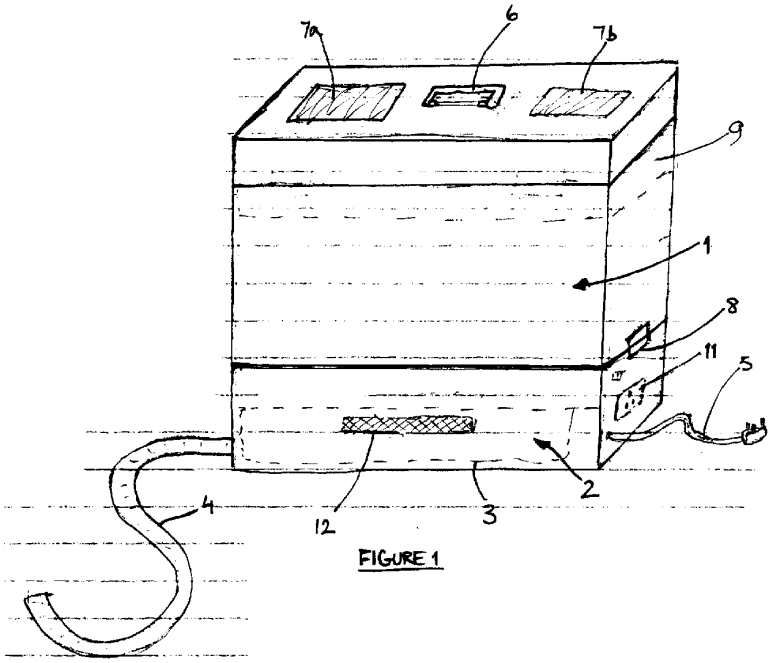


FIGURE 1

GB 2 406 331

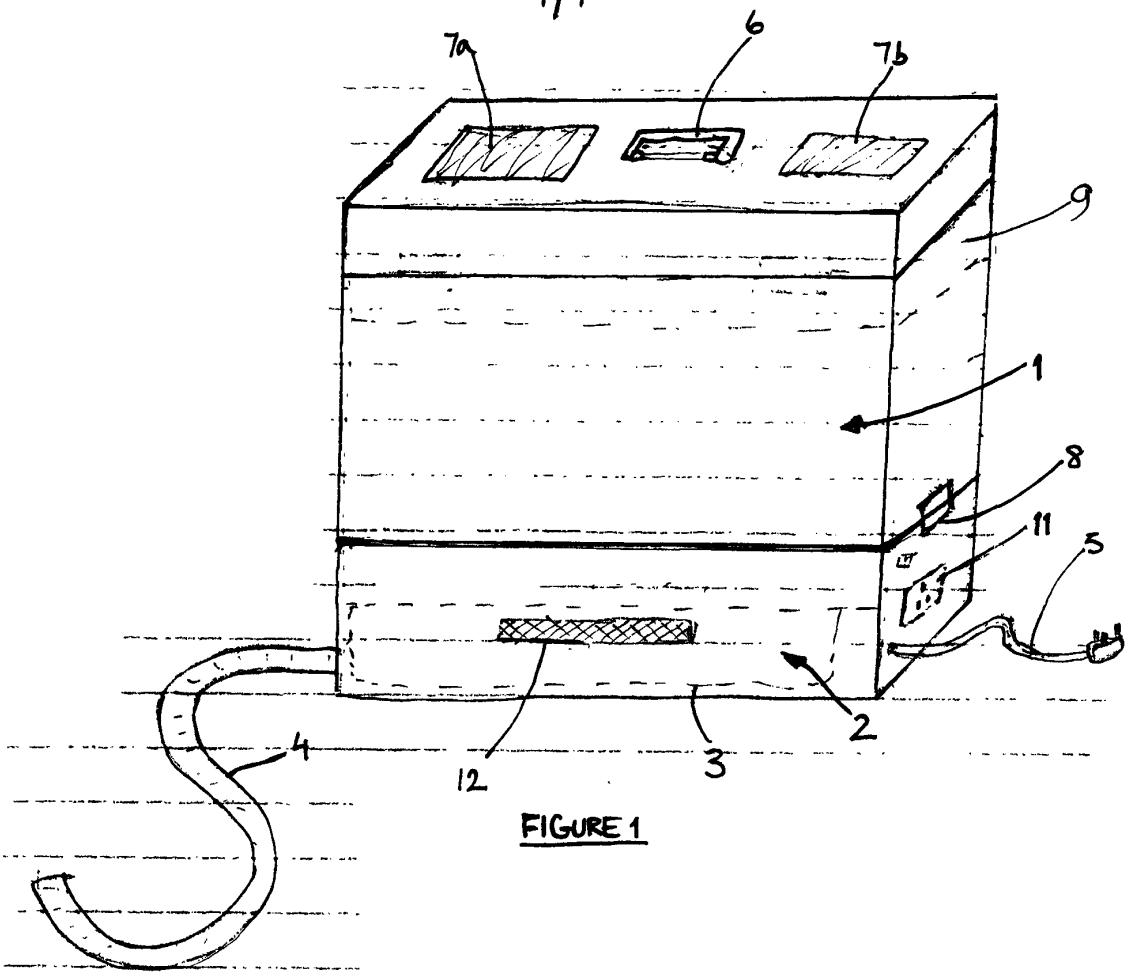


FIGURE 1

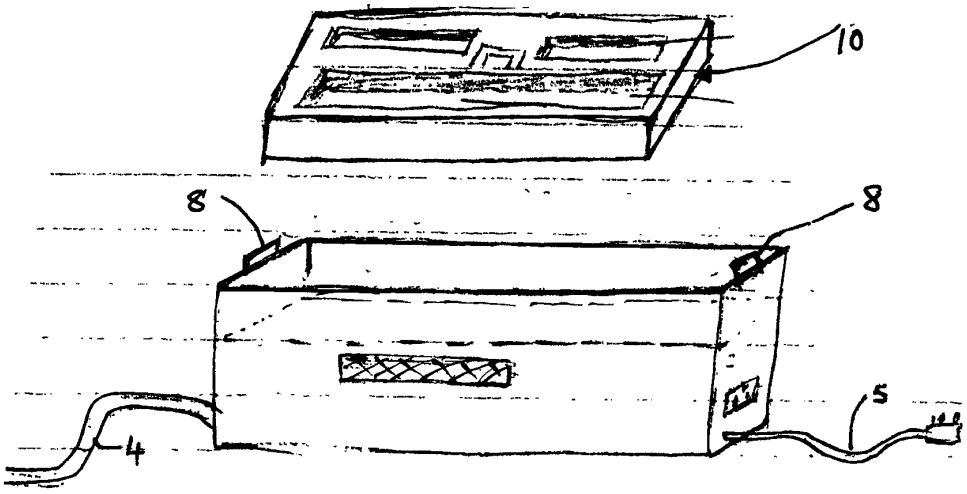


FIGURE 2

IMPROVED TOOLBOX

Field of the Invention

The present invention relates to an improved toolbox that is especially useful for tradesmen such as plumbers and electricians who must carry their tools from site to site.

Background to the Invention

Tradesmen such as electricians, plumbers and carpenters all rely upon a range of different tools in order to carry out their trade and generally carry around a portable toolbox housing many of their most frequently used tools while having an even bigger selection of tools available in the rear of their van or workshop premises. Since most jobs to be carried out are within domestic or commercial premises remote from the van or workshop, the portable toolbox is a vital piece of equipment to enable a job to be carried out efficiently, saving the tradesman from making repeated trips to and from his van or workshop.

The nature of the tools carried by the tradesman ranges from drills with assorted bits, screwdrivers, wrenches, clamps, bending and cutting equipment and the components or spare parts for common jobs, with the items required varying from trade to trade. One item of equipment that commonly is required by all trades, however, is a vacuum cleaner, which by its nature is normally bulky and would need to be carried by the workman either in one hand while carrying the toolbox in his other hand or else carried to or from the van in an additional trip.

Summary of the Invention

According to the present invention there is provided a toolbox which comprises a rigid housing formed of a first housing module for accommodating tools and a second housing module within which is housed a vacuum cleaner, the first module lying against and being demountably coupled to the second module so that the user may conveniently carry the vacuum cleaner assembled together with the first module and, when required, the second module may be demounted from the first

module to enable the vacuum cleaner to be used wholly independently of the first module.

Preferably the first housing module is an upper housing module that is mounted on top of the second / lower housing module.

Particularly preferably the upper module of the toolbox is adapted to serve as a stable level platform for the workman to stand on and suitably may be used as such when assembled to the lower module and when demounted from the lower module.

Suitably the toolbox further is provided with an electrical plug socket and the toolbox may serve as an electrical power extension unit to enable one or more electrical power tools to be coupled to mains electricity via the toolbox.

Suitably an electrical cable extending from the toolbox to plug into a mains socket to power the vacuum cleaner also supplies electrical power to the power extension socket of the toolbox.

Usefully, the power extension socket of the toolbox may also serve as a temporary home for parking the electrical plug of the vacuum cleaner when the vacuum cleaner and electrical socket are otherwise not in use.

Brief Description of the Drawings

A preferred embodiment of the present invention will now be more particularly described, by way of example, with reference to the accompanying drawings, wherein:

Figure 1 is a perspective view of the preferred embodiment of the toolbox with upper and lower modules assembled together;

Figure 2 is a perspective view of the lower module and of an overlying tray of the lower module, the upper module having been removed; and

Figure 3 is an end elevation view of the assembled tool box.

Description of the Preferred Embodiment

As shown in the figures, the preferred embodiment of the toolbox comprises an upper module 1 and a lower module 2 where the lower module 2 accommodates a vacuum cleaner 3 having a vacuum hose 4 extending from one end of the lower module 2 and an electrical mains power supply cable 5 with 13 amp plug extending from the other end of the lower module 2. One or both of the vacuum hose 4 and electrical power supply cable 5 may be retractable into the lower module 2. The lower module 2 has an air vent grille 12 in a sidewall.

The toolbox as a whole is suitably formed of a strong rigid plastics material construction and may, for example, be of nylon or ABS but could be a metal box construction. As assembled, the toolbox is carryable by means of a handle 6 on the upper face of the upper module 1 and may be carried by a user with only one hand instead of having to carry a toolbox and vacuum cleaner in separate hands.

The upper module 1 and the vacuum cleaner housed in the lower module 2 may be used entirely independently of each other when required so that the user may organise his resources to suit the workspace available and is able to far more easily move about the vacuum cleaner 3 for cleaning up than would be the case if the vacuum cleaner housing lower module 2 still remained coupled to the upper module 1. This ability to demount the primary tool-carrying upper module 1 from the vacuum cleaner-housing lower module 2 makes the improved toolbox a practical, versatile facility.

As further shown in Figure 1, the upper face of the upper module 1 incorporates foot pad surfaces 7a, 7b. The toolbox may serve as a stable level platform on which the workman may stand and this platform is functional even when the upper module 1 is demounted from the lower module 2 and used independently. Thus the toolbox of the present invention not only serves as a toolbox and as a vacuum cleaner but also as a dual height platform, being of maximal height when the upper and lower modules 1, 2 are assembled together or of lesser height when the upper module 1 is demounted from the lower module 2.

The demountable nature of the upper module 1 and lower module 2 is suitably achieved through provision of latches/catches 8 with suitably one on each end or each side of the toolbox to extend between the upper module 1 and lower module 2. These latches or catches 8 are easily disengagable when required but provide a firm and secure coupling of the upper and lower modules 1,2 when the toolbox is fully assembled. As shown in Figure 2, the latches/catches 8 are suitably provided on the lower module 2 to engage with the upper module 1. The latches/ catches 8 may also be part of or double as handles, or separate handles may be provided adjacent them to facilitate carrying the vacuum cleaner lower module 2 on its own.

In common with most toolboxes, this toolbox suitably has a number of tool-holding trays that may be lifted out if required. One such tray 9 is generically illustrated as being provided in the upper module 1 and a second such tray 10 is illustrated as being provided to be mounted at the top of the lower module 2. Nevertheless, the primary tool holding capacity of the toolbox is in the upper module 1.

As mentioned, a further facility of the improved toolbox is the provision of an electrical plug socket 11 in one end of the toolbox and which enables the toolbox to function as an electrical power extension unit drawing power from a mains source via the electrical power cable 5. This electrical power socket 11 may also serve as a park for the electrical plug when it is uncoupled from the mains supply.

In light of the above description it will be appreciated that the toolbox of the present invention is highly efficient and in practice saves the workman a great deal of time and is far easier to carry and use than any conventionally available equipment. The capacity of the toolbox is maximised without compromising the portability of the vacuum cleaner through making the primary toolbox module 1 readily demountable from the vacuum cleaner holding lower module 2. Furthermore, the ability to use the upper module 1 as a two height platform simply by the act of mounting or demounting relative to the lower module 2 is also a great advantage.

As simple refinements of the toolbox, the lower module 1 suitably has a divider panel or sheet to lie atop the vacuum cleaner and provide capacity above the vacuum cleaner for storage for one or more items such as, for example, a dust sheet. The lower module 2 may have elongate handles provided in the middle of the major faces of the toolbox lower module 1 or even in the end faces to suit easy transportation of the lower module 2 and facilitate demounting it from the upper module 1. The handle(s) of the base is/ are suitably adjustable to lie flat against the side of the base when not in use.

Claims

1 A toolbox which comprises a rigid housing formed of a first housing module for accommodating tools and a second housing module within which is housed a vacuum cleaner, the first module lying against and being demountably coupled to the second module so that the user may conveniently carry the vacuum cleaner assembled together with the first module and, when required, the second module may be demounted from the first module to enable the vacuum cleaner to be used wholly independently of the first module.

2. A toolbox as claimed in Claim 1, wherein the first housing module is an upper housing module that is mounted on top of the second / lower housing module.

3. A toolbox as claimed in Claim 2, wherein the upper module of the toolbox is adapted to serve as a stable level platform to stand on and may be used as such both when assembled to the lower module and when demounted from the lower module.

4. A toolbox as claimed in Claim 1, 2 or 3, wherein the toolbox has an electrical cable extending from the toolbox to plug into a mains socket to power the vacuum cleaner and the toolbox is further provided with an electrical plug socket and may serve as an electrical power extension unit to enable one or more electrical power tools to be coupled to mains electricity via the toolbox.

5. A toolbox as claimed in Claim 1, 2, 3 or 4, wherein the second module is provided with one or more handles whereby it may readily be carried independently of the first module.

6. A toolbox as claimed in Claim 1, 2, 3, 4 or 5, wherein the second module is provided with two or more latches/catches, one on each end or opposing side thereof whereby the second module is demountably mounted to the first module.

7. A toolbox substantially as hereinbefore described with reference to the accompanying drawings.

INVESTOR IN PEOPLE

Application No: GB 0322207.2
Claims searched: 1 to 7

Examiner: Mike Henderson
Date of search: 6 February 2004

Patents Act 1977 : Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance	
X,Y	X:Cl 1,5 & 6 Y:Cl 3 & 4	GB 669893	(THE BRITISH THOMSON-HOUSTON Co Ltd) (Embodiment of Figs 4 & 5 particularly relevant)
X,Y	X:Cl 1,2,5 & 6 Y:Cl 3 & 4	EP 0916302A3	(FESTO TOOLTECHNIC GmbH & Co) (Whole disclosure relevant)
X,Y	X:Cl 1,2,5 & 6 Y:Cl 3 & 4	US 2534122	(HAMALA) (Whole disclosure relevant)
Y	4	GB 2226009A	(SLORACH) (Whole disclosure relevant)
Y	3	US 3099398	(CROTEAU) (Whole disclosure relevant)
A		GB 2330521A	(SPOONER) (Whole disclosure relevant)

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC[W]:

A4F B8P

Worldwide search of patent documents classified in the following areas of the IPC[7] :

A47L B25H

The following online and other databases have been used in the preparation of this search report :

ONLINE:WPI,EPODOC,JAPIO

(12) UK Patent Application (19) GB (11) 2 413 265 (13) A

(43) Date of A Publication 26.10.2005

(21) Application No: 0409213.6

(22) Date of Filing: 24.04.2004

(71) Applicant(s):
Brian Thomson
12 Woodfield Road, AYR, KA8 8LZ,
United Kingdom

(72) Inventor(s):
Brian Thomson

(74) Agent and/or Address for Service:
Brian Thomson
12 Woodfield Road, AYR, KA8 8LZ,
United Kingdom

(51) INT CL[7]:
A47L 5/36 9/00

(52) UK CL (Edition X):
A4F FSCA

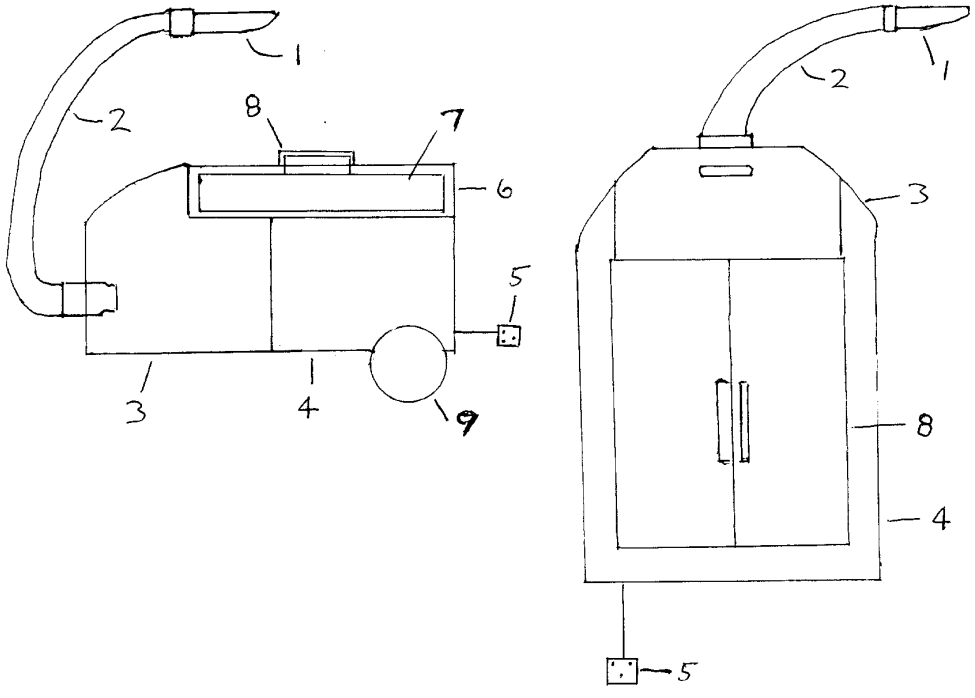
(56) Documents Cited:

DE 009321389 U1	**FR 001539512 A**
US 6374452 B	**US 3778863 A**
US 3296648 A	**US 2573091 A**
US 2355034 A	**US 20030208874 A**

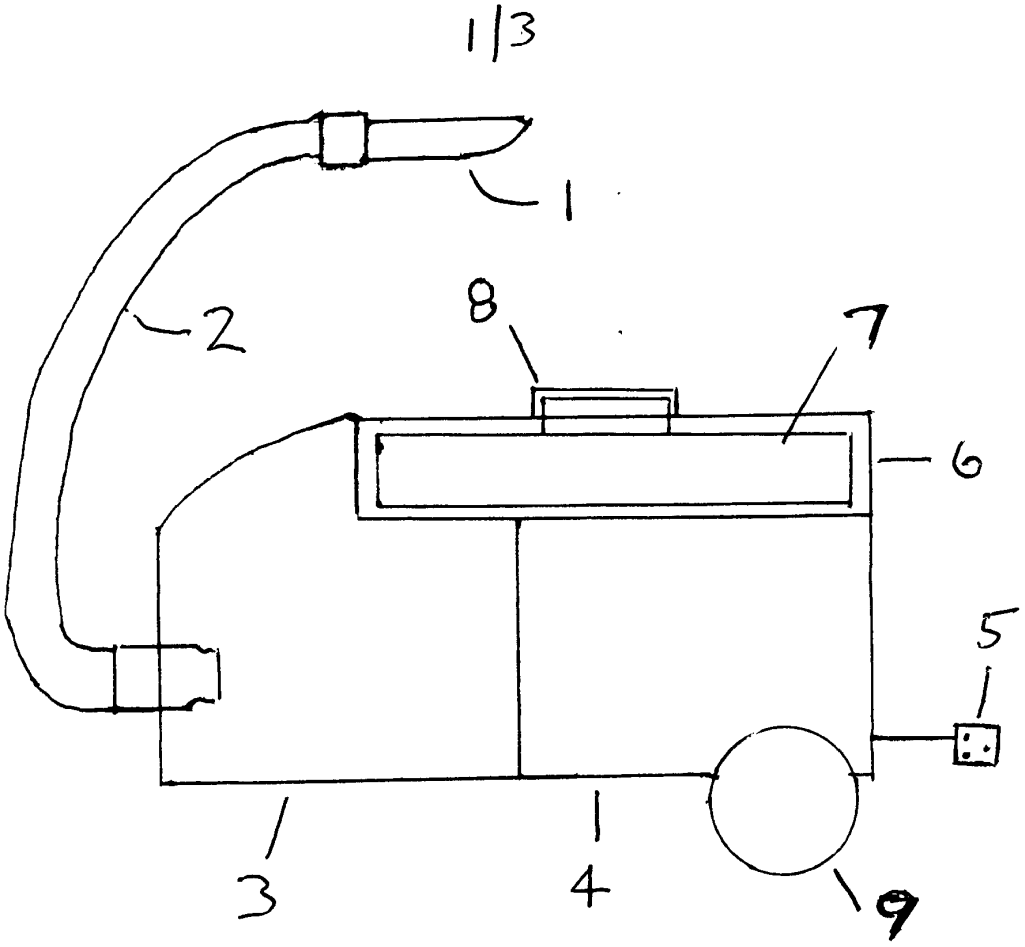
(58) Field of Search:
UK CL (Edition W) **A4F**
INT CL[7] **A47L**
Other: **Online: WPI, EPODOC, PAJ**

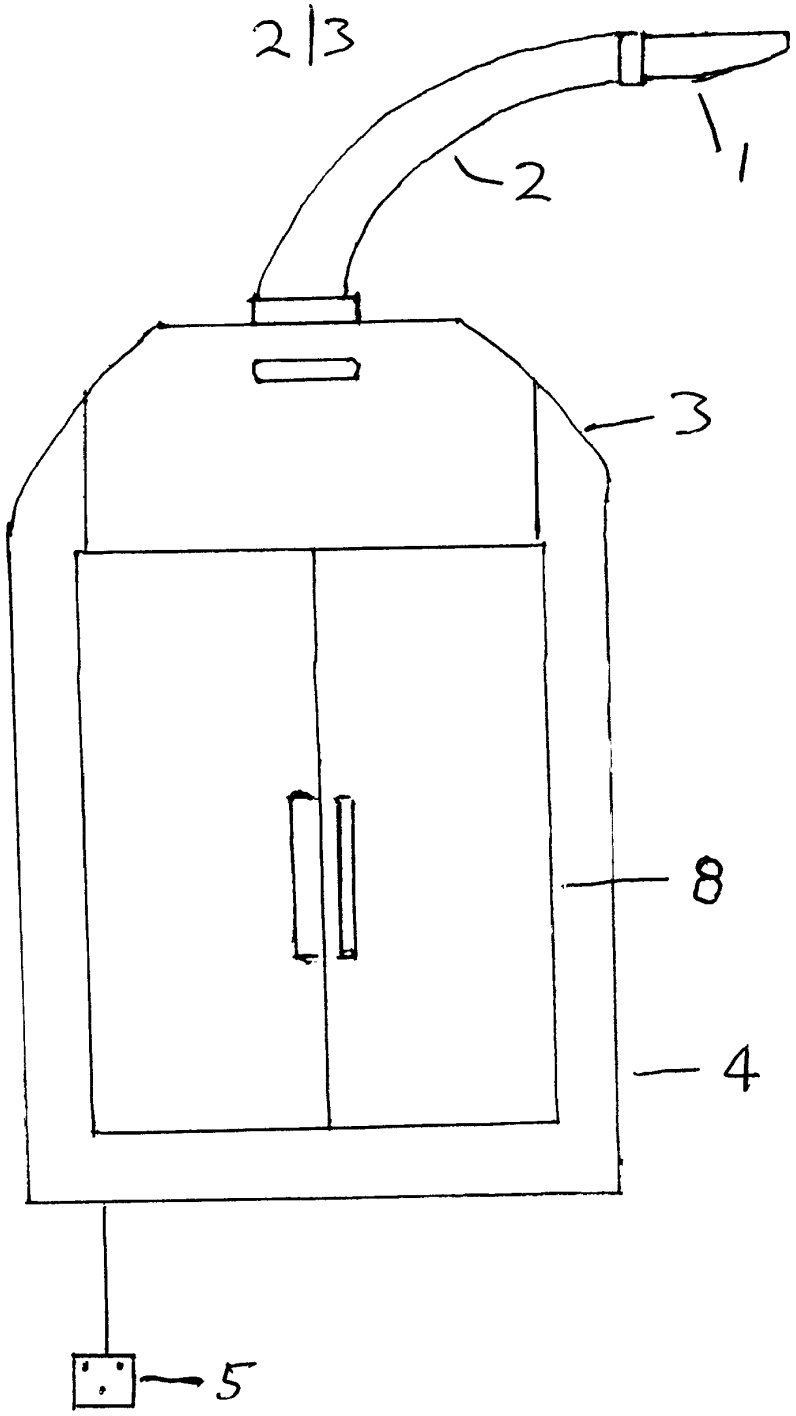
(54) Abstract Title: **Vacuum cleaner with removable storage tray**

(57) A vacuum cleaner has a compartment which houses a removable storage tray 7 large enough to provide storage for a number of tools or the like. The compartment is provide with a pair of doors, 7, 8. One of the doors has a handle and the other door has an opening through which the handle of the tray protrudes, so the cleaner may be carried by means of both handles. The compartment is above the main vacuum cleaner canister which houses the dust collecting compartment 3 and the motor compartment 4.

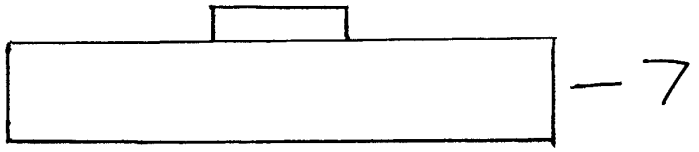


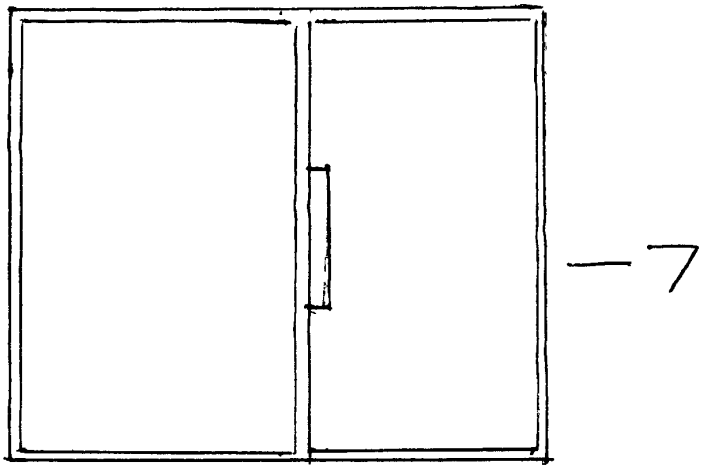
GB 2 413 265


1/3
1
2
8
7
6
5
3
4
9


2|3
1
2
3
8
4
5

3/3





TOOL VAC

THE INVENTION RELATES TO A VACUUM CLEANER WHICH INCLUDES A COMPARTMENT TO HOUSE A REMOVABLE TRAY TWO HEAVY DUTY HINGED DOORS ALLOW ACCESS TO THE REMOVABLE TRAY

THE INVENTION WOULD REDUCE THE NUMBER OF ITEMS THAT NEED TO BE CARRIED

IT DELIVERS CLEAR CONVENIENCE AND WORK EFFICIENCY BENEFITS

THE DEVICE WOULD BE FABRICATED PRIMARILY FROM PLASTIC AND WOULD CONSIST OF A VACUUM CLEANER APPLIANCE WITH A REMOVABLE TRAY ABOVE THE PLASTIC CANISTER HOUSING WHICH WOULD HOLD THE ELECTRIC MOTOR AND DUST COLLECTION COMPARTMENTS ACCESS TO THE DUST COLLECTION COMPARTMENT WOULD BE GAINED FROM THE TOP FRONT END OF THE APPLIANCE THE REMOVABLE TRAY WOULD BE LARGE ENOUGH TO ACCOMMODATE AN ARRAY OF TOOLS OR MATERIAL THE VACUUM CLEANER WOULD BE FITTED WITH A FLEXIBLE HOSE AND ALLOW FOR INTERCHANGABLE NOZZLES TO BE FITTED

ONE OF THE HEAVY DUTY HINGED DOORS WOULD INCLUDE A CARRY HANDLE THE SECOND DOOR WOULD HAVE A OPENING TO ALLOW THE HANDLE OF THE TOOL TRAY TO BE EXPOSED TO ALLOW BOTH HANDLES TO CARRY THE APPLIANCE
FIG 1/3 SHOWS A SIDE VIEW OF THE APPLIANCE ILLUSTRATING 1 INTERCHANGABLE NOZZLE 2 FLEXIBLE HOSE 3 DUST COLLECTION COMPARTMENT 4 ELECTRIC MOTOR COMPARTMENT WITH 5 RETRACTABLE ELECTRIC SUPPLY CABLE 6 HOUSING COMPARTMENT FOR REMOVABLE TRAY 7 REMOVABLE TRAY 8 CARRY HANDLE ON HEAVY DUTY HINGED DOOR 9 ONE OF TWO WHEELS FOR MOBILITY PURPOSES

2

FIG 2/3 SHOWS A TOP VIEW TO THE APPLIANCE WITH A VIEW OF ACCESS PANEL TO DUST COLLECTION COMPARTMENT

FIG 3/3 ILLUSTRATES SIDE AND TOP VIEW TO REMOVABLE TRAY

CLAIMS

1. A VACUUM CLEANER WHICH INCLUDES A COMPARTMENT TO HOUSE A REMOVABLE TRAY.

2. A VACUUM CLEANER AS IN CLAIM 1 WHICH WOULD INCORPORATE A COMPARTMENT GIVEN ACCESS THROUGH TWO HEAVY DUTY HINGED DOORS ONE DOOR WOULD INCLUDE A CARRY HANDLE THE SECOND DOOR WOULD HAVE A OPENING TO ALLOW THE HANDLE OF THE REMOVABLE TRAY TO BE EXPOSED ALLOWING BOTH HANDLES TO CARRY THE APPLIANCE.

3. AS IN CLAIM 1 OR 2 THE VACUUM CLEANER WOULD HAVE A FLEXIBLE HOSE WITH INTERCHANGEABLE NOZZLES.

4. THE REMOVABLE TRAY WOULD BE LARGE ENOUGH TO CARRY AN ARRAY TOOLS OR MATERIAL.

5. THE VACUUM CLEANER AS IN CLAIM 1 OR CLAIM 2 WOULD BE FABRICATED PRIMARILY FROM PLASTIC AND WOULD CONSIST OF A VACUUM CLEANER APPLIANCE WITH A REMOVABLE TRAY ABOVE A CANISTER WHICH WOULD HOUSE THE DUST COMPARTMENT ACCESS WOULD BE GAINED THROUGH TOP FRONT OF APPLIANCE FOR THE DUST COMPARTMENT THE CANISTER WOULD ALSO HOUSE THE ELECTRIC MOTOR WHICH WOULD HAVE A RETRACTABLE SUPPLY CABLE.

6. THE TOOL VAC SUBSTANTIALLY AS HEREIN DESCRIBED AND ILLUSTRATED IN ACCOMPANYING DRAWINGS.

PATENTS • DESIGNS • COPYRIGHT • TRADE MARKS
The Patent Office
4
INVESTOR IN PEOPLE

Application No: GB0409213.6 **Examiner:** John Wilson

Claims searched: 1-6 **Date of search:** 26 August 2004

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1, 3, 4, 5	US 3778863 A Crooks et al - whole document - see the figs.
X	1, 3, 4, 5	US 3296648 A Schaeffer et al - whole duocument - see the figs.
X	1, 3, 4, 5	US2003/208874 A Arnie et al - whole document - see the figs.
X	1, 3, 4, 5	US 6374452 B Francovich et al - whole document - see the figs.
X	1 at least	FR1539512 A Licentia - see fig.2 and the machine translation supplied
X	1 at least	DE9321389 U1 WAP Reinigungssysteme - see drawer 6 figs 2 & 3 and machine translation and abstract supplied
X	2	US 2573091 A Brown
X	2	US 2355034 A Scott

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

CHARTER MARK

PATENTS • DESIGNS • The Patent Office • COPYRIGHT • TRADE MARKS

INVESTOR IN PEOPLE

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC[W] :

A4F

Worldwide search of patent documents classified in the following areas of the IPC[07]

A47L

The following online and other databases have been used in the preparation of this search report

Online: WPI, EPODOC, PAJ

RESEARCH COPY

PATENT SPECIFICATION

694,707

Date of Application and filing Complete Specification: Dec. 27, 1951.

No. 30242/51.

Complete Specification Published: July 22, 1953.

Index at acceptance:—Class 103(i), E2h(5: 9a).

COMPLETE SPECIFICATION

Improvements in or relating to Trolleys for Domestic Appliances or Machines

I, GEORGE ARTHUR CHARD, a British Subject, of 32, Popesgrove, Twickenham, Middlesex, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to trolleys for domestic appliances or machines, such as washing machines, refrigerators, and electric cooking stoves, which usually rest directly on the ground, or have fixed foot members, and owing to their weight are not easy to move.

To enable such appliances to be easily moved, either into position for use or for cleaning purposes, it has been proposed to provide a trolley comprising a base frame mounted on small wheels or castors, on which an appliance can be placed, so that it can then be easily moved about. Furthermore, since it is necessary to immobilise some such appliances when moved into a convenient position for use, as in the case of washing machines, it has been proposed to fit the trolley with a pedal operated brake device comprising brake arms which bear on the ground beneath the trolley when operated by the pedal.

Prior to this invention it was necessary to maintain continuous pressure on the brake pedal in order to hold the brake in operative position during operation of the machine.

The object of this invention is to provide a trolley of the above kind with improved means for operating the brake, so that it remains operative after removal of pressure from the operating pedal, and can subsequently be rendered inoperative at will.

According to the invention, therefore, a trolley having a brake shaft carrying a crank arm, adapted to contact the floor or ground when the shaft is rotated, is fitted with a brake pedal independent of the brake shaft, which rocks about a pivot on the trolley frame, and has a depending arm which contacts with the brake arm, so that on applying pressure to one end of the brake pedal, the pedal moves into one end position. During this movement the depending arm travels upwardly along the brake arm and depresses it to make contact with the ground at its free end, whilst on applying pressure to the other end of the brake pedal the pedal is rocked into the opposite end position and its depending arm travels downwardly along the brake arm, thus allowing it to rise under the pull of a return spring. Thus two positive operations of the brake pedal in opposite directions are required to apply and release the brake.

In order that the invention may be clearly understood and readily carried into practice, it is illustrated, by way of example only, by the accompanying drawings, in which:—

Figure 1 is a side elevation of the trolley on the pedal side, with its braking mechanism in operation; and

Figure 2 is a perspective view of the trolley.

The trolley comprises a rectangular base frame 1, made of angle iron, into which the bottom of the washing machine or other domestic appliance is fitted, and supported by the bottom flange. The frame 1 is mounted at its corners on castor wheels 2, and transversely across the frame extends a brake shaft rotatably mounted on the lower flange of frame 1 by means of bearing straps 4. The shaft 3 has a pair of cranks 5, 6 adjacent to opposite side members of frame 1, to one or both of which is or are connected a pull-off spring 7 anchored to the adjacent side members of frame 1. The crank 6 lies just outside the frame 1, and mounted on the web of the frame 1, to one side of the shaft 3, is a pedal 8 which rocks about a

[Price 2/8]

Price 4s 6d

Price 3s

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2002 - Page 1099
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01400

pivot 9. Depending from the centre of pedal 8 is an arm 10 which can contact with brake arm 6.

At the end of each crank 5, 6 is a braking member or shoe formed by bending the end of crank 5 or 6 at right angles, and on said braking members are fitted non-slip sleeves 11 of rubber, or the like. The ends of pedal 8 are also fitted with non-slip rubber or like sleeves 12, 12.

As will be readily appreciated, when the right hand end of the pedal 8 is depressed with the foot, its arm 10 bears on crank 6 and presses it downwardly, thus pressing its braking member on the ground; at the same time the other crank is similarly operated through cross shaft 3, so that equal braking pressure is applied simultaneously to opposite sides of frame 1.

To release the brake, the left hand end of pedal 8 is depressed, so that the pedal is rocked in the reverse direction, and the arm 10 is moved downwardly and away from the crank arm 6, allowing it to rise under the pull of spring 7; at the same time crank 5 is also raised through brake shaft 3.

It will be appreciated that the brake mechanism is positively operated into either "off" or "on" position, and remains so set until the brake pedal 8 is operated by the foot. Thus it is not necessary to maintain foot pressure on the brake operating pedal, in order to hold the trolley stationary over a prolonged period.

Although the trolley may be used with washing machines to facilitate their movement into position for use, in which they can be held still by the brake mechanism, it is primarily intended for use with refrigerators, electric cooking stoves, or the like, which are mostly stationary when in use (the brake being then applied) but require to be moved out of working position from time to time, in order to permit cleaning of the floor beneath them and of the walls behind them.

It should be understood that although the invention is primarily concerned with a trolley and brake mechanism, removable as a unit, for domestic appliances or machines, it also includes the construction of domestic appliances with the braking mechanism incorporated permanently therein without the intermediary of a trolley, the bottom edge of the appliance or machine taking the place of the trolley frame.

What I claim is:—

1. In a trolley for domestic appliances or machines, floor braking means comprising an angularly movable brake arm adapted to be pressed into contact with the ground, in combination with a pivotally mounted pedal having a part contacting with the side of the brake arm.

2. In a trolley for domestic appliances or machines, floor braking means comprising a base frame mounted on wheels or castors and fitted with a transverse shaft having one or more crank arms adapted to act at the free ends as brake members or shoes, and pivoted to said frame a rocking brake pedal having a part bearing on a crank arm, which it depresses against the action of a pull-off spring when the pedal is rocked into one end position.

3. In a trolley for domestic appliances of the kind hereinbefore indicated, braking mechanism operating on the floor or ground, which is pedal operated into either "off" or "on" position, and remains so set when pressure is removed from the brake pedal.

4. In a trolley for domestic appliances having floor braking means according to claim 3, wherein also the pedal consists of a member adapted to rock about a pivot on the trolley frame between extreme end positions, in which the braking action is either applied or removed, as the case may be.

5. Domestic appliances or machines mounted permanently on wheels or a trolley for such machines without wheels, fitted with braking mechanism comprising an angularly movable brake arm adapted to be pressed into contact with the ground, in combination with a pivotally mounted pedal having a part contacting with the side of the brake arm.

6. An article of domestic furniture fitted at the bottom with castors and also with one or more pressure members adapted to engage with the floor and serve as braking means, in combination with a pivoted lever or pedal adapted to be operated to render the braking means inactive by dis-engagement of the pressure member or members from the floor.

7. Trolleys for use with domestic appliances or machines substantially as herein described with reference to, and as illustrated by the accompanying drawings.

8. The fitting of domestic appliances or machines with braking mechanism substantially as herein described with reference to, and as illustrated by the accompanying drawings.

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2002 - Page 1100
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01400

CHARLES S. PARSONS,
B.Sc., M.I.E.E.
Chartered Patent Agent,
Thanet House, 231, Strand,
London, W.C.2.

Leamington Spa: Printed for Her Majesty's Stationery Office, by the Courier Press.—1953.
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies may be obtained.

694,707 COMPLETE SPECIFICATION
1 SHEET
This drawing is a reproduction of the Original on a reduced scale.

FIG. 1.

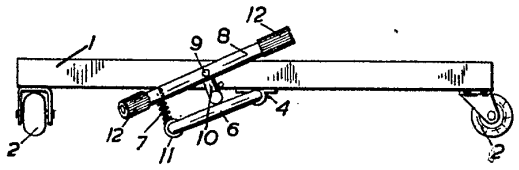
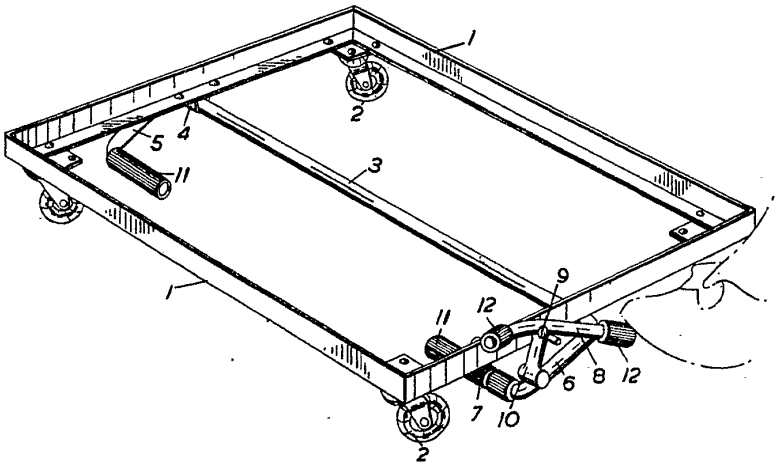


FIG. 2.



Espacenet

Bibliographic data: JP2003194020 (A) — 2003-07-09

INTERLOCKING LATCH SYSTEM AND BOX USING THE SAME

Inventor(s): SUGIMURA ATSUAKI ± (SUGIMURA ATSUAKI)

Applicant(s): TAKIGEN MFG CO ± (TAKIGEN MFG CO LTD)

Classification: **- international:** ***A47B87/02; B42F17/08; B42F7/14; F16B1/02; F16B1/04; F16B12/10; F16B5/07;*** (IPC1-7): A47B87/02; B42F17/08; B42F7/14; F16B1/02; F16B1/04; F16B12/10; F16B5/07

- cooperative:

Application number: JP20010399020 20011228

Priority number(s): JP20010399020 20011228

Abstract of JP2003194020 (A)

PROBLEM TO BE SOLVED: To provide an interlocking latch system capable of automatic and sure connection between both boxes only by placing one box on the other and simple disconnection only by operating a hand hold. ;SOLUTION: The interlocking latch system for connecting the boxes 10 to each other placed in a vertical direction in a disconnectable manner comprises a latch device 40 having a latch member for engaging a latch receiving portion of the box arranged on the lower side in a disengageable manner and a trigger member for operating the latch member. The trigger member operates the latch member to engage the latch receiving member when contacting the box arranged on the lower side. The latch member can disengage the latch receiving portion of the box arranged on the lower side by turning the handle of the hand hold 30. ;COPYRIGHT: (C)2003,JPO

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2002 - Page 1103
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01400

(19)日本国特許庁（ＪＰ）　(12) **公開特許公報**（Ａ）　(11)特許出願公開番号
特開2003－194020
（P2003－194020A）
(43)公開日　平成15年７月９日(2003.7.9)

(51)Int.Cl.⁷	識別記号	Ｆ Ｉ		テーマコード（参考）
Ｆ１６Ｂ　5/07		Ｆ１６Ｂ　5/07	Ｂ	２Ｃ０１７
Ａ４７Ｂ　87/02		Ａ４７Ｂ　87/02		３Ｂ０６０
Ｂ４２Ｆ　7/14		Ｂ４２Ｆ　7/14	Ｃ	３Ｊ００１
17/08		17/08	Ｚ	３Ｊ０２４
Ｆ１６Ｂ　1/02		Ｆ１６Ｂ　1/02	Ｑ	

審査請求　未請求　請求項の数６　ＯＬ　（全　９　頁）　最終頁に続く

(21)出願番号　特願2001－399020(P2001－399020)

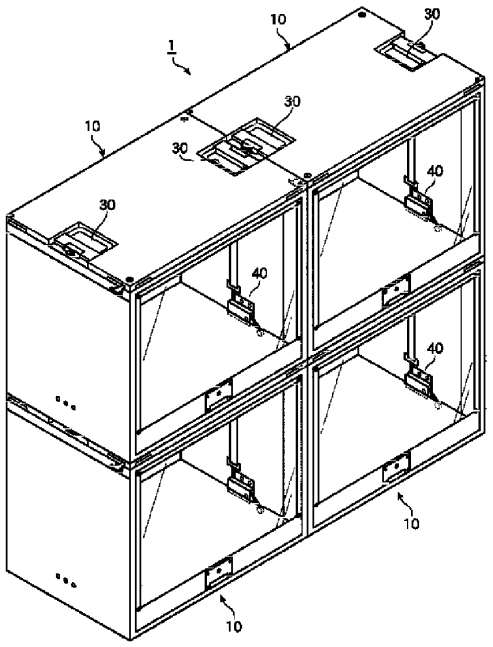
(22)出願日　平成13年12月28日(2001.12.28)

(71)出願人　000108708
タキゲン製造株式会社
東京都品川区西五反田１丁目24番４号
(72)発明者　杉村　篤朗
東京都品川区西五反田１丁目24番４号　タキゲン製造株式会社内
(74)代理人　100081514
弁理士　酒井　一　（外１名）

最終頁に続く

(54)【発明の名称】　連動式ラッチシステム及びこれを用いた箱体

(57)【要約】
【課題】　箱体のうえに他の箱体を載置するだけで、両箱体を自動的かつ確実に連結することができるとともに、この連結状態を取手の操作だけで簡単に解除することができる連動式ラッチシステム及び箱体を提供する。
【解決手段】　上下方向に積載される箱体１０どうしを解除可能に連結する連動式ラッチシステムであって、ラッチ装置４０は、下方に配置された箱体のラッチ受け部に解除可能に係合するラッチ部材と、ラッチ部材を作動させるトリガー部材とを備え、トリガー部材は下方に配置された箱体に接触したときにラッチ部材を作動させてラッチ受け部に係合させるものであり、ラッチ部材は、これが設けられた箱体の取手３０のハンドルが回動すると、下方に配置された箱体のラッチ受け部との係合が解除されるように形成されたものである。



【特許請求の範囲】
【請求項１】　上下方向に積載される箱体どうしを解除可能に連結するラッチ装置と、回動可能なハンドルを含む取手とを備える連動式ラッチシステムであって、
前記ラッチ装置は、下方に配置された前記箱体のラッチ受け部に解除可能に係合するラッチ部材と、該ラッチ部材を作動させるトリガー部材とを備え、該トリガー部材は下方に配置された前記箱体に接触したときに前記ラッチ部材を作動させて前記ラッチ受け部に係合させるものであり、
前記ラッチ部材は、これが設けられた箱体の前記ハンドルが回動すると、下方に配置された前記箱体のラッチ受け部との係合が解除されるように形成されたものであることを特徴とする連動式ラッチシステム。
【請求項２】　各箱体が有する前記ラッチ部材は、ケースに回動可能に枢着されるとともに、下方に配置された前記箱体の前記ラッチ受け部に係合する位置に向かって付勢された状態で設けられ、
前記ラッチ装置は接続部材により同じ箱体の前記取手に連結され、前記ハンドルの回動により前記接続部材に張力が作用すると、該張力が、前記ラッチ部材を付勢する力に抗してこのラッチ部材を回動させ、下方に配置された前記箱体の前記ラッチ受け部との係合を解除するものであることを特徴とする請求項１記載の連動式ラッチシステム。
【請求項３】　前記トリガー部材は、下方に配置された前記箱体に接触する接触レバーと、前記ラッチ部材と係合する係合レバーまたは係合突子とが一体に形成され、ケースに回動可能に枢着されるとともに、前記係合レバーまたは前記係合突子が前記ラッチ部材に当接するように付勢された状態で設けられ、
前記係合レバーまたは前記係合突子は、前記ラッチ部材が前記ラッチ受け部から係合解除されたときにこの係合解除状態を保持するように、前記ラッチ部材と係合するものであり、
前記接触レバーは、これが下方に配置された前記箱体に接触したときに、前記係合レバーまたは前記係合突子と前記ラッチ部材との係合を解除するものであることを特徴とする請求項２に記載の連動式ラッチシステム。
【請求項４】　前記係合レバーまたは前記係合突子を前記ラッチ部材に当接するように付勢する付勢手段と、前記ラッチ部材を下方に配置された前記箱体の前記ラッチ受け部に係合する位置に向かって付勢する付勢手段とが、前記トリガー部材と前記ラッチ部材との間に設けられた一つの付勢手段により実現されるものである請求項３に記載の連動式ラッチシステム。
【請求項５】　前記取手は、基板と、取付具を介して前記基板に回動可能に設けられたハンドルと、該ハンドルを前記基板に向かい付勢してこの上に載置させる付勢手段と、前記接続部材を前記取付具に固定する固定部材とを備えたものであることを特徴とする請求項２乃至請求項４のいずれか１項に記載の連動式ラッチシステム。
【請求項６】　請求項１乃至請求項５のいずれか１項に記載の連動式ラッチシステムが設けられたことを特徴とする箱体。
【発明の詳細な説明】
【０００１】
【発明が属する技術分野】本発明は、上下方向に積載されるラック、キャビネット、文書整理箱および筐体等の箱体どうしを解除可能に連結するための連動式ラッチシステム及びこれを用いた箱体に関する。
【０００２】
【従来の技術】横方向に並べられて上下方向にも積載される文書整理箱が、例えば、特公平７－１００３９７号公報に記載されている。この公報に記載された文書整理箱では、箱上面に係合突起が設けられ、箱底面に孔が穿設され、これらの両部材が係合することにより、上下方向に積載された文書整理箱は結合されている。また文書整理箱には、側壁に回動可能な取手が取り付けられている。
【０００３】上記従来の文書整理箱では、下方に置かれた文書整理箱のうえに他の文書整理箱を載置するだけで、箱どうしの係合は容易に行えるものの、その係合状態は極めて緩やかなものであるため、ごく弱い力が横方向から作用しただけでも簡単に係合解除されてしまい、安定性に欠けるものであった。また取手が、側壁から突き出るように設けられているため、文書整理箱を横方向に並べる際には、これが障害になることも考えられる。
【０００４】
【発明が解決しようとする課題】本発明は、上記のような問題点を解決するためになされたものであり、その課題は、下方に置かれた箱体のうえに他の箱体を載置するだけで、両箱体を自動的かつ確実に連結することができるとともに、この連結状態を取手の操作だけで容易に解除することができる連動式ラッチシステム及び箱体を提供することにある。
【０００５】
【課題を解決するための手段】本発明では、上下方向に積載される箱体どうしを解除可能に連結するラッチ装置と、回動可能なハンドルを含む取手とを備える連動式ラッチシステムであって、前記ラッチ装置は、下方に配置された前記箱体のラッチ受け部に解除可能に係合するラッチ部材と、該ラッチ部材を作動させるトリガー部材とを備え、該トリガー部材は下方に配置された前記箱体に接触したときに前記ラッチ部材を作動させて前記ラッチ受け部に係合させるものであり、前記ラッチ部材は、これが設けられた箱体の前記ハンドルが回動すると、下方に配置された前記箱体のラッチ受け部との係合が解除されるように形成されたものであることを特徴とする連動式ラッチシステムが提供される。

【０００６】また本発明では、上記連動式ラッチシステムが設けられた箱体が提供される。該箱体では、例えば、取手を箱体の上面部分に設け、ラッチ装置を箱体内部の底面付近に設け、接続部材は箱体内部に通して取手とラッチ装置に接続することができる。取手は、箱体の上面部分に設ける場合、箱体の表面から突出しないように設けることが好ましい。またラッチ部材は、ラッチ受け部と係合しているときのみ、箱体底面から下方に突出するように設けることが好ましい。トリガー部材は、ラッチ部材がラッチ受け部から係合解除されているときのみ、箱体底面から下方に突出するように設けることが好ましい。

【０００７】本発明では、取手にフック受け部を設けても良く、またトリガー部材は取手の所定箇所に接触するように配置すると共に、取手にはトリガー部材接触面を設けても良い。

【０００８】

【作用】複数の箱体が上下方向に積載されているとき、上の箱体のラッチ部材は下の箱体のラッチ受け部に係合し、各取手のハンドルは基板上に載置された状態になっている。そして、最上段の箱体を持ち上げるためハンドルを把持すると、ハンドルは付勢手段の力に反して回動し、ハンドルに連結された接続部材が引張られてラッチ部材にも張力が伝わる。この張力により、ラッチ部材はこれを付勢する力に抗して回動し、下の箱体のラッチ受け部から解除されて、上の箱体は持ち上げ可能になる。したがって、本発明の連動式ラッチシステムでは、取手のハンドルを把持するだけで、ラッチ部材は自動的に係合解除される。逆に、ハンドルを把持して持ち上げた箱体を、下方に配置した箱体のうえに積載し、取手のハンドルから手を離すと、ハンドルは付勢手段により回動して基板上に載置された状態に戻る。このとき、接続部材からラッチ部材に伝わっていた張力は弱まり、ラッチ部材はこれを付勢する力により回動して、下方に配置した箱体のラッチ受け部に係合する。したがって、本発明の連動式ラッチシステムでは、取手のハンドルから手を離すだけで、ラッチ部材は自動的にラッチ受け部に係合される。

【０００９】

【実施例】以下、添付図面を参照して本発明の好適な実施形態を説明する。

【００１０】図１は連動式ラッチシステムを用いた箱体１０を複数組み合わせた斜視図であり、図２はこの箱体１０の分解図である。箱体１０は、天板１１と扉１２と壁部材１３と底板１４とレール１５と連動式ラッチシステムとを備え、この連動式ラッチシステムは、取手３０と、ラッチ装置４０と、これらを連結する接続部材としてのベルト７０とを備えている。ここで、天板１１は、表面仕上板１１ａと基板１１ｂとに取手３０等の所要部材が固定され、取手３０は表面仕上板１１ａよりも上方に突出しないように設けられる。また壁部材１３は左右の側壁１３ｂと後壁１３aとからなり、両側壁１３ｂの内面上方にはそれぞれレール１５が固定され、両側壁１３ｂの内面下方にはそれぞれラッチ装置４０が固定される。各ラッチ装置４０に取り付けられたベルト７０は、側壁１３ｂの内面に沿って上方に延設され、各レール１５と各側壁１３ｂとの隙間を通って取手３０に接続される。底板１４は、側壁１３ｂに固定されたラッチ装置４０に対向する２箇所に切欠き１４ａが形成され、各切欠き１４ａは、ここからラッチ装置４０のトリガーレバーやラッチレバーが出入りするために用いられる。扉１２は、枠材１２ｂ，１２ｂ’に透明軽量なアクリル板１２ａが取り付けられ、下側の枠材１２ｂ’にラッチ式取手５０が固定され、上側の枠材１２ｂの両端に枢軸やローラー１２ｅが設けられる。各ローラー１２ｅは各レール１５に走行可能に嵌められ、ラッチ式取手５０は、これに対向する底板１４の所定位置に設けられたラッチ受け部（図示せず）と着脱自在に係合する。扉１２を開くときには、ラッチ式取手５０に手指を入れてラッチを解除し、扉１２を押し上げれば、ローラー１２ｅはレール１５を走行して、扉１２は開放される。

【００１１】次に、連動式ラッチシステムの各構成について説明する。図３（ａ）～（ｃ）は取手３０を示す図であり、図４はハンドル３２の回動状態を示した取手３０の断面図であり、図５は取手３０の組立図である。取手３０は、カバー３１にハンドル３２が熔接で固定され、ベルト７０がベルト固定具３５によりカバー３１に固定され、このカバー３１が軸部材３３により基板３４に枢着され、軸部材３３にバネ３６が環装される。さらに詳細に説明すれば、カバー３１は、一枚の板材を折り曲げて形成されたものであり、上面部３１ａの両側が下方にほぼ直角に折り曲げられて側面部３１ｄが形成され、この側面部３１ｄに軸部材３３を貫装するための孔３１ｆが穿設されている。またカバー３１の前側には、上面部３１ａが下方にほぼ直角に折り曲げられて前面部３１ｃが形成され、前面部３１ｃの両側にはハンドル端部３２ａを挿し入れるための切欠き３１ｅが設けられ、さらに、前面部３１ｃにはベルト固定具３５を螺着するための螺子孔が設けられている。

【００１２】基板３４も、同様に一枚の板材を折り曲げて形成されたものであり、底面部３４ａの両側が折り曲げられてフランジ３４ｃが形成され、後側が折り曲げられて立上り部３４ｅが形成され、この立上り部３４ｅに対向する底面部３４ａの所定位置が切込み折り曲げられて立上り部３４ｆが形成され、これら立上り部３４ｅ，３４ｆ間に軸３４ｄが取り付けられている。この軸３４ｄはラッチ受け部３４ｄとして使用されるものである。さらに、両フランジ３４ｃの後方には、軸部材３３を貫装するための孔を有する軸挿着部３４ｇが設けられている。

【００１３】ベルト固定具３５は、図４及び図５に示したように、ウェブ３５ｃの両側にフランジ３５ａ，３５ｅが設けられたほぼコ字形状のものであり、角にベルト挿通孔３５ｂ，３５ｄが形成され、フランジ３５ａに螺子孔が穿設されている。このベルト固定具３５は、ベルト挿通孔３５ｂ，３５ｄにベルト７０を挿通し、このベルト７０の先端をフランジ３５ａとカバー３１の前面部３４ｃとで挟むように螺子３９で止められる。

【００１４】取手３０は、以上の構成を図５に示したように組み立てることにより形成される。すなわち、カバー３１には予めハンドル３２、ベルト固定具３５、ベルト７０を固定しておき、このカバー３１の両側面部３１ｄを、ワッシャー３８を介して両方の軸挿着部３４ｇの間に嵌め、カバー３１と底面部３４ａとの間にバネ３６を配置し、これら軸挿着部３４ｇ、ワッシャー３８、バネ３６、カバー３１の孔３１ｆに軸部材３３を貫装し、この軸部材３３の両端の溝にＥ形止め輪３７を嵌めると、取手３０は図３に示したように形成される。このとき、ハンドル３２はカバー３１を介してバネ３６から付勢されており、図４の実線で示した状態になっている。この状態から、手指でハンドル３２を把持して持ち上げると、ハンドル３２はバネ３６から受ける力に反し、軸部材３３を枢軸として矢印Ｒ４方向に回動し、２点鎖線で示した仮想線の位置に達し、ベルト７０は引き上げられて張力がラッチ装置４０に伝達される。逆に、手指で把持したハンドル３２を仮想線の位置で離すと、ハンドル３２はバネ３６に付勢されて矢印Ｒ３方向に回動し、実線で示した位置に達し、このとき、ベルト７０は緩んで張力は解除される。

【００１５】次に、図６（ａ）（ｂ）はラッチ装置４０の側面図であり、ラッチ受け部３４ｄから係合が解除された状態が示されている。また図７はラッチ装置４０を図６（ａ）の逆側から見た部分断面図であり、ラッチ受け部３４ｄと係合した状態が示されている。ラッチ装置４０は、ケース４２とトリガー部材４３とラッチ部材４５とを主要部として備えている。ケース４２は、内部にトリガー部材４３とラッチ部材４５を収容する隙間を備え、両部材４３，４５が自在に回動できるように、２枚の板材４２ａ，４２ｂをほぼ平行に離隔して固定し、両側面と下面は開放状態に形成されており、板材４２ｂの上部に後述の連結板４７を挿通するための貫通孔４２が穿設されている。

【００１６】ラッチ部材４５は、特に限定されるものでは無いが、ここでは厚さほぼ３ｍｍ程度の板材から形成された部材であって、受動突子４５ｂと係合凹部４５ｄと接続部４５ｃとを備え、枢軸４５ａにより回動可能にケース４２に枢着されるとともに、バネ４６により矢印Ｒ２方向に付勢されている。係合凹部４５ｄは前記取手３０のラッチ受け部３４ｄに係合する部位である。また受動突子４５ｂは停止面４５ｂ’と摺動面４５ｂ”とを備え、摺動面４５ｂ”はラッチ部材４５が図７の状態から図６（ａ）の状態に回動するときに、トリガー部材４３の係合レバー４３ｅが摺動する面であり、停止面４５ｂ’は図６（ａ）のようにラッチ部材４５がラッチ受け部３４ｄから係合解除されたときに、この状態を維持するためトリガー部材４３の係合レバー４３ｅに係合するための面である。さらに、接続部４５ｃには連結板４７の下端がピン４７ｂにより枢着される。この連結板４７の上端はピン４７ａによりベルト固定板４１に枢着され、ベルト固定板４１にはベルト７０が接続される。

【００１７】トリガー部材４３は、特に限定されるものでは無いが、ここでは厚さほぼ３ｍｍ程度の板材から形成された部材であって、一体に形成された接触レバー４３ｄと係合レバー４３ｅとを備え、枢軸４３ａにより回動可能にケース４２に枢着されるとともに、バネ４４により矢印Ｒ１方向に付勢されている。接触レバー４３ｄは先端にピン４３ｂで枢着されたローラー４３ｃを有し、このローラー４３ｃが、下方に配置された箱体１０の取手３０のカバー３１に接触する。また係合レバー４３ｅは、前記したように、図６（ａ）のようにラッチ部材４５がラッチ受け部３４ｄから係合解除されたときに、この係合解除状態を維持するため停止面４５ｂ’に係合するためのものである。

【００１８】次に、図１、図６及び図７を参照してラッチ装置４０の作用を説明する。図１に示したように、箱体１０が上下方向に積載されているとき、上に配置された箱体１０のラッチ装置４０のラッチ部材４５は、下に配置された箱体１０の取手３０のラッチ受け部３４ｄに係合しており、この係合状態が図７で図示されている。図７の状態について、更に説明すれば、ラッチ部材４５はバネ４６の力を受けてＲ２方向に付勢されており、係合凹部４５ｄがラッチ受け部３４ｄに係合している。このとき、トリガー部材４３はバネ４４に付勢されて、接触レバー４３ｄの先端のローラー４３ｃは、下方に配置された箱体１０の取手３０のカバー３１に接触しており、係合レバー４３ｅはラッチ部材４５の受動突子４５ｂの摺動面４５ｂ”に当接している。また、このとき、ラッチ部材４５にはベルト７０からの張力は作用していない

【００１９】一方、上に配置された箱体１０の取手３０のハンドル３２を、図４の矢印Ｒ４方向に回動させて、手指でハンドル３２を把持して箱体１０を持ち上げると、ベルト７０に張力が作用し、この張力がベルト固定板４１から連結板４７を介してラッチ部材４５に伝達される。これにより、ラッチ部材４５は図７の状態から矢印Ｒ２の逆方向に回動し、係合凹部４５ｄとラッチ受け部３４ｄとの係合状態は解除され、ラッチ部材４５の摺動面４５ｂ”がトリガー部材４３の係合レバー４３ｅを押しながら、トリガー部材４３を矢印Ｒ１の逆方向に回動させる。そして、ラッチ部材４５が所定角度まで回動

すると、係合レバー４３ｅが受動突子４５ｂの停止面４５ｂ’に係合し、これにより、ラッチ部材４５はバネ４６の力に抗して、図６（ａ）のように係合解除された状態で停止する。このとき、トリガー部材４３自体もバネ４４の力に抗して停止しており、先端のローラー４３ｃは図７の位置よりも若干下方に位置している。

【００２０】次に、持ち上げた箱体１０を下方に配置された箱体１０の上に降ろすと、トリガー部材４３のローラー４３ｃは、下方の箱体１０の取手３０のカバー３１に接触し、トリガー部材４３はバネ４４の力に抗してＲ１の逆方向に回動される。このトリガー部材４３の回動により、係合レバー４３ｅは、ラッチ部材４５の受動突子４５ｂの停止面４５ｂ’から係合解除され、ラッチ部材４５はバネ４６に付勢されて矢印Ｒ２方向に回動し、図７に示されたように、下に配置された箱体１０の取手３０のラッチ受け部３４ｄに係合する。

【００２１】次に、図６及び図７とは異なるラッチ装置６０について、図８及び図９を参照して説明する。ラッチ装置６０は、ケース６２とトリガー部材６３とラッチ部材６５とを主要部として備え、ラッチ装置４０と同様に箱体１０に取り付けられ、取手３０と連動して動作するものである。ケース６２は、内部にトリガー部材６３とラッチ部材６５を収容する隙間を備え、下面が開放されて両部材６３，６５が自在に回動できるように上面板６２ａと側面板６２ｂ，６２ｅとで形成されており、側面板６２ｂの下端にはフランジ６２ｃが設けられ、ここに貫通孔６２ｄが穿設されており、上面板６２ａの上部には後述のベルト固定板６１と連結材６７とを挿通するための貫通孔６２ｆが穿設されている。

【００２２】ラッチ部材６５は、受動突子６５ｂと係合凹部６５ｃと接続部６５ｅとを備え、枢軸６５ａにより回動可能にケース６２に枢着されるとともに、バネ６４により矢印Ｒ６方向に付勢されており、このバネ６４は、その一端がラッチ部材６５のバネ固定部６５ｄに固定され、他端がトリガー部材６３のピン６３ｄに固定されている。係合凹部６５ｃは前記取手３０のラッチ受け部３４ｄに係合する部位である。また受動突子６５ｂは停止面６５ｂ’と摺動面６５ｂ”とを備え、摺動面６５ｂ”はラッチ部材６５が図８（ｂ）の状態から図９の状態に回動するときに、トリガー部材４３の係合突子４３ｂが摺動する面であり、停止面６５ｂ’は図９のようにラッチ部材６５がラッチ受け部３４ｄから係合解除されたときに、この状態を維持するためトリガー部材６３の係合突子６３ｂに係合するための面である。さらに、接続部６５ｅには連結材６７の下端がピン６７ｂにより枢着される。この連結材６７には長孔６７ａが設けられており、この長孔６７ａにはベルト固定板６１のピン６１ｂが通されて枢着され、ベルト固定板６１にはベルト７０が接続される。なお、ピン６１ｂはベルト固定板６１に固定されたものである。

【００２３】トリガー部材６３は、上端付近が枢軸６３ａにより回動可能にケース６２に枢着され、この枢軸６３ａの上側に停止突子６３ｅが設けられ、下側に係合突子６３ｂが設けられ、ピン６３ｄからラッチ部材６５まで延びるバネ６４により矢印Ｒ５方向に付勢されている。またトリガー部材６３の下端にはピン６３ｄでローラー６３ｃが枢着され、このローラー６３ｃが、下方に配置された箱体１０の取手３０のカバー３１に接触する。また係合突子６３ｂは、前記したように、図９のようにラッチ部材６５がラッチ受け部３４ｄから係合解除されたときに、この係合解除状態を維持するため停止面６５ｂ’に係合するためのものである。さらに、停止突子６３ｅは、トリガー部材６３が図９の状態から図８（ｂ）の状態になるときに、上面板６２ａの下面に突き当たり、トリガー部材６３の回動を停止させるためのものである。

【００２４】次に、図８及び図９を参照してラッチ装置６０の作用を説明する。図１の箱体１０にラッチ装置６０が取り付けられた場合にも、箱体１０が上下方向に積載されたとき、上に配置された箱体１０のラッチ部材６５が、下方に配置された箱体１０のラッチ受け部３４ｄに係合し、この係合状態が図８（ｂ）で示される。図８（ｂ）では、ラッチ部材６５はバネ６４の力を受けてＲ６方向に付勢され、係合凹部６５ｃがラッチ受け部３４ｄに係合する。このとき、トリガー部材６３は同じバネ６４に付勢され、先端のローラー６３ｃは、下方に配置された箱体１０の取手３０のカバー３１に接触し、係合突子６３ｂはラッチ部材６５の受動突子６５ｂの摺動面６５ｂ”に当接している。また、このとき、ラッチ部材６５にはベルト７０から張力が作用していない

【００２５】一方、上に配置された箱体１０の取手３０のハンドル３２を回動させ、手指で把持して箱体１０を持ち上げると、ベルト７０に張力が作用し、この張力がベルト固定板６１から連結材６７を介してラッチ部材６５に伝達される。これにより、ラッチ部材６５は図８（ｂ）の状態から矢印Ｒ６の逆方向に回動し、係合凹部６５ｃとラッチ受け部３４ｄとの係合状態が解除され、ラッチ部材６５の摺動面６５ｂ”がトリガー部材６３の係合突子４３ｂを押しながら、トリガー部材６３を矢印Ｒ５の逆方向に回動させる。そして、ラッチ部材６５が所定角度まで回動すると、係合突子６３ｂが受動突子６５ｂの停止面６５ｂ’に係合し、これにより、トリガー部材６３とラッチ部材６５はバネ６４の力に抗して、図９のように係合解除された状態で停止し、このとき、トリガー部材６３先端のローラー６３ｃは図８（ｂ）の位置よりも若干下方に位置している。

【００２６】次に、持ち上げた箱体１０を下方の箱体１０の上に降ろすと、トリガー部材６３のローラー６３ｃは、下方の箱体１０の取手３０のカバー３１に接触し、トリガー部材６３はバネ４４の力に抗してＲ１の逆方向

に回動される。このトリガー部材６３の回動により、係合突子６３ｂは、ラッチ部材６５の受動突子６５ｂの停止面６５ｂ’から係合解除され、ラッチ部材６５はバネ６４に付勢されて矢印Ｒ５方向に回動し、図８（ｂ）に示されたように、下に配置された箱体１０の取手３０のラッチ受け部３４ｄに係合する。

【００２７】

【発明の効果】本発明では、上下方向に積載される箱体どうしを解除可能に連結するものであり、ラッチ装置は、下方に配置された箱体のラッチ受け部に解除可能に係合するラッチ部材と、このラッチ部材を作動させるトリガー部材とを備え、このトリガー部材は下方の箱体に接触したときにラッチ部材を作動させてラッチ受け部に係合させ、ラッチ部材は、これが設けられた箱体のハンドルが回動すると、下方の箱体のラッチ受け部との係合が解除されるように形成されている。したがって、下方に置かれた箱体のうえに他の箱体を載置するだけで、両箱体を自動的かつ確実に連結することができるとともに、この連結状態を取手のハンドルの操作だけで容易に解除することが可能になった。

【図面の簡単な説明】

【図１】本発明の連動式ラッチシステムを用いた箱体を複数組み合わせた斜視図である。

【図２】本発明の連動式ラッチシステムを用いた箱体の分解図である。

【図３】連動式ラッチシステムの取手を示す図であり、（ａ）は平面図、（ｂ）は正面図、（ｃ）は側面図である。

【図４】ハンドルの回動状態が仮想線で示された取手の断面図である。

【図５】連動式ラッチシステムの取手の組立図である。

【図６】連動式ラッチシステムのラッチ装置を示す図であり、（ａ）は側面図、（ｂ）は（ａ）における左方から見た側面図である。

【図７】図６（ａ）の逆側から見た断面図である。

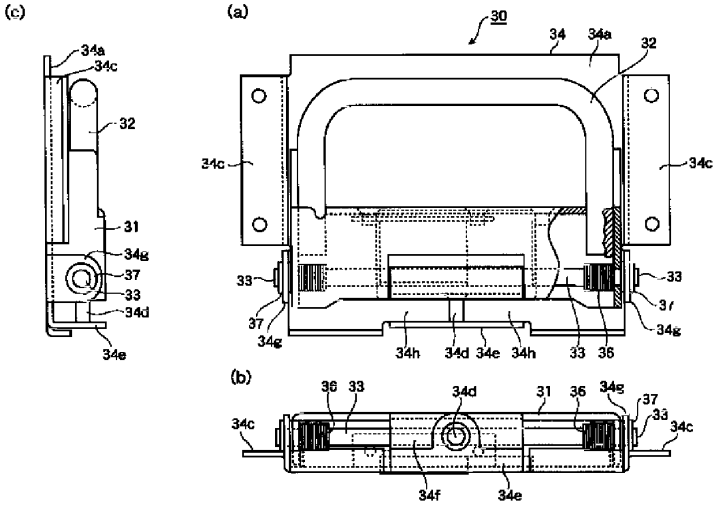
【図８】図６及び図７とは異なる態様のラッチ装置を示す図であり、（ａ）は側面図、（ｂ）は断面図、（ｃ）は（ａ）の逆側から見た側面図、（ｄ）は（ｂ）におけるVIIId－VIIId線に沿った断面図である。

【図９】図８（ｂ）の逆側から見た側面図である。

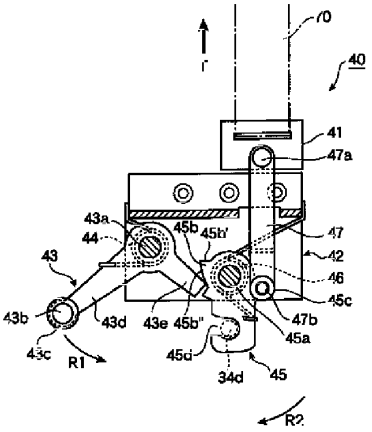
【符号の説明】

１０　箱体
３０　取手
３２　ハンドル
３４ｄ　ラッチ受け部
３６　バネ
４０　ラッチ装置
４２　ケース
４３　トリガー部材
４４，４６　バネ
４５　ラッチ部材
６０　ラッチ装置
６２　ケース
６３　トリガー部材
６４　バネ
６５　ラッチ部材
７０　ベルト

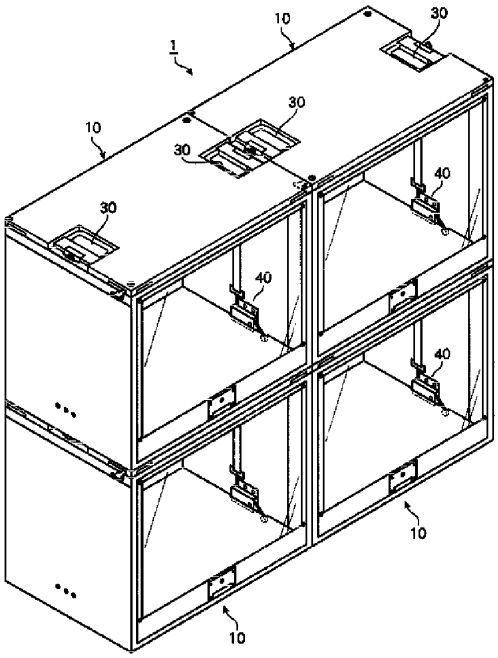
【図３】



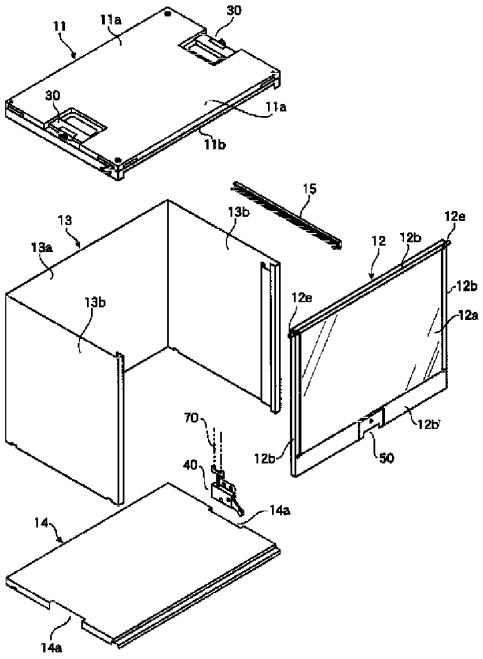
【図７】



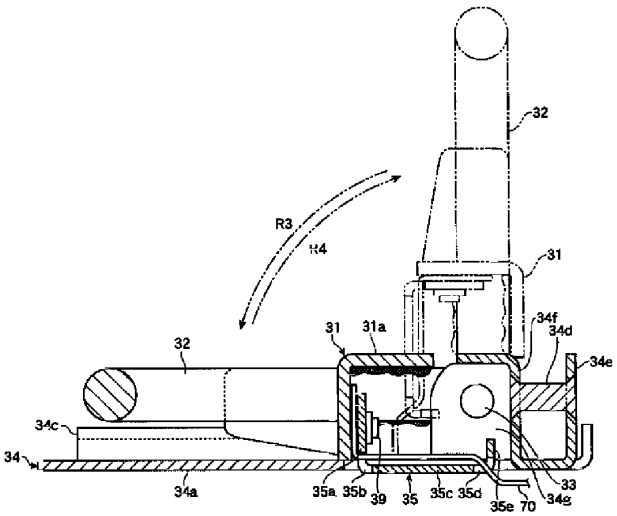
【図1】


1
10
30
40

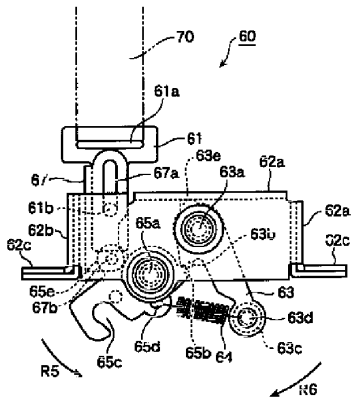
【図2】


11
11a
11b
30
15
13
13a
13b
12
12a
12b
12e
70
40
14
14a
50

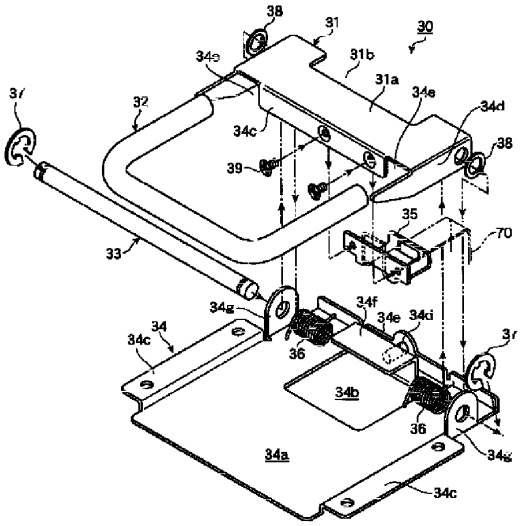
【図4】


32
R3
R4
31
31a
34
34a
34c
34d
34e
34f
33
34g
35
35a
35b
35c
35d
35e
39
70

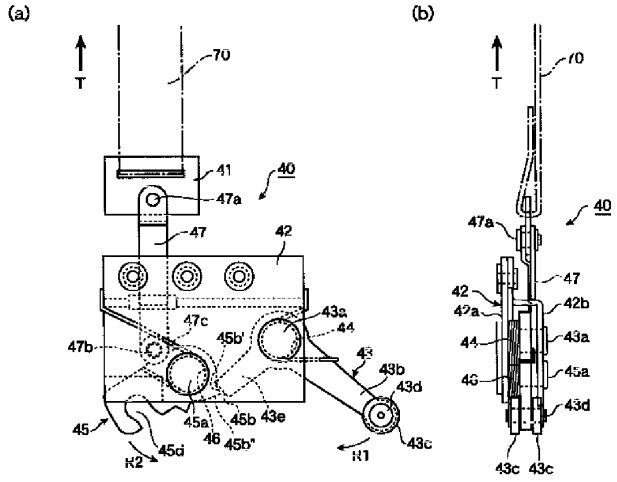
【図9】


70
60
61a
61
67a
63e
63a
62a
61b
62b
62c
65a
63b
65e
67b
63
63d
63c
65d
65b
64
65c
R5
R6

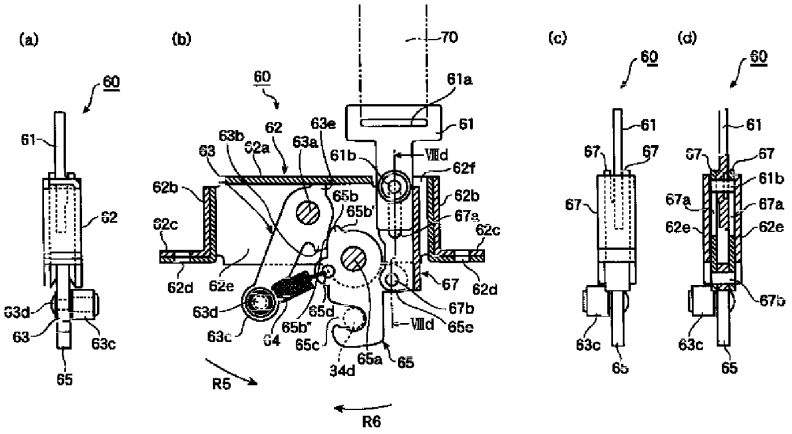
【図5】


38
31
30
34e
31b
31a
34e
34d
37
32
34c
38
39
35
70
33
34g
34f
34e
34d
37
34
34c
36
34b
36
34a
34c

【図6】


(a)
(b)
T
70
41
40
47a
47
42
47c
43a
44
47b
45b
43
43b
43d
45a
45b
43e
45
46
45b'
45d
R2
R1
43c
T
70
40
47a
47
42
42a
42b
44
43a
46
45a
43d
43c
43c

【図8】



フロントページの続き

(51)Int.Cl.[7]	識別記号	FI		(参考)
F16B	1/04	F16B	1/04	A
	12/10		12/10	A

Fターム(参考) 2C017 SA06 SB02 SB06 VA02 VB21
VB23
3B060 BA01 BB02 BC02 BD01 BD02
BE02 BF03
3J001 FA15 GA02 GA06 GB01 HA04
HA08 JD25 KA19 KB03
3J024 AA43 CA16

PTO/SB/08 (09-06)
Approved for use through 03/31/2007. 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.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Date Submitted: December 5, 2019

(use as many sheets as necessary)

Sheet 1 of 5

Complete if Known	
Application Number	16/216,724
Filing Date	December 11, 2018
First Named Inventor	Yaron Brunner
Art Unit	3736
Examiner Name	WEINERTH, GIDEON R
Attorney Docket Number	066749-2270

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number: Number-Kind Code[2] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	A1	2,042,387	05-26-1936	COBB DAVID F	
	A2	2,970,358	02-07-1961	E. C. Elsner	
	A3	3,506,321	04-14-1970	Hampel	
	A4	3,974,898	08-17-978	Tullis et al.	
	A5	4,168,076	09-18-1979	Johnson	
	A6	5,035,445	07-30-1991	Poulin	
	A7	5,105,947	04-21-1992	Wise, Thomas W.	
	A8	5,301,829	04-12-1994	Chrisco	
	A9	5,797,617	08-25-1998	Lin Shiou Chang	
	A10	5,951,037	09-14-1999	Hsieh Hung-Ching	
	A11	6,050,660	04-18-2000	Gurley	
	A12	6,109,627	08-29-2000	Sung Hoan Be	
	A13	6,176,559	01-23-2001	Tiramani et al.	
	A14	6,347,847	02-19-2002	Tiramani et al.	
	A15	6,367,631	04-09-2002	Steigerwald	
	A16	6,371,320	04-16-2002	Sagol	
	A17	6,431,580	08-13-2002	Darren J. Kady	
	A18	6,601,930	08-05-2003	Tiramani et al.	
	A19	6,619,772	09-16-2003	Dierbeck	
	A20	6,945,546	09-20-2005	Edward G. Guirlinger	
	A21	6,948,691	09-27-2005	Brock et al.	
	A22	6,983,946	01-10-2006	Sullivan et al.	
	A23	7,044,484	05-16-2006	Wang	
	A24	7,066,475	06-27-2006	Bret E. Barnes	
	A25	7,147,243	12-12-2006	Darren Kady	
	A26	7,263,742	09-04-2007	Guido Valentini	
	A27	7,367,571	05-06-2008	Nichols	
	A28	7,658,887	02-09-2010	Hovatter	
	A29	7,780,026	08-24-2010	Zuckerman	
	A30	8,028,845	10-04-2011	Himes	
	A31	8,191,910	06-05-2012	Landau et al.	
	A32	8,454,033	06-04-2013	Tsai	
	A33	8,689,396	04-08-2014	Melvin E. Wolfe	
	A34	8,714,355	05-06-2014	Huang	
	A35	8,985,922	03-24-2015	Neumann	
	A36	9,643,629	05-09-2017	The Stanley Works Israel Ltd.	
	A37	2002/0171228	11-21-2002	Kady	
	A38	2003/0115715	06-26-2003	Guido Valentini	
	A39	2003/0146589	08-07-2003	Jarko et al.	

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation 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 applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

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 2 hours 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, 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**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

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.

Substitute for form 1449/PTO				***Complete if Known***	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	16/216,724
				Filing Date	December 11, 2018
Date Submitted: December 5, 2019				**First Named Inventor**	Yaron Brunner
				Art Unit	3736
(use as many sheets as necessary)				Examiner Name	WEINERTH, GIDEON R
Sheet	2	of	5	Attorney Docket Number	066749-2270

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant
	A40	2003/0184034	10-02-2003	Pfeiffer	
	A41	2003/0205877	11-06-2003	Verna et al.	
	A42	2004/0103494	06-03-2004	Valentini	
	A43	2004/0206656	10-21-2004	Dubois et al.	
	A44	2005/0062244	03-24-2005	Guirlinger	
	A45	2005/0104308	05-19-2005	Barnes	
	A46	2006/0006770	01-12-2006	Valentini	
	A47	2006/0119060	06-08-2006	Sullivan et al.	
	A48	2007/0090616	04-26-2007	Tompkins	
	A49	2007/0145700	06-28-2007	Ambrose et al.	
	A50	2008/0121547	05-29-2005	Dur et al.	
	A51	2008/0271280	11-06-2008	FUCHS FRANK et al.	
	A52	2009/0071990	03-19-2009	Jardine et al.	
	A53	2009/0145913	06-11-2009	Panosian et al.	
	A54	2009/0178946	07-16-2009	Patstone et al.	
	A55	2010/0052276	03-04-2010	Brunner	
	A56	2010/0139566	06-10-2010	Lopuszanski, Michel	
	A57	2011/0220531	09-15-2011	Meether et al.	
	A58	2012/0160886	06-28-2012	Henny Paul et al.	
	A59	2012/0180250	07-19-2012	KAERCHER GMBH AND CO ALFRED KG	
	A60	2013/0024468	01-24-2013	Kocsis, Susan C.	
	A61	2013/0031731	02-07-2013	KAERCHER GMBH AND CO ALFRED KG	
	A62	2013/0031732	02-07-2013	KAERCHER GMBH AND CO ALFRED KG	
	A63	2013/0223971	08-29-2013	Grace IV, Robert W.	
	A64	2014/0161518	06-12-2014	KO	
	A65	2017/0165828	06-15-2017	Festool GmbH	
	A66	2017/0257958	09-07-2017	Sabbag et al.	
	A67	2017/0257958	09-07-2017	The Stanley Works Israel Ltd.	
	A68	2018/0220758	08-09-2018	Rothenberger AG	
	A69	2019/0039781	02-07-2019	Kogel	
	A70	D525,789	08-01-2006	Hosking	
	A71	D630,851	01-18-2011	Landau et al.	
	A72	D674,605	01-22-2013	Vilkomirski et al.	
	A73	D663,952	07-24-2012	CREVLING et al.	
	A74	D664,354	07-31-2012	CREVLING et al.	
	A75	D701,696	04-01-2014	Shitrit et al.	
	A76	D753,394	04-12-2016	Brunner	
	A77	D753,395	04-12-2016	Brunner	

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation 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 applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

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 2 hours 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, 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**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

PTO/SB/08 (09-06)
Approved for use through 03/31/2007. 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.

Substitute for form 1449/PTO				***Complete if Known***	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	16/216,724
				Filing Date	December 11, 2018
Date Submitted: December 5, 2019				**First Named Inventor**	Yaron Brunner
				Art Unit	3736
(use as many sheets as necessary)				Examiner Name	WEINERTH, GIDEON R
Sheet	3	of	5	Attorney Docket Number	066749-2270

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant
	A78	D765,974	09-13-2016	Tonelli et al.	
	A79	D770,179	11-01-2016	Menirom	
	A80	D790,221	06-27-2017	Yahav et al.	
	A81	D814,187	04-03-2018	Caglar	
	A82	D833,744	11-20-2018	Yahav et al.	
	A83	D837,515	04-08-2019	Shpitzer	

UNPUBLISHED U.S. PATENT APPLICATION DOCUMENTS

Examiner Initials*	Cite No.[1]	U.S. Patent Application Document Serial Number-Kind Code[2] (*if known*)	Filing Date of Cited Document MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Documents	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	A84	CN101068661	11-07-2007	BOSCH GMBH ROBERT		
	A85	CN102248523	11-23-2011	CHANGHONG HAN et al.		
	A86	CN102469899	05-23-2012	KAERCHER GMBH AND CO KG ALFRED		
	A87	CN102834035	12-19-2012	KAERCHER GMBH AND CO ALFRED KG		
	A88	CN 103118578	05-22-2013	KAERCHER GMBH AND CO ALFRED KG		
	A89	CN 200947356	09-12-2007	FU GANG		
	A90	DE102004057870	06-01-2006	BOSCH GMBH ROBERT		
	A91	DE102010003754	10-13-2011	KAERCHER GMBH AND CO ALFRED KG		
	A92	DE102010003756	10-13-2011	KAERCHER GMBH AND CO ALFRED KG		
	A93	DE102012106482	01-23-2014	WAIGEL JOACHIM		
	A94	DE102012220837	05-15-2014	BOSCH GMBH ROBERT		
	A95	DE102015013053	04-13-2017	BURCHIA ROLF		
	A96	DE102015112204	02-16-2017	PERL MICHAEL		

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation 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 applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

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 2 hours 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, 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**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

PTO/SB/08 (09-06)
Approved for use through 03/31/2007. 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.

Substitute for form 1449/PTO				***Complete if Known***	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	16/216,724
				Filing Date	December 11, 2018
Date Submitted: December 5, 2019				**First Named Inventor**	Yaron Brunner
				Art Unit	3736
(use as many sheets as necessary)				Examiner Name	WEINERTH, GIDEON R
Sheet	4	of	5	Attorney Docket Number	066749-2270

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document: Country Code[3]-Number[4]-Kind Code[5] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Documents	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	A97	DE202011002617	04-28-2011	Bekuplast Kunststoffverarbeitungs-GmbH		
	A98	DE19750543	05-20-1999	FESTO TOOLTECHNIC GMBH AND CO		
	A99	DE20218996	03-06-2003	TTS TOOLTECHNIC SYSTEMS AG		
	A100	DE29708343	07-03-1997	FLIESEN RICHTER GMBH		
	A101	DE3510307	09-25-1986	SPIELHOFF HANS-PETER		
	A102	DE4415638	11-09-1995	Halm		
	A103	DE9313802	12-02-1993	TUNG I ENTERPRISE CO		
	A104	EP0916302	05-19-1999	FESTO TOOLTECHNIC GMBH AND CO		
	A105	EP2289671	03-02-2011	Stanley Works Israel		
	A106	EP1321247	06-25-2003	VALENTINI GUIDO		
	A107	EP1428764B1	06-16-2004	DUBOIS JEAN-MARC et al.		
	A108	EP1819487	08-22-2007	BOSCH GMBH ROBERT		
	A109	EP2346741	07-27-2011	MADSEN JENS OLE		
	A110	EP2456341	05-30-2012	KAERCHER GMBH AND CO ALFRED KG		
	A111	EP2555660	02-13-2013	KAERCHER GMBH AND CO ALFRED KG		
	A112	EP2555661	02-13-2013	KAERCHER GMBH AND CO ALFRED KG		
	A113	GB2330521	04-28-1999	SPOONER PAUL		
	A114	EP2805799	11-23-2016	FLEISCHMANN BERND et al.		
	A115	EP3141354	03-15-2017	KOCH SIMON et al.		
	A116	GB2047181B	02-02-1983	REUNIS SA ATELIERS		
	A117	GB2406331	03-30-2005	JEFFRIES JULIAN CLIFFORD		
	A118	GB2413265	10-26-2005	THOMSON BRIAN		
	A119	GB694707	07-22-1953	GEORGE ARTHUR CHARD		
	A120	JP2003194020A	07-09-2003	SUGIMURA ATSUAKI		

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	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.	T[6]

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation 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 applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

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 2 hours 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, 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**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

PTO/SB/08 (09-06)
Approved for use through 03/31/2007. 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.

Substitute for form 1449/PTO				***Complete if Known***	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	16/216,724
				Filing Date	December 11, 2018
Date Submitted: December 5, 2019				**First Named Inventor**	Yaron Brunner
				Art Unit	3736
(use as many sheets as necessary)				Examiner Name	WEINERTH, GIDEON R
Sheet	5	of	5	Attorney Docket Number	066749-2270

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No.[1]	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.	T[6]

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation 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 applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

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 2 hours 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, 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**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

Electronic Patent Application Fee Transmittal

Application Number:	16216724
Filing Date:	11-Dec-2018
Title of Invention:	Utility Assembly and Coupling Mechanism
First Named Inventor/Applicant Name:	Yaron Brunner
Filer:	Derek Howard Campbell/Andrea Dietzel
Attorney Docket Number:	066749-2270

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:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
RCE- 1ST REQUEST	1801	1	1300	1300
		Total in USD ($)		**1300**

Electronic Acknowledgement Receipt	
EFS ID:	37932034
Application Number:	16216724
International Application Number:	
Confirmation Number:	1402
Title of Invention:	Utility Assembly and Coupling Mechanism
First Named Inventor/Applicant Name:	Yaron Brunner
Customer Number:	142078
Filer:	Derek Howard Campbell/Andrea Dietzel
Filer Authorized By:	Derek Howard Campbell
Attorney Docket Number:	066749-2270
Receipt Date:	05-DEC-2019
Filing Date:	11-DEC-2018
Time Stamp:	13:47:19
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$1300
RAM confirmation Number	E2019B5D49243139
Deposit Account	180882
Authorized User	Andrea Dietzel
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)	

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	Transmittal Letter	066749-2270_Transmittal.pdf	135111 3144bae7dc92df2178eb5816b626266130d8a63c	no	2
Warnings:					
Information:					
2	Request for Continued Examination (RCE)	066749-2270_RCE.pdf	76540 345b669186ab20467a9e3b3c0e9cb7daad75fef5	no	3
Warnings:					
This is not a USPTO supplied RCE SB30 form.					
Information:					
3	Foreign Reference	CN101068661A.pdf	4081845 12ad99145e36d5b23cb754b60cf2c4eac550dd20	no	22
Warnings:					
Information:					
4	Foreign Reference	CN102248523A.pdf	2158720 ccf1942e12eee2559963d49704c2b96433bb4e37	no	14
Warnings:					
Information:					
5	Foreign Reference	CN102469899A.pdf	5104808 36fd720bb7a22b8e50b279b5726d0ecc36f1b4eb	no	23
Warnings:					
Information:					
6	Foreign Reference	CN102834035A.pdf	5233787 410f1eb406770264743cd1796c1379ff6f95590c	no	20
Warnings:					

Information:					
7	Foreign Reference	CN103118578A.pdf	3263528 41a0d82e40ea351ce50046c8aa70f923b6a07d31	no	13
Warnings:					
Information:					
8	Foreign Reference	CN200947356Y.pdf	1124889 d97760c944a7c3d3b0effcd81d27e338644babbc	no	7
Warnings:					
Information:					
9	Foreign Reference	DE102004057870A1.pdf	2951842 fd4a41363734cf66020680133dc8d43514d07a97	no	16
Warnings:					
Information:					
10	Foreign Reference	DE102010003754A1.pdf	2998909 9c89f1ed3be3ddd6866372007e2c51ff91d1c1a6	no	14
Warnings:					
Information:					
11	Foreign Reference	DE102010003756A1.pdf	4433719 f90c56785c7ea529c6b5649687f70fafcfcdd55c	no	20
Warnings:					
Information:					
12	Foreign Reference	DE102012106482A1.pdf	1308058 b301332376f2c55b07fa768c78ab61f200a0f901	no	8
Warnings:					
Information:					
13	Foreign Reference	DE102012220837A1.pdf	3088907 284d4e97e82ddc1cc3287cc0f5bee5ac643637df	no	16
Warnings:					
Information:					

14	Foreign Reference	DE102015013053A1.pdf	3936615 fcbec7d0371436237c646c11dc7fda3adc59c4bb	no	24
Warnings:					
Information:					
15	Foreign Reference	DE102015112204A1.pdf	3405963 5eb60126a373b7465ff39a816d461a44dff5a32f	no	17
Warnings:					
Information:					
16	Foreign Reference	DE202011002617U1.pdf	1074342 142050e6aebedd9507a97b54ae7fddccbe15c15b	no	24
Warnings:					
Information:					
17	Foreign Reference	DE19750543A1.pdf	1482852 3780b22b1bc5eb1d4342d0fcedde333ca04d026a	no	7
Warnings:					
Information:					
18	Foreign Reference	DE20218996U1.pdf	2234499 4c41881c5845cfbe17279dc169461a91147ec339	no	16
Warnings:					
Information:					
19	Foreign Reference	DE29708343U1.pdf	1989268 1c15433fc59b3a5b995fc39ac1ca8f96a70c6446	no	13
Warnings:					
Information:					
20	Foreign Reference	DE3510307A1.pdf	2066529 f614255520ebecf2d295e78be50e068a5b167d3d	no	17
Warnings:					
Information:					

21	Foreign Reference	DE4415638A1.pdf	4945134 9b286a7ffe447a6f2463d2563c44e7d8d2c3a98e	no	19
Warnings:					
Information:					
22	Foreign Reference	DE9313802U1.pdf	2438203 94ecab7a62e99a9d0956e78a858f15569e5c8752	no	17
Warnings:					
Information:					
23	Foreign Reference	EP0916302A2.pdf	1528277 2c39decdc5b051e896392565b5b9e84dd2b6f609	no	8
Warnings:					
Information:					
24	Foreign Reference	EP2289671A2.pdf	2983556 efe835a311e2c06de2b64c423ad9ac7722f1e697	no	47
Warnings:					
Information:					
25	Foreign Reference	EP1321247A2.pdf	443991 db49fd929ac10cc70f905ee89121b45fd91fb1ac	no	14
Warnings:					
Information:					
26	Foreign Reference	EP1428764A1.pdf	3628283 05b9cfe8008068c6400df81ca3a2f757a9d51eec	no	18
Warnings:					
Information:					
27	Foreign Reference	EP1819487A1.pdf	4775172 f60e5f183ad52171d8e4f33d951e2193fee1cf6f	no	32
Warnings:					
Information:					

28	Foreign Reference	EP2346741.pdf	17523 9a4004977566b5c067573ccdb2935d7df8334412	no	1
Warnings:					
Information:					
29	Foreign Reference	EP2456341A1.pdf	6437860 0e4d322b06779adef005b7fdf6337de9cf310d00	no	43
Warnings:					
Information:					
30	Foreign Reference	EP2555660A2.pdf	3603075 078f37088ade50e07ff9c6dbb8331dedcfb4c4c7	no	23
Warnings:					
Information:					
31	Foreign Reference	EP2555661A1.pdf	5810956 a94872b8ffe24d473f5560e4dc6f8afb36524cac	no	37
Warnings:					
Information:					
32	Foreign Reference	GB2330521A.pdf	293383 f7998a94eed705a630061d6273dc547fbafad09c	no	9
Warnings:					
Information:					
33	Foreign Reference	EP2805799B1.pdf	4013143 e84d8a97f21cb392d38c99967daca823a6d0b047	no	18
Warnings:					
Information:					
34	Foreign Reference	EP3141354A1.pdf	10097398 80a40bdb47b643ab2d700cdfed23ff2de8ffb15b	no	44
Warnings:					
Information:					

35	Foreign Reference	GB2047181B.pdf	538513 bb08c34e76375032eb3c31a2be0753ad3cf60460	no	9
Warnings:					
Information:					
36	Foreign Reference	GB2406331A.pdf	325453 c455828642c2b563f04327522b13dc2deaf97229	no	9
Warnings:					
Information:					
37	Foreign Reference	GB2413265A.pdf	185690 adc313f4c0832d338b318c6e4e97b22c00ceebc4	no	9
Warnings:					
Information:					
38	Foreign Reference	GB694707A.pdf	233584 ee165705407e68ce2a963b9c9656e0eaf11df9a8	no	4
Warnings:					
Information:					
39	Foreign Reference	JP2003194020A.pdf	1296265 6d66f36683a93624f0571d1dcc1cb829a143f45d	no	10
Warnings:					
Information:					
40	Information Disclosure Statement (IDS) Form (SB08)	066749-2270_SB08.pdf	157389 fdc8bd8f53f936d74cafbe1dd399e45ccf3d9e21	no	5
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
41	Fee Worksheet (SB06)	fee-info.pdf	30417 1d66c43d5d4025d8450d7d0c44430578f5ef16e1	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	105933996		

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Milwaukee Electric Tool Corporation
Title:	Utility Assembly and Coupling Mechanism
Appl. No.:	16/216,724
Filing Date:	December 11, 2018
Examiner:	WEINERTH, GIDEON R
Art Unit:	3736
Confirmation Number:	1402

INFORMATION DISCLOSURE STATEMENT UNDER 37 CFR §1.56

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Submitted herewith on Form PTO/SB/08 is a listing of the documents known to Applicants in order to comply with Applicants' duty of disclosure pursuant to 37 CFR § 1.56.

A copy of each non-U.S. patent document and each non-patent document is being submitted to comply with the provisions of 37 CFR § 1.97 and §1.98.

The submission of any document herewith, which is not a statutory bar, is not intended as an admission that such document constitutes prior art against the claims of the present application or that such document is considered material to patentability as defined in 37 CFR §1.56(b). Applicants do not waive any rights to take any action which would be appropriate to antedate or otherwise remove as a competent reference any document which is determined to be a *prima facie* art reference against the claims of the present application.

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2002 - Page 1128
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01400

TIMING OF THE DISCLOSURE

The listed documents are being submitted in compliance with 37 CFR §1.97(b)(4), before the mailing of a first Office action after the filing of a Request for Continued Examination under §1.114.

RELEVANCE OF EACH DOCUMENT

The relevance of the foreign-language document is shown in the figures of foreign-language documents and/or are described in the English-language abstract submitted herewith, where available. An English translation of the foreign-language document is not readily available. However, the absence of such translation does not relieve the PTO from its duty to consider the submitted foreign language document (37 CFR §1.98 and MPEP §609)

Applicants respectfully request that each listed document be considered by the Examiner and be made of record in the present application and that an initialed copy of Form PTO/SB/08 be returned in accordance with MPEP §609.

Although Applicant believes that no fee is required for this Request, the Commissioner is hereby authorized to charge any additional fees which may be required for this Request to Deposit Account No. 18-0882.

Respectfully submitted,

Date December 4, 2019

By /Derek H. Campbell/

Reinhart Boerner Van Deuren s.c.
Customer Number: 142078
Telephone: (414) 298-8374
Facsimile: (414) 298-8097

Derek H. Campbell
Attorney for Applicant
Registration No. 70,608

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2002 - Page 1129
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01400

PTO/SB/08 (09-06)
Approved for use through 03/31/2007. 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.

Substitute for form 1449/PTO				***Complete if Known***	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	16/216,724
				Filing Date	December 11, 2018
Date Submitted: December 5, 2019				**First Named Inventor**	Yaron Brunner
				Art Unit	3736
(use as many sheets as necessary)				Examiner Name	WEINERTH, GIDEON R
Sheet	1	of	2	Attorney Docket Number	066749-2270

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

UNPUBLISHED U.S. PATENT APPLICATION DOCUMENTS

Examiner Initials*	Cite No.[1]	U.S. Patent Application Document Serial Number-Kind Code[2] (*if known*)	Filing Date of Cited Document MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Documents	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	A1	WO07121745	11-01-2007	MADSEN JENS OLE		
	A2	WO07121746	11-01-2007	MADSEN JENS OLE		
	A3	WO09140965	11-26-2009	MADSEN JENS OLE		
	A4	WO11009480	01-27-2011	RICKLEFSEN DIRK et al.		
	A5	WO13026084	02-28-2013	VAN DER LINDE et al.		
	A6	WO14125488	08-21-2014	BRUNNER YARON		
	A7	WO17212840	12-14-2017	FURUTA YOSHIHISA		
	A8	WO2007121745A1	11-01-2007	MADSEN JENS OLE		
	A9	WO2017191628	11-09-2017	BRUNNER YARON		

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	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.	T[6]
	A10	International Search Report and Written Opinion for International Application No. PCT/US2018/033161, dated August 6, 2018, 14 pages.	
	A11	International Search Report and Written Opinion for International Application No. PCT/US2019/014940, dated July 26, 2019, 7 pages.	

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation 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 applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

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 2 hours 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, 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**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

PTO/SB/08 (09-06)
Approved for use through 03/31/2007. 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.

Substitute for form 1449/PTO				***Complete if Known***	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	16/216,724
				Filing Date	December 11, 2018
Date Submitted: December 5, 2019				**First Named Inventor**	Yaron Brunner
				Art Unit	3736
(use as many sheets as necessary)				Examiner Name	WEINERTH, GIDEON R
Sheet	2	of	2	Attorney Docket Number	066749-2270

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No.[1]	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.	T[6]
	A12	International Search Report and Written Opinion for International Application No. PCT/IL2019/050689, dated August 23, 2019, 21 pages.	
	A13	STUART, "Sys-Cart Base, a Systainer Mounting Platform," TOOLGUYD, July 28, 2014, https://toolguyd.com/systainer-sys-cart-mounting-base/, 11 pages.	
	A14	"BluCave Universal Storage System," BATAVIA Tools to Build, https://batavia.eu/blucave-storage-system/, believed to be available at least as early as November 29, 2017, 5 pages.	
	A15	"Dewalt TSTAK Carrier Trolley," ITS, https://www.its.co.uk/pd/171229-Dewalt-TSTAK-Carrier-Trolley-_DEW171229.htm, Per Wayback, website dates back to May 2, 2015, 2 pages.	
	A16	"Tool Skool, TSTAK Phase 2 Upgrades | TSTAK Carts – First Look – Tool Skool," YouTube, September 7, 2013, https://www.youtube.com/watch?v=jb06y6J1dr4&feature=youtu.be&t=197, 1 page.	
	A17	"DeWalt TSTAK Vac Rack (Suits DW DWV902M & DWV900L) DWV9500-XJ," Get Tools Direct, https://www.gettoolsdirect.com.au/dewalt-tstak-vac-rack-suits-dwv902m-and-dwv900l-dwv9500-xj.html, believed to be available at least as early as November 29, 2017, 4 pages.	
	A18	STUART, "Ryobi ToolBlox Tool Cabinet System!," TOOLGUYD, September 18, 2014, https://toolguyd.com/ryobi-toolblox-cabinets/, 23 pages.	
	A19	"Blitz Box – Portable Storage Box / Shelf," The Green Head Finds Cool New Stuff, https://www.thegreenhead.com/2013/03/blitz-box-portable-storage-box-shelf.php, Per Wayback, website dates back to February 15, 2015, 5 pages.	
	A20	"Hopkins FloTool 91002 Rhino Box with Mount," Amazon.com, https://www.amazon.com/exec/obidos/ASIN/B003K15F3I/20140000-20, believed to be available at least as early as November 29, 2017, 7 pages.	
	A21	Sortimo Logistix, "Mobile Sortimente", brochure, believed to be available at least as early as November 29, 2017, 17 pages.	
	A22	BluCave Video, https://www.youtube.com/watch?v=Sw7fQQPwoOtY&feature=youtu.be&t=32, believed to be available at least as early as November 29, 2017.	
	A23	Batavia Gmbh, BluCave Storage System, https://protect-us.mimecast.com/s/5XfGCR6KypcgJnlKi9EDoim?domain=batavia.eu, believed to be available at least as early as November 29, 2017, 7 pages.	
	A24	VERTAK, https://www.alibaba.com/product-detail/Vertak-global-patented-multi-function-portable_60217794260.html, believed to be available at least as early as November 29, 2017.	

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation 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 applicant. 1 Applicant's unique citation designation number (optional). 2 See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). 4 For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5 Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. 6 Applicant is to place a check mark here if English language Translation is attached.

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 2 hours 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, 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**.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
1 November 2007 (01.11.2007)

PCT

(10) International Publication Number
WO 2007/121745 A1

(51) International Patent Classification:
B65D 21/02 (2006.01)

(21) International Application Number:
PCT/DK2007/000185

(22) International Filing Date: 20 April 2007 (20.04.2007)

(25) Filing Language: Danish

(26) Publication Language: English

(30) Priority Data:
PA 2006 00566 22 April 2006 (22.04.2006) DK

(71) Applicant *(for all designated States except US)*: **J. O. MADSEN APS** [DK/DK]; Hyldevænget 3, DK-5400 Bogense (DK).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **MADSEN, Jens, Ole** [DK/DK]; Hyldevænget 3, DK-5400 Bogense (DK).

(74) Agent: **LARSEN & BIRKEHOLM A/S**; Skandinavisk Patentbureau, Banegårdspladsen 1, P.O. Box 362, DK-1570 Copenhagen V (DK).

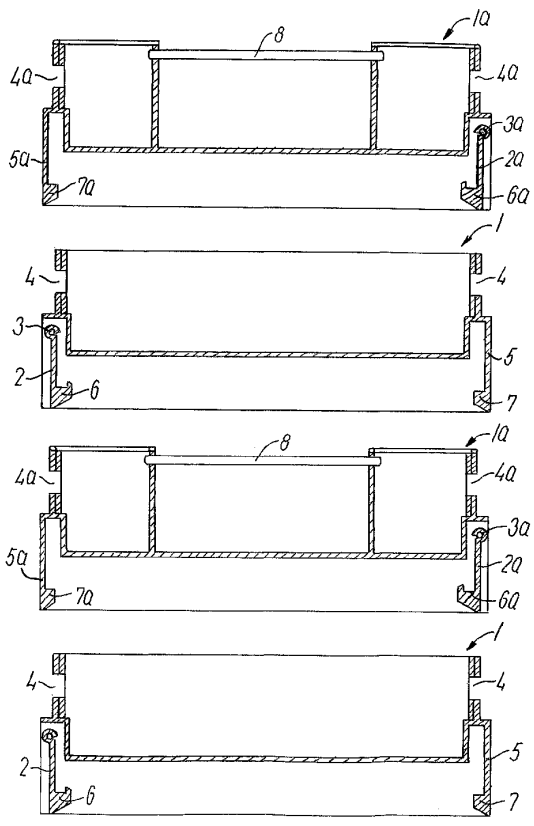
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

[Continued on next page]

(54) **Title:** STACKABLE BOXES AND COVERS



(57) **Abstract:** When stackable boxes (1) are coupled together, which are optionally provided with a cover (1a), all the boxes and covers have locking means, which are formed by at least one gripper part (2, 2a) at their underside, which is preferably biased (2, 3), and which is capable of gripping an edge (4, 4a) provided at the upper side of the boxes or the covers. Hereby, boxes and covers may always be coupled together in an arbitrary order. In a first embodiment, the boxes and the covers have snap locks (2, 2a) and edges (4, 4a) in their gables, while, in a second embodiment, they are constructed with a gripper part and an edge in their one gable, while, in the other gable, they are provided with hooks or flanges which are capable of engaging fixing holes. The stackable boxes may generally be used as a storage device.

WO 2007/121745 A1

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

STACKABLE BOXES AND A STORAGE DEVICE

The invention relates to stackable boxes which may be coupled to each other by locking means, said locking means being formed by locking parts at the bottom of a box which are capable of cooperating with locking means at the top of a box, wherein a removable cover has locking means at the bottom which are of the same type as the locking means at the bottom of a box.

The invention moreover relates to a storage device.

Stackable boxes are known e.g. from DE Utility Model No. 78 28 640. These known boxes, which may have mutually different heights, may be coupled to each other and be terminated at the top by a cover.

EP 555 533 B1 also discloses stackable boxes which may be coupled together.

According to this patent, all the boxes have a cover which is confined between two boxes when the boxes are clamped together.

Thus, the boxes are clamped together analogously with the boxes in the above-mentioned utility model, but with a cover which is arranged between the boxes.

Accordingly, an object of the invention is to provide stackable boxes with or without a cover, which may be coupled together in order to achieve a more flexible stacking, where boxes and covers may be coupled together in an arbitrary order.

The object of the invention is achieved by stackable boxes of the type de-

fined in the introductory portion of claim 1, which is characterized in that the cover has locking means at the top of the cover which are of the same type as the locking means at the top of a box.

Hereby, boxes and covers may be coupled together in an arbitrary order.

For instance, three boxes without a cover may be coupled together, or two boxes without a cover may be coupled together with a box having a cover, and in an arbitrary order.

It is even possible to stack several covers on top of each other, if the teachings in claim 1 are followed.

A user-friendly way of configuring the boxes and the covers is, as stated in claim 2, that the locking means at the bottom of the boxes and the covers are formed by at least one snap lock, which is adapted to grip an edge at the top of the boxes or the covers.

Expediently, as stated in claim 3, the covers and the boxes have two snap locks and two edges, and, as stated in claim 4, at least one snap lock is biased, which results in an embodiment which makes it easy to couple-together the stackable boxes and covers and to separate them from each other.

When, as stated in claim 5, the cover is provided with a carrier grip which is recessed into the cover, and, as stated in claim 6, the covers and the boxes have a snap lock at the bottom and an edge at the top in their one gable, while they have hooks or flanges at the bottom in their opposite gable, which are capable of engaging fixing holes positioned at the top of the cover or the box, it is advantageously ensured that the snap locks of the stackable boxes are not subjected to loads, which may occur if the stack-

able boxes are very heavy, as the separation of the boxes from each other takes place in that the one snap lock is loosened from its edge on an underlying box or cover, following which the loosened box and the overlying boxes are pushed to the side, and then the carrier grip is used for lifting the boxes away from the underlying boxes.

When the boxes are coupled together, they are moved laterally inwards, whereby the hooks or the flanges extend into the fixing holes, while the snap lock automatically locks the boxes to each other.

Finally, as stated in claim 7, it is possible that the snap locks are arranged in the gables or on the sides of the boxes and the covers.

As mentioned, the invention also relates to a storage device.

This storage device is characterized in that each cover has upper and lower coupling means which are of the same type as the upper and lower coupling means of the boxes, whereby, when the boxes are stacked on top of each other, the lower coupling means of each cover cooperates with the upper coupling means of an associated box, and if this box is positioned at the bottom in the stack, its upper coupling means cooperates with the lower coupling means of the overlying box in order to couple covers and boxes together.

An expedient embodiment of the storage device is defined in claim 9.

The invention will now be explained more fully with reference to the drawing, in which

fig. 1 shows a box with a snap lock and an edge according to the invention,

fig. 2 shows two boxes with a cover which are coupled together, while

fig. 3 shows two boxes and two covers in a separated state, seen from the

side in section, but with a snap lock modified relative to fig. 2.

It is noted initially that the parts which the covers have in common with the boxes are provided with the same reference numerals as the boxes, but with a suffixed "a".

In fig. 1, the numeral 1 indicates a box which has locking means in the form of a snap lock 2 near its bottom in its one gable, said snap lock being formed by a plate which may rotate about a shaft.
The snap lock is biased by a spring 3 so that its plate will normally be flush with the vertical wall of the gable.
At its top, the box has an edge 4 which is adapted to receive a snap lock from another box or a cover, as will be explained below.
Finally, at its opposite end, the box has another snap lock, which, however, need not be biased by a spring, but may be made of a resilient material, cf. also fig. 3.
Further, the snap lock 2 and the edge 4 are configured in the same manner as described in the applicant's own EP 0 799 115.

Fig. 2 shows two boxes with covers which are coupled together.
At their lower side, the boxes have snap locks 2 which are biased by a spring 3.
At their lower side, the covers have snap locks 2a which are biased by a spring 3a.
At the upper side of the covers, which have a recessed carrier grip 8, edges 4a are arranged, which are adapted to grip snap locks 2, 2a from an overlying box, or, although it is not shown, snap locks 2a from an overlying cover.

In figure 3, the boxes and the covers have a spring-biased snap lock 2, 2a at their one end, while the snap lock 5, 5a at the opposite ends may be

made of a resilient material.

The spring-biased snap locks 2, 2a have engagement faces 6, 6a, while the snap locks of a resilient material have engagement faces 7, 7a.

When the boxes and the covers are assembled, as shown in fig. 3, a cover having a snap lock 5a without a spring is caused to engage an edge 4 on an underlying box 1 with its engagement face 7a by lateral displacement of the cover. Then, the snap lock 2a with the spring 3a will engage the edge 4 on the box, whereby the cover is coupled to the box.

The process may be repeated so that a plurality of covers and boxes may be coupled together in an arbitrary order, however, the covers may also be coupled to each other.

However, it is also possible to arrange hooks or flanges at the opposite gable, which may engage fixing holes, which, however, are not shown in the figures.

Finally, it should be mentioned that, although it is not shown in the figures, it is also possible to couple two or more covers together on top of each other.

As will be appreciated, the invention provides an extremely flexible stackable box system, where boxes and covers may be coupled together and be separated in an arbitrary order, where the stackable box system may serve as a general storage device.

PATENT CLAIMS

1. Stackable boxes (1) which may be coupled to each other by locking means, said locking means being formed by locking parts at the bottom of a box which is capable of cooperating with locking means at the top of a box, wherein a removable cover (1a) has locking means at the bottom which are of the same type as the locking means at the bottom of a box, c h a r a c – t e r i z e d in that the cover has locking means (4a) at the top of the cover which are of the same type as the locking means (4) at the top of a box.

2. Stackable boxes according to claim 1, c h a r a c t e r i z e d in that the locking means at the bottom of the boxes and the covers are formed by at least one snap lock (2, 2a), which is adapted to grip an edge (4, 4a) at the top of the boxes or the covers.

3. Stackable boxes according to claim 2, c h a r a c t e r i z e d in that the covers (1a) and the boxes (1) have two snap locks (2a, 5a, 2, 5) and two edges (4a, 4).

4. Stackable boxes according to claims 2 – 3, c h a r a c t e r i z e d in that at least one snap lock (2, 2a) is biased (3).

5. Stackable boxes according to claims 1 – 4, c h a r a c t e r i z e d in that the covers (1a) are provided with a carrier grip (8) which is recessed in the cover.

6. Stackable boxes according to claim 2, 4 or 5, c h a r a c t e r i z e d in that the covers (1a) and the boxes (1) have a snap lock (2, 2a) at the bottom and an edge (4, 4a) at the top in their one gable, while they have hooks or flanges at the bottom in their opposite gable which are capable of engaging fixing holes provided at the top of the cover or the box.

7. Stackable boxes according to claims 1 – 6, c h a r a c t e r i z e d in that the snap locks (2) are provided in the gables or on the sides of the boxes and the covers.

8. A storage device comprising two boxes which may be coupled together in a stack on top of each other, wherein the boxes have upper and lower coupling means, and wherein, when the boxes are stacked on top of each other, the lower coupling means of the upper box cooperates with the upper coupling means of the lower box in order to couple the boxes together, and wherein at least one of the boxes is provided with a cover, c h a r a c t e r – i z e d in that each cover has upper and lower coupling means which are of the same type as the upper and lower coupling means of the boxes, whereby, when the boxes are stacked on top of each other, the lower coupling means of each cover cooperates with the upper coupling means of the associated box, and if this box is positioned at the bottom in the stack, its upper coupling means cooperates with the lower coupling means of the overlying box in order to couple covers and boxes together.

9. A storage device according to claim 8, wherein the lower coupling means of each box and of each cover comprises at least one snap coupling, and wherein the upper coupling means of each box and of each cover comprises at least one edge for cooperation with respective snap couplings.

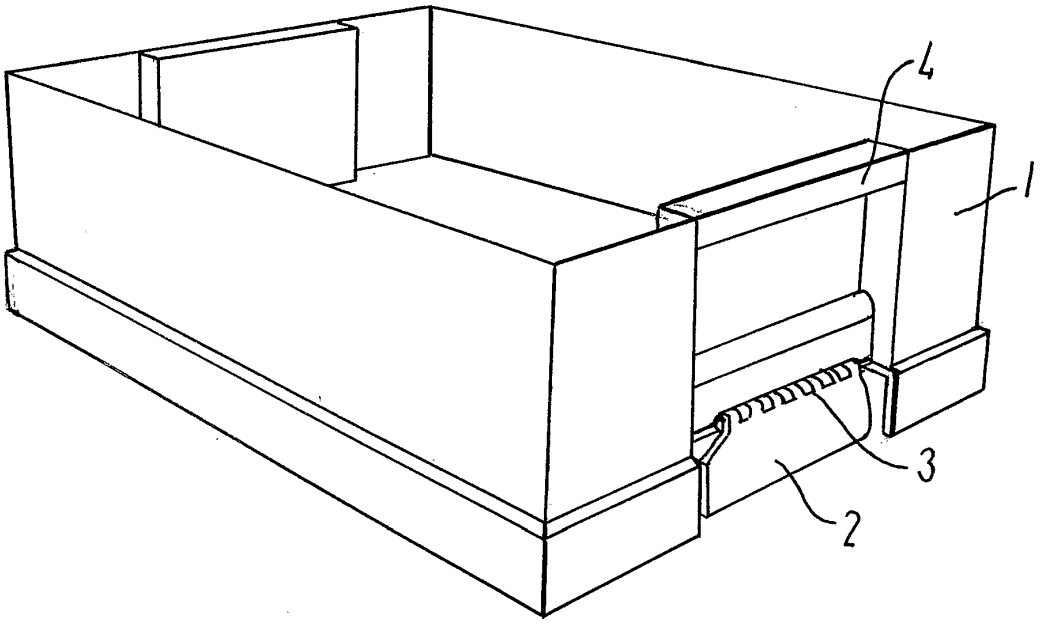


FIG. 1

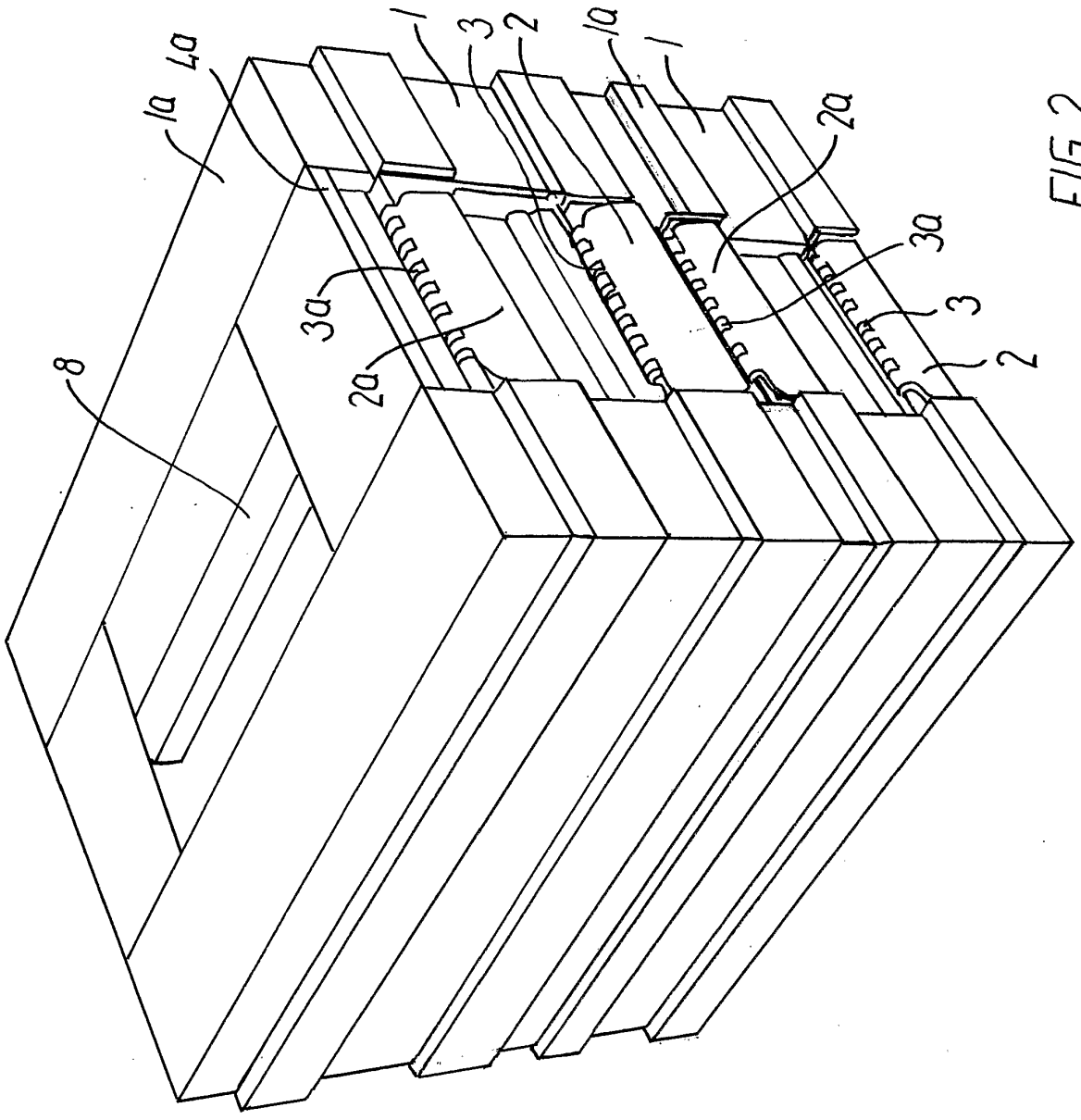
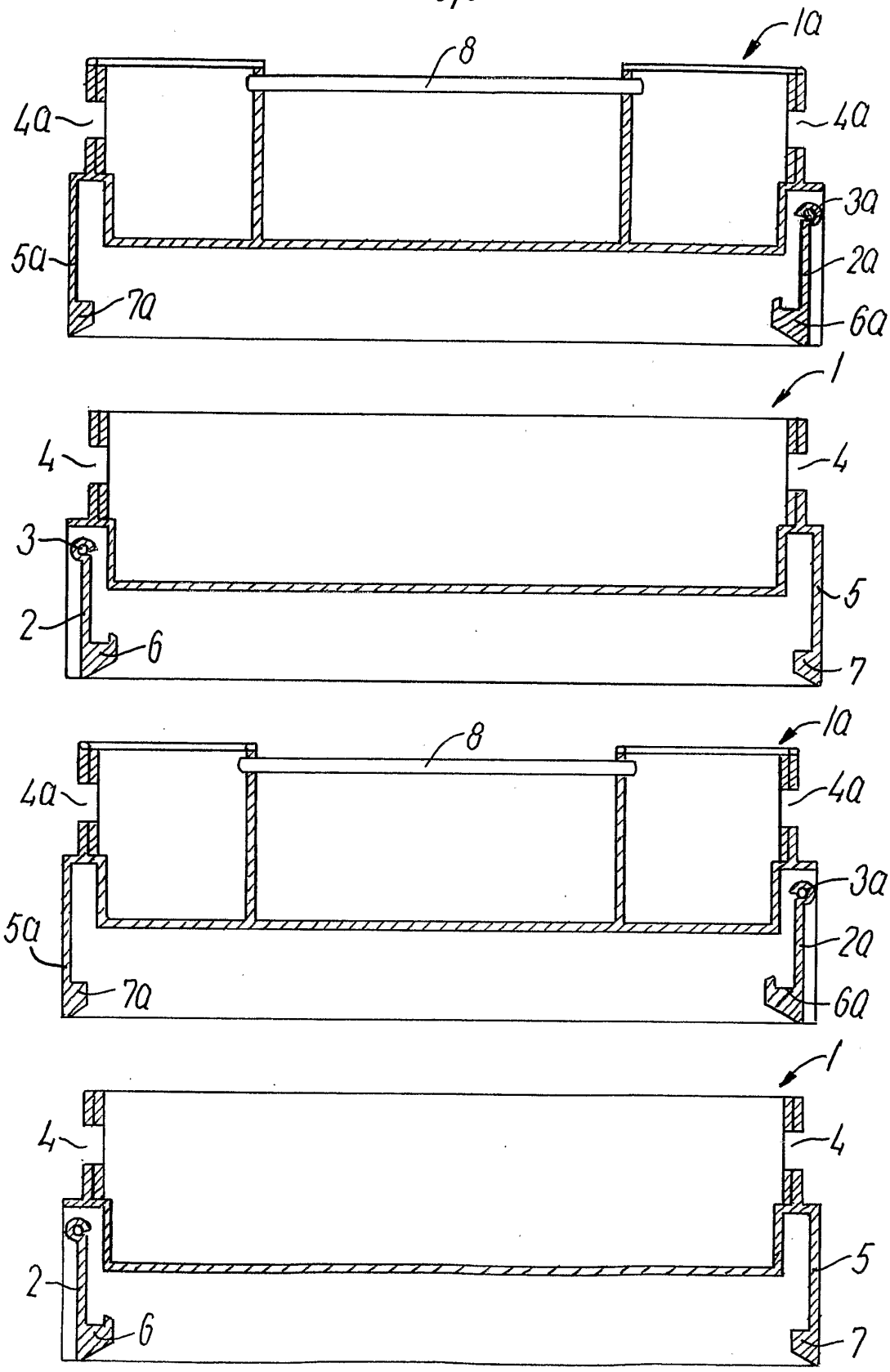


FIG. 2


1a
8
4a
4a
3a
5a
2a
7a
6a
1
4
4
3
5
2
6
7
1a
8
4a
4a
3a
5a
2a
7a
6a
1
4
4
5
2
6
7

INTERNATIONAL SEARCH REPORT

International application No
PCT/DK2007/000185

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65D21/02

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)
A45C B65D B25H

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 practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 42 01 264 A1 (FESTO KG [DE]) 22 July 1993 (1993-07-22) cited in the application column 1, line 35 - line 44	1,8
A	DE 94 06 521 U1 (JACOB FRANK [DE]) 14 July 1994 (1994-07-14) page 3, line 5 - line 14; figures 1-5	1,8
A	DE 78 28 640 U1 (ROX LEDERWARENFABRIKEN HAMANN KG, 8911 HOFSTETTEN) 4 January 1979 (1979-01-04) cited in the application figure 1	1,8

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* 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 document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 July 2007	30/07/2007

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Sundell, Olli

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/DK2007/000185

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
DE 4201264	A1	22-07-1993	AT	109744 T	15-08-1994
			EP	0555533 A1	18-08-1993
DE 9406521	U1	14-07-1994	NONE		
DE 7828640	U1	04-01-1979	NONE		

Form PCT/ISA/210 (patent family annex) (April 2005)

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
1 November 2007 (01.11.2007)

PCT

(10) International Publication Number
WO 2007/121746 A2

(51) International Patent Classification:
B65D 43/02 (2006.01)

(21) International Application Number:
PCT/DK2007/000186

(22) International Filing Date: 20 April 2007 (20.04.2007)

(25) Filing Language: Danish

(26) Publication Language: English

(30) Priority Data:
PA 2006 00568 22 April 2006 (22.04.2006) DK

(71) Applicant *(for all designated States except US)*: **J.O. MADSEN APS** [DK/DK]; Hyldevænget 3, DK-5400 Bogense (DK).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **MADSEN, Jens, Ole** [DK/DK]; Hyldevænget 3, DK-5400 Bogense (DK).

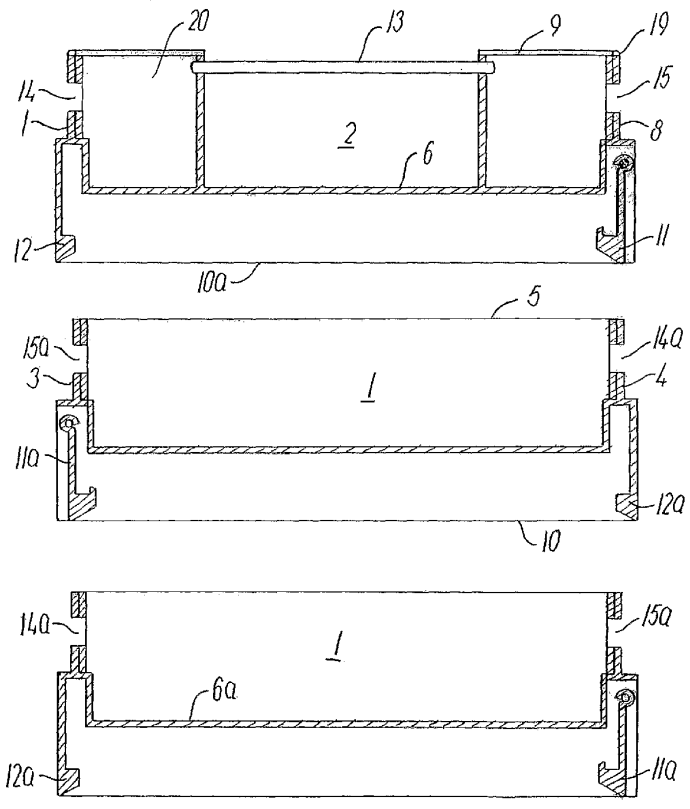
(74) Agent: **LARSEN & BIRKEHOLM A/S**; Skandinavisk Patentbureau, Banegårdspladsen 1, P.O. Box 362, DK-1570 Cøbenhagen V (DK).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL,

[Continued on next page]

(54) Title: A STORAGE DEVICE COMPRISING TWO PARTS



(57) Abstract: A storage device for coupling at least one box (1) and at least one cover (2), having a carrier grip (13), together is formed by a lock or a snap lock (11, 11a), which is provided in the one gable (3, 8) or side wall of the cover or the box, while a locking pin (12, 12a) is provided in the opposite gable (4, 7) or side wall. The snap lock is adapted to engage a gripper flange (14, 14a), which is provided at the top of the gable (3, 8) or side wall of the box or the cover, while the locking pin (12, 12a) is adapted to engage a locking edge (15, 15a), which is provided in the opposite gable (4, 7) or side wall of the box or the cover. The invention provides a storage device, where a cover and a box may be coupled to and be disconnected from each other by a lateral movement of the cover or the box under the action of the carrier grip (13), so that the snap lock is not loaded by the weight of the cover in connection with the separation. In addition, assembly and separation of cover or box to/from the box or the cover may take place in a few seconds.

WO 2007/121746 A2

PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

A storage device comprising two parts

The invention relates to a storage device comprising two parts, such as two boxes or a box and a cover, which parts may be stacked and coupled together, wherein each part has two opposed gables and a coupling means at each gable for detachably coupling the two parts together in a stacked state, wherein the coupling means at the one gable of the one part is arranged to cooperate with the coupling means at the one gable of the other part, wherein the coupling means at the other gable of the one part is arranged to cooperate with the coupling means at the other gable of the other part, and wherein the coupling means of both parts at the one gable are formed by a first coupling means having a snap lock function.
The invention moreover relates to use of the storage device.

Boxes having covers which may be coupled together are provided in several embodiments and sizes and are used in a multitude of connections. In particular for use as tool boxes, there are many types which are configured with various gadgets.

Boxes having covers are known, wherein covers and boxes may be coupled together in a mutual order by means of snap locks provided in the covers, and may thus be adapted to various needs.
The box systems thus known are extremely flexible, but may be vitiated by the drawback that the release of boxes and covers from each other is performed in that a user grips the snap locks in the gables of the boxes and/or the covers by both hands, which means that the weight of the boxes and the covers being released is transferred to the snap locks. To prevent breaking of these, they must therefore be made very sturdy.

Accordingly, an object of the invention is to provide a storage device for boxes having covers, where the weight of the cover or covers and/or the

box or boxes is not transferred to the snap lock.

The object of the invention is achieved by a storage device of the type defined in the introductory portion of claim 1, which is characterized in that the coupling means of the two parts at the other gable are formed by a second coupling device, wherein both coupling means may be coupled together with and be detached from each other by lateral displacement of the two parts relative to each other.

Hereby, the cover and the box may be detached from each other by release of the snap lock, so that the entire weight is not transferred to the snap lock, since parts of the cover are supported by the box or the cover, while the snap lock is released.

It should also be noted that assembly and disassembly of the cover on/from the box takes place in a few seconds, and consequently is very time-saving and simple and convenient for a user to handle.

Expediently, as stated in claim 2, the two coupling means in said second coupling means are formed by a pin, which is provided in the lower portion of the other gable of the part disposed at the top of the stack, as well as an edge arranged to engage the pin, said edge being provided in the upper portion of the other gable of the part disposed at the bottom of the stack.

Hereby, a simple and effective attachment of the cover to the box is achieved when the snap lock is in engagement. The same will apply if it is desired to couple two boxes or two covers together.

To completely prevent transfer of any weight from the cover to the snap lock, it is advantageous if, as stated in claim 3, the cover is provided with a recessed carrier grip at its upper side, whereby the carrier grip absorbs the entire weight of the cover and the boxes and covers coupled together below the cover, which it might be desired to have removed from the underlying

boxes and/or covers.

As stated in claim 4, it is expedient that the snap lock function is configured as a snap lock, which is configured as a moulded part in the gable or side wall of the cover or the box, which may engage the edge which is provided in the gable or the side wall of the cover or the box.

If a more sturdy, but also more expensive snap lock is desired, it is advantageous if, as stated in claim 5, the snap lock is formed by a gripper part which is spring-biased.

If, as stated in claim 6, the cover is provided with an edge at the top of both gables or side walls, and the cover is provided with a snap lock at the bottom of its one gable or sidewall and is provided with a locking pin in its other gable or side wall, and, as stated in claim 7, the box is provided with an edge at the top of both gables or side walls and with a snap lock at the bottom of the one gable and with a locking part at the bottom of the opposite gable, an arbitrary number of boxes and covers may be coupled together in a simple manner in an arbitrary order.

As mentioned, the invention also relates to use.
This use is defined in claim 8.

The advantage of this use is that the costs of packaging, pallets, sheeting, shipment and storage space may be reduced considerably relative to the costs associated with tool boxes assembled at the factory, since a compact concept is involved here.
With this packaging system, combined with the extremely quick assembly concept, the costs may thus be reduced to 30 – 40% of the corresponding costs of tool boxes assembled at the factory.

The invention will now be explained more fully with reference to the drawing, in which

fig. 1 shows a storage device according to the invention on a box having a cover, where the cover is separated from the box,

fig. 2 shows the storage device of fig. 1 during the coupling-together of the cover and the box,

fig. 3 shows the storage device of fig. 1 and fig. 2, where the cover and the box are coupled together,

fig. 4 shows a second embodiment of the invention, where two boxes are seen in perspective before they are assembled,

fig. 5 shows a third embodiment seen from the side and how the storage device is configured with a cover and two boxes,

fig. 6 shows the storage device according to the invention used in another embodiment, while

fig. 7 shows how boxes and covers with the storage device of fig. 4 may be stacked.

Figs. 1 – 3 show a box having a cover, where there is only one set of locking means which cooperate on a box and a cover, while figures 4 and 5 show boxes and covers, where cooperating locking means are provided both at the top and at the bottom of the boxes and the covers.

The figures show a box 1 which has gables 3, 4, a bottom 6a.
In the gables of the box near the open upper part of the box, the gable 3 is

provided with a coupling means in the form of a locking edge 15a, while the opposite gable 4 is provided with a coupling means in the form of a gripper flange 14a.

At the bottom of the gables of the box (only figs. 4 and 5), a coupling means in the form of a snap lock 11a is provided near the open lower part 10 of the box, while a coupling means in the form of a locking edge 12a is provided in its opposite gable.

The numeral 2 designates a cover which has gables 7, 8, a lid 9 and an open lower part 10a as well as a carrier grip 13.

A coupling means in the form of a locking pin 12 and another coupling means in the form of a snap lock 11 are provided at the bottom of the one gable of the cover, said snap lock having spring properties so that a hook on the snap lock is affected by a force directed inwardly against the gable.
A locking means in the form of a gripper flange 14 is provided at the top (only figs. 4 and 5) of the one gable of the cover, while another locking means in the form of a locking edge 15 is provided in the opposite gable.
Further, the cover may be provided with a lid 9, below which an insert part intended to store small tools, screws, nails and the like may be placed.

The mode of operation of the locking system will now be explained more fully with reference to figures 1 – 3.
From the position shown in fig. 1 where a user (not shown) has gripped the carrier grip 13, the gable 7 is moved down, so that the locking pin 12 engages the locking edge 15a.
Then, the cover 2 is pressed down in the direction of the arrow 16, following which the snap lock 11 engages the locking edge 14a, so that the cover 2 is secured to the box 1 by the locking system, which is formed by the snap lock 11, the locking pin 12, the gripper flange 14a and the locking edge 15a.

When, subsequently, the cover 2 is to be detached from the box, a user grips the carrier grip 13 by the one hand and releases the snap lock 11 from the gripper flange 14a by the other hand, following which the cover is lifted and displaced to the right, whereby the cover may be detached from the box.

When the cover is coupled together with and separated from the box, the cover remains in almost the same horizontal plane, as lateral displacements take place during the operations.

In addition, the snap lock 11 will never have to absorb the weight of the cover, which may optionally contain tools and the like.

The storage device according to the invention may be used in connection with the coupling-together of several boxes and covers of the type which is described in the applicant's above-mentioned DK Patent Application No. PA 2004 01454, as will be explained now in connection with figures 6 and 7.

Fig. 6 shows a box system which consists of a box 1 with a mounted cover 2, and a tray 18 having a carrier grip 17 is arranged inside the box 1, where the tray may e.g. contain small tool parts, nails, screws and the like.

The box has obliquely inwardly extending walls, which means that they may be stacked as shown at the bottom of fig. 7.

Moreover, the tray 18 may be moved into the cover 2 and be stacked as shown in fig. 7.

Hereby, an extremely compact system is provided, which occupies minimum space during transport and during storage at wholesalers and at retailers.

Thus, just an assembled box with cover and tray, as shown in fig. 6, need be displayed in a sales room, and when a consumer wants to buy a box with cover, he just takes a box from a first stack and then a cover with tray from a second stack, which may subsequently be coupled together in a few seconds by the locking system according to the invention.

PATENT CLAIMS

1. A storage device comprising two parts, such as two boxes or a box and a cover, which parts may be stacked and coupled together, wherein each part has two opposed gables and a coupling means at each gable for detachably coupling the two parts together in a stacked state, wherein the coupling means at the one gable of the one part is arranged to cooperate with the coupling means at the one gable of the other part, wherein the coupling means at the other gable of the one part is arranged to cooperate with the coupling means at the other gable of the other part, and wherein the coupling means of both parts at the one gable are formed by a first coupling means having a snap lock function, c h a r a c t e r i z e d in that the coupling means of the two parts at the other gable are formed by a second coupling device, wherein both coupling means may be coupled together with and be detached from each other by lateral displacement of the two parts relative to each other.

2. A storage device according to claim 1, c h a r a c t e r i z e d in that the two coupling means in said second coupling means are formed by a pin, which is provided in the lower portion of the second gable of the part disposed at the top of the stack, as well as an edge arranged to engage the pin, said edge being provided in the upper portion of the other gable of the part disposed at the bottom of the stack.

3. A storage device according to claim 1 or 2, c h a r a c t e r i z e d in that the cover is provided with a recessed carrier grip at its upper side.

4. A storage device according to claims 1 – 3, c h a r a c t e r i z e d in that the snap lock function is configured as a snap lock, which is configured as a moulded part in the gable or side wall of the cover or the box, which may engage the edge which is provided in the gable or side wall of the cover or

the box.

5. A storage device according to claims 1 – 3, c h a r a c t e r i z e d in that the snap lock is formed by a gripper part which is spring-biased.

6. A storage device according to claims 1 – 5, c h a r a c t e r i z e d in that the cover is provided with an edge at the top of both gables or side walls, and that the cover is provided with a snap lock at the bottom of its one gable or side wall and is provided with a pin at its other gable or side wall.

7. A storage device according to claims 1 – 6, c h a r a c t e r i z e d in that the box is provided with an edge at the top of both gables or side walls and is provided with a snap lock at the bottom of the one gable and is provided with a pin at the bottom of the opposite gable.

8. Use of a storage device according to claims 1 – 7 in connection with boxes and covers which are shaped conically.

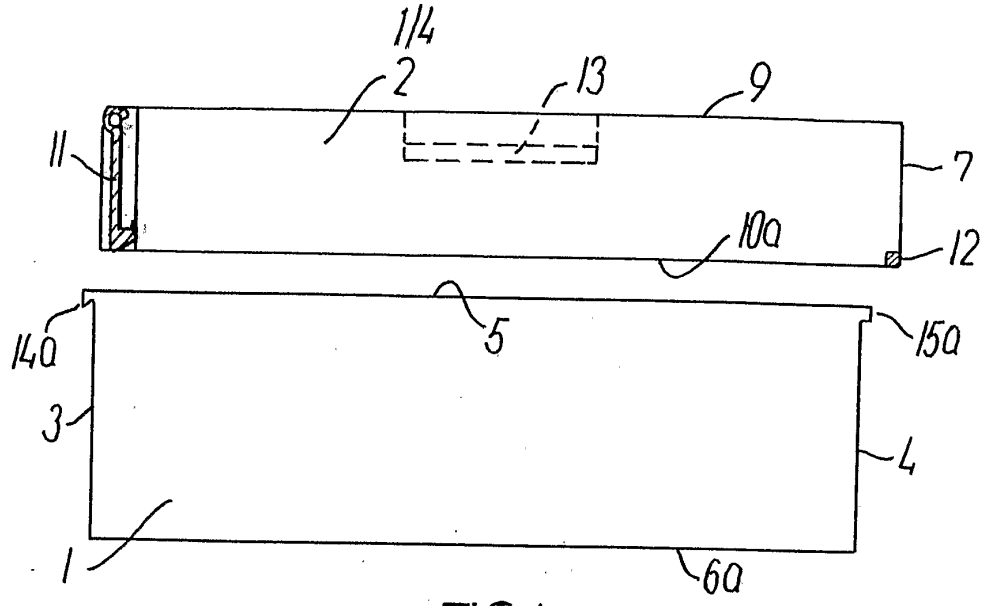


FIG.1

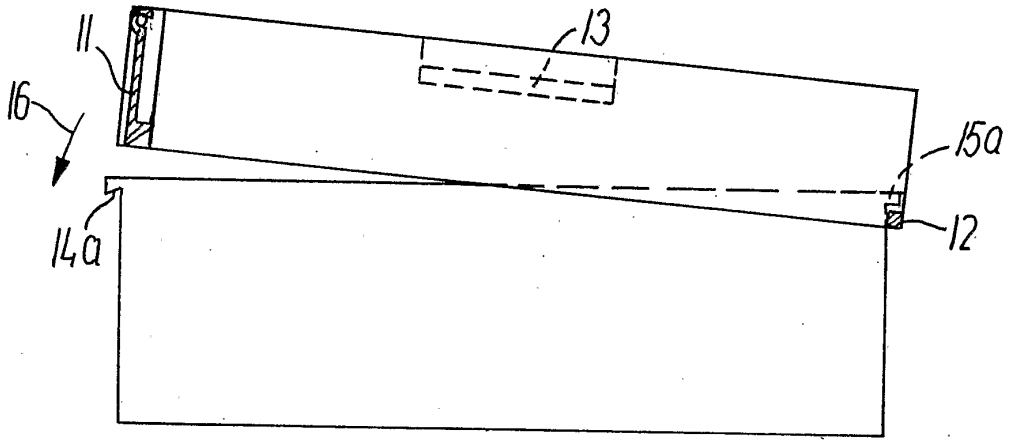


FIG.2

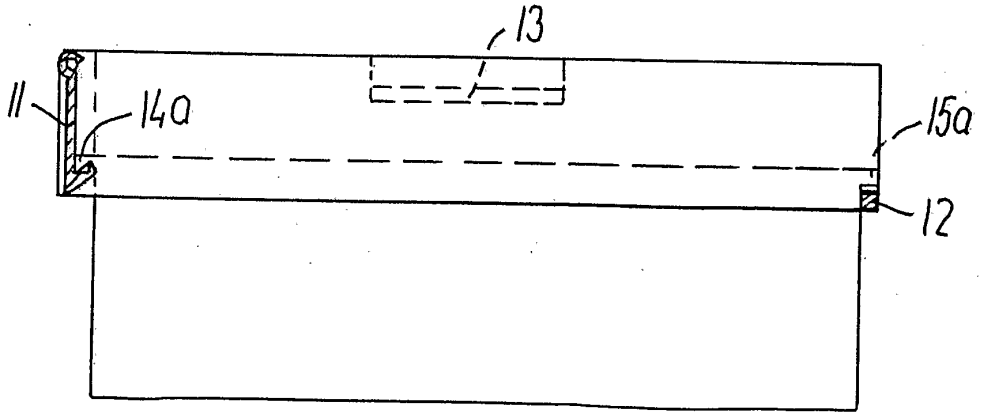


FIG.3

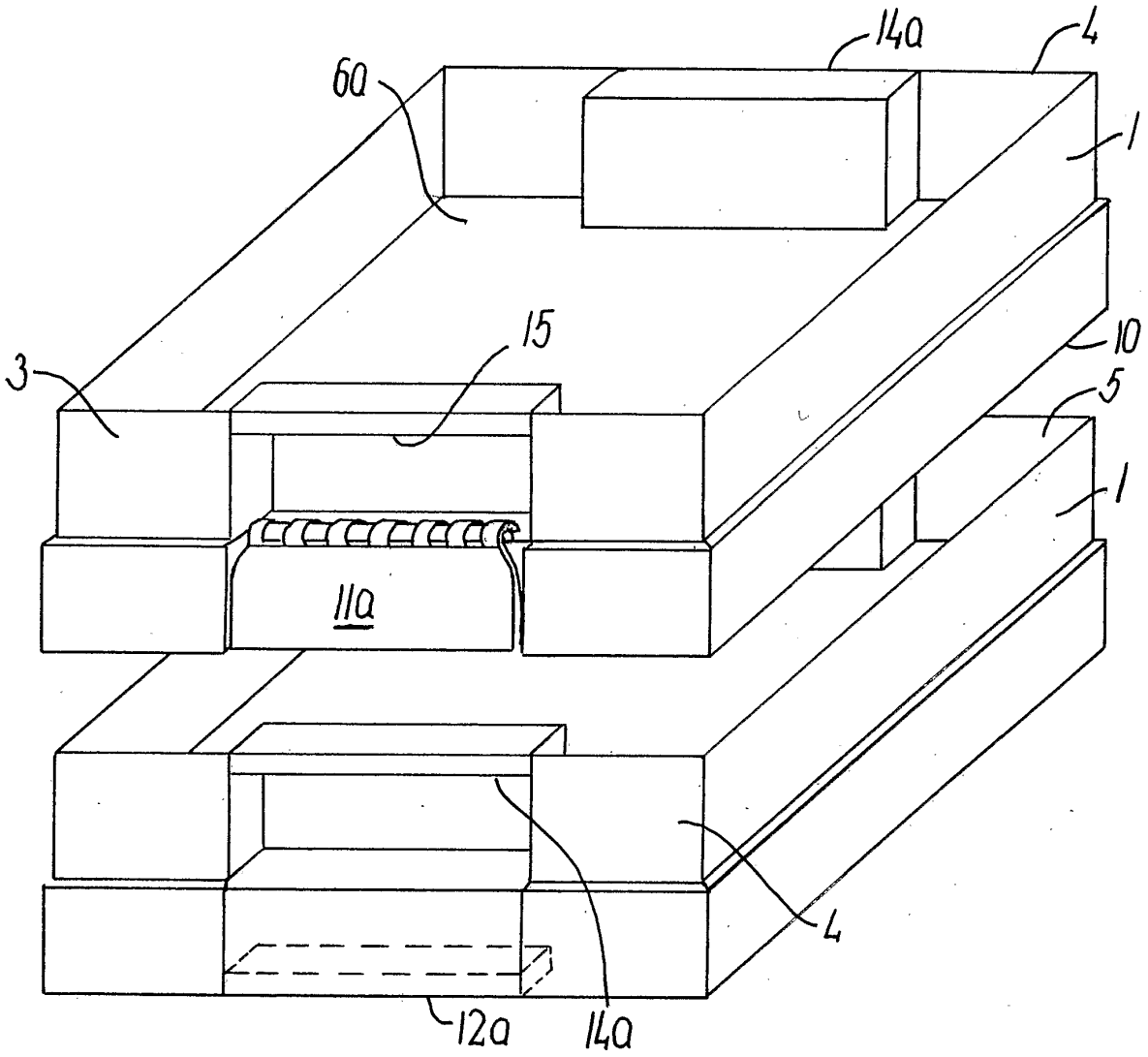


FIG. 4

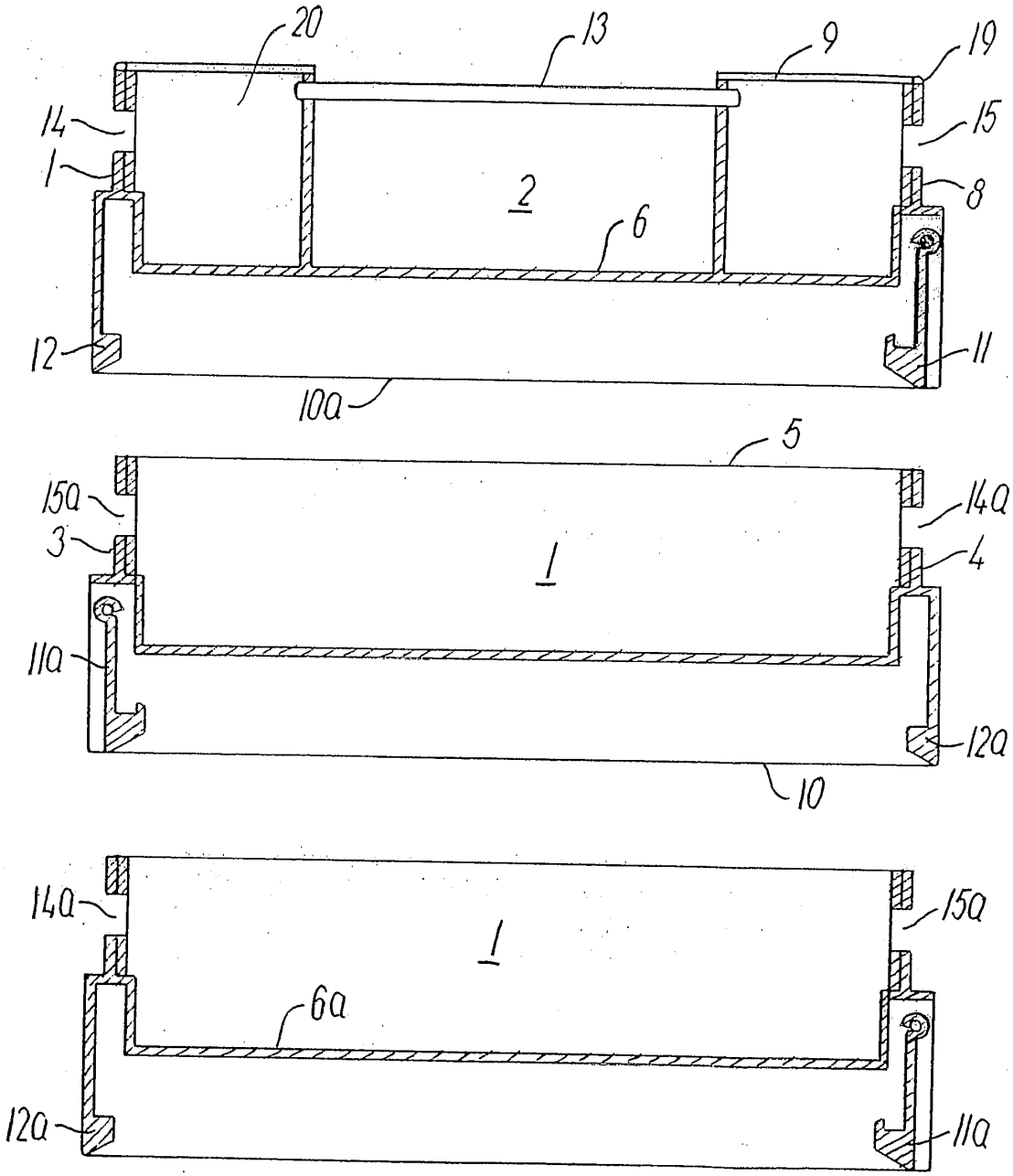

20
13
9
19
14
15
1
2
8
6
12
11
10a
5
15a
14a
3
1
4
11a
12a
10
14a
15a
1
6a
12a
11a

FIG.5

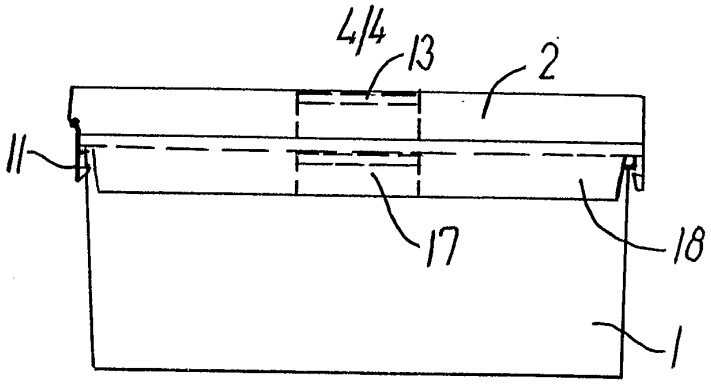


FIG. 6

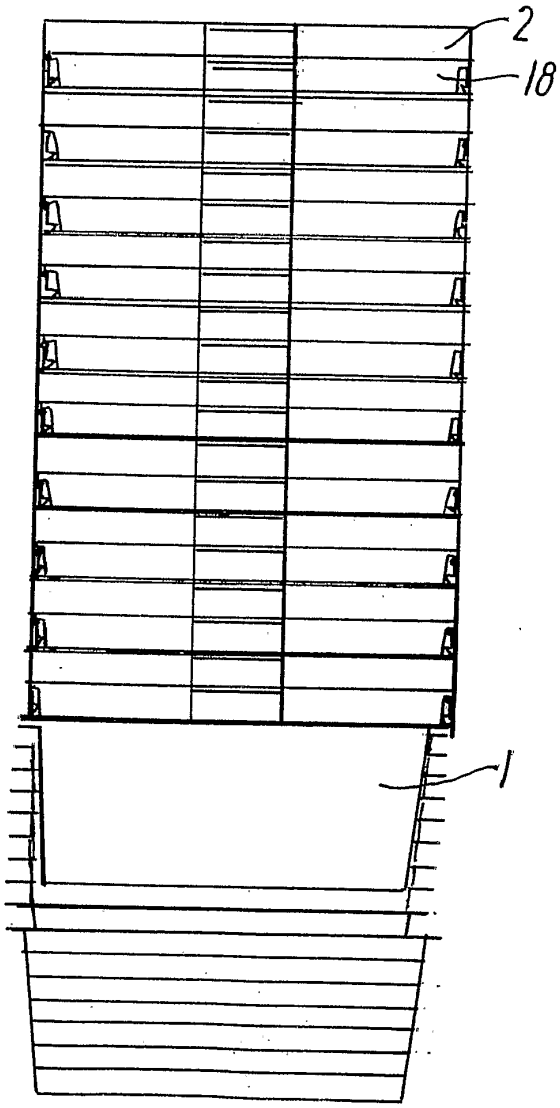


FIG. 7

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
26 November 2009 (26.11.2009)

PCT

(10) International Publication Number
WO 2009/140965 A1

(51) International Patent Classification:
B65D 21/032 (2006.01) *B25H 3/02* (2006.01)

(21) International Application Number:
PCT/DK2009/000107

(22) International Filing Date:
12 May 2009 (12.05.2009)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
PA 2008 00690 19 May 2008 (19.05.2008) DK

(71) Applicant *(for all designated States except US)*: **J.O. MADSEN APS** [DK/DK]; Hyldevaenget 3, DK-5400 Bogense (DK).

(72) Inventor; and
(75) Inventor/Applicant *(for US only)*: **MADSEN, Jens, Ole** [DK/DK]; Hyldevænget 3, DK-5400 Bogense (DK).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

(54) **Title**: STORAGE ARRANGEMENT CONSISTING OF TWO PARTS SUCH AS TWO CASES OR ONE CASE AND ONE LID

Fig. 2

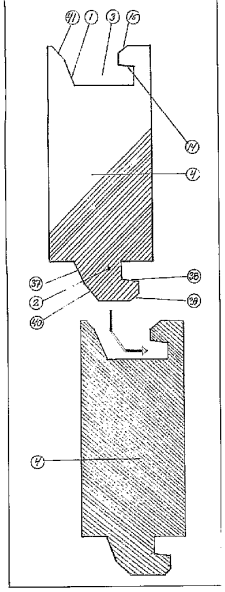
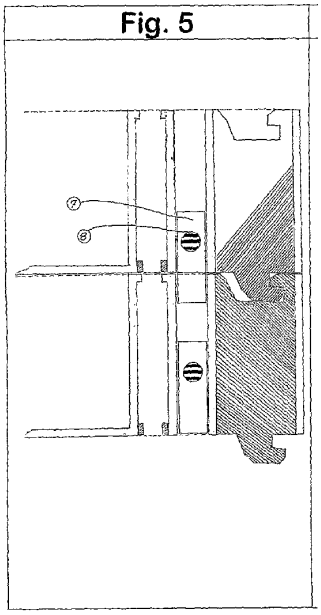


Fig. 5



(57) **Abstract**: u / The storage facility for coupling of at least one box and at least one lid is comprised of coupling units as shown in Fig. 2, bottom bridge 2 on the top box and top bridge 3 on the lower box. These must be tightly engaged via the conic flanges 14 + 38 and subsequently locked in the gear via transport lock 7. The primary objective of the invention is to provide a new and functional storage system for tools, equipment and minor parts, which makes it easy to locate what you are looking for and where the objects are easy and fast accessible. Furthermore, it is possible to produce the invention in an inexpensive way and still make it robust and easy to assemble as well as disassemble in only a few seconds.

WO 2009/140965 A1

Storage arrangement consisting of two parts such as two cases or one case and one lid.

The invention concerns a storage arrangement that includes two parts such as two cases or one case and one lid, which parts can be stacked and connected to each other and where each part has two opposite gables and by a coupling unit in each of the two gable corners for separable connection of the two parts in stacked condition, caused by the four coupling units having one in each corner, is arranged to cooperate with the coupling units of an underlying case or lid, which also are placed in the four corners.

The bottom part of each case is in each of the four corners provided with a bottom bridge and in the four corners of the top part with a top bridge. When the bottom bridges of the top case are placed above the opposite top bridges of the lower case they will easily get in gear and with a slight sidewards push be brought into a tight and compact condition. A transport lock placed in tight connection to one of the connecting bridges (bottom- and top bridges), can be activated outside the case with a little downwards push and provide a blocking for separation of the four sets of connecting bridges and as such also for separation of the two cases or case and lid.
As such cases can be connected unlimited. A craftsman f. inst. can have a set of cases (tower) existing of six – eight cases on top of each other. The value of tools and technical equipment in f. inst. six – eight cases can be extremely high and it can be desirable to lock the whole system (tower). A lock against theft can be integrated in the system with a blocking lock only operational inside the cases. A spring loaded security lock in full height of all cases can be activated with a downwards push and then be locked with a little twist. If f. inst. six cases are stacked on top of each other it will be possible with a push on the security lock on the top case to activate all the security locks of all underlying cases. On the top case a lid with a handgrip can be placed and on the lid can be placed a lock, f. inst. a digital code lock. During this, the whole case system (tower) is locked.

Cases with lids that can be connected are available in various designs and sizes and are being used in many connections. Many tool cases are available with various features.

Normally tool cases and stackable cases are designed with a hinged lid. There are stackable cases with hinged lid that in principle can be stacked and connected unlimited.

The coupling for these case systems normally takes place with snaplocks and/or locking clips. Snaplocks can be springloaded and provide automatic locking. Locking clips normally have to be operated by hand for both locking and unlocking. The disadvantages by these locking clips are that they by low temperature can be tight and difficult to operate (broken nails). They can also be worn, break into pieces and because it is a separate component it can fall off and disappear, where after the system does not work anymore. With a well known case system the coupling is made via four locking clips per case. By coupling of f. inst. six cases it means five cases with each four locking clips = in total twenty locking clips to be pressed in locking position. By separating the case system the process has to be repeated with twenty times finger releases. Furthermore it is a well known disadvantage by existing coupling systems that the coupling is not tight and compact and leaves a space in between the cases from 1,5 to 3,0 mm when lifting in the top case or top lid (accordion effect).

Coupling with snaplocks can be automatic in the locking process and as such very quick. Very often these snaplocks are separate components that can be worn, come to pieces or fall off. In addition these locks will not establish a tight and compact coupling and therefore not provide the desired breaking strength and wearing quality.

The purpose with the invention is to provide a connecting bridge for stackable cases and lids that can raise the desired and needed demand for strength and to avoid breakage in connection with daily use, wear and tear and in addition a simple and quick operational system. Other points and

functions are also a part of the invention and are described following.

The purpose with the invention is considered by a storage arrangement as described in the introduction to claim 1 that is characteristic by that in each of the four corners of the storage arrangement (case) a connecting bridge is moulded together from top to bottom of the case. The connecting bridge is constructed with a top bridge on top and in bottom a bottom bridge.

By coupling of two cases the bottom bridges of the top case will meet the top bridges of the lower case and they will easily fall in gear because of the conical catch flanges on both top- and bottom bridges. The final coupling is made by a slight sideward push on the top case. To secure this coupling, are by at least one of the four connecting bridges moulded together two vertical houses for locking (columns). In one of these is placed a vertical lock (transport lock) that can be operated from outside the case and with a slight downwards push bring the transport lock in a blocking position and secure that all four top bridges and bottom bridges are in gear.

The other vertical column for locking can be used as a security lock as described following.

Because of the special design of the conical top- and bottom bridges the coupling can happen very quick and a push on the locking knob placed outside the case will bring the transport lock in blocking position tight to the connecting bridge.

The four connecting bridges are placed in the outer corners of the cases and as such providing optimal strength and stability in the coupling. The connecting bridges including top- and bottom bridges are moulded together with the gable, sidewall and bottom of the cases and as such providing optimal strength and stability.

The connecting bridges are moulded together with the case and as such there are no loose components that can be worn, go apart, fall off and disappear.

Because of the construction where all the basic elements of the case are moulded together a very advantageous and inexpensive cost price can be obtained.

Alternatively to four connecting bridges per case it could be considered for lighter and private use only to use two connecting bridges, f. inst. one in each gable of the case. Because of the construction with the conical locking frames on top- and bottom bridges and combined with the accuracy available by plastic moulded subjects it will be possible to avoid accordion effect because the coupling will be tight and without wobble.

This also provides a robust impression in connection with the security lock and use of the system (tower) as a sack trolley.

The transport lock keeping the top- and bottom bridges in tight gear can be activated by a locking knob placed outside the cases. The process of locking and unlocking will only take one second.

The locking column for the security lock is moulded together with the case and the connecting bridge for optimal strength and stiffness. The security lock is in same height as the outer dimension of the case and is equipped with a push spring that at all time will try to position the security lock within the height of the case.

The security lock is being activated by a downward push from above and will after four to six mm's movement provide a total blocking and as such secure the coupling. The security lock has a locking arm that can be twisted, get in gear and fix the locking.

If f. inst. six cases are stacked on top of each other the six security locks will in principle be in contact with each other meaning that when the security lock of the top case is activated downwards the security locks of all underlying cases will be brought in blocking position and the final locking with the small locking arm is only needed inside the top case. The security lock can only be operated inside the cases. When the small locking arm in the vertical house for locking is turned back again the push spring will bring all six locks back to the starting point. Upon the top case will be placed a lid with an integrated lock f. inst. a digital padlock and the whole system is locked up.

As such the security lock is extremely quick to operate for unlocking the

system (tower) f. inst. consisting of six cases. Some users could choose to use the security lock as transport lock because only one action (one second) is needed for locking or unlocking the whole tower.
Both transport- and security locks are very robust and strong caused by the construction in which they are placed in the vertical houses moulded together with the gables, sidewalls and bottom of the cases.

The four bottom bridges can be provided with small rubber shoes and then be used as feet, which will protect against dust and scratches on the cases as well and on tables, shelves and floors on which the cases might be placed.

By a selection of extension walls (cases without bottom) existing height of the cases can be enlarged and the volume of the cases will also be enlarged. The extension walls also have a connecting bridge in each of the four corners and can as such be coupled and locked random with the other cases. If f. inst a case is 100 mm high and two extension frames of each 100 mm are placed on top the height of the case will be 300 mm.

With a case system, as here mentioned, with extreme tight and compact connection it is obvious to provide a rolling transport of the set (tower). A bottom box has two wheels that only will obtain contact to the foundation by a 15° backwards inclination. Because the whole set (tower) is very compact and stiff it will in principle be possible to transport it as an ordinary sack trolley.

A transparent lid (possibly disposable) means that a supplier of machines, hand tools, accessories, screws, bolts, etc. can prepare and pack "a set", place the transparent lid on top of the case and seal it. With this the end user (final customer) is secured, that "the set" is complete in the buying situation and when sealing is broken.

A small opening locked with a transparent plate in the walls of the cases provides a visual view to the contents of the cases. The transparent plate is placed in an insert frame and can easily be replaced by a not transparent plate on which can be indicated contents etc. Without any indications this plate will simply just block for view into the case.

The invention also concerns the practical use.

With the previous mentioned basic ideas and features the modern craftsmen can look forward to a more organised and structured separation, handling and transport of tools, equipment, etc.

With the quick disassembly and assembly of the cases, combined with the visual overview of the contents the craftsmen can choose and couple together exact the cases needed for today's work. The transport of the set is wheeled (sack trolley concept).

Following the invention will be described with reference to the enclosed drawings and photos.

Fig. 1 showing two connecting bridges assembled and disassembled.

Fig. 2 showing two connecting bridges disassembled and with more details inclusive conical locks and catch flanges.

Fig. 3 showing two cases in which the connecting bridges in the corner unit are moulded together with the houses for transport- and security lock.

Fig. 4 showing the same as Fig. 3 but now with the transport lock in both cases.

Fig. 5 showing the same as Fig. 4 but with the transport lock of the top case in blocking position.

Fig. 6 showing the two cases with both transport- an security lock in neutral position.

Fig. 7 showing the same as Fig. 6 but with the security lock in blocking position on both top- and bottom case.

Fig. 8 showing transport- and security lock in the four possible positions in respectively 8A – 8B – 8C – 8D. The gable of the case is marked on 8A.

Fig. 9 showing a set of stacked cases (tower) where one of the two integrated transport wheels can be seen lowest at right.

Fig. 10 showing a set of cases (tower) with lid, code lock and carrying-grip.

Fig. 11 showing an extension frame without bottom but with the four connecting bridges.

Fig. 12 showing a 100 mm high standard case.

Fig. 13 showing a 100 mm high standard case with a 100 mm high extension frame placed and the transport lock is locked.

Fig. 14 showing a standard case with two extension frames on top.

Fig. 15 showing a case with a drill and a cable reel as a packed set. Closing of the case can be done with a transparent lid that can be sealed. It means that both the retailer and the end user can be sure that the set is complete.

Fig. 16 showing a case with an inside insert frame with a transparent window for view into the contents of the case.

Fig. 17 showing a case like in Fig. 16 on which the transparent window is replaced be a plate for indication of the contents.

Following the invention will be described with reference to the enclosed drawings/photos and the reference numbers used.

On Fig. 1 is shown the basic drawing of the connecting bridge (4) on which the bottom bridge (2) is framed like a downwards positive L-profile (male) which falls in gear with the top bridge (3) of the underlying case which is framed like a negative L-profile (female).

On Fig. 2 is shown the top bridge (3) with a direct frame (1) which will meet the catch flange (40) on the bottom bridge (2). To simplify and make an easy and safe placing of the top case on the lower case are both top bridge (3) and bottom bridge (2) provided with conical catch flanges (15 + 41) and (39 + 40). To secure a right and compact coupling both top bridge (3) and bottom bridge (2) are constructed with conical locking frames (14 + 38). When top case (10) is placed on top of the lower case (11) the direct frame (1) and the conical catch flange (40) will automatically bring the coupling parts in gear. A slight sideward push will bring the connecting bridges (4) in tight gear and as shown on Fig. 5 the transport lock (7) will block for disassembly and keep the connecting bridges in tight and compact coupling. The transport lock (7) can be activated outside the case by locking knob (8). As it appears on Fin. 5 the transport lock (7) is placed very close to the connecting bridges (4) and thus the coupling is free from wobbles and slack and at the same time robust and almost impossible to break open.

On Fig. 6 is shown the security lock (9) placed in mutual connection with connecting bridge (4) and transport lock (7). Security lock (9) is assembled with a push spring (18) and the set is placed in house for security lock (12) and fixed with a press bushing (17) which at the same time controls and supports the locking tap (19).

As it appears on Fig. 6 and Fig. 7 the two security locks (9) are in contact with each other. When the security lock (9) of the top case is pushed downwards it will automatically move the security lock (9) in the lower case downwards. At the same time the locking tap (19) of the top case is positioned in blocking position with the house for security lock (12) on the lower case.

It means that the security lock (9) of all upon each other placed cases can be activated by just activating the security lock (9) of the top case. Following the final locking can be made by a little twist with locking arm (13). A fine point could be to use the security lock as transport lock. All stacked cases locked via one activation of the security lock (9) of the top

case. Spend of time: 1 second.

All shown examples only show open cases stacked and with a lid on top. If one want a case cases with lids stacked, meaning a case + a lid + a case + a lid etc., it is possible because both the transport lock (7) and security lock (9) can be integrated in the separate lid which then can be stacked and locked with the same system as in the cases, although with a hole in the lid for activating the security lock (9).

On Fig. 9 and Fig. 10 is shown a stacked set (tower 36) with the special bottom case (24) in which the two transport wheels (20) are integrated. The tower (36) is finally on top closed with a lid (21) with carrying grip (23) and a code lock (22).

Fig. 11 shows an extension frame (27) without bottom. The corner unit (5) can also be seen here.

Fig. 12 shows a standard case (28) with bottom and connecting bridge (4) and top bridge (3).

Fig. 13 shows a standard case (28) and an extension frame (27) coupled together.

Fig. 14 shows the same example but with two extension walls (27). As it can be seen it gives a great flexibility to adjust cases in different heights.

Fig. 15 shows a standard case (28) in which a drill and a cable reel is placed. This kind of "combination-pack" is often used by manufacturers as promotional idea for machines, accessories, screws, bolts, nails, plugs etc. It is highly essential for as well manufacturer, retailer and the final end user to be sure that "the set" is complete.
The innovation is here that a transparent lid (29) is placed in a

countersinked frame (32). A sealing can be made by a warm-up/melting into the frame or alternatively via one or two hot melted straps. A carrying grip (30) as well as a hole (31) for the security lock (9) is a possibility, when the transparent lid is wanted for future and continuous use. The transport lock (7) can be operated from outside with the locking knob (8).

Fig. 16 shows the case with a transparent window (33) that inside the case is pushed down in an insert frame (34). The same insert frame (34) is used on Fig. 17 but with the transparent window replaced by a plate (35) for indication of contents.

Patent Claim

1. Storage facility comprising two or more boxes or a box and a lid, all parts that can be stacked and interconnected and where the boxes or lids have opposite facing gables and where the connecting bridge (4) is placed in the four corners or with one connecting bridge (4) on each of the opposite facing gables, whereby the bottom bridge (2) of the upper box or lid interconnects with the top bridge (3) of the below box or lid characterized by the bottom bridge (2) of the top box or lid being shaped as a downward pointing L profile (male part), which interconnects with the top bridge (3) of the below box, which is shaped as an L profile (female part).

2. Storage facility according to requirement 1 characterized by having the four connecting parts in the four outer corners of the boxes or lids.

3. Storage facility according to requirements 1-2 characterized by the connecting parts being cast together with the bottom and side walls of the boxes and the top and side walls of the lids.

4. Storage facility according to requirements 1-3 characterized by the connecting parts being cast together with boxes or lids and connecting via the four cast-in connecting parts.

5. Storage facility according to requirements 1-4 characterized by a construction that allows injection moulding of box and connecting parts or lid and connecting parts in one process.

6. Storage facility according to requirements 1-5 characterized by one or more of the connecting parts being cast together with a locking column.

7. Storage facility according to requirements 1-6 characterized by a construction that creates very close contact between connected boxes and lids.

8. Storage facility according to requirements 1-7 characterized by one or more of the connecting bridge being cast together with a cavity in which a security lock is placed.

9. Storage facility according to requirements 1-8 characterized by having a plexiglass in front of the catch on the locking device.

10. Storage facility according to requirements 1-9 characterized by the security locks' proximity to the connecting bridges and the fact that the security locks will interact with the below security locks, when the boxes or lids are placed on top of each other.

11. Storage facility according to requirements 1-10 characterized by having small soft rubber buttons underneath the four bottom bridges.

12. Storage facility according to requirements 1-11 characterized by wall systems, which are boxes without bottoms and with the same connecting system as boxes and lids.

13. Storage facility according to requirements 1-12 characterized by having transparent glass or plexiglass in the box gables or sides.

14. Storage facility according to requirements 1-13 characterized by having one bottom box with two transport wheels.

Fig. 1

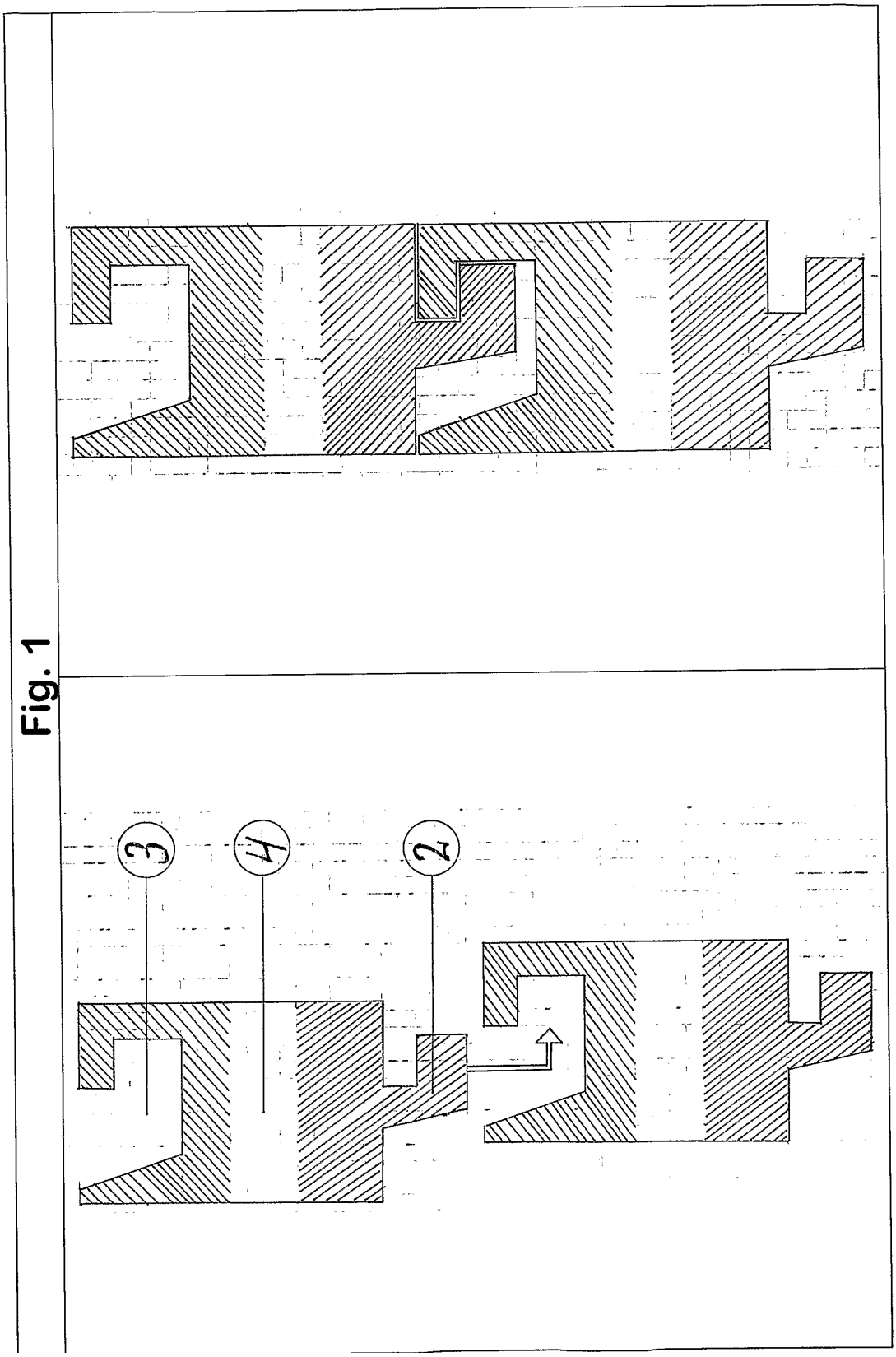


Fig. 4

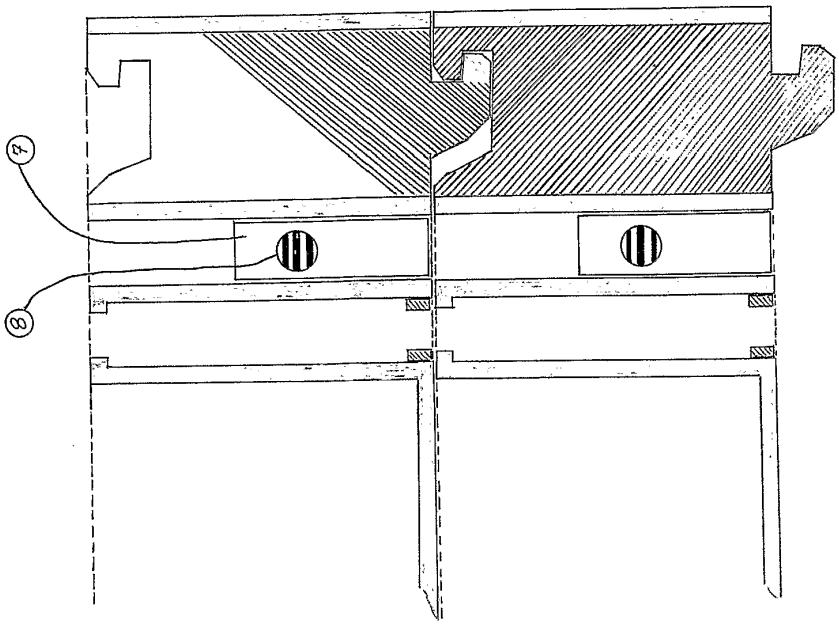


Fig. 3

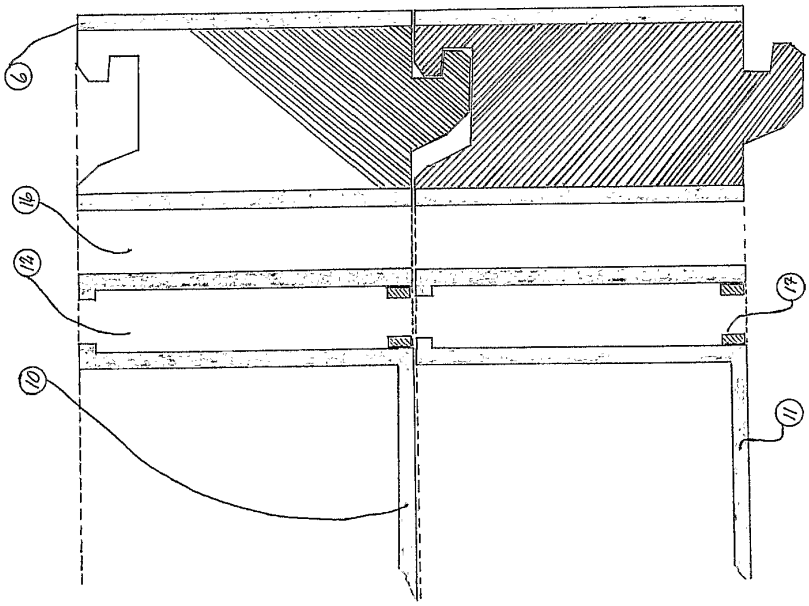


Fig. 2

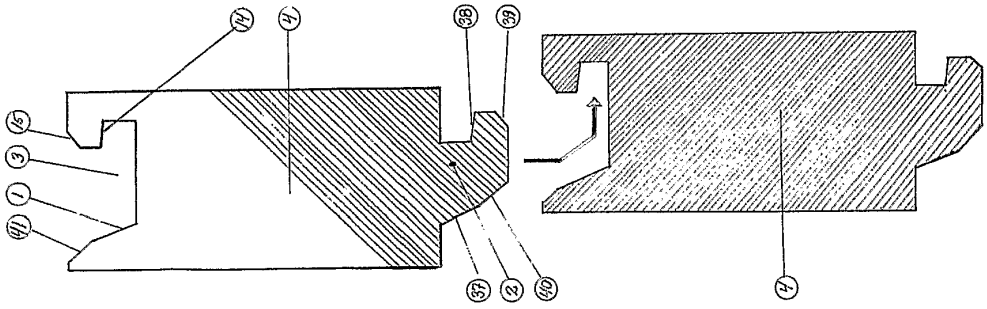


Fig. 7

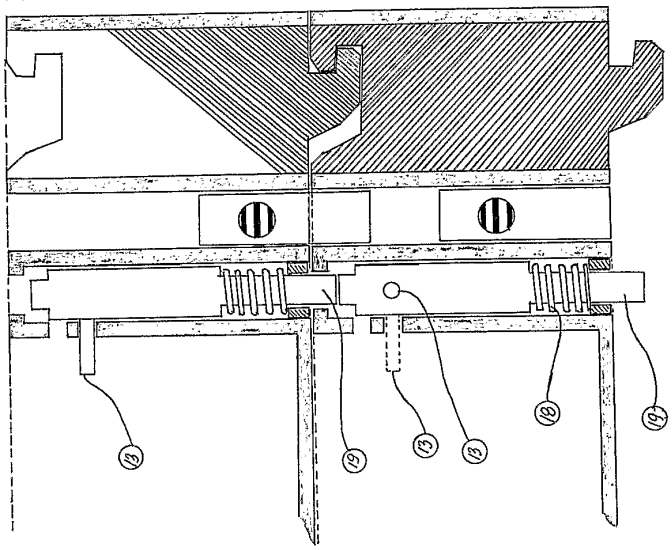


Fig. 6

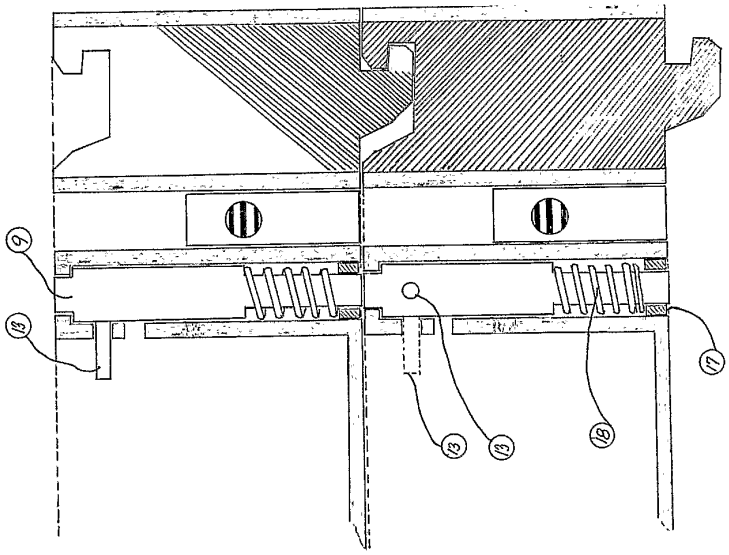
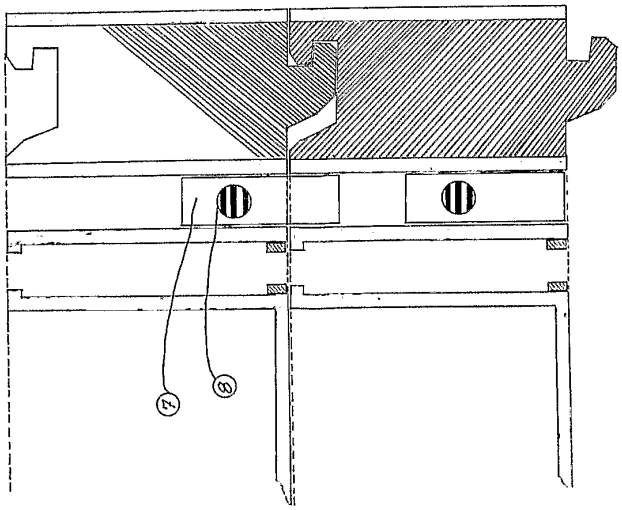


Fig. 5



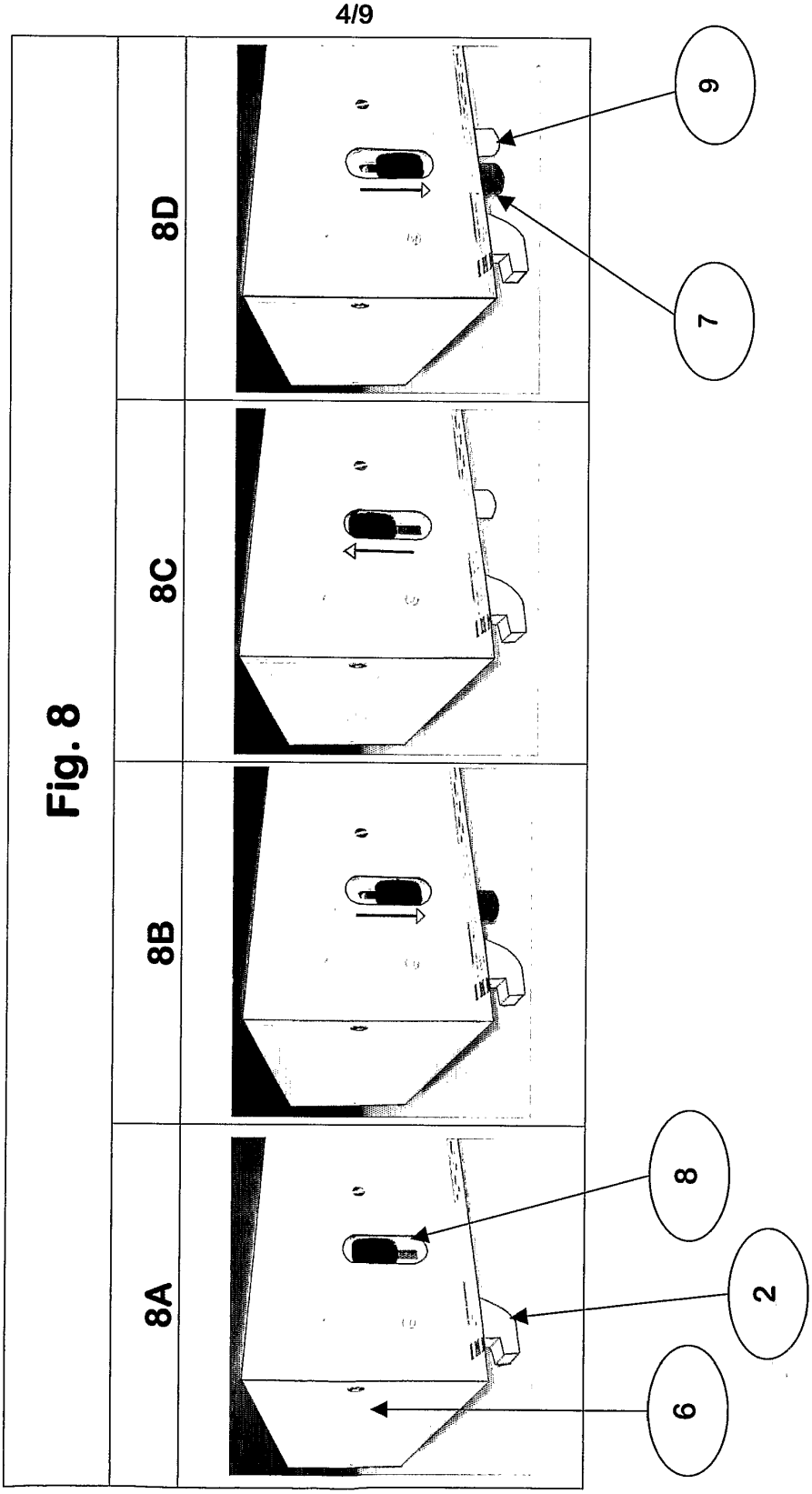


Fig. 8

Fig. 9

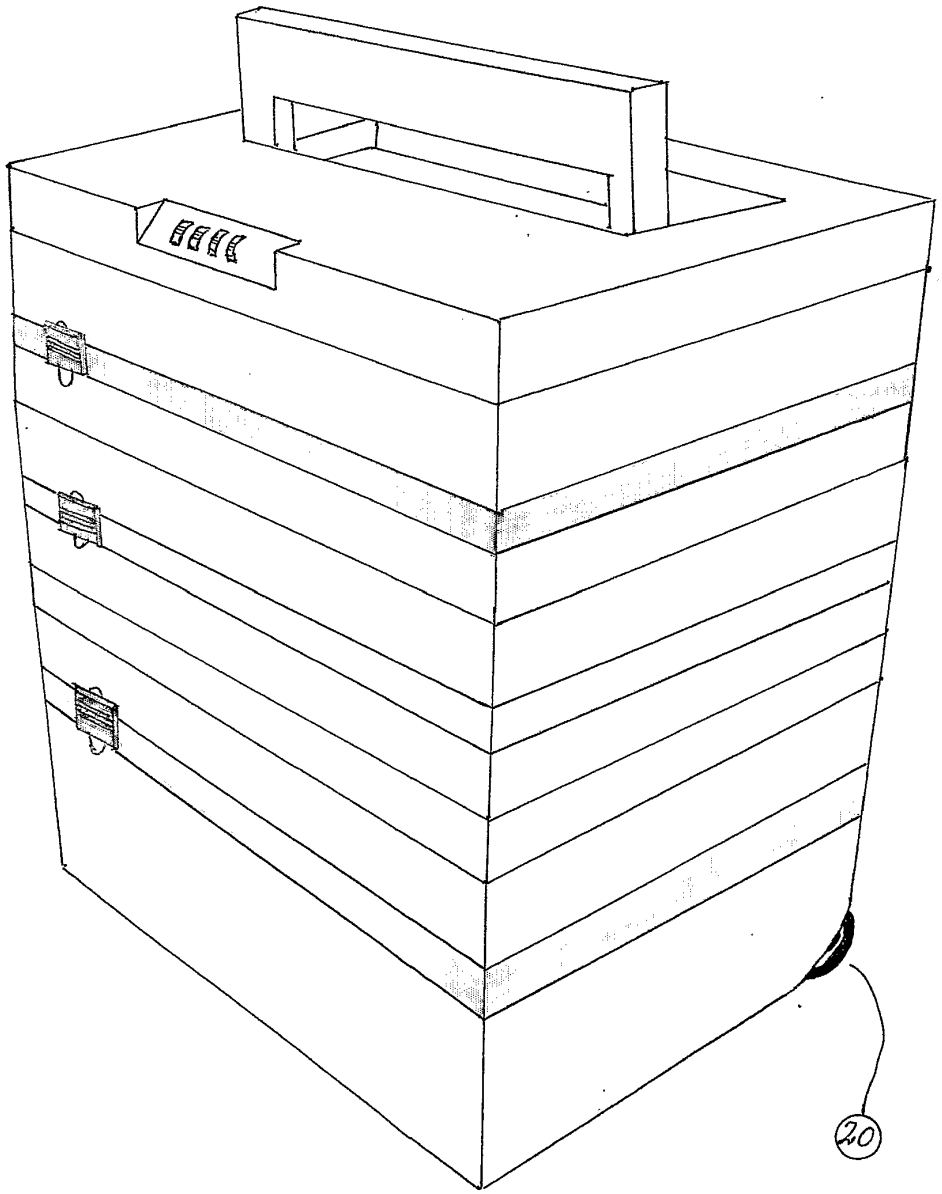


Fig. 10

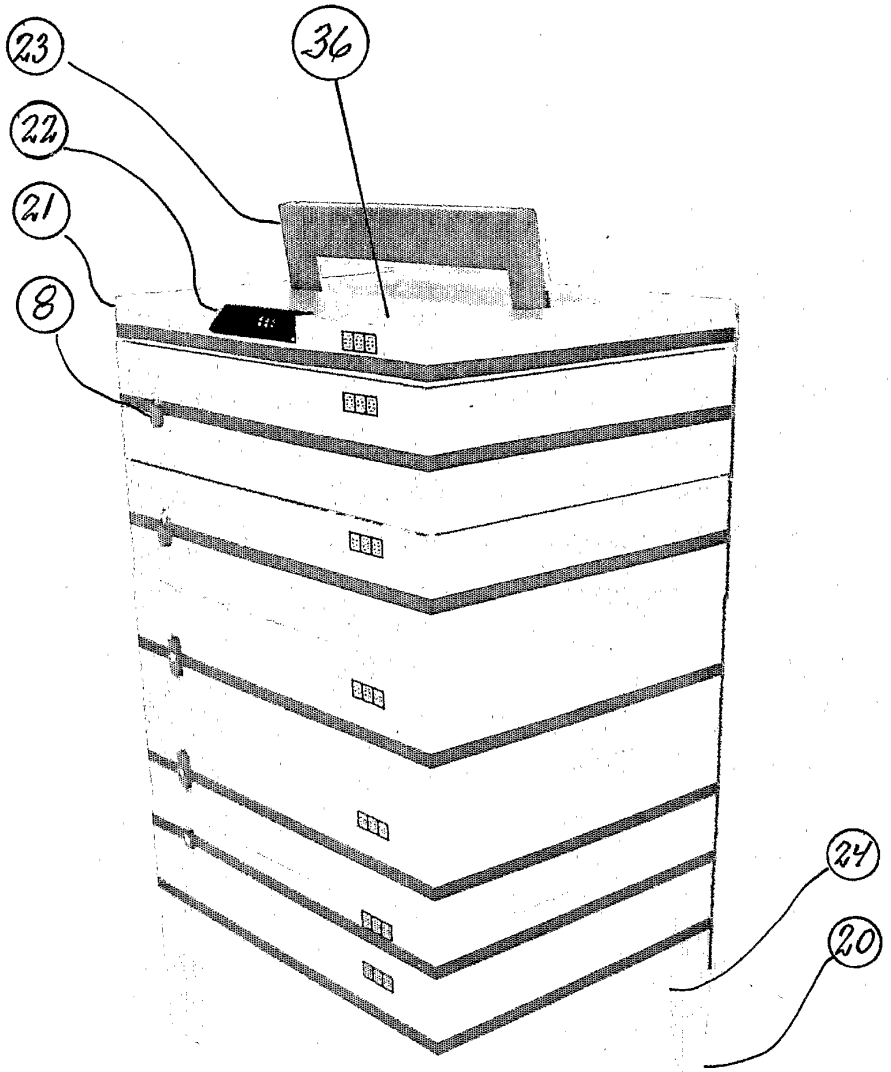


Fig. 11

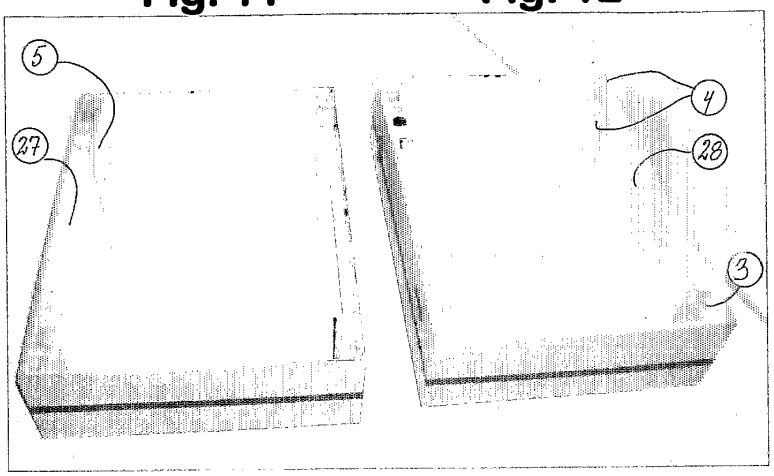


Fig. 12

Fig. 13

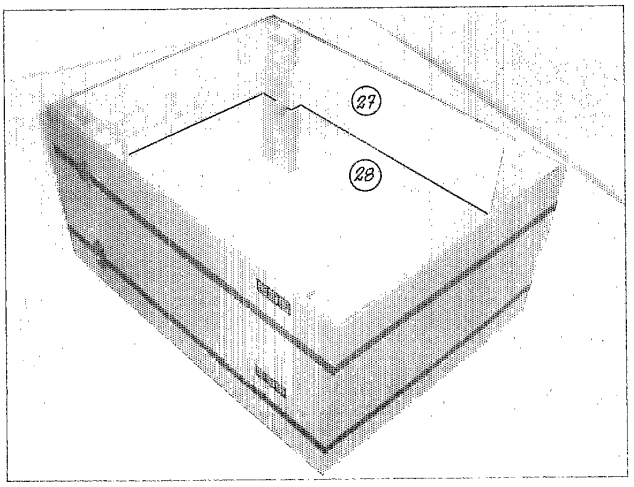
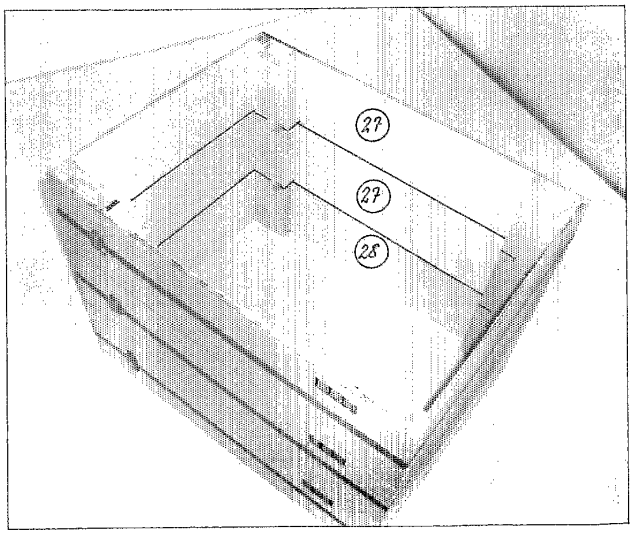


Fig. 14



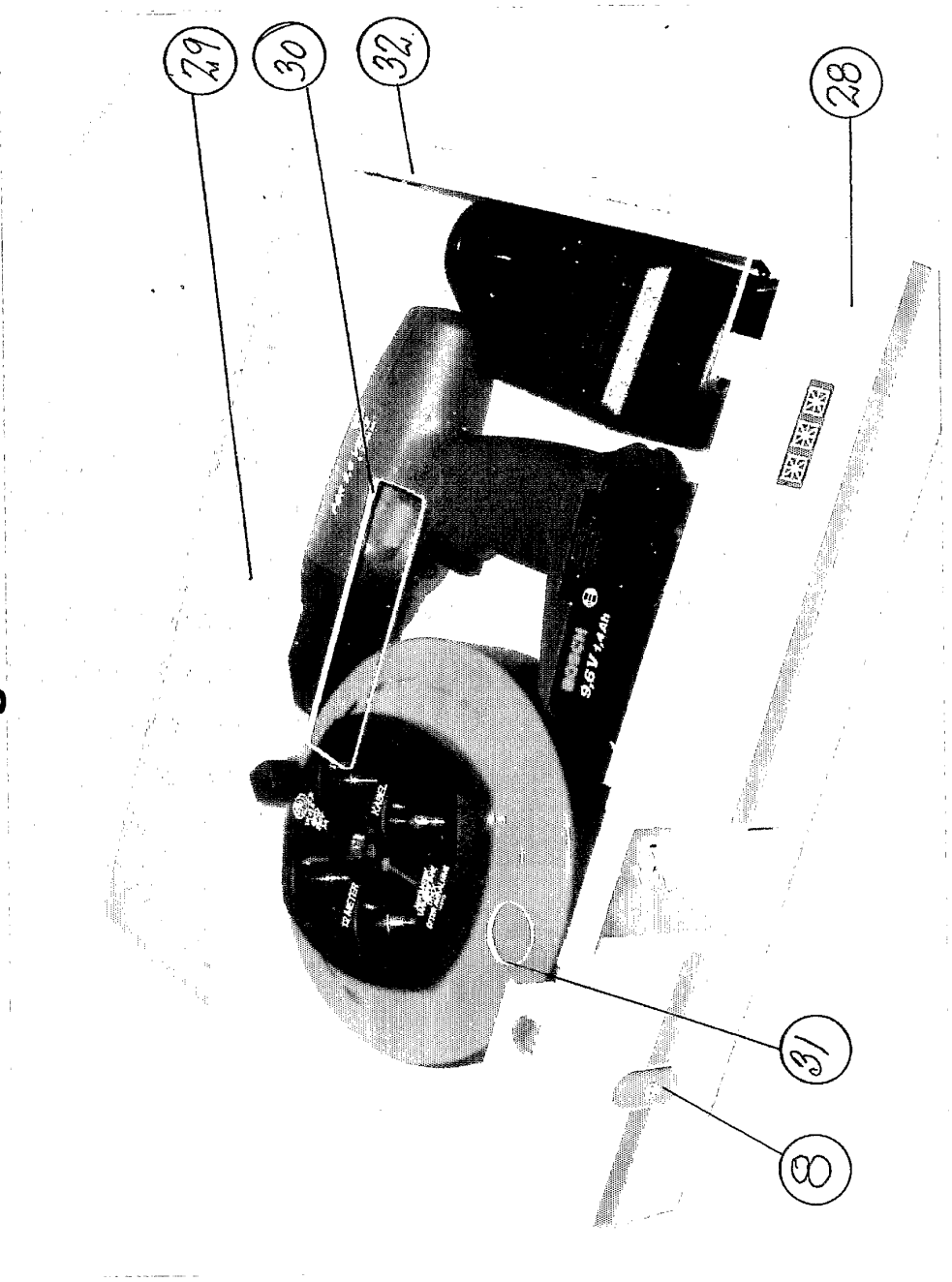


Fig. 15

Fig. 16

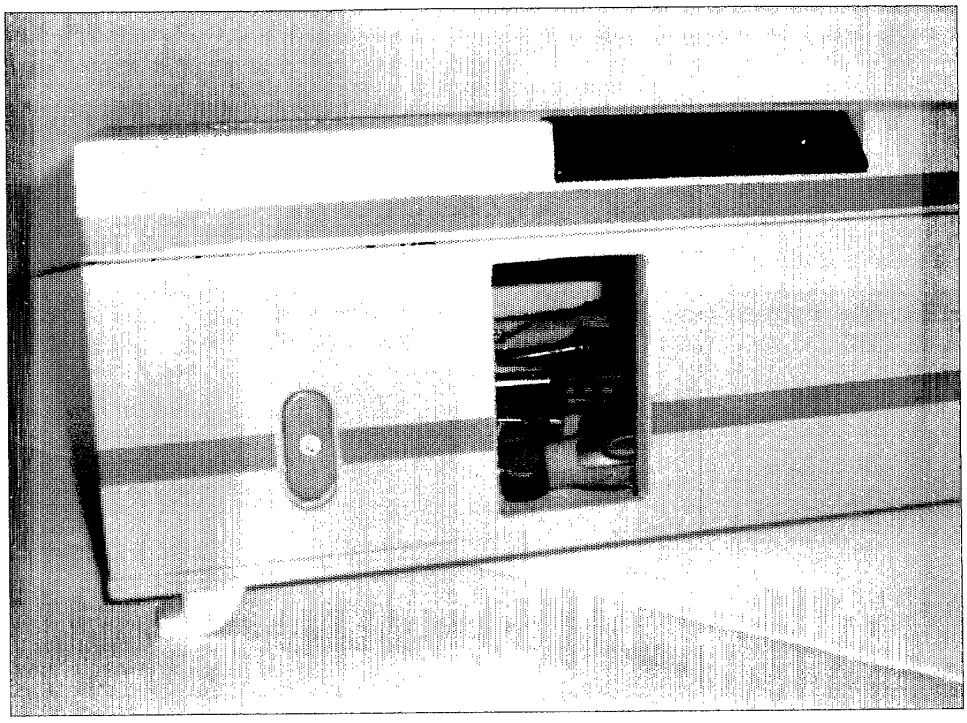
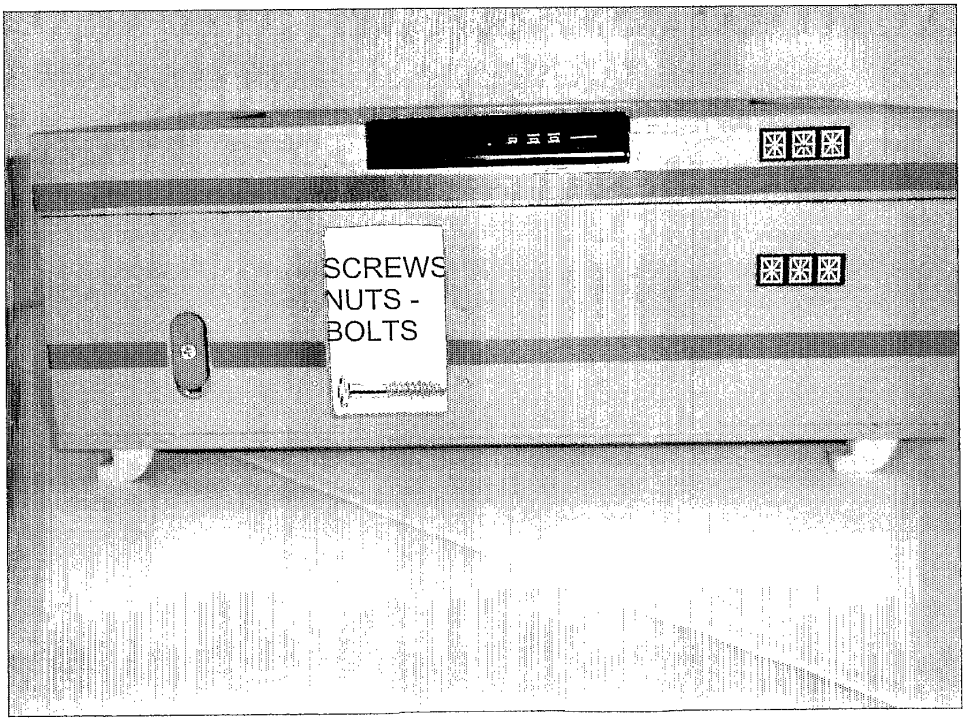


Fig. 17



INTERNATIONAL SEARCH REPORT

International application No.
PCT/DK2009/000107

A. CLASSIFICATION OF SUBJECT MATTER

B65D 21/032 (2006.01), B25H 3/02 (2006.01)
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)

B65D, B25H, E05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

None

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2005/021221 A1 (CARBONE) 10/March/2005	1-14
A	US 4293072 A (HILL et al.) 6/October/1981	1-14

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
06 August 2009	18 August 2009
Name and mailing address of the ISA/ Nordic Patent Institute Helgeshøj Allé 81, 2630 Taastrup, Denmark	Authorized officer Lisbet Hansen

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/DK2009/000107

WO 2005/021221 A1	2005-03-10	AT 394202 T	2008-05-15
		EP 1658160 A1	2006-05-24
		EP 1658160 B1	2008-05-07
		AU 2003265153 A1	2005-03-16
US 4293072 A	1981-10-06	DE 2945372 A1	1981-03-12
		GB 2056412 A	1981-03-18
		GB 2056412 B	1984-03-14
		IL 58447 A	1982-12-31
		ZA 7804787 A	1980-05-28

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG

(19) Weltorganisation für geistiges Eigentum
Internationales Büro

(43) Internationales Veröffentlichungsdatum
27. Januar 2011 (27.01.2011)

PCT

(10) Internationale Veröffentlichungsnummer
WO 2011/009480 A1

(51) Internationale Patentklassifikation:
A47L 9/00 (2006.01) *B25H 3/00* (2006.01)

(21) Internationales Aktenzeichen: PCT/EP2009/059320

(22) Internationales Anmeldedatum:
20. Juli 2009 (20.07.2009)

(25) Einreichungssprache: Deutsch

(26) Veröffentlichungssprache: Deutsch

(71) Anmelder *(für alle Bestimmungsstaaten mit Ausnahme von US)*: **ALFRED KÄRCHER GMBH & CO. KG** [DE/DE]; Alfred-Kärcher-Strasse 28 - 40, 71364 Winnenden (DE).

(72) Erfinder; und

(75) Erfinder/Anmelder *(nur für US)*: **RICKLEFSEN, Dirk** [DE/DE]; Poststrasse 23, 73773 Aichwald/Aichelberg (DE). **HESS, Stefan** [DE/DE]; Schwalbenweg 37, 71397 Leutenbach (DE). **HENSEL, Maic** [DE/DE]; Glemsweg 6, 71522 Backnang (DE).

(74) Anwalt: **HOEGER, STELLRECHT & PARTNER PATENTANWÄLTE**; Uhlandstrasse 14c, 70182 Stuttgart (DE).

(81) Bestimmungsstaaten *(soweit nicht anders angegeben, für jede verfügbare nationale Schutzrechtsart)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

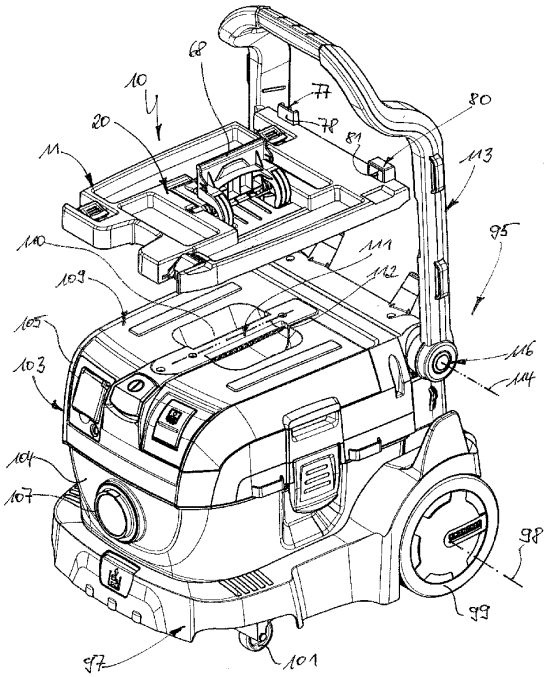
(84) Bestimmungsstaaten *(soweit nicht anders angegeben, für jede verfügbare regionale Schutzrechtsart)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), eurasisches (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), europäisches (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI,

[Fortsetzung auf der nächsten Seite]

(54) Title: ADAPTER DEVICE FOR A PORTABLE CLEANING APPLIANCE AND CLEANING DEVICE HAVING AN ADAPTER DEVICE AND A CLEANING APPLIANCE

(54) Bezeichnung : ADAPTERVORRICHTUNG FÜR EIN TRAGBARES REINIGUNGSGERÄT SOWIE REINIGUNGSEINRICHTUNG MIT EINER ADAPTERVORRICHTUNG UND EINEM REINIGUNGSGERÄT

Fig. 7



(57) Abstract: The invention relates to an adapter device (10) for the arrangement of a container (120) on the housing (105) of a portable cleaning appliance (95). The adapter device (10) comprises an adapter plate (11), which can be placed on the top surface (109) of the housing (105) and which has a storage surface (20) on the top side for placing the container (120), and a locking device (60) for detachably locking the adapter plate (11) to the housing (105) of the cleaning appliance (95) without tools. The invention further relates to a cleaning device comprising a cleaning appliance (95) and such an adapter device (10).

(57) Zusammenfassung: Adaptervorrichtung (10) für die Anordnung eines Behälters (120) am Gehäuse (105) eines tragbaren Reinigungsgerätes (95). Die Adaptervorrichtung (10) umfasst eine Adapterplatte (11), die auf die Deckfläche (109) des Gehäuses (105) aufsetzbar ist und oberseitig eine Stellfläche (20) aufweist zum Abstellen des Behälters (120), sowie eine Verriegelungseinrichtung (60) zum werkzeuglosen lösbaren Verriegeln der Adapterplatte (11) mit dem Gehäuse (105) des Reinigungsgerätes (95). Reinigungseinrichtung mit einem Reinigungsgerät (95) und einer derartigen Adaptervorrichtung (10).

WO 2011/009480 A1

SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Veröffentlicht:

— *mit internationalem Recherchenbericht (Artikel 21 Absatz 3)*

Adaptervorrichtung für ein tragbares Reinigungsgerät sowie Reinigungseinrichtung mit einer Adaptervorrichtung und einem Reinigungsgerät

Die Erfindung betrifft eine Adaptervorrichtung für die Anordnung eines Behälters am Gehäuse eines tragbaren Reinigungsgerätes.

Außerdem betrifft die Erfindung eine Reinigungseinrichtung mit einem tragbaren Reinigungsgerät, das ein Gehäuse aufweist, und mit einer Adaptervorrichtung der voranstehenden Art.

Tragbare Reinigungsgeräte kommen beispielsweise in Form tragbarer Staubsauger oder tragbarer Hochdruckreinigungsgeräte zum Einsatz. Sie werden zum Beispiel auf Baustellen aber auch an sonstigen Einsatzorten benutzt. Die Reinigungsgeräte können vom Benutzer getragen werden. Häufig sind die Reinigungsgeräte auch verfahrbar und weisen hierzu geeignete Laufräder auf.

Die Reinigungsgeräte werden zum Transport zu einem Einsatzort in vielen Fällen in einem Transportfahrzeug positioniert, und da in den meisten Fällen der Stauraum des Transportfahrzeuges beschränkt ist, werden auf den Reinigungsgeräten während des Transportes Behälter abgestellt, beispielsweise Werkzeugkoffer oder sonstige Behälter, die Utensilien aufnehmen. Erreicht das Transportfahrzeug sein Ziel, so werden die Behälter ebenso wie das Reinigungsgerät dem Transportfahrzeug entnommen und anschließend zum eigentlichen Einsatzort getragen.

Aus der EP 0 916 302 B1 ist ein Reinigungsgerät in Form eines Staubsaugers bekannt, dessen Gehäuse oberseitig eine Deckfläche ausbildet mit einer Vertiefung, in die ein Behälter eingesetzt werden kann. Der Behälter ist dadurch auf der Deckfläche des Gehäuses gegen Verrutschen gesichert. Zusätzlich kann der Behälter mit Hilfe von Arretierungselementen in der Vertiefung der Deckfläche arretiert werden. Dies hat den Vorteil, dass der Staubsauger zusammen mit dem Behälter vom Benutzer in Form einer einzigen Transporteinheit bewegt werden kann. Allerdings ist es erforderlich, dass der Behälter exakt die Ausmaße der Vertiefung an der Deckfläche des Staubsaugers aufweist. Behälter und Staubsauger müssen also in ihren Ausmaßen exakt aneinander angepasst sein.

Aufgabe der vorliegenden Erfindung ist es, eine Vorrichtung bereitzustellen, mit deren Hilfe ein Behälter am Gehäuse eines tragbaren Reinigungsgerätes angeordnet werden kann zum gemeinsamen Transport des Reinigungsgerätes zusammen mit dem Behälter.

Diese Aufgabe wird erfindungsgemäß durch eine Adaptervorrichtung mit den Merkmalen von Patentanspruch 1 gelöst. Die erfindungsgemäße Adaptervorrichtung umfasst eine Adapterplatte, die auf das Gehäuse des Reinigungsgerätes aufsetzbar ist. Außerdem umfasst die Adaptervorrichtung eine Verriegelungseinrichtung, mit deren Hilfe die Adapterplatte werkzeuglos mit dem Gehäuse des Reinigungsgerätes lösbar verriegelt werden kann. Die Adapterplatte weist oberseitig eine Stellfläche auf zum Abstellen des Behälters.

In die Erfindung fließt der Gedanke mit ein, dass durch die Bereitstellung einer Adapterplatte, die einerseits, nämlich auf ihrer Unterseite, an das Gehäuse eines tragbaren Reinigungsgerätes angepasst ist, und die andererseits, nämlich auf ihrer Oberseite, eine ebene Stellfläche für einen zusammen mit dem

Reinigungsgerät zu transportierenden Behälter aufweist, auf einfache Weise eine kompakte Transporteinheit bestehend aus dem Behälter, der Adapterplatte und dem Reinigungsgerät gebildet werden kann zum gemeinsamen Transport. Die Adapterplatte ist auf das Gehäuse des Reinigungsgerätes aufsetzbar und kann anschließend mittels der Verriegelungseinrichtung mit dem Gehäuse des Reinigungsgerätes werkzeuglos verriegelt werden. Die Verriegelungseinrichtung wirkt mit dem Gehäuse des Reinigungsgerätes zusammen. Oberseitig kann auf die Adapterplatte der Behälter, beispielsweise ein Werkzeug- oder Zubehörkoffer, aufgesetzt werden. Der Behälter kann bei Bedarf von der Adapterplatte abgenommen werden, zusätzlich kann auch die Adapterplatte vom Reinigungsgerät gelöst werden. Das Verriegeln und Entriegeln der Adapterplatte mit dem Gehäuse des Reinigungsgerätes erfolgt ohne Einsatz eines speziellen Werkzeuges, insbesondere ist es nicht erforderlich, die Adapterplatte mit dem Reinigungsgerät beispielsweise zu verschrauben.

Die Adaptervorrichtung erweitert somit die Einsatzmöglichkeiten des Reinigungsgerätes dahingehend, dass ein Behälter, vorzugsweise ein Werkzeug- oder Zubehörkoffer, auf dem Reinigungsgerät abgestellt und gemeinsam mit diesem transportiert werden kann.

Vorzugsweise ist die Adapterplatte mittels der Verriegelungseinrichtung mit einem hintergreifbaren Gehäuseteil des Gehäuses des Reinigungsgerätes werkzeuglos lösbar verriegelbar. Als hintergreifbares Gehäuseteil kann beispielsweise eine Gehäuselasche, ein hintergreifbarer Gehäusevorsprung oder dergleichen zum Einsatz kommen. Zusätzliche Verriegelungselemente am Reinigungsgerät können dadurch entfallen.

Von besonderem Vorteil ist es, wenn die Adapterplatte mittels der Verriegelungseinrichtung mit einem Tragegriff des Reinigungsgerätes werkzeuglos lös-

bar verriegelbar ist. Der Tragegriff ist bevorzugt an einer Oberseite des Gehäuses des Reinigungsgerätes angeordnet. Der Tragegriff ist üblicherweise sehr stabil ausgestaltet und an das Gewicht des Reinigungsgerätes angepasst, so dass die Verriegelung der Adapterplatte mit dem Tragegriff mechanisch sehr belastbar ausgestaltet werden kann.

Günstigerweise umfasst die Verriegelungseinrichtung mindestens ein Verriegelungsglied, das zwischen einer Verriegelungsstellung und einer Freigabestellung hin und her bewegbar an der Adapterplatte gehalten ist. In der Verriegelungsstellung des mindestens einen Verriegelungsgliedes ist die Adapterplatte unbeweglich am Gehäuse des Reinigungsgerätes festgelegt. Hierzu kann das mindestens eine Verriegelungsglied beispielsweise ein an der Oberseite des Reinigungsgerätes angeordnetes hintergreifbares Gehäuseteil, insbesondere einen Tragegriff hintergreifen oder umgreifen. Soll die Adapterplatte vom Reinigungsgerät gelöst werden, so kann hierzu das mindestens eine Verriegelungsglied ohne Einsatz eines Werkzeuges in seine Freigabestellung überführt werden, in der es das Gehäuse freigibt.

Besonders vorteilhaft ist es, wenn die Verriegelungseinrichtung eine vom Benutzer ergreifbare Verriegelungshandhabe aufweist, die mit dem mindestens einen Verriegelungsglied verbunden ist. Mittels der Verriegelungshandhabe kann der Benutzer das mindestens eine Verriegelungsglied auf einfache Weise ohne Einsatz eines zusätzlichen Werkzeuges zwischen seiner Verriegelungsstellung und seiner Freigabestellung hin und her bewegen.

Bei einer vorteilhaften Ausführungsform steht die Verriegelungshandhabe in der Freigabestellung des mindestens einen Verriegelungsgliedes aus der Stellfläche der Adapterplatte hervor und in der Verriegelungsstellung des mindestens einen Verriegelungsgliedes steht die Verriegelungshandhabe aus der

Stellfläche der Adapterplatte nicht hervor. Die Stellfläche wird bei einer derartigen Ausgestaltung von der Verriegelungshandhabe allenfalls dann beeinträchtigt, wenn die Verriegelungshandhabung eine Position einnimmt, in der das mindestens eine Verriegelungsglied seine Freigabestellung einnimmt. In dieser Stellung kann die Adapterplatte vom Reinigungsgerät abgenommen werden. Befindet sich jedoch das mindestens eine Verriegelungsglied in seiner Verriegelungsstellung, so ist die Verriegelungshandhabe derart angeordnet, dass sie aus der Stellfläche nicht hervorsteht und daher das Abstellen eines Behälters auf der Stellfläche nicht beeinträchtigt.

Es kann beispielsweise vorgesehen sein, dass die Verriegelungshandhabe plattenförmig ausgestaltet ist, wobei sie in der Verriegelungsstellung des mindestens eines Verriegelungsgliedes in der Ebene der Stellfläche oder unterhalb der Ebene der Stellfläche verläuft.

Damit der Benutzer die Verriegelungshandhabe auf einfache Weise ergreifen kann, ist es von Vorteil, wenn die Verriegelungshandhabe hintergreifbar ist.

Das mindestens eine Verriegelungsglied ist bei einer vorteilhaften Ausführungsform der Erfindung um eine Schwenkachse verschwenkbar. Es kann somit zwischen seiner Verriegelungsstellung und seiner Freigabestellung hin und her geschwenkt werden. Die Schwenkachse ist bevorzugt parallel zu einer Längsachse eines oberseitig am Gehäuse des Reinigungsgerätes angeordneten Tragegriffs ausrichtbar.

Günstigerweise umfasst die Verriegelungseinrichtung zwei starr miteinander verbundene und im Abstand zueinander angeordnete Verriegelungsglieder. Dies erhöht die mechanische Belastbarkeit der Verriegelungseinrichtung und der mit dem Tragegriff verriegelten Adapterplatte.

Bevorzugt verbindet die Verriegelungshandhabe die beiden Verriegelungsglieder starr miteinander.

Das mindestens eine Verriegelungsglied ist vorteilhafterweise haken- oder bügelartig ausgestaltet und untergreift in der Verriegelungsstellung ein Gehäuseteil des Reinigungsgerätes, beispielsweise einen Tragegriff.

Bei einer bevorzugten Ausführungsform weist die Adapterplatte oberseitig eine erste Vertiefung auf, die die Verriegelungshandhabe aufnimmt. In der Verriegelungsstellung des mindestens einen Verriegelungsgliedes kann die Verriegelungshandhabe vollständig in die erste Vertiefung der Adapterplatte eintauchen, so dass die Stellfläche der Adapterplatte durch die Verriegelungshandhabe nicht beeinträchtigt ist.

Besonders vorteilhaft ist es, wenn die Verriegelungshandhabe in der Verriegelungsstellung des mindestens einen Verriegelungsgliedes die erste Vertiefung zumindest teilweise abdeckt und die Stellfläche der Adapterplatte erweitert.

Wie bereits erläutert, ist die Adaptervorrichtung für tragbare Reinigungsgeräte vorgesehen. Damit das Reinigungsgerät auch dann getragen werden kann, wenn die Adapterplatte mit dem Gehäuse des Reinigungsgerätes verriegelt ist, ist bei einer vorteilhaften Ausführungsform der Erfindung vorgesehen, dass die Adaptervorrichtung eine Trageeinrichtung aufweist mit mindestens einem Tragegriff, der vom Benutzer umgreifbar ist. Ist die Adapterplatte mit dem Gehäuse des Reinigungsgerätes verriegelt, so kann mit Hilfe des Tragegriffes der Adaptervorrichtung die komplette Reinigungseinrichtung bestehend aus dem Reinigungsgerät und der Adaptervorrichtung getragen werden.

Günstigerweise ist der Tragegriff der Adaptervorrichtung zwischen einer Tragestellung, in der er aus der Stellfläche der Adapterplatte hervorsteht, und einer Ruhestellung, in der er aus der Stellfläche der Adapterplatte nicht hervorsteht, hin und her bewegbar. Der Tragegriff ist somit zum Tragen der Adaptervorrichtung mitsamt dem Reinigungsgerät für den Benutzer auf einfache Weise im Bereich der Stellfläche zugänglich, aus der er in seiner Tragestellung hervorsteht. Soll jedoch ein Behälter auf die Stellfläche abgestellt werden, so kann der Tragegriff der Adaptervorrichtung in eine Ruhestellung überführt werden, in der er aus der Stellfläche nicht hervorsteht und damit die Größe der Stellfläche auch nicht beeinträchtigt.

Bevorzugt ist der Tragegriff der Adaptervorrichtung um eine Schwenkachse verschwenkbar. Dies erleichtert das Überführen des Tragegriffes der Adaptervorrichtung aus seiner Ruhestellung in seine Tragestellung und zurück in die Ruhestellung. In jeder Stellung ist der Tragegriff der Adaptervorrichtung für den Benutzer auf einfache Weise zugänglich. Die Schwenkachse ist bevorzugt parallel zu einer Längsachse eines oberseitig am Gehäuse des Reinigungsgerätes angeordneten Tragegriffs ausrichtbar.

Es kann vorgesehen sein, dass die Adapterplatte oberseitig eine zweite Vertiefung aufweist, die den Tragegriff aufnimmt. In seiner Ruhestellung kann der Tragegriff der Adaptervorrichtung vollständig in die zweite Vertiefung der Adapterplatte eintauchen. Bei Bedarf kann der Benutzer den Tragegriff der Adaptervorrichtung aus der zweiten Vertiefung der Adapterplatte entnehmen und in seine Tragestellung überführen, in der er aus der Stellfläche hervorsteht.

Von Vorteil ist es, wenn der Tragegriff der Adaptervorrichtung in seiner Ruhestellung die zweite Vertiefung zumindest bereichsweise ausfüllt und die Stellfläche der Adapterplatte erweitert.

Günstigerweise ist die Trageeinrichtung der Adaptervorrichtung an der Adapterplatte verschwenkbar gelagert.

Von Vorteil ist es, wenn die Verriegelungseinrichtung an der Trageeinrichtung der Adaptervorrichtung gehalten ist. Dies vereinfacht die Handhabung der Adaptervorrichtung sowohl beim Verriegeln mit dem Gehäuse des Reinigungsgerätes als auch beim Tragen zusammen mit dem Reinigungsgerät. Außerdem ermöglicht es die Halterung der Verriegelungseinrichtung an der Trageinrichtung, in einem ersten Montageschritt die Verriegelungseinrichtung an der Trageinrichtung zu montieren, und in einem zweiten Montageschritt kann dann die aus der Verriegelungseinrichtung und der Trageinrichtung bestehende Baueinheit an der Adapterplatte montiert werden. Dadurch können die Montagekosten gering gehalten werden.

Es kann vorgesehen sein, dass die Verriegelungseinrichtung und die Trageinrichtung starr miteinander verbunden und beweglich an der Adapterplatte gehalten sind. Hierbei kann vorgesehen sein, dass die aus der Verriegelungseinrichtung und der Trageeinrichtung bestehende Baueinheit zwischen einer ersten Stellung, in der das mindestens eine Verriegelungsglied ein Gehäuseteil des Reinigungsgerätes hintergreift und der Tragegriff der Adaptervorrichtung seine Ruhestellung einnimmt, über eine zweite Stellung, in der das mindestens eine Verriegelungsglied ebenfalls das Gehäuseteil des Reinigungsgerätes hintergreift, der Tragegriff der Adaptervorrichtung aber seine Tragestellung einnimmt, und einer dritten Stellung, in der das mindestens eine Verriegelungsglied das Gehäuseteil des Reinigungsgerätes freigibt und der Tragegriff der

Adaptervorrichtung eine Außerbetriebstellung einnimmt, hin und her bewegt werden kann. Je nach Stellung der aus der Verriegelungseinrichtung und der Trageeinrichtung bestehenden Baueinheit kann die Adapterplatte mit dem Gehäuseteil des Reinigungsgerätes verriegelt oder entriegelt sein und es kann der Tragegriff der Adaptervorrichtung seine Ruhestellung oder auch seine Tragestellung einnehmen.

Bei einer bevorzugten Ausgestaltung der Erfindung ist die Verriegelungseinrichtung an der Trageeinrichtung beweglich gelagert ist. Dies gibt die Möglichkeit, die Verriegelungseinrichtung relativ zur Trageeinrichtung zu bewegen. Insbesondere kann bei einer derartigen Ausführungsform das mindestens eine Verriegelungsglied zwischen seiner Verriegelungsstellung und seiner Freigabestellung hin und her bewegt werden, ohne dass dabei die Trageeinrichtung ihre Lage relativ zur Adaptervorrichtung verändern muss. Umgekehrt kann der Tragegriff seine Position relativ zur Adaptervorrichtung verändern, ohne dass die Stellung der Verriegelungseinrichtung verändert werden muss. Es kann dadurch der Tragegriff zwischen seiner Ruhestellung und seiner Tragestellung hin und her bewegt werden, ohne dass dies die Verriegelung der Adapterplatte mit dem Gehäuse des Reinigungsgerätes beeinflusst.

Bei einer vorteilhaften Ausführungsform ist vorgesehen, dass die Verriegelungseinrichtung an der Trageeinrichtung verschwenkbar gelagert ist.

Günstigerweise sind die Verriegelungseinrichtung und die Trageeinrichtung an der Adapterplatte gehalten, wobei sie unabhängig voneinander jeweils um mindestens 90° um eine gemeinsame Schwenkachse verschwenkbar sind. Hierbei kann die gemeinsame Schwenkachse parallel zu einer Längsachse eines oberseitig am Gehäuse des Reinigungsgerätes angeordneten Tragegriffs ausrichtbar sein.

Die Montage der Adaptervorrichtung wird bei einer vorteilhaften Ausführungsform dadurch vereinfacht, dass die Verriegelungseinrichtung mit der Trageeinrichtung verrastbar ist.

Wie bereits erläutert, kann auf die Stellfläche der Adapterplatte ein Behälter, beispielsweise ein Werkzeug- oder Zubehörkoffer abgestellt werden. Hierbei ist es von Vorteil, wenn die Adapterplatte mindestens ein aus der Stellfläche hervorstehendes Anschlagelement aufweist, an das der Behälter anlegbar ist. Das Anschlagelement erleichtert die Positionierung des Behälters auf der Stellfläche der Adapterplatte.

Günstigerweise weist mindestens ein Anschlagelement eine Ausnehmung auf zur Aufnahme eines Vorsprunges des Behälters. Der Behälter kann beispielsweise zapfenförmige Vorsprünge aufweisen, die von einer Ausnehmung eines Anschlagelementes der Adaptervorrichtung aufgenommen werden.

Besonders vorteilhaft ist es, wenn die Adaptervorrichtung mindestens ein Arretierungselement aufweist zum Arretieren des Behälters an der Stellfläche der Adapterplatte. Ein unbeabsichtigtes Lösen des Behälters von der Stellfläche kann dadurch zuverlässig verhindert werden.

Bevorzugt ist mindestens ein Arretierungselement in einer oberseitigen Vertiefung der Adapterplatte beweglich, insbesondere verschwenkbar gelagert. Es kann zum Arretieren des Behälters aus der zugeordneten Vertiefung der Adapterplatte herausbewegt, insbesondere herausgeschwenkt werden, um dann mit einem komplementären Arretierungselement des Behälters zusammenzuwirken.

Wie eingangs erwähnt, betrifft die Erfindung nicht nur eine Adaptervorrichtung der voranstehend genannten Art sondern auch eine Reinigungseinrichtung mit einer derartigen Adaptervorrichtung und mit einem tragbaren Reinigungsgerät.

Bevorzugt umfasst das Reinigungsgerät ein hintergreifbares Gehäuseteil, beispielsweise eine Gehäuselasche oder einen Gehäusevorsprung oder dergleichen, und die Verriegelungseinrichtung der Adaptervorrichtung wirkt mit dem hintergreifbaren Gehäuseteil zusammen zum werkzeuglosen lösbaren Verriegeln der Adapterplatte mit dem Gehäuse. Zusätzliche Verriegelungselemente am Reinigungsgerät sind folglich zum Verriegeln der Adapterplatte nicht erforderlich.

Von ganz besonderem Vorteil ist es, wenn das Reinigungsgerät einen Tragegriff aufweist und die Adapterplatte der Adaptervorrichtung mittels der Verriegelungseinrichtung mit dem Tragegriff werkzeuglos lösbar verriegelbar ist.

Der Tragegriff ist bei einer vorteilhaften Ausgestaltung der Erfindung an der Oberseite des Gehäuses des Reinigungsgerätes angeordnet. Insbesondere kann vorgesehen sein, dass der Tragegriff in eine oberseitige Deckfläche des Gehäuses integriert ist, auf die die Adapterplatte aufsetzbar ist.

Das Reinigungsgerät ist bevorzugt als Staubsauger ausgestaltet. Es kann allerdings auch vorgesehen sein, dass das Reinigungsgerät in Form eines Hochdruckreinigers ausgebildet ist.

Bei einer besonders bevorzugten Ausführungsform der erfindungsgemäßen Reinigungseinrichtung weist das Reinigungsgerät einen verfahrbaren Sockel auf, an dem Laufräder drehbar gelagert sind, sowie ein auf dem Sockel angeordnetes Reinigungsaggregat mit einem Griffbügel, wobei das Reinigungsag-

gregat das Gehäuse aufweist, mit dem die Adapterplatte verriegelbar ist, und wobei der Griffbügel in einer aufgerichteten Stellung im Wesentlichen senkrecht zur Stellfläche der am Gehäuse arretierten Adapterplatte ausgerichtet ist. Bei einer derartigen Ausführungsform ist das Reinigungsgerät mittels des Sockels verfahrbar, und nach Verriegeln der Adapterplatte mit dem Gehäuse des Reinigungsgerätes kann ein Behälter auf die Stellfläche der Adapterplatte aufgestellt werden, der sich dann auch am aufgerichteten Griffbügel abstützen kann. Der Griffbügel ist in seiner aufgerichteten Stellung im Wesentlichen senkrecht zur Stellfläche der Adapterplatte ausgerichtet. Der Behälter kann daher über die Adapterplatte hinausragen und sich in seinem hinausragenden Bereich am Griffbügel abstützen.

Von besonderem Vorteil ist es, wenn das Reinigungsgerät zusammen mit mindestens einem auf der Stellfläche der Adapterplatte angeordneten Behälter um eine gemeinsame Drehachse von zwei Laufrädern verschwenkbar ist. Das Reinigungsgerät kann dann zusammen mit der am Reinigungsgerät arretierten Adaptervorrichtung und dem mindestens einen Behälter nach Art einer Sackkarre verfahren werden. Der Behälter ist mittels der Adaptervorrichtung zuverlässig auf dem Reinigungsgerät positionierbar, bevorzugt ist er an der Adapterplatte arretierbar. Hierbei ist es von besonderem Vorteil, wenn der Behälter oberseitig einen Tragegriff aufweist, so dass der Benutzer den Behälter zusammen mit der Adaptervorrichtung und dem Reinigungsgerät tragen kann, nachdem zuvor in einem ersten Schritt die Adapterplatte am Gehäuse des Reinigungsgerätes arretiert wurde und danach der Behälter an der Adapterplatte arretiert wurde. Der Benutzer kann dann wählen, ob er die komplette Reinigungseinrichtung mitsamt dem oberseitig angeordneten Behälter um die gemeinsame Drehachse zweier Laufräder des Reinigungsgerätes verschwenkt und das Reinigungsgerät mit dem Behälter nach Art einer Sackkarre verfährt, oder ob er, beispielsweise zur Überwindung einer Stufe, den Behälter mitsamt

dem Reinigungsgerät und der dazwischen angeordneten Adaptervorrichtung am Tragegriff des Behälters anhebt.

Die nachfolgende Beschreibung einer bevorzugten Ausführungsform der Erfindung dient im Zusammenhang mit der Zeichnung der näheren Erläuterung. Es zeigen:

Figur 1: eine perspektivische Darstellung einer erfindungsgemäßen Adaptervorrichtung;

Figur 2: eine Draufsicht auf die Adaptervorrichtung aus Figur 1;

Figur 3: eine Schnittansicht der Adaptervorrichtung längs der Linie 3-3 in Figur 2;

Figur 4: eine Darstellung der Adaptervorrichtung nach Art einer Explosionszeichnung;

Figur 5: eine perspektivische Darstellung der Adaptervorrichtung, wobei ein Tragegriff seine Tragestellung und eine Verriegelungseinrichtung ihre Verriegelungsstellung einnehmen;

Figur 6: eine perspektivische Darstellung der Adaptervorrichtung, wobei der Tragegriff seine Ruhestellung und die Verriegelungseinrichtung ihre Freigabestellung einnehmen;

Figur 7: eine perspektivische Darstellung einer erfindungsgemäßen Reinigungseinrichtung nach Art einer Explosionszeichnung mit einem Reinigungsgerät und einer Adaptervorrichtung, wobei eine Verrie-

gelungseinrichtung der Adaptervorrichtung ihre Freigabestellung einnimmt;

Figur 8: eine perspektivische Darstellung der Reinigungseinrichtung, wobei die Adaptervorrichtung mit dem Reinigungsgerät verriegelt ist;

Figur 9: eine perspektivische Darstellung der Reinigungseinrichtung, wobei die Adaptervorrichtung mit dem Reinigungsgerät verriegelt ist und ein Tragegriff der Adaptervorrichtung seine Tragestellung einnimmt, und

Figur 10: eine perspektivische Darstellung der Reinigungseinrichtung mit zwei darauf angeordneten Behältern.

In den Figuren 1 bis 6 ist eine erfindungsgemäße Adaptervorrichtung 10 dargestellt, die auf die Deckfläche eines Gehäuses eines in den Figuren 7 bis 10 dargestellten Reinigungsgerätes aufgesetzt werden kann und ihrerseits eine Stellfläche bildet für einen Behälter, wie er beispielsweise in Figur 10 dargestellt ist.

Die Adaptervorrichtung 10 weist eine Adapterplatte 11 auf, die in der Draufsicht im Wesentlichen rechteckförmig ausgestaltet ist, wobei sie an einem vorderen Rand 12 eine zentrale Einbuchtung 13 aufweist. Ein hinterer Rand 15 der Adapterplatte 11 ist geradlinig ausgebildet, und ein erster Längsrand 16 weist ebenso wie ein zweiter Längsrand 17 eine geringfügig konvex nach außen gekrümmte Gestalt auf. Die beiden Längsränder 16 und 17 sind einander abgewandt und verbinden jeweils den hinteren Rand 15 mit dem vorderen Rand 12.

Die Oberseite 19 der Adapterplatte 11 weist eine ebene Stellfläche 20 auf sowie eine mittige, im Wesentlichen U-förmige erste Vertiefung 22 und eine sich daran anschließende, rechteckförmige zweite Vertiefung 24, an die sich, dem zweiten Längsrand 17 benachbart, eine dritte rechteckförmige Vertiefung 26 anschließt. Dem ersten Längsrand 16 benachbart weist die Adapterplatte 11 auf ihrer Oberseite 19 eine vierte rechteckförmige Vertiefung 28 auf, und der zentralen Einbuchtung 13 benachbart ist zwischen der dritten und der vierten Vertiefung 26, 28 eine fünfte rechteckförmige Vertiefung 30 angeordnet.

Im Übergangsbereich zwischen der ersten und der zweiten Vertiefung 22, 24 sind in die Oberseite 19 fluchtend zueinander eine erste Rastausnehmung 34 und eine zweite Rastausnehmung 36 eingeformt. In die beiden Rastausnehmungen 34 und 36 ist eine Trageeinrichtung 38 eingerastet. Die Trageeinrichtung 38 umfasst einen U-förmigen Tragbügel 40 mit einem ersten Tragschenkel 41 und einem zweiten Tragschenkel 42, die über einen stegartigen Tragegriff 43 einstückig miteinander verbunden sind. Auf ihren einander abgewandten Außenseiten 45 bzw. 46 tragen die beiden Tragschenkel 41 und 42 an ihrem freien Ende einen ersten Gelenkstift 48 bzw. einen zweiten Gelenkstift 49. Die beiden Gelenkstifte sind fluchtend zueinander ausgerichtet und können mit der ersten Rastausnehmung 34 bzw. mit der zweiten Rastausnehmung 36 verrastet werden. Die beiden Gelenkstifte 48 und 49 definieren eine Schwenkachse 51, die senkrecht zum hinteren Rand 15 verläuft und um die die Trageeinrichtung 38 verschwenkt werden kann, nachdem die Gelenkstifte 48 und 49 mit den Rastausnehmungen 34 und 36 verrastet wurden. Dies gibt die Möglichkeit, den Tragbügel 40 und damit auch den Tragegriff 43 zwischen einer Ruhestellung, in der er vollständig in die U-förmige erste Vertiefung 22 eintaucht, und einer Tragestellung, in der der Tragbügel 40 senkrecht zur Stellfläche 20 ausgerichtet ist und der Tragegriff 43 vom Benutzer umgriffen werden kann, hin und her zu schwenken. Der Tragbügel 40 und damit auch

der Tragegriff 43 steht in der Tragestellung, wie sie beispielsweise in Figur 5 dargestellt ist, aus der Stellfläche 20 hervor. In der Ruhestellung hingegen füllt der Tragbügel 40 die erste Vertiefung 22 vollständig aus und erweitert somit die ebene Stellfläche 20. Dies wird insbesondere aus Figur 1 deutlich.

An ihren einander zugewandten Innenseiten 54 bzw. 55 tragen die beiden Tragschenkel 41 und 42 fluchtend zu den Gelenkstiften 48 und 49 einen dritten Gelenkstift 57 bzw. einen vierten Gelenkstift 58. Mit diesen Gelenkstiften ist eine Verriegelungseinrichtung 60 der Adaptervorrichtung 10 verrastet. Die Verriegelungseinrichtung 60 weist hierzu zwei Rastklemmen 62, 63 auf, die mit dem dritten bzw. vierten Gelenkstift 57, 58 verrastet werden können, wobei die Verriegelungseinrichtung 60 um die Schwenkachse 51 relativ zur Trageeinrichtung 38 zwischen einer in Figur 5 dargestellten Verriegelungsstellung und einer in Figur 6 dargestellten Freigabestellung hin und her geschwenkt werden kann.

Die Verriegelungseinrichtung 60 umfasst ein erstes Verriegelungsglied in Form eines ersten Verriegelungsbügels 65 und ein zweites Verriegelungsglied in Form eines zweiten Verriegelungsbügels 66, die identisch ausgestaltet sind und über eine starre, plattenförmig ausgebildete Verriegelungshandhabe 68 miteinander verbunden sind. Den beiden Verriegelungsbügeln 65 und 66 ist im Boden 70 der zweiten Vertiefung 24 jeweils eine Durchbrechung 71 bzw. 72 zugeordnet, die in der Verriegelungsstellung der Verriegelungseinrichtung 60 von den Verriegelungsbügeln 65 bzw. 66 durchgriffen werden kann. In der Verriegelungsstellung stehen daher die Verriegelungsbügel 65 und 66 mit ihren freien Endabschnitten 74 bzw. 75 unterseitig aus der Adapterplatte 11 hervor. Dies wird insbesondere aus Figur 3 deutlich.

Die plattenförmige Verriegelungshandhabe 68 überdeckt in der Verriegelungsstellung der Verriegelungseinrichtung 60 zumindest einen Teilbereich der zweiten Vertiefung 24 und erweitert daher in der Verriegelungsstellung die Stellfläche 20. Vom Benutzer kann die Verriegelungshandhabe 68 in der Verriegelungsstellung der Verriegelungseinrichtung 60 hintergriffen werden. Der Benutzer kann hierzu im Übergangsbereich zwischen der zweiten Vertiefung 24 und der dritten Vertiefung 26 hinter die Verriegelungshandhabe 68 greifen. Anschließend kann er die Verriegelungshandhabe 68 zusammen mit den Verriegelungsbügeln 65 und 66 um die Schwenkachse 51 nach außen verschwenken in die in Figur 6 dargestellte Freigabestellung. In dieser Stellung erreichen die freien Endabschnitte 74 und 75 der Verriegelungsbügel 65 und 66 die Höhe des Bodens 70 der zweiten Vertiefung 24, sie stehen aber nicht mehr unterseitig aus der Adapterplatte 11 hervor.

Im Bereich des hinteren Randes 15 trägt die Adapterplatte 11 an ihrer Oberseite 19 einen aus der Stellfläche 20 herausragenden ersten Anschlag 77 mit einer im Wesentlichen senkrecht zur Stellfläche 20 ausgerichteten ersten Anschlagfläche 78. Und im Abstand zum ersten Anschlag 77 steht im Bereich des hinteren Randes 15 ein zweiter Anschlag 80 aus der Stellfläche 20 hervor, wobei der zweite Anschlag 80 der dritten Vertiefung 26 zugewandt eine rechteckförmige Ausnehmung 81 aufweist.

Im Bereich zwischen dem ersten Anschlag 77 und der vierten Vertiefung 28 weist die Adapterplatte 11 an ihrer Oberseite 19 eine sechste Vertiefung 83 auf, die in den ersten Längsrand 18 einmündet und in der ein erstes Arretierungselement in Form eines ersten Rastbügels 85 verschwenkbar gelagert ist.

Zwischen der vierten Vertiefung 28 und dem vorderen Rand 12 der Adapterplatte 11 ist in die Oberseite 19 eine siebte Vertiefung 87 eingeformt, die im

Wesentlichen identisch ausgestaltet ist wie die sechste Vertiefung 83 und die in den ersten Längsrand 16 einmündet. In der siebten Vertiefung 87 ist ein zweites Arretierungselement in Form eines zweiten Rastbügels 88 verschwenkbar gelagert. Der zweite Rastbügel 88 ist identisch ausgestaltet wie der erste Rastbügel 85.

Zwischen der dritten Vertiefung 26 und dem vorderen Rand 12 der Adapterplatte 11 ist in die Oberseite 19 eine achte Vertiefung 90 eingeformt, die im Wesentlichen identisch ausgestaltet ist wie die sechste und siebte Vertiefung, wobei sie allerdings um 90° gedreht ist und in den vorderen Rand 12 einmündet. In der achten Vertiefung 90 ist ein drittes Arretierungselement in Form eines dritten Rastbügels 91 verschwenkbar gelagert, der identisch ausgebildet ist wie der zweite Rastbügel 88 und der erste Rastbügel 85.

Wie bereits erwähnt, kommt die Adaptervorrichtung 10 für die Anordnung eines Behälters am Gehäuse eines tragbaren Reinigungsgerätes zum Einsatz. Ein derartiges Reinigungsgerät ist in den Figuren 7 bis 10 in Form eines Staubsaugers 95 dargestellt. Dieser umfasst einen Sockel 97 mit zwei um eine gemeinsame Drehachse 98 frei drehbaren hinteren Laufrädern, von denen in Zeichnung nur ein hinteres Laufrad 99 dargestellt ist, und mit zwei vorderen Laufrädern, von denen in der Zeichnung nur ein vorderes Laufrad 101 dargestellt ist. Mittels der Laufräder 99, 101 kann der Sockel 97 entlang einer Bodenfläche verfahren werden.

Auf den Sockel 97 ist ein Saugaggregat 103 aufgesetzt, das ein Gehäuseunterteil 104 und ein Gehäuseoberteil 105 aufweist. Das Gehäuseunterteil 104 bildet in üblicher Weise einen Schmutzsammelbehälter aus, in den über einen Saugeinlass 107 Saugluft zusammen mit Sauggut eingesaugt werden kann. An den Saugeinlass 107 kann in üblicher Weise ein Saugschlauch angeschlossen

werden, der an seinem freien Ende eine Saugdüse trägt. Derartige Saugschläuche und Saugdüsen sind dem Fachmann an sich bekannt und daher in der Zeichnung nicht dargestellt.

Das Gehäuseoberteil 105 nimmt in üblicher Weise eine Saugturbine auf, die von einem Elektromotor angetrieben wird. Mittels der Saugturbine kann der Schmutzsammelbehälter des Gehäuseunterteils 104 mit Unterdruck beaufschlagt werden.

An seiner Oberseite weist das Gehäuseoberteil 104 eine Deckfläche 109 auf mit einer zentralen Vertiefung 110, die stegartig von einem Tragegriff 111 überbrückt ist. Mittels des Tragegriffes 111 kann der Staubsauger 95 vom Benutzer getragen werden.

Am Gehäuseoberteil 105 ist in einem rückwärtigen Bereich ein im Wesentlichen U-förmiger Griffbügel 113 um eine Schwenkachse 114 verschwenkbar gelagert. Der Griffbügel 113 kann um die Schwenkachse 114 zwischen einer in den Figuren 7 bis 10 dargestellten ausgeschwenkten oder aufgerichteten Stellung und einer in der Zeichnung nicht dargestellten eingeschwenkten Stellung hin und her verschwenkt werden. Mittels einer Feststelleinrichtung 116, die am freien Ende zumindest eines Schenkels des Griffbügels 113 angeordnet ist, kann der Griffbügel 113 in seiner ausgeschwenkten Stellung arretiert werden.

Die Adaptervorrichtung 10 kann auf die Deckfläche 109 des Staubsaugers 95 aufgesetzt werden, wobei die Schwenkachse 51 der Trageinrichtung 38 und der Verriegelungseinrichtung 60 parallel zu einer Längsachse 112 des Tragegriffs 111 ausgerichtet ist. Anschließend kann die Adapterplatte 11 mit dem Tragegriff 114 des Staubsaugers 95 verriegelt werden, indem die Verriege-

lungseinrichtung 60 ausgehend von ihrer in Figur 7 dargestellten Freigabestellung in die in Figur 8 dargestellte Verriegelungsstellung verschwenkt wird. In der Verriegelungsstellung hintergreifen die freien Endabschnitte 74 und 75 der Verriegelungsbügel 65 und 66 den Tragegriff 111 des Staubsaugers 95. Der Tragegriff 111 bildet somit ein hintergreifbares Gehäuseteil des Staubsaugers 95 aus, mit dem die Adapterplatte 11 mittels der Verriegelungseinrichtung 60 werkzeuglos lösbar verriegelt werden kann. Die Adapterplatte 11 ist dadurch an der Deckfläche 109 unbeweglich gehalten. Anschließend kann auf die Stellfläche 20 der Adapterplatte 11 ein Behälter 120 aufgestellt werden, wie er in Figur 10 dargestellt ist. Auf den Behälter 120 kann ein weiterer Behälter 122 positioniert sein. Der Behälter 120 kann zur Ausrichtung an der Stellfläche 20 derart positioniert werden, dass er mit einem Seitenbereich an der ersten Anschlagfläche 78 des ersten Anschlages 77 anschlägt und mit einem seitlichen zapfenförmigen Vorsprung in die Ausnehmung 81 des zweiten Anschlages 80 eingreift. Anschließend kann der Behälter 120 mittels der Rastbügel 85, 88 und 91 an der Stellfläche 20 arretiert werden. Der Behälter 20 bildet dann gemeinsam mit der Adaptervorrichtung 10 und dem Staubsauger 95 eine kompakte Transporteinheit aus, die mittels der Laufräder 99 und 101 des Sockels 97 an einer Bodenfläche entlang verfahren werden kann. Außerdem kann die Transporteinheit um die gemeinsame Drehachse 98 nach hinten verschwenkt und dann nach Art einer Sackkarre bewegt werden.

Falls kein Behälter 120 auf der Stellfläche 20 der am Tragegriff 111 des Staubsaugers 95 arretierten Adapterplatte 11 aufgestellt ist, kann die Adaptervorrichtung 10 zusammen mit dem Staubsauger 95 vom Benutzer angehoben werden. Hierzu kann der Benutzer den Tragbügel 40 ausgehend von seiner Ruhestellung, in der er vollständig in die erste Vertiefung 22 eintaucht, in seine Tragestellung verschwenken, in der der Tragebügel und vor allem der Tragegriff 43 aus der Stellfläche 20 hervorstehen, so dass der Benutzer den

Tragegriff 43 mit einer Hand umgreifen kann. Dies wird insbesondere aus Figur 9 deutlich.

Die Adaptervorrichtung 10 gibt somit die Möglichkeit, auf den Staubsauger 95 einen Behälter 120 aufzustellen, obwohl die Deckfläche 109 des Staubsaugers 95 zumindest in Teilbereichen gewölbt und im Übrigen mit Erhebungen versehen ist. Hierzu definiert die Adapterplatte 11 auf ihrer Oberseite 19 eine ebene Stellfläche 20 zum Abstellen des Behälters 120, wobei die Stellfläche 20 zur leichteren Positionierung des Behälters 120 nach oben abstehende Anschläge 77 und 80 aufweist. Mittels der Verriegelungseinrichtung 60 kann die Adapterplatte 11 auf einfache Weise am Gehäuse 105 des Staubsaugers 95 arretiert werden, so dass die aus der Adaptervorrichtung 10 und dem Staubsauger 95 gebildete Reinigungseinrichtung vom Benutzer am Tragegriff 43 getragen werden kann.

Die Adaptervorrichtung 10 kann vom Benutzer bedarfsweise eingesetzt werden, wobei er sie ohne Einsatz eines speziellen Werkzeuges am Gehäuse 105 des Staubsaugers 95 festlegen und von dieser auch ohne Werkzeug wieder lösen kann.

P A T E N T A N S P R Ü C H E

1. Adaptervorrichtung für die Anordnung eines Behälters (120) am Gehäuse (105) eines tragbaren Reinigungsgerätes (95), dadurch gekennzeichnet, dass die Adaptervorrichtung (10) eine Adapterplatte (11) aufweist, die auf das Gehäuse (105) aufsetzbar ist und oberseitig eine Stellfläche (20) aufweist zum Abstellen des Behälters (120), sowie eine Verriegelungseinrichtung (60) zum werkzeuglosen lösbaren Verriegeln der Adapterplatte (11) mit dem Gehäuse (105) des Reinigungsgerätes (95).

2. Adaptervorrichtung nach Anspruch 1, dadurch gekennzeichnet, dass die Adapterplatte (11) mittels der Verriegelungseinrichtung (60) mit einem hintergreifbaren Gehäuseteil (111) des Gehäuses (105) des Reinigungsgerätes (95) werkzeuglos lösbar verriegelbar ist.

3. Adaptervorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, dass die Adapterplatte (11) mittels der Verriegelungseinrichtung (60) mit einem Tragegriff (111) des Reinigungsgerätes (95) werkzeuglos lösbar verriegelbar ist, der an einer Oberseite des Gehäuses (105) des Reinigungsgerätes (95) angeordnet ist.

4. Adaptervorrichtung nach Anspruch 1, 2 oder 3, dadurch gekennzeichnet, dass die Verriegelungseinrichtung (60) mindestens ein Verriegelungsglied (65, 66) aufweist, das zwischen einer Verriegelungsstellung und einer Freigabestellung hin und her bewegbar an der Adapterplatte (11) gehalten ist.

5. Adaptervorrichtung nach Anspruch 4, dadurch gekennzeichnet, dass die Verriegelungseinrichtung (60) eine vom Benutzer ergreifbare Verriegelungshandhabe (68) aufweist, die mit dem mindestens einen Verriegelungsglied (65, 66) verbunden ist.

6. Adaptervorrichtung nach Anspruch 5, dadurch gekennzeichnet, dass die Verriegelungshandhabe (68) in der Freigabestellung des mindestens einen Verriegelungsgliedes (65, 66) aus der Stellfläche (20) der Adapterplatte (11) hervorsteht und in der Verriegelungsstellung des mindestens einen Verriegelungsgliedes (65, 66) aus der Stellfläche (20) der Adapterplatte (11) nicht hervorsteht.

7. Adaptervorrichtung nach Anspruch 5 oder 6, dadurch gekennzeichnet, dass die Verriegelungshandhabe (68) plattenförmig ausgestaltet ist und in der Verriegelungsstellung des mindestens einen Verriegelungsgliedes (65, 66) in der Ebene der Stellfläche (20) oder unterhalb der Ebene der Stellfläche (20) angeordnet ist.

8. Adaptervorrichtung nach einem der Ansprüche 4 bis 7, dadurch gekennzeichnet, dass das mindestens eine Verriegelungsglied (65, 66) um eine Schwenkachse (51) verschwenkbar ist.

9. Adaptervorrichtung nach einem der Ansprüche 4 bis 8, dadurch gekennzeichnet, dass die Verriegelungseinrichtung (60) zwei starr miteinander verbundene und im Abstand zueinander angeordnete Verriegelungsglieder (65, 66) aufweist.

10. Adaptervorrichtung nach Anspruch 9, dadurch gekennzeichnet, dass die Verriegelungshandhabe (68) die beiden Verriegelungsglieder (65, 66) starr miteinander verbindet.

11. Adaptervorrichtung nach einem der Ansprüche 4 bis 10, dadurch gekennzeichnet, dass das mindestens eine Verriegelungsglied (65, 66) haken- oder bügelartig ausgestaltet ist und in der Verriegelungsstellung ein Gehäuseteil (111) des Reinigungsgerätes (95) untergreift.

12. Adaptervorrichtung nach einem der Ansprüche 5 bis 11, dadurch gekennzeichnet, dass die Adapterplatte (11) oberseitig eine erste Vertiefung (22) aufweist, die die Verriegelungshandhabe (68) aufnimmt.

13. Adaptervorrichtung nach einem der voranstehenden Ansprüche, dadurch gekennzeichnet, dass die Adaptervorrichtung (10) eine Trageeinrichtung (38) aufweist mit mindestens einem Tragegriff (43), der vom Benutzer umgreifbar ist.

14. Adaptervorrichtung nach Anspruch 13, dadurch gekennzeichnet, dass der Tragegriff (43) zwischen einer Tragestellung, in der er aus der Stellfläche (20) der Adapterplatte (11) hervorsteht, und einer Ruhestellung, in der er aus der Stellfläche (20) der Adapterplatte (11) nicht hervorsteht, hin und her bewegbar ist.

15. Adaptervorrichtung nach Anspruch 13 oder 14, dadurch gekennzeichnet, dass der Tragegriff (43) der Adaptervorrichtung (10) um eine Schwenkachse (51) verschwenkbar ist.

16. Adaptervorrichtung nach Anspruch 14 oder 15, dadurch gekennzeichnet, dass die Adapterplatte (11) oberseitig eine zweite Vertiefung (24) aufweist, die den Tragegriff (43) aufnimmt.

17. Adaptervorrichtung nach einem der Ansprüche 13 bis 16, dadurch gekennzeichnet, dass die Trageeinrichtung (39) der Adaptervorrichtung (10) an der Adapterplatte (11) verschenkbar gelagert ist.

18. Adaptervorrichtung nach einem der Ansprüche 13 bis 17, dadurch gekennzeichnet, dass die Verriegelungseinrichtung (60) an der Trageeinrichtung (38) gehalten ist.

19. Adaptervorrichtung nach Anspruch 18, dadurch gekennzeichnet, dass die Verriegelungseinrichtung (60) an der Trageeinrichtung (38) beweglich gelagert ist.

20. Adaptervorrichtung nach einem der voranstehenden Ansprüche, dadurch gekennzeichnet, dass die Adapterplatte (11) mindestens ein aus der Stellfläche (20) hervorstehendes Anschlagelement (77, 80) aufweist, an das der Behälter (120) anlegbar ist.

21. Adaptervorrichtung nach Anspruch 20, dadurch gekennzeichnet, dass mindestens ein Anschlagelement (80) eine Ausnehmung (81) aufweist zur Aufnahme eines Vorsprunges des Behälters (120).

22. Adaptervorrichtung nach einem der voranstehenden Ansprüche, dadurch gekennzeichnet, dass die Adaptervorrichtung (10) mindestens ein Arretierungselement (85, 88, 91) aufweist zum Arretieren des Behälters (120) an der Stellfläche (20) der Adapterplatte (11).

23. Adaptervorrichtung nach Anspruch 22, dadurch gekennzeichnet, dass mindestens ein Arretierungselement (85, 88, 91) in einer oberseitigen Vertiefung (83, 87, 90) der Adapterplatte (11) beweglich gelagert ist.

24. Reinigungseinrichtung mit einem tragbaren Reinigungsgerät (95), das ein Gehäuse (104, 105) aufweist, und mit einer Adaptervorrichtung (10) nach einem der voranstehenden Ansprüche.

25. Reinigungseinrichtung nach Anspruch 24, dadurch gekennzeichnet, dass das Gehäuse (105) des Reinigungsgerätes (95) ein hintergreifbares Gehäuseteil (111) aufweist, mit dem die Verriegelungseinrichtung (60) zusammenwirkt zum werkzeuglosen lösbaren Verriegeln der Adapterplatte (11) mit dem Gehäuse (105).

26. Reinigungseinrichtung nach Anspruch 24 oder 25, dadurch gekennzeichnet, dass das Reinigungsgerät (95) einen Tragegriff (111) aufweist und die Adapterplatte (11) der Adaptervorrichtung (10) mittels der Verriegelungseinrichtung mit dem Tragegriff (111) werkzeuglos lösbar verriegelbar ist.

27. Reinigungseinrichtung nach Anspruch 24, 25 oder 26, dadurch gekennzeichnet, dass das Reinigungsgerät als Staubsauger (95) ausgestaltet ist.

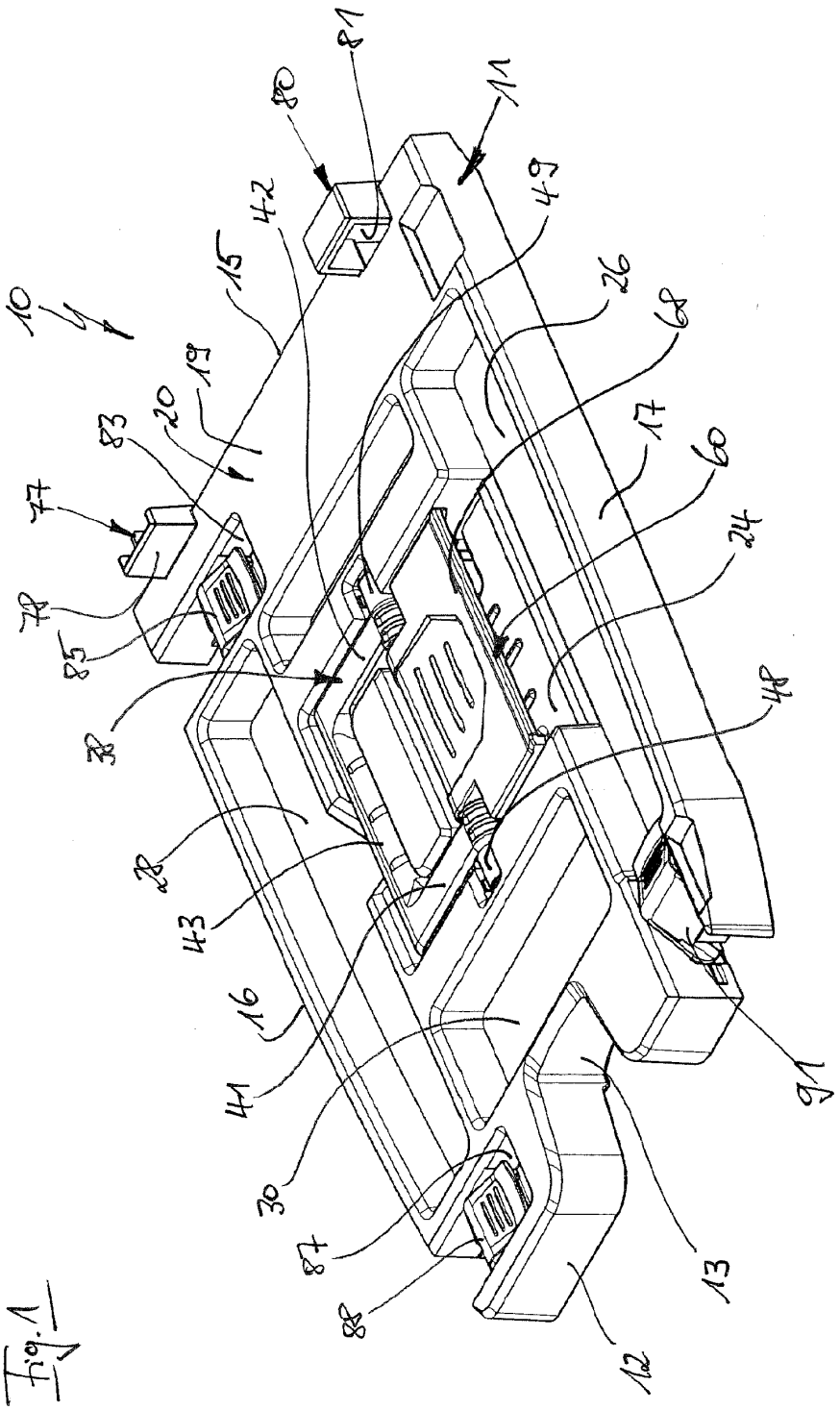

10
81
80
11
42
49
15
26
68
19
20
83
17
60
77
24
72
85
48
78
22
43
16
41
91
30
87
88
13
12

Fig. 1

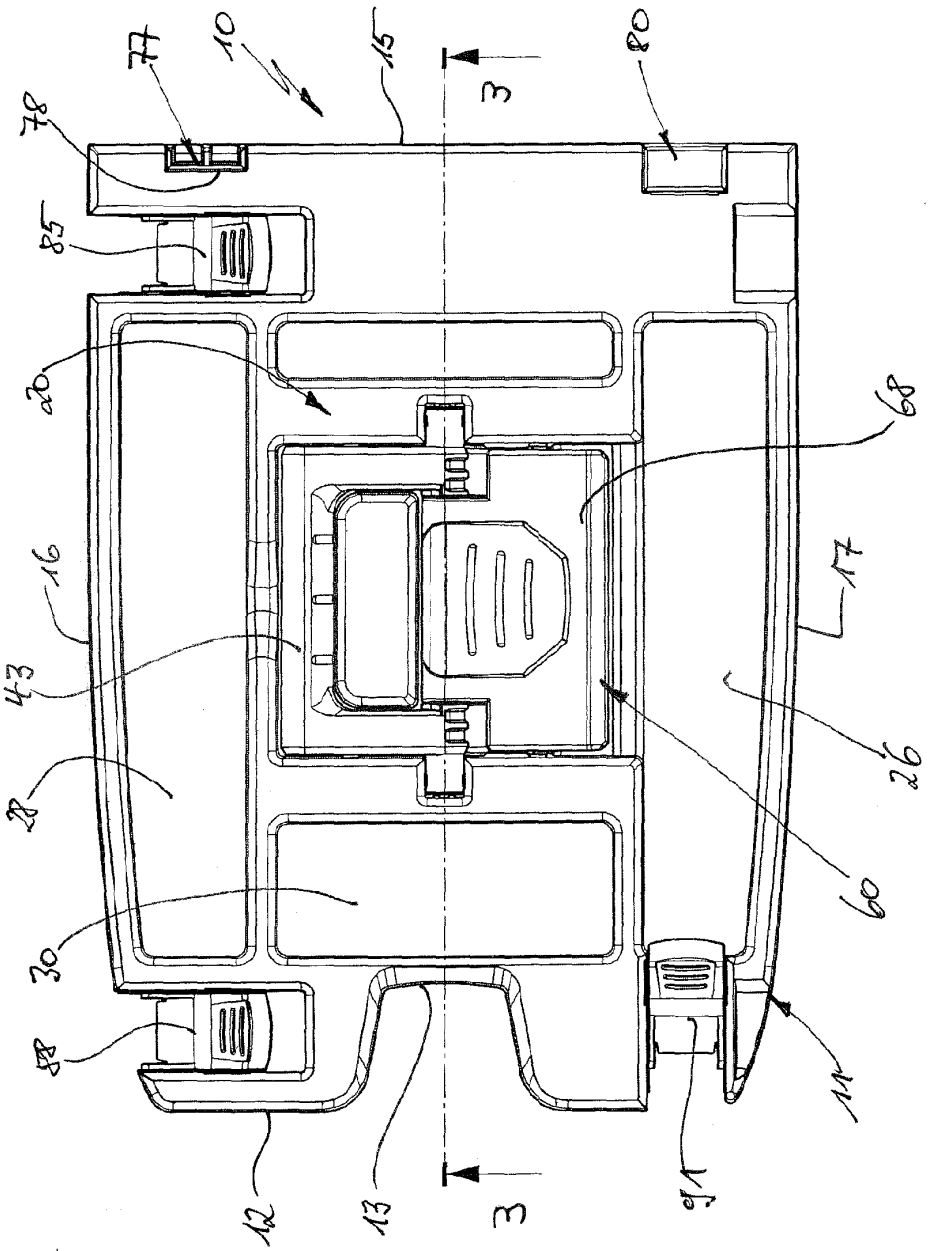


Fig.2

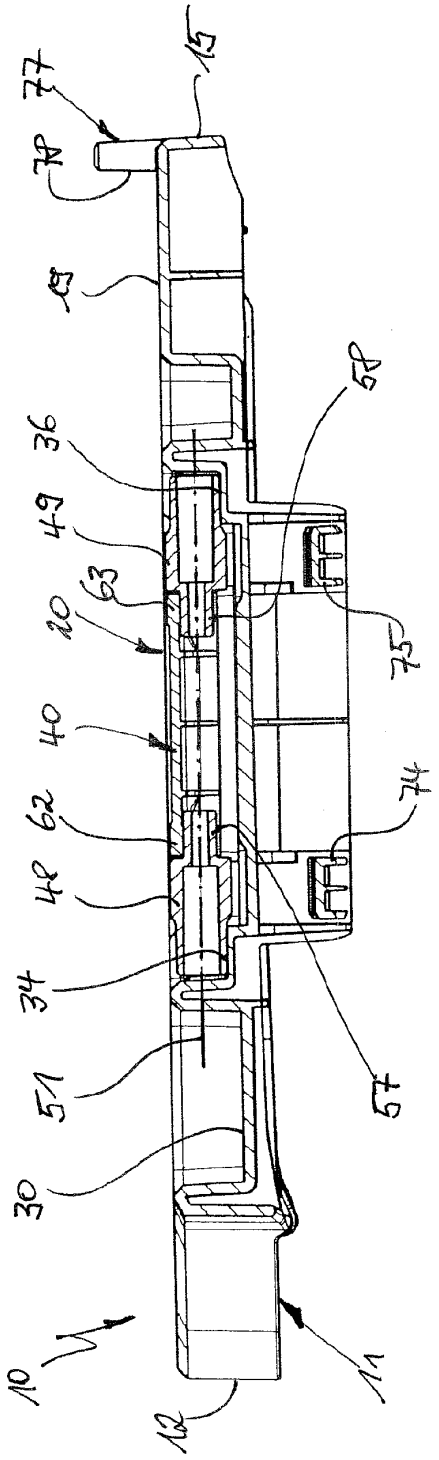


Fig. 3

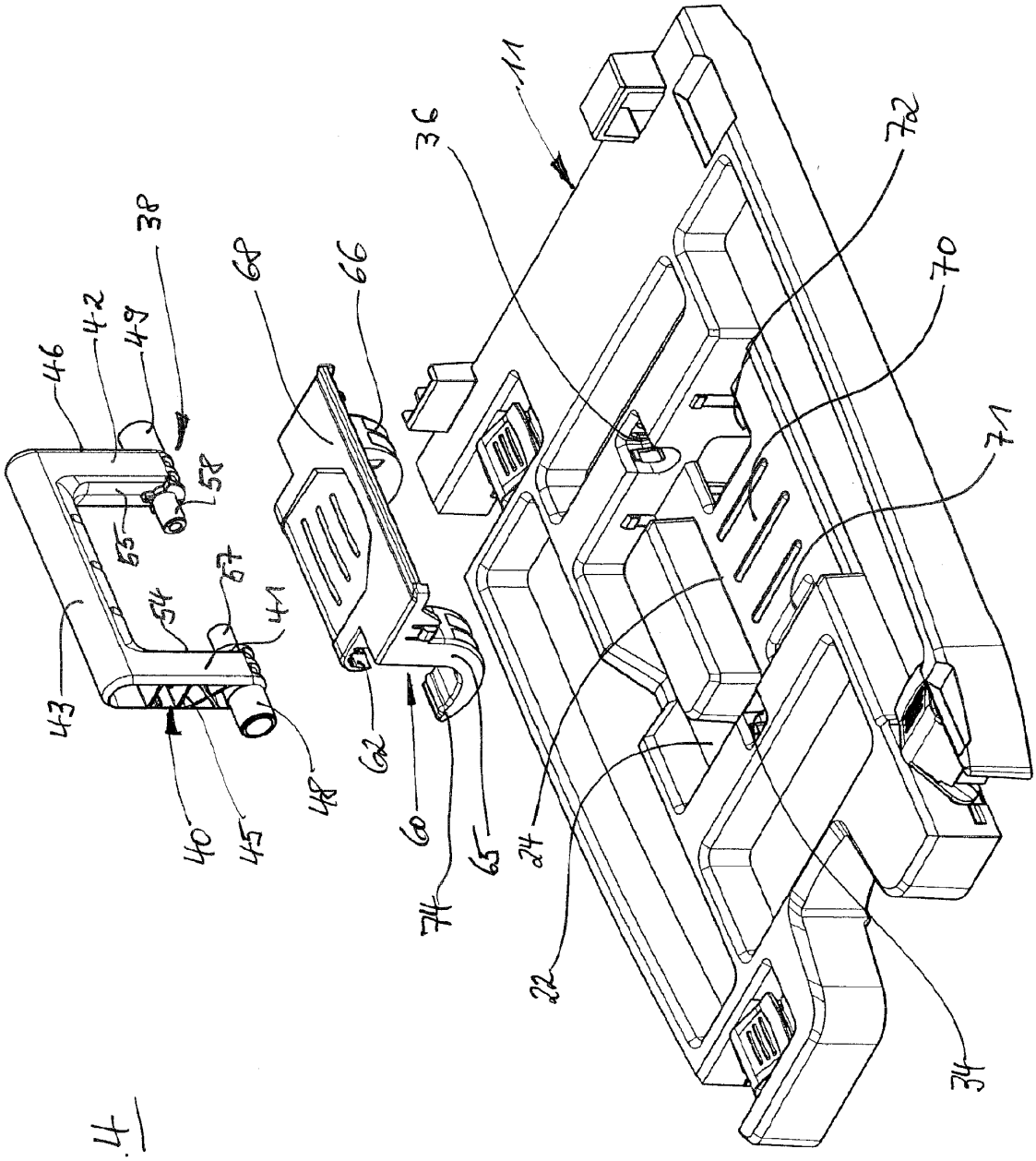

111
36
72
70
71
38
68
66
46
42
49
58
53
54
67
41
43
48
62
60
65
74
40
45
24
22
34

Fig. 4

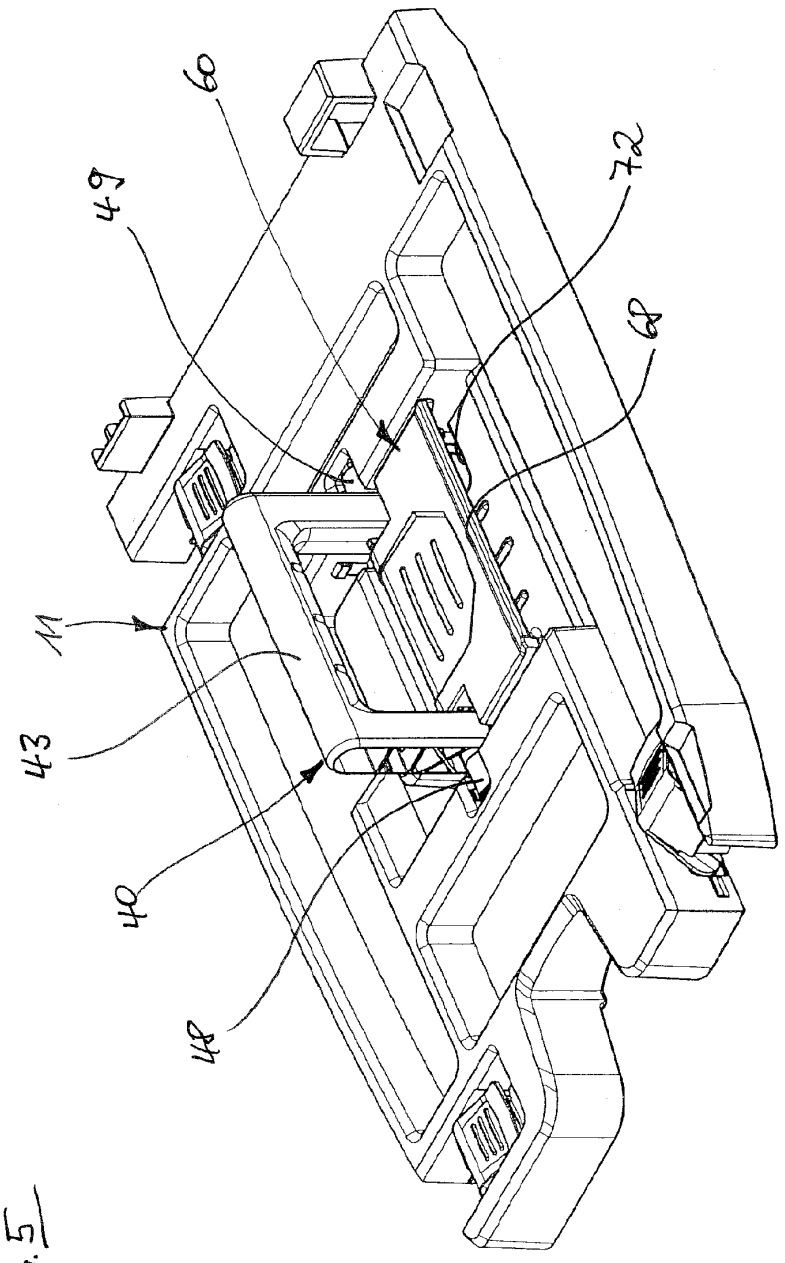


Fig. 5

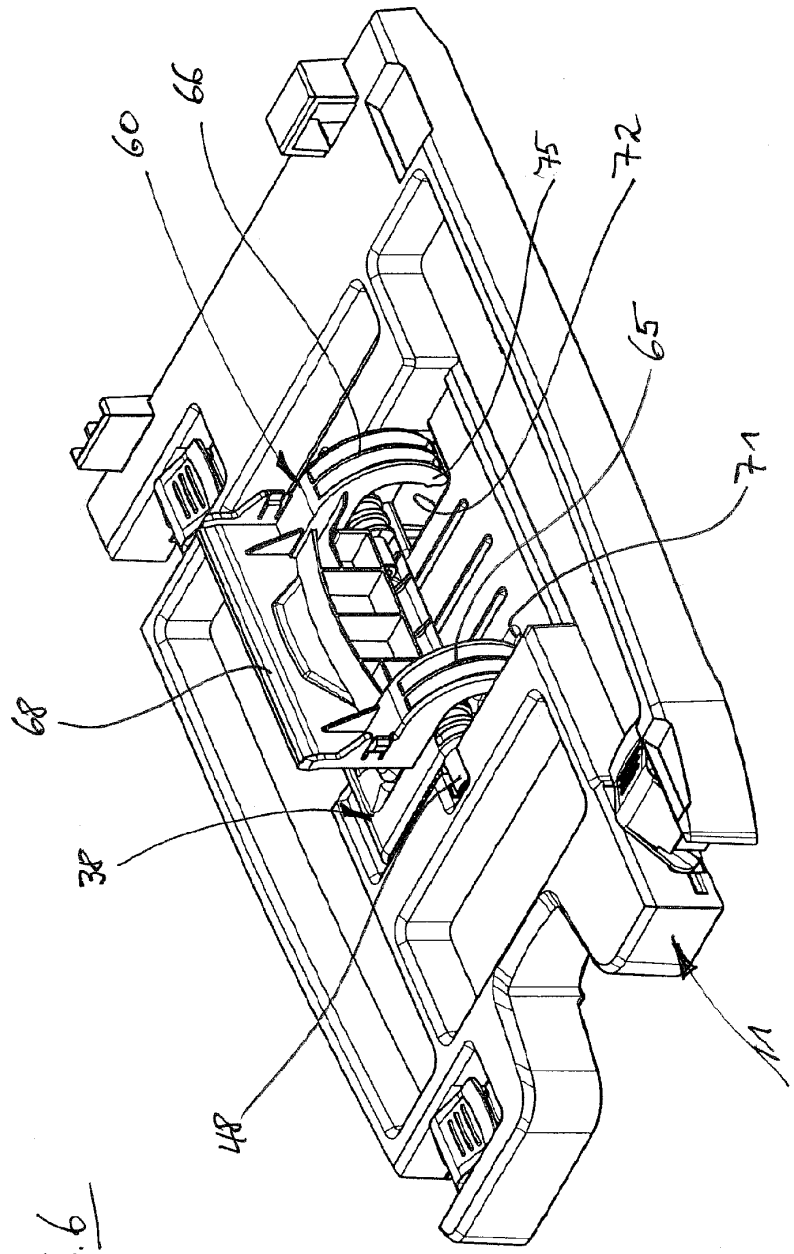


Fig. 6

Fig. 7

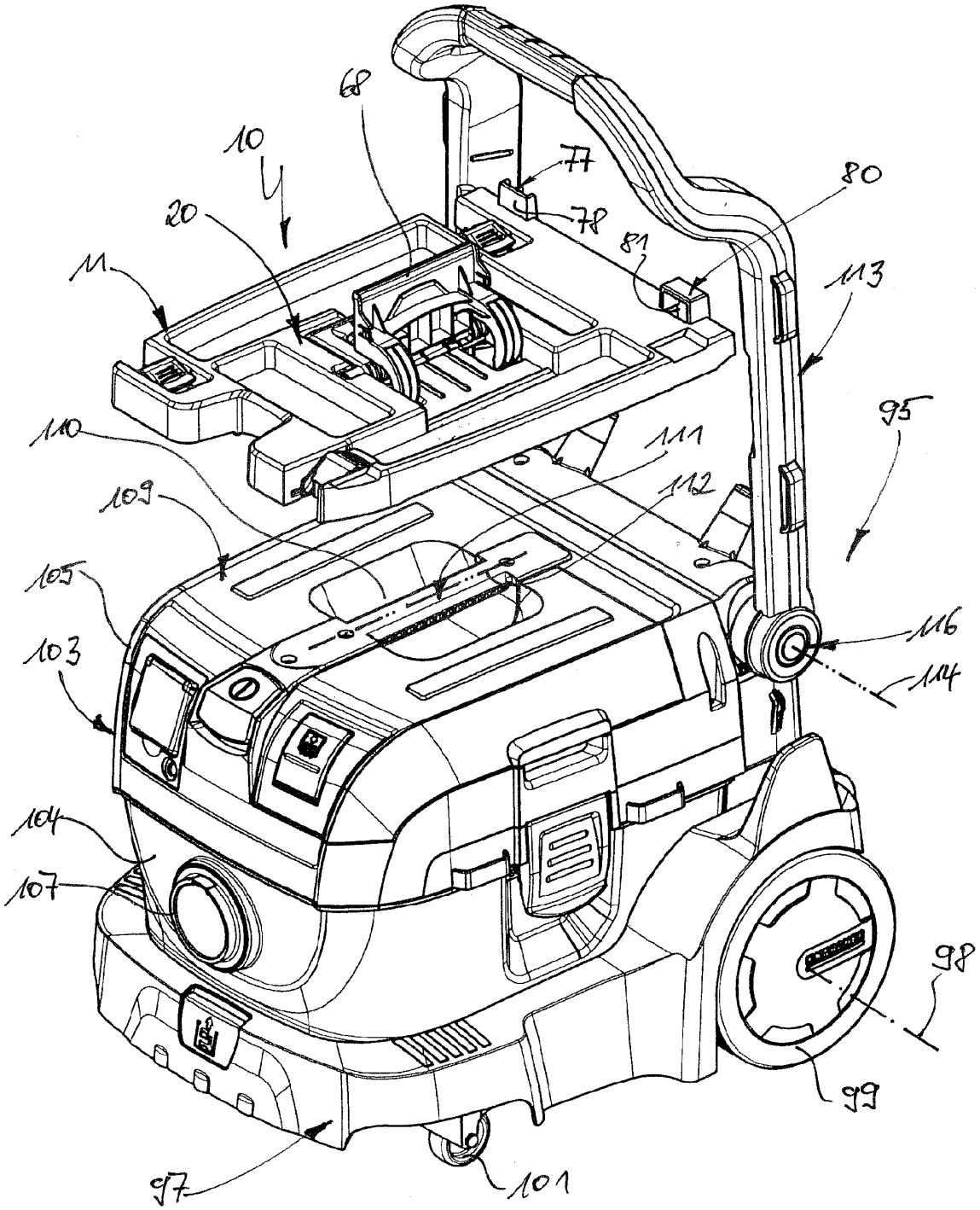

68
10
77
80
20
78
81
11
113
95
110
111
112
109
105
116
103
114
104
107
98
99
97
101

Fig. 8

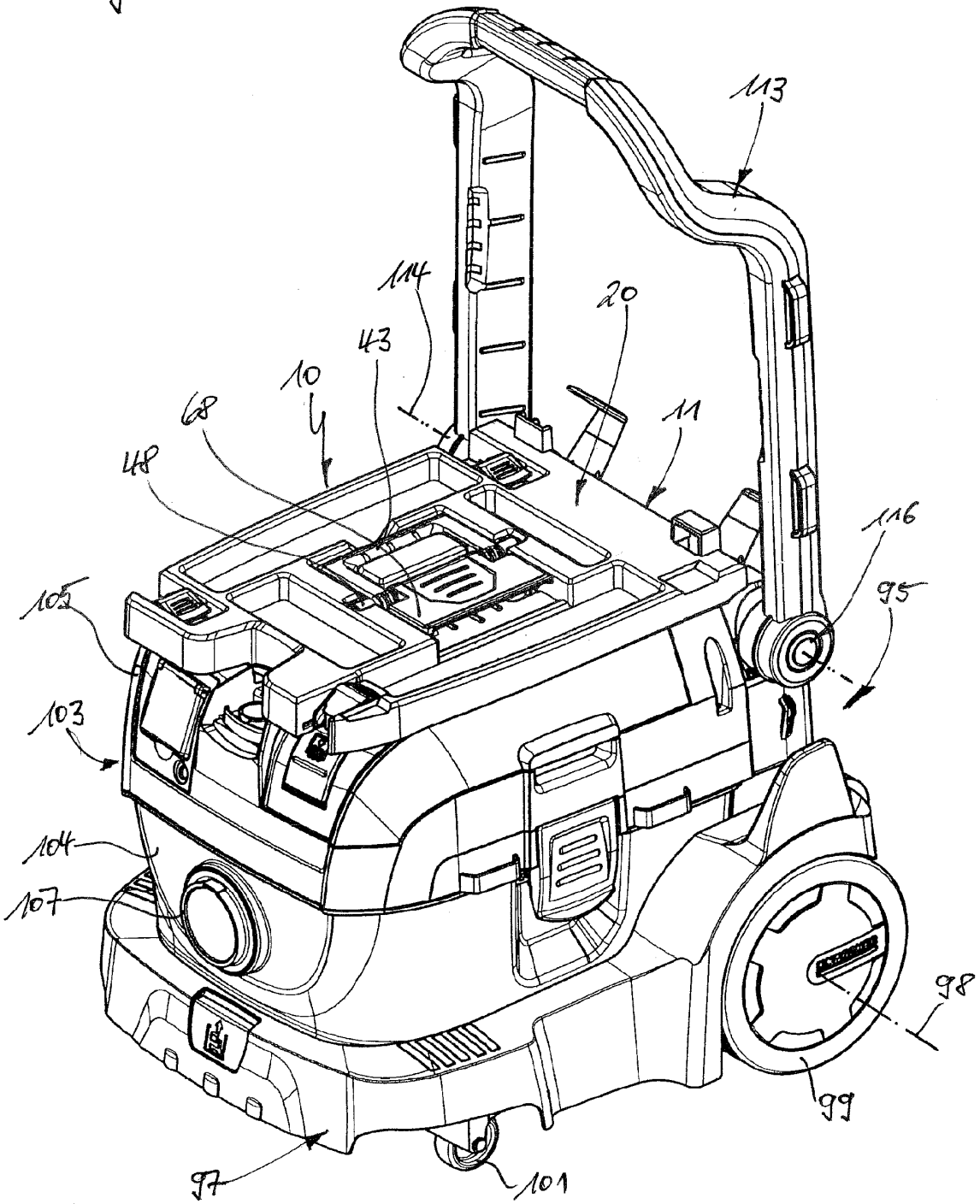


Fig. 9

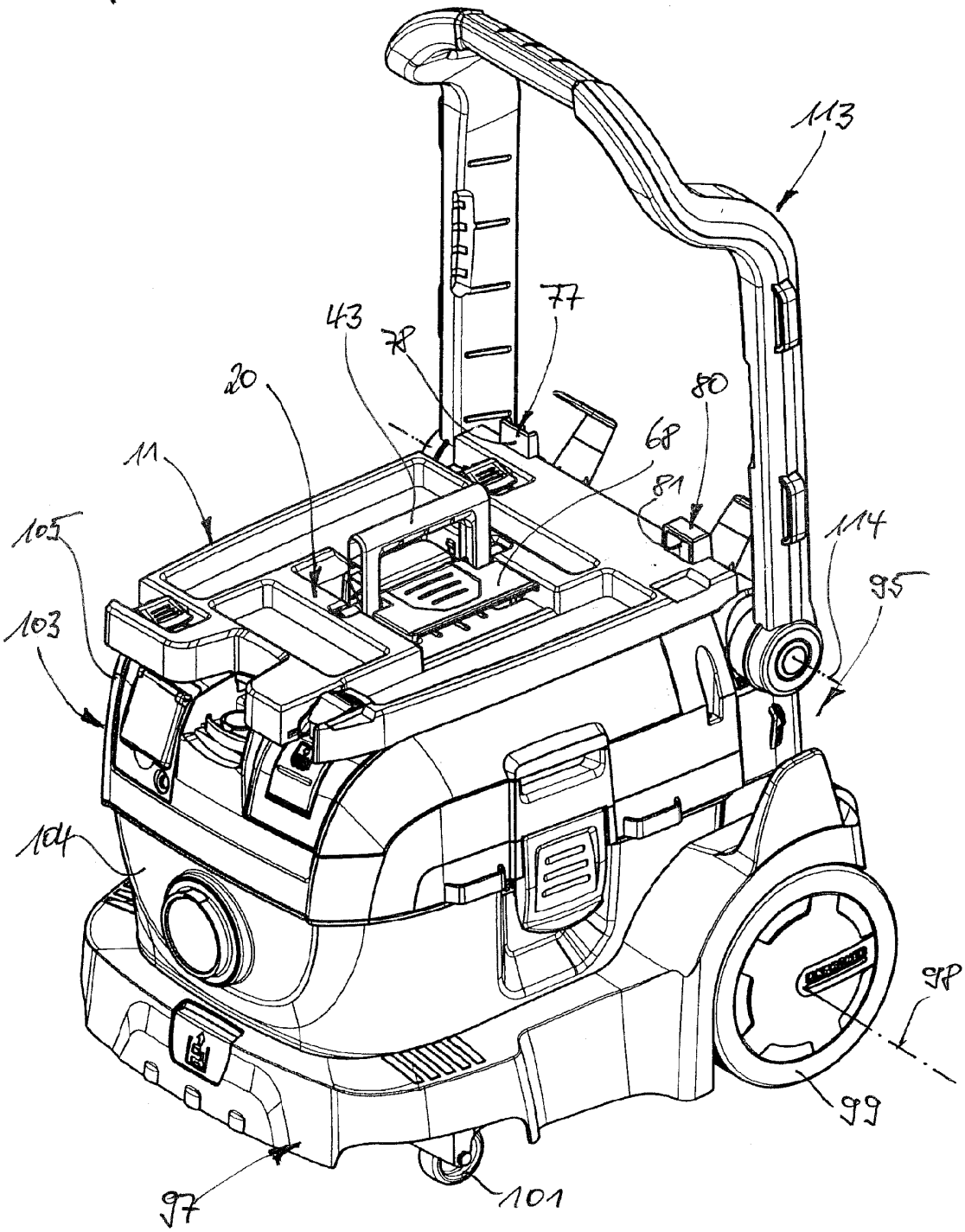
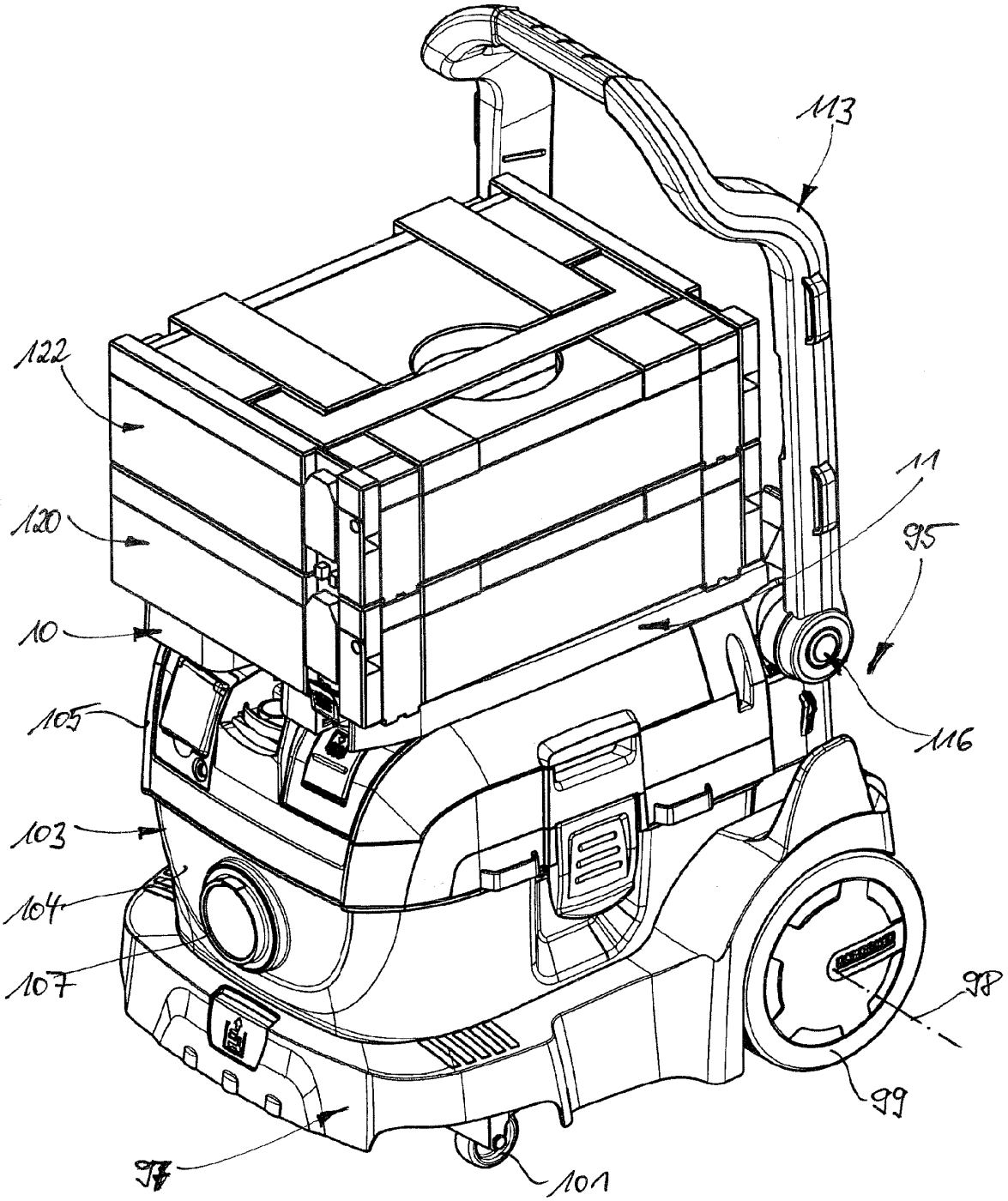


Fig. 10



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2009/059320

A. CLASSIFICATION OF SUBJECT MATTER
INV. A47L9/00 B25H3/00
ADD.

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)
A47L B25H

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 practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 916 302 A2 (FESTO TOOLTECHNIC GMBH & CO [DE] FESTO TOOLTECHNIC GMBH & CO TTS TOOLT) 19 May 1999 (1999-05-19) cited in the application the whole document	1,20-27
A	EP 1 269 903 A2 (FESTOOL GMBH [DE]) 2 January 2003 (2003-01-02) abstract paragraph [0025] figures 1,3	1,22, 24-27
A	EP 1 424 170 A1 (VALENTINI GUIDO [IT]) 2 June 2004 (2004-06-02) abstract paragraphs [0005], [0007] paragraph [0013] figure 3	1,20,22, 24,27

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* 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 document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
31 March 2010	14/04/2010

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Baumgärtner, Ruth

1

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2009/059320

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0916302 A2	19-05-1999	DE 19750543 A1	20-05-1999
EP 1269903 A2	02-01-2003	DE 10130995 A1	16-01-2003
EP 1424170 A1	02-06-2004	AT 413949 T	15-11-2008
		ES 2316694 T3	16-04-2009
		US 2004103494 A1	03-06-2004

Form PCT/ISA/210 (patent family annex) (April 2005)

INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen
PCT/EP2009/059320

A. KLASSIFIZIERUNG DES ANMELDUNGSGEGENSTANDES
INV. A47L9/00 B25H3/00
ADD.

Nach der Internationalen Patentklassifikation (IPC) oder nach der nationalen Klassifikation und der IPC

B. RECHERCHIERTE GEBIETE

Recherchierter Mindestprüfstoff (Klassifikationssystem und Klassifikationssymbole)
A47L B25H

Recherchierte, aber nicht zum Mindestprüfstoff gehörende Veröffentlichungen, soweit diese unter die recherchierten Gebiete fallen

Während der internationalen Recherche konsultierte elektronische Datenbank (Name der Datenbank und evtl. verwendete Suchbegriffe)
EPO-Internal

C. ALS WESENTLICH ANGESEHENE UNTERLAGEN

Kategorie*	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
A	EP 0 916 302 A2 (FESTO TOOLTECHNIC GMBH & CO [DE] FESTO TOOLTECHNIC GMBH & CO TTS TOOLT) 19. Mai 1999 (1999-05-19) in der Anmeldung erwähnt das ganze Dokument	1,20-27
A	EP 1 269 903 A2 (FESTOOL GMBH [DE]) 2. Januar 2003 (2003-01-02) Zusammenfassung Absatz [0025] Abbildungen 1,3	1,22, 24-27
A	EP 1 424 170 A1 (VALENTINI GUIDO [IT]) 2. Juni 2004 (2004-06-02) Zusammenfassung Absätze [0005], [0007] Absatz [0013] Abbildung 3	1,20,22, 24,27

☐ Weitere Veröffentlichungen sind der Fortsetzung von Feld C zu entnehmen ☒ Siehe Anhang Patentfamilie

* Besondere Kategorien von angegebenen Veröffentlichungen :
"A" Veröffentlichung, die den allgemeinen Stand der Technik definiert, aber nicht als besonders bedeutsam anzusehen ist
"E" älteres Dokument, das jedoch erst am oder nach dem internationalen Anmeldedatum veröffentlicht worden ist
"L" Veröffentlichung, die geeignet ist, einen Prioritätsanspruch zweifelhaft erscheinen zu lassen, oder durch die das Veröffentlichungsdatum einer anderen im Recherchenbericht genannten Veröffentlichung belegt werden soll oder die aus einem anderen besonderen Grund angegeben ist (wie ausgeführt)
"O" Veröffentlichung, die sich auf eine mündliche Offenbarung, eine Benutzung, eine Ausstellung oder andere Maßnahmen bezieht
"P" Veröffentlichung, die vor dem internationalen Anmeldedatum, aber nach dem beanspruchten Prioritätsdatum veröffentlicht worden ist
"T" Spätere Veröffentlichung, die nach dem internationalen Anmeldedatum oder dem Prioritätsdatum veröffentlicht worden ist und mit der Anmeldung nicht kollidiert, sondern nur zum Verständnis des der Erfindung zugrundeliegenden Prinzips oder der ihr zugrundeliegenden Theorie angegeben ist
"X" Veröffentlichung von besonderer Bedeutung; die beanspruchte Erfindung kann allein aufgrund dieser Veröffentlichung nicht als neu oder auf erfinderischer Tätigkeit beruhend betrachtet werden
"Y" Veröffentlichung von besonderer Bedeutung; die beanspruchte Erfindung kann nicht als auf erfinderischer Tätigkeit beruhend betrachtet werden, wenn die Veröffentlichung mit einer oder mehreren anderen Veröffentlichungen dieser Kategorie in Verbindung gebracht wird und diese Verbindung für einen Fachmann naheliegend ist
"&" Veröffentlichung, die Mitglied derselben Patentfamilie ist

Datum des Abschlusses der internationalen Recherche	Absendedatum des internationalen Recherchenberichts
31. März 2010	14/04/2010

Name und Postanschrift der Internationalen Recherchenbehörde	Bevollmächtigter Bediensteter
Europäisches Patentamt, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Baumgärtner, Ruth

1

Formblatt PCT/ISA/210 (Blatt 2) (April 2005)

INTERNATIONALER RECHERCHENBERICHT

Angaben zu Veröffentlichungen, die zur selben Patentfamilie gehören

Internationales Aktenzeichen
PCT/EP2009/059320

Im Recherchenbericht angeführtes Patentdokument		Datum der Veröffentlichung	Mitglied(er) der Patentfamilie		Datum der Veröffentlichung
EP 0916302	A2	19-05-1999	DE	19750543 A1	20-05-1999
EP 1269903	A2	02-01-2003	DE	10130995 A1	16-01-2003
EP 1424170	A1	02-06-2004	AT	413949 T	15-11-2008
			ES	2316694 T3	16-04-2009
			US	2004103494 A1	03-06-2004

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
28 February 2013 (28.02.2013)

WIPO | PCT

(10) International Publication Number
WO 2013/026084 A1

(51) International Patent Classification:
B25H 3/00 (2006.01) *B25H 3/04* (2006.01)
B25H 3/02 (2006.01)

(21) International Application Number:
PCT/AU2011/001103

(22) International Filing Date:
25 August 2011 (25.08.2011)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant *(for all designated States except US)*: **DEMAIN TECHNOLOGY PTY LTD** [AU/AU]; Level 1, 13 Corporate Drive, Heatherton, VIC 3202 (AU).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **VAN DER LINDE, Benjamin Luke** [AU/AU]; Level 1, 13 Corporate Drive, Heatherton, VIC 3202 (AU). **SCRIMSHAW, David Leigh** [AU/AU]; Level 1, 13 Corporate Drive, Heatherton, VIC 3202 (AU). **CONNOR, Paul Francis** [AU/AU]; Level 1, 13 Corporate Drive, Heatherton, VIC 3202 (AU). **MILLER, Paul** [AU/AU]; Level 1, 13 Corporate Drive, Heatherton, VIC 3202 (AU). **EYERS, Ben** [GB/AU]; Level 1, 13 Corporate Drive, Heatherton, VIC 3202 (AU). **NETZLER, Sion** [GB/AU]; Level 1, 13 Corporate Drive, Heatherton, VIC 3202 (AU). **LASTMAN, Lucas** [AU/AU]; Level 1, 13 Corporate Drive, Heatherton, VIC 3202 (AU).

(74) Agent: **SMOORENBURG PINI PATENT & TRADE MARK ATTORNEYS**; PO Box 515, Ringwood VIC 3134 (AU).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN,

[Continued on next page]

(54) Title: SYSTEM FOR STORAGE AND TRANSPORT

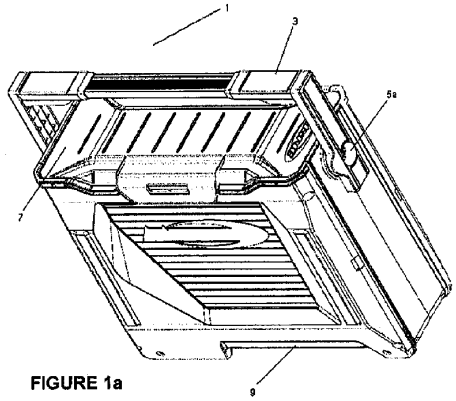


FIGURE 1a

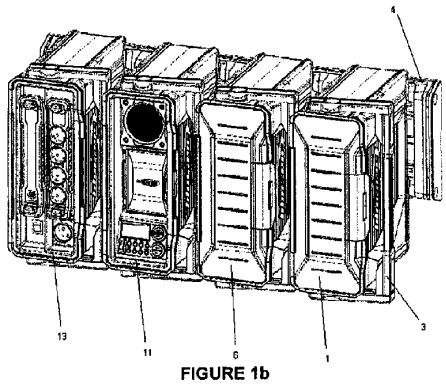


FIGURE 1b

(57) Abstract: The invention relates to a storage system for storing devices including: a frame for demountably supporting multiple carry cabinets, each carry cabinet being adapted to receive a device, characterised in that, said devices can be inserted or removed through a port in their respective carry cabinet while said multiple carry cabinets are mounted on the frame, and said devices can be transported in their respective carry cabinets when each of said carry cabinets are demounted from the frame.

WO 2013/026084 A1

HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

SYSTEM FOR STORAGE AND TRANSPORT

FIELD OF INVENTION

The present invention relates to a system for storage and transport of devices. In one form, the invention relates to a system for storage and transport of handheld power tools and accessories.

It will be convenient to hereinafter describe the invention in relation to power tools and their use by tradesmen and do-it-yourself (DIY) home handymen, however it should be appreciated that the present invention is not limited to that use only. The present invention has application to a wide range of devices, uses and users.

BACKGROUND ART

It is to be appreciated that any discussion of documents, devices, acts or knowledge in this specification is included to explain the context of the present invention. Further, the discussion throughout this specification comes about due to the realisation of the inventor and/or the identification of certain related art problems by the inventor. Moreover, any discussion of material such as documents, devices, acts or knowledge in this specification is included to explain the context of the invention in terms of the inventor's knowledge and experience and, accordingly, any such discussion should not be taken as an admission that any of the material forms part of the prior art base or the common general knowledge in the relevant art in Australia, or elsewhere, on or before the priority date of the disclosure and claims herein.

Tradesmen and others who earn their living in the construction and building industry need to keep their tools in close proximity to their principal workplace. For example, those in a workshop or factory will typically keep their power tools stored adjacent their workshop or work bench. The storage means may range from haphazard organisation of boxes, to hanging the devices on a shadow board or placing them on steel shelving units or in a cupboard. Accessories are typically stored nearby, or in the case of small items such as drill bits, kept in storage drawers or trays. Storage is made more difficult by the variety of ways in which power tools are packaged for sale to consumers ranging from robust hinged cases to flimsy plastic bags intended for disposal.

Many tradesmen who carry out on-site work have to store their power tools in lockable boxes and cupboards in the rear of a vehicle such as a van or utility truck. In order to avoid the time and inconvenience of shifting tools between the vehicle and a principal workplace or worksite many tradesmen purchase two sets of tools.

Similarly, as the cost of power tools has diminished individuals in a domestic environment often possess a wide variety of power tools for DIY projects or hobbies. For example, individuals often own a range of handheld devices such as power drills, AC high speed drills, hammer drills, angle grinders, circular saw, jigsaws, sanders and so forth. They also typically own a range of accessories such as drill bits, sanding papers, sanding belts, cutting blades, battery packs, torches and other lighting, battery chargers, power extension leads and multipoint plugs. Individuals commonly have the power tools stored in a garage or shed, in a disorganised state, packaged or unpackaged, in cupboards or on shelves. This degree of disorganisation makes it particularly difficult for an individual if they need to find and pack up devices and relevant accessories and transport them any distance or use them at locations around their home.

SUMMARY OF INVENTION

An object of the present invention is to provide a system for storage of devices in and area where they may be used, and transport to and from an area where they may be used.

Another object of the present invention is to provide a system for storage and transport of devices that is suitable for professionals and amateurs.

Another object of the present invention is to provide a system for storage and transport of devices and accessories that allows their ready interchange and rearrangement.

A further object of the present invention is to alleviate at least one disadvantage associated with the related art.

It is an object of the embodiments described herein to overcome or alleviate at least one of the above noted drawbacks of related art systems or to at least provide a useful alternative to related art systems.

In a first aspect of embodiments described herein there is provided a storage system for storing devices including:

- a frame for demountably supporting multiple carry cabinets, each carry cabinet being adapted to receive a device,

characterised in that,

- said devices can be inserted or removed through a port in their respective carry cabinet while said multiple carry cabinets are mounted on the frame, and
- said devices can be transported in their respective carry cabinets when each of said carry cabinets are demounted from the frame.

The frame to which the carry cabinets are mounted may be fixed free-standing, or mobile free-standing. Alternatively, the frame may be attached to a fixed structure such as a wall, or form part of a fixed structure.

Typically the carry cabinets of the storage system can be changed between a mounted and a demounted configuration respectively by engaging and disengaging a latch between the carry cabinet and frame. In a particularly preferred embodiment a simple form of latch is used, comprising one or more rails and correspondingly shaped slot(s). The rail may be integral with, or alternatively attached to the frame. The slot of the latch may be defined by a piece of metal or other material sharply curved to form a hook.

In one preferred option, the system includes two or more mountings for carry cabinets. This may be preferred for carry cabinets designed for particularly large or heavy devices. For example, the carry cabinet could include two or more hooks that can engage with two or more rails associated with the frame.

Preferably the mounting is lockable. For example the rail may include a cam that connects mounted carry cabinets such that when the cam is rotated, the carry cabinets are locked to the rail. This could be useful to prevent theft, and stop the carry cabinets accidentally demounting if for example, they were mounted to a frame in the rear of a van or truck.

Carry Cabinet

In another aspect of embodiments described herein there is provided a carry cabinet suitable for use in the storage system of the present invention.

Typically each carry cabinet is of square or rectangular cross section so that multiple carry cabinets can be mounted side-by-side or one on top of the other. Typically the rear end of a rectangular or square carry cabinet includes at least one hook or other engagement means for engaging and disengaging the frame, thus mounting and demounting the carry cabinet on the frame.

Optimally, the positions of the mounted carry cabinets are interchangeable so that they may be arranged and re-arranged in any convenient order.

Typically each carry cabinet includes a fixed or detachable handle. The handle may for example, be used in a first, raised position for manual transportation and a second, retracted position when the carry cabinet is mounted on the frame. The handle may be moved between the first and second positions by rotation about pivots located at either end of the handle. This may make it easier to access the port, and/or the handle may act as a 'spacer' between adjacent carry cabinets. Optimally the handle can be rotated in one direction only so that all handles on mounted carry cabinets are identically oriented.

Preferably a releasable retainer holds the handle in the raised position. For example the retainer may comprise a detent to check the rotational motion of the handle. This will stop the handle falling into the second position which may be inconvenient for example, when the carry cabinet is being mounted on the frame. The retainer may be manually disabled with light manual pressure.

The port may be, for example, an opening, or open side in the carry cabinet. Preferably the carry cabinet includes a cover, such as a hinged door associated with the port. The cover may be adapted to be detached, or swung, rotated, slid, or otherwise moved to allow full access to the port. Typically the cover is transparent or translucent so that it is possible to identify the contents of the carry cabinet when the cover closes over the port.

In a particularly preferred embodiment the carry cabinets can be disassembled for flat packing. For example, if the carry cabinets are constructed of rectangular panels the side and end panels can be stacked for better freight and storage logistics and to take up minimal retail shelf space.

The interior of the carry cabinet may be configured in any convenient manner such as to receive and firmly hold a device, such as a power tool, or accessories for the device. It is important that the cabinet holds the device or

accessories firmly when mounted, when being transported and during mounting/dismounting from the frame. The carry cabinet may, if convenient, be configured to receive an insert consisting of some or all of the packaging in which the device was sold. This would include packaging such as 'cradles' or 'storage docks'. These could for example, be sold with power tools. The storage docks could be constructed of robust plastic material. In a particularly preferred embodiment the storage dock can be slidably inserted along slots in the carry cabinet, preferably using a handle. The handle may be adapted to act as a spacer for at least one other adjacent insert and may, for example prevent a storage dock being inserted in the wrong position.

Preferably the interior of the carry cabinet may be configured using inserts comprising removable dividers or drawers. For example the interior surface of the carry cabinet may be able to slidably receive one or more dividers at one or more positions for location or support of a drawer, or device, or accessory, with or without packaging. Thus a single design of carry cabinet can be adapted to house a wide range of sizes of devices and accessories, thus avoiding the need to design and manufacture multiple housings. Preferably the dividers will interlock with the interior surface of the carry cabinet to provide bracing and thus rigidity and strength.

A removable divider in the form of a flat plate located underneath a drawer may provide support, while a removable divider in the form of a flat plate located above a drawer may enclose the contents so that they do not fall out. The divider may also include a releasable latch for retaining the drawer. Typically the drawers can be slidably positioned in the carry cabinet and readily removed. Optimally they may be slid out at a downward angle so the contents can be easily seen and accessed. The drawers would typically be used for small accessories such as drill bits, cutting blades and batteries.

Shelf

Preferably the storage system includes a shelf removably attached to the frame, or a wall or other structure adjacent the frame. The shelf or shelves may be located at any convenient positions on the frame. Typically the shelf would be elevated, located adjacent the lower surface of mounted carry cabinets.

The shelf may be adapted to support or be used in concert with the devices and accessories in the carry cabinets. For example the shelf may include electrical mountings or connections with wiring to the mains hidden within the frame. The shelf may also include drawers, recesses or other physical supports for devices or accessories.

The shelf may be connected to the frame for shipping and transport to avoid any warping in transit.

Bench

Preferably the storage system includes a bench removably attached to the frame. The bench may be located at any convenient position on the frame. Typically the bench would be located such that carry cabinets could be mounted above or optionally below the bench.

In a particularly preferred embodiment the storage system of the present invention is a bench, that is, the frame consists or comprises a bench that may be free standing, mobile free standing or attached to a structure such as a wall or floor.

Cover

The storage system may include an openable cover or 'hood' which can move from a first, open position to a second, closed position. In the closed position the cover typically encloses the shelf and/or mounted carry cabinets and may be lockable.

It may be convenient to attach the cover to the frame, or a rail forming part of a latch for mounting and demounting the carry cabinets, or a wall or other structure adjacent the frame. Typically the cover is attached to the frame using a pivot or spring mechanism.

Devices and Accessories

The devices contained in the carry cabinets are typically chosen from the group comprising drilling apparatus, cutting apparatus, grinding apparatus, impact drilling apparatus, screw driving apparatus and combinations thereof. For example the devices may include common AC or DC power tools such as power drills, high speed drills, hammer drills, angle grinders, circular saw, jigsaws, sanders and so forth.

The accessories are typically items used in conjunction with power tools or associated with the relevant type of work. For example, accessories would include drill bits, sanding papers, sanding belts, cutting blades and battery packs for use with the power tools. Accessories would also include torches and other lighting, battery chargers, power extension leads and multipoint plugs which contribute to carrying out the relevant work.

In a preferred embodiment, a carry cabinet can carry a device and a draw adapted to store accessories for the device. For example the interior of the draw may be configured to hold the accessories to keep them organised, make them easy to identify and stop them moving about when the carry cabinet is moved. In a particularly preferred embodiment accessories are sold separately from a drawer. Alternatively the accessories may be sold with a drawer functioning as packaging, enabling them to be fitted directly into a carry cabinet.

Some of the many accessories that can be used with the system of the present invention are power and light modules. These include work lights, spotlights, multi-power point strips optionally with retractable power cords. These are particularly valuable for those using power tools. It is particularly convenient to have these stored in carry cabinets, readily demountable to transport to a workplace indoor or outdoor. Alternatively they may be adapted for removable attachment to the frame, particularly the rail, or the shelf where they are held secure. Furthermore a multi-power point strip can be oriented horizontally for ease of use and connection when mounted on the frame or on the shelf and oriented vertically in the carry cabinet.

Another accessory that can be used with the system of the present invention is an audio/communications device. For example the audio/communications device may include functionality derived from mobile phone connection (eg iPhone dock, blutooth connectivity), audio connection (eg for mp3 players, CD player, iPods), AM/FM/digital radio and any other convenient audio or communications means. In a particularly preferred embodiment the audio/communications device includes a charging mat to charge audio or communications devices, particularly mobile phones or mp3 players.

Locating these devices within a carry cabinet creates a low cost, robust, transportable audio module for use at a worksite, particularly outdoor worksites.

The audio/communications device may be plugged into an external power source such as the electricity mains or an electricity generator, or operated by battery, or any other convenient means. In a particularly preferred embodiment the audio/communications device can be powered by plugging into a controller for a drill head or other tool part.

Optimally any speaker internal or integral to the audio/communications device may be improved, for example, by conversion from mono to stereo by coupling to an external speaker/sub woofer/ amp.

Other aspects and preferred forms are disclosed in the specification and/or defined in the appended claims, forming a part of the description of the invention.

In essence, embodiments of the present invention stem from the realization that cabinets can be adapted for storage and transport of devices and accessories that allows their ready interchange and rearrangement while maintaining the ability to readily access the devices and accessories.

Advantages provided by the present invention comprise the following:

- ability to add to the fundamental system on an 'as needs' basis, buying only what is needed at any particular time;
- the system can be used and afforded by professionals or amateurs;
- allows devices to be readily put in order, identified, rearranged, stored and transported;
- provides universal use/interchangeability of the carry cabinets allowing multiple uses and re-uses;
- devices and accessories can be kept secure at any convenient locus such as a workshop or vehicle and transported therefrom.

Further scope of applicability of embodiments of the present invention will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the disclosure herein will become apparent to those skilled in the art from this detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

Further disclosure, objects, advantages and aspects of preferred and other embodiments of the present application may be better understood by those skilled in the relevant art by reference to the following description of embodiments taken in conjunction with the accompanying drawings, which are given by way of illustration only, and thus are not limitative of the disclosure herein, and in which:

- Figure 1 illustrates a carry cabinet for use with the storage system of the present invention in (a) a perspective view when dismounted, and (b) in a perspective view while mounted with three other carry cabinets;
- Figure 2 illustrates a perspective view of single carry cabinet mounted on a frame according to the storage system of the present invention;
- Figure 3 illustrates a perspective view of the single carry cabinet and frame of Figure 2 combined with a shelf;
- Figure 4 illustrates a perspective view of multiple carry cabinets mounted on the frame of Figure 2;
- Figure 5 illustrates a perspective view of multiple carry cabinets mounted on the frame of Figure 2 in combination with a shelf and cover; and
- Figure 6 illustrates a perspective view of the storage system as depicted in Figure 5 with the cover in the closed position.

DETAILED DESCRIPTION

Figure 1a depicts a carry cabinet 1 suitable for use in the storage system of the present invention. In this embodiment the carry cabinet is of rectangular cross section and includes a handle 3 rotatable about pivots 5a, 5b (5b not visible in this view) at either end of the handle 3. The handle is depicted in a first, raised position for manual transportation, held in that position by a detent (not visible in this view). The detent may be overcome with medium manual pressure and the handle 3 may rotated in one direction only about the pivots 5a, 5b to provide unfettered access the opaque cover 7 covering the port. The port substantially comprises an open side in the carry cabinet 1 and the cover 7 comprises a hinged door which in this view is shown to be closed over the port. When the cover 7 is open it permits full access to the interior of the carry cabinet 1 so that a device may be inserted or removed.

One end 9 of the carry cabinet 1 includes a hook or other engagement means for engaging and disengaging the frame as the carry cabinet is mounted and dismounted.

Figure 1b depicts the carry cabinet 1 of Figure 1a mounted on a frame 4 according to the storage system of the present invention. The handle 3 can be seen in the lowered position, having been rotated out of the raised position shown in Figure 1a. Three other carry cabinets are also demountably supported on the frame 4. The rear surfaces of the carry cabinets include latches (not visible in this view) for engaging the frame 4. Two of the carry cabinets 1, 6 include hinged doors and can be used to store devices such as power tools. Carry cabinet 13 includes a removable multi-point power board, other power outlets and a work light. Carry cabinet 11 includes an audio/communications device including a speaker, AM/FM/digital radio and audio connection for an mp3 players or iPod.

Figure 2 depicts a further embodiment of a carry cabinet 2 mounted on a frame 10 according to the storage system of the present invention. The frame 10 can demountably support multiple carry cabinets however for clarity, only one is shown in this drawing. The rear surface of the carry cabinet 2 includes a hook-like formation 12 for engaging a corresponding shaped rail or ridge 14 on the frame 10. The carry cabinet 2 includes an opaque cover 8. Thus it is possible to identify any device inside the carry cabinet 2. Opening the opaque cover 8 provides access to the device.

Figure 3 depicts the carry cabinet 2 and frame 10 of Figure 2 combined with a shelf 15 attached to the lower edge of the frame 10. The shelf 15 can be used to support useful items. In this embodiment the carry cabinet 2 is adapted to support a drawer 19 for storing accessories such as drill bits for use with the power drill 12.

Figure 4 illustrates multiple carry cabinets 2, 20-24 mounted on the frame 10 of Figure 2. The cabinets may be readily re-arranged and put in a different order. In this arrangement it is easy for the user to find and collect the devices and accessories he needs and demount their carry cabinet. Alternatively the user can re-pack the device(s) and accessories in a single carry cabinet.

Each carry cabinet 2, 20-24 is adapted to support a drawer 19, 30-34 for storing accessories. Each carry cabinet 2, 20-23 stores one or more devices.

Carry cabinet 24 stores a multi-point power board 42 including an extendible power cord (not visible).

Figure 5 illustrates multiple carry cabinets 2,20-24 mounted on the frame 10 of Figure 2 in combination with a shelf 15, drawers 19,30-34 for storing accessories and a hood (cover) 40. The cover 40 is pivotally attached to either end of the frame 10 and in this view is shown in the open position. Also in this view, the cover 8 is lifted to show the interior of the carry case 2, and drawer 19 is extended to show how it has a downward slope to provide a user with an adequate view and adequate access to the contents.

Figure 6 illustrates the storage system as depicted in Figure 5, with the cover 40 in the closed position, enclosing the mounted carry cabinets 2, 20-24. The cover 40 can be locked to the frame 10 and/or shelf 15 to keep the carry cabinets secure.

While this invention has been described in connection with specific embodiments thereof, it will be understood that it is capable of further modification(s). This application is intended to cover any variations uses or adaptations of the invention following in general, the principles of the invention and including such departures from the present disclosure as come within known or customary practice within the art to which the invention pertains and as may be applied to the essential features hereinbefore set forth.

As the present invention may be embodied in several forms without departing from the spirit of the essential characteristics of the invention, it should be understood that the above described embodiments are not to limit the present invention unless otherwise specified, but rather should be construed broadly within the spirit and scope of the invention as defined in the appended claims. The described embodiments are to be considered in all respects as illustrative only and not restrictive.

Various modifications and equivalent arrangements are intended to be included within the spirit and scope of the invention and appended claims. Therefore, the specific embodiments are to be understood to be illustrative of the many ways in which the principles of the present invention may be practiced. In the following claims, means-plus-function clauses are intended to cover structures

as performing the defined function and not only structural equivalents, but also equivalent structures.

"Comprises/comprising" and "includes/including" when used in this specification is taken to specify the presence of stated features, integers, steps or components but does not preclude the presence or addition of one or more other features, integers, steps, components or groups thereof. Thus, unless the context clearly requires otherwise, throughout the description and the claims, the words 'comprise', 'comprising', 'includes', 'including' and the like are to be construed in an inclusive sense as opposed to an exclusive or exhaustive sense; that is to say, in the sense of "including, but not limited to".

CLAIMS

1. A storage system for storing devices including:
   - a frame for demountably supporting multiple carry cabinets, each carry cabinet being adapted to receive a device,

   characterised in that,
   - said devices can be inserted or removed through a port in their respective carry cabinet while said multiple carry cabinets are mounted on the frame, and
   - said devices can be transported in their respective carry cabinets when each of said carry cabinets are demounted from the frame.

2. A storage system according to claim 1 wherein the devices are chosen from the group comprising electric tools, battery powered tools, electronic devices, electrical devices and combinations thereof.

3. A storage system according to claim 2 wherein the devices are chosen from the group comprising drilling apparatus, cutting apparatus, grinding apparatus, impact drilling apparatus, screw driving apparatus and combinations thereof.

4. A storage system according to claim 1 wherein a carry cabinet can be changed between a mounted and a demounted configuration respectively by engaging and disengaging a latch between the carry cabinet and frame.

5. A storage system according to claim 4 wherein the latch comprises a rail and correspondingly shaped slot.

6. A storage system according to claim 5 wherein the frame includes multiple rails, each interlocked to an adjacent rail.

7. A storage system according to claim 4 wherein the carry cabinets can be releasably locked to the frame.

8. A storage system according to claim 1 wherein each carry cabinet includes a handle which can be used in a first, raised position for manual transportation and a second, retracted position when the carry cabinet is mounted on the frame.

9. A storage system according to claim 8 wherein the handle is rotatable in one direction for changing between the first and second positions and includes a releasable retainer for holding the handle in the raised position.

10. A storage system according to claim 1 wherein the frame may be used for demountably supporting one or more of said devices.

11. A storage system according to claim 10 wherein the device supported by the frame is chosen from the group comprising a power module, a multi-point power outlet having a retractable cord, a light module, an audio device, a communications device, charging mat for an electronic device or combinations thereof.

12. A storage system according to claim 10 wherein the device is an audio module which is powered by an external power supply when the carry cabinet is demounted.

13. A storage system according to claim 12 wherein the audio module may be connected to an external speaker.

14. A storage system according to claim 1 which comprises a bench.

15. A storage system according to claim 1 which comprises a panel which is suitable for use as a work bench, the panel being horizontally mounted on the frame and above or below said mounted carry cabinets.

16. A storage system according to claim 1 which comprises a panel which is suitable for use as a shelf, the panel being horizontally mounted on the frame adjacent said carry cabinets and suitable for demountably supporting one or more of said devices.

17. A storage system according to claim 16 wherein the device supported by the panel is chosen from the group comprising a power module, a multi-point power outlet having a retractable cord, a light module, an audio module, a communications interface, charging mat for an electronic device or combinations thereof.

18. A storage system according to claim 17 wherein the panel is demountable from the frame.

19. A storage system according to claim 1 which comprises an openable cover for enclosing said mounted carry cabinets.

20. A storage system according to claim 5 which comprises an openable cover which is mounted to the frame.

21. A storage system according to claim 1 wherein the frame comprises a base member for location at floor level, which supports members on which the carry cabinets may be mounted, and wherein the frame is either fixed, freestanding, or mobile freestanding.

22. A carry cabinet suitable for use with the storage system of claim 1 wherein each carry cabinet is further adapted to receive at least one insert chosen from the group comprising drawers, dividers, shelves, storage docks and combinations thereof.

23. A storage dock suitable for being received in the carry cabinet of claim 22, the storage dock including a handle adapted to act as a spacer for at least one other adjacent insert.

24. A carry cabinet according to claim 22 wherein the insert is slidably received in a carry cabinet and adapted to releasably receive device accessories by interference fit.

25. A carry cabinet according to claim 22, each carry cabinet including a port for insertion or removal of the device, wherein the carry cabinet includes a cover associated with the port.

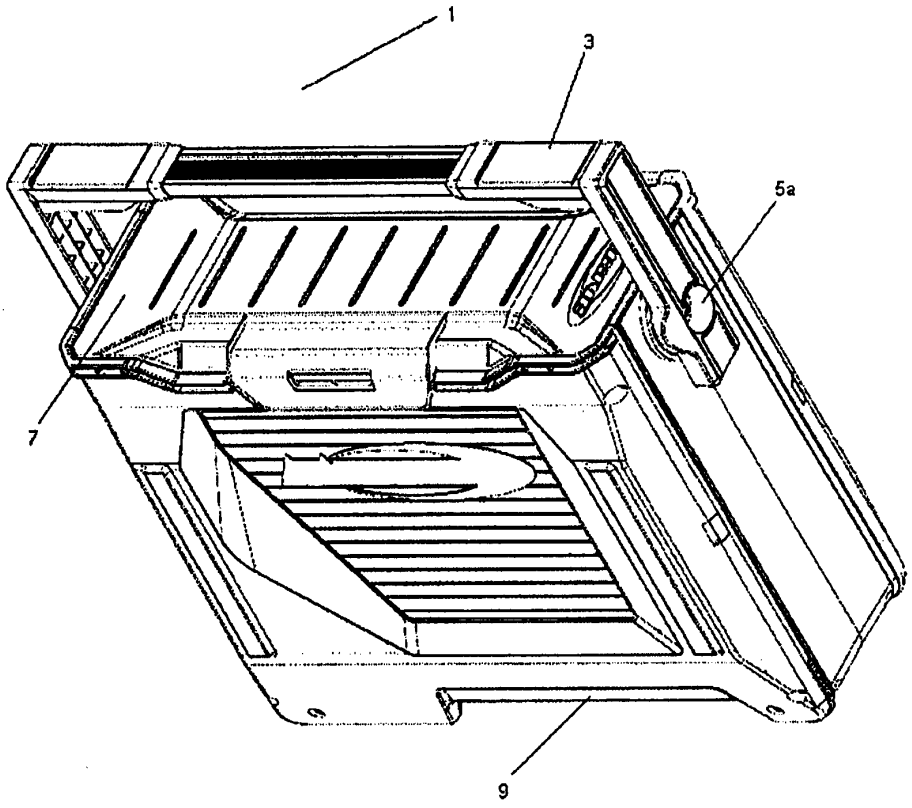


FIGURE 1a

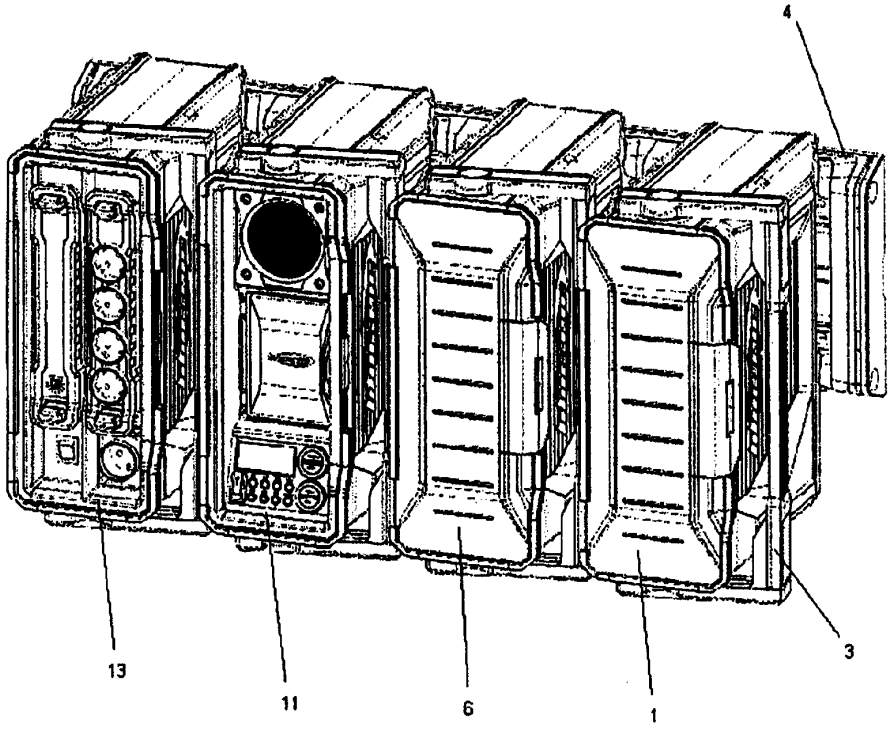


FIGURE 1b

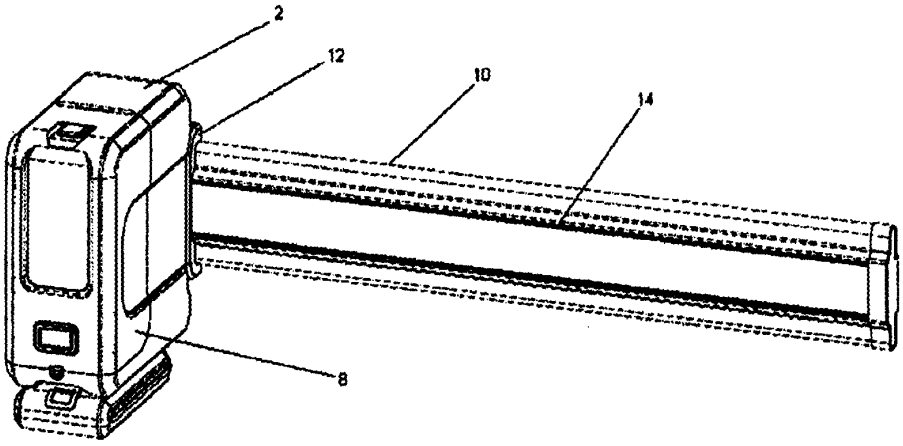


FIGURE 2

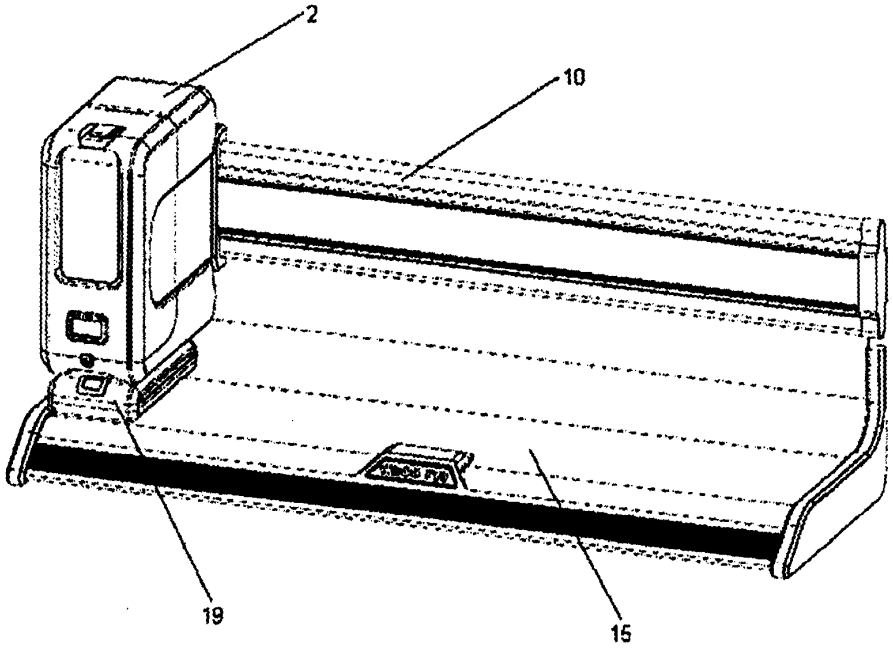


FIGURE 3

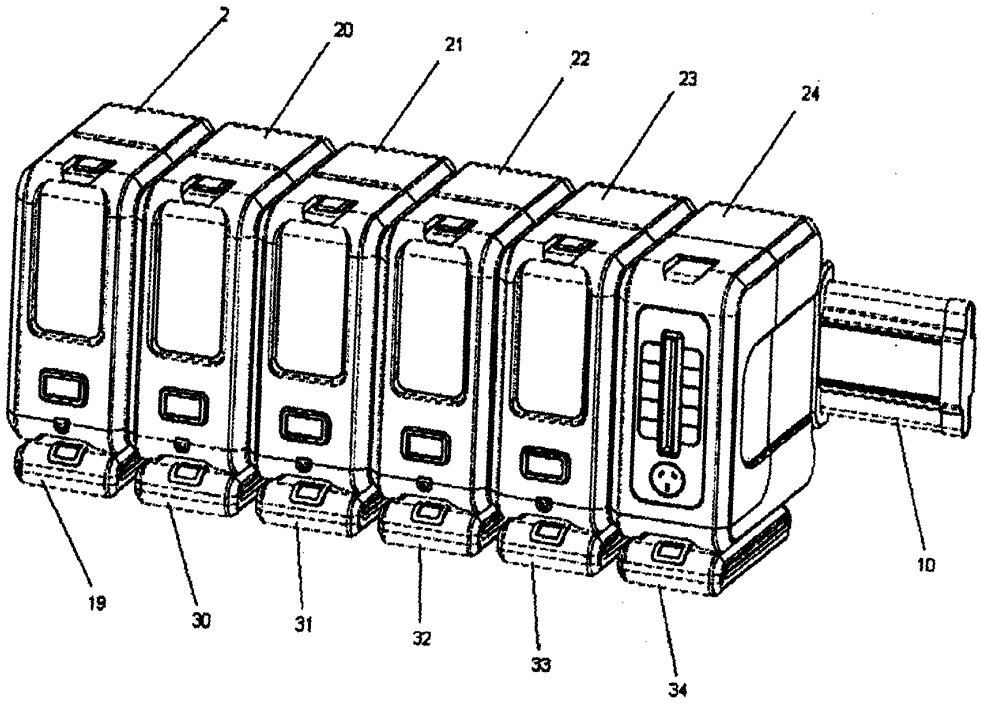


FIGURE 4

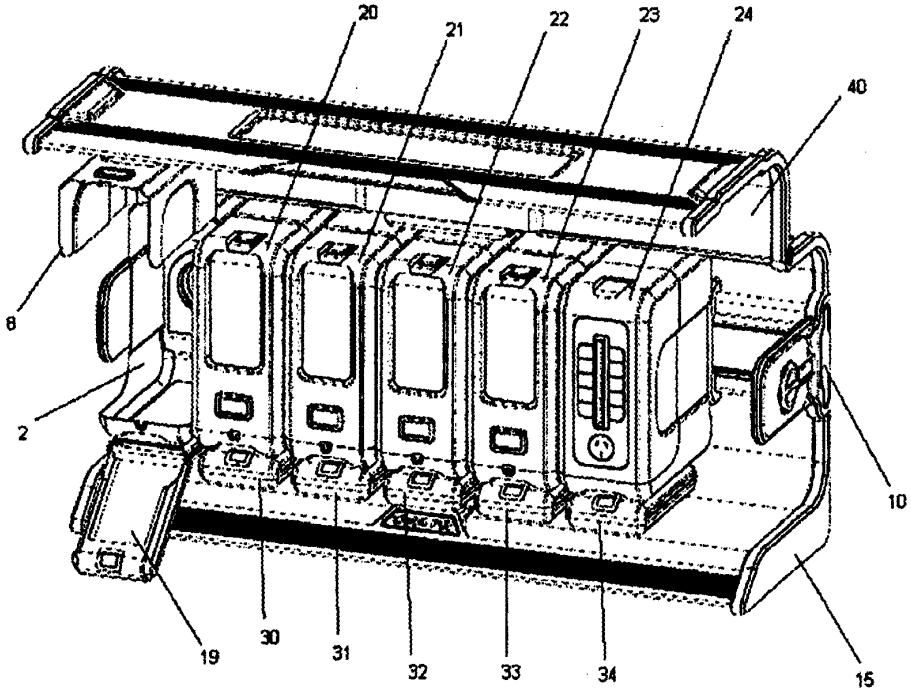


FIGURE 5

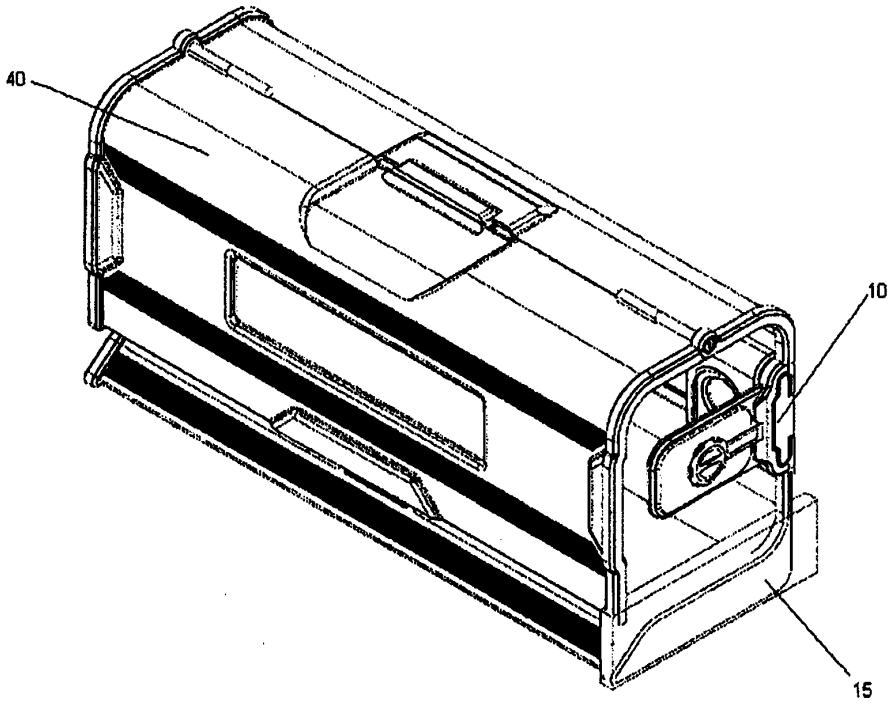


FIGURE 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2011/001103

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.

B25H 3/00 (2006.01) ***B25H 3/02*** (2006.01) ***B25H 3/04*** (2006.01)

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)

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)
WPI, EPODOC: IPC, ECLA B25H 3/00, 3/02, 3/04 A47F 3/00, 3/08 A47B 47/00, 81/00, 87/00 B65G 1/00/LOW & Key words (stor+, rack+, magazine+, rail+, shel+, hook+, attach+, detach+, suspend+, demount+, hold+, support+, container+, case+, carry+, transport+, box+, cabinet?, tool+, device+, accessor+, medical+, electrical+, communicat+,)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5984441 A (STOKHUIJZEN) 16 November 1999. Abstract, figs 1-7 & column 2 lines 10-50	1-4,6,7,10-19,22-25
X	US 20100224527 A1 (HUANG) 9 September 2010 Abstract, figs 1-12 & paras 0003-0005	1-8, 10-25
X	DE 202009012602 U1 (KWB KARL W BURMEISTER GMBH & CO KG) 27 January 2011-09-29 English abstract retrieved from EPODOC database & FIGS 1-8	1-3, 6-19,21-25

☐ Further documents are listed in the continuation of Box C ☒ See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 September 2011	05/10/2011
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. +61 2 6283 7999	Authorized officer **SARAVANAMUTHU PONNAMPALAM** AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No : (02) 6283 2070

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/AU2011/001103

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
US	5984441	AU	16754/97	EP	0820367	WO	9728931
US	2010224527	CA	2694801	CN	101837854	EP	2226163
DE	202009012602U	WO	2011033012				

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2002 - Page 1250
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01400

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
21 August 2014 (21.08.2014)

WIPO | PCT

(10) International Publication Number
WO 2014/125488 A2

(51) International Patent Classification:
E05B 65/46 (2006.01)

(21) International Application Number:
PCT/IL2014/050158

(22) International Filing Date:
13 February 2014 (13.02.2014)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/764,733 14 February 2013 (14.02.2013) US

(71) Applicant: **KETER PLASTIC LTD** [IL/IL]; 2 Sapir St., Industrial Area, 646766 Herzlyia (IL).

(72) Inventor: **BRUNNER, Yaron**; 31 Halivne Street, 36576 Timrat (IL).

(74) Agent: **REINHOLD COHN AND PARTNERS**; P.O.Box 13239, 61131 Tel Aviv (IL).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

— *of inventorship (Rule 4.17(iv))*

[Continued on next page]

(54) **Title**: A CABINET OF STORAGE UNITS

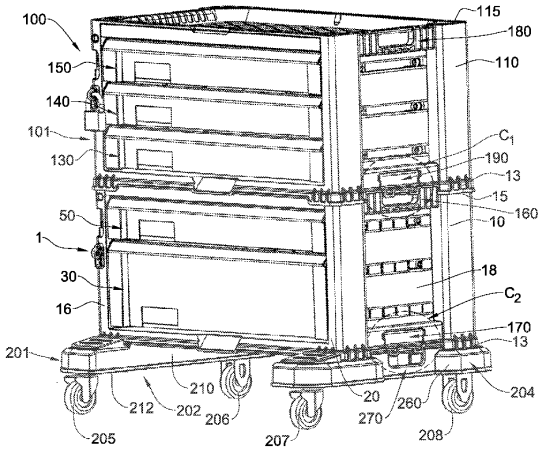


Fig. 18A

(57) **Abstract**: A cabinet comprising: a housing; two or more storage units, each accommodated within the housing and displaceable between a closed position in which a majority of the storage unit is disposed within the housing and an open position in which the storage unit projects from the housing to an extent greater than in said closed position; and a blocking mechanism comprising two or more blocking members, each associated with its corresponding storage unit and configured for selectively arresting said corresponding storage unit in its closed position; the blocking mechanism being displaceable between an unblocked state in which each one of the storage units is free to be displaced from its closed position to its open position and a blocked state in which at least one and no more than all but one of the storage units are arrested in their closed position by their corresponding blocking members. The association between the blocking mechanism and the storage units is such that, when said blocking mechanism is in its unblocked position, displacement of one of said storage units from its closed position to its open position induces displacement of the blocking mechanism from its unblocked state to its blocked state.

WO 2014/125488 A2

Published:

— *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*

A CABINET OF STORAGE UNITS

TECHNOLOGICAL FIELD

The presently disclosed subject matter relates to cabinets having at least one storage unit.

BACKGROUND

Storage cabinets are used to store parts, such as nuts, bolts, and nails, and tools, such as screw drivers, wrenches, and utility knives. These cabinets typically include storage units in the form of drawers, having a predetermined arrangement and size. The drawers are usually arranged from upper side to lower side of the cabinet. The drawers can slide horizontally into and out of the cabinet. Sliding drawers are commonly built into tool cabinets, kitchen cabinets, desks, dining room cabinetry, office furniture, and the like to provide more convenient access to storage space therein.

GENERAL DESCRIPTION

According to one aspect of the presently disclosed subject matter, there is provided a cabinet comprising:

a housing;

two or more storage units, each accommodated within the housing and displaceable between a closed position in which the majority of the storage unit is disposed within the housing and an open position in which the storage unit projects from the housing to an extent greater than in said closed position; and

a blocking mechanism comprising two or more blocking members, each associated with its corresponding storage unit and configured for selectively arresting said corresponding storage unit in its closed position; the blocking mechanism being displaceable between an unblocked state in which each one of the storage units is free to be displaced from its closed position to its open position and a blocked state in which at least one and no more than all but one of the storage units are arrested in their closed position by their corresponding blocking members;

the association between the blocking mechanism and the storage units is such that, when said blocking mechanism is in its unblocked position, displacement of one of said storage units from its closed position to its open position induces displacement of the blocking mechanism from its unblocked state to its blocked state.

The term "majority of the storage unit" may be interpreted with respect to any one of the following: length of the storage unit measured along the direction of its displacement with respect to the housing, nominal dimensions of the storage unit, volume of the storage unit and weight of the storage unit.

The blocking mechanism is configured for preventing more than one storage unit being in their open position at the same time, thereby reducing the probability of tipping over of the cabinet, for example, due to shifting of the center of gravity thereof.

According to one example, at least one of the storage units is a drawer.

According to another example, at least one of the storage units is an assortment box.

The association between the blocking mechanism and the storage units can also be such that displacement of one storage unit from its open position to its closed position induces displacement of the blocking mechanism from its blocked state to its unblocked state.

The storage units can comprise a restricting arrangement associated with the blocking mechanism so that in the blocked state of the blocking mechanism, the blocking mechanism obstructs the restricting arrangement, to thereby prevent displacement thereof from their closed position to their open position. In particular, the restricting arrangement can be constituted by restricting portions of the storage units. In the blocked state, the blocking members are aligned with the corresponding restricting portions of the storage units so that during an attempt to displace a blocked storage unit from its closed position to its open position, the blocking members are configured to engage corresponding restricting portions of the restricting arrangement to thereby obstruct of the storage units and prevent their above displacement.

The cabinet can further comprise a following arrangement associated, on the one hand, with the blocking mechanism, and on the other hand with the storage units. The following arrangement is associated with said storage units such that displacement of one storage unit from its closed position to its open position entails displacement of the following arrangement from its inoperative state to its operative state. The following

arrangement is associated with said blocking mechanism such that displacement of the following arrangement from its inoperative state to its operative state entails displacement of the blocking mechanism from its unblocked state to its blocked state. Thus, displacement of a single storage unit from its closed position to its open position entails displacement of the blocking mechanism from the unblocked state to the blocked state.

The following arrangement can comprise two or more following members configured for association with each of the two or more storage units respectively. According to a particular design, the following arrangement can be a part of the blocking mechanism, i.e. the following members can be integrally formed with the blocking mechanism.

Each of the storage units can be configured with a guiding portion associated with its corresponding following member, so that during the displacement of the storage unit between its closed position and its open position, the corresponding following member slidingly engages its corresponding guiding portion (e.g. cam and following configuration), thereby changing the operative state of the following arrangement between its inoperative state and its operative state, respectively.

During the engagement of the following member with its corresponding guiding portion, the following member can rest on the guiding portion and slide along its length.

The blocking mechanism can be in the form of a single-molded member. In particular, both the blocking members and the following members can be integrally formed therewith and constitute portions of the single-molded member.

Each blocking member and following member can be constituted by a single blocking-following member. In particular, a first portion (e.g. a side surface) of the blocking-following member can constitute the blocking member and a second portion (e.g. a bottom end) of the blocking-following member can constitute the following member.

The storage units can be arranged within the cabinet along a longitudinal axis, and the blocking mechanism can have an elongated shape and can extend along said longitudinal axis.

According to one example, the longitudinal axis can be a vertical axis along which the blocking mechanism is configured to be displaced between its blocked state and its unblocked state.

In particular, the blocking mechanism can be displaced in the upward direction, when displaced from its unblocked state to its blocked state, and in the downward direction, when displaced from its blocked state to its unblocked state.

According to another example, the longitudinal axis can be a horizontal axis along which the blocking mechanism is configured to be displaced between its blocked state and its unblocked state.

The blocking mechanism can be normally urged into its unblocked state by virtue of gravity forces.

The blocking mechanism can further comprise a biasing arrangement configured for biasing the blocking mechanism from its blocked state towards its unblocked state.

The biasing arrangement can be constituted by a compression spring.

The biasing arrangement can be disposed at the uppermost end of the blocking mechanism.

Each guiding portion can be provided with a ramp portion configured to displace the corresponding following member while sliding thereon, thereby displacing the following arrangement towards its operative state, and consequentially, displacing the blocking mechanism towards its blocked state.

The blocking-following member can be sized for passing between the corresponding restricting and guiding portions during the displacement of the storage unit between its closed position and its open position.

The blocking-following member can have a predetermined width which, during the displacement of the storage unit from its closed to its open position, allows the blocking-following member to pass by the corresponding restricting portion before engaging a lower end of the ramp portion, so as to allow the blocking-following member to be displaced in the upper direction when sliding on the ramp portion.

Each of the storage units can have a cavity defined by a base section, a front wall, a first sidewall and a second sidewall, each having a first and a second exterior surface, respectively. The guiding portion of each storage unit can protrude from one of the first and the second exterior surfaces.

The restricting portion of each storage unit can protrude from one of the first and the second exterior surfaces.

At least one of the storage units can further have an intermediate position in which the storage unit projects from the housing to an extent greater than in the closed

position and smaller than in the open position. In the intermediate position, the blocking mechanism is in its unblocked state, thereby allowing more than one storage unit to be displaced to its open position.

In the closed position of the storage unit, a lower end of the ramp portion can be spaced from the blocking-following member along the guiding portion to an intermediate distance, so that the storage unit can be displaced from its closed position to its intermediate position without displacing the blocking mechanism to its blocked state.

The intermediate distance can be such that when all the storage units are in their intermediate position, there is no danger of tipping over of the cabinet.

Each of the blocking members can protrude out of the blocking mechanism towards the respective storage unit.

The cabinet can have a front wall. The blocking members can be disposed along a first plane and the restricting portions can be disposed along a second plane, such that the first plane is closer to the front wall than the second plane.

Each of the following members can protrude out of the blocking mechanism towards the respective storage unit.

The following members can be disposed along the first plane.

Each storage unit can include at least one slide mechanism configured for mounting the storage unit to the housing and facilitating the displacement of the storage unit between its closed position and its open position.

For example, each storage unit can include two slide mechanisms, connected to the first and the second sidewalls of the storage unit, respectively.

The guiding portion can be constituted by a portion of the slide mechanism.

According to another aspect of the presently disclosed subject matter, there is provided a cabinet comprising:

a housing;

one or more storage units, each accommodated within the housing and displaceable between a closed position in which the majority of the storage unit is disposed within the housing and an open position in which the storage unit projects from the housing to an extent greater than in said closed position;

a locking mechanism configured with one or more locking members, each associated with its corresponding storage unit and configured for selectively arresting

said corresponding storage unit in its closed position; the locking mechanism being displaceable between an unlocked state in which each of the storage units is free to be displaced from its closed position to its open position and a locked state in which all the storage units are arrested in their closed position by their corresponding locking members.

The locking mechanism is configured to control the ability of a user to open at least one of the storage units of the cabinet. This control can be important for different safety and/or security reasons in which a user should be prevented from opening the storage units. For example, the locking mechanism can be used for locking all the storage units at their closed position in order to prevent children from opening them and being exposed to their interior content.

It is appreciated that the above cabinet can also be provided with a blocking mechanism according to the previous aspect of the present application, thereby preventing a user from opening more than one storage unit at a time.

According to one example, the storage unit is a drawer.

According to another example, the storage unit is an assortment box.

The storage units can comprise an arresting arrangement associated with the locking mechanism so that in the locked state of the locking mechanism, the locking mechanism obstructs the arresting arrangement, to thereby prevent displacement thereof from their closed position to their open position. In particular, the arresting arrangement can be constituted by arresting portions of the storage units. In the locked state, the locking members are aligned with respective arresting portions of the storage units so that during an attempt to displace a locked storage unit from its closed position to its open position, the locking members are configured to engage corresponding arresting portions of the arresting arrangement to thereby obstruct of the storage units and prevent their above displacement.

The locking mechanism can be in the form of a single-molded member. In particular, the locking members can be integrally formed therewith and constitute portions of the single-molded member.

The storage units can be arranged within the cabinet along a longitudinal axis, and the locking mechanism can have an elongated shape and can extend along the longitudinal axis.

According to one example, the longitudinal axis can be a vertical axis along which the locking mechanism is configured to be displaced between its locked state and its unlocked state.

In particular, the locking mechanism can be displaced in the downward direction, when displaced from its locked state to its unlocked state, and in the upward direction, when displaced from its unlocked state to its locked state.

According to another example, the longitudinal axis can be a horizontal axis along which the locking mechanism is configured to be displaced between its locked state and its unlocked state.

The locking members can be sized for passing beneath the corresponding arresting portions during the displacement of the storage unit between its closed position and its open position.

Each of the storage units can have a cavity defined by a base section, a front wall, a first sidewall and a second sidewall, each having a first and a second exterior surface, respectively. The arresting portion of each storage unit can protrude from one of the first and the second exterior surfaces.

Each of the locking members can protrude out of the locking mechanism towards the respective storage unit.

The cabinet can have a front wall. The locking members can be disposed along a first plane and the arresting portions can be disposed along a second plane, such that the first plane is closer to the front wall than the second plane.

The locking mechanism can comprise an actuator for displacing the locking mechanism between its unlocked state and its locked state.

The actuator can have an actuator cavity configured to accommodate at least one finger of a user for allowing him to displace the locking mechanism between its unlocked state and its locked state.

The front wall of the cabinet can have a front edge. The front edge can have an actuator window configured for providing access to the actuator cavity.

The actuator can be configured with an indicating member, visible via an indicating window formed in the front edge of the cabinet, and configured for indicating the state in which the locking mechanism is disposed.

The indicating member can have a first portion with a first color associated with the locked state of the locking mechanism, and a second portion with a second color

associated with the unlocked state of the locking mechanism. The indicating window is configured to provide visual access to one of the first and the second portions at a time, thereby indicating the state at which the locking mechanism is disposed.

The locking mechanism can further include a securing member protruding therefrom and formed with a securing recess therein. The front edge of the cabinet can be formed with an elongate opening configured for receiving therethrough the securing member. The opening in the front edge of the cabinet can be formed with a raised rim extending about the opening, and being formed with a locking recess.

The arrangement is such that the securing member can assume a first position with respect to the elongate opening, corresponding to a locked state of the locking mechanism, in which the securing recess is aligned with the locking recess of the raised rim, and a second position in with respect to the elongate opening, corresponding to a locked state of the locking mechanism, in which the securing recess is misaligned with the locking recess of the raised rim.

In the first position of the securing member, a member of a lock can be received via the locking recess and the securing recess so as to fix the locking mechanism in its locked state.

Each storage unit can include at least one slide mechanism configured for mounting the storage unit to the housing and facilitating the displacement of the storage unit between its closed position and its open position.

According to still another aspect of the presently disclosed subject matter, there is provided a modular assembly of cabinets, which are configured to be modularly stacked on each other, comprising:

a first cabinet and a second cabinet, each comprising a housing with a base section, a top section and sidewalls extending therebetween, at least one of the sidewalls being provided with at least one upper latching mechanism disposed closer to said top section and at least one lower latching mechanism disposed closer to said base section; and

a support structure comprising at least one support latching mechanism, the support structure being configured to be disposed under a lowermost cabinet of the assembly, so as to provide support to the assembly;

the lower latching mechanism of the first cabinet being selectively engageable with the upper latching mechanism of the second cabinet or with the support latching

mechanism, and the lower latching mechanism of the second cabinet being selectively engageable with the upper latching mechanism of the first cabinet or with the support latching mechanism, thereby allowing modular latched stacking of the first cabinet, the second cabinet and the support structure to each other.

The assembly of cabinets allows selectively stacking the cabinets on each other and on the support structure so that each one of the cabinets is latched to its neighboring cabinet by corresponding upper and lower latching mechanisms while the lowermost cabinet is latched to the support structure by the corresponding lower latching mechanism and the support latching mechanism.

The base section can have a base rim and the top section can have a top rim. The base rim of the first cabinet can correspond in shape and size to the top rim of the second cabinet, so as to allow the first cabinet to be modularly stacked on the second cabinet. The base rim of the second cabinet can correspond in shape and size to the top rim of the first cabinet, so as to allow the second cabinet to be modularly stacked on the first cabinet.

The support structure can have a top section and a base section. The top section can have a support top rim. The support top rim can correspond in shape and size to the base rim of the first cabinet and to the base rim of the second cabinet, so as to allow the first cabinet or the second cabinet to be disposed on the support structure and latched thereto.

The support structure can further have sidewalls extending between the top section and the base section. At least one of the sidewalls of the support structure can be is provided with the support latching mechanism.

The support latching mechanism can be disposed closer to the support top rim than to the base section.

The sidewalls of the support structure can include a right support sidewall, a left support sidewall and a rear support sidewall.

The support structure can be constituted by two separate support members, each including its respective right and left support sidewall.

Each support member can have at least one support connecting portion configured to engage with a corresponding cabinet connecting portion formed within the first and the second bottom for disposing the first or the second cabinet on the support structure.

The support connecting portion can be constituted by a support connecting protrusion, and the cabinet connecting portion can be constituted by a cabinet connecting recess configured to receive said support connecting protrusion.

The support structure can comprise a plurality of wheels mounted to the bottom structure thereof for allowing displacement of the assembly.

The first upper latching mechanism can be similar to the second upper latching mechanism, and the first lower latching mechanism can be similar to the second lower latching mechanism.

The walls of the first and the second cabinets can be generally coplanar with each other when the cabinets are stacked on each other.

The sidewalls of the first and the second cabinets can include a right sidewall, a left sidewall, a rear sidewall and a front sidewall. The front sidewall can have a front opening formed therein configured to receive at least one storage unit into the respective cabinet.

According to one example, the storage unit is a drawer.

According to another example, the storage unit is an assortment box.

According to one example, the lower latching mechanism can comprise a latch recess formed within the respective sidewall, configured for accommodating therein a pivotally rotatable latch member. The latch member can be configured with at least one tongue.

According to still one example, the upper latching mechanism can be a detachably attachable unit.

According to still one example, the upper latching mechanism can comprise a recess formed therein with at least one catch member configured for selectively engaging with the at least one tongue of the latch member.

According to another example, the upper latching mechanism can comprise a latch recess formed within the respective sidewall, configured for accommodating therein a pivotally rotatable latch member. The latch member can be configured with at least one tongue.

According to still another example, the lower latching mechanism can be a detachably attachable unit.

According to still another example, the lower latching mechanism can comprise a recess formed therein with at least one catch member configured for selectively engaging with the at least one tongue of the latch member.

The support latching mechanism can comprise a recess formed therein with at least one catch member configured for selectively engaging with the at least one tongue of the latch member.

The upper latching mechanism can be used as a gripping member configured to be gripped by a user for raising the respective cabinet, while the recess is used for accommodating the user's fingers therein.

The structure of the sidewalls, the top section and the base section of the first and the second cabinets can be similar to each other.

In particular, the first and the second cabinets can be similar to each other.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to better understand the subject matter that is disclosed herein and to exemplify how it may be carried out in practice, embodiments will now be described, by way of non-limiting example only, with reference to the accompanying drawings, in which:

Fig. 1A is a front left isometric view of a cabinet, in accordance with one example of the presently disclosed subject matter;

Fig. 1B is a rear left isometric view of the cabinet of **Fig. 1A**;

Fig. 2A is a front left isometric view of a lower drawer of the cabinet of **Fig. 1A**;

Fig. 2B is an enlarged view of a portion A_1 of **Fig. 2A**;

Fig. 2C is a front left isometric view of an upper drawer of the cabinet of Fig. 1A;

Fig. 2D is an enlarged view of a portion A_2 of **Fig. 2A**;

Fig. 2E is a front left isometric view of a housing of the cabinet of **Fig. 1A**, with the drawers being removed;

Fig. 3 is a rear isometric view of a blocking mechanism of the cabinet of **Fig. 1A**;

Fig. 4A is the cabinet of **Fig. 1A**, with its housing removed therefrom;

Fig. 4B is an enlarged view of a portion A_3 of **Fig. 4A**;

Fig. 5A is a rear left isometric view of the cabinet of **Fig. 1A**, with its housing removed therefrom;

Fig. 5B is an enlarged view of a portion A_4 of **Fig. 5A**;

Figs. 5C to **5E** are rear isometric views of the portion A_4 of **Fig. 5B**, presented during consecutive steps of operation of the drawer;

Fig. 6A is a front left isometric view of the cabinet of the **Fig. 1A** with one drawer shown in its open position and another drawer shown in its closed position;

Fig. 6B is a rear left isometric view of the cabinet of the **Fig. 6A**;

Fig. 7A is the cabinet of **Fig. 6A**, with its housing removed therefrom;

Fig. 7B is an enlarged view of a portion A_5 of **Fig. 7A**;

Fig. 8A is a rear left isometric view of the cabinet of **Fig. 6A**, with its housing removed therefrom;

Fig. 8B is an enlarged view of a portion A_6 of **Fig. 8A**;

Fig. 9A is a front right isometric view of a cabinet, in accordance with another example of the presently disclosed subject matter;

Fig. 9B is a rear right isometric view of the cabinet of **Fig. 9A**;

Fig. 10A is a front right isometric view of a lower drawer of the cabinet of **Fig. 9A**;

Fig. 10B is an enlarged view of a portion B_1 of **Fig. 10A**;

Fig. 10C is a front right isometric view of an upper drawer of the cabinet of **Fig. 9A**;

Fig. 10D is an enlarged view of a portion B_1' of **Fig. 10C**;

Fig. 10E is a front right isometric view of a housing of the cabinet of **Fig. 9A**, with the drawers being removed;

Fig. 11 is a front isometric view of a locking mechanism of the cabinet of **Fig. 9A**, according to another aspect of the presently disclosed subject matter;

Fig. 12A is the cabinet of **Fig. 9A**, with its housing removed therefrom;

Fig. 12B is an enlarged view of a portion B_2 of **Fig. 12A**;

Fig. 13A is a rear right isometric view of the cabinet of **Fig. 9A**, with its housing removed therefrom;

Fig. 13B is an enlarged view of a portion B_3 of **Fig. 13A**;

Fig. 14A is a front right isometric view of the cabinet of the **Fig. 9A** with one drawer shown in its open position and another drawer shown in its closed position;

Fig. 14B is a rear right isometric view of the cabinet of the **Fig. 14A**;

Fig. 15A is the cabinet of Fig. 14A, with its housing removed therefrom;

Fig. 15B is an enlarged view of a portion B_4 of **Fig. 15A**;

Fig. 16A is a rear right isometric view of the cabinet of **Fig. 15A**, with its housing removed therefrom;

Fig. 16B is an enlarged view of a portion B_5 of **Fig. 16A**;

Fig. 17A is an enlarged view of a portion B_6 of **Fig. 9A**;

Fig. 17B is an enlarged view of a portion B_7 of **Fig. 14A**;

Fig. 18A is a front left isometric view of a modular assembly of cabinets, in accordance with another aspect of the presently disclosed subject matter;

Fig. 18B is an enlarged view of a portion C_1 of **Fig. 18A**;

Fig. 18C is an enlarged view of a portion C_2 of **Fig. 18A**;

Fig. 19 is an exploded view of the housing of **Fig. 2E**;

Fig. 20A is a front isometric view of an upper latching mechanism of the cabinets of **Fig. 18A**;

Fig. 20B is a rear isometric view of an upper latching mechanism of the cabinets of **Fig. 18A**;

Fig. 21A is a front isometric view of a lower latching mechanism of the cabinets of **Fig. 18A**;

Fig. 21B is a rear isometric view of a lower latching mechanism of the cabinets of **Fig. 18A**;

Fig. 22A is a front isometric view of a supporting structure of the assembly of **Fig. 18A**;

Fig. 22B is an enlarged view of a portion C_3 of Fig. 22A;

Figs. 23A and **23B** are an isometric view of a cabinet of assortment boxes; and

Figs. 24A and **24B** are an isometric view of an assortment box of the cabinet of **Figs. 23A** and **23B**.

DETAILED DESCRIPTION OF EMBODIMENTS

Attention is first directed to Figs. 1A to 2E, 6A and 6B of the drawings illustrating a cabinet in accordance with one example of the presently disclosed subject matter, generally designated **1**. The cabinet **1** comprises a housing **10** and two storage units in the form of drawrs, including a lower drawer **30** and an upper drawer **50**, each

accommodated within the housing **10** and slidingly displaceable between a closed position in which the drawer is disposed within the housing **10** and an open position in which the drawer projects from the housing **10**. The drawers **30** and **50** are vertically stacked within the housing **10** along a vertical axis **Y**. In Figs. 1A and 1B, the drawers **30** and **50** are in their closed position, and in Figs. 6A and 6B, the drawer **30** is in its open position and the drawer **50** is in its closed position.

As shown in Fig. 2E, the housing **10** has a base section **12** with a base rim **13**, a top section **14** with a top rim **15**, a right sidewall **16**, a left sidewall **18**, a front frame **20** with an opening therein and a rear wall **22**. The front frame **20** has a right front edge **19** and a left front edge **21**. The housing **10** further has a housing cavity **23** defined by the base section **12**, the top section **14**, the sidewalls **16** and **18**, and the walls **20** and **22**. The housing cavity **23** is configured to accommodate the drawers **30** and **50** therein.

It is appreciated that the number of the drawers is not limited to two. An example of a cabinet with three drawers in presented in Fig. 18A. According to the present example, the drawer **30** occupies a space of two drawers, each having dimensions similar to those of the drawer **50**.

As shown in Fig. 2A, the drawer **30** has a front wall **32**, a rear wall **34**, a right sidewall **36**, a left sidewall **38** and a base section (not seen). The front and rear walls **32** and **34**, the right and left sidewalls **36** and **38**, and the base section of the drawer **30** define together a cavity **31** configured for accommodating work tools and appliances. The right sidewall **36** has a right exterior surface **37** and the left sidewall **38** has a left exterior surface **39**.

As shown in Figs. 2C, the drawer **50** has a front wall **52**, a rear wall **54**, a right sidewall **56**, a left sidewall **58** and a base section **60**. The front and rear walls **52** and **54**, the right and left sidewalls **56** and **58**, and the base section **60** define together a cavity **51** configured for accommodating work tools and appliances. The right sidewall **56** has a right exterior surface **57** and the left sidewall **58** has a left exterior surface **59**.

Each of drawers **30** and **50** is slidingly displaceable with respect to the housing **10** by two slide mechanisms interconnecting each drawer to the housing **10**. Each of the two slide mechanisms is a full-extension mechanism being disposed at a respective sidewall of each drawer. The description below is made for example to a left slide mechanism **2** of the drawer **30**.

The slide mechanism **2** (the location of which is generally shown in Fig. 1A) has the following three members: a first member **4** (shown in Figs. 2A and 2B) protruding from the left sidewall **38** and extending between the front wall **32** and the rear wall **34**; a second member (not seen) protruding from the left sidewall **18** of the housing **10** towards the drawer **30** and extending between the front wall **20** and the rear wall **22**; and an intermediate member **6** (shown in Figs. 4A and 4B) slidingly disposed between the first and the second members. The existence of the intermediate member **6** allows the drawer **30** to fully extend out of the housing **10** in its open position (as shown for example in Figs. 6A and 6B). As shown in Figs. 6A and 6B, in the fully extended position of the slide mechanism **2**, one half of the intermediate member **6** is engaging the first member **4**, and another half of the intermediate member **6** is engaging the second member of the slide mechanism **2**, thereby providing support to the drawer **30** with respect to the housing **10**.

Reference is now made to Figs. 3, 4A to 4B and 5A to 5B, in which a blocking mechanism **70** of the cabinet **1** is illustrated, in accordance with one aspect of the presently disclosed subject matter. The blocking mechanism **70** is disposed within the cabinet **1** behind the front edge **21**, between the left sidewall **18** of the housing **10** and the left sidewalls **38** and **58** of the drawers **30** and **50**. The blocking mechanism **70** is mechanically associated with the drawers **30** and **50** for preventing more than one drawer from being displaced to its open position at the same time.

The blocking mechanism **70** is mechanically associated with the drawers **30** and **50** such that, when these drawers are in their closed position, displacement of one drawer from its closed position to its open position induces displacement of the blocking mechanism **70** which, in turn, arrests each of the other drawers in its closed position. The structure of the blocking mechanism **70** and its way of operation will now be described.

The blocking mechanism **70** is a single-molded elongate member oriented within the housing **10** along the vertical axis **Y**. The blocking mechanism **70** has three blocking-following members **71a**, **71b** and **71c**, each associated with its corresponding drawer (if accommodated within the housing **10**) for selectively arresting said corresponding drawer in its closed position. Each of the blocking-following members **71a**, **71b** and **71c** is a blocking member and a following member integrally formed in a single member. As shown in Figs. 4A and 4B, the blocking-following member **71b** is

associated with the drawer **30**, the blocking-following member **71c** is associated with the drawer **50**, and the blocking-following member **71a** is not associated with a specific drawer since the drawer **30** occupies a space of two drawers as mentioned above. The blocking-following members **71a**, **71b** and **71c** laterally are integrally formed with the blocking mechanism **70** and constitute portions thereof. The blocking-following members **71a**, **71b** and **71c** protrude from the blocking mechanism towards their corresponding drawers of the cabinet **1**.

According to the example of the drawings, the blocking mechanism **70** is vertically displaceable along the axis **Y** between a downward unblocked state (shown in Figs. 4A, 4B, 5A and 5B) in which each one of the drawers **30** and **50** is free to be displaced from its closed position to its open position and an upward blocked state (shown in Figs. 7A, 7B, 8A and 8B) in which the drawer **50** is arrested in its closed position by its corresponding blocking-following member **71c**, while the drawer **30** is in its open position. The blocking mechanism **70** is normally urged into its unblocked state by virtue of gravity forces.

As shown in Fig. 3, the blocking mechanism **70** further has a biasing arrangement **79** disposed at the uppermost end thereof and configured for biasing the blocking mechanism **70** towards its unblocked state. The biasing arrangement **79** is constituted by a biasing spring arm configured to engage the top wall **14** of the housing **1**, when the blocking mechanism is in its blocked state, and consequently to be bent. The elastic nature of the biasing arrangement **79** allows the arm to assume its original shape, thereby facilitating the displacement of the blocking mechanism **70** to its unblocked state, when possible.

It should be indicated that the description below is made to a particular example according to which the drawer **30** is displaced to its open position, while the drawer **50** is arrested in its closed position by virtue of the blocking mechanism **70**. It is appreciated that if the drawer **50** is displaced to its open position instead of the drawer **30**, the drawer **30** will be arrested in its closed position by virtue of the blocking mechanism **70** in the same manner as the drawer **50** is arrested when the drawer **30** is displaced to its open position.

Reference is now made again to Figs. 2A to 2D, 3, 4A to 4B and 5A to 5B in order to describe the mechanical association between the blocking mechanism **70** and

the drawers **30** and **50** when the drawer **30** is displaced from its closed position to its open position.

As clearly shown in Fig. 2B and 5B, the drawer **30** has a restricting portion **42** and a guiding portion **43** which are mechanically associated with the blocking-following member **71b**. The restricting portion **42** and the guiding portion **43** protrude from the left exterior surface **39** towards the left sidewall **18** of the housing **10**, and particularly towards to blocking mechanism **70**. The guiding portion **43** is disposed along and under the first element **4** of the slide mechanism **2**. The guiding portion **43** has three portions: a first straight portion **43a**, a ramp portion **43b** and a second straight portion **43c**. The the ramp portion **43b** has a lower end **45** which is disposed between the first straight portion **43a** and the ramp portion **43b**.

As clearly shown in Fig. 2D and 5B, the drawer **50** has a restricting portion **62** and a guiding portion **63** which are mechanically associated with the blocking-following member **71c**. The restricting portion **62** and the guiding portion **63** protrude from the left exterior surface **59** towards the left sidewall **18** of the housing **10**, and particularly towards to blocking mechanism **70**. The guiding portion **63** is disposed along and under the first element of the slide mechanism of the drawer **50**.

As shown in Fig. 3, each of the blocking-following members **71a, 71b** and **71C** has respectively two portions: a side blocking portion **72a**, **72b** and **72c** and a bottom following portion **73a**, **73b** and **73c**. Each of the blocking portions **72a**, **72b** and **72c** constitutes a blocking member which is mechanically associated with the restricting portion of its corresponding drawer and each of the following portions **73a**, **73b** and **73c** constitutes a following member which is mechanically associated with the guiding portion of its corresponding drawer. In particular, the blocking portion **72b** is mechanically associate with the restricting portion **42**, the blocking portion **72c** is mechanically associate with the restricting portion **62**, the following portion **73b** is mechanically associate with the guiding portion **43**, and the following portion **73c** is mechanically associate with the guiding portion **63**.

The association between the restricting portion **62** and the blocking-following members **71c** and particularly with its blocking portion **72c** is such that in the blocked state of the blocking mechanism **70**, when the drawer **30** is in its open position and the drawer **50** is in its closed position, the blocking portion **72c** obstructs the restricting portion **62**, to thereby prevent displacement thereof into its open position.

In a similar manner, the association between the restricting portion **42** and the blocking-following members **71b** and particularly with its blocking portion **72b** is such that in the blocked state of the blocking mechanism **70**, when the drawer **50** is in its open position and the drawer **30** is in its closed position, the blocking portion **72b** obstructs the restricting portion **42**, to thereby prevent displacement thereof into its open position.

As shown in Fig. 5B, the blocking-following members **71a**, **71b** and **71c** are disposed along a first plane which passes through line **AA** and which is substantially parallel to the front frame **20** of the housing **10**. As further shown in this figure, the restricting portions **42** and **62** are disposed along a second plane which passes through line **BB** and which is substantially parallel to the first plane. The first plane is closer to the front frame **20** than the second plane, and both planes are disposed in proximity to the front frame **20**.

The blocking-following member **71b** is sized for passing between the restricting portion **42** and the guiding portion **43** during the displacement of the drawer **30** between its closed position and its open position.

In a similar manner, the blocking-following member **71c** is sized for passing between the restricting portion **62** and the guiding portion **63** during the displacement of the drawer **50** between its closed position and its open position.

In order to describe the mechanical association between the guiding portion **43** and the following portion **73b**, reference is now made particularly to Fig. 5B and additionally to Figs. 5C to 5E, which illustrate the steps of displacement of the drawer **30** from its closed position to its open position, and consequent displacement of the blocking mechanism **70** to its blocked state. As shown in Fig. 5B, when the drawer **30** is in its closed position, the following portion **73b** rests on the guiding portion **43**. As shown in Fig. 5C, when the drawer **30** begins its displacement along a horizontal axis **X** to its open position, the following portion **73b** slides over the first straight portion **43a** of the guiding portion **43** until it reaches the lower end **45** of the ramp portion **43b**. Upon further displacement of the drawer **30** along the axis **X** to its open position, as shown in Fig. 5D, the following portion **73b** engages the ramp portion **43b** and slides along its length. Due to the inclined structure of the ramp portion **43b**, the following portion **73b**, and consequentially the entire blocking mechanism **70** is urged to displace in the upward direction towards the blocked state of the blocking mechanism **70**. As

shown in Fig. 5E, the following portion **73b** has passed the ramp portion **43b**, and as a result of that, the blocking mechanism **70** is disposed in its blocked state. In this state of the blocking mechanism **70**, the blocking-following member **71c** is arresting the drawer **50** in its closed position. A detailed explanation of the blocked state of the blocking mechanism **70** is provided below. Further displacement of the drawer **30** from its position in Fig. 5E to its open position in Figs. 6A and 6B does not influence on the blocking mechanism **70**, which is already in its blocked state.

Reference is now made particularly to Fig. 5B, in which the following distances are used:

W_1 – the width of the blocking following member **72**;

W_2 – the distance between the projection of the restricting member **42** on the first straight portion **43a** and the lower end **45**;

W_3 – the distance between the blocking portion **72b** and the lower end **45**; and

W_4 – the length of a horizontal portion **42'** of the restricting portion **42**.

As seen in Fig. 5B, since W_1 is smaller than W_2 ($W_1<W_2$), during its sliding along the first straight portion **43a** along a distance of W_4, the blocking-following member **71b** is able to pass by the restricting portion **42,** and particularly its horizontal portion **42'**, before engaging the lower end **45** and starting to vertically displace in the upward direction. Only after passing by the restricting portion **42** and engaging the ramp portion **43b**, the blocking-following member **71b** starts to vertically displace in the upward direction together with the entire blocking mechanism **70**. Thus, since the blocking portion **72b** is disposed behind the restricting portion **42**, the blocking mechanism in its blocked state arrest the drawer **30** in its closed position.

In addition to the open and the closed positions of the drawers **30** and **50**, these drawers also have an intermediate position in which the drawer projects from the housing to an extent greater than in the closed position and smaller than in the open position, while the blocking mechanism **70** is still in its unblocked state.

The maximal extent to which the drawers can be displaced and still be in the intermediate position is defined by the distance W_3, which is shown in Fig. 5B.

Since the displacement of the drawer **30** to its intermediate position does not entail displacement of the blocking mechanism **70**, the drawer **50** which is not arrested in its closed position, can also be displaced to its intermediate position. The intermediate distance W_3 can be such that when all the drawers of the cabinet, i.e., the

drawer **30** and the drawer **50** are in their intermediate position, there is no danger of tipping over of the cabinet.

It should be indicated that in the intermediate position of the drawer **30**, the blocking mechanism **70**, and particularly its following portion **73b**, rests on the first straight portion **43a** of the guiding portion **43**. In this position, the gravity forces which are constantly applied on the blocking mechanism **70** will not cause any displacement of the blocking mechanism **70** in the downward direction. Therefore, the drawer **30** will not be displaced from this position due to the existence of these gravity forces.

When the displacement of the drawer **30** from its closed position is stopped in a position in which the following portion **73b** rests on the ramp portion **43b**, the gravity forces that are constantly applied on the blocking mechanism **70** may cause the blocking mechanism **70** to move in the downward direction, thereby causing the following portion **73b** to slide on the ramp portion **43b** towards the first straight portion **73a** which in turn will entail displacement of the drawer **30** to its intermediate or closed position.

When the displacement of the drawer **30** from its closed position is stopped in a position in which the following portion **73b** rests on the second straight portion **43c,** the gravity forces that are constantly applied on the blocking mechanism **70** will not cause any displacement of the blocking mechanism **70** in the downward direction. Therefore, the drawer **30** will not be displaced from this position due to the existence of these gravity forces.

Reference is now made to Figs. 7A, 7B, 8A and 8B in order to describe the mechanical association between the blocking mechanism **70** and the drawers **30** and **50** when the drawer **30** is in its open position and the drawer **50** is arrested in its closed position by the blocking mechanism **70**.

In the blocked state of the blocking mechanism **70**, when the drawer **30** is in its open position, the blocking portion **72c** is aligned with the restricting portion **62** so that during an attempt to displace the drawer **50** from its closed position to its open position, the blocking portion **72c** engages the restricting portion **62** to thereby obstruct the drawer **50** and prevent its displacement to its open position.

Upon displacement of the drawer **30** back to its closed position, the blocking mechanism reverts to its unblocked state by virtue of gravity forces and the operation of the biasing arrangement **79** which tends to revert to its original shape and thereby bias the blocking mechanism **70** to its unblocked state.

Attention is now directed to Figs. 9A to 10E, 14A and 14B of the drawings illustrating a cabinet in accordance with another example of the presently disclosed subject matter, generally designated **301**. The cabinet **301** comprises a housing **310** and two storage units in the form of drawers, including a lower drawer **330** and an upper drawer **350**, each accommodated within the housing **310** and slidingly displaceable between a closed position in which the drawer is disposed within the housing **310** and an open position in which the drawer projects from the housing **310**. The drawers **330** and **350** are vertically stacked within the housing **310** along a vertical axis **Y**. In Figs. 9A and 9B, the drawers **330** and **350** are in their closed position, and in Figs. 14A and 14B, the drawer **330** is in its open position and the drawer **350** is in its closed position.

As shown in Fig. 10E, the housing **310** has a base section **312** with a base rim **313**, a top section **314** with a top rim **315**, a right sidewall **316**, a left sidewall **318**, a front frame **320** with an opening therein and a rear wall **322**. The front frame **320** has a right front edge **319** and a left front edge **321**. The housing **310** further has a housing cavity **323** defined by the base section **312**, the top section **314**, the sidewalls **316** and **318**, and the walls **320** and **322**. The housing cavity **323** is configured to accommodate the drawers **330** and **350** therein.

It is appreciated that the number of the drawers is not limited to two. An example of a cabinet with three drawers in presented in Fig. 18A. According to the present example, the drawer **330** occupies a space of two drawers, each having dimensions similar to those of the drawer **350**.

As shown in Fig. 10A, the drawer **330** has a front wall **332**, a rear wall **334**, a right sidewall **336**, a left sidewall **338** and a base section (not seen). The front and rear walls **332** and **334**, the right and left sidewalls **336** and **338**, and the base section of the drawer **330** define together a cavity **331** configured for accommodating work tools and appliances. The right sidewall **336** has a right exterior surface **337** and the left sidewall **338** has a left exterior surface **339**.

As shown in Figs. 10C, the drawer **350** has a front wall **352**, a rear wall **354**, a right sidewall **356**, a left sidewall **358** and a base section **360**. The front and rear walls **352** and **354**, the right and left sidewalls **356** and **358**, and the base section 3**60** define together a cavity **351** configured for accommodating work tools and appliances. The right sidewall **356** has a right exterior surface **357** and the left sidewall **358** has a left exterior surface **359**.

Each of drawers **330** and **350** is slidingly displaceable with respect to the housing **10** by two slide mechanisms interconnecting each drawer to the housing **10**. Each of the two slide mechanisms is a full-extension mechanism being disposed at a respective sidewall of each drawer.

Reference is now made to Figs. 9A to 14B in which the cabinet **301** is illustrated with a locking mechanism **390** disposed therein, in accordance with another aspect of the presently disclosed subject matter. The locking mechanism **390** is disposed within the housing **310** in proximity to the right front edge **319**, between the right sidewall **316** of the housing **310** and the right sidewalls **336** and **356** of the drawers **330** and **350**. The locking mechanism **390** is mechanically associated with the drawers **330** and **350** for controlling the ability of a user to open at least one of the drawers **330** and **350** of the cabinet **301**. This control allows selectively arresting all the drawers of the cabinet **301**, i.e., the drawers **330** and **350**, in their closed position and respectively releasing the drawers **330** and **350** from their arrested position, and thereby allowing each one of the drawers to be displaced to its open position.

As shown in Figs. 11, 12A, 12B, 13A and 13B, the locking mechanism **390** is a single-molded elongate member oriented within the housing **310** along the vertical axis **Y**. The locking mechanism **390** has three locking members **391**, **392** and **393**, each associated with its corresponding drawer (if accommodated within the housing **310**) for selectively arresting the drawers **330** and **350** in their closed position, and respectively allowing the drawers **330** and 350 to be displaced to their open position. The locking member **392** is associated with the drawer **330**, the locking member **393** is associated with the drawer **360**, and the locking member **391** is not associated with any specific drawer since the drawer **330** has a double depth as mentioned above. The locking members **391**, **392** and **393** are integrally formed with the locking mechanism **390** and constitute a portion thereof.

The locking mechanism **390** is vertically displaceable along the axis **Y** between an upward locked state (shown in Figs. 12A, 12B, 13A and 13B) in which the drawers **330** and **350** of the cabinet **301** are arrested in their closed position by their corresponding locking members **392** and **393**, and a downward unlocked state (shown in Figs. 15A, 15B, 16A and 16B) in which each of the drawers **330** and **350** of the cabinet **301** is free to be displaced from its closed position to its open position.

The locking mechanism **390** further comprises a stopping element **388** protruding therefrom. When the locking mechanism **390** is displaced to its upward locked state, the stopping element **388** is configured to be received in a corresponding first cavity (not shown) formed within the housing **310**, and thereby to be stopped at the locked state. This function of the stopping element **388** will prevent from gravity forces to displace the locking mechanism to its downward unlocked state. When the locking mechanism **390** is displaced to its unlocked state, the stopping element **388** is configured to be received in a corresponding second cavity (not shown) formed within the housing **310**, and thereby to be stopped at the unlocked state. When the stopping element **388** is received within the first and the second cavities, the user may feel or hear a 'click', which can provide indication and feedback regarding the state of the locking mechanism **390**.

As shown in Figs. 10A, 10B, 13A and 13B, the drawer **330** has an arresting portion **344** which is configured to be mechanically associated with the locking member **392** by arresting this drawer in its closed position, and the drawer **350** has an arresting portion **364** (shown in Fig. 13B) which is configured to be mechanically associated with the locking member **393** by arresting this drawer in its closed position. The arresting portions **344** and **364** protrude from the right exterior surfaces **337** and 3**57**, respectively, towards the right sidewall **316** of the housing **310**, and particularly towards to locking mechanism 3**90**.

According to Fig. 13B, the locking members **391**, **392** and **393** are disposed along a third plane which passes through line **CC** and which is parallel to the front frame **320** of the housing **310**, and the arresting portions **344** and **364** are disposed along a fourth plane which passes through line **DD** and which is parallel to the third plane. The third plane is closer to the front frame **320** than the fourth plane, and both planes are disposed in proximity to the front frame **320**.

As shown in Fig. 13B, in which the locking mechanism **390** is in its locked state, the mechanical association between the arresting portions **344** and **364** and the locking members **392** and **393** is such that the locking members **392** and **393** are aligned with their corresponding arresting portions **344** and **366**. In this position of the locking mechanism **390**, during an attempt to displace one of the drawers **330** and **350** from its closed position to its open position, the corresponding locking member **392** or **393**

engages the corresponding arresting portion **344** or **364** to thereby obstruct the drawer and prevent displacement thereof to its open position.

Reference is now made particularly to Figs. 15A, 15B, 16A, 16B, 17A and 17B, in which the locking mechanism **390** is displaced to its unlocked state, allowing any one of the drawers **330** and **350** to be displaced to its open position. According to the particular example of these figures, the drawer **330** is displaced to its open position.

In the unlocked state of the locking mechanism **390**, this mechanism is vertically displaced in a downward direction, thereby causing the locking members **392** and **393** to be misaligned with the arresting portions **344** and **364** and to be disposed under these portions. This disposition of the locking members **392** and **393** with respect to the arresting portions **344** and **364** allows any of the drawers to be displaced to its open position without engaging its corresponding locking member. As shown for example in Fig. 16B, the drawer **330** is displaced to its open position by to the fact that the locking member 3**92** was misaligned with its arresting portion **344**. Due to the existence of the blocking mechanism **370** in the cabinet **301**, only if the drawer **330** will be displaced to its closed position, the drawer **350** will be allowed to be displaced to its open position since the arresting portion **364** is misaligned with the locking member **393**.

Reference is now made to Figs. 9A, 11, 17A and 17B in which further elements of the locking mechanism **390** are presented. The locking mechanism **390** has an actuator **394** configured for displacing the locking mechanism between its unlocked state and its locked state. The actuator has an actuator cavity **395** configured to accommodate at least one finger of a user for allowing him to displace the locking mechanism between its unlocked state and its locked state. The right front edge **319** has an actuator window **324** configured for providing access to the actuator cavity **395**. The actuator **394** has an upward state corresponding to the locked state of the locking mechanism **390** and a downward state corresponding to the unlocked state of the locking mechanism **390**.

As shown in Fig. 17A, in which the locking mechanism **390** is disposed in its locked state, the actuator cavity **395** is disposed in its upward state. In order to displace to locking mechanism **390** to its unlocked state, the user can apply a downwardly directed pushing force on the actuator **394** and against the stopping element **388** which is received within the first cavity. This will result in displacement of the locking mechanism **390** to its unlocked state which is shown in Fig. 17B.

The actuator **394** is configured with an indicating member 3**96** (shown in Fig. 11), visible via an indicating window **325** (shown in Figs. 17A and 17B) formed within the right front edge **319** of the housing **310**, and configured for indicating the state in which the locking mechanism **390** is disposed to the user. The indicating member **396** has a first portion **397** with a first color associated with the locked state of the locking mechanism **390**, and a second portion **398** with a second color associated with the unlocked state of the locking mechanism **390**. The indicating window **325** is configured to provide visual indication of one of the first and the second portions **397** and **398** at a time, thereby indicating respectively the state at which the locking mechanism **90** is disposed. It should be appreciated that indication by means other than color can be applied. These means can include text, touch, etc.

In Fig. 17A it is shown that the first portion **397** is visible via the indicating window **325**, and in Fig. 17B it is shown that the second portion **398** is visible via the indicating window **325**.

The locking mechanism **390** further includes a securing member **399** protruding therefrom and formed with a securing recess **389** therein. The right front edge **319** of the housing 3**10** is formed with an elongate opening **326** configured for receiving therethrough the securing member **399**. The elongate opening **326** is formed with a raised rim **327** extending about the opening, and being formed with a locking recess **328**.

As shown in Fig. 17A, in the locked state of the locking mechanism **390**, the locking recess **328** is aligned with the securing recess **389**, so that a shackle **309** of a lock **308** can be received through the locking recess **328** and the securing recess **389** so as to fix the locking mechanism **390** in its locked state.

As shown in Fig. 17B, in the unlocked state of the locking mechanism **390**, the locking recess **28** is misaligned with the securing recess **389**, so that the shackle **309** cannot be received within the locking recess **328** and the securing recess **389** at the same time because the rim **327** obstructs a portion of the securing recess **389**. The In this position, the lock **308** cannot be used for fixing the locking mechanism in its unlocked state.

Reference is now made to Figs. 18A to 24B, in which modular assembly **100** of cabinets illustrated, in accordance with another aspect of the presently disclosed subject matter.

The modular assembly **100** includes the cabinet **1**, a cabinet **101** and a support structure **201** which are modularly stacked on each other, while the support structure **201** provides support to the whole assembly. In general, the modular assembly **100** can include more than two cabinets which can be modularly stacked on each other, while the lowermost cabinet is disposed on the support structure **201**.

The cabinet **1** comprises the housing **10** and the two drawers **30** and **50**. As described above with reference to Fig. 2E, the housing **10** has the following elements: the base section **12** with the base rim **13**, the top section **14** with the top rim **15**, the right sidewall **16**, the left sidewall **18**, the front frame **20** and the rear wall **22**.

The housing **10** further comprises two upper latching mechanisms and two lower latching mechanisms. The upper latching mechanisms include a right upper latching mechanism (not seen) and a left upper latching mechanism **160**, and the lower latching mechanisms include a right lower latching mechanism (not seen) and a left lower latching mechanism **170**. The right upper latching mechanism of the housing **10** is formed within the right sidewall **16** and partially in the top rim **15**. The left upper latching mechanism **160** is formed within the left sidewall **18** and partially in the top rim **15**. The right lower latching mechanism of the housing **10** is formed within the right sidewall **16** and partially in the bottom rim **13**. The left lower latching mechanism **170** is formed within the left sidewall **18** and partially in the bottom rim **13**.

The cabinet **101** comprises a housing **110** (shown in Fig. 19) which is similar in its structure to the housing **10,** with three storage units in the form of drawers **130**, **140** and **150** accommodated therein. As shown in Fig. **19**, the housing **110** has a base section **112** with a base rim **113**, a top section **114** with a top rim **115**, a right sidewall **116**, a left sidewall **118**, a front frame **120** with an opening therein and a rear wall **122**.

The housing **110** further comprises two upper latching mechanisms and two lower latching mechanisms. The upper latching mechanisms include a right upper latching mechanism **151** (shown in Fig. 19) and a left upper latching mechanism **180**, and the lower latching mechanisms include a right upper mechanism **141** (shown in Fig. 19) and a left lower latching mechanism **190**. The right upper latching mechanism of the housing **110** is formed within the right sidewall **116** and partially in the top rim **115**. The left upper latching mechanism **180** is formed within the left sidewall **118** and partially in the top rim **115**. The right lower latching mechanism of the housing **110** is formed within the right sidewall **116** and partially in the bottom rim **113**. The left lower

latching mechanism **190** is formed within the left sidewall **118** and partially in the bottom rim **113**. When the cabinets **1** and **101** are stacked on each other, their front wall, rear wall and sidewalls are generally coplanar with each other.

As shown in Figs. 18A and 22A, the support structure **201** is constituted by two support members, including a right support member **202** and a left support member **204**, each configured to be latched under its respective sidewall of the lowermost cabinet of the assembly. According to the present example, the lowermost cabinet is constituted by the cabinet **1**.

The right support structure **202** has a housing **210** and the left support structure **204** has a housing **260**. The housing **210** has a base section **212**, a top section **214** with a top rim **215**, a right sidewall (not seen) and a left sidewall **218**. The housing **260** has a base section **262**, a top section **264** with a top rim **265**, a right sidewall (not seen) and a left sidewall **268**.

The top section **214** has two support connecting portions **281** and **282** extending therefrom, and the top section **264** has two support connecting portions **283** and **284** extending therefrom. Each of the support connecting portions **281**, **282**, **283** and **284** is configured to be received within a corresponding cabinet connecting portion (not seen) formed within the bottom sections **12** and **112** for selectively disposing the cabinets **1** and **101** on the support structure **201**.

The support connecting portions **281**, **282**, **283** and **284** are constituted by protruding element, and the cabinet connecting portions are constituted by corresponding recesses configured to receive the protruding elements.

The right support member **202** has two wheels **205** and **206** mounted to the base section **212**, and the left support member **204** has two wheels **207** and **208** mounted to the base section **262**. The wheels **205**, **206**, **207** and **208** are for allowing displacement of the assembly from place to place.

The support structure **201** includes two support latching mechanisms, including a right support latching mechanism (not seen) disposed in the right support member **202**, and a left support latching mechanism **270** disposed in the left support member **204**. The right support latching mechanism of the housing **210** is formed within the right sidewall of the housing **210** and partially in the top rim **215**. The left support latching mechanism **270** is formed within the left sidewall **268** and partially in the top rim **265**.

The modular assembly **100** of cabinets allows selectively stacking the cabinets **1** and **101** on each other and on the support structure **201** so that each one of the cabinets is latched to its neighboring cabinet by corresponding upper and lower latching mechanisms while the lowermost cabinet of the modular assembly is latched to the support structure by the corresponding lower latching mechanisms which is latched to the support latching mechanisms. In other words, the cabinets **1** and **101** can be stacked on top of each other such that in one configuration the cabinet **1** is disposed on the cabinet **101** and latched thereto, and in another configuration, the cabinet **101** is disposed on the cabinet **1** and latched thereto. In addition, the lowermost cabinet of the assembly can be latched to the support structure **201** by using the same latching mechanism of the lowermost cabinet which is used for latching this cabinet to another cabinet, as detailed below.

As shown in Fig. 18A, the base rim **113** of the cabinet **101** correspond in shape and size to the top rim **15** of the cabinet **1**, so that the base rim **113** rests on the top rim **15**. It should be indicated that the base rim **13** of the cabinet **1** corresponds in shape and size to the top rim **115** of the cabinet **101**, so as to allow the cabinet **1** to be modularly stacked on the cabinet **101**.

In addition, the base rim **13** correspond in shape and size to the support rim **265,** so that the base rim **13** rests on the the support rim **265**. It should be indicated that the base rim **113** also correspond in shape and size to the support rim **265,** so as to allow the base rim **113** rests on the the support rim **265** when the cabinet **101** is disposed on the support structure **201**.

As further shown in Fig. 18A, the left lower latching mechanism **190** of the cabinet **101** is latched to the left upper latching mechanism **160** of the cabinet **1**, and the left lower latching mechanism **170** of the cabinet **1** is latched to the left support latching mechanism **270** of the support structure **201**. Although it is not seen in Fig. 18A, the right lower latching mechanism **141** of the cabinet **101** is latched to the right upper latching mechanism of the cabinet **1**, and the right lower latching mechanism of the cabinet **1** is latched to the right support latching mechanism of the support structure **201**.

It is appreciated that the cabinets **1** and **101** can be replaced with each other, so that the cabinet **1** is stacked on the cabinet **101** and latched thereto, and the cabinet **101** is stacked on the support structure **201** and latched thereto by its right and left lower latching mechanisms of the cabinet **101** and the support latching mechanisms.

Reference is now made to Figs. 20A and 20B to describe the structure of the left upper latching mechanism **160**, which is similar in its structure to the left upper latching mechanism **180** and to the right upper latching mechanisms of the cabinets **1** and **101**. Due to this similarity, the description below with respect to left upper latching mechanism **160** is relevant to the other upper latching mechanisms as well.

The left upper latching mechanism **160** is a detachably attachable unit having a front surface **161** and a rear surface **162**. The rear surface **162** includes two fixing members **163** and **164**, each of which is configured to be received within its corresponding cavity within the left wall **118**. One example of such a cavity is shown in Fig. 19, and designated as **166**. The cavity **166** is configured for receiving a fixing member of the left upper latching mechanism **180**. Fig. 19 illustrates the way in which the left upper latching mechanism **180** can be mounted to the left sidewall **118**.

The front surface **161** has a recess **167** formed therein with two catch members **168** and **169**, each configured for selectively engaging with a corresponding portion of the lower latching mechanism **190**.

The right and the left upper latching mechanisms of the cabinets **1** and **101** can be further used as gripping members for allowing a user to grip the respective cabinet and raise it. In this case, the recess which is formed within the respective upper latching mechanism, such as the recess **167**, can be used for accommodating the user's fingers when being gripped.

It should be indicated that the left and the right upper latching mechanisms are attachable to the cabinets **1** and **101** is a lateral direction, so as to support the weight of the cabinet when griped and raised by a user. The attachment in the lateral direction is provided by the direction of the fixing members **163** and **164** and their respective cavities, which is along the axis **X**. Since the axis **X** is perpendicular to the axis **Y** in which the cabinet is raised, the support to the weight of the cabinet is provided.

Reference is now made to Figs. 19, 21A and 21B to describe the structure of the left lower latching mechanism **190**, which is similar in its structure to the left lower latching mechanism **170** and to the right lower latching mechanisms of the cabinets **1** and **101**. Due to this similarity, the description below with respect to left lower latching mechanism **190** is relevant to the other lower latching mechanisms as well.

The left lower latching mechanism **190** is constituted by a latch member **191** (shown in Figs. 21A and 21B), a latch recess **192** (shown in Fig. 19) formed within the

sidewall **118**. The latch member **191** is a pivotally rotatable member having two pivoting elements **193** and **194**, disposed at the upper end of thereof. The pivoting elements **193** and **194** are configured to be received within corresponding cavities formed in the latch recess **192**. One example of such a cavity is shown in Fig. 19, and designated as **195**. When the latch member **191** is mounted within the latch recess **192,** the pivoting element **194** is configured to be received in the cavity **195**. The latch member **191** has two tongues **196** and **197** disposed at the lower end thereof. When the left lower latching mechanism **190** is engaged with the left upper latching mechanism **160**, the latch member **191** is rotated towards the recess **167**, so that the tongue **196** is received within the catch member **169**, and the tongue **197** is received within the catch member **168,** thereby latching the left lower latching mechanism **190** to the left upper latching mechanism **160** .

As shown in Fig. 22B, the left support latching mechanism **270** has a support recess **271** formed therein with two catch members **272** and **273**, each configured for selectively engaging with a corresponding tongue of the left lower latching mechanism **170**. According to another example, in which the cabinet **101** is the lowermost cabinet, the left lower latching mechanism **190** is engaged and latched with the left support latching mechanism **270** by the tongue **196** which is received within the catch member **272** and by the tongue **197** which is received within the catch member **273**.

Turning now to Figs. 18B and 18C, which summarizes the manner according to which the latching mechanisms of the left side of the modular assembly **100** are latched to each other. Fig. 18B illustrates the latching of the left lower latching mechanism **190** to the left upper latching mechanism **160**. In this figure it is shown that the two tongues of the latch member **191** are received within their corresponding catch members. Fig. 18C illustrates the latching of the left lower latching mechanism **170** to the left support latching mechanism **270**. In this figure it is shown that the two tongues of the latch member of the left lower latching mechanism **170** are received within their corresponding catch members **272** and **273**.

Although not detailed above, the latching mechanisms of the right side of the modular assembly **100** are latched to each other in a similar manner at those of the left side.

Reference is now made particularly to Figs. 23A to 24B, which illustrate another example of a cabinet **401**. The cabinet **401** can be modularly integrated within the

modular assembly of the presently disclosed subject matter, and in particular to be stacked above or below each one of the cabinets **1** and **101**, or above the support structure **201**. As part of the modular assembly, the cabinet **401** can also be stacked with another cabinet which is similar the cabinet **401**.

The cabinet **401** comprises a housing **410** which is similar in its exterior structure to the housings **10** and **110** with three storage units in the form of assortment boxes **430**, **440** and **450** accommodated therein. The housing **410** has a base section with a base rim **413**, a top section **414** with a top rim **415**, a right sidewall (not shown), a left sidewall **418**, a front frame **420** with an opening therein and a rear wall **422**.

The housing **410** further comprises two upper latching mechanisms and two lower latching mechanisms. The upper latching mechanisms include a right upper latching mechanism (not shown) and a left upper latching mechanism **480**, and the lower latching mechanisms include a right upper mechanism (not shown) and a left lower latching mechanism **490**. The right upper latching mechanism of the housing **410** is formed within the right sidewall and partially in the top rim **415**. The left upper latching mechanism **480** is formed within the left sidewall **418** and partially in the top rim **415**. The right lower latching mechanism of the housing **110** is formed within the right sidewall and partially in the bottom rim **413**. The left lower latching mechanism **490** is formed within the left sidewall **418** and partially in the bottom rim **413**.

For example, in order to connect the cabinet **401** to the cabinet **1**, when the cabinet **401** is disposed on the cabinet **1**, the right lower latching mechanism of the housing **410** has to be engaged with the right upper latching mechanism of the cabinet **1** and the left lower latching mechanism **490** has to be engaged with the left upper latching mechanism **160** of the cabinet **1**.

The assortment boxes **430**, **440** and **450** are configured to be inserted into and extracted from the housing **410**. As shown in Fig. 23B, the assortment box **430** is extracted from the housing **410**.

Reference is now made to Figs. 24A and 24B, in which the assortment box **430** is illustrated. As shown in these figures, the assortment box **430** has an assortment box housing **432** and a cover **434** pivotally articulated thereto. The assortment box **430** is convertible between a closed position in which the cover **434** covers the assortment box housing **432** (shown in Fig. 24A) and an open position shown in Fig. 24B in which the cover **434** provides access to the interior of the assortment box housing **432**. The

housing **434** has a right rail (now shown) and a left rail **435** in form of a recess, which is configured to receive a corresponding elongated protruding member of the housing **410** so as to allow the assortment box **430** to slide within the housing **410**.

CLAIMS:

1. A cabinet comprising:

a housing;

two or more storage units, each accommodated within the housing and displaceable between a closed position in which a majority of the storage unit is disposed within the housing and an open position in which the storage unit projects from the housing to an extent greater than in said closed position; and

a blocking mechanism comprising two or more blocking members, each associated with its corresponding storage unit and configured for selectively arresting said corresponding storage unit in its closed position; the blocking mechanism being displaceable between an unblocked state in which each one of the storage units is free to be displaced from its closed position to its open position and a blocked state in which at least one and no more than all but one of the storage units are arrested in their closed position by their corresponding blocking members;

the association between the blocking mechanism and the storage units is such that, when said blocking mechanism is in its unblocked position, displacement of one of said storage units from its closed position to its open position induces displacement of the blocking mechanism from its unblocked state to its blocked state.

2. A cabinet according to Claim 1, wherein the association between the blocking mechanism and the storage units is further such that displacement of one storage unit from its open position to its closed position induces displacement of the blocking mechanism from its blocked state to its unblocked state.

3. A cabinet according to Claim 1 or 2, wherein the storage units comprise a restricting arrangement associated with the blocking mechanism so that in the blocked state of the blocking mechanism, the blocking mechanism obstructs the restricting arrangement, to thereby prevent displacement of the storage units from their closed position to their open position.

4. A cabinet according to Claim 3, wherein the restricting arrangement is constituted by restricting portions of the storage units, so that in the blocked state, the blocking members are aligned with the corresponding restricting portions of the storage units so that during an attempt to displace a blocked storage unit from its closed position to its open position, the blocking members are configured to engage corresponding

restricting portions of the restricting arrangement to thereby obstruct of the storage units and prevent their displacement.

5. A cabinet according to any one of the preceding claims, further comprising a following arrangement associated with the blocking mechanism and with the storage units; said following arrangement being associated with said storage units such that displacement of one storage unit from its closed position to its open position entails displacement of the following arrangement from its inoperative state to its operative state, and said following arrangement being associated with said blocking mechanism such that displacement of the following arrangement from its inoperative state to its operative state entails displacement of the blocking mechanism from its unblocked state to its blocked state.

6. A cabinet according to Claim 5, wherein the following arrangement comprises two or more following members configured for association with each of the two or more storage units respectively.

7. A cabinet according to Claim 6, wherein each of the storage units is configured with a guiding portion associated with its corresponding following member, so that during the displacement of the storage unit between its closed position and its open position, the corresponding following member slidingly engages its corresponding guiding portion, thereby changing the operative state of the following arrangement between its inoperative state and its operative state, respectively.

8. A cabinet according to Claim 7, wherein during the engagement of the following member with its corresponding guiding portion, the following member is configured to rest on the guiding portion and slide along its length.

9. A cabinet according to Claim 7 or 8, wherein each of the guiding portion is provided with a ramp portion configured to displace the corresponding following member while sliding thereon, thereby displacing the following arrangement towards its operative state, and consequentially, displacing the blocking mechanism towards its blocked state.

10. A cabinet according to any one of claims 6 to 9, wherein each said blocking member and said following member is constituted by a single blocking-following member so that a first portion of the blocking-following member constitutes the blocking member and a second portion of the blocking-following member constitutes the following member.

11. A cabinet according to Claim 10, wherein the blocking-following member is sized for passing between the corresponding restricting and guiding portions during the displacement of the storage unit between its closed position and its open position.

12. A cabinet according to Claim 10 or 11, wherein the blocking-following member has a predetermined width which, during the displacement of the storage unit from its closed to its open position, allows the blocking-following member to pass by the corresponding restricting portion before engaging a lower end of the ramp portion, so as to allow the blocking-following member to be displaced in the upper direction when sliding on the ramp portion.

13. A cabinet according to any one of the preceding claims, wherein the storage units are arranged within the cabinet along a longitudinal axis, and the blocking mechanism has an elongated shape extending along said longitudinal axis.

14. A cabinet according to Claim 13, wherein the longitudinal axis is a vertical axis along which the blocking mechanism is configured to be displaced between its blocked state and its unblocked state.

15. A cabinet according to any one of the preceding claims, wherein the blocking mechanism is normally urged into its unblocked state by virtue of gravity forces.

16. A cabinet according to any one of the preceding claims, wherein the blocking mechanism comprises a biasing arrangement configured for biasing the blocking mechanism from its blocked state towards its unblocked state.

17. A cabinet according to any one of the preceding claims, wherein the cabinet has a front wall, the blocking members are disposed along a first plane and the restricting portions are disposed along a second plane, such that the first plane is closer to the front wall than the second plane.

18. A cabinet comprising:

a housing;

one or more storage units, each accommodated within the housing and displaceable between a closed position in which a majority of the storage unit is disposed within the housing and an open position in which the storage unit projects from the housing to an extent greater than in said closed position; and

a locking mechanism configured with one or more locking members, each associated with its corresponding storage unit and configured for selectively arresting said corresponding storage unit in its closed position; the locking mechanism being

displaceable between an unlocked state in which each of the storage units is free to be displaced from its closed position to its open position and a locked state in which all the storage units are arrested in their closed position by their corresponding locking members.

19. A cabinet according to Claim 18, wherein the storage units comprise an arresting arrangement associated with the locking mechanism so that in the locked state of the locking mechanism, the locking mechanism obstructs the arresting arrangement, to thereby prevent displacement thereof from their closed position to their open position.

20. A cabinet according to Claim 19, wherein the arresting arrangement is constituted by arresting portions of the storage units; and wherein in the locked state, the locking members are aligned with respective arresting portions of the storage units so that during an attempt to displace a locked storage unit from its closed position to its open position, the locking members are configured to engage corresponding arresting portions of the arresting arrangement to thereby obstruct of the storage units and prevent their displacement.

21. A cabinet according to any one of Claims 18 to 20, wherein the storage units are be arranged within the cabinet along a longitudinal axis, and the locking mechanism has an elongated shape extending along the longitudinal axis.

22. A cabinet according to Claim 21, wherein the longitudinal axis is a vertical axis along which the locking mechanism is displaceable between its locked state and its unlocked state.

23. A cabinet according to any one of Claims 18 to 22, wherein the locking members are sized for passing beneath the corresponding arresting portions during the displacement of the storage unit between its closed position and its open position.

24. A cabinet according to any one of Claims 18 to 23, wherein the cabinet has a front wall, the locking members are disposed along a first plane and the arresting portions are disposed along a second plane, such that the first plane is closer to the front wall than the second plane.

25. A cabinet according to any one of Claims 18 to 24, wherein the locking mechanism comprises an actuator for displacing the locking mechanism between its unlocked state and its locked state.

26. A cabinet according to Claim 25, wherein the actuator has an actuator cavity configured to accommodate at least one finger of a user for allowing him to displace the locking mechanism between its unlocked state and its locked state.

27. A modular assembly of cabinets configured to be modularly stacked on each other, said modular assembly comprising:

a first cabinet and a second cabinet, each comprising a housing with a base section, a top section and sidewalls extending therebetween, at least one of the sidewalls being provided with at least one upper latching mechanism disposed closer to said top section and at least one lower latching mechanism disposed closer to said base section; and

a support structure comprising at least one support latching mechanism, the support structure being configured to be disposed under a lowermost cabinet of the assembly, so as to provide support to the assembly;

the lower latching mechanism of the first cabinet being selectively engageable with the upper latching mechanism of the second cabinet or with the support latching mechanism, and the lower latching mechanism of the second cabinet being selectively engageable with the upper latching mechanism of the first cabinet or with the support latching mechanism, thereby allowing modular latched stacking of the first cabinet, the second cabinet and the support structure to each other.

28. A modular assembly according to Claim 27, wherein the base section has a base rim and the top section has a top rim. The base rim of the first cabinet is corresponding in shape and size to the top rim of the second cabinet, so as to allow the first cabinet to be modularly stacked on the second cabinet; and wherein the base rim of the second cabinet is corresponding in shape and size to the top rim of the first cabinet, so as to allow the second cabinet to be modularly stacked on the first cabinet.

29. A modular assembly according to Claim 27 or 28, wherein the support structure has a top section and a base section, and the top section has a support top rim; and wherein the support top rim is corresponding in shape and size to the base rim of the first cabinet and to the base rim of the second cabinet, so as to allow the first cabinet or the second cabinet to be disposed on the support structure and latched thereto.

30. A modular assembly according to Claim 29, wherein the support latching mechanism is disposed closer to the support top rim than to the base section than to the base section.

31. A modular assembly according to any one of Claims 27 to 30, wherein the support structure further comprises sidewalls extending between the top section and the base section, at least one of the sidewalls of the support structure being provided with the support latching mechanism.

32. A modular assembly according to any one of Claims 27 to 31, wherein the first upper latching mechanism is similar to the second upper latching mechanism, and the first lower latching mechanism is similar to the second lower latching mechanism.

33. A modular assembly according to any one of Claims 27 to 32, wherein the lower latching mechanism comprises a latch recess formed within the respective sidewall, configured for accommodating therein a pivotally rotatable latch member.

34. A modular assembly according to Claim 33, wherein the upper latching mechanism comprises a recess formed therein with at least one catch member configured for selectively engaging with the at least one tongue of the latch member.

35. A modular assembly according to Claim 34, wherein the upper latching mechanism constitutes a gripping member configured to be gripped by a user for raising the respective cabinet, while the recess of the upper latching mechanism is used for accommodating the user's fingers therein.

36. A modular assembly according to any one of Claim 27 to 35, wherein the first and the second cabinets are similar to each other.

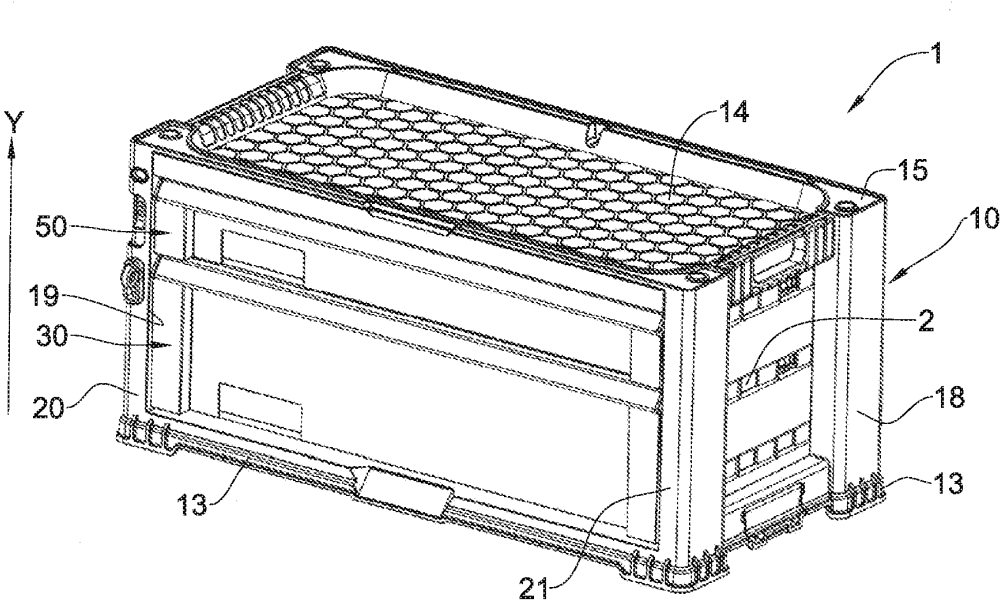


Fig. 1A

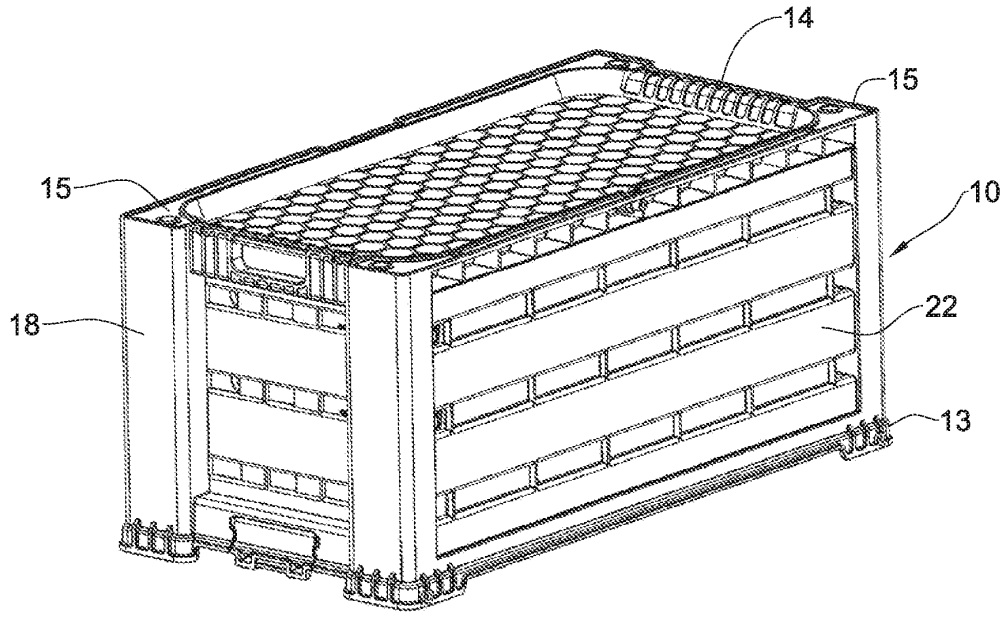


Fig. 1B

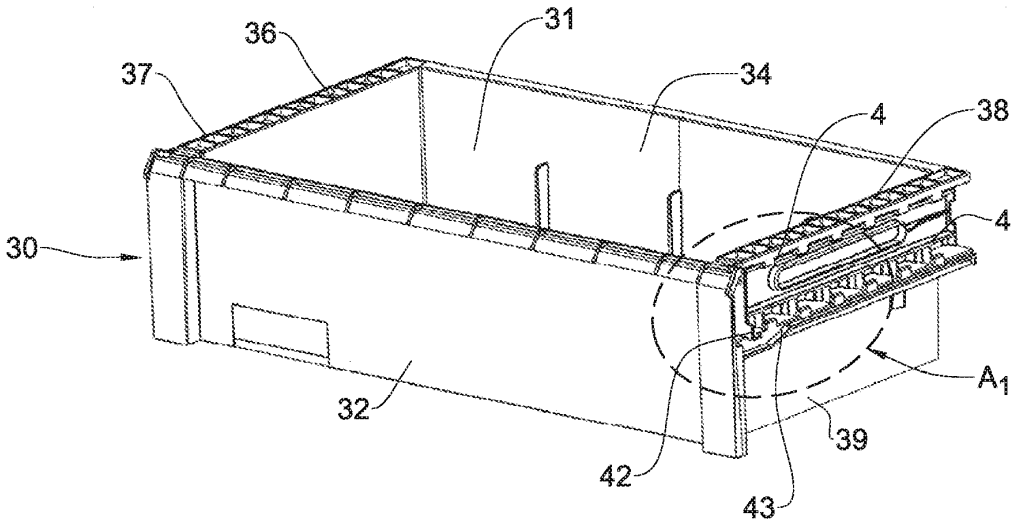


Fig. 2A

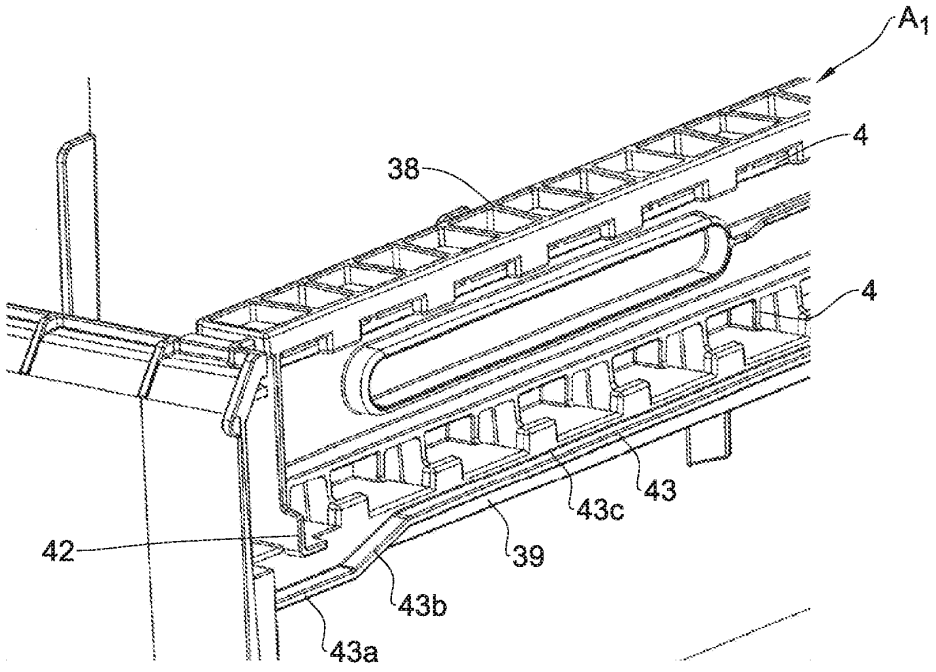


Fig. 2B

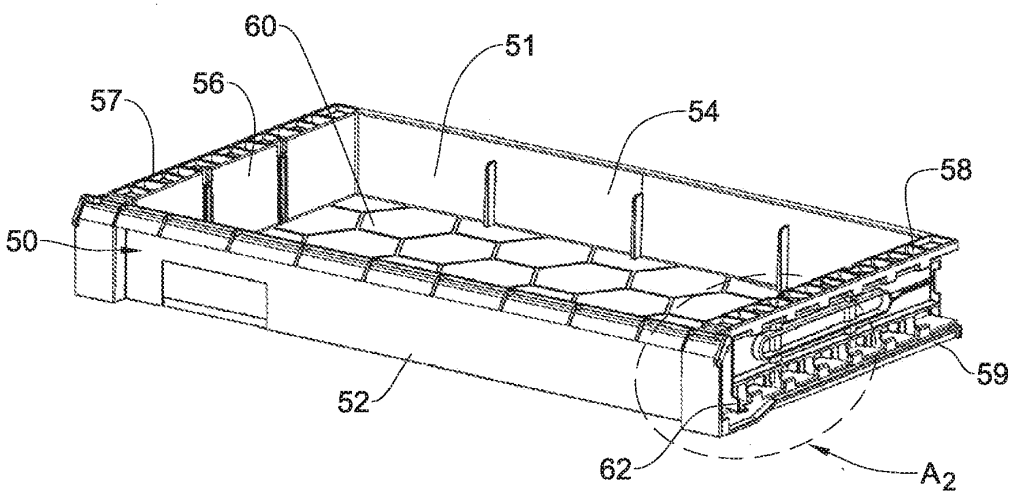


Fig. 2C

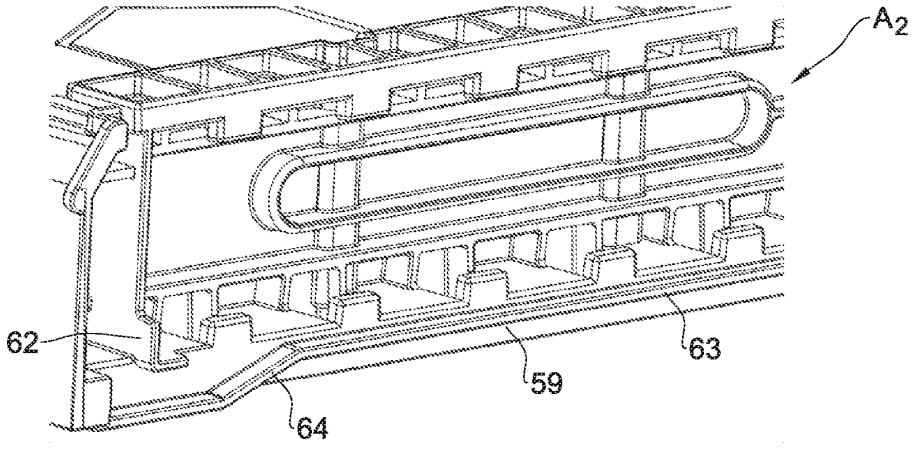


Fig. 2D

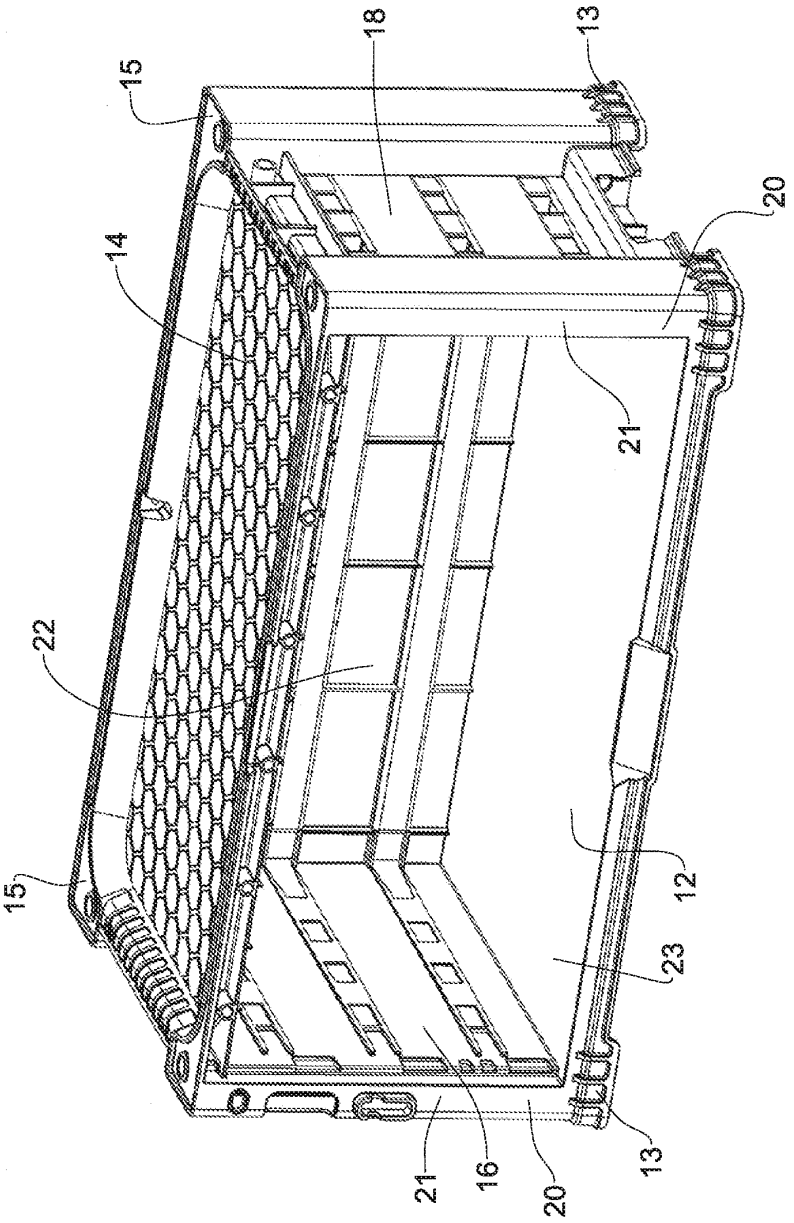


Fig. 2E

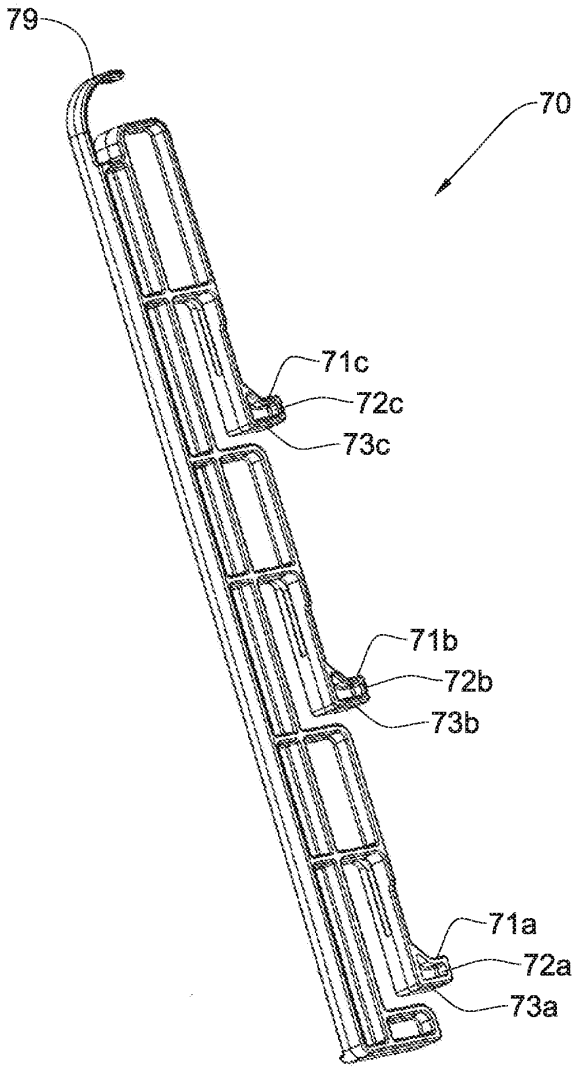


Fig. 3

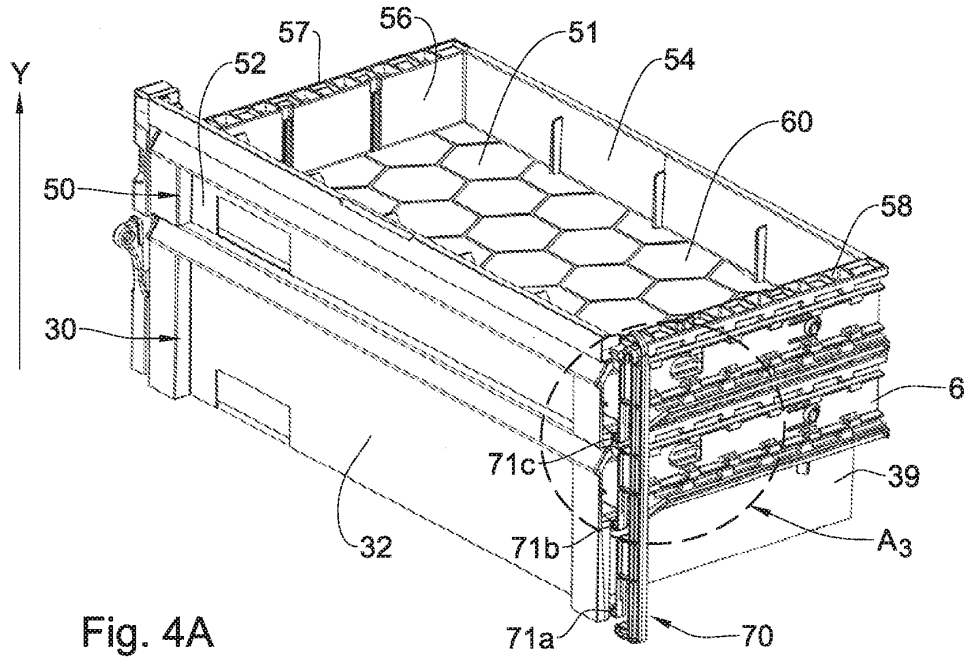

Y
57
56
51
52
54
60
50
58
30
6
71c
39
32
71b
A3
71a
70

Fig. 4A

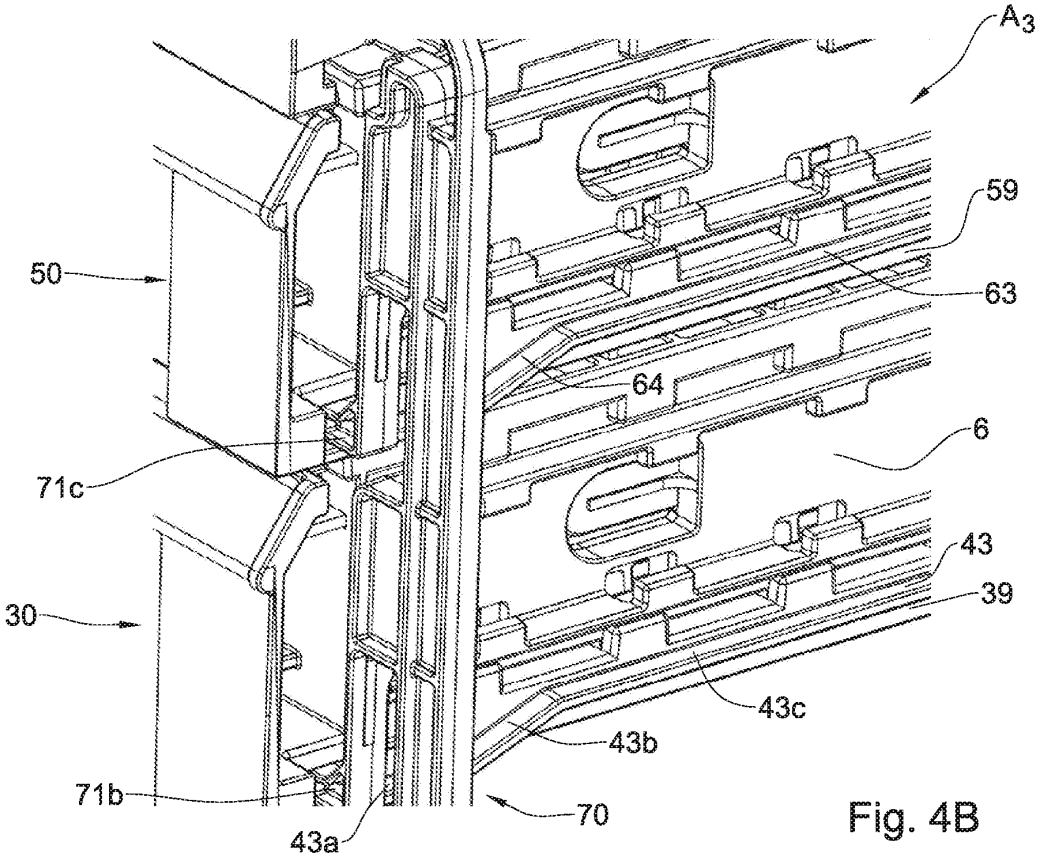

A3
59
50
63
64
6
71c
43
39
30
43c
43b
71b
70
43a

Fig. 4B

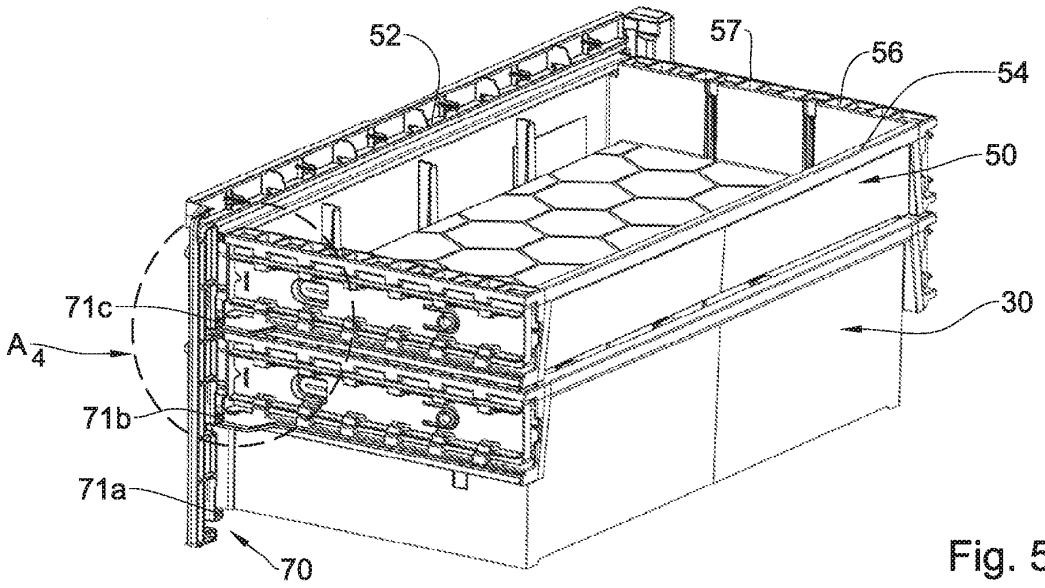

52
57
56
54
50
30
71c
A4
71b
71a
70

Fig. 5A

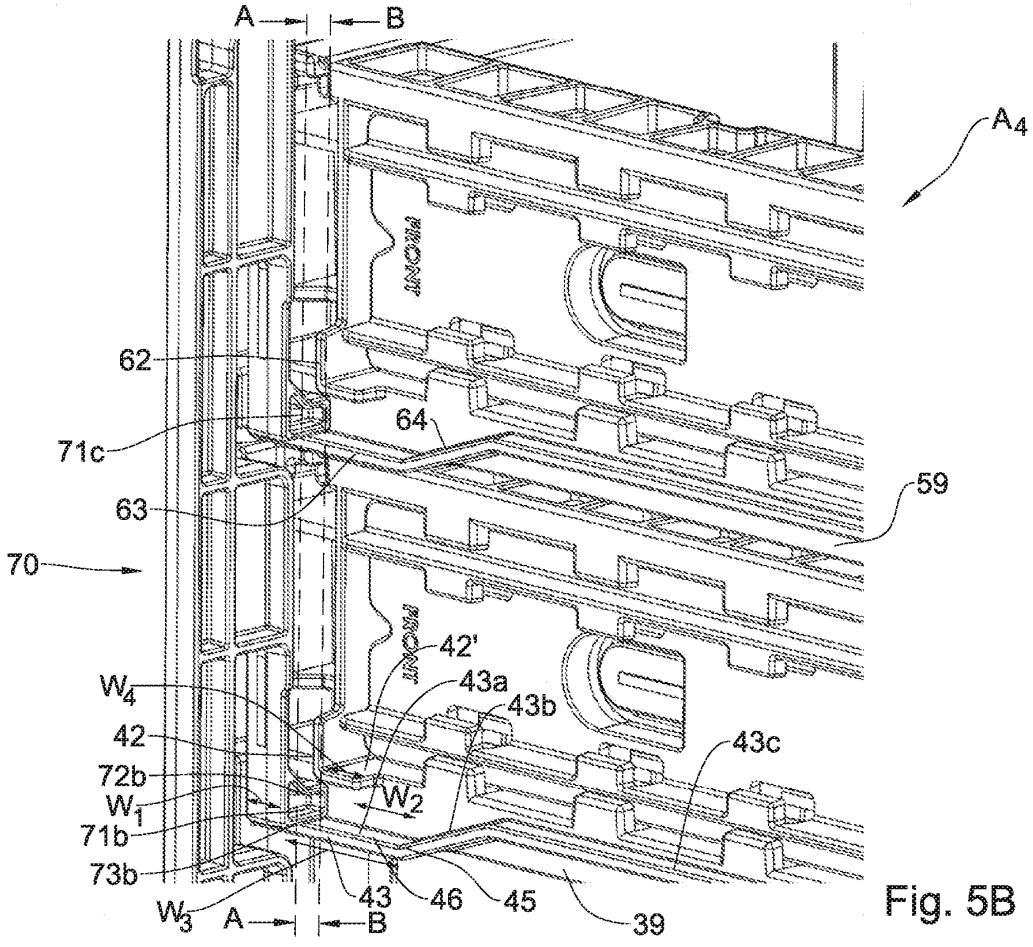

A
B
A4
62
64
71c
59
63
70
42'
W4
43a
43b
42
43c
72b
W2
W1
71b
73b
43
46
45
W3
A
B
39

Fig. 5B

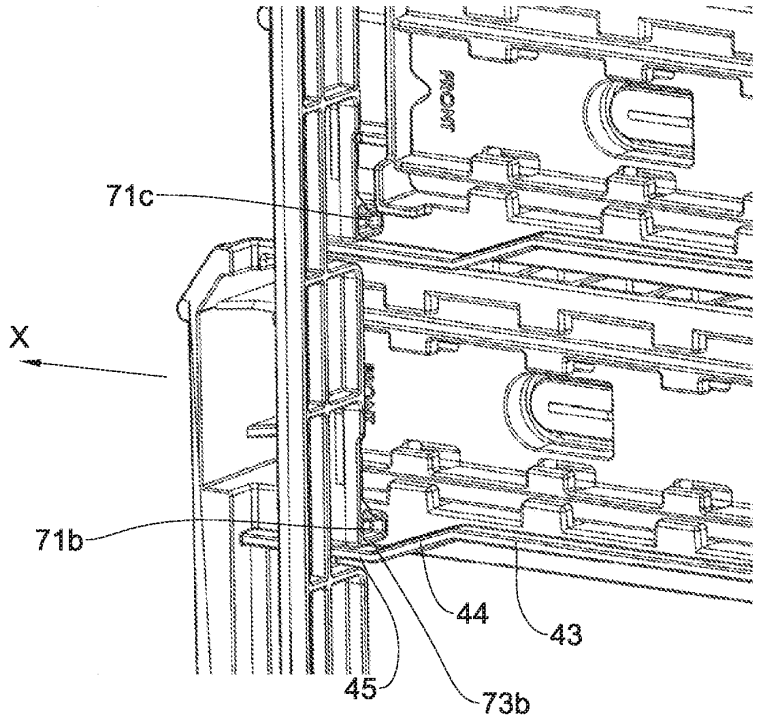


Fig. 5C

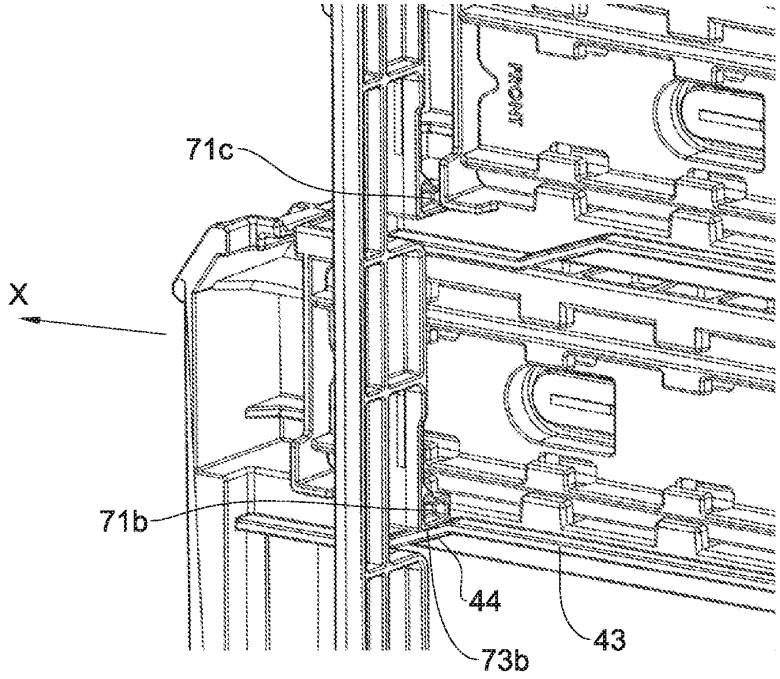


Fig. 5D

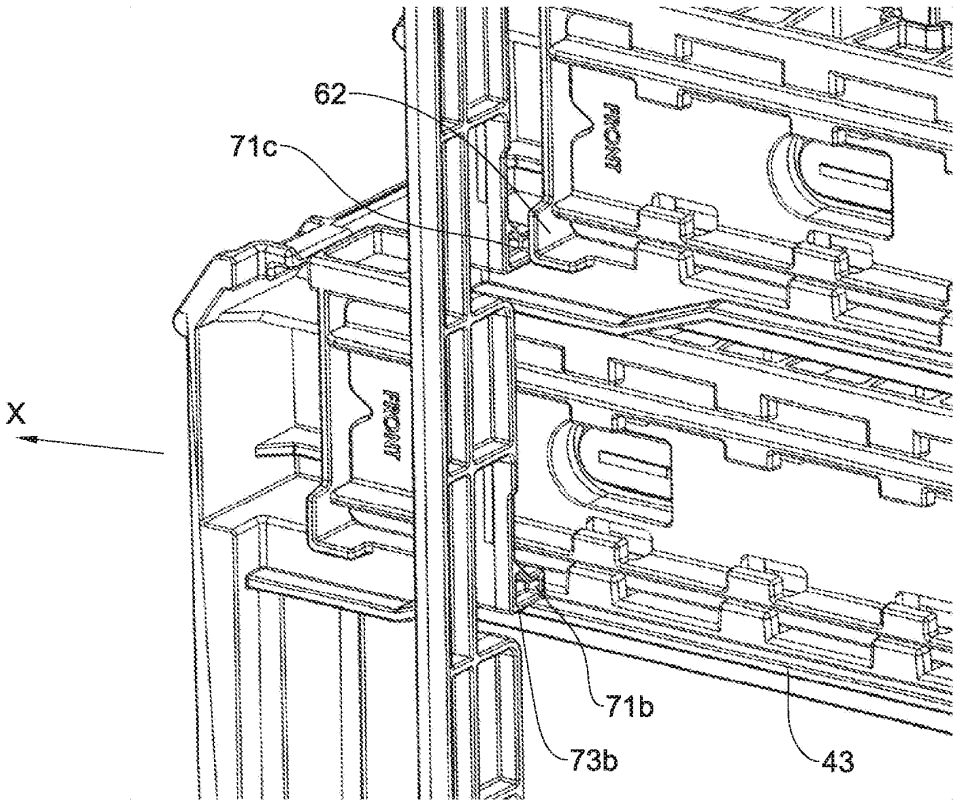


Fig. 5E

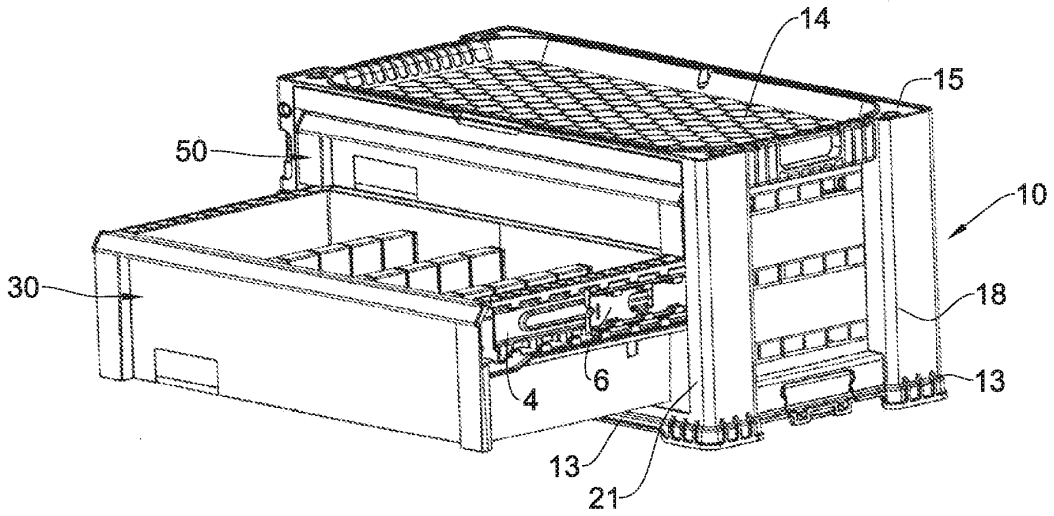


Fig. 6A

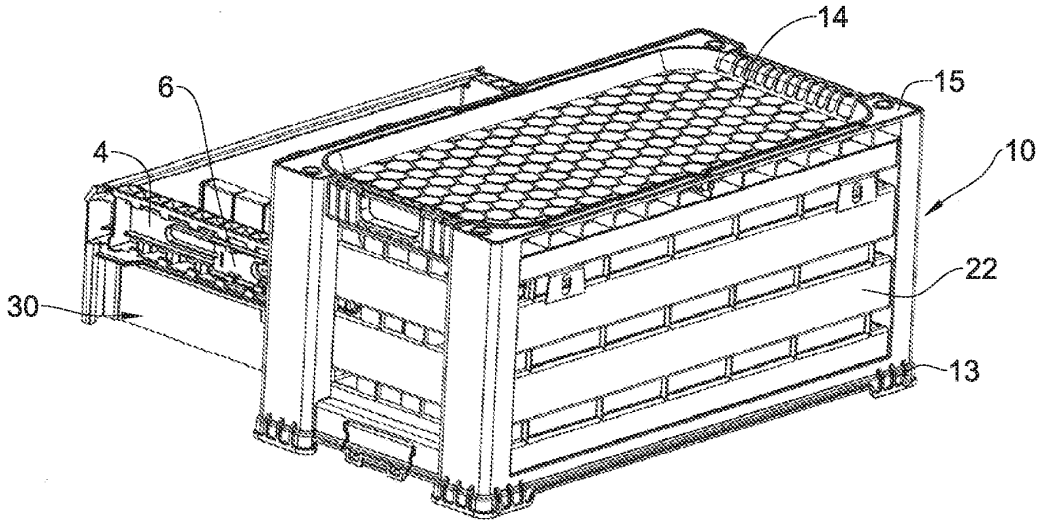


Fig. 6B

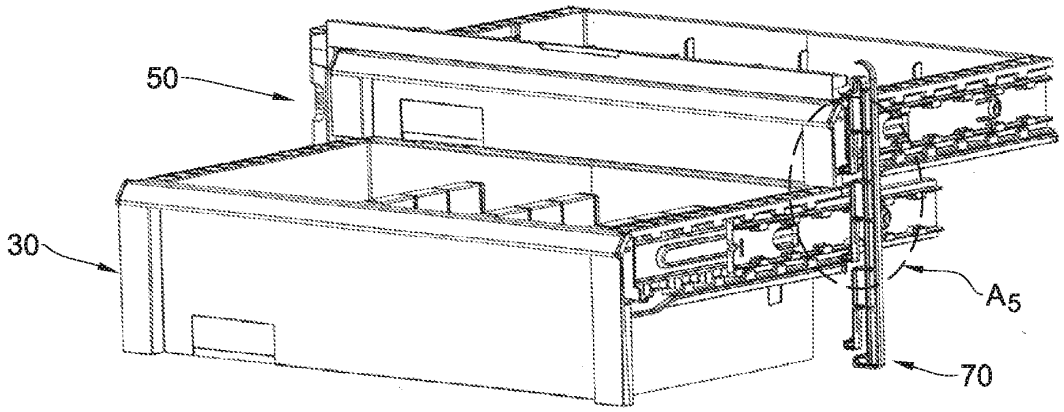


Fig. 7A

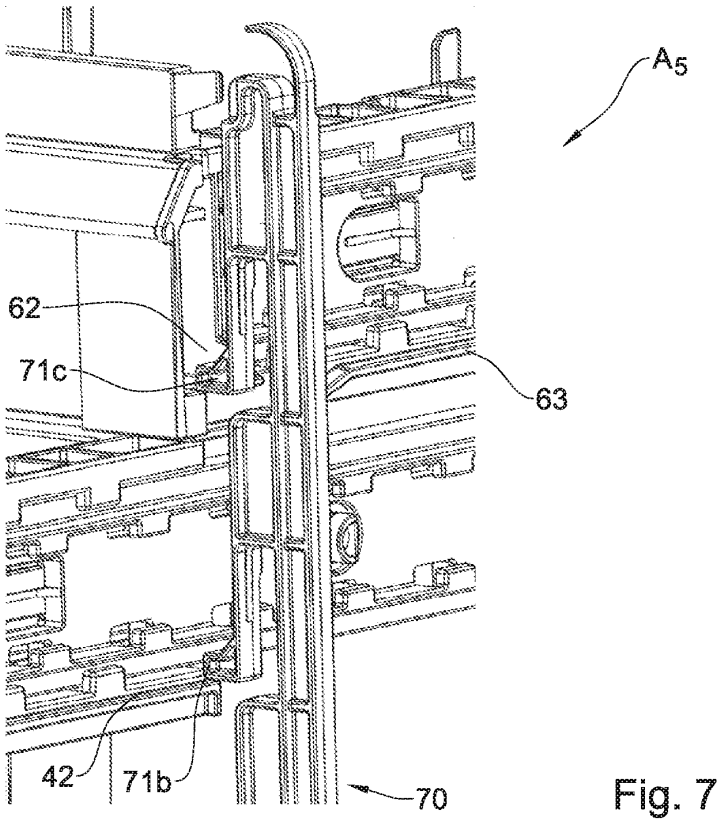


Fig. 7B

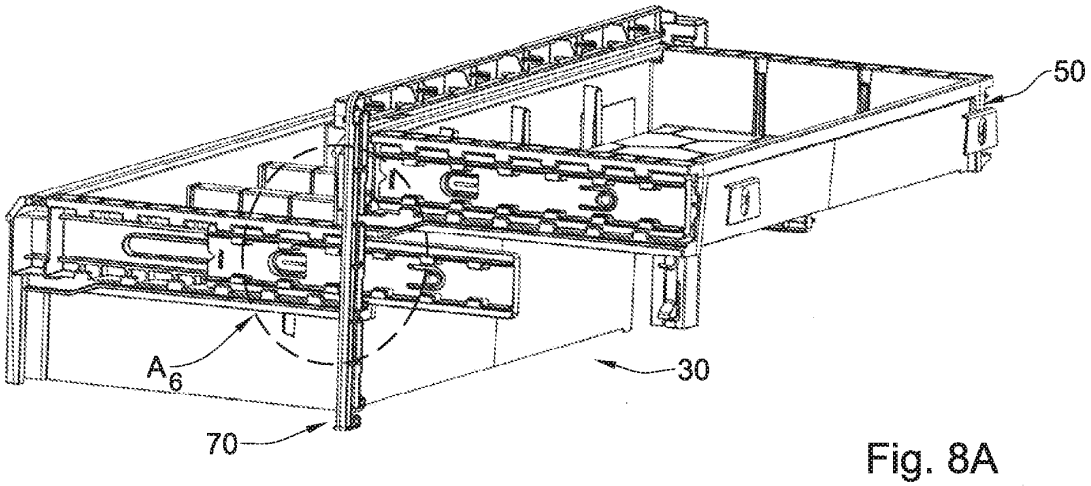


Fig. 8A

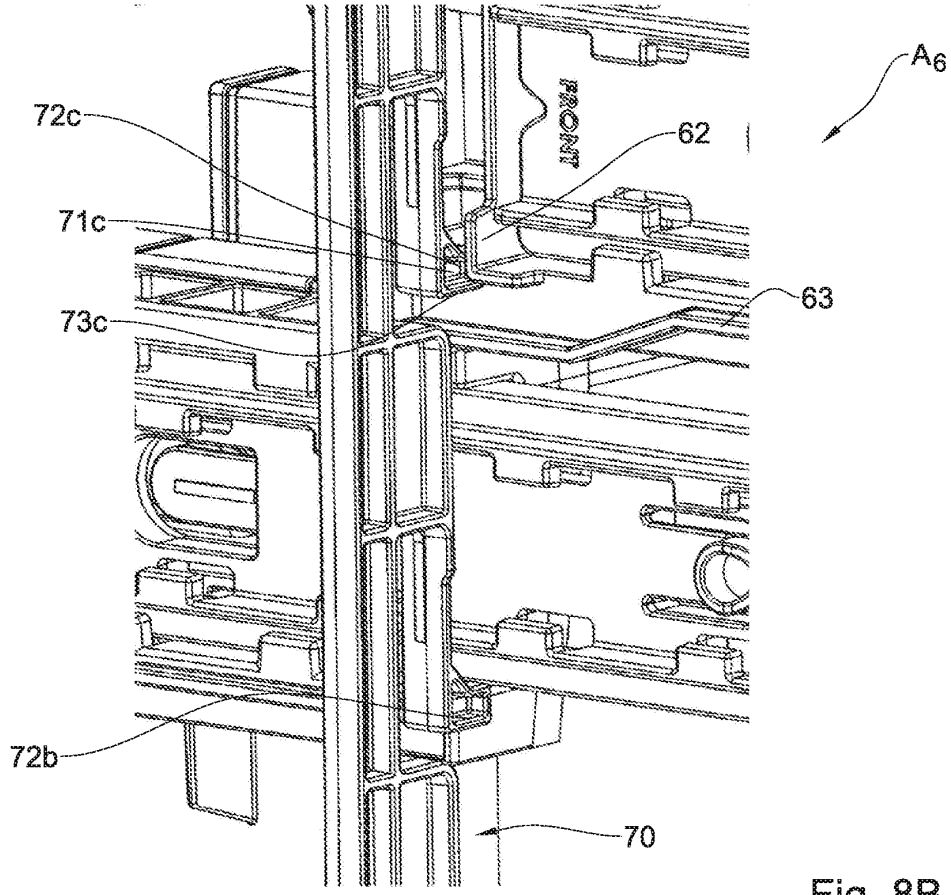


Fig. 8B

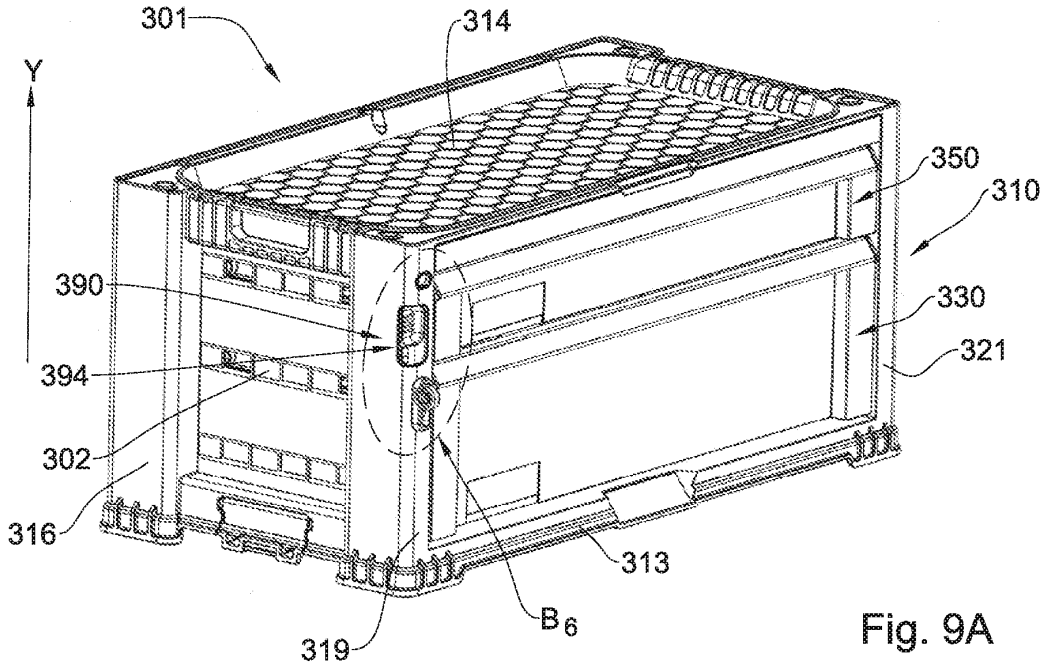

301
314
Y
350
310
390
330
321
394
302
316
313
319
B6

Fig. 9A

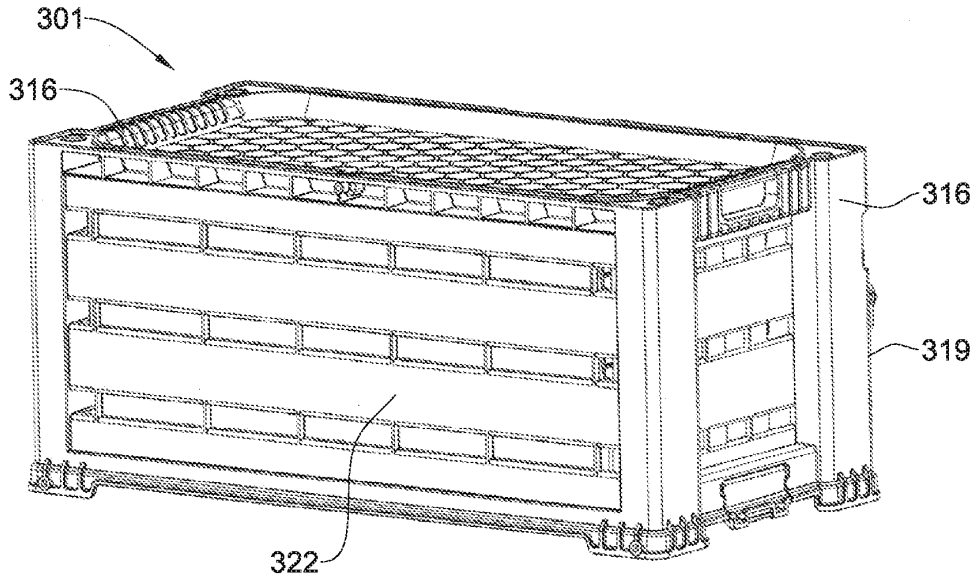

301
316
316
319
322

Fig. 9B

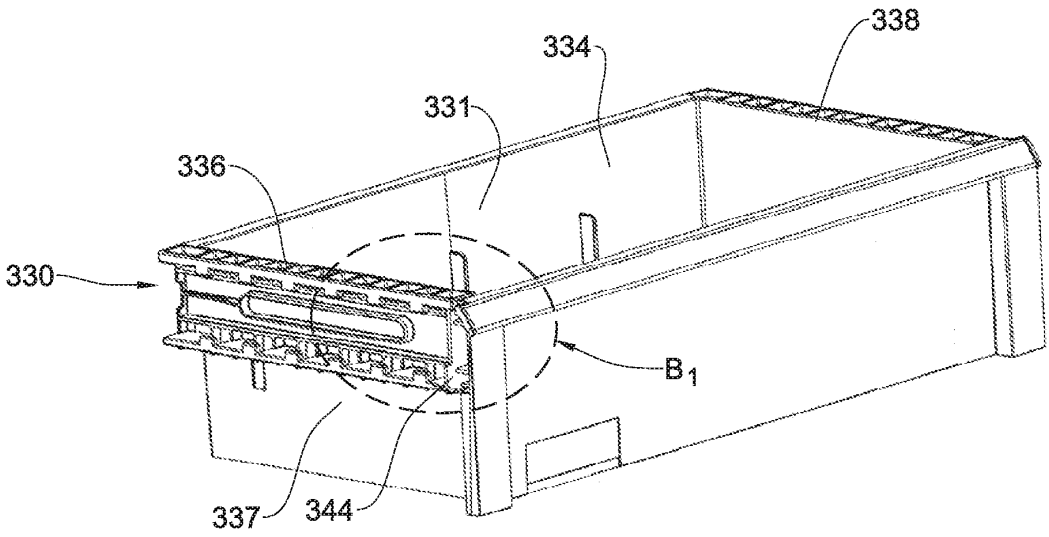


Fig. 10A

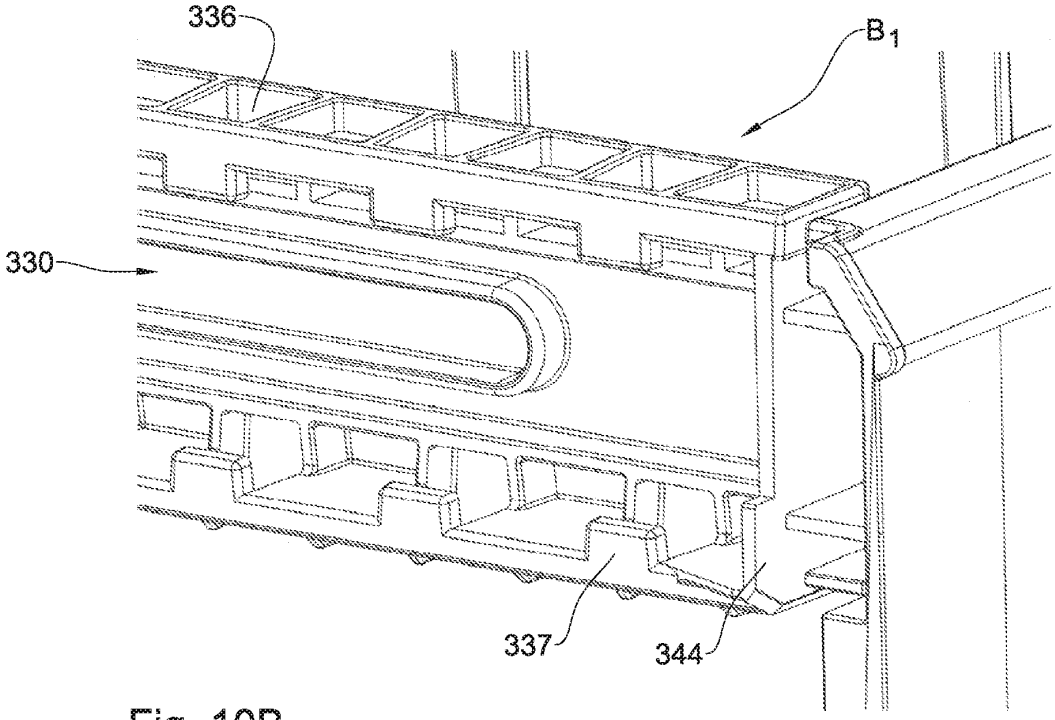


Fig. 10B

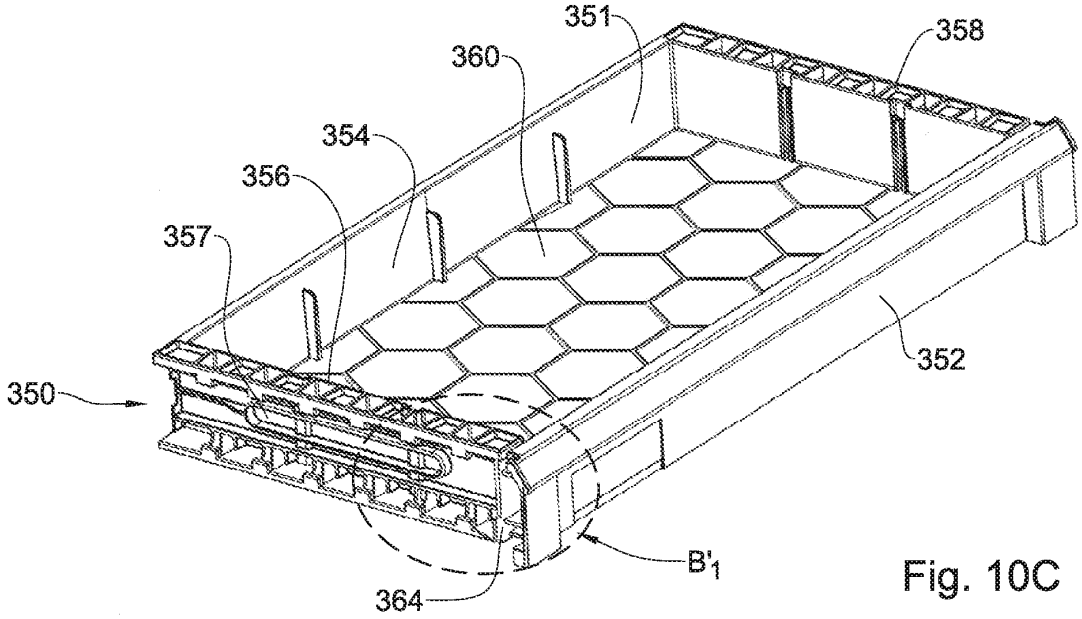


Fig. 10C

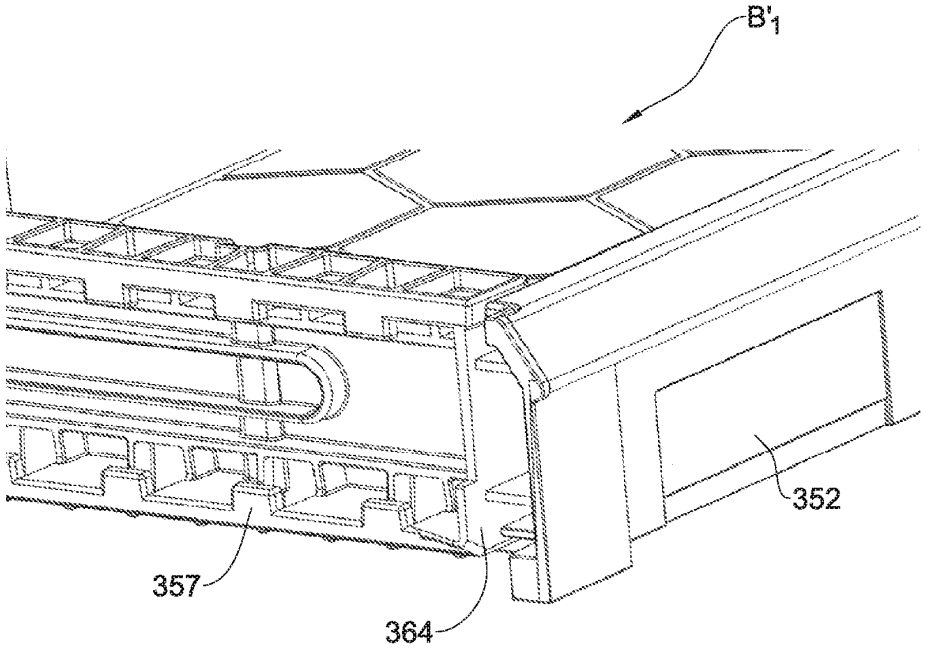


Fig. 10D

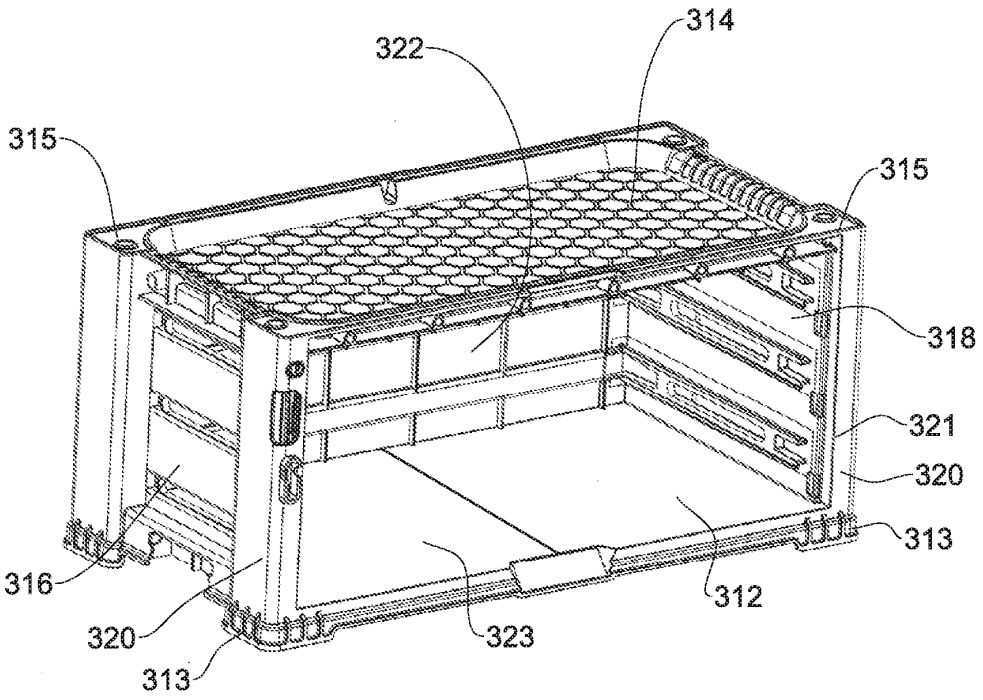


Fig. 10E

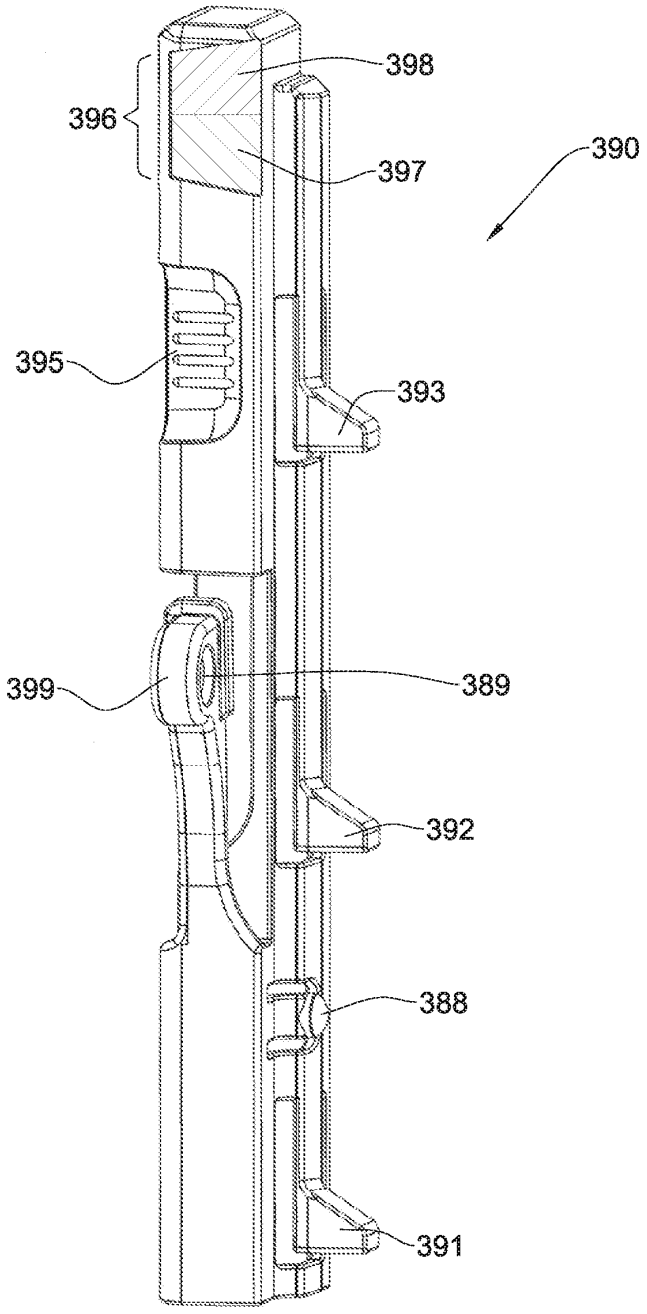


Fig. 11

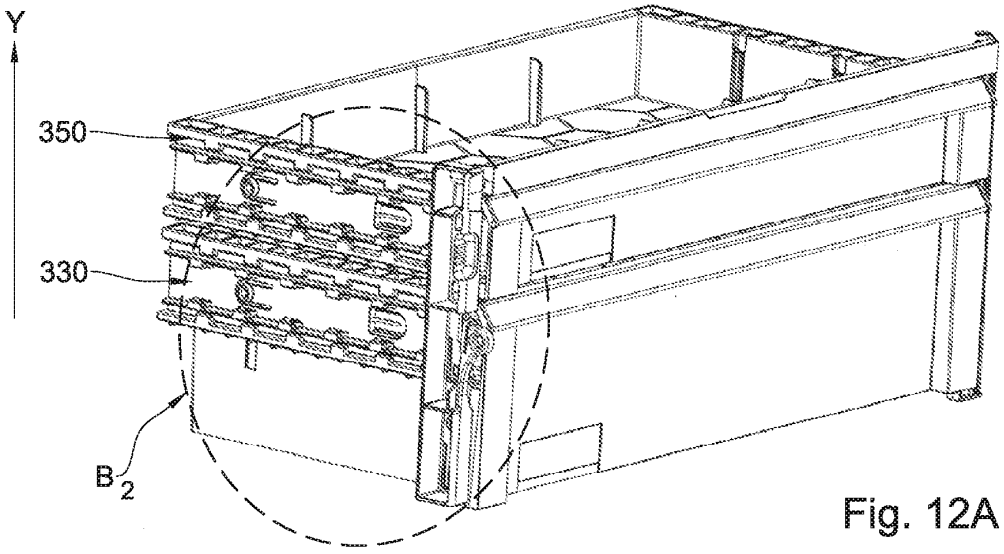


Fig. 12A

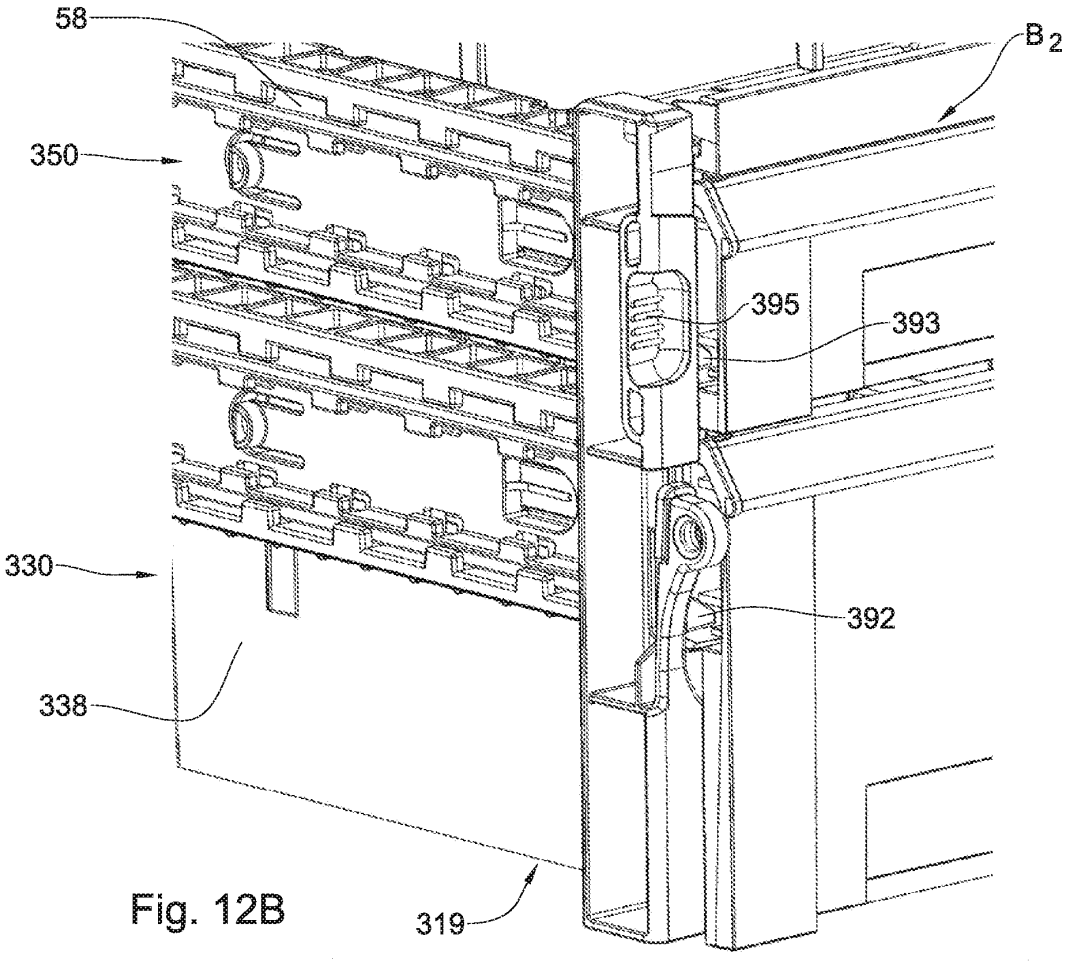


Fig. 12B

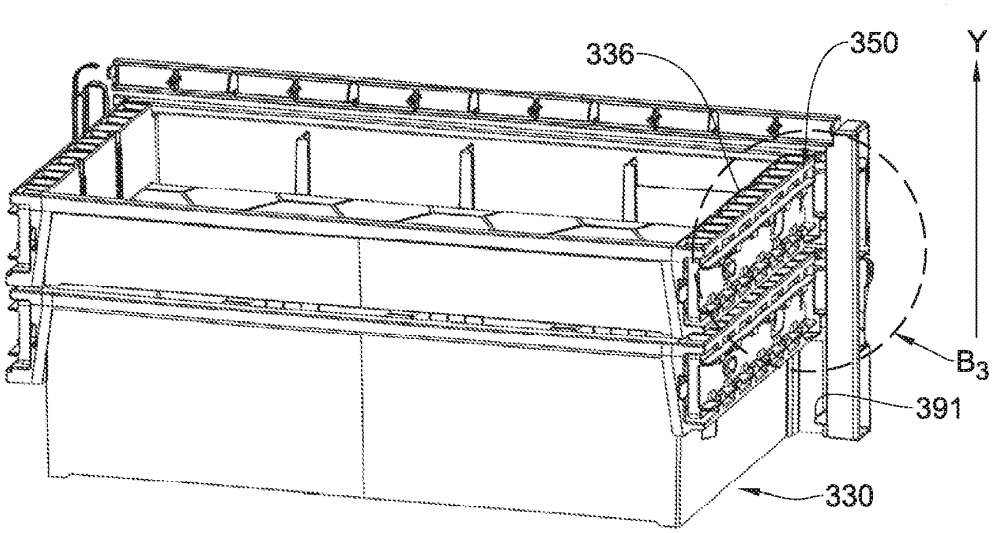


Fig. 13A

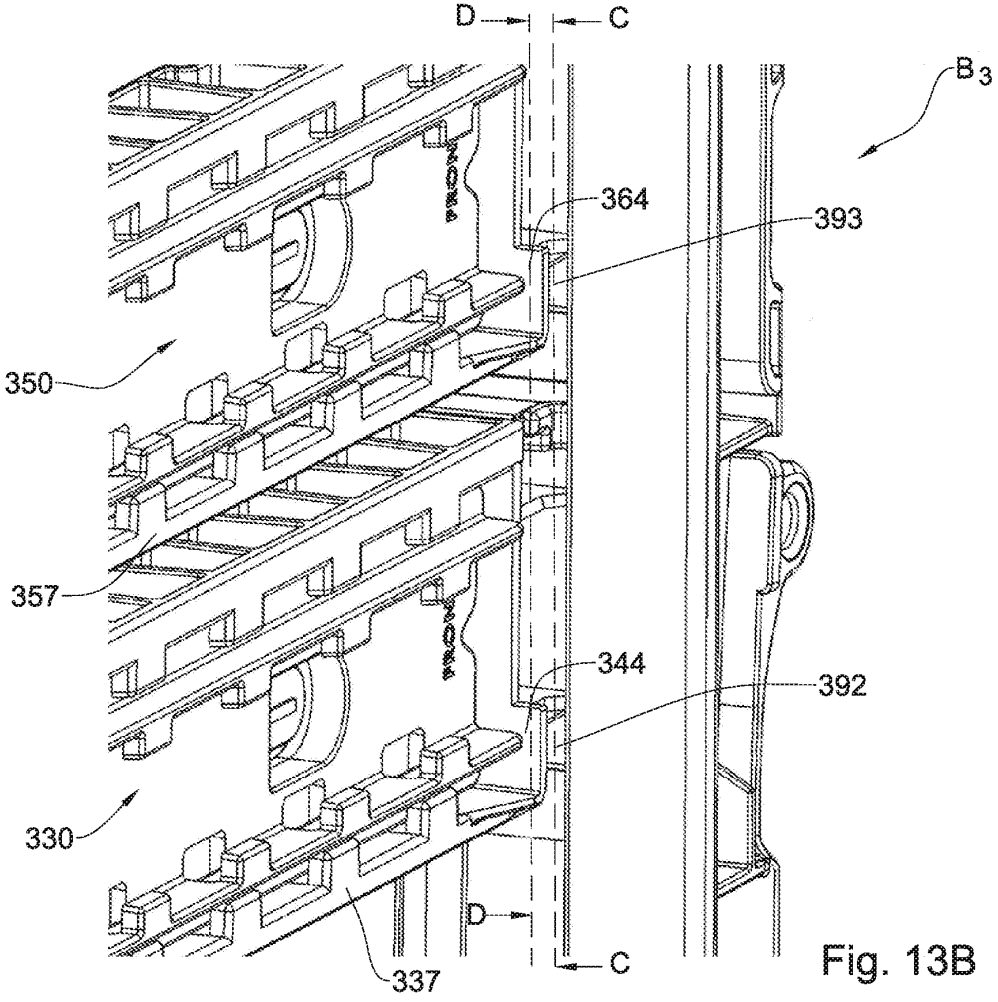


Fig. 13B

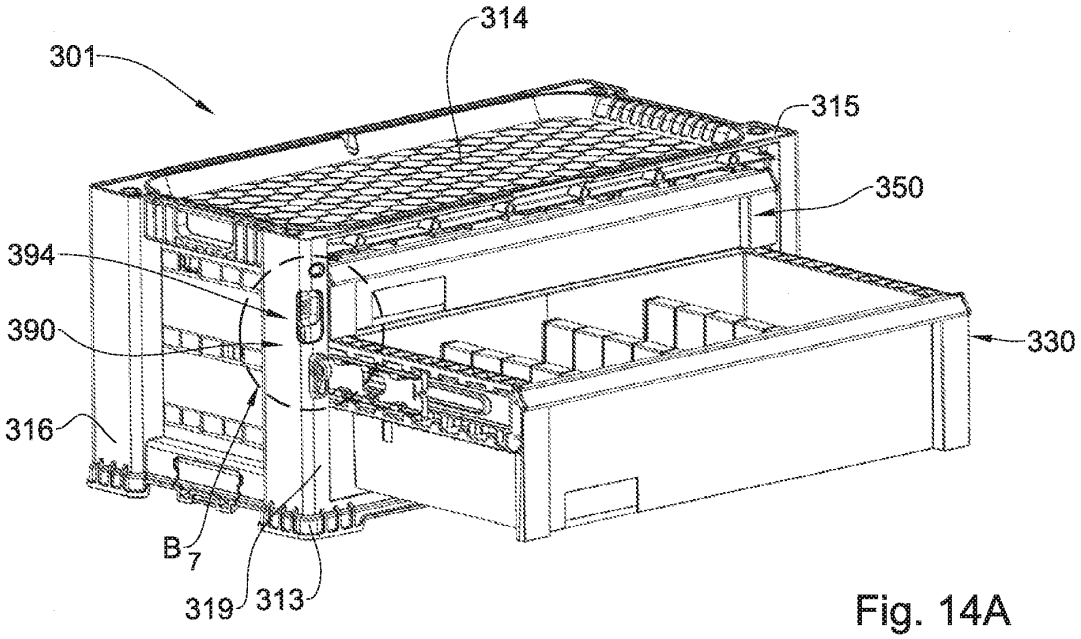


Fig. 14A

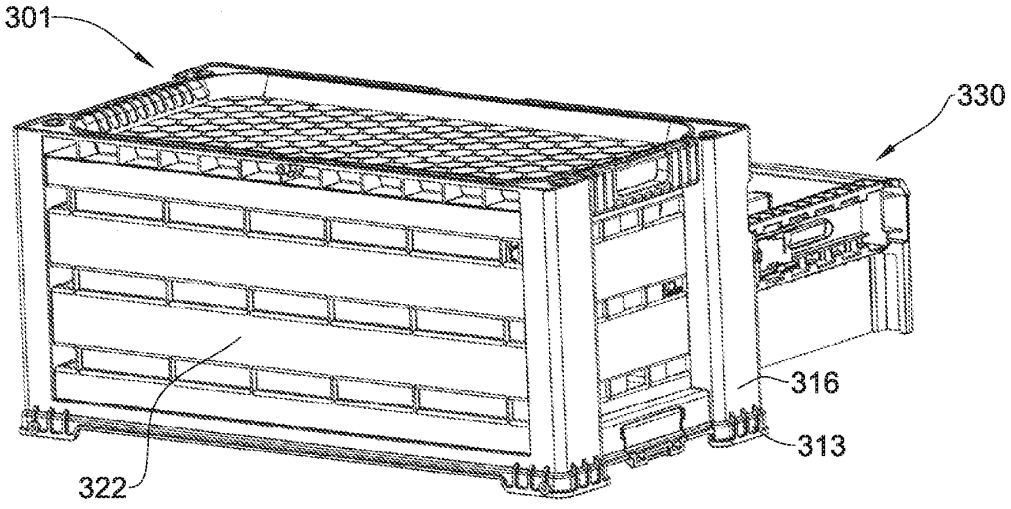


Fig. 14B

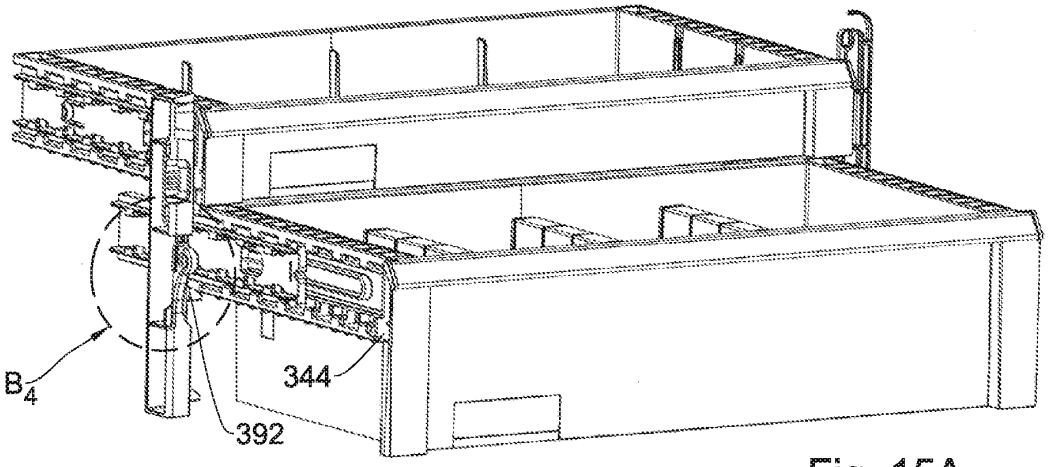


Fig. 15A

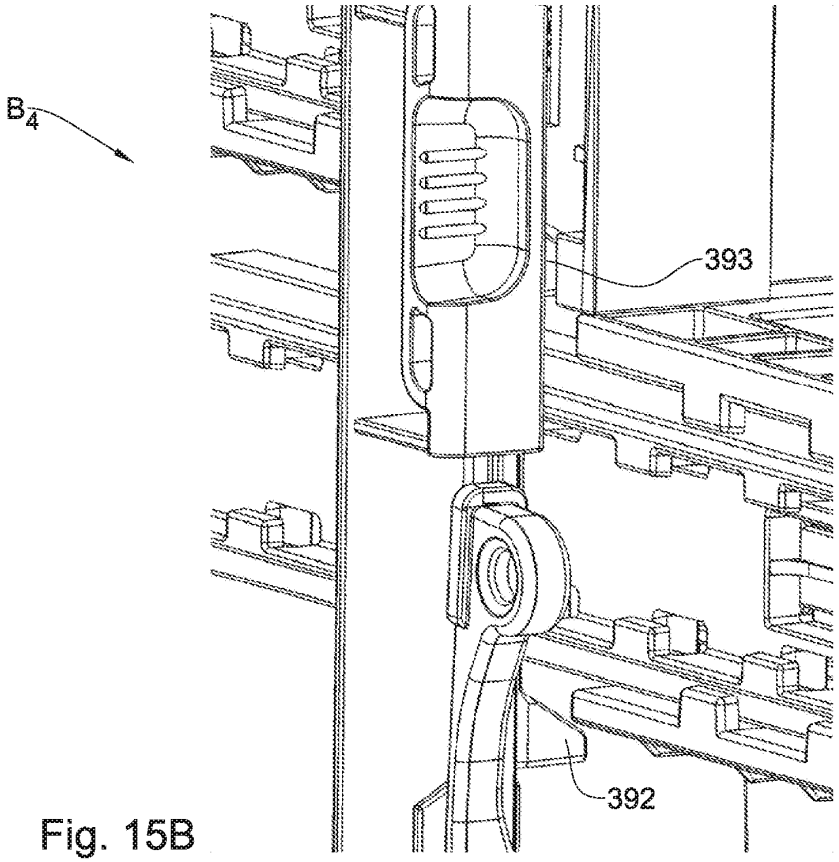


Fig. 15B

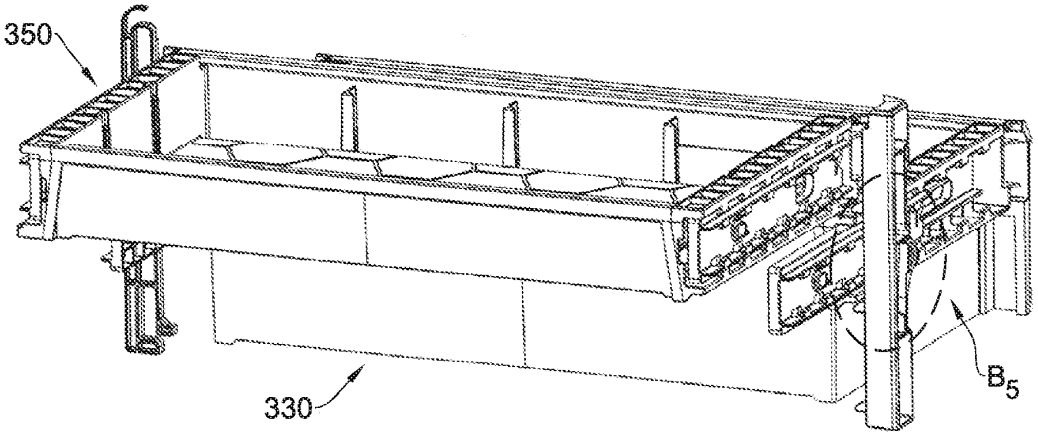


Fig. 16A

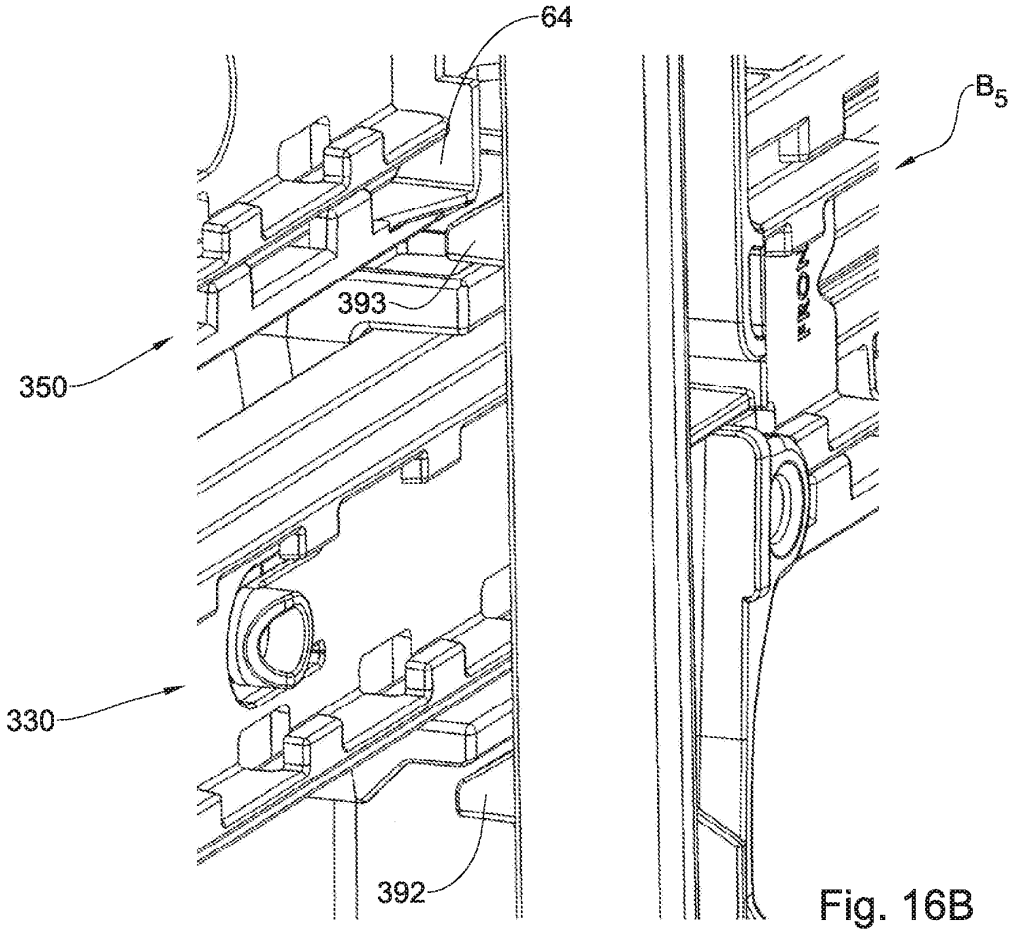


Fig. 16B

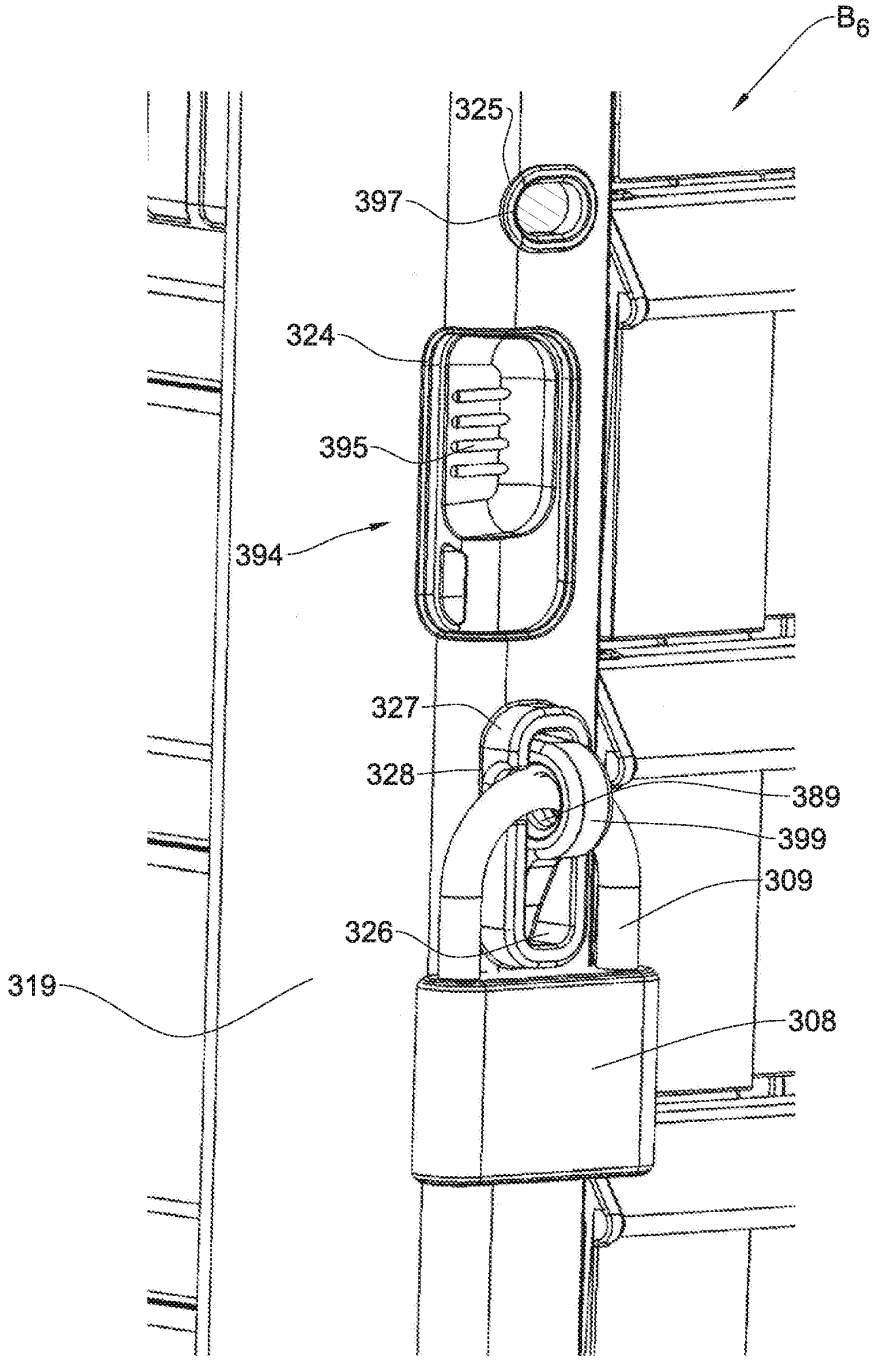


Fig. 17A

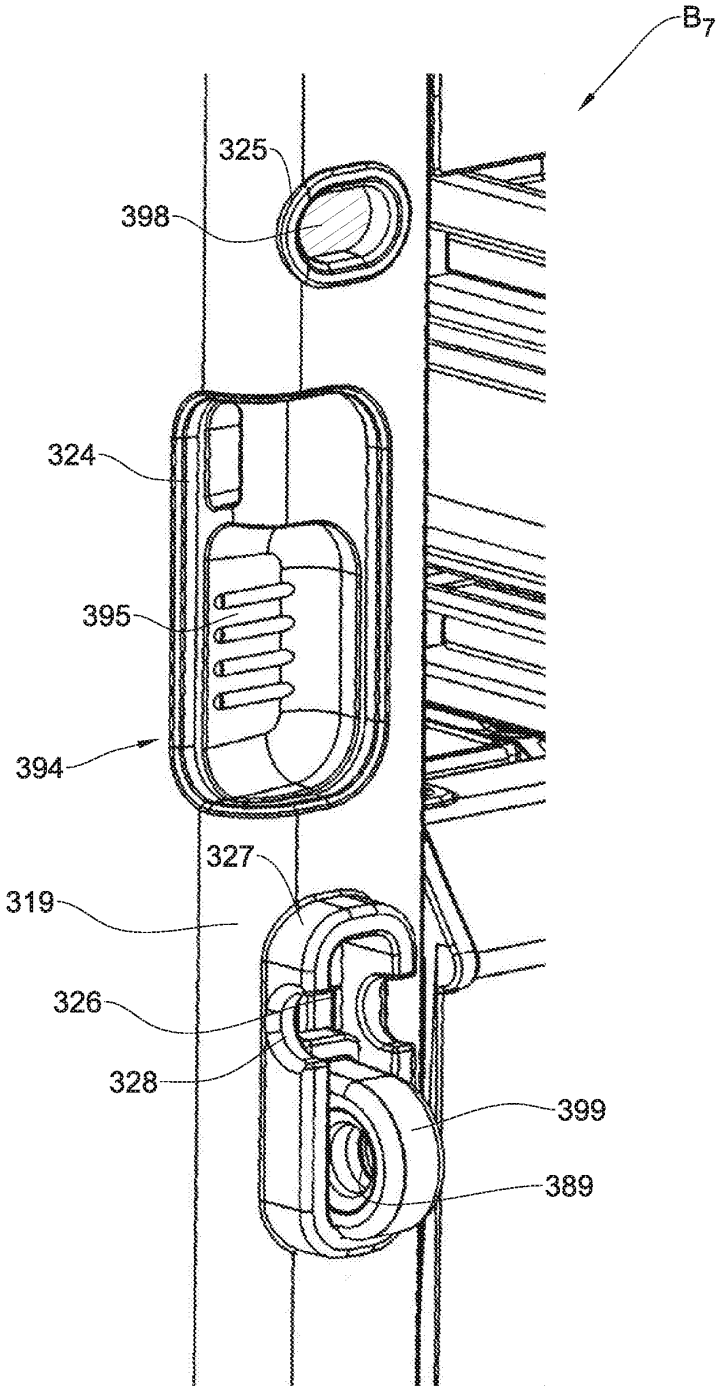


Fig. 17B

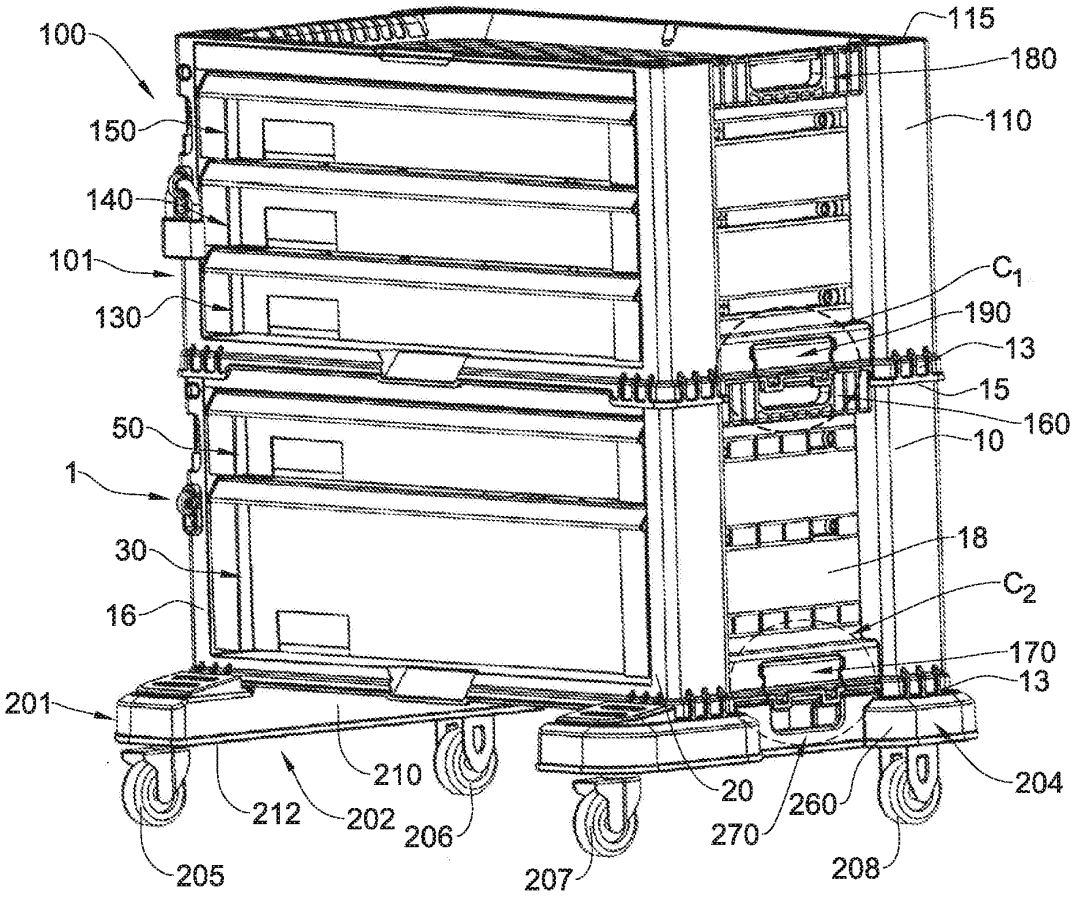

100
150
140
101
130
50
1
30
16
201
115
180
110
C1
190
13
15
160
10
18
C2
170
13
204
205
212
202
210
206
207
20
270
260
208

Fig. 18A

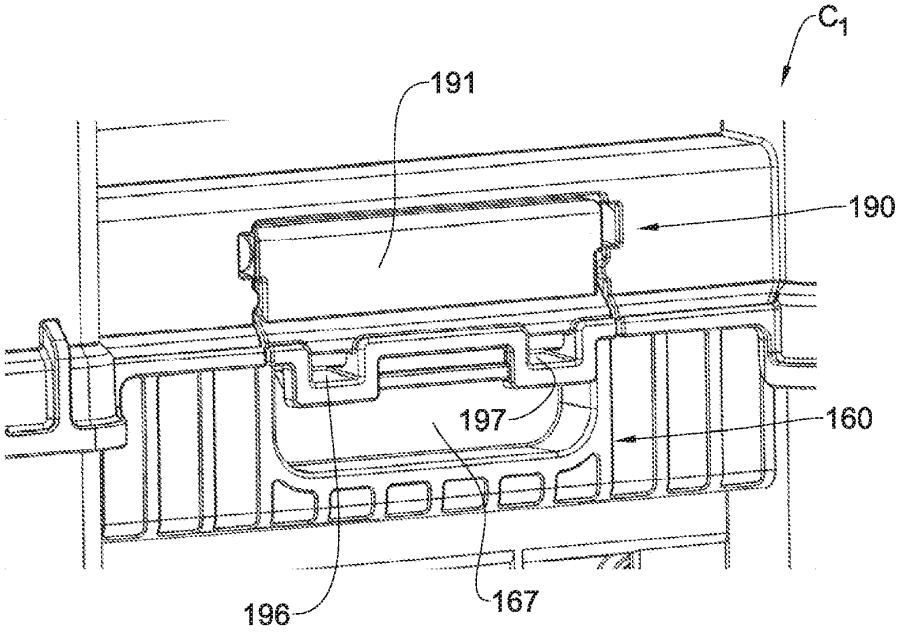


Fig. 18B

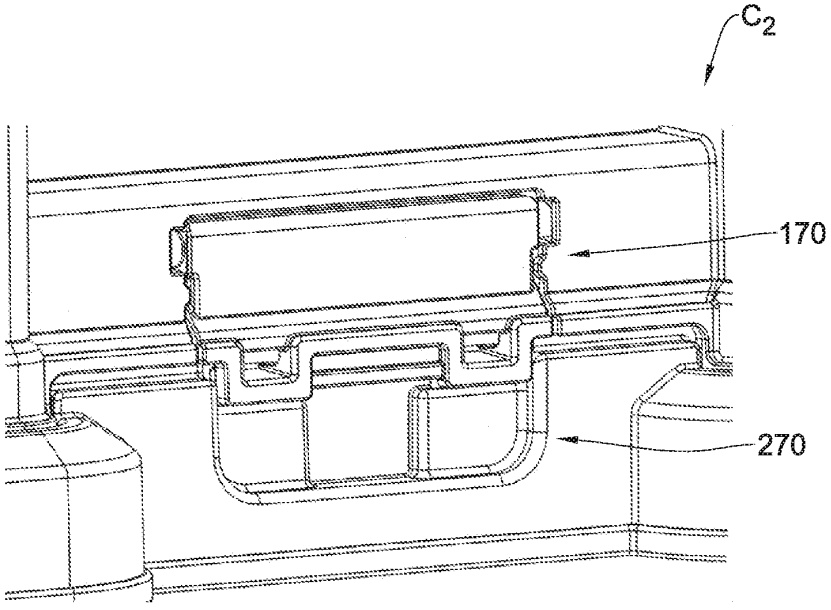


Fig. 18C

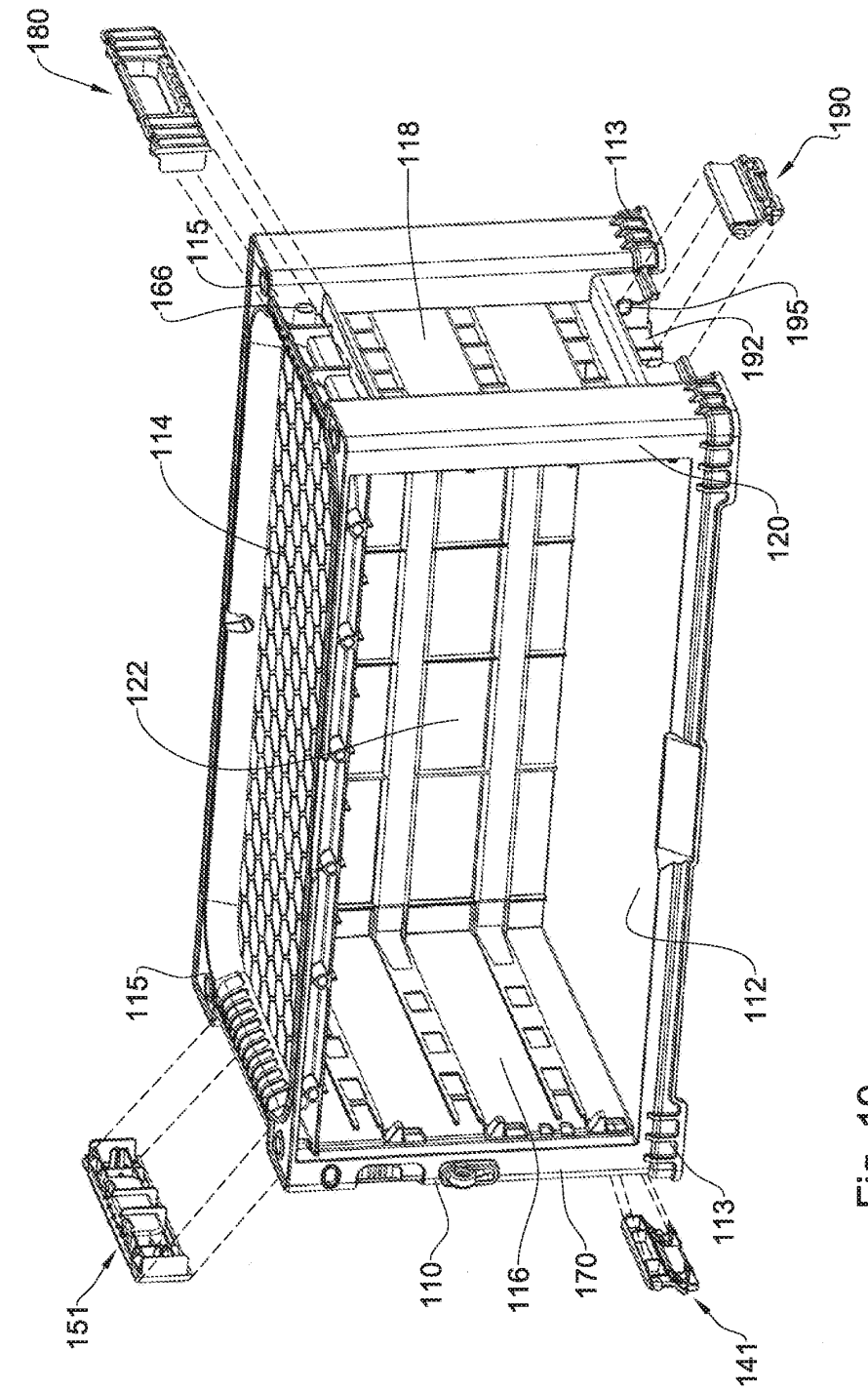

180
118
113
190
115
166
195
192
114
120
122
112
115
113
110
116
170
151
141

Fig. 19

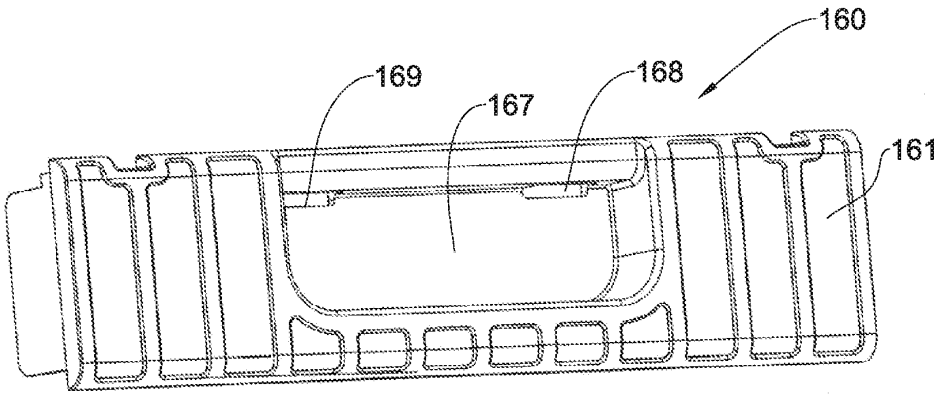


Fig. 20A

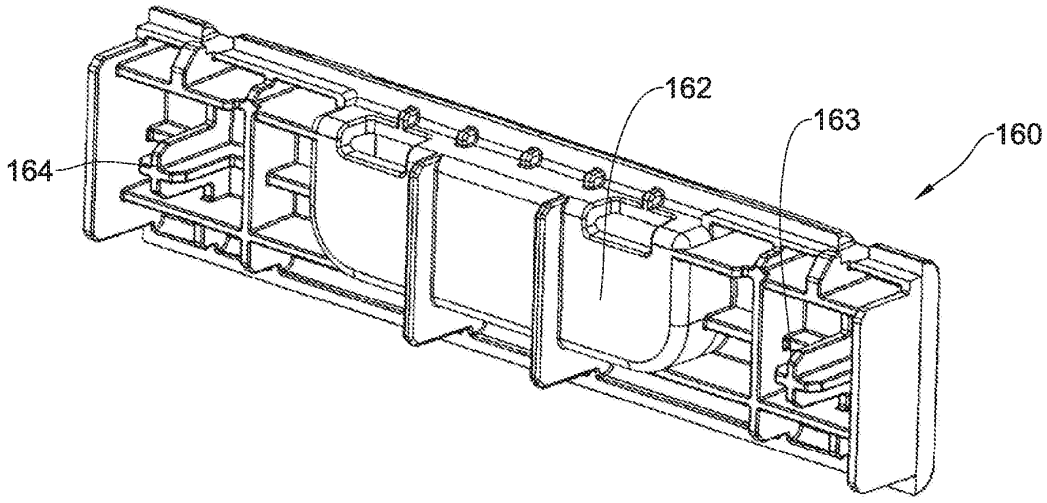


Fig. 20B

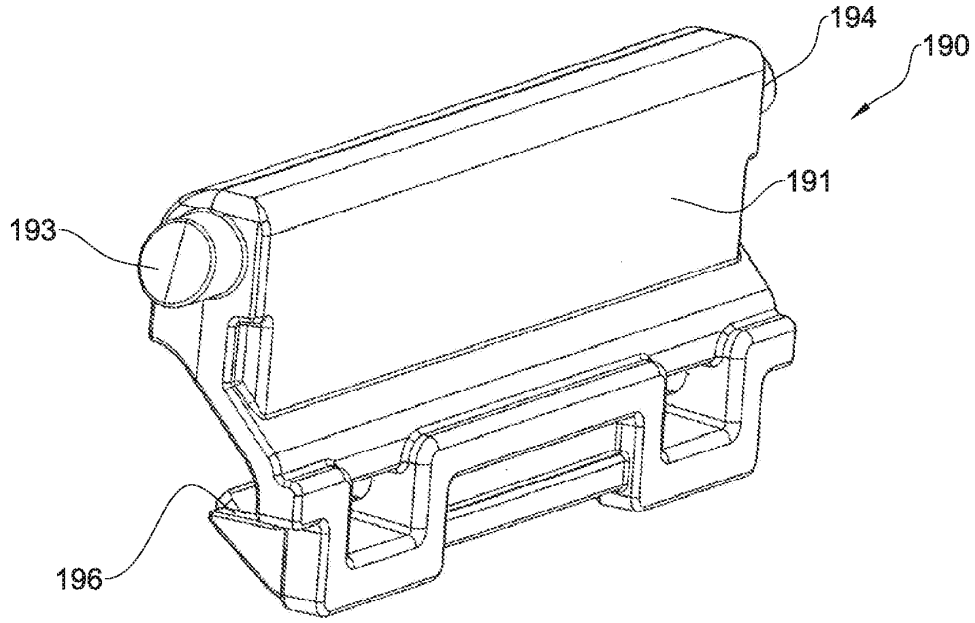


Fig. 21A

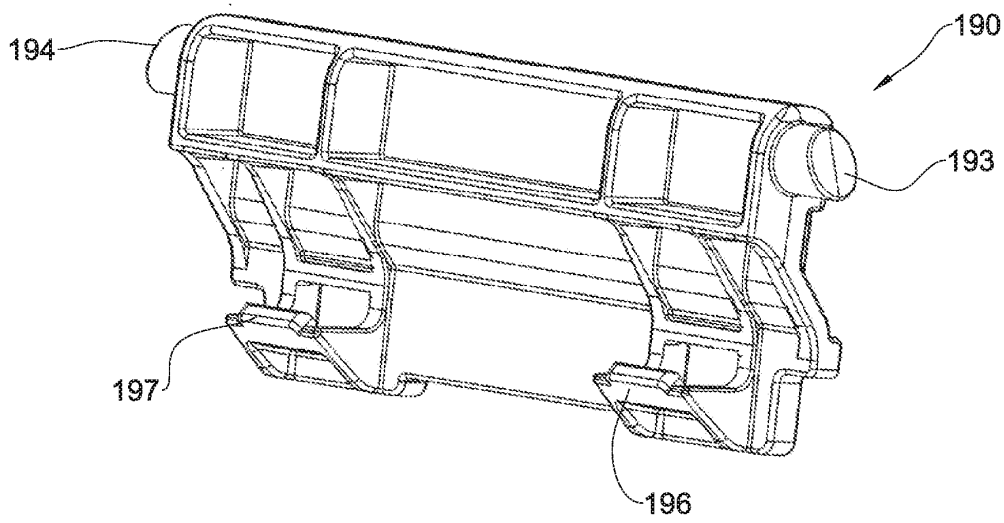


Fig. 21B

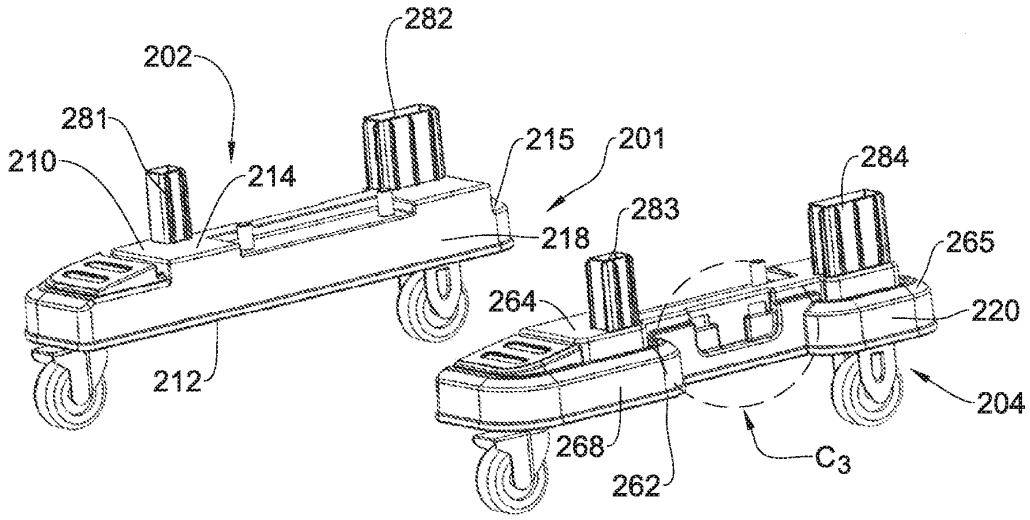


Fig. 22A

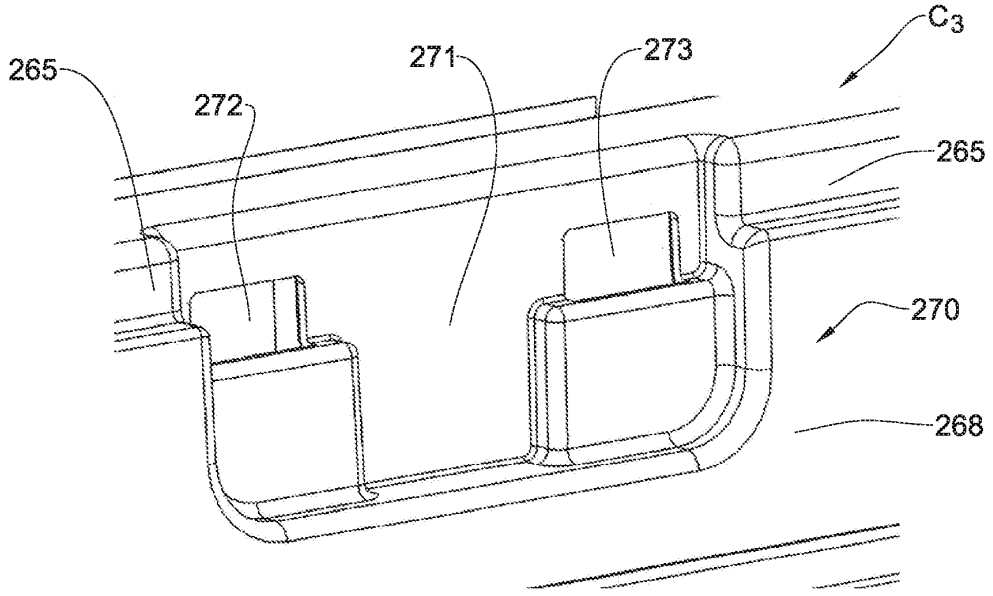


Fig. 22B

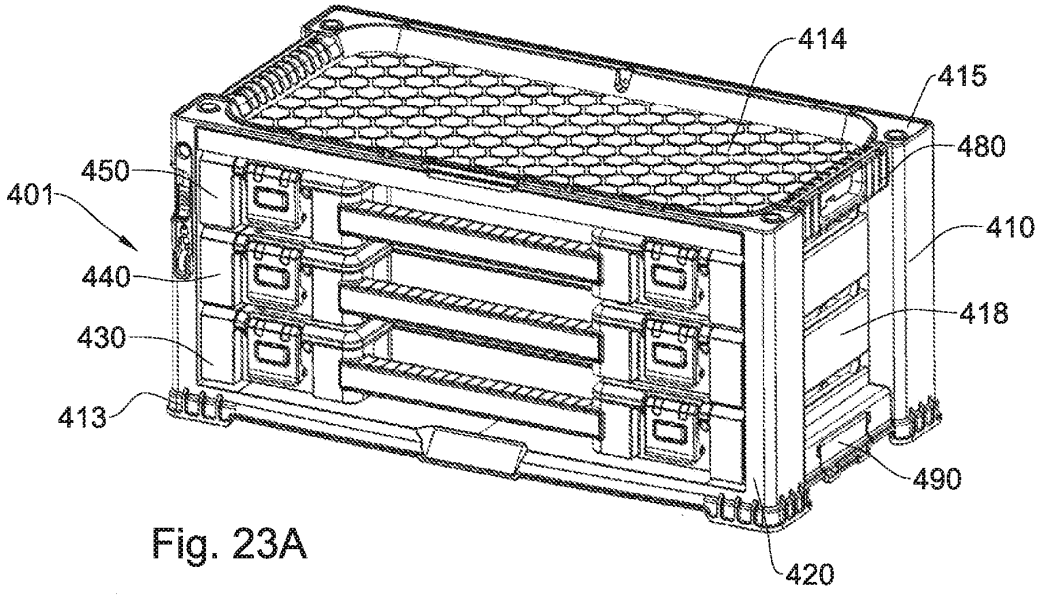


Fig. 23A

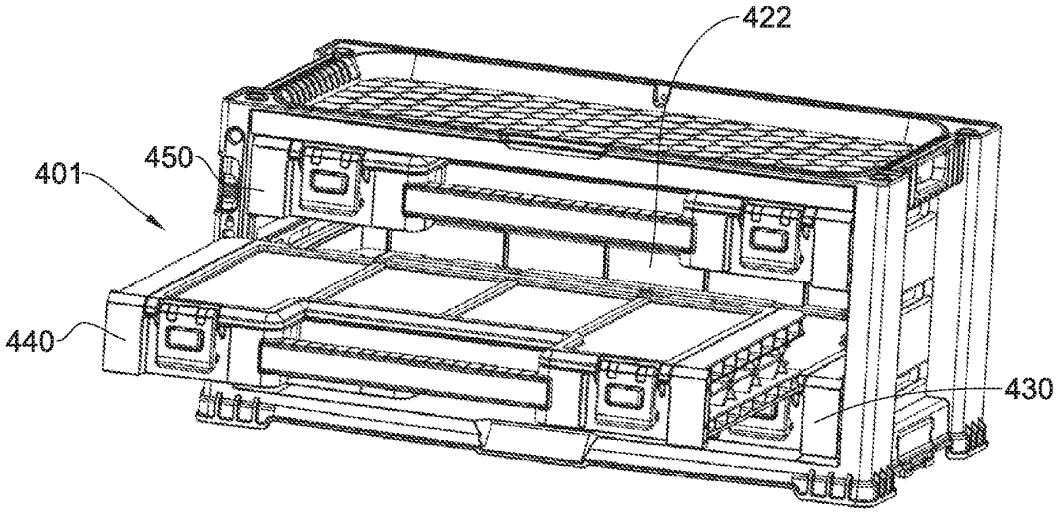


Fig. 23B

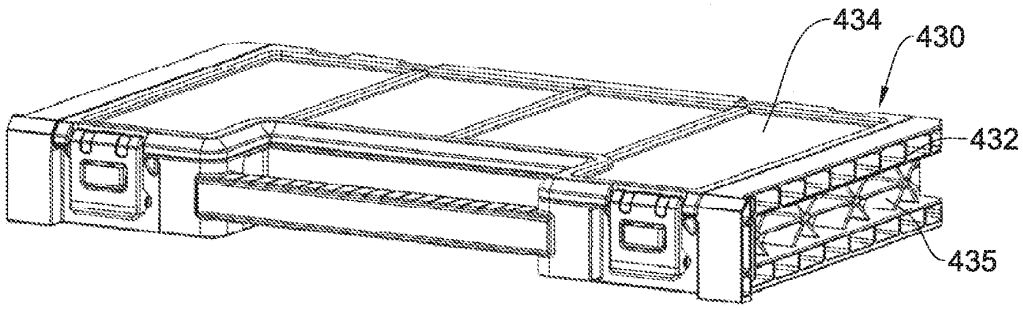


Fig. 24A

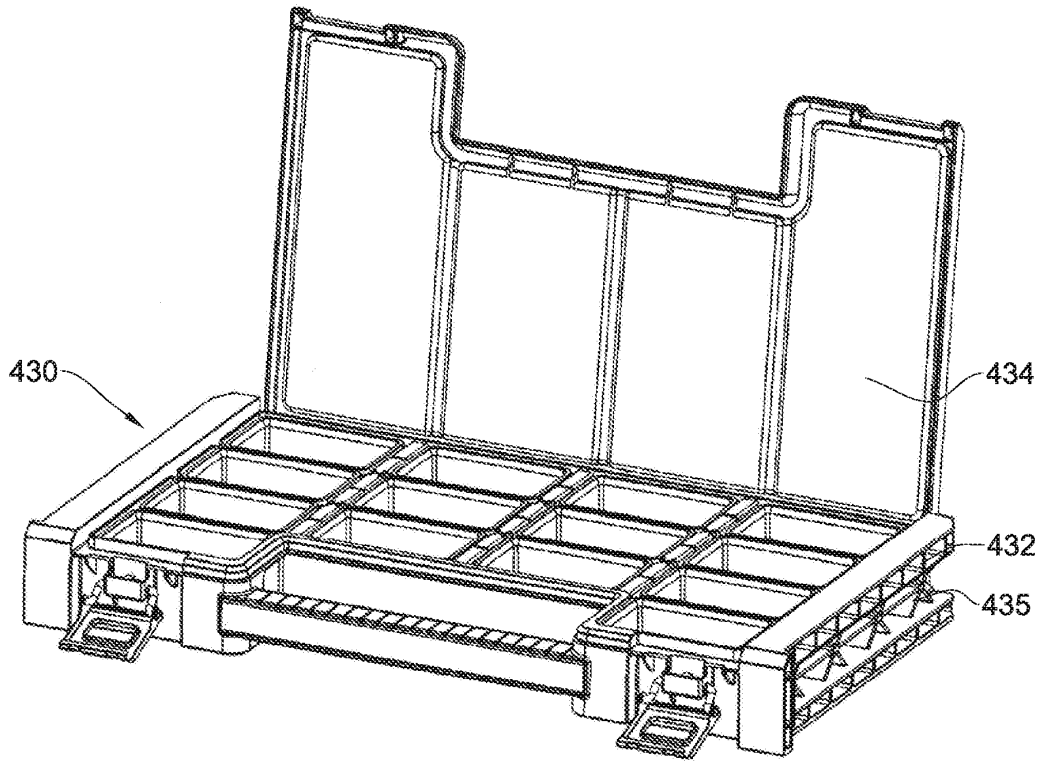


Fig. 24B

(12) 特許協力条約に基づいて公開された国際出願

(19) 世界知的所有権機関
国際事務局

(43) 国際公開日
2017年12月14日(14.12.2017)

WIPO | PCT

(10) 国際公開番号
WO 2017/212840 A1

(51) 国際特許分類:
B65D 21/02 (2006.01) *B65D 21/036* (2006.01)

(21) 国際出願番号： PCT/JP2017/017322

(22) 国際出願日： 2017年5月6日(06.05.2017)

(25) 国際出願の言語： 日本語

(26) 国際公開の言語： 日本語

(30) 優先権データ：
特願 2016-113832 2016年6月7日(07.06.2016) JP

(71) 出願人: 株式会社ジェネシス (**GENESIS CO., LTD.**) [JP/JP]; 〒4300856 静岡県浜松市中区中島１丁目３０番８号 Shizuoka (JP).

(72) 発明者: 古田 義久 (**FURUTA Yoshihisa**); 〒4300856 静岡県浜松市中区中島１丁目３０番８号 Shizuoka (JP).

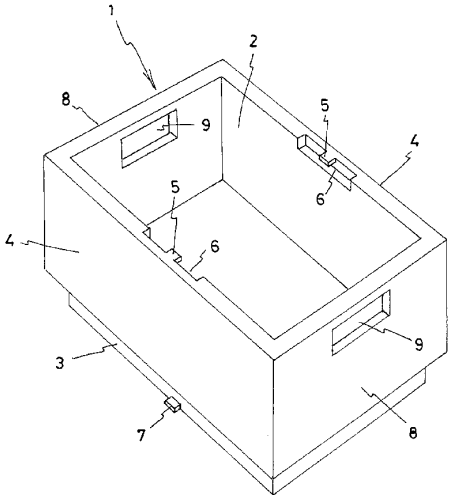
(74) 代理人: 岩根 正敏 (**IWANE Masatoshi**); 〒1780064 東京都練馬区南大泉５－３３－４ Tokyo (JP).

(81) 指定国(表示のない限り、全ての種類の国内保護が可能): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) 指定国(表示のない限り、全ての種類の広域保護が可能): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), ユーラシア (AM, AZ, BY, KG, KZ, RU, TJ, TM), ヨーロッパ (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS,

(54) **Title:** ARTICLE STORAGE CASE

(54) 発明の名称： 物品収納ケース



(57) **Abstract:** This invention addresses the problem of providing an article storage case that can be inexpensively formed, has an excellent workability with regards to performing linking work, and has a high stability when stacked. In order to solve the above problem, there is provided a substantially cubic or cuboid article storage case (1) having an upward opening (2), wherein: a convex part (3) serving also as a leg is formed on the lower surface of a bottom wall so that when cases are stacked, the convex part (3) fits into the upward opening (2) of the lower case; upper tongue pieces (5), (5) projecting inwards or outwards are respectively formed near the center of the upper edge of opposing side walls (4), (4); and lower tongue pieces (7), (7), which project in the opposite direction to the upper tongue pieces (5), (5) and which engage with the upper tongue pieces (5), (5) to link the cases to each other when the cases are stacked, are formed on the lower surface of the bottom wall.

WO 2017/212840 A1

SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

添付公開書類：

一　国際調査報告（条約第21条(3)）

(57) 要約：安価に形成できると共に、連結作業性が良好であり、しかも積み重ね状態の安定性の高い物品収納ケースを提供することを課題とする。上記課題を解決するため、上方に開口（２）を有する略立方体形状或いは略直方体形状の物品収納ケース（１）において、底壁下面に脚部を兼ねた凸部（３）を形成し、該凸部（３）を積み重ねた際の下方ケースの上記上方開口（２）に嵌入させる構成とすると共に、対向する側壁（４），（４）の上端中央付近にそれぞれ内方或いは外方に向けて突出する上方舌片（５），（５）を形成し、該上方舌片（５），（５）と積み重ねた際に係合してケース同士を連結する上記上方舌片（５），（５）とは逆方向に向けて突出する下方舌片（７），（７）を底壁下面に形成した物品収納ケースとした。

明　細　書

発明の名称 ： 物品収納ケース

技術分野

[0001] 本発明は、物品収納ケースに関し、詳しくは、積み重ねたケース同士を容易に連結することができる、物品収納ケースに関するものである。

背景技術

[0002] 工場等において、部品を収納して保管・運搬するために、プラスチック等によって型成形された、上方に開口を有する略立方体形状或いは略直方体形状の物品収納ケースが多用されている。

そして、このような物品収納ケースは、積み重ねた際にズレを防止し、積み重ね状態の安定性を高めるために、底壁下面に脚部を兼ねた凸部を形成し、該凸部を積み重ねた際の下方ケースの上方開口に嵌入させるように構成されている（例えば、特許文献１，２）。 また、積み重ね状態の更なる安定性を図るために、積み重ねたケース同士を連結する構成を有する物品収納ケースも開発されている（例えば、特許文献３）。

先行技術文献

特許文献

[0003] 特許文献1：特開２００４－１２３２２１号公報

特許文献1：特開２００４－３２９０３５号公報

特許文献3：特開平９－１６９３３９号公報

発明の概要

発明が解決しようとする課題

[0004] しかしながら、上記した特許文献１，２に開示されたような、単なる凸部の開口への嵌入のみでは、トラックによる輸送時等に受ける、下から突き上げるような衝撃が加わった場合には、容易に嵌入が外れてしまい、積み重ねがズレることから荷崩れが生じ易いものであった。また、積み重ねたケースを持ち上げる際には、例え空の状態のケースであっても、最下段のケースを

持って持ち上げなければならず、腰をかがめる作業が必要となるなど、作業者に負担を強いるものであった。

一方、特許文献３に開示されたような、積み重ねたケース同士を連結する構成を有するものにあっては、上記した問題は生じないものの、該特許文献３に開示された連結構造は、ケースの上部開口縁部に鋼製の連結具を回動自在に取り付け、該連結具を回動させて相手方ケースの上縁及び／又は連結具に係合させるものであるため、連結具による結合動作が必須となり、その作業が煩わしいものであったと共に、連結手段が大掛かりなものであり、構造も複雑になってコスト高となっていた。

[0005] 本発明は、上述した背景技術が有する課題に鑑みなされたものであって、その目的は、安価に形成できると共に、連結作業性が良好であり、しかも積み重ね状態の安定性の高い物品収納ケースを提供することにある。

課題を解決するための手段

[0006] 上記した目的を達成するため、本発明は、次の〔１〕～〔６〕に記載した物品収納ケースとした。

〔１〕上方に開口を有する略立方体形状或いは略直方体形状の物品収納ケースにおいて、底壁下面に脚部を兼ねた凸部を形成し、該凸部を積み重ねた際の下方ケースの上記上方開口に嵌入させる構成とすると共に、対向する側壁の上端中央付近にそれぞれ内方或いは外方に向けて突出する上方舌片を形成し、該上方舌片と積み重ねた際に係合してケース同士を連結する上記上方舌片とは逆方向に向けて突出する下方舌片を底壁下面に形成したことを特徴とする、物品収納ケース。

〔２〕上記上方舌片の周辺に凹部が形成されていることを特徴とする、上記〔１〕に記載の物品収納ケース。

〔３〕上記上方舌片が側壁上端面より突出して形成されていることを特徴とする、上記〔１〕に記載の物品収納ケース。

〔４〕上記上方舌片の下面に係合凹部が形成され、上記下方舌片の上面に前記上方舌片の係合凹部に嵌入する係合凸部が形成されていることを特徴と

する、上記〔１〕に記載の物品収納ケース。

〔５〕上記上方舌片が長辺側の対向する側壁に形成され、上記下方舌片が底壁下面の上記脚部を兼ねた凸部に形成されていることを特徴とする、上記〔１〕に記載の物品収納ケース。

〔６〕上記ケースの上記上方開口を閉塞する矩形の蓋体であり、該蓋体の下面に凸部を形成し、該凸部を上記ケースの上記上方開口に嵌入させる構成とすると共に、該凸部に上記ケースに形成された上方舌片と係合する舌片を形成したことを特徴とする、上記〔１〕に記載の物品収納ケース。

発明の効果

[0007] 上記した本発明に係る物品収納ケースによれば、ケースを互いに連結するための特別な別部品を付加する必要がなく、上方舌片と下方舌片とをケースに型成形等により一体的に形成すればよいので、製造コストの低減が図れると共に、リサイクルが容易な物品収納ケースを提供することができる。

また、上記した本発明に係る物品収納ケースによれば、上方舌片と下方舌片との係合によって積み重ねたケース同士を連結するものであるため、その連結作業性は良好であり、また信頼性の高い連結が可能なものとなる。

図面の簡単な説明

[0008] [図1]本発明に係る物品収納ケースの一実施形態を示した斜視図である。

[図2]図１に示した物品収納ケースを積み重ねる途中の状態を示した一部切り欠き側面図である。

[図3]図１に示した物品収納ケースを２段積み重ねた状態を示した一部切り欠き側面図である。

[図4]図１に示した物品収納ケースを３段積み重ね、最上段の物品収納ケースを持って垂直方向に持ち上げた状態を示した一部切り欠き側面図、および要部を拡大して示した断面図である。

[図5]図１に示した物品収納ケースを３段積み重ね、最下段の物品収納ケースを持って横方向に倒した状態を示した一部切り欠き側面図、および要部を拡大して示した断面図である。

[図6]本発明に係る物品収納ケースの蓋体を下方から観た斜視図である。

[図7]図１に示した物品収納ケースを５段積み重ね、最上段の物品収納ケースに蓋体を装着した状態を示した一部切り欠き側面図、および要部を拡大して示した断面図である。

[図8]本発明に係る物品収納ケースの他の実施形態を示した斜視図である。

[図9]図８に示した物品収納ケースの平面図である。

[図10]図８に示した物品収納ケースの底面図である。

[図11]上方舌片及び下方舌片の変形例を示した要部斜視図である。

[図12]上方舌片及び下方舌片の他の変形例を示した要部斜視図である。

発明を実施するための形態

[0009] 以下、上記した本発明に係る物品収納ケースの実施形態を、図面を参照しながら詳細に説明する。

[0010] 本発明に係る物品収納ケース１は、例えばプラスチックによってその全体が一体成形されたもので、図１に示すように、略直方体形状で、上方に開口２を有している。また、底壁下面に脚部を兼ねた凸部３が形成され、該凸部３が積み重ねた際の下方ケースの上記上方開口２に嵌入し、積み重ね状態の安定性が図られている。

[0011] 物品収納ケース１の長辺側の対向する側壁４，４の上端中央付近には、それぞれ内方に向けて突出する上方舌片５，５が形成され、該上方舌片５の周辺に凹部６がそれぞれ形成されている。また、底壁下面に形成された上記脚部を兼ねた凸部３には、前記上方舌片５，５と積み重ねた際に係合してケース同士を連結する外方に向けて突出する下方舌片７，７が形成されている。また、短辺側の対向する側壁８，８の外面側の上方中央付近には、取っ手９，９が形成されている。

[0012] 上記のように構成された本発明に係る物品収納ケース１は、積み重ねる際に、図２に示したように、下方のケース１Ａの上方舌片５，５の下方に、上方のケース１Ｂの下方舌片７，７がそれぞれ入り込むように上方舌片５の周辺に形成された上記凹部６を利用して挿入することにより、図３に示したよ

うに、下方のケース１Ａの上方舌片５の下方に上方のケース１Ｂの下方舌片７が位置するように積み重ねられ、容易に積み重ねたケース１Ａ，１Ｂ同士を縦方向に抜けないように連結することができる。

[0013] 上記のようにして積み重ねられた物品収納ケース１Ａ，１Ｂ，１Ｃは、例えば持ち上げる際においては、図４に示したように、最上段の物品収納ケース１Ｃを持って持ち上げることにより、その積み重ねられた全ての物品収納ケース１Ａ，１Ｂ，１Ｃを持ち上げることができるものとなる。また、図５に示したように、積み重ねられた物品収納ケース１Ａ，１Ｂ，１Ｃの最下段のケース１Ａを持って横方向に倒した場合においても、下端を支点として上方舌片５と下方舌片７とが当接して抜けが防止されるため、横方向に倒した状態でも積み重ねがバラけず、搬送が可能なものとなる。

上記した作用は、特に空の状態の物品収納ケース１の搬送作業の際に効果的に現れ、作業者の負担を大きく軽減することができるものとなる。

[0014] また、上記のようにして積み重ねられた物品収納ケース１Ａ，１Ｂ、１Ｃ・・は、トラックによる輸送時等において、下から突き上げるような衝撃が加わった場合にも、上方舌片５と下方舌片７とが当接して抜けが防止されるため、物品収納ケースがズレ難いものとなる。

上記した作用は、積み重ねられた物品収納ケース１Ａ，１Ｂ，１Ｃ・・の輸送時において、その荷崩れを効果的に防止することができるものとなる。

[0015] 図６は、本発明に係る物品収納ケースに用いる蓋体を下方から観た斜視図である。この蓋体５０は、例えばプラスチックによってその全体が一体成形された矩形形状のもので、下面に凸部５１を有し、該凸部５１を上記ケース１の上記上方開口２に嵌入させる構成となっている。また、凸部５１には、上記ケース１の側壁上端に設けた上方舌片５，５と係合する外方に向けて突出する舌片５２，５２が形成されている。

[0016] 上記した蓋体５０は、例えば図７に示したように、５段に積み重ねた本発明に係る物品収納ケース１Ａ，１Ｂ，１Ｃ，１Ｄ，１Ｅの最上段のケース１Ｅの開口２を閉塞するのに用いられる。蓋体５０の装着に際しては、上記し

たケース同士の連結と同様に、ケース１Ｅの上方舌片５，５の下方に、蓋体５０の舌片５２，５２がそれぞれ入り込むように上方舌片５の周辺に形成された上記凹部６を利用して挿入することにより、図７に示したように、ケース１Ｅの上方舌片５の下方に蓋体５０の舌片５２が位置するように装着され、容易にケース１Ｅから蓋体５０が外れないように装着することができる。

[0017] 上記のようにして最上段のケース１Ｅの開口２が蓋体５０によって閉塞された積み重ねられた物品収納ケース１Ａ，１Ｂ，１Ｃ，１Ｄ，１Ｅは、トラックによる輸送時等において、下から突き上げるような衝撃が加わった場合にも、上記したようにケース同士の連結により荷崩れが生じないと共に、蓋体５０はケース１から外れないため、収納した物品が跳ね上げられて散乱することもない。

[0018] 図８は、本発明に係る物品収納ケースの他の実施形態を示した斜視図である。

このケース１０は、薄肉のプラスチックによりその全体が形成され、フランジ１１、リブ１２を適所に配することにより、その剛性が図られている。長辺側の対向する側壁１３，１３の上端中央付に形成された上方舌片１４，１４は、側壁上端面より突出して形成され、その周辺には凹部１５がそれぞれ形成されている。これにより、上方舌片１４の肉厚が確保されていると共に、後記する下方舌片１６の挿入を容易なものとしている。

[0019] また、図１０に示したように、底壁下面には脚部を兼ねた凸部１７が形成されている。この凸部１７は、線状に形成されており、コーナー部に形成されたＬ字状凸部１７ａと、長辺側の中央付近に形成されたＩ字状凸部１７ｂとからなる。これらの凸部１７ａ，１７ｂは、積み重ねた際の下方ケースの上方開口１８に内嵌し、積み重ね状態の安定性が図られている。

Ｉ字状凸部１７ｂ，１７ｂには、上記上方舌片１４，１４と積み重ねた際に係合してケース同士を連結する外方に向けて突出する下方舌片１６，１６が設けられている。また、下方のフランジ１１には、図８に示したように、上記した側壁上端面より突出して形成され上方舌片１４，１４を避ける凹み

１９，１９が設けられている。

この実施形態に係る物品収納ケース１０においても、上記したケース１と同様の作用、効果が得られる。

[0020] 以上、本発明に係る物品収納ケースの実施形態を説明したが、本発明は、何ら既述の実施形態に限定されるものではなく、特許請求の範囲に記載した本発明の技術的思想の範囲内において、さらに種々の変形及び変更が可能であることは当然である。

例えば、上記実施形態においては、略直方体形状の物品収納ケース１，１０につき説明したが、略立方体形状の物品収納ケースとしてもよい。また、ケースに形成する上方舌片５或いは１４及び下方舌片７或いは１６は、内方或いは外方に向けて突出する単なる板状のものであってもよいが、図１１、図１２に示したように、上方舌片２０の下面に係合凹部２１が形成され、下方舌片２２の上面に前記上方舌片の係合凹部に嵌入する係合凸部２３が形成されているものとしてもよい。このような係合部２１，２３を形成した舌片２０，２２とした場合には、当接する際にセンタリングが図れ、より積み重ねたケース同士のズレが防止できるものとなる。

[0021] また、上記実施形態においては、上方舌片５或いは１４は、内方に向けて突出するように形成され、下方舌片７或いは１６は、外方に向けて突出するように形成されたものにつき説明したが、両者がそれぞれ逆方向、すなわち上方舌片は外方、下方舌片は内方に向けて、それぞれ突出するように形成してもよい。

なお、上記した下方舌片についての変形は、蓋体５０に形成する舌片５２についても、同様に実施することができる。また、蓋体５０に形成する凸部５１についても、図１０に示した線状の凸部としてもよく、また場合によっては点状に存在する凸部としてもよい。

[0022] 更に、本発明に係る物品収納ケースは、工場等における部品を収納するケースばかりでなく、ビール瓶を収納するケース、更には野菜を収納するケース等、収容する物品の種類は何ら問わない。また、材質も何ら限定されず、

プラスチック製、木製、金属製等の種々の材料を利用して本発明に係る物品収納ケースを製造することができる。更に言えば、本発明に係る物品収納ケースは、全体が一体的に形成されている必要はなく、多部品を組み合わせて構成されていてもよく、また組み立て式の物品収納ケースであってもよい。

産業上の利用可能性

[0023] 以上、説明した本発明に係る物品収納ケースは、安価に形成できると共に、連結作業性が良好であり、しかも段積み状態の安定性の高い物品収納ケースとなるため、工場等における部品を収納するケース、ビール瓶を収納するケース、更には野菜を収納するケース等に、幅広く利用できるケースとなる。

符号の説明

[0024]
１，１Ａ，１Ｂ，１Ｃ，１０　物品収納ケース
２，１８　開口
３，１７　脚部を兼ねた凸部
４，１３　長辺側の側壁
５，１４，２０　上方舌片
６，１５　凹部
７，１６，２２　下方舌片
８　短辺側の側壁
９　取っ手
１１　フランジ
１２　リブ
１７ａ　Ｌ字状凸部
１７ｂ　Ｉ字状凸部
１９　凹み
２１　係合凹部
２３　係合凸部
５０　蓋体

５１　凸部

５２　舌片

請求の範囲

[請求項1] 上方に開口を有する略立方体形状或いは略直方体形状の物品収納ケースにおいて、底壁下面に脚部を兼ねた凸部を形成し、該凸部を積み重ねた際の下方ケースの上記上方開口に嵌入させる構成とすると共に、対向する側壁の上端中央付近にそれぞれ内方或いは外方に向けて突出する上方舌片を形成し、該上方舌片と積み重ねた際に係合してケース同士を連結する上記上方舌片とは逆方向に向けて突出する下方舌片を底壁下面に形成したことを特徴とする、物品収納ケース。

[請求項2] 上記上方舌片の周辺に凹部が形成されていることを特徴とする、請求項１に記載の物品収納ケース。

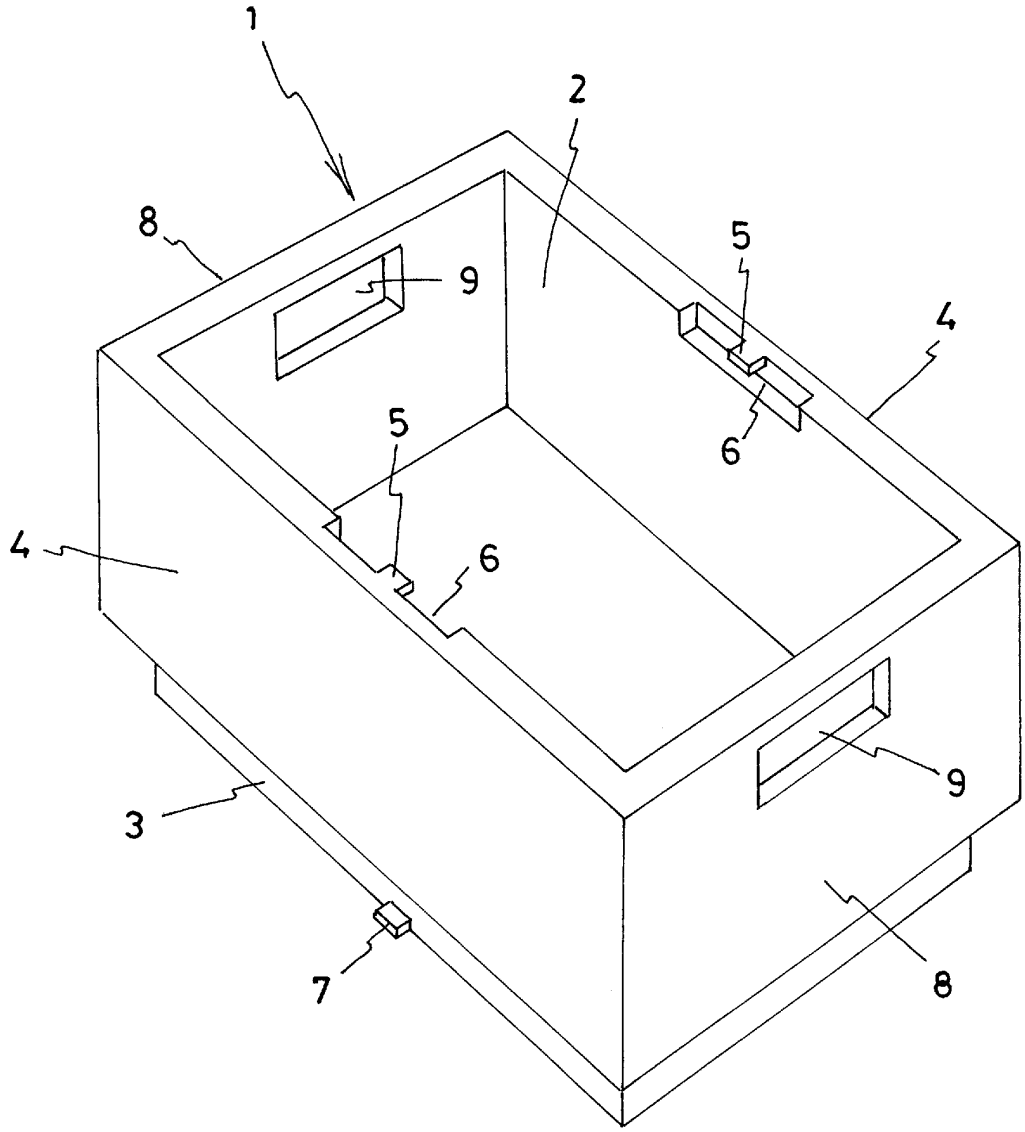
[請求項3] 上記上方舌片が側壁上端面より突出して形成されていることを特徴とする、請求項１に記載の物品収納ケース。

[請求項4] 上記上方舌片の下面に係合凹部が形成され、上記下方舌片の上面に前記上方舌片の係合凹部に嵌入する係合凸部が形成されていることを特徴とする、請求項１に記載の物品収納ケース。

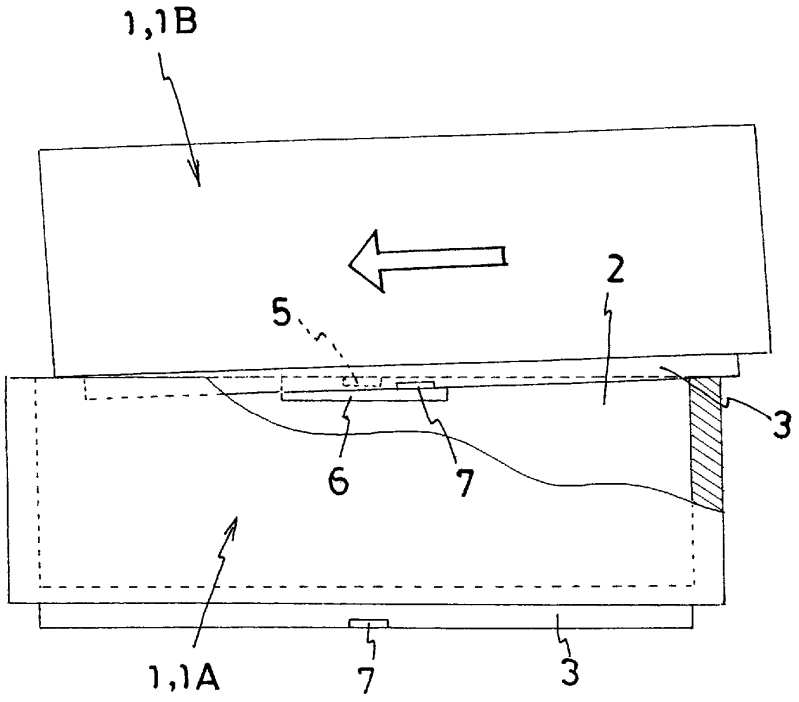
[請求項5] 上記上方舌片が長辺側の対向する側壁に形成され、上記下方舌片が底壁下面の上記脚部を兼ねた凸部に形成されていることを特徴とする、請求項１に記載の物品収納ケース。

[請求項6] 上記ケースの上記上方開口を閉塞する矩形の蓋体であり、該蓋体の下面に凸部を形成し、該凸部を上記ケースの上記上方開口に嵌入させる構成とすると共に、該凸部に上記ケースに形成された上方舌片と係合する舌片を形成したことを特徴とする、請求項１に記載の物品収納ケース。

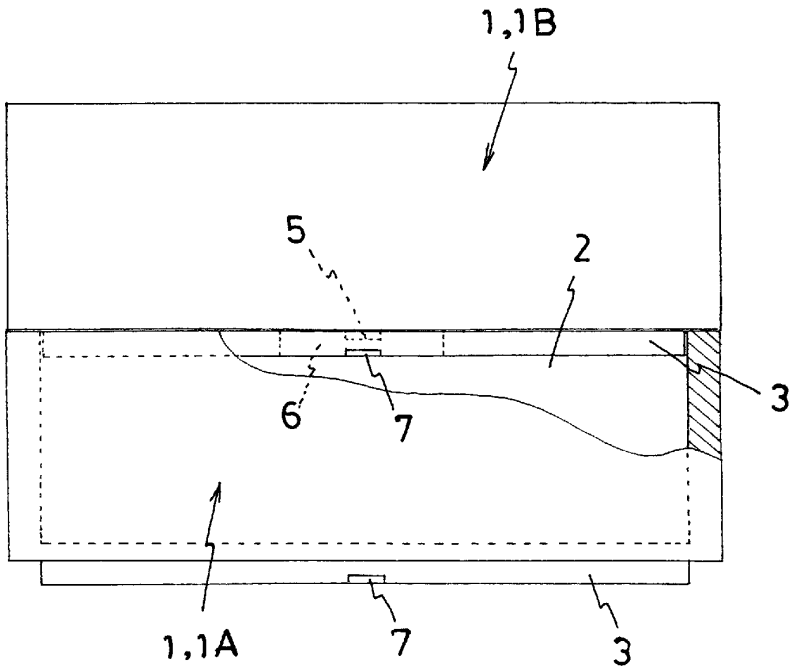
[図1]



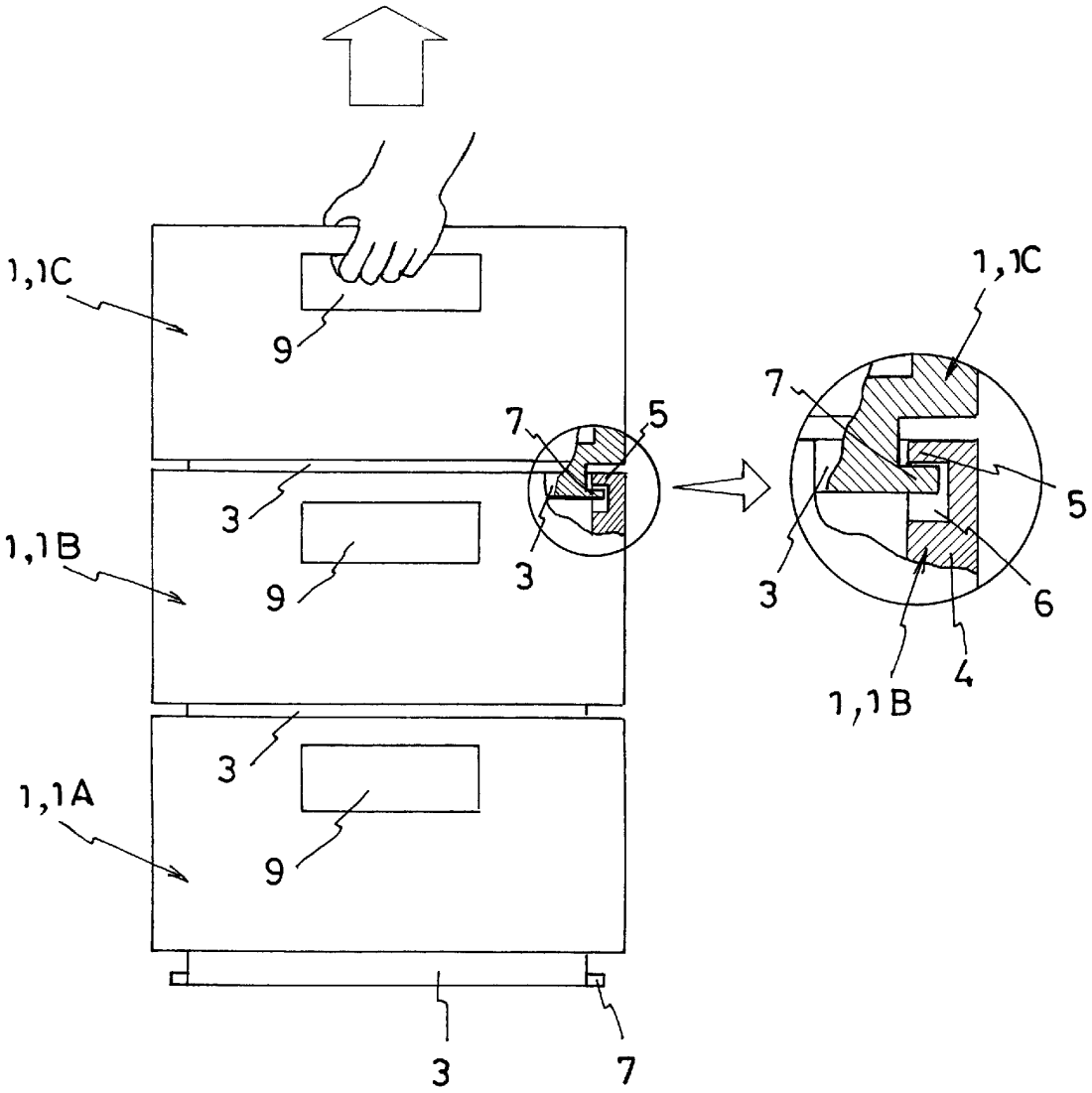
[図2]



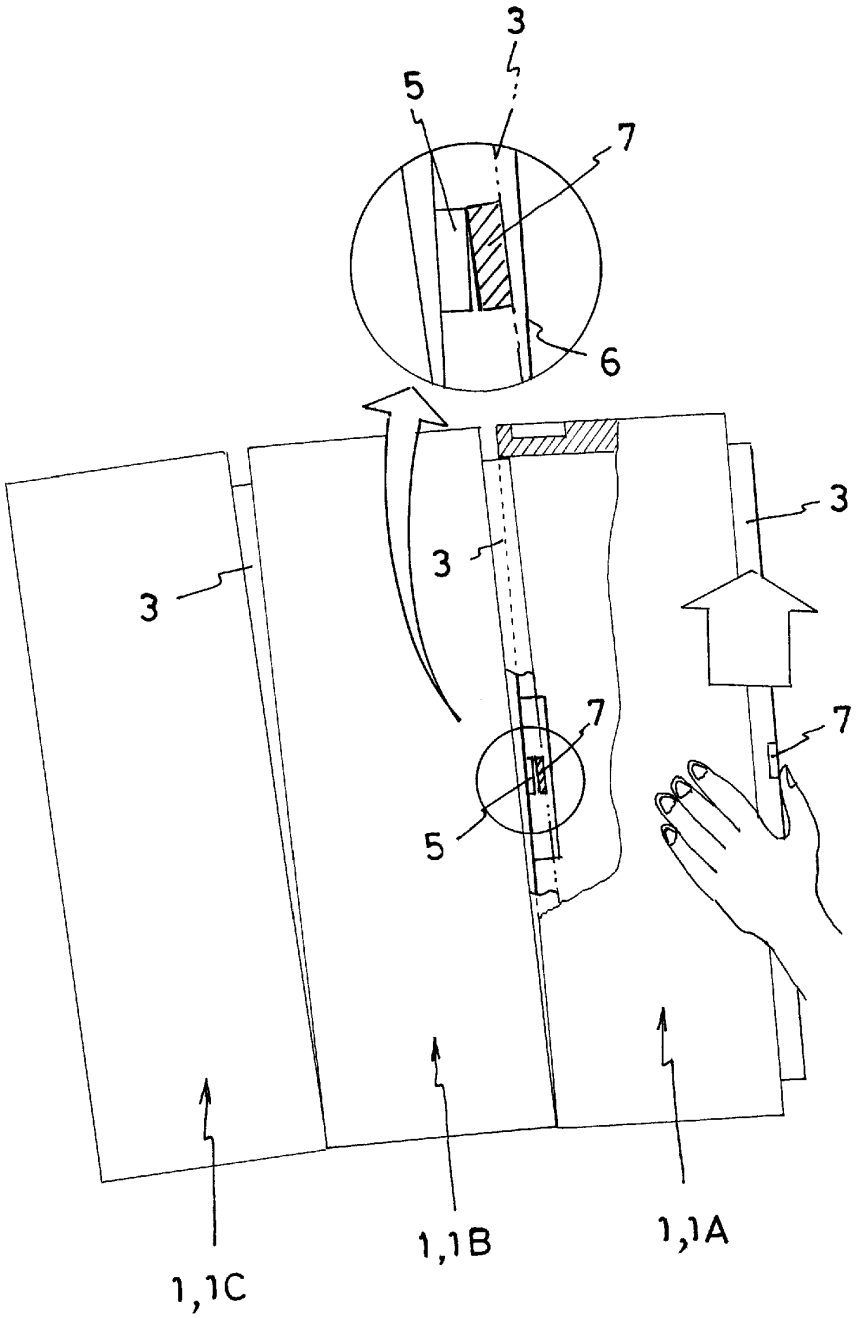
[図3]



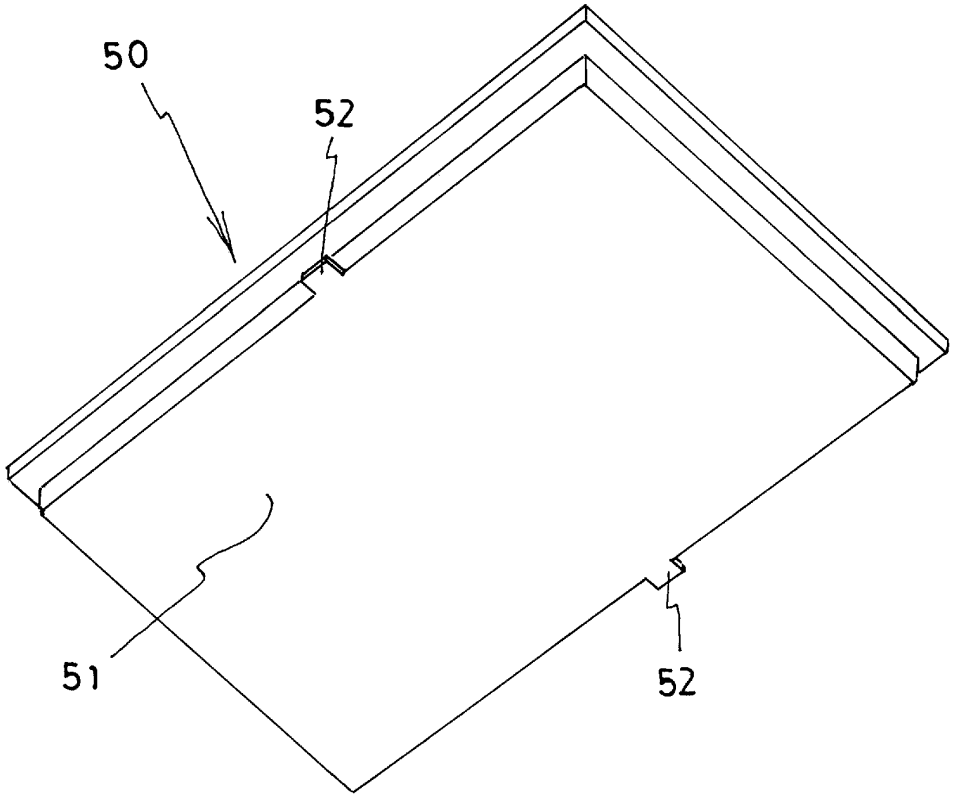
[図4]



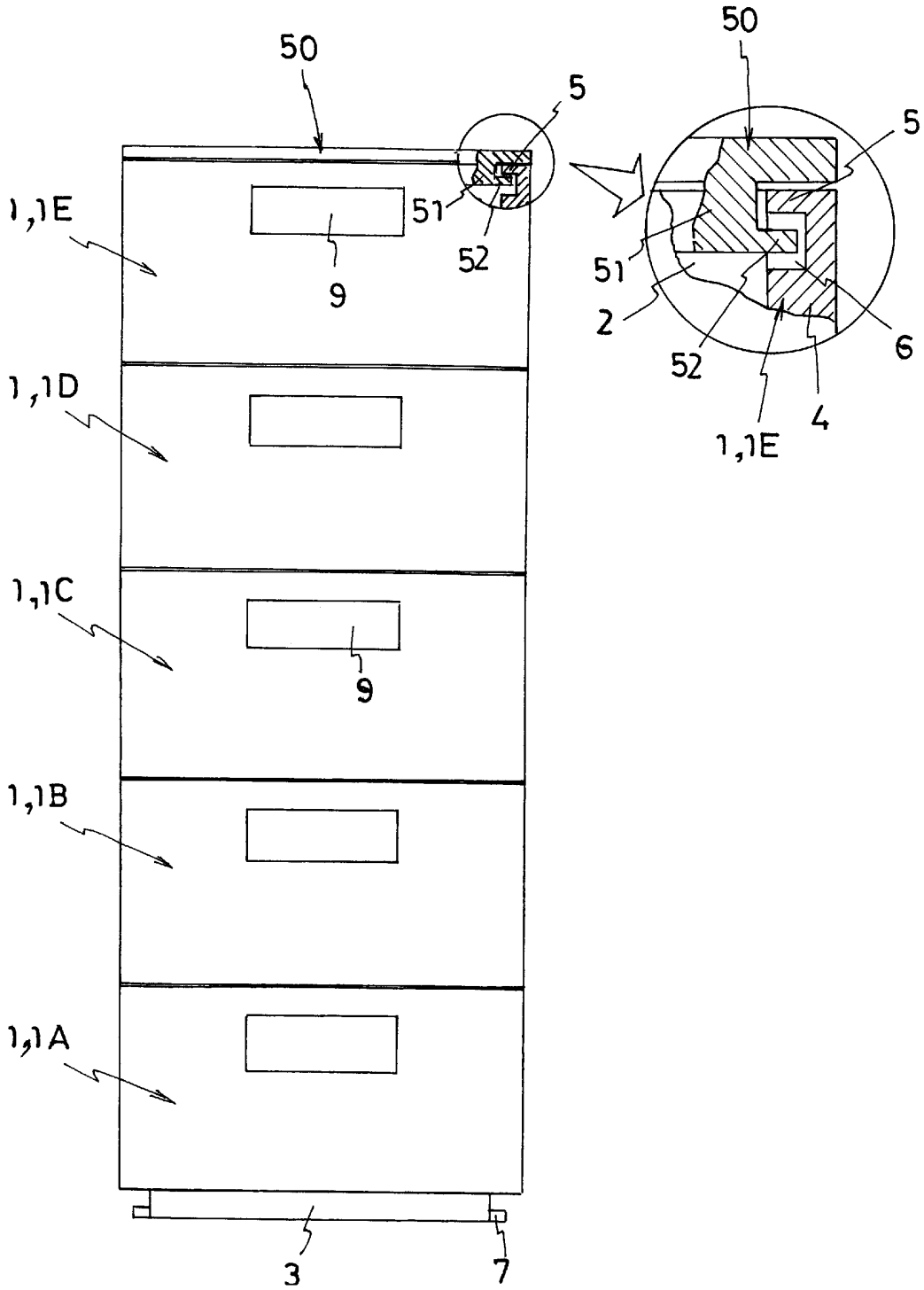
[図5]



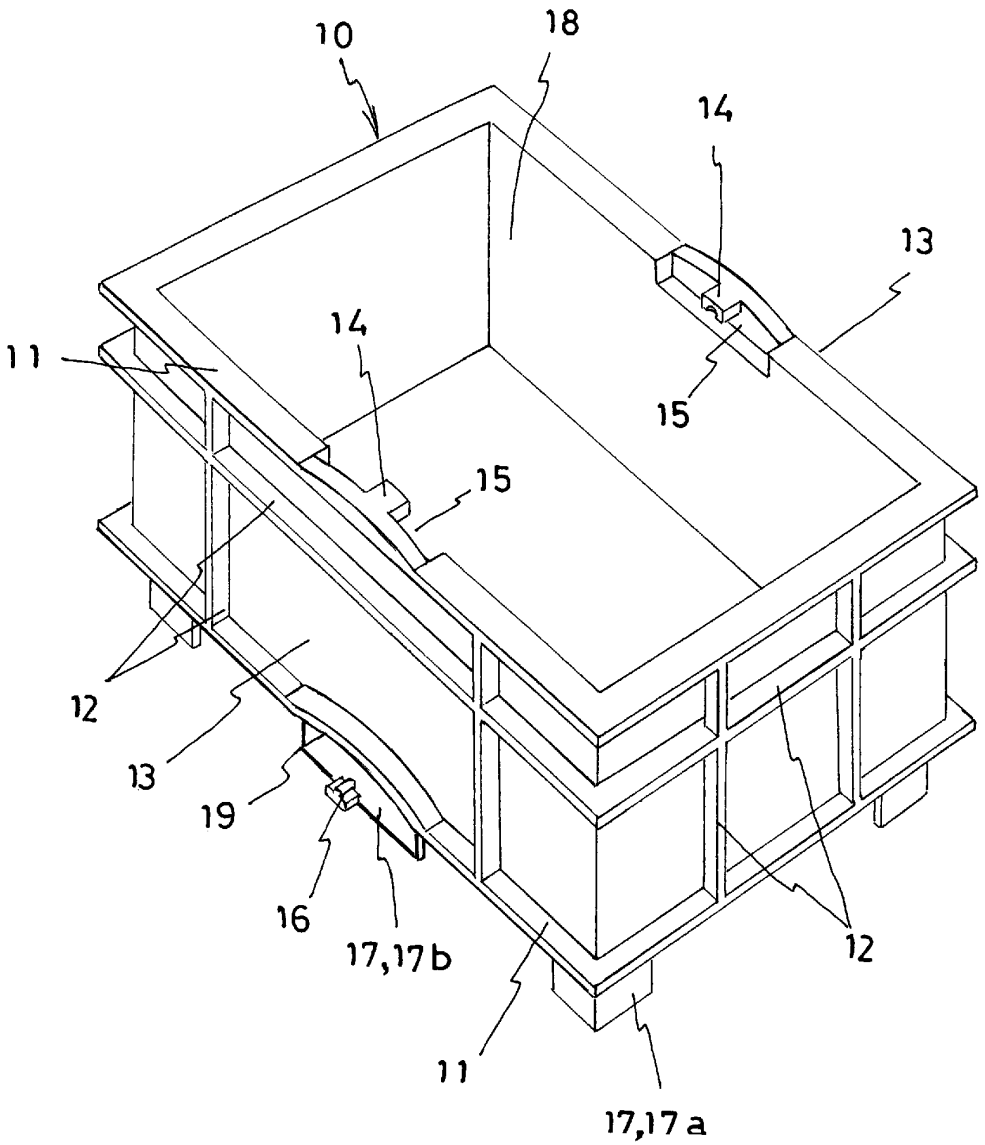
[図6]



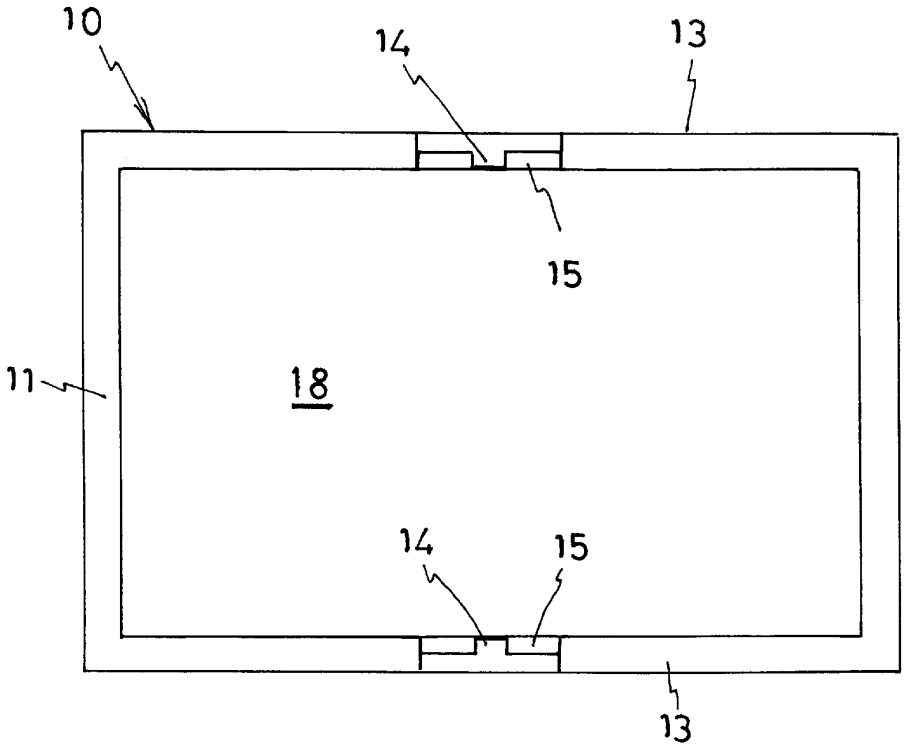
[図7]



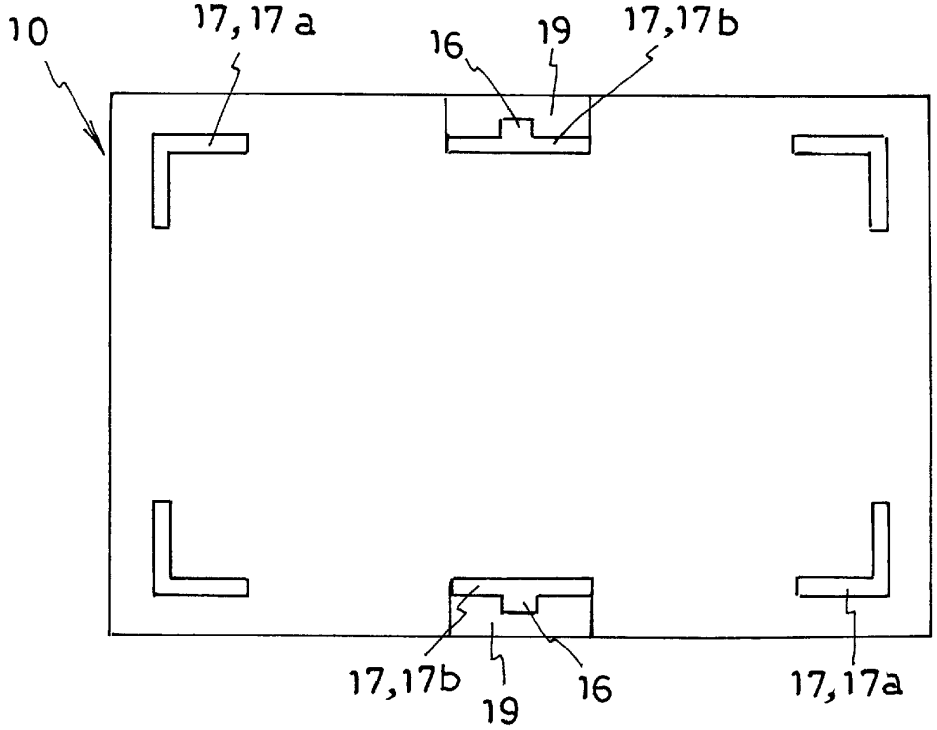
[図8]



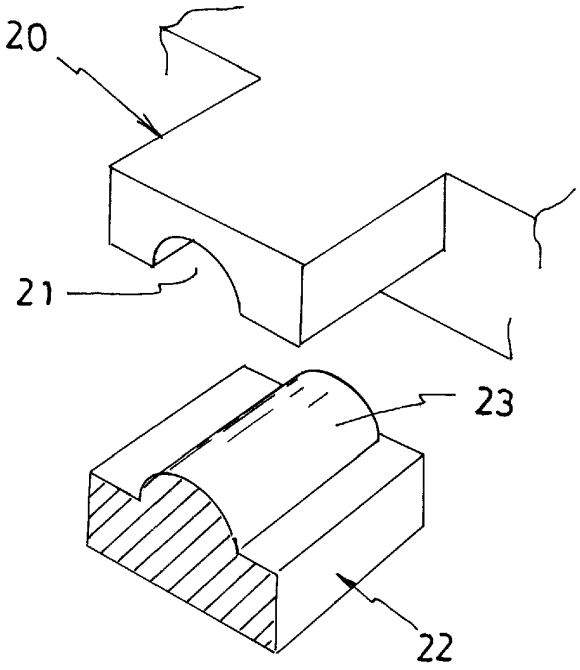
[図9]



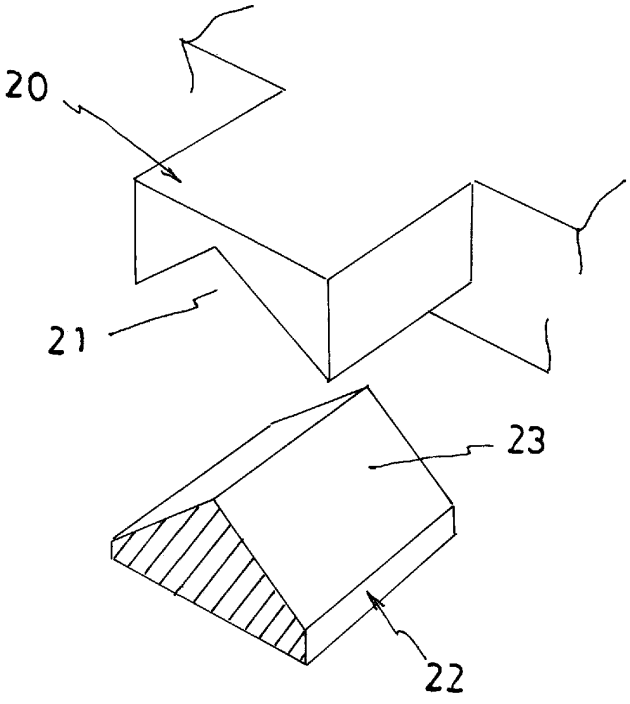
[図10]



[図11]



[図12]



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2017/017322

A. CLASSIFICATION OF SUBJECT MATTER
B65D21/02(2006.01)i, *B65D21/036*(2006.01)i

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)
B65D21/02, B65D21/036

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2017
Kokai Jitsuyo Shinan Koho	1971-2017	Toroku Jitsuyo Shinan Koho	1994-2017

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 141008/1972(Laid-open No. 096229/1974) (Aiho Kagaku Kabushiki Kaisha), 20 August 1974 (20.08.1974), specification, page 1, line 18 to page 2, line 19; fig. 1 to 3 (Family: none)	1,2,5,6 3,4
A	JP 40-033175 Y1 (Sekisui Chemical Co., Ltd.), 19 November 1965 (19.11.1965), (Family: none)	3

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
13 June 2017 (13.06.17)	20 June 2017 (20.06.17)
Name and mailing address of the ISA/ Japan Patent Office	Authorized officer

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2017/017322

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 07-136011 A (Gifu Plastic Industry Co., Ltd.), 30 May 1995 (30.05.1995), (Family: none)	3
A	JP 2009-029516 A (Ingenious Designs L.L.C.), 12 February 2009 (12.02.2009), & US 2009/0026158 A1 & EP 2018816 A1 & KR 10-2008-0061347 A & CN 101352283 A	4
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 027142/1975(Laid-open No. 108943/1976) (Katashi AOKI), 31 August 1976 (31.08.1976), (Family: none)	5

国際調査報告

国際出願番号　ＰＣＴ／ＪＰ２０１７／０１７３２２

Ａ．　発明の属する分野の分類（国際特許分類（ＩＰＣ））

Int.Cl.　B65D21/02(2006.01)i, B65D21/036(2006.01)i

Ｂ．　調査を行った分野

調査を行った最小限資料（国際特許分類（ＩＰＣ））

Int.Cl.　B65D21/02, B65D21/036

最小限資料以外の資料で調査を行った分野に含まれるもの

日本国実用新案公報	１９２２－１９９６年
日本国公開実用新案公報	１９７１－２０１７年
日本国実用新案登録公報	１９９６－２０１７年
日本国登録実用新案公報	１９９４－２０１７年

国際調査で使用した電子データベース（データベースの名称、調査に使用した用語）

Ｃ．　関連すると認められる文献

引用文献のカテゴリー＊	引用文献名　及び一部の箇所が関連するときは、その関連する箇所の表示	関連する請求項の番号
X	日本国実用新案登録出願47-141008号(日本国実用新案登録出願公開49-096229号)の願書に添付した明細書及び図面の内容を撮影したマイクロフィルム（アイホー化学株式会社）1974.08.20, 明細書第１頁第１８行－第２頁第１９行, 第１－３図（ファミリーなし）	１，２，５，６
A	JP 40-033175 Y1（積水化学工業株式会社）1965.11.19,（ファミリーなし）	３，４
A	JP 07-136011 A（岐阜プラスチック工業株式会社）1995.05.30,（ファミリーなし）	３
A		３

☑　Ｃ欄の続きにも文献が列挙されている。　　☐　パテントファミリーに関する別紙を参照。

＊　引用文献のカテゴリー
「A」特に関連のある文献ではなく、一般的技術水準を示すもの
「E」国際出願日前の出願または特許であるが、国際出願日以後に公表されたもの
「L」優先権主張に疑義を提起する文献又は他の文献の発行日若しくは他の特別な理由を確立するために引用する文献（理由を付す）
「O」口頭による開示、使用、展示等に言及する文献
「P」国際出願日前で、かつ優先権の主張の基礎となる出願の日の後に公表された文献
「T」国際出願日又は優先日後に公表された文献であって出願と矛盾するものではなく、発明の原理又は理論の理解のために引用するもの
「X」特に関連のある文献であって、当該文献のみで発明の新規性又は進歩性がないと考えられるもの
「Y」特に関連のある文献であって、当該文献と他の１以上の文献との、当業者にとって自明である組合せによって進歩性がないと考えられるもの
「&」同一パテントファミリー文献

国際調査を完了した日	国際調査報告の発送日
１３．０６．２０１７	２０．０６．２０１７

国際調査機関の名称及びあて先
日本国特許庁（ＩＳＡ／ＪＰ）
郵便番号１００－８９１５
東京都千代田区霞が関三丁目４番３号

特許庁審査官（権限のある職員）　３Ｎ　３４８６
新田　亮二

電話番号　０３－３５８１－１１０１　内線　３３６１

様式ＰＣＴ／ＩＳＡ／２１０（第２ページ）（２０１５年１月）

Ｃ（続き）．　関連すると認められる文献

引用文献のカテゴリー＊	引用文献名　及び一部の箇所が関連するときは、その関連する箇所の表示	関連する請求項の番号
Ａ	JP 2009-029516 A (インジニアス　デザインズ　エルエルシー) 2009.02.12, & US 2009/0026158 A1 & EP 2018816 A1 & KR 10-2008-0061347 A & CN 101352283 A	4
Ａ	日本国実用新案登録出願50-027142号(日本国実用新案登録出願公開51-108943号)の願書に添付した明細書及び図面の内容を撮影したマイクロフィルム（青木固）1976.08.31, (ファミリーなし)	5

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2002 - Page 1347
Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products
IPR2024-01400

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
1 November 2007 (01.11.2007)

PCT

(10) International Publication Number
WO 2007/121745 A1

(51) International Patent Classification:
B65D 21/02 (2006.01)

(21) International Application Number:
PCT/DK2007/000185

(22) International Filing Date: 20 April 2007 (20.04.2007)

(25) Filing Language: Danish

(26) Publication Language: English

(30) Priority Data:
PA 2006 00566 22 April 2006 (22.04.2006) DK

(71) Applicant *(for all designated States except US)*: **J. O. MADSEN APS** [DK/DK]; Hyldevænget 3, DK-5400 Bogense (DK).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **MADSEN, Jens, Ole** [DK/DK]; Hyldevænget 3, DK-5400 Bogense (DK).

(74) Agent: **LARSEN & BIRKEHOLM A/S**; Skandinavisk Patentbureau, Banegårdspladsen 1, P.O. Box 362, DK-1570 Copenhagen V (DK).

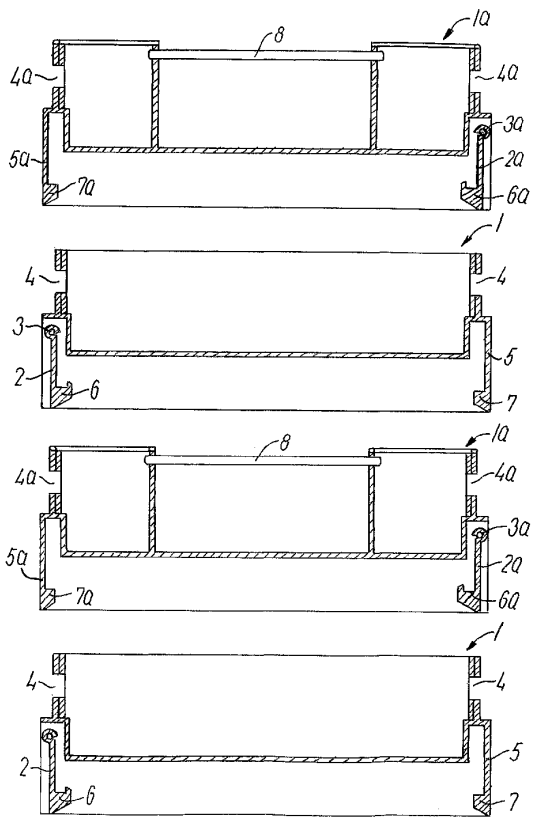
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

[Continued on next page]

(54) **Title:** STACKABLE BOXES AND COVERS



(57) **Abstract:** When stackable boxes (1) are coupled together, which are optionally provided with a cover (1a), all the boxes and covers have locking means, which are formed by at least one gripper part (2, 2a) at their underside, which is preferably biased (2, 3), and which is capable of gripping an edge (4, 4a) provided at the upper side of the boxes or the covers. Hereby, boxes and covers may always be coupled together in an arbitrary order. In a first embodiment, the boxes and the covers have snap locks (2, 2a) and edges (4, 4a) in their gables, while, in a second embodiment, they are constructed with a gripper part and an edge in their one gable, while, in the other gable, they are provided with hooks or flanges which are capable of engaging fixing holes. The stackable boxes may generally be used as a storage device.

WO 2007/121745 A1

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

STACKABLE BOXES AND A STORAGE DEVICE

The invention relates to stackable boxes which may be coupled to each other by locking means, said locking means being formed by locking parts at the bottom of a box which are capable of cooperating with locking means at the top of a box, wherein a removable cover has locking means at the bottom which are of the same type as the locking means at the bottom of a box.

The invention moreover relates to a storage device.

Stackable boxes are known e.g. from DE Utility Model No. 78 28 640. These known boxes, which may have mutually different heights, may be coupled to each other and be terminated at the top by a cover.

EP 555 533 B1 also discloses stackable boxes which may be coupled together.

According to this patent, all the boxes have a cover which is confined between two boxes when the boxes are clamped together.

Thus, the boxes are clamped together analogously with the boxes in the above-mentioned utility model, but with a cover which is arranged between the boxes.

Accordingly, an object of the invention is to provide stackable boxes with or without a cover, which may be coupled together in order to achieve a more flexible stacking, where boxes and covers may be coupled together in an arbitrary order.

The object of the invention is achieved by stackable boxes of the type de-

fined in the introductory portion of claim 1, which is characterized in that the cover has locking means at the top of the cover which are of the same type as the locking means at the top of a box.

Hereby, boxes and covers may be coupled together in an arbitrary order.

For instance, three boxes without a cover may be coupled together, or two boxes without a cover may be coupled together with a box having a cover, and in an arbitrary order.

It is even possible to stack several covers on top of each other, if the teachings in claim 1 are followed.

A user-friendly way of configuring the boxes and the covers is, as stated in claim 2, that the locking means at the bottom of the boxes and the covers are formed by at least one snap lock, which is adapted to grip an edge at the top of the boxes or the covers.

Expediently, as stated in claim 3, the covers and the boxes have two snap locks and two edges, and, as stated in claim 4, at least one snap lock is biased, which results in an embodiment which makes it easy to couple-together the stackable boxes and covers and to separate them from each other.

When, as stated in claim 5, the cover is provided with a carrier grip which is recessed into the cover, and, as stated in claim 6, the covers and the boxes have a snap lock at the bottom and an edge at the top in their one gable, while they have hooks or flanges at the bottom in their opposite gable, which are capable of engaging fixing holes positioned at the top of the cover or the box, it is advantageously ensured that the snap locks of the stackable boxes are not subjected to loads, which may occur if the stack-

able boxes are very heavy, as the separation of the boxes from each other takes place in that the one snap lock is loosened from its edge on an underlying box or cover, following which the loosened box and the overlying boxes are pushed to the side, and then the carrier grip is used for lifting the boxes away from the underlying boxes.

When the boxes are coupled together, they are moved laterally inwards, whereby the hooks or the flanges extend into the fixing holes, while the snap lock automatically locks the boxes to each other.

Finally, as stated in claim 7, it is possible that the snap locks are arranged in the gables or on the sides of the boxes and the covers.

As mentioned, the invention also relates to a storage device.

This storage device is characterized in that each cover has upper and lower coupling means which are of the same type as the upper and lower coupling means of the boxes, whereby, when the boxes are stacked on top of each other, the lower coupling means of each cover cooperates with the upper coupling means of an associated box, and if this box is positioned at the bottom in the stack, its upper coupling means cooperates with the lower coupling means of the overlying box in order to couple covers and boxes together.

An expedient embodiment of the storage device is defined in claim 9.

The invention will now be explained more fully with reference to the drawing, in which

fig. 1 shows a box with a snap lock and an edge according to the invention,

fig. 2 shows two boxes with a cover which are coupled together, while

fig. 3 shows two boxes and two covers in a separated state, seen from the

side in section, but with a snap lock modified relative to fig. 2.

It is noted initially that the parts which the covers have in common with the boxes are provided with the same reference numerals as the boxes, but with a suffixed "a".

In fig. 1, the numeral 1 indicates a box which has locking means in the form of a snap lock 2 near its bottom in its one gable, said snap lock being formed by a plate which may rotate about a shaft.
The snap lock is biased by a spring 3 so that its plate will normally be flush with the vertical wall of the gable.
At its top, the box has an edge 4 which is adapted to receive a snap lock from another box or a cover, as will be explained below.
Finally, at its opposite end, the box has another snap lock, which, however, need not be biased by a spring, but may be made of a resilient material, cf. also fig. 3.
Further, the snap lock 2 and the edge 4 are configured in the same manner as described in the applicant's own EP 0 799 115.

Fig. 2 shows two boxes with covers which are coupled together.
At their lower side, the boxes have snap locks 2 which are biased by a spring 3.
At their lower side, the covers have snap locks 2a which are biased by a spring 3a.
At the upper side of the covers, which have a recessed carrier grip 8, edges 4a are arranged, which are adapted to grip snap locks 2, 2a from an overlying box, or, although it is not shown, snap locks 2a from an overlying cover.

In figure 3, the boxes and the covers have a spring-biased snap lock 2, 2a at their one end, while the snap lock 5, 5a at the opposite ends may be

made of a resilient material.

The spring-biased snap locks 2, 2a have engagement faces 6, 6a, while the snap locks of a resilient material have engagement faces 7, 7a.

When the boxes and the covers are assembled, as shown in fig. 3, a cover having a snap lock 5a without a spring is caused to engage an edge 4 on an underlying box 1 with its engagement face 7a by lateral displacement of the cover. Then, the snap lock 2a with the spring 3a will engage the edge 4 on the box, whereby the cover is coupled to the box.

The process may be repeated so that a plurality of covers and boxes may be coupled together in an arbitrary order, however, the covers may also be coupled to each other.

However, it is also possible to arrange hooks or flanges at the opposite gable, which may engage fixing holes, which, however, are not shown in the figures.

Finally, it should be mentioned that, although it is not shown in the figures, it is also possible to couple two or more covers together on top of each other.

As will be appreciated, the invention provides an extremely flexible stackable box system, where boxes and covers may be coupled together and be separated in an arbitrary order, where the stackable box system may serve as a general storage device.

PATENT CLAIMS

1. Stackable boxes (1) which may be coupled to each other by locking means, said locking means being formed by locking parts at the bottom of a box which is capable of cooperating with locking means at the top of a box, wherein a removable cover (1a) has locking means at the bottom which are of the same type as the locking means at the bottom of a box, c h a r a c – t e r i z e d in that the cover has locking means (4a) at the top of the cover which are of the same type as the locking means (4) at the top of a box.

2. Stackable boxes according to claim 1, c h a r a c t e r i z e d in that the locking means at the bottom of the boxes and the covers are formed by at least one snap lock (2, 2a), which is adapted to grip an edge (4, 4a) at the top of the boxes or the covers.

3. Stackable boxes according to claim 2, c h a r a c t e r i z e d in that the covers (1a) and the boxes (1) have two snap locks (2a, 5a, 2, 5) and two edges (4a, 4).

4. Stackable boxes according to claims 2 – 3, c h a r a c t e r i z e d in that at least one snap lock (2, 2a) is biased (3).

5. Stackable boxes according to claims 1 – 4, c h a r a c t e r i z e d in that the covers (1a) are provided with a carrier grip (8) which is recessed in the cover.

6. Stackable boxes according to claim 2, 4 or 5, c h a r a c t e r i z e d in that the covers (1a) and the boxes (1) have a snap lock (2, 2a) at the bottom and an edge (4, 4a) at the top in their one gable, while they have hooks or flanges at the bottom in their opposite gable which are capable of engaging fixing holes provided at the top of the cover or the box.

7. Stackable boxes according to claims 1 – 6, c h a r a c t e r i z e d in that the snap locks (2) are provided in the gables or on the sides of the boxes and the covers.

8. A storage device comprising two boxes which may be coupled together in a stack on top of each other, wherein the boxes have upper and lower coupling means, and wherein, when the boxes are stacked on top of each other, the lower coupling means of the upper box cooperates with the upper coupling means of the lower box in order to couple the boxes together, and wherein at least one of the boxes is provided with a cover, c h a r a c t e r – i z e d in that each cover has upper and lower coupling means which are of the same type as the upper and lower coupling means of the boxes, whereby, when the boxes are stacked on top of each other, the lower coupling means of each cover cooperates with the upper coupling means of the associated box, and if this box is positioned at the bottom in the stack, its upper coupling means cooperates with the lower coupling means of the overlying box in order to couple covers and boxes together.

9. A storage device according to claim 8, wherein the lower coupling means of each box and of each cover comprises at least one snap coupling, and wherein the upper coupling means of each box and of each cover comprises at least one edge for cooperation with respective snap couplings.

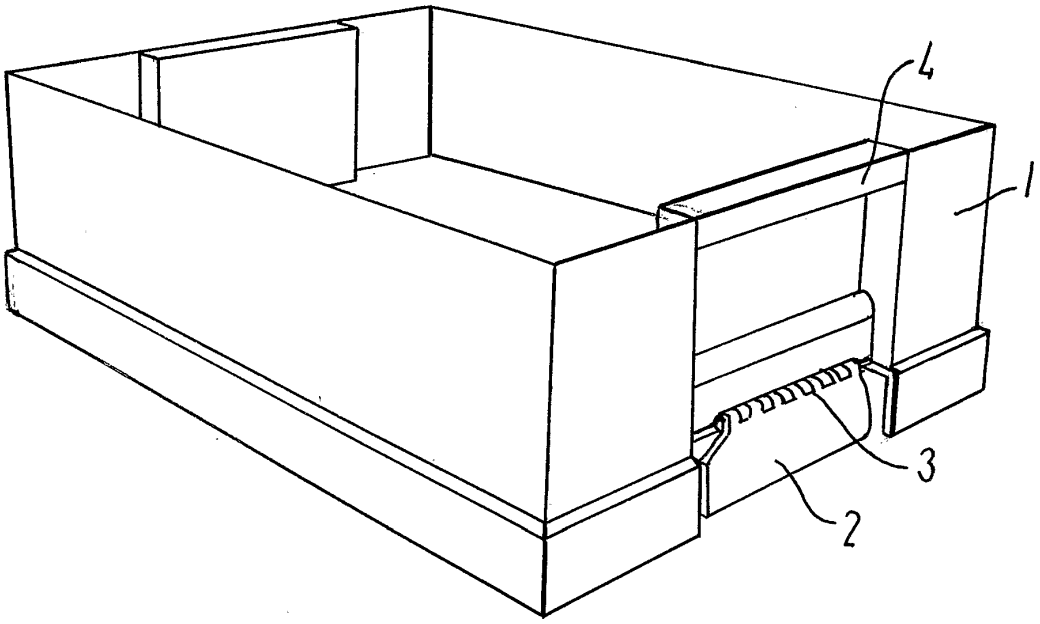


FIG. 1

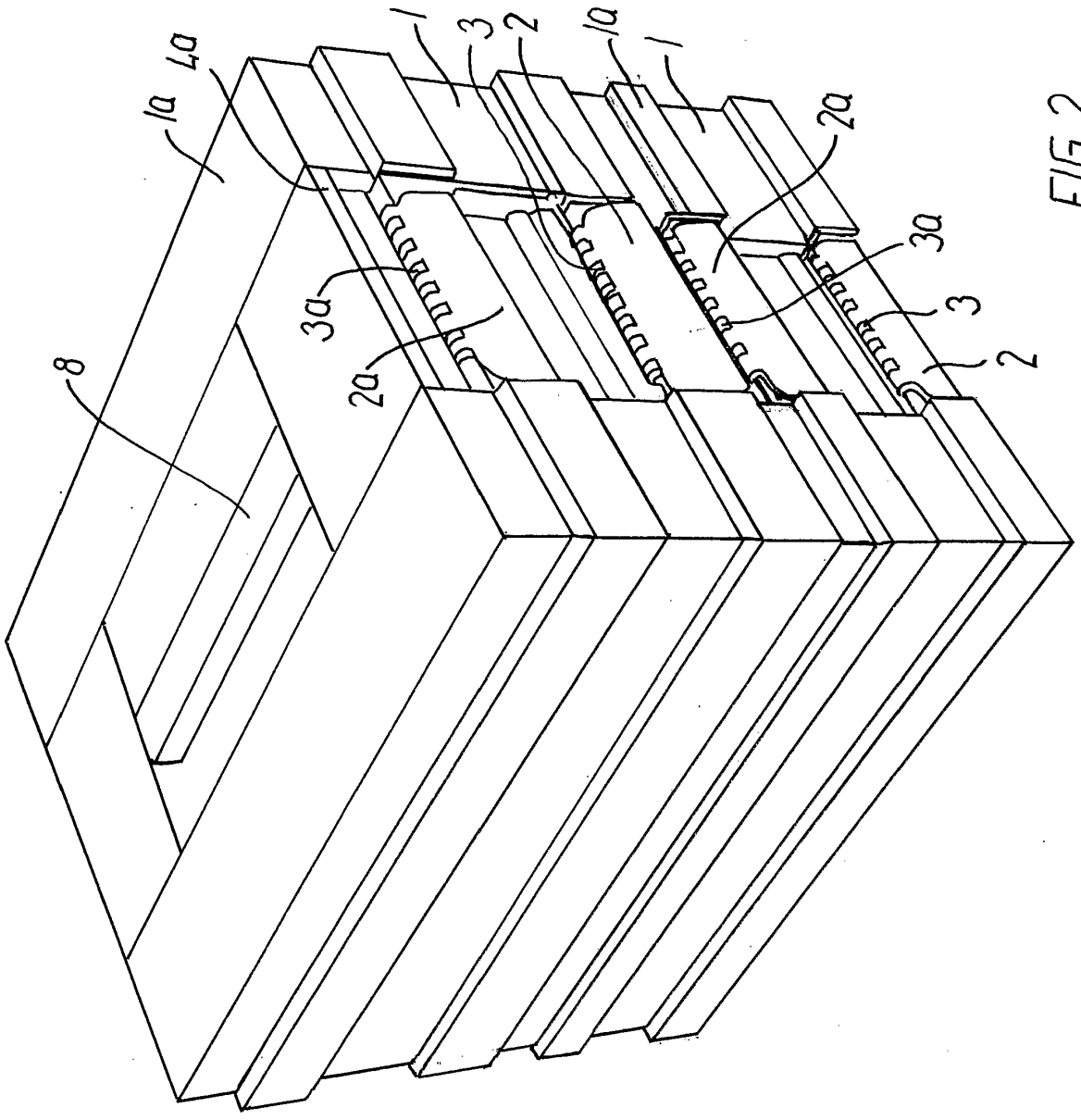
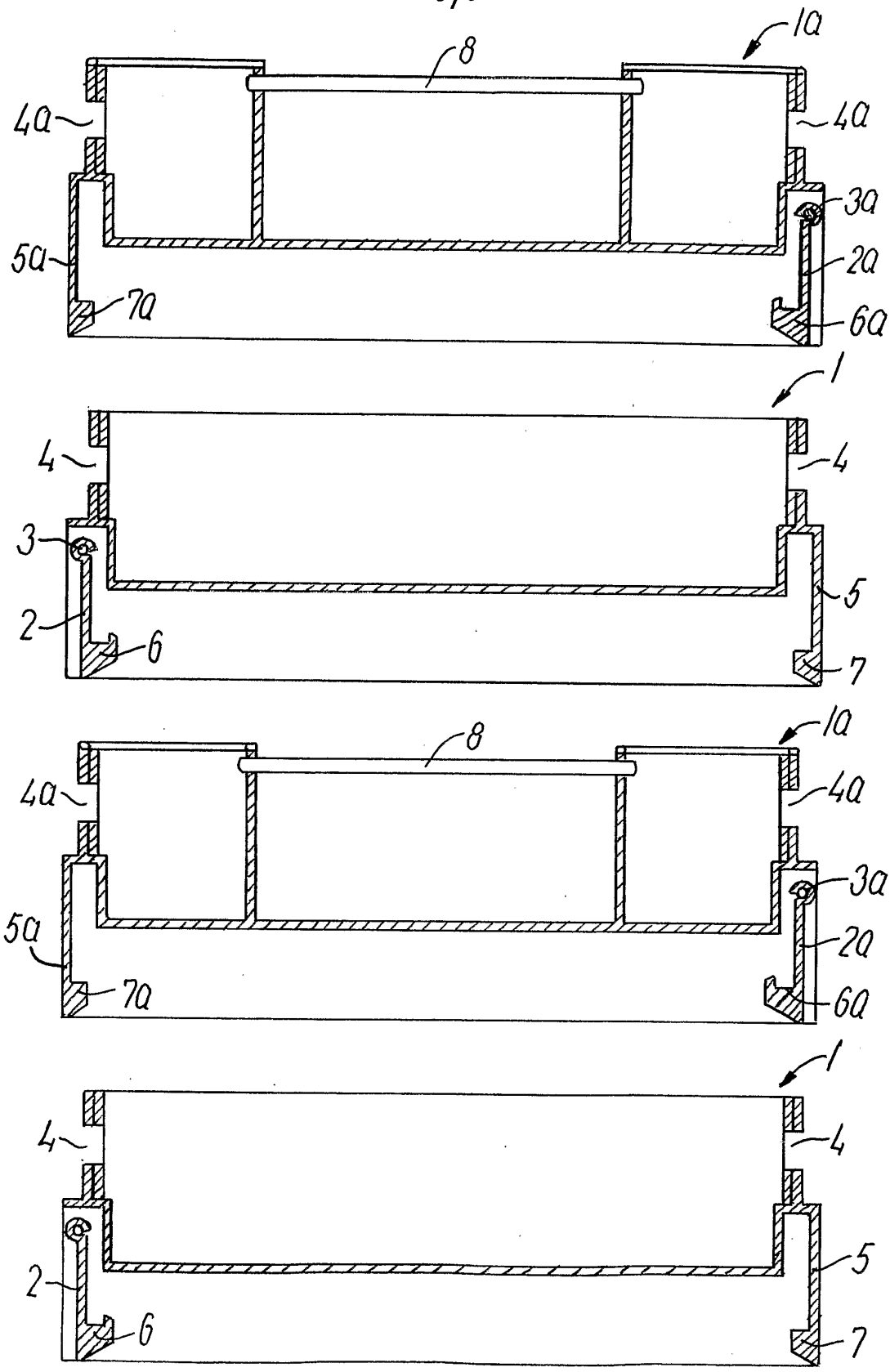


FIG. 2


1a
8
4a
4a
3a
5a
2a
7a
6a
1
4
4
3
5
2
6
7
1a
8
4a
4a
3a
5a
2a
7a
6a
1
4
4
5
2
6
7

INTERNATIONAL SEARCH REPORT

International application No
PCT/DK2007/000185

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65D21/02

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)
A45C B65D B25H

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 practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 42 01 264 A1 (FESTO KG [DE]) 22 July 1993 (1993-07-22) cited in the application column 1, line 35 - line 44	1,8
A	DE 94 06 521 U1 (JACOB FRANK [DE]) 14 July 1994 (1994-07-14) page 3, line 5 - line 14; figures 1-5	1,8
A	DE 78 28 640 U1 (ROX LEDERWARENFABRIKEN HAMANN KG, 8911 HOFSTETTEN) 4 January 1979 (1979-01-04) cited in the application figure 1	1,8

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* 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 document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 July 2007	30/07/2007

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Sundell, Olli

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/DK2007/000185

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
DE 4201264	A1	22-07-1993	AT	109744 T	15-08-1994
			EP	0555533 A1	18-08-1993
DE 9406521	U1	14-07-1994	NONE		
DE 7828640	U1	04-01-1979	NONE		

Form PCT/ISA/210 (patent family annex) (April 2005)

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
09 November 2017 (09.11.2017)

WIPO | PCT

(10) International Publication Number
WO 2017/191628 A1

(51) International Patent Classification:
B25H 3/02 (2006.01) *B65D 21/02* (2006.01)

(21) International Application Number:
PCT/IL2017/050481

(22) International Filing Date:
30 April 2017 (30.04.2017)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
62/330,334 02 May 2016 (02.05.2016) US
62/459,076 15 February 2017 (15.02.2017) US

(71) Applicant: **KETER PLASTIC LTD.** [IL/IL]; 2 Sapir st., Industrial Zone, 4685206 Herzeliya (IL).

(72) Inventor: **BRUNNER, Yaron**; Kibbutz Gvat, P.O.B. 248, 3657900 Kibbutz Gvat (IL).

(74) Agent: **SOKOL, Edith**; Reinhold Cohn And Partners, P.O Box 13239, 6113102 Tel Aviv (IL).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report (Art. 21(3))*

(54) Title: UTILITY ASSEMBLY AND COUPLING MECHANISM

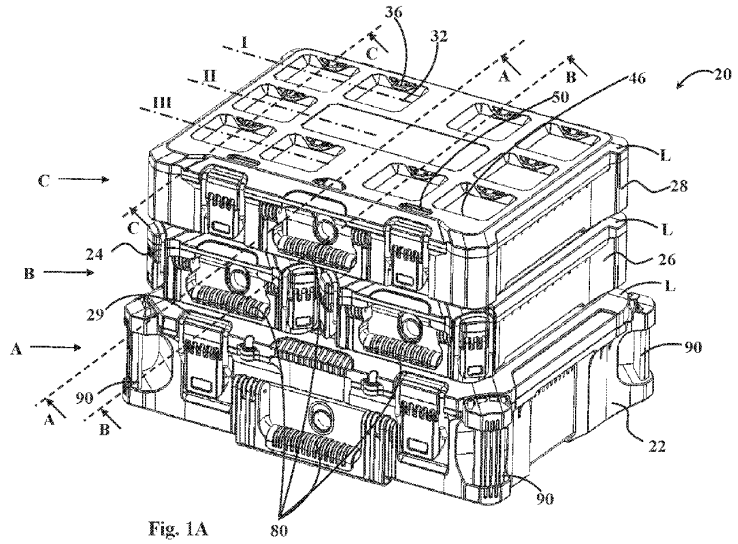


Fig. 1A

(57) Abstract: The present disclosure concerns a coupling mechanism for detachably attaching two or more utility modules to one another, utility assembles, mobile carriers and other attachable modules and articles.

WO 2017/191628 A1

UTILITY ASSEMBLY AND COUPLING MECHANISM

TECHNOLOGICAL FIELD

The present disclosure is directed to a container assembly and more specifically to a utility assembly comprising two or more detachably attachable utility modules. The disclosure is further concerned with a coupling mechanism facilitating detachably attaching the utility modules to one another.

The term 'utility *module'* is used hereinafter in its broad meaning and is meant to denote a variety of articles such as, storage containers, travel luggage, tool boxes, organizers, compacted work benches, cable storage, tools (e.g. hand tools, power generators and power sources), communication modules, carrying platforms, locomotion platforms, etc., of any shape and size, and wherein any utility module can be detachably attached to any other utility module.

The term *'utility assembly*' as used herein denotes any set of utility modules configured for articulation to one another, either as a stationary unit or locomotive.

GENERAL DESCRIPTION

A first aspect of the disclosure concerns a coupling mechanism configured for readily detachably attaching any first article to any second article, wherein any first article and any second article can be any utility module.

The coupling mechanism comprises a male coupler at a face of one of the first utility module and the second utility module, and a female coupler at a face of the other one of the first utility module and the second utility module, said female coupler has a depressed locking location configured with at least one locking rib extending above a depressed surface and along a sliding path, and having an open edge facing in a first sense; said male coupler has a projecting locking location disposed in register with said depressed locking location and configured with at least one locking tongue extending along said engaging sliding path at a second sense, opposite to said first sense, and configured for arresting engagement at a space between said locking rib and depressed surface, the coupling mechanism further comprises at least one locking member for

arresting the first utility module with respect to said second utility module and preventing sliding displacement along said sliding path.

The arrangement is such that at a locked position of a utility assembly the at least one locking tongue of the male coupler engages below said at least one locking rib of the female coupler and the at least one locking member is engaged, thus preventing any respective displacement between the first utility module and the second utility module, and retaining the coupling mechanism at an engaged and locked position.

The term *'first utility module'* as used herein denotes any utility module bearing at least one second utility module over a first surface thereof. The second utility module of a utility assembly may comprise three or more stages of utility modules, and functions as first utility module with respect to a third stage utility module mounted thereover and serving in turn as a second utility module.

According to certain embodiments, one or more female couplers are configured at the top face of the first utility module, and one or more male couplers are configured at the bottom face of the second utility module

The disclosed subject-matter is directed to a utility module configured with at least one of a male coupling mechanism and a female coupling mechanism of the disclosure, a module assembly comprising one or more utility modules of the aforementioned type and a set of utility modules of the aforementioned type.

According to a configuration of the first aspect, there is provide a utility assembly comprising at least a first utility module and at least a second utility module, and comprising a coupling mechanism configured between the first utility module and the second utility module; said coupling mechanism comprising at one of a top face of the first utility module and a bottom face of the second utility module one or more depressed locking locations each configured with a locking rib, and at least one locking latch arresting location; and the other one of said top face of the first utility module and a bottom face of the second utility module comprises one or more projecting portions each configured with a locking tongue disposed in register with said one or more depressed locking locations, and at least one locking latch disposed in register with said at least one locking latch arresting location.

The arrangement is such that, at a locked position, the bottom face of the second utility module at least partially rests over the top face of the first utility module, and the one or more projecting tongues are arrested by the corresponding one or more locking

ribs, and the at least one locking latch is arrested by corresponding at least one locking latch arresting location, thereby preventing sliding displacement between the first utility module and the second utility module, and further wherein disengaging the second utility module from the first utility module is facilitated by disengaging the at least one locking latch from the at least one locking latch arresting location.

Locking engagement between the second utility module and the first utility module is obtained when the one or more depressed locking locations and the one or more projecting portions are disposed behind one another (though not necessarily aligned).

According to a particular configuration of the coupling mechanism, the one or more depressed locking locations and the one or more locking latch arresting locations are configured at the top face of the first utility module, and the one or more projecting portions and the at least one locking latch are configured at the bottom face of the second utility module. According to this configuration, locking between the first utility module and the second utility module is obtained by positioning the second utility module over the second utility module such that one or more locking tongues of the projecting portions engages with one or more respective locking ribs of the depressed locking locations, and wherein the locking latch interlocks with the respective locking latch arresting location.

The arrangement being such that the attaching engagement between the second utility module and the first utility module takes place when the one or more locking tongues and the corresponding one or more respective locking ribs are engaged, thereby preventing vertical separation between the utility modules (i.e. preventing lifting of the second utility module of the first utility module), and further when the locking latch is arrested by the respective locking latch arresting location, thereby preventing sliding displacement of the utility modules one with respect to the other (i.e. sliding displacement of the second module over the first module).

Disengaging the second utility module from the first utility module can be facilitated only after disengaging the locking latch from said locking latch arresting location.

According to a second aspect of the disclosure there is disclosed a coupling mechanism for a utility assembly comprising at least a first utility module and at least a second utility module, said coupling mechanism is configured between the first utility

module and the second utility module and comprises at one of a top face of the first utility module and a bottom face of the second utility module with at least one depressed locking location configured with a locking rib, and at least one locking latch arresting location; and the other one of said top face of the first utility module and a bottom face of the second utility module comprises at least one projecting portion with a locking tongue disposed in register with said at least one depressed locking location, and at least one locking latch disposed in register with said at least one locking latch arresting location; and wherein at a locked position the bottom face at least partially rests over the top face, and the at least one projecting tongue is arrested by the corresponding at least one locking rib and the at least one locking latch is arrested by corresponding at least one locking latch arresting location, and further wherein disengaging the second utility module from the first utility module is facilitated by disengaging the at least one locking latch from the at least one locking latch arresting location.

Engaging the first and second utility modules into the locked position is provided by sliding the second utility module with respect to the first utility module along a sliding path defined by at least one of said at least one locking rib and said at least one locking tongue.

According to one particular configuration the at least one locking rib extends substantially parallel to the sliding path and according to another configuration the at least one locking rib extends substantially perpendicular and intersects the sliding path.

A third aspect of the present disclosure is directed to a utility module being a mobile carrier unit and comprising at least one carrier engagement surface, compatible for interlocking engagement in a detachable manner with a first engagement surface of a utility module.

The term *carrier unit* as used herein denotes any kind of propelled cart configured for detachably attaching and carrying load. The carrier unit may be a hand cart, a mobile tool cart, a mobile workshop, traveling luggage cart, a trolley, etc.

With particular reference to the third aspect, the carrier engagement surface can be larger than the utility module's first engagement surface corresponding with it. In this case, several utility modules may be interlocked simultaneously upon one carrier unit.

According to one configuration there is disclosed a carrier unit comprising a manipulating arrangement, a locomotion system, and an engagement surface comprising

one or more engaging elements. The carrier unit is designated for detachable interlocking engagement with one or more utility modules, each comprising a first engagement surface configured with one or more first engaging elements compatible for detachable interlocking engagement with the carrier engaging elements.

According to yet configuration there is disclosed an assembly comprising a carrier unit comprising an engagement surface comprising one or more engaging elements, and at least one utility module configured with at least one first engagement surface comprising one or more first engaging elements compatible for detachable interlocking engagement with the carrier unit's engaging elements.

According to a modification of this aspect, there is also provided a container unit comprising a top member configured with a second engagement surface of the utility module, said top member, according to one example constitutes a cover of the utility module.

The arrangement is such that a container unit can be readily and easily applied over and interlockingly articulated to a carrier unit, or over a utility module configured with a second engagement surface mimicking the first engagement surface second engagement surface mimicking the first engagement surface of the carrier unit.

Engagement between the carrier unit and the container, and further between two containers, is facilitated by any locking mechanism of the disclosure hereinabove and hereinafter.

According to a specific example, there is a latching mechanism, wherein the first engaging elements of the carrier unit are configured for interlocking engagement with engaging elements of the mating surface of the respective utility module. The latching mechanism may assume various configurations, e.g. male-female couplings, dovetail couplings, and the like. The arrangement being such that only a minor displacement is required in order to lockingly mount, and respectively detach, a utility module over the carrier unit.

According to one specific configuration, the detachable interlocking engagement mechanism between the carrier engaging elements and the utility module`s first engaging elements is a dovetail engagement mechanism, comprising laterally projecting shoulders configured on one of the carrier engagement surfaces and the first engagement surface of a utility module, and a shoulder receiving recess configured on the other one of one of the carrier engagement surfaces and the first engagement surface

of a utility module; where said laterally projecting shoulders are configured for sliding engagement with said shoulder receiving recess.

According to a particular configuration, one or both of the carrier engagement surfaces and the first engagement surface of a respective utility module are configured with depressions, each accommodating respective laterally projecting locking shoulders.

Said dovetail engagement mechanism members constitute said engaging elements, wherein said carrier engaging elements comprise one of said dovetail engagement members, while the utility module`s first engaging element comprises the respective said dovetail engagement member.

According to another configuration, the detachable interlocking engagement mechanism between the carrier engaging elements and the utility module`s first engaging elements is an undercut engagement mechanism, comprising lateral projections configured on one of the carrier engagement surfaces and the first engagement surface of a container unit, and a receiving recess configured on the other one of one of the carrier engagement surfaces and the first engagement surface of a utility module; where said lateral projections are configured for engagement with said receiving recess.

Interlocking engagement of the utility module and the carrier unit takes place by placing the first engagement surface of a utility module over the carrier engagement surface, such that the utility module`s first engaging elements are disposed shifted over the respective carrier engaging elements of the carrier unit, and are then slidingly shifted to obtain sliding interlocking engagement therebetween.

The detachable interlocking engagement mechanism may further comprise a locking mechanism configured for preventing unintentional detaching of the slidingly engaging elements once they are fully interlocked, i.e. to prevent detaching of the utility module from the carrier unit or from another utility module.

According to one configuration, the locking mechanism, comprises a locking pin that is configured for snapingly protruding from one of the engagement surfaces into a designated nook on the other engagement surface. This prevents the engaging surfaces from sliding relatively to each other, and by that it prevents said engaging elements from being slidingly separated once interlocked.

According to one configuration, the carrier engagement surface of the carrier unit constitutes a top wall of the carrier unit, when the carrier unit is balanced

horizontally to the ground, and wherein the utility module`s first engagement surface constitutes a bottom wall of the container unit, when the utility module is balanced horizontally to the ground. The utility module can further comprise a second engagement surface constituting its top wall, or a cover, when the utility module is balanced horizontally to the ground. The second engagement surface of the utility module simulates the carrier engagement surface as it is compatible for engaging with another utility module's first engagement surface.

Any one or more of the following features, designs and configurations, can be implemented in a utility module, a utility assembly, locking mechanism, and the carrier unit and assembly according to the present disclosure, individually or in various combinations thereof:

- A single locking rib can extend at rear end of a depressed locking location (i.e. the female coupler may comprise a single locking rib) and substantially perpendicular to the sliding path;
- Two locking ribs can extend at side edges of a depressed locking location (i.e. the female coupler may comprise two locking ribs) and disposed substantially parallel to the sliding path;
- Two locking ribs can each extend at a respective side edge of two neighboring depressed locking locations, said locking ribs disposed substantially parallel to the sliding path;
- The utility assembly can be modular wherein a top face of a first utility module can interlock with a bottom face of a second utility module disposed thereover in a substantially fully overlapping relation, or with a bottom face of at least one second utility module only partially overlapping therewith;
- A second utility module overlapping a significant portion of a first utility module can be configured with a single release latch for displacing several locking latches articulated therewith;
- Two or more second utility modules can be mounted over a first utility module, each being independently detachable attachable over the first utility module;
- The at least one second utility module is configured for snap-type locking over the first utility module;

- A release latch for displacing the locking latch into disengagement from the locking latch arresting location can be disposed at a front face of the respective second utility module;
- The at least one locking latch and the at least one locking latch arresting location can be disposed at a front portion of the respective utility modules;
- At least one of the first utility module and the second utility module are configured with a gliding surface facilitating displacement and positioning the respective second utility module at the locking position with respect to the first utility module;
- The gliding surface reduces tolerances between the projecting portion and the depressed locking location receiving same;
- One or both of the locking tongue and locking rib can be configured with a slanting surface at corresponding orientation, along the sliding path, for reducing or substantially elimination tolerance therebetween;
- One or both of a front edge of the projecting portion and a corresponding front edge of the depressed locking location can be slanted for gliding positioning of the second utility module into true locking position over the first utility module;
- The locking latch can be configured for displacement in a direction substantially normal to a respective face of a utility module;
- The locking latch can be spring biased and configured for normally projecting from a face of the respective first or second utility module;
- The locking latch can be manipulable to be opened through an opening configured at a front wall of the respective utility module;
- Corners of the utility modules can be reinforced;
- One or more of the utility modules can be a container module, and the utility assembly can be a container assembly/tool caddy;
- The container module can be compartmented and can be configured with sub-containers and sub-compartments;
- The top face of the container module can be configured as a lid or as a functional component of the container module;
- A lid of a second container can be opened also when articulated and locked in position over a first container;

- A lid of a first container can be opened also when a second container is articulated and locked in position thereabove;
- At least one of the container modules can be a locomoting container and can be configured with an arrangement for locomoting said container module. Where the locomoting container is attached to other container modules it can facilitate for locomoting the utility assembly;
- The container modules can be configured with carrying arrangement disposed at any one or more of its faces. According to a particular configuration, a front face of the container modules is configured with a carrying handle and according to another configuration side faces of the container modules can be configured with a carrying handle;
- Examples of utility modules can be any one or more of a cooler box, a workpiece grip, a power supply (e.g. power bank, generator), hand tools, power tools, a locomotive platform (e.g. a work dolly), powered or not, a tactical unit (e.g. military gear, scientific equipment, communications equipment, personal gear, outdoor gear, etc.);
- A tool caddy can be configured with a carrying handle (e.g. telescopic);
- A utility module can be a soft-shell container with at least a rigid face portion configured with a male/female coupler;
- The utility module can be an interface coupling module, i.e. functions only as a coupling interface;
- The interface coupling module can be attached to a surface of any element or object and by different arrangements, fixedly or detachably;
- The interface coupling module can be a cargo interface module for a utility vehicle, so as to attach one or more utility modules to the vehicle;
- The cargo interface module can be a bed cargo module, a roof rack module, etc.;
- The interface coupling module can be a surface mount for attaching utility modules, e.g. a floor mount, wall mount, wall rack, etc.;
- The interface coupling module can be a tool mount/rack;
- The interface coupling module can be belt mount for mounting of utility modules (e.g. a hand tool) to a workers belt;

- The interface coupling module can be an interface mount module for coupling two utility modules to one another, e.g. for articulating two utility modules, both configured with a similar male coupler or a female coupler, and wherein the interface mount module is configured at both faces with an other of male coupler or a female coupler;
- The interface coupling module can be a back pack carrying module, for facilitating attachment and carrying of utility modules;
- A top face of a utility module can be configured with a carrying handle, said carrying handle displaceable between a stowed position and a carrying position, wherein at the stowed position said carrying handle at least partially extends within a niche and does not to interfere with the coupling mechanism;
- The carrier unit may include one or more auxiliary engagement surfaces positioned on an exterior face of the carrier unit. For example, an auxiliary engagement surface can be configured at a bottom face of the carrier unit;
- The carrier unit may include a second engagement surface simulating/mimicking the first engagement surface of the utility module;
- A utility module may be configured with one or more auxiliary first and second engagement surfaces;
- The carrier engagement surface may be a connectivity platform detachably attached to the exterior surface of the carrier unit, facilitating a cart unit or a carrier unit according to the present disclosure;
- One or both of the utility module's first and second engagement surfaces may be detachably attached to an exterior surface of the utility module;
- The carrier engagement surface and the utility module's first engagement surface may be like elements;
- The utility module's first and second engagement surfaces may be like elements;
- The carrier unit's engaging elements and the utility module's first engaging elements may be similar elements;
- One engagement surface may include several engaging elements and one locking mechanism;

- The coupling mechanism is configured for spontaneous displacement into locking engagement within a locking receptacle, wherein manual interference is required only for unlocking the locking mechanism and detaching a utility module from a respective utility module or carrier unit;
- The coupling mechanism can be a spring biased locking pin, normally projecting from a respective engagement surface;
- One or both of the carrier unit and the utility module may further include a locking mechanism designated to prevent unintentional separation of the engagement surfaces while they are interlocked;
- The locking mechanism is manipulable between an unlocked position in which said engagement surfaces may slide upon each other, and a locked state in which the engagement surfaces may not slide upon each other;
- The locking mechanism may be configured with a biasing mechanism for snap arresting at least at its locked state;
- The locking mechanism may be configured with a manually operated activating portion for switching between said unlocked and locked positions.
- The carrier unit may be assembled together with other carrier units the same way it's assembled with the utility modules;
- The locomotion system of the carrier unit may comprise a wheel system (e.g. axially fixed roller wheels, swivel wheels, etc.), a sliding platform, caterpillar tracks, etc;
- The locomotion system of the carrier unit comprises, according to a particular example, several fixed axis wheels, wherein the perimeter of said wheels is tangent with a base edge of the carrier unit;
- At an assembled configuration, where one or more utility modules are attached to the carrier unit, the assembly can be positioned vertically wherein a side face of the one or more containers rest over a supporting surface. According to a particular example, at this position the carrier unit and container assembly are configured with stability members for retaining their stability while positioned vertically to the ground;
- The carrier unit may be stable while positioned horizontally to the ground, by a support system projecting from a bottom face thereof. The support system

may comprise friction enhancing surfaces to restrict displacement of the assembly while placed over a bearing surface;

- The carrier unit may be foldable to a more compact configuration;
- The carrier unit may comprise an external storage box detachably interconnectable to its exterior walls;
- The carrier unit may comprise a power supply detachably interconnectable to its exterior walls;
- The carrier unit's transporting system may be motorized while powered via said power supply;
- The carrier unit may further include a locking mechanism to insure interlocking connection of the engagement surfaces;
- The container unit may comprise non-rigid portions;
- The carrier unit may comprise at least one manipulating arrangement, configurable between a stowed position in which the manipulating arrangement is retracted, and a manipulating position in which the manipulating arrangement is extracted. The manipulating arrangement may be a telescopic or foldable handle;
- The manipulating arrangement may be a gripping handle, a D-grip handle, a T-grip handle, a flexible strap, etc.

EMBODIMENTS

The present disclosure also encompasses embodiment as defined in the following numbered phrases. It should be noted that these numbered embodiments intended to add to this disclosure and is not intended in any way to be limiting.

1. A coupling mechanism configured for readily detachably attaching a first utility module to a second utility module, the coupling mechanism comprising a male coupler at a face of one of the first utility module and the second utility module, and a female coupler at a face of the other one of the first utility module and the second utility module, said female coupler having a depressed locking location configured with at least one locking rib extending above a depressed surface and along a sliding path, and having an open edge facing in a first sense; said male coupler having a projecting

locking location disposed in register with said depressed locking location and configured with at least one locking tongue extending along said engaging sliding path at a second sense, opposite to said first sense, and configured for arresting engagement at a space between said locking rib and depressed surface, the coupling mechanism further comprises at least one locking member for arresting the first utility module with respect to said second utility module and preventing sliding displacement along said sliding path.

2. The coupling mechanism of embodiment 1, wherein said female coupler is configured at the top face of the first utility module, and the male coupler is configured at the bottom face of the second utility module.

3. The coupling arrangement of embodiment 1 or 2, wherein the at least one locking rib extends substantially parallel to the sliding path.

4. The coupling arrangement of embodiment 1 or 2, wherein the at least one locking rib extends substantially perpendicular and intersects the sliding path.

5. The coupling arrangement of embodiment 1 or 2, wherein the female coupler comprises a single locking rib extends at rear end of a depressed locking location and substantially perpendicular to the sliding path.

6. The coupling arrangement of embodiment 1 or 2, wherein the female coupler comprises two locking ribs extend at side edges of a depressed locking location and disposed substantially parallel to the sliding path.

7. The coupling arrangement of embodiment 1 or 2, wherein the female coupler comprises two locking ribs each extend at a respective side edge of two neighboring depressed locking locations, said locking ribs disposed substantially parallel to the sliding path.

8. A coupling mechanism for a utility assembly that comprises at least a first utility module and at least a second utility module, said coupling mechanism is configured between the first utility module and the second utility module; one of a top face of the first utility module and a bottom face of the second utility module comprises at least one depressed locking location configured with a locking rib, and at least one locking latch arresting location; and the other one of said top face of the first utility module and a bottom face of the second utility module comprises at least one projecting portion with a locking tongue disposed in register with said at least one depressed locking location, and at least one locking latch disposed in register with said at least one locking latch

arresting location; and wherein at a locked position the bottom face at least partially rests over the top face, and the at least one projecting tongue is arrested by the corresponding at least one locking rib and the at least one locking latch is arrested by corresponding at least one locking latch arresting location, and further wherein disengaging the second utility module from the first utility module is facilitated by disengaging the at least one locking latch from the at least one locking latch arresting location, such that engaging the first and second utility modules into the locked position is provided by sliding the second utility module with respect to the first utility module along a sliding path defined by at least one of said at least one locking rib and said at least one locking tongue.

9. The coupling arrangement of embodiment 8, wherein the at least one locking rib extends substantially parallel to the sliding path.

10. The coupling arrangement of embodiment 8, wherein the at least one locking rib extends substantially perpendicular and intersects the sliding path.

11. The coupling arrangement of embodiment 8, wherein a single locking rib extends at rear end of a depressed locking location and substantially perpendicular to the sliding path.

12. The coupling arrangement of embodiment 8, wherein two locking ribs extend at side edges of a depressed locking location and disposed substantially parallel to the sliding path.

13. The coupling arrangement of embodiment 8, wherein two locking ribs each extend at a respective side edge of two neighboring depressed locking locations, said locking ribs disposed substantially parallel to the sliding path.

14. The coupling arrangement of any one of embodiments 8 to 13, further comprising a release latch for displacing the locking latch into disengagement from the locking latch arresting location can be disposed at a front face of the respective second utility module.

15. The coupling arrangement of any one of embodiments 8 to 14, wherein the at least one locking latch and the at least one locking latch arresting location are disposed at a front portion of the respective utility modules.

16. The coupling arrangement of any one of embodiments 8 to 15, wherein the locking latch is configured for displacement in a direction substantially normal to a respective face of a utility module.

17. The coupling arrangement of any one of embodiments 8 to 16, wherein locking latch is spring biased and configured for normally projecting from a face of the respective first or second utility module.

18. The coupling arrangement of any one of embodiments 8 to 17, wherein the locking latch is manipulable to be opened through an opening configured at a front wall of the respective utility module.

19. The coupling arrangement of any one of embodiments 1 to 18, wherein one or both of the locking tongue and locking rib are configured with a slanting surface at corresponding orientation along the sliding path.

20. The coupling arrangement of any one of embodiments 1 to 19, wherein one or both of a front edge of the projecting portion (or the projecting locking location) and a corresponding front edge of the depressed locking location are slanted for gliding positioning of the second utility module into locking position over the first utility module.

21. The coupling mechanism of any one of embodiments 1 to 20, wherein the first utility module is configured for detachably attaching one or more second utility modules thereto.

22. A coupling mechanism for a utility assembly comprising at least a first utility module and at least a second utility module, said coupling mechanism is configured between the first utility module and the second utility module and comprises at one of a top face of the first utility module and a bottom face of the second utility module with at least one depressed locking location configured with a locking rib, and at least one locking latch arresting location; and the other one of said top face of the first utility module and a bottom face of the second utility module comprises at least one projecting portion with a locking tongue disposed in register with said at least one depressed locking location, and at least one locking latch disposed in register with said at least one locking latch arresting location; and wherein at a locked position the bottom face at least partially rests over the top face, and the at least one projecting tongue is arrested by the corresponding at least one locking rib and the at least one locking latch is arrested by corresponding at least one locking latch arresting location, and further wherein disengaging the second utility module from the first utility module is facilitated by disengaging the at least one locking latch from the at least one locking latch arresting location.

23. A utility assembly comprising at least a first utility module and at least a second utility module, and comprising a coupling mechanism according to any one of embodiments 1 to 21, the coupling mechanism being configured between the first utility module and the second utility module.

24. A utility assembly comprising at least a first utility module and at least a second utility module, and comprising a coupling mechanism for readily detachably attaching the first and second utility modules, the coupling mechanism being configured between the first utility module and the second utility module; said coupling mechanism comprising at one of a top face of the first utility module and a bottom face of the second utility module one or more depressed locking locations each configured with a locking rib, and at least one locking latch arresting location; and the other one of said top face of the first utility module and a bottom face of the second utility module comprises one or more projecting portions each configured with a locking tongue disposed in register with said one or more depressed locking locations, and at least one locking latch disposed in register with said at least one locking latch arresting location; such that at a locked position, the bottom face of the second utility module at least partially rests over the top face of the first utility module, and the one or more projecting tongues are arrested by the corresponding one or more locking ribs, and the at least one locking latch is arrested by corresponding at least one locking latch arresting location, thereby preventing sliding displacement between the first utility module and the second utility module, and disengaging the second utility module from the first utility module is facilitated by disengaging the at least one locking latch from the at least one locking latch arresting location.

25. The utility assembly of embodiment 24, wherein the first and second utility modules are in a locking engagement when said one or more depressed locking locations and the one or more projecting portions are disposed behind one another.

26. The utility assembly of embodiment 24 or 25, wherein said one or more depressed locking locations and said one or more locking latch arresting locations are configured at the top face of the first utility module, and the one or more projecting portions and the at least one locking latch are configured at the bottom face of the second utility module.

27. The utility assembly of any one of embodiments 24 to 26, wherein at least one second utility module is configured for snap-type locking over the first utility module.

28. The utility assembly of any one of embodiments 24 to 27 wherein engaging the first and second utility modules into the locked position is provided by sliding the second utility module with respect to the first utility module along a sliding path defined by at least one of said at least one locking rib and said at least one locking tongue.

29. The utility assembly of any one of embodiments 24 to 28, wherein the at least one locking rib extends substantially parallel to the sliding path.

30. The utility assembly of embodiment 29, wherein the at least one locking rib extends substantially perpendicular and intersects the sliding path.

31. The utility assembly of embodiment 29, wherein a single locking rib extends at rear end of a depressed locking location and substantially perpendicular to the sliding path.

32. The utility assembly of embodiment 29 wherein two locking ribs extend at side edges of a depressed locking location and disposed substantially parallel to the sliding path.

33. The utility assembly of embodiment 29, wherein two locking ribs each extend at a respective side edge of two neighboring depressed locking locations, said locking ribs disposed substantially parallel to the sliding path.

34. The utility assembly of any one of embodiments 24 to 33, wherein a top face of a first utility module interlocks with a bottom face of a second utility module disposed thereover in a substantially fully overlapping relation, or with a bottom face of at least one second utility module only partially overlapping therewith.

35. The utility assembly of any one of embodiments 24 to 33, wherein the second utility module overlaps a significant portion of a first utility module and is configured with a single release latch for displacing several locking latches articulated therewith.

36. The utility assembly of any one of embodiments 24 to 35, further comprising a release latch for displacing the locking latch into disengagement from the locking latch arresting location can be disposed at a front face of the respective second utility module.

37. The utility assembly of any one of embodiments 24 to 36, wherein the locking latch is configured for displacement in a direction substantially normal to a respective face of a utility module.

38. The utility assembly of any one of embodiments 24 to 37, wherein the locking latch is spring biased and configured for normally projecting from a face of the respective first or second utility module.

39. The utility assembly of any one of embodiments 24 to 38, wherein two or more second utility modules can be mounted over a first utility module, each being independently detachable attachable over the first utility module.

40. The utility assembly of any one of embodiments 24 to 39, wherein at least one of the first utility module and the second utility module are configured with a gliding surface facilitating displacement and positioning the respective second utility module at the locking position with respect to the first utility module.

41. The utility assembly of any one of embodiments 24 to 40, wherein one or more of the utility modules is a container module, and the utility assembly is a container assembly or a tool caddy.

42. The utility assembly of embodiment 41, wherein the container module is compartmented and optionally configured with sub-containers and sub-compartments.

43. The utility assembly of embodiment 41 or 42, wherein a top face of the container module is configured as a lid or as a functional component of the container module.

44. The utility assembly of any one of embodiments 41 to 43, wherein the container modules is a locomoting container, configured with an arrangement for locomoting said utility assembly.

45. The utility assembly of any one of embodiments 41 to 44, wherein the container modules is configured with a carrying arrangement disposed at any one or more of its faces, optionally being a carrying handle.

46. The utility assembly of any one of embodiments 24 to 40, wherein one or more of the utility modules is a soft-shell container with at least a rigid face portion.

47. The utility assembly of any one of embodiments 24 to 40, wherein said first utility module is a mobile carrier unit.

48. The utility assembly of any one of embodiments 24 to 47, further comprising a locking mechanism for preventing unintentional separation of the modules while they are interlocked.

49. The utility assembly of any one of embodiments 24 to 48, wherein the first utility module is configured for detachably attaching at least two second utility modules thereto.

50. A mobile carrier unit comprising at least one carrier engagement surface, compatible for interlocking engagement in a detachable manner with a first engagement

surface of a utility module, said carrier engagement surface having (i) one or more depressed locking locations each configured with a locking rib and at least one locking latch arresting location, configured for engagement with said first engagement surface of a utility module that comprises at least one locking latch and one or more projecting portions, each projecting portion being configured with a locking tongue, or (ii) at least one locking latch and one or more projecting portions each configured with a locking tongue for engagement with said first engagement surface of a utility module that comprises one or more depressed locking locations, each depressed locking locations configured with a locking rib and at least one locking latch arresting location.

51. The mobile carrier unit of embodiment 50, wherein once associated with the utility module, said locking tongue becomes disposed in register with said one or more depressed locking locations, and at least one locking latch become disposed in register with said at least one locking latch arresting location.

52. The mobile carrier unit of embodiment 50 or 51, configured for detachable interlocking engagement with one or more utility modules, each utility module comprising a first engagement surface.

53. The mobile carrier unit of any one of embodiments 50 to 52, further comprising at least one of a manipulating arrangement and a locomotion system.

54. An assembly comprising a mobile carrier unit of any one of embodiments 50 to 53 having at least one carrier engagement surface, and at a least one utility module having a first engagement surface, the utility module being detachably interlocked with the mobile carrier unit by engaging said first engagement surface with said carrier engagement surface.

55. The assembly of embodiment 54, wherein the mobile carrier unit and the at least one utility module are detachably interlocked with one another by a dovetail engagement mechanism, that comprises laterally projecting shoulders configured on one of the carrier engagement surfaces and the first engagement surface of a utility module, and a shoulder receiving recess configured on the other one of one of the carrier engagement surfaces and the first engagement surface of a utility module; where said laterally projecting shoulders are configured for sliding engagement with said shoulder receiving recess.

56. The assembly of embodiment 55, wherein one or both of the carrier engagement surfaces and the first engagement surface of a respective utility module are configured with depressions, each accommodating respective laterally projecting locking shoulders.

57. The assembly of embodiment 54, wherein the mobile carrier unit and the at least one utility module are detachably interlocked with one another by an undercut engagement mechanism, comprising lateral projections configured on one of the carrier engagement surfaces and the first engagement surface of a container unit, and a receiving recess configured on the other one of one of the carrier engagement surfaces and the first engagement surface of a utility module; where said lateral projections are configured for engagement with said receiving recess, such that interlocking engagement of the utility module and the carrier unit takes place by placing the first engagement surface of a utility module over the carrier engagement surface, such that the utility module`s first engaging elements are disposed shifted over the respective carrier engaging elements of the carrier unit, and are then slidingly shifted to obtain sliding interlocking engagement therebetween.

58. The assembly of any one of embodiments 54 to 57, further comprising a locking mechanism configured for preventing unintentional detaching of the utility module from the carrier unit.

59. The assembly of embodiment 58, wherein the locking mechanism comprises a locking pin that is configured for snapingly protruding from one of the engagement surfaces into a designated nook on the other engagement surface.

60. An interface coupling module comprising at least one engagement surface, compatible for interlocking engagement in a detachable manner with a first engagement surface of a utility module, said interface coupling module comprising an engagement surface having (i) one or more depressed locking locations each configured with a locking rib and at least one locking latch arresting location, configured for engagement with said first engagement surface of a utility module that comprises at least one locking latch and one or more projecting portions, each projecting portion being configured with a locking tongue, or (ii) at least one locking latch and one or more projecting portions each configured with a locking tongue for engagement with said first engagement surface of a utility module that comprises one or more depressed locking locations, each depressed locking locations configured with a locking rib and at least one locking latch arresting location

61. The interface coupling module of embodiment 60, being configured for detachable or fixed attachment to a surface of an object.

62. The interface coupling module of embodiment 60 or 61, being a cargo interface module for a utility vehicle configured for attaching one or more utility modules to the vehicle.

63. The interface module of embodiment 60 or 61, being a surface mount for attaching utility modules

64. The interface module of embodiment 60 or 61, being a tool mount or a tool rack.

65. The interface module of embodiment 60 or 61, being a belt mount for mounting of utility modules to a workers belt;

66. The interface module of embodiment 60 or 61, being an interface mount module for coupling two utility modules to one another.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to better understand the subject matter that is disclosed herein and to exemplify how it may be carried out in practice, embodiments will now be described, by way of non-limiting examples only, with reference to the accompanying drawings, in which:

Figs. 1 to **6** are directed to a first example of a locking mechanism, wherein:

Fig. 1A is a top perspective view of a container assembly according to an example of the present disclosure;

Fig. 1B is an exploded perspective view of the container assembly of Fig. 1A;

Fig. 1C is a bottom, front perspective view of Fig. 1B;

Fig. 1D is a bottom, rear perspective view of Fig. 1B;

Fig. 2A is a sectioned portion along line A-A in Fig. 1A;

Fig. 2B is a sectioned portion along line B-B in Fig. 1A;

Fig. 2C is a sectioned portion along line C-C in Fig. 1A;

Figs. 3A to **3D** are consecutive steps illustrating locking engagement of the locking tongue of the second container with the respective locking rib of the first container;

Figs. 4A to **4D** are consecutive steps illustrating locking engagement of the locking latch of the second container with the respective locking latch arresting location of the first container;

Figs. 5A to **5E** schematically demonstrate modularity of a container assembly according to the disclosure;

Figs. 6A to **6G** are various combinations of a modular container assembly according to examples of the present disclosure.

Figs 7 to **12** are directed to a carrier unit and another example of a locking mechanism, wherein:

Fig. 7A is container carrier assembly according to an example of the disclosure, illustrating a top, left perspective view of a container unit, mounted on top of a carrier unit;

Fig. 7B is a top, left perspective view of a second container unit, mounted on top of a first container unit, which in turn is mounted on top of a carrier unit according to an example of the present disclosure;

Fig. 8A is a top, left perspective view of a carrier unit, illustrating the carrier engagement surface in further detail;

Figs. 8B and **8C** are a top and a bottom perspective view of a carrier unit, illustrating the container unit's first engagement surface in further detail;

Fig. 9A is a side section along line F-F in Fig. 7A, illustrating the container unit and the carrier unit unattached;

Fig. 9B is a side section along line F-F in Fig. 7A illustrating the container unit and the carrier unit attached;

Fig. 9C is a close-up view of Fig. 9B;

Fig. 9D is a sectioned view along line F-F in Fig. 7A illustrating the interlocking engagement of the carrier engaging elements together with the container unit's first engaging elements;

Fig. 10A is a sectioned view along line D-D in Fig. 7A, illustrating the locking mechanism;

Fig. 10B is an enlarged image of the portion marked M in Fig. 10A;

Fig. 11A illustrates different sizes of container units forming an assembly, at a tilted orientation;

Fig. 11B illustrates an assembled configuration balanced vertically relatively to the ground;

Fig. 12A shows a container assembly wherein the female coupler comprises two locking ribs extending at respective side edges of two neighboring depressed locking locations;

Fig. 12B is a section along line H-H in Fig. 12A;

Fig. 12C illustrates the utility module apart from the container and flipped, so as to expose the mating coupling mechanism.

Figs. 13 to **24** are different embodiments and configurations of utility modules and utility assemblies according examples of this disclosure.

DETAILED DESCRIPTION OF EMBODIMENTS

Reference is first being made to Figs. 1 to 6, directed to a first configuration of a coupling mechanism. For sake of convenience the utility modules are exemplified as containers and respectively the utility assembly is illustrates as a tool caddy. It is however appreciated that the utility modules can be of any type, shape or size, as discussed hereinabove and as will be exemplified below.

Attention is first directed to Figs. 1 to 4, illustrating a container assembly generally designated **20**, comprising four containers **22**, **24**, **26** and **28** disposed in a triple stage configuration, the stages designated **A**, **B** and **C**. In the illustrated example containers **24** and **26** of the second stage are half-size and overlap the footprint of the first stage container **22** and the third stage container **28**, wherein the first container **22** is for example a hand tool container and containers **22** to **28** are organizers or the like.

The term *'first container'* as used herein denotes a container bearing over a top face thereof at least one other container, said at least one other container denoted herein as a *'second container'*. It is thus appreciated that a second container of a container assembly comprising three or more stages of containers' serves as second container when referred to the first stage container, and as a first container when referred to a third stage container mounted thereover. Accordingly, in the illustrated example of Figs. 1 and 2, container **22** is a first container and containers **24** and **26** are second containers,

whilst they function as first containers when discussing locking arrangement with respect to third stage container **28**.

Each of the containers is configured with a lid **L** constituting a top face of the respective container, said lids being pivotally attached and securely articulated to the respective container through a toggle locking latch **29**. Each top face (see Fig.1B) is configured with several depressed locking locations **32** and it is seen that the at least two depressed locking locations are disposed behind one another along imaginary lines **I**, **II** and **III** (though not necessarily aligned).

Each such depressed locking location is in turn configured with a laterally projecting locking rib **36** extending from a rear portion of the depressed locking location **32** towards a front face of the container. The locking rib **36** has a flat top surface **38** substantially flush with a top surface of the respective lid **L**, and a slanting bottom surface **40**. A front portion **46** of the depressed locking location **32** is slanted too, in the same orientation as bottom surface **40** (i.e. substantially parallel thereto).

Furthermore, the top face, namely lid **L** of the containers, is configured with at least one locking latch arresting location in the form of a recess **50** disposed at a front portion of the respective top face and configured with a slanted rear wall portion **52** and a right angled front wall portion **53**.

A bottom face **54** of each container **22**, **24**, **26** and **28** is configured with several projecting portions **56**, extending in register with the depressed locking locations **32**, and it is seen that the at least two projecting portions **56** are disposed behind one another along the imaginary lines **I**, **II** and **III** (though not necessarily aligned).

Each projecting portions **56** is configured with a locking tongue **60** laterally projecting rearwards and having a slanted surface **62** corresponding with slanting surface **40** of locking rib **36**. Also, a front portion **66** of the projecting portions **56** slants substantially parallel to the slanted surface **62** of the locking tongue **60**.

It is essential that the at least two depressed locking locations **32** and the at least two projecting portions **54** be disposed behind one another (though not necessarily aligned), as exemplified by imaginary lines **I**, **II** and **III** (though not necessarily aligned).

A plunger-like locking latch **70** is disposed at a front portion of each container, said locking latch **70** disposed in register with the recesses **50** and configured with a slanting rear wall portion **72** and a right angled front wall portion **74**, corresponding

with the sloping wall portions of the recesses **50**. The locking latch **70** has an elongate finger engaging aperture **73** (Fig. 2A) accessible through an aperture **75** formed in register at a front wall face of the respective second container, said locking latch **70** being normally biased to project under force of coiled spring **71**, such that the locking latch **70** is axially displaceable between a projecting, locked position and a temporary retracted position during transition into the locked position.

When it is required to detachably attach a second container over a first container, the former is placed over the later (Fig. 3A), placing the projecting portions **56** within the depressed locking location **32** (Fig. 3B) with the locking tongues **60** engaging below and being gradually arrested by the respective locking ribs **36** arresting is obtained (Fig. 3C) until complete arresting is obtained (Fig. 3D). Simultaneously, as the locking tongues **60** arrest by the locking ribs **36**, the locking latch **70** of the second container slides into the locking latch arresting location (recess **50**) and finally snaps into locking engagement therewith. It is noted (Figs 4A to 4D) that first (Figs. 4B and 4C) the locking latch **70** displaces upwards against the biasing effect of spring **71**, and when the second container reaches the final locking position over the first container, the locking latch **70** plunges into arresting position within the recess **50**.

At the locked position the second container is attached over the top face of the first container, such that they can be moved as an integrated unit. Detaching of a second container from a first container is easily facilitated by unlocking, obtained by displacing the locking latch **70** upwards against the biasing effect of spring **71**, whereby the second container can be displaced with respect to the first container and detached therefrom.

As further seen in Figs. 1-4, each of the containers **22**, **24**, **26** and **28**, is configured at a front face thereof with a tiltable carrying handle **80**, for carrying a respective container or the entire container assembly **20**. Also seen, some of the containers can be configured with fender-like protectors **90** at their corners.

Further attention is now directed to Figs. 5A to 5E demonstrating examples of modularity of a container assembly according to the disclosure. Fig. 5A is a planner top view of a first container **94** and Figs. 5B to 5E illustrate second containers superimposed over the first container **94**. In Fig. 5B a second container **96** is substantially as big as the first container **94**, i.e. having the same footprint. In Fig. 5C a second container **98** is as wide as the first container **94**, however narrower in depth, and disposed at a front portion of the first container. In Fig. 5D two second containers **99A**

and **99B** are mounted over the first container **94** and occupy substantially the entire footprint thereof, whereby each of containers **99A** and **99B** is independently attachable and detachable from the first container **94**, as exemplified hereinabove. In Fig. 5E two second containers **100A** and **100B** are positioned over the first container **94**, occupying the entire width though narrower in depth and extending from a front portion of the first container **94**.

Turning now to Figs. 6A to 6K, there are illustrated several examples of container assemblies, subassemblies and their components. Fig. 6A illustrates a disassembled container assembly collectively designated **104** and comprising a base container **106**, a chest of drawers module **108** comprising three drawers, a tool caddy module **110**, a compartmented storage module **112** and a half-sized compartmented storage module **124** (typically two of which). It is noted that the base container is configured for locomoting and comprises at a rear thereof wheels **116** and a telescopic handle **118**.

As can be appreciated from Figs. 6B through 6D, various container assemblies are illustrated, the arrangement is such that in practice any module can constitute either a first container or a second container, as defined hereinabove (though it is more likely that base container **106** serves as a first container).

Figs. 6E and 6F illustrate a chest of drawers module **108**, illustrated separately in Fig. 6E and mounted over a similar drawer module **108** in Fig. 6F. It is appreciated that the drawers of each module can be locked at their closed position to prevent spontaneous opening thereof whilst carrying a module. Furthermore, each module **108** is configured with a pair of carrying handles **115** disposed at top side wall portions thereof, to facilitate carrying of the module.

In Fig. 6G there is illustrated a subassembly comprising a first container in the form of a tool caddy module **110** and second container in the form of a compartmented storage module **112** attached thereto, whilst the lid **119** of the first container is open facilitating access to the contents thereof.

Further attention is now directed to Figs. 7 to 16, showing a third aspect of the disclosure, namely a utility module being a mobile carrier unit and comprising at least one carrier engagement surface, compatible for interlocking engagement in a detachable manner with a first engagement surface of a second utility module. For sake of example only, the second utility module exemplified in the annexed drawings is in the form of a

utility container. It is however appreciated that the utility modules can be of any type, shape or size, as discussed hereinabove and as will be exemplified below. Accordingly, the term *container unit* as used in the following description denotes any type of a utility module, as discussed herein the specification.

Attention is first directed to Fig. 7A, illustrating a container carrier assembly generally designated **200** comprising a container unit **202** (utility module) mounted on top of a carrier unit **206**. The carrier unit **206** is equipped with a telescopic manipulating handle **210**, a pair of rear wheels **208** and a set of horizontally stabilizing support legs **212** at a front portion of the carrier unit **206**. The carrier unit **206** and the container unit **202** are engaged in an interlocking engagement via their engagement surfaces, i.e. a carrier engagement surface **216** at a top face of the a carrier unit **206** (best seen in Fig. 8A), and the container unit's first engagement surface **220** (namely its bottom face; best seen in Figs. 8B and 8C). The container unit **202** is configured with yet a second engagement surface **226** (namely the container's top face), simulating the carrier engagement surface **216**. The container unit **202** further comprises a locking mechanism **230** configured for arresting within a respective notch **231** at the carrier engagement surface **216**, to thereby to prevent displacement and separation of the engagement surfaces **216** and **220** once they are interlocked, as later will be explained.

The carrier engagement surface **216** seen in greater detail in Fig. 8A, illustrates a top perspective view of a carrier unit **206** with the telescopic handle **210** in a retracted position. The carrier engagement surface **216** comprises multiple carrier engaging elements **236**, depressed from the surface, and designated for interlockingly receiving respective container unit's first engaging elements **240**, projecting from the first engagement surface (bottom face) **220** of the container unit **202**.

Each carrier engaging element **240**, is a so-called female coupler and has a depressed locking location configured with at least one locking rib extending above a depressed surface and along a sliding path and having an open edge facing in a first sense. As seen in the drawings, it is generally constituted by a receiving recessed depression **244** in the carrier engagement surface **216**, configured with a pair of facing locking ribs **248**, forming the aforementioned recess. The locking ribs **248** extend substantially parallel to sliding path of the container unit **202** with respect to the carrier unit **206**, said path (designated **P** in Figs. 7A and 9B). Further noted, side walls **250** of

depressions **244** are sloped in order to allow directing of a container unit's first engaging element **240**, mounted upon it, to its interlocking position.

A corresponding coupler configured at the container unit is a so-called male coupler comprising a projecting locking location disposed in register with said depressed locking location and configured with at least one locking tongue extending along said engaging sliding path at a second sense, opposite to said first sense, and configured for arresting engagement at a space between said locking rib and depressed surface. As seen, a single container unit's engaging element **240** is generally constituted a downwardly projecting outwards protrusion **258**, projecting from the bottom face **220** of the container **202**.

In order to lock the container **202** over the carrier unit **206**, upon placing the container **202** over the carrier engagement surface **216** of carrier unit **206** one must mount the container unit's first engaging elements **240** into the depressions **244** and then slide the container **202** along the sliding path **P** (i.e. towards the locking ribs **248**) so that the engaging elements **240** engage below said projecting ribs/shoulders **248** and the engaging elements **240** are thus arrested at a space between said locking ribs and the depressed surface, as seen in Fig. 9C. interlocking engagement of the container (or any other utility module) can be facilitated by a single male-female locking mechanism of the aforementioned type, or by a plurality of such locking mechanism, at any location over the carrier unit **206**.

The shape and size of the locking members is modular as far as the depression **244** in the carrier engagement surface **216**, can be single or double in size (e.g. **236A** in Fig, 8A), so it is large enough to accommodate two container unit's first engaging elements **240**, or two neighboring container unit's first engaging elements. Locking/engaging and detaching of this configuration is similar to a single locking module.

The engagement and locking mechanism is modular in the sense that any first article can be easily and readily articulated to a surface of any second article, wherein the articulation is strong and firm (i.e. substantially motionless).

With further reference to Fig. 7B, there are illustrated two containers **202A** and **202B** articulated over one another, the arrangement being such that the bottom face of the intermediate container **202A** serves for engaging with the top face of the carrier unit **206** and likewise, the top face of the intermediate container **202A** serves for engaging

with the bottom face of the top container **202B**, as discussed herein above. The arrangement is such that each stage is lockingly secured by the locking mechanism **230**, wherein each stage can be detached from the stage below upon releasing locking engagement of the respective locking mechanism **230**.

The locking mechanism **230** is shown in further detail in Figs. 13A and 13B. The locking mechanism comprises a locking pin **231** normally biased by spring **233** such that a tip **235** projects from a bottom surface of the container **202** (see also Fig. 8B) and is configured for snap arresting within a respective notch **231** configured at the engagement surface **216** of the carrier unit **206** (seen also in Fig. 8A). The locking pin **231** is slidable within a race at the side wall of the container, and comprises a finger manipulating portion at **237** (accessible through an opening at the side wall of the container), for displacing the locking pin, against the biasing effect of spring **233**, into its disengaged position, thus facilitating sliding the container along the path **P** into disengagement from the carrier unit (or respective other container or utility module).

The carrier unit **206** is further configured at a bottom end, with a pair of stability supports **264** (Figs. 8A, 14A, 14B and 14C), configured for supporting the carrier unit, with or without a container attached thereto, at an upright, i.e. vertical position, thus preventing it from tipping over, in particular with containers or any other utility module articulated thereto. Stability supports **264** can be, according to a particular configuration, an extension of the telescopic handle **210**, whereby the stability supports are functional as such only when the handle is fully contracted. However, in the illustration of Fig. 16 the utility assembly **253** is maintained at its upright position owing to said stability supports **264** and further bearing over a side face **266** of the intermediate container **202A**, being substantially flush with a bottom face of the stability supports **264**.

With further reference to Figs. 12A to 12C there is illustrated a modification of articulation between a first utility module (container **300** in the particular example) and a second utility module (two work-piece supports **304** in the particular example). The container **300** is substantially similar to that illustrated in the previous examples, wherein the cover/lid **308** is configured with a plurality of female coupler members **310**, each configured with a depressed locking location and a pair of locking ribs extending above the depressed surface and along a sliding path. The opposing locking ribs **312A** and **312B** have an open edge facing in a first sense (the introducing direction).

In the examples hereinbefore, engagement with a corresponding male coupler took place within the vicinity of a single coupling element, i.e. over two engaging ribs **312A** and **321B** of a single depressed locking location **308**, facing each other. However, in the example of Figs. 12A-12C engagement of the work-piece supports **304** takes place over two engaging ribs **312A** and **321B** of two neighboring depressed locking locations **308A** and **308B**. Accordingly, the male coupler of the two work-piece supports **304** is configured for arresting with the two engaging ribs **312A** and **321B** by two individual (separate) male couplers **316A** and **316B**, each configured for arresting one of the respective engaging ribs **312A** and **321B**. Arresting of the male projections **316** takes place as discussed before, by arresting below the respective engaging ribs, within the space at the depressed locking location. In spite of the relative narrow body structure of the work-piece supports **304**, they are each configured with a locking mechanism 330, similar to locking mechanism **230** discussed hereinbefore.

Turning now to Figs. 13 to 24, there are illustrated various examples of utility modules, utility assemblies and various configurations according to the disclosure.

Fig. 13A illustrates a utility module assembly generally designated **400**, comprising a wheeled base container **402** supporting an intermediate container **404**, bearing in turn a cooler box **406** and a power unit **408** disposed side by side over the intermediate container. At least the intermediate container **404** is configured at a bottom face thereof with a male-type coupling arrangement, for attachment over the cover of the base container, said cover configured with a respective female coupling arrangement. The cover of the intermediate container **404** is configured with a similar female coupling arrangement, and can thus engage with one the utility modules **406** and **408**, each configured at its bottom face with a respective male-type coupling arrangement.

It is seen in Figs. 13B through 13D that the intermediate container **404** is fitted with a pivotal carrying handle **418** articulated at the top side walls thereof. The carrying handle has a thickness **t** and the arrangement is such that at the stowed/folded position (Figs. 13B, 13D) the handle **418** is received within a peripheral groove **422** extending over a top edge of the intermediate container **404** and a peripheral groove **424** extending at a bottom edge of the utility modules **408** and **406** (cooler box **406** and a power unit **408**), such that the handle **418** does not constitute an obstacle in mounting and interlocking a utility module over another utility module. It is also seen that at least

some of the utility modules are configured with side handles **428** serving both as carrying handles and as bumpers.

Figs. 14A to 14C illustrate a first utility module in the form of a container **230** supporting two detachable workpiece-piece supports **232** (attached as discussed herein before with reference to Figs. 12). Fig. 14C illustrates a utility module in the form of a work surface **236** configured with a vice race **238**, so that a vice **240**, or other workshop tools can be used. The workpiece-piece supports **232** are configured with a male type coupling having projecting locking locations **244** for engaging with respective female couplers.

In Figs. 15A and 15B there is illustrated a back-rack **250** being a substantially rigid platform having a carrying handle **251** and configured at one side thereof with a pair of adjustable shoulder harnesses **252**, and an adjustable waist harness **254**. The other side of the back-rack is configured as a universal utility mounting platform **258**, configured with a plurality of attachment locations **260**. In the illustrated example all attachment locations **260** are so-called female attachments (as discussed hereinabove in detail), however it is appreciated that the attachment locations can just as well be male-type attachments, or a combination of male and female attachments. According to yet an example (not shown), one side of the carrying platform can be configured with male-type attachments, and an opposite side of the platform be configured with female-type attachments, wherein a used has the choice of attaching the platform to the harness system at an orientation of choice.

In Fig. 16A there is illustrated a utility module in the form of a wheeled carrying unit **264** (shown from a bottom side), similar to that disclosed in connection with Figs. 7 to 11. The carrying unit **264** comprises a rigid platform **266** fitted at a top face thereof with a female/male attaching arrangement in accordance with the disclosure, such that any utility module according to the disclosure can be detachably attached thereto. Also provided is a telescopic manipulating handle **268** and a pair of wheels **266**. The carrying unit can be fitted with a collapsible support plate configuring it into a pushcart (not shown).

Fig. 16B shows a utility assembly **276** comprising a wheeled base container **278** interlocked with a first intermediate container **280** mounted thereover (constituting a second stage of the assembly), and a second intermediate container **282** mounted thereover (constituting a third stage of the assembly **276**), there being yet a fourth stage

utility module container **284** mounted over the second intermediate container **282**. Whilst the second intermediate container **282** has a wider footprint than the first intermediate container **280**, this does not constitute any difficulty as far as attaching it over the second intermediate container **282**, and further, the top face of the second intermediate container **282** has a great surface suited for articulation thereof of several fourth stage utility modules (only one shown).

Fig. 17 shows a carrying bag **280** having soft side walls **282** (in the example illustrated made of fabric), however fitted with (integrally or detachable) an articulation platform base **284,** said articulation platform made of a firm rigid material and is configured with four male-type coupling locations **288** of the type disclosed hereinabove. The carrying bag **280** has a carrying strap **290** useful for hand held or shoulder carrying of the bag.

Figure 18A shows a rigid coupling platform **296**, configured with a plurality of female coupling locations (of the type disclosed herein) and further configured with bolt eyes **298** for securing to any desired surface, and carrying bars **313**.

The coupling platform **296** can be attached for example to a truck bed **306** (Fig. 20), directly over the truck bed or over a cargo container attached to the truck. The coupling platform **296** can be attached to a wall, as in Fig. 18B, wherein a plurality of various utility modules can be articulated thereto. For example, utility modules can be an electric charger **315** of a power tool, a wall mounted sorting container **314**, a hand tool rack **318** (Fig. 18C), a tool coupling adaptor **320** (Fig. 18C), etc.

In Fig. 19 there is illustrated a belt-mount **319** configured as a female coupler according to the disclosure, wherein a tool **321** or a bag/pouch configured with a male coupler can be detachably attached thereto.

In Fig. 21 there is illustrated a wall rack **326** comprising four utility modules in the form of articulation platforms **328** (mountable at different elevations about the wall supports **327**) each configured for bearing and attaching thereto any utility module in accordance with the disclosure.

In Fig. 22 there is illustrated a mobile work stand **340** comprising a wheeled base **242** supporting two racks 344 with four utility modules in the form of articulation platforms **346** (mountable at different elevations about the wall supports **327**) each configured for bearing and attaching thereto any utility module (e.g. containers **348**) in accordance with the disclosure.

In Fig. 23 the utility module is in the form of a dolly **352** configured with wheels **354** and having a top surface configured with an array of female type couplings, as discussed.

In Fig. 24 there is illustrated a utility coupling platform **358** suited for articulation to any desired article (e.g. a bag, a tool, etc.). the utility coupling platform is configured at least at one face thereof with a male coupling locations **360** mimicking the coupling arrangement of the disclosure, rendering it suitable for articulation with a coupling system according to the disclosure.

CLAIMS:

1. A coupling mechanism configured for readily detachably attaching a first utility module to a second utility module, the coupling mechanism comprising a male coupler at a face of one of the first utility module and the second utility module, and a female coupler at a face of the other one of the first utility module and the second utility module, said female coupler having a depressed locking location configured with at least one locking rib extending above a depressed surface and along a sliding path, and having an open edge facing in a first sense; said male coupler having a projecting locking location disposed in register with said depressed locking location and configured with at least one locking tongue extending along said engaging sliding path at a second sense, opposite to said first sense, and configured for arresting engagement at a space between said locking rib and depressed surface, the coupling mechanism further comprises at least one locking member for arresting the first utility module with respect to said second utility module and preventing sliding displacement along said sliding path.

2. The coupling mechanism of claim 1, wherein said female coupler is configured at the top face of the first utility module, and the male coupler is configured at the bottom face of the second utility module.

3. The coupling arrangement of claim 1 or 2, wherein the at least one locking rib extends substantially parallel to the sliding path.

4. The coupling arrangement of claim 1 or 2, wherein the at least one locking rib extends substantially perpendicular and intersects the sliding path.

5. The coupling arrangement of claim 1 or 2, wherein the female coupler comprises a single locking rib extends at rear end of a depressed locking location and substantially perpendicular to the sliding path.

6. The coupling arrangement of claim 1 or 2, wherein the female coupler comprises two locking ribs extend at side edges of a depressed locking location and disposed substantially parallel to the sliding path.

7. The coupling arrangement of claim 1 or 2, wherein the female coupler comprises two locking ribs each extend at a respective side edge of two neighboring depressed locking locations, said locking ribs disposed substantially parallel to the sliding path.

8. A coupling mechanism for a utility assembly that comprises at least a first utility module and at least a second utility module, said coupling mechanism is configured between the first utility module and the second utility module; one of a top face of the first utility module and a bottom face of the second utility module comprises at least one depressed locking location configured with a locking rib, and at least one locking latch arresting location; and the other one of said top face of the first utility module and a bottom face of the second utility module comprises at least one projecting portion with a locking tongue disposed in register with said at least one depressed locking location, and at least one locking latch disposed in register with said at least one locking latch arresting location; and wherein at a locked position the bottom face at least partially rests over the top face, and the at least one projecting tongue is arrested by the corresponding at least one locking rib and the at least one locking latch is arrested by corresponding at least one locking latch arresting location, and further wherein disengaging the second utility module from the first utility module is facilitated by disengaging the at least one locking latch from the at least one locking latch arresting location, such that engaging the first and second utility modules into the locked position is provided by sliding the second utility module with respect to the first utility module along a sliding path defined by at least one of said at least one locking rib and said at least one locking tongue.

9. The coupling arrangement of claim 8, wherein the at least one locking rib extends substantially parallel to the sliding path.

10. The coupling arrangement of claim 8, wherein the at least one locking rib extends substantially perpendicular and intersects the sliding path.

11. The coupling arrangement of claim 8, wherein a single locking rib extends at rear end of a depressed locking location and substantially perpendicular to the sliding path.

12. The coupling arrangement of claim 8, wherein two locking ribs extend at side edges of a depressed locking location and disposed substantially parallel to the sliding path.

13. The coupling arrangement of claim 8, wherein two locking ribs each extend at a respective side edge of two neighboring depressed locking locations, said locking ribs disposed substantially parallel to the sliding path.

14. The coupling arrangement of any one of claims 8 to 13, further comprising a release latch for displacing the locking latch into disengagement from the locking latch arresting location can be disposed at a front face of the respective second utility module.

15. The coupling arrangement of any one of claims 8 to 14, wherein the at least one locking latch and the at least one locking latch arresting location are disposed at a front portion of the respective utility modules.

16. The coupling arrangement of any one of claims 8 to 15, wherein the locking latch is configured for displacement in a direction substantially normal to a respective face of a utility module.

17. The coupling arrangement of any one of claims 8 to 16, wherein locking latch is spring biased and configured for normally projecting from a face of the respective first or second utility module.

18. The coupling arrangement of any one of claims 8 to 17, wherein the locking latch is manipulable to be opened through an opening configured at a front wall of the respective utility module.

19. The coupling arrangement of any one of claims 1 to 18, wherein one or both of the locking tongue and locking rib are configured with a slanting surface at corresponding orientation along the sliding path.

20. The coupling arrangement of any one of claims 1 to 19, wherein one or both of a front edge of the projecting portion (or the projecting locking location) and a corresponding front edge of the depressed locking location are slanted for gliding positioning of the second utility module into locking position over the first utility module.

21. The coupling mechanism of any one of claims 1 to 20, wherein the first utility module is configured for detachably attaching one or more second utility modules thereto.

22. A coupling mechanism for a utility assembly comprising at least a first utility module and at least a second utility module, said coupling mechanism is configured between the first utility module and the second utility module and comprises at one of a top face of the first utility module and a bottom face of the second utility module with at least one depressed locking location configured with a locking rib, and at least one locking latch arresting location; and the other one of said top face of the first utility module and a bottom face of the second utility module comprises at least one projecting

portion with a locking tongue disposed in register with said at least one depressed locking location, and at least one locking latch disposed in register with said at least one locking latch arresting location; and wherein at a locked position the bottom face at least partially rests over the top face, and the at least one projecting tongue is arrested by the corresponding at least one locking rib and the at least one locking latch is arrested by corresponding at least one locking latch arresting location, and further wherein disengaging the second utility module from the first utility module is facilitated by disengaging the at least one locking latch from the at least one locking latch arresting location.

23. A utility assembly comprising at least a first utility module and at least a second utility module, and comprising a coupling mechanism according to any one of claims 1 to 21, the coupling mechanism being configured between the first utility module and the second utility module.

24. A utility assembly comprising at least a first utility module and at least a second utility module, and comprising a coupling mechanism for readily detachably attaching the first and second utility modules, the coupling mechanism being configured between the first utility module and the second utility module; said coupling mechanism comprising at one of a top face of the first utility module and a bottom face of the second utility module one or more depressed locking locations each configured with a locking rib, and at least one locking latch arresting location; and the other one of said top face of the first utility module and a bottom face of the second utility module comprises one or more projecting portions each configured with a locking tongue disposed in register with said one or more depressed locking locations, and at least one locking latch disposed in register with said at least one locking latch arresting location; such that at a locked position, the bottom face of the second utility module at least partially rests over the top face of the first utility module, and the one or more projecting tongues are arrested by the corresponding one or more locking ribs, and the at least one locking latch is arrested by corresponding at least one locking latch arresting location, thereby preventing sliding displacement between the first utility module and the second utility module, and disengaging the second utility module from the first utility module is facilitated by disengaging the at least one locking latch from the at least one locking latch arresting location.

25. The utility assembly of claim 24, wherein the first and second utility modules are in a locking engagement when said one or more depressed locking locations and the one or more projecting portions are disposed behind one another.

26. The utility assembly of claim 24 or 25, wherein said one or more depressed locking locations and said one or more locking latch arresting locations are configured at the top face of the first utility module, and the one or more projecting portions and the at least one locking latch are configured at the bottom face of the second utility module.

27. The utility assembly of any one of claims 24 to 26, wherein at least one second utility module is configured for snap-type locking over the first utility module.

28. The utility assembly of any one of claims 24 to 27 wherein engaging the first and second utility modules into the locked position is provided by sliding the second utility module with respect to the first utility module along a sliding path defined by at least one of said at least one locking rib and said at least one locking tongue.

29. The utility assembly of any one of claims 24 to 28, wherein the at least one locking rib extends substantially parallel to the sliding path.

30. The utility assembly of claim 29, wherein the at least one locking rib extends substantially perpendicular and intersects the sliding path.

31. The utility assembly of claim 29, wherein a single locking rib extends at rear end of a depressed locking location and substantially perpendicular to the sliding path.

32. The utility assembly of claim 29 wherein two locking ribs extend at side edges of a depressed locking location and disposed substantially parallel to the sliding path.

33. The utility assembly of claim 29, wherein two locking ribs each extend at a respective side edge of two neighboring depressed locking locations, said locking ribs disposed substantially parallel to the sliding path.

34. The utility assembly of any one of claims 24 to 33, wherein a top face of a first utility module interlocks with a bottom face of a second utility module disposed thereover in a substantially fully overlapping relation, or with a bottom face of at least one second utility module only partially overlapping therewith.

35. The utility assembly of any one of claims 24 to 33, wherein the second utility module overlaps a significant portion of a first utility module and is configured with a single release latch for displacing several locking latches articulated therewith.

36. The utility assembly of any one of claims 24 to 35, further comprising a release latch for displacing the locking latch into disengagement from the locking latch arresting location can be disposed at a front face of the respective second utility module.

37. The utility assembly of any one of claims 24 to 36, wherein the locking latch is configured for displacement in a direction substantially normal to a respective face of a utility module.

38. The utility assembly of any one of claims 24 to 37, wherein the locking latch is spring biased and configured for normally projecting from a face of the respective first or second utility module.

39. The utility assembly of any one of claims 24 to 38, wherein two or more second utility modules can be mounted over a first utility module, each being independently detachable attachable over the first utility module.

40. The utility assembly of any one of claims 24 to 39, wherein at least one of the first utility module and the second utility module are configured with a gliding surface facilitating displacement and positioning the respective second utility module at the locking position with respect to the first utility module.

41. The utility assembly of any one of claims 24 to 40, wherein one or more of the utility modules is a container module, and the utility assembly is a container assembly or a tool caddy.

42. The utility assembly of claim 41, wherein the container module is compartmented and optionally configured with sub-containers and sub-compartments.

43. The utility assembly of claim 41 or 42, wherein a top face of the container module is configured as a lid or as a functional component of the container module.

44. The utility assembly of any one of claims 41 to 43, wherein the container modules is a locomoting container, configured with an arrangement for locomoting said utility assembly.

45. The utility assembly of any one of claims 41 to 44, wherein the container modules is configured with a carrying arrangement disposed at any one or more of its faces, optionally being a carrying handle.

46. The utility assembly of any one of claims 24 to 40, wherein one or more of the utility modules is a soft-shell container with at least a rigid face portion.

47. The utility assembly of any one of claims 24 to 40, wherein said first utility module is a mobile carrier unit.

48. The utility assembly of any one of claims 24 to 47, further comprising a locking mechanism for preventing unintentional separation of the modules while they are interlocked.

49. The utility assembly of any one of claims 24 to 48, wherein the first utility module is configured for detachably attaching at least two second utility modules thereto.

50. A mobile carrier unit comprising at least one carrier engagement surface, compatible for interlocking engagement in a detachable manner with a first engagement surface of a utility module, said carrier engagement surface having (i) one or more depressed locking locations each configured with a locking rib and at least one locking latch arresting location, configured for engagement with said first engagement surface of a utility module that comprises at least one locking latch and one or more projecting portions, each projecting portion being configured with a locking tongue, or (ii) at least one locking latch and one or more projecting portions each configured with a locking tongue for engagement with said first engagement surface of a utility module that comprises one or more depressed locking locations, each depressed locking locations configured with a locking rib and at least one locking latch arresting location.

51. The mobile carrier unit of claim 50, wherein once associated with the utility module, said locking tongue becomes disposed in register with said one or more depressed locking locations, and at least one locking latch become disposed in register with said at least one locking latch arresting location.

52. The mobile carrier unit of claim 50 or 51, configured for detachable interlocking engagement with one or more utility modules, each utility module comprising a first engagement surface.

53. The mobile carrier unit of any one of claims 50 to 52, further comprising at least one of a manipulating arrangement and a locomotion system.

54. An assembly comprising a mobile carrier unit of any one of claims 50 to 53 having at least one carrier engagement surface, and at a least one utility module having a first engagement surface, the utility module being detachably interlocked with the mobile carrier unit by engaging said first engagement surface with said carrier engagement surface.

55. The assembly of claim 54, wherein the mobile carrier unit and the at least one utility module are detachably interlocked with one another by a dovetail engagement

mechanism, that comprises laterally projecting shoulders configured on one of the carrier engagement surfaces and the first engagement surface of a utility module, and a shoulder receiving recess configured on the other one of one of the carrier engagement surfaces and the first engagement surface of a utility module; where said laterally projecting shoulders are configured for sliding engagement with said shoulder receiving recess.

56. The assembly of claim 55, wherein one or both of the carrier engagement surfaces and the first engagement surface of a respective utility module are configured with depressions, each accommodating respective laterally projecting locking shoulders.

57. The assembly of claim 54, wherein the mobile carrier unit and the at least one utility module are detachably interlocked with one another by an undercut engagement mechanism, comprising lateral projections configured on one of the carrier engagement surfaces and the first engagement surface of a container unit, and a receiving recess configured on the other one of one of the carrier engagement surfaces and the first engagement surface of a utility module; where said lateral projections are configured for engagement with said receiving recess, such that interlocking engagement of the utility module and the carrier unit takes place by placing the first engagement surface of a utility module over the carrier engagement surface, such that the utility module`s first engaging elements are disposed shifted over the respective carrier engaging elements of the carrier unit, and are then slidingly shifted to obtain sliding interlocking engagement therebetween.

58. The assembly of any one of claims 54 to 57, further comprising a locking mechanism configured for preventing unintentional detaching of the utility module from the carrier unit.

59. The assembly of claim 58, wherein the locking mechanism comprises a locking pin that is configured for snapingly protruding from one of the engagement surfaces into a designated nook on the other engagement surface.

60. An interface coupling module comprising at least one engagement surface, compatible for interlocking engagement in a detachable manner with a first engagement surface of a utility module, said interface coupling module comprising an engagement surface having (i) one or more depressed locking locations each configured with a locking rib and at least one locking latch arresting location, configured for engagement with said first engagement surface of a utility module that comprises at least one

locking latch and one or more projecting portions, each projecting portion being configured with a locking tongue, or (ii) at least one locking latch and one or more projecting portions each configured with a locking tongue for engagement with said first engagement surface of a utility module that comprises one or more depressed locking locations, each depressed locking locations configured with a locking rib and at least one locking latch arresting location

61. The interface coupling module of claim 60, being configured for detachable or fixed attachment to a surface of an object.

62. The interface coupling module of claim 60 or 61, being a cargo interface module for a utility vehicle configured for attaching one or more utility modules to the vehicle.

63. The interface module of claim 60 or 61, being a surface mount for attaching utility modules

64. The interface module of claim 60 or 61, being a tool mount or a tool rack.

65. The interface module of claim 60 or 61, being a belt mount for mounting of utility modules to a workers belt;

66. The interface module of claim 60 or 61, being an interface mount module for coupling two utility modules to one another.

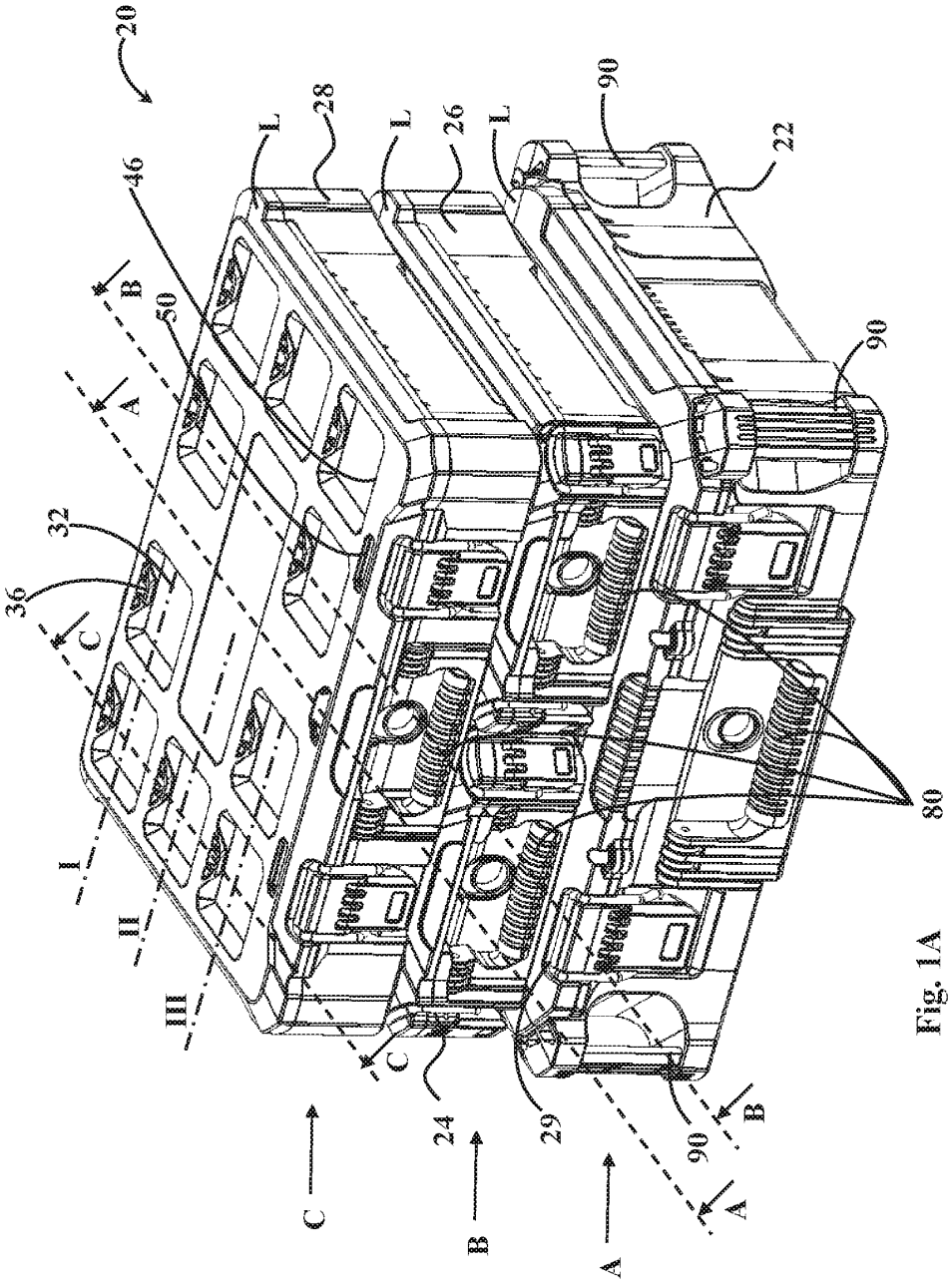


Fig. 1A

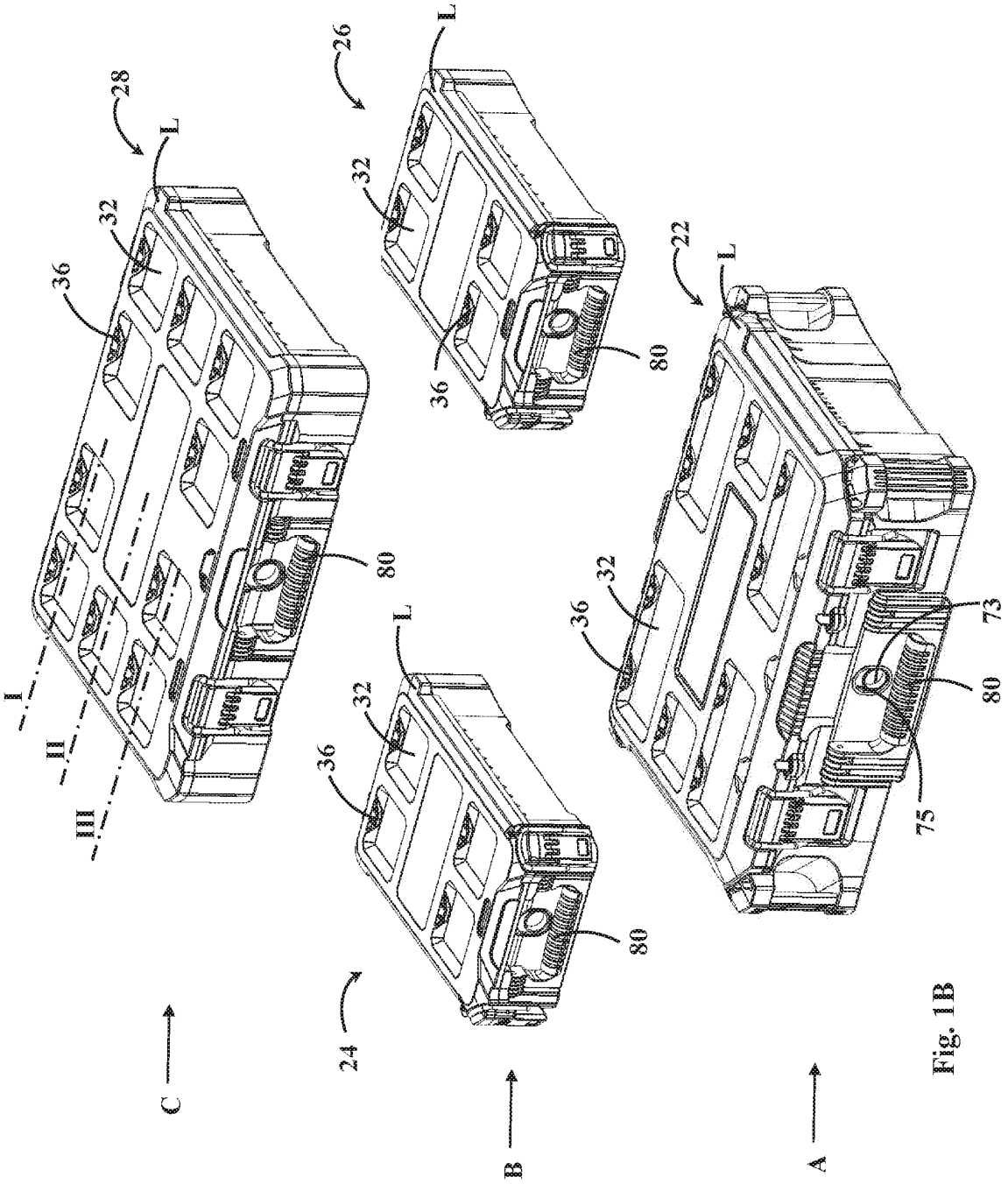


Fig. 1B

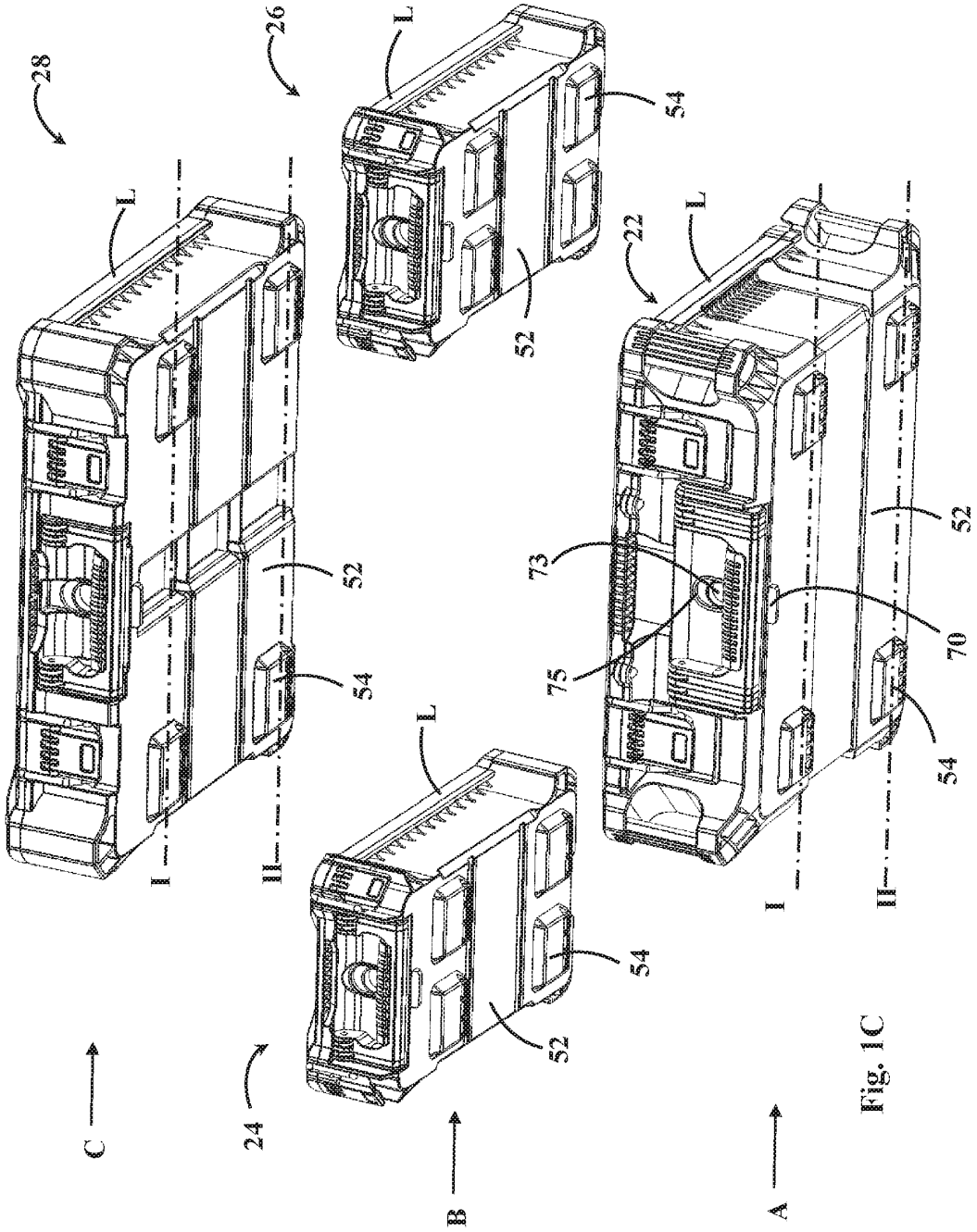


Fig. 1C

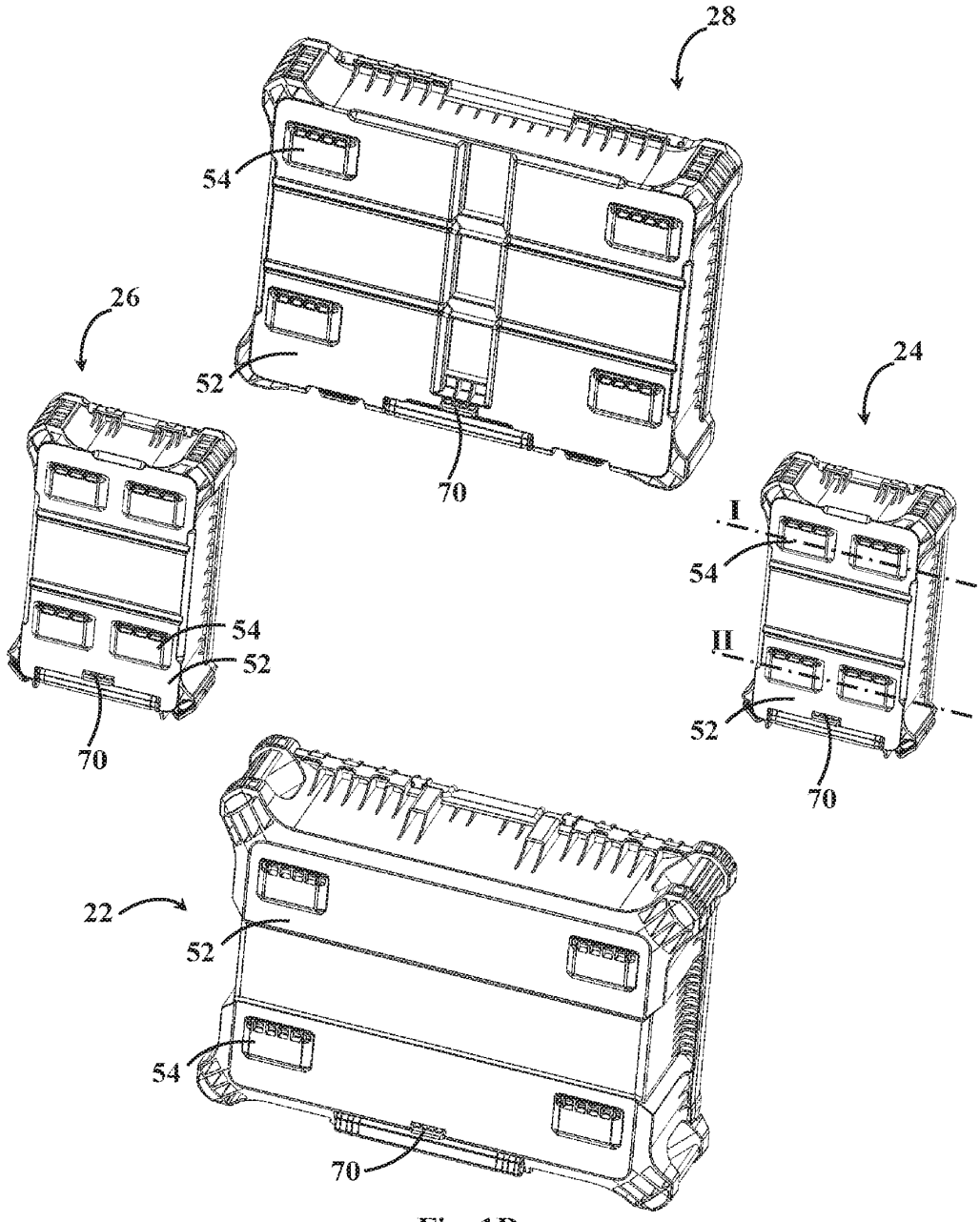


Fig. 1D

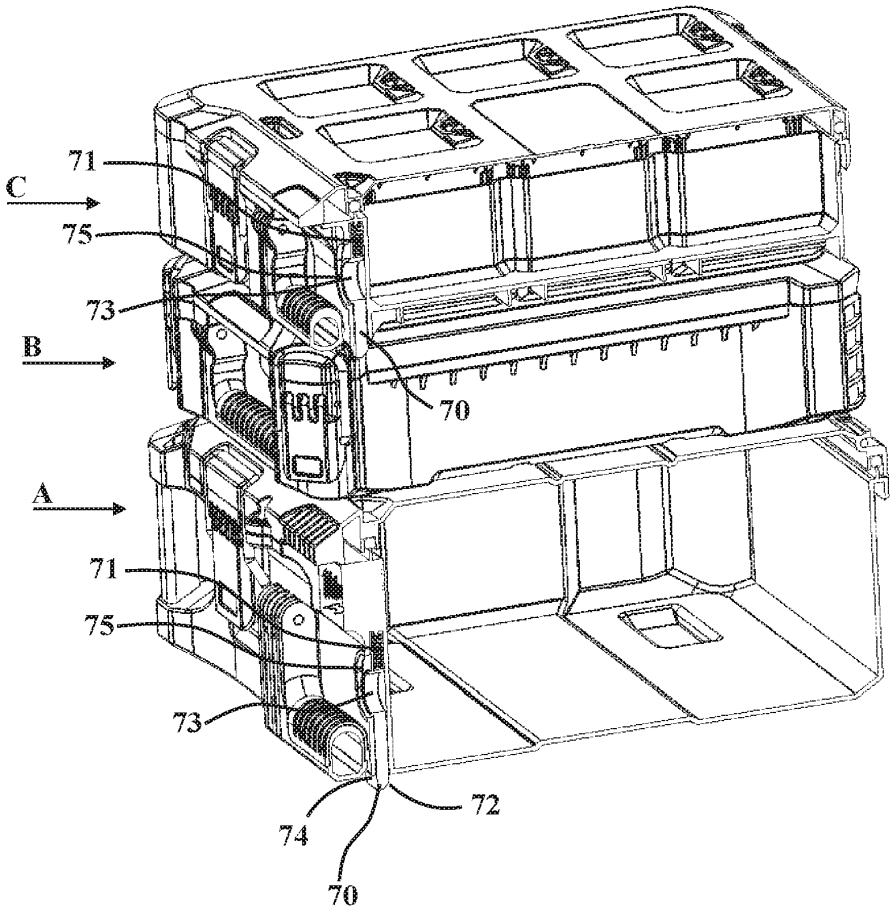


Fig. 2A

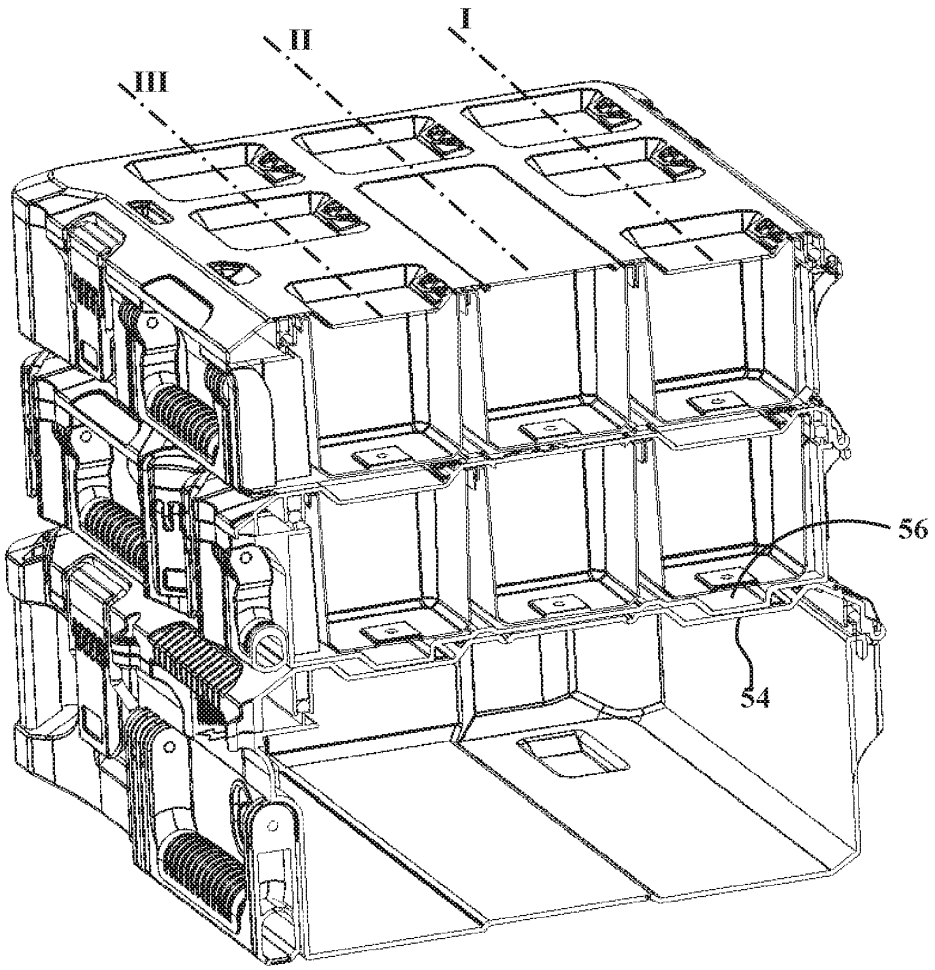


Fig. 2B

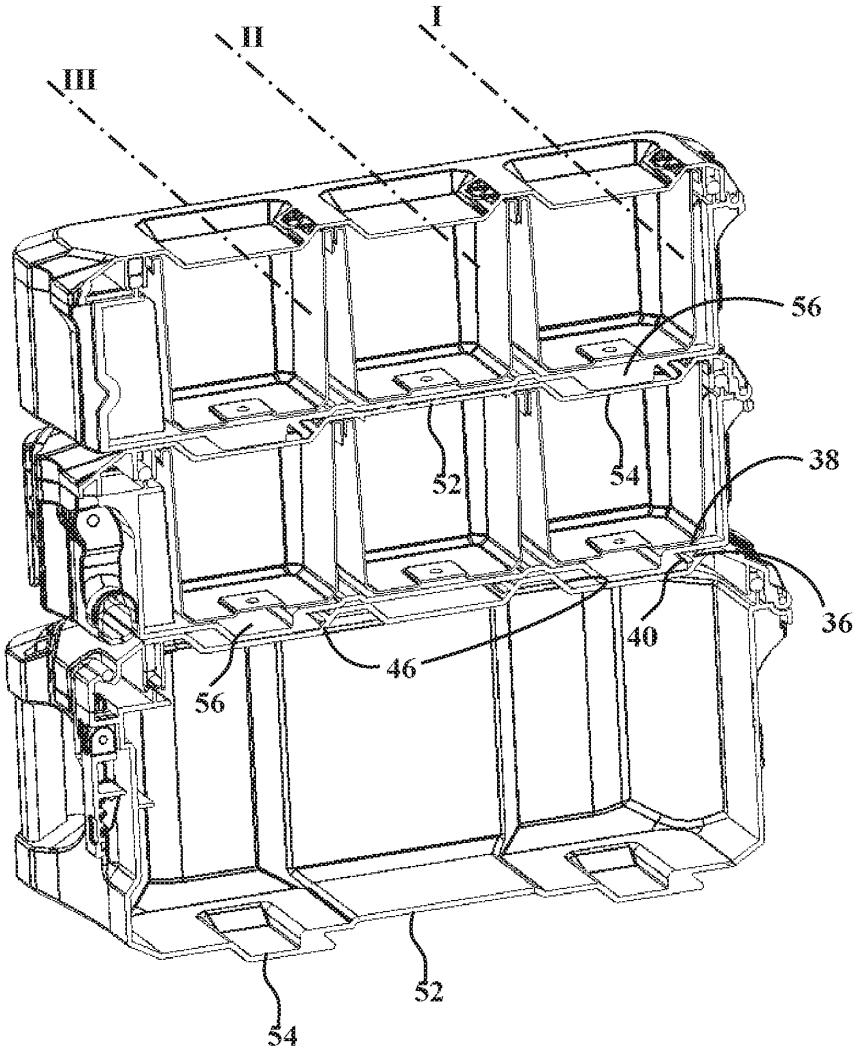


Fig. 2C

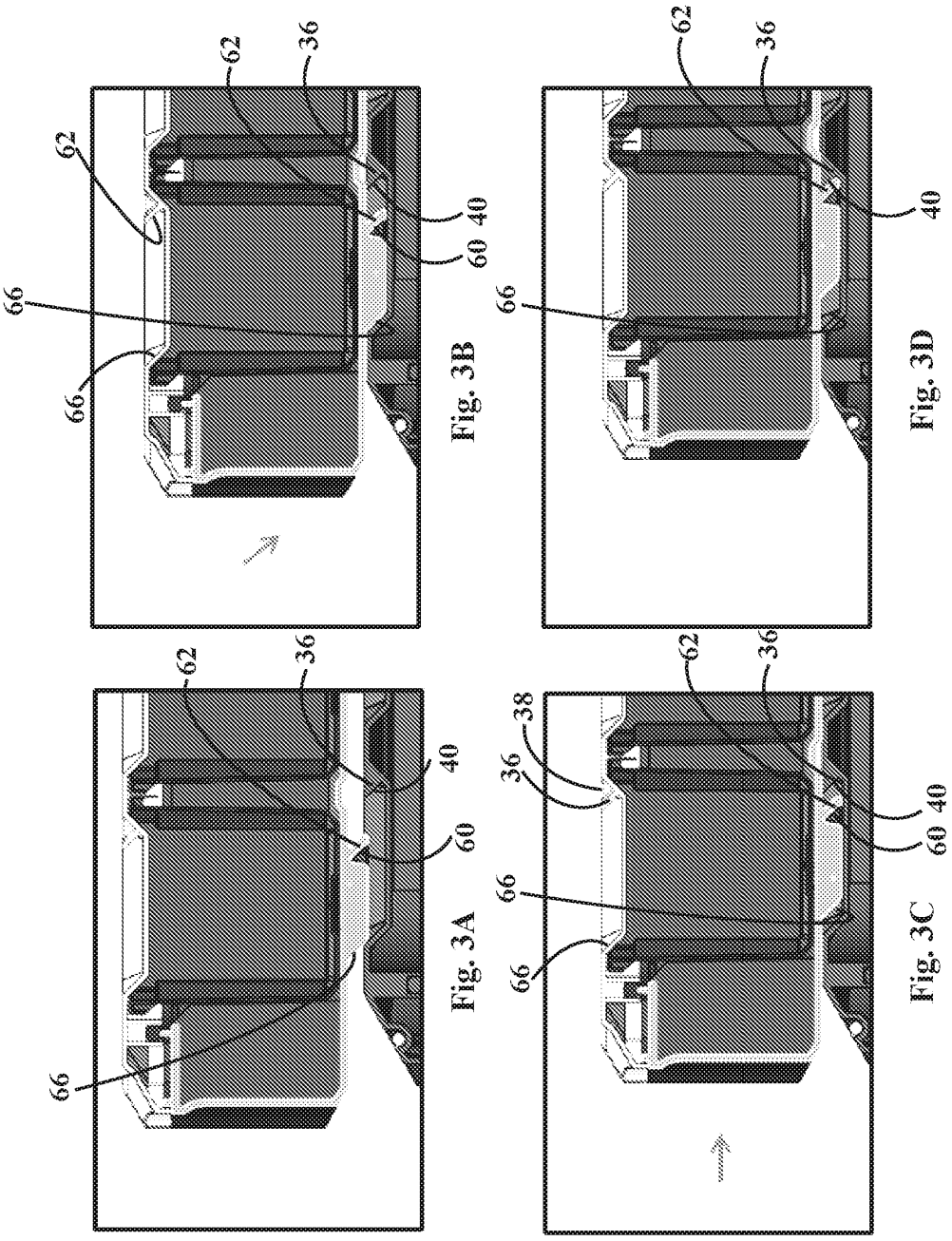
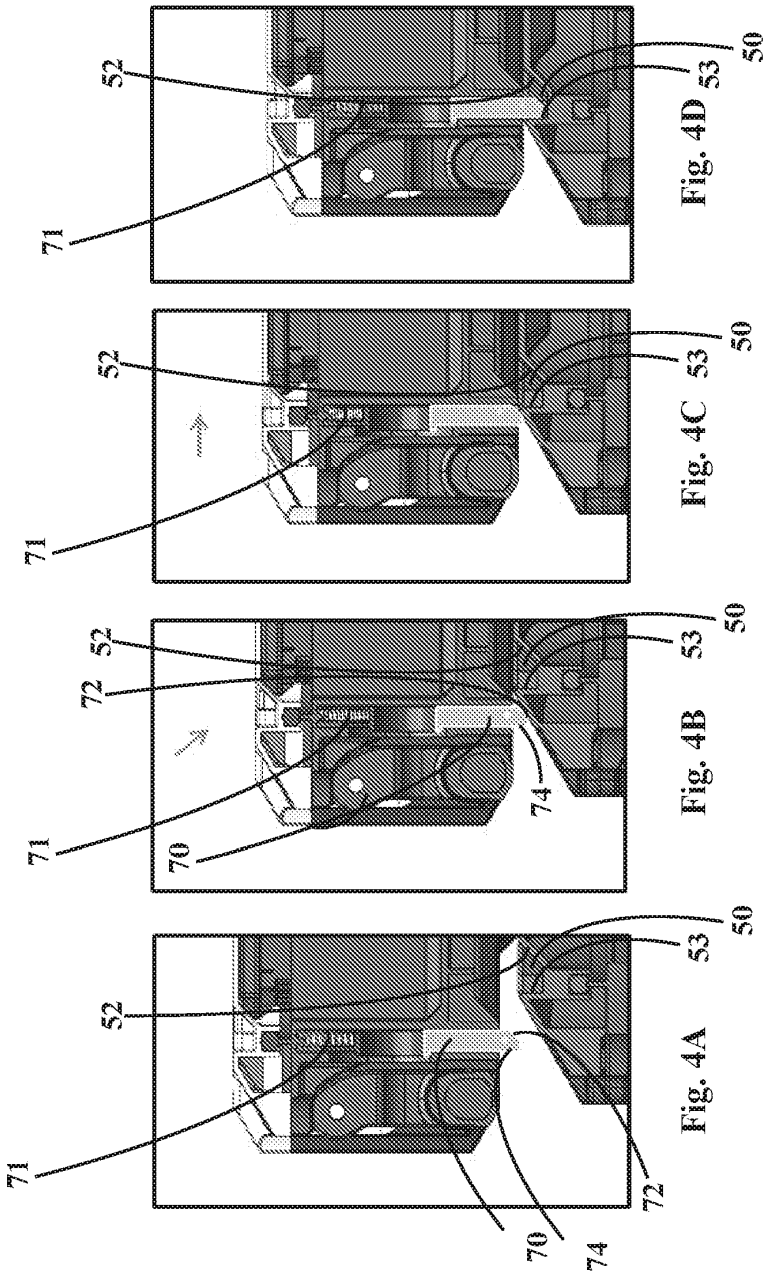


Fig. 3B Fig. 3D

Fig. 3A Fig. 3C


52
53
50
71
Fig. 4D
52
53
50
71
Fig. 4C
52
72
53
50
71
74
70
Fig. 4B
53
50
52
71
72
70
74
Fig. 4A

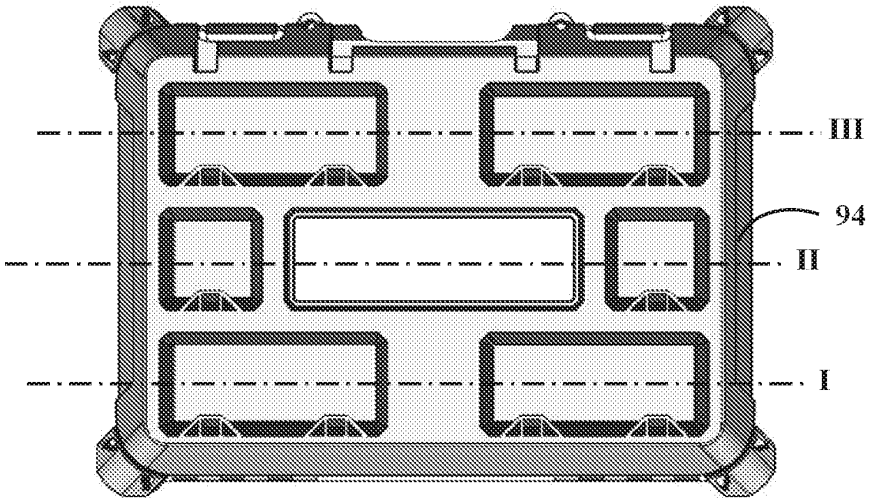


Fig. 5A

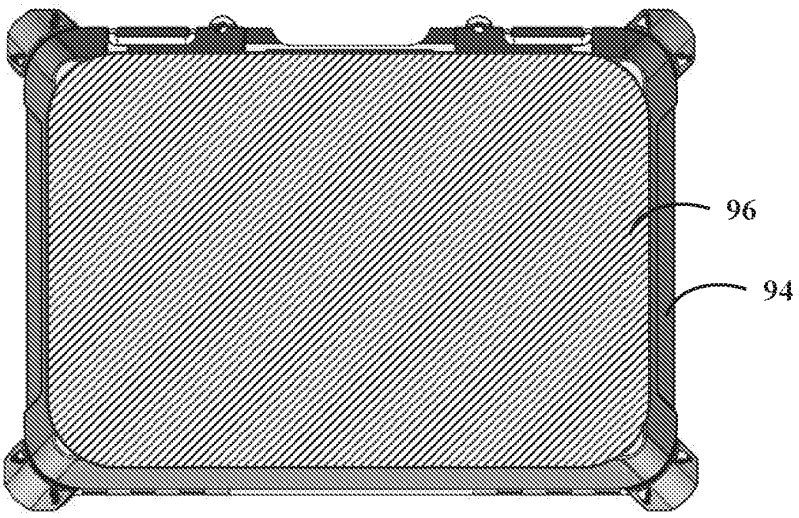


Fig. 5B

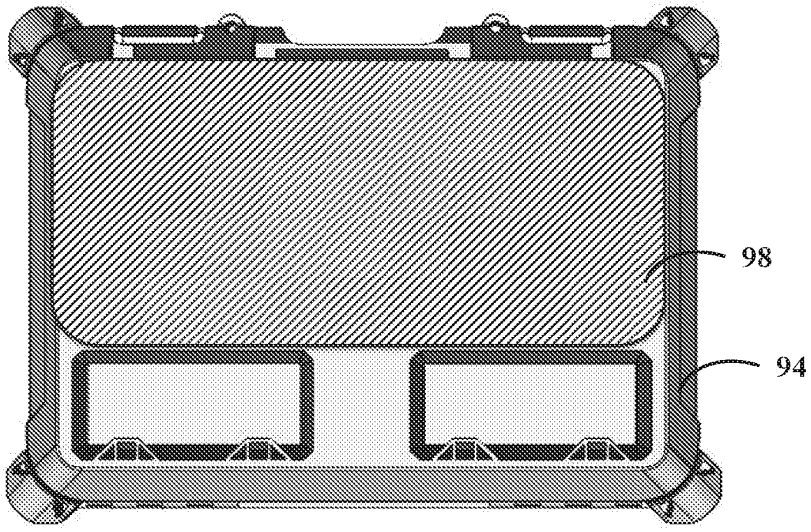


Fig. 5C

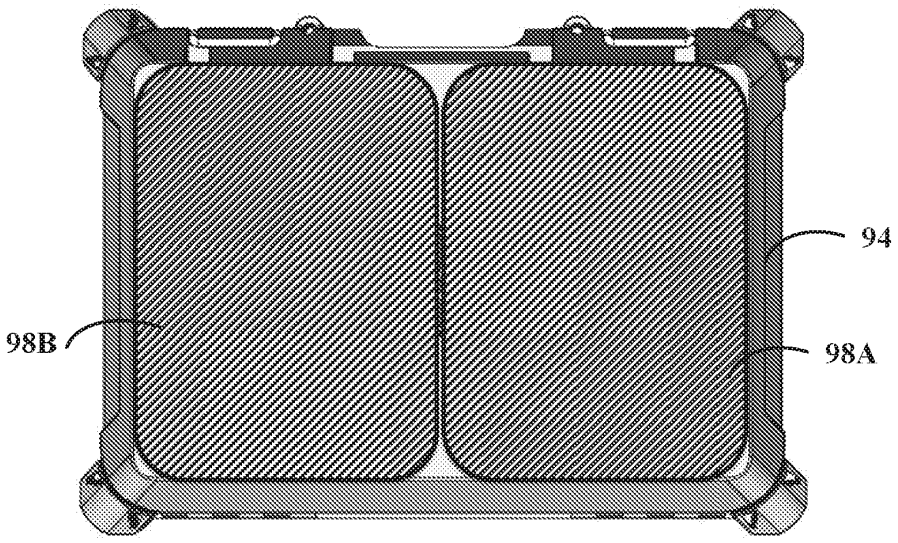


Fig. 5D

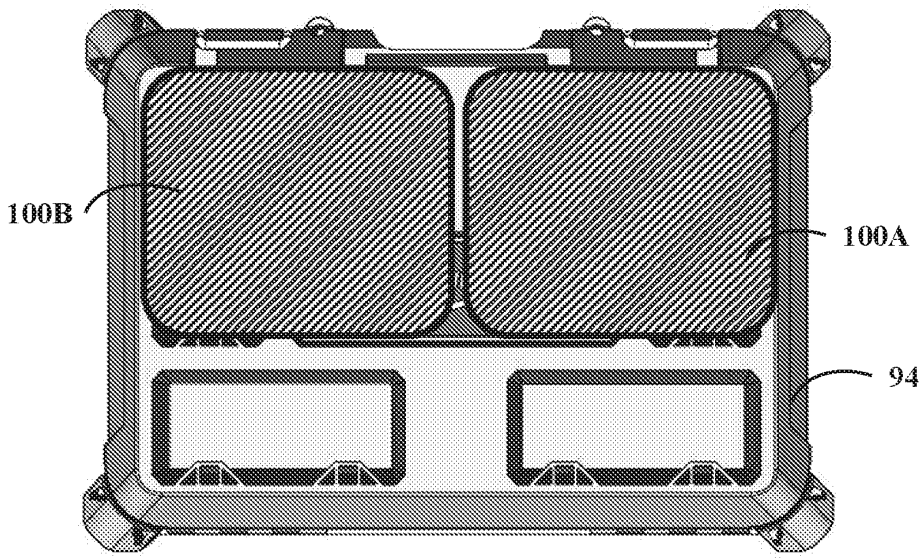


Fig. 5E

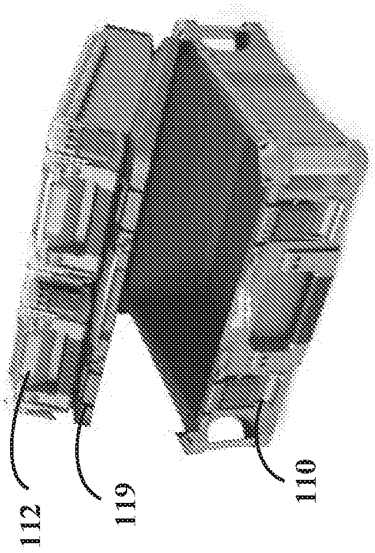


Fig. 6G

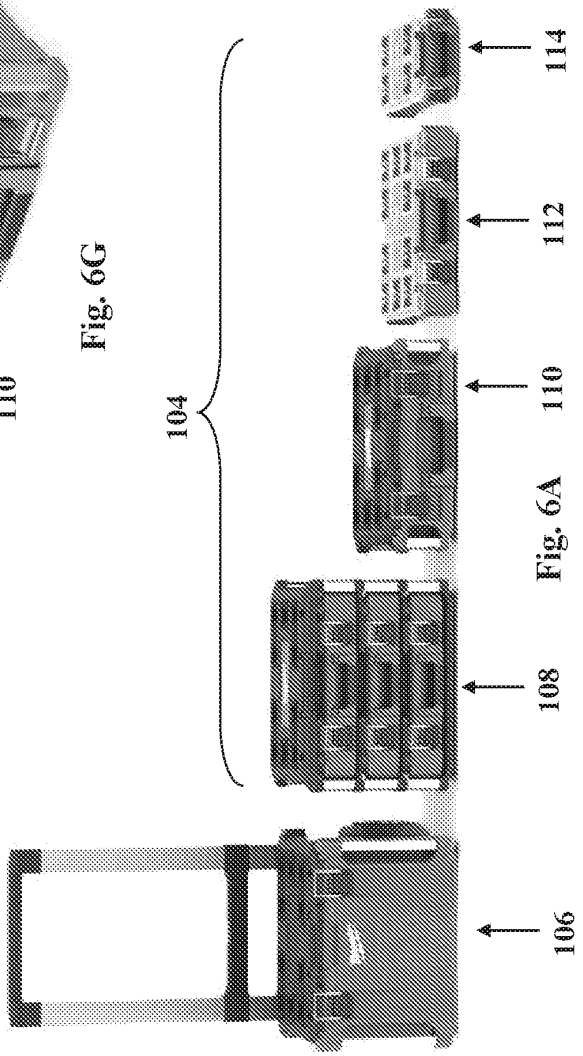


Fig. 6A

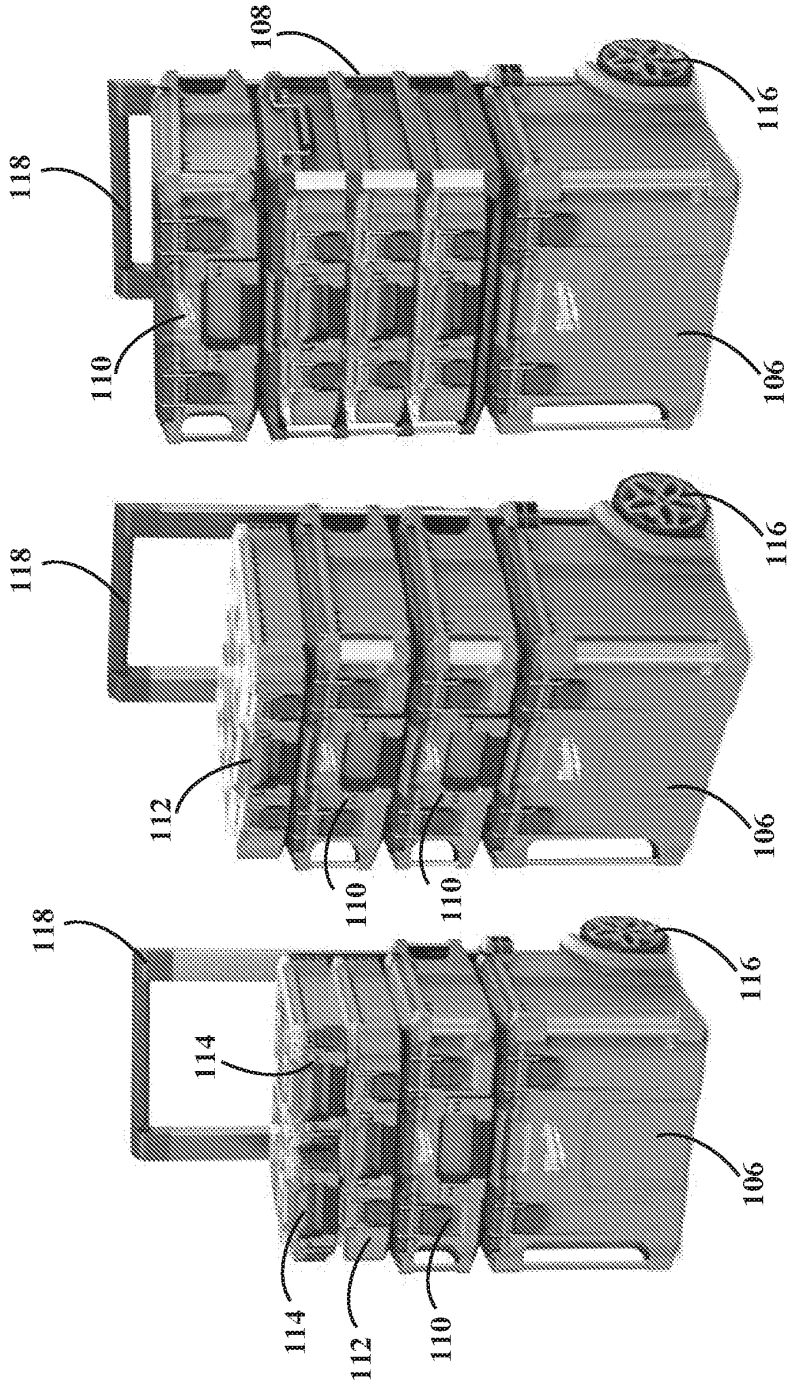


Fig. 6D

Fig. 6C

Fig. 6B

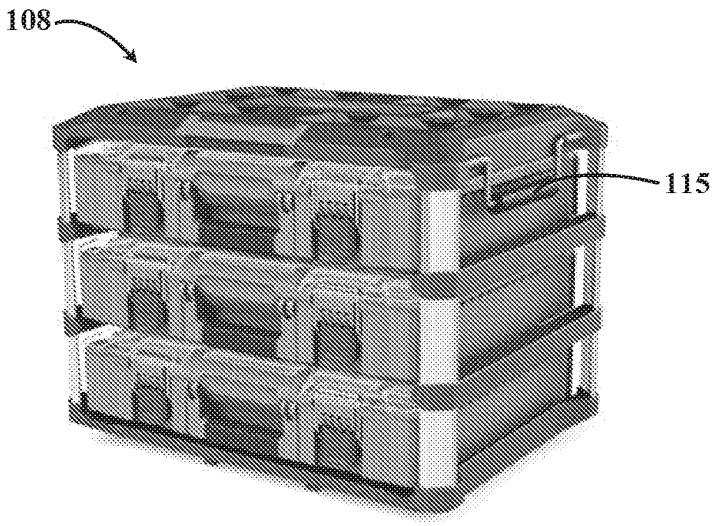


Fig. 6E

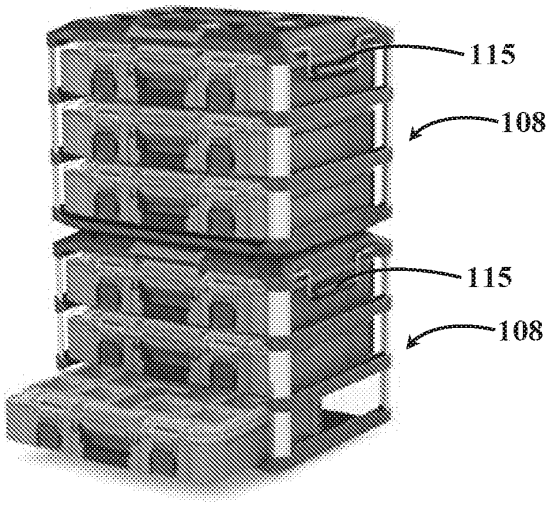


Fig. 6F