

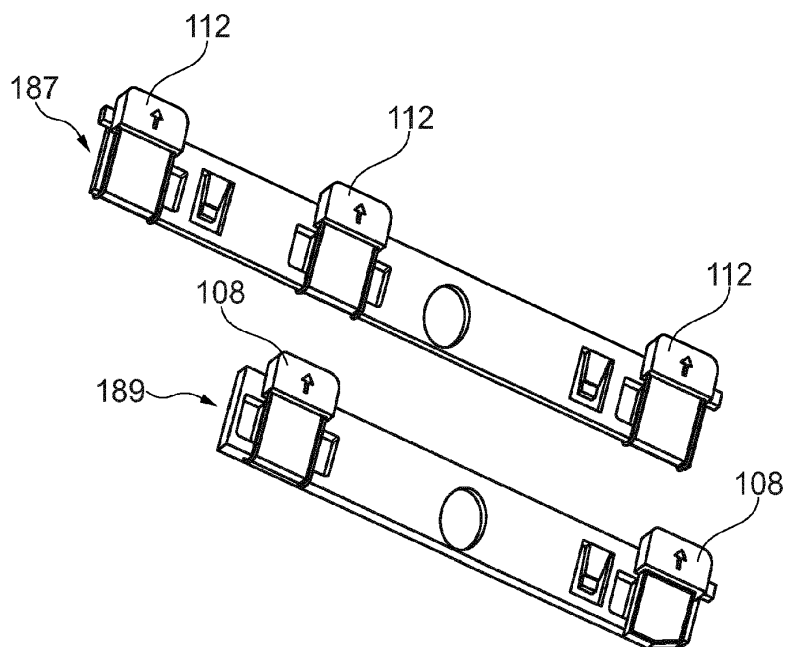


Fig. 7

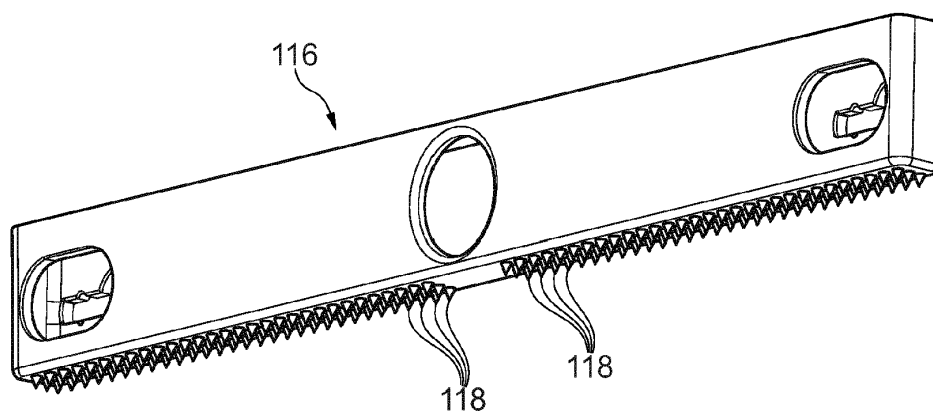


Fig. 8

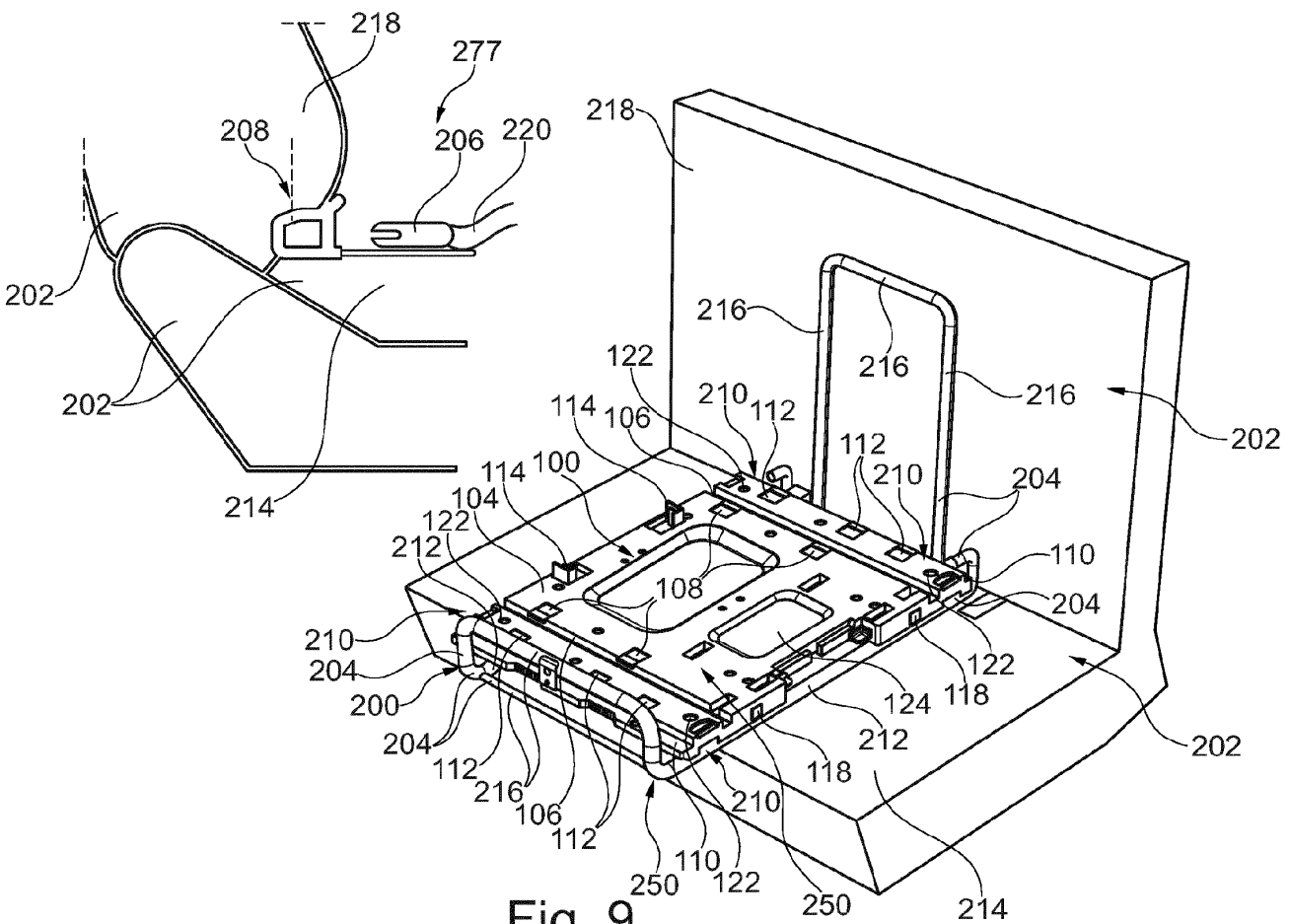


Fig. 9

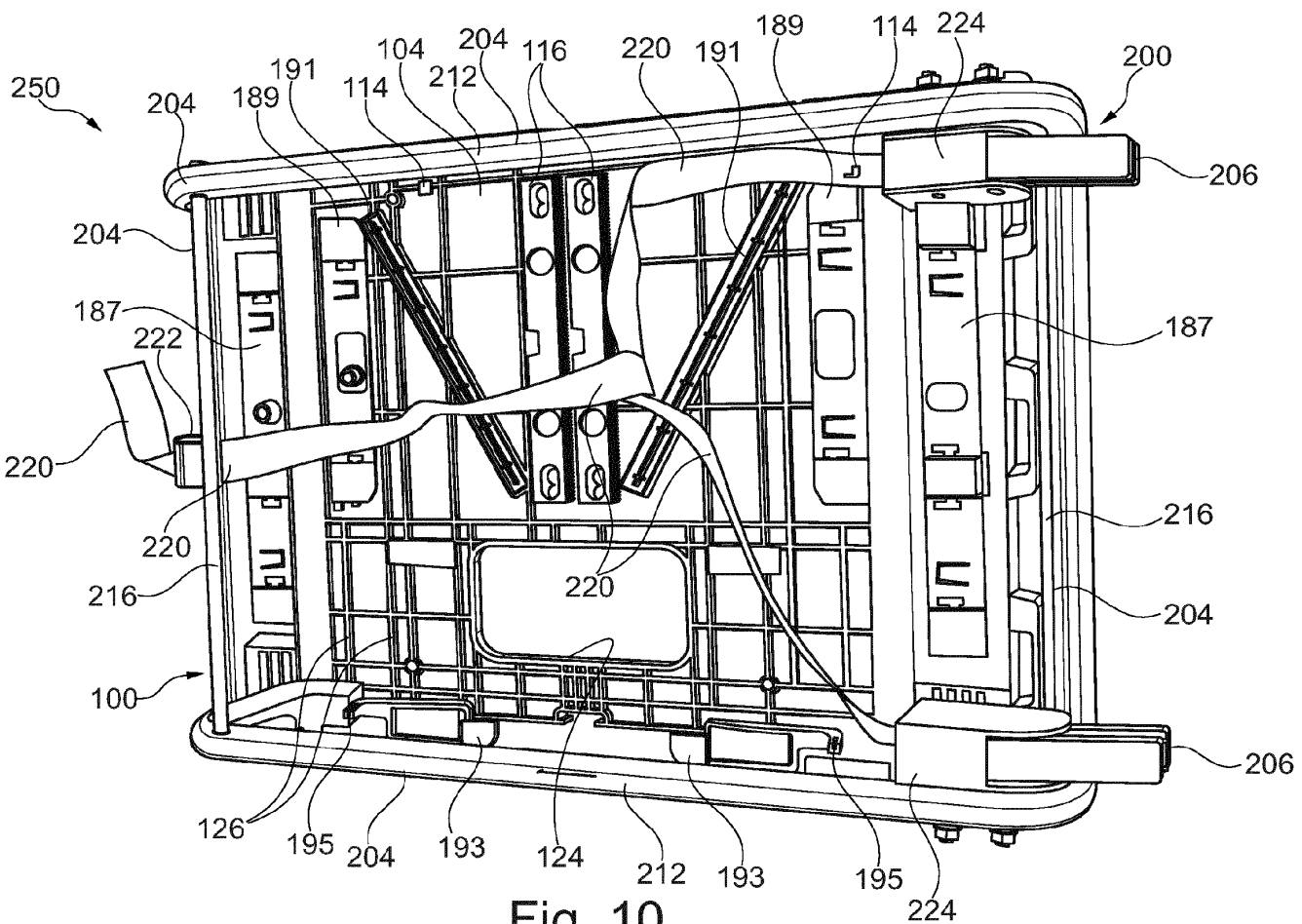


Fig. 10

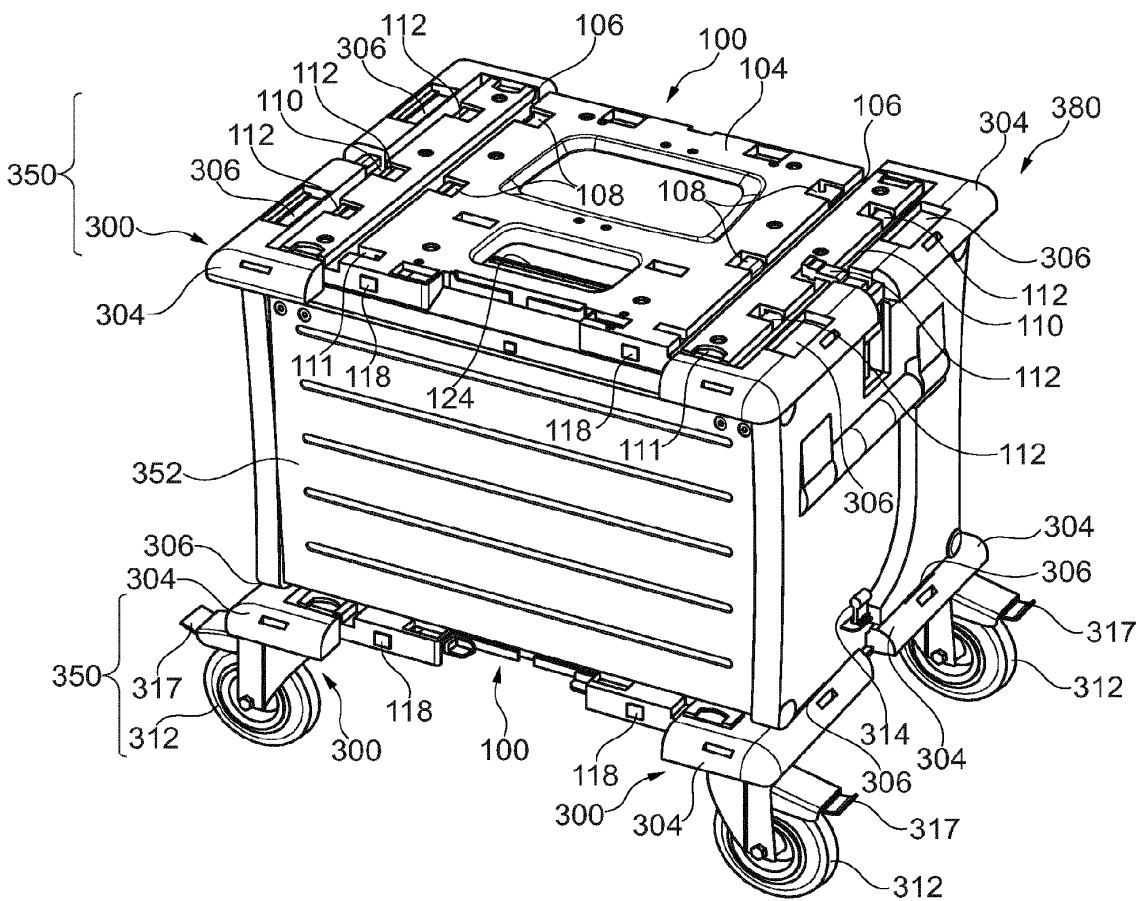
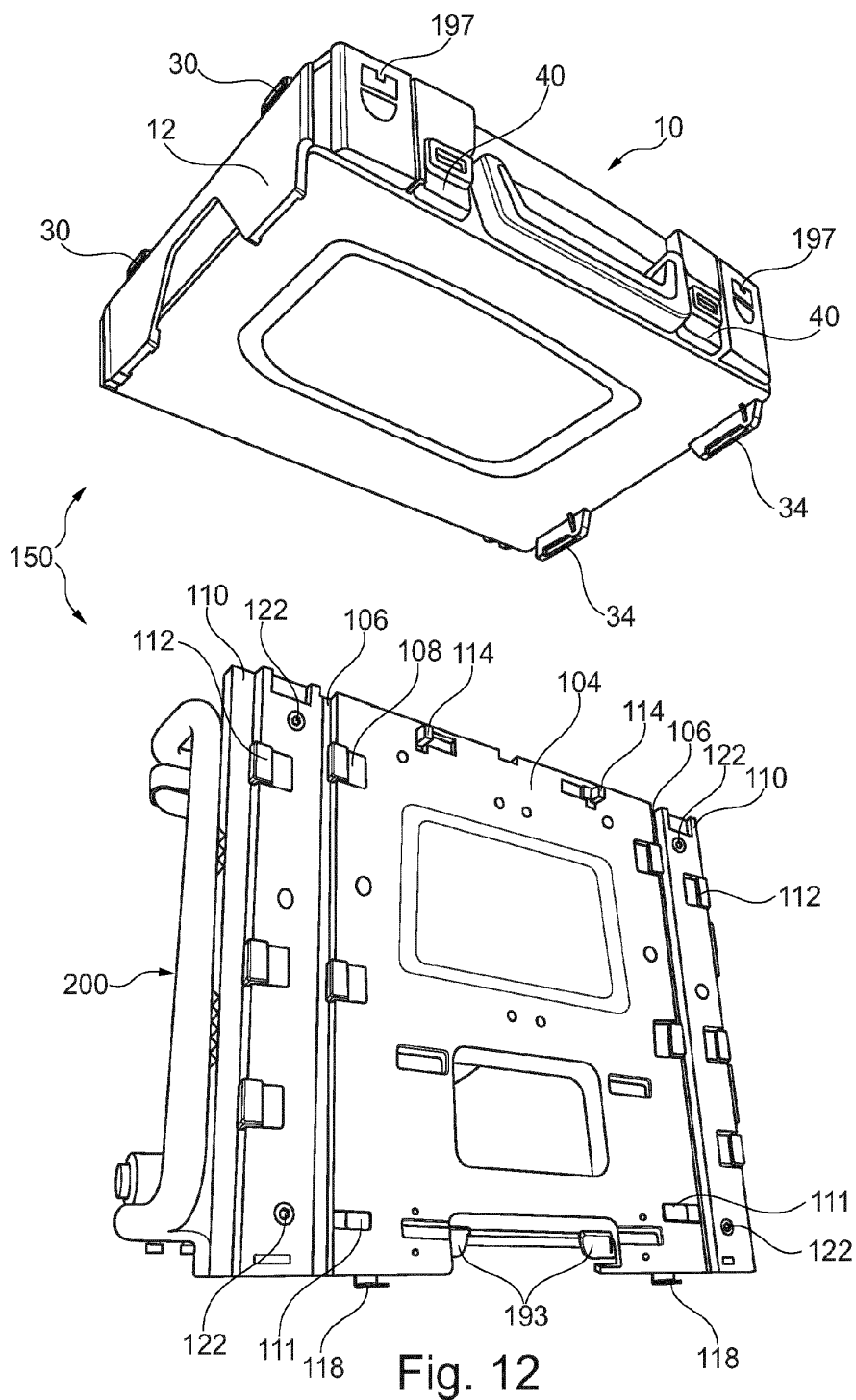


Fig. 11



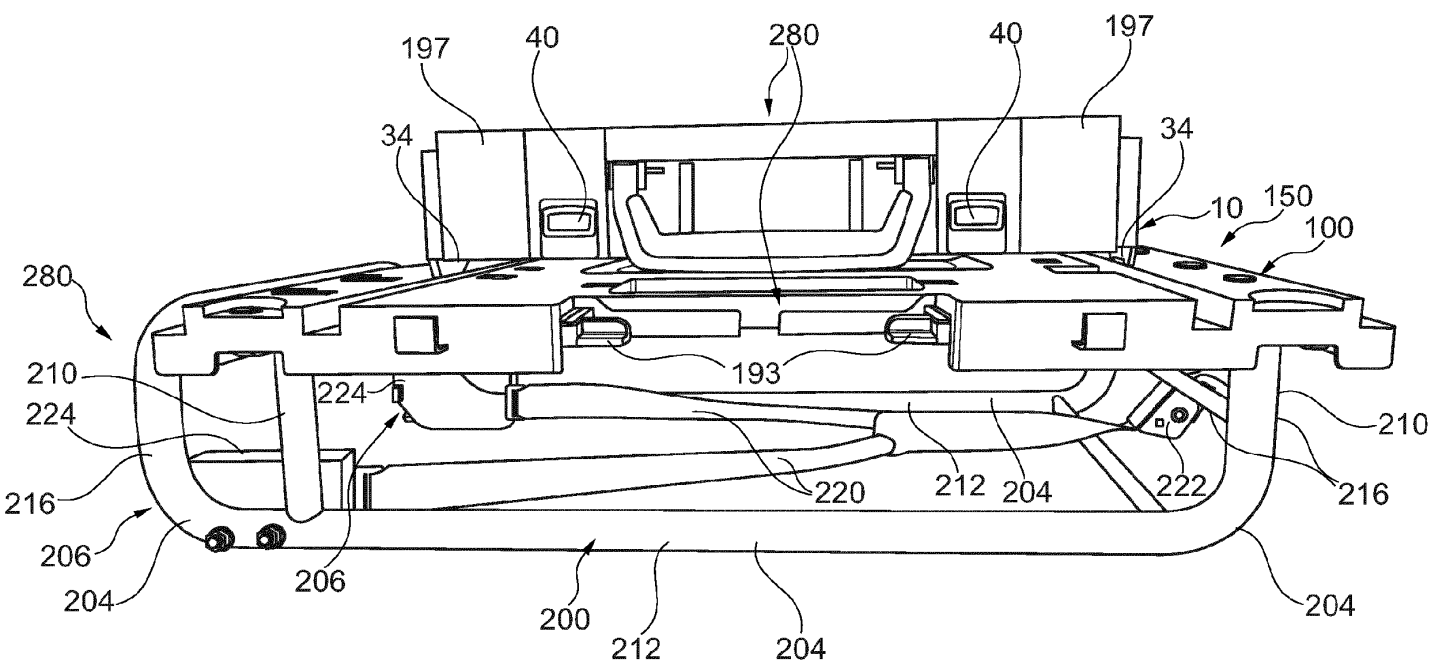


Fig. 13

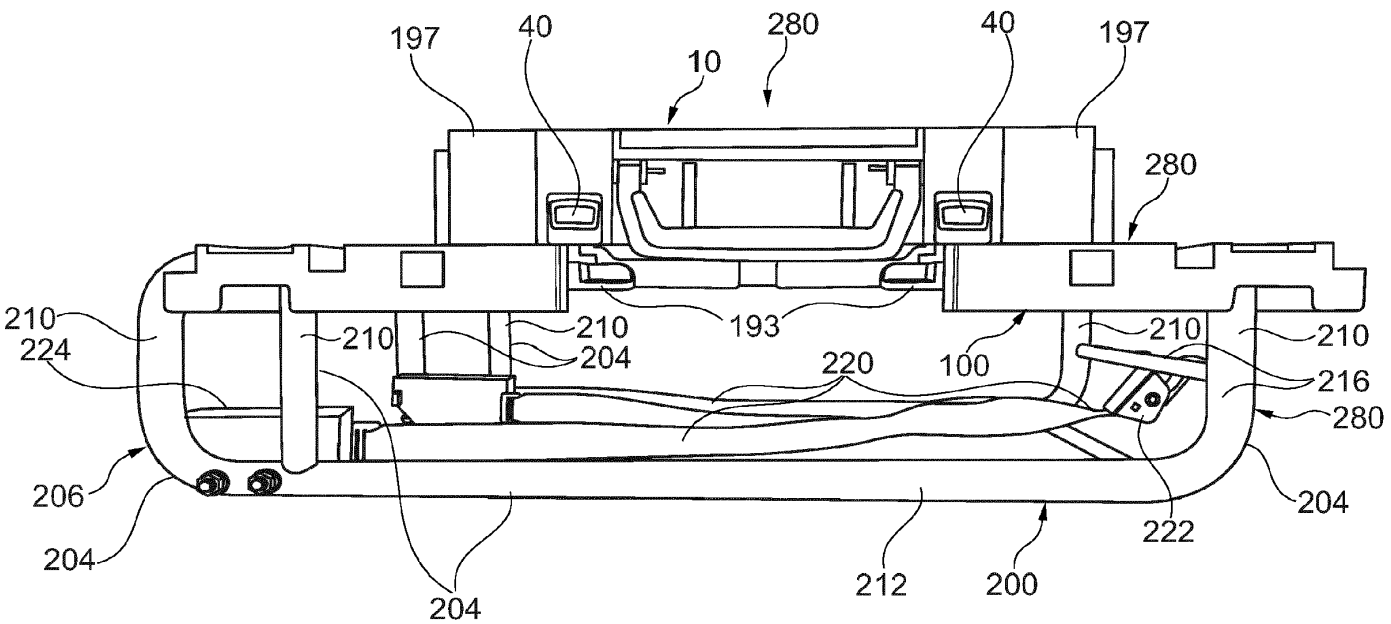


Fig. 14

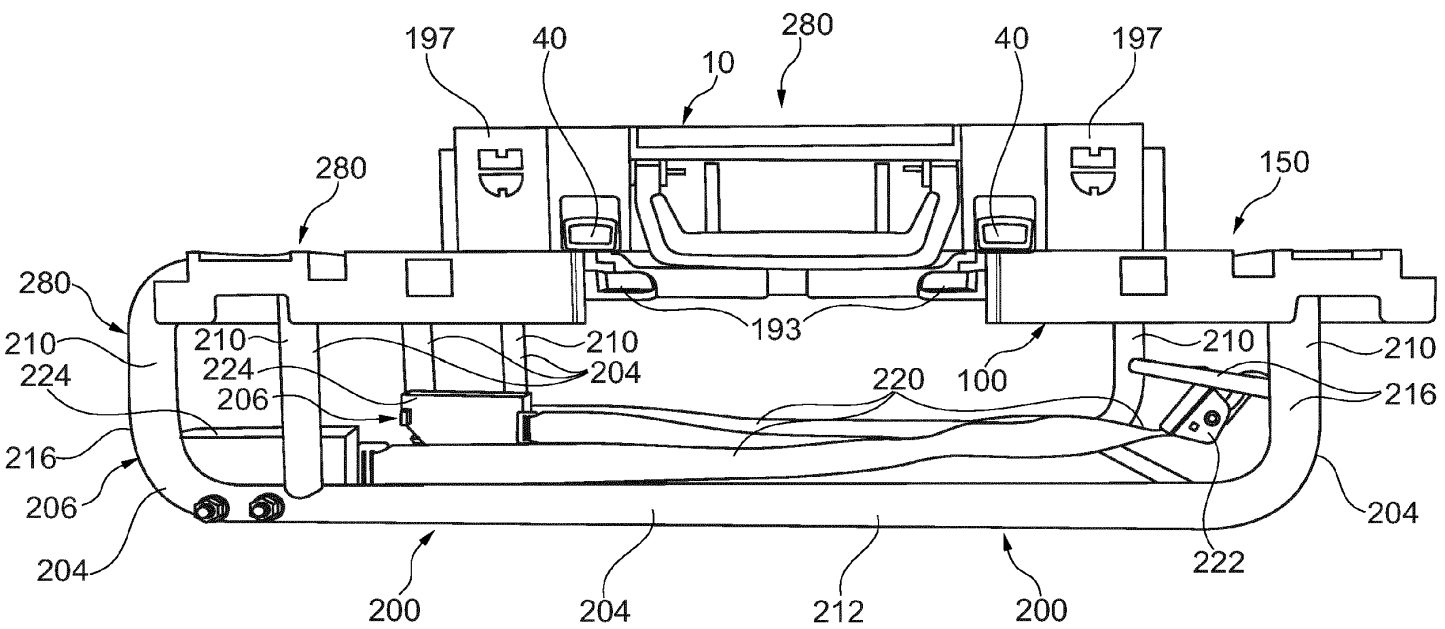


Fig. 15

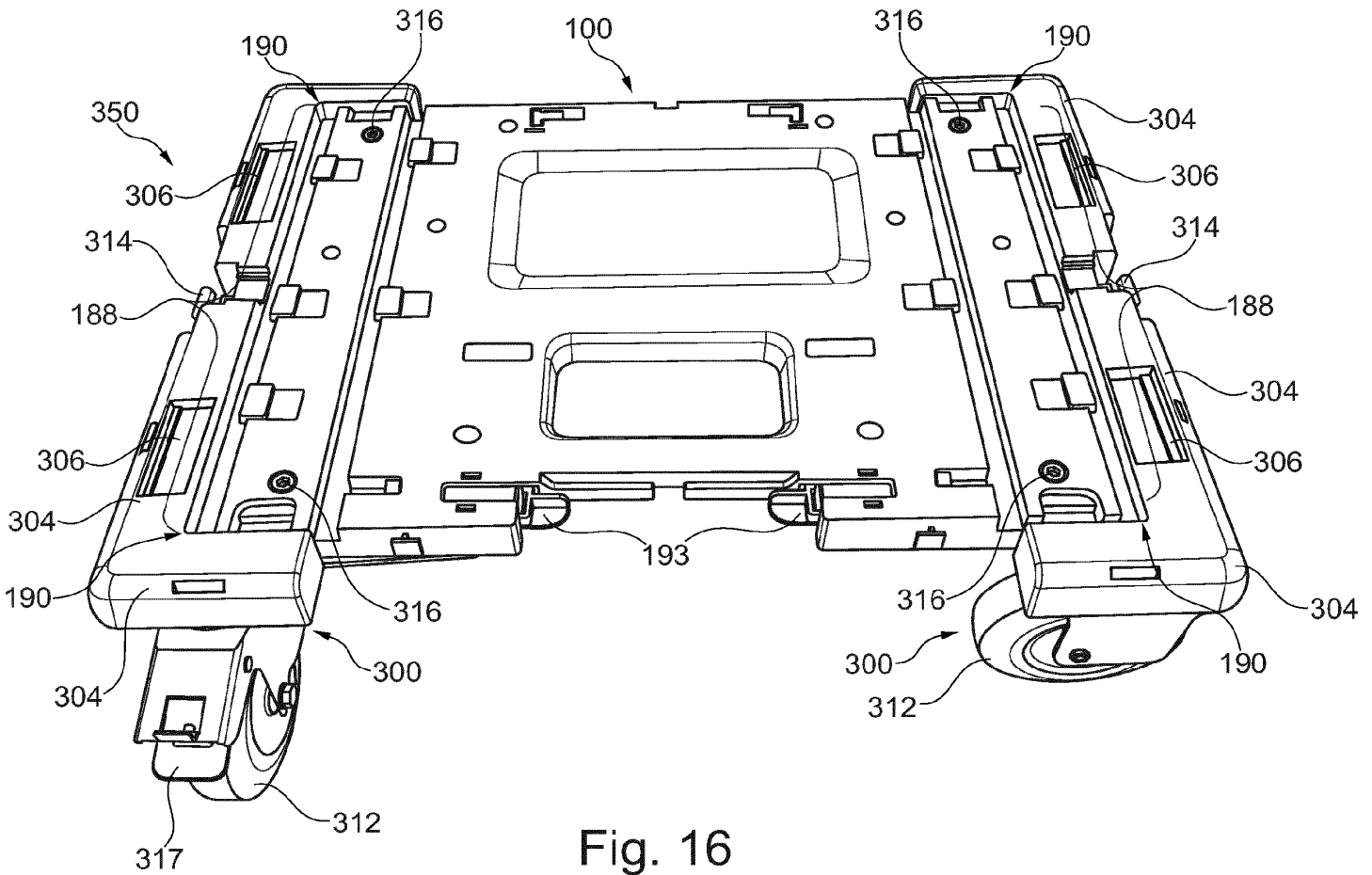
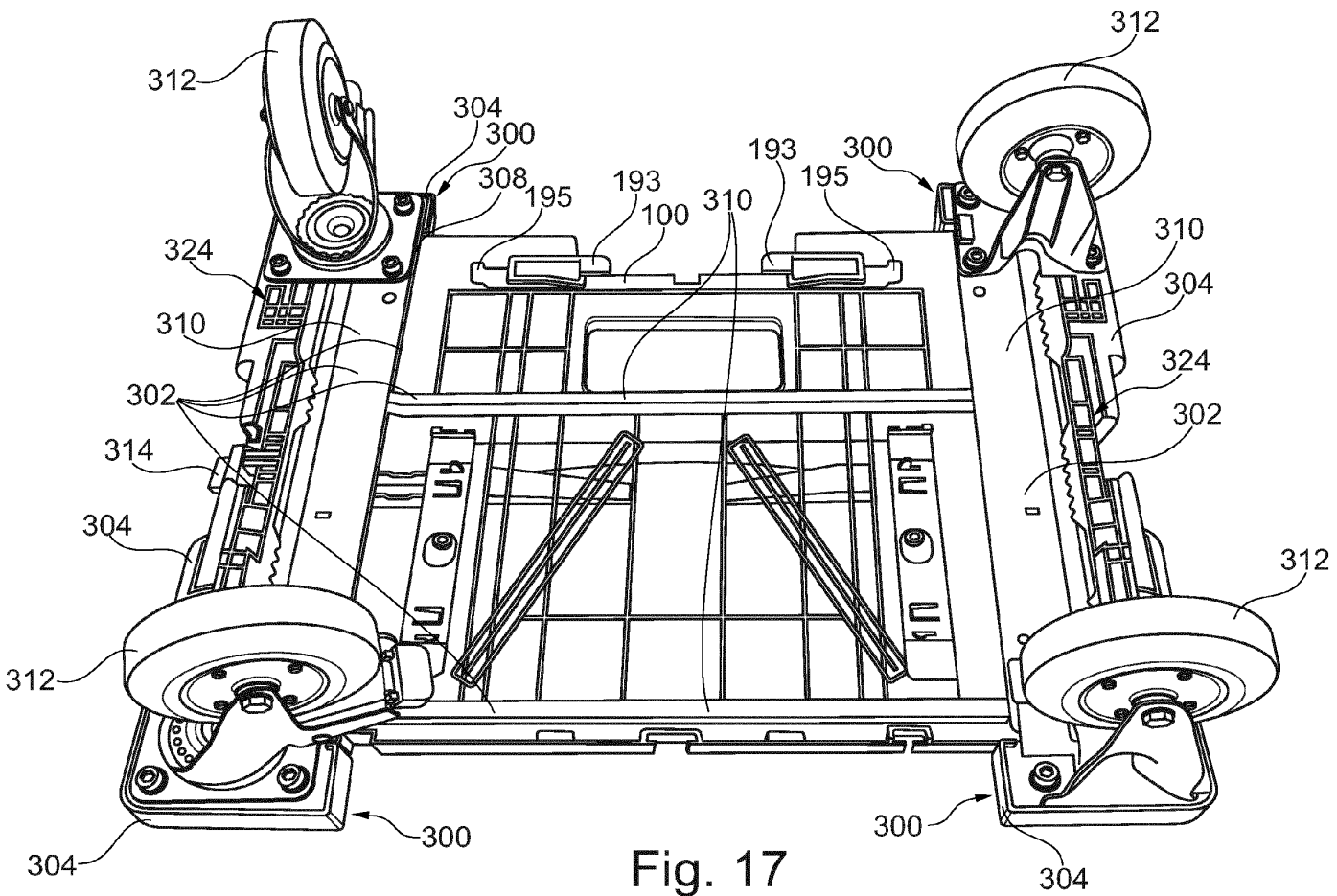


Fig. 16



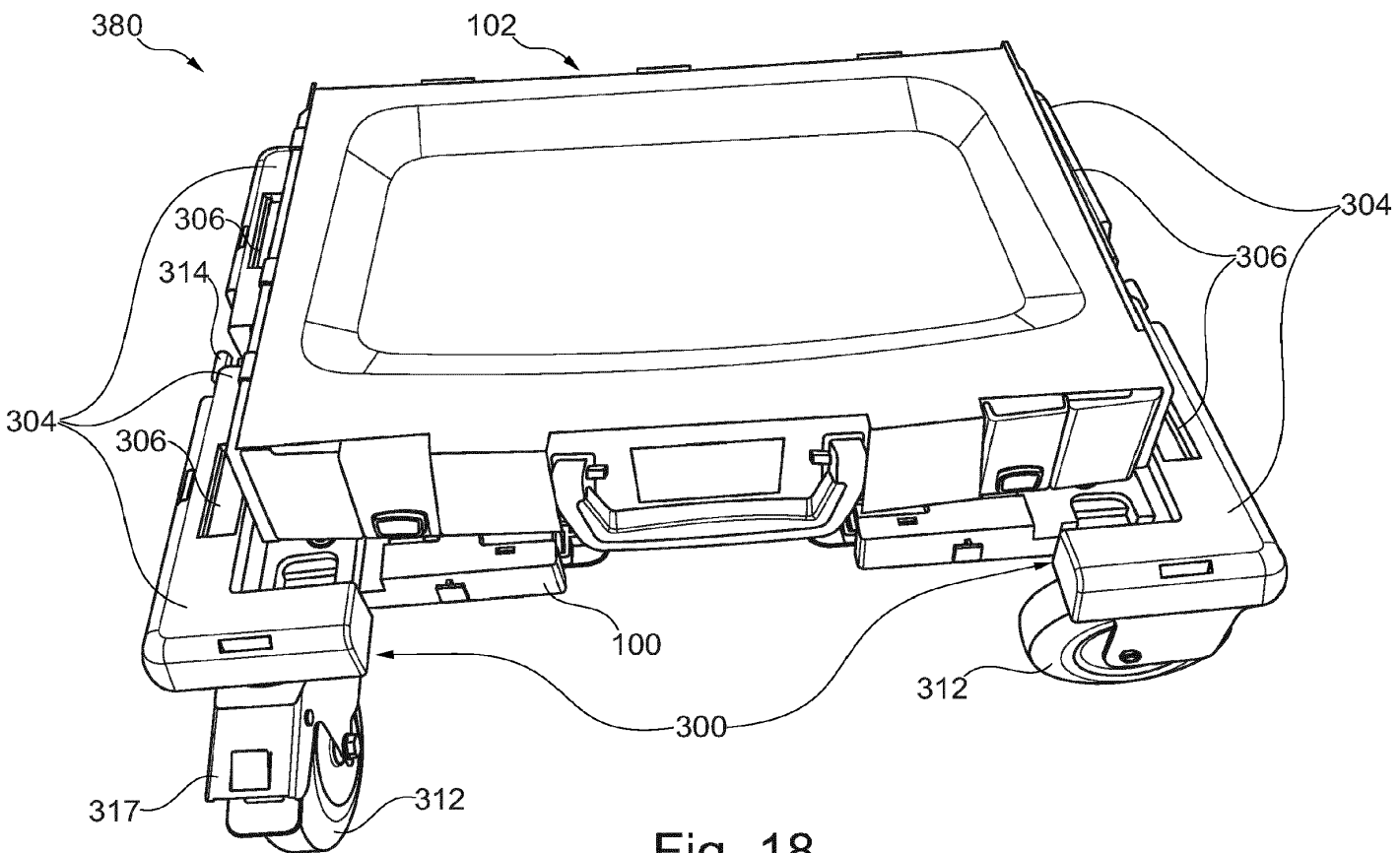


Fig. 18

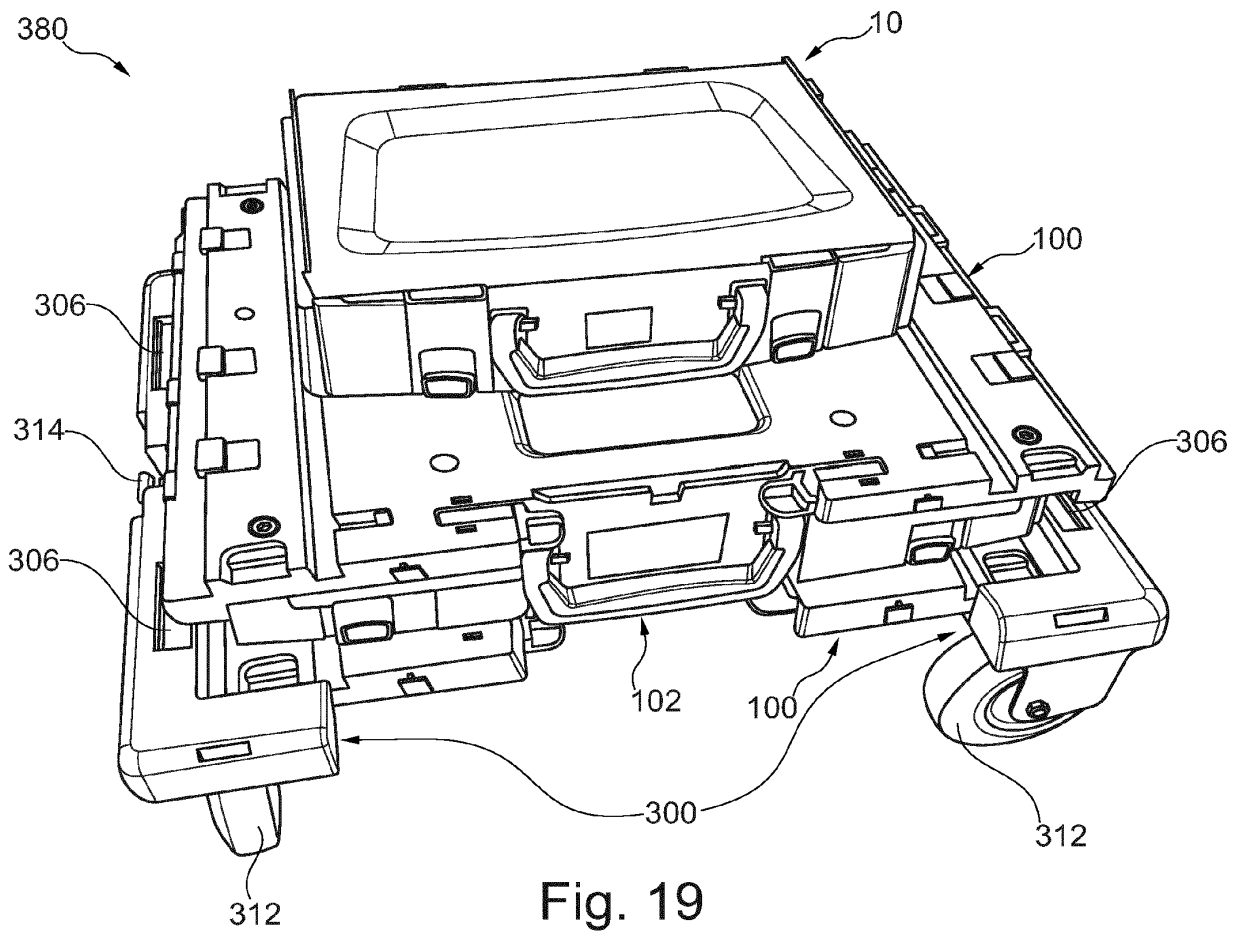
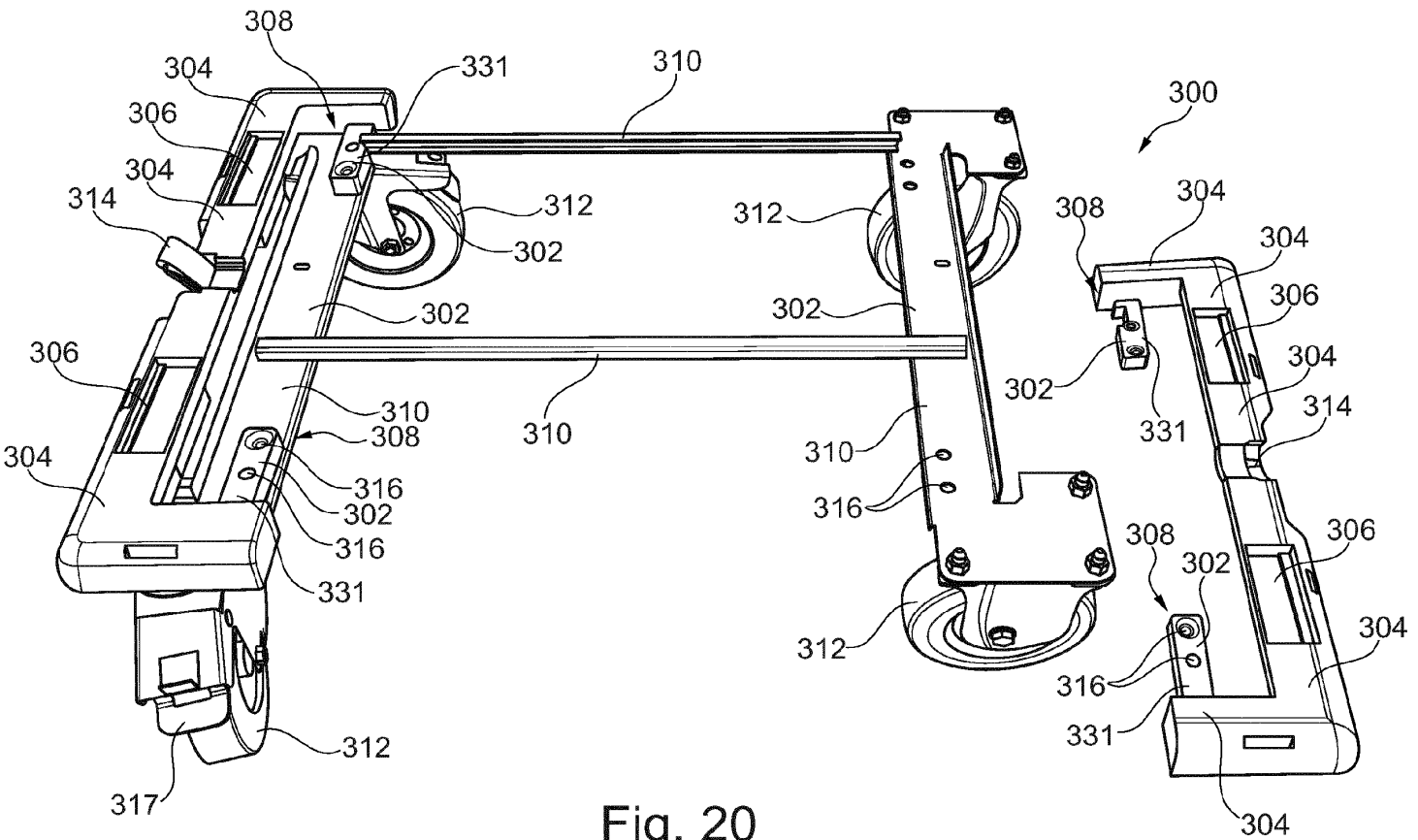


Fig. 19





EUROPÄISCHER RECHERCHENBERICHT

 Nummer der Anmeldung
EP 16 18 4463

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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
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Recherchenort Den Haag		Abschlußdatum der Recherche 31. Januar 2017	Prüfer 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 : mündliche 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	

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Kategorie	Kennzeichnung des Dokuments mit Angabe, soweit erforderlich, der maßgeblichen Teile	Betrifft Anspruch	KLASSIFIKATION DER ANMELDUNG (IPC)
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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 : mündliche 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			

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**ANHANG ZUM EUROPÄISCHEN RECHERCHENBERICHT
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5 In diesem Anhang sind die Mitglieder der Patentfamilien der im obengenannten europäischen Recherchenbericht angeführten
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Für nähere Einzelheiten zu diesem Anhang : siehe Amtsblatt des Europäischen Patentamts, Nr.12/82

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

(54) Title of invention
Container for handling or storing articles

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Fig:1

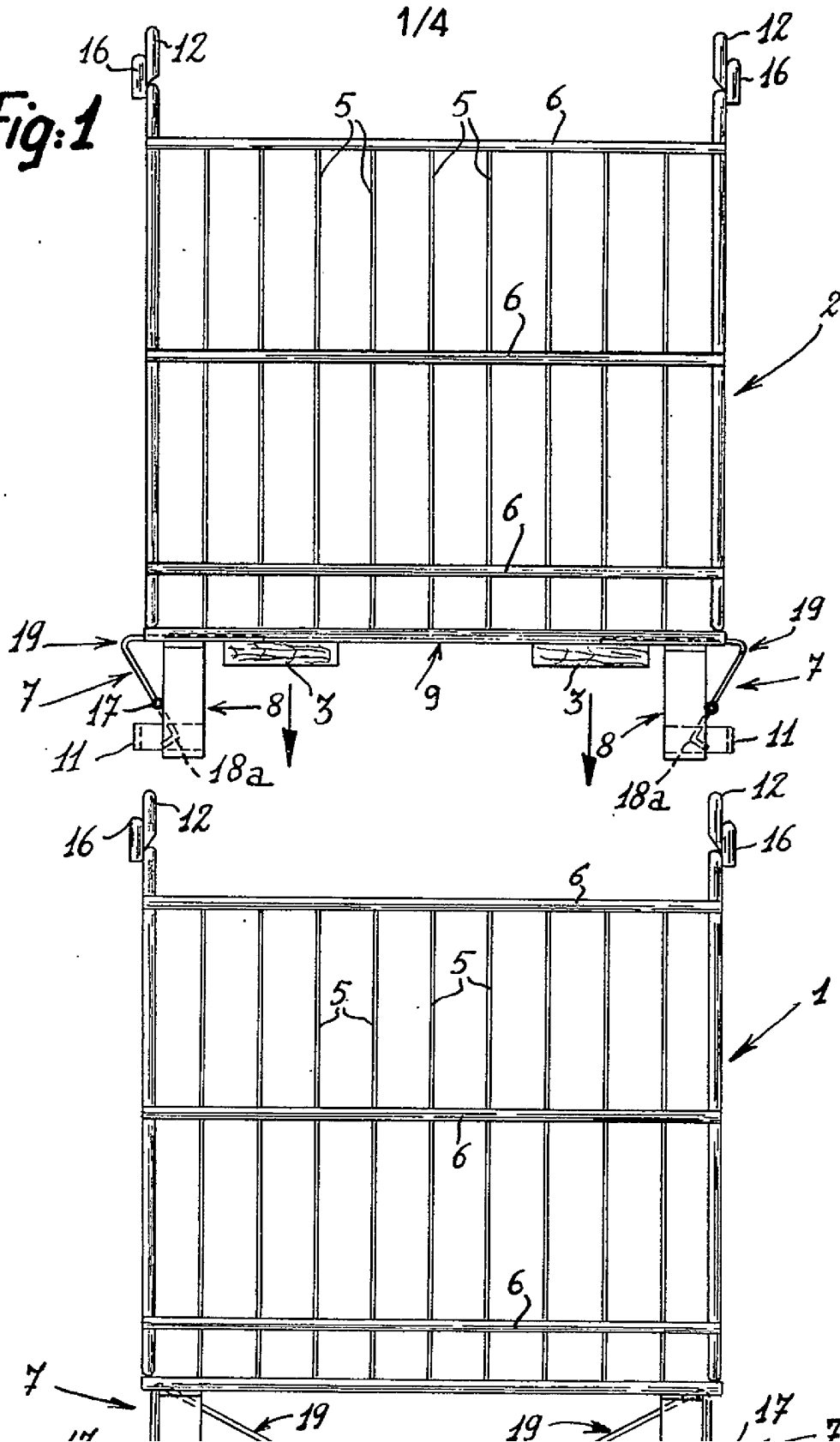
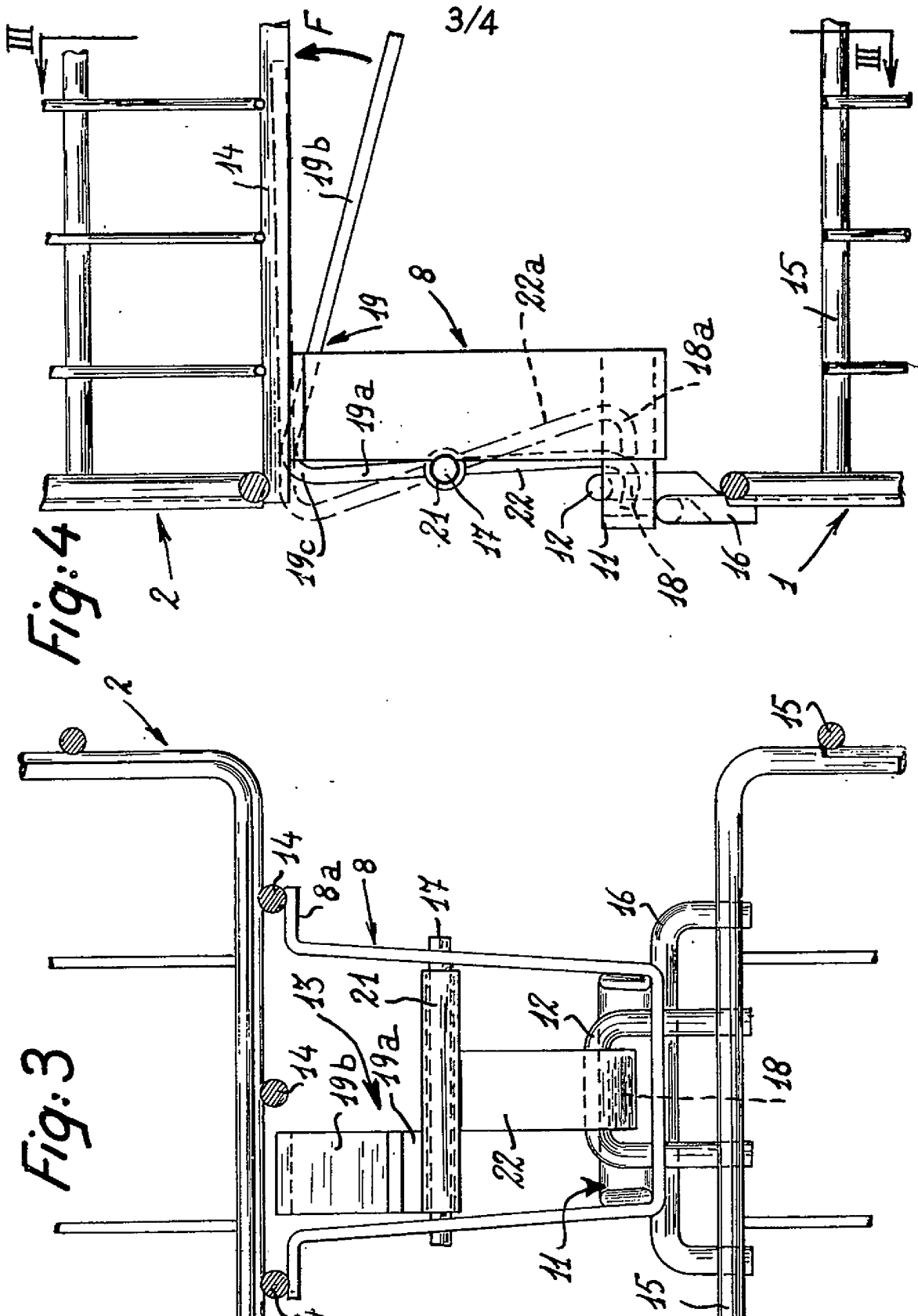


Fig:2



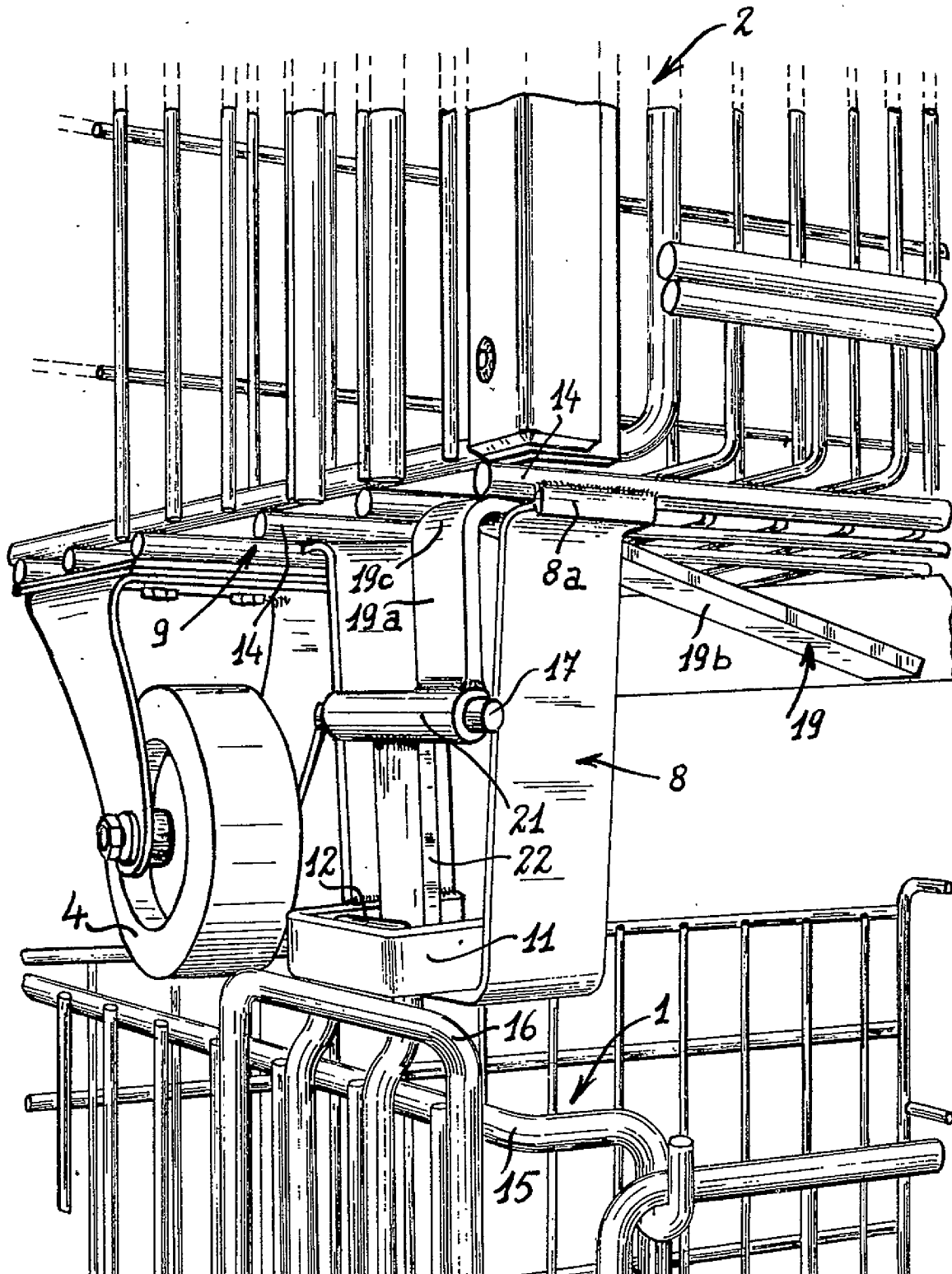
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Fig: 5

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SPECIFICATION

Container for handling or storing articles

5 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
10 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
15 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
20 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
25 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
30 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
35 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
40 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
45 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
50 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
55 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
60 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
70 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, disposed at two diagonally opposed corners of the bottom of the
75 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
80 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
85 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
90 extends at right angles to the axis of rotation and its length is sufficient for automatically 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 abuts the
95 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
100 that the strap can fit around this member. When the upper container is laid upon 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
105 anchored to the lower or supporting container so that the assembly can safely be moved either by pulling same, in the case of rolling carts, or by hoisting by means of handling forks in the case of
110 non-rolling 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
115 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
120 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
125 locked in relation to, the lower container;

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

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 parallelepipedic 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 *8a* 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 *19a* and an elongated arm *19b* forming a predetermined angle between them, the shorter arm *19a* 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 *19b* 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 abuts the strap *11* (*Figures 4* and *5*).

The angular relationship between the elongated arm *19b* and the short arm *19a* is less than 90° and so determined that when the elongated arm *19b* 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 *22a* and *18a* 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 *19b*, the locking hook *18a* 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 pair 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 *19c* of lever *19* can be disposed substantially level with the wires *14* (*Figure 3*).

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:

10 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 19b thereof 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 19b 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 abut the transverse elements of straps 11, at the end of the rotational 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 of 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 with legs 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 horizontal "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 of 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.

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,
5 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
10 riveting.

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

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

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(51) INT CL⁷:
B25H 3/02 , A47L 9/00

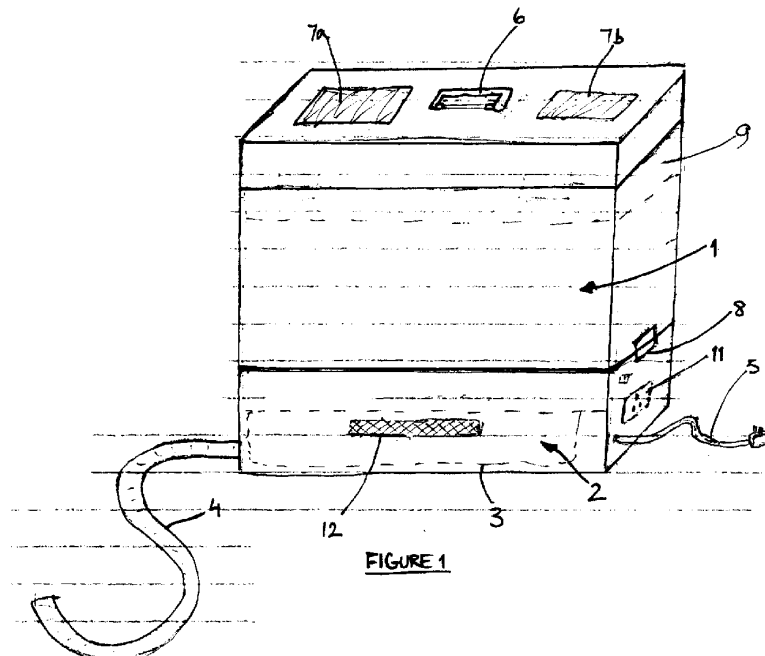
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A4F FC
U1S S1679

(56) Documents Cited:
GB 2330521 A **GB 2226009 A**
GB 0669893 A **EP 0916302 A3**
US 3099398 A **US 2534122 A**

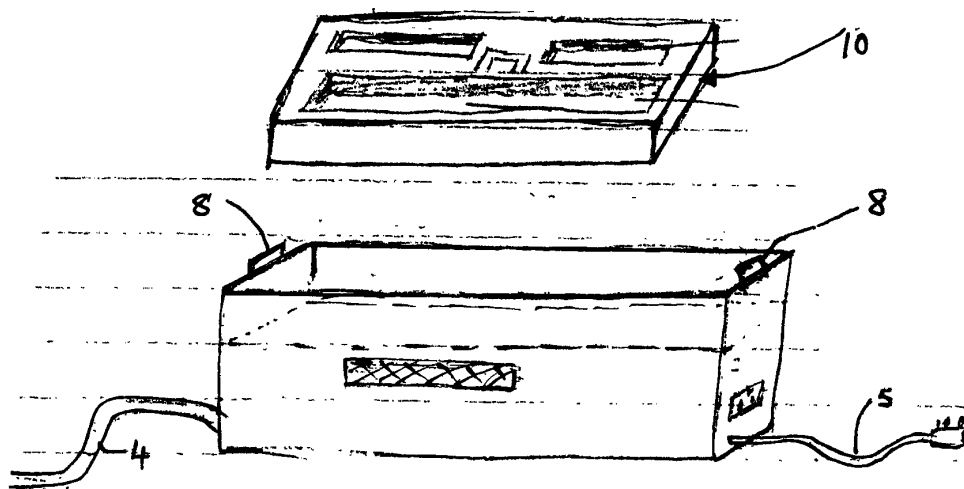
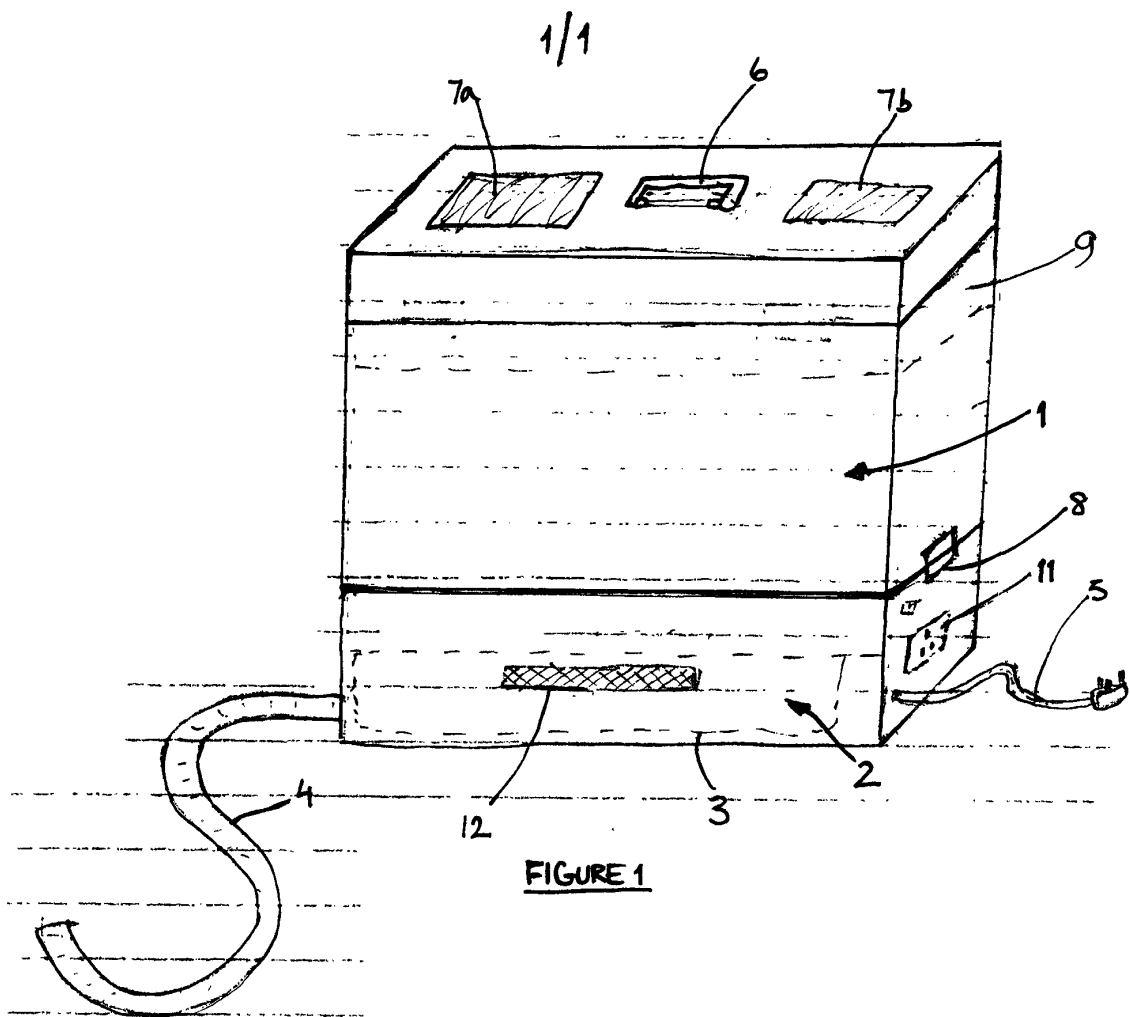
(58) Field of Search:
UK CL (Edition W) **A4F FC, B8P PAX PP**
INT CL⁷ **A47L 9/00, B25H 3/00 3/02 3/04 3/06**
Other: **ONLINE:WPI,EPODOC,JAPIO**

(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.



GB 2 406 331



IMPROVED TOOLBOX**Field of the Invention**

- 5 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

- 10 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.
- 15 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.
- 20 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
- 25 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

- 30 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
- 35 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.

- 5 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
10 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.
15

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.

- 20 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

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

- 30 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
35

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.

5 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
10 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
15 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
20 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
25 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
30 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.

10

Claims

- 5 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
10 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.
- 15 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.
- 20 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
25 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.
- 30 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.
- 35 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 IPC⁷ :

A47L B25H

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

ONLINE: WPI, EPODOC, JAPIO

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(51) INT CL⁷:
A47L 5/36 9/00

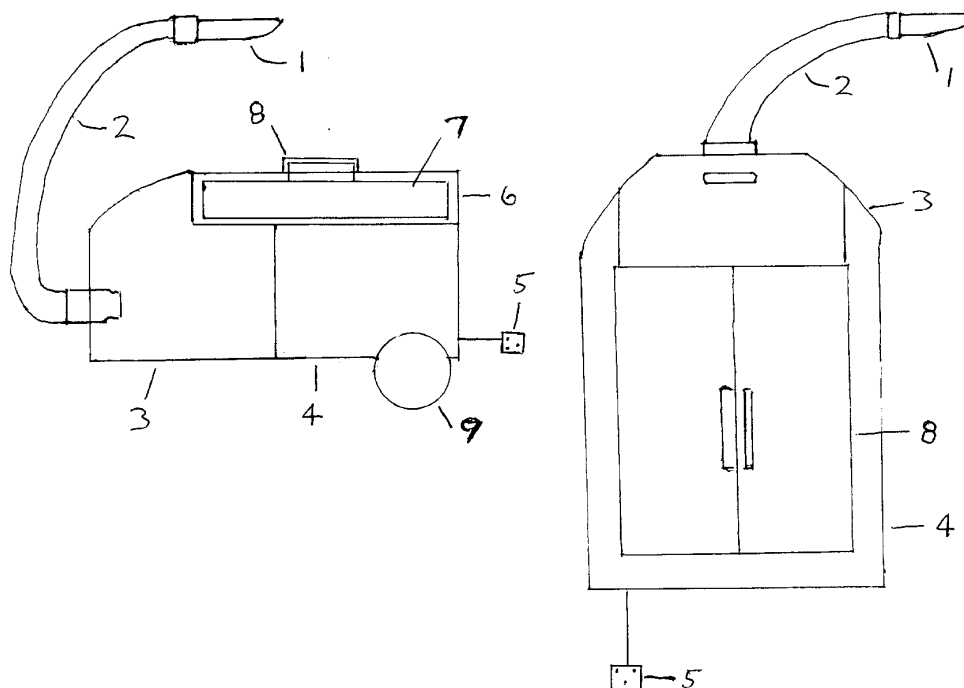
(52) UK CL (Edition X):
A4F FSCA

(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**

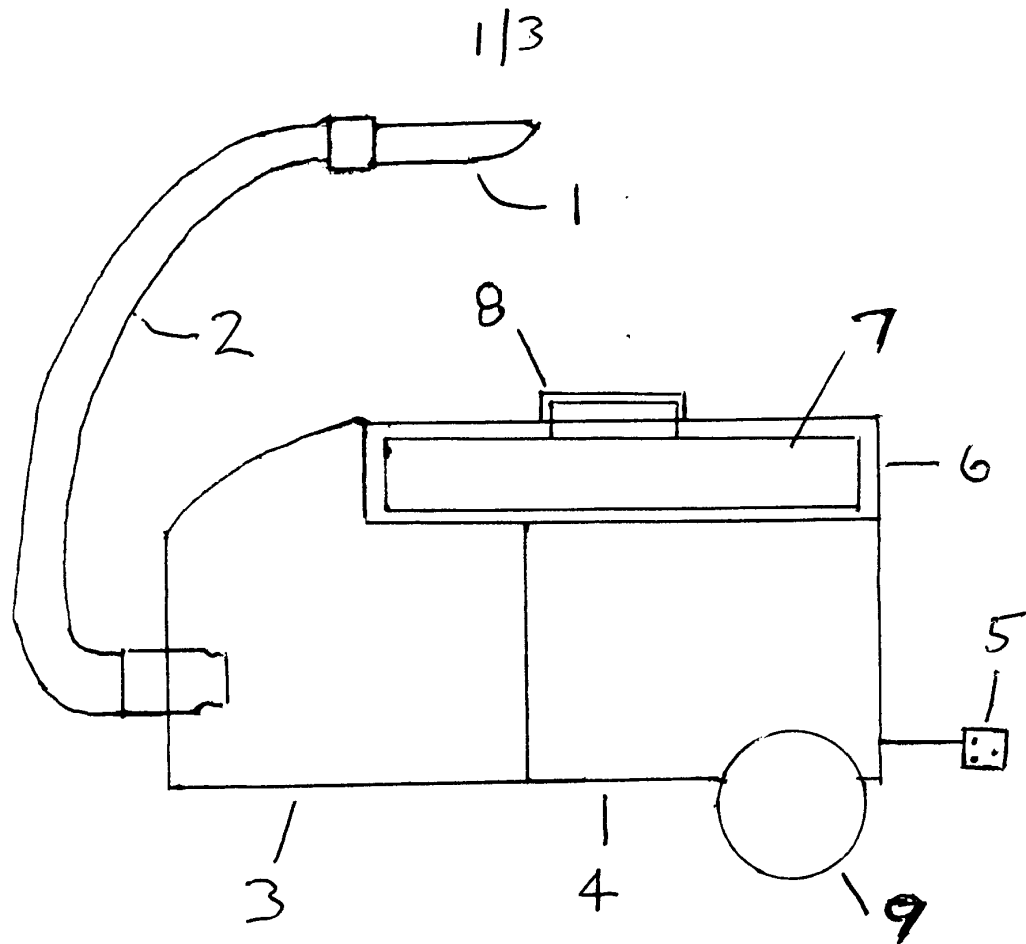
(58) Field of Search:
UK CL (Edition W) **A4F**
INT CL⁷ **A47L**
Other: **Online: WPI, EPODOC, PAJ**

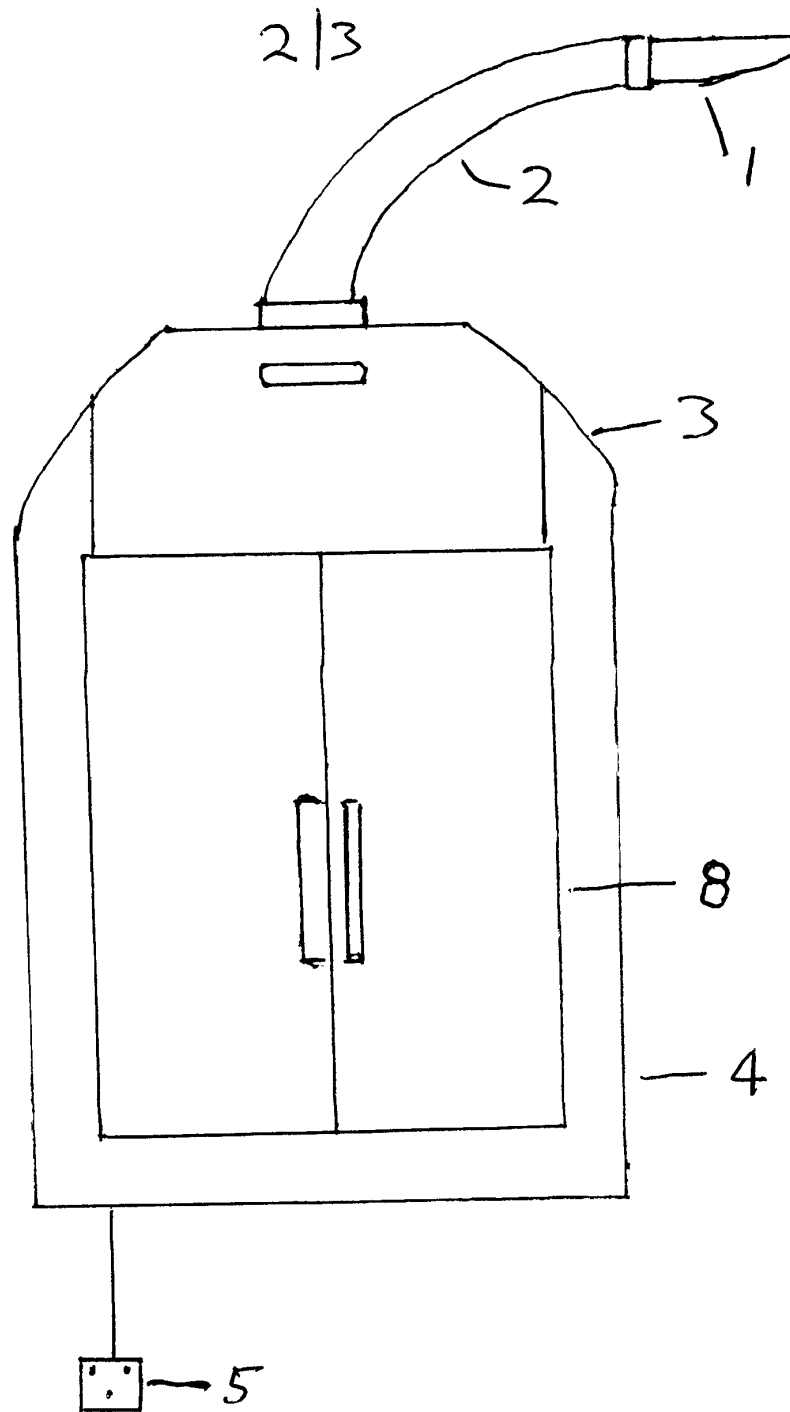
(54) Abstract Title: **Vacuum cleaner with removable storage tray**

(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.

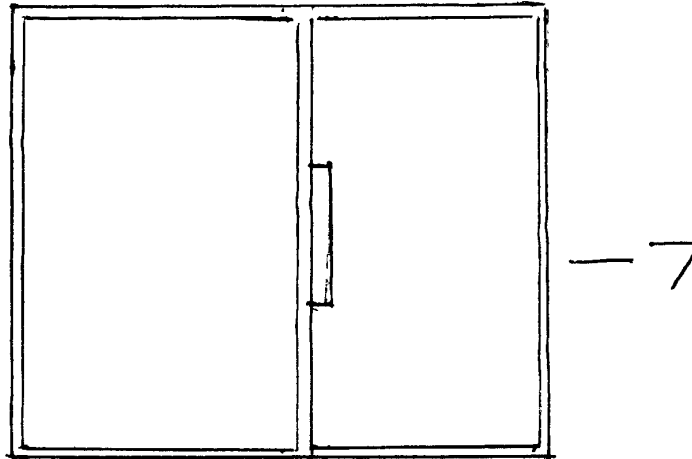
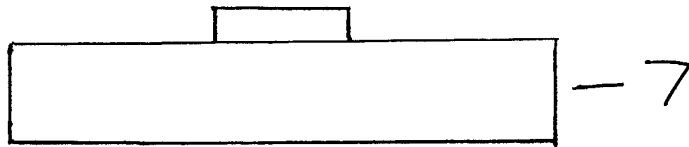


GB 2 413 265





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.



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 document - 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:

Milwaukee Electric Tool, Keter Home and Garden Products – Ex. 2002 - Page 1097

Klein Tools v. Milwaukee Electric Tool, Keter Home and Garden Products

IPR2024-01401



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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 IPC⁰⁷

A47L

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

Online: WPI, EPODOC, PAJ

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

[Price 2/8]

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 4s 6d

Price 3s 6d

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
5 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
10 non-slip rubber or like sleeves 12, 13.

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,
15 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
20 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
25 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
30 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
35 brake operating pedal, in order to hold the trolley stationary over a prolonged period.

Although the trolley may be used with
40 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
45 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
50 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
55 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
60 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
65 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
70 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
75 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
80 position.

3. In a trolley for domestic appliances of the kind hereinbefore indicated, braking mechanism operating on the floor
85 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
90 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
95 may be.

5. Domestic appliances or machines mounted permanently on wheels or a
100 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
105 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
110 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
115 pressure member or members from the floor.

7. Trolleys for use with domestic
120 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.
125

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London, W.C.2.

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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.

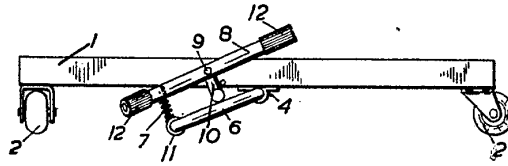
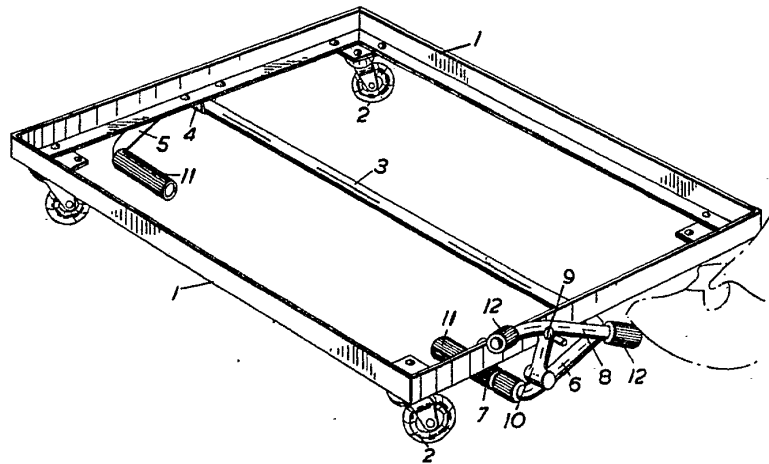


FIG. 2.





Espacenet

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INTERLOCKING LATCH SYSTEM AND BOX USING THE SAME

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- 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

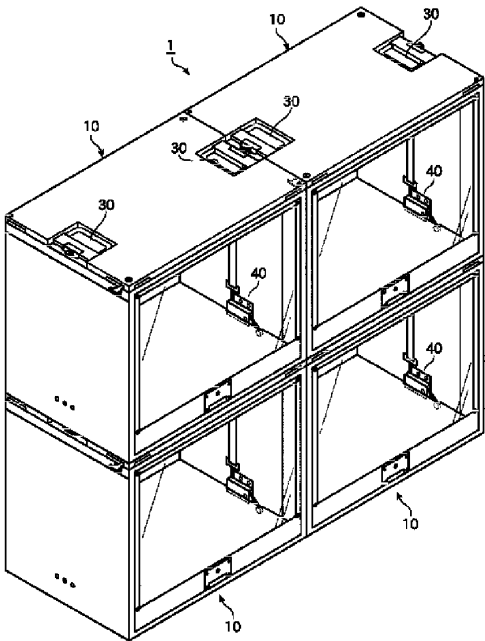
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(54) 【発明の名称】 連動式ラッチシステム及びこれを用いた箱体

(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 1 0 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 4 0 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 3 0 のハンドルが回転すると、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起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起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起は、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起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起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転し、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転し、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転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転して、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との隙間を通して取手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の回転状態を示した取手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が溶接で固定され、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方向に回転し、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方向に回転し、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が自在に回転できるように、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42g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ないが、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により回転可能にケース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)の状態に回転するときに、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ないが、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により回転可能にケース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方向に回転させて、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の逆方向に回転し、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の逆方向に回転させる。そして、ラッチ部材45が所定角度まで回転

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の逆方向に回転される。このトリガー部材43の回転により、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方向に回転し、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が自在に回転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により回転可能にケース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の状態に回転するときに、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により回転可能にケース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の回転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を回転させ、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の逆方向に回転し、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の逆方向に回転させる。そして、ラッチ部材65が所定角度まで回転すると、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

に回転される。このトリガー部材63の回転により、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方向に回転し、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転すると、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】ハンドルの回転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。

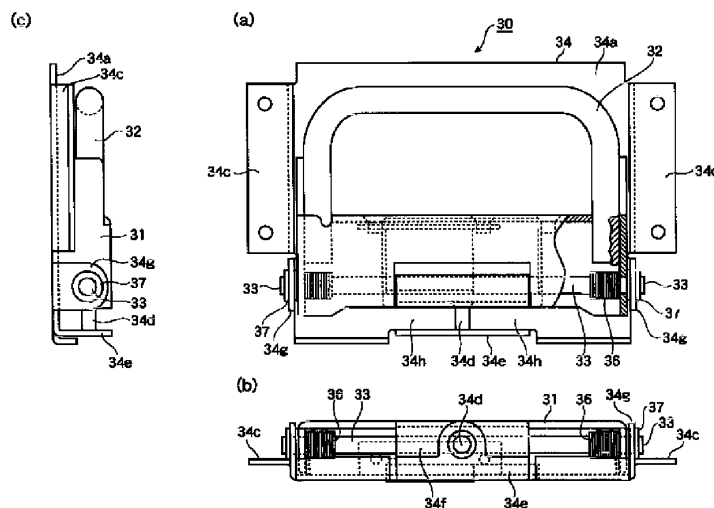
【図8】図6及び図7とは異なる態様のラッチ装置を示す図であり、(a)は側面図、(b)は断面図、(c)は(a)の逆側から見た側面図、(d)は(b)におけるVIIId-VIIId線に沿った断面図である。

【図9】図8(b)の逆側から見た側面図である。

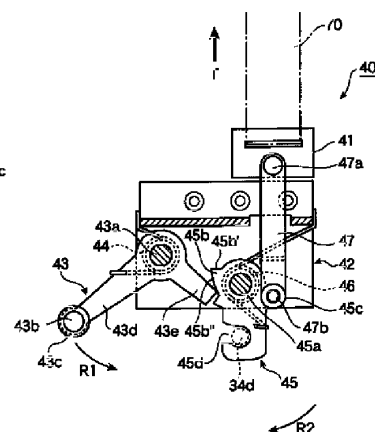
【符号の説明】

- 10 箱体
- 30 取手
- 32 ハンドル
- 34 d 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

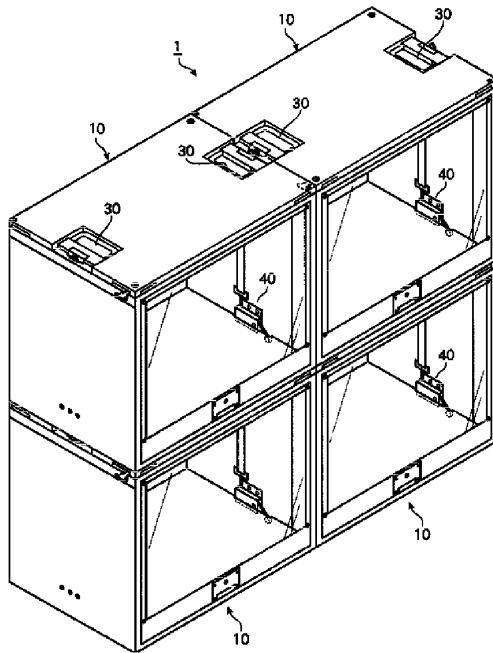
【図3】



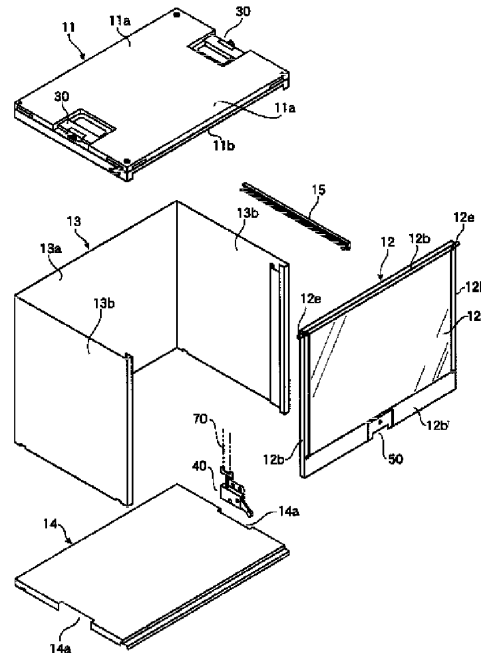
【図7】



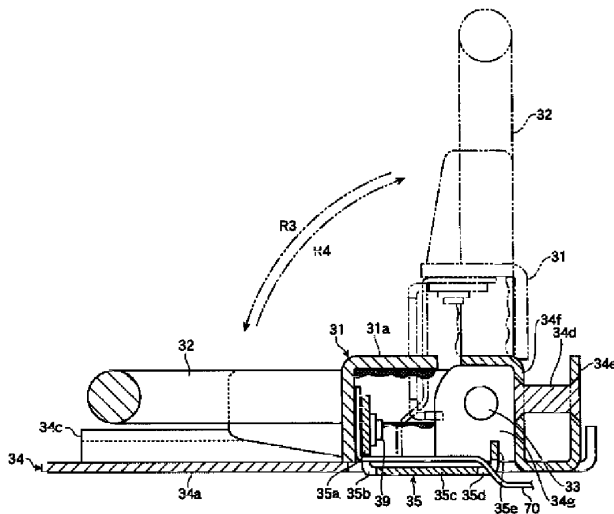
【 1】



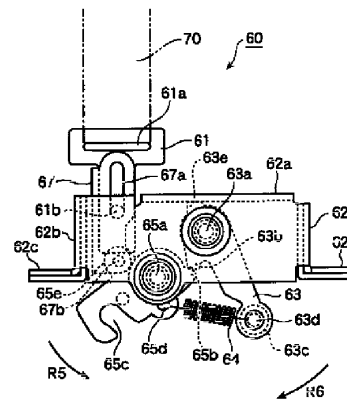
【図2】



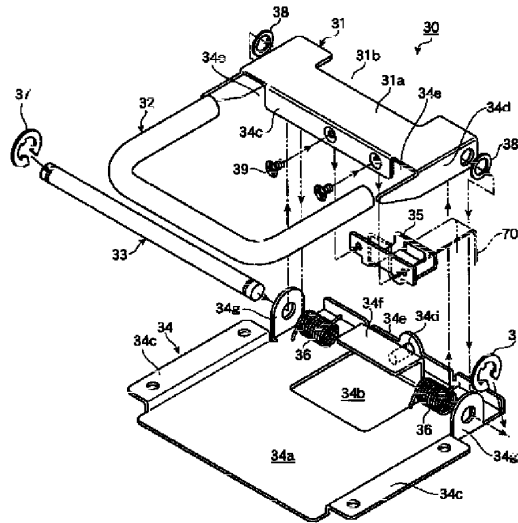
【図4】



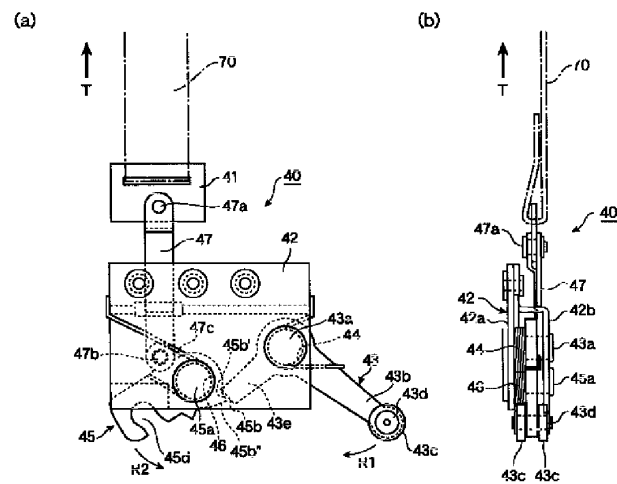
【図9】



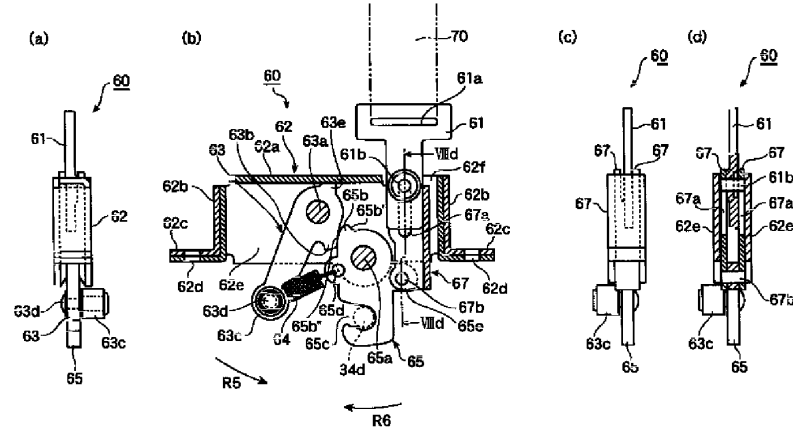
【図5】



【例 6】



【図8】



フロントページの続き

(51)Int. Cl. ⁷	識別記号	F I	(参考)
F 1 6 B	1/04	F 1 6 B	A
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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

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				Filing Date	December 11, 2018
				First Named Inventor	Yaron Brunner
				Art Unit	3736
				Examiner Name	WEINERTH, GIDEON R
Sheet	1	of	5	Attorney Docket Number	066749-2270

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Substitute for form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT Date Submitted: December 5, 2019 <i>(use as many sheets as necessary)</i>				Application Number	16/216,724
				Filing Date	December 11, 2018
				First Named Inventor	Yaron Brunner
				Art Unit	3736
				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.	
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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*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.		
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	A91	DE102010003754	10-13-2011	KAERCHER GMBH AND CO ALFRED KG		
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	A94	DE102012220837	05-15-2014	BOSCH GMBH ROBERT		
	A95	DE102015013053	04-13-2017	BURCHIA ROLF		
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT Date Submitted: December 5, 2019 <i>(use as many sheets as necessary)</i>				Application Number	16/216,724
				Filing Date	December 11, 2018
				First Named Inventor	Yaron Brunner
				Art Unit	3736
				Examiner Name	WEINERTH, GIDEON R
Sheet	4	of	5	Attorney Docket Number	066749-2270

FOREIGN PATENT DOCUMENTS						
Exami ner Initials*	Cite No. ¹	Foreign Patent Document Country Code ³ - Number+Kind Code ⁵ <i>(if known)</i>	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		
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NON PATENT LITERATURE DOCUMENTS			
Exami ner 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
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				Filing Date	December 11, 2018
				First Named Inventor	Yaron Brunner
				Art Unit	3736
				Examiner Name	WEINERTH, GIDEON R
Sheet	5	of	5	Attorney Docket Number	066749-2270

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Exami ner 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

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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
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37 CFR 1.21 (Miscellaneous fees and charges)					
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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Information:					
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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.

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/

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Substitute for form 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT Date Submitted: December 5, 2019 <i>(use as many sheets as necessary)</i>				Application Number	16/216,724
				Filing Date	December 11, 2018
				First Named Inventor	Yaron Brunner
				Art Unit	3736
				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*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	
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*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.

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Substitute for form 1449/PTO				Complete if Known	
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				First Named Inventor	Yaron Brunner
				Art Unit	3736
				Examiner Name	WEINERTH, GIDEON R
Sheet	2	of	2	Attorney Docket Number	066749-2270

NON PATENT LITERATURE DOCUMENTS			
Exami ner 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.	
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	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/5XIGCR6KypcgJnIKi9FDoim?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.	

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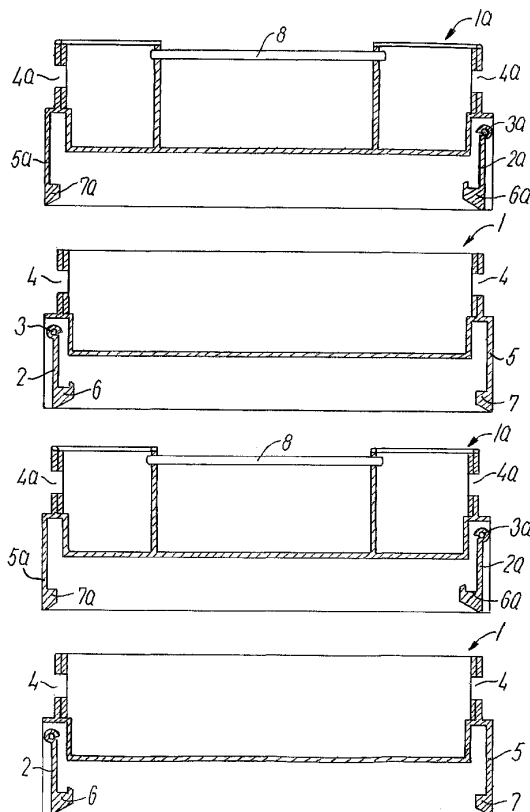
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[Continued on next page]

(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

5 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.

10 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.

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

20 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.

25 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.

30 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.

5 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.

10

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

15

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.

20

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.

25

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

30

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
5 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.

10 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
15 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
20 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
25

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
30

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
5 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.

10 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,
15 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.

20 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.

25 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.

30 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
5 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
10 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
15 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.

20 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, characterized 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, characterized 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, characterized 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, characterized in that at least one snap lock (2, 2a) is biased (3).
5. Stackable boxes according to claims 1 – 4, characterized 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, characterized 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, characterized in that the snap locks (2) are provided in the gables or on the sides of the boxes and the covers.

5 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
10 wherein at least one of the boxes is provided with a cover, 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 the
15 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.

20 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.

1/3

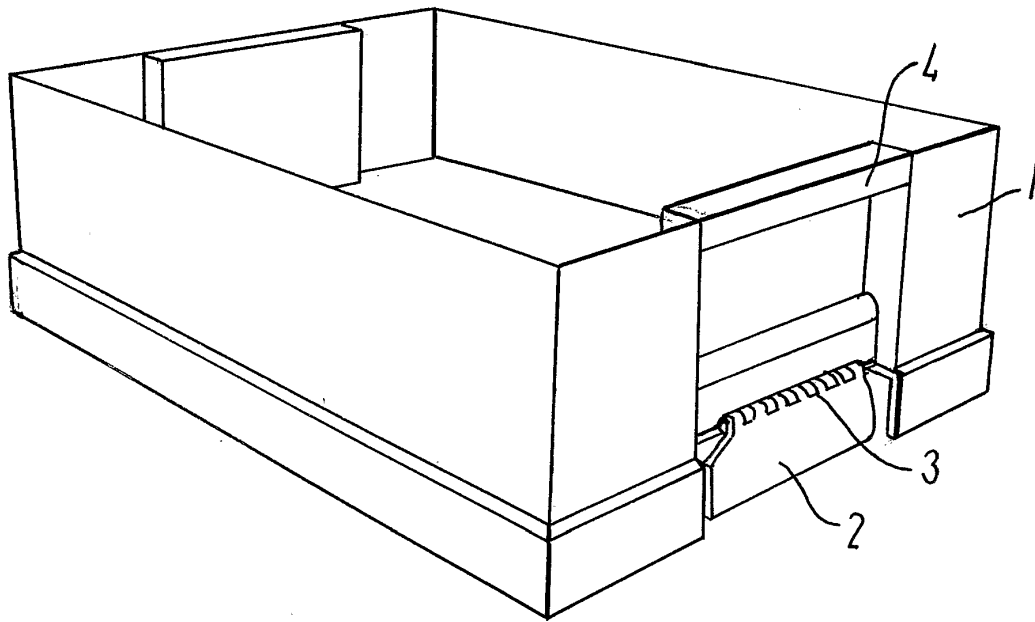
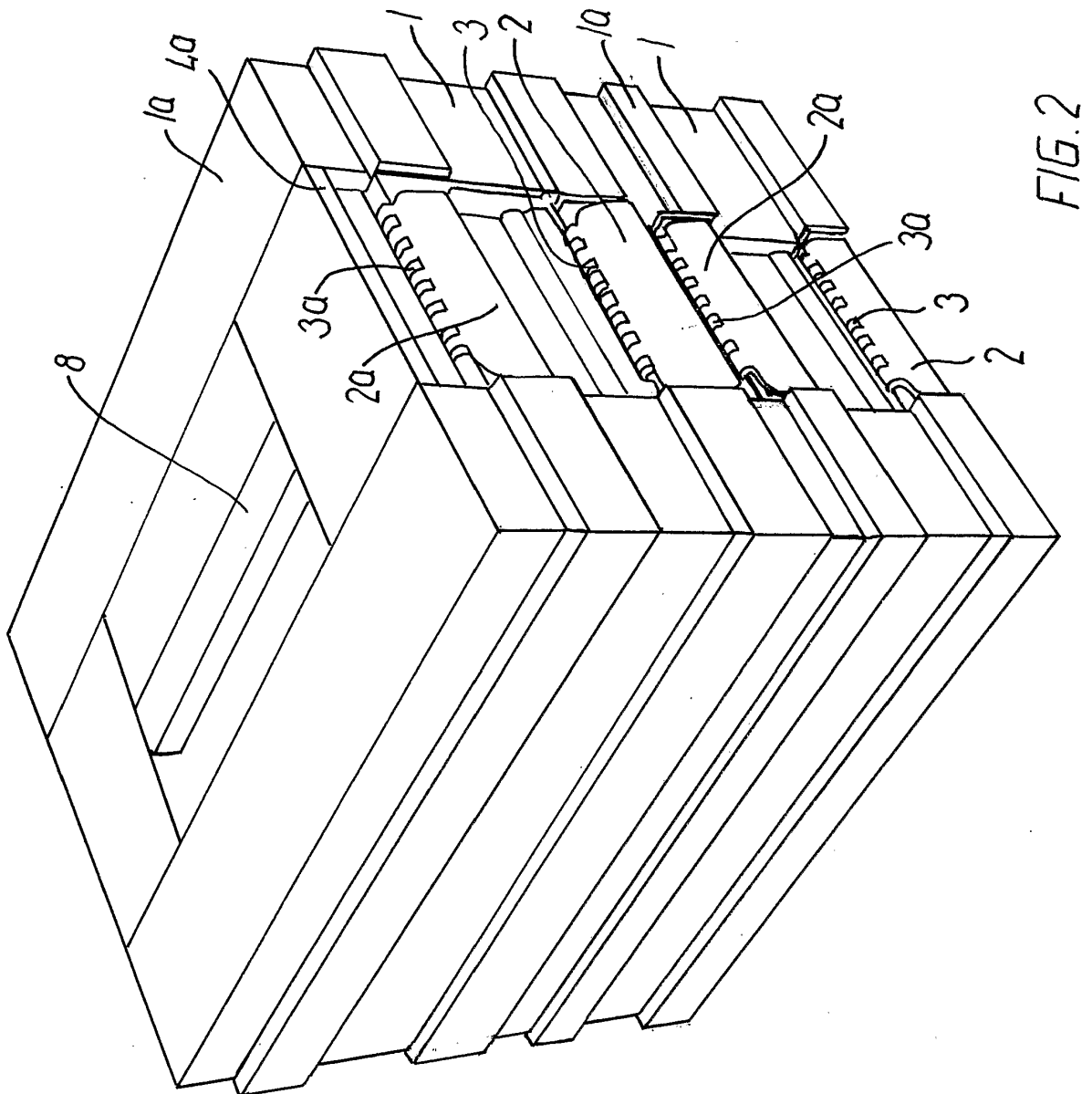
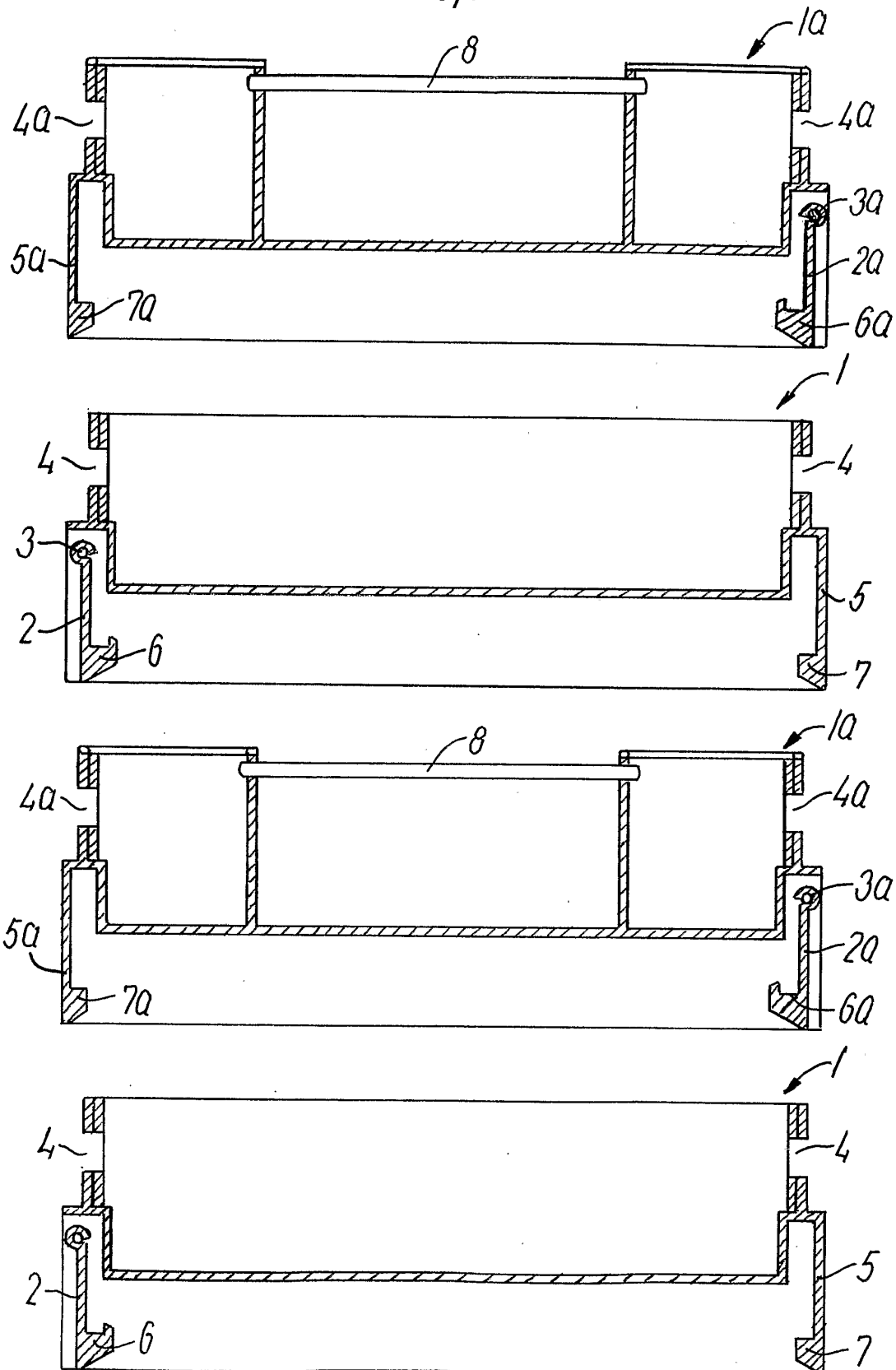


FIG. 1



3/3



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.

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Date of the actual completion of the international search

18 July 2007

Date of mailing of the international search report

30/07/2007

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
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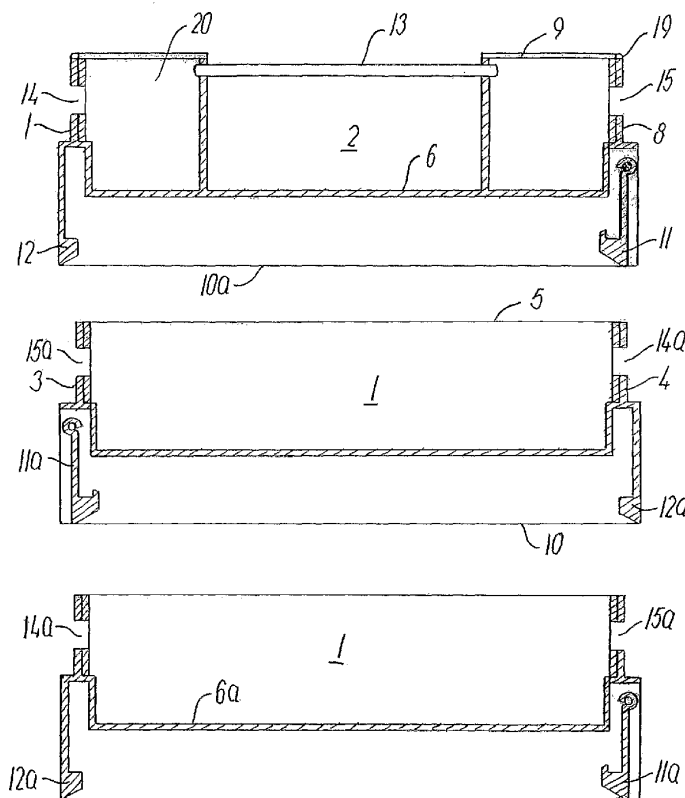
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[Continued on next page]

(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.

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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
5 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
10 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
15 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
20 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
25 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
30 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

5 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,

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

15 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,

20 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.

25 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.

30 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.

5 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.

10 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
15 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.

20 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.

25 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
30 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
5 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
10 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
15 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,
20 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.

25 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
30 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, characterized in that the snap lock is formed by a gripper part which is spring-biased.

5

6. A storage device according to claims 1 – 5, characterized 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.

10

7. A storage device according to claims 1 – 6, characterized 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.

15

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

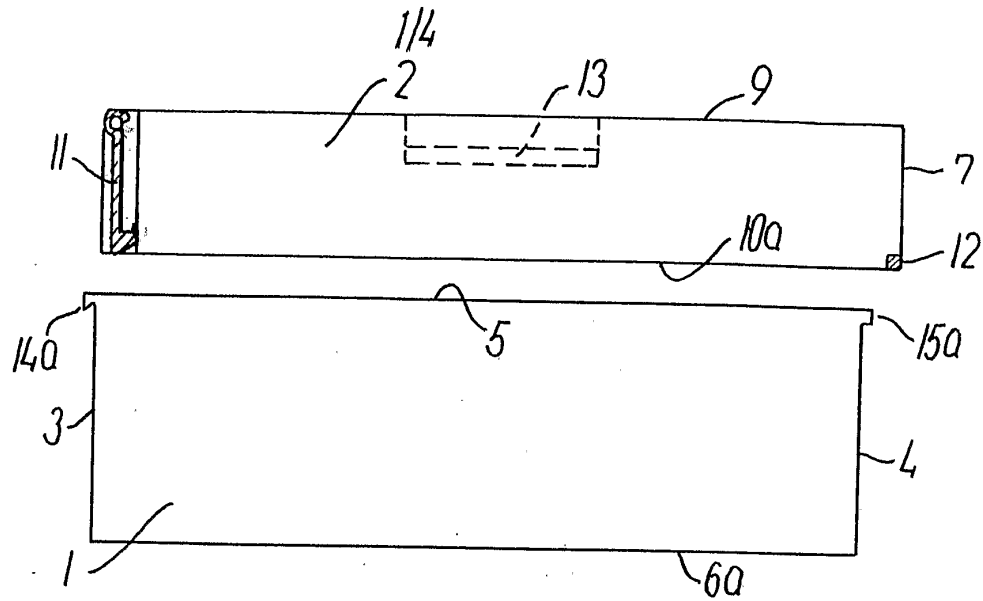


FIG. 1

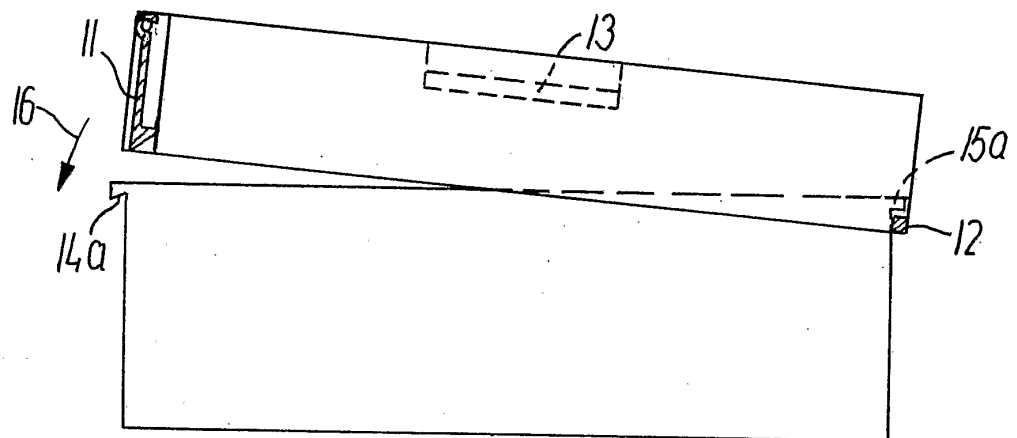


FIG. 2

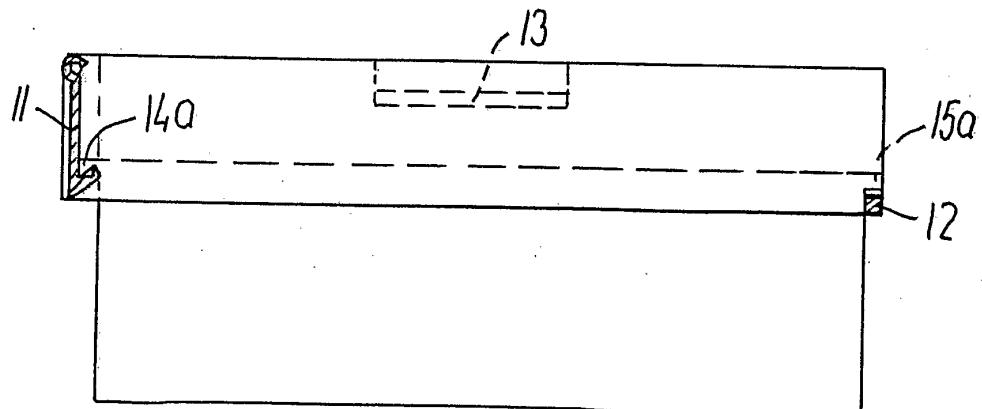


FIG. 3

2/4

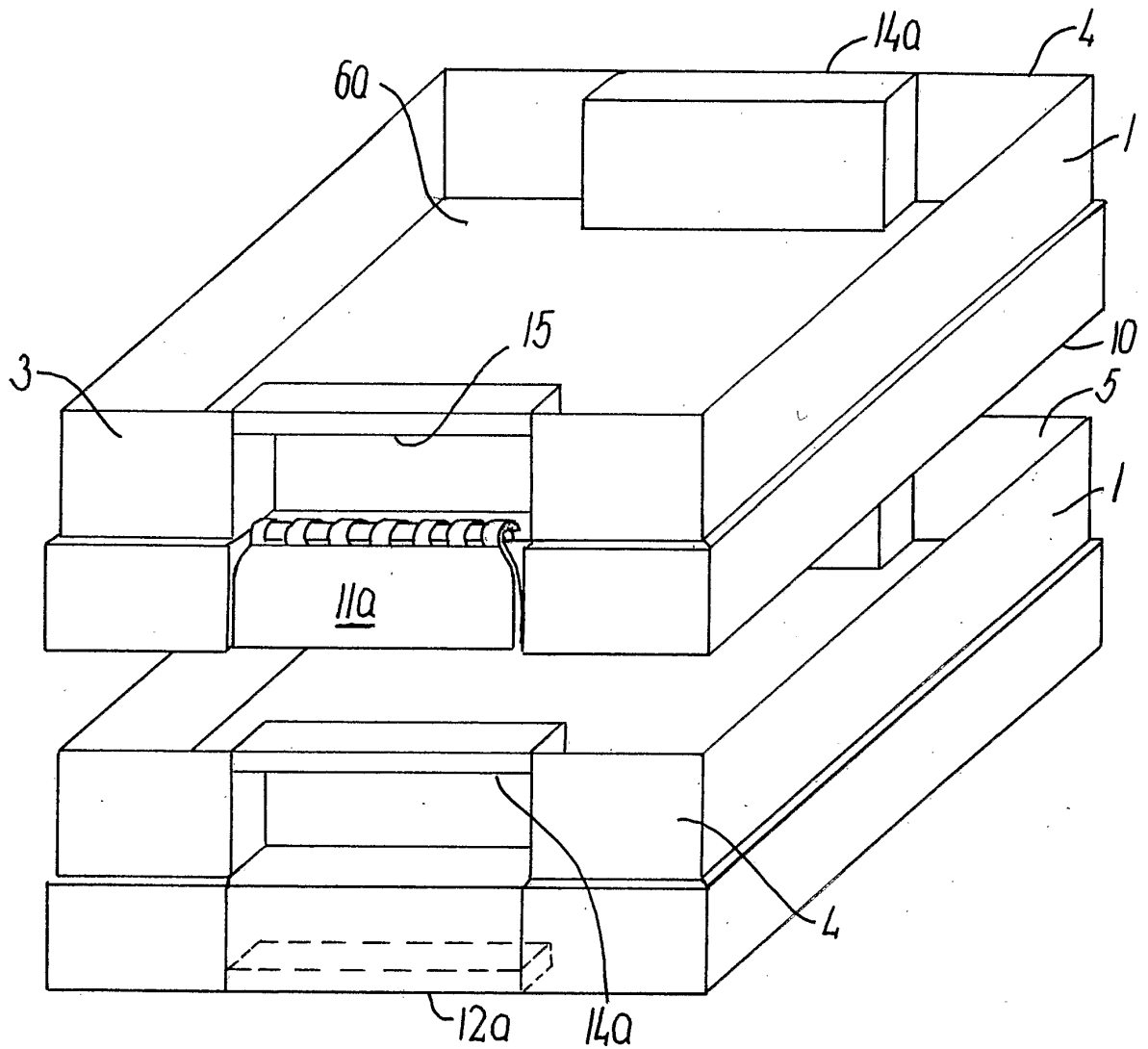


FIG. 4

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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

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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 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.

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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.

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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 A₁ 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 A₂ 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 A₃ of **Fig. 4A**;

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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;

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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 B₄ 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 B₅ of **Fig. 16A**;

Fig. 17A is an enlarged view of a portion B₆ of **Fig. 9A**;

Fig. 17B is an enlarged view of a portion B₇ 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 C₁ of **Fig. 18A**;

Fig. 18C is an enlarged view of a portion C₂ 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 C₃ 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 drawers, including a lower drawer **30** and an upper drawer **50**, each

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accommodated within the housing **10** and slidably 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 is 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 slidably 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**.

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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) slidably 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

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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

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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.

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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

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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

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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.