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(54) **Title:** A LOCKING ARRANGEMENT

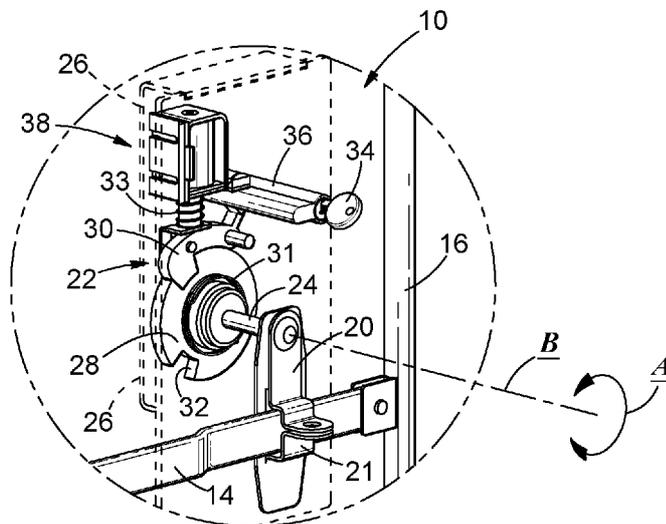


FIGURE 3

(57) **Abstract:** This invention relates to a locking arrangement (10) for a door (12) of a goods container (100), to a goods container (100), and to a method of retrofitting a locking arrangement (10) to a goods container (100). The locking arrangement (10) comprises a locking member (20) which is pivotably mounted A to the container (100), more specifically to the container door (12). The locking member (20) is pivotably displaceable A about a pivot axis B between an engaged position whereby, when a lever (14) is in its locking position, the movement of the lever (14) is inhibited and the door (12) is locked, and a disengaged position wherein the lever (14) is permitted to move to open the door (12) via the bar (16) and cams (18). Retaining means (22) is provided for retaining the locking member (20) at its pivot axis B when the locking member (20) is in the engaged position, whereby displacement of the locking member (20) is restricted.



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

Published:

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- *in black and white; the international application as filed contained color or greyscale and is available for download from PATENTSCOPE*

A LOCKING ARRANGEMENT

INTRODUCTION TO THE INVENTION

5 This invention relates to a locking arrangement. More particularly, but not exclusively, this invention relates to a locking arrangement for a door of a goods container, to a goods container, and to a method of retrofitting a locking arrangement to a goods container.

10 BACKGROUND TO THE INVENTION

Goods containers, such as cargo containers, typically have a rod and lever type lock for locking a door of the container. The lever is generally in the form of a latch and a catch is provided for receiving the latch. The latch is connected to the rod which has
15 cams for locking the door of the container by pivotably displacing the rod with the latch and thereby causing the cams to engage complementary formations on the container in a known manner. A freely pivotably displaceable hasp is furthermore provided which is securable by a padlock, for example, to the catch to retain the latch in a locked position in order to prevent unauthorised access to the container.

20 The padlock, which is separate from the freely swinging hasp, is easily lost or damaged by thieves from outside the container without damaging or causing very little damage to the container itself. By relying on the usage of a padlock, it is also not possible to control access to the container from inside the container or from another remote
25 location.

OBJECT OF THE INVENTION

It is accordingly an object of the present invention to provide a locking arrangement, a goods container and a method of retrofitting a goods container with which the applicant
5 believes the aforementioned problems may at least be alleviated, and/or which may provide a useful alternative to the known apparatuses and/or methods.

SUMMARY OF THE INVENTION

10 According to a first aspect of the invention, there is provided a locking arrangement for a door of a goods container which has a movable lever, the locking arrangement comprising:

- a locking member which is pivotably mountable to the container in order to be pivotably displaceable about a pivot axis between an engaged position whereby
15 movement of the lever is inhibited and the door is locked, and a disengaged position wherein the lever is permitted to move to open the door; and
- retaining means for retaining the locking member at its pivot axis when the locking member is in the engaged position whereby displacement of the locking member is restricted.

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The retaining means may retain the locking member from the inside of the container.

The locking member may be mountable to the container via a spindle which extends from the locking member and operatively through the container along the pivot axis.

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Preferably, the locking member may be mountable to the door of the container.

The retaining means may comprise any one of electrical, mechanical and electro-mechanical means for retaining the locking member at its pivot axis.

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According to an example embodiment of the invention, the retaining means may be operable via a key.

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The locking arrangement may further comprise displacement means for displacing the locking member between its engaged position and its disengaged position.

A catch may be provided for the lever to assist in inhibiting movement of the lever when the locking member is in its engaged position.

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The locking member may be mountable externally of the door, whereas the retaining means and/or the displacement means may be securable internally of the door.

According to a second aspect of the invention, there is provided a goods container comprising:

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- a body defining a chamber inside the body for receiving goods;
- a door which is movably mounted to the body;
- a movable lever for locking the door, the lever being movable between a locking position wherein the door is locked, and an open position whereby the door is unlocked; and

- a locking arrangement for retaining the lever in its locking position, the locking arrangement comprising:
- o a locking member which is pivotably mounted to the container and is pivotably displaceable about a pivot axis between an engaged position whereby movement of the lever is inhibited when the door is locked, and a disengaged position wherein the lever is permitted to move to open the door; and
 - o retaining means for retaining the locking member at its pivot axis when the locking member is in the engaged position whereby displacement of the locking member is restricted.

The locking member may be mounted to the container via a spindle which extends from the locking member and operatively through the container along the pivot axis.

- 15 The locking arrangement may further comprise displacement means for displacing the locking member between its engaged position and its disengaged position.

The retaining means may retain the locking member from the inside of the container.

- 20 The locking member may be mounted externally of the door, whereas the retaining means and/or displacement means may be secured internally of the door.

According to a third aspect of the invention, there is provided a method of retrofitting a locking arrangement to a goods container which has a door and a movable lever, the method comprising the steps of:

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- mounting a locking member to the container to be pivotably displaceable about a pivot axis between an engaged position whereby movement of the lever is inhibited and the door is locked, and a disengaged position wherein the lever is permitted to move to open the door; and
- 5 - securing retaining means to the container for retaining the locking member at its pivot axis when the locking member is in the engaged position whereby displacement of the locking member is restricted.

The method may include the step of removing an existing hasp from the container to
10 expose a hasp hole whereby the step of mounting the locking member to the container may include mounting the locking member to the hasp hole so that the locking member is pivotably movable about the hasp hole.

The method may include providing a spindle that is connected to the locking member
15 for facilitating the pivotal displacement of the locking member about the hasp hole.

The locking member may be mounted externally of the door, whereas the retaining means may be securable internally of the door.

20 These and other features of the invention are described in more detail below.

BRIEF DESCRIPTION OF THE ACCOMPANYING DIAGRAMS

The invention will now further be described, by way of example only, with reference to
25 the accompanying diagrams wherein:

figure 1 is an exterior perspective view of a rear portion of a goods container having a door, a movable lever for operating the door, and a locking arrangement for locking the door in accordance with the invention;

5 figure 2 is a rear view of the goods container of figure 1;

figure 3 is an exterior perspective view of the locking arrangement as accordingly marked in figure 2, with the door not shown and a housing of the locking arrangement shown in broken lines to reveal internal components of the locking arrangement and with a locking member of the locking arrangement in an engaged position;

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figure 4 is an interior view of the goods container of figure 1 having at least part of the locking arrangement provided therein;

15 figure 5 is an interior perspective view of the locking arrangement with the housing being shown in broken lines to reveal the internal components of the locking arrangement and with the locking member in the engaged position; and

20 figures 6 & 7 are perspective views similar to those shown in figures 3 and 5 respectively, but illustrating the locking member in a disengaged position.

DETAILED DESCRIPTION OF THE INVENTION

Referring to the figures, in which like features are indicated by like numerals, an example embodiment of a locking arrangement for a door of a goods container is generally designated by the reference numeral (10), and an example embodiment of a goods container is generally designated by the reference numeral (100) in figures 1, 2 and 4.

Referring to figures 1 and 2, there is shown an example goods container (100). The container (100) comprises a body (110) defining a chamber (112) inside the body (110) for receiving goods (not shown). A door (12) is movably mounted to the container body (110) via hinges (114) for sealing off the chamber (112). According to this example embodiment, the container (100) includes two adjacent doors (12). A movable latch or lever (14) is also provided for locking the door (12) via a bar (16) and hooks or cams (18) to the container body (110). The lever (14), which is located outside the container (100), is movable between a locking position (shown in figures 3 and 5), wherein the door is locked, and an open position (shown in figures 6 and 7) whereby the door is unlocked.

Also provided is a locking arrangement (10) for retaining the lever (14) in its locking position. The locking arrangement (10) comprises a locking member (20) which is pivotably mounted A to the container (100), more specifically to the container door (12). As indicated in figure 3, the locking member (20) is pivotably displaceable A about a pivot axis B between an engaged position (as shown in figures 3 and 5) whereby, when the lever (14) is in its locking position, the movement of the lever (14) is inhibited

and the door (12) is locked, and a disengaged position (as shown in figures 6 and 7) wherein the lever (14) is permitted to move from its locking position to its open position to open the door (12) via the bar (16) and cams (18).

5 Retaining means (22) is further provided for retaining the locking member (20) at its pivot axis B when the locking member (20) is in the engaged position, whereby displacement of the locking member (20) is restricted. A catch (21) is also provided for facilitating the inhibition of movement of the lever (14) when the door is locked. Hence, when the lever (14) is in its locking position and the locking member (20) in its engaged
10 position, lateral movement of the lever (14) is restricted by the container door (12), locking member (20) and catch (21).

Referring to figure 3, the locking member (20) is preferably in the form of a hasp member and pivotably A mounted to the container (100), more specifically to the
15 container door (12), via a spindle (24), which extends from the locking member (20) and operatively through the door (12). The spindle (24) is fast with the locking member (20). The spindle (24) may be integral to the locking member (20). The locking member (20) and spindle (24) are fitted to the container (100), for example after an existing freely pivoting hasp (not shown) has been removed from the container door (12),
20 exposing a hasp hole (not shown) in the container (100), more specifically to the container door (12), about which the hasp rotates and along which the pivot axis B extends. Hence, the spindle (24) is pivotably A mounted in the hasp hole to enable pivotal displacement A of the locking member (20) about pivot axis B. The spindle (24) extends along the pivot axis B. Alternatively a hole may be drilled into the container

(100), more specifically into the container door (12), along which the pivot axis A would then extend.

Referring to figures 4 and 5, the interior of the container (100) is shown with part of the locking arrangement (10) mounted to the operatively inside of the door (12). A housing (26) (shown in broken lines in figure 5) is provided for the locking arrangement (10). The housing (26) is mounted to the door (12), for example, by utilising blind bolts (40) and holes drilled into the door (12).

The retaining means (22), via the spindle (24) which extends through the door (12), retains the locking member (20) in its engaged position from the inside of the container (100) at the pivot axis B.

In the example embodiment of the invention, the retaining means (22) comprises a mechanical cam (28) and a follower (30) with at least one slot (32) provided in the cam (28) for receiving the follower (30) when the locking member (20) is in the engaged position, as shown in figures 3 and 5. According to this example embodiment, the cam (28) includes a plurality of slots (32) which are circumferentially spaced about the cam (28). The retaining means (22) is provided interior of the door (12), whereas the locking member (20) is provided exterior of the door (12), thereby providing security and inhibiting tampering with the retaining means (22).

Biasing means is provided for biasing the cam (28) and/or follower (30) to a particular position. For example, first biasing means, in the form of a torsion spring (31), is provided for biasing the cam (28) to rotate in one direction about the pivot axis B and

second biasing means, in the form of a coil spring (33) is provided for biasing the follower (30) towards the cam (28). The cam (28) is fast with the spindle (24) so that when the locking member (20) pivots, the cam (28) also pivots, and *vice versa*. Hence, the retaining means (22) retains the locking member (20) at its pivot axis B when the locking member (20) is in the engaged position for inhibiting movement of the lever (14). It will be understood that many other embodiments of the retaining means (22) are possible for retaining the locking member (20) at the pivot axis B.

Referring to figures 6 and 7, the retaining means (22) is operable from outside of the container (100), whereby the retaining means (22) could be manipulated between two configurations comprising, firstly, a retaining configuration (shown in figures 3 and 5) wherein it retains the locking member (20) in its engaged position, and secondly, a release configuration (shown in figures 6 and 7) wherein the locking member (20) is free to be displaced from its engaged position. In this instance, when the retaining means (22) changes from its retaining configuration to its release configuration, the rotation force exerted by the torsion spring (31) on the cam (28), causes the locking member (20) to automatically displace from its engaged position to its disengaged position. Accordingly, the locking member (20) is caused to be displaced from the inside of the container (100).

According to this embodiment, the retaining means (22) is operable via a key (34) utilising a barrel (36) which extends through the door (12). Alternatively, an electronic lock and suitable buttons or other control means (for example at a remote location from the locking arrangement (10)) may be used instead of the key (34) and barrel (36).

Displacement means (38) is further provided for displacing the locking member (20) between the engaged position and the disengaged position. The displacement means (38) may for example be in the form of a solenoid. Hence, when an operator turns the key (34), the follower (30) is retracted from the slot (32) by the solenoid (38) against
5 the bias of the coil spring (33), whereby the cam (28) is free to be displaced and, accordingly, the locking member (20) is also freed to be displaced from the engaged position. The torsion spring (31), which is connected to the cam (28), is arranged so that when the follower (30) is retracted and freed as aforementioned, the cam (28), spindle (24) and the locking member (20) are automatically urged from their respective
10 positions shown in figures 3 and 5 to their respective positions shown in figures 6 and 7, so that the locking member (20) adopts the disengaged position, thereby freeing the lever (14). The solenoid (38) may also be substituted by an appropriate spring or other biasing means or other displacement means. The displacement means (38), which is located inside the container (100), thus causes the locking member (20) to be
15 displaced from its engaged position to its disengaged position.

The applicant believes that the present invention presents a unique option for additional security to be achieved from the inside of a container door. Additionally, even when the invention is retrofitted onto an existing container, the integrity of the
20 existing locking assembly remains completely intact. The invention may thus achieve the augmented door security by utilizing an existing hole in the container. Thus, the turning motion of an existing container locking assembly is deliberately duplicated in the rotatory motion inherent to the invention.

It will be appreciated that there are many variations in detail on the invention as herein defined and/or described without departing from the scope and spirit of this disclosure. For example, the locking member (20) may be mountable to parts other than the door (12) of the container (100), such as to the body (110). In the example embodiment of the invention depicted in the figures, the locking arrangement (10) is retro-fitted to an existing goods container (100). However, the locking arrangement (10) may be installed into the goods container (100) during manufacturing thereof. A faceplate may also be provided on the outer side of the door, to cover some of the components of the locking arrangement (10).

It will further be understood that the retaining means and/or the displacement means may be electrical or mechanical or electro-mechanical means for retaining the locking member (20) at its pivot axis B. The solenoid (38) may, for example, be replaced by a suitable motor with gears, one or more springs, or the like. A controller (not shown) may also be provided which is operable to control the operation of the locking arrangement (10). The control may be performed via electrical cables (e.g. from inside a vehicle transporting the goods container (100), alternatively the control may be performed wirelessly, for example via Global System for Mobile Communications (GSM) or the like. A GSM modem may be connected to the controller for this purpose which wirelessly connects to a backend in known manner. A Global Positioning System (GPS) device or other location determining device and a clock may also be connected to the controller. Hence, an operator of the backend may be enabled to track where and when the locking arrangement is utilized and where and when the locking member was opened to the disengaged position. Geo-fencing techniques and/or location-based restrictions may be remotely applied to restrict opening of the

locking member in certain pre-determined locations and/or to enable opening only in other pre-determined locations.

5 It may also be possible to disengage the locking member (20) from the backend, in which example embodiment the key (34), and associated components, may be omitted. It will be appreciated that the locking member (20) may also be utilised in combination with a conventional padlock (not shown) or the like from outside the container (100) for additional security.

10 It will further be appreciated that the foregoing example embodiment has been provided merely for the purposes of explanation and is in no way to be construed as limiting of the present invention. While the present invention has been described with reference to the exemplary embodiment only, it is understood that the words which have been used herein are words of description and illustration, rather than words of
15 limitation. The present invention is also not intended to be limited to the particulars disclosed herein. Rather, the present invention extends to all functionally equivalent structures, methods and uses, such as are within the scope of the appended claims.

CLAIMS

1. A locking arrangement (10) for a door (12) of a goods container (100) which has a movable lever (14), the locking arrangement (10) comprising:
 - 5 - a locking member (20) which is pivotably A mountable to the container (100) in order to be pivotably displaceable A about a pivot axis B between an engaged position whereby movement of the lever (14) is inhibited and the door (12) is locked, and a disengaged position wherein the lever (14) is permitted to move to open the door (12); and
 - 10 - retaining means (22) for retaining the locking member (20) at its pivot axis B when the locking member (20) is in the engaged position whereby displacement A of the locking member (20) is restricted.
2. The locking arrangement (10) of claim 1, wherein the retaining means (22)
15 retains the locking member (20) from the inside of the container (100).
3. The locking arrangement (10) of claim 1 or 2, wherein the locking member (20) is mountable to the container (100) via a spindle (24) which extends from the locking member (20) and operatively through the container (100) along the pivot
20 axis B.
4. The locking arrangement (10) of any one of the preceding claims, wherein the locking member (20) is mountable to the door (12) of the container (100).

5. The locking arrangement (10) of any one of the preceding claims, wherein the retaining means (22) comprises any one of electrical, mechanical and electro-mechanical means for retaining the locking member (20) at its pivot axis B.
- 5 6. The locking arrangement (10) of any one of the preceding claims, wherein the retaining means (22) is operable via a key.
7. The locking arrangement (10) of any one of the preceding claims, including displacement means (38) for displacing the locking member (20) between its
10 engaged position and its disengaged position.
8. The locking arrangement (10) of any one of the preceding claims, including a catch (21) for the lever (14) to assist in inhibiting movement of the lever (14) when the locking member (20) is in its engaged position.
- 15
9. The locking arrangement (10) of any one of the preceding claims, wherein the locking member (20) is mountable externally of the door (12), whereas the retaining means (22) is securable internally of the door (12).
- 20 10. A goods container (100) comprising:
- a body (110) defining a chamber (112) inside the body (110) for receiving goods;
 - a door (12) which is movably mounted to the body (110);

- a movable lever (14) for locking the door (12), the lever (14) being movable between a locking position wherein the door (12) is locked, and an open position whereby the door (12) is unlocked; and
 - a locking arrangement (10) for retaining the lever (14) in its locking position, the locking arrangement (10) comprising:
 - o a locking member (20) which is pivotably A mounted to the container (100) and is pivotably displaceable A about a pivot axis B between an engaged position whereby movement of the lever (14) is inhibited when the door (12) is locked, and a disengaged position wherein the lever (14) is permitted to move to open the door (12); and
 - o retaining means (22) for retaining the locking member (20) at its pivot axis B when the locking member (20) is in the engaged position whereby displacement of the locking member (20) is restricted.
11. The goods container (100) of claim (10), wherein the locking member (20) is mounted to the container (100) via a spindle (24) which extends from the locking member (20) and operatively through the container (100) along the pivot axis B.
12. The goods container (100) of claim 10 or 11, wherein the locking arrangement (10) further comprises displacement means (38) for displacing the locking member (20) between its engaged position and its disengaged position.
13. The goods container (100) of any one of claims 10 to 12, wherein the retaining means (22) retains the locking member (20) from the inside of the container (100).

14. The goods container (100) of any one of claims 10 to 13, wherein the locking member (20) is mounted externally of the door (12), whereas the retaining means (22) is secured internally of the door (12).
- 5 15. A method of retrofitting a locking arrangement (10) to a goods container (100) which has a door (12) and a movable lever (14, the method comprising the steps of:
- mounting a locking member (20) to the container (100) to be pivotably displaceable A about a pivot axis B between an engaged position whereby movement of the lever (14) is inhibited and the door (12) is locked, and a disengaged position wherein the lever (14) is permitted to move to open the door (12); and
 - securing retaining means (22) to the container (100) for retaining the locking member (20) at its pivot axis B when the locking member (20) is in the engaged position whereby displacement A of the locking member (20) is restricted.
- 10
- 15
- 20 16. The method of claim 15, including removing an existing hasp from the container (100) to expose a hasp hole, whereby the step of mounting the locking member (20) to the container (100) includes mounting the locking member (20) to the hasp hole so that the locking member (20) is pivotably movable A about the hasp hole.

17. The method of claim 15 or 16, including providing a spindle (24 that is connected to the locking member (20) for facilitating the pivotal displacement A of the locking member (20) about the hasp hole.
- 5 18. The method of any one of claims 15 to 17, wherein the locking member (20) is mounted externally of the door (12), whereas the retaining means (22) is securable internally of the door (12).
19. The locking arrangement (10) of claim 1, substantially as herein described with
10 reference to the accompanying figures.
20. The goods container (100) of claim 10, substantially as herein described with reference to the accompanying figures.
- 15 21. The method of claim 15, substantially as herein described with reference to the accompanying figures.

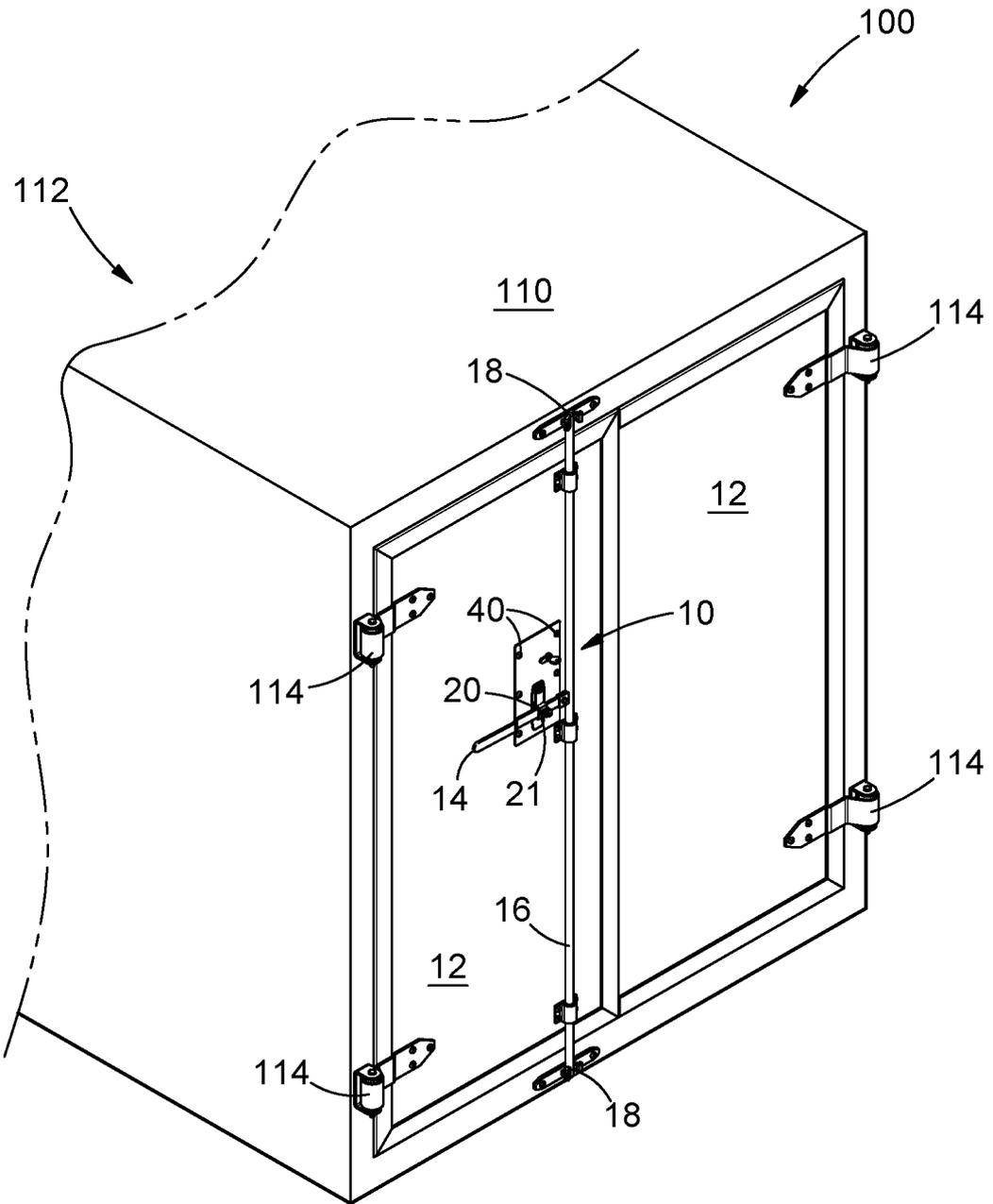


FIGURE 1

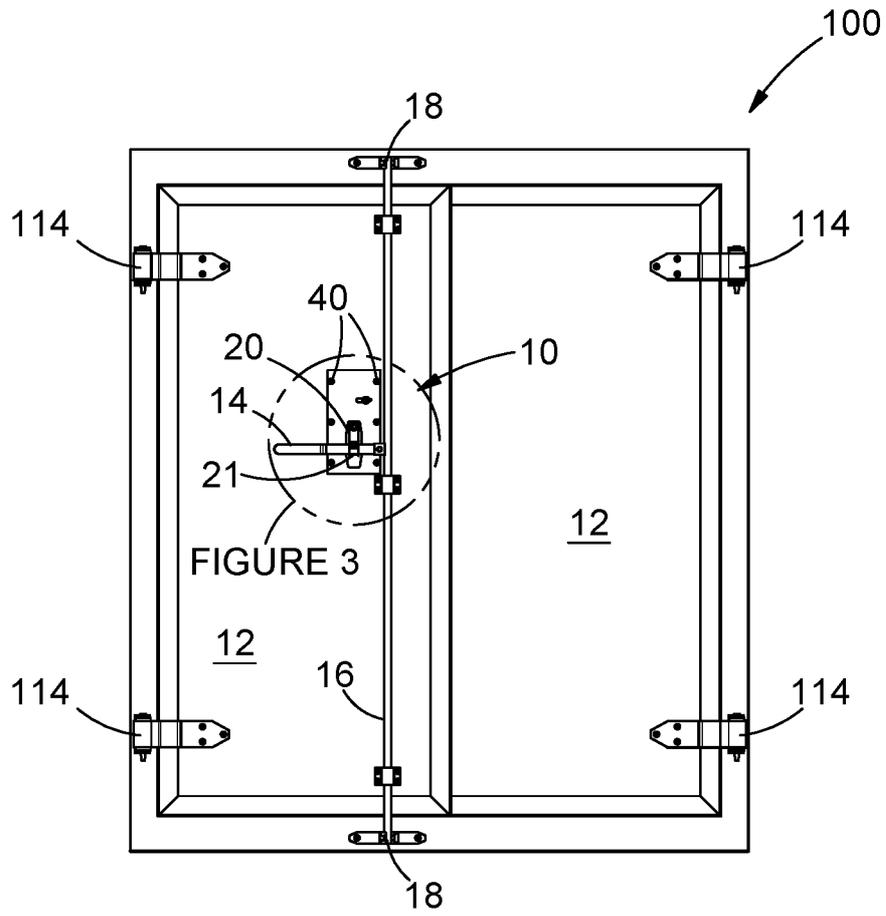


FIGURE 2

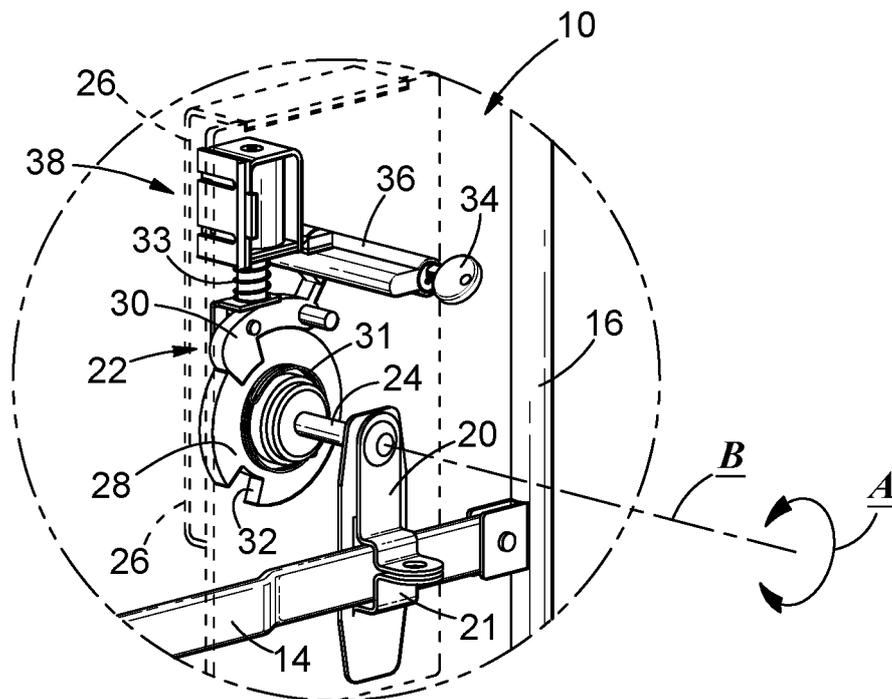


FIGURE 3

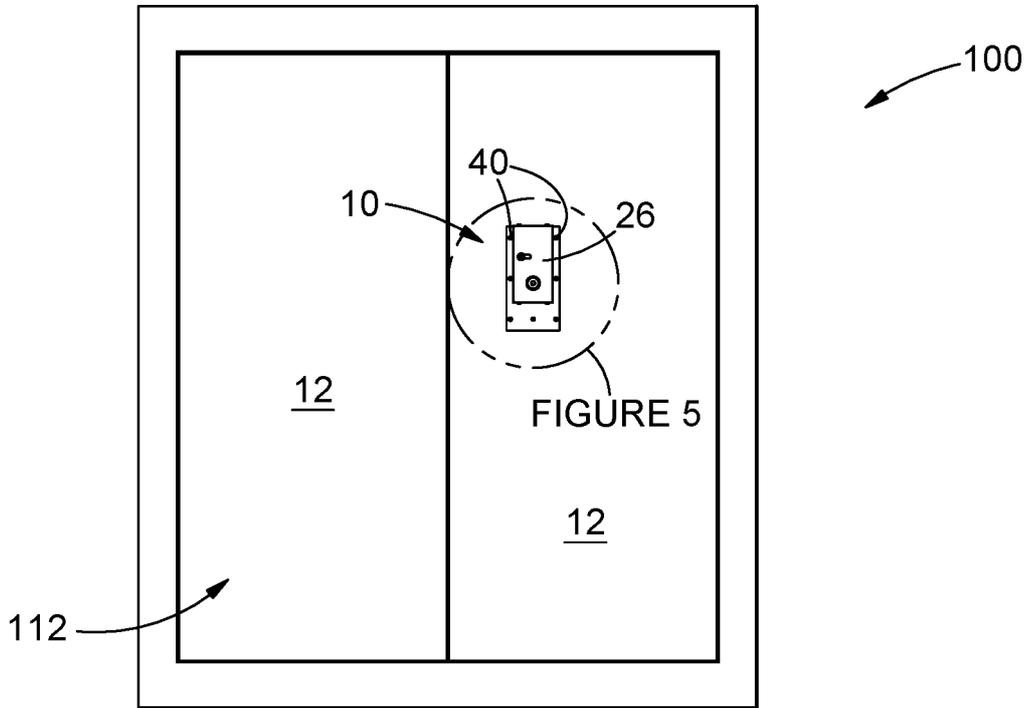


FIGURE 4

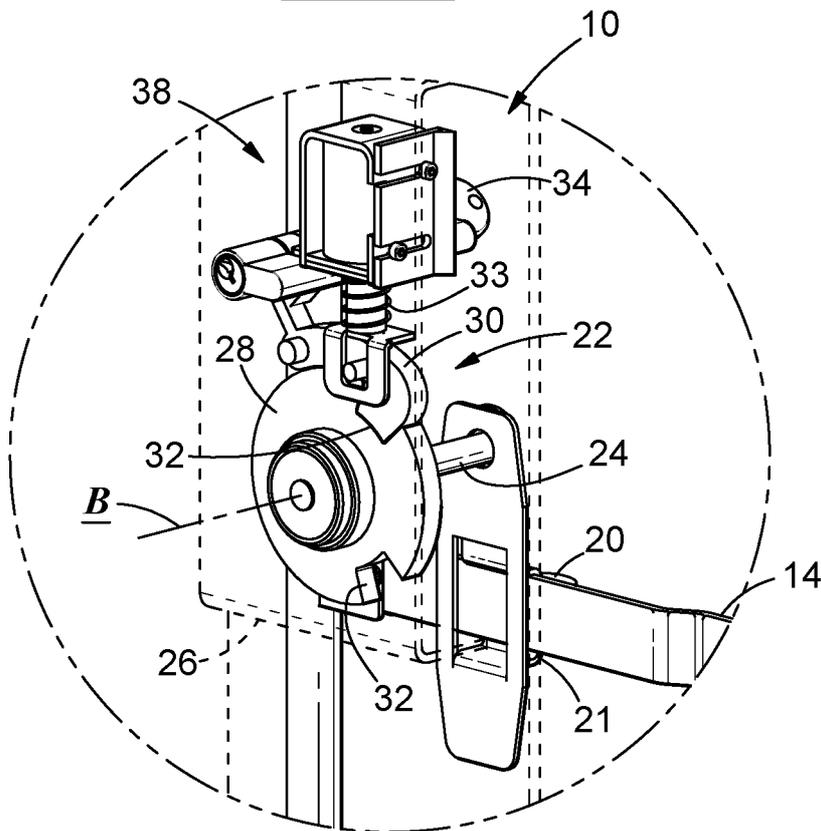


FIGURE 5

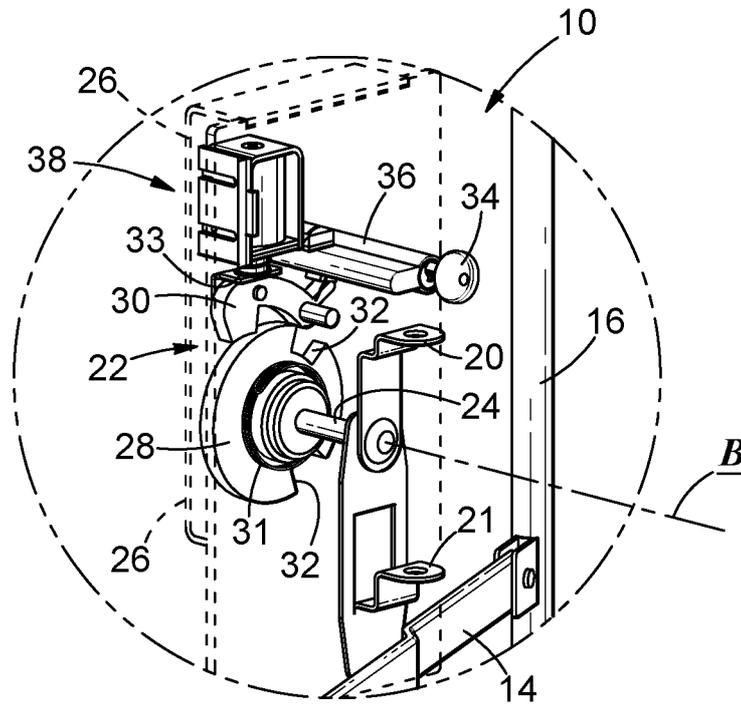


FIGURE 6

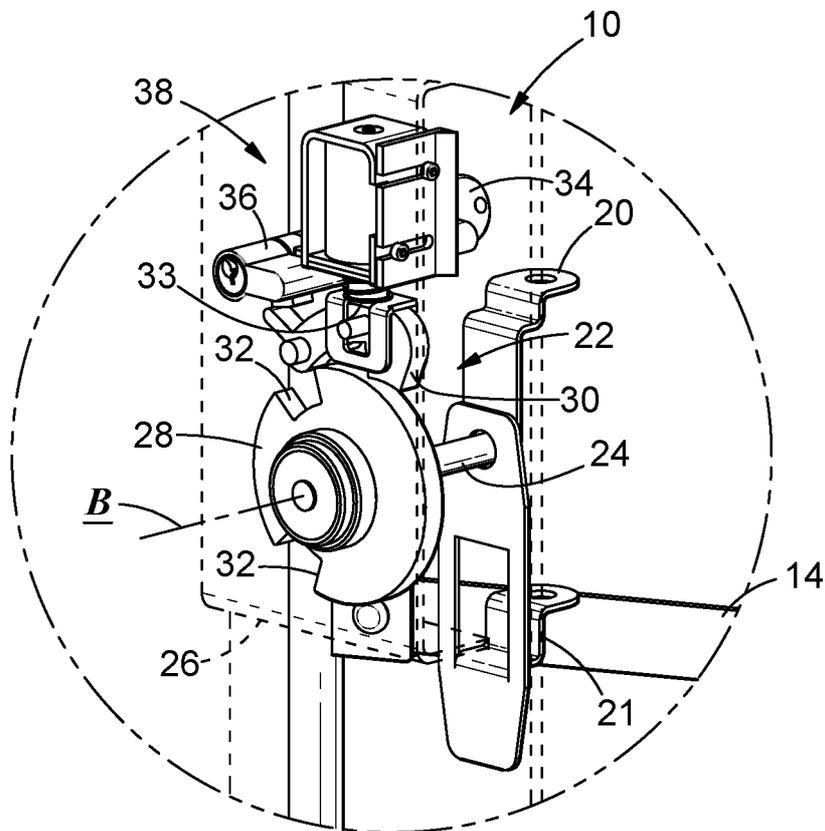


FIGURE 7

INTERNATIONAL SEARCH REPORT

International application No.

PCT / IB 2018/055851

A. CLASSIFICATION OF SUBJECT MATTER IPC: E05B 83/10 (2014.01); E05B 83/08 (2014.01) According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) E05B		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPODOC, WPIAP		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2016093544 A1 (KO), 20160616 (16.06.2016), & (FOR TRANSLATION SEE) US2017328095 A1, 20171116) para. [0024] to [0041], figs. 1 to 6	1
<input type="checkbox"/> Further documents are listed in the continuation of Box C.		<input checked="" type="checkbox"/> See patent family annex.
* Special categories of cited documents:		
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	
"P" document published prior to the international filing date but later than the priority date claimed		
Date of the actual completion of the international search 27 November 2018 (27.11.2018)	Date of mailing of the international search report 12 December 2018 (12.12.2018)	
Name and mailing address of the ISA/AT Austrian Patent Office Dresdner StraBe 87, A-1200 Vienna Facsimile No. +43 / 1 / 534 24-535	Authorized officer RABONG G. Telephone No. +43 / 1 / 534 24-463	

INTERNATIONAL SEARCH REPORT

International application No.

PCT / IB 2018/055851

Box No. II Observations where certain claims were found unsearchable (**Continuation of item 2** of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:

because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.: 19 to 21.

because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

Claims 19 to 21 do not contain any technical feature as they refer to the accompanying figures only (PCT-Rule 6.2 a).

3. Claims Nos.:

because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where **unity** of invention is lacking (Continuation **of item 3** of first sheet)

This international Searching Authority found multiple inventions in this international application, as follows:

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.2. As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

IThe additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.IThe additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.INo protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT / IB 2018/055851

Patent document cited in search report			Patent family member(s)			Publication date
WO	A1	2016093544	US	A1	2017328095	2017-11-16
			WO	A1	2016093544	2016-06-16
			KR	B1	101578183	2015-12-16
