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(54) **SYSTEM FOR THE DAMPED CLOSING OF A SLIDING DOOR LEAF, AS WELL AS A REFRIGERATOR CABINET INCLUDING THIS SYSTEM**

SYSTEM ZUM GEDÄMPFTEN VERSCHLIESSEN EINES FLÜGELS EINER SCHIEBETÜR, SOWIE EIN KÜHLSCHRANK MIT DIESEM SYSTEM

SYSTÈME DE FERMETURE AMORTIE D'UN VANTAIL DE PORTE COULISSANTE, AINSI QU'UNE ARMOIRE FRIGORIFIQUE AVEC CE SYSTÈME

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Description

Field of the invention

[0001] The present invention relates to the technical field of closing systems, and in particular it relates to a system for the damped closing of a sliding door or door leaf, in particular a glass sliding door or door leaf of a refrigerator cabinet.

[0002] Furthermore, the invention relates to a refrigerator cabinet on which this system is mounted.

State of the Art

[0003] Systems for closing sliding doors or door leaves of refrigerator cabinets are known.

[0004] For example, document US2016324335A1 discloses one of these systems, which includes magnetic damping means and a counterweight suitable to promote the return of the sliding door leaf or door to the closed position once opened.

[0005] Such known system reveals several disadvantages, especially in the light of the presence of the counterweight for closing. As a matter of fact, in order to house the latter there arises the need for a vertical space for the sliding thereof on the side of each sliding door or door leaf, which significantly increases the overall dimensions of the refrigerator cabinet on which the system is mounted.

[0006] Besides generally being expensive and difficult to assemble and handle, this makes this system also aesthetically unpleasant.

[0007] A further disadvantage lies in the fact that in case of minimum openings of the sliding door leaf or door, like it often happens in a supermarket when the customer opens the refrigerator cabinet to pick the product closest thereto, the closing weight force could be insufficient to ensure the complete closure of the sliding door leaf or door.

[0008] US 5 884 361 A discloses a system for a damped closing of an opening with the features of the preamble of claim 1.

Summary of the invention

[0009] The object of the present invention is to overcome the drawbacks outlined above by providing a system for the damped closing of a sliding door or door leaf that is highly effective and relatively cost-effective.

[0010] A further object of the present invention is to provide a system for the damped closing of a sliding door or door leaf with minimum overall dimensions.

[0011] A further object of the present invention is to provide a system for the damped closing of a sliding door or door leaf with high aesthetic appeal.

[0012] A further object of the present invention is to provide a system for the damped closing of a sliding door or door leaf capable of always guaranteeing the return

of the sliding door leaf or door to the closed position, even in case of minimum opening.

[0013] A further object of the present invention is to provide a system for the damped closing of a sliding door or door leaf that is easy to assemble.

[0014] These and other objects which will be more apparent hereinafter, are attained by a system for the damped closing of an element for closing an opening as defined in claim 1.

[0015] The dependent claims relate to advantageous embodiments of the invention.

Brief description of the drawings

[0016] Further characteristics and advantages of the invention will be more apparent in light of the detailed description of some preferred but non-exclusive embodiments of the invention, illustrated by way of non-limiting example with reference to the attached drawings, wherein:

FIG. 1 is a schematic view of a refrigerator cabinet **F** in form of a vertical refrigerator cabinet which includes the system **1**;

FIG. 2 is an enlarged view of some details of **FIG. 1**;

FIGS. 3a and **3b** are cross-sectional views taken along planes *IIIa - IIIa* and *IIIb - IIIb* of **FIG. 2**;

FIG. 4 is a schematic view of a refrigerator cabinet **F** in form of a horizontal well refrigerator which includes the system **1**, with **FIG. 4a** showing some enlarged details;

FIG. 5 is a schematic view of an embodiment of a cover **C** for a refrigerator cabinet in form of a horizontal well refrigerator which includes the system **1**, with **FIGS. 5a** and **5b** showing some enlarged details;

FIGS. 6a and **6b** are schematic views of the damping device **40** with the abutment element **42** respectively in operative and inoperative position.

Detailed description of some preferred embodiments

[0017] With reference to the mentioned figures, herein described is a system **1** for the damped closing of an opening **P** of any stationary support structure, for example a wall or a cabinet, according to the invention as defined by the attached claims.

[0018] However, preferably, the stationary support structure may be a refrigerator cabinet **F**, for example as illustrated in **FIG. 1**, a vertical refrigerator cabinet of the type present in supermarkets or the like or, as illustrated in **FIG. 4** or **5**, a horizontal well refrigerator. On the other hand, the stationary support structure may be a frame **T** or a cover **C** of the refrigerator **F**.

[0019] Suitably, the opening **P** may be an access compartment in the refrigerator cabinet **F**. In these types of refrigerator cabinets **F**, the opening **P** is defined by a substantially vertical or horizontal plane, and one or more

door leaves or panels **10**, generally configured as an insulated glazing or a flat or curved monolithic sheet, slide in this sliding plane to close or open the opening **P**.

[0020] It is clear that although hereinafter reference will be made to a door leaf or panel **10** for the sake of simplicity, any closing element, with any structure and/or geometry, may be provided for without departing from the scope of protection of the attached claims.

[0021] The door leaf or panel **10** may be generally rectangular-shaped with a pair of substantially horizontal edges **11**, **11'** and a pair of substantially vertical edges **12**, **12'**.

[0022] One of the substantially horizontal edges **11**, **11'**, and preferably the upper one **11**, may be inserted into an element **20** suitable to guide the sliding of the door leaf **10** by means of appropriate sliding wheels **13**.

[0023] Possibly, the stationary support structure of the system **1** may consist of the sliding element **20**, which in turn may be fixed to the refrigerator **F**.

[0024] As particularly illustrated in FIGS. 3a, 3b, 4a, 5a and 5b, the guide element **20** may have at least one guide wall **22** of the sliding wheels **13**.

[0025] More particularly, in the embodiment of FIGS. 3a and 3b the guide element **20** may be a single or double capsized generally U-shaped rail with a bottom wall **21**, two facing side walls **22**, **22'** and an opening **23** opposite to the bottom wall **21**. Advantageously, the bottom wall **21** and the two facing side walls **22**, **22'** may define the inner surface of the guide rail **20**.

[0026] It is clear that the guide element **20** may be arranged above or below the door leaf or panel **10**, and therefore the bottom wall **21** may be upper or lower with respect to the door leaf or panel **10**, without departing from the scope of protection of the attached claims. Likewise, the guide element may be shaped to form a U or a capsized U.

[0027] On the other hand, in the embodiment of FIG. 4a, the guide element **20** may provide for a guide wall **22** and an abutment wall **21**, while in the embodiment of FIGS. 5a and 5b the guide element **20** may provide for a horizontal guide wall **22**.

[0028] A transmission pulley **14** and the main body **15** of a damping device **40**, whose function will be clearer hereinafter, may be fixed to the upper edge **11** of the door leaf or panel **10**. Both the transmission pulley **14** and the damping device **40** may slide integrally joined with the door leaf or panel **10**.

[0029] Preferably, the transmission pulley **14** may be idle, so as not to exert any braking action on the elastic cord **30**.

[0030] It is clear that both the transmission pulley **14** and the damping device **40** may be positioned in any manner. For example, in the embodiment of FIGS. 5a and 5b are both fixed to the stationary support structure **C**.

[0031] Means for the elastic return of the door leaf or panel **10** from the open position towards the closed position, for example once opened manually by a user, are

also provided for.

[0032] These elastic return means include or consist of one or more elongated elastic elements **30**, for example a rope, a cord or elastic band.

[0033] Although hereinafter reference will be made to an individual elastic cord **30** for the sake of simplicity, it is clear that the elongated elastic element may be of any type and it may vary in number without departing from the scope of protection of the attached claims.

[0034] The end **31** of the elastic cord **30** may be fixed to the guide element **20**, for example to the wall **21** or **22**, while the opposite end **32** may be fixed to the door leaf or panel **10** through the damping device **40**. More particularly, the end **32** of the elastic cord **30** may be fixed to the main body **15** of the damping device **40**, which is in turn fixed to the upper edge **11** of the door leaf or panel **10**.

[0035] It is clear that the end **31** of the elastic cord **30** may be fixed to any point of the stationary support structure without departing from the scope of protection of the attached claims.

[0036] Suitably, the elastic cord **30** may have an intermediate portion **33** engaged in the pulley **14**.

[0037] The aforementioned configuration allows the elastic cord **30** to return the door leaf or panel **10** towards the closed position once opened.

[0038] In the embodiment of FIG. 1, the point for fixing the end **31** to the guide element **20** and the point for fixing the transmission pulley **14** to the edge **11** may be positioned on opposite sides with respect to the substantially perpendicular median plane **IIIb - IIIb** passing through the door leaf or panel **10** and the guide element **20**, while the point for fixing the end **32** to the edge **11** may be interposed therebetween.

[0039] In order to dampen the closing movement of the door leaf or panel **10**, a damping device **40** is provided.

[0040] Likewise, the end **32** may be connected to the door leaf or panel **10** in any position and in any manner, directly or indirectly for example by means of a plate or eyelet integrally joined with the door leaf or panel **10**.

[0041] However, the system **1** includes the damping device **40**, which - during the sliding thereof integrally joined with the door leaf or panel **10** - is designed to interact with an activation pin **41** internally fixed to the guide element **20** so as to be selectively activated when the door leaf or panel **10** is in proximity of the closed position.

[0042] No braking means shall act on the elastic cord **30** before the interaction of the damping device **40** with the activation pin **41**, so that the interaction between the latter occurs with a force sufficient to activate the damping device **40** properly.

[0043] Furthermore, the absence of braking means before damping will allow to have a good closing speed of the door leaf or panel **10** before the interaction of the damping device **40** with the activation pin **41**, therefore minimise the entry of hot air into the refrigerator cabinet **F** and preserve the cold chain for the food contained therein.

[0044] It is clear that the damping device **40** and the

activation pin **41** may be equivalently fixed respectively to the stationary support structure and to the door leaf or panel **10** without departing from the scope of protection of the attached claims.

[0045] The device **40** is per se known in the industry by the name "soft close", and it may have a generally plate-like main body **15**, that is defining a plane, with an abutment element **42** designed to selectively interact with the activation pin **41** to move from an inoperative position, that it takes for example when the door leaf or panel **10** is in the open position, to an operative position, that it takes for example upon interacting with the pin **41**.

[0046] For example, FIG. 6a illustrates the closed position of the door leaf or panel **10** with the abutment element **42** in operative position, while FIG. 6b illustrates the closing movement of the door leaf or panel **10**, with the abutment element **42** in inoperative position just before interacting with the activation pin **41**.

[0047] For example, the abutment element **42** may be a tooth or similar element suitable to impact against the activation pin **41** during the sliding of the main body **15**.

[0048] In a per se known manner, the abutment element **42** may be connected with a damper **43**, for example a gas damper, consisting of a jacket **44** and a stem **45**. Once the abutment element **42** interacts with the activation pin **41**, it passes from the inoperative position to the operative position to activate the damper **43** which dampens the closing movement of the door leaf or panel **10**.

[0049] Furthermore, in a per se known manner, the activation element **42** may also be connected with a traction spring **46**. Furthermore, in a per se known manner, during the movement thereof, the activation element **42** may be guided in a curved guide element **47**.

[0050] Suitably, when the door leaf or panel **10** is in the opening position, the activation pin **41** may be interposed between the fixing point of the end **31** and the damping device **40**.

[0051] Advantageously, in the embodiment of FIGS. 3a and 3b the generally plate-like main body **15** of the device **40** may be fixed to the edge **11** of the door leaf or panel **10**, by means of a C-shaped bracket, parallel to the edge **11**, also substantially flat.

[0052] Therefore, the generally plate-like main body **15** will be substantially perpendicular to the side walls **22**, **22'** and substantially parallel to the bottom wall **21**.

[0053] Therefore, any crushing of the bottom wall **21** due to loads acting thereon will not affect the operation of the device **40**.

[0054] In the light of the above, it is clear that the invention attains the pre-set objectives.

[0055] The damped closing system described above actually has minimum overall dimensions, and it is entirely contained inside the guide element **20**.

[0056] Furthermore, this confers a high aesthetic appeal to the system **1**.

[0057] Furthermore, using the elastic force instead of the weight force always guarantees the return of the door leaf or panel **10** to the closed position even in case of

minimum opening.

[0058] The invention is susceptible to numerous modifications and variants, as long as they fall within the invention as defined in the attached claims. All details can be replaced by other technically equivalent elements, and the materials can be different depending on the technical needs, without departing from the scope of protection of the invention.

[0059] Even though the invention has been described with particular reference to the attached figures, the reference numbers utilised in the description and in the claims are meant for improving the intelligibility of the invention and thus do not limit the claimed scope of protection in any manner whatsoever.

Claims

1. A system for the damped closing of an opening (**P**), the latter being in particular an access opening within a refrigerator cabinet (**F**), comprising:

- at least one closing element (**10**) slidable between a closing position in which it closes said opening (**P**) and an opening position in which said opening (**P**) is open;

- at least one stationary support structure (**T, C**) which includes at least one element (**20**) for guiding the sliding of said at least one closing element (**10**);

- elastic means (**30**) for returning said at least one closing element (**10**) from the opening position towards the closing position;

- damping means (**40, 41**) acting upon closing said at least one closing element (**10**) to counteract the action of said elastic return means (**30**);

wherein said elastic return means include or consist of at least one elongated elastic element (**30**) having a first end (**31**) fixed to said at least one stationary support structure (**T, C**) and a second opposite end (**32**) fixed to said at least one closing element (**10**);

characterized in that said damping means include at least one damping device (**40**) and at least one activation pin (**41**) mutually slidable and cooperating so that the damping device (**40**) is selectively activated when said at least one closing element (**10**) is in proximity of the closing position, said at least one damping device (**40**) being fixed to one of said at least one closing element (**10**) and said at least one stationary support structure (**T, C**), said at least one activation pin (**41**) being fixed to the other of said at least one closing element (**10**) and said at least one stationary support structure (**T, C**); and further

characterized in that the system is free of brak-

ing means which act on said elastic return means (30) before the mutual interaction between the at least one damping device (40) and said at least one activation pin (41).

2. System according to claim 1, further comprising at least one transmission pulley (14) fixed to said at least one closing element (10) or said at least one stationary support structure (T, C), said at least one elongated elastic element (30) comprising an intermediate portion (33) interposed between said first and second end (31, 32) engaged in said at least one transmission pulley (14), the latter preferably being an idler pulley.
3. System according to claim 1 or 2, wherein said at least one closing element (10) comprises at least one sliding wheel (13), said at least one guide element (20) having at least one wall (22) for guiding said at least one sliding wheel (13).
4. System according to claim 1, 2 or 3, wherein said at least one guide element (20) is a guide rail having an inner surface (21, 22, 22') and an opening (23) for access thereto, said at least one closing element (10) including at least one edge (11) inserted into said opening (23) to remain faced to said inner surface (21, 22, 22'), the first end (31) of said at least one elongated elastic element (30) being fixed to said inner surface (21, 22, 22'), the second end (32) of said at least one elongated elastic element (30) being fixed to said edge (11) so as to also remain faced to said inner surface (21, 22, 22'), so as to remain concealed inside said at least one guide rail (20), said transmission pulley (14) also being preferably fixed to said edge (11) so as to also remain faced to said inner surface (21, 22, 22').
5. System according to one or more of the preceding claims, wherein said damping device (40) includes a substantially plate-like main body (15) fixed to said at least one closing element (10).
6. System according to claim 4 and 5, wherein said at least one edge (11) of said at least one closing element (10) is substantially flat, said substantially plate-like main body (15) being fixed to said at least one closing element (10) so as to be substantially parallel to said at least one edge (11).
7. System according to claims 4 and 5 or 4, 5 and 6, wherein the inner surface (21, 22, 22') of said at least one guide element (20) is substantially U-shaped with a bottom wall (21) opposite to said opening (23) and facing side walls (22, 22') substantially flat and parallel with respect to each other, said main body (15) being substantially perpendicular to said facing side walls (22, 22'), said bottom wall (21) also pref-

erably being substantially flat and perpendicular to said facing side walls (22, 22'), said main body (15) being preferably substantially parallel to said bottom wall (21).

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8. System according to claims 3 and 4 or 3, 4 and 7, wherein said at least one sliding wheel (13) is fixed to said at least one edge (11), said inner surface (21, 22, 22') of said at least one guide element (20) comprising said at least one wall (22) for guiding said at least one sliding wheel (13), at least one of said facing side portions (22, 22') of said inner surface (21, 22, 22') preferably comprising said at least one wall (22) for guiding said at least one sliding wheel (13).
9. System according to one or more of the preceding claims, wherein said damping device (40) includes at least one abutment element (42) movable between an inoperative position and an operative position, said at least one abutment element (42) being designed to selectively interact with said activation pin (41) to pass from the inoperative position to the operative position, said damping device (40) including at least one damper (43) having a jacket (44) and a stem (45), one of the latter being integrally joined with said at least one closing element (10), the other of said jacket (44) and said stem (45) being operatively connected with said at least one abutment element (42) to dampen the closing movement of said closing element (10) after the at least one abutment element (42) passes to the operative position.
10. System according to claim 5 and optionally additionally to one or more of the preceding claims 1-4 or 6-9, wherein said second end (32) of said elongated elastic element (30) is fixed to said main body (15).
11. System according to one or more of the preceding claims, wherein when said at least one closing element (10) is in the opening position, said activation pin (41) is interposed between a fixing point of the first end (31) of said elongated elastic element (30) and said damping device (40).
12. System according to one or more of the preceding claims, wherein said at least one elongated elastic element (30) is a cord or an elastic band.
13. A refrigerator cabinet which includes at least one opening (P) for access thereto and a system for the damped closing of said opening (P) according to one or more of the preceding claims.

Patentansprüche

1. System für das gedämpfte Schließen einer Öffnung (P), letztere insbesondere als Zugangsöffnung in-

nerhalb eines Kühlschranks (F), umfassend:

- wenigstens ein Schließelement (10), welches zwischen einer geschlossenen Stellung, in welcher die Öffnung (P) geschlossen ist und einer geöffneten Stellung, in welcher die Öffnung (P) geöffnet ist, verschiebbar ist;
 - wenigstens eine stationäre Tragstruktur (T, C) welche wenigstens ein Element (20) zur Führung der Gleitbewegung des wenigstens einen Schließelements (10) umfasst;
 - elastische Mittel (30), um das wenigstens eine Schließelement (10) aus der geöffneten Stellung in Richtung der Schließstellung zurückzuführen;
 - Dämpfungsmittel (40, 41), die während des Schließens auf wenigstens ein Schließelement (10) wirken, um der Wirkung der elastischen Rückführmittel (30) entgegenzuwirken;
- wobei die elastischen Rückführmittel wenigstens ein längliches elastisches Element (30) umfassen oder daraus bestehen, mit einem ersten Ende (31), welches an der stationären Tragstruktur (T, C) befestigt ist und einem zweiten gegenüberliegenden Ende (32), welches an dem wenigstens einen Schließelement (10) befestigt ist;
- dadurch gekennzeichnet, dass** die Dämpfungsmittel wenigstens eine Dämpfungsvorrichtung (40) und wenigstens einen Aktivierungsstift (41) umfassen, die gegeneinander verschieblich sind und zusammenwirken, sodass die Dämpfungsvorrichtung (40) wahlweise aktiviert ist, wenn das wenigstens eine Schließelement (10) sich in der Nähe der Schließstellung befindet, wobei die wenigstens eine Dämpfungsvorrichtung (40) an dem wenigstens einen Schließelement (10) und der wenigstens einen stationären Tragstruktur (T, C) befestigt ist, wobei der wenigstens eine Aktivierungsstift (41) an dem anderen des wenigstens einen Schließelements (10) und der wenigstens einen stationären Tragstruktur (T, C) befestigt ist; und weiterhin
- dadurch gekennzeichnet, dass** das System frei von Bremsmitteln ist, die auf die elastischen Rückführmittel (30) wirken, vor dem gegenseitigen Zusammenwirken zwischen der wenigstens einen Dämpfungsvorrichtung (40) und dem wenigstens einen Aktivierungsstift (41).

2. System nach Anspruch 1, weiterhin umfassend wenigstens eine Transmissionsrolle (14), die entweder an dem wenigstens einen Schließelement (10) oder an der wenigstens einen stationären Tragstruktur (T, C) befestigt ist, wobei das wenigstens eine längliche elastische Element (30) einen Zwischenteil (33) aufweist, der zwischen dem ersten und zweiten Ende

(31,32) angeordnet ist, das sich in Eingriff mit der wenigstens einen Transmissionsrolle (14) befindet, wobei Letztere vorzugsweise als Leitrolle ausgebildet ist.

3. System nach einem der Ansprüche 1 oder 2, bei welchem das wenigstens eine Schließelement (10) wenigstens ein Gleitrad (13) umfasst, wobei das wenigstens eine Führungselement (20) wenigstens eine Wand (22) zur Führung des wenigstens einen Gleitrads (13) aufweist.
4. System nach einem der Ansprüche 1, 2 oder 3, bei welchem das wenigstens eine Führungselement (20) eine Führungsschiene mit einer inneren Oberfläche (21, 22,22') und eine Öffnung (23) zum Zugriff darauf aufweist, wobei das wenigstens eine Schließelement (10) wenigstens eine Kante (11) umfasst, die in die Öffnung (23) eingesetzt ist, um der inneren Oberfläche (21, 22,22') zugewandt zu bleiben, wobei das erste Ende (31) des wenigstens einen länglichen elastischen Elements (30) an der inneren Oberfläche (21, 22,22') befestigt ist, das zweite Ende (32) des wenigstens einen elastischen Elements (30) an der Kante (11) befestigt ist, um der inneren Oberfläche (21, 22,22') zugewandt zu verbleiben, so dass dieses innerhalb der wenigstens einen Führungsschiene (20) verdeckt bleibt, wobei die Transmissionsrolle (14) ebenfalls vorzugsweise an der Kante (11) befestigt ist, um der inneren Oberfläche (21, 22,22') zugewandt zu verbleiben.
5. System nach einem oder mehreren der vorstehenden Ansprüche, bei welchem die Dämpfungsvorrichtung (40) einen im wesentlichen plattenförmigen Grundkörper (15) aufweist, der an dem wenigstens einen Schließelement (10) befestigt ist.
6. System nach Anspruch 4 und 5, bei welchem die wenigstens eine Kante (11) des wenigstens einen Schließelements (10) im Wesentlichen flach ist, der im wesentlichen plattenförmige Grundkörper (15) an dem wenigstens einen Schließelement (10) derart befestigt ist, dass sich dieses im Wesentlichen parallel zu der wenigstens einen Kante (11) erstreckt.
7. System nach den Ansprüchen 4 und 5 oder 4,5 und 6, bei welchem die innere Oberfläche (21, 22,22') des wenigstens einen Führungselements (20) im wesentlichen U-förmig mit einer Bodenwand (21) ausgebildet ist, die gegenüberliegend der Öffnung (23) angeordnet ist und den sich im Wesentlichen parallel zueinander erstreckenden Seitenwänden (22,22') zugewandt ist, wobei der Grundkörper (15) im Wesentlichen rechtwinklig zu den gegenüberliegenden Seitenwänden (22,22') ist und die Bodenwand (21) ebenso vorzugsweise im Wesentlichen flach und rechtwinklig zu den einander zugekehrten

Seitenwänden (22,22') ist, wobei der Grundkörper (15) im Wesentlichen parallel zu der Bodenwand (21) ist.

8. System nach den Ansprüchen 3 und 4 oder 3,4 und 7, bei welchem das wenigstens eine Gleitrad (13) an der wenigstens einen Kante (11) befestigt ist, die innere Oberfläche (21, 22,22') des wenigstens einen Führungselements (20) wenigstens eine Wand (22) zur Führung des wenigstens einen Gleitrads (13) umfasst, wenigstens eine der sich gegenüberliegenden Seitenteile (22,22') der inneren Oberfläche (21, 22,22') vorzugsweise wenigstens eine Wand (22) zur Führung des wenigstens einen Gleitrads (13) umfasst. 10
9. System nach einem oder mehreren der vorstehenden Ansprüche, wobei die Dämpfungsvorrichtung (40) wenigstens ein Anschlagelement (42) umfasst, das zwischen einer Nicht-Betriebsstellung und einer Betriebsstellung bewegbar ist, wobei das wenigstens eine Anschlagelement (42) so gestaltet ist, dass es wahlweise mit dem Aktivierungsstift (41) zusammenwirkt, um von der Nicht-Betriebsstellung in die Betriebsstellung überzugehen, wobei die Dämpfungsvorrichtung (40) wenigstens einen Dämpfer (43) mit einem Mantel (44) und einem Stängel (45) umfasst, wobei einer der Letzteren einstückig mit dem wenigstens einen Schließelement (10) verbunden ist, das andere des Mantels (44) und des Stängels (45) in Wirkverbindung mit dem wenigstens einen Anschlagelement (42) ist, um die Schließbewegung des Schließelements (10) zu dämpfen, nachdem wenigstens ein Anschlagelement (42) durch die Betriebsstelle hindurch getreten ist. 20
10. System nach Anspruch 5 und optional zusätzlich nach einem oder mehreren der vorhergehenden Ansprüche 1 bis 4 oder 6 bis 9, bei welchem das zweite Ende (32) des länglichen elastischen Elements (30) an dem Grundkörper (15) befestigt ist. 25
11. System nach einem oder mehreren der vorhergehenden Ansprüche, bei welchem, wenn sich das wenigstens eine Schließelement (10) in der geöffneten Stellung befindet, der Aktivierungsstift (41) zwischen einem Befestigungspunkt des ersten Endes (31) des länglichen elastischen Elements (30) und der Dämpfungsvorrichtung (40) angeordnet ist. 30
12. System nach einem oder mehreren der vorhergehenden Ansprüche, bei welchem das wenigstens eine längliche elastische Element (30) eine Schnur oder ein elastisches Band ist. 35
13. Kühlschrank, welcher wenigstens eine Öffnung (P) für den Zugang in diesen aufweist, und ein System zum gedämpften Schließen der Öffnung (P) nach 40

einem oder mehreren der vorhergehenden Ansprüche.

5 Revendications

1. Un système de fermeture amortie d'une ouverture (P), cette dernière étant en particulier une ouverture d'accès à l'intérieur d'une armoire frigorifique (F), comprenant: 10
 - au moins un élément de fermeture (10) pouvant coulisser entre une position de fermeture dans laquelle il ferme ladite ouverture (P) et une position d'ouverture dans laquelle ladite ouverture (P) est ouverte;
 - au moins une structure de support fixe (T, C) qui comprend au moins un élément (20) pour guider le coulissement dudit au moins un élément de fermeture (10);
 - des moyens élastiques (30) pour rappeler ledit au moins un élément de fermeture (10) depuis la position d'ouverture vers la position de fermeture;
 - des moyens d'amortissement (40, 41) agissant lors de la fermeture dudit au moins un élément de fermeture (10) pour agir de manière opposée à l'action desdits moyens de rappel élastique (30);
 dans lequel lesdits moyens de rappel élastique comprennent ou sont constitués d'au moins un élément élastique allongé (30) ayant une première extrémité (31) fixée à ladite au moins une structure de support fixe (T, C) et une deuxième extrémité opposée (32) fixée audit au moins un élément de fermeture (10); 20

caractérisé en ce que lesdits moyens d'amortissement comprennent au moins un dispositif d'amortissement (40) et au moins une goupille d'activation (41) pouvant coulisser mutuellement et coopérant de telle sorte que le dispositif d'amortissement (40) est activé sélectivement lorsque ledit au moins un élément de fermeture (10) est à proximité de la position de fermeture, ledit au moins un dispositif d'amortissement (40) étant fixé à un dudit au moins un élément de fermeture (10) et de ladite au moins une structure de support fixe (T, C), ladite au moins une goupille d'activation (41) étant fixée à un autre dudit au moins un élément de fermeture (10) et de ladite au moins une structure de support fixe (T, C); et en outre 25

caractérisé en ce que le système est exempt de moyens de freinage qui agissent sur lesdits moyens de rappel élastique (30) avant l'interaction mutuelle entre au moins un dispositif d'amortissement (40) et ladite au moins une goupille d'activation (41). 30

2. Système selon la revendication 1, comprenant en outre au moins une poulie de transmission (14) fixée audit au moins un élément de fermeture (10) ou à ladite au moins une structure de support fixe (T, C), ledit au moins un élément élastique allongé (30) comprenant un partie intermédiaire (33) interposée entre lesdites première et deuxième extrémités (31, 32) engagées dans ladite au moins une poulie de transmission (14), cette dernière étant de préférence une poulie de tension. 5
3. Système selon la revendication 1 ou 2, dans lequel ledit au moins un élément de fermeture (10) comprend au moins une roue coulissante (13), ledit au moins un élément de guidage (20) comportant au moins une paroi (22) pour guider ladite au moins une roue coulissante (13). 10
4. Système selon la revendication 1, 2 ou 3, dans lequel ledit au moins un élément de guidage (20) est un rail de guidage comportant une surface interne (21, 22, 22') et une ouverture (23) pour accéder dans celle-ci, ledit au moins un élément de fermeture (10) comprenant au moins un bord (11) inséré dans ladite ouverture (23) pour rester face à ladite surface interne (21, 22, 22'), la première extrémité (31) dudit au moins un élément élastique allongé (30) étant fixée à ladite surface interne (21, 22, 22'), la deuxième extrémité (32) dudit au moins un élément élastique allongé (30) étant fixée audit bord (11) de manière à rester également face à ladite surface interne (21, 22, 22'), afin de rester cachée à l'intérieur dudit au moins un rail de guidage (20), ladite poulie de transmission (14) étant également de préférence fixée audit bord (11) de manière à rester également face à ladite surface intérieure (21, 22, 22'). 20 25 30 35
5. Système selon une ou plusieurs des revendications précédentes, dans lequel ledit dispositif d'amortissement (40) comprend un corps principal sensiblement en forme de plaque (15) fixé audit au moins un élément de fermeture (10). 40
6. Système selon les revendications 4 et 5, dans lequel ledit au moins un bord (11) dudit au moins un élément de fermeture (10) est sensiblement plat, ledit corps principal sensiblement en forme de plaque (15) étant fixé audit au moins un élément de fermeture (10) de manière à être sensiblement parallèle audit au moins un bord (11). 45 50
7. Système selon les revendications 4 et 5 ou 4, 5 et 6, dans lequel la surface interne (21, 22, 22') dudit au moins un élément de guidage (20) est sensiblement en forme de U avec une paroi inférieure (21) opposée à ladite ouverture (23) et tournée vers les parois latérales (22, 22') sensiblement planes et parallèles l'une par rapport à l'autre, ledit corps principal (15) étant sensiblement perpendiculaire auxdites parois latérales d'en face (22, 22'), ladite paroi inférieure (21) étant également, de préférence, sensiblement plane et perpendiculaire auxdites parois latérales d'en face (22, 22'), ledit corps principal (15) étant de préférence sensiblement parallèle à ladite paroi inférieure (21). 55
8. Système selon les revendications 3 et 4 ou 3, 4 et 7, dans lequel ladite au moins une roue coulissante (13) est fixée audit au moins un bord (11), ladite surface interne (21, 22, 22') dudit au moins un élément de guidage (20) comprenant ladite au moins une paroi (22) pour guider ladite au moins une roue coulissante (13), au moins une desdites parties latérales d'en face (22, 22') de ladite surface interne (21, 22, 22') comprenant de préférence ladite au moins une paroi (22) pour guider ladite au moins une roue coulissante (13).
9. Système selon une ou plusieurs des revendications précédentes, dans lequel ledit dispositif d'amortissement (40) comprend au moins un élément de butée (42) mobile entre une position de repos et une position opérationnelle, ledit au moins un élément de butée (42) étant conçu pour interagir sélectivement avec ladite goupille d'activation (41) pour passer de la position de repos à la position de opérationnelle, ledit dispositif d'amortissement (40) comprenant au moins un amortisseur (43) comportant une gaine (44) et une tige (45), l'une de ces dernières étant reliée de manière solidaire audit au moins un élément de fermeture (10), l'autre desdites gaine (44) et tige (45) étant reliée de manière opérationnelle audit au moins un élément de butée (42) pour amortir le mouvement de fermeture dudit élément de fermeture (10) après qu'au moins un élément de butée (42) passe en position opérationnelle.
10. Système selon la revendication 5 et éventuellement en complément selon une ou plusieurs des revendications précédentes 1 à 4 ou 6 à 9, dans lequel ladite deuxième extrémité (32) dudit élément élastique allongé (30) est fixée audit corps principal (15).
11. Système selon une ou plusieurs des revendications précédentes, dans lequel, lorsque ledit au moins un élément de fermeture (10) est en position d'ouverture, ladite goupille d'activation (41) est interposée entre un point de fixation de la première extrémité (31) dudit élément élastique allongé (30) et ledit dispositif d'amortissement (40).
12. Système selon une ou plusieurs des revendications précédentes, dans lequel ledit au moins un élément élastique allongé (30) est un cordon ou une bande élastique.

13. Une armoire frigorifique qui comporte au moins une ouverture **(P)** pour accéder dans celle-ci et un système de fermeture amortie de ladite ouverture **(P)** selon une ou plusieurs des revendications précédentes.

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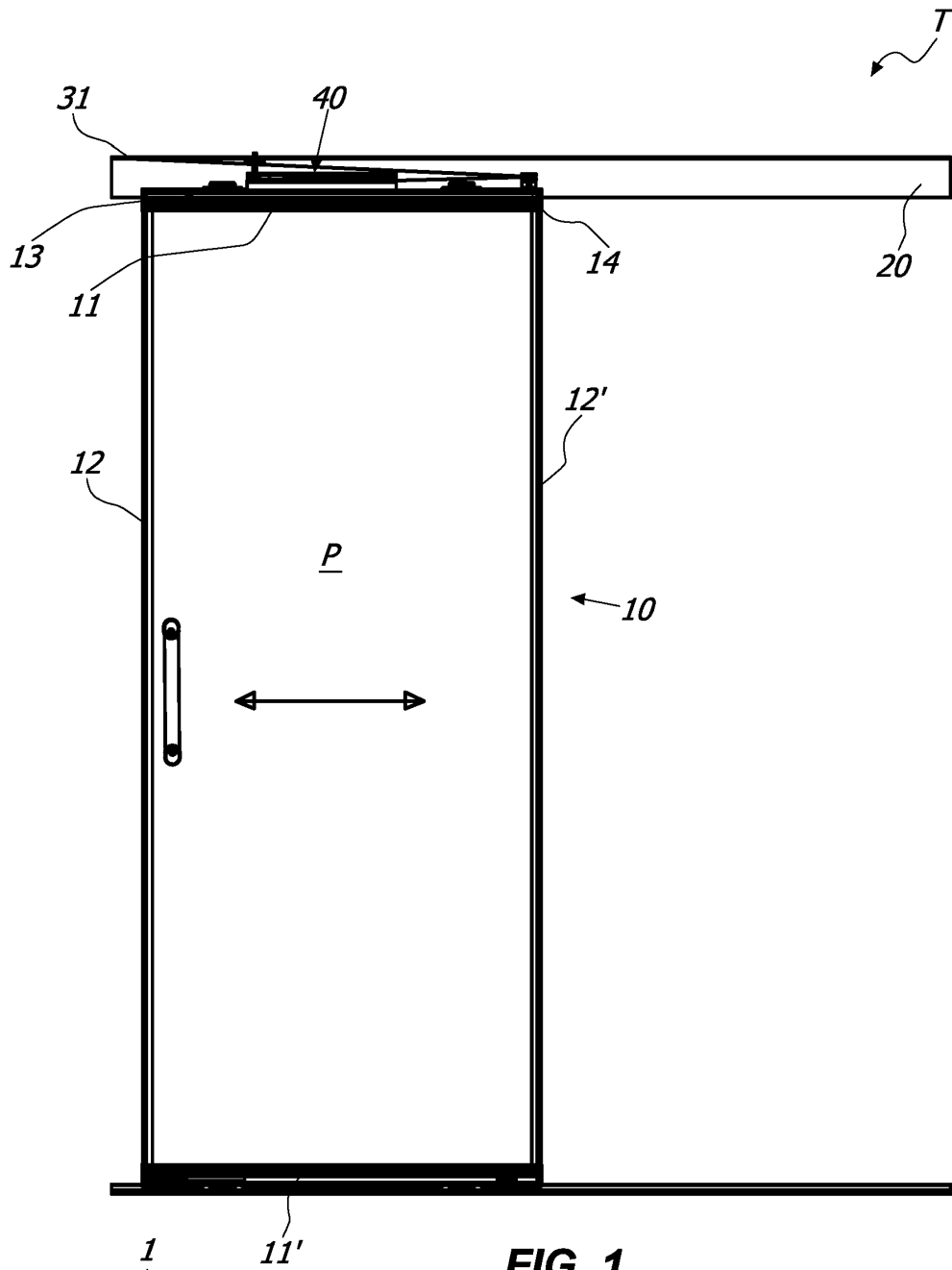


FIG. 1

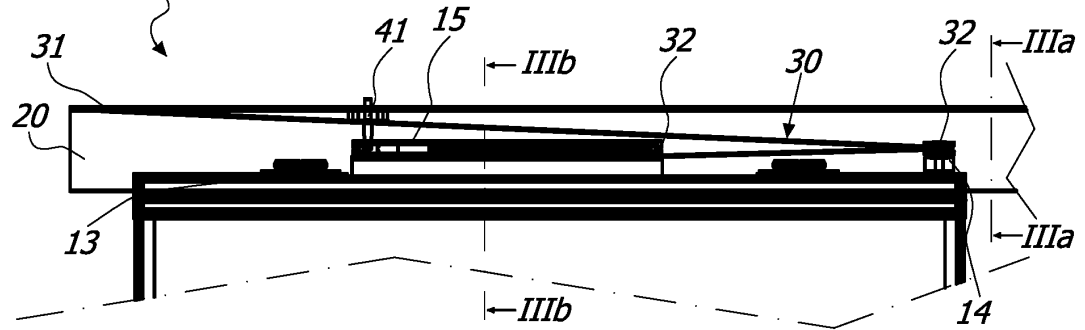


FIG. 2

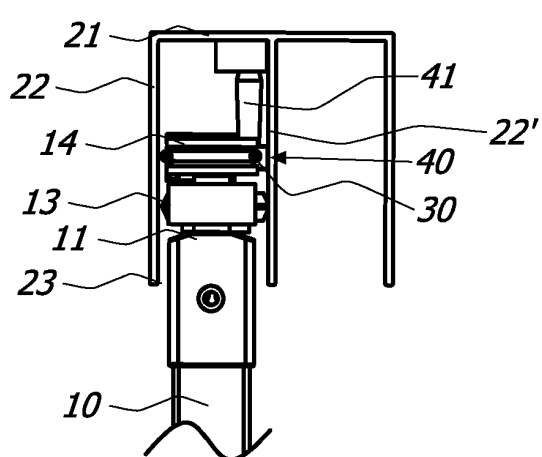


FIG. 3a

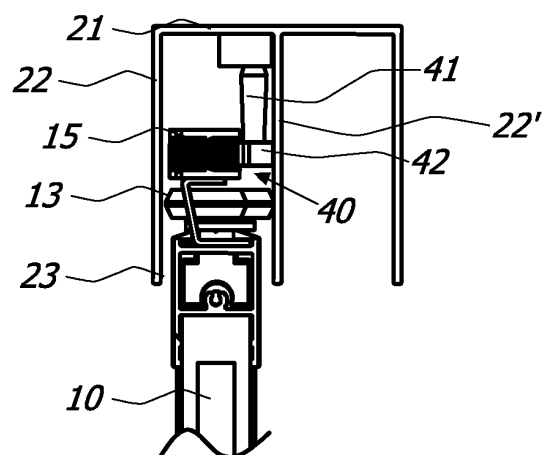


FIG. 3b

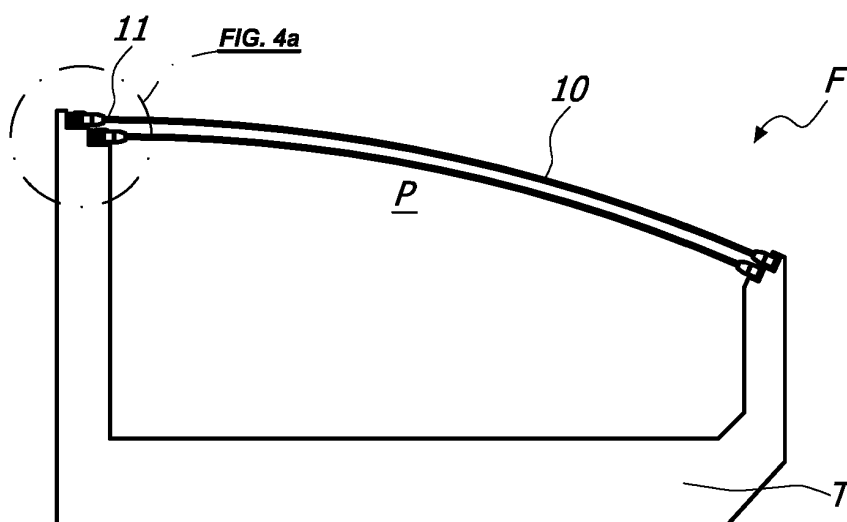


FIG. 4

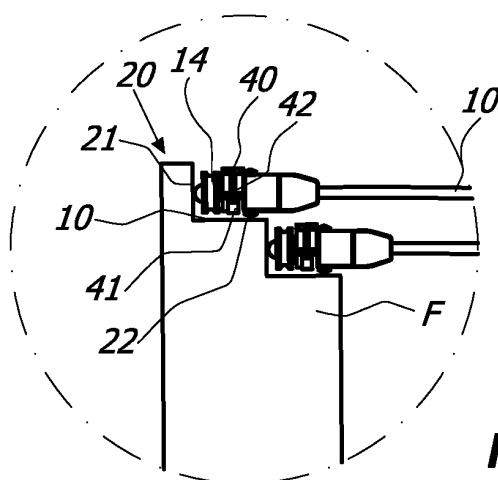


FIG. 4a

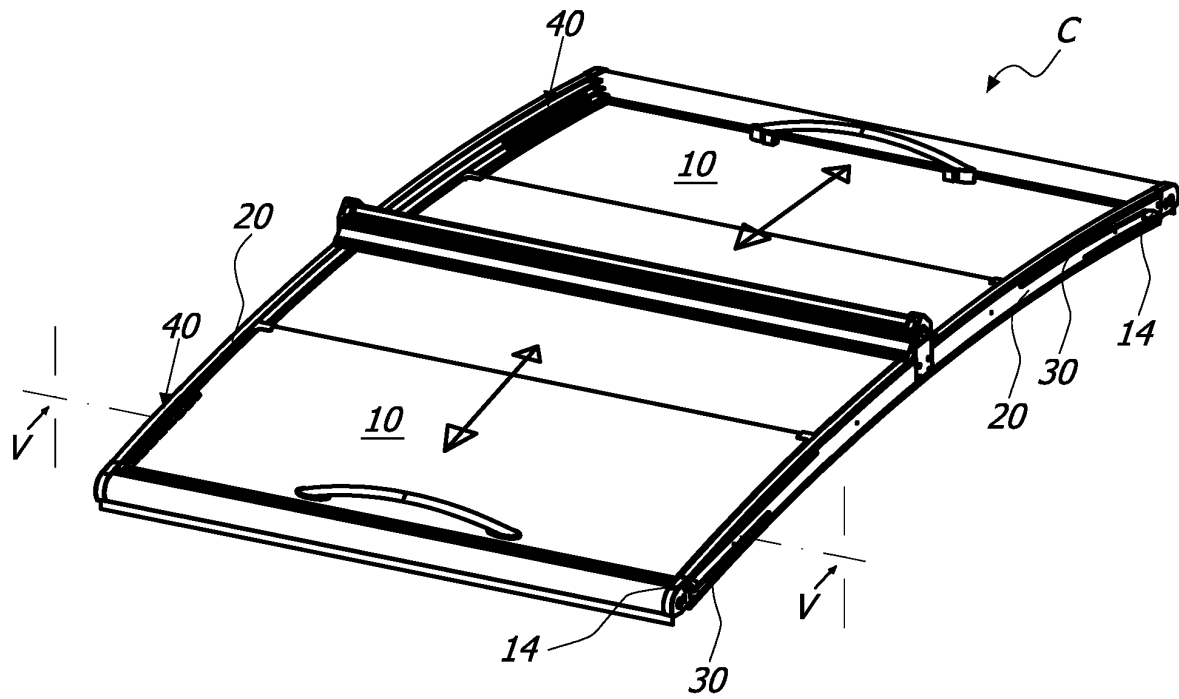


FIG. 5

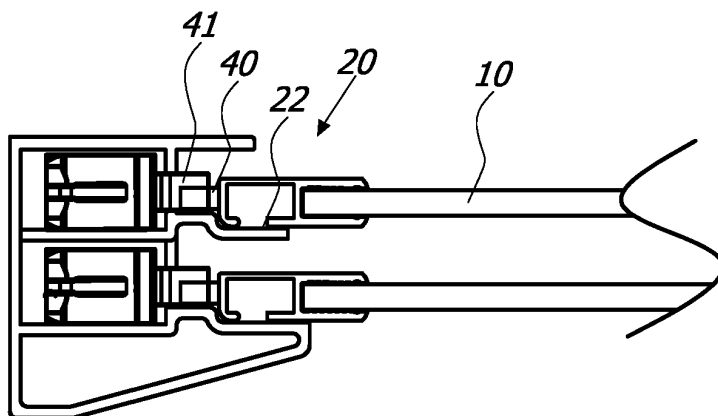


FIG. 5a

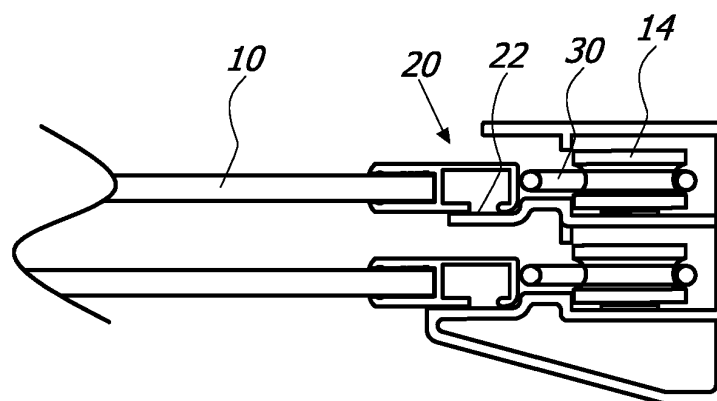
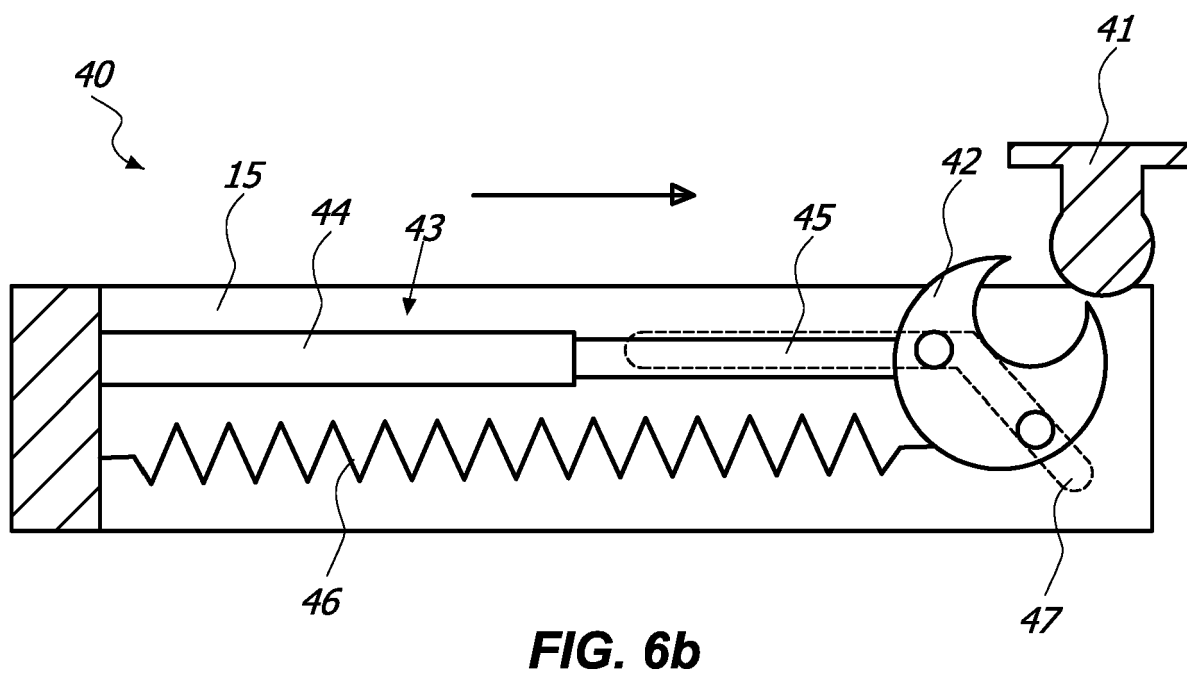
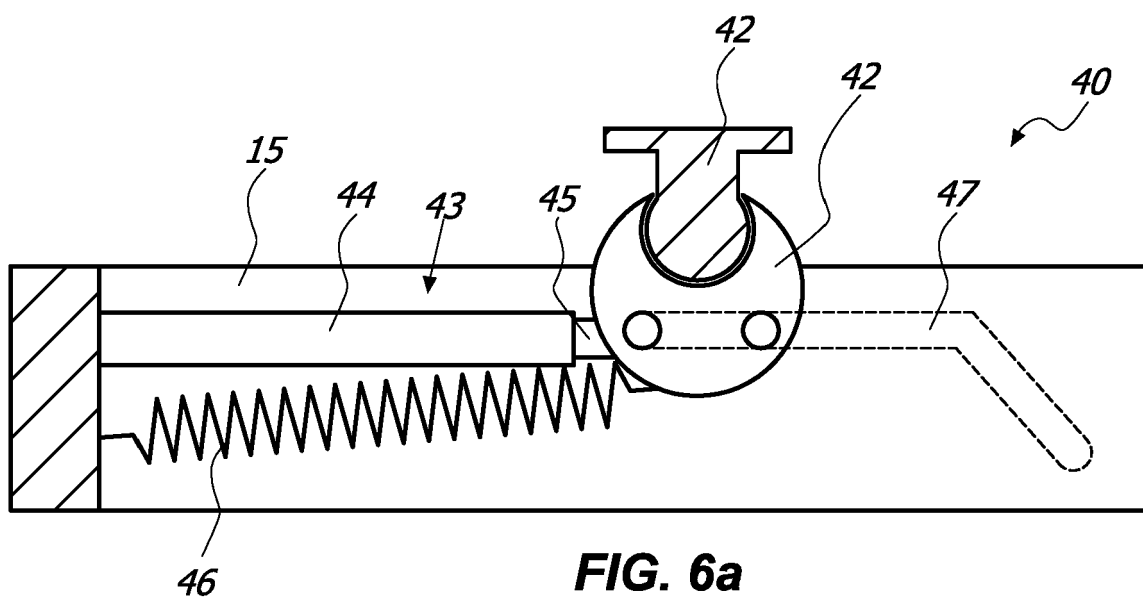


FIG. 5b



REFERENCES CITED IN THE DESCRIPTION

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