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(54) **HINGE DEVICE FOR DOORS OF CHEST APPLIANCES**

SCHARNIERVORRICHTUNG FÜR TÜREN VON KASTENVORRICHTUNGEN

DISPOSITIF DE CHARNIÈRE POUR PORTES D'APPAREILS À COFFRE

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Description

TECHNICAL FIELD

[0001] The present invention is in the field of hinges, and relates to a hinge device for doors of chest appliances, such as chest freezers and furniture.

BACKGROUND ART

[0002] There are known chest freezers equipped with heavy upper hatches or doors fixed to an upper edge of the freezer body by means of a set of hinges for rotating the hatch or door (hereinafter referred to only as 'door' for the sake of brevity) between a closure condition, in which the door is horizontal and closes the opening of the freezer body, and an opening condition, in which the door is rotated upwards around the horizontal axes of the hinges, and is inclined or arranged on a vertical or subvertical plane. Some of these known hinges are equipped with springs assigned to balance the weight of the door. EP1063379A2 discloses an example of such a hinge device.

[0003] A drawback of some of these known hinges is that they are very complex and expensive. Another drawback of some of these known hinges is that they provide an insufficient weight-balancing force, with the opening of the door thus resulting excessively difficult.

[0004] An additional drawback of said known hinges is that they only balance - as far as possible - the weight of the door, but cannot control its stroke in case of excessive speed, especially in the final portion, towards the closing, and if a user pushes the door too hard, the closing may turn out to be aggressive and dangerous for both the freezer and the people nearby.

DISCLOSURE OF THE INVENTION

[0005] An object of the present invention is to provide a hinge device for doors of chest appliances, such as chest freezers, footlockers and furnishing items and apparatuses, and the like, that is cost-effective and reliable.

[0006] Another object is to provide a device able to provide an elastic force, even a very high one, to balance the weight of the door.

[0007] A further object is to provide a device able to provide an action for reducing and dampening the excessive rotational speed of the door.

[0008] Still another object is to provide a device which is also suitable for doors that are very heavy and/or having very elevated hinge arms.

BRIEF DESCRIPTION OF DRAWINGS

[0009] The features of the invention are highlighted as following, with specific reference to the accompanying drawings, in which:

- figure 1 shows an axonometric view of the hinge device for doors of chest appliances, subject-matter of the present invention, related to a freezer - illustrated only in part - in a closed condition;
- figures 2 and 3 show axonometric enlarged views of the device of figure 1 in the closed and extreme open conditions, respectively;
- figure 4 shows an exploded view of the device of figure 2;
- figure 5 shows a rear enlarged view of the device of figure 1, in a closed condition;
- figure 6 shows a section view along plane VI - VI of figure 5;
- figure 7 shows a side view of the device of Figure 5;
- figure 8 shows a rear enlarged view of the device of Figure 1, in an extreme open condition;
- figure 9 shows a cross-section along plane IX - IX of figure 8;
- figure 10 shows a side view of the device of figure 8;
- figures 11 and 12 show partial enlarged views of a detail of figures 6 and 9, respectively.

BEST MODE TO CARRY OUT THE INVENTION

[0010] Referring to figures 1-12, numeral 1 indicates the hinge device for doors of chest appliances, subject-matter of the present invention.

[0011] One or preferably two or more coaxial models of such hinge device are assigned to hinge a door D to a respective chest freezer or furnishing item, whose respective opening may be closed and opened by means of the door D and which in an operating condition lies on a horizontal geometric plane.

[0012] For the sake of brevity, hereinafter the terms "appliance" and "freezer" shall mean a chest freezer or any other chest appliance or furnishing item with a door hinged similarly to that of the chest freezer.

[0013] The door D rotates around a common horizontal axis, as defined by the hinge devices, between a closure condition C, in which the door D is horizontal and closes the opening, possibly by means of a seal, and an extreme opening condition O in which the door is inclined compared to the opening, thus making it accessible.

[0014] Said device 1 comprises a first member 3 assigned to be fixed to a vertical and lateral face of the freezer body A, and a second member 5 assigned to be fixed to said door D, for example, but not limited to, to one of its edges. Preferably, each first 3 and second 5 member consist of respective metal bodies or profiles with "C"-shaped cross-sections.

[0015] Alternatively, it is also provided that the fasteners of such members 3, 5 may be reversed. The first 3 and second 5 members are mutually hinged by means of a horizontal hinge pin 7 - for example made of steel and cylindrical in shape, with both ends being clinched, or in the shape of a mushroom, with an elongated cylindrical shaft and with a clinched end - which allows them to mutually rotate, and defines the rotation axis of the

door. In the case of a door being hinged by means of a number of models of the device 1, the hinge pins 7 are all aligned with the rotation axis of the door.

[0016] Each device 1 also comprises transmission means 11 elongated in shape, i.e., preferably consisting of a metal body or profile with a "C"-shaped cross-section and having a main longitudinal dimension, and which is sufficiently rigid and tough.

[0017] Preferably and as shown in the figures, the transmission means 11 are at least partially inside the second member 5 which is at least partially inside the first member 3.

[0018] The transmission means 11 have an end which is connected to the second member 5 by means of first connection pivot means 13 which are fixed to the second member 5 parallel to, and spaced apart from, the hinge pin 7.

[0019] The first connection pivot means 13 comprise a transverse pivot or, preferably and as shown in the figures, a couple of lateral pins with a common transverse axis. Such lateral pins may be of steel and cylindrical in shape, for example, with both ends clinched or in the shape of a mushroom with a clinched end.

[0020] The external ends of the first connection pivot means 13 stick out laterally and externally from the second member 5 and slide in respective slots 19 obtained in the lateral portions of the first member 3, and each one is in the shape of an arc of a circle which is centered on the axis of the hinge pin 7. Such external ends of the first connection pivot means 13 may match with the ends of the respective slots 19 in the closure and extreme opening conditions.

[0021] The end opposed to the first connection pivot means 13 of the transmission means 11 is bound to slide along an operative direction approaching and leaving the hinge pin 7; for example, and as shown in the Figures, such operative direction is parallel to the longitudinal length of the first member 3 or inclined along a directrix perpendicular to the hinge pin 7 and intersecting the latter 7 or passing near it 7. The device 1 further comprises resilient means 14 assigned to apply to the transmission means 11 an elastic force acting at least partially in said operative direction and towards the opening condition O.

[0022] The bond consisting in the sliding in the operative direction of the end of the transmission means 11 opposed to the first connection pivot means 13, for example, may be achieved by means of sliders and guides parallel to such direction and obtained in, or fixed to, the first member 3 and the transmission means 11, respectively, or vice versa; preferably, the end of the transmission means 11 opposite to the first connection pivot means 13 has second connection pivot means 15 whose ends are bound to slide along respective slot means 17 which are parallel to the operative direction and obtained in respective lateral walls of the first member 3.

[0023] The second connection pivot means 15 may be made of steel, for example, and cylindrical in shape, with both ends being clinched, or in the shape of a mushroom,

with an elongated cylindrical shaft and with a clinched end.

[0024] In the operative condition, the slot members 17 and the first member 3, which has an elongated form in the operative direction, are vertical or almost vertical, whereas the hinge pin 7, the first connection pivot means 13 and the second connection pivot means 15 are parallel and horizontal or almost parallel and/or horizontal.

[0025] The resilient means 14 comprise at least one helicoidal spring, for example made of harmonic steel, acting in extension and having an end which is hooked to the hinge pin 7 and the other end hooked directly or indirectly to the second connection pivot means 15.

[0026] The device 1 comprises sliding friction means 21, consisting of a body in the shape of a shoe, a slider, or a pad with a lining, or of a block made of, or comprising, friction material, for example, and directly or indirectly connected to the transmission means 11, and assigned to slide with friction on the first member 3 in the passage of the device from the closure condition C to the opening condition O, and vice versa, to brake and balance said door D at least in those passages. In a variant of the device, not shown, the sliding friction means 21 may be fixed to the transmission means 11 by means of an elastic pad or a spring element that pushes them against the first member 3, and the helicoidal spring of the resilient means 14 acts in extension and its ends are fixed directly and with respect to the hinge pin 7 and to the second connection pivot means 15 by applying to these two latter 7, 15 an elastic force causing a mutual approaching thereof.

[0027] Preferably and as shown in the figures, the sliding friction means 21 are fixed by means of a respective fixing pivot 23 to an end of a rocker arm means 25 which is centrally engaged, in a freely turning way, to the second connection pivot means 15 or to other elements which are integral to the transmission means 11. The end of the rocker arm means 25 opposed to the sliding friction means is fixed to a corresponding end of the helicoidal spring of the resilient means 14.

[0028] Preferably, the ends of the helicoidal spring of the resilient means 14 are equipped with hooks or pegs, not shown in the figures, to fix them to the hinge pin 7 and to a slot obtained in the end of the rocker arm means 25, respectively, opposed to the sliding friction means.

[0029] The fixing pivot 23 allows the bodies of the sliding friction means 21 to rotate such that the friction surface of these latter means 21 always adheres to the surface of the median longitudinal portion of the first member 3. The rocker arm means 25 serves the two-fold function of connecting the helicoidal spring of the resilient means 14 to the second connection pivot means 15 and of converting the elastic force of such spring and transmitting it to the sliding friction means 21 to push these latter so as to match them with the median longitudinal portion of the first member 3.

[0030] Preferably, the distance of the end of the helicoidal spring 14 fixed to the hinge pin 7 from the median

longitudinal portion of the first member 3 is greater than the distance of the opposite end of the helicoidal spring 14 from said median longitudinal portion of the first member 3, and/or the rocker arm means 25 is in the shape of a curved arc or of an open "V" with the concavity pointed towards said median longitudinal portion of the first member 3. Such ratios between said distances and the shape of the rocker arm means 25 allow the spring to transmit to the rocker arm means 25 a torque that conveniently pushes the sliding friction means 21 against the surface of the median longitudinal portion of the first member 3; the extent of the torque applied to the sliding friction means 21 may be adjusted by dimensioning the ratio between the lever arms of the rocker arm means 25.

Claims

1. Hinge device for a door (D) of a chest appliance (A) having in an operative condition, the respective opening lying on a horizontal geometric plane and the respective door (D) rotating around a horizontal axis between a closure condition, in which said door (D) is horizontal and closes the opening, and an opening condition (O) in which it is inclined compared to the opening, thus making it accessible; said device (1) comprises a first member (3) assigned to be fixed to a body of the appliance (A) and a second member (5) assigned to be fixed to the door (D) of said appliance (A) and hinged to the first member (3) by means of a horizontal hinge pin (7), the device (1) comprises a transmission means (11) having an end which is connected to the second member (5) by means of first connection pivot means (13) which is fixed to the second member (5) parallel to and spaced from the hinge pin (7); wherein the opposite end of the transmission means (11) has a second connection pivot means (15) which is bound to slide along respective slot means (17) which are parallel to an operative direction approaching or leaving the hinge pin (7), said slot means (17) are obtained in respective lateral walls of the first member (3); such device (1) further comprising resilient means (14) assigned to apply to the transmission means (11) an elastic force acting at least partially in said operative direction and towards the opening condition (O), said resilient means (14) comprise at least one helicoidal spring acting in extension and having an end which is hooked to the hinge pin (7) and the other end hooked directly or indirectly to the second connection pivot means (15).
2. Device according to claim 1 **characterized in that** the first member (3) has a form elongated in the operative direction and in the operative condition the first member and the slot means are vertical or almost vertical, the hinge pin (7), the first connection pivot means (13), and the second connection pivot

means (15) are horizontal or almost horizontal.

3. Device according to any of the preceding claims **characterized in that** each one of the first member (3), second member (5) and transmission means (11) consists of a metal body or profile with transverse C-shaped section and that the transmission means (11) are at least partially inside the second member (5) which is partially inside the first member (3).
4. Device according to any of the preceding claims **characterized in that** the first connection pivot means (13) comprise a transverse pivot or a pair of lateral pivots with common transverse axis and **in that** the external ends of the first connection pivot means (13) stick out laterally from the second member (5) and slide in respective slots (19) obtained in the lateral portions of the first member (3) and each one is in the shape of an arc of a circle which is centered on the axis of the hinge pin (7).
5. Device according to any of the preceding claims **characterized in that** it comprises sliding friction means (21) directly or indirectly connected to the transmission means (11) and assigned to slide with friction on the first member (3) in the passage of the device from the extreme closure condition (C) to the one of opening (O) and vice versa to brake and balance said door (D) at least in those passages.
6. Device according to claim 5 **characterized in that** the sliding friction means (21) are fixed by means of a respective fixing pivot (23) to an end of a rocker arm means (25) which is centrally engaged, in a freely turning way, to the second connection pivot means (15) or to other elements which are integral to the transmission means (11), the opposite end of the rocker arm means (25) is connected to a correspondent end of the helicoidal spring of the resilient means (14).
7. Device according to claim 6 **characterized in that** the distance of the helicoidal spring (14) which is fixed to the hinge pin (7) from the median longitudinal portion of the first member (3) is greater than the distance of the opposite end of the helicoidal spring (14) from said median longitudinal portion of the first member (3) and/or the rocker arm means (25) has a curved arc shaped form with the concavity pointed towards said median longitudinal portion of the first member (3).

Patentansprüche

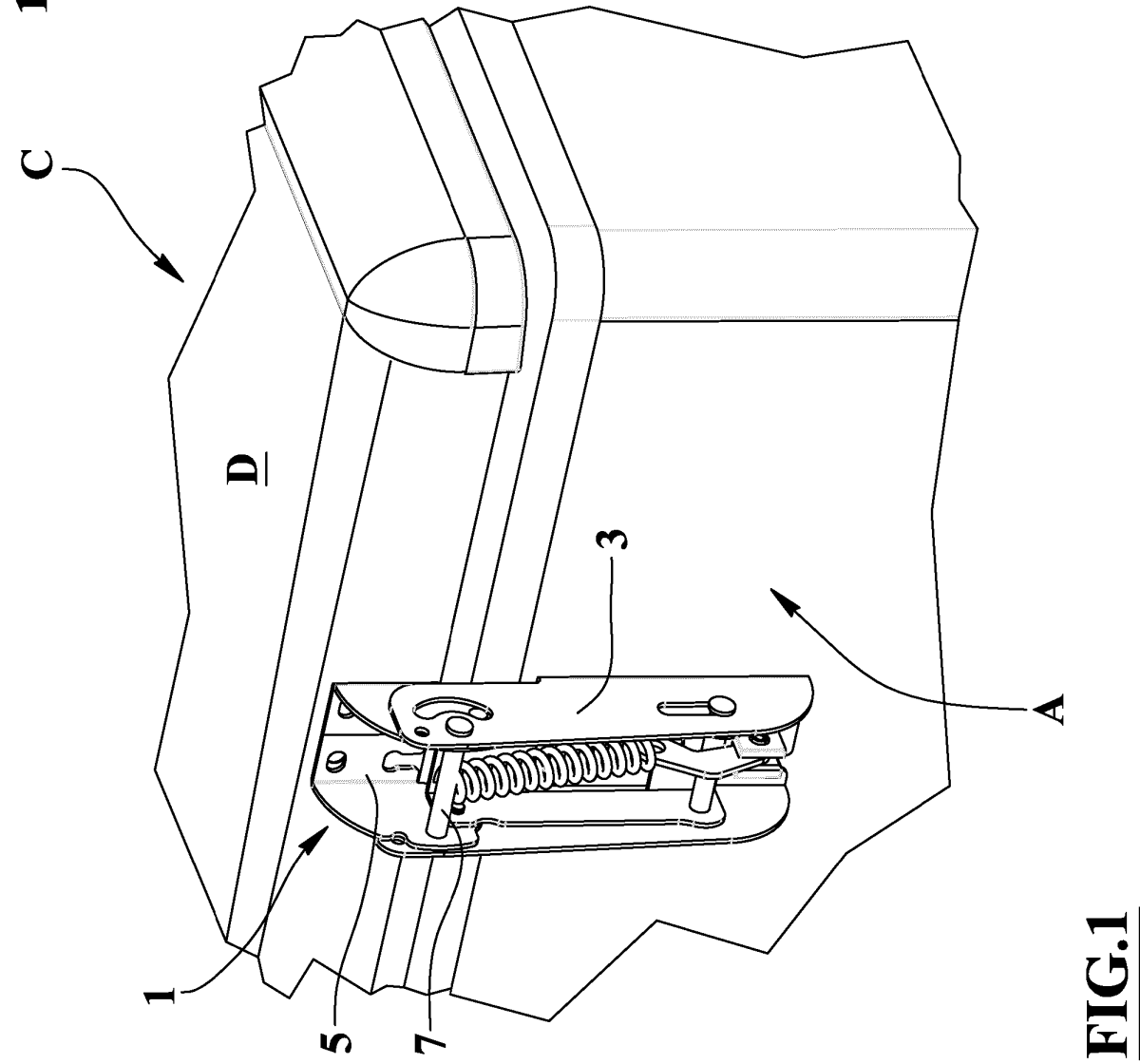
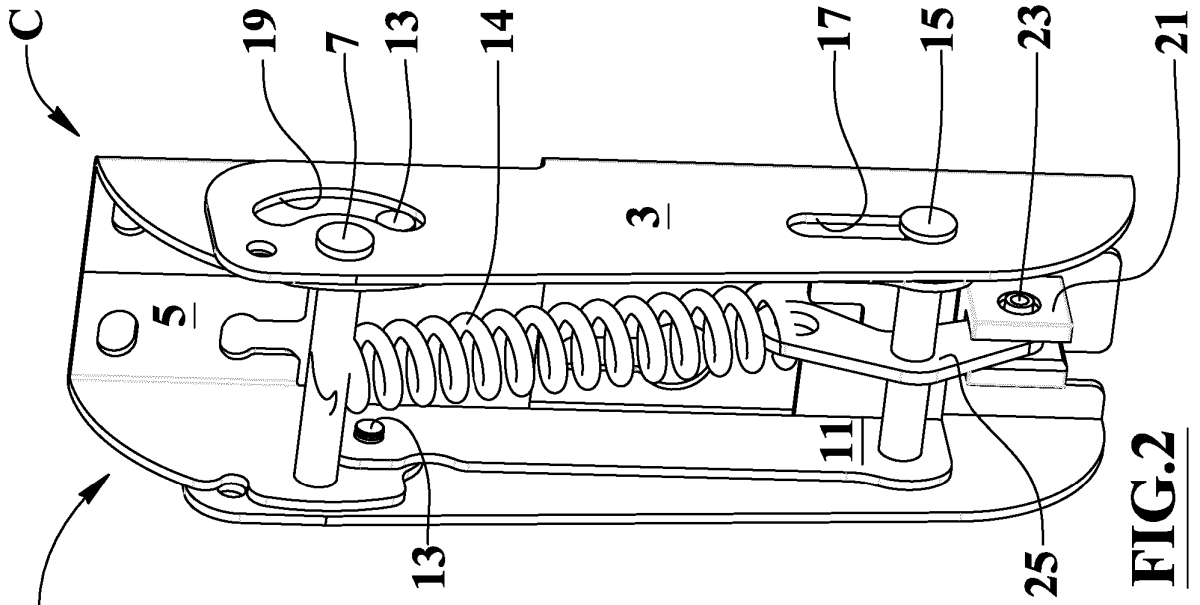
1. Scharniervorrichtung für eine Tür (D) einer Kasten-
vorrichtung (A) bei der in einem Betriebszustand die

- entsprechende Öffnung auf einer horizontalen geometrischen Ebene liegt und sich die entsprechende Tür (D) um eine horizontale Achse dreht zwischen einem Schließzustand, bei dem die Tür (D) horizontal angeordnet ist und die Öffnung schließt, und einem Öffnungszustand (O), bei dem sie im Vergleich zu der Öffnung geneigt angeordnet ist, wodurch sie zugänglich wird; wobei die Vorrichtung (1) umfasst: ein erstes Element (3), das zugeordnet ist, um an einem Körper der Vorrichtung (A) befestigt zu werden und ein zweites Element (5), das zugeordnet ist, um an der Tür (D) der Vorrichtung (A) befestigt und über einen horizontalen Scharnierstift (7) an dem ersten Element (3) eingehängt zu werden, wobei die Vorrichtung (1) ein Übertragungsmittel (11) umfasst, das ein Ende aufweist, das mit dem zweiten Element (5) über ein erstes Verbindungsschwenkmittel (13) verbunden ist, das parallel zu und beabstandet zu dem Scharnierstift (7) an dem zweiten Element (5) befestigt ist; wobei das gegenüberliegende Ende des Übertragungsmittels (11) ein zweites Verbindungsschwenkmittel (15) aufweist, welches entlang entsprechender Schlitzmittel (17) gleiten muss, die parallel zu einer Betriebsrichtung sind, die sich dem Scharnierstift (7) nähern oder ihn verlassen, wobei die Schlitzmittel (17) in entsprechenden Seitenwänden des ersten Elements (3) erhalten werden; wobei solch eine Vorrichtung (1) des Weiteren elastische Mittel (14) umfasst, die zugeordnet sind, um auf das Übertragungsmittel (11) eine elastische Kraft auszuüben, die zumindest teilweise in der Betriebsrichtung und in Richtung des Öffnungszustands (O) wirkt, wobei die elastischen Mittel (14) mindestens eine schraubenartige Feder aufweisen, die in Verlängerung wirkt und ein Ende aufweist, das in den Scharnierstift (7) eingehakt ist und deren anderes Ende direkt oder indirekt in das zweite Verbindungsschwenkmittel (15) eingehakt ist.
2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** das erste Element (3) eine Form aufweist, die in der Betriebsrichtung verlängert ist und in dem Betriebszustand sind das erste Element und das Schlitzmittel vertikal oder fast vertikal, der Scharnierstift (7), das erste Verbindungsschwenkmittel (13) und das zweite Verbindungsschwenkmittel (15) sind horizontal oder fast horizontal.
3. Vorrichtung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das erste Element (3), das zweite Element (5) und das Übertragungsmittel (11) aus einem Metallkörper oder einem Profil mit querverlaufendem C-förmigen Abschnitt besteht und dass sich die Übertragungsmittel (11) zumindest teilweise im Inneren des zweiten Elements (5) befinden, das sich teilweise im Inneren des ersten Elements (3) befindet.
4. Vorrichtung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die ersten Verbindungsschwenkmittel (13) einen schrägen Schwenkpunkt oder ein Paar seitlicher Schwenkpunkte mit gemeinsamer schräger Achse aufweisen, und dadurch, dass die externen Enden des ersten Verbindungsschwenkmittels (13) seitlich von dem zweiten Element (5) abstehen und in entsprechenden Schlitzten (19) gleiten, die in den seitlichen Bereichen des ersten Elements (3) erhalten werden, und jeder weist die Form eines Bogens eines Kreises auf, der sich zentral auf der Achse des Scharnierpins (7) befindet.
5. Vorrichtung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** sie gleitende Reibungsmittel (21) aufweist, die direkt oder indirekt mit dem Übertragungsmittel (11) verbunden sind und zugeordnet sind, um mit Reibung auf dem ersten Element (3) in dem Durchgang der Vorrichtung zu gleiten, von dem extremen Schließzustand (C) zu dem Zustand der Öffnung (O) und umgekehrt, um die Tür (D) zumindest in diesen Durchgängen zu bremsen und auszugleichen.
6. Vorrichtung nach Anspruch 5, **dadurch gekennzeichnet, dass** die gleitenden Reibungsmittel (21) über einen entsprechenden befestigenden Schwenkpunkt (23) befestigt sind an einem Ende eines Schwingarmmittels (25), der in einer frei drehenden Weise mittig in Eingriff genommen wird, an dem zweiten Verbindungsschwenkmittel (15) oder an anderen Elementen, die in dem Übertragungsmittel (11) integriert sind, wobei das gegenüberliegende Ende des Schwingarmmittels (25) mit einem entsprechenden Ende der schraubenförmigen Feder des elastischen Mittels (14) verbunden ist.
7. Vorrichtung nach Anspruch 6, **dadurch gekennzeichnet, dass** der Abstand der schraubenförmigen Feder (14), die an dem Scharnierstift (7) befestigt ist, von dem mittleren Längsabschnitt des ersten Elements (3) größer ist als der Abstand des gegenüberliegenden Endes des schraubenförmigen Feder (14) zu dem mittleren Längsabschnitt des ersten Elements (3) und/oder das Schwingarmmittel (25) hat eine gekrümmte Bogenform, wobei die Konkavität in Richtung des mittleren länglichen Bereichs des ersten Elements (3) zeigt.

Revendications

1. - Dispositif de charnière pour une porte (D) d'un appareil à coffre (A) ayant, dans un état de fonctionnement, l'ouverture respective s'étendant dans un plan géométrique horizontal et la porte (D) respective tournant autour d'un axe horizontal entre un état de

- fermeture, dans lequel ladite porte (D) est horizontale et ferme l'ouverture, et un état d'ouverture (O) dans lequel elle est inclinée par rapport à l'ouverture, la rendant ainsi accessible ; ledit dispositif (1) comprenant un premier élément (3) destiné à être fixé à un châssis de l'appareil (A) et un second élément (5) destiné à être fixé à la porte (D) dudit appareil (A) et articulé au premier élément (3) par un axe de charnière (7) horizontal, le dispositif (1) comprenant un moyen de transmission (11) ayant une extrémité qui est reliée au second élément (5) par un premier moyen de liaison pivot (13) qui est fixé au second élément (5) parallèlement à et à distance de l'axe de charnière (7) ; l'extrémité opposée du moyen de transmission (11) ayant un second moyen de liaison pivot (15) qui est contraint de façon à coulisser le long de moyens de fente (17) respectifs qui sont parallèles à une direction de fonctionnement s'approchant ou s'écartant de l'axe de charnière (7), lesdits moyens de fente (17) étant ménagés dans des parois latérales du premier élément (3) ; un tel dispositif (1) comprenant en outre un moyen élastique (14) destiné à appliquer au moyen de transmission (11) une force élastique agissant au moins en partie dans ladite direction de fonctionnement et vers l'état d'ouverture (O), ledit moyen élastique (14) comprenant au moins un ressort hélicoïdal agissant en traction et ayant une extrémité qui est accrochée à l'axe de charnière (7) et l'autre extrémité étant accrochée directement ou indirectement au second moyen de liaison pivot (15).
2. - Dispositif selon la revendication 1, **caractérisé par le fait que** le premier élément (3) a une forme allongée dans la direction de fonctionnement et, dans l'état de fonctionnement, le premier élément et les moyens de fente sont verticaux ou quasiment verticaux, l'axe de charnière (7), le premier moyen de liaison pivot (13) et le second moyen de liaison pivot (15) sont horizontaux ou quasiment horizontaux.
 3. - Dispositif selon l'une quelconque des revendications précédentes, **caractérisé par le fait que** chacun du premier élément (3), du second élément (5) et du moyen de transmission (11) est constitué d'un corps ou profilé en métal avec une section transversale en forme de C, et **par le fait que** le moyen de transmission (11) est au moins en partie à l'intérieur du second élément (5) qui est au moins en partie à l'intérieur du premier élément (3).
 4. - Dispositif selon l'une quelconque des revendications précédentes, **caractérisé par le fait que** le premier moyen de liaison pivot (13) comprend un pivot transversal ou une paire de pivots latéraux avec un axe transversal commun, et **par le fait que** les extrémités externes du premier moyen de liaison pivot (13) font saillie latéralement du second élément (5) et coulisent dans des fentes respectives (19) ménagées dans les parties latérales du premier élément (3) et chacune se présentant sous la forme d'un arc d'un cercle qui est centré sur l'axe de charnière (7).
 5. - Dispositif selon l'une quelconque des revendications précédentes, **caractérisé par le fait qu'il** comprend un moyen couissant à frottement (21) relié directement ou indirectement au moyen de transmission (11) et destiné à coulisser avec frottement sur le premier élément (3) lors du passage du dispositif de l'état extrême de fermeture (C) à celui d'ouverture (O) et inversement, pour freiner et équilibrer ladite porte (D) au moins lors de ces passages.
 6. - Dispositif selon la revendication 5, **caractérisé par le fait que** le moyen couissant à frottement (21) est fixé par un pivot de fixation (23) respectif à une extrémité d'un moyen de bascule (25) qui est engagée au centre, à rotation libre, sur le second moyen de liaison pivot (14) ou à d'autres éléments qui sont solidaires du moyen de transmission (11), l'extrémité opposée du moyen de bascule (25) étant reliée à une extrémité correspondante du ressort hélicoïdal du moyen élastique (14).
 7. - Dispositif selon la revendication 6, **caractérisé par le fait que** la distance du ressort hélicoïdal (14) qui est fixé à l'axe de charnière (7) par rapport à la partie longitudinale médiane du premier élément (3) est supérieure à la distance de l'extrémité opposée du ressort hélicoïdal (14) par rapport à la partie longitudinale médiane du premier élément (3) et/ou le moyen de bascule (25) a une forme d'arc incurvé dont la concavité est dirigée vers ladite partie longitudinale médiane du premier élément (3).



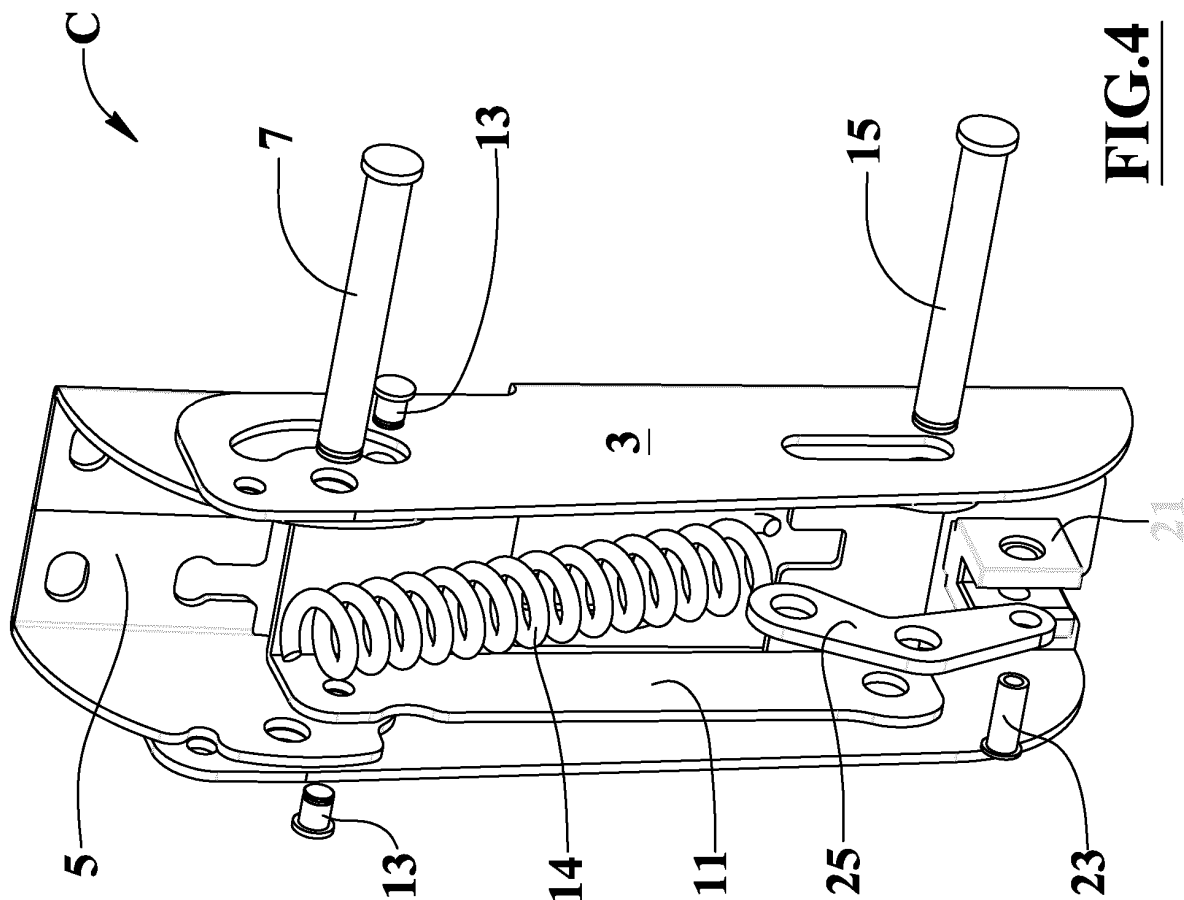


FIG.3

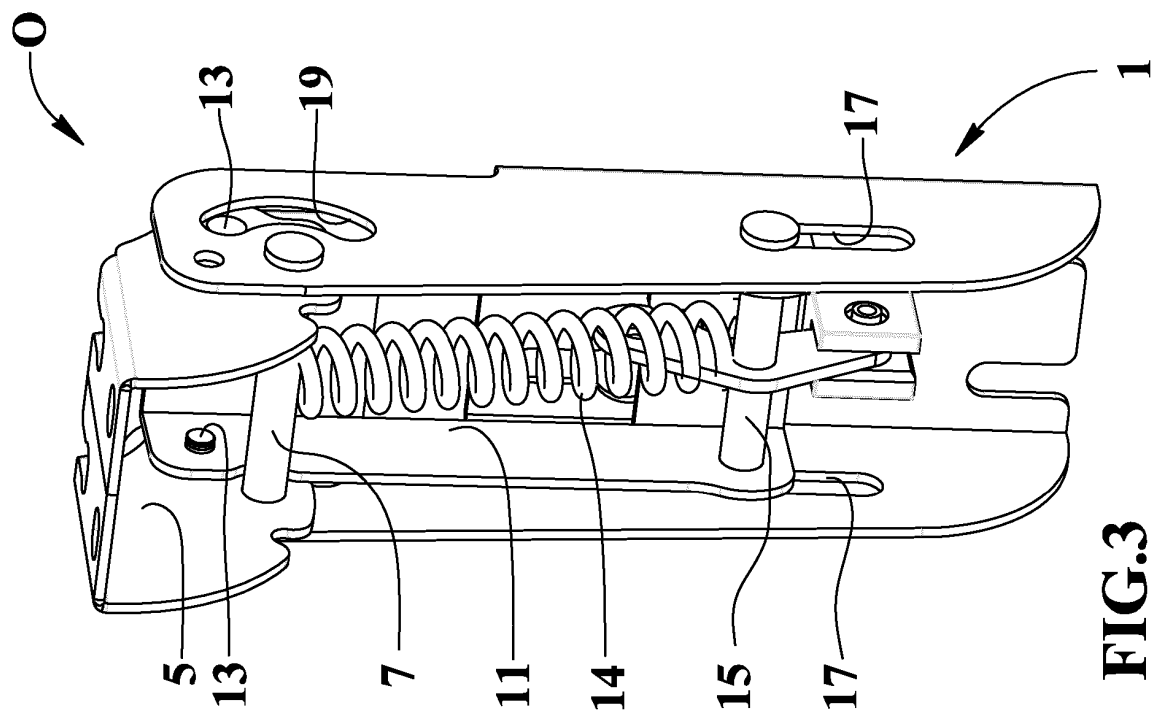


FIG.4

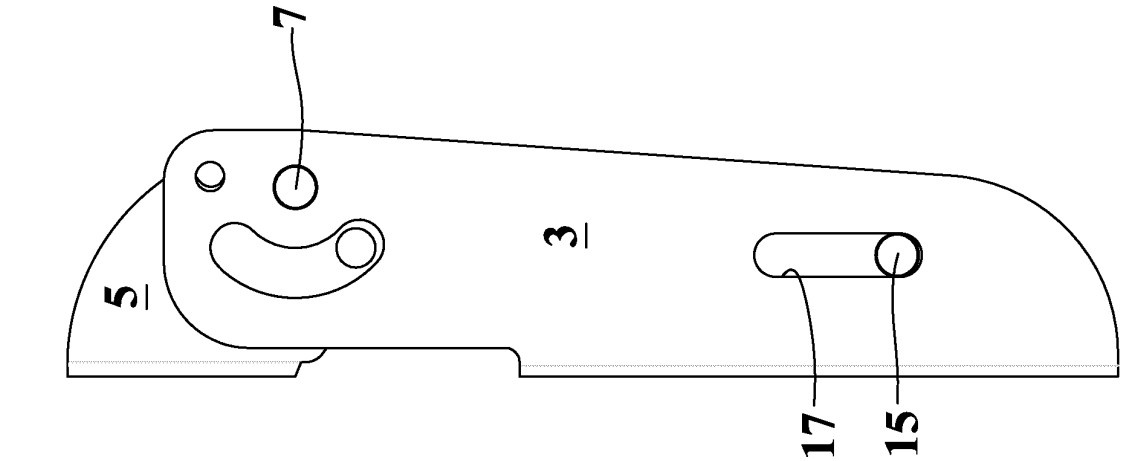


FIG. 7

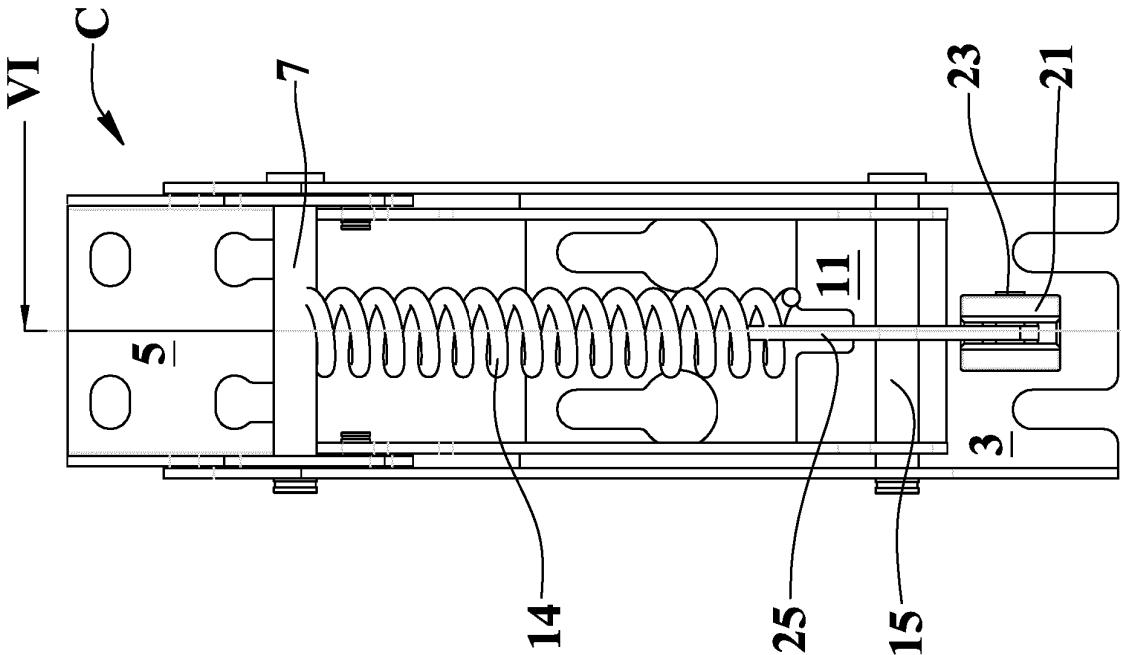


FIG. 5

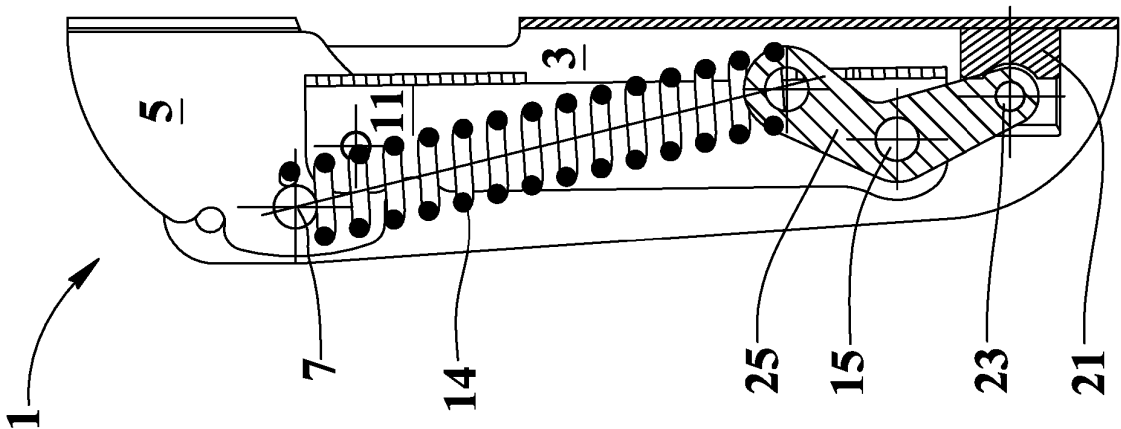


FIG. 6

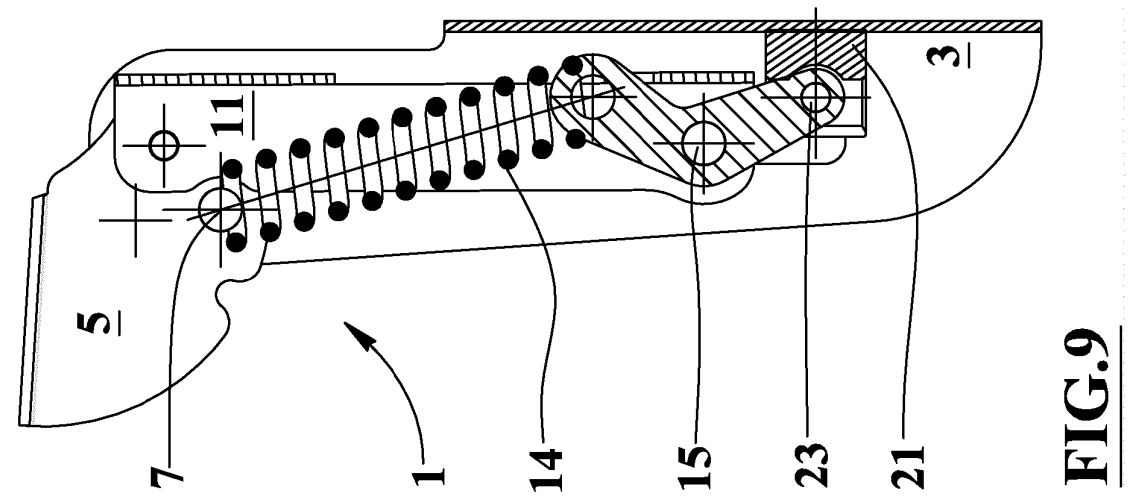
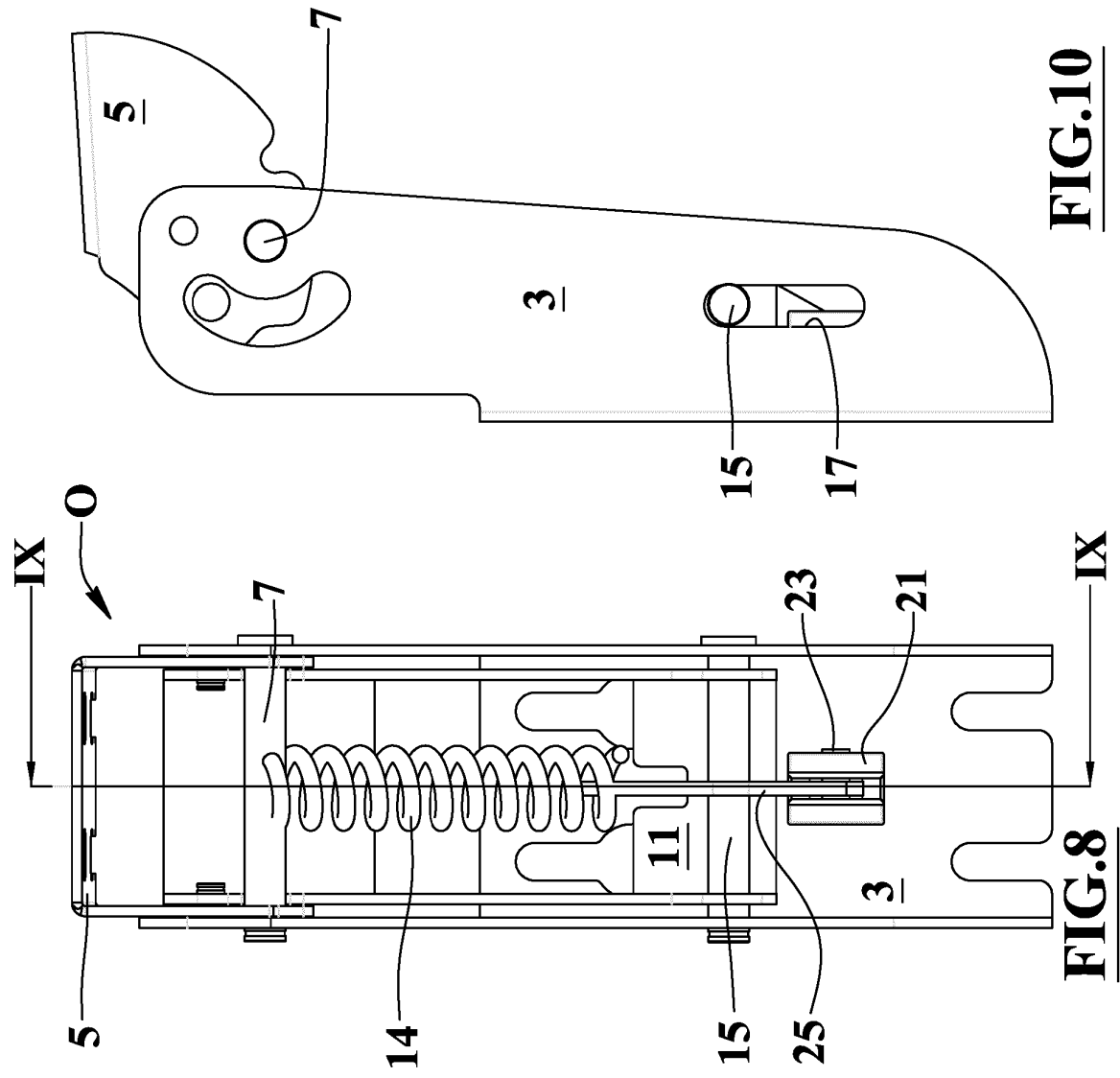
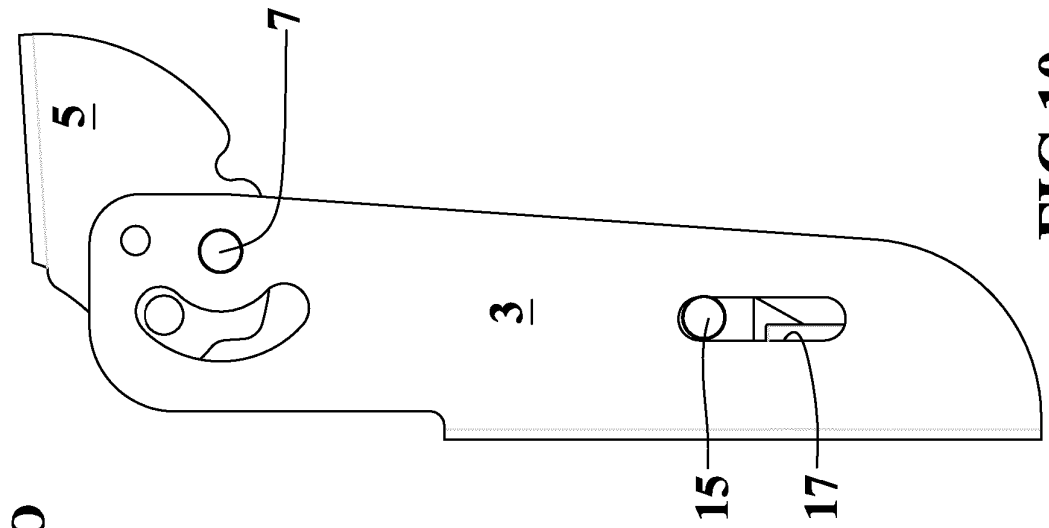
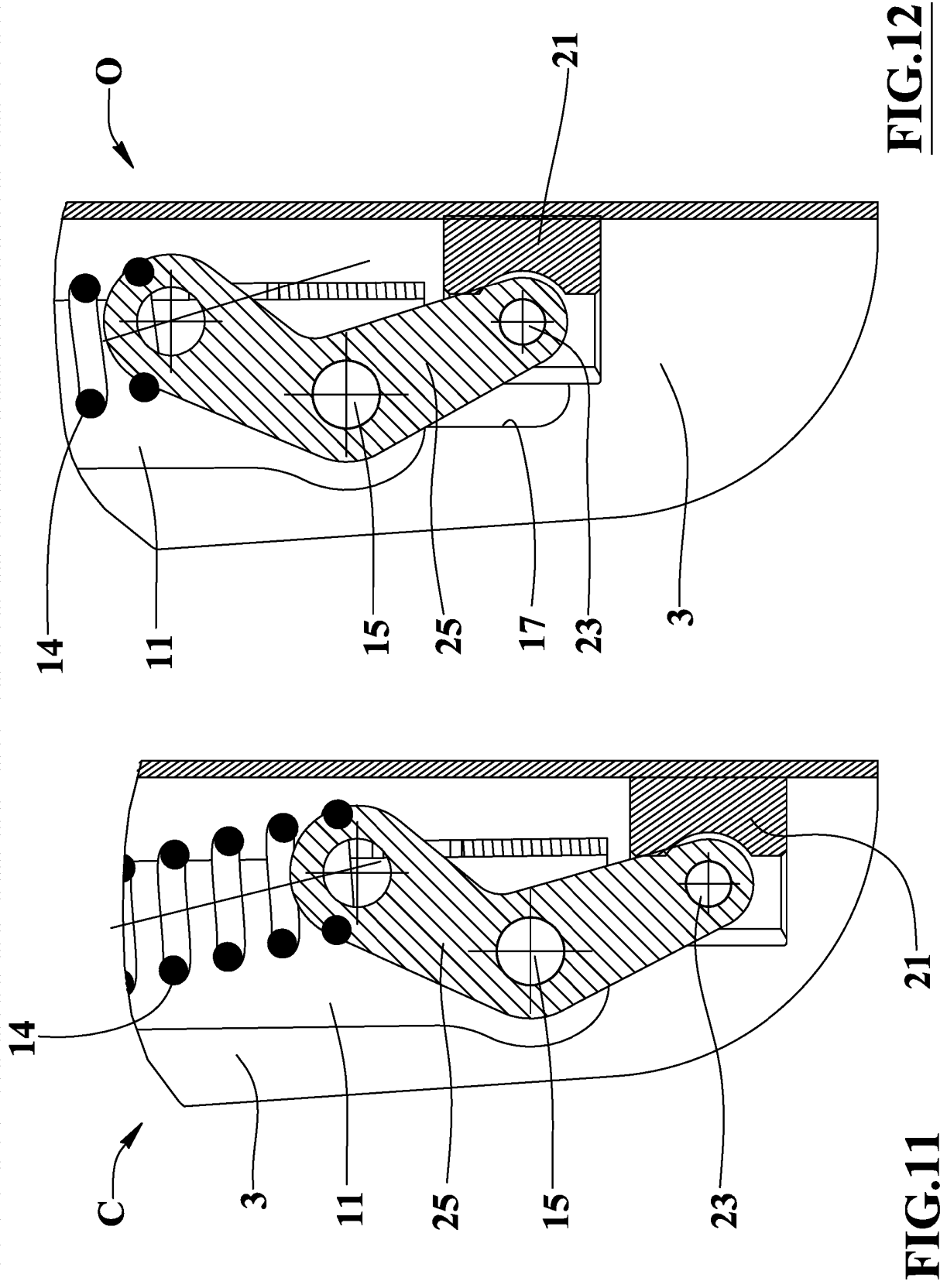


FIG. 10





REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 1063379 A2 [0002]