(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 574 870 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
03.04.2013 Bulletin 2013/14

(51) Int Cl.:
F25D 23/02 *(2006.01)*

(21) Application number: **12183260.4**

(22) Date of filing: **06.09.2012**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **29.09.2011 IT RE20110075**

(71) Applicant: **Cisaplast S.P.A.**
46029 Suzzara (MN) (IT)

(72) Inventor: **Guiducci, Alberto**
46029 Suzzara (Mantova) (IT)

(74) Representative: **Corradini, Corrado et al**
Ing. C. Corradini & C. S.r.l.
Via Dante Alighieri 4
42121 Reggio Emilia (IT)

(54) Hinge unit for refrigerator cabinet doors

(57) A hinge unit (50) for refrigerator cabinet doors (10) comprising:
- a first support element (51) fixable to the refrigerator cabinet (10),
- a second support element (54), fixable to the panel (30) for closing an access gap (12) of the refrigerator cabinet (10) and hinged to the first support element (51), so as to rotate the panel (30) with respect to the refrigerator cabinet (10) between a position for closing and opening the access gap (12),
- elastic return means (53) interposed between the first and second support element (51,54) for the return from the opening position to the closure position, and
- locking means (55,57) adapted to removably lock therebetween the first and the second support element (51,54) in the open position.

The distinctive characteristic of the invention lies in the fact that the locking means comprise two snap-coupling elements respectively associated to the first support element (51) and to the second support element (54), including a lock bolt (55) and a housing seat (57) adapted to provide a mutual automatic coupling following a mutual rotation between the first and the second support element (51,54).

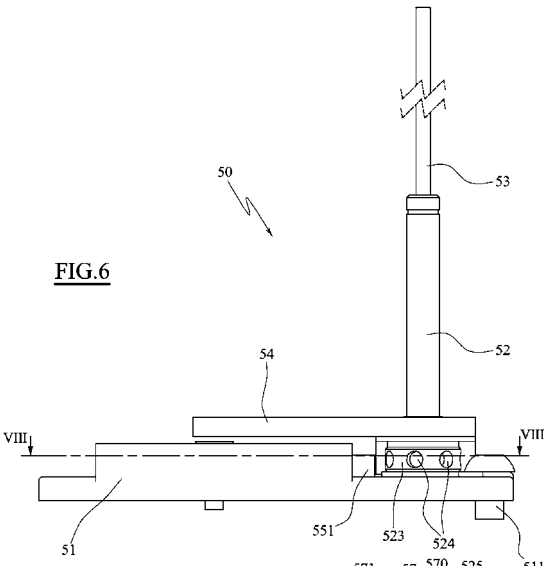

FIG.6

FIG.8

EP 2 574 870 A1

Description

FIELD OF THE INVENTION

[0001] The present invention regards a hinge unit for refrigerator cabinet doors. More in particular, the invention refers to a hinge unit for refrigerator cabinet doors intended to be positioned within sales points for food products or the like, for preserving and displaying such products.

PRIOR ART

[0002] As known, refrigerator cabinets generally comprise a parallelepiped outer body, which is adapted to delimit a refrigerated compartment for receiving the products to be preserved therein.

[0003] The refrigerated compartment is made accessible through a front access gap obtained on a lateral side of the outer body, which is closed by a door which can be partly or entirely transparent, so as to allow the display of the products contained therein.

[0004] Currently, the door of a refrigerator cabinet can be provided with a door leaf or alternatively slidable.

[0005] In particular, a door provided with a door leaf comprises un framework adapted to delimit the access gap of the refrigerator cabinet and one or more panels adapted to close said access gap, which are hinged to the framework, so as to open the access gap rotating like a door leaf.

[0006] Such refrigerator cabinets require that the door provided with a door leaf be provided with an elastic return system which maintains it in closed position and makes it close automatically again each time it is opened by a customer to pick the product.

[0007] There are thus known hinge units provided with springs which are loaded when opening the panel and they are unloaded closing the door provided with a door leaf once again when the panel is released.

[0008] However, during the operations of restoring the stock of products within the cabinet, performed by the designated personnel of the supermarket, the door provided with a door leaf should - for the sake of comfort - remains locked in open position.

[0009] For such purpose, there are known hinge units which, besides having elastic means for automatically closing the door provided with a door leaf, have means maintaining the door in open position which can be inserted manually by the designated personnel and are automatically disengaged when the door is closed once again.

[0010] However, the use of such manual actuation means requires particular attention when calibrating such means, in that the mechanism that maintains the door provided with a door leaf in open position, if not correctly forced or damaged may be locked in such position without allowing the door to return in the closure position.

[0011] Another drawback observed in the use of such means adapted to lock the door provided with a door leaf in the opening position with manual actuation lies in the fact that such means are generally arranged in positions which are not always easy to reach for example in proximity of the base of the refrigerator cabinet or of the top part thereof, an event implying evident inconveniences to the personnel designated to filling the refrigerator cabinet when actuating such means.

[0012] Furthermore, given that such can be actuated by the designated personnel of the supermarket alone, opening the door provided with a door leaf by the client shall always be performed using one hand which, thus, will always remain occupied for such operation implying some drawbacks for the customer when the product to be picked up has a considerable overall dimension or weight or when it is required to pick up several products from the same refrigerator cabinet.

[0013] An object of the present invention is to overcome the aforementioned drawbacks of the prior art, through a simple, rational and inexpensive solution.

[0014] Such objects are attained by the characteristics of the invention indicated in the independent claim. The dependent claims outline preferred and/or particularly advantageous aspects of the invention.

DESCRIPTION OF THE INVENTION

[0015] The invention, particularly, provides a hinge unit for refrigerator cabinet doors comprising:

- a first support element fixable to the refrigerator cabinet,
- a second support element, fixable to the panel for closing an access gap of the refrigerator cabinet and hinged to the first support element, so as to rotate said panel with respect to the refrigerator cabinet between a position for closing and opening the access gap,
- elastic return means interposed between said first and second support element for the return from the opening position to the closure position, and
- locking means adapted to removably lock therebetween the first and the second support element in said open position.

[0016] According to the invention the locking means comprise two snap-coupling elements respectively associated to the first support element and to the second support element, including a lock bolt and a housing seat adapted to provide a mutual automatic coupling following a mutual rotation between the first and the second support element.

[0017] Due to such solution, the door provided with a door leaf of the refrigerator cabinet may remain automatically open without any effort for the operator, who will be solely required to move the panel in opening position.

[0018] Furthermore, an aspect of the invention pro-

vides for that the lock bolt is slidably associated to the respective support element and is moveable from an advanced position, in which is adapted to engage the housing seat, at a receded position, countering elastic means, for example of the type of compression springs.

[0019] Thus, the locking and unlocking the door provided with a door leaf may occur in an automatic, quick and safe manner.

[0020] A further aspect of the invention lies in the fact that the support element provided with the housing seat comprises cam means adapted to move said lock bolt from the advanced position to the receded position during the mutual rotation of the support elements between the closure position and the opening position for the disengagement thereof from the housing seat.

[0021] Due to such aspect, both the locking of the door provided with a door leaf in the open position and the locking thereof is facilitated by said cam means operating on the lock bolt.

[0022] Another aspect of the invention provides for that the lock bolt is slidably associated along a rectilinear guide provided in said first support element and provided with at least one abutment element adapted to stop the travel of the lock bolt in the advanced position thereof.

[0023] Due to such solution, the compression springs operate only at the contact between the cam means and the lock bolt, allowing a greater efficiency and duration thereof and reducing the mutual contacts between the moveable members of the hinge unit.

[0024] Furthemore, due to this solution it is possible to have a sharpened lock bolt which allows a greater blocking stability and at the same time a reduced friction between the moveable members, without needing rolling members or other similar devices.

[0025] A further aspect further of the invention provides for that the housing seat is associated to the second support element and is moveable between a first position in which it is aligned to the lock bolt along the sliding direction thereof, when the support elements are in the closure position, and a second position in which it is misaligned with respect to the lock bolt, when the support elements are in the opening position.

[0026] Furthermore, the first and the second support element are inclined therebetween by 90° in the opening position and are superimposed - in plan view - in the closure position.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] Further characteristics and advantages of the invention will be apparent from reading the following description provided by way of non-limiting example, with reference to the figures illustrated in the attached drawings.

Figure 1 is a front schematic view of a refrigerator cabinet provided with a door with a door leaf provided with hinge units, according to the present invention.

Figure 2 is an axonometric view of a hinge unit, according to the invention, in closure position.

Figure 3 is the axonometric view of the hinge unit of figure 1 in opening position.

Figure 4 is the top view of figure 2.

Figure 5 is the top view of figure 3.

Figure 6 is the lateral view of figure 2.

Figure 7 is the lateral view of figure 3.

Figure 8 is the view along the line of section VIII-VIII of figure 6.

Figure 9 is the view along the line of section IX-IX of figure 7.

Figure 10 is the view along the line of section X-X of figure 4.

Figure 11 is the view along the line of section XI-XI of figure 5.

PREFERRED EMBODIMENT OF THE INVENTION

[0028] It should be initially observed that over the following description, the top and bottom, upper and lower as well as left and right concepts are all deemed referred to the view of figure 1.

[0029] The refrigerator cabinet 10 illustrated in figure 1 comprises an outer parallelepiped-shaped body 11, which is adapted to delimit a refrigerated compartment (not visible) for receiving the products to be preserved therewithin.

[0030] Said refrigerated compartment is made accessible from outside through an access gap 12, which is obtained at the front part on a vertical side of the outer body 11.

[0031] Said access gap 12 is closed by a door which is indicated in its entirety with 20.

[0032] The door 20 comprises a fixed framework 21 adapted to delimit the access gap 12, which has a rectangular shape defined by two pairs of parallel profiles, including a pair of vertical profiles, left 22 and right 23 respectively, and a pair of horizontal profiles, upper 24 and lower 25 respectively.

[0033] The profiles 22-25 can be made of plastic material, for example PVC, to improve thermal insulation of the refrigerated compartment and prevent condensate phenomena, and they can be externally covered by an aluminium coating which improves the aesthetic features thereof.

[0034] The door 20 comprises furthermore two panels 30, which are generally adapted to close the access gap 12 delimited by the fixed framework 21.

[0035] In particular, each panel 30 has a rectangular shape substantially having the same height of the access gap 12, and width equivalent to slightly greater than half the width of the access gap 12.

[0036] Thus, each panel 30 is separately adapted to close a respective half of the access gap 12.

[0037] Each panel 30 comprises an occlusion sheet 31, typically made of transparent material, for example glass, to allow the display of the products contained within

the refrigerator cabinet 10, and a frame 32 adapted to perimetrally surround said occlusion sheet 31.

[0038] In particular, the frame 32 is defined by a series of straight profiles that are fixed along the edges of the occlusion sheet 31.

[0039] Also the profiles of the frame 32 can be made of plastic material, for example PVC, and they can be externally covered by an aluminium coating.

[0040] As illustrated in figure 1, each panel 30 is further hinged to the fixed framework 21, so as to be able to rotate with respect thereto around a vertical rotational axis X and parallel to the laying plane of the framework 21. This hinge coupling is obtained through at least one hinge unit generally indicated with number 50 and shown in the detail in the figures 2 - 11 and which will be described in detail hereinafter.

[0041] The hinge units 50 can be two for each panel 30 respectively arranged in an upper and lower area panel 30 or alternatively one for each panel 30.

[0042] As observable in figure 1, the hinge units 50 of the left panel 30 are arranged at the left edge of such panel 30, vice versa, the hinge units 50 of the right panel 30 are arranged at the right edge of such panel 30.

[0043] Due to this solution, the panels 30 are adapted to rotate in opposite directions with respect to the framework 21, like two door leaves, each around its own rotation axis X, between the closure position shown in figure 1 towards a further opening position of the respective portion of the access gap 12, such that, when both panels 30 are in said further opening position, the access gap 12 is completely open.

[0044] Figures 2 to 11 show - for the sake of simplicity - only the lower right hinge unit 50.

[0045] The hinge unit 50 comprises a first support element 51 substantially plate-like, for example rectangular-based with rounded edges, on which there are made through holes 510 adapted to be engaged by screws 511 adapted to fix the support element to the framework 21, for example at the lower profile 25 thereof.

[0046] In the first support element 51, substantially in a recessed area decentred towards the right, there is provided a cylindrical seat 512 in which there is rotatably inserted - substantially fittingly - a rotation pin 52, which vertically rises from the first support element 51.

[0047] The rotation pin 52 is provided with a cavity 520 internal and coaxial with the rotation pin, which is adapted to receive a torsion spring 53, of the square-shaped bar type coaxially inserted in the cavity 520.

[0048] The cavity 520 has a cylindrical upper area 521 adapted to receive - with clearance - the torsion spring 53 and a lower prismatic area 522, with square-shaped base in the example, adapted to obtain a prismatic coupling with the torsion spring 53.

[0049] In practice, the lower end of the torsion spring 53 is fittingly inserted in the lower area 522 of the cavity so that to a rotation of the rotation pin 52 there corresponds an equivalent rotation of the lower end of the torsion spring 53. The torsion spring 53 extends longitudinally beyond the rotation pin 52, so as to exit from the upper area 521 of the cavity 520.

[0050] The upper end of the torsion spring 53 is adapted to be inserted in a locking nut 33 fixed to the panel 30, as known to the man skilled in the art, and shown solely schematically in figure 2.

[0051] The locking nut 33, for example, has a square-shaped cavity adapted to be inserted - substantially fittingly - on the torsion spring 53 hindering the mutual rotation between the upper end of the torsion spring 53 and the panel 30. The rotation pin 52 comprises a widening 523 on which there are obtained a plurality of threaded blind holes 524, radial (to horizontal axis) and equally spaced from each other, in which there can be inserted a pin 525 which allows to rotatably actuate the rotation pin 52 with respect to the first support element 51 (within the cylindrical seat 512) for preloading the torsion spring 53.

[0052] Then, from the first support element 51 there rises an abutment pin 526 with vertical longitudinal development, for example inserted in a through hole 527 made in the first support element 51 (in the figure there are shown two of them which can be selectively engaged by the abutment pin 526 depending on whether the hinge unit 50 is arranged on the right or on the left of the door 30 to be opened).

[0053] The abutment pin 526 is adapted to define an abutment position for the pin 525 against the elastic action of the torsion spring 53, so as to preload the torsion spring and lock the rotation of the lower end of the torsion spring 53 with respect to the first support element 51.

[0054] The hinge unit 50 comprises a second support element 54, also plate-like, for example with rectangular base having bevelled edges.

[0055] The second support element 54 has a plurality of through holes 540 in which there are inserted fastening screws (not shown) adapted to be fastened to the frame 32 of the panel 30.

[0056] The second support element 54 further comprises a cylindrical cavity 541 with a vertical axis adapted to be inserted with clearance on the rotation pin 52 for the rotation of the second support element 54 with respect to the rotation pin.

[0057] Between the rotation pin 52 and the second cylindrical element 54 there is interposed a bushing 528, inserted on the rotation pin 52 and resting on the widening 523 of the rotation pin, so as to define a surface for the resting and rotation of the second support element 54 with respect to the rotation pin 52 and maintain the second support element 54 raised from the first support element.

[0058] Thus the second support element 54 is hinged to the first support element 51, through the rotation pin 52, so as to rotate the panel 30 with respect to the framework 21 between a position for closing and opening the access gap 12.

[0059] In practice, the second support element 54 is superimposed - in plan view - to the first support element

51 in the closure position and it is inclined, for example by 90°, with respect thereto in the opening position.

[0060] The hinge unit 50 comprises locking means adapted to removably lock therebetween the first support element 51 and the second support element 54 in the open position.

[0061] Particularly, the locking means comprise an automatic actuation lock bolt 55 which is slidably associated to the first support element 51.

[0062] The first support element 51 comprises a rectilinear guide 513 arranged adjacent to the cylindrical seat 512 and arranged with longitudinal axis laying on a plane orthogonal to the rotation axis X.

[0063] In this case, the rectilinear guide 513 has a longitudinal development parallel to the longitudinal axis of the first support element 51 and it is centred with respect thereto.

[0064] The lock bolt 55 is adapted to slide along the rectilinear guide 513 between an advanced position, in which it is approached to the rotation pin 52 and a receded position, in which it is moved away therefrom.

[0065] In practice, the rectilinear guide 513 is provided at the left raised area of the first support element 51 and it is defined by a notch 514 with longitudinal development obtained in the first support element 51.

[0066] In plan view, the notch 514 is shaped to form an open channel at the ends and delimited by a pair of side frames 515 parallel with respect to each other between which the lock bolt 55 is adapted o slide.

[0067] The notch 514 terminates, with one of the open ends, on the recessed area decentred towards the right of the first support element 51 and, with the other open end, on a widened cavity 516.

[0068] In practice, the widened cavity 516 is arranged upstream of the side frames 515, in the sliding direction of the lock bolt 55 from the receded position to the advanced position.

[0069] In plan view, the widened cavity 516 is perimetrally closed on all sides except from the notch 514.

[0070] In the widened cavity 516 there are housed a pair of compression springs 56, which are compressed between the closed rear bottom of the widened cavity 516 (distal from the notch 514) and the rear wall of the lock bolt 55, so as to push the lock bolt towards the advanced position thereof.

[0071] In the shown preferred embodiment the compression springs 56 are of the helical type and they have respective longitudinal axes converging therebetween.

[0072] Correspondingly, the widened cavity 516 has a substantially tapered configuration - in plan view - which is narrower in proximity of the rectilinear guide 513 (notch 514) and widens at the opposite closed end.

[0073] More in particular, the widened cavity 516 is substantially V-shaped, so as to define a central area 517 in relief, interposed between the two compression springs 56, where some of the through holes 510 can be obtained.

[0074] However, it is not excluded that the helical springs be arranged with longitudinal axes parallel therebetween and the widened cavity be substantially rectangular-based.

[0075] The rectilinear guide 513 is provided with an abutment element 518, for example, defined by the connection shoulder between the side frames 515 and the widened cavity 516, which is adapted to stop the travel of the lock bolt 55 in the advanced position thereof.

[0076] The notch 514 and the widened cavity 516 are, then, closed - at the upper part - by a cover 519 adapted to hold - at the upper part - the lock bolt 55 and the compression springs 56.

[0077] The lock bolt 55 comprises a substantially parallelepiped-shaped extended body 550 adapted to slidably engage the rectilinear guide whose front end 551 (in the sliding direction from the receded position to the advanced position thereof) is substantially sharp-pointed and whose rear end 552 defines a widened wall adapted to interfere - at the front part - with the abutment element 518 and define - at the rear part - a support area for the compression springs 56.

[0078] The front end 551 of the lock bolt 55 is such to protrude projecting frontally to the left raised area of the first support element 51 being positioned above the recessed area on the right side thereof.

[0079] In practice, the first support element 51 defines a box-shaped body in which there is inserted - therewithin - the lock bolt 55, whose front end 551 alone exits from the open end of the notch 514 which faces towards the rotation pin 52.

[0080] Additionally, the locking means comprise a housing seat 57 obtained in the second support element 52 and, thus, rotatably integral therewith, which is adapted to receive the front end 551 of the lock bolt 55 when the second support element 54 is in the opening position.

[0081] In practice, the housing seat 57 is provided at one side (rear in figure 2) of the second support element 54 and it is obtained on a tooth 570 projecting beneath the second support element, so that, rotating the second support element 54 by 90° from the closure position to the opening position, the housing seat 57 passes, at the upper part - to the recessed area (right) of the first support element 51, from a position in which it is not aligned with the lock bolt 55 (along the sliding direction of the lock bolt) to a position in which it is aligned therewith and accessible therefrom.

[0082] Furthermore, the housing seat 57 has a substantially V-shaped profile - in plan view - so as to receive - substantially fittingly - the advanced sharp-pointed end 551 of the lock bolt 55 when it is in the advanced position and guarantee the centring thereof.

[0083] The tooth 570 comprises at least one rounded side 571 arranged in lateral position with respect to the housing seat 57 and adapted to come to contact with the front end 551 of the lock bolt 55, during the rotary motion of the second support element 54 with respect to the first support element 51 between the opening position and the closure position.

[0084] The rounded side 571 serves as a cam for the lock bolt 55 moving it, countering the compression springs 56, from the advanced position to the receded position, during the rotary motion imparted to the panel 30 by the user.

[0085] In practice, the compression of the compression springs 46 by the rounded side 571 allow the snap-coupling of the lock bolt 55 in the housing seat 57, when opening the panel 30, and simultaneously facilitates the exit thereof for the unlocking thereof, when closing.

[0086] The compression springs 56 are configured so that the rigidity thereof is greater than the rigidity of the torsion spring 53, so that when the lock bolt 55 is inserted in the housing seat 57 the torsion spring 53 is not capable, alone, of removing the constraint to the rotation of the second support element 54 with respect to the first support element 51 offered by the lock bolt 55.

[0087] In the light of what has been described above, the hinge unit 50 operates as follows.

[0088] The panel 30 is normally closed and, thus the second support element 54 is superimposed (in the closure position thereof) to the first support element 51 pushed by the preload of the torsion spring 53.

[0089] In such configuration (Figs 2,4,6,8 and 10), the lock bolt 55 and the housing seat 57 misaligned with respect to each other and the panel 30 can be actuated in rotation for opening the door 20.

[0090] Following a rotation of the panel 30 by 90° with respect to the axis X (Figs 3,5,7 and 11), the housing seat 57 rotates with the second support element 54 moving before the lock bolt 55, which, previously pushed by the rounded side 571 of the tooth 570 in the receded position thereof against the thrust action of the compression springs 56, it is instantaneously and automatically moved in the advanced position (due to the action of the compression springs 56) snap-coupling the housing seat same.

[0091] With the lock bolt 55 engaged in the housing seat 57 the panel 30 is forced, against the action of the torsion spring 53 to remain in open position.

[0092] In order to unlock the panel 30 it is thus sufficient to rotatably actuate with a minimum force, such to overcome the action of the compression springs 56, the panel 30, so that the lock bolt 55, sliding on the sides of the housing seat 57 and of the rounded side 571 of the tooth 570, moves in the receded position thereof and the panel 30 free to rotate towards the closure position by means of the return action exerted by the torsion spring 53.

[0093] The invention thus conceived can be subjected to numerous modifications and variants all falling within the scope of protection of the invention. Furthermore all the details can be replaced by other technically equivalent elements.

[0094] In practice the materials used, as well as the contingent shapes and dimensions, may vary depending on the requirements without departing from the scope of protection of the following claims.

Claims

1. Hinge unit (50) for refrigerator cabinet doors (10) comprising:

- a first support element (51) fixable to the refrigerator cabinet (10),
- a second support element (54), fixable to the panel (30) for closing an access gap (12) of the refrigerator cabinet (10) and hinged to the first support element (51), so as to rotate said panel (30) with respect to the refrigerator cabinet (10) between a position for closing and opening the access gap (12),
- elastic return means (53) interposed between said first and second support element (51,54) for the return from the opening position to the closure position, e
- locking means (55,57) adapted to removably lock therebetween the first and the second support element (51,54) in said open position,

comprising two snap-coupling elements respectively associated to the first support element (51) and to the second support element (54), including a lock bolt (55) and a housing seat (57) adapted to provide a mutual automatic coupling following a mutual rotation between the first and the second support element (51,54), wherein the lock bolt (55) is slidably associated to the respective support element (51) and is moveable from an advanced position, in which it is adapted to engage the housing seat (57), at a receded position, countering elastic means (56), **characterized in that** the lock bolt (55) is slidably associated along a rectilinear guide (513) provided in said first support element (51) and provided with at least one abutment element (518) adapted to stop the travel of the lock bolt (55) in the advanced position thereof.

2. Unit (50), according to claim 1, wherein the support element (54) provided with the housing seat (57) comprises cam means (570,571) adapted to move said lock bolt (55) from the advanced position to the receded position during the mutual rotation of the support elements (51,54) between the closure position and the opening position for the disengagement thereof from the housing seat (57).

3. Unit (50), according to claim 1, wherein the lock bolt (55) is moveable on a plane orthogonal to the hinging axis between the first support element (51) and the second support element (54).

4. Unit (50), according to claim 1, wherein the housing seat (57) is associated to the second support element (54) and is moveable between a first position wherein it is aligned to the lock bolt (55) along the

sliding direction thereof, when the support elements (51,54) are in the closure position, and a second position wherein it is misaligned with respect to the lock bolt (55), when the support elements (51,54) are in the opening position.

5. Unit (50), according to claim 1, wherein said elastic means comprise at least one compression spring (56).

6. Unit (50), according to claim 5, **characterised in that** it comprises a pair of compression springs (56) of the helical type having converging longitudinal axes.

7. Unit (50), according to claim 1, wherein the elastic return means comprise a torsion spring (53).

8. Unit according to claim 1, wherein the first and the second support element (51,54) are inclined therebetween by 90° in the opening position and are superimposed - in plan view - in the closure position.

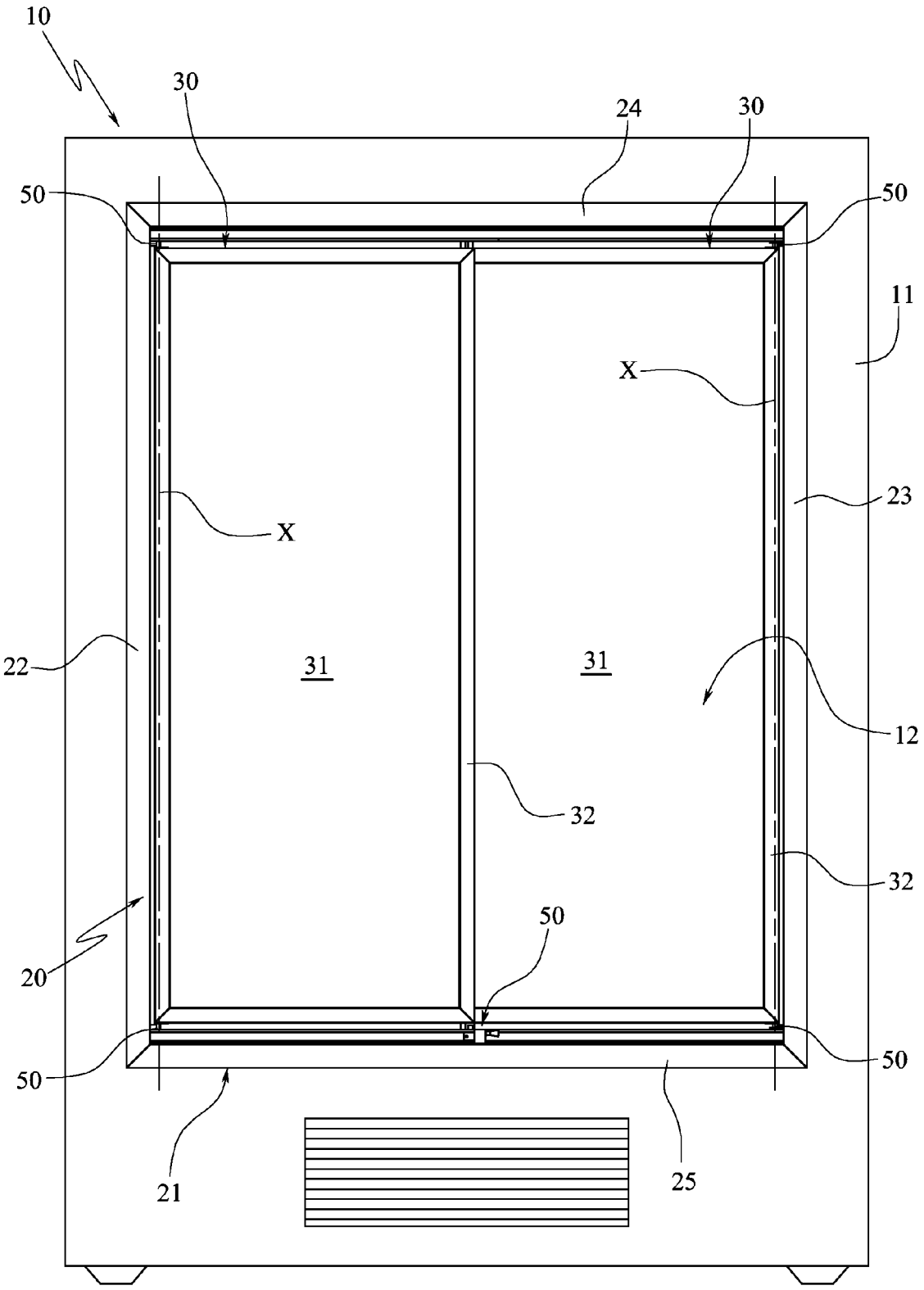

FIG.1

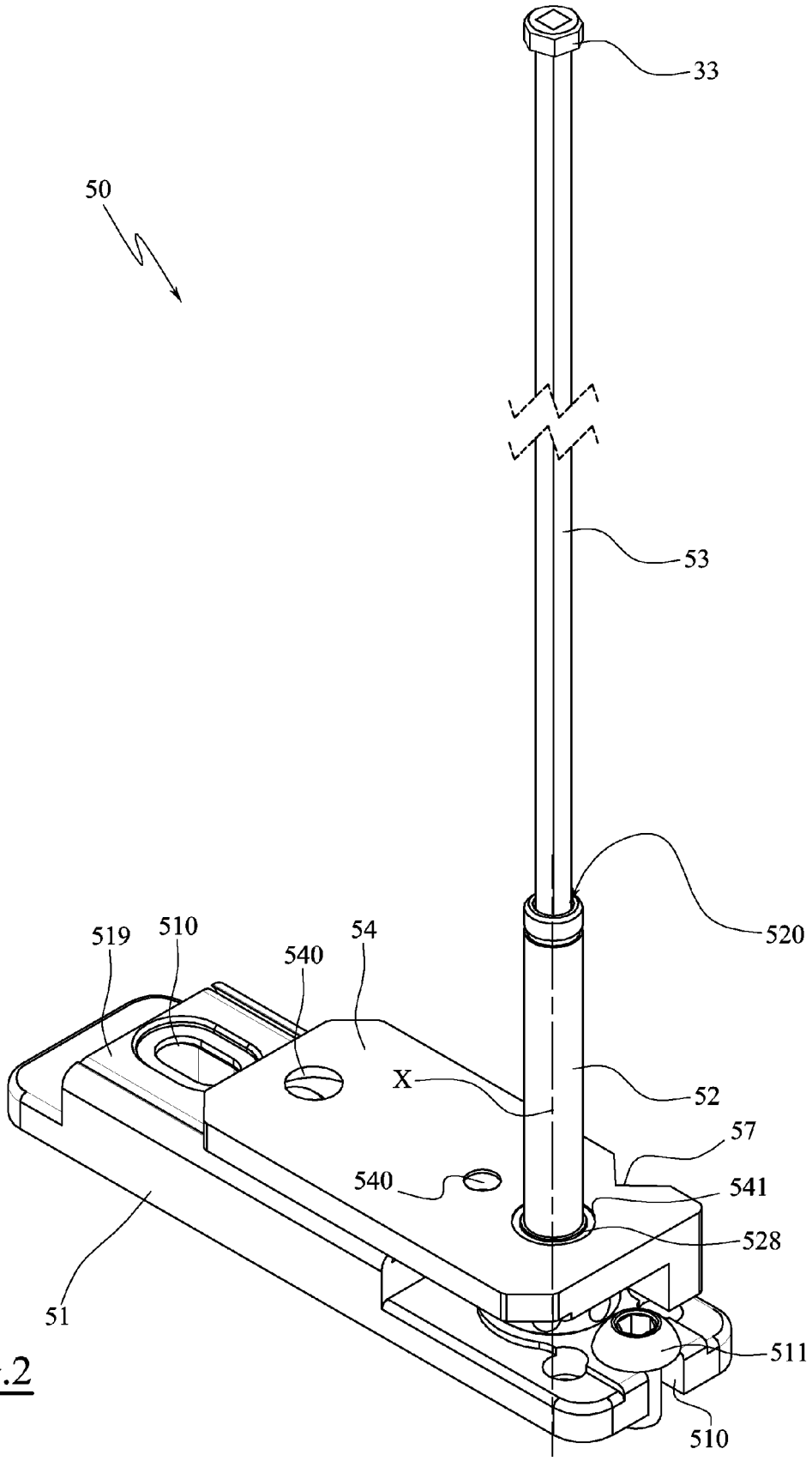

FIG.2

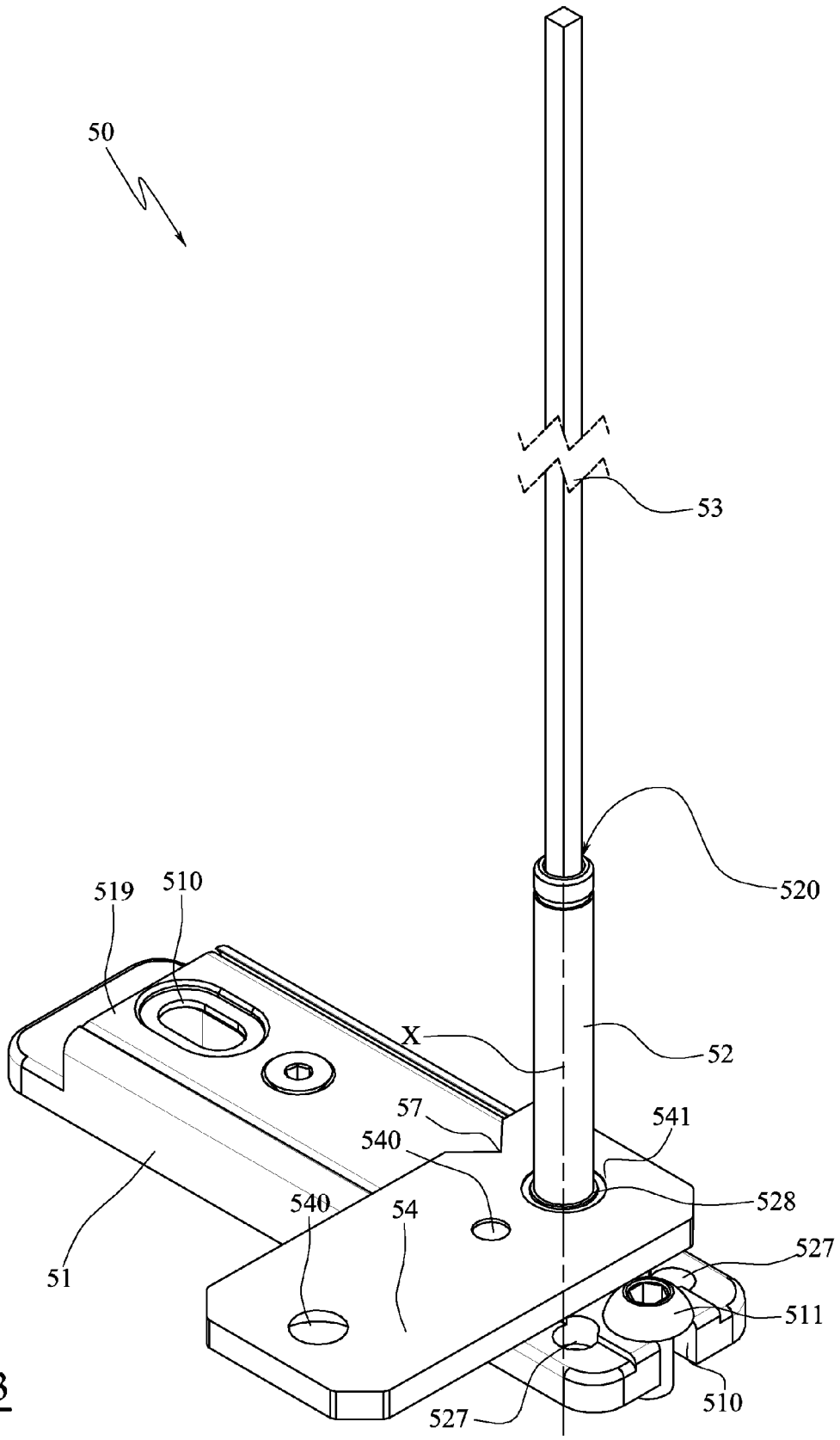

FIG.3

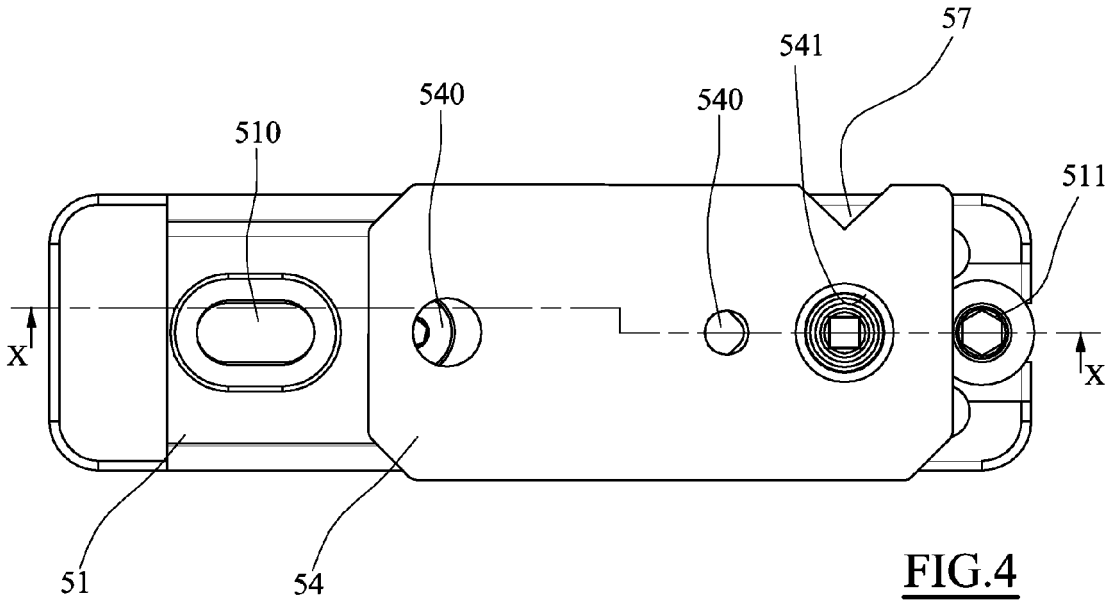

FIG.4

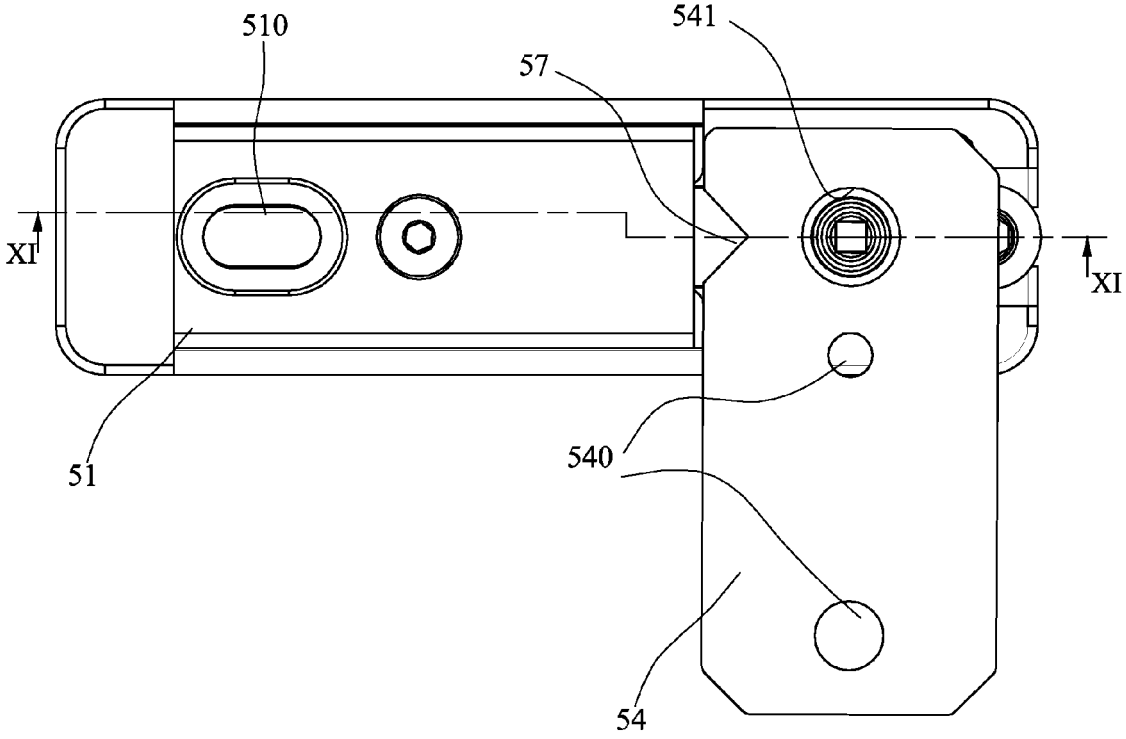

FIG.5

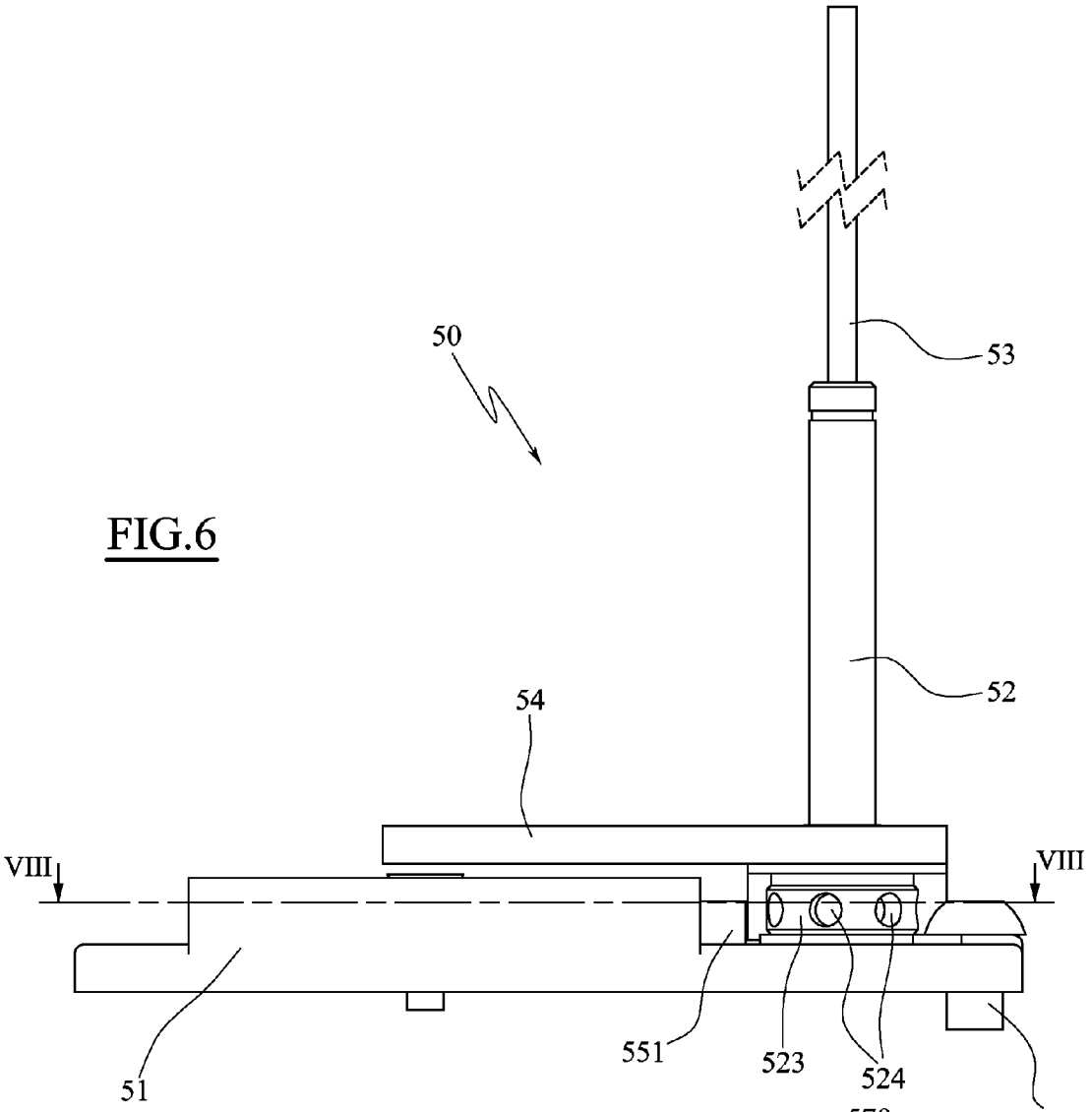
50
53
52
54
VIII
VIII
51
551
523
524
511

FIG.6

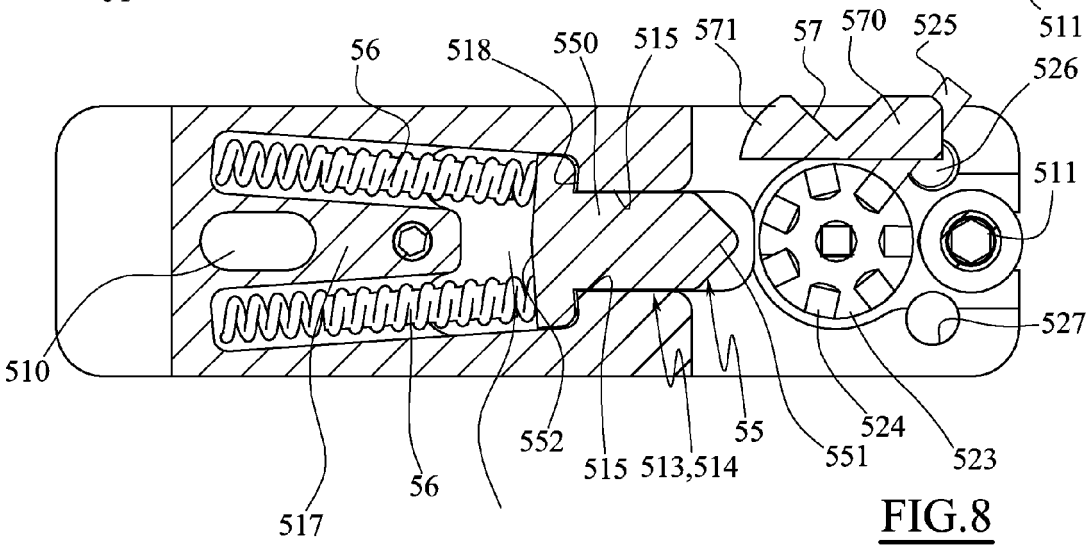
56
518
550
515
571
57
570
525
526
511
527
510
552
515
513,514
55
551
524
523
56
517

FIG.8

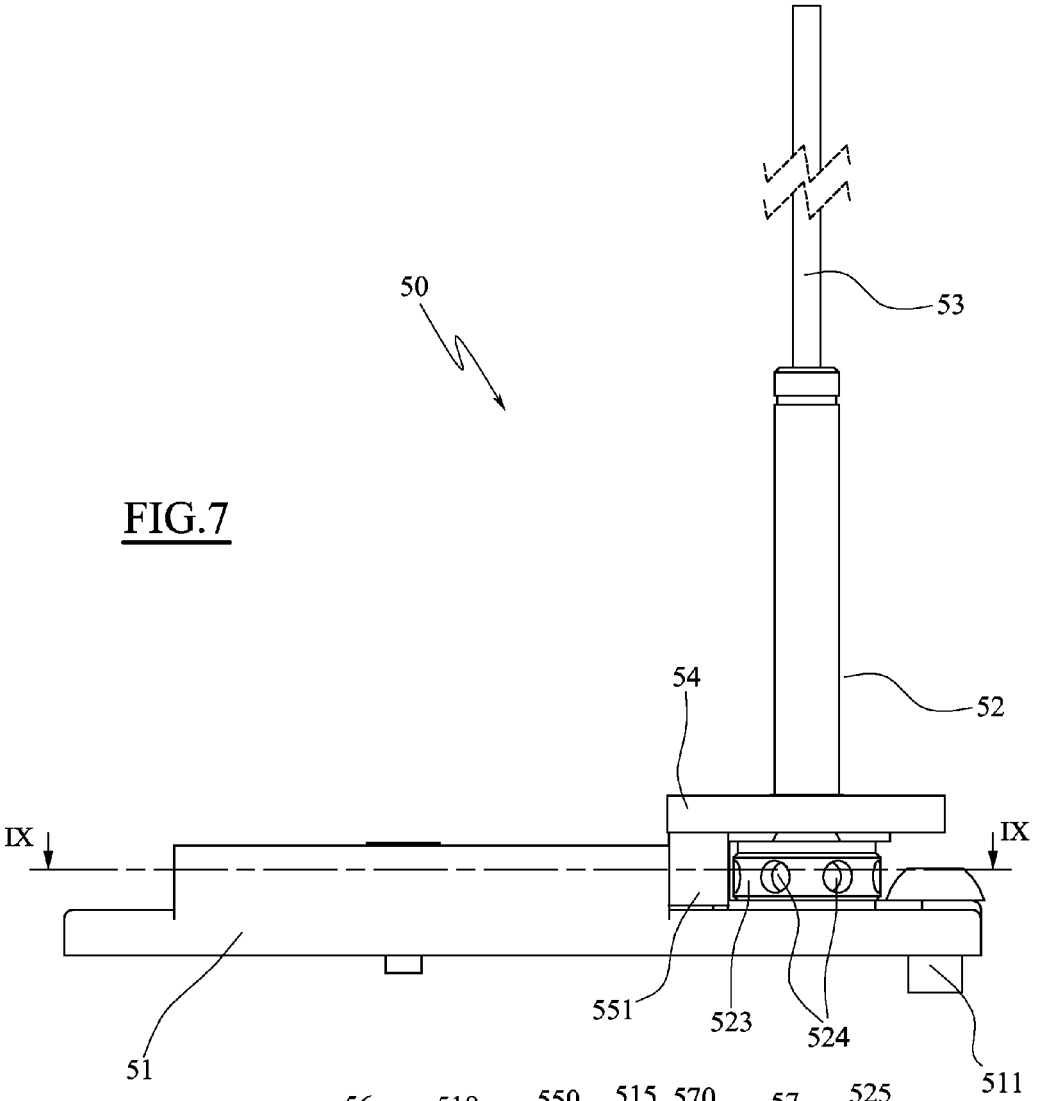
50
53
54
52
IX
IX
551
523
524
51
511

FIG.7

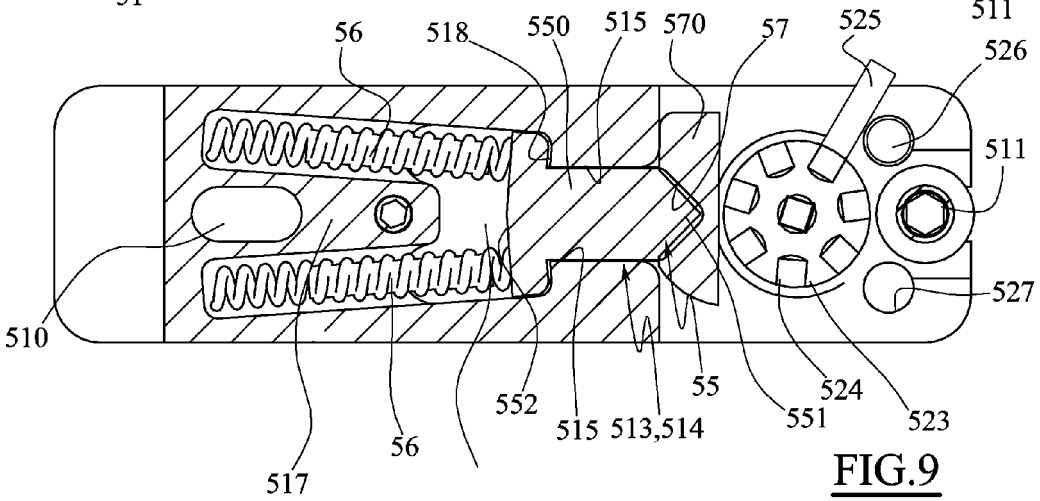
56
518
550
515
570
57
525
526
511
510
527
552
55
524
551
523
515
513,514
56
517

FIG.9

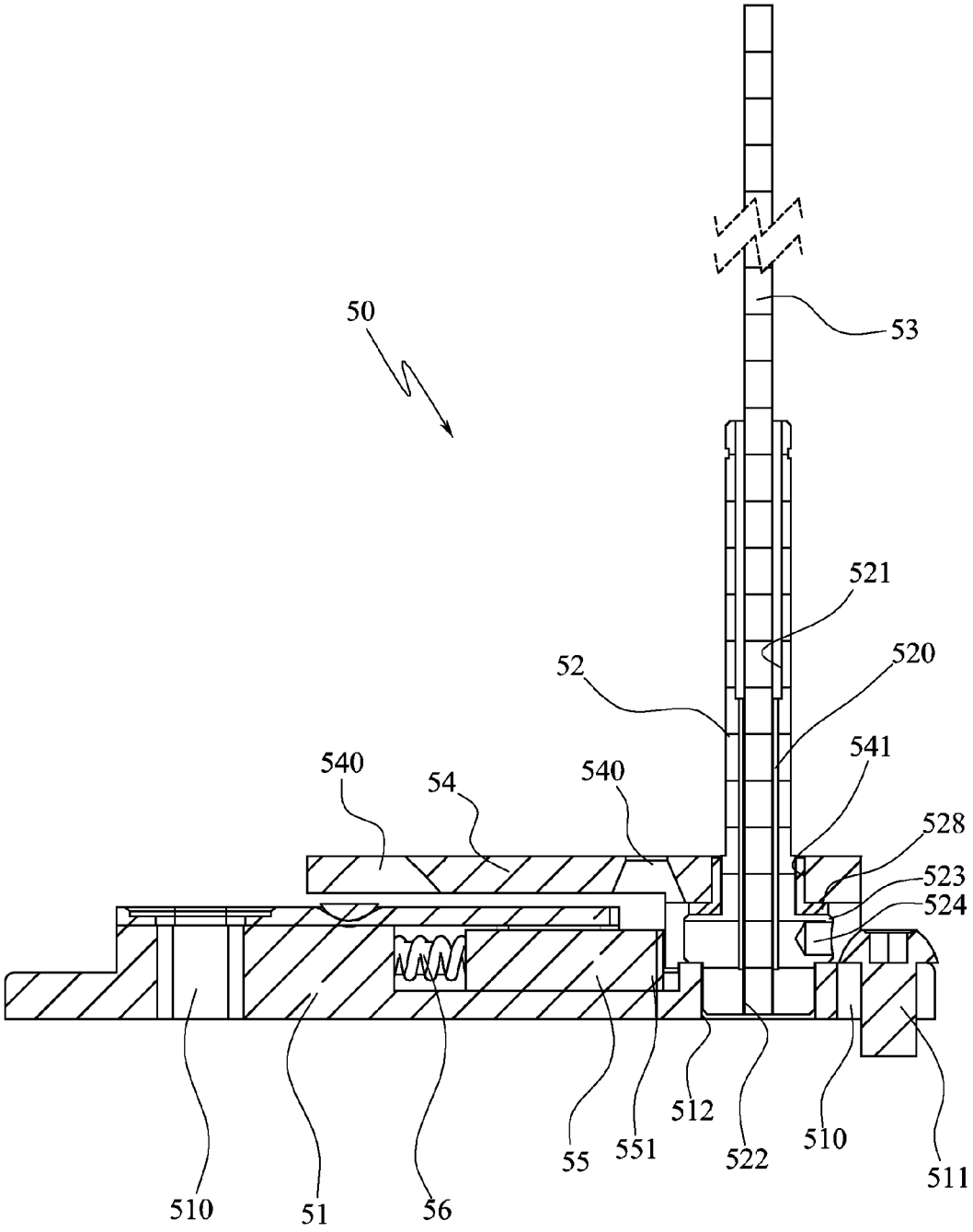
50
53
521
520
52
541
540
54
540
528
523
524
512
522
510
511
55
551
510
51
56

FIG.10

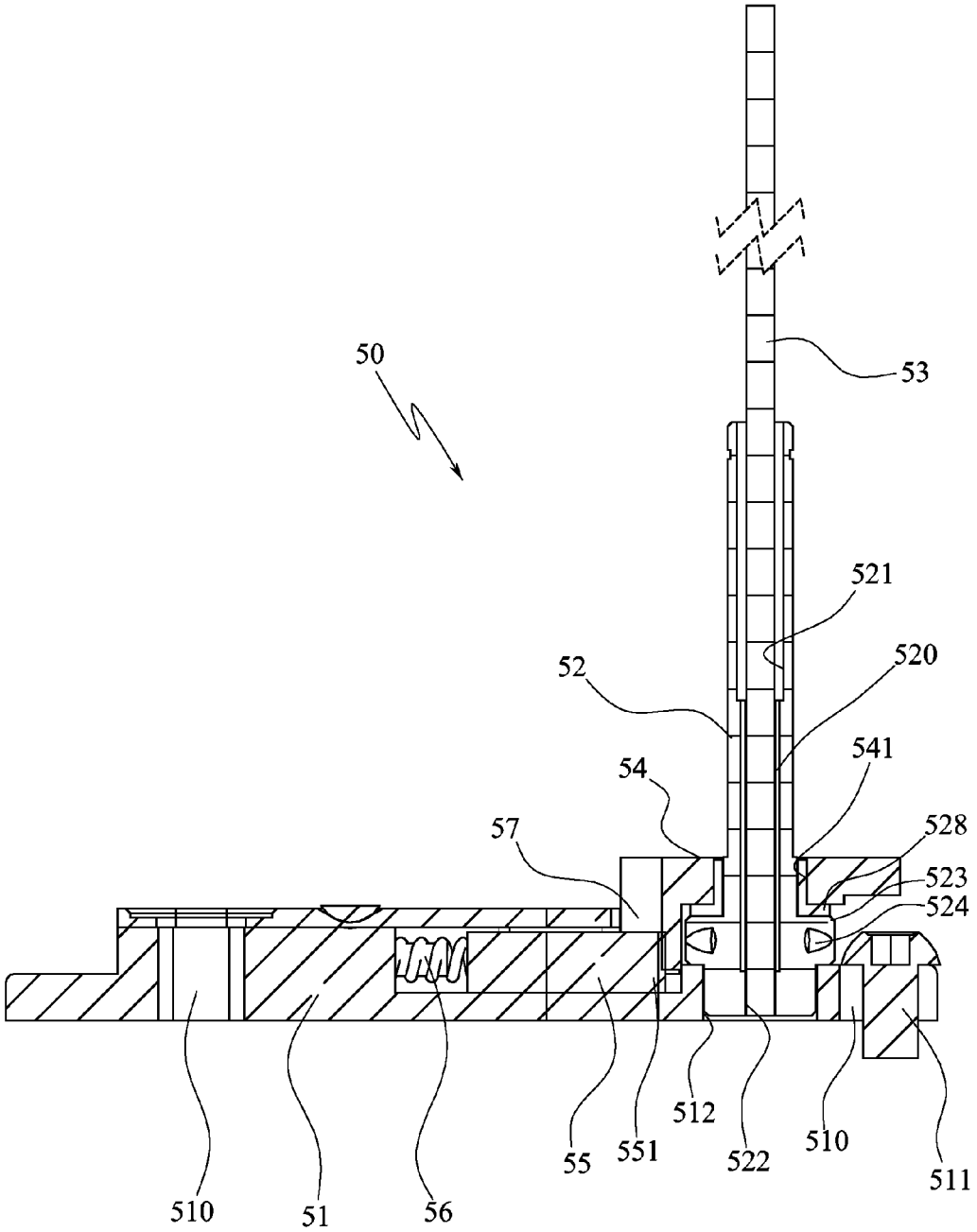
50
53
521
520
52
541
54
57
528
523
524
512
55
551
522
510
511
510
51
56

FIG.11

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 12 18 3260

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2003/000955 A1 (LEE YOUNG-GIL [KR]) 2 January 2003 (2003-01-02) * figures 6-11 *	1	INV. F25D23/02
A	GB 1 362 089 A (ESCALONA JULIAN J) 30 July 1974 (1974-07-30) * the whole document *	1	
A	EP 0 111 019 A1 (ARDCO INC [US]) 20 June 1984 (1984-06-20) * page 7, line 11 - page 13, line 34; figures 1-5 *	1	
A	US 3 452 387 A (JERILA TORSTI T T ET AL) 1 July 1969 (1969-07-01) * column 4, line 74 - column 5, line 74 *	1	
A	JP 58 108392 U (JPO) 23 July 1983 (1983-07-23) * abstract; figures 1,2,9,10,13,14 *	1	
A	US 5 020 189 A (GROME DONALD C [US] ET AL) 4 June 1991 (1991-06-04) * the whole document *	1	TECHNICAL FIELDS SEARCHED (IPC) F25D E05D E05F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	21 November 2012	Jessen, Flemming

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 12 18 3260

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

21-11-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2003000955 A1	02-01-2003	CN 1397781 A	19-02-2003
		JP 2002360166 A	17-12-2002
		US 2003000955 A1	02-01-2003
GB 1362089 A	30-07-1974	BE 778938 A1	30-05-1972
		DE 2205940 A1	24-08-1972
		FR 2126857 A5	06-10-1972
		GB 1362089 A	30-07-1974
		NL 7201466 A	15-08-1972
EP 0111019 A1	20-06-1984	DE 3274134 D1	11-12-1986
		EP 0111019 A1	20-06-1984
US 3452387 A	01-07-1969	NONE	
JP 58108392 U	23-07-1983	NONE	
US 5020189 A	04-06-1991	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82