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(54) **A door for a refrigerator cabinet**

(57) A door (20) for a refrigerator cabinet (10), comprising a frame (21) destined to delimit an access (12) passage of the refrigerator cabinet (10) and at least two panels (30) singly destined to close a respective portion of the access (12) passage, each of which panels (30) is hinged to at least a respective support element (33) associated to the frame (21), such as to be able to rotate with respect to the frame (21) between a closed position and an open position of the respective portion of the access (12). The support element (33) of each panel (30) is slidably coupled to the frame (21) in such a way that the respective panel (30) can slide with respect to the frame (21) between the closed position and a further open position of the respective portion of the access (12) passage.

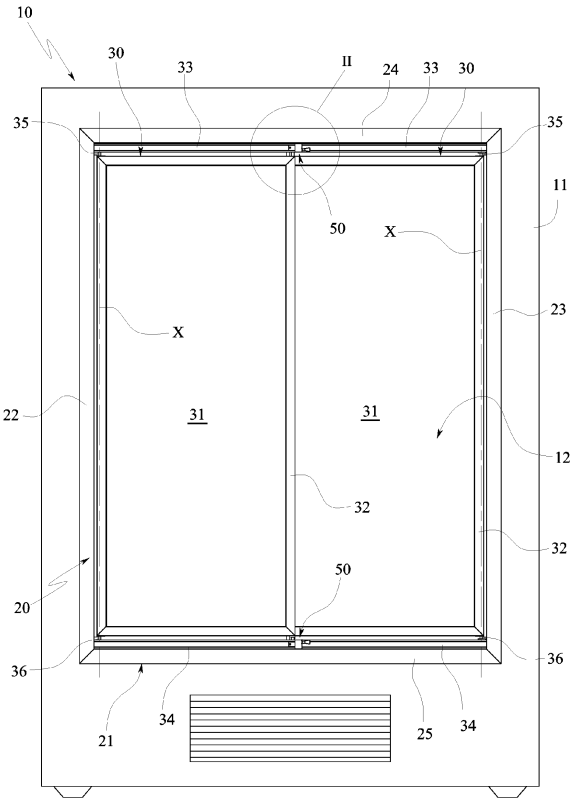

FIG.1

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Description

[0001] The invention relates to a door for a refrigerator cabinet, in particular for refrigerator cabinets destined to be located internally of sales points for foods or the like, for conserving and displaying these products.

[0002] As is known, refrigerator cabinets generally comprise an external body in the shape of a parallelepiped, which is destined to delimit internally thereof a refrigerated compartment for receiving the products to be conserved.

[0003] The refrigerator compartment is made accessible through a front access passage afforded on a lateral flank of the external body, which is closed by a door that can be partially or entirely transparent, such as to enable vision of the products contained internally thereof.

[0004] At present, the door of a refrigerator cabinet can be a leaf door or a sliding door.

[0005] In particular, a leaf door comprises a frame destined to delimit the access of the refrigerator cabinet and one or more panels destined to close the access, which are hinged to the frame such as to open the access by rotating, in the way of usual doors.

[0006] In order to guarantee adequate opening of the access, the leaf door requires a large space in front of the refrigerator cabinet, so that the panels can rotate without obstruction.

[0007] This requirement can sometimes be a drawback, as it places constraints on the location of the refrigerator cabinet internally of the sales point, making it particularly unsuitable for use in smaller sales points having restricted space. This drawback can be obviated by the use of refrigerator cabinets having sliding doors.

[0008] A sliding door comprises a frame destined to delimit the access of the refrigerator cabinet and at least two panels destined to close the access, which are slidably coupled to the frame, such that each of the panels can slide with respect to the frame between a closed position and an open position of a respective portion of the access.

[0009] These two panels are generally parallel and offset from one another, such as to be able to slide freely with respect to one another without any reciprocal interference.

[0010] A drawback of this solution consists however in the fact that the sliding panels can be opened only one at a time, such that the access to the refrigerator cabinet is always partially closed, which in particular hinders the filling operations of the refrigerator cabinet with the products to be conserved. An aim of an embodiment of the present invention is therefore to resolve, or at least reduce, the mentioned drawbacks of the known refrigerator cabinets, in relation to both those having leaf doors and those having sliding doors.

[0011] A further aim is to attain the above-mentioned aim with a solution that is simple, rational and relatively economical.

[0012] These aims are attained by the characteristics of the embodiments of the invention reported in the independent claims. The dependent claims delineate preferred and/or particularly advantageous aspects of the various embodiments of the present invention.

[0013] In particular, an embodiment of the invention makes available a door for refrigerator cabinets which comprises a frame destined to delimit an access passage to the refrigerator cabinet and at least two panels, singly destined to close a respective portion of the access passage.

[0014] Each of the panels is hinged to at least a respective support element associated to the frame, such as to be able to rotate with respect to the frame between a closed position and an open position of the respective portion of the access passage.

[0015] The support element of each panel is in turn slidably coupled to the frame, such that the respective panel can slide with respect to the frame between the closed position and a further open position of the respective portion of the access.

[0016] In this way, a door of the present invention can be advantageously used both as a leaf door, for example for facilitating filling of the refrigerator cabinet with the products to be conserved, and alternatively as a sliding door, for example for reducing the constraints of size created by the refrigerator cabinet internally of the sales point.

[0017] In an aspect of the invention, the door comprises at least a first blocking element for each panel, which is mobile between a blocked position, in which it is destined to prevent the relative panel from rotating with respect to the frame, and an unblocked position, in which it is destined to enable the respective panel to rotate with respect to the frame.

[0018] The first blocking element has the advantage of preventing rotation of the panel, when the door is used as a sliding door.

[0019] In a further aspect of the invention, the door further comprises at least a second blocking element for each panel, which is mobile between a blocked position, in which it is destined to prevent the respective panel from sliding with respect to the frame, and an unblocked position, in which it is destined to enable the respective panel to slide with respect to the frame.

[0020] The second blocking element has the advantage of preventing the sliding of the panel, when the door is used as a leaf door.

[0021] In a preferred aspect of the invention, the first and second blocking elements are reciprocally associated, such that when the first blocking element is in the blocking position the second blocking element is automatically in an unblocking position, and when the first blocking element is in the unblocking position the second blocking element is automatically in the blocking position. This solution has the advantage of enabling activation of both the blocking elements with a single operation, while at the same time guaranteeing that the panels cannot be free to slide and rotate at the same time.

[0022] In more detail, in an embodiment of the invention the first blocking element is defined by an end of a pin, which is slidably associated to the support element of the panel, such as to be able to slide between a first operating position, in which the end is inserted in a hole in the panel, and a second operating position, in which the end is removed from the hole in the panel. The second blocking element is defined by the opposite end of the pin which, when the pin is in the second operating position, is destined to come into contact with a fixed element of the frame, such as to prevent the support element from sliding, and when the pin is in the first operating position it is unconstrained from the fixed element, enabling the support element to slide. This embodiment has the advantage of being rather simple and economical. In a further aspect of the invention, the support element of the panel is provided with at least a carriage, which is slidably coupled to guide means associated to the frame.

[0023] In this way, the sliding of the panel with respect to the frame is advantageously stable and fluid.

[0024] In a further aspect of the invention, each panel is preferably hinged to two support elements, in a same rotation axis.

[0025] The support elements are positioned adjacent to two opposite edges of the panel and are slidably coupled to two opposite sides of the frame.

[0026] This solution has the advantage of making the door more solid, improving the stability and fluidity of both the rotation and the sliding of the panels with respect to the frame.

[0027] In a further embodiment of the invention, a refrigerator cabinet is provided which comprises a door having the characteristics described herein above. Further characteristics and advantages of the invention will emerge from a reading of the following description, which is provided by way of non-limiting example, with the aid of the appended figures of the drawings, in which:

figure 1 is a schematic front view of a refrigerator cabinet, provided with a door according to an embodiment of the present invention;
figure 2 is the detail denoted by II in figure 1, illustrated in a larger scale; figure 3 is section III-III of figure 2;
figure 4 is a portion of section IV-IV of figure 3;
figure 5 is a portion of section V-V of figure 3;
figure 6 is the detail denoted by VI in figure 4, shown in enlarged scale;
figures from 7 to 9 are figure 6 illustrated in two positions during a displacement of the blocking device.

[0028] Note that during the course of the following description, the concepts of high and low, upper and lower and left and right refer to the view presented in figure 1.

[0029] The refrigerator cabinet 10 illustrated in figure 1 comprises an external body 11 in the shape of a parallelepiped, which is destined to delimit internally thereof a refrigerator compartment (not visible) for housing the products to be conserved.

[0030] The refrigerator compartment is made accessible from outside through an access 12 passage, which is afforded frontally on a vertical side of the external body 11.

[0031] The access 12 is closed by a door which is denoted in its entirety by 20.

[0032] The door 20 comprises a fixed frame 21 destined to delimit the access 12, which frame 21 exhibits a rectangular shape defined by two pairs of parallel elements, namely a pair of vertical elements, respectively a left element 22 and a right element 23, and a pair of horizontal elements, respectively an upper element 24 and a lower element 25.

[0033] The elements 22-25 can be made of a plastic material, for example PVC, in order to improve thermal insulation of the refrigerated chamber and prevent condensation phenomena, and can be covered externally by an aluminium cladding, to improve the aesthetic aspect thereof.

[0034] The door 20 further comprises two panels 30, which are overall destined to close the access 12 passage delimited by the fixed frame 21.

[0035] In particular, each panel 30 exhibits a rectangular shape substantially exhibiting the same height as the access 12, and a breadth which is a little greater than half of the width of the access 12.

[0036] In this way, each panel 30 is singly destined to close a respective half of the access 12.

[0037] Each panel 30 comprises a covering pane 31, typically made of a transparent material, for example glass, so that the products contained internally of the refrigerator cabinet 10 can be viewed, and a frame 32 destined to border the perimeter of the covering pane 31.

[0038] In particular, the frame 32 is defined by a series of straight elements which are fixed along the edges of the covering pane 31.

[0039] The frame 32 elements can also be made of a plastic material, for example PVC, and can be externally clad by an aluminium cladding.

[0040] Each panel 30 is associated to two respective support bars, an upper support bar 33 and a lower support bar 34, which are orientated parallel to the horizontal profiles 24 and 25 of the frame 21 and are of a length which is substantially equal to the width of the respective panel 30.

[0041] In particular, the upper support bar 33 is interposed between the upper edge of the panel 30 and the upper element 24 of the frame 21, while the lower support bar 34 is interposed between the lower edge of the panel 30 and the lower element 25 of the frame 21.

[0042] As illustrated in figures 4 and 5, the upper support bar 33 of each panel 30 is slidably coupled to the upper element 24 of the frame 21.

[0043] This sliding coupling is obtained by means of a pair of carriages 40, which are fixed to the upper support bar 33, for example via a central screw 41, and are provided with grooved casters 42, which are coupled to re-

spective guide rails 43 afforded in a longitudinal gully 44 of the upper element 24 of the frame 21.

[0044] As illustrated in figure 3, the upper element 24 of the frame 21 more precisely comprises two parallel and flanked distinct longitudinal gullies 44, one of which is destined to receive the carriages 40 of a panel 30 while the other is destined to receive the carriages of the other panel 30, such that the panels 30 are parallel but offset from one another.

[0045] The lower support bar 34 of each panel 30 is in turn slidably coupled to the lower element 25 of the frame 21, using the same constructional solution described herein above in relation to the upper support bar 33.

[0046] This coupling has not been illustrated in detail in the figures as it is the same as what is illustrated in figures 4, 5 and 6.

[0047] Thanks to the offset arrangement of the panels 30 and the sliding coupling of the support bars 33 and 34 with the elements 24 and 25, each panel 30 is able to slide with respect to the frame 21, without interfering with the other panel 30, from the closed position shown in figure 1 towards the opening of the relative portion of the access 12 passage.

[0048] In more detail, the left closing panel 30 is destined to slide rightwards, superposing on the right panel 30, such as to open the left portion of the access 12; while the right panel 30 is destined to slide leftwards, passing behind the left panel 30, such as to open the right portion of the access 12. As illustrated in figure 1, each panel 30 is further hinged to both respective support bars 33 and 34, such as to be able to rotate with respect thereto about a vertical rotation axis X, perpendicular to the sliding direction of the panels 30 and parallel to the lie plane of the frame 21.

[0049] This hinge coupling is obtained by means of two coaxial pins 35 and 36, which project with respect to the upper edge and the lower edge of the panel 30, and are respectively inserted in a hole 37, afforded in the upper support bar 33 (see figures 4 and 5), and in a hole (not illustrated) coaxial to the preceding hole but afforded in the lower support bar 34.

[0050] A plastic bushing 38 is interposed between each pin and the relative receiving hole therefor.

[0051] As can be seen in figure 1, the pins 35 and 36 of the left panel 30 are located at the left edge of the panel 30, and are received in holes afforded at the left end of the support bars 33 and 34.

[0052] Opposite, the pins 35 and 36 of the right panel 30 are located at the right edge of the panel 30, and are received in holes afforded at the right end of the relative support bars 33 and 34.

[0053] Thanks to this solution, the panels 30 are destined to rotate in opposite directions with respect to the frame 21, in the manner of two doors, each about the rotation axis X thereof, from the closed position illustrated in figure 1 and towards a further open position of the respective portion of the access 12 passage, such that when both panels 30 are in the further open position the access 12 passage is completely open.

[0054] In an aspect of the invention, two identical blocking devices, denoted in their entirety by 50, are associated to the upper support bars 33 of the panels 30. Each of the blocking devices 50 is destined to assume a first opening configuration, in which it enables the respective panel 30 to slide while at the same time preventing the panel 30 from rotating with respect to the frame 21, and a second operating configuration, in which it enables the respective panel 30 to rotate while at the same time preventing the panel 30 from sliding with respect to the frame 21.

[0055] As illustrated in figures 4 and 5, each blocking device 50 comprises a pin 51, having an axis which is parallel to the rotation axis X of the relative panel 30, which pin 51 is slidably received in a through-hole 52 afforded in the upper support bar 33 at the opposite end of the upper support bar 33 with respect to the end in which the hole 37 is afforded.

[0056] The pin 51 exhibits a greater length than the thickness of the upper support bar 33, such that the lower end 53 thereof and the upper end 54 thereof can project from opposite sides.

[0057] When the panel 30 is in the closed position of figure 1, the pin 51 is coaxial to a hole 55 afforded in the frame 32 of the panel 30, as well as substantially tangential to a vertical wall of an endrun stop bracket 56 fixed to the upper element 24 of the frame 21.

[0058] As illustrated in figure 6, the blocking device 50 further comprises a screw 58, which is orientated parallel to the upper support bar 33 and is screwed to an intermediate tract of the pin 51, passing through a vertical slit 59 which is afforded in the end of the upper support bar 33 and develops over the whole thickness thereof.

[0059] The projecting portion of the screw 58 passes through a vertically-developing slot 60, which is afforded in a block 61 (see also figure 2) which is fixed to the end of the upper support bar 33.

[0060] In particular, the slot 60 is afforded in a wall of the block 61 which is facing and distanced from the end of the upper support bar 33.

[0061] As illustrated in figure 3, the slot 60 is substantially defined by two vertically superposed holes, respectively and upper hole 60A and a lower hole 60B, which are set in communication by an intermediate gully 60C, a length of which is smaller than a diameter of the holes 60A and 60B.

[0062] A knob 62 is housed in the slot 60, which knob 62 is coaxially inserted on the projecting portion of the screw 58.

[0063] As illustrated in figure 6, the knob 62 can slide on the projecting portion of the screw 58, a head of which screw 58 however prevents the knob 62 from completely de-inserting.

[0064] In particular, the knob 62 is constantly pushed against the head of the screw 58 by a spring 63, which is coaxially inserted on the tract of the screw 58 which is comprised between the upper support bar 33 and the

wall of the block 61 in which the slot 60 is afforded, and is interposed between a first washer 64, destined to be in contact the upper support bar 33, and a second washer 65, destined to be in contact with the knob 62.

[0065] The knob 62 exhibits a truncoconical grip portion 62A at the distal end from the spring 63, a substantially-cylindrical broadened portion 62B at the proximal end to the spring 63, and a narrowed portion 62C, also substantially cylindrical, interposed between the other two portions.

[0066] The diameter of the broadened portion 62B is substantially the same as the diameter of the holes 60A and 60B of the slot 60, while the diameter of the narrowed portion 62C is substantially the same as the thickness of the intermediate gully 60C.

[0067] In this way, the spring 63 pushes the broadened portion 62B of the knob 62 to engage internally of the upper hole 60A or alternatively the lower hole 60B, preventing the projecting portion of the screw 58 from sliding vertically internally of the slot 60.

[0068] In particular, when the broadened portion 62B is engaged in the lower hole 60B, the lower end 53 of the pin 51 is inserted in the hole 55 of the respective panel 30, such that the panel 30 cannot rotate with respect to the frame 21. At the same time, the upper end 54 of the pin 51 is vertically distanced from the end run stop bracket 56, such that the panel 30 becomes free to slide with respect to the frame 21.

[0069] Vice versa, when the broadened portion 62B is engaged in the upper hole 60A, as illustrated in figure 9, the upper end 54 of the pin 51 is in contact with the vertical wall of the endrun stop bracket 56, which is orientated such as to prevent the panel 30 from sliding with respect to the frame 21.

[0070] At the same time, the lower end 53 of the pin 51 is completely freed from the hole 55, such that the panel 30 remains free to rotate with respect to the frame 21.

[0071] To displace the pin 51 between these two positions, an operator need perform only the following manual operations:

- axially push the knob 62 towards the support bar 33, in contrast with the spring 63 (see figure 7), freeing the broadened portion 62B from the lower hole 60B and aligning the narrowed portion 62C with the intermediate gully 60C,
- push the knob 62 upwards (see figure 8), at the same time raising the screw 58 and the pin 51, and finally
- release the knob 62 (see figure 9) such that the spring 63 snap-engages with the broadened portion 62B in the upper hole 60A of the slot 60.

[0072] Naturally, in order to return the pin 51 into the preceding position the same steps will be performed starting from the coupling of the broadened portion 62B with the upper hole 60A, up to reaching the coupling of the broadened portion 62B with the lower hole 60B.

[0073] It is specified that a further blocking device 50, identical to the one described herein above, is also associated to the lower support bar 34 of each panel 30, as illustrated in figure 1.

[0074] The further blocking device 50 is not detailed in the accompanying figures of the drawings as its structural characteristics are exactly alike to those shown in figure 6 for the blocking device 50 of the upper support bar 33.

[0075] Obviously a skilled person in the art might make numerous modifications of a technical-applicational nature to the door 20 as described herein above, without its forsaking the ambit of the invention as claimed in the following.

Claims

1. A door (20) for a refrigerator cabinet (10), comprising a frame (21) destined to delimit an access (12) of the refrigerator cabinet (10) and at least two panels (30) singly destined to close a respective portion of the access (12), each of which panels (30) is hinged to at least a respective support element (33) associated to the frame (21), such as to be able to rotate with respect to the frame (21) between a closed position and an open position of the respective portion of the access (12), **characterised in that** the support element (33) of each panel (30) is slidably coupled to the frame (21) in such a way that each panel (30) can individually slide with respect to the frame (21) between the closed position of the respective portion of the access (12) and a further open position of the respective portion of the access (12) thereby superposing on the other panel.

2. The door (20) of claim 1, **characterised in that** it comprises at least a first blocking element (53) for each panel (30), the first blocking element (53) being mobile between a blocked position, in which it is destined to prevent the respective panel (30) from rotating with respect to the frame (21), and an unblocked position, in which the first blocking element (53) is destined to enable the respective panel (30) to rotate with respect to the frame (21).

3. The door (20) of claim 1 or 2, **characterised in that** it comprises at least a second blocking element (54) for each panel (30), the second blocking element (54) being mobile between a blocked position, in which it is destined to prevent the respective panel (30) from sliding with respect to the frame (21), and an unblocked position, in which it is destined to enable the respective panel (30) to slide with respect to the frame (21).

4. The door (20) of claims 2 and 3, **characterised in that** the first blocking element (53) and the second blocking element (54) are reciprocally associated

such that when the first blocking element (53) is in the blocked position the second blocking element (54) is in the unblocked position, and when the first blocking element (53) is in the unblocked position the second blocking element (54) is in the blocked position.

5. The door (20) of claim 4, **characterised in that** the first blocking element (53) is defined by an end (53) of a pin (51), which is slidably associated to the support element (33) such as to be able to slide between a first operating position, in which the end (53) is inserted in a hole in the panel (30), and a second operating position, in which the end (53) is de-inserted from the hole (55) of the panel (30), and **in that** the second blocking element is defined by an opposite end (54) of the pin (51) which, when the pin (51) is in the second operating position, is destined to be in contact with a fixed element (56) of the frame (21), such as to prevent the support element (33) from sliding, and when the pin (51) is in the first operating position, is freed from the fixed element (56), enabling the support element (33) to slide.

6. The door (20) of any one of the preceding claims, **characterised in that** the support element (33) is provided with at least a carriage (40), which is slidably coupled to guide means (43) associated to the frame (21).

7. The door (20) of any one of the preceding claims, **characterised in that** each panel (30) is hinged to two support elements (33, 34) according to a same rotation axis (X), the support elements (33, 34) being positioned adjacent to two opposite ends of the panel (30) and being slidingly coupled to two opposite sides (24, 25) of the frame (21).

8. A refrigerator cabinet (10) comprising a door (20) according to any one of the preceding claims.

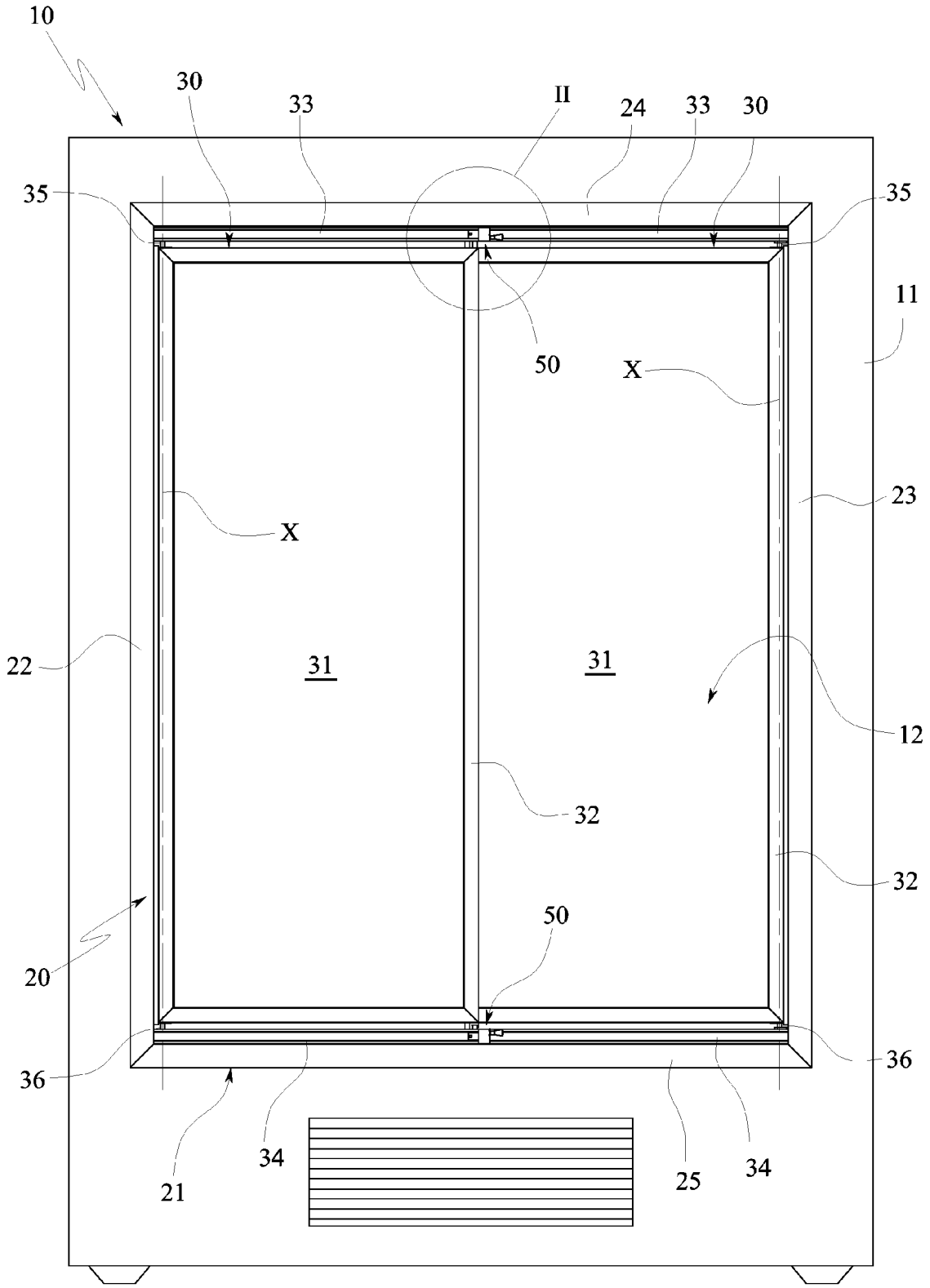

10
30
33
II
24
33
30
35
35
11
50
X
X
23
22
31
31
12
32
32
20
50
36
36
21
34
25
34

FIG.1

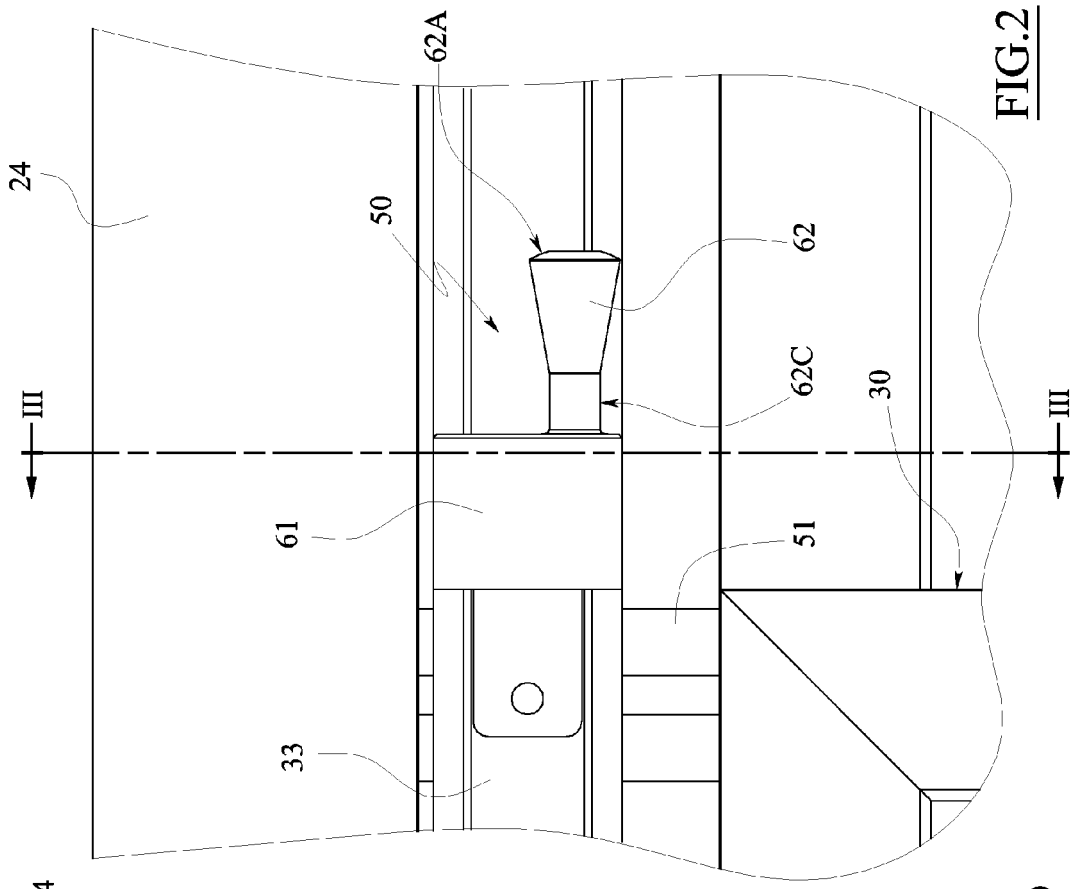
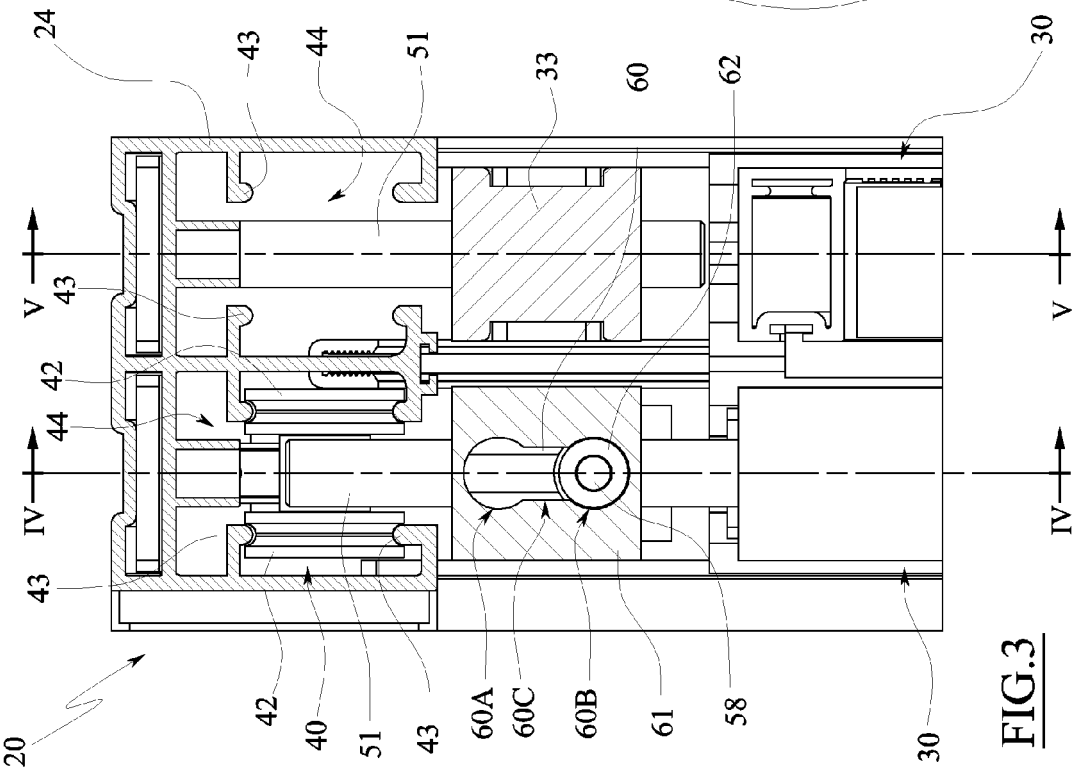

24
62A
50
62
62C
30
III
III
61
51
33

FIG.2


24
43
44
51
33
60
62
30
V
V
43
42
44
IV
IV
43
20
42
40
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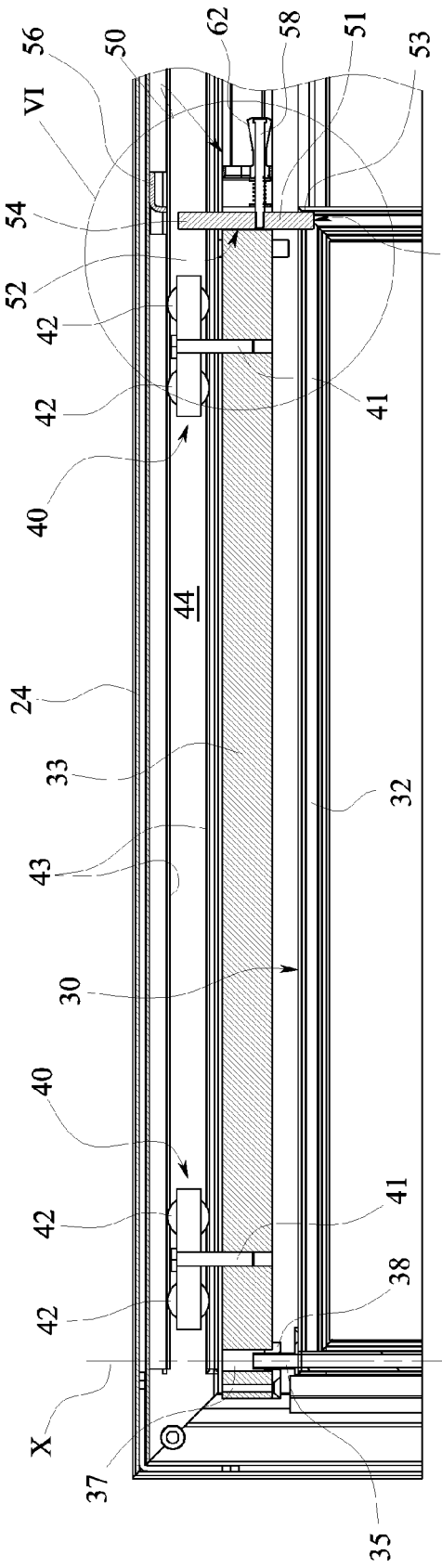
43
60A
60C
60B
61
58
30

FIG.3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56
50
62
58
51
53
54
52
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42
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44
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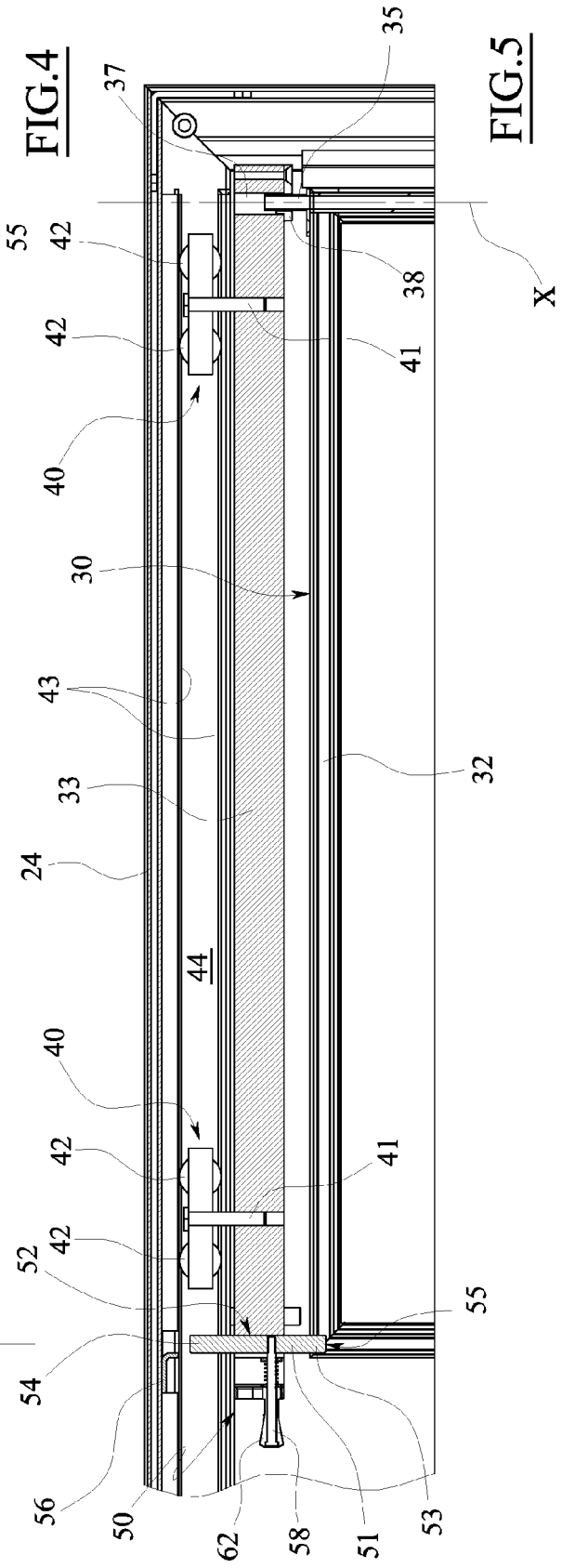
40
42
42
41
38
X
37
35

FIG.4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38
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56
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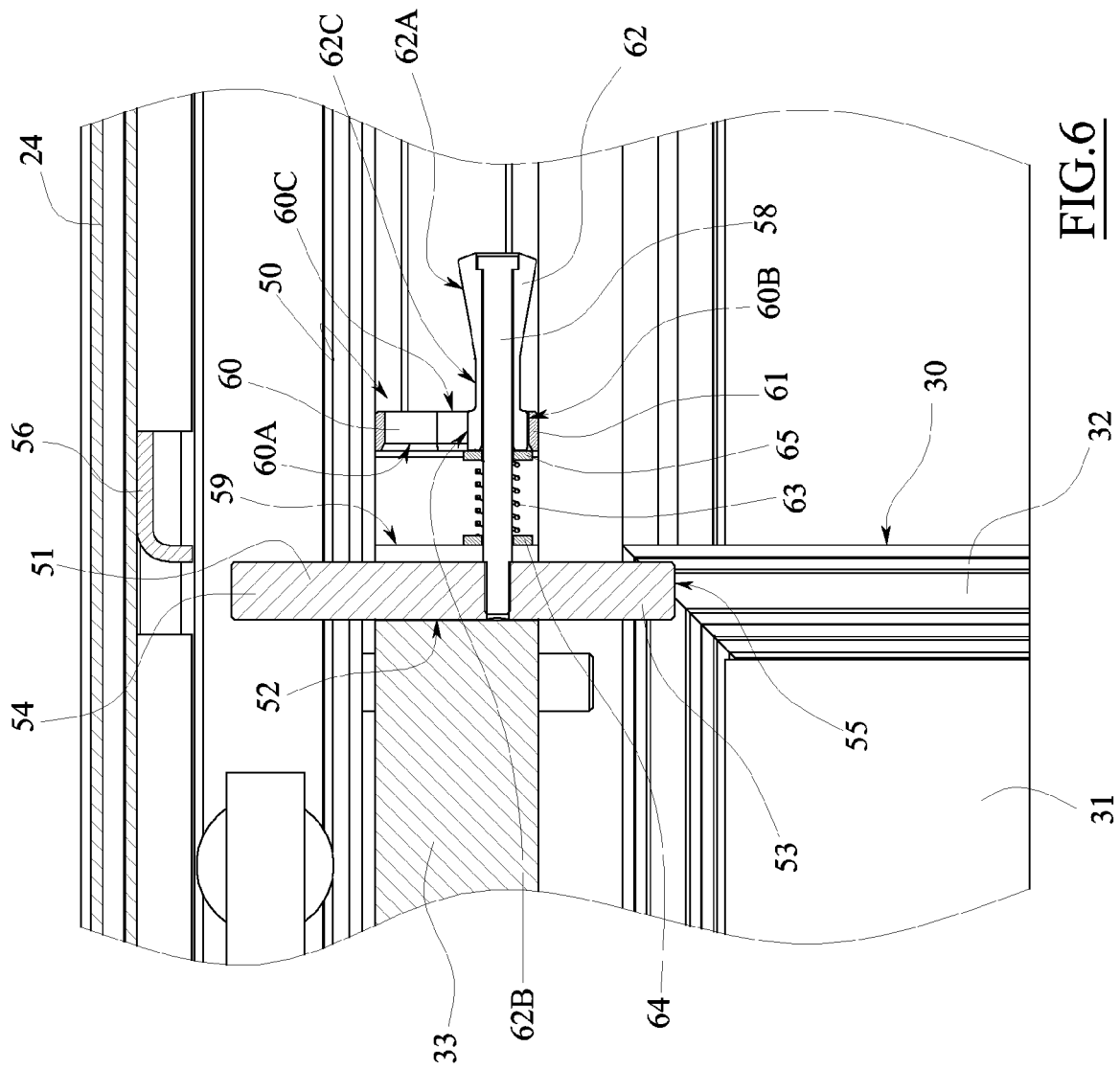
62
58
51
53

FIG.5


62C
62A
62
24
60C
58
50
60B
60
61
30
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60A
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63
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54
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55
53
31
33
62B
64

FIG.6

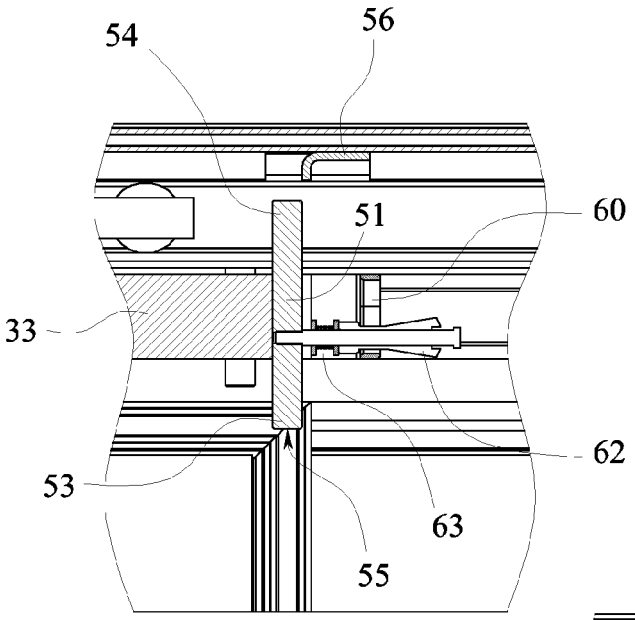

FIG.7

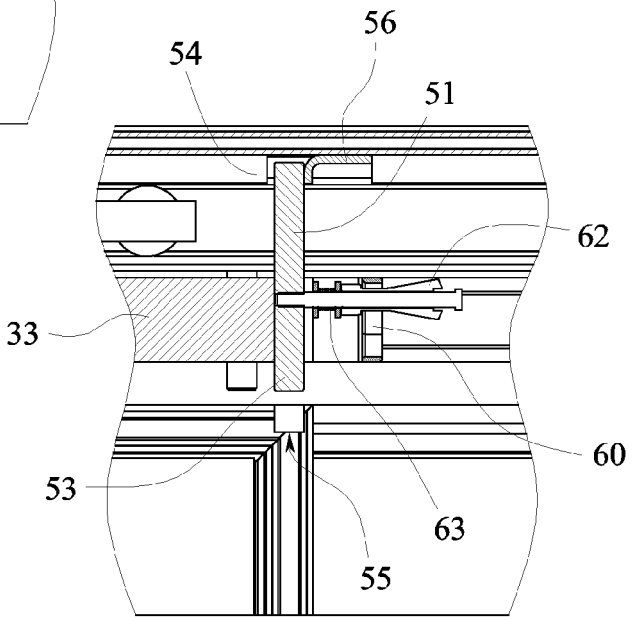

FIG.8

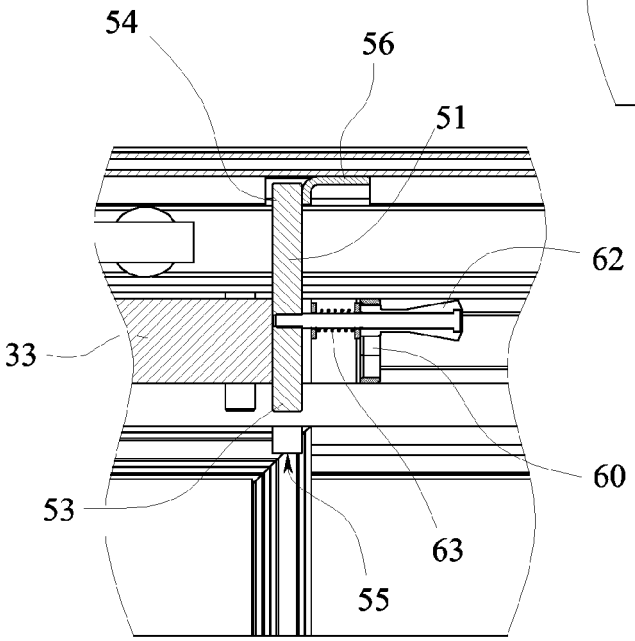

FIG.9