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(54) **Swinging door system for a storage cabinet**

Beschlagvorrichtung für eine Klappe eines Lagerschranks

Mécanisme pour porte basculante d'une armoire

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Description

[0001] The present invention relates to a device for rotatably connecting a door to a wall unit.

[0002] A wall unit is a piece of furniture attached to a wall and consisting of a frame forming a compartment which is made accessible using one or more doors.

[0003] A known type of device for connecting the door to the wall unit involves the door being connected to the frame by means of one or more hinges which allow the door to open, by rotating the door relative to the wall unit about a horizontal axis. Therefore, this type of device is notable for the orientation of the axis of rotation between the door and the wall unit.

[0004] The present invention is mainly intended for devices for rotatably connecting a door to a wall unit of the above-mentioned type, that is to say, applicable to a door with a horizontal axis of rotation relative to the wall unit.

[0005] A detailed examination of the construction of the devices known in the prior art reveals that there are basically two types of devices for rotatably connecting a door to the frame of a wall unit.

[0006] In the first type the door is connected to the frame of the wall unit simply by one or more hinges placed between an inner wall of the wall unit and the portion of the door opposite the inner wall of the wall unit.

[0007] This solution, although certainly simple and undeniably economical to make, has significant functional disadvantages which mean that it is only used in a limited number of applications.

[0008] For example, when the wall units are large, or the doors are very heavy, the above-mentioned solution is unsuitable, since it becomes difficult for the user to open and close the doors.

[0009] Therefore, a second type of devices for rotatably connecting the door to the frame of the wall unit was developed. This type uses more complex devices than the simple hinge mentioned above.

[0010] In particular, devices are known for connecting doors to the frame of a wall unit which comprise secondary mechanisms for assisting door closing operations, to facilitate use of the doors by a user.

[0011] Structurally, these devices comprise a plurality of rods and springs, which may be operated by electric motors, forming the above-mentioned mechanism and placed inside the wall unit, close to or in direct contact with a wall forming the edge of the frame. More specifically, in the above-mentioned devices the mechanism operates between an inner wall of the wall unit and the surface of the door directly opposite the inside of the wall unit. In this way, when the door is in the closed position, the mechanism is completely contained inside the wall unit and is not visible from the outside.

[0012] This feature guarantees that the movement of the mechanism, and therefore of the entire device, is not obstructed by bodies outside the wall unit, such as other, adjacent pieces of furniture.

[0013] The Applicant has found that various aspects

of the devices for rotatably connecting a door to a wall unit in the prior art can be improved on.

[0014] As already indicated, the devices in which the door is connected to the frame exclusively by means of a hinge are not effectively usable in those cases in which the door is very heavy, for example due to the type of material used to make the door or due to its size.

[0015] Moreover, the devices in the prior art which use mechanisms to assist the user in moving the door also have some disadvantages.

[0016] Firstly, since the mechanisms are positioned inside the wall unit, it becomes particularly difficult to furnish the inside of the wall unit in a functional manner.

[0017] The elements of which the mechanism consists make the insertion of shelves in the frame difficult because, as the space necessary for the mechanism to operate must be taken into account, the shelves cannot be placed in just any positions. In other words, the inside of the wall unit cannot be furnished in a way which exclusively meets requirements for functional and ergonomic use.

[0018] In addition, the devices in the prior art which use mechanisms need periodic maintenance in order to guarantee that the mechanism operates correctly. Considering that the mechanism is inside the wall unit, said maintenance obliges the user, or the person carrying out the maintenance, to at least partly empty the wall unit so as to gain access to the mechanism and work on it. Moreover, due to the limited room for manoeuvre available inside the wall unit, such maintenance is often awkward.

[0019] Document US 2003/117047 A1 discloses a device for rotatably connecting a door to a wall unit comprising a box-shaped container body, a control rod housed in the container body connected to the door of the wall unit at a horizontal axis of rotation, the control rod being movable between a first operating position when the door is open and a second operating position when the door is closed. The device further comprises secondary means connected to the control rod to accelerate the control rod during part of its movement between the first and second operating position.

[0020] In this context, the main technical task of the present invention is to propose a device for rotatably connecting a door to a wall unit which is free of the above-mentioned disadvantages.

[0021] In particular, the aim of the present invention is to provide a device for rotatably connecting a door to a wall unit which allows the inside of the wall unit to be furnished exclusively on the basis of specifications for functional and ergonomic use.

[0022] Another aim of the present invention is to propose a device for rotatably connecting a door to a wall unit which is easily and rapidly adjustable.

[0023] The technical task stated and the aims specified are substantially achieved by a device for rotatably connecting a door to a wall unit comprising the technical features described in one or more of the claims herein.

[0024] Further features and advantages of the present

invention are more apparent in the description below, with reference to the accompanying drawings, which illustrate a preferred embodiment of a device for rotatably connecting a door to a wall unit, without limiting the scope of its application, and in which:

- Figure 1 is a perspective view with some parts cut away to better illustrate others of a device made according to the present invention for rotatably connecting a door to a wall unit, in a first operating position;
- Figure 2 is a perspective view of the device illustrated in Figure 1 in a second operating position;
- Figure 3 is a perspective view of the device illustrated in Figure 1 in a third operating position;
- Figure 4 is a view of a detail from Figure 3 according to cross-section IV-IV;
- Figure 5 is a view of a detail from Figure 3 according to cross-section V-V;
- Figure 6 is a view of a detail from Figure 5 according to cross-section VI-VI;
- Figure 7 is a perspective view of a detail of the device illustrated in Figure 1.

[0025] With reference to Figures 1 to 3, the numeral 1 denotes as a whole a device for rotatably connecting a door 101 to a wall unit 100 according to the present invention.

[0026] For the sake of convenience, the accompanying drawings and the description which follows refer specifically to a device 1 for rotatably connecting a door 101 to a wall unit 100 applied to a wall unit with a single door with a horizontal hinge.

[0027] However, it must be emphasised that the device 1 disclosed may also be applied to wall units with two or more doors with horizontal hinges, both where the doors are arranged consecutively with one another, and where the doors are arranged above one another.

[0028] As is clearly indicated in the description which follows, the modifications which have to be made to the device 1 to adapt it to the above-mentioned wall units are minimal and do not affect device 1 structure and operation. Whatever the case, when necessary, these modifications will be specified.

[0029] The device 1 comprises at least one box-shaped container body 2 which can be connected to a wall 102 of a frame 103 belonging to a wall unit 100. The wall 102 of the frame 103 to which the device can be connected is, advantageously, an outer wall. If there are two or more device 1 box-shaped container bodies 2, the box-shaped container bodies 2 may be connected to opposite outer walls 102 of the frame 103.

[0030] Each box-shaped container body 2 can be connected to the respective wall 102 of the frame 103 by a plurality of screws 3 or equivalent connecting means.

[0031] The device 1 comprises at least one control rod 4, housed inside the container body 2, with a first end 4a which can be rigidly connected to the door 101 of the wall

unit 100. In particular, the control rod 4 can be connected to the door 101 of the wall unit 100 at a door 101 horizontal axis of rotation R relative to the wall unit 100. This connection between the control rod 4 and the door 101 is made possible by a pin 105. The pin 105 is rotatably connected to the container body 2 and can be connected to the door 101 using suitable connecting means 106, such as screws (as illustrated in Figure 2). The control rod 4 is connected to the pin 105 at its rotating connection with the container body 2. When the pin 105 is connected to the door 101, it rotates about an axis formed by the door 101 axis of rotation R relative to the wall unit 100.

[0032] The control rod 4 is mobile inside the container body 2 between a first operating position, illustrated in Figure 1, and a second operating position, illustrated in Figure 2. With the control rod 4 in its first operating position the door 101 is open, whilst with the control rod in its second operating condition the door 101 is closed. In other words, since the control rod 4 can be rigidly connected to the door 101, it moves between the two operating positions according to the position that can be assumed by the door 101.

[0033] Advantageously, the device 1 comprises, inside the container body 2, at least one actuator 5 which accompanies the control rod 4 in its movement between the two operating positions described.

[0034] For this purpose, the first end 5a of the actuator 5 is rotatably connected to the container body 2 and its second end 5b is rotatably connected to the control rod 4. In this way, the actuator 5, which in the preferred embodiment consists of a gas spring, but which could be any single-acting or double-acting actuator, operates as a connecting element between the container body 2 and, by means of the control rod 4, the door 101.

[0035] Advantageously, the device 1 comprises secondary means 6 for the control rod 4 to assist the control rod 4 during at least part of its stroke from the first operating position towards the second operating position and vice versa.

[0036] The secondary means 6 are connected to the container body 2 and, more specifically, comprise a brake 7 operatively connected to an intercepting projection 8. Said intercepting projection 8 is designed to intercept a second end 4b of the control rod 4, opposite the end 4a which can be connected to the door 101 by the pin 105, during its motion from the first towards the second operating position.

[0037] The brake 7 and the intercepting projection 8 are mobile relative to the container body 2 between a start of control rod 4 braking position, visible in Figure 3, and an end of control rod 4 braking position, visible in Figure 2, slowing the control rod stroke once the intercepting projection 8 is engaged.

[0038] Moreover, the secondary means 6 comprise return means 9 for accelerating the control rod 4 from the second operating position towards the first operating position. The return means 9 comprise at least one spring 9a operatively connected between the container body 2

and the intercepting projection 8. As illustrated in Figure 2, the spring 9a is in the most extended configuration when the control rod 4 is in its second operating position. In this way, when the control rod 4 moves towards the first operating position, the spring 9a exerts a return force which accelerates the control rod 4. In other words, the spring 9a assists the user in opening the door 101.

[0039] Moreover, being integral with the intercepting projection 8, the spring 9a returns the intercepting projection and the brake 7 to the start of braking position once the control rod 4 moves towards the first operating position.

[0040] Advantageously, the spring 9a assists the brake 7 in its braking action on the control rod 4 during the latter's movement towards the second operating condition. The spring 9a is in the least extended configuration, as illustrated in Figure 1, when the control rod 4 is in its first operating position, thus slowing the control rod 4 movement towards the second operating position. Obviously, this effect begins when the control rod 4, as it moves towards the second operating position, engages with the intercepting projection 8.

[0041] Advantageously, the actuator 5 also operates in conjunction with the secondary means 6. As illustrated in Figure 1, the actuator 5 is in its most extended condition when the control rod 4 is in its first operating position. The actuator 5 reaches its least extended configuration in an intermediate operating position between the first and the second, in particular as illustrated in Figure 3, in the position in which the control rod 4 engages with the intercepting projection 8.

[0042] Finally, with the control rod 4 in its second operating position, the actuator 5 is in an intermediate extension configuration. This means that, for example, during control rod 4 movement between the second operating position and the first, particularly after the control rod 4 has disengaged from the intercepting projection 8, the actuator 5 accelerates the control rod 4 towards the first operating position. In this case, the actuator 5 behaves like a compressed spring.

[0043] Summarising actuator 5 operation, it may be said that it acts like a compressed spring when the control rod 4 moves from the intermediate operating position of disengagement from the intercepting projection 8 towards the first operating position and when the control rod 4 moves from the intermediate operating position of engagement with the intercepting projection 8 towards the second operating position.

[0044] Similarly, the actuator 5 behaves like an extended spring when the control rod 4 moves from the first operating position towards the intermediate operating position of engagement with the intercepting projection 8 and when the control rod 4 moves from the second operating position towards the intermediate operating position of engagement with the intercepting projection 8.

[0045] Therefore, depending on the movement that the control rod 4 is performing, the actuator 5 acts as a braking element or an accelerator element for the control rod

4, operating in conjunction with the brake 7 or the return means 9.

[0046] Advantageously, the actuator 5 therefore generates a device 1 stable equilibrium position corresponding to the control rod 4 intermediate operating position.

[0047] In the preferred embodiment, as illustrated in Figures 1 to 3, the brake 7 comprises a rack 10 operatively connected to and integral with the intercepting projection 8 and a toothed rotary damper 11 integral with the container body 2. The rack 10 is driven by the control rod 4 when the latter engages with the intercepting projection 8 in the movement towards the second operating position. The toothed rotary damper 11 engages with the rack 10. In this way, the movement of the rack 10, that is to say, of the control rod 4, is opposed by the action of the rotary damper 11.

[0048] It must be pointed out that the term rotary damper refers to a known device, which is therefore not illustrated in detail, consisting of a clutch-controlled wheel, with a high level of resistance to rotation in one direction and a practically negligible resistance to rotation in the opposite direction. Obviously, the greatest resistance to rotation of the rotary damper 11 is in the direction which moves the rack 10 towards the end of braking position.

[0049] Advantageously, the secondary means 6 comprise means 12 for setting the spring 9a return force. These setting means 12 comprise a spring guide rod 13 extending substantially parallel with the spring 9a and engaging with one end 9b of the spring. The end 13b of the spring guide rod 13 opposite the end 13a which engages with the spring 9a has a connecting portion 14 which engages with a bolt 15 or screw that is screwed into it. The head of the bolt 15 makes contact with a projection 16 integral with the container body 2. By turning the bolt 15, that is to say, tightening or loosening the bolt 15 in the connecting portion 14 of the spring guide rod 13, the distance between the container body 2 projection 16 and the portion 13a of the spring guide rod 13 which engages with the spring 9a is reduced or increased, thereby reducing or increasing the length of the spring guide rod 13.

[0050] In this way, the maximum travel of the spring 9a can be controlled, that is to say, its return force can be set.

[0051] Advantageously, the device 1 comprises actuator 5 pre-loading means 17. In this way, the force exerted by the actuator 5 on the control rod 4 can also be adjusted according to requirements.

[0052] In particular, the actuator 5 pre-loading means 17 operate between the end 5a of the actuator 5 rotatably engaging with the container body 2 and the container body 2 itself. In detail, the pre-loading means 17 comprise a rocker arm 18 rotatably connected to the container body 2, along an axis of rotation A, and mobile between a plurality of angular positions defined by the rotation of the rocker arm 18 about the axis A. The first end 5a of the actuator 5 rotatably engages with the rocker arm 18 in an eccentric position relative to the axis of rotation A. In

this way, each rocker arm 18 angular position corresponds to a different length between the point where the actuator 5 is hinged to the rocker arm 18, and so to the container body 2, and the point where the actuator 5 is hinged to the control rod 4, that is to say, each rocker arm 18 angular position corresponds to a different actuator 5 pre-loading.

[0053] To move the rocker arm 18 to different angular positions and lock it in the desired angular position, the pre-loading means 17 comprise rocker arm 18 constraining means 19. In the preferred embodiment, said constraining means 19 comprise a screw 20 with a threaded portion 20a engaged by screwing into a threaded hole. The threaded hole is made in a protuberance 21 which rotates relative to and projects from the rocker arm 18 and engages with the screw 20 in a direction perpendicular to the axis of rotation A. The screw 20 also comprises a head which makes contact with a stop 22 integral with the container body 2 and an unthreaded portion 20b slidably engaging in the stop 22 integral with the container body 2. In this way, tightening or loosening the screw 20 in the threaded hole of the rocker arm 18 rotary protuberance 21 adjusts the rocker arm 18 angular position. To assist the screw 20 in adjusting the rocker arm 18 angular position, the constraining means 19 also comprise a long slot 23 made in the rocker arm 18, in which a pin 24 integral with the container body slidably engages. The slot 23 in the rocker arm 18 has the shape of a circular arc, with the ideal circle containing said arc having its centre at the axis A.

[0054] Advantageously, the device 1 also comprises adjusting means 25 integral with the container body 2 and which can be activated on the door 101 hinge 104 to adjust the distance between the door and the frame 103 of the wall unit 100.

[0055] For this purpose, the adjusting means 25, illustrated in detail in Figures 4 to 6, comprise a first plate-shaped element 26 which can slide relative to the container body 2 in a first direction Z. This sliding may be made possible, for example, by a rail coupling, of the known type and therefore not illustrated, or by equivalent means. A second plate-shaped element 27 slides relative to the first plate-shaped element 26 in a second direction X perpendicular to the first direction Z. The door 101 hinge 104 can be rotatably connected to this second plate-shaped element 27.

[0056] In this way, by moving the two plate-shaped elements 26, 27 which slide in the first direction Z and the second direction X, perpendicular to one another, the position of the hinge 104 can be adjusted relative to the wall unit 100 frame 103. These movements are made possible by drive means 28 operating between the first plate-shaped element 26 and the container body 2 and between the second plate-shaped element 27 and the first plate-shaped element 26.

[0057] More specifically, the drive means 28 comprise, as illustrated in Figures 4 and 5, at least one first screw 29 extending in the first direction Z, or in a direction par-

allel with it, having a threaded portion 29a which engages by screwing into a threaded hole made in a protuberance 30 of the first plate-shaped element 26. The first screw 29 also comprises a head which makes contact with a stop 31 integral with the container body 2 and an unthreaded portion 29b slidably engaging in the stop 31 integral with the container body 2. In this way, tightening or loosening the first screw 29 in the threaded hole in the protuberance 30 of the first plate-shaped element 26 adjusts the position of the first plate-shaped element 26 relative to the container body 2 in the first direction Z.

[0058] To hold the first plate-shaped element 26 in the required position, the first plate-shaped element 26 comprises at least one slot-like through hole 32 in which a threaded pin 33 integral with the container body 2 engages. The first plate-shaped element 26 is made integral with the container body 2 by a nut 34 which, when screwed onto the threaded pin 33, clamps the first plate-shaped element 26 against the container body 2. In the preferred embodiment, as illustrated in Figure 6, there are at least another two slot-like through holes 32a in the first plate-shaped element 26, in which the same number of threaded pins 33a engage (Figure 6 shows only one pin 33a and one slot 32a). The threaded pins 33a are clamped by respective nuts 34a with a self-lubricating washer, for example made of PTFE, allowing the first plate-shaped element 26 to slide during adjustment operations, basically operating as sliding guides for the first plate-shaped element 26 relative to the container body 2.

[0059] The drive means 28 also comprise, as illustrated in Figures 4 and 5, at least one second screw 35 extending in the second direction X, or in a direction parallel with it, having a threaded portion 35a engaged by screwing into a threaded hole made in the second plate-shaped element 27. The second screw 35 also comprises a head in contact with a stop 36 integral with the first plate-shaped element 26 and an unthreaded portion 35b slidably engaging in the stop 36 belonging to the first plate-shaped element 26. In this way, tightening or loosening the second screw 35 in the threaded hole in the second plate-shaped element 27 adjusts the position of the second plate-shaped element 27 relative to the first plate-shaped element 26, and so also to the container body 2, in the second direction X.

[0060] The second screw 35 makes contact with the stop 36 integral with the first plate-shaped element 26 even when partly loosened, that is to say, turned anti-clockwise, thanks to the action of the actuator 5, by means of the control rod 4, on the second plate-shaped element 27.

[0061] Advantageously, the pin 105 is rotatably supported by the second plate-shaped element 27, forming the rotary connection between the door 104 and the container body 2.

[0062] Again, to hold the second plate-shaped element 27 in the required position, there is a clamp screw 37 which engages in a slot-like through hole 38 in the second plate-shaped element 27 and is screwed into a threaded

hole in the first plate-shaped element 26.

[0063] It should be noticed that, to guarantee maximum efficiency, the clamping element 37, 33 for both the second plate-shaped element 27 relative to the first plate-shaped element 26 and for the first plate-shaped element 26 relative to the container body 2, act in directions at right angles respectively to the second direction X and to the first direction Z of sliding.

[0064] To adjust the position of the door 101 relative to the frame 103 in a third direction Y, perpendicular to both the first direction Z and the second direction X, the device 1 comprises translation means 39 which can be connected to the door 101, located on the outside of the container body 2 and able to connect directly to the wall unit 100 frame 103, as illustrated in Figure 7.

[0065] Said translation means 39 comprise a first connecting element 40 which can be connected to the frame 103 and a second connecting element 41 which can be connected to the door 101.

[0066] The two connecting elements 40, 41 are rotatably connected to one another by a hinge 42 with the same axis of rotation R as the door 101 relative to the frame 103. In particular, the first connecting element 40 consists of a plate 43 which can be connected to the frame 103 to which the hinge 42 is slidably connected between the first connecting element 40 and the second connecting element 41. The sliding connection is created by a long slot 44 made in the hinge 42 in which there is a screw 45 which engages by screwing into the plate 43. The slot 44 made in the hinge 42 extends chiefly in a direction coinciding with the third adjusting direction Y. Moreover, the second connecting element 41 comprises two halves 41a, 41b which can be moved away from one another in the first direction Z using grub screws 46 which engage by screwing into one 41b of the two halves, making contact with the other half 41a. The half 41a which acts as the stop for the grub screws 46 is the one to which the door 101 can be directly connected.

[0067] It should be noticed how the distance between the door and the wall unit frame can be adjusted in the second direction X on the translation means 39 too. For this purpose, the plate 43 comprises two long slots 43a extending in the second direction X, in which two screws 43b that can be screwed into the frame 103 engage.

[0068] Advantageously, the container body 2 comprises an inspection opening 47 which allows access to and operation of the adjusting means 25, the actuator 5 pre-loading means 17 and the means 12 for setting the spring 9a return force.

[0069] In particular, as shown in the accompanying drawings, all of the adjusting screws 15, 20, 29, 35 are directly opposite the inspection opening 47 in the container body 2. The inspection opening 47 is made accessible by a cover 48 in the container body 2 which, in the preferred embodiment, is completely removable from the container body 2 using pull-apart coupling means 49, for example Velcro®.

[0070] As indicated, the device 1 may be applied both

to wall units with a single horizontal door and to wall units with two or more horizontal doors. In particular, if the device 1 is to be applied to a single horizontal door, one device 1 on each of the two opposite outer walls of the wall unit is sufficient, with the door connected to the pins 105 and the adjusting means 25 used if necessary.

[0071] Similarly, to apply the device 1 to two or more horizontal doors on the same wall unit, simply fit the side walls of the wall unit and one or more of the middle walls of the wall unit with a device 1 and connect the door to the pins 105.

[0072] Regardless of the type of horizontal door to which the device 1 is applied, when a user begins opening the door of the wall unit, the door moves the control rod 4 from the second operating position towards the first operating position. The control rod 4 movement is facilitated by the return means 9 which, therefore, assist the user in lifting the door 101.

[0073] When the user closes the door, the control rod 4 engages with the intercepting projection 8 which activates the brake 7, slowing the door stroke, opposing the force of gravity and preventing the door from banging too violently against the wall unit frame. It should be emphasised that the spring 9a and the actuator 5 also contribute towards this braking action.

[0074] The present invention fulfils the preset aims.

[0075] The container body, housing all of the device elements, when applied to the outer wall of the frame, allows the inside of the wall unit to be furnished exclusively according to specifications for functional and ergonomic use, since there is no need to consider any space necessary for the movement of device elements.

[0076] Moreover, the device elements can be adjusted by simply removing the cover of the inspection opening and accessing the adjusting means which, as indicated, are directly opposite the inspection opening, making adjustments fast and easy.

[0077] The invention also brings important advantages.

[0078] The device is fully functional even when the actuator is only partly functional, for example when the elastic properties change due to prolonged use, since the actuator pre-loading means allow actuator pre-loading to be adjusted and restore it to a fully functional state.

[0079] Moreover, by making the device in the appropriate size, it is possible to move large doors, since the force which must be exerted by a user to open the door, that is to say, to lift the door, is partly reduced by the return means.

[0080] Also, the secondary means for the control rod prevent a violent impact between the door and the frame during door closing, since the door closing stroke is slowed.

[0081] Finally, the stable equilibrium position in a control rod intermediate position, corresponding to a door "half-open" configuration, allows partial access to the inside of the wall unit without having to completely open the door.

Claims

1. A device for rotatably connecting a door (101) to a wall unit (100) comprising at least one box-shaped container body (2) which can be connected to an outer wall (102) of the frame (103) of a wall unit (100); at least one control rod (4) housed in the container body (2) and rigidly connectable to a door (101) of the wall unit (100) at a door (101) horizontal axis of rotation (R) relative to the wall unit (100), the rod being mobile between a first operating position in which the door is open and a second operating position in which the door is closed; secondary means (6) for the control rod (4), connected to the container body (2) and operating on the control rod (4) at least to accelerate the control rod (4) during at least part of its movement between the second operating position and the first operating position,
characterised in that:
 - the rod (4) moves inside the container body (2);
 - the secondary means (6) comprise return means (9) for accelerating the control rod (4) from the second operating position towards the first operating position, a brake (7) and an intercepting projections (8) for intercepting the control rod (4) during its movement towards the second operating position;
 - the brake (7) and the intercepting projection (8) being operatively connected to one another and mobile relative to the container body (2) between a start of control rod (4) braking position and an end of control rod (4) braking position, slowing the control rod (4) stroke once the intercepting projection (8) is engaged;
 - the return means (4) comprising at least one spring (9a) operatively connected between the container body (2) and the intercepting projection (8); such that when the control rod (4) moves towards the first operating position, the spring (9a) exerts a return force which accelerates the control rod (4) assisting the user in opening the door (101) and by virtue of being integral with the intercepting projection (8), the spring (9a) returns the intercepting projection (8) and the brake (7) to the start of breaking position; and such that during the movement of the control rod (4) towards the second operating position the spring (9a) assists the brake (7) in its breaking action on the control rod (4), this effect beginning when the control rod (4), as it moves towards the second operating position, engages with the intercepting projection (8).
2. The device according to claim 1, comprising a pin (105) rotatably connected to the container body (2), connected to the control rod (4) and able to form a stable connection to the door (101); the pin rotating integrally with the door about the axis of rotation (R).
3. The device according to claim 1, **characterised in that** the container body (2) comprises a cover (48) forming an inspection opening (47) for access to the inside of the container body (2).
4. The device according to claim 2, **characterised in that** the control rod (4) has a first end (4a) which is rigidly connectable to the door (101), said intercepting projection (8) is designed to intercept a second end (4b) of the control rod (4), opposite the end (4a) which can be connected to the door (101) by the pin (105), during its motion from the first towards the second operating position.
5. The device according to any of the previous claims, **characterised in that** the secondary means (6) comprise means (12) for setting the spring (9a) return force.
6. The device according to any of the previous claims, in which the brake (7) comprises a rack (10) integral with the intercepting projection (8) and with which a toothed rotary damper (11) connected to the container body (2) engages.
7. The device according to claim 3, comprising adjusting means (25) located in the container body (2) which can be activated at least on a door (101) hinge (104) to adjust the distance between the door (101) hinge (104) and the wall unit (100) frame (103); it being possible to set the adjusting means (25) through the inspection opening (47) in the container body (2).
8. The device according to claim 7, in which the adjusting means (25) comprise a first plate-shaped element (26) sliding relative to the container body (2) in a first direction (z), a second plate-shaped element (27) sliding relative to the first plate-shaped element (26) in a second direction (X) perpendicular to the first direction (Z) and drive means (28) for moving respectively the first plate-shaped element (26) relative to the container body (2) and the second plate-shaped element (27) relative to the first plate-shaped element (26); the pin (105) being rotatably connected to the second plate-shaped element (27).
9. The device according to claim 8, in which the drive means (28) comprise at least one first screw (29) having: a head in contact with a stop (31) integral with the container body (2); an unthreaded portion (29b) slidably engaging in the stop (31) integral with the container body (2) and a threaded portion (29a) engaging by screwing into the first plate-shaped element (26), in the first direction (Z); the drive means (28) also comprising at least one second screw (35)

having: a head in contact with a stop (36) integral with the first plate-shaped element (26); an unthreaded portion (35b) slidably engaging in the stop (36) integral with the first plate-shaped element (26) and a threaded portion (35a) engaging by screwing into the second plate-shaped element (27), in the second direction (X).

10. The device according to any of the previous claims, comprising at least one actuator (5) having a first end (5a) rotatably connected to the container body (2) and a second end (5b) rotatably connected to the control rod (4), for accompanying the control rod (4) between the first and the second operating positions, the return means (9) comprising the actuator (5) for accelerating the control rod (4) at least during part of its movement from the second operating position towards the first operating position.

11. The device according to claim 10, comprising actuator (5) pre-loading means (17) operating between the container body (2) and the first end (5a) of the actuator (5); it being possible to set the pre-loading means (17) through the inspection opening (47) in the container body (2).

12. The device according to claim 11, in which the pre-loading means (17) comprise a rocker arm (18) rotatably connected to the container body (2) along an axis of rotation (A) and mobile between a plurality of angular positions, means (19) for constraining the rocker arm (18) in a selected angular position; the actuator (5) having the first end (5a) rotatably connected to the rocker arm (18) in an eccentric position relative to the axis of rotation (A), for applying predetermined pre-loading to the actuator (5) according to the angular position or the rocker arm (18).

13. The device according to claim 12, in which the constraining means (19) comprise a screw (20) having: a head in contact with a stop (22) integral with the container body (2); an unthreaded portion (20b) slidably engaging in the stop (22) integral with the container body (2) and a threaded portion (20a) engaging by screwing into a threaded hole in the rocker arm (18) perpendicular to the axis of rotation (A).

14. The device according to any of the claims from 10 to 13, **characterised in that** the actuator (5) reaches its least extended configuration in an intermediate operating position between the first and the second, in particular in the position in which the control rod (4) engages with the intercepting projection (8).

15. The device according to any of the claims from 10 to 14, **characterised in that** with the control rod in its second operating position the actuator (5) is in an intermediate extension configuration.

16. The device according to any of the claims from 10 to 15, **characterised in that** the actuator (5) is in its most extended condition when the control rod (4) is in its first operating position.

17. The device according to any of the claims from 10 to 16, **characterised in that** the actuator (5) acts like a compressed spring when the control rod (4) moves from the intermediate operating position of disengagement from the intercepting projection (8) towards the first operating position and when the control rod (4) moves from the intermediate operating position of engagement with the intercepting projection 8 towards the second operating position.

18. The device according to any of the claims from 10 to 17, **characterised in that** the actuator (5) behaves like an extended spring when the control rod (4) moves from the first operating position towards the intermediate operating position of engagement with the intercepting projection (8) and when the control rod (4) moves from the second operating position towards the intermediate operating position of engagement with the intercepting projection (8).

19. The device according to any of the claims from 10 to 18, **characterised in that** the actuator (5) consists of a gas spring.

20. The device according to any of the claims from 10 to 19, **characterised in that** the actuator (5) consists of a single acting actuator.

21. The device according to any of the claims from 10 to 20, **characterised in that** the actuator (5) consists of a double acting actuator.

22. A wall unit comprising a frame and at least one door which can be rotatably connected to the frame along a horizontal axis of rotation (R), **characterised in that** it comprises at least one device according to one or more of the claims from 1 to 21 for rotatably connecting at least one door to the wall unit along said axis of rotation (R).

Patentansprüche

1. Vorrichtung zur drehbaren Befestigung einer Türklappe (101) an einem Wandschrank (100), enthaltend wenigstens einen kastenförmigen Aufnahmekörper (2), welcher an eine Aussenwand (102) des Rahmens (103) von einem Wandschrank (100) angeschlossen werden kann; wenigstens eine Betätigungsstange (4), angeordnet in dem Aufnahmekörper (2) und starr anschliessbar an eine Türklappe (101) des Wandschranks (100) an eine horizontale

Drehachse (R) der Türklappe (101) im Verhältnis zu dem Wandschrank (100), wobei die Stange beweglich ist zwischen einer ersten Betriebsposition, in welcher die Türklappe geöffnet ist, und einer zweiten Betriebsposition, in welcher die Türklappe geschlossen ist; Bedienungsmittel (6) für die Betätigungsstange (4), angebracht an dem Aufnahmekörper (2) und auf die Betätigungsstange (4) einwirkend, und zwar wenigstens zum Beschleunigen der Betätigungsstange (4) während wenigstens einem Teil ihrer Bewegung zwischen der zweiten Betriebsposition und der ersten Betriebsposition, **dadurch gekennzeichnet, dass:**

- sich die Stange (4) im Inneren des Aufnahmekörpers bewegt;
- die Bedienungsmittel (6) Rückholmittel (9) enthalten, und zwar zum Beschleunigen der Betätigungsstange (4) aus der zweiten Betriebsposition in die erste Betriebsposition, eine Bremse (7) und einen Abfangvorsprung (8) zum Abfangen der Betätigungsstange (4) während ihrer Bewegung in die zweite Betriebsposition;
- die Bremse (7) und der Abfangvorsprung (8) betrieblich miteinander verbunden und im Verhältnis zu dem Aufnahmekörper (2) beweglich sind zwischen einer Position des Bremsbeginns der Betätigungsstange (4) und einer Position des Bremsendes der Betätigungsstange (4), wobei der Schub der Betätigungsstange (4) verlangsamt wird, sobald der Abfangvorsprung (8) gegriffen hat;
- die Rückholmittel (9) wenigstens eine Feder (9a) enthalten, betrieblich eingesetzt zwischen dem Aufnahmekörper (2) und dem Abfangvorsprung (8), so dass, wenn sich die Betätigungsstange (4) in die erste Betriebsposition bewegt, die Feder (9a) eine Rückholkraft ausübt, welche die Betätigungsstange (4) beschleunigt und den Benutzer beim Öffnen der Türklappe (101) unterstützt, und **dadurch**, dass sie integral ist mit dem Abfangvorsprung (8), zieht die Feder (9a) den Abfangvorsprung (8) zurück und somit die Bremse (7) in die Position des Bremsbeginns; und solche, dass während der Bewegung der Betätigungsstange (4) in die zweite Betriebsposition die Feder (9a) die Bremse (7) in ihrer Bremswirkung auf die Betätigungsstange (4) unterstützt, wobei diese Wirkung beginnt, wenn die Betätigungsstange (4), sobald sie sich in die zweite Betriebsposition bewegt, mit dem Abfangvorsprung (8) eingreift.

2. Vorrichtung nach Patentanspruch 1, enthaltend einen Zapfen (105), drehbar angeschlossen an den Aufnahmekörper (2), verbunden mit der Betätigungsstange (4) und in der Lage, eine stabile Verbindung mit der Türklappe (101) herzustellen; wobei

sich der Zapfen fest verbunden mit der Türklappe um die Drehachse (R) dreht.

3. Vorrichtung nach Patentanspruch 1, **dadurch gekennzeichnet, dass** der Aufnahmekörper (2) einen Deckel (48) enthält, der eine Inspektionsöffnung (47) für den Zugang zum Inneren des Aufnahmekörpers (2) bildet.
4. Vorrichtung nach Patentanspruch 2, **dadurch gekennzeichnet, dass** die Betätigungsstange (4) ein erstes Ende (4a) hat, welches starr an die Türklappe (101) anschliessbar ist, wobei der genannte Abfangvorsprung (8) dazu bestimmt ist, ein zweites, dem Ende (4a) entgegengesetztes Ende (4b) der Betätigungsstange (4) abzufangen, welches durch den Zapfen (105) mit der Türklappe (101) verbunden werden kann, und zwar während der Bewegung aus der ersten in die zweite Betriebsposition.
5. Vorrichtung nach einem beliebigen der vorstehenden Patentansprüche, **dadurch gekennzeichnet, dass** die Bedienungsmittel (6) Mittel (12) zum Einstellen der Rückholkraft der Feder (9a) enthalten.
6. Vorrichtung nach einem Beliebigen der vorstehenden Patentansprüche, bei welcher die Bremse (7) eine Zahnstange (10) enthält, fest verbunden mit dem Abfangvorsprung (8), und in welche ein sich drehender verzahnter Dämpfer (11) greift, der an den Aufnahmekörper (2) angeschlossen ist.
7. Vorrichtung nach Patentanspruch 3, enthaltend in dem Aufnahmekörper (2) angeordnete Einstellmittel (25), welche wenigstens an einem Scharnier (104) der Türklappe (101) aktiviert werden können, um den Abstand zwischen dem Scharnier (104) der Türklappe (101) und dem Rahmen (103) des Wandschranks (100) zu regulieren; wobei es möglich ist, die Einstellmittel (25) durch die Inspektionsöffnung (47) in dem Aufnahmekörper (2) zu betätigen.
8. Vorrichtung nach Patentanspruch 7, bei welcher die Einstellmittel (25) ein erstes plattenförmiges Element (26) enthalten, gleitend im Verhältnis zu dem Aufnahmekörper (2) in einer ersten Richtung (Z), ein zweites plattenförmiges Element (27), gleitend im Verhältnis zu dem ersten plattenförmigen Element (26) in einer zweiten Richtung (X) lotrecht zu der ersten Richtung (Z), sowie Antriebsmittel (28) zum Bewegen jeweils des ersten plattenförmigen Elementes (26) im Verhältnis zu dem Aufnahmekörper (2) und des zweiten plattenförmigen Elementes (27) im Verhältnis zu dem ersten plattenförmigen Element (26); wobei der Zapfen (105) drehbar an dem zweiten plattenförmigen Element (27) angebracht ist.

9. Vorrichtung nach Patentanspruch 8, bei welcher die Antriebsmittel (28) wenigstens eine erste Schraube (29) enthalten, aufweisend: einen Kopf im Kontakt mit einem mit dem Aufnahmekörper (2) fest verbundenen Anschlag (31); einen gewindelosen Abschnitt (29b), gleitbar in den mit dem Aufnahmekörper (2) fest verbundenen Anschlag (31) greifend, und einen Gewindeabschnitt (29a), der durch Einschrauben in das erste plattenförmige Element (26) in der ersten Richtung (Z) greift; wobei die Antriebsmittel (28) ebenfalls wenigstens eine zweite Schraube (35) enthalten, aufweisend: einen Kopf im Kontakt mit einem mit dem ersten plattenförmigen Element (26) fest verbundenen Anschlag (36); einen gewindelosen Abschnitt (35b), gleitbar in den mit dem ersten plattenförmigen Element (26) fest verbundenen Anschlag (36) greifend, und einen Gewindeabschnitt (35a), der durch Einschrauben in das zweite plattenförmige Element (27) in der zweiten Richtung (X) greift.
10. Vorrichtung nach einem beliebigen der vorstehenden Patentansprüche, enthaltend wenigstens einen Stellantrieb (5), der ein erstes Ende (5a) drehbar an den Aufnahmekörper (2) angeschlossen hat und ein zweites Ende (5b) drehbar an die Betätigungsstange (4) angeschlossen hat, um die Betätigungsstange (4) zwischen den ersten und zweiten Betriebspositionen zu führen, wobei die Rückholmittel (9) den Stellantrieb (5) enthalten, um die Betätigungsstange (4) wenigstens während ihrer Bewegungsstrecke aus der zweiten Betriebsposition in die erste Betriebsposition zu beschleunigen.
11. Vorrichtung nach Patentanspruch 10, enthaltend Vorspannmittel (17) für den Stellantrieb (5), die zwischen dem Aufnahmekörper (2) und dem ersten Ende (5a) des Stellantriebes (5) arbeiten; wobei es möglich ist, die Vorspannmittel (17) durch die Inspektionsöffnung (47) in dem Aufnahmekörper (2) einzustellen.
12. Vorrichtung nach Patentanspruch 11, bei welcher die Vorspannmittel (17) einen Kipphebel (18) enthalten, drehbar angeschlossen an den Aufnahmekörper (2) entlang einer Drehachse (A) und beweglich zwischen einer Anzahl von Winkelpositionen, sowie Mittel (19) zum Halten des Kipphebels (18) in einer gewählten Winkelposition; wobei der Stellantrieb (5) das erste Ende (5a) drehbar an den Kipphebel (18) angeschlossen hat, und zwar in einer exzentrischen Position im Verhältnis zu der Drehachse (A), um eine vorgegebene Vorspannung an dem Stellantrieb (5) anzubringen, je nach der Winkelposition des Kipphebels (18).
13. Vorrichtung nach Patentanspruch 12, bei welcher die Haltemittel (19) eine Schraube (20) enthalten, die wie folgt aufweist: einen Kopf im Kontakt mit einem Anschlag (22), fest verbunden mit dem Aufnahmekörper (2); einen gewindelosen Abschnitt (20b), der gleitbar in den fest mit dem Aufnahmekörper (2) verbundenen Anschlag (22) greift, und einen Gewindeabschnitt (20a), der durch Einschrauben in eine Gewindebohrung in dem Kipphebel (18) lotrecht zu der Drehachse (A) greift.
14. Vorrichtung nach einem beliebigen der Patentansprüche von 10 bis 13, **dadurch gekennzeichnet, dass** der Stellantrieb (5) wenigstens seine ausgefahrene Konfiguration in einer mittleren Betriebsposition zwischen der ersten und der zweiten erreicht, insbesondere in der Position, in welcher die Betätigungsstange (4) sich mit dem Abfangvorsprung (8) verbindet.
15. Vorrichtung nach einem beliebigen der Patentansprüche von 10 bis 14, **dadurch gekennzeichnet, dass** mit der Betätigungsstange in ihrer zweiten Betriebsposition sich der Stellantrieb (5) in einer mittleren Ausfahrkonfiguration befindet.
16. Vorrichtung nach einem beliebigen der Patentansprüche von 10 bis 15, **dadurch gekennzeichnet, dass** der Stellantrieb (5) sich in dem weitest ausgefahrenen Zustand befindet, wenn die Betätigungsstange (4) in ihrer ersten Betriebsposition ist.
17. Vorrichtung nach einem beliebigen der Patentansprüche von 10 bis 16, **dadurch gekennzeichnet, dass** Stellantrieb (5) wie eine komprimierte Feder wirkt, wenn sich die Betätigungsstange (4) aus der mittleren Betriebsposition der Freigabe von dem Abfangvorsprung (8) in die erste Betriebsposition bewegt, und wenn sich die Betätigungsstange (4) aus der mittleren Betriebsposition des Eingreifens mit dem Abfangvorsprung (8) in die zweite Betriebsposition bewegt.
18. Vorrichtung nach einem beliebigen der Patentansprüche von 10 bis 17, **dadurch gekennzeichnet, dass** der Stellantrieb (5) sich wie eine ausgedehnte Feder verhält, wenn sich die Betätigungsstange (4) aus der ersten Betriebsposition in die mittlere Betriebsposition des Eingriffs mit dem Abfangvorsprung (8) bewegt, und wenn sich die Betätigungsstange (4) aus der zweiten Betriebsposition in die mittlere Betriebsposition des Eingriffs mit dem Abfangvorsprung (8) bewegt.
19. Vorrichtung nach einem beliebigen der Patentansprüche von 10 bis 18, **dadurch gekennzeichnet, dass** der Stellantrieb (5) aus einer Gasfeder besteht.
20. Vorrichtung nach einem beliebigen der Patentansprüche von 10 bis 19, **dadurch gekennzeichnet,**

dass der Stellantrieb (5) aus einem einfachwirkenden Antrieb besteht.

21. Vorrichtung nach einem beliebigen der Patentansprüche von 10 bis 20, **dadurch gekennzeichnet**, **dass** der Stellantrieb (5) aus einem doppeltwirkenden Antrieb besteht. 5
22. Wandschrank, enthaltend einen Rahmen und wenigstens eine Türklappe, welche drehbar an den Rahmen entlang einer horizontalen Drehachse (R) angeschlossen werden kann, **dadurch gekennzeichnet**, **dass** er wenigstens eine Vorrichtung nach einem oder mehreren der Patentansprüche von 1 bis 21 enthält, um drehbar wenigstens eine Türklappe entlang der genannten Drehachse (R) an den Wandschrank anzuschliessen. 10 15

Revendications 20

1. Dispositif pour fixer de manière rotative une porte (101) à un élément mural (100) comprenant au moins un corps conteneur en forme de boîte (2) pouvant être relié à une paroi externe (102) du châssis (103) d'un élément mural (100); au moins une tige de commande (4) logée dans le corps conteneur (2) et rigidement connectable à une porte (101) de l'élément mural (100) en correspondance d'un axe horizontal de rotation (R) de la porte (101) par rapport à l'élément mural (100), la tige étant mobile entre une première position opérationnelle dans laquelle la porte est ouverte et une seconde position opérationnelle dans laquelle la porte est fermée; des moyens secondaires (6) pour la tige de commande (4), connectés au corps conteneur (2) et opérant sur la tige de commande (4) au moins pour accélérer la tige de commande (4) pendant au moins une partie de ses mouvements entre la seconde position opérationnelle et la première position opérationnelle, **caractérisé en ce que**: 25 30 35 40

- la tige (4) se déplace à l'intérieur du corps conteneur (2);
- les moyens secondaires (6) comprennent des moyens de rappel (9) pour accélérer la tige de commande (4) de la seconde position opérationnelle vers la première position opérationnelle, un frein (7) et des appendices d'interception (8) pour intercepter la tige de commande (4) pendant son mouvement vers la seconde position opérationnelle;
- le frein (7) et l'appendice d'interception (8) étant opérationnellement connectés l'un à l'autre et mobiles par rapport au corps conteneur (2) entre le début et la fin de la position de freinage de la tige de commande (4), en ralentissant la course de la tige de commande (4) une fois 45 50 55

que l'appendice d'interception (8) est engagé;
- les moyens de rappel (4) comprenant au moins un ressort (9a) opérationnellement connecté entre le corps conteneur (2) et l'appendice d'interception (8); de telle manière que, lorsque la tige de commande (4) se déplace vers la première position opérationnelle, le ressort (9a) exerce une force de rappel qui accélère la tige de commande (4) en assistant l'utilisateur dans l'ouverture de la porte (101) et, en vertu du fait qu'il fait partie intégrante de l'appendice d'interception (8), le ressort (9a) ramène l'appendice d'interception (8) et le frein (7) au début de la position de freinage; et de telle manière que pendant le mouvement de la tige de commande (4) vers la seconde position opérationnelle, le ressort (9a) assiste le frein (7) dans son action de freinage sur la tige de commande (4), cet effet commençant lorsque la tige de commande (4), quand elle se déplace vers la seconde position opérationnelle, engage l'appendice d'interception (8).

2. Dispositif selon la revendication 1, comprenant un axe (105) connecté en rotation au corps conteneur (2), connecté à la tige de commande (4) et pouvant former une connexion stable avec la porte (101); l'axe pivotant avec la porte autour de l'axe de rotation (R). 25 30
3. Dispositif selon la revendication 1, **caractérisé en ce que** le corps conteneur (2) comprend un capot (48) formant une ouverture d'inspection (47) permettant d'accéder à l'intérieur du corps conteneur (2). 35 40
4. Dispositif selon la revendication 2, **caractérisé en ce que** la tige de commande (4) présente une première extrémité (4a) pouvant être rigidement connectée à la porte (101), ledit appendice d'interception (8) est conçu pour intercepter une seconde extrémité (4b) de la tige de commande (4), opposée à l'extrémité (4a) pouvant être connectée à la porte (101) par l'axe (105), pendant son mouvement de la première à la seconde position opérationnelle. 45 50 55
5. Dispositif selon n'importe laquelle des revendications précédentes, **caractérisé en ce que** les moyens secondaires (6) comprennent des moyens (12) de réglage de la force de rappel du ressort (9a).
6. Dispositif selon n'importe laquelle des revendications précédentes, dans lequel le frein (7) comprend une crémaillère (10) faisant partie intégrante de l'appendice d'interception (8) et sur laquelle s'engage un amortisseur rotatif denté (11) connecté au corps conteneur (2).
7. Dispositif selon la revendication 3, comprenant des moyens de réglage (25) situés dans le corps conte-

- neur (2) et activables au moins sur la charnière (104) d'une porte (101) pour régler la distance entre la charnière (104) de la porte (101) et le châssis (103) de l'élément mural (100); étant possible d'accéder aux moyens de réglage (25) au travers de l'ouverture d'inspection (47) dans le corps conteneur (2).
8. Dispositif selon la revendication 7, dans lequel les moyens de réglage (25) comprennent un premier élément en forme de plaque (26) couissant par rapport au corps conteneur (2) dans une première direction (z), un second élément en forme de plaque (27) couissant par rapport au premier élément en forme de plaque (26) dans une seconde direction (x) perpendiculaire à la première direction (z) et des moyens d'actionnement (28) pour déplacer respectivement le premier élément en forme de plaque (26) par rapport au corps conteneur (2) et le second élément en forme de plaque (27) par rapport au premier élément en forme de plaque (26); l'axe (105) étant connecté en rotation au second élément en forme de plaque (27).
9. Dispositif selon la revendication 8, dans lequel les moyens d'actionnement (28) comprennent au moins une première vis (29) pourvue de: une tête en contact avec une butée (31) faisant partie intégrante du corps conteneur (2); une portion non filetée (29b) s'engageant de manière coulissante dans la butée (31) intégrale du corps conteneur (2) et une portion filetée (29a) engageant par vissage le premier élément en forme de plaque (26), dans la première direction (z); les moyens d'actionnement (28) comprenant également une seconde vis (35) pourvue de: une tête en contact avec une butée (36) faisant partie intégrante du premier élément en forme de plaque (26); une portion non filetée (35b) s'engageant de manière coulissante dans la butée (36) intégrale du premier élément en forme de plaque (26) et une portion filetée (35a) s'engageant par vissage dans le second élément en forme de plaque (27), dans la seconde direction (X).
10. Dispositif selon n'importe laquelle des revendications précédentes, comprenant au moins un actionneur (5) ayant une première extrémité (5a) relié en rotation au corps conteneur (2) et une seconde extrémité (5b) reliée en rotation à la tige de commande (4), pour accompagner la tige de commande (4) entre la première et la seconde position opérationnelle, les moyens de rappel (9) comprenant l'actionneur (5) pour accélérer la tige de commande (4) au moins pendant une partie de son mouvement de la seconde position opérationnelle à la première position opérationnelle.
11. Dispositif selon la revendication 10, comprenant des moyens de pré-charge (17) de l'actionneur (5) opérant entre le corps conteneur (2) et la première extrémité (5a) de l'actionneur (5); étant possible de régler les moyens de pré-charge (17) au travers de l'ouverture d'inspection (47) dans le corps conteneur (2).
12. Dispositif selon la revendication 11, dans lequel les moyens de pré-charge (17) comprennent un balancier (18) relié en rotation au corps conteneur (2) le long d'un axe de rotation (A) et mobile entre une pluralité de positions angulaires, et des moyens (19) de maintien du balancier (18) dans une position angulaire sélectionnée; l'actionneur (5) ayant la première extrémité (5a) reliée en rotation au balancier (18) dans une position excentrique par rapport à l'axe de rotation (A), pour appliquer une pré-charge prédéterminée sur l'actionneur (5) selon la position angulaire du balancier (18).
13. Dispositif selon la revendication 12, dans lequel les moyens de maintien (19) comprennent une vis (20) pourvue de: une tête en contact avec une butée (22) faisant partie intégrante du corps conteneur (2); une portion non filetée (20b) engagée de manière coulissante dans la butée (22) intégrale du corps conteneur (2) et une portion filetée (20a) s'engageant par vissage dans un orifice taraudé dans le basculeur (18) perpendiculaire à l'axe de rotation (A).
14. Dispositif selon n'importe laquelle des revendications 10 à 13, **caractérisé en ce que** l'actionneur (5) atteint sa configuration la moins étendue dans une position opérationnelle intermédiaire entre la première et la seconde, en particulier dans la position dans laquelle la tige de commande (4) engage l'appendice d'interception (8).
15. Dispositif selon n'importe laquelle des revendications 10 à 14, **caractérisé en ce que**, avec la tige de commande dans sa seconde position opérationnelle, l'actionneur (5) se trouve dans une configuration d'extension intermédiaire.
16. Dispositif selon n'importe laquelle des revendications 10 à 15, **caractérisé en ce que** l'actionneur (5) se trouve dans sa configuration la plus étendue lorsque la tige de commande (4) se trouve dans sa première configuration opérationnelle.
17. Dispositif selon n'importe laquelle des revendications 10 à 16, **caractérisé en ce que** l'actionneur (5) agit comme un ressort comprimé lorsque la tige de commande (4) se déplace de la position opérationnelle intermédiaire de désengagement de l'appendice d'interception (8) à la première position opérationnelle, et lorsque la tige de commande (4) se déplace de la position opérationnelle intermédiaire d'engagement avec l'appendice d'interception (8) à

la seconde position opérationnelle.

18. Dispositif selon n'importe laquelle des revendications 10 à 17, **caractérisé en ce que** l'actionneur (5) agit comme un ressort étiré lorsque la tige de commande (4) se déplace de la première position opérationnelle à la position opérationnelle intermédiaire d'engagement avec l'appendice d'interception (8), et lorsque la tige de commande (4) se déplace de la seconde position opérationnelle à la position opérationnelle intermédiaire d'engagement avec l'appendice d'interception (8). 5 10
19. Dispositif selon n'importe laquelle des revendications 10 à 18, **caractérisé en ce que** l'actionneur (5) consiste en un ressort à gaz. 15
20. Dispositif selon n'importe laquelle des revendications 10 à 19, **caractérisé en ce que** l'actionneur (5) consiste en un actionneur simple effet. 20
21. Dispositif selon n'importe laquelle des revendications 10 à 20, **caractérisé en ce que** l'actionneur (5) consiste en un actionneur double effet. 25
22. Élément mural comprenant un châssis et au moins une porte pouvant être connectée en rotation au châssis le long d'un axe horizontal de rotation (R), **caractérisé en ce qu'il** comprend au moins un dispositif selon une ou plusieurs des revendications 1 à 21 pour relier en rotation au moins une porte à l'élément mural le long dudit axe de rotation (R). 30

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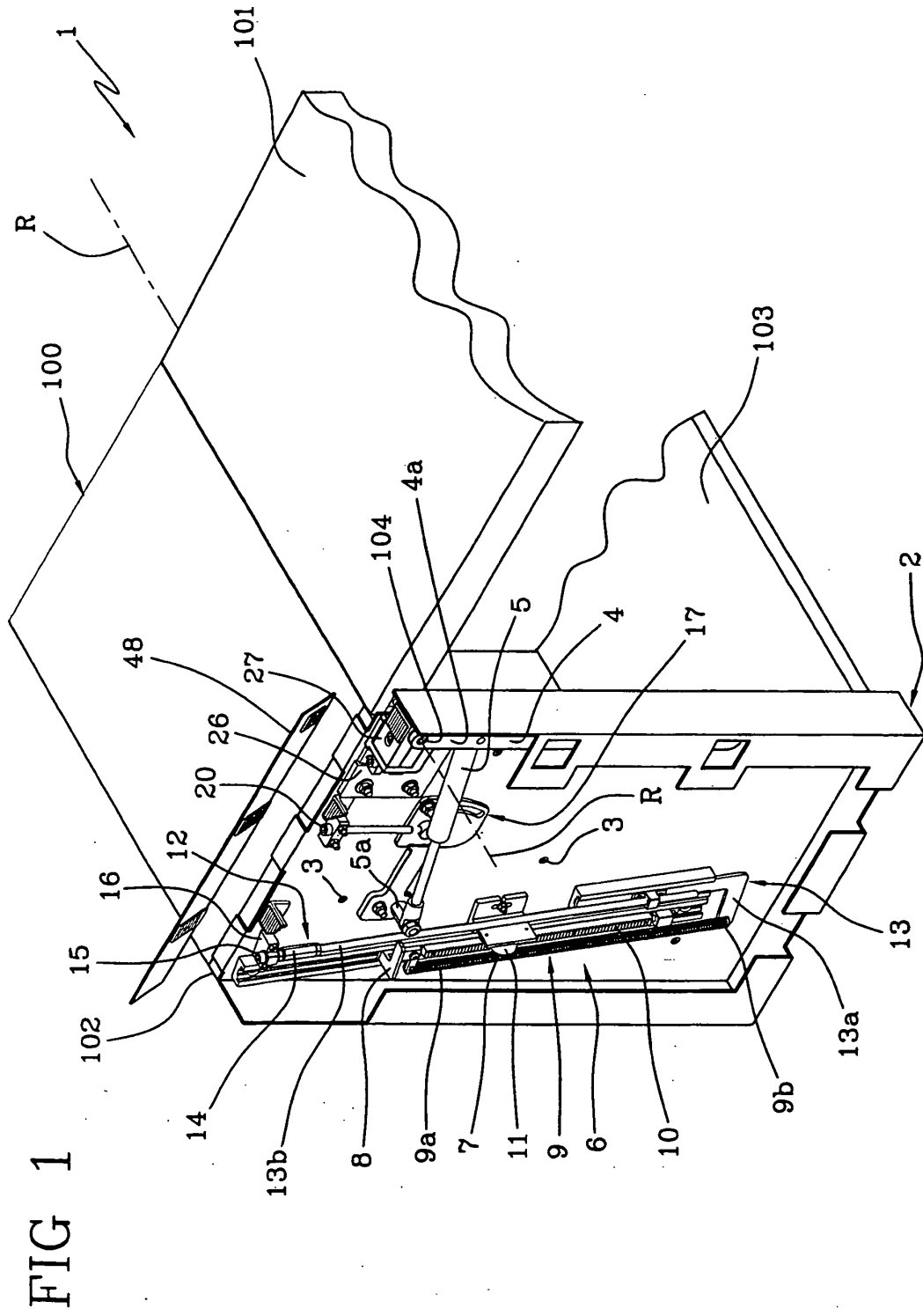


FIG 2

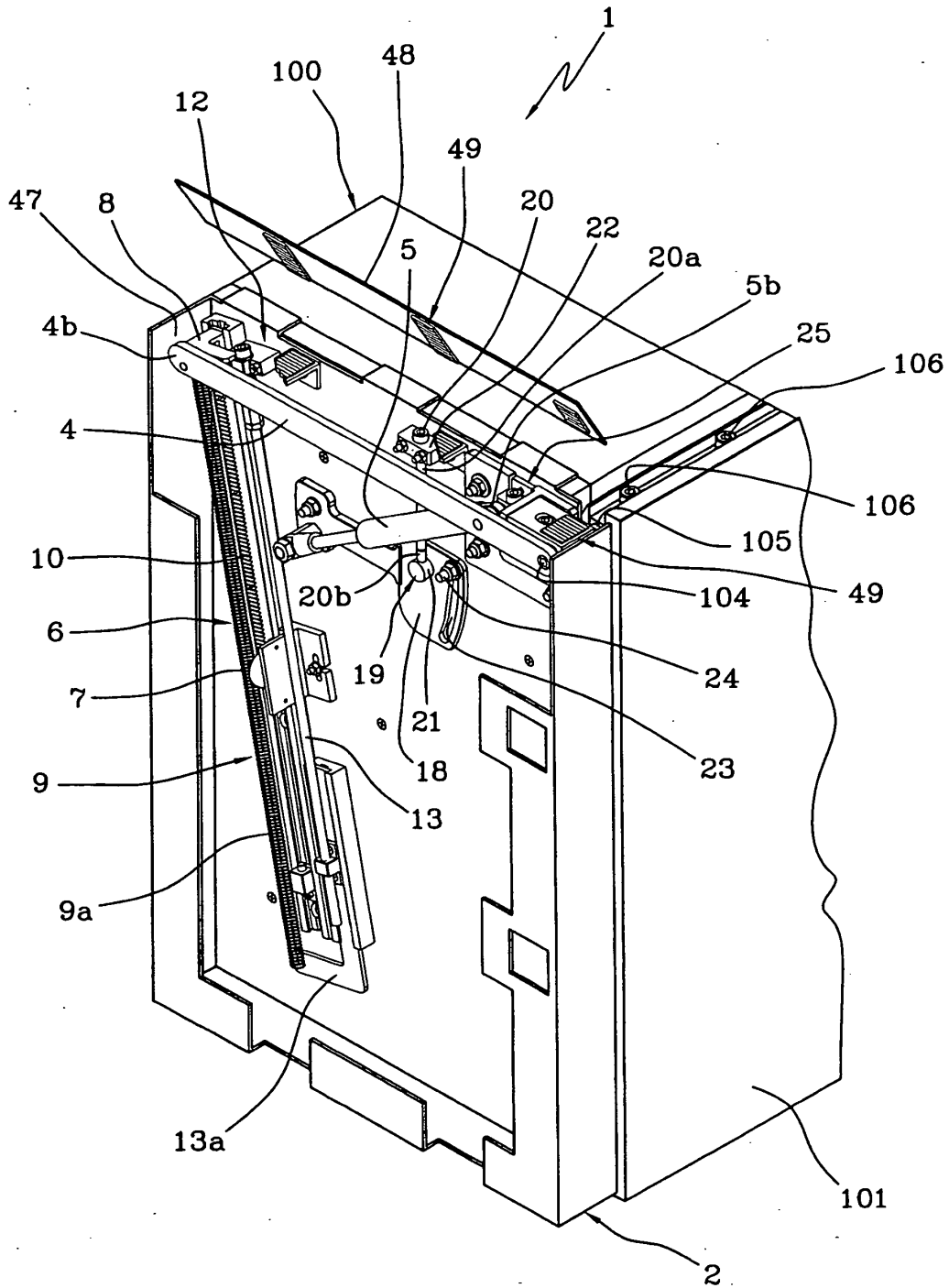


FIG 3

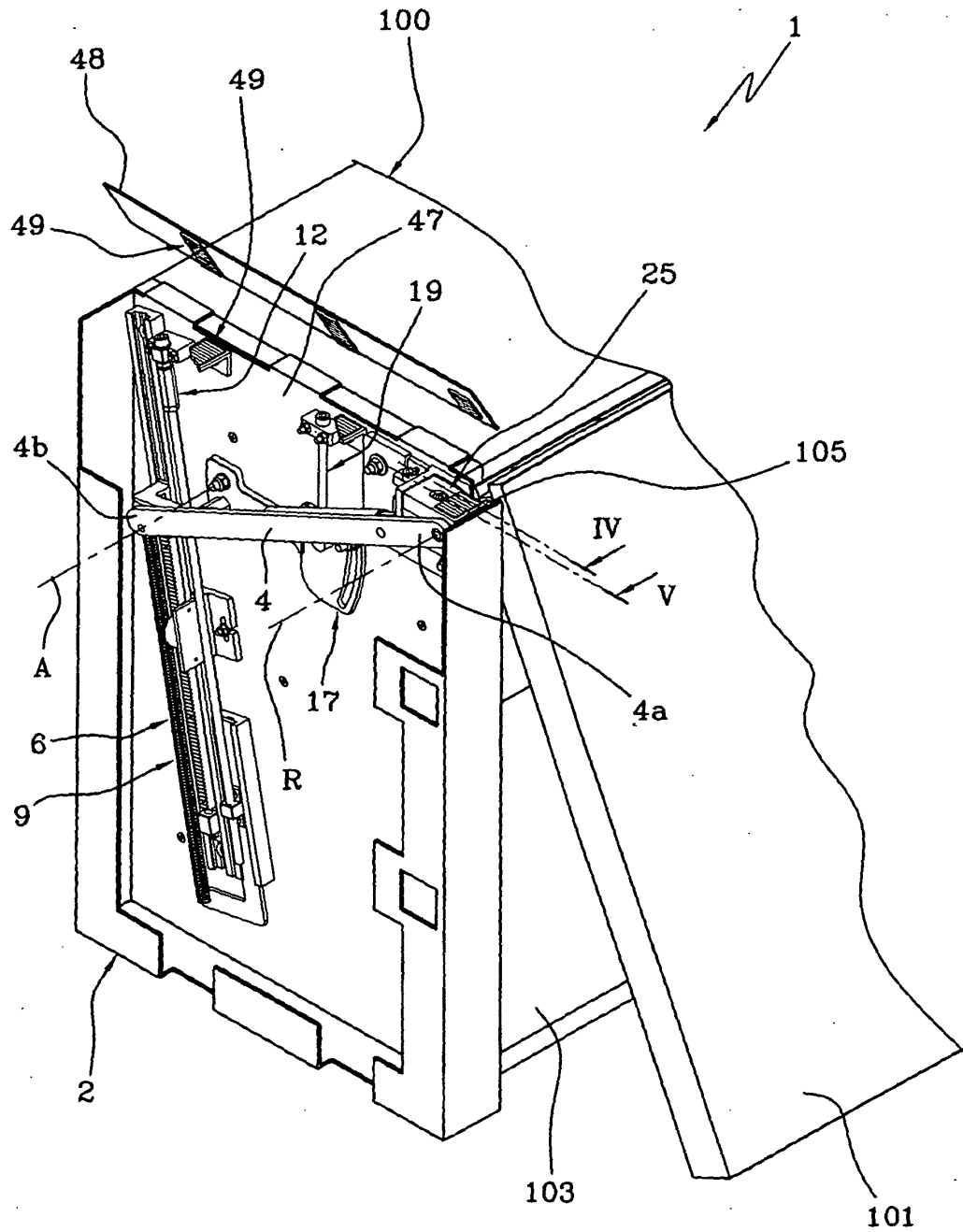


FIG 4

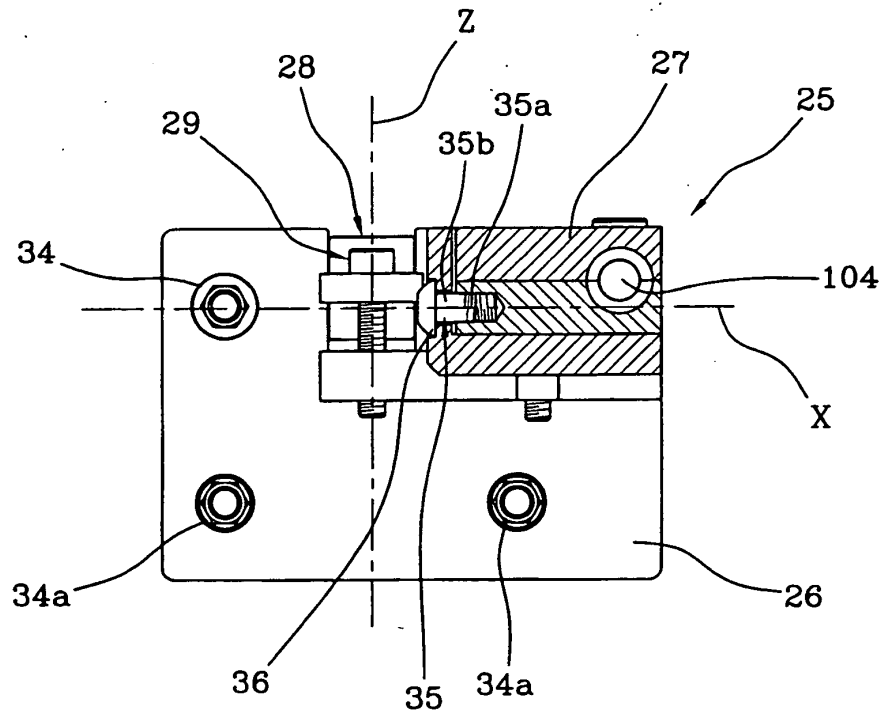


FIG 5

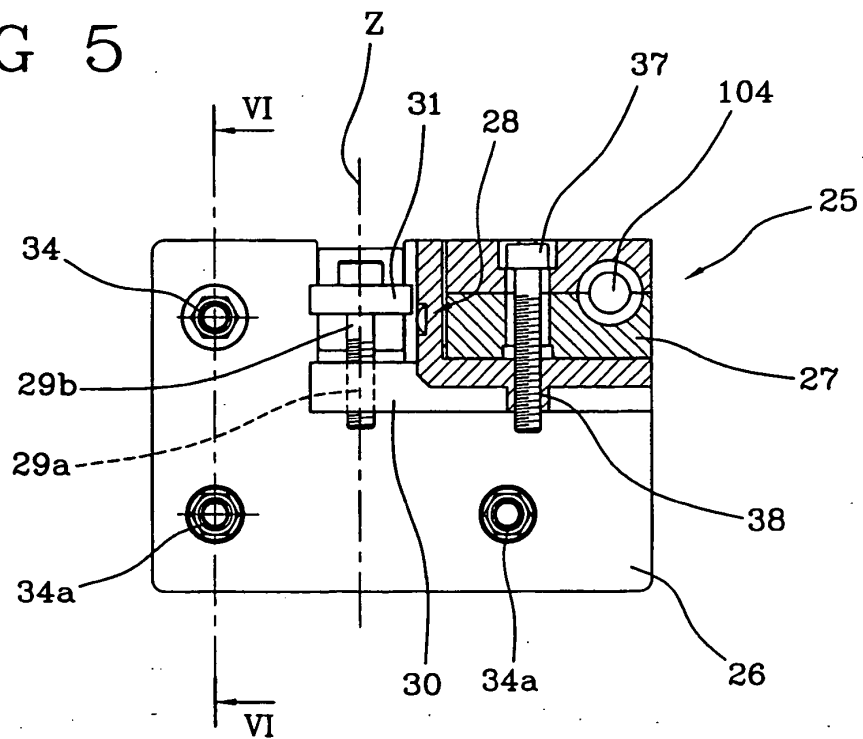


FIG 6

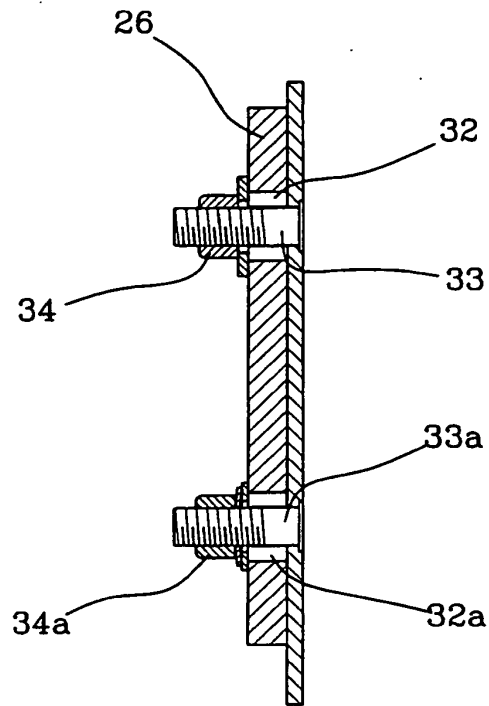
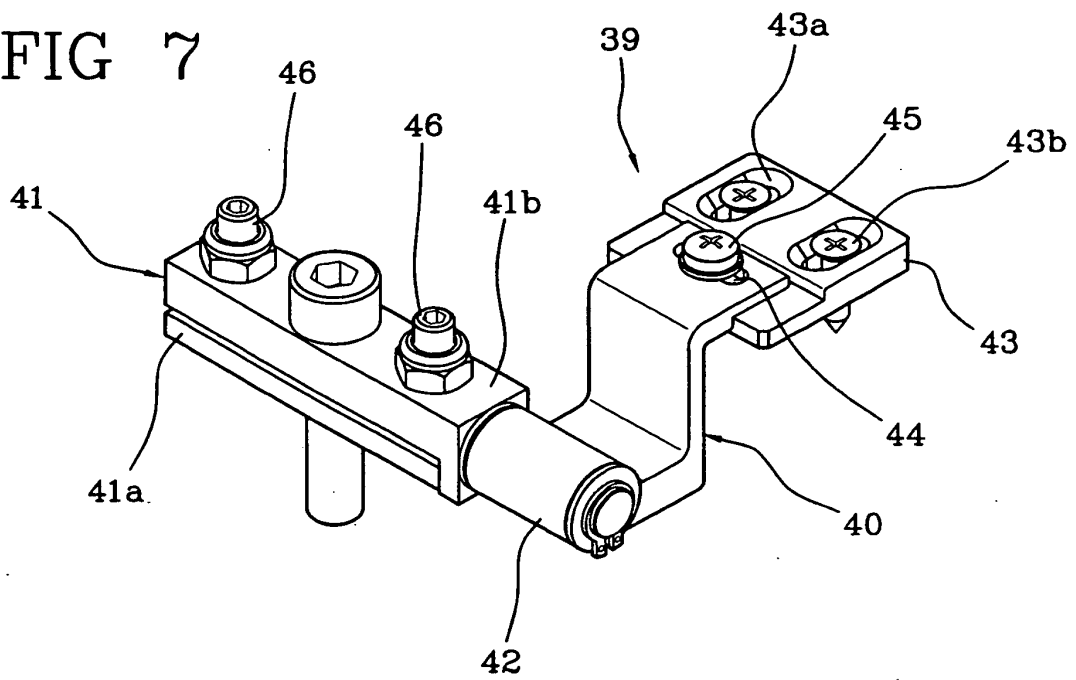


FIG 7



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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