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(54) **HANGING CABINET WITH OVERTURNING DOORS**

HÄNGESCHRANK MIT UMKLAPPBAREN TÜREN

MEUBLE SUSPENDU DOTÉ DE PORTES BASCULANTES

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(73) Proprietor: **SYSTEM HOLZ S.P.A.**
22044 Cremnago di Inverigo (IT)

(72) Inventor: **MOLTENI, Angelo**
I-22040 Brenna (IT)

(74) Representative: **Ferroni, Filippo et al**
Metroconsult S.r.l.
Foro Buonaparte, 51
20121 Milano (IT)

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Description

[0001] The present invention relates to cabinets in general and to hanging cabinets in particular.

[0002] As known, hanging cabinets are located at man's height, usually above other pieces of furniture or kitchen tops, and are frequently opened and closed for taking and putting away commonly used objects; the motion of their doors is therefore particularly important compared to other kinds of cabinets (including free-standing ones) used in environments other than the kitchen or subject to less frequent use.

[0003] In fact, for obvious reasons, hanging cabinets should be easily opened and closed frequently, and their doors at man's height should not represent a hindrance or a danger for people; for example, this is the case when the doors remain open and a person working in the kitchen may be unaware of it and thus be at risk of hitting his/her head against the doors, with easily imaginable consequences.

[0004] For these reasons, it has become a recent trend to manufacture kitchen hanging cabinets having upward opening doors, i.e. doors which can be overturned relative to a horizontal axis; in this way, in fact, the door is opened by lifting it higher than the average man's height, thus avoiding the risk that a person hits his/her head against it.

[0005] Also, it should be pointed out that doors of this type allow to gain access to the entire inner space of the hanging cabinet through a single opening movement, since the door is as wide as the cabinet and clears the whole width thereof as it is being lifted.

[0006] According to this recent trend, various door actuation mechanisms have been developed which allow to control the upward and downward motions of the doors or to hold them in the open condition; these mechanisms utilize advanced viscous damping systems, return springs, levers and other components, which are described in detail in the large technical and patent literature available on this matter.

[0007] As a representative example of this state of the art, it is nonetheless worth citing the international patent application published under number WO/2003/ 025323 to Huwil-Werke.

[0008] US-A-2869954 discloses the features of the preamble of claim 1.

[0009] This application describes a hanging cabinet with a door made up of an upper panel and a lower panel hinged together, wherein the first panel is also hinged to the cabinet structure: this offers the advantage that, when the door is lifted, the hinged lower panel remains hanging from the upper one, so that it can be grabbed and pulled downwards more easily in order to close the door.

[0010] In fact, it is apparent that, if the door were made from a single panel (i.e. not from two hinged panels), the projecting end of the lifted panel would be higher than the door according to Huwil's international application, thus making it difficult for short or average-height people to grab it in order to close the cabinet.

[0011] However, it should be taken into consideration that, when a cabinet door made up of hinged panels is lifted, the lower panel hanging downwards becomes a hindrance for a person wanting to take or put objects from/in the cabinet.

[0012] As a matter of fact, in said condition the lower panel limits the accessibility of the top portion of the cabinet, although mechanisms are used in order to keep it in a folded condition, as it is the case of the aforementioned patent application.

[0013] It should also be noted that such mechanisms must also provide for holding the entire door in order to keep it open, since otherwise a person should hold it up with one hand, making his/her movements difficult .

[0014] These mechanisms are therefore rather complex and may lose efficiency and reliability over time.

[0015] The present invention aims at getting over this state of the art; that is, it aims at providing a cabinet, in particular, but not limited to, a hanging cabinet, having such structural and operating features as to overcome the above-described drawbacks of prior-art cabinets.

[0016] The idea based on which said object is attained is to provide a cabinet having two separate doors which, when opened, are respectively overturned upwards and downwards or toward the cabinet sides, until they get at least partly juxtaposed outside the upper and lower walls or the sides of the cabinet.

[0017] Such a cabinet can be easily opened with just one hand, if the doors are so arranged that they can open simultaneously; furthermore, the fact that the doors are overturned downwards and upwards, i.e. about a horizontal axis, allows to gain access to the whole inner space of the cabinet right away without having to hold the doors in order to keep them open.

[0018] The features of the cabinet according to the invention will be stated in a more analytical manner in the claims appended hereto; before starting this description, it should be stated that the invention also comprises a device which is specifically adapted to actuate the cabinet doors, the features of which are included in the claims as well.

[0019] The aforementioned features and the effects deriving therefrom will become apparent from the following description of a preferred, but non-limiting, embodiment example and of a number of possible embodiment variations thereof illustrated in the annexed drawings, wherein:

- Fig. 1 is a perspective view of a hanging cabinet according to a preferred embodiment of the invention, in three distinct operating conditions;
- Fig. 2 is a side view of the cabinet of Fig. 1, in the same operating conditions;
- Fig. 3 shows a partially sectioned detail of the preceding cabinet, in the same operating conditions;
- Fig. 4 shows a detail of Fig. 3, in the same operating conditions;

- Fig. 5 is an exploded view of the detail of Fig. 3;
- Fig. 6 shows a detail of Fig. 5;
- Fig. 7 shows a first variation of the detail of Fig. 3, in the same operating conditions, which does not form part of the invention;
- Fig. 8 shows a second variation of the detail of Fig. 3;
- Figs. 9 and 10 show respective details of Fig. 8;
- Fig. 11 shows the detail of Fig. 3 in the closed condition;
- Fig. 12 shows a detail of Fig. 11;
- Fig. 13 shows schematically a front view and a side view of the cabinet according to the invention, with doors to be adjusted;
- Fig. 14 is an exploded view of elements comprised in the detail of Fig. 12;
- Fig. 15 shows a third variation of the detail of Fig. 3;
- Figs. 16 and 17 show respective details of Fig. 15;
- Fig. 18 shows an improvement of the cabinet according to the invention;
- Fig. 19 shows a detail of Fig. 18;
- Fig. 20 is an exploded view of a connecting rod to be applied to the detail of Fig. 19;

[0020] Referring to the drawings, reference number 1 designates as a whole a cabinet according to the invention.

[0021] Said cabinet is a hanging one, i.e. it is intended for being hung on a wall, and has an external structure comprising an upper wall 2, a lower wall 3 and two sides 4, 5; this structure is closed in front by two doors 6 and 7, respectively an upper one and a lower one, which can be overturned as will be better described later.

[0022] In the illustrated example, upper door 6 is frame type, whereas lower one 7 is a simple panel made of laminated chipboard or the like, on which there is a handle 8; of course, this is just one of several possible embodiments, as both doors may have different shapes and be made of different materials depending on the specific solutions conceived by the designers.

[0023] Likewise, it is hardly worth mentioning that cabinet 1 preferably (but not necessarily) has also a back wall 9, and that shelves, drawers, compartments or the like may be included inside the cabinet, which are not shown in the drawings for clarity.

[0024] As shown in the sequence of images (a), (b), (c) of Figs. 1-3, doors 6 and 7 move simultaneously from the closed condition to the open condition (and vice versa), until they reach a position wherein they are at least partly juxtaposed to upper wall 2 and to lower wall 3 of the cabinet.

[0025] The door motion takes place through a device 10 located on each side 4, 5 of the cabinet; for simplicity's sake, reference will hereafter be made to just one of said devices, but the same shall apply to the other device as well.

[0026] In this regard, Fig. 5 clearly shows that the components of device 10 are contained in a box-shaped housing formed by two sections 12, 13 coupled together; on the latter there are pairs of longitudinal ribs designated 14 and 15, respectively, which are used for joining the sections in order to form the box-shaped housing as well as for guiding the motion of some components of the mechanism used for actuating the doors.

[0027] Device 10 is removably secured to the cabinet structure by means of screws and tie-rods which are known per se and therefore not shown in the drawings.

[0028] Device 10 is both simple and reliable, in that it essentially comprises a mechanism with a central rod 20, to the ends of which respective rack toothings 21, 22 are fastened (in this case by using simple screws): said toothings engage with corresponding pinions 23, 24 being present at the base of swing arms 25, 26 supporting doors 6 and 7, whereto they are hinged through end feet 27, 28.

[0029] In practice, when the doors are opened (or closed) by a person, the force applied to the end of swing arms 25, 26 causes them to rotate together with respective pinions 23, 24 which, by engaging with rack 21, 22, move rod 20 either downwards, if the cabinet is being opened, as shown in Fig. 3(c), or upwards, if the cabinet is being closed, as shown in Fig. 3(a).

[0030] In order to facilitate the motion of rod 20, in this example it is guided by a block 18, located at the centre of section 13, which is also advantageously used as a support for an end-of-stroke damper 29; the latter is a small hydraulic cylinder inserted in a longitudinal groove 30 of rod 20 and used for slowing down and stopping rod 20 as it approaches the end of its stroke. Sections 12, 13 forming the housing of the box-shaped mechanism of device 10 are joined at their ends by bases 32, 33 fastened with screws; these bases are also used as caps for closing the mechanism housing and as supports for a respective swinging connecting rod 34, 35.

[0031] Each connecting rod slides in a guide 36, 37 being present on doors 6, 7, thus following the motion of the latter as they are being juxtaposed to upper wall 2 and lower wall 3 of the cabinet, as shown in Figs. 1(c), 2 (c), 3(c).

[0032] In fact, during the opening and closing phases, doors 6 and 7 rotate together with swing arms 25 and 26, whereto they are hinged through the feet 27, 28, and move (upwards or downwards, depending on whether the cabinet is being opened or closed) guided by the relative sliding occurring between guides 36, 37 and the connecting rods 34, 35.

[0033] The advantageous effects deriving from the functional aspects of cabinet 1, which allow to attain the objects of the invention, are apparent in the light of the above explanations.

[0034] In fact, actuation device 10 allows both upper door 2 and lower door 3 to be opened or closed simultaneously, even by acting only on one of them; in the example taken into consideration, a person will preferably act on the lower door, since it is the one equipped with handle 8.

[0035] This makes it easy to open or close the cabinet

even for short or average-height people, who can reach lower door 7 easily in any condition, even when it is wide open.

[0036] From a kinematic point of view, in the cabinet according to a preferred embodiment of the invention doors 6 and 7 are overturned through a combined rotating-translational motion from a closed condition, wherein they are arranged vertically, to an open condition, wherein they are arranged horizontally on upper wall 2 and under lower wall 3 of the cabinet, respectively, and vice versa.

[0037] Doors 6, 7 remain horizontal without a person having to hold them with one hand and without using any holding mechanism: this is due to the fact that the lower door is pushed downwards and kept open by its own weight, which is transmitted to the upper door through the mechanism comprising racks 21, 22, thus keeping it open as well.

[0038] In other words, it can be said that it is the very mechanism for the simultaneous actuation of both doors which operates as a holding mechanism by making use of weight force; in this context, it is clear that a well-balanced force system, wherein both doors have the same weight, will allow to minimize the force required to open and close the doors, at the same time making it easier to hold them in the open condition.

[0039] Since, as shown in the drawings, the doors may be different because they may be provided by using different configurations and/or materials, it is apparent that they may also have different weights; in such circumstances, it would therefore be advisable to adopt design solutions which compensate for the weight difference, e.g. by appropriately using materials having different specific weights (plastic, wood, glass, steel, etc.) or by using ballast elements (e.g. heavy handles, or weights in the hollow portions of the frames).

[0040] A further important advantageous aspect of the invention which deserves to be adequately highlighted is the fact that, in the open condition, both doors 6 and 7 are arranged outside upper wall 2 and lower wall 3, and are at least partly juxtaposed thereto.

[0041] Thus, they do not take up any space inside the cabinet and, most importantly, lower door 7 does not hinder a person having to take or put objects from/in the cabinet.

[0042] In fact, it is clear that, if door 7 were not arranged at least partly along lower wall 3, it would be completely overhanging and projecting for its full width, thus representing an inevitable obstacle for the raised arm of a person wanting to reach inside the cabinet.

[0043] On the contrary, in the described example lower door 7 is juxtaposed to lower wall 3 of cabinet 1, so that it is projecting only for a portion of its width, thereby causing less hindrance.

[0044] Said hindrance may be reduced even further by providing a lower door 7 being shorter than upper door 6, i.e. by sizing the doors differently, with respect to the example illustrated in the drawings.

[0045] In such a case, suitable measures may also be taken in order to balance the different weights of the doors, due to the different sizes thereof.

[0046] The aforementioned special device 10 for actuating the cabinet doors simultaneously also offers advantageous effects as far as manufacturing is concerned.

[0047] Firstly, the mechanical components are housed in a box-shaped container which, once it has been secured to cabinet sides 4, 5, becomes incorporated therein.

[0048] This simplifies the cabinet's assembling operations, since device 10 can be manufactured separately and then mounted to the rest of the cabinet together with the doors.

[0049] Furthermore, the protected housing and the simplicity of the two-rack mechanism make it safe and reliable over time.

[0050] Secondly, it should be remarked that, according to this invention, actuation mechanism of the door works in a substantially vertical direction, so that the device 10 can be placed as an upright arranged in front of the structure of cabinet 1.

[0051] Thus it takes up no space inside the cabinet, unlike in known devices such as the one disclosed in the international application WO/2003/025323, wherein the mechanism including the swing arm is located inside the cabinet.

[0052] Of course device 10, which has been described above as a rack-type device, may be subject to several variations.

[0053] One of these variations, which does not form part of the claimed invention, is shown in Fig. 7, wherein structurally or functionally equivalent items are designated by the same reference numbers. In this variation, the central rod and the two racks are replaced with a flexible cable 70 made of metal or another appropriate material, which is wound around or unwound from pulleys 75, 76 respectively arranged at the base of the swing arms 25, 26 and integral with the swing arms 25, 26.

[0054] It can be easily understood that such a solution is equivalent to the previously described one, because when a person opens lower door 7, pulley 76 at the base of swing arm 26 is turned clockwise (with reference to Fig. 7) and cable 70 is wound around it accordingly.

[0055] As a result of this winding, cable 70 is unwound from pulley 75 at the base of upper swing arm 25, thereby turning the latter counterclockwise and opening upper door 6.

[0056] Of course, the reverse will occur when closing the cabinet, i.e. as lower door 7 is closed, swing arm 26 and lower pulley 76 turn counterclockwise (with reference to Fig. 7), so that the cable is unwound from it and is wound around upper pulley 75, which is turned clockwise together with the associated swing arm 25.

[0057] In order to accompany these motions, device 10 includes return springs 77, 78, in this case being of flexure type, with one ann secured to bases 32, 33 and the other arm secured to pulleys 75, 76, so as to make

the opening and closing motions of the doors softer and smoother.

[0058] These springs may also be applied to the rack-type device 10 of the preceding embodiment, as shown by way of example in Fig. 5, wherein spring 77 in the upper area is clearly visible (lower spring 78 is not shown in this drawing for simplicity's sake).

[0059] It is appropriate to underline that also the variation of device 10 with cable 70, which does not form part of the invention, works in a substantially vertical direction (like the one using racks), and that its components are located inside the box-shaped housing formed by sections 12 and 13: therefore, the above remarks about the advantageous effects deriving from these features apply to this variation as well.

[0060] A further embodiment of the invention is shown in Figs. 8-10, wherein the same reference numbers designate equivalent items.

[0061] As easily understood, in this case device 10 (which is of rack type) has hinge arms 84, 85 replacing connecting rods 34, 35 of the above examples. These arms are known hinged-lever units manufactured by the present Applicant for hinges of common furniture.

[0062] In the latter, the arms are mounted on bases thanks to an intermediate part (not shown in the drawings as it is per se known), whereas in the example of the present invention arms 84, 85 (with the intermediate parts) are engaged in a sliding way in respective guides 36, 37 being present on doors 6 and 7.

[0063] In this solution, the typical rotating-translational motion given to the hinge arms 84, 85 by the hinged levers is combined with the sliding motion of guides 36, 37, thereby facilitating the latter and therefore, more in general, also the opening and closing motions of the doors.

[0064] A further embodiment of the door overturning device is finally visible in Figs. 15-17, wherein structurally or functionally equivalent items are designated by the same reference numbers for simplicity.

[0065] As shown, in this case device 10 is functionally similar to the preceding one, the only difference consisting in the fact that two racks are secured side by side to each end of central rod 20, which racks engage with a matching pair of pinions. Therefore, in this case, the swing arm moving system turns out to be de facto doubled.

[0066] For clarity, it is still worth adding that the drawings show how the base of upper swing arm 25 is interposed between pinions 23 and 42, which respectively engage with racks 21 and 41 being present on the upper end of rod 20. Likewise, the base of lower swing arm 26 is interposed between pinions 24 and 44, which respectively engage with racks 22 and 43 being present on the lower end of rod 20.

[0067] In this solution, the double rack and the double pinion provide a more effective overturning motion, even with heavy or large doors.

[0068] It is appropriate to remark that, as described previously, the components of device 10 are contained in a box-shaped housing made up of two sections 12, 13 coupled together.

[0069] Advantageously, since this third variation is particularly suitable for heavy doors, thermoplastic rubber stop inserts 45 are interposed between the two sections 12 and 13 for each door.

[0070] Inserts 45 are applied to the pair of ribs 14 and 15 being present on sections 12 and 13, respectively, through grooves 46 and 47 obtained on opposite sides of the body of inserts 45, parallel to sections 12 and 13, according to the representation of Fig. 15. Each insert 45 may be positioned by sliding it manually over the sections, in the areas where the doors stop when they are in the closed condition.

[0071] In fact, the function of inserts 45 is to absorb the impact of the doors against the cabinet structure at the end of their closing motion. Also, the impact absorption capacity of inserts 45 is further improved by the body thereof being advantageously hollow, which increases elasticity.

[0072] Of course, inserts 45 are present on both overturning devices 10 of the doors, and the cabinet according to an embodiment of the invention may also be provided with another improvement, as shown in Fig. 18, should the doors be particularly long and wide.

[0073] For clarity, Fig. 18 shows just the lower half-door of cabinet 1, in order to make the details described herein more visible.

[0074] Said improvement consists in providing a notch 50, 51 (enlarged in Fig. 19) on the front edge of upper wall 2 and of lower wall 3, respectively, of cabinet 1.

[0075] Each notch is adapted to house a swinging connecting rod, shown in an exploded view in Fig. 20; each connecting rod 52 is adapted to be housed in respective notch 50, 51, and for this purpose it is applied into an associated mounting 53 to be inserted into the notch.

[0076] Connecting rods 52 engage in a sliding way in a respective guide, e.g. made of aluminium, plastic or another suitable material, which is secured to the corresponding door; Fig. 18 only shows guide 55 applied to the lower door. Said connecting rod 52 has a structure which is similar to that of connecting rods 34, 35 secured to device 10, and slides in guide 55 in order to follow the motion of the door being opened or closed.

[0077] As said, this solution limits the risk of flexure for large or heavy doors. Finally, it is hardly the case of pointing out that, depending on the various possible mechanical alternatives, the motion of the doors may also be different from that shown in the drawings, in the sense that more complex motions may be provided according to which the doors first move vertically and are then turn until they reach the wide open condition while remaining partly juxtaposed to the upper and lower walls of the cabinet.

[0078] This requires the presence of mechanisms being more complex than those taken into consideration in the above descriptions, which however should not be excluded at all.

[0079] Another possible modification to what has been described so far may be obtained by providing cabinet 1 with just a single door actuation device 10 (instead of the pair of devices included in the preceding examples); this alternative might be advantageous for hanging cabinets being small or having lightweight doors, wherein the latter can be supported by just two swing arms 25, 26 arranged on one side only.

[0080] As an alternative, it is possible to connect a device 10 as described above, i.e. with arms linked by rack-type mechanisms, to another swing arm-type device located on the opposite side of the cabinet but lacking said mechanisms.

[0081] Let us consider the case wherein swing arms 25 and 26 of a device 10 on one side of the cabinet structure are connected, through a shaft or another equivalent means passing through upper wall 2 and lower wall 3 of the cabinet, to swing arms of a second device located on the other side, but lacking any rack-type mechanisms.

[0082] In such a variation, the arms of this second device would be driven by those of the first one, so that it would no longer be necessary to connect them kinematically together through the aforementioned rack-type mechanisms.

[0083] Finally, it is worth remarking that, in accordance with a preferred embodiment shown in Figs. 11-14, it is possible to provide door position adjustments in both the vertical and horizontal directions, as schematically indicated by the arrows in Fig. 13.

[0084] For this purpose, end feet 27 and 28 of swing arms 25 e 26 consist of two pieces; as shown in the exploded view of foot 28 in Fig. 14 (the other foot is identical and therefore is not shown in detail), it has a base 80 which is secured to cabinet door 7 by means of a dowel 81.

[0085] Body 82 of the foot is then mounted to base 80, which body is advantageously provided on one end with two prongs 83, 84 engaging with base 80, while on the opposite end there is a hinge seat 85 for connection to swing arm 26.

[0086] Prongs 83, 84 have a rounded shape which allows body 82 to rotate slightly relative to base 80, by screwing and unscrewing a threaded pin 87 provided with a base 88, through a hole 89 in body 82 of the foot.

[0087] Base 88 of pin 87 engages in a front notch 90 of base 80; note that both the pin, with its particular conformation, and the front notch are of a known type already in use for certain furniture hinges.

[0088] Furthermore, body 82 moves longitudinally relative to base 80 as a screw 94 having an eccentric head 95 is loosened or tightened; the latter is inserted in an elongated hole 96 across body 82 and, as it is turned, it moves the body forwards or backwards relative to the base.

[0089] Finally, it should be highlighted that, although the examples and variations taken into account so far have always referred to a hanging cabinet with doors which can be overturned upwards and downwards (i.e. a horizontal-type cabinet), the invention may as well be applied to vertical-type cupboards or hanging cabinets, i.e. turned by 90° compared to the one shown in the previous drawings.

[0090] In these cases, upper wall 2 and lower wall 3 shown in the drawings will become the sides of the cabinet, whereas, vice versa, sides 4 and 5 will become its upper and lower walls; in a vertical hanging cabinet, doors 6 and 7 are overturned along its sides (as opposed to the upper and lower walls) and are at least partly juxtaposed thereto.

[0091] All of these variants still fall within the scope of the following claims.

Claims

1. Cabinet having a structure comprising an upper wall (2), a lower wall (3) and sides (4, 5) extending laterally between said walls, a pair of doors (6, 7) for frontal closing of the structure that can be respectively overturned upwards and downwards or toward the cabinet sides so that they are both arranged outside the structure when wide open, said cabinet comprising at least a first and a second swing arm (25, 26), each having one end (27, 28) connected to a respective door (6, 7), which are swung simultaneously by an overturning device (10) extending between the upper and lower walls (2, 3) or the sides (4, 5) of the cabinet, wherein the overturning device (10) of the doors (6, 7) comprises a box-shaped housing (12, 13) applied to one of the cabinet sides (4, 5) or to one of the cabinet upper or lower walls (2,3), on the side thereof facing the doors (6,7), said box-shaped housing (12, 13) containing means for moving the swing arms (25, 26) simultaneously, **characterized in that** said box-shaped housing (12, 13) is removably secured to the cabinet structure, and wherein the means for simultaneously moving the swing arms (25, 26) comprise a pair of racks (21, 22) located at the respective ends of a rod (20) which is movable in a substantially longitudinal direction relative to the box-shaped housing (12, 13), which racks engage with pinions (23, 24) associated with the bases of the swing arms (25, 26) for the rotation thereof.

2. Cabinet according to claim 1, wherein the doors (6, 7), when they are in the wide open condition, are at least partly juxtaposed to the outer surface of the upper and lower walls (2, 3) or of the sides (4, 5).

3. Cabinet according to claim 2, wherein the box-shaped housing of the device (10) comprises a pair of matched sections (12, 13) between which the means (20-24; 41-44) for moving the swing arms (25, 26) simultaneously are arranged.

4. Cabinet according to claim 1, wherein the means for moving the swing arms (25, 26) comprise two pairs of racks (21, 41; 22, 43) located at the respective ends of a rod (20) which is movable in a substantially longitudinal direction relative to the sections (12, 13) of the overturning device (10), which pairs of racks engage with respective pairs of pinions (23, 42; 24, 44) associated with the bases of the swing arms (25, 26) for the rotation thereof.

5. Cabinet according to any of the preceding claims, wherein the overturning motion of the doors (6, 7) is guided by sliding guide means (34-37; 52, 55; 84, 85).

6. Cabinet according to claim 5, wherein said sliding guide means comprise, for each door (6, 7), at least one connecting rod (34, 35, 52) pivoted to the overturning device (10) and coupled in a sliding way to a guide (36, 37, 55) arranged on the corresponding door (6, 7).

7. Cabinet according to claim 5, wherein said sliding guide means comprise, for each door (6, 7), at least one hinge arm (84, 85) pivoted to the overturning device (10) and coupled in a sliding way to a guide (36, 37) arranged on the corresponding door (6, 7).

8. Cabinet according to claim 9, wherein the hinge arm (84, 85) is of a type comprising hinged levers and an intermediate body.

9. Cabinet according to any of the preceding claims, wherein the overturning device (10) of the doors comprises springs (77, 78) acting on the swing arms (25, 26) in order to facilitate the motion thereof.

10. Cabinet according to any of the preceding claims, wherein the doors (6, 7) are made of different materials and/or have different sizes.

11. Cabinet according to any of the preceding claims, wherein the swing arms (25, 26) are fitted with a foot (27, 28) comprising a base (80) secured to a respective door (6, 7), an upper body (82) adjustably applied to said base and hinged to the end of the swing arm (25, 26).

12. Cabinet according to claim 11, wherein the upper body (82) can rotate relative to the base (80) changing its inclination, thus providing a front adjustment of the position of the corresponding door (6, 7).

13. Cabinet according to claim 12, wherein the rotation of the upper body (82) is obtained through a threaded pin (87) provided with a base (88) engaging in a notch (90) of the base (80).

14. Cabinet according to claim 13, wherein the position of the upper body (82) relative to the base (80) is adjusted longitudinally by means of a screw (94) having an eccentric head (95).

15. Cabinet according to any of the preceding claims, **characterized by** comprising at least one insert (45) applied to the overturning devices (10) for absorbing the impact of the doors at the end of their closing stroke.

16. Cabinet according to any of the preceding claims, being of the hanging, horizontal type, the doors (6, 7) of which are opened by overturning them towards the upper wall (2) and the lower wall (3), respectively.

Patentansprüche

1. Schrank, der so aufgebaut ist, dass er folgendes aufweist: eine obere Wand (2), eine untere Wand (3) und Seiten (4, 5), die seitlich zwischen den Wänden verlaufen, ein Paar Türen (6, 7) zum stirnseitigen Schließen des Aufbaus, die jeweils nach oben und nach unten oder zu den Schrankseiten hin umgeklappt werden können, so dass sie sich beide im weit geöffneten Zustand außerhalb des Schrankes bzw. des Aufbaus befinden, wobei der Schrank mindestens einen ersten und einen zweiten Schwingarm (25, 26) besitzt, dessen eines Ende (27, 28) jeweils mit einer Tür (6, 7) verbunden ist, die gleichzeitig durch eine Umklappvorrichtung (10), welche sich zwischen der oberen und unteren Wand (2, 3) oder den Seiten (27, 28) des Schrankes erstreckt, geschwenkt werden, wobei die Umklappvorrichtung (10) der Türen (6, 7) ein kastenförmiges Gehäuse (12, 13) aufweist, das an einer der Schrankseiten (4, 5) oder an der oberen oder unteren Wand (12, 13) des Schrankes an der den Türen (6, 7) zugewandten Seite angebracht ist, wobei das kastenförmige Gehäuse (12, 13) Mittel zum gleichzeitigen Bewegen der Schwingarme (25, 26) enthält, **dadurch gekennzeichnet, dass** das kastenförmige Gehäuse (12, 13) abnehmbar an der Schrankkonstruktion befestigt ist, und wobei die Mittel zum gleichzeitigen Bewegen der Schwingarme (25, 26) ein Paar Zahnstangen (21, 22) aufweisen, die an den jeweiligen Enden einer Stange angebracht sind, die im wesentlichen in Längsrichtung zu dem kastenförmigen Gehäuse (12, 13) verschiebbar ist, wobei die Zahnstangen in Ritzel (23, 24) eingreifen, die mit der Basis der Schwingarme (25, 26) verbunden sind, um für deren Drehung zu sorgen.

2. Schrank nach Anspruch 1, wobei die Türen (6, 7) in weit geöffnetem Zustand mindestens teilweise neben der Außenseite der oberen und unteren Wand (2, 3) oder neben den Seiten (4, 5) angeordnet sind.

3. Schrank nach Anspruch 2, wobei das kastenförmige Gehäuse der Vorrichtung (10) ein Paar entsprechender Abschnitte (12, 13) aufweist, zwischen denen die Mittel (20 - 24; 41 - 44) zum gleichzeitigen Bewegen der Schwingarme (25, 26) angeordnet sind.

4. Schrank nach Anspruch 1, wobei die Mittel zum Bewegen der Schwingarme (25, 26) zwei Paar Zahnstangen (21, 41; 22, 43) aufweisen, die an den jeweiligen Enden einer Stange (20) angeordnet sind, die im wesentlichen in einer Längsrichtung zu den Abschnitten (12, 13) der Umklappvorrichtung (10) verschiebbar ist, wobei die Zahnstangenpaare in jeweilige Ritzelpaare (23, 42; 24, 44) eingreifen, die mit der Basis der Schwingarme (25, 26) verbunden sind, um für deren Drehung zu sorgen.

5. Schrank nach einem der vorhergehenden Ansprüche, wobei die Umklappbewegung der Türen (6, 7) durch verschiebbare Führungselemente (34 - 37; 52, 55; 84, 85) geführt wird.

6. Schrank nach Anspruch 5, wobei die verschiebbaren Führungselemente für jede Tür (6, 7) mindestens eine Verbindungsstange (34, 35, 52) aufweisen, die mit der Umklappvorrichtung (10) gelenkig verbunden und verschiebbar mit einer Führung (36, 37, 55) gekoppelt ist, die an der jeweiligen Tür (6, 7) angeordnet ist.

7. Schrank nach Anspruch 5, wobei die verschiebbaren Führungselemente für jede Tür (6, 7) mindestens einen Scharnierarm bzw. eine Scharnierhälfte (84, 85) aufweisen, die mit der Umklappvorrichtung (10) gelenkig verbunden und verschiebbar mit einer Führung (36, 37) gekoppelt ist, die an der jeweiligen Tür (6, 7) angeordnet ist.

8. Schrank nach Anspruch 9, wobei der Scharnierarm bzw. die Scharnierhälfte (84, 85) angelenkte Hebel und ein Zwischenstück besitzt.

9. Schrank nach einem der vorhergehenden Ansprüche, wobei die Umklappvorrichtung (10) der Türen Federn (77, 78) aufweist, die auf die Schwingarme (25, 26) wirken, um deren Bewegung zu erleichtern.

10. Schrank nach einem der vorhergehenden Ansprüche, wobei die Türen (6, 7) aus unterschiedlichen Werkstoffen hergestellt sind und/oder verschiedene Größen aufweisen.

11. Schrank nach einem der vorhergehenden Ansprüche, wobei die Schwingarme (25, 26) an einem Fuß (27, 28) befestigt sind, welcher eine Basis (80) aufweist, die an einer jeweiligen Tür (6, 7) angebracht ist, einem oberen Teil (82), der verstellbar an der Basis angebracht und an dem Ende des Schwingarmes (25, 26) angelenkt ist.

12. Schrank nach Anspruch 11, wobei sich das obere Teil (82) gegenüber der Basis (80) drehen kann und seine Neigung ändert, und somit eine frontseitige Verstellung der Position der jeweiligen Tür (6, 7) bietet.

13. Schrank nach Anspruch 12, wobei die Drehung des oberen Teils (82) durch einen Gewindestift (87) erreicht wird, der mit einer Basis (88) versehen ist, die in eine Einkerbung (90) der Basis (80) eingreift.

14. Schrank nach Anspruch 13, wobei die Position des oberen Teils (82) zu der Basis (80) in Längsrichtung mittels einer Schraube (94) verstellt wird, die einen exzentrischen Kopf (95) aufweist.

15. Schrank nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** er mindestens eine Einlage (45) besitzt, die an der Umklappvorrichtung (10) angebracht ist, um den Aufprall der Türen am Ende ihres Schließweges abzudämpfen.

16. Schrank nach einem der vorhergehenden Ansprüche, wobei es sich um einen horizontalen Hängeschrank handelt, dessen Türen (6, 7) geöffnet werden, indem sie jeweils zu der oberen Wand (2) und der unteren Wand (3) hin umgeklappt werden.

Revendications

1. Armoire comportant une structure comprenant une paroi supérieure (2), une paroi inférieure (3) et des côtés (4, 5) s'étendant latéralement entre lesdites parois, une paire de portes (6, 7) pour la fermeture frontale de la structure qui peuvent être basculées respectivement vers le haut et vers le bas ou vers les côtés de l'armoire de sorte qu'elles soient toutes deux agencées à l'extérieur de la structure lorsqu'elles sont grandes ouvertes, ladite armoire comprenant au moins des premier et deuxième bras pivotants (25, 26) ayant chacun une extrémité (27, 28) reliée à une porte (6, 7) respective, qui pivotent simultanément à l'aide d'un dispositif de basculement (10) s'étendant entre les parois supérieure et inférieure (2, 3) ou les côtés (4, 5) de l'armoire, dans laquelle le dispositif de basculement (10) des portes (6, 7) comprend un logement en forme de boîte (12, 13) appliqué à l'un des côtés (4, 5) de l'armoire ou à l'une des parois supérieure ou inférieure (2, 3) de l'armoire, du côté de celui-ci faisant face aux portes (6, 7), ledit logement en forme de boîte (12, 13) contenant des moyens pour déplacer les bras pivotants (25, 26) simultanément, **caractérisée en ce que** ledit logement en forme de boîte (12, 13) est fixé de manière amovible à la structure d'armoire, et dans

laquelle les moyens pour déplacer simultanément les bras pivotants (25, 26) comprennent une paire de crémaillères (21, 22) situées aux extrémités respectives d'une tige (20) qui peut être déplacée dans une direction sensiblement longitudinale par rapport au logement en forme de boîte (12, 13), lesquelles crémaillères viennent en prise avec des pignons (23, 24) associés aux bases des bras pivotants (25, 26) pour la rotation de ceux-ci.

2. Armoire selon la revendication 1, dans laquelle les portes (6, 7), lorsqu'elles sont dans la condition grandes ouvertes, sont au moins partiellement juxtaposées à la surface externe des parois supérieure et inférieure (2, 3) ou des côtés (4, 5).

3. Armoire selon la revendication 2, dans laquelle le logement en forme de boîte du dispositif (10) comprend une paire de sections appariées (12, 13) entre lesquelles les moyens (20 à 24; 41 à 44) pour déplacer les bras pivotants (25, 26) simultanément sont agencés.

4. Armoire selon la revendication 1, dans laquelle les moyens pour déplacer les bras pivotants (25, 26) comprennent deux paires de crémaillères (21, 41 ; 22, 43) situées aux extrémités respectives d'une tige (20) qui peut être déplacée dans une direction sensiblement longitudinale par rapport aux sections (12, 13) du dispositif de basculement (10), lesquelles paires de crémaillères viennent en prise avec des paires respectives de pignons (23, 42 ; 24, 44) associées aux bases des bras pivotants (25, 26) pour la rotation de ceux-ci.

5. Armoire selon l'une quelconque des revendications précédentes, dans laquelle le mouvement de basculement des portes (6, 7) est guidé par des moyens de guidage de coulissement (34 à 37 ; 52, 55 ; 84, 85).

6. Armoire selon la revendication 5, dans laquelle lesdits moyens de guidage de coulissement comprennent, pour chaque porte (6, 7), au moins une tige de liaison (34, 35, 52) pivotant par rapport au dispositif de basculement (10) et accouplée d'une manière coulissante à un guide (36, 37, 55) agencé sur la porte (6, 7) correspondante.

7. Armoire selon la revendication 5, dans laquelle lesdits moyens de guidage de coulissement comprennent, pour chaque porte (6, 7), au moins un bras d'articulation (84, 85) pivotant par rapport au dispositif de basculement (10) et accouplé d'une manière coulissante à un guide (36, 37) agencé sur la porte (6, 7) correspondante.

8. Armoire selon la revendication 9, dans laquelle le bras d'articulation (84, 85) est d'un type comprenant des leviers articulés et un corps intermédiaire.

9. Armoire selon l'une quelconque des revendications précédentes, dans laquelle le dispositif de basculement (10) des portes comprend des ressorts (77, 78) agissant sur les bras pivotants (25, 26) afin de faciliter leur mouvement.

10. Armoire selon l'une quelconque des revendications précédentes, dans laquelle les portes (6, 7) sont constituées de différents matériaux et/ou ont différentes tailles.

11. Armoire selon l'une quelconque des revendications précédentes, dans laquelle les bras pivotants (25, 26) sont équipés d'un pied (27, 28) comprenant une base (80) fixée à une porte (6, 7) respective, un corps supérieur (82) étant appliqué de manière ajustable à ladite base et articulé à l'extrémité du bras pivotant (25, 26).

12. Armoire selon la revendication 11, dans laquelle le corps supérieur (82) peut effectuer une rotation par rapport à la base (80), modifiant son inclinaison, réalisant ainsi un ajustement avant de la position de la porte (6, 7) correspondante.

13. Armoire selon la revendication 12, dans laquelle la rotation du corps supérieur (82) est obtenue par l'intermédiaire d'une broche filetée (87) pourvue d'une base (88) s'engageant dans une encoche (90) de la base (80).

14. Armoire selon la revendication 13, dans laquelle la position du corps supérieur (82) par rapport à la base (80) est ajustée longitudinalement au moyen d'une vis (94) comportant une tête excentrique (95).

15. Armoire selon l'une quelconque des revendications précédentes, **caractérisée en ce qu'**elle comprend au moins un insert (45) appliqué au dispositif de basculement (10) pour absorber l'impact des portes à la fin de leur course de fermeture.

16. Armoire selon l'une quelconque des revendications précédentes, qui est de type suspendu et horizontal, dont les portes (6, 7) sont ouvertes en les basculant vers la paroi supérieure (2) et la paroi inférieure (3), respectivement.

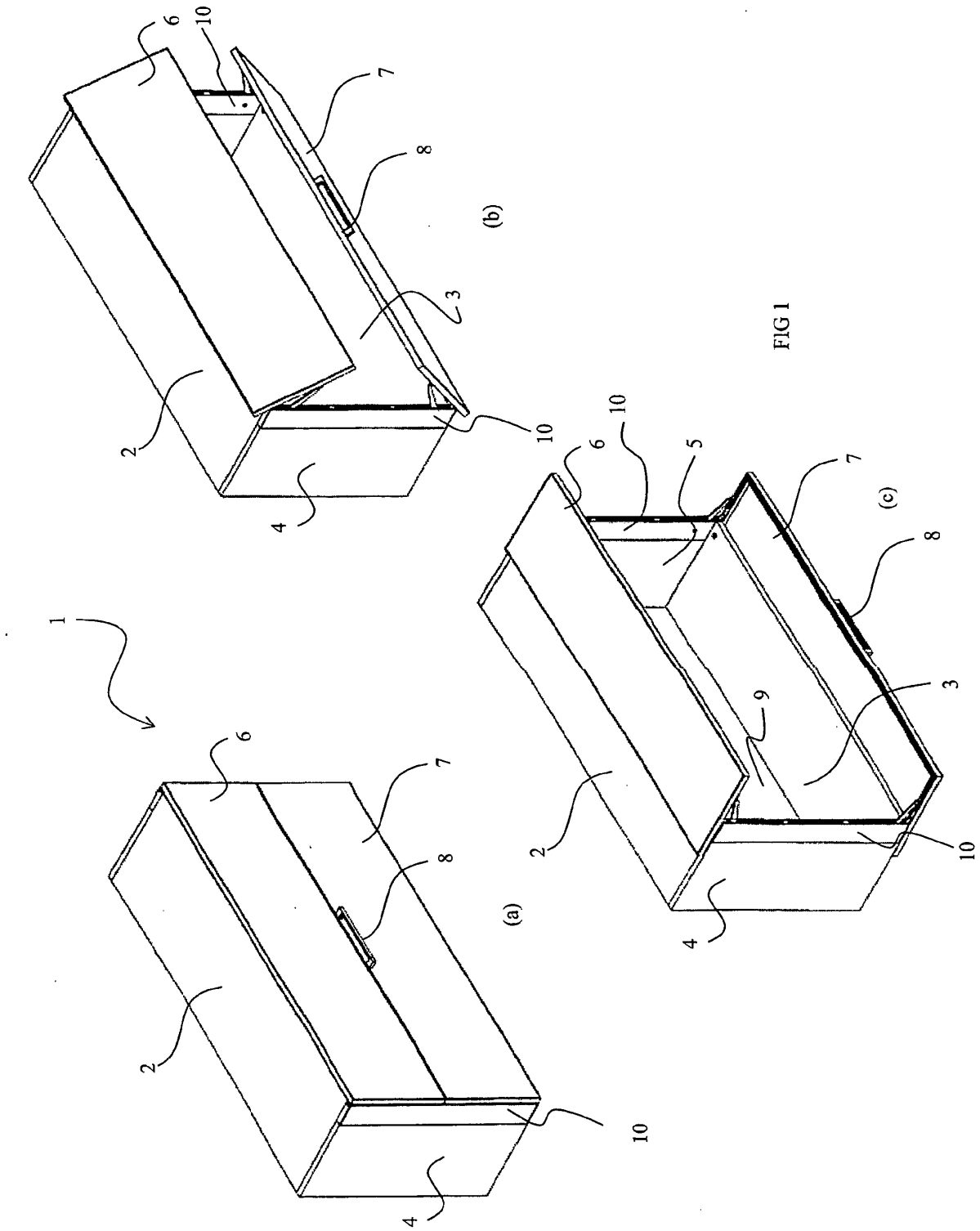


FIG 1

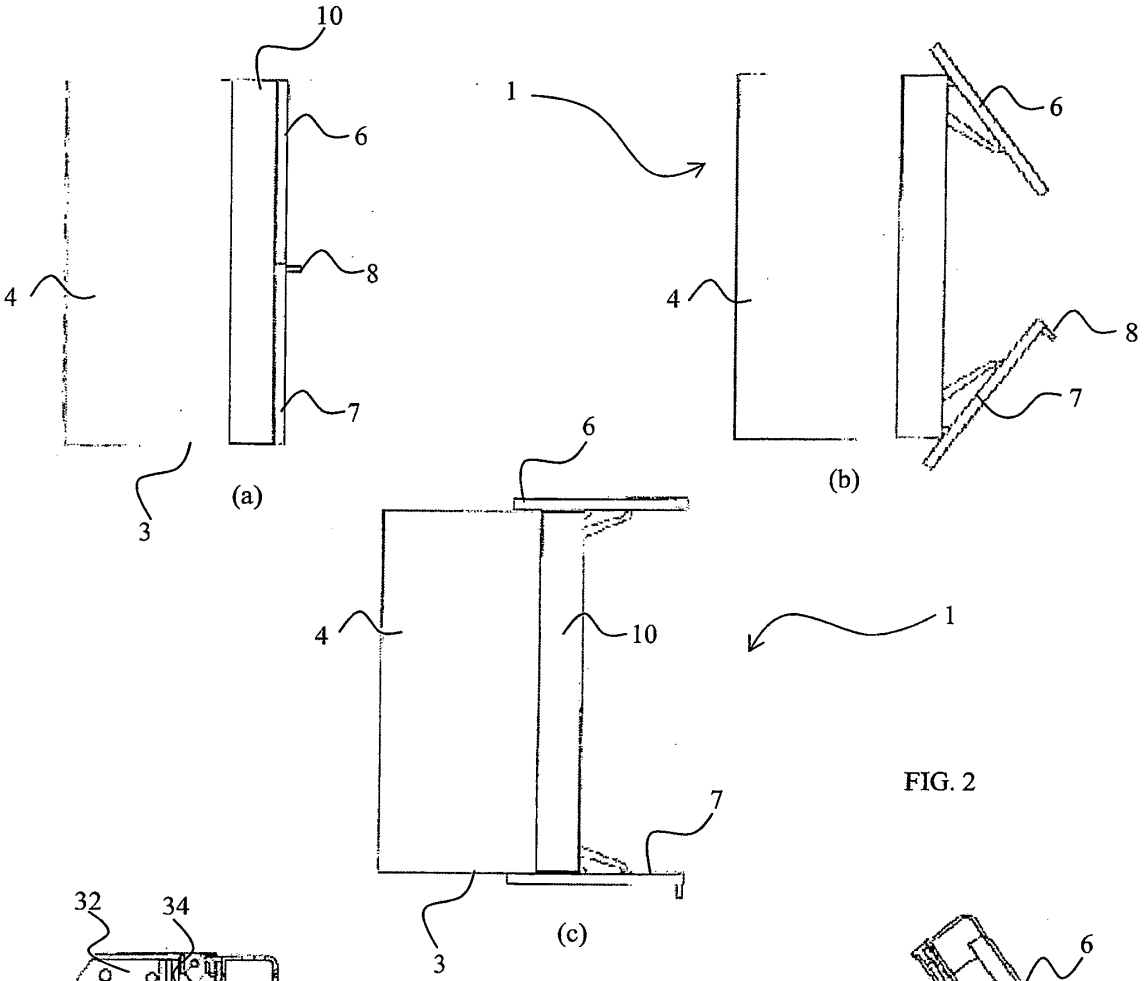


FIG. 2

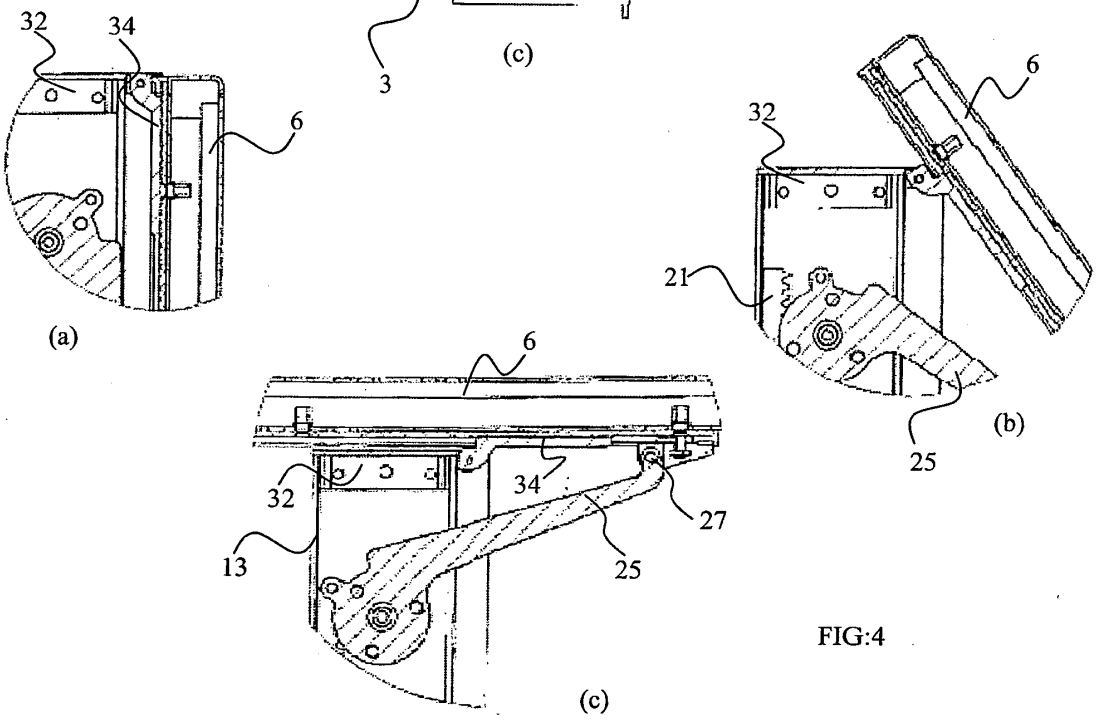
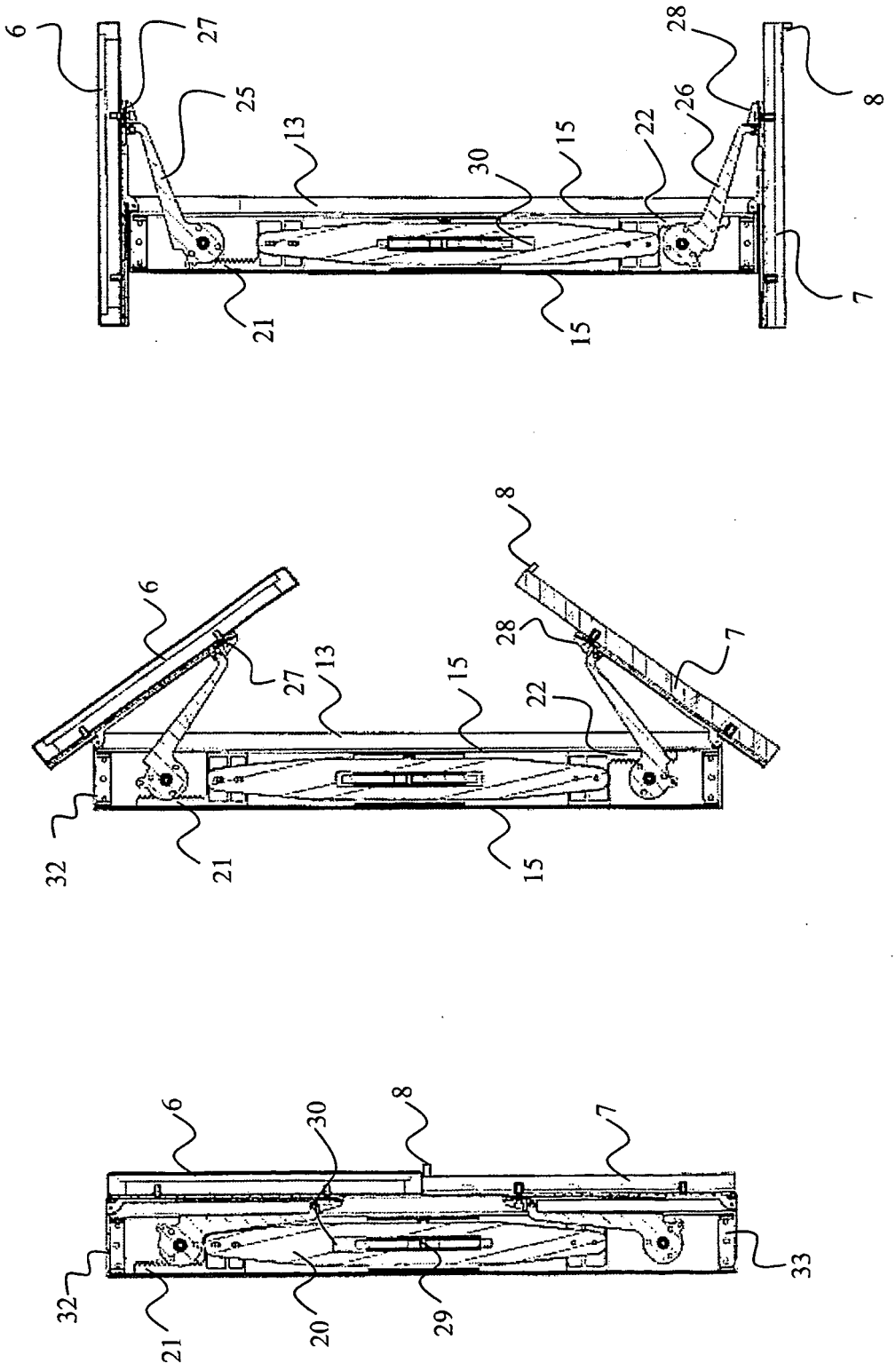


FIG:4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26
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8
21
15
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(c)
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6
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7
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13
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22
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21
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(b)
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7
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33
21
20
29
(a)

FIG. 3

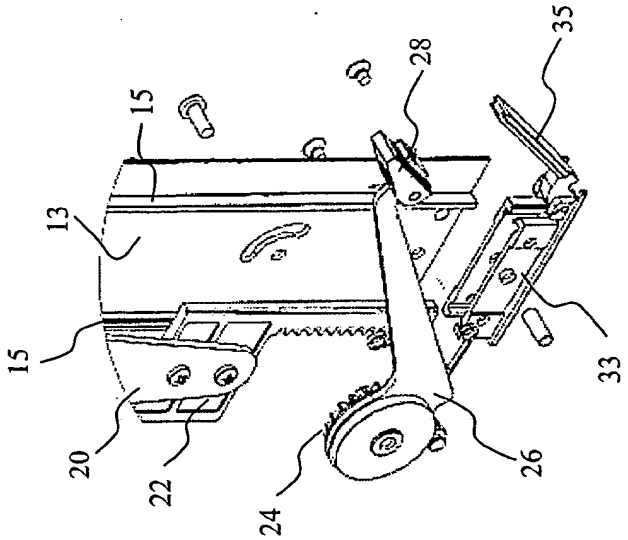
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FIG 6

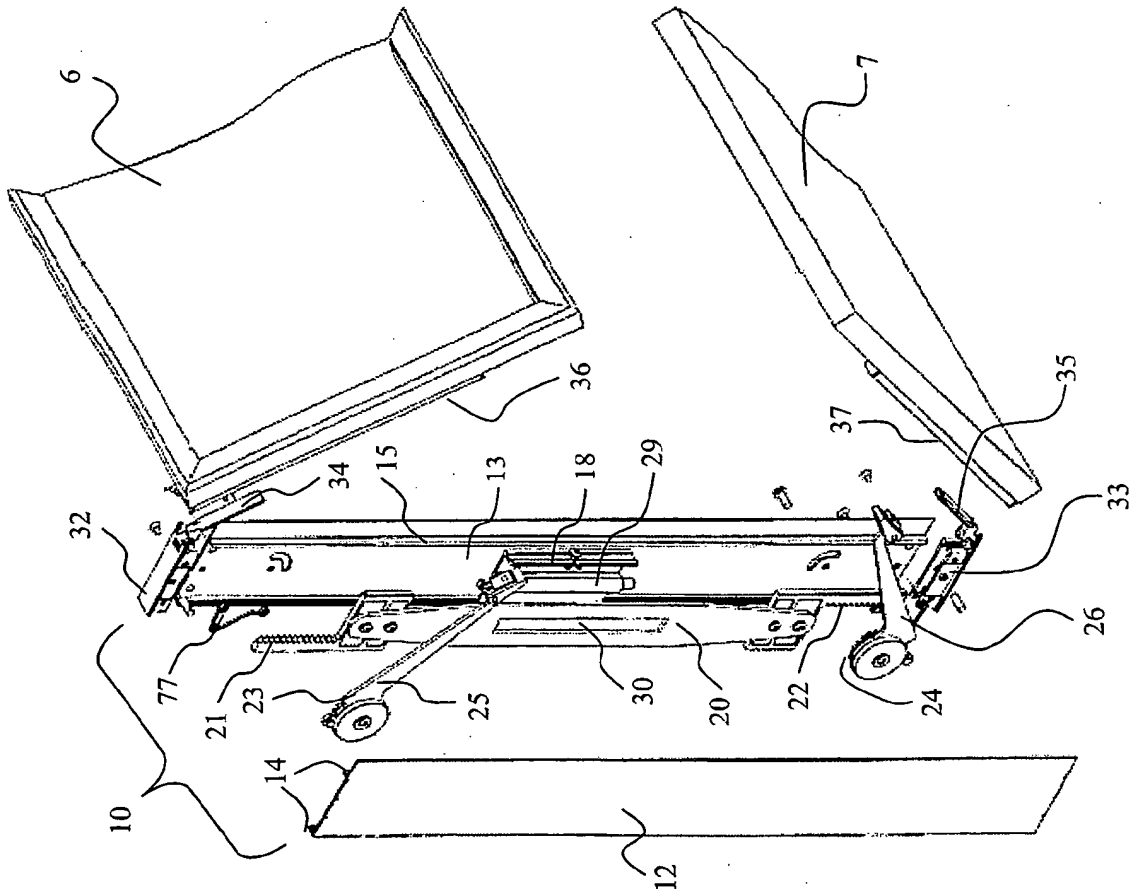
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FIG 5

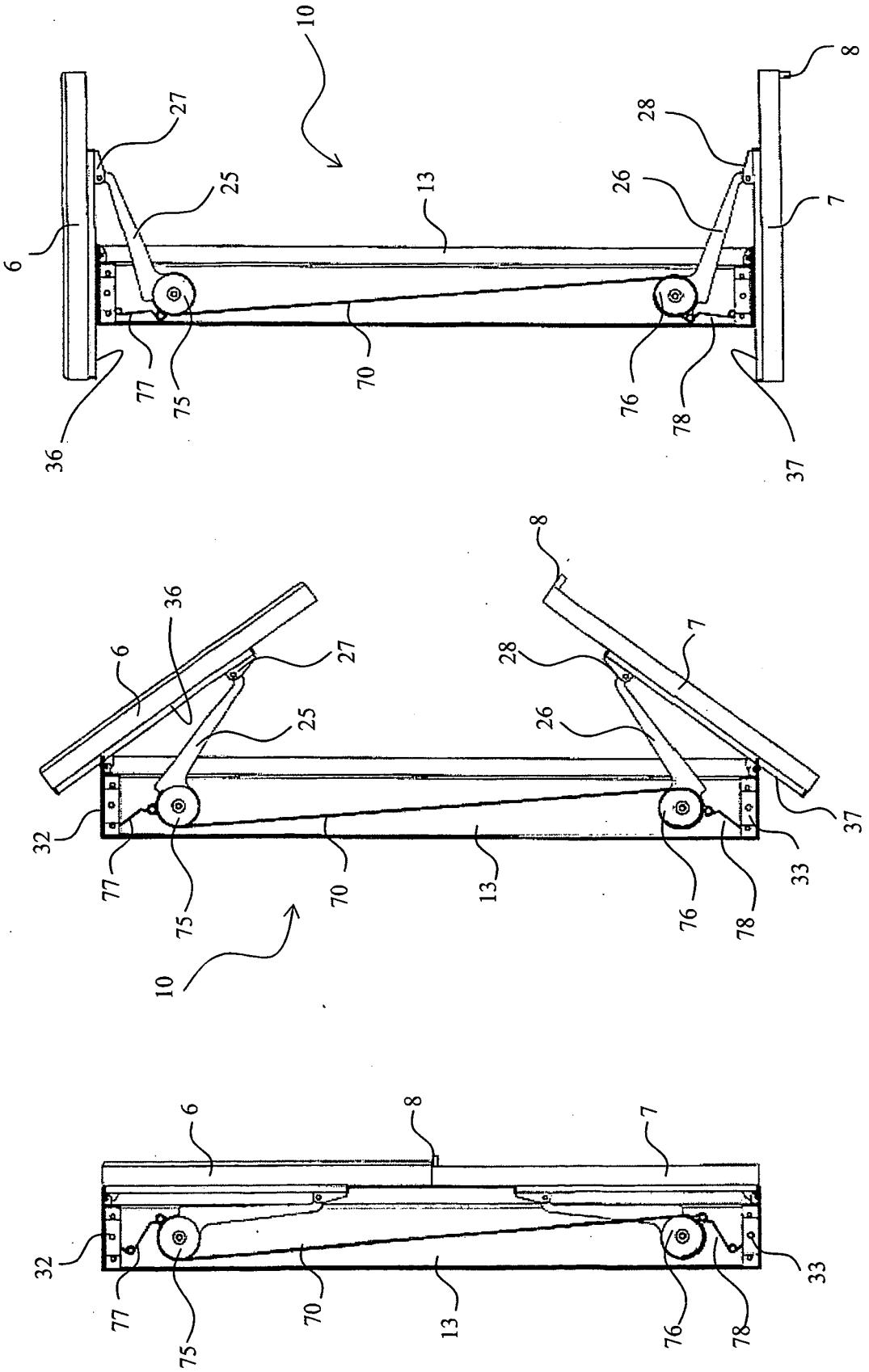

FIG. 7

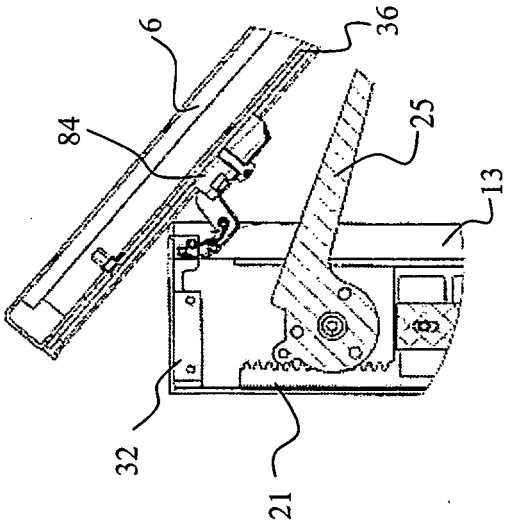

FIG: 10

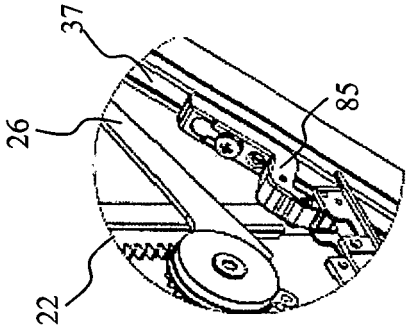

FIG: 9

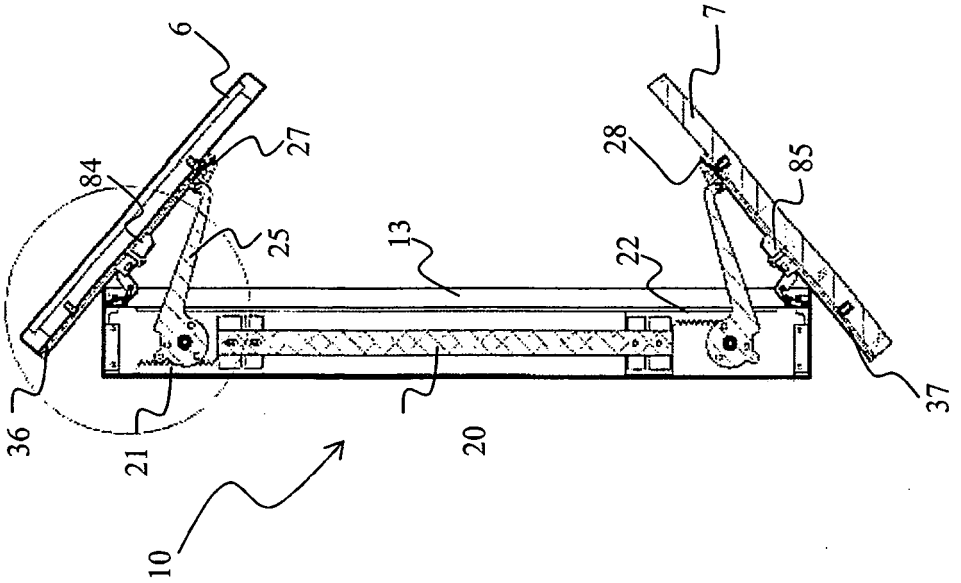

FIG. 8

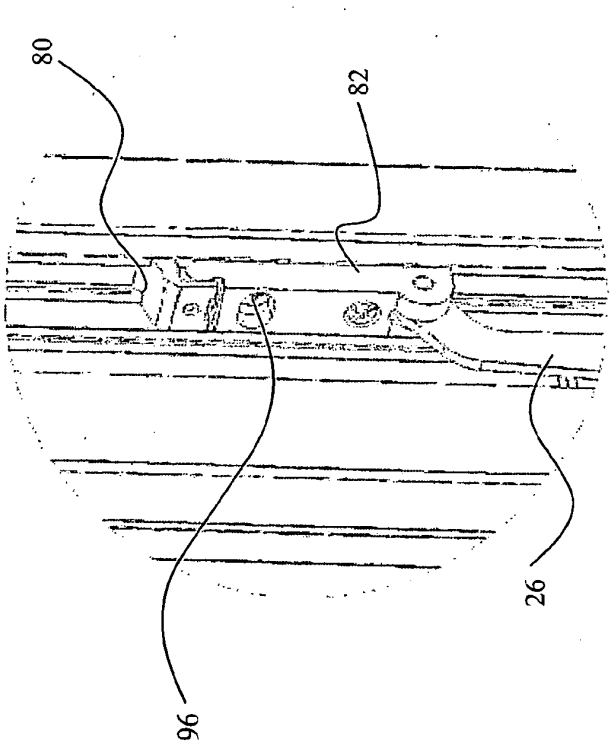

FIG. 12

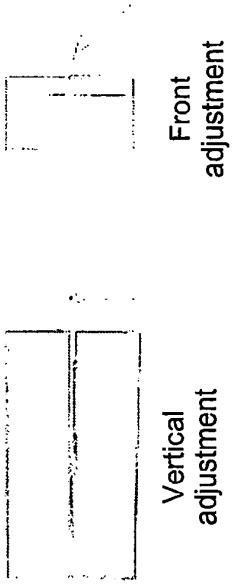

FIG. 13

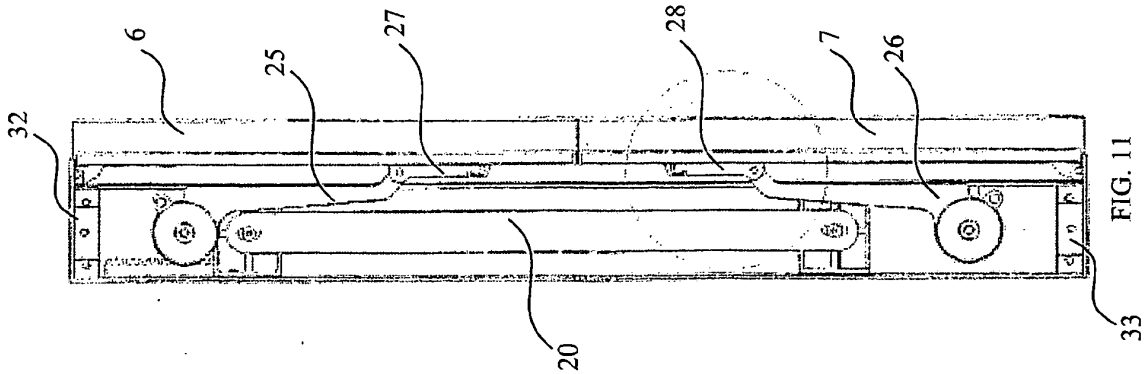

FIG. 11

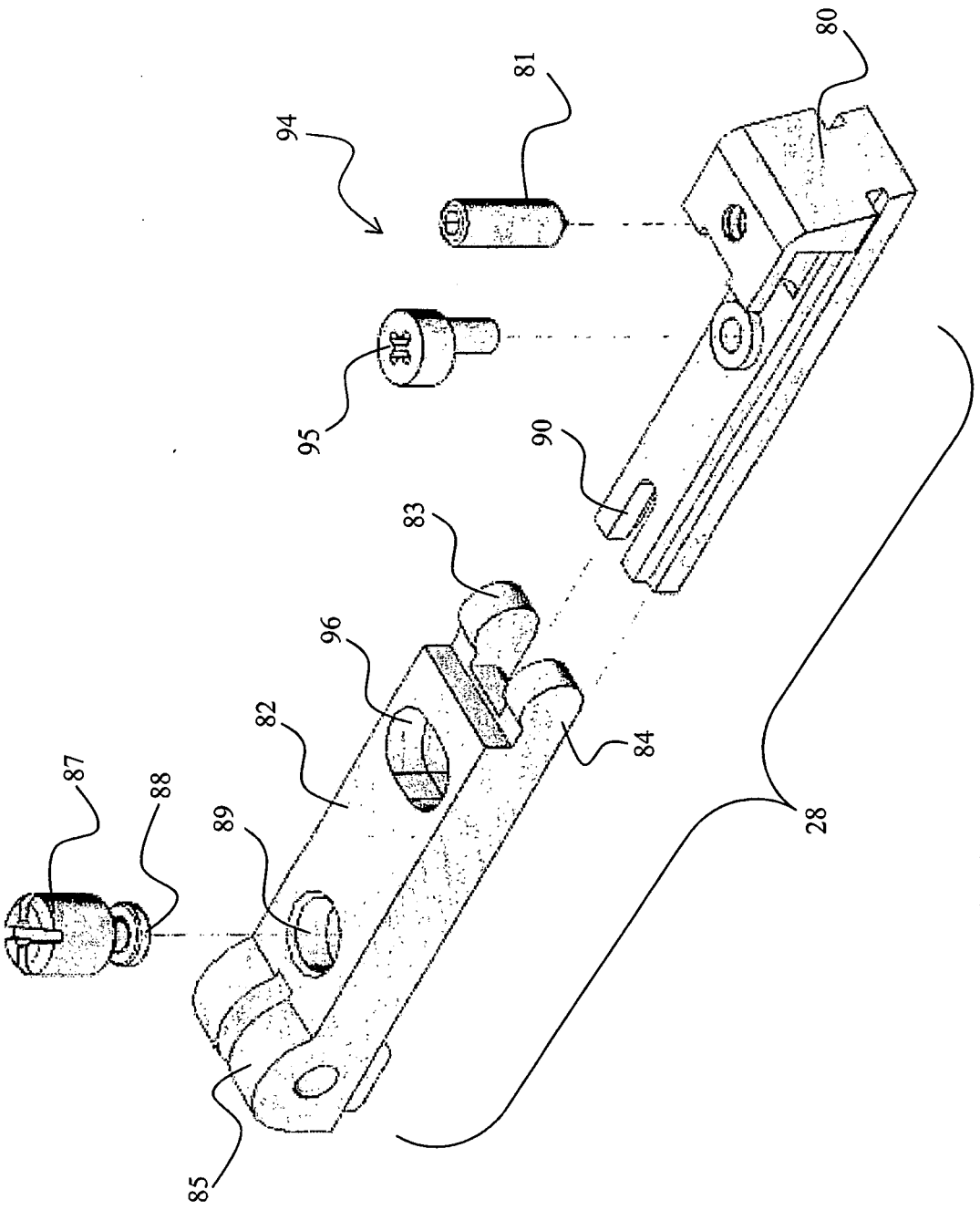

FIG. 14

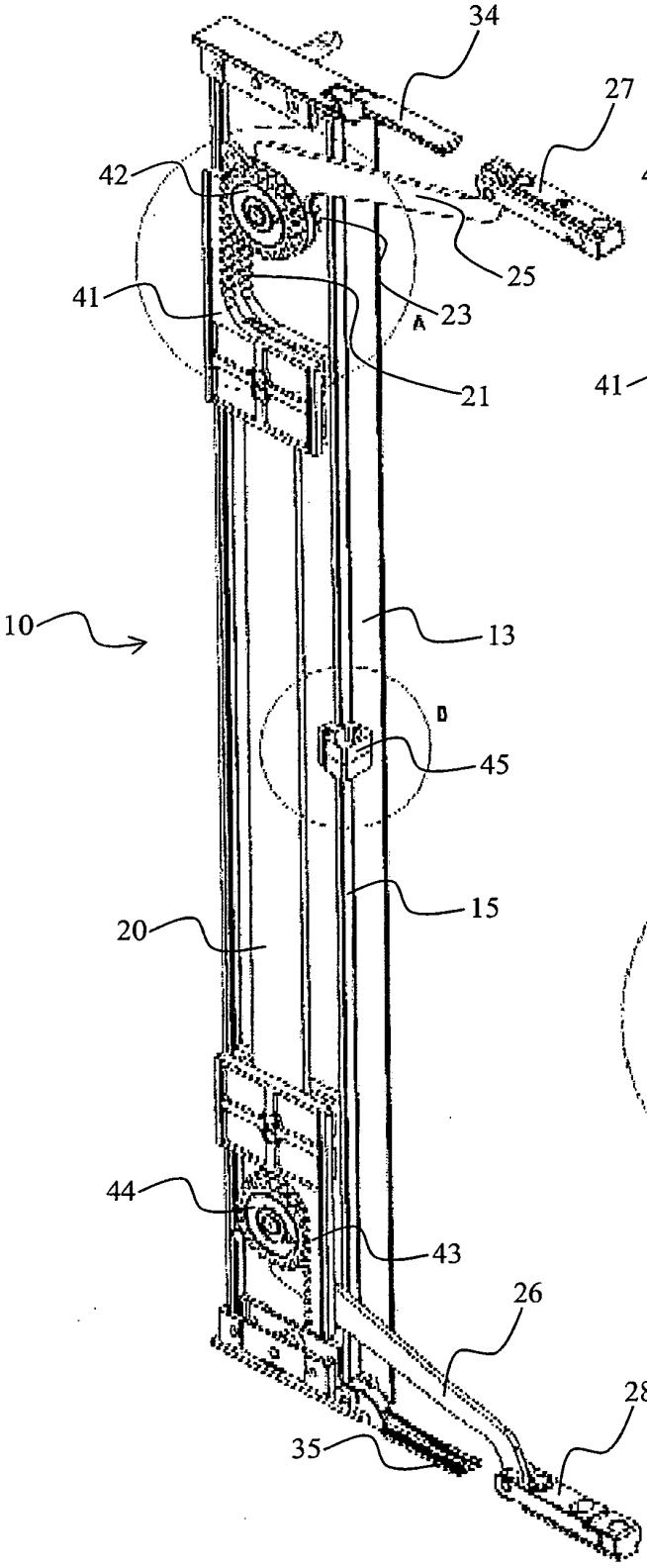

FIG. 15

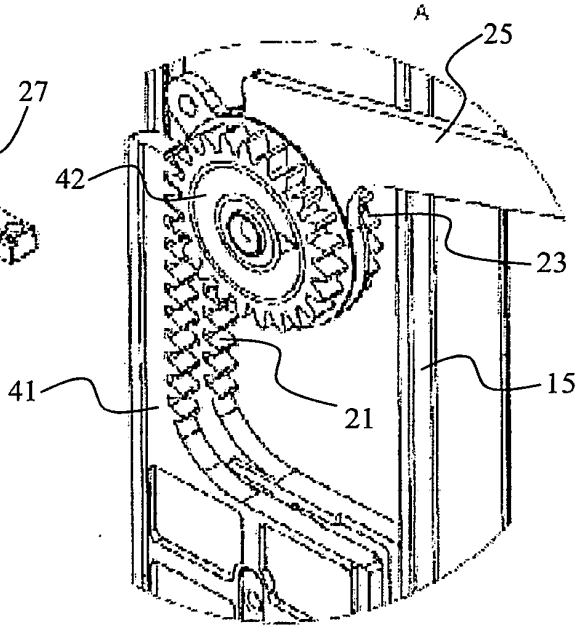

FIG. 17

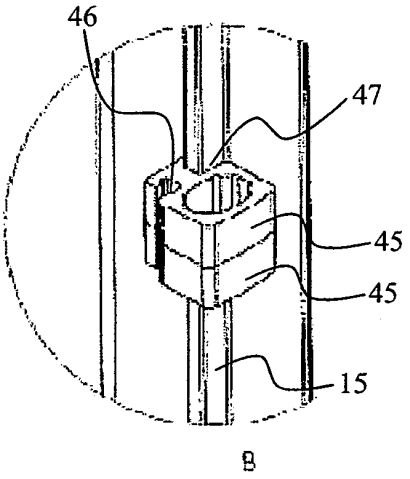

FIG. 16

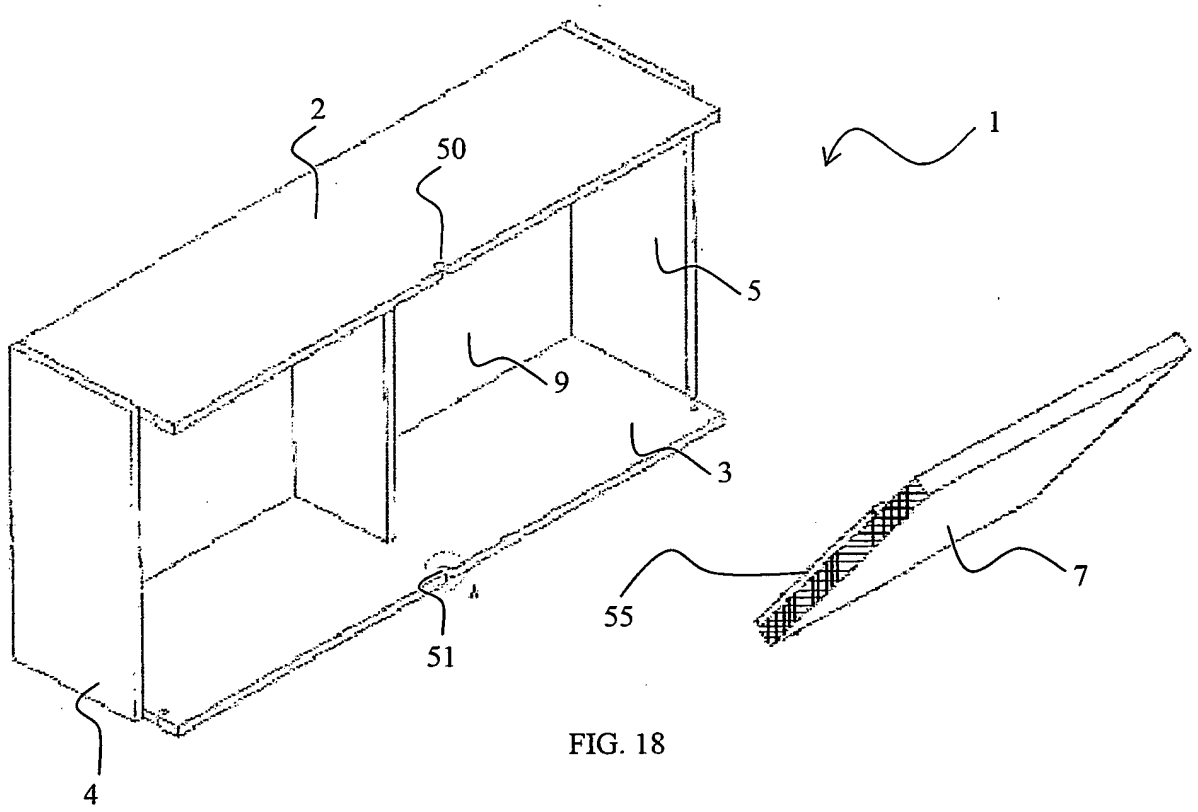

FIG. 18

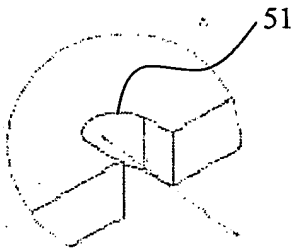

FIG. 19

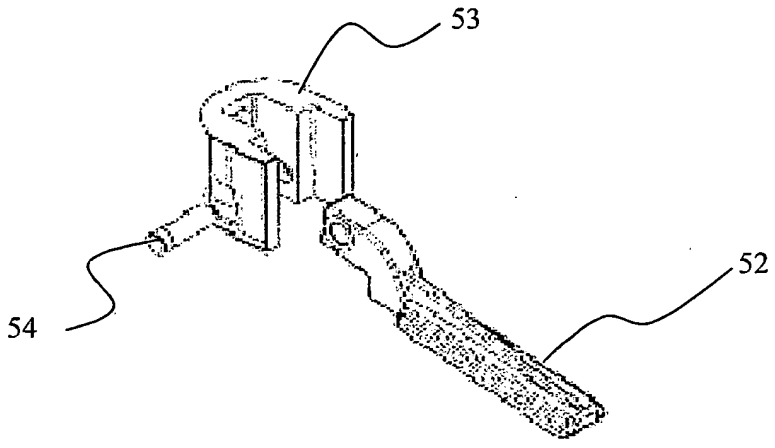

FIG. 20

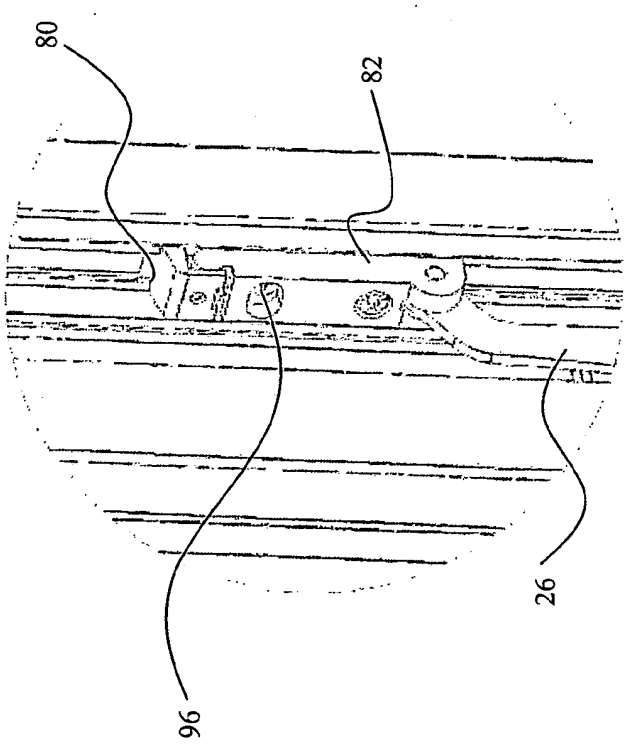

FIG. 12

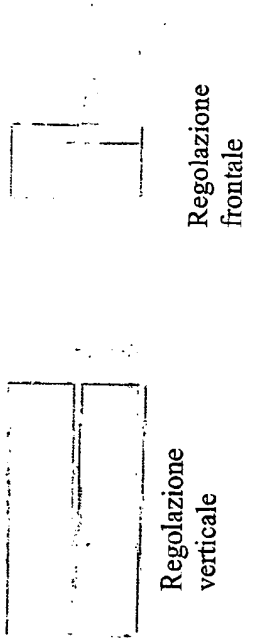

FIG. 13

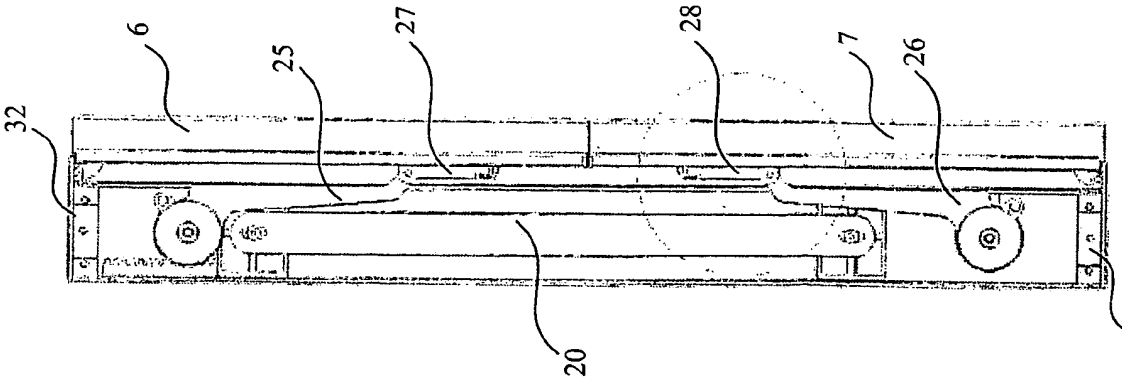

FIG. 11

REFERENCES CITED IN THE DESCRIPTION

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- US 2869954 A **[0008]**