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(11) **EP 1 535 539 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
01.06.2005 Bulletin 2005/22

(51) Int Cl.7: **A47B 95/00**

(21) Application number: **04105039.4**

(22) Date of filing: **14.10.2004**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PL PT RO SE SI SK TR**
Designated Extension States:
AL HR LT LV MK

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(30) Priority: **27.11.2003 IT PN20030084**

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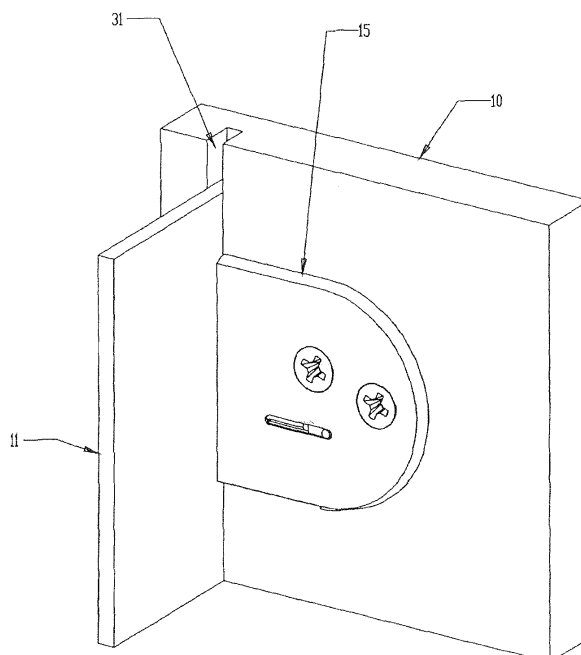
(54) **Method and apparatus for manufacturing a wall-hung cabinet**

(57) Method and apparatus for manufacturing a wall-hung, i.e. suspended cabinet, such as in particular a kitchen cabinet, comprising two side walls (10) and a back wall (11), all of which are provided in a vertical arrangement, two horizontal enclosing walls, i.e. an upper wall or ceiling (12) and a lower wall or bottom (13), and possibly at least a front closing door (14), said cabinet

being provided with cabinet suspending, i.e. wall-hanging means (15) adapted to link up with a support rail (40) that is generally attached to a wall of the kitchen.

Said cabinet suspending means (15) are simply fitted by insertion in respective accommodating recesses (30) provided by boring or milling in the side walls (10), where the side edges of the back wall (11) of the cabinet are able to pass through them.

FIG. 2



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Description

[0001] The present invention refers to a method for manufacturing a wall-hung, i.e. suspended cabinet, such as in particular a kitchen cabinet, and an apparatus for making such cabinet in a simpler, more rational manner.

[0002] A wall-hung cabinet of the above cited kind is generally known to be constituted by two side walls and a back wall provided in a vertical arrangement, two horizontal enclosing walls, i.e. an upper wall or ceiling and a lower wall or bottom, and possibly at least a front closing door. The cabinet itself must be provided with cabinet suspending, i.e. wall-hanging means adapted to link up with a support rail that is generally attached to a wall of the kitchen. In prior-art wall-hung cabinets, said cabinet suspending, i.e. wall-hanging means are attached to the side walls of the cabinet and protrude from the back wall thereof, so that - when installed - said back wall is spaced from the wall of the kitchen so as to both enable the cabinet suspending means to conveniently link up with the wall-mounted support rail provided therebehind, and to thereby create a space - generally referred to as "sanitary space" in the art - between the cabinet and the kitchen wall.

[0003] The cabinet suspending means are substantially constituted by a properly shaped bracket, which is capable of being adjusted by means of screw-type adjustment means in view of correctly adapting the position of the cabinet to the desired height and depth. The bracket itself and the pertaining adjustment devices are housed within a case, from the back side of which there protrudes the end portion of the bracket that is intended for linking up with the support rail.

[0004] Suspending means for wall-hung cabinets of the above cited kind are described for example in the European patent No. 0 033 179 and the US patent Nos. 3,946,979 and 5,351,929.

[0005] However, wall-hung cabinets made using suspending, i.e. link-up devices of this kind have a number of both construction-related and practical drawbacks. From a construction point of view, there is in the first place the need for the back wall of the cabinet to be cut or drilled in order to provide the apertures for the end portions of the mounting brackets to pass therethrough. This requires a specific operation to be performed, which, if it has to be done on the back wall of the cabinet, certainly calls for the position of installation of the cabinet to be exactly known or determined in advance, thereby reducing a possibility for a standardized production of the cabinet itself to be planned. From a practical point of view, the cabinet suspending devices attached to the side walls of the cabinet form protruding elements that take up space inside the cabinet, thereby making the cabinet itself or, better, the interior space thereof less rational to use. Furthermore, some solutions adopted in the art require a multiplicity of fastening means to secure the cabinet suspending devices to the walls of the cab-

inet.

[0006] It therefore is a main object of the present invention to provide a modified method for manufacturing a wall-hung cabinet of the above-indicated kind, duly provided with its own cabinet suspending devices, which is effective in reducing the manufacturing complexity and simplifying the installation of the cabinet itself.

[0007] A further purpose within such general object of the present invention is to cut the number of components and items needed to assemble the various parts of the cabinet.

[0008] Still another purpose of the present invention is to minimize the space that is taken up by the functional parts of the cabinet to be mounted in the cabinet interior.

[0009] According to the present invention, these aims are reached in a manufacturing method, and the apparatus provided to implement such method, incorporating the features and characteristics as recited in the claims appended hereto.

[0010] Features and advantages of the present invention will anyway be more readily understood from the description that is given below by way of nonlimiting example with reference to the accompanying drawings, in which:

- Figure 1 is a perspective view of a wall-hung kitchen cabinet;
- Figure 2 is a perspective view of a detail of the wall-hung cabinet shown in Figure 1;
- Figure 3 is a partial perspective view of the detail shown in Figure 2, as viewed in a closed condition;
- Figure 4 is a partial perspective view of the detail shown in Figure 2, as viewed in an open condition;
- Figure 5 is a view of a first embodiment of a detail of the cabinet shown in Figure 1, as viewed in perspective and in cross-section along the line A-A, respectively;
- Figure 6 is a view of a second embodiment of the detail shown in Figure 5, as viewed in perspective and in cross-section along the line B-B, respectively;
- Figure 7 is a perspective view of an alternative embodiment of the detail shown in Figure 4;
- Figure 8 is a front view of the detail shown in Figure 7, as viewed in its closed condition; and
- Figure 9 is a front view of the detail shown in Figure 7, as viewed in its open condition.

[0011] A wall-hung or suspended cabinet according

to the present invention is shown in a broadly perspective view in Figure 1. The wall-hung cabinet is normally designed for use in a kitchen; however, wall-hung or suspended cabinets of this kind are currently used and installed even in other rooms and environments both in residential and in professional or commercial buildings (offices, laboratories and the like).

[0012] The cabinet itself is essentially made up of two side walls 10 and a back wall 11, all of which are provided in a vertical arrangement, two horizontal enclosing walls, i.e. an upper wall or ceiling 12 and a lower wall or bottom 13, and possibly at least a front closing door 14.

[0013] The cabinet itself is provided with cabinet suspending, i.e. wall-hanging means 15 (Figure 2), which are adapted to link up with a support rail 40 (Figure 1) that is generally attached to a wall of the kitchen. Said cabinet suspending means are substantially constituted by a properly shaped lever 16 (Figures 3 and 4), which is hinged on within a case 17, from which there protrudes the hook-like shaped rear end portion 18 of said lever. The lever 16 is associated to actuation means 19, 20, preferably of a worm-gear type consisting of a worm screw and wheel, which enable the lever to be actuated by an axial displacement and a rotation about its hinging pin 21, respectively. Therefore, the cabinet suspending means are such as to readily enable the wall-hung cabinet to be properly adjusted in both its height and depth.

[0014] In particular, by rotating the screw 19 the pin 21 (Figure 4) is displaced axially via the drive gear 22, whereas turning the screw 20 causes the lever 16 to be actuated into rotating via the drive gear 23 and the escapement or ratchet device 24. The linear displacement of the pin 21 is guided by the pairing of the pin-and-slot arrangement 25 (Figure 3) with the case 17.

[0015] According to the present invention, the cabinet suspending means 15 are simply inserted in a proper recess 30 (Figures 5 and 6) provided within the wall 10 of the cabinet, so as to be able to accommodate them therewithin in such a manner as to have them lying substantially flush with the surface of the same wall or, at most, just slightly protruding therefrom. The accommodation 30 extends according to a substantially horizontal axis starting from the rear edge of the wall 10, and it is open at said edge so as to enable the lever 16 of the cabinet suspending means 15 to pass therethrough.

[0016] For this solution to be embodied practically, all it takes is to perform a simple operation to cut or bore the wall accordingly, so as to give the recess 30 a shape that may be either exactly complementary to the shape of the case 17 or even different therefrom if the case 17 is provided to extend in such a way as to be able to completely close the recess 30 (Figures 2 and 3), so as to prevent foreign matters from penetrating thereinto. In a preferable manner, the accommodation 30 is provided by either drilling mutually interfering bores orthogonally to the wall (Figure 5) or by a linear milling operation (Figure 6), so as to form a recess featuring undercuts 41. This proves adequate in view of ensuring the ability of

the cabinet suspending device 15 to stay firmly in its seat, while avoiding any risk of it possibly being pulled out under load conditions.

[0017] Among other things, this solution enables screw-type or similar fastening devices of any kind to be done away with when mounting the cabinet suspending devices 15 on to the cabinet walls 10.

[0018] Furthermore, the side wall 10 of the cabinet must be also provided with a vertical groove 31 extending at a distance from the rear edge of the same wall. In this groove 31 there is inserted the side edge of the back wall 11 of the cabinet (Figure 2).

[0019] According to the present invention, the back wall 11 of the cabinet remains intact, i.e. is not subject to any boring or cutting operation as usual in prior-art solutions, while anyway enabling the lever 16 of the cabinet suspending device 15 to extend towards the rear side of the cabinet. As a matter of fact, the lever 16 is in the shape of an L, with the body portion thereof that is fully contained inside the accommodation 30 and parallel to the side wall 10, and with the link-up end portion 18 thereof that extends orthogonally to said body portion (Figure 4). The vertical groove 31 is provided in the wall 10 to a depth that is smaller than the depth of the recess 30 accommodating the cabinet suspending device 15 (Figures 5 and 6). In this manner, the body of the lever 16 does not interfere with the edge of the back wall 11 inserted in the groove 30.

[0020] Illustrated in Figures 7 to 9 is an alternative embodiment of the above-considered solution illustrated in Figure 4 for implementing the cabinet suspending device 15 suitable for manufacturing a wall-hung cabinet in accordance with the present invention. This alternative embodiment is particularly well-suited for application in an accommodation 30, 41 having substantially a conformation as shown in Figure 6, wherein the same reference numerals are used in these Figures, and in the following description of this alternative embodiment, to indicate parts and details that are similar to those already described with reference to Figure 4.

[0021] The device itself is enclosed in a case that is made up of two distinct parts, i.e. a shell 17' and a cover 17", which are adapted to be assembled by means of a simple insertion-type or snap-fit coupling. The contoured lever 16 is displaced axially with the aid of the worm screw 50 engaging the gear 22, which is firmly joined to a screw 19. The latter is engaged in the threaded pin 21, which is inserted in a barrel 51 that is firmly joined to the lever 16. As a result, by turning the screw 19, the resulting movement is transmitted to the lever 16, which is displaced in a direction that is orthogonal to the direction of the axis of the screw 19. Similarly, the ratchet gear 24 is driven to displace with the aid of the worm screw 20 engaging the gear 23, which is firmly joined to a screw 52. The latter is engaged in the threaded pin 54, which is inserted in a barrel 53 that is firmly joined to the ratchet gear 24. The ratchet gear 24 is guided by the inner contour 49 of the shell 17' so as to act

on the lever 16, in such a manner as to enable the wall-hung cabinet to be adjusted vertically in its mounted position (solid line and dashed line in Figures 8 and 9). In this connection, it should be noticed that the lever 16 and the ratchet gear 24 are adapted to rotate with the respective barrels 51 and 53 on the corresponding pins 21 and 54.

[0022] The displacement of the lever 16 and the ratchet gear 24 is guided also by the pin-and-slot coupling of the pins 21 and 54 in the respective slots 25 and 56, which are provided inside the cover 17" of the case housing the cabinet suspending device (as illustrated in Figure 7). Corresponding slots (not shown) may be provided also in the shell 17'.

[0023] In a preferred manner, the above cited pins 21 and 54 are provided with respective extensions 71 and 72, which protrude from the slots 52 and 56 of the cover 17" to indicate the height and depth position into which the wall-hung cabinet is adjusted (Figure 8)

[0024] The insertion-type or snap-fit coupling of the cover 17" with the shell 17' to close the case housing the suspending device is carried out by means of pegs 60 and 61, which are provided on the inner side of the cover 17" and are adapted to snap into inserting in corresponding receptacles 62 and 63 provided in the shell 17' (Figure 7).

[0025] Preferably, the accommodation 30 that houses the cabinet suspending device has an aperture 70, which is so shaped and sized as to be able to receive the support rail 40, thereby enabling the back wall of the wall-hung cabinet to be brought into direct contact with the wall on which the wall-hung cabinet itself is to be installed. Correspondingly, the shell 17' of the case housing the cabinet suspending device is so shaped as to protect the edge of the aperture 70.

[0026] The contour of the case housing the cabinet suspending device is furthermore provided with a kind of scoring or tothing (not shown in the Figures) to prevent the device itself from slipping off its accommodation 30, 41 accidentally. The latter is advantageously provided in the wall 10 of the cabined by means of a combined boring and milling operation that cuts working time.

[0027] The described solution - in the various alternative embodiments thereof - is therefore fully able to rationalize both manufacturing and installation of a wall-hung cabinet provided with the respective cabinet suspending devices, as well as to reduce the number of components and items needed to assembly the various parts of the cabinet.

Claims

1. Method for manufacturing a wall-hung, i.e. suspended cabinet, such as in particular a kitchen cabinet, comprising two side walls (10) and a back wall (11), all of which are provided in a vertical arrangement, two horizontal enclosing walls, i.e. an upper

wall or ceiling (12) and a lower wall or bottom (13), and possibly at least a front closing door (14), said cabinet being provided with cabinet suspending, i. e. wall-hanging means (15) adapted to link up with a support rail (40) that is generally attached to a wall of the kitchen, **characterized in that** said side walls (10) are engraved so as to obtain a vertical groove (31) extending at a distance from the rear edge thereof, as well as a recess (30) having a horizontal axis and being open on the rear side to accommodate said cabinet suspending means (15), said cabinet suspending means (15) being press-fitted into their respective accommodations (30) and the side edges of the back wall (11) being inserted in the vertical grooves (31) of the side walls (10) by causing them to pass through said cabinet suspending means (15).

2. Method for manufacturing a wall-hung cabinet according to claim 1, **characterized in that** said vertical groove (31) is cut to a depth that is smaller than the depth of the recess (30) accommodating the cabinet suspending device.

3. Method for manufacturing a wall-hung cabinet according to claim 1, **characterized in that** said recess (30) is made by a boring or milling operation and is so shaped as to feature undercuts (41) preventing the cabinet suspending means (15) from slipping off or being pulled out under load conditions.

4. Method for manufacturing a wall-hung cabinet according to any of the claims 1 to 3, **characterized in that** said cabinet suspending means (15) are contained in a case (17) that is received within the respective accommodation recess (30) so as to lie substantially flush with the inner surface of the side wall (10).

5. Apparatus for manufacturing a wall-hung, i.e. suspended cabinet, such as in particular a kitchen cabinet, comprising two side walls (10) and a back wall (11), all of which are provided in a vertical arrangement, two horizontal enclosing walls, i.e. an upper wall or ceiling (12) and a lower wall or bottom (13), and possibly at least a front closing door (14), said cabinet being provided with cabinet suspending, i. e. wall-hanging means (15) adapted to link up with a support rail (40) that is generally attached to a wall of the kitchen, **characterized in that** said cabinet suspending means (15) are simply fitted by insertion in respective accommodating recesses (30) provided in the side walls (10), where the side edges of the back wall (11) of the cabinet are able to pass through them.

6. Apparatus for manufacturing a wall-hung cabinet

according to claim 5, **characterized in that** said cabinet suspending means (15) comprise a L-shaped lever (16), the body portion of which is fully contained inside the accommodation recess (30) in a parallel arrangement with respect to the side wall (10), and the link-up end portion (18) of which extends orthogonally to said body portion and at the back of the back wall (11) of the cabinet.

- 5
7. Apparatus for manufacturing a wall-hung cabinet according to claim 5 or 6, **characterized in that** said cabinet suspending means (15) further comprise a ratchet gear (24) adapted to act upon the lever (16) to bring and keep it in a linked-up position, said lever and said ratchet gear being capable of being displaced via respective screw-type actuation means (19, 21, 22, 50-51; 20, 23, 52-54) that are operable in an orthogonal direction with respect to the displacement direction of the lever and the ratchet gear.
- 10
- 15
- 20
8. Apparatus for manufacturing a wall-hung cabinet according to claim 7, **characterized in that** said actuation means for operating the lever (16) and the ratchet gear (24) comprise a worm screw (19; 20), a gear (22; 23), a screw (50; 52), a threaded pin (21; 54) and a barrel (51; 53), respectively, in which said barrels are firmly joined to the lever (16) and the ratchet gear (24), respectively, and are pivotally hinged on the corresponding threaded pin (21; 54).
- 25
- 30
9. Apparatus for manufacturing a wall-hung cabinet according to any of the preceding claims 5 to 8, **characterized in that** said cabinet suspending means (15) are enclosed in a case that is adapted to be inserted in the accommodation recess (30) of the cabinet and is made up of a shell (17) and a cover (17') that are capable of being coupled to each other by means of pegs (60, 61) and corresponding receptacles (62, 63), respectively.
- 35
- 40
10. Apparatus for manufacturing a wall-hung cabinet according to any of the preceding claims 5 to 9, **characterized in that** said accommodation recess (30) has a correspondingly contoured aperture (70) adapted to receive the support rail (40) for hanging the cabinet, when the latter is linked up with said rail in a position in which it fully adheres against the wall.
- 45
- 50
11. Apparatus for manufacturing a wall-hung cabinet according to any of the preceding claims 5 to 10, **characterized in that** said shell (17) of the case containing said cabinet suspending means (15) is so shaped as to protect the edge of the aperture (70).
- 55

FIG. 1

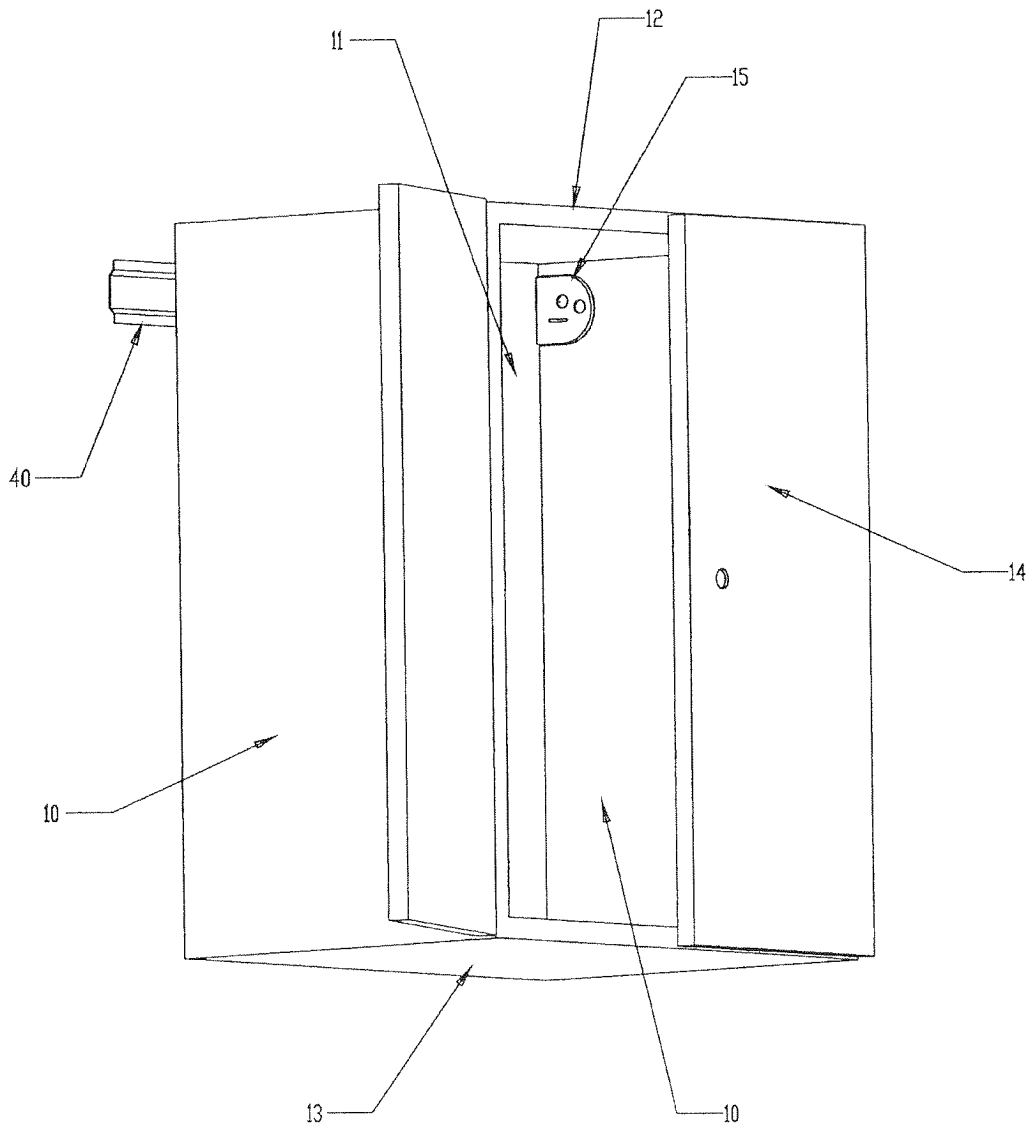


FIG. 2

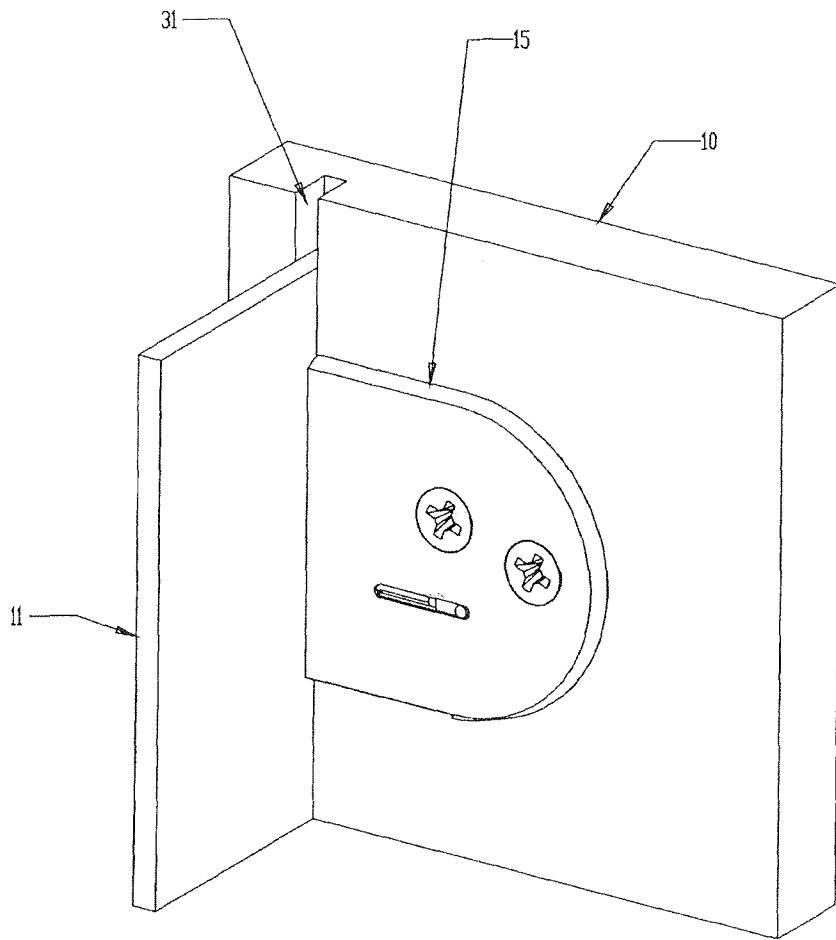


FIG. 3

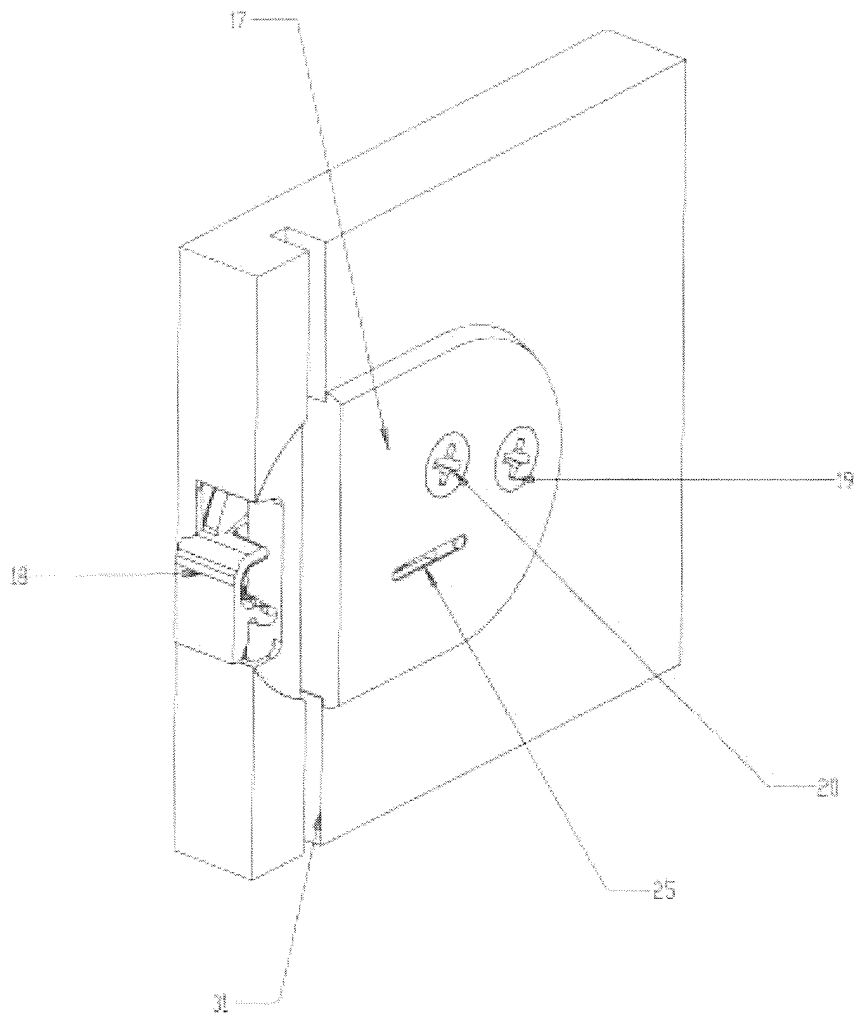


FIG. 4

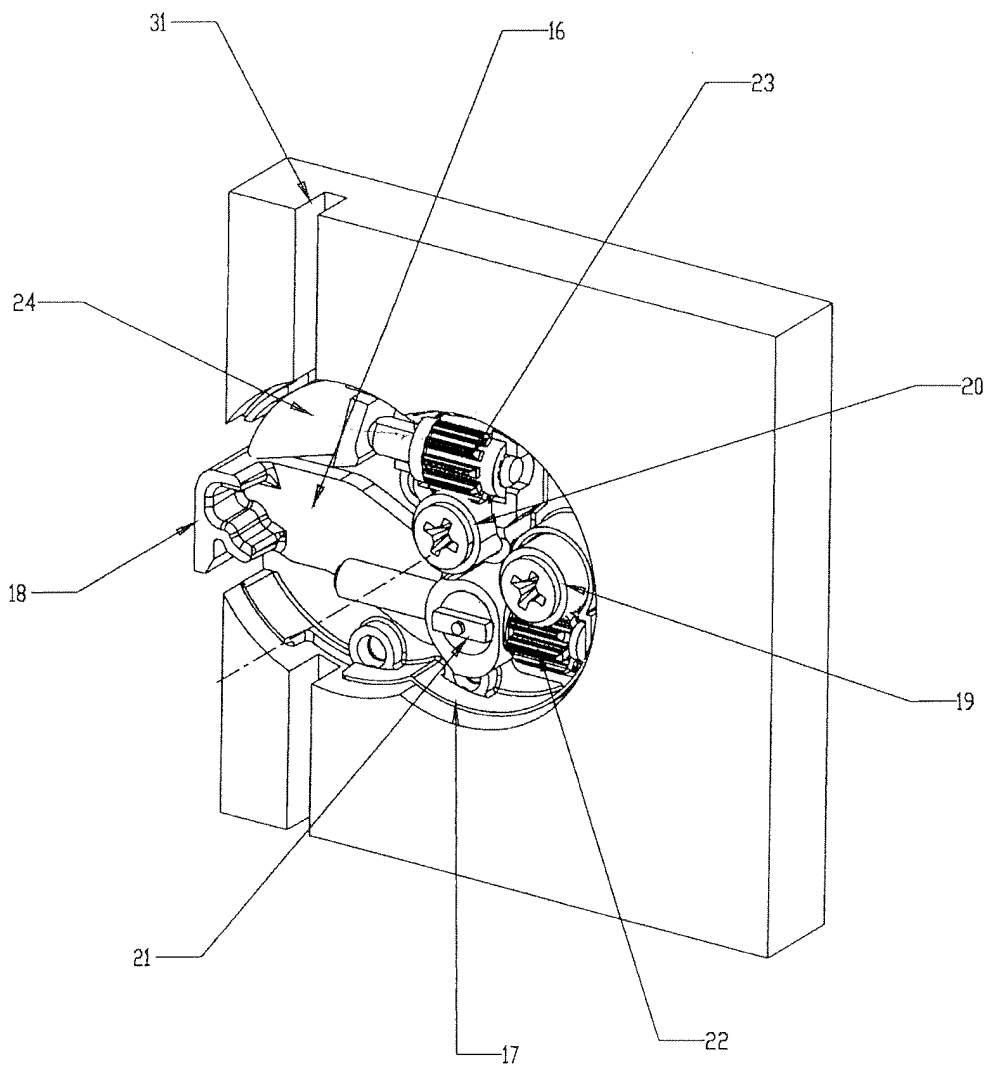
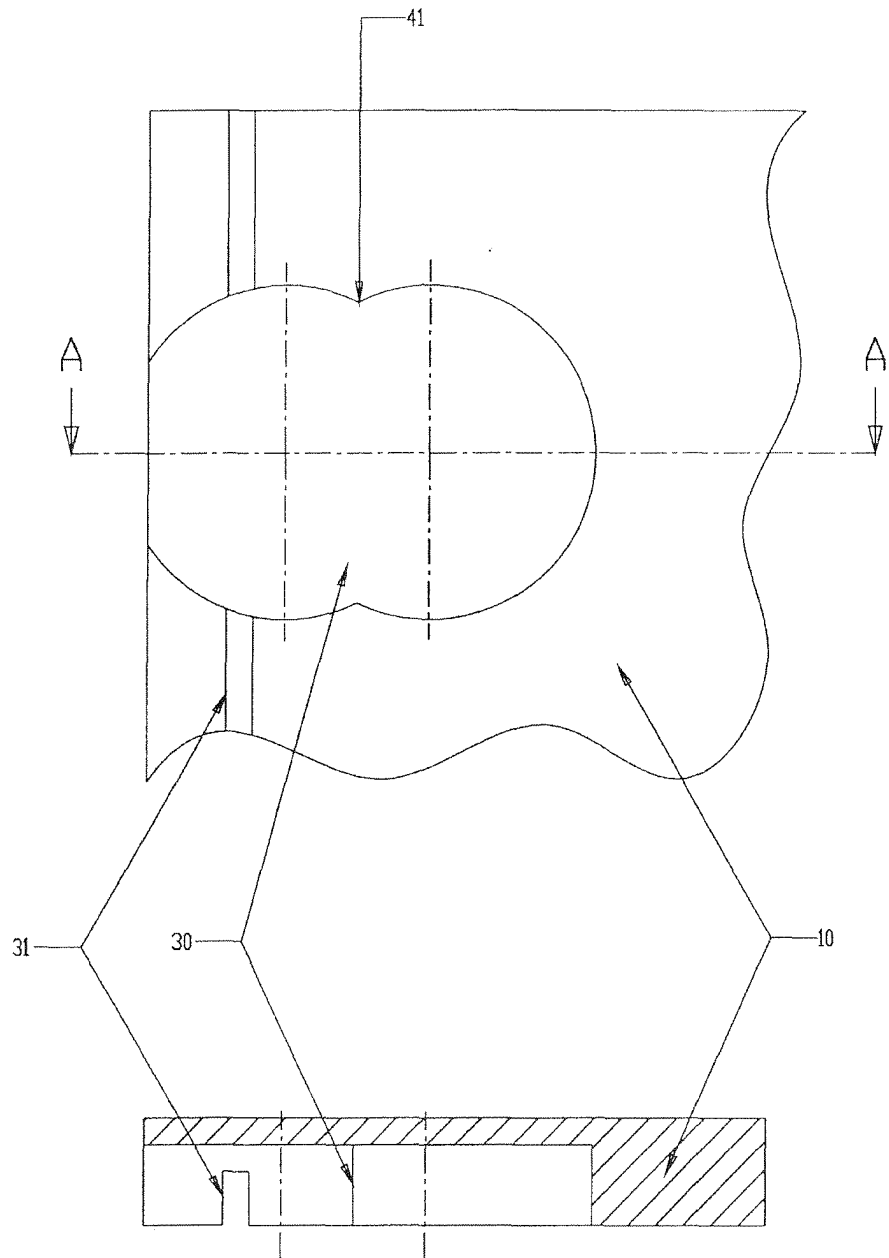
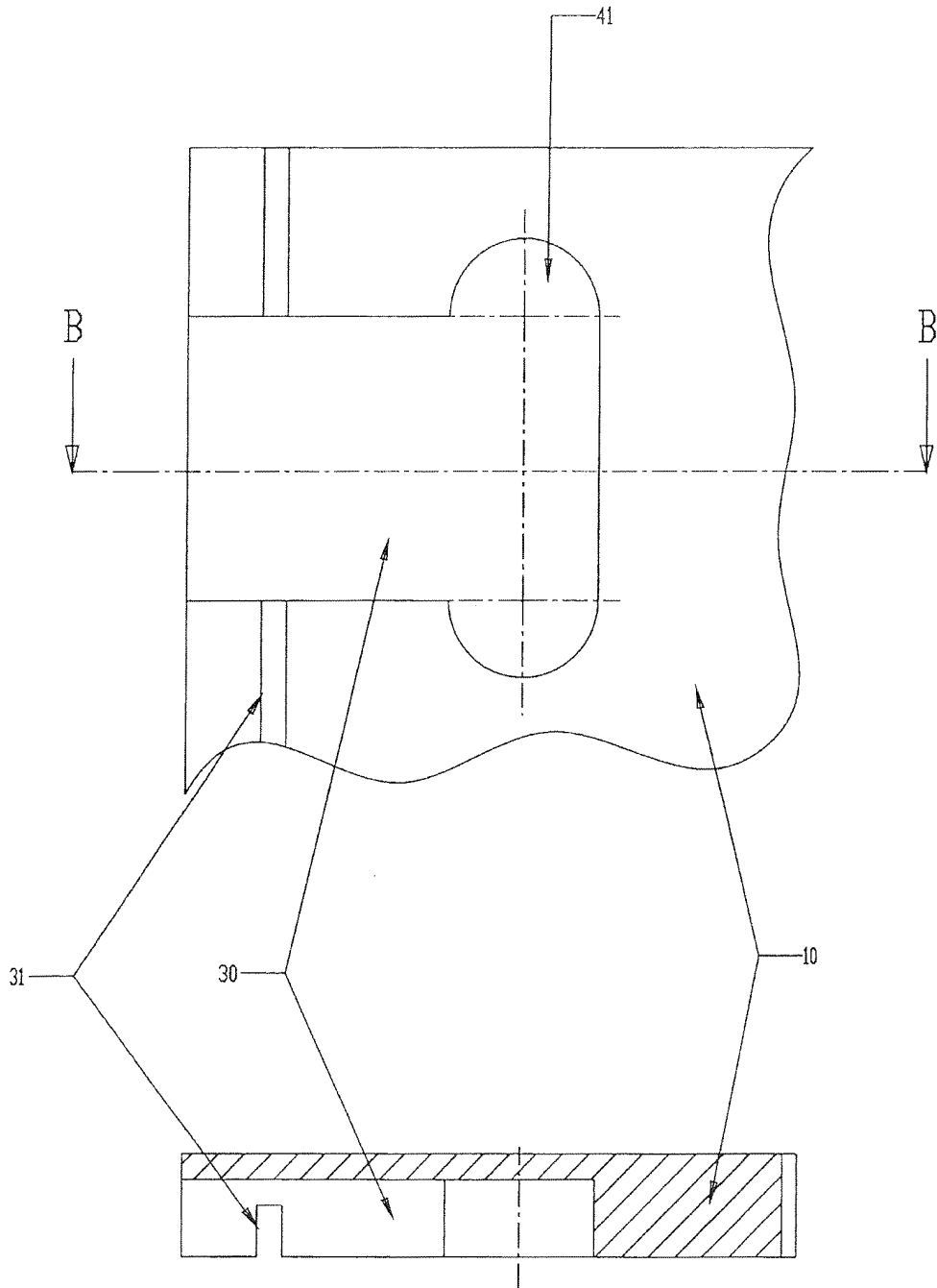


FIG. 5



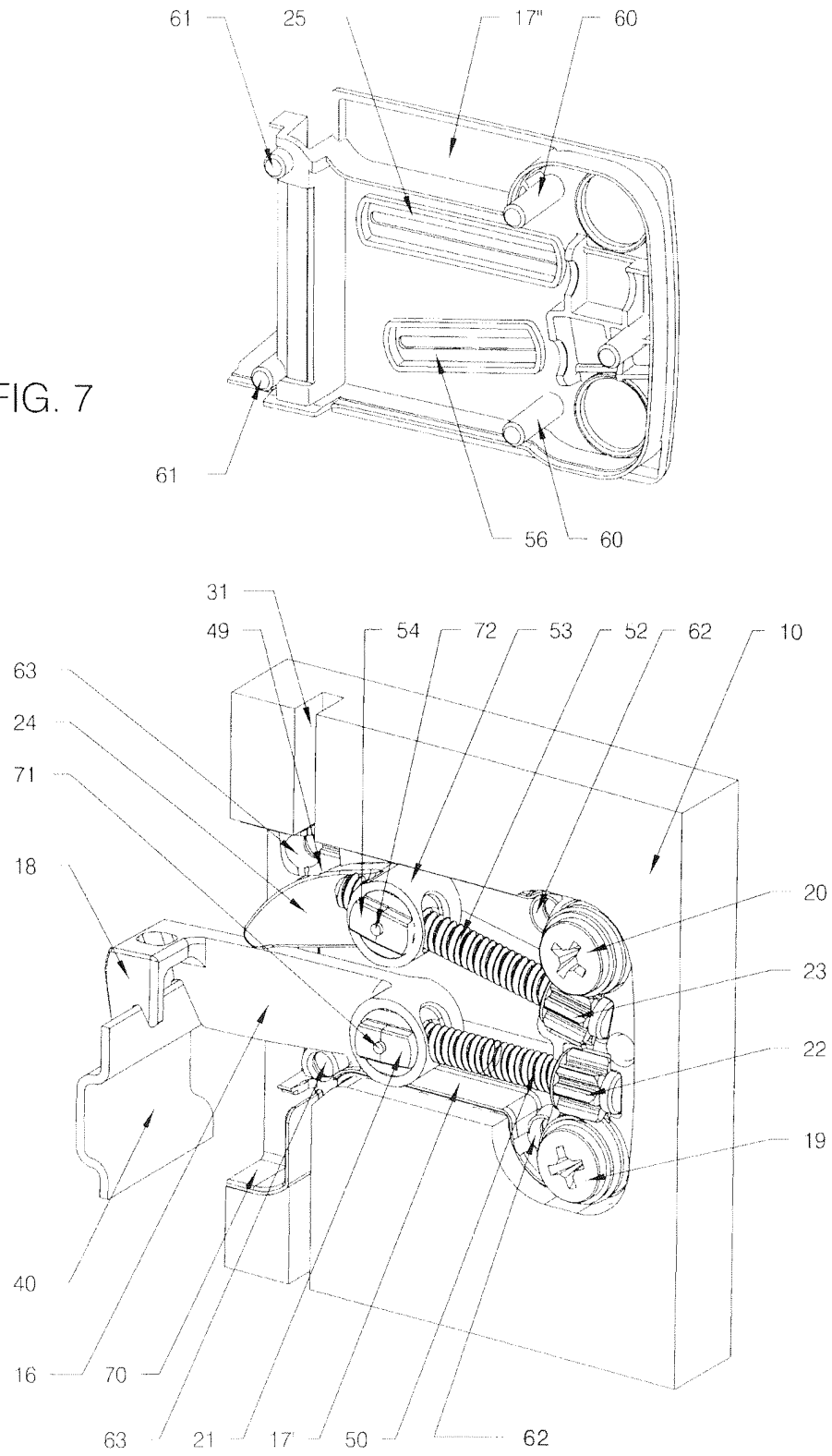
SEZIONE A-A

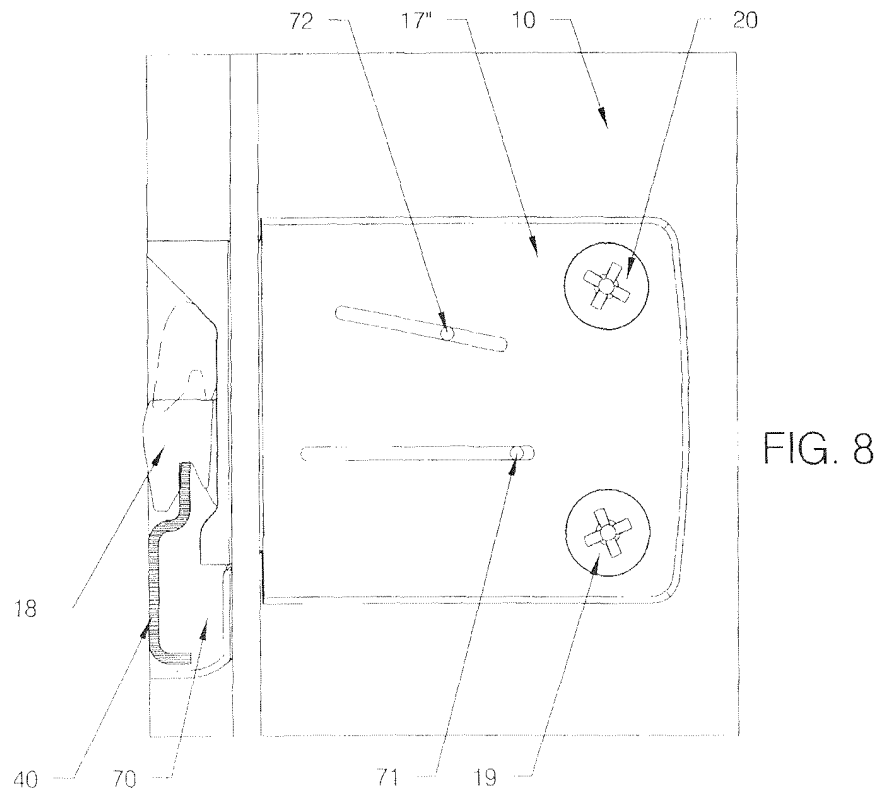
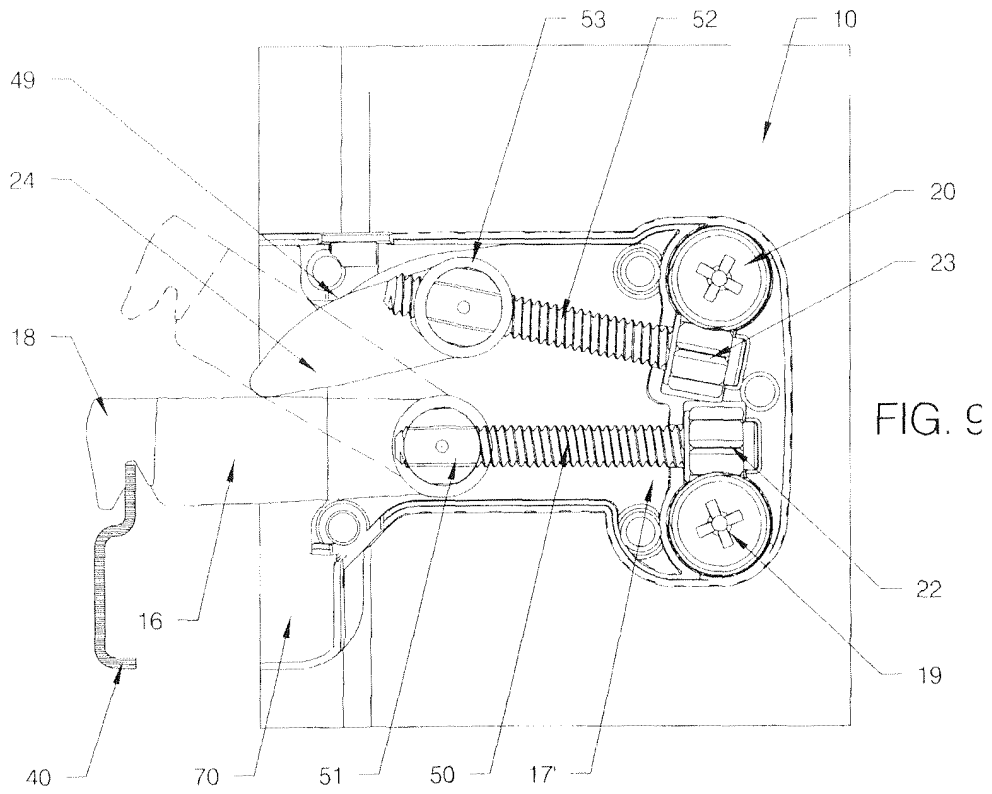
FIG. 6



SEZIONE B-B

FIG. 7







DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		8 December 2004	Noesen, R
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EPO FORM 1503 03-82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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

08-12-2004

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