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(54) **Hinge for doors or windows in metal section bars**

(57) A hinge for doors or windows in metal section bar, comprising two of mutually and pivotally coupling elements (3, 23) which can be attached to the frame and to the wing (1) of the doors or windows, wherein each of said elements has attachment means (6,7, 26, 27)

suitable for being engaged in corresponding grooved housings (2) formed on the frame or the wing respectively, and locking means (9, 11, 29, 31) engaged in the same grooved housings and which can be actuated to be forced against them to prevent sliding of said attachment means in said housings (2).

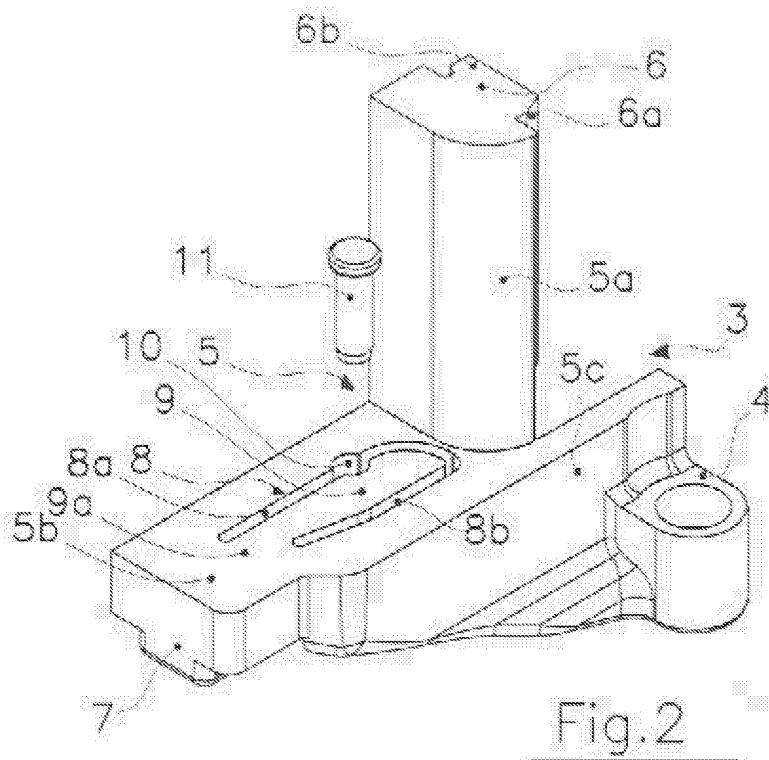


Fig. 2

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Description

[0001] The present invention relates in general to the field of the accessories for doors and windows in metal section bars, in particular section bars in aluminium.

[0002] More particularly the object of the present invention is a hinge which can be used in aluminium doors or windows of the wing type or tilt and turn type.

[0003] As is well known, the wings of doors and windows are connected to the respective frames by means of hinges formed by two reciprocal coupling elements consisting more particularly of a male element and a female element rotatingly engaged one in the other. Each element of rotating reciprocal coupling comprises a hinge pin or respectively a hinge housing for the engaging of said pin. The two elements can be connected to the frame or to the wing irrespectively; more frequently, in the case of doors or windows in metal section bar, the male element is connected to the wing, but in some cases, both the wing and the frame have female elements, which can be aligned at assembly and pivotally connected to each other by a free pin engaged in the female elements.

[0004] The male and the female elements each comprises its own attachment means so as to be fixed to the respective structure, frame or wing. In doors or windows in metal section bar the coupling elements are fixed by the attachment means to the contact walls between the wing and the frame, that is to say those not visible nor accessible when the doors or windows is closed. In the prior art each coupling element comprises a generally square attachment plate, wherefrom the pin or relative housing extends, and a counterplate between which the section bar forming the frame or the wing is placed. Fastening between the plate and counterplate is carried out by means of screws.

[0005] The above described structure of hinges for doors or windows in metal section bar according to the prior art involves the use of numerous separate components (square plate, counterplate and screws) and can therefore only be used in a manual process of assembly of the doors or windows. In the case instead of the production of doors or windows on a large scale by automated processes, a structure of this kind cannot be used in that assembly of the various components cannot be automated, except with extremely complex and costly equipment.

[0006] The object of the present invention is to provide a hinge for doors or windows in metal section bars which enables assembly of the same by means of automatic machinery.

[0007] A particular object of the present invention is to provide a hinge of the type mentioned above wherein the respective coupling elements are designed for fixed connection on the relative section bar, in this way allowing automatic assembly.

[0008] These objects are achieved with the hinge for doors or windows in metal section bars according to the

present invention whose basic features are claimed in claim 1.

[0009] Basically the hinge according to the present invention comprises two mutually and pivotally coupling elements, each intended to be attached either to the frame or to the wing of a door or window. Each coupling element comprises attachment means suitable for being engaged in respective grooved housings of the frame or of the wing and blocking means engaged in the same grooved housings and which can be actuated by forcing against them to prevent sliding of the attachment means inside them.

[0010] More particularly the attachment means comprise a first longitudinal toothed rib fit for hooking to the respective grooved housing, while the locking means comprise an additional rib, with teeth on the opposite side in relation to the first rib, and can be actuated by forcing by means of the interposition of a wedge or peg member so as to prevent sliding of the first ribbing in the respective housing.

[0011] In a preferred embodiment of the invention each mutually and pivotally coupling element comprises a hinge pin or, respectively, a hinge housing for the engaging of the pin extending from a square plate holding the attachment means and the locking means. The square plate comprises a first arm and a second arm perpendicular one to the other and a third arm, extending from the opposite side to the first arm in relation to the second arm, holding the pin or the housing. The first and the second ribbings extend on the same side along the first and the second arms.

[0012] Further features and advantages of the hinge for doors or windows in metal section bar according to the invention will be made clearer by the following description of an embodiment thereof, given by way of a non-limiting example with reference to the accompanying drawings in which:

- Figure 1 shows a detail perspective view of a metal frame of a doors or windows on which a female element of a hinge is mounted according to the present invention;
- Figure 2 shows an enlarged perspective view of a female element of the hinge according to the present invention;
- Figure 3 shows a cross section of the female element made along the axis of the forcing peg;
- Figure 4 shows in a perspective view the initial step of assembly of the female element on the frame;
- Figure 5 shows a top plan view of the female element during the assembly step shown in Figure 4;
- Figure 6 shows an enlarged perspective view of a male element of the hinge according to the invention;
- Figure 7 shows a cross section of the locking means of the male element of Figure 6.

[0013] Referring to Figures 1 and 2, 1 denotes a frame

of a door or window in metal section bar on which a grooved housing 2 is formed having two fins 2a and 2b projecting one towards the other and running along the entire internal perimeter. A female element of the hinge according to the invention, generally indicated at 3, is made in a single shaped body wherefrom a housing 4 extends for the engaging of a pin, not shown. The female element 3 also comprises an attachment body 5, with a substantially square shape and comprising a first arm 5a and a second arm 5b, perpendicular one to the other, and a third arm 5c, extending from the opposite side to the arm 5b in relation to the arm 5a and holding the housing 4 at its free end.

[0014] Respective longitudinal toothed ribs 6 and 7 are formed along the external faces of the two arms 5a and 5b. The first rib 6, which extends along the arm 5a of the anchorage body 5, has a bevelled edge 6a and, at the opposite side, a longitudinal tooth 6b. On the second arm 5b a substantially U-shaped through notch 8 is formed which defines on the same arm 5b a portion 9 with an elongated shape, referred to for the sake of simplicity as tongue, connected flexibly to the arm 5b via its root 9a. The main sides of the notch 8 extend longitudinally on the arm 5b, so that the tongue 9 extends from approximately the free end of the arm 5b towards the arm 5a.

[0015] Near the free end of the tongue 9, one of the sides of the notch 8, denoted by 8a, has a widening 10 intended for the forced engaging of a wedge or peg body 11, shown in an exploded view in Figures 1 and 2, whose function shall be described herein below. As shown in Figure 3, the rib 7, also with teeth and extending along the second arm 5b, has an enlarged edge 12, with a substantial tooth shape, at its portion coinciding with the notch 8 and along the other side 8b of the latter.

[0016] Referring to Figures 4 and 5, assembly of the female element 3 on the frame 1 is performed as follows.

[0017] The first arm 5a is first engaged in the grooved housing 2 of the frame 1. This is performed by moving the attachment body 5 closer in the entry direction indicated by the arrow A (in Figure 5), so as to hook the longitudinal tooth 6b under the relative fin 2a. With a rotary movement as indicated by the arrow B, the first rib 6 is inserted in the housing 2 thanks to the presence of the bevelled edge 6a. The first arm 5a is then made to slide along the portion of the groove 2 wherein the first rib 6 is engaged until the second longitudinal rib 7 is engaged in the respective portion of the groove 2. At this point the female element 3 is positioned in the corner of the frame, without however being attached there. In order to block it in this position the peg 11 is engaged in the widening 10 (arrow C in Figure 3) and, being of a larger size than the widening 10, causes a displacement, in the direction of the arrow D (Fig. 3), of the tongue 9 which bends correspondingly around its root 9a. More specifically, as can also be seen in Figure 3, the peg 11 has a frusto-colonial portion whose smallest diameter is smaller than that of the widening 10 and a

stem of larger diameter. More particularly the difference between the values of the diameter of the stem of the peg 11 and of the diameter of the widening 10 gauges the extent of the movement of the edge 12 of the tongue 9.

[0018] In this way the enlarged edge 12 of the tongue 9 is forced against the fin 2b of the grooved housing 2, hooking it and generating a friction force which prevents the sliding of the first ribbing, and hence of the entire female element, in the groove 2. The presence of the longitudinal tooth 6b and of the enlarged edge 12 allows fixing of the attachment body 5 to the frame 1 without the use of screws. The sequence of insertion of the body 5 in the frame 1 in the directions indicated by arrows A, B, C, D also allows definition of a process of assembly of the individual elements of coupling of the hinge composed of simple linear movements which can be implemented by means of an automatic assembly machine.

[0019] The hinge for doors or windows in metal section bar according to the invention therefore solves the problems of hinges according to the prior art in that, thanks to its shape, it can be fixedly connected to the wing or to the frame without the aid of screws and counterplates. The simplicity of the movements required for the connection makes it particularly suitable for use in a line for production of doors or windows by means of machines operating automatically.

[0020] Figures 6 and 7 instead show a male element 23 of a hinge intended to be attached to the frame of the wing and then to the external edge thereof. The male element 23 is also made in a single shaped body wherefrom the hinge pin 24 extends for engaging in a hinge housing, such as the housing 4, of the female element 3. The male element 23 also comprises an attachment body 25 of a substantially square shape and composed of two perpendicular arms 25a, 25b and a third arm 25c, extending from the opposite side to the arm 25b in relation to the arm 25a and holding the housing 24 at its free end.

[0021] Since the grooved housings 2 for connection of the attachment body 25 to the wing in this case run along the external edge of the relative frame, the attachment and locking means are consequently provided on the internal faces of the body 25.

[0022] More particularly the arm 25a has a rib 26 with two projections 26a extending symmetrically from opposite sides to its free end. The ribbing 26 has such a width as to engage in the grooved housing 2, while the two projections 26a abut from the inside on the two fins 2a, 2b once the rib 26 is engaged in the housing 2. The arm 25b has a rib 27 and a through notch 28 defining a portion 29 with elongated shape, referred to for the sake of simplicity as tongue, comprising at least one part of the rib 27 and connected flexibly to the arm 25b via its root 29a. The notch extends along the arm 25b in a substantially longitudinal direction and the root 29a is near the other arm 25a.

[0023] Near the free end of the tongue 29 the notch

28 has a widening 30 intended for forcedly engaging a peg 31 identical to the peg 11 described previously.

[0024] For assembly the toothed ribbing 26 is first inserted slidingly from below in the grooved housing 2 until it engages the rib 27 in the corresponding grooved housing, making the arm 25b abut on the fins 2a, 2b. The peg 31 is forcedly inserted in the widening 30, this resulting in a forced abutment of the arm 25b against the fins 2a, 2b and the side walls of the grooved housing 2 and the locking of the male element 23 on the wing frame.

[0025] In the present description reference has been made hitherto to a female element 3 of a hinge to be attached to the fixed frame of the doors or windows and to a male hinge element 23 to be attached to the frame of a wing of the doors or windows. The corresponding male elements to be attached to the fixed frame and female elements to be attached to the frame of the wing are not described here in that evident to a person skilled in the art.

[0026] Despite the fact that the unit cost of the hinge according to the invention is not lower than that of similar known hinges, the advantages which can be achieved by simplification of the assembly process lead to a significantly lower overall cost of production of the entire doors or windows.

[0027] Variations and/or modifications may be made to the hinge for doors or windows in metal section bars according to the present invention without departing from the scope and spirit of the invention as set forth in the following claims.

Claims

1. Hinge for doors or windows in metal section bar, comprising two mutually and pivotally coupling elements (3, 23) fixable to the frame and to the wing of the doors or windows, **characterised in that** each of said elements has attachment means (6, 7, 26, 27) suitable for being engaged in corresponding grooved housings (2) formed in the frame or the wing respectively, and locking means (9, 11, 29, 31) engaged in the same grooved housings and which can be actuated to be forced against them to prevent sliding of said attachment means (5, 25) in said housings (2).
2. Hinge for doors or windows according to claim 1, wherein said attachment means comprise a first toothed rib (6, 26) extending from each of said mutually and pivotally coupling elements (3, 23) to hook inside said grooved housing (2), said attachment means comprising a second rib (7, 27) which can be moved in said grooved housing so as to be hooked and forced against it, developing a friction force suitable for preventing sliding of said first rib (6, 26).
3. Hinge for doors or windows according to claim 2, wherein said second rib (7, 27) extends from a portion (9, 29) of said mutually and pivotally coupling element which is partially separated from the latter and can be forced against said grooved housing due to the interposition of a wedge body (11, 31) between it and the remaining portion of said mutually and pivotally coupling element.
4. Hinge for doors or windows according to claim 3, wherein said second rib (7) has an enlarged edge (12), on the opposite side in relation to a tooth (6b) of said first rib (6), suitable for hooking and forcing against said grooved housing (2) as a result of a displacement of said portion (9).
5. Hinge for doors or windows in section bar according to any one of the previous claims, wherein each mutually and pivotally coupling element comprises a hinge pin (24) or respectively a hinge housing (4) for engaging said pin, extending from a square plate (5, 25) holding said attachment means (6, 7, 26, 27) and said locking means (9, 11, 29, 31) said square plate comprising a first arm (5a, 25a) and a second arm (5b, 25b) perpendicular to each other and a third arm (5c, 25c), extending from the opposite side to the first arm in relation to said second arm, holding said pin (24) or said housing (4), said first and said second rib (6, 7, 26, 27) extending from the same side along said first and second arm (5a, 5b, 25a, 25b).
6. Hinge for doors or windows according to claim 5, wherein on said second arm (5b) a substantially U-shaped through notch (8) is formed defining a portion (9) of said arm wherefrom said second rib (7) extends, a housing (10) being provided along said notch (8) for the forced insertion of said wedge body (11).
7. Hinge for doors or windows according to claim 6, wherein the portion (9) of said arm defined by said substantially U-shaped notch has an elongated shape starting from a root (9a) of connection to said arm and said housing (10) for the wedge body (11) is provided near the free end thereof and on the opposite side to the toothed edge (12) of said second ribbing (7).
8. Hinge for doors or windows according to any one of claims 1 to 5, wherein on said second arm (25b) a substantially longitudinal through notch (28) is formed, defining a portion (29) of said arm wherefrom at least part of said second rib (27) extends, a housing (30) being provided along said notch for forced insertion of said wedge body (31).
9. Hinge for doors or windows according to claim 8,

wherein said notch (28) extends from approximately said first arm (25a) as far as a side edge of said second arm (25b), defining a free end of said portion in proximity of which said housing (30) is formed.

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- 10.** Hinge for doors or windows according to any one of the previous claims, wherein said wedge body (11, 31) is a peg with a stem of larger diameter than the diameter of said housing (10, 30) and a frusto-conical free end with a smaller minimum diameter than the diameter of said housing.

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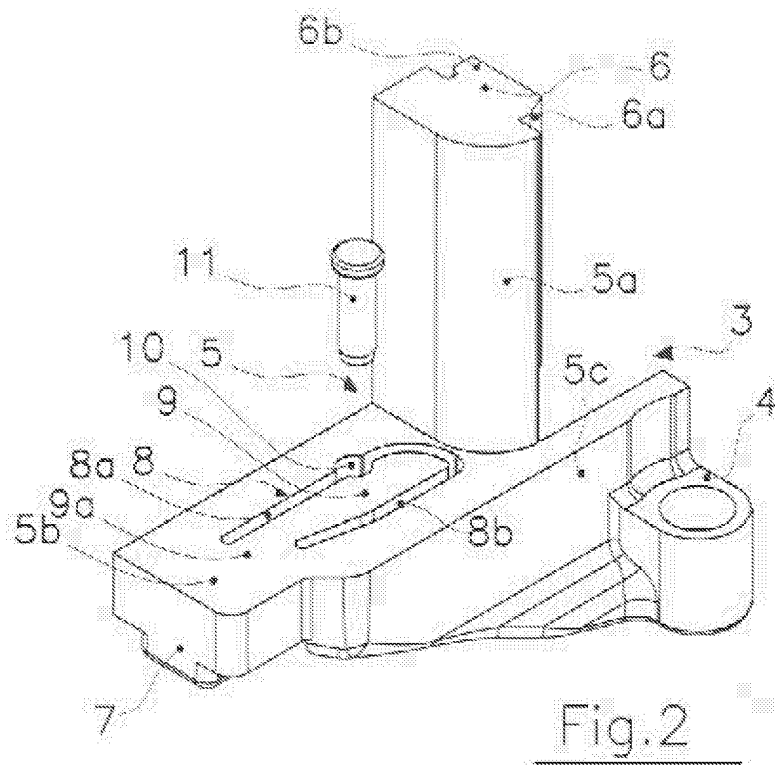
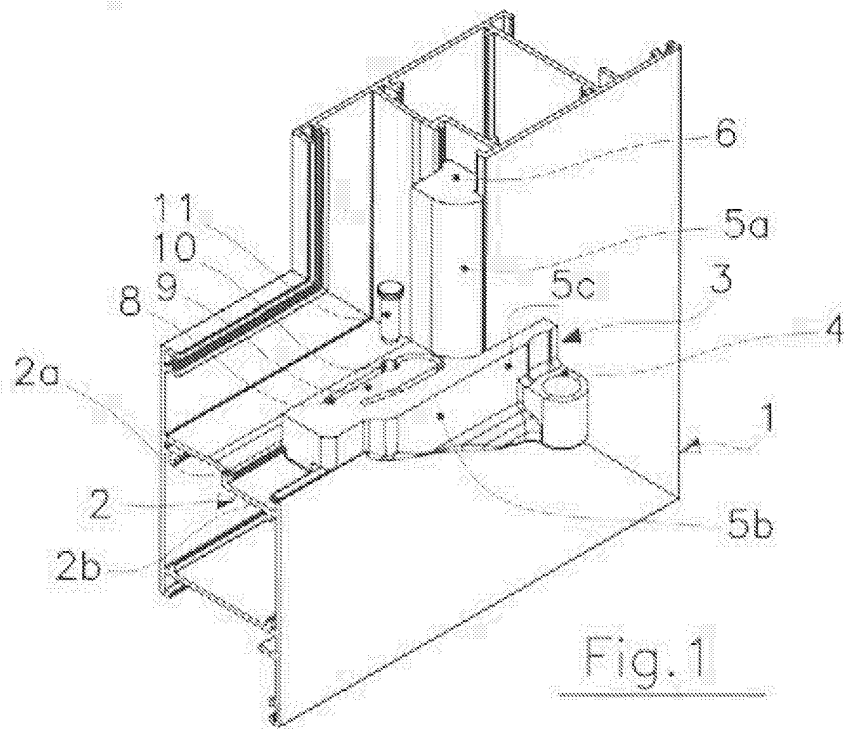
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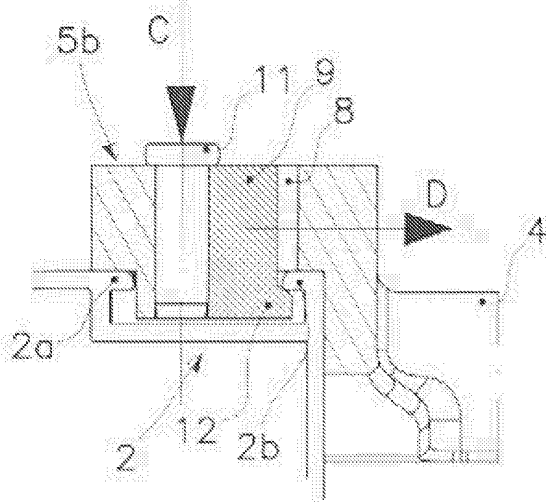


Fig.3

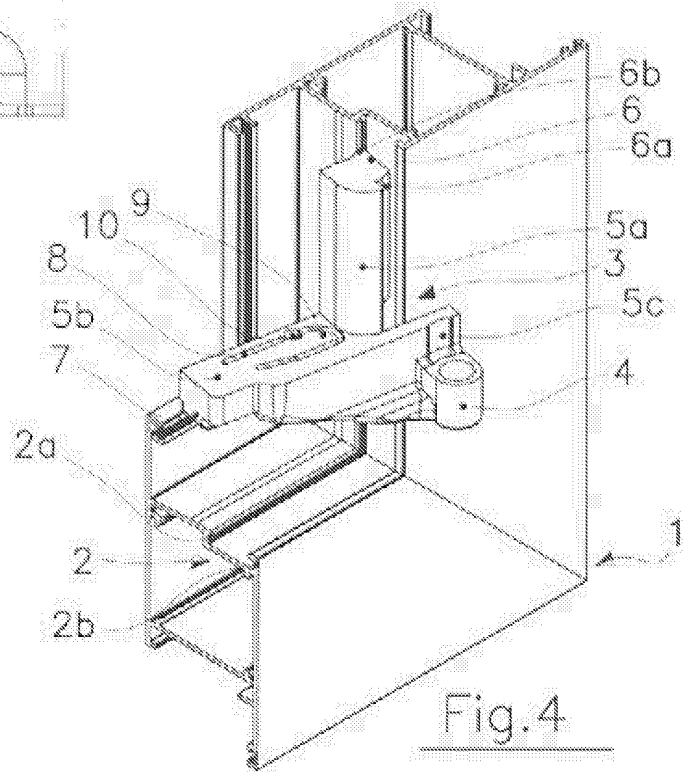


Fig.4

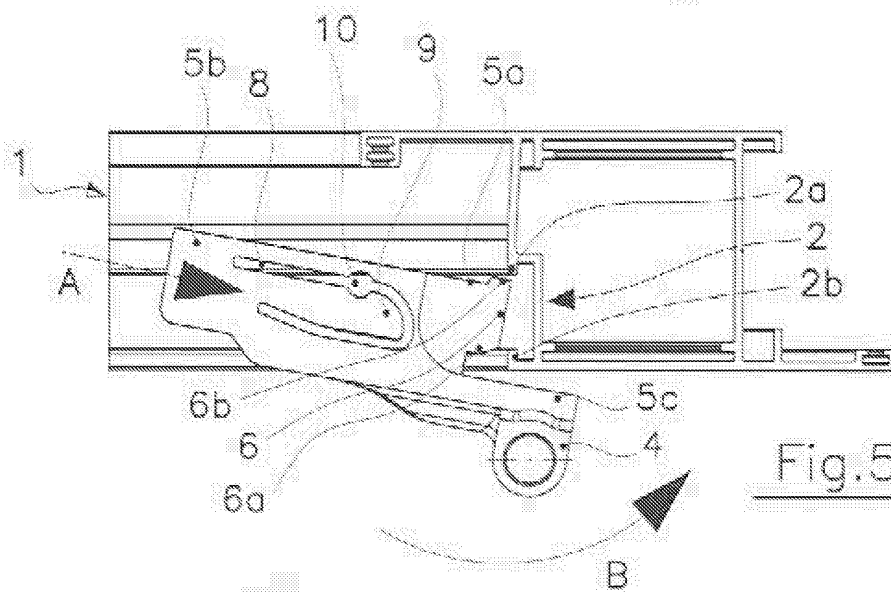
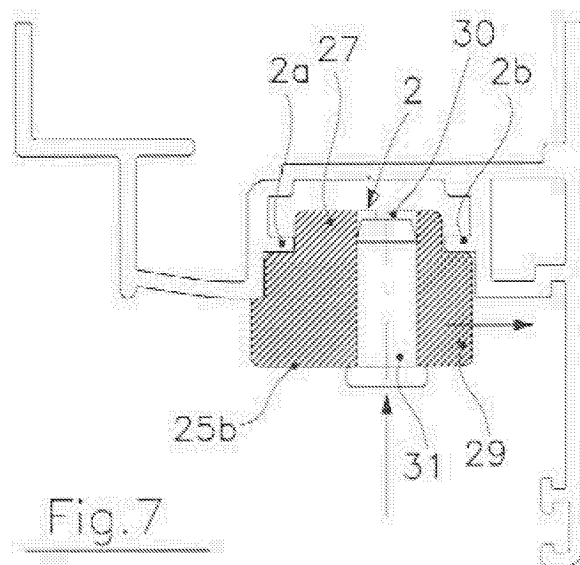
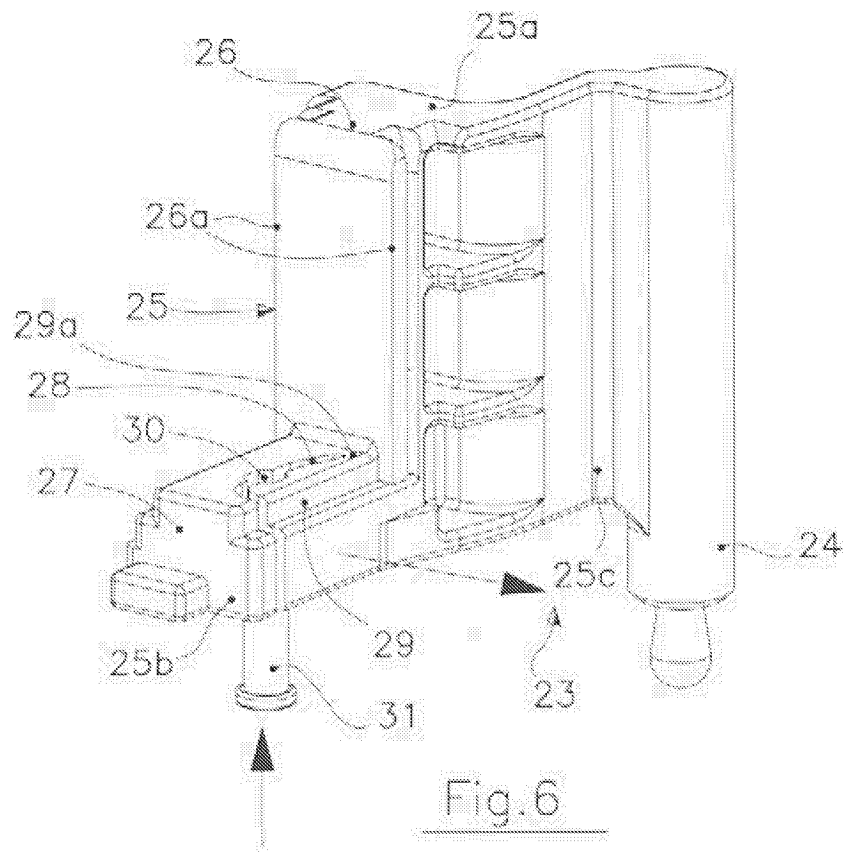


Fig.5





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Application Number
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Place of search Munich		Date of completion of the search 13 May 2005	Examiner Di Renzo, R
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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