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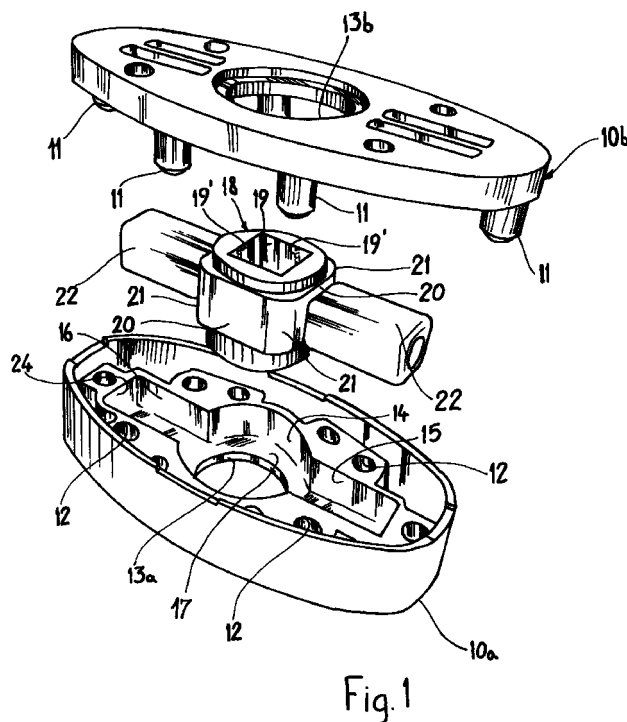
(71) Applicant: **ALUTEC S.r.l.**
34147 S.Dorligo della Valle (TS) (IT)

(72) Inventor:
Balbo Di Vinadio, Aimone
20100 Milano (IT)

(74) Representative:
Cantaluppi, Stefano et al
c/o JACOBACCI & PERANI S.p.A.
Via Berchet, 9
35131 Padova (IT)

(54) **A device for controlling the movement of handles for door and window frames**

(57) A description is given of a device for controlling the movement of a handle (30) for door and window frames, which handle is mounted to rotate together with a prismatic pin (27) coupled to a bolt (29). A prismatic element (18) has a central seat (19) suitable for receiving the pin (27) in order to rotate together therewith, and a plurality of flat outer thrust surfaces (20) suitable for cooperating with a pair of sliders (22) urged resiliently in order to bring about a corresponding plurality of stable configurations in each of which the bolt (29) is in a locking position, and the handle (30) is in one of a plurality of corresponding angularly spaced stable release positions.



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Description

[0001] The present invention relates to a device for controlling the movement of handles for door and window frames, in which at least one handle is mounted to rotate together with a prismatic pin coupled to a bolt means, the device comprising a casing which can be secured to the leaf of the frame and which contains resilient thrust means acting against a thrust surface which is fixed for rotation with the prismatic pin in order to push the bolt means into a locking position when the handle is released.

[0002] As is known, rotatable handles for opening and closing door and window frames are fixed for rotation with a pin which brings about the opening or closing movement of a bolt, depending on the direction of rotation imparted to the handle. The handle is normally associated with a resilient return element which tends to return the handle and the bolt to a closing position. When the handle is rotated downwards to open the door or window frame, the return element is loaded resiliently. When the handle is released, the resilient element automatically returns the bolt to the withdrawn or closing position and, at the same time, returns the handle to its initial rest position.

[0003] The above-mentioned opposing resilient element is generally accommodated in a casing mounted in the leaf of the door or window, and acts against an element which is unitary with the handle by the interposition of a piston guided slidably inside the above-mentioned casing.

[0004] The systems described above have a disadvantage owing to the fact that the resilient return element is weakened in the course of time because of the weight of the handle, especially in the case of handles produced from metal alloys, such as brass or a zinc-aluminium-magnesium alloy.

[0005] The resilient element thus loses the strength necessary to restore the rest position of the handle and the closing position of the bolt and therefore the lock becomes less efficient. In addition, the handle acquires undesired play and adopts an inclined rest position instead of a horizontal rest position and therefore its opening travel becomes too short, conveying to the user an unpleasant impression of defectiveness.

[0006] Another limit encountered by the configurations discussed above concerns the fact that the handles can be operated, for the purpose of opening, in only one direction of rotation and they have only one stable closing position. The travel of the handle is normally limited to an angle of approximately 45° by the abutment of a part unitary with the handle against the above-mentioned casing or one of the elements contained in the casing.

[0007] The object of the present invention is to provide a return mechanism for handles that is capable of overcoming the disadvantages and limits of the prior art discussed above.

[0008] That and other objects are achieved in accordance with the invention by means of a device of the type specified above, characterized in that it comprises a prismatic element rotatable inside the casing and having a central seat suitable for receiving the pin in order to rotate together therewith, and a plurality of flat outer surfaces, constituting a plurality of said thrust surfaces, suitable for cooperating with at least one of the resilient thrust means in order to give rise to a corresponding plurality of stable configurations in each of which the bolt means is in a locking position, and the handle is in one of a plurality of corresponding angularly spaced stable release positions.

[0009] Other characteristics and advantages of the present invention will now be described with reference to the appended drawings which are provided purely by way of non-limiting example and in which the same components in the various views correspond to the same reference numerals and in which:

- Figure 1 is an exploded perspective view of a container casing and of some components of the device according to the invention;
- Figure 2 is a perspective view of the casing of Figure 1 in the assembled state;
- Figure 3 is a view in horizontal section of a door or window frame on which a device according to the invention is mounted;
- Figure 4 is a diagrammatic front view illustrating the positions attainable by a handle provided with the device of the invention;
- Figure 5 is a view in vertical section of a door or window frame provided with the device of the present invention; and
- Figures 6 and 7 are perspective views of particular applications of the device on a door or window frame having a single handle and on a door or window frame provided with a tilting opening and closing system.

[0010] Referring first of all to Figures 1 and 2, a casing for containing the device according to the invention is generally indicated 10. The casing 10, which is suitable for mounting on the leaf of a door or window in the region of the lock, is formed by joining two complementary half-shells advantageously produced by moulding plastics material, the half-shells being a main box-shaped body 10a and a cover 10b, which are connectable by means of a plurality of appendages 11 and corresponding locking seats 12.

[0011] The main body 10a is formed in such a manner that it has a recess in which can be seen a cylindrical central recessed region 14 communicating with two rectilinear and aligned recessed regions 15, 16 which are diametrically opposed relative to the central recessed region 14. The half-shells 10a and 10b have respective circular central openings 13a, 13b which are coaxial with the central axis of rotation x of the handle,

as will be described in more detail hereinafter. The circular opening 13a is defined by an annular edge 17 having an inside diameter substantially smaller than that of the central recessed region 14. As used herein, the terms "inner", "outer", "axial", "radial" and "transverse" should be interpreted with reference to the axis of rotation of the handle, unless otherwise indicated.

[0012] The central recessed region 14 is suitable for receiving in a rotatable manner a bush 18 which has an axial central hole 19 having a square cross-section; the outer side surface of the bush also has four substantially flat surfaces 20 which are arranged opposite one another in pairs to form a square having sides parallel to those of the central hole 19. The flat surfaces 20 are connected to one another by rounded corner regions 21.

[0013] Respective sliders 22 are inserted in the rectilinear recessed regions 15, 16, in a manner slidable in the radial direction, and are resiliently urged in opposite directions against two opposite flat faces 20 of the bush 18 by the action of respective resilient thrust elements, such as, for example, springs 23 (Figure 5) which exert a radial opposing action against walls 24 of the box-shaped body 10a.

[0014] The bush 18, the sliders 22 and the return springs 23 are mounted in the main body 10a, after which the casing 10 is closed by the cover 10b; the whole thus assembled is ready to be secured to the structure of the leaf of a door or window 25 in the region of a lock diagrammatically indicated 26 in Figure 3.

[0015] An axial pin 27, which has a square cross-section and which is coupled to a mechanism 28 for moving a bolt 29, is inserted in the central hole 19 of the bush 18. The pin 27 has dimensions matching those of the hole 19; ribs or other uneven regions 19' are preferably formed on the walls of the hole 19, whereby the pin fits with slight interference, for the purpose of cancelling the play.

[0016] The assembled casing 10 is then secured to the structure of the leaf 25 by means of securing elements 31 and can be covered by a snap-fitting outer covering element 32.

[0017] The end portions of the pin 27 are finally fixed for rotation with one or two handles 30, depending on the type of door or window frame, the handles being located one on each side of the leaf.

[0018] The device described above functions in the following manner.

[0019] In the position illustrated with a continuous line in Figure 4, the handle 30 is in a rest position, which corresponds to an extended or locking position of the bolt. In that position, the sliders 22 are in the most extended or central position, pushing against the flat faces 20 of the bush 18.

[0020] By rotating the handle either in the clockwise direction or in the anticlockwise direction, the pin 27 sets the bush 18 in rotation; as that movement is performed, the rounded corner regions 21 of the bush act

as cam means, moving the sliders 22 away against the action of the resilient elements 23.

[0021] The lock is designed to unlock the bolt when the angle of rotation of the handle is close to 45°. Until an opening angle of 45° is reached (indicated 30' in Figure 4), which represents a state of instability, the resilient elements 23 continue to push on the faces 20 on which they acted in the initial rest state, and therefore they tend to bring about the return of the handle to its initial position when it is released. When an angle of 45° is exceeded, the resilient elements 23, having in their turn passed over the corner regions 21, push on the other two faces 20, which are at right-angles to the initial faces, and they therefore tend to rotate the bush 18 and the handle 30 into another position of stability, rotated through 90° and indicated 30" in Figure 4.

[0022] With a bush having four flat faces as illustrated, there will thus be four positions of stability, at 0°, 90°, 180° and 270° (indicated 30"), with intermediate positions of instability at 45°, 135°, 225° and 315° (indicated 30').

[0023] Owing to the fact that each position of stability or closure of the bolt is intermediate two positions of instability or opening, in order to open the door or window it is necessary only to rotate the handle through $\pm 45^\circ$ in either of the two possible directions of rotation. By effecting release before reaching the above-mentioned angular value of instability, the handle will return to the starting position; by exceeding the angle of instability, the handle will reach a stable position rotated through 90° or through a multiple of 90°, depending on the rotation undergone.

[0024] It will be appreciated that the device of the present invention can be applied to door and window frames having a handle on one (Figure 6) or both sides, and to frames provided with sliding and/or tilting opening and closing systems (Figure 7).

[0025] In devices of known type, because the handle is assembled with the resilient return mechanism, manufacturers are forced to produce handles in two versions, a right or left version, or they leave to the frame-maker the task of mounting the return spring in the casing in accordance with the version involved. That often causes inconvenience or errors. In many cases, a mounting error of that type makes it necessary to dismount the handle and to remount it or replace it. However, with the solution of the present invention, the handle can be turned into any position in order to obtain the desired right or left configuration.

[0026] The device of the present invention also enables practical advantages relating to transport and mounting operations to be obtained. Whereas in devices of known type the handle and the casing containing the return mechanism are assembled together, in the present invention the handles are mounted last, and therefore the frames can be transported already provided with the casing but without the handle, and therefore they have a reduced transverse bulk and can

be transported in larger numbers without the risk of damaging the handles and sheets of glass or other surfaces of the frame. The absence of the handle at the moment of mounting the casing on the frame makes it possible to use screwdrivers without obstruction by the handle and without the risk of damaging it. The handle, which is the component most prone to damage, may advantageously be replaced without removing the casing, even when the door or window is closed.

[0027] Naturally, the principle of the invention remaining the same, the forms of embodiment and details of construction may be varied widely with respect to those described and illustrated purely by way of non-limiting example, without thereby departing from the scope of the invention as defined in the appended claims. In particular, the device may have a single thrust slider instead of a pair, as discussed in the illustrated preferred embodiment.

Claims

1. A device for controlling the movement of handles for door and window frames, in which at least one handle (30) is mounted to rotate together with a prismatic pin (27) coupled to a bolt means (29), the device comprising a casing (10) which can be secured to the leaf of the frame and which contains resilient thrust means (22, 23) acting against a thrust surface (20) which is fixed for rotation with the prismatic pin (27) in order to push the bolt means (29) into a locking position when the handle is released, characterized in that it comprises a prismatic element (18) rotatable inside the casing (10) and having a central seat (19) suitable for receiving the pin (27) in order to rotate together therewith, and a plurality of flat outer surfaces (20), constituting a plurality of said thrust surfaces, suitable for cooperating with at least one of the resilient thrust means (22, 23) in order to give rise to a corresponding plurality of stable configurations in each of which the bolt means (29) is in a locking position, and the handle (30) is in one of a plurality of corresponding angularly spaced stable release positions.
2. A device according to claim 1, characterized in that it comprises a pair of opposing resilient thrust means (22, 23) for pushing on two opposite flat outer surfaces (20) of the rotatable prismatic element (18).
3. A device according to claim 2, characterized in that the casing (10) defines a recess in which can be seen a substantially cylindrical central recessed portion (14) in which the prismatic element (18) is rotatable; the central recessed portion (14) communicating with two rectilinear and aligned recessed regions (15, 16) which are diametrically opposed relative to the central recessed region (14) and in which the resilient thrust means (22, 23) are respectively accommodated in a slidable manner.
4. A device according to claim 1, characterized in that the flat surfaces (20) are connected to one another by rounded corner regions (21).
5. A device according to claim 1, characterized in that the prismatic pin (27), the central seat (19) and the outer thrust surfaces (20) are formed and arranged as respective concentric squares and with parallel sides.
6. A device according to claim 1, characterized in that the prismatic pin (27) is fitted in the central seat (19) with slight interference.
7. A device according to claim 6, characterized in that uneven regions (19') suitable for producing the interference fit are formed on the walls of the central seat (19).
8. A device according to claim 1, characterized in that the central seat (19) is a through-hole.

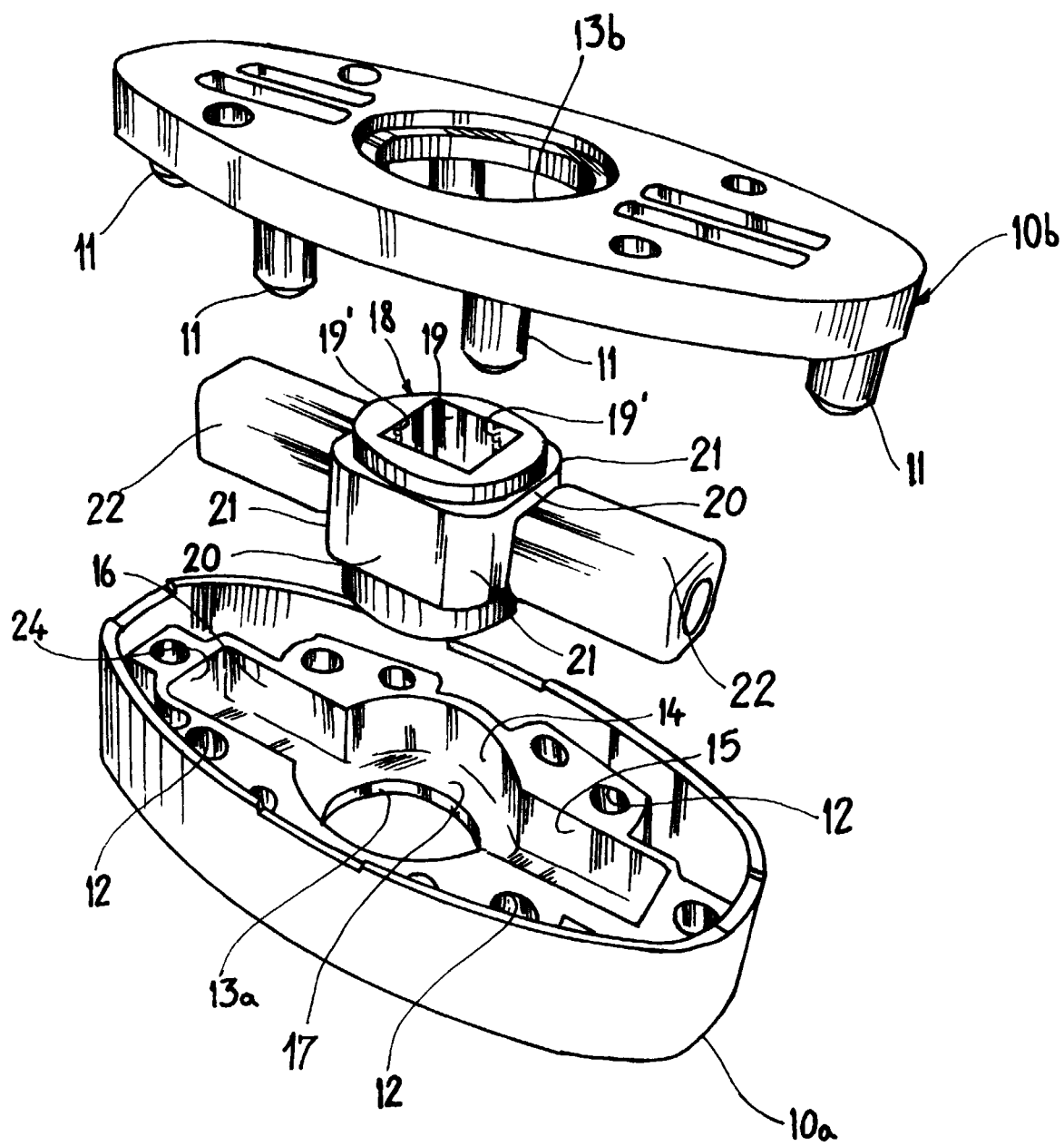


Fig.1

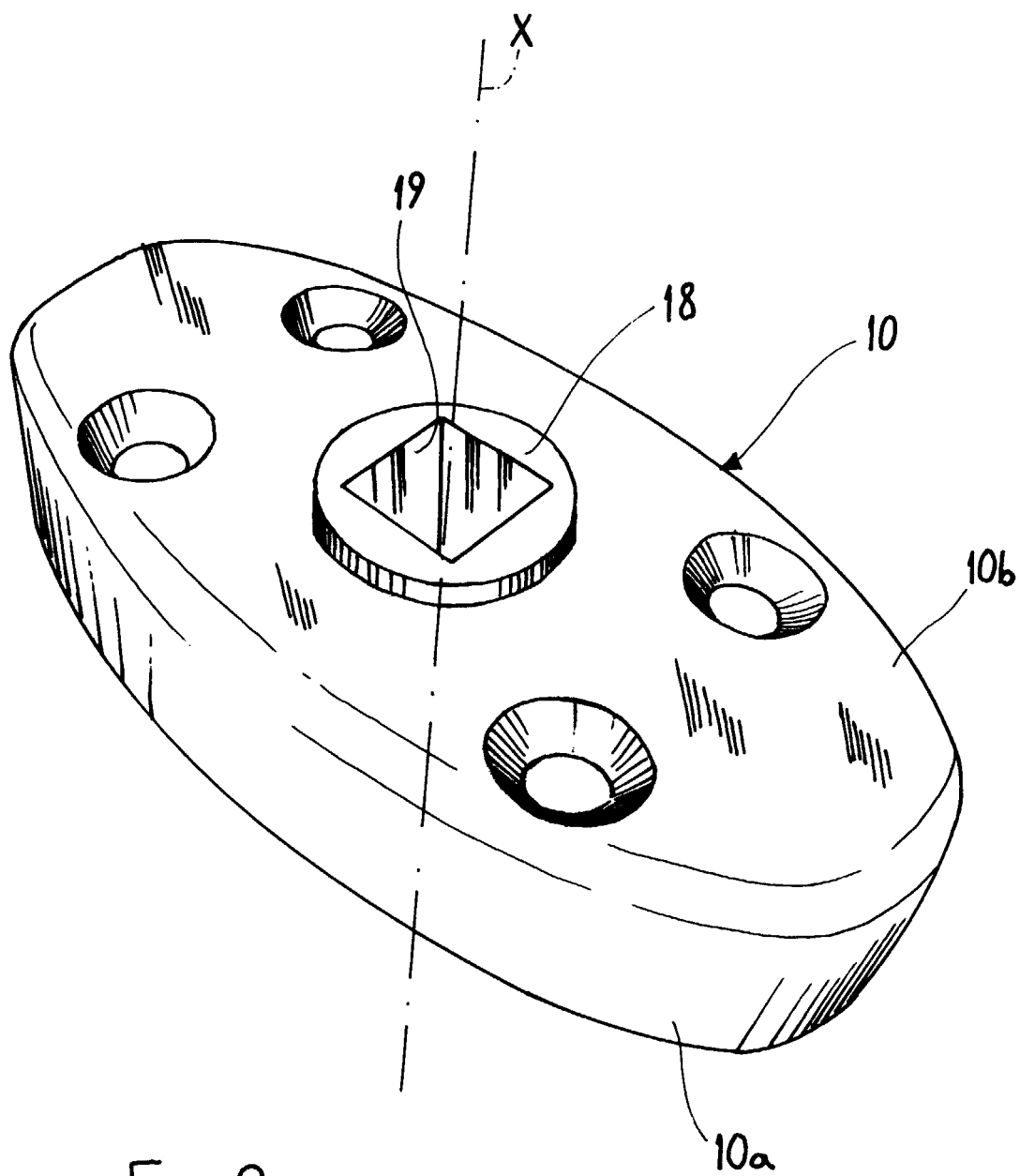
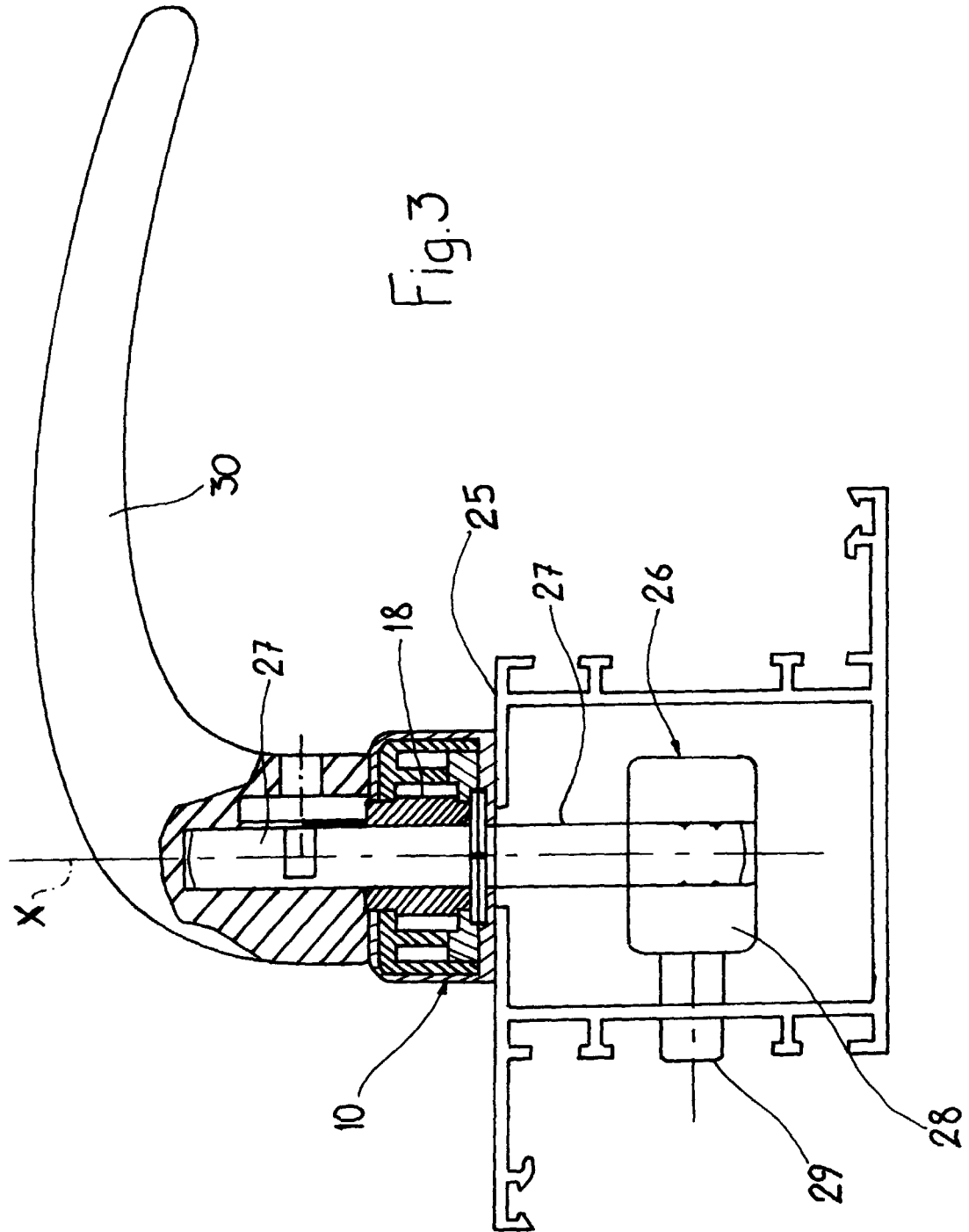
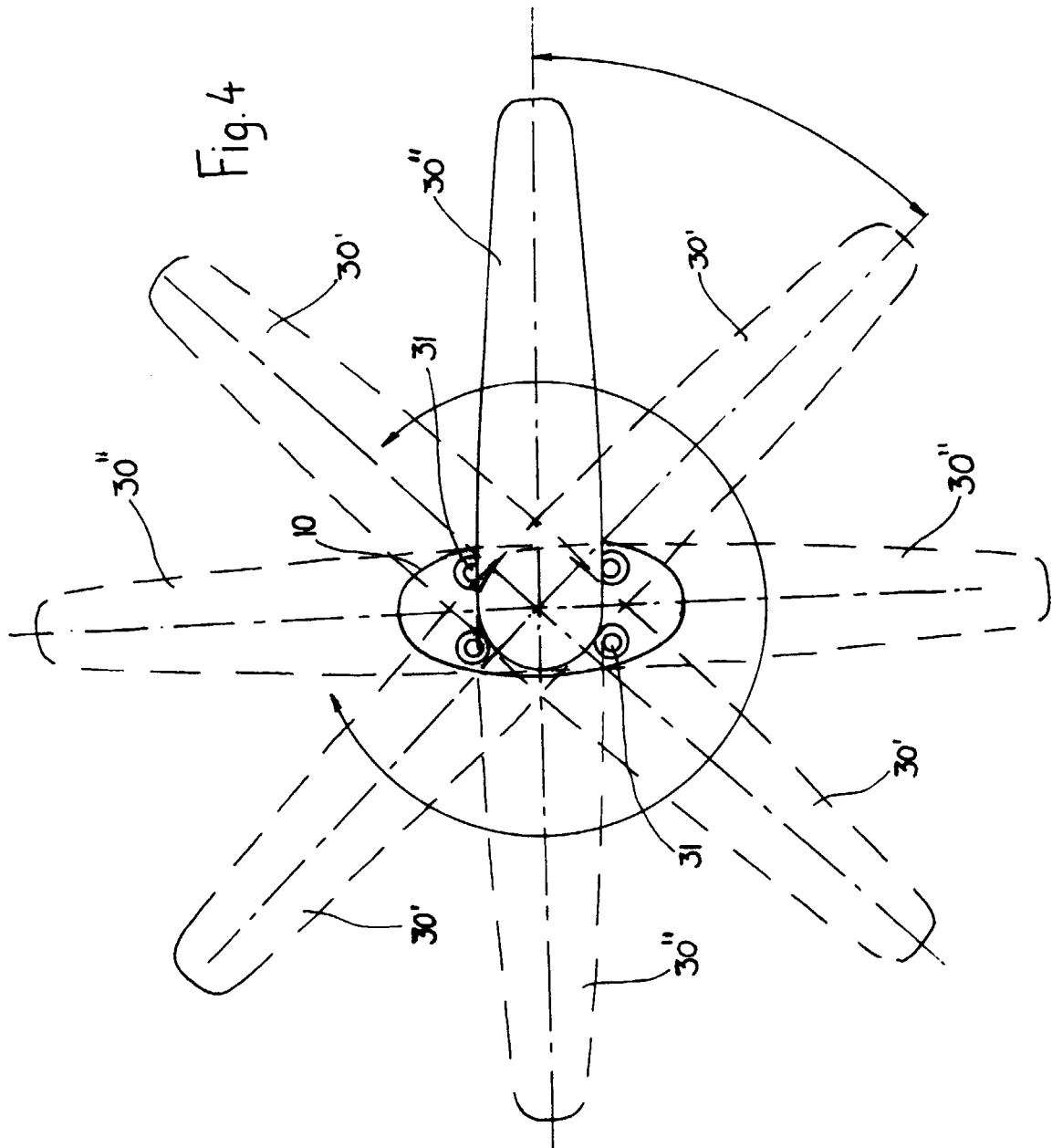


Fig.2





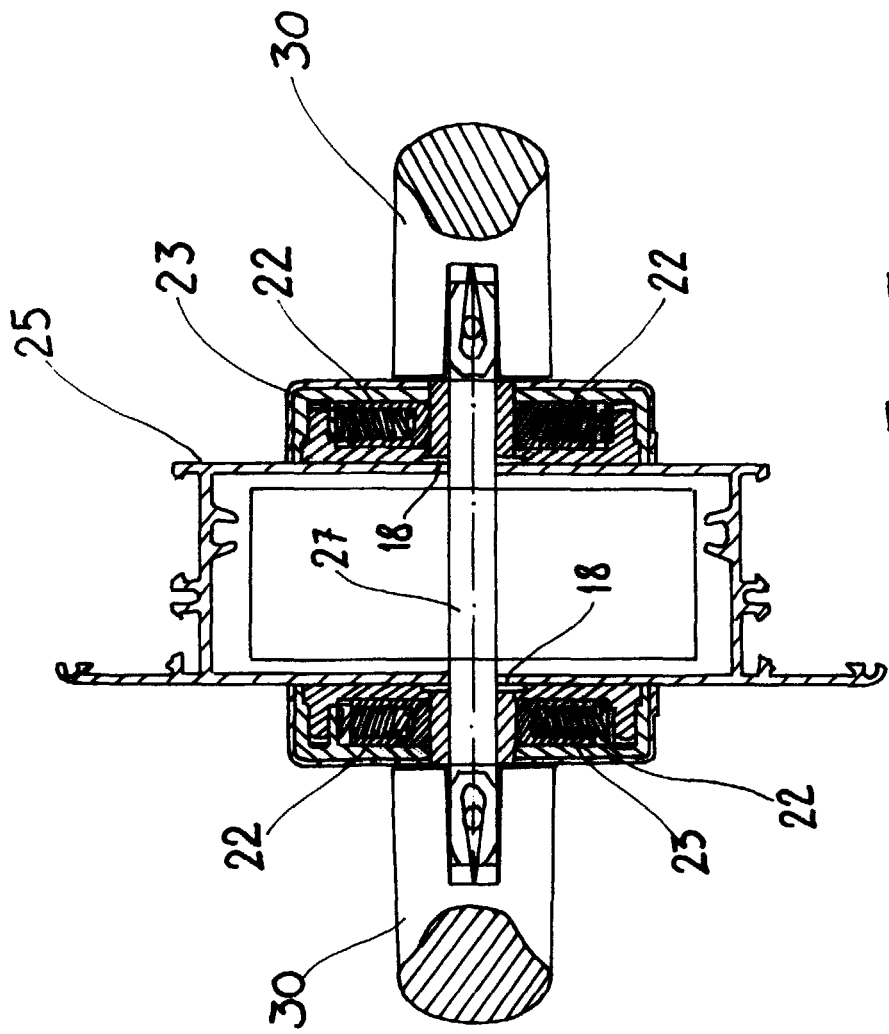


Fig.5

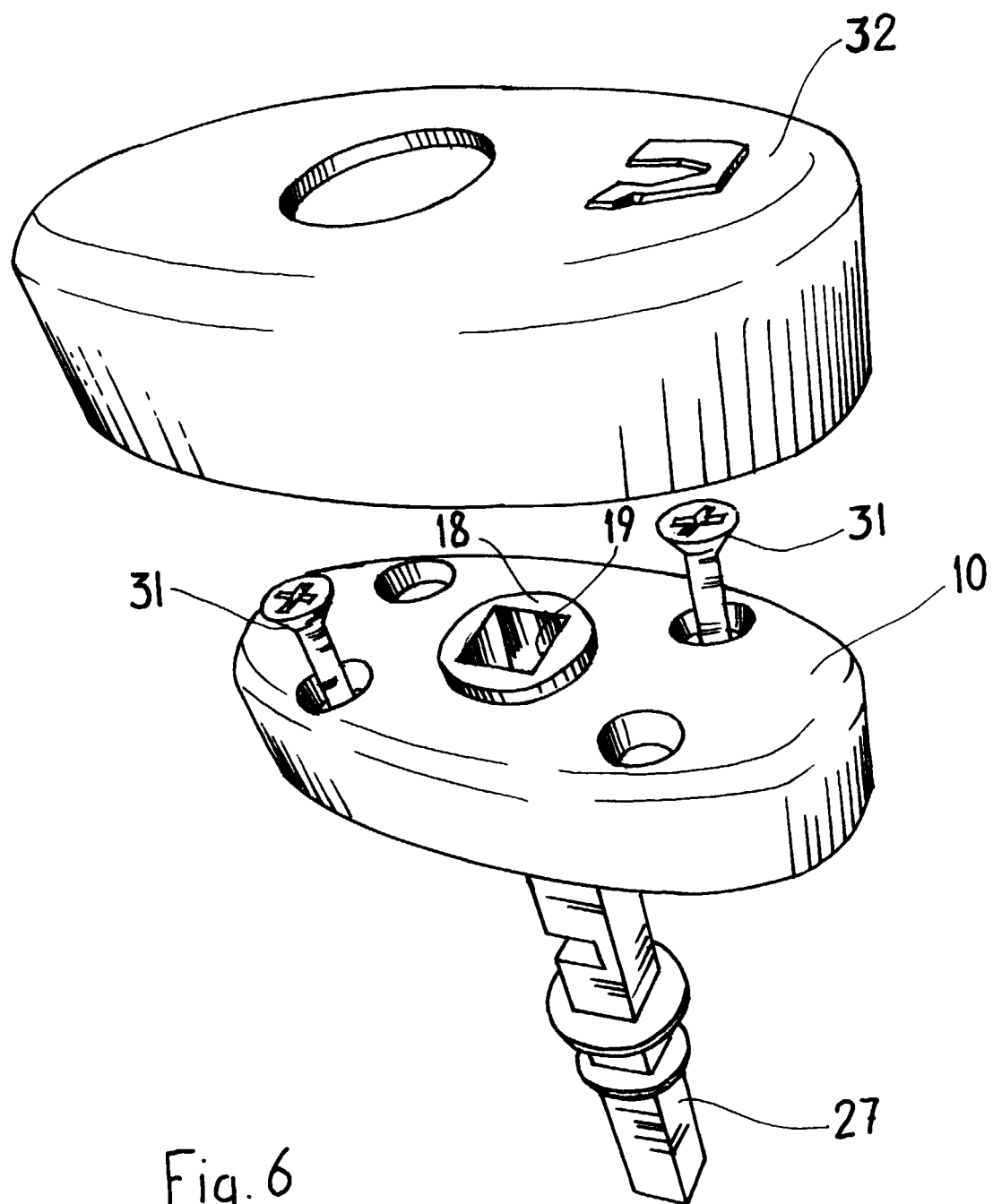


Fig. 6

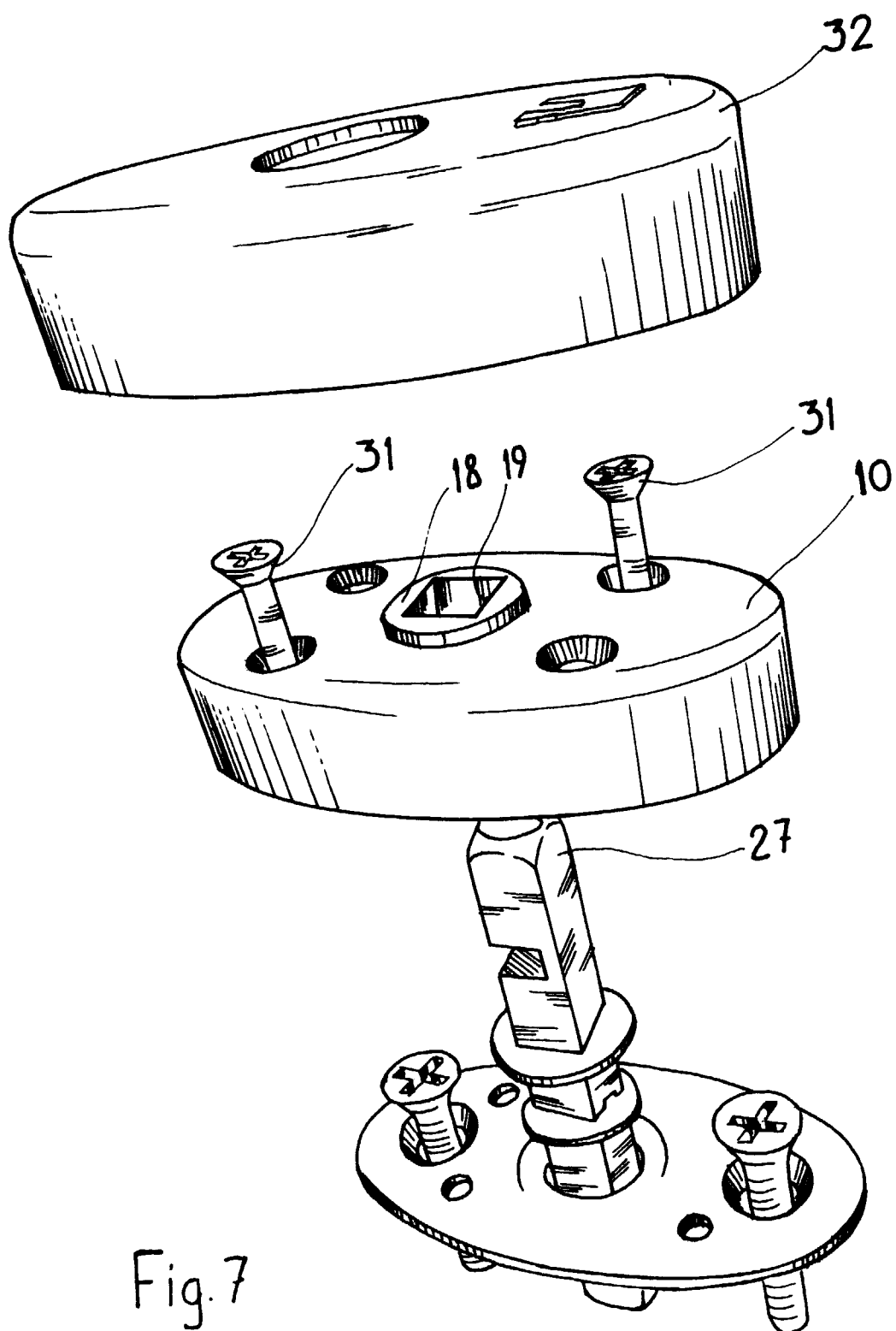


Fig. 7



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EUROPEAN SEARCH REPORT

Application Number
EP 99 11 7076

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	DE 87 02 724 U (HOPPE GMBH & CO KG) 9 April 1987 (1987-04-09)	1,2,4,5,8	E05B3/06
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A	DE 34 02 089 A (GEBRÜDER GOLDSCHMIDT BAUBESCHLÄGE GMBH) 1 August 1985 (1985-08-01) * figures 1-6 *	1-3,8	TECHNICAL FIELDS SEARCHED (Int.Cl.7) E05B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 10 March 2000	Examiner PEREZ MENDEZ, J
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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EP 99 11 7076

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
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