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(54) **Kinematic device for cremone bolt closings for door and window frames.**

(57) The present invention relates to a kinematic device for cremone bolt closings, comprising a handle assembly and a moving mechanism for the rods of the cremone bolt, connected together by a square cross-section shaft. The handle assembly comprises a handle 1 coupled by means of a boss 6 to a second tubular element 12 on a support case 10, a device being formed in the lower portion 16 of said case 10 to fix the angular open/closed positions of the handle 1. The square cross-section shaft 3 connects the handle assembly to a moving mechanism 2, in which, inside a box-shaped body 35, there is a mechanism made up of a sprocket wheel 38 and a pair of rack elements 44, 45, integral with respective guides sliding in respective straight guide housings 50, 51, elements 48, 49 engaging the pair of cremone bolt rods 59, 60 being formed on the outside of said box-shaped body 35. The present invention is particularly suitable for closing metal doors and windows opening outward.

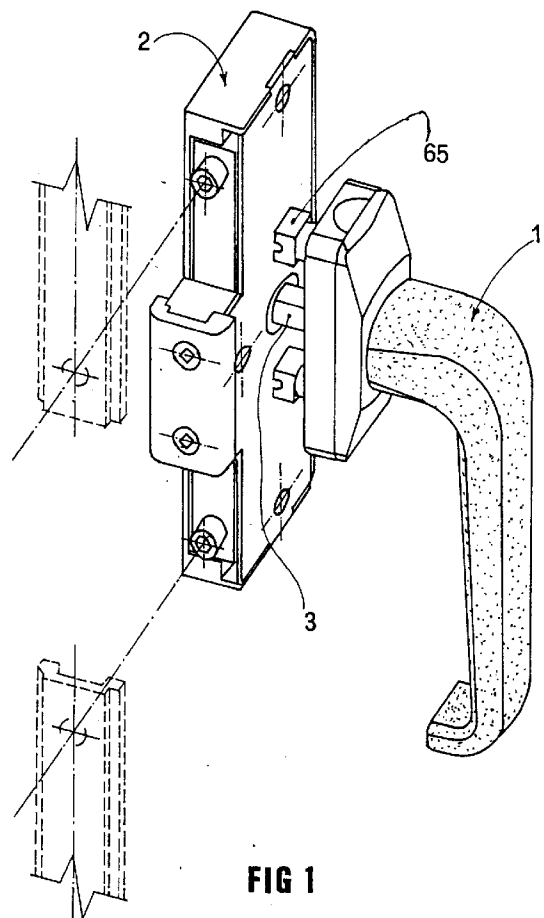


FIG 1

The present invention relates to a kinematic device for cremone bolt closings, comprising a handle assembly and a moving mechanism for the rods of the cremone bolt, which are connected together by a square cross-section shaft, said device being particularly suitable for closing metal doors and windows that open outward.

The use of metal doors and windows, in particular made of aluminium, has further increased with the decrease in the types of profile used to manufacture door and window frames, and with the use of the so-called "European chamber", that is to say the use of a space of a substantially unified size for all frames (for example that between the wing profile and the frame profile) made to house certain types of accessory and mechanism specially studied to be inserted and locked into this space, substantially without having to perform any type of operation. However, in some working conditions, for example in case of windows opening outward, for geometrical reasons, the space known as the "European chamber" cannot be used. Furthermore, there are some disadvantages connected with the working dimensions of the handle with respect to the fixed frame, in particular when opening. In these cases, in order to house the accessories, it is necessary to use the base chambers of the profile, and if necessary to use larger sized chambers.

Handles for windows opening outward are found in the state of the art, which, although based on the cremone bolt mechanism (which guarantees optimal closing, locking the window both above and below onto the window frame), move the cremone bolt rods by means of sliders, which move the cremone bolt rods directly. The handle forms an integral part of this type of device and, consequently, it cannot be used separately in other types of accessory, whatever its aesthetic value may be.

Object of the present invention is to provide an improved kinematic device for cremone bolt closings, comprising a handle assembly with a square cross-section shaft and a moving mechanism, particularly suitable for use in door and window frames opening outward, and designed in such a way that the handle assembly and the shaft can be separated from the moving mechanism and used separately if desired.

The subject matter of the present invention is a kinematic device for cremone bolt closing devices for door and window frames, comprising a handle assembly, a moving mechanism, connected by a shaft, characterized in that said handle assembly comprises a handle, coupled by a first tubular element, the engaged end being integral therewith, and by means of a boss to a second tubular element arranged in a substantially central position on the upper part of a support case, substantially in the shape of a parallelepipedon, a first bore being formed in a substantially central position on said boss, there being formed in

the lower part of said case a first housing of substantially circular form and a pair of grooves arranged in a diametrically opposite position with respect to first said housing and in communication therewith, a positioning ring with a square opening being arranged in said first housing, a plurality of indentations being formed symmetrically around the external edge of said ring, said indentations being arranged so as to cooperate with spherical elements held against said outer edge by the action of spring elements housed inside said grooves, a pair of bores being formed in said support case, in a position substantially symmetrical to said second tubular element; said shaft has a square cross-section substantially coinciding with that of said opening, and can be inserted into said first tubular element, said moving mechanism comprises a box-shaped body substantially in the shape of a parallelepipedon and a first closing plate, a second bore being formed on said plate, a second housing of a substantially circular shape being formed within said box-shaped body, said second housing holding a sprocket wheel in movable engagement in a coaxial relation with an adaptor having a square internal opening capable of engaging with said shaft, said mechanism further comprising a pair of rack elements cooperating with said sprocket wheel, each of said elements being integral with a respective guide and each of said guides sliding in a respective straight guide housing, elements for engagement of a pair of rods being formed on each one of said guides, the arrangement being such that rotation of said handle between two angular positions adjusted by the cooperation between said positioning ring and said spherical elements, causes, through said shaft, rotation of said sprocket wheel and movement in an opposite direction of said rack elements, causing a corresponding movement of said rods.

The present invention will now be described in greater detail with reference to a preferred embodiment thereof, based on the figures of the enclosed drawings, in which:

figure 1 is an axonometric view of the kinematic device according to the present invention;

figure 2 is an exploded view of the various components of the handle assembly;

figure 3 is a plan view of the lower portion of the support case;

figure 4 is a partial cross-section top view showing the handle assembly assembled on a window frame;

figure 5 is a side section view of a handle assembled with its moving mechanism;

figure 6 is an exploded view of the moving mechanism of the cremone bolt rods;

figure 7 is an axonometric view of a section of profile forming a portion of a frame, in which holes have been made for insertion of the moving mechanism;

figure 8 is an axonometric view of a handle mounted on a profile, in which the rods of the cremone bolt have also been mounted; and figure 9 is a cross-section view from above of an application of the kinematic device according to the present invention to an intermediate joint in a two-part window opening outward.

According to the present invention, figure 1 shows the kinematic device, which comprises the handle group 1' and the moving mechanism 2, connected by a square cross-section shaft 3. The handle 1 (as can be seen more clearly in figure 2) has engaged at its end a first tubular element 4 (into which the shaft 3 is inserted), which can be connected to the bore 8 (first bore) of a boss 7. On the inner surface of the bore 8 a projection 9 is formed, which cooperates with a spring element 6 and a spacing washer 5 to keep the boss 7 against the support case 10. The support case 10, substantially in the shape of a parallelepipedon, has on its upper surface 11, in a substantially central position, a second tubular element 12 and, in a substantially symmetrical position with respect to the second tubular element 12, a pair of bores 13, 13' and a pair of bevels 14, 14' formed on the edge 15. In the lower part 16 of the case 10 (as can be seen more clearly in figure 3) a first housing 17 is formed, of substantially circular shape, and a pair of grooves 18, 18' arranged in a diametrically opposite position with respect to said housing and in communication therewith. In the first housing 17 (as can be seen more clearly in figure 2) a spacing washer 19 is placed, upon which rests in a coaxial relationship a positioning ring 20 with a square cross-section internal opening 21 corresponding to that of the shaft 3. The ring 20 also has a plurality of indentations 23 made symmetrically around the external edge 22 of the ring 20. The indentations 23 cooperate alternately with a pair of spherical elements 24 inserted in the grooves 18 and held in position against the outer edge 21 of the ring 20 by respective spring elements 25. Reciprocal engagement of the spherical elements 24 with the indentations 23 determines and fixes the angular open/closed positions of the handle 1. A second closing plate 26 is provided to close the bottom of the case 10, said second closing plate having a central bore 27 (third bore) and a pair of bores 29, 29' for the passage of fixing elements 28, 28'.

The boss 7 in its operative position is pushed by the spring element 6 against the case 10, and engages along its perimeter 33 with the corresponding step 34 formed along the edge 15 of the case 10. The bevels 14, 14' facilitate disengagement of the perimeter 33 of the boss 7 from the step 34, in order to allow rotation around the second tubular element 12 of the boss itself and to enable the operator to access the pair of bores 13, 13' to insert the check pins 30 into the handle assembly (as can be seen more clearly in figure 5). An upsetting, not shown, of the edge of first

tubular element 4 on the ring 20 prevents the handle separating from the structure to which it is coupled.

Rotation of the handle 1 transmits movement through shaft 3 to the moving mechanism 2. As can be seen more clearly from figure 6, the moving mechanism 2 is contained inside a box-shaped body 35, having substantially the shape of a parallelogram, closed on one side by a first closing plate 36 on which is formed, in a substantially central position, a bore 37 (second bore) for passage of the shaft 3. Inside the mechanism 2, the shaft 3 activates a sprocket wheel 38, engaging in the square opening 39 (with dimensions substantially the same as those of the shaft 3) of an adaptor 40, in turn permanently engaged in an axial relation with the sprocket wheel 38. The sprocket wheel 38 and the adaptor 40 are housed in a housing 41 (second housing), on the bottom of which a through bore 42 is formed, and their top parts cooperate with a centering bush 43.

The teeth 38' of the sprocket wheel 38 engage with a pair of rack elements 44 and 45, moving them symmetrically and longitudinally in opposite directions, each element 44, 45 being integral with a respective guide 46, 47 by means of a respective pair of fixing elements 48, 49 and 48', 49', each guide sliding in a respective straight guide housing 50 and 51. A plurality of bores 52, 52' 52n and 53, 53' ... 53n is formed in the rack elements 44 and 45, said bores being formed in a spaced relationship corresponding to the teeth on the sprocket wheel 38, the bore closest to the end of the shaft (respectively 52 and 53) not engaged with the guides being open at the bottom to facilitate assembly.

In the box-shaped body 35, in a substantially symmetrical position with respect to the housing 41 (second housing), two housings 54 and 55 are formed to house the pins 30 fixing the moving mechanism 2 to a frame. Said box-shaped body 35 is also provided with a ledge element made up of two elements 56 and 56' fixed by pins 57, 57'. The first closing plate 36 is fixed to the body 35 of the fixing elements 58 through relative bores 58'.

As will be more clearly seen from figure 8, the elements 48 and 49 serve to engage the ends of the rods 59 and 60 of the cremone bolt for movement thereof, by means of common devices which are not specified further. Rotation of the handle 1 between two angular positions offset by 90° one from the other and regulated by the reciprocal engagement of the ring 20 and the spherical elements 24, is transmitted through the shaft 3 to the sprocket wheel 38. The subsequent rotation of the sprocket wheel 38 moves the cremone rack elements 44 and 45 and, consequently, both the guides 46 and 47 and the elements 48 and 49, which govern the movement of the rods 58 and 60 to close or open the window, respectively.

The kinematic device according to the present invention differs from those known to the state of the

art above all due to the fact that it is a mechanism in which a handle associated with a square cross-section shaft is used for cremone bolt closing mechanisms in outward-opening windows made of metal profiles. Furthermore, the use of a square (sides of the square cross-section of the shaft 3) and a distance between the centers of bores 13 and 13' unified to 7 and 43 mm, respectively, increases versatility, allowing the handle group to be used also in common door and window frames opening inward.

Furthermore, the distance between the centers of the bores and the profile acting as a frame has been chosen in such a way that the handle does not interfere with the frame profile itself during opening.

Figure 7 shows an axonometric view of a cross-section of a profile in which bores 62 and 63 have been made for passage of the fixing pins, and bore 61 for passage of the square cross-section shaft, and cavity 64 has been made to hold the moving mechanism.

In these cases (and in particular in case of aluminium profiles) according to the present invention it is preferred to use profiles with wide chambers, that is to say with a chamber of width not less than 35 mm. According to the present invention the use of spacers is also advantageously provided, said spacers being generically indicated with 65 in figure 1, in order to adapt the kinematic device for use in chambers of different sizes.

Figure 9 shows a cross-section view from above of an application of the kinematic device according to the present invention for a central connection in a two-part window opening outward.

Claims

1. Kinematic device for cremone bolt closing devices for door and window frames, comprising a handle assembly (1'), a moving mechanism (2), connected by a shaft (3), characterized in that said handle assembly (1') comprises a handle (1), coupled by a first tubular element (4), the engaged end being integral therewith, and by means of a boss (7) to a second tubular element (12) arranged in a substantially central position on the upper part (11) of a support case (10), substantially in the shape of a parallelepipedon, a first bore (8) being formed in a substantially central position on said boss (7), there being formed in the lower part (16) of said case (10) a first housing (17) of substantially circular form and a pair of grooves (18, 18') arranged in a diametrically opposite position with respect to said first housing and in communication therewith, a positioning ring (20) with a square opening (21) being arranged in said first housing, a plurality of indentations (23) being formed symmetrically around

the external edge (22) of said ring, said indentations being arranged so as to cooperate with spherical elements (24) held against said outer edge by the action of spring elements (25) housed inside said grooves, a pair of bores (13, 13') being formed in said support case, in a position substantially symmetrical to said second tubular element (12);

said shaft (3) has a square cross-section substantially coinciding with that of said opening (21), and can be inserted into said first tubular element,

said moving mechanism comprises a box-shaped body (35) substantially in the shape of a parallelepipedon and a first closing plate (36), a second bore (37) being formed on said plate, a second housing (41) of a substantially circular shape being formed within said box-shaped body, said second housing holding a sprocket wheel (38) in movable engagement in a coaxial relation with an adaptor (40) having a square internal opening (39) capable of engaging with said shaft, said mechanism further comprising a pair of rack elements (44, 45) cooperating with said sprocket wheel (38), each of said elements being integral with a respective guide (46, 47) and each of said guides sliding in a respective straight guide housing (50, 51), elements (48, 49) for engagement of a pair of rods (59, 60) being formed on each one of said guides,

the arrangement being such that rotation of said handle between two angular positions adjusted by the cooperation between said positioning ring and said spherical elements, causes, through said shaft, rotation of said sprocket wheel and movement in an opposite direction of said rack elements, causing a corresponding movement of said rods.

2. Kinematic device according to claim 1, characterized in that on the inner surface of said first bore a projection (9) is formed, and between said first tubular element and said boss are arranged a spring element (6) and a spacing washer (5), said boss also being provided with an edge (33) that is complementary to a step (34) formed on the edge (15) of said case,

the arrangement being such that in working conditions said boss is pushed against said case and held in position by the reciprocal engagement of said boss and said step.

3. Kinematic device according to claims 1 or 2, characterized in that on the upper surface (11) of said case, in a substantially symmetrical position with respect to said second tubular element, are formed a pair of bores (13, 13'), and a pair of bevels (14, 14') are formed on said edge, the ar-

rangement being such that said bevels facilitate opening of the boss to access the bores (13, 13').

4. Kinematic device according to claims 1 to 3, characterized in that each element of said pair of rack elements has a plurality of bores (52, 52'....52n) and (53, 53'... 53n) respectively, formed in a spaced relationship corresponding to the teeth (38') in said sprocket wheel.
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5. Kinematic device according to claim 4, characterized in that the bore in said rack elements, formed close to the end of said rack elements not engaged with said guides, is open at the bottom.
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6. Kinematic device according to claims 1 to 3, characterized in that said support case is closed in the lower part by a second closing plate (26) having a third bore (27) in a substantially central position.
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7. Kinematic device according to claim 1, characterized in that the side of said square cross-section shaft measures 7 mm and the distance between said bores (13) and (13') in said handle assembly is 43 mm.
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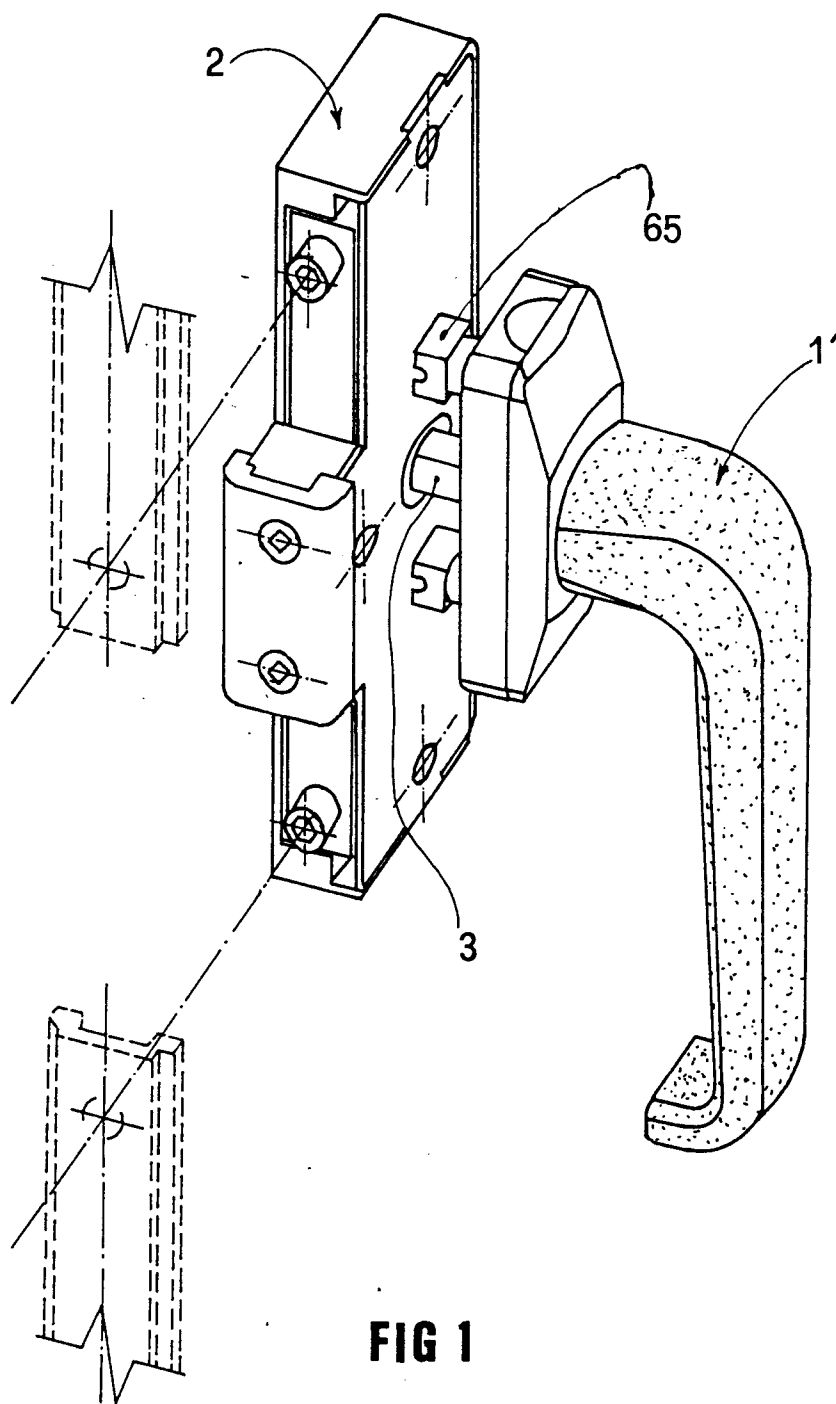
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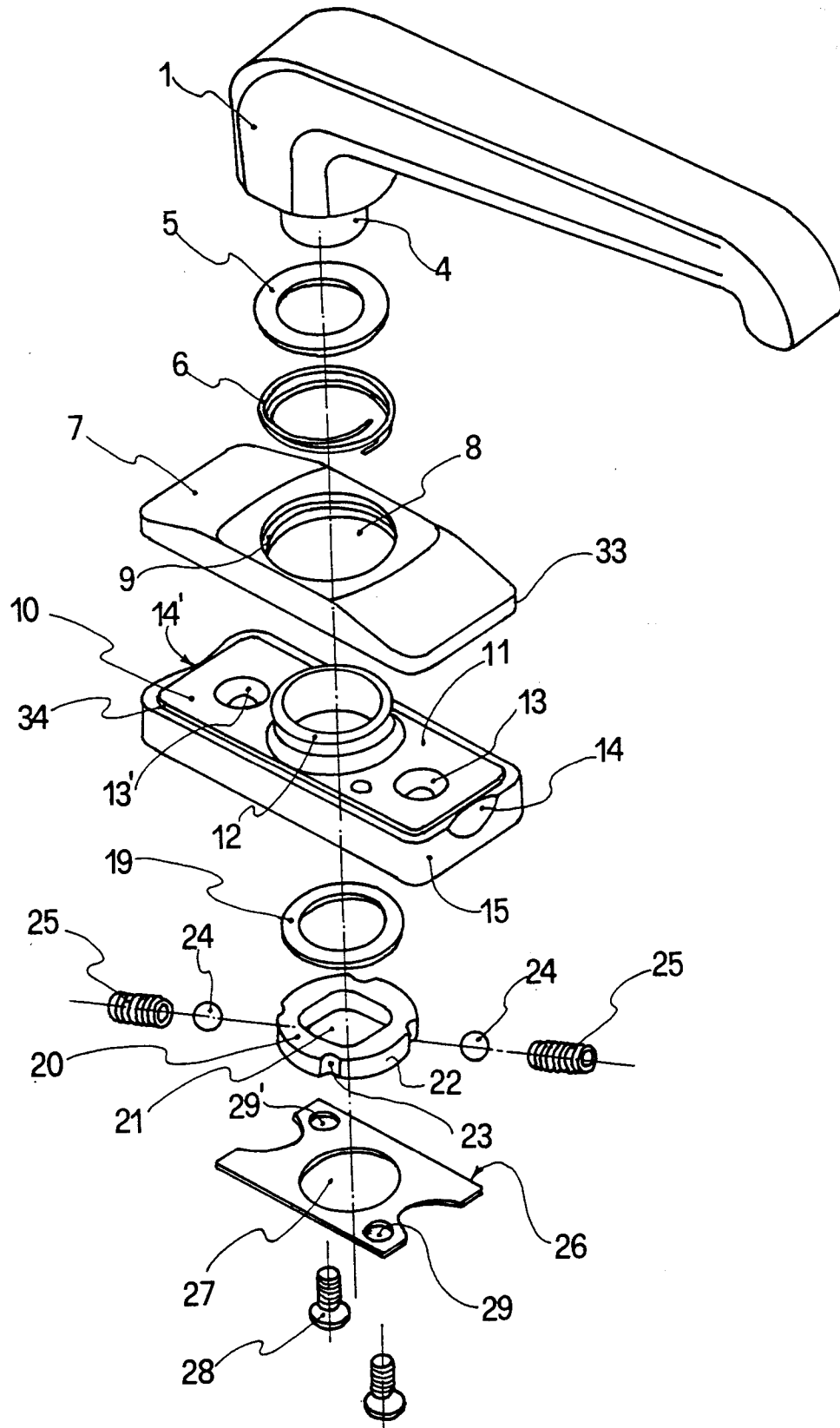


FIG 2

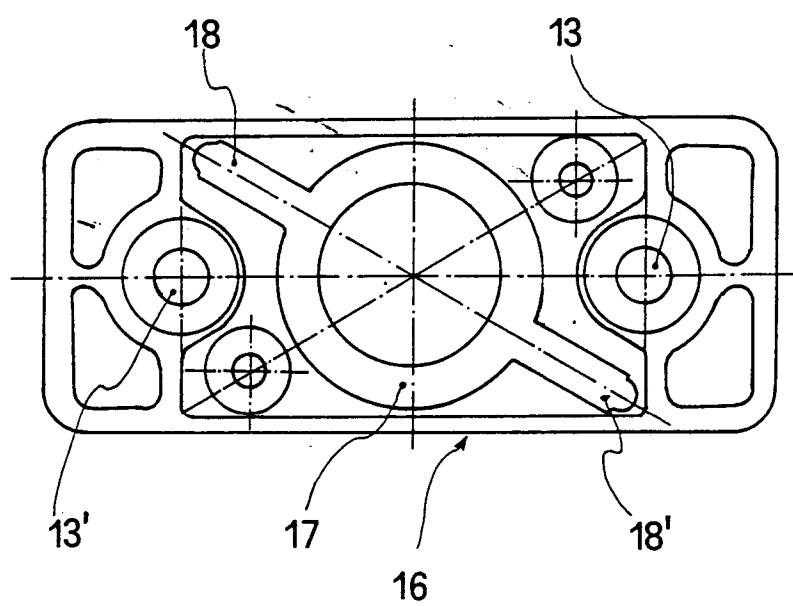


FIG 3

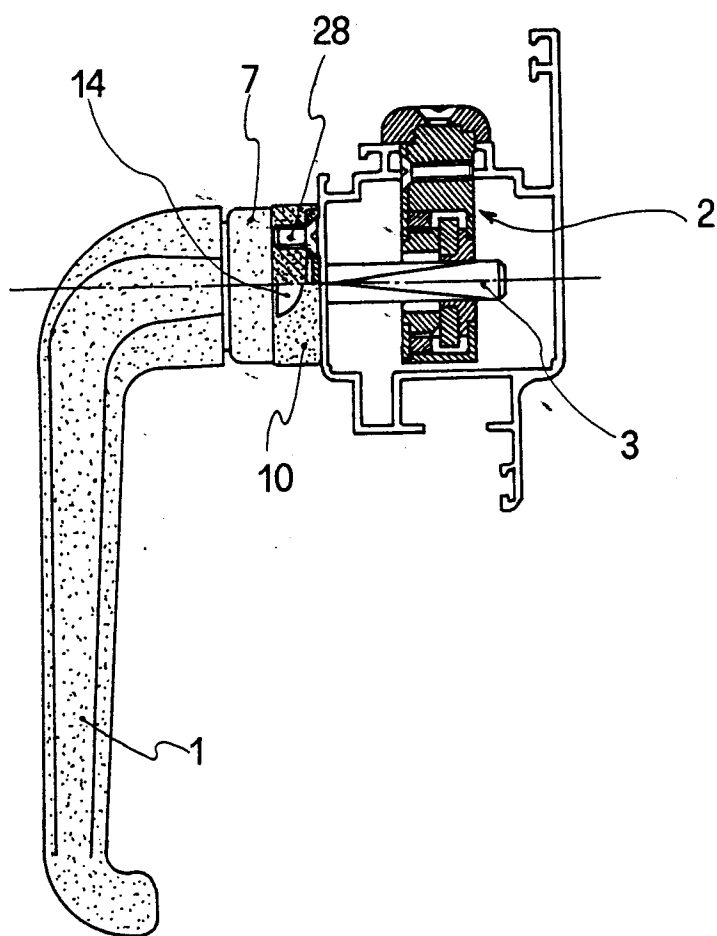


FIG 4

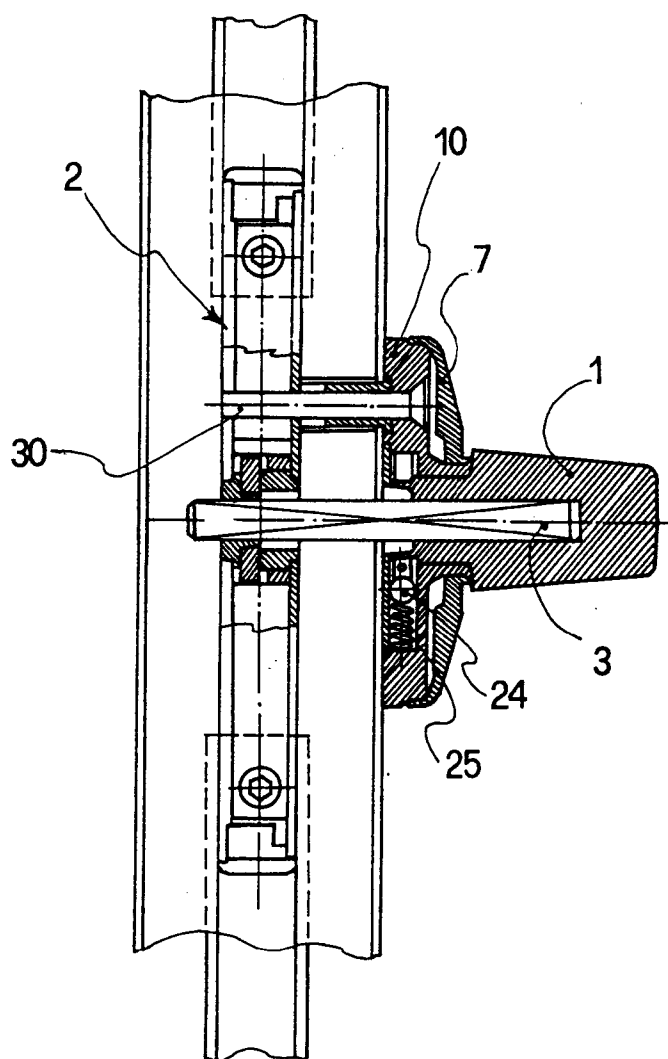


FIG 5

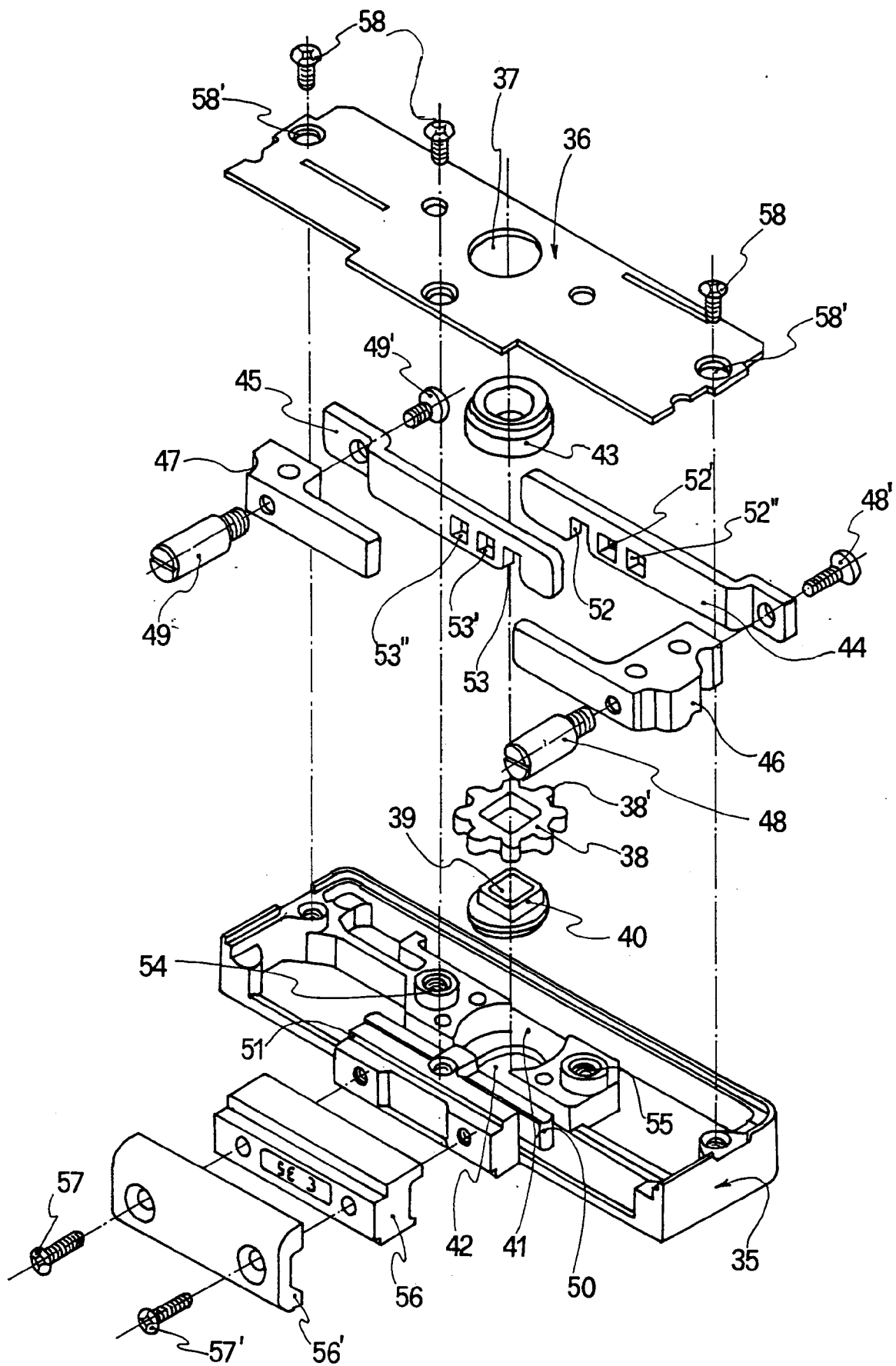


FIG 6

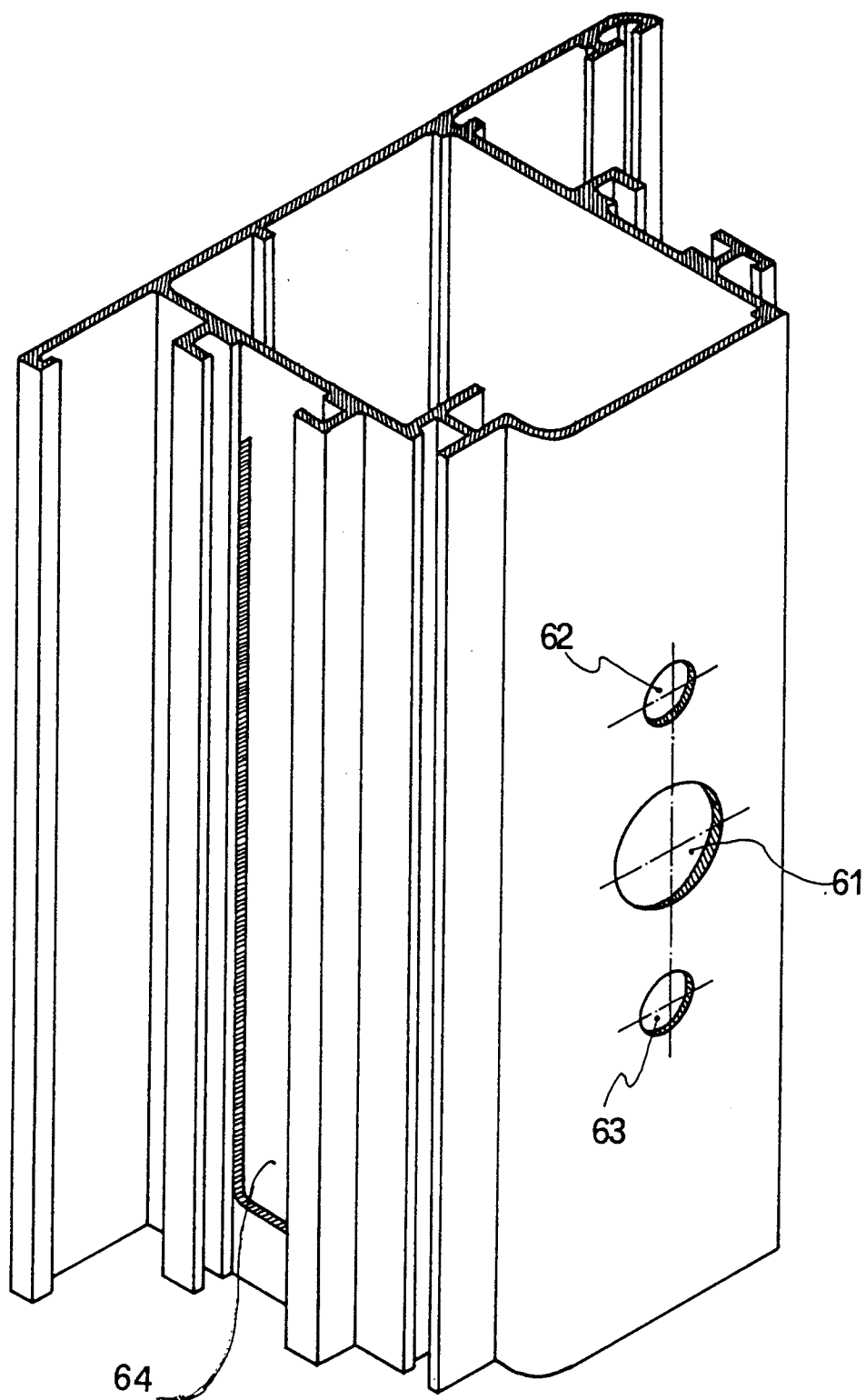


FIG 7

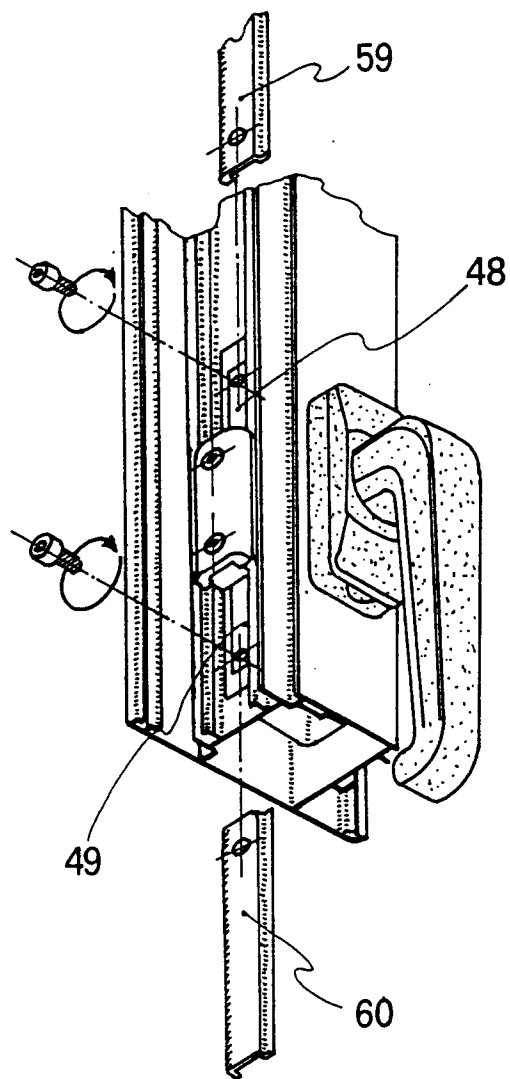
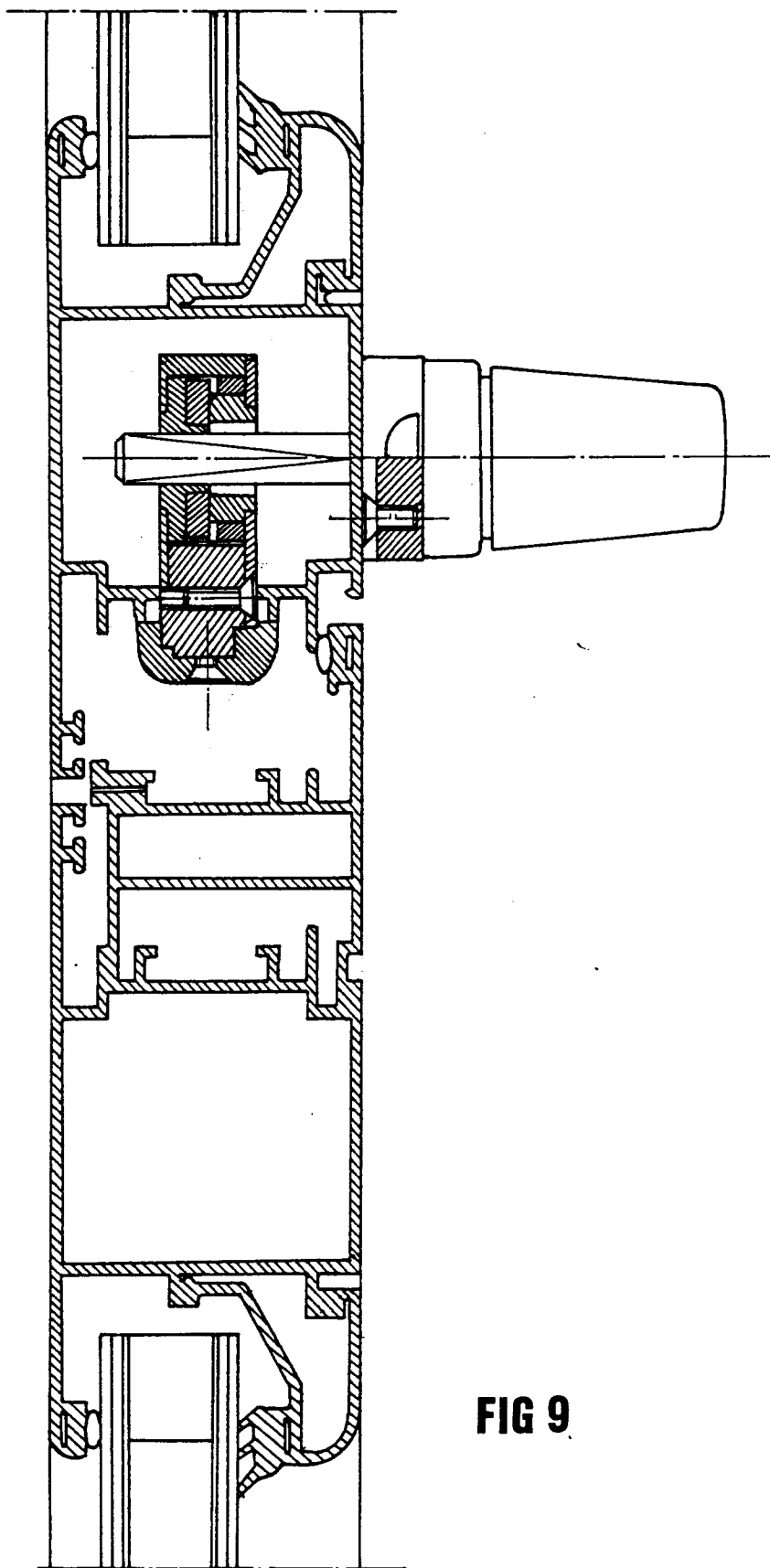


FIG 8





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 94 83 0123

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.5)
A	CH-A-473 300 (SPRECHER) * the whole document * ---	1, 4	E05C9/04 E05B15/00
A	DE-U-89 06 683 (WEICKMANN) * page 9, line 8 - line 29 * ---	1	
A	DE-A-34 45 170 (AVVANZINI) * the whole document * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			E05C E05B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 4 July 1994	Examiner Verelst, P
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