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(71) Applicant: **GSG International S.p.A.**
40054 Budrio (Bologna) (IT)

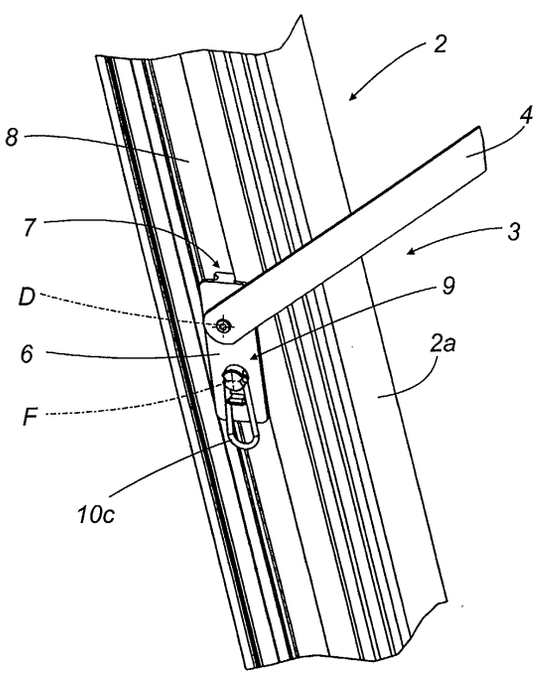
(72) Inventor: **Lambertini, Marco**
40068 San Lazzaro di Savena (Bologna) (IT)

(74) Representative: **Lanzoni, Luciano**
c/o BUGNION S.p.A.
Via Goito, 18
40126 Bologna (IT)

(54) Checking device for bottom-hung window frames

(57) The invention relates to a drive unit for bottom-hung window frames of the type comprising a fixed frame (1) with a mobile frame (2) hinged to its crosspiece (1a) at (Y), the mobile frame (2) moving between a closed position, in contact with the fixed frame (1), and an open position, at an angle (α) to the fixed frame (1). Between the fixed frame (1) and the mobile frame (2) there are drive means (3) which move the mobile frame (2) between the closed position and the open position, the means comprising at least one rod (4), its first end pivoting at a first channel (5) of an upright (1b) of the fixed frame (1), the other end pivoting at a slide (6), sliding by means of an internal body (7) in a second channel (8) of an upright (2a) of the mobile frame (2). At least one end portion (7a) of the internal body (7) of the slide (6) comprises at the point (D) of connection to the rod (4) has a transversal dimension (T) which is less than the transversal dimension (T1) of the second channel (8), allowing the slide (6) to rock inside the second channel (8); the slide (6) rocking being designed to allow a slowing of the mobile frame (2) movement from the closed position to the open position.

FIG.3



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Description

[0001] The present invention relates to a drive unit for bottom-hung or tilt and turn window frames, in particular for metal frames.

[0002] At present, the above-mentioned bottom-hung window frames comprise a mobile frame hinged to the lower crosspiece of a fixed frame and a control unit for opening and closing the mobile frame.

[0003] Between the fixed and mobile frames there are also means for guiding and for the stable positioning of the mobile frame, designed to allow the correct movement of the mobile frame between the closed and open positions, that is to say, at a preset angle to the fixed frame.

[0004] Said means comprise one or two tie rods (according to the size of the frame), each pivoting at a first end in a channel in the section forming an upright of the fixed frame (by means of a suitably shaped rotary tie rod connecting pin), and at the other end at a slide which is slidably connected in a channel in a corresponding upright of the mobile frame.

[0005] Therefore, the tie rod follows the opening and closing movement of the mobile frame thanks to the rotation allowed by the first fixed pivot on the fixed frame and by the sliding action of the slide along the channel in the mobile frame, thanks to the second pivot point.

[0006] The maximum opening angle possible for the mobile frame is normally given by an end of stroke block fixed in the channel in the mobile frame, which stops the above-mentioned slide during mobile frame opening.

[0007] Another structural addition of these guide and positioning means consists of means for releasing the slide or rotation pin so as to achieve complete rotation of the mobile frame, to allow the glass on the outside of the mobile frame to be cleaned.

[0008] However, with a frame structured in this way it is impossible to correctly control the mobile frame opening speed, that is to say, the sliding action of the slide in the channel in the mobile frame, with consequent continuous stresses on all of the parts of which the frame consists. Over time, this can all lead to movement of the end of stroke block in the channel and the breakage of drive elements.

[0009] In an attempt to overcome such disadvantages, some devices have been developed which involve the use of screw means acting directly on the slide and designed to allow expansion of the slide transversal dimension, so as to achieve greater friction during mobile frame sliding.

[0010] This device allows, on one hand, a more controlled frame descent, but on the other hand it makes it more difficult for the user to close the frame, since the resistance of the slide is equal in both sliding directions. In addition, it must be remembered that such solutions require frequent adjustments.

[0011] The aim of the present invention is, therefore, to overcome the above-mentioned disadvantages by providing a drive unit for bottom-hung windows which has an extremely simple structure and with the possibility of gradual control of both the mobile frame descent and the mobile frame ascent and closing without the addition of any structural elements compared to conventional drive units.

[0012] Accordingly, the present invention provides a drive unit for bottom-hung windows of the type comprising a fixed frame with a crosspiece to which a mobile frame is hinged, the latter moving between a closed position, in contact with the fixed frame, and an open position, at an angle to the fixed frame. Between the fixed and mobile frames there are drive means for moving the mobile frame between the closed position and the open position. The drive means comprise at least one rod, its first end pivoting at a first channel in a fixed frame upright and the other end pivoting at a slide which slides, by means of an internal body, in a second channel in a mobile frame upright. At least one end portion of the internal body of the slide at the point where it connects to the rod has a transversal dimension that is less than the transversal dimension of the second channel so as to allow the slide to rock inside the second channel. This rocking by the slide allows a slowing in the movement of the mobile frame from the closed position to the open position.

[0013] The technical features of the present invention, in accordance with the above-mentioned aims, are set out in the claims herein and the advantages more clearly illustrated in the detailed description which follows, with reference to the accompanying drawings, which illustrate a preferred embodiment of the invention without limiting the scope of the inventive concept, and in which:

- Figure 1 is a perspective view with some parts cut away to better illustrate others, of a part of a bottom-hung window frame fitted with a drive unit according to the present invention;
- Figure 2 is a view from A in Figure 1 of a detail of the drive unit illustrated in Figure 1;
- Figure 3 is a view from B in Figure 1 of another detail of the drive unit illustrated in Figure 1;
- Figure 4 is an exploded perspective view of the drive unit illustrated in the previous figures;
- Figure 5 is a longitudinal section, with some parts cut away to better illustrate others, of a detail showing a slide of the drive unit, illustrated in the previous figures;
- Figures 6 and 7 are schematic front views with some parts cut away to better illustrate others of two different configurations of the slide illustrated in Figure 5 applied to a mobile frame;
- Figure 8 is a top plan view with some parts cut away to better illustrate others, of an alternative embodiment of the slide illustrated in the previous figures;
- Figure 9 is a longitudinal section with some parts cut away to better illustrate others, of the slide illustrated in Figure 8;

- Figure 10 is a cross-section through line X - X shown in Figure 8.

[0014] With reference to the accompanying drawings, and in particular with reference to Figure 1, the drive unit in question is used for bottom-hung window frames.

[0015] These bottom-hung frames, labelled 101, comprise a fixed frame 1 to whose crosspiece 1a a mobile frame 2 is hinged at Y, the mobile frame moving between a closed position (not illustrated), in which it makes contact with the fixed frame 1, and an open position, in which it is set at an angle α to the fixed frame 1 (see Figure 1).

[0016] These movements by the mobile frame 2 are made possible by drive means which are not illustrated, being of the known type and not strictly part of the present invention.

[0017] Between the fixed frame 1 and the mobile frame 2 there are also drive means 3 which move the mobile frame 2 from the closed position to the open position and vice versa.

[0018] As illustrated in Figures 2, 3 and 4, the drive means 3 may comprise (in a minimum configuration for small window frames) at least one rod 4, its first end pivoting in a first channel 5 of an upright 1b of the fixed frame 1 and the second end pivoting at a slide 6 which slides, by means of a suitably shaped internal body 7, in a second channel 8 of an upright 2a of the mobile frame 2.

[0019] These window frames normally include two units consisting of the above-mentioned elements and positioned on the two uprights of the fixed frame 1 and the mobile frame 2.

[0020] As is clearly illustrated in Figure 5, at least one end portion 7a of the internal body 7 of the slide 6 at the point D of connection with the rod 4, has a transversal dimension T which is less than the transversal dimension T1 of the second channel 8. In this way, the slide 6 rocks inside the second channel 8 (see arrow F1 in Figure 6).

[0021] This rocking allows the control, that is to say slowing, of the mobile frame 2 stroke as it moves from the closed position to the open position.

[0022] To allow this type of controlled movement, the slide 6 also comprises means 9 which lock the slide 6 in and release it from the second channel 8, clearly illustrated in Figure 4. Said locking and release means 9 are used to allow the mobile frame 2 to rotate through 180° to allow total cleaning of the external part of the mobile frame 2.

[0023] In practice, the locking means 9 form a second pivot point F on the slide 6, offset relative to the point D of connection to the rod 4, and about which the slide 6 rocks.

[0024] In Figure 4 the locking means 9 comprise a pin 10 attached to the slide 6. The pin 10 has two opposite projections 10a and 10b (forming a sort of cam) and is mobile (see arrow F2), manually and using a special manual grip element 10c, between a position in which the slide 6 is locked, in which the projections 10a and 10b project from the transversal dimension T of the slide 6 and are engaged in the second channel 8, and a position in which the slide 6 is released, turned through an angle E relative to the first position, in which the projections 10a and 10b are within the transversal dimension T of the slide 6, allowing its release from the second channel 8.

[0025] As is also illustrated in Figures 8 and 10, the above-mentioned manual grip element 10c (illustrated with a dashed line) is partially housed in a lowered non-operating position, in a slot 100 in a surface of the slide 6, so as to stabilise the grip element 10c (consisting of a spring) and prevent its unwanted rotation.

[0026] Looking more closely at the technical details, the internal body 7 also forms a mobile frame 2 end of stroke element, upon reaching the angle α, at a position in which it is at the maximum angle to the second channel 8 (again see Figure 6) and allowed by a stable contact of two opposite end points of the internal body 7 on the second channel 8.

[0027] The rocking of the whole internal body 7 is caused by its particular configuration, with a taper extending towards the outer edge of the internal body 7, at the portion 7a next to the point D of connection to the rod 4.

[0028] As illustrated in Figure 9, the internal body 7 has a portion 7h of one of its sides that is at an angle β to the inside and extends from the second pivot point F towards a more outer end of the internal body 7 at the portion next to the point D of connection to the rod 4 in such a way as to confer an asymmetrical profile on a part of the internal body 7. The remaining sides of the internal body 7 are completely straight.

[0029] In an alternative embodiment illustrated in Figure 5, the internal body 7 has, without interruption, the first, end portion 7a tapered and extending towards the outside of the internal body 7, at the point D of connection to the rod 4, a second, straight intermediate portion 7b, at the above-mentioned second pivot point F, and a third, end portion 7c which is tapered and again extends towards the outside of the internal body 7. This internal body 7 external profile architecture allows not just slowing of the stroke and locking at the preset angle, but also slide 6 realignment (see Figure 7) relative to the second channel 8 when the mobile frame 2 moves from the open position to the closed position.

[0030] Figure 5 shows by way of example and without limiting the scope of the present invention, the tapered third, end portion 7c with an extension R1 shorter than the extension of the first tapered end portion 7a.

[0031] The second, straight intermediate portion 7b also has a transversal dimension T2 which is less than the transversal dimension T1 of the second channel 8.

[0032] The drive unit structured in this way functions as follows, starting with a closed frame configuration.

[0033] Mobile frame 2 opening causes the rod 4 to

push the slide 6 (see arrow F3 in Figure 6), and is designed to allow the slide 6 to rotate or rock about the pivot point F in the second channel 8 (see arrow F1). The rotation is accentuated by the fact that the pivot point F and the point D of connection to the rod 4 are distanced, that is to say, offset from one another.

[0034] During the slide 6 upstroke (see arrow F4), this angled position of the internal body 7 of the slide 6 in the second channel 8 slows the mobile frame 2 descent, partly thanks to the friction generated both by the angled position and by the type of material used to make the body 7 (normally, but without limiting the scope of the present invention, a synthetic plastic material).

[0035] The rod 4 maximum extension, together with the maximum angle reached by the internal body 7 in the second channel 8 stops the opening movement of the mobile frame 2 when it reaches the angle α.

[0036] During mobile frame 2 closing, the upward thrust applied by the user is discharged mostly at the pivot point F (see arrow F5 in Figure 7), since the rod 4 is, in this case, a passive closing element and allows a simple realignment counter-thrust (see arrow F6). This situation results in a counter-rotation of the body 7 (see arrow F7) until the body 7 is substantially realigned with the second channel 8, with consequent rapid downward sliding (see arrow F8) by the body and rapid closing of the mobile frame 2.

[0037] A unit structured in this way fulfils the preset aims thanks to an extremely simple configuration of the elements, which is rational in construction terms and does not require any additional end of stroke elements in the mobile frame.

[0038] The special shape of the slide internal body allows an extremely precise control of the frame movement, that is to say, substantially automatic slowing of the mobile frame descent and, in contrast, allows rapid upward sliding during the closing stage without any special adjustments on the slide.

[0039] The invention described can be subject to modifications and variations without thereby departing from the scope of the inventive concept. Moreover, all the details of the invention may be substituted by technically equivalent elements.

Claims

1. A drive unit for bottom-hung window frames of the type comprising a fixed frame (1) with a mobile frame (2) hinged to its crosspiece (1a) at (Y), the mobile frame (2) moving between a closed position, in contact with the fixed frame (1), and an open position, at an angle (α) to the fixed frame (1); between the fixed frame (1) and the mobile frame (2) there being drive means (3) which move the mobile frame (2) between the closed position and the open position and vice versa, the means comprising at least one rod (4), its first end pivoting at a first channel (5) of an upright (1b) of the fixed frame (1), the other end pivoting at a slide (6), sliding by means of an internal body (7) in a second channel (8) of an upright (2a) of the mobile frame (2), the drive unit being **characterised in that** at least one end portion (7a) of the internal body (7) of the slide (6), at the point (D) of connection to the rod (4), has a transversal dimension (T) which is less than the transversal dimension (T1) of the second channel (8), allowing the slide (6) to rock inside the second channel (8); the rocking being designed to allow a slowing of the mobile frame (2) movement from the closed position to the open position.

2. The unit according to claim 1, **characterised in that** the slide (6) comprises means (9) for locking the slide (6) in and releasing it from the second channel (8), designed to form a second pivot point (F) on the slide (6), offset relative to the point (D) of connection to the rod (4), and about which the slide (6) rocks.

3. The unit according to claim 1, **characterised in that** the internal body (7) forms a mobile frame (2) end of stroke element, when the frame reaches the angle (α), at the internal body (7) maximum angle to the second channel (8) and defined by a stable contact of two opposite end points of the internal body (7) on the second channel (8).

4. The unit according to claim 1, **characterised in that** the internal body (7) has a taper extending towards the outer edge of the internal body (7), at the portion (7a) close to the point (D) of connection to the rod (4).

5. The unit according to claim 1, **characterised in that** the internal body (7) has a portion (7h) of one side that is at an angle (β) to the inside and extends from the second pivot point (F) and towards a more outer end of the internal body (7) at the portion close to the point (D) of connection to the rod (4) in such a way as to confer an asymmetrical profile on a part of the internal body (7).

6. The unit according to claim 1, **characterised in that** the internal body (7) has, without interruption, a first, end portion (7a) that is tapered and extends towards the outside of the internal body (7), at the point (D) of connection to the rod (4) and a second, intermediate portion (7b), that is straight, at a second pivot point (F).

7. The unit according to claim 1, **characterised in that** the internal body (7) has, without interruption, a first, end portion (7a) that is tapered and extends towards the outside of the internal body (7), at the point (D) of connection to the rod (4), a second, intermediate portion (7b), that is straight, at a second

pivot point (F), and a third, end portion (7c), that is tapered and extends towards the outside of the internal body (7), allowing slide (6) realignment relative to the second channel (8) when the mobile frame (2) moves from the open position to the closed position.

8. The unit according to claim 6, **characterised in that** the tapered third end portion (7c) has an extension (R1) which is shorter than the extension (R) of the tapered first end portion (7a).

9. The unit according to claim 6, **characterised in that** the second, straight intermediate portion (7b) has a transversal dimension (T2) which is less than the transversal dimension (T1) of the second channel (8).

10. The unit according to claim 2, **characterised in that** the locking means (9) comprise a pin (10) attached to the slide (6); the pin (10) having two opposite projections (10a, 10b) which are manually mobile between a position in which the slide (6) is locked, in which the projections (10a, 10b) project from the transversal dimension (T) of the slide (6) and are engaged in the second channel (8), and a position in which the slide (6) is released, turned through an angle (E) relative to the first position, in which the projections (10a, 10b) are within the transversal dimension (T) of the slide (6).

11. The unit according to claim 10, **characterised in that** the pin (10) is attached to a manual grip element (10c) which is partially housed, in a lowered non-operating position, in a slot (100) in a surface of the slide (6), stabilising the grip element (10c) and preventing its unwanted rotation.

FIG.1

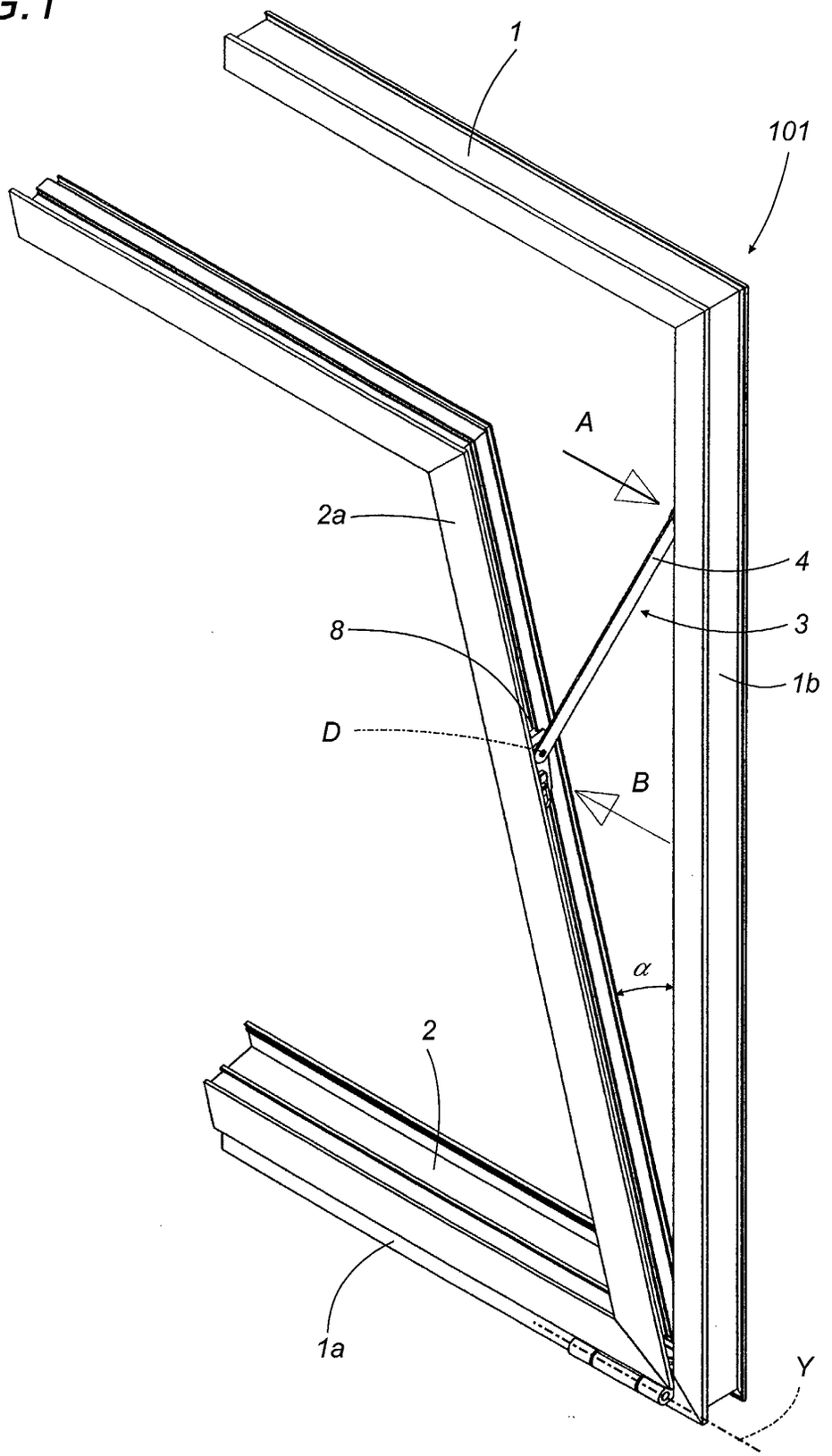


FIG.2

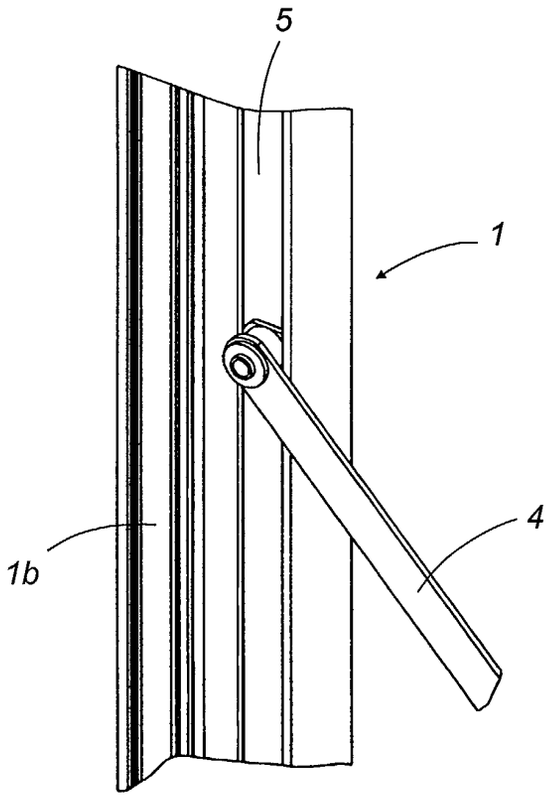


FIG.3

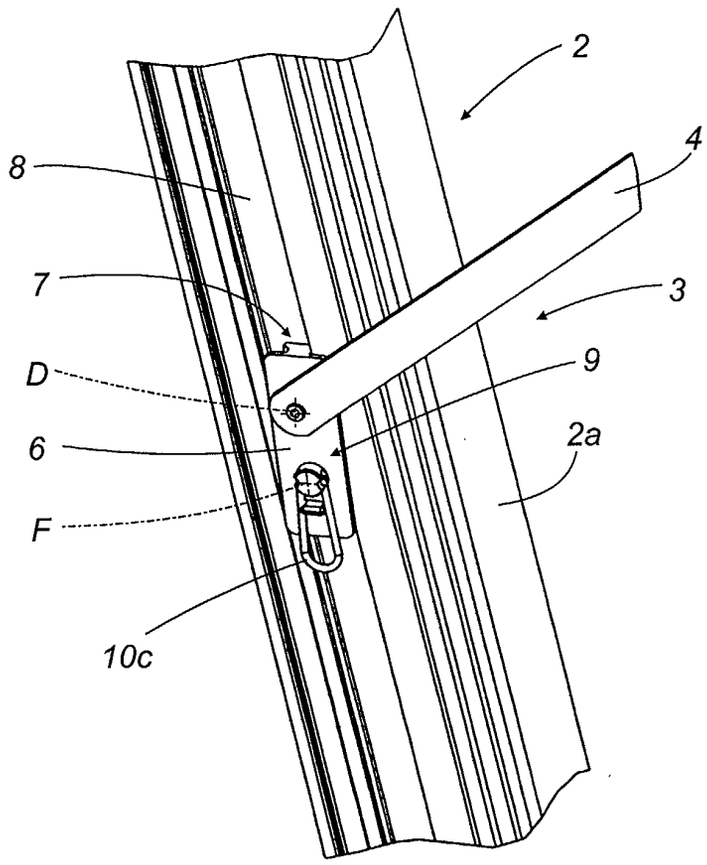


FIG.4

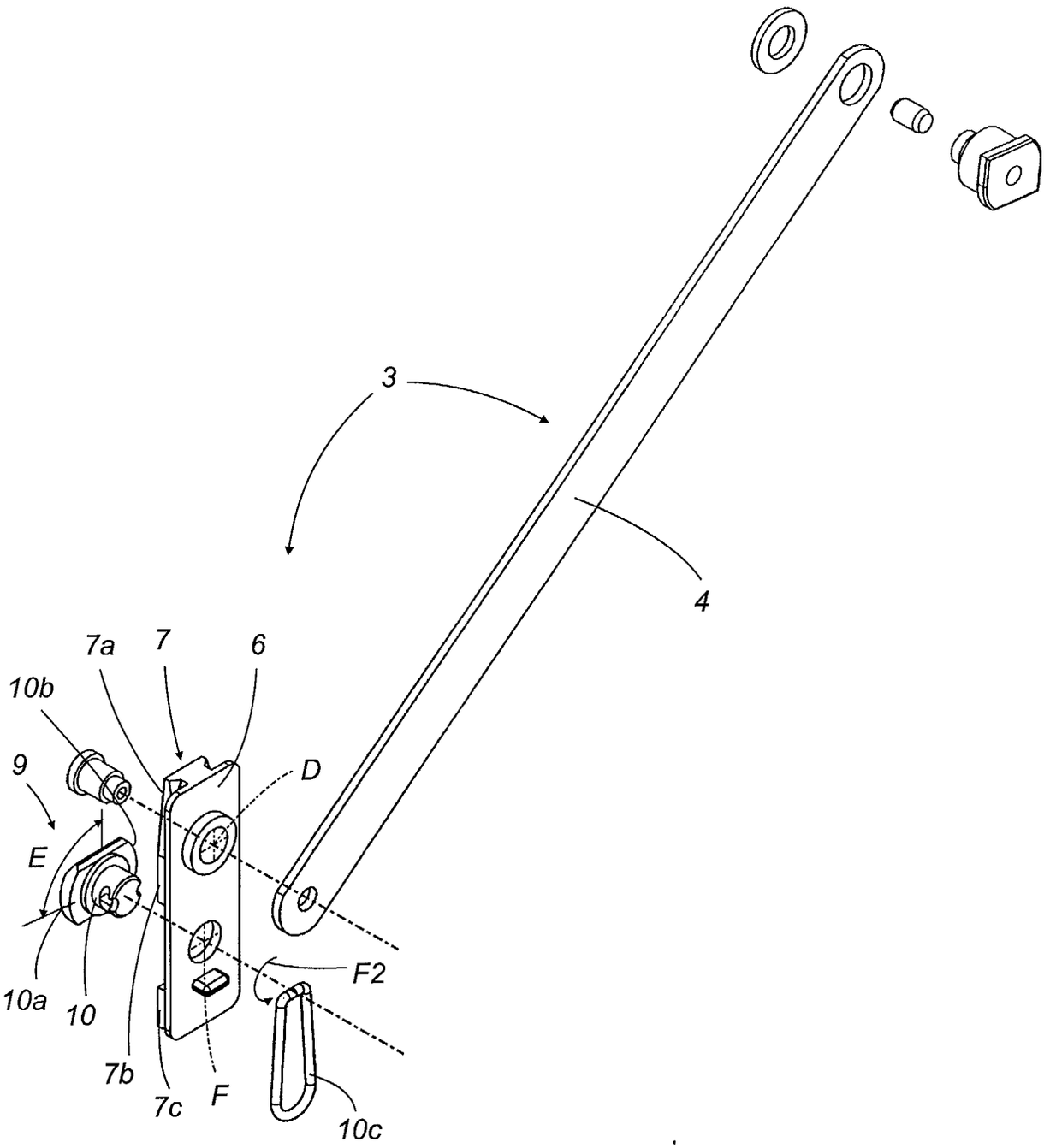


FIG.5

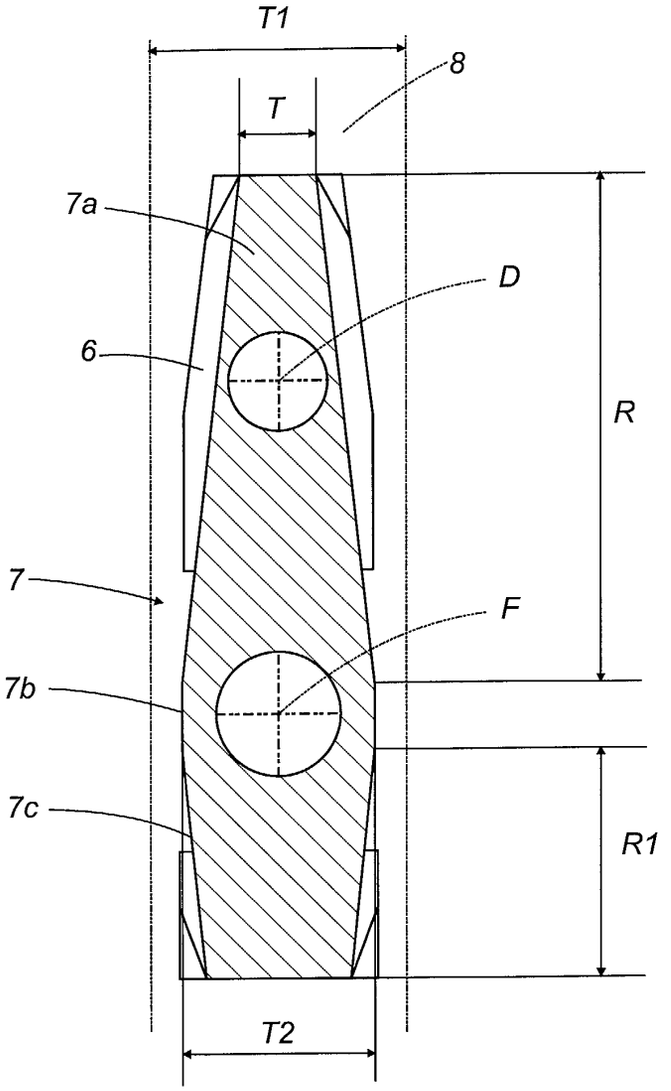


FIG.6

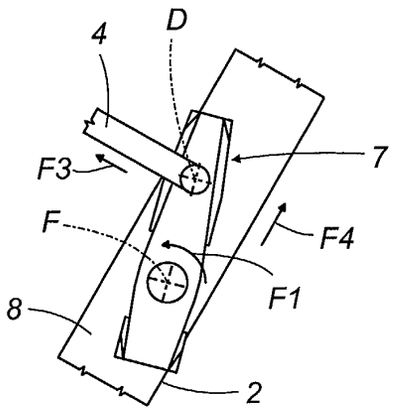


FIG.7

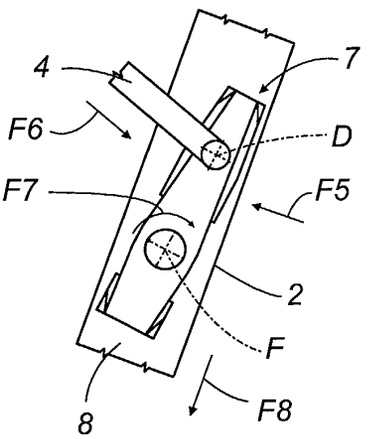


FIG.8

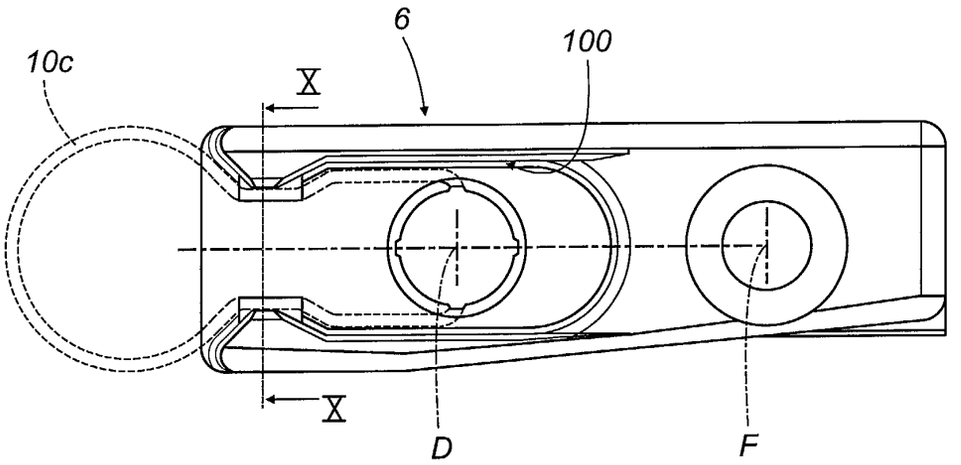


FIG.9

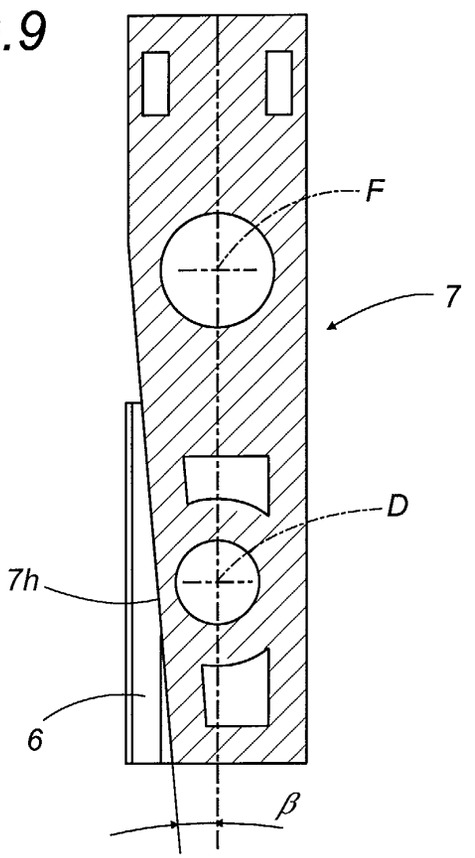
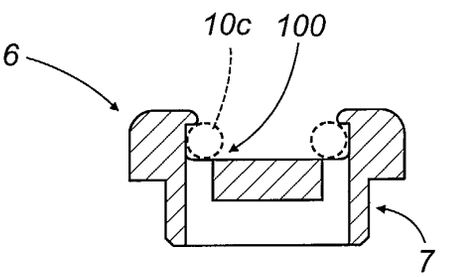


FIG.10



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EUROPEAN SEARCH REPORT

Application Number
EP 01 83 0727

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)
A	WO 00 49258 A (LOPERFIDO MICHELE ;MASTER SRL (IT)) 24 August 2000 (2000-08-24) * the whole document *	1-11	E05C17/28
A	US 5 560 084 A (BAKER NEIL M) 1 October 1996 (1996-10-01) * the whole document *	1-11	
A	GB 2 323 628 A (COTSWOLD ARCHITECT PROD) 30 September 1998 (1998-09-30) * page 3, line 19 - page 5, line 7; figures *	1-11	
A	GB 1 352 675 A (ANDERBERG MFG CO A W) 8 May 1974 (1974-05-08) * the whole document *	1-11	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

E05C
E05D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	5 April 2002	Di Renzo, R

CATEGORY OF CITED DOCUMENTS

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05-04-2002

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0049258 A	24-08-2000	IT T0990113 A1	16-08-2000
		AU 3189500 A	04-09-2000
		EP 1161607 A1	12-12-2001
		WO 0049258 A1	24-08-2000
US 5560084 A	01-10-1996	GB 2281098 A ,B	22-02-1995
		SG 52254 A1	28-09-1998
		HK 160496 A	06-09-1996
GB 2323628 A	30-09-1998	NONE	
GB 1352675 A	08-05-1974	NONE	

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