(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 017 415 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
21.01.2009 Bulletin 2009/04

(51) Int Cl.:
E05C 9/20 *(2006.01)* ***E05C 9/04*** *(2006.01)*

(21) Application number: **08160316.9**

(22) Date of filing: **14.07.2008**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR
Designated Extension States:
AL BA MK RS

(30) Priority: **19.07.2007 IT BO20070499**

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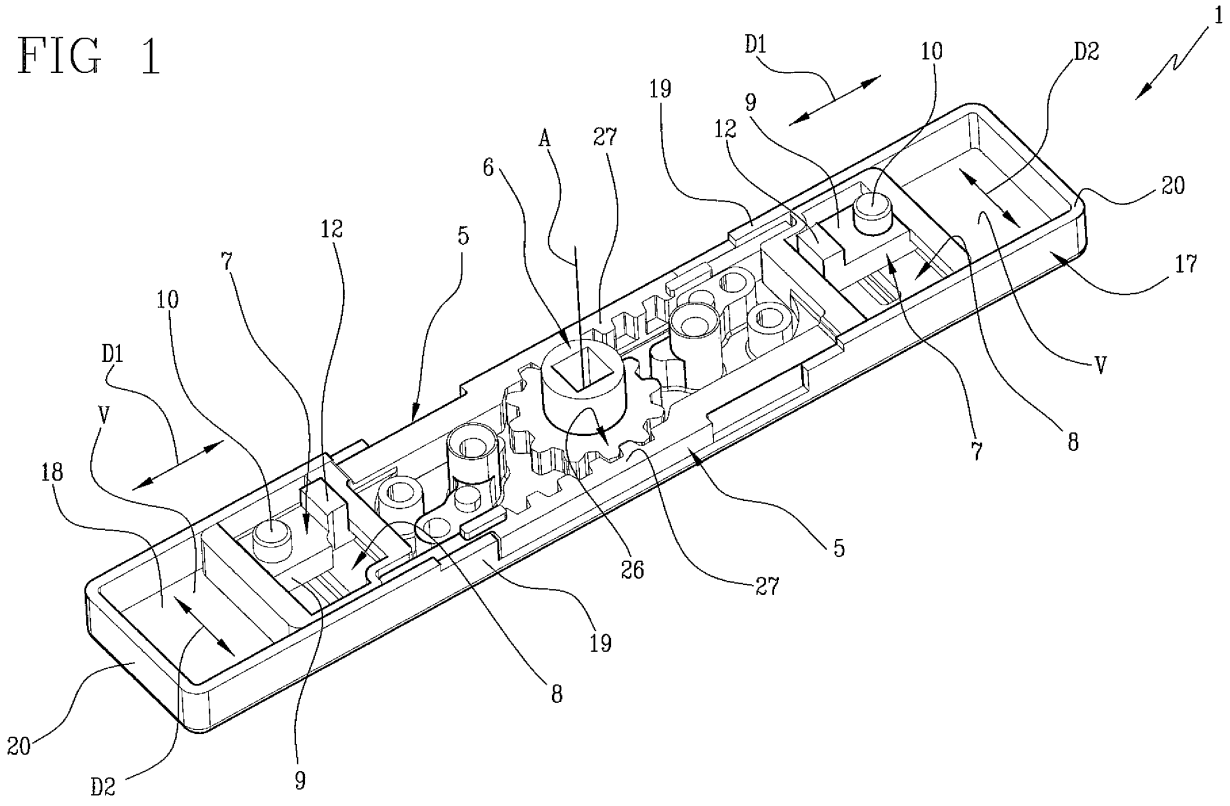
(54) **An operating device for doors and windows**

(57) An operating device for doors and windows comprises at least one drive member (5) that can be associated with a locking device (3) to move the latter between a door/window locked configuration and a door/window unlocked configuration along a first direction (D1) parallel to the principal axis along which the operating device (1) extends; control means (6) acting on the drive member (5) to switch the locking device (3) between the locked and unlocked configurations; the drive member (5) comprises a fastening element (7) to fasten the locking device (3) to the drive member (5); the fastening element (7) is continuously mobile along a second direction (D2) perpendicular to the first direction (D1).

FIG 1



EP 2 017 415 A2

Description

[0001] This invention relates to an operating device for doors and windows, in particular doors and windows with frames made of metal or PVC.

[0002] In particular, the invention can be advantageously applied to windows known in the jargon of the trade as "awning windows". These windows comprise a sash that opens outwards from the bottom and is hinged at the top to a fixed window frame.

[0003] Operating devices for doors and windows are known which are used to actuate a device that locks the sash to the fixed frame.

[0004] The operating device essentially comprises a box-shaped element or case that can be associated with or housed in a sash rail and containing kinematic units (such as racks) for operating the locking devices and controlled by a handle protruding outwards from the sash.

[0005] In particular, the locking device is slidably mounted on the sash and comprises one or more rods, fitted in a groove in the rail profile and provided with a respective pin and/or boss protruding (from the end of the rod in the case of the pin or transversally of the rod in the case of the boss) which, when required, strikes a respective contact member formed or mounted on the fixed frame.

[0006] For this purpose, the operating devices comprise one or more drive elements (usually rack and pinion devices) interposed and connected between the rod or rods and the control element (handle) acting on the kinematic and operating units.

[0007] By operating on the handle, the locking device can be switched from a configuration in which the sash is rigidly fixed to the fixed frame and cannot be moved to a configuration in which the sash is released from the fixed frame and can be opened.

[0008] More specifically, the drive element comprises suitable means for connecting it to the rod. For example, the connecting means may be embodied by a pin which protrudes from the case constituting the box-shaped element and which can be associated with a respective hole made in the rod.

[0009] In prior art operating devices, the connecting means are made as a single part with the remaining components of the drive element protruding from the case.

[0010] Thus, the position of the connecting means is substantially fixed relative to an axis which, usually, is the centre line of the case.

[0011] Disadvantageously, therefore, prior art operating devices can be used and assembled only with reference to the configuration of the groove in which the rods slide so as to coincide with the rods and enable the respective pin to be coupled with the rods.

[0012] In other words, since the position of the connecting means is fixed, a single drive member design can, in many cases, be connected to only a few types of sash profiles where the sliding groove correctly matches the positioning axis of the pin coupled to the hole in the rods (also taking into account the confined spaces in which the cases containing the operating elements can be fitted). As a result, to be able to install a prior art operating device with different types of locking devices, it is necessary to provide at least a plurality of drive members, each provided with connecting means suitably located for a particular type of sash profile, where the rod sliding grooves are correctly positioned.

[0013] Consequently, production costs increase considerably and a large amount of warehouse space is required to keep the full range of stock for all the different types of door and window operating devices.

[0014] In view of the above, the technical purpose of this invention is to propose an operating device for doors and windows that is free of the stated disadvantages.

[0015] In particular, this invention has for an aim to provide an operating device for doors and windows that is versatile and easy to adapt to different installation conditions.

[0016] Another aim of the invention is to provide an operating device for doors and windows that is inexpensive and easy to keep in stock.

[0017] According to the invention, the technical purpose and aims stated above are achieved by an operating device for doors and windows as described in one or more of the appended claims.

[0018] Further features and advantages of the invention are more apparent in the detailed description below, with reference to a preferred, non-limiting embodiment of an operating device for doors and windows, as illustrated in the accompanying drawings, in which:

- Figure 1 is a perspective view, with some parts removed in order to better illustrate others, of a preferred embodiment of an operating device for doors and windows according to this invention;
- Figure 2 is a perspective exploded view of the operating device of Figure 1;
- Figures 3 and 4 are top plan views illustrating two different operating configurations of the operating device of Figure 1;
- Figures 5 and 6 illustrate two details of the operating device of Figure 1; and
- Figure 7 is a perspective view of the operating device for doors and windows of Figure 1 installed on a door/window frame shown partly cut away.

[0019] With reference to the accompanying drawings, the numeral 1 denotes in its entirety an operating device according to the invention for doors and windows with frames made of metal or the like and of PVC.

[0020] The operating device 1 is advantageously applicable to windows known as "awning windows". Windows of this type (not fully illustrated in the drawings since they are of well-known type) comprise a sash that opens outwards from the bottom and is hinged at the top, along its upper rail, to a fixed window frame.

[0021] As shown in Figure 7, the operating device 1 is

connected to a mobile frame 2 of a window sash. The mobile frame 2, as stated, comprises a metal or plastic profile, of which only a part is shown.

[0022] The window also comprises a fixed frame (not illustrated in the drawings) with which the mobile frame 2 of the sash is associated.

[0023] The operating device 1 is associated with a locking device 3 that is mobile between a locked configuration, where the mobile frame 2 is engaged with the fixed frame, and an unlocked configuration, where the mobile frame 2 is disengaged from the fixed frame.

[0024] The locking device 3 may comprise one or more rods 4 slidable in grooves made in the mobile frame 2 and one or more locking elements fixed to the rod. In the window locked configuration, the locking elements, also referred to as "bosses" (not shown in the drawings) are stably accommodated in holes made in the fixed frame of the window. Thus, the sash cannot be moved away from the fixed frame and, hence, cannot be opened. In the unlocked configuration, the bosses are away from or outside the holes, thus enabling the sash to be moved away from the fixed frame and opened.

[0025] The operating device 1 comprises at least one drive member 5 functionally connected to the locking device 3 for reversibly moving the locking device 3 between the locked configuration and the unlocked configuration of the window.

[0026] The drive member 5 is mobile along a direction "D1" parallel to the principal axis along which the operating device 1 extends. In particular, the first direction "D1" is also parallel to a principal direction along which the portion of the mobile frame 2 on which the operating device 1 is mounted extends.

[0027] In the embodiment described, the operating device 1 comprises a pair of drive members 5, each moving towards and/or away from the other.

[0028] The operating device 1 also comprises control means 6 acting on each drive member 5 for reversibly switching the locking device 3 between the locked and unlocked configurations of the window.

[0029] Each drive member 5 comprises a fastening element 7 necessary to stably connect the locking device 3 to the drive member 5 itself.

[0030] Each fastening element 7 is mobile along a second direction "D2" perpendicular to the first direction "D1" between a first and a second end position (two example positions are shown in Figure 3).

[0031] More specifically, each fastening element 7 is mobile in such a way that it can adopt a plurality of stable positions included between the first and the second end position, thus adapting to the position of the hole in the rod 4.

[0032] Looking in more detail, each drive member 5 also comprises a respective guide 8 slidable along the above mentioned first direction "D1" and where each fastening element 7 is slidably inserted. More specifically, each guide 8 slides between a first position (Figure 3), where the guides 8 are closer together, and a second position (Figure 4), where the guides 8 are further apart.

[0033] Each fastening element 7 comprises a slider 9 that is slidably mounted in the respective guide 8 and is substantially in the shape of a parallelepiped. The slider 9 has a pin 10 located near a first end 9a of the slider 9 itself. The pin 10 is accommodated in a hole 11 made in the rod 4 of the locking device 3 so as to couple the locking device 3 itself to each drive member 5.

[0034] The slider 9 also has a shoulder 12 located near a second end 9b of the slider 9, opposite the first end 9a along the principal direction in which operating device 1 extends. When the rod of the locking device 3 is coupled to the slider 9, one end edge of the rod 4 itself abuts against the shoulder 12. The coupling between the rod 4 and the shoulder 12 minimizes any coupling problems between the pin 10 and the hole 11, thus reducing the play between them.

[0035] Each guide 8 comprises a base wall 13 and two opposite side walls 14. The side walls 14 are parallel to each other and extend along the above mentioned second direction "D2".

[0036] Each side wall 14 of the guide 8 has a respective straight groove 15 formed near the base wall 13 of the guide 8 itself.

[0037] Each fastening element 7 comprises two tabs 16 housed in the grooves 15 in the guide 8 so as to render more stable the translational movement of the fastening element 7 along the second direction "D2".

[0038] In particular, the tabs 16 are located near the above mentioned first and second ends 9a and 9b of the slider 9.

[0039] The operating device 1 comprises a case or containing element 17 defining a slideway "V" for the drive members 5.

[0040] More specifically, the containing element 17 comprises a bottom wall 18, a pair of side walls 19 lying along the first direction "D1" and a pair of end walls 20 lying along the second direction "D2". In other words, the containing element 17 is substantially in the shape of a parallelepiped.

[0041] The operating device 1 further comprises means 21 for accessing each fastening element 7.

[0042] In the embodiment described, the access means 21 comprise at least one slot 22 associated with a respective drive member 5. Each slot 22 is made in the bottom wall 18 in the vicinity of a respective guide 8 when the latter is in the first and/or the second position. The slot 22 provides access to the slideway "V".

[0043] The access means 21 also comprise an opening 23 made in the base wall 13 of each guide 8.

[0044] Looking in more detail, when each guide 8 is in the first and/or the second end position, the slots 22 made in the bottom wall 18 of the containing element 17 are aligned with and placed over the openings 23 in the base walls 13 of the guides 8. Thus, each fastening element 7 can be accessed from the outside of the operating device 1 and moved along the second direction "D2".

[0045] To facilitate adjustment of each fastening ele-

ment 7 from the outside, the bottom surface 7a of each fastening element 7 has a slit 24 made in it through which the fastening element 7 can be engaged and moved by a suitable tool. Looking in more detail, the bottom surface 7a of the fastening element 7 faces the base wall 13 of the respective guide 8.

[0046] Each drive member 5 also comprises a rack 25 associated with each guide 8 to allow each guide 8 to move along the first direction "D1". Looking in more detail, each rack 25 is made as a single part with the guide 8.

[0047] The racks 25 are associated with the control means 6. More specifically, the control means 6 comprise a pinion 26 that meshes with respective toothed portions 27 of the racks 25.

[0048] The pinion 26 is located near a central zone of the containing element 17 and its rotation axis "A" is perpendicular to the first and second directions "D1" and "D2". The pinion 26 comprises a toothed crown 28 associated with a hollow cylindrical mounting element 29 having a square internal section. The cylindrical element 29 has an extension 29a located at the bottom wall 18 of the containing element 17. In particular, the bottom wall 18 of the containing element 17 has a hole 30 that accommodates the extension 29a in such a way as to render more stable the rotational movement of the pinion 26.

[0049] The operating device 1 also comprises a lid 31, fixed with screws that are not illustrated, for at least partly covering the control means 6 and the drive members 5.

[0050] The operating device 1 is fixed to the mobile frame 2 of the window using suitable first screws 32. The embodiment described comprises four first screws 32 (Figure 2) for fixing the operating device 1 to the mobile frame 2.

[0051] The pinion 26 is coupled to a handle 33 that can be operated by a user to switch the operating device 1 between the locked and unlocked configurations (Figure 7). More specifically, the handle 33 is coupled to the pinion 26 by a square coupling pin 38, that is to say, a pin having a square cross section, that can be inserted into the hollow element 29 of the pinion 26.

[0052] Figure 7 also shows a handle 33 mounting element 34 fixed to the mobile frame 2 of the window by respective second screws 35, and a cap 36 for covering the mounting element 34 of the handle 33. Also shown are a grub screw 37 used to fasten the handle 33 to the coupling pin 38 and a seal 39 interposed between the handle and the cap 36 to prevent unwanted infiltration of water.

[0053] During installation, the operating device 1 is fixed to the mobile frame 2 of the window. Next, the operating device 1 is coupled to the locking device 3. More specifically, the rods 4 of the locking device 3 are inserted into the respective grooves in such a way that the holes made in the vicinity of their ends are positioned near each fastening element 7. The installer acts on each fastening element 7 through the above described access means 21 in such a way as to move the fastening elements 7 until the pin 10 on each fastening element 7 is coaxially aligned with the hole in the respective rod 4. In this way, the operating device 1 can be coupled to the locking device.

[0054] When a user turns the handle 33, the pinion 26, integrally associated with the handle 33, turns and causes the racks 25 to move in a straight line. The racks move the guides 8 of the drive members 5 and, at the same time, the fastening elements 7. Thus, the rods 4 of the locking device 3 are moved in a straight line in such a way as to switch the locking device 3 between the locked configuration and the unlocked configuration.

[0055] The invention achieves the above mentioned aims and brings important advantages.

[0056] First of all, since the fastening elements 7 used to couple the operating device 1 to the locking device 3 are mobile along the second direction "D2" perpendicular to the principal axis of the operating device 1 itself, the operating device 1 can be applied to many different types of profiles where the grooves that house the rods 4 of the locking device 3 are located in different positions.

[0057] That means the operating device 1 can be adapted to suit rods 4 located in different positions and therefore having coupling holes 11 also located in different positions.

[0058] It is not therefore necessary to make different operating devices 1 according to the type of profile used. This allows production costs to be significantly reduced.

[0059] Moreover, total warehouse space required to stock the operating device 1 is also reduced, thus reducing warehousing requirements and costs accordingly.

[0060] The invention described above is susceptible of industrial application and may be modified and adapted in several ways without thereby departing from the scope of the inventive concept. Moreover, all details of the invention may be substituted by technically equivalent elements.

Claims

1. An operating device for doors and windows comprising:

- at least one drive member (5) that can be associated with a locking device (3) to move the locking device (3) between a door/window locked configuration and a door/window unlocked configuration along a first direction (D1) parallel to the principal axis along which the operating device (1) extends;
- control means (6) acting on the drive member (5) to switch the locking device (3) between the locked and unlocked configurations; the operating device being **characterized in that** the drive member (5) comprises a fastening element (7) to fix the locking device (3) to the drive member (5); the fastening element (7) being continuously

mobile along a second direction (D2) perpendicular to the first direction (D1).

2. The device according to claim 1, **characterized in that** the drive member (5) comprises a guide (8), extending along the direction (D2) and mobile as one with it along the first direction (D1); the fastening element (7) sliding freely in the guide (8).

3. The device according to claim 1 or 2, **characterized in that** it further comprises means (21) for accessing the fastening element (7).

4. The device according to claim 2 or 3, **characterized in that** the fastening element comprises a slider (7) that is slidably mounted in the guide (8) and a pin (10) protruding from the slider and designed to be accommodated in a hole made in the locking device (3).

5. The device according to any of the claims from 2 to 4, **characterized in that** the guide (8) comprises a base wall (13) and two opposite side walls (14) extending along the second direction (D2); the guide (8) also having a groove (15) formed on each side wall (14).

6. The device according to claim 5, **characterized in that** the fastening element (7) comprises at least one tab (16) housed in the groove (15) in the guide (8).

7. The device according to any of the claims from 3 to 6, **characterized in that** it further comprises a containing elememt (17) defining a slideway (V) for the drive member (5); said containing element (17) comprising a bottom wall (18).

8. The device according to claim 7, **characterized in that** the access means (21) comprise a slot (22) made in the bottom wall (18) of the containing element (17) to provide access to the slideway (V).

9. The device according to claim 8, **characterized in that** the guide comprises a base wall (13) and **in that** the access means (21) further comprise an opening (23) made in the base wall (13) of the guide (8).

10. The device according to claim 9, **characterized in that** the slot (22) in the bottom wall (18) of the containing element (17) can be placed over the opening (23) in the base wall (13) of the guide (8) to provide access to the fastening element (7) so as to move the latter along the second direction (D2).

11. The device according to any of the claims from 3 to 10, **characterized in that** the fastening element (7) has a slit (24) made in a bottom surface (7a) of the slider (9) facing the base wall (13) of the guide (8); the slit (24) being accessible through the access means (21) to move the fastening element (7).

12. The device according to any of the foregoing claims, **characterized in that** the drive member (5) further comprises a rack (25) associated with the guide (8).

13. The device according to claim 12, **characterized in that** the guide (8) and the rack (25) are made as a single part.

14. The device according to claim 12 or 13, **characterized in that** the control means (6) comprise a pinion (26) that meshes with the rack (25).

15. The device according to any of the foregoing claims, **characterized in that** it comprises a pair of drive members (5), each mobile towards/away from the other.

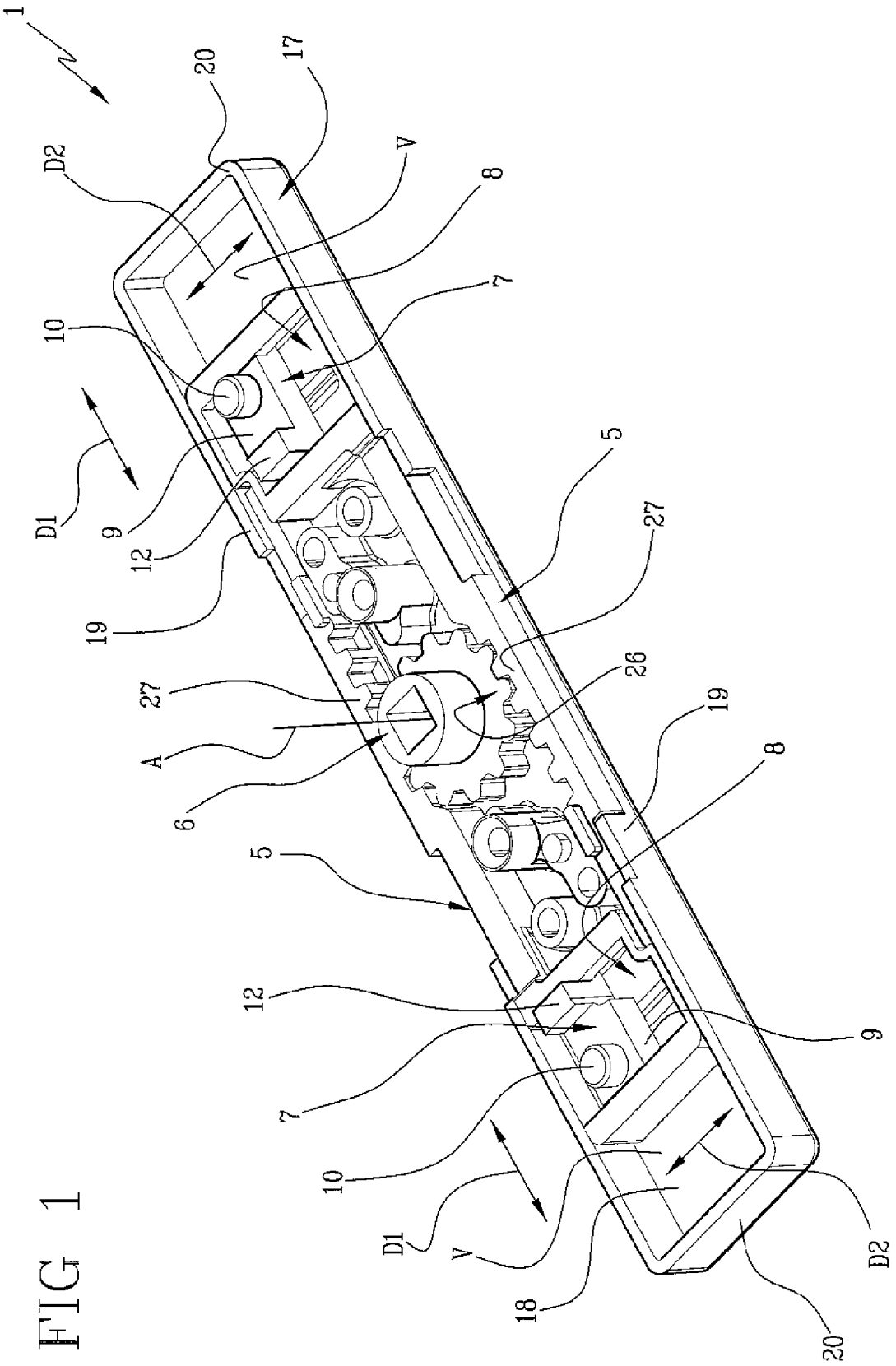


FIG 1

FIG 2

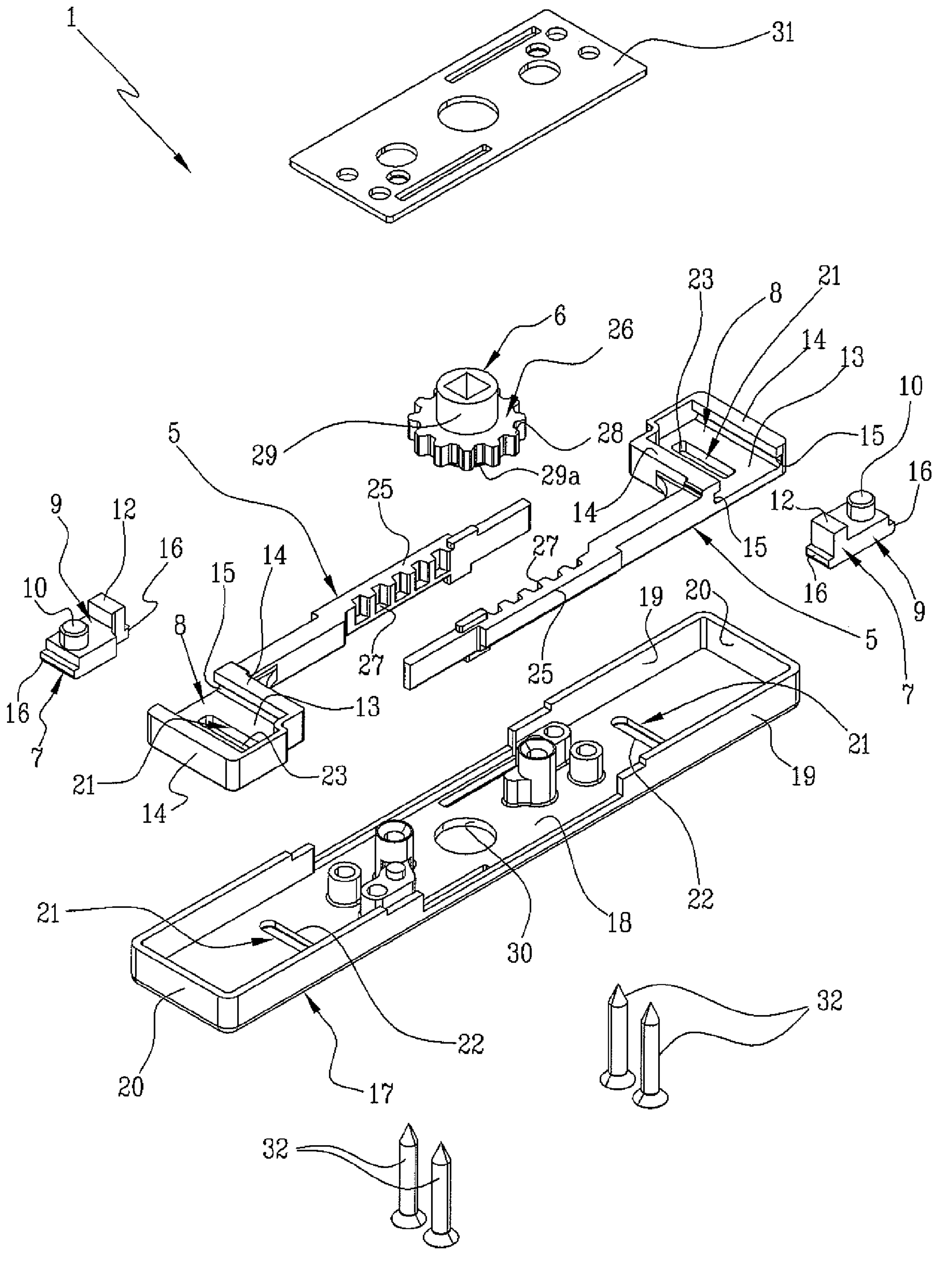

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FIG 3

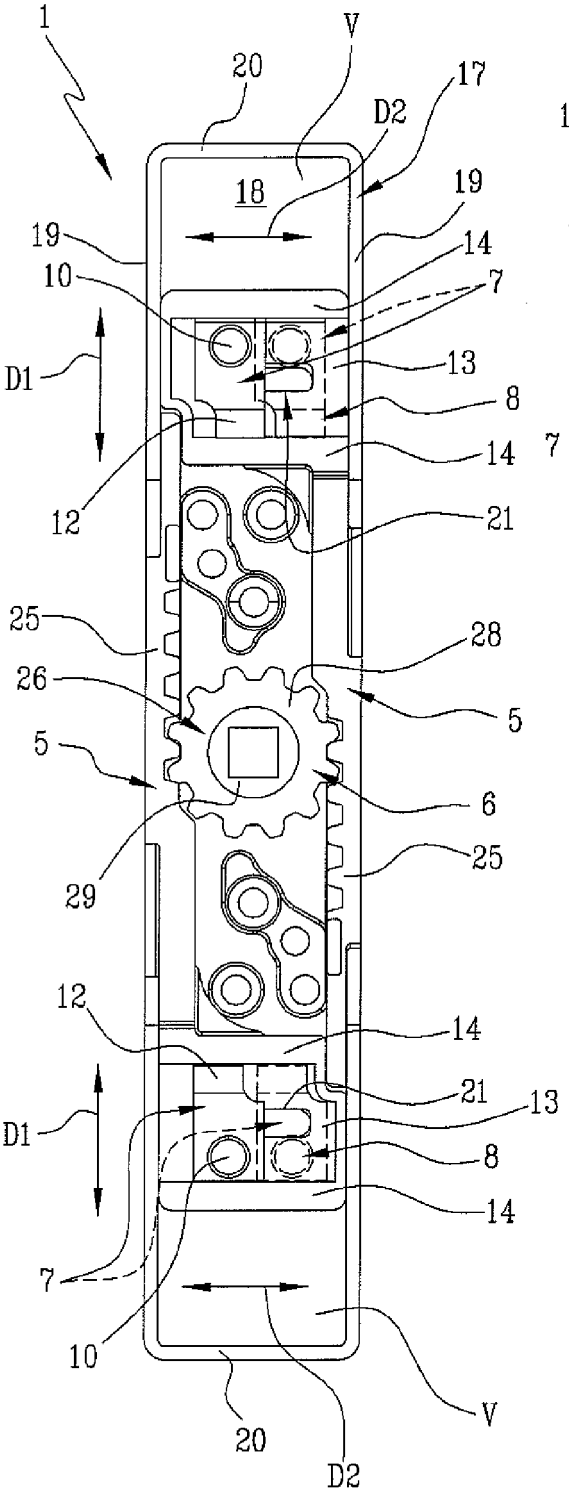
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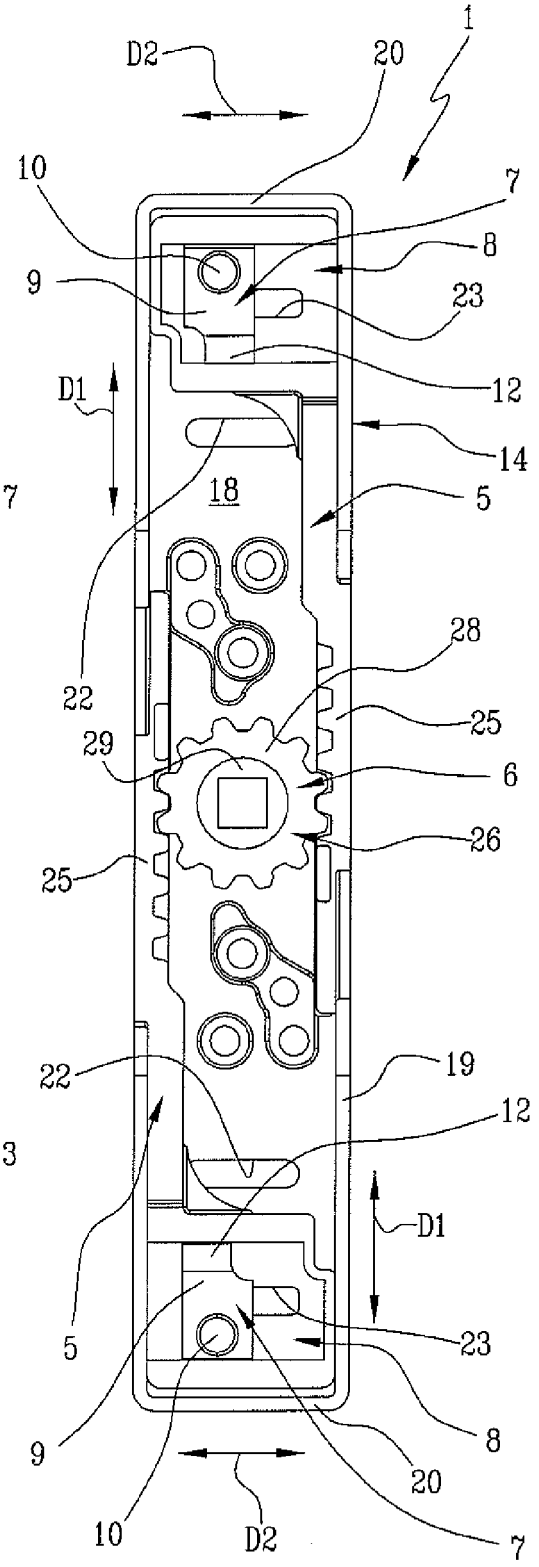
FIG 4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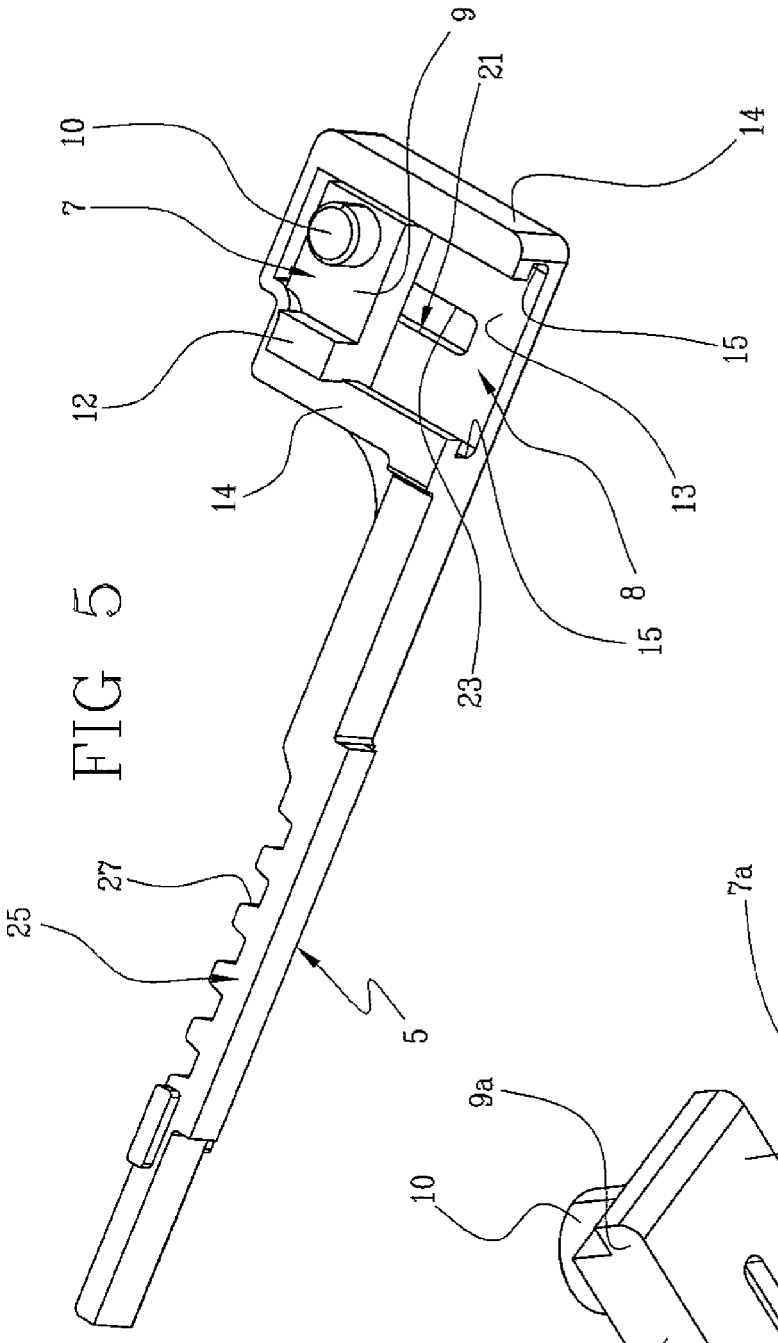

FIG 5

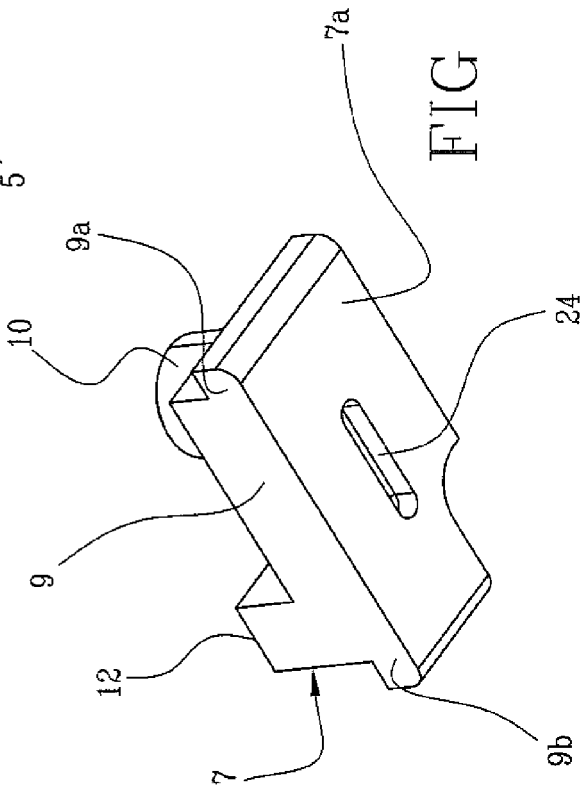

FIG 6

FIG 7