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(54) Closure device for use with openable door or window

(57) A closure device (14) for use with a movable closure member which is mounted for movement between open and closed positions with respect to a fixed frame in which is it mounted, and being intended to be mounted on a closing face of the closure member and to be co-operative with a keeper mounted on the fixed frame to lock the closure member in the closed position. The closure device comprises: an actuator device (15) which is adapted to be mounted in the closing face of the movable member; an elongate actuator element (16a) which is linearly displacable in a direction generally lengthwise of the closing face, and being displacable between an operative position and an inoperative position by operation of the actuator device; and at least one locking element (16) connected to the elongate actuator element (16a) and movable into and out of engagement with a locking formation on the keeper, and having an engaging portion which engages with the locking formation so as to resist forced separation of the closure device and the keeper in a direction generally perpendicular to the closing face.

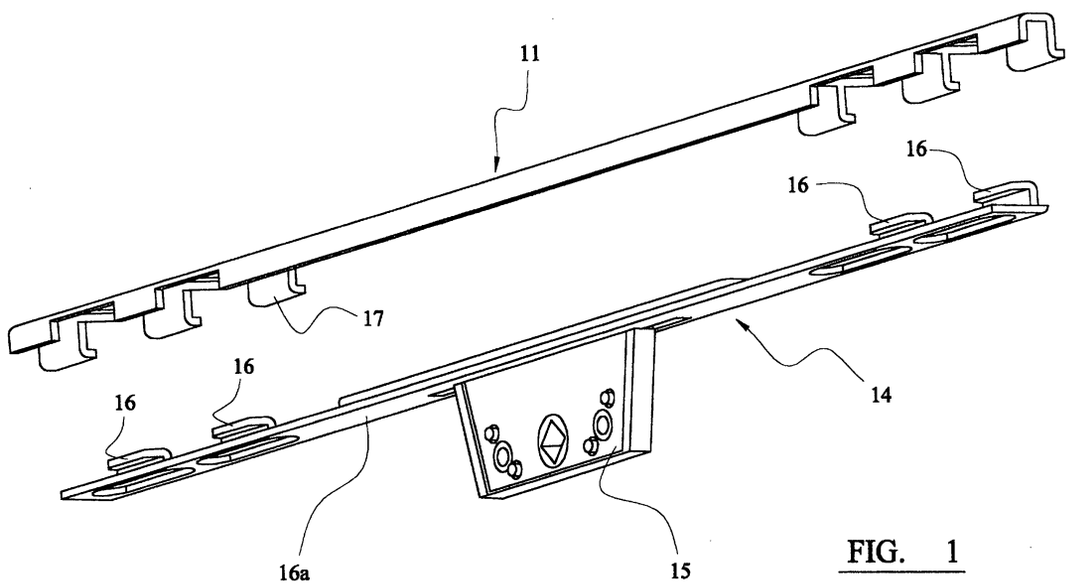

FIG. 1

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Description

[0001] This invention relates to a closure device for use with an openable door or window, referred to hereinafter as a movable closure member, and which is intended to be mounted on a closing face of the movable member and to cooperate with a fixed keeper mounted on a cooperating face of a fixed frame in which the closure member is movably mounted.

[0002] In the art of closure devices for use with openable doors and windows, and especially (though not exclusively) when PVCU sections are utilised, it is known to provide so-called espagnolette fittings. As is well known, an espagnolette fitting usually comprises a "gearbox" which is mounted in a recess in the closing face of the closure member, and which has a square drive socket which receives a spindle of an operating handle which is rotated in order to actuate the fitting between a release position and a locking position.

[0003] Rotation of the internal components of the gearbox is translated into linear movement of one or more slide bar or rod (usually referred to as an espagnolette rod) carrying locking or "mushroom" cams which are movable into and out of engagement with respective keeper elements of a keeper arrangement on the fixed frame,

[0004] A mushroom cam is, effectively, a cylinder with a circular flange at one end, and the circular flange fits over the keep, and with the cylindrical part sliding through a slot defined in the keep. Therefore, in practice, it is only the diametrically opposed small rim portions which provide resistance against relative separation. The rest of the circular flange is redundant, in that it does not have any retaining function. However, it is presently necessary to provide a complete circular flange, because of the means of adjustment usually provided in a standard mushroom cam. Thus, each mushroom cam usually has in its head portion a hexagonal socket into which an Allen key or the like can be entered, and which allows the cam to be rotated and via an eccentric arrangement, this increases or reduces the amount of transverse "pull" during locking. This is required in order to compensate for any sealing deficiencies in the installation i.e. to take up any excessive clearance between closing frame components and wiper and other seals carried thereby.

[0005] The present invention seeks to provide a simplified espagnolette fitting, and/or a simplified keeper arrangement for use therewith. The invention therefore does not utilise existing mushroom cams, but instead employs, in one preferred embodiment, a series of "tangs", spaced apart along its length. A generally similar design of keep may be provided, and which is preferably of one-piece formation, and having matching tang or holding portions, but also provided with slots between the holding portions on the keep to allow registry, followed by linear movement.

[0006] According to a first aspect of the invention there is provided a closure device for use with a movable closure member which is mounted for movement between open and closed positions with respect to a fixed frame in which it is mounted, said closure device being intended to be mounted on a closing face of the closure member and to be cooperative with a keeper mounted on the fixed frame to lock the closure member in the closed position, and in which the closure device comprises:

an actuator device which is adapted to be mounted in the closing face of the movable member;
an elongate actuator element which is linearly displaceable in a direction generally lengthwise of the closing face, said actuator element being displaceable between an operative position and an inoperative position by operation of the actuator device; and,
at least one locking element connected to the elongate actuator element and which is movable into and out of engagement with a locking formation on the keeper upon movement of the elongate actuator element to and from its operative position, said locking element having an inturned flange portion which is engagable with the locking formation so as to resist forced separation of the closure device and the keeper in a direction generally perpendicular to the closing face.

[0007] According to a second aspect of the invention there is provided a closure device for use with a movable closure member which is mounted for movement between open and closed positions with respect to a fixed frame in which it is mounted, said closure device being intended to be mounted on a closing face of the closure member and to be cooperative with a keeper mounted on the fixed frame to lock the closure member in the closed position, and in which the closure device comprises:

an actuator device which is adapted to be mounted in the closing face of the movable member;
an elongate actuator element which is linearly displaceable in a direction generally lengthwise of the closing face, said actuator element being displaceable between an operative position and an inoperative position by operation of the actuator device; and,
at least one locking element connected to the elongate actuator element and which is movable into and out of engagement with a locking formation on the keeper upon movement of the elongate actuator element to and from its operative position, said locking element being L-shaped, or T-shaped in cross section to engage with the locking formation so as to resist forced separation of the closure device and the keeper in a direction generally perpendicular to the closing face.

[0008] According to a third aspect of the invention there is provided a closure device for use with a movable closure member which is mounted for movement between open and closed positions with respect to a fixed frame in which it is mounted, said closure device being intended to be mounted on a closing face of the closure member and to be cooperative with a keeper mounted on the fixed frame to lock the closure member in the closed position, and in which the closure device comprises:

an actuator device which is adapted to be mounted in the closing face of the movable member;
an elongate actuator element which is linearly displaceable in a direction generally lengthwise of the closing face, said actuator element being displaceable between an operative position and an inoperative position by operation of the actuator device; and,
at least one locking tang connected to the elongate actuator element and which is movable into and out of engagement with a locking formation on the keeper upon movement of the elongate actuator element to and from its operative position, said tang being engageable with the locking formation so as to resist forced separation of the closure device and the keeper in a direction generally perpendicular to the closing face.

[0009] It may be desirable to provide a ramp on the underside of the tangs on the keeper arrangement, and/or on the upper side of the tangs on the espagnolette fitting, although this would add to the cost. The invention therefore is primarily, though not exclusively, seeking to provide an economically manufactured construction, and also simple in construction, and yet being a reliable arrangement.

[0010] It is also a preferred, though not exclusive, option to design the fittings in such a way as to be able to fit into the space which is already made available automatically in extruded PVCU sections, i.e. spaces already available to accommodate "friction stays".

[0011] The closure device of the invention therefore is similar to existing espagnolette fittings, in that it locks and seals in the same plane, but has many locking/sealing points along its length. Sealing adjustment, unlike existing arrangements of eccentric cams on espagnolettes fitting into fixed keeps, is catered for by using slots which traverse the keep (preferably a continuous one-piece keep) to generate a required correct sealing gap.

[0012] The closure device of the invention therefore is designed to provide a more secure product than existing espagnolette fittings, whilst maintaining the same ease of assembly, which is of particular advantage of espagnolette fittings, compared to the more labour intensive route required by the use of another well known closure device in the art, known as "shootbolts" . The construction and arrangements of shootbolts will be well known to those of ordinary skill in the art, and need not be described any further herein.

[0013] A preferred embodiment of closure device according to the invention will be described in more detail below with reference to the accompanying drawings, and/or a novel keeper arrangement for use therewith. However, in general terms, the preferred embodiment of the invention seeks to provide a fitting which can provide any one or more of the following features:

1. continuous interlocking points either side of the gearbox, for continuous interlocking points along the entire length of the fitting;
2. continuous interlocking keeper arrangement, corresponding to the movable fitting;
3. a fully assembled fitting which can be designed to fit into an existing "friction stay cavity" already present in a PVCU section; therefore only two height sizes will be required;
4. the option to reduce the length of the fitting, by being cut down to size to suit the size of window or door aperture available;
5. to form the interlocking elements from one piece of material, although they could be fabricated from more than one piece

BRIEF DESCRIPTION OF THE DRAWINGS

[0014]

Figure 1 is a perspective and exploded view from one side of a preferred embodiment of closure device according to the invention, for mounting on a closing face of an openable door or window, and intended to cooperate with a fixed keeper arrangement on a closing face of a fixed frame member in which the door or window is movably mounted;
Figure 2 is a similar perspective and exploded view, but from the other side of the closure device;
Figures 3 and 4 are plan views of the closure device and a related keeper arrangement, but showing different positions of adjustment;
Figure 5 is a cross-sectional view of the frame components which form the cooperative closing faces of a fixed frame and the movable member, provided, respectively, with a keeper arrangement and a closure device which can cooperate to lock the closure member to the fixed frame when the closure device is actuated to a locking mode;
Figures 6a and 6b are, respectively, exploded and engaged (but not lockingly engaged) views of a modified embodiment of closure device and keeper according to the invention, viewed from one side;
Figures 7a and 7b are similar views, but from an opposite side;
Figure 8 is a plan view of the modified embodiment in the assembled state; and,
Figure 9 is a view, similar to Figure 5, of the modified

embodiment installed in co-operating parts of a fixed frame and a movable closure member.

[0015] Referring first to Figure 5 of the drawings, this shows the cooperation between a closing face of an openable door or window and the corresponding closing face of a fixed frame. Figure 5 is a transverse cross-section view of the frame components, and reference 10 identifies an extruded PVCU section which forms one of the frame members of a fixed rectangular frame, and which carries a keeper arrangement having three integrally connected components identified by reference 11. Reference 12 identifies an extruded PVCU section forming one frame member of a rectangular frame of the door or window, and component 12 defines a mounting recess 13 in which is mounted an embodiment of closure device according to the invention, designated generally by reference 14, and which cooperates with the keeper arrangement 11.

[0016] The closure device 14 includes linearly displaceable locking tangs, which move into and out of locking engagement with corresponding components of the keeper arrangement, upon operation of a handle (not shown) which applies rotary actuation, or de-actuation movement to the locking components.

[0017] Figures 1 and 2 are perspective and exploded views from opposite sides of the closure device 14, and the keeper arrangement 11. The closure device 14 has an actuator device in the form of a gearbox 15 which can be operated to apply linear movement to locking tangs 16 which are slidably movable into and out of engagement with locking formations 17 of the keeper arrangement 11, which, as shown in Figures 1 and 2, is a one-piece keeper formation. The tangs 16 are carried by a slide bar or rod 16a (forming an elongate actuator element) which is linearly displaceable upon actuation of the gearbox 15. In the illustrated embodiment, the rod 16a is of one-piece formation. However, if required, the rod 16a could be replaced by a 2-part slide rod arrangement, in which the rods are movable in opposite directions during locking and unlocking operations.

[0018] A suitable motion-reversal mechanism will then be provided in the gearbox 15, to apply opposite movements to the slide rods.

[0019] The illustrated embodiment also has a "night vent" facility, though without interengagement between tangs 16 and 17. As shown, each tang 16, 17 is L-shaped in cross-section, and preferably is integral with (one piece) the element which carries it.

[0020] Figures 3 and 4 are plan views showing cooperation between the closure device and the keeper arrangement, and showing adjustment into and out of locking engagement. The references 14 are applied to the cooperating parts of the closure device, and the references 17 are applied to the component parts of the keeper arrangement.

[0021] It will be evident from the drawings that the "tangs" 16 comprise locking elements which are connected to the elongate actuator element 16a and which are movable into and out of engagement with locking formations 17 on the keeper upon movement of the elongate actuator element to and from its operative position.

[0022] Evidently, the tangs 16 comprise elements which are L-shaped in cross section, to engage with the respective locking formations, and to resist forced separation of the closure device and the keeper in a direction generally perpendicular to the closing face, when the closure member (openable door or window) has been moved to its closed position.

[0023] Furthermore, although it is illustrated in the drawings that the tangs 16 are of one piece formation with the elongate actuator element 16a, evidently there are other means whereby the locking element(s) (16) can be connected to the elongate actuator element.

[0024] It should be understood that other co-operating shapes may be given to the interengaging elements 16 and 17, and which may include interengaging T-shaped formations.

[0025] Referring to Figures 6a, 6b, 7a, 7b, 8 and 9, there is shown a modified embodiment, in which corresponding components to those already described in the first embodiment are given the same reference numerals, but with the addition of 100.

Claims

1. A closure device (14) for use with a movable closure member which is mounted for movement between open and closed positions with respect to a fixed frame in which it is mounted, said closure device being intended to be mounted on a closing face of the closure member and to be cooperative with a keeper mounted on the fixed frame to lock the closure member in the closed position, and in which the closure device comprises:

   an actuator device (15) which is adapted to be mounted in the closing face of the movable member;
   an elongate actuator element (16a) which is linearly displaceable in a direction generally lengthwise of the closing face, said actuator element being displaceable between an operative position and an inoperative position by operation of the actuator device (15); and,
   at least one locking element (16) connected to the elongate actuator element (16a) and which is movable into and out of engagement with a locking formation on the keeper upon movement of the elongate actuator element (16a) to and from its operative position, said locking element having an inturned flange portion which is engagable with the locking formation so as to resist forced separation of the closure device

and the keeper in a direction generally perpendicular to the closing face.

2. A closure device (14) for use with a movable closure member which is mounted for movement between open and closed positions with respect to a fixed frame in which it is mounted, said closure device being intended to be mounted on a closing face of the closure member and to be cooperative with a keeper mounted on the fixed frame to lock the closure member in the closed position, and in which the closure device comprises:

an actuator device (15) which is adapted to be mounted in the closing face of the movable member;
an elongate actuator element (16a) which is linearly displaceable in a direction generally lengthwise of the closing face, said actuator element being displaceable between an operative position and an inoperative position by operation of the actuator device (15); and,
at least one locking element (16) connected to the elongate actuator element (16a) and which is movable into and out of engagement with a locking formation on the keeper upon movement of the elongate actuator element (16a) to and from its operative position, said locking element being preferably L-shaped or T-shaped in cross section to engage with the locking formation and to resist forced separation of the closure device and the keeper in a direction generally perpendicular to the closing face.

3. A closure device (14) for use with a movable closure member which is mounted for movement between open and closed positions with respect to a fixed frame in which it is mounted, said closure device being intended to be mounted on a closing face of the closure member and to be cooperative with a keeper mounted on the fixed frame to lock the closure member in the closed position, and in which the closure device comprises:

an actuator device (15) which is adapted to be mounted in the closing face of the movable member;
an elongate actuator element (16a) which is linearly displaceable in a direction generally lengthwise of the closing face, said actuator element being displaceable between an operative position and an inoperative position by operation of the actuator device (15); and,
at least one locking tang (16) connected to the elongate actuator element (16a) and which is movable into and out of engagement with a locking formation on the keeper upon movement of the elongate actuator element (16a) to and from its operative position, said tang being engageable with the locking formation so as to resist forced separation of the closure device and the keeper in a direction generally perpendicular to the closing face.

4. A closure device according to claim 3, in which the locking tang is formed in one piece with the elongate actuator element (16a).

5. A closure device according to any one of claims 1 to 4, in which at least two locking elements (16) are provided on the elongate actuator element (16a), spaced apart from each other, and each engageable with a respective locking formation on the keeper upon movement of the elongate actuator element to and from its operative position.

6. A closure device according to claim 1, in which the locking element (16) is formed in one piece with the elongate actuator element (16a).

7. A closure device according to claim 2, in which the L-shaped or T-shaped locking element (16) is formed in one piece with the elongate actuator element (16a).

8. A closure device according to any one of the preceding claims, in which the actuator device comprises an espagnolette type gearbox fitting (15).

9. A closure device according to any one of the preceding claims, in which the elongate actuator element (16a) comprises an espagnolette type rod.

10. A closure device according to any one of the preceding claims, in which two elongate actuator elements (16a) are provided, which are movable in relatively opposite directions, upon operation of the actuator device (15).

11. A closure device according to any one of the preceding claims, in combination with a keeper for cooperation therewith.

12. A keeper adapted to be mounted on a fixed frame and cooperable with a closure device according to any one of the preceding claims, said keeper having a locking formation which is engageable by said at least one locking element.

13. A keeper according to claim 12, in which the locking formation is formed in one piece with the keeper (11).

14. A keeper according to claim 12 or 13, and provided with slots to provide weather seal adjustment.

15. A keeper according to any one of claims 12 to 14, in combination with a closure device according to any one of claims 1 to 10.

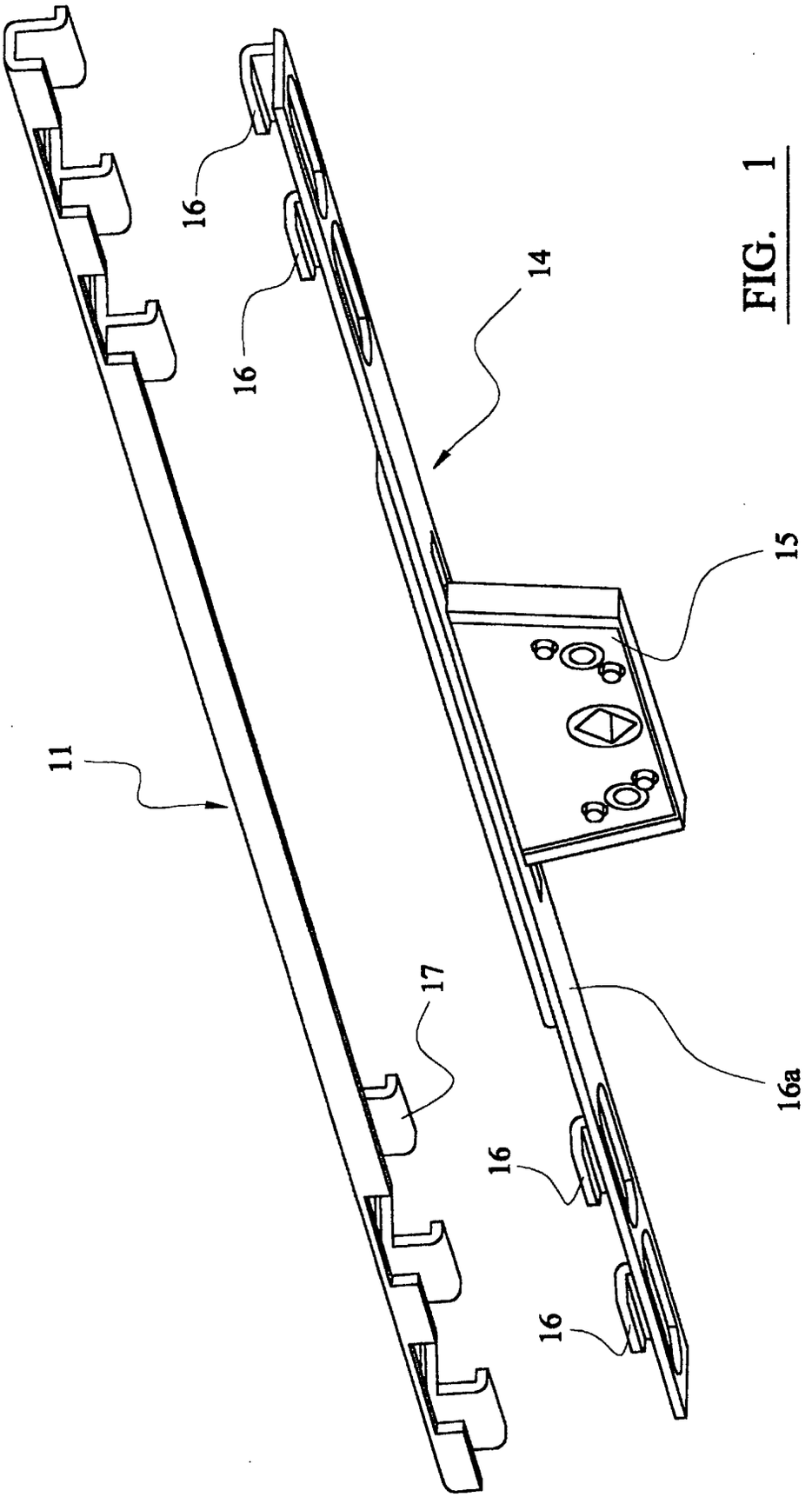

FIG. 1

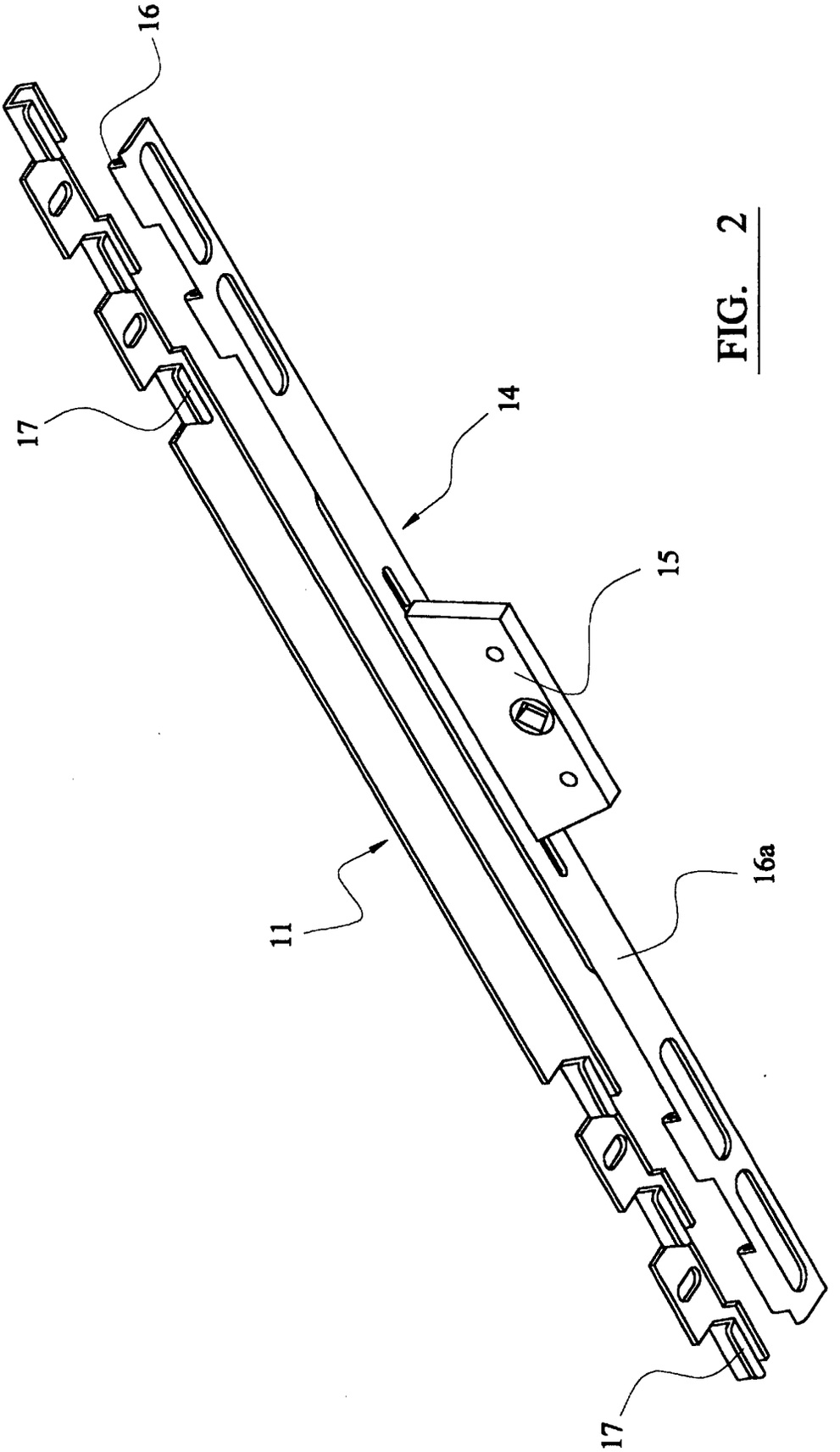

FIG. 2

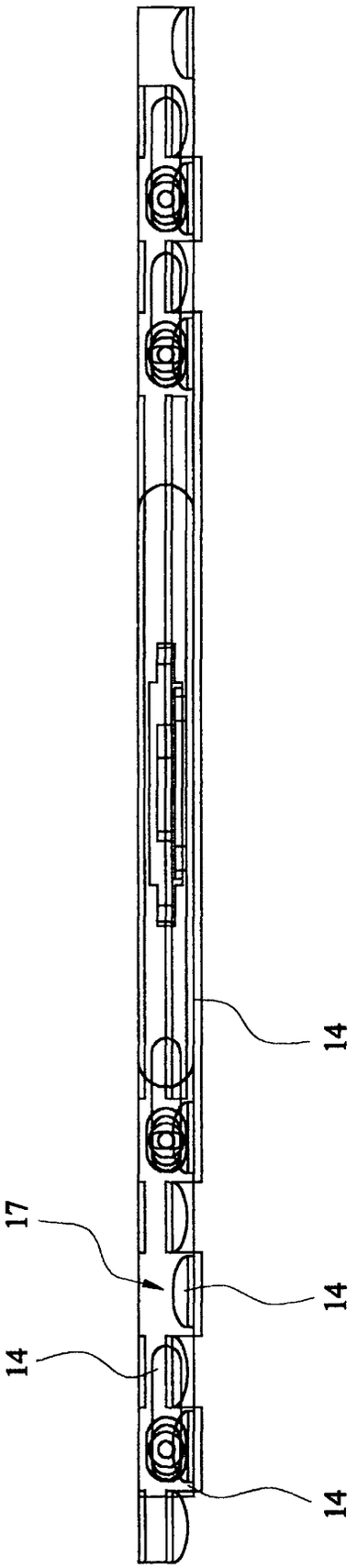

FIG. 3

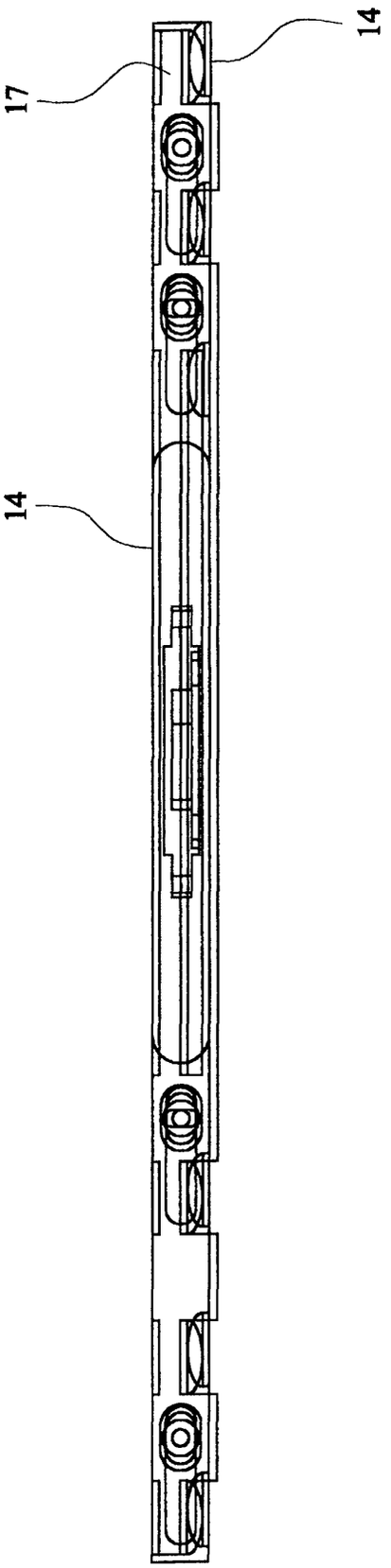

FIG. 4

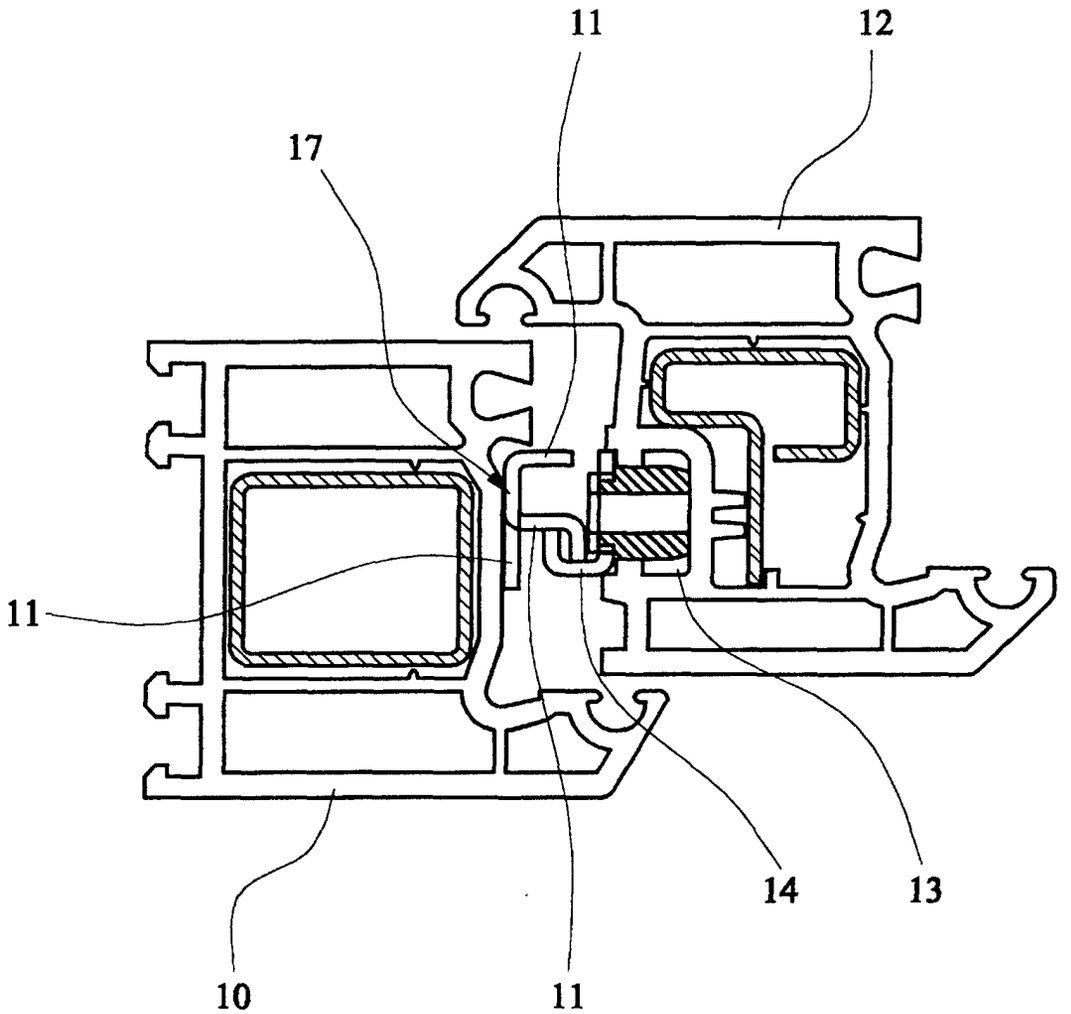

FIG. 5

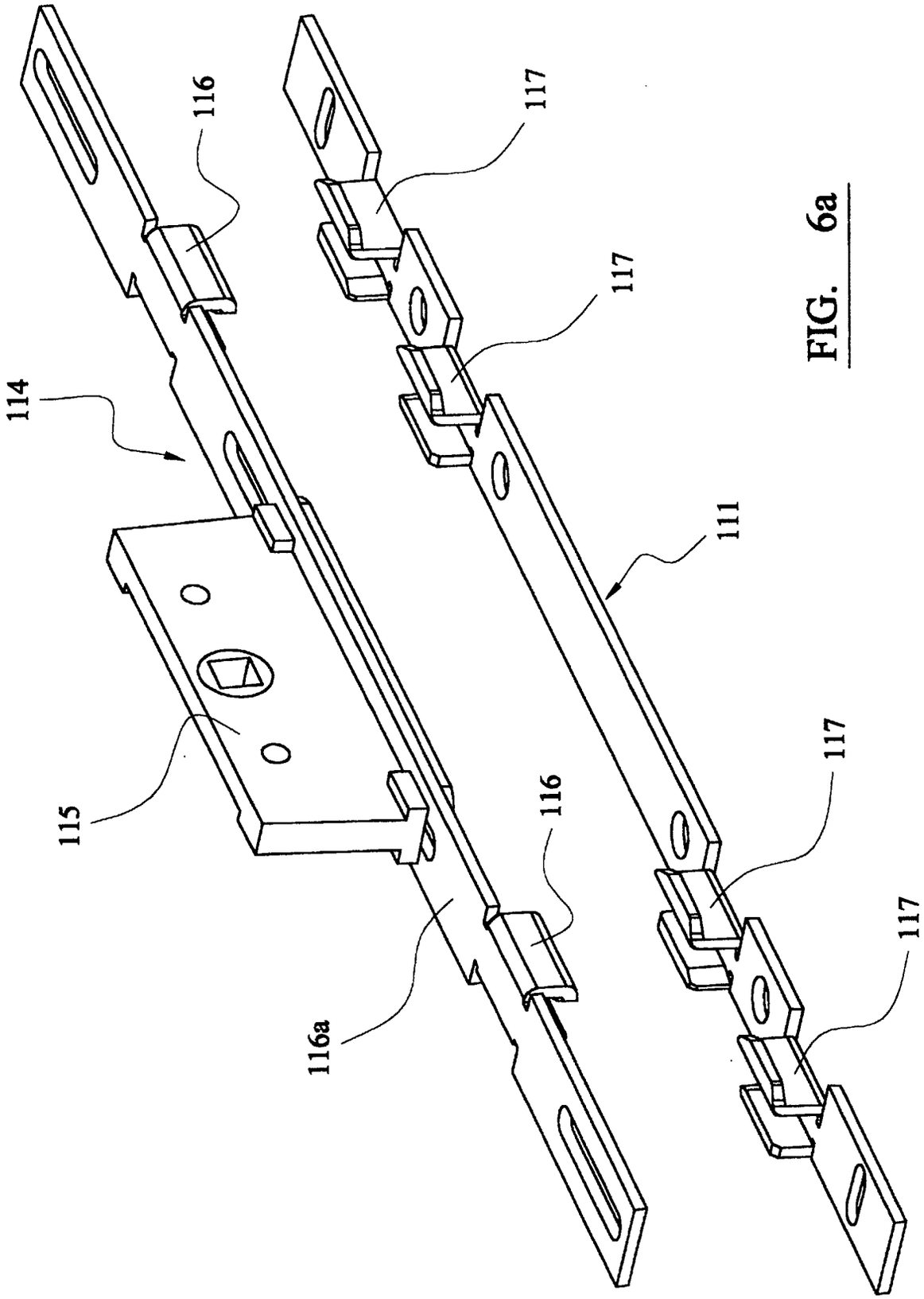

FIG. 6a

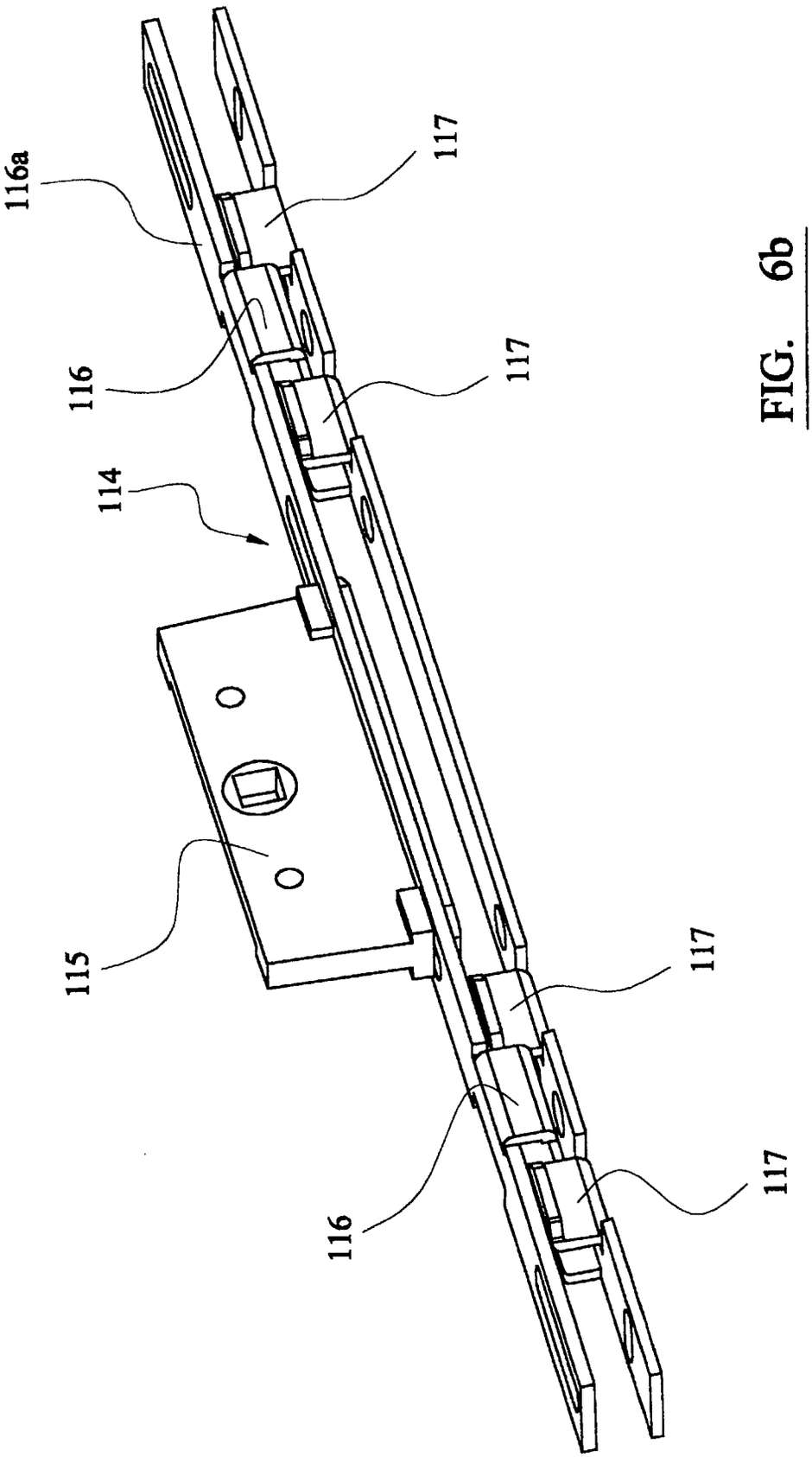

FIG. 6b

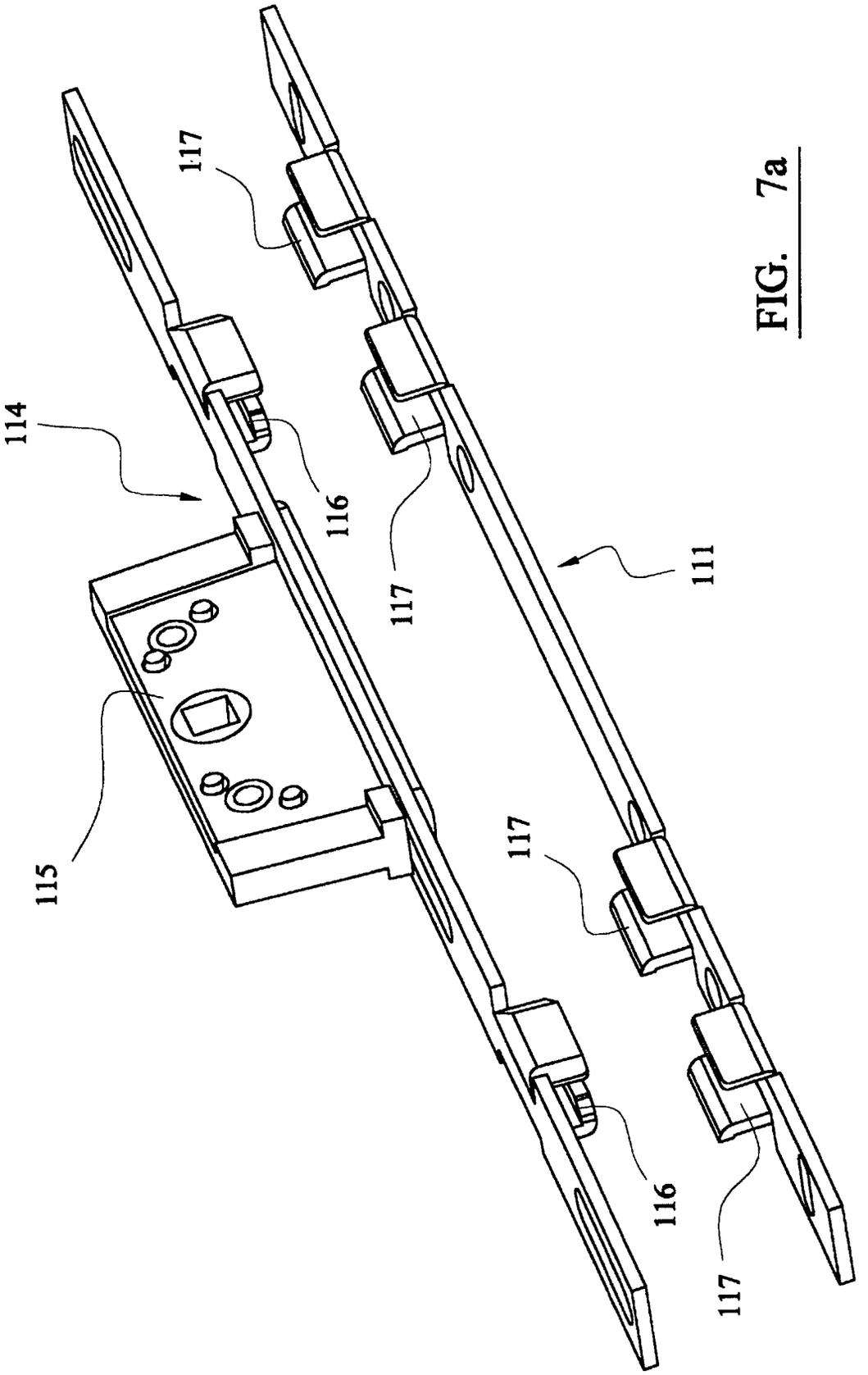

FIG. 7a

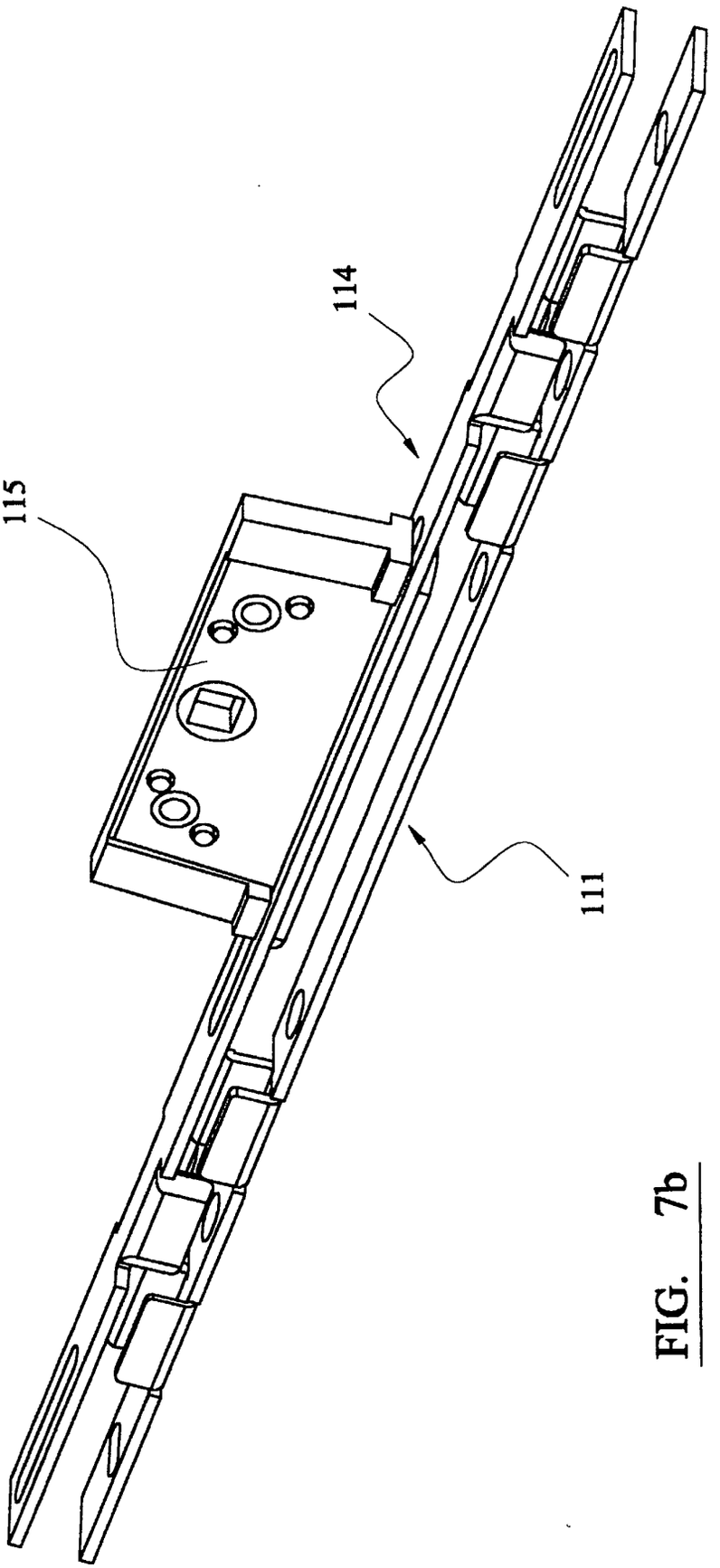

FIG. 7b

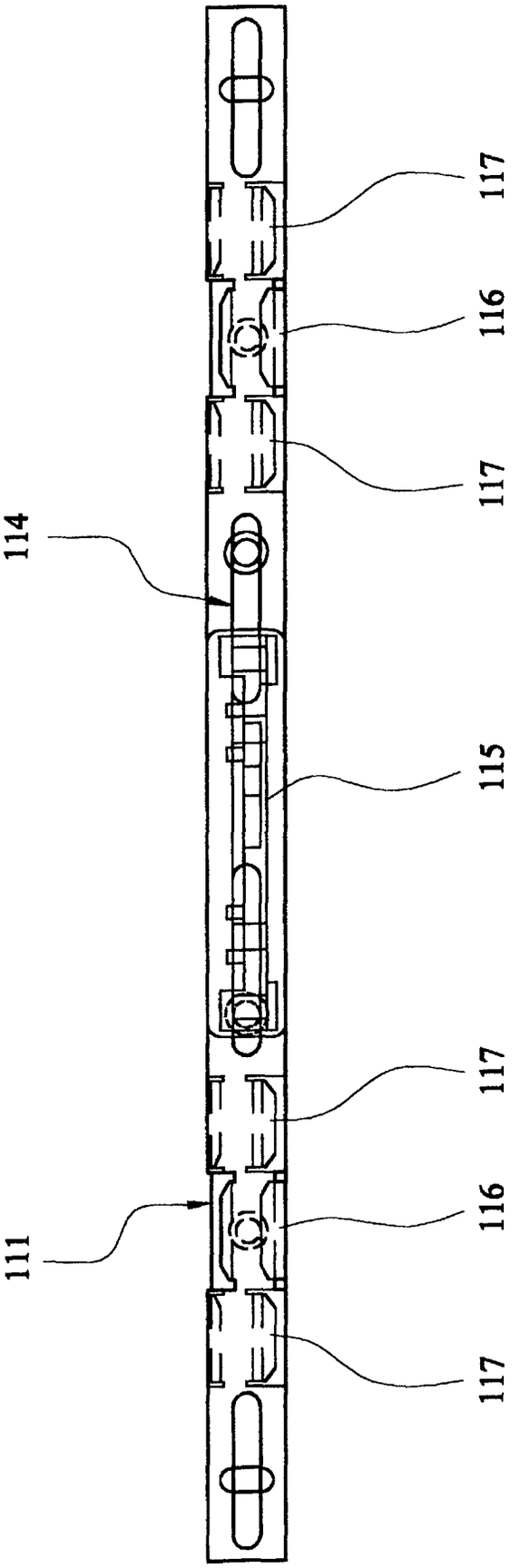

FIG. 8

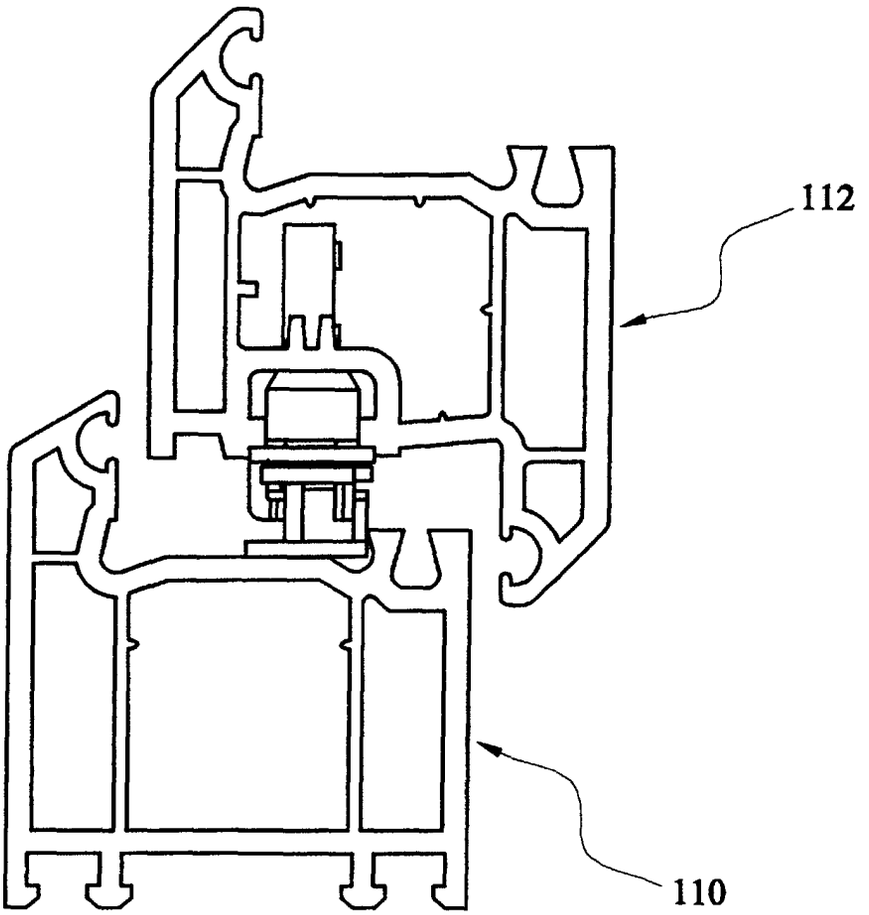

FIG. 9