



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
16.12.2009 Bulletin 2009/51

(51) Int Cl.:
E05B 17/20 (2006.01) E05B 65/08 (2006.01)

(21) Application number: **09162000.5**

(22) Date of filing: **05.06.2009**

(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 MK MT NL NO PL PT RO SE SI SK TR

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

(30) Priority: **10.06.2008 IT BO20080366**

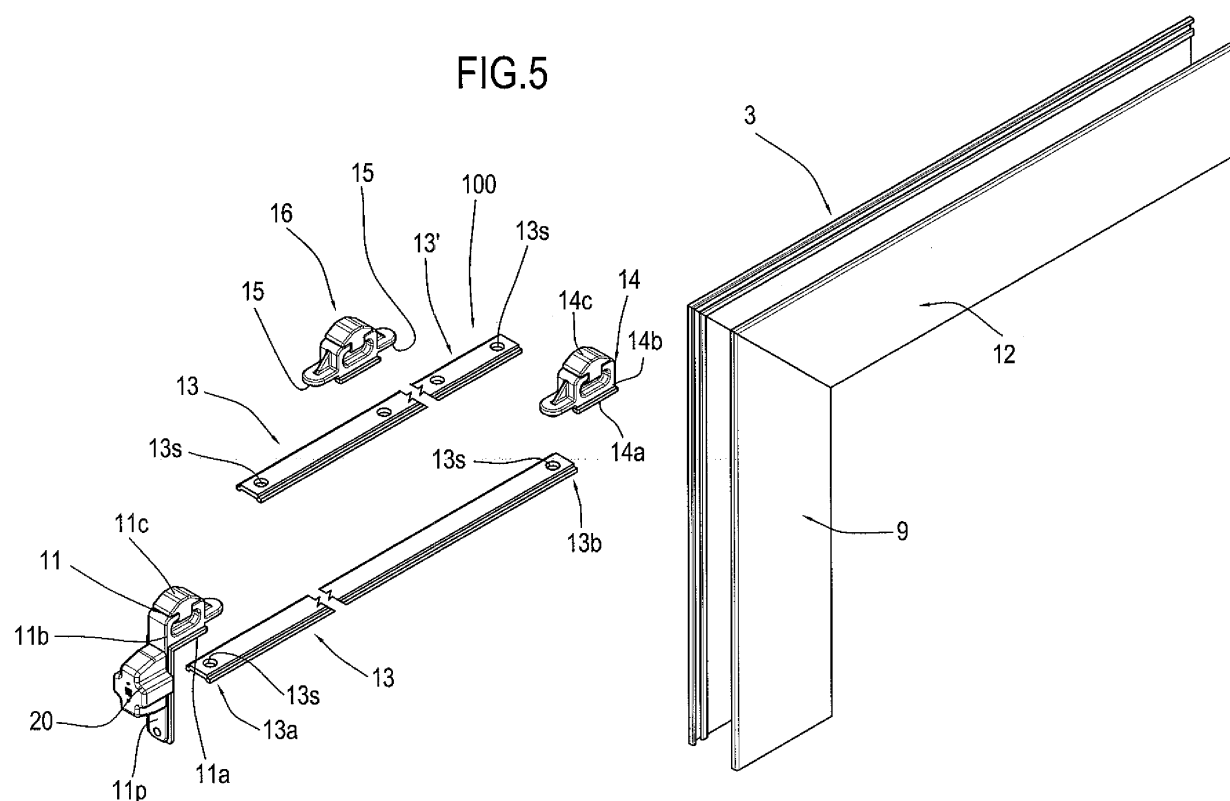
(74) Representative: **Lanzoni, Luciano**
Bugnion SpA
Via Goito 18
40126 Bologna (IT)

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

(54) **Anti-lifting device for sliding doors or windows**

(57) An anti-lifting device for sliding doors or windows comprises: a fixed frame (2); a mobile frame (3); a pair of carriages (4,5) connected to the lower rail (6) of the sash (3); a control element (8), located on the sash (3), connected to operating means and to closing means and designed to define a sash (3) open and a sash closed configuration; a contact element or plug (11) projecting from the sash (3) upper rail (12) close to its first upper

corner, and in practice designed to prevent sash (3) lifting relative to the fixed frame (2); a positioner/spacer element (13); the positioner/spacer element (13) having, along its length, a second contact element (14), projecting above the positioner/spacer element (13), the first end (13a) of the positioner/spacer element being able to connect to the first element (11) to form a single rigid anti-lifting unit.



Description

[0001] The present invention relates to an anti-lifting device for sliding doors or windows, in particular for metal doors or windows.

[0002] The above-mentioned sliding doors or windows are well known, and basically comprise:

- a fixed frame;
- at least one mobile frame or sash which slides horizontally, opening and closing relative to the fixed frame;
- at least one sliding unit or carriage, connected to the lower rail of the sash and resting on a horizontal base track, and designed to allow the sash to slide in both directions (opening and closing);
- a control element located on the mobile frame and designed to drive operating means located along a sash stile and with which it is possible to define a sash open configuration, with relative sliding, and a closed configuration by means of sash contact with the fixed frame;
- closing means, also controlled by the operating means and acting between the sash stile and the fixed frame stile.

[0003] On this type of sliding door or window unit, contact elements or inserts may be applied, known to experts in the field as "anti-lifting plugs".

[0004] This accessory is normally connected to the door or window, especially if the door or window separates an interior room from the outside, particularly on low storeys of a building (such as separation of the room from a garden).

[0005] These anti-lifting plugs comprise a base B which can be connected to the sash A profile and a peg or plug T, joined to or forming a single body with the base B, which projects from the sash A profile zone (in particular that forming the upper rail) opposite the corresponding inner zone of the fixed frame profile (see Figure 1).

[0006] The anti-lifting plug is applied on the sliding sash to prevent it from being lifted and/or pulled up out of its lower guides: such lifting could cause the sash to fall accidentally during an incorrect operation, but above all, it could be the result of prowlers attempting to break in from the outside.

[0007] This anti-lifting plug is only applied on the upper corner of the sash, close to the side in which the operating means and closing means are present, since the plug must be fitted to the sash only after sash installation on the relative fixed frame equipped with the tracks. This is because the presence of the plug would prevent normal installation operations.

[0008] The current problem is caused by the possibility that any attempt to lift the sash may be tried on the opposite side of the sash to that fitted with the anti-lifting plug. In such a case, the lifting action, even though less simple, could still cause the sash to come out of the

tracks, meaning that it could be forced open. This is more critical if the sash has large dimensions, both in height and length.

[0009] At present, the possibility of fitting an anti-lifting plug on sliding sashes of this type is unfeasible, since the upper corner of the sash furthest from the corner zone fitted with the anti-lifting plug is closed beforehand by a guard profile extending along the entire sash stile: This is designed to keep these zones closed without interruption, avoiding the entry of external agents and improving the appearance of the whole door or window.

[0010] The present invention therefore has for an aim to overcome these disadvantages by providing an anti-lifting device for sliding doors or windows with high security features, which is easy to fit, and which allows rapid and secure positioning of a plurality of lifting plugs along the upper rail and as far as the upper corner furthest from the opening side, without work on the door or window.

[0011] Accordingly, the present invention achieves this aim with an anti-lifting device, in particular for sliding doors or windows, comprising the technical features set out in one or more of the appended claims.

[0012] The technical features of the invention, with reference to the above aims, are clearly described in the claims below and its advantages are more apparent from the detailed description which follows, with reference to the accompanying drawings which illustrate a preferred embodiment of the invention provided merely by way of example without restricting the scope of the inventive concept, and in which:

- Figure 1 is a side view with some parts cut away to better illustrate others of a corner zone of a sliding sash equipped with a contact element or anti-lifting plug of the known type;
- Figure 2 is a schematic side view of a sliding door or window equipped with the anti-lifting device according to the present invention;
- Figure 3 is a front view with some parts cut away to better illustrate others of a portion of a sliding sash of Figure 2 equipped with the anti-lifting device according to the present invention;
- Figure 4 is cross section through line IV - IV of Figure 3;
- Figure 5 is an exploded perspective view of the portion of sash of Figure 3.

[0013] With reference to the accompanying drawings, and in particular Figure 2, the anti-lifting device according to the invention, labelled 100 in its entirety, is used for sliding doors or windows 1, in particular for metal doors or windows.

[0014] These sliding doors or windows 1 basically comprise: a fixed frame 2, at least one mobile frame 3, a pair of carriages 4 and 5 for mobile frame 3 sliding, and a control element 8 for defining the mobile frame 3 open and closed positions.

[0015] More precisely, the mobile frame 3, or sash,

can slide horizontally, opening and closing relative to the fixed frame 2 and also comprises a perimeter channel C slidably housing operating means (not strictly part of the invention, therefore not illustrated). In the usual structure of the sliding door or window 1 the sash 3 can normally be combined with a fixed or semi-fixed sash 101.

[0016] The pair of carriages 4 and 5 is connected to the lower rail 6 of the sash 3 and rests on a horizontal base track 7, positioned on the fixed frame 2, allowing the sash 3 to slide in both directions, labelled F1 and F2, opening and closing.

[0017] The control element 8, located on the sash 3, is usually a handle connected to the operating means and, consequently, to closing means (also of the known type, not strictly part of the invention and therefore not illustrated) driven by the handle 8 to define, respectively, a sash 3 open configuration, allowing its subsequent opening sliding, and a sash 3 closed configuration with the sash 3 stile 9 and the fixed frame 2 stile 10 opposite and in contact with each other.

[0018] In addition, the door or window 1 is equipped with the anti-lifting device 100 comprising a contact element or plug 11 connected to and projecting from the sash 3 upper rail 12 (see Figures 2 and 3) and close to the first upper corner of the sash 3 formed by the upper rail 12 and the stile 9.

[0019] The first plug 11 is located opposite the fixed frame 2 upper rail 10t, in practice preventing forced lifting of the sash 3 relative to the fixed frame 2.

[0020] As is also illustrated in Figures 4 and 5, the device 100 comprises at least one spacer element 13, slidably positioned in the portion of channel C of the upper rail 12 before the first contact element 11.

[0021] This positioner/spacer element 13 comprises, along its length, at least a second contact element or plug 14, projecting above the element 13.

[0022] A first end 13a of the positioner/spacer element 13 can also be connected to the first contact element 11, thus forming a single rigid anti-lifting unit formed by the two contact elements 11 and 14 located along the upper rail 12.

[0023] In more detail, the second contact element or plug 14 may be independent of the spacer element 13, slidably connecting with and projecting from the upper rail 12, its lower portion 14a connecting in the channel C, before the first contact element 11. This second element 14 can be stably connected to the free second end 13b of the positioner/spacer element 13 opposite the end 13a able to connect with the first contact element 11.

[0024] In particular, but without limiting the scope of the invention, the positioner/spacer element 13 may have a length L allowing positioning of the second contact element 14 close to the second upper corner of the sash 3, opposite the first upper corner.

[0025] At a structural level, the positioner/spacer and connecting element consists of a rod 13 segment, with variable length, being slidably housed in the channel C and having hooking cavities 13s for connecting means

15 present on the respective lower portions 11a, 14a of the two contact elements 11 and 14.

[0026] Each of the first and second contact elements or plugs 11 and 14 in turn has the lower portions 11a and 14a comprising two opposite undercuts (for retention and sliding in the channel C) and a lower protrusion 15 (basically a pin), forming the connecting means, for connection with the corresponding cavities 13s at the respective ends 13a and 13b of the rod 13.

[0027] An even more complete embodiment (see dashed lines in Figure 5) may comprise: two elements 13 and 13' comprising respective rod segments designed to rigidly connect the first and second contact elements 11 and 14, and at least a third contact element or plug 16 which can slidably connect, in series and alternating with the rods 13 and 13', in the channel C in the upper rail 12.

[0028] Obviously, the third element 16 comprises a bilateral pair of the above-mentioned lower protrusions or pins 15 for connecting with the respective rods 13, 13'.

[0029] Said embodiment could advantageously be used for very long mobile sashes.

[0030] At a structural level, each contact element 11, 14 may comprise the above-mentioned lower portion 11a, 14a slidably connecting with the channel C and with the rod 13, and an upper portion comprising a central body 11b, 14b and a shaped or curved upper protrusion 11c, 14c designed to make contact, if the sash 3 is lifted, with the inner profile P or groove of the fixed frame 2 upper rail 10t.

[0031] Finally, as shown in the accompanying drawings, the first contact element 11 may comprise a right angle shaped lower extension 11p which can be stably connected (for example using screw means) at the corner portion of the stile 9 of the first upper corner. In that way, the whole anti-lifting device 100 is made stable and fastened in place.

[0032] On said extension 11p there may be a front contact element 20 designed to form a sash closing limit stop element.

[0033] Basically, with a device 100 structured in this way, with the sash 3 already fitted and partly open, the second contact element 14 already connected to the rod 13 can simply be slid into the channel C in the sash 3 upper rail 12.

[0034] When the rod 13 is almost completely inserted, the first element 11 is connected to the end 13a of the rod and this is all inserted in the channel C until the first element 11 makes contact with the first upper corner of the sash 3.

[0035] At this point the first element 11 is fastened on the sash 3 stile 9, creating the fixed, rigid structure of the device 100.

[0036] Obviously, if the second element forms a single body with the rod, there is no need to slide the second element along the channel. Instead, the whole rod - second contact element unit is made to slide.

[0037] Similarly, if there are two or more rods and two

or more contact elements, the steps described above are repeated for each, positioning the contact elements in series, alternating with the connecting rods until reaching the final element at the first upper corner of the sash.

[0038] Thanks to the rod 13 which is made to measure (for example using suitable known machines for making operating rods) one can be certain of the precise positioning of the second contact element 14.

[0039] Therefore, a device structured in this way fulfils the preset aims thanks to the presence of the rod for precise positioning (and if necessary connection) of the second contact element.

[0040] This structure provides greater door or window seal security without having to modify its structure.

[0041] The device is fitted simply and securely thanks to the presence of the channel in the door or window and providing the rod working length: thus making the fitter's work easier.

[0042] The invention described 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 the details of the invention may be substituted by technically equivalent elements.

Claims

1. An anti-lifting device for sliding doors or windows, the sliding doors or windows (1) being of the type comprising at least:

- a fixed frame (2);
- at least one mobile frame (3) or sash which slides horizontally, opening and closing relative to the fixed frame (2), having a perimeter channel (C) for slidably housing operating means;
- a sliding unit (4, 5) comprising a pair of carriages connected to the lower rail (6) of the sash (3) and resting on a horizontal base track (7), allowing the sash (3) to slide in both directions (F1, F2), opening and closing;
- a control element (8), located on the sash (3), connected to the operating means and to closing means driven by the control element (8) to define, respectively, a sash (3) open configuration, allowing its subsequent opening sliding, and a sash (3) closed configuration with the sash (3) stile (9) and the fixed frame (2) stile (10) opposite and in contact with each other;
- at least one contact element or plug (11) connected to and projecting from the sash (3) upper rail (12) close to the first upper corner of the sash (3) formed by the upper rail (12) and the stile (9), being located opposite the upper rail (10t) of the fixed frame (2), and designed in practice to prevent sash (3) lifting relative to the fixed frame (2), the device (100) being **characterised**

in that it comprises at least one positioner/spacer element (13), slidably positioned in the portion of channel (C) of the upper rail (12) before the first contact element (11); the positioner/spacer element (13) having, along its length, at least a second contact element or plug (14), projecting above the positioner/spacer element (13); the first end (13a) of the positioner/spacer element (13) being able to connect to the first contact element (11), forming a single rigid anti-lifting unit formed by the first and second contact elements (11, 14) located along the upper rail (12).

2. The device according to claim 1, **characterised in that** the second contact element or plug (14) is independent of the positioner/spacer element (13), slidably connecting with and projecting from the upper rail (12), by means of its lower portion (14a) which can connect in the channel (C), and before the first contact element (11); the second element (14) being able to stably connect to the free second end (13b) of the positioner/spacer element (13), opposite the end (13a) able to be connected with the first contact element (11).
3. The device according to claim 1 or 2, **characterised in that** the length of the positioner/spacer element (13) allows positioning of at least the second contact element (14) close to the second upper corner of the sash (3), opposite the first upper corner.
4. The device according to claim 1 or 2, **characterised in that** the positioner/spacer and connecting element comprises a rod (13) segment slidably connecting in the channel (C) and having hooking cavities (13s) for connecting means (15) located on the respective lower portions (11a, 14a) of the two contact elements (11, 14).
5. The device according to claim 1 or 2, **characterised in that** each of the first and second contact elements or plugs (11, 14) comprises the lower portions (11a, 14a) with two opposite undercuts and a lower protrusion (15), forming connecting means, for connecting with respective cavities (13s) at the respective ends (13a, 13b) of the positioner/spacer element (13).
6. The device according to claim 1 or 2, **characterised in that** it comprises at least two positioner/spacer elements (13, 13') comprising respective rod segments designed to rigidly connect the first contact element (11) and the second contact element (14), at least a third contact element or plug (16) slidably connecting, in series and alternating with the positioner/spacer elements (13, 13'), in the channel (C) in the upper rail (12).

7. The device according to claim 1, **characterised in that** the first contact element (11) comprises a right angle shaped lower extension (11p), where the vertical extension (11p) can be stably connected at the corner portion of the stile (9) of the first upper corner. 5
8. The device according to claim 1 or 2, **characterised in that** each contact element (11, 14) comprises the lower portion (11a, 14a) for slidably connecting with the channel (C) and an upper portion comprising a 10
central body (11b, 14b) and a shaped or curved upper protrusion (11c, 14c) designed to make contact, if the sash (3) is lifted, with the inner profile (P) of the fixed frame (2) rail (TP). 15

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FIG.1

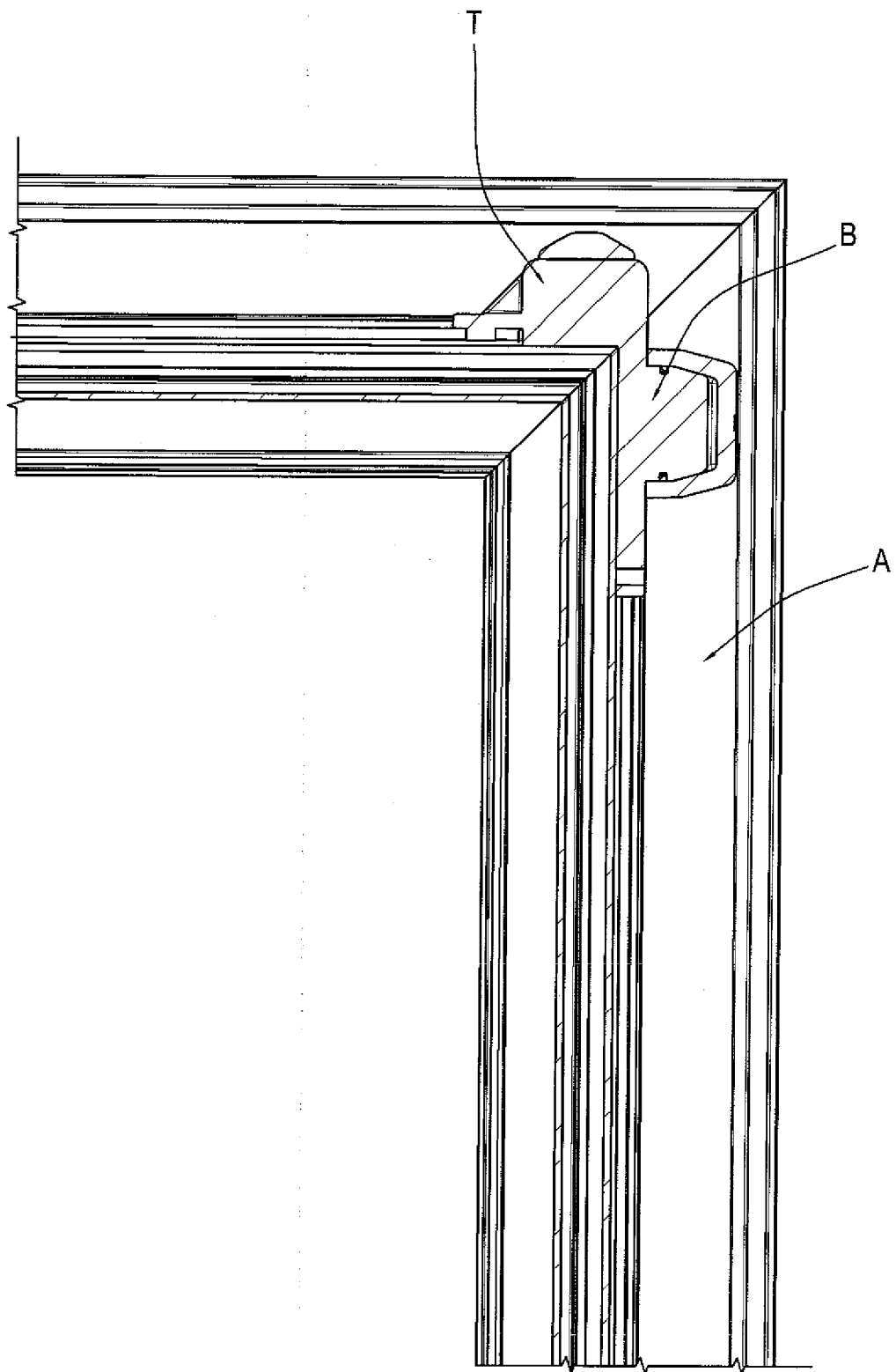


FIG.2

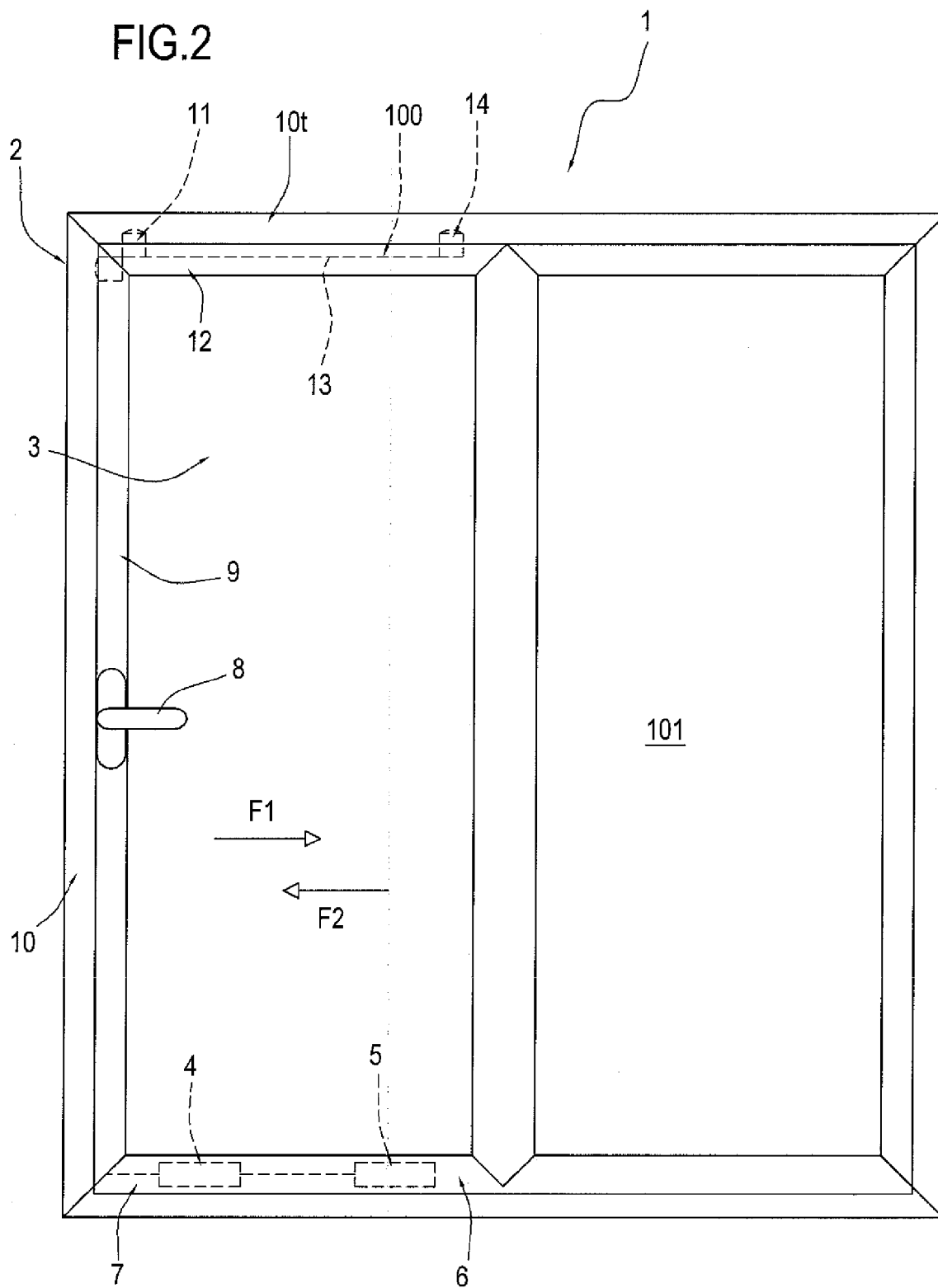


FIG.3

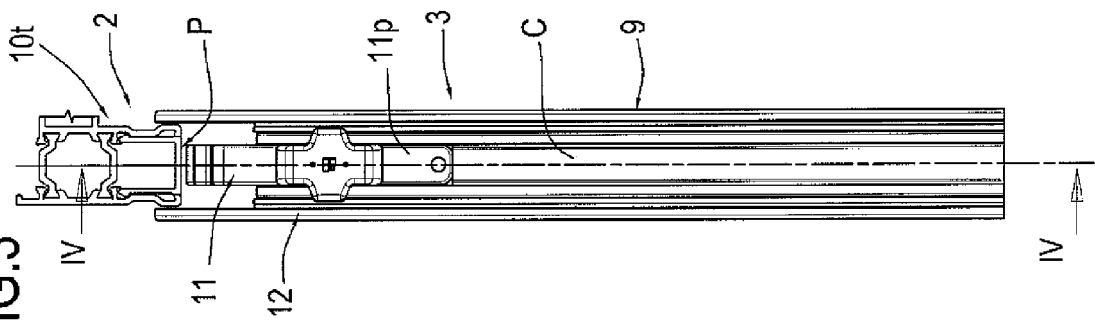


FIG.4

