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

(11) **EP 4 464 861 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
20.11.2024 Bulletin 2024/47

(21) Application number: **24175102.3**

(22) Date of filing: **10.05.2024**

(51) International Patent Classification (IPC):
E05C 17/28 *(2006.01)* *E05C 9/20* *(2006.01)*
E05C 9/24 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
E05C 17/28; E05C 9/20; E05C 9/24

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

(30) Priority: **12.05.2023 IT 202300009567**

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(54) A HANDLE CONTROLLED LIMITER DEVICE FOR LIMITING THE OPENING OF A WINDOW OR DOOR

(57) A limiter device (1) for limiting the opening of a window or door (100) with a wing (101) movable with respect to a fixed frame (104) and provided with an opening and closing hardware (110) controlled by a handle (111), the limiter device (1) comprising:
- a straight guide (2) which is at least partially inserted in the first channel (106) of a first profile (102) of the wing (101), defines a sliding direction (J) and has at least one lying surface (20) for at least one slider (3);
- a slider (3) which is inserted in the straight guide (2) in a slidable manner along the sliding direction (J) and which has a first face (30) lying on the lying surface (20) and a second face (31) different from the first face (30);
- a block (4) that can be inserted and fixed into a second channel (107) of a second profile (103) of the fixed frame (104);
- an arm (5) hinged at its opposite ends to the slider (3) and to the block (4), respectively, in a rotatable manner about axes parallel to each other;
- a pushing body (6) coupled with the straight guide (2) and arranged to act on the second face (31) of the slider (3),
- wherein the pushing body (6) and the straight guide (2) are coupled with each other in a relatively movable manner by a reciprocating straight motion along the sliding direction (J) and by a translational motion along a pushing direction (K) orthogonal to the sliding direction (J), between a first position, wherein the pushing body (6) is moved away from said second face (31) of the slider (3) leaving it free to slide along the sliding guide (2), and a second position, wherein the pushing body (6) is moved close to and pressed on the second face (31) of the slider (3) exerting a thrust on it adapted to block by friction the sliding thereof along the straight guide (2).

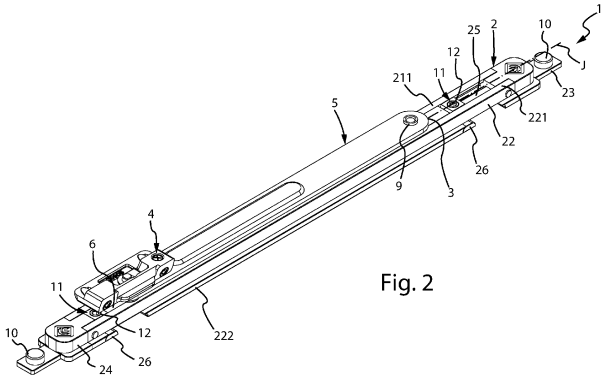

Fig. 2

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Description

[0001] The present invention relates to a limiter device for limiting the opening of a door or window with a wing, which is movable with respect to a fixed frame.

[0002] The present invention relates in particular to a limiter device for limiting the opening of windows and doors whose frames and wings are made of metal or plastic profiles, and which are provided with an opening/closing hardware controlled by a handle to be handled by a user.

[0003] More specifically, the present invention relates to a limiter device of a type controlled by such a handle to lock the wing in open positions.

[0004] Limiter devices of this type are already known and generally comprise:

- a straight guide which is configured to be inserted in a first channel of a first profile of a wing and along which a slider can slide;
- a block configured to be inserted in a fixed manner into a second channel of a second profile of a fixed frame,
- an arm whose opposite ends are hinged to the slider and the block respectively.

[0005] This arm, once assembled, is hinged to both the slider and the block around respective axes of rotation that are parallel to each other and orthogonal to the bottom of the two channels.

[0006] The length of the arm determines the maximum opening angle of the wing.

[0007] When the wing is closed, the block, the arm and the straight guide with the slider are basically superimposed on each other. When the wing is opened, the slider slides along the straight guide and the arm starts to move transversely with respect to the second profile of the fixed frame, until the arm reaches the limit position when the slider reaches the end of its stroke. In this way, the maximum opening of the wing is limited to a predetermined angle.

[0008] Limiter devices of this kind are known in which mechanisms are provided for locking the wing in open positions that can be controlled by the hardware associated to the wing, i.e. by the respective operating handle.

[0009] In a first type of such known limiter devices, a longitudinal bar is housed in the straight guide, which extends through a shaped hole formed through the slider. This bar has a polygonal cross-section, is rotatably supported about its own longitudinal extension, and is connected to the wing hardware so that its rotation is controlled by this hardware via the operation of the handle. By acting on the handle, the bar is rotated from a position where it does not interfere with the shaped hole of the slider to a position where it interferes with the shaped hole of the slider by frictionally blocking its sliding relative to the straight guide. Interference is generated between the outer side surface of the polygonal section bar and the inner side surface of the shaped hole.

[0010] It has been found that over time, due to component wear and tear, limiter devices of this type have erratic operation and do not ensure stable locking of the wing.

[0011] A second type of such limiter devices is known, in which a drawn element is housed in the guide body with a plurality of embossments that fit into corresponding hollow seats formed in the bottom of the guide body and under which the slider slides. The drawn element is operated in a slidable manner by the hardware associated to the wing via the handle and, following the wedging of the embossments in the respective hollow seats, it is brought into interference with the slider, blocking the sliding thereof.

[0012] The structure of such a known limiter device is complex and constructively expensive.

[0013] The object of the present invention is to overcome the above-mentioned drawbacks and, in particular, to devise an alternative limiter device, and a system for limiting the opening of a window or door, that is reliable and safe.

[0014] It is a further object of the present invention to provide a limiter device, and an opening limiting system, which allows the wing to be locked in any open position it may assume with respect to the fixed frame, i.e., which allows the wing position to be varied with respect to the fixed frame continuously within a desired variability range by locking it in any position it may assume within that variability range.

[0015] It is the object of the present invention to provide a limiter device, and an opening limiting system, which allows the wing to be locked simply by acting on the handle which is associated with the closing/opening hardware of the wing.

[0016] Yet another object is to provide a limiter device, and an opening limiting system, that are structurally simple, easy to assemble, and which operate effectively and durably.

[0017] The aforementioned objects, and others that will be more apparent below, are achieved by a limiter device for limiting the opening of a window or door as recited in the independent claims.

[0018] Further features are comprised in the dependent claims.

[0019] The characteristics and advantages shall be more apparent by the description of a possible preferred, but not exclusive, embodiment of a limiter device and a system for limiting the opening of a window or door, illustrated by way of non-limiting example with the aid of the accompanying drawings in which:

Figure 1 is a partially exploded view of a possible embodiment of a limiter device according to the present invention;

Figure 2 is an axonometric view of the limiter device in Figure 1 in an assembled configuration and in a position corresponding to a closed position of a win-

dow or door where the wing is resting against the fixed frame;

Figure 3 is an axonometric view showing a possible opening and closing hardware for a window or door wing and a limiter device such as the one in Figure 2 that can be associated with it, where the limiter device is in a position corresponding to an open position of the window or door wing, the wing forming a zero angle with the fixed frame, and locking the wing;

Figures 4a, 4b and 4c show axonometric views at different angles of a possible window or door with a limiter device according to the present invention assembled, with the wing in a closed and locked position, in a fully open position (approx. 90°) and locked, and in an intermediate open position and locked, respectively;

Figure 5 is a front and partially cross-sectional view of a limiter device according to the present invention in a position corresponding to a closed position of a window or door, of which a possible hardware is shown, in which the wing rests on the fixed frame forming a zero angle with it, and the wing is locked in that position, the pushing body being in its second position;

Figure 6 is a view like Figure 5 also showing the first profile forming a crosspiece of the wing and the second profile forming a corresponding crosspiece of the fixed frame, and in which the pushing body is only partially shown;

Figure 7 is a section according to the plane VII-VII shown in Figure 6 in which the profiles are only partially shown;

Figures 8, 9 and 10 are views like those in Figures 5, 6 and 7 in which the limiter device is in a position corresponding to a closed position of the window or door and an unlocked position of the wing, the pushing body being in its first position;

Figures 11 and 12 show a plan view of a limiter device according to the present invention in a position corresponding respectively to a closed position of a window or door and a locked position of the wing and to a fully open position of the window or door and a locked position of the wing.

[0020] With reference to the accompanying figures, a possible embodiment of a limiter device for limiting the opening of a window or door is shown, indicated overall with reference number 1.

[0021] The limiter device 1 is adapted to limit the opening of a window or door 100 with a movable wing 101 with respect to a fixed frame 104 and to lock the wing 101 in any position it assumes with respect to the fixed frame 104.

[0022] The limiter device 1 is configured to lock the wing 101 in any open position it assumes with respect to the fixed frame 104, i.e. whatever angle α is formed between the plane of the wing 101 and the plane of the fixed frame 104, wherein such angle α is generally variable between 0° (closing) and 90° (maximum opening).

[0023] The limiter device 1 is of the type realising a lock substantially by friction adapted to guarantee the locking of the wing 101 in any open position with respect to the fixed frame 104.

[0024] It should be noted that in the present description and the appended claims, the locking of the wing 101 is a lock made substantially by friction; it is, therefore, releasable if a thrust is exerted on the wing 101 to overcome the frictional force generated in the lock.

[0025] The limiter device 1 is of the type that can be connected to the opening and closing hardware 110 associated with the wing 101, wherein the opening and closing hardware 110 is controlled by a user-operated handle 111. The limiter device 1 is controlled by the hardware 110, switching between the unlocked position and the locked position of the wing 101 following operation of the handle 111 between the unlocked position and the locked position of the wing 101 and vice versa.

[0026] It should be noted that in the present description, the expressions "unlocking position" and "locking position" refer to the positions that the limiter device 1 can assume whatever position the wing 101 has with respect to the fixed frame 104 to respectively unlock or lock its opening/closing movement with respect to the fixed frame 104.

[0027] The expressions "release position" and "constraint position" refer to the positions that the hardware 110 can assume following operation of the handle 111. Considering the wing 101 resting on the fixed frame 104 in the closed position of the window or door 100: the release position frees the wing 101 from the fixed frame 104 allowing the opening of the door or window, the constraint position constrains the wing 101 to the fixed frame 104 preventing the opening of the window or door.

[0028] The hardware 110 can evidently be controlled via the handle 111 between the release position and the constraint position even when the window is opened with the wing 101 forming a non-zero angle α with the fixed frame 104. The transition of the hardware 110 from the release position to the constraint position is controlled by the handle 111 and in turn controls the transition of the limiter device 1 from the unlocking position to the locking position and vice versa.

[0029] As will become clearer below:

- the release position assumed by the hardware 110 corresponds to the unlocking position of the limiter device 1 and thus of the wing 101, which is thus free to be moved with respect to the fixed frame 104 within the limits imposed by the limiter device 1 itself (i.e. maximum opening angle α);
- the constraint position assumed by the hardware 110 corresponds to the locking position of the limiter device 1 and thus of the wing 101, which is thus locked with respect to the fixed frame 104 in whatever position it is, i.e. whatever angle α it forms with the fixed

frame 104 ($0° \leq \alpha \leq 90°$).

[0030] In particular, the wing 101 is hinged to the fixed frame with hinges (not visible) that allow it to be opened.

[0031] Both the wing 101 and the fixed frame 104 are made of metal or plastic profiles, of which a possible configuration is shown in the accompanying figures by way of example only.

[0032] The wing 101 comprises a first profile 102 with a respective first longitudinal channel 106 with a bottom and two sidewalls from which longitudinal tabs project facing each other to delimit a longitudinal slit.

[0033] The fixed frame 104 comprises a second profile 103 with a respective second longitudinal channel 107 with a bottom and two sidewalls from which longitudinal tabs project facing each other to delimit a longitudinal slit.

[0034] The first channel 106 and the second channel 107 are open to the outside.

[0035] When the wing 101 is closed onto the fixed frame 104, the first profile 102 and the second profile 103 rest on each other and partially overlap with the respective first and second channels 106,107 parallel to and facing each other.

[0036] The first profile 102 can constitute a crosspiece of the wing 101, in the figures the lower crosspiece. Similarly, the second profile 103 can form a crosspiece of the fixed frame 104, in the figures the lower crosspiece.

[0037] The hardware 110, solely by way of example, may comprise a mechanism 112 for transforming the generally rotational movement of the handle 111 into a translational movement of closing/opening rods 113, which are provided with locking lugs 114 adapted to abut on in corresponding strikers fixed to the fixed frame 104 and not shown. The mechanism 112 is recessed into a side profile 105 forming one side of the wing 101, and the closing/opening rods 113 are housed in a slidable manner in a corresponding channel 108 of this side profile 105.

[0038] The hardware 110 then comprises an angular element 115 which accommodates a transmission element, by means of which the translational movement of the closing/opening rods 113 is transmitted to control rods 116 which can be connected to the limiter device 1.

[0039] The hardware 110 is not further described as it is of a type known to a person skilled in the art and not limiting in its specific embodiment.

[0040] In the accompanying figures, the control rods 116 are only partially shown and can have any shape.

[0041] Figures 3 and 5 show the hardware 110 in the constrained position. Figure 8 shows the hardware 110 in the released position.

[0042] The limiter device 1 comprises:

- a straight guide 2 which is configured to be at least partially inserted in the first channel 106 of the first profile 102 of the wing 101; the straight guide 2 defines a sliding direction J and has at least one lying surface 20 for at least one slider 3;- a slider 3 which is inserted in the straight guide 2 in a slidable manner along the sliding direction J and which has at least one first face 30 lying on the lying surface 20 and at least one second face 31 different from the first face 30;- a block 4 configured to be inserted and fixed into the second channel 107 of the second profile 103 of the fixed frame 104; an arm 5 hinged at its axially opposite ends to the slider 3 and to the block 4, respectively, in a rotatable manner around axes parallel to each other.

[0043] Considering the limiter device 1 mounted on a wing 101, the sliding direction J is parallel to the longitudinal extension direction of the first channel 106 of the first profile 102.

[0044] The block 4 can be fixed in the second channel 107 with fixings of a type known to a person skilled in the art, such as grub screws 7 and strikers. The arm 5 is hinged to the block 4 and the slider 3 in a rotatable manner about axes parallel to each other and parallel to the axis of rotation of the wing 101 with respect to the fixed frame 104 as defined by the respective hinges.

[0045] The arm 5 can be hinged to the block 4 in a detachable and adjustable manner, e.g. by means of eccentric pins 8, or in an immovable manner, e.g. by means of riveting screws. The arm 5 can be hinged to the slider 3 by means of a peg 9. The length of the arm 5 determines the maximum opening angle of the wing 101 and is generally 90°. According to the present invention, the limiter device 1 comprises a pushing body 6 coupled to the straight guide 2 and arranged to act on the second face 31 of the slider 3, wherein the pushing body 6 and the straight guide 2 are coupled to each other in a relatively movable manner of alternating straight motion along the sliding direction J and translational motion along a pushing direction K orthogonal to the sliding direction J such that the pushing body 6 and the straight guide 2 are relatively movable between:- at least one first position, wherein the pushing body 6 is moved away from the second face 31 of the slider 3 leaving the sliding of the slider 3 along the sliding guide 2 free, and thus the opening and closing movement of the wing 101, and- and at least one second position, wherein the pushing body 6 is moved close to and pressed on the second face 31 of the slider 3 exerting a thrust on it adapted to block by friction the sliding of the slider 3 along the straight guide 2, and thus the opening and closing movement of the wing 101. For this purpose, the straight guide 2 and the pushing body 6 are coupled together in a relatively movable manner with an inclined plane X-X coupling forming a non-zero angle β of less than 90° with the sliding direction J. The first position of the pushing body 6 relative to the straight guide 2 corresponds to the unlocking position.

[0046] The second position of the pushing body 6 relative to the straight guide 2 corresponds to the locking position. The pushing direction K is advantageously orthogonal to the sliding plane of the slider 3. That is, con-

sidering the limiter device 1 mounted on the wing 101 as shown in the accompanying figures, the pushing direction K is parallel to the plane defined by the wing 101 and orthogonal to the bottom of the first channel 106.

[0047] The second face 31 of the slider 3 is preferably opposite the first face 30 and, advantageously, the pushing direction K is orthogonal to the second face 31.

[0048] The first face 30 of the slider 3 may not be continuous, as depicted in the accompanying figures.

[0049] The second face 31 is advantageously continuous and flat, as depicted in the accompanying figures, except at the hole 32 formed in the slider 3 for the insertion of the peg 9 therein.

[0050] The pushing body 6 is generally in the form of a bar, advantageously a straight-section bar, and extends longitudinally for a length at least equal to the useful stroke of the slider 3 with respect to the straight guide 2.

[0051] The limiter device 1, as mentioned above, is of the type controlled by the operation of the handle 111 of the hardware 110. To this end, it comprises at least one attachment member 10 to an actuation member of the reciprocating straight motion of the straight guide 2 relative to the pushing body 6 (or vice versa) along the sliding direction J. The attachment member 10 is fixed to one of the straight guide 2 and the pushing body 6. The attachment member 10 is attached to one of the straight guide 2 and the pushing body 6, which is guided in sliding direction J with respect to the other.

[0052] The actuating element is part of the hardware 110 or can be coupled to it and, advantageously, consists of a control rod 116.

[0053] The relative motion between the straight guide 2 and the pushing body 6 is thus controlled by the hardware 110 via the operation of the handle 111.

[0054] Advantageously, the limiter device 1 comprises more than one attachment member 10, one at each axially opposite end of the limiter device 1, which advantageously allows the arrangement of locking points (e.g. pawls) also downstream of the limiter device 1.

[0055] The limiter device 1 may then comprise at least one stop 11 adapted to prevent the reciprocating straight motion along the sliding direction J of the other of the straight guide 2 and the pushing body 6, i.e. the one of them not provided with the attachment member 10.

[0056] The stop 11 comprises at least one fastening member 12, for example a grub screw or the like, to the first channel 106 of the first profile 102. Advantageously, more than one stop 11 is provided.

[0057] In the preferred embodiment of the limiter device 1 shown in the accompanying figures, advantageously:

- the straight guide 2 is configured to be at least partially inserted into the first channel 106 in a slidable manner in an alternating straight motion along a direction parallel to or coinciding with the sliding direction J;
- the pushing body 6 is coupled to the straight guide 2 and is configured to be inserted into the first channel 106 in a fixed manner along the sliding direction J and in a movable manner with a translational motion parallel to itself along a pushing direction K,
- wherein the pushing body 6 and the straight guide 2 are coupled together in a relatively movable manner with reciprocating straight motion along the sliding direction J and translational motion along the pushing direction K by means of an inclined plane X-X coupling so that the sliding motion of the straight guide 2 along the sliding direction J is followed by a translational motion of the pushing body 6 along the pushing direction K for their transition from the first position to the second position and vice versa.

[0058] Advantageously, the straight guide 2 is guided in reciprocating straight motion along the sliding direction J with respect to the pushing body 6 and the pushing body 6 is guided in translational motion parallel to itself along the pushing direction K, the pushing body 6 being movable between the first position and the second position as a result of the reciprocating straight motion of the straight guide 2 being controlled by the hardware 110 via the handle 111.

[0059] In the embodiment shown in the accompanying drawings, therefore:

- the attachment member 10 is fixed to the straight guide 2, which is inserted into the channel 106 of the first profile in a slidable manner along the sliding direction J and is guided in a slidable manner along the sliding direction J with respect to the pushing body 6,
- the stops 11 are configured to stop the sliding of the pushing body 6 along the sliding direction J, allowing and guiding the translational motion of the pushing body 6 parallel to itself along the pushing direction K with respect to the straight guide 2.

[0060] However, alternative embodiments cannot be ruled out, in which, for example, the pushing body 6 could be provided with both reciprocating straight motion along the sliding direction J and translational motion along the pushing direction K.

[0061] In any case, following the relative sliding of the straight guide 2 and the pushing body 6 along the sliding direction J controlled by the hardware 110 by operation of the handle 111, the pushing body 6 slides with respect to the straight guide 2 along the pushing direction K moving alternately to the first position and to the second position respectively to leave free and block the sliding of the slider 3 with respect to the straight guide 2 and thus leave free or block the rotation of the arm 5 and consequently of the wing 101. This is due to the inclined plane coupling between the straight guide 2 and the pushing body 6.

[0062] Preferably, the straight guide 2 comprises a pair of sides 21, 22 facing and parallel to each other and ex-

tending along the sliding direction J and between which the slider 3 is held in a slidable manner.

[0063] The sides 21,22 are joined together by at least one bridge body 23,24, e.g. by pegs 230, 240 which can be inserted into corresponding holes in the sides 21,22 to form a single body.

[0064] Advantageously, each of the bridge bodies 23, 24 has a respective attachment member 10 which, in the form shown, consists, for example, of a cylindrical protrusion which can be inserted into a corresponding hole in a respective control rod 116.

[0065] The pushing body 6 consists of a bar interposed between the sides 21,22 and extending for a length at least equal to the useful stroke of the slider 3 with respect to the straight guide 2.

[0066] The bar advantageously has a straight section. The bar, i.e. the pushing body 6, has a contacting face 60 adapted to contact the second surface 31 of the slider 30. The contacting face 60 faces the second surface 31 of the slider 3 and is advantageously flat and parallel to the second surface 31. The pushing direction K is orthogonal to the contacting face 60.

[0067] The bar, i.e. the pushing body 6, then has a second face 61 opposite the contacting face 60 and which, considering the limiter device 1 mounted on a wing 101, faces the bottom of the first channel 106.

[0068] Each of the two sides 21,22 comprises at least one slot 210, 220 which extends along an inclined direction X-X with respect to said sliding direction J and in which at least one pin 610, 620 (peg or pin) fixed to the pushing body 6, or vice versa, is inserted in a slidable manner.

[0069] As can be seen from the accompanying figures, the slots 210,220 have a straight axial extension along a direction X-X that lies in a parallel plane to the sliding direction J and the pushing direction K and that is inclined with respect to both of them forming a non-zero angle with each of them other than 90°. The figures show the angle β that the axial extension of the slots 210,220 forms with the sliding direction J.

[0070] The slots 210, 220 are specular two by two and the respective pins 610,620 are coaxial with each other, possibly being able to be made as a single body with the pushing body 6. Advantageously, there are several pairs of slots 210,220 in which corresponding pins 610,620 slide.

[0071] The coupling between the slots 210,220 and the pins 610,620 forms the inclined plane coupling by which, following the sliding of the straight guide 2 with respect to the pushing body 6 along the sliding direction J, the pushing body 6 slides along the pushing direction K.

[0072] To this end, the straight guide 2 is guided in sliding motion along the sliding direction J with respect to the pushing body 6, however the former being prevented from sliding with respect to the latter along the pushing direction K.

[0073] Similarly, the pushing body 6 is driven in translational motion parallel to itself along the pushing direction K with respect to the straight guide 2, however the former being prevented from sliding with respect to the latter along the sliding direction J.

[0074] The straight guide 2 is guided in sliding motion along the sliding direction J with respect to the pushing body 6 by means of a prismatic coupling 25 made between the bridge bodies 23, 24 and a respective guide body which can be inserted into the first channel 106 and provided with fastening elements to the first channel 106.

[0075] Advantageously, as shown in the embodiment in the accompanying figures, the straight guide 2 is guided in sliding motion along the sliding direction J with respect to the pushing body 6 by means of a prismatic coupling 25 made between the bridge bodies 23, 24 and a respective stop 11. Each stop 11 then also forms a guide body for the straight guide 2. The prismatic coupling 25 between the stops 11 and the bridge bodies 23,24 is T-shaped, dovetail-shaped or similar, so as to leave the straight guide 2 free to slide along the sliding direction J while preventing it from sliding along the pushing direction K, as well as, of course, any possibility of rotation.

[0076] Advantageously, as shown in the embodiment in the accompanying figures, the pushing body 6 is guided in translational motion parallel to itself along the pushing direction K with respect to the straight guide 2 by means of the stops 11.

[0077] That is to say, the limiter device 1 comprises two stops 11 which are arranged at the axially opposite ends of the pushing body 6 substantially in contact therewith (i.e. unless there is clearance to ensure the possibility of sliding along the pushing direction K). The stops 11, once fastened to the first channel 106 by means of the fastening members 12, block the sliding of the pushing body 6 along the sliding direction J. The faces of the two stops 11 facing axially opposite ends of the pushing body 6 are shaped to guide its sliding along the pushing direction K. In the embodiment shown in the accompanying figures, they are flat as are the end faces of the bar forming the pushing body 6. However, alternative embodiments cannot be ruled out in which, for example, a prismatic coupling could be made between the stops 11 and the pushing body 6.

[0078] In more detail, each of the two sides 21,22 comprises along its own first longitudinal edge a first longitudinal tab 211,221. The first longitudinal tabs 211, 221 are facing and spaced to each other defining a slot along which a first portion of the slider 3 runs. The inner surface of the first longitudinal tabs 211,221 forms the lying surface 20 for a second portion of the slider 3 forming the first face 30.

[0079] Each of the two sides 21,22 comprises along its own second longitudinal edge opposite the first a second longitudinal tab 212,222. The second longitudinal tabs 212,222 are opposed to each other and adapted to be inserted into the channel 106 of the first profile by resting on the latter's tabs to retain the straight guide 2 in it.

[0080] The sides 21,22 have at their axially opposite

ends respective recesses 213,223 in which protrusions 26 are accommodated projecting from the stops 11 forming the end-stroke of the sliding of the straight guide 2 with respect to the pushing body 6.

[0081] The slider 3 consists of a prismatic body with a first portion inserted into the slot defined between the first longitudinal tabs 211,221 and widening into a second portion that is accommodated between the sides 21,22. The first surface 30 is defined by the transition section between the first portion and the second portion and rests on the lying surface 20 defined by the inner surface of the first longitudinal tabs 211,221. The second surface 31 is opposite the first surface 30 and faces the pushing body 6 or contacting face 60 of the latter. The first surface 30 is advantageously inclined. The second surface 31 and the contacting face 60 are advantageously flat, parallel to each other and orthogonal to the pushing direction K.

[0082] The subject matter of the present invention is also a system for limiting the opening of windows and doors, comprising:

- a limiter device 1 as described above,
- a window or door 100 comprising a wing 101 comprising a first perimeter profile 102 with a first channel 106 adapted to contain, at least partially, the straight guide 2,
- a fixed frame 104 comprising a second perimeter profile 103 with a second channel 107 adapted to contain the block 4,
- an opening and closing hardware 110 for opening and closing the wing 101 controlled by a handle 111 and connected to the limiter device 1 by means of an actuation member (control rod 116) of the relative motion of the straight guide 2 and the pushing body 6 between the first position and the second position respectively to leave the sliding of the slider 3 along the straight guide 2 free and thus the movement of the wing 101 with respect to the fixed frame 104, and to block by friction the sliding of the slider 3 along the straight guide 2, and thus the movement of the wing 101 with respect to the fixed frame 104 in any position of the first one with respect to the second one.

[0083] The assembly and the operation of the limiter device 1 according to the present invention are immediately comprehensible to a person skilled in the art in light of the description provided above and the accompanying figures.

[0084] In short, the mounting of limiter device 1 takes place:

- by inserting and fastening the block 4 in the second channel 107 of the second profile 103 of the fixed frame 104;
- by inserting the straight guide 2 into the first channel 106 of the first profile 102 of the wing 101;
- by attaching the stops 11 to the first channel 106 by means of the fastening members 12;
- by connecting the straight guide 2 to the control rods 116 of the hardware 110 via the attachment members 10.

[0085] The operation of the limiter device 1 is as follows:

- When the handle 111 is rotated to the position corresponding to the release position of the wing 101 (Figures 8, 9 and 10), the pushing body 6 is in the first position with respect to the straight guide 2 in which it is moved away from the slider 3 and, in particular, from the second face 31 of it, leaving the sliding of the slider 3 along the straight guide 2 free. In the accompanying Figures 8, 9 and 10 it can be seen that the pushing body 6 is set back towards the bottom of the first channel 106 and between its contacting face 60 and the second surface 31 of the slider 3 there is a non-zero distance H. In this position, the wing 101 can be moved with respect to the fixed frame 104 to open or close the window or door.
- When the handle 111 is rotated to the position corresponding to the constraint position of the wing 101 (Figures 5, 6 and 7), as a result of the sliding of the straight guide 2 along the first channel 106, the pushing body 6 is in the second position with respect to the straight guide 2. The pushing body 6 is moved towards the slider 3 and, in particular, to the second face 31 of it, frictionally blocking the sliding of the slider 3 along the straight guide 2. In the accompanying Figures 5, 6 and 7, it can be seen that the pushing body 6 is moved away from the bottom of the first channel 106 and its contacting face 60 is in contact with the second surface 31 of the slider 3, the distance H being cancelled. In this position, the wing 101 is locked whatever position it has in relation to the fixed frame 104: closed (Figure 4a), maximum opening (Figure 4b) and intermediate opening (Figure 4c).

[0086] The rotation of the handle 111 controls, by means of the control rods 116, the sliding of the straight guide 2 along the first channel 106, i.e. along the sliding direction J, with consequent displacement of the pushing body 6 along the pushing direction K by means of the inclined plane coupling made by means of the slots 210,220 and the pins 610,620.

[0087] The limiter device 1 according to the present invention allows the slider 3 and, thus, the wing 101 to be stably and securely locked in any continuously variable opening position between the closed position and the maximum opening position of the window or door.

[0088] The limiter device 1 according to the present invention is easily controlled by acting on the control handle 111 of the hardware 110, being switchable between the unlocking position and the locking position of the slid-

er 3 and thus of the wing 101 by moving the handle 111 from the release position to the constraint position and vice versa.

[0089] The limiter device 1 according to the present invention has a constructively simple and contained-cost structure.

[0090] The fact that the straight guide is inserted into the first channel 106 in a slidable manner along the sliding direction J and the pushing body 6 is inserted into the first channel 106 in a fixed slidable manner along the sliding direction J allows the arrangement of attachment members 10 at both opposite ends of the straight guide. This makes it possible to connect the straight guide 2 at one end to an actuation member of its sliding and at the opposite end to opening/closing members of the wing.

[0091] The limiter device thus conceived is susceptible to many modifications and variants, all falling within the same inventive concept; furthermore, all details can be replaced by equivalent technical elements. In practice, the materials used, as long as they are compatible with the specific use, as well as the dimensions and the contingent shapes, may be any according to the technical requirements.

Claims

1. Limiter device (1) for limiting the opening of a window or door (100) with a wing (101) movable with respect to a fixed frame (104) and provided with an opening and closing hardware (110) controlled by a handle (111), said limiter device (1) comprising:

   - a straight guide (2) which is configured to be at least partially inserted in a first channel (106) of a first profile (102) of a wing (101) of said window or door and which defines a sliding direction (J), wherein said straight guide (2) has at least one lying surface (20) for at least one slider (3);
   - a slider (3) which is inserted in said straight guide (2) in a slidable manner along said sliding direction (J) and which has at least one first face (30) lying on said at least one lying surface (20) and at least one second face (31) different from said first face (30);
   - a block (4) configured to be inserted and fixed into a second channel (107) of a second profile (103) of a fixed frame (104) of said window or door;
   - an arm (5) hinged at its axially opposite ends to said slider (3) and to said block (4), respectively, in a rotatable manner around axes parallel to each other;
   - a pushing body (6) coupled with said straight guide (2) and arranged to act on said second face (31) of said slider (3),
   - wherein said pushing body (6) and said straight guide (2) are coupled with each other in a relatively movable manner by a reciprocating straight motion along said sliding direction (J) and by a translational motion along a pushing direction (K) orthogonal to said sliding direction (J), wherein said pushing body (6) and said straight guide (2) are relatively movable between at least one first position, wherein said pushing body (6) is moved away from said second face (31) of said slider (3) leaving the sliding of said slider (3) along said sliding guide (2) free, and at least one second position, wherein said pushing body (6) is moved close to and pressed on said second face (31) of said slider (3) exerting a pushing on it adapted to block by friction the sliding of said slider (3) along said straight guide (2) .

2. Limiter device (1) according to claim 1, wherein said second face (31) is opposite to said first face (30).

3. Limiter device (1) according to claim 1 or 2, wherein said pushing direction (K) is orthogonal to said second face (31).

4. Limiter device (1) according to one or more of the preceding claims, wherein said pushing body (6) extends for a length at least equal to the useful stroke of said slider (3) with respect to said straight guide (2).

5. Limiter device (1) according to one or more of the preceding claims, wherein said straight guide (2) and said pushing body (6) are coupled with each other in a relatively movable manner to each other with an inclined-plane (X-X) coupling forming a non-zero angle (β) of less than 90° with said sliding direction (J).

6. Limiter device (1) according to one or more of the preceding claims, comprising at least one attachment member (10) to an actuation member of said reciprocating straight motion along said sliding direction (J), wherein said at least one attachment member (109) is fixed to one of said straight guide (2) and said pushing body (6) which is guided in sliding motion along said sliding direction (J) with respect to the other and wherein said actuation member is part of or couplable with said hardware (110).

7. Limiter device (1) according to claim 6, comprising at least one stop (11) adapted to prevent the reciprocating straight motion along said sliding direction (J) of the other between said straight guide (2) and said pushing body (6), wherein said stop (11) comprises at least one fastening member (12) to said first channel (106).

8. Limiter device (1) according to one or more of the

preceding claims, wherein said straight guide (2) is movably guided by a reciprocating straight motion along said sliding direction (J) with respect to said pushing body (6) and wherein said pushing body (6) is guided in a translational motion parallel to itself along said pushing direction (K), said pushing body (6) being movable between said first position and said second position as result of the reciprocating straight motion of said straight guide (2).

9. Limiter device (1) according to claims 7 and 8, wherein:

- said at least one attachment member (10) is fixed to said straight guide (2), said straight guide (2) being insertable in said first channel (106) in a slidable manner along said sliding direction (J),
- said at least one stop (11) is arranged to prevent the reciprocating straight motion along said sliding direction (J) of said pushing body (6) with respect to said first channel (106),
- said pushing body (6) being guided in sliding along said pushing direction (K) with respect to said straight guide (2) and
- said straight guide (2) being guided in sliding along said sliding direction (J) with respect to said pushing body (6).

10. Limiter device (1) according to one or more of the preceding claims, **characterized in that** said straight guide (2) comprises a pair of sides (21, 22) facing and parallel to each other and extending along said sliding direction (J) and between which said slider (3) is held in a slidable manner, wherein said sides (21,22) are joined together by at least one bridge body (23,24), and **in that** said pushing body (6) comprises a bar interposed between said sides (21, 22).

11. Limiter device (1) according to claim 10, wherein said bar has a contacting face (60) with said second face (31) of said slider (3), said contacting face (60) being substantially flat and facing said second face (31) of said slider (3).

12. Limiter device (1) according to claim 10 or 11, wherein said sides (21,22) comprise each at least one slot (210,220) which extends along an inclined direction with respect to said sliding direction (J) and in which at least one pin (610, 620) fixed to said pushing body (6), or vice versa, is inserted in a slidable manner.

13. Limiter device (1) according to any one of claims 10 to 12, wherein said at least one bridge body (23,24) is coupled by a prismatic coupling with a respective guide body insertable in said first channel (106) and provided with fastening members to said first channel (106).

14. Limiter device (1) according to claim 13, wherein said bridge body (23,24) comprises at least one attachment member (10) to an actuation member of said reciprocating straight motion along said sliding direction (J), said actuation member being part of or couplable with said hardware (110), and wherein said at least one guide body forms at least one stop (11) to the sliding of said pushing body (6) along said sliding direction (J) and a guide for sliding said pushing body (6) along said pushing direction (K).

15. Limiter device (1) according to one or more of claims 10 to 14, **characterized in that** each of said sides (21,22) comprises a first longitudinal tab (211,221) along its first longitudinal edge, wherein said first longitudinal tabs (211,221) are facing and spaced to each other defining a slot along which a first portion of said slider (3) runs and wherein said first longitudinal tabs (211,221) form said lying surface (20) for a second portion of said slider (3) forming the first face (30).

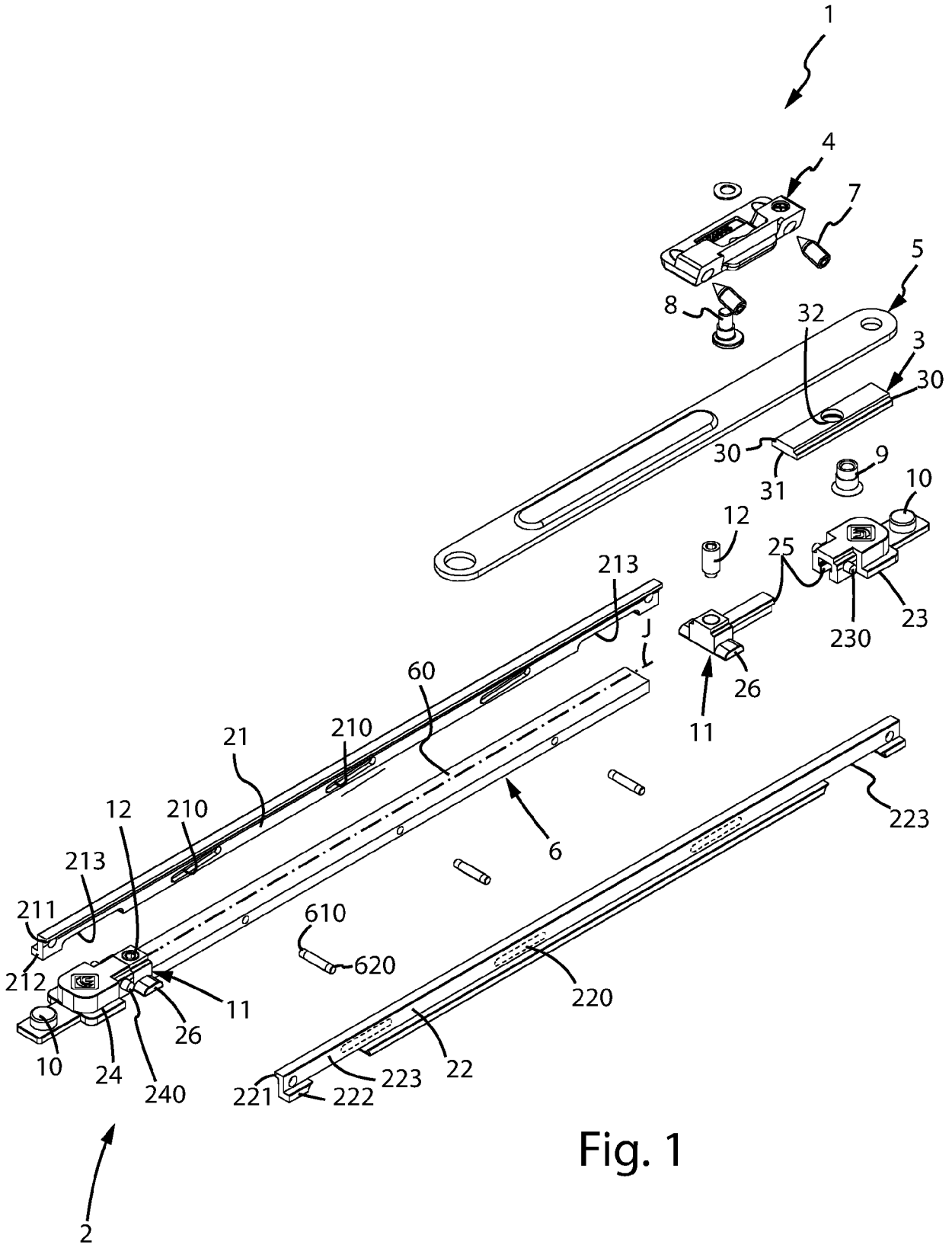
16. Limiter device (1) according to claim 15, **characterized in that** each of said sides (21,22) comprises a second longitudinal tab (212,222) along its second longitudinal edge opposite to the respective first longitudinal edge, said second longitudinal tabs (212,222) being opposed to each other and adapted to insert in the first channel (106) of said first profile (102) to hold said straight guide (2) therein.

17. Limiter device (1) according to claim 15 or 16, wherein said slider (3) is arranged with said its second portion between said first longitudinal tabs (211,221) and said bar.

18. System for limiting the opening of windows or doors, comprising:

- a limiter device (1) according to any one of the preceding claims;
- a window or door (100) comprising a wing (101) comprising a first perimeter profile (102) with a first channel (106) adapted to contain at least partially said straight guide (2);
- a fixed frame (104) comprising a second perimeter profile (103) with a second channel (107) adapted to contain said block (4),
- an opening and closing hardware (110) for opening and closing said wing (101) with respect to said fixed frame (104), said hardware being controlled by a handle (111) and connected to said limiter device (1) by means of an actuation member (116) of the relative motion of said straight guide (2) and said pushing body (6) between said first position and said second position respectively to leave the movement of said wing (101) with respect to said fixed frame (104)

free and to block by friction the movement of said wing (101) with respect to said fixed frame (104) in any position of the first one with respect to the second one.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32
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31
9
10
12
25
213
23
230
60
26
11
21
210
223
12
210
6
213
211
610
620
212
11
220
26
10
24
240
221
222
223
22
2

Fig. 1

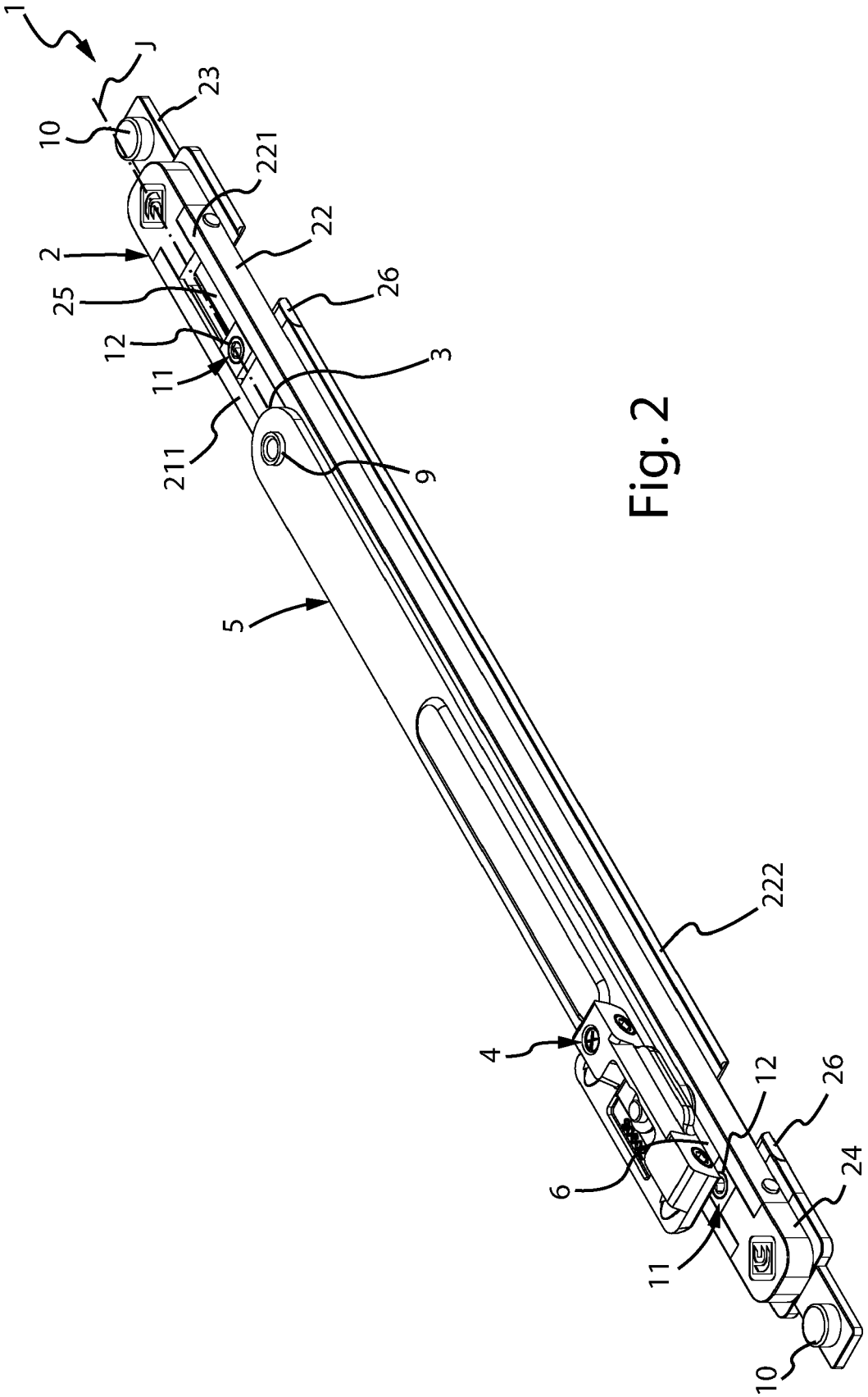


Fig. 2

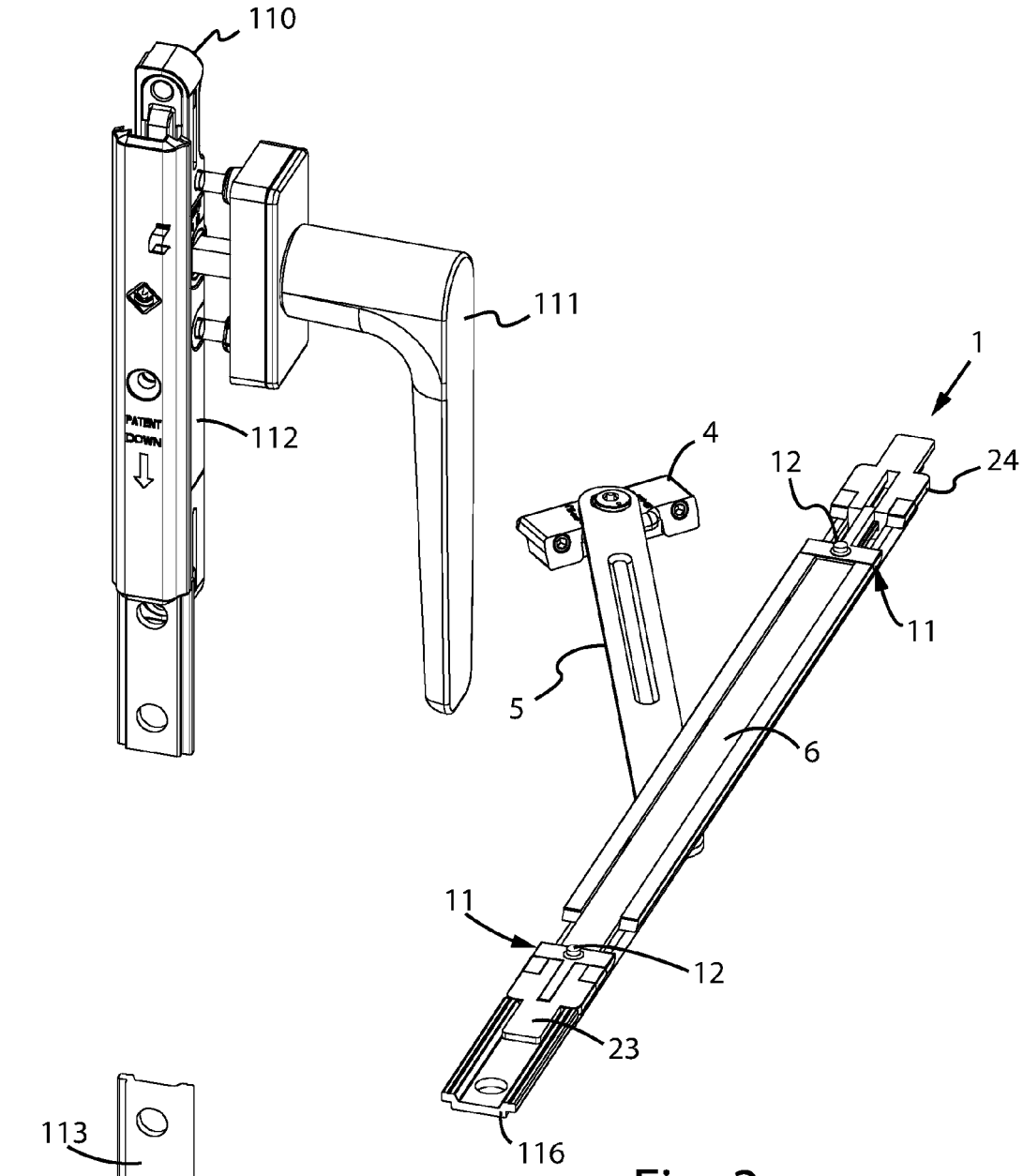

110
111
PATIENT DOWN
112
1
4
12
24
11
5
6
11
12
23
116
113
114
116
115

Fig. 3

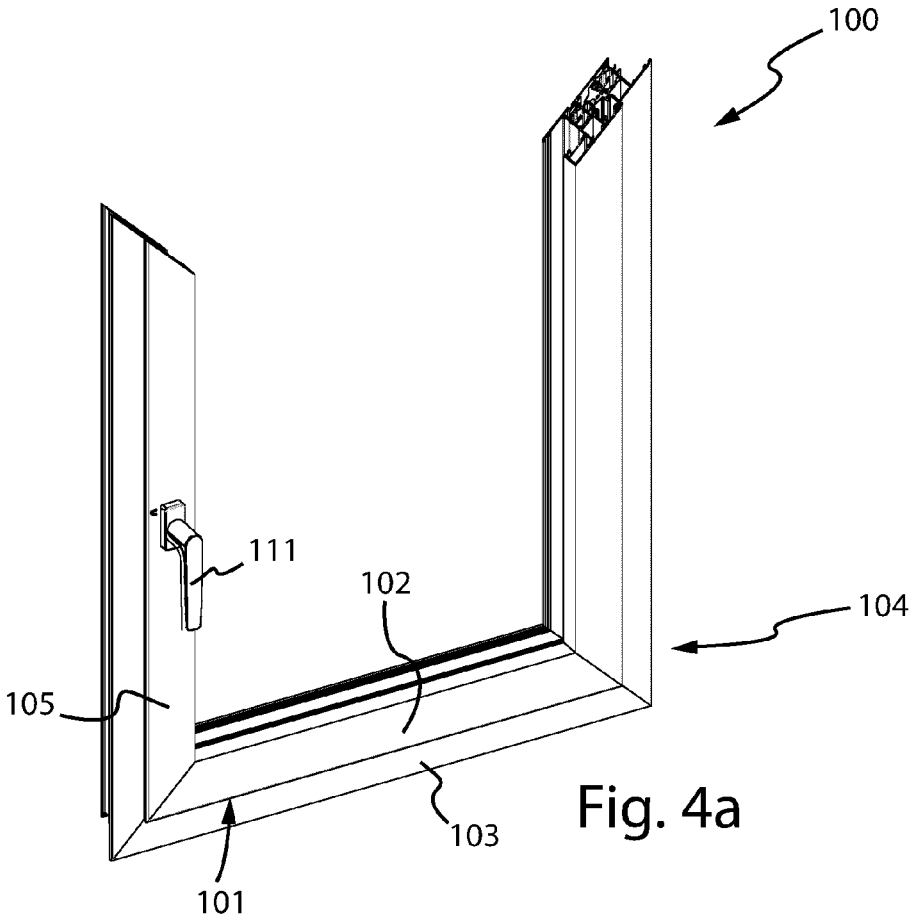


Fig. 4a

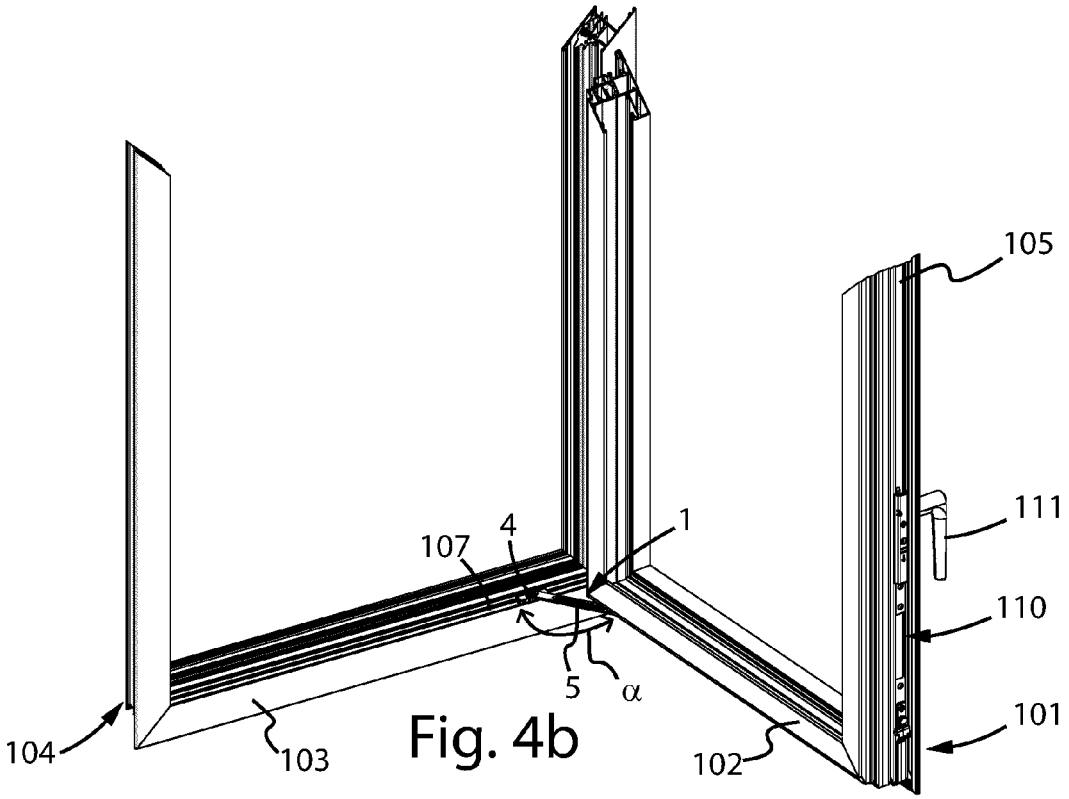


Fig. 4b

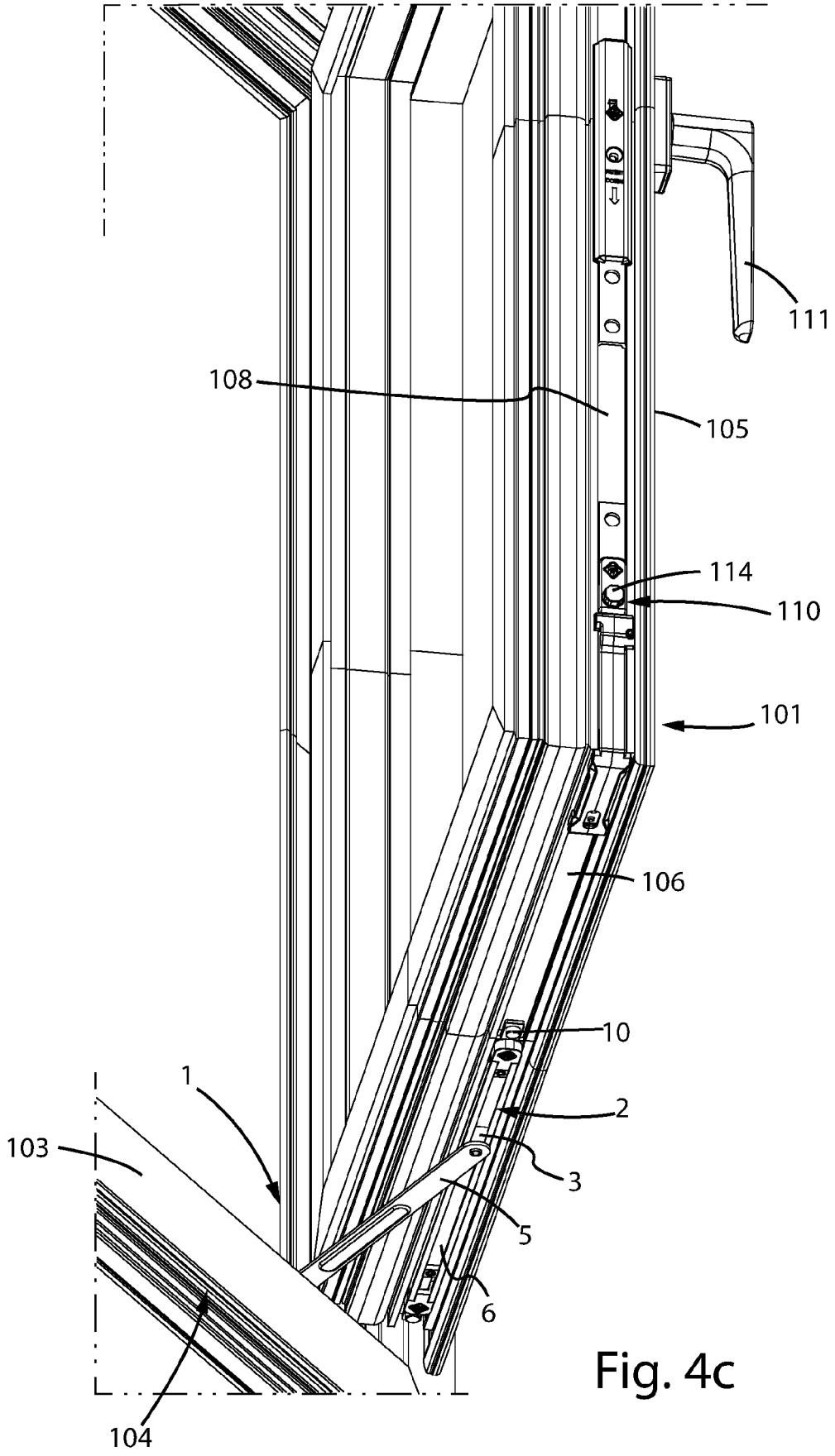


Fig. 4c

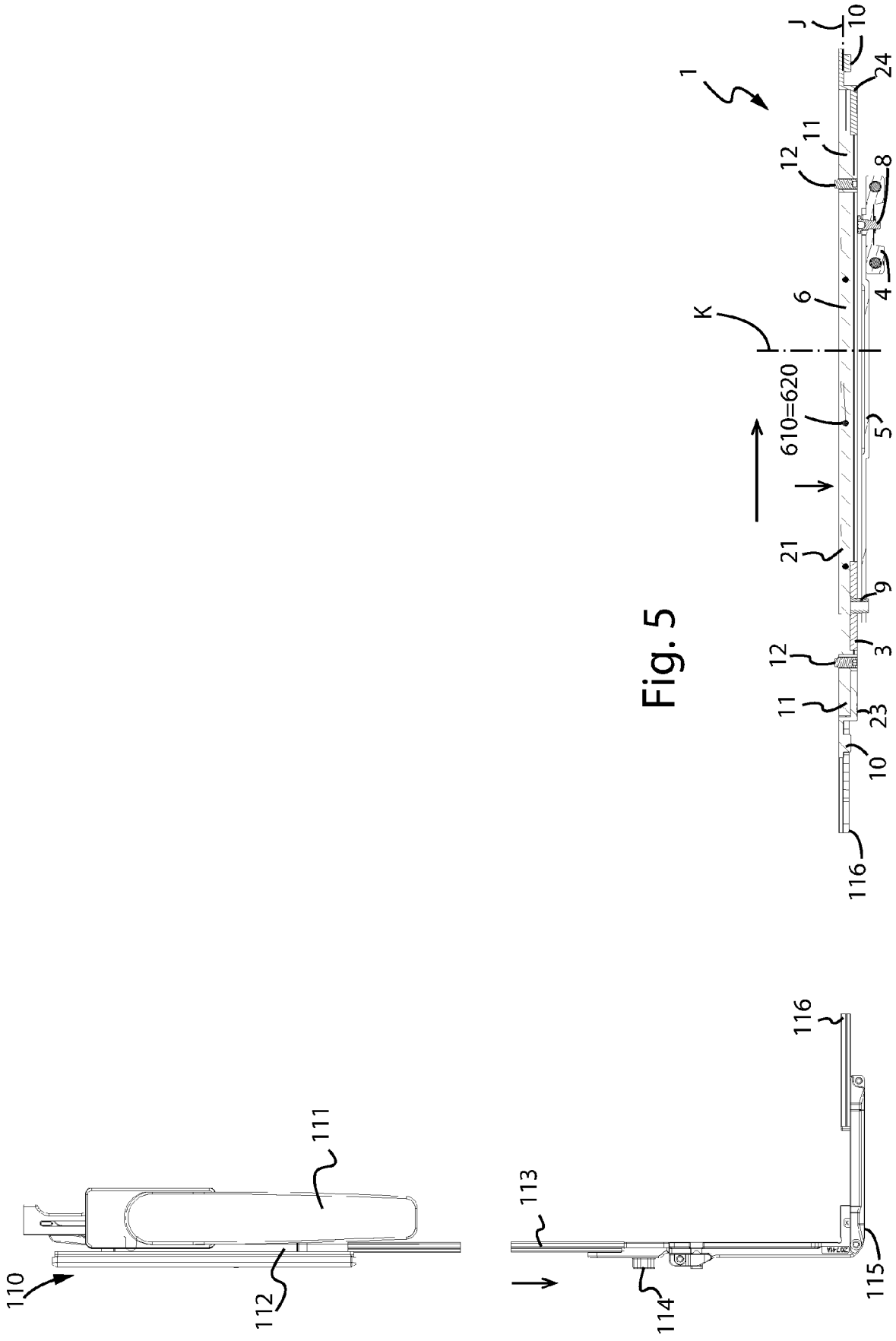

1
J
10
24
11
12
8
4
6
K
610=620
5
21
9
3
12
11
23
10
116
110
111
112
113
114
115
116

Fig. 5

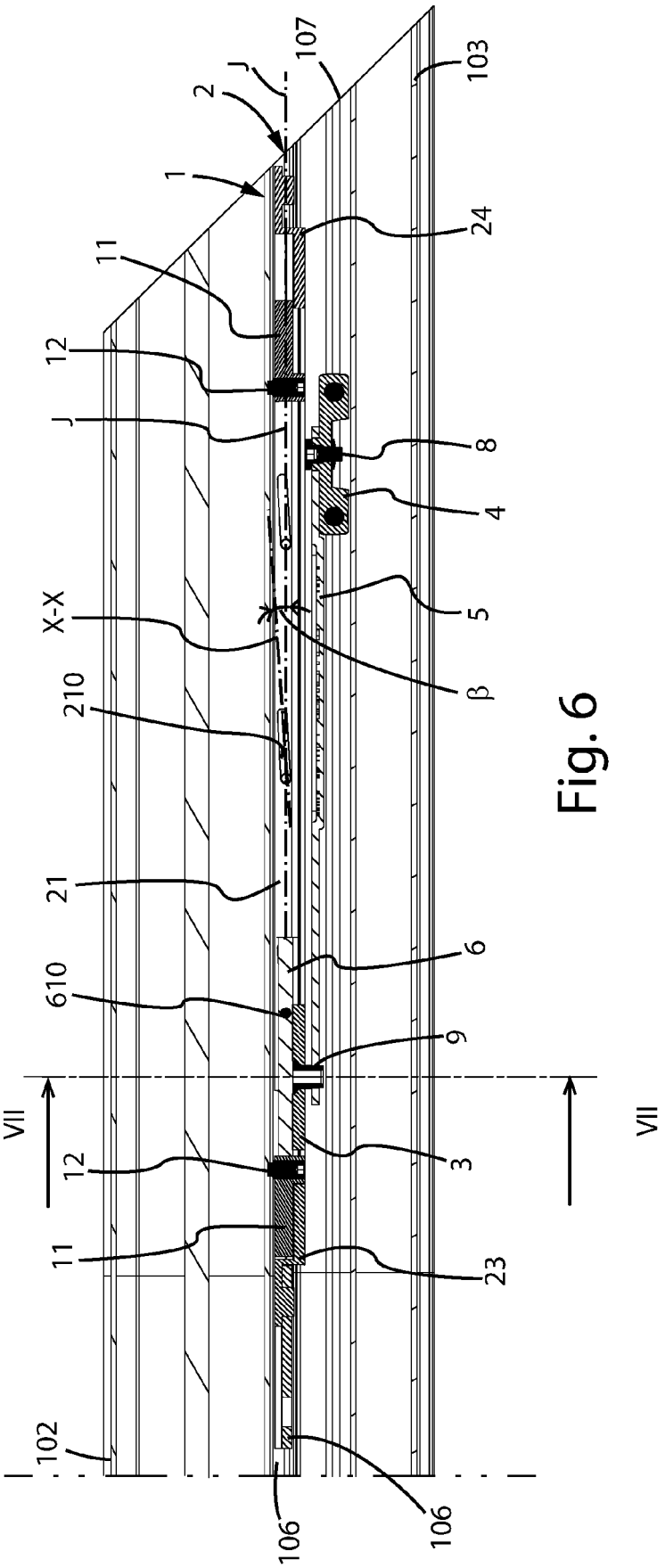

107
103
2
J
1
24
11
12
J
8
4
X-X
5
β
210
21
6
610
9
VII
12
3
11
23
VII
102
106
106

Fig. 6

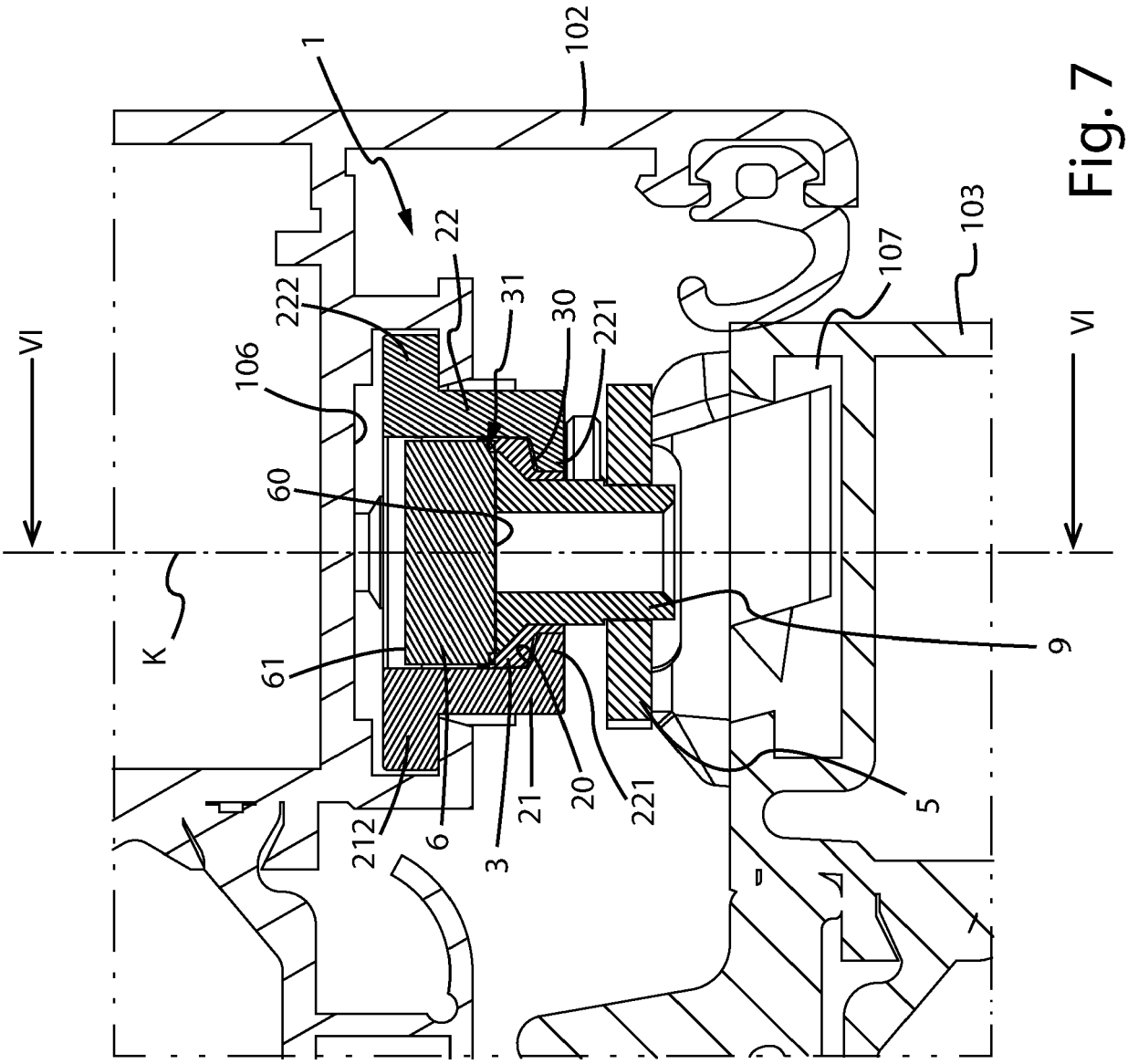
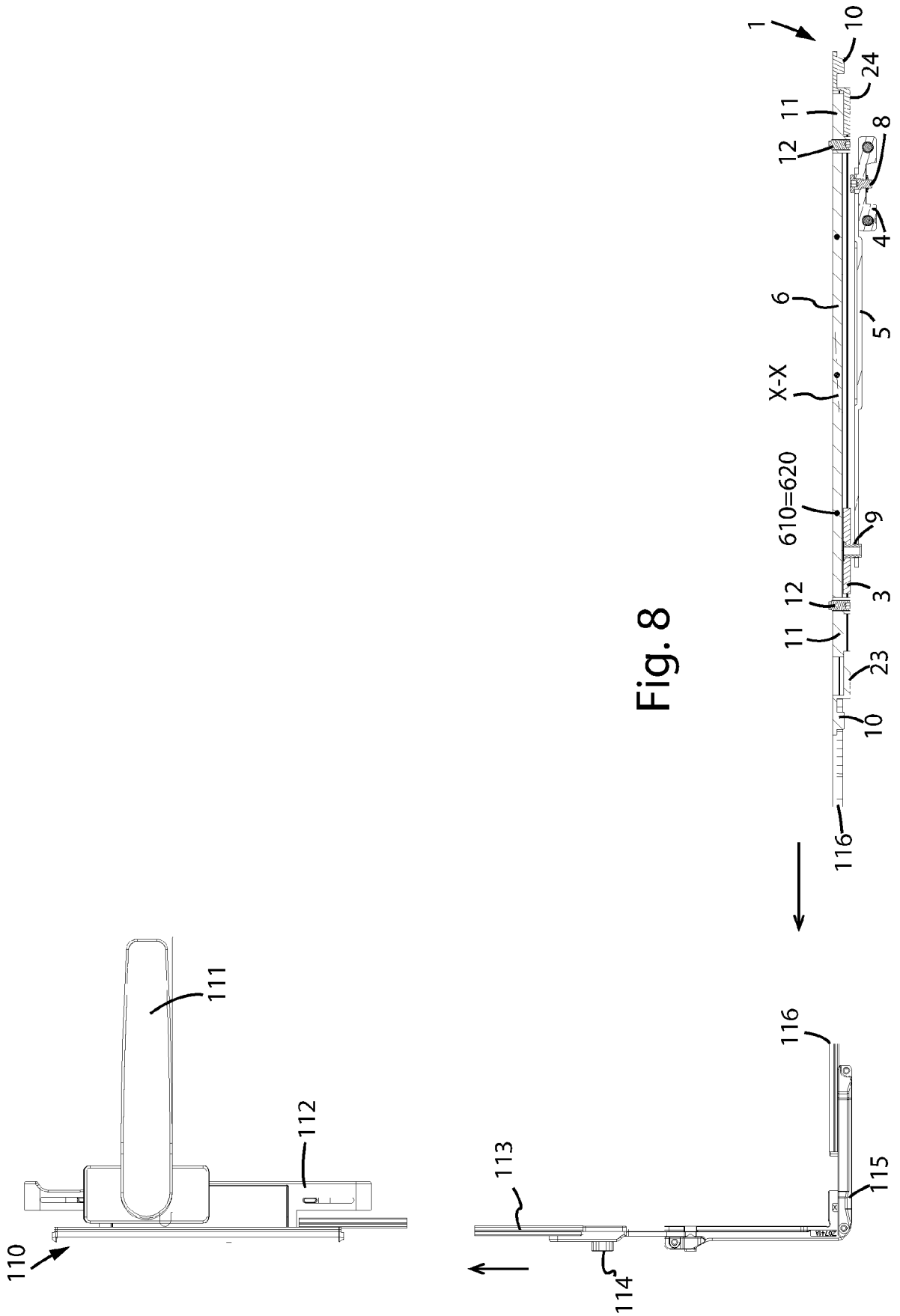


Fig. 7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12
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X-X
610=620
9
3
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11
23
10
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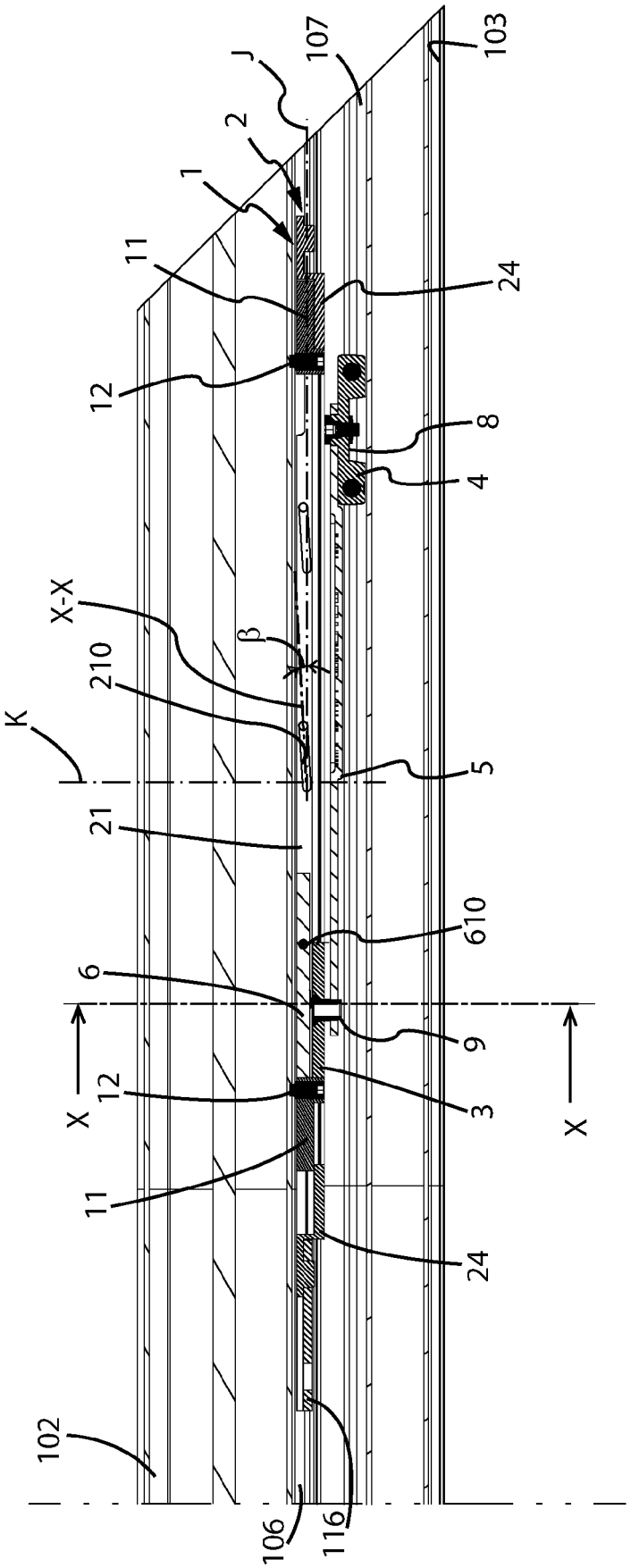
111
112
110
116
113
115
114

Fig. 8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107
103
2
1
11
24
12
8
4
X-X
β
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K
5
21
610
6
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3
X
X
11
24
102
106
116

Fig. 9

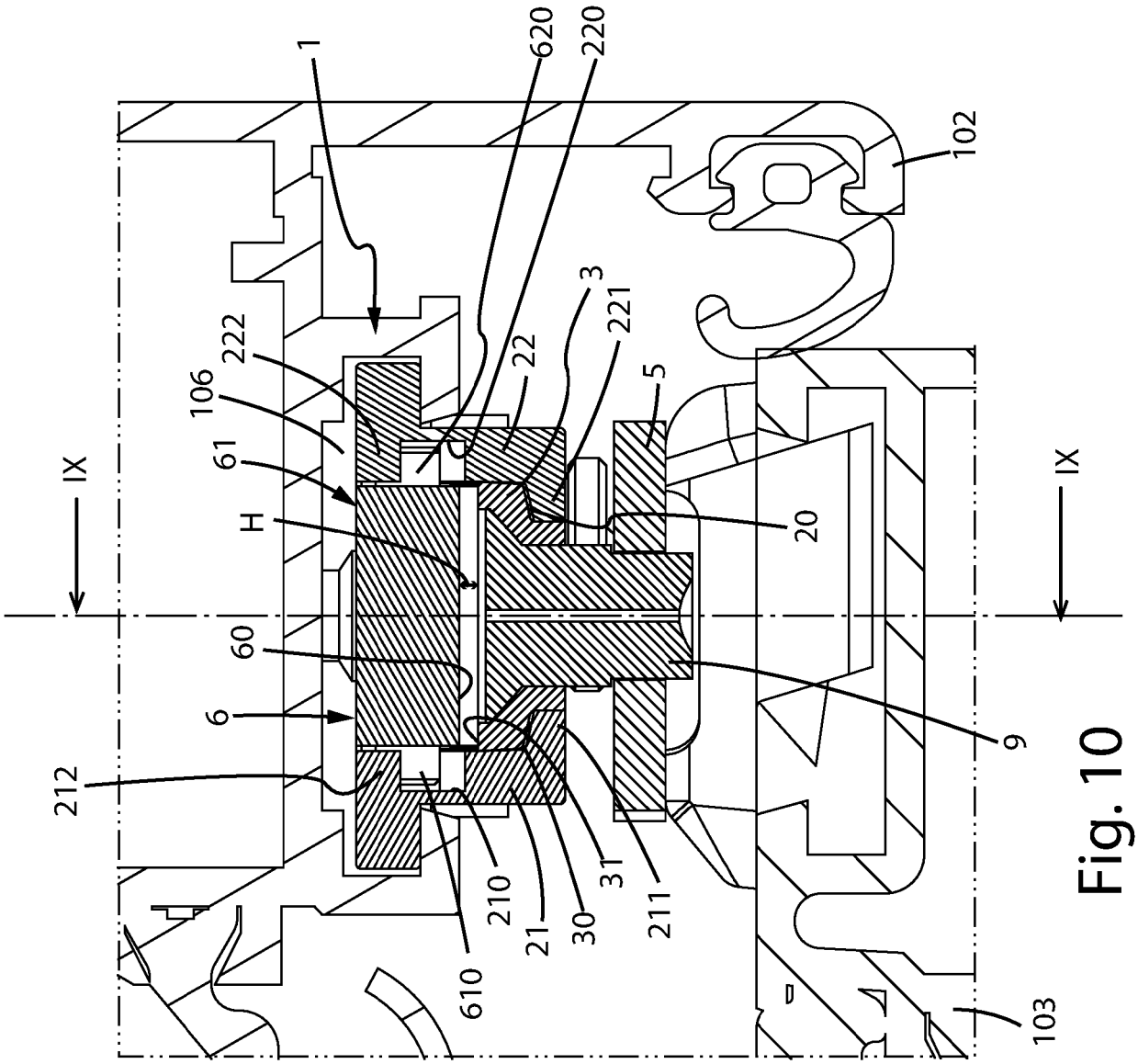
1
620
220
102
3
221
222
22
106
5
61
H
20
IX
IX
60
6
9
212
210
21
30
31
211
610
103

Fig. 10

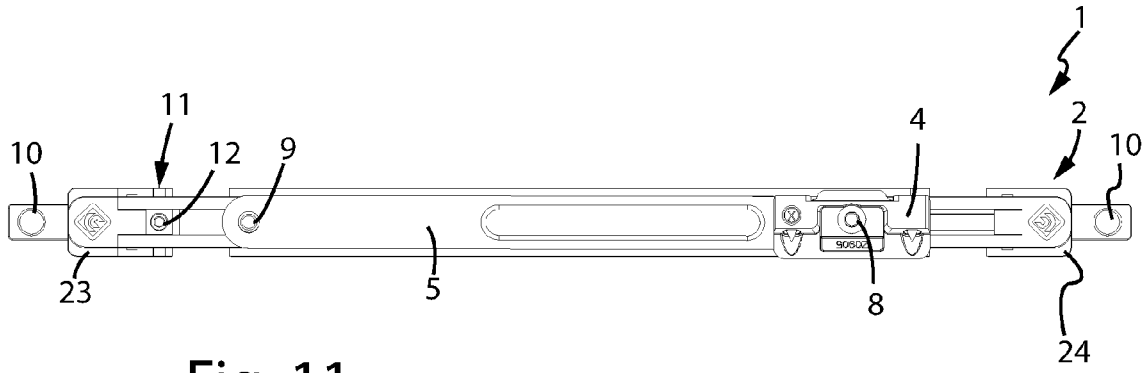

Fig. 11

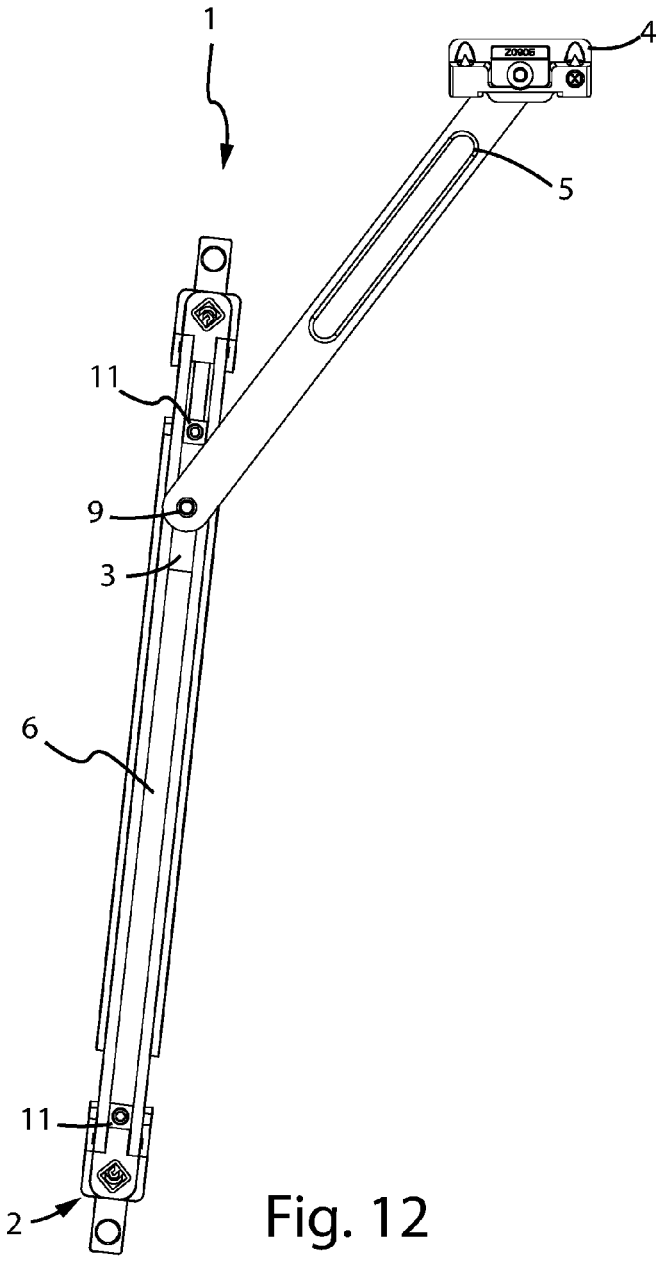

Fig. 12

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EUROPEAN SEARCH REPORT

Application Number
EP 24 17 5102

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 195 16 588 C1 (WEIDTMANN WILHELM KG [DE]) 19 September 1996 (1996-09-19) * column 3`17 - column 5, line 51 * * figures 1-6 *	1-18	INV. E05C17/28 ADD. E05C9/20 E05C9/24
A	DE 20 2014 009559 U1 (WILH SCHLECHTENDAHL & SOEHNE GMBH & CO KG [DE]) 10 February 2015 (2015-02-10) * paragraph [0028] - paragraph [0042] * * figures 1-5 *	1-18	
A	GB 2 383 376 A (JURRAS LTD [IE]) 25 June 2003 (2003-06-25) * page 4 - page 10 * * figures 1-14 *	1-18	

TECHNICAL FIELDS SEARCHED (IPC)

E05C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	30 September 2024	Antonov, Ventseslav

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 24 17 5102

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30-09-2024

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