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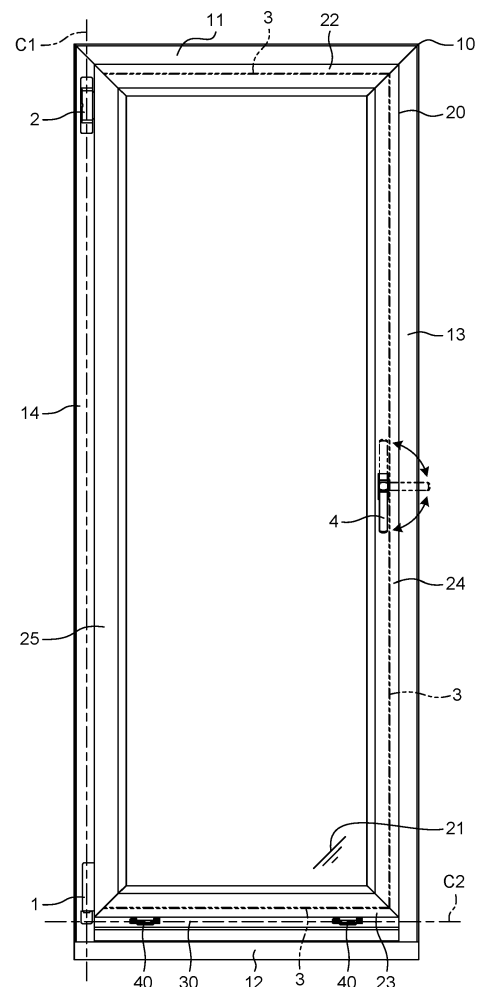
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(54) **ATTACHMENT DEVICE FOR FITTING, AND FITTING**

(57) Provided is an attachment device (30) for a fitting. The attachment device (30) is configured to be openable relative to a frame body (10) with a vertical open axis center (C1) as a center, together with a sash (20) including an action member (3) acting with an operation of a handle (4) when the action member (3) is moved from a lock position to an open position. The attachment device (30) includes a device main body (31) that is attached to a lower rail (23) of the sash (20), an input member (50) that is movably provided relative to the device main body (31) and is linked to the action member (3), a watertightness ensuring member (70) that is provided in the device main body (31) to be movable along a vertical direction of the sash (20), the watertightness ensuring member (70) being configured to hold a watertightness member (71), and an linking mechanism configured to link the input member (50) to the watertightness ensuring member (70) to move the watertightness ensuring member (70) relative to the device main body (31) through movement of the input member (50). The linking mechanism is configured to: move the watertightness ensuring member (70) downward when the action member (3) is arranged at the lock position, and move the watertightness ensuring member (70) upward when the action member (3) is arranged at the open position.

FIG.1



Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to an attachment device for a fitting that is applied to a fitting allowing a sash to be opened relative to a frame body with a vertical open axis as a center, and to a fitting.

2. Description of the Related Art

[0002] In a fitting in which a sash is supported by a frame body to be turnable with a vertical open axis as a center, such as a casement window, an inner peripheral fin part is provided from four sides of the frame to the inner peripheral side, and a sealing member is attached on the inner peripheral part. Thus, when the sash is closed, the sealing member is pressed against the sash so as to secure watertightness between the sash and the sealing member. A conventional example is described in Japanese Laid-open Patent Publication No. 2017-203341.

[0003] In a case where the above-described fitting is provided at an opening where a person comes in and out, for example, the inner peripheral fin part projecting from the lower frame forms a step. Therefore, considering barrier-free design, such a fitting is not necessarily preferable, and limits places for installation. It is possible to take measures by providing slopes on both sides of the inner peripheral fin part, for example. However, space is required to arrange slopes on both the entrance side and the exit side of the fitting, which may further limit places for installation.

[0004] In view of the above-described aspects, the invention aims at providing an attachment device for a fitting capable of achieving a fitting structure securing watertightness without limiting places for installation, and a fitting.

SUMMARY OF THE INVENTION

[0005] An attachment device for a fitting according to the invention is configured to be openable relative to a frame body with a vertical open axis center as a center, together with a sash including an action member acting with an operation of a handle when the action member is moved from a lock position to an open position. The attachment device includes a device main body that is attached to a lower rail of the sash, an input member that is movably provided relative to the device main body and is linked to the action member, a watertightness ensuring member that is provided in the device main body to be movable along a vertical direction of the sash, the watertightness ensuring member being configured to hold a watertightness member, and an linking mechanism configured to link the input member to the watertightness

ensuring member and moves the watertightness ensuring member relative to the device main body through movement of the input member, in which the linking mechanism is configured to move the watertightness ensuring member downward when the action member is arranged at the lock position, and move the watertightness ensuring member upward when the action member is arranged at the open position.

[0006] The above and other objects, features, advantages and technical and industrial significance of this invention will be better understood by reading the following detailed description of presently preferred embodiments of the invention, when considered in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007]

FIG. 1 is a view of a fitting to which an attachment device of an embodiment of the invention is applied, viewed from the indoor side;

FIG. 2 is a vertical section view of the fitting illustrated in FIG. 1;

FIG. 3 is a transverse section view of the fitting illustrated in FIG. 1;

FIGS. 4A to 4C are schematic views of the action states of a sash in the fitting illustrated in FIG. 1, in which FIG. 4A is a perspective view of the fitting when a handle is arranged at a locked position, FIG. 4B is a perspective view of the fitting when a handle is arranged at an inward-opening position, so that the sash is opened inward, and FIG. 4C is a perspective view of the fitting when a handle is arranged at an inward-tilt position, so that the sash is tilted inward;

FIG. 5 is a vertical section view of the attachment device applied to the fitting illustrated in FIG. 1;

FIG. 6 is an exploded view of the attachment device illustrated in FIG. 5;

FIGS. 7A and 7B are views illustrating components of an interlinking mechanism of the attachment device illustrated in FIG. 5, in which FIG. 7A is a partially broken side view of an upper slider arranged on the upper side of the device main body, and FIG. 7B is a partially broken side view of a lower slider arranged on the lower side of the device main body;

FIG. 8 is a view of a main part of the fitting to which the attachment device illustrated in FIG. 5 is attached, viewed from the indoor side;

FIG. 9 is an enlarged vertical section view of the main part of the fitting illustrated in FIG. 1;

FIG. 10 is a view illustrating the relation between an action member provided at the sash and the upper slider and an input member provided in the device main body, in which (a) of FIG. 10 is a main part broken view of the sash when the action member is arranged at a lock position, viewed from the indoor side, (b) of FIG. 10 is a main part plane view illus-

trating a position of the input member when the action member is arranged at the lock position, (c) of FIG. 10 is a main part broken view of the sash when the action member is arranged at an open position, viewed from the indoor side, (d) of FIG. 10 is a main part plane view illustrating a position of the input member when the action member is arranged at the open position, (e) of FIG. 10 is a main part broken view of the sash when the action member is arranged at a tilt position, and (f) of FIG. 10 is a main part plane view illustrating a position of the input member when the action member is arranged at the tilt position; FIG. 11A is a vertical section view of the attachment device when the action member is arranged at the lock position, viewed from the indoor side; FIG. 11B is a vertical section view of the attachment device when the action member is arranged at the open position, viewed from the indoor side; FIG. 11C is a vertical section view of the attachment device when the action member is arranged at the tilt position, viewed from the indoor side; FIG. 12 is a vertical section view of a main part of the fitting illustrated in FIG. 1 when the action member is arranged at the lock position; FIG. 13 is a vertical section view of the main part of the fitting illustrated in FIG. 1, in which (a) of FIG. 13 is a vertical section view of the main part when the action member is arranged at the open position, and (b) of FIG. 13 is a vertical section view of the main part when the action member is arranged at the lock position after the sash been opened; and FIG. 14 is a vertical section view of the main part of the fitting illustrated in FIG. 1 when the action member is arranged at the tilt position, so that the sash is tilted inward.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0008] The following will specifically describe a preferred embodiment of the attachment device for a fitting with reference to the enclosed drawings. Note that in the following description, the terms "depth direction" and "face direction" will be used for convenience. The "depth direction" is a direction along the depth of the fitting, as illustrated by an arrow A of the drawings. A surface along the depth direction may be referred to as a depth surface. The face direction is a vertical direction orthogonal to the depth direction, in a case of an upper frame or an upper rail described later, for example, which extends along a horizontal direction. In a case of a vertical frame or a stile, which extends along a vertical direction, the face direction is a horizontal direction orthogonal to the depth direction. A surface along the face direction may be referred to as a face surface.

[0009] FIG. 1 to FIG. 3 are views of a fitting to which an attachment device for a fitting of the embodiment of the invention is applied. The fitting exemplified here in-

cludes a frame body 10 and a sash 20, and a lower support unit 1 and an upper support unit 2 provided between the frame body 10 and the sash 20 support the sash 20 to be openable relative to the frame body 10.

[0010] The frame body 10 is framed by four sides of an upper frame 11, a lower frame 12, and right and left vertical frames 13, 14. In the embodiment, especially the upper frame 11 and the right and left frames 13, 14 having the same section shape are applied, and the ends thereof are connected by miter joining. These upper frame 11 and right and left frames 13, 14 are extruded shape materials made of resin, and each of these frames has substantially the same section shape in a part over the entire length along the longitudinal direction. As is clear from the drawings, the upper frame 11 and right and left frames 13, 14 respectively include inner peripheral fin parts 11b, 13b, 14b at the edge portions positioned on the outdoor side of inner peripheral side depth surfaces 11a, 13a, 14a. The inner peripheral fin parts 11b, 13b, 14b project to the inner peripheral side, and each includes a sealing member 15 at the edge portion facing the indoor side.

[0011] Meanwhile, the lower frame 12 of the frame body 10 has the same size along the depth direction as the upper frame 11 and the like. However, the lower frame 12 does not include a projection such as the inner peripheral fin part, and an inner peripheral side depth surface 12a is substantially flat. The exemplified drawing illustrates the lower frame 12 including therein a drain path 12b. The drain path 12b is open in a slit shape on the depth surface of the lower frame 12 so as to drain water entering through this slit-shaped opening to the outside of the lower frame 12 through a drain port (not illustrated). The lower frame 12 is also an extruded shape material made of resin.

[0012] The sash 20 is formed by attaching an upper rail 22, a lower rail 23, and right and left stiles 24, 25 to four sides of a rectangular surface material 21. In the embodiment, as the rails 22, 23 and the stiles 24, 25 forming the sash 20, the four sides have the same section shape, and the ends thereof are connected by miter joining. These rails 22, 23 and stiles 24, 25 are extruded shape materials made of resin, and each has the substantially same section shape in a part over the entire length along the longitudinal direction. As is clear from the drawings, the rails 22, 23 and the stiles 24, 25 respectively include outer peripheral fin parts 22b, 23b, 24b, 25b at the edge portions positioned on the indoor side of outer peripheral side depth surfaces 22a, 23a, 24a, 25a. The outer peripheral fin parts 22b, 23b, 24b, 25b project to the outer peripheral side, and each includes a sealing member 26 at the edge portion facing the outdoor side. Meanwhile, inner peripheral side depth surfaces 22c, 23c, 24c, 25c of the rails 22, 23 and the stiles 24, 25 respectively include supporting fin parts 22d, 23d, 24d, 25d at the edge portions positioned on the outdoor side, and beads 27 attached at the edge portions positioned on the indoor side. The supporting fin parts 22d, 23d, 24d, 25d support a surface facing the outdoor

side of the surface material 21, and projects to the inner peripheral side. The beads 27 support a surface facing the indoor side of the surface material 21. Note that in the following, in order to distinguish the right and left vertical frames 13, 14 and the right and left stiles 24, 25, the frame and the stile positioned on the right side viewed from the indoor side are referred to as the right vertical frame 13 and the right stile 24, and the frame and the stile positioned on the left side viewed from the indoor side are referred to as the left vertical frame 14 and the left stile 25.

[0013] The lower support unit 1 and the upper support unit 2 form what is called a drehkipp window, and are provided between the left vertical frame 14 and the left stile 25. As illustrated schematically in FIGS. 4A to 4C, the lower support unit 1 supports the sash 20 relative to the frame body 10 to be openable (opened inward) so that the right stile 24 projects to the indoor side with a vertical open axis center C1 as a center, and supports the sash 20 relative to the frame body 10 to be openable (tilted inward) so that the upper rail 22 projects to the indoor side with a tilt axis center C2 as a center along the longitudinal direction of the lower rail 23. The upper support unit 2 is switched between a lock state and an unlock state by the action of an action member 3 described later. When the upper support unit 2 is locked, the upper rail 22 is turnable relative to the frame body 10 with the open axis center C1 as a center. In a case where the upper support unit 2 is unlocked, the upper rail 22 is movable to the indoor side while being substantially parallel with the upper frame 11.

[0014] As illustrated in FIG. 1 to FIG. 3, the sash 20 includes a handle 4 on the right stile 24, and the action member 3 is arranged at the periphery of the sash 20. The handle 4 is a part operated to open and close the sash 20, and is attached on the face surface facing the indoor side. The handle 4 is turnable with a handle axis center along the depth direction as a center. In the embodiment, the position extended substantially vertically downward from the handle axis center is a locked position, the position turned clockwise by 90° from the locked position to be extended substantially horizontally is an inward-opening position, and the position further turned clockwise by 90° from the inward-opening position to be extended substantially vertically upward is an inward-tilt position. The handle may be operated between the lock position and the inward-tilt position.

[0015] The action member 3 is a belt member that is retractably arranged in longitudinal housing grooves 22e, 23e, 24e, 25e formed on the outer peripheral side depth surfaces of the rails 22, 23 and the stiles 24, 25. In the embodiment, the action member 3 is continuously arranged over the upper rail 22, the right stile 24, and the lower rail 23 so as to be retractable interlocking with the operation of the handle 4. To be more specific, as the handle 4 turns counterclockwise from the locked position to the inward-tilt position, the action member 3 of the right stile 24 moves downward, the action member 3 of the

upper rail 22 moves rightward, and the action member 3 of the lower rail 23 moves leftward. The above-described upper support unit 2 is kept locked by rightward movement of the action member 3 with the operation of the handle 4 from the locked position to the inward-opening position. That is, the upper rail 22 does not move in parallel with the upper frame 11, and the upper support unit 2 functions to only allow the upper rail 22 to be turned relative to the upper frame 11 with the vertical open axis center C1 as a center. However, when the handle 4 is operated to the inward-tilt position and the amount of rightward movement of the action member 3 is increased, the upper support unit 2 is unlocked. In this manner, the upper support unit 2 functions to allow the upper rail 22 to be moved in parallel with the upper frame 11.

[0016] A lock pin (not illustrated) is provided at a preferable position of the action member 3 arranged at the right stile 24. When the handle 4 is arranged at the locked position, a blocking projection (not illustrated) provided in parallel at the right vertical frame 13 and the lock pin are brought in contact with each other in the depth direction on the indoor side, which blocks opening of the sash 20 relative to the frame body 10. However, when the handle 4 is arranged at the inward-opening position and the inward-tilt position, the lock pin is moved to the lower side than the blocking projection, which allows opening of the sash 20 relative to the frame body 10.

[0017] Meanwhile, as illustrated in FIG. 2, an interlocking pin (action member) 5 is provided on the action member 3 arranged at the lower rail 23. The interlocking pin 5 is fixed to the action member 3 in the state where the distal end portion with a small diameter projects outward from the housing groove 23e of the lower rail 23, and is able to move integrally with the action member 3. Supposing that the position of the action member 3 when the handle 4 is arranged at the locked position is a lock position, the position of the action member 3 when the handle 4 is arranged at the inward-opening position is an open position, and the position of the action member 3 when the handle 4 is arranged at the inward-tilt position is a tilt position, the interlocking pin 5 is sequentially moved leftward relative to the lower rail 23, viewed from the indoor side, as the action member 3 is moved from the lock position to the open position and then to the tilt position.

[0018] As is clear from FIG. 2 and FIG. 3, between the upper frame 11 and the right and left vertical frames 13, 14 of the frame body 10, and the upper rail 22 and the right and left stiles 24, 25 of the sash 20, the frame body 10 supports the sash 20 through the lower support unit 1 and the upper support unit 2 so that the sealing members 15 attached on the inner peripheral fin parts 11b, 13b, 14b can contact the sash 20 and the sealing members 26 attached on the outer peripheral fin parts 22b, 24b, 25b can contact the frame body 10. Thus, when the sash 20 is closed relative to the frame body 10, it is possible to secure desired watertightness between them. Meanwhile, between the lower frame 12 and the lower

rail 23, the vertical size of the sash 20 is smaller than the vertical size of the frame body 10 so that the inner peripheral side depth surface 12a of the lower frame 12 and the outer peripheral side depth surface 23a of the lower rail 23 face each other with a gap when the sash 20 is closed relative to the frame body 10, and an attachment device 30 is provided between them.

[0019] The attachment device 30 includes a device main body 31 in size filling a gap between the lower frame 12 and the lower rail 23. As illustrated in FIG. 5 and FIG. 6, the device main body 31 is a solid member in which a face surface 31a facing the indoor side and a face surface 31b facing the outdoor side are in parallel with each other and a part positioned on the outdoor side projects vertically, and is attached to the lower surface of the lower rail 23 through a hinge 40. The hinge 40 includes a tilt axis 41 extending substantially horizontally along the longitudinal direction of the lower rail 23, and connects the lower rail 23 and the device main body 31 in the state where the hinge 40 is turnable with the center of the tilt axis 41 (= tilt axis center C2) as a center. To be more specific, the hinge 40 connects the lower rail 23 and the device main body 31 so that a part therebetween is turnable in the state where one element 42 of the hinge 40 is fixed to the outer peripheral fin part 23b of the lower rail 23 and the other element 43 of the hinge 40 is fixed to the face surface 31a facing the indoor side of the device main body 31, with the tilt axis 41 positioned on the outer peripheral side of the outer peripheral fin part 23b and on the indoor side than the device main body 31.

[0020] As is clear from the drawings, when the face surface 31a facing the indoor side of the device main body 31 is arranged along the vertical direction (hereinafter, this state is referred to as a standard position of the device main body 31), the upper edge thereof is in pressure contact with the sealing member 26 attached on the outer peripheral fin part 23b of the lower rail 23. Moreover, in the device main body 31 arranged at the standard position, the face surface 31b facing the outdoor side is arranged on the substantially same plane surface as a face surface 23f facing the outdoor side of the supporting fin part 23d of the lower rail 23. At parts positioned on the outdoor side of the device main body 31, a fin-shaped sealing member 32 is attached on each of an inner peripheral side depth surface 31c and an outer peripheral side depth surface 31d. When the device main body 31 is arranged at the standard position, the fin-shaped sealing member 32 attached on the inner peripheral side depth surface 31c is in contact with an outer peripheral side depth surface 23g of the supporting fin part 23d provided at the lower rail 23. When the device main body 31 is arranged at the standard position in the state where the sash 20 is closed relative to the frame body 10, the fin-shaped sealing member 32 attached on the outer peripheral side depth surface 31d can come in contact with the inner peripheral side depth surface 12a of the lower frame 12.

[0021] As illustrated in FIG. 2, in the device main body

31, an upper slider 33 is arranged at an area facing the action member 3 of the lower rail 23, and a lower slider 34 is arranged at an area on the vertically lower side of the upper slider 33. As illustrated in FIG. 5, FIG. 6, FIGS. 7A and 7B, and FIGS. 11A to 11C, the upper slider 33 and the lower slider 34 are formed by belt-like thin plates. They are parallel with each other, and are arranged at the device main body 31 to be movable along the longitudinal direction of the lower rail 23. The longitudinal size of such sliders 33, 34 is slightly smaller than that of the device main body 31. Slide guide holes 33a, 34a are provided at appropriate positions of the upper slider 33 and the lower slider 34, respectively. The slide guide holes 33a, 34a are long in the longitudinal direction, and are formed to have the same length. Guide pins 35 provided in the device main body 31 penetrate the slide guide holes 33a, 34a. The guide pins 35 are provided with the same pitch as the slide guide holes 33a, 34a, and function to regulate a movement range of each slider 33, 34 by being in contact with the both ends of the slide guide holes 33a, 34a.

[0022] Each of the upper slider 33 and the lower slider 34 includes a rack (interlocking member) 36 in the middle part, and lock members 37 at the both ends. The racks 36 are fixed to surfaces of the sliders 33, 34 facing each other, and include teeth with the same pitch at the parts facing each other. Interlocking gears (interlocking members) 38 are provided between the racks 36. The interlocking gear 38 is arranged in the device main body 31 to be turnable with an axis 38a along the depth direction as a center, and is engaged with the rack 36 of each of the sliders 33, 34. In the embodiment, two same interlocking gears 38 are provided to be separate from each other, and each of them is engaged with the rack 36 of the sliders 33, 34. The upper slider 33 and the lower slider 34 engaged with the interlocking gears 38 through the racks 36 are interlocked with each other to be moved in mutually opposite directions. The lock member 37 has a prism shape, and is fixed at the ends of the sliders 33, 34, on the surfaces facing each other. Each lock member 37 includes a recessed groove-shaped slide guide 37a, and is movable together with the sliders 33, 34 relative to the device main body 31 in the state where rails 39 provided in the device main body 31 are engaged with the slide guides 37a. The lock members 37 attached to the sliders 33, 34 has a size storable in the device main body 31 together with the sliders 33, 34 when the sliders 33, 34 are stored in the device main body 31.

[0023] Input members 50 are connected to the upper slider 33, and lifting drive members 60 are connected to the lower slider 34. The input member 50 includes an interlocking hole 51 allowing insertion of the interlocking pin 5 provided at the lower rail 23 thereto when the device main body 31 is positioned at the standard position, and is connected to the upper surface of the upper slider 33. To be more specific, the input member 50 is connected to the upper slider 33 so that the interlocking pin 5 is inserted into the interlocking hole 51 when the action

member 3 is arranged at the lock position in the state where the upper slider 33 is moved to the rightmost side of the device main body 31 and the lower slider 34 is moved to the leftmost side thereof when viewed from the indoor side. As is clear from the drawings, the interlocking hole 51 of the input member 50 is long along the depth direction. When the interlocking pin 5 is inserted into the interlocking hole 51, the interlocking hole 51 allows relative movement along the depth direction of the input member 50, and restrict relative movement along the longitudinal direction of the upper slider 33. That is, even in the state where the interlocking pin 5 is inserted into the interlocking hole 51 of the input member 50, it is possible to turn the device main body 31 relative to the lower rail 23 with the tilt axis 41 of the hinge 40 as a center. Meanwhile, when the action member 3 is moved in the state where the interlocking pin 5 is inserted into the interlocking hole 51 of the input member 50, the interlocking pin 5 engages with the input member 50, whereby the upper slider 33 is interlocked with the action member 3, and the lower slider 34 is interlocked with the action member 3 through the rack 36 and the interlocking gear 38.

[0024] To be more specific, when the action member 3 is arranged at the lock position, the lock member 37 provided at the upper slider 33 projects outward from the right side of the device main body 31, and the lock member 37 provided at the lower slider 34 projects outward from the left side of the device main body 31 (advanced position of the lock member 37), as illustrated in FIG. 11A. When the action member 3 is arranged to the open position from this state, the lock member 37 provided at the upper slider 33 and the lock member 37 provided at the lower slider 34 are both stored in the device main body 31 (retreated position of the lock member 37), as illustrated in FIG. 11B. Furthermore, when the action member 3 is arranged to the tilt position from this state, the upper slider 33 is moved to the leftmost side so that the lock member 37 projects outward from the left side of the device main body 31, and the lower slider 34 is moved to the rightmost side so that the lock member 37 projects outward from the right side of the device main body 31 (advanced position of the lock member 37), as illustrated in FIG. 11C. As is clear from the drawings, in the embodiment, the input members 50 with the same shape are provided in a plurality of positions of the upper slider 33. Each of the input members 50 includes an engagement portion 52. The engagement portion 52 projects to the outdoor side from the upper edge portion at a part facing the outdoor side of the input member 50.

[0025] The lifting drive member 60 connects an upper member 61 and a lower member 62 thereof, and thus forms a tilt drive hole 60a therebetween. The tilt drive hole 60a is symmetrical to be inclined so that the both ends are lower and the center part is higher when viewed from the indoor side, and is connected to the lower surface of the lower slider 34. The lifting drive members 60 with the same shape are also provided at a plurality of positions of the lower slider 34.

[0026] Moreover, a watertightness ensuring member 70 is provided in the device main body 31. The watertightness ensuring member 70 is a block-shaped member formed so that the size along the longitudinal direction of the lower rail 23 is substantially same as that of the device main body 31, and holds watertightness members 71 on both the lower surface and the side surface facing the device main body 31. The watertightness member 71 has a regular shape for securing desirable watertightness relative to the device main body 31 and to the lower frame 12, and is provided entirely on the lower surface and the side surface of the watertightness ensuring member 70. The watertightness ensuring member 70 includes a support shaft 72 at the side surface facing the device main body 31. The support shaft 72 has a column shape extending along the depth direction, and the number thereof corresponds to that of the above-described lifting drive members 60. Such a support shaft 72 is inserted into the tilt drive hole 60a of the lifting drive member 60 through a lifting guide 73 fixed to the device main body 31. The lifting guide 73 includes a lifting guide hole 73a along the vertical direction, and restricts right-left movement of the inserted support shaft 72 relative to the device main body 31.

[0027] Meanwhile, the attachment device 30 includes hook members 80 for attachment to the lower rail 23 and lock reception members 90 for attachment to the right and left vertical frames 13, 14, as illustrated in FIG. 8. The hook member 80 is fixed to the edge portion positioned on the outdoor side of the outer peripheral side depth surface 23a of the lower rail 23, and the number of the hook members 80 corresponds to that of the input members 50 of the device main body 31. Each hook member 80 projects downward and then bends to the indoor side. Such a hook member 80 may engage with the engagement portion 52 of the input member 50 in the state where the device main body 31 is arranged at the standard position, and is able to block, when engaged, a turn of the device main body 31 relative to the lower rail 23 with the tilt axis center C2 as a center. In the embodiment, as illustrated in FIG. 10, the hook member 80 is provided to the lower rail 23 so as to engage with the engagement portion 52 of the input member 50 when the action member 3 is arranged at the lock position or the open position in the state where the interlocking pin 5 is inserted into the input member 50, and so as to release the engagement between the hook member 80 and the engagement portion 52 of the input member 50 when the action member 3 is arranged at the tilt position.

[0028] The lock reception member 90 is fixed to parts corresponding to both ends of the device main body 31 in the right and left vertical frames 13, 14, and includes engagement recessed portions 91 at parts facing the end surface of the lock member 37, as illustrated in FIGS. 8 and 9. The engagement recessed portion 91 is a recess open to the indoor side and closed on the outdoor side, and is able to house the lock member 37 projecting from the device main body 31.

[0029] The following will describe the functions of the above-described attachment device 30, and specifically describe the characteristics of the invention of this application. Note that in the following description, the right and left corresponds to the direction viewed from the indoor side, for convenience.

[0030] In the attachment device 30 having the above-described structure, when the handle 4 is arranged at the locked position in the state where the sash 20 is closed, the action member 3 is arranged at the lock position. Thus, the upper slider 33 is moved rightward relative to the device main body 31, while the lower slider 34 is moved leftward. Therefore, the lock member 37 provided at the upper slider 33 engages with the lock reception member 90 of the right vertical frame 13, and the lock member 37 provided at the lower slider 34 engages with the lock reception member 90 at the left vertical frame 14. In this manner, in the state where the sash 20 is locked relative to the frame body 10, the movement of the device main body 31 to the indoor side is blocked, thereby preventing deterioration of crime-prevention property of the fitting.

[0031] Moreover, when the handle 4 is arranged at the locked position, the lifting drive member 60 connected to the lower slider 34 is also moved to the left side relative to the device main body 31. Thus, the support shaft 72 of the watertightness ensuring member 70 is guided downward by the tilt drive hole 60a, thereby keeping the state where the watertightness ensuring member 70 is moved downward relative to the device main body 31, as illustrated in FIG. 12. In this manner, the watertightness member 71 provided on the lower surface of the watertightness ensuring member 70 is in pressure contact with the inner peripheral side depth surface of the lower frame 12.

[0032] As described above, in the state where the action member 3 is arranged at the lock position, the engagement portion 52 of the input member 50 engages with the hook member 80, which blocks a turn of the device main body 31 relative to the lower rail 23 and keeps the device main body 31 at the standard position. Thus, the sealing members 15, 26 provided on the outer peripheral fin parts 22b, 23b, 24b, 25b of the lower rail 23 are in pressure contact with the device main body 31, and the fin-shaped sealing member 32 attached on the inner peripheral side depth surface 31c is in contact with the lower rail 23. Furthermore, the fin-shaped sealing member 32 attached on the outer peripheral side depth surface 31d is in contact with the inner peripheral side depth surface of the lower frame 12. At the both end portions of the device main body 31, the sealing members 15, 26 provided on the inner peripheral fin parts 11b, 13b, 14b of the vertical frames 13, 14 are in pressure contact with the face surface facing the outdoor side, although this is not illustrated in the drawings. Consequently, it is possible to secure desirable watertightness between the lower rail 23 and the device main body 31 and between the device main body 31 and the lower frame 12, which

prevents entry of outdoor water such as rainwater to the indoor side.

[0033] When the handle 4 is operated to the inward-opening position from the above-described state, the action member 3 is arranged at the open position. Thus, the lock members 37 are all stored in the device main body 31. As described above, when the handle 4 is arranged at the inward-opening position, the upper support unit 2 is kept locked, which allows the sash 20 to be opened relative to the frame body 10 with the open axis center C1 as a center. Here, the lifting drive member 60 connected to the lower slider 34 is moved rightward relative to the device main body 31, whereby the support shaft 72 of the watertightness ensuring member 70 is arranged at the upmost side. Thus, the watertightness ensuring member 70 is kept in the uppermost position relative to the device main body 31, as illustrated in (a) of FIG. 13. Consequently, the watertightness member 71 provided on the lower surface of the watertightness ensuring member 70 is separated from the inner peripheral side depth surface of the lower frame 12, which prevents a possibility that the watertightness member 71 impedes opening and closing of the sash 20 with the open axis center C1 as a center.

[0034] Note that when the handle 4 is returned to the locked position in the state where the sash 20 is open, the watertightness ensuring member 70 is moved downward relative to the device main body 31, as illustrated in (b) of FIG. 13, whereby a part of the watertightness member 71 on a side of the open axis center C1 is brought into contact with the inner peripheral side depth surface of the lower frame 12. Therefore, it is possible to temporarily fix the sash 20 in the open state, which prevents a case where the sash 20 is closed unnecessarily, for example.

[0035] Meanwhile, when the handle 4 is operated to the inward-tilt position from the state where the sash 20 is closed, the action member 3 is arranged to the tilt position. Thus, the upper slider 33 is moved leftward relative to the device main body 31, while the lower slider 34 is moved rightward. Therefore, the lock member 37 provided at the upper slider 33 engage with the lock reception member 90 of the left vertical frame 14, and the lock member 37 provided at the lower slider 34 engages with the lock reception member 90 of the right vertical frame 13, which prevents movement of the device main body 31 to the indoor side. Here, the lifting drive member 60 connected to the lower slider 34 is moved rightward relative to the device main body 31, whereby the support shaft 72 of the watertightness ensuring member 70 is guided upward and then downward again. Then, the watertightness ensuring member 70 is moved downward relative to the device main body 31 and is kept in this state, as illustrated in FIG. 14. In this manner, the watertightness member 71 provided on the lower surface of the watertightness ensuring member 70 is in pressure contact with the inner peripheral side depth surface of the lower frame 12.

[0036] As described above, when the handle 4 is arranged to the inward-tilt position, the upper support unit 2 is unlocked, which allows the upper rail 22 to move in parallel with the upper frame 11. Here, in the attachment device 30, the engagement state between the engagement portion 52 of the input member 50 and the hook member 80 is released. Thus, the device main body 31 can turn relative to the lower rail 23 with the tilt axis center C2 as a center. This enables the sash 20 to turn relative to the device main body 31 with the tilt axis center C2 as a center, which allows the sash 20 to be tilted inward relative to the frame body 10.

[0037] Note that in the above-described embodiment, the device main body 31 is turnably attached to the lower rail 23, which allows the sash 20 to be tilted inward relative to the frame body 10. However, it is not necessarily required to turnably attach the device main body 31 to the lower rail 23, and the device main body 31 may be fixed directly to the lower rail 23. In this case, the engagement portion 52 of the input member 50, the hook member 80, and the lock member 37 are not necessarily required, and it is sufficient if a hinge is simply used as the support unit between the frame body 10 and the sash 20. Moreover, the movement of the input member 50 is transmitted to the lifting drive member 60 through the upper and lower sliders 33, 34 and the interlocking gear 38. However, the lifting drive member 60 may be operated directly by the movement of the input member 50.

[0038] As described above, the attachment device for a fitting according to the invention is configured to be openable relative to a frame body with a vertical open axis center as a center, together with a sash including an action member acting with an operation of a handle when the action member is moved from a lock position to an open position. The attachment device includes a device main body that is attached to a lower rail of the sash, an input member that is movably provided relative to the device main body and is linked to the action member, a watertightness ensuring member that is provided in the device main body to be movable along a vertical direction of the sash, the watertightness ensuring member being configured to hold a watertightness member, and an linking mechanism configured to link the input member to the watertightness ensuring member and moves the watertightness ensuring member relative to the device main body through movement of the input member, in which the linking mechanism is configured to move the watertightness ensuring member downward when the action member is arranged at the lock position, and move the watertightness ensuring member upward when the action member is arranged at the open position.

[0039] In the invention, the watertightness ensuring member is vertically movably provided in the device main body attached to the lower rail. Thus, when the action member is arranged at the lock position, that is, when the sash is closed, the watertightness ensuring member is moved downward so that the watertightness member is brought in pressure contact with the lower frame, while

the watertightness ensuring member is moved upward when the action member is arranged at the open position, that is, when the sash is opened and moved. In this manner, it is possible to secure desirable watertightness between the sash and the frame body when the sash is closed, without providing any projection such as an inner peripheral fin part on the lower frame. Therefore, the invention may be also applied to a building considering barrier-free design, and has no restriction for installation of the fitting.

[0040] The above-described attachment device for a fitting according to the invention further includes a hook member that is fixed to the lower rail, and a hinge configured to connect the device main body to the lower rail to be turnable with a tilt axis center as a center along a longitudinal direction of the lower rail, in which at least one of the input member and the linking mechanism includes an engagement portion configured to engage with the hook member when the action member is arranged at the lock position or the open position, so as to block a turn of the device main body with the tilt axis center as a center, and release the engagement with the hook member when the action member is moved to a tilt position passing the lock position and the open position, so as to allow a turn of the device main body with the tilt axis center as a center.

[0041] In the invention, the part between the lower rail and the device main body is rotatable with the tilt axis center as a center. This allows the sash to be tilted relative to the device main body.

[0042] The above-described attachment device for a fitting according to the invention is characterized in that the device main body includes a lock member interlocking with the input member, and the lock member is positioned at an advanced position advanced from the device main body when the action member is arranged at the lock position, and is positioned at a retreated position retreated relative to the device main body when the action member is arranged at the open position.

[0043] In the invention, when the action member is arranged at the lock position, the lock member is arranged at the advanced position. Thus, for example, engaging the lock member with the frame body can block the movement of the device main body relative to the frame body. It is not required to store the lock member arranged at the retreated position in the device main body, and it is sufficient if the lock member is retreated relative to the advanced position.

[0044] The above-described attachment device for a fitting according to the invention is characterized in that the device main body includes a lock member interlocking with the input member, and the lock member is positioned at an advanced position advanced from the device main body when the action member is arranged at the lock position or the tilt position, and is positioned at a retreated position retreated relative to the device main body when the action member is arranged at the open position.

[0045] In the invention, when the action member is arranged at the lock position or the tilt position, the lock member is arranged at the advanced position. Thus, for example, engaging the lock member with the frame body can block the movement of the device main body relative to the frame body. It is not required to store the lock member arranged at the retreated position in the device main body, and it is sufficient if the lock member is retreated relative to the advanced position.

[0046] The attachment device for a fitting according to the invention further includes a lock reception member that is fixed to a vertical frame of the frame body, in which the lock member is configured to engage with the lock reception member when the lock member is arranged at the advanced position.

[0047] In the invention, the lock reception member with which the lock member is engaged is formed separately from the vertical frame. Thus, it becomes unnecessary to process the vertical frame so that the lock member is engaged therewith.

[0048] The above-described attachment device for a fitting according to the invention is characterized in that the linking mechanism includes upper and lower two sliders that are provided in the device main body so as to be movable along the longitudinal direction of the lower rail, an interlocking member configured to interlock the upper and lower two sliders, and a lifting drive member that is linked to the watertightness ensuring member, and the input member is connected to the slider arranged on an upper side of the device main body, and the lifting drive member is connected to the slider arranged on a lower side of the device main body.

[0049] In the invention, it is possible to adjust a distance between the input member and the lifting drive member, which allows application to more kinds of fittings.

[0050] The above-described attachment device for a fitting according to the invention is characterized in that at least one of the upper and lower two sliders includes the lock member at an end.

[0051] In the invention, it is possible to engage the lock member with the vertical frame through movement of the sliders.

[0052] The above-described attachment device for a fitting according to the invention is characterized in that the interlocking member includes an interlocking gear that is turnably provided between the upper and lower two sliders, and racks connected to the upper and lower two sliders, in which the each of the racks is engaged with the interlocking gear.

[0053] In the invention, the two sliders are interlocked in mutually different directions. Thus, if the lock member is provided at the ends of the sliders, the lock members may engage with the vertical frames on the both sides at the same time. Note that the interlocking member is not limited to the combination of the interlocking gear and the rack, and a belt may be used, for example, to interlock the upper and lower sliders. Moreover, it is not necessary that the two sliders move in mutually different directions,

and they may be interlocked in the same direction. Furthermore, it is also possible to transmit movement of the input member to the lifting drive member through an endless belt, without using the sliders.

[0054] The above-described attachment device for a fitting according to the invention is characterized in that the watertightness ensuring member includes a support shaft extending horizontally along a direction crossing a moving direction of the slider, the device main body includes a lifting guide allowing vertical movement of the support shaft and blocking movement of the support shaft along the longitudinal direction of the lower rail, and the lifting drive member includes a tilt guide hole tilted vertically along the longitudinal direction of the lower rail, and the support shaft is inserted into the tilt guide hole through the lifting guide.

[0055] In the invention, it is possible to easily adjust vertical movement of the watertightness ensuring member by changing a tilt angle of the tilt guide hole.

[0056] Furthermore, the fitting of the invention is characterized in that the above-described attachment device for a fitting is attached on a lower surface of a lower rail included in a sash.

[0057] In the invention, the watertightness ensuring member is vertically movably provided in the device main body attached on the lower rail, and the watertightness ensuring member is moved downward so that the watertightness member is in pressure contact with the lower frame, while the watertightness ensuring member is moved upward when the sash is opened and moved. Thus, it is possible, when the sash is closed, to secure desirable watertightness between the sash and the frame body without providing a projection such as an inner peripheral fin part on the lower frame. Therefore, the invention may be also applied to a building considering barrier-free design, and has no restriction for installation of the fitting.

[0058] Although the invention has been described with respect to specific embodiments for a complete and clear disclosure, the appended claims are not to be thus limited but are to be construed as embodying all modifications and alternative constructions that may occur to one skilled in the art that fairly fall within the basic teaching herein set forth.

Claims

1. An attachment device (30) for a fitting, the attachment device (30) being configured to be openable relative to a frame body (10) with a vertical open axis center (C1) as a center, together with a sash (20) including an action member (3) acting with an operation of a handle (4) when the action member (3) is moved from a lock position to an open position, the attachment device (30) comprising:

a device main body (31) that is attached to a

lower rail (23) of the sash (20);
 an input member (50) that is movably provided relative to the device main body (31) and is linked to the action member (3);
 a watertightness ensuring member (70) that is provided in the device main body (31) to be movable along a vertical direction of the sash (20), the watertightness ensuring member (70) being configured to hold a watertightness member (71); and
 a linking mechanism configured to link the input member (50) to the watertightness ensuring member (70) to move the watertightness ensuring member (70) relative to the device main body (31) through movement of the input member (50), wherein the linking mechanism is configured to:

move the watertightness ensuring member (70) downward when the action member (3) is arranged at the lock position; and
 move the watertightness ensuring member (70) upward when the action member (3) is arranged at the open position.

2. The attachment device (30) for a fitting according to claim 1, further comprising:

a hook member (80) that is fixed to the lower rail (23); and
 a hinge (40) configured to connect the device main body (31) to the lower rail (23) to be turnable with a tilt axis center (C2) along a longitudinal direction of the lower rail (23) as a center, wherein at least one of the input member (50) and the linking mechanism includes an engagement portion (52) configured to

engage with the hook member (80) when the action member (3) is arranged at the lock position or the open position, so as to block a turn of the device main body (31) with the tilt axis center (C2) as a center, and release the engagement with the hook member (80) when the action member (3) is moved to a tilt position passing the lock position and the open position, so as to allow a turn of the device main body (31) with the tilt axis center (C2) as a center.

3. The attachment device (30) for a fitting according to claim 1, wherein the device main body (31) includes a lock member (37) interlocking with the input member (50), and the lock member (37) is positioned at an advanced position advanced from the device main body (31) when the action member (3) is arranged at the lock

position, and is positioned at a retreated position retreated relative to the device main body (31) when the action member (3) is arranged at the open position.

4. The attachment device (30) for a fitting according to claim 2, wherein the device main body (31) includes a lock member (37) interlocking with the input member (50), and the lock member (37) is positioned at an advanced position advanced from the device main body (31) when the action member (3) is arranged at the lock position or the tilt position, and is positioned at a retreated position retreated relative to the device main body (31) when the action member (3) is arranged at the open position.

5. The attachment device (30) for a fitting according to claim 3 or 4, further comprising:

a lock reception member (90) that is fixed to a vertical frame (13,14) of the frame body (10), wherein the lock member (37) is configured to engage with the lock reception member (90) when the lock member (37) is arranged at the advanced position.

6. The attachment device (30) for a fitting according to claim 3 or 4, wherein the linking mechanism includes upper and lower two sliders (33,34) that are provided in the device main body (31) so as to be movable along the longitudinal direction of the lower rail (23), an interlocking member configured to interlock the upper and lower two sliders (33,34), and a lifting drive member (60) that is linked to the watertightness ensuring member (70), and the input member (50) is connected to the slider (33) arranged on an upper side of the device main body (31), and the lifting drive member (60) is connected to the slider (34) arranged on a lower side of the device main body (31).

7. The attachment device (30) for a fitting according to claim 6, wherein at least one of the upper and lower two sliders (33,34) includes the lock member (37) at an end.

8. The attachment device (30) for a fitting according to claim 6, wherein the interlocking member includes an interlocking gear (38) that is turnably provided between the upper and lower two sliders (33,34), and racks (36) connected to the upper and lower two sliders (33,34), and each of the racks (36) is engaged with the interlocking gear (38).

9. The attachment device (30) for a fitting according to claim 6, wherein the watertightness ensuring member (70) includes a support shaft (72) extending horizontally along a direction crossing a moving direction of the slider (33,34),
the device main body (31) includes a lifting guide (73) allowing vertical movement of the support shaft (72) and blocking movement of the support shaft (72) along the longitudinal direction of the lower rail (23), and
the lifting drive member (60) includes a tilt drive hole (60a) tilted vertically along the longitudinal direction of the lower rail (23), and the support shaft (72) is inserted into the tilt drive hole (60a) through the lifting guide (73).

10. A fitting, comprising:

a sash (20); and
the attachment device (30) for a fitting according to any one of claims 1 to 9, wherein
the attachment device (30) for a fitting is attached on a lower surface of a lower rail (23) included in the sash (20).

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FIG.1

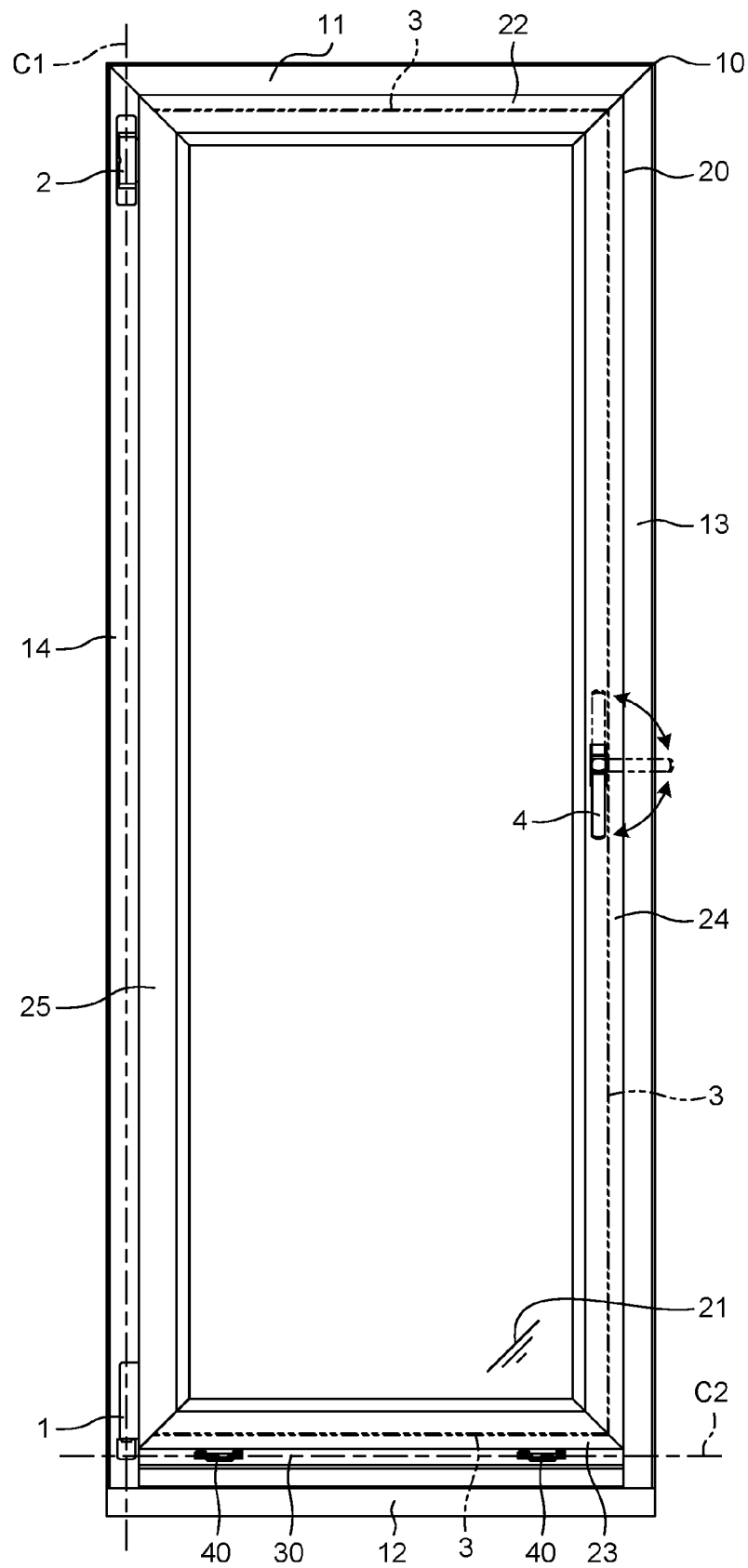
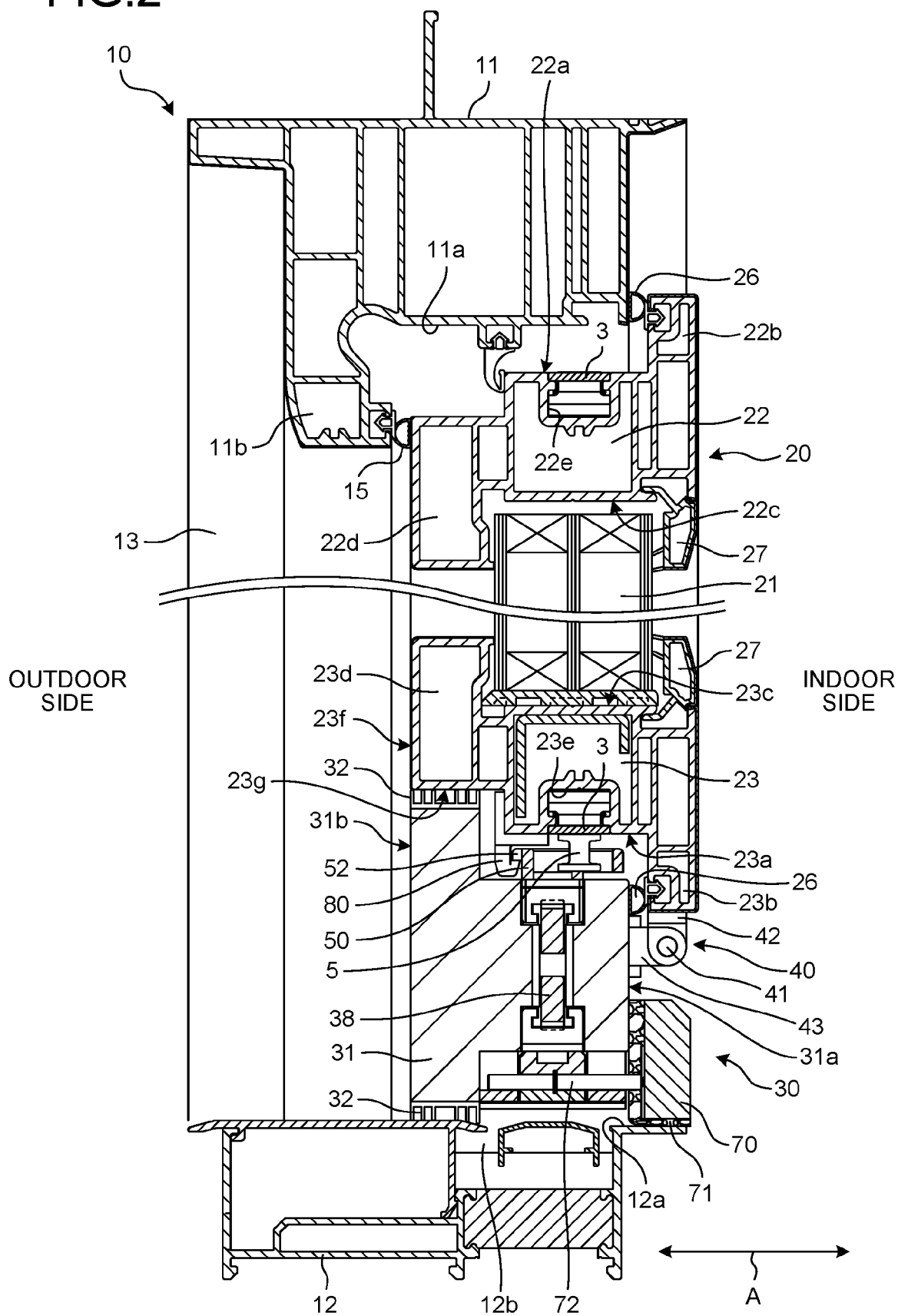


FIG.2



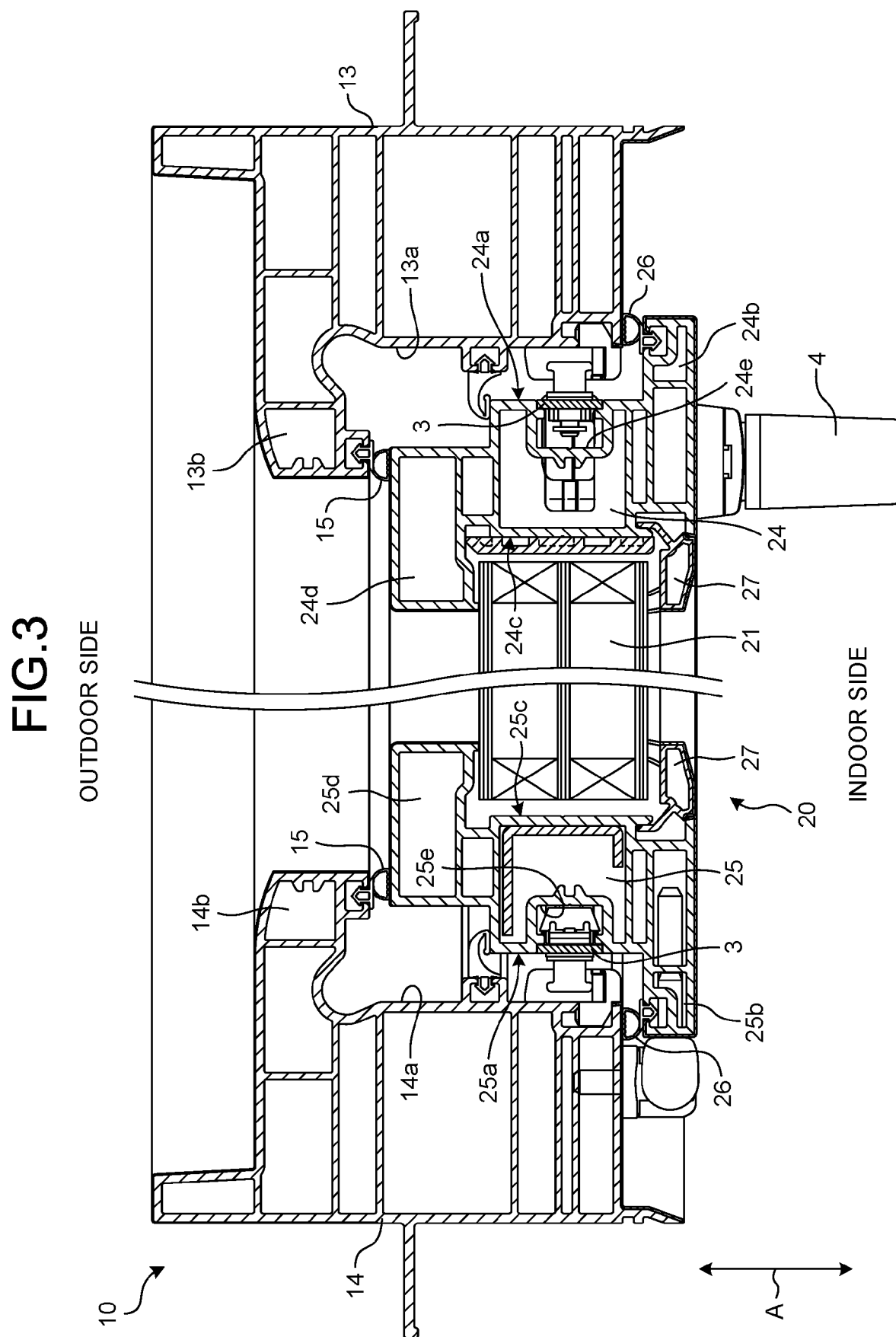
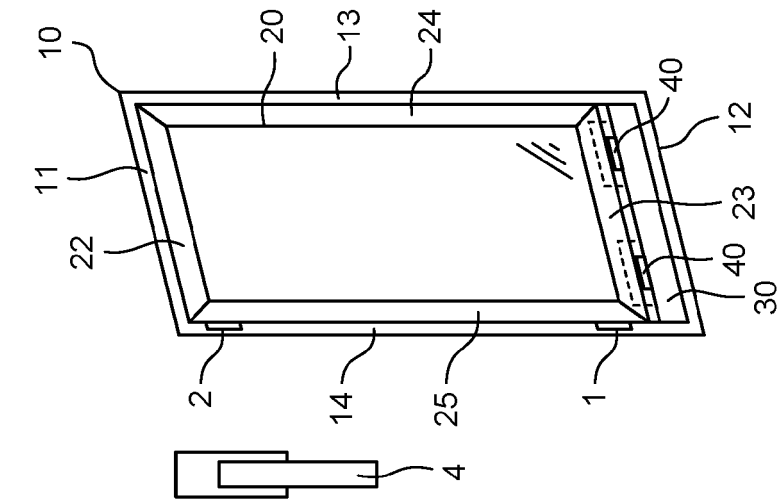
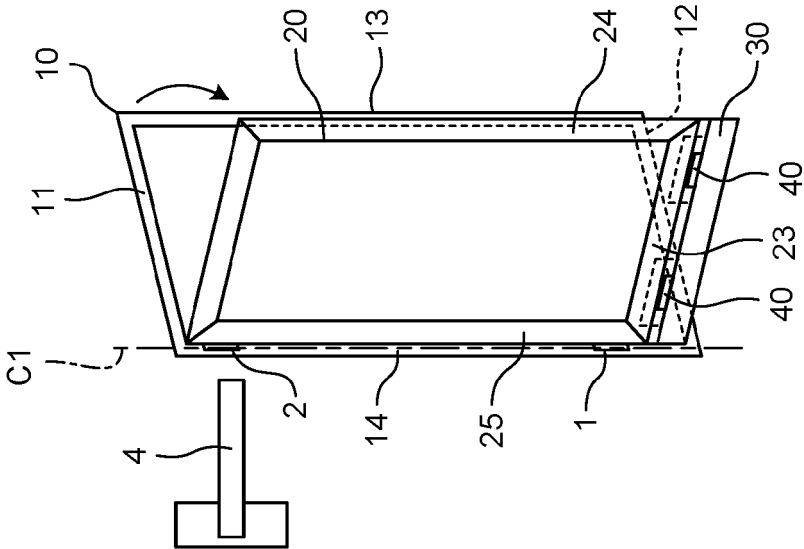


FIG.4A



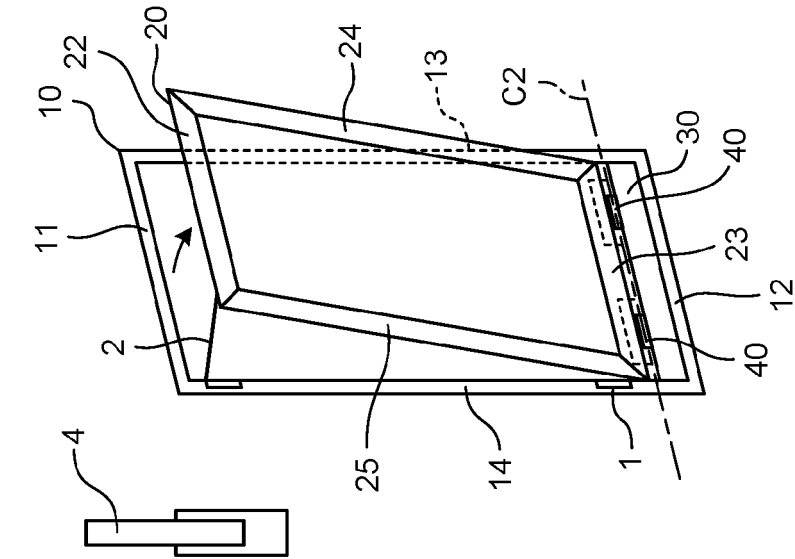
CLOSED POSITION

FIG.4B



INWARD-OPENING
POSITION

FIG.4C



INWARD-TILT
POSITION

FIG.5

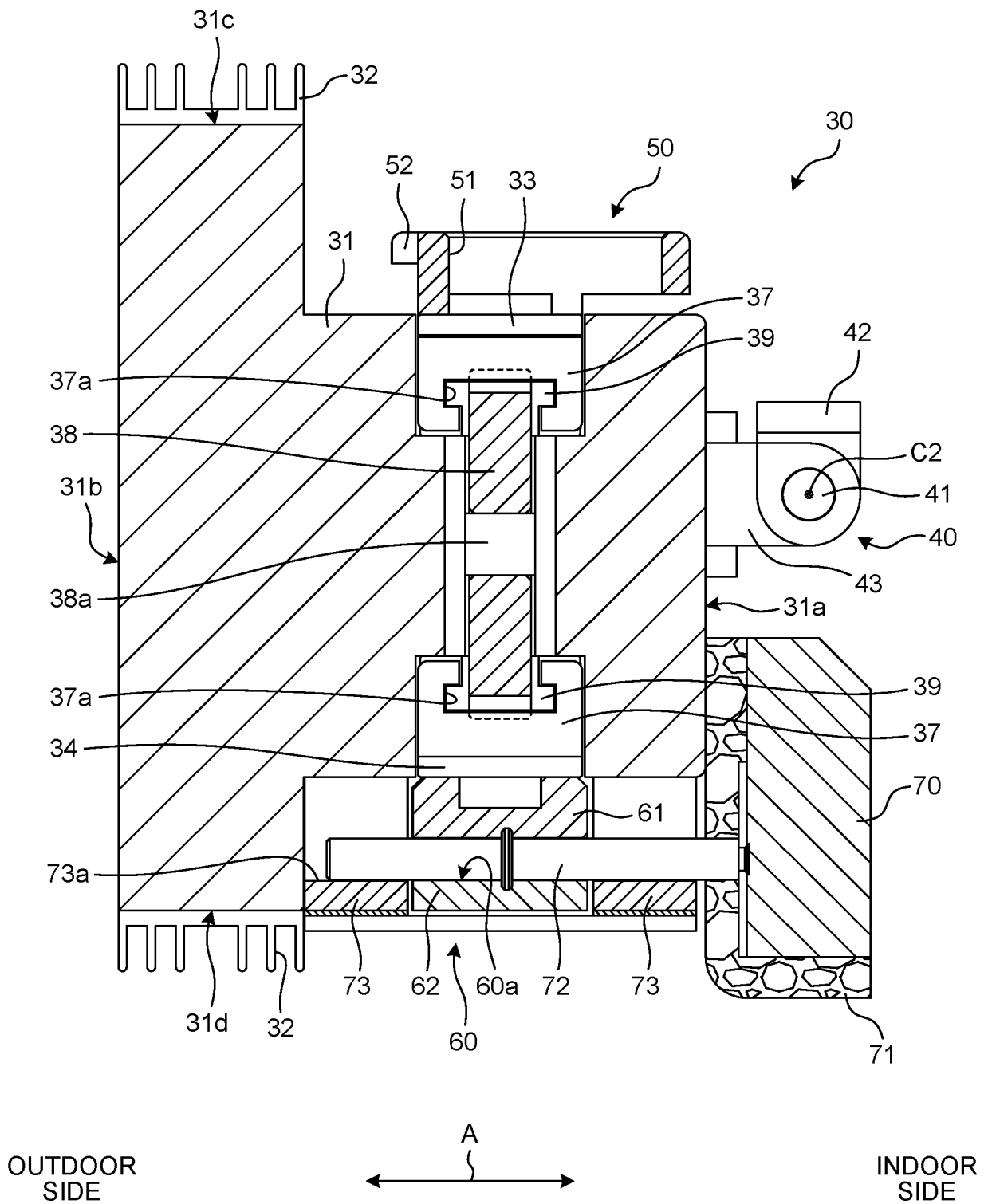


FIG.6

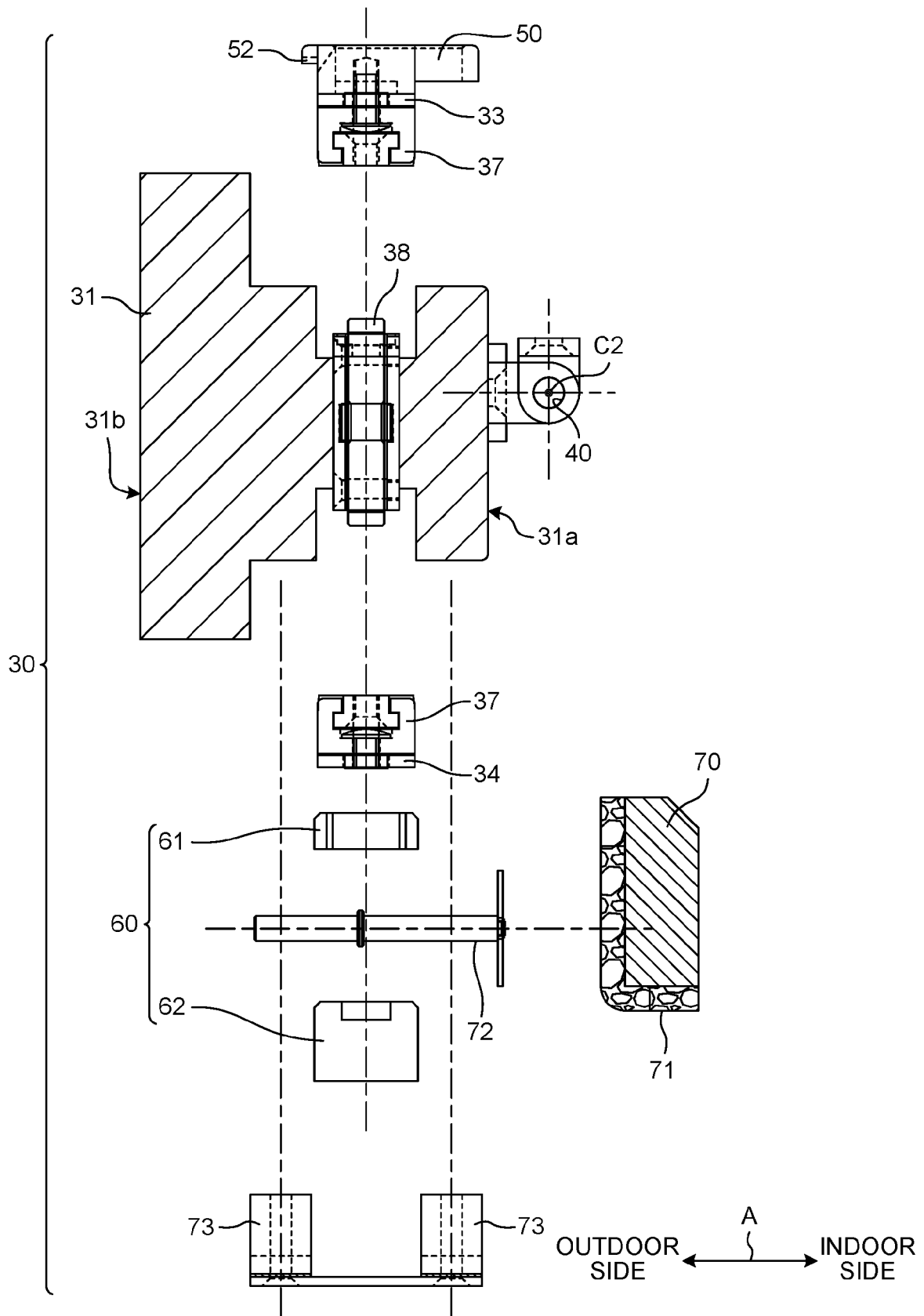


FIG.7A

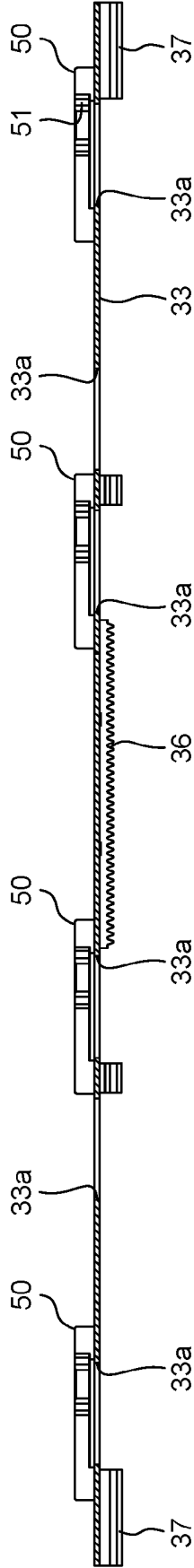


FIG.7B

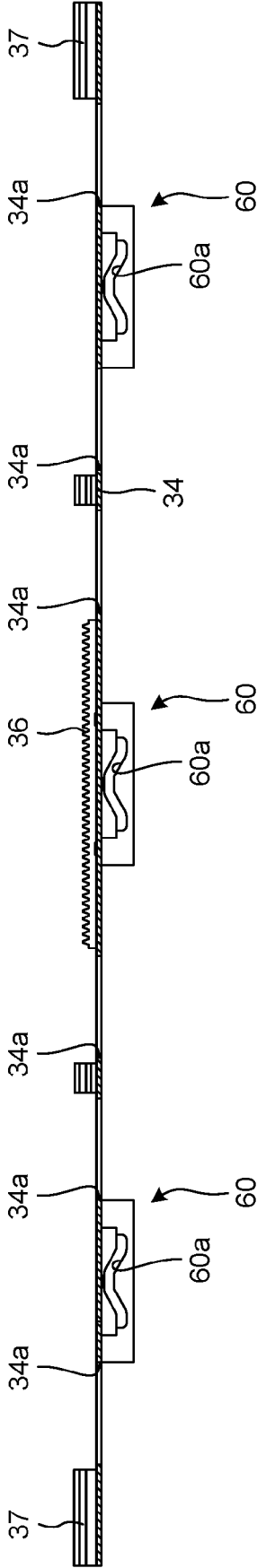


FIG.8

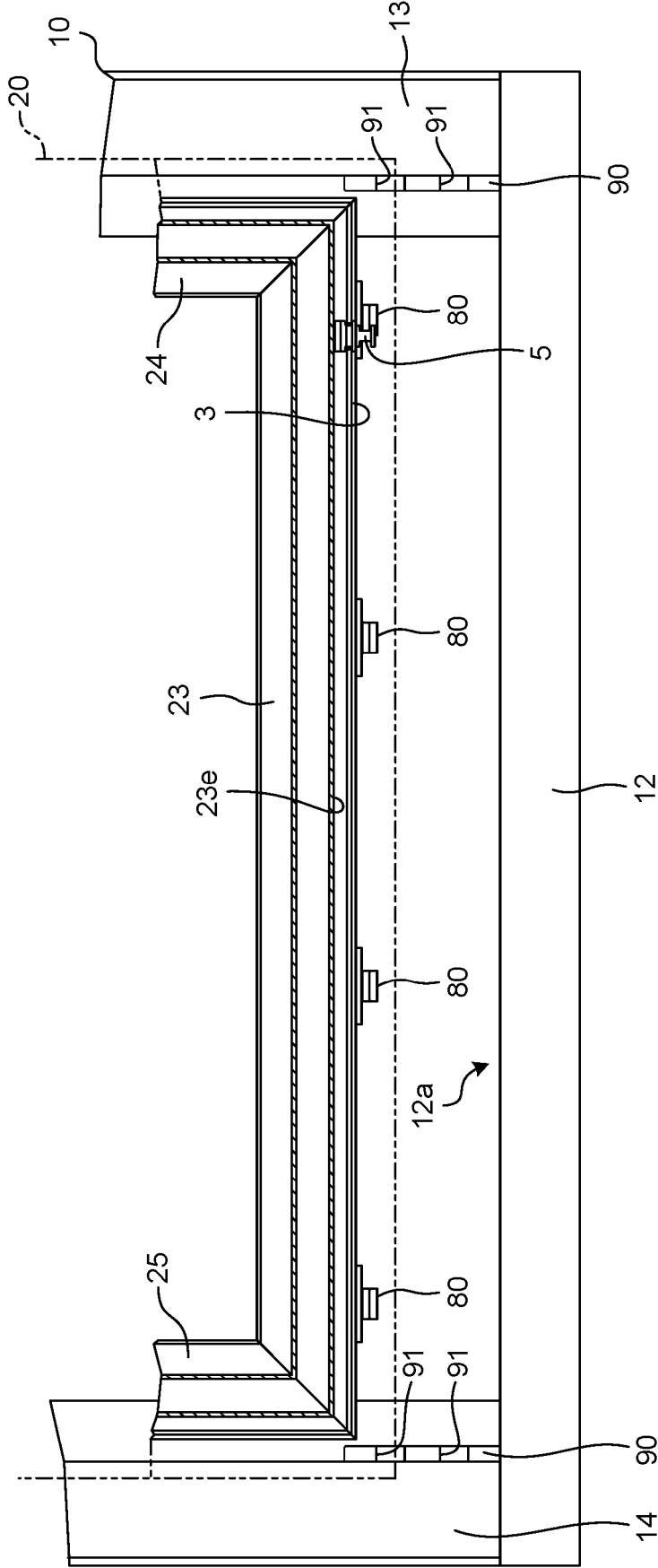


FIG.9

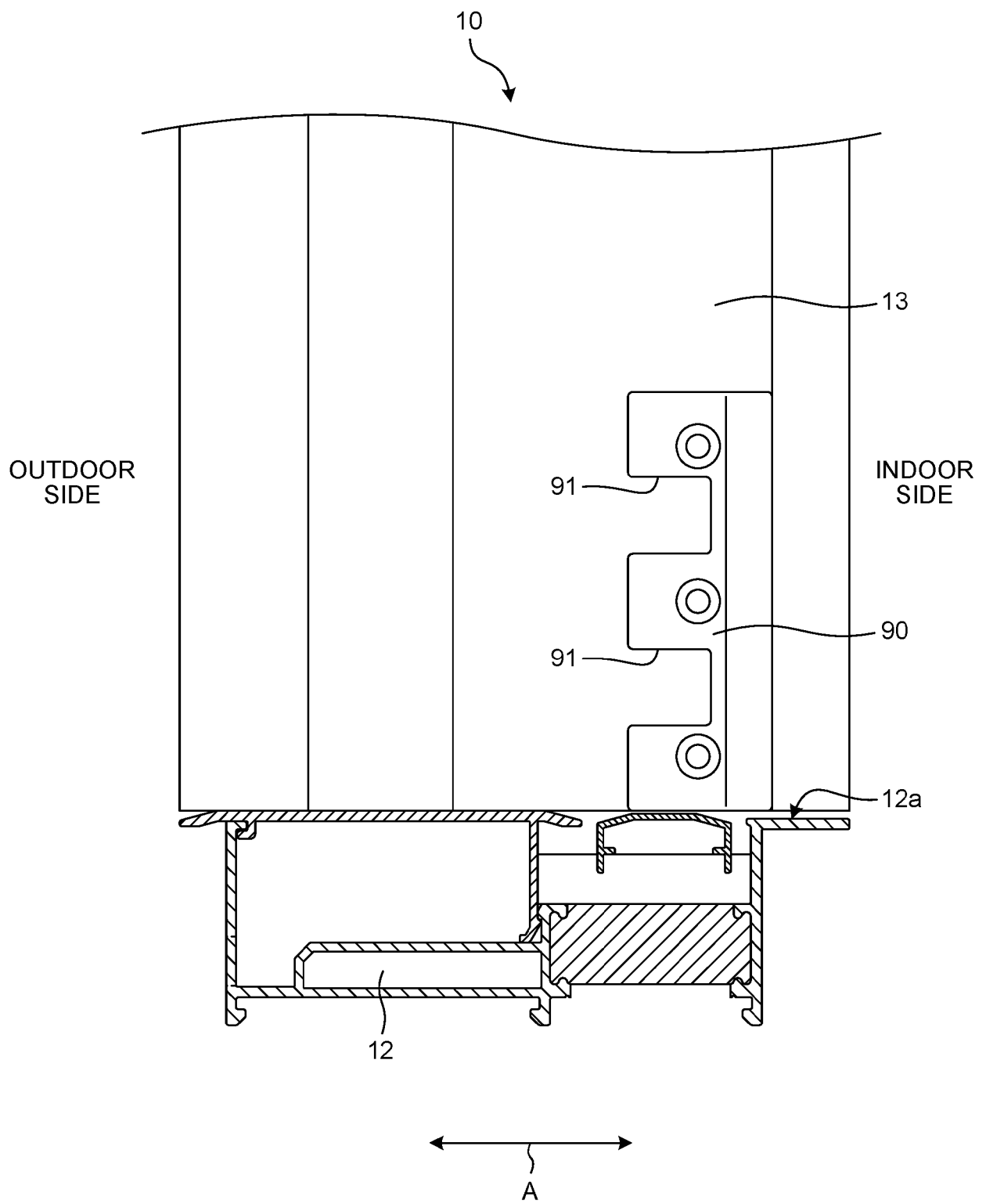


FIG.10

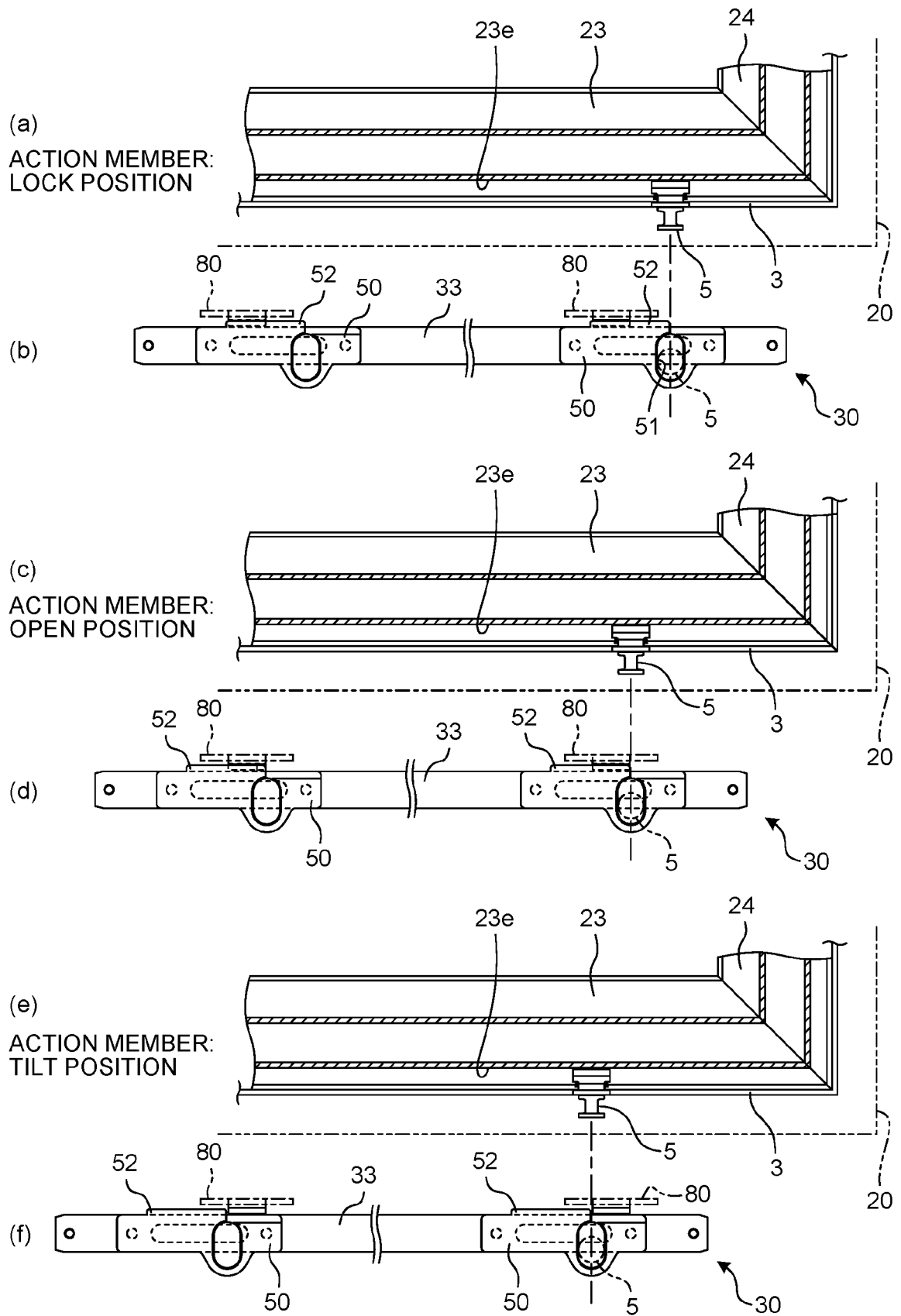


FIG.11A

ACTION MEMBER: LOCK POSITION
LOCK MEMBER: ADVANCED POSITION

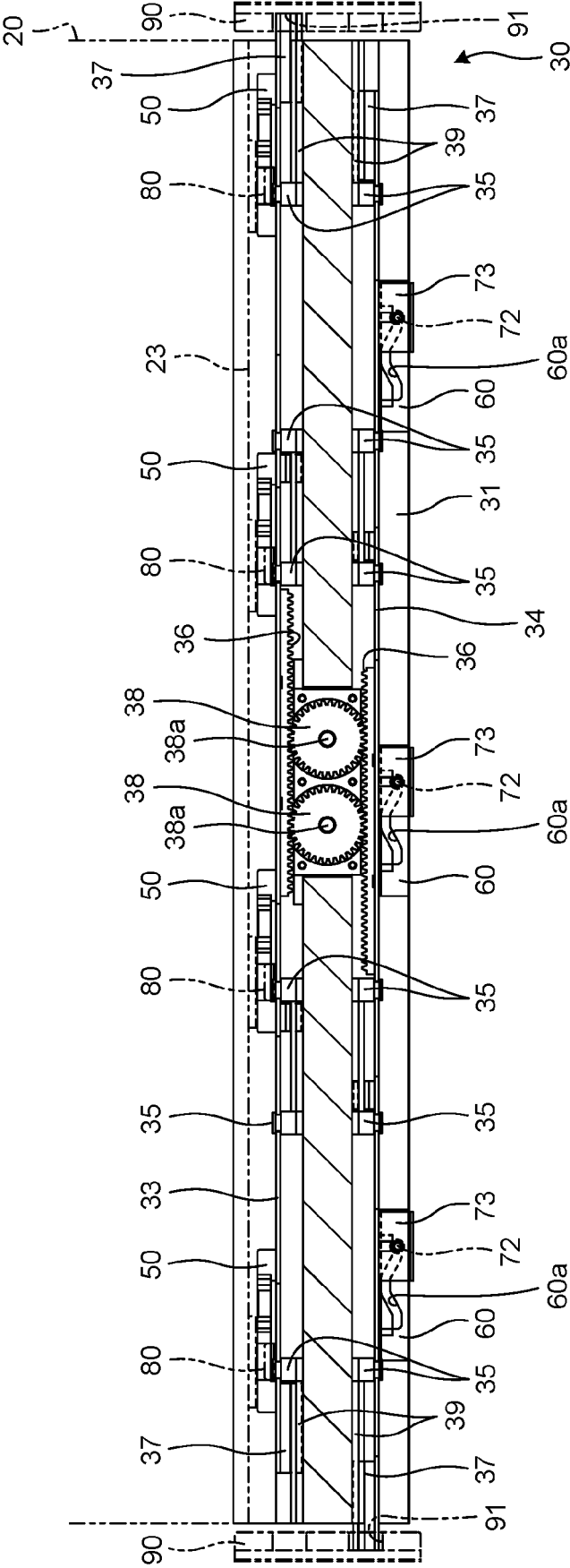


FIG.11B

ACTION MEMBER: OPEN POSITION
LOCK MEMBER: RETREATED POSITION

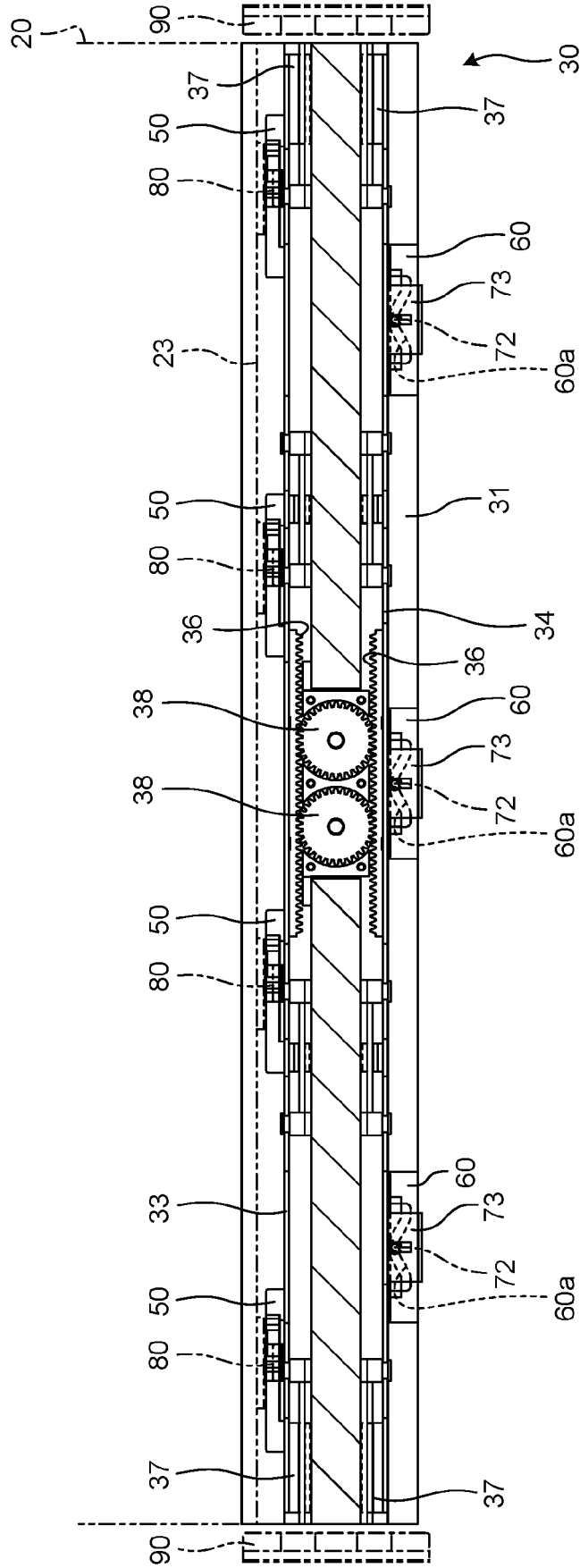


FIG.11C

ACTION MEMBER: TILT POSITION
LOCK MEMBER: ADVANCED POSITION

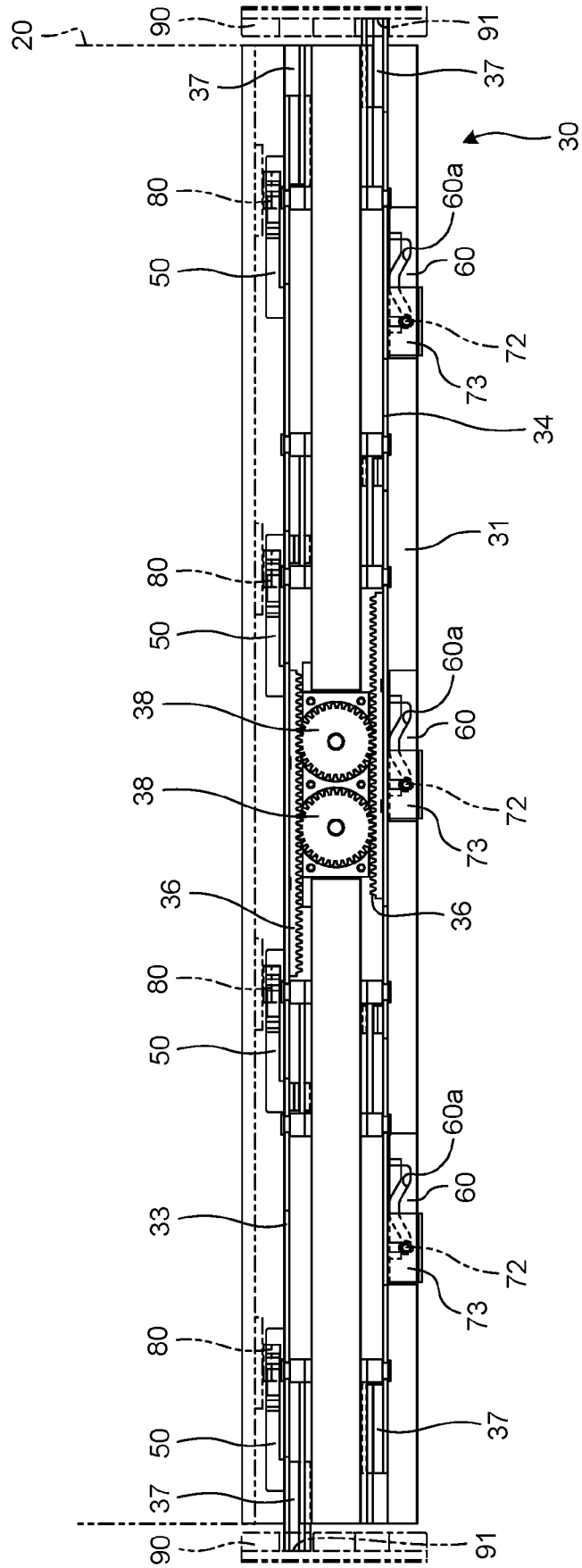


FIG.12

ACTION MEMBER: LOCK POSITION

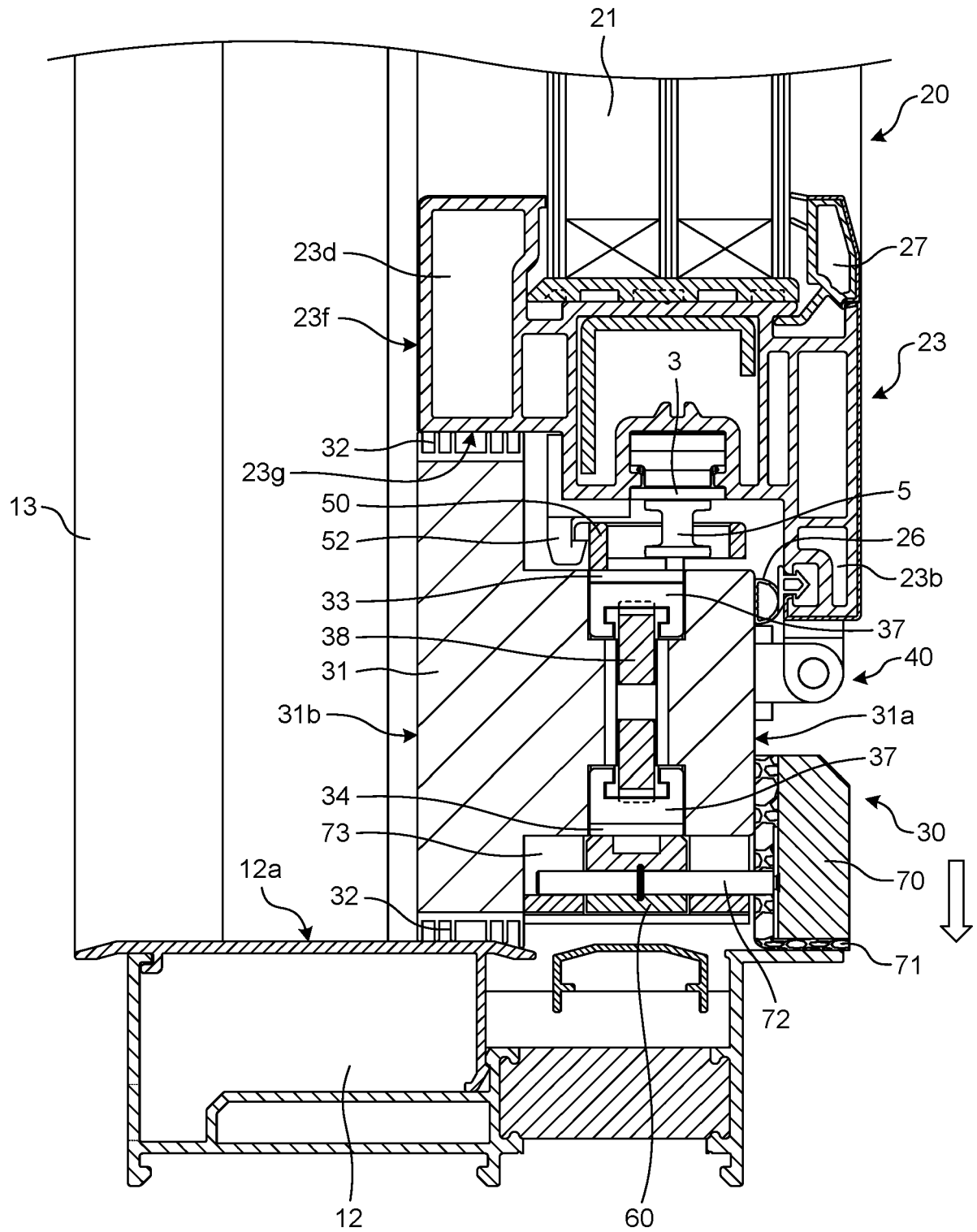
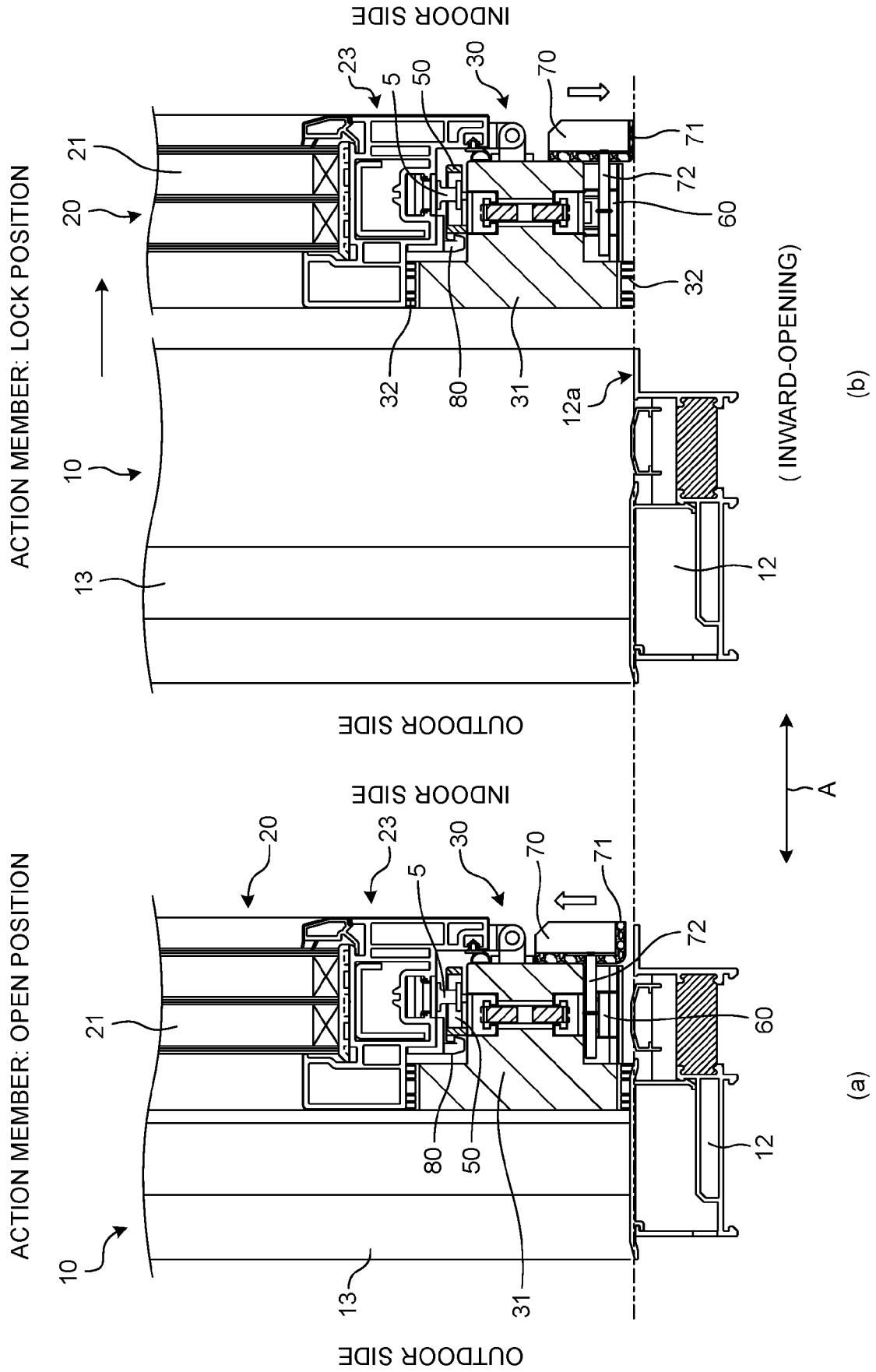


FIG. 13





EUROPEAN SEARCH REPORT

Application Number
EP 20 21 6826

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 3 550 102 A2 (EDS ELECTRIC DRIVE SOLUTION GMBH & CO KG [DE]) 9 October 2019 (2019-10-09)	1,10	INV. E05C9/04 E05C17/44
A	* paragraph [0052] - paragraph [0066]; figures 1-3 *	2-9	E06B7/20 E06B3/34 E05D15/52 E06B3/22
X	FR 2 660 692 A1 (ROTO FRANCK AG [DE]) 11 October 1991 (1991-10-11) * the whole document *	1,10	
X	US 2017/260799 A1 (SILLER PAUL T [US] ET AL) 14 September 2017 (2017-09-14) * the whole document *	1,10	
X	DE 297 20 978 U1 (ERNST KELLER GMBH & CO KG [DE]) 12 March 1998 (1998-03-12) * paragraph [0062] - paragraph [0069]; figures 3,4 *	1,10	
X	US 2009/077895 A1 (TSHAI ADI [US]) 26 March 2009 (2009-03-26) * paragraph [0051] - paragraph [0056]; figure 18 *	1,10	TECHNICAL FIELDS SEARCHED (IPC) E05C E06B E05G E05D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 2 June 2021	Examiner Ansel, Yannick
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 20 21 6826

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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02-06-2021

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 3550102 A2	09-10-2019	DE 102018204075 A1 EP 3550102 A2	19-09-2019 09-10-2019
FR 2660692 A1	11-10-1991	AT 398329 B DE 9004118 U1 FR 2660692 A1	25-11-1994 28-06-1990 11-10-1991
US 2017260799 A1	14-09-2017	NONE	
DE 29720978 U1	12-03-1998	NONE	
US 2009077895 A1	26-03-2009	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2017203341 A [0002]