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(54) **Operating system for doors/windows with multiple locking points**

(57) An operating system for doors/windows (10) with multiple locking points comprising a gear casing (20) through which a drive bar (40), an exposed hinged corner device (50) and an opening mechanism (60) are controlled by a handle (30), so as to tilt and/or inward open the door/window (10). The gear casing (20) includes a first and a second casings (21, 22) made from plastic, wherein the first casing (21) has at least one insertion hole (211) while the second casing (22) has a corresponding bored connecting rod (221) comprising a plurality of grooves (222) defining tightening pieces (223), thereby when the first and second casings (21, 22) are connected, the bored connecting rod (221) is inserted into the insertion hole (211) and a positioning pin (25) is passed through the insertion hole (211) and the bore connecting rod (221), so that the positioning pin (25) presses the tightening piece (223) to expand outward so as to make the bore connecting rod (221) fit in the insertion hole (211) tightly .

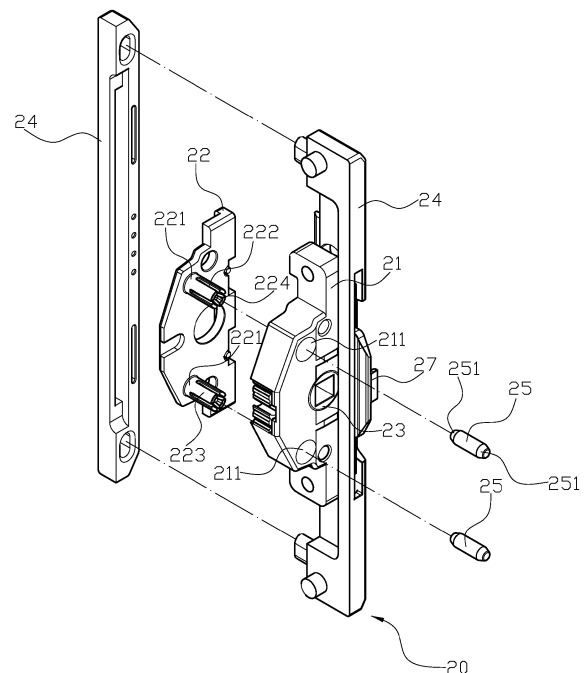


FIG. 5

Description

BACKGROUND OF THE INVENTION

1. Fields of the invention

[0001] The present invention relates to an operating system for doors/windows with multiple locking points, especially to an operating system for inward tilt-turn doors/windows with multiple locking points in which more locking points are added on a second side of an inner frame thereof so as to keep thieves and intruders out and to offer better security.

2. Descriptions of Related Art

[0002] Refer to United Kingdom Pat. No. GB2303166A, an operating mechanism for a multi-point lock is revealed. The operating mechanism for a multi-point lock has following shortcomings. Firstly, two casing parts 5a, 5b of a gear casing 5 are made by zinc alloy die-casting. Thus the cost of materials required is high and the total weight is heavier. This has negative effects on the competitiveness of the company. Moreover, riveting is used to join the two casing parts 5a, 5b. The riveting requires a larger force applied to rivets to have impact on the gear casing 5. Such structure and the technique consume more energy during application. Furthermore, once users want to use the doors/windows installed with the gear casing in combination with hinged corner devices to make the doors/windows tilt inward or open inward, there is not enough space to accommodate the hinged corner devices because one side of an inner frame/an outer frame with a hinge is disposed with an opening mechanism. Moreover, the inner frame and the outer frame on the opposite side of the handle are unable to accommodate more lock points. Thus intruders or thieves can force the door/window open easily and enter users' houses. The house is not safe and secure.

SUMMARY OF THE INVENTION

[0003] Therefore it is a primary object of the present invention to provide an operating system for doors/windows with multiple locking points in which more locking points are added on a second side of an inner frame thereof so as to keep thieves and intruders out and provide a better anti-theft function.

[0004] In order to achieve the above object, an operating system for doors/windows with multiple locking points of the present invention is provided. The door/window includes an inner frame and an outer frame. The inner frame composed of four frame strips is mounted with a petition plate therein. Through a gear casing arranged at a first side of the inner frame, a drive bar, an exposed hinged corner device, and an opening mechanism are controlled by a handle so as to open the inner frame whose second side is arranged with a hinge piv-

oted to the outer frame for tilt and inward opening of the door/window. Moreover, the second side of the inner frame can be added with a lock point so as to prevent the second side from being opened by intruders and provide a good anti-theft function when an embedded hinged corner device is installed on top of the second side of the inner frame and the embedded hinged corner device is also connected to a drive bar. An outer edge of the frame strip of the inner frame is disposed with two adjacent projections and a stopper is extended inward from a side end of each projection. A sliding groove is formed on the frame strip and is defined by the projections and the stoppers.

[0005] The gear casing includes a plastic first casing and a plastic second casing, corresponding to each other. A gear controlled by the handle is mounted inside the first and the second casings. The gear drives a rack set on a moveable frame to slide and move so as to open or close the door/window by sliding of the moveable frame connected with the first and the second casings. Moreover, the first casing is disposed with at least one insertion hole while the second casing is arranged with at least one projecting bored connecting rod on an inner surface thereof. The number of the projecting bored connecting rod is the same with the number of the insertion hole. A plurality of grooves is arranged annularly around the bored connecting rod. The arrangement of the grooves allows tightening pieces to be expanded outwards and elastically deformed while being applied with forces. An entrance angle is formed on an inner edge of a side end of the tightening piece. After all internal components of the gear casing being mounted and positioned into the first casing and the second casing, the bored connecting rods are inserted into the insertion holes so as to make the first casing and the second casing align and connect to each other smoothly. After the alignment and connection of the first casing and the second casing, a positioning pin is passed through the insertion hole and inserted into the bored connecting rod. The positioning pin presses the tightening piece to expand outward so as to make the bored connecting rod fit in the insertion hole of the first casing tightly. At the same time, each of two ends of the positioning pin is disposed with a tapered guiding segment. By combination of the tapered guiding segment and the entrance angle of the tightening piece, the positioning pin is inserted into the bored connecting rod faster with less effort.

[0006] The embedded hinged corner device includes a main body, a first block, a second block, a flexible piece, and a C-shaped lock. The main body consists of a horizontal extension segment and a vertical extension segment, respectively disposed with a guiding rail for receiving the first block and the second block. The first block and the second block sliding inside the guiding rail are connected by the flexible piece. While in use, the first block is pushed or pulled and the second block is sliding or stopped from sliding along with the first block synchronously due to the flexible piece that transmits a driving

force. The lock point on the second side of the door/window is shifted between a lock state and an unlocked state through the sliding movement mentioned above. Each of two sides of the horizontal extension segment is disposed with a projecting sliding block. By the sliding blocks being slid along with the horizontal extension segment and into the sliding groove of the frame strip on top of the inner frame, the embedded hinged corner device is fixed on a corner on top of the second side of the inner frame and an inner surface of the vertical extension segment is attached to the stopper of the frame strip on a lateral side of the inner frame. Moreover, the embedded hinged corner device is fastened from the top side by the C-shaped lock. Thus the embedded hinged corner device is positioned on the inner frame by dual mechanisms. Thereby the assembly of the operating system for doors/windows with multiple locking points is completed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The structure and the technical means adopted by the present invention to achieve the above and other objects can be best understood by referring to the following detailed description of the preferred embodiments and the accompanying drawings, wherein

- Fig. 1 is a perspective view of an embodiment according to the present invention;
- Fig. 2 is a schematic drawing showing that an embodiment of the present invention is tilted inward;
- Fig. 3 is a schematic drawing showing that an embodiment of the present invention is opened inward;
- Fig. 4 is a partial explosive view of an embodiment according to the present invention;
- Fig. 5 is an enlarged explosive view of a gear casing of an embodiment according to the present invention;
- Fig. 6 is a cross sectional view of a gear casing of an embodiment according to the present invention;
- Fig. 7 is a cross sectional view taken along the A-A line of the embodiment in Fig. 6;
- Fig. 8 is another partial explosive view of an embodiment according to the present invention;
- Fig. 9 is an enlarged explosive view of an embedded hinged corner device of an embodiment according to the present invention;
- Fig. 10 is a partial cross sectional view of an embedded hinged corner device sliding into a frame strip of an embodiment according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0008] Refer to Fig. 1, a door/window 10 includes an outer frame 11 and an inner frame 12. The inner frame 12 is formed by four frame strips 13 and a petition plate (such as a piece of glass or wood) is mounted therein. A

handle 30 is used to control a drive bar 40, an exposed hinged corner device 50, and an opening mechanism 60 through a gear casing 20 disposed on a first side 121 of the inner frame 12 so as to tilt or inward open the inner frame 12 that includes a second side 122 with a hinge pivoted to the outer frame 11, as shown in the Fig. 2 and Fig. 3.

[0009] When an embedded hinged corner device 70 is arranged on the top of the second side 122 of the inner frame 12 and is also connected to a drive bar 40, the second side 122 of the inner frame 12 can be added with a lock point 80 so as to prevent the second side 122 from being opened by thieves. It's harder for thieves to break the window/door locks and a better security is offered.

[0010] As shown in Fig. 8, two adjacent projections 131 are disposed on an outer edge of the frame strip 13 of the inner frame 12. A stopper 132 is extended inward from a side end of each projection 131. A sliding groove 133 is formed on the frame strip 13 and is defined by the projections 131 and the stoppers 132.

[0011] Refer from Fig. 4 to Fig. 7, the gear casing 20 includes a first casing 21 and a second casing 22, made from plastic and corresponding to each other. A gear 23 controlled by the handle 30 is mounted inside the first casing 21 and the second casing 22. The gear 23 rotates and causes a rack 241 arranged at a moveable frame 24 to slide and move. Thus the door/window 10 is opened or closed according to changes of sliding positions of the moveable frame 24 connected with the first and the second casings 21, 22. Moreover, the first casing 21 is disposed with at least one insertion hole 211 while the second casing 22 is arranged with at least one projecting bored connecting rod 221 on an inner surface thereof. The number of the projecting bored connecting rod 221 is the same with the number of the insertion hole 211 and the number is two in this embodiment. A plurality of grooves 222 is disposed annularly around the bored connecting rod 221. The formation of the grooves 222 allows tightening pieces 223 to be expanded outwards and elastically deformed when forces are applied to the tightening pieces 223. An entrance angle 224 is formed on an inner edge of a side end of the tightening piece 223. After all internal components of the gear casing 20 being mounted and positioned into the first casing 21 and the second casing 22, the bored connecting rods 221 are inserted into the insertion holes 211 so as to make the first casing 21 and the second casing 22 align and connect to each other smoothly. After the alignment and connection of the first casing 21 and the second casing 22, a positioning pin 25 is passed through the insertion hole 211 and inserted into the bored connecting rod 221. The positioning pin 25 presses the tightening piece 223 to expand outward so as to make the bored connecting rod 221 fit in the insertion hole 211 of the first casing 21 firmly. At the same time, each of two ends of the positioning pin 25 is disposed with a tapered guiding segment 251. Due to the design of the tapered guiding segment 251 and the entrance angle 224 of the tightening piece 223, the po-

sitioning pin 25 can be inserted into the bored connecting rod 221 faster with less effort.

[0012] Refer from Fig. 8 to Fig. 10, the embedded hinged corner device 70 includes a main body 71, a first block 72, a second block 73, a flexible piece 74, and a C-shaped lock 75. The main body 71 consists of a horizontal extension segment 711 and a vertical extension segment 712. The horizontal extension segment 711 and the vertical extension segment 712 are respectively arranged with a guiding rail 713 for receiving the first block 72 and the second block 73. The first block 72 and the second block 73 sliding inside the guiding rails 713 are connected by the flexible piece 74. While in use, the first block 72 is pushed or pulled and the second block 73 is sliding or stopped from sliding along with the first block 72 synchronously because the flexible piece 74 transmits a driving force. The lock point 80 on the second side 122 of the door/window 10 is shifted between a lock state and an unlocked state through the above sliding movement. A sliding block 714 is projecting from each of two sides of the horizontal extension segment 711. By the sliding blocks 714 being slid along with the horizontal extension segment 711 and into the sliding groove 133 of the frame strip 13 on top of the inner frame 12, the embedded hinged corner device 70 is fixed on a corner on top of the second side 122 of the inner frame 12 and an inner surface of the vertical extension segment 712 is attached to the stopper 132 of the frame strip 13 on a lateral side of the inner frame 12. Moreover, the C-shaped lock 75 is used to fasten the embedded hinged corner device 70 from the top side. Thus the embedded hinged corner device 70 is positioned on the inner frame 12 by dual mechanisms.

[0013] While in use, the first casing 21 and the second casing 22 of the gear casing 20 are fixed on the first side 121 of the inner frame 12. The gear 23 is rotated and controlled by the handle 30 and the driving force is transmitted by the rack 241 to make the moveable frame 24 slide upward and downward. Then the control direction is changed by the sliding movement of the moveable frame 24 through the drive bar 40, the exposed hinged corner device 50, and the embedded hinged corner device 70. Next together with the opening mechanism 60 having multiple stages, each lock point on the door/window 10 is unlocked or locked for inward opening or tilt of the door/window 10. Moreover, a control piece 27 that is continually pushed against by a spring 26 and used to lock the gear 23 at normal conditions is disposed in the gear casing 20. When the inner frame 12 is opened, the control piece 27 is no more pressed and getting a released force, the gear 23 will be locked by the control piece 27 and unable to be rotated so as to prevent the moveable frame 24 from being shifted from an open position. Once the moveable frame 24 is shifted from the open position, it needs to be positioned again while being closed. On the other hand, the control piece 27 is pushed against by an anti-misoperation block 111 arranged on the outer frame 11 and then is moved back when the

inner frame 12 is closed. Thus the gear 23 is no more locked and is ready to work again in the next opening.

[0014] Refer to Fig. 6, the gear 23 includes an concave part 231 while the first casing 21 is arranged with two clips 212. The two clips 212 push against a push rod 28 to against and contact the concave part 231 for preventing the gear 23 from being rotated before installation of the gear casing 20. The rotation of the gear 23 before installation of the gear casing 20 will cause that the moveable frame 24 is not maintained in a middle position and an error occurs in the connection of the drive bar 40. After the installation of the gear casing 20 being completed and the gear 23 being rotated by the handle 30, the push rod 28 is pushed by curved surfaces on two sides of the concave part 231 to be clipped and fixed by the two clips 212. A non-destructive foolproof design is provided through the combination of the clips 212, the push rod 28 and the concave part 231.

[0015] In summary, the operating system for doors/windows with multiple locking points according to the present invention has following advantages. Firstly, the first casing 21 and the second casing 22 of the gear casing 20 are made from plastic. Thus the material cost is low and the requirement of light weight is satisfied. Therefore the competitive advantages are achieved. Moreover, by the insertion hole 211, the bored connecting rod 221 and the positioning pin 25, the first casing 21 and the second casing 22 are connected with each other without applying a large amount of force to rivets for joining the casings 21, 22. The operation is easy and the energy is saved. By the assembly of the sliding groove 133 and the sliding block 714, the second side 122 of the inner frame 12 can be arranged with the embedded hinged corner device 70. Thus the locking point 80 is added through the arrangement of the embedded hinged corner device 70. Therefore the second side 122 of the inner frame 12 is locked precisely to prevent the door/window 10 from being forced open and prevent intruders from accessing the house. The present invention provides the security and safety.

[0016] Additional advantages and modifications will readily occur to those skilled in the art. Therefore, the invention in its broader aspects is not limited to the specific details, and representative devices shown and described herein. Accordingly, various modifications may be made without departing from the spirit or scope of the general inventive concept as defined by the appended claims and their equivalents.

Claims

1. An operating system for doors/windows with multiple locking points comprising:

an inner frame and an outer frame of a door/window while the inner frame having four frame strips;

- a gear casing arranged at a first side of the inner frame and a handle used to control a drive bar, an exposed hinged corner device, and an opening mechanism through the gear casing so as to open the inner frame having a second side pivoted to the outer frame for tilt and inward opening of the door/window; the gear casing including a first casing and a second casing corresponding to each other; a gear controlled by the handle being mounted in the first casing and the second casing, and being used for driving a rack arranged at a moveable frame to slide and move; the door/window is opened or closed according to changes of sliding positions of the moveable frame connected with the first casing and the second casing;
- wherein the first casing and the second casing of the gear casing are corresponding to each other and made from plastic; the first casing is disposed with at least one insertion hole while the second casing is arranged with at least one bored connecting rod projecting from an inner surface thereof; the bored connecting rod is corresponding to the insertion hole and the number of the projecting bored connecting rod is the same with the number of the insertion hole; a plurality of grooves is arranged annularly around the bored connecting rod and the grooves allow tightening pieces to be expanded outwards and elastically deformed while being applied with forces;
- thereby the bored connecting rod is inserted into the insertion hole to connect the first casing and the second casing smoothly after internal components of the gear casing being mounted and positioned into the first casing and the second casing; a positioning pin is passed through the insertion hole and inserted into the bored connecting rod after the first casing and the second casing being connected; the positioning pin presses the tightening piece to expand outward so as to make the bored connecting rod fit in the insertion hole of the first casing tightly.
2. The device as claimed in claim 1, wherein an entrance angle is formed on an inner edge of a side end of the tightening piece while a tapered guiding segment is disposed on each of two ends of the positioning pin; the positioning pin is inserted into the bored connecting rod faster with less effort by the tapered guiding segment and the entrance angle of the tightening piece.
 3. The device as claimed in claim 1, wherein the outer frame is disposed with an anti-misoperation block and a control piece that is continually pushed against by a spring and used to lock the gear at normal conditions is disposed in the gear casing.
 4. The device as claimed in claim 1, wherein the second side of the inner frame is able to be added with at least one lock point so as to prevent the second side from being opened when an embedded hinged corner device is arranged at a corner on top of the second side of the inner frame and is connected to a drive bar.
 5. The device as claimed in claim 4, wherein two adjacent projections are disposed on an outer edge of the frame strip of the inner frame and a stopper is extended inward from a side end of each projection; a sliding groove defined by the projections and the stoppers is formed on the frame strip; the embedded hinged corner device includes a main body having a horizontal extension segment and a vertical extension segment; the horizontal extension segment and the vertical extension segment are respectively arranged with a guiding rail for receiving a first block and a second block; the first block and the second block sliding inside the guiding rails are connected by a flexible piece; the first block is pushed or pulled while in use and the second block is sliding or stopped from sliding along with the first block synchronously due to the flexible piece that transmits a driving force; the lock point on the second side of the door/window is shifted between a lock state and an unlocked state by sliding of the first block and the second block in the guiding rails; a sliding block is projecting from each of two sides of the horizontal extension segment; the embedded hinged corner device is fixed on a corner on top of the second side of the inner frame by the sliding blocks being slid along with the horizontal extension segment into the sliding groove of the frame strip on top of the inner frame; and an inner surface of the vertical extension segment is attached to the stopper of the frame strip on a lateral side of the inner frame.
 6. The device as claimed in claim 4, wherein the embedded hinged corner device is used together with a C-shaped lock; the embedded hinged corner device is fastened by the C-shaped lock from a top side thereof; thus the embedded hinged corner device is positioned on the inner frame by dual mechanisms.

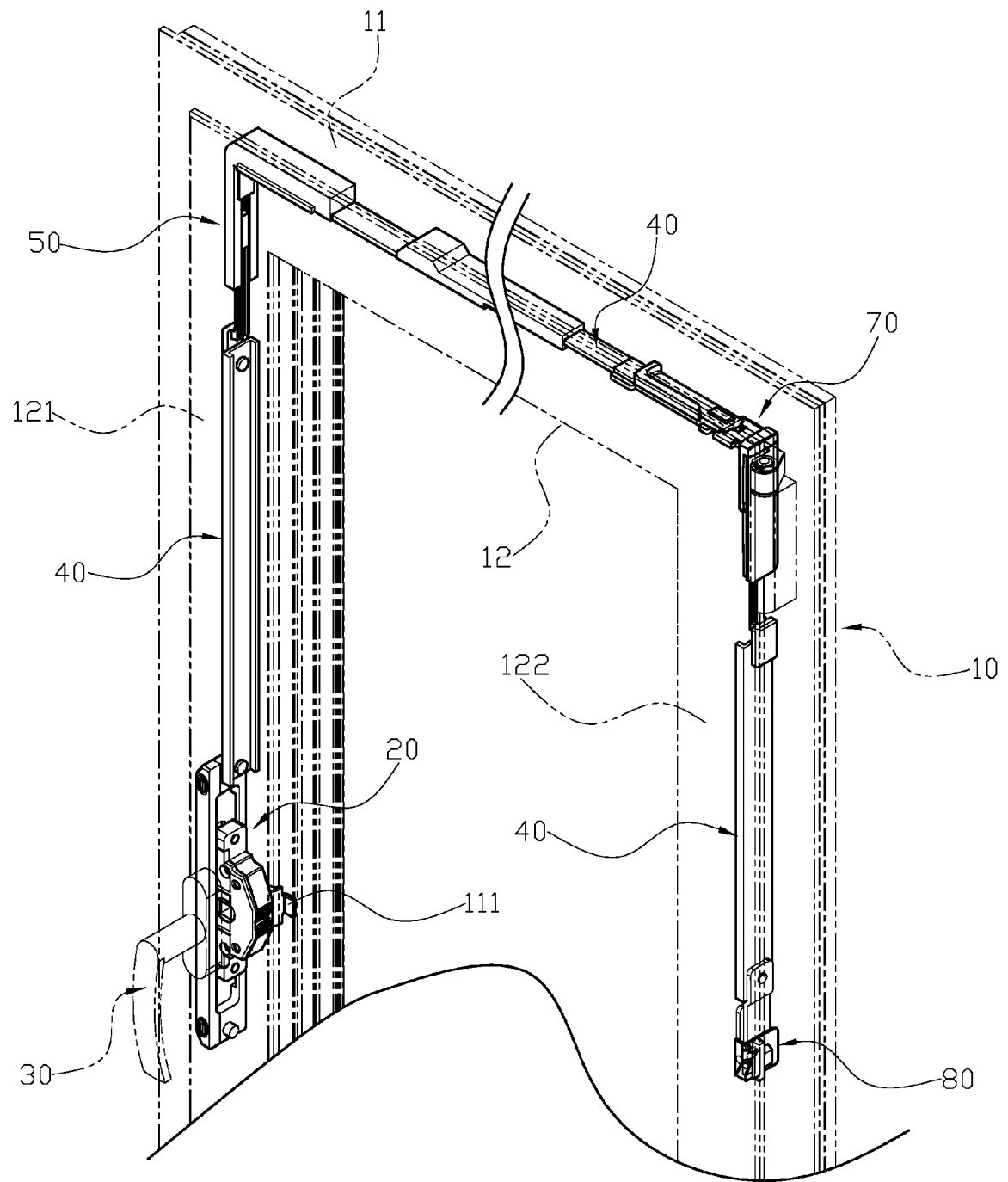


FIG. 1

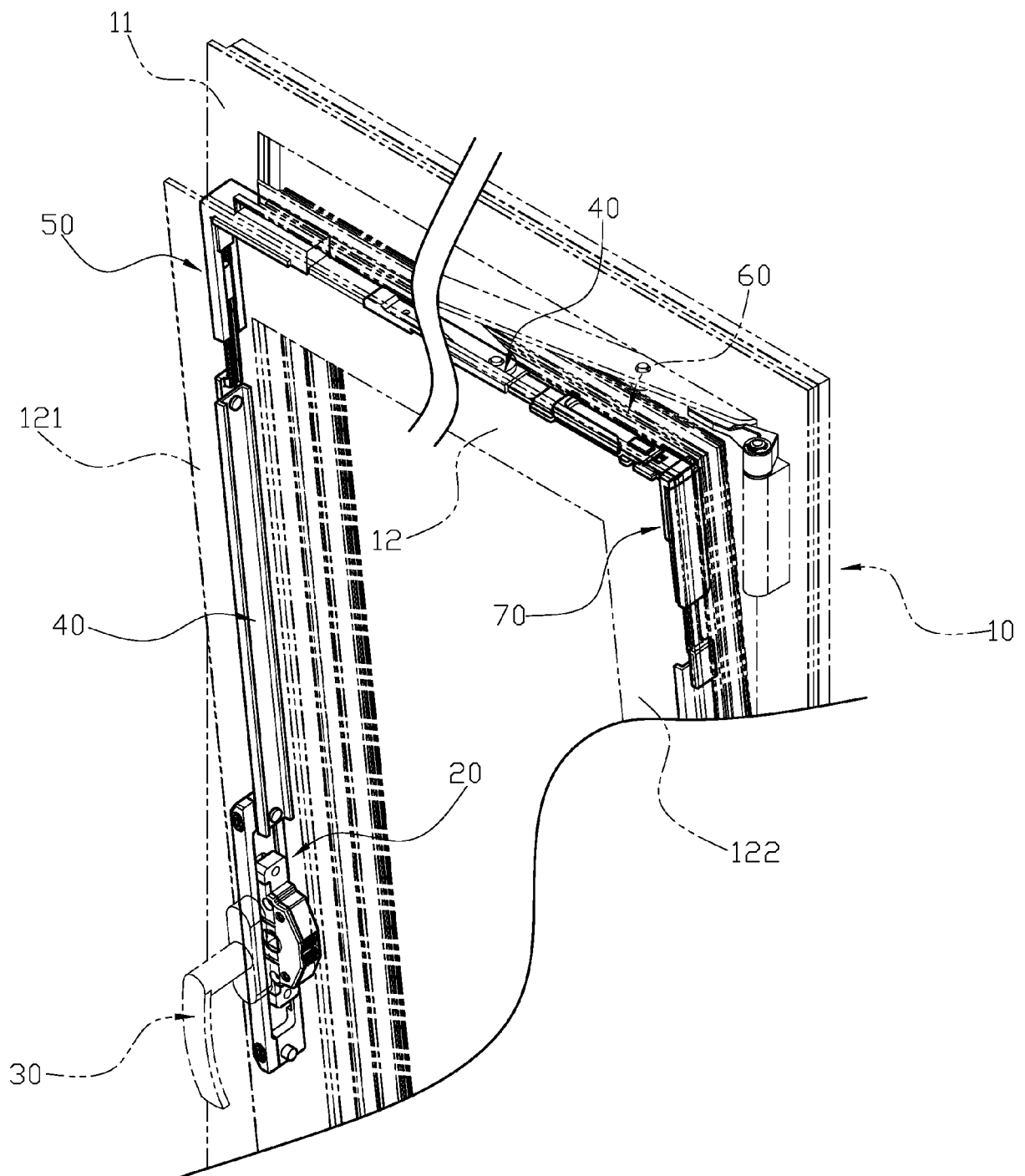


FIG. 2

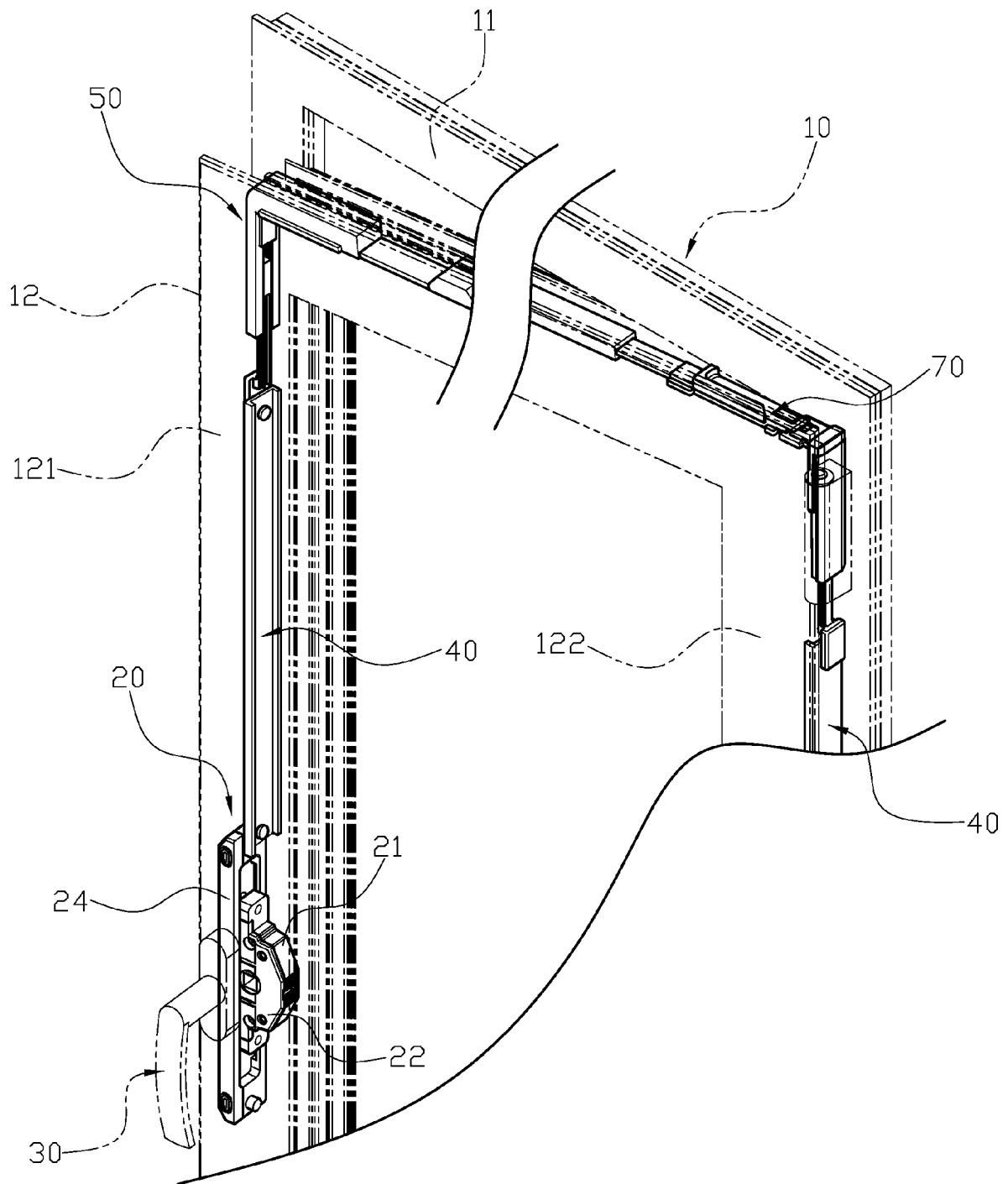


FIG. 3

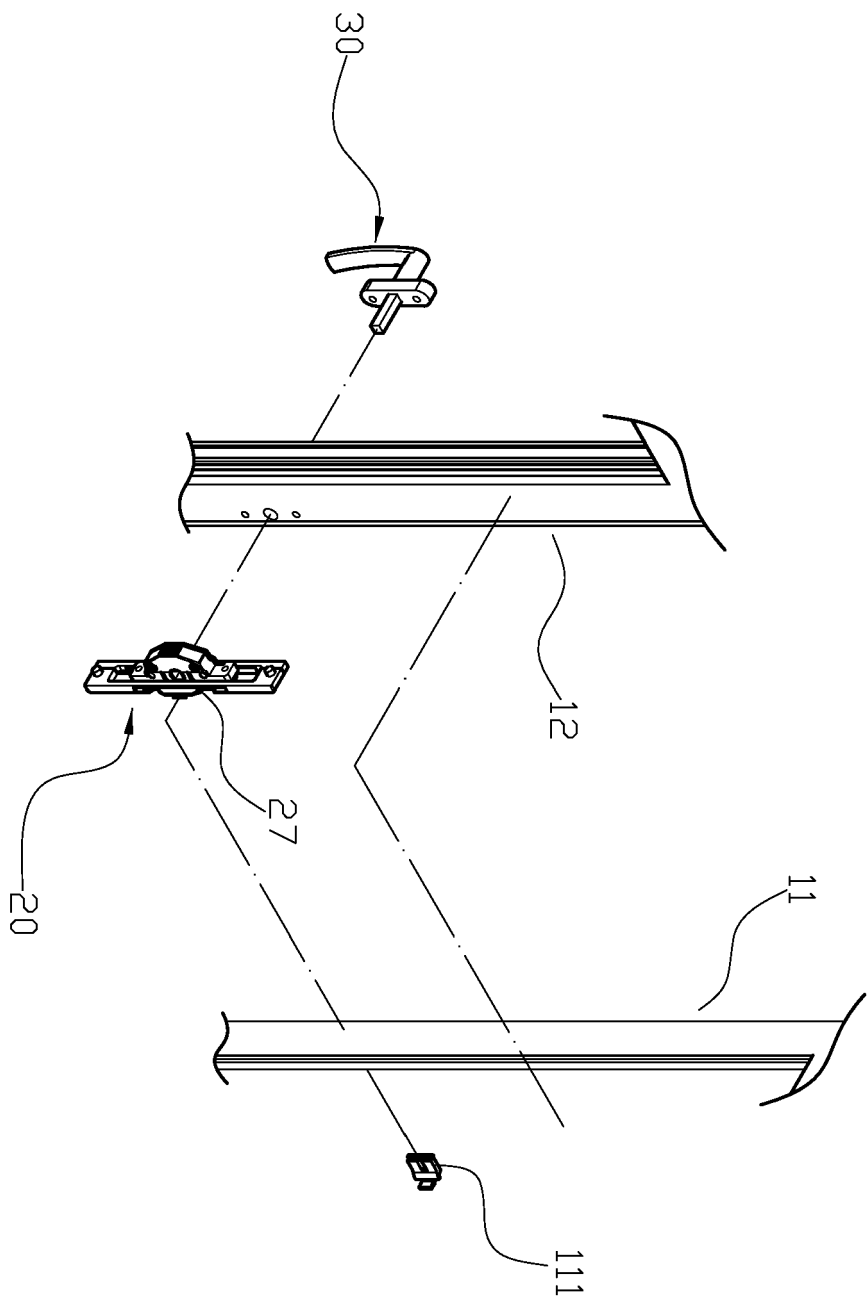


FIG. 4

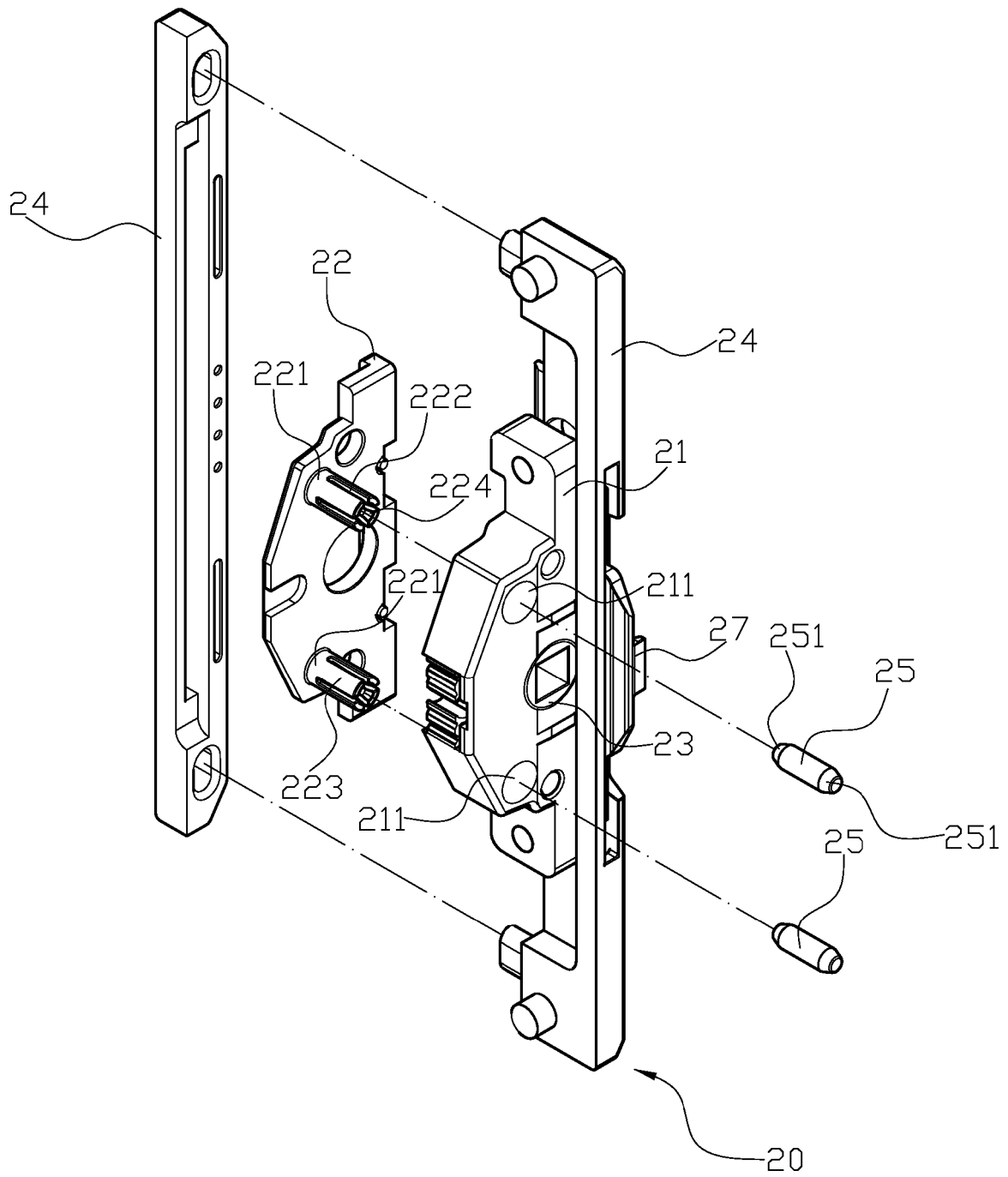


FIG. 5

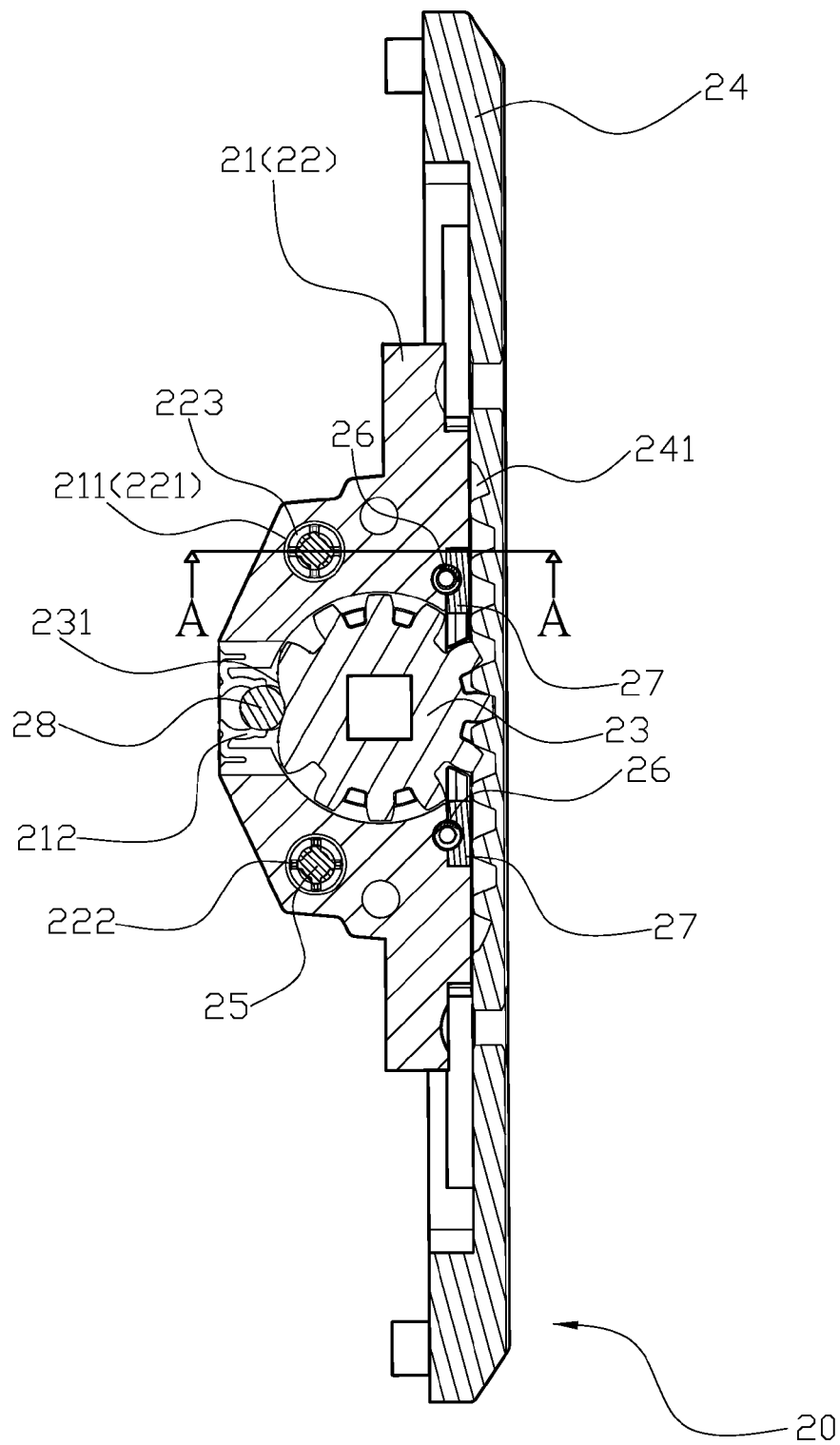


FIG. 6

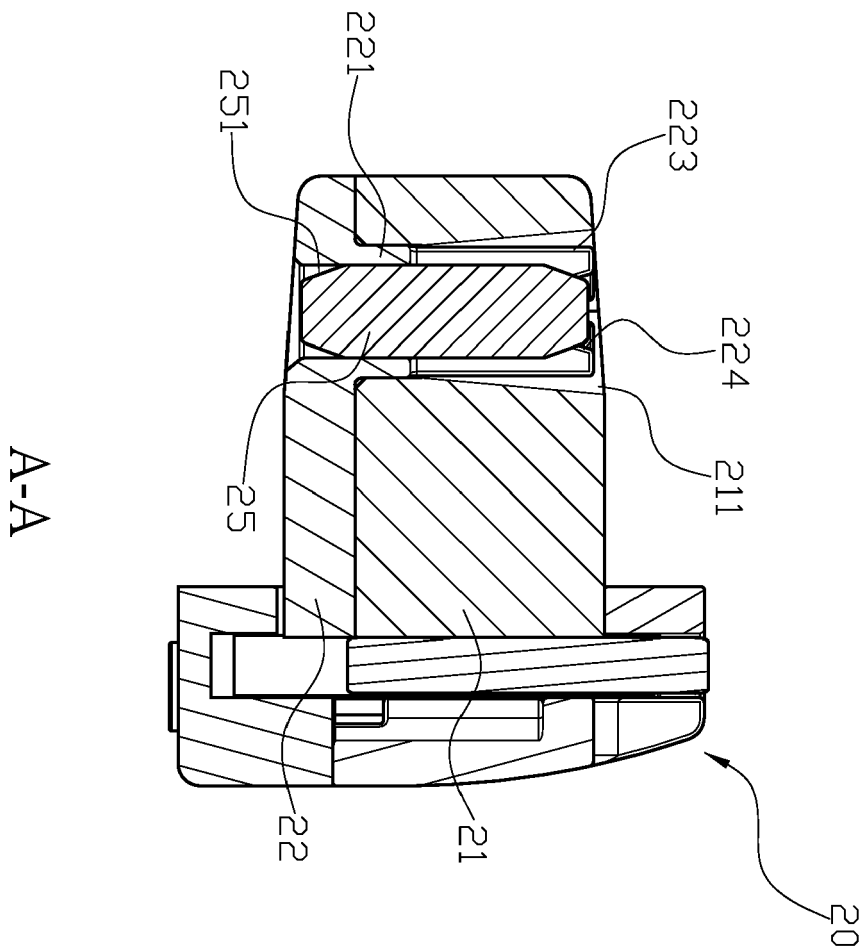


FIG. 7

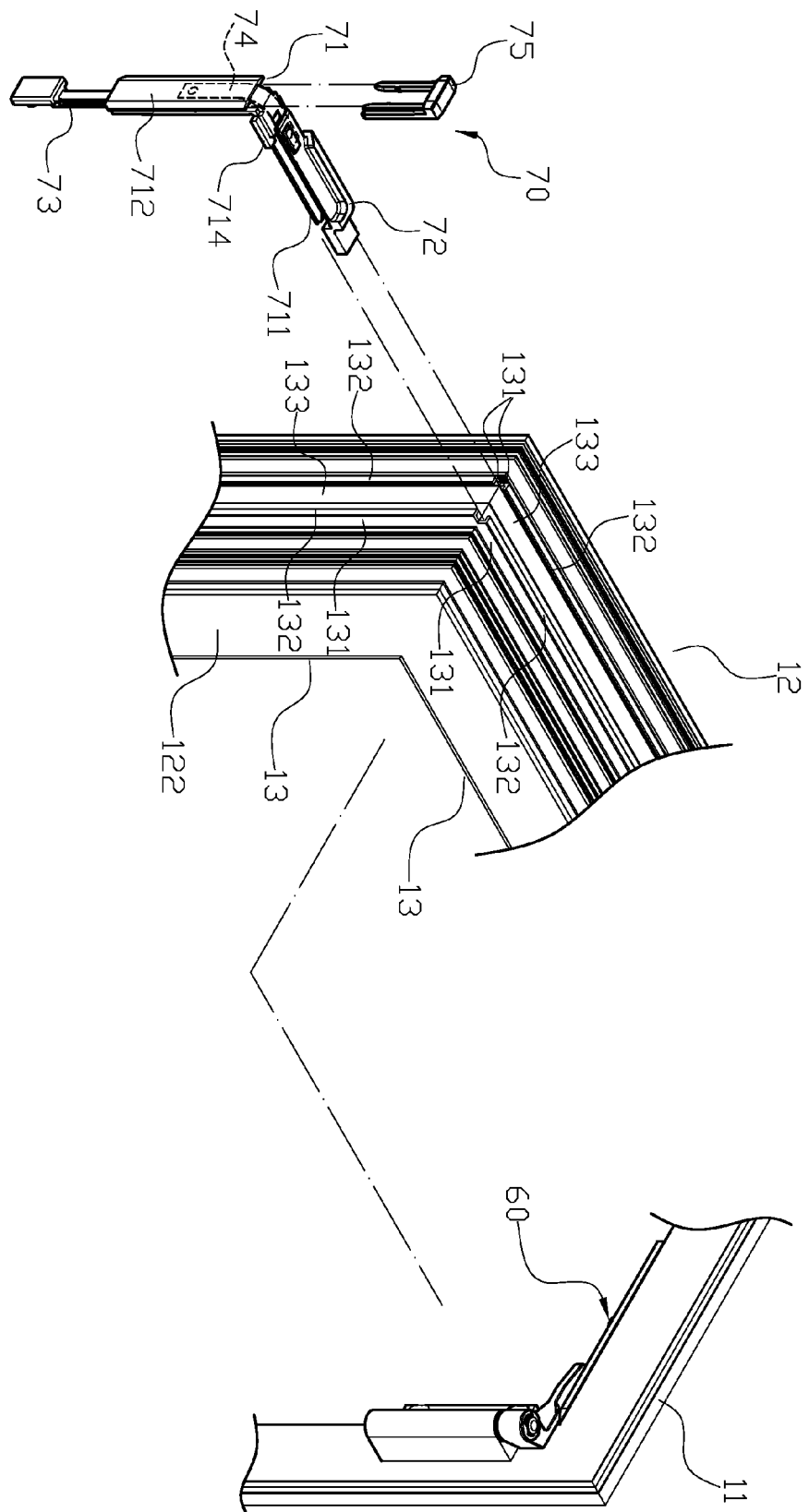


FIG. 8

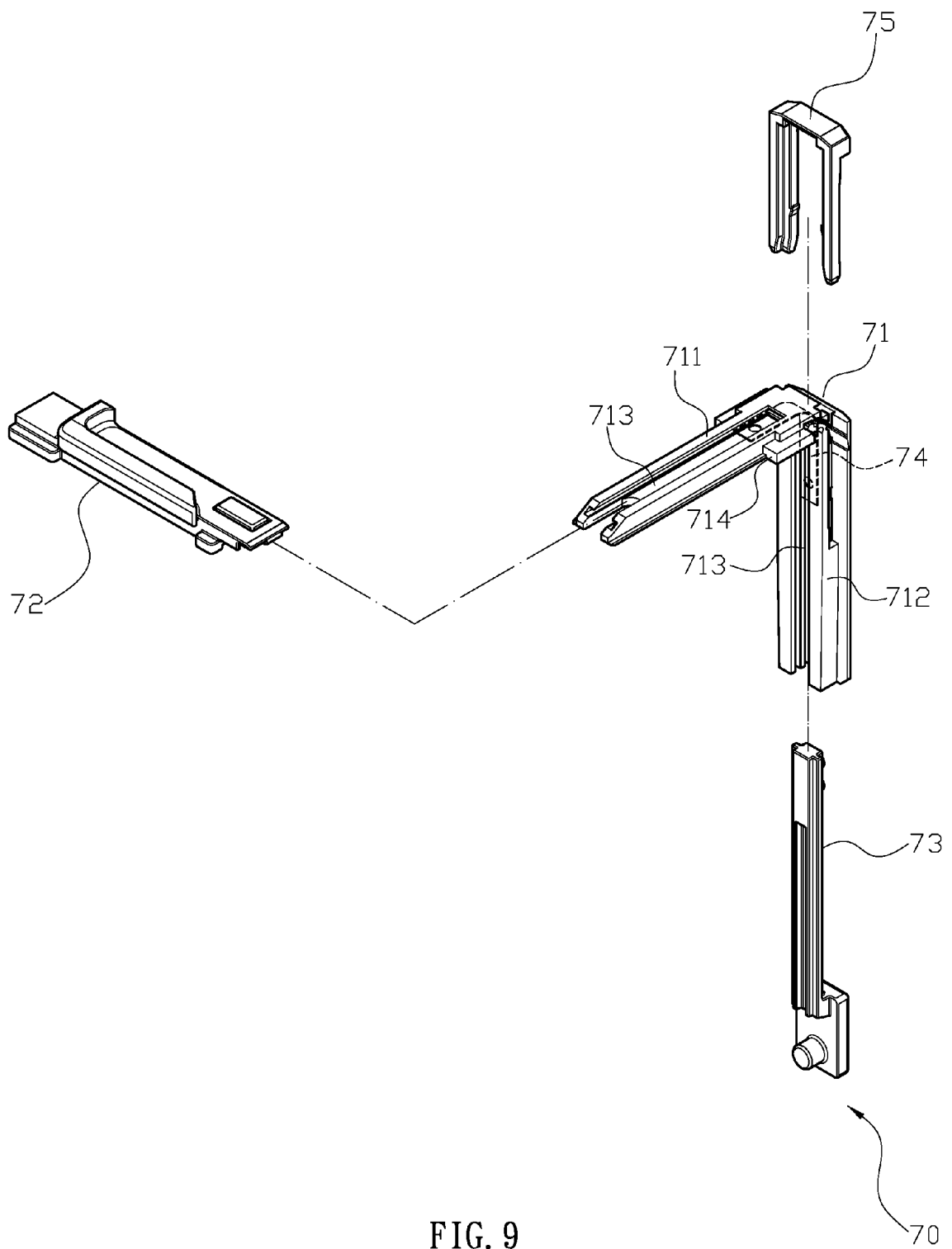


FIG. 9

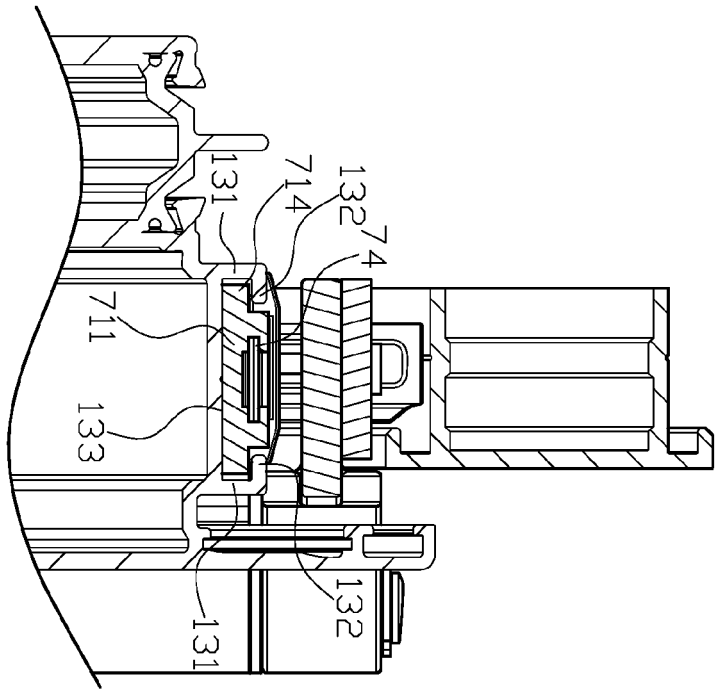


FIG. 10



EUROPEAN SEARCH REPORT

Application Number
EP 12 19 3705

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Place of search The Hague		Date of completion of the search 26 April 2013	Examiner Pérez Méndez, José F
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