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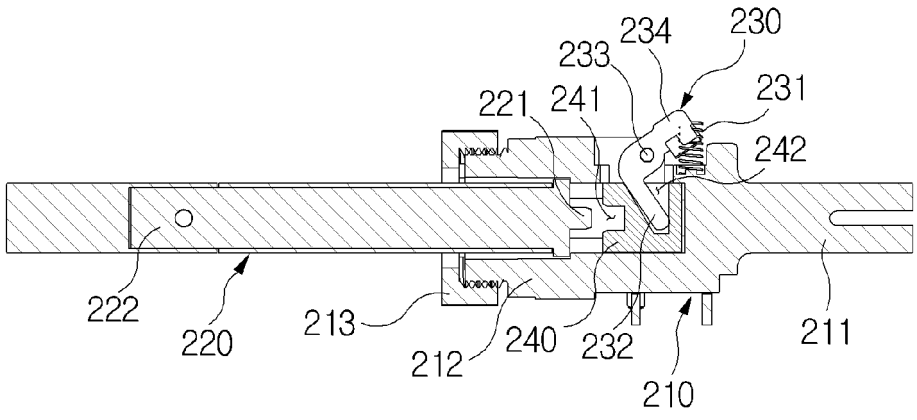
(54) DOOR LOCK DRIVE ASSEMBLY

(57) In a door lock drive assembly, an inner door handle shaft and an outer door handle shaft are selectively bound in accordance with an authentication signal or an action of a key, and can retain the strong binding force even when a strong torque is transmitted to the handle shafts. The door lock drive assembly includes: a shaft connection unit that is provided with a pushing member configured to selectively connect a first handle shaft and a second handle shaft in such a manner that the first handle shaft and the second handle shaft are connected with or disconnected from each other; a slide unit that is provided with a pressing unit which is vertically movable to press the pushing member; and a mechanical driving unit that is formed with a keyway and vertically moves the pressing unit of the slide unit when a key is inserted into the keyway and rotated.

Fig 2



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Description

Technical Field

[0001] The present invention relates to a door lock drive assembly, and more particularly to a door lock drive assembly, in which inner and outer door handle shafts are selectively bound according to an authentication signal or a key action, and a tight binding force can be maintained even when a strong torque is transmitted to the handle shafts.

Background Art

[0002] A door is installed with a mechanical or electronic door lock in order to keep the safety of a residential space or the security of a working space against an illegal entry of a third party. Recently, an anti-panic type door lock has been frequently used, of which the latch is operated in cooperation with an inner door handle so as to allow a resident to quickly escape to the outside from a disaster, such as a fire, occurring indoors or a dangerous situation, such as a break-in.

[0003] A conventional electronic door lock (including an anti-panic type door lock) is typically configured such that the latch of the door lock is operated using a motor. That is, the conventional electronic door lock includes a plurality of gears and link members therein for interconnecting the motor and the latch, and the torque of the motor is transmitted to the latch through the gears and the link members to perform a locking action and an unlocking action by the latch.

[0004] However, when the latch is jammed in the door frame or the engagement between the gears is mismatched, the conventional structure as described above may cause a situation in which the latch is not smoothly operated by the motor, thereby making it difficult to open the door from the outside to enter indoors.

[0005] For example, when the door becomes askew a little due to its weight or the position of the latch is somewhat changed as an impact is applied to the door, the door lock may not be smoothly operated unless the torque of the motor is sufficient to forcibly operate the latch.

[0006] In addition, the conventional structure requires a plurality of decelerating gears and link members to convert the torque of the motor into the rectilinear reciprocating movement of the latch, which makes the construction of the door lock complicated, and hinders the miniaturization of the door lock.

[0007] Meanwhile, recently, an anti-panic type door lock has been frequently used as briefly described above. Because such an anti-panic type door lock is configured such that the latch is operated by the rotation of the inner door handle, the latch can be operated relatively easily even when the latch is jammed in the door frame if the outer and inner door handle shafts are capable of being tightly bound selectively depending on an authentication signal or a key action.

[0008] Therefore, what is required is to develop a door lock drive assembly which can selectively bind the inner and outer door handle shafts depending on an authentication signal or a key action.

Detailed Description of the Invention

Technical Problem

[0009] The present invention was made in an effort to solve the above-mentioned problems, and an aspect of the present invention is to provide a door lock drive assembly which can selectively bind the inner and outer door handle shafts depending on an authentication signal or a key action, and maintain a strong binding force even when a strong torque is transmitted to the handle shafts.

Technical Solution

[0010] In order to solve the technical problem, in accordance with an aspect of the present invention, there is provided a door lock drive assembly including: a shaft connection unit that is provided with a pushing member configured to selectively connect a first handle shaft and a second handle shaft in such a manner that the first handle shaft and the second handle shaft are connected with or disconnected from each other; a slide unit that is provided with a pressing unit which is vertically movable to press the pushing member; and a mechanical driving unit that is formed with a keyway and vertically moves the pressing unit of the slide unit when a key is inserted into the keyway and rotated.

[0011] The door lock drive assembly may further include a pushing member, wherein the pushing member is provided with a rotary axle hinged to the first handle shaft, and with reference to the rotary axle, one end of the pushing member is elastically supported on the outer peripheral surface of the first handle shaft, and the other end is positioned in the inside of the slide unit.

[0012] The slide unit may be formed with an inclined groove, and the other end of the pushing member is positioned in the inclined groove.

[0013] The slide unit may include: a slide body; a slide member installed in the sliding body to be capable of being reciprocated to press the pushing member, which is configured to connect and disconnect the handle shafts, to a side; a driving motor installed in the inside of the slide body; a guide coil disposed in the reciprocating direction of the slide member, a side surface of the slide member being fixed to the guide coil; and a guide member comprising a guide plate which is rotated by the driving motor and formed with a protrusion step on the outer peripheral surface thereof to be moved along the guide coil, and a shaft slider configured to control the guide plate to be contacted with or separated from the guide coil.

[0014] The guide plate may be configured such that

the protrusion step is contacted with the guide coil in the state in which the guide plate is elastically supported in the guide coil.

[0015] Preferably, an inclined part may be formed at a tail end where the guide plate and the shaft slider are contacted with each other, so that when the shaft slider pushes the guide plate, the protrusion step in a pressed state is released from the guide coil.

[0016] The other end of the slide member may be formed with a protrusion plate configured to be interlocked with a manual driving shaft provided in the door lock.

[0017] The mechanical driving unit may include: a driving unit body; a first cam that is rotatably installed in the driving unit body, and configured to push a tail end of the slide unit to a side by being interlocked with a keyway shaft to be rotated; and a second cam that is coaxially connected with the first cam, and positioned in front of the first cam, the second cam being formed with a recess for fixing a position.

[0018] The pressing unit protrusively formed on the slide unit may be retained in a close contact state in the recess to fix the position of the second cam.

[0019] The first cam may be formed in such a manner that its outer peripheral, which is in contact with the slide unit, forms an oval shape.

[0020] The driving unit body may be provided with a cover unit for protecting the first cam.

[0021] The pushing member may include: a pin inserted into the insertion hole of the handle shaft, and a guide part fixed to the leading end of the pin, and coupled with the leading end of the pressing unit.

[0022] The leading end of the pressing unit is formed with a fixing groove, into which the guide part is inserted.

[0023] The guide part may be formed in a circular arc shape.

[0024] The pin may be fitted with a spring to elastically support the pushing member.

[0025] The pin and the guide part may be formed integrally with each other.

Advantageous Effects

[0026] In accordance with the present invention, when a door lock drive assembly presses a pushing member according to an authentication signal, the slide member connects inner and outer door handle shafts with each other. As a result, inner and outer door handle shafts can be selectively connected with each other, thereby improving the convenience in use.

[0027] In addition, when a door lock is electronically inactivated, for example, due to a power outage or an emergency situation, the inventive door lock drive assembly allows a user to connect or disconnect the handle shafts using a key, thereby improving the convenience in use.

Brief Description of the Drawings

[0028]

FIG. 1 is a schematic view illustrating a construction of a door lock drive assembly according to a first exemplary embodiment of the present invention;

FIG. 2 is a cross-sectional view illustrating a shaft connection unit of the door lock drive assembly according to the first exemplary embodiment;

FIG. 3 is a perspective view illustrating a pushing member of the shaft connection unit of the door lock drive assembly according to the first exemplary embodiment;

FIG. 4 is a cross-sectional view illustrating the disconnected state of the shaft connection unit of the door lock drive assembly according to the first exemplary embodiment;

FIG. 5 is a cross-sectional view illustrating the connected state of the shaft connection unit of the door lock drive assembly according to the first exemplary embodiment;

FIG. 6 is a perspective view illustrating a slide unit of the door lock drive assembly according to the first exemplary embodiment;

FIG. 7 is a perspective view illustrating the internal construction of the slide unit of the door lock drive assembly according to the first exemplary embodiment;

FIG. 8 is a front view illustrating the internal construction of the slide unit of the door lock drive assembly according to the first exemplary embodiment;

FIG. 9 is a side view illustrating the internal construction of the slide unit of the door lock drive assembly according to the first exemplary embodiment;

FIG. 10 is an exploded perspective view illustrating the internal construction of the slide unit of the door lock drive assembly according to the first exemplary embodiment;

FIG. 11 is a perspective view illustrating a mechanical driving unit of the door lock drive assembly according to the first exemplary embodiment;

FIG. 12 is an exploded perspective view illustrating the mechanical driving unit of the door lock drive assembly according to the first exemplary embodiment;

FIG. 13 is a front view illustrating the mechanical driving unit of the door lock drive assembly according to the first exemplary embodiment;

FIG. 14 is a perspective view illustrating the internal construction of the mechanical driving unit of the door lock drive assembly according to the first exemplary embodiment;

FIG. 15 is a front view illustrating the internal construction of the mechanical driving unit of the door lock drive assembly according to the first exemplary embodiment;

FIG. 16 is a perspective view illustrating a shaft con-

nection unit of a door lock drive assembly according to a second exemplary embodiment of the present invention;

FIG. 17 is a plan view illustrating the shaft connection unit of the door lock drive assembly according to the second exemplary embodiment;

FIG. 18 is a partial exploded perspective view illustrating a connective relationship of a pushing member of the door lock drive assembly according to the second exemplary embodiment;

FIG. 19 is a partial front view illustrating the operating state of a shaft connection unit of the door lock drive assembly according to the second exemplary embodiment; and

FIG. 20 is a partial side view illustrating the operating state of the shaft connection unit of the door lock drive assembly according to the second exemplary embodiment.

Mode for Carrying Out the Invention

[0029] Now, exemplary embodiments of the present invention will be described with reference to accompanying illustrative drawings.

[0030] FIG. 1 is a schematic view illustrating a construction of a door lock drive assembly according to a first exemplary embodiment of the present invention. As illustrated in FIG. 1, the inventive door lock drive assembly includes a slide unit 100, a shaft connection unit 200, and a mechanical driving unit 300.

[0031] Each of the components will be described in detail with reference to drawings. FIG. 2 is a cross-sectional view illustrating a shaft connection unit of the door lock drive assembly according to the first exemplary embodiment, FIG. 3 is a perspective view illustrating a pushing member of the shaft connection unit of the door lock drive assembly according to the first exemplary embodiment, FIG. 4 is a cross-sectional view illustrating the disconnected state of the shaft connection unit of the door lock drive assembly according to the first exemplary embodiment, and FIG. 5 is a cross-sectional view illustrating the connected state of the shaft connection unit of the door lock drive assembly according to the first exemplary embodiment.

[0032] As illustrated in FIGs. 2 to 5, the shaft connection unit 200 generally includes a first handle shaft 210, a second handle shaft 220, a slide member 240, and a pushing member 230. The first handle shaft 210 is formed with a main body 212 and a connection end 211 at an end of the main body 212 to be capable of being connected with an outer door handle unit (not illustrated).

[0033] The interior of the main body 212 is formed with a space in which the slide member 240 is positioned to be capable of being vertically reciprocated. In addition, a threaded part is formed at the lower end of the main body 212, and a coupling member 213 is fastened to the threaded part to accommodate a part of the second handle shaft 220.

[0034] The slide member 240 is formed with an inclined groove 242 (see FIG. 5) on a lateral side thereof, and a part of the pushing member 230 is positioned in the inclined groove 242.

[0035] Meanwhile, the slide member 240 is formed with a fastening groove 241 on the bottom side thereof, and a lug 221 formed to extend from an end of the second handle shaft 220 is selectively introduced into or withdrawn from the fastening groove 241. Further, when the first handle shaft 210 is rotated, the slide member 240 is cooperatively moved with the first handle shaft 210 in the inside of the first handle shaft 210.

[0036] Therefore, when the slide member 240 is moved in the inside of the first handle shaft 210 and connected with the lug 221 of the second handle shaft(220), the first handle shaft 210 and the second handle shaft 220 may be interlocked with each other. In addition, because the tail end 222 of the second handle shaft 220 may be connected with a deadbolt interlocking body of a mortis, the door lock is opened when the handle shafts are rotated.

[0037] Meanwhile, the pushing member 230 is provided with a rotary axle 233 which is hinged to the main body 212 of the first handle shaft 210. In addition, the pushing member 230 is elastically supported on the outer peripheral surface of the main body 212 at one end thereof with reference to the rotary axle 233. Further, the other end of pushing member 230 is inserted into the inclined groove 242 (see FIG. 5) of the slide member 240.

[0038] Specifically, with reference to the rotary axle 233, at the one end, the pushing member 230 is formed with a hooking end 232 positioned in the inclined groove 242, and at the other end, the pushing member 230 is formed with a pushing end 234, against which the pressing unit 120 of the slide unit 100 is abutted. The pushing end 234 is formed with extension end portions 236 and 238 which extend to opposite sides, respectively. In addition, the pushing end 234 is formed with a spring anchoring part 235 on the inner surface thereof.

[0039] Therefore, a spring 231 is installed in such a manner that one end is anchored to the spring anchoring part 235, and the other end is positioned on the outer surface of the main body 212 of the first handle shaft 210, thereby elastically supporting pushing member 230 with reference to the rotary axle 233. That is, because the one end of pushing member 230 is elastically supported, the hooking end 232 of the pushing member 230 may come into close contact with the inclined groove 242 of the slide member 240.

[0040] As illustrated in FIGs. 4 and 5, the shaft connection unit 200 may be configured in such a manner that a separate slide unit 100 may be equipped in a door lock to be capable of selectively pressing the pushing member 230. Specifically, the slide unit 100 is installed on an inner frame 110a of the door lock adjacent to the shaft connection unit 200. When an authentication signal is received by authentication means, the slide unit 100 drives the pressing unit 120, and the pressing unit 120

presses the pushing end 234 (see FIG. 3) of the pushing member 230 as illustrated in FIG. 5.

[0041] When the pushing member 230 is pressed in this manner, the pushing member 230 is pivoted about the rotary axle 233, and the hooking end 232 of the pushing member 230 moves the slide member 240 downward. The slide member 240 moved in this manner makes the lug 221 of the second handle shaft 220 approach to the fastening groove 241 of the slide member 240, whereby the first handle shaft 210 and the second handle shaft 220 may be interlocked with each other.

[0042] Meanwhile, when the pressing unit 120 of the slide unit 100 is not driven, the pushing member 230 is pressed by the spring 231 to move the slide member 240 inwardly, thereby disconnecting the connection with the second handle shaft 220.

[0043] FIG. 6 is a perspective view illustrating a slide unit of the door lock drive assembly according to the first exemplary embodiment, FIG. 7 is a perspective view illustrating the internal construction of the slide unit of the door lock drive assembly according to the first exemplary embodiment, FIG. 8 is a front view illustrating the internal construction of the slide unit of the door lock drive assembly according to the first exemplary embodiment, FIG. 9 is a side view illustrating the internal construction of the slide unit of the door lock drive assembly according to the first exemplary embodiment, and FIG. 10 is an exploded perspective view illustrating the internal construction of the slide unit of the door lock drive assembly according to the first exemplary embodiment.

[0044] As illustrated in FIGs. 6 to 10, the slide unit 100 generally includes a slide body 110, a pressing unit 120, and a guide member.

[0045] In this construction, the pressing unit 120 is installed in the inside of the slide body 110 to be capable of being vertically reciprocated. In addition, a slide bar 125 may be formed at an end of the pressing unit 120 to press the pushing member 230, and the slide bar 125 may be formed with a seating groove 125a, with which the pushing member 230 may be contacted.

[0046] Meanwhile, the slide body 110 is installed with a driving motor 121, and the driving motor 121 is provided with a driving gear 121a at the bottom side thereof. The driving gear 121a is gear-coupled with the interlocking post 122 which is formed with a gear unit 122a.

[0047] In this construction, a guide member may be configured by a guide coil S1 which is fitted on the interlocking post 122, and a guide plate 128 and a shaft slider 127 which are provided in the interlocking post 122.

[0048] In this connection, a protrusion step 128a is formed on a side of the guide plate 128 to selectively contact with the guide coil S1, and the guide coil S1 is anchored to a side of the pressing unit 120 at the opposite ends thereof.

[0049] In addition, a spring S2 is fitted on the shaft slider 127 so that the shaft slider 127 is elastically supported in the interlocking post 122, and the tail end of the shaft slider 127 is installed to be in close contact with the pressing member 126.

[0050] At the contact ends of the guide plate 128 and the shaft slider 127, an inclined part 129 is formed, so that when the shaft slider 127 pushes the guide plate 128, the protrusion step 128a is disengaged from the guide coil S1.

[0051] Meanwhile, the slide body 110 may be configured by combining a first cover body 111 and a second cover body 112.

[0052] The inventive slide unit 100 is installed in a door lock body between the shaft connection unit 200 and a mechanical driving unit 300.

[0053] Specifically, when the pressing unit 120 of the slide unit 100 pushes the pushing member 230, the handle shafts (not illustrated) are in the connected state. To the contrary, when the pressing unit 120 does not push the pushing member 230, the handle shafts are disconnected.

[0054] Meanwhile, as illustrated in FIG. 11, the mechanical driving unit 300 is provided with a second cam 310 and a first cam 330 interlocked with the second cam 310, and the cams 310 and 330 are connected to a keyway shaft. The first cam 330 is a means for moving the pressing member 126, and the second cam 310 is a means for moving the protrusion plate (slide bar) of the pressing unit 120.

[0055] When the second cam 310 is rotated, the pressing member 126 is pushed upward. Then, the pressing member 126 pushes the shaft slider 127 upward, the guide plate 128 is lowered along the inclined part 129, and the protrusion step 128a of the guide plate 128 is disengaged from the guide coil S1.

[0056] In the state in which the guide plate 128 is disengaged from the guide coil S1, the pressing unit 120 is freely movable. Especially, when the second cam 320 of the mechanical driving unit 300 is rotated to push the protrusion plate 123, the pressing unit 120 may be manually pushed. Accordingly, the handle shafts may be manually connected with each other.

[0057] Meanwhile, when the handle shafts are connected electronically rather than manually, the torque of the motor 121 rotates the interlocking post 122 through the gear connection. Then, the protrusion step 128a of the guide plate 128 installed in the interlocking post 122 is rotated along the guide coil S1 to move the pressing unit 120, to which the guide coil S1 is connected, and to press the pushing member 230, whereby the shaft connection unit 200 can connect the handle shafts with each other.

[0058] FIG. 11 is a perspective view illustrating a mechanical driving unit of the door lock drive assembly according to the first exemplary embodiment, FIG. 12 is an exploded perspective view illustrating the mechanical driving unit of the door lock drive assembly according to the first exemplary embodiment, FIG. 13 is a front view illustrating the mechanical driving unit of the door lock drive assembly according to the first exemplary embodiment, FIG. 14 is a perspective view illustrating the inter-

nal construction of the mechanical driving unit of the door lock drive assembly according to the first exemplary embodiment, and FIG. 15 is a front view illustrating the internal construction of the mechanical driving unit of the door lock drive assembly according to the first exemplary embodiment.

[0059] As illustrated in FIGs. 11 to 15, the mechanical driving unit 300 essentially consists of a driving body 340, a first cam 330, and a second cam 310.

[0060] In this construction, the first cam 330 is rotatably installed on the driving body 340 to be interlocked with the keyway shaft. Specifically, the first cam 330 is rotatably installed in the connection groove 342 formed in the driving body 340. In addition, the first cam 330 is formed with an oval-shaped flange 331 along the outer periphery, and is formed with a rotary axle (no reference numeral is designated) at the center thereof. In front of the rotary axle, a second cam 310 is mounted.

[0061] Meanwhile, a gear driving unit 350 gear-coupled with the first cam 330 is rotatably installed in a seating groove 341 formed in the driving body 340. As a result, when the gear driving unit 350 is rotated, a gear 351 provided in the gear driving unit 350 is interlocked with a gear (not illustrated) provided on a side of the first cam 330, thereby enabling the first cam 330 to be rotated.

[0062] As a different embodiment, the gear driving unit 350 may be connected with a keyway shaft (not illustrated), into which a key may be inserted such that the keyway shaft can be interlocked with the key, in which case the gear driving unit 350 may be driven when a user rotates the keyway shaft with the key.

[0063] In addition, in the outside of the first cam 330, a cover unit 320 is mounted to protect the first cam 330, in which a surrounding part 315 is bulgingly formed in the cover unit 320 to have a space which is sufficient for allowing the oval-shaped flange 331 of the first cam 330 to be rotated therein. In that event, an opened part 312 is formed at an area of the surrounding part 315 to allow the oval-shaped flange 331 to be partially exposed to the outside.

[0064] On the front side of the first cam 330, an anchoring part 332 is protrusively formed so as to mount the second cam 310. The anchoring part 332 is coupled with the second cam 310 in the state in which it extends through the front side of the cover unit 320 to be exposed.

[0065] The second cam 310 has an outer peripheral surface with a circular shape, and a recess 311 for fixing a position is formed on the outer peripheral surface of the second cam 310.

[0066] In this manner, the mechanical driving unit 300 is installed to be interlocked with the slide unit 100 for driving the shaft connection unit 200 installed in the door lock body.

[0067] Specifically, the shaft connection unit 200 is a means for selectively connecting or disconnecting the handle shafts, in which when the shaft connection unit pushes the pushing member 230, the handle shafts are connected with each other, and when the shaft connection unit 200 does not push the pushing member 230, the handle shafts are disconnected from each other.

[0068] The shaft connection unit 200 may be operated through the slide unit 100. That is, when the pressing unit 120 of the slide unit 100 presses the pushing member 230, the shaft connection unit 200 renders the handle shafts to be connected with each other.

[0069] The slide unit 100 is formed with a protrusion plate 123 for driving the pressing unit 120, in which the protrusion plate 123 is installed at a position where it is interlocked with the oval-shaped flange 331 of the first cam 330.

[0070] That is, when the first cam 330 is rotated, the protrusion plate 123 is pushed to a side in the state in which the oval-shaped flange 331 and the protrusion plate 123 are in contact with each other. In other words, the protrusion plate 123 is moved along the oval-shaped flange 331, and the pressing unit 120 connected with the protrusion plate 123 is also moved to press the pushing member 230, thereby enabling the handle shafts to be connected with each other.

[0071] At an end of the slide unit 100, a pressing member 126 is installed in a state in which the pressing member 126 is elastically supported by a spring (not illustrated). The pressing member 126 is installed in a state in which its tail end is in close contact with the seating groove 311 of the second cam 310.

[0072] The pressing member 126 is a means for fixing a reference point for the second cam 310 and the first cam 330 interlocked with the second cam 310. That is, the pressing member 126 maintains the state in which it is in close contact with the seating groove 311 of the second cam 310.

[0073] In this state, when the user rotates the keyway shaft to rotate the first cam 330, the seating groove 311 of the second cam 310 is rotated to push the pressing member 126 upward, and when the keyway shaft is returned to its original position, the pressing member 126 is in close contact with the seating groove 311 to be prevented from being moved leftward or rightward.

[0074] With this construction, it is possible to prevent the keyway shaft from idling. In addition, since the user can recognize the driving position, it is possible to improve the operating reliability.

[0075] FIG. 16 is a perspective view illustrating a shaft connection unit of a door lock drive assembly according to a second exemplary embodiment of the present invention, FIG. 17 is a plan view illustrating the shaft connection unit of the door lock drive assembly according to the second exemplary embodiment, FIG. 18 is a partial exploded perspective view illustrating a connective relationship of a pushing member of the door lock drive assembly according to the second exemplary embodiment, FIG. 19 is a partial front view illustrating the operating state of a shaft connection unit of the door lock drive assembly according to the second exemplary embodiment, and FIG. 20 is a partial side view illustrating the operating state of the shaft connection unit of the door lock drive assembly

according to the second exemplary embodiment.

[0076] As illustrated in FIGs. 16 to 20, with reference to a clutch body 410, the shaft connection unit according to the second exemplary embodiment is formed with a handle shaft 420 at one end and a connection end 416 at the other end.

[0077] The handle shaft 420 is equipped with an inner door handle, and hence serves as a means to which the driving force is transmitted. As illustrated in FIG. 16, the connection end 416 is formed with a coupling groove 412, into which the shaft of an outer door handle is inserted.

[0078] Meanwhile, the clutch body 410 is equipped with a pushing member 430, in which as illustrated in FIG. 17, the pushing member 430 consists of a guide part 431 and a pin 432. In that event, the guide part 431 and the pin 432 may be integrally formed, and takes a shape formed by coupling separate members.

[0079] Specifically, the guide part 431 is coupled to the leading end of the pin 432. In addition, the guide part 431 is formed in a circular arc shape. Further, the pin 432 may be introduced into the insertion hole 415 (FIG. 20) formed in a handle shaft 420. In that event, the state in which the pin 432 of the pushing member 430 is inserted into the insertion hole 415 corresponds to the connection state of the clutch where the driving force of the handle shaft 420 can be transmitted to the shaft coupled to the other side (the connection end 416).

[0080] Whereas, the state in which the pin 432 is released from the insertion hole 415 corresponds to the disconnection state of the clutch where the driving force of the handle shaft 420 is not transmitted to the shaft coupled to the connection end 416 and the handle shaft 420 idles alone.

[0081] Meanwhile, the clutch body 410 is equipped with a bracket 433. A pin 432 is mounted in the inside of the bracket 433 in a state in which a spring 434 is inserted into the bracket 433, and the guide part 431 is fixed to the leading end of the pin 432. In that event, the spring 434 may be occasionally omitted. That is, the pushing member 430 and the slide bar 125 may provide structures interlocked with each other even without the spring 434.

[0082] Specifically, the slide bar 125 of the slide unit 100 is formed with a fixing groove 455 on the bottom side thereof. The fixing groove 455 is a place where the guide part 431 is inserted, and may be formed in a shape corresponding to the shape of the guide part 431, for example, in a circular arc shape. Here, reference numeral 500 designates the frame body.

[0083] As the guide part 431 is inserted into the slide bar 125, the pushing member 430 and the slide bar 125 may be interlocked with each other in the fixed state. Thus, even when the pushing member 430 is rotated in the state in which it is inserted into the insertion hole 415 (FIG. 20) of the handle shaft 420 (the clutch is not disconnected), the slide bar 125 is interlocked with the pushing member 430 without being separated from the pushing member 430, and hence the position sensing of the slide bar 125 recognizes the clutch as not being in the disconnected state.

[0084] As illustrated in FIGs. 19 and 20, in the state in which the slide bar 125 of the slide unit 100 presses the pushing member 430, the clutch is in the connected state, and hence when the handle shaft 420 is rotated, the door lock is unlocked.

[0085] In that event, even when the pushing member 430 is rotated in the state where it is abnormally released from the insertion hole 415 of the handle shaft 420, the guide part 431 is rotated in the state in which it is inserted into the fixing groove 455 of the slide bar 125. Therefore, the present invention can recognize that the pushing member 430 is positioned at an incompletely released state (in which the pin 432 is caught midway) through a position sensor provided in a slide device.

[0086] As a result, even when the pushing member 430 is completely inserted into or released from the handle shaft 420, the slide bar 125 and the pushing member 430 are interlocked with each other at any rotating position without being released from each other. As such, it is possible to prevent the occurrence of malfunction of the door lock in advance.

[0087] Although the present invention was illustrated and described above with reference to several specific exemplary embodiments, the present invention is not limited to the exemplary embodiments. A person ordinarily skilled in the art the present invention belongs can make various changes and modifications without departing from a technical sprit and scope of the present invention defined in the claims.

Claims

1. A door lock drive assembly comprising:

   a shaft connection unit that is provided with a pushing member configured to selectively connect a first handle shaft and a second handle shaft in such a manner that the first handle shaft and the second handle shaft are connected with or disconnected from each other;
   a slide unit that is provided with a pressing unit which is vertically movable to press the pushing member; and
   a mechanical driving unit that is formed with a keyway and vertically moves the pressing unit of the slide unit when a key is inserted into the keyway and rotated.

2. The door lock drive assembly as claimed in claim 1, further comprising a pushing member, wherein the pushing member is provided with a rotary axle hinged to the first handle shaft, and with reference to the rotary axle, one end of the pushing member is elastically supported on the outer peripheral surface of the first handle shaft, and the other end is

positioned in the inside of the slide unit.

3. The door lock drive assembly as claimed in claim 2, wherein the slide unit is formed with an inclined groove, and the other end of the pushing member is positioned in the inclined groove.

4. The door lock drive assembly as claimed in claim 1, wherein the slide unit comprises:

a slide body;
a slide member installed in the sliding body to be capable of being reciprocated to press the pushing member, which is configured to connect and disconnect the handle shafts, to a side;
a driving motor installed in the inside of the slide body;
a guide coil disposed in the reciprocating direction of the slide member, a side surface of the slide member being fixed to the guide coil; and
a guide member comprising a guide plate which is rotated by the driving motor and formed with a protrusion step on the outer peripheral surface thereof to be moved along the guide coil, and a shaft slider configured to control the guide plate to be contacted with or separated from the guide coil.

5. The door lock drive assembly as claimed in claim 4, wherein the guide plate is configured such that the protrusion step is contacted with the guide coil in the state in which the guide plate is elastically supported in the guide coil.

6. The door lock drive assembly as claimed in claim 5, wherein an inclined part is formed at a tail end where the guide plate and the shaft slider are contacted with each other, so that when the shaft slider pushes the guide plate, the protrusion step in a pressed state is released from the guide coil.

7. The door lock drive assembly as claimed in claim 4, wherein the other end of the slide member is formed with a protrusion plate configured to be interlocked with a manual driving shaft provided in the door lock.

8. The door lock drive assembly as claimed in claim 1 or 2, wherein the mechanical driving unit comprises:

a driving unit body;
a first cam that is rotatably installed in the driving unit body, and configured to push a tail end of the slide unit to a side by being interlocked with a keyway shaft to be rotated; and
a second cam that is coaxially connected with the first cam, and positioned in front of the first cam, the second cam being formed with a recess for fixing a position.

9. The door lock drive assembly as claimed in claim 8, wherein the pressing unit protrusively formed on the slide unit is retained in a close contact state in the recess to fix the position of the second cam.

10. The door lock drive assembly as claimed in claim 8, wherein the first cam is formed in such a manner that its outer peripheral, which is in contact with the slide unit, forms an oval shape.

11. The door lock drive assembly as claimed in claim 8, wherein the driving unit body is provided with a cover unit for protecting the first cam.

12. The door lock drive assembly as claimed in claim 1, wherein the pushing member comprises:

a pin inserted into the insertion hole of the handle shaft, and
a guide part fixed to the leading end of the pin, and coupled with the leading end of the pressing unit.

13. The door lock drive assembly as claimed in claim 12, wherein the leading end of the pressing unit is formed with a fixing groove, into which the guide part is inserted.

14. The door lock drive assembly as claimed in claim 12, wherein the guide part is formed in a circular arc shape.

15. The door lock drive assembly as claimed in claim 12, wherein the pin is fitted with a spring to elastically support the pushing member.

16. The door lock drive assembly as claimed in claim 12, wherein the pin and the guide part are formed integrally with each other.

Fig 1

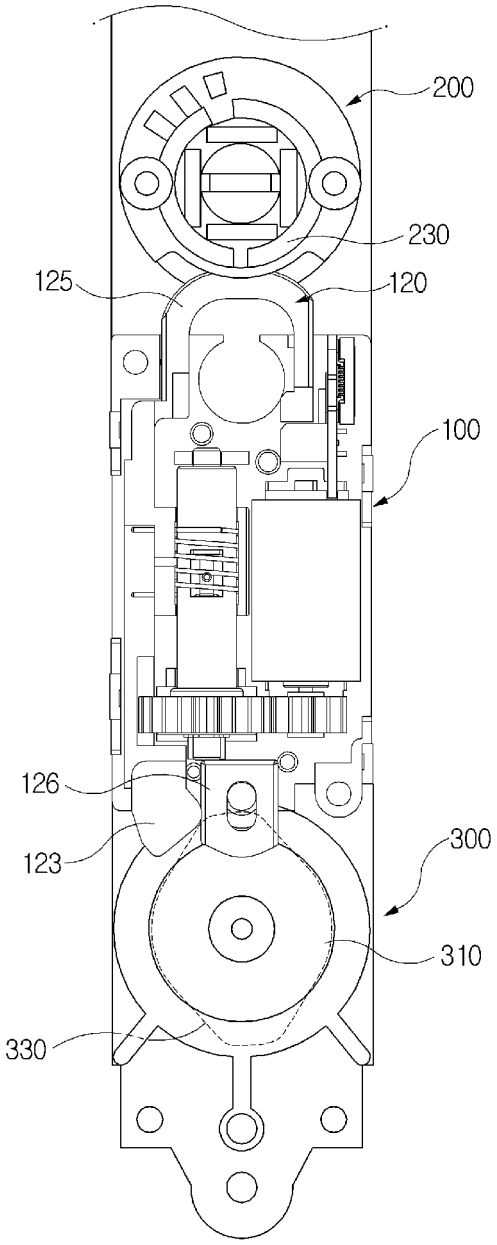

Fig 2

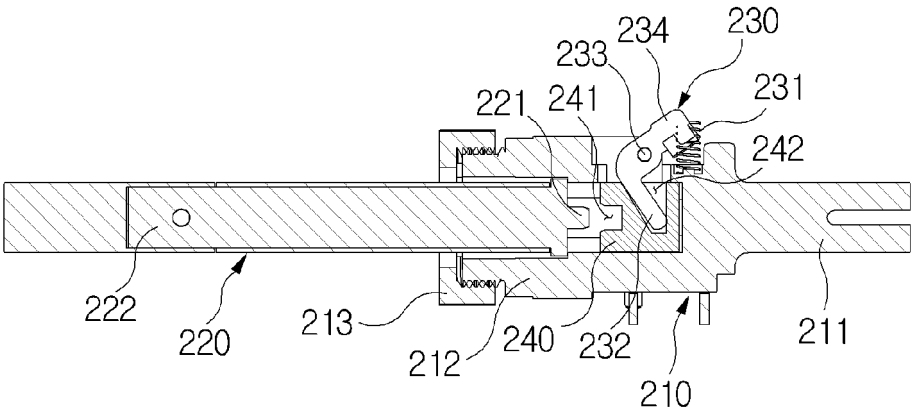
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Fig 3

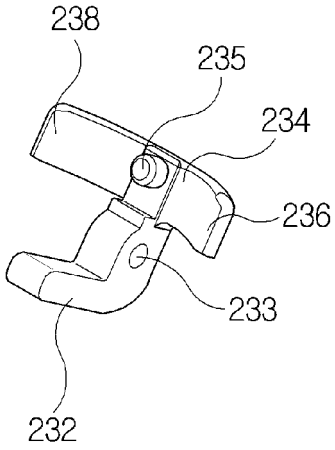
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Fig 4

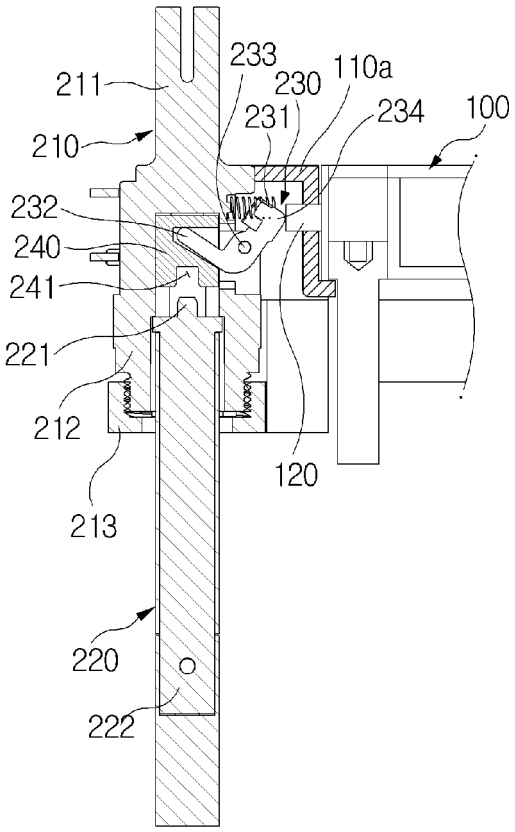
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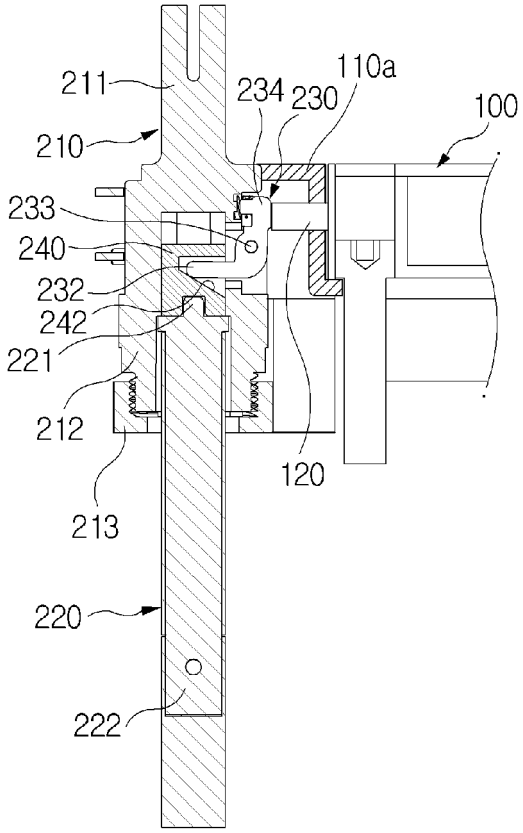
Fig 5



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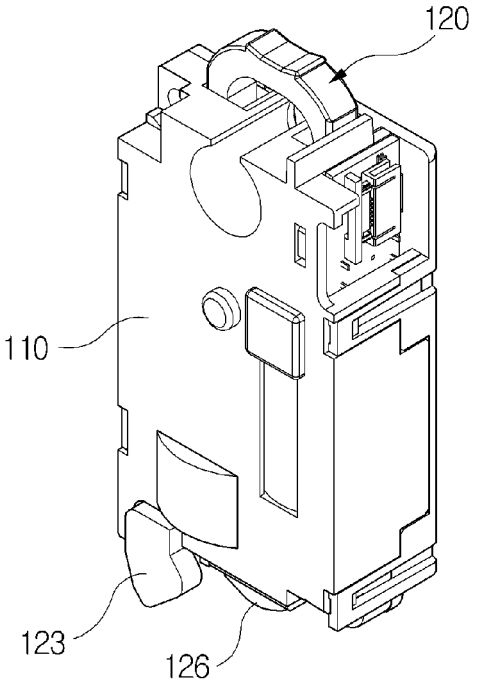

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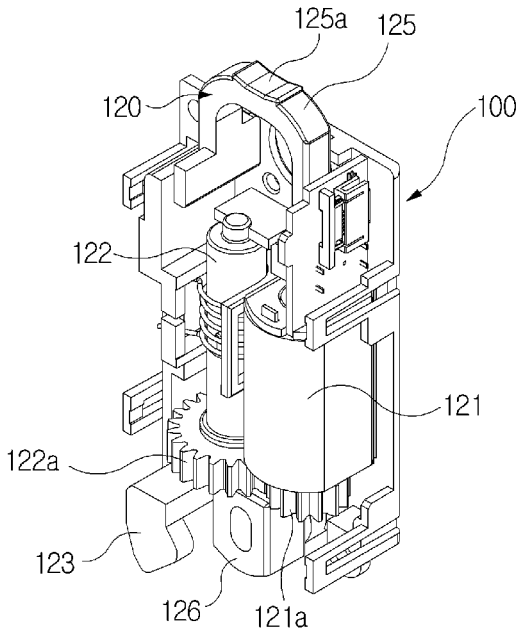
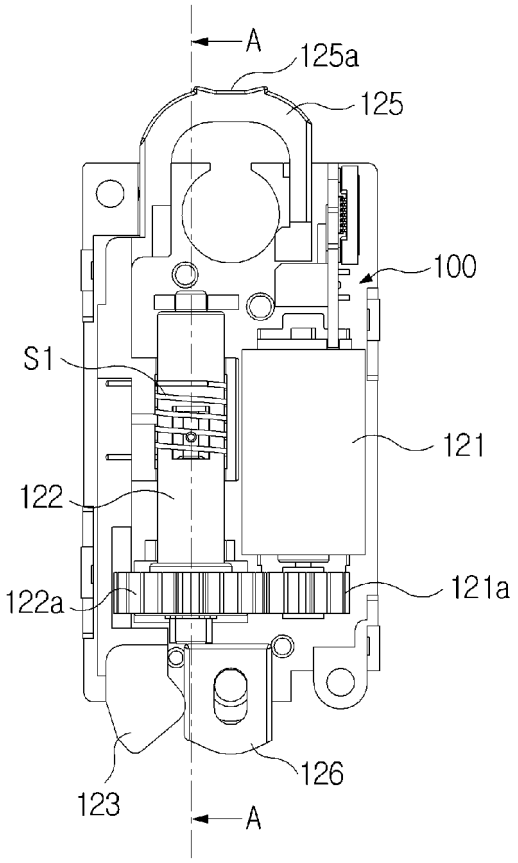


Fig 8



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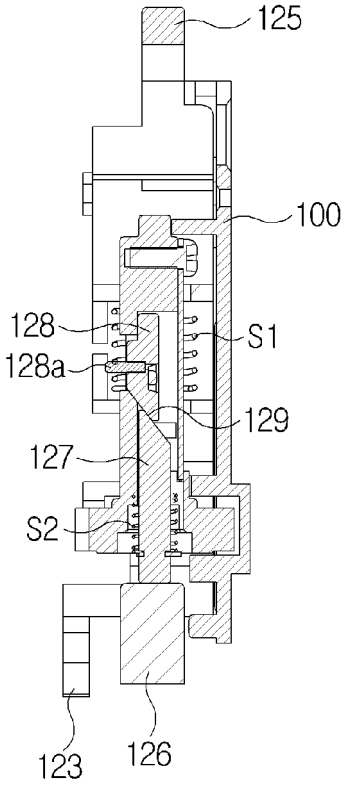
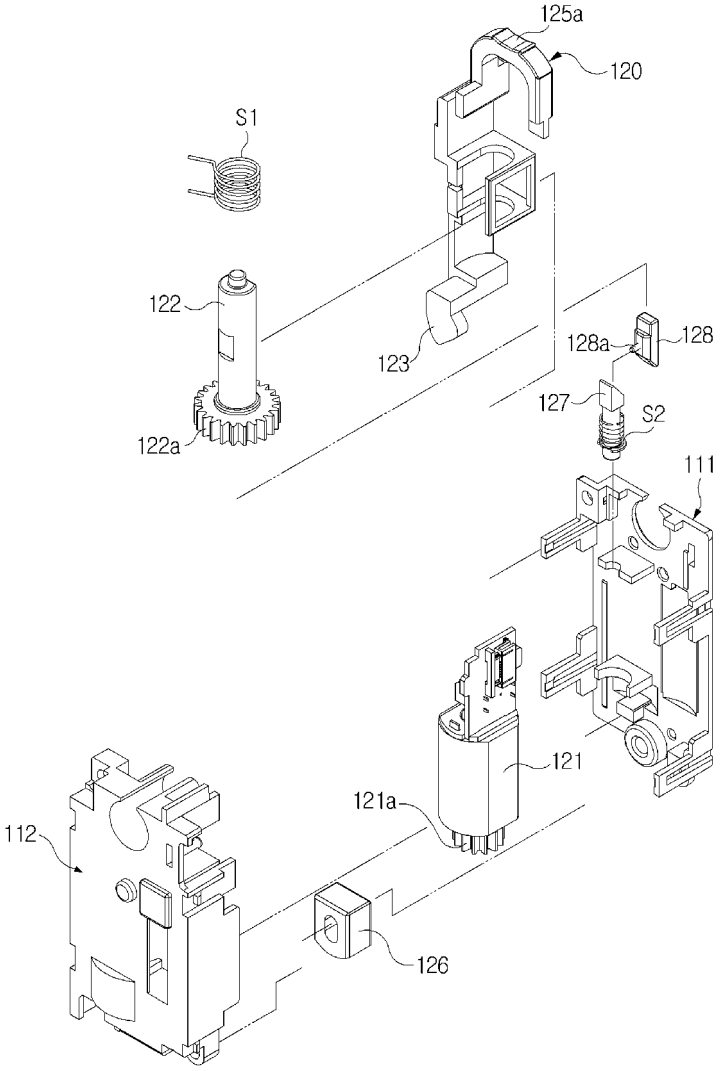


Fig 10



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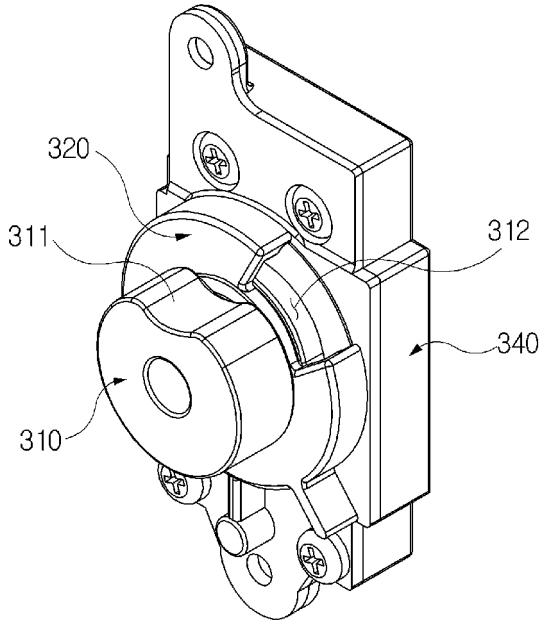
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Fig 12

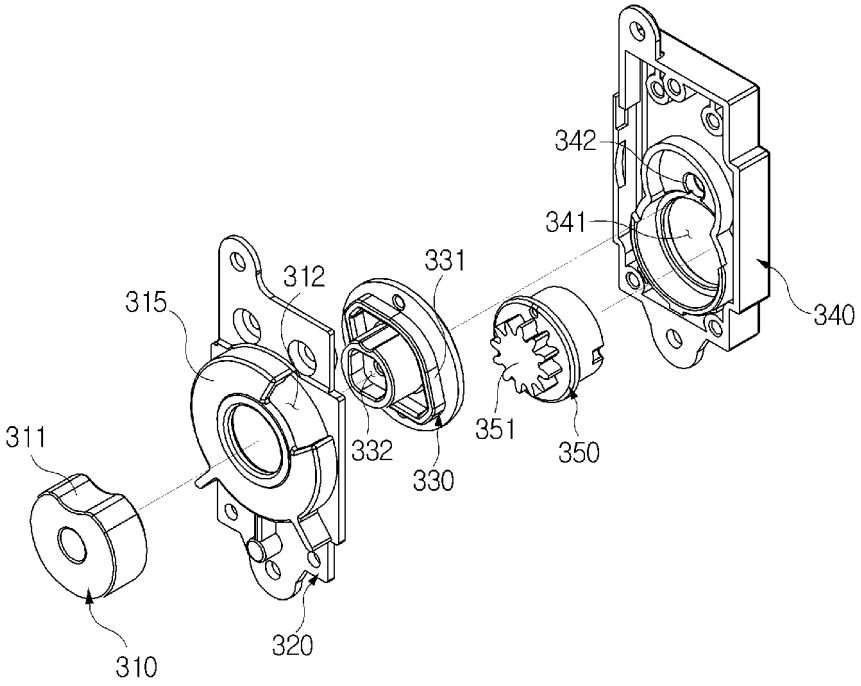
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Fig 13

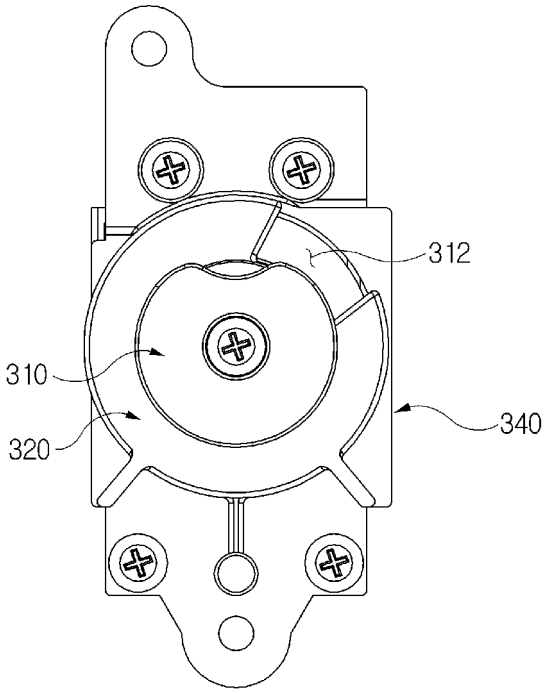
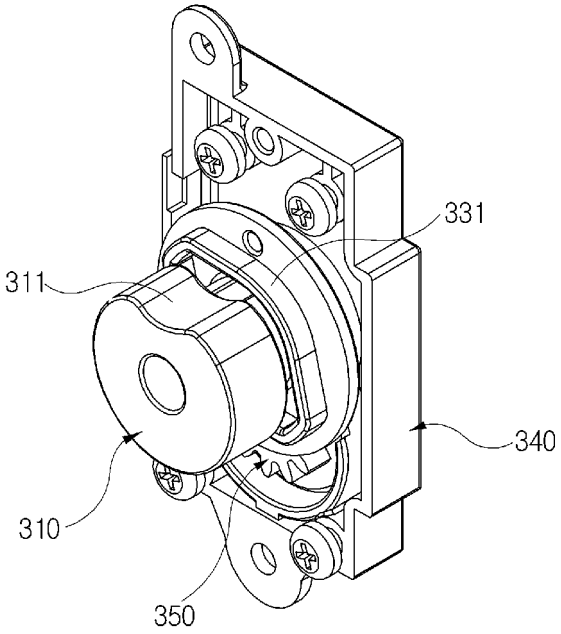


Fig 14



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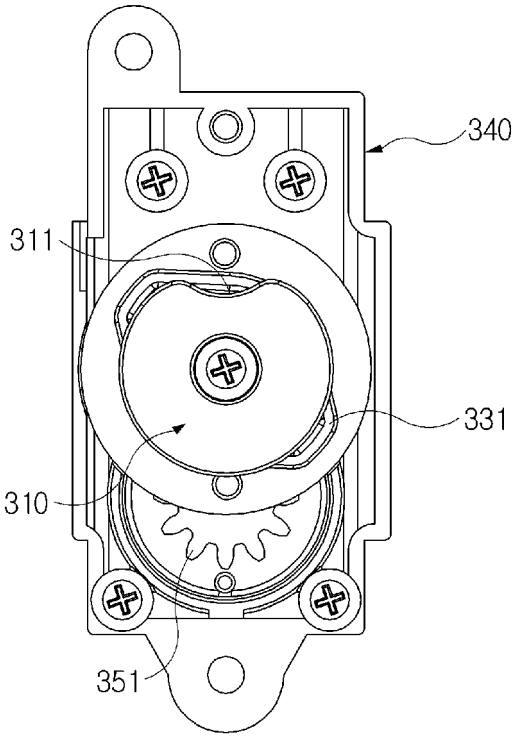

Fig 16

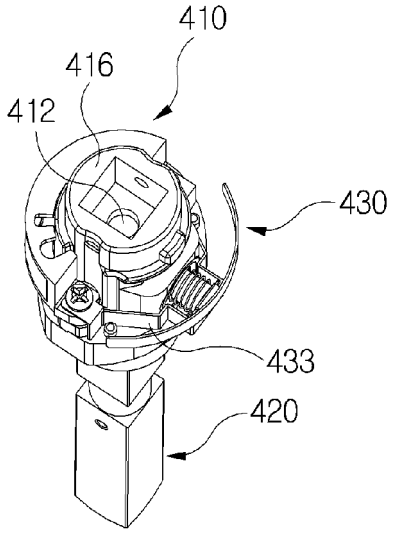

Fig 17

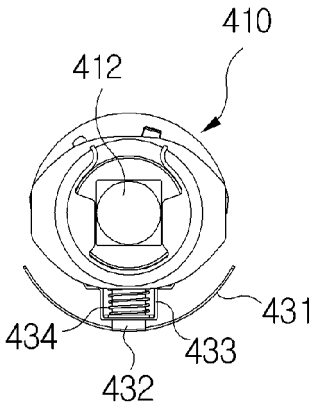

Fig 18

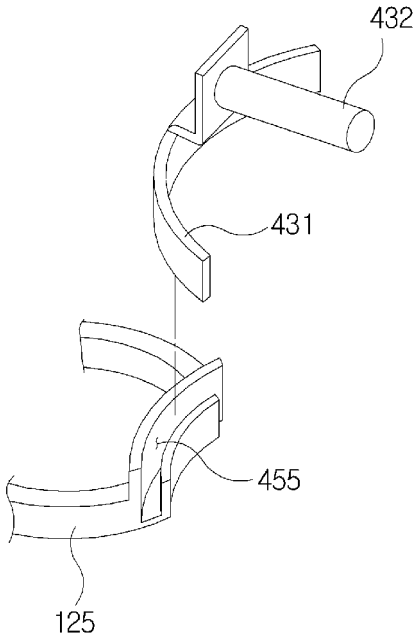

Fig 19

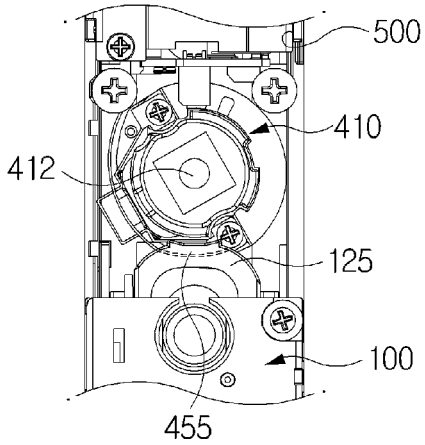

Fig 20