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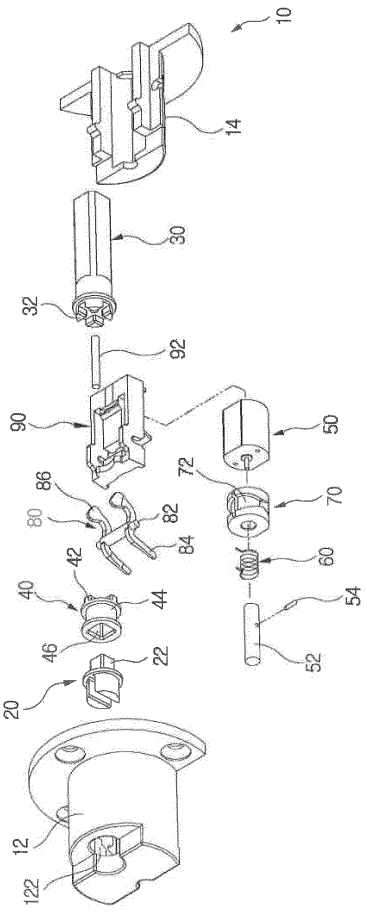
(54) ELECTRONIC DOOR LOCK DEVICE FOR CONNECTING CLUTCH EASILY

(57) The present invention relates to an electronic door lock device for connecting a clutch easily. The electronic door lock device includes: a first shaft connected to a first handle to operate a latch during a rotation operation; a second shaft connected to a second handle, the second shaft being disposed on the same axis as the first shaft and having a first roughness on an end thereof; a shaft connection member disposed between the first shaft and the second shaft, the shaft connection member being movably disposed on the first shaft and having a second roughness on an end facing the second shaft so as to be engaged with the first roughness; and a driving device operating the shaft connection member according to an external signal.

[Figure 1]



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Description

[Technical Field]

[0001] The present invention relates to an electronic door lock device, and more particularly, to an electronic door lock device for connecting a clutch easily, in which two shafts connected with two different door handles can be easily connected with or disconnected from each other using the easy clutch connection structure.

[Background Art]

[0002] An electronic door locking device can easily lock and unlock a door without a key which is cumbersome to carry. Therefore, the electronic door locking device is widely used in an apartment house.

[0003] The electronic door locking device is classified into two kinds of structures. Herein, in one of the structures, a latch is directly or indirectly operated by a driving means such as a motor driven by identification signal, and in the other structure, the latch is interlocked with an internal handle of a door, and a shaft of the internal handle and a shaft of an external handle of the door are selectively connected or disconnected according to the identification signal.

[0004] In case of the former, the configuration for operating the latch and the configuration for operating the door handle are separated from each other, and thus a latch operation assembly (i.e., door locking device) may be manufactured separately, and also the assembly may be additionally installed at a door in which other door locking device is already installed.

[0005] However, in the door locking device having such structure, since driving force of the motor is transmitted through a plurality of gears, the gears are worn as time passes and thus the latch is not operated normally or malfunctioned.

[0006] Further, in order to operate the relatively hard and heavy latch, the door locking device having such structure has to use an expensive high power motor and thus the current consumption is also high.

[0007] However, in case of the latter, since the latch is operated by rotation of the internal handle of the door, the malfunction of the latch hardly occurs. Furthermore, since the motor moved only a shaft connecting member for connecting two shafts instead of operating the heavy latch, it is possible to use a relatively small motor and thus the current consumption is low.

[0008] In such door locking device, only when an uneven portion of the shaft connecting member is exactly engaged with an uneven portion of the shaft of the external handle of the door, the external handle of the door is rotated and thus the door is unlocked. Therefore, if the uneven portion of the shaft connecting member is exactly engaged with the uneven portion of the shaft of the external handle of the door due to undesirable rotation of the shaft of the external handle or the internal handle of the door, the shafts are not connected through the shaft connecting member and thus the door is not unlocked even though a user inputs correct identification signal.

[Disclosure]

[Technical Problem]

[0009] An object of the present invention is to provide an electronic door lock device for connecting a clutch easily which can easily connect the shaft of the external handle of the door with the shaft connecting member even though the external handle of the door is undesirably rotated in any state.

[0010] Another object of the present invention is to provide an electronic door lock device for connecting a clutch easily which can be easily installed at an existing door with a handle.

[Technical Solution]

[0011] To achieve the object of the present invention, the present invention provides an electronic door lock device for connecting a clutch easily, including a clutch assembly including a first shaft which is connected with a first handle so as to operate a latch when the first handle is rotated; a second shaft which is connected with a second handle and coaxially disposed with the first shaft and of which an end is formed with a first uneven portion; a shaft connection member which is disposed between the first and second shafts and movably disposed at the first shaft and of which an end faced with the second shaft is formed with a second uneven portion engaged with the first uneven portion; and a driving part which operates the shaft connection member according to an external signal, wherein the driving part includes a motor having a shaft; a driving member which is movably installed on the shaft of the motor and in which a coil spring is installed; a pin which is installed in the shaft of the motor so as to move the driving member via the coil spring when the motor is operated; and an operation member which is rotatably installed at the clutch assembly and connected with the driving member and the shaft connection member so as to connect or disconnect the shaft connection member with or from the second shaft according to movement of the driving member.

[0012] Preferably, the operation member includes an axial portion which is coupled with the clutch assembly; a first pair of legs which are vertically extended from the axial portion so as to be connected with the driving member; and a second pair of legs which are extended from the axial portion in a symmetric direction to the first pairs of legs so as to be connected with the shaft connection member.

[0013] Preferably, a first groove in which the first pair of legs are inserted is formed in an outer circumferential surface of the driving member, and a second groove in which the second pair of legs are disposed is formed in

an outer circumferential surface of the shaft connection member.

[0014] Preferably, one end of the first shaft is formed into a square pillar shape, and the shaft connection member is formed with a square hole in which the first shaft having the square pillar shape is inserted.

[Advantageous Effects]

[0015] As described above, the present invention can facilely connect the shafts of the handles of the door having the handles which are rotatably disposed at the door in order to reduce the manufacturing cost and simplify the structure thereof.

[0016] Further, since the present invention has the relatively simple shaft connection structure, it is advantageous to reduce the size of the door locking device.

[0017] Further, since the clutch assembly of the present invention has the same size of the key cylinder of the conventional manual door locking device, it can be facilely additionally provided or replaced with the conventional manual door locking device. In other words, since the present invention has no a mortise formed in the door, it can be applied to the existing door having the handles without any additional machining processes.

[0018] Furthermore, since the connection and disconnection between the shaft of the internal handle and the shaft of the external handle is mechanically achieved by the motor, it is relatively strong on external electrical or magnetic shock and thus it is possible to considerably the malfunction thereof caused by the shock.

[Description of Drawings]

[0019] The above and other objects, features and advantages of the present invention will become apparent from the following description of preferred embodiments given in conjunction with the accompanying drawings, in which:

Fig. 1 is an exploded perspective view of a clutch assembly provided in an electronic door locking device according to a first embodiment of the present invention.

Fig. 2 is an assembled perspective view of the clutch assembly of Fig. 1.

Fig. 3 is a partial cross-sectional view of the clutch assembly of Fig. 2.

Figs. 4 and 5 are views showing an operation relationship between a coil spring and a driving member in the clutch assembly upon driving of a motor according to the first embodiment of the present invention.

Figs. 6 and 7 are views showing an operation state of the clutch assembly according to the first embodiment of the present invention.

Fig. 8 is a partially cut away view showing a state that the clutch is not completely engaged.

Fig. 9 is a partially exploded perspective view showing an installation structure of an electronic door locking device having the clutch assembly of Fig. 2.

Fig. 10 is a side view showing a state that the electronic door locking device of Fig. 9 is applied to a door.

Fig. 11 is a cross-sectional view showing a schematic structure of an electronic door locking device according to a second embodiment of the present invention.

Fig. 12 is an exploded perspective view of a clutch assembly of Fig. 11.

Fig. 13 is an exploded perspective view of a second handle of Fig. 11.

Figs. 14 and 15 are views showing an operation principle of the electronic door locking device of Fig. 11.

[Best Mode]

[0020] Hereinafter, the embodiments of the present invention will be described in detail with reference to accompanying drawings.

(First embodiment)

[0021] Fig. 1 is an exploded perspective view of a clutch assembly provided in an electronic door locking device according to a first embodiment of the present invention, Fig. 2 is an assembled perspective view of the clutch assembly of Fig. 1, Fig. 3 is a partial cross-sectional view of the clutch assembly of Fig. 2, Figs. 4 and 5 are views showing an operation relationship between a coil spring and a driving member in the clutch assembly upon driving of a motor according to the first embodiment of the present invention, Figs. 6 and 7 are views showing an operation state of the clutch assembly according to the first embodiment of the present invention, Fig. 8 is a partially cut away view showing a state that the clutch is not completely engaged, Fig. 9 is a partially exploded perspective view showing an installation structure of an electronic door locking device having the clutch assembly of Fig. 2, and Fig. 10 is a side view showing a state that the electronic door locking device of Fig. 9 is applied to a door.

[0022] The structure of a clutch assembly provided of an electronic door locking device according to the embodiment is different from that of the conventional door locking device, and thus the clutch assembly 10 will be mainly described. Therefore, other configurations of the present invention may be the same as those of the prior art and these configurations may be modified in the scope that a person skilled in the art can recognize or achieve.

[0023] As shown in Fig. 1, the clutch assembly 10 according to the first embodiment of the present invention includes upper and lower bodies 12 and 14, a first shaft 20, a second shaft 30, a shaft connection member 40, a motor 50, a coil spring 60, a driving member 70 and an operation member 80 and may further include a guide

member 90.

[0024] A space for receiving almost other elements is formed at a faced portion of the upper and lower bodies 12 and 14 (i.e., a lower portion of the upper body 12 and an upper portion of the lower body 14), thereby forming the outer appearance of the clutch assembly 10. Herein, since the clutch assembly 10 formed by coupling the upper and lower bodies 12 and 14 has a small size, it can be facilely installed at the conventional or other electronic door locking device.

[0025] The first shaft 20 is disposed to be exposed to the outside through a hole 122 of the upper body 12. The first shaft 20 is connected with an internal handle (not shown) of the door or a shaft of the internal handle and rotated together when the internal handle is rotated. And the first shaft 20 is mechanically connected with construction elements for operating a latch (not shown) and thus directly or indirectly drives the latch upon its rotation. One of both ends of the first shaft 20, which is coupled with the shaft connection member 40, is formed into shape of a square pillar(22).

[0026] The second shaft 30 is disposed in the clutch assembly 10 so as to have the same axial center as the first shaft 20 and also spaced part from the first shaft 20 so as to be not directly connected or contacted with the first shaft 20. The second shaft 30 is connected with an internal handle (not shown) of the door or a shaft of the internal handle and rotated together when the internal handle is rotated. And the first shaft 20 is connected with an external handle (not shown) of the door or a shaft of the external handle and rotated together when the external handle is rotated. One end of the second shaft 30 is formed into a square pillar shape so as to be firmly coupled with the external handle and the other end thereof has a first uneven portion 32 so as to be coupled with the shaft connection member 40. In the embodiment, as shown in Fig. 1, the first uneven portion 32 consists of a cross-shaped groove and protrusions formed by the groove. For reference, the first and second shafts 20 and 30 are rotatably disposed in the clutch assembly 10.

[0027] The shaft connection member 40 is disposed between the first and second shafts 20 and 30 so as to be reciprocated between the first and second shafts 20 and 30. More detailedly, the shaft connection member 40 is disposed at a square pillar 22 of the first shaft 20 so as to be movable in an axial direction thereof so that the first and second shafts 20 and 30 are selectively connected with each other and thus the rotation of the second shaft 30 can be transmitted to the first shaft 20. One end of the shaft connection member 40 (which is faced with the first shaft 20) is formed with a square hole 46 having a desired depth and the other end thereof (which is faced with the second shaft 30) is formed with a second uneven portion 42 (a cross-shaped protrusion in case of the embodiment) which is engaged with the first uneven portion 32. A second groove 44 having a desired width is formed at the outer circumference of the shaft connection member 40. And a stepped portion is formed at both side ends of the outer circumference of the shaft connection member 40 by the second groove 44. The shaft connection member 40 is formed to be longer than a spaced distance between the first and second shafts 20 and 30. In other words, the shaft connection member 40 has an enough length to be engaged with the first uneven portion 32 of the second shaft 30 while the shaft connection member 40 is coupled with the first shaft 20.

[0028] The motor 50 is installed at the lower body 14 so as to generate driving force for driving the shaft connection member 40. The motor 50 is provided with a shaft 52 extended in one direction (i.e., toward the first shaft 20 in case of the embodiment), and the shaft 52 is rotated when the motor 50 is operated. The shaft 52 is formed with a through-hole which is formed to be vertical to a length direction thereof, and a pin 54 is inserted into the through-hole. The pin 54 functions to move a coil spring 60 inserted onto the shaft 52 of the motor 50 (this will be described later).

[0029] As described above, the coil spring 60 is installed at the shaft 52 of the motor 50 and functions to move the driving member 70 in the axial direction thereof when the motor 50 is driven. This function can be achieved by that the pin 54 compresses the coil spring 60 toward one side or the other side thereof according to forward rotation or reverse rotation of the motor 50. Therefore, it is preferable that both ends of the coil spring 60 is closely wound or opened unlike a conventional spring, such that the pin 54 can be moved inside the coil spring 60.

[0030] The driving member 70 is installed at the shaft 52 of the motor 50 together with the coil spring 60. A space for receiving the coil spring 60 is formed in the driving member 70, and a first groove 72 is formed at an outer surface (i.e., an outer circumference) of the driving member 70 so that a first leg 84 of the operation member 80 can be inserted therein. An opening formed at each end of the driving member 70 has a smaller diameter than a diameter of the coil spring 60 (but the shaft of the motor can be inserted therein), such that the coil spring 60 disposed in the driving member 70 is not separated to the outside. For reference, in order to install the coil spring 60 in the driving member 70, one end of the coil spring 60 is firstly inserted into the opening of the driving member 70 and the coil spring 60 is then rotated continuously (i.e., the coil spring 60 is inserted into the driving member 70 by its own screw motion).

[0031] The operation member 80 is rotatably disposed at the upper body 12 or lower body 14 and functions to convert a displacement of the driving member 70 into a displacement of the shaft connection member 40. The operation member 80 is provided with an axial portion 82 functioning as a rotational axis, and two pairs of legs 84 and 86 which are symmetrically disposed about the axial portion 82. Each pair of legs 84, 86 are extended to be parallel with each other and inserted into the driving member 70 and the shaft connection member 40. In other words, the first pair of legs 84 are inserted into the first

groove 72 of the driving member 70 and the second pair of legs 86 are inserted into the second groove 44 of the shaft connection member 40 (referring to Fig. 3). Therefore, if the driving member 70 is moved to one side along the shaft 52 of the motor 50, the displacement of the driving member 70 is transmitted to the shaft connection member 40 through the operation member 80 and thus the shaft connection member 40 is reversely moved corresponding to the displacement of the driving member 70 (that is, the operation member 80 functions as a lever).

[0032] The guide member 90 is disposed in the clutch assembly 10 and functions as a guider which allows the shaft connection member 40 to be stably moved within a preset range and also functions as a boss which supports the axial portion 82 of the operation member 80. The guide member 90 may further include a guide rod 92 which passes through the shaft connection member 40 and the second shaft 30. Meanwhile, the guide member 90 and the guide rod 92 may be omitted or modified depending on the internal structure of the clutch assembly 10.

[0033] Referring to Figs. 4 and 5, the movement of the driving member 70 upon the driving of the motor 50 will be described.

[0034] As described above, the pin 54 is installed at the shaft 52 of the motor 50. The pin 54 is moved along the spiral body of the coil spring 60 when the motor 50 is driven (actually, the coil spring 60 is moved) and compresses the coil spring 60. For example, if the motor 50 is driven clockwise (in an arrow direction of Fig. 4), the pin 54 is moved along the spiral body of the coil spring 60 and compresses left (in Fig. 5) the coil spring 60 (referring to Fig. 5a). If the motor 50 is driven counterclockwise, the pin 54 is moved along the spiral body of the coil spring 60 and compresses right the coil spring 60 (referring to Fig. 5b).

[0035] The compression of the coil spring 60 causes the driving member 70 to be moved by restoring force of the coil spring 60. In other words, when the coil spring 60 is compressed to the left side of the pin 54, the driving member 70 is pushed left by the restoring force of the coil spring 60 (referring to Fig. 5a). And when coil spring 60 is compressed to the right side of the pin 54, the driving member 70 is pushed right by the restoring force of the coil spring 60 (referring to Fig. 5b).

[0036] Hereinafter, the movement of the shaft connection member 40 according to the movement of the driving member 70 will be described with reference to Figs. 6 and 7. In the electronic door locking device with the facile clutch connection structure, when an authorized identification signal or a correct key operation is not provided, the first and second shafts 20 and 30 are maintained in the state of being separated from each other. In this case, a person on the inside of the door can rotate the door handle and can release the locking state of the latch, but a person on the outside of the door cannot release the locking state of the latch even though rotating the door handle.

[0037] Therefore, in the clutch assembly 10 of the present invention, the shaft connection member 40 and the second shaft 30 are normally maintained in the state of being separated from each other. This state is achieved by that the driving member 70 is moved to the motor 50, as shown in Fig. 6. That is, if the driving member 70 is moved right by the rotation of the motor 50 and the restoring force of the coil spring 60, the shaft connection member 40 is moved left by the counterclockwise rotation of the operation member 80 (in Fig. 6) rotated by the rotation of the driving member 70, and thus the shaft connection member 40 and the second shaft 30 are separated from each other.

[0038] However, when the motor 50 is reversely rotated by the authorized identification signal or the key operation, the driving member 70 is moved left by the restoring force of the coil spring 60, and the shaft connection member 40 is moved right by the operation member 80 which is rotated counterclockwise. Then, the second uneven portion 42 of the shaft connection member 40 is engaged with the first uneven portion 32 of the second shaft 30, and the first and second shafts 20 and 30 are connected with each other through the shaft connection member 40, and the internal handle of the door can be rotated by the rotation of the external handle of the door. Meanwhile, some of the door handles has an elastic member so as to be returned to its original position when the handles are rotated by the user. However, in this case, it is necessary to provide separate elements together with the elastic member.

[0039] Therefore, in order to simplify the configuration of the door handle, a recent handle is formed to be freely rotated (that is, the handle is not returned to its original position after the handle is rotated by the user).

[0040] In this configuration, when the user rotates the internal or external handle of the door, a state that the second uneven portion 42 of the shaft connection member 40 cannot be engaged with the first uneven portion 32 of the second shaft 30 may occur as shown in Fig. 8. In this case, the shaft connection member 40 is not engaged completely with the second shaft 30 even by the authorized identification signal or the key operation, and thus the user cannot open the door from the outside. However, the present invention can solve the problem. In the clutch assembly 10 of the present invention, if the state that the shaft connection member 40 cannot be engaged with the second shaft 30 occurs as shown in Fig. 8, the driving member 70 and the coil spring 60 are maintained in the state shown by the solid line of Fig. 5a. In other words, the driving member 70 is maintained in a state of being not completely moved left, and the coil spring 60 is maintained in a state of being compressed.

[0041] In this situation, the state that the second uneven portion 42 of the shaft connection member 40 cannot be engaged with the first uneven portion 32 of the second shaft 30 cannot be overcome. But since the driving member 70 has inertia tending to keep it moving left due to the compressed coil spring 60, the user rotates the ex-

ternal handle of the door, and the second uneven portion 42 of the shaft connection member 40 and the first uneven portion 32 of the second shaft 30 can be engaged with each other, and thus the driving member 70 is further moved left by the restoring force of the coil spring 60. Finally, the shaft connection member 40 can be additionally moved through the operation member 80 due to the further movement of the driving member 70, and thus the second uneven portion 42 of the shaft connection member 40 can be firmly engaged with the first uneven portion 32 of the second shaft 30.

[0042] Therefore, according to the present invention, even in the state that the shaft connection member 40 cannot be engaged with the second shaft 30 when the user rotates the door handle, the shaft connection member 40 and the second shaft 30 are facilely engaged with each other by only the rotational operation of the handle. And the installation of the electronic door locking device having the clutch assembly 10 as described above will be described.

[0043] As shown in Figs. 9 and 10, the door locking device according to the embodiment of the present invention includes an outer body 100, an inner body 200, a striker 300 and a clutch assembly 10.

[0044] The outer body 100 is disposed at an outside (or outdoor side) of the door D and includes a plurality of buttons 104 (e.g., buttons for numerals from 0 to 9 or special characters such as * and #) for receiving the secret code number or identification signal and a handle 102 for operating a latch 204. Further, the outer body 100 is formed with a hole for installing the handle 102. The hole passing through the outer body 100 allows coupling between the handle 102 and the clutch assembly 10 which is disposed at the inside of the door D.

[0045] The inner body 200 is disposed at an inside (or indoor side) of the door D and includes the latch 204 and a handle 202 (referring to Fig. 10) for operating the latch 204. And the inner body 200 further include various mechanical parts for allowing the latch 204 to be operated by rotational force of the handle 202, a power part for supplying power to the mechanical parts and the clutch assembly 10, and a control part for transferring an electric signal to the clutch assembly 10.

[0046] The striker 300 is disposed at a door frame (not shown) and formed with a hole for receiving the latch 204 of the inner body 200. For reference, an installation position of the striker 300 may be changed according to an installation position of the inner body 200 and an operation direction of the latch 204, and a shape of the striker 300 may be also changed according to a shape of the latch 204 (for example, in case that the latch 204 is formed into a hook shape, the striker 300 may be changed so as to have a proper shape for receiving the hook-shaped latch).

[0047] The clutch assembly 10 is disposed in a hole H of the door D and connected with the handle 102 of the outer body 100 and the handle 202 of the inner body 200. As described above, the clutch assembly 10 connected with the two handles 102 and 202 functions to selectively connect or disconnect the hand 102 of the outer body 100 and the handle 202 of the inner body 200 according to an external signal, such that the latch 204 is operated by only the authorized external signal.

[0048] In the electronic door locking device of the present invention, as described above, since the inner body 100, the outer body 200 and the clutch assembly 10 can be easily and simply installed through the hole H formed to install the handles of the door, it can be facilely replaced with the conventional door locking device.

(Second embodiment)

[0049] Fig. 11 is a cross-sectional view showing a schematic structure of an electronic door locking device according to a second embodiment of the present invention, Fig. 12 is an exploded perspective view of a clutch assembly of Fig. 11, Fig. 13 is an exploded perspective view of a second handle of Fig. 11, and Figs. 14 and 15 are views showing an operation principle of the electronic door locking device of Fig. 11.

[0050] In the door locking device 110 according to the second embodiment of the present invention, each construction element can be easily installed through the hole H for installing the handles of the door D without a mortise installed in the door D. The door locking device 110 of the present invention includes a first handle 120, a second handle 130, a first body 140, a second body 150 and a clutch assembly 160.

[0051] The first handle 120 is rotatably disposed at an inside (i.e., an indoor side) of the door D and provided with a shaft 122 which is disposed to be extended to the inside of the door D through the hole H of the door D. The shaft 122 is connected with the clutch assembly 160 and also connected mechanically with a latch assembly 142 disposed at the first body 140. Therefore, when the first handle 120 is rotated, the latch assembly 142 of the first body 140 can be operated so as to release the locking state of the door D.

[0052] The second handle 130 is rotatably disposed at an outside (i.e., an outdoor side) of the door D and coupled with a part (more detailedly, a housing 162) of the clutch assembly 160 so as to be rotated integrally with the part (i.e., the housing 162). Therefore, when the second handle 130 is rotated from the outside of the door D, the housing 162 is rotated together with the second handle 130. Meanwhile, the second handle 130 is comprised of various members including a cylinder assembly 134 which can operate the clutch assembly 160 through an operation of a key.

[0053] As shown in Fig. 13, the second handle 130 includes the cylinder assembly 134, a cam member 136 and a third contact member 138. The cylinder assembly 134 is disposed at the second handle 130. The cylinder assembly 134 or a shaft 1342 of the cylinder assembly 134 is rotated by the operation of the key K. The configuration of the cylinder assembly 134 for the operation of

the key is already well known, and thus the description thereof will be omitted. The cam member 136 functions to convert a rotational motion of the cylinder assembly 134 into a linear motion of the third contact member 138 and includes a fixed pin 1362, a bushing 1364 and a half moon-shaped protrusion 1366. The cam member 136 is rotated together with the shaft 1342. One end of the third contact member 138 is inserted into a hole 1628 of the housing 162 of the clutch assembly 160, and the other end thereof is contacted with the protrusion 1366. The other end of the third contact member 138 has a half moon-shaped protrusion similar to the protrusion 1366 so as to be moved inside of the housing 162 when the protrusion 1366 is rotated. For reference, in the embodiment, the cam member 136 is divided into three pieces, but it may be formed into a single member which can convert the rotational motion of the shaft 1342 of the cylinder assembly 134.

[0054] The first body 140 is disposed at the inside of the door D and provided with the latch assembly 142 which allows the door lock setting. The latch assembly 142 includes a latch which is protruded from the door frame and a mechanical part which can operate the latch. The latch assembly 142 is mechanically connected with the first handle 120 or the shaft 122 of the first handle 120 so as to be operated when the first handle 120 is rotated. For reference, the configuration of the latch assembly 142 and the connection structure between the latch assembly 142 and the shaft 122 would be obvious to a person skilled in the art from the already well know technique, and thus the description thereof will be omitted.

[0055] The second body 150 is disposed at the outside of the door D and provided with an identification signal input part 152 and a driving means 154. The identification signal input part 152 is provided with a plurality of buttons for inputting the identification signal and electrically connected with the driving means 154. When the correct identification signal is input through the buttons, the identification signal input part 152 transfers an electric signal for driving the driving means 154. The driving means 154 is operated depending on the electric signal of the identification signal input part 152. The driving means 154 operates the clutch assembly 160 so that the shaft 122 and the second handle 130 are connected with each other.

[0056] As shown in Fig. 12, the clutch assembly 160 includes a housing 162, a first contact member 164, a second contact member 166, a press member 168 and an elastic member 169.

[0057] The housing 162 is formed into a cylindrical shape and provided with a supporting portion 1622 for installing one pair of press member 168 and a hole 1626 having a square shape in section, in which the contact members 164 and 166 are installed. The supporting portion 1622 is formed at an outer circumference of the housing 162, and the hole 1626 is formed to be elongated at one side of the housing 162 (which is opposed to the first handle 120) in the length direction of the housing 162. A through-hole 1624 which is communicated with the inside (i.e., the hole 1626) of the housing 162 is formed in a circumferential side (a lower side of Fig. 12) of the housing 162.

[0058] The first contact member 164 is an elongated shaft-shaped member and functions to connect the shaft 122 of the first handle 120 and the clutch assembly 160. One end of the first contact member 164 has a thick rod shape which is coupled to the shaft 122, and the other end thereof has a cylindrical shape which is inserted into the hole 1626 of the housing 162. Herein, since the other end of the first contact member 164 has a circular shape in section, of which a diameter is the same as a width of the hole 1626, the first contact member 164 can be rotated while being contacted with the inner wall of the hole 1626. Meanwhile, the other end of the first contact member 164 is formed with a protrusion 1642 for connecting with the second contact member 166.

[0059] The second contact member 166 is formed with a hexahedral shape which is inserted into the hole 1626 of the housing 162. The second contact member 166 is installed in the hole 1626 of the housing 162 so as to be movable in the length direction of the housing 162. One end of the second contact member 166 is formed with a groove 1662 which is mated with the protrusion 1642 of the first contact member 164, and an insertion hole 1664 in which a protrusion of the press member 168 is inserted is formed in a side surface (a lower side of Fig. 12) of the second contact member 166. The second contact member 166 is rotated integrally with the housing 162 and moved forward and backward in the length direction of the housing 162 and also selectively engaged with the first contact member 164.

[0060] The pair of press members 168 has a curved shape which is bent like a bow. When the pair of press members 168 are disposed at the housing 162 so as to be pressed in any radial direction of the housing 162, they are formed into a ring shape (i.e., since the press members 168 is disposed so as to enclose the housing 162, the housing 162 can be pressed by the driving means 154 even though the housing 162 is rotated). Each of the press members 168 has a branched portion 1682 which is protruded from a middle portion of the curved body toward a center portion of a virtual circle formed by the curved body. The branched portion 1682 is fixed to the supporting portion 1622 of the housing 162 by a pin or the like so that the press members 168 can be rotated around a hole formed by the supporting portion 1622. Meanwhile, one of the press members 168 (which is disposed at a lower side of the housing 162) is formed with a protrusion 1684 which is inserted into the insertion hole 1664 of the second contact member 166 through the through-hole 1624 of the housing 162. The protrusion 1684 may be formed by further extending the branched portion 1682. As described above, the pair of press members 168 installed on the housing 162 function to move the second contact member 166 according to a rotational

direction thereof and thus to connect or disconnect the second contact member 166 with or from the first contact member 164.

[0061] The elastic member 169 is disposed between the housing 162 and the press member 168 and functions to rotate the pair of press members 168 in one direction (e.g., a direction that the press members 168 are spaced part from each other or a direction that the protrusion 1684 is rotated counterclockwise). Therefore, if external force (generated by the driving means 154) is not applied to the pair of press members 168, the press members 168 are maintained in a state shown in Fig. 11. In this case, the second contact member 166 is separated from the first contact member by the protrusion 1684 of the press member 168.

[0062] Hereinafter, the operation principle of the present invention will be described with reference to Figs. 12 to 15.

[0063] In the door locking device 110 of the present invention, the connection between the first handle 120 and the second handle 130 is released at normal times so that the latch assembly 142 mechanically connected with the shaft 122 of the first handle 120 is not operated even though rotating the second handle 130 at the outside. That is, the first and second contact members 164 and 166 disposed in the housing 162 of the clutch assembly 160 is maintained in the state shown in Fig. 11 in which they are disconnected from each other.

[0064] In this situation, if the identification signal is input through the identification signal input part 152, the driving means 154 is operated (i.e., a rod of the driving means 154 is moved down) so as to press at least one of the press members 168. Then, the protrusion 1684 is rotated clockwise (in Fig. 11) by the rotation of the press members 168 and thus the first and second contact members 164 and 166 are engaged with each other as shown in Fig. 14 (the detailed structure of each element is shown in Fig. 12). The rotational force of second handle 130 can be transmitted to the first handle 120 due to the engagement between the first and second contact members 164 and 166. Therefore, when the second handle 130 is rotated by the user, the latch assembly 142 connected with the first handle 120 is operated and the locking state of the door is released.

[0065] Meanwhile, in the state shown in Fig. 11, if the key K is operated, the cylinder assembly 134 or the shaft 1342 of the cylinder assembly 134 is rotated. And as shown in Fig. 15, the cam member 136 pushes the third contact member 138 toward the inside of the housing 162, and the third contact member 138 pushes the second contact member 166 toward the first contact member 164, and thus the first and second contact members 164 and 166 are engaged with each other (the detailed structure of each element is shown in Fig. 12). As described above, since the rotational force of the second handle 130 can be transmitted to the first handle 120 due to the engagement between the contact members 164 and 166, the latch assembly 142 connected with the first handle 120 is operated by the rotation of the second handle 130 and the locking state of the door is released.

[Industrial Applicability]

[0066] As described above, since the first and second handles are connected by the operation of the key or the inputting of the identification signal, the mortise is not needed and the locking device can be facilely installed at the door.

[0067] In addition, since the present invention can be installed at any doors having the hole for installing the handle, it is prevented that the door is damaged undesirably when replacing the door locking device.

[0068] While the present invention has been described with respect to the specific embodiments, it will be apparent to those skilled in the art that various changes and modifications may be made without departing from the spirit and scope of the invention as defined in the following claims.

Claims

1. An electronic door lock device for connecting a clutch easily, comprising:

a clutch assembly comprising:

a first shaft which is connected with a first handle so as to operate a latch when the first handle is rotated;
a second shaft which is connected with a second handle and coaxially disposed with the first shaft and of which an end is formed with a first uneven portion;
a shaft connection member which is disposed between the first and second shafts and movably disposed at the first shaft and of which an end faced with the second shaft is formed with a second uneven portion engaged with the first uneven portion;
and a driving part which operates the shaft connection member according to an external signal, wherein the driving part comprises a motor having a shaft;
a driving member which is movably installed on the shaft of the motor and in which a coil spring is installed; a pin which is installed in the shaft of the motor so as to move the driving member via the coil spring when the motor is operated; and
an operation member which is rotatably installed at the clutch assembly and connected with the driving member and the shaft connection member so as to connect or disconnect the shaft connection member with or from the second shaft according to move-

ment of the driving member.

2. The electronic door lock device according to claim 1, wherein the operation member comprises an axial portion which is coupled with the clutch assembly; a first pair of legs which are vertically extended from the axial portion so as to be connected with the driving member; and a second pair of legs which are extended from the axial portion in a symmetric direction to the first pairs of legs so as to be connected with the shaft connection member.

3. The electronic door lock device according to claim 2, wherein a first groove in which the first pair of legs are inserted is formed in an outer circumferential surface of the driving member, and a second groove in which the second pair of legs are disposed is formed in an outer circumferential surface of the shaft connection member.

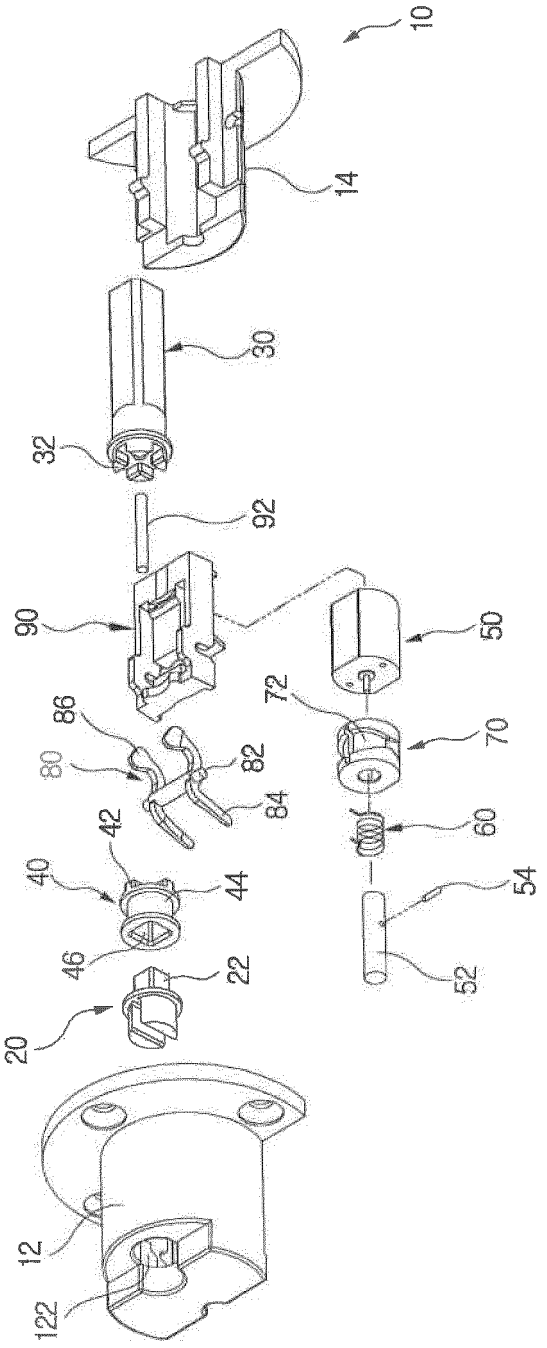
4. The electronic door lock device according to claim 3, wherein one end of the first shaft is formed into a square pillar shape, and the shaft connection member is formed with a square hole in which the first shaft having the square pillar shape is inserted.

5. An electronic door lock device for connecting a clutch easily, comprising:

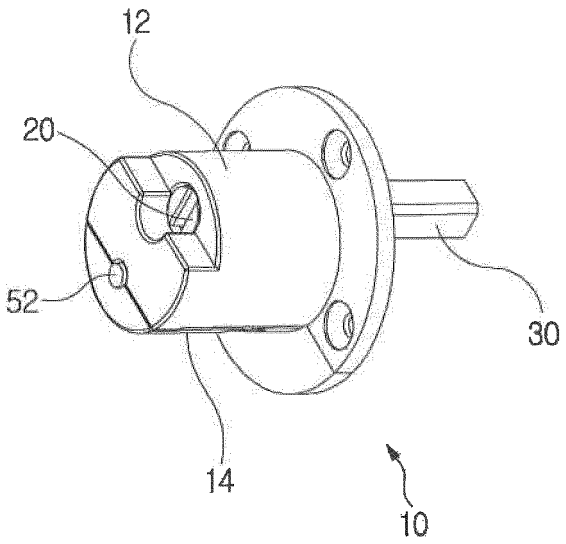
a first handle which is provided with a shaft and disposed at a door so as to be rotatable on the shaft; a second handle which is rotatably disposed at the door;
a first body which is installed at a first surface of the door and provided with a latch assembly operated by rotation of the shaft;
a clutch assembly which selectively connect the shaft and the second handle; and
a second body which is installed at a second surface of the door and provided with an identification signal inputting part and a driving means for operating the clutch assembly according to an identification signal generated from the identification signal inputting part, wherein the clutch assembly comprises
a housing which is coupled with the second handle and formed with a hole opened toward the first handle; a first contact member which is installed in the hole so as to be coupled with the shaft and of which an end is formed with a protrusion;
a second contact member which is installed in the hole so as to be rotated integrally with the housing, and of which an end is formed with a groove mated with the protrusion and the end is moved in a length direction of the housing so as to be selectively connected with the first contact member; a pair of press members which are rotatably disposed around the housing so as to be selectively rotated by an operation of the driving means and which moves the second contact member in the length direction of the housing so as to selectively connect the first and second contact members with each other; and an elastic member which is installed at the housing and which pushes the second contact member or rotates the pair of press members so as to disconnect the first and second contact members from each other.

6. The electronic door lock device according to claim 5, wherein the second handle comprises a cylinder assembly which is formed with a key hole and rotated upon an operation of a key; a wedge-shaped cam member which is coupled with the cylinder assembly; and a third contact member which is disposed to be movable in the length direction of the housing and of which an end is formed into a desired shape corresponding to the cam member so as to selectively push the second contact member according to rotation of the cylinder assembly.

[Figure 1]



[Figure 2]



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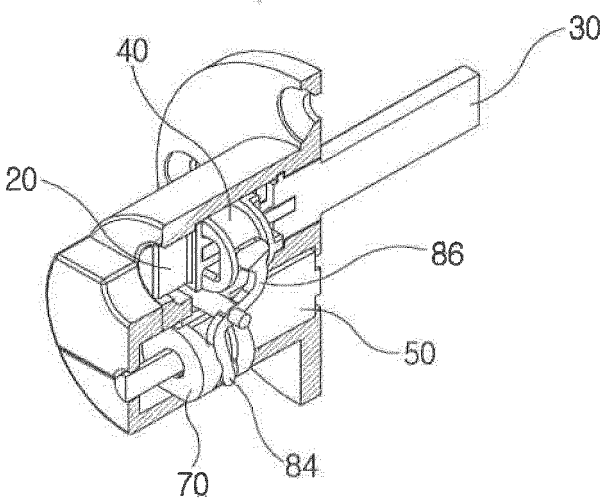

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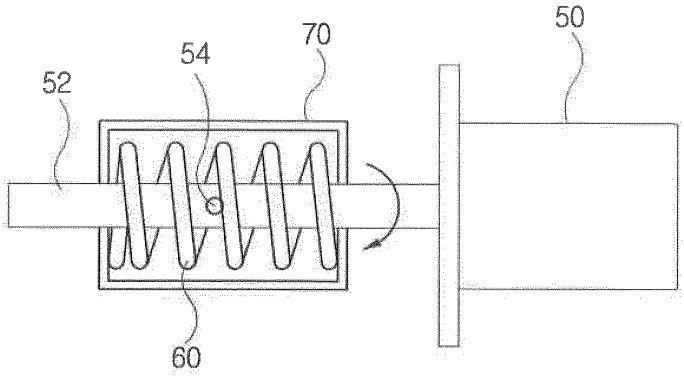

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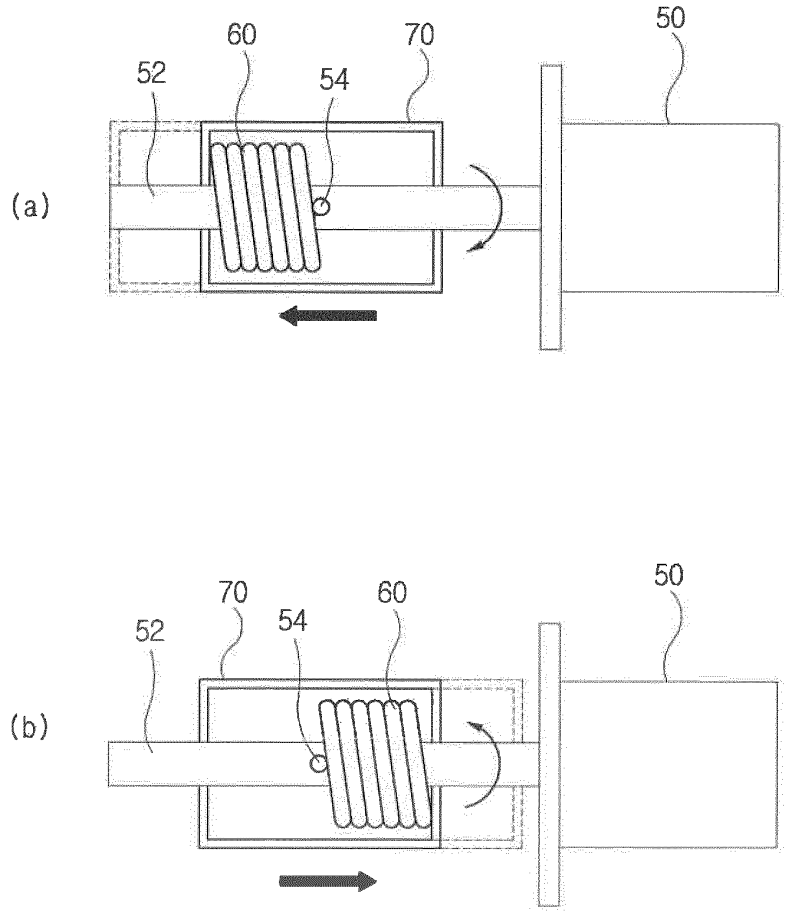

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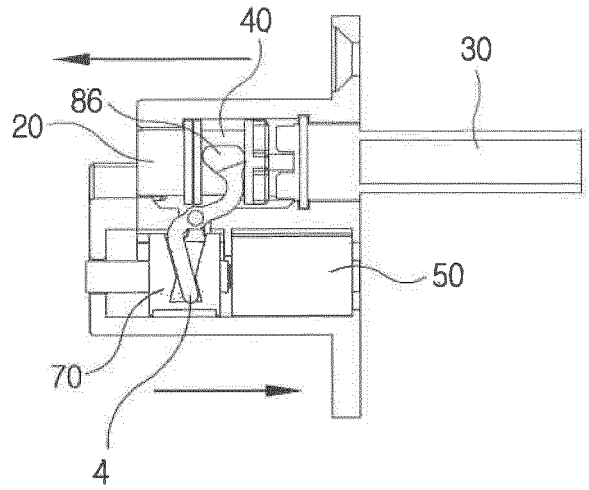
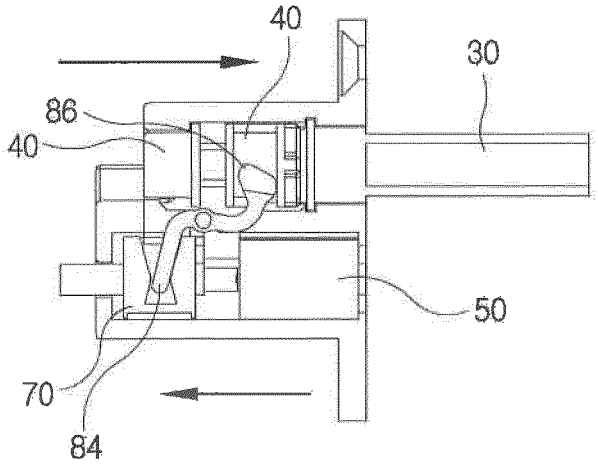
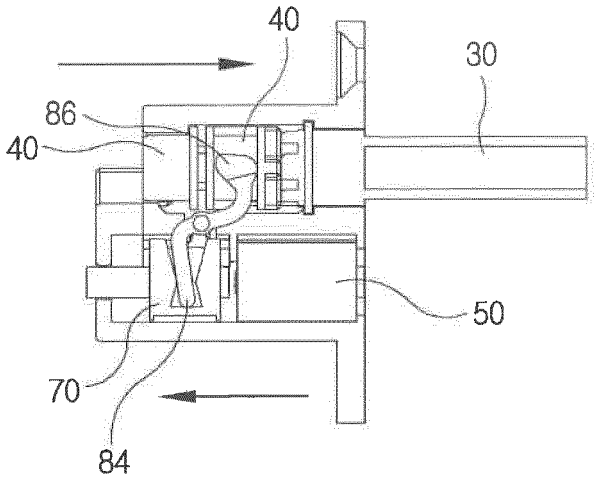


[Figure 7]



[Figure 8]



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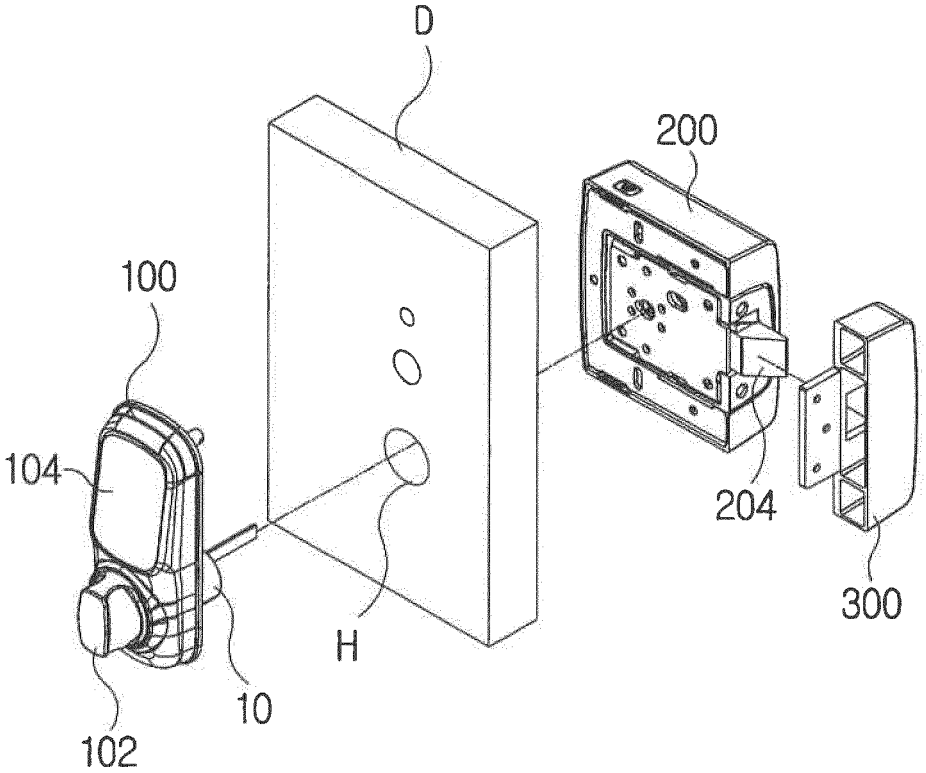

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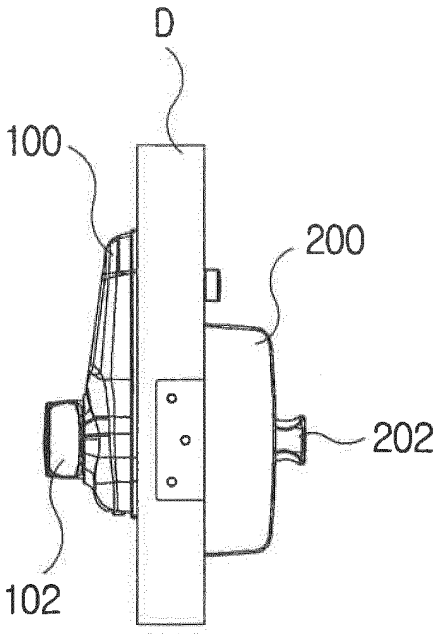
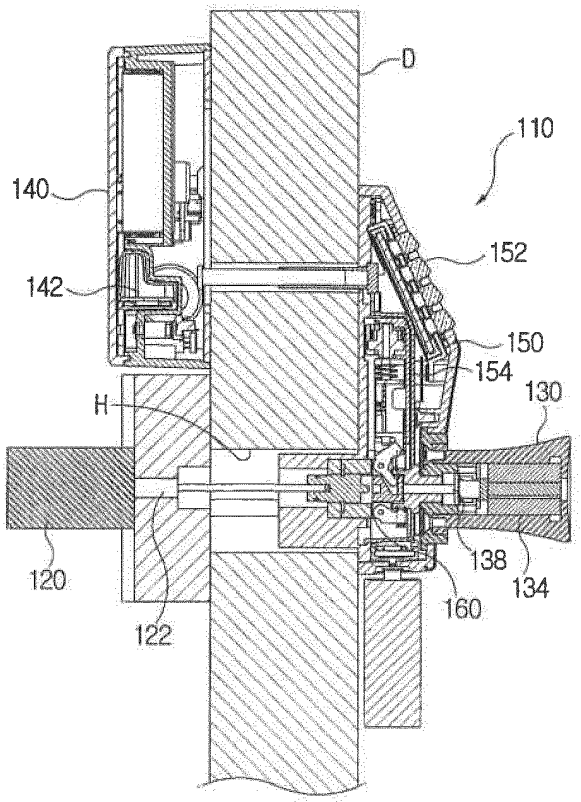
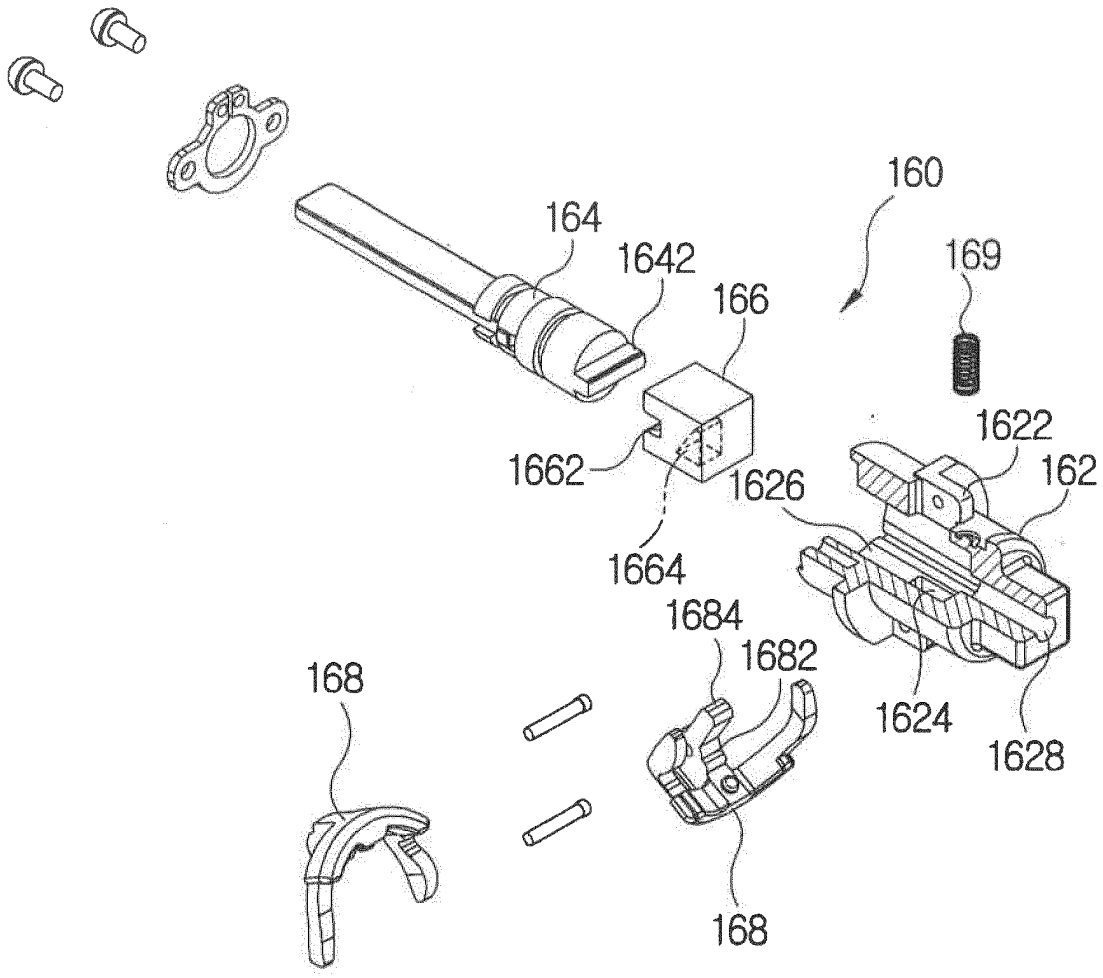


[Figure 11]



[Figure 12]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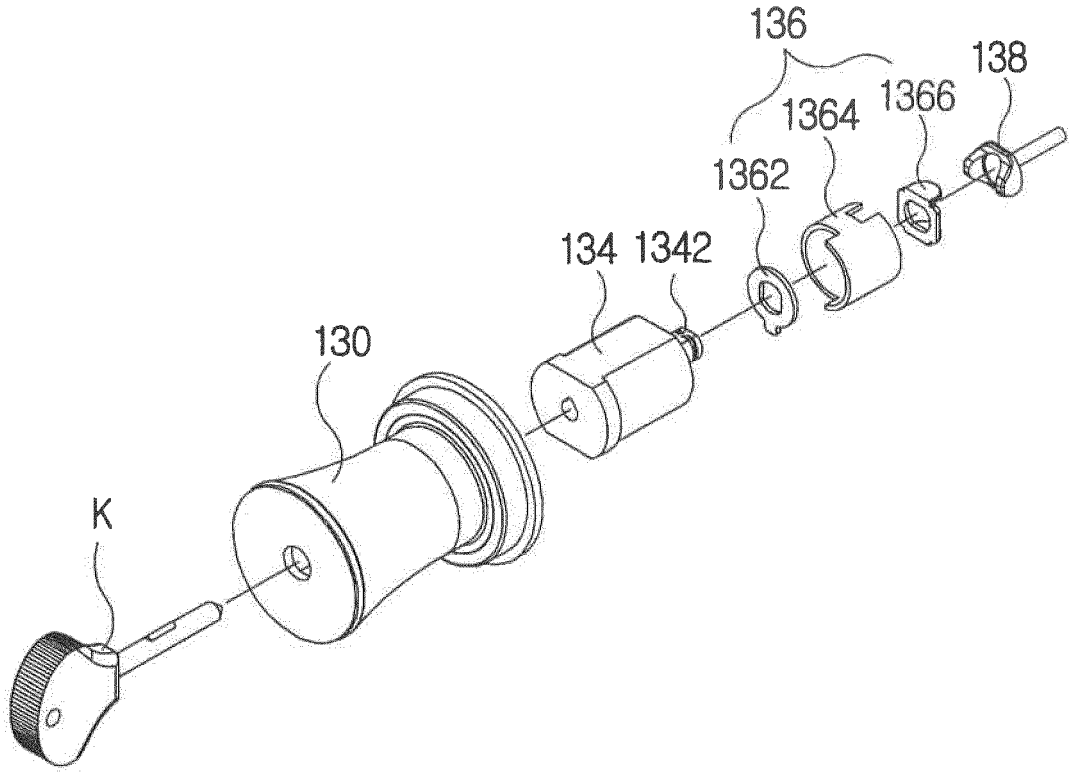
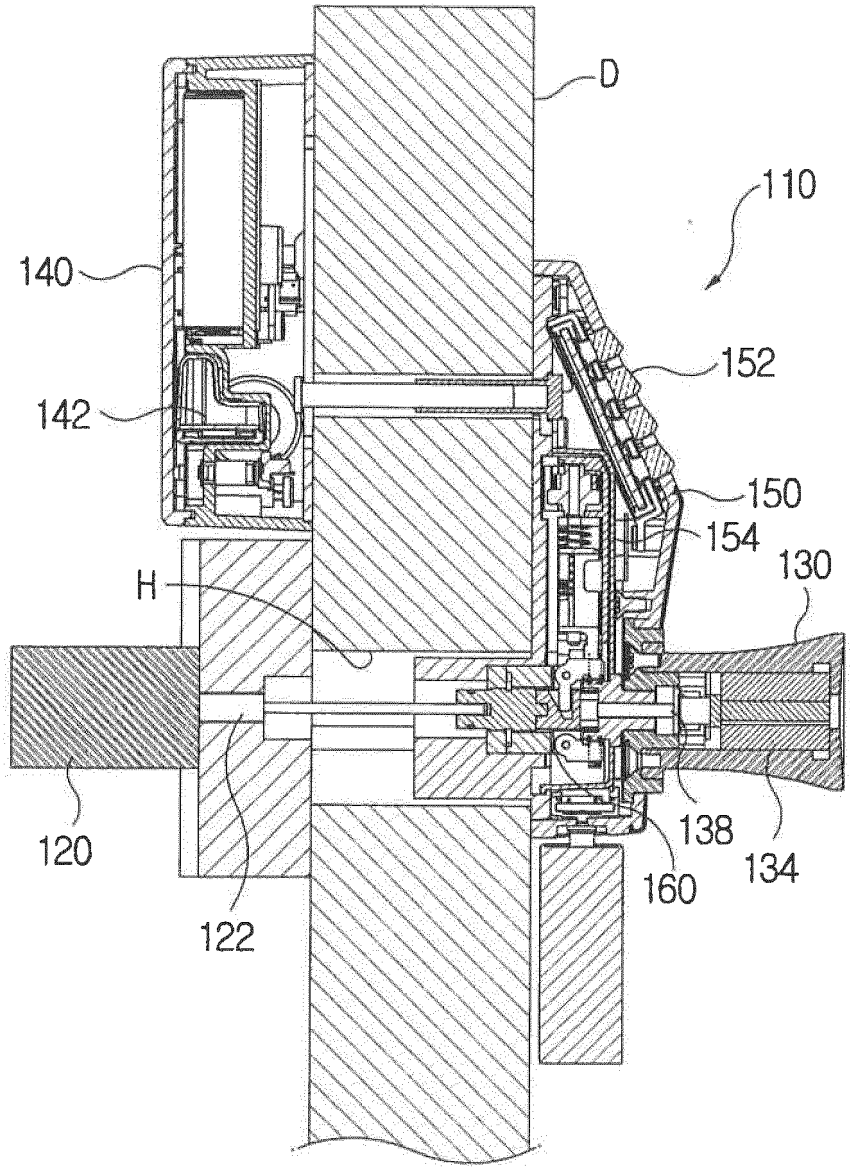
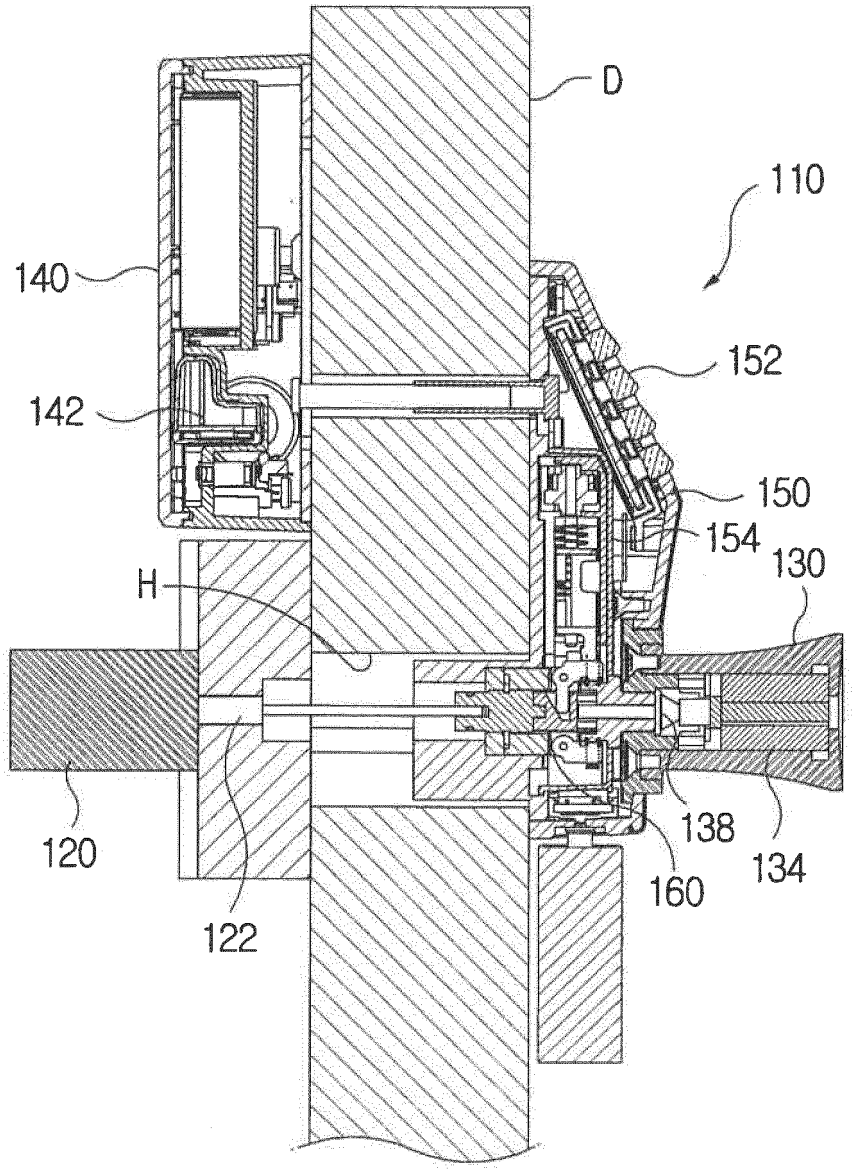
[Figure 13]



[Figure 14]



[Figure 15]



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2011/001317

A. CLASSIFICATION OF SUBJECT MATTER

E05B 47/06(2006.01)i, E05B 63/24(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

E05B 47/06; E05B 47/02; E05B 13/00; E05B 15/00; E05B 45/06; E05B 47/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean Utility models and applications for Utility models: IPC as above
Japanese Utility models and applications for Utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) & Keywords: clutch, cam, cylinder, axis, motor, drive, connection, spring, handle

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 10-0627538 B1 (LOCKWOOOD SECURITY PRODUCTS PTY. LIMITIED) 22 September 2006 Abstract, the claims, figures 1-11	1-6
A	KR 10-2010-0067217 A (IREVO, INC.) 21 June 2010 Abstract, the claims, figures 1-10	1-6
A	JP 2009-068311 A (UNION CORP) 02 April 2009 Abstract, the claims, figures 1-3	1-6
A	EP 1881135 A1 (SALTO SYSTEMS, S.L.) 23 January 2008 Abstract, the claims, figures 1-13	1-6

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
13 OCTOBER 2011 (13.10.2011)	**14 OCTOBER 2011 (14.10.2011)**
Name and mailing address of the ISA/KR Korean Intellectual Property Office Government Complex-Daejeon, 139 Seonsa-ro, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
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