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(54) **Cylinder lock assembly with mechanical and electronic mechanism**

(57) A cylinder lock assembly includes an electronic key (99) having a conducting plate (107), a cylinder lock body (1), a lock core (7) received inside the body (1) and having a spring (23) engageable with the conducting plate (107) and a passage (11) longitudinally defined in the lock core (7), a rotor (81) movably received in the body (1) and having a first slit (83) longitudinally defined in the rotor (81) and a side slit (85) radially defined in the rotor (81), a cam (77) movably received in a cutout (3)

of the body (1) and securely received in the rotor (81), a clutch device having a first clutch (109), a second clutch (115) and a third clutch (133), a first rotation circuit board (123), a second rotation circuit board (127), a driving element (69) connected to a seat (141) to drive the third clutch (133) and the first clutch (109) to move, a control unit (91) electrically connected to the second rotation circuit board (127) and the driving element (69) and a power source (93) electrically connected to the driving element (69) and the control unit (91).

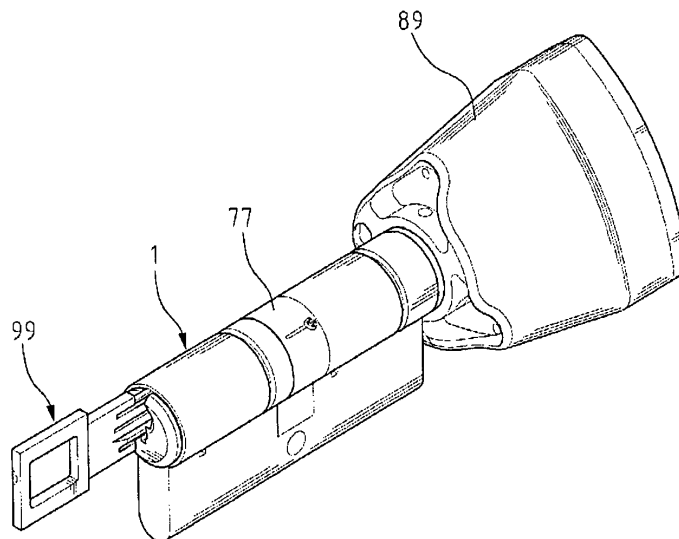


FIG. 1

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a cylinder lock assembly, and more particularly to a lock assembly having a mechanical and electronic locking function so as to provide two locking capabilities.

2. Description of Related Art

[0002] In general, a mechanical lock has multiple tumblers movably received in a lock core that is securely received inside a lock body. Thus, only a proper key inserted into a keyway defined in the lock core is able to activate movement of the tumblers. Therefore, rotation of the key is able to drive the lock core to rotate accordingly. Despite the varieties of mechanical locks, all the mechanical locks provide only a single locking function.

[0003] A conventional electrical lock includes a sensing card and a lock having a sensing unit to sense the information recorded on the sensing card so as to unlock the lock. This electrical lock, too, has only a single locking function and cannot provide sufficient security as required. As a result, the current locks, mechanical locks or the electrical locks, can only provide a single locking function and not dual locking functions to enhance security.

SUMMARY OF THE INVENTION

[0004] A primary objective of the present invention is to obviate the shortcoming of the conventional lock and to improve the lock core adopted from an electronic lock to achieve dual protection effect and hence the novelty and industrial application requirement is met.

[0005] A secondary objective of the present invention is to accomplish two different protection effects with simplified structure and low manufacture cost such that the market requirements is met and industrial value is high.

[0006] Other objects, advantages, and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

[0007]

Figure 1 is a perspective view of a cylinder lock assembly in accordance with the present invention;
Figure 2 is an exploded perspective view of the cylinder lock assembly of the present invention;
Figure 3 is a cross-sectional view of the lock core of the cylinder lock assembly with a first clutch detached from a second clutch;

Figure 4 is a cross-sectional view showing that the first clutch and the second clutch are engaged with each other;

Figure 5 is a schematic view showing a status where an engagement sensing element has not been moved by the first clutch;

Figure 6 is a schematic view showing a status where the engagement sensing element is moved by the first clutch;

Figure 7 is an exploded perspective view showing a second preferred embodiment of the present invention;

Figure 8 is a cross-sectional view showing the inner structure of the present invention;

Figure 9 is an enlarged cross-sectional view showing that the coupling device of the present invention is disengaged and the key is rotatable; and

Figure 10 is an enlarged cross-sectional view showing that the coupling device of the present invention is engaged and the key is immovable.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

[0008] With reference to Figures 1 and 2, a cylinder lock assembly constructed in accordance with the present invention comprises a cylinder lock body 1, a lock core 7, a rotor 81, a sensing device 39, a driving element and a coupling device composed of a first clutch 25 and a second clutch 33. The cylinder body 1 has a hollow barrel 5 and a cutout 3 dividing the barrel 5 into two halves to receive therein a cam 77 having a boss 79 formed on a bottom of the cam 77. A first radial slit 10 and a second radial slit 102 are respectively formed on a front portion and a rear portion of the barrel 5.

[0009] The lock core 7 is a hollow cylinder and has two opposed paths 11 respectively defined in parallel to a longitudinal axis of the cylinder in a side periphery of the lock core 7, a passage 13 axially defined in the side periphery of the lock core 7 and a groove 19 defined in a proximal end of the lock core 7. The passage 13 is provided to receive therein a pad 15, an abutting element 23 that engages with the pad 15 and a cover 232. The pad 15 has a through hole 17 defined through the pad 15 to receive therein an engagement bead 231 which is engaged with the abutting element 23. The cover 232 is provided to secure the abutting element 23 and the engagement bead 231 inside the pad 15. The lock core 7 further has multiple tumblers (not shown) inside the lock core 7. Because how the tumblers are moved is well known in the art, detailed description thereof is omitted for brevity.

[0010] The rotor 81 is a hollow cylinder with two open ends. The rotor 81 has two first slits 83 each defined in two opposed side periphery of the rotor 81 to be parallel to an axial axis of the rotor 81 and at least one second slit 85 (two are shown in this embodiment) parallel to the axial axis of the rotor 81. A flange 810 is formed on an

outer periphery of the rotor 81.

[0011] The first clutch 25 has two first bosses 27 respectively formed on two opposed ends of the first clutch 25 to be received in the two paths 11 of the lock core 7 and an extension 29 formed on a side of the first clutch 25 and having a recess 31 defined to be parallel to an axial axis of the extension 29. The second clutch 33 has a cavity 37 defined to correspond to the extension 29 of the first clutch 25 and two second bosses 35 to be received in the first slits 83 of the rotor 81.

[0012] The sensing device 39 includes a first rotation pad 41, a first rotation ring 47, a second rotation pad 59, and a second rotation ring 53. The first rotation pad 41 has a first bar 43 extending from a side of the first rotation pad 41 and a first conductor 45. The second rotation pad 59 has two second bars 61 extending from a rear side of the second rotation pad 59 and two apertures 63 defined in a front side of the second rotation pad 59 and extending into the apertures 63 respectively. A first conducting bead 55 and a second conducting bead 57 are respectively received in and partially extended out of the two apertures 63. The first rotation ring 47 has an indent 49 defined to movably receive therein an engagement element 51.

[0013] The driving element is designated with a reference numeral 69 and may be a motor. The motor's shaft is connected to a threaded rod 71, which in turn is threaded to a nut 73. The nut 73 is connected to an actuator 75 that is composed of a first actuator 751, a second actuator 752, and a third actuator 753. Because how the first actuator 751, the second actuator 752, and the third actuator 753 are operated is not the focus of the present invention, detailed description thereof is thus omitted. After the combination between the motor 69 and the actuator 75 via the nut 73, the combination is assembled into a motor bracket 65 whose rear end is connected to a master circuit board 91. Thereafter, a cylindrical conducting seat 67 is mounted outside the motor bracket 67. The motor bracket 65 has four arms 650 formed on a distal end of the motor bracket 65 to correspond to the first slits 83 and the second slits 85.

[0014] In addition, the present invention further has an alarming system to sound off an alarm when an unauthorized personnel is trying to inappropriately open the lock of the present invention so as to upgrade the safety of the lock. In order to achieve the goal, the lock of the present invention further has a rotation seat 89. The rotation seat 89 has a battery 93 and a buzzer 95 both received in the rotation seat 89 and electrically connected to the master circuit board 91. A cover 97 is provided to the rotation seat 89 to enclose the battery 93 and the buzzer 95 inside the rotation seat 89.

[0015] After the first conducting bead 55 and the second conducting bead 57 are received in the apertures 63 and the engagement sensing element 51 is received in the indent 49 of the first rotation ring 47, the first rotation ring 47 and the second rotation ring 53 are sandwiched between the first rotation pad 41 and the second rotation pad 59 such that the first rotation ring 47 is engaged with

the first rotation pad 41 and the second rotation ring 53 is engaged with the second rotation pad 59 and the first conducting bead 55 is extended into the first bar 43. After extending the extension 29 of the first clutch 25 through the rotation pads and the rotation rings, the two first bosses 27 of the first clutch 25 are received in the paths 11 of the lock core 7. Then the lock core 7 is inserted into the front portion of the hollow barrel 5 of the cylinder body 1. A first positioning ring 21 is applied to pass through the first radial slit 10 and the groove 19 of the lock core 7 so as to secure the lock core 7 inside the cylinder body 1.

[0016] The motor bracket 65 after assembled with the master circuit board 91, the motor 69, the nut 73, the actuator 75 and the conducting seat 67 enables its four arms 650 to respectively extend into the first slits 83 and the second slits 85 so as to allow the motor bracket 65 to be assembled inside the rotor 81. Then the two bosses 35 of the second clutch 33 are extended into the first slits 83 of the rotor 81. Thereafter, the rotor 81 is extended into the barrel 5 of the lock body 1 and pass over the cam 77 that is rested in the cutout 3 in the lock body 1. A screw or the like is used to secure the position of the cam 77 relative to the rotor 81. A positioning ring is applied to extend through the second radial slit 102 of the body 1 and secured to an outer periphery of the rotor 81 by engagement with the flange 810 such that the rotor 81 will not detach from the barrel 5 of lock body 1. Lastly the rotation seat 89 is assembled to the rear end of the lock body 1.

[0017] The first bar of the first rotation pad 41 is engaged with the abutting element 23 and the engagement sensing element 51 is extended into the recess 31 of the first clutch 25. At the moment, the engagement sensing element 51 is not in engagement with the second conducting bead 57. The two second bars 61 of the second rotation pad 59 are engaged with one end of the conducting seat 67, which is electrically connected to the master circuit board 91. The master circuit board 91 is electrically connected to the motor 69. The master circuit board 91 is able to send a signal to the motor 69 to activate/deactivate the motor 69 and to the buzzer 95 so that the buzzer 95 is able to send out an alarm.

[0018] A key 99 with a built-in circuit board is shown in Figure 2, wherein the key 99 is composed of a key body 101, a chip 105, and a conductor 107. The chip 105 is securely attached to a side of the key body 101 and then the conductor 107 to attached to a free side of the chip 105. Thereafter, an encapsulation 103 is provided to enclose the combination of the chip 105 and the conductor 107 to avoid contamination.

[0019] With reference to Figures 3 and 4, when the lock of the present invention is in a locked status, a dual protection mechanism is accomplished. That is, the first locking function is accomplished by the conventional latching function of the lock core 7 and the second locking function is accomplished by the clutch of the present invention. When the user is trying to unlock the lock of the present invention, the user has to unlock the conventional

latching mechanism and then the clutch to complete the unlocking process of the present invention. If only the first mechanism is unlocked, and an unauthorized person is trying to break the lock, the buzzer 95 will send out an alarm. If the chip 105 is connected to a security authority, the warning signal will send the alarm to the security authority to have better protection.

[0020] To be more specific, before the key is inserted into the lock core 7, the lock of the present invention is locked by the conventional tumblers and thus the lock core 7 is not rotatable. In the meantime, because the master circuit board 91 does not receive any signal from the chip 105, the motor 69 inside the lock of the present invention is immovable to unlock the lock. However, after the insertion of the key, the lock core 7 is unlocked to allow the lock core 7 to be rotatable so as to deactivate the conventional latching mechanism. In the meantime, the conductor 107 is engaged with the engagement bead 231. By way of the abutting element 23, the first bar 43, the first conducting bead 55, the second bar 61 and the conducting seat 67, the information in the chip 105 will be transmitted to the master circuit board 91 to verify whether the inserted key is correct. The key 99, after being inserted into the lock core 7, is engaged with the first conductor 45. The first clutch 25 pushed by the key 99 will be moved axially so as to push the sensing element 51 to engage with the second conducting bead 57, as shown in Figures 5 and 6. Therefore, an electrical connection is established among the first conductor 45, the sensing element 51, the second conducting bead 57, the second bars 61, the conducting seat 67 and the master circuit board 91. After verification is confirmed, the motor 69 is activated by the master circuit board 91 and the motor 69 drives the threaded rod 71 to rotate, which in turn drives the actuator 75 and the second clutch 33 to move toward the key 99 via the nut 73. In the meantime the cavity 37 of the second clutch 33 is aligned with the extension 29 of the first clutch 25, as shown in Figure 4. Thus rotation of the key 99 is able to rotate the lock core 7, the rotor 81 is also rotated such that the boss of the cam 77 is also moved and the lock is unlocked.

[0021] When the rotor 81 is rotated, the master circuit board 91 is able to determine whether the lock of the present invention is in a normal operational status. That is, if only the lock core 7 is rotated but not the rotor 81, the master circuit board 91 is able to send out a signal to the buzzer to generate the alarm. An electromagnetic valve can be applied to the present invention to replace the motor 69. The electromagnetic valve is connected to the second clutch 33 so as to move the second clutch 33 to move linearly.

[0022] With reference to Figures 7-10, a different embodiment of the present invention is shown to have a lock body 1, a lock core 7, a rotor 81, and a coupling device. The cylinder body 1 has a hollow barrel 5 and a cutout 3 dividing the barrel 5 into two halves to receive therein a cam 71 having a boss 73 formed on a bottom of the cam 71.

[0023] The lock core 7 is a hollow cylinder and has two opposed paths 11 respectively defined in parallel to a longitudinal axis of the cylinder in a side periphery of the lock core 7, a passage 13 axially defined in the side periphery of the lock core 7 and a groove 19 defined in a proximal end of the lock core 7. The passage 13 is provided to receive therein a pad 15 and a spring 23 that engages the pad 15. The lock core 7 further has multiple tumblers (not shown) inside the lock core 7. A first rotation circuit board 123 is securely mounted on a distal end of the lock core 7 and has multiple second cutouts 125 defined in a periphery of the first rotation circuit board 123 such that multiple screws (not shown) are able to extend through the second cutout 125 and into the distal end of the lock core 7 to secure the first rotation circuit board 123. The first rotation circuit board 123 has a contact 131 securely mounted on the first rotation circuit board 123.

[0024] The rotor 81 has a longitudinally defined first slit 83 and a side slit 85 defined along the first slit 83. The first slit 83 and the side slit 85 communicate with an open end defined in a distal end of the rotor 81. A second rotation circuit board 127 is securely mounted on the distal end of the rotor 81 and has a second contact 131 mounted thereon. A hole 811 is defined in a side face of the rotor 81.

[0025] The coupling device includes a first clutch 109, a second clutch 115, and a third clutch 133. The second clutch 115 has two opposed bosses 117 each formed on an end of the second clutch 115 to be received in the path 11 of the lock core 7 and a protrusion 121 formed on a side face of the second clutch 31. Before the first rotation circuit board 123 is secured to the distal end of the lock core 7, the second clutch 115 is first placed in a central hole 9 of the lock core 7 with the two bosses 117 received in the path 11 and then the first rotation circuit board 123 is mounted on the distal end of the lock core 7. Multiple first springs 119 are received between the first rotation circuit board 123 and the second clutch 115. After the pad 15 and the spring 23 are received in the passage 13 of the lock core 7, the lock core 7 is assembled in a front portion of one of the barrels 5 of the body 1. A positioning ring 233 is applied to extend the radial slit 10 and into the groove 19 of the lock core 7 to prevent the lock core 7 from moving axially in the body 1. However, the lock core 7 is able to rotate inside the body 1.

[0026] The first clutch 109 has an indent 113 corresponding to the protrusion 121 of the second clutch 115 and two opposed first blocks 111 respectively formed on a side of the first clutch 109 to be received in the first slit 83 of the rotor 81.

[0027] The third clutch 133 has two second blocks 137 respectively formed on a side face of the third clutch 133 to be received in the first slit 83 of the rotor 81 and an elongated hole 141 defined in a side of the third clutch 133. A through hole 135 is defined in a front face of the third clutch 133 to communicate with a threaded hole 145 of a seat 143 after the seat 143 is received in the third clutch 133 from the elongated hole 141. Thereafter, a projection 147 formed with the seat 143 is extended out

of the elongated hole 141. Both the third clutch 133 and the seat 143 are received in the rotor 81 with the two second blocks 135 received in the first slit 83. A second spring 139 is sandwiched between the first clutch 109 and the third clutch 133. The rotor 81 further has a driving element, positioning block 153 and a conductor 149 having two opposed arms 151 respectively formed on a side of the conductor 149. The positioning block 153 has two opposed cutouts (not numbered) to securely receive therein the conductor 149 and allow the two arms 151 to extend out of the positioning block 153. In this embodiment, the driving element is a motor 69 having a motor shaft extending through a motor bracket 155 to be threadingly connected to a threaded bolt 71 and the threaded hole 145 of the seat 141. The motor 69, the motor bracket 155, the third clutch 133, and the seat 143 are assembled inside the rotor 81 to have the projection 147 positioned between the two arms 151. Then the second rotation circuit board 127 is positioned in the rotor 81 by screws extending through the third cutouts 129 of the second rotation circuit board 127 and into the rotor 81. A bolt 163 is provided to extend through a clamping ring 161 and into the hole 811 of the rotor 81 so as to position the rotor 81 with the clamping ring 161.

[0028] A ring 157 having teeth formed on an inner side of the ring 157 is assembled with the body 1 via a second slit 101 radially defined in the barrel 5 of the body 1 to allow the rotor 81 to extend through the ring 157 and the cam 77 which is received in the cutout 3 of the body 1. Screws are applied to secure the cam 77 to an outer periphery of the rotor 81. A sensor 159 is mounted on the outer periphery of the rotor 81 and the sensor 159 is facing the teeth of the ring 157 after the rotor 81 is received in the barrel 5 of the body 1.

[0029] After the aforementioned elements are assembled inside the body 1, because the bosses 117 of the second clutch 115 are received in the path 11 of the lock core 7, there is no relative rotation between the second clutch 115 and the lock core 7. The spring 23 is electrically connected to the first rotation circuit board 123 so that the first rotation circuit board 123 is able to receive signals from the spring 23.

[0030] The motor 69 is able to drive the threaded bolt 71 so as to move the seat 143, which in turn drives the third clutch 133 to move. Movement of the third clutch 133 moves the first clutch 109 via the second spring 139. Because the projection 147 of the seat 143 is received in the side slit 85 of the rotor 81, the movement of the seat 143 allows the projection 147 to move away from or into the side slit 85. Meanwhile the first blocks 137 and the second blocks 111 are also moved into or away from the first slit 83 of the rotor 81. When the projection 147 is extended out of the side slit 83 and the first blocks 137 and the second blocks 111 are moved into the first slit 83, the rotor 81 can not be rotated. However, when the first blocks 137 and the second blocks 111 are moved out of the first slit 83, the rotor 81 can be rotated. When the rotor is rotated, the boss 79 is moved in the cutout 3

to drive a different locking device (not shown).

[0031] The present invention further has an alarm system to sound an alarm when there is an unauthorized person trying to unlock the lock mechanism of the present invention so as to enhance the safety of the lock mechanism. In this embodiment, there is further provided a rotation seat 89. The rotation seat 89 has a master circuit board 91, a battery 93, a buzzer 95, and a cover 97 provided in front of the rotation seat 89. The battery 93, the buzzer 95, and the master circuit board 93 are electrically connected with one another and the master circuit board 91 is electrically connected to the second rotation circuit board 127 and the sensor 159.

[0032] A key 99, as shown in Figure 7, provided with embedded circuit includes a body 101, a chip 105 formed in the body 101 and having a conducting plate 103 integrally formed on the chip 105 and an encapsulation (not shown) enclosing the chip 103 inside the body 101 to avoid damage to the chip 105. The contacts 131 on the first rotation circuit board 123 and the second rotation circuit board 127 are able to send signals to the motor and the clutch device so as to drive the lock mechanism of the present invention.

[0033] When the lock mechanism of the present invention is in a locked status, there will be two different locking mechanisms to provide the desired locking effect, namely the conventional latching mechanism in the lock core 7 and the coupling device. If a user is trying to unlock the lock mechanism of the present invention, the user will have to unlock the lock core 7 and the clutch device of the lock mechanism sequentially, otherwise the buzzer 95 will sound an alarm to warn the security guard that there is an illegal action going on. To be more specific of the operation of the lock mechanism of the present invention, it is to be noted that before the key 99 is inserted into the lock core 7, the multiple tumblers will lock the lock core 7 to prevent the lock core 7 from rotation such that the lock mechanism is locked. Because how the tumblers lock the lock core 7 is conventional in the art, detailed description thereof is omitted for brevity. In the meantime, the first rotation circuit board 123 and the second rotation circuit board 127 are fixed so that there is no signal transmitted to the master circuit board 89 to drive the motor 69 to move. The third clutch 133 and the first clutch 109 are received in the rotor 81 and thus the first blocks 111 of the first clutch 109 and the second blocks 137 of the third clutch 133 are received in the first slit 83 of the rotor 81 to disable the rotation of the rotor 81. A second locking effect is accomplished.

[0034] On the contrary, after the key 99 is inserted into the lock core 7, the tumblers are rearranged to allow the lock core 7 to be rotatable. Meanwhile the conducting plate 103 of the chip 105 engages with the spring 23 such that code information in the chip 145 will be transmitted to the first rotation circuit board 123 via the spring 23. Then the information is transmitted to the master circuit board 91 via the contacts 131 of the first rotation circuit board 123 and the second rotation circuit board 127. After

the master circuit board 91 receives the information, the motor 69 is activated to drive the threaded bolt 71 to rotate. The rotation of the threaded bolt 71 drives the third clutch 133 and the first clutch 109 to move toward the key 99 to allow the first blocks 137 and the second blocks 111 to be away from the first slit 83 and to allow engagement between the first clutch 109 and the second clutch 115, until the extension 147 of the seat 143 engages with one of the arms 151 of the conductor 149 such that the motor 69 is stopped. Therefore, rotation of the key 99 drives not only the lock core 7, but also the rotor 81 and thus the boss 73 of the cam 71 is driven to unlock the lock mechanism. While the rotor 81 is rotated, the sensor 159 is able to sense the teeth of the ring 157 and the master circuit board 91 will determine whether the lock mechanism is in normal unlocking condition and thus the buzzer 95 will not sound an alarm. However, if only the lock core 7 is rotated but not the rotor 81, the buzzer 95 will then sound the alarm. The motor 69 can be replaced by an electromagnetic valve that is connected to the third clutch 133 to drive the third clutch 133 to move linearly so as to accomplish the aforementioned objective.

[0035] Even though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and function of the invention, the disclosure is illustrative only, and changes may be made in detail, especially in matters of shape, size, and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

Claims

1. A cylinder lock assembly comprising:

an electronic key having a chip and a conducting plate integrally formed with the chip;
 a cylinder lock body having a cutout defined in a central portion of the body to divide the body into two barrels;
 a cylinder lock core received inside the body and having therein multiple tumblers movably received in the lock core and driven by the key, the lock core having a spring engageable with the conducting plate and a passage longitudinally defined in an outer periphery of the lock core;
 a rotor movably received in the body and having a first slit longitudinally defined in the rotor and a side slit radially defined in the rotor;
 a cam movably received in the cutout of the body and securely received in the rotor;
 a coupling device having a first clutch and a second clutch, wherein the first clutch is received in the passage of the lock core, the second clutch

is received in the first slit of the rotor;
 a first rotation circuit board securely received in the lock core and having a first contact ring on the first rotation circuit board;
 a second rotation circuit board securely in the rotator and having a second contact ring on the second rotation circuit board;
 a driving element connected to the seat to drive the second clutch to move so that the second clutch is able to move away or into the first slit of the rotor;
 a control unit provided between the first clutch and the second clutch electrically connected to the second rotation circuit board and the driving element such that when the first contact of the first rotation circuit board engages with the second contact of the second rotation circuit board, a signal is transmitted to the control unit to activate the driving element and drive the first clutch and the third clutch to move;
 a master circuit board electrically connected to the control unit and the driving element to operably connect to the driving element; and
 a power source electrically connected to the driving element and the master circuit board.

2. The cylinder lock assembly as claimed in Claim 1, wherein the driving element is a motor having a motor shaft in connection with a threaded bolt which is connected to a nut and the nut is connected to the second clutch.
3. The cylinder lock assembly as claimed in Claim 2, wherein an actuator is sandwiched between the coupling device and a nut.
4. The cylinder lock assembly as claimed in Claim 1, wherein the driving element is an electromagnetic valve in connection with a threaded bolt that is connected to a threaded hole defined in the seat.
5. The cylinder lock assembly as claimed in Claim 3 further comprising a conducting seat to sequentially receive therein the master circuit board, the driving element and the actuator, the conducting seat is electrically connected to the control unit and the master circuit board.
6. The cylinder lock assembly as claimed in Claim 1, wherein the control unit includes a first rotation pad, a first rotation ring, a second rotation pad and a second rotation ring, the first rotation ring and the second rotation ring are sandwiched between the first rotation pad and the second rotation pad and the first rotation pad engages with an abutting element in the lock core.
7. The cylinder lock assembly as claimed in Claim 6,

wherein the first rotation ring has an engagement element, the first clutch has a recess, the engagement element is received in the recess so that when the first clutch is moved, the engagement element is moved to engage with the engagement bead.

8. The cylinder lock assembly as claimed in Claim 1 further having a buzzer electrically connected to the master circuit board.

9. The cylinder lock assembly as claimed in Claim 1, wherein the power source is a battery.

10. A cylinder lock assembly comprising:

an electronic key having a chip and a conducting plate integrally formed with the chip;

a cylinder lock body having a cutout defined in a central portion of the body to divide the body into two barrels;

a cylinder lock core received inside the body and having therein multiple tumblers movably received in the lock core and driven by the key, the lock core having a spring engageable with the conducting plate and a passage longitudinally defined in an outer periphery of the lock core;

a rotor movably received in the body and having a first slit longitudinally defined in the rotor and a side slit radially defined in the rotor;

a cam movably received in the cutout of the body and securely received in the rotor;

a coupling device having a first clutch, a second clutch and a third clutch, wherein the first clutch is received in the passage of the lock core, the first clutch and the third clutch are received in the first slit of the rotor, a spring is sandwiched between the first clutch and the third clutch;

a seat;

a first rotation circuit board securely received in the lock core and having a first contact ring on the first rotation circuit board;

a second rotation circuit board securely in the rotator and having a second contact ring on the second rotation circuit board;

a driving element connected to the seat to drive the first clutch and the third clutch to move so that the first clutch and the third clutch are able to move away or into the first slit of the rotor;

a master circuit board electrically connected to the second rotation circuit board and the driving element such that when the first contact of the first rotation circuit board engages with the second contact of the second rotation circuit board, a signal is transmitted to the control unit to activate the driving element and drive the first clutch and the third clutch to move; and

a power source electrically connected to the

driving element and the master circuit board.

11. The cylinder lock assembly as claimed in Claim 10, wherein the driving element is a motor having a motor shaft in connection with a threaded bolt which is connected to a threaded hole of the seat.

12. The cylinder lock assembly as claimed in Claim 10, wherein the driving element is an electromagnetic valve in connection to the third clutch.

13. The cylinder lock assembly as claimed in Claim 10, wherein the rotor has a sensor with two arms respectively and electrically connected to the driving element, the arms are alternately connected to two opposed second blocks each formed on a side of the third clutch to stop the driving element.

14. The cylinder lock assembly as claimed in Claim 13 further comprising a buzzer electrically connected to the master circuit board.

15. The cylinder lock assembly as claimed in Claim 10, wherein the power source comprise a battery.

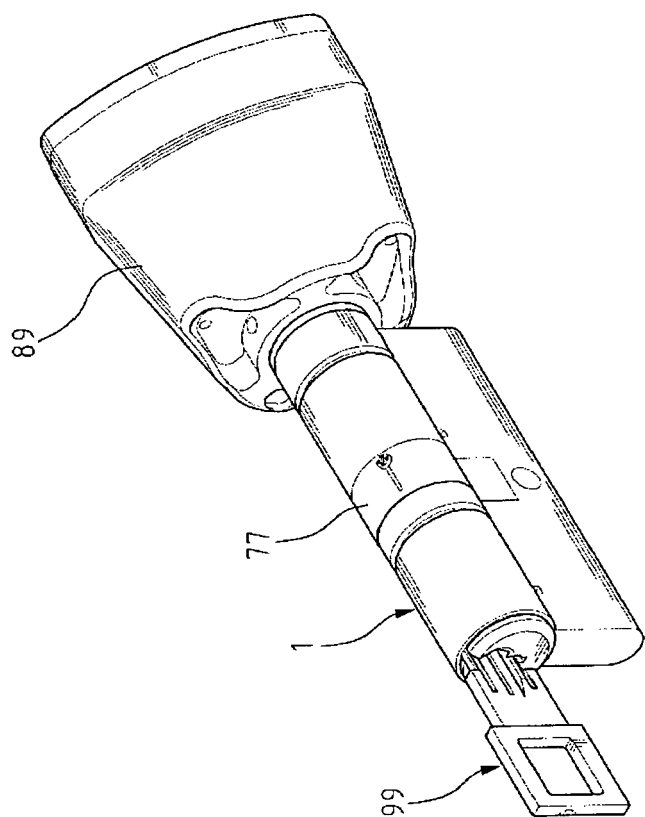


FIG. 1

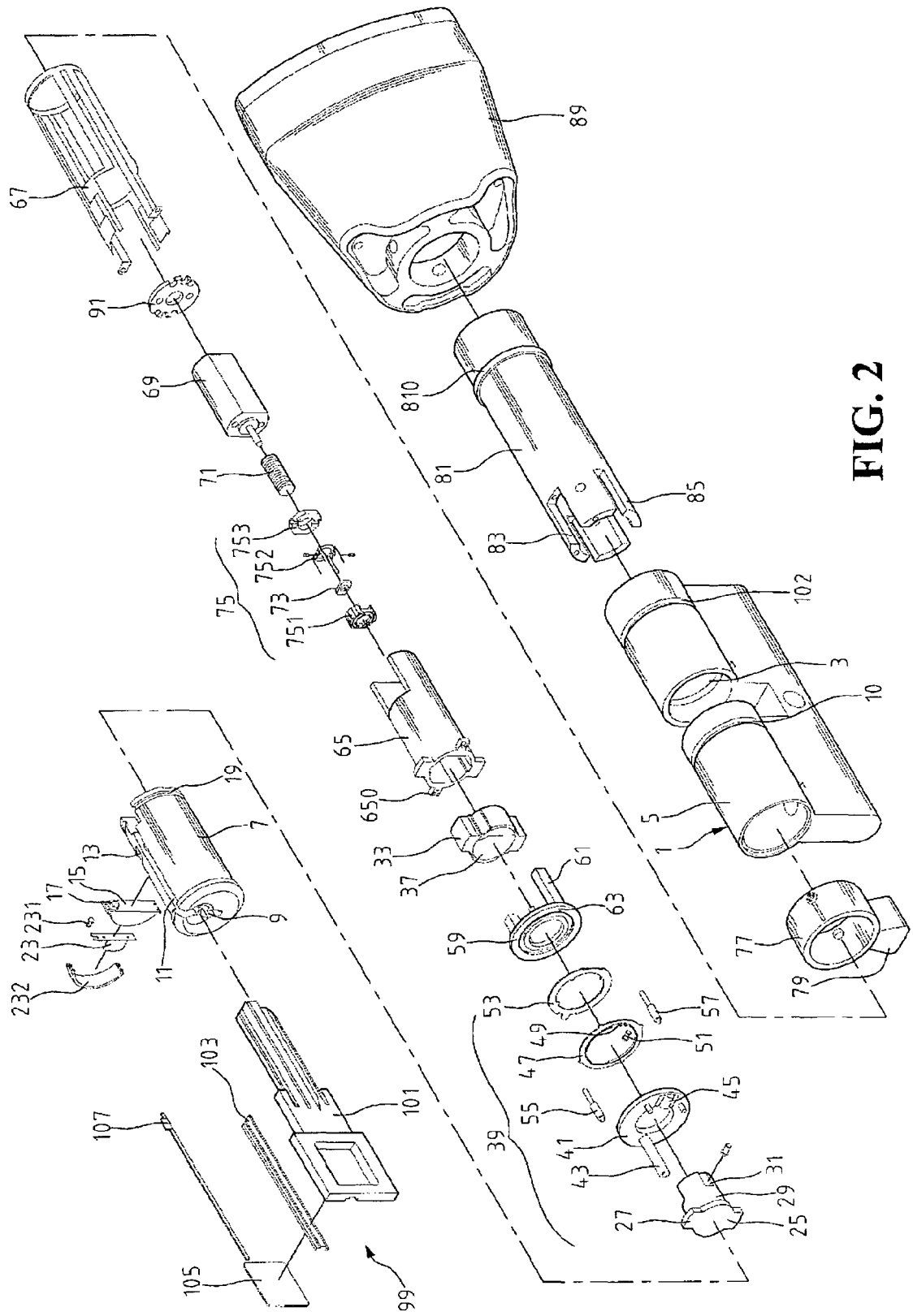


FIG. 2

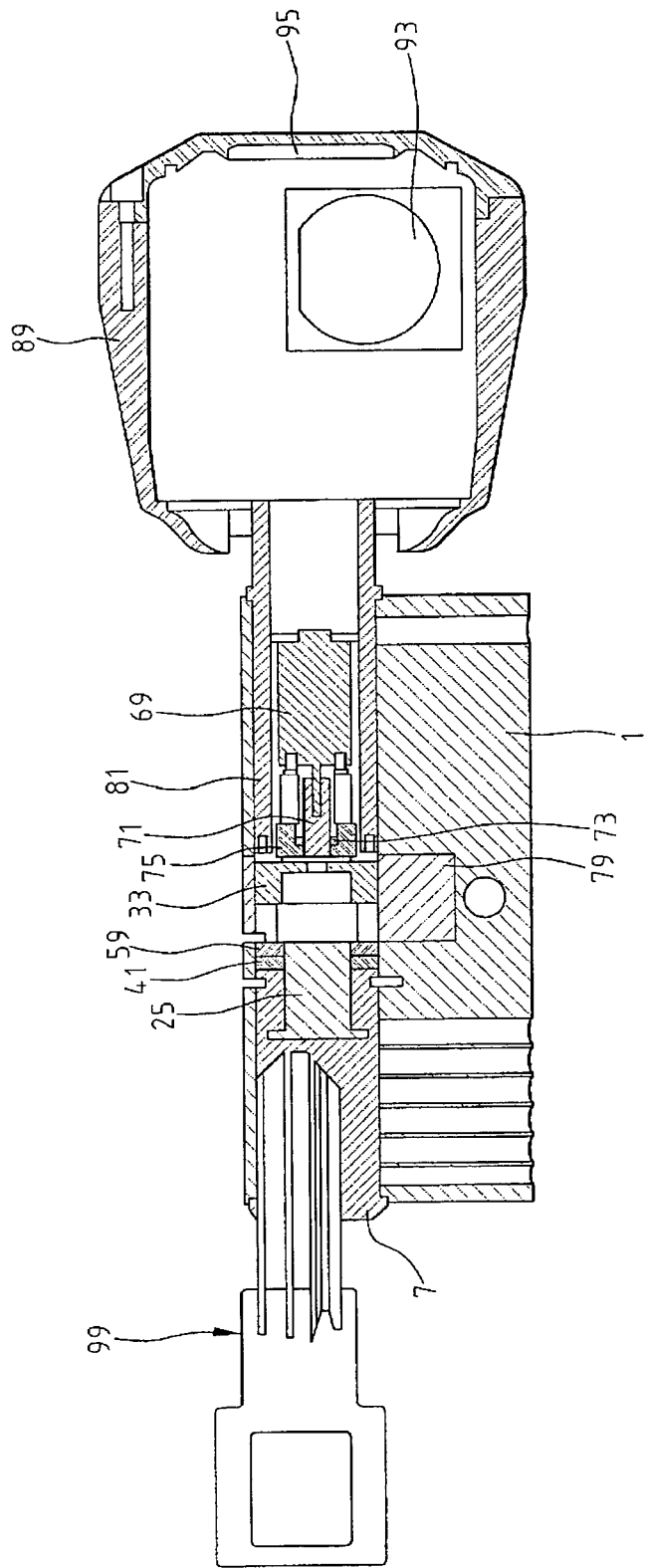


FIG. 3

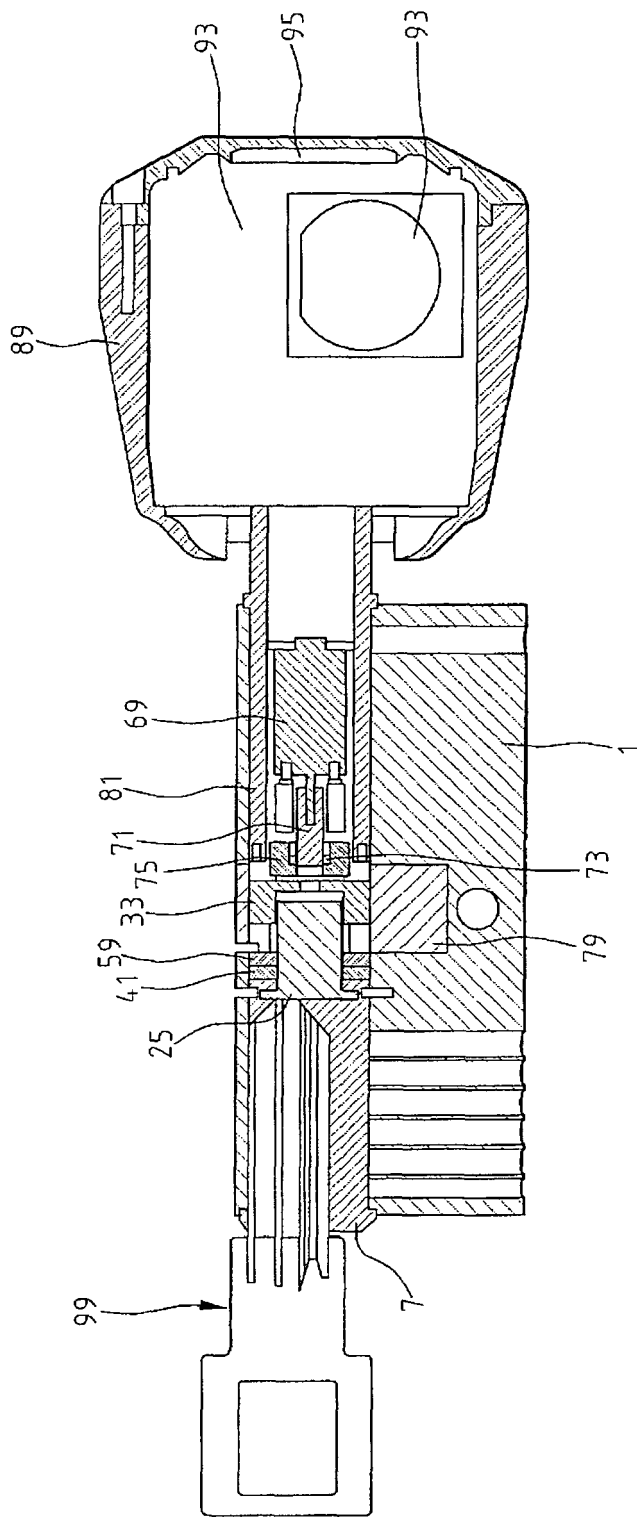


FIG. 4

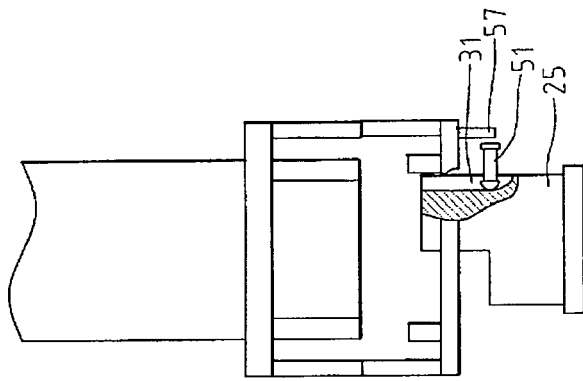


FIG. 5

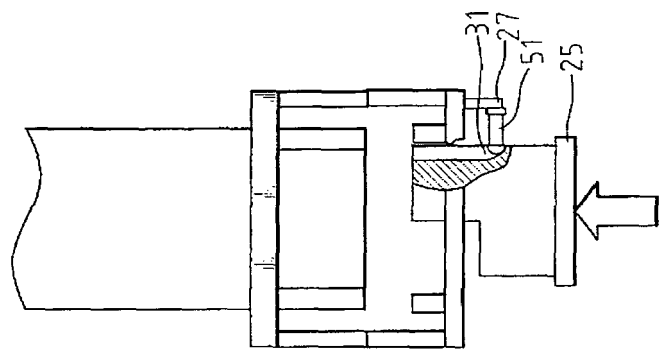


FIG. 6

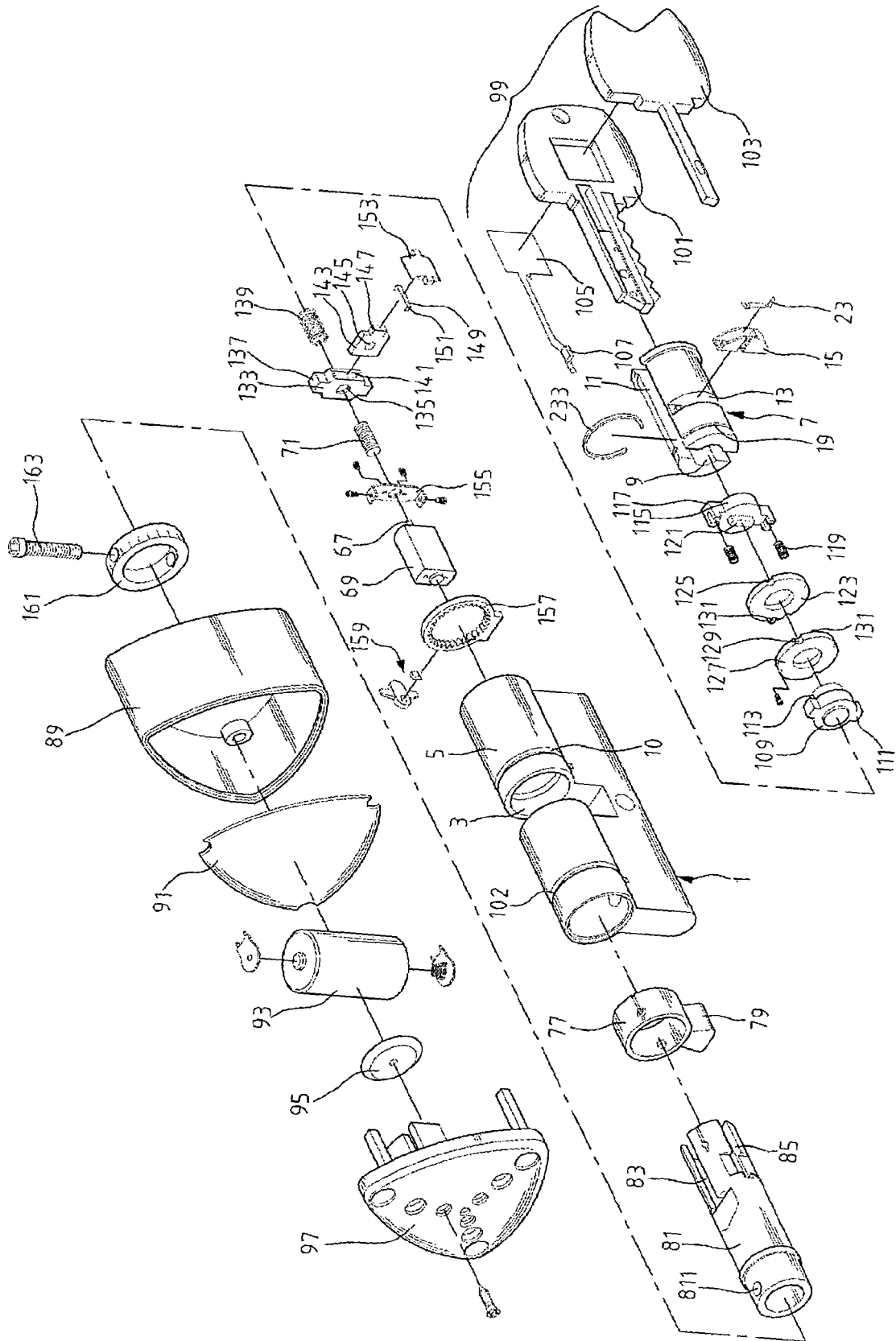


FIG. 7

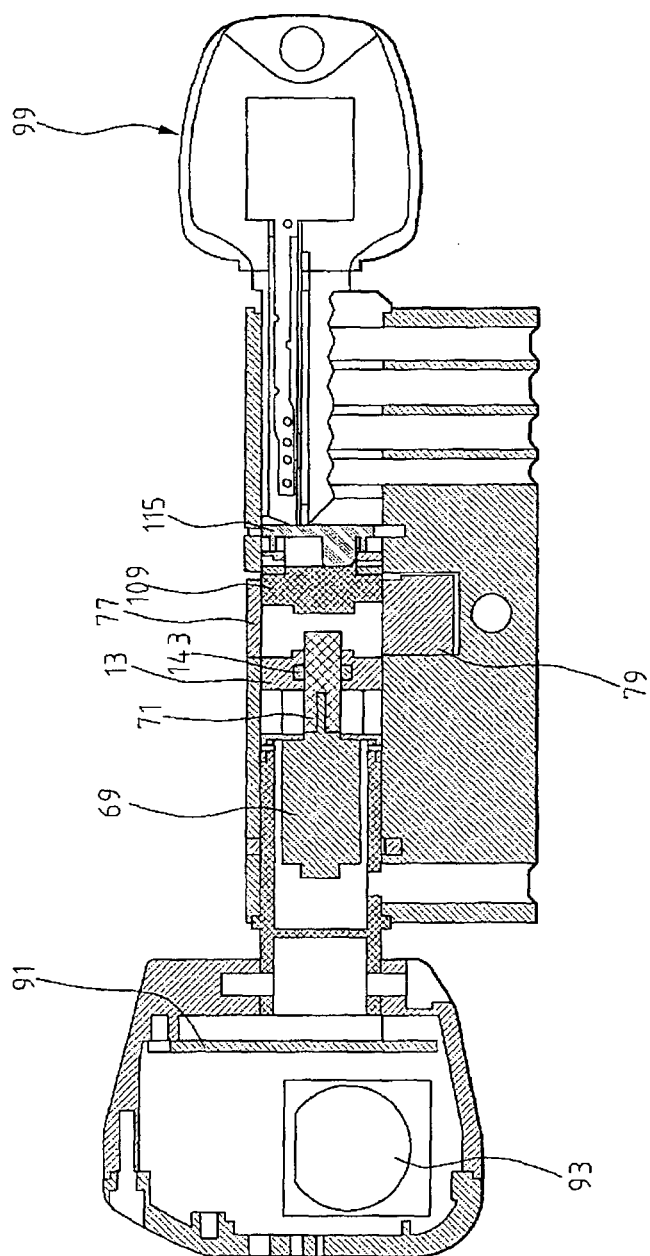


FIG. 8

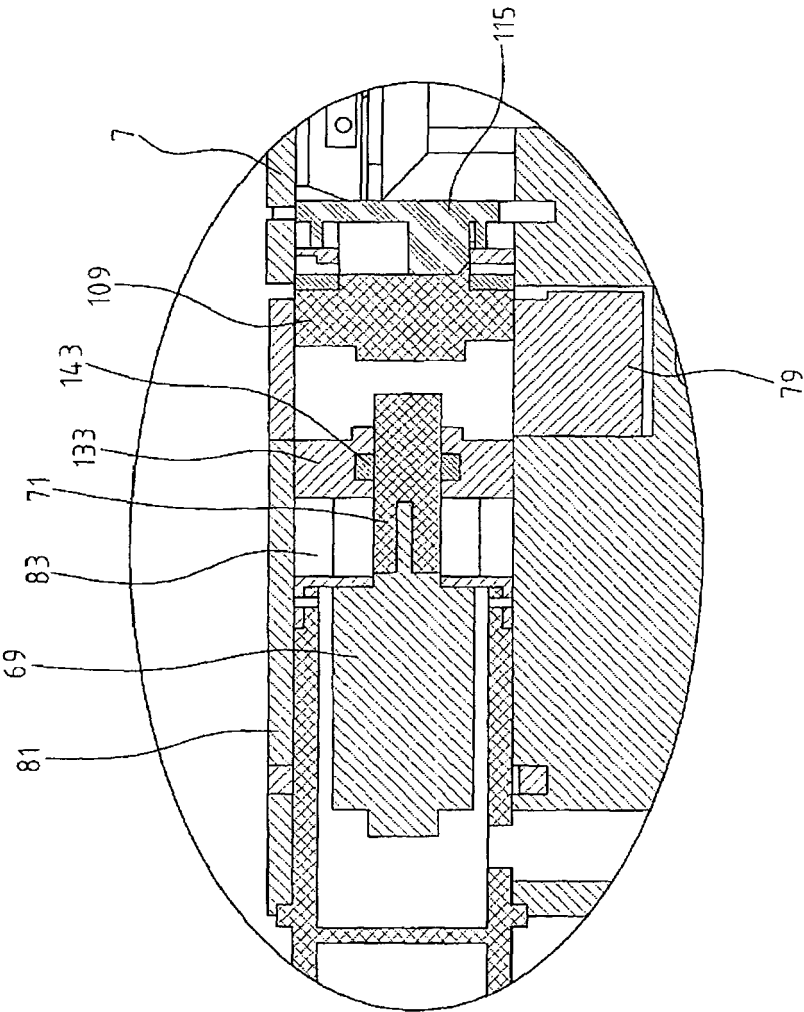


FIG. 9

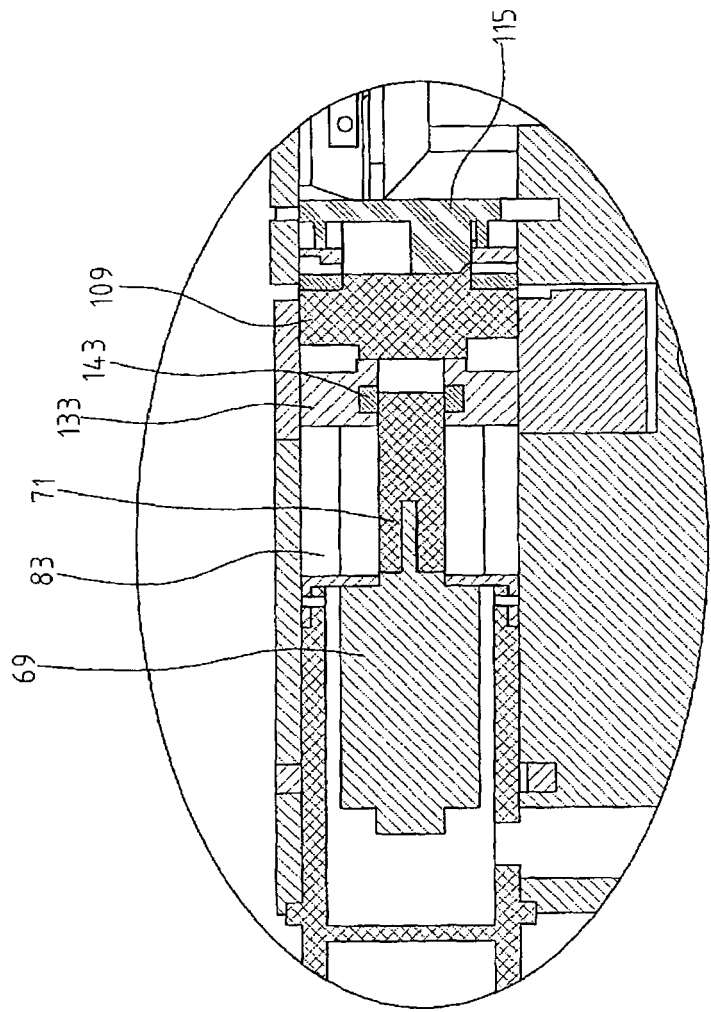


FIG. 10



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 07 5732

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 11 November 2005	Examiner PEREZ MENDEZ, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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