

[54] **DOOR LOCK ELECTRICAL CONTROL UNIT**
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[58] Field of Search **70/218, 231, 277, 70/222, 223; 192/67 R, 84 C, 95, 40; 74/625; 292/336.3, 336.5**

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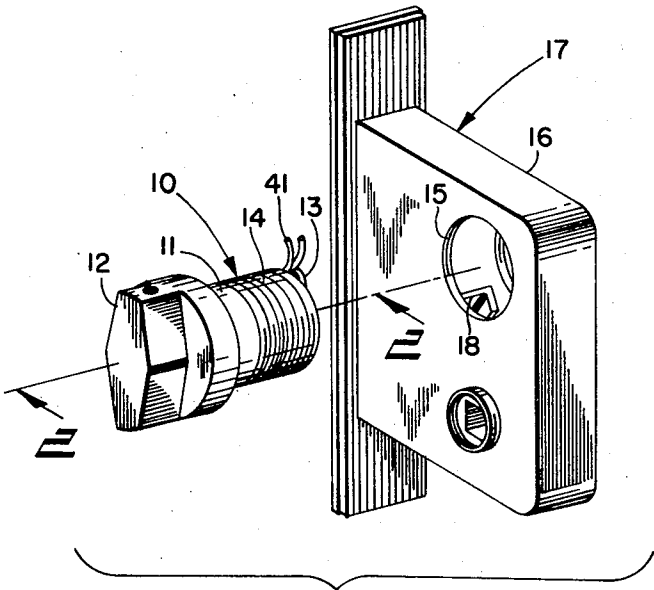
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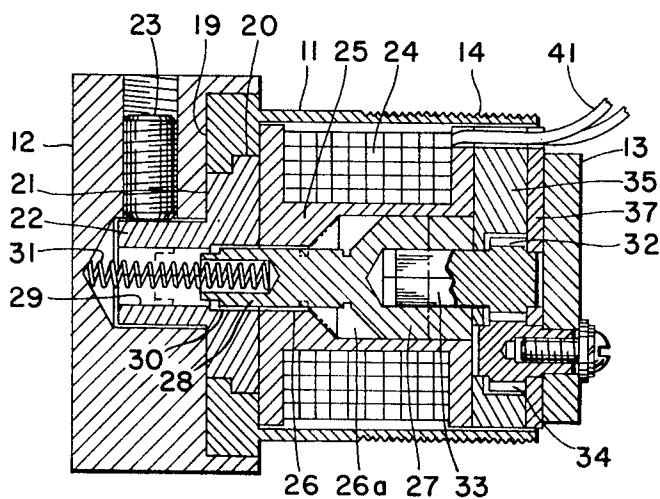
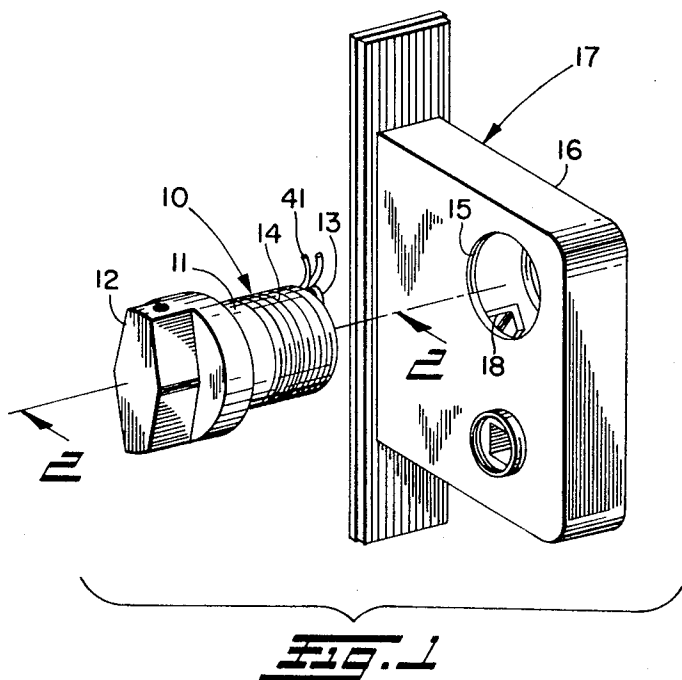
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[57] **ABSTRACT**
An electrically controlled manual operating unit for a door lock, adapted to be assembled in place of conventional manually operated means on the lock. The housing of the unit is shaped like a usual type of key controlled tumbler cylinder, and mounts a knob in freely rotatable relation to a lock actuating cam. The cylinder contains a solenoid that must be energized to engage a clutch in order to permit rotating movements of the knob to rotate the cam.

5 Claims, 3 Drawing Figures





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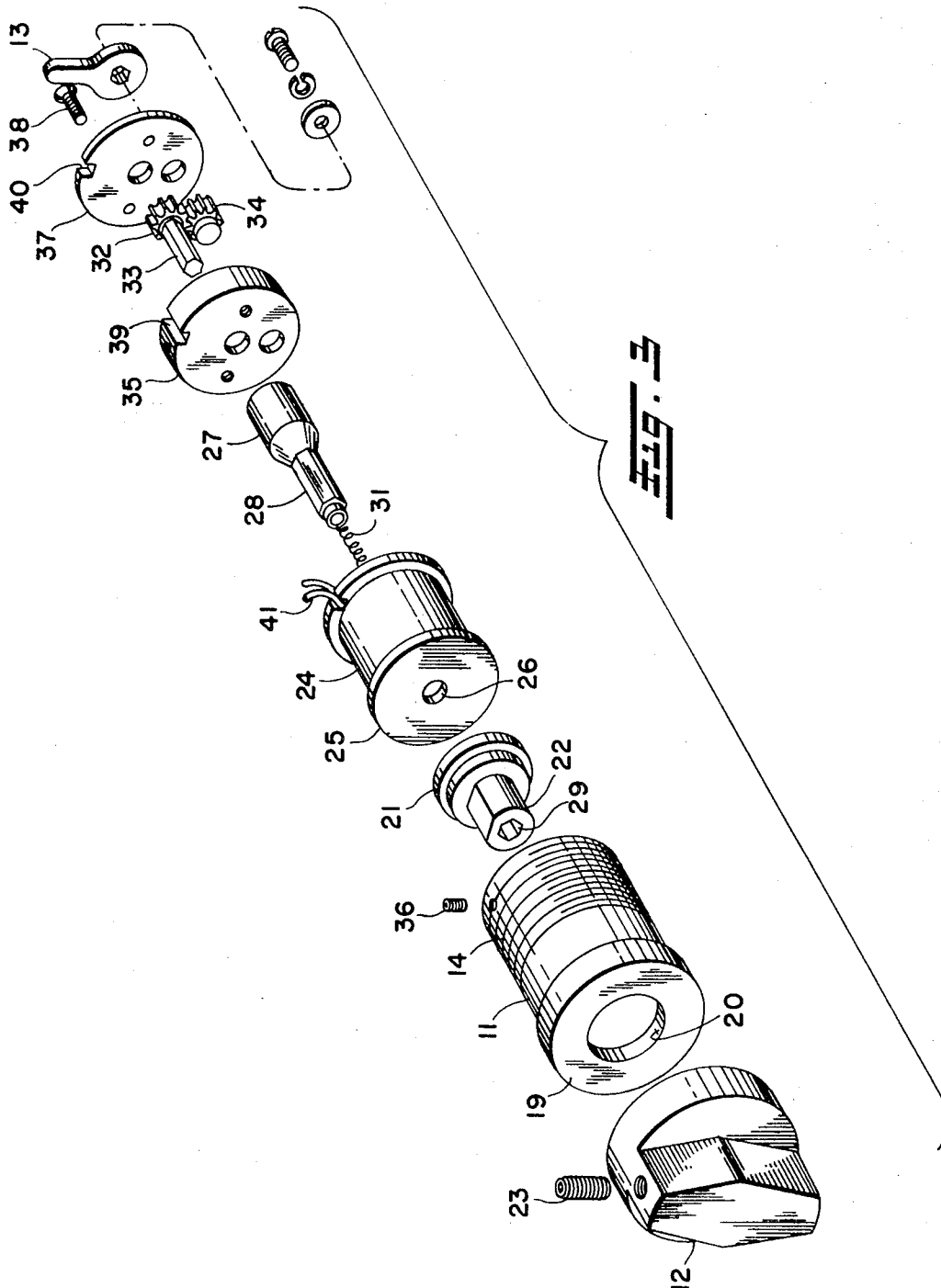


FIG. 3

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DOOR LOCK ELECTRICAL CONTROL UNIT

This invention relates to door locks, and more particularly to a novel electrically controlled manual operating unit for a door lock.

As will be appreciated, it frequently is desired that the locking or release of a door be controlled through the application of an electrical signal. For the purpose the prior art contains door locks, sometimes called electromechanical locks, that include electrical means for operating or controlling the movements of the bolt of the lock. Those locks differ in construction from types of locks that are in more widespread use, and frequently depart from desirable principles of lock design. That gives rise to certain objections so that the locks of that kind have not found the best acceptance. Generally, where door release is to be controlled electrically, it has been found preferable to utilize a standard type of mechanically controlled lock on the door, the electrical control then being achieved through an electric strike mounted on the door frame to coact with the bolt of the lock. Nevertheless, the electric strikes do present a problem in common with the electromechanical locks, since each is relatively costly and requires special installation on either the door or door frame. Through the novel concept of the present invention, it now is possible to achieve very effective electrical control while utilizing a conventional mechanical type of door lock and strike.

We contribute by our invention a novel door lock control unit that includes a manually operated knob, and electrical means that will control a functional relation between the knob and a lock mechanism. More particularly, our lock control unit comprises a housing that is adapted to mount the knob for rotation freely in relation to the mechanism of a conventional door lock, and that contains electrical means acting when energized to place the knob in operating relation to the mechanism.

As a feature of the invention, a housing contains electrical control means for a lock, while having a portion so formed that the control means may easily be assembled in the place of conventional operating means on the casing of a standard mechanical type of door lock.

As a more particular feature, the control housing has opposed ends on which are a manually operated knob and a lock actuating member, and contains coacting clutch parts connected to the knob and to the lock actuating member. The housing also contains a solenoid that controls the coaction between the clutch parts whereby to control an operating relation between the knob and lock actuating member.

We have thus outlined rather broadly the more important features of our invention in order that the detailed description thereof that follows may be better understood, and in order that our contribution to the art may be better appreciated. There are, of course, additional features of our invention that will be described hereinafter and which will form the subject of the claims appended hereto. Those skilled in the art will appreciate that the conception on which our disclosure is based may readily be utilized as a basis for the designing of other structures for carrying out the several purposes of our invention. It is important, therefore, that the claims be regarded as including such equivalent constructions as do not depart from the spirit and scope

of our invention, in order to prevent the appropriation of our invention by those skilled in the art.

In the drawings:

FIG. 1 shows a perspective view of our novel lock operating control unit, and a door lock on which the unit may be utilized;

FIG. 2 shows a longitudinal section on the line 2—2 in FIG. 1, on a larger scale; and

FIG. 3 shows an exploded view of parts of the invention.

Referring now more particularly to FIG. 1 of the drawings, our novel lock operating control unit 10 includes a housing 11 having front and rear end portions on which a manually operated member 12 and a lock actuating member 13 are mounted to rotate. In the form that we prefer, the housing 11 is a cylinder having screw threads 14, the outer shape being like a usual form of lock tumbler cylinder. Those threads 14 will engage screw threads 15 on the casing 16 of a conventional door lock 17 so as to mount the cylinder on the lock. Then, the actuating member 13 forms a cam that is supported in position to actuate lock mechanism 18 in the lock casing 16. Preferably also the manually operated member 12 is a knob, all as shown in FIG. 1.

Referring to FIG. 2, the cylinder 11 has a front end wall 19 formed with a stepped opening 20. A circular member 21, that I shall term a clutch part, is mounted to rotate in the opening 20 and includes a stem portion 22 to which the knob 12 is secured, as by a set screw 23.

Within the cylinder 11 we mount a solenoid having a coil 24 on a spool 25. An axial opening 26 extends through spool 25 and has a relatively wide rearward portion 26a in which a magnetic core member 27 is mounted to slide and to rotate. The core member 27 has a relatively narrow portion 28 forming a driven clutch part extending forwardly and engaging an opening 29 in the clutch part 21, that being the part to which knob 12 is secured. Clutch part 28 is adapted to key to the opening 29, as by complementary hexagonal shapes best seen in FIG. 3. However, opening 29 has a portion 30, FIG. 2, offering clearance whereby there will be no keying when solenoid core 27 is in the retracted position shown in full lines in FIG. 2. A coil spring 31 engages between core 27 and an inner surface of knob 12 to press core 27 toward its retracted position.

The core 27 and its clutch part 28 are connected to the lock actuating cam 13 through a gear 32 having a shaft portion 33 keyed in an opening of solenoid core 27, and a meshing gear 34 to which cam 13 is integrally attached. Thereby the driven clutch part 28 is permitted to slide axially while able to act positively to rotate the lock actuating cam 13.

A retaining disc 35 is formed with opening in which gears 32, 34 rotate, and holds solenoid spool 25, core 27 and clutch part 21 in assembled position in cylinder 11, the disc 35 being secured by a screw 36, FIG. 3, engaging openings in the cylinder and disc. We show a cover plate 37 that holds gears 32, 34 assembled and that is secured by one or more screws 38, FIG. 3. Disc 35 and plate 37 may be formed with slots 39 and 40 that will accept lead wires 41 of solenoid coil 24.

It will be apparent that the knob 12 will not be effective to rotate the lock actuating member 13 when solenoid coil 24 is not energized. More particularly, spring 31 then will hold the driven clutch part 28 in its retracted position, shown in full lines in FIG. 2, in which

the keying surface of part 28 is positioned in the clearance space 30 of the clutch part 21. Knob 12 then can rotate freely in relation to the lock actuating member 13, so that a person will be unable by rotating the knob to operate the lock on which cylinder 11 may be mounted. Now assuming that solenoid coil 24 is energized, as may be done through a desired form of security circuit, the solenoid core 27 will move to the forward position shown by dotted lines in FIG. 2, engaging the clutch parts and enabling a person who rotates the knob 12 to operate the lock.

Earlier in our description, we have referred to FIG. 1 to indicate that our control unit 10 may be mounted through screw threads 15 on a conventional door lock 17. Those who are skilled in the art will appreciate that screw threads 15 are a standard feature that certain types of lock have for mounting conventional lock operating means, such as a tumbler cylinder. Of course, types of lock exist that utilize lock operating means mounted through screws, brackets or other means, or where the operating means are simply secured to a door so as to be mounted in relation to a lock on the door. Our invention may very well be utilized with those types of lock, and it is merely necessary to know here that our novel control unit has a housing on which there are means for mounting the unit relatively to a door lock. Therefore, we do not wish to limit our invention by a housing that actually is a cylinder formed with screw threads.

We believe that it will now be understood that our invention will enable a door to be equipped with an extremely effective electric locking control while requiring no electromechanical lock or electric strike, and permitting electrical control to be easily applied to doors that are equipped with a standard type of mechanical lock. We believe, therefore, that the considerable value of our novel lock control unit will be understood, and that the merits of our invention will be fully appreciated by those skilled in the art.

We now claim:

1. In a lock operating control having a housing operatively engaged with a lock casing having lock mechanisms therein, a manually operated member, and an actuating member mounted on said housing for engaging said lock mechanisms and effecting actuation of said lock mechanisms upon rotation of said manually operated member on said housing, the improvement that comprises means mounting said manually operated member for free rotation relatively to said actuating member on said housing, electrically controlled means having first and second conditions for operatively connecting and disconnecting said manually operated member and said actuating member, said electrical control means when in said first condition enabling rotating movements of the manually operated member to operate the lock, said electrical control means when in said second condition preventing rotational movement of said actuating member in response to rotation of said manually operated member to render said manually operated member incapable of operating the lock, said housing being a cylinder and said manually operated member being a knob mounted on a front portion of said cylinder, said actuating member being mounted on a rearward portion of said cylinder, said rearward cylinder portion being equipped with means for engaging said lock casing to mount the cylinder on the casing, and coacting clutch parts connected to said knob and

to said actuating member, said clutch parts being mounted to rotate about the axis of said cylinder, said electrically controlled means including a solenoid encircling one of said clutch parts in the cylinder and controlling the coaction of said clutch parts.

2. In a lock operating control for a door lock that has a casing on which there are mounting means for conventional lock operating means, a housing for said control, a manually operated member and a lock actuating member mounted for free rotation relatively to each other on opposed end portions of said housing, means on said housing for assembling said housing to the mounting means on the lock casing so as to support said actuating member in position to coact with lock mechanism in the casing, electrically actuated means mounted in said housing for establishing and controlling an operating connection between said manually operated member and said lock actuating member upon rotation of said manually operated member in a first direction or a second direction opposite said first direction, to achieve electrical control on a manually operated lock, said housing being a cylinder having external screw threads complementary to screw threads on the lock casing.

3. The invention set forth in claim 2 in which said manually operated member is a knob, and said electrically actuated means comprise clutch parts spring pressed relatively to one another and connected to said knob and to said lock actuating member, said knob and clutch parts being mounted to rotate in the axis of said cylinder, and a solenoid encircling one of said clutch parts within the cylinder for moving said one part so as to control a coacting relation between the clutch parts.

4. A lock control for a locking system allowing manual operation of the locking system in response to a control signal comprising:

a lock mechanism;

a control housing having a main body mounted within the lock mechanism of the locking system;

a manually operable member mounted at one end of the main body of said control housing;

an actuating member mounted on the main body of said control housing to operate the lock mechanism of the locking system;

first clutch means fixed to said manually operable member to operate in response to operation of said manually operable member;

second clutch means operably connected to said actuating member and movable longitudinally in the main body of said control housing to connect said second clutch means with said first clutch means; and

control means for longitudinally moving said second clutch means in response to the control signal being applied to said control means to allow said actuating member to operate the locking system in response to operation of said manually operable member acting through said first and said second clutch means.

5. The invention set forth in claim 4 in which said housing is a cylinder and said manually operated member is a knob mounted on a front end portion of said cylinder, said actuating member being mounted on a rearward portion of said cylinder, and a rearward portion of said cylinder being equipped with means for engaging lock said mechanism to mount the cylinder on the lock mechanism.

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