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ELECTRIC DOOR LOCK

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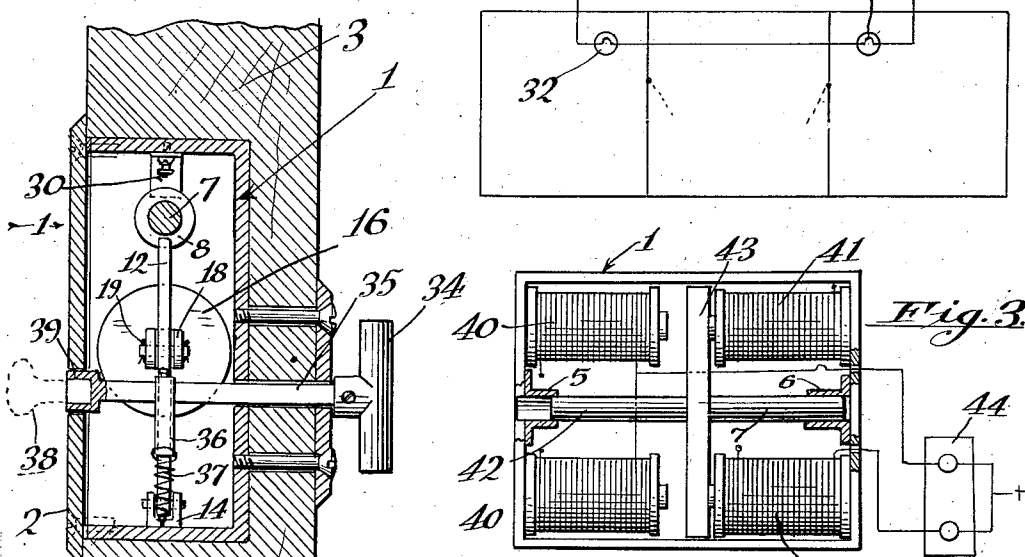
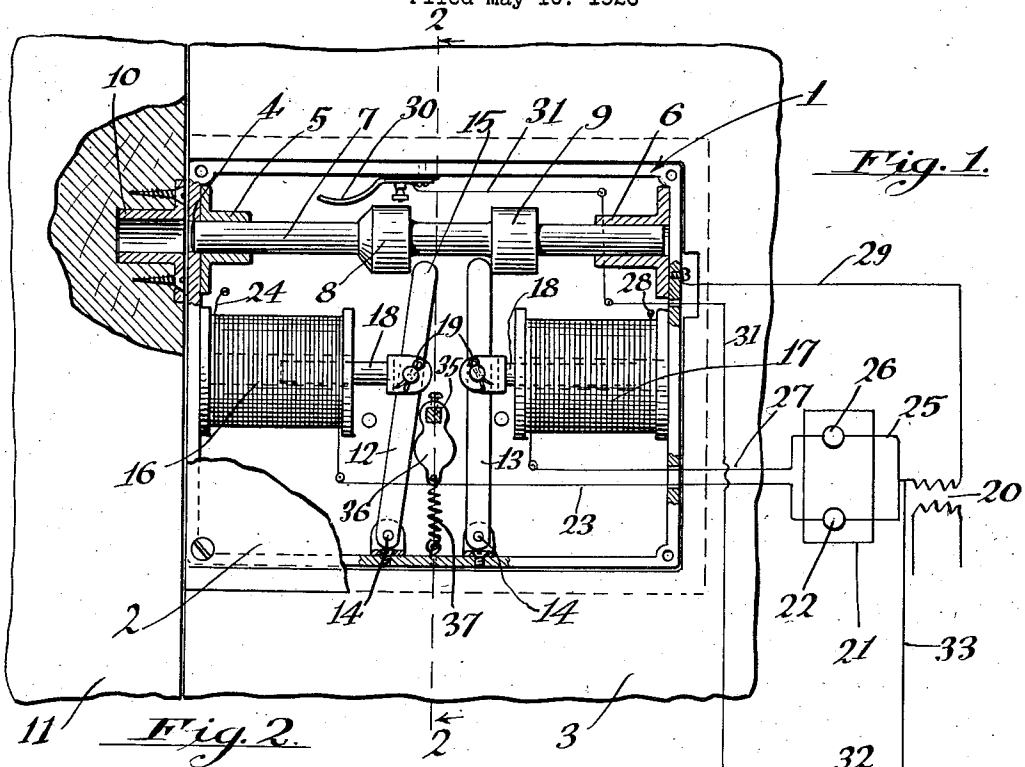


Fig. 3. Inventor
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UNITED STATES PATENT OFFICE.

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ELECTRIC DOOR LOCK.

Application filed May 10, 1926. Serial No. 108,035.

Our invention is an electric door lock designed to be operated by a distant control switch to lock and unlock the door by such distant switch, and also to give signals showing whether the door is locked or unlocked. The lock also has provision for manual operation.

An object of our invention is in the construction of an electric door lock, the utilization of a plurality of electro-magnetic devices, one of these being for sliding a bolt into locking operation and the other for sliding a bolt backwardly into the lock housing out of locking position. These electro-magnetic devices are in circuit with switches so that when one switch is operated the bolt will be thrown and when the other switch is operated the bolt will be returned to its housing. We also employ a signal circuit with signal lamps indicating when the door is locked and by the lamps being extinguished that the door is unlocked.

An additional feature of our invention is the provision of a handle to be placed on the inside of a door so that the lock may be manually manipulated and the utilization of a key on the outside of the door to manipulate the lock; these latter features being required should the electric circuit be broken.

Our invention is of particular use in hotels or the like for suites of rooms having a bathroom between, in which a person entering the bathroom from rooms on either side may press the switch button, thus locking both of the communicating doors and give a signal in the rooms that the bathroom doors are locked. On leaving the bathroom the person presses the second button which unlocks both the doors and extinguishes the signal lights. Our invention of course, is applicable to very many different installations.

In constructing our lock we utilize a suitable housing and a sliding bolt having a pair of spaced shoulders thereon. We also utilize two electro-magnets having sliding armatures and having a pair of operating levers pivotally connected to the housing and connected to the armatures, the free ends of these levers being adapted to engage the shoulders on the bolt.

One magnet is utilized to throw the bolt into locking position by moving the lever and at the same time drawing the other armature lever and its connected armature outwardly. On operation of the unlocking switch the second electro-magnet is energized, actuating its connected lever to draw the bolt backwardly into unlocking position. In these operations an electric contact engages one of the shoulders and energizes a circuit having an electric signal lamp therein.

Our invention will be more readily understood from the following description and drawings, in which;

Figure 1 is an elevation of our lock with the face plate removed, as if taken in the direction of the arrow 1 of Fig. 2, showing a diagram of electric circuits;

Fig. 2 is a vertical cross section on the line 2-2 of Fig. 1, in the direction of the arrow;

Fig. 3 is a face view of an alternative construction of lock with the face plate removed, showing a heavier construction for actuating heavy bolts.

In the construction shown in Figs. 1 and 2, a suitable lock housing 1 having a face plate 2, is adapted to be secured in a door 3 or the like, in any suitable manner. The housing is provided with an aperture 4 on one edge and has guideways 5 and 6 attached to the inner edges of the housing. These guideways support the locking bolt 7. This bolt is provided with locking and unlocking shoulders 8 and 9, preferably formed as enlargements of the bolt. The bolt is preferably made circular so that it may rotate if desired, but may be made in any suitable shape. A socket 10 is secured to the door jamb 11 or other suitable structure to engage the bolt for locking the door.

Locking and unlocking levers 12 and 13 are preferably connected to the bottom of the housing by means of pivots 14, the free ends of such levers being positioned to engage the shoulders 8 and 9 on one side thereof. A locking electro-magnet 16 and an unlocking electro-magnet 17 are secured in the housing and have armatures 18; these armatures being connected to the levers 12 and 13 by pins 19 or the like.

The electric circuit for actuating the locks is substantially as follows:

The source of power is indicated by a transformer 20. A lead 21 extends from the secondary through a locking switch 22 and a lead 23 to the locking magnet coils 16, and to a ground 24 attached to the housing. Another lead 25 extends through an unlocking switch 26 and a lead 27 to the coil of the magnet 17 and has a ground connection 28. The return is by a lead 29 connected to the housing to the secondary of the transformer.

The manner of operation of our lock so far described, is substantially as follows:

Presuming the bolt is in the unlocked position of Fig. 1, when the locking switch 22 is actuated, this being usually merely by a press button, the locking magnet is energized, drawing the armature 18 therein and swinging the lever 12, the free end of which bears against the shoulder 8; thus shifting the bolt into the socket 10. In this action the shoulder 9 moves the lever 13, drawing the armature connected thereto out of its coil. When it is desired to unlock the door the unlocking switch 26 is actuated momentarily and causes the energizing of the magnet 17, drawing in its armature and swinging the unlocking lever 13, the free end of which bears against the shoulder 9; thus drawing the bolt inwardly into the housing, at the same time shifting the lever 12 and drawing out its connected armature back into the position shown in Fig. 1.

The signalling circuit is substantially as follows:

A spring contact 30 is secured to the housing being insulated therefrom, and has an electric lead 31 which may be connected in series through one or more signal lamps 32 and by the return lead 33 back to the transformer. It will thus be seen that when the bolt is thrust outwardly into its locking position, an electric circuit is established through the electric leads and lamps above mentioned and by the spring contact 30 to the shoulder 8 and thence through the grounding of the housing back to the secondary of the transformer; thus indicating that the bolt is drawn and the door locked. Manifestly on the reverse motion of the bolt the lights are switched off.

The manual manipulation of the lock is by means of a handle 34 having an operating stem 35 connected to a cam 36. This cam is connected by a spring 37 to one side of the housing and is normally thus positioned to be inoperative when the bolt is drawn in either direction. However, by turning the handle the cam may be thrust against the lever 12 or the lever 13 if desired and thus manipulate the bolt to lock and unlock the door.

A key 38 may be inserted through a key-

hole 39 in the lock and by means of a suitable connection actuate the cam 36 to lock or unlock the door. These latter features are intended for use should the electric circuit for any reason become interrupted; also should it be necessary for someone having authority to unlock a door from the outside, they may utilize the key to get in a room or the like, even if the bolt has been thrown by the electric devices or by the handle.

In Fig. 3 we illustrate a construction suitable for large bolts. In this case a pair of electro-magnets 40 and 41 are utilized to throw the bolt 42 into locking or unlocking position. In this construction a flat armature bar 43 is preferably rigidly connected to the bolt and so positioned as to be acted upon by both of the pairs of coils. This construction utilizes the double press button type of switch 44 with electric leads therefrom to the different coils. The manner of energizing such coils and control of the bolt is substantially as above described.

It is obvious that our electric door lock and signal system connected therewith may be utilized in many different types of installations, and hence may require considerable change in general design or specific features to suit different circumstances. Such changes however, would be within the spirit of our invention as set forth in the description, drawings and claims.

Having described our invention, what we claim is:

1. An electric door lock comprising in combination a housing having a slidable bolt, a pair of spaced shoulders on the bolt, a pair of levers pivotally mounted in the housing, having their free ends adapted to engage the said shoulders, electro-magnetic devices operatively connected to each of the levers, a circuit for each device having a separate switch, one of said devices actuating its lever to slide the bolt to lock a door or the like, and the other to retract the bolt, each of said devices causing a movement by means of the shoulders on the bolt of the other lever.
2. An electric door lock comprising, in combination, a housing having a slidable bolt, a pair of spaced shoulders on the bolt, a pair of levers pivotally mounted in the housing and having their free ends engaging the shoulders, electric means for operating the levers to move the bolt to locked position and to move the bolt to unlocked position, a handle operatively connected with the bolt and adapted to be positioned on one side of a door, and a key adapted to be inserted on the opposite side of the door.
3. An electric door lock comprising in combination a housing having a slidable bolt, a pair of spaced shoulders on the bolt, a pair of levers pivotally mounted in the housing and having their free ends engag-

ing the shoulders, electrical coils secured in the housing at opposite ends thereof with the axes parallel to the bolt, armatures slidable in said coils and connected to the levers, an independent circuit having an independent switch for each coil to energize same and operate the armatures to shift the levers to

move the bolt, and manually operated means to actuate said levers.

In testimony whereof we have signed our names to this specification. 10

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