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G. B. THOMAS

ELECTRIC SWITCH

Filed April 13, 1922

Fig. 1.

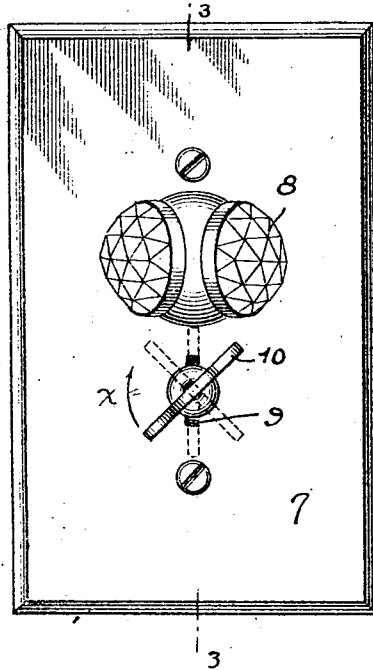


Fig. 2.

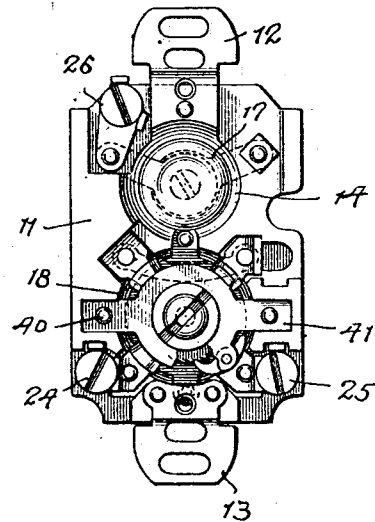


Fig. 3.

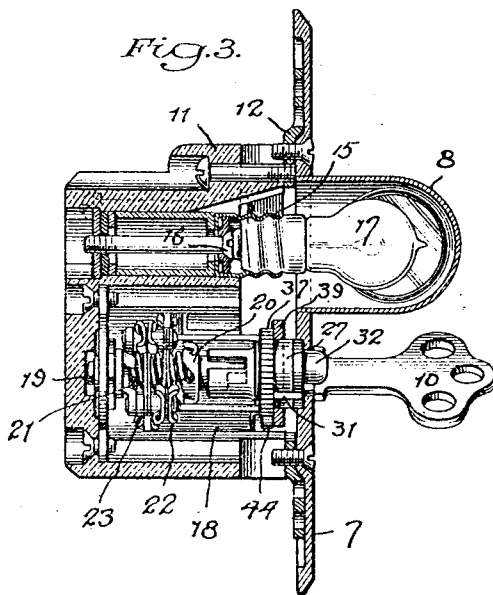
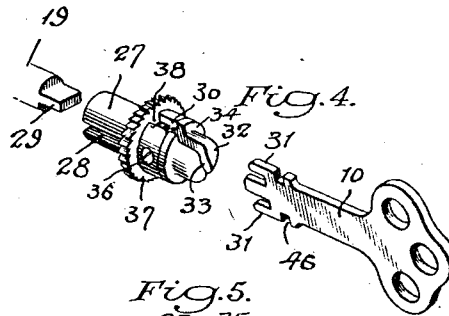


Fig. 5.

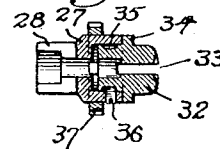
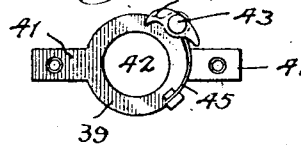


Fig. 6.



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## UNITED STATES PATENT OFFICE.

GEORGE B. THOMAS, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE BRYANT ELECTRIC COMPANY, OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF CONNECTICUT.

## ELECTRIC SWITCH.

Application filed April 13, 1922. Serial No. 552,226.

*To all whom it may concern:*

Be it known that I, GEORGE B. THOMAS, a citizen of the United States of America, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

My invention relates to electric switches, and particularly to an electric switch of the key operated type. The object of my invention is to provide a key operated switch of such character that the key cannot be removed except in predetermined circuit conditions. The switch is especially useful in a signal system, but may be employed in any suitable installation.

In the accompanying drawings—

Fig. 1 is a plan view of a face plate and associated bull's eye which may be used with the switch in a signal circuit;

Fig. 2 is a broken plan of a fitting in which a switch of the present type is embodied;

Fig. 3 is a longitudinal section on the line 3—3, Fig. 1;

Fig. 4 is a dropped perspective of portion of the switch spindle and associated elements;

Fig. 5 is a mid section through the key operated barrel; and

Fig. 6 is a plan of the ratchet yoke.

While the present switch may be arranged in any suitable type of fitting, I have shown it in a signal switch suitable for use in a hotel or the like. The switch is of the flush type and has an associated cover plate 7 which carries a bull's eye 8, and is slotted at 9 to form a guideway for the shank of the switch operating key 10. Beneath the face plate is a cup-shaped insulating body 11, supported by lugs 12 and 13 within an outlet box (not shown), in the customary manner. The base is recessed at 14 to accommodate socket terminals 15 and 16 for a pilot lamp 17, housed within the bull's eye 8. The base is also recessed at 18 to afford a switch chamber within which may be arranged a rotary snap switch of any suitable character. That here shown is of a two-blade type, with a central spindle 19 carrying a crown 20, with which is engaged one end of the switch spring 21 for rotating the switch blades 22 and 23 with a snap action. An escapement of any suit-

able sort may be employed; my invention does not relate to this feature of the construction. Appropriate wire terminals 24, 25 and 26 are mounted on the base and so connected with the switch and socket terminals that in the "on" position of the switch, a circuit is established through the pilot lamp, and associated signal system.

To actuate the switch, I provide a key operated barrel 27 slotted at 28 to receive the web 29 formed at the outer end of the spindle 19. At its opposite end the barrel is slotted at 30 to receive the engaging fingers 31 of the key 10. It is also centrally recessed at this end to accommodate a guard bushing 32, slotted at 33 to receive the mid portion of the key and having a flange 34 which overlies the slots 30 in the barrel. The neck of the bushing is peripherally channelled at 35 to receive a detaining pin or screw 36 which passes through the outer end of the barrel and secures the bushing in swivelling engagement therewith. Surrounding the barrel is a ratchet disc 37, the inwardly extending lugs 38 of which enter the key slots 30 in the barrel and thus engage the latter.

A yoke piece 39, secured rigidly in position on the base by screw bolts 40 taking into its extended opposite ends 41, is centrally apertured at 42 to pass over the barrel and rest against the ratchet 47, which is thus maintained in position, while the same means hold the barrel in engagement with the spindle. Pivoted at 43 on the lower face of the yoke is a pawl 44 pressed by the spring 45 against the teeth of the ratchet disc 37, and thus preventing rotation of the barrel in one direction.

The shank of the key 10 is slotted at 46 to straddle the face plate 7 during the rotation of the key after its insertion in the slot 9.

The operation of the switch is as follows: Assuming the slot 33 in the guard bushing to be in register with the slot 30 in the barrel 27, and both to be in register with the slot 9 in the face plate, the key 10 may be inserted through the latter sufficiently far to bring its fingers 31 into the notches 30 at the outer end of the barrel, while the marginal slots 46 in the key register with the face plate 7. The key may now be rotated, and with it the barrel 27 and spindle 19, thus actuating the switch. Assuming

the switch to be actuated when the handle has reached the position indicated in full lines in Fig. 1, the key cannot be rotated backward to withdraw it from the slot 9, since reverse rotation of the barrel is prevented by the pawl 44 engaging the ratchet disc 37 fast with the barrel 27. If the switch is now in circuit closing position, the lamp 17 in the bull's eye 8 is lighted, and the associated signal circuit energized. Before the key can be withdrawn it must be further rotated in the same direction, as indicated by the arrow X in Fig. 1. A partial further rotation of the key to the position indicated in dotted lines actuates the switch mechanism to throw the switch blades to open-circuit position. It is obvious that in this position the key still can not be withdrawn, since the face plate 7 is still engaged in the marginal notches 46 in the sides of the key shank. Further rotation of the key, however, brings the slot 33 in the guard bushing, the slot 33 in the barrel, and the key itself into register with the slot 9 in the face plate so that the key may now be withdrawn. Inasmuch as this partial rotation places the switch spring 21 under tension, it is obvious that were it not for the ratchet and pawl, upon withdrawal of the key, the spindle 19 would be reversely rotated, and with it the barrel 27, thus shifting the slot 30 in the latter out of register with the slot 9 in the face plate, so that the key could not be again inserted. The pawl 44, however, engages the ratchet disc 37 fast on the barrel 27 and thus holds the latter in the position to which it has been rotated, while the switch spring remains under tension and the escapement mechanism of the switch partially, but not fully actuated. Only a slight additional rotation of the key to the position shown in full lines in Fig. 1 is necessary therefore to again close the circuit through the switch.

(In a hotel installation such as suggested, a chamber maid entering a room for service, turns the switch by means of the key to circuit closing position, thus closing the signal circuit and also lighting the bull's eye so that the supervising matron may know in what room she can be found. As the maid leaves the room, and the key is turned to position for withdrawal, the circuit is broken and is left in open-circuit position.

Various modifications in details of construction and operation will readily occur to those dealing with the problem, without departing from what I claim as my invention.

I claim—

1. In an electric switch, a rotary switch bar, a spring for driving the latter, an escapement mechanism controlling the rotation of the bar by the spring, a rotary mem-

ber for stressing the spring and operating the escapement, and means for holding said rotary member against reverse rotation after partial stressing of the spring but in advance of the release of the escapement.

2. In an electric switch, a rotary switch bar, a spring for driving the latter, an escapement mechanism controlling the rotation of the bar by the spring, a rotary member for stressing the spring and operating the escapement, and ratchet means for holding the rotary member against reverse rotation after partial stressing of the spring but in advance of the release of the escapement.

3. In an electric switch, a switch-actuating member having a predetermined throw to cause the switch to function, a key for operating said member, a guard plate through which the key can pass only when the switch-actuating member is in an intermediate position, and means for maintaining said member in its intermediate position for insertion or withdrawal of the operating key through the guard plate.

4. In an electric switch, a switch-actuating member having a predetermined throw to cause the switch to function, a key for operating said member, a guard-plate through which the key can pass only when the switch-actuating member is in an intermediate position, a spring tending to maintain said member at the end of its throw, and means for holding said member in its intermediate position against the action of said spring to permit the insertion or withdrawal of the operating key through the guard plate.

5. In an electric switch, a rotary switch spindle, a rotary switch bar, a spring operatively connecting the spindle and switch bar, and escapement operated by the spindle and controlling the rotation of the switch bar, a key for operatively engaging the switch spindle, a guard plate through which the key passes into said operative engagement with the switch spindle, and a key-way member beneath the guard plate, the key-ways in said guard plate and key-way member registering only in a position in which the spring is under stress and the escapement partially withdrawn, together with means for maintaining said parts in register to permit the introduction or withdrawal of the spindle-operating key.

6. In a rotary snap switch, a rotary switch spindle having an associated key way, a guard plate having a key way registering with the spindle key way only in certain position of the latter, and a member swiveling with respect to the spindle and having a key way adapted to register with that in the spindle and guard plate in a certain position of the parts, and having means to obstruct access to the key way in the spindle in other relative rotary positions.

7. In a rotary snap switch, a rotary spindle, a key-operated barrel adapted to engage said spindle for rotation therewith, a ratchet member fast with said barrel, a switch spring stressed by the rotation of said spindle, means engaging said barrel to hold it in position on the switch spindle, and an associated ratchet switch member carried by said holding means to prevent reverse rotation of said spindle.
8. In a rotary snap switch, a key-operated rotary switch spindle, a cover plate overlying the same and apertured to permit the engagement and rotation of the key with the spindle, and a member swivelling with respect to the spindle and located at the aperture in the cover plate to prevent access to the key way in the spindle except in predetermined relative position of the movable parts with respect to each other and to the cover plate.
9. In a rotary snap switch, a switch spindle, a key way member engaged at one end of said spindle to rotate therewith, a ratchet on said member, a stationary frame element holding said member in position, and a pawl on said frame element and engaging said ratchet to prevent reverse rotation of said spindle after partial rotation thereof in switch-operating direction.
- In testimony whereof I have signed my name to this specification.

GEORGE B. THOMAS.