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His Attorney.
Our invention relates to the operating mechanism of electric switches, particularly those of relatively large capacity. Switches usually are designed and constructed to interrupt circuits at voltages having definite limits, the final separation of the contacts being such as to insure the complete interruption of the current with a satisfactory factor of safety. In certain switch constructions, it has happened that the opening movement of the switch has been followed by a reverse movement by which the contacts approach each other to such an extent as to objectionably lower the interrupting efficiency of the switch. Such reverse movements are caused by a rebounding of the moving contacts of the switch upon reaching the limit of the full open position. Again in the case of an enclosed oil switch it may be due to the gas pressure in the switch acting upon the contact operating rod. Our invention has for its object the provision of an improved switch operating mechanism having means for effectively preventing such a reverse movement of the moving contacts.

Our invention will be better understood from the following description taken in connection with the accompanying drawing, and its scope will be pointed out in the appended claims.

Referring to the drawing, Fig. 1 illustrates a switch having an operating mechanism involving our invention; Fig. 2 is an enlarged view of the mechanism shown in Fig. 1; and Figs. 3 and 4 show details thereof drawn to a still larger scale.

The switch which we have illustrated by way of example in Fig. 1 is an oil switch of well known construction comprising insulator bushings 1 supporting fixed contacts within explosion chambers 2 and a yoke 3 carrying the movable contact rods 4. Contact operating rod 5 extends through the top of the enclosing casing (not shown) and connects with the straight line motion mechanism 6. This mechanism operatively connects as through lever 7 and rod 8 with the member 9 which for convenience will be termed the operated member. This member comprises the two parallel plates 10 joined at their upper ends to the block 11 into which the rod 8 is threaded. Slidably mounted between the plates 10 is the member 12 comprising the two plates 13 connected at their lower ends by the bridge 14. For convenience, member 12 will be termed the operating member. Members 9 and 12 are shown connected together by the pins 16 and 17, the plates of member 9 having elongated pin openings 18 and 19 whereby the two members have a limited longitudinal movement relative to each other. The operated member 9 may be actuated by either power or manual means or by both. In the drawing we have shown both power and manual actuating means, the former comprising a solenoid mechanism 22 and the latter a simple hand lever 23. For actuation by this lever the lower end of member 12 carries the roller 24 which is adapted to be engaged by the roller 26 on the end of the lever 23. The solenoid actuating mechanism is of common construction and therefore will not be described in detail. The solenoid is housed within the casing 28 and when energized operates to turn lever 29 clockwise. This lever is connected by link 30 to lever 31 which lever accordingly will be rotated counterclockwise. Toggles 32 and 33 serve to retain the mechanism in the closed circuit position illustrated by Fig. 1 until tripped to allow the switch to open as is well known. Lever 31 is pivoted to pin 34 between plates 13.

Secured to a fixed portion of the solenoid mechanism is the ratchet 35 whose teeth are adapted to be engaged by the pawl 36 pivotally supported jointly by the pin 37 carried by member 12 and by the pin 38 carried by member 9. By being mounted in this manner pawl 36 is moved into engagement with the ratchet by relative movement of members 9 and 12 in one direction and moved out of engagement therewith by relative movement of the members in the opposite direction. In the position of the parts shown in Fig. 2 where the switch is held closed by the toggles 32 and 33 the pawl is held away from the ratchet. Upon tripping open the switch, the members 9 and 12 descend to the position shown in Fig. 3 and during their downward
movement they should move relatively to cause the pawl to engage the ratchet. This relative movement may be caused by the addition of a suitable weight on the adjacent end of lever 31 or what is preferable a suitable spring may be provided to operate the pawl. In the drawing we have shown the compression spring 40 between lugs 41 and 42 secured respectively to members 9 and 12 whereby as soon as the toggles are released, the pawl is swung so as to engage the ratchet. A reverse movement of the contacts at the end of the opening stroke is thereby effectively prevented. In a subsequent reclosing of the switch by the solenoid or by the manual lever, pins 16 and 17 are first shifted against the force of the spring to the upper ends of the slots 18 and 19, rocking the pawl out of engagement with the ratchet. Continued movement of the lever 31 thereupon effects the closing of the switch.

What we claim as new and desire to secure by Letters Patent of the United States, is:

1. In an electric switch having movable contacts arranged when the switch is tripped to take a predetermined open circuit position, operating mechanism for said contacts constructed to prevent a return movement thereof after reaching said predetermined position comprising an operating member, an operated member connected therewith, a latch connected to both of said members for preventing movement of said operated member in a direction to close the switch, means cooperating with said operating member for retaining said latch in operative position, and means actuated by a switch closing movement of the operating member for rendering said retaining means inoperative.

2. In an electric switch having movable contacts arranged when the switch is tripped to take a predetermined open circuit position, operating mechanism for said contacts constructed to prevent a return movement thereof after reaching said predetermined position comprising an operating member, an operated member connected therewith, a latch connected to both of said members adapted in one position to restrain movement of the operated member in a switch closing direction, means cooperating with said operating member tending to maintain said latch in its restraining position, and means responsive to the switch closing movement of said operating member for moving said latch to an inoperative position.

3. In an electric switch having movable contacts arranged when the switch is tripped to take a predetermined open circuit position, operating mechanism for said contacts constructed to prevent a return movement thereof after reaching said predetermined position comprising an operating member, an operated member having a lost motion connection therewith, a latch pivoted to one of said members and adapted in one position to restrain movement of the operated member in a switch closing direction, yielding means cooperating with said operating member tending to maintain said latch in its restraining position, and means responsive to the switch closing movement of said operating member for moving said latch to an inoperative position against said yielding means.

4. In an electric switch having movable contacts arranged when the switch is tripped to take a predetermined open circuit position, operating mechanism for said contacts constructed to prevent a return movement thereof after reaching said predetermined position comprising an operating member, an operated member having a lost motion connection therewith and having an operating connection with the movable contact of said switch, a fixed ratchet, a cooperating pawl pivotally connected respectively to said operating and operated members and arranged when engaging the ratchet to prevent movement of said operated member and switch contact toward closed circuit position, and a spring for causing the pawl to engage the ratchet, said pawl being withdrawn from the ratchet when the operating member is actuated to close the switch.

In witness whereof, we have hereunto set our hands this 19th day of January, 1928.

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