May 23, 1950 M. O. SOUZA 2,508,692

SWITCH

Filed Feb. 24, 1945

Fig. 1.

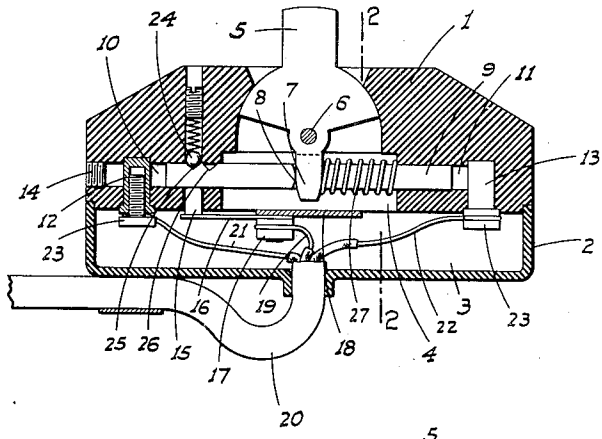


Fig. 2.

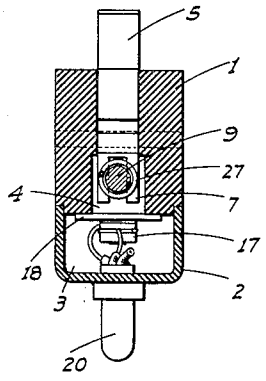


Fig. 4.

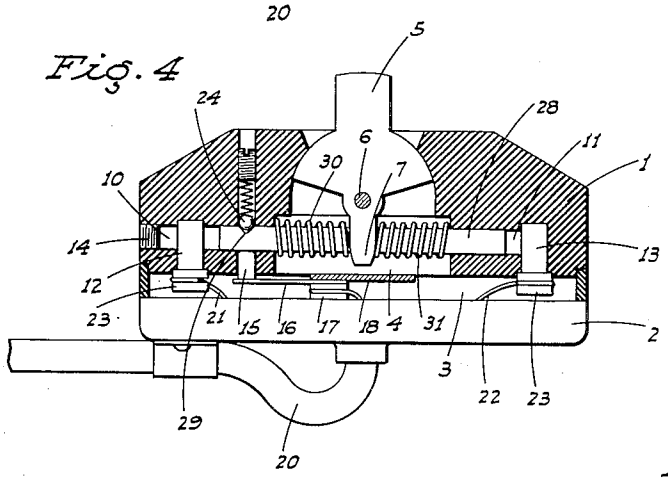


Fig. 3.

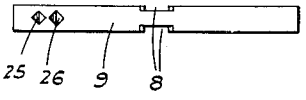
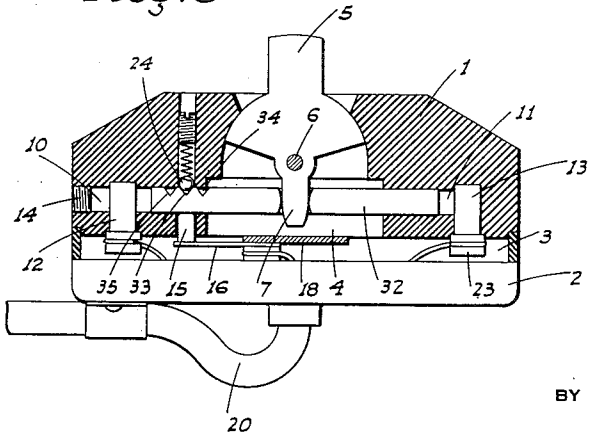


Fig. 5.



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SWITCH

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3 Claims. (Cl. 200—16)

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This invention relates to, and it is an object to provide, an improved electric switch of manually actuated type; such switch being especially designed for industrial or commercial use, and particularly in connection with reversible electric motors of the type which require a three-wire control circuit.

Another object of this invention is to provide an electric motor reversing switch which includes a novel contact assembly arranged to be actuated by a finger lever, to establish a circuit between a common lead wire and either of the remaining pair of lead wires, selectively, of a three-wire circuit.

A further object of the invention is to provide an electric motor reversing switch which includes a finger lever movable from a central or "off" position to selective "on" positions on either side of said central position, whereby to reversibly actuate the motor; the switch being constructed so that by the simple substitution of one for another removable part of the contact assembly, the switch can be made to automatically "hold" in one or both "on" positions, or to automatically return to the central or "off" position when hand released from one or both of said "on" positions. The switch is thus readily adaptable to different uses.

A further object of the invention is to produce a simple and inexpensive device, and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Figure 1 is a longitudinal sectional elevation of the improved switch.

Figure 2 is a transverse section on line 2—2 of Fig. 1.

Figure 3 is a plan view of the contact plunger, detached.

Figure 4 is a longitudinal sectional elevation, embodying a modified type of contact plunger.

Figure 5 is a longitudinal sectional elevation embodying a still further modified type of contact plunger.

Referring now more particularly to the characters of reference on the drawings, and at present to Figs. 1–3 inclusive, my improved switch comprises a body 1 of dielectric material; said body including, at the back thereof, a removable

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cap 2 forming a chamber 3 between the body 1 and the back wall of said cap.

Intermediate its ends and centrally of its sides the body 1 is formed with a slot 4 which extends through said body from front to back. A finger lever 5 is pivoted in the slot 4 on a removable cross pin 6, the outer end of said lever projecting beyond the front of the body 1 for finger engagement.

At its inner end and rearwardly of the cross pin 6 the lever 5 is formed with a fork 7 which engages in opposed notches 8 cut in opposite sides of a longitudinally extending, elongated contact plunger 9 slidably seated at opposite ends in opposed alined bores 10 and 11 formed in the body 1 on opposite sides of the slot 4. It will be seen that with swinging movement of the finger lever 5 in one direction or the other, the fork 7 will cause a corresponding but opposite movement of the elongated contact plunger 9.

A pair of cylindrical contacts, indicated at 12 and 13 respectively, project into the body 1 from the chamber 3 and intersect the bores 10 and 11 respectively at points adjacent the ends thereof; the contact plunger 9 being of such length that when the finger lever 5 is in a central position, i. e. at right angles to said plunger, the ends of the latter are disposed adjacent but short of the contacts 12 and 13. The contact 12 is removable, whereby to permit of removal of the contact plunger 9 from the body through an end opening in the bore 10 which is normally closed by a screw plug 14. With swinging movement of the finger lever 5 in one direction the plunger 9 will engage the contact 12, while movement of the finger lever in the other direction will cause such plunger to engage the contact 13.

A contact pin 15 slidably engages through the body from the back to the bore 10 and there constantly rides against the adjacent portion of the plunger 9. At its outer or rear end the contact pin 15 extends somewhat beyond the back of the body 1 and is fixed in connection with a leaf spring 16 which extends in the chamber 3 to connection with a terminal 17 mounted on a cross plate 18 intersecting the slot 4 at the back of said body. The terminal 17 is connected with the common lead wire 19 of a three-wire cable 20 incorporated in the control circuit for a reversible electric motor (not shown). The other two wires of the cable 20 are indicated at 21 and 22, and said other wires are connected to the cylindrical contacts 12 and 13, respectively, by means of screws 23 threaded into said contacts from within the chamber 3.

When the finger lever 5 is swung in a direction to engage the plunger 9 with the contact 12, the circuit is closed through wires 19 and 21, while movement of the finger lever in the opposite direction to engage the plunger with contact 13 closes the circuit between wires 19 and 22.

When the finger lever 5 is in center position the switch is "off" relative to the bore contacts 12 and 13, and the plunger 9 is then held in a corresponding position clear of said contacts by a spring-pressed detent 24 disposed in a bore in the body opposite the contact pin 15, such detent engaging in a socket 25 in the plunger.

In the embodiment of Fig. 1 the switch is arranged so that when the circuit is closed through wires 19 and 21 by swinging the finger lever 5 in a direction to engage the plunger with contact 12, the switch is automatically maintained in such closed position by reason of the provision of a further socket 26 in the plunger, and into which socket 26 the spring-pressed detent 24 then engages. To return the switch to its neutral or "off" position it is necessary to manully actuate the finger lever 5.

However, when the switch is closed in the opposite direction, i. e. with plunger 9 engaging contact 13, it is automatically returned to "off" position when the lever 5 is released. This is accomplished by the provision of a compression spring 27 surrounding the plunger 9 between the fork 7 and the body 1 in the direction of said contact 13.

Thus, with the switch arranged as in Fig. 1, it will automatically remain closed for the circuit comprising wires 19 and 21, but will automatically open when the lever is released for the circuit comprising wires 19 and 22.

In the embodiment shown in Fig. 4 the general assembly of the switch remains the same, but here the switch is provided with a plunger 28 which includes solely a single socket 29, for the reception of the spring-pressed detent 24 when the switch is in "off" position. In this embodiment compression springs 30 and 31 surround the plunger 28 on opposite sides of the fork 7, whereby the switch automatically returns to "off" position from either "on" position when manually released.

In the embodiment of Fig. 5, the general assembly of the switch still remains the same, but here the plunger 32 includes three detent receiving sockets in longitudinally spaced relation adapted to receive the detent 24, said sockets being indicated at 33, 34, and 35. When the detent seats in notch 33 the switch is in "off" position, as is obvious, while the sockets 34 and 35 serve to releasably lock the switch in "on" position relative to the contacts 12 and 13, respectively. In this embodiment no return springs are used, and the switch will remain in either "on" position until manually returned to "off" position.

The embodiments of Figs. 1, 4, and 5 are adapted, as is obvious, to various switching requirements, depending on the nature of the use to which the controlled motor is to be put.

As is evident, the switch may be readily converted from one type to the other, merely by the substitution of different plungers, and in certain instances the addition or renewal of one or more of the compression springs. The remainder of the assembly remains unchanged.

From the foregoing description it will be readily seen that there has been produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful and upon which Letters Patent is desired:

1. A switch comprising a dielectric body provided with a slot cut into the face thereof, the body being also provided with a pair of alined bores extending respectively to opposite sides of the slot, a pair of fixed electric contact members, each such contact member projecting into one of the bores adjacent the outer end thereof, a third electric contact member mounted in the body and projecting into one of said bores between the slot and the other contact member in said one bore, a plunger of conductive material throughout such plunger projecting through said slot and into both bores and slidable therein, such plunger being in constant slidable contact with the third contact member and normally out of engagement with both of the pair of contact members; and means movable in the slot and connected with the plunger and operable to selectively move the plunger into engagement with one or the other of said pair of contact members.

2. A switch as in claim 1 in which the plunger is provided with a notch in its surface, and an element slidably mounted in the body and yieldably engageable with the plunger when the latter is in a predetermined position in the bores.

3. A switch as in claim 1 in which the plunger operating means is a finger lever pivoted in the slot, the inner end of the lever being in operative engagement with the plunger, and a spring interposed between such lower end of the lever and the opposite side of the slot.

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