March 21, 1933. G. H. WHITTINGHAM 1,902,743

PUSH BUTTON SWITCH

Filed Aug. 4, 1930

FIG. 1.

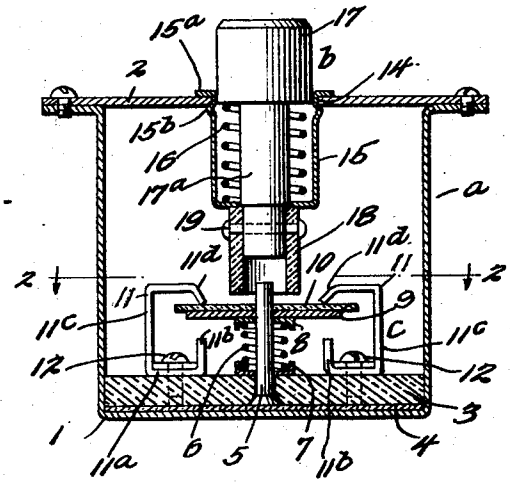


FIG. 2.

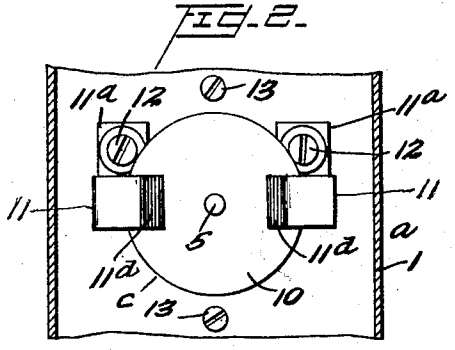
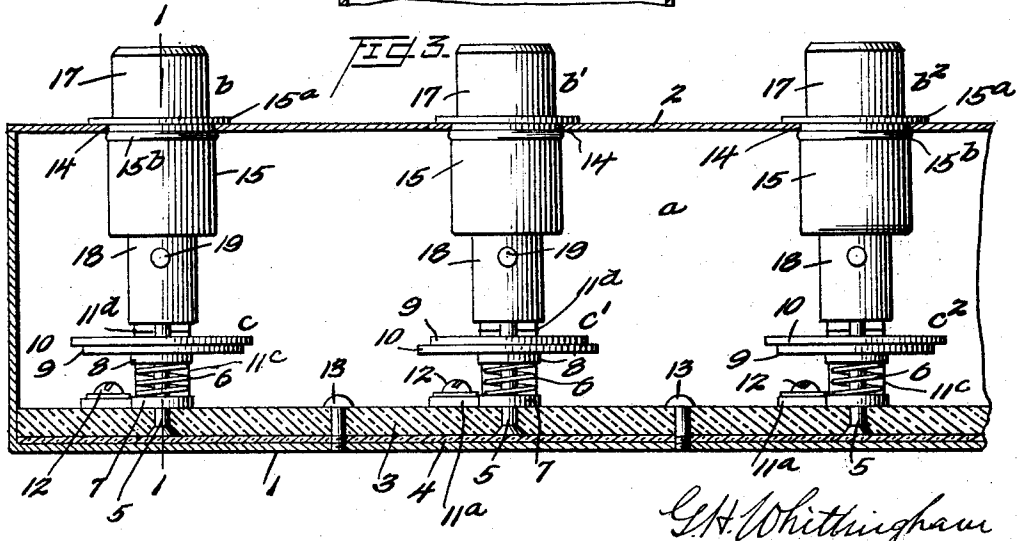


FIG. 3.



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UNITED STATES PATENT OFFICE

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PUSH BUTTON SWITCH

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This invention relates to push button switches adapted for controlling the contactors of electric motors, but suitable also for other purposes. One object of the invention is to provide a push button switch of few parts which can be easily assembled and which is readily convertible from a normally closed switch to a normally open switch, and vice versa. Another object of the invention is to provide a push button switch in which the contact mechanism is arranged as a unit in a suitable casing, while the push button is arranged as a unit on the cover for the casing, so that by removing the cover the push button will be out of the way when it is desired to have access to the contact mechanism, or the wiring within the casing.

The details of the invention will be clear from the accompanying drawing, in which:

Fig. 1 is a transverse section through a switch casing and switch, taken on the line 1—1 of Fig. 3;

Fig. 2 is a horizontal section on the line 2—2 of Fig. 1; and,

Fig. 3 is a central longitudinal section through the casing showing a plurality of switches.

Referring to the drawing, a indicates a switch casing shown in the form of a sheet metal channel 1, having a removable top or cover plate 2. The several push buttons b, b', and b^2 are shown mounted in the cover plate, and the switches c, c' and c^2 which these push buttons operate are mounted on a base 3 of insulating material in the bottom of the casing. A thin sheet of insulating material 4 is laid on the bottom of the casing to prevent the metal parts connected with the switches from coming into contact with the bottom wall.

The switches are alike, and a description of one will suffice for all. The switch c comprises a metal guide pin 5 which extends loosely through an opening in the longitudinal center of the base 3 and is provided with a head which rests upon the thin sheet of insulating material 4. Surrounding this guide pin is a coiled spring 6, the ends of which rest in cups 7 and 8, which have central perforations and which are strung on the guide pin. A metal contact disk 9, having a central perforation, is slidable on the rod and rests on the upper cup 8, and a disk 10 of insulating material, of larger diameter than the disk 9, has a central perforation through which the guide pin extends, and this disk 10 rests on the contact disk 9.

At opposite sides of the guide pin are two stationary contact members 11, both alike, and each comprising a flat foot piece 11^a, which is secured to the base 3 by a binding screw 12, a contact part 11^b, which projects upwardly at one side of the foot piece, and an arm 11^c which projects upwardly at the opposite side of the foot piece, thence extends horizontally and terminates in a downwardly inclined contact part 11^d, over the part 11^b. These contact parts are spaced apart and the marginal portions of the disks 9 and 10 extend between the contact surfaces of both contact members.

In the switch c, the spring presses the disks 9 and 10 upwardly so that the insulating disk 10 rests against the upper contacts 11^d and the switch is normally open. To close the switch, the disks are pressed downwardly until the metal disk 10 engages the contacts 11^b.

If it is desired to have a normally closed switch, the positions of the disks 9 and 10 are reversed. Thus, in the switch c', the metal disk 9 is uppermost and it is normally pressed against the upper contacts and the switch is normally closed. Downward pressure on the disks of this switch will open it, and continued downward movement will cause the insulating disk 10 to engage the lower contacts 11^b which will arrest the movement.

In order to change a switch from a normally open switch to a normally closed switch, or vice versa, it is merely necessary to loosen the screws 13, which secure the base 3 to the casing, and raise the base a short distance. The guide pins 5 fit loosely in the openings in the base and will not lift with the base, or, if they do lift, they may be pushed down far enough to permit of the removal of the disks 9 and 10. The disks are then re-

versed and replaced on the guide pin and the base is then secured to the casing by the screws 13. In the drawing, the switches c and c^2 are shown as normally open switches and the switch c' as a normally closed switch.

The push buttons for operating the switches are separate units, mounted in the cover plate. In mounting the push buttons, a circular opening 14 is made in the cover so that it will be central over the switch c, for instance, and a sheet metal thimble 15, having an end flange 15^a, is inserted in the opening, the flange resting upon the outer side of the cover plate. The thimble is then firmly secured to the cover plate by embossing a rib 15^b in the peripheral wall of the thimble immediately under the plate. The thimble forms a housing for the spring 16. The push button 17 comprises a knob having a stem 17^a which extends axially through the spring and through an opening in the bottom of the thimble, and a sleeve 18, of insulating material, is secured to the lower end of the stem by a rivet 19. The sleeve forms a stop which abuts against the lower end of the thimble and limits the upward movement of the push button, and the sleeve terminates a short distance above the disks on the switch.

It will be evident that depression of the push button b will force the insulating and metal disks downward, and when the metal disk bridges the contacts 11^b, the switch will be closed. When the push button is released, the spring will force the disks upwardly until the insulating disk engages the upper contacts 11^a. Depression of the push button b' will cause the metal disk 9 of the switch c' to leave the upper contacts, thereby opening the switch, and a further downward movement of the push button will cause the insulating disk 10 to abut against the lower contacts and limit the movement of the push button.

What I claim is:

1. A push-button switch comprising a base of insulating material, a push-button spring-pressed away from the base, a guide-pin projecting from the base toward the push-button, stationary contact members arranged on the base at opposite sides of the pin, each member having two spaced contact surfaces, an insulating disk and a metal disk slidable on the pin and both projecting between the spaced contact surfaces of both members, and a spring interposed between said disks and the base and normally pressing said disks toward the push-button.

2. A switch casing having a detachable cover, a base of insulating material arranged within the casing, a switch mounted on said base and comprising a guide pin projecting toward the cover, stationary contact members at opposite sides of the pin, each member having two spaced contact surfaces, an insulating disk and a metal disk slidable on the pin and both projecting between said spaced surfaces, a spring interposed between said disks and the base, and means for moving said disks against the action of the spring comprising a push button arranged in the cover opposite said pin and adapted, when depressed, to bear against said disks.

3. A switch casing having a detachable cover, a base of insulating material removably secured within the casing, a switch mounted on said base and comprising a guide pin projecting toward the cover, stationary contact members at opposite sides of the pin, each member having two spaced contact surfaces, an insulating disk and a metal disk slidable on the pin and both projecting between said spaced surfaces and a spring interposed between said disks and the base, and means for moving said disks comprising a thimble, concentric with the pin, extending through an opening in the cover into the casing and secured to the cover, a push button movable in said thimble and having a shank extending through the bottom of the thimble, a sleeve of insulating material on the inner end of said shank adapted to bear against said disks, and a spring in said thimble normally pressing said push button away from the disks.

In testimony whereof I affix my signature.

GEORGE H. WHITTINGHAM.