July 10, 1928. 1,676,971

A. B. WEAVER

PULL BUTTON CONTROLLING SWITCH

Filed June 1, 1923

Fig. 1.

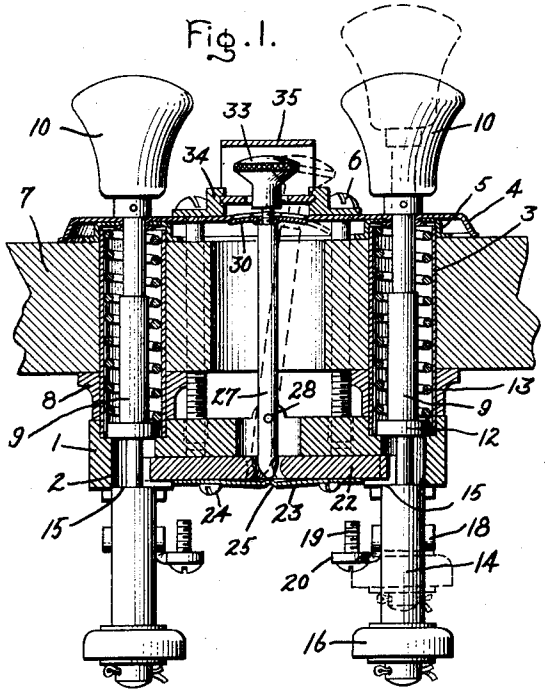


Fig. 2.

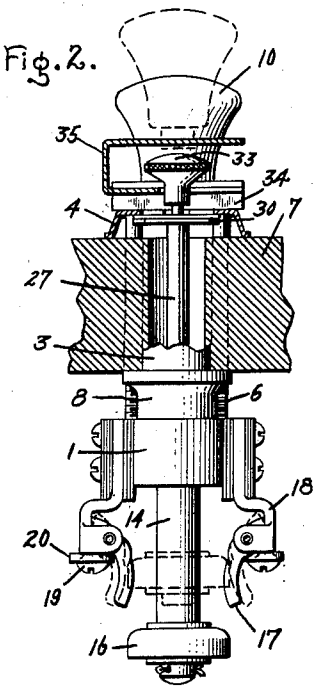


Fig. 3.

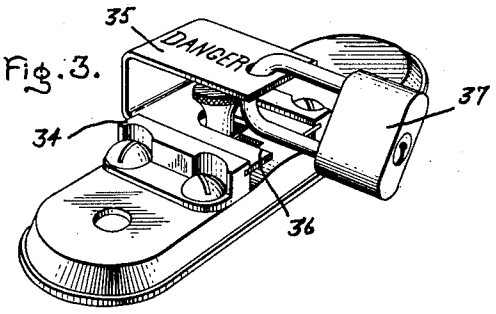


Fig. 4.

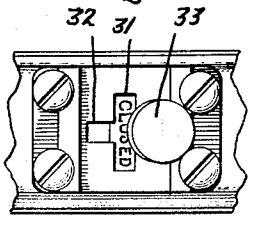
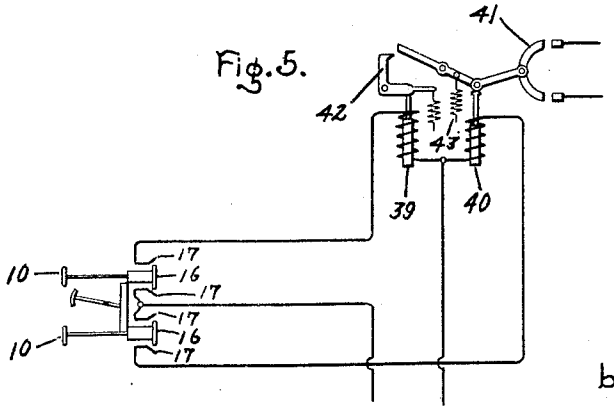


Fig. 5.



Inventor:
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His Attorney.

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UNITED STATES PATENT OFFICE.

ARTHUR B. WEAVER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

PULL-BUTTON-CONTROLLING SWITCH.

Application filed June 1, 1923. Serial No. 642,830.

My invention relates to pull button electric switches of the type disclosed in Patent No. 1,096,913 to Charles H. Hill which is assigned to the same assignee as is the present application. This type of switch comprises a pair of spring biased parallel pull rods each carrying a movable switch element and each having a pull button or other handle whereby they may be individually operated as desired to close and open electric circuits.

It is often desirable in such a switch to be able to lock either or both pull rods against movement to a closed circuit position and as a safeguard to a workman engaged on a circuit of dangerously high potential controlled by the switch, it is further desirable that the workman himself may be able to apply an additional lock to the switch before beginning work on the circuit controlled thereby.

An object of my invention therefore is to provide an interlocking means operative either to lock selectively the one or the other of the two pull rods of a switch of the above mentioned type against movement to closed circuit position or to lock simultaneously both pull rods against such movement. Another object is to provide a lock for the aforesaid interlocking means whereby both pull rods may be locked against movement to a closed circuit position.

My invention will be better understood by reference to the accompanying specification and drawing and its scope will be pointed out in the appended claims.

Figure 1 is a longitudinal sectional view of a switch involving my invention; Fig. 2 is a transverse sectional view of the same; Fig. 3 is a perspective view of the top plate and parts carried thereby including the locking device; Fig. 4 is a fragmentary top view of the plate and parts shown in Fig. 3 with the locking device removed, and Fig. 5 is a circuit diagram showing how the switch may be used.

Referring now to the drawing, the switch comprises a frame 1 having a pair of openings 2 and in alinement with which are two tubes 3 whose lower ends are secured to the frame 1 and whose upper ends are secured to a top plate 4 by means of rings 5. By means of screws 6 the frame 1 and plate 4 may be clamped to a panel 7, suitable spacing rings 8 being interposed between the frame and the underside of the panel. Slidably mounted in the tubes 3 and plate 4 are rods 9 having pull buttons or handles 10 at their upper ends and having enlarged intermediate portions 12 against which bear coil springs 13 to normally hold the switch in open circuit position. At the lower end of each rod is an enlarged portion 14 forming a shoulder 15 and carrying at its lower end the movable contact member 16. Each member 16 when raised engages on opposite sides a pair of contact members 17 pivotally mounted on brackets 18 carried by and insulated from the frame 1. Connections to an external circuit may be made to the brackets 18 by means of screws 19 threaded in ears 20.

Mounted in a channel formed on the underside of the frame 1 between the openings 2 is a slide 22 which is retained in the aforesaid channel by a plate 23, secured to the frame by screws 24. This plate is preferably formed of resilient material and at its midpoint is provided with a bent-up portion or hump 25 for a purpose to be hereinafter described. The slide 22 is of such a length that when it is slid to the right it will overlap the shoulder 15 of the right hand rod 9 and thereby prevent a sufficient outward movement of that rod to effect closing of the switch operated thereby, but the left hand rod 9 will be left free for outward movement. Likewise when the slide is moved to the extreme left, the left hand switch rod is prevented from being shifted but the right hand rod is left free. In its mid-position the slide will engage the shoulders 15 of both rods 9 in which case neither switch can be closed. For the purpose of shifting the slide 22 to any one of its three positions, I have provided a lever 27 fulcrumed at 28 to the frame 1 and having its lower end rounded and engaging in a central opening in the slide 22. The hump 25 engaging the lower rounded end of the lever 27 serves to resiliently hold the lever and the slide moved thereby to the one or to the other of its extreme positions. The upper end of the lever 27 is shown provided with an indicator plate 30 which may bear the legends "Closed" and "Open" and which may be seen through a transverse slot 31 formed in the top plate. An intersecting longitudinal slot 32 permits the necessary rocking movement of the lever. For actuating the lever a thumb screw 33

having a straight shank is provided. Two transversely arranged guides 34, which are secured to the plate 4 by means of the clamping screws 6, receive in suitable grooves formed therein one leg portion of a U-shaped locking member 35. The sliding leg of this member is provided with slot 36 of a width sufficient to receive the shank of the thumb screw 33 but insufficient to permit it to have any appreciable rocking movement. The slot 36 being centrally arranged in the locking member 35, the lever 27 must necessarily be in its mid-position when the locking member is applied and after being applied it effectively retains the slide 22 in its mid-position whereby both switches are locked against a closing movement. If desired the locking member may bear a legend such, for example, as "Danger" to give warning to an attendant that the switch should not be operated or if additional protection is desired a padlock 37 may be applied with its hasp passing through a hole in the opposite leg of the member 35 so as to interfere with the thumb screw 33 should one attempt to remove the member 35 without first removing the padlock.

Although the above described switch is particularly adapted to control a solenoid operated switch as shown diagrammatically by Fig. 5 it will be obvious to those skilled in the art that it is by no means confined to such use but may be put to a variety of uses. According to Fig. 5, I have shown the switch involving my invention as connected to close the circuit of either of the two solenoids 39 and 40 of the solenoid controlled switch 41. When the upper pull button 10 is pulled closing the corresponding switch, solenoid 39 is energized and the trip 42 is actuated to permit spring 43 to open the switch 41. When the lower pull button 10 is pulled closing the corresponding switch, solenoid 40 is energized and the switch 41 is closed and latched.

While I have described only one embodiment of my invention, I do not wish to be limited to the particular form shown and described as it will be apparent that many modifications therein may be made without departing from the scope of my invention as set forth in the appended claims.

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

1. An electric switch comprising a plurality of movable circuit controlling members each biased to the open circuit position and having means by which they may be moved to closed circuit position, a locking element for said circuit controlling members mounted for movement transversely thereof, said locking element in one position preventing movement of one of said members to closed circuit position, in another position preventing movement of another of said members to closed circuit position and in an intermediate position preventing movement of both of said members to closed circuit position, a lever having a pivotal motion in the plane of movement of said locking element for operating the same and having two extreme positions and an intermediate position corresponding to the positions of said locking element, restraining means for said lever including a restraining member and guiding means therefor whereby the restraining member is adapted to be applied when the lever is in its intermediate position, said restraining member having portions which engage opposite sides of the lever to prevent pivotal movement thereof from its intermediate position, said restraining member being arranged to be locked against movement in said guiding means when in its restraining position.

2. An electric switch comprising a plurality of movable circuit controlling members each biased to the open circuit position and having means by which they may be moved to closed circuit position, a locking element for said circuit controlling members mounted for movement transversely thereof, said locking element in one position preventing movement of one of said members to closed circuit position, in another position preventing movement of another of said members to closed circuit position and in an intermediate position preventing movement of both of said members to closed circuit position, a lever for operating said locking element having two extreme positions and an intermediate position corresponding to the positions of said locking element, and a restraining member for said lever adapted to be applied when the lever is in its intermediate position, said restraining member having a slotted portion for receiving the end of the lever to prevent movement thereof and a portion for covering the end of the lever.

In witness whereof, I have hereunto set my hand this 29 day of May, 1923.

ARTHUR B. WEAVER.