July 11, 1933. H. M. WARD 1,918,199

ELECTRICAL SWITCH

Filed Dec. 17, 1931

FIG. 1

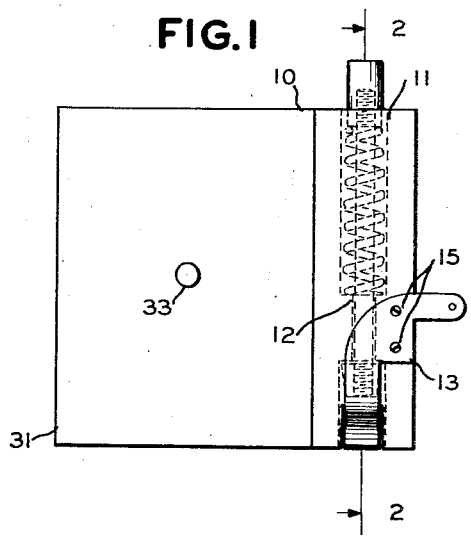


FIG. 2

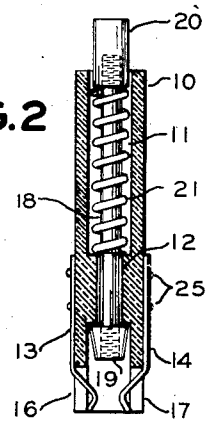


FIG. 4

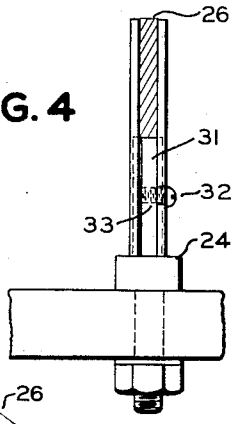


FIG. 3

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UNITED STATES PATENT OFFICE

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ELECTRIC SWITCH

Application filed December 17, 1931. Serial No. 581,731.

This invention relates to arrangements for electrical switches, more particularly to means for mounting auxiliary switches in switch apparatus so that an auxiliary circuit will be closed at the time of closing the main switch.

Auxiliary switches have been employed heretofore in various connections such as for setting up a signal circuit to indicate when certain switches on a switchboard are closed. Auxiliary switches are employed in connection with various types of switch arrangements, among them being the ordinary knife blade switch. My improved auxiliary switch is especially adaptable to be mounted in connection with knife blade switches.

Heretofore when auxiliary switches have been used or employed with knife switches the auxiliary switch is arranged to be operated by a pin, a bar, or some other protruding element added to the knife switch structure which acts to close the auxiliary switch when the knife switch is moved into closed position. The auxiliary switch is mounted on the switchboard beside the main switch in such position as to be operated by the protruding element. According to my invention I have provided an auxiliary switch which does not require additional space on the switchboard for mounting and which does not require an additional actuating element on the knife switch apparatus.

It is an object of my invention therefore, to provide an auxiliary circuit switch which is actuated at the time of operation of the main switch and which does not require extra space on the switchboard for mounting or the addition of actuating elements to the main switch mechanism.

Another object of my invention is to provide an auxiliary switch arrangement which may be mounted on a switch mechanism without the addition of auxiliary supporting means for the same.

A further object is to provide an auxiliary switch which may be mounted within the switchboard area occupied by a main switch such as the knife type of switch without adding any conducting material to the air gap separating the conductors of the main switch, thereby avoiding any tendency to weaken the air gap.

These and other objects are affected by my invention as will be apparent from the following description and claims taken in connection with the accompanying drawing forming a part of this application in which

Figs. 1 and 2 are views in elevation of one form of the auxiliary switch mechanism;

Fig. 3 is a perspective view of the auxiliary switch applied to the knife switch mounting; and

Fig. 4 is a front elevation of the switch post carrying the auxiliary switch.

Referring now to the drawing, this invention is shown as embodied in a knife switch and an auxiliary switch mechanism supported on the knife switch independent of the switchboard. It is to be understood, however, that both the main switch and the auxiliary switch may be embodied in other forms.

Referring to Figs. 1 and 2 the auxiliary switch comprises a block 10 of insulating material having an opening 11 and a constriction 12 spaced from the ends of the opening. At the lower part of the opening is a pair of spaced contact members 13 and 14 which are secured to the block by screws 15. The lower ends of the contact members extend toward each other through transverse recesses 16 and 17 connecting with the central opening 11. Extending through the constriction 12 is a stem 18 having a collar 19 threaded on the lower end and a cap 20 threaded on the upper end. Between the cap 20 and the shoulders of the constriction 12 is a compression spring 21 arranged to hold the stem up so that the collar 19 is against the lower shoulders of the constriction, and so that the cap 20 extends above the upper edges of the block member 10. The collar member 19 is of conducting material and is tapered toward its lower end and arranged to be pressed down between the inwardly extending ends of the contact members 13 and 14 and close the circuit by bridging across the contacts. The cap member 20 is of a non-conducting material so that it may be operated by any portion of

the main switch mechanism in the path of which it may be mounted. When the cap 20 is engaged and carried downward the collar 19 is brought into bridging position as just described. When the cap is released the spring 21 having been compressed pushes the stem upward withdrawing the collar member 19 and breaking the contact.

Referring to Fig. 3, the main switch is of the type known as knife switches and illustrates the auxiliary switch mounted thereon. In order to add an auxiliary switch to this type of switch mechanism without placing conducting material in the air gap separating the conductors of the switch, I have provided for mounting the switch block 10 directly underneath one of the blades of the switch. It will be apparent that the auxiliary switch could be mounted at some distance outside the area separating the conducting elements of the main switch without adding conducting material to the air gaps, but this would require additional switchboard area for the combination. I have found that if the auxiliary switch mechanism is placed in line with the switch conductors, that the characteristics of the main switch are not in any way altered and the extra switchboard space is not required.

The main switch comprises one or more hinge posts 23 and corresponding contact or jaw posts 24 mounted on a switch panel 25 of suitable non-conducting material.

The switch posts are slotted substantially throughout the portion extending above the switchboard. Ordinarily this slotted portion is two or more times the width of the bridging element. The prongs of the slotted portion are slightly closed together so as to provide a gripping effect on the bridging element. The bridging element or elements comprise bars 26 designated as knife blade elements pivotally mounted at one end, near the outer end of the slot provided in the hinge posts. The other ends of the knife blades are secured to an actuating bar 27 provided with a handle 28. When thus secured the knife blades can be swung around the pivot points by the handle and the switch may be closed by swinging the blades over and bringing them down between the prongs or jaws of the posts 24.

As just described, ordinarily the slots between the jaws of the switch posts are relatively deeper than the width of the knife blade. This leaves an open space in the slot beneath the blade which is not entered by the knife blade when the switch is closed as illustrated in Fig. 4. It is in the lower portion of this slot that I prefer to arrange for the auxiliary switch 10 to be mounted. The auxiliary switch block is provided with a tongue member 31 arranged to fit between the jaws of one of the posts 24. The tongue 31 is preferably fitted loosely between the jaws so as to not interfere with the gripping action of the jaws upon the knife blade as the main switch is closed. I have found that the auxiliary switch may be securely held in place without any interference by having the tongue 31 of such width as to just fill up the space not occupied by the knife blade when in closed position between the post jaws and by holding the tongue in place by means of a machine screw 32 through one of the jaw members and into a tapped hole 33 in the tongue 31. When the screw is tightened in place the tongue 31 will be held securely against the inside of one of the jaws, as clearly shown in Fig. 4, while the other jaw is entirely free and the spring action of the jaw is not interfered with. Other methods of securing the tongue in place may be employed.

It is to be understood, however, that the auxiliary switch may be mounted by piercing the switchboard directly underneath one of the plates of the switch or secured in any other suitable manner substantially within the area occupied by the conductors of one of the switch circuits.

From the foregoing description the operation of the combination will be apparent. When the knife switch is in open position the compression spring of the auxiliary switch holds the collar 19 in open circuit position. The cap 20 being positioned in line with the slot in the post 24 will be engaged and carried downwardly by the blade of the knife switch entering that post as the main switch is closed and brought into normally closed position. This will cause the auxiliary switch to be closed in the manner described. When the knife switch is opened by raising the knife blades the auxiliary switch is simultaneously opened by the compression spring 21.

From the foregoing description it will be seen that I have provided an auxiliary switch which may be employed to set up a signal circuit or for other desirable purposes and which may be attached to a switch mechanism without the addition of any auxiliary parts for obtaining a mounting or support for the switch or any parts for actuating the switch as the main switch mechanism is operated. It will further be observed that the switch mechanism as described and illustrated in the drawing may be utilized to indicate when the main switch is fully closed, due to the fact that the cap 21 may be of such length that it does not close the auxiliary switch until the main switch is moved into normally closed position, or in other words, with the knife blade carried to the proper depth in the slot between the jaws of the post 24.

It will be readily apparent that this arrangement may also provide for closing an auxiliary signal circuit when the main

switch is open or to indicate any other position of the circuits of the main switch by suitably locating and modifying the arrangement of the parts.

Although I have shown and described my invention as being applied to the knife blade type of switch, it will be apparent to those skilled in the art that it may be applied equally well to other types of switch mechanisms.

While I have shown this invention in but one form it will be apparent to those skilled in the art that it is not so limited but is subject to various changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limits shall be placed thereon as are imposed by the prior art or as are specifically set forth in the appended claims.

I claim:

1. The combination in a switch mechanism of an insulating base, a primary switch embodying a pair of posts mounted upon said base, a connector bar for completing an electrical circuit between said posts, with an element of insulating material secured to one of said posts, and a secondary switch mounted upon said element of insulating material, said secondary switch embodying an actuating member disposed in position to be engaged by the connector bar to actuate said secondary switch when the connector bar is in circuit closing position.

2. In combination, a primary switch embodying a pivotally mounted connector bar and a switch post slotted to form spaced contact jaws for receiving the free end of the bar when in circuit closing position, the slot in said post having a depth in excess of the penetration of the bar, and an auxiliary circuit closing switch provided with an insulating housing having a projecting tongue disposed in the excess portion of said slot and secured to the contact post, said auxiliary switch comprising oppositely disposed transversely yieldable contact members, a wedge-shaped bridge member, an actuating member disposed in the path of the connector bar and carrying the bridge member for closing the auxiliary switch with a switching action between the contacts when the connector bar is moved into normal engagement with the jaws of the switch post.

3. The combination in a switch mechanism of a primary switch, an insulating panel upon which said primary switch is mounted, said switch embodying a pivotally mounted connector bar and a switch post with which the connector bar is brought into engagement when the switch is in circuit closing position, a block of insulating material secured to said switch post and arranged to carry members for providing a secondary switch biased toward an open position, said secondary switch including oppositely disposed transversely yieldable contact members, a wedge-shaped bridging conductor having secured thereto an actuating member of non-conducting material and arranged to be engaged by the connector bar for closing the secondary switch when the primary switch is moved to normal circuit closing position.

4. In combination, a knife primary switch having a knife element movable from an open to a closed position, an insulating base for mounting said primary switch, a split prong switch post for receiving said knife when the switch is closed, an auxiliary switch, a casing of insulating material for said auxiliary switch, said casing having a protruding tongue secured between the prongs of said switch post and supported independently of said base, an operating member for said auxiliary switch protruding from said casing and disposed to be engaged by said movable element of the primary switch whenever said element is moved to a closed position.

5. In combination, a knife primary switch having a knife element movable from an open to a closed position, an insulating base for mounting said primary switch, a switch post for receiving said knife when the switch is closed, an auxiliary switch comprising an integral switch assembly mounted on said switch post by insulating means and supported independently of said base, an operating member for said auxiliary switch extending from said assembly and disposed to be engaged by said movable element of the primary switch whenever said element is moved into a closed position.

In testimony whereof, I affix my signature.

HARLEY M. WARD.