Oct. 4, 1932. W. L. BUTLER ET AL 1,880,775

ELECTRICAL SWITCH

Filed Aug. 17, 1929

Fig. 1.

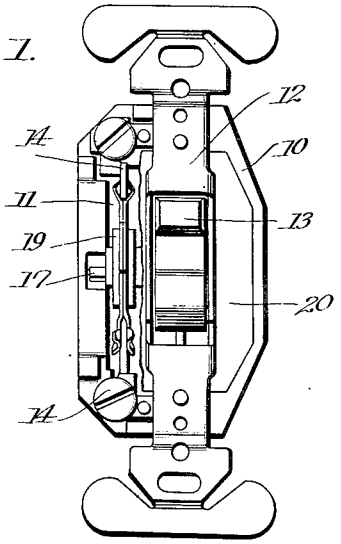


Fig. 2.

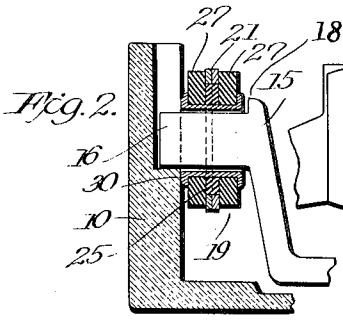


Fig. 3.

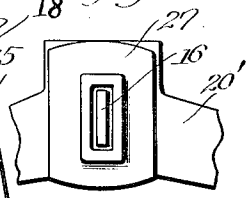


Fig. 4.

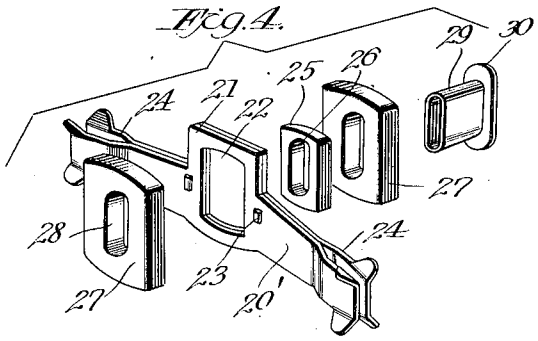


Fig. 5.

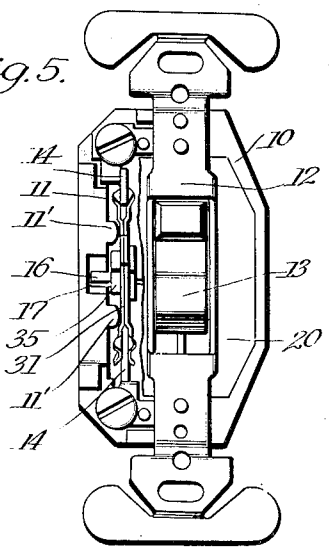


Fig. 6.

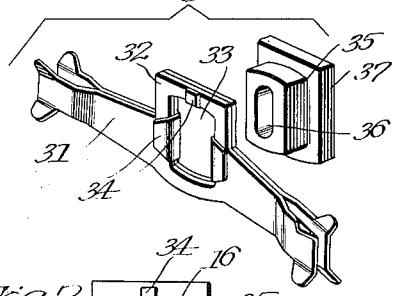


Fig. 7.

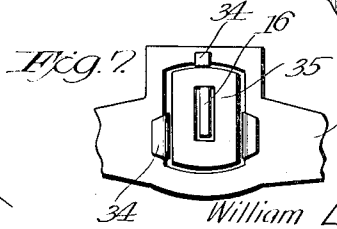
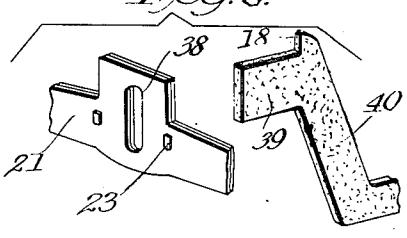


Fig. 8.



Inventors

William L. Butler.

William H. Fabrey.

By Cushman, Darby & Darby

Attorney

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UNITED STATES PATENT OFFICE

WILLIAM L. BUTLER AND WILLIAM H. FABREY, OF SCHENECTADY, NEW YORK, ASSIGNORS TO WEBER ELECTRIC COMPANY, OF SCHENECTADY, NEW YORK, A CORPORATION OF NEW YORK

ELECTRICAL SWITCH

Application filed August 17, 1929. Serial No. 386,669.

The invention relates to new and useful improvements in electric switches.

An important object of the invention is to provide a special mounting for a switch arm, whereby it will be insulated from the actuating mechanism, and will have a floating connection therewith, allowing for lateral movements of the arm with respect to the mechanism for properly insuring proper electrical contact with stationary contacts.

Another object of the invention is to provide means for limiting the lateral play or movements of the switch arm and for maintaining it in spaced relation to a wall of a casing in which it is mounted.

Another object of the invention is to provide simple and inexpensive means for uniting the two blades constituting the switch arm.

A still further object of the invention is to construct one of the members of the switch arm mechanism of insulating material in order to insulate the arm for the mechanism.

Other objects and advantages of the invention will become apparent during the course of the following description.

In the accompanying drawing forming a part of the description, and wherein like numerals are employed to designate like parts throughout the several views.

Figure 1 is a top plan of the switch involving one form of the invention.

Figure 2 is a fragmentary transverse section through a portion thereof.

Figure 3 is an elevation showing the switch arm mounted upon an element of the switch actuator illustrating the play between the same.

Figure 4 is a perspective exploded view of the parts of the switch arm assembly.

Figure 5 is a plan of a switch involving a modified form of switch arm mounting.

Figure 6 is a perspective exploded view of the switch arm assembly of this modification.

Figure 7 is a plan of the modified switch arm assembly illustrating its loose connection on the part of the actuating mechanism, and

Figure 8 is a perspective view of a third modification of mounting the switch arm.

This invention relates to electrical switches, and more particularly, those of the double snap type disclosed in the co-pending application of Butler et al. Serial No. 231,059, filed November 4, 1917. The present invention has for its object to provide an improved mounting for the switch arm, and improved means for uniting the two blades constituting the switch arm.

Referring now more particularly to the drawing, 10 designates a casing of insulating or dielectric material having a cavity 11 therein for the reception of a snap switch mechanism, not shown, as it forms no part of the present invention other than hereinafter set forth. This switch mechanism is retained within a cavity by means of a bridge plate 12 having a slot in which operates an actuator button 13 in the well known manner.

Secured to the casing 10 are a pair of stationary contacts 14, having suitable binding posts associated therewith, as is usual, and these stationary contacts are disposed adjacent a side wall of the cavity 11, as shown.

The switch mechanism includes a U-shaped oscillatory member 15 having lateral extensions 16, by which it is fulcrumed in V-shaped recesses 17 in opposed walls of the casing 10. Shoulders 18 are provided on the U-shaped member at the inner ends of the extensions 16, as clearly shown in Figures 2 and 8, for a purpose which will be hereinafter described. In the form of invention disclosed in Figures 1 to 7 inclusive, this U-shaped member is stamped from sheet metal. A switch arm assembly indicated in its entirety by the numeral 19 is loosely mounted upon the extension 16 of the U-shaped arm adjacent the stationary contacts, and the entire switch mechanism is usually concealed within the housing by means of a sheet of insulation 20 held over the open end of the cavity 11 beneath the bridge plate 12.

As is well understood in this type of snap switch, the ends of the switch arm are snapped into engagement with the stationary contacts 14 upon movement of the actuator button 13 in one direction, and are snapped out of engagement with the stationary contacts upon

movement of the button in the opposite direction.

This invention primarily concerns the switch arm assembly 19 shown most effectively in Figure 4 where the parts are shown separated. The switch arm is composed of a pair of separately formed juxtaposed resilient blades 20′ having enlarged central portions 21 provided with registering openings 22 of a size greatly in excess of the cross sectional area of the extension 16 of the U-shaped member. These two blades are secured together by means of struck-out projections 23 of one blade extending through openings in the other blade and upset or bent over on opposite sides of the openings 22. The outer ends 24 of the two juxtaposed blades are flared outwardly, and slightly spaced to receive the stationary contacts 14 when the switch arm is snapped into engagement therewith by the actuating mechanism heretofore described. In other respects, the switch arm is of the same construction as that disclosed in the above mentioned co-pending application.

Adapted to be received within the central opening 22 of the switch arm is an insulating block 25 having an elongated central opening 26, which is considerably larger than the cross sectional area of the extension 16. The thickness of this block is substantially the same as the combined thicknesses of the two blades constituting the switch arm. This block may obviously be formed as an integral extension of either washer 27, as shown in the modification in Figure 6.

Arranged upon opposite faces of the switch arm are a pair of insulating washers 27, each of which is provided with an elongated central opening 28 of a size corresponding to the opening in the insulating block 25 and adapted to register therewith. These insulating washers and block are secured to the switch arm by means of a tubular rivet 29 which extends through the central apertures of all three pieces of insulation, as well as through the enlarged opening 22 of the switch arm, and opposite ends 30 of the rivet are upset against the outer faces of the washers 27 to securely clamp the parts together. It is to be particularly noted that the opening through the tubular rivet is substantially larger than the cross sectional area of the extension 16 of the oscillatory U-shaped member 15 and is adapted to be mounted thereon with an extremely loose fit, as best seen in Figure 3, so as to be floated on the lateral extension and permit it to have lateral play thereon and loose connection therewith. Due to the fact that the rivet is retained wholly disengaged from any parts of the switch blades, it will be appreciated that the switch arm is entirely insulated from the U-shaped member 15.

The upset ends 30 of the tubular rivet are adapted to abut the shoulders 18 of the U-shaped member and the interior surface of the wall of the casing on opposite sides of the V-shaped recesses 17 so as to limit the lateral movement of the switch arm; it being observed in Figure 2 that the switch arm assembly is permitted slight movement longitudinally of the extension 16, whereby the ends of the switch arm may properly engage the stationary contacts, and at the same time be held out of engagement with the side walls of the cavity in the casing.

In the modification shown in Figures 5 to 7 inclusive, a modified switch arm assembly is disclosed, but it, like the preceding form, is loosely mounted upon the extension 16 of the oscillatory U-shaped member 15 to have lateral play or oscillation thereon. The two blades 31 of this modification are provided with enlarged central portions 32, each of which is provided with an enlarged openings 33, which are adapted for registration. Three margins of the opening in one of these blades are provided, each with a lug or projection 34, all of which are extended through the opening in the coacting blade 31 and bent over the edges thereof to firmly clamp the two blades of the switch arm together.

In order to loosely mount this switch arm upon the extension 16 and insulate it therefrom, a block of insulation 35 is provided with an elongated central opening 36 of a size larger than the cross sectional area of the extension 16, to be loosely mounted thereon. This block 35 is considerably smaller than the registering openings 33 in the switch blades, and is adapted to extend therethrough so that the switch blades themselves have floating connection or are loosely mounted upon this block of insulation. If desired, the block 35 may be provided with an outwardly extending flange 37 adapted for engagement with the shoulders 18 of the oscillatory U-shaped member 15. The wall of the cavity 11 adjacent the switch arm is provided on each side of the V-shaped notch 17 with a vertical rib 11′ for engagement with the switch arm at opposite sides of its center to limit the lateral movements or oscillations of the switch arm.

The form of invention disclosed in Figure 8 dispenses with the necessity of equipping the switch blade assembly with means for insulating the same from the U-shaped oscillatory member 15 of the preceding forms. The switch arm of this modification is of the same construction as the switch arm of the form of invention disclosed in Figures 1 to 4 inclusive, so far as concerns the means for clamping the two blades of the arm together. However, the central opening 38 in the switch arm is not as large as the central openings in the preceding forms, but is elongated and larger than the

cross sectional area of a lateral extension 39 of an oscillatory U-shaped member 40 corresponding to the oscillatory elements 15 of the preceding forms, so as to be loosely mounted thereon and capable of lateral movements or oscillations. The U-shaped oscillatory member 40 is constructed of insulating material instead of sheet metal to obviate the necessity of providing the switch arm assembly with insulating means.

It is to be understood that various changes in the size, shape and arrangement of the various parts may be resorted to without departing from the scope of the appended claims.

We claim:—

1. In a snap switch construction, an oscillatory member, a switch arm loosely mounted thereon and insulated therefrom, said switch arm having an opening larger than the cross section of said oscillatory member, an insulating block mounted in said opening, insulating members on opposite sides of said switch arm, and a tubular rivet extending through said insulating block and members and having a loose fit upon said oscillatory member for loosely mounting the switch arm and clamping the insulation thereto.

2. In a snap switch construction, a casing having a cavity, a snap switch mechanism including an oscillatory member mounted therein, a pair of stationary contacts, a switch arm mounted on said oscillatory member and insulated therefrom, insulating members on opposite sides of said arm, a tubular rivet for securing the insulating members to said arm and having a loose fit upon said oscillatory member for loosely mounting said arm, and one end of the rivet being engageable with a wall of said cavity to limit lateral play of the arm upon the oscillatory member.

3. In a snap switch construction, a casing having a cavity therein, a snap switch mechanism including a U-shaped oscillatory member having extensions mounted in the walls of said cavity, a switch blade loosely mounted upon one of said extensions and having an opening larger than the same, an insulating block in said opening and having an opening which receives said extension, a pair of insulating members on opposite sides of said blade and having registering openings to receive said extension, a tubular rivet extending through the openings of all of said members for clamping them together and having a loose fit upon said extension for loosely mounting said blade, and one end of said rivet being engageable with a wall of said cavity to limit lateral play of the blade upon said extension.

4. In a snap switch construction, an oscillatory member, a switch arm mounted thereon and insulated therefrom, said switch arm having an opening larger than the cross section of said oscillatory member, an insulating block mounted in said opening, insulating members on opposite sides of said switch arm, and a tubular rivet extending through said insulating block and members for mounting the switch arm on said oscillatory member and for clamping the insulating members upon said switch arm.

5. In a snap switch construction, an oscillatory member, a switch arm mounted thereon and insulated therefrom, said switch arm having an opening larger than the cross section of said oscillatory member, insulating members on opposite sides of said switch arm, and a tubular rivet extending through said insulating members and the enlarged opening in said switch arm for mounting said switch arm on the oscillatory member and for clamping the insulating members upon said blade.

In testimony whereof we have hereunto set our hands.

WILLIAM L. BUTLER.
WILLIAM H. FABREY.