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ELECTRIC SWITCH

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This invention relates generally to electrical switches of the rotary type, primarily adapted for use in conjunction with automotive electrical apparatus.

One important object of the invention is to provide means whereby the switch may be easily and quickly connected with respect to a support such as the instrument panel of an automobile.

Another object is to provide a switch and improved means whereby the contact carrier forming a part thereof may be easily and quickly assembled to the switch casing.

A further object is to provide a contact carrier in which the contact means carried thereby are arranged with respect to each other in a particular manner.

A still further object is to provide a switch consisting of very few parts which may be economically manufactured and assembled on a production basis.

Other objects and advantages of the invention will become apparent after considering the description hereinafter set forth in conjunction with the drawing annexed hereto.

Referring to the drawing:

Figure 1 is a front view of an electric switch;

Figure 2 is a vertical section taken through the switch illustrated in Figure 1, for the purpose of showing certain details of construction;

Figure 3 is a sectional view taken substantially on line 3—3 of Figure 2, showing the switch in an open circuit position;

Figure 4 is a section taken substantially on line 4—4 of Figure 2; and

Figure 5 is a view on a reduced scale showing other details of construction.

The electric switch illustrated in the drawing includes, among other things, a switch casing generally designated 1, means generally designated 2 for attaching the switch with respect to a support, a contact carrier generally designated 3 secured to the switch casing, operating means generally designated 4, and bridge means generally designated 5 carried by the operating means 4 adapted for movement with respect to the contacts carried by the contact carrier 3 whereby to control an electric circuit.

As mentioned above, one important object of the invention is to provide improved means whereby the switch may be easily and quickly connected with respect to a support, such as the instrument panel of an automotive vehicle, and this will first be described. The switch casing 1 is preferably made in the form of a generally rectangular or oblong box, and includes a

front wall portion 6, side walls 7, and end walls 8 and 9. The front wall is provided with a circular aperture 10 which receives the operating means 4. The contact carrier 3 is secured to and closes off the open side of the switch casing, as clearly shown in Figure 2. The means 2 integrally formed with the casing for securing the switch to a support includes, a continuing portion 11 of the top or end wall 9, and extends rearwardly with reference to the front wall 6 in a plane parallel to the axis of the switch casing, a curved or radial portion 12, and a portion 13 which is arranged in spaced apart parallel relation with respect to the wall portion 9 and continuations 11 thereof. Otherwise expressed, the switch casing is provided with a continuation extending rearwardly, upwardly, and thence forwardly whereby to provide a bifurcation or opening adapted to receive the lower rear marginal edge of an instrument panel.

The free extremity of the portion 13 is preferably provided with a tubular internally threaded portion 14 which receives a small bolt 15 for clamping the panel between the inner extremity of the bolt and the portions 9 and 11. In order to reenforce the portions constituting the attaching means and prevent same from bending when the bolt 15 is being tightened upon the panel, their marginal edges are preferably turned as indicated at 16. If found desirable those portions adjacent the entrance may be rounded to the bifurcation as indicated at 17 and 18 whereby to assist in piloting the attaching means and panel with respect to each other. This arrangement provides what might be termed a C-clamp integrally connected to the casing. In other words, the attaching means 2 is integrally connected to the switch casing for the purpose of reducing manufacturing costs. Obviously, any one of the other walls of the casing could be extended to provide integral attaching means.

The contact carrier generally designated 3, and the manner in which same may be easily and quickly assembled with respect to the casing will now be described. The continuation or portion 11 adjacent the end or top wall 9 of the casing is preferably provided with a pair of inwardly extending notches 19 whereby to provide a reduced portion or neck 20, as clearly illustrated in Figure 5. One extremity of the carrier 3 is provided with a generally rectangular recess 21 which receives the reduced portion 20 of the continuation in a manner whereby the portions 22 of the carrier will be set within the notches

19, as shown in Figures 4 and 5 in order that this extremity of the carrier will be interlocked with the casing. The opposite extremity of the carrier 3 is preferably provided with a pair of oppositely disposed side notches 23 which receive integral fingers formed on the side wall 7 of the casing. The extremities of the fingers are preferably split and pressed apart to provide a pair of ears 24 whereby to lock the carrier 3 in place. Accordingly, to assemble the carrier 3 with respect to the switch casing, it is merely necessary to insert one extremity of the carrier with respect to the notches and reduced portion 20, and the notches 23 adjacent the other extremity of the carrier into registry with the fingers of the side walls 7, whereupon the fingers are spread apart to permanently lock the carrier in place.

The electrical connection means or contact means mounted on the carrier 3 will now be considered. Although the electrical connection means may be arranged in any desirable manner, the contact means herein illustrated are preferably secured to the carrier in a unique manner. A terminal post 25, adapted for connection to a battery, is secured to one extremity of the carrier 3 by means of a rivet 26. A fuse clip 27 is also preferably permanently secured to the terminal post 25, and to the carrier 3 by the rivet 26. A fuse clip 28 is secured adjacent the opposite extremity of the carrier 3 by means of a headed contact rivet 29. A fuse element is shown connected to the fuse clips 27 and 28. A terminal post 30, adapted for connection to fog lamps, is secured adjacent one side of the carrier by means of a headed contact rivet 32 and a terminal post 31 corresponding to the terminal post 30, adapted for connection to the tail lamps of the automobile, is disposed adjacent the other side of the carrier by means of a headed contact rivet 33. The post 25 and clip 28 are preferably located along the longitudinal axis of the carrier, and the posts 30 and 31 are disposed on opposite sides of the axis in a plane substantially at right angles thereto. The headed contact rivets 29, 32, and 33 are preferably equally spaced apart both radially and circumferentially, and are preferably provided with circular contact heads 34, as illustrated in Figure 2, which engage the inner face of the carrier 3.

In order to provide a smooth track or surface over which the bridge means generally designated 5 may travel with respect to the heads 34 of the rivets, a spacer member 35 of insulating material is preferably associated with the carrier 3, and provided with circular recesses receiving the heads of the rivets 26, 29, 32, and 33. It is to be noted that the rivet 26 which secures the terminal post 25 and clip 27 to the carrier 3 is located in a position whereby its head can not be engaged by the bridge means 5. The spacer 35 is of a thickness corresponding to the thickness of the rivet heads so that the contact surface of the heads will be positioned substantially flush with the inner flat surface of the spacer member. The spacer member is held in relation to the switch casing in the same manner as the carrier 3 is held in relation thereto.

The operating means generally designated 4, and bridge means 5 associated therewith will now be described. This operating means is preferably made in the form of an insulating member including, a knurled knob portion 36 which is rotatably received within the aperture 10 provided in the front wall 6 of the switch casing. The inner extremity of the operating means is preferably provided with an enlarged generally an-

nular portion 37 which is disposed within the confines of the casing, and is adapted to bear against the inner surface of the front wall 6 of the casing, as clearly shown in Figure 2. A pair of oppositely disposed notches or recesses 38 are preferably provided adjacent the periphery of the enlargement 37, and well 39 extends axially inwardly from the inner end of the knob.

The bridge means designated 5, clearly illustrated in Figures 2 and 3, is preferably made in the form of a generally oblong or rectangular metal plate. Each extremity of this plate is provided with a laterally or upwardly extending tongue 40, which tongues are slidably received in the notches 38 provided adjacent the inner extremity of the operating means 4. A helical spring 41 is disposed within the well or recess 39 of the means 4, and functions to urge the operating means outwardly, and at the same time presses the bridge means 5 rearwardly, or in a direction toward the various contacts mounted on the carrier 3. The contact plate is provided with a plurality of rounded contact portions 42, 43, and 44 which project outwardly from the plate in a direction opposite to that of the tongues 40. As clearly illustrated in Figure 3, the contact portion 42 is provided adjacent one corner of the plate and the contact portion 43 adjacent the other corner of the plate, said contact portions being arranged on one side of the longitudinal axis of the plate. The side of the plate opposite that side having the contact portions 42 and 43, is preferably provided with an integral generally triangular offset portion 44. The contact portion 43 is provided adjacent the free extremity of this offset portion. The contact portions 42, 43, and 44 are preferably equally spaced apart both radially and circumferentially to an extent corresponding to that of the contact rivets 29, 32, and 33.

Means are provided for limiting or predetermining the extent to which the operating means 4 may be rotated, and this is preferably accomplished by providing the enlargement 37 of the means 4, with a flat 45 and a flat 46 as clearly illustrated in Figure 1. When the flat 45 is in engagement with the inner surface of the side wall 7 as shown in Figure 1, the contact portions 42 through 44 of the bridge means 5 are in engagement with the spacer member 35 of insulating material; in other words the portions are out of engagement with the contact heads 34 of the rivet contacts 29, 32, and 33 as illustrated in Figure 3 to place the switch in open circuit position. However, when the operating means is rotated so that the flat 46 thereof engages the opposite side wall 7, the contact portions 42, 43, and 44 will engage the contact heads 34 of the contact rivets 33, 32, and 29, respectively, to place the switch in circuit closing position. In circuit closing position the current will pass from the battery terminal 25, through the fuse element connected to the fuse clips 27 and 28, to the rivet contacts 29, and through the contact plate or bridge means 5, the terminal posts 30 and 31, whereby to control fog lamps and tail lamps, or other electrical apparatus associated with an automotive vehicle, airplane or the like.

In view of the foregoing description, it will be apparent that improved means integral with the switch casing have been provided whereby the switch may be easily and quickly assembled or connected with respect to a support. It will also be evident that improved means have been provided whereby the contact carrier of a switch

may be easily and quickly assembled with respect thereto, including a unique arrangement of the electrical connection means associated with the contact carrier.

Having thus described my invention, it is obvious that various modifications may be made in the same without departing from the spirit of the invention; and, therefore, I do not wish to be understood as limiting myself to the exact forms, constructions, arrangements, and combination of parts herein shown and described.

I claim:

1. A switch casing including; a substantially vertical front wall, top, bottom, and side walls extending rearwardly from said front wall; a carrier carrying contacts secured to said casing in a plane parallel to said front wall; switch mechanism in said casing; an opening provided in said front wall receiving means for operating said mechanism; said top wall having an integral continuation including, a portion extending rearwardly substantially parallel to said bottom wall, an upwardly curved portion, and a portion extending forwardly in spaced apart parallel relation with respect to said top wall whereby to provide a bifurcation adapted to receive a support; and means carried by the forwardly extending portion for securing the switch to the support.

2. An electric switch including, a casing, a contact carrier carrying contacts carried by said casing, switch mechanism arranged in said casing, means for operating said mechanism, said casing being provided with bracket means whereby to secure the switch with respect to a support, said bracket means having a reduced portion, and said carrier having a notch receiving said reduced portion whereby to assist in securing said carrier with respect to said casing.

3. An electric switch including, a switch casing, a contact carrier carrying contacts carried by said casing, switching mechanism arranged in said casing, means for operating said mechanism, said casing being provided with means for securing the switch with respect to a support, said means being provided with an opening, and a portion of said carrier projecting into said opening whereby to assist in securing the carrier with respect to said casing.

4. An electric switch including, a switch casing, a relatively flat carrier of insulating material supporting contacts carried by said casing, switching mechanism arranged in said casing, means for operating said mechanism, said carrier having a marginal substantially rectangular recess, said casing having a projection substantially rectangular in cross-section projecting into said recess, the free extremity of said projection being deformed to increase the width of the projection in a manner whereby to distort the end walls of the recess in a manner whereby said carrier is held in relation to said switch casing.

5. An electric switch including, a switch casing, a carrier of insulating material supporting contacts carried by said casing, switch mechanism arranged in said casing, means for operating said mechanism, said carrier having an opening, said casing having a projection of a predetermined cross-section projecting into said opening, the free extremity of said projection being deformed to increase the size of the projection in a manner whereby to distort certain walls of the opening in a manner whereby said carrier is held in relation to said switch casing.

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