May 9, 1944. H. C. BOLLEY 2,348,519

ELECTRIC SWITCH

Filed Jan. 29, 1942

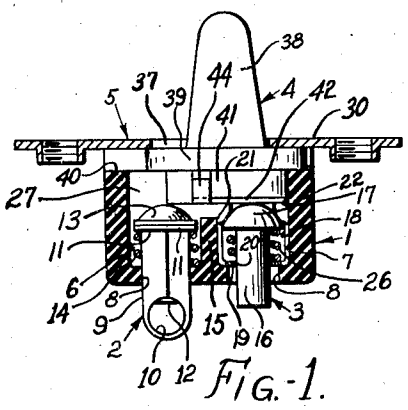


FIG.-1.

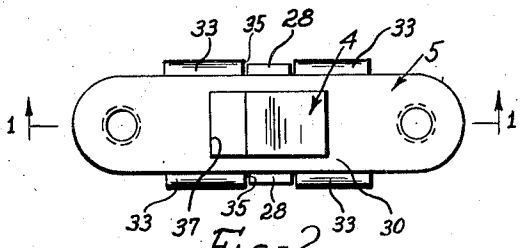


FIG.-2.

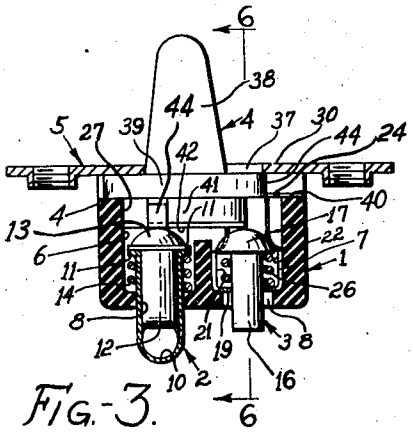


FIG.-3.

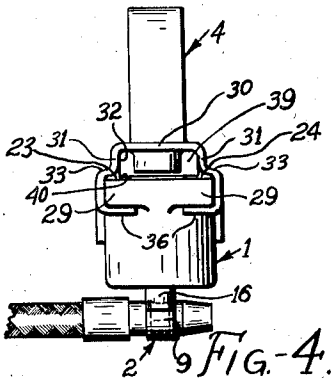


FIG.-4.

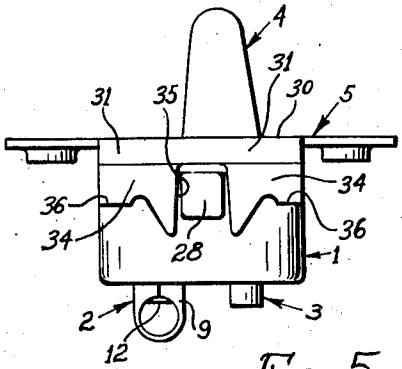


FIG.-5.

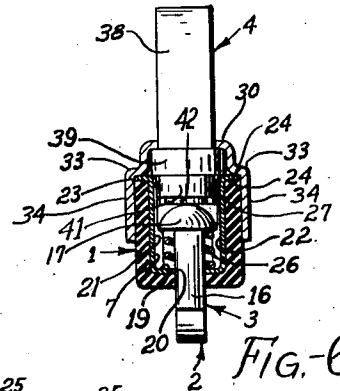


FIG.-6.

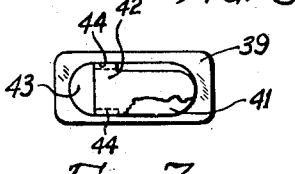


FIG.-7.

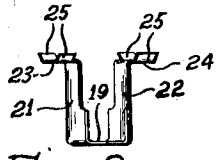


FIG.-8.

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ELECTRIC SWITCH

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Application January 29, 1942, Serial No. 428,723

13 Claims. (Cl. 200—164)

This invention relates generally to electric switches and more particularly to relatively small switches of the reciprocatory type, used in automobiles, other vehicles, and appliances.

One object of the invention is to construct a switch including, a housing of insulating material; spaced apart spring pressed contact means; actuating means carrying a bridge member which is engageable with the contact means, and a mounting member for the switch.

More specifically, the invention is directed to an electric switch of the character disclosed in the patent of William Schmid, No. 2,256,295, bearing date of September 16, 1941, including an improvement thereover, which preferably consists in electrically connecting one of the contact means to the mounting member.

Another object of the invention is to provide an improved circuit continuing member for electrically connecting one of the contact means and the mounting member together.

A further object of the invention is to provide a switch which consists of a very few parts and can be economically manufactured 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.

In the drawing:

Figure 1 is a vertical section of the switch taken substantially on line 1—1 of Figure 2, showing the switch in an "off" position;

Figure 2 is a top view of the switch;

Figure 3 is a vertical section more or less corresponding to the Figure 1, except that the switch is shown in an "on" position;

Figure 4 is an end view of the switch;

Figure 5 is a front view in elevation of the switch illustrated in Figure 4;

Figure 6 is a vertical section taken substantially on line 6—6 of Figure 3 illustrating certain details;

Figure 7 is a bottom view of the actuating member; and

Figure 8 is a perspective view of the circuit continuing member or insert which provides an electrical connection between one of the contact means and the mounting member or plate of the switch.

Referring to the drawing, numeral 1 generally designates the housing of the switch; 2 and 3 the spaced apart spring pressed contact means which are reciprocably mounted on the housing 1; 4 is the actuator carrying a bridge or contact plate for the contact means; and 5 is the metallic mounting member providing means whereby the switch may be mounted with respect to a suitable support such as a pillar, or the instrument panel of an automobile.

The switch housing is preferably oblong in shape and is constructed of some desirable molded insulating material. The upper extremity of the housing is generally rectangular in shape having a flat top surface, and the lower extremity is generally oblong or oval in shape. A pair of spaced apart generally parallel cylindrical wells or pockets 6 and 7 extend downwardly into the housing. The bottom wall of the housing is preferably provided with a pair of spaced apart rectangular apertures 8 which are more or less axially disposed with and communicate with the wells 6 and 7 just referred to. The housing is provided with a longitudinal guideway or chamber 27 preferably rectangular in shape within which the lower extremity of the actuator reciprocates. The housing is also provided with bosses 28 adjacent its side walls and integral corner projections 29, the purpose of which will be described later.

The contact means generally designated 2 is a subassembly including an outer part and an inner part. The outer part is comprised of two integrally connected channel portions which when fashioned into the desired shape form a tubular body 9. This outer tubular body part 9 is preferably provided with a terminal receiving aperture 10 adjacent its outer extremity; and an outwardly extending generally annular abutment adjacent its inner extremity, formed by an arcuate flange 11 adjacent the inner end of each of the channel portions, as clearly illustrated in Figures 1 and 3.

The inner part of the contact means 2 is arranged within the body part 9, and one end is provided with a rounded detent portion 12 which cooperates with the terminal receiving aperture 10; and the other end is provided with an enlarged conical contact portion 13, which is adapted to normally engage the abutment formed by the flanges 11 on the tubular part 9. The shank or stem portion of the inner part is preferably rectangular in cross-section and of a size so that same may easily slide within the tubular part 9 and the diameter of the contact portion 13 is substantially the same as the diameter of the generally annular flange formed by the flanges 11. The flanges 11 and the contact portion 13 are preferably of a size to be guided by the wall of the well 6 as clearly illustrated in Figures 1 and 3. The apertures 8 are preferably rectangu-

lar in shape and the contact means 2 is preferably rectangular in cross-section and projects through one of the apertures 8 and consequently, rotation of the contact means 2 with respect to the housing is prevented. A helical spring 14 is arranged in the well 6 and encircles the contact means 2 with one end engaging the flanges 11 and the other end the bottom wall of the well 6 whereby to normally urge the contact means inwardly toward the bridge carried by the actuator 4.

The contact means 2 is preferably of a character whereby to receive a plug conductor terminal of the snap type clearly shown in Figure 4. The terminal shown is in wide commercial use and is adapted to be received in the terminal receiving aperture 10 with the rounded detent portion 12 of the contact means cooperating with the cove or groove in the terminal in order to assist in resiliently holding the terminal to the contact means. When the terminal for example is inserted into the aperture 10 of the contact means the outer part 9 of the contact means is moved outwardly with respect to the inner part causing the flanges 11 on the outer part and the enlarged rounded contact portion 13 to separate.

The contact means generally designated 3 is adapted for movement within the well 7 of the housing and is insulated from the contact means 2 by means of a partition 15. The contact means 3 is preferably in the form of a rivet having a round shank portion 16 and a rounded contact portion 17. An insert or circuit continuing member 18 preferably cup-shape in form is seated within the well 7, and it is through the intermediation of this insert that the contact means 3 is electrically connected to the mounting plate generally designated 5. This insert or continuing member is preferably constructed from relatively thin resilient sheet metal stock. This insert 18 includes a bottom wall portion 19 which is adapted to engage the bottom wall of the well or recess 7 and is provided with an aperture 20 through which the stem 16 of the contact means 3 projects into the aperture 8 and exteriorly of the housing. The insert also includes a pair of upstanding spaced apart generally parallel arcuate wall or arm portions 21 and 22. The upper extremities of the wall portions are of less circumferential extent than the lower extremities in order to provide clearance for that part of the actutaor which is movable within the housing. The free ends 23 and 24 of the wall portions 21 and 22 are preferably bent outwardly substantially at right angles with respect to the wall portions and overlie the top flat surface of the switch housing 1 as clearly illustrated in Figure 6. The free ends or lateral portions 23 and 24 are more or less rectangular in shape and of a width preferably not greater than the thickness of the side wall portions of the switch housing. The extremities 25 of the lateral portions 23 and 24 are preferably bent upwardly as illustrated in Figure 8 so as to provide tongues or portions which will resiliently engage or bit into the mounting plate 5 whereby to provide a good electrical connection between the insert and the mounting plate when the plate is firmly secured to the housing.

The contact portion 17 of the contact means 3 is preferably of the same diameter as the contact portion 13 of the contact means 2, and slightly less than the inside diameter of the insert, so that same may more or less slidably engage the inner wall surfaces of the insert. A helical spring 26 of a diameter slightly less than the diameter of the spring 14 acting on the contact means 2 is seated within the insert and surrounds the stem 16 of the contact means 3. One end of the spring engages the bottom wall 19 of the insert and its other end engages the base of the rounded contact portion 17 in a manner whereby to urge the contact means 3 in a direction for engagement with the bridge means of the switch.

Referring now to the construction of the mounting member 5, the same includes an elongated substantially flat portion 30 having downturned relatively short side walls 31 whereby to provide a channel or longitudinal guideway or open ended channel 32 preferably substantially rectangular in cross-section. The mounting plate also has outwardly extending spaced apart shoulder portions 33 and portions 34 which depend therefrom, and together provide a second longitudinal channel, of a size somewhat larger than the first channel, adapted to receive the upper generally rectangular extremity of the housing 1 including a portion of the lower oval extremity. As clearly shown each of the portions 34 is provided with extensions so as to engage and reinforce the sides and ends of the housing. The portions 34 which are spaced apart provide bifurcations 35 which receive the bosses 28 provided on the sides of the housing, and the extensions or fingers 36 formed on the portions 34 are bent over to engage the corner projections 29 above referred to. The mounting plate 5 is thus firmly anchored to the housing. The flat portion 30 of the mounting plate is provided with a longitudinally extending centrally disposed rectangular slot 37 through which extends the elongated tapered handle 38 which forms a part of the actuating member 4. The end continuations of the plate are provided with threaded protuberances through which screws may be extended for securing the switch to a mounting.

The actuator 4 is preferably constructed of molded insulating material and formed with a generally rectangular enlargement 39 adjacent its lower extremity, which slides within the channel 32 of the mounting plate and along the top flat surface 40 of the housing. This actuator is also provided with a generally oval shaped integral section 41 which projects downwardly from the enlargement 39 for movement within the guideway 27 formed in the housing. This section is preferably somewhat smaller than the enlargement and is set back from its sides and ends. The lower surface of the section 41 is preferably recessed nearly its full length so as to receive a bridge means or contact plate 42. This contact plate 42 as clearly illustrated in Figures 1 and 7 is positioned flush with the unrecessed portion 43 and is provided with fingers 44 which straddle the section 41 and project into notches provided therefor in its sides, whereby to assist in holding the bridge attached to the actuator.

The operation of the switch is very simple. As shown in Figure 1 it is in an "off" or open circuit position. In this position the contact portion 13 of the contact means 2 is in engagement with the portion 43 of the insulator actuator and the contact portion 17 of the contact means 3 is in engagement with the bridge or contact plate 42. When the actuator 4 is moved to the left to a closed position, as illustrated in Figure 3, the contact portions 13 and 17 engage the contact plate 42, and since the insert or circuit continuing member 18 is both mechanically and electrically connected to the contact means 3 and the mount-

ing plate 5, it is apparent that the mounting plate is placed in circuit with the contact means. A switch of this character has been found very useful in those cases where it is advisable to ground the switch to the chassis of an automobile or some other mounting.

In addition to the foregoing, it will be evident that the springs associated with the contact means 2 and 3 also function to cause the enlargement 39 of the actuator 4 to normally bear against the bottom or base of the upper channel 32 provided on the mounting plate. It will also be apparent that since the upper channel 32 is open at each end that the ends are adapted to be alternately closed by the extremities of the enlargement 39.

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 combinations of parts herein shown and described.

I claim:

1. A switch including in combination: a housing provided with wells and apertures cooperating with said wells; a pair of contact means, each having a contact portion arranged within a well and projecting through an aperture; a spring encircling each of said contact means; said housing being further formed with a guideway with said contact portions extending therein, bosses adjacent its side walls and projections at its corners; an actuator provided with a handle at one extremity and an enlargement at the other extremity; said enlargement being provided with a longitudinal projection movable within said guideway; bridge means carried by said longitudinal projection adapted to cooperate with said contact portions; a mounting plate for said switch provided with a slot through which said handle extends and formed to provide a pair of channel portions; one of said channels slidably receiving said enlargement; the other channel portion receiving the upper extremity of the housing and provided with bifurcations receiving said bosses, and fingers which are clamped over said corner projections; and means electrically connecting one of said contact means with said mounting plate; said means including a part clamped between said housing and said plate.

2. A switch including in combination: a housing provided with wells and apertures cooperating with said wells; a pair of contact means, each having a contact portion arranged with a well and a portion extending through said aperture; a spring encircling each of said contact means; said housing being further formed with a guideway with said contact portions extending therein, bosses adjacent its side walls and projections at its corners; an actuator provided with a handle at one extremity and an enlargement at the other extremity; said enlargement being provided with a longitudinal projection movable within the guideway; bridge means carried by said longitudinal projection adapted to cooperate with said contact portions; a mounting plate for said switch provided with a slot through which said handle extends and formed to provide a pair of open ended channel portions; said enlargement being slidably arranged in one of said channel portions and adapted to alternately close its open ends when the actuator is reciprocated; the other channel portion receiving the upper extremity of said housing and provided with bifurcations receiving said bosses, and fingers which are clamped over said corner projections; and a metallic insert seated in one of said wells engaging one of said contact means and clamped between said housing and said mounting plate whereby to provide an electrical connection between the plate and said one contact means.

3. An electric switch including in combination: a housing constructed of insulating material, a pair of contact means carried by said housing, a mounting plate for the switch connected to said housing, bridge means mounted for movement with respect to the contact means, and means clamped between said housing and said mounting plate providing an electrical connection between one of said contact means and said mounting plate.

4. A circuit continuing member for use in conjunction with an electric switch or the like including, a base portion, said base being provided with a pair of upstanding spaced apart generally parallel arm portions, said arm portions being generally arcuate in cross-section and constructed in a manner whereby the lower extremities are of a greater circumferential extent than the upper extremities, each of said arm portions being provided adjacent its upper extremity with a pair of outwardly extending finger portions which serve as contacts when the member is associated with a switch or the like.

5. An electric switch including in combination: a switch housing having a detachable cover therefor, contact means carried by the housing, bridge means including means for moving the same with respect to said contact means, and means having a part secured between the housing and the cover providing an electrical connection between one of said contact means and said cover.

6. An electric switch including in combination: a switch housing having a detachable mounting member therefor, contact means carried by the housing, bridge means including means for moving the same with respect to said contact means, and means engaging one of said contact means and having a part arranged between said housing and said mounting member engaging said mounting member whereby to provide an electrical connection between said member and said one contact means, said part having a resilient finger pressing against said member.

7. An electric switch including in combination: a switch housing having a mounting member therefor, contact means carried by said housing, bridge means including means for moving the same with respect to said contact means, means clamped between said housing and said mounting member providing an electrical connection between one of said contact means and said mounting member, said bridge means when moved to one position being adapted to engage one of said contact means, and when moved to another position engages both of said contact means to provide a through circuit between said contact means and said mounting member.

8. An electric switch including, a housing constructed of insulating material, a guideway and a pair of openings arranged substantially transverse to and communicating with said guideway, a pair of contact means mounted in said openings, a mounting plate for the switch connected to said housing, bridge means movably mounted in said guideway for cooperation with said contact means, and means electrically connecting one of said contact means with said mounting plate having a portion disposed in said guide-

way and being so constructed and arranged that same will not interfere with the movement of said bridge means within said guideway.

9. An electric switch including, a housing constructed of insulating material, a guideway and a pair of wells arranged substantially transverse to and communicating with said guideway, a pair of contact means movably mounted in said wells, a mounting plate for the switch connected to said housing, bridge means movably mounted in said guideway for cooperation with said contact means, and generally U-shaped means disposed in one of said wells and slidably receiving one of said contact means and engaging the mounting plate for electrically connecting together the said contact means and plate.

10. An electric switch including, a housing constructed of insulating material, a guideway and a pair of wells arranged substantially transverse to and communicating with said guideway, a pair of contact means mounted in said wells, a mounting plate for the switch connected to said housing, bridge means movably mounted in said guideway for cooperation with said contact means, and grounding means extending into the guideway electrically connecting one of the contact means with the mounting plate, said grounding means being so constructed and arranged that the bridge means is adapted to pass at least through a part or portion thereof.

11. An electric switch including, a housing constructed of insulating material, a guideway and a pair of openings arranged substantially transverse to said guideway, a pair of contact means mounted in said openings, a mounting plate for the switch connected to said housing, bridge means movably mounted in said guideway for cooperation with said contact means, and means electrically connecting one of said contact means with said mounting plate comprising generally U-shaped means receiving one of said contact means and having spaced portions projecting into the guideway and a portion engaging the mounting plate whereby to electrically connect the latter with said one contact means, said spaced portions of said generally U-shaped means disposed in said guideway being so constructed that the said bridge means is adapted to move in the space therebetween.

12. An electric switch including, a housing constructed of insulating material, a guideway and a pair of wells arranged substantially transverse to and communicating with said guideway, a pair of contact means mounted in said wells, a mounting plate for the switch connected to said housing, bridge means movably mounted in said guideway for cooperation with said contact means, and generally U-shaped means disposed in one of said wells receiving one of said contact means and having a portion extending into said guideway and a portion caught between said housing and said mounting plate and being so constructed and arranged that that portion which extends into the guideway does not interfere with the movement of said bridge means.

13. An electric switch including, an enclosure providing a chamber within which bridge means is movably disposed, said enclosure being provided with a carrier of insulating material supporting a pair of contact means, means for operating the bridge means with respect to the contact means, and said enclosure also being provided with means for mounting the switch with respect to a support, and grounding means surrounding one of said contact means passing through said chamber and connected to said mounting means whereby to electrically support said one contact means with said mounting means.

HERSCHEL C. BOLLEY.