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ELECTRIC SWITCH OF THE PUSH-AND-PULL TYPE

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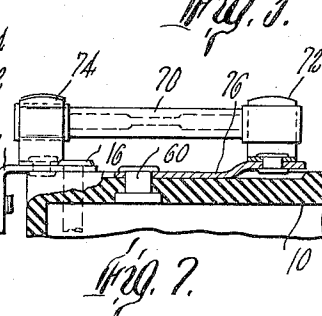
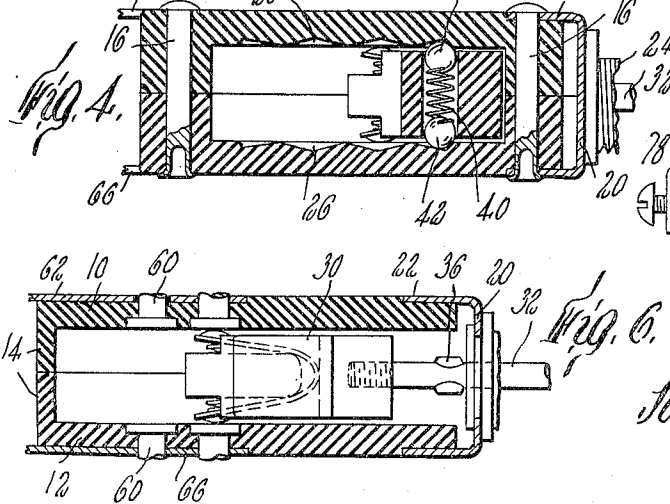
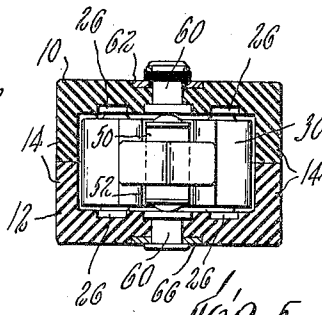
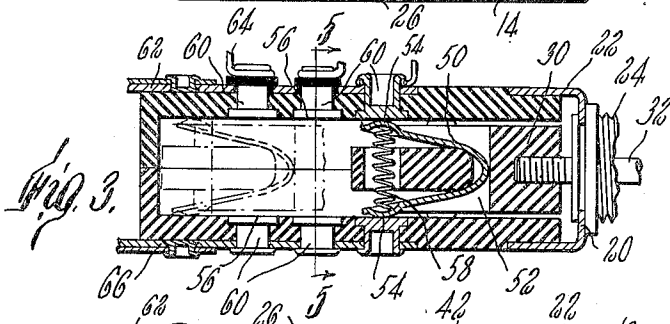
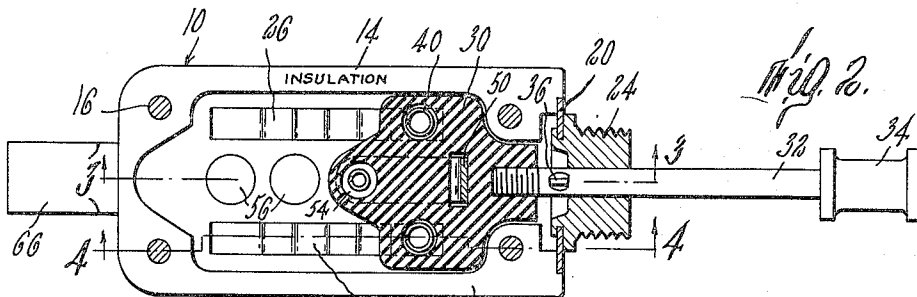
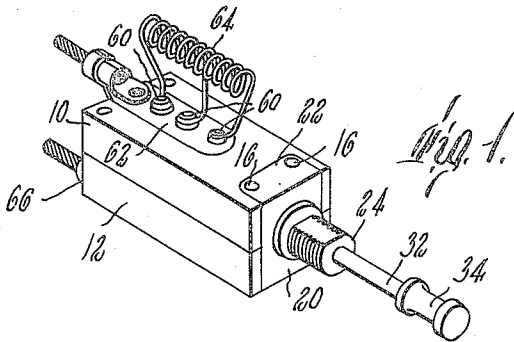


Fig. 7.
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UNITED STATES PATENT OFFICE

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ELECTRIC SWITCH OF THE PUSH-AND-PULL TYPE

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3 Claims. (Cl. 200—16)

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This invention relates to electric switches of the push and pull type having a plunger which is axially movable to operate the switch. It is an object of the invention to make such a switch with a housing or casing composed of two halves which are similar when molded, so that only a single shape need be molded. In making up a switch from two such halves, the conducting elements which are secured thereto can be varied to produce switches having various characteristics.

For a more complete understanding of the invention, reference may be had to the following description thereof, and to the drawing, of which—

Figure 1 is a perspective view of a switch embodying the invention;

Figure 2 is a sectional view of same on a longitudinal plane, shown on a larger scale;

Figure 3 is a section on line 3—3 of Figure 2;

Figure 4 is a section on line 4—4 of Figure 2;

Figure 5 is a section on line 5—5 of Figure 3;

Figure 6 is a sectional view of a modified switch structure; and

Figure 7 is a fragmentary, sectional view of a modified form of the invention.

The switch shown on the drawing comprises a housing composed of two halves or members 10 and 12 which are of insulating material, such as a moldable plastic, and are molded originally in identical forms. Each of these halves of the housing is generally rectangular in shape and is molded with an upstanding rim 14 which extends around three sides of the member and is thickened at the corners, forming fillets to accommodate at each corner a hole for a through fastening element, such as a rivet. Four such rivets 16 are indicated on the drawing. These rivets permanently secure together the two housing halves 10 and 12 and two of the rivets also secure in place a metal end plate 20 which extends across the opening left at the fourth side of the halves, this plate having flanges 22 through which two of the rivets 16 pass to secure the plate in its position as an end wall of the housing. The plate 20 has a central aperture in which is secured a hollow stem 24. The stem may be externally screw-threaded so as to facilitate the mounting of the switch on a supporting wall, such as the dashboard of a vehicle, through which the stem 24 may project to receive a nut (not shown). Each of the housing halves 10 and 12 is molded with two series of shallow depressions 26, as indicated in Figures 2 and 4. These series extend longitudinally and

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are parallel to each other. When the two halves 10 and 12 are secured together, the two series of one half of the housing are respectively opposite to the two series of the other half. As hereinafter described, the depressions 26 cooperate with detent elements to maintain the moving part of the switch yieldingly in any one of a number of positions of operation.

Within the housing is slidably mounted a slide 30 which consists of a molded block of insulation, having a rod 32 projecting therefrom through the hollow stem 24. A suitable finger piece 34 may be mounted on the outer end of the rod 32. In order to limit the outward movement of the rod, a stop element 36 may be formed thereon by pinching the metal of the rod so as to form a boss projecting radially outward. The location of this boss on the rod determines the length of stroke of the slide. The slide 30 carries therewith a pair of detent assemblies, each such assembly consisting of a compression spring 40 disposed in a transverse bore through the slide 30, and a pair of ball bearings 42 engaged by the ends of the spring so as to press them against the opposed inner surfaces of the housing halves 10 and 12.

The detent assemblies are so located that the balls 42 move into and out of the successive depressions 26 as the slide is moved within the housing. These assemblies thus tend to maintain the slide yieldingly in any one of a number of operating positions defined by the depressions 26 in each series. The slide 30 also carries a bridging conductor 50 which, as shown in Figure 3, is preferably of U-shape and extends through a transverse aperture 52 in the slide 30. The end portions of the conductor 50 are preferably bulged outward, as at 54, to provide contact elements to engage fixed contact elements 56 mounted flush with the inner surfaces of the housing halves 10 and 12. To ensure a firm contact between the fixed and movable elements, a helical spring 58 is compressed between the movable elements 54; this spring extends through a hole in the slide 30 and presses the elements 54 firmly against the inner surfaces of the housing halves 10 and 12 or the fixed contact elements 56.

The fixed contact elements 56 may conveniently be heads of rivets 60 which extend through the wall of one or the other of the housing halves and are electrically connected at their exterior portions with electrical elements which may vary according to the requirements of any particular switch. Each of the rivets 60 is in transverse

alignment with a corresponding pair of depressions 26 so that the positions of operation of the slide defined by the several groups of depressions 26 are those in which the contact elements 54 are in contact with a pair of opposed fixed elements 56 or in contact with the walls of the housing halves, the latter position being the one assumed when the switch is in the "off" position.

The switch illustrated in Figures 1, 2 and 3 of the drawing, includes three rivets 60 in each housing half, there being four depressions 26 in each series of depressions. The three rivets 60 in the housing half 10 serve as through fasteners to secure a terminal assembly 62 to the housing, one of the rivets being electrically connected to the terminal assembly, the others being insulated from direct contact therewith. The three rivets support and are electrically connected to a resistance coil 64 at the ends and an intermediate point thereof. The three rivets 60 in the housing half 12 secure a terminal assembly 66 to the housing and are all electrically connected to the terminal. Thus, this switch can be employed to close a circuit with no resistance in the switch or with two degrees of resistance, according to the position of the slide 30.

It is not necessary to have as many as three contact points 56 in each housing half. For example, Figure 6 shows a switch having only two rivets 60 in each housing half. By connecting the rivets in one of these halves through a resistance coil (not shown) this switch may be employed to close a circuit with or without the inclusion of the resistance element. In such a switch, the stroke of the slide is preferably limited to the length of three depressions 26 by suitably locating the boss 36 on the rod 32.

Similarly, if a simple on-and-off switch is desired, a single rivet 60 may be used in each housing half. Figure 7 shows a fragment of such a switch with the addition of a fuse 70. The fuse is of the cartridge type and is supported in clips 72 and 74. The clip 72 is connected to the rivet 60 by a metal strip 76 which is secured to the housing by the rivet 60. The clip 74 is secured to and electrically connected with a terminal assembly 78, the latter being secured to the housing by one or two of the rivets 16 which hold the housing halves together.

By changing the kind and arrangement of the electrical elements mounted on the housing, switches having other characteristics can be made, using identically molded housing valves.

I claim:

1. An electric switch of the push and pull type, comprising a housing of two identically molded halves each generally rectangular in shape with a rim around three sides, a fillet at each corner and two parallel, longitudinally extending series of shallow depressions in the inner surface thereof, said halves being arranged with the edges of their rims in mutual contact to form three sides of the housing, an end plate forming the fourth side of the housing, said end plate having flanges engaging on the mutually remote faces of said halves, a fastening element extending through the fillets at each corner of the housing to secure the halves together, two of said fastening elements also passing through said flanges to secure said end plate in position, a slide of insulating material longitudinally movable within said housing, an operating rod secured to said

slide and extending through the end plate, a resilient bridging conductor carried by said slide and pressing against the opposed surfaces of said halves, a terminal on the exterior of each said half, metal contact elements extending through the walls of the respective halves, said contact elements having heads flush with the inner surfaces of the halves in the path of movement of said bridging conductor, and spring-pressed elements in said slide arranged to engage in said depressions to serve as yielding detents.

2. An electric switch of the push and pull type, comprising a housing of two identically molded halves each generally rectangular in shape with a rim around three sides and a series of shallow depressions in the inner face, through-fastening elements at the four corners of the housing holding the halves together in rim-to-rim engagement, a metal plate secured by two of said elements across the end of the housing at the fourth side of said halves, said plate having an aperture and a hollow stem secured thereto, a rod extending slidably through said stem and aperture, a slide of insulation secured to the inner end of said rod, spring-pressed detent elements carried by said slide and arranged to enter said depressions to determine operating positions for said slide, a bridging conductor carried by said slide, and metal contact elements mounted in said halves in position to be engaged by said bridging conductor when the slide is in any of its operating positions.

3. An electric switch comprising a generally rectangular housing of insulating material comprising two hollow members held together to enclose a cavity, the bottoms of the hollows in said members constituting a pair of opposed faces in said cavity, a series of fixed contact elements flush with one of said opposed faces and on the longitudinal median thereof, two series of shallow depressions in said face parallel to said series of contact elements and on either side thereof, a series of flush contact elements and two series of shallow depressions in the other of said opposed faces and directly opposite the corresponding series in the first said face, a block of insulation slidable lengthwise of the housing between said faces, a bridging conductor carried by said block, means carried by the block pressing portions of said conductor against corresponding elements in the opposed series of contact elements, four detent elements carried by said block, and spring means pressing said four elements against corresponding series of depressions in said faces.

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