

Jan. 31, 1950

R. P. H. HINDS
ELECTRIC SWITCH

2,496,092

Filed Jan. 23, 1948

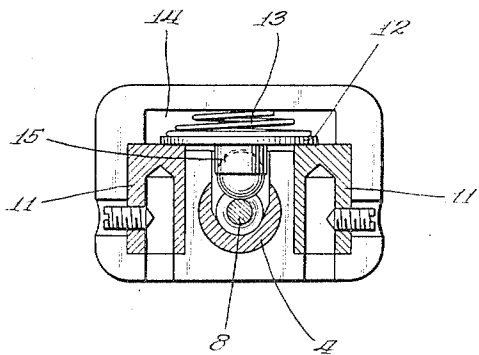
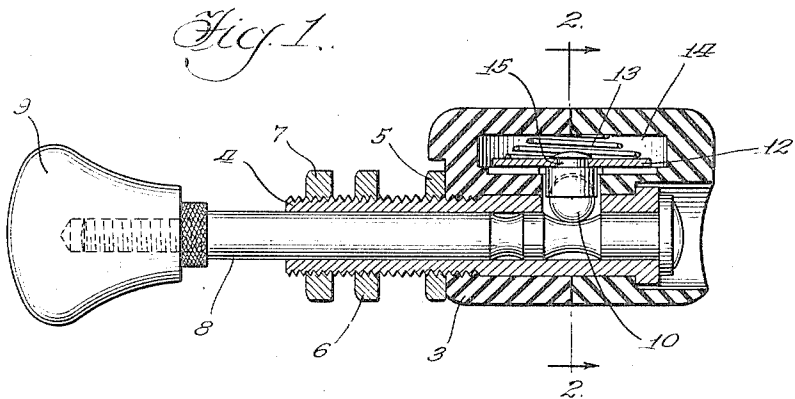


Fig. 2.

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UNITED STATES PATENT OFFICE

2,496,092

ELECTRIC SWITCH

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Application January 23, 1948, Serial No. 3,880
In Great Britain October 28, 1946Section 1, Public Law 690, August 8, 1946
Patent expires October 28, 1966

4 Claims. (Cl. 200—161)

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This invention relates to electric switches of the push-pull type. In such switches as usually constructed, the sliding operating bolt itself forms or carries a bridging contact which engages a pair of stationary spring contacts. In the switches of the present invention, the sliding bolt is formed with a cam profile which operates to displace laterally a separate bridging contact. With this arrangement the electrical contact making portion of the switch may be completely insulated from the operating bolt and the danger of a short circuit thereby greatly reduced.

In the preferred form, the switch of the present invention comprises an insulating body formed with a bore, a recess disposed to one side of the bore and a channel connecting the recess to the bore, an operating bolt having portions of different cross section longitudinally slidable within the bore, a pair of contact members extending into the recess, a bridging contact disposed within the recess on the side of the contact members remote from the bore spring means urging the bridging contact into engagement with the contact members and a pin displaceable within the channel in the body by longitudinal movement of the operating bolt for moving the bridging contact out of engagement with the contact members against the action of the spring.

Other features and advantages of the invention will sufficiently appear from the following description of the particular switch embodying the invention, which is shown in the accompanying drawing. In this drawing, Figure 1 is a longitudinal section through the switch, while Figure 2 is a transverse section on the line 2—2 of Figure 1.

The switch illustrated comprises an insulating body 3 of substantially cylindrical shape formed near one end with a diametrical bore, one end of which is of enlarged diameter and of D-shape. A metal guide tube 4 extends through the bore in the body, an external D-shaped flange at one end of the tube engaging in the enlarged portion of the bore. The other end of the tube projects from the body and is externally screw-threaded for adapting it to serve as a mounting stem for the device. A lock nut 5 engaged on this portion of the tube secures the latter to the body and other such nuts 6 and 7 allow the tube and thus the switch body to be secured to a mounting panel. A metal operating bolt 8 fits slidably within the bore of the guide tube, one end of the bolt projecting from the threaded end of the guide tube and carrying an operating knob 9 of insulating material. The other end of the bolt is

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reduced in diameter and riveted over a washer, which thus forms a head preventing the bolt from being withdrawn from the guide tube.

The operating bolt is formed with two axially spaced profile portions in the form of circumferential grooves or recesses of arcuate cross section, one of which is of greater depth than the other. The permitted travel of the operating bolt within the guide tube is such that the centre line of either groove can be brought on to the axis of the body. At the end remote from the operating bolt and its guide tube, the body is formed with a cylindrical chamber 14. From this chamber a radial channel extends to the bore containing the guide tube, and registers with a side wall opening in the form of an aperture in the guide tube. An operating structure including a steel ball 10, fitting freely in the axial bore, can thus engage in either of the grooves in the operating bolt and be moved axially of the body by longitudinal movement of the bolt.

Two other channels in the body, disposed on opposite sides of the axis, extend from the chamber 14 to the lower face of the body. The lower parts of these channels are of reduced diameter and their enlarged upper part contain cylindrical electrode or contact members 11, whose upper ends project into the chamber and whose lower ends are made hollow to receive conductors passed through the lower ends of the bores. Grub screws secure the cables within the contact members and hold the latter in position within the body.

A bridging contact in the form of a metal disc 12 is movably disposed within the chamber 14 and is urged into engagement with the contact members by spring means in the form of a coil compression spring 13. The electrode or switch terminal members 11 are complementary with the member 12 in forming separable and closable switch contact means. The bridging contact disc has a central hole, into which fits the reduced upper end of a pin 15 of insulating material slidably disposed in the axial channel of the body and cooperable with the ball 10 to form said operating structure. The recessed lower end of pin 15 engages the steel ball 10, which in turn engages the operating bolt 8. The dimensions of the parts are such that when the deeper of the two grooves in the operating bolt lies opposite the axial channel in the body (as shown in the drawing) it allows the spring 13 to move the bridging disc 12 into engagement with the contact members 11, while when the shallower groove is brought opposite the axial channel, the

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bridging contact is moved by ball 10 and pin 15 against the action of spring 13 and is held out of engagement with one or both of the contacts 11.

The cylindrical body 3 is formed in two parts, which are secured together by the guide tube 4 and nut 5. The chamber 14, the axial channel in which the pin 15 works and the channels which receive the contact member 11 are constituted by mating recesses formed in the meeting faces of the two body parts.

I claim:

1. An electric switch of the push pull type comprising an insulating body formed with a bore, a chamber spaced radially from said bore and disposed to one side thereof and a radial channel communicating between the chamber and the bore, a tubular mounting stem disposed in said bore and having an attaching portion projecting axially outwardly thereof, said stem having a side-wall opening registering with said channel, an electrode member embedded in said body and extending from a position in said chamber to a position accessible exteriorly of the body, a contact member in said chamber and movable therein axially of said channel between positions respectively contacting and separated from said electrode, spring means in the chamber urging the contact member axially of said chamber toward said bore, an operating bolt slidable axially in the tubular mounting member, an operating structure disposed in said channel and side-wall opening between the switch contact member and said bolt and movable axially in said channel, and said bolt having axially spaced recesses of different depth selectively registerable with said operating structure, the deeper of said recesses accommodating movement of the switch element axially of the channel into one of said positions and cooperating with said spring and said structure for yieldably resisting axial displacement of the bolt, the other of said recesses being of a depth maintaining said operating structure axially outwardly of the channel against the force of the spring for maintaining the switch element in the other of its positions and cooperating with the spring and said structure for yieldably resisting axial displacement of the bolt.

2. An electric switch of the push pull type comprising an insulating body formed with a bore, a chamber spaced radially from said bore and disposed to one side thereof and a radial channel communicating between the chamber and

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the bore, a guide tube disposed in said bore, said guide tube having a side-wall opening registering with said channel, separable and closable switch contact means disposed in said chamber, an operating structure for said electrode means projecting through said channel and side-wall opening into the guide tube, spring means in the chamber urging the contact means closed and urging the switch operating structure radially inwardly of the tubular guide, the operating structure being displaceable radially outwardly with respect to the guide tube for separating the switch contact means, an operating bolt slidable axially in the guide tube and having profile portions selectively registerable with the switch operating structure for causing it to respectively occupy the positions causing the switch electrode means to be opened or closed, and said insulating body being formed in two parts having contiguous meeting faces extending transversely of the guide tube, and each of said meeting faces containing recess means which pursuant to assembly of said parts conjointly constitute the chamber and channel, and means on the guide tube for securing said parts assembled.

3. The combination set forth in claim 2, wherein there is a mounting stem comprising said guide sleeve, and said mounting stem having a portion projecting endwise from the insulating body.

4. The combination set forth in claim 2, wherein said insulating body comprises openings leading from the chamber exteriorly of the insulating body and intersected by a plane common thereto and to said channel and extending transversely of said guide tube, switch terminal members respectively disposed in said openings, the meeting faces of the two parts of said insulating body being coincident with said plane when the parts are assembled, and said meeting faces also containing recess means which pursuant to assembly of the parts form said terminal-member-receiving openings.

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