Sept. 5, 1950 H. W. BATCHELLER 2,521,560

STATION PLUNGER SWITCH

Filed Feb. 17, 1948

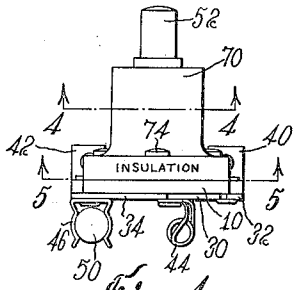


Fig. 1

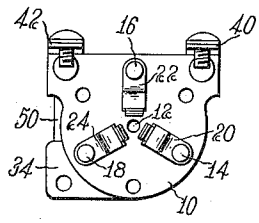


Fig. 2

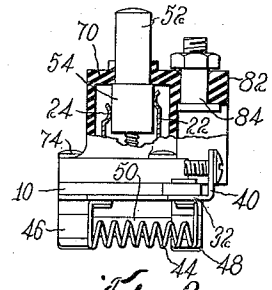


Fig. 3

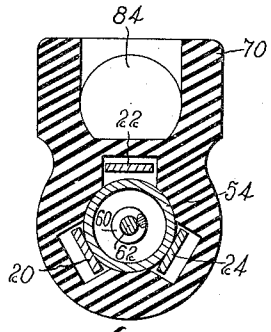


Fig. 4

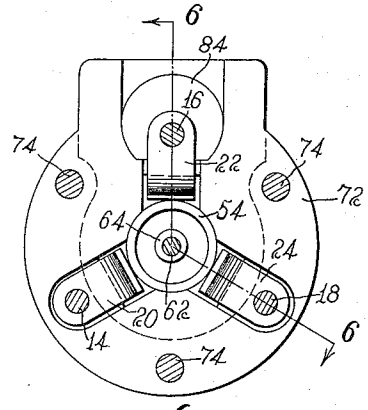


Fig. 5

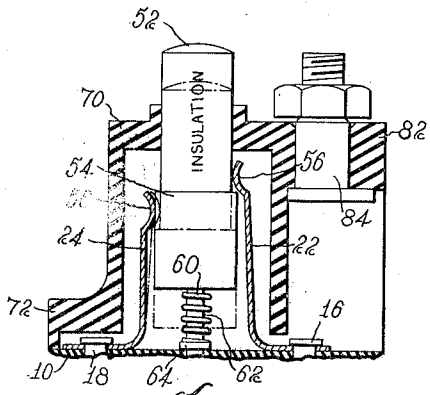


Fig. 6

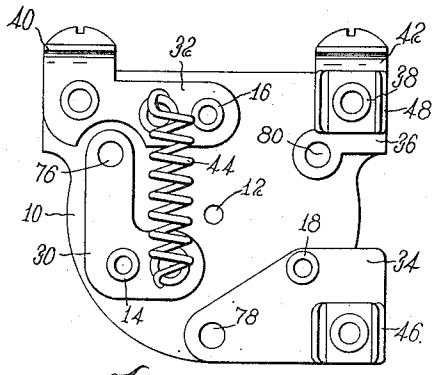


Fig. 7

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STATION PLUNGER SWITCH

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Application February 17, 1948, Serial No. 8,827

1 Claim. (Cl. 200—16)

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This invention relates to electric switches of the plunger type, and more particularly to switches designed for use in controlling a motor which is to be operated in conjunction with apparatus which is mechanically controlled as by a lever or the like. When thus employed, the switch is mounted with the operating lever so that the lever bears against the plunger of the switch and operates it when the lever is swung.

It is an object of the invention to provide a switch of the type mentioned, composed of simple parts which can be inexpensively made and easily assembled.

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 front elevation of the switch embodying the invention;

Figure 2 is a top plan view of the base with the parts which are mounted thereon;

Figure 3 is a side elevation of the switch shown in Figure 1, a portion being broken away;

Figures 4 to 7 are on a larger scale than Figures 1 to 3;

Figure 4 is a section on the line 4—4 of Figure 1;

Figure 5 is a section on the line 5—5 of Figure 1;

Figure 6 is a section on the line 6—6 of Figure 5; and

Figure 7 is a bottom plan view of the base assembly shown in Figure 2.

The switch illustrated on the drawing comprises a base 10 which consists of a disk cut or punched from a sheet of suitable insulating material, such as vulcanized fiber or the like, or individually molded. On this base are mounted all of the switch elements with the exception of a bridging conductor carried by the plunger hereinafter described. The disk 10 has a central hole 12 surrounded by two series of three holes each, arranged in alternation in a circular series of six holes. Three of these holes contain rivets 14, 16 and 18, or other through fasteners, which secure a set of contact elements 20, 22 and 24 to the base and also connect these elements electrically to separate metal plates 30, 32 and 34 respectively. The rivets also serve to secure these metal plates to the bottom face of the base disk 10, as indicated in Figure 7. As therein shown, a fourth plate 36 is secured to the bottom of the disk 10 by a suitable rivet 38. All the plates are preferably stampings from sheet metal stock. The plates 32 and 36 include extensions 40 and 42

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which serve as switch terminals, these extensions being bent at right angles to the respective plates of which they are parts. A resistance element 44 is connected between and supported by the plates 30 and 32. Clips 46 and 48 are mounted on the plates 34 and 36 respectively to receive and hold a suitable fuse 50 of the cartridge type. If no fuse is desired, the plates 34 and 36 may be directly connected or may be made as a single unitary plate.

The contact elements 20, 22 and 24 are preferably strips of resilient metal, such as copper or brass, having feet which are held against the base 10 by the rivets, and upstanding portions which incline toward one another. As indicated in Figure 6, the contact element 22 is longer than the elements 20 and 24, the latter two elements being of the same length. The three elements press resiliently against a plunger 52 of insulation which carries a metal sleeve 54, the latter serving as a bridging conductor to connect either the contact elements 20 and 24 only or all three of the contact elements, according to the position of the plunger. Each of the contact elements is shaped at its upper end with a rounded boss 56, which is the point of engagement with the plunger 52 and conductor 54. When the plunger 52 is pushed inward as far as it will go, all three of the contact elements engage only the insulating portion of the plunger, and the switch is then open. When the plunger is allowed to take the position shown in Figure 6, the bridging conductor 54 is in contact with only the shorter contact elements 20 and 24. When the plunger is in its fully projected position, as illustrated in Figure 3, the bridging conductor 54 is in contact with all three of the contact elements.

The plunger 52 has an axial bore extending in from its lower end which receives the upper end portion of a compressed spring 60. The lower end portion of the spring contains a guiding plug 62 which has a flange 64 near its lower end. The lower end of the plug 62 fits in the central hole 12 of the base 10 and the flange 64 presses against the base itself. The spring 60 bears against the upper face of the flange 64 and presses the plunger upwardly toward its fully projected position.

Figure 7 shows the relationship of the parts to which the contact elements are connected, with the exception of the fuse 50 which is omitted from this figure to show the other parts more clearly. When the plunger 52 is in the intermediate position shown in Figure 6, the bridging conductor 54 connects the contact elements 20

and 24, thus establishing a conducting path from the terminal 40 to the terminal 42 through the resistance element 44 and the rivets 14 and 18. When the plunger is moved to the fully projected position shown in Figure 3, the resistance unit is short-circuited by a conducting path through the rivets 16 and 18. When the plunger is pushed all the way in against the spring 60, the bridging conductor 54 is in contact with none of the contact elements and the terminal 40 is then disconnected entirely from the terminal 42.

The upper portion of the plunger projects slidably through a housing member 70 which is of insulation and may be conveniently a molded article adapted to enclose the contact elements and to cover the upper surface of most of the base 10. The housing 70 is made with a bottom flange 72 through which three screws 74 extend to fasten the housing member 70 to the base. The screws 74 go through the other three holes of the circular series, as shown in Figures 2 and 7, and are in threaded engagement with the plates 30, 34 and 36, these plates being provided with internally threaded holes 76, 78 and 80 respectively. The housing member 70 may be provided with an extension 82 in which is a bolt 84 for securing the switch to a supporting wall.

I claim:

An electric switch comprising a base consisting of a disk of insulation having a number of holes therethrough, conductor plates secured to the bottom face of said disk and spaced from each other, two of said plates having terminals

for connecting the switch into a circuit, three of said plates each having a screw-threaded hole registering with one of the holes in the base disk, three contact springs arranged in a circular series on the upper face of the disk, metal rivets extending through some of the holes in the base and connecting said springs respectively with three of said plates, a plunger slidable between said contact springs, said plunger having a bridging conductor thereon movable into simultaneous contact with said contact springs, a housing member seated on the upper face of said base and enclosing said contact springs and bridging conductor, and screws for securing said housing member to said base, said screws engaging in the threaded holes in the respective conductor plates.

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