

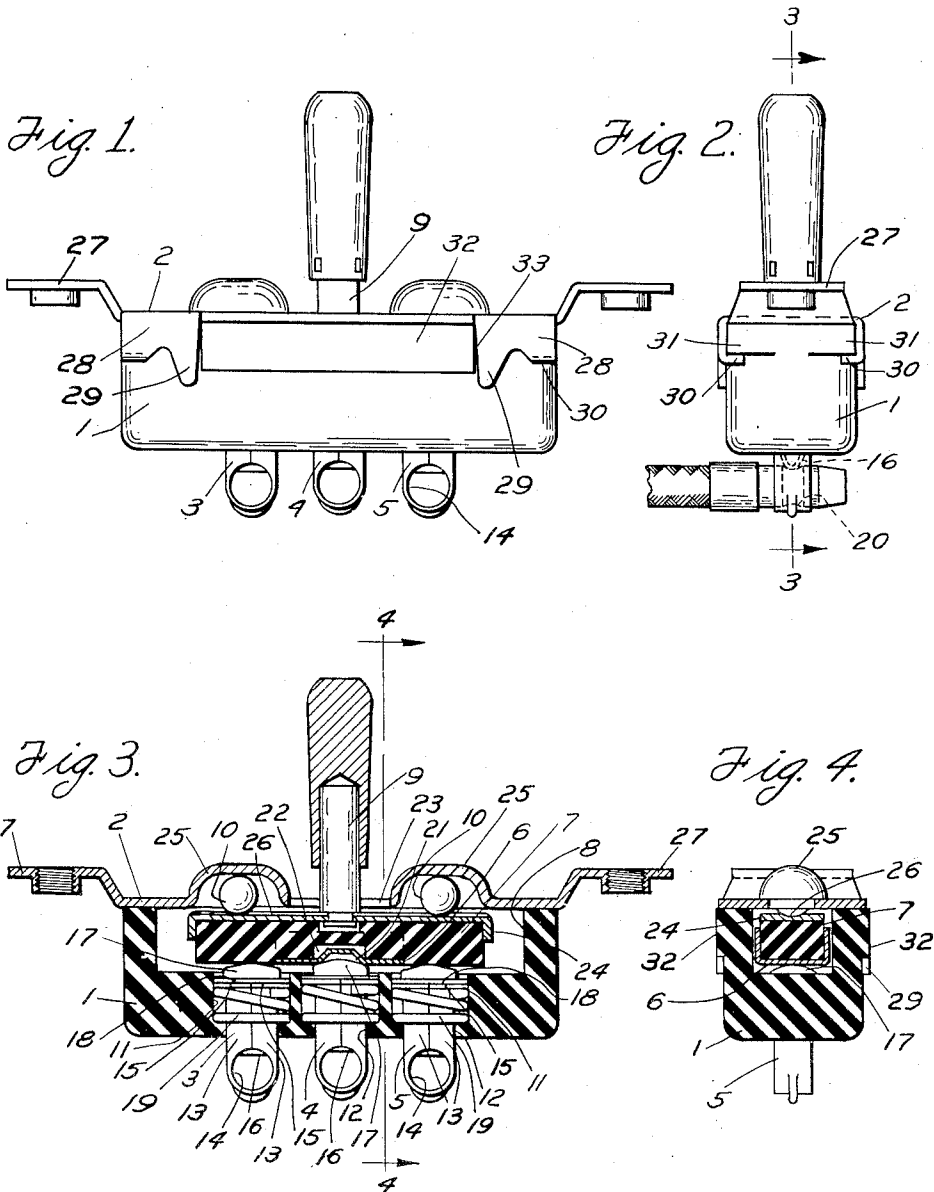
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ELECTRIC SWITCH

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ELECTRIC SWITCH

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This invention relates generally to electrical switches, and particularly to switches of the reciprocating type, capable of controlling a plurality of electrical circuits.

One object of the invention is to provide means whereby to decrease the amount of friction between the parts of the switching mechanism, particularly between the means movable with the bridge means and the switch housing.

Another important object is to provide outwardly extending races containing movable bearing means on a part of the switch housing, preferably the cover, and offset extensions on the cover in order to prevent the races from being the only part of the switch housing that abuts or engages the support to which the switch is connected.

Another object is to construct a switch with provision whereby one position of the switch preferably the intermediate or off position is predetermined.

A further object is to design a switch that consists of very few parts, which may be economically manufactured and assembled on a commercial scale.

Many other objects and advantages of the invention will appear after considering the drawing annexed hereto.

In the drawing:

Figure 1 is an upstanding side view of the switch;

Figure 2 is an end view of the switch shown in Figure 1, including a terminal;

Figure 3 is a view taken substantially on line 3—3 of Figure 2, which clearly shows the principles of design and construction; and

Figure 4 is a section taken substantially on line 4—4 of Figure 3.

Referring first to the general arrangement of the important parts comprising the switch, the switch housing as herein shown is preferably comprised of two parts, a receptacle 1 constructed of insulating material, and a metal cover 2, which also serves as a mounting plate for the switch. A plurality of contact means 3, 4, and 5, are carried by the receptacle 1, and are mounted in a manner that will be explained later. A bridge 6 mounted on a carrier 7 is adapted for longitudinal movement within the recess or guideway 8 formed therefor in the receptacle 1. Such movement is preferably effected by means of an actuator member 9. Movable bearing means 10 are carried by the cover 2, and the various parts of the switch mechanism are so constructed and arranged that the bridge means

is operatively related with respect to the contact means, and the means movable within the guideway 8 and carrying bridge means will engage the movable bearing means 10, and thereby eliminate considerable friction particularly between the switch cover and said movable means.

Considering now more in detail the principles of design and construction, and particularly the contact means and the manner in which they are mounted, the relatively thick bottom wall of the receptacle 1, as here shown, is preferably provided with a plurality of spaced apart circular wells 11 arranged in line with each other. A rectangular aperture 12 is communicatively connected with each well. Each of the contact means 3, 4, and 5, is preferably constructed of sheet metal which is folded into a pair of channel portions 13, which, when brought together as shown, constitute a tubular body, substantially rectangular in cross-section, having a terminal receiving aperture 14 adjacent its outer free extremity, and a pair of semi-circular outwardly extending flanges 15 adjacent its inner extremity. Since the contact means extend through the apertures 12, rotation of the contact means is prevented. A metal insert is arranged within the body of each contact means, and its outer end is provided with a detent 16 that intersects the terminal receiving aperture 14, and its inner extremity is provided with an enlarged conical contact portion 17, having a substantially annular flange 18, which abuts the flanges 15 of the body, as clearly shown. A helical compression spring 19 is arranged in each well 11, and surrounds the body of each contact means in a manner whereby to force the contact means inwardly. Obviously, the flanges 15 and 18, including the spring are guided by the wall of the well. As clearly shown, the contact means are separated by partitions. When a terminal of the character shown in Figure 2 is first inserted in a terminal receiving aperture 14, the tubular body will move outwardly compressing the spring 19, and further insertion will cause the terminal to snap into place, and that portion of the body defining the aperture 14 will press the groove 20 of the terminal into cooperation with the detent 16. The flanges 15 and 18 will, of course, separate axially to some extent when the terminal is in place.

As to the construction of the bridge member and the parts movable therewith, it is evident from the drawing that the bridge member 6 is preferably of channel shape, and the side walls thereof embrace the side walls of the carrier 7, and the carrier is undercut intermediate its ends

in order to receive the contacting surface of the bridge member, and maintain same in a flush position with the bottom surface of the carrier. The bridge is preferably provided with a pocket 21, centrally located, which projects into a clearance recess 22 formed adjacent the lower extremity of the carrier 7.

Movement of the bridge 6 and the carrier 7 therefore may be effected in any suitable manner, but as here shown, are preferably adapted for reciprocation within the guideway 8 by means of the actuator 9. The actuator 9, is in the form of a stem that projects through a longitudinal central slot 23 provided in the cover 2, and if desired an extension handle of the character shown may be secured to the actuator. A holding member 24 is preferably permanently secured to the inner end of the actuator 9, and extends along the upper face of the carrier 7 and is downturned against the end walls thereof. In other words, member 24 embraces the carrier 7, and is movable therewith. The actuator 9 may be secured to member 24 in any suitable manner, but, as here shown, the actuator is provided with a reduced end that projects through a hole in the member 24, and is thence flanged over, and a recess in the upper extremity of the carrier provides clearance for the flange.

With respect to the construction of the cover 2 or mounting plate, it will be evident that same is provided with a substantially rectangular flat portion, having a pair of spaced apart outwardly extending substantially semi-circular longitudinal races 25 formed therein, and that the longitudinal slot 23 is located therebetween. Also, that the movable bearing means 10 in the form of steel balls are located substantially within the confines of said races, and that the member 24 engages the movable bearing means 10, and not the substantially rectangular flat portion of the cover 2. In order to more fully insure proper guiding of the bridge means 6, the carrier 7, and the member 24, a longitudinal groove 26 is provided in the upper surface of the member 24 and receives the movable bearing means 10. The cover 2 is provided with offset extensions 27 which project outwardly with respect to the flat rectangular portion of the cover 2 to an extent substantially equal to the extent of the races 25, and are adapted to abut or engage the support to which the switch is to be connected. In other words, the switch could not be properly mounted if the races 25 only were to engage the support. In practise, it has been found desirable to place a small quantity of lubricant within each of the races 25, but of course, this is not necessary. If desired, the longitudinal slot 23 may predetermine the distance of travel, but as now manufactured, the downturned ends of the member 24 engage the respective ends of the receptacle 1 to limit the travel when the switch is moved to either of its on positions.

Referring particularly to Figure 3, the switch is shown in an off position, and such position is predetermined since the pocket 21 of the bridge means 6 receives the conical contact portion 17 of the center or intermediate contact means 4. In this position the center contact means 4 is forced inwardly to a greater extent than the other contact means 3 and 5; or, in other words, the contact means 3 and 5 are maintained in a substantially fixed position and normally bear against the under surface of the carrier 7. When the actuator 9 is moved to the extreme left, the

conical portion 17 of the contact means 4 will be disengaged from the pocket of the bridge 6, and the flat contacting portion of the bridge will engage the contact portions 17 of the contact means 3 and 4 whereby to control a circuit, and when the actuator is moved to the extreme right, the said flat contacting portion of the bridge will establish contact between the contact means 4 and 5 to control another circuit. It is of course understood that electrical conductors provide a connection between an electrical source and the contact means 3, 4, and 5 and to some device to be controlled by the switch, and that each conductor is preferably provided with a terminal of the character shown in Figure 2 that is adapted to snap into each of the contact means.

The receptacle 1, and cover 2 comprising the switch housing may be secured together in any suitable manner, but as here shown, the cover is preferably provided with a pair of depending portions 28 adjacent each end thereof, which embrace the receptacle 1. Each of the portions 28 is provided with a pair of fingers 29 and 30. The fingers 29 engage the side walls of the receptacle, and the fingers 30 are adapted to be folded under to engage integral corner projections 31 formed on the receptacle as clearly shown in Figure 2. Each side of the receptacle 1 is also formed with a longitudinal substantially rectangular outwardly extending integral projection 32, and said projections 32 are of such a length that they pilot or guide the receptacle and cover with respect to each other during assembly, and piloting is made easier by tapering the fingers 29 as indicated at 33.

In view of the foregoing, it will be evident that improved means are provided whereby to decrease a considerable amount of friction between the parts comprising the switch mechanism, and means whereby to predetermine the off position of the switch.

Having thus described our invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of the invention; and, therefore, we do not wish to be understood as limiting ourselves to the exact form, construction, arrangement, and combination of parts, herein shown and described.

What we claim and desire to obtain by Letters Patents is:

1. A mounting member for a switch including, a relatively long narrow substantially flat sheet metal portion, a pair of spaced apart elongated depressions providing races projecting from one side of said flat portion, an aperture provided in said flat portion between said races for the reception of an operating member for the switching mechanism, rollable bearing means arranged for reciprocable movement in said races adapted to cooperate with a switching mechanism, said flat portion having offset end continuations projecting from said one side of said portion, and means projecting from the other side of said portion for securing said member to the switch.

2. A switch cover including a substantially flat sheet metal portion, end continuations projecting from one side of said portion for attaching the cover to a support, and a channel formed in said portion and extending from said side providing a race adapted to receive bearing means for a switching mechanism, said end continuations being offset with respect to said chan-

nel whereby to compensate for the height said channel extends from said side.

3. An electric switch, including a housing, a mounting member for said switch including, a
 5 relatively long narrow substantially flat sheet metal portion, a pair of spaced apart elongated concave depressions providing races projecting from one side of said flat portion, an aperture
 10 provided in said flat portion between said races for the reception of an operating member for the switching mechanism, rollable bearing means arranged for reciprocable movement in
 15 said races adapted to cooperate with a switching mechanism, said flat portion having offset end continuations projecting from said one side of said portion, and means projecting from the
 20 other side of said portion for securing said member to the switch, said projecting means including leg portions, some of said legs extending alongside said housing for bracing same, and
 some of the legs being clinched over said housing for holding the mounting member in place.

4. A mounting member for a switch including, a relatively long narrow substantially flat sheet
 25 metal portion, a pair of spaced apart elongated concave depressions providing races projecting from one side of said flat portion, an aperture provided in said flat portion between said races for the reception of an operating member for
 30 the switching mechanism, rollable bearing means arranged for reciprocable movement in said races adapted to cooperate with a switching mechanism, said flat portion having offset end continuations projecting from said one side of

said portion a distance corresponding substantially to the height of said races, and spaced apart bendable means projecting from the other side of said portion for securing said member to the switch.

5. A switch cover including a substantially flat
 5 sheet metal portion, end continuations projecting from one side of said portion for attaching the cover to a support, and a plurality of spaced apart channels formed in said portion and extending from said side providing races adapted
 10 to receive bearing means for a switching mechanism, said end continuations being offset with respect to said channels whereby to compensate for the height said channels extend from said
 15 side.

6. A switch including a housing, a cover including a substantially flat sheet metal portion, end continuations projecting from one side of
 20 said portion for attaching the cover to a support, a channel formed in said portion and extending from said side providing a race adapted to receive bearing means for a switching mechanism, said end continuations being offset with respect
 25 to said channel whereby to compensate for the height said channel extends from said side, and spaced apart portions projecting laterally from said substantially flat portion, certain of said lateral portions embracing said housing and
 30 other portions being bent over the housing to hold the cover in place.

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