My invention relates to electrical contact and connection means, such as may be embodied in electrical switches and the like, and more particularly to terminal receiving means for cooperation with so-called snap terminals and contact members associated with the terminal receiving means, and the principal object of my invention is to provide new and improved electrical contact means of these types.

The present application is a division of my copending application, Serial Number 30,282, filed July 6, 1935, now Patent Number 2,166,545, issued July 18, 1939.

In the drawing accompanying this specification, and forming a part of this application, I have shown, for purposes of illustration, one form which my invention may assume. In the drawing:

Figure 1 is a view partly in longitudinal section and partly in elevation showing one embodiment of my invention, used in an electric switch.

Figure 2 is a longitudinal section of one of the combined contact means and terminal receiving means shown in Figure 1, the base of the switch being fragmentarily shown.

Figure 3 is a section taken on the line 3-3 of Figure 2, looking in the direction of the arrows, with a plug conductor terminal added.

Figure 4 is a fragmentary perspective view of a detail of the base shown in Figure 1, and

Figure 5 is a perspective view of the disassembled parts of the combined contact means and terminal receiving means.

Referring in detail to the drawing, Figure 1 shows a switch 10 mounted on a panel 11. The switch 10 includes relatively movable elements comprising, in this instance, a rotatable insulating disc 12 carrying a contact plate 13 capable of a plurality of contacts 14, 15, 16 forming part of a plurality of unitary contact-terminal posts 17, 18, 19 supported by a base 20 in a manner to be further described. The base 20 is fastened to and supported in any suitable manner by a cup-shaped casing 21, the end wall 22 of which is fastened to a tubular threaded member 23, which is disposed through an aperture 24 in the panel 11 and fastened to the panel 11 in any suitable manner, as by nuts 25. The insulating disc 12 is carried in any suitable manner and rotatable by an operating member 26 here shown in the form of a dished metallic disc fastened to an end of an actuating shaft 27, rotatably disposed within the tubular member 23. The other end of the shaft 27 is provided with an operating handle 28 suitably fastened thereon.

The contact-terminal post 18 is mounted in axial alignment with the center of the insulating disc 12 and the contact 15 of the contact-terminal post 18 is adapted to engage walls of a recess 29 formed in the contact plate 13. The contact 18 of the contact-terminal post 19 is shown in engagement with another recess, 30, in the plate 13 spaced radially from the central recess 29; and the contact 14 of the contact-terminal post 17 is shown in engagement with walls of a recess 31 formed in the insulating disc 12 itself, spaced radially the same distance from the central recess 29, so that, in the position of the parts shown, the contacts 15, 16 are electrically connected by the plate 13, whereas the contact 14 is unconnected to any portion of the contact plate 13, or plates if desired, may be of various numbers and forms, depending on the number of circuits it is desired to control and the manner in which it is desired to control them.

Referring now more particularly to the unitary contact-terminal post 17 shown in detail in Figures 2, 3, and 5. The contact-terminal post 17 comprises a socket member 32 in which the contact 14 is reciprocably mounted. The socket member 32 is here shown as of generally square cross-section, having opposite walls 33, 34 forming integral extensions of the legs of a loop 35, the loop providing an aperture 36. The socket member has opposite walls 37, 38, at right angles to the walls 33, 34, each wall 37, 38 being formed in halves 39, 40, the wall halves 39, 40 being integral with the wall 33 and the wall halves 40 being integral with the wall 34. The wall halves 39, 40 are each provided at the bottom thereof (as viewed in Figure 5) with a lateral extension or foot 41. The walls 33, 34 are similarly each provided with a lateral extension or foot 42, these feet 42 being here shown as somewhat wider than the feet 41 on the wall halves 37, 38. The opposite walls 33, 34 are provided with aligned apertures 43, 44, here shown as of square shape, in which apertures 43, 44 are slidably disposed projections 45, 46, of rectangular cross-section, on a detent means 47. The detent means 47 is here shown as formed of sheet metal of generally square shaped form to fit slidably within the socket member 32. The detent means 47 is here shown as provided with a hemispherically protuberance 48 pressed upwardly (as viewed...
in Figure 5) from the inside of the dished shaped portion of the detent means. The detent means 47 are also provided with another pair of projections 49, 50, of rectangular cross-sectional, extending from the sides of the dish shaped portion of the detent means, at right angles to the sides from which the projections 45, 46 extend, and these projections 49, 50 are disposed slidably in a pair of aligned apertures 51, 52 formed by recessing the adjacent margins of the wall halves 39, 40 of the walls 37, 38. These apertures 51, 52 are generally rectangular in cross-section and have their upper margins, as viewed in Figure 6, in the same plane as the upper margins of the apertures 43, 44. The lower margins of the apertures 51, 52 are below the lower margins of the smaller apertures 43, 44.

The contact 14 is here shown as made of sheet metal and having a contact portion proper 53, with an outwardly curved surface, provided with two pairs of oppositely disposed legs 54, 55 and 56, 57 tapering toward their ends and extending at right angles to the contact portion proper 53. The legs 54, 55, 56, 57 serve, among other things, to guide the contact 14 for reciprocating movement in the socket member 32. The legs 56, 57 are each provided with a laterally outwardly bent extension 58, of reduced width, slidably disposed in the apertures 51, 52. Disposed within the socket member 32, between the detent means 47 and the contact 14 is a helical spring 59, one end of which engages the inside of the dish shaped portion of the detent means 47 and the other end of which engages the inside surface of the curved contact portion proper of the contact 14. The detent means 47 is thus biased toward the right (as viewed in Figures 1, 2, and 3) toward the aperture 43 formed by the loop 35, so that the projections 45, 46, 49, 50 on the detent means 47 engage and are stopped by the right hand margins of the apertures 43, 44, 51, 52 in the walls 33, 34, 37, 38 of the socket member 32. In that position, the outside surface of the dished portion of the detent means 47 extends somewhat beyond the right hand margins of the walls 37, 38, in the illustrated embodiment. At the same time, the spring 59 biases the contact 14 in the opposite direction so that the lateral projections 58 engage and are stopped by the left hand margins of the apertures 51, 52.

It will be evident from the hereinbefore described construction that the socket member 32, the loop 35, and the feet 41, 42 may all be made of a single piece of sheet metal. Before the loop 35 is fully bent to the form shown in the drawing, the detent means 47 is inserted within the walls 33, 34, 37, 38 including also the spring 59 and the contact 14. The halves of the socket member 32 may then be moved toward each other, the detent 47, spring 59, and contact 14 having the positions shown in Figures 1, 2, and 3, when the free margins of the wall halves 39, 40 of the walls 37, 38 meet in lines or planes of contact 60. The assembly then constitutes a self contained unitary contact-terminal post 17.

All that is necessary in order to mount the unitary contact-terminal post 17 on the insulating member 20 is to insert it through an aperture 51 in the base, the aperture 61 being generally square in cross-section and fitting the exterior of the socket member 32. The aperture 61 may be countersunk by a generally cylindrical recess 62, so that the bottoms of the feet 41, 42 will be flush with the front face of the insulating base 20. The tops of the feet 41, 42 bear against the bottom of the cylindrical recess 62, thereby limiting insertion of the unitary contact-terminal post 17 in the base 20. The square cross-section aperture 61 in the base is here shown as provided in two of its opposite walls with longitudinally extending channels or recesses 63, 64 in which the lateral projections 58 on the contact 14 are free to move, these lateral projections 58 extending, in the present embodiment, beyond the outer faces of the walls 37, 38.

The unitary contact-terminal posts 18, 19 are shown as identical with the unitary contact-terminal post 17, and are insertable through apertures in the base 20, identical with the apertures 61 for the contact-terminal post 17, and require no further description.

When the unitary contact-terminal posts 17, 18, 19 have been assembled with the base 20, in the manner already described in connection with the contact-terminal post 17, the base 20 may then be assembled with and fastened to the casing 21, and the springs 59 of the contact-terminal posts 17, 18, 19 are thereby compressed to a predetermined extent by engagement of the contacts 14, 15, 16 either with the contact plate 13 or with the insulating disc 12. Thus the springs 59 serve to bias the respective contacts 14, 15, 16 against the insulating disc 12 and the contact plate 13 and also serve to bias in the opposite direction the detent means 47 respectively associated therewith.

Electrical connection may then be made to the contact-terminal posts 17, 18, 19 by inserting plug conductor terminals in the apertures formed by the respective loops 35. One form of conductor terminal 65, suitable for use with the terminal receiving means is shown in Figure 3, this conductor terminal 65 comprising a generally cylindrical portion 66 having a frusto-conical end 67 and an annular furrow 68 in the cylindrical portion 66. The conductor terminal 65 may be fastened to a conductor 69 disposed therein, by swaging, as indicated by swage indentations 70. When the conductor terminal 65 is inserted in the aperture 35, the frusto-conical portion 67 moves the detent means 47 toward the left, as viewed in Figure 3, by camming action of the cone bias of the spring 59, further inserting movement causing the hemispherical portion 48 of the detent means 47 to snap into the annular furrow 68.

Moreover, it will be evident that each of the contact-terminal posts is assembled to the base 20 of insulating material in such a manner whereby the socket or body portion 32 is held substantially in a fixed position, and this is very important for the reason that any accidental pull on a conductor wire secured to the socket will not disturb or otherwise break the electrical circuit between the contact plate or bridge member 13 and the contact associated with each socket. In other words, the contacts carried by the socket members may laterally adjust themselves or float with respect to the contact plate and the sockets.

It will be evident that the apertures 61, of which there is one for each unitary contact-terminal post 17, 18, 19 and so on, being of non-circular outline, conforming generally to the cross-sectional outline of the socket member 32, will prevent turning of the contact-terminal post about their axes. Also, the apertures 61 have their cross-sectional axes so disposed that plug conductor terminals, such as 65, may be inserted in all of the conductor terminal receiving means, without interference with each other.
From the foregoing it will be apparent to those skilled in the art that the illustrated embodiment of my invention provides a new and improved electrical contact and connection means, readily and conveniently constructed and assembled, and accordingly, accomplishes at least the principal object of my invention. On the other hand, it also will be obvious to those skilled in the art that the illustrated embodiment of my invention may be variously changed and modified, or features thereof, singly or collectively, embodied in other combinations than those illustrated, without departing from the spirit of my invention, or sacrificing all of the advantages thereof, and that accordingly, the disclosure herein is illustrative only, and my invention is not limited thereto.

What I claim and desire to secure by Letters Patent is:

1. Electrical connection means, comprising: a one piece tubular body, having a recess for receiving a conductor terminal, said body being provided with slot means in its side walls; a detent member reciprocably mounted in said body, and being constructed and arranged to cooperate with said body recess and a conductor terminal disposed in said body recess, said detent member having projection means projecting through said side walls in said slot means for guidance; and a contact member, reciprocably mounted in said body, and having projection means also projecting through said side walls in said slot means for guidance.

2. An electric switch including in combination, a casing, a switch back provided with a seat including electrical connection means loosely mounted in said seat, switching mechanism including a bridge member movable within said casing for cooperation with said electrical connection means, said electrical connection means comprising a body projecting through said switch back and provided with a terminal receiving aperture at its outer extremity, guideways provided in said body, detent means and a contact member carried by said body and having means slidable in said guideways, and means for urging detent means and said contact member in opposite directions in a manner whereby said detent will retain a terminal pressed in said aperture, said contact member will be directed to be engaged by said bridge member, and said connection means will be held in said seat.

3. An electrical apparatus including in combination, a bridge member, an insulator provided with a seat including electrical connection means loosely mounted in said seat, said electrical connection means comprising a body member projected through said insulator and provided with a terminal receiving aperture at its outer extremity, guideways provided in said body, detent means and a contact member carried by said body and having means slidable in said guideways, and means for urging said detent means and said contact member in opposite directions whereby said detent will retain a terminal pressed in said aperture, said contact member will be directed to be engaged by said bridge member, and said connection means will be held in said seat.

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