

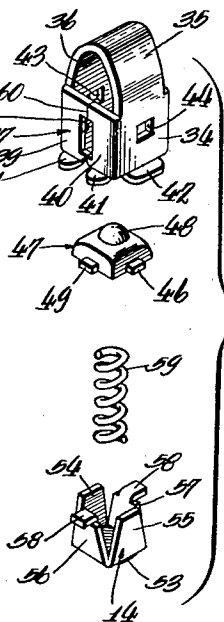
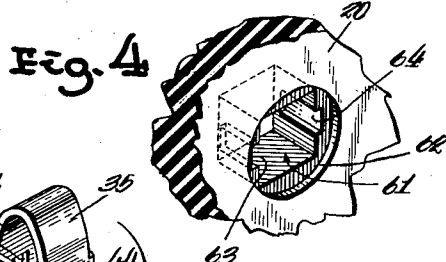
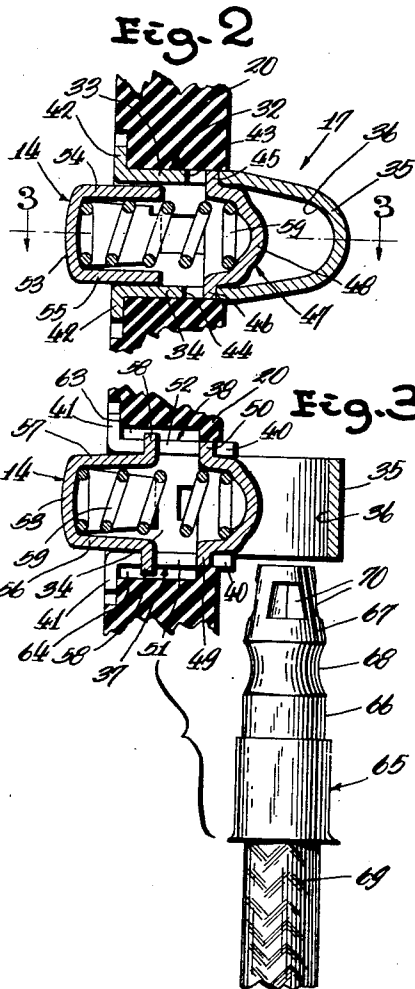
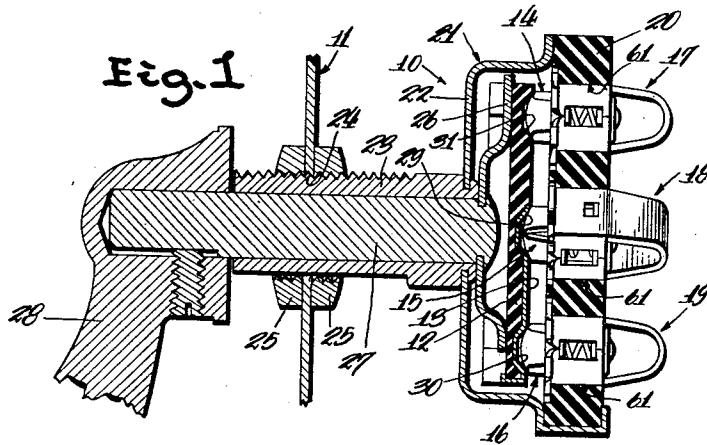
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ELECTRICAL CONTACT AND CONNECTION MEANS

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ELECTRICAL CONTACT AND CONNECTION MEANS

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My invention relates to electrical contact and connection means, such as may be used or 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. 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 cooperable with 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 thereto.

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 16

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. It will be understood that the number of contacts 14, 15, 16 and their relative location, and the configuration 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 reciprocally 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 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 dished form to fit slidably within the socket member 32. The detent means 47 is here shown as provided with a hemispherical protuberance 48 pressed upwardly (as viewed in Figure 5) from the inside of the dish shaped portion of the detent means. The detent means 47 is also provided with another pair of projections 49, 50, of rectangular cross-section, 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 dis-

posed slidably in a pair of alined 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 5, 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 36 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 dish 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 base 20 is to insert it through an aperture 61 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 counter-sunk 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 extend-

ing, 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 aperture 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 swedging, as indicated by swedge indentations 70. When the conductor terminal 65 is inserted in the aperture 36, the frusto-conical portion 67 moves the detent means 47 toward the left, as viewed in Figure 3, by cam action, against the 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.

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 posts 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.

I claim:

1. Electrical connection means, comprising: a support, having an aperture provided with pre-formed slots in the marginal surface thereof; a 75

body constructed of sheet material, disposed in said aperture, and having an integral loop portion arched axially over said support aperture providing a conductor terminal receiving aperture, said body having projections disposed in predetermined relation with respect to the axis of said receiving aperture; said projections and the slots in said support aperture being constructed and arranged to interengage when said body is assembled with said support, so that the axis of said receiving aperture is disposed in predetermined relation about the axis of said support aperture.

2. Electrical connection means, comprising: a support, having an aperture, the marginal surface of which is formed with diametrically opposed grooves extending in an axial direction; a body constructed of sheet material, having outwardly bent feet extending transversely from one end, and fingers extending from opposite sides of said body and slidably receivable within said grooves; said body being of a transverse size to slidably fit within said support aperture, and being assemblable with said support by aligning said fingers with said grooves and inserting the opposite end of said body into said support aperture, said feet engaging a surface of said support to limit inserting movement of said body, and said fingers positioning said body in predetermined radial relation with respect to said support aperture and being adapted to slide within said grooves after said body is fixed in said aperture.

3. Electrical connection means, comprising: a support, having an aperture, the marginal surface of which is formed with diametrically opposed grooves extending in an axial direction, said support having a recess in one surface countersinking said aperture; a body, having outwardly bent feet extending transversely from one end, and fingers extending from opposite sides of said body and slidably receivable within said grooves; said body being of a transverse size to slidably fit within said support aperture, and being assemblable with said support by aligning said fingers with said grooves and inserting the opposite end of said body through said recess and into said support aperture, said feet engaging the bottom of said recess to limit inserting movement of said body and having a thickness proportionate to the depth of said recess so that the outer surfaces of said feet are flush with said one surface of said support, and said fingers positioning said body in predetermined radial relation with respect to said support aperture.

4. Electrical connection means, comprising: a support, having an aperture, the marginal surface of which is formed with a groove extending in an axial direction; a tubular body, having a slot in its marginal wall extending in a longitudinal direction, and having outwardly bent foot means extending transversely from one end, said body being of a transverse size to slidably fit within said support aperture; a member, at least partially disposed within said body for slidable movement longitudinally of said body, having a finger slidable within said body slot, and engaging margins of said slot to limit movement of said member, said finger projecting beyond the outline of said body and being receivable within said groove; said body being assemblable with said support by aligning said finger with said groove and inserting the opposite end of said body into said support aperture, said foot means engaging a surface of said

support to limit inserting movement of said body, the projecting portion of said finger engaging the marginal surfaces of said groove to position said body in predetermined radial relation with respect to said support aperture.

5. Electrical connection means, comprising: a support, having a polygonal aperture formed with axially extending grooves in opposed marginal surfaces; a tubular sheet-metal body, having a first pair of longitudinally extending slots in opposed marginal walls, and a second pair of longitudinally extending slots in other opposed marginal walls, said body having also a loop at one end for receiving a conductor terminal, and outwardly bent foot means extending transversely from the opposite open end, and said body being of a polygonal transverse size to slidably fit within said support aperture; a member, at least partially disposed within said body adjacent said opposite open end for slidable movement longitudinally of said body, having opposed fingers respectively slidable within said first pair of body slots, and engaging margins of said slots to limit movement of said member, said fingers projecting beyond the outline of said body and being receivable within respective support aperture grooves; a detent, slidable longitudinally within said body, and having fingers respectively slidable within said second pair of slots, and engaging margins of said slots to limit movement of said detent, said detent communicating with said loop; a single resilient means, disposed within said body between said member and said detent, urging said member outwardly of said body and said detent toward said loop to yieldably engage a conductor terminal in said loop; said body being assemblable with said support by aligning said member fingers with said support aperture grooves and inserting said loop of said body into said support aperture, said foot means engaging a surface of said support to limit inserting movement of said body, the projecting portion of said fingers engaging the marginal surfaces of said grooves to position said body in predetermined radial relation with respect to said support aperture.

6. Electrical connection means, comprising: a support, having an aperture, the marginal surface of which is formed with diametrically opposed grooves extending in an axial direction, said support having a recess in one surface countersinking said aperture; a tubular body constructed of sheet material, having outwardly bent feet extending transversely from one extremity, and fingers extending from opposite sides of said body and slidably receivable within said grooves; said body being of a transverse size to slidably fit within said support aperture whereby said body will be held in place by friction, and being assemblable with said support by aligning said fingers with said grooves and inserting the opposite extremity of said body through said recess and into said support aperture, said feet engaging the bottom of said recess to limit inserting movement of said body and having a thickness proportionate to the depth of said recess so that the outer surfaces of said feet are flush with said one surface of said support, and said fingers positioning said body in predetermined radial relation with respect to said support aperture.

7. Electrical connection means, comprising: a support, having an aperture, the marginal surface of which is formed with a groove extending in an axial direction; a tubular body, having a

slot in its marginal wall extending in a longitudinal direction, and having outwardly bent foot means extending transversely from one end, said body being of a transverse size to slidably fit
5 within said support aperture; a member, at least partially disposed within said body for slidable movement longitudinally of said body, having a finger slidable within said body slot, said finger projecting beyond the outline of said body and
10 being receivable within said groove; said body

being assemblable with said support by aligning said finger with said groove and inserting the opposite end of said body into said support aperture, said foot means engaging a surface of said support to limit inserting movement of said body, the projecting portion of said finger engaging the marginal surfaces of said groove to position said body in predetermined radial relation with respect to said support aperture.

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