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W. J. McFADDEN
ELECTRICAL CONNECTER

2,050,440

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Fig 1

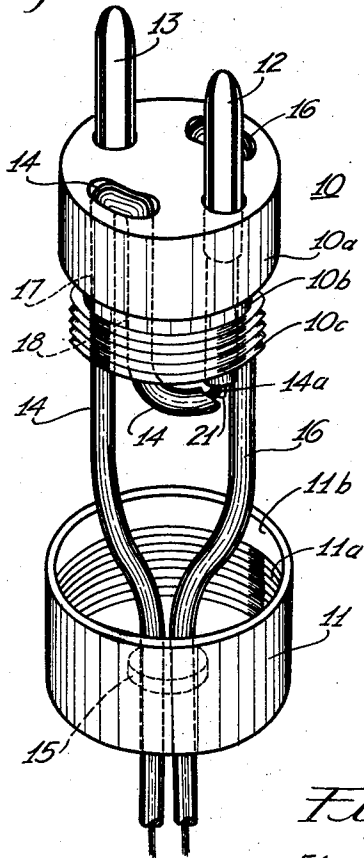


Fig 2

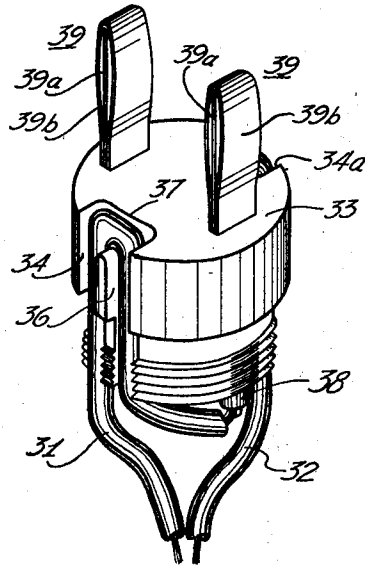


Fig 3

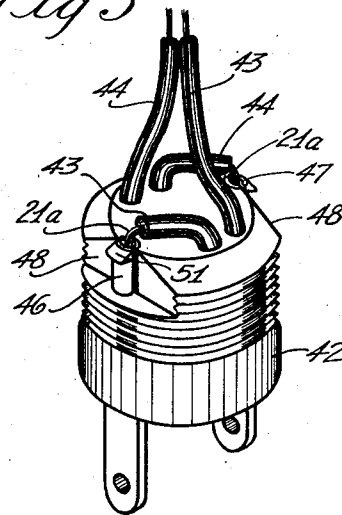


Fig 5

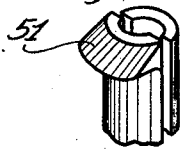
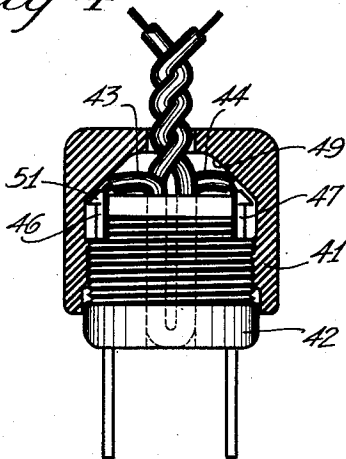


Fig 4



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ELECTRICAL CONNECTER

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1 Claim. (Cl. 173—361)

This invention relates to electrical connectors and has particular relation to the binding posts, electrical contacting members and conductor engaging means for such connectors.

5 In the electrical connectors ordinarily used in lighting circuits, electrical business machines, electrical surgical instruments and electrical devices in general where portions of circuits are connected and disconnected from other portions
10 of the circuit at will, some considerable difficulty is encountered at times because the contacting members of the connectors are in loose engagement with one another and because strain on the conductors is likely to pull the ends of the con-
15 ductors out of their respective binding posts. Furthermore, the set screws commonly employed in certain connectors for gripping the electrical connectors sometimes loosen, thus permitting poor electrical contact between the conductors and the binding posts.

20 It is therefore a general object of my invention to provide a connector which will avoid the difficulties of the devices of the prior art.

25 It is also a general object of my invention to provide, in an electrical connector, means for relieving strains imposed upon the binding posts by the conductors.

30 It is another object of my invention to provide improved contacting members and binding posts for electrical connectors.

35 It is another object of my invention to provide simple and easy means for making electrical connections between conductors and binding posts which need not be soldered or secured by screw means.

40 It is another object of my invention to provide, in an electrical connector, means for securing the conductors to the respective binding posts without the use of a soldered joint or threaded binding means.

Another object of my invention is to provide, in an electrical connector, means for maintaining contact between the contacting members of such devices.

45 Another object of my invention is to provide an extremely simply and dependable connector in which parts which might become loosened or lost are eliminated.

50 Other and further features and objects of the invention will be more apparent to those skilled in the art upon a consideration of the accompanying drawing and following specification, wherein is disclosed several exemplary embodiments of the invention, with the understanding,
55 however, that such changes may be made therein

as fall within the scope of the appended claims, without departing from the spirit of the invention.

In said drawing:

Figure 1 is an enlarged view in perspective of 5 a plug connector and plug cap constructed according to one embodiment of my invention.

Figure 2 is an enlarged view in perspective of a plug connector constructed according to another 10 embodiment of my invention.

Figure 3 is an enlarged view in perspective of a plug connector illustrating still another embodiment of my invention.

Figure 4 is an enlarged view, partly in section and partly in elevation, of the device shown in 15 Figure 5 with the plug cap, also shown in section, threaded on the plug; and

Figure 5 is an enlarged fragmentary view in perspective of a binding post of the device shown 20 in Figures 3 and 4.

Referring now to the drawing and more particularly to Figure 1, the connector plug here shown is more particularly adapted for use when a plug and socket of small diameter is desirable, as for instance in surgical instruments, beauty 25 treatment devices, business machines and the like. The socket, with which this plug may be used, is well known in the art and therefore has not been illustrated. The connector here shown is comprised of a plug 10 and its parts and a plug 30 cap 11 adapted to be threaded on the end of the plug. In the device here shown a pair of contact posts 12 and 13 are secured in the body of the plug 10 in accordance with the usual construction and these contact posts are comprised of an 35 inner rod-like member and an outer spring cap comprised of a four leafed spring member fitting over the central rod with the parts thereof adapted to spring outwardly against the walls of the socket contacts (not shown) to maintain 40 contact therewith.

In this embodiment of my invention the posts 12 and 13 are drilled from their outer ends, as indicated at 14a, to receive the bared ends of the insulated or covered conductors 14 and 16. In 45 this embodiment of the invention also two pairs of parallel bores 17 and 18 are drilled longitudinally through the plug. These bores are of slightly larger diameter than the outside diameter of the covering of the conductors 14 and 16 50 and the inner or upper ends of adjacent bores are connected so that the conductors which lie in these bores do not project above the inner surface of the plug.

The inner portion of the plug 10, indicated at 55

10a, is cylindrical in shape but the lower portion 10b is cut away at its outer periphery and is provided with screw threads 10c. The cap 11 is threaded, as indicated at 11a, except for a portion at 11b which is cut away so that the inner edge of the cap may slip over the cylindrical portion 10a of the plug 10 when the cap is threaded on the plug.

In connecting conductors 14 and 16 to the binding posts 12 and 13 the conductors are passed through a centrally located opening 15 of the cap 11 and one conductor is threaded up through the bore 17 and down through the bore 18, and the bared conductor inserted in the bore in the outer end of the post 12. The conductor 16 is threaded upwardly through the bore 17a and down through the bore 18a and is inserted in the outer end of the post 13 in the same manner as conductor 14 was inserted and secured in post 12. The cap 11 is then threaded onto the plug 10. In this embodiment of the invention the bared conductors 14 and 16 are held in place within the openings in the posts 12 and 13 by means of small pins 21 which are forced into the openings of the posts after the wires have been inserted therein.

It will be found that by looping the wires through the parallel bores of the plug in this manner any strain on the conductors outside the plug tends only to wedge the conductors into the plug at the point where the parallel bores are connected and that no strain reaches the connection of the conductors with the binding posts. Since there is no strain on the conductors in the posts and since these connections need meet only the needs of good electrical connections without the necessity of supplying also strain resisting devices the pins 21 are quite effective in securing and maintaining a good electrical contact.

In the device shown in Figure 2, substantially the same principle of operation is utilized in engaging the conductors 31 and 32 to the plug 33 to relieve strain except that in the case of this embodiment of the invention the means for receiving the conductors in the plug are grooves in the side wall of the plug rather than the parallel bores of the device shown in Figure 1, the grooves 34 and 36 being connected by a horizontal groove 37 at the top or inner end of the plug. The conductor 32 is received within grooves indicated at 34a on the other side of the plug in the same manner as the conductor 31 is received in the grooves 34, 36, and 37. The cap preferably is sufficiently elongated to cover, in its engaged position, almost the entire side wall of the plug to thus cover and protect the conductors. The advantage of this structure over that shown in Figure 1 is that the bared conductors 31 and 32 may be first secured in binding posts 38 and then the conductors inserted in their respective grooves, whereas in the device shown in Figure 1, the conductors must be first threaded through the bores and then inserted in the binding posts, the first operation being a somewhat simpler and quicker manufacturing operation.

In the device shown in Figure 2, I have illustrated a pair of contacting members 39 constructed according to one embodiment of my invention. These contacting members consist of

a flat relatively rigid strip 39a over which spring strips 39b are secured. These strips 39b are flat strips of springy conducting material bent back upon themselves and with the end thereof secured in the plug 33. These contacting members have been found very effective in retaining the plug in place in the socket.

In Figures 3, 4, and 5 I have illustrated a modified form of my invention in which the cap 41, as it is threaded upon the plug 42, is employed for gripping the bared conductors 43 and 44 in binding posts 46 and 47. In this embodiment of the invention the plug 42 is cut away, as indicated at 48, to expose the outer end of the binding posts 46 and 47 and the binding posts are slit at the bores 21a to permit the exposed side walls of the bores of the binding posts to be driven inwardly to grip the bared conductors. The inner bottom wall of the cap 41 is preferably beveled as indicated at 49 and this bevel serves to drive the side walls of the binding posts 46 and 47 inwardly, thus causing the side walls to grip the inserted bared end of the conductors 43 and 44 in a vise-like manner.

In order to facilitate this wedging action of the beveled portion 49 of cap 41 against the binding posts 46 and 47 the binding posts are preferably provided with sloping lips 51, as indicated in the drawing, which lips are adapted to be engaged by the beveled inner wall of the cap 41 to assist in driving them inwardly against the conductors.

It is apparent that, in the modifications of the invention shown in Figures 3, 4, and 5, no pins or like means are necessary in holding the bared conductors in the binding posts and that this action is secured merely by threading the cap tightly onto the plug.

It is apparent that I have provided improved means for gripping the conductors as they enter the plug so that strain on the conductors is not transmitted to the binding posts of the plug. Furthermore, I have provided improved means for holding the contacting members in the socket, thus to engage the plug in the socket so that it is not readily removed or dislodged therefrom. It is also apparent that I have provided a new and improved means for engaging the bared conductors in the binding posts of the plug.

It is apparent that modifications of my invention may be made by those skilled in the art. Such modifications may be made without departing from the spirit and scope of my invention as set forth in the appended claim.

I claim as my invention:

In a connector, a cylindrical plug member having six openings extending entirely therethrough, the axes of which are spaced along a circle which is approximately concentric with the axis of the plug member, a pair of contact prongs positioned in two oppositely disposed openings, a free end of each prong being adapted to constitute a contact member, and a pair of conductors, each conductor being threaded from the base of the plug through an opening, then reversely through an adjacent opening back to the plug base and being electrically connected to that end of the prong adjacent the base of the plug.

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