Jan. 13, 1953 H. P. DUPRE 2,625,578

SOCKET HAVING A LOCKING TAB WITH A GRADUALLY SLOPING CAMMING SURFACE

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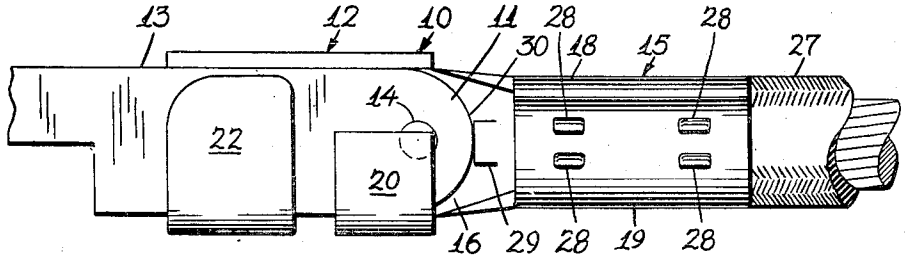

FIG. 1.

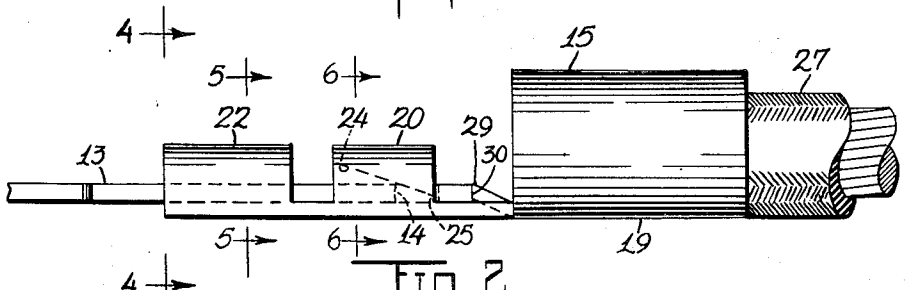

FIG. 2.

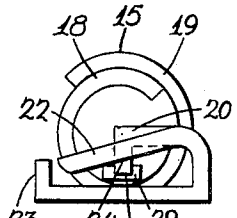

FIG. 4.

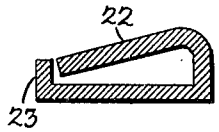

FIG. 5.

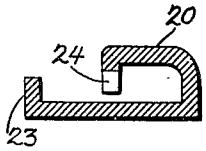

FIG 6

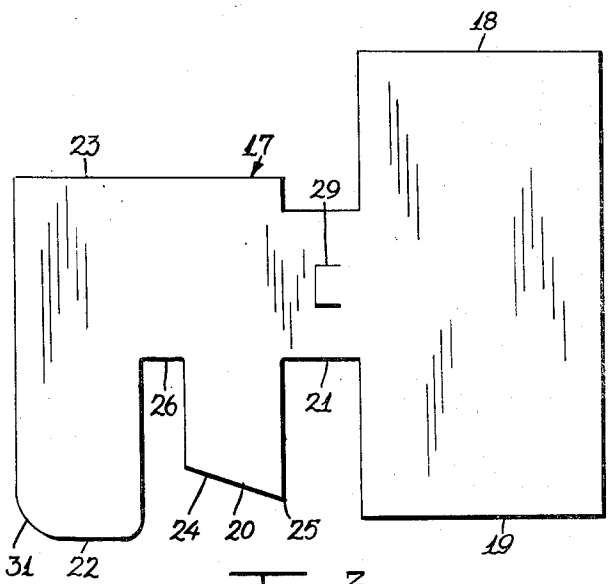

FIG. 3.

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SOCKET HAVING A LOCKING TAB WITH A GRADUALLY SLOPING CAMMING SURFACE

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2 Claims. (Cl. 173—363)

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This invention relates to connectors and more particularly to a longitudinally displaced type of electrical connector that may be used in association with solder pads on relays or the like.

It has been the custom in the construction of relays, telephone jacks and similar equipment to provide a contact tip having an aperture at one end through which a bared end of a conductor is looped and soldered to make the electrical connection. There are many disadvantages in the use of a soldered connection, involving the use of a soldering iron with possible damage to the cable insulation and relay. Additionally soldering requires an excessive amount of time for making the installation, and does not afford a ready means for separating the connection. The use of a solderless relay connector overcomes these disadvantages with an overall savings in use.

It is therefore a primary object of my invention to provide a solderless connector socket that can be used with the presently constructed and installed solder pads or like equipment without modification, and which may be quickly connected and separated and reused when necessary without special tools or destruction of the connection or parts thereof.

It is a further object of my invention to provide an electrical connector with a spring contact means and a spring locking means which insures an efficient electrical connection that cannot be disconnected accidently.

Another object of my invention is to provide in a separable electrical connector a positive locking means having a cam portion to permit the connector members to be readily joined and an interlocking portion which prevents separation until intentionally released.

Still further objects of my invention are to provide a connector which can be formed from a blank stamped from sheet metal; to provide a sheet metal blank having a plurality of integrally formed tabs which can be shaped into the component portions of the socket connector half; to provide an integrally formed overlapping barrel portion which may be indented through the overlap to the conductor inserted therein; to provide a stop means to limit the inward movement of a counter part portion of a connector and to prevent loosening of the connection; and to provide a connector having the above characteristics, of simple construction which lends itself to economical manufacture.

I accomplish these and other objects and obtain my new results as will be apparent from the device described in the following specification, particularly pointed out in the claims, and illustrated in the accompanying drawing, in which—

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Fig. 1 is a top plan view of my novel assembled connector showing a portion of the solder pad.

Fig. 2 is a side elevation view of the same.

Fig. 3 is a top plan view of the blank from which the socket member of the connector is constructed.

Fig. 4 is an end elevation view of the socket member only taken along line 4—4 of Fig. 2.

Fig. 5 is a cross-sectional view of the socket member only taken along line 5—5 of Fig. 2.

Fig. 6 is a cross-sectional view of the socket member only taken along line 6—6 of Fig. 2.

Referring to the drawing reference numeral 10 indicates a longitudinally displaced type of electrical connector comprising a plug member 11 and a socket member 12.

The plug member 11 is a conventional solder pad used in relays, telephone jacks and like equipment having a contact portion 13 with a recess or aperture 14 which heretofore has been utilized to contain the bared end of a conductor not shown, for soldering to the pad. The contact tip of the solder pad is in strip form and may be constructed of sheet metal.

The socket member 12 is preferably made of thin spring tempered Phosphor bronze material having a barrel portion 15 and a contact portion 16 constructed from a sheet metal blank 17 as illustrated in Fig. 3. The blank 17 comprises a plurality of tab portions; end tabs 18 and 19 connected to intermediate tab 20 by a bridge portion 21 and end tabs 22 and 23. The end tabs 18 and 19 are of a width sufficient to enable them to overlap when forming the barrel 15. Intermediate tab 20 is formed with a skewed edge 24 with a pointed end 25 for use as a camming surface and locking means respectively, as will be hereinafter described. The tab 20 is spaced from the end tab 22 by a re-entered section 26 to provide independent resiliency in the respective tab portions. Tab 23 has a narrow width and extends substantially the length of the contact portion 16.

To form the finished socket member, the thin free ends of tabs 18 and 19 are rolled into an overlapping relation to form the barrel portion 15, as shown in Fig. 4 for receiving the bared end of conductor 27, which is indented to the barrel through the overlapped portions 18 and 19, by means of a special indenter making a plurality of small longitudinally and transversely spaced indentations 28 especially devised for indenting the overlapping ends of resilient metal. The tab por-

tion 20 is bent over, in the form of a loop, as shown in Fig. 6, with the skewed pointed end portion 24 in a position normal to the contact portion 16. The skewed portion is in a position normal to the contact position and spaced there from a distance less than the thickness of the plug blade and longitudinally aligned with a center line passing through the aperture 14 in the plug. The skewed portion forms a cam surface for the end of the plug as it is inserted into the socket member, the tab 20 being biased upwardly until the pointed end 25 drops into the aperture 14 by the springiness of the material which presses and locks the plug to the socket member. Further inward movement of the plug end 30 is prevented by abutment with a lip or stop 29 which is struck up from the surface of the bridge portion in the socket member. The lip 29 may be formed in the sheet metal blank during the stamping operation.

As the pointed end 25 snaps into aperture 14 of the plug the outer edge of the tab 20 abuts a portion of the forward wall of the aperture, as shown in Fig. 2, forming a stop. To withdraw the plug, the tab 20 may be pried upward by insertion of any sharp instrument within the loop portion to disengage the pointed end 25 from the aperture 14.

The tab 22 is bent over to form a resilient leaf, the free end of which is spaced from the contact portion of the socket member less than the thickness of the plug blade, as shown in Fig. 5. The forward edge 31 of the tab 22 is rounded to facilitate entry of the plug blade. As the plug is inserted into the socket member, the resilient tab wipes along the plug blade firmly pressing the members together to insure an efficient electrical contact.

The tabs 20 and 22 cooperating with the tab 23, which is bent into a shoulder, forms the socket of the socket member and guides the plug member to the inward position where it is locked by the pointed end 25 of the tab 20.

I thus provide a longitudinally displaced type of electrical connector that can be mechanically attached to a solder pad without modification or to any plug member having an aperture or a recess at one end. By utilizing a resilient locking tab having a prong to engage the aperture or recess, I can prevent unintentional separation and obtain a positive mechanical connection. By providing a resilient contact tab, I can maintain the plug and socket connector members in firm electrical contact insuring an efficient "wiped" connection supplemented by the resilient locking tab.

I can economically construct my connector from a metal blank stamped from sheet stock having all the component portions formed integrally. With my connector, a minimum of spacing between adjacent connectors in any installation can be maintained, as the connector is approximately the width of the conductor it is attached to and no lateral clearance is needed in making or breaking the connection.

I have thus described my invention, but I desire it understood that it is not confined to the particular forms or uses shown and described, the same being merely illustrative, and that the invention may be carried out in other ways without departing from the spirit of my invention, and, therefore, I claim broadly the right to employ all equivalent instrumentalities coming within the scope of the appended claims, and by means of which, objects of my invention are attained and new results accomplished, as it is obvious that the particular embodiments herein shown and described are only some of the many that can be employed to attain these objects and accomplish these results.

I claim:

1. A separable connector socket for accommodating a flat solder pad member having an aperture at its free end for threadedly receiving a conductor intended to be soldered therein, said socket member having at one end a ferrule adapted to be connected to the bared end of a conductor, and at the other end a flat contact surface to engage the solder pad member, a resilient locking tab mounted on one side of the socket member extending over and spaced from the contact surface a distance less than the thickness of the solder pad member and having a gradually sloping camming surface extending longitudinal and inwardly of the socket member terminating in a locking projection to engage the aperture of the solder pad to lock the members together, an upstanding shoulder extending from the opposite side of the socket member forming a socket substantially rectangular in cross-section with the flat contact surface and the resilient tab, to prevent lateral displacement of the flat pad member, a resilient contact tab mounted on the socket member and provided with a camming surface, said contact tab extending over and at the end of the camming surface spaced from the contact face a distance less than the thickness of the solder pad member whereby the pad member will be pressed and locked in position by the socket member to obtain an efficient electrical and mechanical connection without the use of solder.

2. The connector socket of claim 1, wherein the gradually sloping camming surface of the locking tab extends across said tab in a direction longitudinal of the socket member.

HENRY PETER DUPRE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,225,127	Heath	May 8, 1917
1,482,888	Converse	Feb. 5, 1924
1,995,115	Douglas	Mar. 19, 1935
2,279,915	Cram	Apr. 14, 1942
2,303,384	Penfold	Dec. 1, 1942
2,318,647	White	May 11, 1943
2,427,182	Bergan	Sept. 9, 1947
2,451,800	Buchanan et al.	Oct. 19, 1948