

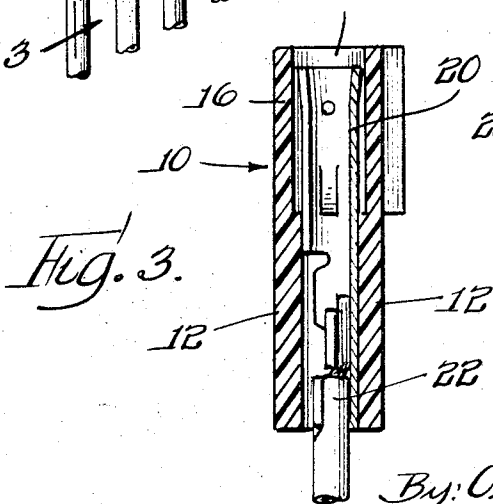
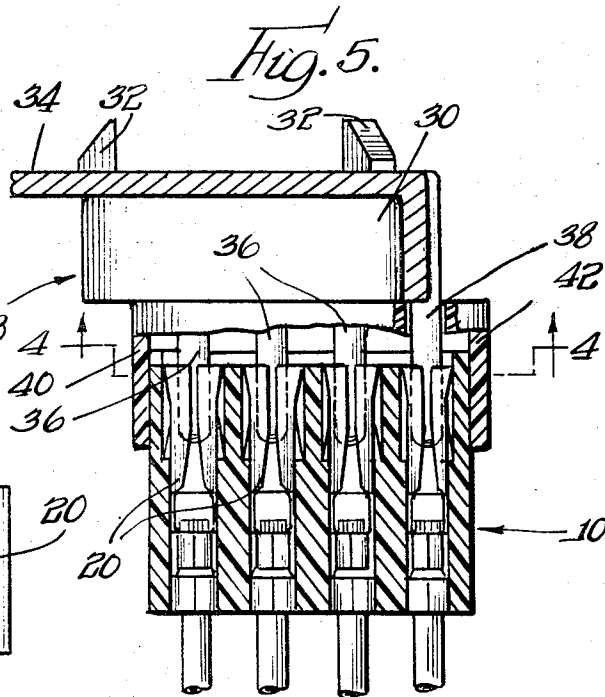
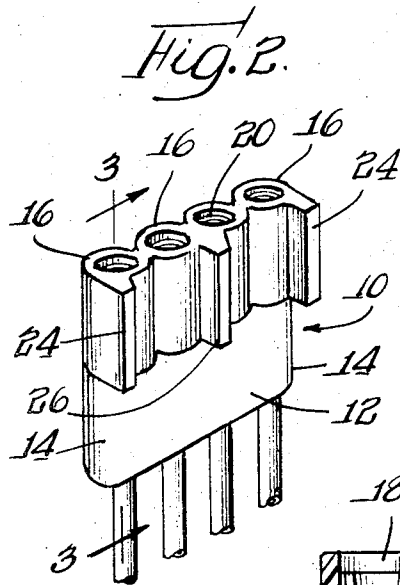
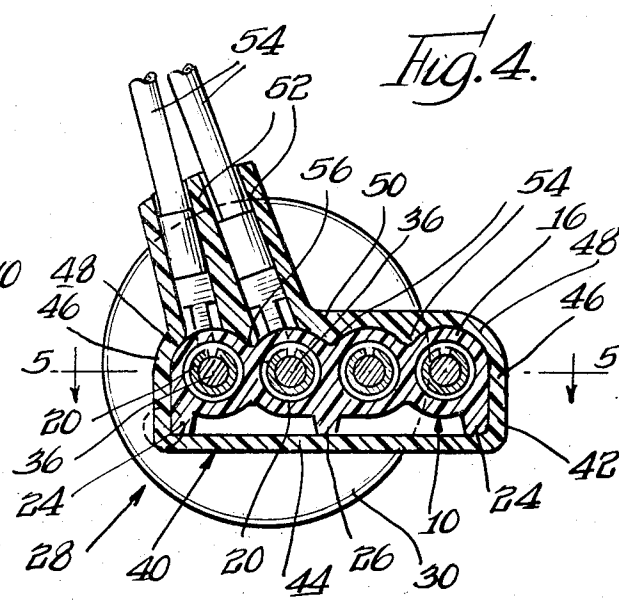
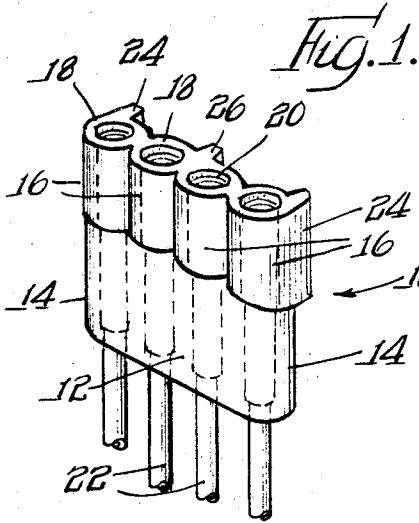
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3,407,380

ELECTRICAL CONNECTOR

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3,407,380

ELECTRICAL CONNECTOR

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Original application Mar. 16, 1965, Ser. No. 440,075.

Divided and this application June 9, 1966, Ser. No. 556,446

3 Claims. (Cl. 339—186)

This invention comprises a division of my application Ser. No. 440,075 filed Mar. 16, 1965, for "Switch Connector."

The present invention relates to a plug-in type of female electrical connector. Connectors of this type are known in the art, and the present connector is concerned particularly with association or reception of four transversely aligned male pins. The necessity of keying such structure to prevent reversed connection will be apparent.

Prior art connectors of the same general type have not been sufficiently positively keyed. Such devices also have required relatively thick walls. This is wasteful of material, and also leads to problems of distortion in plastic sections and problems in molding. Such prior art devices also have had electric terminal members therein which have been only marginally satisfactory as electric contacts.

Accordingly, it is an object of the present invention to provide an improved plug-in female connector.

More particularly, it is an object of the present invention to provide a plug-type connector which is more efficiently keyed than any heretofore known in the art.

It is yet another object of the present invention to provide an electric connector having thin wall sections, thereby minimizing the use of material and avoiding problems in molding and avoiding warpage problems of thick plastic sections.

Yet another object of the present invention is to provide an improved electric connector having superior terminals therein making a large area surface engagement.

Other and further objects and advantages of the present invention will be apparent from the following description when taken in connection with the accompanying drawings wherein:

FIG. 1 is a perspective view of a connector made in accordance with the present invention;

FIG. 2 is a perspective view of the connector taken from the opposite side;

FIG. 3 is a longitudinal section through the connector as taken along the line 3—3 in FIG. 2;

FIG. 4 is a cross-section through the connector and through an associated male unit as taken along the line 4—4 in FIG. 5; and

FIG. 5 is a longitudinal section through the connector and the cooperating male unit as taken substantially along the line 5—5 in FIG. 4.

Turning now in greater particularity to the figures and first to FIGS. 1—3, there will be seen a plug 10 constructed in accordance with the principles of the present invention. This plug is made of a suitable U.L.-approved thermoplastic material, nylon being one satisfactory example. The lower portion of the plug is generally flat, as indicated at 12 with generally rounded ends 14 connecting the flat sides. The plug continues up to an upper portion or entering end formed substantially in the shape of a plurality of adjoined cylinders 16 having bores 18 therein receiving preferably crimp-on terminals 20. These terminals preferably are of the type shown in my Patent 3,178,673. The terminals are mechanically crimped onto lead wires 22 entering bottom ends of the bores 18, with the upper portions of the terminals being of split tubular form to receive cylindrical male pins in surface engagement therewith.

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The plug 10 is provided with flanges 24 at the corners or lateral edges of one side and with a central projecting flange or nib 26 for keying the plug to a socket, and also for providing support for the plug from the side on which the flanges are located. The flanges 24 are tangent to the adjacent cylinders 16 and extend in the same direction substantially parallel to one another. As will be appreciated, the rounded nature of the opposite lateral edges of the upper portion of the plug along with the flanges 24 and 26 preclude the insertion of the plug in reversed position relative to a socket of more or less complementary configuration.

There is a plurality of terminals 20 greater than two, and as will be observed, in the preferred embodiment of the invention, there are four female terminals 20 and four bores 18 in which they are received. Obviously, for most efficient use of the plug and a complementary socket, four electric connections are made with four male pins in the socket.

The terminals preferably are applied to the wires and snapped into the plug, generally as contemplated in my previously-identified Patent 3,178,673, although it is certainly within the scope of the present invention that the terminals either with or without the wires could be molded in the plug during the manufacture thereof.

Although the plug as heretofore shown and described has wide application, including association with a receptacle of complementary shape having male pins therein, the plug is hereinafter shown in combination with a particular switch connector for consistency with the parent application Ser. No. 440,075. In particular, the complementary switch connector, hereinafter identified by numeral 28, includes a cylindrical, molded plastic switch housing 30 housing any suitable switch and having integral bayonet connections 32 for attachment to a base plate 34. Three male pins 36 depend from the cylindrical switch housing 28. A fourth pin 38 is formed integral with the mounting plate 34, serving as a grounding pin, and depends in parallel, side-by-side array with the pins 36. As will be seen in FIGS. 4 and 5, the tubular terminals 20 respectively receive the male pins 36 and 38.

An integral skirt or shroud 40 depends from the cylindrical switch housing 30 and projects at one end 42 beyond the switch housing. The skirt or shroud 40 is provided with one vertical flat wall 44 against which the flanges 24 and 26 abut. End walls 46 form right-angle corners with the flat wall 44, thus further cooperating with the flanges 24. The corners opposite the right-angle corners are rounded as at 48 for cooperation with the cylindrical portions 16 of the plug, and positively precluding association with the flanges 24. The shroud or skirt is provided with a second and relatively short sidewall 50 parallel to the sidewall 44 in spaced relation thereto, and provided in one corner with lateral guide-ways or chutes 52 accommodating motor leads 54 having terminals slipped over two of the pins 36. The inside of the wall 50 is complementary to the plug, having ridges 54 and a protrusion 56 on the dividing wall between the chutes 52 which fit into the flutes between adjacent cylindrical sections 16.

From the foregoing it will be seen that the plug uses a minimum of material and is keyed to the complementary socket structure, and also is supported therefrom by the flanges 24 and 26. It will be understood that the particular example as herein shown and described is for purposes of illustration. Various changes will no doubt occur to those skilled in the art and will be understood as forming a part of the present invention insofar as they fall within the spirit and scope of the appended claims.

The invention is claimed as follows:

1. A plug-type electric connector comprising a plu-

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ality of cylindrical conductive terminal members in spaced apart, side-by-side parallel array, and an unsupported insulated resinous plastic housing positioning and supporting said terminals; said housing being generally wide and flat and having an entering end comprising a series of side-by-side adjoined hollow cylindrical sections each coaxial with and supporting one of said terminal members, the two laterally outermost of said cylindrical sections having projections extending therefrom and elongated axially of the terminals for positioning and keying said electric connector relative to a complementary electric connector.

2. An electric connector as set forth in claim 1 wherein the projections comprise flanges tangent to the two laterally outermost cylindrical sections extending substantially parallel to one another.

3. An electric connector as set forth in claim 1 and

further including at least one more projection intermediate the first two mentioned projections and extending substantially in the same direction.

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