

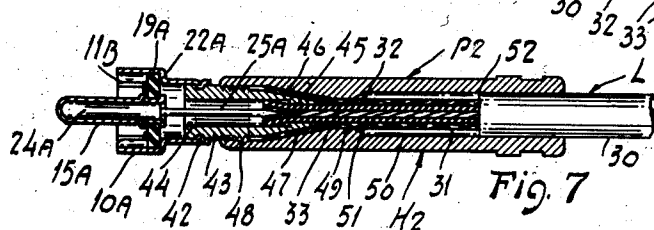
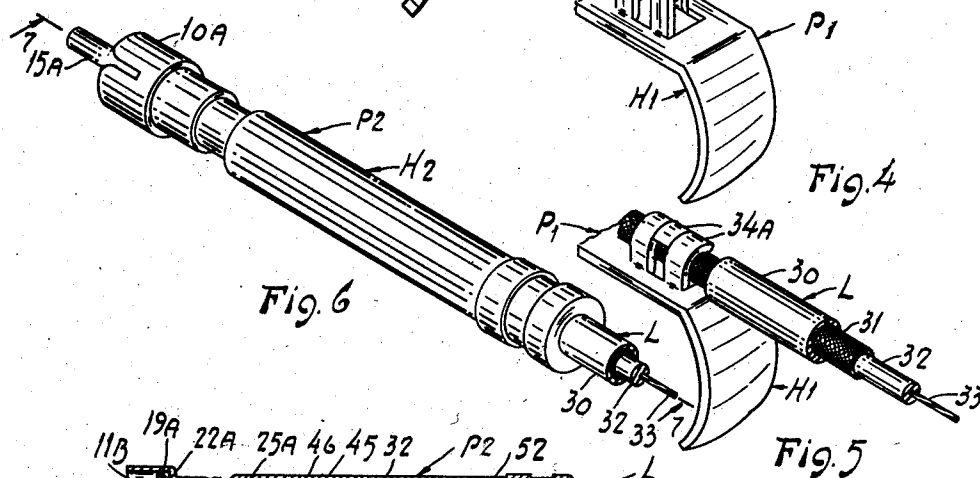
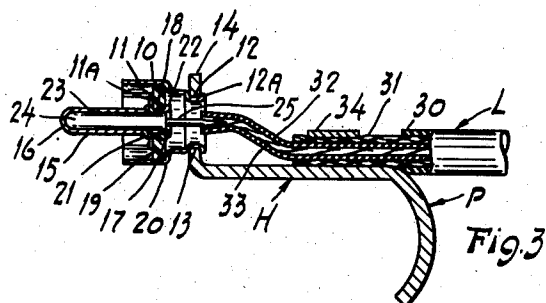
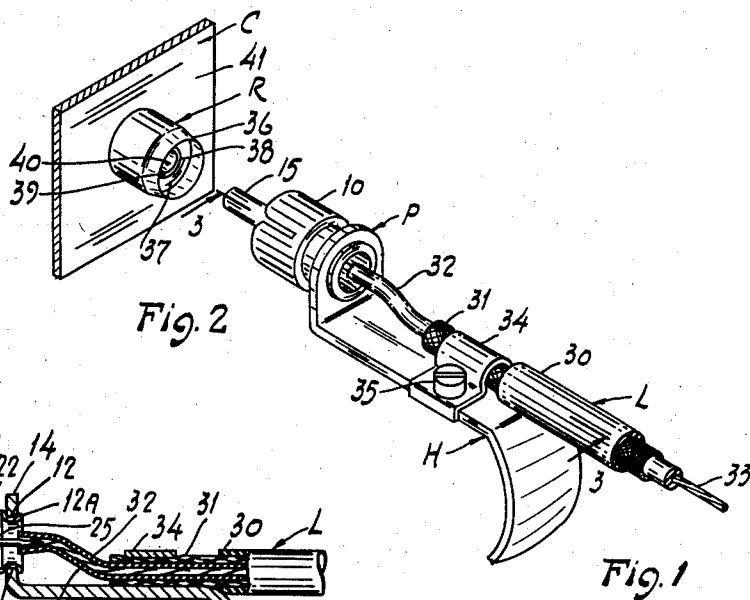
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SOLDERLESS ELECTRICAL CONNECTOR

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SOLDERLESS ELECTRICAL CONNECTOR

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1 Claim. (Cl. 339—100)

Our invention relates to electrical conductor terminals, and more particularly relates to solderless type terminals for shielded and coaxial cables.

The shielded and coaxial cables used as interconnections between electronic devices is usually comprised of a very fine stranded or tinsel center lead surrounded by a tubular insulation. Coaxially disposed around the central lead, and over the tubular insulation, is a stranded wire lead which is used as a companion lead for the center lead and a shielding means for the center lead. Surrounding the coaxial lead and over the entire assembly is a sheath of insulating material. As it is very difficult to make a satisfactory electrical connection to the fine center lead of the cable, it is an object of our invention to devise a solderless terminal for a coaxial cable that is readily and securely applied to the coaxial cable end.

Another object of our invention is to devise a terminal for a coaxial cable that provides positive electrical connection between the current carrying parts of the terminal and the current carrying leads of the cable.

Another object of our invention is to devise an electrical terminal for a coaxial cable that provides definite securing of the coaxial lead to prevent movement between the current carrying parts of the terminal and the attached leads and thus prevent destruction of the electrical connection.

Another object of our invention is to devise an electrical terminal for a coaxial cable having the current carrying elements of the terminal coaxially disposed.

Other objects of our invention are to provide an improved device of the character described, which is easily and economically produced, which is sturdy and compact in construction, and which provides positive and secure termination for the leads of a coaxial or shielded cable.

With the above and related objects in view, our invention consists in the details of construction as hereinafter shall be set forth, and the description will be more readily understood when read in conjunction with the accompanying drawings, in which:

Fig. 1 is an isometric view of a preferred embodiment of our improved terminal showing the terminal applied to the leads of a coaxial cable.

Fig. 2 is an isometric view of the female portion of our improved connector shown positioned in the panel of an electronic device chassis.

Fig. 3 is a sectional elevational view taken along the line 3—3 of Fig. 1.

Fig. 4 is an isometric view showing a modified method of securing the coaxial cable to the terminal and making electrical contact to the shielding lead of the cable (cable not shown).

Fig. 5 is an isometric view of the modified method of cable securing showing the securing means formed over the shielding lead of the cable.

Fig. 6 is an isometric view of a modified form of our improved coaxial cable terminal.

Fig. 7 is a sectional view taken along the line 7—7 of Fig. 6.

Referring now in greater detail to the drawings, we disclose, in Figs. 1, 2, and 3, a solderless terminal for shielded and coaxial cables. The plug or male portion, generally designated as P, is shown in Fig. 1 and the receptacle or female portion, generally designated R, is shown in Fig. 2. The plug portion P is comprised of a contacting shield 10 having slots 11 therein. The slots 11 are provided in the contacting shield 10 to permit limited flexing of the contacting shield so that it can be pressed onto and have a positive electrical contact with the shield of the receptacle portion R, hereinafter described. A shouldered cylindrical portion 12 of the contacting shield 10 is arranged to interfit with a hole 13 in a handle member 14, the cylindrical portion 12 being expanded at 12A to fixedly secure the contacting shield in definite space relationship to the handle, generally designated as H. The contact making element 15 of the plug unit P is cylindrical in shape with a closed semi-spherical end 16. The inner end 17 of the contact making element 15 is arranged to interfit with a hole 18 in a disc-shaped insulating spacer member 19. The spacer member 19 is positioned by a shouldered portion 20 of the contacting shield 10 and is secured in place by a portion of the metal that is cut out of the slots 11 in the contacting shield. The metal cut out of the slots is allowed to remain attached to the contacting shield 10 at the bottom of the slots. A portion of the strip of metal is then cut off and the balance 11A is bent inward to secure the disc-shaped insulating member 19 (see Fig. 3). A portion of the cylindrical wall of the contact making element 15 is expanded to form a shoulder 21 which interfits with one side of the disc-shaped insulating spacer member 19. The inner end 22 of the contact making element 15 is expanded against the inner side of the disc-shaped insulating member 19 to definitely position the contact making element in coaxial space relationship with the contact making shield 10. Force fitting within the bore 23 of the contact making element 15 is a cylindrical metal insert 24 having a pointed shaft 25 on its inner end (see Fig. 3).

When a mechanic wishes to apply the plug unit P to a shielded or coaxial cable, generally designated as L, he first strips about one inch of the sheath 30 from the cable L exposing the stranded shielding coaxial lead 31, then cuts off about one-half inch of the stranded shield coaxial lead 31, exposing the tubular insulation 32 over the central lead 33. The mechanic then forces the tubular insulation 32 together with the central lead 33 onto the pointed shaft 25, so that the pointed shaft 25 enters the bore of the tubular insulation 32 and makes positive contact with the central lead 33. A relief or securing clamp 34 is then fixedly attached to the handle member 14 by way of the securing screw 35 to provide mechanical securing of the shielded or coaxial cable to the plug unit and electrical connection of the stranded shielding coaxial lead 31 to the plug unit P.

In Figs. 4 and 5 is illustrated a modified form of securing for the stranded shielded coaxial cable lead L. In this embodiment, upwardly extending fingers 34A cut and formed from the metal of the handle unit H1 (see Fig. 4), are spaced and positioned so that they can be bent around the stranded coaxial lead of the cable L (see Fig. 5), to provide mechanical securing of the shielded or coaxial cable to the plug unit and electrical connection of the stranded shielding coaxial lead 30 to the plug unit P1.

The receptacle or female unit R (see Fig. 2), is comprised of a cylindrical shielding element 36 within which is fixedly positioned a disc-shaped insulating member 37 having a central hole 38 in which is fixedly positioned a

metallic female contact element 39. A hole 40 in the contact element 39 is arranged to receive and make contact with the contact making element 15 of the plug unit P. Wire connections (not shown) to electronic devices (not shown) within the chassis are soldered to the inner end of the female contact element 39. The cylindrical shield element 36 is fixedly mounted on the metal panel 41 of the chassis, generally designated C.

From the above description and the illustrations, it will be readily observed that secure and positive connection can be made to a shielded or coaxial cable with little effort on the part of the mechanic making the application.

In Figs. 6 and 7 is illustrated a modified embodiment of our improved connector. In this embodiment, the coaxial relationship of the conducting parts is maintained throughout the plug unit P1 and receptacle unit R. In the latter embodiment, the contacting shield 10A, slots 11B, shouldered cylindrical portion 22A, contact making element 15A, disc-shaped insulating spacer member 19A, and cylindrical metal insert 24A, with pointed shaft 25A are arranged in the same manner as corresponding parts of the first described embodiment. However, in the latter embodiment, the contacting shield 10A is fixedly secured by crimping to a cylindrical tapered body member 43. A hole 44, extending longitudinally through the center of the cylindrical tapered body member, provides definite coaxial space relationship between the pointed shaft 25A, which extends longitudinally through the hole 44, and the metallic wall of the cylindrical tapered body member 43. A reduced diameter hole 45, adjacent to the tapered end 46 of the cylindrical tapered body member 43, is of a size that neatly interfits with the external surface of the tubular insulation 32 of the shielded or coaxial cable. With this arrangement, it can readily be observed that when the mechanic inserts the tubular insulation 32 having the central lead 33 within a hole therein, the pointed shaft 25A will be in perfect alignment to enter the hole in the tubular insulation 32 and make positive contact with the central lead 33. The tapered end 46 of the cylindrical tapered body member 43 is arranged to interfit with an internal taper 47 in the handle member H1. When the plug unit P1 is assembled, the stranded shielding coaxial lead 31 of cable L is arranged to be positioned between the tapered end 46 of the body portion 43 and the internal taper 47 in the handle H1 (see Fig. 7). Interfitting helical threads on the body portion 43 and handle unit H1 at 48 provide for definite securing of the body portion 43 and handle H1 and clamping action between the tapered end 46 of the tapered body portion 43 and the internal taper 47 in the handle unit H2 to provide definite electrical connection for the coaxial lead 31 and mechanical securing for the cable L. A constriction 49 in the lateral hole in the handle unit H2 is of a size that neatly interfits with the external surface of the coaxial lead 31 and a hole 50, tapered at its inner end 51 and of a size to neatly interfit with the sheath 30 of the cable L, is provided in the handle unit H2. The handle portion H2 of the plug P1 may be fabricated from metal or insulating material.

When a mechanic wishes to apply the plug unit P1 to a

shielded or coaxial cable L, he first strips about one and one-half inches of sheath 30 from the cable L, exposing the stranded shielding coaxial lead 31. He then threads the cable end into the handle unit. The taper 51 in the hole 50 assists the mechanic in this operation until the cut sheath end 52 abuts the tapered end 51 of the hole 50. With the cable in this latter position, the cut end of the cable extends about one-half inch beyond the threaded end of the handle unit H2. The mechanic now flares the stranded coaxial lead 31 slightly, and threads the tubular insulation 32 into the hole 44 on the threaded body member 43, the central lead 33 making contact with the pointed shaft 25A, and then forms the strands of the stranded coaxial lead over the taper 46 of the body portion 43. He now slides the handle unit H2 up and engages the interfitting helical threads 48 on the body portion 43 and handle unit H2 to secure the entire assembly and electrically connect the central lead 33 and coaxial lead 31 to the plug unit P1.

From the above description and illustrations of the latter embodiment, it can readily be observed that coaxial positioning of the current carrying parts and leads is maintained throughout the entire plug assembly P1. The stranded shielding coaxial lead 31, being in coaxially spaced relationship to the central lead 33; the cylindrical tapered body member 43, being in coaxially spaced relationship with the pointed shaft 25A; and the contacting shield 10A being in coaxially spaced relationship to the contact making element 15A.

The receptacle unit employed with the plug unit P1 is the same as that used with the plug unit P and as illustrated in Fig. 2 and described above.

Although our invention has been described in considerable detail, such description is intended as being illustrative rather than as limiting, as the invention may be variously embodied, and the scope of the invention is to be determined as claimed.

We claim as our invention:

A coaxial and shielding cable terminal comprising a tubular contacting shield, a disc shaped insulating member held within said tubular contacting shield, a pointed shaft held by a metallic insert and centrally supported upon said insulated disc, a handle member secured to the outside of said contacting shield, a relief clamp detachably secured to said handle and being adapted to grasp the insulation of a cable, said pointed shaft being adapted to pierce one end of the cable whereby electrical contact is made by the metal insert.

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