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COAXIAL CABLE CONNECTOR

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The present invention relates primarily to electrical cable connectors and mountings, and particularly to connectors and mountings for coaxial cable.

In the electrical transmission cable art there has been a considerable growth in the use of coaxial cables. These cables usually take the form of metal jacketed or braided cable. By metal jacketed cable herein is meant a cable comprising a tubular metal sheath or outer conductor, usually formed of copper or aluminum tubing, within which is housed a center or inner conductor, usually a copper wire or rod, the inner conductor being spaced or insulated from the outer tubing. In the specific case of coaxial cable, this inner conductor is centrally and coaxially spaced and supported from the outer tubing sheath, usually either by dielectric glass or plastic beads, a plastic spiral, a foamed plastic, or other insulating filler. In the case of braided cable, the above-mentioned sheath or outer conductor is a sleeve of braided wire filaments, and usually the braided sleeve is covered with a plastic sheath.

The advent and growth of coaxial cable and analogous shielded conductors has created special problems of installation. It is obviously desirable in the case of either field or bench installations, but particularly the former, that fittings for the cable be readily and easily applied with simple and conventional hand tools, and that mechanically and electrically reliable applications of fittings be attainable with a minimum of skill. Further, particularly in the instance of high frequency installations, it is of utmost importance that changes in the capacitive relationship between the inner and outer conductor be held to a minimum by the application of the fittings.

The present invention is accordingly primarily concerned with fittings for shielded electrical transmission cables, particularly coaxial cables, and with the mounting or fastening of such fittings on the cable. One aspect of the present invention relates to fastening a sleeve, nut, or the like to the exterior of the cable, by a procedure that is similar to but simpler than a threaded union. Broadly, the sleeve is formed with an internal helical groove or track. The internal diameter of this sleeve upon which the helical track is formed is slightly greater than the external diameter of the cable sheath to which it is to be applied so that it may telescope thereover. The end of a wire having a diameter greater than the depth of the groove or track is introduced at the forward terminus of the groove, and the sleeve is then rotated over the cable. Rotation of the sleeve causes the wire to embed in the cable tubing, and as rotation of the sleeve is continued, successive portions of the wire are thus embedded, and form the equivalent of a helical thread over which the groove or track in the sleeve advances, thus forming a union or fastening between the sleeve and cable tubing somewhat analogous to a threaded joint. Once the sleeve is thus anchored to the cable, it may provide the basis for an electrical end connector, an end coupling, a support, or the like, for the cable. In accordance with a further aspect of the present invention,

means are provided for locking the aforementioned sleeve in position on the cable, and for providing separate electrical contact with the outer conductor and with the inner conductor when desired, as in the instance of providing a connector on the end of the cable.

It is accordingly one object of the present invention to provide a mechanical coupling between a cable and a sleeve applied thereover.

A further object of the present invention is to provide such a coupling having a partially self-forming union between the cable and sleeve.

Another object of the present invention is to provide an electrical connector employing the foreging coupling as the basis of union between the connector elements and an electric cable.

Still a further object of the present invention is to provide an electrical cable end mounting to an electrical instrument housing employing the sleeve and cable union as the basis for anchoring the cable.

Still another object of the present invention is to provide a mechanical anchor on the exterior of a metal jacketed cable and a separate electrical connecting element for the cable supported by the anchor, in a manner to provide both a firm and reliable electrical connection with the cable and a tight and strong mechanical union between the anchor and cable.

Other objects and advantages of the present invention will become apparent to those skilled in the art from a consideration of the following exemplary detailed description of preferred specific embodiments of the invention, this description being had in conjunction with the accompanying drawings in which like numerals refer to like or corresponding parts, and wherein:

Fig. 1 is longitudinal sectional view of a coaxial cable connector embodying the principles of the present invention, applied to the end of a metal jacketed coaxial cable;

Fig. 2 is an exploded view of the connector and cable shown in Fig. 1;

Fig. 3 is an enlarged and partially cut-away isometric view of a sleeve anchored to a metal jacketed coaxial cable in accordance with the present invention;

Fig. 4 is a longitudinal section of the sleeve shown in Figs. 1–3;

Figs. 5A–D are views of the sleeve being anchored to a metal jacketed coaxial cable, shown in successive steps of application;

Fig. 6 is a sectional and isometric view of an embodiment of the present invention for mounting the end of a metal jacketed coaxial cable on an electrical instrument housing;

Fig. 7 is an isometric view of one element employed in the embodiment of Fig. 6;

Fig. 8 is a modification of the embodiment of the invention shown in Fig. 1;

Fig. 9 is a modification of the embodiment of the invention shown in Fig. 6;

Fig. 9A is a modification of the embodiment of the invention shown in Fig. 8;

Fig. 10 is a further modification of the embodiment shown in Fig. 6;

Fig. 11 is an elevation view of the sleeve employed in the present invention embodying an additional feature of the invention;

Fig. 12 is a view of the sleeve of Fig. 11 applied to a pipe, rod, hose, or cable;

Figs. 13 and 14 are cross-sectional views taken on lines 13—13 and 14—14 respectively of Fig. 11;

Fig. 15 is an elevational and partially cut away view of a sleeve as shown in Fig. 11, and embodying a further feature of the invention;

Fig. 16 is a longitudinal sectional view of a connector applied to a braided coaxial cable;