

1

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COAXIAL CABLE COUPLING

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The present invention relates primarily to electrical cable connectors, and particularly to connectors for coaxial cable. However, the present invention more generally relates to the application of fittings and the like to cables, pipes, tubes, rods, and hose of various types. Additionally, one aspect of the present invention relates to fastenings in general, and particularly to fastenings for deformable materials, such as metals, plastics, elastomers, and the like. This application is a continuation-in-part of the copending application of Leo G. Dumire, George Edlen, and Boris Haskell, filed January 5, 1959, and bearing S.N. 785,025, now U.S. Patent Number 2,983,779, issued May 9, 1961.

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 and insulated from the outer tubing by a suitable dielectric. In the specific use 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 dielectric filler. In the case of braided cable, as distinguished from metal jacketed 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 metal jacketed shielded electrical transmission cables, particularly with metal jacketed coaxial cables, and with the mounting or fastening of these 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 groove 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 di-

2

ameter greater than the depth of the groove or track is introduced at a leading 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. This sleeve may form an anchoring base for various types of fittings and mountings for pipes, conduits, and hose generally. In the specific case of an electrical cable, once the sleeve is thus anchored to the cable, it may provide the attachment basis for an electrical connector, coupling, or the like, for the cable, adapted to provide separate electrical contact with the outer conductor and with the inner conductor and mating engagement with a corresponding connector part associated with another electrical device.

It is accordingly one object of the present invention to provide a mechanical coupling between a cable, conduit, pipe, tube, or hose 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, conduit, pipe, tube, or hose and the sleeve.

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

And an additional object of the present invention is to provide a mechanical coupling between a first member having a cylindrical aperture and a second member having a cylindrical surface adapted to be received in said aperture; and further to provide such a coupling which is partially self forming.

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, and applied to the end of a metal jacketed coaxial cable;

FIG. 1a is a cross-sectional view of the connector taken along the line 1a-1a of FIG. 1;

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. 3a is an enlarged sectional view of a portion of the sleeve and cable taken along the line 3a-3a of FIG. 3;

FIG. 4 is a longitudinal section of the sleeve shown in FIGS. 1, 2, 3, and 3a;

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

FIGS. 6 and 7 are transverse sectional views of sleeves employed in the present invention taken along the line of the first convolution of the helical groove in the sleeve,