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CONNECTOR FOR COAXIAL CABLES

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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 elements formed of malleable material, particularly in the form of cables, pipes, tubes, rods, or hose.

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 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 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 insulation 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 conductors 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. The present invention is likewise concerned with the mounting or fastening of fittings on other analogous devices, such as pipes, tubing rods, and hose. A principal aspect of the present invention relates to fastening an anchor or the like to the exterior of the cable, pipe, or analogous device, which anchor can provide the basis of attachment of various fittings and the like to the cable or pipe. Basically, this anchor comprises a sheet metal sleeve having a plurality of internally extending small, sharp, hollow, tubular projections, which are adapted to be embedded in the wall of the pipe, cable, tubing or other structure to which the anchor is to be applied. The bases of the hollow projections are closed, as by a skin or cylinder overlying the exterior of the sleeve. In addition, along at least a portion of their length said hollow projections are formed with completely circumambient walls. This anchor is applied to a metal jacketed coaxial cable (or to a malleable metal pipe, rod, or the like) by being telescopically slipped over the end thereof to a desired location, and radially compressed or crimped thereon, causing the small hollow projections to penetrate or embed in the outer metal

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jacket of the cable. As the thin walls of the hollow projections penetrate the metal of the cable jacket, these projections become filled with the metal of the cable jacket encompassed by the penetrating walls. Because of the complete circumambient nature of the penetrating walls, and because the bases of the hollow projections are closed, these small hollow projections, now filled with the metal of the cable jacket, become substantially the equivalent of embedded solid projections having the volume described by the overall dimensions of the hollow projections. Thus, while moving only that relatively small amount of cable metal equal to the wall volume of the projections, one obtains substantially the gripping equivalent to embedding solid projections having the overall dimensions of the hollow projections. Embedding such relatively large solid projections would, however, require moving the relatively large amount of cable metal equal to the overall dimensional volume of the projections.

As a result of these features of the present invention, one obtains an exceptionally strong anchor grip by movement of but a very little of the metal of the cable, pipe, rod or other device to which the present anchor may be applied. Consequently, only a small amount of force is required to apply the present anchor, and very little deformation of the cable is suffered, as compared with prior art piercing grip connectors adapted to provide an equivalent anchor grip.

In the specific case of a shielded or coaxial electrical cable, once the anchor is mounted on the cable, it may provide the attachment base 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 of the cable and mating engagement with a corresponding connector part associated with another electrical device. When applied to pipes, tubing, conduits, or rods in general, the anchor itself may form a coupling or connector member, or it may form the attachment base for conventional coupling elements or fittings.

It is accordingly one object of the present invention to provide an anchor adapted to be affixed to the exterior of a cable, conduit, pipe, tube, hose, or the like, for coupling fittings thereto.

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

A further object of the present invention is to provide an electrical connector for metal jacketed coaxial cable, employing the foregoing anchor affixed to the outer conductor as the basis of union between the connector elements and the cable conductors.

Still another object of the present invention is to provide an anchor adapted to be affixed to the exterior of conduits, pipes, tubes, rods, hose, or the like, for coupling such devices.

Other objects and advantages of the present invention will become apparent to those skilled in the art from a consideration of the following detailed description of exemplary 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 a 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. 2 is an exploded view of the connector and cable shown in FIG. 1.

FIG. 3 is an enlarged fragmentary detailed view of the anchor sleeve taken along line 3-3 of FIG. 2.