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MEANS FOR CONNECTING METAL JACKETED COAXIAL CABLE

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The present invention relates to coaxial cable connectors and more particular to a coaxial cable connector for aluminum jacketed coaxial cables and to a tool for applying the connector to a cable.

Considerable difficulty has been experienced in developing a coaxial cable connector for aluminum jacketed coaxial cables. More particularly, difficulty has been experienced in securing the connector to the cable with sufficient strength that the connector will not be pulled from the cable under loads which are experienced in actual field operations. Prior experience with affixing connectors to metallic tubes has indicated two approaches may be employed. In a first approach a nut is placed over the end of the tube and the end of the tube is then flared so that when the nut is coupled to the body of the connector, the flare cooperates with an inwardly directed flange on the nut to provide a secure coupling between the tube and the connection. It was found however that when this approach was employed in attaching connector to aluminum jacketed cables, the tube was weakened at the junction of the tube and the flare to such an extent that the flared portion became easily detached from the remainder of the tube and therefore this method was found to be completely unsuitable.

A second approach to securing couplers to metallic tubes has been to thread the tube and the coupler so as to provide a threaded connection therebetween. This method was also found to be unsuitable because the aluminum tubing was so weakened by the threads that when the assembly was subjected to a pull test, the aluminum jacket readily parted along the line of the thread.

An additional disadvantage accruing to the utilization of threads to secure the coupler to the cable is that the inner surface of the tube was deformed to such an extent that the resulting distortion produces a mismatch. Therefore, appreciable deformation of the inner surface of the outer conductor must be avoided.

An attempt was made to reduce the cutting and the deforming effect of the thread by making the threads shallower, but a thread depth was arrived at where the threads would not take in the sleeve before a depth was achieved which would not materially weaken the jacket or deform its interior. It appears that the initial threads started at the very end of the jacket were of insufficient strength to pull the cutting member along the length of the tube and the threads initially cut were torn out so that all that remained was a short end length of tube of reduced diameter. Therefore, it was found that neither of the conventional approaches, of flaring the ends of the tube or threading the tube, were applicable to aluminum jacketed coaxial cables.

Another difficulty with most methods for securing coaxial connectors to aluminum jacketed coaxial cables is the difficulty in applying the connectors and the requirement of a large number of different types of tools which must be employed for cutting the cable so as to leave a small end portion of the center conductor available for connection to the connector and for flaring the cable if the first method of attachment is employed or for threading the cable or applying a threaded sleeve to the cable if the second method is employed, are all distinct tools and normally are rather difficult to employ.

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It is an object of the present invention to provide a coaxial cable connector for aluminum jacketed tubes which is secured to the aluminum jacketed cable with such strength that the coupling between the cable and the connector is stronger than the body of the cable itself.

It is another object of the present invention to provide a coaxial cable connector which is secured to the cable with such strength that under a pull test the body of the cable parts before the connector can be pulled from the cable.

It is another object of the present invention to provide a coaxial cable connector which may be readily connected to the cable in field work and further to provide a novel single tool for performing substantially all of the operations necessary for applying the connector to the cable.

It is yet another object of the present invention to provide a single tool which may perform substantially all of the operations required for securing the coaxial cable connector of the present invention to an aluminum jacketed coaxial cable.

In accordance with the present invention there is provided a coaxial cable connector consisting of three distinct parts, a metallic sleeve, a nut and a main connector body. The sleeve has an internal diameter of approximately the same diameter as the external diameter of the aluminum jacketed cable, and terminates at one end in an outwardly directed flange which for purposes to be described subsequently is formed as a many-sided nut. The inner diameter of the metallic sleeve is uniform throughout its length except at a portion adjacent the flange where the internal diameter gradually tapers outwardly from adjacent the axial, inner edge of a flange to the end of the flange. The inner circumference of the sleeve is threaded from adjacent the inner end of the tapered portion of the sleeve over a predetermined length. The connector further comprises a nut having an internal diameter substantially greater than the external diameter of the sleeve but having an inwardly directed flange adjacent an unthreaded end of the nut which cooperates with the nut-shaped flange on the sleeve so as to provide a stop for the nut, that is, to provide a surface of engagement with the radial surface of the flange.

The main body of the connector comprises a cylindrical member having thread at its two ends, with at least one set of these threads being adapted to cooperate with the threads on the nut which is disposed about the sleeve. The other set of threads may be adapted to cooperate with any desired type of prior art connector or a sleeve and nut of the connector of the present invention. The transverse annular end face of the main body of the connector, terminates in an axially-extending shoulder which tapers inwardly with a slope corresponding approximately with the slope of the outwardly flared portion of the sleeve. A small hollow tube is disposed coaxially of the main connector body and is secured therein by an appropriate dielectric material which is positioned remote from the two ends of the small hollow tube which ends coincide approximately with the ends of the connector body. The hollow tube is adapted to receive the center conductor of the coaxial cable.

Referring specifically to the novel features of the connector of the present invention, the hollow sleeve is adapted to be threaded onto the end of the aluminum jacket. A threaded coupling which neither weakens the jacket or produces appreciable deformation of the internal surface of the jacket has been achieved by employing rounded threads of lesser depth than standard (sharp) threads of sufficient depth to cut threads in the jacket. It has been found that round threads will emboss a track in the jacket, where sharp threads are of insufficient depth to so do and that the threads thus formed in the jacket do not weaken the jacket or produce appreciable deformation of the internal surface thereof.