

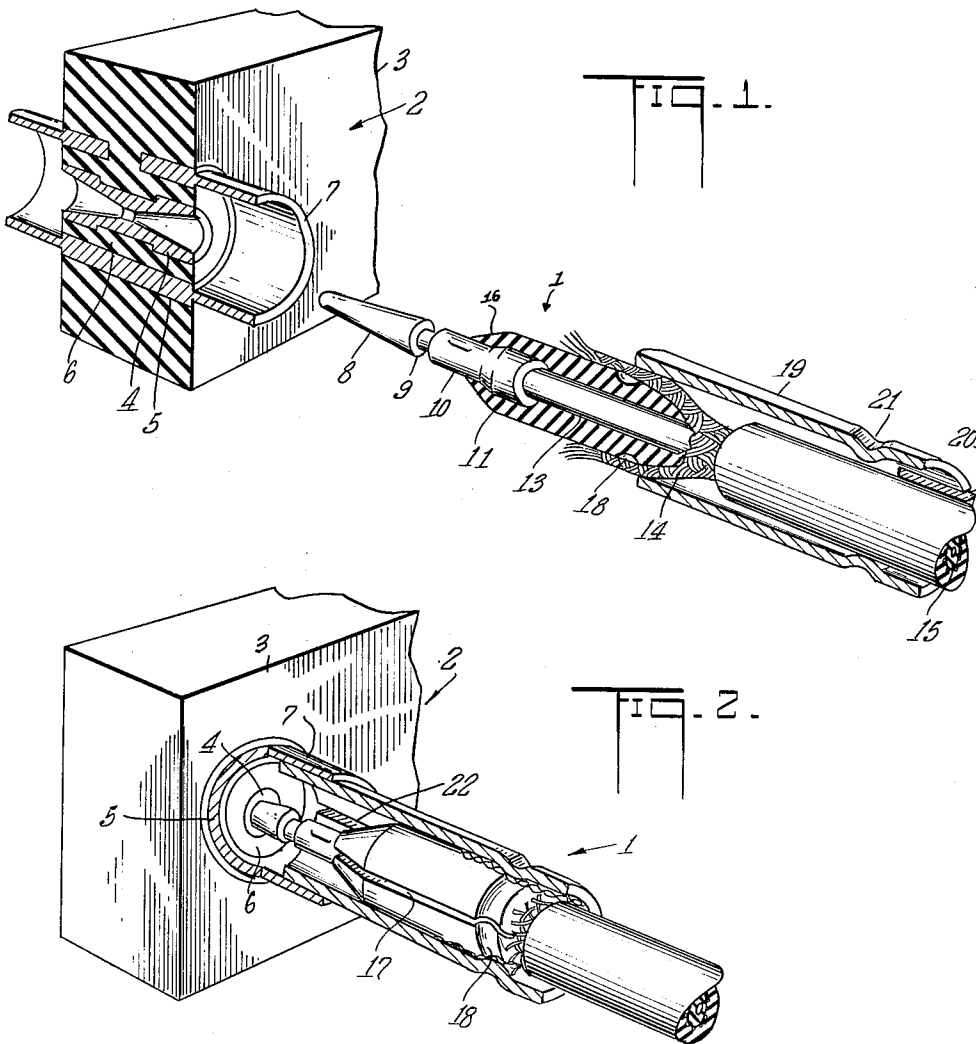
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TAPERED PIN COAXIAL CONNECTION

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TAPERED PIN COAXIAL CONNECTION

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2 Claims. (Cl. 339-177)

My invention relates to electrical connectors and, more particularly, to electrical connectors in which a coaxial or shielded wire conductor is coupled to a panel or patch board through which an electrical connection is made.

This application is a continuation of S.N. 691,071, filed on October 18, 1957, now abandoned.

It is highly desirable that apparatus utilizing inputs of electrical and magnetic waves of high frequency be coupled with the same facility with which connections of lower frequency apparatus can be accomplished. However, the very nature of the energy used by high frequency apparatus requires a high quality transmission line such as coaxial or shielded wire conductors to be utilized. For example, in the demonstration of high fidelity audio components it is often desirable to be able to interconnect a great plurality of component apparatus in a large number of combinations through the use of coaxial conductors. In the past, electrical connections for coaxial cable have been extremely complicated to establish, thus hindering the demonstration of such equipment.

Most usually, such coaxial or shielded wire conductors were terminated by connections which have required soldering the braid or outer conductor and the inner conductor elements to a terminal connector. The terminal connectors which were attached to the cable by soldering were then mated to receptacles or sockets in order to establish the electrical connection. The soldering of these terminal parts involved the handling of very small parts under awkward conditions, causing the attachment of a single cable terminal to be both tedious and time consuming.

In order to overcome some of the disadvantages of the above described connections, jumper wires were sometimes utilized to form a common grounding connection for all the cable terminals. These jumper wires joined each braided conductor to the next braided conductor in series and connected the last braided wire to the panel or patchboard in order to transmit the ground potential through the panel.

In order to overcome the objection of soldering components, solderless coaxial connectors were developed in which wedge shaped components were utilized to make mechanical and electrical connection between the outer conductor and the terminal of the cable. Such connectors, utilizing wedge shaped elements to force fit conductor portions, have not proven entirely satisfactory since the operator or user of the connector can break the connection by applying a tension between the cable end and the terminal, thus the assurance of always establishing a good connection and maintaining it has been lacking.

There is also known a connector for joining coaxial cable or shielded wire connections to a panel in which the inner and outer conductors were joined to the panel connector and which utilized a tapered pin for terminating the inner conductor of the cable. The tapered pin was mechanically and electrically crimped to the inner conductor and an inner sleeve formed of a relatively hard metal was inserted beneath the outer conductor and an outer ring of a softer metal was inserted over the outer conductor and crimped thereto. An outer sleeve was electrically connected to the outer ring and provided

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electrical contact making means for connecting the outer conductor of the cable to the outer connection panel, while the tapered pin was inserted into the inner connection of the panel.

While the above described panel connection is satisfactory for many purposes we have found that the cable termination can be greatly improved by providing means for rigidly maintaining the coaxial spacing between the inner and outer portion of the cable termination. In addition, my invention provides for the insulating sleeve, which maintains the coaxial spacing between the inner and outer portions of the cable termination, to have a grooved recess therein and also provides for a mating groove in the outer sleeve. Thus, by locating the outer shield conductor between the insulating and outer sleeves the shielded wire will be rigidly maintained in position by the mating of the insulating and outer sleeves.

One of the objects of my invention, therefore, is to provide a coaxial cable or shielded wire connection that is simple to make, easy to install, and provides a positive spacing member between the inner and outer cable terminating members.

Another object of my invention is to provide a coaxial cable for shielded wire connection in which a minimum number of parts are used.

One of the features of my invention is the provision of a connector for joining coaxial cable or shielded wire connections to a panel in which the inner and outer conductors are joined to the panel connector and which utilizes a tapered pin for terminating the inner conductor. The tapered pin is mechanically and electrically crimped to the inner conductor and an inner sleeve formed of an insulating material is located beneath the outer conductor. An outer sleeve is snap-fitted by means of an operating bead or groove to compress the braided conductor peripherally onto the inner insulating sleeve, the insulating sleeve maintaining the coaxial relationship between the inner and outer connection terminating members.

The above mentioned and other features and objects of my invention will become more apparent by reference to the following description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view partly in section of the connection shown in FIG. 2.

FIG. 2 is an exploded perspective view partly in section of one form of the panel connection of my invention.

Referring to FIGS. 1 and 2 of the drawing, a panel connection in accordance with the principles of my invention is therein shown to comprise a cable termination 1 and a panel socket 2. Reference numeral 3 indicates a fragmentary portion of a panel wall made of electrical insulating material through which extends an inner socket 4 and an outer socket 5. The socket members 4 and 5 may be molded in spaced apart relationship at the same time that the panel wall 3 is molded, and may be properly insulated from each other by insulation 6 which may be the wall material or a separate insulation spacer. The socket members 4 and 5 are suitably secured to the panel wall 3, preferably in a manner which makes the mounting leakproof. Outer socket member 5 extends beyond the panel wall 3 and terminates in an external portion 7 which is utilized to engage the cable termination 1. It is, of course, understood that a plurality of panel sockets 2 can be located in the panel wall 3 to provide a multiplicity of socket connections.

The cable termination 1 comprises the tapered pin shaped member 8 which is force fitted into the inner socket member 4 by the use of an insertion impacting tool not shown. The insertion impacting tool utilizes

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the shoulder 9 to apply force to the tapered pin 8. The inner conductor is located in the conductor receiving socket 10 of the tapered pin and the insulation surrounding the inner conductor is located within the insulation gripping shroud 11. An indentation or crimping, secures the inner conductor of the cable to the socket connector 10 and the shroud 11 is compressed to grip the insulation 13.

The braided outer conductor or shield 14 of the cable 15 is exposed and trimmed back of the tapered pin member 8. A supporting inner sleeve 16 composed of an insulating material is mounted or slid under the outer conductor 14 and over the inner conductor insulation 13. The inner sleeve 16 may be longitudinally split as shown at 17 to provide for easy placement. A depression 18, preferably annular, is molded into the sleeve 16. The shielded conductor is then located over the inner sleeve 16.

An outer sleeve 19 having one end slotted as at 20 to provide a spring-like action has an annular groove 21 therein which matches the groove 18 in the insulating sleeve 16. The outer sleeve 19 is moved into place and the groove 21 mates with the groove 18 compressing the braided conductor 14 and making mechanical and electrical connection thereto. The slots 20 are provided to facilitate the movement of the outer sleeve 19 over the braided conductor 14, while the slots 22 are provided to facilitate the coupling of the outer sleeve 19 with the end 7 of the outer socket member 5.

The diameter of the outer sleeve 19 is made slightly larger than the inner diameter of the end 7 of the outer socket member 5. This is done to provide an outward pressure when the sleeve 19 is inserted into outer socket member 5.

While I have described above the principles of my invention in connection with specific apparatus, it is to be understood clearly that this description is made only by way of example and not as a limitation to the scope of my invention as set forth in the objects thereof and in the accompanying claims.

I claim:

1. A coaxial connection comprising: an end of a coaxial cable including an inner conductor and an outer

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conductor coaxial with and insulated from said inner conductor; a female connector including a rigid, tapered, inner socket having a solid annulus and an outer socket coaxial with and insulated from said inner socket; and a male connector including a tapered contact pin connected to the end of said inner cable conductor and disposed forward of the end of said outer cable conductor, and in solid, impacted, mating engagement with said tapered inner socket, thereby securing said male connector and said coaxial cable to said female connector; said tapered contact pin having an impact tool receiving shoulder to receive an impactation to provide said securing engagement; an insulating sleeve transversely disposed between at least one of the group consisting of said tapered contact pin and said inner cable conductor end, and said outer cable conductor end; and both said insulating sleeve and said outer cable conductor end disposed rearwardly of and exposing said tapered contact pin shoulder; and an outer conductive sleeve which is transversely resilient, resiliently engaging said outer socket and said outer cable conductor end and substantially enclosing said tapered contact pin; said conductive sleeve being free to longitudinally slide on said outer socket independently of the engagement of said tapered contact pin with respect to said inner socket.

2. The connection according to claim 1 wherein said insulating sleeve and said outer conductive sleeve include cooperating bead and groove portions disposed to releasably snap-lock said sleeves together with said outer cable conductor therebetween when both said conductive sleeve and said tapered contact pin are disposed in their female connector engaging position.

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