March 22, 1960 H. W. HARBOURT 2,930,024

COAXIAL CABLE CONNECTOR

Filed June 29, 1956

FIG.1.

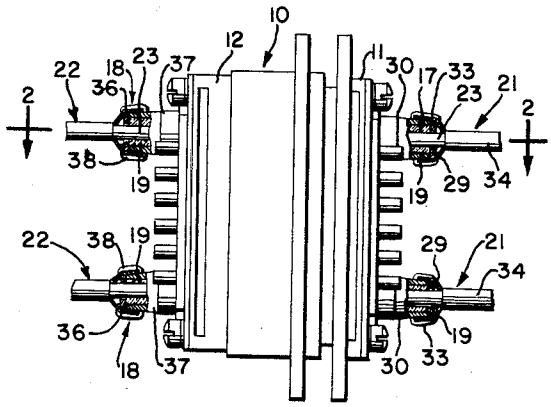


FIG.2.

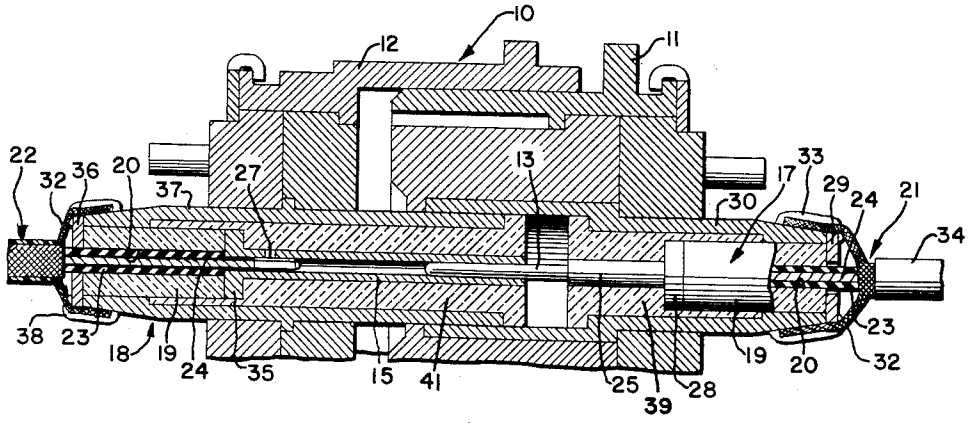
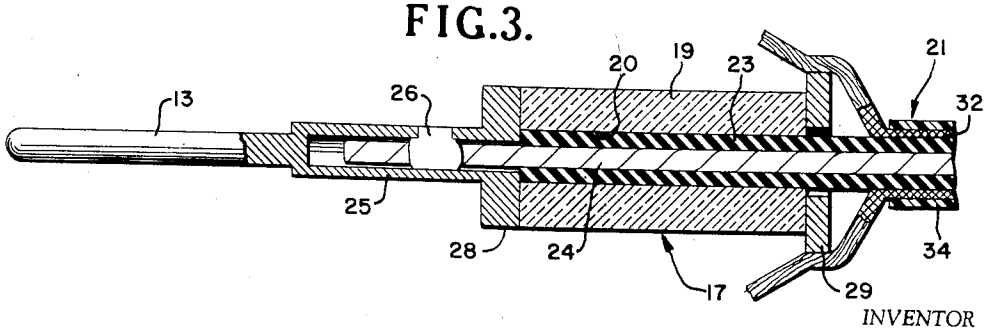


FIG.3.



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COAXIAL CABLE CONNECTOR

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1 Claim. (Cl. 339—177)

(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

The present invention relates to electrical transmission lines and is particularly concerned with a nonresilient backing retainer for use with a transmission line employed with a coaxial connector.

Heretofore, it has been found that upon attaching the male member of the coupling to the female member the terminal pin carrying the coaxial conductor often backed out during the assembly of the aforesaid members thus causing an inferior electrical connection between the pin and pin contact arranged within the coupling members.

The present invention overcomes the aforesaid disadvantages encountered in prior art devices by providing a novel nonresilient support for coaxial conductors which is mechanically simple, easy to attach to the conductors and which provides an efficient electrical connection between transmission lines. Moreover, the invention contemplates the provision of a nonresilient insulating support for transmission lines which comprises a cylindrical element disposed about a portion of the continuous insulating sleeve enclosing the flexible conductor of a coaxial cable and having a metallic washer on one end thereof, the free end of the conductor being soldered to the pin and sleeve contacts of the coupling and the free end of the braided copper conductor of the cable with the washer soldered to the outer portions of each coupling member thereby to secure the cable to the aforesaid members and thus prevent axial displacement of the aforesaid pin and sleeve contacts as the male and female members are assembled thereby insuring an efficient electrical connection therebetween.

An object of the invention is to provide a new and improved nonresilient support for the terminal end of a transmission line.

Another object of the invention is the provision of novel means for securely attaching a coaxial conductor to a coaxial coupling.

A further object of the invention is the provision of novel means for connecting flexible conductors of a coaxial cable to a coaxial coupling in such a manner as to insure an efficient electrical connection between the contact pin and contact sleeve.

Other objects and many of the attendant advantages will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawing wherein:

Fig. 1 is an elevation view partly in section of a separable coupling illustrating a pair of coaxial transmission lines provided with a backing retainer constructed in accordance with the present invention;

Fig. 2 is an enlarged sectional view taken on the line 2—2 of Fig. 1; and

Fig. 3 is an enlarged sectional view of the backing retainer illustrating the retainer in connection with a coaxial transmission line.

Referring now to the drawing and more particularly to Fig. 1, the numeral 10 generally indicates a conventional transmission line coupling comprising a pair of separable sections 11 and 12, the section 11 constituting a male member and the section 12 constituting the female member of the coupling, as more clearly shown on Fig. 2. The section 11 is provided with a conventional elongated contact pin 13, the section 12 being provided with a conventional elongated split sleeve or tubular contact 15 for receiving the pin 13.

The numerals 17 and 18 generally indicate a pair of retainers constructed in accordance with the present invention, each retainer comprising an elongated tubular element or sleeve 19 composed of any nonresilient or substantially rigid plastic material suitable for the purpose and having a centrally disposed bore 20 extending therethrough. As more clearly shown on Fig. 2 a pair of coaxial cables 21 and 22 are carried by sections 11 and 12 respectively, each of the cables having a continuous inner insulating sleeve or coating 23 enclosing the inner flexible or axial conductor 24 thereof and extending through bore 20 of the element 19 associated therewith. One of the conductors 24 received in and soldered to the tubular portion 25 of pin 13 as at 26, Fig. 3, the other one of the conductors 24 being soldered to tubular contact 15 as at 27, Fig. 2.

It will be noted, Fig. 2, that sleeve 19 of retainer 17 is disposed between an annular flange 28 formed on portion 25 of pin 13 and a washer 29 disposed about the coating 23 the sleeve being in abutting engagement with the flange and washer and serving as a nonresilient spacer therebetween. The washer may be composed of any material suitable for the purpose, such, for example, as brass, and is disposed in abutting engagement with the terminal end of a tubular receptacle member 30 carried by section 11. The terminal end of the outer braided conductor 32 of cable 21 is soldered to the terminal end of receptacle member 30 and to washer 29 as at 33, Fig. 2, and is shielded by the usual rubber or saturated fabric element 34. Similarly, sleeve 19 of retainer 18 is disposed between a flange 35 formed on tubular contact 15 and a washer 36 disposed about the coating 23 in abutting engagement with sleeve 19 and a tubular receptacle member 37, carried by member 12, the washer 36 being composed of any material suitable for the purpose such, for example, as brass. The terminal end of the braided conductor 32 of cable 21 is soldered to the terminal end of receptacle member 37 and to washer 36 as at 38. Soldering the braided conductors 32 to the rejective washers and receptacle members has the effect of securely fastening the washers to the members. As will be understood by reference to Fig. 2, member 37 is telescopically receivable in member 30 and is also separable therefrom.

In order that contacts 13 and 15 may be supported and positioned in proper relation to each other upon connection thereof, there is provided an elongated element 39, suitably bored to receive portion 25 of pin 13, flange 28 and part of sleeve 19, the element being composed of suitable insulating material and serving to support the pin axially within member 30, as will be understood by viewing Fig. 2. Numeral 41 designates an elongated insulating element which functions in a like manner to support sleeve contact 15 axially within member 37.

By the aforesaid arrangement the cables 21 and 22 are secured to receptacle members 30 and 37 of sections 11 and 12 and a nonresilient or substantially rigid backing is provided for the contacts 13 and 15 whereby displacement or backing out thereof is prevented as pin 13 is inserted into sleeve contact 25 and thus an efficient electrical connection is established and maintained therebetween which results in a stable pulse output when the

coupling is employed with various electronic devices such, for example, as a subminiature amplifier or the like.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claim the invention may be practiced otherwise than as specifically described.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

In a means for electrically connecting a pair of coaxial cables each of which comprises an outer hollow conductor and an inner axial conductor with an insulating cover separating the conductors and surrounding the inner one thereof, the combination comprising a pair of metallic tubes telescopically related to each other and each having an externally tapered outer end, a pair of annular metallic elements respectively associated with said tubes, one each of said elements being disposed in abutting engagement with the tapered outer end of said tubes respectively, each element having a surface providing an inwardly directed shoulder at the outer end of the associated tube, a pair of hollow members of substantially rigid insulating material associated with said tubes, one each of said members being slidably disposed respectively with said tubes and in engagement with the shoulder provided by the element at the outer end thereof respectively, the outer conductor of one of said cables being soldered both to one of said elements and to the tapered end portion of its associated tube to prevent movement therebetween, the inner conductor and insulating cover of said cable extending into said associated tube and passing through said one element and the associated hollow member, the outer and inner conductors and insulating cover of the other cable being correspondingly related to the other element and associated tube and hollow member, a pair of elongated contacts each having a hollow flanged base, one each of said contacts being disposed within said tubes with the flanged base thereof abutting one of said associated hollow insulating members respectively, one of said contacts having a tubular projection constituting a tubular contact, the other of said contacts having a pin projection constituting a pin contact, one of the inner conductors passing through the flanged base of one of said contacts and being electrically connected thereto, the other inner conductor being correspondingly related to the other of said contacts, and means maintaining said contacts properly positioned for insertion of said pin contact in said tubular contact upon assembly and telescoping of said tubes; whereby each contact is backed by substantially rigid structure such that backing out of the contacts relative to the tube within which it is disposed while the pin contact is being inserted into the tubular contact is prevented and an effective connection thereof is made and maintained.

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