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ELECTRICAL CONNECTORS FOR COAXIAL CABLES

Filed March 13, 1964

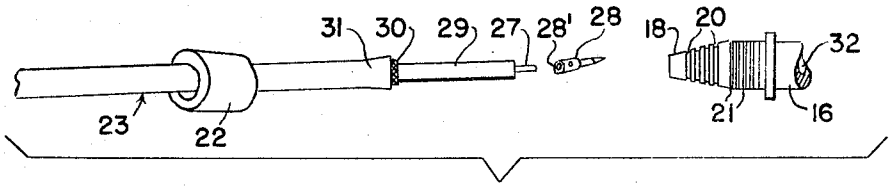

FIG. 1

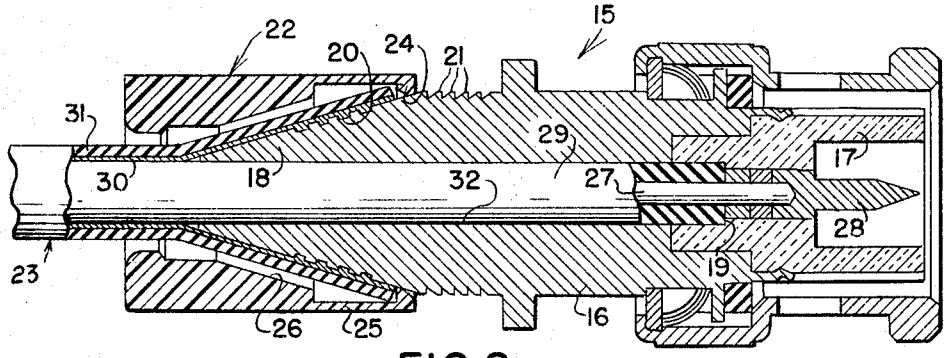

FIG. 2

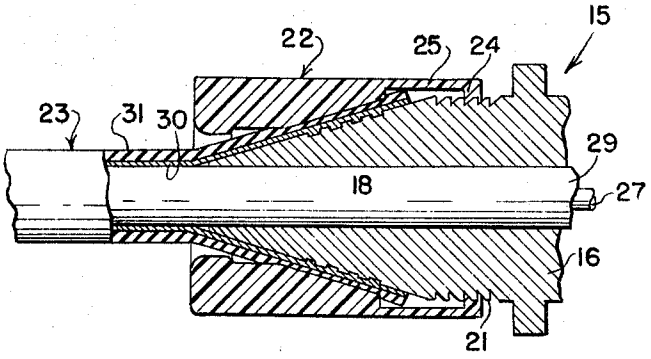

FIG. 3

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ELECTRICAL CONNECTORS FOR COAXIAL CABLES

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The present invention relates to electrical connectors for solid and semi-solid dielectric-filled coaxial cables and more particularly to the connector to be carried by an end of such cable for detachable connection to a mating terminal on a wave signal apparatus or another cable end.

An object of this invention is to provide a novel and improved connector of the class mentioned, which securely clamps the cable without indentation of the cable dielectric and hence without disturbance of the cable's impedance characteristic. The strength of the joint afforded by this connector is more than sufficient to withstand all forces and manipulations to which the connector and its cable are subjected to under normal use conditions.

A further object thereof is to provide a novel and improved connector of the character described, comprising a minimum of parts and which affords easy assembly, is very simple in construction, reasonable in cost to manufacture and efficient in carrying out the purposes for which it is designed.

Other objects and advantages will become apparent as this disclosure proceeds.

For one practice of this invention, my new connector consists of a body assembly whose main conductive body member is tubular and has a conical end provided with annular grooves on its periphery. On a cylindrical portion next to said end, there are annular ratchet teeth. In the other end of said main body member, there is fitted a tubular insulator which may have a counterbore. Also, there is a plastic ferrule which sets on the conical end of said tubular body. Part of the interior surface of said ferrule is conical to cooperate with said conical end of the main body member to clamp the cable's outer tubular conductor and its outer dielectric covering. The mouth end of said ferrule has an inward annular pawl formation which is forced to engage said annular teeth in succession until the assembly is tightly effected.

I will now describe a preferred embodiment of this invention and its manner of use and operation in greater detail, for which I shall refer to the accompanying drawing forming part of this specification. In this drawing, similar characters of reference indicate corresponding parts in all the views.

FIG. 1 is an "exploded" view showing a cable end prepared for association with the connector, the end pin which is to be secured to the bared end of the cable's inner conductor and a fragment of the conically-ended main body member as well as the mentioned ferrule which maintains the assembly. In this view, said pin and ferrule are shown in perspective while the cable and main body member are longitudinal elevations.

FIG. 2 is an enlarged central section showing the connector and the cable at the initial stage of being associated.

FIG. 3 is a part of FIG. 2, showing the completed assembly condition.

In the drawing, the body assembly indicated generally by the numeral **15**, comprises a main conductive tubular body member **16** holding the tubular insulator **17** at one end and having the conical form **18** for its other end. The remainder of the body assembly is of any conventional construction or as may suit any required installation.

My only concern with the body assembly here, is the provision of the counterbore **19** in the tubular insulator **17** and the structure shown in FIG. 3.

Said conical end **18** of the main body member **16**, is provided with the annular grooves **20**, and on the cylindrical portion next to said conical end, there are the annular ratchet teeth **21**. Important to note, is the ferrule indicated generally by the numeral **22** which sets onto said conical end and in cooperation therewith, effects assembly with the coaxial cable denoted generally by the numeral **23**. The mouth end of the ferrule has an inward flange **24** therearound, which in structure serves as a pawl adapted to engage a ratchet tooth **21** when forced thereon. In order to permit the annular pawl to expand and enter between such teeth, the mouth-end portion **25** of said ferrule, is relatively thin and of resilient quality. Beyond this thin-walled portion **25**, the ferrule is comparatively thick and its interior has a frusto-conical surface **26** matching the conical outer surface of the end **18** of the main body member. This ferrule **22** serves as a clamping sleeve and is preferably made of plastic which may be the material known in the trade as "Delrin." The diameter of the distal tip of the pawl **24** is suitably less than the outer diameter of the ratchet teeth **21** to attain an "interference" fit.

To mount the connector on the end of the coaxial cable **23**, the ferrule **22** is set on the cable so that its pawl end is nearest the cable end. The inner conductor **27** is bared sufficient to be entered into the socket **28'** of the pin **28** which is then soldered thereto or otherwise suitably secured. The cable's dielectric **29** is then bared a distance equal to that between the seat of the counterbore **19** to a point between the teeth **21** and the grooves **20**. Now, the cable's outer conductor **30** and its insulative covering **31** are flared by pushing the cable dielectric **29** into the bore **32** of the main body member **16**, into which said dielectric slidingly fits, the end of said dielectric will come up against the seat of the counterbore and stop there, while the outer conductor and its covering will receive the tapered end **18** of the main body member **16** thereinto as shown in FIG. 2. Now, the ferrule **22** is slid on the cable and set onto the tubular main body member **16** as shown in FIG. 2, and then forced onto the ratchet teeth **21** as far as it will go. It is evident that in such movement, the conical surface **26** will have tightly pressed the outer conductor **30** and its outer covering **31** against the conical end **18**. Said outer conductor will be sunken into the grooves **20** and the cable is thus tightly secured and properly associated with the connector as shown in FIG. 3. Of course, these connectors are made of suitable sizes for the various cables they are to be used for.

This invention is capable of numerous forms and various applications without departing from the essential features herein disclosed. It is therefore intended and desired that the embodiment shown herein shall be deemed merely illustrative and not restrictive and that the patent shall cover all patentable novelty herein set forth; reference being had to the following claims rather than to the specific description herein to indicate the scope of this invention.

I claim:

1. In an electrical connector for a coaxial cable of the type including a tubular dielectric having an inner conductor fitted therethrough and at least an outer tubular conductor covering said dielectric, an electrically conductive tubular body member having a tapered end, for slidingly receiving therein the end portion of the dielectric whereby said tapered end shall enter between said dielectric and said outer tubular conductor and shall contact the latter; said body member having exterior ratchet teeth inclined in one direction in relation to its length

and shoulders facing in the opposite direction, said ratchet teeth being adjacent said tapered end, and a sleeve to receive said tapered end therein, having at least in part, a tapered interior surface adapted to contact the exterior of the cable when the said sleeve is placed over said tapered end and to press same against the surface of said tapered end; said sleeve having a resilient portion and terminating in a pawl formation which need be forced to come beyond said tapered end whereby said pawl formation will enter between adjacent teeth and be engaged thereby to maintain the assembly whereby said cable is tightly clamped in said connector; said pawl engaging at least one of said shoulders to secure the sleeve against inadvertent removal.

2. A connector as defined in claim **1**, wherein said tapered end is provided with a groove whereinto the outer tubular conductor will be forced into upon pushing said sleeve onto the body member.

3. A connector as defined in claim **1**, wherein said ratchet teeth and pawl formation are annular.

4. A connector as defined in claim **3**, wherein the tapered end of the body member is provided with at least one annular groove.

5. A connector as defined in claim **1**, wherein said sleeve is of plastic material.

6. A connector as defined in claim **1**, wherein said tapered end and said tapered surface are conical; said tapered end being provided with at least one groove; said groove, ratchet teeth and pawl formation being annular; the cross-section of the body member where it has the ratchet teeth, being round.

7. A connector as defined in claim **1**, wherein said sleeve is comparatively thin near said pawl formation and relatively thick at that part thereof which has the interior tapered surface; said thin portion affording resilient quality.

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