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COUPLING MEANS FOR CO-AXIAL CABLE SECTIONS

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Fig. 1.

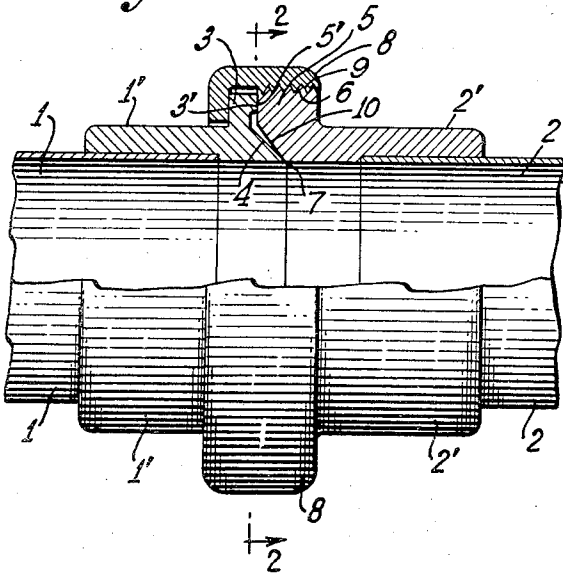


Fig. 2.

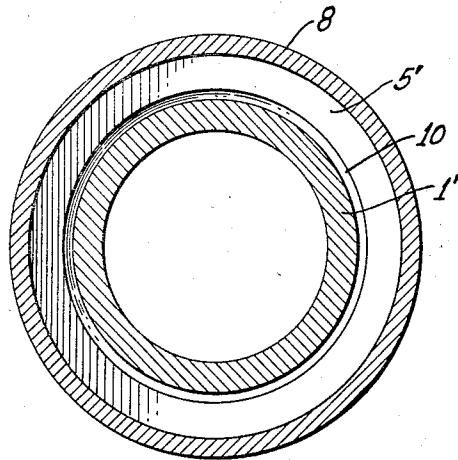


Fig. 3.

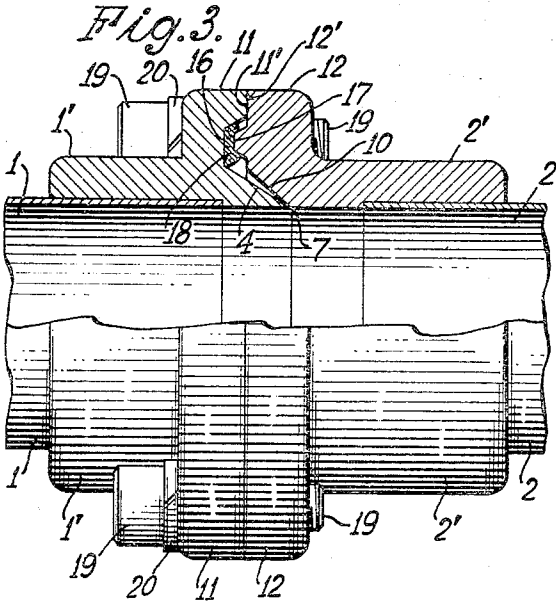
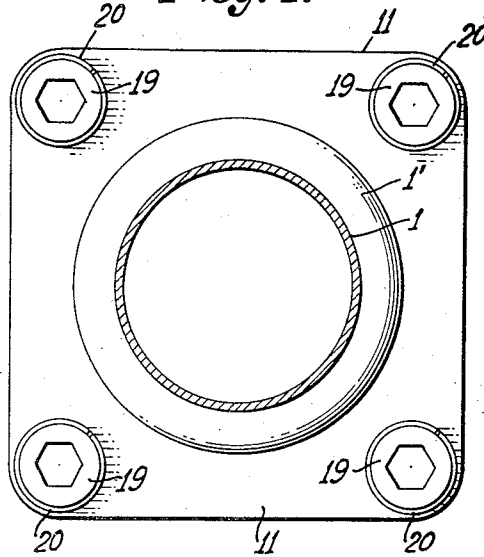


Fig. 4.



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COUPLING MEANS FOR COAXIAL CABLE SECTIONS

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Application September 18, 1942, Serial No. 458,788

1 Claim. (Cl. 285—122)

This invention relates to a coupling means for coaxial cables and more particularly to means for joining together the sections of the outer conductor in co-axial cables.

Co-axial cables comprise an inner conductor 5 which is co-axially surrounded by a tubular outer conductor, the inner and outer conductor being spaced a certain distance apart.

Joints in the outer conductor of co-axial cables can be made by soldering or the like. The sections of such soldered cables, however, cannot be quickly assembled or taken apart. Instead of making permanent connections by soldering, the adjacent ends of the conductor sections may form joints, which are held together by screws or bolts, for example. It has been found, however, 15 that in known joints of this type the inner surfaces of the outer conductor sections do not present a satisfactory low loss electrical path, particularly in an ultra-high frequency circuit.

It is the main object of the present invention to provide an improved coupling means for the outer conductor sections in co-axial cables, said coupling means being adapted to be quickly assembled and taken apart, and to provide a low loss electrical path which does not cause inconveniences in an ultra-high frequency circuit. Another object of the invention is to provide a coupling means which forms a satisfactory gaseous seal between the outer conductor sections of a co-axial cable to be connected.

With the above and other objects in view, as will appear to those skilled in the art from the present disclosure, this invention may best be understood by reference to the accompanying drawing, in which some embodiments of my invention are shown for illustrative purposes, and in which:

Fig. 1 is a sectional view of a coupling means for co-axial cables embodying the invention;

Fig. 2 is a sectional view of the coupling means shown in Fig. 1, the section being taken along line 2—2;

Fig. 3 shows a preferred embodiment of this invention partly in section, and partly in elevation, and Fig. 4 is an end view of the coupling means shown in Fig. 3.

The inner conductor which may be of any suitable type, is not shown in the drawing.

Referring now to Figures 1 and 2, section 1 of an outer conductor of an ultra-high frequency co-axial cable is provided with an end member 1', while the adjoining section 2 of said co-axial cable is provided with an end member 2'. These end members are connected with the respective 55

sections 1 and 2, for example by soldering. Member 1' is provided with a projecting ring portion 3, and has a bevelled, inwardly tapering end portion 4. Member 2' is formed with a shoulder 5, provided with a screw-thread 6. This member 2' has an outwardly tapering inner end portion 10 being adapted to receive the inwardly tapering end portion 4 of section 1. As indicated in Fig. 1, the angle formed by conical surface 4 and the axially extending inner cylindrical surface of end piece 1' is slightly smaller than the corresponding angle formed by the conical surface of end portion 10 and the axially extending inner cylindrical surface of end piece 2', the difference between said angles preferably amounting to about 2°-3°. End portions 1' and 2' may be brought into tight engagement by means of clamping nut 8 which is provided with thread 9.

Owing to the above described design of the adjoining end pieces, electrical contact is formed in the joint at the inside of the outer conductor at 7 only, and the inner surface of the joined outer conductor sections thus formed, represents an electrical path which does not cause substantial evolution of heat and the occurrence of losses in an ultra-high frequency circuit in which the construction here shown may be used. The inner surfaces of the outer conductor sections and the inner surfaces of the end members form an unbroken, cylindrical surface having substantially the same inner cross-section throughout the outer conductor sections and the coupling means.

In this construction it is essential that the abutting surfaces 3' and 5' of members 3 and 5, respectively, are capable of preventing end members 1' and 2' from being clamped together too tightly, as too tight clamping would damage the "razor" edge contact formed at 7.

In the modification shown in Figures 3 and 4, end member 1' of an outer section of a co-axial cable is provided with a bevelled inwardly tapering end portion 4. End member 2' is provided with an outwardly tapering inner end portion 10. End member 1' is also provided with a recess 16, which is adapted to receive a corresponding projecting part 17 of end member 2' in spaced relation so that a suitable packing element, such as neoprene gasket 18 may be inserted between said projecting part 17 and recess 16. End members 1' and 2' are flanged, and their flanges 11 and 12 are adapted to receive cap screws 19 for bringing the end members into engagement. An electrical and gas-tight connection is thus formed between the individual sections of the outer con-

ductor. Split washers 20 are interposed between the heads of said screws and the flange 11. Flanges 11 and 12 have abutting portions 11' and 12', respectively, and these abutting portions are adapted to prevent end members 1' and 2' from being screwed together too tightly. In other respects, the coupling means shown in Figs. 3 and 4, is similar to that shown in Figs. 1 and 2.

It will be understood that this invention may be carried out in other specific ways than those herein set forth, and, for example, clamping or tightening means other than those shown in the drawing may be used. The embodiments shown should be, therefore, considered as illustrative and not restrictive within the spirit of the invention as defined in the appended claim.

This is a continuation in part of my co-pending application Serial No. 421,453, filed on December 3, 1941.

I claim:

In a coupling means for outer conductor sections of a co-axial cable, in combination two end members, one of said end members being provided with an inwardly tapering conical end portion adapted to be received by an outwardly tapering conical end portion of the other of said end members, the angle formed by the conical surface of the inwardly tapering conical end portion and the cable axis, being slightly smaller than the angle formed by the conical surface of said outwardly tapering conical end portion and the cable axis, each of said end members being provided with a flange, said flanges having abutting portions adapted to limit the engagement of said conical surfaces to a narrow zone at the end only of the inwardly tapering conical end portion.

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