Nov. 23, 1943. W. A. BRUNO 2,335,040

COUPLING MEANS FOR TUBULAR ELECTRICAL CONDUCTOR SECTIONS

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Fig. 1.

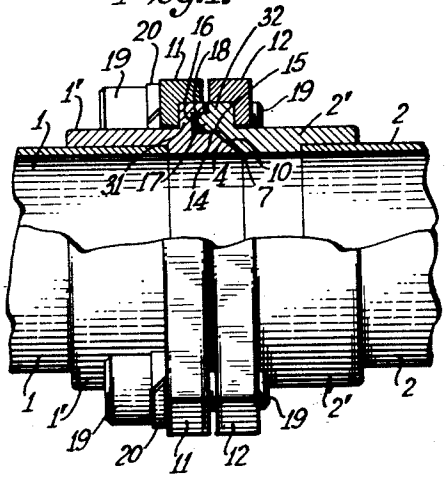


Fig. 2.

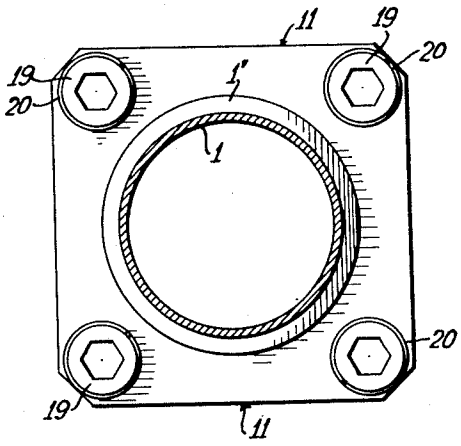


Fig. 3.

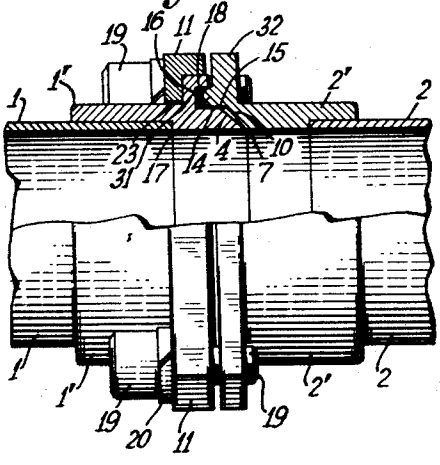
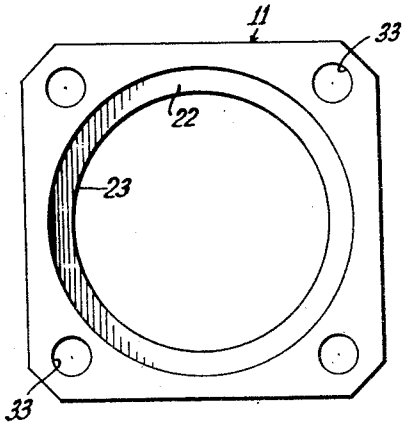


Fig. 4.



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Fig.5.

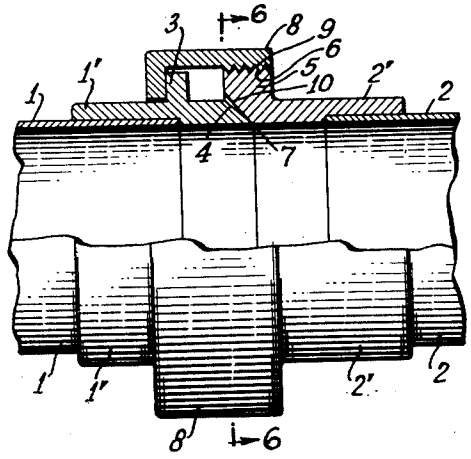


Fig.6.

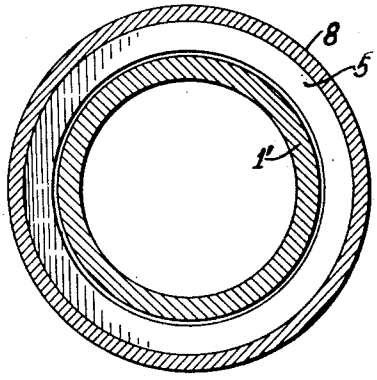


Fig.7.

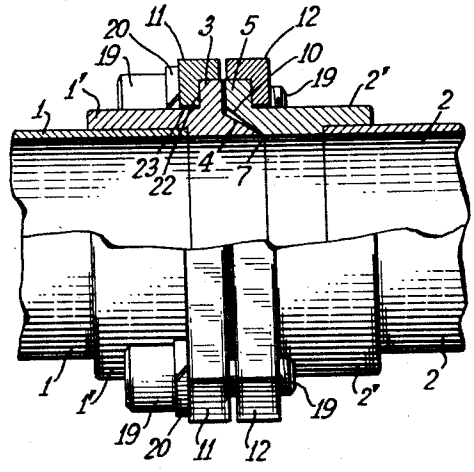
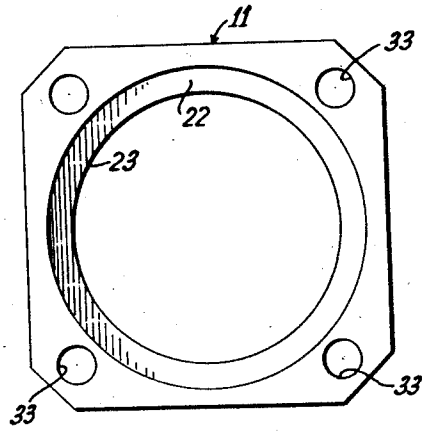


Fig.8.



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COUPLING MEANS FOR TUBULAR ELECTRICAL CONDUCTOR SECTIONS

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Application June 23, 1942, Serial No. 448,069

2 Claims. (Cl. 285—140)

This invention relates to connecters for tubular elements, and has particular relation to connecters for coupling tubular conductors such as outer conductors for co-axial cables, wave guides, or other high-frequency conductors.

The main object of this invention is to provide an improved connecter for tubular electrical high-frequency conductors of the type disclosed in my co-pending application Serial No. 421,453, filed December 3, 1941, said connecter being adapted to be quickly assembled and taken apart and to provide for a safe and low loss electrical connection of substantially constant impedance of the parts to be connected.

Another object of the invention is to provide a connecter which forms a satisfactory gaseous seal between the elements to be connected.

A further object of this invention is to provide a connecter which can be easily assembled and brought into safe and tight engagement in any desired position of axially aligned tubular elements to be coupled.

Further objects and the advantages of this invention will appear from the following specification and claims, taken in connection with the appended drawings, wherein:

Fig. 1 shows a preferred embodiment of a connecter according to this invention partly in section, and partly in elevation;

Fig. 2 is an end view of the connecter shown in Fig. 1;

Fig. 3 illustrates a modified embodiment of the invention;

Fig. 4 is the front view of a removable flange used in devices of the type shown in Figs. 1 and 3;

Fig. 5 shows a further modification of my connecter partly in section and partly in elevation;

Fig. 6 is an end view of the connecter shown in Fig. 5;

Fig. 7 shows a further embodiment of my connecter partly in section and partly in elevation; and

Fig. 8 is a front view of a removable flange shown in Fig. 7.

Referring now to Figs. 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 sections 1 and 2, for example by soldering. Member 1' is flanged at 31, and is provided with a conical end portion 4, and with an adjacent cylindrical portion 14, which extends in axial direction. End member 2' is flanged at 32, and is provided with an outwardly tapering inner end portion 10, and an inner cylindrical portion 15, which extends in axial direction. This cylindrical portion is adapted to receive said cylindrical portion 14 of end member 1' and serves as a guide for end member 1'. This end member 1' is also provided with a recess 16, which is adapted to receive a correspondingly projecting part 17 of end member 2' in spaced relation, so that a suitable packing element, such as a neoprene gasket 18 may be inserted between said projecting part 17 and recess 16.

In order to bring end members 1' and 2' into tight engagement, removable flanges 11 and 12 are placed on said members 1' and 2'. Each of these flanges 11 and 12 is provided with a circular orifice 23 and an annular recess 22, adapted to receive the integral flange portion 31 and 32 of end members 1' and 2', respectively, and also provided with holes 33 adapted to receive screws 19. The depth of annular recesses 22 is somewhat smaller than the thickness of the flange portions 31 and 32 so that these flange portions slightly protrude from said annular recesses. Flanges 11 and 12 are preferably of a substantially equal design and of substantially equal dimensions, and those portions of the integral flanges 31 and 32 which are received by annular recesses 22 and circular orifices 23 are then also of a substantially equal design. By screwing screws 19 in holes 33, flange portions 31 and 32, as well as end members 1' and 2' proper, may be brought into tight engagement. It is noted that such tightening does not require any radial alignment of end pieces 1' and 2'.

In the connecter for tubular high-frequency conductors illustrated in Fig. 3, only one removable flange is used in combination with an integral flange portion of the adjoining end piece. End piece 2' is provided with an integral flange portion 32, which is larger than the corresponding flange portion 31 of end piece 1'. A removable flange 11 provided with a circular orifice 23 and an annular recess 22 adapted to receive flange portion 31 is applied to end piece 1'. By screwing screw 19 into the holes provided in flange portion 32 and flange 11, end pieces 1' and 2' may be brought into tight engagement.

Referring now to Figures 5 and 6, tubular conductor sections 1 and 2 are soldered to end members 1' and 2' respectively. Member 1' is provided with a projecting ring portion 3, and has a conical end portion 4. Member 2' is formed with a

shoulder 5 provided with a screw-thread 6. This member 2' has a conical end portion 10, said end portion 10 being adapted to receive conical end portion 4 of section 1. As indicated in the drawings, 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° to 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 this shape of the adjoining end pieces, contact is formed in the connecter at the tips of conical portions 4 and 10.

The connecter illustrated in Figures 7 and 8 comprises end pieces of a design similar to that of the end pieces shown in Figures 5 and 6. However, in the embodiment shown in Figures 7 and 8, tightening of the connecter parts is effected by removable flanges 11 and 12 and screws inserted in these flanges. These flanges, which are preferably of an equal design and of equal dimensions, are provided with a circular orifice 23 and annular recess 22 receiving registering flanged portions 3 and 5, said portions 3 and 5 slightly protruding from said annular recesses when the connecter parts are assembled as shown in the drawings. By screwing screws 19 in holes 33, flanged portions 3 and 5 as well as end members 1' and 2' proper may be brought into tight engagement.

It is to be understood that my invention is not limited to the specific embodiments presented herein for illustration, and is susceptible of numerous modifications within the scope and spirit of the invention as defined in the appended claims.

I claim:

1. In a connecter for connecting tubular, electrical conductor sections, two end members provided with registering tapered end portions, the tapers of said end portions being at slightly different angles, means adapted to bring said end members into tight engagement and to cause formation of contact at the tips of said tapered end portions, said means comprising two loose flanges of substantially equal design, and elements for bringing said flanges into engagement, each of said flanges being provided with an orifice and a recess adapted to receive a registering portion of the end members, said portion, in assembled condition of the coupling means, protruding from said recess.

2. In a coupling means for outer conductor sections of a co-axial cable, two end members provided with registering tapered end portions and adjacent registering cylindrical portions, the tapers of said end portions being at slightly different angles, one of said end members being also provided with a recess adapted to receive a projection of the other end member and to receive packing means between said projection and the surface of said recess, means adapted to bring said end members into engagement, and to cause formation of contact at the tips of said tapered end portions, said means comprising two loose flanges of substantially equal design, and elements for bringing said flanges into engagement, each of said flanges being provided with an orifice and a recess adapted to receive a registering portion of the end members, said portions, in assembled condition of the coupling means, protruding from said recess.

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