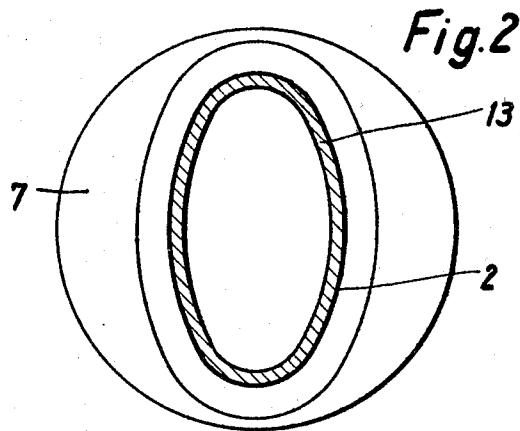
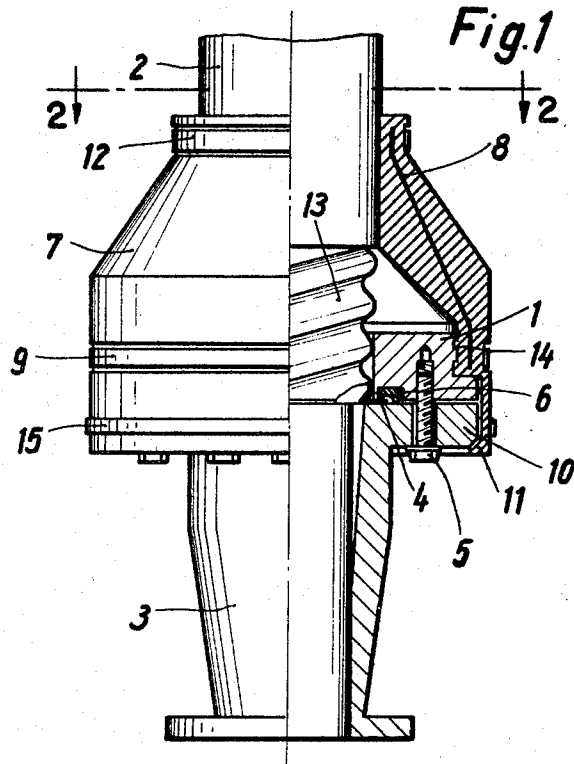


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CONNECTING ARRANGEMENT FOR CORRUGATED TUBE WAVEGUIDES
UTILIZING AN ELASTIC COLLAR ELEMENT
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CONNECTING ARRANGEMENT FOR CORRUGATED TUBE WAVEGUIDES UTILIZING AN ELASTIC COLLAR ELEMENT

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12 Claims

ABSTRACT OF THE DISCLOSURE

Mounting arrangement for a connecting plug extending from the flanged end of a flexible, corrugated tube waveguide having a protective jacket. The mounting arrangement provides an electrically conductive clamping element near the flanged end of the waveguide and an elastic collar element for supporting the flanged end of the waveguide. The collar element is fastened to the side of the clamping element facing away from the flanged end. Moreover, the collar element extends in the direction of the waveguide to sealingly engage the protective jacket thereof. This mounting arrangement provides both effective mechanical support and electrical conductance at the flanged end of the waveguide.

BACKGROUND OF THE INVENTION

The present invention relates to a mounting arrangement for a connecting plug extending from the flanged end of a flexible, corrugated tube waveguide which is used for transmitting microwaves.

The waveguide of the type to which the present invention relates is flexible and can be reeled up on a drum. Moreover, such a waveguide is a corrugated tube characterized by a non-circular cross section having a flanged end. The mounting arrangement of the type to which the present invention relates must be adequately constructed to provide both for making electrical contact and for mechanically supporting the waveguide at its connecting plug end.

In conventional means for mounting a connecting plug element to a corrugated tube waveguide, the connecting plug has been fastened or mounted on the waveguide by means of clamping jaws pressing on a collar produced by flanging of the waveguide end. The clamping jaw of such mounting means is provided with a suitable gasket in order to seal the system in a gas-tight manner. The mechanical supporting of such prior art mounting means is effected by correspondingly shaped, long metallic sleeves extending over a relatively great length of the corrugated tube waveguide, while the required sealing of such mounting means is effected by the concomitant use of elastic rubber sections and clamping rings.

Mountings, of the type discussed above, have certain disadvantages. One disadvantage is that they are constructed in such a manner that when used, particularly at low frequencies, they are structurally great in size; hence, are also rather expensive.

SUMMARY OF THE INVENTION

It is, therefore, an object of the present invention to provide a substantially simpler and more compact mounting means which provides a mechanical support for the corrugated tube waveguide at least as effective and without the disadvantages of the type of mounting means discussed above.

In brief, according to the present invention, a mounting arrangement for a connecting plug extending from the

end of a flanged waveguide is provided in which the plug mounting mentioned above is fastened on the side of an element of the mounting facing away from the end of the waveguide. Such collar extends in the direction of the corrugated tube waveguide and sealingly contacts the protective jacket thereof.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a longitudinal view, partly in section, of the mounting arrangement according to the present invention.

FIG. 2 is an axial view of the mounting arrangement, according to the present invention, taken along the line 2—2 of FIG. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIG. 1, a longitudinal view, partly in section, is illustrated of a mounting arrangement constructed in accordance with the present invention. The corrugated tubular hollow waveguide 13 is conventionally provided on its end with a flanged collar 4, which is electrically conductive and is designed to ensure a required electrical contact with a connecting plug 3 adjacent thereto. The connecting plug 3 is provided at the flanged end of the corrugated tube waveguide 13. The connecting plug 3 includes a flange 10, which is pressed against the clamping element 1 with the aid of the threaded fastener 5. The flanged collar 4 is thus clamped in between the two parts flange 10 and clamping element 1 in such a manner that electrical contact is ensured. A sealing ring 6 effects the necessary seal required for the mounting arrangement device. The connecting plug 3 is used to provide a means for connecting the waveguide 12 to appliances or other waveguides. Moreover, the plug 3 provides a transition means for converting the effective internal cross section of the corrugated tube waveguide 13 into a standard waveguide cross section, which latter is preferably rectangular in shape.

A protective jacket 2 provided around the corrugated tube waveguide 13 is removed at the connecting plug end of the waveguide. Only that much, a predetermined length, of the protective jacket is removed to provide that effective electrical contact will be established by means of the clamping element 1 at the flanged end, with concomitant centering.

The mechanical supporting of the connecting plug end of the waveguide is effected with the aid of an elastic collar 7. One end of the latter is pushed over the clamping element 1 and connected thereto. This connection can be effected, as illustrated in FIG. 1, by a clamping device 9, in the form of a band. The clamping element 1 is provided, on the side facing away from the end of the waveguide, with an indentation or recess 14, which serves to receive the collar 7. As shown in the illustrated embodiment, the recess 14 is, in turn, profiled to provide two additional grooves which are not designed by reference numerals. This profiling results in an especially satisfactory seal being effected by the elastic collar 7 and prevents the collar 7 from being pulled off the clamping element 1, when it is pressed against the clamping piece 1 by the clamping band 9. Furthermore, the diameter of collar 7 is tapered in the direction of the corrugated tube waveguide 13. The collar 7 sealingly contacts the protective jacket 2 of the waveguide 13 with its end away from the clamping element 1. In order to satisfy the particularly high sealing requirements necessary for the entire arrangement, the end of the elastic collar 7 contacting the protective jacket 2 is held by means of an additional clamping device or band 12.

Depending upon the particular type of material which forms the collar 7 as well as the length of the collar, it might be necessary to provide some additional support-

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ing strength for the connecting plug end of the corrugated tube waveguide 13. To the extent that the supporting strength of the collar 7 is not sufficient, because of the particular material used to form it or the particular dimensions of its wall thickness it is possible to provide reinforcing strips 8 which are inserted within the wall defining the collar 7. Such strips 8 extend substantially in the longitudinal direction of the waveguide 13.

A further aspect of the invention provides a construction of the collar 7 at the connecting plug end of the corrugated tube waveguide 13 which includes an extended lip portion 11 which is of such a length that it extends over and beyond the flange 10 of the connecting piece 3. Preferably, the lip portion 11 has a diameter at its end which is smaller than the external diameter of the flange 10, so that a very good seal is obtained. The portion of the extended collar lip portion 11 resting on the flange 10 can likewise be pressed against the flange 10 with the aid of a clamping device 15.

A preferred utilization of the mounting arrangement according to the present invention is in the field of corrugated tubular hollow waveguides having an approximately elliptical cross section. In this regard, it is possible to enhance the supporting effect of the mounting arrangement on the corrugated tube waveguide 13 by dimensioning the material of the wall defining the collar 7 so that it has a greater thickness in the region of the short axis of the ellipse of the waveguide cross section than in the region of its long axis. This takes into account the fact that the waveguide is especially flexible in the plane of the short axis and thus is more susceptible to damage in the zone of the mounting.

Referring to FIG. 2, this shows a view of the mounting arrangement of FIG. 1 as seen from the line 2—2 near the end of the waveguide. The elements illustrated in FIG. 2, which are identical to elements in FIG. 1, are designated by the same reference numerals.

By constructing the mounting arrangement, in accordance with the invention, it is made possible to effect a flawless mechanical support for the corrugated tube waveguide in a compact, relatively light-weight manner. Moreover, the end of the waveguide which is not covered by the protective jacket is simultaneously shielded against corrosion. Furthermore, the entire arrangement is sealed in such a manner that it is possible to operate the waveguide under high pressure.

It will be understood that the above description of the present invention is susceptible to various modifications, changes and adaptations.

What is claimed is:

1. Mounting arrangement for a connecting plug extending from the flanged end of a flexible, corrugated tube waveguide having a non-circular cross section and a protective jacket around the tube, comprising in combination:
 - (a) a clamping element attached to the waveguide near the flanged end thereof;
 - (b) an elastic collar element for supporting the flanged end of the waveguide, said collar element being fastened to the side of the clamping element which

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faces away from the flanged end of the waveguide and extending in the direction of the waveguide to sealingly engage the protective jacket of the waveguide tube.

2. Arrangement as defined in claim 1 wherein said clamping element is both an electrical contact member and a mechanical support member, said clamping element being provided with an indentation for receiving said collar element fastened thereto.

3. Arrangement as defined in claim 2 wherein said collar element is reinforced by strip elements provided within the body thereof.

4. Arrangement as defined in claim 3 wherein said collar element is attached near one of its ends to said clamping element with the aid of a clamping device provided on the outside of said collar element which presses said collar element against said clamping element.

5. Arrangement as defined in claim 4 wherein said clamping device is in the form of a band.

6. Arrangement as defined in claim 4 wherein another clamping device is provided near the end of said collar element which sealingly engages the protective jacket of the waveguide tube, said clamping device sealingly fastening said collar element to said protective jacket.

7. Arrangement as defined in claim 6 wherein the collar element is defined by a wall the thickness of which is reduced in the regions of said two clamping devices.

8. Arrangement as defined by claim 7 wherein said connecting plug includes a connecting flange at its end nearest the waveguide and said collar element includes a lip portion at its end nearest said connecting flange, said lip portion extending over and beyond said connecting flange.

9. Arrangement as defined in claim 8 wherein the end of said lip portion adjacent the connecting flange is provided a smaller diameter than the external diameter of said connecting flange.

10. Arrangement as defined in claim 8 wherein said collar element is fastened to said connecting flange with the aid of a further clamping device provided near the end of said collar element engaging said connecting flange.

11. Arrangement as defined in claim 10 wherein said further clamping device is in the form of a band.

12. Arrangement as defined in claim 10 wherein said waveguide has a generally elliptically shaped cross section and said wall defining the collar element is thicker in the region of the short axis of said cross section than in the region of the long axis thereof.

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PAUL L. GENSLER, Primary Examiner

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