

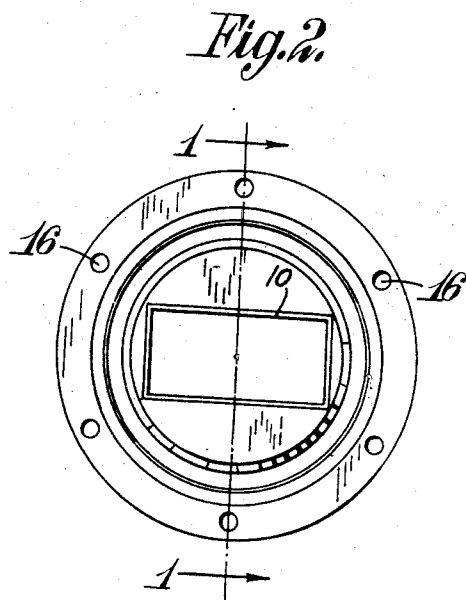
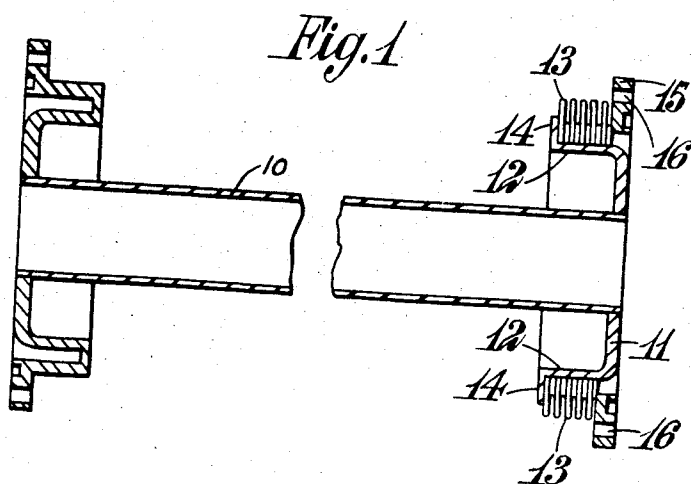
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WAVEGUIDES

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2,883,632

WAVEGUIDES

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5 Claims. (Cl. 333—98)

This invention relates to waveguides.

Long waveguide runs are generally built up of lengths of waveguide. It may happen that the apparatus to which the waveguide run is connected at either end is so positioned that there must be some slight angular misalignment between two lengths of waveguide. Such misalignment is generally unlikely to be greater than one or two degrees. It is one of the objects of the present invention to provide an improved form of waveguide unit enabling lengths of waveguide to be joined with a slight angular misalignment.

As is well known, waveguide lengths are commonly joined by means of flanges and are provided at the junctions with double quarter-wave choke systems in order to ensure effective electrical contact between the adjacent ends of the waveguide proper. The present invention makes use of waveguide connections of this kind.

According to this invention a waveguide unit comprising a length of waveguide having an annular flange at least at one end for connection to a further flanged waveguide and having a double quarter-wave choke system of which one of the quarter-wave sections extends axially of the waveguide in the form of a double walled cylinder surrounding the waveguide is characterized in said one of the walls of said cylinder is wholly or partly of bellows construction to permit of relative movement of the flange and the waveguide. Most conveniently the outer wall of the cylinder is of bellows construction. It has been found that such a construction can be made to work satisfactorily for misalignments up to about five degrees. Furthermore the bellows can be arranged to permit of compensation for slight errors in length of units in the waveguide run.

The following is a description of one embodiment of the invention reference being made to the accompanying drawings in which:

Figure 1 is a longitudinal section through a waveguide; and

Figure 2 is an end view of the unit of Figure 1.

Referring to the drawings there is shown a length of rectangular waveguide 10 which is shown, in Figure 1, in a section parallel to the narrow face. At one end, the guide 10 is terminated by a plate 11 extending outwards radially from the waveguide walls, the radius of the plate being such that it extends outwardly in a radial direction for a quarter wave length from the mid points of the broad sides of the waveguide. From the outer periphery of this plate a cylinder 12 extends backwards along the length of the waveguide and this cylinder is surrounded by a bellows 13, the bellows and cylinder both being joined to a ring 14 at the end of the bellows and cylinder remote from the plate 11. The other end of the bellows 13 is secured to an outwardly extending flange 15 having bolt holes 16 for bolting to a corresponding flange on another length of waveguide. The

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ring 14, the cylinder 12 and the plate 11 may be formed integrally with the waveguide or they may be joined in the known manner. It will be seen that the flange 15 can move relatively to the length of waveguide 10 because of the flexibility of the bellows. This construction forms a double quarter-wave choke, the first quarter-wave section of which is bounded on one side by the radially extending plate 11 and on the other side by the corresponding plate formed on the next adjacent length of waveguide. A second quarter-wave section of the choke is formed by the cavity between the cylinder and the bellows. By reason of this choke, it is not necessary for the end plate 11 to be in electrical contact with the corresponding end plate of the next adjoining length of waveguide.

It will be particularly noted that the construction described in the preceding paragraph need not be any more bulky than a conventional type of waveguide using a double quarter wave choke system. The bellows mounted flange may be arranged so that it can be coupled directly either to a similar bellows mounted flange at the end of a further length of waveguide but more usually it would be connected to a simple flange formed by a radially extending plate on a further length of waveguide. It will be noted also that this waveguide unit may be made interchangeable with waveguide units of rigid construction.

I claim:

1. A waveguide unit comprising a length of waveguide having, at least at one end, a double quarter-wave choke system between an annular flange and the waveguide walls, the choke system being formed in a double-walled cylinder surrounding the waveguide at a suitable radial distance from the waveguide walls, the cylinder being closed at one end and, at the other end, having its outer wall connected to the inner periphery of said flange and its inner wall connected to the outer periphery of a plate joined to and extending radially from the end of the waveguide walls, characterized in that at least one of the walls of said cylinder is at least partly of bellows construction to permit of relative movement of the flange and the waveguide.

2. A waveguide unit as claimed in claim 1 wherein the outer wall of the cylinder is of bellows construction.

3. A waveguide unit comprising a length of waveguide having an annular flange, at least at one end, for connection to a further waveguide, a plate joined to the end of the waveguide walls and extending radially therefrom towards said flange, and a double walled cylinder having one closed end and surrounding the waveguide, one of the walls of said cylinder being at least partly of bellows construction, the inner wall of the cylinder at the open end being joined to said plate around the outer periphery thereof and the outer wall of said cylinder being joined to said flange around the inner periphery thereof.

4. A waveguide unit as claimed in claim 3 wherein the whole of one wall of the cylinder is of bellows construction.

5. A waveguide unit as claimed in claim 3 wherein the whole of the outer wall of the cylinder is of bellows construction.

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