March 26, 1957 C. W. DAVIS 2,786,998

ANTENNA FEED HORN

Filed April 21, 1953

FIG. 1

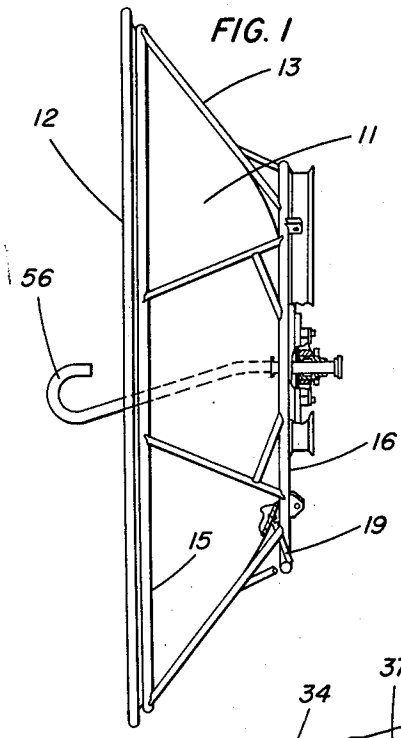
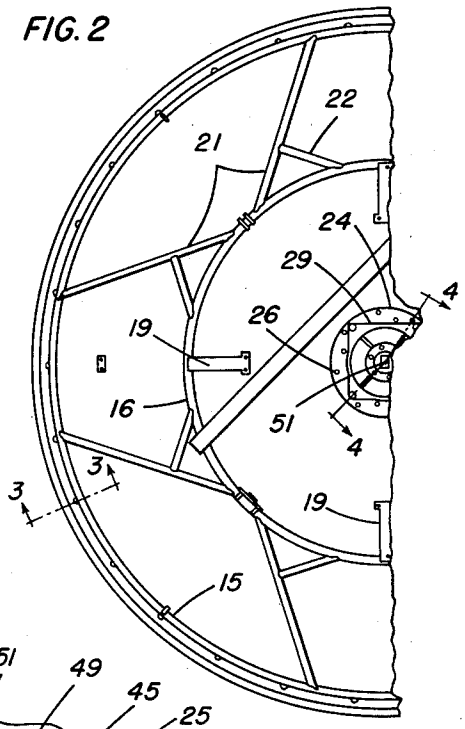


FIG. 2



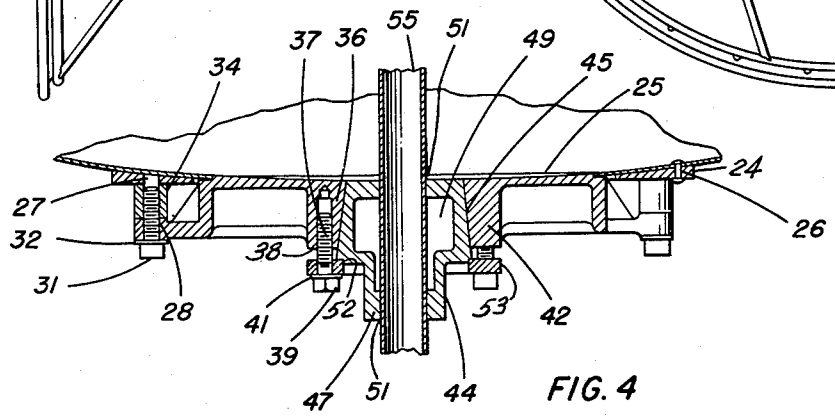


FIG. 4

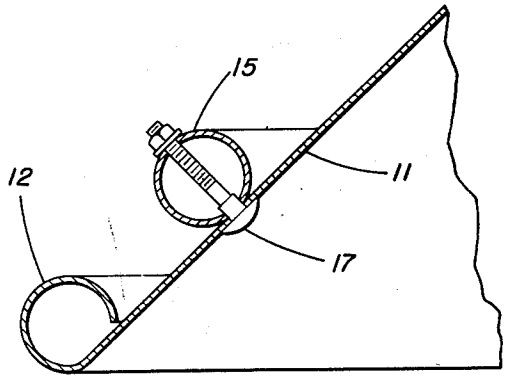


FIG. 3

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United States Patent Office 2,786,998 Patented Mar. 26, 1957

2,786,998

ANTENNA FEED HORN

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Application April 21, 1953, Serial No. 349,997

4 Claims. (Cl. 343—775)

The present invention concerns an antenna and in particular concerns an antenna feed horn and matching arrangement therefor.

In many microwave installations, it is necessary to have a relatively long waveguide feeding the antenna. Such waveguides may be matched at the entrance to the reflector but when so matched there is still a length of waveguide extending through the dish with a reverse turn for feeding the horn which faces the concavity of the dish. The invention improves upon the prior art devices by providing for the waveguide an adjustable connection through the reflector dish, and by further providing means for adjusting the feedline match with respect to the input in the horn. An adjustment rod is extended through the antenna dish to the horn for this purpose.

An object of the invention is to provide an antenna.

Another object is to provide an antenna feed horn and matching arrangement therefor.

Another object is to provide in connection with a microwave antenna an adjustable connection through the reflector dish and means for adjusting the feed line match with respect to the input in the horn.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

Fig. 1 is a side elevation of a preferred embodiment of the invention,

Fig. 2 is a fragmentary view seen from the right of Fig. 1,

Fig. 3 is a fragmentary detail taken along line 3—3 of Fig. 2, and

Fig. 4 is a fragmentary detail taken along line 4—4 of Fig. 2.

In Fig. 1 there is shown a dished reflector **11** of parabolic shape in axial section and having an outwardly turned rim **12**, the shape of the rim being more clearly shown in Fig. 3. A frame **13** is provided for supporting the parabolic dished reflector **11**. The frame **13** comprises in part a pair of tubular rings **15** and **16**. The tubular ring **15** is secured to the outer side of the reflector **11** adjacent its rim **12** by means of a series of bolts and nuts **17**; the instant embodiment of the invention includes twenty-six of these bolts and nuts.

The tubular ring **16** is secured to the reflector **11** by means of four channeled support straps **19**. Each of the straps **19** is welded at one of its ends to the tubular ring **16** at a portion thereof remote from the reflector **11** and the other end of each of the straps **19** is riveted at two places to the reflector **11**. The two tubular rings **15** and **16** are not only separately secured to the reflector but are also joined to one another by means of strut-like members **21** and **22** welded to or otherwise affixed to rings **15** and **16**. The assembly of tubular rings **15**, **16** and strut-like members **21** and **22** provides the rigid frame **13**.

A mounting ring **24** is coaxially secured to the outer

side of reflector **11** by means of a plurality of aluminum rivets **26**. The mounting ring **24** (Fig. 4) is provided with tapped holes **27** at four equally spaced arcuate intervals. A circular section of the reflector portion included by the mounting ring is cut away at **25**.

A clamp support **29** whose perimeter is substantially a square is provided with an opening **28** in each of its four corners, each of which openings is adapted to align with one of the tapped holes **27** in mounting ring **24**. Bolts **31** and washers **32** secure the clamp support **29** to the ring assembly **24**. Collars **34** are provided to space the clamp support **29** from the ring assembly **24**; collars **34** may be welded to the mounting ring **24** at each of said tapped hole positions. The clamp support **29** is provided with an axial opening **36** which is frustro-conical in shape. The rim **38** of the clamp support opening **36** has a plurality of tapped holes **37**. A plurality of bolts **39** having washers **41** are adapted to be threaded into openings **37**.

A clamp **44** having a frustro-conical portion **45** is adapted to be mounted in mating relation in the axial opening of the clamp support **29**. The clamp is provided with a reduced axial shank portion **47** extending beyond the larger end of its frustro-conical portion and is hollow as at **49**. Each of its ends have a rectangular opening **51** for receiving a waveguide connection **55**. The clamp **44** may be provided with suitable longitudinal slots (not shown) to allow for radial compression and expansion. The larger end of the frustro-conical portion **45** has a stepped edge **52**. A ring **53** having a plurality of openings corresponding to the openings **37** in the clamp support **29** is adapted to be fitted over clamp **44** and retained in place by means of screws **39** and washers **41**.

In operation the waveguide connection **55** to the feed horn **56** can be adjusted axially and radially of the parabolic reflector dish **11** from the back. To perform the adjustment operation the bolts **39** for retaining ring **51** are loosened permitting the clamp **44** to move axially. As a result of the axial movement, radial clamping pressure on the waveguide **55** is released permitting the waveguide to be adjusted. By means of the adjustment the antenna may be accurately focused.

Adjustment of the feed line match with respect to the input in the horn is accomplished by actuating an adjustment rod (not shown) extending through the antenna dish **11** to the horn **56**.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

I claim:

1. A microwave antenna comprising a dished reflector, said reflector being formed with an opening axially thereof, a rigid supporting framework for said reflector, a mounting ring secured to the outer surface of said reflector coaxially thereof, a clamp support secured to said mounting ring axially of said reflector and seating in the opening in said reflector, said clamp support constructed and arranged so as to provide a continuation of the inside surface of said reflector, said clamp support further formed with a frustro conical opening coaxial with said reflector, a frustro conical hollow clamp formed with a reduced axial shank portion and further formed with at least one longitudinal slot to allow for radial compression, a waveguide axially supported in said clamp, a bolt engaged clamping ring, said clamping ring engaging said clamp to cause said clamp to move axially in the frustro conical opening of said clamp support for selectively gripping or releasing said waveguide.

2. A microwave antenna comprising a dished reflector,

said reflector being formed with an opening axially thereof, a mounting ring secured to the outer surface of said reflector coaxially thereof, a clamp support secured to said mounting ring axially of said reflector and seating in the opening in said reflector, said clamp support constructed and arranged so as to provide a continuation of the inside surface of said reflector, said clamp support further formed with a frustro conical opening coaxial with said reflector, a frustro conical hollow clamp formed with a reduced axial shank portion and further formed with at least one longitudinal slot to allow for radial compression, a waveguide axially supported in said clamp, a bolt-engaged clamping ring, said clamping ring engaging said clamp to cause said clamp to move axially in the frustro conical opening of said clamp support for selectively gripping or releasing said waveguide.

3. A microwave antenna comprising a reflector, said reflector being formed with an opening axially thereof, a clamp support secured to convex side of said reflector axially thereof and seating in the opening in said reflector, said clamp support constructed and arranged as to provide a continuation of the inside surface of said reflector, said clamp support further formed with a frustro conical opening, coaxial with said reflector, a frustro conical hollow clamp formed with a reduced axial shank portion and further formed with at least one longitudinal slot to allow for radial compression, a waveguide axially supported in said clamp, and a clamping ring bolted to said

clamp support for engaging said clamp to cause said clamp to move axially in the frustro conical opening of said clamp support for selectively gripping or releasing said waveguide.

4. A microwave antenna comprising a reflector, said reflector being formed with an opening axially thereof, a clamp support secured to the convex side of said reflector axially thereof, and seating in the opening in said reflector, said clamp support constructed and arranged so as to provide a continuation of the inside surface of said reflector, said clamp support further formed with a frustro conical opening coaxial with said reflector, a frustro conical hollow clamp formed with at least one longitudinal slot to allow for radial compression, a waveguide axially supported in said clamp, and a clamping ring bolted to said clamp support for engaging said clamp to cause said clamp to move axially in the frustro conical opening of said clamp support for selectively gripping or releasing said waveguide.

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