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(54) **Slot waveguide radiator**

(57) A slotted wave guide radiator comprises a wave guide 1 having provided in a face 8 thereof slots 3 aligned parallel to the wave guide longitudinal axis. The wave guide has on each side of the slots an external plate 4 shaped to extend out from the face parallel to the wave guide longitudinal axis and to reverse on itself to extend behind the face 8 on the respective side of the wave guide to broaden out thereby the beam of radiation radiated from the slots. V shaped external plates are described wherein the plate on one side of the slots is a mirror image of the plate on the other side of the slots.

In this way when the wave guide radiator is mounted vertically an azimuth beam coverage of at least 180° is produced.

FIG. 1.

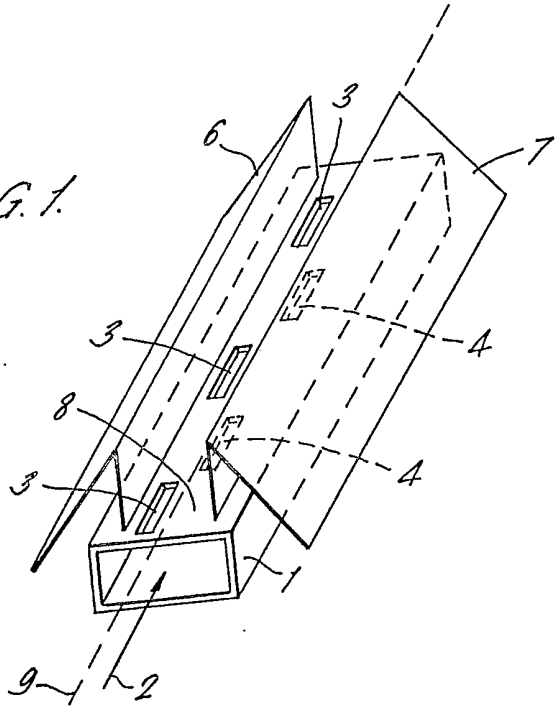

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FIG. 1.

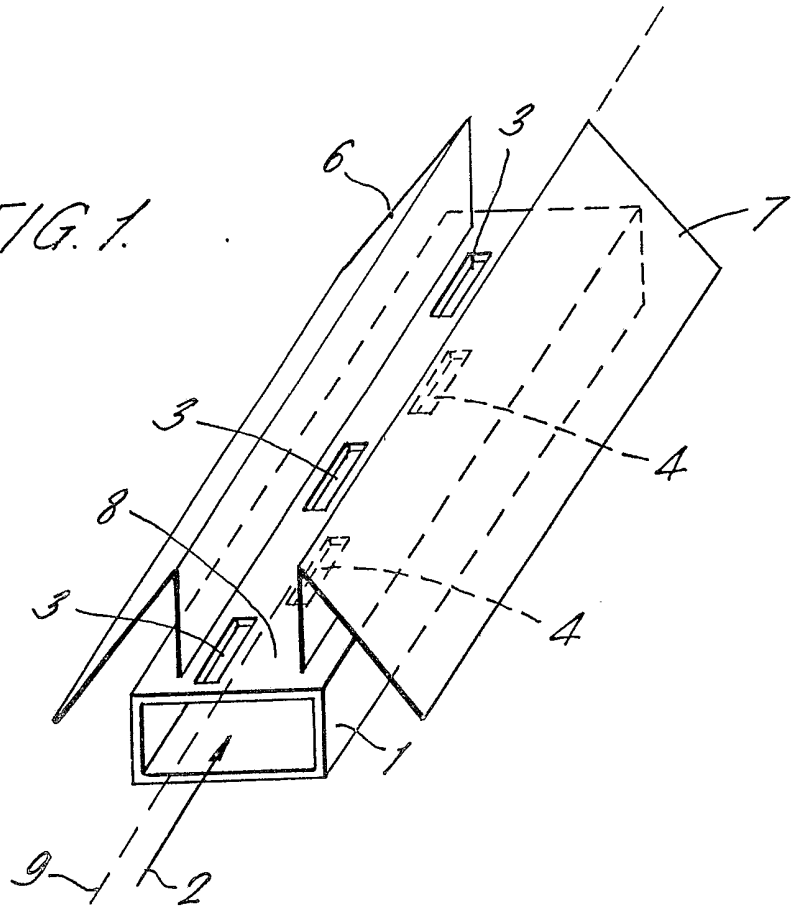
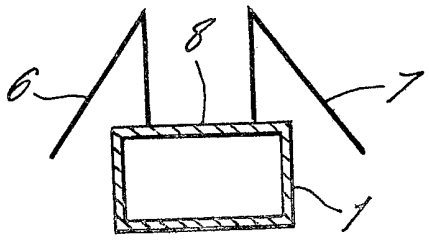


FIG. 2.



SPECIFICATION

Slot waveguide radiator

This invention relates to slot waveguide radiators which in particular radiate microwaves.

Known slot waveguide microwave radiators when mounted vertically have a typical azimuth beam coverage of the order of 120°. In particular applications of microwave radiators it is desirable to have a greater azimuth beam coverage than this.

There is provided according to the invention a slotted waveguide radiator comprising a waveguide having provided in a face thereof slots aligned parallel to the waveguide longitudinal axis, the waveguide having on each side of the slots an external plate shaped to extend out from said face parallel to said axis and to reverse on itself to extend behind said face on the respective side of the waveguide to broaden out thereby the beam of radiation radiated from the slots. In this way by mounting the waveguide radiator vertically an azimuth beam coverage of at least 180° is conveniently produced. Consequently the slotted waveguide radiator is specially useful as a transponder in a navigational aid system. Preferably the plate on one side of the slots is a mirror image shape of the plate on the other side of the slots. The plates can be V-shaped and can extend out vertically from the face to extend along the axis direction to have an end at least equal with each end of the slots. The width of the face on the waveguide is typically three quarters of the wavelength of radiation to be radiated and preferably the centres of adjacent slots are spaced apart as measured along said axis by one half the wavelength of the radiation within the waveguide.

Examples of the present invention will now be described with reference to the accompanying drawings in which:

Figure 1 illustrates a slot waveguide radiator embodying the invention;

Figure 2 illustrates an end view of the radiator shown in Figure 1, along line 2 therein.

Referring to the drawings a waveguide 1 includes a number of slots provided in a face 8 of the waveguide. The slots are aligned parallel to the waveguide longitudinal axis 2. The face 8 has slots arranged therein to form a symmetrical longitudinal zig-zag pattern about a centre line 9 of the face although clearly the pattern could be arranged differently with respect to the centre line. The slots are typically arranged such that the distance between the centre of adjacent slots, as measured along the axis 2, is one half the wavelength of the microwave radiation within the waveguide. The width of the face 8 is also preferably three quarters of the wavelength of the radiation to be radiated. Consequently radiation is radiated from the slots in phase. This form of known slot waveguide radiator when mounted vertically has an azimuth beam width of the order of 70°.

On either side of the pattern there is attached to the waveguide face 8, by welding say, a V-shaped metal plate 6 and 7 respectively. Each plate extends vertically from the face 8 and reverses on itself to extend behind the face on either side of the waveguide as illustrated. As a result when mounted vertically the azimuth beam width of the microwave radiation radiated from the slots is broadened out to the order of 180°. The beam width is defined by the extent to which the plates reverse on themselves and also to how far they extend behind face 8.

Therefore a cheap and easy to manufacture radiator capable of having an azimuth beam width of 180° is formed by the addition of plates 6 and 7 to the slot waveguide radiators. It will be apparent that other shaped plates can be employed, for example curved plates, and it is not essential that the plates extend vertically from face 8 or are shaped to be mirror images of one another. Furthermore although the plates can extend along the axis 2 to have their ends equal or beyond each end of the pattern of slots, each individual slot could have a pair of plates or alternative slots can have a respective plate on alternate sides of the pattern. It will be apparent that the slot radiator illustrated can be employed for electromagnetic radiation other than microwaves.

CLAIMS

1. A slotted waveguide radiator comprising a waveguide having provided in a face thereof slots aligned parallel to the waveguide longitudinal axis, the waveguide having on each side of the slots an external plate shaped to extend out from said face parallel to said axis and to reverse on itself to extend behind said face on the respective side of the waveguide to broaden out thereby the beam of radiation radiated from the slots.

2. A waveguide radiator as claimed in claim 1 wherein the plate on one side of the slots is a mirror image shape of the plate on the other side of the slots.

3. A waveguide radiator as claimed in claim 1 or 2 wherein the said plates are V-shaped.

4. A waveguide radiator as claimed in claim 3 wherein each plate extends out vertically from said face.

5. A waveguide radiator as claimed in any preceding claim wherein the plates extend along the axis direction to have an end at least equal with each end of said slots.

6. A waveguide radiator as claimed in any preceding claim wherein the width of said face of the waveguide is substantially three quarters of the wavelength of radiation to be radiated therefrom.

7. A waveguide radiator as claimed in any preceding claim wherein the centres of adjacent slots are spaced a predetermined distance apart as measured along said axis, said distance being substantially one half the wavelength of radiation within the waveguide.

8. A waveguide radiator as claimed in any preceding claim wherein said slots are provided symmetrically about a longitudinal line central on said face.

9. A slotted waveguide radiator substantially as herein described with reference to the accompanying drawings.

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