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OMNIPOLARIZATION MICROSTRIP ANTENNA

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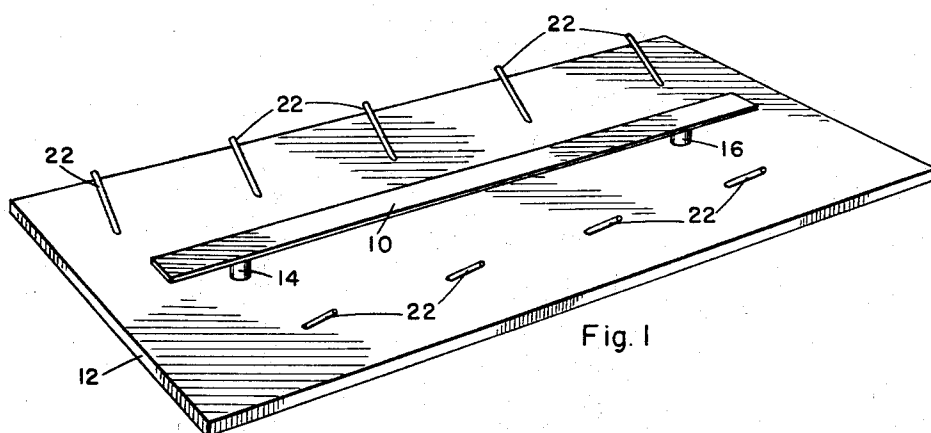


Fig. 1

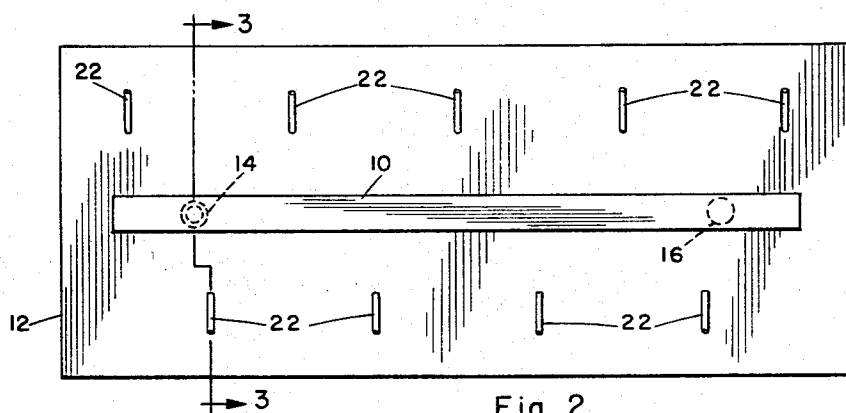


Fig. 2

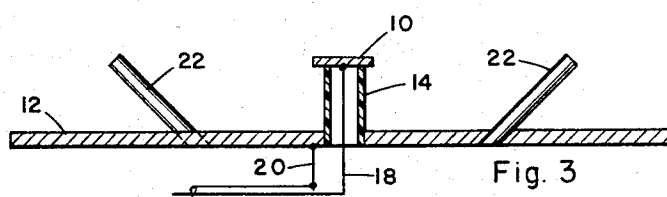


Fig. 3

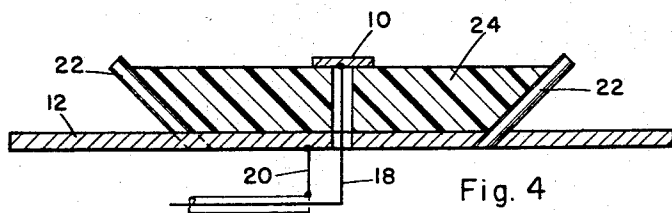


Fig. 4

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OMNIPOLARIZATION MICROSTRIP ANTENNA
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The present invention relates generally to antennas and more particularly to an omnipolarization microstrip antenna.

The primary object of this invention is to provide a microstrip antenna sensitive to radiation with linear polarization or circular polarization in either direction, with substantially constant gain.

Another object of this invention is to provide a microstrip antenna comprising a rigid unitary structure with no adjustable or moving parts to become loose or detached.

A further object of this invention is to provide an antenna which is compact, light in weight and adaptable to a variety of uses and installations.

Finally, it is an object to provide a microstrip antenna of the aforementioned character which is simple and economical to manufacture and which contains a minimum of component parts.

With these and other objects definitely in view, this invention consists in the novel construction, combination and arrangement of elements and portions, as will be hereinafter fully described in the specification, particularly pointed out in the claims, and illustrated in the drawing which forms a material part of this disclosure, and in which:

FIGURE 1 is a perspective view of the complete antenna;

FIGURE 2 is a top plan view thereof;

FIGURE 3 is an enlarged sectional view taken on line 3-3 of FIGURE 2 and rotated 90 degrees; and

FIGURE 4 is a similar sectional view showing an alternative mounting for the microstrip.

Referring now to FIGURES 1-3 of the drawing, the antenna comprises an elongated, conductive microstrip 10 mounted on a plate-like conductive ground plane 12, said microstrip being supported in spaced parallel relation to the ground plane by posts 14 and 16 of insulative material. The post 14 may be hollow, as in FIGURE 3, for passage of a connection 18 to microstrip 10, the other antenna connection 20 being made to the ground plane 12. Along each side of microstrip 10 in spaced parallel relation thereto is a linear array of monopole radiating elements 22, extending from ground plane 12 and inclined outwardly from said microstrip. The angle of inclination of monopoles 22 relative to the microstrip 10 is preferably 45 degrees for best omnipolarization characteristics, but could be some other angle for specific purposes. For instance, it may be desirable to increase sensitivity to a particular polarization while maintaining general omnipolarization qualities. The monopoles 22 on one side of the microstrip 10 are longitudinally staggered in relation to those on the other side and all monopoles are nominally one quarter wavelength in length.

Bandwidth of the antenna can be varied by a logarithmic periodic variation in the size and spacing of the monopole radiating elements. The radiation pattern of the antenna is endfire and directivity is proportional to the antenna length and number of radiating elements.

The linear arrays of monopoles 22 together with their images on the other side of ground plane 12, effectively

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constitute dipole arrays on opposite sides of the microstrip transmission line 10. Incident radiation, in any direction of polarization, excites the monopoles 22, which in turn excite the microstrip 10. Some monopoles will be excited more than others, depending on the polarization of the incident radiation, but the total amplitude of the signal received in the microstrip will be substantially constant.

An alternative support for the microstrip 10 is illustrated in FIGURE 4, in which the insulated posts are replaced by a dielectric block 24 of suitable thickness to hold the microstrip in its correct spaced relation from ground plane 12. The dielectric block 24 preferably extends the full length of microstrip 10 and may also extend laterally to provide additional support for the monopoles 22. The dielectric material is, of course, selected to maintain the correct phase relationship in the antenna.

The simplicity and compactness of the antenna make it adaptable to various uses, the light weight making it feasible to attach or build the antenna into aircraft, missiles, or space vehicles. In fact the skin of any such vehicle, if conductive, may be utilized as a ground plane, since it is not essential for the ground plane to be entirely flat. The size of the antenna will be dependent on the frequencies to be handled and the specific use of the antenna.

It is understood that minor variation from the form of the invention disclosed herein may be made without departure from the spirit and scope of the invention, and that the specification and drawing are to be considered as merely illustrative rather than limiting.

I claim:

1. An omnipolarization microstrip antenna, comprising:
 - an elongated, conductive microstrip;
 - a conductive ground plane;
 - said microstrip being fixedly supported in spaced relation from and substantially parallel to said ground plane;
 - a linear array of longitudinally spaced radiating elements extending from said ground plane on each side of and substantially parallel to said microstrip;
 - said linear arrays of radiating elements being inclined in opposite directions relative to said microstrip.
2. An omnipolarization microstrip antenna, comprising:
 - an elongated conductive microstrip;
 - a conductive ground plane;
 - said microstrip being fixedly supported in spaced relation from and substantially parallel to said ground plane;
 - a linear array of longitudinally spaced radiating elements extending from said ground plane on each side of and substantially parallel to said microstrip;
 - said radiating elements being outwardly inclined on opposite sides of said microstrip.
3. An antenna according to claim 2 and including a dielectric block fixed to said ground plane and said microstrip and supporting the microstrip.
4. An antenna according to claim 2 wherein said radiating elements are inclined at 45 degrees relative to said microstrip.
5. An omnipolarization microstrip antenna, comprising:
 - an elongated, conductive microstrip;
 - a conductive ground plane;
 - said microstrip being fixedly supported in spaced rela-

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tion from and substantially parallel to said ground plane;
 a linear array of longitudinally spaced radiating elements extending from said ground plane on each side of and substantially parallel to said microstrip;
 said radiating elements being outwardly inclined on opposite sides of said microstrip;
 and the radiating elements on one side of said microstrip being longitudinally staggered with respect to the radiating elements on the other side thereof.

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