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DIRECTIVE ANTENNA

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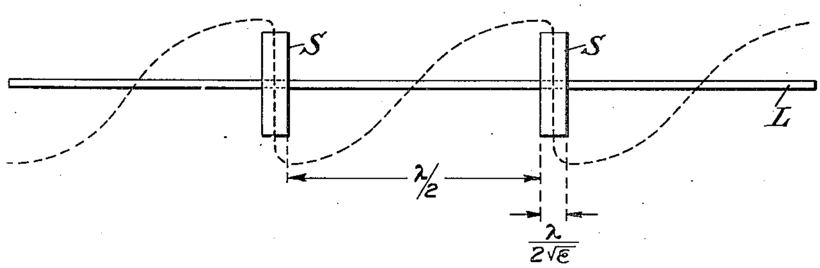

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DIRECTIVE ANTENNA

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3 Claims. (Cl. 250—33)

Directive antennae are known which comprise dipoles a half-wavelength long and arranged end to end in line. The dipoles are energized to coincide in phase and may each be composed of tubular conductors arranged concentrically so that the dipoles each comprise an outer conductor and an inner one. The outer conductors are interconnected through the inner conductors in alternate succession. The radiation from these antennae is collected and directed strongly in directions perpendicular to the dipoles. However, the provision of concentric tubular conductors meets with certain difficulties. For instance, it is not easy to mount the dipoles in position.

The present invention aims to avoid such difficulties and is concerned with an arrangement an example of which is described hereafter with reference to the accompanying drawing, which is a diagrammatic illustration thereof.

The antenna here represented comprises a straight conductor L and discs S through which this conductor extends. These discs are spaced $\lambda/2$, that is, a half-wavelength apart, and have a dielectric constant which is as high as possible. There are ceramic materials whose dielectric constant is $\epsilon=80$. As the wavelength in a medium of a dielectric constant ϵ is

$$\frac{\lambda}{\sqrt{\epsilon}}$$

phase reversal will occur in short sections of the dielectric, namely, the sections contained in the medium having a high ϵ. The phase relations will therefore be the same in any two conductor sections which are $\lambda/2$ long and are separated from each other by such a medium. The thickness of the discs is determined with the aid of the formula

$$\frac{\lambda}{2\sqrt{\epsilon}}$$

In the case of a dielectric constant $\epsilon=80$ the thickness of the discs S should thus be 12% of $\lambda/2$.

Because of this small thickness of the discs S the conductor sections oscillating within them do not materially aid in the production of the radiation pattern.

The novel arrangement is preferably intended for the decimeter wave range and is very simple, no complicated circuit arrangement being necessary as the conductor L may be self-supporting. Also, no switching means need be provided.

What is claimed is:

1. An antenna comprising a straight conductor and means for effectively dividing said conductor into half-wavelength resonant sections, comprising discs of material having a high dielectric constant threaded on said conductor and spaced apart along said conductor a distance substantially equal to a half-wavelength at the operating frequency, the thickness of said discs being a selected function of the operating wavelength and the dielectric constant of the material from which said disc is made.

2. An antenna according to claim 1, wherein said discs are made of a thickness determined by the formula

$$\frac{\lambda}{2\sqrt{\epsilon}}$$

wherein λ=the operating wavelength and ϵ=the dielectric constant of the material of said disc.

3. An antenna according to claim 1, wherein said straight conductor is sufficiently rigid to form a self-supported antenna structure.

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