

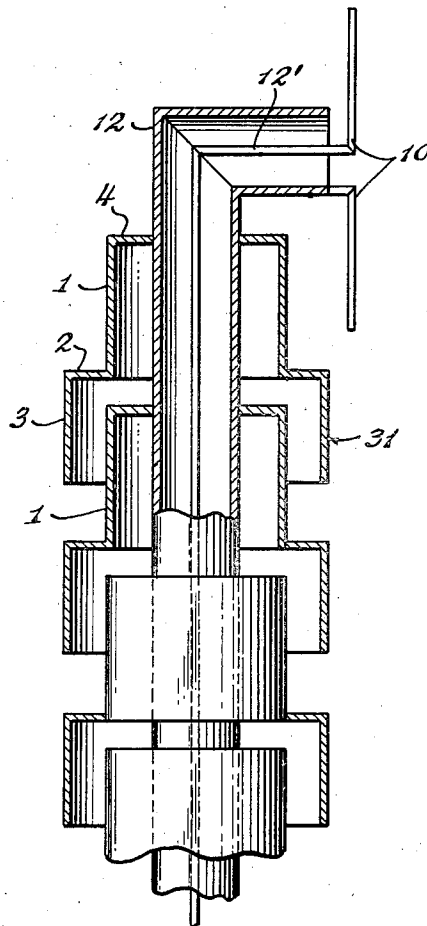
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TRANSMISSION LINE

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TRANSMISSION LINE

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3 Claims. (Cl. 178-44)

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This invention relates, generally, to transmission line antenna feeds, and the invention has reference more particularly to a novel antenna feed wherein shielding means is provided for the purpose of preventing leakage of energy along the outer surface of the feed line.

The present application is a division of co-pending application Serial No. 412,918 for Object detecting and locating system, filed September 30, 1941.

An object of the present invention is to provide a novel transmission antenna feed that is so constructed and arranged as to prevent the leakage of energy along the exterior thereof.

Other objects and advantages will become apparent from the specification, taken in connection with the accompanying drawing, wherein the single figure of the drawing is a view in elevation with parts broken away, showing the novel antenna feed line construction of this invention.

Referring now to the drawing, the numeral 10 designates a dipole antenna that is fed from a concentric line 12 having an inner conductor 12'. In accordance with the principles of this invention, the antenna line 12 is provided with means for preventing current flow on the exterior surface of the line outer conductor, the presence of which current causes scattering of the emitted radiation. This means comprises a plurality of approximately quarter-wavelength concentric line resonators 31 having the exterior conductor of line 12, for example, as their inner conductor. Each of these resonators consists of an inner cylindrical portion 1 of reduced diameter having a closed annular inner end 4 fixed upon the line 12, the outer end of this reduced portion being open and being connected by an annular flange 2 to an enlarged outer cylindrical portion 3 of the resonator, which outer portion has an open end and partially overlaps the reduced portion 1 of the adjoining resonator. Each resonator acts as a lumped impedance to the flow of current and these resonators may be spaced a quarter-wavelength apart or less. Thus, in Fig. 6 these resonators are shown less than a quarter-wavelength apart, thereby shortening the distance measured in wavelengths between the successive impedances. Any radiation impinging on the outside of the line is affected as though the line were broken at a plurality of points.

The use of the concentric line resonators 31 is particularly desirable where the antenna structure is to be used in connection with a reflector, such as a parabolic reflector, and such use serves to suppress shell waves, i. e., waves arising on the outer surface of the feeder line. By having several resonators 31 partially overlapping, the distances between substantially open circuit points

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on the exterior of the conductor is reduced, thereby greatly enhancing the effectiveness of the wave suppression.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. Means for preventing ultra high frequency current flow on the exterior surface of a conducting member comprising a plurality of conducting shells surrounding said member, each of said conducting shells having a portion of reduced diameter connected to said member and a portion of larger diameter partially overlapping the portion of reduced diameter of an adjacent shell, said adjacent shells forming together with said member a plurality of resonant structures providing a high impedance to ultra high frequency current flow between said adjacent shells.

2. Means for preventing ultra high frequency current flow on the exterior surface of a conducting member comprising a plurality of similarly disposed conducting shells surrounding said member, said shells having open outer end portions and reduced inner end portions connected to said member, the connections of said reduced inner end portions to said member being mutually spaced apart less than one quarter of said ultra high frequency wavelength, adjacent shells forming together with said member a plurality of resonant structures providing high impedance to current flow between said open outer ends of said shells.

3. Means for inhibiting reradiation of ultra high frequency waves from the exterior surface of an electrical conductor comprising a series of metallic cupped resonators having enlarged portions provided with free edges and reduced portions provided with edges conductively attached to said conductor, each of said resonators having its enlarged portion at least partially overlapping an adjacent reduced portion of an adjoining resonator to provide a spacing between corresponding portions of said free edges of adjacent resonators less than one quarter of said ultra high frequency wavelength, adjacent resonators forming together with said conductor a plurality of resonant structures providing high impedance to current flow between said free edges of said resonators.

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