

[54] **TERMINATOR FOR SPIRAL ANTENNA**

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[57] **ABSTRACT**

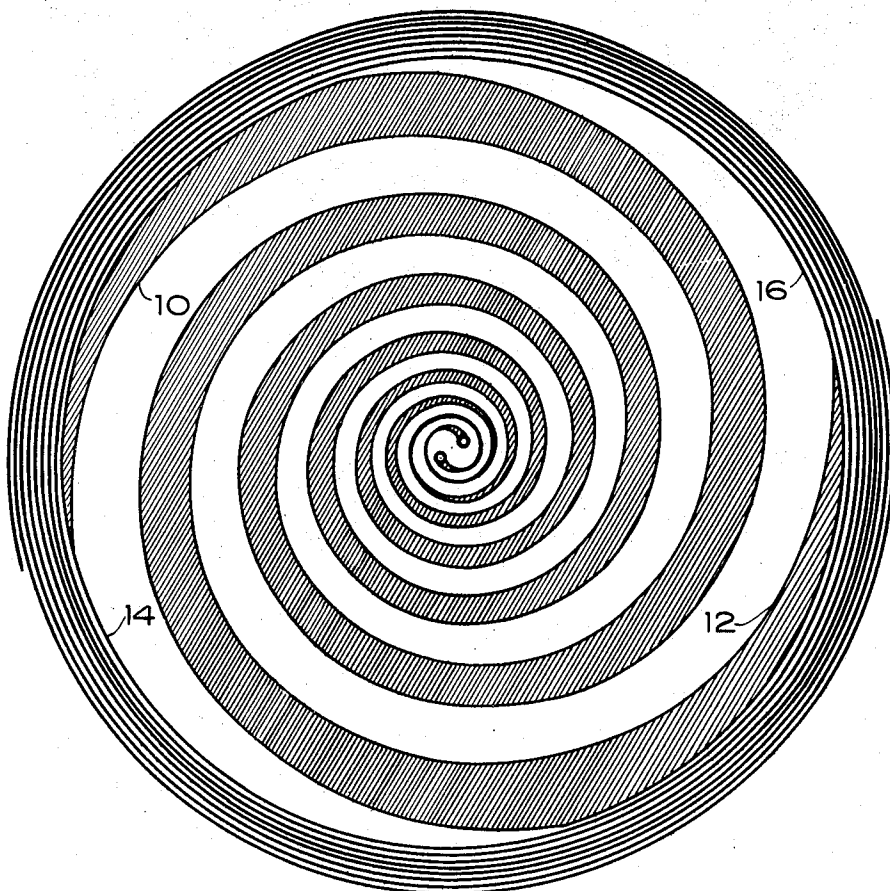
A spiral antenna wherein its radiating elements terminate in Archimedean spirals.

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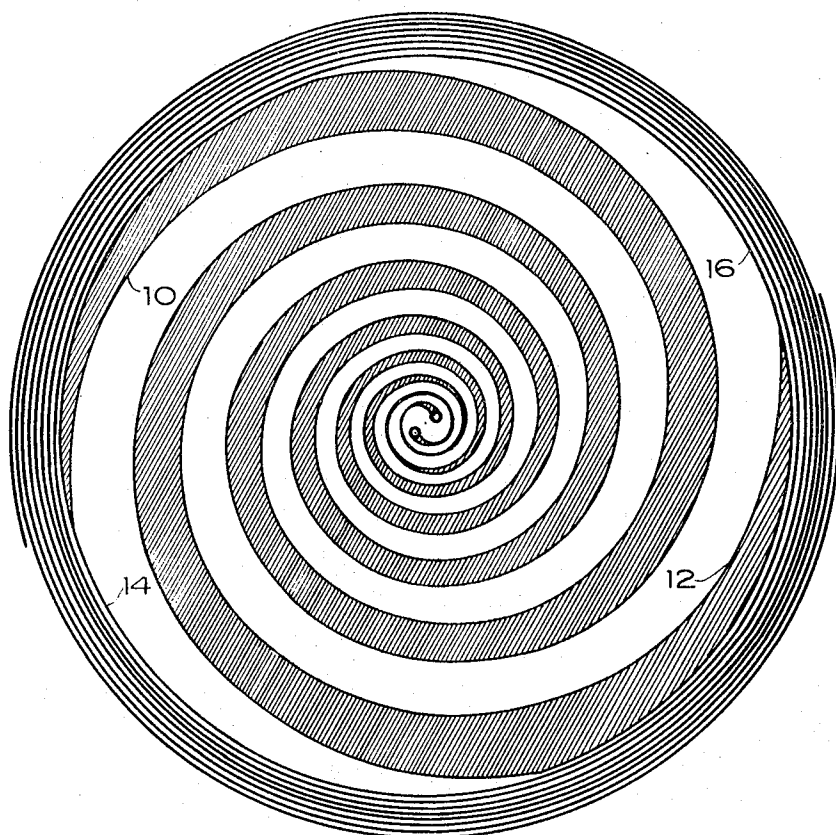
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7 Claims, 1 Drawing Figure



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TERMINATOR FOR SPIRAL ANTENNA

STATEMENT OF GOVERNMENT INTEREST

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

BACKGROUND OF THE INVENTION

In order to achieve an equiangular spiral direction finding antenna which is frequency independent and will operate for any polarization, the antenna radiating elements must be so loaded as to simulate an infinite radiating plane. In prior devices loading is accomplished by physically mounting radio frequency resistive material to the radiating surface of the antenna.

The material is often ferrite filled epoxy, machined to close tolerances in an annular shape, and attached to the antenna at its outermost part. Viewed in cross section, the material is seen as attached at the full diameter of the antenna substrate, and sloping away from the surface of the antenna, in a covering relationship, toward its center. That is, the material is a ferrite loaded epoxy washer having a wedge shaped cross section, wherein the thickest portion of the wedge is attached to the antenna substrate at its outer edge and the thinnest portion of the wedge extends toward the center of the antenna in covering relationship to the radiators, in order to provide gradual resistive coupling to the antenna.

As a result, the antenna's physical dimension and weight are increased. Its depth is increased by the thickness of the material. Its diameter by the surface outside the radiating area required for mounting the material; and its weight by the weight of the resistive material, which is primarily iron. Additionally, because of the proximity of the material to the radiating surface the antenna frequency band is limited and its sensitivity is reduced.

SUMMARY OF THE INVENTION

The present invention is a means for loading the antenna by encircling the radiating elements with a plurality of interlocking spirals, wherein each of the spirals is attached to a radiating element. These spirals are, in general, Archimedean spirals consisting of elements having constant width, and spacing between adjacent element equal to the element's width.

BRIEF DESCRIPTION OF THE DRAWING

The FIGURE is a diagrammatical view of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention which is a means for terminating the radiating elements of a spiral antenna is shown in the FIGURE. Although the spiral antenna shown is composed of two radiating elements 10 and 12, the present invention can be used with spiral antennas having any number of radiators.

The termination means consists of arms 14 and 16. Arm 14, connected to radiator 10, and arm 16, connected to radiator 12, are Archimedean spirals arranged in an interlocking fashion. The width of arm 14 is equal to the width of arm 16, and the spacing between adjacent arms 14 and 16 is equal to the arm width. By interlocking, arms 14 and 16 couple and provide resistive loading for radiators 10 and 12, which simulates an infinite radiating plane.

The present invention is implemented as follows: at the radius determined by the parameters defining the intended use (frequency range, etc.), the width of radiating elements 10 and 12 are decreased and converted into interlocking Archimedean spirals 14 and 16, wherein the spacing between adjacent arms 14 and 16 equal the arm width. Although the arms may be of any length, approximately four revolutions by each arm provides satisfactory results for at least some applications.

The spiral antenna and terminating means may be produced by etching copper clad epoxy glass board. The negative used for etching may be a photocopy of a spiral drawing wherein the design is determined by the antennas intended use. In the alternative, as an example, the terminating means may be constructed from wires wound in the preferred spirals and soldered to the ends of radiators 10 and 12.

As mentioned above, the present invention is not limited to the embodiment shown, but may be utilized with spiral antennas having any number of radiating elements.

What is claimed is:

1. An antenna array comprising;
a plurality of interwound spiral radiators, and
a radiator termination means having at least a separate spiral member coupled to each said radiator and encircling said plurality of radiators for simulating an infinite radiating plane.

2. The antenna of claim 1 wherein each said member is an electrically conductive material in the shape of an Archimedean spiral fixedly attached to each said radiator, such that each said radiator has one electrically conductive Archimedean spiral arm attached thereto.

3. The antenna of claim 2 wherein the Archimedean spiral arms interlock such that the spiral arms attached to adjacent radiators are adjacent.

4. The antenna of claim 3 wherein the width of each said spiral arm is equal to the width of the separation between adjacent spiral arms.

5. The antenna of claim 4 wherein said antenna comprises a copper clad epoxy glass board wherein said radiators and said spiral arms are etched.

6. The antenna of claim 4 wherein said antenna comprises a copper clad epoxy glass board wherein said radiators are etched, and electrically conductive wire in the shape of an Archimedean spiral attached to each radiator.

7. The antenna of claim 4 wherein the length of said arms is such that each said arm encircles said radiators four times.

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