

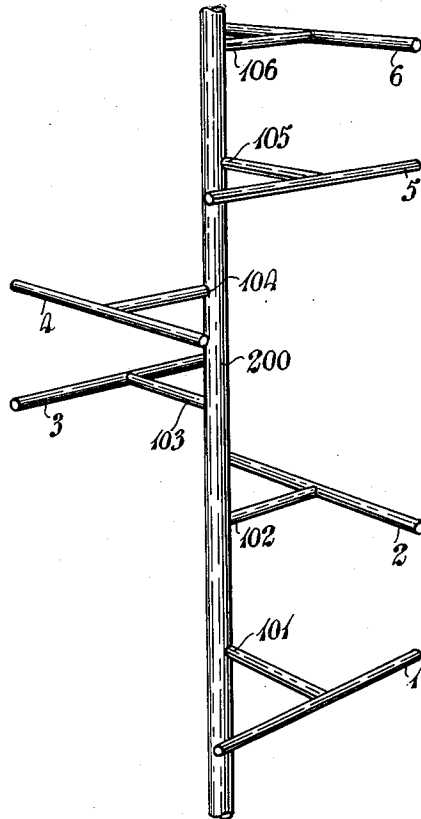
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RADIO ANTENNA

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## UNITED STATES PATENT OFFICE

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## RADIO ANTENNA

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2 Claims. (Cl. 250—33)

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This invention relates to a radio antenna for the transmission or reception of short waves, and has for its object to provide an antenna for horizontally or vertically polarised waves with a substantially circular radiation pattern in the horizontal plane and a horizontally directive pattern in the vertical plane. In the known methods of constructing an aerial with these characteristics a larger number of radiating elements are generally involved and the connection of feeders to ensure the correct phasing of each element becomes complex if the array is required to be highly directive. The present invention provides an antenna having a minimum of radiating elements and of which the feeder system is relatively simple.

The invention consists in a radio antenna comprising a plurality of radiating elements, which may be half wave dipoles, which are disposed around and spaced from a central longitudinal axis, the radiating elements being spaced in the direction of said axis and at different radial angles with respect thereto, whereby the radiating elements are disposed around the axis in helical fashion.

A feature of the invention consists in a radio antenna wherein the radiating elements, which may be half wave length dipoles, are supported on struts radiating from a central tower or mast which carries the main feeder with which the aerial is excited, the radiating elements being spaced along the length of the tower or mast with consecutive radiating elements disposed in different angular position around the tower or mast in helical fashion.

The radiating elements are preferably spaced by a distance of a quarter wave length from the central axis or mast and the radial angle between two adjacent radiating elements is made proportional to their longitudinal spacing relative to the wave length. Thus if the radiating elements are spaced at distances of a quarter wave length along the axis, each will be angularly disposed at 90° with respect to the next adjacent radiating elements.

An embodiment according to the invention is illustrated in the accompanying drawing which shows a transmitting or receiving aerial for horizontally polarised waves in which the radiation is concentrated in a horizontal direction with a substantially circular radiation pattern measured in a horizontal plane. The rods or wires 1, 2, 3 etc., are horizontally radiating elements which may be half wave length dipoles fed at their centre points. Each element is supported on a strut about one quarter of a wavelength long from a central tower or mast 200 carrying the main feeder with which the aerial is excited. The vertical spacing between adjacent radiating elements is one quarter of a wavelength, and the feeders from each

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element are connected to the main feeder at points 101, 102, 103 etc., where the struts are fixed to the mast.

It will be seen that the phase angles of the currents in the radiating elements are 0°, 90°, 180°, 270° etc., with reference to the element 1. The elements 1, 5, etc., lying in the same vertical plane are therefore excited in phase and in opposite phase with respect to the elements 3, etc., which lie in a parallel vertical plane spaced at a horizontal distance of one half wavelength from the plane containing the elements 1, 5, etc. The radiation from all these elements is therefore additive in a horizontal direction. In a similar manner the radiation from the even numbered elements is additive in a horizontal direction but in phase quadrature and at right angles to that of the odd numbered elements. The whole therefore combines to produce a radiation pattern which is substantially circular in a horizontal plane.

In an alternative arrangement, the radiating elements may be vertical and produce vertically polarised waves with similar radiation pattern in the horizontal plane.

I claim:

1. Radio antenna comprising a plurality of radiating elements which are supported on struts projecting from a central mast which carries the main feeder with which the aerial is excited, the radiating elements being spaced by a distance of a quarter wavelength from the central mast and being spaced from one another along the length of the mast by the distance of a quarter wavelength with consecutive radiating elements disposed in different angular positions in helical fashion, each radiating element being angularly disposed at 90° with respect to the next adjacent radiating element.

2. Radio antenna comprising a central mast serving as the main feeder with which the aerial is excited, a plurality of quarter-wave struts projecting radially from the central mast and spaced from one another along the direction of the mast by a distance of a quarter wavelength, each strut projecting from the mast in a radial direction which is angularly disposed at 90° with respect to the next adjacent strut, and a half wave dipole mounted on the end of each strut.

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