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ANTENNA AND SUPPORT STRUCTURE

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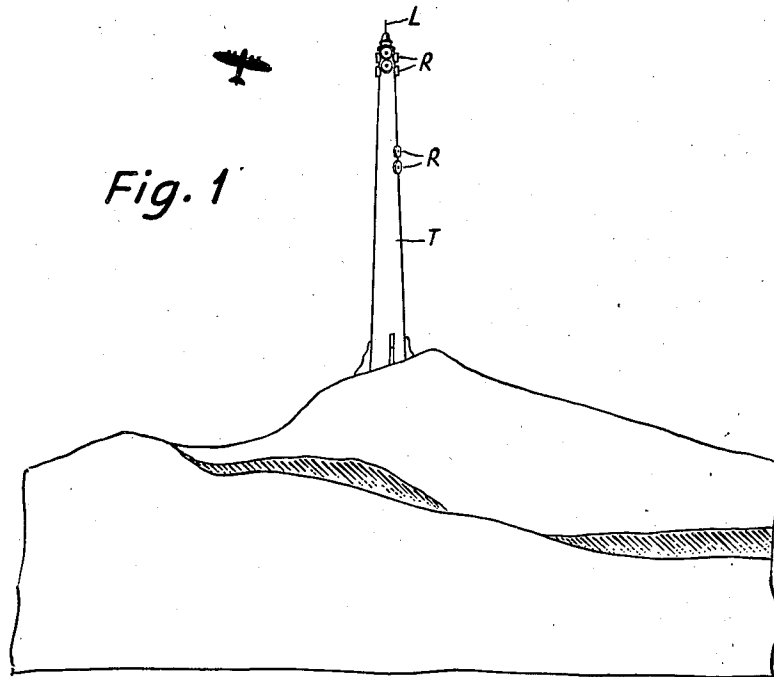
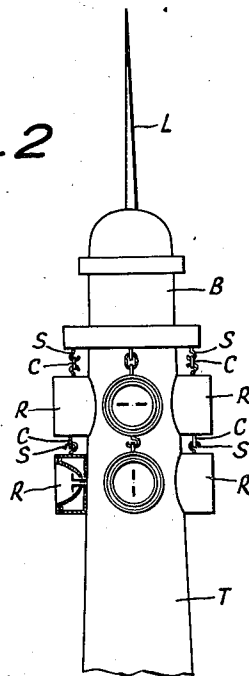


Fig. 2



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ANTENNA AND SUPPORT STRUCTURE

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9 Claims. (Cl. 250—33)

The present invention relates to antennas and, more particularly, to ultra short wave antennae supporting structures which are particularly adaptable to radio relay service.

An object of the present invention is the provision of supporting structure for plurality of antennae, such supporting structure providing for maximum electrical separation between the different antennae.

A further object of the present invention is an antenna supporting structure, as aforesaid, which allows flexibility in the circuit and antenna arrangement.

Still a further object is the provision of an antenna structure, as aforesaid, which is low in cost and may be readily constructed.

The foregoing objects, and others which may appear from the following detailed description, are attained by the provision of a supporting tower in the form of a slender concrete column with radiating units hung on the outside of the column as desired. The column is preferably hollow and may be monolithic in construction or built up of separate blocks, as desired. The radiating elements may be in the form of single or multiple dipoles within parabolic reflectors, or radiating horns may be used. The reflectors or horns may be provided with impedance pockets around the rim thereof in order to reduce coupling between the adjacent units.

The present invention will be more fully understood by reference to the following detailed description, which is accompanied by a drawing in which Figure 1 illustrates in perspective an antenna tower embodying the principles of the present invention, while Figure 2 shows partly in section an enlarged detail of a portion of the tower and the associated radiators shown in Figure 1.

Referring, now, to the drawing, reference character T indicates an antenna supporting tower which is preferably of such height and so located as to permit the maximum line of sight distance between adjacent relay stations. As shown in the figure, the antenna tower is free from obstruction in all directions. The tower is preferably constructed in the form of a slender hollow concrete column. The tower is preferably monolithic in construction, that is, it is constructed by pouring fluid concrete in forms and allowing the concrete to solidify before removing the forms. In this way the entire tower is effectively a single piece of concrete. This form of construction has been widely utilized heretofore in farm silos and other similar forms of construction and has

proven very satisfactory. For reasons which will appear later, the tower is preferably circular in cross-section and has a smooth outside surface.

In desired locations over the outside of the tower are located the antenna structures R. As shown in more detail in cross-section in Figure 2, each of the radiating structures R may comprise a dipole antenna or an array of dipole antennas within a parabolic reflector. The parabolic reflector is surrounded by an outer shell and preferably enclosed on the back by a wall having a form such that it will lie in close engagement with the smooth outer surface of the tower T without rocking. The radiating units R are supported at the desired height on the tower T by means of supporting chains or cables C attached in any suitable manner such as by hooks S to the top of the tower. Thus it will be seen that the height of each of the units may be adjusted by adjusting the length of the cable to chains C and their direction of maximum directivity with respect to the tower adjusted by swinging the radiating units around the tower to point in the desired direction.

Due to the fact that the back sides of the radiating units closely follow the form of the outside of the tower the direction of maximum directivity, once established, is maintained without difficulty. The radiating units R may be spaced along the height of the tower T to any degree found necessary in order to prevent coupling between receiving and transmitting antennae operating on closely adjacent frequencies. Also, as indicated by the dipoles in Figure 2, polarization diversity may be used. In order to further decrease the possibility of coupling between antennae operating on closely adjacent frequencies impedance traps may be provided around the periphery of the parabolic reflectors as shown clearly in the radiating units on the front of the tower in Figure 2 and in section on one of the side radiators. The impedance traps, however, do not form a part of the present invention and are more fully described in my copending application #282,119, filed June 30, 1939, now Patent #2,281,196, granted April 28, 1942.

Since the relay station, as I have thus far described it, is ordinarily located in exposed locations and is of considerable height it is desirable to provide thereon a beacon light B in order to prevent interference with aerial traffic. Also, for lightning protection a lightning rod L may be provided. It should be clearly noted that due to the manner of supporting the radiating units R

on the outside of tower T, the radiating units may be easily located both as to height and direction at the most efficient location. Should it be found necessary, at a later date, to revise the location of one of the radiating elements or to add new ones to the system this may be done with very little effort since the outside surface of the tower T is uniform and does not need to be provided with windows or other apertures through the wall for connections to the radiators or for the radiators themselves.

Due to the form of the construction used in the present invention the problem of standardizing structures in a relay chain is reduced to such an extent that the building of the necessary supporting columns may be done at any convenient time and entirely independently of the details of the rest of the relay system. The necessity of incorporating ply wood as an integral part of the supporting structure has been eliminated.

While the radiating structures as shown in Figure 2 have not been indicated as being entirely enclosed, the open faces of the parabolic reflectors may be enclosed with a nonconducting sheet, if desired, in order to protect the dipole radiators from the effects of the weather.

While I have particularly shown and described one embodiment of the present invention, it is to be clearly understood that my invention is not limited thereto but that modifications within the scope of the invention may be made.

I claim:

1. In combination with a plurality of directive short wave antenna structures, a supporting tower for said structures, said tower having a smooth outer surface, said antenna structures having a back surface adapted to fit in close engagement with the outer surface of said tower and said antenna structures being supported in position around the outside of said tower by means for hanging said antenna structures from the top of said tower.

2. In combination with a plurality of directive short wave antenna structures, a supporting tower for such structures, said tower having a smooth outer surface, said antenna structures having a back surface adapted to fit in close engagement with the outer surface of said tower, and means for maintaining said antenna structures in predetermined positions on the outside of said tower.

3. In combination with one or more directive short wave antenna structure, a supporting tower for said antenna structures, said tower being circular in cross-section, said antenna structures having a back surface adapted to fit in close engagement with the outer surface of said tower and means for hanging said antenna structures at a predetermined height on said tower from the top of said tower, said antenna structures being maintained laterally in position on said tower solely by reason of the engagement of their back surfaces against said tower.

4. In a structure as set forth in claim 1, wherein said antenna structures comprise radiating means within directive reflectors.

5. In a structure as set forth in claim 2, wherein said antenna structures comprise radiating means within directive reflectors.

6. In a structure as set forth in claim 3, wherein said antenna structures comprise radiating means within directive reflectors.

7. In a structure as set forth in claim 1, wherein said antenna structures comprise radiating means within parabolic conductive reflectors.

8. In a structure as set forth in claim 2, wherein said antenna structures comprise radiating means within parabolic conductive reflectors.

9. In a structure as set forth in claim 3, wherein said antenna structures comprise radiating means within parabolic conductive reflectors.

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