Sept. 17, 1935. C. E. SCHULER 2,014,785

WAVE ANTENNA

Filed April 26, 1935

Fig. 1.

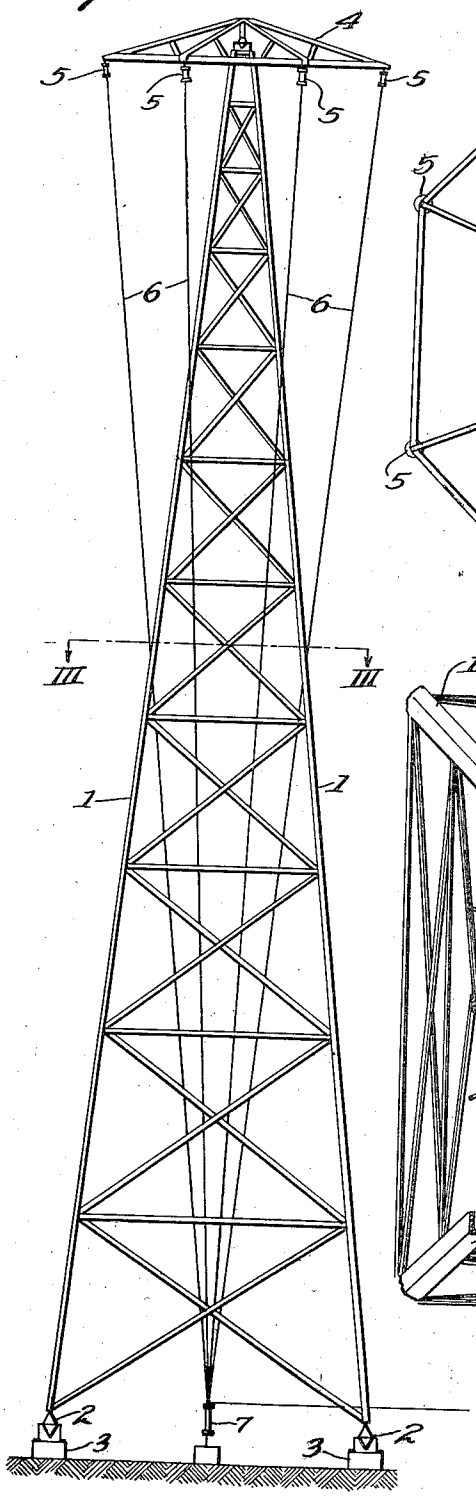


Fig. 2.

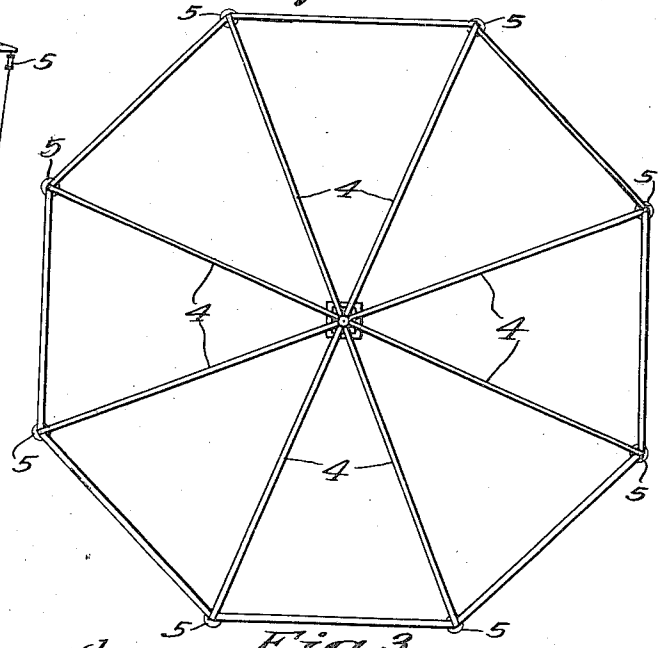
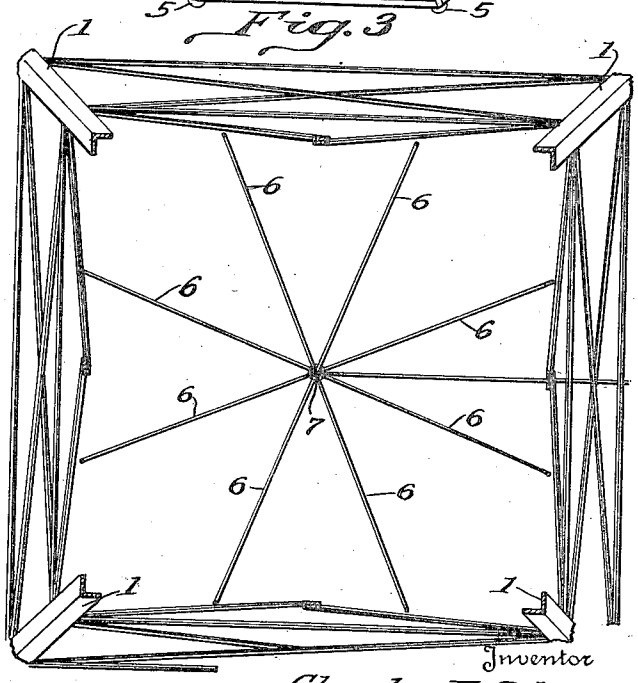


Fig. 3



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UNITED STATES PATENT OFFICE

2,014,785

WAVE ANTENNA

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Application April 26, 1935, Serial No. 18,399

5 Claims. (Cl. 250—33)

This invention relates to the art of radio broadcasting and transmission of electro-magnetic waves through space by means of a radio tower or vertical antenna radiator; and more specifically to a novel high vertical radiator or antenna comprising a self-supporting mast having a relatively large top structure and electrical conductors secured at their upper ends to the top structure and converging at their lower ends to an insulator support located in the approximate center of the antenna, whereby a non-symmetrical electrical structure is produced.

In the prior art, it has been proposed to use structures as antennas comprising self-supporting vertical towers or radiators which do not require the employment of cables or guy wires to hold the same in an upright position. Such radiators possess fairly high efficiency but from tests it has been found that the current distribution in the mast of the tower is not as uniform as it should be for maximum efficiency. According to well established theory, the current in a half wave antenna is zero on both open ends and, in general, follows a sine curve. In the ordinary self-supporting tower, which is of conical or pyramidal form, due to the high capacity at the base therefor, the current does not reach zero and as a result, the current loop of such an antenna is low. Inasmuch as the ordinary self-supporting tower tapers to a comparatively narrow top, the capacity to ground decreases, causing the current distribution to become more unsatisfactory.

The present invention has for its primary object the improvement of the current distribution in a self-supporting type of vertical radiator or antenna, this being accomplished primarily by means of a series of conductors arranged to descend in cone-shaped fashion from the wide top of the tower structure in order to come to a point in the center of the tower at its base, the upper ends of said conductors being insulated from the widened top of the tower or outrigger in the preferred form of the invention.

Another object of the invention is to arrange the inverted cone-shaped conductors in order to modify current distribution so that the latter will follow more closely a sine curve.

This application constitutes a continuation-in-part of the disclosures contained in my prior application Serial No. 679,926 filed July 11, 1933 for an improved wave antenna.

For a further understanding of the invention, reference is to be had to the following description and the accompanying drawing, wherein:

Fig. 1 is a view in side elevation of a vertical antenna constructed in accordance with the present invention;

Fig. 2 is a top plan view;

Fig. 3 is a horizontal sectional view on the line III—III of Fig. 1.

Referring to the drawing, the numeral 1 represents a tower formed of structural steel members and reenforcing struts and girders providing a four-cornered tower of the self-supporting type with a broad base tapering to a narrow top. The lower ends of the tower preferably rest upon insulators 2, which are carried by concrete supporting piers 3. At the top of the tower, the latter is provided with a widened laterally extending frame 4, ordinarily referred to in the art as an outrigger, and in accordance with the present invention, this outrigger is provided at spaced points with a plurality of depending insulators 5 to which are secured the upper ends of radiator conductors 6 preferably in the form of wires. These wires are electrically spaced from the mast or tower 1 and depend in a conical manner from the outrigger frame to an insulator 7 arranged in the center of the base of the tower 1, whereby there is produced a non-symmetrical electrical structure of an inverted conical shape, which increases the current at the top of the radiator, thereby increasing radiation.

As shown in Fig. 1, if the insulators 5 are included between the top supporting structure and the conical wires, as well as at the point of connection of these wires at the base, the tower or mast simply becomes a mechanical support for the inverted conical radiator with an accompanying decrease in capacity at the base.

What is claimed is:

1. A vertical radiator comprising a mast, a relatively large top structure, and antenna wires secured at their upper ends to the outer portion of said top structure and electrically insulated therefrom, said wires converging downwardly in electrically spaced relation from said mast and having their lower ends secured to a ground insulator disposed in approximately the center of said mast.

2. A wave antenna comprising a non-radiating vertical tower tapering progressively from an enlarged base to a narrow top, an outrigger support carried by the top of the tower, a plurality of spaced conductors having their upper ends secured to said support but electrically insulated therefrom, said conductors converging downwardly toward the base of the tower in inverted conical order, and an insulator disposed sub-

stantially axially of the base of the tower and to which the lower converging ends of said conductors are secured.

3. A wave antenna comprising a vertical tower tapering progressively from an enlarged base to a narrow top, an outrigger support carried by the top of the tower, a plurality of spaced conductors, insulators connecting the upper ends of said conductors with said support, said conductors converging downwardly toward the base of the tower in inverted conical order, an insulator disposed substantially axially of the base of the tower and to which the lower converging ends of said conductors are secured, and means for supplying electrical energy to be radiated to said conductors.

4. A vertical wave radiator comprising a mast tapering progressively from an enlarged base to a narrow top, an outrigger arranged substantially at the top of said mast, spaced insulators carried by said outrigger, an insulated support located in the approximate center of the radiator base, and electrical conductors secured at their upper ends to the insulators carried by said outrigger and at their lower ends to said insulator support, whereby a non-symmetrical electrical structure is produced.

5. A vertical wave radiator comprising a mast tapering progressively from an enlarged base to a narrow top, an enlarged outrigger support carried adjacent to the top of said mast, spaced insulators carried by the perimeter of said outrigger, an insulated support located in the approximate center of the base of the mast, and spaced electrical conductors having their upper ends secured to the outrigger insulators and their lower converging ends secured to said support, said conductors being electrically spaced from said mast whereby to produce a non-symmetrical electrical structure of an inverted conical shape having increased radiation output at the top of the radiator.

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