Feb. 18, 1936. K. POSTHUMUS ET AL 2,031,065

ANTENNA

Original Filed Sept. 19, 1929

Fig. 1

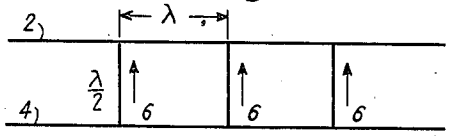


Fig. 2

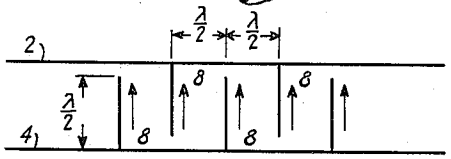


Fig. 3

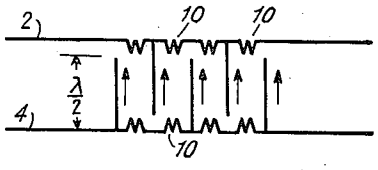


Fig. 4

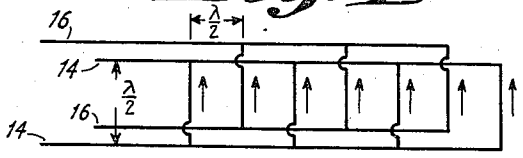


Fig. 5

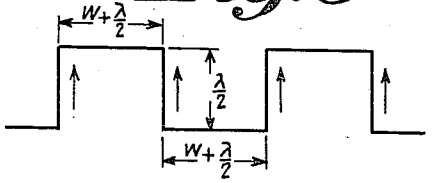


Fig. 6

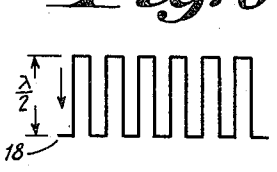
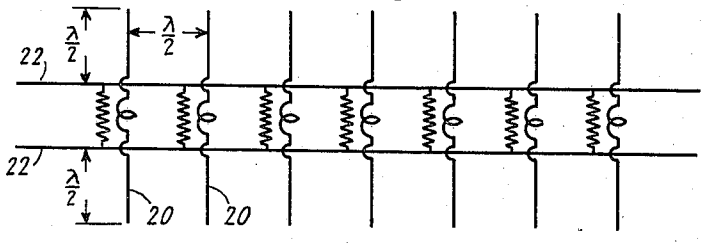


Fig. 7



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2,031,065

UNITED STATES PATENT OFFICE

2,031,065

ANTENNA

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Original application September 19, 1929, Serial No. 393,794. Divided and this application September 21, 1933, Serial No. 690,355. In the Netherlands September 19, 1928

5 Claims. (Cl. 250—11)

This invention is a division of our copending application Serial No. 393,794, filed September 19, 1929, and relates to antenna systems for transmitting and receiving wireless signals. More particularly, the invention provides an arrangement in which a pure directional effect is obtained by means of an aerial system utilizing a plurality of aerials or radiators.

According to the invention the height of these aerials is substantially equal to or an odd multiple of the half wave length of the oscillations to be transmitted or received, and the said aerials are energized such that the operative direction is at right angles to the plane in which the aerials are located.

In the preferred embodiment an arrangement is provided in which the spacing of the aerials is a half wave length and each aerial is connected to one of two feeders present such that the energy in all the aerials is in phase. As an alternative, four feeders are provided and each aerial is conected to two feeders such that the energy in all the aerials is in phase. An arrangement may be provided in which the spacing of the aerials is a half wave length and the aerials, which are alternately coupled in opposition, are connected to two central feeders. Alternatively, the spacing of the aerials may be an odd multiple of the half wave length and a single feeder is connected to all the aerials such that the energy in all the aerials is in phase.

The invention will be more clearly understood by reference to the accompanying drawing, in which Figures 1 to 7 inclusive show some embodiments.

Figure 1 shows an antenna having two feeders 2, 4 to which the aerials 6 are connected. The aerials are spaced one wave length apart so that they are in phase. This is necessary to secure a directional effect at right angles to the plane of the aerials and this is so in the case with all the aerial systems claimed.

Figure 2 shows an antenna having likewise two feeders 2, 4.

In this case the aerials 8 are spaced a half wave length apart and as shown in the drawing are each only connected to one of the two feeders so as to ensure uniformity in phase.

The arrangement shown in Figure 3, is identical with that of Figure 2 but for the width of the aerial system which is reduced by the interconnection of coils 10 in the feeders such that the spacing of the radiators or aerials is still electrically a half wave length.

Figure 4 shows an improvement in the arrangement of Figure 3, the free ends of the aerials 8 shown in Figure 3 being connected to two feeders 14, 16 so that the radiation of energy from the feeders, if any, is balanced by the close proximity of a forward and a backward lead. The pairs of feeders 14, 14 and 16, 16 are preferably placed close together or they may be separated by an even number of half wave lengths to get proper radiation addition in a direction perpendicular to their length.

Referring to Figure 5, all the aerials are fed from one single feeder 18 and so are they in Figure 6 which shows the same antenna construction, but for the spacing of the aerials being very small so that in principle all the aerials are simultaneously in phase if their length is a half wave length. That is to say, by bending adjacent half wave lengths, the currents therein, upon which radiation depends, are made to flow in the same direction. As nevertheless the horizontal spacing is to be slightly taken account of, the length of the aerials will practically be slightly smaller.

Referring to Figure 7, the aerials 20 are arranged on either side of two central feeders 22; in order to ensure uniformity in phase at a spacing of a half wave length, the aerials must be alternately coupled in opposition to the feeders.

We claim:

1. A directive antenna system comprising a two wire transmission line, the wires of said line being parallel to each other and separated a distance equal to an odd multiple of half the length of the communication wave, parallel radiators transverse of said wires extending between said wires and connected thereto, said radiators being located substantially one wave length apart whereby cophasal energization is effected therein.

2. A directive antenna system comprising a two wire transmission line, the wires of said line being parallel to each other and separated a distance equal to an odd multiple of half the length of the communication wave, parallel radiators transverse of said wires extending between said wires and connected thereto, said radiators being located substantially one wave length apart whereby cophasal energization is effected therein, another similar antenna system located close to said first antenna system so arranged that the corresponding wires of both said transmission lines are in proximity to each other for the cancellation of radiation from the wires of both of said lines, the radiators of said first antenna system being located substantially intermediate the radiators of said second antenna system.

3. A system in accordance with claim 2, char-

acterized in this, that the radiators of one antenna are separated from the adjacent radiators of the other antenna substantially one half wave length apart.

4. A directive antenna system comprising a two wire transmission line, the wires of said line being parallel to each other and separated a distance equal to one half the length of the communication wave, parallel radiators transverse of said wires extending between said wires and connected thereto, said radiators being located substantially one wave length apart whereby cophasal energization is effected therein, another similar antenna system located close to said first antenna system so arranged that the corresponding wires of both said transmission lines are in proximity to each other for the cancellation of radiation from the wires of both said lines, the radiators of said first antenna system being located substantially intermediate the radiators of said second antenna system with respect to a single plane, adjacent radiators being separated one half wave length apart.

5. A directive antenna system comprising a two wire transmission line, the wires of said line being parallel to each other and separated a distance equal to an odd multiple of half the length of the communication wave, parallel radiators transverse of said wires extending between said wires and connected thereto, said radiators being located substantially one wave length apart whereby cophasal energization is effected therein, another similar antenna system parallel to said first antenna system and separated therefrom an even number of half wave lengths, the radiators of said first antenna system being located substantially intermediate the radiators of said second antenna system with respect to a single plane.

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