May 21, 1935. W. ILBERG 2,002,181

TRANSMITTER

Filed July 7, 1931

Fig. 1

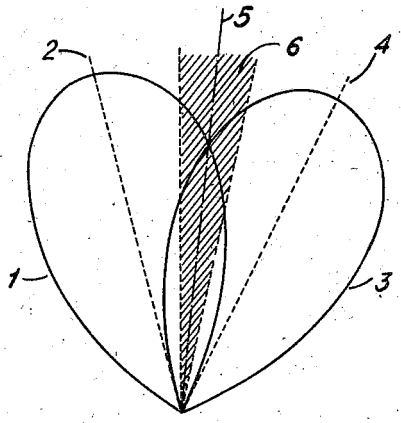


Fig. 2

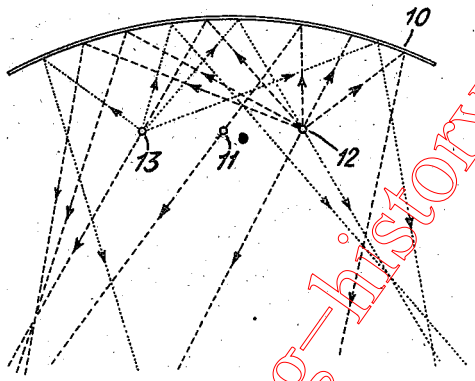
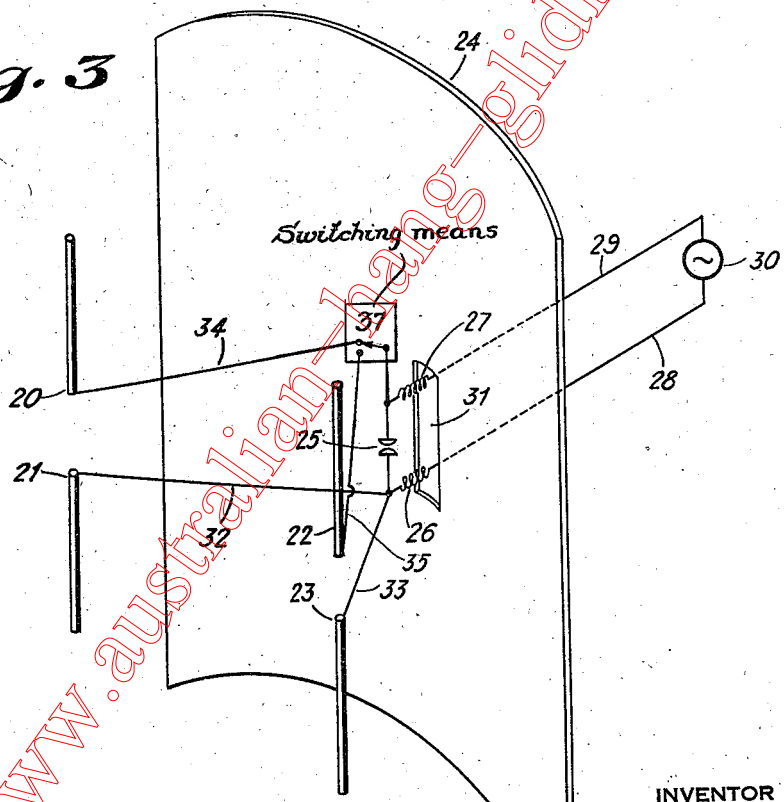


Fig. 3



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TRANSMITTER

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3 Claims. (Cl. 250—11)

In the field of navigation, it shall be assumed as known to be able to form, for the purposes of position finding, a relatively sharp pilot ray or radio beam by means of two wireless transmitters, each of which has comparatively poor sharpness of beam formation, which transmitters send out Morse signals in adjacent, partly overlapping cones, these cones complementing each other to form a "dash" in exactly opposite rhythm. The pilot beam proper is in that case formed by a small sector within which a receiver receives a permanent dash, while outside this sector the one or the other signal is obtained (so-called *a—n* method of Scheller and Kiebitz). It is further known to apply this method to the field of the ultra short waves (decimeter waves) whose use offers many advantages. In practice, the necessity arises to maintain both transmitters continuously at the same output, at least relatively to each other, in order to exclude a change of position of the pilot beam. Experience has proved that the maintenance of this condition encounters great difficulties when using decimeter waves, particularly then when spark gaps are used for the generation of the oscillations since they are subject to uncontrollable energy variations due to burning out or the like. Even in tube transmitters it is known that variations in the output and wave length may easily occur.

The invention to be described is designed to overcome this difficulty and to insure the constancy of the position of the pilot beam even in case of a strongly varying transmitted energy.

For this purpose and in accordance with the invention both transmitters are to be fed from a joint generator of oscillations whose output is alternatively distributed to both radiating systems in the rhythm of the signals. The switching required therefor is accomplished for instance by means of an automatic switch arrangement which is best constructed so that it operates with a current interruption which is as short as possible. The connection of the oscillator with the switch, and that of the switches with the emitters may be effected by means of tuned Lecher systems (so-called energy conductors) in order to obtain a favorable efficiency of the energy transmission.

A better understanding of the invention may be had by referring to the accompanying drawing wherein Figure 1 shows the well known radiation characteristics of two antennæ so arranged that a portion of the characteristics overlap; Figure 2 illustrates in cross section applicant's arrangement of a reflector and antennæ showing the manner in which radiation is reflected by the reflector, and Figure 3 shows in perspective applicant's preferred embodiment.

In order to produce a directional beam each of the two emitters must be equipped with a reflector so that the radiating diagrams, measured horizontally, have the form shown in Figure 1 wherein overlapping sectors occur. 1 and 3 designate the two radiation diagrams whose main beam directions are 2 and 4. In the line 5 the fields produced by each beam are of equal strength so that there the signals disappear and there is heard only a permanent dash. Due to a certain lack of sensitivity of the ear towards differences in sound intensities, the signals are not only neutralized on line 5, but also within a small sector 6. This sector becomes the narrower the steeper the sides of the radiation diagram. In order to obtain such a formation of the beam, each emitter may be provided with a separate reflector with suitable orientation, or still more simple, both emitters can have a joint reflector or mirror which may, for instance, be given the form of a parabolic cylinder whereby each dipole is laterally displaced off the focal line by a suitable amount. This arrangement is shown in section in Figure 2. Therein 10 designates the horizontal section through the mirror, assumed as parabola, and 11 its focal point. 12 and 13 are the two dipoles. If an emitter were located in focal point 11, the radiation reflected by the mirror would leave parallel in front. If, however, the emitters are laterally displaced the direction of the reflected beams changes.

In Figure 2 the course of individual beams coming from emitter 12 is indicated by dashed lines, the beams of dipole 13 by dotted lines. It may be seen at once that the radiation is no longer directed towards the front, but that there are obtained two radiation diagrams, deviating somewhat in direction, and corresponding to Figure 1. It is possible in this manner to require one reflector only and to thereby decrease the initial costs and also the space requirements of the entire system.

Figure 3 shows an embodiment of the present invention, schematically and in perspective view, wherein a spark gap is used as oscillator. 20, 21 and 22, 23 represent the two dipole emitters which are located in front of a reflector 24 of parabolic-cylindrical shape. A spark gap 25 is connected via the h. f. chokes 26 and 27 and the two lines 28, 29 with an alternating potential source 30. For the passage of lines 28, 29 reflector 24 is provided with a slit 31. The dipole halves 21, 23 are connected with one electrode of spark gap 25 by lines

32, 33. The other electrode is connected with a suitable switching apparatus 37 which is herein shown conventionally in box form so that either the dipole half 20 is connected through line 34, or the dipole half 22 through line 35, with the upper electrode of spark gap 25. Consequently, either the dipole 20, 21 radiates or the dipole 22, 23, the radiation diagram assuming the form shown in Figure 1. In place of the spark gap, one or several electron tubes may equally well serve as oscillators. The switch 37 may moreover be constructed in the manner that both halves of the non-radiating dipole are switched off at the proper time. Switch 37 may further be constructed as magnetically controlled relay.

What is claimed is:

1. An ultra short wave transmitting system having, in combination, two parallel dipole antenna systems, a single reflector surrounding at least partially said systems for causing said systems to radiate in different directions, each of said dipoles being located out of the focal line of said reflector, and means for alternately energizing said two systems.

2. An ultra short wave transmitting system having, in combination, two dipole antenna systems, a single reflector surrounding at least partially said systems, each of said dipoles being located out of the focal line of said reflector an equal degree in opposite directions to effect radiation in different directions, means centrally located between said antenna systems for energizing same, switching mechanism for alternately connecting said energizing means to said dipole antennas, and Lecher wire connections from said switching mechanism to said dipole antenna systems.

3. An ultra short wave transmitting system having, in combination, two antenna systems, a single reflector surrounding at least partially said systems for causing said systems to radiate in different directions, each of said antenna systems being located out of the focal line of said reflector, and means for alternately energizing said two systems.

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