Dec. 15, 1936. P. HERMANSPANN 2,064,112

ANTENNA

Filed Dec. 29, 1934

Fig. 1

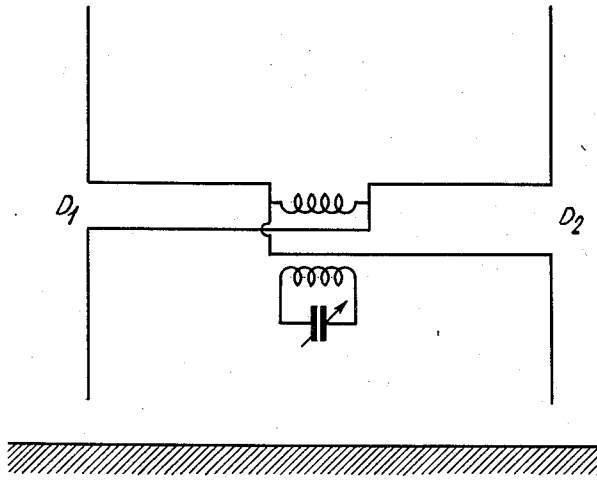


Fig. 2

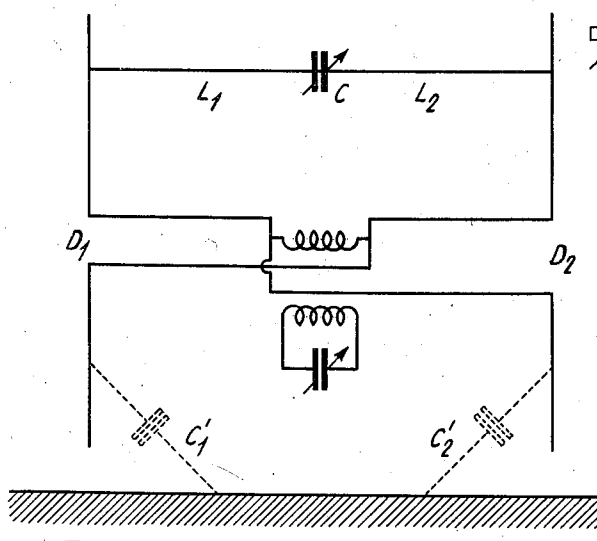
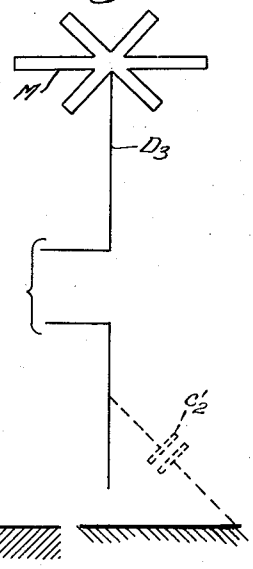


Fig. 3



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Patented Dec. 15, 1936

2,064,112

UNITED STATES PATENT OFFICE

2,064,112

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Application December 29, 1934, Serial No. 759,637
In Germany December 30, 1933

2 Claims. (Cl. 250—11)

This invention relates to a direction-finder comprising two oppositely connected dipoles.

The so-called nocturnal action arising in direction-finding work with a coil or loop antenna may be ascribed to wrongly polarized indirect radiations. In other words, when this nocturnal effect is produced there arises a wrongly polarized horizontal electrical component in addition to the electric component which is normally polarized.

Adcock has shown in his British patent No. 130,490 that by differential connection of two vertical dipoles it is possible to design a direction-finding system which will not respond to a horizontal electrical component.

The novel features of my invention have been set forth in the claims as required by law. The nature of my invention will be understood from the following detailed description thereof when read in connection with the attached drawing in which:

Figure 1 illustrates the type of antenna system involved;

Figure 2 shows said antenna system modified in accordance with my invention;

Figure 3 shows still another modification by which my invention may be carried out.

Fig. 1 shows the fundamental construction of an Adcock system in which the two dipoles D1 and D2 are connected in opposition. Upon the arising of a wrongly or faultily polarized electrical component, the latter will be ineffective for the reason that the currents in the horizontal leads are of equal size and will neutralize one another.

In reality, the situation is impaired for the reason that the lower halves of the dipoles are always at closer proximity to the ground or surface of the earth or possibly to a screening sheet than the upper dipole halves. In other words, dissymmetry will arise in the Adcock system, and as a result the currents in the horizontal wires are no longer equal. Such a direction-finder always evidences appreciable shifts of the beacon or beam.

Now, this defect is obviated according to this invention by equalizing the respective impedances of the upper and the lower dipole halves.

Thus, as shown in the exemplary embodiment of Fig. 2, I may provide an interconnection between the upper arms of the dipoles, this interconnection comprising wires L_1 and L_2 between which is a capacitance C. The capacitance may be made variable if desired. The object of this interconnection is to compensate for the capacitance existing between the lower arms of the dipoles and ground as indicated by the broken line representations of virtual capacitances C'_1 and C'_2.

In the operation of my invention it will be seen that I have improved upon the well known Adcock system in that I have so arranged the several dipole arms as to have their impedances suitably matched despite the proximity of the lower arms to earth. Hence the currents in the horizontal system of conductors which interconnect the upper arm of each dipole with a lower arm of another dipole will be equalized.

According to a modification of my invention, as shown in Fig. 3, the impedances of the upper arms D_3 of the dipoles may be matched with those of the lower arms thereof if strips of sheet metal M are used for introducing additional capacitance into the impedance properties of the upper dipole arms. The advantage of this arrangement is that the inductances L_1 and L_2 of Fig. 2 are eliminated. This arrangement becomes increasingly valuable when the system is used for ultra-high frequencies. Exhaustive research has shown that it meets the requirements for eliminating phase shift in a direction finding beam due to the so-called "night effect".

What is claimed is:

1. In an antenna system, a pair of upright dipoles, means including a system of parallel conductors for interconnecting the upper arm of each dipole with the lower arm of the other dipole, and means including an inductive and capacitive impedance interconnecting points on the upper arms of the two dipoles and near the upper extremities of said arms for balancing the impedances of the lower arms of the two dipoles where otherwise an unbalance would exist due to the proximity of said lower arms to ground.

2. In an antenna system, a pair of vertically disposed dipoles, horizontal cross connections between the upper arm of each dipole and the lower arm of the other dipole, a transformer having a primary winding which interconnects said cross connections at the center of symmetry thereof, and means including strips of sheet metal connected to the upper arms of said dipoles for matching the excess capacitance of the lower arms due to the proximity of the latter to ground.

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