March 2, 1943. K. KOSCHMIEDER 2,312,421

DIRECTION FINDING SYSTEM

Filed June 27, 1941

FIG.1.

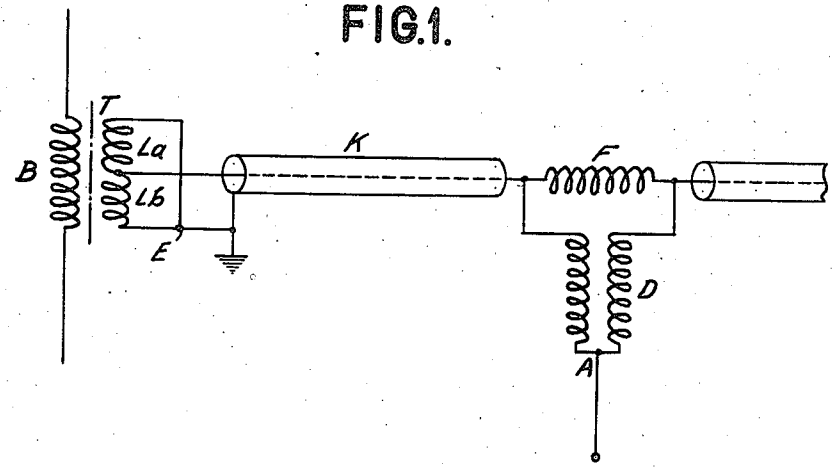
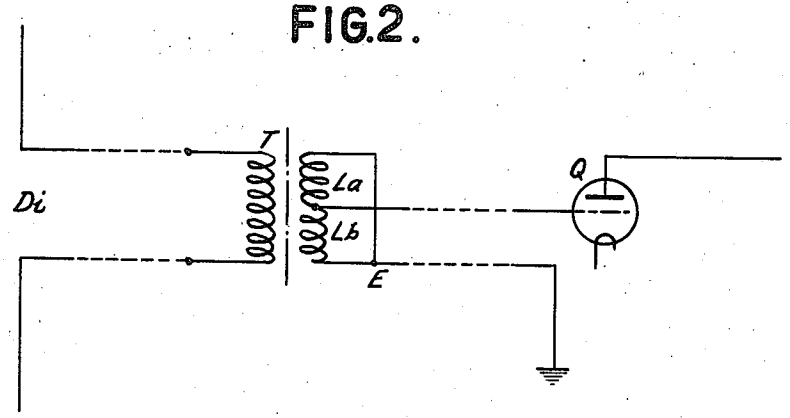


FIG.2.



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DIRECTION FINDING SYSTEM

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In Germany June 27, 1940

4 Claims. (Cl. 250—11)

In the copending patent application Serial Number 401,129 of K. Holsten, filed July 5, 1941, a direction finding system is described in which a non-directional antenna is fed from a directional antenna and the novel feature of which is that the field coils of a goniometer or the coupling coils of a goniometer frame, as the case may be, are each associated with a double-wound choke connected in parallel with the respective coil and joined at its center point to the non-directional antenna.

One of the supply lines from the directional antenna to the goniometer must be grounded. To such end a high frequency cable whose outer conductor is earthed may be arranged to interconnect the directional antenna and the goniometer, or two parallel lines located in a grounded cable may be used. In this case one of these two lines must be earthed. Such an arrangement requires that a suitable transition means must be provided between the symmetric antenna, such as a dipole or a frame aerial, and the asymmetric cable. The present invention has for its object the provision of a simple and efficient circuit arrangement for connecting a symmetric antenna to an asymmetric cable, such as a co-axial cable.

According to the present invention, the directional antenna is joined to an asymmetric high frequency line by a transformer constructed as described hereafter by way of example.

In the drawing, Fig. 1 is a circuit diagram showing one embodiment of the invention, Fig. 2 is a diagram illustrating a second embodiment.

B, Fig. 1, denotes an antenna of a H- or U-Adcock system. This system is connected by a cable K to a field coil F of a goniometer. Any suitable number of such antennae may be arranged in pairs in a well-known manner. The non-directional antenna voltage is derived by a double-wound choke coil D connected as a high impedance path across coil F so that a non-directional antenna, not shown, may be joined to the middle point A of coil D which provides a low impedance differential path for the non-directional antenna. In order to accommodate the asymmetric cable line to the symmetric antenna B the two are coupled together by a high frequency transformer T the secondary of which is divided into halves L*a*, L*b* which are wound in opposition to one another. As shown by way of example, the inner conductor of the cable K is joined to the middle of the secondary coil L*a*, L*b*. The ends of this coil are connected together, as shown at E, and are joined to the earthed outer conductor of the cable.

Such an arrangement is useful not alone for Adcock antenna systems but also for stationary frame aerials operating by means of goniometers, and will also be useful for an arrangement of the kind shown in Fig. 2 by way of example, and which has a dipole D*i* connected to an amplifying device Q. If the arrangement according to Fig. 2 were constructed with the aid of the customary coupled coils, one end of the secondary being grounded and the other end connected to the grid of an amplifying tube, then the dipole would be loaded unequally because the space capacities of the coupled coils entail a counter-current which is the more intense the farther the respective end of the secondary coil is remote from earth.

It will thus be seen that the transformer here described is useful for any arrangement in which a symmetric high frequency line is to be coupled to an asymmetric one.

What is claimed is:

1. In a direction finding system, a directional antenna system, a non-directional antenna system, means for coupling said systems comprising an asymmetric high frequency line having a grounded and an ungrounded conductor, a transformer having a primary winding in circuit with said directional antenna system and a pair of secondary windings, said secondary windings being wound in opposition to each other, a connection joining adjacent ends of said windings with the ungrounded conductor of said line, the outer terminals of said windings being connected to said grounded conductor, a goniometer field coil connected in series in said ungrounded conductor, a choke coil connected across said field coil, said non-directional antenna system being connected to the middle point of said choke coil.

2. A direction finding system according to claim 1 in which the directional antenna system includes a dipole.

3. A direction finding system according to claim 1 in which the directional antenna system includes a dipole, with the primary winding of the transformer connected between the poles of said dipole.

4. A system according to claim 1 where the asymmetric high frequency line is a co-axial cable.

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