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A. LEIB ET AL
DIRECTION FINDER
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2,120,366

Fig. 3

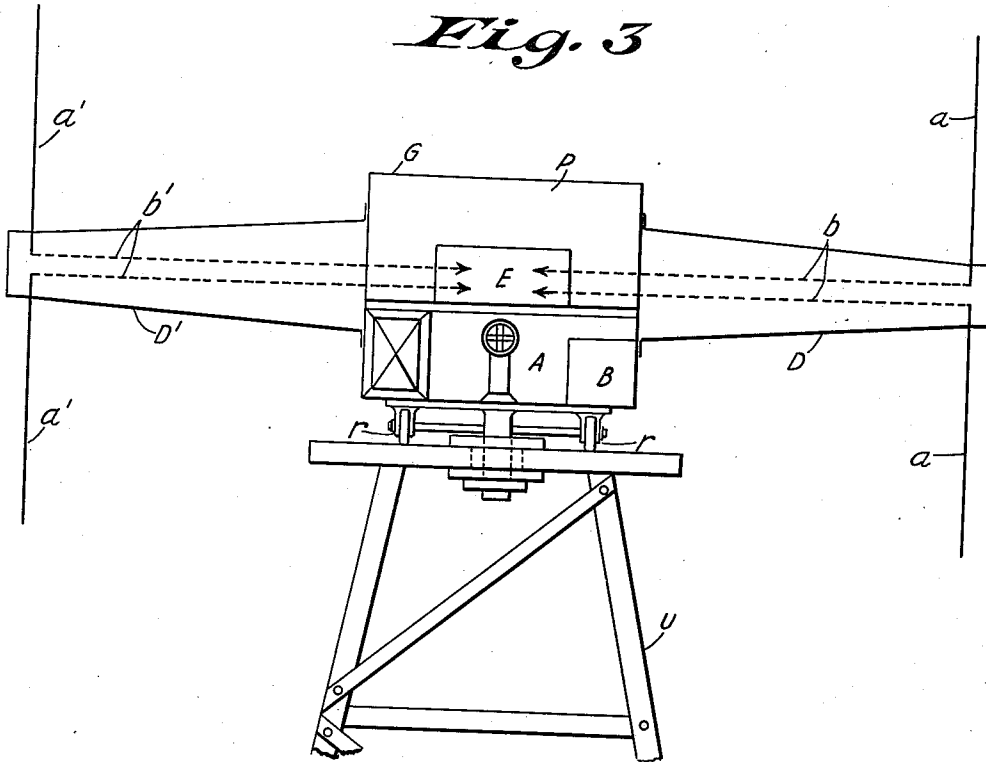


Fig. 1.

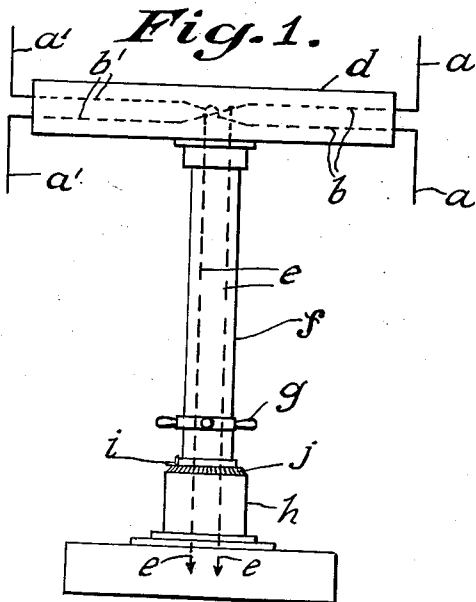
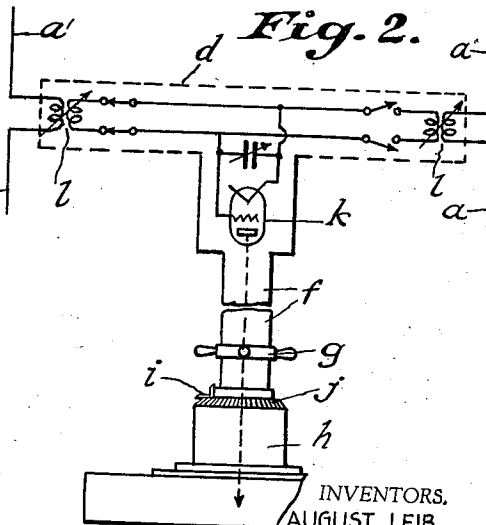


Fig. 2.



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DIRECTION FINDER

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8 Claims. (Cl. 250—11)

This invention relates to a turnable Adcock-direction finder. In the turnable Adcock direction finder, two dipoles are used arranged within a definite distance from each other. These dipoles are turned about their central axis.

This invention will be made completely understood by referring to the accompanying drawing, in which

Fig. 1 is an elevation of a simple direction finder;

Fig. 2 is another modification which is generally similar to that of Fig. 1, and

Fig. 3 is an elevation of an improved direction finder wherein the receiver is rotated with the direction finder.

Figure 1 shows schematically such Adcock direction finder in its simplest shape. The dipoles a , a and a' , a' , respectively, are connected to each other by means of horizontal leads b and b' and two lines c connect them to the receiver. The dipoles are supported by a cross tubing d shielding the leads b , b' and fixedly connected with the vertical turnable tube f containing the leads e . g designates a turnhandle, h is a bearing, and j is the scale indicating the angle of the turning. In such a construction of the Adcock direction finder the capacity of the lead-ins is large as regards the capacity of the dipoles and a part of the receiving energy received by the dipoles thus becomes lost. Hence, with the Adcock direction finder according to Figure 1, the sharpness of the direction finding obtainable therewith is very poor.

In another embodiment of the Adcock direction finder, the losses in the leads to the receiver are avoided by arranging the first or several amplifier stages, or the receiver proper, in the turnable support of the dipoles proper, suitably in the enlarged space formed in the upper part of the turnable tubing f at its place of connection with the cross tubing d . This is illustrated, for instance, in Figure 2, according to which the first stage (input stage of the receiver) represented by the tube k is mounted within the enlarged space l . The dipoles may hereby be inductively, capacitively or galvanically connected to the input circuit of the first stage. In Figure 2, an inductive coupling is shown by means of transformers l , l' .

This arrangement produces much more favorable sharpness in the direction finding than the arrangement according to Figure 1. However, it has the disadvantage that all switching-tuning-and coupling elements must be operated by way of distant control from the bottom. Due to

this distant operation and the turning tube there also exists a capacitive asymmetry of the dipoles. The capacity of the lower rods of the dipoles is greater with respect to the turning tube, the receiver and ground than is the capacity of the upper rods.

These disadvantages are avoided in accordance with this invention by so constructing the Adcock direction finder that the housing of the room for finding the direction and containing the receiver apparatus, batteries, drive for the direction finder and space for the operator, supports the Adcock dipoles and is turnably mounted upon a suitable stand, for instance, the tower of the direction finder. The mounting can be carried out in such manner that the housing when turning carries therewith the entire content of the direction finding room, or else that only the housing is turnable while the content of the direction finding room contained in the housing, hence the receiver, the batteries, the space for the operator and the drive are fixedly mounted on the base.

An embodiment of the arrangement in accordance with the invention is shown in Figure 3, by way of example, wherein the receiver designated by E, the batteries designated by B and the drive A, together with the bearing scale and the space for the operator, are arranged within a room P shielded by the housing G and rotate with the housing. On the side of the housing the cross supports D, D' are fixedly secured, the latter supporting the dipoles of the direction finder. The housing G is rotatably mounted on a base U, for instance, by means of wheels. The base may consist of non-conducting material, for instance, wood, in order to avoid electrical, in particular capacitive, asymmetry of the dipoles. The turning of the direction finding room, together with the direction finding antenna, is carried out by the operator manually or by means of a motor. The horizontal dipole lines b , b' are directly connected to the receiver. The supporting arms D, D' can serve as shields for the horizontal dipole lines. In this described arrangement there is also avoided a change of the capacity of the dipoles resulting from the movements of the operator, since the latter is within the shielded direction finding room.

Such arrangement is very well suited, in particular, for the direction finding of longer waves of the navigation-air-and marine service. Where such a direction finder is to be set up on a flying field or in direct vicinity thereof, it should be so dimensioned that the greatest height of the an-

tenna of the antenna arrangement does not exceed 10 meters, so as to eliminate any possible hindrance in the movement of the airplanes. It is advisable to shield electrically the horizontal connections *b, b'*, by means of a suitable shield (unless the supporting arms *D, D'* furnish this shield) and to conductively connect this shield to the shielding housing *G*. As regards the housing, itself, the same can be composed of non-conducting material, provided with a metallic shield in the form of a net or cage. Furthermore, the arrangement is advisably such that this shield can be grounded or insulated from the ground at will; during the pauses in the operation the grounding of the shield will then be sustained, during operation the grounding can be interrupted at will by employing a suitable lightning protector.

We claim:

1. A rotatable direction finder comprising a central housing having space for an operator, receiving apparatus, direction finder scale, and means for rotating said direction finder, two dipoles each one of which is fixedly secured to an arm extending outward from the sides of the housing, said housing being mounted for rotation upon the upper portion of a direction finder tower.
2. A rotatable direction finder according to claim 1, characterized in that the upper portion of said tower consists of a platform of non-conducting material.
3. A rotatable direction finder comprising a supporting tower for a central housing having space for an operator, receiving apparatus, direction finder scale, and means for rotating said direction finder, two dipoles each one of which is fixedly secured to an arm extending outward from the sides of the housing, said housing and said arm being provided with a metallic shield to shield the horizontal leads which connect the dipoles with a receiver, and means for rotating said housing on a platform located on the top of said supporting tower.
4. A rotatable direction finder comprising a supporting tower, a central housing pivotally located on the top of said supporting tower, said central housing having space for an operator, receiving apparatus, direction finder scale, and means for rotating said direction finder, two dipoles each one of which is fixedly secured to an arm extending outward from said housing, a

bearing centrally located on the top of said tower, a plurality of rotatable elements secured to said central housing, and means within said housing for rotating the housing around said bearing.

5. A rotatable direction finder comprising a supporting tower having an upper platform, a central shielded housing, two dipoles fixedly secured to an arm extending outward from the sides of said housing, a bearing centrally located on said platform, a plurality of rotatable elements secured to the under side of said housing and arranged for rotation on said upper platform, and means within said housing for rotating the same around said bearing.

6. A rotatable direction finder comprising a supporting tower having an upper insulating platform, a central housing pivotally located in the central portion of said upper platform, two dipoles fixedly secured to an arm extending outward from the sides of said housing, a plurality of rotatable elements secured to the under side of said housing and arranged for rotation on said insulating platform, and means within said housing for rotating the same on said platform.

7. A rotatable direction finder comprising a supporting tower having an upper platform of insulating material, a shielded housing pivotally secured to the central portion of said platform, said housing having two dipoles fixedly secured to an arm extending outward from the sides of said housing, a plurality of rotatable elements secured to the under side of said housing and arranged for rotation on said upper platform, and means within said housing for rotating the housing on said platform.

8. A rotatable direction finder comprising a supporting tower having an upper platform of insulating material, a shielded housing having a space for an operator and the entire receiving and directional scale equipment pivotally secured to the central portion of said platform, said housing having two dipoles fixedly secured to an arm extending outward from the sides of said housing, a plurality of rotatable elements secured to the under side of said housing and arranged for rotation on said upper platform, and means within said housing for rotating the housing on said platform.

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