

July 7, 1936.

A. LEIB

2,046,473

DIRECTION FINDER ANTENNA

Filed Oct. 6, 1933

Fig. 1

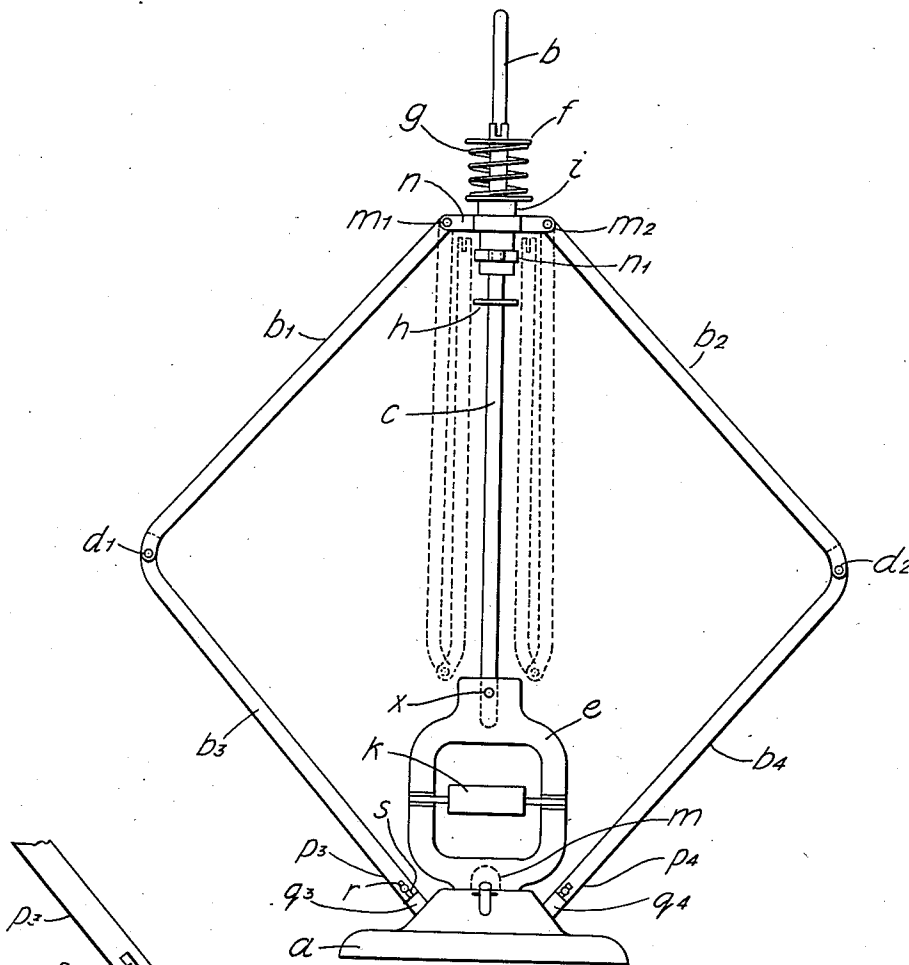
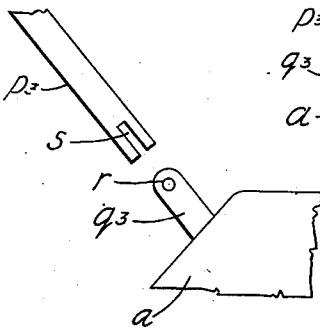
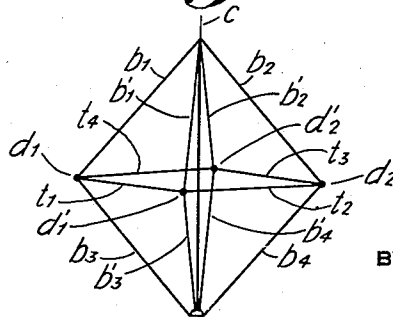


Fig. 3

Fig. 2



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2,046,473

DIRECTION FINDER ANTENNA

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Application October 6, 1933, Serial No. 692,413
In Germany October 14, 1932

6 Claims. (Cl. 250—11)

This invention relates to direction finding antenna for transportable stations with one or two frames disposed at right angle to each other, in particular for collapsible arrangements.

It is very important to make the direction finding frame antennas for transportable stations as simple, light and robust as possible whereby they should be easily mountable and demountable and conveniently taken apart so that the demounted and collapsed parts can be accommodated in a casing or cover or the like, of possibly small dimensions. In order to facilitate the accomplishment of this requirement the direction finding antenna consisting of a frame or two frames at right angle to each other is so constructed in accordance with the invention that the frame (or each of them respectively) forms a single winding consisting of rigid parts. In case of a collapsible and easily separable arrangement with centrally arranged auxiliary straight antenna for ascertaining the sense of direction or for more precisely defining the minimum, the structure can be such that each frame consists of four rigid legs, whereby the upper ends of the two upper legs are pivotally mounted on a through-pass-insulator of the auxiliary straight antenna and which is adapted to be only slightly movable between a spring supported by the auxiliary antenna and a stop provided on the same auxiliary antenna. The two lower legs of the frame (or each of the frames) can be so constructed as to form a pivotal joint at their upper ends with the corresponding upper legs and that their lower ends are provided with mounting members, for instance, lugs, thus making it possible to fixedly secure the frame at these lower ends to the support of the entire antenna structure by means of clamping screws or the like. In order to stiffen up the entire arrangement the various corners of the frame in which the upper and lower legs are pivotally joined to each other may be connected to each other by suitable connections adapted for tension stress such as chains or non-flexible cords. Furthermore, the auxiliary straight antenna may not be directly mounted at the support for the entire assembly but may be mounted at a compass support which itself may be centrally mounted on the common support for the entire arrangement.

This invention will be more clearly understood by referring to the accompanying drawing in which,

Fig. 1 is an elevation of the improved antenna;

Fig. 2 is a diagram of a frame work of the antenna formed by the structure shown in Fig. 1;

Fig. 3 is a detailed elevation of the means for holding the lower legs.

An embodiment of the arrangement according to the invention is shown in Figure 1 by way of example, in particular for the case in which two direction finding antennas disposed at right angle to each other are used and an auxiliary straight antenna is disposed in the common vertical axis. In operating condition the two frames form, as seen from Figure 2, a frame work similar to an octahedron with the auxiliary straight antenna (c) disposed in the vertical axis of the octahedron, whereby the one frame consists of a single winding formed by the legs b_1, b_2, b_3, b_4 and the second frame is formed in a similar way of the legs b_1', b_2', b_3', b_4' . The manner in which these two frames are electrically combined with the receiver arrangement does not form a primary feature of the invention. They may for instance be used in such manner that during the actual direction finding the one frame may serve for adjusting upon the minimum receiving intensity and the other frame after direction finding is completed, may be used for rapidly ascertaining the sense of direction by means of the auxiliary rod antenna b (see German Patent 477,614).

For the sake of clarity, Figure 1 only shows the frame b_1, b_2, b_3, b_4 . The auxiliary rod antenna c (also formed of a pipe) is in the given embodiment not directly mounted on the support a of the entire antenna arrangement but on a bearing frame e of the compass k and which is fastened at one side to the support a (for instance to a projection m) in such manner that it can be easily mounted and demounted. The auxiliary antenna c has a through-pass insulator i fixedly secured thereon and which has a limited movement. A spring g is supported from a collar f of the auxiliary antenna c whereby the spring pressure is exerted upon the insulator i tending to shift the insulator against a stop h fastened to the auxiliary straight antenna. A metallic clamp n fastened to the insulator i is connected to the frame legs b_1 and b_2 by means of joints m_1 and m_2 . In a similar manner a second clamp n' fastened to the insulator i is pivoted to the other frame. The legs b_1 and b_2 respectively are connected with the lower legs b_3 and b_4 respectively by means of the pivotal joints d_1 and d_2 respectively. The extremities p_3 and p_4 of the said lower legs can easily be attached as shown by Fig. 3 to the respective holding organs such as lugs q_3 and q_4 of the support a for instance by means of slots s , bolt r and suitable clamping

members such as butterfly nuts. The arrangement of the other frame is carried out in a similar manner. All legs may consist of tubes. At each pivotal joint in order to secure a favorable contact the adjacent parts are suitably connected by means of a flexible metal strip or litz wire soldered to the ends of these parts.

After mounting the compass device *e* upon the support *a*, and the auxiliary straight antenna *c* with the frame legs upon said compass device, the lower legs are fitted at the ends into the corresponding lugs of the support. Due to the action of spring *g* the insulator *i* is thereby pressed against the stop *h*. In order to secure the right angle between the two frames, the members *t*₁, *t*₂, *t*₄, *t*₅ (see Fig. 2) are mounted between the corners *d*₁, *d*₁', *d*₂, *d*₂'. These transverse connections preferably consist of chains or non-flexible cords and may at their ends for instance be fastened to hooks provided at the joints *d*₁, *d*₁', *d*₂, *d*₂'. Due to the tension of these connections the insulator *i* is moved against the action of spring *g* so that it becomes somewhat separated from the stop *h*. The spring however is of sufficient force so as to maintain the transverse connections *t* in a condition of tension. At this stage the clamping of parts *p* and *q* can take place by tightening of the corresponding clamping members (butterfly nuts). For the purpose of demounting it is only necessary to loosen the said clamping organs between the parts *p* and *q* and to remove the auxiliary rod antenna with frame, for instance by disconnecting the locking means *x*. The entire assembly can thus be separated into three parts: the support *a*, the compass arrangement *e* and the auxiliary straight antenna *c* with the frame legs suspended thereon. The latter can be folded together as indicated by the dotted lines. If the auxiliary antenna *c* should not be long enough a further rod *b* may be fastened to the top whereby the auxiliary antenna is preferably formed of two separable parts.

I claim:

1. A folding direction finding antenna comprising a plurality of pivoted legs forming a loop antenna with two loops positioned at right angles to each other, an auxiliary straight rod-like antenna located in the common vertical axis of said loop antenna, a main support for said loop antenna and a central compass support fastened to said main support, means for folding up said legs so as to lie substantially parallel with the auxiliary antenna and above said compass support.

2. A folding direction finding antenna comprising a plurality of pivoted legs forming a loop antenna with two loops positioned at right angles to each other, an auxiliary straight antenna located in the common vertical axis of said loop antenna, a main support for said loop antenna and a central compass support fastened to said main

support, a plurality of central joints comprising non-flexible rods transversely connecting said legs, means for folding up said legs so as to lie substantially parallel with the auxiliary antenna and above said compass support.

3. A direction finder antenna for a transportable station comprising a central compass support, a central rod-like antenna located above said compass support, a loop antenna having two frames positioned at right angles to each other and particularly adapted for folding up, characterized in that each frame comprises a plurality of pivoted legs arranged to form a single winding, said pivoted legs being folded in a position parallel to said central rod-like antenna.

4. A direction finder antenna for a transportable station, comprising a central compass support, a central rod-like antenna located above said compass support, a loop antenna having two frames positioned at right angles to each other and particularly adapted for folding up, characterized in that each frame comprises a plurality of pivoted legs arranged to form a single winding, said pivoted legs being folded in a position parallel to said central rod-like antenna, said antenna being arranged so as to be demounted in three separate parts, said separate parts comprising a support member for said rod-like antenna and said compass support, the central rod-like antenna and the folding frame.

5. A folding direction finding antenna comprising a plurality of pivoted legs forming a loop antenna with two loops positioned at right angles to each other, an auxiliary straight antenna located in the common vertical axis of said loop antenna, a main support for said loop antenna and a central compass support fastened to said main support, an insulator adapted to slide on said auxiliary straight antenna to retain a plurality of central joints comprising non-flexible cords transversely connecting said legs, means for folding up said legs so as to lie substantially parallel with the auxiliary antenna and above said compass support.

6. A folding direction finding antenna comprising a plurality of pivoted legs forming a loop antenna with two loops positioned at right angles to each other, an auxiliary straight antenna located in the common vertical axis of said loop antenna, a main support for said loop antenna and a central compass support fastened to said main support, an insulator adapted to slide on said auxiliary straight antenna, a spring member cooperating with said insulator to retain a plurality of central joints comprising non-flexible cords transversely connecting said legs, means for folding up said legs so as to lie substantially parallel with the auxiliary antenna and above said compass support.

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