May 9, 1933. J. C. KARNES 1,908,022

SOUND LOCATING APPARATUS

Filed Nov. 2, 1931

Fig - 1 -

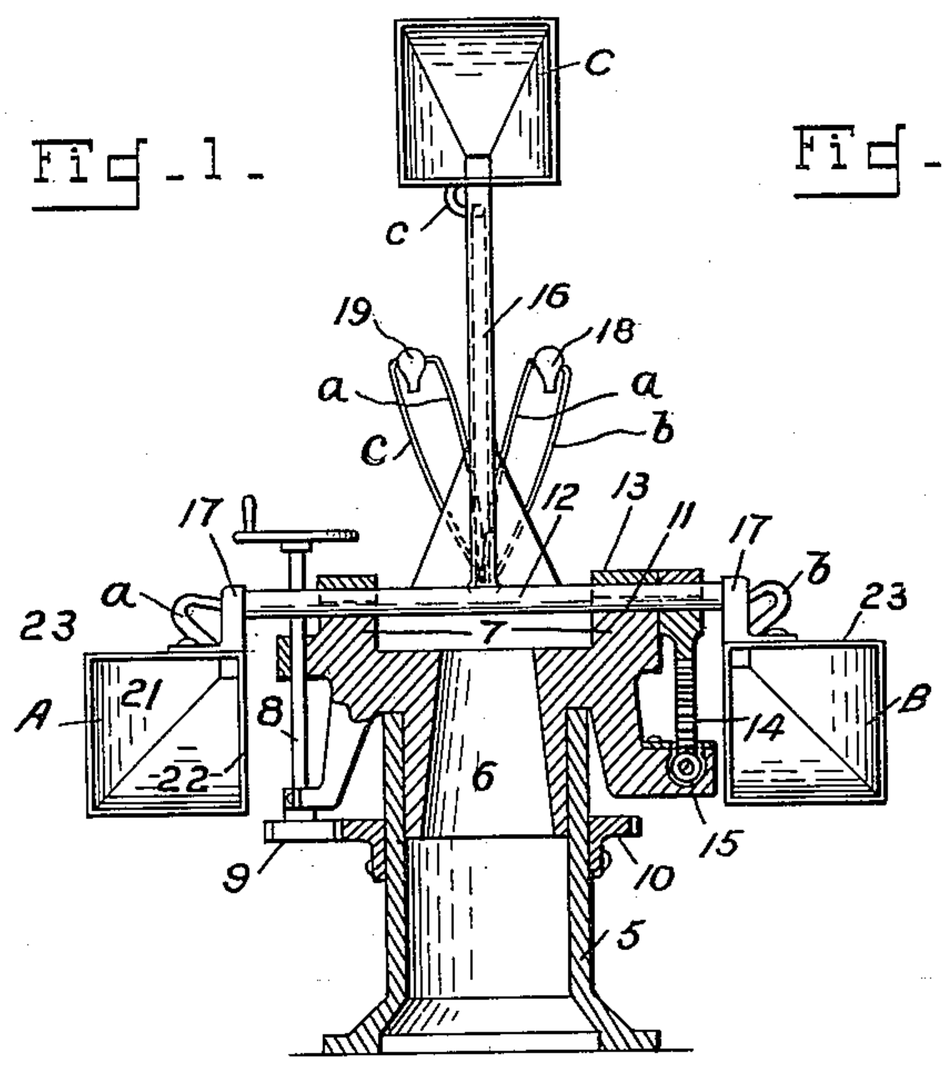


Fig - 2 -

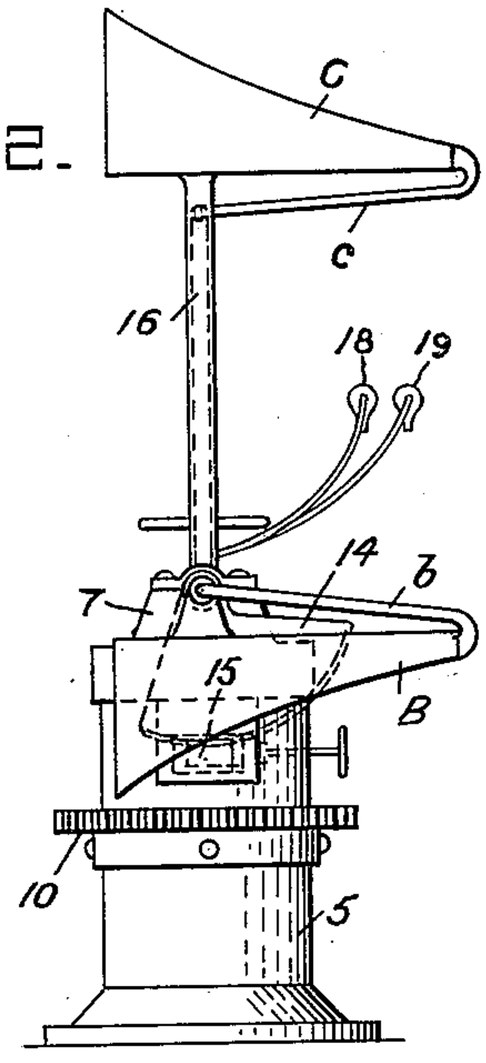


Fig - 4 -

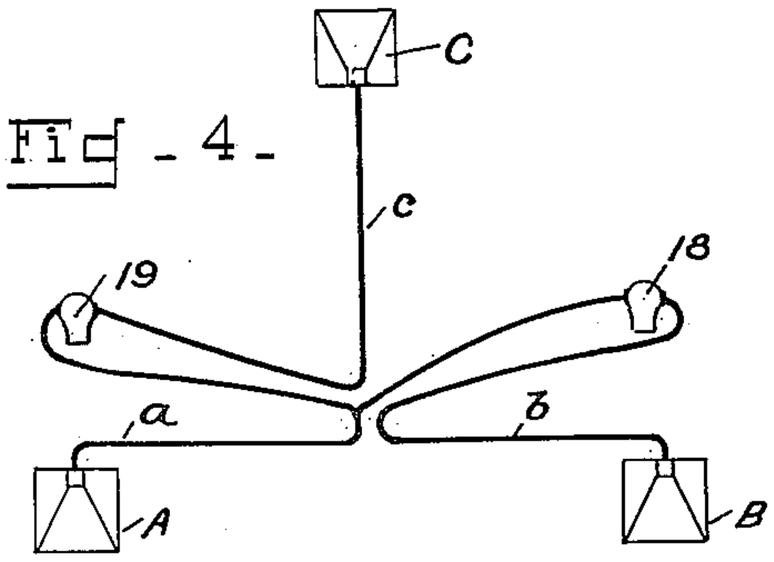


Fig - 3 -

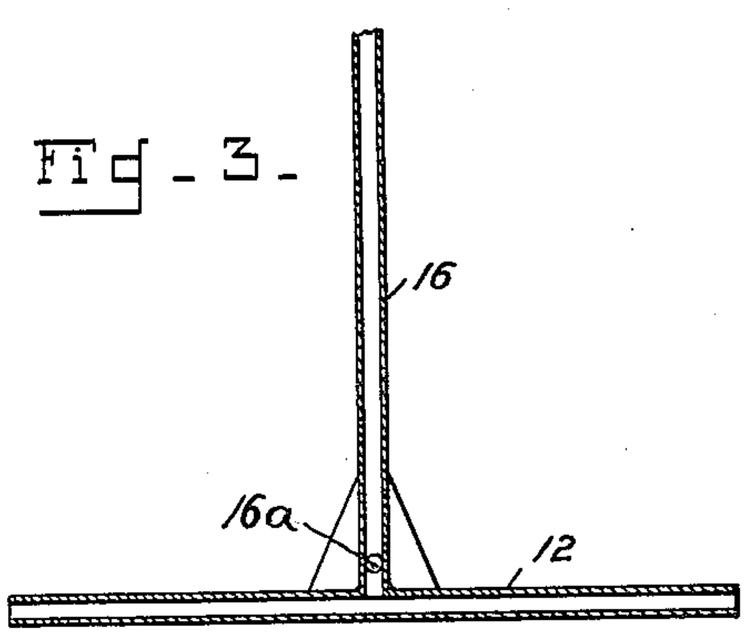


Fig - 5 -

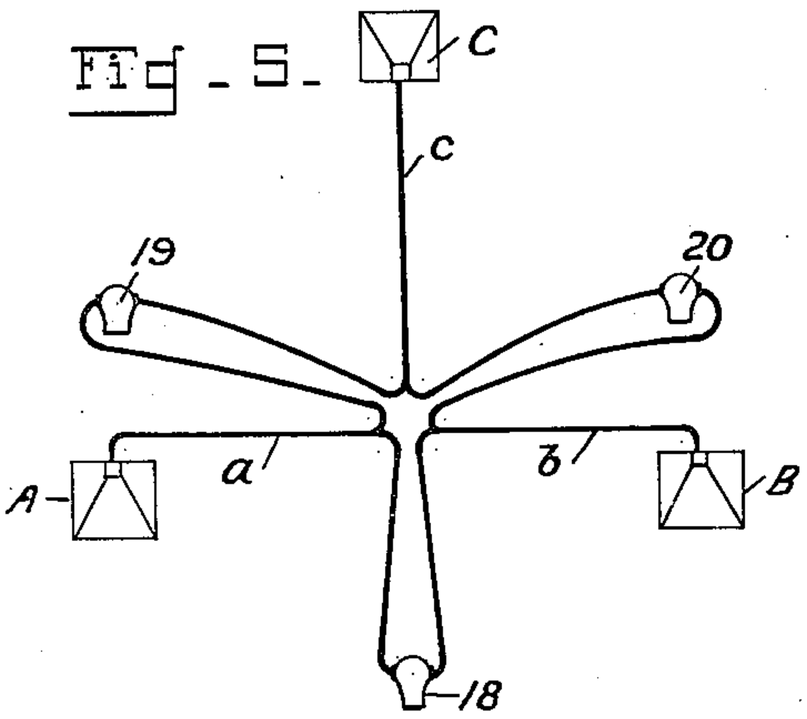
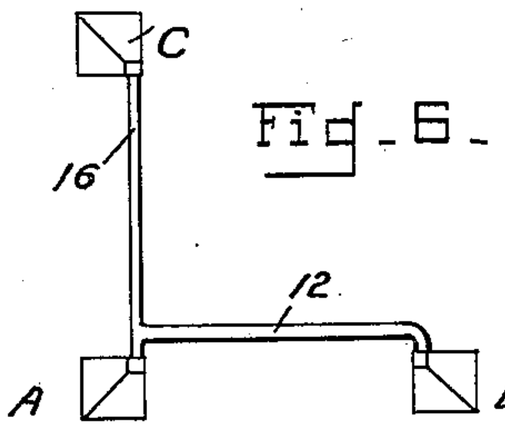


Fig - 6 -



INVENTOR.
James C. Karnes
BY W. N. Roach
ATTORNEY

Patented May 9, 1933 1,908,022

UNITED STATES PATENT OFFICE

JAMES C. KARNES, OF BUFFALO, NEW YORK

SOUND LOCATING APPARATUS

Application filed November 2, 1931. Serial No. 572,544.

(GRANTED UNDER THE ACT OF MARCH 3, 1883, AS AMENDED APRIL 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment to me of any royalty thereon.

This invention relates to a sound locating apparatus of the type operating according to a system of binaural comparison in which the apparatus is directed at the source of sound and the listener reduces the phase difference to zero.

Such apparatus, as disclosed for example in Patent No. 1,774,826 of September 2, 1930, includes two pairs of horns arranged on intersecting base lines to respectively afford lateral and vertical impressions of direction in azimuth and in elevation.

The purpose of the present invention is to effect a reduction in the size and weight of the apparatus by eliminating one of the four horns. One of the lateral horns is common to both the lateral and vertical sets and in a modification each of the lateral horns may be grouped with the vertically spaced horn.

With the foregoing and other objects in view, the invention resides in the novel arrangement and combination of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

A practical embodiment of the invention is illustrated in the accompanying drawing, wherein:

Fig. 1 is a view in front elevation, partly in section showing the improved apparatus pointed at zero elevation.

Fig. 2 is a view in side elevation thereof.

Fig. 3 is a longitudinal sectional view of the horn support.

Figs. 4 and 5 are diagrammatic views illustrating methods of pairing the horns.

Fig. 6 is a view in front elevation of the horns and their support and showing a modified arrangement.

Referring to the drawing by characters of reference.

The apparatus comprises a mount in which a base 5 rotatably supports a top carriage 6 including spaced arms 7—7. The traversing mechanism for moving the top carriage in azimuth consists of a shaft 8 mounted on the top carriage and having a gear 9 meshing with a ring gear 10 on the base.

The spaced arms 7—7 each terminate in a bearing 11 adapted to receive a horizontally disposed support 12 which is confined by trunnion caps 13—13. A segmental gear 14 fast on the support 12 is actuated by worm gearing 15 carried by the top carriage and provides means whereby the support is rotated about its axis.

An arm 16 is fast on the center of the support and is positioned perpendicular thereto at a point midway between the arm 7 of the top carriage as shown in Fig. 1 or at one end of the support 12 as shown in Fig. 6.

A pair of horns A and B arranged in parallel relation are carried on the extremities of the support on the side opposite to the arm 16. The horns are each attached to the support by means of a bracket 17 whose length is so determined that the horns A and B will be counterbalance the arm 16 and a horn C on the extremity thereof.

The trunnion members are hollow and while they may be utilized to form a part of the horns as taught by the prior art they are preferably employed as a casing or housing for flexible sound conducting tubes *a*—*b*—*c*—leading respectively from the horns A—B—C and passing through an aperture 16*a* in the arm 16. As shown in Fig. 4 the tubes *a*—*b* are connected to the head set 18 of the azimuth listener, and one of them, in the present instance the tube *a* is divided so that one of the branches is available for pairing with the tube *c* on the head set 19 for the vertical or elevation listener. As shown in Fig. 5, by also dividing the tubes *b* and *c*, a third grouping *b*—*c* is available for a head set 20 of a third listener who has an opportunity to check or listen for signals. The group *b*—*c* combines the lateral separation between the horns of the azimuth listener with the vertical separation between the horns of the elevation listener.

As seen in Fig. 1 the horn C is of the type shown in Patent No. 1,758,393 of May 13,

1930, in which increased directivity is obtained by providing an eccentric throat 21 and a plane inner side 22 adapted to baffle non-frontal sound waves. The horns A and B are each provided with the plane inner side 22 but since one or the other of them is additionally paired with the horn C, the side 23 nearest to the horn C and which constitutes the inner side of the vertical or elevation group is likewise a plane surface. The position of the throat 21, looking into the horns A or B therefore at one corner.

I claim.

1. In a sound apparatus, a mount, a support trunnioned on the mount, spaced horns carried by the support, means for coupling said horns form a sound receiver set, an arm fast on the support at one end thereof and perpendicular thereto, a horn on said arm means for coupling said horn to each of the spaced horns to form sound receiver sets.

2. In a sound apparatus, a mount, a support trunnioned on the mount, spaced horns carried by the support, means for coupling said horns to form a sound receiver set, an arm fast on the support and perpendicular thereto, a horn on said arm and means for coupling said horn to each of the spaced horns to form sound receiver sets.

3. In a sound apparatus, a mount, a support trunnioned on the mount, spaced horns carried by the support, means for coupling said horns to form a sound receiver set, an arm fast on the support and perpendicular thereto, a horn on said arm and means for coupling said horn to one of the spaced horns to form a sound receiver set.

4. In a sound apparatus, horizontally and vertically spaced sound receivers arranged on intersecting basel lines, and means for coupling one sound receiver from each base line into a sound receiver set.

5. In a sound apparatus, three sound receivers arranged on two intersecting base lines and means for coupling each sound receiver with the remaining sound receivers whereby three separate sound receiver sets are provided.

JAMES C. KARNES.