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TESTING AND TRAINING DEVICE FOR TWO-EARS SOUND LOCATORS

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Fig. 2

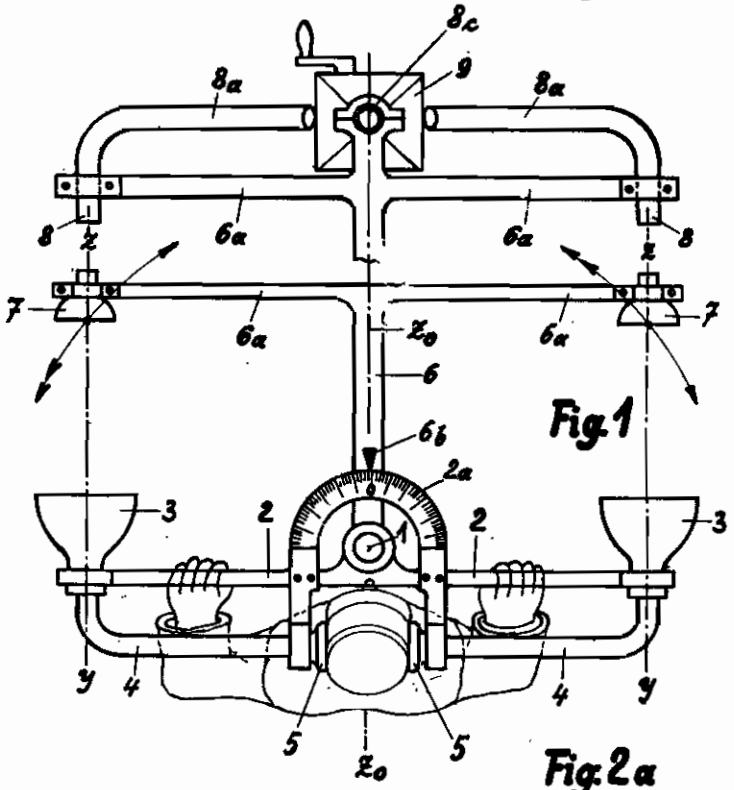
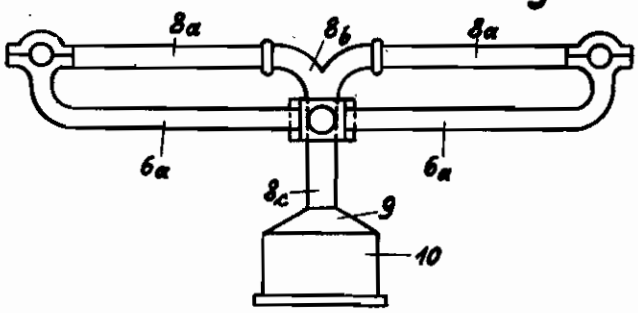


Fig. 1

Fig. 2a



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ALIEN PROPERTY CUSTODIAN

TESTING AND TRAINING DEVICE FOR TWO-EARS SOUND LOCATORS

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With the device according to the invention two-ears sound locators can be tested with regard to the accuracy of direction-finding. Furthermore the device may be used as an apparatus for training the direction-finding crew in the use of sound locators for locating the invisible moving airplanes.

For testing two-ears sound locators up to now airplane noise imitating loudspeakers are used, mounted in great distance in order to ascertain subjectively by repeated direction-finding the mean sound direction to bring the same into accordance with the optical direction by suitable means, as for instance by altering the length of the path of the sound impulses conducted to the right and to the left ear, respectively. For this reason during the training in sound location the sound locator has been set in any direction and by repeated direction-finding the individual error in reading off the sound direction compared with the optical direction has been ascertained.

For testing the zero direction of the direction indicator of a two-ears sound locator according to the invention, in the plane of the parallel acoustic axes of the two sound receivers two sources of sound, as far as possible of equal loudness, timbre, and frequency, are arranged as far as possible in equal distances opposite the sound receivers in the mean position of the device so that on turning the sound locator differences in intensity and phase will occur between the impulses arriving at the left and right ear respectively, causing the impression of a displacement transverse to the sound direction of a single remote source of sound which can be located now by oscillating the sound locator into its acoustic axis.

In order to build a training device for sound location based upon the principle explained above, according to the invention the two sources of sound being situated exactly opposite the sound receivers in the middle position of the device and having as far as possible equal loudness, timbre, and frequency, are arranged on a support rotatably mounted on the pivot of the sound locator so that on turning this support differences in intensity as well as in phases between the impulses arriving at the right and left ear respectively, will occur whereby also by this turning the impression of a moving sound source will be created, the movement of which can be followed by corresponding turning of the sound located in exactly the same manner as it is the case during the acoustic pursuit of a remote airplane moving in transverse direction to the sound direction.

The device according to the invention is shown in the drawings by way of example in two forms of execution in combination with a sound locator movable in a horizontal plane.

Fig. 1 shows in plan view a locator with two telephones and sound sources.

Fig. 2 shows in plan view a device in which the orifices of two equal sound conduits are used as sound sources, the conduits coming from a common sound source.

Fig. 2*a* shows the same device in an elevation from behind.

The two sound receivers **3**, **3** are mounted on a horizontal support **2** journalled on a vertical pivot **1**. To these two sound receivers the two horizontal sound conduits **4**, **4** of equal length are connected in such a manner that the two shells **5**, **5** made of soft rubber will bear tightly against the ears of the operator. Below the support **2** a T-shaped support **6** is journalled on the pivot **1** independently of the support **2**, a loud telephone **7** (a small loudspeaker) being arranged on each of the two arms **6***a*, **6***a*, these telephones having as far as possible equal intensity and timbre. In the middle position of the support **6** the centres of the diaphragms of the two telephones are situated in the acoustic axis *y*—*z* of the two sound receivers. The diaphragms of these two telephones connected together parallel or in series are set into oscillations by a common alternating current, preferably by the amplified current controlled by the grammophone sound box whereby preferably the grammophone disc produces airplane noise.

The support **6** is provided with an indicator **6***b* which coincides in the middle position with the zero mark of a dial **2***a* arranged on the pivot **2** in order to ascertain the accuracy of the adjustment of the sound direction with regard to the acoustic axis z_0—z_0 of the sound locator when the examinator turns the telephone support at will. Preferably the dial with the indicator is shielded so that it can not be observed by the operator. The results can be registered in a known manner by recording the angular differences between the sound direction and the locating direction on a running paper strip. In view of the fact that in practice often interfering noises caused by wind, motor cars etc. impede the direction-finding, preferably a supplement telephone generating such interfering noises is arranged on the support **2** or on the support **6**.

Instead of the two telephones energized with

the same phase of a. c. also two sound conduits 8*a*, 8*a* are arranged on the arms 8*a*, 8*a* and situated in the middle position of the support 8 opposite to the two sound receivers, these sound conduits being connected with a vertical central conduit 8c by a forked conduit 8*b* and the central conduit 8c being connected to the sound box of a grammophone 10 by a funnel 9. Also in this device the airplane noise produced by the sound box will issue from the opening 6, 8 of the sound conduit with equal phase, equal intensity, and equal timbre, and therefore will produce the impression of a single remote sound source the transverse movement of which is simulated by turning the support 8.

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