

No. 631,070.

Patented Aug. 15, 1899.

A. M. GOODALE.
SOUND LOCATING DEVICE.

(Application filed Aug. 21, 1896.)

(No Model.)

Fig: 1.

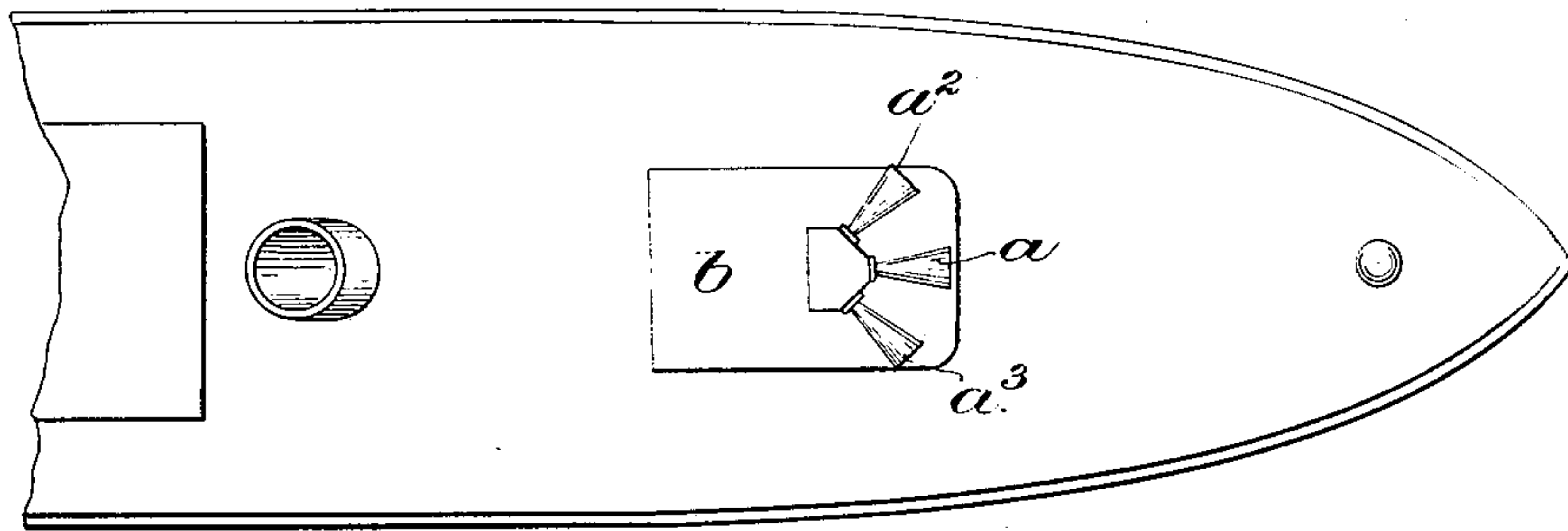
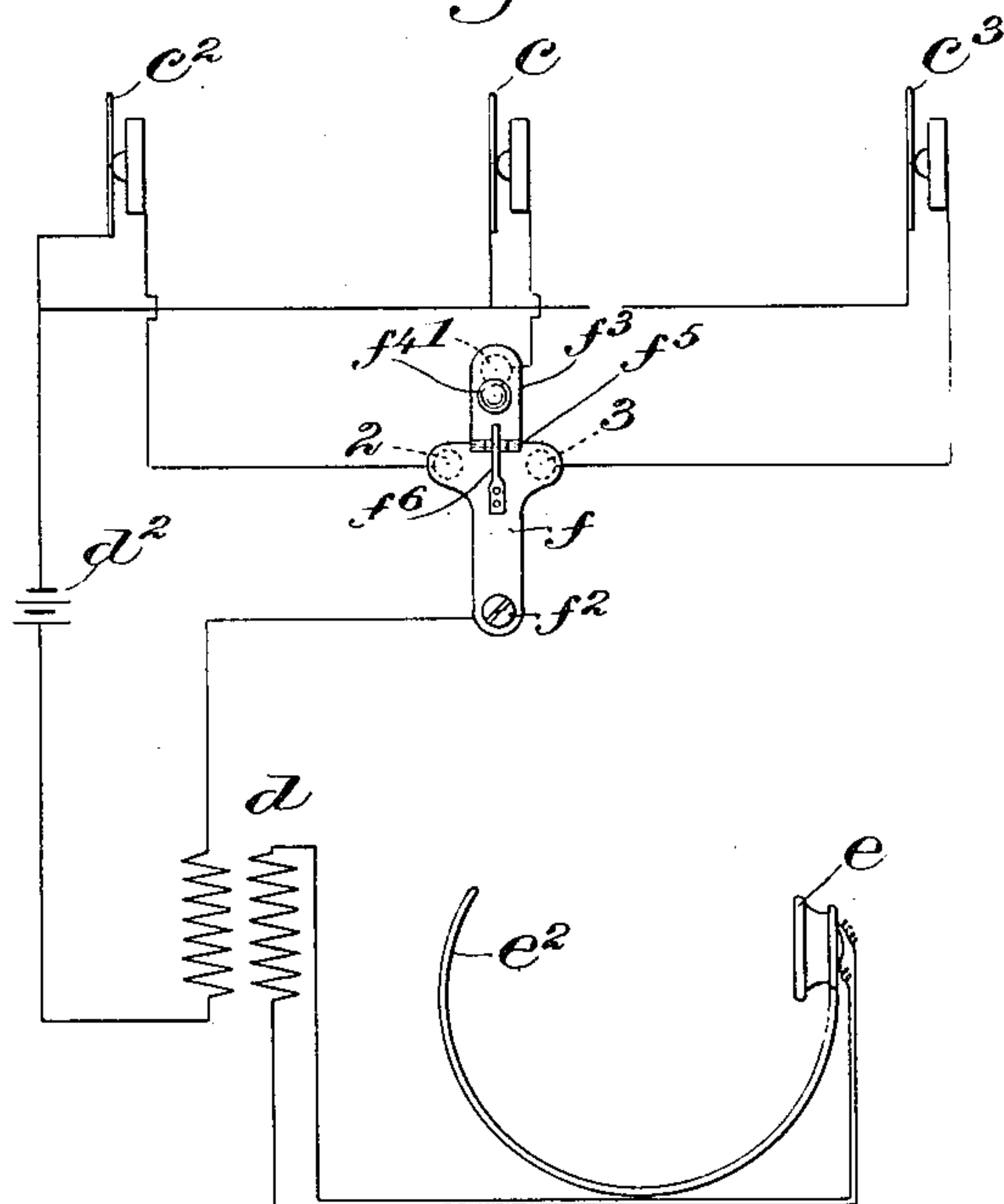


Fig: 2.



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UNITED STATES PATENT OFFICE.

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SOUND-LOCATING DEVICE.

SPECIFICATION forming part of Letters Patent No. 631,070, dated August 15, 1899.

Application filed August 21, 1896. Serial No. 803,436. (No model.)

To all whom it may concern:

Be it known that I, ALFRED M. GOODALE, of Waltham, county of Middlesex, and State of Massachusetts, have invented an Improvement in Sound-Locating Devices, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

The present invention relates to a sound-locating device and is intended, mainly, for use on board ship to aid in distinguishing sounds and determining from what point the said sounds proceed, so that the whistles or audible signals on other vessels or at points along the shore may be distinguished in case of fog when nothing can be seen.

The officers of a ship when proceeding through a dense fog are constantly on the alert for sounds, and it is essential that the sounds should be located with the greatest possible exactness, and without some means for collecting the sound and determining its direction of approach there is a severe strain upon the nerves, which is very exhausting, while it is obviously necessary to reduce speed, since the sounds cannot be heard until they are within dangerous proximity. To collect the sounds and make them more readily distinguishable, therefore, it is desirable to use some device in the nature of a sound-collecting funnel, it being obvious, however, that with such a device sounds will only be heard to the best advantage if the sound-collector is turned to the direction of the point from which the sound proceeds. If, therefore, a simple funnel or ear-trumpet were used, it would be necessary in order to locate the sound to keep changing the position of said funnel. It is further desirable in order that the sound-collector may be placed in the most advantageous position to provide means for transmitting the sounds therefrom to a convenient place of observation—as, for example, the pilot-house.

The present invention aims to render the use of sound-collecting devices practical and convenient; and it consists, mainly, in arranging a number of such devices pointed in different directions, so that a sound proceed-

ing from any quarter will be concentrated and brought in by one or the other of these instruments; and it further consists in the combination, with such an instrument, of means for transmitting the sounds from one or more of such instruments to the ear of the person whose duty it is to act upon information derived in this way, so that a sound coming from any point will be at once perceived.

In order to determine the locality of the sound, means are further provided for determining which instrument of a number pointed in different directions has received the sound or the greater part thereof, and consequently from what direction the sound proceeds.

In carrying out the invention, for example, in connection with a ship a number of sound-concentrating devices are preferably employed and fixed in any suitable position and arranged to point in different directions—for example, one pointing straight ahead, one toward the port side, and one toward the starboard side—and means are also provided for transmitting the sound from each or all of said instruments to a common point, telephone-transmitters being preferably used, and in conjunction with each transmitting device is a cut-off, so that by the manipulation of said cut-offs the comparative effect of a sound on the several collectors may be observed and the direction from which it proceeds may be readily determined.

Figure 1 is a plan view of a sufficient portion of a vessel to indicate a convenient arrangement of sound-concentrating devices. Fig. 2 is a diagram view of a telephone-circuit, whereby the sound may be transmitted from said devices to a common point, and a switch for controlling the circuits to determine from which instrument the sound proceeds.

As herein shown, the sound-collecting devices a , a^2 , and a^3 , which may be the well-known megaphones, are arranged over the top of the pilot-house b , the device a pointing toward the bow of the ship, the one a^2 pointing diagonally toward the port, and the one a^3 toward the starboard. It is obvious that any number of these instruments may be used, it being mainly essential, however, that

sounds which proceed from somewhere ahead of the vessel should be perceived and located, there being three instruments shown therefore as a practical illustration of the invention.

In order that a sound within the range of any of the instruments may be perceived, means are provided for transmitting the sounds from any or all of the instruments to a common point, so that any sound will be perceived by the attendant at this point, the arrangement being such, however, that after a sound is perceived it is possible to determine from which instrument it mainly proceeds. This may be accomplished by providing a sound-transmitting device leading from each of the said instruments to a common point, telephone-transmitters c , c^2 , and c^3 being herein indicated, each of said transmitters corresponding to and being located at the apex of one of the said collectors. The said transmitters are herein shown as all connected in multiple arc to the primary coil of a transformer d , the secondary of which is connected with a receiving instrument e , which may be of any suitable kind, said instrument being herein shown as provided with a band or holding device e^2 , by which it may be secured to the head of the attendant after the manner of receivers employed for continuous use—as, for example, at central telephone-offices. It is obvious, therefore, that any sound which is received and concentrated by any of the collectors a , a^2 , and a^3 is transmitted through the telephone-circuit and at once perceived by the person using the device. After a sound is perceived, however, it becomes necessary to locate the same, and this may be evidently accomplished by determining from which collector the sound mainly proceeds. To this end means are provided for cutting off the transmission of sound from the said collectors successively, it being obvious that if the sound ceases upon cutting off any one of the said instruments it must proceed wholly from that collector the cutting off of which has caused its cessation, while in the case of a sound coming from an intermediate point its direction can be ascertained by a comparison of its effect upon the several collectors, respectively.

When telephone-transmitters are used, it is obvious that this may be accomplished by means of a suitable switch f , such a switch being herein shown as provided with contacts 1, 2, and 3, respectively connected with one member of the transmitters c , c^2 , and c^3 , the other members of which are connected through the local battery d^2 with one terminal of the primary of the transformer d , the other terminal of which is connected to the movable switch member f . The said switch member, which is pivoted at f^2 , normally stands in the position shown in Fig. 2, the main portion of said switch member being of

such shape as to bridge the contacts 2 and 3, while a supplemental switch member f^3 , hinged to the member f , is also in contact with the switch-terminal 1. With the switch in this position, therefore, all three of the terminals are connected with the receivers e , so that a sound coming from any direction will be perceived by the person using the device. When a sound is perceived, however, the operator, in order to determine the location of the sound, may manipulate the switch as follows: By means of a handle or knob f^4 the member f^3 may be turned upon the hinge f^5 against the stress of a suitable restoring-spring f^6 , and it is lifted out of contact with the terminal 1, which is connected to the receiver c at the instrument a , and it is obvious that if upon thus manipulating the member f^3 the sound ceases or is largely diminished in volume it must proceed from directly ahead, or nearly so, having been mainly gathered and concentrated by the instrument a . If such manipulation of the switch, however, does not result in a cessation or material decrease of the sound, it is obvious that it must proceed mainly from one of the other two instruments a^2 or a^3 , and to determine which of these it proceeds from the handle f^4 may be moved to the right or to the left, thus swinging the member f upon its pivot f^2 , so as to cut off either the terminal 2 or the terminal 3. If, for example, the member f is moved to the right and cuts off the terminal 2, it is obvious that if the sound ceases it proceeds from the instrument a^2 , while if it continues it proceeds from the instrument a^3 , no further manipulation of the switch being necessary.

By the use of an instrument of this kind it is obvious that sounds proceeding from a long distance off can be easily and clearly distinguished without straining the attention and their location determined by a simple manipulation of a suitable device, such as the switch hereinbefore described.

If desired, the switch mechanism or other controlling device for the several sound-transmitters may be caused to coöperate with a visual signal which will indicate at a distance the direction from which the sound proceeds, as determined by the attendant who is in charge of the apparatus.

It is not intended to limit the invention to the specific construction and arrangement of the devices herein shown to illustrate the same, since it is obvious that the construction or nature of the several instrumentalities which are combined to produce an operative device in accordance with the invention may be varied and the specific arrangement modified without departing from the invention.

I claim—

A sound-locating device, comprising the combination of two or more sound-collecting devices, a telephone-transmitter for each of such devices, a telephone-receiver connected

with all of the several transmitters, and a switch interposed between the said transmitters and the receiver and adapted to be operated by the user of the receiver to ascertain
5 the relative activity of the transmitters, substantially as described.

In testimony whereof I have signed my

name to this specification in the presence of two subscribing witnesses.

ALFRED M. GOODALE.

Witnesses:

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