No. 877,317. PATENTED JAN. 21, 1908.

D. O. FOSGATE.

AURIPHONE.

APPLICATION FILED APR. 18, 1907.

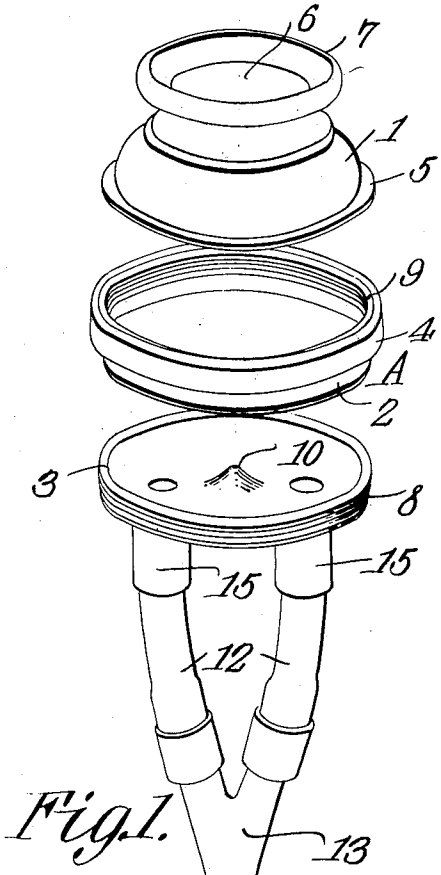
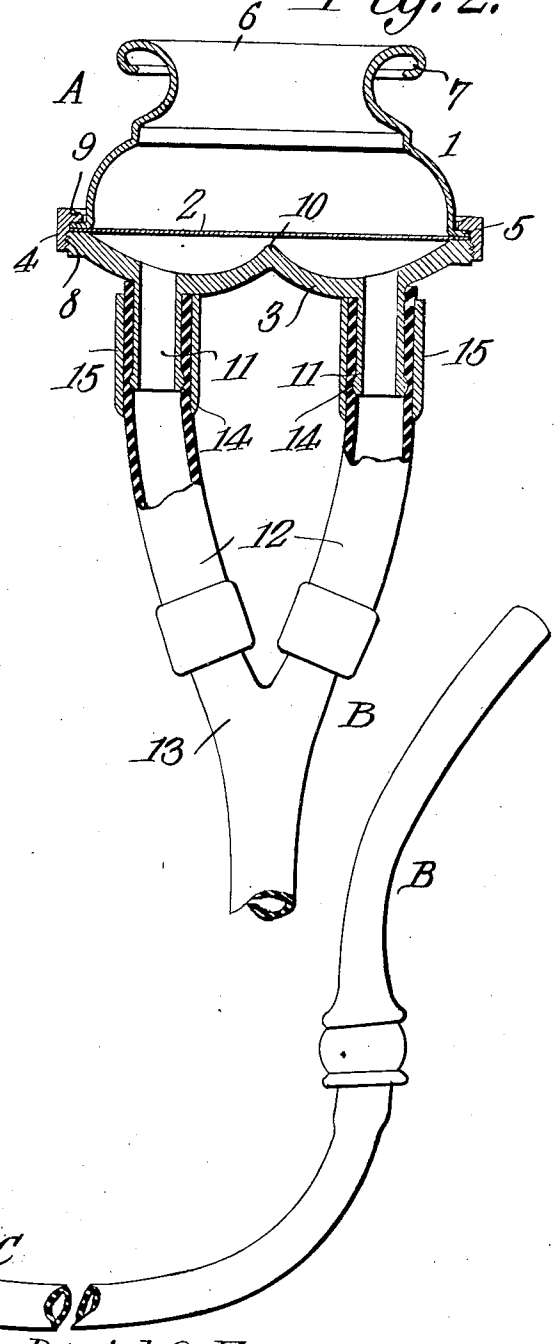


Fig. 1.

Fig. 2.



WITNESSES:

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AURIPHONE.

No. 877,317. Specification of Letters Patent. Patented Jan. 21, 1908.

Application filed April 18, 1907. Serial No. 369,033.

To all whom it may concern:

Be it known that I, DANIEL O. FOSGATE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Auriphone, of which the following is a specification.

This invention relates to an auriphone, or ear trumpet, of that type in which a diaphragm is employed in the mouthpiece to augment the wave sounds produced by a person speaking into the same, and it relates more particularly to the construction of the mouthpiece.

The invention has for one of its objects to improve and simplify the construction and operation of devices of this character so as to be comparatively inexpensive and easy to manufacture and thoroughly reliable and efficient in use.

A further object of the invention is to provide a mouthpiece which possesses superior intensifying qualities so that the slightest sounds become audible, this being due to the particular form of chamber behind the diaphragm whereby the wave sounds are so affected that they are greatly intensified on their way through the speaking tube.

Another object of the invention is the provision of a simple form of connection between the flexible sound conducting tube and the mouthpiece, whereby the parts are readily and firmly united.

With these objects in view, and others, as will appear as the nature of the invention is better understood, the invention comprises the various novel features of construction and arrangement of parts, which will be more fully described hereinafter and set forth with particularity in the claims appended hereto.

In the accompanying drawing, which illustrates one of the embodiments of the invention, Figure 1 is a perspective view of the speaking tube showing the parts of the mouthpiece detached and arranged in their relative positions. Fig. 2 is an enlarged central vertical section of the mouthpiece with parts of the sound conducting tube in elevation.

Corresponding parts in the several figures are indicated throughout by similar characters of reference.

Referring to the drawing, A designates the mouthpiece, B the tubular ear piece, and C the flexible sound wave conducting tube connecting the mouthpiece to the ear piece so as to convey the intensified sound waves from the speaker to the hearer.

The mouthpiece A comprises a trumpet or shield 1, a diaphragm 2, a supporting disk or back 3, and a clamping ring 4 for holding the several parts together. The trumpet 1 is preferably constructed of sheet metal spun into the desired shape and provided with an outwardly extending peripheral flange 5. The open end 6 of the trumpet, which is presented to the mouth of the speaker, is formed with a rounded rim 7, and from the opening 6 the trumpet expands inwardly toward the flanged end 5. The diaphragm 2, which may be made from sheet hard rubber, steel or mica, but preferably the latter, as it transmits a more distinct and clearer sound, is of such a size that its periphery is flush with the flange 5 of the shield or trumpet 1. The disk 3 is of about the same diameter as the diaphragm and is provided with an external thread 8 on its periphery for receiving the ring 4. The ring 4 is formed at its top with an inwardly extending annular flange 9 that engages over the flange 5 of the trumpet 1, so that the diaphragm 2 is firmly clamped between the disk or back 3 and the trumpet.

The inner surface of the disk or back 3 is annularly concaved so as to form an annular basin-like chamber having a central cone 10 the apex of which is located about one sixteenth of an inch from the diaphragm in trumpets adapted for ordinary use. By means of this cone, the sound waves produced by the diaphragm are divided and intensified as they are conveyed to the tube C. In connection with this form of sound transmitting chamber, a plurality of avenues for the sound waves to pass through are provided, which avenues unite at a suitable point with the receiving end of the sound conducting tube C. For this purpose, the disk 3 is formed with a number of nipples 11 to which are attached the branches 12 of the tube C. To increase the flexibility of the device at the mouthpiece, the branches 12 are preferably short pieces of rubber tubing which are connected with the main tube C by a Y-coupling 13 which is of hard rubber. To securely hold the branches 12 on the nipples 11, the latter are formed with beads 14 and the branches 12 are fitted over the nipples. Around the nipples, and ends of the rubber

tube 13 on the nipples, are the sleeves 15, preferably of hard rubber or metal. These sleeves are of such a diameter that the pieces of tubing 12 are compressed at the beads 14, as shown in Fig. 2, so that the sleeves and beads serve as clamping means for securely holding the parts together, and the rigid sleeves serve to prevent bending and breakage of the tubes adjacent to the nipples. The branches 12 can be readily detached from the mouthpiece by working the sleeve 15 downwardly on the said branches until they clear the beads 14, whereupon the branches can be readily pulled off the nipples.

From the foregoing description, taken in connection with the accompanying drawing, the advantages of the construction and of the method of operation will be readily understood by those skilled in the art to which the invention appertains. In operation, the sound waves produced by the speaker's voice cause the diaphragm in the mouthpiece to vibrate so that the air on the back side of the diaphragm is also set into vibration. These wave sounds are divided by the cone 10 and intensified thereby and by the particular shape of the chamber formed between the diaphragm and disk 3. These intensified sound waves are then directed through the branches of the sound conducting tube and then come together in the latter, whereupon they are transmitted to the ear of the hearer. The sensitiveness of the instrument is such that it can be used successfully as a stethoscope for testing the action of the heart. When used in this manner, the mouthpiece 1 is placed against the body of the person being examined, while the ear piece B is, of course, held to the ears of the physician. It has been found in practice that the instrument is so sensitive that the heart's action can be heard distinctly through heavy clothing and even while a person is wearing a heavy winter overcoat.

I have described the principle of operation of the invention, together with the apparatus which I now consider to be the best embodiment thereof, but I desire to have it understood that the apparatus shown is merely illustrative, and that various changes may be made, as are within the scope of the claims.

What is claimed is:—

1. In an instrument of the class described, the combination of a mouthpiece, a single sound conducting tube, and a multiple connection between the mouthpiece and tube.

2. In an instrument of the class described, the combination of a mouthpiece, a single sound conducting tube, and a plurality of branches connecting the mouthpiece with the tube.

3. In an instrument of the class described, the combination of a mouthpiece having a plurality of nipples, with a single sound conducting tube having branches connected with the nipples.

4. In an instrument of the class described, the combination of a mouthpiece, with a single sound conducting tube having a plurality of connections with the mouthpiece.

5. In an instrument of the class described, the combination of a mouthpiece, a plurality of nipples thereon, a single sound conducting tube, a pair of flexible tubes connected with the nipples, and a Y-coupling between the flexible tubes and sound conducting tube.

6. In an instrument of the class described, the combination with a disk having an annular concavity in one face thereof to form a projecting rim and provided with a substantially conical raised portion projecting from the center of the concavity, of a dome-shaped shield secured to the disk having a concavity facing that of the latter, and a diaphragm interposed between the shield and disk and separating the concavities thereof.

7. In a mouthpiece comprising a shield, a diaphragm extending across the same, a member at the back of the diaphragm, and a means connected with the member and detachably engaging the shield for clamping the diaphragm between the latter and member.

8. A mouthpiece comprising a shield having a peripheral flange at one end, a diaphragm extending across the said end and bearing against the flange, a member at the back of the diaphragm having a peripheral thread, and a ring engaging the thread and having an internal flange detachably engaging the flange of the shield to hold the parts in place.

9. In an instrument of the class described, the combination of a shield, a diaphragm, a member on one side of the diaphragm having an annular hollow and a central conical portion, means for clamping the member and shield together with the diaphragm between them, nipples on the member communicating with the hollow thereof, a pair of branches connected with the nipples and a single sound conductor connected to both of the said branches.

10. In an instrument of the class described, the combination with a disk having an annular concavity in one face thereof to form a projecting rim and provided with a substantially conical raised portion projecting from the center of the concavity, of a dome-shaped shield secured to the disk having a concavity facing that of the latter, a diaphragm interposed between the shield and disk and separating the concavities thereof, a pair of nipples on the disk communicating with the annular concavity thereof, a branched pipe having its branches connected to the respective nipples, and a single sound

conducting tube connected to receive the sound from both branches of the branch pipe.

11. In a device of the character described, the combination with a disk having an annular concavity therein and provided with a conical portion raised above the center of the concavity, and a diaphragm mounted in coöperative relation with the disk and adapted to vibrate in proximity to the conical portion thereof, of a dome-shaped shield arranged in coöperative relation with the diaphragm and opposite to the concavity of the disk, the latter and the shield forming substantially closed chambers at opposite sides of the diaphragm, the shield having a reduced opening therein, and means for conducting the sound from the concavity of the disk.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

DANIEL O. FOSGATE.

Witnesses:
CHAS. R. JOHNSON,
F. J. SWAUSH.