Sept. 22, 1931. C. FENSKY 1,824,427

HEARING DEVICE

Filed May 19, 1928

FIG. 1

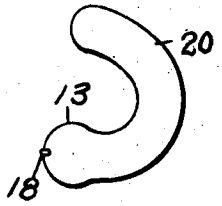


FIG. 2

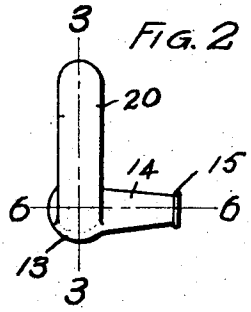


FIG. 3

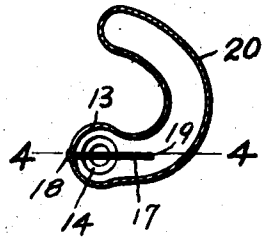


FIG. 5

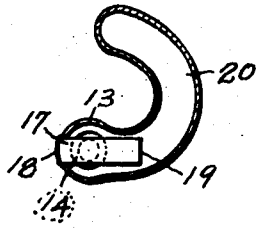


FIG. 4

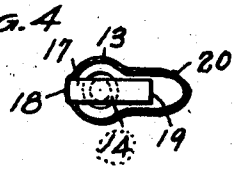


FIG. 6

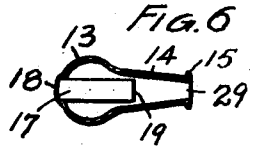


FIG. 8

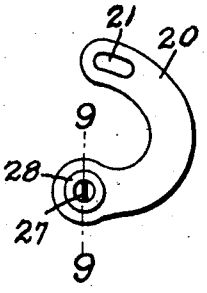


FIG. 7

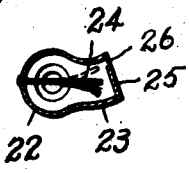


FIG. 9

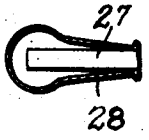


FIG. 10

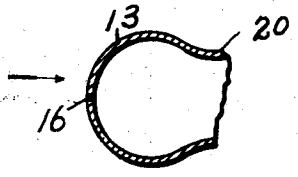


FIG. 11

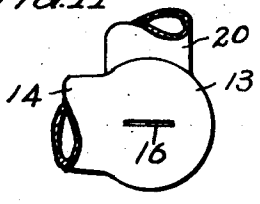


FIG. 12

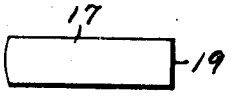
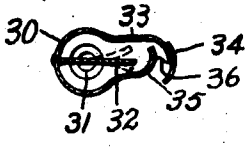


FIG. 13



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Patented Sept. 22, 1931

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UNITED STATES PATENT OFFICE

CHARLES FENSKY, OF ST. LOUIS, MISSOURI

HEARING DEVICE

Application filed May 19, 1928. Serial No. 278,961.

My invention relates to improvements in hearing devices, and has for its primary object a device for improving the hearing of afflicted persons and which is so constructed that normal vibrations or sound waves will be augmented.

A further object is to construct a hearing device which is adapted to be inserted in the outer ear and which, while preventing a sudden inrushing or increasing pressure of air to the interior of the ear, will also augment the vibration imparted to the ear and ear drum by the sound waves.

A still further object is to construct a hearing device which is provided on its interior with a reed or flexible member, which will vibrate under the influence of sound waves and not only augment the sound waves but will also tend to set up a vibration in the device itself independently of the vibrations imparted to the device by the sound waves per se.

In the drawings:

Fig. 1 is a side view of one form of my device.

Fig. 2 is an end view of the same.

Fig. 3 is a section taken on the line 3—3 of Fig. 2.

Fig. 4 is a section taken on the line 4—4 of Fig. 3.

Fig. 5 is a section similar to Fig. 3 showing the reed in a different position.

Fig. 6 is a section taken on the line 6—6 of Fig. 2 showing the reed in still another position.

Fig. 7 is a modified form of construction showing a device which is practically invisible when in use.

Fig. 8 is a side elevation of another form of construction.

Fig. 9 is a section taken on the line 9—9 of Fig. 8.

Fig. 10 is an enlarged fragmental section illustrating the manner of opening the device for the insertion of the reed as illustrated in Figs. 3 and 5.

Fig. 11 is an enlarged fragmental view of Fig. 10 viewed in the direction of the arrow.

Fig. 12 is a plan view of one form of reed; and

Fig. 13 is a longitudinal section of still another form of hearing device.

In the construction of my device I employ a globular-shaped member 13, which is hollow and formed of noncorrosive material and also of material which is susceptible of vibrating when impinged upon by sound waves. Extending from the member 13 is a member 14, which is hollow and tapered and which communicates with the interior of the member 13. The member 14 is designed to be inserted into the outer ear passage and is preferably provided on its outer end with a bead 15, this bead not only aiding in holding the device in the ear passage but also preventing any liability of scratching or tearing the lining of the passage. In the construction as disclosed in Figs. 1 to 7 inclusive, the member 13 is provided with a slot 16 (see Figs. 10 and 11), through which a flexible vibrator reed 17 is inserted. This reed may be inserted so as to lie horizontally as illustrated in Figs. 3, 4 and 7, or it may be inserted so as to extend vertically as illustrated in Fig. 5. After the reed has been inserted through the slot 16 it is secured in position at one end only by means of solder or similar fastening means 18, leaving the end 19 of the flexible vibrator or reed free to vibrate.

I may, if desired, provide the member 13 with an arcuate extension 20, which is also hollow and which is arranged at substantially right angles to the tubular member 14, and which is adapted to be inserted in and carried by the concha of the ear. The member 20, as disclosed in Figs. 3 and 5, also communicates with the member 14. This member 20 may be imperforate as disclosed in Figs. 1, 2, 3 and 5, or it may have an opening 21 formed therein as disclosed in Fig. 8. The opening 21 when used may be either in the end of the member or it may be in one of the side walls so that the opening will be turned toward the head when the device is worn or it may be on the outside.

In Figs. 1 to 5 inclusive I have disclosed the reed as extending into the member 20. This, however, is not essential as the reed may extend into the member 14 as disclosed in Fig. 6.

In Fig. 7 I have disclosed a modified form of construction in which the member 22 is of the same shape as the member 13 and is also provided with a tubular member for insertion into the outer ear passage but instead of using a curved member similar to the member 20, I form a short extension 23 at right angles to the tubular member, which fits into the ear passage. This extension 23 is hollow and communicates with the member 22, the same as the member or portion 20 communicates with the portion 13.

A reed 24 is also employed, which may be placed in the various positions illustrated in Figs. 3, 5 and 6. The member 23, however, is partially closed at its outer end by means of a wall 25 thus leaving only a small passage 26 for the sound waves to enter. My purpose in making this construction is that I believe that the sound waves after passing through the passage 26 into the portion 22 will strike the wall 25 and rebound thereby increasing the vibration of the reed 24.

In Figs. 8 and 9 I have disclosed still another modification in which the reed 27 is inserted through the member 28, which corresponds to the member 14 of Fig. 2. In this way the cutting of the slot 16 is eliminated. The device as disclosed in Figs. 8 and 9 may be provided with the curved member 20, if desired, although it may be omitted entirely.

I may still further modify my device by closing the opening 29 formed in the member 14 by placing a disk therein without departing from the spirit of my invention. In fact the interior of the hearing device may be sealed entirely. This, of course, it is believed, depends entirely upon the sensitiveness of the ear drum patient using the device because in cases of extremely hard hearing I believe it preferable to leave the end of the member 14 open so that not only the vibrations imparted to the device by the sound waves and by the vibration of the reed will reach the ear drum and inner ear, but in addition the air within the outer passage of the ear and within the device will also be vibrated by the vibration of the reed and thus exert additional influence on the ear drum and inner ear.

The modification shown in Fig. 13, 30 represents the enlargement and is similar to the enlargement 13. The enlargement 30 is also provided with a tapered tube 31, which fits in the outer ear passage. 32 represents the reed and 33 the hollow extension formed integral with the enlargement 30. In this hollow extension, however, the forward upper portion 34 is bent downwardly while the lower forward portion 35 is bent upwardly so as to overlap each other but still leave a passage 36 between the portions 34 and 35 through which sound waves can readily pass but after once entering the extension 33 they will be more or less entrapped thereby and in attempting to escape through the opening 36, these sound waves will strike the portions 34 and 35 and be reflected back into the member 30, and it is my belief that such reflection of the sound waves will tend to stimulate and increase the vibration of the reed 32.

By the construction of my device, as aforesaid, and by reason of the reed which is formed of thin material capable of vibrating readily under the influence of sound waves, not only will the sound waves cause the device as a whole to vibrate but by setting up vibrations in the reed, these vibrations will be imparted to the device as a whole and where an opening is present in the portion which is inserted in the ear passage, the air in the outer ear passage will also be set in vibration thereby increasing vibrations transmitted to the ear drum and thereby improving the hearing, because it is a well known fact that in most cases of hard hearing this condition is due to the ear drum becoming thickened and not vibrating properly, but even where the ear drum has been broken, my device will aid in imparting vibrations to the inner ear and transferring these vibrations to the auditory nerve because the member 14 can be made sufficiently long so as to set up vibrations in the bones of the inner ear and cause them to function and transmit the vibrations to the auditory nerve.

It is obvious that the body of the hearing device may be made out of any material and the reed likewise made out of any flexible material that is so mounted as to be free to vibrate and that the reed may be located at any position within the hearing device and further that the hearing device may be provided with one or more openings and located at various points in the body of the instrument of the hearing device.

Having fully described my invention, what I claim is:—

1. A hearing device comprising two hollow members communicating with and arranged at substantially right angles to each other, one of said portions adapted to lie wholly within the outer ear and the other portion to be inserted in the ear passage, a flexible reed secured at one end only carried by one of said portions, the other end of said reed being uncontacted with whereby said reed is freely vibrating, said vibrations augmenting the sound waves.

2. A hearing device comprising a pair of hollow members arranged at right angles to each other and adapted to lie wholly within the ear and thus be practically invisible, one of said portions extending into the ear passage, a flexible reed secured at one end only within one of said members, the remainder of said reed being entirely free and uncontacted with whereby said reed can vibrate freely and augment sound waves.

3. A hearing device comprising a pair of hollow members arranged at right angles to

each other and adapted to lie wholly within the outer ear and thus be substantially invisible, one of said hollow members adapted to extend into the ear passage, a flexible reed secured at one end only within one of said members, the remainder of said reed extending into said member, but being free and uncontacted with whereby said reed can vibrate freely under the action of sound waves and augment the same.

4. A hearing device comprising a member located within the concha of the ear, said member having a portion adapted to be inserted in the ear passage and a flexible member secured at one end only located within said hollow member, the major portion of said flexible member being free and uncontacted with so that said flexible member can be placed in vibration due to sound waves striking the first mentioned member and to vibrate in sympathy therewith, said vibration causing the sound waves which reach the inner ear to be augmented.

In testimony whereof I have affixed my signature.

CHARLES FENSKY.