

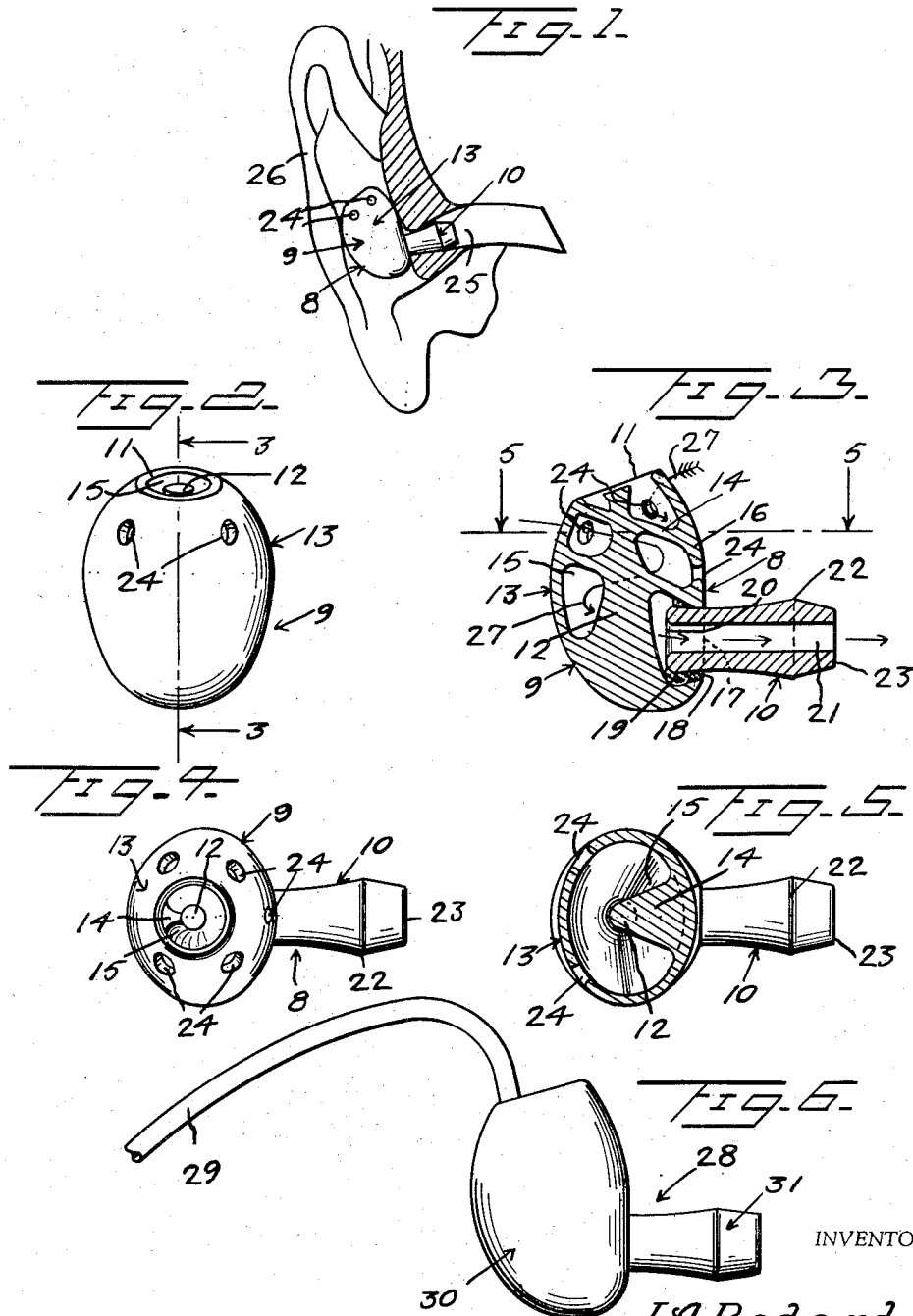
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HEARING AID

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HEARING AID

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This invention relates to a novel instrument of extremely simple construction for collecting and intensifying sound and which will thus materially improve the hearing in an ear to which the device is applied.

Another object of the invention is to provide an instrument of this character which is very inconspicuous in use, yet which due to its unique construction will provide a large sound receiving chamber for amplifying sound waves entering said chamber and which are conveyed thereby to the ear.

A further object of the invention is to form a hearing aid instrument of the aforescribed character utilizing a natural object having good acoustic characteristics to provide the sound receiving chamber and which natural object is modified to afford ready access of sound waves to said chamber and by means of which the amplified sound waves are effectively conveyed from the chamber to the ear passage.

Various other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawing, illustrating presently preferred embodiments thereof, and wherein:

Figure 1 is a side elevational view showing the acoustic device in an applied position;

Figure 2 is an enlarged elevational view looking toward the outer side of the acoustic device or from left to right of Figure 1;

Figure 3 is a vertical sectional view, taken substantially along a plane as indicated by the line 3—3 of Figure 2;

Figure 4 is a top plan view of the hearing aid;

Figure 5 is a horizontal or cross sectional view thereof, taken substantially along a plane as indicated by the line 5—5 of Figure 3, and

Figure 6 is a side elevational view of a slightly modified form of the hearing aid.

Referring more specifically to the drawing, and first with reference to Figures 1 to 5, the hearing aid or acoustic device as disclosed herein is in the nature of an audiphone. Said hearing aid or acoustic device, designated generally 8, consists of a body portion, designated generally 9, and a hollow stem or tube 10. The body portion 9 is preferably formed from a small sea shell the apex of which is cut off to provide a relatively large nearly annular opening 11 at the upper end of the body 9. The body 9 as best illustrated in Figure 3 is elongated and has a central column 12 which diminishes in thickness or cross sectional size toward the upper end of the body 9 as defined by the opening 11. The outer wall, designated generally 13, of the body 9 has a substantial part thereof including all of its upper portion disposed around and spaced from the tapered central column 12. A volute or ascending spiral partition 14 is disposed around the upper portion of the central column 12 and has its inner edge integrally joined thereto and its outer edge integrally joined to said surrounding wall 13. Said column 12, the surrounding wall 13 and the partition 14 combine to form a volute sound receiving chamber 15 the

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restricted upper end of which opens outwardly of the body 9 through the opening 11.

Said sounding chamber 15 increases in size toward its opposite open end and which would normally open through the large aperture of the shell and which is formed in the inner part 16 of the surrounding wall 13 and remote from the opening 11. However, an end portion of the hollow stem or tube 10 extends through and occupies a substantial part 17 of said aperture and the remainder of the aperture, not occupied by a part of the stem or tube 10, is closed and sealed by a wall insert 18 and the inner end of the stem or tube 10 is anchored in the opening 17 by a suitable bonding medium 19, as best seen in Figure 3.

The inner end 20 of the tube or stem 10 is spaced from the adjacent portion of the column 12 and is thus located in the lower end of the spiral sounding chamber 15. The stem or tube 10 has a bore of substantial cross sectional size extending from end-to-end therethrough and designated 21. The exterior of the stem or tube 10 is preferably thickened as seen at 22 near the other end 23 thereof, and said tube or stem is of substantial wall thickness as seen in Figure 3 and is preferably formed of rubber so that it can yield to conformably fit the outer end portion of an ear passage or canal 25, as seen in Figure 1.

The wall 13, beneath the top opening 11 of the body 9, is provided with a plurality of openings 24 which open outwardly thereof and into the sound amplifying chamber 15. Said wall 13 is preferably provided with four openings arranged near the upper end thereof, as best seen in Figure 4, so that two of the openings will face forwardly and the other two rearwardly when the acoustic device 8 is in an applied position as seen in Figure 1. Another opening 24 is disposed on the inner side of the body member 9 above the tube or stem 10, as seen in Figures 3 and 4.

The hearing aid or acoustic device 8 is shown in Figure 1 in an applied position with the stem or tube 10 extending into the outer end of the ear passage or canal 25. The enlarged portion 22 thereof will effectively function to retain the stem in its applied position of Figure 1 for supporting the sound amplifying body 9 within the outer portion of the ear, as seen in Figure 1. The acoustic device 8 will normally be of a smaller size than as illustrated in Figure 1 and will therefore be very inconspicuous while in use.

Sound waves approaching the ear 26 in which the device 8 is mounted will enter the sound amplifying body 9 through the relatively large top opening 11 and/or through the openings 24 and will travel downwardly through the body 9 within the sound amplifying chamber 15 around the central column 12 and will be amplified by the enlarged lower portion of the chamber 15 and as thus amplified will be conveyed through the tube or stem 10 into the inner portion of the ear passage 25. The sound waves will not be distorted in their spiralling downward travel through the chamber 15, as indicated by the arrows 27 in Figure 3.

It will thus be apparent that an acoustic device of extremely simple construction has been provided and wherein the natural sound amplifying characteristics of a sea shell has been utilized through modifications thereof. The body 9 may be painted any desired color to render it both attractive in appearance and inconspicuous.

Figure 6 illustrates a slightly modified form of the invention and wherein an acoustic device 28, which differs only slightly in construction from the acoustic device 8, is adapted to be utilized as a replacement for a conventional ear mold as is employed with an electrically powered hearing aid and wherein the sound conveying tube 29 carries the sound waves from a receiver or micro-

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phone to the ear mold. The acoustic device 28 includes a body 30 and a hollow stem or tube 31. The body 30 is constructed in the same manner as the body 9 except that the end of the tube 29 extends into the upper end of the sounding chamber thereof and the top opening of the body 30 is sealed around said end of the tube 29 and the openings 24 are omitted. The tube or stem 31 corresponds to the tube or stem 10 and is mounted in the same manner. Thus, sound waves can enter the body 30 only through the tube 29 and are amplified therein in the same manner as in the body 9 and thereafter pass outwardly through the hollow stem or tube 31.

Various modifications and changes are contemplated and may be resorted to, without departing from the function or scope of the invention as hereinafter defined by the appended claims.

I claim as my invention:

1. A hearing device comprising a hollow body member provided with a helical sounding chamber, means for admitting sound waves to said chamber adjacent one end thereof, a hollow stem having one end secured to said body member and communicating with said chamber adjacent the opposite end thereof, said stem having a portion extending from said body member and adapted to engage the outer end portion of an ear passage or canal for conveying sound waves from said chamber into the ear canal and for supporting said hollow body member in the outer part of the ear, said means comprising an opening formed in a portion of said hollow body disposed remote from said stem and communicating with the first mentioned end of said chamber, said opening being of a larger size than the cross sectional size of the chamber end with which the opening communicates.

2. An acoustic device comprising an elongated body member having a central column extending longitudinally thereof, an outer wall disposed around and spaced from said column and a volute partition disposed between said column and wall and combining therewith to form a volute sound receiving chamber, a hollow stem having an end secured in and extending through a portion of said outer wall and communicating with said chamber adjacent one end thereof, said hollow stem being adapted to fit an ear passage for supporting the body in the outer part of the ear and being disposed at a substantial angle to said column, and said body having an

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opening in the end thereof disposed remote from said stem and communicating with an end of said sound receiving chamber and of a larger size than the cross sectional size of said end of the chamber and through which sound waves are adapted to enter said chamber and travel spirally therethrough to said stem, the bore of said stem forming a passageway for the sound waves from said chamber to the ear passage.

3. An acoustic device as in claim 2, said sound receiving chamber increasing in size toward the end thereof to which the stem is connected, and said body opening being formed around an end of the central column.

4. An acoustic device as in claim 2, said wall having a plurality of openings of smaller size than said end opening and spaced from said stem for admitting additional sound waves to said chamber.

5. An acoustic device comprising a sea shell of the univalve type having an apex at one end, an aperture opening outwardly of a side thereof remote from said end and a volute chamber extending from said apex to the aperture, a hollow stem having an end extending into said aperture and secured to the sea shell, said stem end communicating with an end of the shell chamber, means sealing the aperture of the shell around said stem end, and said shell having an opening formed in the apex thereof of larger size than the cross sectional size of the adjacent end of the volute chamber and through which sound waves are adapted to be admitted to said adjacent end of said volute shell chamber to be amplified in passing therethrough to the end of the hollow stem communicating with the opposite end of the volute chamber, said hollow stem having an outer portion adapted to be mounted in the outer end of an ear passage for supporting the shell in the outer part of the ear and for providing a passageway for the sound waves from the shell chamber to the ear passage.

6. An acoustic device as in claim 5, said shell having openings therein disposed around and spaced from the apex opening thereof forming additional admittance openings for sound waves to the shell chamber.

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