

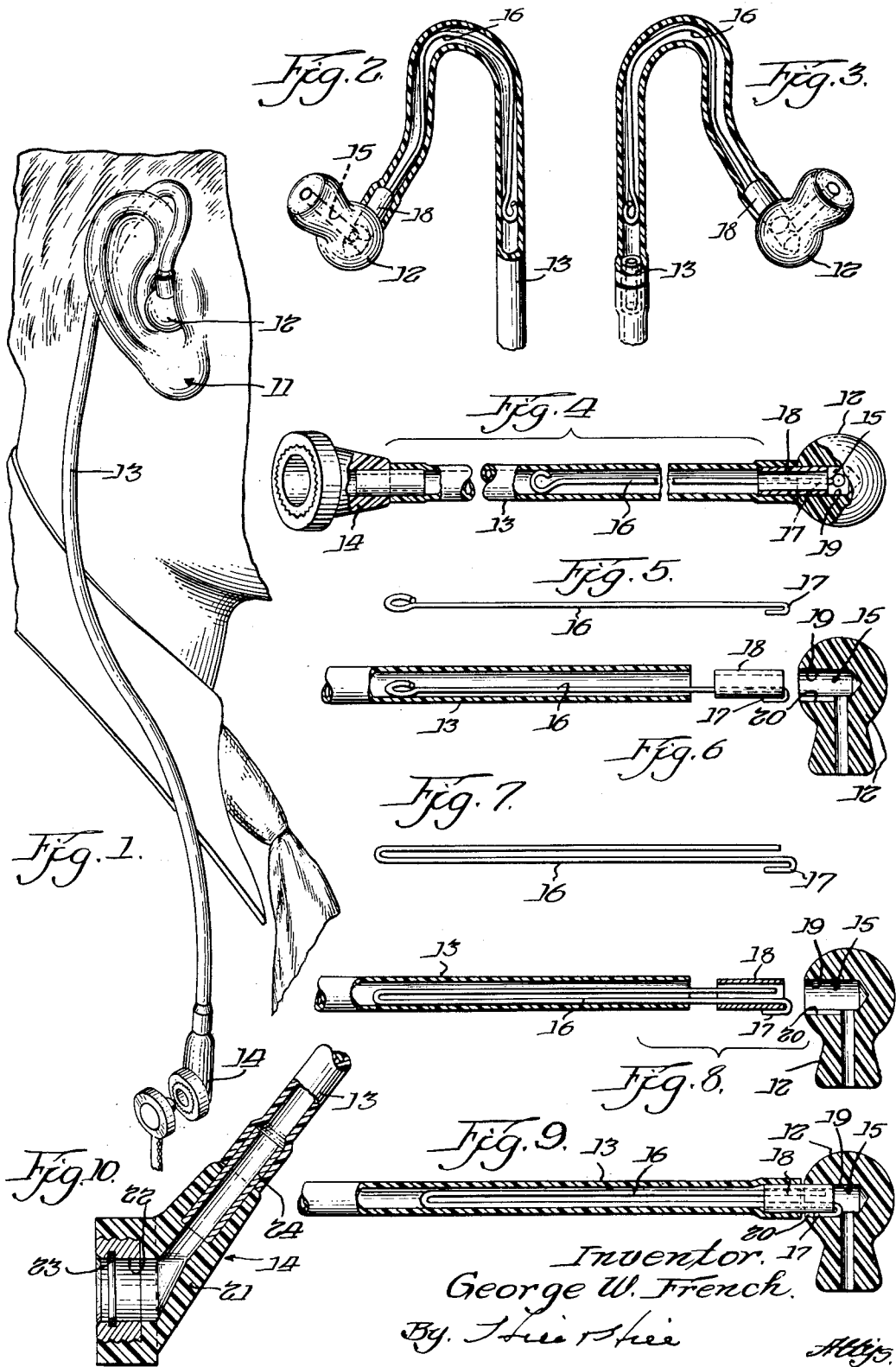
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HEARING AID ATTACHMENT

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1

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HEARING AID ATTACHMENT

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The present invention relates to a hearing aid attachment.

More particularly, the invention relates to a hearing aid attachment for use with a hearing aid device of the type wherein the output of a sound reproducer carried in a pocket, or in some place other than on an ear of a user, is connected to an ear of the user through a hollow tube.

Hearing aid devices of the above generally described type are well known in the art, and have come into widespread use because of the convenient manner in which they can be carried. Known devices of this type do have certain disadvantages, however, which prevent the device from being as completely satisfactory as they otherwise could be. In particular, known devices of this type utilize a small, hollow tube constructed of a semi-rigid material such as Lucite, aluminum, brass, etc., which is connected to an ear piece retained in the ear of the user, and is supported by being looped or fitted over an ear of the user. Heretofore, the looped portions of the hollow tube have been constructed of metal or Lucite, and while satisfactory in operation have been the cause of some discomfort to the user due to the fact that such portions could not be easily shaped or fitted for a particular user, and because of this fact might be easily noticed while being worn. Further, should the particular portion of the tube in question be constructed of a semi-rigid plastic material such as Lucite, it might be easily broken in the normal usage of the tube.

It is therefore one object of the present invention to provide a hearing aid attachment that can be readily fitted for a particular user.

Another object of the invention is to provide a hearing aid attachment of light, sturdy construction, that will stand up under considerable wear and tear and not be easily broken under normal conditions of usage.

Still another object of the invention is to provide a hearing aid attachment that cannot be easily noticed while being worn.

Another object of the invention is to provide a hearing aid attachment that is relatively simple and inexpensive to manufacture.

A feature of the invention is the provision of a hearing aid attachment that includes an ear tip adapted to be fitted in the ear of a user, and a flexible, hollow tube for connecting the ear tip to a sound reproducer carried in the pocket of the user.

Another feature of the invention is the provision of a hearing aid attachment that comprises an ear tip, a flexible, hollow tube for connecting the ear tip to a sound reproducer, the tube being readily formed into any desired shape, and means for retaining the tube in the desired shape.

Other objects, features, and many of the attendant advantages of this invention will be appreciated readily as the same becomes understood by reference to the following detailed description when considered in connection with the accompanying drawing, wherein similar parts in each of the several figures are designated by the same reference numeral, and wherein:

2

Fig. 1 is a perspective view of a hearing aid attachment constructed in accordance with the invention, and showing the attachment as it appears while being worn;

Fig. 2 is a side elevational view, partly in section, of a portion of the attachment adapted to be fitted over the right ear of a user;

Fig. 3 is an elevational view, partly in section, of a portion of a modified form of the hearing aid attachment shown in Fig. 2 adapted to be fitted over the left ear of a user;

Fig. 4 is an elevational view, partly in section, of the hearing aid attachment comprising the invention as it appears after manufacture, and prior to being shaped for use by a particular wearer;

Fig. 5 is an elevational view of a wire included as a part of the hearing aid attachment shown in Figs. 1 through 4;

Fig. 6 is an elevational view, partly in section of the hearing aid attachment, shown in Fig. 4, with the component parts thereof disassembled;

Fig. 7 is an elevational view of a wire comprising a part of a second embodiment of a hearing aid attachment constructed in accordance with the invention;

Fig. 8 is a sectional view of a second embodiment of the hearing aid attachment incorporating the wire shown in Fig. 7, and showing the component parts thereof disassembled;

Fig. 9 is a sectional view of the second embodiment of the hearing aid attachment showing the parts thereof in assembled relation; and

Fig. 10 is a sectional view of the end of the attachment adapted to be fitted to the output of a sound reproducer carried in a pocket of the user, or on some other part of his clothing.

Referring now to Fig. 1 of the drawings, the reference numeral 11 indicates an ear of an individual or user on whom the hearing aid attachment comprising the invention is fitted. Inserted in the ear of the user is an ear tip 12 which will be described more fully hereinafter. Connected to the ear tip 12 is a flexible, hollow tube 13 which may be constructed of plastic such as Vinylite, rubber or some similar material which is sufficiently sturdy to retain its tubular character, but which is sufficiently resilient so that it can be readily formed into any desired configuration. The portion of tube 13 immediately adjacent ear tip 12 is formed into a U-shaped configuration and fitted over the ear of the user in the manner illustrated in Fig. 1. In the modification of the invention shown in Figs. 1 and 2, the tube 13 comprises a single unitary member. If desired, however, the tube may be formed in two pieces in the manner illustrated in Fig. 3 of the drawings, each of the separate pieces being constructed of the same material, and joined together by a tubular sleeve that serves to splice the two pieces of tubing together. The tubular sleeve is identical in construction to a sleeve, which is described hereinafter, that is used to connect the tube 13 to ear tip 12. Connected to the end of tube 13 opposite the end thereof to which the ear tip 12 is attached, is a means 14 for coupling the tube to the outlet of a sound reproducer, not shown.

With reference now to Figs. 2 and 3, the ear tip 12, which is preferably constructed in the manner described in my U. S. Letters Patent No. 2,545,731 issued March 20, 1951, comprises a generally cylindrical member having an intermediate portion thereof of lesser diameter than the end portions, and one of the end portions thereof rounded and shaped so as to be easily insertable in the ear of a user. The ear tip is made out of a hard plastic material, and has a passageway 15 formed therein for conveying sound waves therethrough from the hollow tube 13 to the ear of the user.

In order that the generally U-shaped portion of tube

3

13 fitted over the top of the ear of the user retain its desired shape, means are provided which are readily bendable, but which serves to maintain the shape of tube after the same has been formed into a desired U-shape configuration.

This means comprises a relatively fine, bendable element or wire 16, best seen in Fig. 5 of the drawings, which is sufficiently pliable so that it can be readily formed into a desired U-shape configuration, but which is sufficiently strong to resist forces, other than directly applied forces, tending to deform the wire once it has been shaped. For this reason the element 16 preferably comprises a relatively fine strong steel wire which is lesser in diameter than the inside diameter of tube 13 and therefore adapted to be inserted in the tube. One end of the wire 16 is outwardly hooked as at 17, and engages the side of a tubular sleeve 18, constructed of a rigid material such as aluminum, brass, steel, or any satisfactory substitute therefor, through which wire 16 extends in the manner best shown in Figs. 4 and 6. The tubular sleeve 18 is adapted to press fit in a generally circular portion 19 of a key-shaped aperture formed in ear tip 12 and comprising a part of the passageway 15, with the outwardly hooked portions 17 of the wire 16 adapted to fit in a slot portion 20 of the key-shaped aperture. In this manner, the bendable wire 16 may be secured to ear tip 12 and, if desired, tubular sleeve 18 may be glued in position. Upon completion of assembly of the tubular sleeve 18, wire 16, and ear tip 12, the flexible, hollow tube 13 is drawn over wire 16 and sleeve 18 in the manner shown in Fig. 4 of the drawings, with the wire 16 extending within tube 13 for a portion of its length. If desired, the tube may be firmly secured to sleeve 18 by glue or some other adhesive, thereby forming a sturdy but light and relatively cheap hearing aid attachment capable of standing up under considerable use. Because the tube 13, sleeve 18, ear tip 12 may all be constructed of a clear plastic material, the attachment can be designed so that it is not easily noticed while being worn by a user. In the event that a two-piece tube 13 is provided, the lower portion of the tube can be readily changed should it become necessary because of hardening of the lower portion due to aging. Since it is desirable that the lower portion of the tube 13 be flexible, this portion may then be renewed whenever it is necessary, and the upper U-shaped or ear portion retained thereby doing away with the necessity of reshaping the ear portion every time the lower portion of the tube has to be renewed.

With reference now to Figs. 7, 8, and 9 of the drawings, a second embodiment of the invention is illustrated which is, in many respects, identical to the embodiment shown in Figs. 2 through 6, but differs therefrom only with regard to the construction of the bendable element 16. In the embodiment of the invention shown in Figs. 7, 8, and 9, the bendable element 16 preferably comprises a wire having a reversely bent leg portion extending back towards the hook portion 17 in a hairpin fashion. By constructing the wire 16 in this manner, all the advantages of the construction described in Figs. 2 through 6 are retained, and an additional advantage is obtained by the provision of the double leg portions of the wire which serve as a spacer to prevent the sides of tube 13 from being pressed together at any point along its length.

Referring now to Fig. 10 of the drawings, the means whereby tube 13 is connected to the output of a sound reproducer is shown. This means comprises a hard plastic member 21 having a central passageway 22 formed therein for conveying sound waves from the outlet of the reproducer to the interior of tube 13. For convenience, one end of the passageway 22 is provided with a snap fastener 23 adapted to co-act with a complementally formed element on the outlet of the sound reproducer, and inserted in the opposite end of the passageway 22 is a tubular sleeve 24 constructed of aluminum or a similar

4

rigid material over which the end of tube 13 is drawn and secured by gluing, or some other means. This construction provides a means for effectively connecting the attachment to the output of a sound reproducer without in any way complicating its manufacture.

From the foregoing description it can be readily appreciated that the invention provides an ear attachment that can be easily fitted on a particular user by merely shaping the portion of the flexible tube 13 through which bendable element or wire 16 extends to fit over the top of the ear of the user. The wire 16 then serves to retain the tube in the desired shape. Because the wire 16 may be readily bent, this operation requires little or not time at all to perform, in contrast to the considerable effort required in shaping the semi-rigid plastic or metal tubes used on previous devices of the same nature. Due to the fact that tube 13 is constructed of a flexible material, it cannot be easily broken or chipped during normal usage, it is of light weight, and can be designed so that it is not easily noticed while being worn. Further, it is sturdy, simple to construct, and inexpensively manufactured.

While the present invention has been described for use with a hearing aid device, it is of course to be understood that it may be readily adapted for use with any known sound reproducing devices such as a dictaphone, radio, telephone, etc., without requiring any modification whatsoever.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention; hence, I do not wish to be understood as limiting myself to the exact form, construction, arrangement, and combination of parts herein shown and described, or uses mentioned.

What I claim as new and desire to secure by Letters Patent is:

1. A hearing aid attachment including in combination an ear tip adapted to be fitted into the ear of a user, a flexible hollow tube connected to said ear tip and adapted to be connected to a sound reproducing device, said flexible hollow tube comprising a short, straight and longitudinally extending fine wire means positioned substantially axially within the tube and operatively connected to the ear tip at one end and mounted within the tube contiguous to the ear tip, said tube serving to convey sound waves to said ear tip, and said fine wire means and the contiguous portion of the tube adapted for forming a U-shaped section adapted to be fitted over the ear of the user, whereby the hearing aid attachment is adapted to be fitted to the ear of the user by forming the aforesaid fine wire means and the contiguous portion of the tube.

2. A hearing aid attachment including in combination an ear tip adapted to be fitted into the ear of a user and having a passageway therein for conveying sound waves to the ear of a user, a hollow flexible tube having a U-shaped section adapted to be fitted over the ear of a user with the leg portions thereof depending on opposite sides of the ear, one of the leg portions being connected to said ear tip and the remaining leg portion being adapted to be connected to a sound reproducing device, the interior of said tube communicating with the passageway in said ear tip and serving to convey sound waves thereto, a short, straight and longitudinally extending fine wire means operatively connected to the ear tip at one end and mounted within the U-shaped section of the tube contiguous to the ear tip, and said fine wire means and the contiguous U-shaped section of the tube adapted to be fitted over the ear of a user by forming the aforesaid fine wire means and the contiguous U-shaped section of the flexible hollow tube.

3. A hearing aid attachment including in combination an ear tip adapted to be fitted into the ear of a user, a hollow tube connected to said ear tip and adapted to be connected to a sound reproducing device, said tube

5

comprising a U-shaped portion adapted to be fitted over the ear of a user and serving to convey sound waves from the sound reproducing device to said ear tip, and longitudinally extending pliable wire means in said tube for maintaining the configuration of said U-shaped portion operatively connected at one end to the ear tip and extending throughout the U-shaped portion, whereby the U-shaped portion of the hollow tube is adapted to be fitted over the ear of the user by forming the hollow tube and the aforesaid pliable means into a U-shaped portion conforming to the ear of the user.

4. A hearing aid attachment including in combination an ear tip adapted to be fitted into the ear of a user, a hollow tube connected to said ear tip and adapted to be connected to a sound reproducing device, said tube comprising a U-shaped portion adapted to be fitted over the ear of a user and serving to convey sound waves from the sound reproducing device to said ear tip, means in said tube for maintaining the configuration of said U-shaped portion, said last-mentioned means comprising a straight bendable wire element secured at one end to the ear tip in said U-shaped portion of said tube and adapted to be bent, said portion of the hollow tube within which the straight bendable wire element is contiguously mounted adapted to be deformed into a U-shaped portion complementally formed to fit over the ear of the user, said element being lesser in dimension than the inside diameter of said tube.

5. A hearing aid device including in combination an ear tip adapted to be fitted in the ear of a user, a flexible hollow tube connected to said ear tip and adapted to be connected to a sound reproducing device, said tube serving to convey sound waves to said ear tip, a straight bendable wire secured to said ear tip and extending axially into said tube for a portion of the length thereof, said wire being of a lesser dimension than the inside diameter of said tube, and said bendable wire and contiguous portion of the hollow tube within which the wire is contiguously mounted adapted to be deformed into a U-shaped portion complementally formed to fit the ear of the user and said bendable wire retaining the shape of the U-shaped portion so deformed.

6. A hearing aid attachment including in combination an ear tip adapted to be fitted in the ear of a user, said ear tip having a passageway therein for conveying sound waves to the ear of a user, a tubular sleeve of relatively rigid construction having a portion adapted to be secured in said passageway with the remaining portion thereof extending outwardly from said ear tip, a straight bendable wire arranged within said tubular sleeve and including a hook-shaped end thereof affixed to the portion of said tubular sleeve secured in said ear tip for mounting the bendable wire contiguous to the ear tip, a flexible and inherently resilient hollow tube having one end thereof telescoped over said sleeve and said wire with said wire extending into said hollow tube for a portion of its length for looping over the ear of the user, said bendable wire and a portion of the flexible hollow tube in which it extends adapted to be deformed into a U-shaped portion complementally formed to fit over the ear of the user, said bendable wire overcoming the inherent resiliency of the tube, and said tube having the remaining end thereof adapted to be connected to a sound reproducing device and serving to convey sound waves to the ear of the user.

7. A hearing aid attachment including in combination an ear tip adapted to be fitted in the ear of a user, said ear tip having a passageway therein for conveying sound waves to the ear of a user, a tubular sleeve of relatively rigid construction having a portion adapted to be secured in said passageway with the remaining portion thereof extending outwardly from said ear tip, a bendable wire formed with a reverse bend substantially hairpin-shaped and arranged within said tubular sleeve and including a hook-shaped end thereof affixed to the portion of said tubular sleeve secured in said ear tip for mounting the

6

bendable wire contiguous to the ear tip, a flexible and inherently resilient hollow tube having one end thereof telescoped over said sleeve and said hairpin-shaped wire with said hairpin-shaped wire extending into said hollow tube for a portion of its length for looping over the ear of the user, said bendable wire and a portion of the flexible hollow tube in which it extends adapted to be deformed into a U-shaped portion complementally formed to fit over the ear of the user, said bendable wire overcoming the inherent resiliency of the tube, and said tube having the remaining end thereof adapted to be connected to a sound reproducing device and serving to convey sound waves to the ear of the user.

8. A hearing aid attachment including in combination an ear tip adapted to be fitted in the ear of a user, said ear tip having a generally key-shaped passageway therein for conveying sound waves to the ear of a user, a tubular sleeve of relatively rigid construction having a portion thereof secured in the circular head portion of the key-shaped passageway in said ear tip with the remaining portion of said tubular sleeve extending outwardly from said ear tip, a bendable wire arranged within said sleeve and including a hook-shaped end thereof hooked around the end of said sleeve secured in said ear tip with the section of the hooked portion engaging the outside surface of said sleeve being seated in the slot portion of the key-shaped passageway in said ear tip for mounting the bendable wire contiguous to the ear tip, a flexible hollow tube having one end thereof telescoped over said sleeve and said wire with said wire extending into said hollow tube for a portion of its length, said portion of the hollow tube within which the wire is contiguously mounted adapted to be deformed into a U-shaped portion complementally formed to fit over the ear of the user, and said tube having the remaining end thereof adapted to be connected to a sound reproducing device and serving to convey sound waves to the ear of the user.

9. A hearing aid attachment including in combination an ear tip adapted to be fitted in the ear of the user, said ear tip having a generally key-shaped passageway therein for conveying sound waves to the ear of a user, a tubular sleeve of relatively rigid construction having a portion thereof secured in the circular head portion of the key-shaped passageway in said ear tip with the remaining portion of said tubular sleeve extending outwardly from said ear tip, a bendable wire formed with a reverse bend substantially hairpin-shaped and arranged within said sleeve and including a hook-shaped end thereof hooked around the end of said sleeve secured in said ear tip with the section of the hooked portion engaging the outside surface of said sleeve being seated in the slot portion of the key-shaped passageway in said ear tip for mounting the bendable wire contiguous to the ear tip, a flexible hollow tube having one end thereof telescoped over said sleeve and said wire with said wire extending into said hollow tube for a portion of its length, said portion of the hollow tube within which the hairpin-shaped wire is contiguously mounted adapted to be deformed into a U-shaped portion complementally formed to fit over the ear of the user, and said tube having the remaining end thereof adapted to be connected to a sound reproducing device and serving to convey sound waves to the ear of the user.

References Cited in the file of this patent

UNITED STATES PATENTS

999,225	Hopewell	Aug. 1, 1911
1,302,887	Weil	May 6, 1919
1,786,459	Simons	Dec. 30, 1930
2,142,407	Norton et al.	Jan. 3, 1939
2,506,490	Coley	May 2, 1950
2,545,731	French	Mar. 20, 1951
2,573,132	French	Oct. 30, 1951