

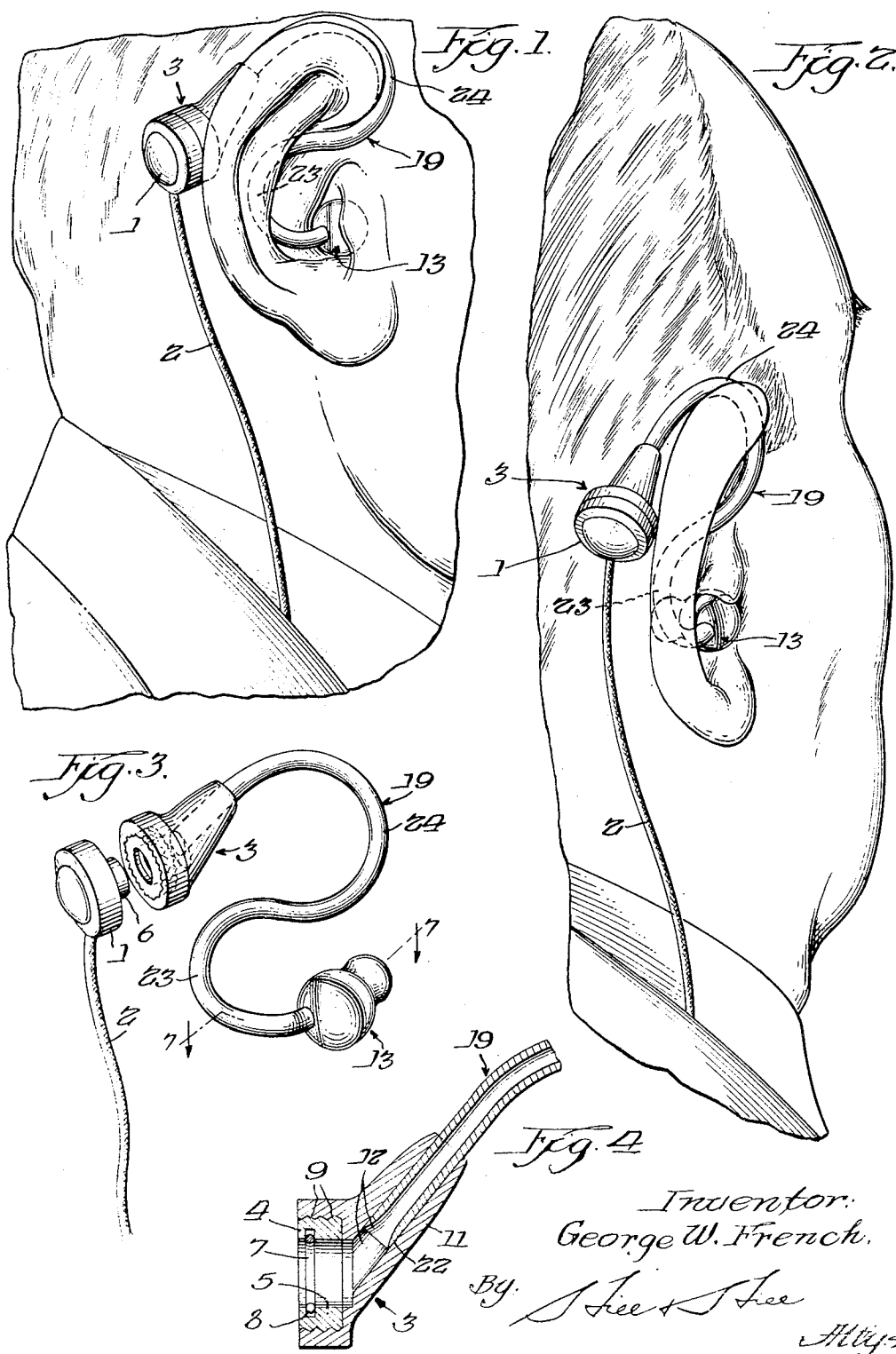
March 20, 1951

G. W. FRENCH
HEARING AID SUPPORT

2,545,731

Filed June 24, 1946

2 Sheets-Sheet 1



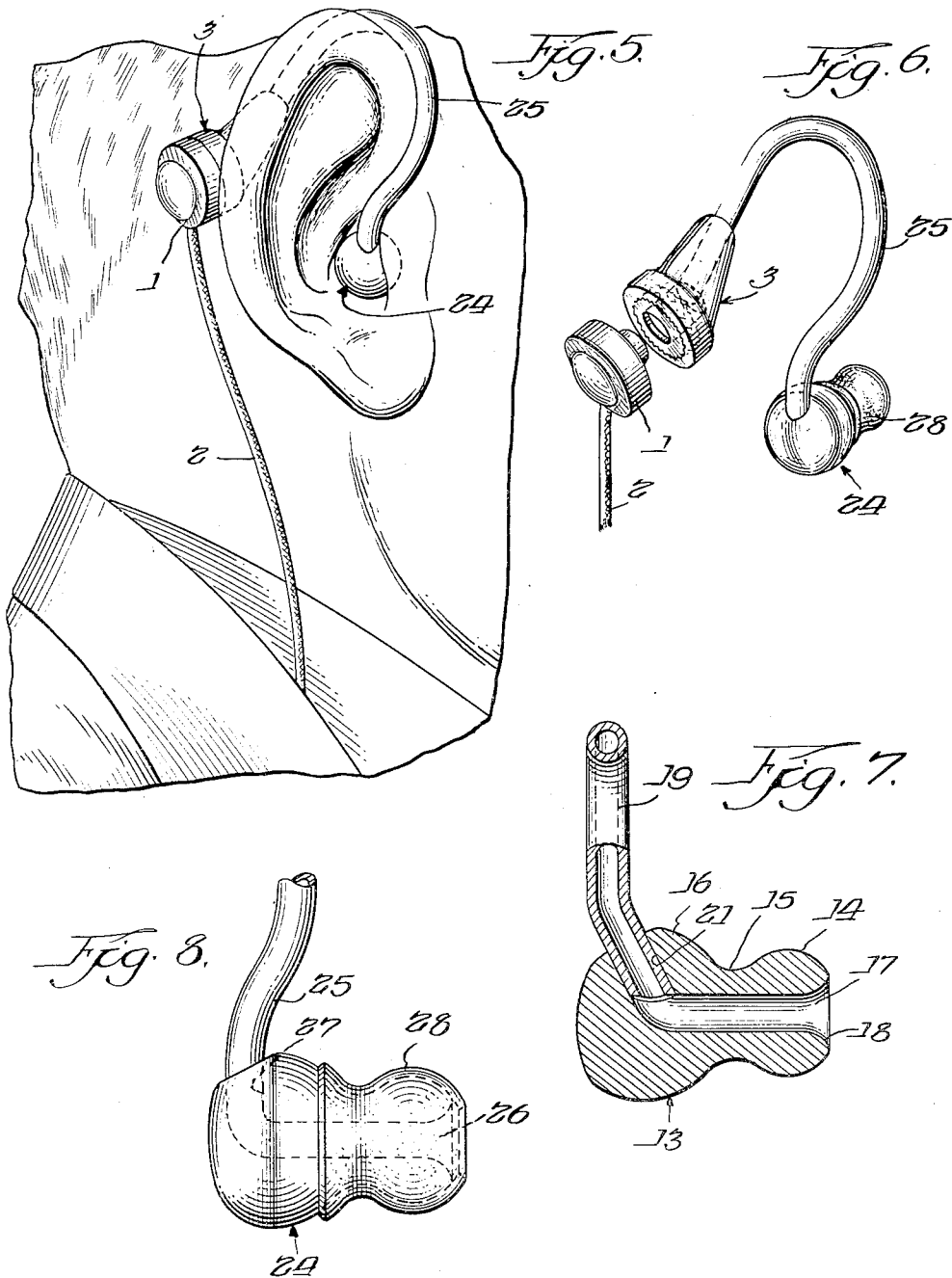
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UNITED STATES PATENT OFFICE

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HEARING AID SUPPORT

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2 Claims. (Cl. 181—23)

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My invention relates generally to a hearing aid attachment, and more particularly to ear attachments for use with such hearing aids.

The invention has as one of its main objects the production of such a device which is not readily noticeable when in use, so that it will not be apparent to others that the user has a hearing infirmity. Often times the user of a hearing aid is somewhat self-conscious of the same, and as the infirmity is usually readily apparent to others, due to the presence of the reproducer or ear piece, normally positioned on the outside of the ear, where it is visible, there is a tendency for other persons to speak louder than necessary. This, in turn, often times accents the afflicted person's embarrassment and self-consciousness. It might be mentioned that while the wearing of a hearing aid is comparable to the wearing of glasses, there seems to be a greater tendency for persons to be more sensitive about their condition in the case of hearing than in the case of eyesight.

The present device is so constructed that its presence on the wearer is relatively not noticeable, particularly when the observer directly faces the wearer.

Another object in the invention is the production of such a device, which is so constructed that it readily supports itself upon the ear of the wearer with substantially no force applied to that portion of the device which is inserted into the ear channel, so that the device will be efficiently retained in proper operating position.

A further object of the invention is the production of such a device which does not have to be designed to a particular person's ear, but, with relatively minor adjustments, will readily fit different persons, rendering it unnecessary to mold that portion of the device that goes into the ear to fit the wearer.

A further object of the invention is the production of such a device which is very simple in construction, durable and relatively inexpensive to manufacture.

Many other objects and advantages of the construction herein shown and described will be obvious to those skilled in the art from the disclosure herein given.

To this end my invention consists in the novel construction, arrangement and combination of parts herein shown and described, and more particularly pointed out in the appended claims.

In the drawings wherein like reference characters indicate like or corresponding parts:

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Fig. 1 is a side view of a portion of the head, illustrating the application of the present invention to the ear;

Fig. 2 is a view similar to Fig. 1, but looking more from the rear of the head;

Fig. 3 is a perspective view of one form of the invention, with the sound reproducer separated therefrom;

Fig. 4 is a sectional view of that portion of the device engageable with the sound reproducer;

Fig. 5 is a view similar to Fig. 1, embodying a differently shaped sound directing tube from that illustrated in Fig. 1;

Fig. 6 is a perspective view of the device illustrated in Fig. 5;

Fig. 7 is a sectional view through the ear piece of the device illustrated in Fig. 3, taken approximately on line 7—7 of Fig. 3, and

Fig. 8 is a side elevational view of the ear piece, disclosed in the construction illustrated in Fig. 6.

It has been customary in the past with hearing aids, to attach the sound reproducer, or head piece, directly to the ear piece which is inserted into the person's ear canal, the reproducer being normally supported by a frictional engagement of the ear piece with the ear; consequently, it is generally deemed desirable for obtaining best results to mold the ear piece to fit the ear of the wearer, this requiring the taking of an impression of the person's ear and making the ear piece therefrom. Obviously, with such a construction, the reproducer is clearly visible when being worn.

The present invention contemplates positioning the reproducer behind the ear, where it is substantially out of sight, and connecting the reproducer to an ear piece of more or less standard shape, insertible into the ear channel by a small hollow tube or conduit made of any suitable material as, for example, plastic, the tube preferably being tinted to approximately a flesh color, so that it will be relatively unnoticeable when worn, and of a size to satisfactorily direct sound waves from the reproducer to the ear piece.

Referring to the drawings, and more particularly to Figs. 1 to 4, and Fig. 7, a standard type of sound reproducer, indicated generally by the numeral 1, may be employed, the reproducer 1 being connected to a vacuum tube or other amplifying apparatus (not shown) by a cord 2. Removably attached to the reproducer 1 is a connecting member 3, formed from plastic or other suitable material, provided with a metal insert 4, having a bore 5 therein, of a size to

snugly receive the stem 6 of the sound reproducer, the two being connected by any suitable means depending upon the type of reproducer employed. In the present instance, the insert 4 is provided with a spring ring 7, positioned within the annular groove 8, in the bore 5, the ring 7 being engageable with a cooperating groove or narrow portion on the stem 6 of the reproducer. The mean diameter of the ring 7 is approximately that of the bore 5, whereby the inner half of the ring will be positioned within the bore and the outer half within the groove 8, so that on insertion of the stem 6 within the bore 5, the ring 7 may be expanded until the stem 6 is inserted to a point where the cooperating groove or narrow portion on the stem will be opposite the spring, which will thereupon contract to lock the two elements together.

Obviously the insert 4 may be designed to cooperate with any suitable type of reproducer as, for example, the insert 4 could be internally threaded and the stem 6 externally threaded. As illustrated in Fig. 4, the insert 4 is preferably provided with corrugations 9 or other projections about its periphery, so that it will be firmly retained in the member 3. Integrally formed with the connector 3, and extending at an angle to the axis of the bore 5, is a nipple 11, having a longitudinally extending bore 12 therein, communicating with the bore 5, the axis of the bore 12 preferably intersecting the axis of the bore 5. Adapted to be positioned in the ear of the wearer is an ear piece designated generally by the numeral 13 and of more or less conventional size and shape having an enlarged tip portion 14 connected by a relatively narrow neck portion 15 to the body 16 thereof, and having an axially aligned bore 17 therein, the latter terminating in a flared mouth 18. The ear piece 13 is likewise made of plastic or other suitable material.

The connecting member 3 is secured to the ear piece 13 by a relatively small hollow tube 19, of a size to satisfactorily direct sound waves from the reproducer to the ear piece, one end of the tube 19 being positioned in the bore 12 of the connecting member 3, and the opposite end of the tube being inserted in a bore 21 in the ear piece 13, the bore 21 extending at an angle to, and communicating with, the bore 17 thereof as clearly illustrated in Fig. 7. The end of the tube 19 positioned within the bore 12 of the connecting member may be flared, as shown at 22, so that sound waves passing through the bore 5 and bore 12 into the tube 19 will not be obstructed by the end edge of the tube and undesirable back waves formed. For the same reason, the side walls of the respective bores 21 and 17 are preferably rounded at their junctures. The tube 19 is secured to the member 3 and ear piece 13 by any suitable means, and where the device is constructed of plastic, they may be fastened together by employing a suitable solvent or cement.

In the construction illustrated in Figs. 1 to 3, the tube 19 is generally S-shaped, being formed into two reverse loops 23 and 24 respectively, so that when the device is positioned by the ear of the wearer and the ear piece 13 inserted into the ear canal, the loop 23 will be positioned within the ear, lightly engaging the back portion thereof and the loop 24 will extend around over the top of the ear to adjacent the rear thereof whereby the reproducer 1 is positioned well behind the ear. Obviously the only portion of the device exposed to view, particularly from the front, is the front portion of the loop 24, the loop 23 being almost

completely concealed by the ear, as is the ear piece 13.

It will be particularly noted that with this construction the loop 23 will effectively maintain the ear piece 13 in position within the ear canal and prevent undesired displacement thereof, and as the reproducer 1 is supported from the top of the ear by the loop 24, there will be no tendency, resulting from the weight of the reproducer, to displace the device from the ear. Likewise, it will be apparent that as the reproducer is positioned behind the ear, it is relatively well concealed from view.

In actual practice, the device is preferably shipped to the dealer with the connecting member 3 and ear piece 13 uncemented to the tube 19, so that when the device is being initially fitted to the ear of the user, the tube 19 may be properly positioned with respect to the ear piece 13 to fit that particular ear, and as the bore 21 extends at an angle to the bore 18, various positions of the ear piece 13, with respect to the loops 23 and 24 may be obtained. Similarly, the connecting member 3 may be rotated about the end of the tube 19 to position the reproducer 1 as close to the head and ear as possible, and it will be apparent that due to the angular relationship between the bore 12 and bore 5, by rotating the member 3 with respect to the tube, various positions of the reproducer 1 with respect to the head of the wearer may be obtained.

It might be mentioned that the tube 19 is preferably constructed of a material that may be deformed slightly if necessary with the application of heat, so that the curvature of the loops 23 and 24 may be varied slightly to permit proper positioning upon the ear of the wearer. After the tube 19 has been properly shaped, and the correct position of the ear piece 13 and connecting member 3 relative to the tube ascertained, the latter may be cemented to the ear piece 13 and connecting member 3 by applying a small amount of solvent or cement to the tube at its junctures with respective pieces, thereby firmly uniting the various elements of the device into an integral structure.

In the construction illustrated in Figs. 5, 6 and 8, the same type of reproducer 1 and connecting member 3 is employed. Likewise a similarly shaped ear piece 24 is utilized, the ear piece 24 being substantially identical with the ear piece 19 with the exception that the tube 25 enters the ear piece at substantially a right angle to the bore 26 thereof, the tube 25 being seated in the bore 27 thereof, communicating with the bore 26. The main difference between the construction illustrated in Fig. 6 and the construction illustrated in Fig. 3, previously described, is in the curvature of the respective tubes, the tube 19 being generally S-shaped, and the tube 25 being generally U-shaped, so that when the tube 25 is applied to the ear, as illustrated in Fig. 5, the tube will extend upwardly from the ear piece 24, around the top of the ear and back to the connecting member 3 and reproducer 1.

As this construction may not afford the positive retention of the ear piece in the ear channel provided by the loop 23 in the former construction, it may be desirable in some instances if the ordinary ear piece, such as that illustrated is employed, to provide the same with a thin rubber coating 28 to produce a greater frictional contact between the ear piece and the ear channel.

The device illustrated in Fig. 6 is fitted to the wearer's ear in substantially the same manner as

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the device illustrated in Fig. 3, the connecting member 3 and the ear piece 24 being cemented to the tube 25 after the various elements have been satisfactorily adjusted to fit the wearer. The device is also preferably flesh colored to blend with the skin of the wearer.

Obviously the device may be readily constructed for use with reproducers of different types and with various types of ear pieces, and it will be apparent that as substantially all of the weight of the reproducer is carried by the top portion of the ear, various types of ear pieces may be employed, such as those of soft rubber or other material, which ear pieces heretofore have not been satisfactory where frictional engagement of the ear piece in the ear channel must be solely relied upon to support the reproducer.

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. In a hearing aid device, the combination of an elongated hollow ear piece, the intermediate portion of which is of lesser thickness than the end portions thereof, one end portion being rounded to form a tip adapted to be inserted into the ear canal of a human ear, a relatively stiff hollow tube operatively connected at one end to said ear piece and terminating at the other end in a connector adapted to be removably engageable with a sound reproducer for directing sound therefrom to the ear piece, said tube being generally S-shaped in curvature with one loop thereof adapted to extend over and rest upon the top of the ear on which it is to be worn for

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supporting the sound reproducer in position behind the ear, and the other loop adapted to be positioned within the ear and engageable therewith to maintain the ear piece in position in the ear.

2. In a hearing aid device, the combination of a sound reproducer, adapted to be positioned behind a human ear, an elongated hollow ear piece, the intermediate portion of which is of lesser thickness than the end portions thereof, one end portion being rounded to form a tip adapted to be inserted into the ear canal of the user, a relatively stiff hollow tube operatively connected at one end to said ear piece at an angle to the axis thereof and terminating at the other end in a connector removably engageable with a sound reproducer for directing sound therefrom to the ear piece, said tube extending from said connector at an angle to the axis of said reproducer, said tube being generally S-shaped in curvature with one loop thereof adapted to extend over and rest upon the top of the ear on which it is to be worn for supporting the sound reproducer in position behind the ear, and the other loop adapted to be positioned within the ear and engageable therewith to maintain the ear piece in position in the ear.

GEORGE W. FRENCH.

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