Sept. 18, 1956

C. H. STARKEY

2,763,334

EAR MOLD FOR HEARING AIDS

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Fig. 1

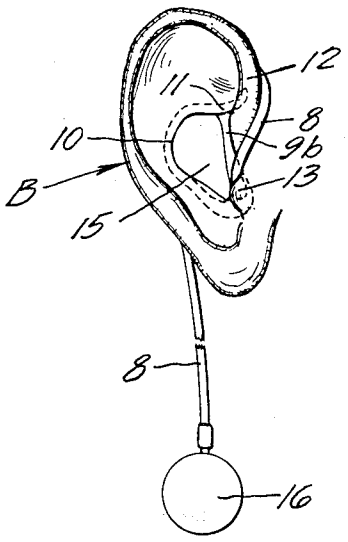


Fig. 2

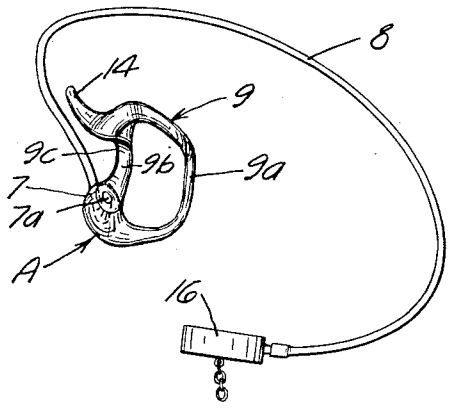


Fig. 4

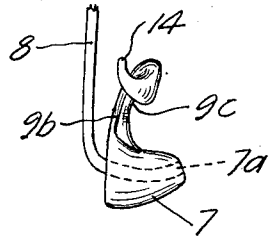


Fig. 3

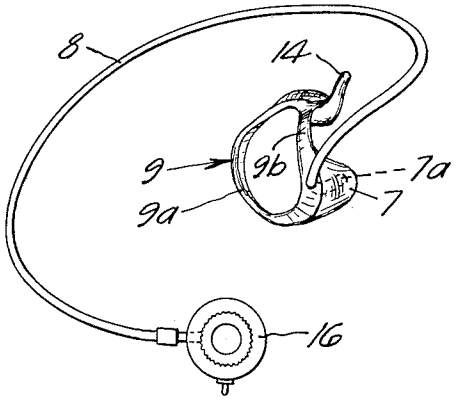
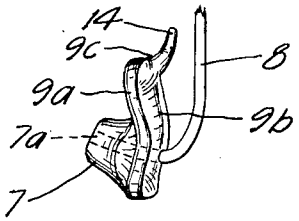


Fig. 5



Inventor

By Charles H. Starkey

Williamson, Williamson, Schroeder & Adams

Attorneys.

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EAR MOLD FOR HEARING AIDS

Charles H. Starkey, Maple Plain, Minn.

Continuation of abandoned application Serial No. 788,473, November 28, 1947. This application August 7, 1952, Serial No. 303,031

2 Claims. (Cl. 181—23)

This invention relates generally to a hearing aid ear piece and particularly to an ear mold specifically constructed to interfit with and be substantially concealed by the natural shape of the respective portions of a human ear.

The present application is a continuation of my previously filed co-pending application, Serial No. 788,473, filed November 28, 1947, now abandoned, and entitled Hearing Aid Unit.

It has been a difficult problem confronting manufacturers and sellers of hearing aids to provide an efficient, yet inconspicuous and comfortable, ear piece for use with hearing aids. People who are hard of hearing are almost, without exception, very self-conscious about their affliction and it has been the constant aim of hearing aid manufacturers to conceal as much of the hearing aid apparatus as possible, either in the clothes of the wearer or in the natural configuration of the ear and head. In the past, ear molds have been constructed which completely fill the concha of the ear and usually include the hearing aid receiver attached directly thereto. This produces a relatively obvious and conspicuous structure which is also relatively heavy and uncomfortable for the wearer.

It is an object of the present invention to provide an ear mold for hearing aids which is substantially entirely concealed by the helix, anti-helix and tragus of the human ear while exposing substantially the entire concave surface of the concha.

It is another object to provide a hearing aid ear mold having an inwardly extending auditory canal plug member with a thin narrow band connected therewith and having a helix engaging projection extending upwardly from the forward upper portion of said band, said auditory canal member having a passage therethrough and an elongated flexible sound transmission tube having one end connected at the outer end of said passage with the other end thereof adapted to engage the receiver of a hearing aid whereby said receiver is positioned remotely from the ear and may be concealed in the hair or clothes of the wearer and said band being of a size to be received in the anti-helix of the ear and concealed thereby with the central portion thereof open to expose the concha of the ear and produce a light-weight, extremely comfortable and inconspicuous hearing aid which is materially cooler to wear in hot weather.

It is a further object to provide an ear mold of skeleton design and made entirely of transparent or flesh colored plastic material whereby substantially the entire ear mold structure may be hidden from view with the exposed portions being relatively inconspicuous.

These and other objects and advantages of this invention will more fully appear from the following description made in connection with the accompanying drawings wherein like reference characters refer to the same or similar parts throughout the several views, and in which:

Fig. 1 is a perspective view of a human ear with my ear mold mounted therein;

Fig. 2 is a perspective view of the inside of a mold with a sound transmission tube connected therewith;

Fig. 3 is a perspective view of the outside of an ear mold;

Fig. 4 is a front elevational view of my ear mold; and

Fig. 5 is a rear elevational view thereof.

As illustrated in the accompanying drawings, I show my ear mold designated as an entirety by the letter A with said ear mold being shown inserted in a human ear B in Fig. 1. My ear mold A has an auditory canal plug member 7 adapted to be received in and completely fill the outer portion of the auditory canal of the wearer. A sound transmission passage 7*a* extends through the plug member 7 and has an elongated sound transmission tube 8 made from clear or flesh-tinted flexible plastic such as vinyl plastic or the like and said tube 8 is connected at one end of the outer end of said passage 7*a*. The inner end of said passage 7*a* communicates with an intermediate portion of the auditory canal of the ear.

A substantially rigid continuous generally D-shaped retaining loop 9 is fixed to the outer portion of said plug member 7. The rear portion 9*a* of said loop 9 is curved to conform to the curvature of the anti-helix 10 of the wearer's ear and the front portion thereof, 9*b*, extends in a substantially straight line directly upwardly from said canal plug member to the junction between the upper end 11 of the anti-helix and the helix 12 of the ear. It should be noted, as best shown in Fig. 1, that the tragus 13 of the ear completely conceals the plug member 7 and the connection between the outer end of passage 7*a* and one end of tube 8.

An upwardly curved helix engaging horn or lug 14 is connected in fixed relation at the upper end of said straight forward upstanding portion 9*b* of loop 9 and, as best shown in Figs. 2 and 4, extends a substantial distance inwardly with a sharply curved recess at 9*c* to receive the front lower portion of the ear helix with the upwardly curved portion being adapted to be hooked under the fold of said lower front helix portion and securely retained thereunder.

The loop 9 has a generally straight, forwardly disposed portion 9*b* which is provided with a recess 9*c* thereunder to receive in overlying relation the outwardly protruding formation extending into the forward portion of the ear concha which is formed by the downward extension of the upper forward end of the ear helix. This straight portion 9*b* is sufficiently thin to clearly expose most of said protruding formation, and the lower portion thereof, as has been previously stated, underlies the tragus 13 of the ear. The upper curved portion designated by the reference character 9*d* of loop 9 is somewhat thicker than the rear curved portion 9*a* thereof, and the lower curved portion 9*e* of said loop is gradually thickened as it approaches the plug member 7. While the surface defined by the outer portion of the D-shaped loop 9 is curved slightly, as shown in Fig. 4, to conform precisely to the slight curvature of the anti-helix of the ear, the same lies generally in an upstanding flat plane. The horn or lug 14 curves inwardly and upwardly from the thickened upper loop portion 9*d*, and the inner thickened loop portion 9*d* underlies the fold formed by the forward upper end portion of the ear helix 12 adjacent the forward upper end of the anti-helix 10 and is of the proper size and shape to be completely concealed by either the upper forward portion of the ear helix or the forward portion of the anti-helix adjacent thereto with the groove 9*b* accommodating the outwardly protruding portion and the straight portion 9*b* being sufficiently narrow to expose the greater part of said protruding ear

portion. The rear portion 9*a* of said loop is considerably narrower than the upper and lower portions 9*d* and 9*e* respectively and fits under and is concealed by the rear curved portion of the anti-helix and exposes the entire concha of the ear for view.

As best shown in Fig. 1, the entire ear mold A may be quickly and easily mounted in the outer ear of a wearer with the plug member 7 received in the outer portion of the auditory canal. The plug member 7 is of course designed to completely fill the outer portion of the auditory canal and form a substantial seal therewith to prevent interference from sounds not transmitted through the sound transmission tube 8. The lug or horn 14 is inserted under the fold of the front lower end portion of the helix and is securely retained and completely concealed thereby with the rear loop portion 9*a* being received under the anti-helix 10 and concealed thereby. The tragus overlies the outer portion of the plug member 7 and the connection therewith with the end of tube 8 to substantially conceal the same, thus exposing to view only a relatively short portion of the sound transmission tube 8 adjacent said plug member and a small portion of the upwardly extending front portion of loop 9*b*. It should be noted that the entire medial portion of the concha 15 of the ear is exposed to view and of course direct contact with the air is thus permitted to produce effective ventilation thereof during the warm weather. The free end of the sound transmission tube 8 has a receiver connector element 16 attached thereto and is adapted to be connected with a conventional hearing aid receiver at some convenient and concealed position remote from the ear of the wearer, such as in the hair of a woman or under the shirt or suit coat of a man.

It will be seen that I have provided a novel and highly efficient ear mold structure constructed to conform to the shape of a wearer's ear and to interfit with the lower front portion of the helix and underlie the antihelix and tragus of the ear to be concealed thereby, thus leaving only a portion of the sound transmission tube 8 and the front upstanding portion 9*b* of the retaining loop 9 visible. In the form shown, the entire ear mold structure A is formed from an integrally cast transparent or flesh colored translucent plastic material which is extremely inconspicuous even where visible. Obviously, the relatively large receiver button (not shown) from the amplifier set is positioned remotely in spaced relation from the ear and is not supported in any way by the ear mold. The retaining loop 9 and upwardly curved lug 14 combine to form a light-weight skeleton frame structure adapted to securely and positively anchor the ear mold in operative position while being substantially entirely concealed by the natural formation of the ear structure and permitting the entire concha of the ear to be exposed to view. This light-weight structure may be comfortably worn for relatively long intervals of time without causing discomfort even in hot weather, since only a small area of the ear structure is actually engaged by the respective portions of the ear mold.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts without departing from the scope of this invention, which, generally stated, consists in the matter shown and described herein and set forth in the appended claims.

What I claim is:

1. An ear piece for hearing aids made entirely from an integrally formed transparent plastic material and comprising an auditory canal plug member of a size and shape to be received in and completely fill the outer portion of the auditory canal of a user's ear and having a sound transmission passage formed therethrough, a substantially D-shaped continuous closed loop having the outer portion thereof lying in substantially the same plane with the outer portion of said plug member and having a substantially straight forward portion with a recess formed thereunder to accommodate the ear protuberance extending downwardly from the upper forward end of the ear helix and exposing said protuberance within the ear concha, the upper portion of said loop adjacent the upper end of said straight portion being thickened to be received under the upper forward portions of the anti-helix of the ear and the ear helix, an upwardly and inwardly curved lug underlying and interfitting with the fold of the upper forward portion of the ear helix, said upper curved loop portion gradually diminishing in thickness and in width toward the rear thereof and integrally joined with a narrow curved rear portion made sufficiently thin to be received under and concealed by the rear portion of the ear anti-helix around the rear periphery of the concha and the lower forward portion of said loop interconnecting with the lower end of said straight forward portion at said plug member and gradually increasing in thickness to be received under and engage the lower forward portion of the anti-helix, and an elongated flexible sound transmission tube made from transparent plastic material connected at one end in sealed relation with the outer end of the sound transmission passage formed through said plug member and having its other end adapted to be connected with a hearing aid receiver in a concealed position disposed remotely of the outer exposed portion of the wearer's ear.

2. A one-piece transparent plastic ear piece for hearing aids comprising a substantially D-shaped loop member having outer and inner face portions in the form of a curved portion and a connecting part between the ends thereof, the curved portion of the loop member having upper and lower end portions and being narrow throughout a major portion thereof and increasing in width at its upper and lower end portions, the connecting part connecting the upper and lower end portions of the curved portion thereof thus forming with the curved portion the D-shape with an open center, the said connecting part being of greater width than the width of the major portion of the curved part of the loop and of increased width at its lower end, an upwardly and outwardly curved tapered lug in the form of a continuation of the upper end of the curved portion of the loop and of less cross-sectional dimensions than the cross-sectional dimensions of the upper end portion of the curved loop portion adjacent the upper end of the connecting part and the end of the lug terminating within the plane of the outer face portion of the ear piece, an auditory canal tapered plug extending substantially horizontally inwardly from the inner face portion at the lower end portion of the loop adjacent the lower portion of the connecting part and beyond the plane of said inner face, the tapered plug having a passageway completely substantially horizontally therethrough, whereby when the ear piece is properly inserted in a human ear the outer face portion thereof, except for a portion of the part connecting the upper and lower end portions of the curved part of the loop, will be concealed from view.

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