July 26, 1960 A. L. SMITH 2,946,394

AIR-CONDUCTION HEARING AID CLAMPS

Filed Jan. 18, 1954 2 Sheets-Sheet 1

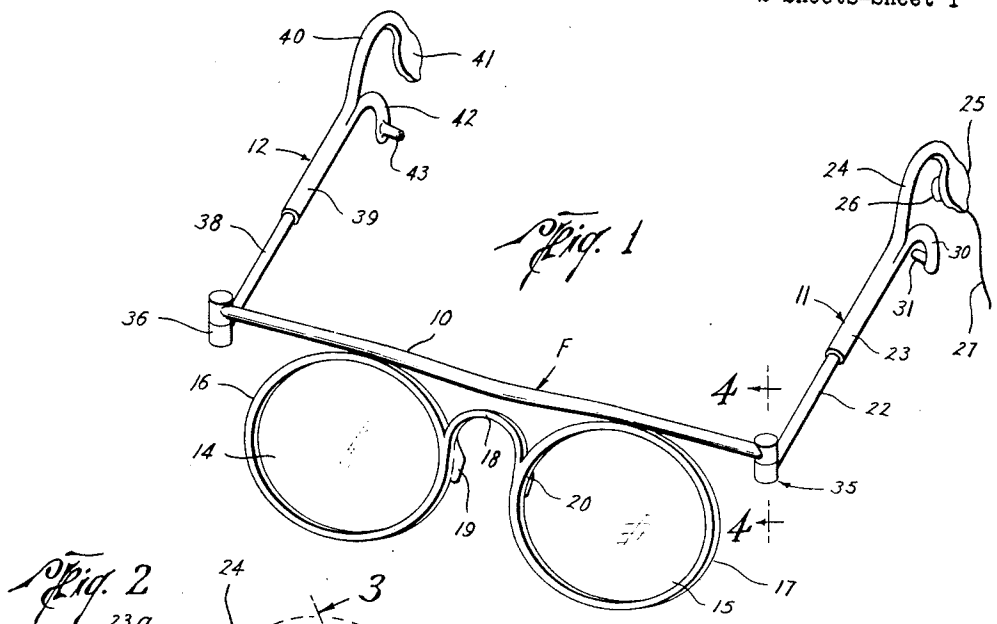

Fig. 1

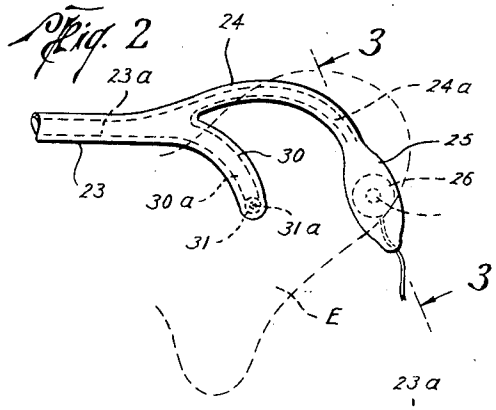

Fig. 2

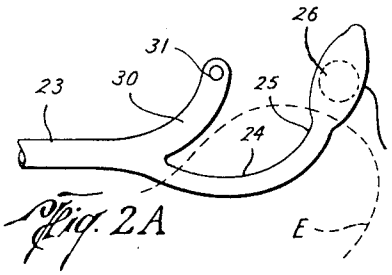

Fig. 2A

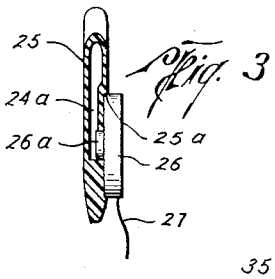

Fig. 3

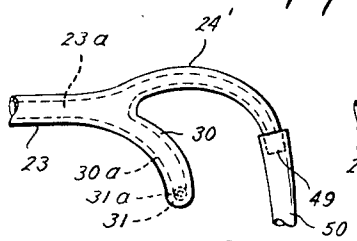

Fig. 5

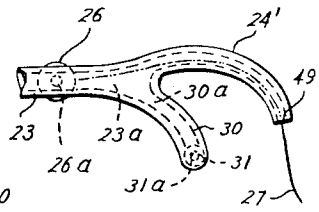

Fig. 6

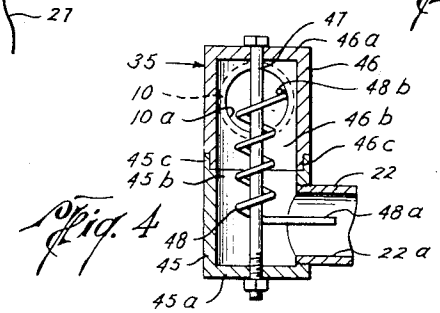

Fig. 4

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AIR-CONDUCTION HEARING AID CLAMPS

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Fig. 11

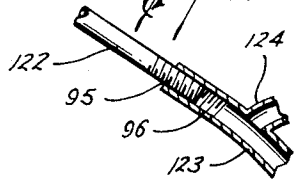


Fig. 7

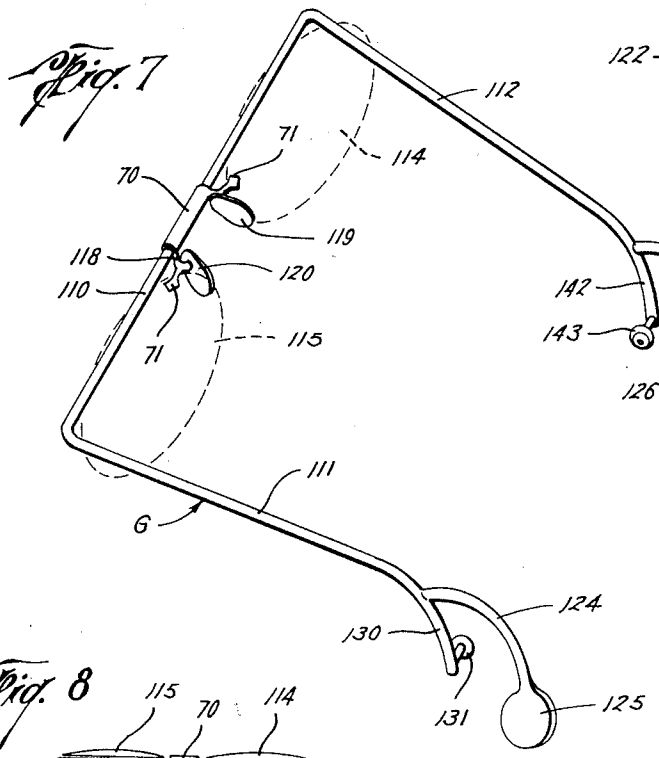


Fig. 8

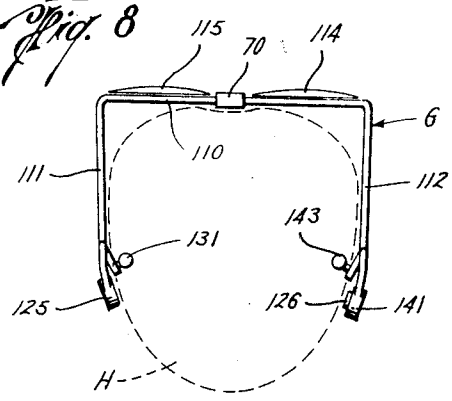


Fig. 10

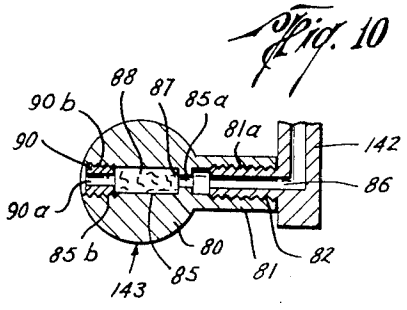
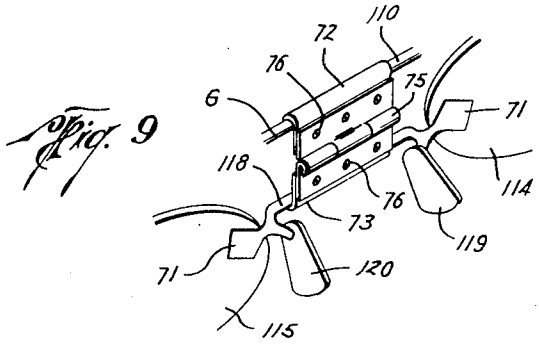


Fig. 9



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AIR-CONDUCTION HEARING AID CLAMPS

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Filed Jan. 18, 1954, Ser. No. 404,672

6 Claims. (Cl. 181—23)

This invention relates to new and useful improvements in air-conduction hearing aid clamps.

This application is a continuation-in-part of my co-pending United States patent application, Serial No. 343,631, filed March 20, 1953, now abandoned.

It is well known that the majority of people who wear hearing aids also wear eye glasses. There are two basic types of hearing aids, namely, the bone conduction type and the air conduction type. In the past, hearing aids of the bone conduction type have been incorporated with eye glasses. Examples of such use are illustrated in the U.S. patent to Benway, No. 1,897,833, U.S. Patent No. 2,207,705 to Cox and U.S. Patent No. 2,613,282 to Scaife. In the bone conduction type of hearing aid, a vibrating member must be held next to a bone in close proximity to the hearing nerve behind the ear.

In many cases, however, the defective condition of a person's hearing is such that an air conduction type of hearing aid is prescribed rather than the bone conduction type. With the conventional hearing aids using air conduction, the receiver is held in the ear by a wax mold made to fit the contour of the inside of the ear. The receiver is attached to the opening in the mold to transmit the vibration from the receiver through the mold opening to the ear drum. With such conventional hearing aid using air conduction, the receiver projects from the center of the ear and is very conspicuous. In addition, the electrical wire which extends from the receiver to the amplifier and control mechanism located in the person's shirt or coat pocket is very conspicuously dangling from the receiver and is subject to being inadvertently caught and pulled loose from the receiver.

It is therefore an object of this invention to provide a clamping frame which is adapted to have connected therewith an air conduction type hearing aid receiver assembly, which may be either integral therewith or separate therefrom in the form of an attachment, the electrical wire or conductor tube which is normally attached to the receiver being positioned behind the ear so that it can extend down the back of the neck of the user and thereby be substantially concealed.

It is an important object of this invention to provide a frame which is adapted to be supported on the head of a user to have connected therewith any conventional air conduction type hearing aid receiver, wherein the vibrations from the receiver are transmitted through the frame column to at least one of the user's ears.

Another object of this invention is to provide a clamping frame adapted to be supported on the head of a user and which is capable of conducting sound to the ear cavities of both ears of a user whereby a single air conduction receiver may be connected to said frame column for transmitting sound to both of the ears of the user.

A further object of this invention is to provide a combined clamping frame and eyeglass construction wherein the frame is adapted to conduct sound therethrough to an ear cavity member mounted on a side temple member of the frame, the side temple member being longitudinally

adjustable to accommodate various distances from a person's ear to the front portion of the frame to which the eyeglasses are attached, said side temple member also being adjustable to correctly position the ear cavity member in the ear cavity, and said frame having a means for urging the side temple toward the head of the user so as to maintain the ear cavity member in the ear cavity.

Still another object of this invention is to provide a frame which is adapted to be supported upon a person's nose and ears, wherein the frame includes a side temple member having an ear cavity member, with the side temple member being rotatable so that the ear cavity member can be rotated from a position within the ear cavity to a position thereabove to leave the ear cavity exposed for the use of a telephone or similar instrument.

A specific object is to provide a hearing aid assembly which lends itself to manufacture as an attachment, whereby the assembly may be constructed as a unit which is readily combined with the standard front lens frame of the usual eyeglass frame.

Another object of this invention is to provide a hearing aid clamp having a mounting for an air conduction receiver wherein the clamp is resilient, is formed in one piece and is adapted to urge ear cavity members firmly into the ear cavities of a user, said clamp being supported on the nose of the user and by the clamping pressure applied to the ear cavity members.

Another object of this invention is to provide a frame adapted to be supported on the head of the user, wherein the frame is capable of conducting sound to both ears of a user, and wherein means are provided for adjusting the volume of the sound received in both ears so that the hearing will be substantially balanced with respect to both ears, giving dimensional hearing or perception to the user.

The construction designed to carry out the invention will be hereinafter described, together with other features thereof.

The invention will be more readily understood from a reading of the following specifications and by reference to the accompanying drawings forming a part thereof, wherein examples of the invention are shown, and wherein:

Figure 1 is an isometric view of the clamping frame of this invention with the eyeglasses connected thereto and one type of air conduction hearing aid connected therewith.

Figure 2 is an elevational view of a portion of one of the side temple members of the clamping frame, illustrating the relationship of such member to the ear of a user.

Figure 2A is a view similar to Figure 2, but illustrating the side temple member after rotation to expose the ear cavity of the ear for the use of a telephone or similar instrument.

Figure 3 is a sectional view taken on line 3—3 of Figure 2 and illustrates the mounting of an air conduction hearing aid receiver on the rear surface of the side temple member.

Figure 4 is a sectional view taken on line 4—4 of Figure 1 and illustrates the hollow tube construction of the frame and particularly the hinged connection between the front member of the frame and each of the side temple members of the frame.

Figure 5 is an elevational view illustrating a portion of one of the side temple members of the frame with an air conduction tube connected to the frame instead of the receiver illustrated in the preceding figures.

Figure 6 is an elevational view illustrating a portion of one of the side members of the frame wherein the hearing air receiver is located on the side member which extends over the ear.

Figure 7 is an isometric view of a modified form of

the frame illustrated in Figure 1, and illustrating in particular a one-piece resilient clamping frame.

Figure 8 is a plan view of the construction of Figure 7, illustrating the position thereof on the head of a user.

Figure 9 is an isometric view illustrating a portion of the construction of this invention, and illustrating a hinged connection of the clamping frame to the eyeglassese frame.

Figure 10 is a sectional view illustrating a preferred type of ear cavity member, and

Figure 11 is a view, partly in section and partly in elevation, illustrating a modified construction of the side temple members of the clamping frame.

In the drawings the letter F designates generally a clamping frame which includes a central or front member **10** which has pivotally connected thereto side temple members **11** and **12**. The central or front frame member **10** may have connected therewith a pair of eyeglasses or lenses **14** and **15**. The eyeglasses or lenses **14** and **15** may be connected or mounted with respect to the front frame member **10** in any suitable manner, but as illustrated in the drawings, the lenses **14** and **15** each have an annular support ring **16** and **17**, respectively, which are connected together by a bridge **18** having nose pieces **19** and **20** for resting upon the nose of a user. The upper end of each of the rings **16** and **17** is secured to the front frame member **10** but obviously said rings could be integral therewith.

Referring now to Figure 1 and the side member **11** shown therein, it can be seen that such member **11** is divided into two sections, a forward section **22** which is pivotally connected to the front frame member **10** and the rear portion **23** which is adjustably connected to the forward member or section **22**. The rear section **23** of the side member **11** has an arcuate or curved ear support **24** which extends upwardly and behind the ear of the user. The ear support **24** after extending upwardly and behind the ear E of the user (Figure 2) is curved downwardly at its rear extremity **25** so that substantially the entire ear support **24** is concealed behind the ear E. As shown in Figures 1–3 the rear extremity **25** is preferably enlarged as compared to the size of the rest of the ear support **24** and is adapted to have mounted therewith an air conduction hearing aid receiver **26** of the usual construction having electrical wires **27** leading therefrom to the amplifier, microphone and other mechanism (not shown). As is well known, air conduction hearing aids pick up sound, amplify same, and then transmit the amplified sound therefrom to the receiver. In the form of this invention, the vibrations from the receiver **26** are transmitted through the opening **26***a* thereof into the bore or hollow passage **24***a* inside of the ear support **24**. The receiver is mounted on the inner surface of the enlarged portion **25**, preferably in a recess such as **25***a*, by the use of a snap ring.

The rear section **23** of the side temple member **11** also has a downwardly curved ear tube **30** which has at its lower end a tapered inwardly extending ear cavity member or plug **31**. As best seen in Figure 2, the bore or inner passage **23***a* of the rear section **23** communicates with the bore or inner passage **30***a* of the ear tube **30** and also with the bore or inner passage **24***a* of the ear support **24**. The ear cavity plug **31** also has a hollow bore **21***a* and is adapted to extend into the cavity of the ear E so that there is a communication to the ear drum of the user. Thus, there is a direct sound communication from the receiver **26** through the bore **24***a* of the curved ear support **24** to the bore **30***a* of the ear tube **30** which communicates with the bore **31***a* of the ear cavity member **31**, so that sound vibrations from the receiver **26** are conducted to the ear drum of the user. Ear cavity tube member **31** may be flexible and made of plastic if desired.

There is also sound communication from the rear section **23** through its bore **23***a* to the forward section **22** which is hollow and thence through the hollow pivot connection **35** to the hollow front frame member **10** and then through the other hollow pivot connection **36** to the right side temple member **12**. The right side temple member **12** is substantially identical with the left side temple member **11** except that it is unnecessary to provide for the receiver **26**, since as will be explained, the single receiver **26** provides for hearing in both of the ears of the user.

The right side temple member **12** has a forward section **38** and a rear section **39** which correspond with the forward section **22** and rear section **23** of the member **11**, respectively. The right side member **12** also has the arcuate or curved ear support **40** which corresponds with the ear support **24**. The end extremity **41** of the ear support **40** may be enlarged to correspond with the enlarged end **25** of the ear support **24**, and, depending upon the condition of hearing of the user, it may be desirable to position a hearing aid receiver on the enlarged portion **41** in some cases instead of, or in addition to, the one shown on the enlarged portion **25**. The right side temple member **12** also has an ear tube **42** which is provided with an ear cavity plug **43** which is identical with and faces toward the plug **31** on the ear tube **30**. The sections **38** and **39** as well as the ear tube **42** and the plug **43** are hollow as are their corresponding parts on the left temple member **11**, so that the sound from the receiver **26** will be transmitted to the right ear as well as to the left ear. Although it is unnecessary to provide a hollow passage through the ear support **40**, such can be provided if desired so that the receiver **26** can be disposed on the enlarged portion **41** if preferred. By reason of this construction employing an ear plug in each of the ears of the user, a more balanced sense of hearing is possible. A substantially equal intensity of sound may be transmitted to both ears by providing a slightly smaller inner passage or bore through the sections of the left temple member **11** which has the receiver **26** connected thereto. Of course, if the receiver **26** is disposed on the right temple member **12**, then such member **12** would have the reduced inner passage.

The details of the hollow pivoted connection **35** are shown in Figure 4. The forward section **22** of the left temple member **11** is threaded or otherwise secured to a lower cylinder **45**, which has a closed lower end **45***a* and an open upper end **45***b*. An upper cylinder **46** is disposed above the lower cylinder **45** and it has a closed upper end **46***a* and an open lower end **46***b* which establishes communication between the cylinders **45** and **46**. The front frame member **10** is connected to the side of the upper cylinder **46** so that sound communication is established from the bore **22***a* of the forward section **22** through the cylinders **45** and **46** to the bore **10***a* of the front frame member **10**. The cylinders **45** and **46** have interfitting shoulders **45***c* and **46***c* which prevent lateral displacement of the cylinders but permit relative rotational movement between the cylinders. A pin or bolt **47** extends axially or vertically through both of the cylinders **45** and **46** to prevent vertical separation of the cylinders. A resilient means such as a coil spring **48** encircles the pin **47** and has its lower end **48***a* extending into the bore **22***a* of the forward section **22**. The upper end **48***b* of the spring **48** extends at substantially right angles to the lower end **48***a* and projects into the bore **10***a* of the front frame member **10**. The spring **48** is under torsion so that the end **48***a* is forced into contact with the inner side of the bore **22***a* and the inner side of the frame member bore **10***a* whereby the forward section **22** of the side member **11** is urged inwardly in a direction toward the front frame member **10**. Since the rear section **23** of the side member **11** is connected to the forward section **22**, the urging of the spring **48** also tends to move the entire side member **11** inwardly so that when the frame F is disposed on the head of a user, the side temple member **11** is

urged against the side of the person's head. This holds the ear plug **31** firmly within the ear cavity. The right side member **12** is similarly urged against the head of the user by the pivotal connection **36** which is identical with the pivotal connection **35** but has the spring action in reverse.

As best seen in Figure 1, the forward section **22** is of a lesser external diameter than the bore **23***a* of the rear section **23** so that the sections **22** and **23** have a telescoping fit whereby the rear section **23** is longitudinally slidable on the forward section **22** and is rotatable relative thereto. This permits an adjustment for the distance from the nose of the user to his ears, so that the ear support **24** can be extended over the ear of the user when the nose pieces **19** and **20** are resting upon the nose of the user. Similarly the sections **38** and **39** are adapted to be moved longitudinally and rotatably relative to each other so that the ear support **40** will fit upon the other ear of the user in its proper position. Additionally, because of the slidable and rotatable features of the rear sections **23** and **39**, it is possible to accurately locate the ear plugs **31** and **43** respectively, in the ears of the user, while at the same time permitting rotation of the rear sleeve or section **23** to a raised position (Figure 2A) wherein the ear support **24** still rests upon the inner portion of the ear but the ear plug **31** is moved out of the ear cavity so that the ear is open for the use of a telephone or similar instrument. Thus, the rotatable connection between the sections **22** and **23** permits a rapid removal of the plug **31** from the ear cavity without the necessity for removing the glasses or the receiver **26** from the head of the user. This is a distinct advantage over the conventional air conduction hearing aids which employ an ear mold which is difficultly removable from the ear cavity. It will also be evident that the plugs **31** and **43**, each of which is an elongate tapered cylindrical member, are much more comfortable to the user when positioned in the ear cavity as compared to the ear molds used with the conventional hearing aids.

The operation or use of the frame F for transmitting sound to both ears of the user is believed evident from the foregoing description. The receiver **26** transmits amplified sound vibrations to the inner passage **24***a* of the ear support **24** from whence the sound travels to the ear plug **31** through the ear tube **30**. The sound is also conducted through the bore of the rear section or tube **23** to the forward section or tube **22**, then through the hollow connection **35**, through the hollow front frame member **10**, through the hollow connection **36**, and thence through the hollow side member **12** to the hollow ear plug **43**. Hearing with both ears is thus obtained with the use of a single receiver. It will be appreciated that if only one ear is desired to be connected to the receiver, the bore **23***a* could be closed off forward of the junction between the bore **24***a* and the bore **30***a*. In fact, the entire frame could be made substantially solid except for the hollow passages establishing communication from the receiver **26** to the ear plug **31**. In such case the spring **48** and a similar spring (not shown) for the pivotal connection **36** might be placed on the exterior rather than on the interior of the frame.

In Figure 5, a modification of the rear tube or section **23** of the side member **11** is illustrated. This form of the invention is constructed for connection to a hearing aid of the air conduction type which has a receiver adapted to be located in the user's shirt pocket or coat pocket and with a tube extending to the frame F. All of the parts of the rear section or tube **23** are identical except that the ear support **24'** has an open end **49** whereby the flexible hollow tube **50** may be connected thereto. Such tube **50** extends to the receiver which is disposed in the user's coat or shirt pocket. This form of the invention has all of the advantages of the form previously explained wherein the receiver is attached to the enlarged portion **25**, since the tube **50**, like the wires **27**, is disposed behind the ear and is concealed by the back of the user's neck and the use of the special ear mold is likewise eliminated.

In some instances it may be desirable to locate the receiver **26** at some point on the frame F other than the enlarged end **25**. An example of this type of modification is illustrated in Figure 6, wherein the receiver **26** is disposed on the inner surface of the rear section or tube **23**. It will be appreciated that the position of the receiver **26** in Figure 6 is merely illustrative and such receiver may be positioned at some other point on the tube **23**, or in some cases on the tube **30**. The curved ear support **24'** illustrated in Figure 5 is utilized in the modification of Figure 6 to provide the open end **49** so that the electrical wire **27** can be extended therethrough to the receiver **26**. The opening **26***a* in the receiver **26** communicates with the bore or inner passage **23***a* which in turn communicates with the bore **30***a* and the bore **31***a* of the plug **31**. Although the receiver **26** may not be entirely concealed in this form of the invention, it is very easy to completely conceal such receiver by enlarging the size of the tube **23** so that the receiver **26** is entirely hidden behind the tube **23**. The receiver may also be located on either the top or bottom surfaces of the tube **23**. In this form of the invention the receiver **26** could be mounted or connected to the tube **23** in any desired manner so long as the opening **26***a* is in communication with the passage **23***a*, but preferably it would be secured with an adhesive in substantially the same manner as when the receiver **26** is disposed on the enlarged portion **25** (Figure 3). As will be appreciated, the modification shown in Figures 5 and 6 could be used with either or both ears in the same manner as the form of the invention shown in the Figures 1–3.

In Figures 7 and 8, a modified clamping frame G is illustrated which is formed of a resilient material such as spring steel, aluminum alloy, or the like so that there will be inherent resiliency in the frame G, and therefore the spring construction shown particularly in Figure 4 is eliminated in this modification. Preferably, the frame G is formed of one piece of tubing or tubular material, whereby the front or central member **110** and the side temple members **111** and **112** are integral and a hollow passage is provided through the frame for conducting the sound by air-conduction from the hearing aid receiver **126** to both ear cavity members **131** and **143**.

The mid-portion of the central member **110** is connected to the bridge member **118** and the nose pieces **119** and **120** by a bracket **70** which is secured to the member **110** and bridge member **118** by clamping, welding, brazing, screws or other similar securing means. The nose pieces **119** and **120** and the bridge member **118** may be connected to the eyeglasses **114** and **115** (shown in dotted lines) by extensions **71**. Thus, when the eyeglasses are so mounted, with the frame G, the bridge member **118** and extensions **71** constitute the eyeglasses frame to which the clamping frame G is attached. Of course, the front portions of other types of eyeglasses frames could be utilized; for example, the type that completely surrounds the eyeglasses (Figure 1) could also be used in the form of the invention of Figures 7 and 8. In fact, it will be evident that the frame F of Figure 1 could be connected to the bridge member **18** by a bracket such as **70** (Figure 7).

Aside from the several differences above explained, the construction of Figures 7 and 8 is substantially identical with that of Figure 1. The ear cavity members **131** and **143** are mounted on downwardly curved ear tubes **130** and **142**, respectively; curved ear supports **124** and **140** which are adapted to extend above and behind the ears are provided with enlargements **125** and **141**, respectively, and as explained in connection with Figure 1, one or both of the enlargements **125** and **141** may have hearing aid receivers **126** connected thereto,

or the receiver or receivers may be connected as illustrated in either the modification of Figure 5 or Figure 6.

As illustrated diagrammatically in Figure 8, the clamping pressure of the frame G urges the ear cavity members **131** and **143** firmly into the ear cavities of the ears, which is effected by the inherent resiliency of the frame G and by normally positioning the ends of the frame G, including the ear tubes **130** and **142**, spaced apart a distance less than the width of the head H of the user. With such construction, the ends of the frame G are spaced from each other a distance less than the width of the head of the user when the frame G is off the head, but when the frame G is on the head H (Figure 8), substantially equal pressure or inward urging of the ear cavity members is effected automatically, with the support of the midpoint of the front portion **110** on the nose of the user by the nose pieces **119** and **120** serving as a fulcrum point for the inward movement of the side members **111** and **112**.

In Figure 9, a modified connection of the clamping frame G to the bridge member **118** is illustrated wherein a bracket section **72** is secured to the mid portion of the front or central member **110** of the frame G and a similar bracket section **73** is secured to the bridge member **118**. A hinge **75** joins the bracket sections **72** and **73** by screws **76** or similar securing means. The hinge **75** is constructed to permit the swinging of the eyeglasses from a position in front of the eyes of the user to a position above the line of vision of the user when the user desires to clean the glasses or to otherwise continue to use the hearing aid without using the glasses. It will be appreciated that the hinged connection of Figure 9 could be used for attaching the eyeglasses **14** and **15** to the frame F in the Figure 1 construction.

In Figure 10, a detailed sectional view of the ear cavity member **143** is illustrated in its preferred embodiment. The portion **80** which extends into the ear cavity is substantially ball-shaped and it has formed integral therewith or connected thereto a sleeve **81** which is internally threaded at **81***a* for threaded connection with the hollow ear tube **142** having external threads **82** thereon. The ball-shaped portion **80** has a passage **85** therethrough which establishes sound or air communication with the bore **86** of the tube **142**. At the end of the passage **85** adjacent to the bore **86**, a reduced opening **85***a* is provided to form an annular shoulder **87**. Packing material **88** is placed in the passage **85** and is confined between the shoulder **87** and an annular retainer **90**. The retainer **90** has an opening **90***a* therethrough which is preferably about the same size as the opening **85***a* and the bore **86**. External threads **90***b* on the retainer **90** engage with internal threads **85***b* in the inner end of the passage **85** so that upon rotation, the retainer **90** can be moved toward the packing **88** to compress same; the more that the packing **88** is compressed, the denser it becomes, thereby dampening or reducing the volume of the sound passing therethrough to the ear drum of the user. Rotation of the retainer **90** can be accomplished by having a notch (not shown) in the exposed end thereof for the reception of a screwdriver, or similar means can be provided. The packing material must be capable of having air or sound pass therethrough and must be compressible to reduce the volume of the sound passing therethrough from the bore **86** to the ear cavity. Preferably, the packing material **88** is felt, although it may be cotton, wool or similar materials.

It was previously pointed out in connection with the form of the invention of Figure 1 that a balanced sense of hearing is obtainable by reason of the air-conduction of the sound from the receiver through the bore of the frame to the two ear cavity members. It was also mentioned that the volume of sound transmitted to the two ears may be varied by reducing the size of the inner passage of the frame on the side to which the hearing aid receiver is attached so that substantially equal hearing may be obtained with both ears. The sound dampening means of Figure 10 is particularly suitable for such regulation since it is adjustable and may be relatively closely controlled. For example, if a person has one ear in which hearing is 70% normal and the other ear in which hearing is 30% normal, the hearing aid receiver would usually be attached to the frame on the side adjacent the more defective ear (30% normal) and the packing material in the ear cavity member for the better ear (70% normal) would be compressed so that the volume of the sound passing to the better ear is reduced as compared to the volume of the sound passing to the more defective ear. The sound volume to the better ear is reduced to the extent necessary for the user to have a substantially equal sense of hearing in both ears. The foregoing example is, of course, not intended to be limiting, as in actual use the sound volume may be dampened on the side adjacent the hearing aid receiver; the particular relationship of the receiver and the dampener depends on the relative condition of the hearing of the user. Materials of different densities may be used instead of using compression by inserting same in the sound passages to dampen the sound whereby the same purpose can be accomplished as by compression.

It is believed evident that the sound dampening structure of Figure 10 could also be used with the ear cavity member **131** of Figure 7, or with the ear cavity members **31** and/or **43** of Figure 1.

In Figure 11, a modified construction of the side temple members is illustrated which may be used for either the clamping frame of Figure 1 or that of Figure 7. As pointed out in connection with Figure 1, the side temple member **11** is preferably formed in a forward section **22** and a rear section **23** so that both longitudinal and rotational movement of the section **23** relative to the section **22** can be obtained. Similarly, the side member **12** is preferably formed in the two relatively movable sections **38** and **39** for such adjustment. In Figure 11, a portion of the side temple member such as **111** of Figure 7 is shown wherein a forward section **122** is connected to a rear section **123** for rotational and longitudinal movement of the sections **122** and **123** relative to each other. The sections **122** and **123** may be connected with a non-threaded telescoping fit, but to prevent the rear section **123** from inadvertently slipping from the forward section **122** a threaded connection therebetween is provided by the engagement of the external threads **95** on the forward section **122** and the internal threads **96** on the rear section **123**. The side temple member **112** could, of course, be made the same as the side member **111**. Also, the sections of the side temple members of the clamp of Figure 1 could be formed with threads as shown in Figure 11.

From the foregoing description, it can be seen that in all forms of the invention a frame for positioning on the head of a user has been provided which is adapted to be connected to any conventional type of air conduction hearing aid receiver, whereby sound can be conducted to either or both ears of the user. The hearing aid receiver is substantially concealed by the frame, and the wires or tube leading to the frame are positioned behind the ears of the user so that the wire or tube can be led down the back of the neck of the user for concealment. When the frame F or the frame G is used with the eyeglasses **14** and **15**, the fact that the person wearing the glasses is also using a hearing aid is not readily ascertainable by a casual observer. In addition, the various forms of the clamping frame of this invention eliminate the necessity of the special plastic ear mold now used with the hearing aid receivers, so that the user is more comfortable and the ear cavity can be readily exposed for the use of a telephone or other hearing without the hearing aid.

It will also be evident that the ear support **23** with the mounting for an ear cavity member and a receiver

form a hearing aid assembly or side temple member attachment which can be readily attached to standard side temple members of the usual eyeglasses frames or to the front frame members of the usual eyeglasses frames.

The invention provides balanced hearing so that the sense of true hearing is obtained and the full roundness of sound is focused to the hearing sense for better understanding and dimensional hearing, an experience which has not been provided for hearing aid users heretofore.

The foregoing disclosure and description of the invention is illustrative and explanatory thereof, and various changes in the size, shape and materials, as well as in the details of the illustrated construction may be made, within the scope of the appended claims, without departing from the spirit of the invention.

What is claimed is:

1. A clamping frame comprising, a front frame member adapted to extend across the brow of the user, means for connecting said frame member to an eyeglasses lens frame, a side temple member connected to each end of said front frame member and adapted to extend along the side of the head of the user for support on the user's ears, each of said side temple members carrying an ear cavity plug member which is adapted to extend into the ear cavity of the ear adjacent thereto, a receiver of an air conduction hearing aid mounted upon the rear portion of one of the side temple members of the frame, said frame having an air passage thereon extending from the point at which the receiver is mounted to the ear cavity members whereby sound may be conducted from the receiver through said passage of the frame to both ears of the user so that a balanced hearing is obtained.

2. A clamping frame adapted to be connected with an eyeglasses lens frame and comprising, a front frame member adapted to extend across the face of the user above the eyeglasses frame, a side temple member extending from each end of said front frame member adapted to extend along the side of the head of the user, an ear cavity member on each of said side temple members adapted to extend into the ear cavity of the user's ear adjacent thereto, a receiver of an air conduction hearing aid mounted on the rear portion of one of the side temple members of the frame, said frame having an air passage therein extending from the point at which the receiver is mounted to the ear cavity members whereby sound from the receiver may be conducted through the frame to both ears of the user, and means for resiliently urging said ear cavity members inwardly toward the user's head to firmly seat said ear cavity members in the ears of the user.

3. The structure set forth in claim 2, wherein said front frame member and said side temple members are formed in one piece and of a resilient material whereby the inherent resiliency of the frame provides said means

for resiliently urging said ear cavity members inwardly toward the user's head.

4. The structure set forth in claim 2, including means in one of said ear cavity members for dampening the sound volume transmitted thereto from the hearing aid receiver, said means comprising a resilient packing material disposed in the air passage of said one of said ear cavity members.

5. The structure set forth in claim 2, including means in one of said ear cavity members for dampening the sound volume transmitted thereto from the hearing aid receiver, said means comprising a packing material disposed in the air passage of said one of said ear cavity members, and means to adjust the volume of the sound transmitted through said packing material by changing the density of said material.

6. A combination eyeglasses and hearing aid structure including, an eyeglasses lens frame, a pair of side temple members, means for securing the forward ends of said temple members to the lens frame, each of said side members being formed of a forward section and a rear section, each of said temple members having an air conducting passage entirely therethrough, the forward section of each temple member being attached to the eyeglasses lens frame through the securing means, an air conduction receiver carried by the rear section of one of said side temple members, means secured to and extending from the rear section of that side member on which the receiver is mounted for conducting sound from said receiver to the ear of the wearer, means establishing sound communication between the air conducting passages of the side temple members, and a second means attached to that temple member which does not have the receiver mounted thereon for establishing communication between the passage of that member and the other ear of the wearer, and means for securing the forward and rear sections of each of said side members together.

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