

[54] HEADSET AND METHOD OF MAKING IT

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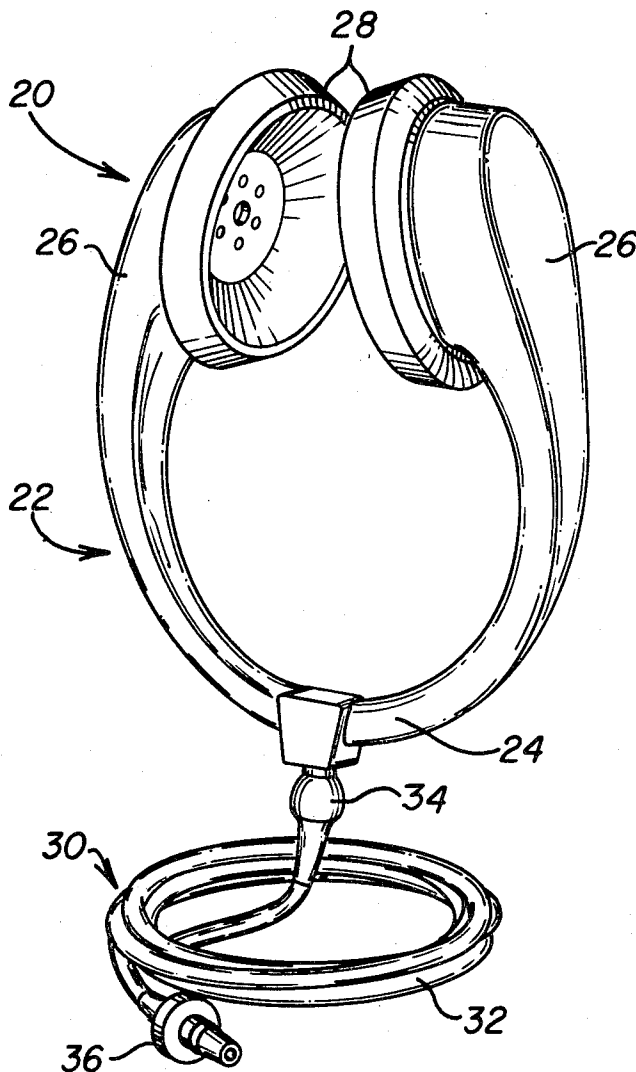
[58] Field of Search 179/156 R, 182 R

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Attorney, Agent, or Firm—Hubbard, Thurman, Turner & Tucker

[57] ABSTRACT

A headset includes a body comprising a chin portion extending to enlarged ear portions. Each ear portion includes an earpad receiving opening defined by an annular rim. An earpad is mounted in each earpad receiving opening of the headset body and comprises an ear engaging layer extending to a cylindrical ear surrounding portion which encloses an annular cushioning member. Each earpad further comprises a retaining portion which encloses an annular retaining member formed from a relatively rigid material. The ear surrounding and retaining portions of each earpad are separated by a groove which receives the annular rim of one of the earpad receiving openings of the headset body, whereby the earpads are detachably secured to the headset body.

15 Claims, 11 Drawing Figures



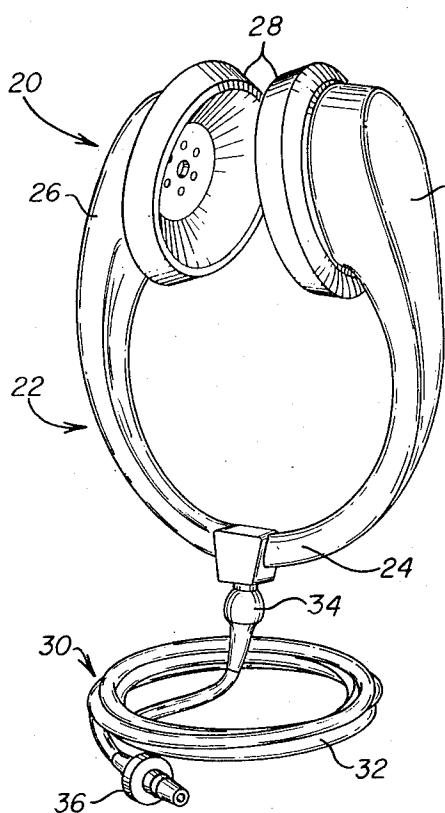


FIG. 1

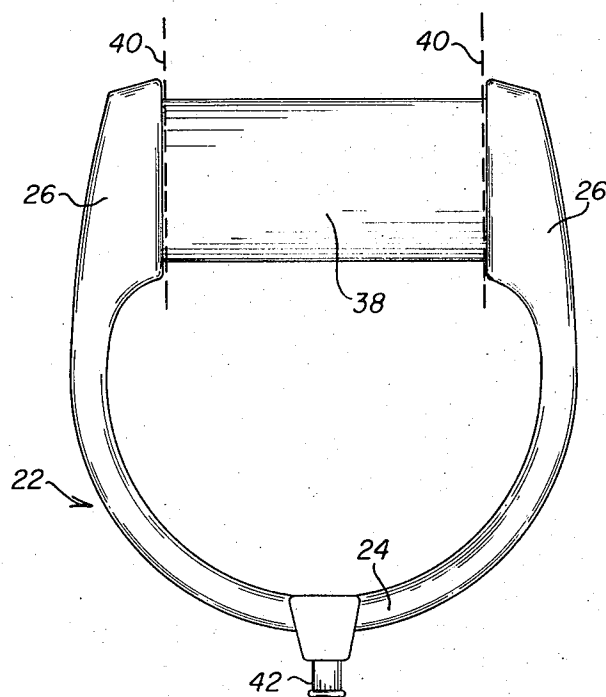


FIG. 2

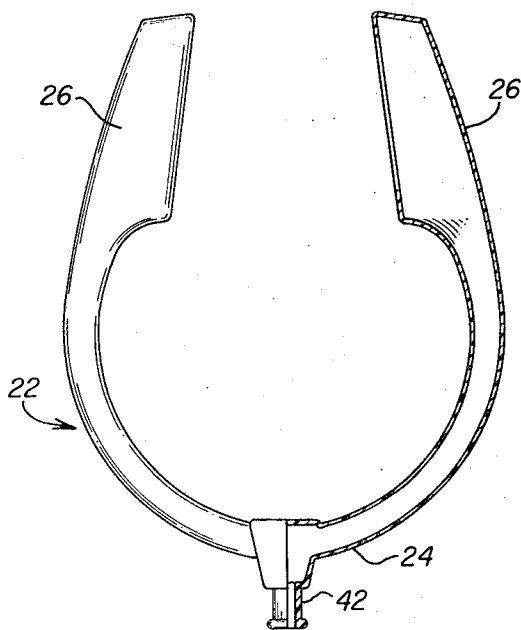


FIG. 3

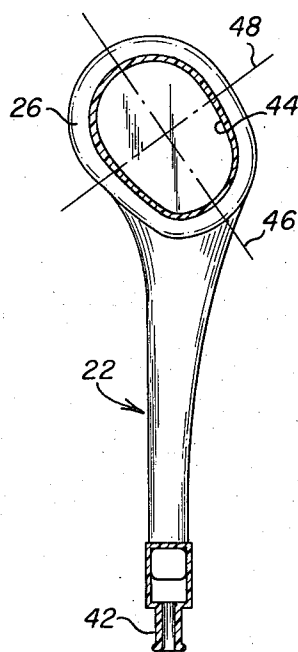


FIG. 4

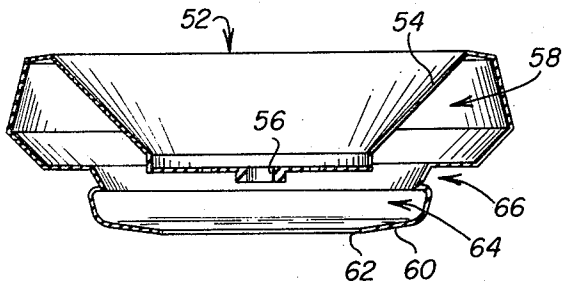


FIG. 5

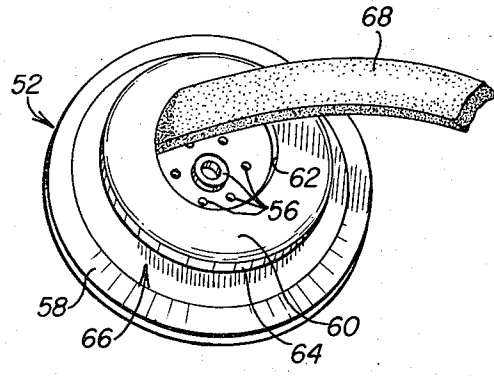


FIG. 6

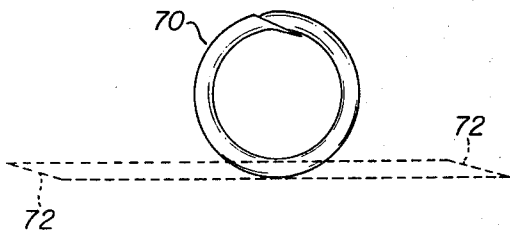


FIG. 7

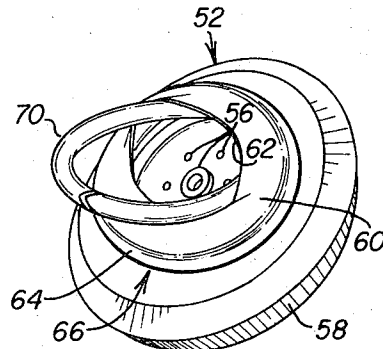


FIG. 8

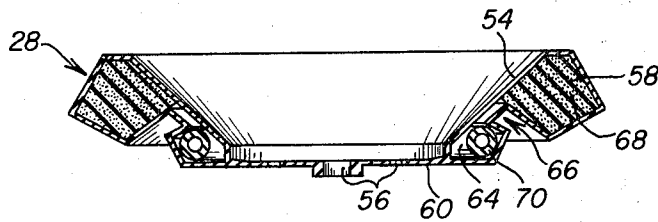


FIG. 9

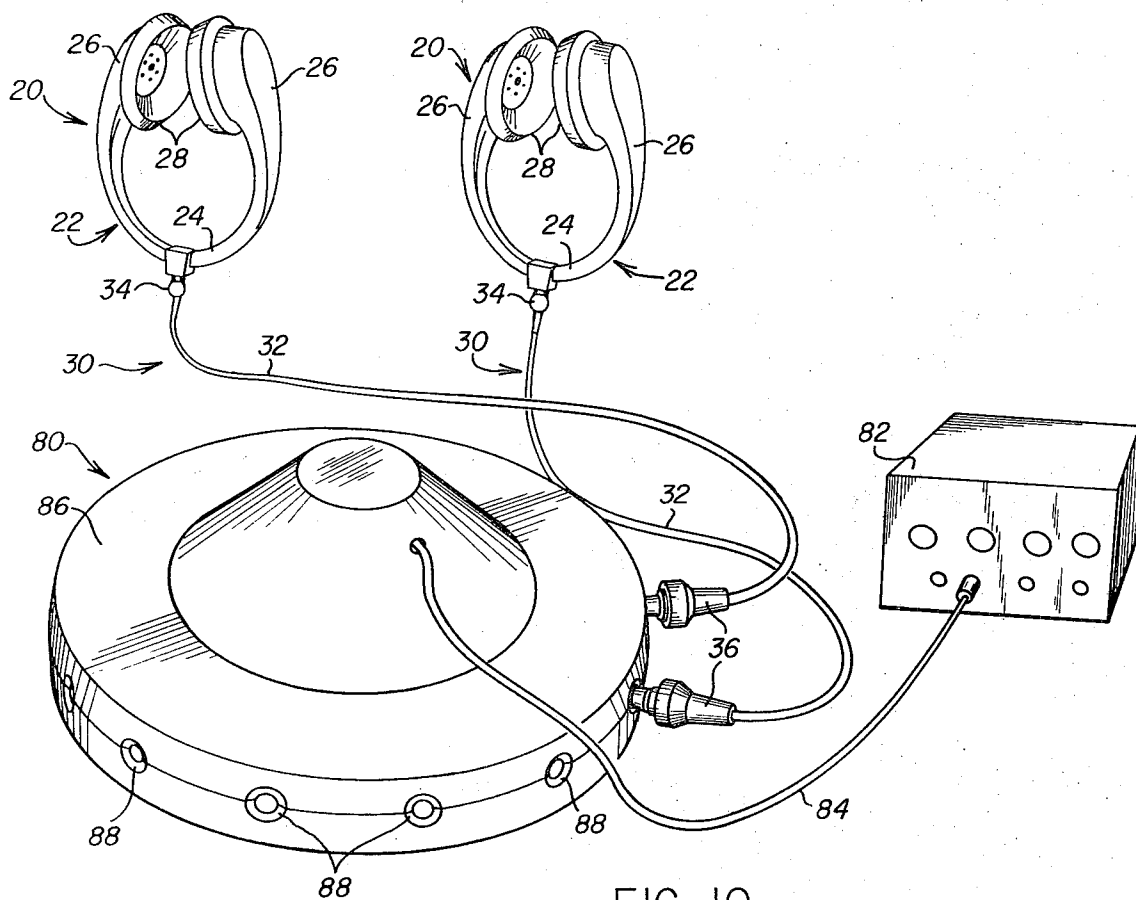


FIG. 10

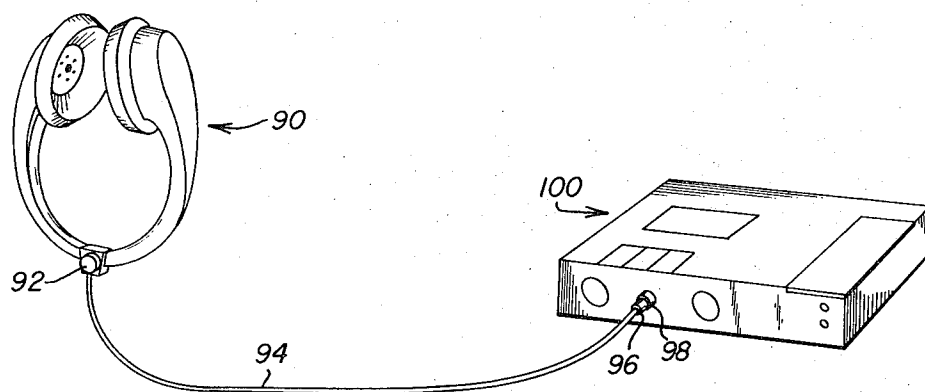


FIG. 11

HEADSET AND METHOD OF MAKING IT

BACKGROUND AND SUMMARY OF THE INVENTION

This invention relates generally to headsets, and more particularly to a method of manufacturing headsets and to headsets produced in accordance with the method.

As is well known, headsets are presently utilized throughout the communications industry for various purposes, particularly communications to and from vehicles of all types. Headsets are also used for educational and instructional purposes, such as in language laboratories, for transmitting prerecorded and/or programmed lesson materials, etc. Finally, headsets are frequently used for purely recreational purposes, such as in conjunction with hi-fi and stereo equipment, tape decks, and similar apparatus.

Notwithstanding the foregoing relatively widespread use, headsets have heretofore remained very expensive to purchase and use. Thus, most prior art headsets have been fabricated from relatively expensive component parts, such as machined and/or cast metal parts, etc. Even in those instances in which headsets have incorporated plastic parts, these parts have been complicated in design and therefore have not been readily adapted to fabrication by means of low cost manufacturing techniques. This has resulted in an average retail selling price for a typical headset in the neighborhood of \$75.00.

Presently available headsets also exhibit numerous additional disadvantageous characteristics. Thus, many headsets are extremely heavy and cumbersome, and are therefore very unpleasant to use even for short periods of time. Another problem comprises the lack of any convenient method of cleaning headsets, particularly those portions which contact the ear of a listener. This is especially troublesome in the case of schools and similar situations wherein it is frequently necessary to use the same headset for a variety of listeners.

It should be noted that lightweight headsets have been provided heretofore. For example, headsets comprising plastic tubes extending to earplugs adapted to be received in the ears of a listener have been supplied for use by passengers on commercial airlines and for use in conjunction with dictating systems. However, headsets of this type have typically been very uncomfortable to use. Also, no efficient means has been provided for cleaning the earplugs of these headsets.

The present invention comprises a novel headset which overcomes the foregoing and other difficulties that have long been associated with the prior art. In accordance with the broader aspects of the invention, a headset comprises a molded plastic body including the portion adapted to extend under the chin of a listener and extending to a pair of enlarged ear portions. The ear portions include opposed openings wherein a pair of earpads are detachably secured to the headset body. By this means, the earpads are positioned to engage and substantially surround the ears of the listener. There is thus provided a headset which can be manufactured by means of low cost techniques so that the total retail cost of the headset is about one tenth that of a comparable prior art headset. At the same time, the headset is extremely lightweight and comfortable in use. Finally, the earpads of the headset are detachable

and completely washable so that the invention is readily adapted for use in schools, and the like wherein the use of one headset by more than one person is necessary.

More specifically, the earpads of the headset are fabricated by first molding an earpad blank comprising an ear engaging layer which extends to a cylindrical ear surrounding portion. A layer having an aperture formed through it is situated opposite the ear engaging layer and extends to a retaining portion. The ear surrounding portion and the retaining portions are separated by a groove adapted to receive the rim of the earpad receiving opening of the headset body.

After the earpad blank is molded, an annular cushioning member and an annular retaining member are inserted through the opening in the layer opposite the ear engaging layer and are positioned in the ear surrounding portion and in the retaining portion of the earpad blank, respectively. Finally, the inner surfaces of the opposed layers comprising the earpad blank are bonded one to the other. By this means there is formed an earpad which is adapted for mating engagement with the earpad receiving openings of the headset body to detachably secure the earpads to the headset body, and yet are removable from the headset body for cleaning purposes.

Headsets incorporating the present invention are particularly adapted for use in conjunction with multiple outlet acoustic distributors. In such a case the headset body is entirely hollow and is connected to the acoustic distributor through a hollow tubular passageway extending to an appropriate jack. Those skilled in the art will appreciate the fact that the headset incorporating the present invention may also be utilized in conjunction with devices providing an electrical output. In such a case the headset body is equipped with a miniature speaker and is electrically coupled to the output device.

DESCRIPTION OF THE DRAWINGS

A more complete understanding of the invention may be had by referring to the following Detailed Description when taken in conjunction with the accompanying Drawings, wherein:

FIG. 1 is a perspective view of a headset manufactured in accordance with and incorporating the invention;

FIG. 2 is an illustration of the initial steps in the fabrication of the body of the headset shown in FIG. 1;

FIG. 3 is a front view of a completed headset body fabricated in accordance with the invention;

FIG. 4 is a sectional view taken generally along the line 4-4 in FIG. 3 in the direction of the arrows;

FIG. 5 is a sectional view of an earpad blank utilized in the practice of the invention;

FIGS. 6, 7 and 8 are illustrations of progressive steps in the fabrication of an earpad incorporating the invention;

FIG. 9 is a sectional view of a completed earpad; and

FIGS. 10 and 11 are illustrations of two uses of the invention.

DETAILED DESCRIPTION

Referring now to the Drawings, and particularly to FIG. 1, there is shown a headset 20 fabricated in accordance with and incorporating the present invention.

The headset 20 comprises a hollow body 22 including a portion 24 adapted for positioning under the chin of a listener and a pair of opposed ear portions 26. The ear portions 26 comprise the opposite ends of the body 22 and support a pair of opposed earpads 28.

The headset 20 shown in FIG. 1 comprises an embodiment of the invention which is particularly adapted for use in conjunction with acoustic distributors of the type shown in FIG. 10. Headsets of this type are provided with a hollow passageway 30 whereby sound generated in the acoustic distributor passes into the chin portion 24 of the hollow body 22, through the body 22, and through passageways formed in the earpads 28 to the ears of a listener utilizing the headset. The hollow passageway 30 comprises a length of hollow flexible plastic tubing 32 extending between a nipple 34 secured to the chin portion 24 of the body 22 and a jack 36. The jack 36 is of course adapted for mating engagement with the acoustic distributor.

A method of fabricating the body 22 of the headset 20 is illustrated in FIGS. 2, 3, and 4. As is best shown in FIG. 2, the body 22 is preferably fabricated by blow molding one of the various thermoplastic materials, such as low density polyethylene. However, as will be appreciated by those skilled in the art, virtually any thermoplastic material as well as numerous thermosetting materials may be utilized in the practice of the invention. Also, various molding techniques in addition to blow molding may be utilized to fabricate the body 22.

The body 22 is preferably formed with a cylinder 38 separating the ear portions 26 thereof. The cylinder 38 is dimensioned to maintain the ear portions 26 separated by a distance that is approximately equal to the distance between the ears of the intended user of the headset 20. Following the molding operation the body 22 is allowed to cool, whereupon the cylinder 38 is severed from the remainder of the headset 20 by cutting along the dashed lines 40 shown in FIG. 2. Following the cutting operation the cylinder 38 is removed and discarded.

When the cylinder 38 is removed, the body 22 assumes the configuration illustrated in FIG. 3. The ear portions 26 of the body 22 are thus positioned substantially closer to one another than the spacing of the ears of the intended listener of the headset. This assures that the resiliency of the body 22 will apply a light pressure to the ears of the listener, whereby the headset 20 will be securely retained in place during use. On the other hand, the pressure that is applied by the body 22 to the ears of the listener is not so great as to be uncomfortable, even after long periods of use.

As is clearly shown in FIGS. 3 and 4, the body 22 of the headset 20 is hollow throughout. The chin portion 24 of the body 22 is provided with a nipple 42 which is adapted to receive the nipple 34 of the hollow passageway 30. The nipples 42 and 34 are preferably so designed that the hollow passageway 30 cannot easily be removed from the body 22 of the headset 20.

As is best shown in FIG. 4, each ear portion 26 of the body 22 comprises an earpad receiving opening 44 resulting from the removal of the cylinder 38 and defined by an annular rim. The earpad receiving openings 44 are oval in shape and are defined by major and minor axes 46 and 48. By this means, whenever the ear portions 26 of the body 22 are aligned with the corresponding axes of the ears of a listener, the chin portion

24 of the body 22 projects forwardly so as to be properly received under the chin of the listener.

The earpads 28 of the headset 20 may be fabricated in accordance with the procedure illustrated in FIGS. 4 through 8. The initial step in the procedure comprises fabricating an earpad blank 52, preferably by blow molding one of the thermoplastic materials, such as low density polyethylene. However, those skilled in the art will appreciate the fact that the earpad blank 52 may be fabricated by various other conventional techniques and from various other conventional molding materials, if desired.

The earpad blank 52 comprises an ear engaging layer 54 having apertures 56 formed therein and extending to a cylindrical ear surrounding portion 58. A layer 60 having an aperture 62 formed therein is disposed opposite to the ear engaging layer 54. A groove 66 is disposed between the ear surrounding portion 58 and the retaining portion 64.

After the earpad blank 52 has been formed, an ear cushioning member 68 is mounted in the ear surrounding portion 58 thereof. As is best shown in FIG. 6, this is preferably accomplished by threading an elongate cushioning member 68 through the aperture 62 and into the ear surrounding portion 58 of the blank 52. The member 68 is preferably formed from a highly resilient material, such as plastic foam or the like, and is normally straight. By this means the resiliency of the cushioning member maintains the member in engagement with the ear surrounding portion 58 and in an annular configuration.

After the cushioning member 68 is installed in the earpad blank 52, an annular retaining member 70 is installed therein. The retaining member 70 may be easily formed by slitting a length of plastic tubing on the bias to provide a pair of oppositely pointed ends 72, and then slipping one of the pointed ends 72 into the other to form a ring. Thereafter, the annular retaining member 70 is mounted in the retaining portion 64 of the earpad blank 52. Again, this is accomplished by threading the annular retaining member 70 into the aperture 62 formed in the layer 60 of the blank. The annular retaining member 70 is preferably larger in diameter than the rim defining the earpad receiving opening in the body 22.

Following the installation of the cushioning member 68 in the ear surrounding portion 58 and the installation of the annular retaining member 70 in the retaining portion 64 of the earpad blank 52, the interior of the layer 60 is heat sealed to the interior of the ear engaging layer 54. At this point the apertures 56 and 62 formed in the two layers are aligned so as to provide a passageway through the earpad 28. Finally, the earpad 28 is mounted in the earpad receiving opening 44 of the ear portion 26 of the body 22. This is easily accomplished by simply deforming the earpad sufficiently to allow the retaining portion 64 and the annular retaining member 70 mounted therein to pass over the edge of the opening 44, and then releasing the earpad so that the retaining portion 64 and the annular retaining member 70 mounted therein are securely positioned behind the edge of the aperture 44.

The use of the foregoing earpad construction has been found to be highly advantageous. Thus, by means of the annular retaining members 70, the earpads 28 are securely retained in the body 22 and are therefore not easily removed by children, etc. On the other hand,

the earpads 28 are adapted for removal by maintenance personnel for cleaning purposes. The later operation is conveniently accomplished by means of a conventional residential-type washing machine.

After the earpads 28 are mounted on the body 22 of the headset 20, the hollow passageway 30 is secured to the chin portion 24. This is accomplished by engaging the nipple 34 on the passageway 30 with the nipple 42 on the body 22. The nipple 42 may comprise a heat shrinkable plastic member, whereby heat is employed to form a strong mechanical bond between the nipples 34 and 42 and also to form an acoustic seal therebetween. A force fit between the nipples 42 and 34 may also be utilized in the practice of the invention, if desired.

The use of the invention is illustrated in FIGS. 10 and 11. Referring particularly to FIG. 10, there is shown an acoustic distributor 80. The acoustic distributor 80 is actuated by electrical signals produced by a device 82 which is coupled to the acoustic distributor 80 by an electrical cable 84. The cable 84 extends to a speaker mounted within a housing 86 and adapted to produce sound therein. The sound is normally contained within the housing 86 by a plurality of valving members 88.

The headset 20 is utilized in conjunction with the acoustic distributor 80 by inserting the jack 36 of the hollow passageway 30 into the housing 86, whereby one of the valving members 88 is displaced to permit sound generated within the housing to pass into the hollow passageway 30. The sound in turn passes through the hollow passageway 30 and through the hollow body 22 of the headset 20. From the hollow body 22 the sound passes through the earpads 28 mounted on the ear portions 26 and is received by the listener.

Another use of the invention is illustrated in FIG. 11. A hollow headset 90 incorporating the invention and constructed substantially as shown in FIGS. 1 through 9 is adapted for connection to a miniature speaker 92 of the type used in transcription machines and similar apparatus. The miniature speaker 92 is connected through an electrical cable 94 to a jack 96 which is in turn adapted for connection to a mating jack 98 on an apparatus 100 which produces electrical outputs such as a tape deck, a dictation transcriber, etc. In this embodiment of the invention the hollow passageway 30 is not needed and is therefore dispensed with. The nipple 42 of the body 22 may also be dispensed with, if desired.

The headset shown in FIG. 11 is utilized by connecting the jack 96 to a source of electrical signals which are adapted for conversion to an audible output. These signals are transmitted through the cable 94 to the miniature speaker 92 which converts the signals to an audible output in the well known manner. The audible output is in turn directed through the body and the earpads of the headset 90, whereby it is received by a listener.

From the foregoing it will be appreciated that the use of the headsets incorporating the present invention results in numerous advantages over the prior art. Thus, headsets utilizing the invention do not comprise portions projecting into the ear of the listener and are therefore both extremely comfortable and safe to use. Rather than projecting into the ear, the headsets include earpieces which surround and embrace substantially the entire ear under light but firm pressure. This feature of the invention, in combination with the fact

that the entire headset is fabricated from lightweight, hollow materials, results in a headset construction which may be utilized for extended periods of time without discomfort. One of the most important features of the invention comprises the construction of the earpads. By this means the earpads are securely retained in the headset body and yet are removable for cleaning purposes.

Although particular embodiments of the invention have been illustrated in the accompanying Drawings and described in the foregoing Detailed Description, it will be understood that the invention is not limited to the embodiments disclosed, but is capable of numerous rearrangements, modifications, and substitutions of parts and elements without departing from the spirit of the invention.

What is claimed is:

1. A method of fabricating a headset comprising: forming a headset body including a portion adapted for positioning under the chin of a listener and extending to opposed ear portions each comprising an inwardly facing earpad receiving opening defined by an annular rim; forming a pair of earpads each comprising an outer ear engaging layer extending to a cylindrical ear surrounding portion and an inner layer extending to a cylindrical retaining portion which is separated from the ear surrounding portion by a groove; positioning a cushioning member in the ear surrounding portion of each earpad; positioning a retaining member in the retaining portion of each earpad; and mounting the earpads in the earpad receiving openings of the headset body with the grooves of the earpads received in the annular rims of the openings and with the retaining portions of the earpads and the retaining members mounted therein positioned within the rims whereby the earpads are detachably secured to the headset body.
2. The method of fabricating a headset according to claim 1 wherein the step of positioning a retaining member in the retaining portion of each earpad is carried out by joining the ends of two lengths of relatively rigid plastic material to form a pair of annular retaining members, and positioning the annular retaining members in the retaining portions of the earpads.
3. The method of fabricating a headset according to claim 2 wherein each annular retaining member is formed by forming at least one pointed end on a length of plastic tubing material into the interior of the opposite end of the material to form the annular retaining member.
4. The method of fabricating a headset according to claim 3 wherein the step of positioning a cushioning member in the ear surrounding portion of each earpad is carried out by threading a length of relatively resilient plastic material into the ear surrounding portion of each earpad and thereby forming an annular cushioning member extending around the periphery of the ear engaging layer of each earpad.
5. The method of fabricating a headset according to claim 4 further including the step of bonding the inner layer of each earpad to the ear engaging layer thereof subsequent to the positioning of the cushioning and retaining members in the earpad and prior to mounting of the earpad in the earpad receiving opening of the headset body.

6. A method of making an earpad comprising:
forming an earpad blank comprising an ear engaging
layer extending to a cylindrical ear surrounding
portion, a cylindrical retaining portion, and a
groove separating the ear surrounding and retain- 5
ing portions;
mounting an annular cushioning member in the ear
surrounding portion of the earpad blank so that the
cushioning member extends around the periphery
of the ear engaging layer; and 10
mounting an annular retaining member in the retain-
ing portion of the earpad blank and thereby form-
ing an earpad which is adapted for mounting in a
headset having an earpad receiving opening defin- 15
ed by a rim by receiving the rim in the groove of
the earpad with the retaining portion of the earpad
positioned behind the rim.
7. The method of making an earpad according to
claim 6 wherein the step of mounting an annular retain- 20
ing member in the retaining portion of the earpad blank
is carried out by joining the ends of a length of rela-
tively rigid plastic tubing material to form the annular
retaining member, and subsequently positioning the an-
nular retaining member thus formed in the retaining
portion of the earpad blank.
8. The method of making an earpad according to
claim 7 wherein the step of mounting an annular cush- 25
ioning member in the ear surrounding portion of the
earpad blank is further characterized by threading a
normally straight length of relatively resilient plastic
material into the ear surrounding portion of the earpad
blank whereby the resiliency of the length of resilient 30
material maintains the cushioning member in engage-
ment with the interior of the ear surrounding portion of
the earpad blank and in the annular configuration.
9. The method of making an earpad according to
claim 8 wherein the step of forming an earpad blank is 35
further characterized by forming a layer disposed op-
positely from the ear engaging layer and having an ap-
erture formed through it and wherein the cushioning
member and retaining member mounting steps are car- 40
ried out by inserting the cushioning member and the
retaining member into the interior of the earpad blank
through the aperture in said layer.
10. The method of making an earpad according to 45
claim 9 wherein the earpad is completed by bonding
the interior surfaces of the layers at the opposite ends
of the earpad blank to one another after the cushioning
member and the retaining member have been posi-
tioned in their respective portions.
11. A headset comprising:
a headset body including a portion adapted to extend

- under the chin of a listener and extending between
a pair of opposed ear portions, each of said ear por-
tions comprising an earpad receiving opening defin-
ed by an annular rim; and
a pair of earpads mounted on the ear portions of the
headset body in facing relation to engage and sub-
stantially cover the ears of a listener, each of said
earpads comprising:
an inwardly facing ear engaging layer,
a first cylindrical portion extending from the ear
engaging layer to the earpad receiving opening of
the headset body,
an annular cushioning member mounted in the first
cylindrical portion of the earpad and extending
around the periphery of the ear engaging layer,
a second cylindrical portion positioned inside the
earpad receiving opening of the headset body,
and
an annular retaining member positioned within the
second cylindrical portion and within the annular
rim of the earpad receiving opening of the head-
set body, whereby the earpad is detachably se-
cured to the headset body.
12. The headset according to claim 11 wherein each
earpad further comprises a groove located between the
ear surrounding and retaining portions of the earpad
and receiving the annular rim defining one of the ear-
pad receiving openings in the headset body and for co-
operation with the retaining member to secure the ear-
pad in the earpad receiving opening.
13. The headset according to claim 12 wherein the
retaining portion of each earpad extends to a layer dis-
posed opposite from the ear engaging layer of the ear-
pad and wherein the layers at the opposite ends of each
earpad are bonded one to the other to secure the cush-
ioning member and the retaining member in the ear-
pad.
14. The headset according to claim 13 wherein the
retaining member of each earpad comprises a length of
relatively rigid plastic tubing joined at the ends to form
an annular retaining member having a diameter larger
than the diameter of the annular rim defining the ear-
pad receiving opening.
15. The headset according to claim 14 wherein the
cushioning member within each earpad comprises a
normally straight length of resilient foam mounted
within the ear surrounding portion of the earpad in an
annular configuration and extending around the pe-
riphery of the ear engaging layer of the earpad.

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