

[54] SOUND TUBE HEADSET

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[58] Field of Search 181/24, 31 R, 31 B, 23; 179/107 H, 107 E, 1 ST

[56]

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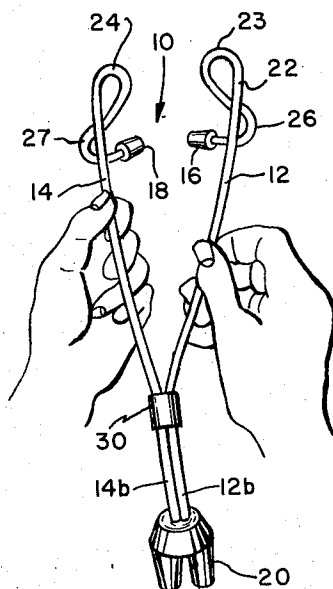
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[57]

ABSTRACT

A sound tube headset formed of flexible tubing having arcuate end portions adapted to rest on the ears, extend downwardly behind the ears and forwardly in front of the wearer and with an adjustable slider for holding the lower portions of the tubes together and for slightly tensioning the same in the region of the clavicle to effectively secure the ear engaging portions in position and substantially obviate inadvertent dislodgment.

7 Claims, 7 Drawing Figures



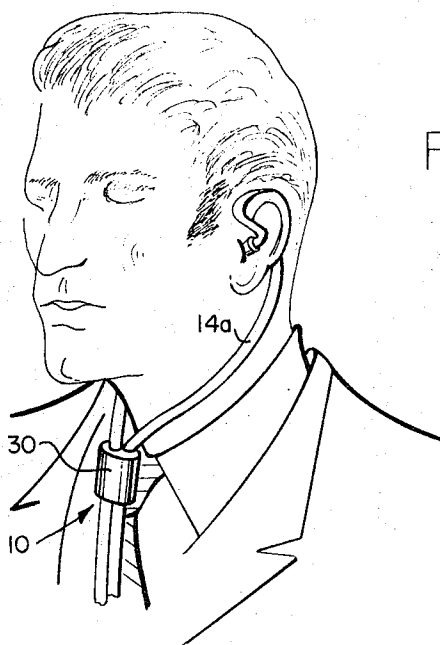


Fig. 1

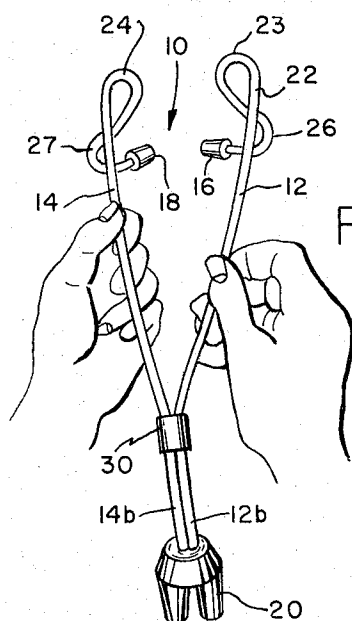


Fig. 2

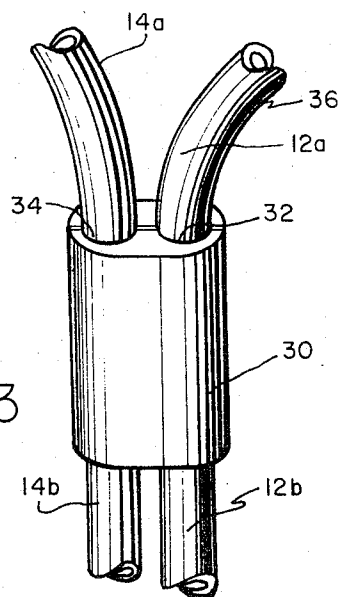


Fig. 3

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Fig. 4

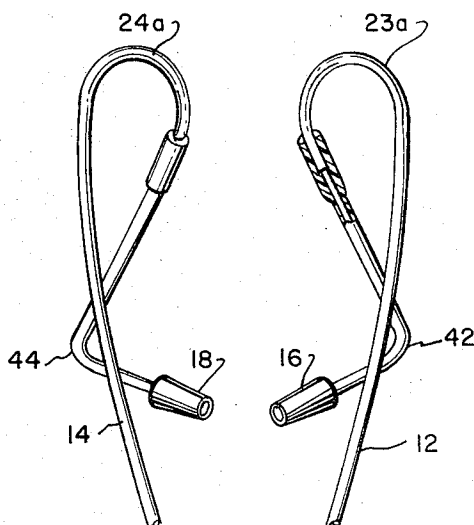


Fig. 5

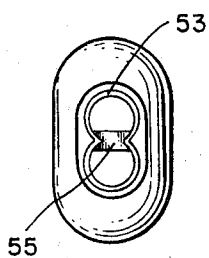
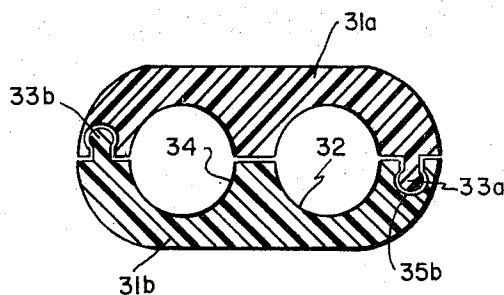


Fig. 7

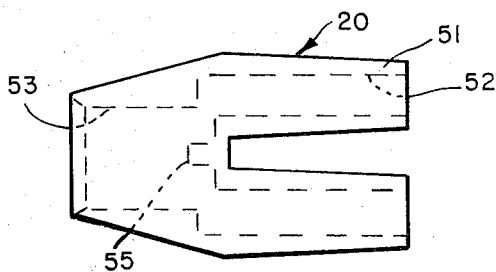


Fig. 6

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SOUND TUBE HEADSET

BACKGROUND OF THE INVENTION

This invention relates to sound tube headsets of the general class suitable for use in commercial airline passenger entertainment and more particularly to a light weight inexpensive structural arrangement for such headsets.

While the sound tube headset of the present invention is hereinafter described with reference to a particular embodiment which has been found most suitable for commercial airline usage, it should be understood that the invention is not so limited but has application to a variety of other audio systems and apparatus.

Heretofore, audio headsets of the type used for passenger entertainment in airline service have employed rigid or semi-rigid head engaging elements formed of a material different from that of the sound conducting tubes and, consequently, have involved substantial manufacturing expense including component assembly operations. Such prior art devices are not only undesirably expensive but are subject to a relatively undesirable level of breakage in use and because of the head clamping characteristic are not comfortably usable by all persons. Such prior art headsets, because of the use of rigid spring-like ear engaging elements, have been relatively fragile as well as being somewhat uncomfortable when worn for long time periods. Additionally some particular, headsets designed to be large enough for comfortable use by adults are not readily adjustable to fit small children and, consequently, when used by children tend to be insecurely retained and subject to inadvertent dislodgment from the listener's head.

Accordingly, it is a primary object of the present invention to overcome the foregoing undesirable features of prior art sound tube headsets and to provide a headset for airline passenger entertainment service of simplified and inexpensive construction which can be comfortably and readily used by all passengers including small children.

It is another object of the present invention to provide a headset which may be inexpensively manufactured primarily from polymeric tubing and without the several component manufacturing and assembling operations heretofore required.

SUMMARY OF THE INVENTION

In a preferred embodiment of the invention the headset is formed of a single length of dual-conduit plastic tubing of the type in which the two conduits are joined together along their adjacent edges. In making the headset, the two tubes are first separated or split apart along a substantial portion of their length from one end, a slider member having a pair of longitudinal apertures is positioned on the two separated tubes so as to be manually moveable therealong and the separated ends of the two tubes above the slider are formed, for example by the application of heat, to have a generally U-shaped configuration including a sharply curved portion adapted to rest upon the ear of the user. The lower end of the dual tubing is provided with a dual sound coupling member which preferably is cemented to the ends of the tubing and is operative to connect the tubes to receive sound from a dual sound (i.e., stereo) source. The slider member preferably has cylindrical apertures therethrough slightly larger than the outside diameters of the sound tubes but frictionally engaging the tubes in a manner such that the slider member will be retained at any position along the tubes to which it is manually adjusted. In use, the U-shaped upper ends of the sound tubes are placed over the respective ears of the user and the tips of the tubes are slightly inserted into the ear canals. The slider member is then moved upwardly along the tubes to a point approximately adjacent to the clavicle so that it operates to bias the tubes toward each other and retain the ear engaging portions in position.

The advantages and details of construction of devices in accordance with the present invention will be more apparent and better understood from the following description when considered in conjunction with the accompanying drawings, throughout which like characters indicate like parts.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a sound tube headset in accordance with the present invention as it appears while being worn by a user;

FIG. 2 is a back view of the headset more completely illustrating the features of same;

FIG. 3 is an enlarged view of one portion of the assembly shown in FIG. 2;

FIG. 4 illustrates an alternative construction of the upper end ear engaging portions of the headset assembly;

FIG. 5 is a cross-sectional view of the slider member taken along the lines 5—5 of FIG. 3; and

FIG. 6 is an enlarged plan view of the connector member preferably used in the assembly shown in FIG. 2.

FIG. 7 is a cross-sectional view of the connector member of FIG. 6.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, the headset indicated generally by the numeral 10 includes first and second flexible tubes 12 and 14 which are preferably formed of a polymeric material such as polyvinylchloride (PVC) or polyethylene or the like and which extend from a primary sound source (not shown) upwardly to the ears of the wearer. The lower portions 12b and 14b of the sound tubes are preferably joined together along their adjacent edges to constitute a single cord and are provided at their lower ends with a cemented-in-place PVC connecting member 20 for coupling the tubes to the sound source. The connecting member 20 preferably takes the form illustrated in FIG. 6 and described in more particular detail hereinafter. A slider member 30 having parallel longitudinal apertures 32 and 34 is mounted on the upwardly extending tube portions 12a and 14a so as to be manually moveable therealong. In a preferred form the apertures 32 and 34 in the slider member have internal diameters only very slightly larger than the nominal outside diameter of the tubes 12 and 14 so that the slider member frictionally engages the tubing and will readily be retained in position at any point along the tubing. As best shown in FIG. 2 the upper end of each of the tubes 12 and 14 is formed, for example by the application of heat, into a generally U-shaped configuration adapted to comfortably engage the user's ears. More specifically, the tube 12 is adapted to couple to the right ear of the user and the tube 14 extends over the left ear and has its tip portion 18 inserted into the ear canal of the left ear. The U-shaped configuration of each tube preferably includes a slightly arcuate portion 22 adapted to extend upwardly behind the ear shell, a more sharply curved portion 23 which rests on top of the ear and a reversely curved portion 26 which extends within the ear shell and is curved inwardly from the plane of the ear shell to bring the tip portions 16 and 18 into general alignment with the ear canal. As shown in FIG. 2 the reversely curved portions 26 and 27 extend in opposite senses respectively from the planes of the U-shaped portions 23 and 24. Accordingly, in using this particular embodiment of the invention, it is necessary that tubes 12 and 14 engage the right and left ears respectively rather than vice versa. To that end the tubes preferably are marked or color-coded in a manner to inform the user as to which side of the headset is the "right" side. For example, in the course of manufacturing the dual tubing the tube 12 is provided with a colored stripe or stripes 36 extending the entire length thereof. Alternatively, the ear tips 16 and 18 may be differently colored to provide distinction. With such color coding it is then possible to inform the user of the correct right-left headset orientation by means of printed instruction either on or in the transparent plastic bag conventionally employed for sterile packaging of the headsets. Alternatively, when the tubes 12, 14 are formed of soft polyvinylchloride the reverse curved portion 26 may be shaped so that the portions 22, 23, and 26 form substantially an S-shape, with the reverse curve 26 and the axis of ear piece 16 being nominally in the

same plane as the U-shaped portion 23. In the use of this alternative configuration the wearer after placing the tubes over each ear, simply bends the ends inwardly enough to insert tip portions 16 and 18 into the ear canals. This alternative embodiment has the advantage that it is freely reversible left from right and therefore does not require color-coding or instructions for assuring correct orientation.

In accordance with a further embodiment of the invention (illustrated in FIG. 4) the polymeric tubes 12 and 14 are terminated a short distance downwardly in front of the ear shell and are fitted with separate L-shaped members 42 and 44. The L-shaped ear piece 42 is formed of semi-rigid polymeric tubing and has at its upper end a slightly enlarged coupling portion within which the downwardly extending end of tubing 12 is frictionally retained. Accordingly, the L-shaped members 42 and 44 are manually rotatable relative to the tubes 12 and 14 and therefore may be rotatably adjusted to 'fit' either ear of the user. This alternative construction permits the user to wear the headset with tubes 12 and 14 engaging the right and left ears respectively or vice versa (i.e., with tube 12 on the left ear and tube 14 on the right ear). Hence, this further embodiment of the invention has the advantage of being easily reversible left from right so that no color-coding or other orientation marking of tubes 12 and 14 is necessary.

The tip portions 16 and 18 (FIG. 4) preferably are separate soft polyvinylchloride elements of a size and shape to comfortably fit the ears of the average user and having a longitudinal aperture into which the ends of the L-shaped members 42 and 44 may be press fit. In the preferred forms of the invention the tubes 12, 14 are made of a material, such as polyvinylchloride, which is relatively flexible while having substantial resiliency so that the U-shaped portions 23 and 24 have sufficient structural integrity and resiliency to normally return after being slightly deformed to their original preformed arcuate shape. With such materials the ear engaging portions are sufficiently flexible to comfortably fit the ears of substantially all users including small children. Use of the adjustable slider member 30 enables the headset to be comfortably and yet securely attached to the user's head without resorting to springs or other head clamping devices.

In accordance with one embodiment of the invention slider member 30 (as shown in FIGS. 1-3) is a single piece formed of PVC or the like and having first and second cylindrical apertures 32 and 34 extending longitudinally therethrough. In assembling the headset the tubes 12 and 14 are first threaded through the apertures 32 and 34 after which the upper ends are formed into the desired arcuate shape by the application of heat. This one-piece configuration of the slider member 30 is most economical to manufacture but, in volume production, has the slight disadvantage that the tubes 12 and 14 must be threaded through the slider prior to shaping the ear engaging portions of the tubes.

In an alternative embodiment especially well suited for mass production of the headset the slider member 30 may be constructed as shown in FIG. 5. In accordance with this embodiment the slider member comprises first and second identical elements 31a and 31b each having a pair of longitudinally extending semi-cylindrical grooves 32 and 34 so that when the elements are assembled together in facing relationship they form a pair of parallel substantially cylindrical apertures in which the tubes 12 and 14 are adjustably held. The element 31a, for example, includes adjacent the right hand edge two projecting pins 33a which are molded integrally with the half-slider 31a and extend outwardly from the surface to engage and snap into a pair of aligned apertures 35b in the element 31b. Similarly, adjacent its left hand edge the half-slider 31b has a pair of integral pins 33b adapted to snap into correspondingly located apertures 35a. The two half-sliders 31a and 31b are assembled together, with the tubes 12 and 14 held in the cylindrical apertures 32 and 34, by firmly pressing the half-sliders together in face-to-face relation so that the pins 33a and 33b snap into their mating apertures. This two-piece construction of the slider member is particularly appropriate

for high volume production in that the two half-sliders 31a and 31b can be assembled on the tubes 12 and 14 after the ear engaging portions have been shaped.

The connector member 20 for connecting the headset assembly to a stereo sound source (not shown) is preferably constructed as illustrated in FIG. 6. Specifically member 20 is molded of a semi-rigid polymeric material such as PVC, has a pair of hollow probe portions in which the apertures 52 extend beyond the base of the probe portions. At the other end, member 20 has a figure 8 shaped aperture into which the unseparated lower ends 12b and 14b of the dual tubing may be pressed and cemented. At the bottom of aperture 53 the connector member is provided with a central web 55 which tightly engages the end of the dual tubing in a manner to prevent sound leakage between the two stereo channels. Thus, connector member 20 is a coupling probe of relatively inexpensive construction into which the dual conduit tubing, without splitting the lower ends 12b and 14b apart, is pressed and preferably cemented, thereby adapting the dual conduit tubing for facile connection to the dual channel audio source normally provided in the armrest (or seat back) of the aircraft, or other vehicle.

In use the headset is first taken in the hands of the user as shown in FIG. 2, the ear engaging portion of the tube 14 is looped over the left ear and tube 12 is looped over the right ear, after which the tip portions 16 and 18 are slightly inserted into the ear canals. Because of the flexibility of the one piece tubing structure, the foregoing arrangement would not per se be completely adequate to retain the headset on the user's head. To firmly secure the headset in position against accidental dislodgment the slider member 30 is moved upwardly along the tubes 12 and 14 to a position approximately adjacent the clavicle. At that position the slider member is frictionally retained in place on the tubes and operates to exert a slight downward tensioning force on each tube so that the ear engaging portions are retained securely and comfortably in position irrespective of the age, relative stature, or movement of the wearer.

While the present invention has been shown and described with reference to specific exemplar forms only, it will be apparent to those skilled in the art that it is not so limited but is susceptible to various changes and modifications without departing from the spirit and scope thereof.

We claim:

1. In a headset for conducting sound waves from a source to the ears of a user:

first and second elongated tubes each having at one end a portion adapted to engage an ear of the user, with said tubes being joined together over a substantial length near the other ends and having at said other ends a sound coupling member for operatively connecting said tubes to a sound source;

each of said tubes being of a relatively flexible and resilient polymeric material and formed to provide adjacent the ear engaging end a generally U-shaped configuration including a slightly arcuate leg portion adapted to extend upwardly behind the ear a more sharply curved portion adapted to extend over and to be supported by the ear and a tip portion affixed to the end of the tube and adapted to be inserted into the ear canal so that said tubes are dependently supported from the ears;

a slider member having first and second substantially longitudinally extending apertures, with said first and second tubes extending respectively through said first and second apertures, and said slider member being manually movable upwardly along said tubes to a position approximately adjacent the user's clavicle so that the upper portions of said tubes are effectively secured to the user's head in a manner substantially obviating inadvertent dislodgment.

2. A headset in accordance with claim 1 in which each of said tubes includes a reversely curved portion immediately adjacent the tip portion thereof for causing said tip portion to extend inwardly toward the ear canal from the plane of the U-shaped configuration.

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3. A headset in accordance with claim 1 in which separate substantially L-shaped semi-rigid members are rotatably attached to the U-shaped portions of the respective sound tubes thereby obviating the need for right-left orientation marking of the sound tubes.

4. A headset in accordance with claim 1 in which said tubes are formed of a flexible and resilient polymeric material selected from the group consisting of polyvinylchloride and polyethylene.

5. A headset in accordance with claim 1 in which said slider member comprises first and second half-slider elements, with each of said elements having a substantially planar inner surface and a pair of substantially parallel semi-cylindrical grooves extending the entire length of said surface, and with said first and second elements having cooperative fastening means for securing said elements together with said planar

surfaces disposed in facing contiguity to provide first and second substantially parallel apertures in which the sound tubes are adjustably retained.

6. A headset in accordance with claim 2 in which said tubes are distinguishably color-coded to provide for correct right-left orientation of the ear engaging portions.

7. A headset in accordance with claim 1 in which said sound coupling member is especially adapted for connecting to a stereo sound source and comprises first and second probe portions at one end forming a substantially figure 8 shaped aperture at the other end and web means intermediate said probes and said figure 8 aperture to tightly engage the end of the dual tubing in a manner to prevent sound leakage between the two stereo channels.

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