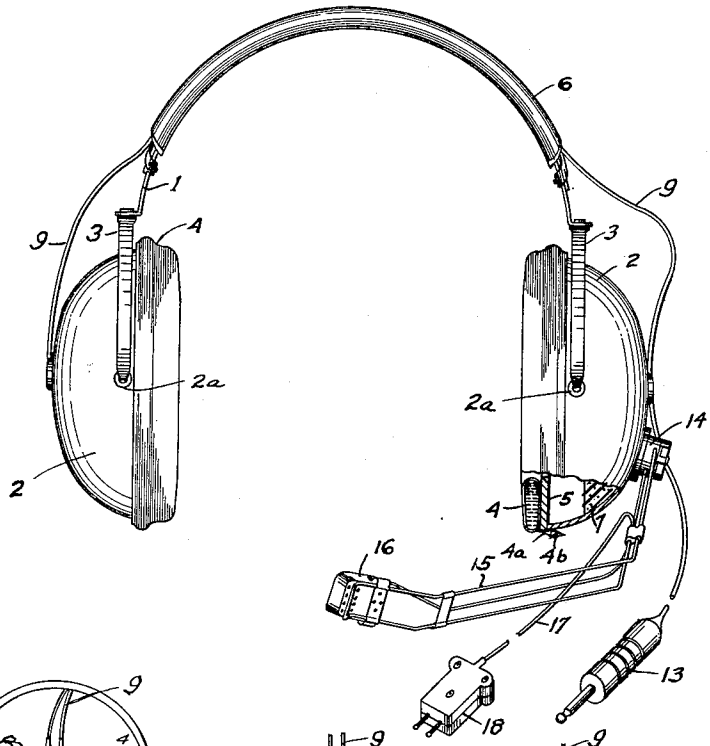
Dec. 26, 1961 J. N. SIMPSON ETAL 3,014,998

HEADPHONES

Filed March 24, 1960

Fig. 1.



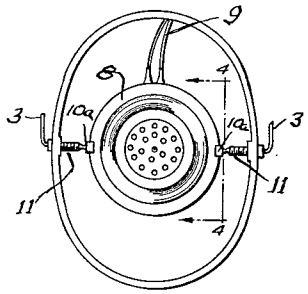


Fig. 2.

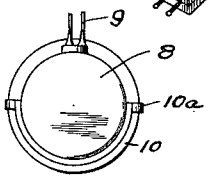


Fig. 3.

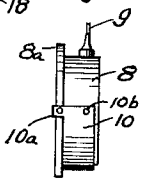


Fig. 4.

INVENTORS.

BY *Jack N. Simpson*
Warren C. Mauch.

William J. Ruano

ATTORNEY.

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HEADPHONES

Jack N. Simpson, Reading, Pa., and Warren C. Morch, Babylon, N.Y., assignors to The Electric Storage Battery Company, Philadelphia, Pa.

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This invention relates to improvements in headphones to make them more comfortable to wear over extended periods of time and to more effectively exclude extraneous, ambient sound, also to an improved mounting for the headphones so that special or standard earphones or receiver units may be used and may be removed in the event that the headphones are to be used solely as ear protectors for attenuating unwanted sound, such as factory noises.

An outstanding disadvantage of conventional types of headphones, such as used by telephone operators, is that after they are worn for appreciable periods of time they cause fatigue, discomfort and annoyance because of the uncomfortable fit of the headphones on or around the ears of the wearer, even when materials such as sponge rubber, cellular foam and the like are used as paddings; furthermore, such paddings are not effective for attenuating unwanted sound, such as in the case when the headphones are to be used by aviators or operating or maintenance personnel of jet airplanes and the like.

An object of the present invention is to provide a novel headphone set which is devoid of the above-named disadvantages and which can be comfortably worn for very long periods of time without causing fatigue to the wearer.

A further object of the present invention is to provide a radially detachable, fluid-filled cushion for providing not only a comfortable but a highly effective noise excluding seal about the ears of the wearer and to provide a relatively simple and inexpensive earphone or headphone mounting which enables the mounting of any standard earphone receiver units and the easy removal of the units in the event that the headset is to be used solely for the purpose of excluding unwanted sounds, such as in factories, jet-engine airfields and other noisy areas.

A further object of the present invention is to provide a headphone which is equipped with a boom microphone as well as earphones so as to be useful in communication systems for telephone operators, radio operators and the like, and which provides a high order of efficiency in attenuating outside noises of low and high frequencies and in obtaining high fidelity sound reproduction within the ear cups in which the earphones are mounted.

Other objects and advantages of the present invention will become more apparent from a study of the following description taken with the accompanying drawing wherein:

FIG. 1 is a front or elevation view, with a portion shown partly broken away and in cross-section and illustrating a boom microphone and a pair of headphones having receivers mounted therein so as to be useful for telephone and radio operators and the like;

FIG. 2 is an interior view of one of the cups shown in FIG. 1 with the base plate and fluid-filled ear cushion removed to more clearly show the interior mounting for the headphone receiver units;

FIG. 3 is a rear view of the receiver mounting shown in FIG. 2; and

FIG. 4 is a side view of the receiver mounting shown in FIGS. 2 and 3.

Referring more particularly to the drawing, numeral 1 denotes a headband of adjustable length and of any

well known type which supports a pair of ear cups 2—2 which cups are preferably of plastic material, such as nylon, melamine, or other thermo-setting or thermoplastic material and are of substantially hemispherical shape in order to obtain high fidelity sound reception. The cups 2—2 are provided with recesses 2*a* which serve as pivots or bearings for receiving rounded or pointed end portions of yokes 3—3 which pivotally support the cups so that they may be adjustably tilted along horizontal, parallel axes and fitted to the head of the wearer.

The ear cups 2—2 are preferably provided with tubular, fluid-filled liners or cushions 4—4 made of any suitable flexible material, such as plastic, for example, a polyvinyl plastic which is sufficiently pliable so as to readily conform to the shape of the portion surrounding the ear of the wearer and provide a comfortable fit, but sufficiently thick to minimize puncturing.

The cushions 4—4 are partially filled with fluid, preferably a liquid, to the extent of perhaps ¼, or slightly less than capacity of the total volume of the cushion. This liquid is preferably a mixture of water and glycerine, perhaps 70% glycerine and 30% water, for use in all climates although this proportion may be varied somewhat and in extremely warm climates only about 20% glycerine need be used. Even water alone is useful but optimum results are obtained by the addition of glycerine.

In order to make the fluid-filled cushions 4 readily detachable and easily removable in the event of the need of replacement, such as in the case of a leaky ear cushion, or sanitary measures, an integral thin plastic ring 4*a* is provided throughout the entire periphery of each cushion, preferably comprising two superimposed layers, one extending from each side of the cushion. There is sandwiched between the two layers forming the flanges 4*a*, a rubber or other flexible material ring 4*b* which is under a degree of tension so that it will grasp the ear cups around a flanged portion thereof so as to secure the fluid-filled cushions in place. Of course, when it is desired to remove the cushion, this can be done merely by pulling upon the flexible bands 4 and extending their diameters so as to allow the ear cushions to be slipped off and thereby replaced.

It is important to eliminate the air in the liquid filling which may be accomplished by evacuation followed by a squeezing out process. The ear cushions rest against annular base plates 5 within the ear cups as shown more clearly in FIG. 1. Such fluid-filled cushions conform to the ear-surrounding parts and provide a very easy and comfortable fit so that the headphones may be worn for extended periods of time without discomfort to the wearer.

An important feature of this invention resides in the mounting for the headphone which mounting comprises a sponge-type insert 7 against which is supported or rested headphones or receivers or earphones 8 of any well-known construction which are connected by means of wires 9 to the receiver (not shown).

A yoke 10 of substantially semicircular shape is provided which encircles about half the diameter of the headphone 8 and has ears 10*a* which are flanged so as to fit about diametrically opposite portions of the headphone 8 and thereby securely hold it in place. Into suitable holes, such as 10*b* of the yoke, there are inserted the ends of mounting screws 11, which screws may be provided with kerfed heads into which a suitable tool may be inserted or flats for wrench type tool for turning the screw and thereby clamping the yoke between the radially inwardly extending ends of the screws. Upon removal of such tool, the hole, recess or well portion of the heads of the screws may serve as bearings for the in-

wardly projecting ends of the earcup-supporting yokes 3—3. Thus the yoke eliminates the necessity of changing the construction of the standard headphone 8. And when it is desired to use device merely for the purpose of excluding outside noises, this can be done simply by removing screws 11 which enables complete removal of the headphones 8.

The headphones are also provided with a mounting element 14 which is supported by providing a hole in one of the cups 2, which mounting element supports stiff wires or rods 15. At the end of rods 15 there is mounted a microphone 16 of any well known type which is connected by means of wire 17 to a jack 18 which is plugged into a radio transmitter or telephone transmitter or the like.

Of course, when it is desired not to use the boom microphone, it is merely necessary to remove the mounting element 14, or to at least remove the wires 15 supported therefrom.

Thus it will be seen that there is provided, in accordance with the present invention, a highly efficient headset which can be used either for the sole purpose of excluding or attenuating very loud sounds or noises, such as jet engine noises, factory noises, and the like, or which may be used by telephone or radio operators or others who wear headphones for long periods of time, and which are provided with fluid-filled cushions which enable wearing of the headphones for such long periods of time without tiring the operator; furthermore, there is provided a novel mounting for the headphone so as to make it easy to insert or remove the headphone or earphone or receiver at will, also which provides high-fidelity reception from the headphones.

While we have illustrated and described a single specific embodiment of our invention, it will be understood that this is by way of illustration only, and that various changes and modifications may be made within the contemplation of our invention and within the scope of the claims.

We claim:

1. A headphone set comprising a pair of cups for surrounding the ears of the wearer, a mass of resilient material contained in the base of each cup, an earphone resting against said mass, a semicircular yoke supporting the earphone in each cup, a pair of screws extending radially inwardly horizontally from diametrically opposite portions of each cup and having inner ends projecting into said yoke for supporting it in position.

2. A headphone as recited in claim 1, together with a head-surrounding band, a yoke supported on each end of said band, the outer ends of said screws having well portions serving as bearings for receiving the extremities of said last mentioned yoke to permit pivotal movement therewith.

3. A headphone set as recited in claim 1 together with a tubular cushion of flexible plastic material surrounding the mouth portion of each of said cups and being partially filled with a fluid.

4. A headphone set as recited in claim 3 wherein said fluid completely fills said tubular cushion.

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