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DEVICE FOR PROTECTING EARS FROM NOISE

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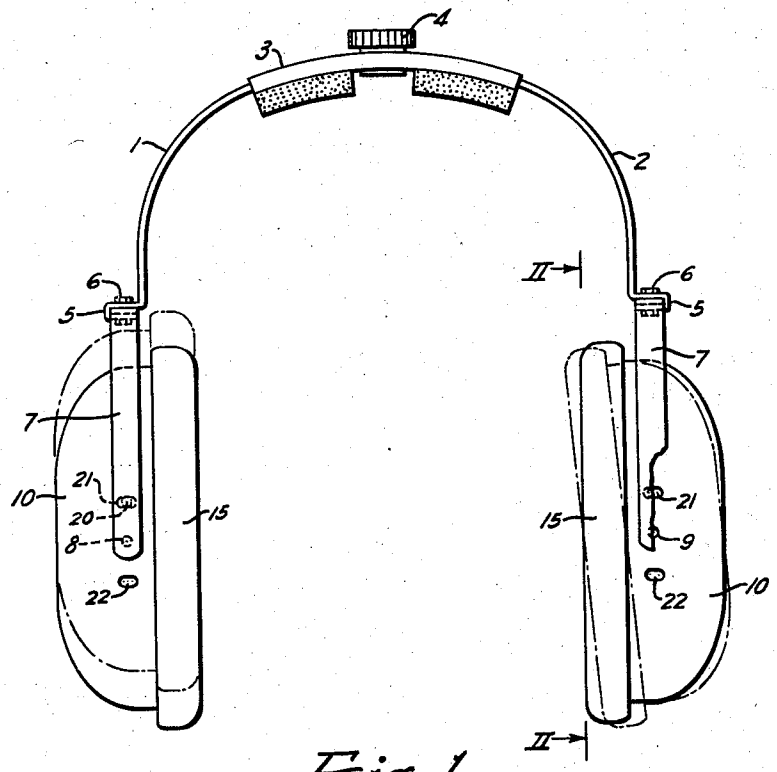


Fig. 1

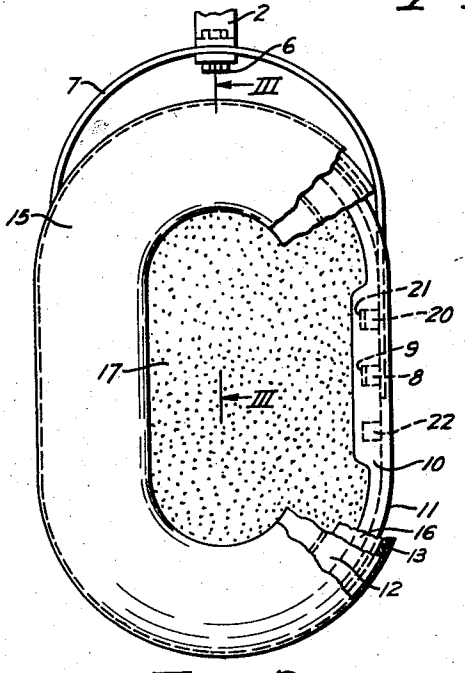


Fig. 2

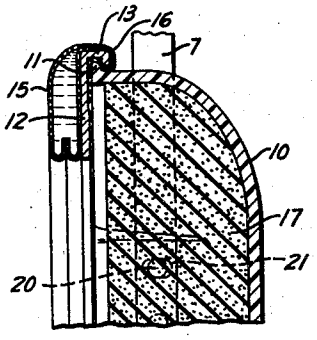


Fig. 3

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DEVICE FOR PROTECTING EARS FROM NOISE

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4 Claims. (Cl. 2—209)

This invention relates to devices for covering the ears to protect them from noise, and has for its objects the provision of such a device which is of simple construction, which has improved noise-sealing engagement with the head around the ears, and in which the ear covering members are tiltable and adjustable vertically relative to their support.

In accordance with this invention, each of a pair of ear covers includes a cup adapted to fit over an ear and provided around its free edge with a laterally projected bead. A thin ring extends from the cup bead part way across the cup and is provided with a peripheral flange that is hooked over the bead to hold the ring in place. Engaging the outer surface of the ring is a tubular annular cushion, from the circumference of which a flexible skirt extends back across the ring flange and then forward between the flange and bead and inward between the ring and cup to hold the cushion in place. The cushion is filled with liquid. The ear covers are held against the head around the ears by means of a headband that extends across the top of the head and has inverted U-shaped yokes at its opposite ends. Pairs of vertically spaced pins project toward each other from the lower ends of each yoke, and each of the cups is provided at opposite sides with a central circular recess and substantially parallel elongated recesses above and below it. These are for receiving the pins to permit tilting of the cups and vertical adjustment of them in the yokes.

The preferred embodiment of the invention is illustrated in the accompanying drawings, in which

Fig. 1 is a front view of our noise protection device;

Fig. 2 is an enlarged view of the inner side of one of the ear covers, partly broken away; and

Fig. 3 is a fragmentary vertical section taken on the line III—III of Fig. 2.

Referring to the drawings, a headband is provided which may be of any suitable construction that will extend across the top of the head and a short way down the sides. The one shown includes a pair of spring metal strips **1** and **2**, the upper portions of which are slidably mounted in a cover member **3** that contains an adjustment knob **4**, by which the springs can be moved lengthwise toward and away from each other to adjust the width of the band. This mounting forms no part of this invention and therefore will not be described in greater detail. The outer or lower end of each spring is bent out into substantially horizontal position and then down to provide a narrow flange **5**. The horizontal portion is connected by a nut and bolt **6** to the upper part of an inverted U-shaped yoke **7** that engages the bottom of that portion and the flange **5**. Each yoke is also made from spring metal and has substantially parallel side portions as shown in Fig. 2.

Near the lower end of each side of each yoke there is an inwardly projecting pin **8**. These two pins on each yoke project into circular recesses **9** in the opposite sides of a cup **10** forming part of an ear cover. The

cup preferably is made from a rigid plastic and is oval with its major axis extending vertically. It can be tilted on the axis of the pins that support it at its center. As shown in Fig. 3, the free edge of the cup around its open side has an integral laterally projecting bead **11**. A thin ring **12** is disposed parallel to the plane of the cup opening and extends inwardly from the cup bead a short distance across the cup. The outside of the ring is provided with a peripheral flange **13** having an inturned outer edge so that the flange will hook over the bead to hold the ring in place. The ring preferably is made from a suitable plastic and has a slight amount of flexibility to permit it to be pulled off the bead, or to be snapped over it during assembly. Its inner portion is thicker than its outer portion to give it more rigidity where it is most needed.

Engaging the outer surface of ring **12** is a tubular annular cushion **15**, which is made from impervious material, such as flexible thin sheet plastic. The cushion overlies the entire outer surface of the ring and has joined to its circumference, integrally or otherwise, a thin flexible skirt **16** that may be made of the same material. This skirt extends back across the outside of the ring and its flange and then extends inward and forward between the flange and bead as shown in Fig. 3. The skirt then turns again and extends inward between the ring and cup a short distance. Because the skirt is clamped in place between the ring and cup, it holds the cushion in position against the outer face of the ring. The cushion is filled with a suitable liquid, preferably glycerine or other low freezing point liquid. The cups preferably are nearly filled with sound-absorbing material **17**, such as plastic foam or sponge rubber.

When this device is placed in position on the head, the cushions are fitted around the ears, which extend into the cups a short distance. The cushions engage the head around the ears, and the pressure of the headband and yokes presses the cushions firmly in place. Due to their liquid filling, the cushions will conform themselves to the contour of the surfaces they engage so that a good seal will be formed entirely around each ear. Such a cushion has low rigidity, which is necessary if it is going to mold itself to the side of the head. Nevertheless, the cushion, being filled with liquid, has high density, so that it naturally reduces sound transmission through it.

Another feature of this invention is that the ear covers are adjustable vertically relative to the headband, which permits the device to fit substantially everyone. Accordingly, each yoke is provided about one-half inch above pins **8** with another pair of opposed pins **20** that project into recesses **21** in the opposite sides of a cup above circular recesses **9** when the cups are in their lower position shown in full lines in Fig. 1. Recesses **21** are elongated horizontally to permit the cups to tilt a limited amount in order to adjust themselves to the angle of the head they are engaging. The cups are also provided with elongated recesses **22** the same distance below the circular recesses as recesses **21** are above them. Consequently, by springing the sides of a yoke apart to permit the pins to be withdrawn from the cup recesses, the cup can be raised in the yoke until the pins snap into the lower pairs of recesses. Upper pins **20** then will project into the central recesses **9**, and lower pins **8** will project into the lower recesses **22**. The ear cover then will be supported in the dotted line position shown at the left in Fig. 1.

According to the provisions of the patent statutes, we have explained the principle of our invention and have illustrated and described what we now consider to represent its best embodiment. However, we desire to

have it understood, that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

We claim:

1. In a device for protecting ears from noise, a pair of ear covers, each cover comprising a cup having an open front adapted to receive an ear and provided around its free edge with a laterally projecting bead, a thin ring extending from said cup bead part way across the cup and provided with a peripheral rear flange hooked over the bead to hold the ring in place, a tubular annular cushion engaging the outer surface of said ring, a flexible skirt joined to the cushion at the circumference of the cushion and extending back across said ring flange and then forward between the flange and bead and inward between the ring and cup to hold the cushion in place, and sound absorbing material filling the cushion.

2. In a device according to claim 1, said ring having only enough flexibility to permit it to be removed from said cup bead, and the inner portion of the ring being more rigid than its outer portion.

3. In a device according to claim 1, a headband, an inverted U-shaped yoke on each end of the headband, and pairs of vertically spaced pins projecting toward each other from the lower ends of each yoke, each of said cups being provided at opposite sides with a central circular recess and substantially parallel elongated recesses above and below it, said recesses being spaced apart vertically to receive in each circular recess either of the two pins at that side of the cup while one of the adjacent elongated recesses receives the other pin, whereby the cups can be adjusted vertically in the yokes and can tilt therein to a limited extent.

4. In a device for protecting ears from noise a pair of ear cover cups, a headband, an inverted U-shaped yoke on each end of the headband, and pairs of vertically spaced pins projecting toward each other from the lower ends of each yoke, each of said cups being provided at opposite sides with a central circular recess and substantially parallel elongated recesses above and below it, said recesses being spaced apart vertically to receive in each circular recess either of the two pins at that side of the cup while one of the adjacent elongated recesses receives the other pin, whereby the cups can be adjusted vertically in the yokes and can tilt therein to a limited extent.

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