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R. H. SALISBURY ET AL  
EAR PROTECTOR

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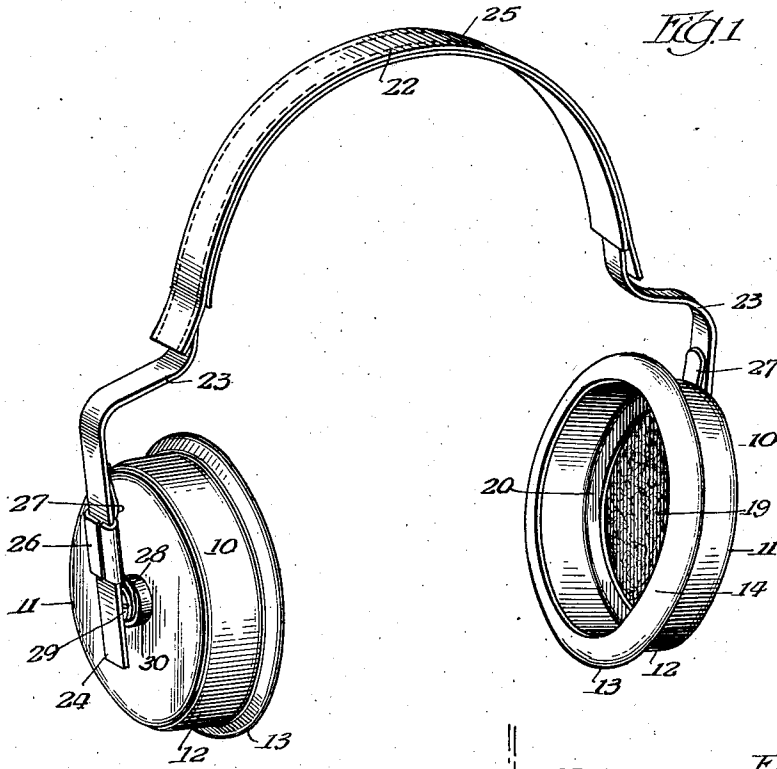


FIG. 1

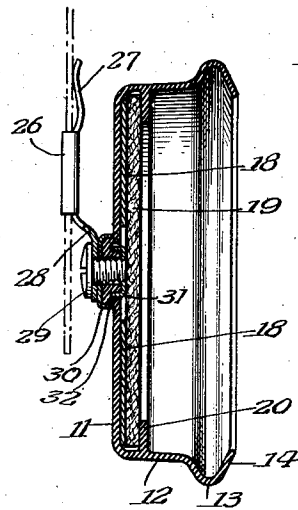
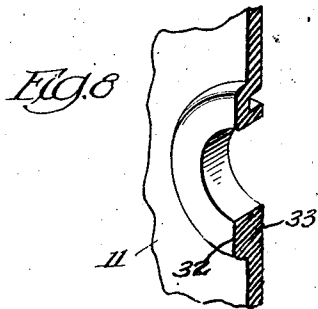
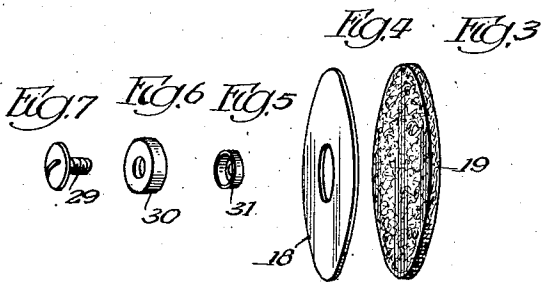


FIG. 2



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## UNITED STATES PATENT OFFICE

2,437,049

## EAR PROTECTOR

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1 Claim. (Cl. 128—152)

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The invention relates to ear protectors.

One object of the invention is to provide a simple and efficient device to be worn by workers in factories for muffling the noises which are generally known to cause human fatigue.

Another object of the invention is to provide a protector for this purpose which includes a cup which is adapted to enclose the bony structure in the rear of the ear which actively conducts sound and which is adapted to protect this bony structure from high frequency sounds, such as occur in factories where riveting is done.

Ear stopples, such as have been used, serve to damp out some of the sounds produced by riveting, but also prevent the worker from hearing the human voice.

Another object of the invention is to provide a protector which will damp out the high frequency noises, such as produced by riveting, while still making it possible for the worker to hear human voices.

Other objects of the invention will appear from the detailed description.

The invention consists in the several novel features hereinafter described and more particularly pointed out by claim at the conclusion hereof.

In the drawings:

Fig. 1 is a perspective of an ear protector embodying the invention.

Fig. 2 is a section of one of the ear drums.

Fig. 3 is a perspective of a fibrous sound-damping element.

Fig. 4 is a perspective of the stiffening element between the back of the ear cup and the damping element.

Fig. 5 is a perspective of the inner washer, and

Fig. 6, a perspective of the outer washer, which are used in clamping the cup to a retaining clip.

Fig. 7 is a perspective of the screw for securing the clip to the cup.

Fig. 8 is a detailed section of the elastic cup.

The invention is exemplified in an ear protector which comprises a pair of cups 10 which are formed of soft or flexible rubber and are adapted to enclose a pair of human ears and to extend around the bony structure rearwardly of the ears. Each cup 10 comprises a transverse back-wall 11, an integral cylindrical portion 12, and an annular bead 13 terminating in an angular inwardly extending flange 14. The flexibility of the flange 14 and bead 13 permit the cup to adapt itself to the contour of the anatomy around the ear and the bony structure in the rear thereof without excessive pressure. A disc

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18 of suitable rigid material fits against the flexible back-wall 11 of the ear cup and functions as a stiffening element. A disc 19 formed of any suitable sound-damping materials, usually fibrous, is retained in the cup and against disc 18 by a rib 20 which extends inwardly from and is integral with the cylindrical rim portion 12 of the cup. The cups are yieldingly held around the ears by a holder which is formed of a resilient strip of metal and comprises a curved portion 22 adapted to fit around the head, angular outward bends 23, and integral terminals 24. The portion 22 of the head-piece is preferably provided with a suitable protective covering 25 of soft material, such as leather. Each cup is slidably connected to one of the terminals 24 of the head-piece by a clip 26 which fits around the terminal, is frictionally held thereon by a resilient tongue 27, and is connected to the cup. Each clip is provided with an offset extension or ear 28. The clip is connected to the cup by a screw 29 which extends through an outer cup-shaped washer 30 and is threaded to an inner cup-shaped washer 31. The back-wall 11 of the cup is provided on its back face with an integral projecting portion 32 around which the flange of washer 30 fits and with an annular groove 33 on its inner face into which the flange of the inner washer 31 fits. This provides a flexible connection between the clip 26 and the cup which permits the cup to angularly position itself to conform to the contour of the surfaces of the head around the ear.

The invention exemplifies an ear protector which is adapted to damp out high frequencies of sound by covering the entire ear and the bony structure to the rear thereof, which is simple in construction and which does not prevent the wearer from hearing spoken sounds so that the protector has a much higher safety factor than ear stopples placed in the outer ear cavities which are unsanitary and blank out all sounds.

The back 11, cylindrical portion or rim 12, and the projection for the outer washer are integrally formed of relatively soft rubber or other elastic material and the cup will be light in weight. The stiffening and damping disks are removably held in the cup by the rib 20 of elastic material. The washers, back and screw provide a simple flexible connection between the cup with the stiffening plate therein and the supporting clip.

The device in its entirety is simple in construction, light in weight, composed of separable parts, and efficient in operation.

The invention is not to be understood as lim-

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ited to the details described since these may be modified within the scope of the appended claim without departing from the spirit and scope of the invention.

Having thus described the invention, what we regard as new and desire to claim by Letters Patent is:

An ear protector comprising, a cup of relatively thin elastic material, with a substantially flat back-wall and an integral annular rim adapted to extend around the ear and the bony structure thereof, a supporting device, means, including cup-shaped washers of different diameters and engaging the opposite faces of said back wall and a screw, for clamping the washers against the central portion of the elastic back-wall and connecting said portion of the back-wall to the device, with the circumferentially outward portion of the back-wall free to be flexed angularly relatively to its central portion, a substantially flat stiffening plate having one of its faces fitting against, and free for angular movement with, said outward portion of the back-wall, a substantially flat sound-damping disk fitting

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against the other face of the plate, and an annular member in the annular rim, for removably confining the plate and disk between the back-wall and said member and in outwardly spaced relation from the free end of the rim.

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