Feb. 4, 1941. E. BAUM 2,230,738

EARDRUM PROTECTOR

Filed Oct. 27, 1939

Fig. 1.

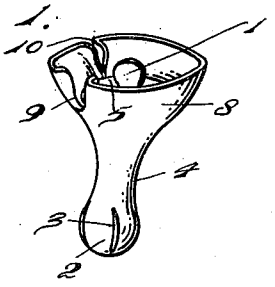


Fig. 2.

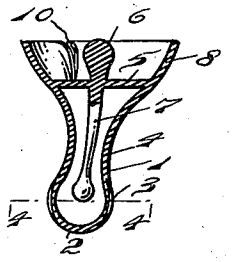


Fig. 5.

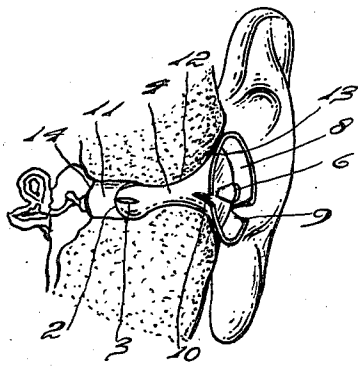
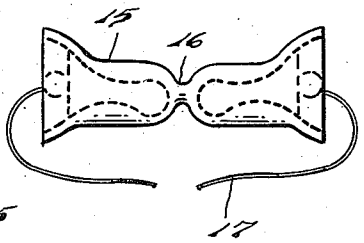


Fig. 6.



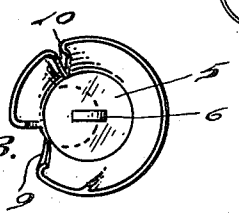


Fig. 3.

Fig. 4.

INVENTOR

Edward Baum

BY

Herbert F. Fairbanks

ATTORNEY

Patented Feb. 4, 1941

2,230,738

UNITED STATES PATENT OFFICE

2,230,738

EARDRUM PROTECTOR

Edward Baum, Philadelphia, Pa.

Application October 27, 1939, Serial No. 301,529

1 Claim. (Cl. 128—152)

In my prior Patent No. 1,344,935, of June 29, 1920, I described and broadly claimed a novel eardrum protector.

My present invention, while employing some of the features of my prior patent, has additional advantageous features of construction which I have found in practice to give new and improved results.

Many classes of people in their regular line of duty, such as soldiers, sailors, gunners, airplane pilots, riveters, divers, bathers and other persons, have their ears subjected to a bombardment of injurious, missile like sound vibrations caused by air disturbances emanating from or incident to their occupations. This causes a gradual thickening and in some cases rupture of the ear drums and results in impaired hearing or deafness.

The object therefore of this invention is to devise a scientifically constructed and efficient device which can be readily inserted and removed by the user and will protect the ears from the action of abnormal sound vibrations, and also prevent the entrance into the ear of anything of an irritating or injurious nature.

With the foregoing in view, my invention comprehends a novel eardrum protector which can be inserted in the external ear canal to exclude the entrance of air sound or concussional waves or convections into the ear channel, thereby protecting the organs of the ear from excessive or injurious vibrations and indirectly protecting the entire nervous system from shock such as shell shock by severe sound vibrations.

It further comprehends a novel protector shaped to conform to the inner walls of the ear comprising a hollow pneumatic body portion with flexible walls with an inner sound absorbing member, and with a flexible flange portion at its outer end, and with pressure relieving grooves at its forward bulbous end. The protector is of reduced diameter intermediate its ends so that it can contract or flex while being inserted without creating injurious pressure, and will automatically expand when in place to adjust itself to the meatus of the user. The compression of air against the ear drum during insertion is prevented by the grooves as the forward end of the protector.

It further comprehends a novel protector having a novel construction of a flexible flange at its outer end and surrounding a grasping handle which is connected with the rear disc or plate which carries the sound absorbing member.

Other novel features of construction and advantage will hereinafter more clearly appear in the detailed description and the appended claim.

For the purpose of illustrating the invention, I have shown in the accompanying drawing a preferred embodiment of it, which, in practice, will give satisfactory and reliable results. It is, however, to be understood that this embodiment is typical only and the various instrumentalities of which my invention consists can be variously arranged and organized, and the invention is not limited to the exact arrangement and organization of these instrumentalities as herein set forth.

Figure 1 is a perspective view of an eardrum protector embodying my invention.

Figure 2 is a vertical section.

Figure 3 is a top plan view.

Figure 4 is a section on line 4—4 of Figure 2.

Figure 5 shows a sectional view of the human ear with the protector in place, and in perspective.

Figure 6 is a detail of a container with a pair of protectors therein.

Similar numerals indicate corresponding parts.

Referring to the drawing:

The protector is preferably made of flexible or elastic material such as rubber, so that it can be molded to form an integral structure.

1 designates the body portion which is bulbous or rounded at its forward end as at 2 and provided with longitudinally extending, circumferentially spaced grooves 3, which serve as drainage channels and to relieve compression of air when the protector is being inserted.

The body portion has a reduced neck 4, which is closed by a flexible or elastic diaphragm 5, to which a handle 6 is connected. The diaphragm 5 has also connected with it a flexible but relatively stiff rod 7, which acts as a sound absorbing member and terminates a desired distance from the front end of the body portion in a hall shaped portion.

The rear end of the body portion is provided with an outwardly flaring, flexible flange 8 having slots 9 and 10 with the marginal portions at the sides of the slots projected inwardly.

The diaphragm, handle and sound absorbing member are preferably formed in one piece and the diaphragm is then vulcanized to the body portion and contributes with the body portion to form an internal chamber with air contained therein.

In my prior patent, the forward end of the body portion had a thick wall but I have found that a thin wall substantially of the same thickness as the rest of the body portion gives better results as it can better conform to the contour

of the juxtaposed portions of the ear canal. The outer flange may be thinner than the wall of the body portion.

The ear canal 11 is of reduced diameter at 12, and flares outwardly at 13, see Figure 5, the drum being shown at 14.

In Figure 6 I have shown a container 15 for receiving a pair of ear drum protectors, the container being contracted at 16, so that it can be clipped to a display easel or other support. The protectors are sold in pairs connected by a string 17.

The manner in which my novel eardrum protector is used will now be clearly understood by those skilled in this art. The protector is held by the handle 6 and inserted into the ear canal. The sound absorbing member 7, moves forward to engage the inner wall of the forward end of the body portion which contracts as it passes through the portion 12 of reduced diameter of the ear canal. The air between the end 2 and the eardrum 14 passes out through the grooves 3. The internal air pressure in the chamber of the body portion causes the latter to assume the contour of the juxtaposed wall of the ear canal. The segmental flange 8 engages the wall of the ear canal at its outer end without creating an uncomfortable or painful pressure.

The diaphragm 5, the shock absorbing member 6, and the body portion 1, effectively prevent injury to the eardrum or to the inner ear.

I have found in practice that the use of the segmental flange 8 is of marked advantage, since it closely fits the wall of the ear at the entrance end of the ear canal and prevents abnormal sound vibrations passing into the ear canal along the outer face of the body portion. It also enables one to use the same size of protector with ears having the ear canal of different dimensions.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

An eardrum protector comprising an elongated hollow body portion forming an air chamber, of reduced diameter intermediate its ends and terminating at its forward end in a bulb having a thin wall provided in its outer periphery with longitudinally extending, circumferentially spaced grooves forming ventilating channels to prevent compression on the eardrum when the protector is inserted into the ear canal and to prevent suction on the eardrum when the protector is withdrawn from the ear canal, a diaphragm sealing the rear end of said air chamber, a sound absorbing member extending from said diaphragm into said chamber, a flange flaring outwardly from the body portion, and a handle for said diaphragm.

EDWARD BAUM.