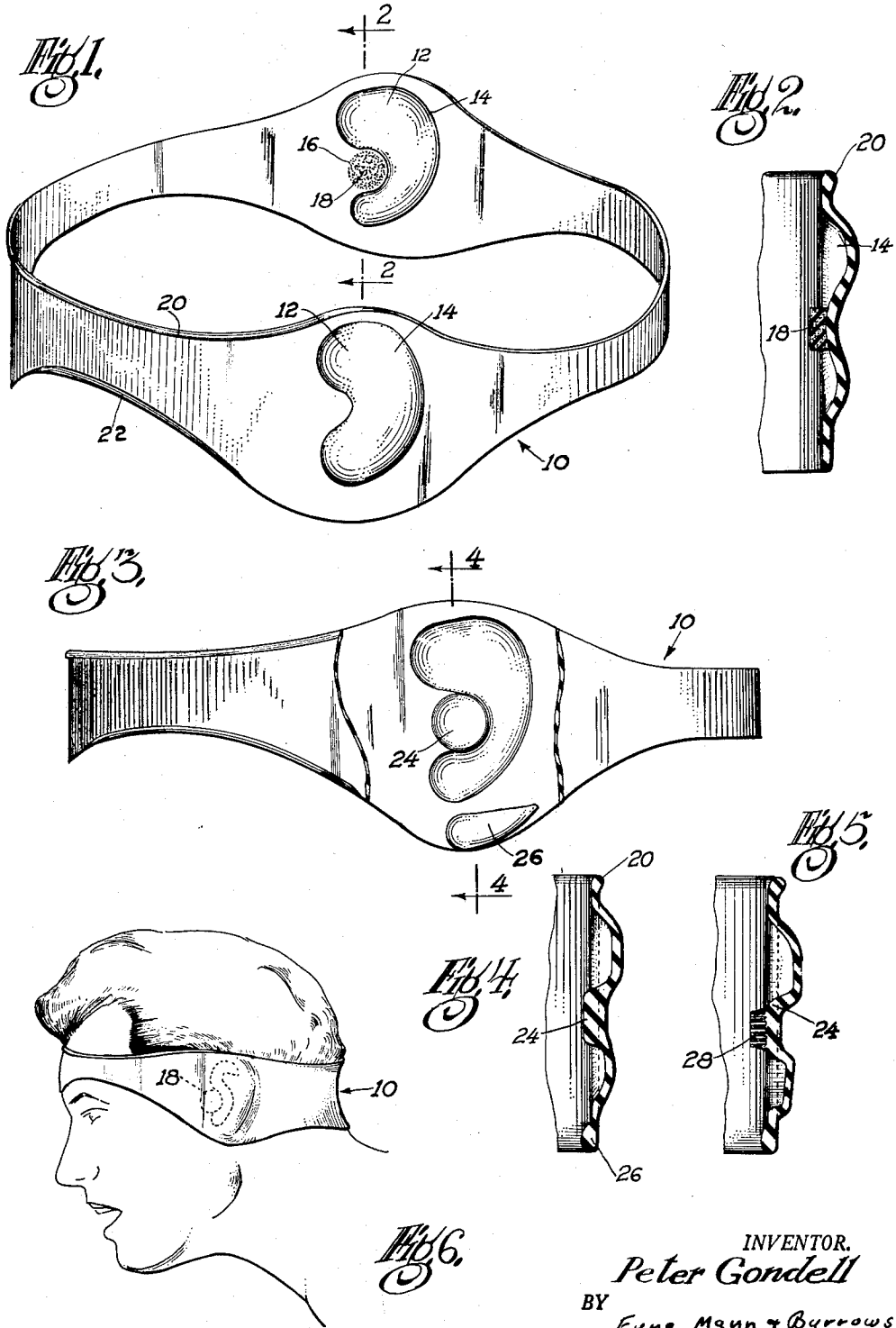


March 20, 1956

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EAR PROTECTOR
Filed May 21, 1953

2,738,514



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2,738,514

EAR PROTECTOR

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Application May 21, 1953, Serial No. 356,567

4 Claims. (Cl. 2—209)

This invention relates to an improved ear protector which is comfortable to wear and which provides a water-tight seal for the ears.

Many attempts have been made to produce a water-tight ear protector, but these have not proven entirely satisfactory because the protector either fails to follow the irregular contour of the head closely enough to prevent infiltration of water below and behind the ears, or it fits so loosely over the ears that it forms air pockets which provide a passageway for water to the inner ear.

I have now produced an ear protector made of an elastic band with a pair of recesses for the ears which substantially eliminate air pockets over the ears and which (because of the nature of the material) follow the contour of the bony structure around the ear so closely that they provide a highly efficient water-tight seal for the ears. This is accomplished by means of kidney-shaped recesses which are deep enough to receive the top and upper back part of the ear and which, like the ear, taper down toward the front and bottom. By tapering the recesses in accordance with the thickness of the outer ear, I substantially eliminate air pockets in the recesses and achieve uniform and even distribution of pressure against the bony structure immediately surrounding the ears. In my ear protector the characteristic kidney-like shape of the recess is extremely important because, with the recess formed in this way, I am able to use the material in the body of the band to effectively cover the canal leading to the inner ear. When this is done the inner ear canal is sealed off by the band which presses against the bone around the canal opening, giving added protection against infiltration of water. I have found that the effectiveness of this additional sealing action is materially increased by positioning a protuberance on the band which pushes the ear tragus down over the entrance to the inner ear canal. In this way the ear tragus provides a natural seal for the canal making my protector extremely effective for keeping water out of the ears.

In another form of my invention, increased protection against infiltration of water is achieved by making the material in those portions of the band which fit over the opening to the inner ear canal and against the neck under the ear lobe considerably thicker than the rest of the material in the band. When this is done, the thickened portions of the band form a bulb which, when the band is stretched, tends to turn inwardly towards the head thereby improving the fit of the band over the opening to the inner ear canal and against the neck under the ear lobe.

These and other advantages of my invention can be readily understood by reference to the accompanying drawing in which

Fig. 1 is a side view of my ear protector;

Fig. 2 is a section taken on line 2—2 of Fig. 1;

Fig. 3 is a side view of another form of my ear protector;

Fig. 4 is a section taken on line 4—4 of Fig. 3.

Fig. 5 shows another form of my invention. In this

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form of my invention the band is substantially the same as the one shown in Fig. 4 with the exception that it includes a protuberance such as that shown in Fig. 1; and Fig. 6 shows my ear protector as worn.

Turning now to Figs. 1 and 2 of the drawings, 10 is an elastic band of molded rubber having ear recesses 12 on each side which project out beyond the outer surface of the band and which are formed as an integral part of the band. Recesses 12 are in the general form of a kidney and have their maximum depth at 14. This maximum depth is about $\frac{3}{16}$ to $\frac{5}{16}$ -inch and ordinarily it is approximately $\frac{1}{4}$ -inch. As shown, recesses 12 gradually taper down at the front and bottom and may be made to merge into the body portion of band 10. In use, recesses 12 hold those portions of the outer ear that project from the head but all of the bearing pressure of the band is taken by the bony structure of the skull around the periphery of the outer ear. As a result there is no uncomfortable pressure against the ears. As shown at 16, the body portion of band 10 extends well into the central part of the kidney-shaped recesses 12, and when the protector is worn this part of band 10 passes over the ear tragus and into the outer ear where it presses against the bone surrounding the opening leading to the inner ear canal. The advantage of this construction is that the extension of the band at 16 provides a seal positioned directly over the opening to the inner ear canal, which gives additional protection against any water that may seep into the recesses from below and behind the ears. In the preferred form of my invention shown, a protuberance 18 on extension 16 of the body portion of band 10 is located where it will press the ear tragus down over the inner ear canal so that the tragus serves as a bulwark for sealing the canal. Protuberance 18 may be an integral part of band 10, or it may be a separate piece of sponge rubber or the like. At the front of band 10 are a pair of welts 20 and 22 positioned along the top and bottom portions of the band respectively. These welts improve the appearance of the band and increase its grip on the wearer's head.

The form of ear protector shown in Figs. 3 and 4 is substantially identical with the one shown in Figs. 1 and 2, but in this form of my invention the thickness of the body portion of band 10 is substantially increased on both sides as at 24 and 26. For example, if the material in band 10 is made $\frac{1}{8}$ -inch thick, then the portions marked 24 and 26 are preferably made approximately $\frac{1}{4}$ -inch to $\frac{3}{8}$ -inch thick, which represents an increase in thickness of band 10 of about $\frac{3}{8}$ -inch to $\frac{3}{4}$ -inch. When band 10 is worn, the thickened portions stretch less than the rest of the band and they tend to exert increased pressure against the bony structure of the skull. This materially increases the effectiveness of protection against infiltration of water. In this connection it is to be noted that the thickened portion of the band 26 forms a bulb which when the band is worn tends to turn inwardly to fill the neck cavity under the ear lobe. The band shown in Fig. 5 is the band of Fig. 4 but in this form of my invention the band includes a protuberance 28 which is made an integral part of band 10. As in Fig. 1 the protuberance in Fig. 5 is positioned in the band where it will bear against the ear tragus to press it down over the entrance to the inner ear canal.

If desired, my ear protector may be fitted with a top to keep the hair dry but I prefer the open band as shown, since it is not likely to be pulled from the head by suction of the water during diving or when swimming underwater.

Another advantage of the annular band open at top and bottom is that the tension within the band manifests itself in only one direction. That is the tension exists parallel to welts 20 and 22 and there is little, if

any, tension in the band perpendicular to the welts. Thus the material in the band will not readily fatigue and as a result it retains its original circumference for a long period of time. This prolongs the useful life of the band and enables me to use a highly elastic material for the band.

It will be understood that it is intended to cover all changes and modifications of the preferred embodiment of my invention herein chosen for the purpose of illustration which do not constitute departures from the spirit and scope of my invention.

What I claim is:

1. An ear protector comprising an annular elastic band which is adapted to fit snugly around the head, said band having a pair of ear recesses positioned in the body thereof on opposite sides of the band which project out beyond the outer surface of the body of the band when it is in position on the wearer's head, each of said recesses being in the general form of a kidney for holding only those portions of the outer ear that project from the head so that pressure of the body of the band is taken by the bony structure of the skull around the periphery of the outer ear, and said body of the band being extended into the central part of the kidney-shaped recesses to cover the ear tragus and cavity leading into the inner ear to press against the bone surrounding the opening leading to the inner ear canal, and said recesses having a maximum depth toward the top and back which

gradually tapers down toward the front and bottom of the recesses when the band is in position on the wearer's head, whereby a substantially watertight seal is achieved by means of the body of the band.

2. A structure as specified in claim 1 in which a protuberance is positioned on the body of the band adjacent and centrally of the front edge defining said kidney-shaped recess where it is adapted to bear against the tragus of the ear when the band is worn.

3. A structure as specified in claim 1 in which the material in the body of the band which lies below the kidney-shaped recess is substantially thicker than the rest of the material in the band so that it will stretch less than the rest of the band and exert pressure under the ear lobe and against the bone surrounding the opening to the inner ear respectively when the band is worn.

4. The structure as specified in claim 1 in which the annular elastic band is open at the top and bottom.

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