B. A. STAIR.

EAR STOPPER.

APPLICATION FILED MAY 29, 1918.

1,406,425.

Patented Feb. 14, 1922.

Fig. 1.

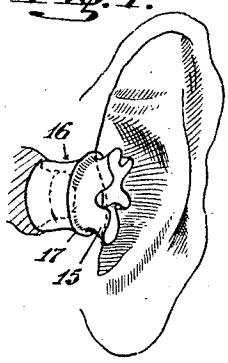


Fig. 2.

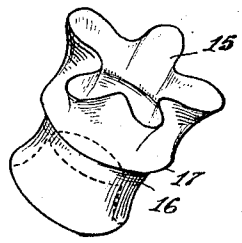


Fig. 3.

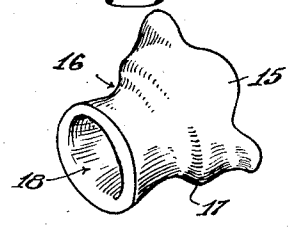


Fig. 4.

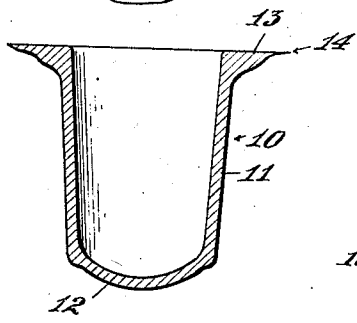


Fig. 5.

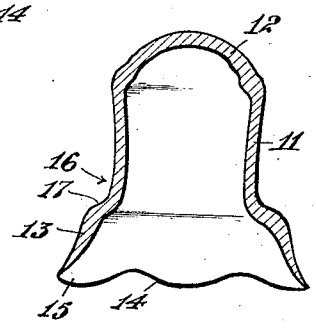


Fig. 6.

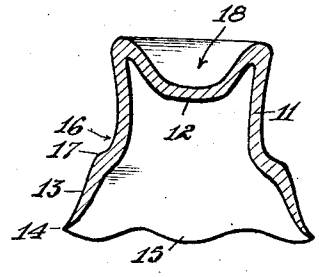


Fig. 7.

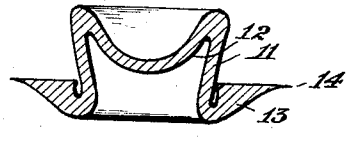


Fig. 8.

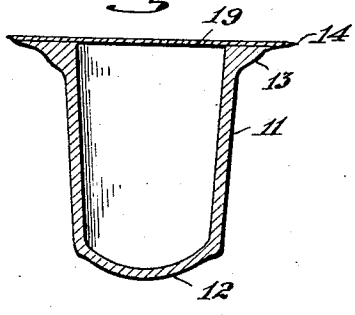
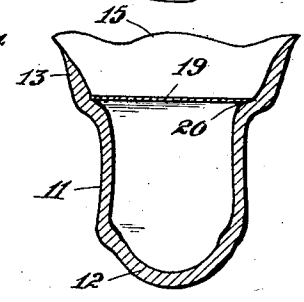


Fig. 9.



WITNESS:

Mary S. Elmhurst

INVENTOR.

Blaine A. Stair

BY

R. S. Berry,

ATTORNEY.

UNITED STATES PATENT OFFICE.

BLAINE A. STAIR, OF LOS ANGELES, CALIFORNIA.

EAR STOPPER.

1,406,425. Specification of Letters Patent. Patented Feb. 14, 1922.

Application filed May 29, 1918. Serial No. 237,288.

To all whom it may concern:

Be it known that I, BLAINE A. STAIR, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Ear Stopper, of which the following is a specification.

This invention relates to an ear stopper and has as its object to provide a device for closing the ear passage to prevent loud noises and concussions from affecting the sense of hearing and also prevent dirt and water from entering the ears.

Another object is to provide a device of the above character which is simple in construction and readily applied and which is so formed as not to be easily displaced. Other objects will appear hereinafter.

The invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a perspective view illustrating the stopper as applied.

Fig. 2 is a perspective view of the stopper as seen from its outer end.

Fig. 3 is a perspective view of the stopper as seen from its inner end.

Fig. 4 is a view of the body of the stopper in vertical section as formed in a mold.

Fig. 5 is a view in section showing the body as turned inside out.

Fig. 6 is a view showing the stopper in its complete form illustrating the manner of turning the bottom wall inwardly to form a suction cup.

Fig. 7 is a view showing the outer portion of the stopper folded back upon the body to give it a button-like shape to facilitate its being carried or packed.

Figs. 8 and 9 are view in vertical section illustrating modifications of the invention.

10 designates a flexible and elastic cup-shaped body made of rubber or rubber composition. This body is formed in a mold to have the shape shown in Fig. 4, that is, with a cylindrical side wall 11 slightly tapered and terminating at its reduced end in an outwardly domed or convex bottom wall 12 and with an outwardly projecting marginal flange 13 on its open end. The flange 13 is tapered in cross section from its juncture with the body to a wafer edge 14; the top or outer face of the flange being flat whilst the lower face is inclined in order to give the device its preferred shape as shown in Figs. 1, 2 and 3. The body is turned inside out as shown in Fig. 5 thereby causing the flange to be contracted at its juncture with the body so that its outer edge will be fluted or scalloped as indicated at 15. The cylindrical body portion will then converge from its closed end to form a reduced portion as indicated at 16 terminating in the shoulder 17 at the base of the flange 13; the shoulder forming a stop adapted to seat on the margin of the ear opening when the portion 11 is inserted in the ear channel as shown in Fig. 1. The bottom wall 12 is then turned inwardly as shown in Fig. 6 forming a depression on the inner end of the stopper comprising a suction cup 18.

The inturned end wall 12 provides a fullness which acts as a diaphragm and serves as a shock absorber to cushion sound waves impacting thereon; the inturned end being adapted to vibrate and on its movement outward or toward the interior of the ear under pressure from the interior of the stopple to effect a slight expansion or enlargement of the bulged inner end of the stopple within the ear canal. This, coupled with the divergent form of the plug portion of the stopple insures its remaining in place where a stopple of the proper size is used.

In the application of the invention the stopper is moistened and inserted in the ear, being pushed with the fingers and at the same time given a twisting motion. If properly inserted a little suction sensation will be felt in the ear, which is induced by the suction cup 18 and insures the stopper being held against easy displacement. The fluted or scalloped flange 15 serves as a means for readily grasping the stopper to remove same and also serves to insure against water entering the ear as the thin fluted edge will readily spread and extend over the margin of the ear opening when spread outwardly as would be the case when submerged.

In some instances it may be desirable to form the interior of the stopper with a dead air space in which event the cup-shaped body may be closed at its outer end by a wall 19 as shown in Figs. 8 and 9.

This wall may be placed on the body without turning the latter inside out as shown in Fig. 8 or it may be seated on a shoulder 20 formed at the base of the flange 13 as shown in Fig. 9. In either event the bottom wall 12 may be turned inwardly to form the suction cup 18 as shown in Fig. 6 or it may be disposed in the normal position shown in

Figs. 8 and 9 in event the suction cup is not desired.

I claim:

1. An ear stopper comprising a flexible cup-shaped body adapted to be inserted in the ear and having an inturned bottom wall, and an outwardly extending tapered flange on the margin of the open end of said body.

2. An ear stopper comprising a flexible cup-shaped body having an inturned bottom wall forming a suction cup on the bottom thereof, and a fluted flange on the open end of said body.

3. An ear stopper comprising a hollow cylindrical body portion formed with tapered side walls converging from its inner end, and having an inturned end wall closing its enlarged inner end adapted on application of pressure within the body portion to expand the latter at its inner end.

4. An ear stopper comprising a hollow body portion closed at one end by an inturned end wall, said body portion decreasing in diameter from its closed end toward its open end, an annular shoulder on the reduced end, and an outwardly diverging fluted flange on said shoulder adapted to be turned backward with the shoulder to encircle the body portion intermediate its ends.

5. An ear stopper comprising a hollow body portion having a bottom wall adapted to be inturned to form a cavity on the inner end of said body portion; said body portion formed with side walls converging from the bottom wall and having an outwardly extending annular shoulder at the termination of the convergent side walls adapted to seat on the margin of the ear opening, and a fluted elastic flange on said shoulder adapted to project outwardly from the ear opening.

6. In an ear stopper, a flexible cylindrical body, and an inturned cup shaped end wall on said body adapted on being subjected to pressure interiorly of said body to expand the latter.

7. An ear stopper, comprising a cylindrical body, and an inturned cup-shaped end wall on said body.

BLAINE A. STAIR.