Sept. 17, 1946. A. E. WOODRUFF 2,407,731

RECEIVER EAR PIECE

Filed Nov. 29, 1944

FIG. 1

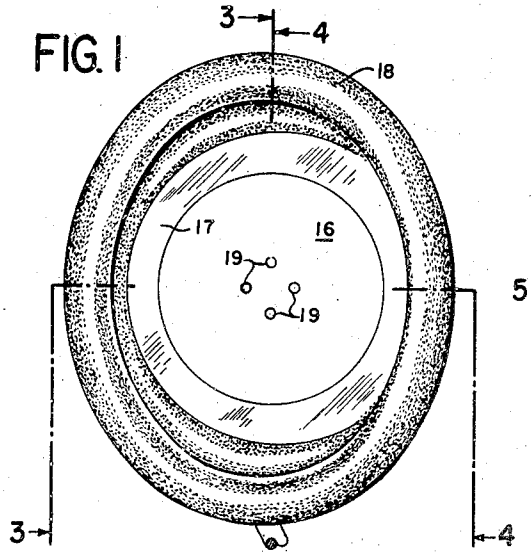


FIG. 2

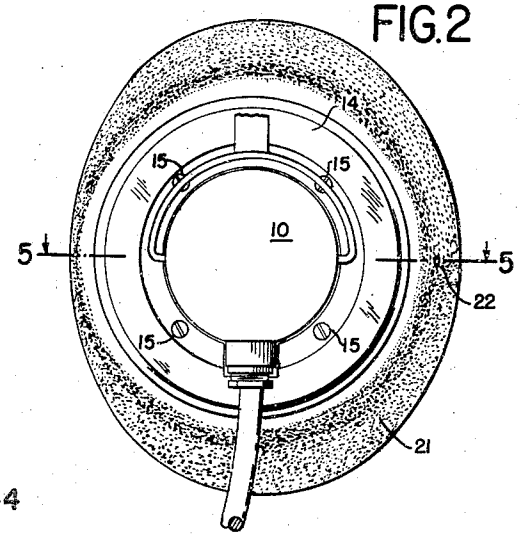


FIG. 3

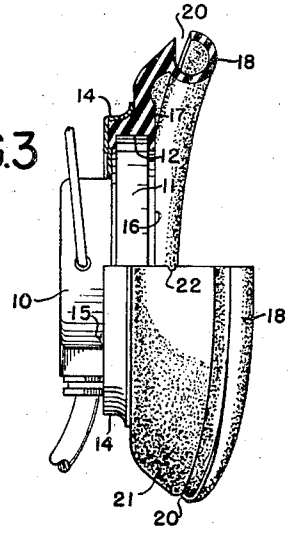


FIG. 4

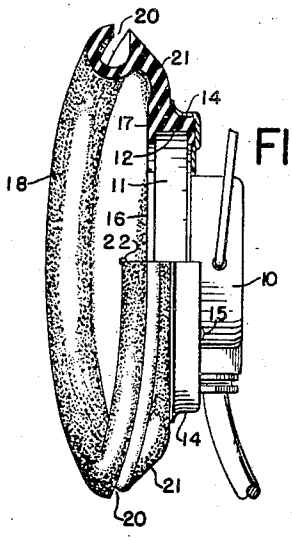


FIG. 5

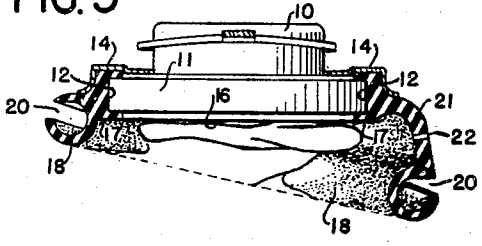
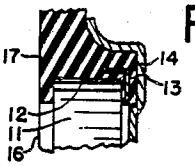


FIG. 6



INVENTOR.
ALBERT E. WOODRUFF

BY

ATTORNEY

Patented Sept. 17, 1946 2,407,731

UNITED STATES PATENT OFFICE

2,407,731

RECEIVER EAR PIECE

Albert E. Woodruff, Oak Park, Ill., assignor to Automatic Electric Laboratories, Inc., Chicago, Ill., a corporation of Delaware

Application November 29, 1944, Serial No. 565,640

4 Claims. (Cl. 179—182)

1

The present invention relates to improvements in earpieces for sound receivers of the type used in radio and telephone apparatus.

An important object of the invention is the provision of an improved head engaging member adapted to be detachably affixed to a telephone or radio receiver, whereby the receiver may be maintained in efficient working relationship to the ear of a person without physical discomfort to the wearer. A further object is the provision of a comfortable and efficient ear piece which excludes from the ear of the user all sounds other than those issuing from the receiver, thereby to eliminate confusing extraneous noises.

According to one feature of the invention, a cavity for receiving the whole ear of the user is provided, the rim of this cavity engaging the bony part of the head surrounding the ear so that the sound receiver is held against the user's ear without exerting any material pressure upon the ear itself. According to another feature, the rim of the cavity is formed as a hollow bead of flexible material slotted in a novel way to make the earpiece seat more comfortably upon the wearer's head, thus to support the receiver and at the same time close the cavity to extraneous sounds. Another feature resides in the arrangement for securing the earpiece to the receiver.

Other objects and features will be apparent from the following description taken in connection with the accompanying drawing, wherein

Fig. 1 is a front elevation of the receiver and earpiece,

Fig. 2 is a rear elevation of the receiver and earpiece,

Fig. 3 is a view partly in cross section taken along the line 3—3 of Fig. 1,

Fig. 4 is a view partly in cross section taken along the line 4—4 of Fig. 1,

Fig. 5 is a cross section taken along the line 5—5 of Fig. 2, showing the application of the improved earpiece to the head of a user, and

Fig. 6 is an enlarged cross sectional view, showing a detail of the earpiece construction.

The improved earpiece is formed of rubber or like flexible material, and is so shaped as to be symmetrical with respect to the plane indicated by line 5—5 of Fig. 2. It may be secured to the associated receiver 10 in any suitable manner, the preferred arrangement, however, being to provide on the receiver an outwardly extending flange or rim 11 which fits tightly into an annular groove 12 in the earpiece. The rear wall of the groove preferably is reinforced as shown in Fig. 6, by molding into the rubber a metal ring 13 of L-

2

shaped cross section. If this is done the earpiece may be attached to the receiver by passing the rear portion of the receiver through the central opening in the earpiece from the front side of the earpiece toward the back, and then temporarily distorting the front wall of groove 12 by bending or stretching the earpiece in order to permit flange 11 to be forced into the groove. When the flange is properly positioned in the groove, a metal retaining ring 14 is secured to the receiver by four screws 15, as shown, making it impossible for the earpiece thereafter to be loosened or detached from the receiver by accident.

As thus assembled, the face 16 of the receiver is flush with the inner front face 17 of the earpiece, and together these form the bottom of the cavity into which the ear of the user is placed. The rim 18 of the cavity engages the head of the user about his ear, the line of contact therebetween being generally oval in shape with the major axis of the oval extending longitudinally of the ear of the user. As best seen in Fig. 5, the contact surface of rim 18 lies in a plane oblique to the bottom of the cavity, whereby the cavity is deepest in the region behind the wearer's ear and shallowest in the region forward of the ear. This brings the face of the receiver snugly into contact with the wearer's ear and insures that the sounds issuing from the orifices 19 of the receiver will be projected directly into the auditory canal, while at the same time it avoids subjecting any part of the ear to such pressure as might lead to discomfort.

The rim 18 takes the form of a hollow annular bead whose outermost wall is severed by an opening 20 which extends as a continuous slot around the outer margin of the rim. This gives the rim a somewhat C-shaped cross section. As shown in Figs. 3–5, the slot 20 does not enter the bead 18 along a line radial to the bead, but along a line which makes one side of the slot tangent to the interior circular wall of the bead.

When the earpiece is applied to the head of the user, the bead 18 will yield readily at any particular point of contact until the slot 20 becomes closed at that point; then, due to the outer free edge of the bead being reinforced by the wall which it now abuts, it yields much less readily and hence transmits more of the applied pressure to the adjacent wall section 21 which will then also begin to yield. It will be noted that the wall 21 is considerably thicker than the wall of the bead 18, whereby very little deformation occurs in wall 21 before slot 20 is closed. The initial

yielding of bead 18 automatically adjusts the earpiece to irregularities along the line of contact with the wearer's head, whereby a substantially enclosed chamber is formed which excludes extraneous noises from the wearer's ear. A small hole 22 is provided in wall 21 to equalize the pressure of the air inside and outside this chamber.

The unit may be held against the wearer's head by any suitable means, this forming no part of the invention. The resultant pressure applied to the ear of the wearer will be very small, while that borne by his head is so well distributed that no discomfort can result.

Having described the invention, what is considered new and is desired to be protected by Letters Patent is set forth in the following claims.

What is claimed is:

1. In an earpiece for receivers of the class described, a body of flexible material including a hollow bead encircling the ear of the wearer so that one face of said bead engages the wearer's head, and an annular slot in the outer peripheral wall of said bead whereby the head-engaging face of said bead is supported solely by the inner peripheral wall of said bead.

2. In an earpiece for a sound receiver, a compartment into which the ear of the wearer is adapted to be placed to bring it into juxtaposition with the receiver, said compartment including a hollow annular bead of flexible material engaging the head of the wearer, an opening in said bead such that every cross section of the bead taken along a plane radial to the axis of said receiver is C-shaped, and said opening being so disposed in said bead that the yielding of said bead when it engages the head of the wearer tends to close said opening.

3. In an earpiece for a sound receiver, a compartment into which the ear of the wearer is adapted to be placed to bring it into juxtaposition with the receiver, said compartment including a hollow annular bead engaging the head of the wearer around his ear, an opening in said bead whereby every cross section of the bead taken along a plane radial to the axis of said receiver is C-shaped, with the open side of the C facing directly away from the axis of the receiver.

4. An earpiece as claimed in claim 3, wherein the walls of said compartment which are adjacent to said flexible bead are also flexible but to a lesser degree than said bead.

ALBERT E. WOODRUFF.