H. G. PAPE.

RECEIVER EARPIECE.

APPLICATION FILED APR. 15, 1921.

1,425,047. Patented Aug. 8, 1922.

Fig. 2.

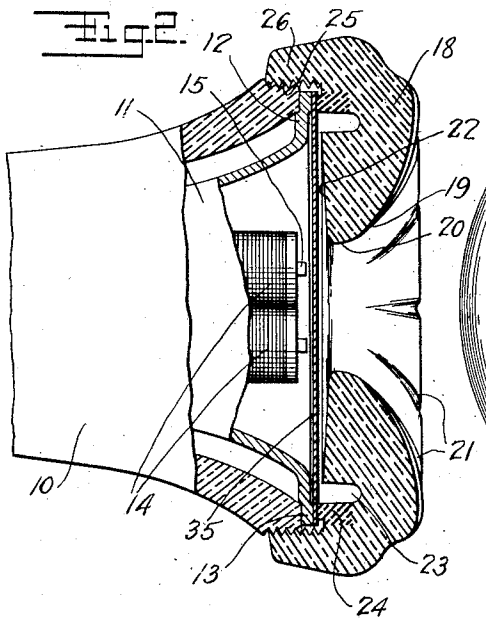
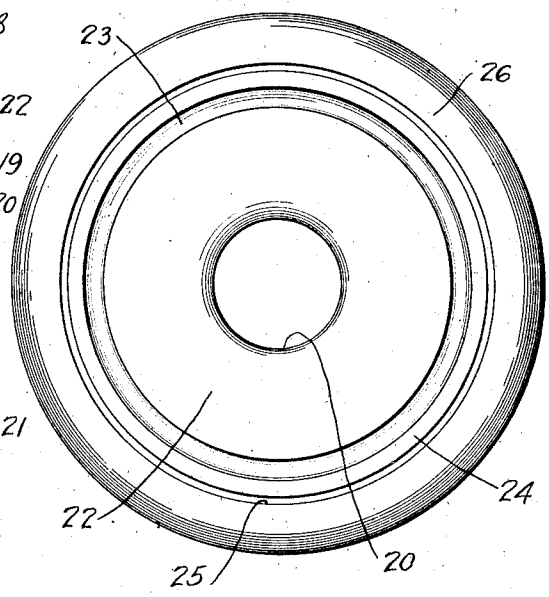


Fig. 1.



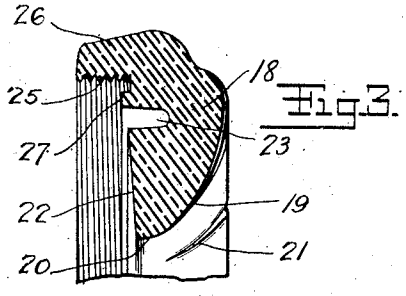


Fig. 3.

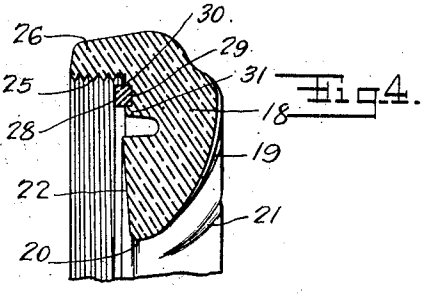
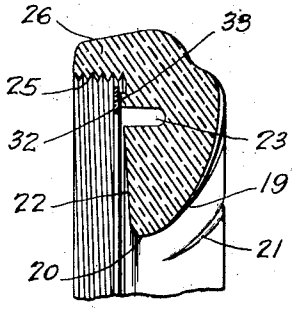


Fig. 4.

Fig. 5.



Inventor

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UNITED STATES PATENT OFFICE.

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RECEIVER EARPIECE.

1,425,047. Specification of Letters Patent. Patented Aug. 8, 1922.

Application filed April 15, 1921. Serial No. 461,484.

To all whom it may concern:

Be it known that I, HERMAN G. PAPE, a citizen of the United States, residing in New York, in the county and State of New York, have invented certain new and useful Improvements in Receiver Earpieces, of which the following is a specification.

The principal purpose of the present invention is to provide means combined with an ear-piece, whereby a diaphragm may be held in a level plane without distortion when clamped between two opposing surfaces constituting its seats.

A further object is to provide a yieldable surface for the reception of the diaphragm, such surface being preferably integral with the main element of the structure.

It is known that all materials are prone to change in their physical shape, due to inherent initial strains, molecular structure, climatic conditions, as humidity, temperature, etc., which are unavoidable and but partially overcome by seasoning processes. This applies to metals as well as rubber, shellac and synthetic compositions of matter used extensively in the construction of apparatus of the kind indicated, and irrespective of the accuracy originally secured on finished surfaces, the same are susceptible of becoming so warped or distorted as to seriously interfere with the functions they are expected to perform.

It is also known that in structures using diaphragms, such as telephone receivers, transmitters, etc., in which it is imperative that the diaphragms be clamped firmly at their periphery and held so as to vibrate freely at their center, the best results are attained only when the clamping surfaces, or at least the fixed surface, be truly flat and level, otherwise the sound produced is harsh and discordant, frequently to the extent of unintelligibility, due to a rocking effect or looseness, permitting fluctuations of rim portions of the diaphragm because of imperfect contact.

The object is then, broadly, in the provision of means by which a complete and satisfactory clamping of the diaphragm is secured, irrespective of surface conditions.

These objects are attained by the novel construction, combination and arrangement of parts, hereinafter described and shown in the accompanying drawings, forming a material part of this disclosure, and in which:—

Figure 1 is a rear elevational view of a conventional type of telephone receiver.

Figure 2 is a fragmentary side elevational view of the same, parts being in section, showing the application of the invention to the receiver shell, diaphragm and interior housing.

Figure 3 is a fractional sectional view showing an adaptation of the device.

Figure 4 is a similar sectional view showing a further modification.

Figure 5 is an other like sectional view illustrating another adaptation.

Referring in detail to the drawings, the numeral 10 designates in general the hand-piece or shell of a receiver, the same containing a sleeve or interior housing 11 having an expanded flange 12 terminating in a ring 13 overlying the larger, front end of the hand-piece.

Carried by the sleeve are a pair of magnets 14 having extending pole pieces 15 disposed slightly below the plane of the outer surface of the flange 12.

Engaged by external screw threads, formed on the largest diameter of the outer shell, is a cap or ear-piece 18, its outer surface 19 being convexly curved inward towards the central opening 20 and provided with a plurality of radial grooves 21 for the vibration or pulsational passage of air when in use.

The inner surface 22 of the ear-piece is slightly concave with walls leading from the opening 20 to an annular recess 23 extending partially through the thickest portion of the ear-piece.

The outer peripheral wall of the recess 23 is composed of softer, more pliable material than its main body, this material being in the form of a ring 24, the circumference of which extends to the screw threads 25 used to connect the annularly flanged portion 26 of the cap to the outer shell 10.

The invention resides principally in the formation of the elastic, pliable ring 24 and may be combined in one of several different ways.

These ear-pieces, when molded, undergo a

process of baking, analogous to that of vulcanization, during which provisions may be made to maintain the ring portion in a softer condition than the surrounding material.

Another method is to provide a more pliable ring made of a different, more elastic substance, and embed the same in the mold so that when treated as to become an integral part of the product.

It may also be possible to use a softening agent that will cause the molded ring to assume the function desired.

In the modification shown in Figure 3 the entire structure of the ear-piece is made of semi-hard material but capable of conforming, so far as the ring seat 27 is concerned, with the surface to which it is forced into contact.

In the adaptation illustrated in Figure 4 a pliable ring 28 is secured in an annular recess 29 formed between shoulders 30 and 31, the ring being embedded substantially half its thickness and held permanently in position by cement.

In Figure 5 a thin ring or gasket 32 is shown as cemented to a raised seat 33 for like purposes, it being understood that in both the latter devices the entire ear-piece structure is relatively hard throughout.

In operation, the face of the metal flange or ring 13 is drawn against the end of the hand-piece and the circular disc or metal diaphragm 35 is then applied so as to be acted upon by the pole pieces of the magnets 15, in a manner well understood in the art; the cap or ear-piece 18 is screwed into position, clamping the peripheral edges of the diaphragm firmly against the finished metallic seat of the ring 13.

Should this seat 33 vary originally from being truly flat or later become distorted, the flexible element 24 of the ear-piece will give way within a certain degree, but continue to clamp the diaphragm so as to prevent it from rattling or playing loosely even minutely, at the edge, while vibrations are imparted to it from the centre.

The same effect is attained by the entirely semi-elastic cap shown in Figure 3; substantially like results by the cap with the cemented ring in Figure 4, and to a lesser degree by the cap with the gasket indicated in Figure 5; thus all of the several varieties submitted perform the desired functions of an elastic clamp, or rear cap with integral self-rectifying diaphragm seat.

While certain preferred embodiments of this invention have been shown and described, it will be understood that changes in the form, arrangements, proportions, sizes and details, thereof may be made without departing from the scope of the invention as defined in the appended claims.

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

1. An earpiece having an adherent diaphragm clamping element of distinctly greater pliability than the main body thereof.

2. An earpiece having an integral clamping surface adapted to contact with a diaphragm, said clamping surface being distinctly softer than the body of the earpiece.

3. An acoustical member having an adherent, relatively soft, yielding ring adapted to make contact with a diaphragm, said member having a central perforation and a concave formation leading to the perforation.

4. A phonetic member comprised or relatively firm non-yielding material having a diaphragm seat of relatively soft, elastic and flexible material cohering thereto.

5. An ear-piece having a portion thereof softer than the body of adjacent material, said softer portion forming an integral part of said ear-piece.

6. An ear-piece having a diaphragm seat relatively yielding and more elastic than the main body thereof, said diaphragm seat forming an integral part of said ear-piece.

7. A diaphragm clamping device comprising a relatively rigid body having an adherent yielding diaphragm seat.

8. An ear-piece, in combination with a diaphragm and a support therefor, comprising an annular body having a central opening, means for engaging the ear-piece to said support, and an elastic seat in said ear-piece for said diaphragm, said seat constituting an integral part of said ear-piece.

9. An ear-piece, in combination with a diaphragm and a support therefor, comprising an annular body having a central opening, and an annular recess circumjacent thereto, of a flexible, yielding seat for said diaphragm circumambient the recess, adapted to clamp said diaphragm along its peripheral edge, and means formed with the body of said ear-piece engageable with said support.

10. A diaphragm clamping device for a phonetic instrument comprising a relatively firm non-yielding body and a diaphragm clamping surface affixed thereto of relatively greater pliability.

11. In an acoustical member, the combination with a diaphragm and a support therefor, of an annular body having a central opening, and an annular recess circumjacent thereto, a flexible, secured yielding seat for said diaphragm circumambient the recess, adapted to clamp said diaphragm along its peripheral edge, and means formed with said body engageable with said support.

12. In an acoustical member, with combination with a diaphragm and a support therefor, of an annular body having a cen-

tral opening, a secured flexible yielding seat adapted to clamp said diaphragm along its peripheral edge, and means formed with the body of said member engageable with said support, said member being of slightly concave formation on its inner surface leading from the diaphragm seat towards the central opening and merging outward into a pronounced deeper and trumpet bell like concavity.

In testimony whereof I have signed my name to this application.

HERMAN G. PAPE.