No. 752,705. PATENTED FEB. 23, 1904.

H. G. PAPE.

AUDIPHONE RECEIVER.

APPLICATION FILED OCT. 21, 1902.

NO MODEL.

Fig. 1.

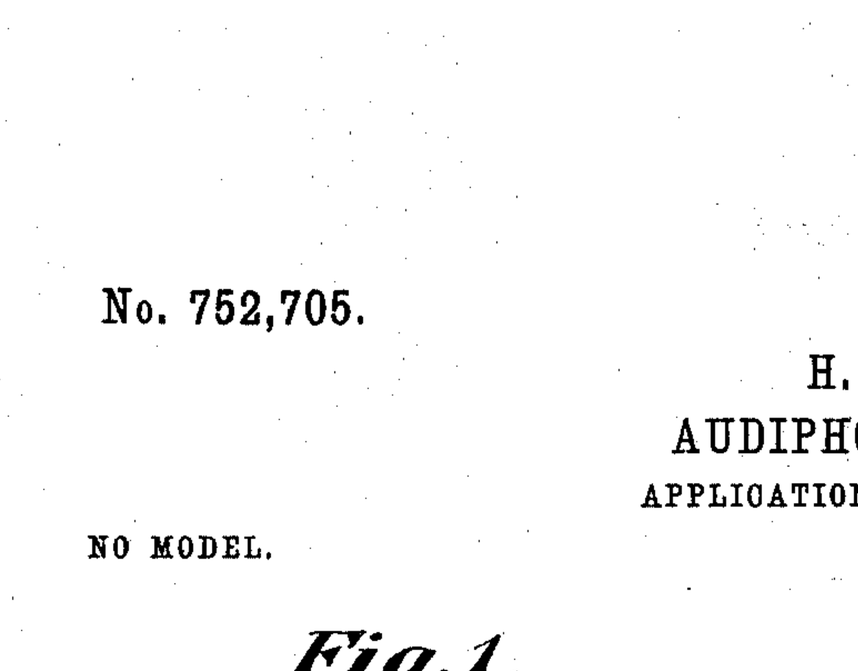


Fig. 3.

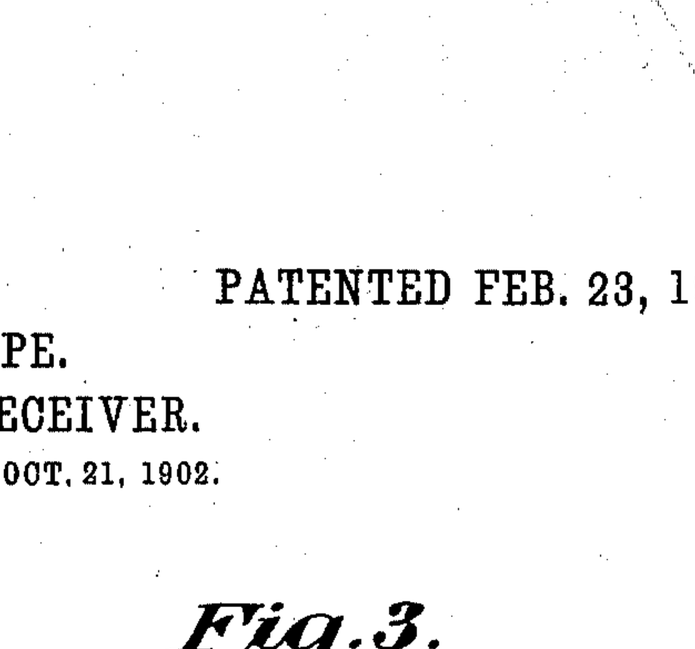
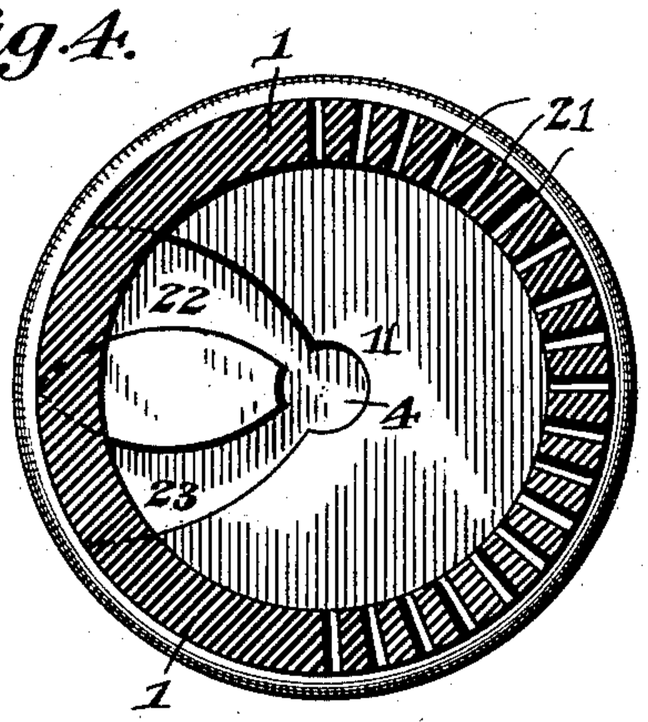


Fig. 2.

Fig. 4.



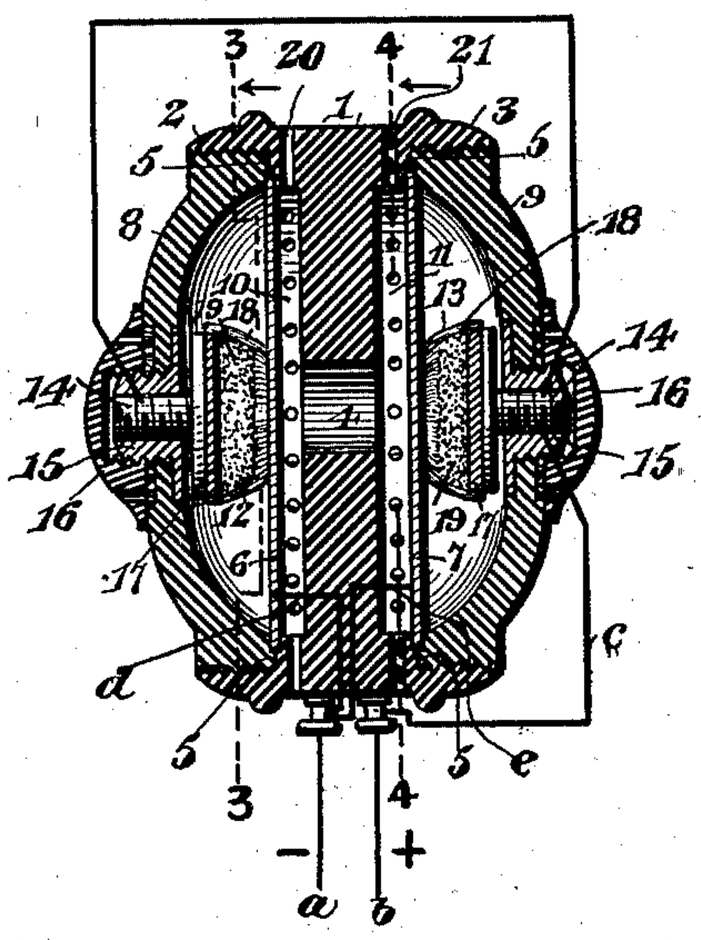
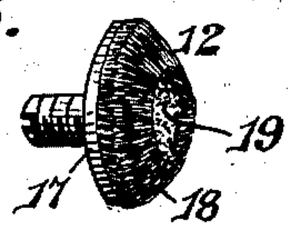


Fig. 5.



Witnesses
Jas. E. McCathran
Louis J. Julihn

Hermann G. Pape, Inventor

By E. G. Siggers

Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 752,705. Patented February 23, 1904.

UNITED STATES PATENT OFFICE.

HERMANN G. PAPE, OF BROOKLYN, NEW YORK, ASSIGNOR OF THIRTY ONE-HUNDREDTHS TO JAMES McVEY, OF NEW YORK, N. Y.

AUDIPHONE-RECEIVER.

SPECIFICATION forming part of Letters Patent No. 752,705, dated February 23, 1904.

Application filed October 21, 1902. Serial No. 128,191. (No model.)

To all whom it may concern:

Be it known that I, HERMANN G. PAPE, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented a new and useful Audiphone-Receiver, of which the following is a specification.

My present invention relates to audiphone-receivers of that type disclosed in my concurrent application, Serial No. 123,330, for Letters Patent.

As is well understood by those skilled in the art, the audiphone is an instrument for magnifying sound-vibrations, and is particularly designed for the use of deaf persons, the apparatus comprising an earpiece having electrical connection with a receiver, which latter corresponds in general function to a telephone-transmitter and is arranged to transmit to the earpiece sound-vibrations magnified by microphonic action.

In my concurrent application above identified the receiver is composed of two separable sides or sections, the electrodes of which are connected in multiple. Each side includes a diaphragm and a button-electrode, and a central sound-chamber is disposed to direct sound-waves in opposite directions against the central portions of the diaphragms. Provision is made for the dissipation of the sound-waves without reverberation after the diaphragms have been vibrated, and the sound-waves are led to the central sound-chamber through a receiving passage or funnel leading therefrom to the periphery of the receiver. These several features of construction are in general included in the present instrument; but the invention has for its primary object to intensify the vibrations of the diaphragms by a novel arrangement of receiving passages or funnels, which causes the sound-waves passing therethrough to impinge within the sound-chamber and to be thus projected with greater force against the diaphragms.

A further object is to improve and simplify the construction of the receiver-casing.

In the accompanying drawings, Figure 1 is a perspective view of the receiver. Fig. 2 is a diametrical sectional view thereof, showing the wiring in diagram. Fig. 3 is a section on the line 3 3 of Fig. 2. Fig. 4 is a section on the line 4 4 of Fig. 2, and Fig. 5 is a detail perspective view of one of the electrodes.

Like characters of reference are used to designate corresponding parts throughout the several views.

The casing of the receiver is made up of a central member 1, which is preferably a hard-rubber disk, provided at its periphery with oppositely-extending annular flanges 2 and 3 and at its center with a transverse opening constituting what may be termed a "central" sound-chamber 4. The opposite side faces of the central member or disk 1 are formed with circular cavities of less diameter than the internal diameter of the flanges 2 and 3, so as to define annular seats 5, against which are imposed the outer edges of circular diaphragms 6 and 7, of carbon or other suitable conductive material.

The diaphragms are retained upon their seats in parallel relation by externally-threaded concavo-convex cover-disks 8 and 9, screwed into the internally-threaded flanges 2 and 3, as clearly shown in Fig. 2. The surface cavities in the opposite sides of the disk 1 define sound-dissipating chambers 10 and 11 between the central member and the diaphragms, and the concavo-convex form of the cover-disks provides spaces between the diaphragms and said disks for the interposition of button-electrodes 12 and 13. The shanks 14 of the buttons are screwed into bushings 15, which are in turn screwed through the cover-disks 8 and 9 and are capped at their couter ends by hard rubber or other suitable caps 16, screwed upon the bushings.

The button-electrodes 12 and 13 are not novel, and their particular form is not an essential feature of the present invention. As shown in the drawings, however, they each comprise a disk 17, from the edge of which extends a fringe or wall 18, of silk or other fiber, inclosing granulated carbon 19, opposed to the adjacent diaphragm.

The peripheral wall of the casing is provided with circumferential series of openings 20 and 21, located in planes intermediate of

the disk 1 and the diaphragms and disposed radially and in parallelism with said diaphragms. These openings establish communication between the sound-dissipating chambers and the outer air and are designed (as stated at length in my concurrent application) to prevent such reverberation within the chambers 10 and 11 as would tend to impair the efficiency of the device.

The line-wires *a* and *b* of the circuit in which the earpiece (not illustrated) is included are led to binding-posts mounted on the receiver at any desired point—as, for instance, upon the periphery thereof, as shown in Fig. 2. From one of the binding-posts a wire *c* is led successively to the button-electrodes, the other side of the circuit being in electrical connection with both diaphragms through wires *d* and *e*, carried back to the other binding-post. By this character of wiring the two sides of the receiver are included in multiple in the circuit, and therefore while the electromotive force is increased by the duplication of the circuit-closing agencies the device is still useful for the reception and transmission of sound even though one side may become inoperative.

It will now be evident that sound-waves led to the central sound-chamber 4 will be projected in opposite directions against the diaphragms and having vibrated the latter will dissipate within the chambers 10 and 11, communicating at their margins with the outer air. This provision for overcoming reverberation within the receiver is one of the primary features of the invention claimed in the companion application, and the primary feature of the present invention is more particularly concerned not with the manner of disposing of the sound-waves after the diaphragms have been vibrated, but, on the contrary, with a novel arrangement of the means whereby the sound-waves are conducted to the central sound-chamber and are projected with greater force against the diaphragms.

By reference to Fig. 4 it will be seen that the sound-waves are conducted to the central sound-chamber 4 through inclosed receiving funnels or passages 22 and 23, formed in the central member or disk 1 and extending from the periphery of the casing of the sound-chamber. These funnels or passages have their larger outer ends in immediate juxtaposition and are longitudinally curved, as shown, to dispose their inner ends in angular relation, so that the sound-waves entering through these passages or funnels will impinge within the sound-chamber and will thus be deflected in opposite directions with considerable force, striking the diaphragms at their central or most responsive portions and thence dissipating within the chambers 10 and 11.

We have found in practice that the microphonic action of the receiver is increased by uniting the sound-waves received from a plurality of passages prior to the impact of the waves upon the diaphragm and that a greater activity is induced if the receiving passages or funnels bear such relation to the central sound-chamber that the sound-waves passing into the instrument through said passages will impinge within the chamber and be thus directed toward the diaphragm in a manner similar to that in which the flame is spread by a burner of the impinging type.

The operation of the receiver is as follows: Sound-waves produced by articulate or other sounds uttered in the vicinity of the receiver will pass through the inclosed receiving passages or funnels 22 and 23 and will converge to and impinge within the central sound-chamber 4. This impinging of the waves will cause their deflection in opposite directions from the sound-chamber and against the diaphragms, which latter will be vibrated to transmit corresponding vibrations to the diaphragm or diaphragms of the earpiece by the variation of the electrical resistance in the circuit. Having vibrated the diaphragms, the sound-waves will be dissipated in the chambers 10 and 11, within which reverberation will be prevented by the passages or openings 20 and 21, leading to the exterior of the receiver.

It is thought that from the foregoing the construction and arrangement of my audiphone-receiver will be clearly apparent; but I wish it to be distinctly understood that I do not limit myself to the structural details defined or to the use of the instrument in connection with audiphones, since it is obvious that changes, modifications, and variations of the illustrated structure might be effected or the instrument used in other relations—for instance, as the transmitter of a telephone apparatus—without departing from the spirit of the invention.

What I claim is—

1. An instrument of the character described, comprising a casing, electrodes one of which is a diaphragm; a central sound-chamber disposed opposite the center of the diaphragm, and a plurality of angularly-related receiving-passages extending parallel with the diaphragm and opening into the sound-chamber.

2. An instrument of the character described, comprising a casing, a pair of electrodes one of which is a diaphragm, a central sound-chamber formed in one wall of the casing opposite the diaphragm, and angularly-related receiving-passages formed in the chambered wall of the casing and extending parallel with the diaphragm with their point of convergence located within the sound-chamber.

3. An instrument of the character described, comprising a casing one wall of which is formed with a central sound-chamber, a pair of electrodes one of which is a diaphragm spaced from the chambered wall to form an intermediate sound-dissipating chamber, one or more openings leading from the sound-dis-

sipating chamber to the exterior of the casing, and a plurality of receiving-passages extending substantially parallel with the diaphragm from the exterior of the casing to the central sound-chamber.

4. An instrument of the character described, comprising a casing having a middle wall formed with a central sound-chamber, diaphragms spaced from the opposite sides of said wall, electrodes in operative relation to the diaphragms, and a plurality of receiving-passages leading from the exterior of the casing to the central sound-chamber.

5. An instrument of the character described, comprising a casing having a middle wall formed with a central opening defining a central sound-chamber, diaphragms spaced from the opposite sides of said wall, electrodes in operative relation with the diaphragms, and receiving-passages extending from the periphery of the casing to the central sound-chamber and having their inner ends disposed in angular relation to cause the sound-waves received from said passages to impinge within the sound-chamber and to pass in opposite directions to the diaphragms.

6. An instrument of the character described, comprising a casing having a middle wall, diaphragms spaced from said wall to define intermediate sound-dissipating chambers, electrodes in operative relation with the diaphragms, openings piercing the periphery of the casing in planes between the diaphragms and the middle wall, said middle wall being provided with a central sound-chamber extending transversely therethrough opposite the centers of the diaphragms, and angularly-related receiving-passages formed in the middle wall and extending from the periphery of the casing to the central sound-chamber.

7. An instrument of the character described, comprising a casing, diaphragms, coöperating electrodes, a sound-chamber intermediate of the diaphragms, and a plurality of inclosed receiving passages or funnels located wholly within the confines of the casing and extending from the exterior thereof to the sound-chamber.

8. An instrument of the character described, comprising a central member of circular form having an axial opening constituting a central sound-chamber, surface cavities in its opposite sides and internally-threaded oppositely-disposed annular flanges, diaphragms seated at their edges against the central member, externally-threaded cover-disks of concavo-convex form screwed into the annular flanges of the central member and clamping the peripheral edges of the diaphragms, button-electrodes carried by the cover-disks and operatively related to the diaphragms, openings piercing the outer wall of the central member between the diaphragms, and a pair of receiving passages or funnels formed in the central member and leading from the periphery of the casing to the central sound-chamber, the inner ends of said passages or funnels being disposed in angular relation to cause the sound-waves entering the instrument through said passages to impinge within the central sound-chamber and pass therefrom in opposite directions to the diaphragms.

9. An instrument of the character described, comprising a casing having a middle wall formed with a central transverse sound-chamber, diaphragms spaced from the opposite sides of said wall to define intermediate sound-dissipating chambers, electrodes coöperating with the diaphragms, a plurality of receiving passages or funnels formed in the middle wall of the casing parallel with the diaphragms and converging in the central sound-chamber, and a series of radial openings in the peripheral walls of the sound-dissipating chambers and parallel with the diaphragm, whereby the sound-waves passing through the receiving passages or funnels impinge within the central sound-chamber, are thence deflected in opposite directions against the diaphragms, and are permitted to dissipate through the openings in the peripheral walls of the dissipating-chambers to prevent reverberation.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

HERMANN G. PAPE.

Witnesses:
WILLIAM F. TAYLOR,
JOHN L. PETER.