

Aug. 4, 1925.

1,548,322

F. JAMES

SOUND INSTRUMENT

Filed Dec. 22, 1921

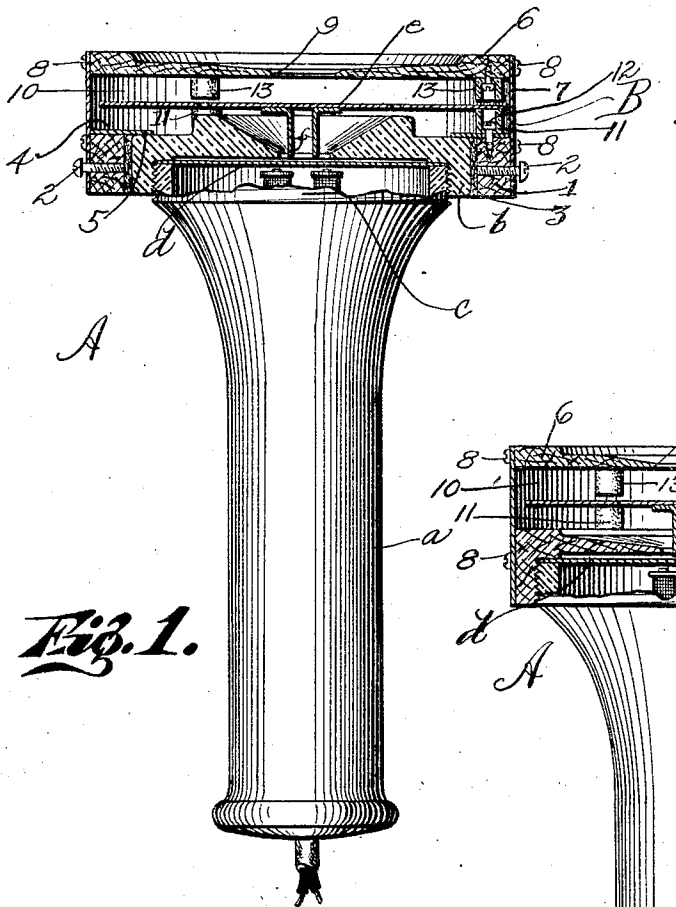


Fig. 1.

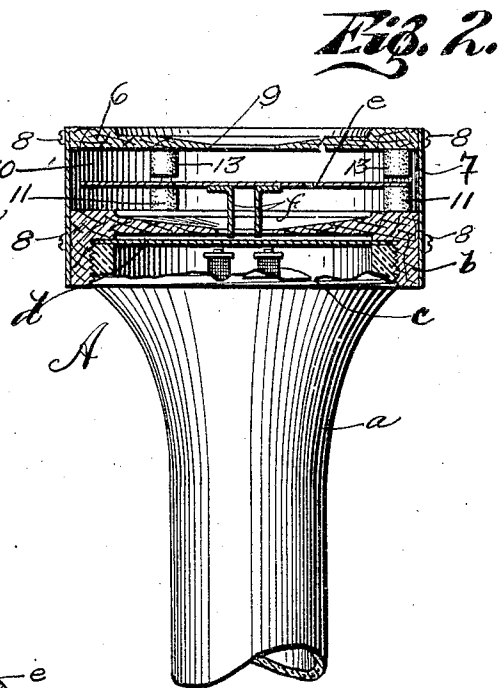


Fig. 2.

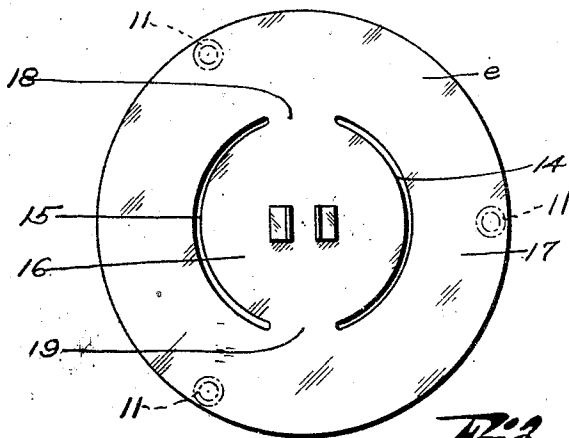


Fig. 3.

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UNITED STATES PATENT OFFICE.

FELIX JAMES, OF LOS ANGELES, CALIFORNIA.

SOUND INSTRUMENT.

Application filed December 22, 1921. Serial No. 524,130.

To all whom it may concern:

Be it known that I, FELIX JAMES, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Sound Instruments, of which the following is a specification.

This invention relates to means affecting vibration for telephones and other instruments, and particularly to telephone receiver construction. The invention has for an object the rendition in a telephone receiver of more distinct tones, a slight amplification of said tones, and the precluding from its user of disagreeable sounds or harsh sounds resultant upon a sudden change of potential of the telephone line.

In practicing the invention I may incorporate in the ordinary form of bipolar telephone receiver, a cap member auxiliary to the cap member already carried by the telephone receiver, or a cap member adapted to fit directly upon the shell or casing of the telephone receiver. Within said auxiliary cap member I arrange a freely movable diaphragm, that is, movable in any direction, which diaphragm is adapted to be actuated by the main diaphragm of the telephone receiver. The first mentioned diaphragm may be termed an auxiliary diaphragm, and is preferably formed so as to incorporate two vibrating members. This is accomplished by providing said auxiliary diaphragm with arcuate slots so as to partition said diaphragm. When this auxiliary diaphragm is operating in conjunction with the main diaphragm the quality of tone produced in the telephone receiver is at once pleasing, with all harshness, grating or inductive effects practically eliminated.

The invention has for further objects the provision in a telephone receiver of means for affecting the vibration, which will be superior in point of relative simplicity and inexpensiveness, taken in conjunction with utility, durability, general efficiency and serviceability for the purpose intended.

With the above mentioned and other objects in view, the invention consists in the novel and useful provision, formation, construction and combination, association and relative arrangement of parts, members and features, as illustrated in some of its em-

bodiments in the accompanying drawing, described in the following detailed statement, and finally pointed out in claims.

In the drawing:

Figure 1 is an elevation, partly in section, of the improved means for affecting vibration, shown in conjunction with a telephone receiver;

Figure 2 is a view similar to Figure 1 and showing a slight modification of the invention; and

Figure 3 is a plan view of the auxiliary diaphragm.

Corresponding parts in all the figures are designated by the same reference characters.

Referring with particularity to the drawing, A designates a telephone receiver in its entirety, of which *a* is a telephone receiver case or shell, *b* a cap member screw-threaded upon said shell, and *c* bobbin members adapted to magnetically attract and cause vibration in a diaphragm member *d*. The elements just stated are of the ordinary construction utilized in telephone receivers. Detachably joined to the telephone receiver and in particular to the cap member *b* is the means for affecting vibration designated in its entirety by B. The said means B may comprise an annular member 1 adapted to be held to the cap *b* by means of screws 2 passing transversely through the member 1 and engaging the cap *b*. In the drawing an insulating ring member 3 is interposed between the annular member 1 and the cap *b*. To insure that the member 1 will not slip from the cap, a further annular member 4 is joined with the member 1 and has a portion thereof, as 5, bearing against the receiver cap *b*. A secondary cap, which may be termed an ear cap 6 is held spaced from the main cap *b* by means of an annular member 7 joined with the cap 6 and the member 1, as by means of screws 8. The auxiliary cap 6 may be formed in the usual manner, and is provided with a centrally located opening 9 so that sound may pass therethrough. The spacing of the cap 6 from the member 1 provides a chamber 10 when the means B is carried upon the main cap member *b*. Carried upon the annular member 5 are annular flanged members 11. A plurality of these members are provided at spaced points on the member 5 and said members are held in position by means of screws 12. Members 13, corre-

sponding to the members 11 are carried by the auxiliary cap 6, and the said members 11 and 13 are in alignment with each other. Free to move in all directions between or rest upon the members 11 or 13, is an auxiliary diaphragm *e*, which is best shown in Figure 3, and in which it will be seen that the same is provided with two arcuate slots 14 and 15 so as to form a smaller diaphragm element 16 and a larger diaphragm element 17. The parts as 18 and 19 interconnect the diaphragm portions 16 and 17 and tend to make the whole diaphragm *e*. This construction allows a varying amplitude of vibration between the diaphragm portions 16 and 17; that is to say, considering the diaphragm in one plane the entire diaphragm *e* will vibrate to a certain extent, which rate of vibration would be materially less than the rate of vibration of the diaphragm portion 16 when considered alone. This difference in the vibratory frequency between the diaphragm portions and the fact that the diaphragm may move freely, being within the chamber 10, as it will be seen that the said diaphragm *e* is not restrained in any particular manner, tends to overcome all harsh sounds, absorbing the same.

I have also found it expedient as aiding in the tone quality produced by the diaphragm to provide spaced members *f* depending from the portion 16 and centrally thereof, as shown in the figures. These depending members *f* do not touch the main diaphragm *d*, and act to maintain the two portions 16 and 17 of the diaphragm *e* in proper vibratory balance.

The modification shown in Figure 2 consists in forming the cap member *b* integrally with the member B, as by joining the annular member 7 directly to the cap member *b*. In Figure 2 the cap member *b* is shown as of wood, in cross section; however, it is obvious that the cap member *b*, as well as the cap member 6 may be formed of other material, such as bakelite, rubber or composition of any kind, and I do not wish to be limited to the use of wood, as indicated in the drawings.

A device of this character has been found extremely practical in actual use.

It is obvious that many changes and variations and modifications may be made in departure from the particular description and showing of the accompanying drawing, in adapting the invention to varying conditions and requirements of use and service, without departing from the true spirit of the invention.

Having thus disclosed my invention, I claim and desire to secure by Letters Patent:

1. A device of the character disclosed, including a diaphragm adapted to be vibrated, and a secondary diaphragm mount-

ed for free movement in all directions and spaced from said first diaphragm and adapted to vibrate responsive to certain vibrations of said first named diaphragm; said secondary diaphragm being slotted to produce two portions and whereby sound is passed through such slot; means being provided upon one portion of such slotted secondary diaphragm tending to maintain vibratory balance between both portions thereof.

2. A device of the character disclosed, including a diaphragm adapted to be vibrated, and a secondary diaphragm mounted for free movement in all directions and spaced from said first diaphragm and adapted to vibrate responsive to certain vibrations of said first named diaphragm; said secondary diaphragm being slotted to produce two portions and whereby sound is passed through such slot; means being provided upon one portion of such secondary diaphragm tending to maintain vibratory balance between both portions thereof; said secondary diaphragm having arcuate slots to produce the slotted formation thereof, the arcs thereof confining in part the central portion of the diaphragm.

3. A device of the character disclosed, including a primary diaphragm adapted to be vibrated, and a secondary diaphragm spaced from said first diaphragm and adapted to vibrate in response to certain vibrations thereof; said secondary diaphragm being provided with separate portions separated by a slotted portion for passing sound; means being provided tending to maintain the separate portions of said secondary diaphragm in vibratory balance.

4. A device of the character disclosed, including a primary diaphragm adapted to be vibrated, and a secondary diaphragm spaced from said first diaphragm and adapted to vibrate in response to certain vibrations thereof; said secondary diaphragm being provided with separate portions separated by a slotted portion for passing sound; means being provided tending to maintain the separate portions of said secondary diaphragm in vibratory balance; said latter means comprising a member mounted upon one of the secondary diaphragm portions and directed toward the other diaphragm.

5. A device of the character disclosed, including a primary diaphragm adapted to be vibrated, and a secondary diaphragm spaced from said first diaphragm and adapted to vibrate in response to certain vibrations thereof; said secondary diaphragm being provided with separate portions separated by a slotted portion for passing sound; means being provided tending to maintain the separate portions of said secondary diaphragm in vibratory balance; said latter means comprising a member mounted upon

one of the secondary diaphragm portions
and directed toward the other diaphragm;
said secondary diaphragm having slotted
portions circumscribing in part the second-
ary portions thereof, said means being
5 mounted in connection with said secondary
portion.

In testimony whereof, I have signed my
name to this specification in the presence of
two subscribing witnesses.

FELIX JAMES.

Witnesses:

GERALD F. H. DELAMER,
J. CALVIN BROWN.