Oct. 4, 1927. 1,644,605

J. PAVEK

SOUND AMPLIFIER FOR RADIO AND TELEPHONE RECEPTION

Filed Aug. 25 1925 2 Sheets-Sheet 1

Fig. 1.

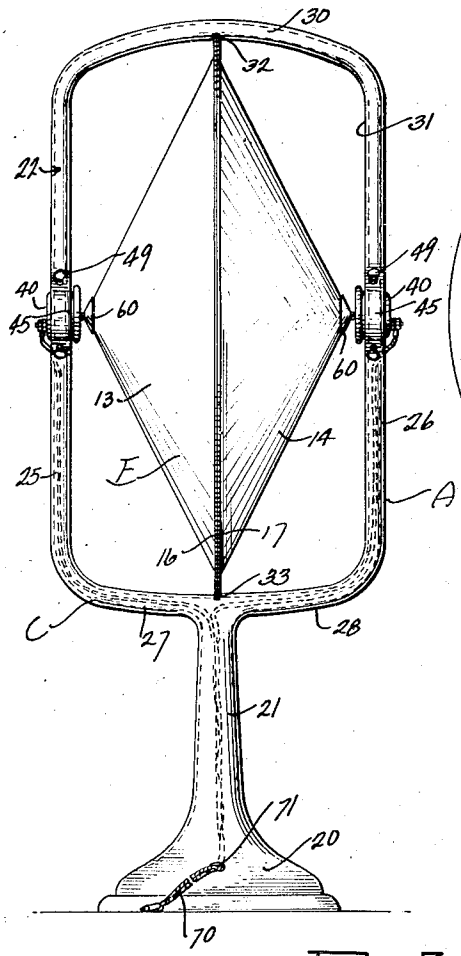


Fig. 2.

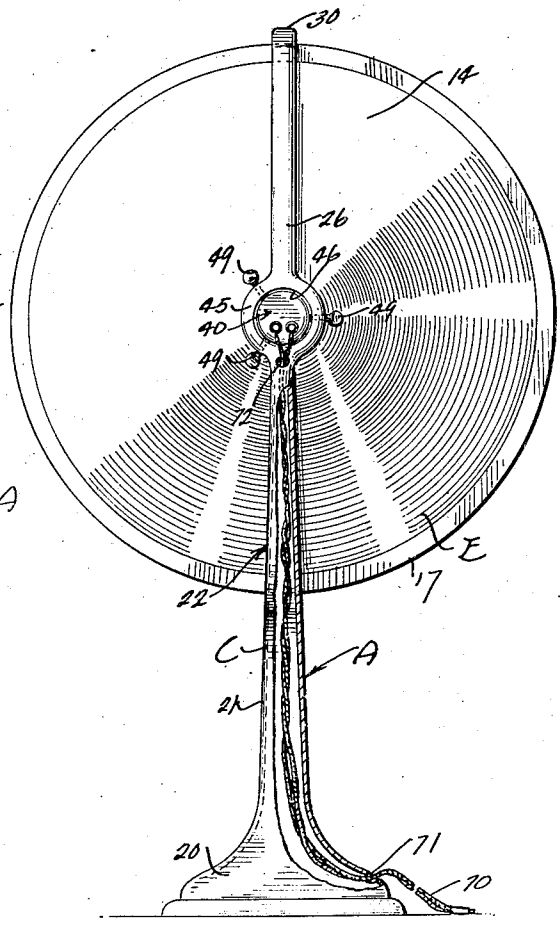
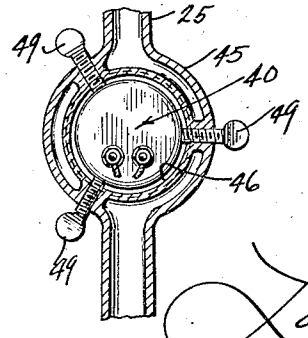


Fig. 3.



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Fig. 4.

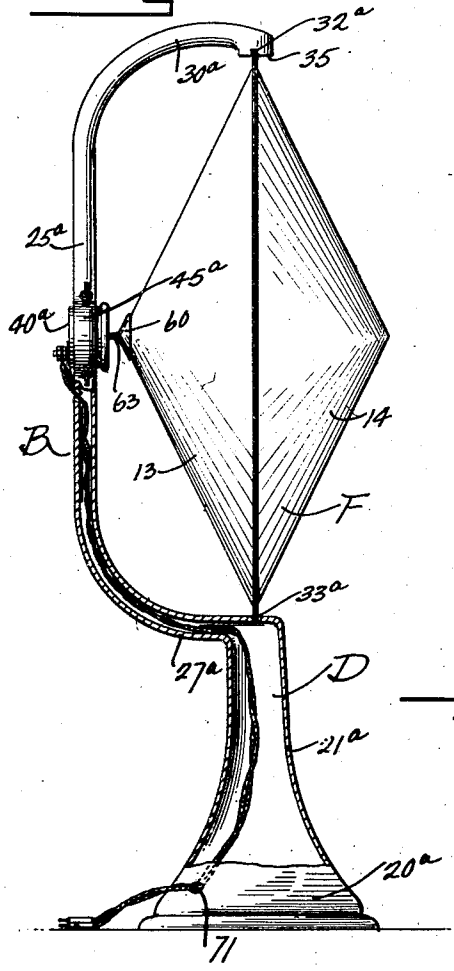


Fig. 5.

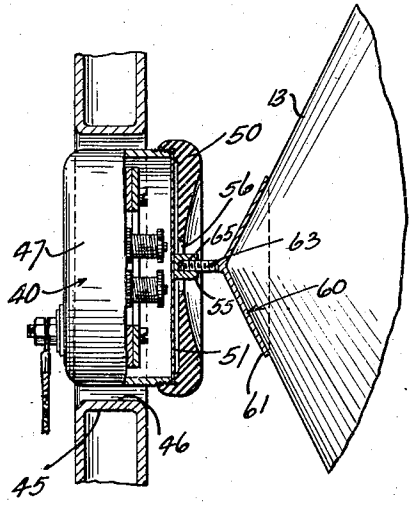


Fig. 6.

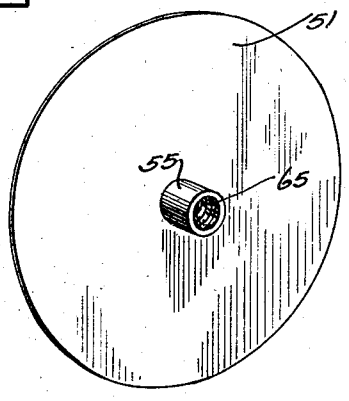
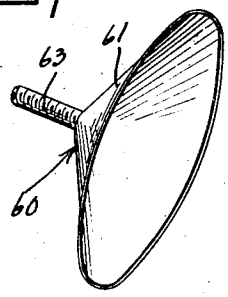


Fig. 7.



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UNITED STATES PATENT OFFICE.

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SOUND AMPLIFIER FOR RADIO AND TELEPHONE RECEPTION.

Application filed August 25, 1925. Serial No. 52,413.

This invention relates to improvements in loud speaker units adapted for radio or telephone reception.

The primary object of this invention is the provision of an improved type of loud speaker unit particularly well adapted for receiving radio messages, embodying novel means for connecting conventional types of telephone or radio receivers thereto.

A further object of this invention is the provision of an improved loud speaker unit, embodying a novel diaphragm construction with improved means for connecting the said diaphragm to the diaphragm construction of conventional radio and telephone receivers.

A further object of this invention is the provision of an improved loud speaker unit for radio and telephone reception, embodying a novel type of frame and cooperating diaphragm construction.

Other objects and advantages of this invention will be apparent during the course of the following detailed description.

In the drawings, forming a part of this specification, and wherein similar reference characters designate corresponding parts throughout the several views,

Figure 1 is a front elevation of the improved sound amplifying device or so called loud speaker of the preferred type, which is adapted for use with conventional telephone or radio phone receivers to amplify the message of such receivers.

Figure 2 is a side elevation, partly in section, of the invention as illustrated in Figure 1.

Figure 3 is an enlarged fragmentary sectional view showing the means for connecting conventional radio or phone receivers to the improved sound amplifier.

Figure 4 is a somewhat different form of invention, embodying characteristics of the form illustrated in Figure 1, and of the type which is used with the conventional small loud speaker unit for radio reception.

Figure 5 is an enlarged sectional view showing the novel means of connecting the diaphragm construction of the improved sound amplifier with the diaphragm of conventional radio or telephone receivers.

Figure 6 is a perspective view of a modified type of diaphragm which is used, with this invention, in the conventional telephone or radio receiver.

Figure 7 is a perspective view of a connecting piece for the diaphragm structure of the improved sound amplifier.

In the drawings, wherein for the purpose of illustration are shown preferred and modified forms of this invention, the letter A may generally designate the form of invention to which the conventional telephone or radio receivers are attached, and the letter B may generally designate the form of invention illustrated in Figure 4, with which the conventional small loud speaking radio receiver is used.

The forms of invention A and B respectively comprise frames C and D, with which diaphragms E and F respectively are used.

Referring to the sound amplifying diaphragm constructions E and F, the same include about the same structural features, in the provision of substantially conical shaped diaphragms 13 and 14, which are peripherally connected by gluing or otherwise fixing the annular outer flanges 16 and 17 thereof together. The conical shaped diaphragms portions 13 and 14 are formed of some inherently stiff although resilient or yieldable material, such as pyroxyline, cardboard, composition paper, fiber, or the like, and they are preferably of identical formation, which may be shaped in any approved manner. When fixed together the apices of the diaphragms 13 and 14 face in opposite directions on the axial line of the diaphragm constructions E and F, and to their apices the receivers of telephones, radios, and the like may be connected for the purpose of amplifying sound.

The diaphragms E and F are of relatively large diameter, sufficient to produce the loud speaking effect so desired.

Referring now to the form of invention A, which I consider will be of most general use, the same is adapted to be used for supporting the diaphragm construction E, in attachment with a pair of telephone or radio receivers of the general or conventional type. To this end the frame B preferably comprises a hollow base 20; vertical tubular standard 21; and a loop-shaped supporting frame part 22, which consists of the preferably vertical side standards 25 and 26, which are preferably tubular, being connected to the tubular standard 21 by means of integral tubular connecting arms 27 and 28 which may be horizontally positioned, so that the standard portions 25 and 26 are in parallel relation with each other, and in parallel

offset relation from the axis of the standard 21. The side frame or standard portions 25 and 26 are upwardly connected together by means of a top connecting portion 30, which is also preferably tubular. The entire frame may be of integral construction, or may be formed of different parts if desired, although it is preferably of the form and structure illustrated in Figure 1.

The diaphragm structure E is of course mounted in the opening 31 provided by the loop-shaped frame 22, and to insure its retention, the peripheral flanges 16 and 17 of the diaphragm discs are supported in grooves 32 and 33 provided at the top of the standard 21 and portion 30 of the supporting frame C, so that the diaphragm is positioned in a horizontal plane with the plane of connection of the diaphragms 13 and 14 in the same plane as the axis of the supporting standard 21, with the opposite apices of the diaphragm parts 13 and 14 facing the frame side portions 25 and 26 respectively, substantially intermediate the ends thereof.

The frame portions 25 and 26, intermediate each of the ends thereof are formed in novel manner, as is illustrated in Figure 3, and as will be subsequently described following the description of the structure of the frame D for the form of invention B.

The frame D is primarily used in connection with support of a single conventional receiver, preferably the loud speaker radio type. This frame preferably includes a hollow base 20^a integral with a vertical tubular standard 21^a. A receiver supporting frame standard 25^a, of tubular formation, is offset laterally from the axis of the standard 21^a by means of a lateral arm 27^a, of integral and tubular formation. This places the standard portion 25^a in substantial parallelism with the axis of the main standard 21^a. At the upper end of the side frame standard 25^a a diaphragm supporting arm 30^a is provided, the free end 35 of which is disposed directly over the top of the standard 21^a, and it is grooved at 32^a in facing relation with a groove 33^a provided in the top of the standard 21^a, to receive the flange of the diaphragm plates 13 and 14, in the relation illustrated in Figure 4 of the drawings. In this position the apex of the diaphragm 13 faces the frame standard 25^a substantially intermediate the ends of the latter, where the receiver is to be supported, and for connection to such receiver as will be subsequently described.

The specific type of frame C is adapted to be used for supporting a pair of similarly formed telephone or radio receiver units 40, whereas the frame standard 25^a of the frame B of the form of invention B is used for supporting a single, so called loud speaker radio receiver 40^a, which in its embodiment is of about the same formation as the receiver unit 40, especially in so far as its application to the supporting frames of this invention is concerned.

Each of the tubular frame standards or portions 25, 26 and 25^a, intermediate their ends, is provided with a ring-shaped receiver unit supporting frame 45, which has been specifically illustrated in Figure 3 of the drawings, and which may be of tubular or other formation either integral with the frames by soldering or otherwise attached thereto, so that the plane of the opening 46 provided therethrough faces the adjacent apex of the diaphragm structure E or F, as the case may be. Into this opening 46 the casing 47 of the receiver 40 or 40^a is slipped, as is illustrated in Figure 5 of the drawings, and it is clamped therein in detachable manner by means of radially disposed set screws 49, which are adjustably carried by the ring-shaped frame 45, in adjustable projecting relation thru the opening 46. Preferably three of these set screws are provided in the relation illustrated in Figure 3.

Referring to the cooperative connection of the diaphragms 13 and 14 at their apices with the receiver units 40 or 40^a, the conventional diaphragms provided in such phone receivers or radio receivers 40 or 40^a are removed, by detaching the conventional cover 50, and in place thereof a diaphragm disc 51 is positioned. This diaphragm 51 may be of approved diaphragm material, shaped somewhat according to the conventional diaphragm of the units in conventional use, with this exception, that an axial internally screw threaded projection 55 is rigidly attached thereto, in any approved manner, so that it will project thru the central opening 56 of the attaching cover 50, when in place, as is illustrated in Figure 5 of the drawings.

Upon both apices of the diaphragm members 13 and 14 of the diaphragm structure E, and only the apex of the diaphragm 13 of the structure F, novel diaphragm receiver attaching members 60 are provided, which includes a conical shaped attaching plate or portion 61 to fit directly over the apex of the diaphragm portions 13 and 14, in secured relation thereto in any approved manner. Axially extending from the apex of the attaching portions 61 of these members 60 are screw threaded shanks 63, which are adapted for detachable connection in the screw threaded passageways 65 of the diaphragm projections 55.

The conducting wires 70 of the receiver units 40 and 40^a may extend thru suitable openings 71 in the bases of the frames C and D, and lead upwardly thru the passageways of the frame standards and arm portions, directly to adjacent the support of the receiver units 40 and 40^a, and are thence

led outwardly thru suitable openings 72 for conventional connection to said receiver units.

From the foregoing description of this invention it is apparent that a novel type of sound amplifying device, or loud speaker, has been provided, for use in connection with telephone, radio, or other electrical reception, which is of a simple and compact form, and which provides means by which a novel sound producing diaphragm may be connected in efficient manner to conventional radio or phone receiver units.

Various changes in the shape, size, and arrangement of parts may be made to the forms of invention herein shown and described, without departing from the spirit of the same or the scope of the claims.

I claim:

1. In a sound amplifying device a diaphragm construction consisting of a pair of conical diaphragms oppositely disposed to provide a compartment therebetween, said diaphragms having the apices thereof provided with outwardly extending shanks, and sound receivers including diaphragms connected with both of said shanks.

2. In a sound amplifying device a diaphragm construction consisting of a pair of conical diaphragms oppositely disposed to provide a compartment therebetween, said diaphragm construction having an apex thereof provided with an outwardly extending shank, a receiver unit, including a diaphragm, and means for connecting the last mentioned diaphragm to the shank.

3. In a device of the class described a supporting frame, a sound amplifying diaphragm construction supported by the frame, said frame having an opening therethrough, a conventional receiver, means for detachably clamping the receiver in said opening of the frame, and means for connecting the receiver with said sound amplifying diaphragm construction in sound conducting relation.

4. In a sound amplifier a supporting frame, a sound amplifying diaphragm of substantially conical formation supported by said frame, said frame having an opening therein which the apex of said conical shaped diaphragm faces, a sound producing receiver mounted in said opening, and means connecting the receiver in sound conducting relation with the apex of said diaphragm.

5. A sound amplifying device for radio reception comprising a frame including a portion having a transverse opening therein, a diaphragm construction supported by the frame the same being of conical formation and having an apex facing said opening, a sound receiver including a diaphragm, means for detachably connecting the conventional receiver in the opening of said frame with the diaphragm facing the apex of said last mentioned diaphragm construction, and means for connecting the apex with the diaphragm of said receiver.

6. In a sound amplifying device of the class described a frame including a standard portion, a side frame portion connected in offset relation with the standard portion, a diaphragm construction supported by the frame above said standard including a conical diaphragm with an apex facing said side frame portion, a receiver including a diaphragm, means detachably connecting said receiver with said side frame portion with the diaphragm thereof facing the apex of said diaphragm construction, and means connecting the diaphragm of the receiver with said diaphragm construction in a sound conducting relation.

7. In a sound amplifier of the class described a frame having an opening therein with opposite side portions having facing sockets in spaced relation, a diaphragm construction including substantially conical shaped diaphragm members mounted in the opening of said frame, said conical shaped diaphragm members having the apices thereof oppositely facing in alignment with the sockets of the side portions of said frame, sound receivers detachably connected in said sockets of the side portions of said frame, and means for connecting said receivers in sound conducting relation with the apices of said diaphragm construction.

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