March 8, 1927. 1,619,981

S. P. KNUT

SOUND MAGNIFIER

Filed March 14, 1923

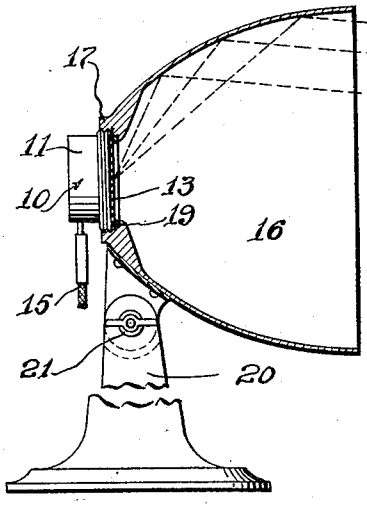


Fig. 1.

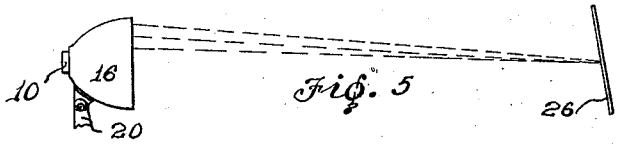


Fig. 5

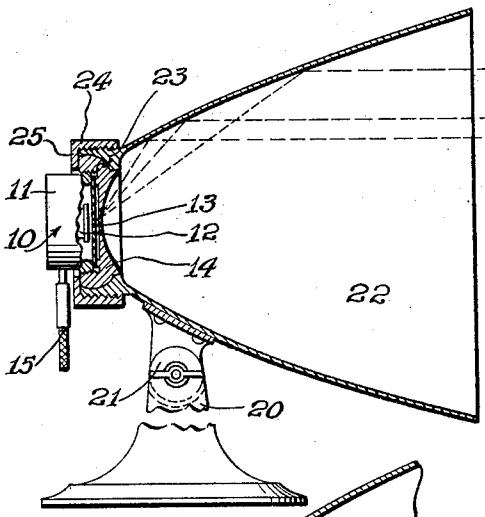


Fig. 2.

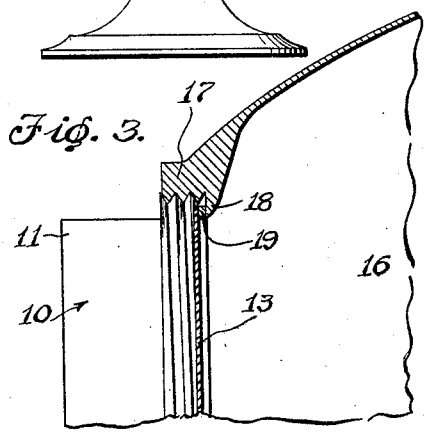


Fig. 3.

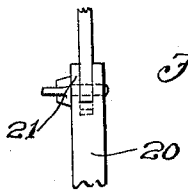


Fig. 4.

Inventor

Sargeant P. Knut

By I. Richard Paris.

Attorney

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UNITED STATES PATENT OFFICE.

SARGEANT P. KNUT, OF WASHINGTON, DISTRICT OF COLUMBIA.

SOUND MAGNIFIER.

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It is the object of this invention to provide the conventional watch case telephone receiver, or any other type of receiver or sound generator commonly used in radio telephony, with a device which will magnify, amplify and concentrate rhythmically the sound vibrations of the receiver diaphragm. Another object is to so construct the device that the sound may be concentrated and directed in any desired direction; or it may be concentrated and directed toward any desired point.

A further object of this invention is to convert the conventional telephone receiver into an effective telephone transmitter.

These objects are accomplished by attaching to the sound generator or receiver a sound reflector having a reflecting surface of revolution generated by a conic section, the diaphragm of the receiver being so disposed that its center coincides with the focal point of the surface.

The device is preferably constructed in such a manner that it may be readily attached to and detached from the conventional receiver without modifying the construction and operation of the receiver per se. The device is also designed so that when it is attached to the receiver the two together constitute a unit which may be placed at any desired point and the sound will be rhythmically magnified and directed in any desired direction or concentrated upon any desired distant point.

The structure and operation of my invention will be understood from the following description and the accompanying drawings.

In the drawings Fig. 1 is a sectional view of one form of my invention; Fig. 2 is a similar view of another form of my invention; Figs. 3 and 4 are detail views; Fig. 5 shows another form of the invention.

In Figures 1 and 2, 10 indicates the conventional watch case receiver, which consists of the casing 11, having the electromagnet 12 mounted therein, the diaphragm 13 and the cap 14. 15 is the lead wire. The receiver is ordinarily placed against the ear of the listener. It is the object of this invention to magnify the sound emitted by this receiver in such a manner that it may be heard clearly and distinctly at a distance from the instrument by more than one person. To this end I provide a sound reflector 16 having for its inner surface one of revolution generated by a conic section such as an ellipsoid, a paraboloid or the like. The reflector 16 shown in Figure 1 has an ellipsoidal reflecting surface. This surface has two focal points. The rear end of the reflector is constructed in the manner shown in detail in Fig. 3. It is provided with a longitudinal rearwardly extending flange 17, threaded interiorly, and a lateral inward flange 18. On the rear face of the flange 18 is affixed a resilient packing ring 19, of rubber, felt or the like. By removing the cap 14 of the conventional receiver the sound magnifier may be attached to the receiver in the manner shown in Figs. 1 and 3. The magnifier is designed and constructed in such a manner that when assembled the center of the diaphragm coincides with the one focal point of the sound reflecting surface. The other focal point is at a distance from the instrument. The result is that the vibrations of the diaphragm are reflected, rhythmically magnified and concentrated at the distant focus, where a group of persons may listen in on the instrument. With the construction shown the entire diaphragm is exposed with the result that the vibrations of all parts of it are utilized, reflected, rhythmically and synchronously magnified and directed to the distant focus or the vicinity thereof. If desired a sounding board 26 may be placed at the distant focal point, as shown in Fig. 5, in such a manner as to magnify and direct the sound as desired.

The magnifier is provided with a base 20 articulated at 21 as shown in order to permit of the vertical adjustment of the magnifier.

Fig. 2 shows another form of my invention in which a paraboloidal surface of reflection is used. The reflector 22 has an exteriorly threaded rearwardly extending flange 23 which is formed inwardly in such a manner as to conform to the peripheral face of the cap of the conventional receiver. The reflector is so proportioned and constructed that when it is placed against the receiver in the manner shown the focal point of the reflecting surface will coincide with the center of the disk diaphragm 13. The interiorly threaded ring 24 which is provided with the shoulder 25 serves to hold the receiver 10 positioned with relation to the reflector. By these means the sound waves emitted by the diaphragm will be

synchronously and rhythmically reflected from the walls 16 and directed along the broken lines indicated. The sound waves are also magnified and amplified with the result that they become clearly, distinctly, synchronously and rhythmically audible at a distance from the instrument. If desired a sounding board may also be associated with the parabolic reflector. The board may be placed at a suitable distance from the instrument and at right angles to the axis of the parabola.

The device disclosed hereinabove may if desired serve as an effective transmitter. By reason of the concentration and magnification of the sound waves upon the diaphragm, the amplitude of its vibrations is greatly increased. This causes a greater variation in the reluctance of the magnetic circuit than it is possible to obtain without the use of the sound magnifier, which in turn brings about a greater variation of the magnetic flux and a greater induced current. If desired the circuit may be designed to carry a greater current than is normally carried by this type of receiver. With an increased current and an increased flux the vibrations of the diaphragm bring about a greater variation of the flux and a greater variation in the current which transmits the sound.

The drawings are only illustrative of the invention. The dimensions of the reflector may be varied to obtain varied results.

I claim:

1. A sound magnifying device comprising a body having a sound reflecting surface of revolution generated by a conic section having its axis disposed substantially along a horizontal line, a support for said body, disposed in a direction transverse to said body, and attached to said body, and an integral interiorly threaded flange disposed in the rear of the said body and coaxially therewith, whereby the watch case type of telephone receiver may be attached to said body in such a manner as to dispose the disc vibrator of the receiver in the focal plane of the reflecting surface and perpendicular to the axis thereof, the device being interchangeable with the cover of the telephone receiver.

2. A sound magnifying device comprising a body having a parabolic sound reflecting surface and a horizontal axis, a support for said body disposed in a direction transverse to the axis of the said body and attached to said body, an interiorly threaded flange integral with said body and coaxial therewith, and an interior transverse flange integral with said body at the foot of said first flange, the outer face of the second named flange being disposed in the focal plane of said reflecting surface, said flanges constituting means whereby a telephone receiver may be attached to said body with the vibrating disc disposed in the focal plane of the reflecting surface.

In testimony whereof I hereunto affix my signature.

SARGEANT P. KNUT.