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P. J. COOK

DIAPHRAGM FOR TELEPHONE RECEIVERS

Filed March 23, 1925

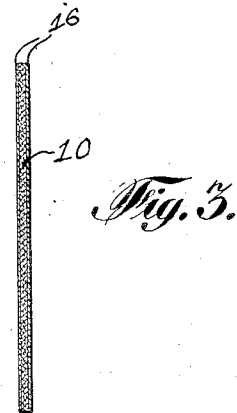
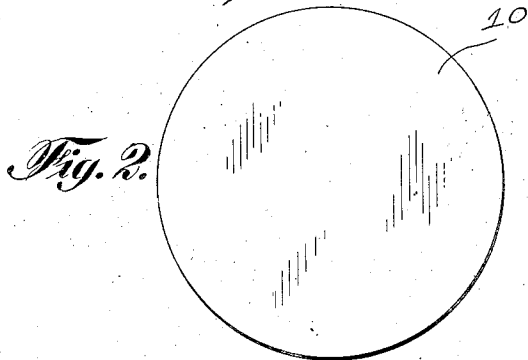
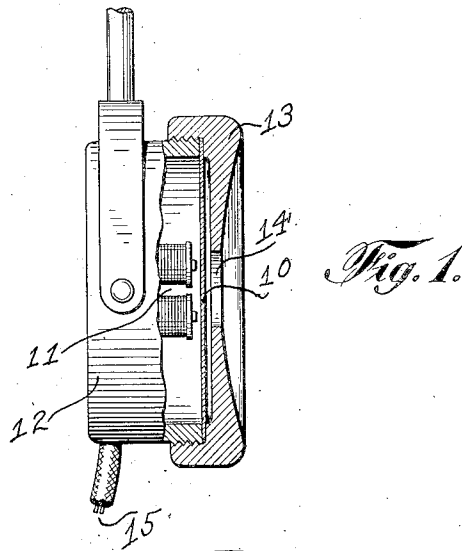


Fig. 4.

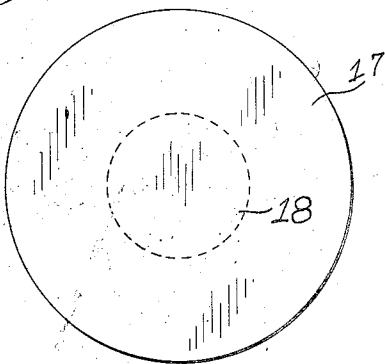
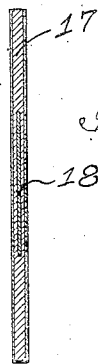


Fig. 5.



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DIAPHRAGM FOR TELEPHONE RECEIVERS.

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To all whom it may concern:

Be it known that I, PALMER J. COOK, a citizen of the United States, and a resident of Southfield, county of Berkshire, and State of Massachusetts, have invented certain new and useful Improvements in Diaphragms for Telephone Receivers, of which the following is a specification.

This invention relates to telephone receivers, and more particularly to an improved form of diaphragm for use in a telephone receiver, a radio headset, a loud speaker, or the like.

One object of this invention is to provide a diaphragm of the above nature which will be constructed partly of iron and partly of non-metallic material, and which will be used in place of the "all-metal" diaphragms now on the market.

A further object is to provide a diaphragm of the above nature which will faithfully reproduce the transmitted sound vibrations without distortion throughout practically the entire range of audible frequencies.

A further object is to provide a device of this nature which will be simple in construction, inexpensive to manufacture, practically unbreakable, and very efficient and durable in use.

With these and other objects in view there have been illustrated on the accompanying drawings, two forms in which the invention may be conveniently embodied in practice.

Fig. 1 represents a side view, partly in section, of a radio headset in which the first form of diaphragm has been installed.

Fig. 2 is a plan view of the diaphragm shown separately.

Fig. 3 is a sectional view of the same.

Figs. 4 and 5 are plan and sectional views respectively of a second and modified form of diaphragm, also embodying the invention.

In the use of telephone receiving instruments, and more particularly those instruments employed for the reception of radio broadcasted programs, it has been previously impossible to obtain satisfactory reproduction of the transmitted sounds, and a certain amount of distortion was always encountered. This has been due largely to the fact that the iron diaphragms necessarily employed would not respond equally well to sounds of all different wave lengths. Moreover, in the use of such all-metal dia-

phragms, a metallic tone was also imparted to the sounds produced.

By means of the present invention, the above and other disadvantages have been largely avoided. This has been accomplished by providing a diaphragm consisting of a material formed by combining a non-metallic material with iron. It has been discovered that such a diaphragm will reproduce the natural tones of sound waves quite faithfully over the entire range of audible frequencies, and at the same time will practically eliminate the metallic tone formerly noticed.

Referring now to the drawings in which like reference numerals denote corresponding parts throughout the several views, the first embodiment of the invention is illustrated in Figs. 1, 2, and 3. As shown in said figures, the diaphragm comprises a circular disc 10 of flat sheet material made from rawhide "scrap" or "grindings" mixed with a sufficient amount of finely divided soft iron to render the material susceptible to the magnetic oscillations in the field surrounding an electromagnet. It has been found in one example that a material containing an equal part of iron filings, or iron dust, and rawhide produces a satisfactory diaphragm. The sheeting of said material is preferably done in a mold under heat and high pressure.

It has been found in practice that a pressure of six to seven tons per square inch is necessary to produce the required degree of strength and solidity in the sheet material.

The diaphragm 10 is made of such a size that it will seat on the periphery of a threaded casing 12 of a telephone headset, and said diaphragm 10 is adapted to be held securely in position by means of an annular cover member 13, which is tapped with internal threads and is adapted to screw upon the external threads of said casing 12. The face of the cover member 13 is cupped inwardly and is provided with a central aperture 14 through which the sounds produced by the diaphragm may travel. In the operation of the device, it will be understood that the combination rawhide and iron diaphragm will vibrate in response to the varying magnetic field of the electromagnet 11, which in turn is responsive to the fluctuating current in wires 15 connected to a radio receiving set or other

instrument receiving impulses from a transmitting instrument.

In order to render the diaphragm more durable and less sensitive to atmospheric conditions, it may be given a coating 16 of any suitable strong waterproof material such as shellac, varnish, or the like.

In Figs. 4 and 5, the second or modified form of combination metal and non-metal diaphragm is disclosed. This form of diaphragm is identical in shape with the diaphragm 10 illustrated in Figs. 1, 2, and 3, and comprises a disc 17 made from a sheet of hot-pressed rawhide having embedded in its interior a small circular disc 18 of soft iron. The diameter of the small disc 18 is preferably, though not necessarily, less than one-half the diameter of the diaphragm 17 itself. It will be understood that in this modified form of the invention, the small iron disc 18 will respond to the fluctuating field of the electromagnet 14 and will communicate its motion to the entire diaphragm 17. The modified form of diaphragm 17 is preferably given a coating 19 of strong waterproof material, as in the first form of the invention shown in Figs. 1, 2, and 3.

One advantage of the present invention is that the combination metal and non-metal diaphragm serves to bring out music and other sounds with great detail and reproduces equally well all sounds between the extreme ends of the scale of audible frequencies.

While the invention has been herein il-

lustrated as being applied to a radio headset, it will be understood that it may equally well be employed in ordinary telephone receivers, loud speakers, amplifiers, etc., within its general principles and scope.

While there have been disclosed in this specification two forms in which the invention may be embodied, it is to be understood that these forms are shown for the purpose of illustration only, and that the invention is not to be limited to the specific disclosures but may be modified and embodied in various other forms without departing from its spirit. In short, the invention includes all the modifications and embodiments coming within the scope of the following claims.

Having thus fully described the invention, what is claimed as new, and for which it is desired to secure Letters Patent, is:

1. A diaphragm for a telephone receiver consisting of a sheet of rawhide having combined therewith a sheet of iron.

2. A diaphragm for a telephone receiver or amplifier unit consisting of a disc of thin sheet rawhide in combination with iron.

3. A diaphragm for a telephone receiver or amplifier unit consisting of a thin sheet of rawhide in combination with iron, said diaphragm having a waterproof coating.

In testimony whereof, I have affixed my signature to this specification

PALMER J. COOK.