June 15, 1926. 1,588,547

L. R. GOLLADAY

TELEPHONE RECEIVER

Filed April 25, 1924

Fig. 1.

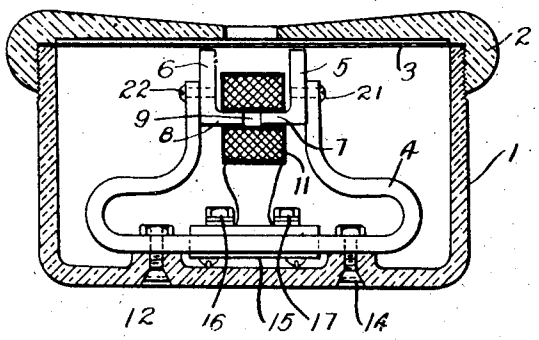
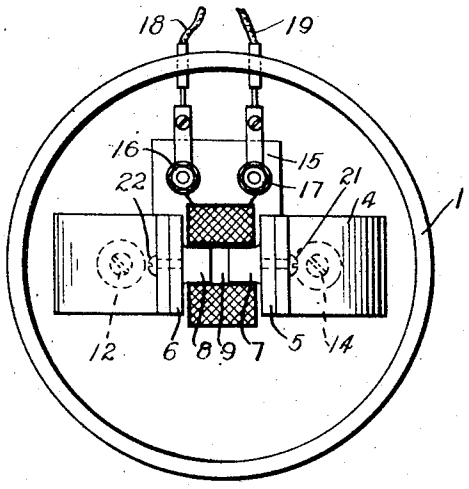


Fig. 2.



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UNITED STATES PATENT OFFICE.

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TELEPHONE RECEIVER.

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My invention relates to telephone receiver devices and more particularly to telephone receiver devices of high efficiency.

One object of my invention is to produce a telephone receiver device having a shunt path for magnetic flux.

Another object of my invention is to produce a telephone receiver device in which the varying flux is passed through a path other than the permanent magnet.

Another object of my invention is to produce a telephone receiver device having a single electromagnet coil.

Another object of my invention is to produce a telephone receiver device in which the variations in pull upon the diaphragm are produced by diverting a variable portion of the permanent magnet flux through a shunt path.

Another object of my invention is to produce a telephone receiver device having a shunt magnetic path of variable impedance.

In the prior art of the construction of telephone receiver devices, it has been customary to embody in the construction, a permanent magnet having pole pieces, each carrying electromagnet coils and positioned adjacent to a diaphragm. The permanent magnet flux exerts a steady pull upon the diaphragm which is varied by fluctuating currents through the coils upon the pole pieces. This construction has the disadvantage that the flux variations must occur through the mass of the permanent magnet. Permanent magnet steels have a relatively low incremental permeability and, in consequence, considerable impedance is opposed to the flux changes. Furthermore, such a structure requires two electromagnet coils, and it allows of considerable flux leakage, resulting in lessened efficiency. Also, the relatively large mass of undivided metal allows the production of eddy currents which cause an undesirable loss of energy and thereby a lowered efficiency.

My invention provides means whereby the variation in flux is permitted to occur only in pole piece portions of the magnetic circuit which have a high incremental permeability and whereby flux leakage is made to serve a useful purpose.

Other objects and structural details of my invention will be apparent from the following description when read in connection with the accompanying drawings, wherein:

Fig. 1 is a view in sectional elevation of an embodiment of my invention, and

Fig. 2 is a plan view of an embodiment of my invention the coil thereof being in section.

Referring to the figures, a case 1 is provided having a cover 2. Clamped between the edge of the case 1 and the cover 2 is a diaphragm 3. Mounted within the container 1 is a permanent magnet 4, to the poles of which are attached pole pieces 5 and 6 having extensions 7 and 8 thereon and an air gap 9 therebetween. Upon the projections 7 and 8 of the pole pieces 5 and 6 is mounted an electromagnet coil 11. The permanent magnet 4 is held in place in case 1 by bolts 12 and 14. An insulating terminal block mounting 15 carries binding posts 16 and 17 to which are attached the lead wires 18 and 19. The pole pieces 5 and 6 are attached to the magnet 4 by screws 21 and 22.

In the operation of my device, the diaphragm 3 is attracted toward the pole pieces 5 and 6 by the pull of the magnetic flux of the permanent magnet 4. A portion of the flux of the magnet 4 also passes through the shunt path comprising the extension 7, the air gap 9 and the extension 8. The fluctuating electric current passing through the coil 11 induces a varying magnetomotive force in the magnetic circuit comprising the extension 8, pole piece 6, diaphragm 3, pole piece 5, extension 7 and the air gap 9. This varying magnetomotive force causes a variation in the flux passing through the coil 11, thereby resulting in a variation in the flux passing from the pole piece 6, through the diaphragm 3 to the pole piece 5, and thereby varying the pull upon the diaphragm 3.

The variations in pull result in vibrations of the diaphragm 3, which movement produces corresponding pulsations of the surrounding air.

By virtue of the position of the coil 11 upon a shunt path, the variations in magnetic flux are caused to occur in the pole pieces which are the portion of the magnetic circuit having a high incremental permeability. By this means, a maximum va-

riation is caused to take place in the flux passing through the diaphragm, and eddy current losses, as well as other iron losses in the magnet body, are avoided.

While I have shown only one embodiment of my invention in the accompanying drawings, it is capable of various changes and modifications without departing from the spirit thereof, and it is desired, therefore, that only such limitations shall be imposed thereon as are indicated in the prior art or indicated in the appended claims.

I claim as my invention:

1. In a telephone receiver, a magnetic circuit comprising a diaphragm, a permanent magnet, a pair of pole pieces thereon of greater incremental permeability than the permanent magnet, said pole pieces having portions forming a magnetic shunt, and a source of alternating magnetomotive force associated with said magnetic shunt.

2. In a telephone receiver, a diaphragm, a magnetic circuit comprising a pair of members of high incremental permeability and said diaphragm, a permanent magnet associated with said magnetic circuit for establishing a steady flux through two portions of said magnetic circuit in parallel, and a coil associated with said magnetic circuit for establishing a varying flux through said portions in series.

In testimony whereof, I have hereunto subscribed my name this 17th day of April, 1924.

LAWRENCE R. GOLLADAY.