(No Model.)

M. L. BAXTER.

RECEIVING TELEPHONE.

No. 277,199. Patented May 8, 1883.

Fig. 1.

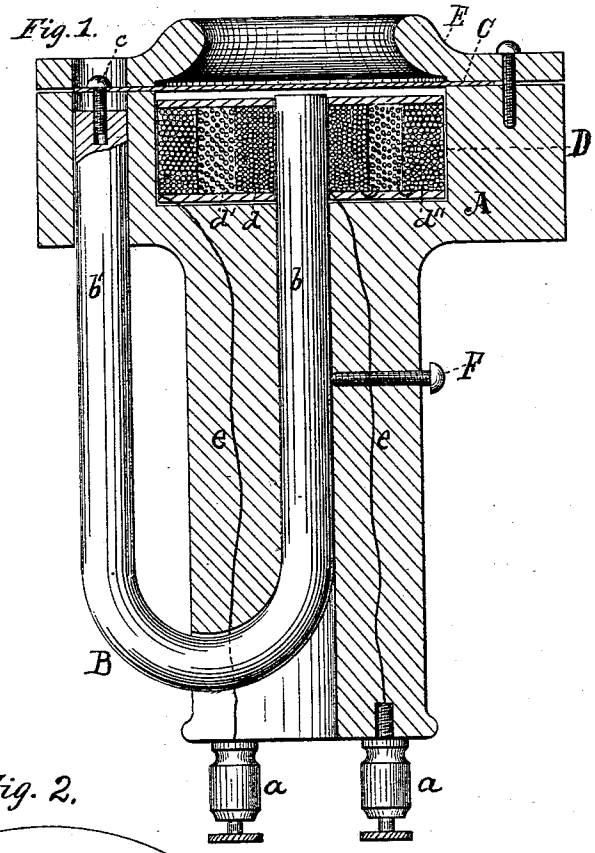


Fig. 2.

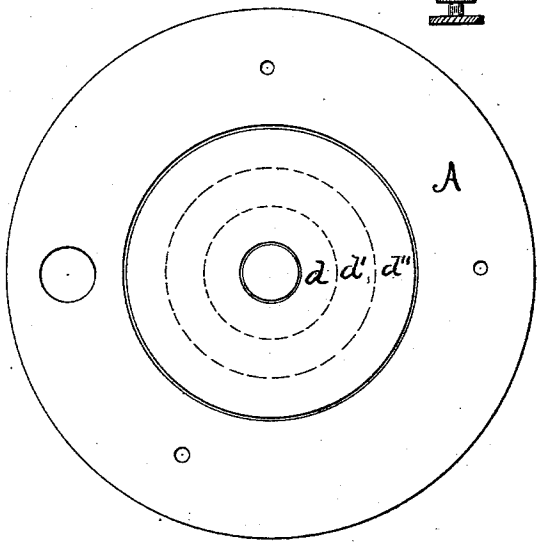
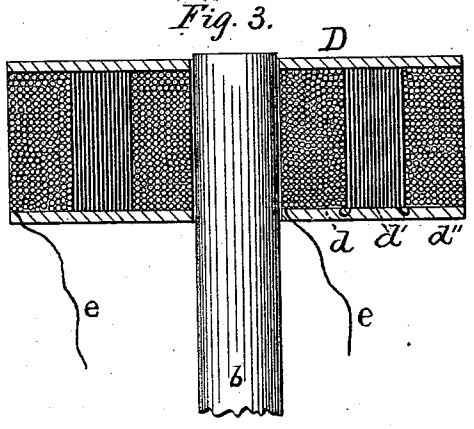


Fig. 3.



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UNITED STATES PATENT OFFICE.

MYRON L. BAXTER, OF AURORA, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE OVERLAND TELEPHONE COMPANY.

RECEIVING-TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 277,199, dated May 8, 1883.

Application filed December 22, 1882. (No model.)

To all whom it may concern:

Be it known that I, MYRON L. BAXTER, a citizen of the United States of America, residing at Aurora, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Receiving-Telephones, of which the following is a specification, reference being had therein to the accompanying drawings, in which—

Figure 1 is a vertical section of a receiving-telephone made in accordance with my invention. Fig. 2 is a plan view of the same with the ear-piece E removed. Fig. 3 is an enlarged vertical section of the coil and a part of the magnet, and shows a modification of the coil.

The several parts are indicated by the same letters in the different figures.

A is the stock or holder, made of wood, hard rubber, or any other suitable material, with ear-piece E, attached in any convenient manner, for clamping and securely holding by its periphery the vibrating iron diaphragm C.

B is a U-shaped permanent magnet, to one leg, *b*, of which the aforesaid diaphragm C is attached by a screw, *c*. (Clearly shown in Fig. 1.) By this arrangement a stronger magnetic effect is produced between the pole *b'* and the diaphragm C.

D is the actuating or inducing coil, consisting of three concentric parts, *d*, *d'*, and *d''*, hereinafter more fully described.

e e are the connecting-wires connecting the parts *d* and *d''* with the binding-posts *a a*.

F is a set-screw for securely clamping and holding the magnet in place in the stock A at a proper distance from the vibrating diaphragm C. Currents of electricity entering and departing by the binding-posts *a a* actuate the compound inducing-coil D to produce audible vibration of the diaphragm.

The object of my invention is to provide a more perfect receiving-telephone, and one in which vocal sounds, including speech, shall not only be increased in volume, but also be rendered more clear, smooth, and natural. While my receiver may be used to advantage with ordinary transmitters, it is intended especially for use with a new form of battery-transmitter recently invented by me, whereof an application for Letters Patent is now pending; and the features of my invention which I believe to be new and which I claim are those belonging, essentially, to the compound actuating-coil D. This coil is made up as follows: its central portion, *d*, the part *d'*, of fine insulated iron wire or iron ribbon, and the part *d''*, of fine insulated copper wire. A current of electricity entering at one of the binding-posts and reaching first the outer end of the copper-wire coil *d''* traverses successively throughout all the convolutions of coils *d''*, *d'*, and *d*, passing from the latter to the other binding-post. The object of the iron coil *d'* is to afford, in addition to the central magnetic core, *b*, a tubular electro-magnet made up of the wire or ribbon itself, so that this coil, while it acts as an inducing-helix to the central magnetic core, is itself acted upon and rendered magnetic by the action of the copper-wire coil *d''*, and to a considerable extent reacts upon itself to produce the same result. Its effect upon the diaphragm is obvious—it amplifies the vibration. At Fig. 1 this portion of the coil is shown as wire, and in Fig. 3 as ribbon. The ribbon being merely a flattened wire, I regard the two as equivalents. In use I make the ribbon exceedingly thin, so as to get inductive effect from the current; but while more magnetic effect is obtained from the ribbon greater inductive effect is obtained from the wire. In either case it is to be understood that the material, be it ribbon or wire, is covered by an insulator.

With regard to my iron wire or ribbon coil, I do not wish to be understood as confining myself to soft iron, as steel may be used with advantage.

I am aware that a helix of copper wire without a core may in a manner be considered a magnet; but its magnetism is strongest in its vacant center, being due to the lines of force (so to speak) set up by electric currents, and not to the magnetic condition of the particles of the metal of which it is composed. The iron coil, however, becomes truly magnetic. It may here be remarked that the size of the iron wire used is greater than that of the copper, their cross-sectional areas being proportioned approximately to the relative conductivity of the metals.

Having thus described my invention, I claim as new—

1. In combination with an iron diaphragm arranged at right angles and in proximity to one pole of a permanent magnet, said magnet exerting an attractive influence at or near its center, an inducing-coil for varying the said attraction, composed partly of copper and partly of iron, for the purpose specified.

2. In combination with a vibrating iron diaphragm arranged at right angles, and its center in proximity to one pole of a permanent magnet and rigidly attached near its periphery to the other pole of the same magnet, an inducing-coil composed partly of iron and partly of copper, for the purpose specified.

3. In combination with a vibrating iron diaphragm, a cylindrical electro-magnet made up of convolutions of iron ribbon, the same being surrounded by a helix of copper wire and inclosing another helix of copper wire and one pole of a permanent magnet.

4. A compound inducing-coil consisting of a cylinder made up of a continuous insulated iron ribbon surrounded by a helix of copper wire, and acting by attraction upon a superposed iron diaphragm, and by electrical induction upon one pole of a permanent magnet located within said cylinder, substantially as described.

5. In combination with a vibrating iron diaphragm and a permanent magnet arranged at right angles thereto and exerting a magnetic attraction upon the same at or near its center, an inducing-helix of iron ribbon surrounding and in electrical connection with another inducing-helix of copper wire.

6. In combination with a permanently-magnetic core and an iron diaphragm, an inducing-coil consisting of two helices of insulated copper wire arranged concentrically, and having between them a helix of insulated iron ribbon, substantially as described, and for the purpose specified.

7. In combination with a vibrating iron diaphragm arranged at right angles, with its center in proximity to one pole of a permanent magnet and rigidly attached near its periphery to the other pole of the same magnet, an inducing-helix of iron ribbon surrounding and in electrical connection with another inducing-helix of copper wire.

8. In combination with a vibrating iron diaphragm and a permanent magnet arranged at right angles thereto and exerting a magnetic attraction upon the same at or near its center, an inducing-helix of iron ribbon surrounding and in electrical connection with another inducing-helix of copper wire, said helix of iron ribbon acting, by virtue of electric currents traversing its insulated convolutions, to vary the aforesaid magnetic attraction and at the same time to produce within its own substance a tubular electro-magnet.

In testimony whereof I affix my signature, in presence of two witnesses, this 21st day of December, 1882.

MYRON L. BAXTER.

Witnesses:
JAMES T. RICHARDSON,
D. G. DIXON.