

(No Model.)

2 Sheets—Sheet 1.

J. W. McDONOUGH.  
TELEPHONE.

No. 485,876.

Patented Nov. 8, 1892.

Fig. 1.

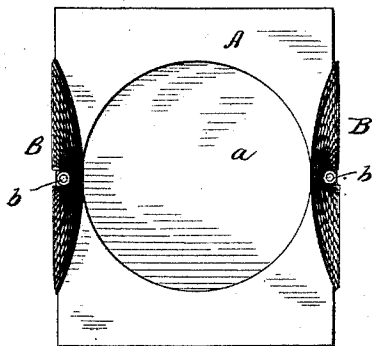


Fig. 3.

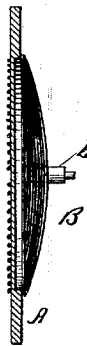


Fig. 2.

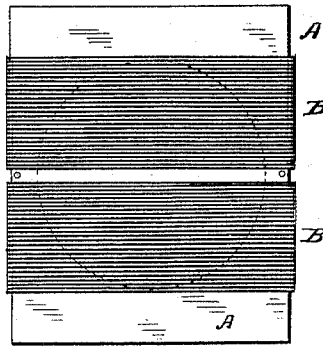


Fig. 4.

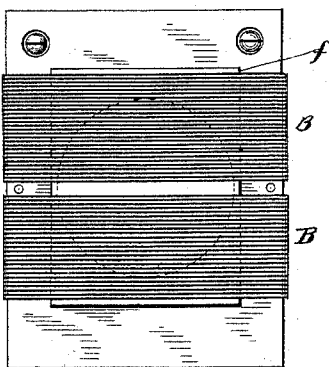


Fig. 6.

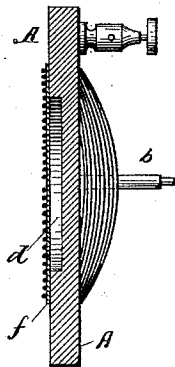


Fig. 5.

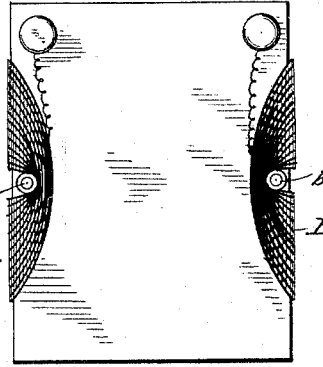
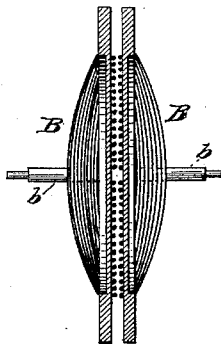


Fig. 7.



Witnesses:

E. H. M. Schagen  
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By his Attorney: H. S. Townsend

(No Model.)

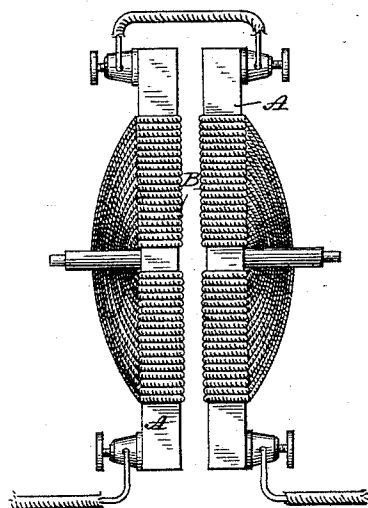
2 Sheets—Sheet 2.

J. W. McDONOUGH.  
TELEPHONE.

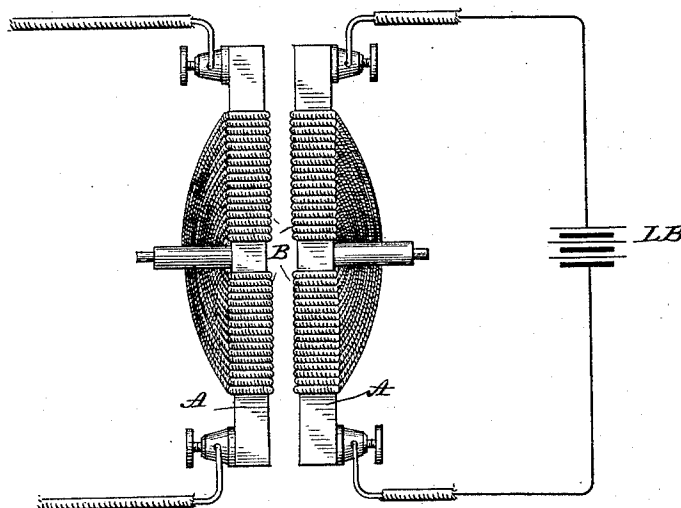
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*Fig. 8.*



*Fig. 9.*



Witnesses:

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*James W. McDonough*

By his Attorney: *H. C. Townsend*

# UNITED STATES PATENT OFFICE.

JAMES W. McDONOUGH, OF NEW YORK, N. Y.

## TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 485,876, dated November 8, 1892.

Application filed July 21, 1884. Serial No. 138,364. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES W. McDONOUGH, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Telephones, of which the following is a specification.

My invention relates to instruments for the transmission or reproduction of sounds by electricity.

My invention embodies an instrument capable of use either as a transmitter or a receiver; and it consists, essentially, in a vibratory plate or body to the surface of which is applied a conductor arranged with its contiguous portions parallel to one another. I have found by experiment that the passage of electrical vibrations through a wire portions of which are parallel to one another and are placed over a suitable vibratory plate or body will produce sonorous vibrations of sufficient strength to be clearly audible when the apparatus is placed to the ear, and similarly that an instrument of this kind may be used as a transmitter of sounds if a current be passed through the wire and sounds be made in the neighborhood of the apparatus.

Some of the forms that my invention may take in practice are shown in the accompanying drawings, in which—

Figure 1 is a rear view, and Fig. 2 a face view, of one form of the instrument. Fig. 3 is a vertical cross-section of the same. Figs. 4, 5, and 6 are similar views of another form of the instrument. Fig. 7 illustrates another method of carrying out the invention. Figs. 8 and 9 illustrate modifications of the invention.

A, Figs. 1, 2, and 3, indicates a base or block of any desired material, magnetic or non-magnetic. It may be in practice of hard rubber or of wood. At *a* said block or base is made thin to form a vibratory plate or surface. Over said surface passes a conductor, (indicated at B,) which is preferably applied by winding it around posts *b b*, set on the base or block A. The portions of said conductor passing over the surface *a* are preferably parallel, as indicated. The conductor might be wound or applied in any other desired manner, provided it be so arranged as to pass in whole or in part over and in contact or proximity with

the surface of *a*. The terminals of the conductor B are connected into circuit after the manner of any ordinary magnet-telephone. Telephonic or electric vibrations passing through the conductor produce sounds which can be heard on placing the instrument to the ear.

The action of the instrument when used as a receiver is due to the attraction of the parallel conductors, although to this effect there may be added the expansion and contraction of the conductors under the recurring electric pulsations or vibrations, which is also well understood by electricians to be an effect produced by an electric current flowing in a conductor.

If the instrument be used as a transmitter, a current should be made to flow through the wire. The action is in this case due to the minute vibrations of the parallel portions of the wire with relation to one another, thus producing on well-known principles electric pulsations or vibrations in the circuit of which they form a part.

In the modification of my invention shown in Figs. 4, 5, and 6 a block or base of any suitable material is recessed at *d*, and a diaphragm, plate, or other vibratory body *f* is placed over said recess. The wire or conductor is laid, as before, over the plate *f* and in one or more layers.

In Fig. 7 I have shown how my invention may be carried into fuller effect by combining with the wire or conductor of the instrument, as described, other wire or conductor parallel therewith and in inductive proximity thereto. This may be accomplished, as indicated in Fig. 7, by simply placing two instruments such as described face to face with the wire on one against and parallel with the wire on the other. The inductive action of the currents in the wire of one surface or plate upon the wire supported upon the other portion produces an attractive or repulsive action, which tends to set into vibration the vibratory plate or plates. The wires on the two portions are preferably connected in the same circuit, although one might be in a local and the other a line circuit. These modifications are illustrated in Figs. 8 and 9. In Fig. 8 the two conductors upon the two vibratory surfaces are placed in the same cir-

cuit, and the connections are made in such way that a current flowing in the conductor of one plate will flow, say, in the same direction in that portion of the conductor upon the other plate that is in proximity to the first. It will thus happen that when the electric vibrations or pulsations flow in the circuit mechanical vibrations will be produced owing to the attraction of the parallel currents. Such vibrations are also produced, as before explained, by the attraction between the parallel portion of the conductor on each single plate or portion of the instrument.

In the modification shown in Fig. 9 the conductor upon one portion of the instrument is in a local circuit with a battery L B and the currents in the other portion and over the line results in producing an attraction or repulsion between the parallel conductors, according to the direction of the line-current, which produces the mechanical action resulting in sound. If the instrument be used as a transmitter, the vibration of the conductors carrying the local-battery currents will produce, on the well-known principle of current-induction, electric currents or pulsations on the line conductor.

What I claim as my invention is—

1. In a telephone, a vibratory plate or body having electric conductors or portions of electric conductors arranged substantially parallel to one another over substantially the whole

surface of said plate or body and substantially parallel with the latter, said conductors being vibratory to impart a vibratory action to the plate or body, substantially as described.

2. In a telephone, a vibratory plate or body having electric conductors or portions of electric conductors arranged substantially parallel to one another over substantially the whole surface of said plate or body and substantially parallel with the latter and arranged to form a diaphragm in themselves and having the capacity to vibrate as a diaphragm and communicate their motion to substantially every part of the plate or body, substantially as described.

3. In a telephone, a combination, with the vibratory plate, of a conducting-wire wound over fixed supports and having a series of turns passing across the face of the vibratory plate in such way as to cover substantially the surface of said plate and to act as and communicate the motion of a diaphragm thereto, substantially as described.

Signed at New York, in the county of New York and State of New York, this 19th day of July, A. D. 1884.

JAMES W. McDONOUGH.

Witnesses:

THOS. TOOMEY,  
GEO. C. COFFIN.