(No Model.)

T. A. WATSON.

MAGNETO TELEPHONE.

No. 266,567. Patented Oct. 24, 1882.

Fig: 1.

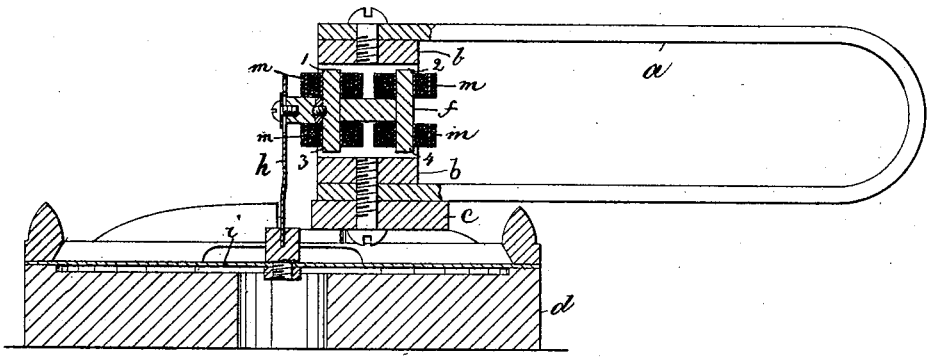
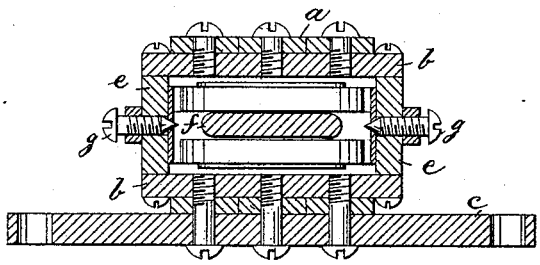


Fig: 2.



Witnesses.
Jos. P. Livermore
L. F. Connor

Inventor.
Thomas A. Watson
by Crosby Gregory Attys.

UNITED STATES PATENT OFFICE.

THOMAS A. WATSON, OF EVERETT, ASSIGNOR TO THE AMERICAN BELL TELEPHONE COMPANY, OF BOSTON, MASSACHUSETTS.

MAGNETO-TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 266,567, dated October 24, 1882.

Application filed April 17, 1880. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. WATSON, of Everett, county of Middlesex, State of Massachusetts, have invented an Improvement in Magneto-Telephones, of which the following description, in connection with the accompanying drawings, is a specification.

My invention relates to telephones, and has for its object to produce currents of greater strength than have commonly been employed for this purpose.

In the magneto-telephones now generally used a thin plate or diaphragm of soft iron is vibrated by the sound-waves in the magnetic field of a magnet, the poles of which are surrounded with coils in which electric currents are induced by the vibrations of the said plate. In such instruments the plate or armature is of small mass, and the effect of its movement on the magnet and coils is small.

My invention consists in causing the sound-vibrations to move a large armature similar to those of the usual forms of magneto-electric machines, the coils being wound on the said armature, and the currents generated therein being much stronger than those previously described.

In the usual magneto-electric machines the armature is pivoted to enable it to be moved in the magnetic field, and I am enabled by following the same construction to readily apply my invention to any of the usual forms of machine, among which may be mentioned the Siemens, Clarke, or Saxton and Gramme.

In any form of machine I connect the armature pivoted to move in the magnetic field by a suitable link and lever-arm, if necessary, with a body or diaphragm adapted to be vibrated in the usual manner by sound-waves, the vibrations of the said diaphragm thus causing through the said connections an oscillation or vibration of the said armature on its pivot by which strong currents are induced in its coils.

As herein shown, an armature pivoted between the poles of a horseshoe-magnet after the manner of a Siemens armature, but somewhat varied in construction therefrom, is connected by a rod with a common telephone-diaphragm.

Figure 1 is a longitudinal section of the apparatus, the armature being shown in cross-section; and Fig. 2, a cross-section thereof, the armature being shown in longitudinal section.

The magnet *a*, which may be of any desired form, (herein shown as a compound horseshoe-magnet provided with suitable pole-pieces, *b*,) is supported on a cross-bar, *c*, which may be attached to the frame-work or casing in which the apparatus is sustained, a portion only of which is shown at *d*. The pole-pieces *b* are secured at their ends upon pieces of non-magnetic material, *e*, between which the armature *f* is supported free to oscillate a short distance on the points *g*. The armature *f* might be made as a Siemens armature, round and free to rotate on the pivots *g*; but as only a very slight oscillating movement is needed for the purpose now in consideration the form shown is preferred, as it brings the poles of the armature in closer proximity to those of the magnet and admits of a more decided movement of said armature to and from the magnet. One side of the armature is connected by a bar, *h*, with a flexible diaphragm, *i*, (shown as one of the usual telephone-diaphragms) secured in the usual manner upon the frame *d*. The bar *h* is slotted at its upper end, where it joins the armature, to enable it to be easily adjusted. The armature *f* is shown as having four projections, 1 2 3 4, extending toward the poles of the magnet, the said projections forming poles of the said armature and each sustaining a suitable induction-coil, *m*.

It will be seen that when the rod *h* is moved in one direction two of the poles, as 1 and 4, diagonally opposite one another, will approach, while the other two, 2 and 3, recede from the poles of the magnet, and the four sets of coils should be so wound and connected that the currents induced in all the sets by the movement of their respective poles shall be in the same direction.

It is obvious that any form of armature, as the Gramme or Saxton, can be connected with the flexible diaphragm, so as to be oscillated in the magnetic field of its magnet, and that by connecting the said armature nearer to its pivotal axis the amplitude of vibration of the armature, and consequently the intensity of the induced currents, is increased.

It is obvious that this form of instrument is well adapted for a receiving-instrument, elec-

tric currents passing through the coils *m* on the armature, causing the said armature to oscillate, and it, by the connecting-rod *h*, vibrating the diaphragm to emit sound.

In case the instrument is to be used only as a receiver, it may be desirable to increase the amplitude of vibration of the diaphragm, which may be readily done by connecting the bar *h* with the armature or an arm attached thereto at a considerable distance from its pivotal axis.

I claim—

1. In a magneto-telephone, the combination, with the magnet, of an armature pivoted to oscillate on an axis passing through or close to its center of gravity, induction-coils included in the electric circuit and located in the magnetic field, and a vibratory surface or diaphragm connected with said armature on a point or one side of its axis, substantially as described.

2. The combination of a vibratory surface or diaphragm with a magnet, induction-coils included in the electric circuit and located in the field of said magnet, and an elongated armature connected with said diaphragm and pivoted to oscillate on an axis parallel or approximately parallel with the line of length of said armature, substantially as described.

3. The combination, with a permanent magnet and an armature wound with insulated wire and pivoted to oscillate in the field of force of said magnet, of a vibratory surface or diaphragm and connecting-rod joining the said armature at a point on one side of the axis thereof, with said vibratory surface or diaphragm, and adapted to impart the movements of one to the other in both directions, substantially as described.

4. A telephone-diaphragm and an armature connected therewith pivoted to oscillate between the poles of the magnet, the said armature being provided with a series of poles each provided with induction-coils so arranged that as the armature oscillates the several poles alternately approach and recede from the poles of the magnet, a part approaching while the rest recede, substantially as and for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THOMAS A. WATSON.

Witnesses:
JOS. P. LIVERMORE,
N. E. C. WHITNEY.