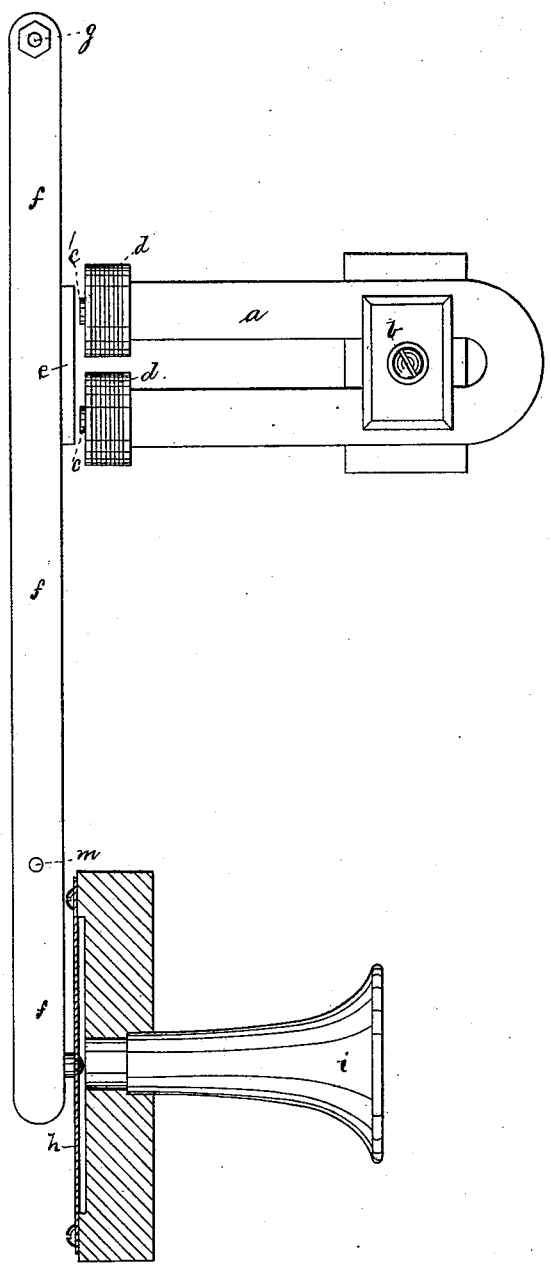
(No Model.)

T. A. WATSON.

TELEPHONE.

No. 348,077. Patented Aug. 24, 1886.



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UNITED STATES PATENT OFFICE.

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

TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 348,077, dated August 24, 1886.

Application filed June 15, 1880. Serial No. 11,765. (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 Telephones, of which the following description, in connection with the accompanying drawing, is a specification.

My invention relates to telephones, and has for its object to increase the amplitude of the vibrations of the diaphragm which gives out the sound, or of the armature or vibrating contact electrodes, or other device used to produce a varying electric impulse, thus increasing the loudness and volume of the sound received.

The invention is herein shown embodied in a magneto-telephone; and it consists in connecting the armature of the magnet thereof with a diaphragm by a mechanical device for increasing range of movement, herein shown as a simple lever, the connected armature and diaphragm taking the place of the usual diaphragm, which itself forms the armature of and is vibrated by the magnet.

When the instrument is to be used as a transmitter, the armature and diaphragm should be so connected that the movement of the former is greater than that of the latter, so that the currents induced will be stronger, and consequently have a more powerful effect upon the receiving-telephone. In some cases it may be desirable to increase the amplitude of movement of the vibrating point of a microphone or battery-transmitter.

The drawing shows a plan view of a magneto-telephone embodying my invention, part being shown in section.

The magnet *a* is shown as a horseshoe-magnet, suitably supported, as at *b*, in proper position to have its poles *c*, provided with the usual induction-coils, *d*, act on the armature *e*, of suitable size and form to be strongly affected thereby. The armature *e* is rigidly attached to a lever, *f*, having one end pivoted at *g* and the other end rigidly connected with the diaphragm *h*, which is placed in front of the usual sound-chamber and mouth-piece, *i*, and may be of any desired material not necessarily magnetic. By this arrangement it will be seen that any vibration imparted to the lever *f* will be transmitted to the diaphragm, and that according to the well-known mechanical principle of the lever, the movement of the extremity of the lever connected with the diaphragm will be greater than that of any intermediate point thereof in the ratio of the whole length of the said lever to that of the portion between the said intermediate point and the fulcrum *g*.

When constructed in the proportions shown in the drawing, the amplitude of movement of the end of the lever *f* and the connected diaphragm *h* will be about three times as great as that of the armature *e*, and the effect of the vibrations of the said diaphragm *h* on the air to produce sound-waves will be considerably greater and will produce considerably louder sound than a diaphragm vibrated in the ordinary way by the direct magnetic impulses.

The lever *f* should be of light stiff material, hard tough wood having a compact grain being found very good for this purpose.

If it is desired to use the telephone as a transmitter, the amplitude of vibration of the armature *e* should be increased, which may be done by constructing the telephone with the positions of the diaphragm and mouth-piece and the armature and magnet reversed, the diaphragm being connected with the lever at some intermediate point, and the armature secured to the free end thereof; or the parts may remain in the same position relative to the lever, which should then be pivoted at a point between the armature and diaphragm and nearer the latter, as at *m*, instead of *g*. When the same instrument is to be used as a transmitter and receiver, suitable pivots may be provided at *g* and *m*, and the lever connected with and vibrated on the one or the other, as desired. It is obvious that a lever of this description can also be used in connection with the contact-electrodes of a microphone or battery-transmitter when it is desired to have the vibrations of the movable electrode of different amplitude from those of the diaphragm.

I do not limit myself to a lever as the means for increasing the range of movement or amplitude of vibration of one of the movable parts set in motion by the other, as other mechanically-equivalent devices for transmitting and increasing motion may be used.

I claim—

1. In a telephonic instrument, a diaphragm to receive or impart sound-waves, combined with a lever rigidly connected therewith to enable a point on the said lever to have a vibratory movement of greater amplitude than that of the diaphragm, substantially as described.

2. In a telephone, an armature-lever arranged in contact with the diaphragm and provided with an adjustable fulcrum, substantially as described, whereby on changing the fulcrum the vibrations of the armature or of the diaphragm may be communicated from either to the other with an augmented or diminished force.

3. The combination of a diaphragm, armature-lever, and magnet adjustable with reference to the armature-lever, substantially as 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.