

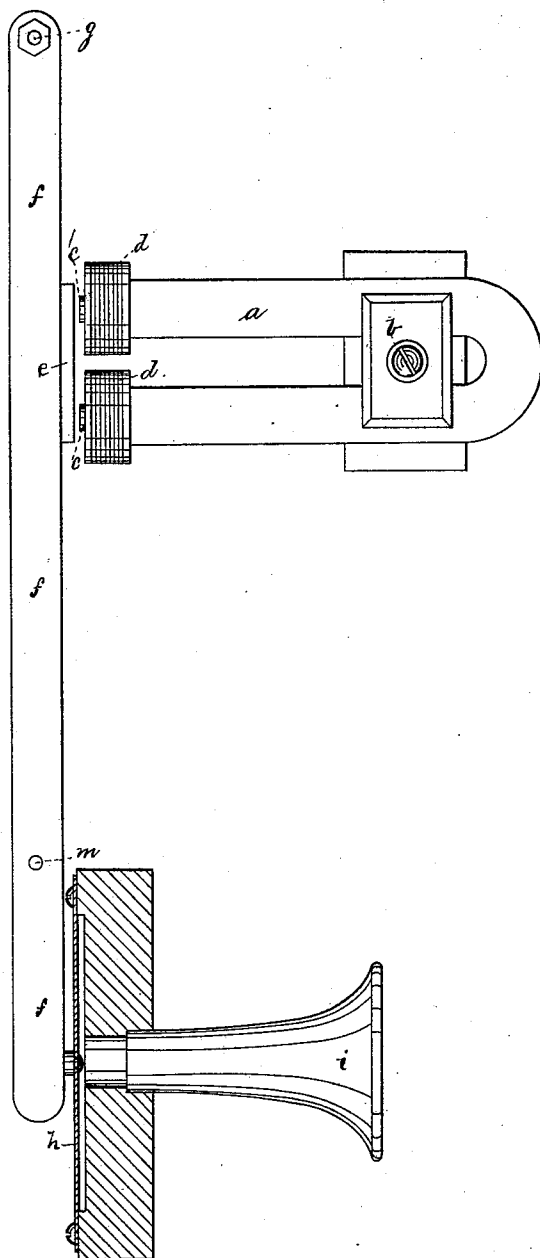
(No Model.)

T. A. WATSON.

TELEPHONE.

No. 348,077.

Patented Aug. 24, 1886.



WITNESSES-

Jos. P. Livenmore
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INVENTOR-

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UNITED STATES PATENT OFFICE.

THOMAS A. WATSON, OF EVERETT, ASSIGNOR TO THE AMERICAN BELL
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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 Massa-
chusetts, have invented an Improvement in
5 Telephones, of which the following descrip-
tion, 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
10 vibrations of the diaphragm which gives out
the sound, or of the armature or vibrating
contact electrodes, or other device used to pro-
duce a varying electric impulse, thus increas-
ing the loudness and volume of the sound
15 received.

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

25 When the instrument is to be used as a trans-
mitter, 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
30 consequently have a more powerful effect upon
the receiving telephone. In some cases it may
be desirable to increase the amplitude of move-
ment of the vibrating point of a microphone
or battery-transmitter.

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

The magnet *a* is shown as a horseshoe-mag-
net, suitably supported, as at *b*, in proper
40 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
45 the other end rigidly connected with the dia-
phragm *h*, which is placed in front of the usual
sound-chamber and mouth-piece, *i*, and may be
of any desired material not necessarily mag-
netic. By this arrangement it will be seen
50 that any vibration imparted to the lever *f* will
be transmitted to the diaphragm, and that

according to the well-known mechanical prin-
ciple of the lever, the movement of the ex-
tremity of the lever connected with the dia-
phragm will be greater than that of any inter-
55 mediate 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 60
in the drawing, the amplitude of movement of
the end of the lever *f* and the connected dia-
phragm *h* will be about three times as great as
that of the armature *e*, and the effect of the
65 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 ordi-
nary way by the direct magnetic impulses.

The lever *f* should be of light stiff material, 70
hard tough wood having a compact grain be-
ing 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 75
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 80
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*. 85
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 con-
nected with and vibrated on the one or the
other, as desired. It is obvious that a lever of 90
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 dif-
ferent amplitude from those of the diaphragm. 95

I do not limit myself to a lever as the means
for increasing the range of movement or am-
plitude of vibration of one of the movable
parts set in motion by the other, as other me-
chanically-equivalent devices for transmitting 100
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.