

A. E. DOLBEAR.
 Combined Speaking-Telephone and Morse-Sounder.
 No. 220,205. Patented Sept. 30, 1879.

Fig. 1.

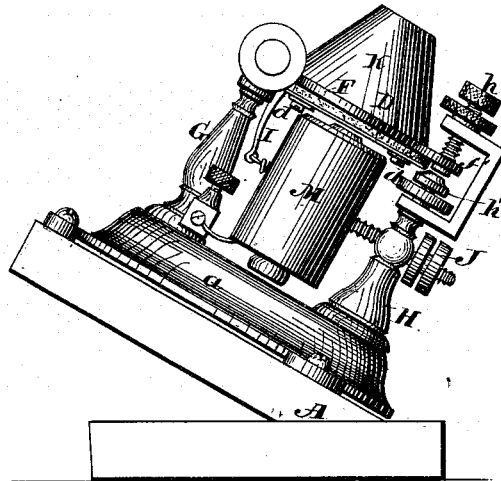


Fig. 2.

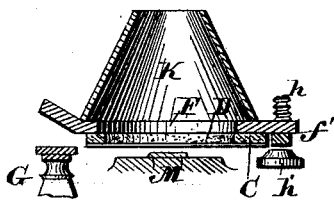


Fig. 3.

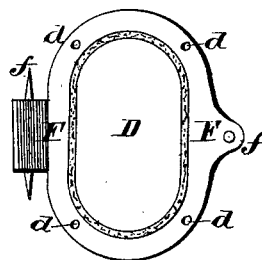
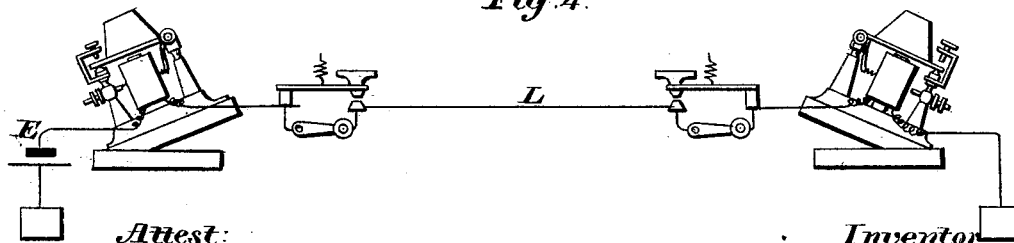


Fig. 4.



Attest:

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 Atty.

UNITED STATES PATENT OFFICE.

AMOS E. DOLBEAR, OF SOMERVILLE, MASSACHUSETTS.

IMPROVEMENT IN COMBINED SPEAKING-TELEPHONE AND MORSE SOUNDER.

Specification forming part of Letters Patent No. **220,205**, dated September 30, 1879; application filed May 3, 1878.

To all whom it may concern:

Be it known that I, AMOS EMERSON DOLBEAR, of Somerville, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Combined Speaking-Telephone and Morse Receiving-Instrument, which improvements are fully set forth in the following specification, reference being had to the accompanying drawings.

My invention relates to a certain class of instruments technically known as "telephones," which are especially adapted to the transmission and reproduction at a distance of sonorous waves or vibrations of every description by means of electrical impulses traversing a circuit of conductors.

My improvement consists in mounting the elastic diaphragm of a telephonic instrument, which forms the armature of the electro-magnet, upon a rigid frame, to which the edges of the said diaphragm are secured in the usual manner, which frame is hinged on one side to a stationary support, while the opposite side is provided with a projection which is so arranged as to be capable of vibrating between adjustable stops. Thus the diaphragm is made to serve also the purpose of an armature of a sounder for receiving Morse signals, while the frame to which the diaphragm is attached in like manner serves the purpose of the armature-lever, being provided with an adjustable retracting-spring of the usual construction.

An instrument thus constructed and arranged may be conveniently made to serve the double purpose of a telephonic transmitter or receiver, and of a Morse sounder or receiving-instrument.

In the accompanying drawings, Figure 1 is a side elevation of my combined telephone and sounder. Fig. 2 is a vertical longitudinal section of a portion of the same. Fig. 3 is a horizontal section of the same, showing a plan view of the diaphragm and the hinged frame upon which it is mounted; and Fig. 4 is a diagram, showing the arrangement of the apparatus upon a circuit.

In Fig. 1, A is the base of the instrument, which may be of wood, and is preferably constructed of such form as to support the instrument in an inclined position, as shown in the drawings. Upon the hollow metallic base-

plate *a*, which is secured to the wooden base A, is mounted an electro-magnet, M, similar to the magnets usually employed in Morse sounders, except that the length of the cores may with advantage be made proportionately shorter than those of the sounder as usually constructed.

The other parts of the instrument are in all respects similar to those of a sounder, except that I substitute for the armature and armature-lever commonly employed a device which serves the additional purpose of telegraphically transmitting and receiving articulate sounds, and which is constructed and arranged as follows:

An oval or round frame, F, preferably constructed of brass or other non-magnetic metal, and of sufficient thickness to give it the necessary weight and rigidity, is hinged at one edge by means of a pivot, *f*, turning in set-screws, one of which is seen at *g*, Fig. 1, these set-screws being mounted upon a standard, G, rising from the base-plate *a*. At the opposite edge of the frame F is a projection, *f'*, which extends horizontally between the two adjustable stops, *h h'*, upon the standard H. A diaphragm, D, composed of a thin oval plate of iron or other metal susceptible to magnetic influence, is firmly secured at its edge by screws *d d d d* to the under side of the frame F in such a position that its central portion is directly above the poles of the electro-magnet M.

Between the diaphragm D and the frame F is interposed a cushion, C, of felt, cork, paper, india-rubber, or other equivalent substance, the function of which is to prevent the communication of vibrations from the diaphragm D to the frame F and other portions of the instrument. To more perfectly insure this result, washers *c*, of the same material, are placed between the diaphragm D and the heads of the screws *d d d d*. By this arrangement the diaphragm D is acoustically insulated from its supports.

Upon the top of the frame F, over the diaphragm, is placed a vocalizing-chamber or mouth-piece, K, which is provided with a suitable opening at the top, and which may be of any suitable or convenient form. The frame F is provided with an arm, I, projecting downward at right angles from a point near its ful-

crum, to which is attached a retracting-spring, *i*. The tension of the spring may be adjusted by means of the nut *J*.

My improved instruments, when constructed in the manner hereinbefore described, may, without any change whatever, be conveniently employed either as a telephone or as a Morse sounder.

The manner in which two or more of my improved instruments are arranged on a circuit for use is shown in Fig. 4. It is necessary to make use of a continuous closed circuit, including one or more voltaic batteries, the arrangement of which is well understood, and therefore needs no particular description.

The process of transmitting and receiving communications by the Morse system, using the instrument solely as a sounder, does not differ from the method in general use. On long lines it will usually be found preferable to so construct the combined instrument that it will serve as a relay for operating a sounder in a local circuit, a modification which will be readily understood and applied by any person skilled in the art of telegraphy.

When the circuit is not in use for the transmission of Morse signals it is traversed by a constant current from the battery *E*, and the cores of the electro-magnet *M* of each instrument in the circuit are in effect converted

into permanent magnets. The armature or diaphragm *D* is consequently attracted by the stop *h*, which is so adjusted that the diaphragm cannot quite touch the poles of the magnet.

I claim as my invention—

1. A combined Morse receiving-instrument and speaking-telephone having but a single electro-magnet, substantially as specified.

2. An electro-magnet and an elastic diaphragm or armature secured to a rigid supporting-frame, in combination with a hinge or pivot, stops to limit the movement of the said frame to and from the magnet, and an adjustable retracting-spring, substantially as and for the purpose specified.

3. An elastic diaphragm mounted in front of and in close proximity to the poles of an electro-magnet, in combination with a rigid supporting-frame, and having cushions of felt or other equivalent substance interposed between the diaphragm and the frame, so as to prevent any metallic contact, substantially as and for the purpose specified.

In witness whereof I have hereunto set my hand this 1st day of May, A. D. 1878.

AMOS EMERSON DOLBEAR.

Witnesses:

JAS. B. BELL,
JOS. WEST.