

G. M. PHELPS.  
Electric Speaking Telephones.

No. 214,840.

Patented April 29, 1879.

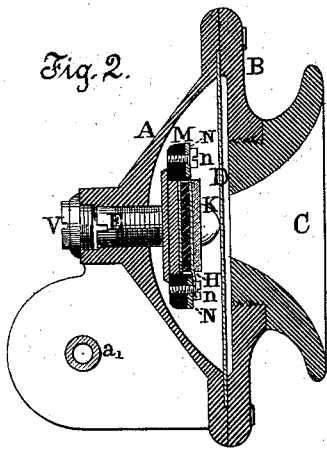


Fig. 2.

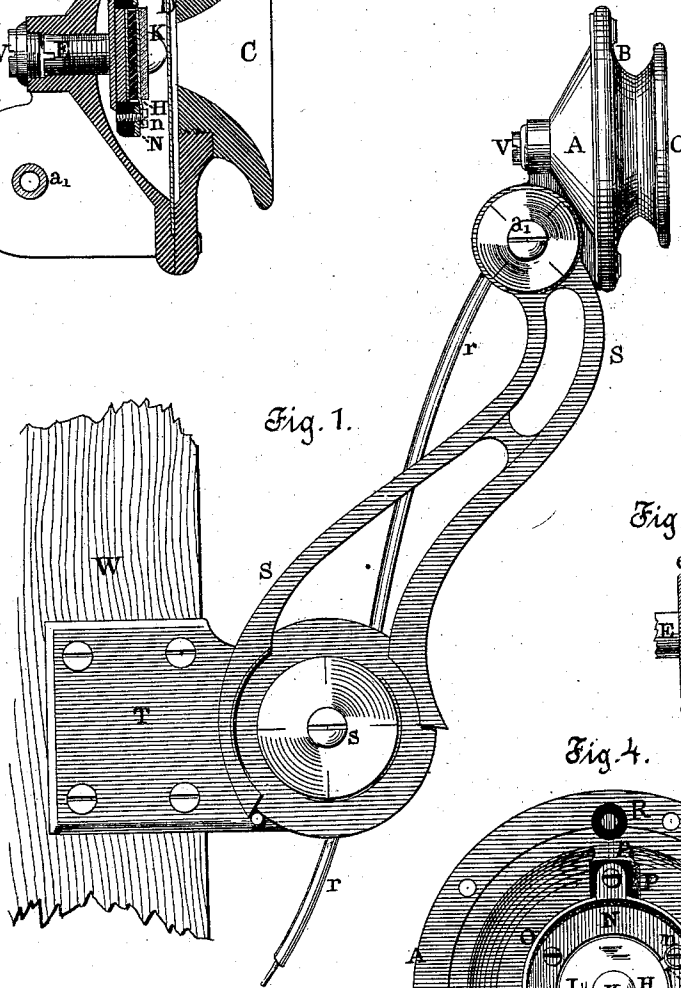


Fig. 1.

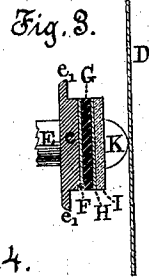


Fig. 3.

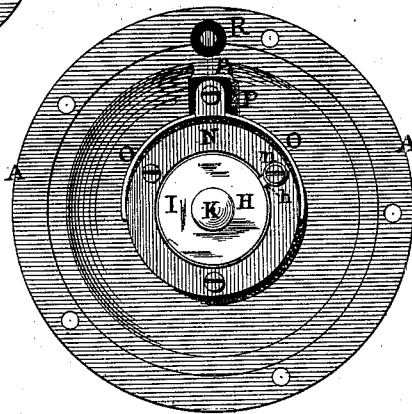


Fig. 4.

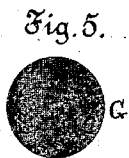


Fig. 5.



Fig. 6.

Witnesses:

*Levy and Saffert  
William J. Cox*

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by *Frank L. Pope,*  
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# UNITED STATES PATENT OFFICE.

GEORGE M. PHELPS, OF BROOKLYN, NEW YORK.

## IMPROVEMENT IN ELECTRIC SPEAKING-TELEPHONES.

Specification forming part of Letters Patent No. 214,840, dated April 29, 1879; application filed December 6, 1878.

*To all whom it may concern:*

Be it known that I, GEORGE M. PHELPS, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Transmitters for Speaking-Telephones, which improvements are fully set forth in the following specification, reference being had to the accompanying drawings.

My invention relates to that class of transmitters for speaking-telephones in which the strength of a continuous electrical current from a local battery is thrown into waves or undulations by the action of sonorous atmospheric vibrations upon a variable resistance inserted in said circuit.

My improvements consist, first, in providing means whereby the adjustment can be effected without interrupting the continuity of the circuit; second, in so arranging the apparatus that the vibrations of the diaphragm are transmitted to the variable resistance by means of a conical or hemispherical contact-point, which will interfere but slightly with the free vibration of the diaphragm; and, third, in attaching the transmitter to its support by means of a movable jointed arm, whereby greater convenience in operating it is secured.

In the accompanying drawings, Figure 1 is a side elevation of a telephonic transmitter embodying my improvements. Fig. 2 is a vertical section of a portion of the same, showing the construction and arrangement of the transmitting devices. Fig. 3 is a detached sectional view of the transmitting devices. Fig. 4 is a front view of the apparatus with the mouth-piece and diaphragm removed. Figs. 5 and 6 are detached views showing certain details of the apparatus.

The transmitting apparatus is inclosed in a cup-shaped metallic case, A, Figs. 1, 2, and 4, over the mouth of which is placed a circular plate or disk, D, of metal, forming a diaphragm. This is secured in its position by means of the cover B, which is placed over it, and made fast to the case A by means of screws or otherwise. The cover B is annular in form and has a trumpet-shaped mouth-piece, C, screwed into the circular opening in its center. The transmitting apparatus proper is mounted upon a metallic screw, E, Figs. 2 and 3, which is fitted into a hole bored through the back of

the case A at its center, and closed by an outer screw-cap, V. The screw E has a flat circular head, *e*, surrounded by a flange, *e'*, (best seen in Fig. 3,) and upon it is fitted an annular ring, M, composed of vulcanite or other insulating material, to the face of which a flat metallic ring, N, of the same or a little greater diameter is secured by screws *n*. (See Fig. 2.) The inner edge of the insulating-ring M is made to project considerably beyond the head of the screw *e*, upon which it is fixed so as to form a shallow cylindrical cup having a metallic bottom and sides of insulating material, for the reception of a carbon button, G, a face view of which is shown in Fig. 5, and a sectional view in Figs. 2 and 3. This carbon button is preferably composed of compressed lamp-black, although other forms of carbon, and even certain metallic compositions, may be substituted therefor with very fair results. The button G is placed loosely between two thin plates, F and H, of platinum or other infusible metal. The plate F is permanently secured to the head *e* of the screw E, while the plate H is cemented to a circular plate of glass, I. The plate H has a projection, *h*, Figs. 2, 4, and 6, through which it is secured to and electrically connected with the metallic ring N by means of the screw *n*. Upon the glass plate I, which serves both to support and insulate it, is cemented a hemispherical or conical projection, K, the apex of which rests against the center of the diaphragm D, as best seen in Figs. 3 and 6.

The advantage of this peculiar form is, that the motion of the diaphragm D is thereby communicated from the exact center of its vibration with the least possible interference with its freedom of movement.

The electrical connections of the apparatus are arranged as follows: One pole of the battery is connected with the body of the case A. The electrical current passes thence through the screw E and platinum plate F to the carbon button G, and through the button G and platinum plate H to the ring N. From the ring N (which is insulated from the case A by the vulcanite ring M) the current passes to the contact-springs O O, Fig. 6, which press against opposite points on the periphery of the said ring, these springs being likewise insulated

from the case A by a vulcanite support, P, and thence, by the insulated wire *p*, to a metallic stud or binding-screw mounted upon the insulating-support R. From this an insulated wire, *r*, Fig. 1, leads to the other pole of the battery. In this circuit any suitable receiving or repeating telephonic instrument may be placed, which will respond to the action of the transmitter. The resistance of this circuit is controlled by the varying pressure of the diaphragm D upon the carbon button G, through the medium of the hemispherical or conical projection K, the glass plate I, and the platinum plate H. Thus, when articulate words are spoken or sounds are uttered in the vicinity of the mouth-piece C, the plate or diaphragm D is thrown into vibration in a manner well understood, and, as hereinbefore explained, those vibrations are made to control the strength of the current by varying the resistance of the carbon button G.

By mounting the working parts of the transmitter upon the screw E, the normal pressure of the diaphragm D against the carbon button G may be conveniently and accurately adjusted by simply removing the cap V and turning the screw E and its attachments from the back with an ordinary screw-driver. This operation does not interfere in any way with the electrical connections, which are made by the pressure of the springs O O against any portion of the edge of the ring N.

For convenience of manipulation the case A, containing the transmitting apparatus, is jointed at *a* to one end of a metallic arm, S, of suitable length, the other end of which is jointed in like manner to a stationary support, T, which

may, in turn, be secured to any convenient structure, W, such as a wall or window-casing. This arrangement permits of the convenient use of the apparatus by persons of varying heights, as the flexure at the joints *a* and *s* permits the mouth-piece C to be placed in any position required without interfering in the least with the operation of the instrument.

I claim as my invention—

1. In a telephonic transmitter, a carbon button or disk, or its equivalent, and a plate of platinum or other metal held in contact therewith by pressure, in combination with a metallic ring and one or more contact-springs, the whole being so arranged as to admit of the adjustment of the normal pressure without interrupting the electric circuit, substantially as specified.

2. In a telephonic transmitter, a carbon button or disk, or its equivalent, and a plate of platinum or other metal held in contact therewith by pressure, in combination with a hemispherical or conical projection, the apex of which rests against the center of the vibrating plate or diaphragm, so as to receive motion therefrom, substantially as specified.

3. A telephonic transmitter attached to its support by means of a movable jointed arm, substantially as and for the purpose specified.

In witness whereof I have hereunto set my hand this 5th day of December, A. D. 1878.

GEO. M. PHELPS.

Witnesses:

WM. R. ROBERTS,  
WM. ARNOUX.