(No Model.)

R. M. LOCKWOOD & S. H. BARTLETT.

Telephone Receiver.

No. 228,825. **Patented June 15, 1880.**

Fig. 1.

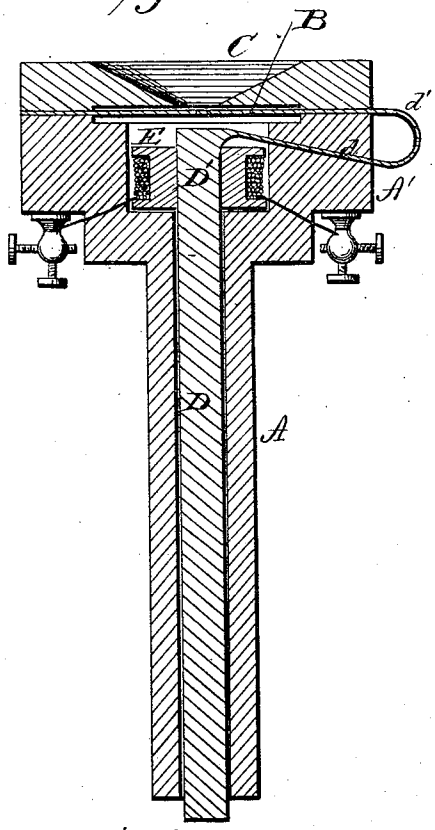


Fig. 2.

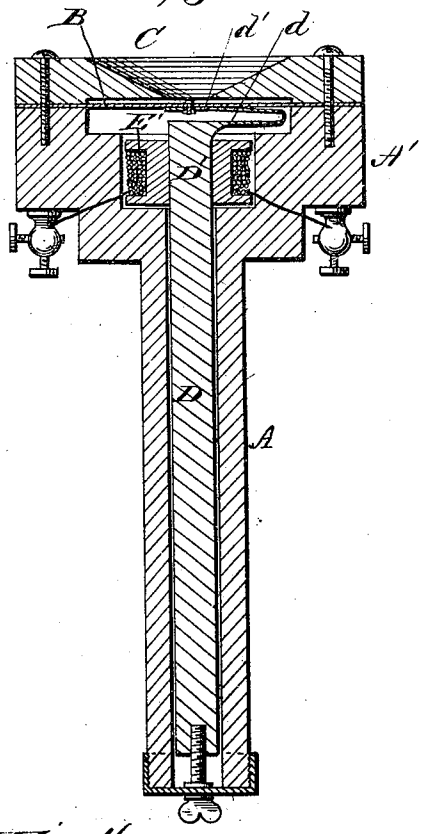


Fig. 3.

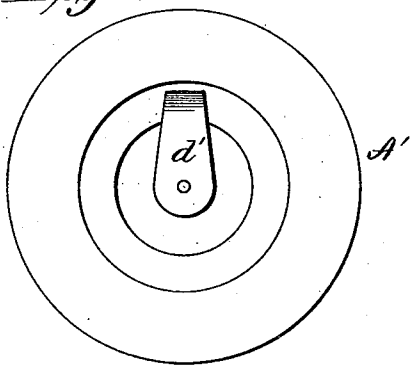


Fig. 4.

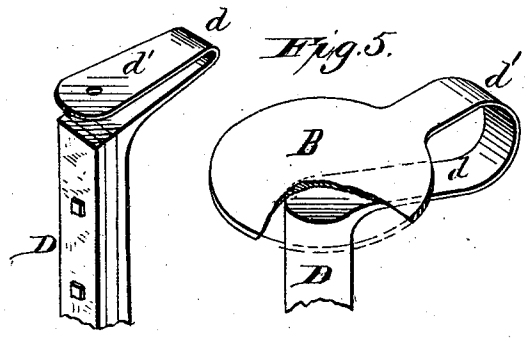


Fig. 5.

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Saml. H. Bartlett,
by Sell, Smith, Atty.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ROBERT M. LOCKWOOD AND SAMUEL H. BARTLETT, OF NEW YORK, N. Y., ASSIGNORS OF ONE-HALF OF THEIR RIGHT TO CHARLES F. LIVERMORE, OF SAME PLACE.

TELEPHONE-RECEIVER.

SPECIFICATION forming part of Letters Patent No. 228,825, dated June 15, 1880.

Application filed April 30, 1880. (No model.)

To all whom it may concern:

Be it known that we, ROBERT M. LOCKWOOD and SAMUEL H. BARTLETT, of the city, county, and State of New York, have invented a new and useful Improvement in Telephone-Receivers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 represents our improved telephone or vocal-sound-telegraph receiver. Fig. 2 is a similar view, showing a modification in the manner of connecting the diaphragm with the magnet. Fig. 3 is an end view of the construction shown in Fig. 2, with the ear-piece and diaphragm removed; and Figs. 4 and 5 are perspective views of the end of the magnet, having one the spring-arm and the other the spring-arm and diaphragm applied.

Similar letters of reference denote corresponding parts wherever used.

Our invention relates to a novel construction of the end of the magnet to which the diaphragm is connected, whereby, through disturbance or variations of magnetic power between parts of the same pole of the magnet, vocal sounds are transmitted to the diaphragm or sounding-board; and it consists in extending the pole in the form of a flat U-shaped spring, the outer free end of which, overhanging the end of the magnet of which it is an extension, is expanded into or has the diaphragm connected with it, as hereinafter explained.

In the accompanying drawings, A represents the body or handle of the receiver, made of wood or other suitable material, cylindrical in form, and enlarged at one end, A′, to accommodate the diaphragm B and ear-piece C secured thereto.

The body or handle A is perforated longitudinally to receive the magnet D, the perforation in the enlarged end A′ being enlarged into a socket for the reception of a spool or helix, E, surrounding the end D′ of the magnet, as shown. The magnet at the end D′ is drawn out, reduced in size, and bent at a right angle to the body D of the magnet, or nearly so, extends to one side thereof in the form of a flat spring, *d*, recurved upon itself in U form until the outer arm or end, *d′*, overhangs the end D′ of the body of the magnet, as shown.

Where the end *d′* is expanded to form the diaphragm B, as shown, the spring portion passes out through an opening in the head A′, and is there recurved so as to bring the diaphragm over the end thereof, where it is held in place by the ear-piece C, which is secured to said head or end by screws or other suitable fastening devices; but as good practical results have been obtained by making the diaphragm of different material from the magnet, such as wood, paper, parchment, brass, &c., constituting a sounding-board, the end *d′* of the spring-arm may terminate at a point overhanging the end D′ of the body of the magnet, and the diaphragm or sounding-board may be bolted or otherwise firmly fastened to it, as shown in Fig. 2. Where the latter form of construction is employed the magnet should be made adjustable longitudinally by means of a thumb-screw or equivalent device, as shown, for adjusting the tension of the disk or sounding-board B as may be necessary to give it the utmost efficiency.

Under the arrangement described it will be seen that the spring-arm *d d′* forms an extension of the pole D′ of the magnet, reduced in size, and its normal condition will be one of rest in relation thereto. Thus, calling the current in the helix E one, the amount of magnetism in the magnet D at D′ will be one and that in the arm *d′* one, and the latter will be at rest. The body of the magnet lies within the helix, and is more easily and quickly effected by it, and constitutes, as it were, a reservoir from which the smaller arm *d d′* is supplied. Now, supposing the current in the helix to be suddenly increased to two, the end D′ becomes two in advance of the end *d′*, and for the instant attracts the latter until it becomes also two, when it again instantly repels it; then its normal condition as a part of the same pole is restored, and it returns to its position of rest, until again attracted or repelled through another disturbance of the current in the helix. Thus for each disturbance in the current there will be three distinct movements of the arm *d′* or diaphragm B con-

nected therewith. First it will be drawn down or toward the end D′, then it will be repelled beyond its normal position, and finally, the equilibrium being restored, it moves back to rest. Thus it will be seen that the diaphragm is operated by differences or disturbances of degree of polarity or attraction and repulsion in the same pole.

In Fig. 4 the magnet is shown made up of a number of strips, an extension of one of which forms the spring-arm. This form obviates the necessity of drawing out the body of the magnet and facilitates its construction.

We are aware that the pole or poles of a horseshoe-magnet have been expanded to form a disk or diaphragm; but in such cases, so far as we are advised, the diaphragm has been brought into such relation to the opposite pole of the magnet as to be acted upon and controlled or held under restraint by said pole by interchange of polarity. This we do not claim; but,

Having now described our invention, we claim—

1. The pole of the magnet extended in the form of a laterally-projecting recurved arm and connected with the diaphragm or sounding-board, substantially as described.

2. The curved spring and diaphragm, made in one piece with and forming an extension of the pole of the magnet, substantially as described.

3. The diaphragm connected with the magnet through the spring-extension of one pole of the latter and arranged with relation to said pole substantially as shown and described.

In testimony whereof we have hereunto set our hands this 29th day of April, A. D. 1880.

ROBT. M. LOCKWOOD.
SAMUEL H. BARTLETT.

Witnesses:
C. H. HANKINSON,
T. W. HARTFIELD.