

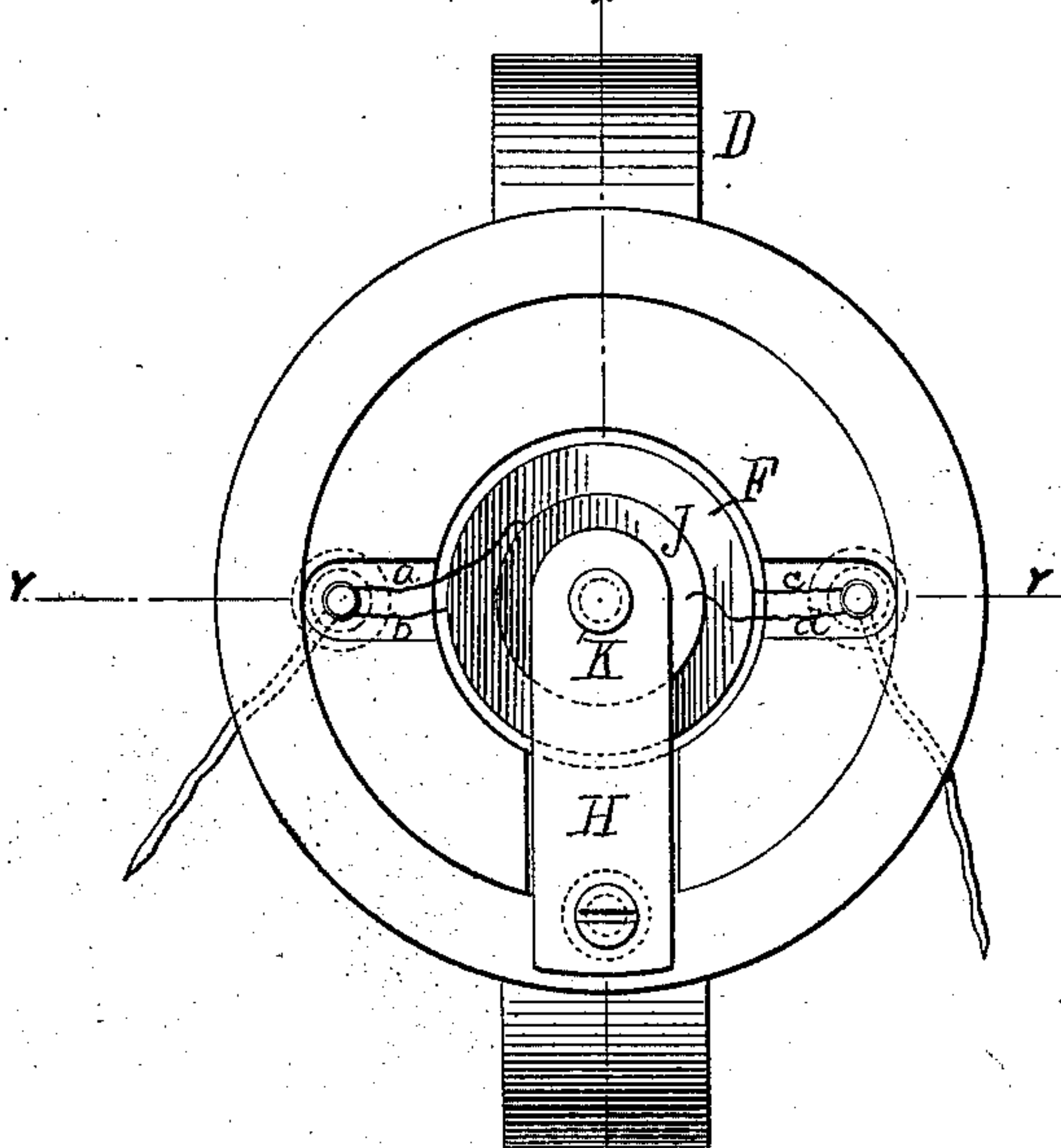
(No Model.)

D. DRAWBAUGH.  
TELEPHONE.

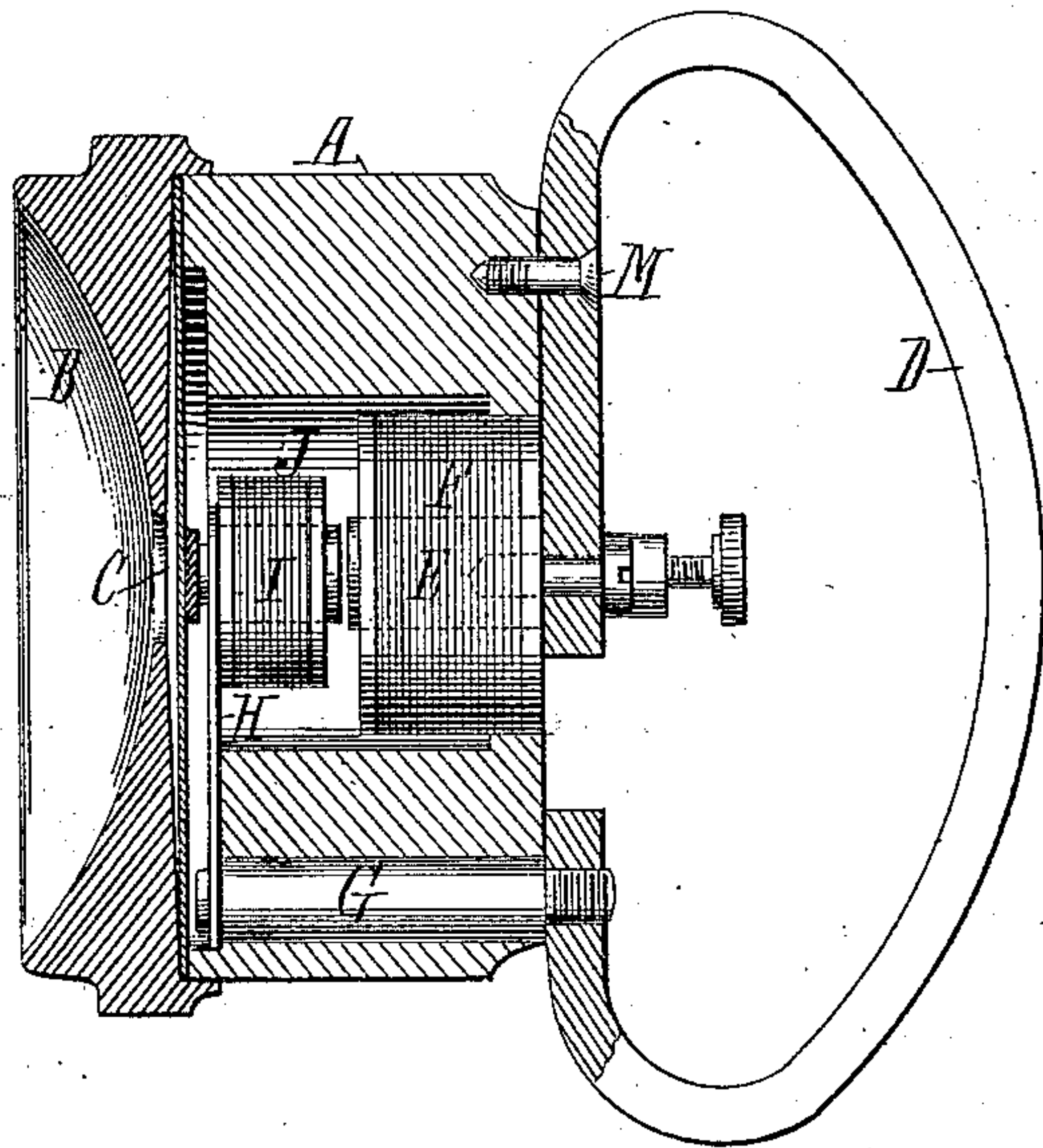
No. 290,979.

Patented Dec. 25, 1883.

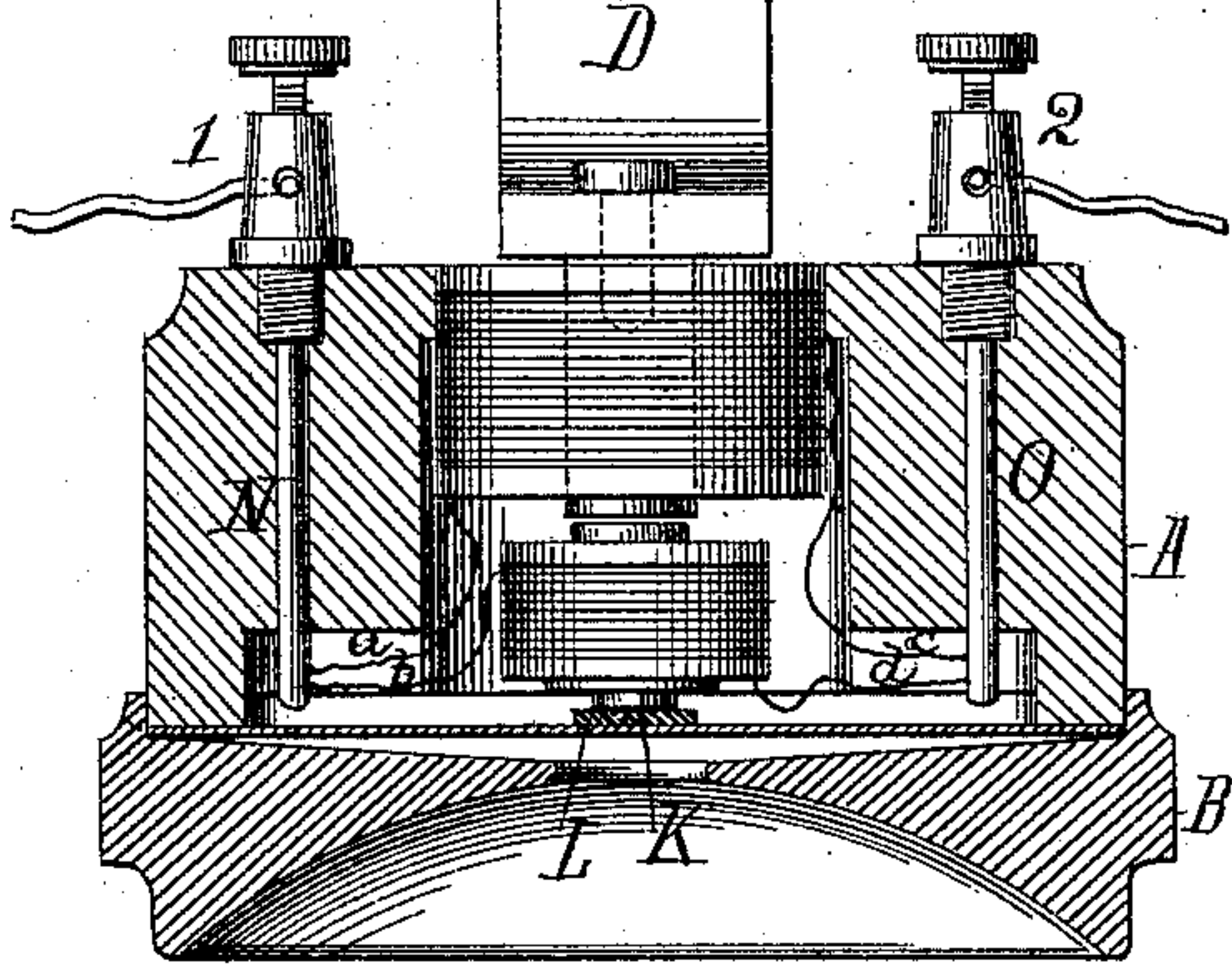
*Fig. 1.*



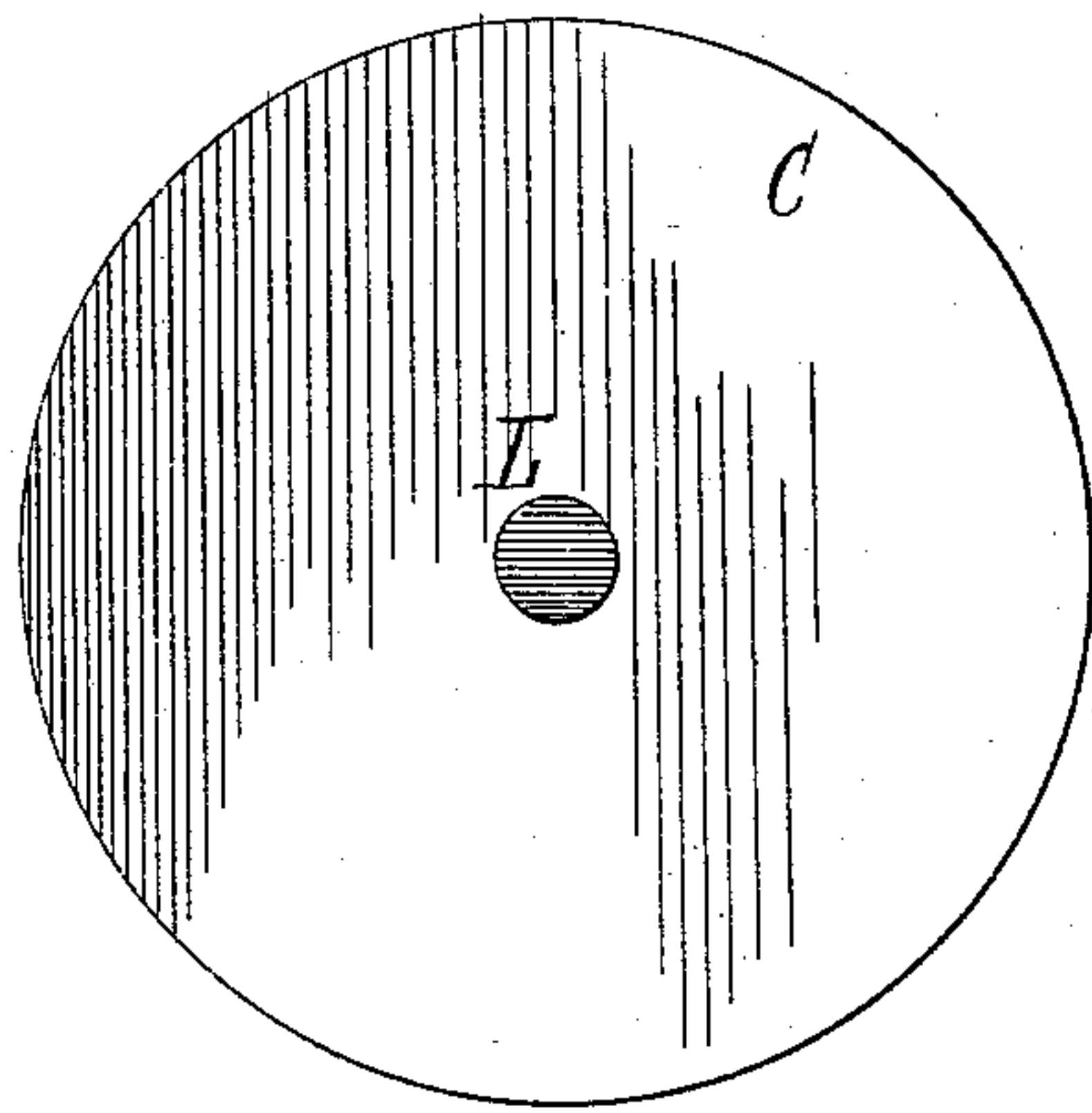
*Fig. 2.*



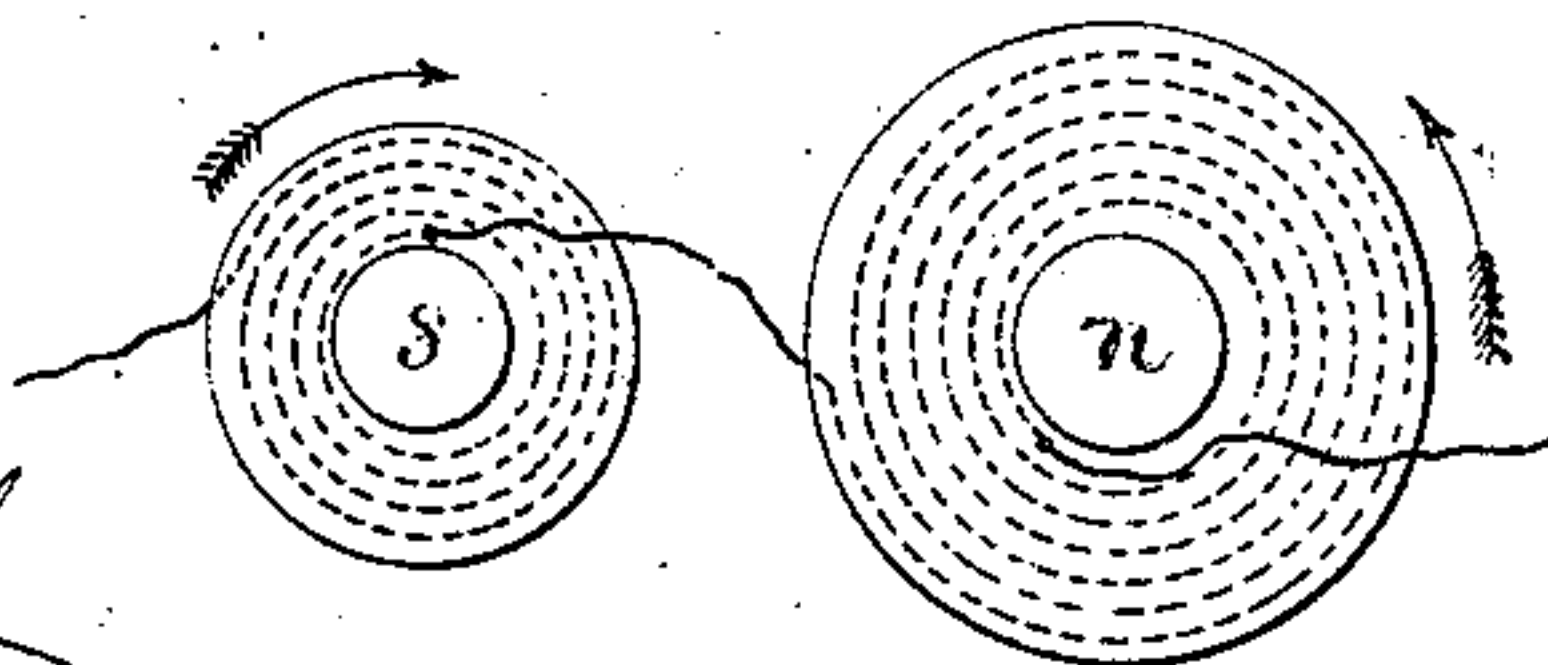
*Fig. 3.*



*Fig. 4.*



*Fig. 5.*



WITNESSES:

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INVENTOR

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# UNITED STATES PATENT OFFICE.

DANIEL DRAWBAUGH, OF EBERLY'S MILL, PENNSYLVANIA.

## TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 280,979, dated December 25, 1883.

Application filed June 20, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, DANIEL DRAWBAUGH, of Eberly's Mills, Cumberland county, Pennsylvania, have invented a new and useful Improvement in Telephones, of which the following is a specification.

The invention relates to a magneto-telephone; and it consists more particularly in the construction hereinafter set forth, whereby the instrument is rendered more sensitive and better adapted for use as a transmitter.

In the drawings, Figure 1 is a face view with the diaphragm and mouth-piece removed. Fig. 2 is a section on the line *xx* of Fig. 1. Fig. 3 is a section on the line *yy* of Fig. 1. Fig. 4 is a rear view of the diaphragm. Fig. 5 is a diagram showing the direction of currents and the manner of winding the coils.

Similar letters of reference indicate like parts.

A is the box or body of the instrument. B is the mouth-piece. C is the diaphragm, which may be of non-inductive material, held between said mouth-piece and body. D is a permanent magnet, to one pole of which is secured the core E of the coil F. To the other pole of said magnet is secured a bar, G, of inductive material, said bar passing through the body A, and having secured at its outer end a thin flat piece of metal, H, which carries the core I of the coil J. The piece H and the cores I and E are all of inductive material. The core I is secured to the piece H by a metal screw, K, the protruding head of which abuts against the piece of rubber or other insulating material L, secured to the center of the rear side of the diaphragm. The magnet D is also secured to the body A by a screw, M. The current enters the instrument at, for example, the binding-post 1, proceeds by the rod N to the wires *a b*, thence through the coils F and J to the wires *c d*, rod O, and binding-post 2, and out; or it may take the reverse direction.

It will be apparent from Fig. 2 that the facing ends of the cores E and I will be rendered oppositely magnetic by induction from the poles of the permanent magnet D. It will also be apparent from Fig. 5 that when the

coils are wound, as there shown, and the current in said coils takes the direction of the arrows, the facing ends *s n* of the cores E I will be rendered oppositely magnetic by induction of the current, so that under the conditions noted the effect of passage of the current through the coils, when the instrument is used as a receiver, will be to augment the opposite magnetisms of the facing ends of the cores, and so to increase their mutual attraction. The core I and coil J, which is secured to the thin vibrating piece of metal H, is free to move under the influence of this attraction and to communicate its motion to the diaphragm through the contact of the parts K and L. Conversely, when the instrument is used as a transmitter, the movement of the diaphragm is communicated to the spring H and electro-magnet I and J, so that by the movement of the latter in the strong magnetic field-produced currents are thereby induced in both coils F and J, which currents unite upon the line.

In practice the electro-magnets E F and I J should be so proportioned as that by a given current the strength of magnetization in the smaller electro-magnet should be about one-third that produced in the larger one.

I am aware that a telephone having an electro-magnet attached to a diaphragm, and thereby caused to vibrate before the poles of another electro-magnet, both sets of coils being in the same circuit, is old, and this construction I do not herein claim.

I claim as my invention—

1. In a telephone, a diaphragm, a permanent magnet, and two electro-magnets both in the telephone-circuit, the electro-magnets having the ends of their cores facing one another, the said ends being oppositely polarized by induction from the poles of the permanent magnet, one of the electro-magnets being fixed and the other movable, and sustained by a spring-support, vibrating or receiving vibrations from the diaphragm by contact therewith, substantially as described.

2. In a telephone, a fixed electro-magnet, a movable electro-magnet secured to a spring-support, and a diaphragm vibrated by or com-

communicating vibrations to said spring-support, the movable electro-magnet constituting the armature of the fixed electro-magnet, substantially as described.

5 3. In a telephone and in the circuit thereof, two electro-magnets having cores normally oppositely polarized by communication with the opposite poles of a permanent magnet, arranged the one in the magnetic field of force  
10 of the other, one being fixed and the other movable, a means of causing the movable electro-magnet to vibrate by the influence of sound-waves produced by the voice, and a means of leading the currents induced in both  
15 electro-magnets to unite upon the line, substantially as described.

4. The combination, in a telephone, of the permanent magnet M, electro-magnet E F,

electro-magnet I J, support H, rod G, and diaphragm C, substantially as described. 20

5. The combination, in a telephone, of the electro-magnet E F, electro-magnet I J, support H, and diaphragm C, substantially as described.

6. The combination, in a telephone, of the 25 electro-magnet I J, support H, projection K, insulating piece L, and diaphragm C, substantially as described.

7. The combination, in a telephone, of the binding-posts 1 2, rods N O, wires *a b c d*, 30 diaphragm C, and electro-magnets I J and E F, substantially as described.

DANIEL DRAWBAUGH.

Witnesses:

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