

(No Model.)

R. S. BARNUM.
TELEPHONE TRANSMITTER.

No. 575,869.

Patented Jan. 26, 1897.

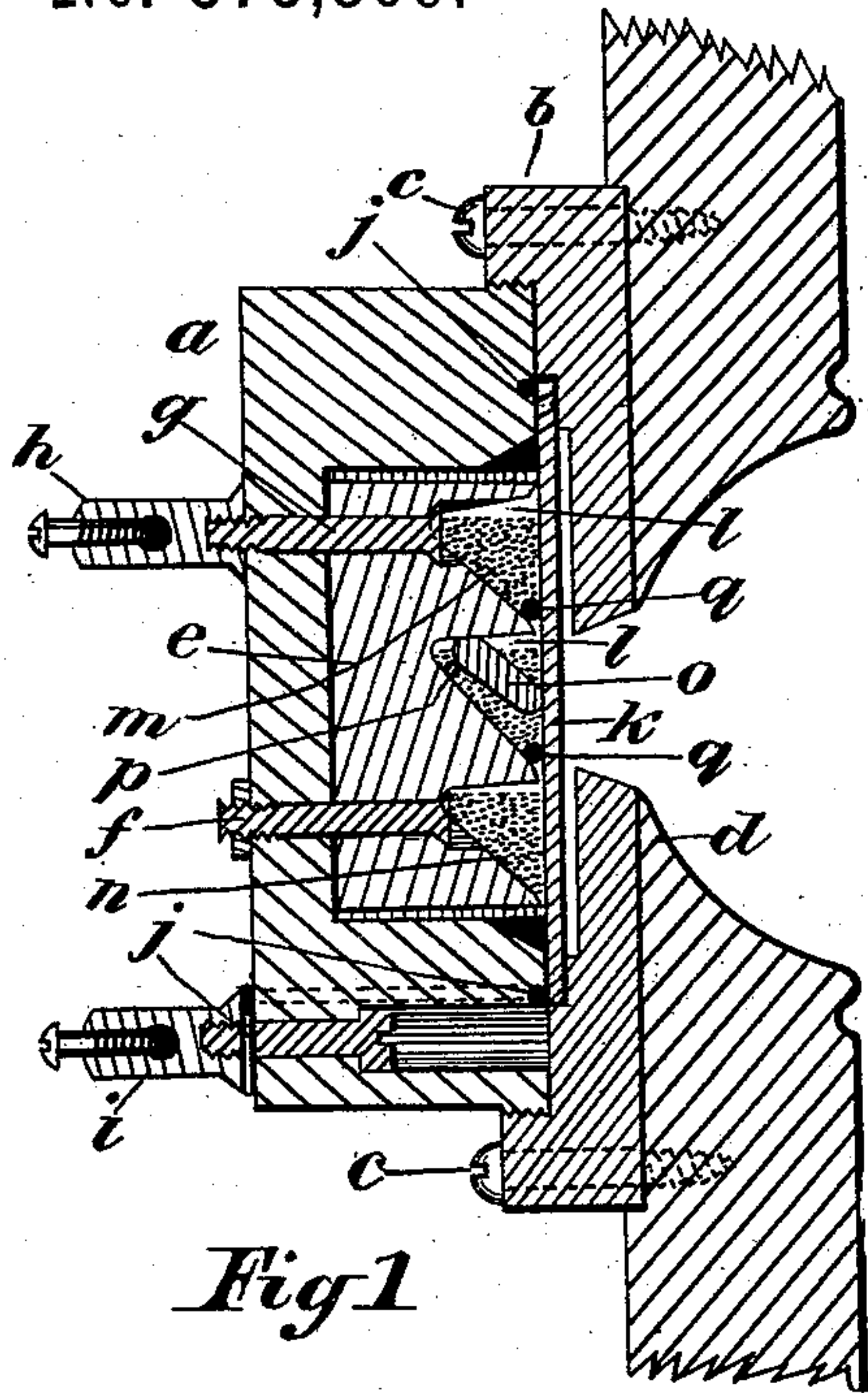


Fig. 1

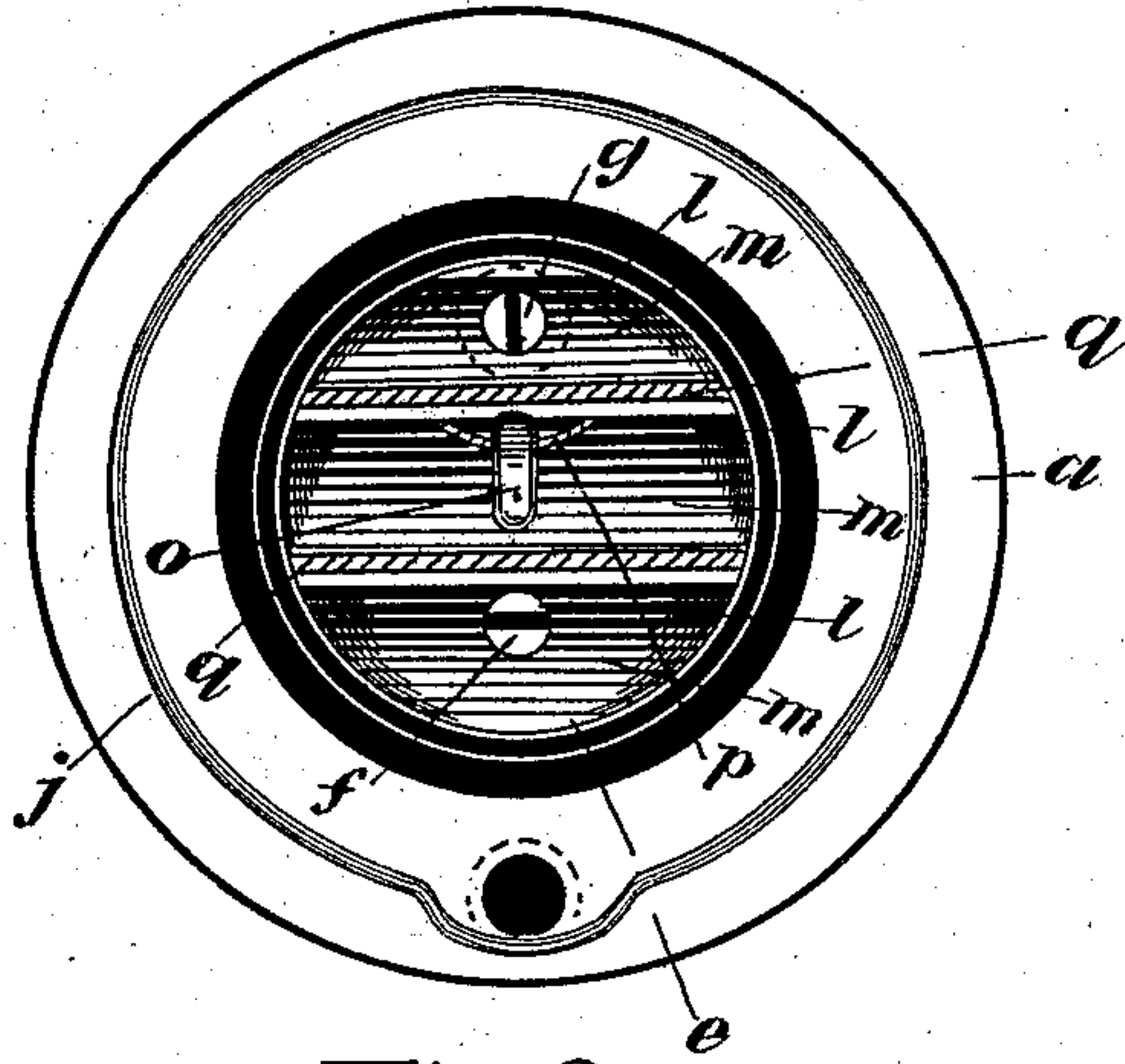


Fig. 2

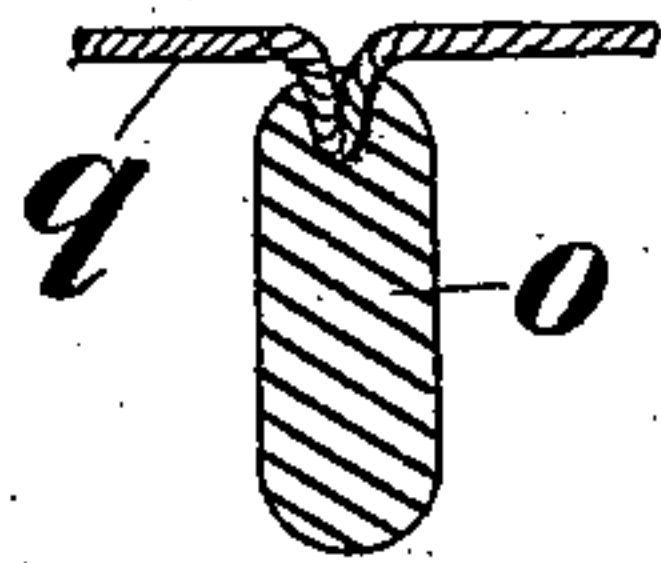


Fig. 5

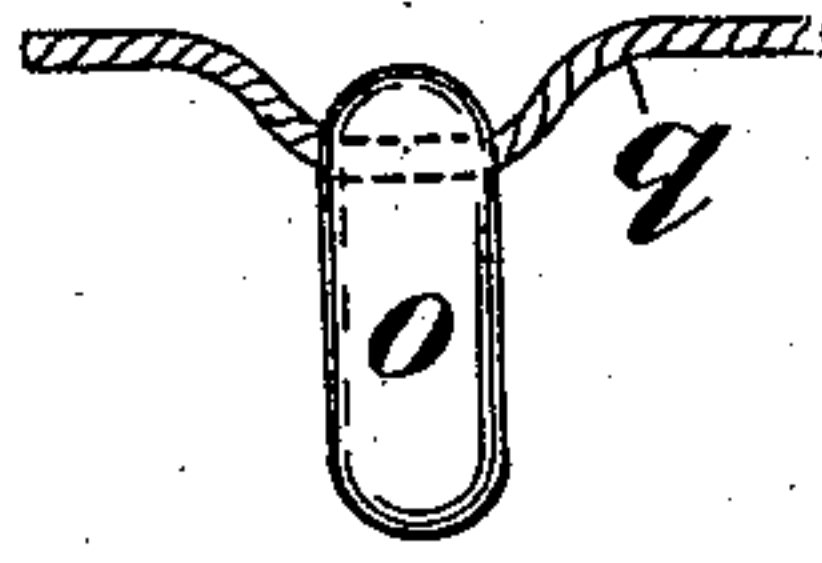


Fig. 6

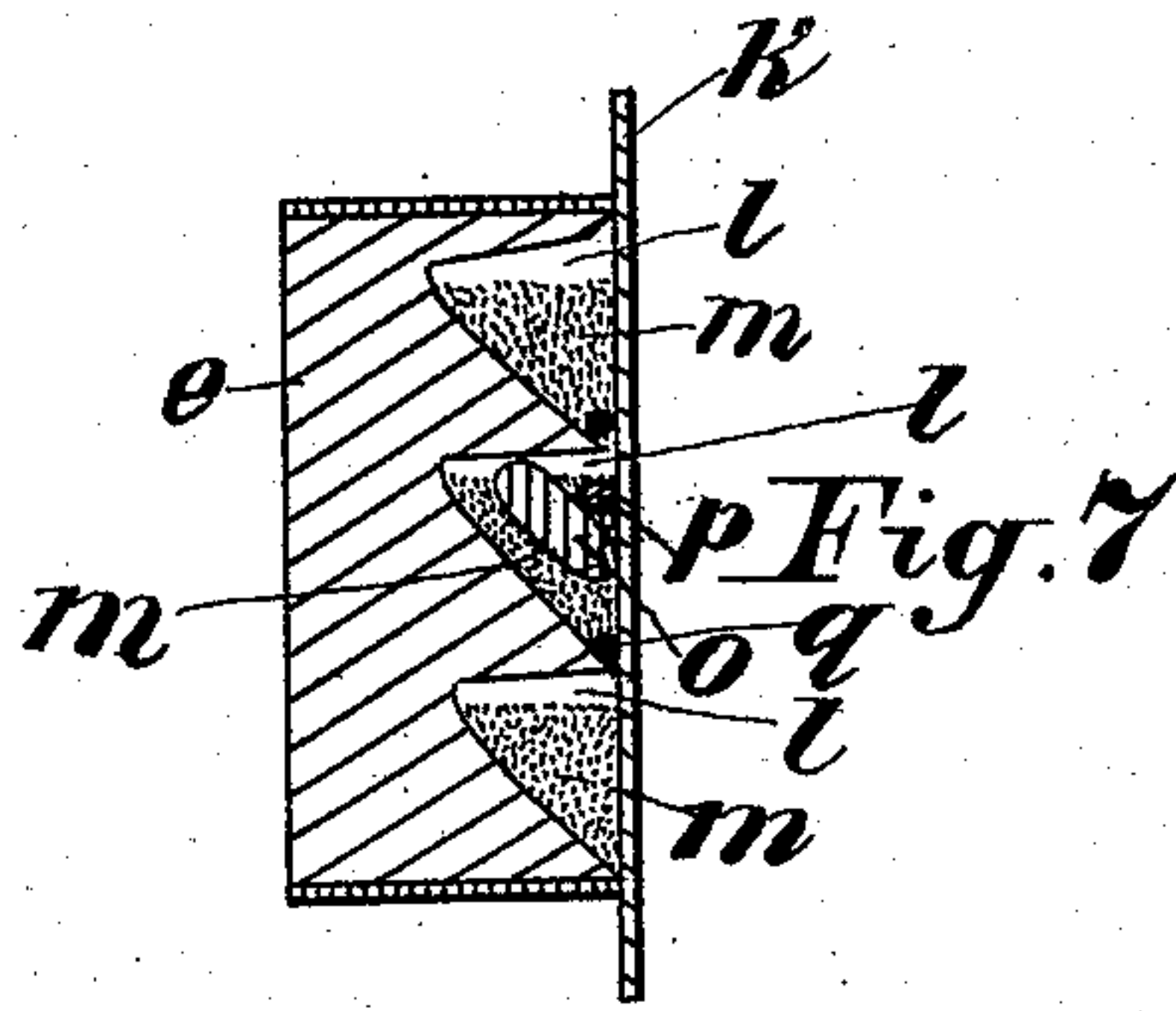


Fig. 7

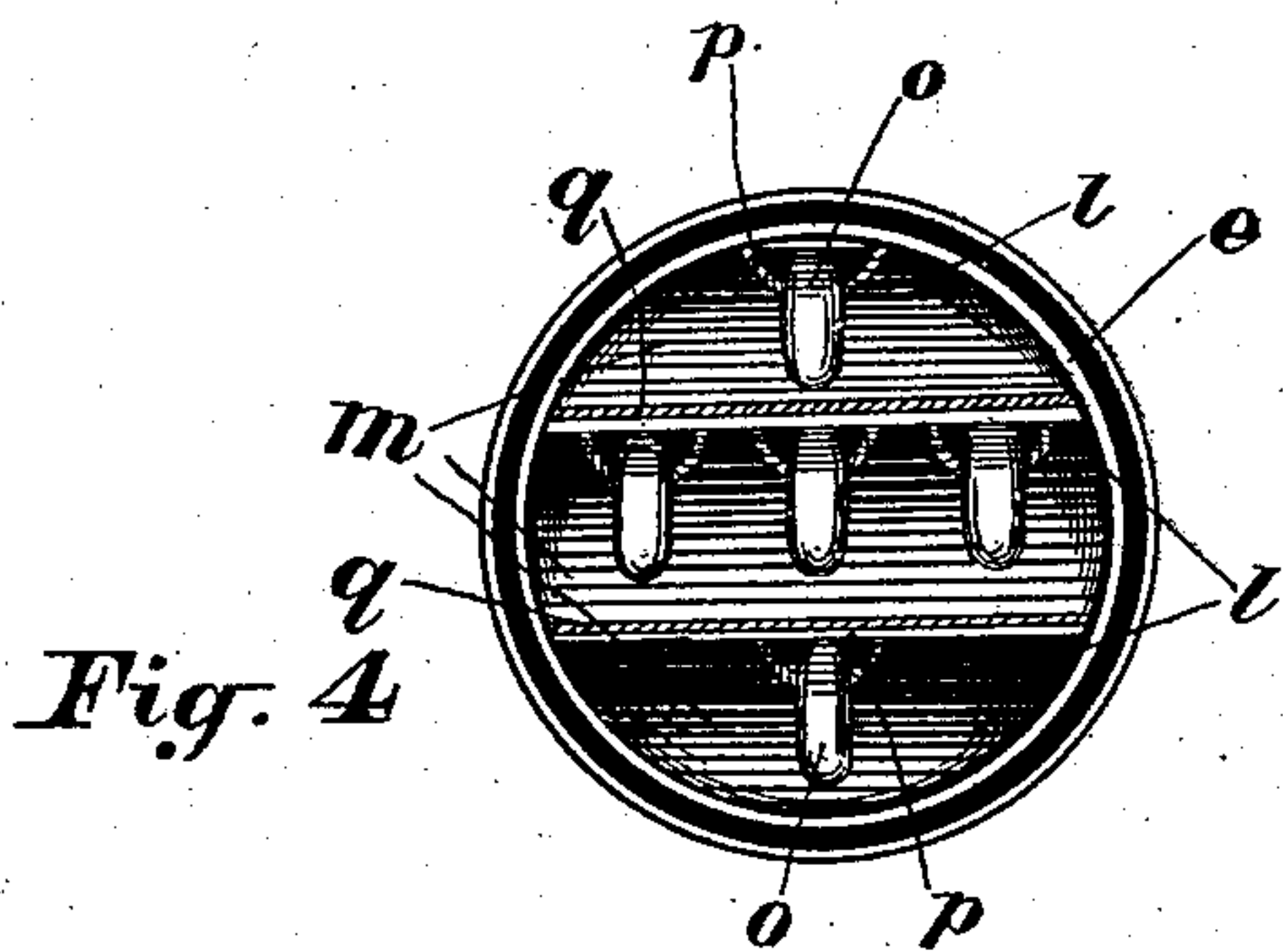


Fig. 4

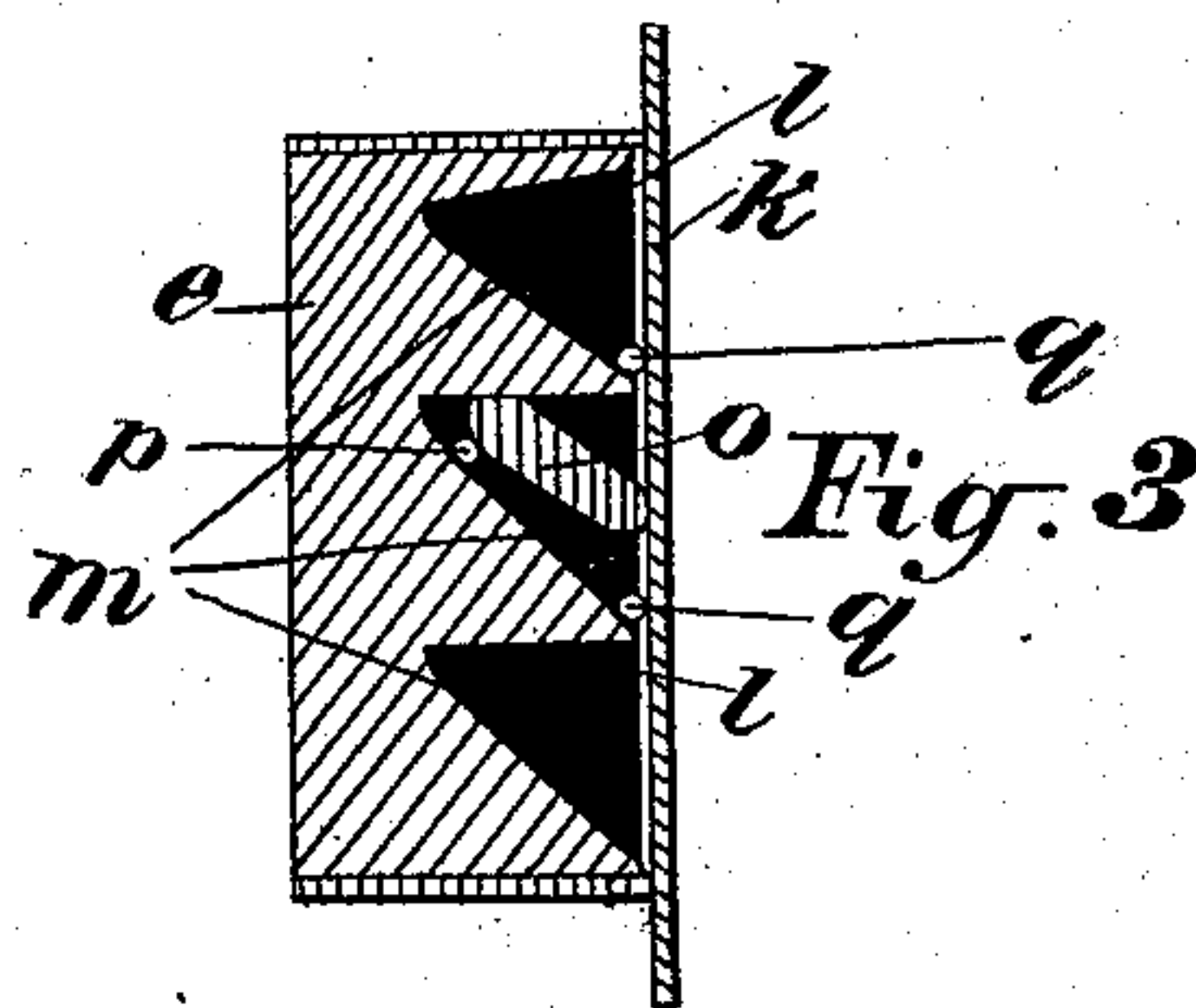


Fig. 3

Witnesses;
J. D. Clark
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per David H. Fletcher,
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UNITED STATES PATENT OFFICE.

RUSSELL S. BARNUM, OF CHICAGO, ILLINOIS.

TELEPHONE-TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 575,869, dated January 26, 1897.

Application filed June 1, 1896. Serial No. 593,780. (No model.)

To all whom it may concern:

Be it known that I, RUSSELL S. BARNUM, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Telephone-Transmitters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in which corresponding letters of reference in the different figures indicate like parts.

The primary object of my invention is to make a loud-speaking telephone-transmitter which may be so constructed as to be equally well adapted for long or short distances by merely varying the battery force in circuit therewith. To these ends I so construct the same that loose particles of conducting material may be employed therein in such a way as to prevent them from becoming packed so as to interfere with the movement of the diaphragm, while at the same time they may so act upon one or more loose or hinged tongues of conducting material arranged in an oblique position between the diaphragm and the block of carbon or other conducting material behind it that all rattling noises may be prevented, while a positive contact may be maintained through said tongue or tongues between the diaphragm and the block of conducting material, thereby increasing the loudness and clearness of the tone or speaking qualities of the instrument while permitting an indefinite variation in battery force. I accomplish said object in the manner and by the means hereinafter more particularly described, and definitely pointed out in the claims.

Figure 1 in the drawings is a central vertical sectional view of a telephone-transmitter embodying the features of my invention. Fig. 2 is a face view thereof representing said device with the diaphragm removed. Fig. 3 is a central vertical sectional view in detail showing the carbon block with the hinged tongue, the loose carbon particles being removed. Fig. 4 is a face view of a carbon block, showing a modification of said invention in which a series of hinged tongues are employed. Fig. 5 is a sectional view in detail of one of the carbon tongues, showing a modified way of attaching the hinge or cord;

and Fig. 6 is an enlarged view of said tongue, showing the preferred manner of attaching said cord.

Referring to the drawings, *a* represents the back or main body of a telephone-transmitter case which is, by preference, screwed, as shown, into a front portion *b*, the latter being secured by means of screws *c* to the usual door, in which is formed the customary mouth-piece *d*. Within a suitable recess in the part *a* I place a carbon block *e*, which is retained in position by means of screws *f g*, the latter of which is connected with a binding-post *h*. A secondary binding-post *i* is attached to the part *a* by means of a screw, as shown, and a wire *j*, connecting with said binding-post, is passed through the part *a*, as indicated in dotted lines in Fig. 1, to the front of said part *a*, where it is preferably bent in the form of a ring, so as to encircle the opening containing the block *e*, as shown in Fig. 2, in such a manner that the diaphragm *k* may rest against it and form a metallic contact therewith throughout its circumference, thus making such a connection between the binding-post *i* and diaphragm as to enable an electric circuit to be completed through them, while a more perfect distribution of the current is made over the entire surface of the diaphragm.

The carbon block *e* is provided with one or more, but preferably a series or plurality of, recesses *l*, which are so constructed as to form forwardly and downwardly inclined planes *m*, the incline in each case being of such a pitch as to form a ledge adapted to partially support or aid in the support of loose particles *n*, preferably of granulated carbon or other suitable conducting material, with which said recesses are partially or nearly filled. Within one or more of said recesses, if more than one, I place one or more loosely hinged or suspended tongues *o*, which are preferably rounded at the ends and are arranged obliquely to the plane of the diaphragm. Said tongues are hinged or suspended, preferably by means of loose cords *p* of cotton or other suitable fiber or material, at the rear of said recesses and beneath the ledges overhanging the same, so that the normal tendency of the forward ends of said tongues is to drop down upon said inclined planes; but the length of

the tongue is such that when the forward end is raised it is brought into contact with the diaphragm, as indicated in Figs. 1 and 3.

The recesses *l* are nearly filled with loose particles of conducting material *n*, as stated, which, when shaken by the action of the current and the movement of the diaphragm, tend to fall beneath the loose tongues *o*, and thus to crowd or lift the forward end of the latter upwardly and to hold it into contact with the diaphragm while the rear end of the tongue is in contact with the carbon block. This construction and arrangement enable a more positive contact and better electrical connection to be established between the diaphragm and the carbon block *e* than if the loose granules only were employed, thereby insuring a much louder tone, while the supporting action of the granules upon the tongue not only serves to maintain a sufficiently-yielding contact to enable the diaphragm to vibrate freely, but also serves to prevent it from rattling.

I have found in actual practice that a single loose tongue placed so as to be brought into contact with the center of the diaphragm, as shown in Fig. 2, greatly increases the efficiency of the instrument, both as to length of transmission and loudness and clearness of tone. Moreover, I have found it to be equally effective as a loud-speaking instrument, both for short and long distances, the increase in battery force serving in no perceptible degree to impair its talking qualities.

The placing of the carbon granules within the inclined recesses prevents them from becoming packed and wedged against the diaphragm, as is the tendency where the usual vertical recess is employed. In order to prevent them from wedging between the points of the ledges and the diaphragm, so as to interfere with the vibration of the latter, I stretch cords *q*, of soft flexible material, across the carbon block immediately above the ledges, as shown.

It is obvious that the hinge need not be made so as to hold the rear end of the tongue at all times in contact with the carbon block, inasmuch as the action of the loose granules will have that tendency however loose the hinge may be. I prefer to leave it loose enough to give freedom of action to the tongue, provided the latter is maintained in the inclined position specified.

The hinge may consist of a cord or tape of any suitable flexible material and may be fastened in any approved manner; but I prefer to attach it in the way indicated in Figs. 1, 2, and 6. In Fig. 5 the cord is shown as being inserted within a bore in the upper end of the tongue. In Fig. 4 I have shown five tongues, one in each of the upper and lower recesses and three in the middle recess.

The carbon block and diaphragm respectively form opposite electrodes, and the circuit is completed from one to the other through the hinged tongues when the forward

ends of the latter are lifted into contact with the diaphragm through the action of the loose particles. Inasmuch as the rear ends of the tongues are held in contact with the carbon block, it is not necessary to fill the respective recesses with the granules. On the contrary, I find that much better results are obtained by only partially filling them and causing the edges of the overhanging ledges to be brought into such close proximity to the diaphragm as to prevent the particles in one compartment from entering another. This separation and partial filling of the different compartments prevent the granules from wedging and packing and insures greater freedom of action.

While I prefer to use the cords, it is obvious that they may be dispensed with, inasmuch as the edges of the ledges are placed very close to the diaphragm, and hence would prevent any but the finest granules from passing from one compartment to another.

Having thus described my invention, I claim—

1. A telephone-transmitter in which is combined a carbon block constituting one electrode having a recess formed in its face the edges of which above and below are brought into close proximity to the diaphragm, an obliquely and forwardly depending tongue having its rear end loosely secured to said block within said recess, a diaphragm constituting the opposite electrode, and loose particles of conducting material partially surrounding said tongue and in contact therewith and with said block and diaphragm, substantially as described.

2. In a telephone-transmitter, the combination with a diaphragm constituting one electrode and suitable electrical connections with a line and source of electricity, of a carbon block forming the opposite electrode, said block having a recess therein adjacent to the diaphragm, a tongue of conducting material loosely hinged within said recess and arranged so that its forward end may touch said diaphragm and its rear end said block, and loose particles of conducting material contained within and partially filling said recess, substantially as described.

3. The combination in a telephone-transmitter, of a diaphragm and carbon block forming opposite electrodes with respect to each other, said block being provided with a recess in its face adjacent to the diaphragm, a hinged tongue, and loose particles of conducting material arranged within said recess so as to partially cover said tongue, a source of electricity, and suitable electric connections, substantially as described.

4. The combination in a telephone-transmitter of a diaphragm and a carbon block forming opposite electrodes, said carbon block having a series of recesses within its face adjacent to the diaphragm, the edges of which recesses are brought into such close proximity to said diaphragm as to prevent the passage of loose particles from one compartment to

another, loose tongues of conducting material hinged within said recesses, loose particles of like material also arranged therein so as to partially cover said tongues, a source of electricity and suitable electrical connections, substantially as described.

5. The combination in a telephone-transmitter of a diaphragm and a carbon block forming opposite electrodes, said carbon block having a series of recesses formed within its face with overhanging ledges, the edges of which are in sufficiently close proximity to the diaphragm to prevent the passage of granules from one compartment to another, a plurality of loose tongues composed of conducting material, means for suspending or hinging the same so that their axes may be oblique to the plane of the diaphragm, and loose particles of conducting material placed within said separated compartments, as and for the purposes specified.

6. In a telephone-transmitter, a diaphragm and a carbon block constituting two electrodes and a mass of granulated conducting material, of an obliquely-disposed tongue in elec-

trical contact with both electrodes, one end of said tongue being projected into the mass of granulated conducting material and in electrical contact with the diaphragm, while the opposite end of said tongue is caused to extend above the mass of granulated conducting material and into contact with said carbon-block electrode, substantially as shown and described.

7. In a telephone, a diaphragm and carbon block constituting two electrodes, and a mass of granulated conducting material, an obliquely-disposed carbon tongue hinged to one, and in electrical contact with both of the said electrodes, said tongue projecting into but only partially surrounded by said granulated conducting material, substantially as described.

In testimony whereof I have signed this specification, in the presence of two subscribing witnesses, this 30th day of April, 1896.

RUSSELL S. BARNUM.

Witnesses:

D. H. FLETCHER,

DE WITT W. CHAMBERLIN.