

(No Model.)

T. GRISSINGER.  
TELEPHONE TRANSMITTER.

No. 523,276.

Patented July 17, 1894.

Fig. 1.

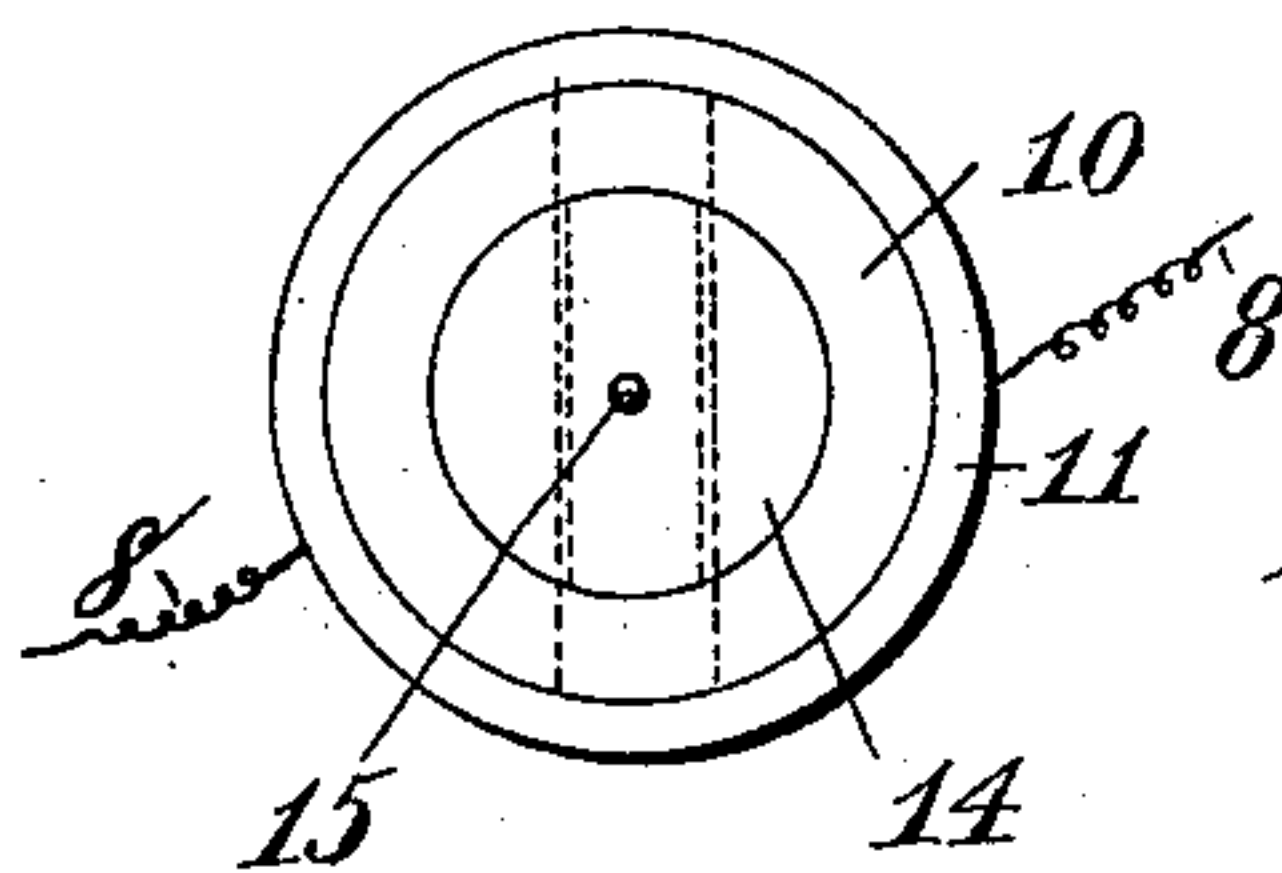


Fig. 2.

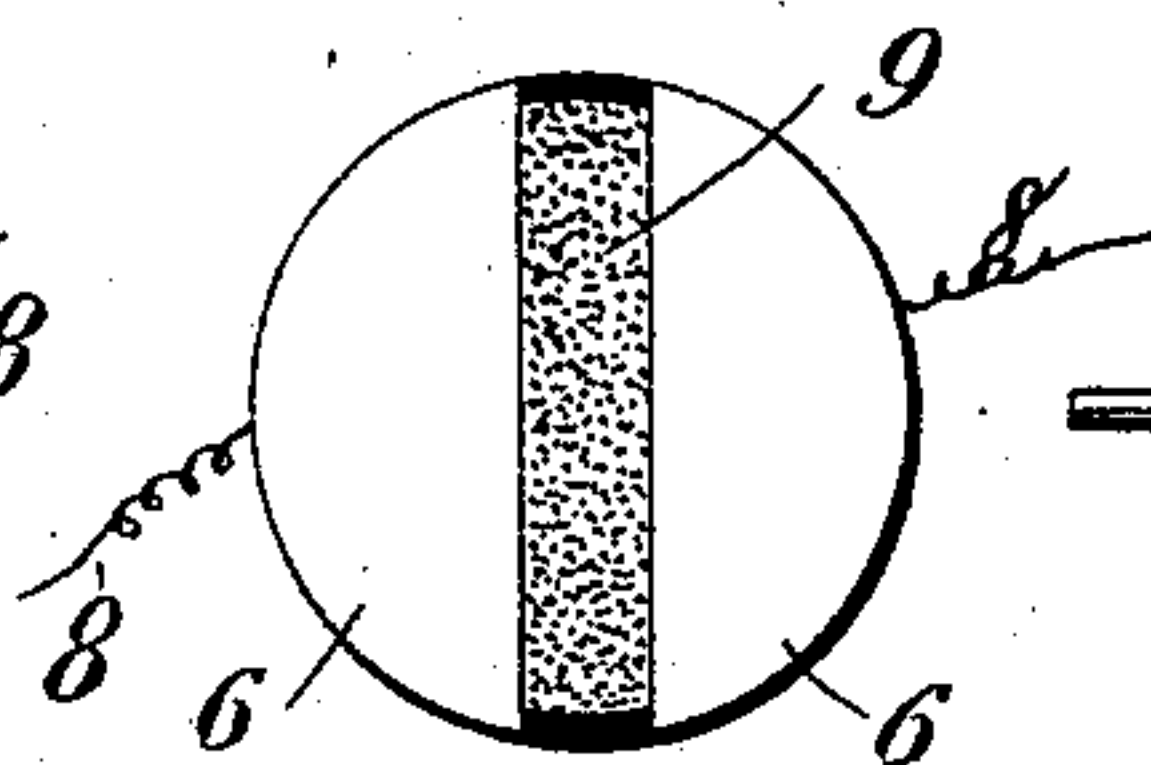


Fig. 3.

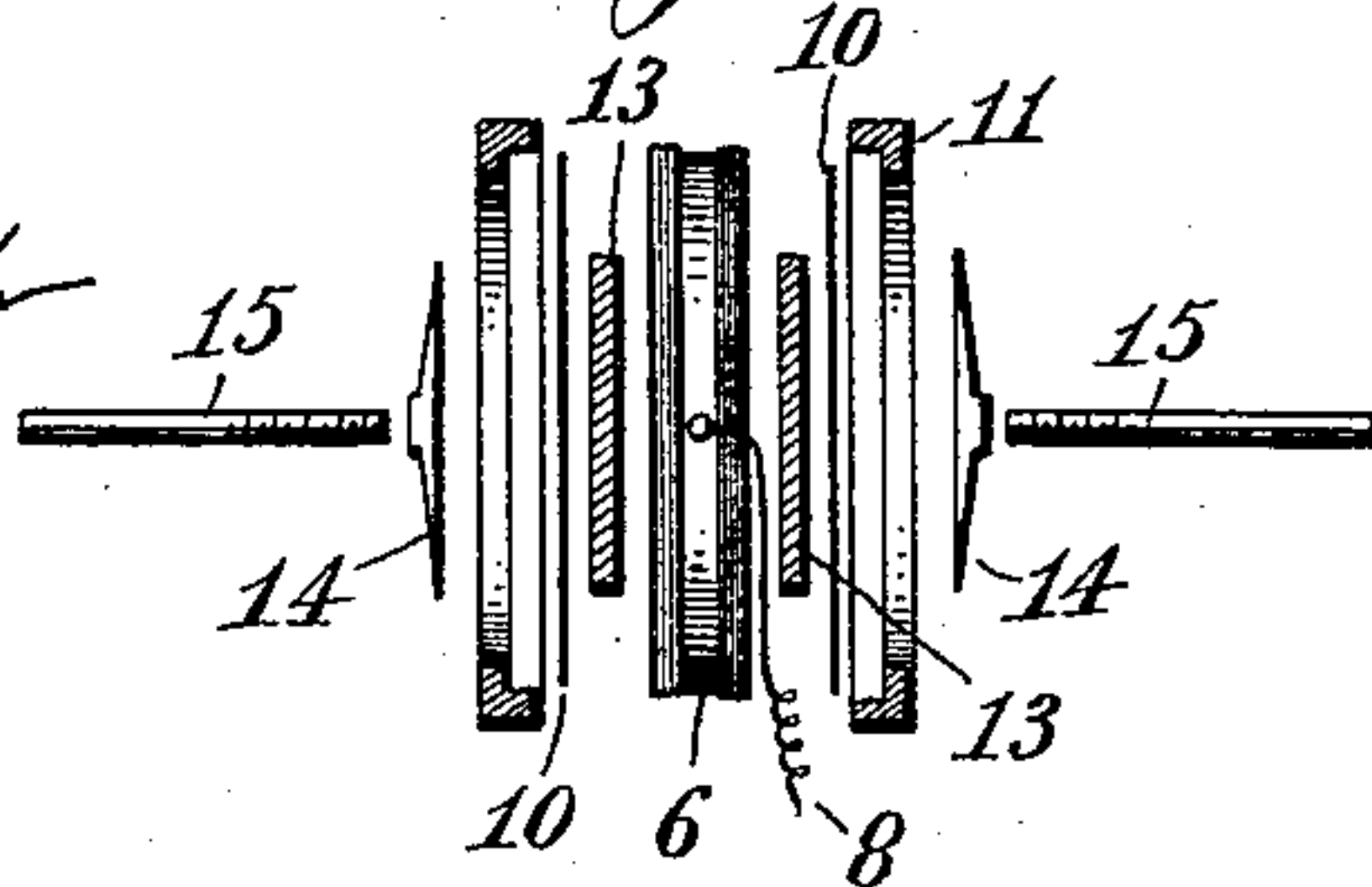


Fig. 5.

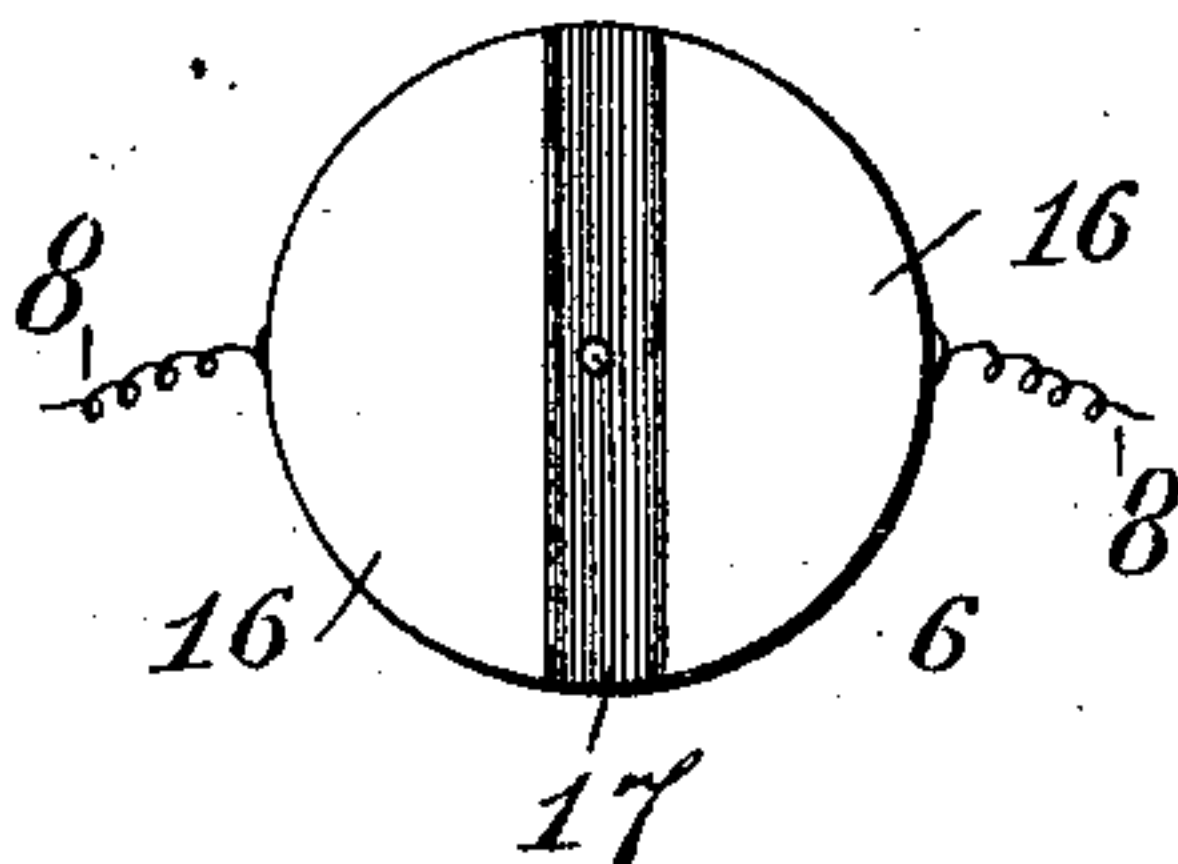


Fig. 6.

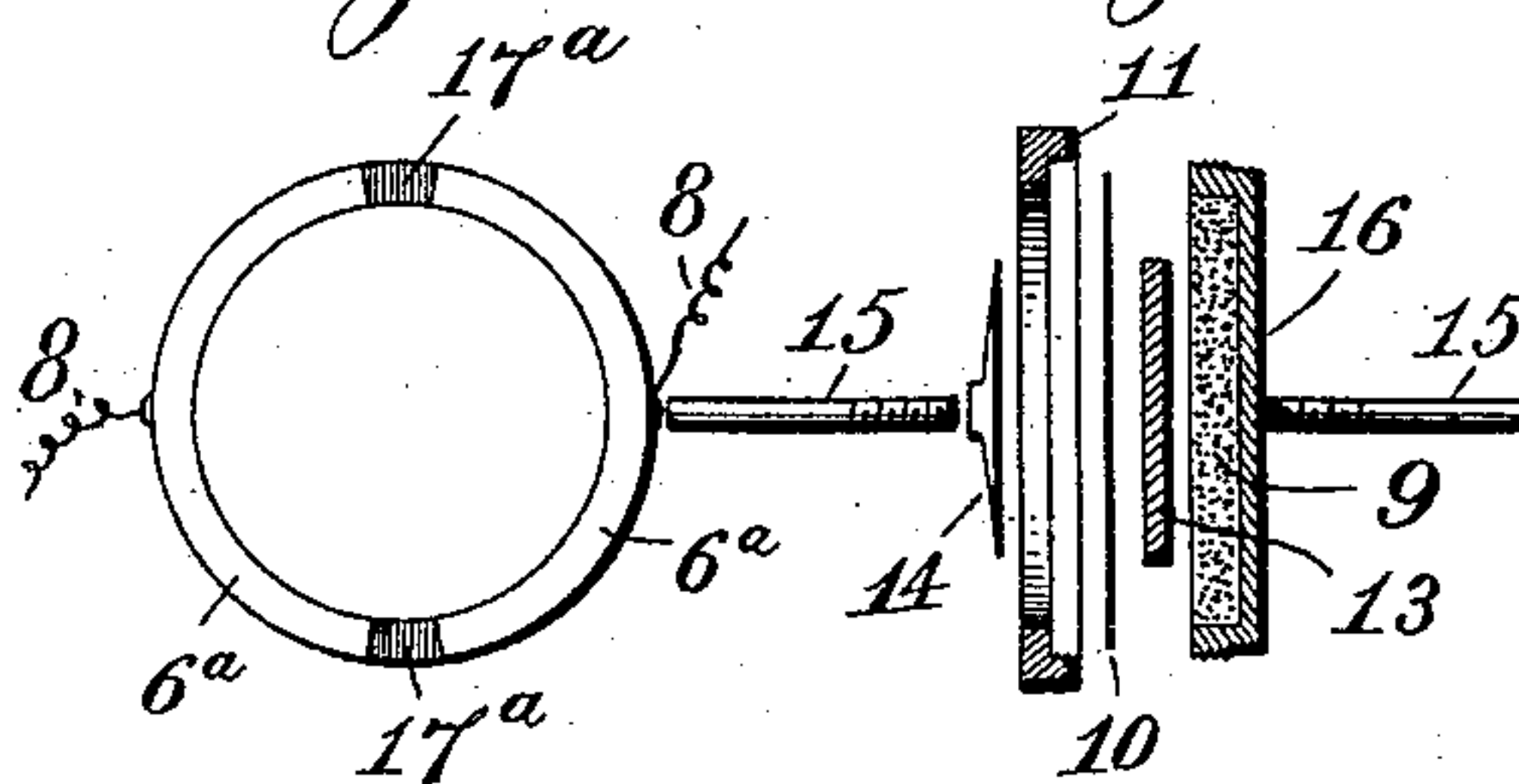


Fig. 4.

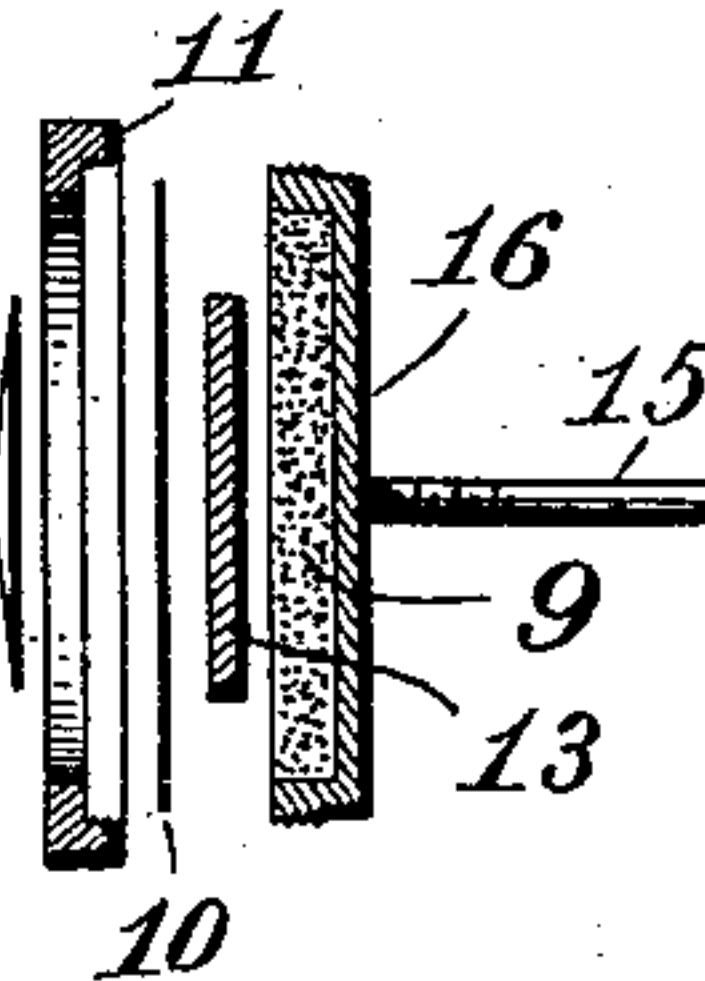


Fig. 7.

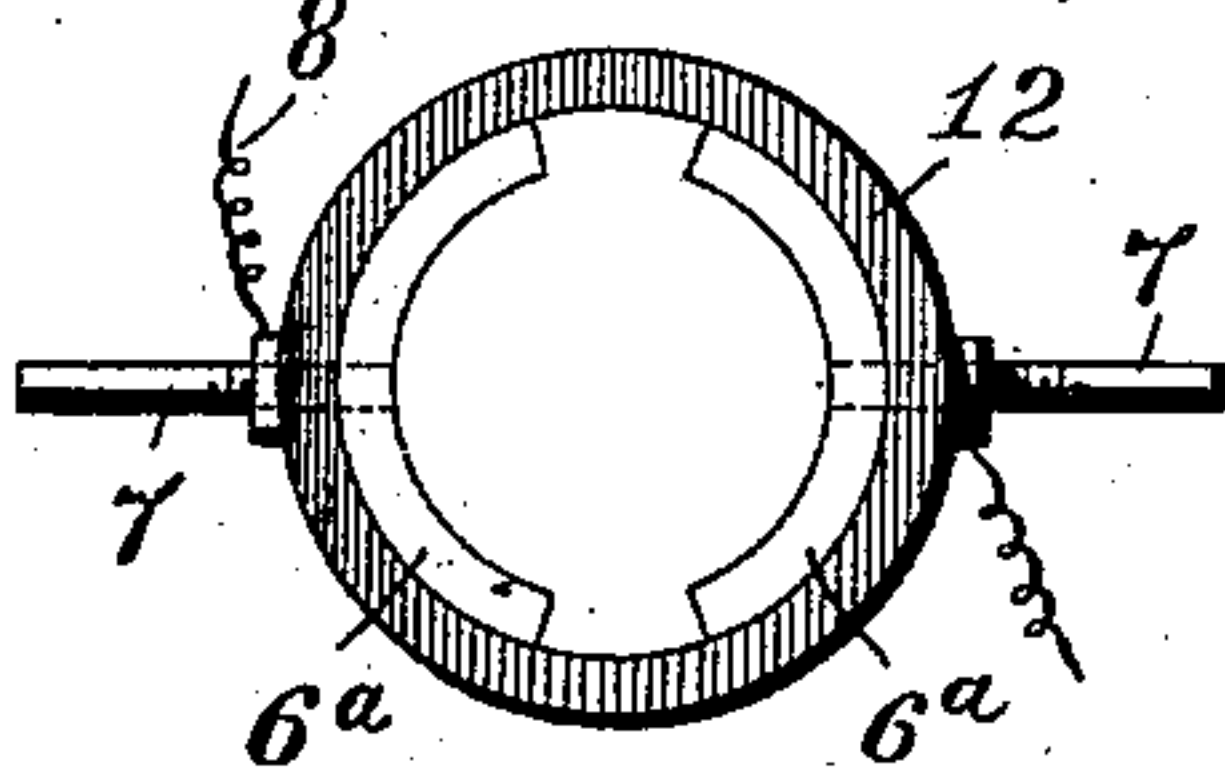


Fig. 8.

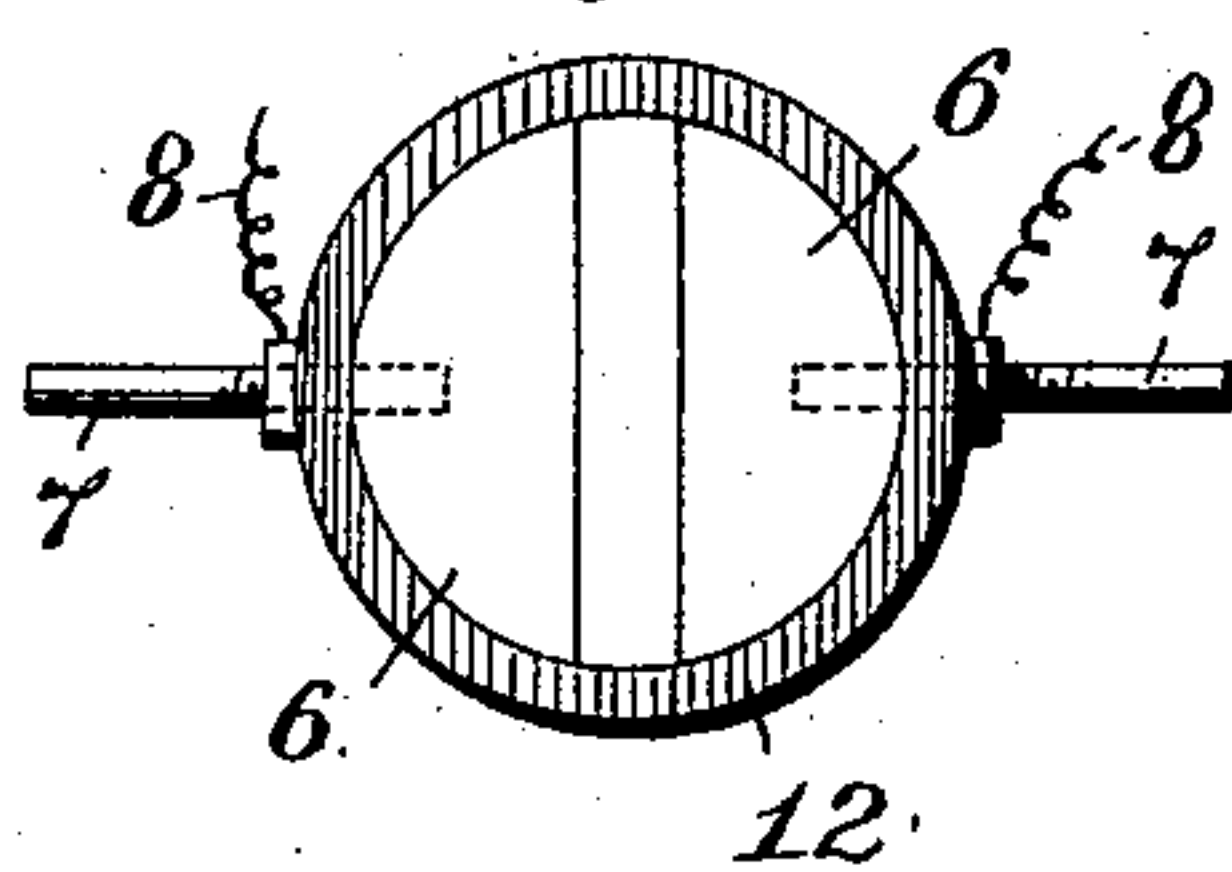
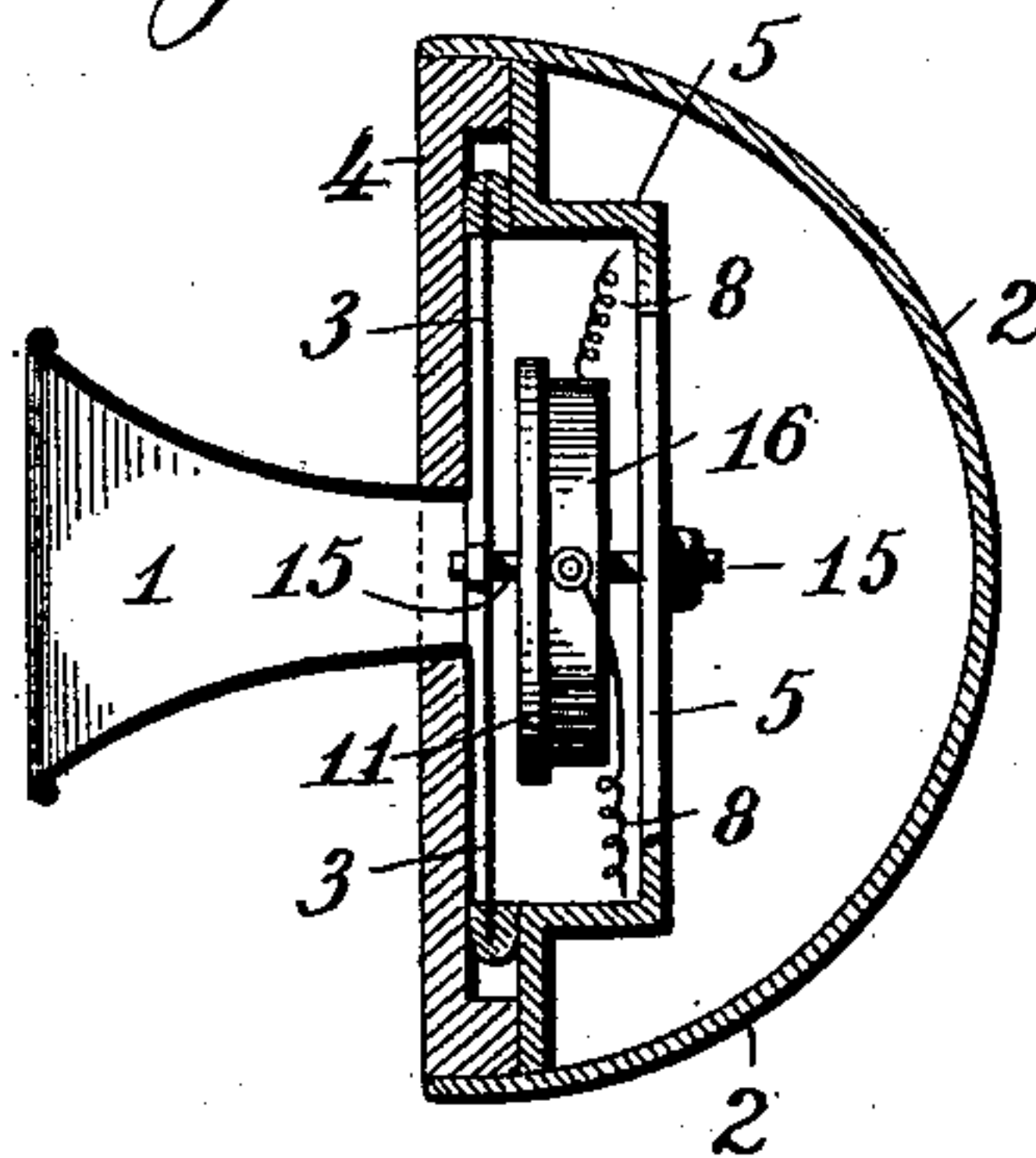


Fig. 9.



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# UNITED STATES PATENT OFFICE.

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## TELEPHONE-TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 523,276, dated July 17, 1894.

Application filed May 24, 1894. Serial No. 512,369. (No model.)

*To all whom it may concern:*

Be it known that I, THEODORE GRISSINGER, a citizen of the United States, residing at Mechanicsburg, in the county of Cumberland and State of Pennsylvania, have invented new and useful Improvements in Telephone-Transmitters, of which the following is a specification.

This invention relates to that class of telephonic transmitters in which the electrodes or terminals of the conducting wires are in the form of fixed or relatively immovable plates, arcs, or half disks insulated from each other except that electrical conduction is provided through a granulated variable resistance medium located between and in contact with the electrodes.

The object of my invention is to obtain the necessary variations or undulations of current through the action on the granulated variable resistance material of a plunger that is independent of the fixed electrodes and at all times out of contact therewith, and to so arrange the said plunger that it will be capable of effecting the required changes of position in the particles constituting the variable resistance medium.

My invention consists in the features of construction and novel combination of devices in a telephone-transmitter, as herein-after described and claimed.

In the annexed drawings illustrating the invention—Figure 1 is an end view of the parts that immediately incase electrodes and granulated variable resistance material. Fig. 2 is an elevation of the electrodes. Fig. 3 is an edge view of electrodes and plungers with accompanying devices partly in section. Fig. 4 is a longitudinal or axial section, showing a modification in the construction of the electrodes. Fig. 5 is a face elevation of the electrodes separated by a strip of insulation. Fig. 6 shows another modification in the form of the electrodes. Figs. 7 and 8 show electrodes mounted in an annular hard rubber casing. Fig. 9 is a partly sectional elevation of a transmitter embodying my invention.

Referring first to Fig. 9, the numeral 1 designates the ordinary mouth piece and 2 the outer casing which may be made of hard rubber, wood, or other suitable non-conducting material.

The diaphragm 3 and mouth piece 1 may be supported by a frame 4 provided with a bridge piece 5, as usual.

The electrodes 6 may be in the form of half disks, as shown in Figs. 2 and 8, or in the form of arcs 6<sup>a</sup>, Figs. 6 and 7, and are composed of metal or other conducting material. Each electrode 6 or 6<sup>a</sup> is fixed or immovable with relation to the other, and they may be rigidly supported in the outer casing 2 in any suitable manner, as by arms 7 having one end screwed into or otherwise secured to the edge or periphery of the electrode and the other end held in or attached to the casing of the instrument. The conducting wires 8 are fastened to an edge of each electrode and the current is passed through the instrument laterally or from side to side, instead of axially.

Electrical connection between the fixed electrodes 6 or 6<sup>a</sup> is provided for through a granulated variable resistance medium 9 which may consist of finely crushed coke or other form of carbon powder commonly employed for the purpose. Except for the connection afforded by this variable resistance medium the fixed electrodes are insulated from each other, either by being placed a proper distance apart or by the employment of a suitable insulating substance.

The granular variable resistance material 9 is confined between the electrodes by means of a flexible mica disk or disks 10 held in place by a clamping ring or rings 11 screwed onto the fixed metal electrodes or onto a hard rubber casing 12, Figs. 7 and 8, in which they may be placed.

A plunger 13 is arranged on the inner side of the flexible mica disk 10 and is clamped thereto by a nut or washer 14 on a screw-rod 15 to the inner end of which the plunger is attached. The plunger 13 may be either rectangular or circular according to the shape of the space between the two electrodes in which the granular material is contained.

As shown in Figs. 1, 2 and 8, the space or chamber for holding the granular variable resistance medium is of rectangular form, while in Figs. 6 and 7 it is circular.

The plunger or plungers may be made of either metal or a non-metallic material, but if metallic they should be somewhat smaller



than the space occupied by the variable resistance medium, so as not to come in contact with the electrodes.

In Fig. 3 I have shown two plungers 13 and two mica disks 10 on opposite sides of the electrodes and inclosed granular variable resistance medium, and also two clamping rings 11 and two nuts or washers 14 on the screw-rods; but as shown in Fig. 4 one of the plungers and mica disks and one of the clamping rings and nuts or washers may be dispensed with. In this case, however, the electrodes 6 may be provided with a back 16, Fig. 4, intersected by a strip of insulating material 17, Fig. 5, to electrically separate the two electrodes except for the granulated variable resistance medium in contact therewith.

As shown in Fig. 6, the arc shaped electrodes 6<sup>a</sup> may be separated at opposite points by insulating material 17<sup>a</sup>, or, as shown in Fig. 7, they may be insulated from each other simply by being held a suitable distance apart.

The plungers 13, Fig. 3, are connected by their rods 15 with the diaphragm 3 and bridge-piece 5, respectively, as shown in Fig. 9. One of these rods may be secured to the back piece 16, Fig. 4, when the form of electrode there shown is employed.

In using the transmitter the vibrations of the diaphragm 3 are communicated to the plunger 13 which is thus caused to exert a varying pressure on the granulated conducting or variable resistance medium 9 in such manner as to change the position of the particles or granules and thereby effect the required undulations or variations of current for reproducing the sound waves representing articulate speech.

It will be observed that I do not depend upon variable contact with or between the electrodes, as they are relatively immovable; but I secure the necessary variations or undulations of current by reason of an interference with its free passage through the variable resistance medium caused by the vibrations of a plunger in contact with said medium and wholly independent of and separate from the electrodes.

In my improvement the electrodes are supported immovably and always retain the same position. Whether made of metal or other conducting material I prefer that these electrodes shall be as smooth as possible in order to produce the best results in facilitating change of position among the particles of granulated variable resistance material in contact therewith, for I do not depend upon pressure on the electrodes, but simply upon a change in position of the particles of granulated material with reference to each other, produced by varying pressure of the plunger. The diaphragm is not in contact with the variable resistance medium and neither the plunger nor the diaphragm serve as electrodes as in some forms of transmitters.

The electrodes 6 or 6<sup>a</sup> may be supported

either by means of the rods 7 or 15, or in any other convenient manner. If the electrodes and hard rubber casing 12 be clamped to the outer casing 2 or to the bridge piece 5, the other supports may be dispensed with, or they may all be employed jointly.

I would have it understood that I do not confine myself to any particular form of electrode in the arrangement of parts shown either in Fig. 3 or Fig. 4; the back 16, Fig. 4, being provided with a threaded extension or rim to engage the screw-threaded clamping ring and thus inclose the electrodes and variable resistance medium. The strip of insulation 17, Fig. 5, is used only when the annular hard rubber case 12 is dispensed with, the periphery of the electrodes being then provided with screw-threads, as shown in Fig. 3, to engage the clamping rings.

What I claim as my invention is—

1. In a telephone transmitter, the combination with fixed electrodes, a granulated variable resistance medium held in contact with said electrodes, and a diaphragm not in contact with the said variable resistance medium, of a plunger connected with the diaphragm and arranged to exert a varying pressure on the said granulated material to change the position of its particles and effect variations or undulations of current, substantially as described.

2. In a telephone transmitter, the combination with a diaphragm and fixed electrodes laterally connected with conducting wires, of a granulated variable resistance medium confined in contact with the electrodes, and a plunger connected with the diaphragm and arranged to exert a varying pressure on the said granulated material, substantially as and for the purpose described.

3. In a telephone transmitter, the combination with two fixed electrodes, a granulated variable resistance medium in contact with the electrodes and a flexible disk to hold the said granulated material in place, of a diaphragm, and a plunger clamped to the flexible disk and connected with the diaphragm, said plunger being arranged to exert a varying pressure on the granulated variable resistance medium to change the position of its particles, substantially as and for the purpose described.

4. In a telephone transmitter, the combination with fixed electrodes secured laterally to the casing of the instrument and a granulated variable resistance medium held in contact with said electrodes, of a plunger arranged to exert a varying pressure on the granulated material and a diaphragm connected with the plunger, substantially as and for the purpose described.

5. In a telephone transmitter, the combination of fixed electrodes supported at lateral points, a granulated variable resistance medium in contact with the electrodes, one or more flexible disks to hold the granulated



material in place, a diaphragm, a plunger  
connected with the diaphragm and arranged  
to exert a varying pressure on said granu-  
lated resistance medium, and means for pass-  
5 ing an electric current laterally through the  
instrument, substantially as described.

In testimony whereof I have hereunto set my

hand and affixed my seal in presence of two  
subscribing witnesses.

THEODORE GRISSINGER. [L. s.]

Witnesses:

E. W. HURST,  
G. W. BEELMAN.