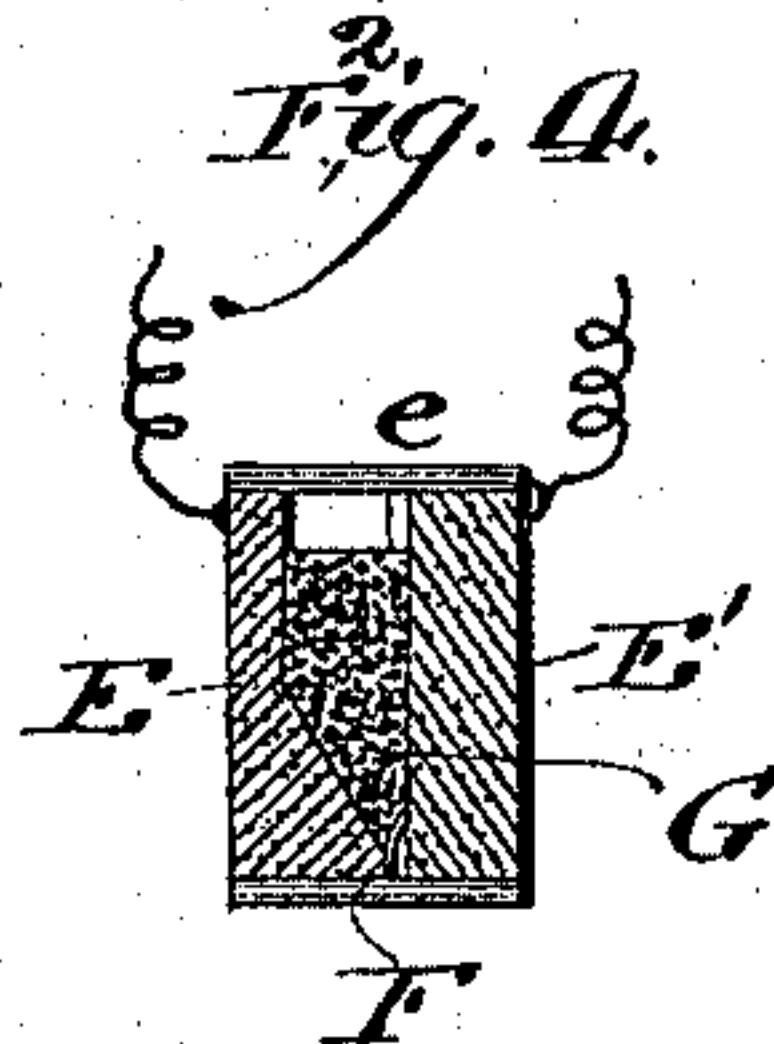
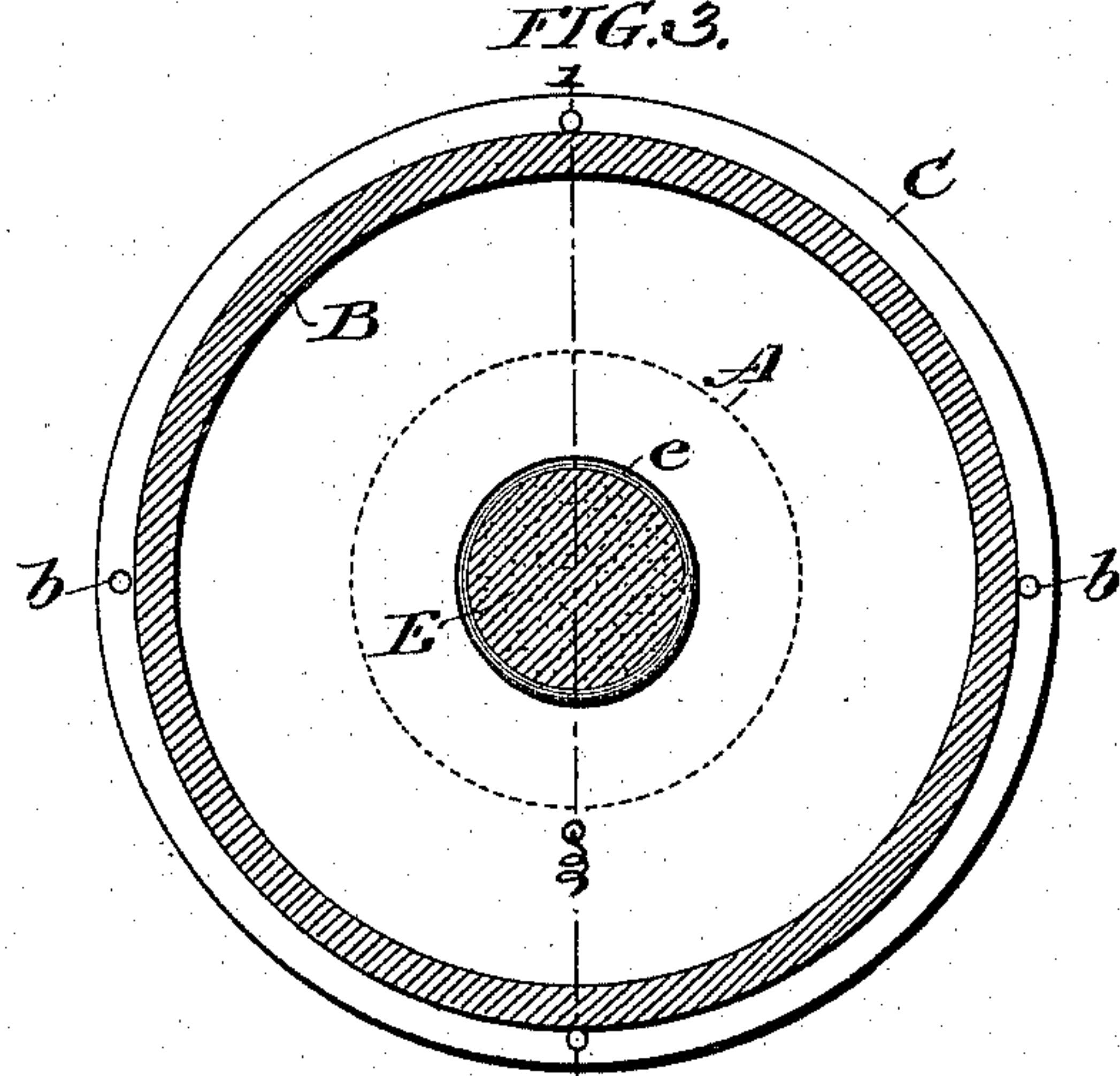
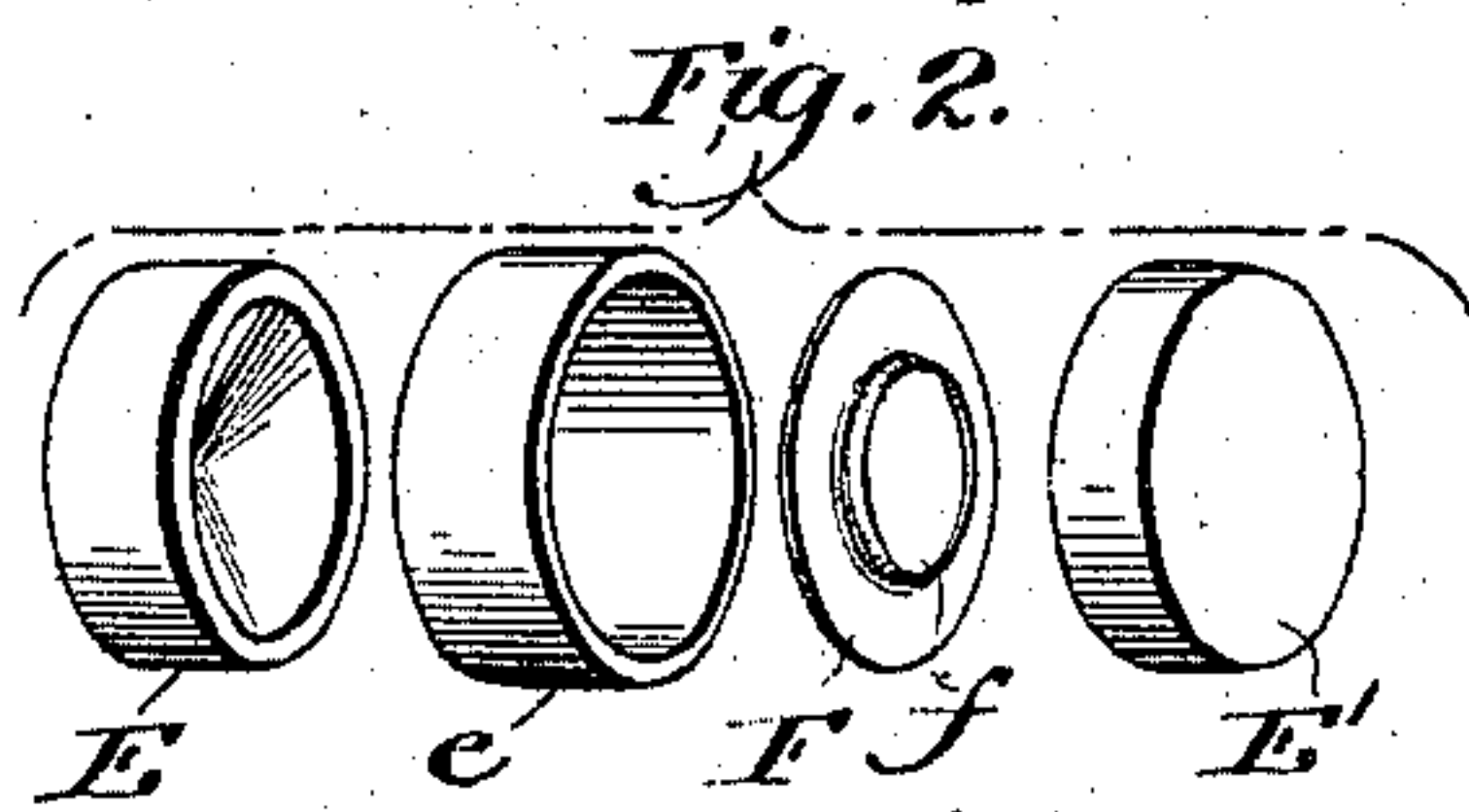
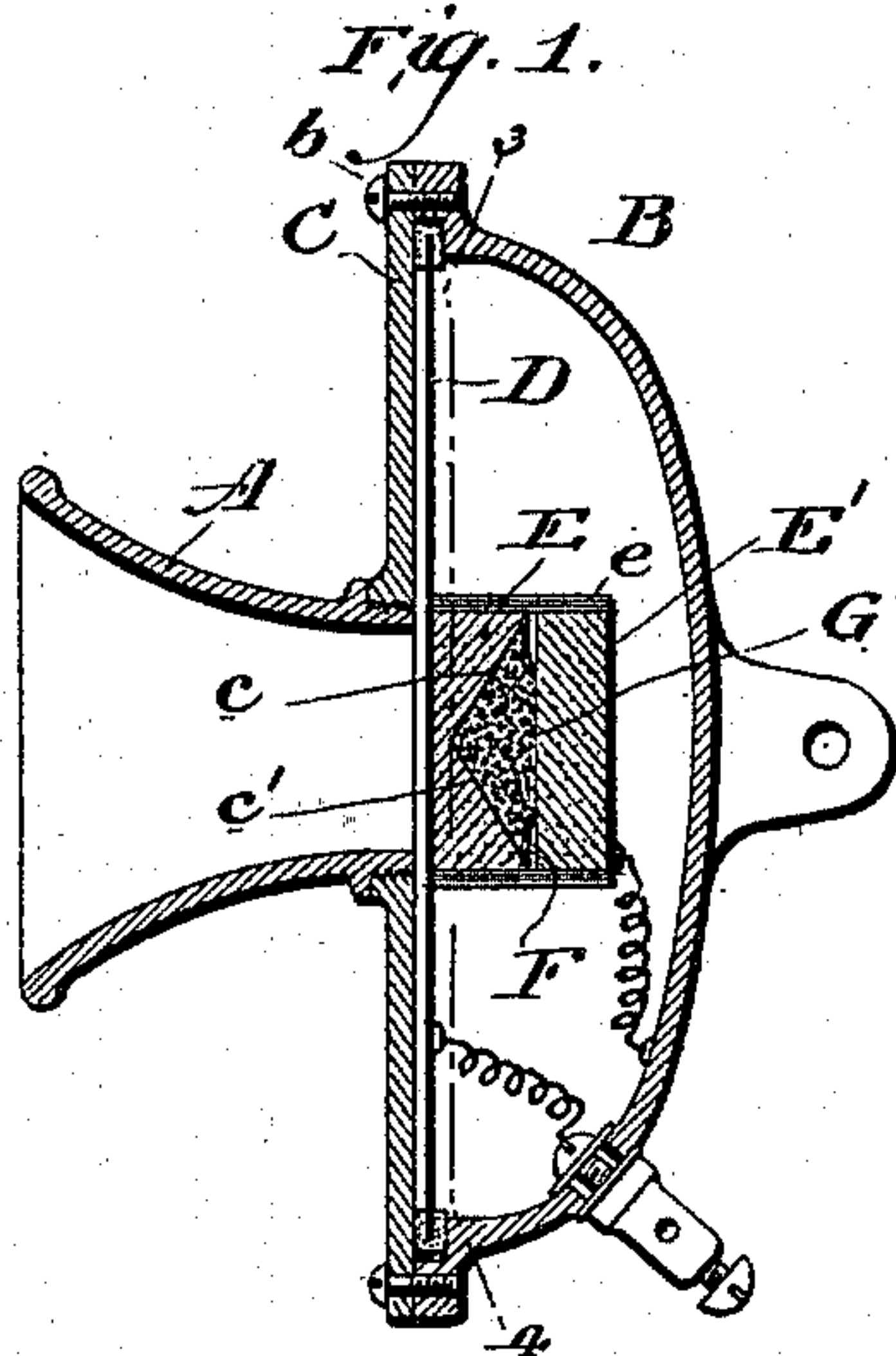


(No Model)

L. W. PULLEN.
TELEPHONE TRANSMITTER.

No. 573,356.

Patented Dec. 15, 1896



Witnesses.

Wm. R. Fisher
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Inventor.

Lem W. Pullen
by *James P. Peter*
Attorney.

UNITED STATES PATENT OFFICE.

LEON W. PULLEN, OF CAMDEN, NEW JERSEY.

TELEPHONE-TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 573,356, dated December 15, 1896.

Application filed November 11, 1895. Serial No. 568,643. (No model.)

To all whom it may concern:

Be it known that I, LEON W. PULLEN, a citizen of the United States, and a resident of the city of Camden, State of New Jersey, have
5 invented a certain new and useful Improvement in Telephone-Transmitters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.
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My invention has relation to telephone-transmitters in which free or loosely-held particles of carbon or other conducting material is employed as a means of varying the
15 resistance, and has for its object to provide a transmitter in which the conducting material will not pack, but will be held in its normal state in place between the two inner faces of the two electrodes or buttons and preferably at or near the central portions of the same.
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In apparatus heretofore existing difficulty has been experienced in preventing the granulated carbon from falling away from portions of the faces of the electrodes and settling by gravity, thus impairing the efficiency of the apparatus. In my invention I overcome this difficulty and provide a better and more efficient transmitter by providing in one
25 of the electrodes or in both of them a chamber or receptacle for the free or loose conducting material having an inclined lower wall or concaved or cone-shaped supporting-walls for the finely-divided conducting material, preferably so arranged and constructed
30 as to retain and support this intermediate conducting material about the central portion of the electrodes and away from the outer edges.
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In the accompanying drawings, Figure 1 is a sectional elevation of a transmitter embodying my invention on the line 1 2 of Fig. 3. Fig. 2 is a detail perspective view of the electrodes, preferably solid carbons, flexible supporting-ring, and central flange-disk, disassembled. Fig. 3 is a sectional view on the
40 line 3 4 of Fig. 1. Fig. 4 illustrates my invention with only the inner lower wall of the chamber inclined.
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A represents the mouthpiece, connected with the rear cup-shaped casting B through
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the medium of the flanged plate C. The diaphragm D, of metal or other suitable material, has preferably upon its circumference a rubber band *b*, and is secured and held in position back of the mouthpiece A in the casting B between the outer edge of the casting B and the inner face of the plate C. The recessed electrode E is rigidly secured by cementing or otherwise to the rear of the central portion of the diaphragm immediately back of the mouthpiece. The electrode E' is adjusted yieldingly to the rear of the piece E, preferably through the medium of the elastic band *e*, which passes around the circumference of the two carbons E E'.
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As illustrated in Fig. 1, the chamber or recess in the electrode is provided in the carbon E, having the inclined walls *c c'*, forming a concaved recess for the reception of the loose or free conducting material G. The outer ends of the walls *c c'* in the form shown in Fig. 1 terminate in the inner face of the electrode E, just short of its circumferential line. I have also illustrated in the drawings
70 a ring F, of a flexible insulating material, having the edges *f* of the inner circle flanged outwardly, adapted to bear against the inner face of the electrode E' for the purpose of assisting in better retaining the granulated conducting material in contact with the central portion of the electrodes and preventing the granulated conducting material from falling by gravity to the outer edges or circumference of the electrodes. The two electrodes E
75 E' are held together yieldingly, as through the medium of the circumferentially-disposed insulating elastic ring *e*, the elasticity of which keeps the rear electrode E' in close and immediate contact with the granulated conducting material and against the outwardly-flaring edges *f* of the insulating-ring F.
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Other tension mechanism might be employed for effecting the same purpose. In the construction shown the tendency of the inclined wall upon which the carbon rests and is supported prevents the upper portions from falling. In other words, the lower inclined supporting-wall operates as a wedge to retain and support the granulated conducting material in position and to prevent the upper portion from falling and packing. When the
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diaphragm and electrodes yield under the action of the voice in the operation of the transmitter, the elastic ring *e* or other tension device employed tends to return the electrodes to their normal relative positions, which also tends to drive any of the particles of carbon which have partially dropped down back again up the inclined base-wall. Further, the two electrodes *E E'* being yieldingly connected to each other and secured together, as through the medium of the elastic ring *e* or other tension device, the concaved recess may be completely filled with granulated carbon, as shown in Fig. 1, and any tendency to settle down in the recess is prevented by the tension of the ring *e* or other tension device operating upon the two carbons.

The transmitter may be connected in telephone-circuit as in the ordinary telephone connection.

It is clear that the granulated carbon-chamber having the inclined walls may be provided in either of the electrodes *E* or *E'*, or may be partly in one and partly in the other, if desired. If the construction of the transmitter is such that the diaphragm and recessed electrode can be adjusted to the casing, so that when in position the inclined inner wall of the chamber shall form the bottom of the chamber, the lower inner wall only of the recess or chamber need be inclined, as illustrated in Fig. 4.

An operative practical transmitter may be constructed within the spirit of my invention without the use of any vibratory plate or diaphragm, as illustrated in Fig. 4, the transmitter being suspended, as by the circuit-wires, upon hooks or otherwise.

It is also clear that the construction of transmitter may be changed and varied without departing from the spirit of my invention, as other forms of transmitter apparatus may be employed.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a telephone-transmitter the combination of the electrodes, *E, E'*, conducting material, *G*, and insulating-ring, *F*, arranged parallel with and between the electrodes *E, E'*, substantially as shown and described.

2. In a telephone-transmitter, two or more opposing electrodes yieldingly connected together in such manner as to form a cavity or chamber between them, and an insulating-ring extending into said cavity or chamber between the electrodes, substantially as specified.

3. In a telephone-transmitter, the combination of the electrodes, a chamber between said electrodes, granular conducting material situated in said chamber, a perforated disk of insulating material extending between the

two electrodes and adapted to partially cover the face of one of said electrodes.

4. In a telephone-transmitter a vibratory plate or diaphragm, two electrodes adjusted to said diaphragm, means for holding said electrodes together in position yieldingly toward each other, a recess or chamber provided in or between the inner faces of the electrodes having inclined walls extending toward the outer edges or circumference of said electrodes, finely-divided conducting material provided in said recess or chamber, and flanged insulating-ring provided between the electrodes the lips of the inner circle of said ring slightly bent to bear against the inner face of one of the said electrodes to retain the finely-divided conducting material at or near the central portion of said electrode, substantially as described.

5. In a telephone-transmitter the combination of two electrodes yieldingly connected together, a concave or cone-shape chamber provided in the inner face of one of the electrodes, free or loosely-held conducting material provided in said chamber and insulating-ring having its inner lips flaring outwardly toward and adapted to bear upon the inner face of the unconcaved disk, substantially as described.

6. In a granulated-carbon telephone-transmitter, a carbon disk provided to the diaphragm connected therewith having a substantially cone-shaped cavity provided in its inner face with the base in a line with its length, a second carbon disk connected with the first disk to the rear of the first disk, tension device for maintaining the relative normal position of the carbon disks when at rest, finely-granulated conducting material provided in said cavity between the inclined walls of said cavity and the inner face of the second disk and insulating flanged ring provided between the said disks for assisting in retaining the granulated conducting material away from the outer edges of the said disk, substantially as described.

7. In a telephone-transmitter an electrode, *E*, secured to the diaphragm, a concaved or cone-shaped cavity provided in said electrode having inclined walls, *c, c'*, second electrode, *E'*, secured to the rear of the first disk, a flexible band, *e*, circumferentially disposed around said disks and holding the same yieldingly together, insulating flanged ring, *F*, and granulated conducting material provided in said chamber, substantially as described.

In witness whereof I have hereunto set my hand this 7th day of November, A. D. 1895.

LEON W. PULLEN.

Witnesses:

EDMUND S. MILLS,
J. HENDERSON.