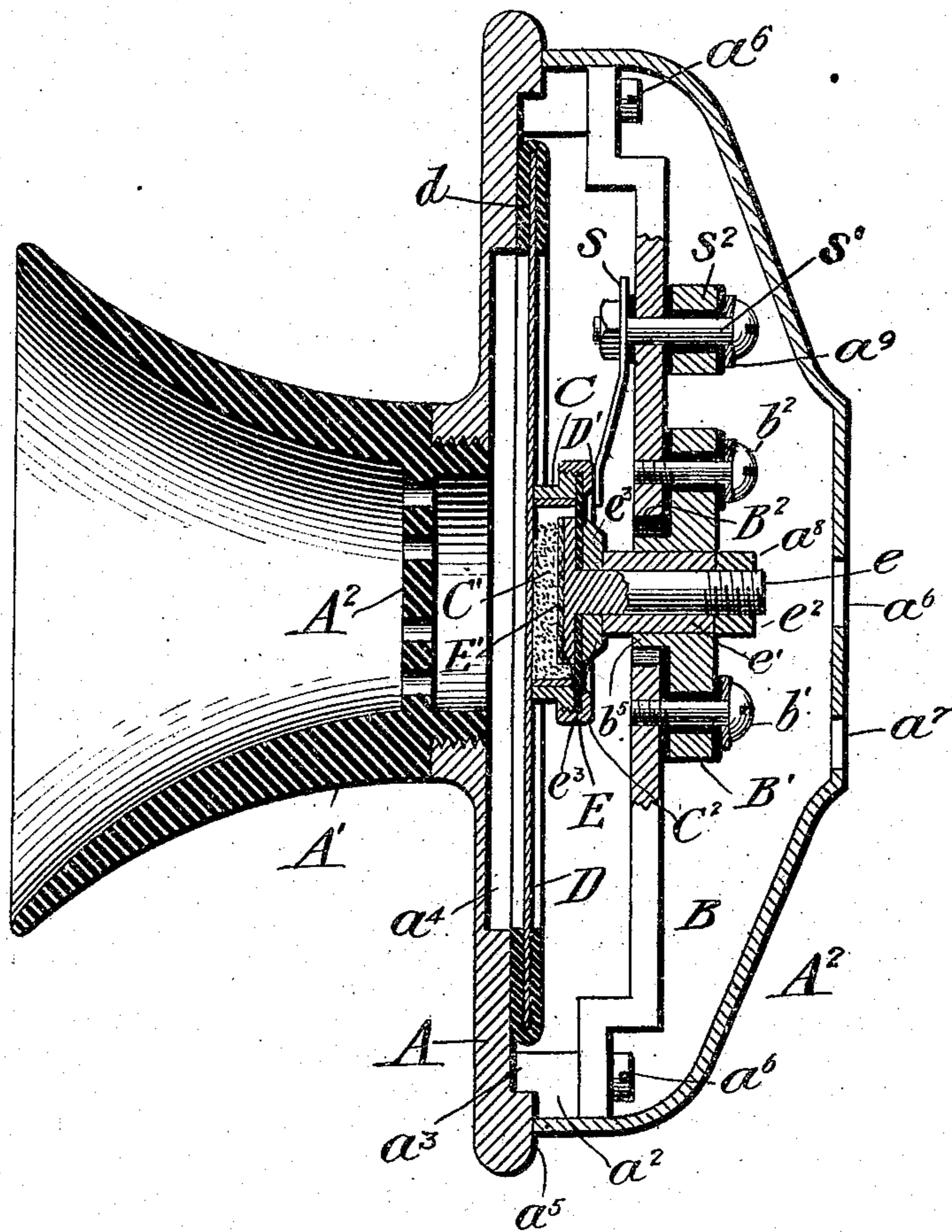


W. W. DEAN.  
 TELEPHONE TRANSMITTER.  
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Witnesses:  
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# UNITED STATES PATENT OFFICE.

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## TELEPHONE-TRANSMITTER.

No. 907,97

Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that I, WILLIAM W. DEAN, a citizen of the United States, residing at Elyria, in the county of Lorain and State of Ohio, have invented certain new and useful Improvements in Telephone-Transmitters, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to telephone transmitters, and particularly to that type of instrument known in the art as solid back transmitters, in which granular carbon or finely-divided material, such as powdered carbon, is used as the resistance-varying material.

It has for its object the production of an instrument of this class in which the parts shall be easy to assemble and adjust, without any sacrifice of accuracy or exactness, and which shall be highly sensitive and efficient when assembled and adjusted.

A further object of the invention is the production of an instrument in which the main diaphragm constitutes the bottom of the resistance chamber or button, and also the front electrode.

The highest type of granular transmitter known in the art to-day is that having a separate resistance chamber or "button" containing the electrodes and the granular material supported in proximity to the diaphragm, which is usually connected to one of the electrodes, while the other is rigidly fixed, being attached to the frame of the instrument by means of a bridge or its equivalent. This type has been developed in many forms, and is widely used commercially, but in spite of this fact it is subject to certain drawbacks and defects inherent in the general design, which prevent the attainment of full efficiency. One of the defects which I have discovered and have removed in the design presented herewith is the positive connection of both electrodes. In case of a very small variation in drilling or assembling, or in the punch that produces the central opening in the diaphragm, the parts will not aline perfectly, and as the button is assembled separately with its two stems presumably perfectly alined, there is a final slight distortion of the auxiliary diaphragm, which creates a normal compression strain on one side of the chamber and the diaphragm, and a tension strain on the other. The result is a drop in

the individual instrument and a lack of uniformity in the type. Another defect is the fixed character of the ordinary containing cup which permits the granules therein to pack or to be packed. It is a well known fact that in the best solid-back transmitters a packed condition of the carbon may be produced by placing the lips to the mouth-piece and exhausting the air from in front of the diaphragm. The latter buckles forward, the carbon drops into a mass, and when the diaphragm through its own resilience goes back to normal position the carbon is compressed into almost solidity. My invention is designed to obviate all of these difficulties, and others which could be pointed out by way of example, but which are so apparent to those versed in the art as to need no explanation or criticism on my part.

The further objects of the invention will be elaborated in the specific description which follows, and more particularly pointed out in the appended claims.

My invention is illustrated in the accompanying sheet of drawings, in which a single section of the transmitter is shown.

Referring now to the drawings A represents a circular front plate centrally apertured to receive the mouth-piece A', which is screwed into said front plate. This mouth-piece is preferably of hard rubber, and is provided with the perforated septum A<sup>2</sup>, adapted to protect the diaphragm of the instrument. The plate A is provided upon its rear side with an annular face adapted to receive the diaphragm D, and in front of the diaphragm it is slightly recessed, as at a<sup>4</sup>, to form the sound chamber. Around the periphery of the plate I provide the rearwardly-extending posts a<sup>2</sup>, and the annular bead a<sup>5</sup>, upon which the inclosing casing A<sup>2</sup> is adapted to rest; this being secured to the several posts a<sup>2</sup> by screws, (not shown). Extending from side to side and resting upon two posts a<sup>2</sup> is the bridge B, which is centrally apertured at B<sup>2</sup> to receive the neck b<sup>5</sup> of the boss B', which is insulated from but secured to the bridge by screws b'<sup>2</sup>—b<sup>2</sup>, which pass through bushed openings in the boss B'. The inclosing shell A<sup>2</sup> has its central rear portion flattened and provided with suitable apertures a<sup>6</sup>—a<sup>7</sup>, the former of which is adapted to admit the line conductors to the circuit terminals a<sup>8</sup>—a<sup>9</sup> of the instrument, and the latter of which is adapted to receive the se-

curing means by which the instrument is connected to its supporting base.

The boss B' is centrally apertured to receive the stud e', and is provided with a set-screw, (not shown), adapted to lock the stud in adjusted position. Extending through the stud e' is the shank e of the rear electrode E', which in this instance is a circular plate having a hard carbon face highly polished. Between a small disk e<sup>3</sup>, which is carried by the stud e', and the rear electrode E' there is secured the supplemental diaphragm D', of mica, by means of the clamp nut e<sup>2</sup>, which in this instance also serves as the binding nut for one of the circuit terminals.

Secured to the supplemental diaphragm D' by an annular retaining ring C<sup>2</sup> is the resistance cup which in this instance comprises a flanged ring C, the main diaphragm D constituting the bottom of what is known as the resistance button. The diaphragm is gold-plated or platinum-faced upon its inner side, and constitutes the front electrode of the instrument.

Mounted upon the bridge by means of a boss S<sup>2</sup>, which is centrally apertured and bushed with insulating material to prevent contact with the bridge, are pressure springs S, (only one of which is shown), which are adapted to bear upon the annular retaining ring C<sup>2</sup>, and force the resistance cup C into engagement with the diaphragm. A bolt S' is adapted to pass through the bushed opening of the boss S<sup>2</sup>, so as to hold the springs in place, and at the same time afford a binding post for the other circuit terminal of the instrument.

The circuit of the instrument is as follows: from bolt S', spring S, retaining ring C<sup>2</sup>, resistance cup C, diaphragm D, resistance-varying material C', rear electrode E', shank e, and out to line.

In assembling the instrument the diaphragm is insulated from the front plate A by the soft rubber band d, which is stretched around its periphery, and is held in place by the pressure of the resistance cup C as exerted thereon by the springs S. The separate damper springs commonly used with this type of instrument I find I do not need, the springs S performing their function perfectly. In fact, the damping action of the springs S being symmetrical, and communicated to the diaphragm through the resistance chamber over a suitable central area, is much superior to that of the ordinary springs, and from this emanates a part of the superiority of my instrument. After the diaphragm has been seated against the face a<sup>3</sup> of the front plate A, the bridge B, with the resistance chamber connected thereto and substantially filled with resistance-varying material, is secured in position upon the flange a<sup>2</sup> by the screws a<sup>6</sup>. The set-screw which holds the stud e' in place within the apertured boss B' is now

unscrewed so as to allow the springs S, and the inherent resiliency of the diaphragm to adjust the stud e' to its proper position within the boss. After this the set-screw is tightened and the rear electrode fixed so that subsequent vibrations of the main diaphragm D are taken up by the springs S and the supplemental diaphragm d'.

The operation of this transmitter is sufficiently apparent from the above description, when taken in connection with the accompanying sheet of drawings, to obviate any further description. It is however evident that the resistance chamber and its accompanying parts are not carried by the diaphragm, nor is it positively connected thereto, yet the springs S maintain a sufficiently intimate contact and a heavy enough pressure to insure most excellent transmission of the vibratory motion of the diaphragm to the cup, and, as the diaphragm D is plated or platinum-faced on its entire inner side, it is immaterial if the cup is not accurately centered with reference thereto. The parts, however, are self-centering, and the granular carbon or other resistance-varying material in the cup is constantly agitated to prevent its packing. The instrument is economical to manufacture, simple to assemble, and efficient in use. The cup may be provided with sharp edges to engage the diaphragm so as to make a tight joint, if desired, but this is not essential.

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

1. In a telephone transmitter, a vibrating diaphragm constituting an electrode, an independently supported resistance cup, said diaphragm constituting the bottom of said cup, a second electrode in said cup, an auxiliary diaphragm peripherally secured to the cup, and centrally secured to the fixed electrode, and means for holding the cup in engagement with the diaphragm so that it is vibrated thereby.

2. In a telephone transmitter, a vibrating diaphragm constituting one electrode, a resistance cup independently supported with respect to the diaphragm, a second electrode in said cup, an auxiliary diaphragm peripherally secured to the edge of the cup and connecting the same with the fixed electrode, granular carbon between the electrodes, and springs engaging the resistance cup and adapted to hold the same against the diaphragm so that it is vibrated thereby.

3. In a telephone transmitter, the combination with a resilient diaphragm, of a fixed electrode, a cup formed of inflexible material surrounding said electrode and having its edges resting against the diaphragm, a flexible connection between the cup and the fixed electrode, granular material in the cup, and spring pressure means adapted to force

the cup into engagement with the diaphragm so as to put the same under initial tension.

4. In a telephone transmitter, the combination with a resilient diaphragm coated on its inner face to form an electrode, a fixed electrode, a cup formed of inflexible material surrounding the fixed electrode and with its edges independent of but resting against the resilient diaphragm, granular material in the

cup, and spring pressure means adapted to 10 force the cup against the diaphragm to put the same under initial tension.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM W. DEAN.

Witnesses:

RAY H. MANSON,  
S. A. BEYLAND.