(No Model.)

E. A. & T. GRISSINGER.

TELEPHONE TRANSMITTER.

No. 469,085. Patented Feb. 16, 1892.

Fig. 1.

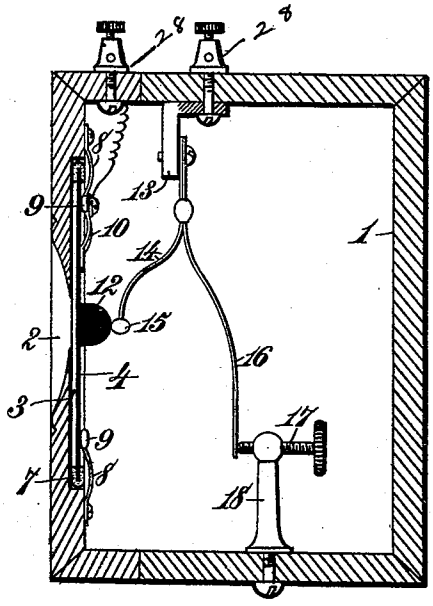


Fig. 2.

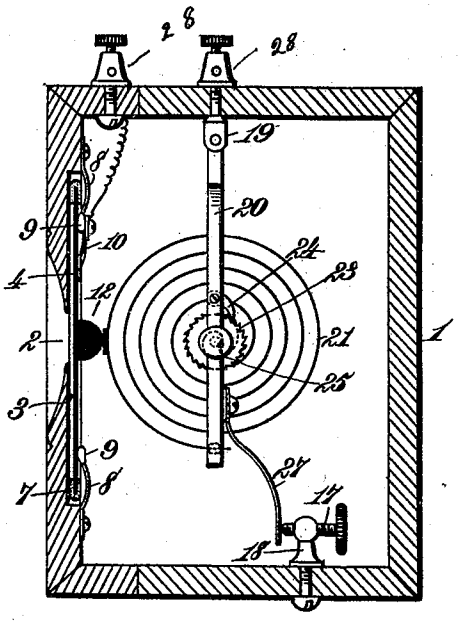


Fig. 3.

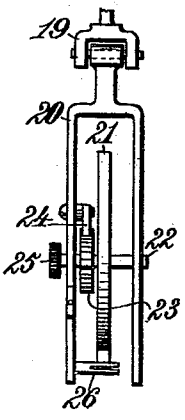


Fig. 4.

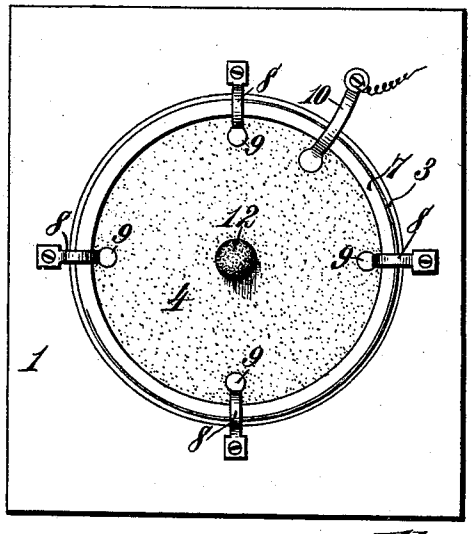
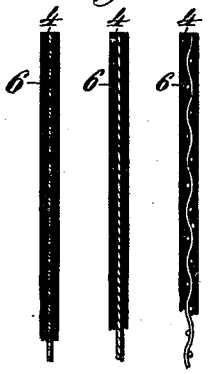


Fig. 5.



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UNITED STATES PATENT OFFICE.

ELWOOD A. GRISSINGER AND THEODORE GRISSINGER, OF MECHANICSBURG, PENNSYLVANIA.

TELEPHONE-TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 469,085, dated February 16, 1892.

Application filed September 16, 1891. Serial No. 405,865. (No model.)

To all whom it may concern:

Be it known that we, ELWOOD A. GRISSINGER and THEODORE GRISSINGER, citizens of the United States, residing at Mechanicsburg, in the county of Cumberland and State of Pennsylvania, have invented new and useful Improvements in Transmitters for Contact-Telephones, of which the following is a specification.

Our invention relates to electrical telephones of the type commonly known as "contact-telephones," and the purpose thereof is to provide a transmitter which shall be extremely sensitive and susceptible to phonetic vibrations of very low intensity.

It is our purpose, also, to provide a transmitter having a diaphragm of novel construction connected electrically with the line-wire and having a novel mounting, the construction of said diaphragm being such that we obtain a larger body or mass under pressure and an increased field of electrical saturation in the resistance-offering conductor.

It is our purpose, also, to employ either a carbon diaphragm or preferably one formed of a perforated or foraminous substance, plated or otherwise coated with carbon, whereby it is rendered more sensitive than a diaphragm of the ordinary construction.

It is a further purpose of our invention to combine with a transmitter of a contact-telephone novel pressure-regulating devices and new and improved means for varying the pressure upon the resistance-offering electrode, whereby extremely delicate adjustments may be made.

Our invention consists to these ends in the several novel features of construction and new combinations of parts hereinafter fully described, and then more particularly pointed out in the claims concluding this specification.

To enable others skilled in the art to understand and practice our invention, we will proceed to describe the same in detail, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical section taken from front to rear of a transmitter for a contact-telephone embodying our invention. Fig. 2 is a similar section showing a substitute construction of the pressure-regulating devices. Fig. 3 is a rear elevation of the pivoted pressure-lever shown in the side elevation in Fig. 2. Fig. 4 is a rear elevation of the diaphragm and its mounting, showing, also, one manner of making the line connection. Fig. 5 is a view showing in detail the construction of the diaphragm.

The reference-numeral 1 in said drawings indicates the case or transmitter-box, in one vertical wall of which is formed the usual sound-opening 2. In the rear face of this wall is formed a recess 3, in which is placed the diaphragm 4, which we construct, preferably as follows. We use a sheet, film, or disk of any suitable metallic or non-metallic substance, preferably perforated or otherwise so formed that it shall have numerous openings, though we may use an imperforate diaphragm of any suitable material. A good material for the diaphragm is wire-gauze or wire-netting of suitable fineness, though a perforated metal film gives good results, and we may use any non-metallic material capable of receiving a carbon coating or plating and giving the proper responsive vibrations. The disk, sheet, or film is coated or plated with carbon 6 in such manner that the latter fills the interstices of the perforated or foraminous sheet or disk, and provides a diaphragm which is practically a homogeneous imperforate mass of carbon, but possessing also the resilience of the metal or other foundation-forming part thereof. When the carbon is applied by plating, the diaphragm will consist of a practically solid, strongly coherent plate of carbon, and when the latter is applied in any manner other than by plating, it should be done in such manner as to produce a substantially similar structure—that is, a diaphragm composed of a practically homogeneous strongly coherent mass of carbon. The diaphragm thus formed is placed in the recess 3 behind the sound-opening 2, which is concentric with said recess. The marginal portion of the diaphragm is inclosed in a cushion 7, formed of any suitable substance and in any way preferred, this being a feature too well understood to require specific description. The diaphragm is retained in place by clasps 8, usually of an elastic material, their ends be-

ing provided with cushions 9, which rest against the rear face of the diaphragm in close proximity to the cushion 7. We make the line connection with the diaphragm by means of an elastic contact-plate 10, mounted by one end upon the transmitter-box, and having its free end resting upon the diaphragm near the marginal cushion between two of the clasps 8. Upon the rear face of the diaphragm at its center or in axial line of the sound-opening 2 is formed or mounted a carbon button 12.

Hanging from the top of the casing or transmitter-box is a bracket 13, to which is secured a spring-strip or elastic plate 14, which extends downward and is curved toward the center of the diaphragm 4, its extremity being provided with a secondary electrode 15, which may be either carbon or metal, pressed by the spring 14 against the carbon button 12. From the spring-strip 14, below the supporting-bracket 13, diverges an auxiliary or secondary pressure-adjusting strip 16, which is extended downward far enough to permit the engagement with its end of a set-screw 17, tapped through a post 18 rising from the floor of the box. By manipulating this set-screw the elastic pressure of the secondary electrode 15 upon the carbon button 12 may be adjusted with much delicacy and accuracy.

We also use the elastic-pressure device shown in Fig. 2, in which the numeral 19 denotes a pivotal support depending from the ceiling or top of the box, from which hangs a lever 20, bifurcated or having two parallel arms, between which is arranged a spiral spring 21, its inner end made fast to a shaft 22, journaled in the parallel arms of the lever and provided with a ratchet 23, which is engaged by a holding-pawl 24, pivoted to the lever. We usually provide the shaft 22 with a milled head or button 25, lying outside the lever, to enable the shaft to be turned. When these parts are used, the outer end of the spiral spring is made fast to a stud 26, lying between the lever-arms and rigid with one or both thereof. The lever 20 is so placed that the back or surface of the outer coil of the spiral spring 21 is turned toward the diaphragm. Upon this portion of the spring is mounted the secondary electrode of metal or carbon and having any preferred form—as, for example, a strip of carbon placed upon the spring-coil or a metal diaphragm and carbon button mounted thereon instead of the the carbon strip.

To one arm of the lever 20 is attached a secondary or auxiliary spring 27, which diverges somewhat from the lever and extends downward to make engagement with the point of the set-screw 17. It should be noted, however, that the ratchet 23 and holding-pawl 24 may be dispensed with or omitted, and the outer end of the spring will in such case be cast loose instead of being made fast to the stud 26. When the said parts are present, however, it will be seen that by manipulating the milled head 25 the spiral spring 21 may be placed under greater or less tension, thereby increasing or decreasing its power of elastic resistance. This adjustment, in combination with the regulation of the set-screw 17, gives a compound regulation of pressure and when properly arranged materially increases the delicacy and accuracy of the transmitted pulsations.

We may connect the secondary electrode to the primary of an induction-coil and thence to the second pole of the battery, as usual, the secondary of the induction-coil being in the line; but this matter, as well as the method of making the line connection with the diaphragm, is subject to very considerable variation. The wires enter the box and leave the same by way of binding-posts 28.

We may use a metallic diaphragm and a carbon button for a primary and secondary electrode, respectively, and such metallic diaphragm may, if used, be perforated or imperforate, as desired. On the other hand, we may use a carbon diaphragm perforated or imperforate with a metallic button. Moreover, the button 12 on the phonetic diaphragm 4 may be dispensed with, and the diaphragm alone, of metal or carbon, may be used as the primary electrode with a secondary electrode of carbon or metal. Finally, a carbon diaphragm having a carbon button may be used as primary with or without a carbon electrode as secondary.

It will be understood that in the several particulars named our invention is not restricted to specific material or construction.

What we claim is—

1. In a telephone-transmitter, a diaphragm consisting of a film of suitable material inclosed by a substantially homogeneous strongly-coherent body of carbon, substantially as described.

2. In a telephone-transmitter, a diaphragm composed of a film of suitable materials having openings and inclosed by a practically homogeneous strongly-coherent body of carbon, substantially as described.

3. In a telephone-transmitter, a diaphragm composed of a foraminous film, such as wire-netting, inclosed by a practically homogeneous imperforate and strongly-coherent body of carbon provided with a carbon button, substantially as described.

4. In a telephone-transmitter, the combination, with a diaphragm having a central carbon button, of a frame suspended behind said diaphragm, a spiral spring coiled within the frame and having a secondary electrode on its outer coil bearing against the carbon button on the diaphragm, and a spring on said frame having bearing on an adjustable support mounted on the telephone-casing, substantially as described.

5. In a telephone-transmitter, the combination, with a diaphragm having a central carbon electrode, of a pivotally-suspended frame behind the diaphragm composed of vertical

parallel arms, a spiral spring having one end mounted on a revoluble shaft supported by said arms, and an adjustable support having a set-screw bearing on a spring rigidly mounted on the pivotally-mounted frame, substantially as described.

6. In a telephone-transmitter, the combination of a diaphragm of a secondary electrode, a spiral spring on the outer coil of which said electrode is mounted, a lever having a shaft to which the inner end of the spring is made fast and a stud holding the outer end of the same, said shaft having a ratchet and a stop-pawl engaged with it, a secondary or auxiliary spring having one end attached to the pivoted lever, and a set-screw adapted to bear against the free end of said secondary spring, substantially as described.

In testimony whereof we have hereunto set our hands and affixed our seals in presence of two subscribing witnesses.

ELWOOD A. GRISSINGER. [L. S.]
THEODORE GRISSINGER. [L. S.]

Witnesses:
E. N. MOSSER,
M. M. DOUGHERTY.