(No Model.)

F. A. RAY.

TELEPHONE TRANSMITTER.

No. 605,913. Patented June 21, 1898.

Fig. 1.

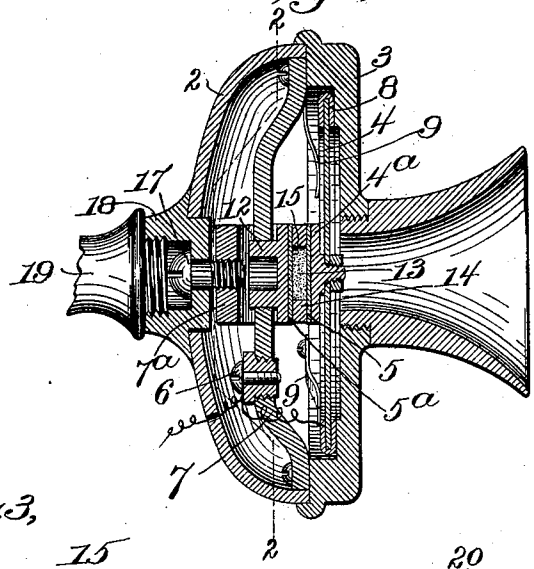


Fig. 3.

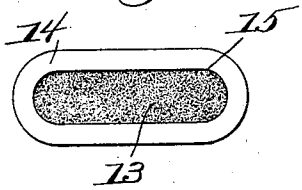


Fig. 4.

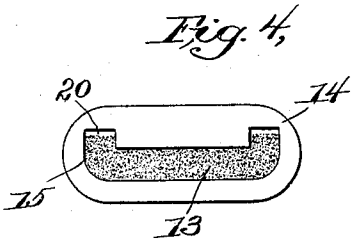


Fig. 2.

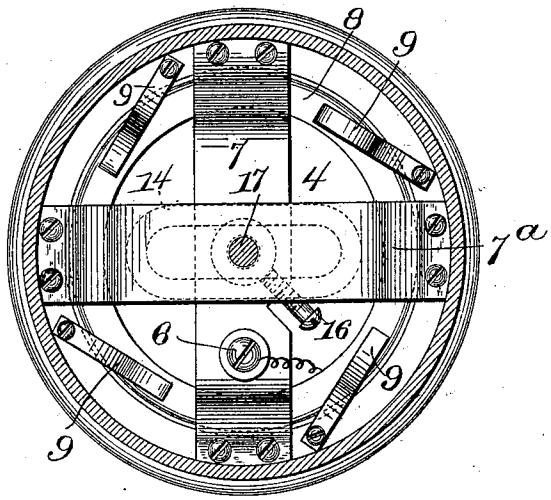
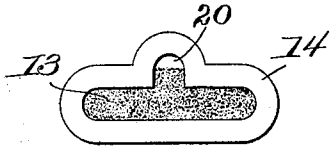


Fig. 5.



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UNITED STATES PATENT OFFICE.

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TELEPHONE-TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 605,913, dated June 21, 1898.

Application filed August 18, 1897. Serial No. 648,714. (No model.)

To all whom it may concern:

Be it known that I, FOREST A. RAY, a citizen of the United States, residing in Boston, county of Suffolk, and State of Massachusetts, have invented an Improvement in Telephone-Transmitters, of which the following description, in connection with the accompanying drawings, is a specification, like numerals on the drawings representing like parts.

This invention relates to telephone-transmitters, particularly that class known as the "granular-carbon" type.

My improvements are embodied in the construction and proportions of the cell, whereby greater volume and strength of tone are obtained, together with much greater sensitiveness, and also in an improved construction and arrangement of the parts coöperating with said cell in the use of the instrument. These advantages will be readily appreciated by those skilled in the art.

Heretofore the general construction of granular-carbon transmitters has usually included a single circular cell containing finely-pulverized carbon or comminuted resistance-varying material located between the electrodes of the instrument and operated upon by the diaphragm. Ordinarily in order to enable a reasonably-strong current to be employed, too great a column or depth of carbon was required, and this rendered the transmitter dull or dead—in other words, a loss of sensitiveness occurred. It will be understood that in order to secure a high degree of sensitiveness the granules of carbon should rest together in the loosest manner possible consistent with the passage of the current. If, however, in order to obviate this pressure or tendency to pack the dimensions of the cell are reduced to increase its sensitiveness, then the instrument is rendered weak and much of its volume and power is lost, due to the high resistance of the cell thus employed. Conversely, if the cell be increased in diameter to reduce its resistance the pressure between the granules is increased and the sensitiveness of the instrument is impaired directly in proportion as the cell is enlarged. Consequently the proportions of the cell are limited, and it is the purpose of my invention to obviate the disadvantages enumerated above and at the same time to produce an instrument in which volume, strength, and sensitiveness are all combined.

The drawings herewith presented illustrate, in Figure 1, a telephone-transmitter of the granular-carbon type embodying my invention in vertical section. Fig. 2 is a sectional plan of the transmitter on line 2 2. Fig. 3 is a side elevation of a cell embodying my invention, and Figs. 4 and 5 are still different constructions.

In the drawings the case is composed of two parts 2 3, respectively back and front, joined inside the bead on the periphery of the front. The diaphragm is at 4, to one side of which is secured a small brass plate 4^a, a threaded stem, provided with a shoulder, passing through the diaphragm and being secured to it by a nut. To this plate is affixed a thin carbon disk 5, forming the vibrating electrode of the transmitter. This latter is electrically united to the insulated screw 6 on the bridge 7, which diametrically spans the interior of the case and is secured to the front thereof by screws or other fastening device. The diaphragm is furnished with a rubber band 8, which overlaps the outside edge thereof and is held fast in the case by the pressure of a plurality of springs 9. The bridge 7 is centrally apertured to receive the fixed electrode, and this element comprises a flanged hub 12, to the inner end of which is soldered or otherwise fastened a thin carbon disk 5^a.

Between the two carbon disks 5 5^a is interposed the granulated carbon 13, which is confined by an elongated ring 14 of very soft felt or other spongy material of the shape shown in Fig. 3. This ring forms a cell and is secured by glue or otherwise to the fixed electrode, the fine carbon particles being retained by the felt 14 and the opposite adjacent disks 5 5^a, which jointly act as the retaining-walls. The chamber 15 of this cell is now very nearly filled with fine granulated carbon, and the fixed electrode is then pressed forward toward the vibrating electrode 5 by a special adjusting thumb-screw temporarily placed within the central screw-opening of the bridge 7^a, by which the felt ring is lightly pressed against the surface of the carbon disk of the vibrating electrode until the granulated carbon is

caused to fill the cell of the transmitter, while at the same time the transmitter is spoken to which settles the carbon while it is being adjusted, so that the carbon cell will remain full when the set-screw 16 is turned down firmly against the hub 12, thereby holding the fixed electrode and cell in position. After this adjustment has been made and the set-screw has been placed in position to hold the fixed electrode stationary the special adjusting thumb-screw is removed. It will be noticed that this case is united without any external or visible fastening elements, and this I consider a feature in my invention. To accomplish this, after the remainder of the instrument is assembled the cup-shaped rear part 2 is slipped within the bead and a screw 17 is entered through the central tubular boss 18 and is screwed into the second bridge 7^a, which is shown as at right angles to the first and similarly secured to the casing. This boss is interiorly screw-threaded and is to receive the extremity of the arm 19 of the transmitter. In the drawings the boss is shown as a separate piece from the back cover 2 of the case; but it may be made integral therewith. Thus it will be observed that after the transmitter is mounted in position the instrument is securely locked and sealed and cannot be tampered with. In fact, it is only by removing it from the arm 19 that access can be had to the assembling-screw and the instrument taken apart.

In the formation of the granular-carbon cell it will be noticed that the vertical dimension is very small compared with the horizontal dimension. In this way I carry out and produce the advantageous results hereinbefore set forth. In the making up of the instrument the exterior or case of the instrument is to be so marked or distinguished that when set in position the longer dimension of the cell shall be horizontal. Thus I obtain a cell in which the quantity of granulated carbon is sufficient to be of low resistance, and therefore permits the use of a strong current, while the small vertical dimension reduces the pressure of the granules upon each other to a minimum, and thereby largely increases the microphonic action of the instrument. Consequently the instrument is exceedingly sensitive, while great strength and volume are maintained.

In Figs. 4 and 5 I have shown slight modifications in the shape of the cell, the general configuration of the cell being the same as that in Fig. 3, but I have formed a small upward or vertical extension 20, those portions of the electrodes which form the opposite sides of these vertical extensions preferably being insulated. These are partly filled with granular carbon, and this column exerts its weight by the hydrostatic principle to keep the remaining portion of the cell full under light pressure.

I wish it understood that I do not confine myself to any particular form or construction of cell herein shown so long as the electrode formed within the cell by the granulated carbon is closely confined on all sides and has a greater horizontal than vertical dimension.

I claim—

1. In a telephone-transmitter, the combination with the fixed and vibratory electrodes consisting of substantially plane conducting-plates; of an oblong cell formed of insulating material, closely confining comminuted resistance-varying material between the said electrodes, the long axis of said cell being horizontally positioned and parallel to said plates, substantially as described.

2. In a telephone-transmitter, the combination with an outer case, of a vibrating electrode and a fixed electrode both within the said case, a flattened ring of yielding material between and in contact with the said electrodes, the longer axis of said ring being horizontal, and comminuted resistance-varying material completely filling the space inclosed by the said electrodes and the said ring, substantially as described.

3. In combination with a telephone-transmitter, a cell for comminuted resistance-varying material, said cell comprising a flattened ring of soft spongy material, said comminuted material to be contained within a narrow oblong space having one or more upright extensions, for purposes described.

4. In a telephone-transmitter, an outer casing, a vibrating electrode, a fixed electrode, both within the casing, a bridge to support the fixed electrode, combined with a second bridge transversely of the first, means for securing the second bridge to the arm of the instrument, and a flattened ring to create a cell for comminuted resistance-varying material, said cell to have its longer axis horizontally positioned, as set forth.

5. In a telephone-transmitter, an outer casing composed of two separable parts, back and front, a bridge diametrically of but within the casing, combined with a screw-threaded boss to receive the arm of the instrument, and a screw which unites the bridge with the boss to hold the back and front of the casing together as a unit.

6. In a telephone-transmitter, a separable case comprising a back and front part, two bridges transversely of each other secured to the front part, an interiorly-screw-threaded boss to admit the arm of the instrument, and a screw which unites said boss with one of the bridges, combined with a fixed electrode secured to the other bridge, a vibrating electrode attached to the front part of the case, and a flattened ring of felt interposed between the two electrodes to contain comminuted resistance-varying material, the longer axis of the ring to be horizontally positioned, substantially as described.

7. In a telephone-transmitter, the combination with a front casing member, of means for securing the vibratory electrode thereto, a bridge-piece secured thereto provided with

an opening to receive the supporting-block for the fixed electrode, a set-screw in said bridge-piece to secure said supporting-block, another bridge-piece also secured to said front casing member, a threaded opening in the bridge-piece last named, said opening being in line with the supporting-block for the fixed electrode, a rear casing member provided with a socket to receive the arm of the instrument, and a screw extending through an opening at the bottom of the socket into said threaded opening, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FOREST A. RAY.

Witnesses:
H. J. LIVERMORE,
MARY E. MARONEY.