

(No Model.)

F. R. COLVIN.
TELEPHONE TRANSMITTER.

No. 513,305.

Patented Jan. 23, 1894.

Fig. 1

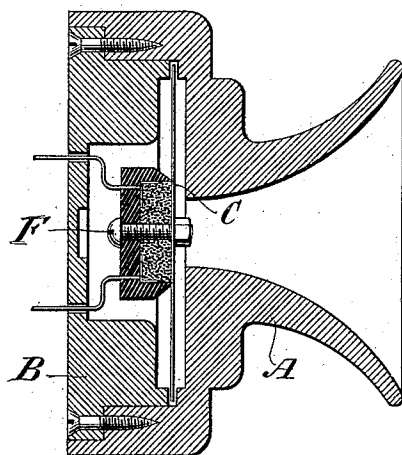
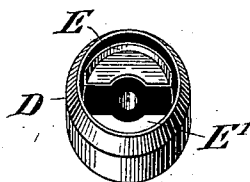


Fig. 2.



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TELEPHONE-TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 513,305, dated January 23, 1894.

Application filed October 10, 1893. Serial No. 487,744. (No model.)

To all whom it may concern:

Be it known that I, FRANK R. COLVIN, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Telephone-Transmitters, of which the following is a specification.

This invention relates to telephone transmitters, its object being to produce a cheap and effective instrument which will not require frequent adjustment and will not deteriorate in transmitting power during protracted service.

The invention relates more particularly to transmitters of that type in which a body of granular or finely divided conducting material is used to vary the resistance between circuit electrodes under the impact of sound waves in the atmosphere, and thus create electrical undulations which may be thrown directly into the line, or inductively transferred thereto in a way well understood.

The invention comprises a closed receptacle containing the electrodes or terminals of the transmitting circuit, which is filled or partially filled with a granular conducting substance and is sealed to prevent the absorption of moisture.

It comprises also means for improving the transmitting qualities of the instrument, by so mounting the diaphragm in relation to the mass of granular material that an increased freedom to vibrate will be attained.

Another feature of the invention comprises fixed electrodes in contra-distinction to one or more movable electrodes, whereby changes of adjustment are rendered unnecessary.

The invention comprises other features of novelty which will be more particularly explained hereinafter, and will be definitely indicated in the claims appended to this specification.

In the accompanying drawings, which illustrate the invention, Figure 1 is a sectional view of a telephone transmitter embodying my improvements, and Fig. 2 is a perspective view of the closed cell containing the electrodes, and which also contains the granular resistance-varying material.

I provide a suitably formed shell A provided with the usual mouth-piece and recess in the rear, into which recess fits a back piece

B provided with an annular shoulder co-operating with a corresponding shoulder on the shell to form an annular recess to receive a diaphragm C. The recess is made of such dimensions as to permit the diaphragm to be very loosely held in place when the parts of the instrument are assembled so that the diaphragm and the cell it carries may vibrate freely under the impact of sound waves. Upon the diaphragm is supported a shallow cylindrical cell D carrying two fixed and preferably semi-cylindrical electrodes E, E', to which are electrically connected the circuit terminals, as illustrated. The cell D is provided with a sharp edge or rim around its mouth, so that when it is clamped firmly against the diaphragm, as, for example, by a central bolt F, the diaphragm will be in close contact at all points with the sharp edge of the cell. Within the cell is placed a mass of conducting or semi-conducting granular material, such, for example, as fine granular hard carbon. If the transmitter is to stand vertically the amount of carbon should be sufficient to contact with both electrodes, so that there will be at all times an electric path from one electrode to the other. After the diaphragm and cell have been assembled, they are dipped in or coated with any suitable sealing compound to exclude air and moisture from the granules.

The lack of uniformity in efficiency of carbon transmitters has been found to be largely attributable to the absorption of moisture from the air by the mass of granular carbon, such absorption not only producing an inherent variation of resistance by reason of the presence of moisture, but reducing the range of effective resistance by rendering the edges of the granules softer and smoother. I have found that by sealing the vessel containing the carbon, in the manner described, or in any other suitable way, moisture is effectually excluded and derangements incident to its presence are obviated.

Several other important advantages result from the construction hereinabove described. The diaphragm being loosely mounted is free to vibrate at its edge and hence there results a greater amplitude of movement of its central portions, such movement being less obstructed than it would be if the diaphragm

were confined at its outer edge in the usual manner, and being in contact with the containing cell upon a mere circular line formed by the sharp edge of the latter, upon which it moves as upon a fulcrum, the freedom to vibrate is further promoted. The center of the diaphragm is firmly secured by the bolt F, but it will be observed that the outer rim as well as the circular line of contact with the edge of the cell is free; great freedom of movement combined with elasticity is thus effectually secured. The electrodes being fixed with relation to each other the necessity of repeated adjustment is removed, the variation of resistance being principally due to inter-granular change of arrangement of the mass within the cell under the vibration of the diaphragm, the granules being forced thereby to assume different relations of contact and thus vary the resistance between these fixed electrodes. The parts may be constructed of any suitable material. The cylindrical cell is preferably of insulating material, though it might be of metal covered with insulating material.

As illustrated in the drawings, the electrodes E, E' are preferably semi-cylindrical and are provided with a semi-circular bottom. There is thus afforded a wide area of contact between the electrodes and the granular material, and hence an effective conductive relation is established. The electrodes lying in two planes, that is to say, along the side wall or walls of the cell and the bottom, it is evident that the intimacy of contact between the mass of granules and the electrodes will not be disturbed by a change of position of the transmitter, as gravity will tend to promote such intimacy whether the bottom of the cell stands in a vertical, horizontal or intermediate plane. Under the impact of sound waves the diaphragm is thrown into vibration and the granular material contained in the cell is agitated, varying the resistance in accordance with the degree of agitation.

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

1. A telephone transmitter provided with a diaphragm loosely supported and having its entire rim or outer edge free to vibrate undampened, said diaphragm carrying electrodes fixed with relation to each other, and a resistance varying material between the electrodes.

2. A telephone transmitter provided with a diaphragm carrying a cell containing a granular conductor and fixed electrodes relatively non-vibratory in contact with said granular conductor.

3. A telephone transmitter provided with a diaphragm, a cell containing a resistance-varying granular material, said cell engaging the diaphragm by a sharp edge, and a rigid connection between the cell and the diaphragm within the area inclosed by said edge.

4. A telephone transmitter provided with a diaphragm carrying an air-tight cell containing granular conducting material in contact with electrodes, and fixed electrodes relatively non-vibratory in contact with said granular material.

5. A telephone transmitter comprising two fixed electrodes, a case filled with granular conducting material inclosing the same, said case being provided with a sharp edge, and a diaphragm elastically supported against said edge.

6. A telephone transmitter provided with a diaphragm carrying a cell containing granular conducting material, and having fixed electrodes relatively non-vibratory in the walls of said cell.

7. A telephone transmitter provided with a loosely supported diaphragm, a cell containing granular conducting material connected thereto by a rigid connection within said cell, and fixed electrodes in contact with said conducting material.

In testimony whereof I have hereunto subscribed my name this 9th day of October, A. D. 1893.

FRANK R. COLVIN.

Witnesses:

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