

(No Model.)

D. N. ROWAN.
TELEPHONE TRANSMITTER.

No. 571,399.

Patented Nov. 17, 1896.

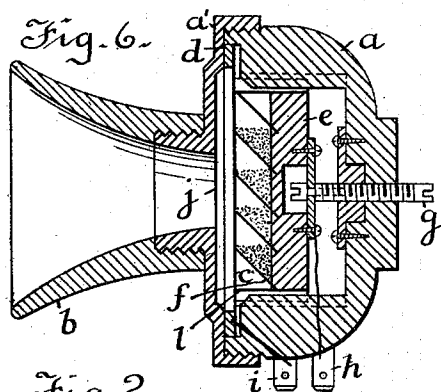


Fig. 4.

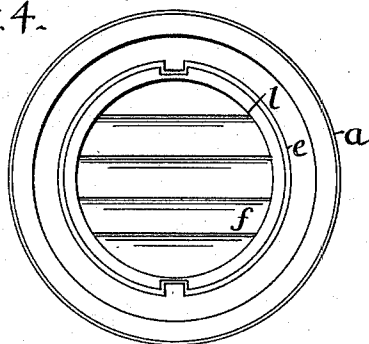


Fig. 2.

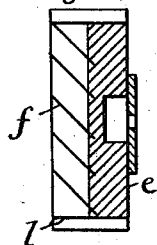


Fig. 1.

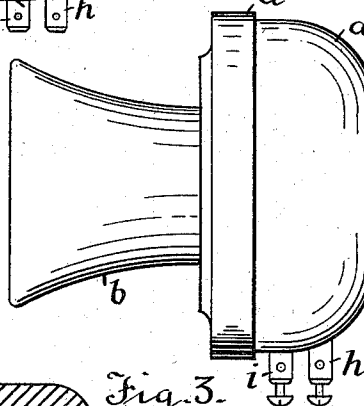


Fig. 9.

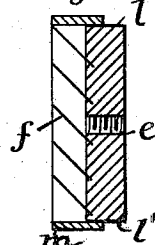


Fig. 8.

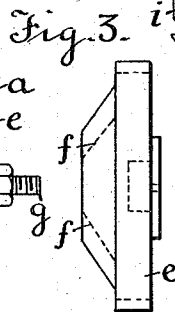
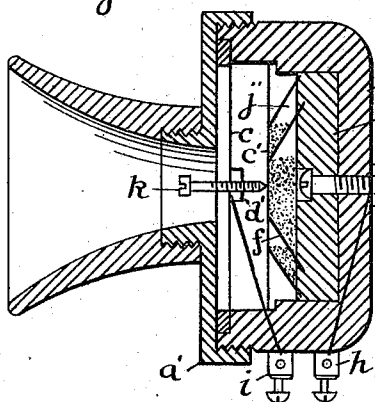


Fig. 5.

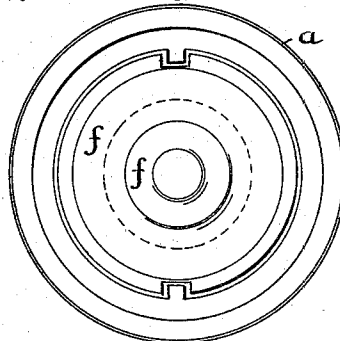
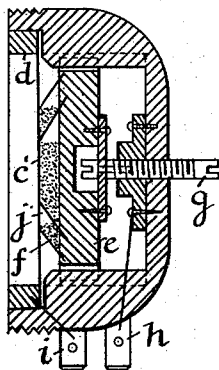


Fig. 7.



Witnesses
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UNITED STATES PATENT OFFICE.

DAVID NOBLE ROWAN, OF IRVINGTON, NEW YORK.

TELEPHONE-TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 571,399, dated November 17, 1896.

Application filed December 10, 1895. Serial No. 571,701. (No model.)

To all whom it may concern:

Be it known that I, DAVID NOBLE ROWAN, a citizen of the United States, residing at Irvington, county of Westchester, State of New York, have invented a certain new and useful Improvement in Telephone-Transmitters, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to telephone-transmitters with two electrodes, between which granulated or globular particles of conducting material is used to vary the electrical resistance, and adapted to short or long distance service.

I prefer to construct my transmitters by having a solid electrode in the rear, with non-conducting shelves attached to its face, with granular or globular conducting material suspended on the shelves between the electrodes.

My invention consists in the combination of flexible non-conducting shelves with sufficient granular or globular conducting material suspended on the shelves between the electrodes to produce the required varying resistance, first, in combination with a single diaphragm in contact with the shelves and the granular or globular conducting material regulated by a pressure device; second, in combination with a movable inner diaphragm in contact with the shelves and the granular or globular conducting material, with a fixed outer diaphragm, with a space between the diaphragms, with a pressure device, for instance, a screw and nut, for regulating the pressure of the inner diaphragm against the shelves and the granular or globular conducting material. These shelves may be made in various ways, but I have produced the best results with and prefer to use shelves, horizontal or circular, made of thin strips of mica or celluloid, as shown in my illustrations, which I can securely attach at any required angle to the face of the rear electrode. I prefer the use of mica for the shelves because it is practically indestructible, not affected by the weather, and does not deteriorate by age, is not attacked by parasites, and possesses in the highest degree the quality of resiliency and responds to the vibrations of the diaphragm, and the granules are by each

vibration of the diaphragm and shelves moved back against the other electrode, returning again by gravity to the front electrode to be continuously moved by or agitated by the same process. It is impossible for the granules to pack on the shelves or against the electrodes.

In adjusting the workings of the transmitter when a single diaphragm is used I place the front electrode so that it presses against the projecting edges of the shelves, which keeps the granules from overflowing from one shelf to another or into the case and brings the granules in contact with the front electrode above the line of shelves. The ends of the shelves constructed to be horizontal when used are closed at each end by non-conducting material, and the circular shelves are continuous. Each shelf securely holds the granules therein placed. Any adjustment needed to produce the more perfect results can be made by moving the front electrode forward, pressing the flexible shelves and the granules, or drawing it back to relieve the pressure when the rear electrode is stationary, as, for instance, by a screw and nut, or by moving the rear electrode to which the shelves are attached up to or back from the front electrode when the diaphragm is stationary. Another and preferable mode of constructing the front electrode is to cover the shelves attached to the rear electrode by a carbon or metal inner movable diaphragm or disk which sets in a case of non-conducting material which surrounds the back electrode and supports the inner diaphragm, having an outer fixed diaphragm, which may be of any suitable material, metal preferred, leaving a space between the outer diaphragm and the inner diaphragm or disk. The outer diaphragm is sustained by its edges, but free to vibrate, with a fixed adjustable nut attached to its center with a screw passing through the fixed nut and projecting through this diaphragm. The screw is smooth-pointed and worked from the front of the transmitter by a screw-driver or otherwise, so that the point of the screw touches the face of the inner diaphragm or disk, the result being that each vibration of the outer diaphragm instantaneously presses the point of the screw against the inner diaphragm or disk, which

vibrates it simultaneously with the outer diaphragm, the inner diaphragm or disk performing the same functions as if directly acted upon by the voice, but more effectively.

5 This screw also acts as an adjuster.

The accompanying drawings illustrate my invention.

Figure 1 is a side elevation of a telephone-transmitter embodying my invention when set up perpendicularly for commercial use. 10 Fig. 2 is a sectional view of the rear electrode, showing my invention when the shelves are placed horizontally with a single diaphragm. Fig. 3 is a sectional view of the same thing, showing my invention when the shelves are placed circular. Figs. 4 and 5 15 are views of the faces of Figs. 2 and 3, illustrating the two methods of arranging the shelves. Fig. 6 is a vertical central section of Fig. 1, showing my invention when I use horizontal shelves and a single diaphragm. Fig. 7 is the same showing the circular shelves. Fig. 8 shows the same when I use an inner and outer diaphragm and shows the adjusting device. Fig. 9 is the same as Fig. 2, 20 showing its construction when I use a non-conducting diaphragm.

I will describe my invention as illustrated.

a and *a'* are the two parts of the outer case, 30 which may be of metal, glass, wood, hard rubber, or other composition. I prefer it made of non-conducting material, because if made of metal it requires a lining of non-conducting material.

35 *b* is the usual mouthpiece into which the user speaks.

c is the outer diaphragm, and *c'* is the inner diaphragm. Either or both can be made of metal or hard carbon or other suitable material. 40

d is the metal ring or plate to which the diaphragm *c* is attached when only one diaphragm is used, and when the outer diaphragm *c* is not used forms the front electrode from which contact is taken. 45

d' is the front electrode when the outer diaphragm *c* is used, and contact is taken from the adjusting-nut on the outer diaphragm *c*.

e is the rear electrode, which can be made 50 of metal or hard carbon. I prefer the latter, or it can be hard carbon electrotyped with metal to strengthen it, which is fastened to *a* by means of a screw or screws or clamp.

f are the non-conducting vibrating shelves, 55 which I make of mica or any other suitable non-conducting material and firmly attach to the face of the rear electrode, so that they will move flexibly and vibrate.

g is a screw which passes through the center of the electrode *e* and case *a*, holding them together, and from which contact can be taken to *h*, which is the contact-post of the rear electrode, and may be used as an adjusting-screw to move the rear electrode. 60

65 *i* is the contact-post of the front electrode *d* or *d'*, connected by means of a wire running through case *a*.

j is the granulated carbon between the electrodes.

k is the adjusting-screw to move the inner diaphragm *c'* when two diaphragms are used. 70

l is the insulation-band inclosing rear electrode *e* and forming the end of the horizontal shelves.

l' is the same when it covers *e* and insulates it from the metal ring *m*. 75

m is a wide metal ring which I use in connection with and when I use a non-conducting diaphragm, such as wood or mica, with the horizontal shelves, which passes sufficiently over the rear electrode, separated therefrom by insulating material *l'*, such as mica or its equivalent, so that it will allow the diaphragm which is attached to its top or front end to come in contact with the shelves, and at the same time the inside of the metal ring forms the end of the shelves coming in contact with the granulated carbon forming the front electrode. 80

Although I show the two forms of flexible shelves which I prefer, the material and compositions may be varied to operate in a similar manner for the same purpose in squares, diamonds, octagonal, and other shapes and at different angles. I have worked the shelves when placed from ten degrees to a right angle to the face of the rear electrode, but I prefer when I use circular shelves to place them at from twenty to thirty degrees to the face of the rear electrode, and when I use horizontal shelves to place them at from forty-five to fifty degrees to the face of the rear electrode. 95

Having described the preferable forms of my device and different modifications thereof, I do not limit myself to the particular mechanism shown or described, because I found that modified and different forms of shelves, while not producing as good results as the two forms which I prefer and have adopted for commercial purposes, were much better and cheaper than most of the transmitters now in use. 105

The transmitter which I have described is adapted to short or long service, according to the amount of electrical force used in connection with it, and they are uniform in quality of transmission. 115

Having described my invention, I claim and desire to secure by Letters Patent— 120

1. In a telephone-transmitter, the combination of flexible, non-conducting shelves, electrodes, and granular conducting material suspended on the shelves between the electrodes as described. 125

2. In a telephone-transmitter, the combination of flexible non-conducting shelves, granular conducting material thereon suspended on the shelves between electrodes, an inner diaphragm in contact with the shelves and the granular conducting material, a fixed outer diaphragm with a space between the diaphragms and a mechanical connection between the diaphragms, as described. 130

3. The combination of flexible non-conducting shelves, granular conducting material thereon, suspended on the shelves between electrodes, an inner diaphragm in contact with the shelves and the granular conducting material, a fixed outer diaphragm, with a space between the diaphragms and a pressure device between the diaphragms, as described.
- 10 4. The combination of flexible non-conducting shelves, granular conducting material thereon suspended between the electrodes, an inner diaphragm in contact with the shelves and the granular conducting material, a fixed outer diaphragm, with a space between the diaphragms and a screw and nut for regulating the pressure of the inner diaphragm against the shelves and the granular conducting material thereon, as described.
- In witness whereof I have hereunto set my hand and seal this 30th day of November, 1895.
- D. NOBLE ROWAN. [L. s.]
- Witnesses:
T. W. MOORE,
WEBSTER GILLETTE.