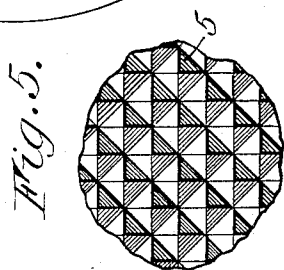
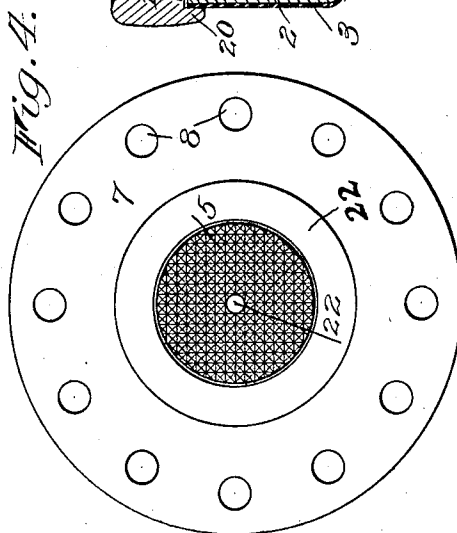
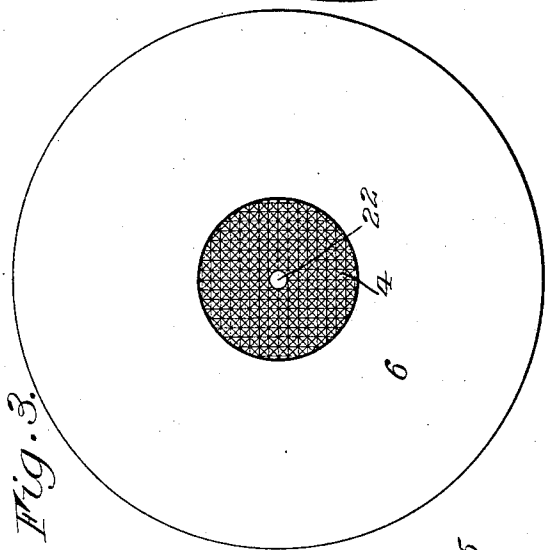
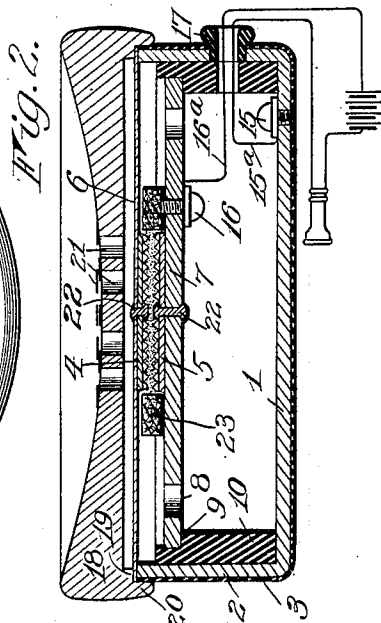
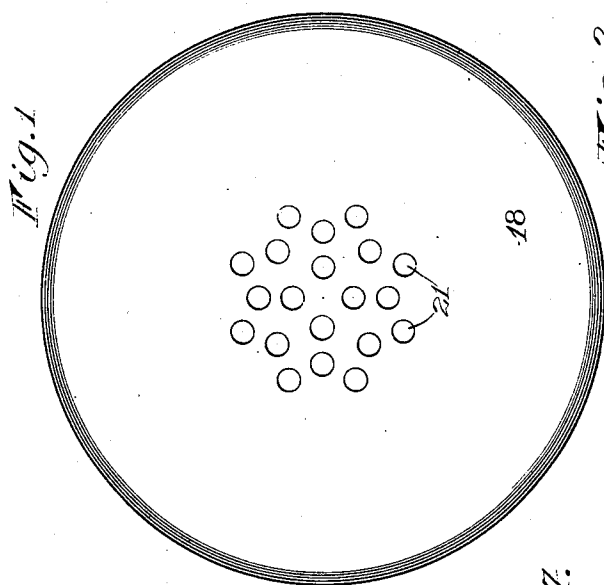


No. 837,457.

PATENTED DEC. 4, 1906.

F. W. FAHRENFELD.  
TELEPHONE TRANSMITTER.  
APPLICATION FILED AUG. 31, 1905.



Witnesses

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# UNITED STATES PATENT OFFICE.

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## TELEPHONE-TRANSMITTER.

No. 837,457.

Specification of Letters Patent.

Patented Dec. 4, 1906.

Application filed August 31, 1905. Serial No. 276,495.

*To all whom it may concern:*

Be it known that I, FRED W. FAHRENFELD, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Telephone-Transmitters; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of the specification, and to the reference-numerals marked thereon.

My present invention relates to telephony; and it has for its object to provide a transmitter for telephone instruments that shall be simple in construction and comprise few parts capable of withstanding rough usage, and which are designed particularly to form a compact article of small size, although equally well adapted to be employed in making large transmitters.

My invention has for its further object to provide an improved form of electrode-plates whereby contact-surfaces of large areas are provided and which are so arranged as to prevent the packing of the conductive material or carbon between them.

To these and other ends the invention consists in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings, Figure 1 is a plan view of the transmitter for telephones constructed in accordance with my invention. Fig. 2 is an enlarged cross-sectional view thereof, showing diagrammatically a telephone-circuit in which it is adapted to be arranged. Fig. 3 is a detail plan view of the vibratory diaphragm. Fig. 4 is a similar view of the bridge supporting the back electrode. Fig. 5 is an enlarged plan view of one of the electrodes. Fig. 6 is a cross-sectional view thereof.

Similar reference-numerals in the several figures indicate similar parts.

A transmitter constructed in accordance with my invention embodies a metallic cup-shaped cylindrical case having the bottom 1 and the side wall 2, which is covered on its outer surface with insulation 3, which may be applied in the form of an enamel of rubber or other suitable material. The front

and back electrode-plates (indicated by 4 and 5, respectively) are arranged one upon a vibratory diaphragm 6 and the other upon a stationary bridge 7, comprising a cylindrical metallic plate provided with perforations 8 and adapted to be seated on a shoulder 9 on a ring formed of gutta-percha, fiber, or other insulating material, (indicated by 10.) This ring is formed of such a diameter that it may be pressed into the cup-shaped casing, and a bridge 7 is also made of such a size that when pressed against the shoulder 9 these parts will be securely positioned. On the inner side of the bottom 1 is a small screw or binding-post 15, and on the proximate side of the bridge 7 is a similar post 16, to which are connected the circuit-wires 15<sup>a</sup> and 16<sup>a</sup>, respectively, which when the parts are assembled extend outwardly through registering apertures in the ring 10 and the wall 2 of the casing. The aperture in the side of the casing is protected by an insulating-bushing 17 and forms a vent which coöperates with the apertures 8 to permit the escape of air from the casing, thus preventing the forming of an air-cushion to interfere with the operation of the diaphragm. The diaphragm 7 comprises a thin metallic disk of a diameter equal to that of the casing, and as it rests upon the edges of the side walls 2 it is in electrical connection therewith. The cap-piece 18 secures the diaphragm in place and its inner side is recessed and provided with a shoulder 19, which engages the face of the diaphragm at its outer edge, and it is also provided with a rim 20, adapted to embrace the periphery of the side walls 2 of the casing to hold the parts in operative position, although other fastening devices may be employed, if desired. The outer face of the cap 18 is convex, and at the center it is provided with a series of perforations 21, through which air vibrations may effect the operation of the diaphragm 6.

The arrangement and construction of the foregoing parts enables the transmitter to be made small in size; but as devices of this character are usually inefficient in operation owing to the small area of the coöperating parts serving to make and break the electric circuit I employ plates which, although small in diameter, possess relatively large contact-surfaces. To accomplish this object, I pro-

vide the plates with numerous projections which may be formed in a variety of ways, although I preferably provide them with converging sides or faces which meet at their upper ends. These projections may be pointed ribs, as would appear in a side view of the plate, such as Fig. 6, or they may be made pyramidal, as shown in Fig. 5, by milling intersecting slots in the face of the plate, as will be understood. In practice these plates are permanently secured to the vibratory diaphragm 6 and to the bridge-piece 7 by rivets 22, with the pointed projections on one plate directly above and in proximity to the points of the projections on the other plate. The bridge-piece 7 is located relatively to the diaphragm, so that the opposing projections on the plates are out of contact, and the telephone-circuit will be completed through the loose conductive material, such as granular carbon, generally employed for this purpose, and to hold the latter in place between the plates I employ a ring 23, of felt or other non-conductive material, which rests on the bridge and extends into proximity with the diaphragm. To further increase the conductivity of the plates, their surfaces are plated with gold or similar non-corrosive metal.

A transmitter embodying my invention consists of few parts which are simple in construction and may be readily assembled. By employing contact-plates having a plurality of projections a contact-surface of large area may be readily obtained on a comparatively small plate, and by making said projections pointed they serve to prevent the carbon or other granular conductive material from becoming packed between them.

I claim as my invention—

1. In a transmitter, the combination with a cup-shaped casing of conductive material provided with an aperture and comprising a back and an annular rim, a covering of insulating material applied to the exterior of the casing, and an insulated bridge in the latter, of means on the bridge and on the interior of the casing for securing the conductors of a telephone-circuit to said parts, a diaphragm extending over the bridge and supported on the rim of the casing, a cap-piece of insulating material engaging the diaphragm and fitting over the exterior of the casing, electrode-plates on the bridge and diaphragm and conductive material between said plates.

2. In a transmitter, the combination with a cup-shaped metallic casing provided with an aperture and comprising a back and an annular rim, a perforated bridge fitted within the rim and closing the casing, of a diaphragm also closing the casing and in electrical connection therewith and arranged over the bridge, electrode-plates on the bridge and diaphragm and conductive mate-

rial between said plates, a cap-piece fitting the rim and securing the diaphragm thereon, and means on the bridge and casing for securing the conductors of a telephone-circuit to said parts within the casing.

3. In a transmitter, the combination with a metallic casing, a metallic bridge-piece supported therein and insulated therefrom and a vibratory diaphragm closing the casing and connected thereto, of electrode-plates mounted in opposition to each other on the diaphragm and bridge, a ring surrounding said plates and resting on the bridge without engaging the diaphragm and granular conductive material between the plates.

4. In a transmitter, the combination with a casing having a side wall, a ring of insulating material located within said wall having a shoulder and a bridge-piece supported on said shoulder, of a vibratory diaphragm secured at its edges to the edges of the side walls, electrode-plates secured to the bridge-piece and diaphragm and granular conductive material located between the plates.

5. In a transmitter, the combination with a casing having an annular side wall, a ring of insulating material fitted therein having an annular shoulder and a bridge-piece supported thereon, of a vibratory diaphragm resting on the edges of the walls of the casing, a cap fitting over it and engaging the outer side of said wall, and cooperating electrode-plates on the diaphragm and bridge.

6. In a transmitter, the combination with a casing having an annular side wall, a ring of insulating material fitted therein having an annular shoulder and a bridge-piece supported thereon, of a vibratory diaphragm resting on the edges of the walls of the casing and a perforated cap covering the diaphragm and provided with a shoulder engaging the edge of the diaphragm, a rim on the cap engaging the outer side of the wall of the casing and cooperating electrode-plates on the diaphragm and bridge.

7. In a transmitter, the combination with a metallic casing having a laterally-extending side wall provided with a perforation and adapted to be connected to one side of a telephone-circuit, an insulating-ring in the casing provided with an aperture registering with the perforation in the casing and a perforated metallic bridge-piece adapted to be connected to the other side of a telephone-circuit, of a vibratory metallic diaphragm engaging the side wall of the casing, a cap resting on the diaphragm and having a rim engaging the exterior of said wall and conductive material located between the diaphragm and bridge.

FRED W. FAHRENFELD.

Witnesses:

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