

J. P. MAXFIELD.
TELEPHONE TRANSMITTER.
APPLICATION FILED JAN. 3, 1916.

1,296,683.

Patented Mar. 11, 1919.
Fig. 2.

Fig. 1.

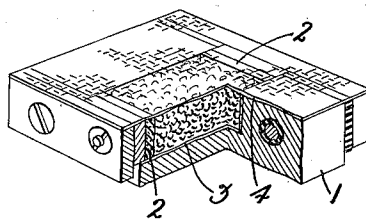
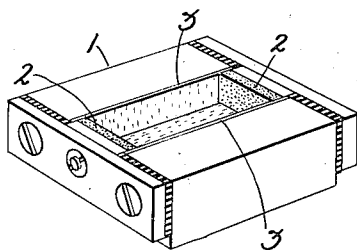


Fig. 3.

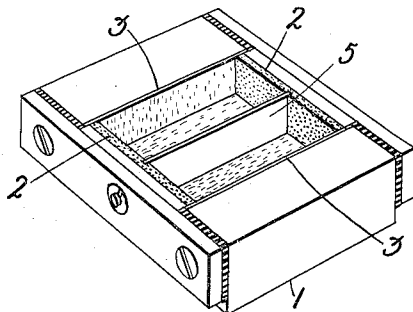


Fig. 4.

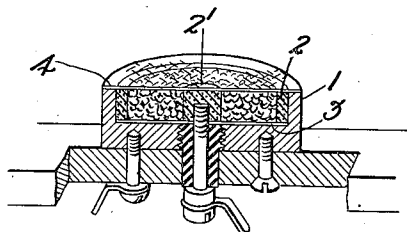
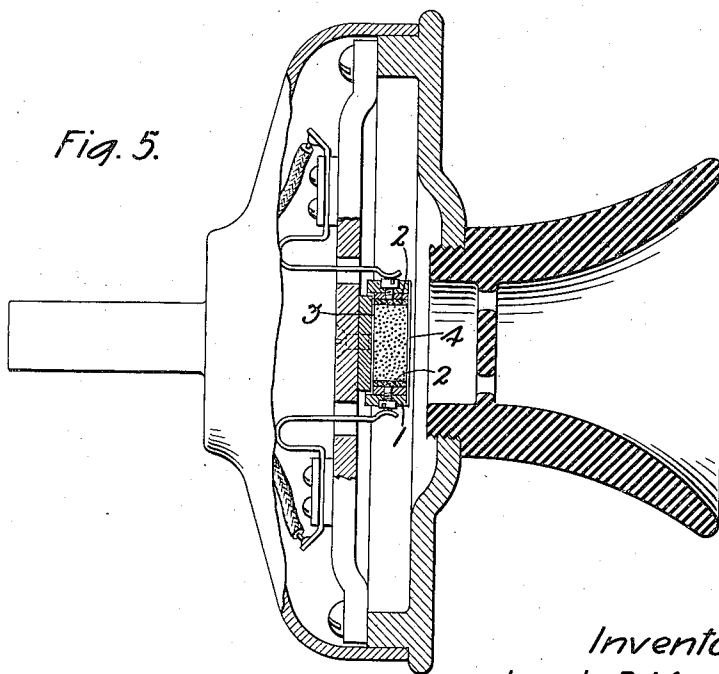


Fig. 5.



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TELEPHONE-TRANSMITTER.

1,296,683.

Specification of Letters Patent.

Patented Mar. 11, 1919.

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To all whom it may concern:

Be it known that I, JOSEPH P. MAXFIELD, a citizen of the United States, residing at Maplewood, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Telephone-Transmitters, of which the following is a full, clear, concise, and exact description.

This invention relates to telephone transmitters. Its object is to provide a transmitter of increased efficiency in the reproduction through current variations of audible sounds impressed upon it.

This object is accomplished by dispensing with the diaphragm ordinarily used in microphone transmitters, and exposing the microphonic substance, in the form of a mass of granular conducting material, directly to the action of the varying air pressure by which it operates. By this construction the distortion, due to the fact that all diaphragms are more or less selectively responsive, is eliminated. It has been found that the microphonic action of a transmitter may be obtained, even in the absence of any appreciable motion of the grains, when the pressure of the gas medium between the granules is varied, and this fact has been utilized to secure a transmitter which is particularly adapted to the faithful reproduction of music or speech.

This invention will be more fully described in connection with the drawings, in which Figure 1 represents a simple form of transmitter which has been found useful in the transmission of music and speech. Fig. 2 is a slightly modified form in which, to avoid loss of the granules, they are covered with a loose mesh covering, such as bolting silk, which does not interfere appreciably with the communication of variations in air pressure directly to the granular mass, and which communicates no appreciable motion to the grains by its vibration. Fig. 3 shows a modification of Fig. 1. Fig. 4 a further modification by which symmetry is obtained, and Fig. 5 shows a commercial transmitter constructed in accordance with this invention.

Referring to Fig. 1, 1 represents a rectangular chamber, open at the top and containing the electrodes 2 and the insulating strips 3. The granular mass is contained in the space bounded by electrodes 2 and strips 3. When this transmitter is placed in a room in which speech or music is being produced, and connected in the usual circuit, a

very high quality of reproduction is obtained and the source of sound may be located at a considerable distance from the transmitter.

Fig. 2 is similar to Fig. 1, except that the granules are retained by the covering 4, which should be so porous that there is offered the least obstruction to the transfer of air pressure through it consistent with its object, which is to prevent loss of granules in transportation and handling.

In Fig. 3 the transmitter of Fig. 1 is modified by the addition of the insulating strip 5 which divides the chamber into two parts. It has been found that this adds somewhat to the efficiency of the device when it is used in a position other than horizontal.

Fig. 4 is a modification of Fig. 2 which eliminates one objection to Fig. 2, namely, that when it is used in a vertical plane, the amount of the granular mass, in contact with the electrodes, depends upon the vertical angle through which the device is turned. In Fig. 4 the electrode 2 has the form of a ring, as shown, while the complementary electrode 2' is located at the center of this ring. By this means the amount of granular material in contact with the electrodes is independent of the angle through which the device may be turned about an axis of symmetry. In this figure, as well as in Fig. 2, the purpose of the covering 4 is not to transmit motion to the granules, but merely to retain them, and for this reason it should be so constructed as to expose as small a surface as possible to the incoming waves. It has been found that a very loose mesh silk covering is suitable for this purpose, the mesh being as large as is possible without allowing the grains to fall through.

Fig. 5 shows the rectangular box of Fig. 2 mounted in a commercial transmitter. It is clear that any one of the other transmitters shown in these drawings may be substituted, and in fact it will usually be desirable to make use of the transmitter of Fig. 4 for this purpose.

What is claimed is:

1. A telephone transmitter comprising a chamber containing electrodes and a resistance comprising a granular conducting material between said electrodes, and means for exposing said granules to the direct action of aerial sound waves whereby the value of said resistance is controlled in accordance therewith.

2. A telephone transmitter comprising an open chamber containing electrodes and granular conducting material, the said material forming directly the receiving element for aerial sound waves without the intermediary of a vibrating diaphragm attached to one of said electrodes. 5
3. A telephone transmitter comprising a chamber, electrodes and granular conducting material in said chamber, and a loose mesh covering for said chamber through which aerial disturbances are transmitted to the granular mass without the intermediary of a vibrating diaphragm attached to one of said electrodes. 10
4. A telephone transmitter comprising a chamber, electrodes and granular conducting material in said chamber, and a porous gauze covering whereby the granular mass is retained and the said inclosed mass is directly exposed to aerial disturbances without the intermediary of a vibrating diaphragm attached to one of said electrodes. 15
5. A telephone transmitter comprising a chamber containing electrodes and granular material and a retaining covering of gauze so proportioned as to mesh and area that aerial disturbances act substantially directly upon the said granular mass without the intermediary of a vibrating diaphragm attached to one of said electrodes. 20
6. A telephone transmitter comprising a chamber containing electrodes and granular material, said chamber having a face of meshed material through which aerial disturbances may penetrate without substantial obstruction and affect directly said granular material without the intermediary of a vibrating diaphragm attached to one of said electrodes. 25
7. A telephone transmitter comprising a chamber containing two non-vibrating electrodes and a granular conducting material between said electrodes exposed directly to aerial sound waves. 40
8. A telephone transmitter comprising a chamber containing two electrodes substantially nonresponsive to sound vibrations, and a granular conducting material between said electrodes exposed directly to aerial sound waves. 45
9. A telephone transmitter comprising a chamber, electrodes and a granular conducting material in said chamber, said electrodes being substantially nonresponsive to sound vibrations, and a loose mesh covering said chamber through which aerial disturbances are transmitted to the granular mass. 50
10. A telephone transmitter comprising a chamber containing electrodes and a variable resistance comprising a granular conducting material between said electrodes controlled in value by the amount of air pressure thereon, the open face of said chamber being covered by a porous gauze whereby the granular mass may be retained. 55
- In witness whereof, I hereunto subscribe my name this 30th day of December, A. D. 1915. 60
- JOSEPH P. MAXFIELD. 65