

No. 617,433.

Patented Jan. 10, 1899.

T. BERDELL.
TELEPHONE.

(Application filed Mar. 28, 1896.)

(No Model.)

Fig. 2.

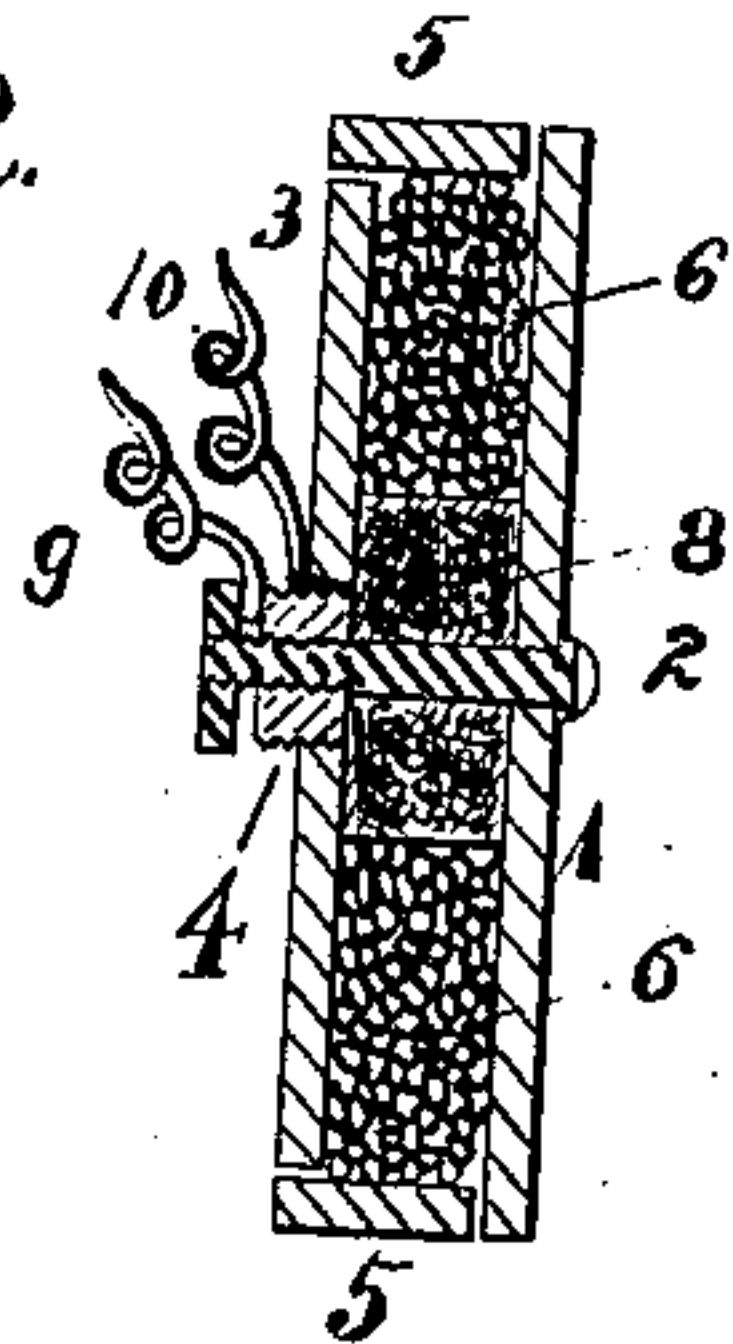


Fig. 4.

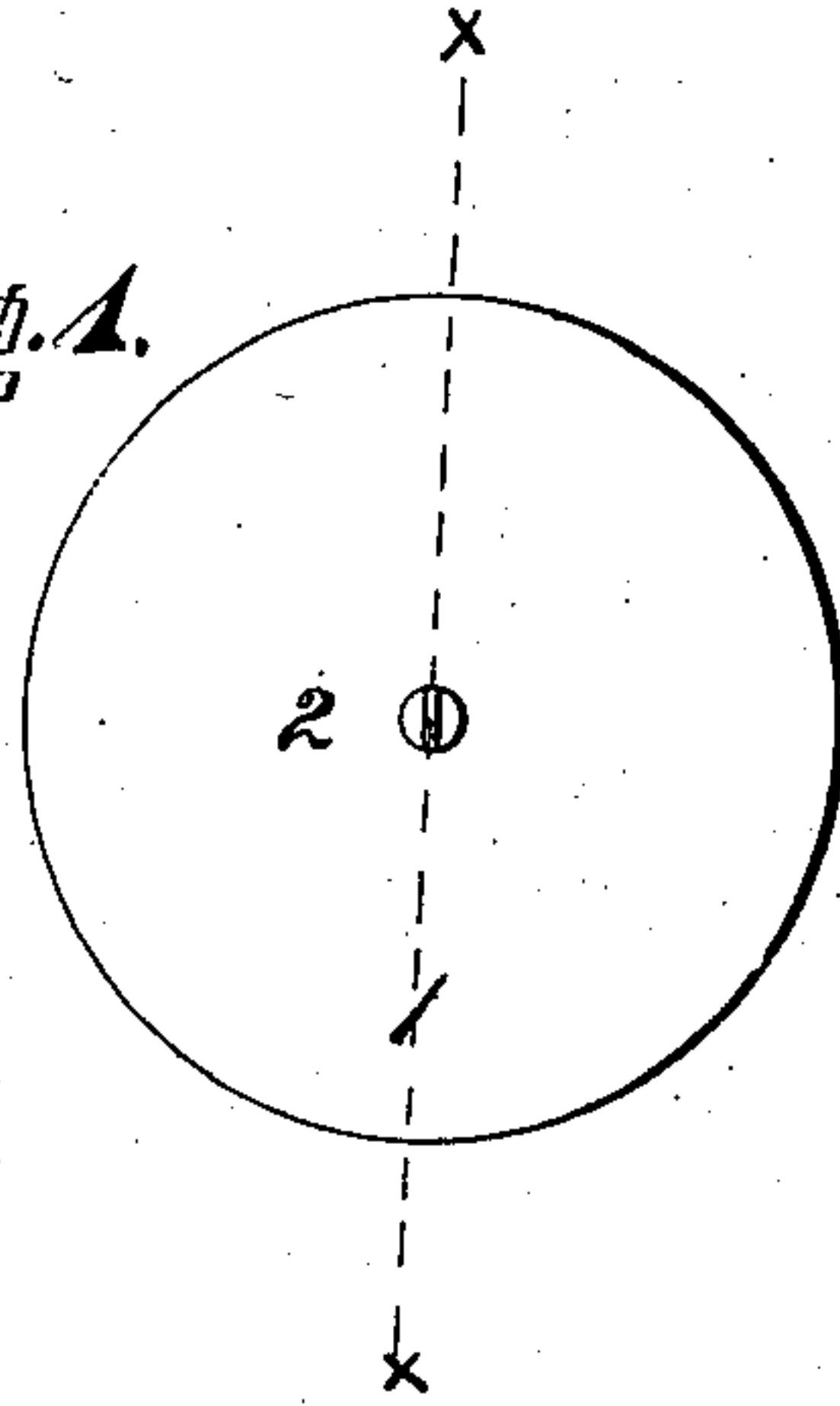


Fig. 3.

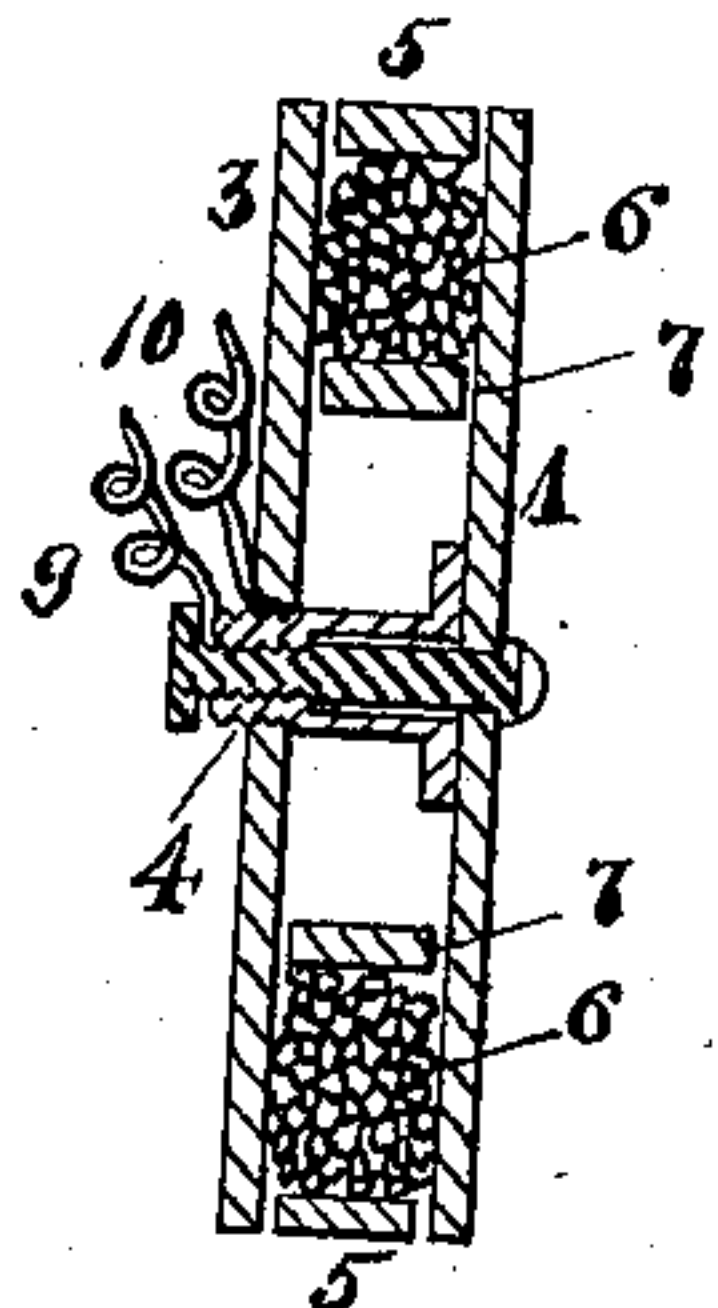


Fig. 4.

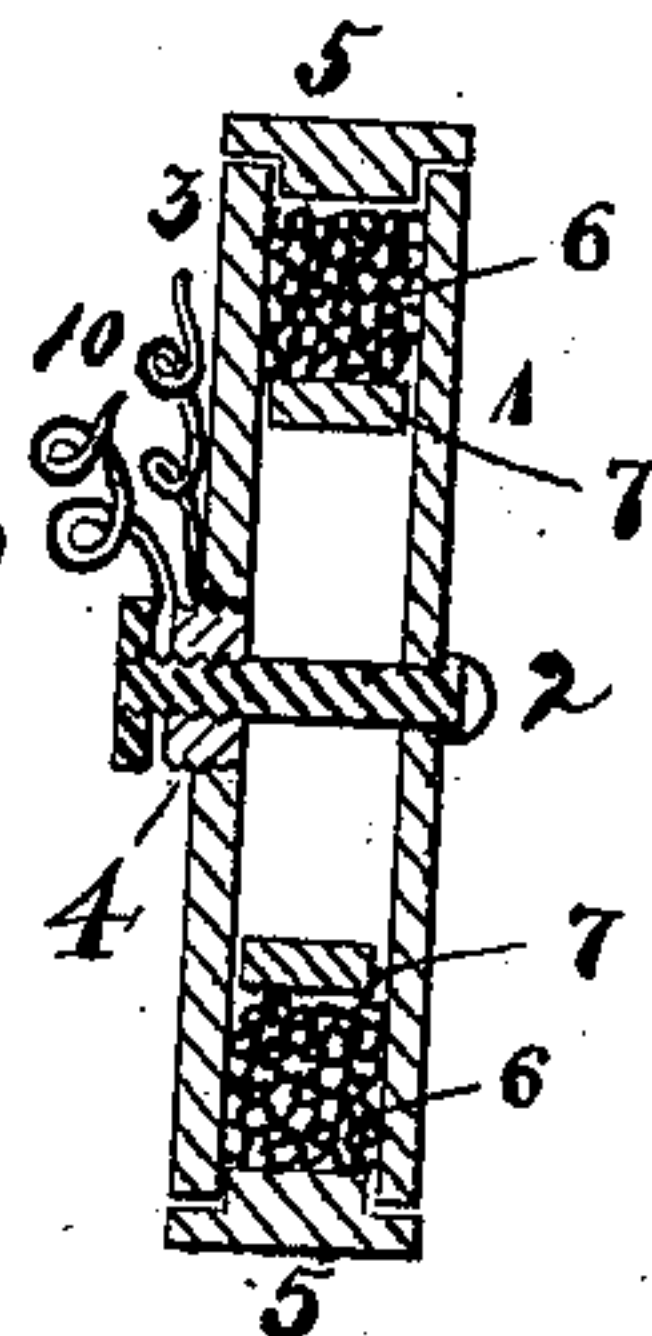
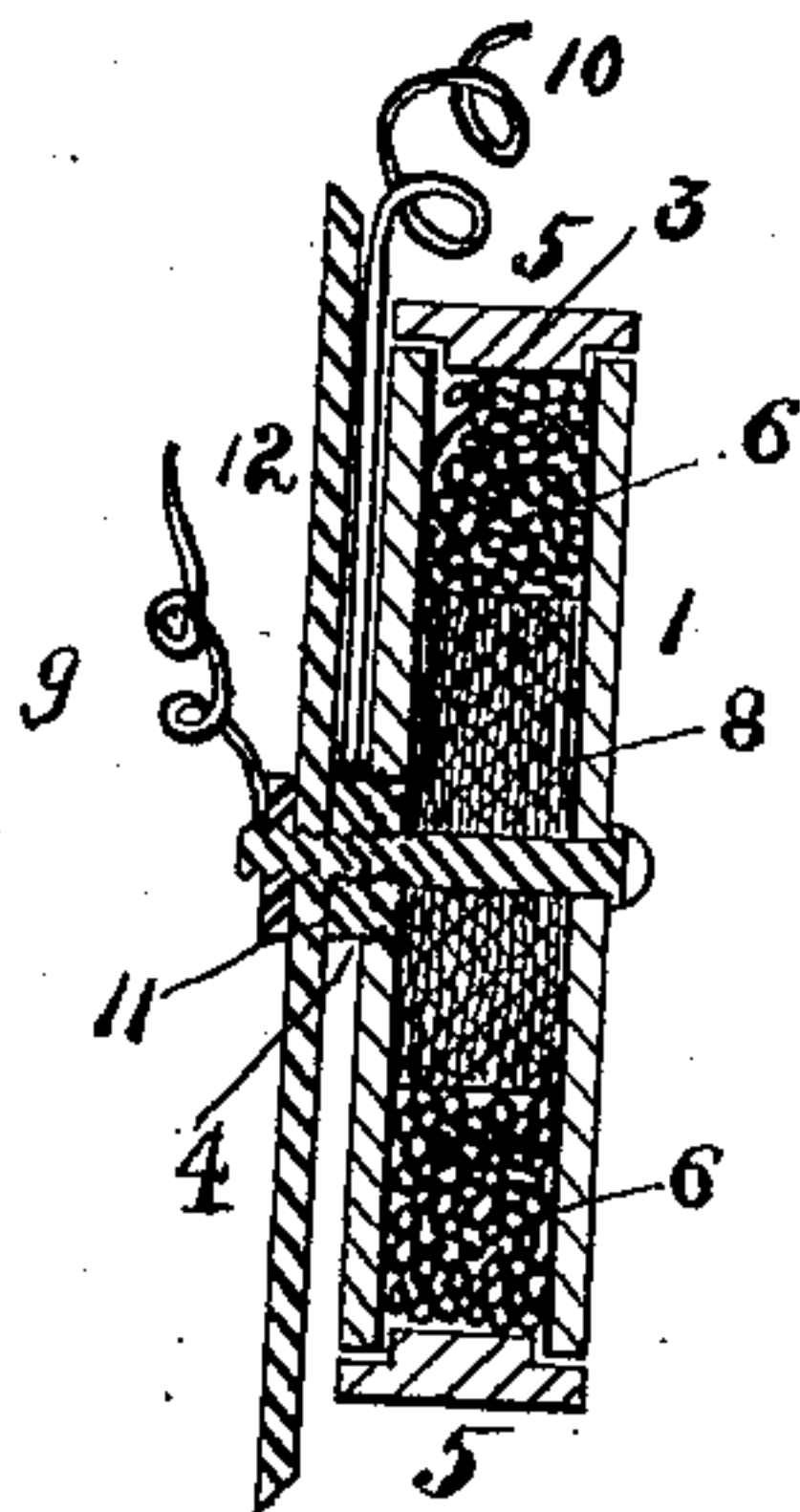


Fig. 5.



Witnesses
Louis Berger.
Louise Gilmore

Theodore Berdell. Inventor
By his Attorney A. M. Pierce.

UNITED STATES PATENT OFFICE.

THEODORE BERDELL, OF SUMMIT, NEW JERSEY.

TELEPHONE.

SPECIFICATION forming part of Letters Patent No. 617,433, dated January 10, 1899.

Application filed March 28, 1896. Serial No. 585,208. (No model.)

To all whom it may concern:

Be it known that I, THEODORE BERDELL, a citizen of the United States, residing in Summit, Union county, State of New Jersey, have
5 invented a new and useful Improvement in Telephones, of which the following is a specification.

My invention relates especially to instruments employed for transmitting and receiving tones, particularly of articulate speech,
10 the present invention being an improvement upon that shown and described by me in an application filed December 27, 1895, Serial No. 573,433, and has for its object the pro-
15 vision of a very simple telephonic instrument.

To attain the desired end, my invention consists in certain novel and useful combinations or arrangements of parts, and peculiarities of construction and operation, all of
20 which will be hereinafter first fully described and then pointed out in the claims.

In the accompanying drawings, forming a part hereof, Figure 1 is a front elevation of a telephonic instrument embodying my in-
25 vention. Fig. 2 is a vertical axial sectional view at line *xx* of Fig. 1. Figs. 3, 4, and 5 are like views illustrating different assembling of the parts.

Similar numerals of reference wherever
30 they occur indicate corresponding parts in all the figures.

1 is the front diaphragm, made of carbon or any other suitable material. This diaphragm is perforated at its center and is
35 mounted upon a metallic or conducting screw or pin 2.

3 is a back diaphragm or plate preferably made of carbon and provided at its center with a non-conducting bushing 4.

40 5 is an exterior ring of non-conducting material which is placed outside of or between the diaphragms, and serves to prevent the escape of the granules 6. 7 is a central ring of non-conducting material or a disk of felt
45 8, as in Figs. 2 and 5, either arrangement serving to keep the granular material 6 away from the center of the diaphragms and in an annulus, as shown.

9 and 10 are the line-wires, the line 9 being electrically connected to the central pin or screw 2, and the wire 10 to the back diaphragm or plate 3.

As heretofore constructed and arranged telephonic instruments have depended upon the inclosing boxes or cases for holding the
55 diaphragms in place. Such is not the case in my instrument, as it does not require any inclosing case to operate perfectly or as a support. Such case may be added, if desired, to give the instrument ornamentation, and
60 in that case a part of such box may represent the ring 5; but my instrument may be supported upon a plate of metal against which the back diaphragm rests and the conductor thereto connected to any part of the plate,
65 or the screw 2 may be passed through a nut 11 or a plate of metal purely for the purpose of electrical connection and be secured on a panel 12, as a door, desk, or any other desirable and convenient location, as illus-
70 trated in Fig. 5 of the drawings. The rings 5 and 7 have no function in my device other than to hold the annulus of granular material in place.

It may be found desirable in assembling the
75 parts or attaching the instrument to a support to secure the exterior ring to the back plate or diaphragm and hold the same at any convenient point; but when this is done the front diaphragm is not in any way affected,
80 but remains substantially free at its periphery.

When constructed and arranged as above described, my telephone will be found very effective, while it is so simple that when as-
85 sembled for use the parts do not require any special adjustment whatever.

The instrument may be use as a transmitter alone or as a transmitter and receiver, as set forth in my application, Serial No. 573,433,
90 hereinbefore referred to.

My construction of the telephone differs from previous arrangements, as the diaphragms or plates are held together, but insulated from each other, whereas in said pre-
95 vious constructions the diaphragms are not held together. By my arrangement a greater range of transmission is obtained, as it is equally effective for a whisper or a shriek. The instrument is extremely sensitive and will
100 transmit perfectly when the speaker is located ten or twenty feet away from it and uses ordinary conversational tones, and talking in a very loud voice near the transmitter will not

in any way impair the effectiveness of the transmission.

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

1. In a telephonic instrument, two diaphragms secured rigidly together at their centers but insulated from each other, and unsupported and free to vibrate at their peripheries, in combination with granulated material located between the diaphragms, substantially as shown and described.

2. In a telephonic instrument, two diaphragms secured together and supported at their centers, and insulated from each other, in combination with an annulus of granulated material held between the diaphragms, substantially as shown and described.

3. In a telephonic instrument, two diaphragms secured together at their centers while free to vibrate at the edges, insulated

from each other, and provided with suitable electrical connections, in combination with an inner ring, an annulus of granular material, and an outer insulating-ring confining the granular material between the diaphragms, substantially as shown and described.

4. In a telephonic instrument, the combination of an outer diaphragm held at its center by a conducting-support; an inner diaphragm or plate mounted upon an insulating-bushing, through which the said conducting-support passes; and an annulus of granular material held between the two diaphragms substantially as shown and described.

In testimony that I claim the foregoing I hereunto set my hand in the presence of two witnesses.

THEODORE BERDELL.

Witnesses:

A. M. PIERCE,
LOUIS BERGER.