W. W. DEAN.

TELEPHONE TRANSMITTER.

APPLICATION FILED APR. 24, 1908.

1,000,499. Patented Aug. 15, 1911.

Fig. 2.

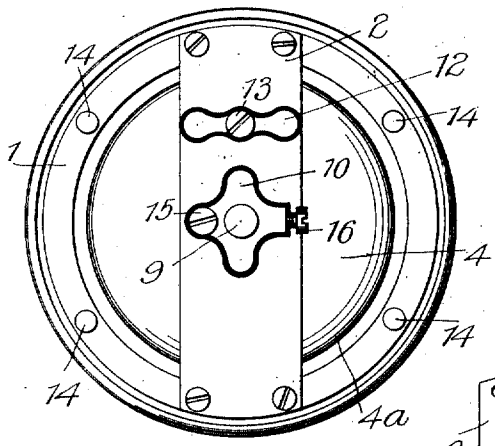
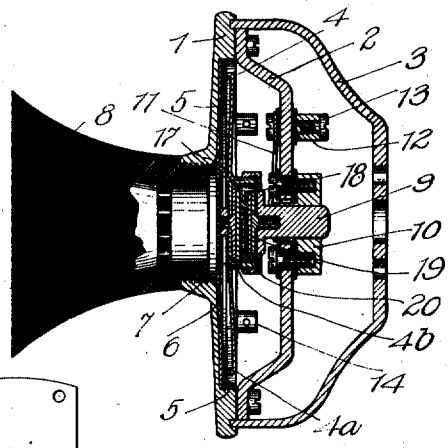


Fig. 1.



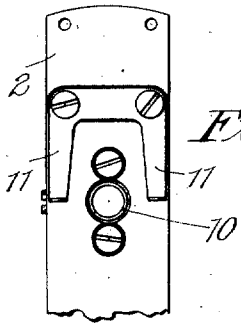


Fig. 3.

Fig. 4.

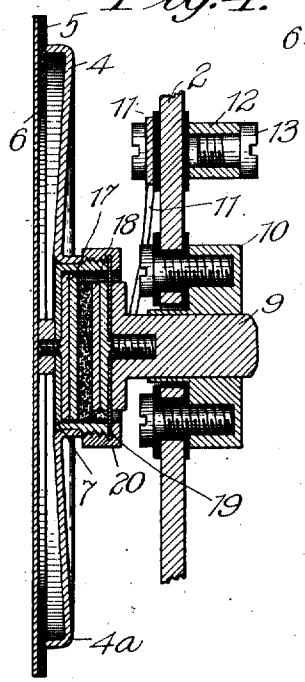
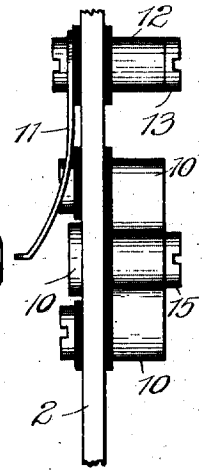


Fig. 5.

Fig. 6.



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UNITED STATES PATENT OFFICE.

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TELEPHONE-TRANSMITTER.

1,000,499. Specification of Letters Patent. Patented Aug. 15, 1911.

Application filed April 24, 1908. Serial No. 428,936.

To all whom it may concern:

Be it known that I, WILLIAM W. DEAN, a citizen of the United States, residing at Elyria, in the county of Lorain and State of Ohio, have invented a certain new and Improved Telephone-Transmitter, 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 transmitters for use in telephone work, and it belongs to that type of instruments in which granular or comminuated material, as carbon, is used for the purpose of varying the resistance of the circuit including the transmitter and thus furnishing a means for transmitting the voice waves.

My invention consists essentially in providing a transmitter with a diaphragm having a reinforced outer edge or periphery, and I make use of this reinforcing portion or flange to support the diaphragm at its outer edge and thus constitute an edge bearing all around the circumference of the diaphragm. The diaphragm is adapted to engage and vibrate a resistance cup or chamber which may be of ordinary construction containing two or more electrodes of suitable material and having granular material of comparatively high resistance between the electrodes.

My invention also consists in so forming the diaphragm that the expansion of the same due to the heat produced by the flow of current through the resistance material contained in the cup or chamber will tend to separate the electrodes in the chamber and thus free the granular material rather than to bring the electrodes closer together and thus compress the granular material or pack the transmitter.

By my invention I secure a larger effective area of diaphragm, since the usual cushioning ring around the periphery of the same is omitted and the action of the diaphragm is clearer and better, since the removal of this cushioning ring also removes a tendency to muffle the vibrations of the diaphragm. Another disadvantage of the cushioning ring is eliminated by my construction, which consists in eliminating all strain upon the supplemental diaphragm of the cup or chamber due to the aging and gradual compression of the cushioning ring, which gradual compression, followed up by the tensioning springs of the transmitter, has in the past produced serious distortion of the supplemental diaphragm, resulting in many cases in a very inefficient relation of the parts of the resistance cup or chamber. In my construction I avoid all results of this character by seating the bearing edge around the circumference of the main diaphragm upon a ring of hard, practically non-compressible insulating material, such as mica, oiled linen, fiber or similar material.

As a result of the construction indicated, by my invention the parts of the transmitter retain their proper working position practically indefinitely, and the transmitter is not subject to deterioration for the reasons usually combining to require repair of transmitters after being used for some time. My invention also makes it possible to form the main diaphragms more accurately than heretofore, and as constructed in accordance with my invention these diaphragms retain their proper shape much better than the ordinary form of diaphragms heretofore used.

The several drawings illustrating my invention are as follows:

Figure 1 is a sectional view through the transmitter assembled; Fig. 2 is a back view of the transmitter shown in Fig. 1, with the transmitter shell removed; Fig. 3 is a view of a portion of the bridge and shows the tensioning springs of the transmitter; Fig. 4 is an enlarged sectional view of the working parts of the transmitter assembled; Fig. 5 is a view of the parts shown in Fig. 4, such parts being separated to more clearly indicate their nature and construction; Fig. 6 is an edge view of a portion of the bridge of the transmitter and shows the parts supported thereby.

Similar numerals refer to similar parts throughout the several views.

Referring to the drawings, the front plate 1 has formed therein an annular recess extending nearly to the circumference of the front plate, and in this recess is supported first a disk of waterproof material 6, which may consist of celluloid, mica or any similar material, and next a ring 5 of non-compressible insulating material, as mica, fiber or similar material. These materials are more durable than rubber, etc., not being subject to what is commonly known as slack-

ing. Slacking is due to a process of oxidation. When slacked, the rubber gasket becomes hard and brittle, failing absolutely to perform the functions for which it is used. The main diaphragm 4 is supported against the ring 5 by its engagement with the resistance cup 7 which cup is supported by the stud 9 from the bridge 2 by means of a block 10 secured to but insulated from such bridge. The bridge 2 is supported from the front plate 1 by suitable screws, as indicated.

The cup 7 consists of a body portion adapted to receive the electrode 17 which is secured in place by a suitable nut as indicated, and opposite this electrode 17 a second electrode 18 is supported by means of the supplemental diaphragm 19, secured against one side of the cup 7 by the screw ring 20. The electrode 18 is adapted to engage the stud 9, which operates to clamp the supplemental diaphragm 19 securely between such stud and the electrode 18.

The diaphragm 4 is centrally perforated and a flange 4^b is formed around this opening which extends toward the back of the transmitter, such flange being adapted to fit the outer surface of the resistance cup 7 and rest against the edge of the clamping ring 20. Tension springs 11, 11, supported by but insulated from the bridge 2 are provided, which rest against the clamping ring 20 on its rear face, and at diametrically opposite points for the purpose of placing the desired tension upon the diaphragm 4 and thus holding the diaphragm firmly against the insulating ring 5.

When the parts are assembled, the stud 9 is free to move in the block 10 until the parts have been given their final position, in which condition the screw 16 is tightened, thus holding the stud 9 securely in the block 10 which is supported by but insulated from the bridge 2. The tension springs 11, 11 are in electrical connection with a block 12 also supported by but insulated from the bridge 2.

The diaphragm 4 has formed around its outer periphery a flange 4^a extending toward the front of the transmitter, which flange performs the function of reinforcing the diaphragm and also presenting an edge bearing to the insulated material 5, which permits a very free movement of the diaphragm 4 when vibrated. The outer edge of this flange 4^a is carefully turned off and thus trued up after the diaphragm is formed by means of suitable dies. The diaphragm 4 is dished slightly, as indicated in Figs. 4 and 5, the center of the same extending slightly in front of the outer portion, as a result of which when the diaphragm is heated by the heating of the resistance cup, due to the flow of current therethrough, the expansion of the central portion of the diaphragm will deflect such portion forward or toward the front of the transmitter and thus tend to unpack the transmitter. By this conformation of the diaphragm, motion of the central portion to the rear as a result of this heating action is absolutely prevented, and it is impossible for the heating of the diaphragm to pack the transmitter.

The blocks 10 and 12, supported by but insulated from the bridge 2, constitute the terminals of the transmitter and connection may be made to these blocks by suitable screws 15 and 13.

The shell 3, indicated in Fig. 1, is provided for protecting the parts of the transmitter, and this shell is supported from the front plate by screws adapted to engage the posts 14 extending from the front plate to the rear.

While I have shown my invention in the particular embodiment herein disclosed, I do not limit myself to this construction, but desire to claim broadly all equivalent means for producing the same result.

What I claim is:

1. In a telephone transmitter, a casing, carbon resistance varying means supported from said casing and adapted to form part of an electric circuit and means to increase the resistance of said resistance varying means when the flow of current therethrough is increased.

2. In a telephone transmitter, a casing, a diaphragm supported by the casing and adapted to be vibrated by sound waves, and resistance-varying means operated by such diaphragm and adapted to form part of an electric circuit, such diaphragm being dished outwardly to increase the resistance of such means when heated.

3. In a telephone transmitter, a casing, a diaphragm supported by the casing and adapted to be vibrated by sound waves, and resistance-varying means operated by such diaphragm and adapted to form part of an electric circuit, such diaphragm being dished outwardly to increase the resistance of such means when heated by the flow of current therethrough.

4. In a telephone transmitter, a casing, a diaphragm supported by the casing and adapted to be vibrated by sound waves, such diaphragm flanged at its outer edge, and resistance-varying means operated by such diaphragm and adapted to form part of an electric circuit, such diaphragm being dished outwardly to increase the resistance of such means by the flow of current therethrough.

5. In a telephone transmitter, a casing, a diaphragm supported by the casing and adapted to be vibrated by sound waves, such diaphragm having a peripheral flange extending at practically right angles to the plane of the diaphragm, and resistance-varying means operated by such diaphragm

and adapted to form part of an electric circuit, such diaphragm being dished outwardly to increase the resistance of such means when heated.

6. In a telephone transmitter, a casing, a diaphragm supported by the casing and adapted to be vibrated by sound waves, such diaphragm provided with an edge bearing around its periphery, and resistance-varying means operated by such diaphragm and adapted to form part of an electric circuit, such diaphragm being dished outwardly to increase the resistance of such means when heated by the flow of current therethrough.

7. In a telephone transmitter, a front plate, a diaphragm bearing against but insulated from the front plate, a bridge supported from the front plate back of the diaphragm, a granule chamber located between such bridge and the diaphragm, electrodes in such chamber for directing electric current through the material in the chamber, such diaphragm being dished outwardly to increase the resistance between the electrodes by the flow of current therethrough, and springs bearing upon such chamber serving to hold the diaphragm in position against the front plate.

8. In a telephone transmitter, a front plate, a diaphragm bearing against but insulated from the front plate, a bridge supported from the front plate back of the diaphragm, a granule chamber located between such bridge and the diaphragm, electrodes in such chamber for directing electric current through the material in the chamber, such diaphragm so dished as to separate such electrodes and thereby agitate the granules by the flow of current therethrough, and springs bearing upon such chamber serving to hold the diaphragm in position against the front plate.

9. In a telephone transmitter, a front plate, a diaphragm bearing against but insulated from the front plate, a bridge supported from the front plate back of the diaphragm, a granule chamber located between such bridge and the chamber, electrodes in such chamber for directing electric current through the material in the chamber, the central portion of such diaphragm dished outward whereby the resistance between the electrodes is increased by the flow of current between them, and springs bearing upon such chamber serving to hold the diaphragm in position against the front plate.

10. In a telephone transmitter, a front plate, a diaphragm bearing against but insulated from the front plate, a bridge supported from the front plate back of the diaphragm, a granule chamber located between such bridge and the diaphragm, and electrodes in such chamber for directing electric current through the material in the chamber, the central portion of such diaphragm dished outward, whereby the electrodes in such chamber are separated, the granules contained therein are agitated and the resistance between the electrodes is increased by the flow of current between them.

11. In a telephone transmitter, a front plate, a diaphragm bearing against but insulated from the front plate, such diaphragm reinforced around its periphery, a bridge supported from the front plate back of the diaphragm, a granule chamber located between such bridge and the diaphragm, electrodes in such chamber for directing electric current through the material in the chamber, such diaphragm being dished outwardly to increase the resistance between the electrodes by the flow of current therethrough, and springs bearing upon such chamber serving to hold the diaphragm in position against the front plate.

12. In a telephone transmitter, a front plate, a diaphragm having a peripheral flange formed thereon to bear against non-yielding insulation supported by the front plate, a bridge supported from the front plate back of the diaphragm, a granule chamber located between such bridge and the diaphragm, electrodes in such chamber for directing electric current through the material in the chamber, such diaphragm being dished outwardly to support such electrodes and thereby agitate the granules by the flow of current therethrough, and springs bearing upon such chamber serving to hold the diaphragm in position against the front plate.

13. In a telephone transmitter, a front plate, a diaphragm having a flange around its periphery at practically right angles to the plane of the diaphragm, the outer edge of such flange constituting a rocking edge bearing against non-yielding insulation supported by the front plate, a bridge supported from the front plate back of the diaphragm, a granule chamber located between such bridge and the diaphragm, electrodes in such chamber for directing electric current through the material in the chamber, the central portion of such diaphragm dished outward whereby the resistance between the electrodes is increased when current flows between them, and springs bearing upon such chamber serving to hold the diaphragm in position against the front plate.

14. In a telephone transmitter, a front plate, a diaphragm bearing against but insulated from the front plate, a bridge supported from the front plate back of the diaphragm, a granule chamber located between such bridge and the diaphragm, electrodes in such chamber for directing electric current through the material in the chamber, such diaphragm being dished outwardly to increase the resistance between the electrodes

by the flow of current therethrough, and means for holding the diaphragm in position against the front plate.

15. In a telephone transmitter, a front plate, a diaphragm bearing against but insulated from the front plate, a bridge supported from the front plate back of the diaphragm, a granule chamber located between such bridge and the diaphragm, electrodes in such chamber for directing electric current through the material in the chamber, such diaphragm being dished outwardly to separate such electrodes and thereby agitate the granules by the flow of current therethrough, and means for holding the diaphragm in position against the front plate.

16. In a telephone transmitter, a front plate, a diaphragm bearing against but insulated from the front plate, a bridge supported from the front plate back of the diaphragm, a granule chamber located between such bridge and the chamber, electrodes in such chamber for directing electric current through the material in the chamber, the central portion of such diaphragm dished outward whereby the resistance between the electrodes is increased by the flow of current between them, and means for holding the diaphragm in position against the front plate.

17. In a telephone transmitter, the combination of a plate, a diaphragm resting thereagainst, a granule chamber, an electrode therein partaking of the movements of the diaphragm, granules in said chamber, a second electrode fixed with respect to said diaphragm, said diaphragm dished outwardly to agitate the granules when a current passing between said granules is changed as to strength.

18. In a telephone transmitter the combination of a plate, a diaphragm resting thereagainst, a granule chamber, an electrode therein partaking of the movements of the diaphragm, granules in said chamber, a second electrode fixed with respect to said diaphragm, said diaphragm being dished outwardly to agitate the granules when the strength of current flowing through the transmitter is changed.

In witness whereof, I hereunto subscribe my name this 20″ day of April A. D. 1908.

WILLIAM W. DEAN.

Witnesses:
A. D. T. LIBBY,
S. A. BEYLAND.