T. A. EDISON.

TRANSMITTER.

APPLICATION FILED OCT. 26, 1918.

1,425,183. Patented Aug. 8, 1922.

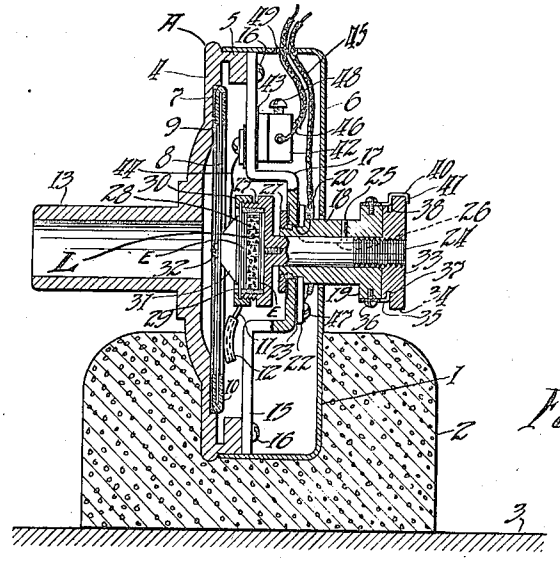

Fig. 1

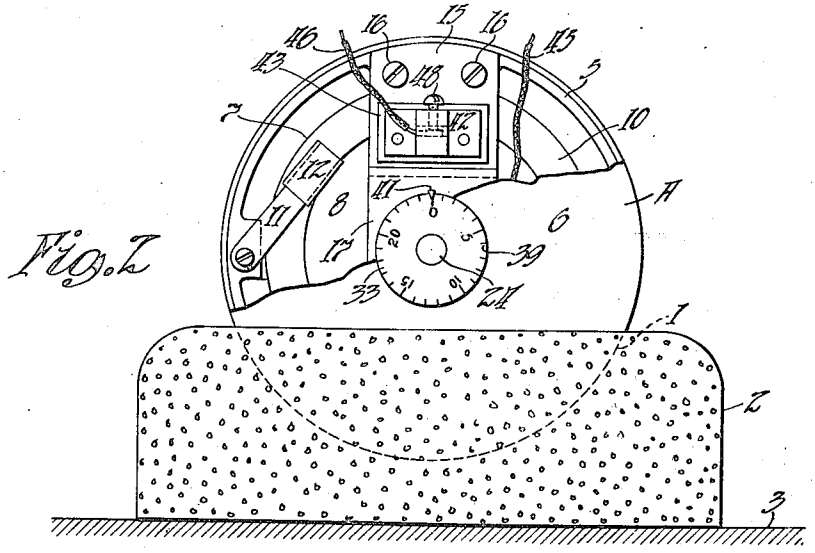

Fig. 2

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UNITED STATES PATENT OFFICE.

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TRANSMITTER.

1,425,183. Specification of Letters Patent. Patented Aug. 8, 1922.

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To all whom it may concern:

Be it known that I, THOMAS A. EDISON, a citizen of the United States, and a resident of Llewellyn Park, West Orange, Essex County, New Jersey, have invented certain new and useful Improvements in Transmitters, of which the following is a description.

My invention relates to transmitters, and more particularly to microphone transmitters wherein the desired variations in current are produced by variations in electrical resistance caused by varying the pressure upon a quantity of granular conductive material, such as carbon, which is disposed between electrodes in the circuit carrying the current, preferably in a somewhat loose state, the requisite changes in pressure being effected between the electrodes and the granular material by a diaphragm or other means adapted to be set into vibration by the sound waves from a source of sound, such as the human voice.

Practically all microphone transmitters of this type such as are now used are seriously and adversely affected by phenomena extraneous to the sounds which the same are designed to transmit, such for example, as shocks, jars, vibrations, concussions, etc. occurring in the neighborhood thereof, these phenomena often causing such relative movement of the conductive granules disposed between the electrodes of the microphone transmitter as to produce extraneous or foreign sounds loud enough when amplified to practically obliterate and render it impossible to understand or detect the sounds which the microphone is intended to transmit.

The principal object of my invention is to produce a microphone transmitter of this character which will be extremely sensitive to very weak as well as to loud sounds which it is desired to transmit thereby, and at the same time to substantially eliminate or prevent the production of foreign or extraneous sounds such as described above, thereby rendering it possible to employ powerful amplifying devices, such as the audion, with the transmitter.

More specifically described, my invention consists in supporting a microphone transmitter entirely by a mass or masses of resilient material, preferably the material known by the trade name "rubber sponge". The mounting of the transmitter in this manner prevents a majority of all of the stresses, jars, etc. of the building, vehicle or other structure in which the microphone may be located from being communicated thereto and the production thereby of any appreciable internal movements in the mass of conductive granules or fine particles. The invention also consists in making still further provision against the production of internal movements in the mass of conductive granules of the microphone by jars, etc., preferably by filling the space between the electrodes in which these granules are disposed with a very light hydrocarbon "oil", preferably pure distilled motor gasolene having a very low boiling point whereby the loose mass of granules or fine particles of conductive material will be completely immersed therein. The effect of this liquid is to dampen the movement of the conductive granules and probably hold them in closer contact. This liquid also acts by its buoyancy to lighten the pressure of the granules on each other. I find that the sensitiveness of the microphone to the sounds which it is desired to transmit thereby and which are communicated to the main diaphragm of the microphone by the air or other fluid in which the latter is disposed, is but very slightly diminished by the use of the liquid, while internal movements of the mass of conductive granules or fine particles by jars, etc. occurring in the vicinity of the microphone, and thereby the production of "jar" or like extraneous sounds in the microphone, are practically eliminated. A microphone apparatus in which the features just described are combined is extremely efficient, as it is possible to transmit thereby very clearly and distinctly, sounds of the weakest character as well as loud sounds; my improved mircrophonic apparatus being especially adapted for the transmission of oral communications, as the articulation and distinctness of such communications transmitted thereby are greatly increased.

Other objects and features of my invention will be hereinafter more fully described and claimed.

In order that my invention may be more clearly understood, attention is directed to the drawing accompanying and forming a part of this specification, and in which:

Figure 1 is a central vertical sectional

view, partly in elevation, of a microphone transmitter constructed and mounted in accordance with my invention; and

Figure 2 is a view in front elevation, partly broken away, of the structure shown in Figure 1.

Referring to the drawing, reference character A represents the microphone transmitter which is mounted in a recess 1 formed in a large mass 2 of resilient or elastic material, preferably the material known by the trade name "rubber sponge." The mass 2 rests on a suitable base 3 and constitutes the entire support for the microphone, and prevents nearly all jars, etc. to which the base is subjected from being communicated to the transmitter.

The microphone casing consists of a metallic sound box 4 having an arched body portion from which extends an annular flange 5, and a cover 6 provided with a peripheral flange the end portion of which surrounds the flange 5 and is detachably secured thereto in any suitable manner. The sound box 4 is provided with an annular seat 7 about the arched body portion thereof, and a metallic diaphragm 8 is suitably secured against an annular shellaced fabric ring 9 mounted on the said seat. The peripheral edge portion of the diaphragm 8 preferably has applied thereto a ring 10 formed of rubber or other suitable yielding material, covering both faces of such edge portion, and the diaphragm is preferably held to its seat by means of a plurality of leaf springs 11 secured at one end to the annular flange 5 of the sound box and bearing at their free ends on the rubber ring 10, said free ends preferably having sleeves 12 of soft rubber or other suitable yielding material mounted thereon. A hollow neck 13 extends centrally from the base of the sound box 4 and is adapted to have a horn or other suitable receiver secured thereto by means of which the sound waves from the person speaking, or other source of sound, are caused to converge into the sound box body and set the diaphragm 8 into vibration. A bridge 15 extends diametrically across the sound box body and has its ends suitably secured to the annular flange 5 as by means of screws 16, the central portion of this bridge being provided with a U-shaped portion 17 extending towards the cover 6. Reference character 18 represents a cylindrical bearing member or sleeve which extends through an opening in the center of the cover 6 in line with the hollow neck 13 of the sound box 4, the outer end of said sleeve being provided with an annular flange 19 and the inner end thereof being provided with a reduced cylindrical portion 20 which extends through an opening provided in the center of the U-shaped portion 17 of bridge 15. The inner end of the reduced portion 20 of the sleeve 18 has a nut 21 threaded thereon, whereby the sleeve 18 is rigidly secured to the bridge 15. An arm 22 constituting a contact member is mounted on the reduced end portion 20 of sleeve 18 between the shoulder provided by such reduced portion and the base of the U-shaped portion 17 of bridge 15, and suitable insulation 23 separates the base of the U-shaped portion 17 from the arm or contact member 22, the sleeve 18 and the nut 21.

A cylindrical rod or stem 24 is slidably mounted in and extends through the bearing member or sleeve 18, rotary movement of this rod being prevented by means of a pin 25 secured to the sleeve 18 and projecting into a longitudinal slot 26 formed in the rod. The inner end of rod 24 has rigidly secured thereto and preferably formed integrally therewith a cup-shaped member 27 which constitutes a receptacle or chamber in which a pair of spaced electrodes E and a mass of conductive granules or very fine particles 28, preferably of carbon, are disposed. The end of this chamber is closed by a mica diaphragm 29 which is held in place by a ring 30 threaded on the cup-shaped member 27. The spaced electrodes E of the transmitter are respectively disposed between the mass of conductive granules 28 and the diaphragm 29 and the base of member 27. A small conical metallic member 31 is disposed between the diaphragms 8 and 29 and is provided at one end with a metallic button 32 which extends through and is rigidly connected with the diaphragm 8 at the center thereof, and is suitably mechanically and electrically connected at its other end with the electrode E adjacent the diaphragm 29. A quantity of liquid L, such as a light hydrocarbon "oil," preferably pure distilled motor gasolene having a very low boiling point, is inserted in the cup-shaped member or receptacle 27 with the granular carbon 28, a sufficient volume of such liquid preferably being employed to substantially fill all the space in such receptacle between the electrodes E not occupied by the loose mass of fine particles of carbon. It will thus be apparent that the loose mass of fine particles or granules of carbon is completely immersed in the light hydrocarbon oil. The results arising from the use of this liquid have already been fully described. A disc 33 having a knurled head 34 is threaded on the outer end of the rod or stem 24 and bears against the outer face of the flange 19 of the sleeve or bearing member 18. A member 35 is secured at one end to the flange 19, as by a screw 36, and the other end thereof is provided with a finger 37 which projects into an annular groove 38 formed in the disc 33, whereby movement of the latter axially of the member or sleeve 18 is prevented. It will thus be seen that the turning of disc 33 will effect sliding movement of the rod

or stem 24 in the sleeve 18, and therefore movement of the cup-shaped member or receptacle 27 axially of the microphone casing. As the member 31 connects the diaphragm 29 and adjacent electrode E with the diaphragm 8 mounted on the sound box 4, it will be seen that such movement of the member 27 may be utilized for the adjustment of the initial pressure on the mass of granular carbon 28 to suit varying conditions of use. The face of the disc 33 is preferably provided with a scale or graduations 39 with which a suitable index or pointer 41, formed on the end of a member 40 secured to the flange 19, co-operates to facilitate such adjustment.

A contact member 42 is suitably secured to the bridge 15 and separated therefrom by suitable insulation 43, and a flexible conductor 44 connects this contact member with the conical metallic member 31. Conductors 45 and 46 respectively connected to the contact members 22 and 42, as by binding screws 47 and 48, extend from the microphone through a suitable opening 49 in the cover 6 for connection in the circuit.

The path of the circuit through the microphone is as follows: From the conductor 45 through contact member 22, sleeve 18, rod 24, to the base of the cup-shaped member 27 and the adjacent electrode E, then through the granular carbon 28, the other electrode E, member 31, conductor 44, contact member 42, to the other conductor 46.

While I have shown the preferred embodiment of my invention, it is to be understood that the same is subject to numerous changes and modifications without any departure from the spirit of the invention and the scope of the appended claims.

Having now described my invention, what I claim as new and desire to protect by Letters Patent is as follows:—

1. A microphone transmitter comprising a pair of spaced electrodes, and a loose mass of fine particles or granules of conductive material wholly immersed in a single liquid between said electrodes, substantially as described.

2. A microphone transmitter comprising a pair of spaced electrodes, and a loose mass of fine particles or granules of conductive material wholly immersed in a liquid hydrocarbon between said electrodes, substantially as described.

3. A microphone transmitter comprising a pair of spaced electrodes, and a loose mass of fine particles or granules of conductive material wholly immersed in gasolene between said electrodes, substantially as described.

4. A microphone transmitter comprising a fluid-tight receptacle filled with a single liquid and carrying a pair of spaced electrodes, and a loose mass of fine particles or granules of conductive material wholly immersed in said liquid between said electrodes, substantially as described.

5. A microphone transmitter comprising a fluid-tight receptacle filled with a liquid hydro-carbon and carrying a pair of spaced electrodes, and a loose mass of fine particles or granules of conductive material wholly immersed in said liquid between said electrodes, substantially as described.

6. In combination, a microphone transmitter comprising a pair of spaced electrodes and a loose mass of fine particles or granules of conductive material wholly immersed in a single liquid between said electrodes, and a large mass of "rubber sponge" in which said microphone transmitter is mounted and by which it is wholly and directly supported, substantially as described.

7. In combination, a microphone transmitter comprising a pair of spaced electrodes and a loose mass of fine particles or granules of conductive material wholly immersed in a body of liquid hydro-carbon between said electrodes, and a large mass of rubber-like material in which said microphone transmitter is mounted and by which it is wholly and directly supported, substantially as described.

This specification signed this 23rd day of October, 1918.

THOS. A. EDISON.