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A. J. MUNDY & A. E. SMITH.

ELECTRIC TRANSMITTER.

APPLICATION FILED SEPT. 8, 1903.

NO MODEL.

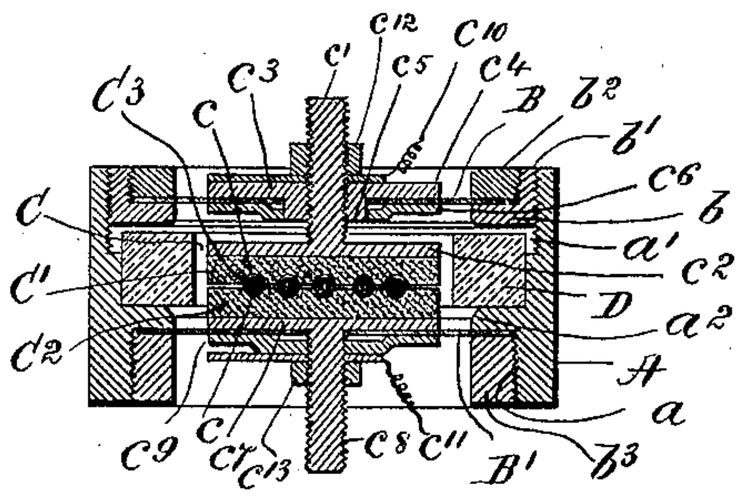

Fig. 1.

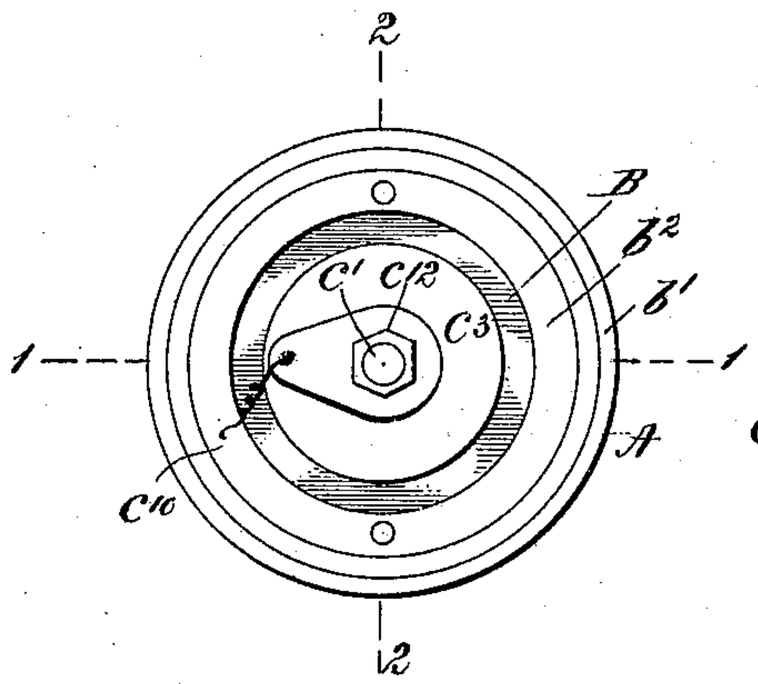

Fig. 3.

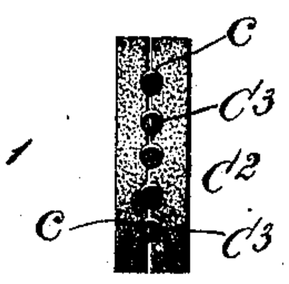

Fig. 6.

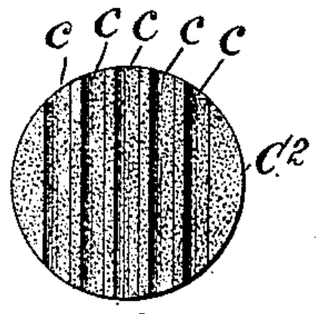

Fig. 4.

Fig. 5.

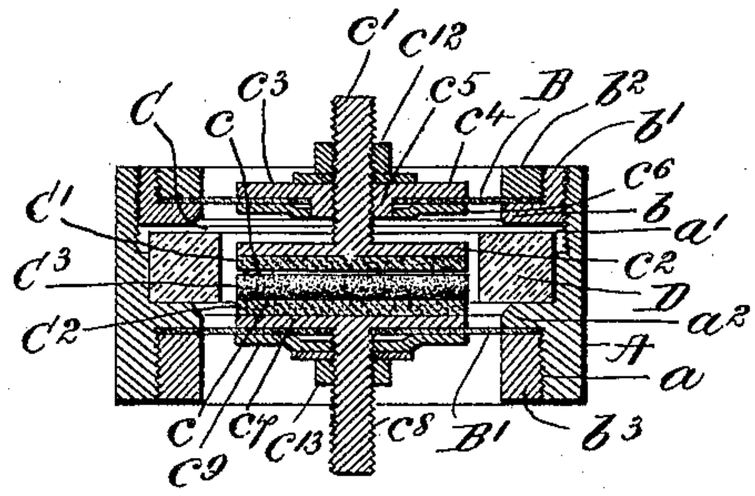

Fig. 2.

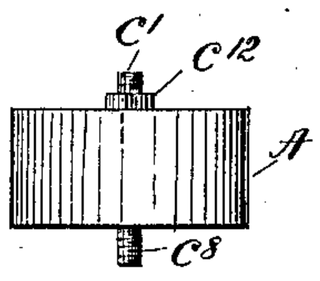

Fig. 7.

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No. 763,501. Patented June 28, 1904.

UNITED STATES PATENT OFFICE.

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ELECTRIC TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 763,501, dated June 28, 1904.

Application filed September 8, 1903. Serial No. 172,207. (No model.)

To all whom it may concern:

Be it known that we, ARTHUR J. MUNDY, of Boston, in the county of Suffolk, and ALBERT E. SMITH, of Waltham, in the county of Middlesex, State of Massachusetts, citizens of the United States, have invented a new and useful Improvement in Electric Transmitters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The invention relates to an improvement in electric transmitters. While it has been designed for use as a transmitter of sound-vibrations conducted by water, it is not intended that it shall be confined to such use.

All electric transmitters of which we have knowledge employ a means for varying electrical resistance, generally carbon, which varies in its capacity, due to a disposition of its structure to change. This change in structure of the resisting medium affects the transmission of the vibrations, and consequently the quality and character of the sound. A means for varying electrical resistance which is lightly held and which has a constant relation to the carbon-plates seems to possess greater sensitiveness to the reception of light vibrations; but, on the other hand, it is more liable to fluctuations, owing to its disposition to change to a somewhat denser relation or body.

For submarine use—that is, for the purpose of receiving while submerged in water sound-vibrations which have been imparted to the water at a distance from the receiving-point—the transmitter requires to be especially sensitive, in order that it may transmit the lightest vibrations which it receives, and constant in character, so that it may always be relied upon to act. A transmitter having this sensitiveness and constancy to a very considerable degree, at least, we have devised by a structure which introduces the means for varying electrical resistance between the carbon-plates in the shape of separate cylindrical bodies which are so disposed with respect to the plates that they maintain between the two a uniform, constant, and sensitive relationship. These cylindrical bodies are each contained in a cylindrical space between the two carbon-plates, which is slightly larger in diameter than the diameter of the carbon body in order that the carbon body may not be cramped by the plates or restricted in its movement by them, the carbon resting in some part against both plates. Thus each cylinder carbon is not affected by the other cylinders, its character is not changed by use, it has no opportunity to pack, and its relation to the surfaces of the carbon-plates remains uniform and constant.

We prefer to use for the carbons sections of filaments employed for incandescent lights and which have a cellular nature and a surface which is rough and which has a large number of relatively independent points, although this is not essential. We also prefer that each carbon-plate be mounted on a resilient diaphragm and so that the carbon bodies are contained between two resiliently-held carbon-plates.

We will now describe the invention in detail in conjunction with the drawings, forming a part of this specification. wherein—

Figure 1 is a view in horizontal central section of enough of the transmitter to illustrate the invention. Fig. 2 is a view in horizontal central section with the transmitter turned a quarter-revolution from the position shown in Fig. 1. Fig. 3 is a view of the trasmitter in elevation. Fig. 4 is a view in full elevation, and Fig. 5 in end elevation, of a carbon-plate. Fig. 6 is a view in end elevation of two carbon-plates vertically disposed to show their holding-recesses and the ends of the carbon bodies held by them. Fig. 7 is a view in side elevation of the transmitter of normal size, the other views being enlarged ones.

Referring to the drawings, A represents the case of the transmitter. It is preferably made of brass and has extending through it a horizontal hole. Its interior has the threaded sections a a' and the web or flange a^2, forming shoulders on each side. These threaded sections and shoulders furnish the means for

mounting the parts of the transmitter within the cavity of the case.

The transmitter is represented as having the resilient diaphragm B B′, preferably of mica. The diaphragm B is held against a flange b of an annular collar b', which screws upon the threaded section a', and it is held against said flange by the annular nut b^2, which screws upon a portion of the annular collar b'. The diaphragm B′ is held against the flange a^2 by the annular nut b^3. Between the diaphragms is the chamber C, which contains the carbon-plates and means for varying electrical resistance. C′ is one of the plates and C² is the other. They are substantially alike and each has semicircular recesses c in their inner faces, arranged in line with each other and forming substantially cylindrical recesses extending crosswise both and which serve to contain the means C³ for varying electrical resistance, which is preferably in the form of a long cylindrical body of carbon. These recesses are separated from each other, so that each piece or stick of carbon is held separated from all the others. The sides of the piece of carbon with respect to its holding-recess is such as to permit the carbon to rest loosely in it and so that portions of it will be in contact with the carbon-plate C′ and portions with the plate C².

The carbon-plate C′ is attached to the diaphragm by means of the stud c', which has an enlarged head c^2. The stud is threaded, extends through a hole in the diaphragm, and is clamped to the diaphragm by means of the nut c^3, having a wide flange c^4, and hub c^5, and a clamping-nut c^6, which screws upon the hub. The nut c^3 screws upon the stud c', and the two nuts serve to engage the diaphragm flatly and also in a way to permit of the adjustment of the carbon-plate C′ to or from the carbon-plate C², there being sufficient space between the clamping-nuts and the flange of the stud to permit of this movement of the carbon-plate in the cavity C.

The carbon-plate C² is attached to the enlarged head c^7 of the stud c^8. This stud passes through the diaphragm B′, and the flange is clamped to the diaphragm by the clamping-nut c^9 and which is shaped and is of a size to clamp the diaphragm flatly to the flange of the stud.

The terminal wires c^{10} and c^{11} are each clamped to a stud-nut between and within the clamping-washer and the nut by means of the nut c^{12} in the first instance and c^{13} in the other.

The ring D, of insulating material, may be held against a shoulder formed by the flange a^2 of the case and to come opposite the space between the carbon-plates and so as to hold the carbons if they should slip somewhat from their plates from making an electrical connection with the shell.

We prefer that in use the transmitter be held so that the carbon lengths will be vertically disposed one above the other, like the rounds of a ladder, so to speak, although it may be held so that they shall all be perpendicular. The transmitter will work with the carbon-plates in a horizontal position, but not so well.

Any means for varying electrical resistance may be employed, so long as it is disposed in the form of individual lengths adapted to be separately held within grooves or recesses in one or both of the carbon-plates, preferably in both and as shown. The form of carbon length which we prefer to use we have already mentioned.

A transmitter of this character is not only very sensitive but is also remarkably constant in work, so that the quality and capacity of the vibrations remain substantially the same.

Having thus fully described our invention, we claim and desire to secure by Letters Patent of the United States—

1. In an electric transmitter, carbon-plates having opposed relation to each other, recesses in one of said plates, and independent elongated pieces for varying electrical resistance lengthwise in said recesses in contact with both plates but in separated relation from each other.

2. In an electric transmitter, carbon-plates, recesses in said plates opposed to each other, the said pair of recesses having a parallel relation with each other across the plates, and means for varying electrical resistance in the form of elongated pieces loosely held in said recesses in separated relation from each other.

3. In an electric transmitter, two carbon-plates having recesses extending across them, elongated pieces loosely contained in said recesses to be in contact with both plates but separated from each other, and an independent diaphragm for each carbon-plate and to which it is attached.

4. In an electric transmitter of the character specified, a case, two diaphragms attached to the case to form a chamber, two carbon-plates within said chamber each having independent recesses, the corresponding recesses in the two plates being in opposed relation to each other, means for varying electrical resistance contained in said recesses to be in contact with both plates, devices for attaching said carbon-plates to the diaphragms in a manner to permit of their adjustment with respect to each other.

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ALBERT E. SMITH.

Witnesses:
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