

(No Model.)

J. E. ROULEZ.

ELECTRICAL APPARATUS FOR REPRODUCING SOUNDS.

No. 450,426.

Patented Apr. 14, 1891.

FIG. 1

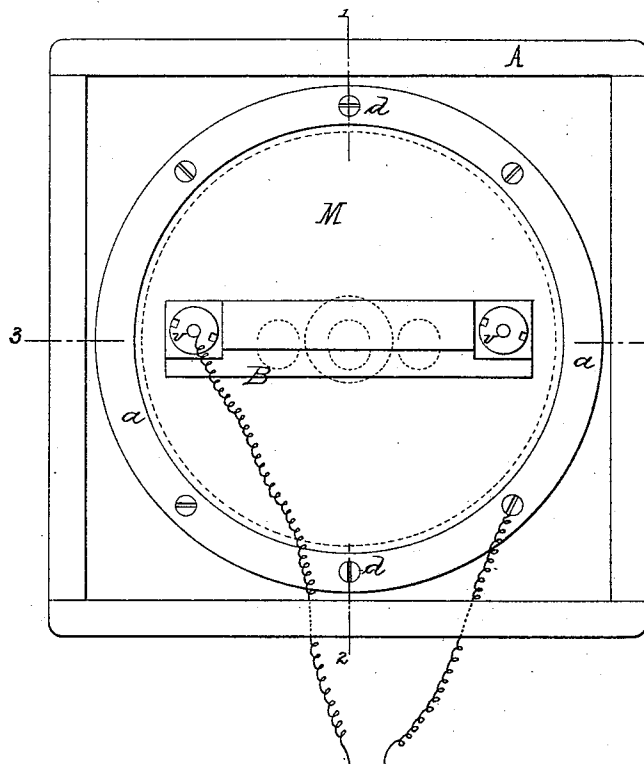


FIG. 2

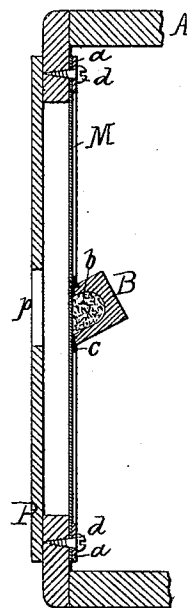
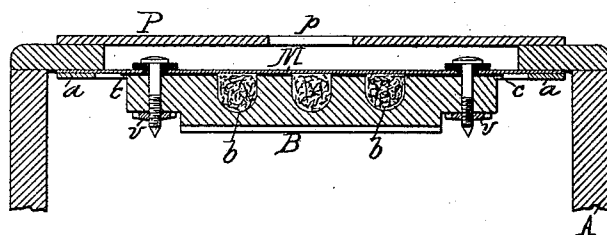


FIG. 3



WITNESSES:

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JULES ERNEST ROULEZ, OF PARIS, FRANCE.

ELECTRICAL APPARATUS FOR REPRODUCING SOUNDS.

SPECIFICATION forming part of Letters Patent No. 450,426, dated April 14, 1891.

Application filed October 9, 1890. Serial No. 367,553. (No model.) Patented in France February 4, 1890, No. 203,907.

To all whom it may concern:

Be it known that I, JULES ERNEST ROULEZ, a citizen of the Republic of France, residing in Paris, France, have invented certain improvements in Electrical Apparatus for Reproducing Sounds, (for which I have obtained a French patent, dated February 4, 1890, No. 203,907,) of which the following is a specification.

The improved electrical sound-carrying or sound-conveying apparatus forming the object of the present invention is employed for reproducing speech and other sounds at a distance. The said apparatus is constructed with a membrane or diaphragm of a material which is a semi or imperfect conductor of electricity and one or more blocks of the same or like material directly attached to the said membrane, but electrically insulated therefrom, and containing in cavities provided for the purpose, being open on the side turned toward the membrane, a body or material through which the electric current is caused to pass, and which is composed of powder or, preferably, filaments of semi-conducting material less than one millimeter or one twenty-fifth of an inch in section.

The following are characteristic features of this apparatus: first, intimate and complete union of the vibrating membrane or diaphragm with the blocks, so as to form one piece attached to the support solely by the edges of the membrane or diaphragm; second, the formation of a hollow or vacant space in front of the said vibrating membrane without exposing the latter to accidental shocks, but so as to concentrate the sound-waves and involve and bring into play the entire surface of the said membrane, in order to produce a more considerable effect; third, the employment as intermediary part or electrical connection between the membrane and the insulated blocks of filaments of semi-conducting material of less than one millimeter in section.

In order that my said invention may be fully understood, I shall now proceed more particularly to describe the same, and for that purpose shall refer to the several figures on the annexed sheets of drawings, the same letters of reference indicating corresponding parts in all the figures.

Figure 1 of the accompanying drawings represents in elevation the back of the membrane composed of semi-conducting material and provided with one insulated block. Fig. 2 represents the apparatus in vertical section, the section being taken on the line 1 2, Fig. 1; and Fig. 3 represents a horizontal section on the line 3 4, Fig. 1.

The apparatus is provided with a circular membrane or diaphragm M, of semi-conducting material (retort-carbon, agglomerated carbon, graphite, or the like) and of suitable dimensions, according to the degree of sensitivity to be obtained in the instrument. To this membrane a block B, of the same semi-conducting material, is attached by means of screws *v*, suitably insulated. In the block B are formed cavities or cells *b* in the side toward the membrane, which are filled with short or broken filaments of semi-conducting material of less than one millimeter in section. These filaments may be replaced by the same material in the form of dust or powder, but with less advantage. The block B is insulated from the membrane M by a sheet or plate *c*, of non-conducting material, perforated with as many holes as there are cells in the block, so that the filamentary substance or material *b* is in direct contact with the membrane. The membrane, being thus provided with one or more blocks B, is placed on a board or support A, about four or five millimeters, or, say, one-fourth inch, thick, perforated with a circular aperture slightly smaller than the diameter of the membrane, so that the latter may be attached by its edges to the support.

In order to secure the membrane in position, a metal washer or ring *a* is employed, which is placed over the edges of the membrane and secured by screws *d*, screwed into the support A. This support is covered by another board or plate P, which is relatively thin, and is perforated with a central hole *p* of any suitable dimensions. This plate forms between itself and the membrane a vacant space or chamber of about the same width as the thickness of the support A, so that the entire surface of the membrane is bare and the membrane is free to vibrate under the influence of the sound-waves that may impinge against it. Finally, the apparatus is

- placed in communication with any suitable source of electricity by means of conductors x and y . The current enters by the membrane and leaves by the block, or vice versa.
- 5 When the sound-waves strike the membrane, the resulting vibrations, owing to the way in which the parts are connected together, are transmitted to all the other parts simultaneously and without shock. The arrangement
- 10 of the apparatus consequently has the effect of obviating the hissing or frizzling and other disadvantages resulting from unstable contacts, which prejudice the clearness or sharpness of the sounds.
- 15 The intensity of the apparatus is regulated by reducing the diameter of the hole p or by providing it with a mouth-piece. In the former case the intensity is diminished. In the latter case it is augmented.
- 20 This apparatus may be constructed of any suitable form and dimensions, and any suitable material may be employed in the construction of its constituent parts, or they may be combined with the supplementary parts of
- 25 microphones, commutators, electro-magnets, and the like.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

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1. A microphonic or other similar electric apparatus with a membrane or diaphragm M , of semi-conducting material, having one terminal conductor connected to it, in combina-

tion with one or more insulated blocks B , to which the other conductor is connected, these blocks being also of semi-conducting material and secured to and supported solely by the said membrane, substantially as hereinbefore described.

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2. A microphonic or other similar electric apparatus having a vibrating membrane M , to which one terminal conductor is connected, in combination with insulated blocks B , secured to and carried wholly by the said membrane and having cells b , containing filaments of semi-conducting material, the other terminal being connected to said blocks, substantially as hereinbefore described.

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3. An electrical apparatus for reproducing or conveying sound with a vibrating membrane or diaphragm M , having rigidly attached to it near its edges one or more insulating-blocks B , supported solely by said diaphragm, the intermediate or connecting body between the said membrane or diaphragm being composed of broken filaments not exceeding about one millimeter in section, and one terminal conductor being connected to the diaphragm, while the other is connected to the blocks, substantially as described.

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In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JULES ERNEST ROULEZ.

Witnesses:

LÉON FRANCKENS,
ROBT. M. HOOPER.