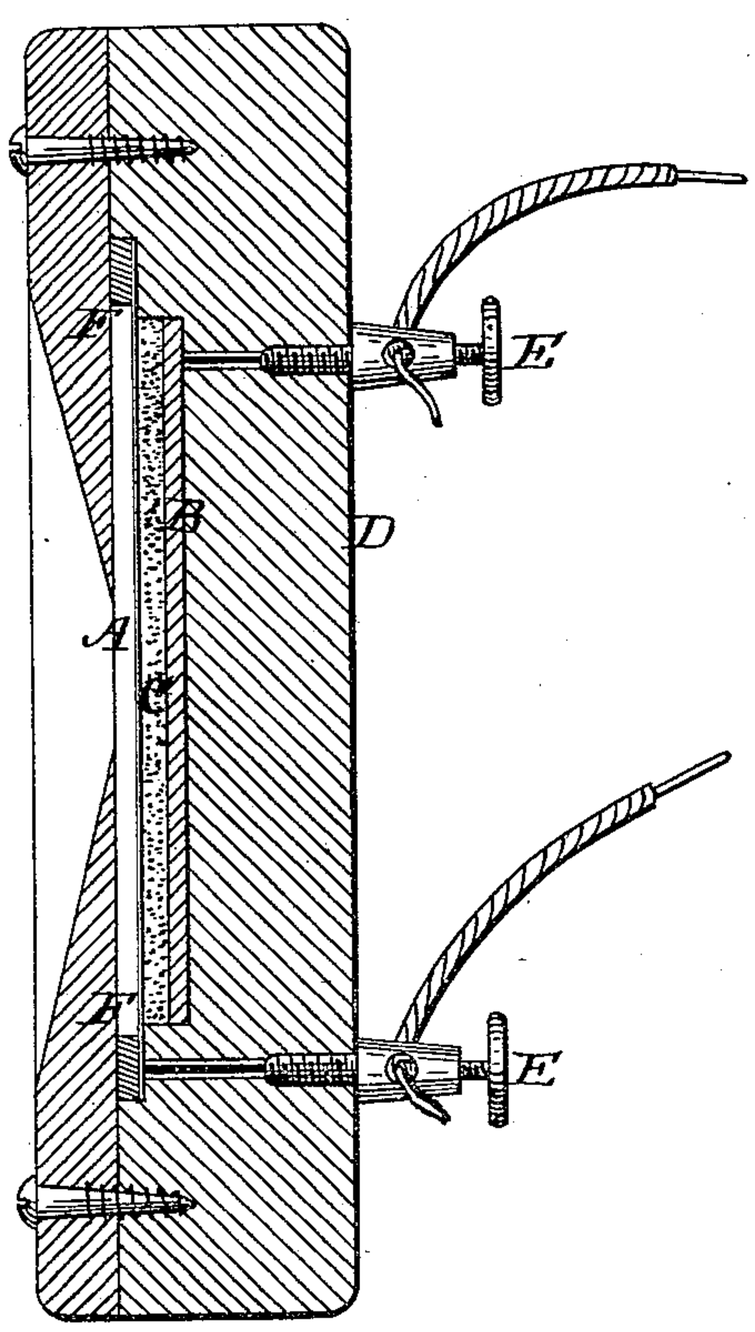
(No Model.)

H. HUNNINGS.

TRANSMITTER FOR TELEPHONES.

No. 246,512. Patented Aug. 30, 1881.



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UNITED STATES PATENT OFFICE.

HENRY HUNNINGS, OF ROTHWELL LEEDS, COUNTY OF YORK, ENGLAND.

TRANSMITTER FOR TELEPHONES.

SPECIFICATION forming part of Letters Patent No. 246,512, dated August 30, 1881.

Application filed May 14, 1881. (No model.) Patented in England September 16, 1878.

To all whom it may concern:

Be it known that I, HENRY HUNNINGS, a subject of the Queen of Great Britain, and residing at Rothwell Leeds, in the county of York, England, have invented certain Improvements in and appertaining to Transmitters for Telephones, (for which I have obtained a patent in Great Britain, No. 3,647, dated 16th September, 1878,) of which the following is a specification.

This invention relates to an improved transmitter or battery telephone, which is designed to take the place of the usual transmitting-telephone, and has for its object to increase the loudness and distinctness of the sounds reproduced by the receiving-instrument at the end of the line. It is shown embodied in a compact apparatus that can be freely handed about without liability to be injured. A front vibrating diaphragm, composed wholly or in part of suitable metal—such as platinum, silver, ferrotype-iron, tinned iron, and the like—is employed. In close proximity to the aforesaid vibrating diaphragm is fixed a disk of brass or other suitable metal, and the intervening space is filled with carbon in the form of powder to the depth of, say, about one-sixteenth of an inch. The vibrating diaphragm and the fixed disk of brass are connected, respectively, with the opposite poles of a voltaic battery. The whole may be secured in a box of suitable non-conducting material, with a mouth-piece, if desired.

The way in which I prefer to carry my invention into effect is illustrated in the accompanying drawing, showing an enlarged section of the telephone-transmitter. The details can be indefinitely varied, the great feature being in the use of carbon in a state of fine loose powder, not in any way compressed or consolidated, as I find the loose particles of conducting matter to be most delicately sensitive to sonorous vibrations.

Referring to the drawing, A is the vibrating diaphragm, which I make very thin, preferably of platinum-foil, though thin ferrotype-iron, silver, or other metal, or a suitable metal-coated material may be used. It is held in place by the ring F, or in any suitable way, so as to permit it to vibrate freely.

B is the fixed disk or back plate, of brass or other suitable metal.

The intervening space between the diaphragm A and disk B is filled with the loose finely-divided conducting material C. I find the most advantageous result to proceed from the use of oven-made engine-coke, crushed very finely, not ground so as to pulverize (not to shear or tear) the particles, as I find the best results proceed from this. I may, however, use metallized carbon powder prepared with mercury or other suitable metal, if desired.

E E are the binding-screws, placed in connection with the plates A and B.

The above is placed in circuit with a voltaic battery and receiving-telephone of suitable construction—such as Bell's—and the words or other sounds made close to the instrument, or otherwise, will be found to be distinctly and loudly reproduced at the receiving-instrument.

The diaphragm, fixed disk or back plate, and case D might be altered in form, or be made oval or square, or other suitable shape, if desired; but the best results are produced if the instrument is made circular.

When the instrument is held in the hand at a convenient angle for speaking into it—say inclined from the vertical twenty-five degrees, or thereabout—the weight of the particles generally packs them sufficiently, even if the chamber be not absolutely full, but has a pinch of the material taken out after filling. The handling to which the instrument will be subjected, if used as a hand-instrument, will ordinarily keep the filling in good condition, or, if by accident it becomes too tightly wedged, turning it upside down or striking it with the hand will generally restore it to the proper state.

Having now described my invention and the best mode known to me of carrying it into effect, I would observe, in conclusion, that I do not claim herein, broadly, as a tension-regulator or means for varying the resistance in telephonic transmitters, finely-divided conducting material in a loose and free state, nor the combination, with a body of such material, broadly, of a vibratory plate or diaphragm for varying the electrical resistance of said body, not, however, as waiving my right to said matter, but reserving the same for separate application for

Letters Patent; and I also wish it to be understood that I do not claim the principle of using carbon in the solid or consolidated form to increase or diminish the resistance of a telephonic circuit for the purpose of transmitting sounds, as this is exemplified in the well-known "Hughes microphone" and the "Edison carbon telephone;" nor do I claim the coating of fibrous or similar surfaces with carbon to produce the same result; but

What I do herein claim as my invention is—

1. As a tension-regulator or means for varying the resistance in telephone-transmitters, finely-divided carbon in a loose and free state, substantially as described.

2. The combination, in a telephone-transmitter, with a body of finely-divided carbon in a loose and free state, of a vibratory plate or diaphragm for varying the electrical resistance of said body in accordance with its own vibrations, substantially as described.

3. A telephone-transmitter comprising a thin metallic or metal-covered diaphragm, a back plate, a layer of finely-divided carbon or similar conducting material in a loose and free state inclosed between said diaphragm and back plate, and a suitable case, substantially as described.

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

HENRY HUNNINGS.

Witnesses:

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