(No Model.)

T. OEŸAN.

TELEPHONE TRANSMITTER.

No. 448,726. Patented Mar. 24, 1891.

Fig. 2.

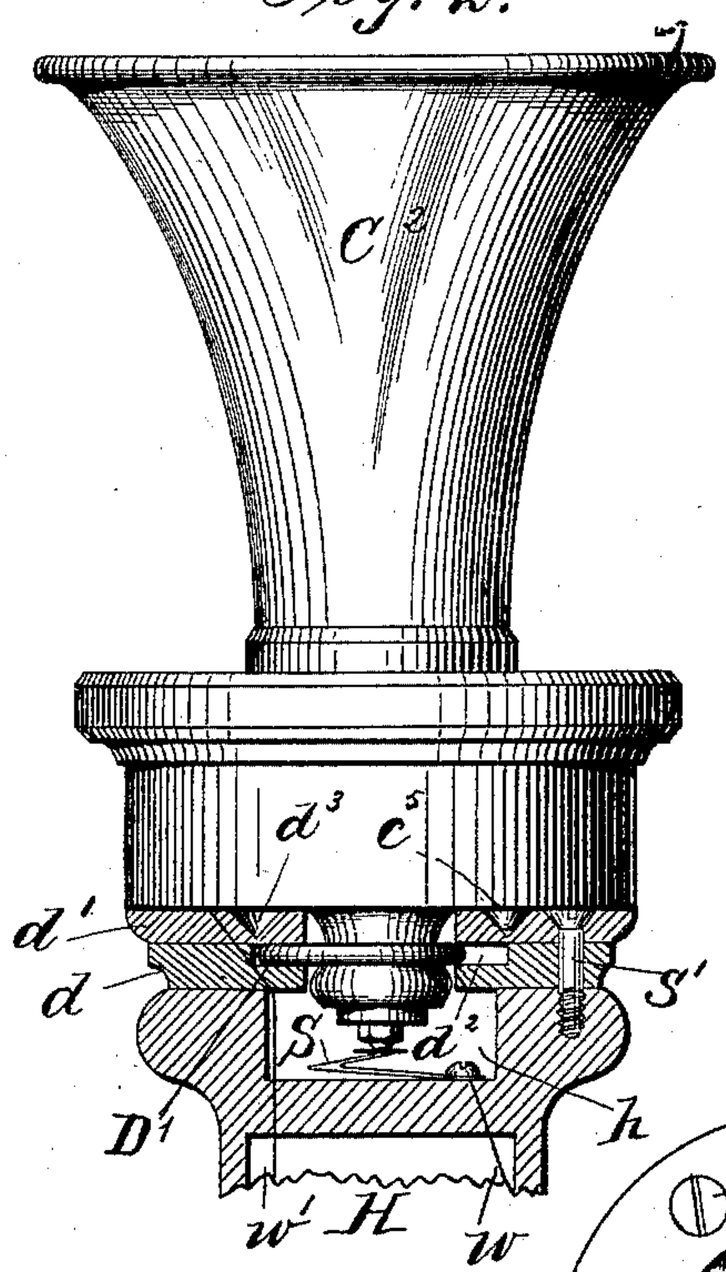


Fig. 1.

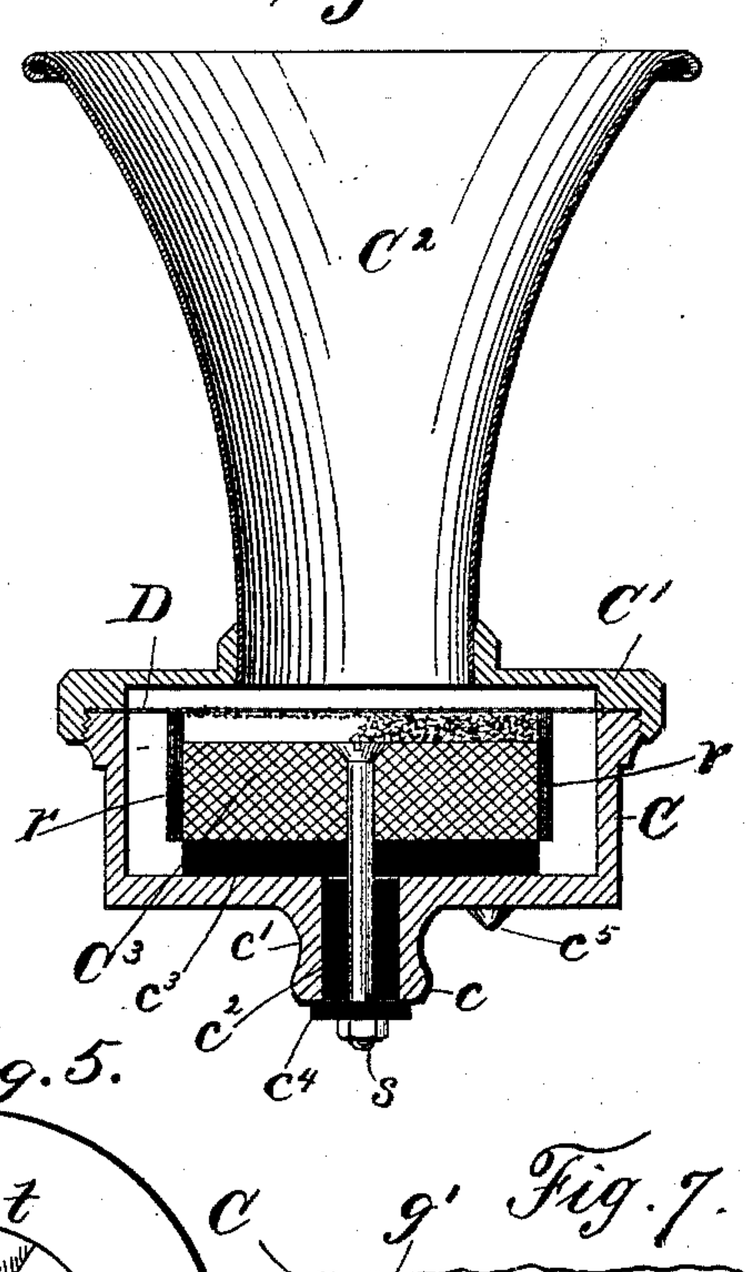


Fig. 5.

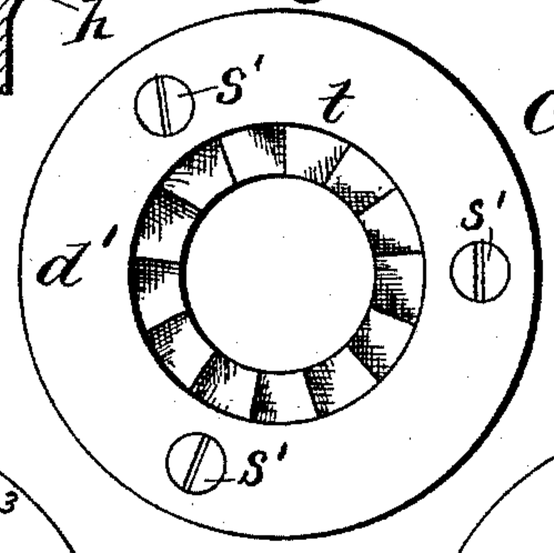


Fig. 7.

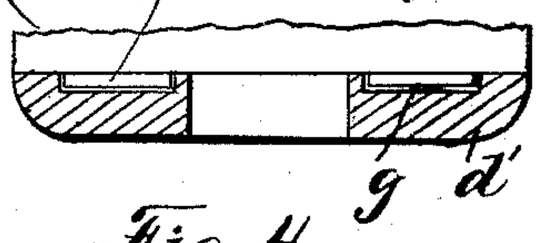


Fig. 3.

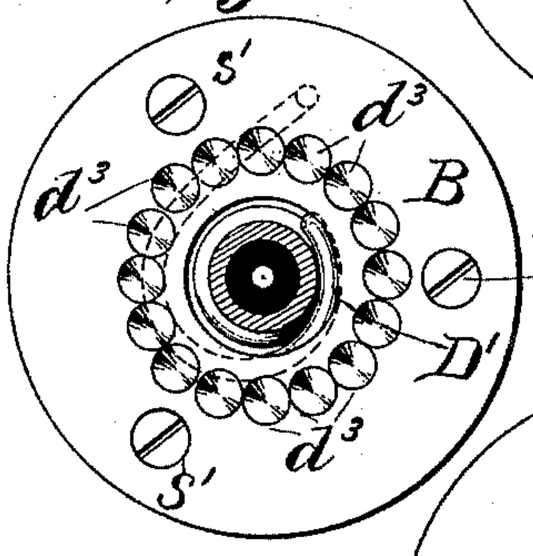


Fig. 6.

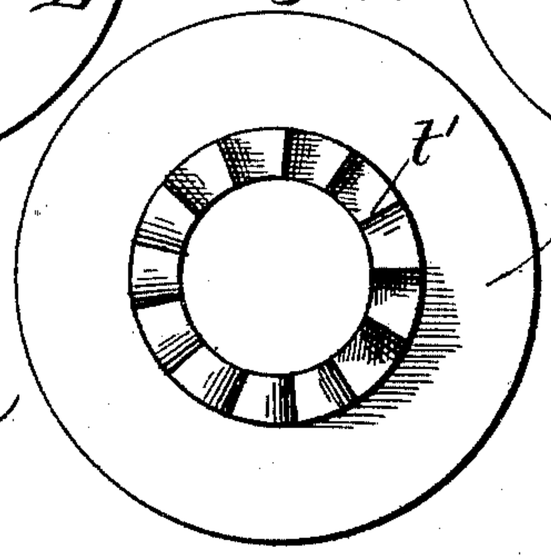
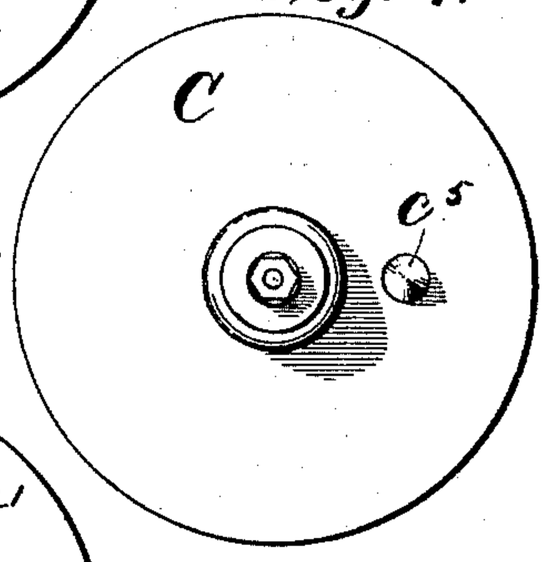


Fig. 4.



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UNITED STATES PATENT OFFICE.

THORSTEIN OEYAN, OF CHRISTIANIA, NORWAY.

TELEPHONE-TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 448,726, dated March 24, 1891.

Application filed October 25, 1890. Serial No. 369,305. (No model.) Patented in Norway March 24, 1890, No. 1,768, and in Germany April 12, 1890, No. 55,605.

To all whom it may concern:

Be it known that I, THORSTEIN OEYAN, a subject of the King of Norway and Sweden, residing at Christiania, Norway, have invented certain new and useful Improvements in Telephone-Transmitters, (for which I have obtained Letters Patent in Norway, dated March 24, 1890, No. 1,768, and in Germany, dated April 12, 1890, No. 55,605;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to that class of phonic transmitters in which loose or granulated carbon is employed for one of the electrodes, in combination with the diaphragm having its face proximate to the loose or granulated carbon coated or covered with the same material. The transmission of electrical impulses through these transmitters becomes more or less defective after a comparatively short use by reason of the loose or granulated carbon becoming packed by the vibrations of the diaphragm or from other causes. In order to again restore such a transmitter to its primitive effectiveness, shaking has to be resorted to in order to again loosen the packed carbon, which can, however, not readily be done without disconnecting the microphone from its holder, the connection between the two being usually effected by means of screws. On the other hand, a resonant diaphragm—that is to say, a diaphragm constructed of wood—has heretofore been used exclusively, so far as I know, in this class of telephones, and the inner face of this diaphragm has been covered or coated with granulated or other carbon, and, as is well known, these diaphragms offer a greater resistance to the passage of the electric currents.

My invention has for its object a construction of receiver adapted to be violently shaken or vibrated without removing the same from its holder; and my said invention has for its further object to reduce the resistance to the passage of the electric pulsations or currents through the diaphragm.

The means for vibrating the microphone in order to loosen the more or less packed carbon consists, essentially, in providing a connection between the microphone and its holder that will permit either one or the other to be revolved and by providing means whereby a reciprocating or alternate rising and falling motion is imparted to the holder and microphone when either is revolved, and in order to render the vibrations more intense I provide a spring connection between the holder and microphone. The reduction of the resistance to the passage of the electric currents or pulsations through the diaphragm I effect by using a diaphragm constructed of a material that is a good conductor of electricity, as a metallic diaphragm, and preferably a diaphragm made of a thin sheet of copper whose face proximate to the loose or granulated carbon is coated with carbon; but that my invention may be fully understood I will describe the same in detail, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal section of the transmitter proper; Fig. 2, an elevation thereof, showing a portion of the holder connected therewith in section. Fig. 3 is a top plan view or outer face view of the holder, and Fig. 4 an under side view of the microphone-casing. Figs. 5 and 6 are views similar to Figs. 3 and 4, respectively; and Fig. 7, a sectional view illustrating modified means for imparting a reciprocating motion to the microphone-casing.

In the drawings, C indicates the microphone-casing, to the cover C′ of which is secured the mouth-piece C^2. As shown, the casing has on its under side a knob-like projection *c*, provided with a throat *c′*, which projection has an axial passage containing a cylinder c^2, of insulating material, for the passage of the screw *s*, by means of which the disk of carbon C^3 is secured within the casing, said carbon cylinder being insulated from the casing by a disk c^3 of suitable insulating material, and said screw by the cylinder c^2 and a washer c^4 of like material.

D is the diaphragm, which, for reasons hereinabove stated, is made of a thin sheet of copper, and is, as usual, firmly clamped between the casing C and its cover C'. The disk of carbon C^3 is of such a thickness as to leave a space between its upper face and the diaphragm D, which space is filled with comminuted or granulated carbon that is held in its place by a ring of felt *r*, secured to the carbon and abutting against the diaphragm D, the under side of which is, as usual, coated or covered with carbon.

On its underside the casing C has a conical stud c^5, for purposes presently explained.

H is the holder, of which I have only shown the upper part, in which is formed an annular recess *h* for the reception of the knob or projection *c* on the microphone-casing C, and to the bottom of the recess is secured a spring S, whose free end contacts with the end of the screw *s*, by means of which the carbon disk C^3 is secured within its casing, said spring being connected with one of the circuit-wires *w*.

To the upper face of the holder H are secured two metallic disks *d* and *d'*, through which and the casing C the diaphragm D is connected with the other circuit-wire *w'*. The lower disk *d* has an annular recess formed in its upper face around its axial aperture, so that when the two disks are secured to the holder by means of the screws *s'* there will be formed an annular groove d^2 about on a line with the throat *c'* of the knob *c* on the microphone-casing C. In said groove is arranged a coiled spring D', one end of which engages the throat *c'* of the knob *c*, as shown in Figs. 1 and 3, thus providing a resilient connection between the microphone-casing and its holder. In the outer face of the upper metallic plate *d'* are formed a circular series of conical sockets d^3 in the plane of the conical stud c^5 on the under side of the casing C.

When the casing and holder are connected as described and the former is revolved, the stud c^5 will alternately pass from one socket d^3 to another, imparting a rising and falling or reciprocating motion to said casing, which motion can take place without disconnecting the parts, owing to the resilient connection between the two, thus shaking up the loose carbon in the casing C. The intensity of the vibratory motion can be increased according to the power applied to the parts in opposite directions or toward each other, especially when the stud c^5 is about to pass from one socket d^3 to the other, so that the loose carbon will be violently shaken for the purposes hereinbefore stated. On the other hand, the casing C may be readily disconnected from its holder by the application of sufficient force to cause the loop or coil of the spring D', that encircles the throat *c'* of the knob *c*, to spread sufficiently to permit the end of the said knob to pass through said loop, as will be readily understood. It will also be readily understood that the relative arrangement of the sockets d^3 and the stud c^5 may be reversed and said stud formed on the upper plate *d'* and the sockets in the under side of the casing C. Furthermore, that instead of said sockets and stud other means may be employed for imparting to the casing C a rising-and-falling or reciprocating motion. For instance, the upper plate *d'* may have a circular row of countersunk ratchet-teeth *t* formed in its upper face engaged by ratchet-teeth *t'* on the under side of the casing C, or vice versa, as shown in Figs. 5 and 6; or the said plate *d'* may have radial grooves *g* formed around its axial aperture that are V-shaped in cross-section, and the casing C may be provided with correspondingly-shaped radial ribs *g'*, as shown in Fig. 7.

Having described my invention, what I claim is—

1. In a phonic transmitter, a microphone-casing and a holder therefor connected together so as to revolve about their axes and to alternately recede from and approach each other when one of said parts is continuously revolved in the same direction or when both parts are continuously revolved in opposite directions, for the purpose set forth.

2. In a phonic transmitter of the class described, the combination, with the microphone-casing provided with a projection or projections on its under side, of a holder for said casing, provided with depressions on its outer face in register with said projection or projections, said parts being adapted to revolve one upon the other, whereby a reciprocating motion is imparted thereto when so revolved, for the purpose set forth.

3. In a phonic transmitter of the class described, the combination, with the microphone-casing, provided with a projection or projections on its under side, of a holder for said casing, provided with depressions on its outer face in register with said projection or projections, said parts being adapted to revolve one upon the other, and a resilient connection between said casing and holder, substantially as and for the purpose specified.

4. In a phonic transmitter of the class described, a pair of electrodes composed of a compound electrode of metal and carbon in the form of a metallic diaphragm coated with carbon on one side and a carbon electrode composed of a solid disk of carbon and loose granular carbon, said compound electrode being arranged relatively to the loose carbon of the carbon electrode, so that its carbon-coated side will face the carbon electrode, for the purpose set forth.

5. In a phonic transmitter of the class described, the combination, with the microphone-casing provided on its under side with a knob *c*, having the throat *c'*, and with a stud c^5, of the holder H, having conical sockets d^3 formed in its upper face, and the spring D', connected with the holder and arranged to encircle the throat *c'* of the knob *c* of the casing, substantially as and for the purpose set forth.

6. In a phonic transmitter of the class described, the combination, with the microphone-casing C, provided on its under side with a knob *c*, having throat *c'*, and with a conical stud c^5, of the socketed holder H, the disks *d* and *d'*, secured to the socketed end of said holder, said disk *d* having an annular recess formed around its axial aperture and said disk *d'* having conical sockets d^3 formed in its face, and the spring D', arranged in the annular groove formed between said plates *d d'* by said annular recess, the free end of said spring encircling the throat of the knob *c*, substantially as and for the purpose set forth.

7. In a phonic transmitter of the class described, the microphone-casing C, provided on its under side with a knob *c*, having throat *c'*, and with a stud c^5, the copper diaphragm D, the microphone composed of a disk of carbon and of loose or granulated carbon, and the screw *s*, extending through said knob, said carbon disk and screw being insulated from the casing, as set forth, and the felt ring encompassing the carbon disk, the socketed holder H, the contact-spring S, secured in the socket of the holder and adapted to contact with the end of the screw *s*, the metallic disks *d* and *d'*, said disk *d* having an annular recess formed around its axial aperture, and said disk *d'* having a circular row of conical sockets formed around its axial aperture, and the spring D', arranged in the groove formed between the two disks *d d'* by said annular recess, the free end of said spring encircling the throat of the knob *c*, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

THORSTEIN OEYAN.

Witnesses:
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L. DAAE.