(No Model.)

T. F. TAYLOR.

TELEPHONE RECEIVER.

No. 314,156. Patented Mar. 17, 1885.

Fig. 1,

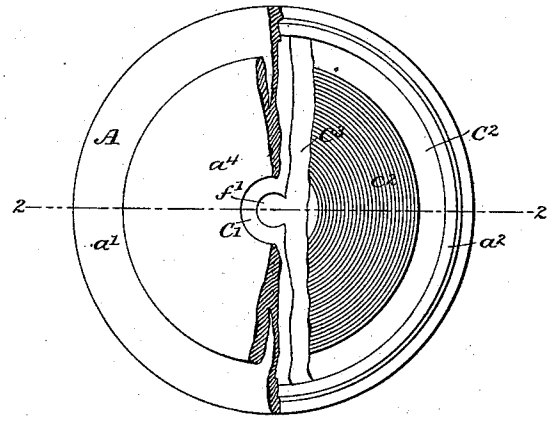


Fig. 2,

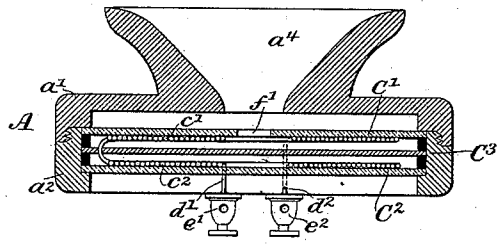
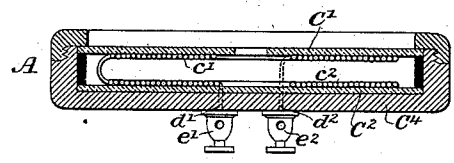


Fig. 3,



WITNESSES

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THEODORE F. TAYLOR, OF BROOKLYN, NEW YORK,

TELEPHONE-RECEIVER.

SPECIFICATION forming part of Letters Patent No. 314,156, dated March 17, 1885.

Application filed January 7, 1884. (No model.) Patented in England February 5, 1884, No. 2,703; in France February 5, 1884, No. 160,135; in Germany February 5, 1884; in Belgium February 15, 1884, No. 64,050, and in Canada June 16, 1884, No. 19,581.

To all whom it may concern:

Be it known that I, THEODORE F. TAYLOR, a citizen of the United States, residing in Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Telephone-Receivers, of which the following is a specification.

The invention relates to the class of instruments employed for translating into corresponding air-vibrations or sound-waves the variations in the strength of an electric current which have been established through the agency of vocal or other sounds.

It is a well-known fact that electric currents, when they are caused to traverse neighboring parallel conductors in the same direction, exert upon each other an attractive force, and when in opposite directions a repulsive force, and the degree of force with which they so attract or repel is dependent upon the proximity of the conductors and the strengths of the currents. When, therefore, the positions of the conductors are approximately constant, the variations in force may be considered as depending upon the variations in strength. Parallel results are obtained when an electric current is caused to pass through a single electric conductor in proximity to a continuation of itself. Upon this principle the invention is essentially based; and it consists, generally, in so disposing an electric conductor that different portions of its length are brought into proximity to each other, and a current of electricity caused to traverse the same will pass and repass either in approximately parallel directions or in opposite directions through such different portions, and in combining with such a conductor appropriate means for increasing or re-enforcing the volume of sound obtained from the action of the convolutions of the same and rendering it more recognizable.

Suitable means are provided for supporting the conductor, and for securing electric connections therewith, so that it may be conveniently included in a telephonic circuit. To this end the conductor is preferably arranged in the form of one or more flat spiral coils, and these coils are supported upon the confronting faces of two plates, which are preferably of glass or other equivalent material. When an electric current from a suitable transmitter is caused to traverse the convolutions of these coils, it so acts upon them, or causes them to act, that sound-waves are produced which correspond to the sound-waves by which the transmitter is actuated. The spiral coils are preferably placed in planes parallel with each other, and they are preferably so connected with each other that a current of electricity traversing the same will pass in parallel or approximately parallel directions through their convolutions. The parts may, however, be organized to cause the currents to pass in opposite directions through the different coils. The volume or the intensity of the sound which is obtained from the action of the spiral coils may be considerably intensified by placing a plate or other body of iron in proximity to the supporting-plates of the coils. For this purpose it is desirable either to place a thin flat plate of iron between the confronting coils and to support the same in such a position in any convenient manner, or to place a plate of iron, which may be quite thick, against the surface of one of the supporting-plates opposite the coil of wire which is secured to the same plate.

For the purpose of still further aiding or adding to the acoustic effects which may be derived from the instrument, it is desirable to perforate one of the supporting-plates at or near its center, thereby permitting any motion occurring within or between the plates to more readily impart itself to the surrounding air.

In the accompanying drawings, Figure 1 is a plan view, partly in section, of an instrument illustrating the invention, and Fig. 2 is a vertical transverse section of the same. Fig. 3 is a transverse section of a modified form of the same.

Referring to Figs. 1 and 2, A represents a suitable case, of hard rubber or other suitable material, for supporting the several parts of the instrument. This case is preferably constructed in the form of a wide ring in two sections, a' and a^2, adapted to be screwed together, as shown, and it is provided with an ear-piece, a^4, of any convenient form.

Within the case A are supported two plates, C' and C^2, which are preferably of glass or

other non-magnetic material—such, for instance, as paper, vulcanized fiber, glass, wood, or porcelain. One of the plates, C', is preferably perforated at its center, as shown at f', for the purpose of more readily permitting the sound-waves to escape from the interior of the instrument. The plates are separated a slight distance from each other by means of an intervening ring, a^3, or by any other suitable means. Upon the confronting surfaces of the two diaphragms are placed two flat spiral coils of wire, as shown at c' and c^2, respectively. These coils are preferably secured to the plates by means of a thick varnish or other similar material, and they are connected with each other in such a manner that a current of electricity entering one terminal, d', will pass through the convolutions of the coils in parallel directions. The two terminals d' and d^2 are secured to suitable binding-posts, e' and e^2, by means of which electrical connections may be conveniently established with the same when the instrument is put in use.

Between the two plates C' and C^2 is supported in any convenient manner a soft-iron plate, C^3. Such a plate, it is found, will serve to considerably intensify the effects of the instrument. Whatever effects are produced upon the air by the action of the spiral coils c' and c^2 and the plate C^3 are more readily communicated to the outer air and thus to the sense of the operator by the presence of the perforation f'.

The current employed for operating the instrument may be obtained in any of the usual manners. In practice it will be found convenient to employ some suitable form of transmitter adapted to vary the strength of an electric current correlatively with the sound-waves embodying the words which it is desired to transmit.

In Fig. 3 a different method of applying the re-enforcing plate is shown. According to the plan illustrated in these figures the plate C^3 (shown in Figs. 1 and 2) is replaced by a thick body of iron, C^4, which is placed against the side of the supporting-plate C^2 opposite the coil c^2. The plate C^4 is preferably in contact with the surface of the plate C^2, and it is supported in its proper position in any suitable manner.

Having on January 3, 1884, and on January 29, 1884, filed other applications (Serial Nos. 116,381 and 116,625 and 119,089, respectively,) for Letters Patent for certain improvements in telephone-receivers, and having in those applications described certain features involved in this application, I do not herein claim any improvements shown, described, and claimed in either of those applications, and not specifically claimed herein.

I claim as my invention—

1. In a telephone-receiver, the combination, substantially as hereinbefore set forth, of an electric conductor which is thrown into vibration by the varying force of attraction or repulsion mutually exerted between different portions of the same when traversed by an electrical current of varying strength, a supporting-plate for said conductor, and an independent plate or mass of soft iron serving to re-enforce the vibrations of said conductor and supporting-plate.

2. The combination, substantially as hereinbefore set forth, of an electrical conductor formed into two confronting flat spirals situated in parallel planes, and a plate of soft iron intervening between the same.

3. A telephonic receiving-instrument consisting of an electrical conductor formed into spiral coils, means serving to support the spirals in their relative positions, and a soft-iron plate intervening between the same.

4. A telephonic receiving-instrument consisting in the combination, substantially as hereinbefore set forth, of an electrical conductor the different portions of the length of which extend in directions parallel to each other, and which is thrown into vibration by the effects produced therein when traversed by an electric current of varying strength, non-magnetic plates upon which said conductor is supported, and a soft-iron plate serving to re-enforce the vibrations imparted to said conductor.

5. A telephonic receiving-instrument consisting of an electric conductor formed into confronting flat spiral coils situated in parallel planes, in combination with means for placing the same in circuit with a main-line conductor, and a plate or mass of soft iron serving to re-enforce the vibrations imparted to said coils.

6. In a telephonic receiver, an electrical conductor the different portions of the length of which extend parallel to each other, in combination with non-magnetic supporting-plates, one of which plates is perforated, and a plate of soft iron serving to re-enforce the vibrations imparted to said conductor, substantially as described.

In testimony whereof I have hereunto subscribed my name this 5th day of January, A. D. 1884.

THEODORE F. TAYLOR.

Witnesses:
CARRIE E. DAVIDSON,
CHARLES A. TERRY.