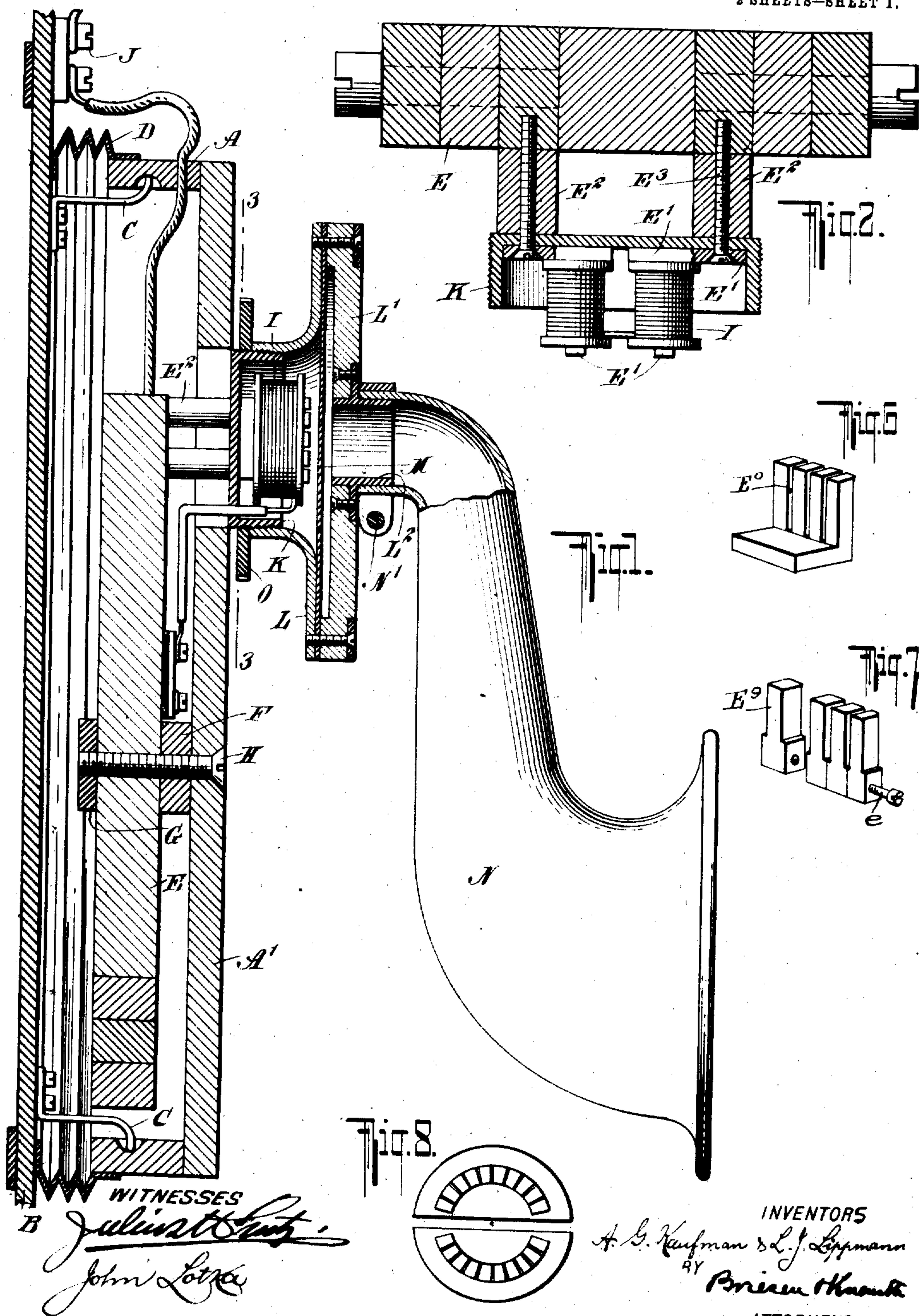


APPLICATION FILED FEB. 7, 1907.

Patented Oct. 6, 1908.

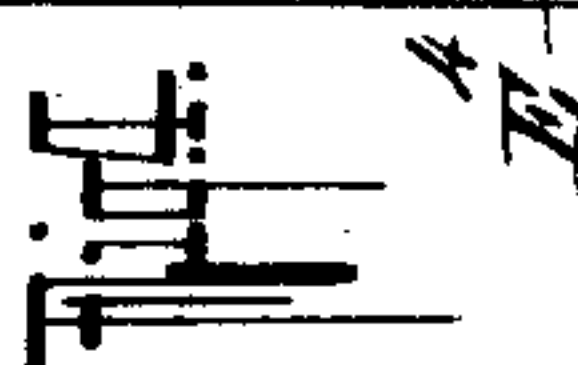
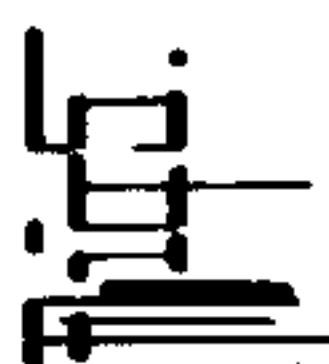
2 SHEETS—SHEET 1.



APPLICATION FILED FEB. 7, 1907.

Patented Oct. 6, 1908.

2 SHEETS—SHEET 2.



INVENTORS
A. G. Kaufman & L. J. Lippmann
BY *Brisson & Kneass*
ATTORNEYS.

ATTORNEYS.

UNITED STATES PATENT OFFICE.

ADOLPH G. KAUFMAN AND LEOPOLD J. LIPPMANN, OF NEW YORK, N. Y., ASSIGNORS
TO AMERICAN CALLAPHONE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF
GEORGIA.

TELEPHONE-RECEIVER.

No. 900,287.

Specification of Letters Patent.

Patented Oct. 6, 1908.

Application filed February 7, 1907. Serial No. 356,171.

To all whom it may concern:

Be it known that we, ADOLPH G. KAUFMAN and LEOPOLD J. LIPPMANN, both citizens of the United States, and residents of the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Telephone-
Receivers, of which the following is a specification.

Our invention relates to receivers for electric telephones and has for its object to construct a sensitive receiver which will produce sounds of great loudness and clearness, enabling the transmitted speech to be heard at a considerable distance from the receiver, and also to insulate the receiver against the transmission of extraneous noises.

The invention will be fully described hereinafter, and the features of novelty pointed out in the appended claims.

Reference is to be had to the accompanying drawings, in which

Figure 1 is a sectional elevation of a telephone receiver embodying our invention; Fig. 2 is a detail view of the receiver magnet and its connections, drawn upon an enlarged scale; Fig. 3 is a vertical section on line 3-3 of Fig. 1; Fig. 4 is a rear view showing another form of our invention; Fig. 5 shows still another form of our invention, illustrating only the magnets with their pole pieces, spools and the socket which receives the diaphragm holder; and Figs. 6, 7, and 8 are detail views showing constructions of the magnet pole pieces.

In the construction represented in Figs. 1, 2 and 3, A is a suitable casing which we prefer to secure elastically to the wall plate or other support B, as by means of springs C. In order that dust may be excluded irrespective of any motion or vibration of the casing A, an expansible shield or curtain, such as the bellows D, may bridge the opening between the casing and its support B.

The front wall A' preferably forms a door which may be opened to give access to the magnet E and other parts within the casing. This magnet we generally arrange so that it will be comparatively free, that is practically out of contact with the walls of the casing. For this purpose, a distance piece F (of wood or other suitable material) may be located between the front wall A' and the middle portion of the magnet E, while a cross bar G is located against the rear sur-

face of the magnet, this crossbar, in conjunction with screws H, serving to fasten the magnet to the front wall or door A'. The magnet thus projects in opposite directions from its support or fastening, the ends or projecting portions being practically free. The magnet is preferably lamellated, as shown, carrying pole pieces E¹, by means of distance pieces E² which may be non-magnetic, and screws E³ which in the present case are of magnetic material. In any event, there should be a connection of magnetic material from the magnet to the pole pieces E¹, but each pole piece should be magnetically separated from the other. The pole pieces, which for securing the best results should have parallel slits as shown, carry the customary spools I of insulated wire with suitable connections to binding posts J, as shown best in Fig. 3. Preferably the pole pieces and spools are located outside the casing A (the distance pieces E² projecting through an opening in the front wall A') and are partly surrounded by the socket K secured in place by the screws E³. The socket which is therefore carried by the magnet is screw threaded externally to receive the box L, provided with a clamping plate L' to hold the diaphragm M. To the clamping plate L' is secured centrally a tube L² on which is mounted one end of an amplifying horn N, capable of turning on said tube and held in position by means of a clamping ring N'. The amplifying horn may therefore be adjusted to different positions. We prefer to employ the curved and gradually flaring construction shown, and we have discovered that this construction produces better results than a straight amplifying horn. The outer end of the horn is eccentric and one end is parallel to the other, both being perpendicular to the plane of the diaphragm. It will be observed that the diaphragm box L with the diaphragm M and the horn N are carried directly by the magnet and will therefore always remain in the same position relatively to the magnet, (even should the latter vibrate) unless the adjustment is changed by screwing the box L on its socket K.

The distance between the diaphragm M and the pole pieces of the magnet may be varied by screwing the box L on the socket K, and when the proper adjustment has been obtained, the parts are secured against accidental displacement by means of a nut O,

which is preferably located outside the casing A so that the apparatus need not be opened or taken apart in order to effect the adjustment.

5 The peculiar way of supporting the magnet so that it is free in almost its entire length renders the device very sensitive and the magnet almost entirely independent of any vibrations of the casing A or its cover
10 A'. The elastic support or suspension of the casing safeguards it in a large measure against the transmission of vibrations to which the support or wall plate B may be subjected.

15 In the construction illustrated by Figs. 1, 2 and 3, the magnet E is a simple horse-shoe magnet of the lamellated type. In Fig. 4 two such magnets E⁴ are employed with like poles adjacent to each other, and each pole
20 piece E⁵ is magnetically connected with like poles of both magnets. The construction of the casing and the manner of securing the magnet, diaphragm, and amplifying horn thereto, may be the same as described with
25 reference to Figs. 1, 2, and 3.

In Fig. 5 the two lamellated magnets E⁶ form a rectangular figure with centrally disposed and inwardly directed ends E⁷ from each of which a pole piece E⁸ projects at a
30 right angle. The sections of these pole pieces are separated by slits as shown and may be made to form a curve with their outer edges, so that the magnetic action on the diaphragm will be more effective.

35 In Fig. 6, each pole piece is shown as of rectangular or angle-iron shape, with slits E⁹ in one of its members. These slit pole pieces may be made to form a curve with the outer and inner edges, as shown in Fig. 8. In Fig. 7 individual pole pieces E⁹ are employed, and secured together by a screw
40 e. The other parts of this structure may be the same as before described, the spools I' being shaped to conform with the pole pieces E⁹ in Figs. 5 and 8.

Most of the features disclosed herein are contained in an earlier application filed by us in the United States Patent Office, November 13, 1906, Serial No. 343,198.

50 We claim as our invention:

1. A telephone receiver, comprising a casing, a magnet support therein, a magnet carried by said support and projecting in opposite directions therefrom, pole pieces at
55 the ends of the magnet, coils on said pole pieces, a diaphragm box carried by the magnet independently of the casing, and a diaphragm located in said box adjacent to the pole pieces.

2. A telephone receiver comprising a casing, a magnet supported therein, magnet coils, a diaphragm box carried by the magnet directly and independently of the casing, and a diaphragm in said box.

3. A telephone receiver comprising a casing, a magnet supported therein, magnet coils, a diaphragm box carried by the magnet directly and independently of the casing and adjustable toward and from the magnet, and a diaphragm in said box.

4. A telephone receiver comprising a magnet the pole pieces of which having opposite polarity are located alongside of one another, each of said pole-pieces having a lateral offset for connecting it to the magnet and being
75 provided with a plurality of slits and a curved outer edge.

5. A telephone receiver comprising a casing, a magnet supported therein, magnet coils, a screwthreaded socket secured to the
80 magnet directly and supported independently of the casing, a diaphragm box having a screw connection with said socket, and a diaphragm in said box.

6. A telephone receiver comprising a casing, a magnet supported therein, a socket secured to the magnet directly and supported independently of the casing, pole pieces and magnet coils within said socket, a diaphragm box carried by said socket adjustably, and a
90 diaphragm in said box.

7. A telephone receiver comprising a casing, a magnet supported therein at a distance from its pole pieces so as to give the latter considerable freedom, a diaphragm
95 box carried directly by the pole piece portions of the magnet independently of the casing and movable relatively to the casing in unison with said magnet portions, and a diaphragm in said box.

8. A telephone receiver comprising a casing, a magnet supported therein at a distance from its pole pieces so as to give the latter considerable freedom, a diaphragm box carried adjustably by the pole piece portions of
105 the magnet independently of the casing and movable relatively to the casing in unison with said magnet portions, and a diaphragm in said box.

In testimony whereof, we have signed this specification in the presence of two subscribing witnesses.

ADOLPH G. KAUFMAN.
LEOPOLD J. LIPPMANN.

Witnesses:

OTTO V. SCHRENK,
JOHN LOTKA.