

June 23, 1931.

H. LIEBER

1,811,638

EARPHONE TRANSMITTER

Filed Dec. 9, 1929

Fig. 1.

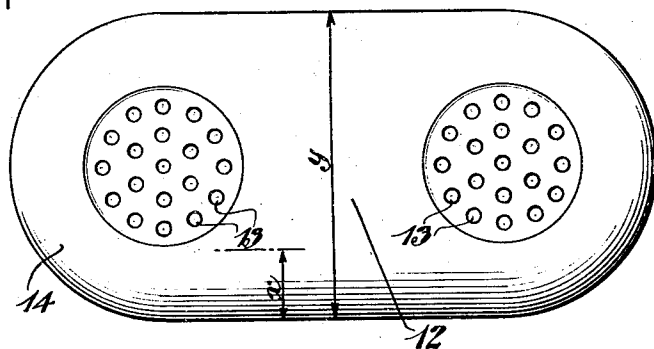


Fig. 2.

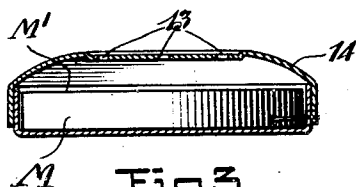
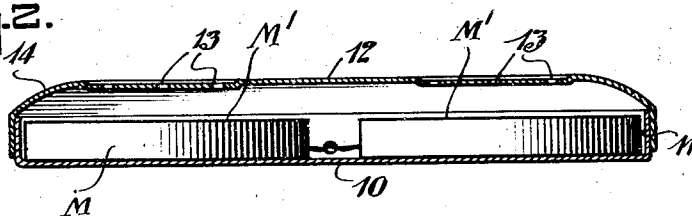


Fig. 3.

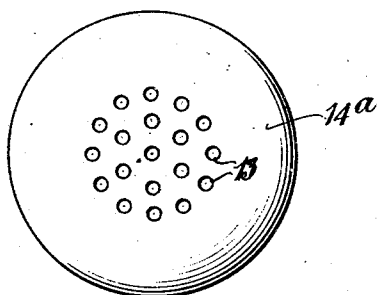


Fig. 4.

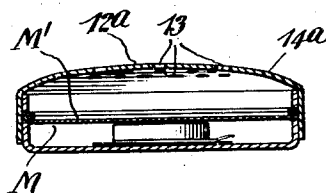


Fig. 5.

INVENTOR

*Hugo Lieber*

BY HIS ATTORNEY

*Arthur L. K...*

## UNITED STATES PATENT OFFICE

HUGO LIEBER, OF NEW YORK, N. Y., ASSIGNOR TO SONOTONE CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

## EARPHONE TRANSMITTER

Application filed December 9, 1929. Serial No. 412,685.

This invention relates to transmitters for earphones designed to assist the hearing of the deaf. Such earphones consist of a receiver, a dry battery and a microphone transmitter. To facilitate the carrying of the microphones and to prevent injury to them they are ordinarily enclosed in a casing containing perforations for the admission of sound. Such transmitters heretofore used are of limited sound amplifying power and have had the disadvantage of blurring the sounds and introducing foreign noises.

I have discovered by means of extensive investigations and experiments that the operation of an earphone transmitter depends to a large extent on the form of the case in which the microphone is placed, and, as a result, I have invented a transmitter having a case formed as a soundbox of particular shape, which increases the amplification, eliminates blurring and, to a large extent, does away with foreign noises.

The nature of my invention may best be understood by an examination of the accompanying drawings which show two forms of transmitter embodying my invention. In the drawings:

Fig. 1 is a front view of a two-microphone transmitter embodying my invention, and Figs. 2 and 3 are respectively longitudinal and transverse sections of this transmitter; and

Fig. 4 is a front view, and Fig. 5 a transverse section of a one-microphone transmitter embodying my invention.

In all the figures, the microphonic apparatus, which may be of one or more microphones of the usual granulated carbon type, is indicated by M, and the front face or sound receiving vibratory disc or diaphragm of each microphone is indicated by M'.

In the transmitter shown in Figs. 1 to 3, the microphonic apparatus M, including two microphones placed side-by-side, is enclosed in a casing having a back wall 10 and an edge wall 11 with semi-circular ends, the width of the casing being not substantially greater than the diameter of the diaphragms. The front wall of the casing (which may be detachable from the rear portion as shown, al-

though this is not material to my invention) is of outwardly bulging, or flattened dome, shape and includes a flat central portion 12 which lies parallel to the diaphragms M' of the microphones and is spaced some distance from them and has perforations 13 located in front of the middle parts of the microphone diaphragms. The central portion 12, the area of which is less than half of the total area of the front wall, is connected to the side edges 11 of the casing by the outer portion 14 of the front wall, which outer portion is inclined inwardly so that it makes an angle of less than  $45^\circ$  with the microphone diaphragms, and is slightly convexly curved, and has a width  $x$  equal to about one-fifth of the width  $y$  of the casing.

The transmitter shown in Figs. 4 and 5 is similar to that which has been described and its corresponding parts are indicated by corresponding reference numerals, but it has only one microphone and has a circular casing. The central portion 12a of its front wall is not flat but is slightly convexly curved so as to continue the curvature of the outer connecting wall portion 14a, and the outer wall portion 14a makes a somewhat lesser angle with the microphone diaphragm than the wall portion 14 of the transmitter shown in Figs. 1 to 3. In both cases the perforated central portion of the front wall is substantially parallel to the microphone diaphragm.

The casings described provide sound-chambers in front of the sound receiving diaphragms of the microphones, which increase the strength of the transmitted vibrations and the volume of the sound reproduced by the receiver, eliminate blurring and largely eliminate foreign noises.

What I claim is:

1. An earphone transmitter, comprising the combination with microphonic apparatus, of a sound-box casing having a back wall, an edge wall, and a front wall comprising a central portion substantially parallel to the face of the microphonic apparatus having an area materially less than that of the entire front wall spaced outwardly from the face of the microphonic apparatus and containing perforations and an inwardly inclined portion

connecting the edge wall to said central portion and having a width not less than one-sixth of the width of the casing.

2. An earphone transmitter, comprising the combination with microphonic apparatus, of a sound-box casing consisting of a back wall, an edge wall, and a front wall comprising a central portion substantially parallel to the face of the microphonic apparatus having an area materially less than that of the entire front wall spaced outwardly from the face of the microphonic apparatus and containing perforations, and an outer portion connecting the edge wall to said central portion and inwardly inclined so that it lies at an average angle of less than  $45^\circ$  to the front face of the microphonic apparatus.

3. An earphone transmitter, comprising the combination with microphonic apparatus, of a sound-box casing consisting of a back wall, an edge wall, and a front wall comprising a central portion substantially parallel to the face of the microphonic apparatus having an area materially less than that of the entire front wall spaced outwardly from the front face of the microphonic apparatus and containing perforations and a convexly curved inwardly inclined portion extending from the edge wall to said central portion.

4. An earphone transmitter, comprising the combination with microphonic apparatus, of a sound-box casing consisting of a back wall, an edge wall, a front wall comprising a central portion substantially parallel to the face of the microphonic apparatus having an area materially less than that of the entire front wall spaced outwardly from the front face of the microphonic apparatus and containing perforations and a convexly curved inwardly inclined portion connecting the edge wall to said central portion and having a width not less than one-sixth of the width of the casing.

5. An earphone transmitter, comprising the combination with microphonic apparatus, of a sound-box casing consisting of a back wall covering the back face of the microphonic apparatus, an edge wall enclosing the side edges thereof, a substantially continuously curved front wall comprising a central portion substantially parallel to the face of the microphonic apparatus having an area materially less than that of the entire front wall spaced outwardly from the front face of the microphonic apparatus and containing perforations, and a convexly curved portion connecting the edge wall to the said central portion and inwardly inclined so that its average angle to the front face of the microphonic apparatus is less than  $45^\circ$ .

6. An earphone transmitter, comprising the combination with two microphones, of a sound-box casing in which the microphones are seated side-by-side consisting of a back wall, an edge wall, side edges of the micro-

phones, and a front wall comprising a central portion parallel to the front faces of the microphones and spaced therefrom and a convexly curved inwardly inclined portion connecting the edge wall with said central portion.

7. An earphone transmitter, comprising the combination with microphonic apparatus, of a sound-box casing therefor having a flat back and a continuously convexly curved front whose middle portion is spaced outwardly from the front face of the microphonic apparatus and contains perforations.

In testimony whereof, I have hereunto set my hand.

HUGO LIEBER.

70

75

80

85

90

95

100

105

110

115

120

125

130