

W. M. LORIMER & A. T. ZIEGLER.

SOUND CONCENTRATOR.

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1,043,783.

Patented Nov. 5, 1912.

Fig. 1.

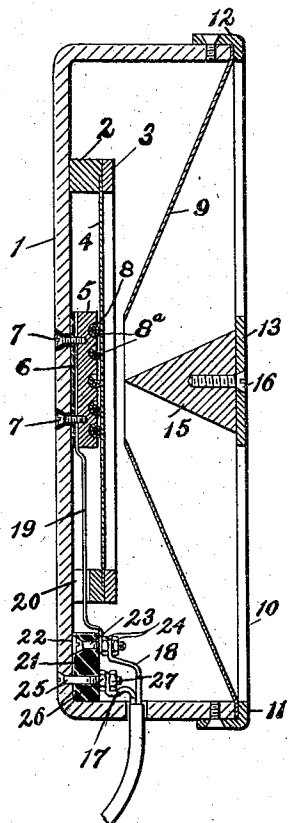


Fig. 2.

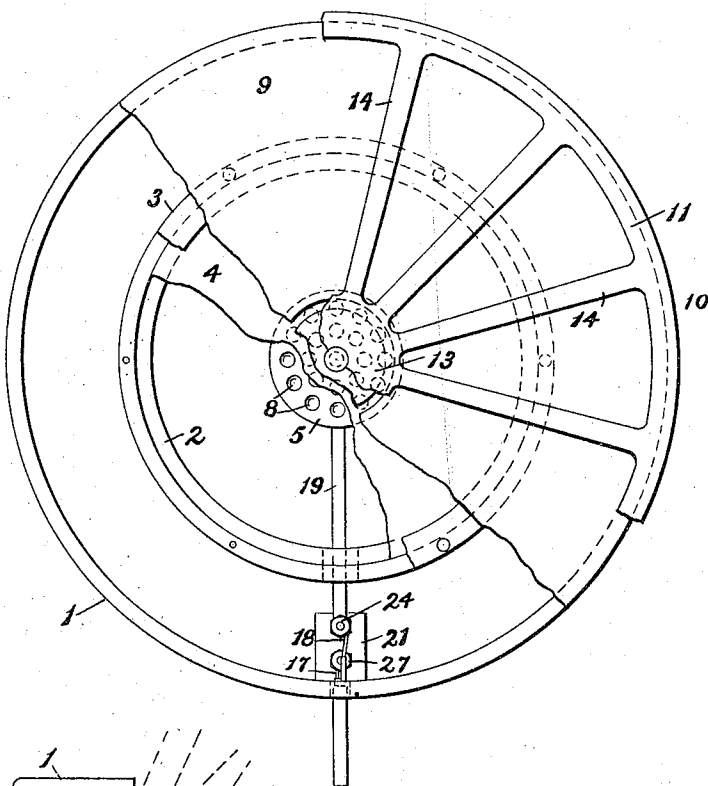
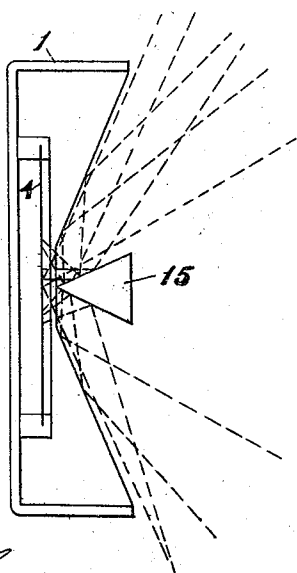


Fig. 3.



WITNESSES:

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SOUND-CONCENTRATOR.

1,043,783.

Specification of Letters Patent.

Patented Nov. 5, 1912.

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To all whom it may concern:

Be it known that we, WILLIAM M. LORIMER, a resident of New Wilmington, in the county of Lawrence and State of Pennsylvania, and ALFRED T. ZIEGLER, a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Sound-Concentrators, of which the following is a specification.

This invention relates to devices which are intended for the use of people whose sense of hearing is impaired and particularly to the transmitter elements which serve to gather, concentrate and intensify such sound waves as may be produced in the vicinity of the instrument.

The object of the invention is to provide a light, simple and compact device for collecting, concentrating and intensifying sound waves in such manner as to insure a maximum degree of efficiency, as regards both the collection of such waves from wide areas or various directions, and the intensification of the sounds that are transmitted to the ear.

In the accompanying drawing, Figure 1 is a sectional view through the center of a sound concentrator and transmitter that embodies the invention; Fig. 2 is a view, partially in front elevation and partially in section, of the device shown in Fig. 1; and Fig. 3 is a diagrammatic view of the device and some of the representative sound waves received thereby.

The operating parts of the apparatus constituting the invention are mounted in and supported by a case 1 of conducting material, preferably of aluminum, though not necessarily of this or any other specific material. The other metal parts of the instrument are also preferably made of aluminum, though the invention is in no wise limited in this regard.

Fastened to the bottom of the case 1, upon the inside, is a metal ring 2, and clamped to the front face of the ring 2, by means of a second metal ring 3, is a thin circular diaphragm 4 preferably of carbon. A carbon block 5 is mounted centrally upon the base of the case 1, between the base and the diaphragm 4, suitable insulation 6 being interposed between the block and the base of the case and the block being clamped to the base by means of one or more suitable in-

sulated screws 7. The front face of the block 5 is provided with a plurality of recesses 8 in which are disposed small balls or granules 8^a of carbon which normally rest against the diaphragm 4 and serve to make vibratory contact therewith and with the block 5, as is usual in transmitting devices of this general character.

A frusto-conical metal deflector 9 is mounted upon the rim of the case 1 and its outer edge is clamped between the edge of the case and a cap or cover 10. The cap 10 comprises an outer rim 11 having a flange 12 that fits over the outer face of the case and is fastened thereto by screws or other suitable means. The cap also comprises a relatively small center piece 13 and a plurality of arms 14 which constitute integral parts of the portions 11 and 13 and may be varied in number as may be desired. Obstruction to the sound waves passing into the case is, of course, undesirable and, consequently, the arms 14 are narrow and as few in number as will serve to properly support the center piece 13.

A conical deflector 15 is fastened to the portion 13 by means of a screw 16, and projects to substantially the plane of the inner end of the frusto-conical deflector 9. The part 15 may also be of frusto-conical form and of less depth than the deflector 9, if desired, though a device of substantially the form and dimensions shown will probably be found preferable.

In order to make the proper and desired connections to an electric circuit for utilizing the device thus far described in connection with a suitable receiver, we connect one conductor 17 of the circuit to the case 1, and consequently to the rings 2 and 3 and the diaphragm 4, and the other conductor 18 of the circuit to the block 5 by means of a strip 19 of copper or other good conducting material, a suitable notch or recess 20 being provided in the ring 2 to accommodate the strip 19 without contact between the parts. Either the recess or the strip may, of course, be provided with suitable insulation, if desired, in order to avoid all danger of contact between the said parts.

Any suitable means may be employed for making the desired circuit connections with the case 1 and the strip 19 but the means which we prefer to employ comprise an insulating block 21 having a recess 22, a bind-

ing screw 23, the head of which is located in the recess 22, binding nuts 24 for clamping the conductor 18 and the end of the strip 19 to each and to the block 21, a binding screw 25 having its head seated in a recess in the outer face of the case 1, a holding nut 26 and a binding nut 27 for clamping the conductor 17 against the nut 26.

It will be understood from the foregoing description, in view of the drawings—particular reference being now had to Fig. 3—that the device which embodies the invention presents a very wide opening for the reception of sound waves, and consequently that sounds produced in any part of a wide area will be intercepted. It will be noted further that the opening through which the sound waves are projected against the diaphragm is relatively small, and that the consequent condensation of the sound waves produces an intensification of the sound that is transmitted to the ear. It will be noted further that a considerable percentage of the sound waves will impinge directly upon the diaphragm—this being true for nearly all angles of movements of the intercepted waves. Some of the waves will, of course, impinge upon the deflector 9, as indicated in Fig. 3 of the drawing, and these will be deflected against the deflector 15 and thence against the diaphragm 4.

An important and desirable characteristic of the invention is the direct utilization, in a forward direction, of all sound waves that are intercepted, it being possible thereby to secure a maximum operating efficiency.

We desire it to be understood that, while the specific elements shown and described are desirable and effective in service, any variations from what is shown which do not materially modify or change the mode of operation or the result are within the spirit and scope of the invention.

Claims:

1. A sound concentrator comprising a case having an open-work cover or cap, a diaphragm supported within the case adjacent to its base, a frusto-conical deflector clamped between the cap and the edge of the case, and a centrally located conical deflector mounted on said cap.

2. A sound concentrator comprising a case having a cap consisting of a rim, a center piece and radial arms, a diaphragm supported with the case, a frusto-conical deflector having its outer edge clamped between the cap and the case edge and its smaller end adjacent to said diaphragm, and a relatively small conical deflector projecting inwardly from the center piece of said cap.

3. A sound concentrator comprising a case having an open-work cap, a frusto-conical deflector clamped between the cap and the edge of the case, and a small conical deflector centrally supported by the cap.

4. A transmitter comprising a metal case, a diaphragm supported within the case and near its rear wall, a frusto-conical deflector supported by the front edge of the peripheral wall of said casing and having its smaller end terminating in front of and adjacent to said diaphragm, means for securing the front end of said deflector to the front edge of the peripheral wall of the casing, a relatively small conical deflector concentrically disposed within said frusto-conical deflector with its smaller end also adjacent to said diaphragm, and means for imparting the vibratory influence of said diaphragm to an electric circuit.

5. A sound concentrator comprising a case, a diaphragm supported centrally in the case adjacent to its base, a frusto-conical deflecting shell having its outer end supported by the edge of the rim of the case and extending inwardly into proximity to the central portion of the diaphragm, and a cover or cap secured to the case and closing the same, said cover or cap being provided with large openings extending out substantially to the edge of the deflecting shell.

6. A sound concentrator comprising a case, a diaphragm, supported in the case adjacent to its base, a frusto-conical shell extending from the free edge of the case inwardly with its small end in proximity to the central portion of the diaphragm, and a cover or cap secured to the case and clamping the outer larger edge of the deflecting shell against the edge of the case, said cover or cap being of open work extending out substantially to the outer end of the deflecting shell.

7. A sound concentrator comprising a case having a cap consisting of a rim and small center piece, a radial arm with openings therebetween extending out to the walls of the case, a diaphragm supported within the case, and a frusto-conical deflecting shell having its outer larger edge clamped between the cap and the edge of the case and its smaller end located adjacent to the central portion of said diaphragm.

In testimony whereof, we have hereunto set our hands.

WILLIAM M. LORIMER.
ALFRED T. ZIEGLER.

Witnesses:

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MARY E. CAHOON.