Aug. 4, 1936. R. R. GLEN 2,049,767

LOUDSPEAKER AND THE LIKE

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Fig. 2.

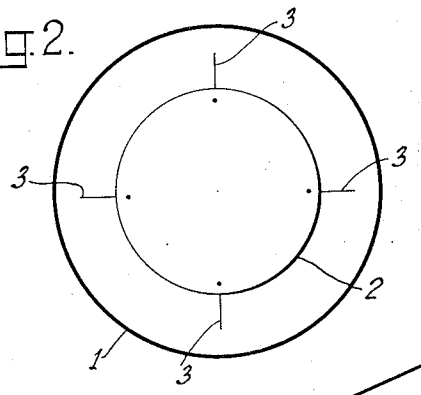


Fig. 1.

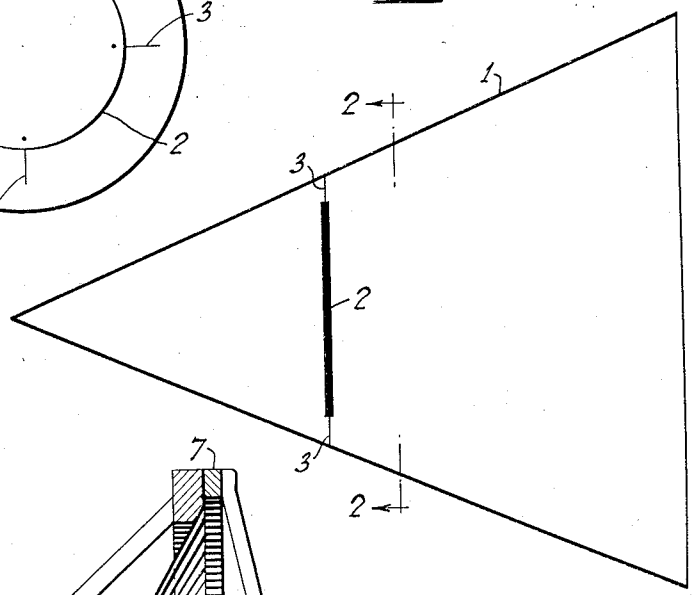
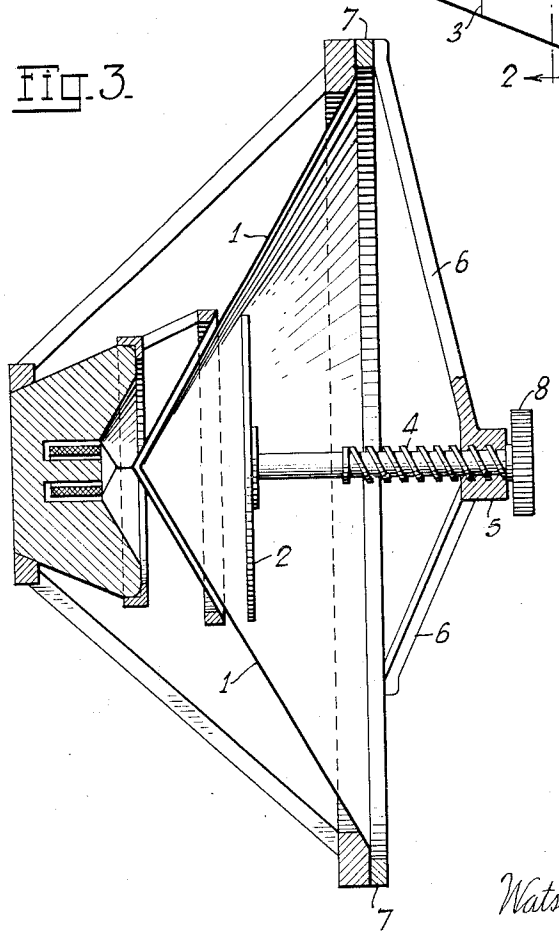


Fig. 3.



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Fig. 4.

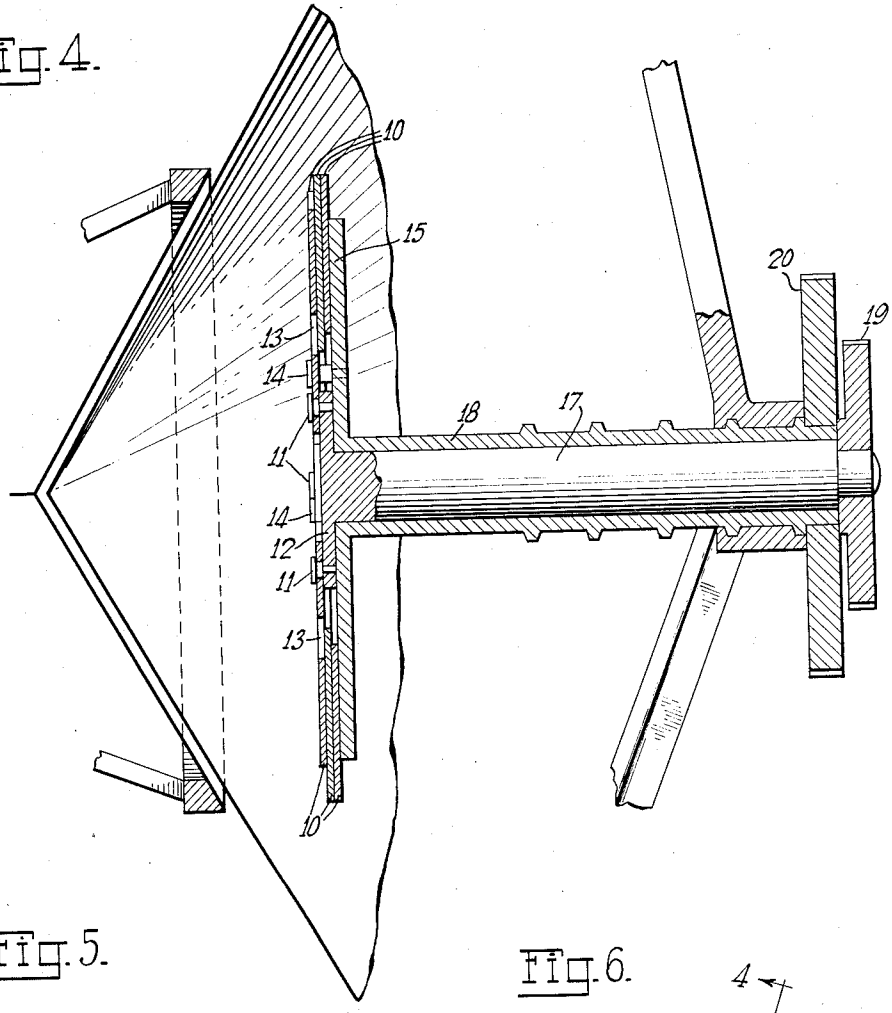


Fig. 5.

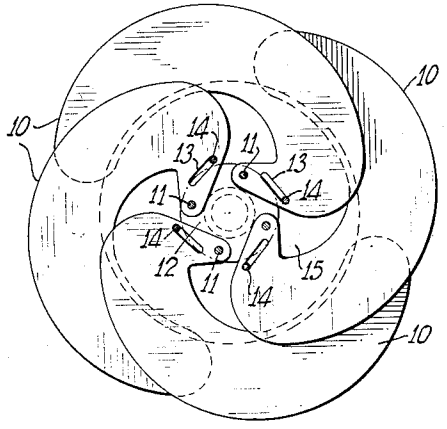
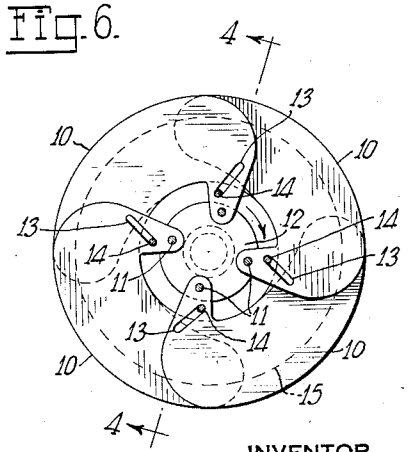


Fig. 6.



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UNITED STATES PATENT OFFICE

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LOUDSPEAKER AND THE LIKE

Robert Rodger Glen, Anglet, France, assignor to Glen's Patents and Holdings, Inc., New York, N. Y., a corporation of Delaware

Application March 27, 1935, Serial No. 13,242
In Great Britain July 4, 1934

3 Claims. (Cl. 181—31)

This invention relates to improvements in loudspeakers and the like (for example, horns or hooters) and has for its object generally to provide means whereby the tone quality of a loudspeaker or like instrument may be modified or adjusted, for example, at will.

More specifically, it is an object of the invention to provide a loudspeaker or like instrument which has a vibrating diaphragm or sound cone, with an associated sound screen or disk that is supported within the sound cone in the path of the emitted sound, such disk being preferably in a plane transverse (for example, at right angles) to the cone axis and having its periphery disposed in spaced relation to the inner surface of the cone. In one form of the invention, the disk is circular and concentric with the cone axis. The disk may be supported by threads, from the wall of the cone, or, alternatively, it may be carried by an axial rod supported at its other end on an external structure.

The support of a disk by means of threads and the like has been divided out of this application and made the subject matter of my divisional case, Serial No. 48,875, filed November 8, 1935.

It is also an object of the invention to provide means whereby the distance of such disk from the apex of the cone may be varied to achieve a desired modification of the tone quality of the instrument at will.

Still another object of the invention is to provide means associated with the disk which give it the form of a composite structure, whereby its diameter may be varied.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts, which will be exemplified in the construction hereinafter set forth, and the scope of the invention will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a diagrammatic view showing a vertical section of a sound cone for a loudspeaker provided with a screen disk in accordance with the invention;

Fig. 2 is a section on the line 2—2 of Fig. 1 and looking in the direction of the arrows;

Fig. 3 is a vertical section showing a modified form of loudspeaker provided with a screen disk according to the present invention;

Fig. 4 is a fragmentary vertical section showing still another form of loudspeaker provided with a disk constructed so as to be capable of varying its diameter; and

Figs. 5 and 6 are detailed elevational views showing the form of disk employed in the arrangement shown in Fig. 4.

Like reference numerals refer to like parts throughout the several figures of the drawings.

Referring now to the drawings, and particularly to Figs. 1 and 2, a sound cone for a loudspeaker is shown at 1; the cone having a full angle of 45° and being preferably constructed of papier-mâché or other suitable resonant material. The cone is actuated in any convenient manner, for example, by means of an electrical driving unit connected to the apex, but not shown in the drawings in the interest of clearness of illustration.

To achieve the desired modification of the sound produced by the cone 1, in accordance with the invention, a relatively thick disk 2 is disposed at a suitable distance from the apex in a manner which intercepts sound. For the ordinary range of vocal sounds the distance from disk to apex is advantageously taken as approximately one and five-eighths inches (about four centimeters). The disk itself may be of any suitable material, such as soft aluminum or celluloid, and is supported in place by elastic means, such as rubber threads 3 connecting its periphery to the wall of the cone. The diameter of the disk is such that an annular space is left between the disk and the cone through which the sound is emitted. In this embodiment, the cone extends a substantial distance beyond the disk; for example, it may have a perimeter of fourteen inches (approxily thirty-five centimeters) at its widest part.

In the modified form shown in Fig. 3, the disk 2 is rigidly attached to a screw-threaded rod 4 of steep pitch which is screwed into a central boss 5 of a supporting frame comprising three equally spaced arms 6 and a rim 7 disposed at the mouth of the cone. A handwheel 8 is fixed to the end of the rod and by rotation of this wheel the distance of the disk from the apex of the cone may be adjusted, and it is found that by this adjustment a wide range of difference in the tone quality of the loudspeaker is obtained.

In the further modification shown in Figs. 4 to 6, the disk takes the form of a composite structure comprising a plurality of overlapping metal plates 10 (arranged after the fashion of an iris

diaphragm) pivoted at points 11 to a supporting disk 12. Each plate 10 has a slot 13 engaged by a pin 14 carried on a disk 15 and the slots and pins are so arranged and positioned that if the disk 15 is rotated relative to the disk 12 the pins in sliding along the slots will rotate the plates about their pivots 11 causing them to move outwardly from the position shown in Fig. 6 to the expanded position shown in Fig. 5, or vice versa, thus causing the total area of the disk to be varied. It is important that the material selected for the movable plates be chosen to give as little resonance as possible in use and that the various parts be assembled in such a manner that there is as little relative vibration as possible. A suitable material for the movable plates is soft aluminum.

The supporting disk 12 is rigidly secured to a rod 17 surrounded by an externally screwed tube 18 to which is attached the disk 15, and which is supported from the mouth of the cone in similar manner to the support for the rod 4 in Fig. 3. The rod 17 is provided with a handwheel 19 and the tube 18 with a handwheel 20, and it will be seen that by rotation of the wheel 20 the composite disk and its associated parts will be moved axially of the cone without altering the size of the disk, while by rotating the wheel 19 relative to the wheel 20 the size of the disk will be varied.

Since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In loudspeakers and the like, the combination with a sound cone, of a disk disposed within the cone at a desired point on the cone axis and in spaced relation to the inner surface of the cone, a supporting frame associated with said cone, and a stout rod carrying said disk adjustably engaging with said frame whereby the position of said disk may be varied.

2. In loudspeakers and the like, the combination with a sound cone, of a disk disposed within the cone at a desired point on the cone axis and in spaced relation to the inner surface of the cone, said disk comprising a plurality of plates pivotally associated to form a composite body of approximately circular outline whose diameter may be varied, and means for supporting said disk in the desired position.

3. In loudspeakers and the like, the combination with a sound cone, of a disk disposed within the cone at a desired point on the cone axis and in spaced relation to the inner surface of the cone, said disk comprising a plurality of plates pivotally associated to form a composite body of approximately circular outline whose diameter may be varied, a supporting frame associated with said cone, and a rod carrying said disk for adjustably supporting said disk from said frame.

ROBERT R. GLEN.