Feb. 25, 1930. F. C. BARTON 1,748,858

APPARATUS FOR THE INTERCONVERSION OF SOUND AND ELECTRICAL IMPULSES

Filed Dec. 6, 1927

Fig. 1.

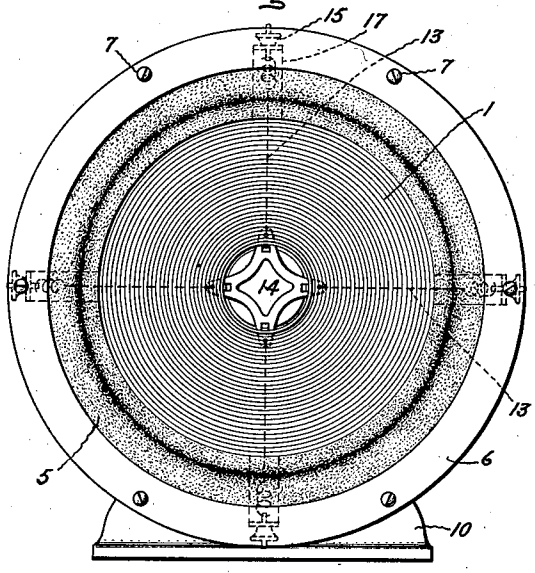


Fig. 2.

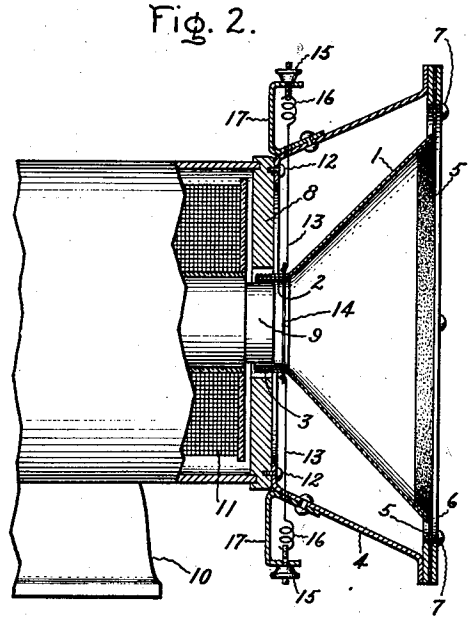
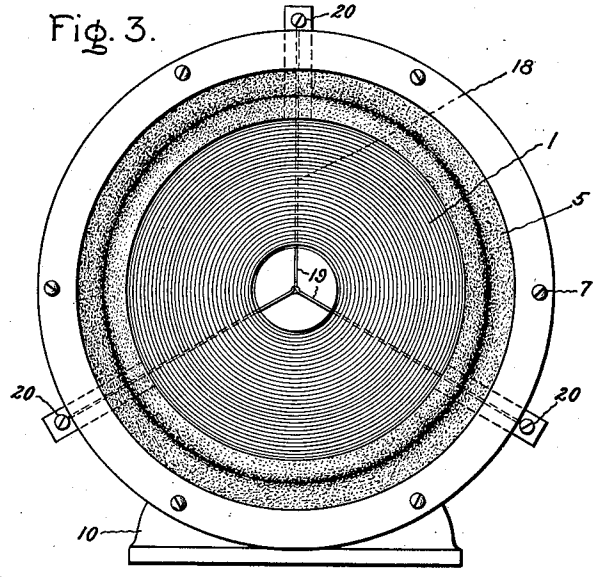


Fig. 3.



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UNITED STATES PATENT OFFICE

FREDERICK C. BARTON, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK

APPARATUS FOR THE INTERCONVERSION OF SOUND AND ELECTRICAL IMPULSES

Application filed December 6, 1927. Serial No. 238,194.

My invention relates to apparatus for the interconversion of sound and electrical impulses, and has for its principal object the provision of means for maintaining a desired mechanical relation between the various parts of such apparatus.

Many different types of apparatus for the interconversion of sound and electrical impulses have been provided in the past. Some of these apparatus comprise a coil which is arranged to be moved in a magnetic field either for producing sound impulses which are dependent on electrical impulses or for producing electrical impulses which are dependent on sound or on the contour of a sound record.

When a coil is arranged to be moved in a magnetic field, difficulty is frequently encountered in producing and maintaining the proper spacing between the movable coil and the pole members through which the magnetic field is produced. In accordance with my invention, this difficulty is avoided by the provision of an improved means for adjusting and maintaining the position of the coil in the magnetic field.

My invention will be better understood from the following description when considered in connection with the accompanying drawings and its scope will be pointed out in the appended claims.

Referring to the drawings, Figs. 1 and 2 illustrate different views of a sound producing apparatus wherein my invention has been embodied; and Fig. 3 illustrates a modified form of the apparatus.

This apparatus comprises a conical diaphragm 1 which is provided with a collar 2 for supporting coil 3 and is mounted within a casing 4. At its outer periphery, this diaphragm is attached to a flexible member 5 of velvet, leather, or the like, which has its outer edge clamped between the edge of the casing 4 and a member 6 by means of screws 7. With this arrangement, the diaphragm 1 is loosely held within the casing 4 and is permitted to move freely in response to electrical impulses applied to the coil 3 or in response to sound impulses applied to the diaphragm.

The coil 3 is supported in an annular air gap between the poles 8 and 9 of a magnet which is mounted on a base 10 and may be provided with a field coil 11. The casing 4 is clamped to the pole pieces 8 by means of screws 12, and the position of the coil in the air gap is determined by tensile forces applied to a plurality of cords 13 which are attached at their inner ends to a coil support spider 14 and at their outer ends to adjusting screws 15 through resilient means shown as spiral springs 16. It will be observed that the spider 14 is punched at the base of each of its arms to produce lugs which are bent into contact with the inner periphery of the coil thus forming a rigid connection between the spider and the coil.

Adjustment of the coil 3 in the annular air gap is effected by means of the screws 15 which are supported upon the casing 4 through brackets 17 and are arranged to tighten or loosen the cords 13. It will be readily understood that the cords 13 permit the coil 3 to move freely in a direction along the axis of the coil and air gap but tend to prevent movement of the coil in a direction perpendicular to this axis.

The modification of the invention illustrated by Fig. 3 differs from that previously described in that three cords 18 knotted together at the center of the movable coil 3 and rigidly attached to the diaphragm 1 are provided for centering the movable coil in the air gap. A further difference in this modification is that the tension of the cords 19 is adjusted from the front of the diaphragm by winding their outer ends around the adjusting screws 19. This is more fully described and specifically claimed in a copending application of Arthur G. Zimmerman, Serial No. 224,973, filed October 8, 1927, and assigned to the same assignee as the present application.

The embodiment of the invention illustrated and described herein has been selected for the purpose of clearly setting forth the principles involved. It will be apparent, however, that the invention is susceptible of being modified to meet the different conditions encountered in its use and I therefore

aim to cover by the appended claims all modifications within the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A sound producing device comprising a diaphragm, means for producing a magnetic field, a movable coil supported on said diaphragm within said magnetic field, a casing, and means comprising a plurality of cords interposed between casing and said diaphragm for adjusting the position of said coil in said field.

2. A sound producing device comprising a diaphragm, means for producing a magnetic field, a movable coil supported on said diaphragm within said magnetic field, a support and means for adjusting the position of said coil in said field including spiral springs interposed between said coil and said support.

3. A sound producing device comprising a casing, a diaphragm mounted within said casing, means for producing a magnetic field, a movable coil supported on said diaphragm within said magnetic field, and means for adjusting the position of said coil in said field including a plurality of cords connected to said coil, and resilient members connected to said cords.

4. An acoustical device comprising magnetic means provided with an air gap, a diaphragm, a movable coil operatively associated with said diaphragm and mounted in said air gap, a plurality of adjustable means, and a plurality of flexible means each interposed between said coil and a different one of said adjustable means.

5. The combination of a casing, a diaphragm attached to said casing through a plurality of flexible connections, a movable coil operatively associated with said diaphragm, and means for independently adjusting the tension of said flexible connections.

In witness whereof, I have hereunto set my hand this 5th day of December, 1927.

FREDERICK C. BARTON.