Sept. 1, 1931. G. VON ARCO 1,820,956

LOUD SPEAKER

Filed Nov. 27, 1925

Fig. 1

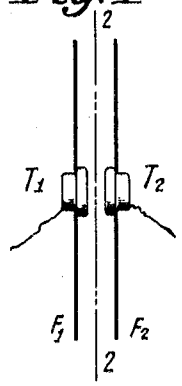


Fig. 2

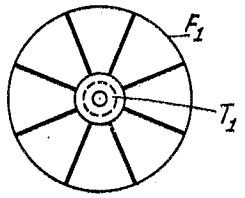


Fig. 3

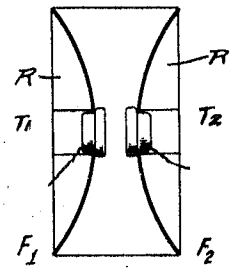
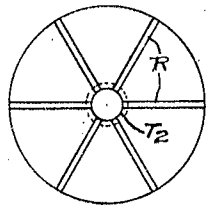


Fig. 4.



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UNITED STATES PATENT OFFICE

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LOUD SPEAKER

Application filed November 27, 1925, Serial No. 71,615, and in Germany December 24, 1924.

This invention relates to means for converting electrical impulses into sound or speech waves, which said devices are commonly known in the radio art as loud speakers.

Common objections to the usual type of loud speaker are that they are unsightly in appearance, directional in their results and lacking in true quality reproduction. This invention has for its object to eliminate these undesirabilities and its purpose is to make it possible to construct a loud speaker of pleasing design and capable of giving non-directional and true reproduction.

Referring to the drawings, Fig. 1 represents a side view of the mechanical structure.

Fig. 2 represents a view taken along the line 2—2 of Fig. 1.

Fig. 3 shows a slightly different form of my invention.

Fig. 4 is an end view of the device of Fig. 3.

If two telephones are mounted parallel with reference to one another at a small distance apart, say ½ to 1 cm. with their openings turned towards each other, they exhibit a considerable amplification of their acoustic actions. It is upon this discovery and principle upon which the idea underlying the present invention is based. Instead of the conventional funnel-shaped structure, an acoustic space is created for the reinforcement of the sound vibrations which is bounded by means of two surfaces placed opposite one another, each of which constitutes a surface of revolution, and in which the telephone, or a similar instrument whose acoustic actions are to be reinforced, is mounted. The simplest case of such an acoustic space is the space between two circular flat plates in the center of each of which a telephone is arranged (Fig. 1). If both telephones produce co-phasal vibrations of sound, there is obtained a reinforced action. To avoid disturbing natural vibrations of the surfaces bounding the acoustic space a good and suitable plan is to divide the acoustic space by means of radial partitions, into different compartments (Fig. 2), with the result that the whole arrangement forms a sort of individual composite sound funnel. However, in lieu of disposing the plates in two flat planes parallel to one another, a still more advantageous plan is to make their reciprocal distance variable with the distance from the center, say, in the way as the cross section changes in the case of the customary funnel so that the profile of a radial section laid through the two surfaces would resemble or equal the cross section of a funnel. Such a form of construction is illustrated in Fig. 3 of the accompanying drawings which illustrates a section through the two surfaces F1 and F2, with the telephones T1 and T2 being arranged in the center of each surface. Also in a device of this kind, the bridging or connection of the individual surfaces by means of radial partitions or ribs uniting the two surfaces, would be a suitable scheme in order to thereby suppress the natural vibration of the large surfaces. But the stiffening of the surfaces may be accomplished also by the arrangement of radial ribs outside the acoustic space for each surface individually. Such a series of ribs R is shown in Figs. 3 and 4 extending from points adjacent the telephones to the edges of the plates, the ribs being arranged on the concave surface of the plates so as not to interfere with the acoustic properties of the device.

From the above description of the mechanical essentials of an embodiment of my invention it can readily be seen that a loud speaker capable of reproducing true and non-directional sound waves may be constructed and housed in a suitable cabinet of pleasing design.

Having fully described my invention, I claim:—

1. In a loud speaker, a plurality of vibrating diaphragms, and a plurality of curved disks, said diaphragms being centrally disposed therein and said disks and diaphragms being positioned to oppose each other and form a trumpet-like acoustic chamber therebetween.

2. In an acoustic device, two adjacent

members positioned to form an acoustic chamber there-between, means for producing sound vibrations within such chamber and means for preventing said members from vibrating in sections.

3. In an acoustic device, two adjacent disks, the inner surfaces thereof being opposed to form an acoustic chamber and means cooperating with the outer surfaces to prevent sectional vibrations of said disks.

4. A unit for an acoustic device, said unit having a convex face for amplifying sound and an oppositely disposed face and means attached to the latter face to stiffen said said unit.

5. In combination a plurality of unconnected surfaces and a sound producing means in each surface, said surfaces being arranged to form an acoustic chamber by themselves and said sound producing means acting simultaneously to produce compressions or rarefactions, in said acoustic chamber.

6. In combination a plurality of vibrating members and means surrounding each of said vibrating members and positioned to form an acoustic chamber having an opening extending through an angle of 360° whereby sound waves are propagated in all directions, said vibrating members being operated to simultaneously produce compressions or rarefactions in said acoustic chamber.

7. In combination a plurality of vibrating members arranged to direct sound waves in different directions and means positioned to surround each of said vibrating members to form an acoustic chamber, said chamber having an opening for directing sound waves in every direction in one plane, said vibrating members being operated to simultaneously produce compressions or rarefactions in said acoustic chamber.

GEORG VON ARCO.