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R. VERMEULEN ET AL

1,947,749

LOUD SPEAKER

Filed March 5, 1929

Fig. 2

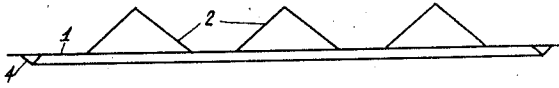
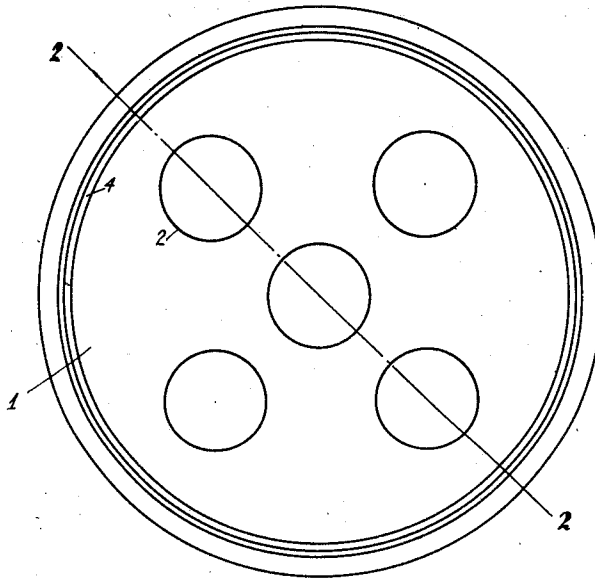


Fig. 1

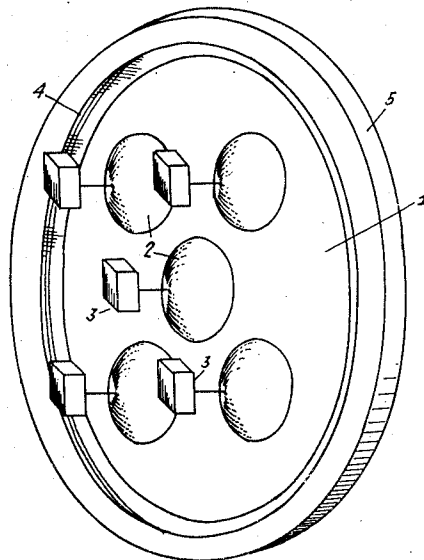


Fig. 3

By their Attorney

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UNITED STATES PATENT OFFICE

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LOUD SPEAKER

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Application March 5, 1929, Serial No. 344,158,
and in the Netherlands April 27, 1928

4 Claims. (Cl. 179—109)

The invention relates to loudspeakers which are provided with a plurality of magnet systems. Usually, loudspeakers of this type are provided with as many vibrating members as there are magnet systems and the vibrating members are preferably so arranged that their axes are parallel to each other, each of the said vibrating members being actuated by one of the magnet systems.

According to the present invention, the loudspeaker comprises a vibrating member constituted by a diaphragm of large surface, which is provided with a plurality of protuberances which are coupled either separately or in groups with one of the magnet systems.

In operation the protuberance or protuberances substantially reproduce the high frequencies whereas the diaphragm reproduces principally the low frequencies. In order to facilitate this, the protuberances may be made, for example, of thin paper and the diaphragm of thick paper or, if desired, the protuberances and the diaphragm may be made of different materials.

According to an approved embodiment of the invention, a flat diaphragm is provided with conical protuberances each of which is connected with a separate magnet system. The edge of the diaphragm is rigidly clamped in a frame and the diaphragm is provided with circular folds which form a yielding support therefor.

Instead of a conical shape the protuberances may also be given any other shape. It is also possible to use instead of a flat diaphragm a spherical or conical diaphragm. Driving units of the electrodynamic or electrostatic types may also be used in place of the magnetic system shown.

The invention will be more clearly understood by referring to the accompanying drawing in which:

Figure 1 is a plan view of a vibrating member according to the invention;

Figure 2 is a cross section taken on the line II—II of Figure 1;

Figure 3 is a front view of the loudspeaker according to the invention.

In the approved embodiment illustrated by the drawing a flat circular diaphragm 1 is provided with five protuberances 2 which are conical in shape. Each of these protuberances is connected with a separate magnet system 3 but if it is desired, a group of the protuberances may be coupled to a single magnet system. The diaphragm 1 is rigidly clamped in a frame 5 and it is provided with circular folds 4 in order to enable it to move in a direction parallel to its axis.

Various other types of clamping and supporting means may be used, however, without departing from the spirit of the invention.

It is to be understood that the novel features of the invention may be embodied in various other arrangements and that accordingly we do not wish to be restricted to the structure of the approved form of our invention as illustrated by the accompanying drawing.

We claim:

1. A sound reproducer comprising a plurality of magnet systems, a large diaphragm of thick paper, a plurality of protuberances on said diaphragm, each of said protuberances being of thin paper, and a connection from each of said protuberances to a different one of said plurality of magnet systems.

2. In a loud speaker having a plurality of actuating units, a diaphragm comprising a plane member, a plurality of acoustically similar conical diaphragms rigidly mounted thereon at spaced intervals, said conical diaphragms being mounted at their large end, and means at the small end of each conical diaphragm for attachment to a driving unit.

3. The structure of claim 2 in which the plane member is made of paper and the conical diaphragms are separate members rigidly united thereto.

4. The structure of claim 2 in which the plane diaphragm has a peripheral portion having corrugations formed therein and adapted to be clamped along its outer edge.

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