

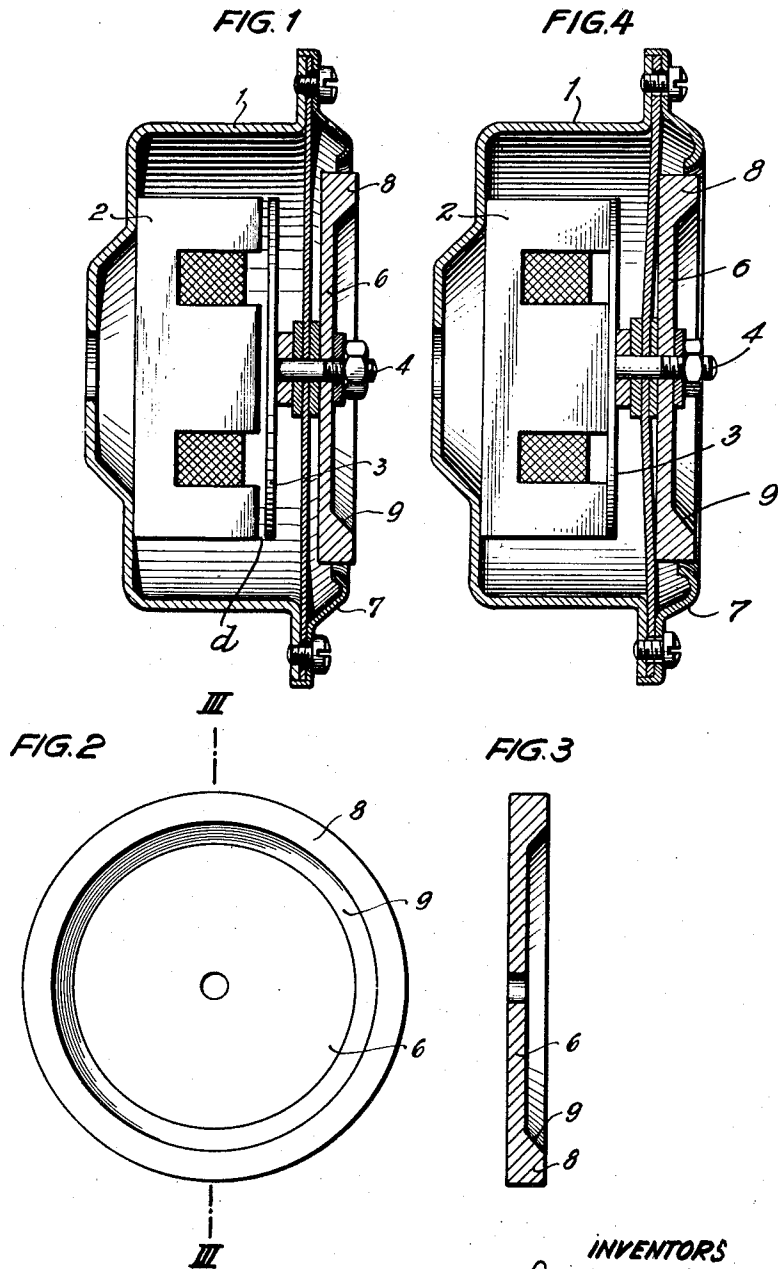
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SOUND PRODUCERS

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SOUND PRODUCERS

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6 Claims. (Cl. 340—388)

The invention relates to a sound producer having a diaphragm which is set vibrating by periodic power impulses and which is connected centrally with a substantially even circular vibratory disc, more particularly to a signal horn for mechanically propelled vehicles.

With the previously known sound producers of the type set forth the vibratory disc is either equally thick throughout or is tapered towards its edge.

The effect of a vibratory disc on the strength and audibility of the sound waves emitted may be improved in a surprising manner if it is reinforced in its freely vibrating marginal area in accordance with the present invention.

By this means it is rendered possible for as large a portion as possible of the energy imparted to the vibratory disc by the power impulses to be radiated in the high frequencies whereby sound waves of a tone particularly suitable for penetrating areas of noise are produced.

Sound producers are also already known in which there is provided instead of an even circular vibratory disc, a flat vibratory beam which is tapered in cross section on both sides of a central attachment point in order to give greater elasticity to both its arms. These vibratory beams have comparatively accurately defined vibration and depend substantially only on the diaphragm for the formation of the sound waves. The vibratory disc constructed in accordance with the invention on the other hand also acts directly as a radiating surface which transmits energy in vibrations particularly in the high frequencies.

The invention will be further described by way of example in greater detail with reference to the accompanying drawings which show by way of example one construction embodying the present invention and in which:

Fig. 1 is a diagrammatic sectional view through an electromagnetically actuated horn,

Fig. 2 is a front view of the vibratory disc,

Fig. 3 is a cross section on line III—III of Fig. 2, and

Fig. 4 is a view similar to Fig. 1 and showing the armature impinging on the core.

An electro-magnet 2 is mounted in a casing 1 and is excited periodically in a manner not shown in greater detail. Opposite the poles of the electro-magnet 2 is disposed an armature 3 which is firmly connected thereto with a bolt 4. On the bolt are also secured a diaphragm 5 and a vibratory disc 6. The diaphragm 5 which is illustrated in the drawing as an even flat diaphragm, but could equally well be a diaphragm provided with annular corrugations, is firmly gripped on its outer periphery between a marginal section of the casing 1 and a closing ring 7, the inner edge of which extends into the vicinity of the outer edge of the vibratory disc 6.

On its outer edge, the vibratory disc 6 has a rim-like reinforcement 8 which projects out of the plane of the disc on one side. In the example of construction illustrated the disc 6 is so mounted that the rim 8 is disposed on the side of the disc 6 turned away from the diaphragm 5 so that the disc may be disposed as near as possible to the diaphragm. The inner edge 9 of the rim of the disc

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is inclined in a direction towards the middle of the disc whereby the mechanical durability of the disc, as also the formation of the vibration, is improved.

It has proved to be an advantage if the rim 8 is so proportioned that its radial width is smaller than one eighth of the diameter of the disc 6, whilst the axial thickness of the reinforcement 8 is about twice the thickness of the centre part of the disc.

For the desired production of a sound-penetrating tone it is also an advantage for the diameter of the vibratory disc 6 to be greater than half of the diameter of the vibratory part of the diaphragm 5.

For the vibratory disc 6 special materials with low internal damping effect are suitable such as for example aluminium, artificial material, ceramic substances, glass or the like.

The air gap *d* between the core of the electromagnet 2 and the armature 3 connected with the diaphragm when in resting position is so small, that the armature impinges on the core on every pull exerted by the electromagnet as shown in Fig. 4.

We claim:

1. In a sound producer, a diaphragm, means for imparting periodic vibration exciting power impulses to the diaphragm, a vibratory disc disposed in confronting spaced relation to the diaphragm, means for connecting the center of said disc to the center of the diaphragm, said disc having a central portion of substantially uniform thickness and being reinforced in thickness in its marginal region.

2. In a sound producer, a diaphragm, means for imparting periodic vibration exciting power impulses to the diaphragm, a vibratory disc disposed in confronting relation to the diaphragm, means for connecting the center of said disc to the center of the diaphragm, said disc having an inner portion of substantially uniform thickness and a rim portion of increased thickness projecting from the disc in a direction away from the diaphragm, said rim portion having an inner surface inclined in a direction towards the center of the disc.

3. In a sound producer, a diaphragm, means for clamping the diaphragm at its marginal edge, means for imparting periodic vibration exciting power impulses to the central portion of the diaphragm, a vibratory disc disposed in face to face confronting relation with the diaphragm, means for connecting the center of said disc to the central portion of the diaphragm, said disc having a center portion of substantially uniform thickness and a rim portion of increased thickness projecting from the disc in a direction away from the diaphragm, the disc having a diameter greater than half the diameter of the vibrating center portion of the diaphragm.

4. In a sound producer, a diaphragm, means for imparting periodic vibration exciting power impulses to the diaphragm, a vibratory disc disposed in face to face confronting relation with the diaphragm, means for connecting the center of said disc to the diaphragm, said disc having an inner portion of substantially uniform thickness and a rim portion of increased thickness projecting from the disc on only one side of the disc, the thickness of the rim of the disc being approximately twice the thickness of the inner portion of the disc.

5. In a sound producer having a vibrating diaphragm, a vibratory disc disposed in confronting face to face spaced relation with the diaphragm, means for connecting the center of the disc to the center of the vibrating diaphragm with outer parts of the disc free to vibrate, said disc having an inner portion of substantially uniform thickness and a rim portion of increased thickness projecting from the disc on only one side of the disc, the radial width of the rim of the disc being less than one eighth of the diameter of the disc.

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6. In a sound producer, a disc shaped diaphragm, means for imparting periodic vibration exciting power impulses to the diaphragm, a vibratory disc, means for clamping the marginal edge of the diaphragm so that only the center portion of the diaphragm can vibrate, means connecting the center of the disc to the center of the diaphragm and disposing the disc in spaced face to face relation with the diaphragm, said disc having a diameter greater than half the diameter of the vibrating center portion of the diaphragm, said disc having a center portion of substantially uniform thickness and a rim portion having a thickness approximately twice the thickness of the inner portion, said rim portion having a radial width less than one eighth of the diameter of

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the disc, projecting from the disc in a direction away from the diaphragm, and having an inner surface inclined in a direction towards the center of the disc.

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