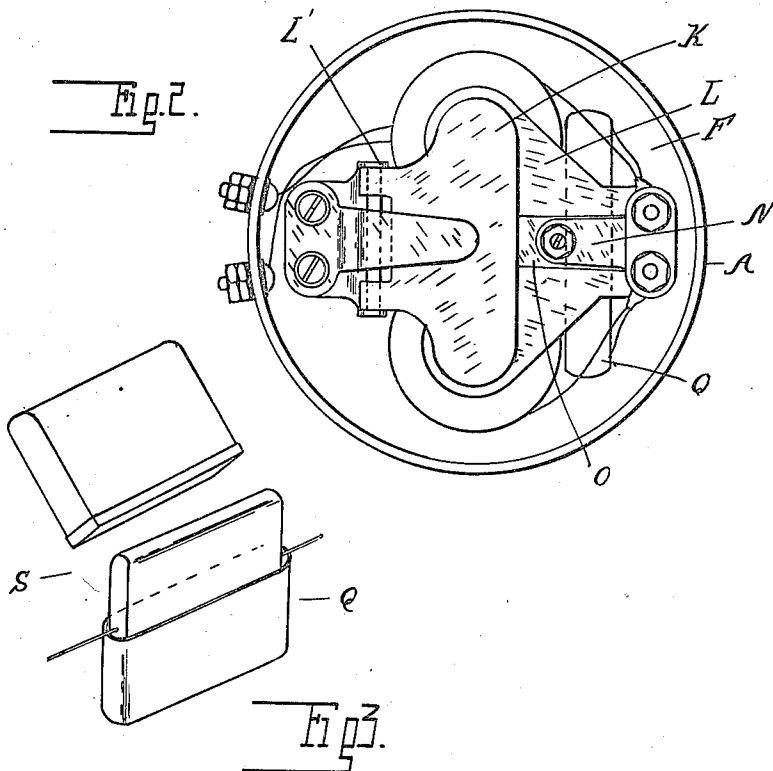
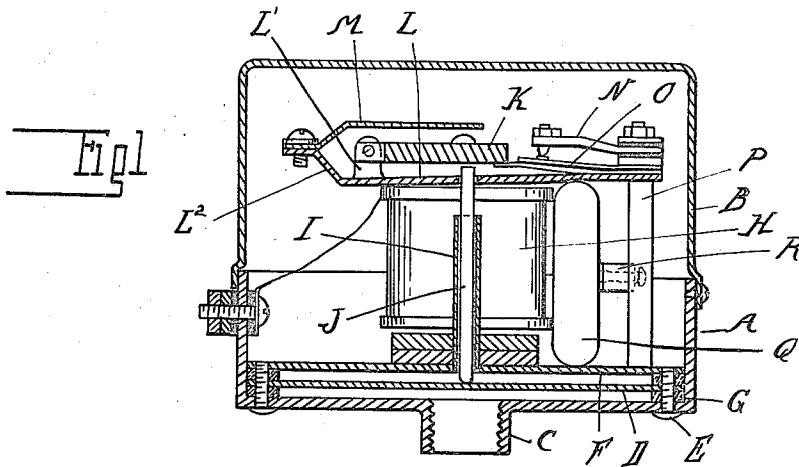


C. J. SCHWARZE.
ELECTRICALLY OPERATED SOUND PRODUCER.
APPLICATION FILED SEPT. 17, 1912.

1,167,601.

Patented Jan. 11, 1916.



Witnesses

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UNITED STATES PATENT OFFICE.

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ELECTRICALLY-OPERATED SOUND-PRODUCER.

1,167,601.

Specification of Letters Patent.

Patented Jan. 11, 1916.

Application filed September 17, 1912. Serial No. 720,851.

To all whom it may concern:

Be it known that I, CARL J. SCHWARZE, a citizen of the United States of America, residing at Adrian, in the county of Lenawee and State of Michigan, have invented certain new and useful Improvements in Electrically-Operated Sound-Producers, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to electrically operated sound producers, in which a metallic diaphragm is set into vibration by the impact of an electro-magnetically oscillated member.

It is the object of the present invention to simplify the construction and to increase the efficiency of the device; and the invention consists in various features of construction as hereinafter set forth.

In the drawings: Figure 1 is a central, longitudinal section through the instrument; Fig. 2 is a plan view thereof with the cover removed; Fig. 3 is a perspective view of the condenser with one of the housing sections removed.

A is a metallic casing, preferably of cylindrical form, and provided with a correspondingly shaped metallic cover B, detachably engaging the same. The end of the casing A is provided with a central nipple C, which forms a means for the adjustment of a suitable horn or megaphone. Adjacent to this head is a stiff, metallic diaphragm D, secured at its periphery by screws E, and spaced from the head and a false bottom F by annular washers G. Upon the false bottom F is mounted the electro-magnet H; and between the poles of this magnet and in the center of the case is a tubular bearing I for an oscillatory rod J. One end of this rod is adjacent to the diaphragm D, while the other end extends in proximity to an armature K, which is pivotally secured to a plate L on the poles of the magnet. The plate L is preferably struck up from sheet metal, having ears L' forming the pivotal bearings in the armature, and a raised portion L² to which is anchored a buffer spring M. To the opposite end of the plate L is secured a make-and-break circuit closer including the contact point N, and a resilient contact member O, the latter extending into the path of the armature K.

P is a post forming an additional sup-

port for the plate L, its opposite end being attached to the false bottom F.

Q is a condenser arranged between the magnet H and the post P, when clamped in position by a clip R. This condenser is formed of the usual alternately arranged sheets of metallic foil and insulating material; but to protect the construction and to facilitate its mounting in the case, I have provided a metallic armor therefor. This consists of a pair of caps S, preferably of pressed steel, each of which covers one-half of the condenser and extends into contact with the adjacent cap. Thus not only the sides, but the top and bottom edges and ends are completely surrounded, and by placing an asbestos and other yieldable lining between the condenser proper and the armor, the former is held securely in position and is thoroughly protected. The condenser is attached to the magnet in the usual way and serves to greatly reduce the sparking upon opening the circuit.

In operation the rod J is entirely free from both the diaphragm and the armature, while the latter is free to be oscillated by the magnet with a comparatively slight resistance of the make-and-break contact spring O. The movement of this armature will, however, cause an impact upon the rod J, which is transmitted to the diaphragm D, and the recoil of the latter will cause a reverse movement of the armature beyond its original and normal position. The succeeding magnetic pull will cause a greater impact with a correspondingly increased recoil, and thus with each succeeding oscillation the amplitude of movement and force of impact will be increased. The buffer spring M is initially out of contact with the armature, but with the increased amplitude of movement of the latter this also will be brought into action, with a result that the armature and striker rod J will be subjected to the opposite recoil of the stiff diaphragm and stiff buffer spring, thereby producing a large volume of sound with the expenditure of a comparatively small amount of energy.

The mechanical construction of the parts is such that the instrument may be manufactured at small cost, while the condenser prevents sparking of the electrodes.

What I claim as my invention is:

1. A sound producer comprising a resilient sounder and an opposed resilient buffer,

a freely movable striker interposed between said sounder and buffer with a clearance, electro-magnetic means independent of said resilient buffer for oscillating said striker, comprising an electro-magnet, a pivoted armature arranged between the striker and the buffer, and a make-and-break circuit closer operated by the oscillation of said armature.

2. A sound producer comprising a resilient sounder and opposed resilient buffer, an electro-magnet, a pivoted armature therefor arranged adjacent to said buffer with a clearance for a limited freedom of oscillation, a make-and-break circuit closer operated by the oscillation of said armature, said make-and-break circuit closer being independent of said resilient buffer, and a striker rod having one end arranged in the path of said armature and the other end adapted to strike against said sounder.

3. A sound producer comprising a resilient sounding diaphragm, an electro-magnet and a pivoted armature for said magnet, a make-and-break circuit closer, a resilient buffer independent of said make-and-break circuit closer adjacent to said armature but providing a clearance for a limited free oscillation of the latter, and a striker rod having one end in the path of said armature and the opposite end adjacent to said sounding diaphragm.

4. A sound producer comprising a case, a sounding diaphragm marginally supported within said case, an electro-magnet within the case adjacent to but out of contact with said diaphragm, a non-magnetic plate secured to the poles of said magnet, a pivoted armature, a make-and-break circuit closer and a resilient buffer independent of said make-and-break circuit closer, all mounted on said non-magnetic plate; and a cover for closing said case and completely housing the parts therein.

5. A sound producer comprising a case, a resilient sounding diaphragm marginally supported within said case adjacent to one end thereof, a head within said case adjacent to but out of contact with said diaphragm, an electro-magnet mounted on said head, a non-magnetic plate mounted on the poles of said magnet, a pivoted armature, a make-and-break circuit closer and resilient buffer independent of said make-and-break circuit closer mounted on said magnetic plate, a striker rod between said armature and said diaphragm, and a cover for said case.

6. A sound producer comprising a cup-shaped case section with a central nipple for attachment to a horn, a sound-producing diaphragm marginally supported within said case adjacent to the end thereof, a head adja-

cent to said diaphragm but separated therefrom, an electro-magnet mounted on said head, having its poles upon opposite sides of the center thereof, a non-magnetic plate mounted on the poles of said magnet, a hinged armature, a make-and-break circuit closer and a resilient buffer independent of said make-and-break circuit closer mounted on said non-magnetic plate, a cupped casing member complementary to and telescopically engaging said first-mentioned casing member, and together therewith completely housing the contained parts, and a striker rod between the armature and said diaphragm.

7. The combination with a horseshoe electro-magnet of a non-magnetic plate mounted on the poles of said magnet, a pivoted armature, a make-and-break circuit closer and a resilient buffer independent of said make-and-break circuit closer mounted on said plate, a bearing intermediate the poles of said magnet, a striker rod slidable in said bearing, having one end in the path of said armature, and a resilient sound producer adjacent to said magnet and in the path of the opposite end of said striker rod.

8. The combination with a horseshoe electro-magnet, of a non-magnetic plate mounted on the poles of said magnet and extending laterally therefrom, an armature pivoted to ears struck up from said plate, a make-and-break circuit closer mounted on said plate, in operative relation to said armature, a resilient buffer mounted upon the opposite side of said plate, with its free end projecting into proximity to said armature, a condenser arranged at the side of said magnet, a sounding diaphragm arranged adjacent to the opposite end of said magnet, a striker rod slidably secured in a bearing intermediate the poles of said magnet, one end thereof being in proximity to said armature and the opposite end to said diaphragm, and a casing in which said diaphragm and magnet are mounted and for housing the same.

9. The combination with a resilient sounder, of an opposed resilient buffer, a freely movable striker interposed between said sounder and buffer with a clearance, means for oscillating said striker, comprising an electro-magnet, a non-magnetic plate mounted above said magnet, an armature directly pivoted to ears struck up from said plate arranged between the striker and buffer, and a make-and-break circuit closer.

In testimony whereof I affix my signature in presence of two witnesses.

CARL J. SCHWARZE.

Witnesses:

J. N. SAMPSON,
GUY B. SAMPSON.