

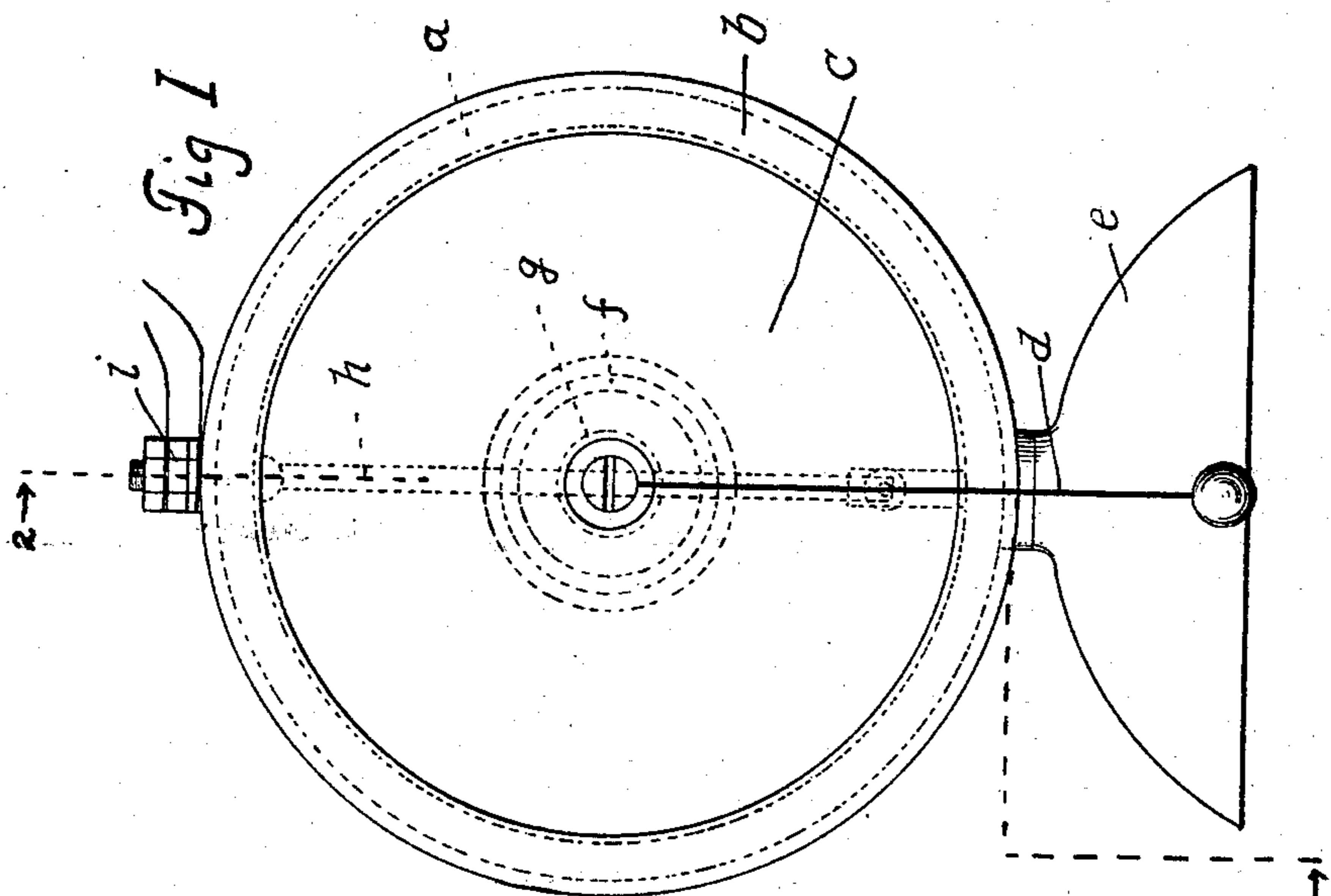
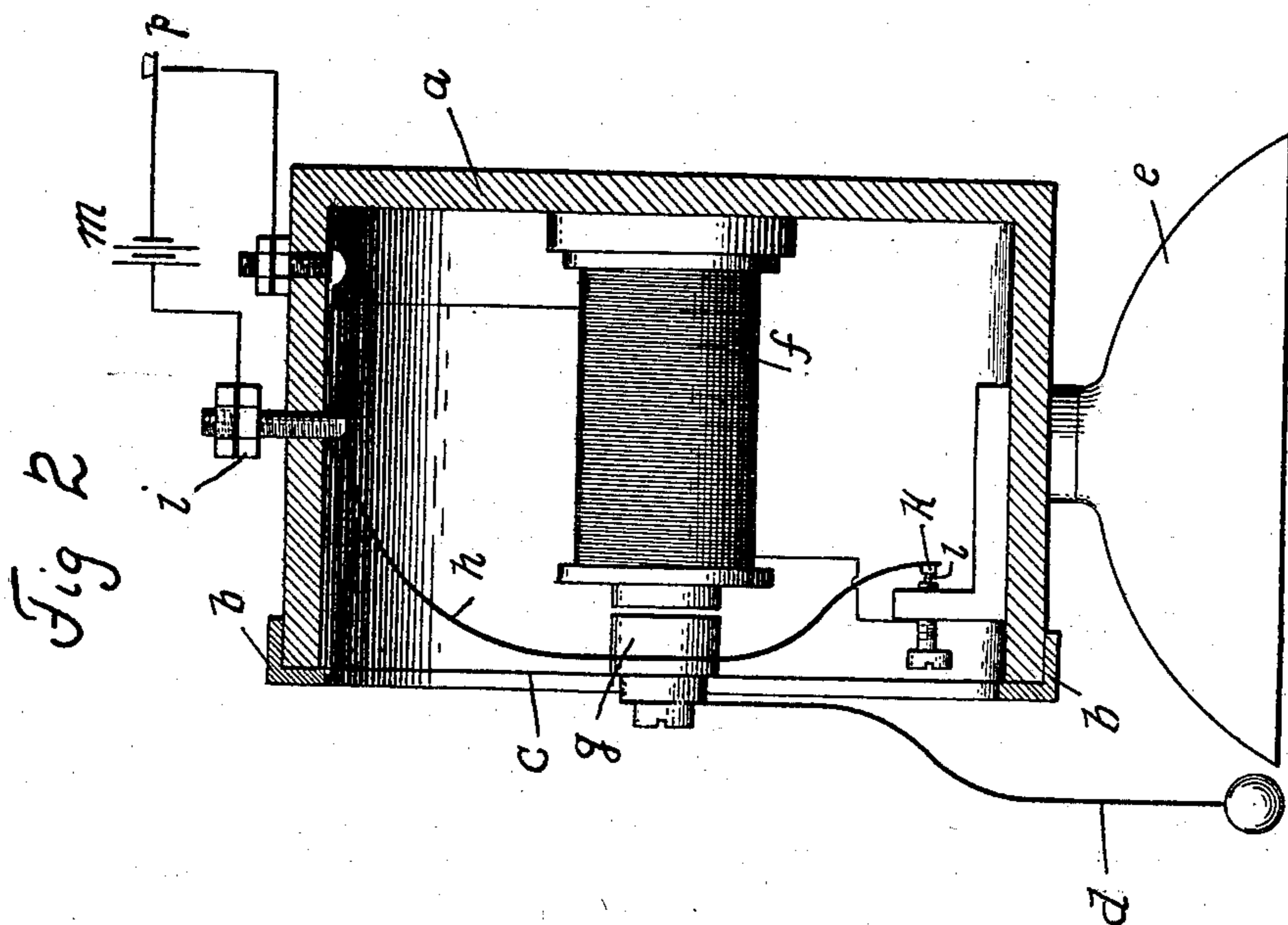
No. 637,778.

Patented Nov. 28, 1899.

G. E. L. GRABE.
ELECTROMAGNETIC INSTRUMENT.

(Application filed Aug. 4, 1899.)

(No Model.)



Witnesses:
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UNITED STATES PATENT OFFICE.

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ELECTROMAGNETIC INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 637,778, dated November 28, 1899.

Application filed August 4, 1899. Serial No. 726,153. (No model.)

To all whom it may concern:

Be it known that I, GEORG EUGEN LEOPOLD GRABE, engineer, a subject of the German Emperor, residing at Berlin, Kingdom of Prussia, Germany, have invented a certain new and useful Improvement in Electromagnetic Instruments, (Case No. 217,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to alarm-bells, buzzers, and other electromagnetic instruments employing vibrating armatures, and especially to those instruments in which the armature is used to change the condition of the circuit employed for effecting the operation of the electromagnet.

The invention has for its object the improvement in the construction of that class of electrical instruments whose operating parts are inclosed by weatherproof casings, the object of my invention being greatly to simplify the construction and to provide a more compact arrangement of the operating parts.

Generally speaking, my invention may be described as consisting of a casing for the instrument, a diaphragm of extended area forming a wall or a portion of a wall of the casing, a hammer carried, preferably, by said diaphragm upon the exterior of the casing, an armature also carried by the diaphragm and disposed, preferably, within the casing, in which is also placed the electromagnet, and a circuit-changing portion within the casing and having one member carried by the diaphragm. The diaphragm is constructed of resilient flexible material, so that it may enable the armature to vibrate.

I will explain my invention more particularly by reference to the accompanying drawings, in which—

Figure 1 is an elevation of a vibrating bell constituting one embodiment of the invention. Fig. 2 is a cross-sectional view on line 2 2 of Fig. 1, illustrating also the circuit connections of the apparatus.

Like letters indicate like parts in both figures.

A receptacle *a* is provided with a cover *b*,

having a diaphragm *c* of resilient flexible material. The casing comprising the receptacle *a*, the cover *b*, and the diaphragm *c* forms a water-tight or weatherproof inclosure for operating parts, as will be hereinafter more fully explained. A vibrating or buzzing member *d* is preferably provided upon the exterior of the casing, a gong *e* being in this instance mounted upon the exterior of the casing, against which the hammer carried by the vibrating member is adapted to strike.

Within the casing is mounted an electromagnet *f*, whose cores are preferably perpendicularly disposed with relation to the diaphragm *c*, the poles of the electromagnet opposing the said diaphragm. I preferably provide an armature *g* for the electromagnet, which is preferably also inclosed within the casing, the said armature being secured to the diaphragm. I provide a leaf-spring *h*, which coöperates with the diaphragm to remove the armature from the opposed poles of the magnet, a set-screw *i* being provided for adjusting the tension of the spring. The spring is preferably provided with an extension supporting a contact-anvil *k*, opposed to a second contact-anvil *l*, these contact-anvils forming terminals of a circuit including the spring *h*, the set-screw *i*, a battery *m*, and the electromagnet *f*.

It will be observed that the conductor forming a part of the circuit is passed through a wall of the receptacle *a*. The parts are so adjusted that when the circuit is closed by a push-button or other switch *p* contact between the terminals *k* and *l* is rapidly made and broken. The contact parts *k* and *l* by being thus inclosed are free from the deleterious influence of moisture, &c.

While I have shown an electric bell that is operated by alternately making and breaking a circuit, other circuits may be employed.

I do not wish to be limited to the precise construction shown; but,

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In an instrument of the class described, the combination with an electromagnet, of a closed casing for containing the same, a dia-

phragm of yielding material forming a part of the said casing, an armature for the said magnet carried by the said diaphragm, and a vibrating member *d* carried by the diaphragm upon the exterior of the casing, substantially as described.

2. In an instrument of the class described, the combination with the closed casing, a yielding diaphragm forming a part thereof, of an electromagnet, circuit-changing means for controlling the circuit including the electromagnet included within the said casing, an armature for the electromagnet carried by the said diaphragm and a vibrating member *d* carried by the diaphragm, substantially as described.

3. In an instrument of the class described, the combination with two parts comprising an electromagnet and its armature, of an inclosed casing, a yielding diaphragm forming a part of the said casing, one of the aforesaid two parts being carried by the said diaphragm, a circuit-changing portion for controlling the circuit including the electromagnet contained within the inclosed casing and a vibrating member *d* carried by the diaphragm, substantially as described.

4. In an instrument of the class described, the combination with an electromagnet of a closed casing for containing the same, a diaphragm of yielding material forming part of said casing, an armature for the said magnet carried by the said diaphragm and a vibratory member *d* carried by the diaphragm upon the exterior of the casing, the armature being also contained within the casing, substantially as described.

5. In an instrument of the class described, the combination with an electromagnet, of a closed casing for containing the same, a diaphragm of yielding material forming a part of the said casing, an armature for the said magnet carried by the said diaphragm, the armature being also contained within the said casing, and a spring *h* within the casing for removing the armature from the electromagnet, substantially as described.

6. In an instrument of the class described, the combination with an electromagnet, of a closed casing for containing the same, a diaphragm of yielding material forming a part of the said casing, an armature for the said magnet carried by the said diaphragm, and a buzzing member *d* also carried by said diaphragm, substantially as described.

7. In an instrument of the class described, the combination with an electromagnet, of a

closed casing for containing the same, a diaphragm of yielding material forming a part of the said casing, an armature for the said magnet carried by the said diaphragm, a buzzing member *d* also carried by said diaphragm, and a spring *h* for effecting the removal of the armature from the electromagnet, substantially as described.

8. In an instrument of the class described, the combination with a closed casing, of an electromagnet with its armature contained within the said casing, a diaphragm forming a part of the said casing, upon which the said armature is mounted, a contact *k* carried by the armature, and a second contact *l* opposed to the contact *k*, the said contacts forming terminals of a circuit including the electromagnet and being inclosed within the said casing, substantially as described.

9. In an instrument of the class described, the combination with a closed casing, of an electromagnet with its armature contained within the said casing, a diaphragm forming a part of the said casing, upon which the said armature is mounted, a contact *k* carried by the armature, a second contact *l* opposed to the contact *k*, the said contacts forming terminals of a circuit including the electromagnet and being inclosed within the said casing, and a buzzer *d* also carried by the said diaphragm, substantially as described.

10. In an instrument of the class described, the combination with a closed casing, of an electromagnet with its armature contained within the said casing, a diaphragm forming a part of the said casing, upon which the said armature is mounted, a contact *k* carried by the armature, a second contact *l* opposed to the contact *k*, the said contacts forming terminals of a circuit including the electromagnet and being inclosed within the said casing, a buzzer *d* also carried by the said diaphragm, and a spring *h* for effecting the removal of the armature, substantially as described.

11. In an instrument of the class described, the combination with a closed casing, a vibrating diaphragm forming a part thereof, of a buzzing element *d* carried by the said diaphragm, and means for controlling the operation of the said element *d* located within the casing, substantially as described.

In witness whereof I hereunto subscribe my name this 8th day of July, A. D. 1899.

GEORG EUGEN LEOPOLD GRABE.

Witnesses:

WOLDEMAR HAUPT,
HENRY HASPER.