(No Model.)

H. F. ALBRIGHT.

ELECTRIC VIBRATING BELL.

No. 592,269. Patented Oct. 26, 1897.

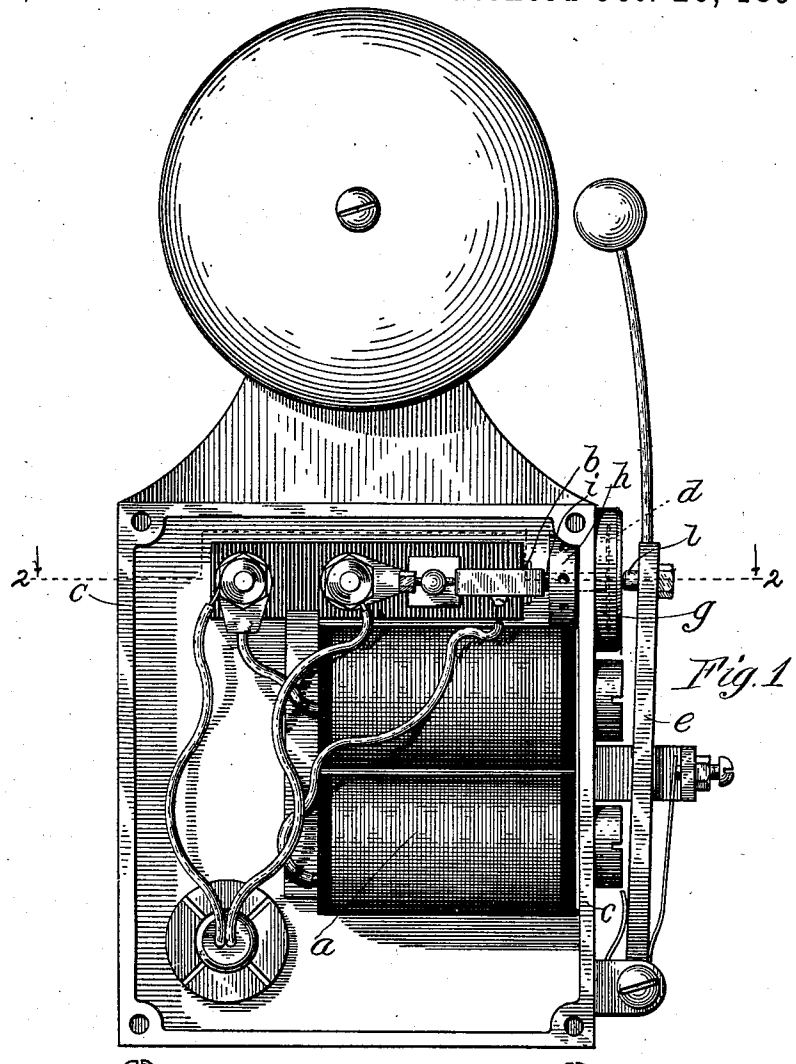

Fig. 1

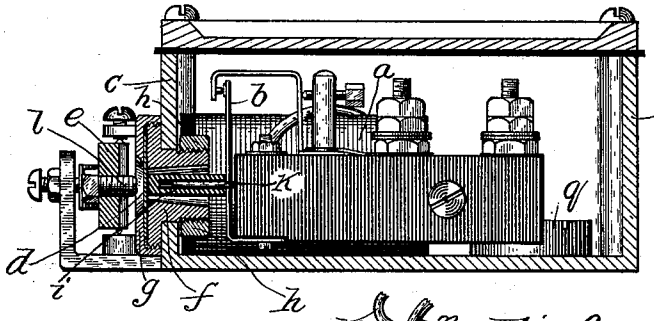

Fig. 2.

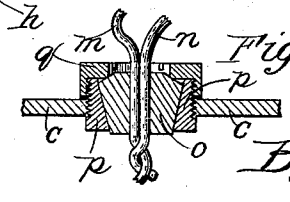

Fig. 3.

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UNITED STATES PATENT OFFICE.

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ELECTRIC VIBRATING BELL.

SPECIFICATION forming part of Letters Patent No. 592,269, dated October 26, 1897.

Application filed July 11, 1896. Serial No. 598,783. (No model.)

To all whom it may concern:

Be it known that I, HENRY FLEETWOOD ALBRIGHT, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Electric Vibrating Bells, (Case No. 1,) 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 electric vibrating bells and buzzers, and is specially intended to prevent water or moisture from penetrating to the electrical connections, contacts, and helices. Vibrating bells, especially when used on shipboard, for example, require such protection.

My invention particularly relates to inclosing the circuit-breaking mechanism and magnets in a water-tight case or compartment, while the vibrating armature is outside of the said case, my construction being such that the armature may in its vibration act upon the inclosed circuit-breaking spring-contact of the bell or buzzer, while the case is maintained closed, without permitting water or moisture to get into the case or compartment.

My invention relates further to a soft-rubber plug through which the connecting-wires are led into the case, the plug being compressed about the wires by an annular clamp screwed over the same. The medium which I have provided for communicating motion from the vibrating armature to the circuit-breaking contact-spring consists of a flexible or otherwise yielding diaphragm or part of the case which incloses the waterproof compartment. The case may be formed of any non-magnetic material. I find brass or like metallic composition suitable. The front of the casing I preferably make removable. A packing of rubber being interposed keeps out water or moisture. The magnets I preferably secure to the frame by means of soft-iron screws inserted from outside through suitable openings and screwed into the magnet-cores, the projecting ends of the screws constituting the poles of the magnet opposite the armature.

In the drawings which are illustrative of my invention, Figure 1 is a plan view of a vibrating bell embodying my invention. Fig. 2 is a view, partially in section, upon line 2 2 of Fig. 1. Fig. 3 is a detail view showing the manner of packing the wires as they lead through the case.

Like parts are indicated by similar letters of reference throughout the different figures.

The operation of the vibrating electric bell is well understood. The battery-circuit being closed through the electromagnet, the armature is attracted and the hammer is caused to strike the gong. The movement of the armature when thus attracted serves to open the circuit, and the magnet is thus deënergized and the armature is carried back by its retractile spring. This operation being rapidly repeated the armature is kept in vibration.

In Figs. 1 and 2 I have shown the electromagnet *a*, the circuit-breaking contact-spring *b*, and the electrical connections surrounded by the case *c*. This inclosing case is made water-tight in any suitable manner.

The principal feature of my invention consists in providing a yielding diaphragm or portion of the case *d*, through the medium of which motion from the armature *e* may be communicated to the circuit-breaking spring *b*. As shown in the drawings, the diaphragm *d* consists of a flexible or yielding disk of hard rubber held in position by means of a bushing *f* inserted through the side of the case, over which the disk is placed and secured by means of an annular clamping-cap *g*, which is screwed over the projecting head of the bushing. A lock-nut *h*, turned upon the inner end of the bushing, serves to secure the bushing in place. A sleeve *i*, supported loosely by the pin *k*, so that the sleeve may move longitudinally thereon, is interposed between the circuit-breaking contact-spring *b* and the diaphragm *d*, as shown. Upon the armature I provide a suitable lug or boss *l*, adapted to drum against the diaphragm *d* as the armature is vibrated. The diaphragm yields to the impact of the boss, and thus the sleeve *i* is moved longitudinally upon the pin *k* against the circuit-breaking contact-spring *b*, and thus the movement of the armature

outside the casing is permitted to operate the circuit-breaking contact-key without opening the casing—that is, the casing is maintained water-tight, while the outside armature in its vibrations operates the circuit-breaking device inclosed, with other parts to be protected, within the waterproof compartment.

In Fig. 3 the circuit-wires *m n* are led through holes provided in the soft-rubber conical plug *o*. This soft-rubber plug is inserted in a bushing *p*, screwed into the bottom of the case, as shown, and an annular cap *q* is provided, which being screwed down upon the thread provided on the bushing compresses the rubber about the wires, and the plug being thus compressed moisture is prevented from entering the compartment.

It will thus be seen that the broad feature of novelty consists in operating the circuit-breaker of the bell by means of the armature through the medium of a yielding water-tight diaphragm or portion of the side of the casing. Heretofore it has been proposed to build water-tight bells with a second armature inside the case at the inner end of the magnets, such additional armature being intended to operate the circuit-breaker. Such construction has been found expensive and unsatisfactory. Among other objections to the use of an extra armature I would mention the fact that when adjusted to operate in one position the armature will not operate properly in another position, as is required especially when bells are used on shipboard.

My invention herein will be found of special utility in the navy and in mining work, or wherever moisture and dirt would injuriously affect an ordinary vibrating bell or buzzer.

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

1. A waterproof case for a vibrating bell or buzzer, said case containing the electromagnet, the spring-contact and electrical connections and being provided with a diaphragm through which movement of the armature is communicated to the contact within the case to interrupt the circuit, said case being provided also with a soft-rubber plug through which the circuit-wires are led, and a screw cap or clamp for compressing the rubber of the plug about the wires in combination with the vibrating armature, whereby the case is maintained water-tight, while the armature outside the case is permitted to vibrate.

2. In combination, an electromagnet and switch-contacts controlling the current therein, a closed case containing the said electromagnet and the switch-contacts, a diaphragm of yielding material forming a part of said case, a spring-impelled lever carrying one of said contact-pieces normally pressed against the diaphragm, an armature for the electromagnet outside the case and a part impelled thereby adapted to strike the outer face of the diaphragm to move the switch-contacts within the case, substantially as described.

3. As a new article of manufacture an electric bell comprising an electromagnet, an armature therefor, a bell-hammer controlled by the armature, switch-contacts controlling the current in the magnet, and means for moving one of the switch-contacts through the agency of the armature, the electromagnet and the switch-contacts being inclosed in a sealed case, said armature being mounted upon the exterior of the case, substantially as described.

4. The combination with a case having an aperture, a yielding diaphragm or part hermetically closing the aperture, an electromagnet and circuit-breaking spring-contact of a bell or buzzer within the case, of the armature of said electromagnet without the case, adapted to press upon said diaphragm or yielding part when attracted to thereby move the circuit-breaking contact, and thereby interrupt the circuit, whereby the said contact and the electromagnet are protected from water or moisture, while the armature outside the case is permitted to vibrate; substantially as described.

In witness whereof I hereunto subscribe my name this 13th day of June, A. D. 1896.

HENRY FLEETWOOD ALBRIGHT.

Witnesses:
O. A. BELL,
E. S. KEEFER.