

(No Model.)

F. R. McBERTY.
POLARIZED SIGNAL BELL.

No. 598,269.

Patented Feb. 1, 1898.

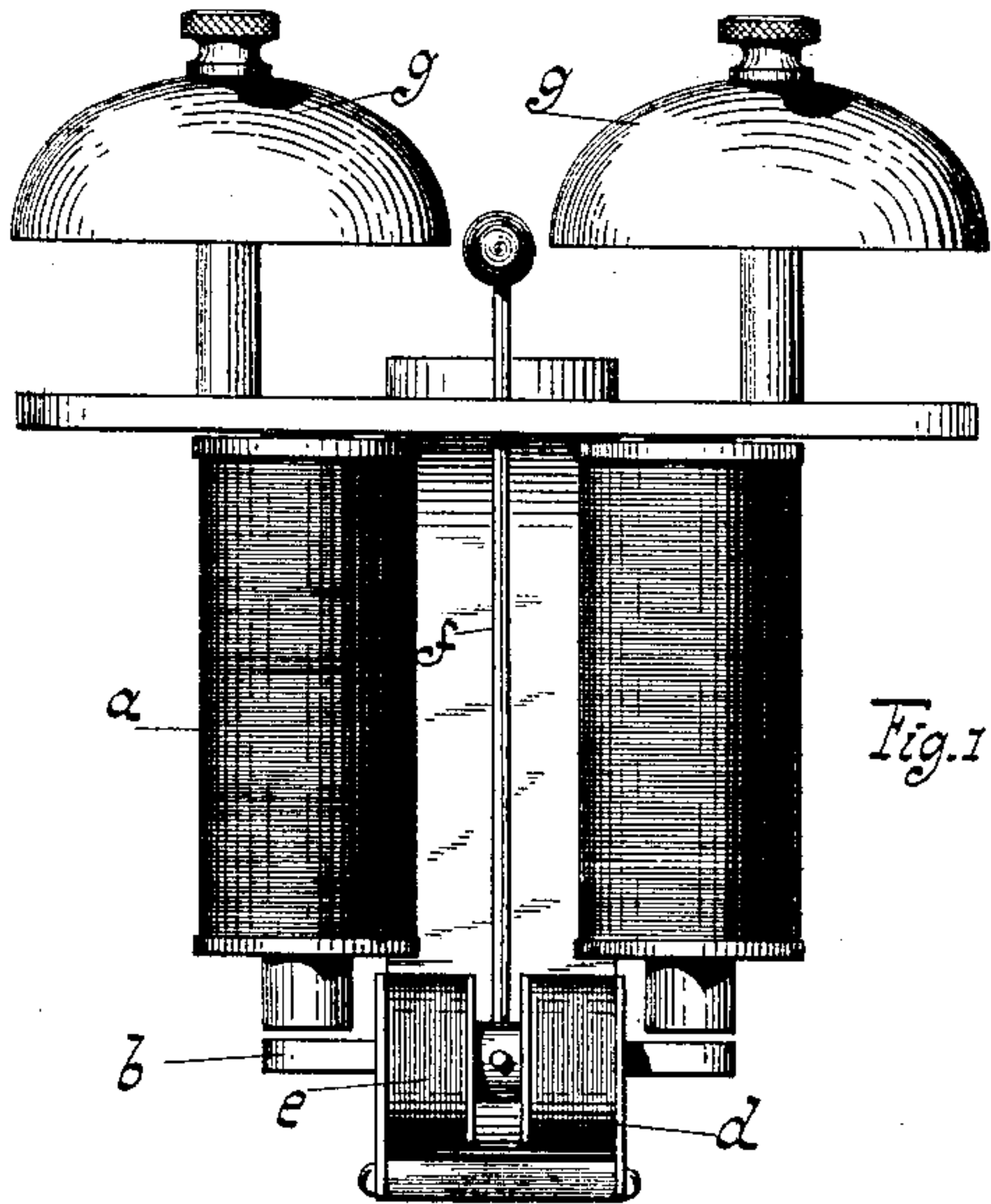


Fig. 1

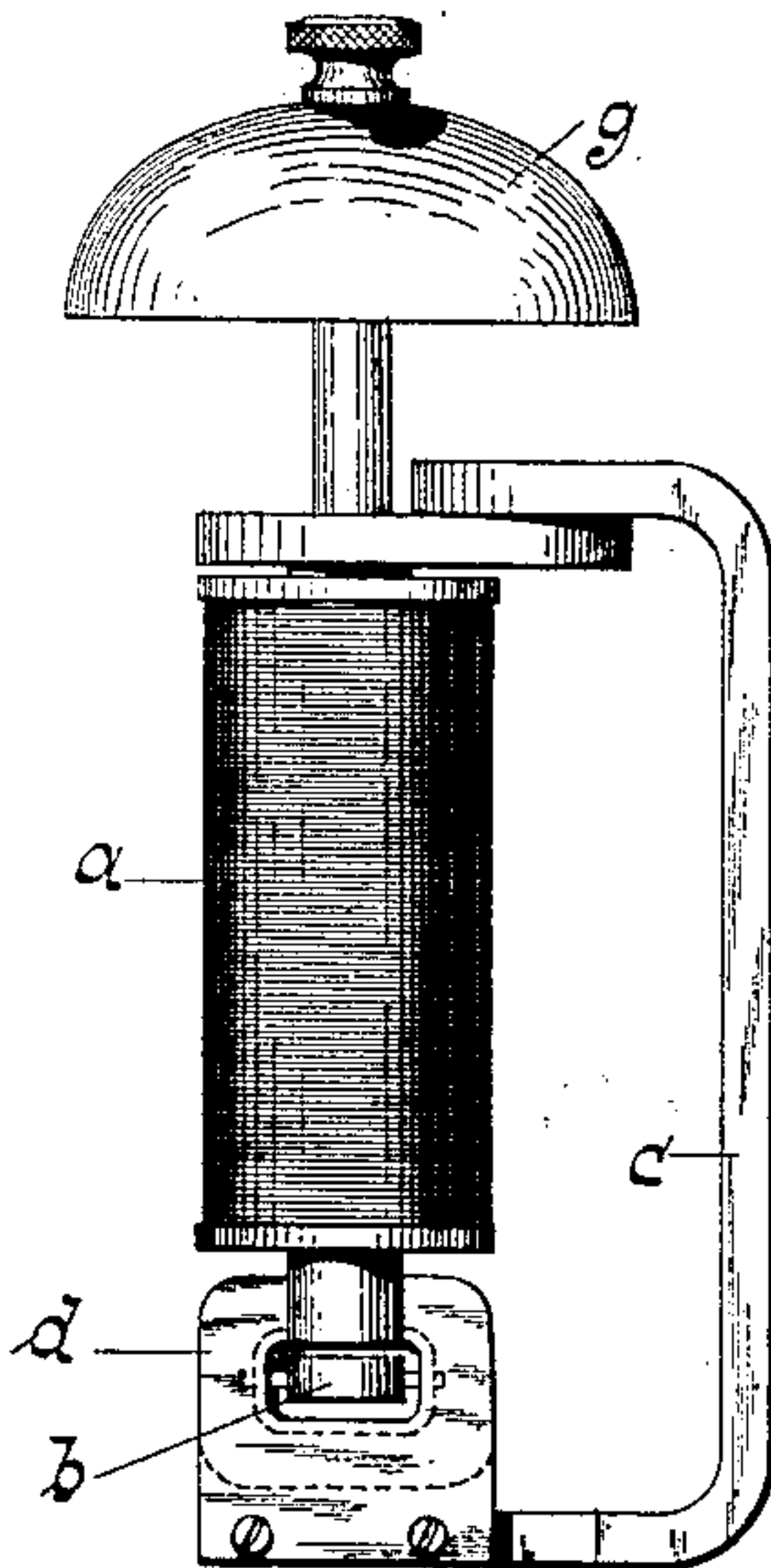


Fig. 2

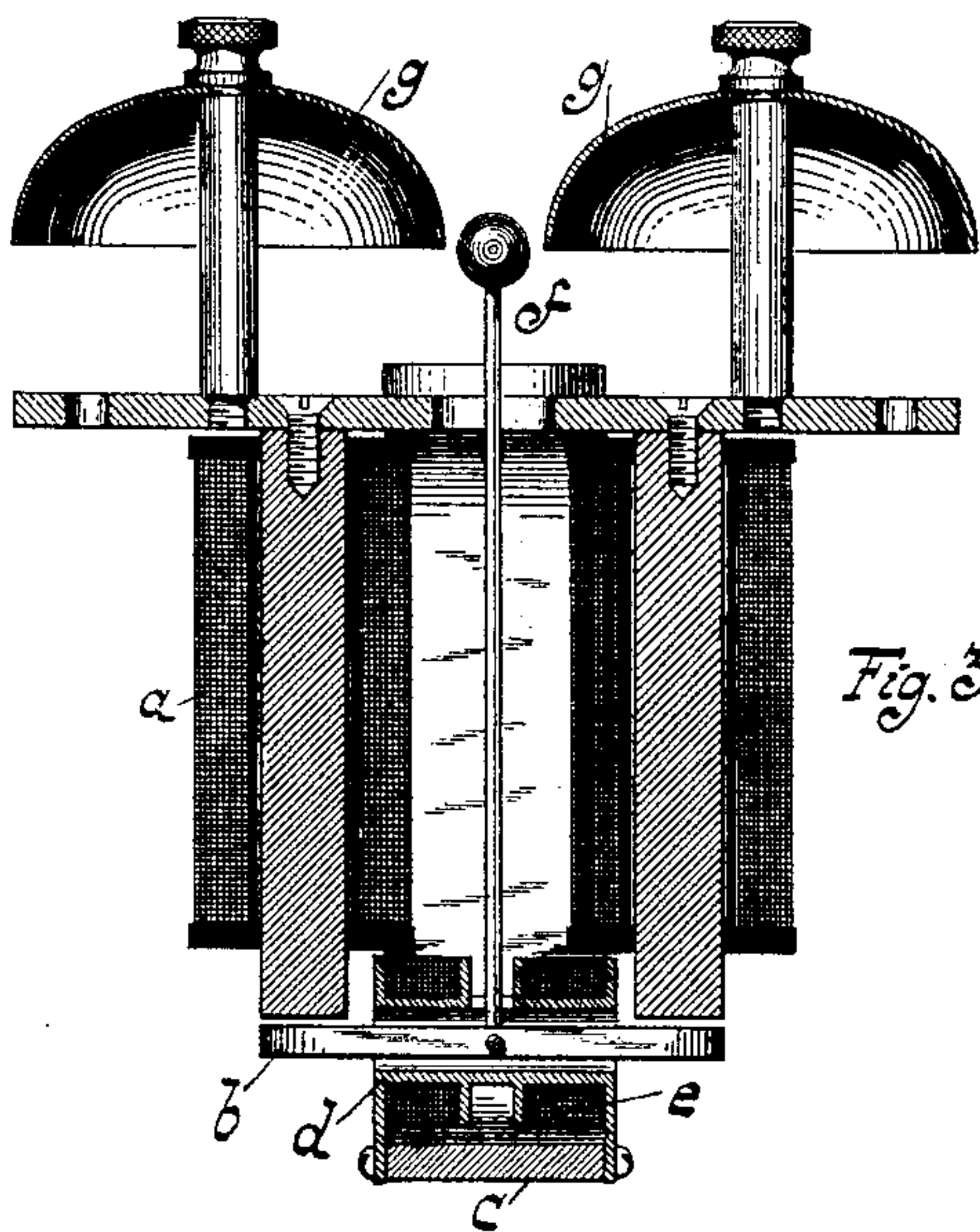


Fig. 3

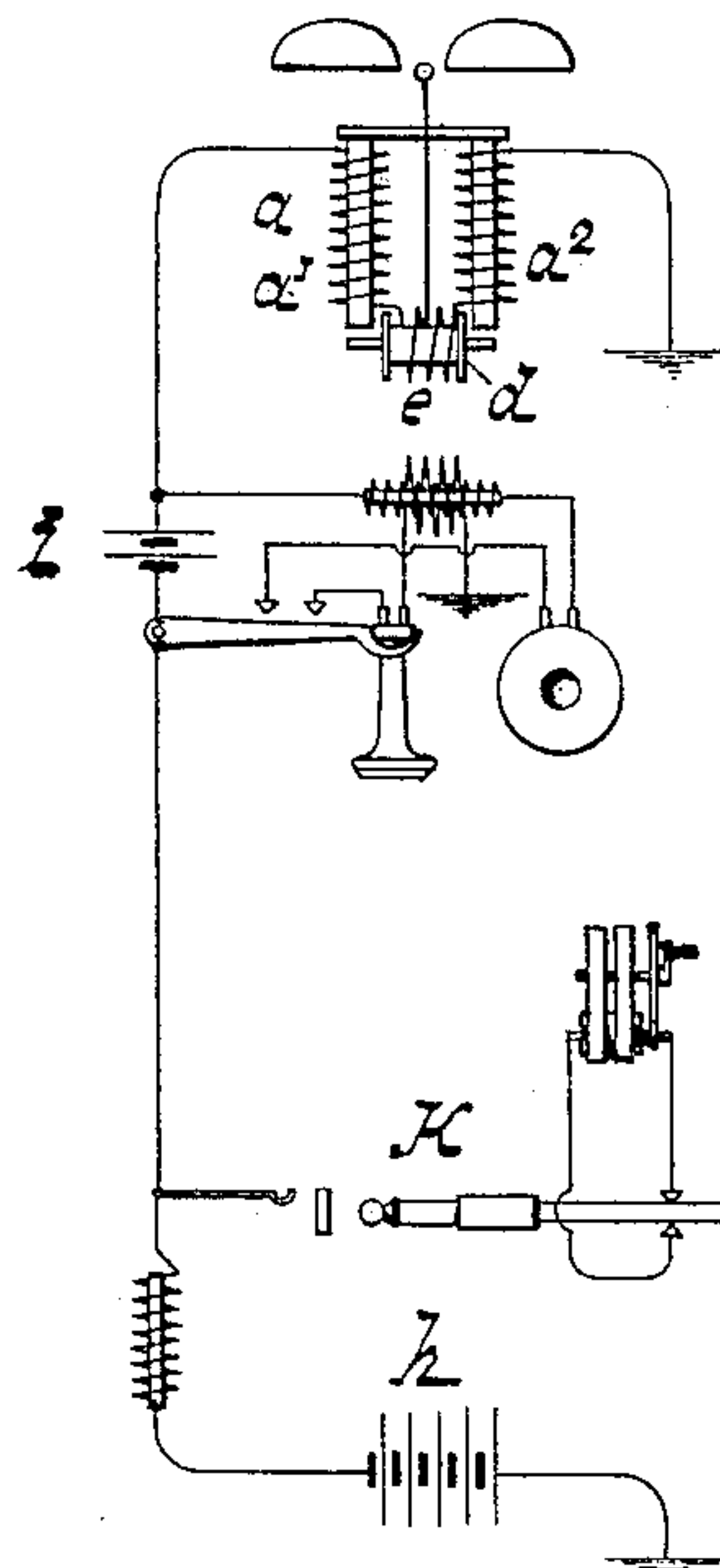


Fig. 4

Witnesses:

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UNITED STATES PATENT OFFICE.

FRANK R. McBERTY, OF DOWNER'S GROVE, ILLINOIS, ASSIGNOR TO THE
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POLARIZED SIGNAL-BELL.

SPECIFICATION forming part of Letters Patent No. 598,269, dated February 1, 1898.

Application filed November 24, 1896. Serial No. 613,262. (No model.)

To all whom it may concern:

Be it known that I, FRANK R. McBERTY, a citizen of the United States, residing at Downer's Grove, in the county of Du Page and State of Illinois, have invented a certain new and useful Improvement in Polarized Signal-Bells, (Case No. 48,) 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 is a signal-bell for telephone substations, and is designed to be responsive only to alternating or pulsating signaling-currents and to remain inert when traversed by an unvarying current. It is intended for use in telephone-lines furnished with storage batteries at their substations and with means for charging the storage batteries over the line-circuits during the idleness of the telephones.

The operation of the bells ordinarily employed in telephone-substations is seriously interfered with by this charging-current constantly present in the line.

My improvement consists in surrounding the armature or movable portion of the bell by a coil connected with the line-circuit and acting on the armature in opposition to the windings of the electromagnet of the bell, and also with a closed conducting-circuit of low resistance in position to protect the armature from magnetization by the said coil when it is traversed by the rapidly-varying currents. This closed conducting-circuit may be a copper tube placed about the armature and forming the spool on which the before-mentioned coil is wound. When the various windings of the bell are traversed by an unvarying current, the effect of the electromagnet of the bell upon the armature is neutralized by the opposing effect of the helix about the armature. When, however, the current through these windings is rapidly varied, the magnetization of the magnet is correspondingly varied, while that of the armature remains practically constant, being unaffected by the varying field of the winding about it, so that the armature is thrown into vibration in the usual way and serves to actuate suitable striking mechanism.

This improved bell is illustrated in the accompanying drawings, of which—

Figure 1 is a front elevation of the instrument. Fig. 2 is a side elevation thereof, and Fig. 3 is a transverse sectional view. Fig. 4 is a diagram representing the circuits through the different windings in conjunction with a telephone-line, a local storage battery at the substation thereof, and a central charging-battery therefor.

The bell comprises the usual electromagnet *a*, a centrally-pivoted armature *b* before its poles, and a permanent magnet *c*, with one pole presented to the yoke of the magnet *a* and its other extended into position to polarize the armature *b*. In the present invention the armature *b* is surrounded by a heavy spool or tube *d* of copper, over which is wound a coil *e* of insulated wire. The different parts may be assembled in a frame in the usual way. The armature *b* carries a tongue *f*, provided with a hammer which vibrates between two gongs *g*.

The windings *a'* *a*² of the magnet *a* and the winding *e* about the armature *b* are connected in series in the line-circuit, the polarity of winding *e* being arranged to oppose that of the windings *a'* *a*². The winding *e* should have a sufficient number of turns to completely neutralize the effect of magnet *a* upon the armature. In Fig. 4 this appliance is shown connected in a circuit with a charging-battery *h*, which may be located at a central office, and a local storage battery *i* at the substation. The magnet of a signal-controlling instrument is connected in the telephone-line, and a spring-jack is connected with the line for the purpose of uniting it with other lines. A calling-plug *k*, arranged for insertion into the spring-jack, forms the terminal of a generator of alternating current.

While the constant current from the battery *h* flows through the windings of the bell the armature of the bell remains in a neutral condition and stands indifferently in contact with either pole of the magnet *a*. When, however, the generator of alternating current is connected with the line by means of the plug, the rapid undulations of the current produced thereby in the circuit cause rapid variations

or alternations in the magnetism of magnet *a*. The field of winding *e* is of course of similar varying character; but the energy of this latter varying field is expended in inducing currents in the copper spool *d*, so that the armature *b* remains unaffected by it. Hence the armature, polarized by the permanent magnet, is thrown into vibration by the varying magnetism of magnet *a* in the usual manner.

10 The use of my invention is of course not limited to signal-bells, but may be applied in any case where it is desired to render an armature inert as to continuous currents in its magnet, but responsive to varying or alternating currents.

15 I desire to secure by Letters Patent—

1. The combination with an electromagnet, the armature thereof and a circuit including the windings of the magnet, of a helix connected with the same circuit inclosing some portion of the magnetic circuit of the magnet and acting differentially thereto, and a closed conducting-circuit of low resistance surrounding the magnetic circuit between the said winding and the said magnetic circuit, whereby the magnet is rendered inert as to continuous currents in its windings, but it remains responsive to varying currents, as described.

2. The combination with an electromagnet, 30 its armature and the circuit including the magnet-windings, of a closed conducting-circuit of low resistance surrounding the armature, and a winding connected with the said

circuit surrounding the said closed conducting-circuit and adapted to neutralize the magnetic effect of the magnet upon the armature, substantially as described. 35

3. The combination with a polarized magnet and a centrally-pivoted armature therefor, of a tube of copper surrounding the armature, 40 and a helix surrounding the tube of copper, the said helix being connected with the circuit of the magnet and being adapted to neutralize the magnetic effect thereof on the armature, substantially as described. 45

4. The combination with a telephone-line, a source of continuous current therein, a source of alternating calling-current and means for connecting it with the line, of a signaling instrument in the line comprising a magnet and 50 an armature therefor, a signal actuated by the armature, the magnet having differential windings connected with the line-circuit to neutralize each other, and a closed conducting-circuit interposed between the iron of the 55 magnetic circuit and one of said differential windings, whereby the signaling instrument remains inert as to the continuous current in the circuit, but is operated by the alternating current, as described. 60

In witness whereof I hereunto subscribe my name this 14th day of October, A. D. 1896.

FRANK R. MCBERTY.

Witnesses:

ELLA EDLER,
DUNCAN E. WILLET.