No. 825,406. PATENTED JULY 10, 1906.

M. K. McGRATH.

POLARIZED MAGNET DEVICE.

APPLICATION FILED JAN. 11, 1904.

Fig. 1

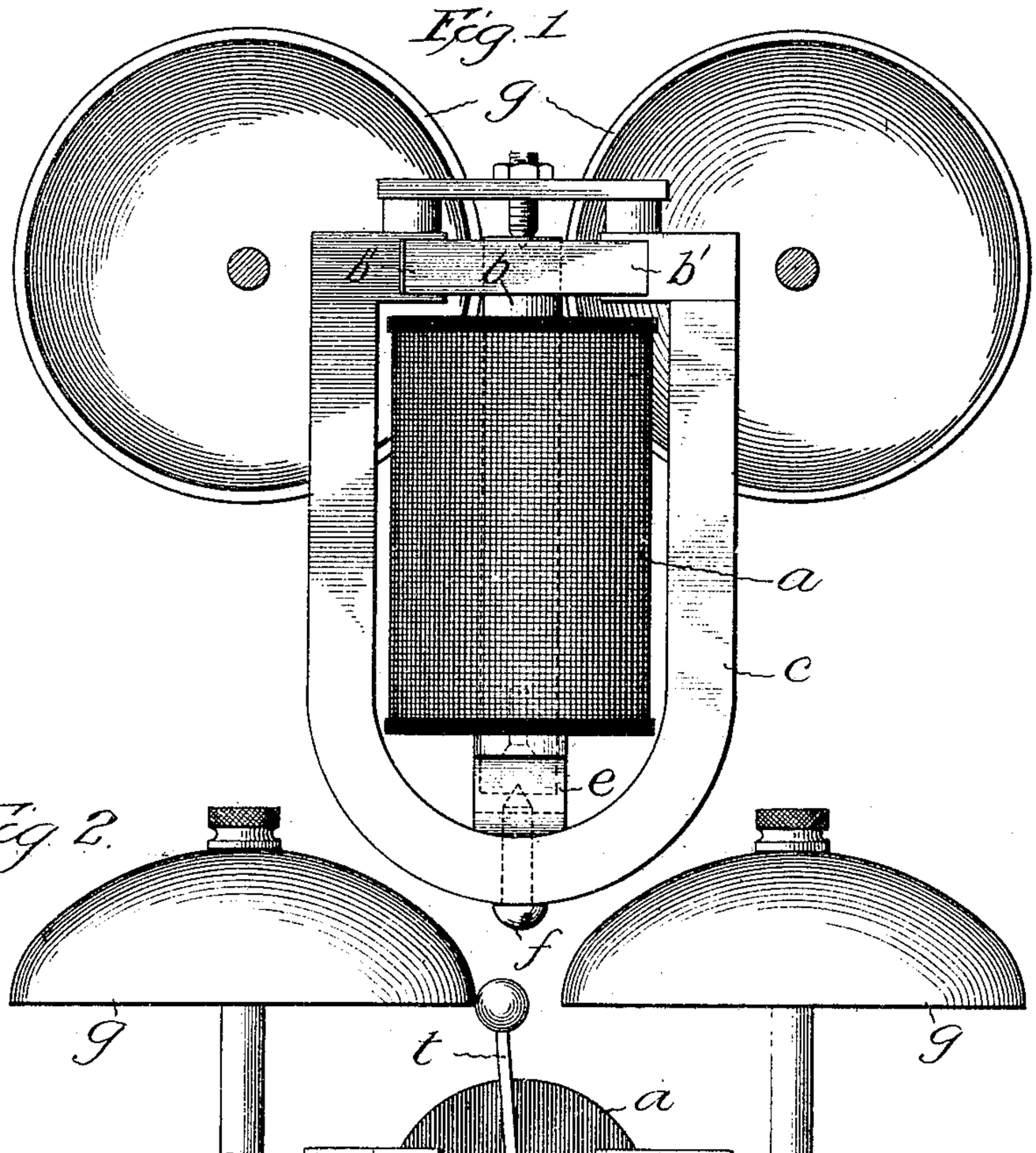


Fig 2.

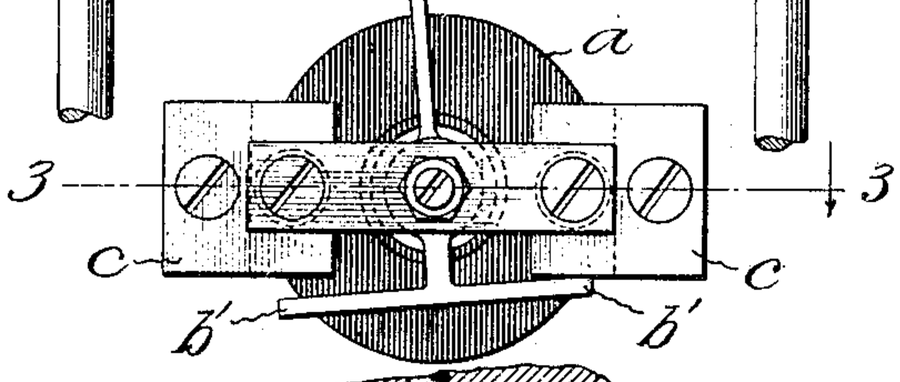
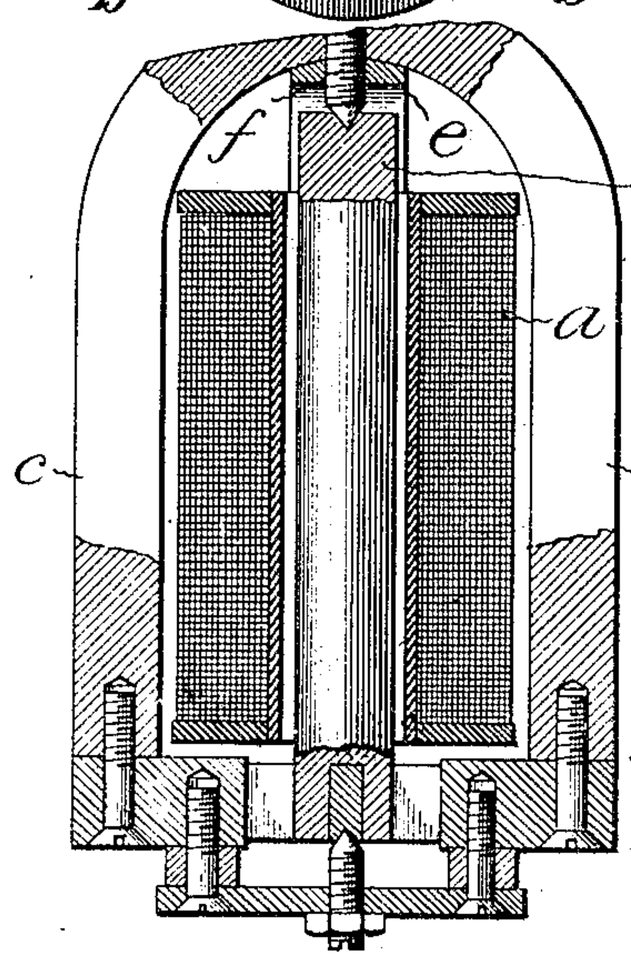


Fig 3.



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UNITED STATES PATENT OFFICE.

MAURICE K. McGRATH, OF CHICAGO, ILLINOIS, ASSIGNOR TO WESTERN ELECTRIC COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

POLARIZED-MAGNET DEVICE.

No. 825,406. Specification of Letters Patent. Patented July 10, 1906.

Application filed January 11, 1904. Serial No. 188,428.

To all whom it may concern:

Be it known that I, MAURICE K. McGRATH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Polarized-Magnet Devices, of which the following is a full, clear, concise, and exact description.

My invention relates to a polarized-magnet device of the kind which is used to operate telephone signal bells or ringers or for polarized relays; and its object is to provide an improved device of this character which will require but a single magnetizing-helix and will be highly efficient in operation and cheap and simple to manufacture.

I will describe my invention by reference to the accompanying drawings, in which—

Figure 1 is a bottom view of my improved polarized-magnet device. Fig. 2 is an end view thereof, and Fig. 3 is a vertical sectional view of the device.

The same letters of reference are used to designate the same parts wherever they are shown.

In the device shown a single magnet-helix *a* is provided surrounding a soft-iron core *b*, which is relatively movable therein. The core is pivoted to rock upon its axis from side to side and carries soft iron lateral extensions *b' b'*.

As shown, the magnet *c* is of the well-known horseshoe shape and the poles thereof are united by a non-magnetic bridge-piece *d*, in which one end of the core is pivoted. The other end of said core may be pivoted at the yoke portion of the magnet, said core lying between and parallel with the arms of the magnet. For the sake of compactness the core is mounted in the same plane as the poles of the magnet. The lateral extensions *b' b'* of the core are in position to be attracted or repelled by the poles respectively of the magnet, which are on either side thereof, whereby the core is turned upon its axis to one side or the other, dependent on the direction of the current through the helix. Said extensions *b' b'* form, in effect, a T-shaped extension in magnetic relation to the poles of the horseshoe-magnet. Said helix is supported between the legs of the permanent magnet by a U-shaped bracket *e*, secured to the yoke of the permanent magnet, the arms of said bracket being secured to one of the insulating-heads of the helix-spool on opposite sides of the core. The pin or screw *f*, which secures the bracket to the magnet-yoke, serves also as a pivotal mounting for one end of the core *b*.

Two gongs *g g* are illustrated in Figs. 1 and 2 in position to be struck by a tapper *t*, carried by the pivoted core *b*.

When a current is passed through the helix *a*, the core *b*, including the lateral extensions *b'*, is magnetized, the polarity of the end carrying said extensions depending, of course, upon the direction in which the current circulates in the helix around it. The horseshoe-magnet presenting a positive pole on one side of said core extension and a negative pole on the other side said extension if given, say, a positive polarity by the magnetizing-helix will be attracted by the negative pole and repelled by the positive. A reversal of current in the helix will reverse the polarity of the core extension, which will thereupon be attracted to the positive pole and repelled by the negative. The core will thus be turned axially to one side or the other as often as the current flowing in the helix is reversed. An alternating current, such as is used for signaling purposes in telephone-exchange systems, when passed through the helix *a* will produce a rapid vibration of the core and cause the tapper to strike alternately the gongs *g g*.

It will be apparent that by means of my invention I have been able to produce a device which is very compact and self-contained, which will operate with great efficiency, and which is simple and cheap to manufacture.

I claim—

1. The combination with a permanent horseshoe-magnet, of a soft-iron core lying parallel with the arms of said magnet, pivotal mountings for said core permitting the same to rock on its axis, a T-shaped soft-iron extension from said core in magnetic relation with the poles of said horseshoe-magnet respectively, and a stationary magnetizing-helix supported by said magnet and surrounding said core, whereby the core is caused to turn on its axis to one side or the other according to the direction of current in said helix.

2. In a polarized magnetic device, the combination with a permanent horseshoe-mag-

net, of a stationary magnetizing-helix supported between the legs of said magnet, a non-magnetic bridge-piece uniting the poles of said magnet, a core lying parallel with said magnet-legs, and surrounded by said helix, said core being pivoted at one end at the yoke of the magnet and at the other end in said bridge-piece to rotate axially, lateral extensions of said core, in position to be attracted or repelled by the poles of said magnet according to the polarity imparted to said core by said helix, and mechanism operated by said extensions in their movement.

3. The combination with a permanent horseshoe-magnet, of a bracket secured to the yoke of said magnet, a magnetizing-helix supported by said bracket between the legs of said magnet, a core lying parallel with said magnet-legs and surrounded by said helix, a non-magnetic bridge-piece uniting the poles of said magnet, said core being pivoted at one end of the yoke of the permanent magnet and at the other end in said bridge-piece to rotate axially independent of said helix, and extensions of said core in position to be attracted or repelled by the poles of said magnet.

4. In a polarized bell, the combination with a permanent horseshoe-magnet, of a non-magnetic bridge-piece uniting the poles thereof, a soft-iron core having one end pivoted in said bridge-piece, and the other end pivoted at the yoke portion of the horseshoe-magnet, soft iron lateral extensions of said core in position to be attracted or repelled by the poles respectively of said horseshoe-magnet to rock said core upon its axis from side to side, a stationary helix surrounding said core, said core being free to move axially therein, a tapper carried by the core, and gongs against which said tapper is adapted to strike in vibrating.

5. In a polarized magnetic device, the combination with a permanent horseshoe-magnet, of a bracket, a pin securing said bracket to the yoke of the permanent magnet and projecting beyond said bracket, a stationary magnetizing-helix supported by said bracket between the legs of said magnet, a non-magnetic bridge-piece uniting the poles of said magnet, a core lying parallel with said magnet-legs and surrounded by said helix, said core being pivoted at one end upon the aforesaid pin, and at the other end in said bridge-piece to rotate axially, lateral extensions of said core in position to be attracted or repelled by the poles of said magnet according to the polarity imparted to said core by said helix, and mechanism operated by said extensions in their movement.

6. The combination with a permanent horseshoe-magnet, of a core lying parallel with the arms of said magnet, a non-magnetic bridge-piece uniting the poles of said magnet, one end of said core being pivoted in said bridge-piece, the other end of said core being pivoted at the yoke portion of said magnet, extensions of said core in magnetic relation to the poles or said magnet, and a stationary magnetizing-helix supported by said magnet and surrounding said core.

In witness whereof I hereunto subscribe my name this 3d day of December, A. D. 1903.

MAURICE K. McGRATH.

Witnesses:
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