

W. KAISLING.
BIASED POLARIZED RINGER.
APPLICATION FILED MAY 31, 1912.

1,102,415.

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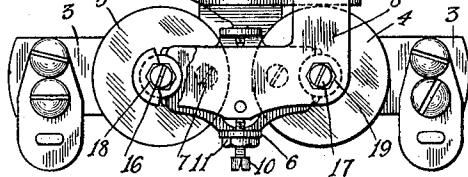
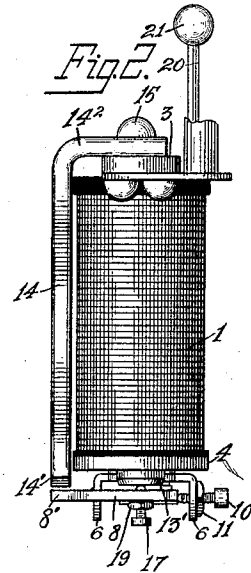
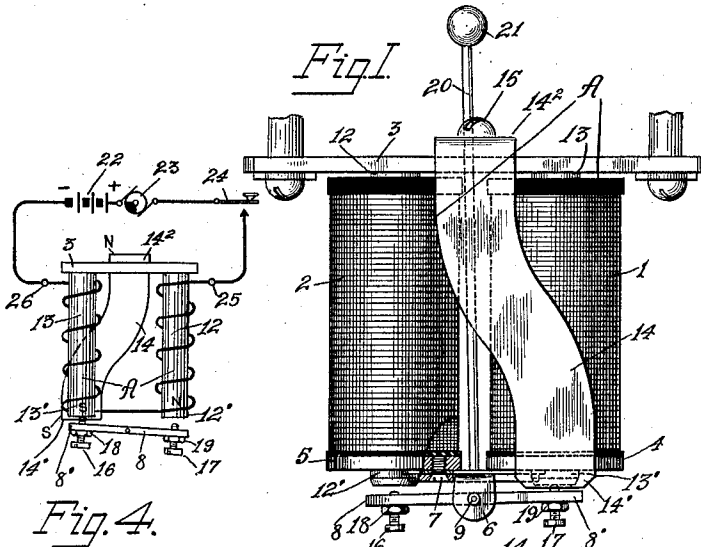


Fig. 3.

Fig. 4.

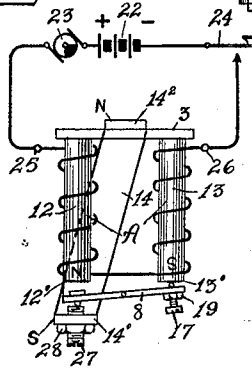


Fig. 5.

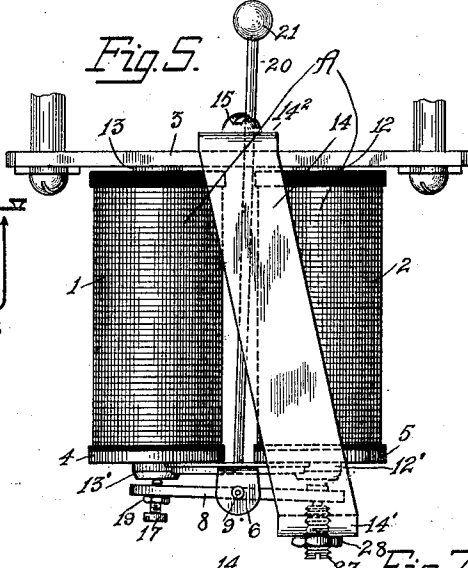
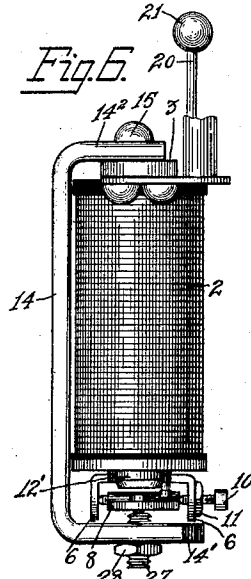
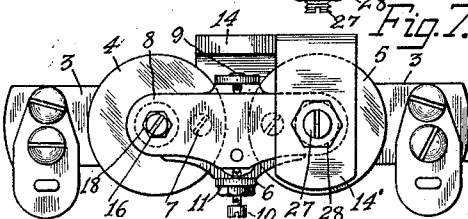


Fig. 6.



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UNITED STATES PATENT OFFICE.

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BIASED POLARIZED RINGER.

1,102,415.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM KAISLING, a citizen of the United States of America, residing in Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Biased Polarized Ringers, of which the following is a specification.

My invention relates to biased ringers and more particularly to biased polarized ringers in which a permanent magnet is provided for biasing the armature.

In another application of mine relating to ringers of the above character, I have claimed a biased ringer in which two permanent magnets are provided for effecting the biasing operation, and I consider my present invention an improvement over my previous one referred to in that I provide but a single electromagnet for effecting this biasing operation.

In the accompanying drawings I have shown several embodiments of my invention, like reference characters indicating like parts, and in which—

Figure 1 is a side elevation of the preferred embodiment; Fig. 2 is an end elevation of Fig. 1; Fig. 3 is a bottom view of Fig. 1; Fig. 4 illustrates diagrammatically a circuit arrangement for poling and operating the device of Figs. 1 to 3; Fig. 5 is a side elevation of a modification of the device of Figs. 1 to 3; Fig. 6 is an end elevation of Fig. 5; Fig. 7 is a bottom view of Fig. 5; and Fig. 8 illustrates diagrammatically a circuit arrangement for poling and operating the device of Figs. 5 to 7.

Referring now more particularly to the device of Figs. 1 to 3, said structure comprises a so-called horseshoe magnet A, including a pair of electromagnet spools 1, 2, connected by a yoke 3 having extending portions for supporting the bells in a well known manner. The heads 4, 5 of the spools 1, 2, are preferably of non-magnetic metal, and an armature supporting bracket 6 is secured to said heads 4, 5, by means of screws 7. An armature 8 is pivotally attached to bracket 6 by means of a pivoted stud 9 and a pivot screw 10, said screw being locked by means of a lock nut 11. In Fig. 3 a portion of armature 8 is broken away to show the bifurcated end of bracket 6 where it partly encircles the core 12, while the other end of bracket 6 likewise partly

encircles the core 13, this being shown by dotted lines in Fig. 3. A permanent magnet 14 is attached by means of a screw 15 at the middle of the yoke portion 3 of the horseshoe magnet A. Said magnet 14 extends to a point near the free end 13' of one of the cores 13 of magnet A, and armature 8 has an extending portion 8' adapted to coöperate with the free end 14' of magnet 14 so that the end of armature 8 that lies near the free end of magnet 14 is normally held in an attracted position due to magnetic flux flowing over a path including magnet 14, armature end 8', one of the cores 13 of electromagnet A, back to magnet 14 so that the armature is maintained biased by this attraction. A pair of adjusting screws 16, 17 are provided for armature 8, said screws being maintained in adjustment by means of lock nuts 18, 19. A clapper rod 20 is also attached to armature 8 and supports a clapper ball 21 adapted to strike the gong provided for the ringer but not shown here.

Operation of Figs. 1 to 4.—Fig. 4 illustrates diagrammatically a poling arrangement for the device of Fig. 1 in which the permanent magnet 14 has a south seeking pole 14' and a north seeking pole 14'', the north and south poles of said magnet 14 being indicated by the letters N and S, respectively. Assuming the electromagnet at normal and without any circuit closed through its winding, the armature 8 will be held in the biased position indicated, by a magnetic flux passing over a path including magnet 14, the left end of yoke 3, core 13 and the portion 8' of armature 8 back to magnet 14.

In order to vibrate the armature 8 a source of pulsating current is provided, a battery 22 and interrupter 23 being illustrated and connected in circuit with the windings of electromagnet A, said circuit being interrupted at the key 24. With the windings of electromagnet A arranged as in Fig. 4, in order to vibrate armature 8 the positive pole of the pulsating current source is connected to the terminal 25 while the negative pole of said source is connected to terminal 26. Upon closing key 24, positive pulsations of current pass through the windings of magnet A whereby a north pole 12' and a south pole 13' are produced, and as the two poles 13' and 14' which held the armature 8 biased are now of a like char-

acter. it is apparent that the magnetic pull upon the end 8' of armature 8 is destroyed and the magnetic flux now traverses a path from north pole 12', through armature 8 and the south poles 13', 14', returning over core 13 and magnet 14 to the core 12, whereby the opposite or single pole end of armature 8 is attracted by the pole 12'. This operating attraction upon armature 8 lasts only as long as this positive pulsation of current through magnet A, and when said pulsation ceases, the end 8' of armature 8 is again attracted to its normally biased position, as before. For each pulsation of current, the armature 8 is of course vibrated a single time, the frequency of its vibration being determined by the frequency of the pulsation.

Figs. 5 to 8.—In Figs. 5 to 8 I have illustrated a modification of the device of Figs. 1 to 4, the principal difference of construction being in permanent magnet 14. This magnet in the present device has its end 14' bent to project over the armature 8 and carries an adjustable screw 27 adapted to be held in position by means of a locking nut 28. With this arrangement the two poles which normally hold armature 8 biased act upon its opposite end instead of upon one of its ends as in the other device. This will be apparent as the magnetic flux produced by the permanent magnet 14 flows through the armature 8, core 12, yoke 3, returning over magnet 14. This path is of course the principal path for the flow of the normal magnetic flux produced by magnet 14 and although a multiple path is provided by core 13, this does not affect the normal position of armature 8.

Operation of Figs. 5 to 8.—In Fig. 8 I have illustrated diagrammatically a poling arrangement of electromagnet A and permanent magnet 14, together with an operating circuit therefor. Assuming a device poled to operate with the circuit connections illustrated in Fig. 8, the pole 14' of magnet 14 is made a south pole, while 14² is of course a north pole, and with the device at normal, that is, with its operating circuit interrupted, the armature 8 is held in the biased position illustrated due to the magnetic flux produced by permanent magnet 14 flowing over a path including its north pole 14², the right end of yoke 3, core 13 and armature 8 returning to magnet 14. When at normal the device of Fig. 8 differs from the device of Fig. 4 in that the two ends of armature 8 are acted upon in Fig. 8, while in Fig. 4 only one end of the armature 8 is acted upon, but the principle is the same in that one core 13 and permanent magnet 14 affect the normal biasing operation.

To operate the device of Fig. 8 the same principle applies as in the device of Fig. 4, that is, the core 13 of the horse-shoe magnet

A which normally assists in the biasing operation is energized to produce a pole 13' similar to the pole 14', which in this case is a south pole. To effect this result, I have shown the winding of magnet A of Fig. 8 the same as the magnet of Fig. 4, and the battery connections the same. When the key 24 is closed, a flow of current through the winding of magnet A is in such a direction that a south pole 13' and a north pole 12' are produced, and as the two poles 13', 14' which are holding armature 8 biased are now like poles, the biasing attraction upon said armature is interrupted, and said armature is moved by the operating attraction of the pole 12' and held in its alternate position during the flow of such pulsation. Of course, as soon as the pulsation ceases the armature 8 is restored to its normal biased position as electromagnet A is de-energized. As long as key 24 is kept closed the pulsations of current through magnet A affect vibrations of armature 8 in a manner as described.

Referring now to Figs. 4 and 8, when pulsations of opposite polarity to that shown and described are passed through the windings of the horse-shoe magnet A so that the pole 13' is of a polarity opposite to that of the pole 14' of permanent magnet 14, then no vibration of armature 8 results. It is apparent that with pulsations in a direction to produce opposite attracting poles 13' 14' that the armature 8 is retained in its normal biased position due to the increased magnetic flow which results.

While I have illustrated a way of poling the permanent magnet and the electromagnet to operate the embodiments of my invention, it will be apparent that my invention is by no means limited to the exact poling as shown and described, neither is it essential that the structure be built up as shown and described, as many changes and modifications may be made, and therefore I do not desire to be limited to the structures shown and described, but aim to cover all those changes and modifications as come within the spirit and scope of the appended claims.

What I claim as new and desire to secure by United States Letters Patent is:

1. A device of the character described comprising a horse-shoe electromagnet, a permanent magnet attached at one end to the yoke of said electromagnet and having a free end extending to a position adjacent one of the poles of said electromagnet, an armature adapted to coöperate with the poles of said electromagnet and normally held biased by the free pole of said permanent magnet and one of the poles of the electromagnet, and a winding for said electromagnet effective, when traversed by pulsations of current to produce a pole at the said attracting pole of the electromagnet

like the free or attracting pole of said permanent magnet, to vibrate said armature.

2. A device of the character described comprising a horse-shoe electromagnet, a permanent magnet supported with one end in magnetic relation to the yoke of said electromagnet and having its other end extending to a position adjacent one of the poles of said electromagnet, a pivotally supported armature normally held biased by the adjacent poles of said permanent and electromagnet, and a winding for said electromagnet effective, when traversed by pulsations of current adapted to produce like poles at the said biasing poles of the permanent and electro-magnet and an opposite pole at the other pole of said electromagnet to vibrate said armature.

3. A device of the character described comprising a horse-shoe electromagnet, an armature pivotally supported in operative relation to the cores of said electromagnet, a permanent magnet suitably associated with said electromagnet and armature so as to produce a normal magnetic flux in a path including said electromagnet said armature and said permanent magnet, said permanent magnet being positioned so as to produce an unvarying normal bias of said armature, and a winding for said electromagnet effective, when traversed by pulsations of current adapted to reverse said flow of magnetic flux in said electromagnet, to vibrate said armature.

4. A device of the character described

comprising a horse-shoe electromagnet, a permanent magnet attached at one end to the middle of the yoke of said electromagnet and having its free end extending obliquely to a position adjacent one of the poles of said electromagnet, a vibratile armature adapted to cooperate with the poles of said electromagnet and normally held biased by the free pole of said permanent magnet and one of the poles of the electromagnet, a winding for said electromagnet effective, when traversed by pulsations of current adapted to produce like poles at the attracting poles of the electromagnet and permanent magnet and an opposite pole at the other free pole of said electromagnet, to vibrate said armature.

5. A device of the character described comprising a horse-shoe electromagnet, an armature pivotally supported at a middle point with its opposite ends in operative relation to the free poles of said electromagnet, a permanent magnet attached at one end to the middle of the yoke of said electromagnet and having its free end adjacent an off-center portion of said armature so as to produce an unvarying normal bias of said armature.

Signed by me at Chicago, county of Cook and State of Illinois, in the presence of two witnesses.

WILLIAM KAISLING.

Witnesses:

G. E. MUELLER,
B. O'BRIEN.