No. 735,384. PATENTED AUG. 4, 1903.

M. R. HUTCHISON.

CHARGING SWITCH.

APPLICATION FILED NOV. 26, 1902.

NO MODEL.

Fig. 1

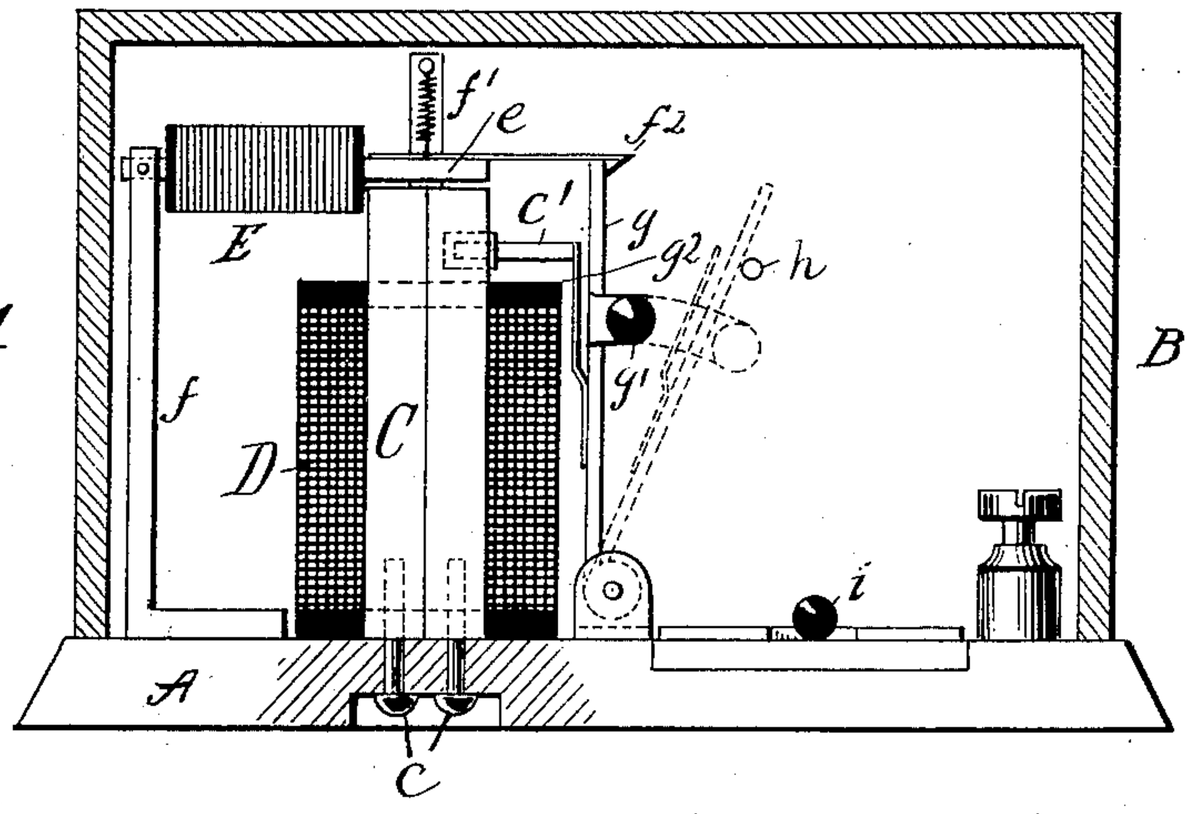


Fig. 2.

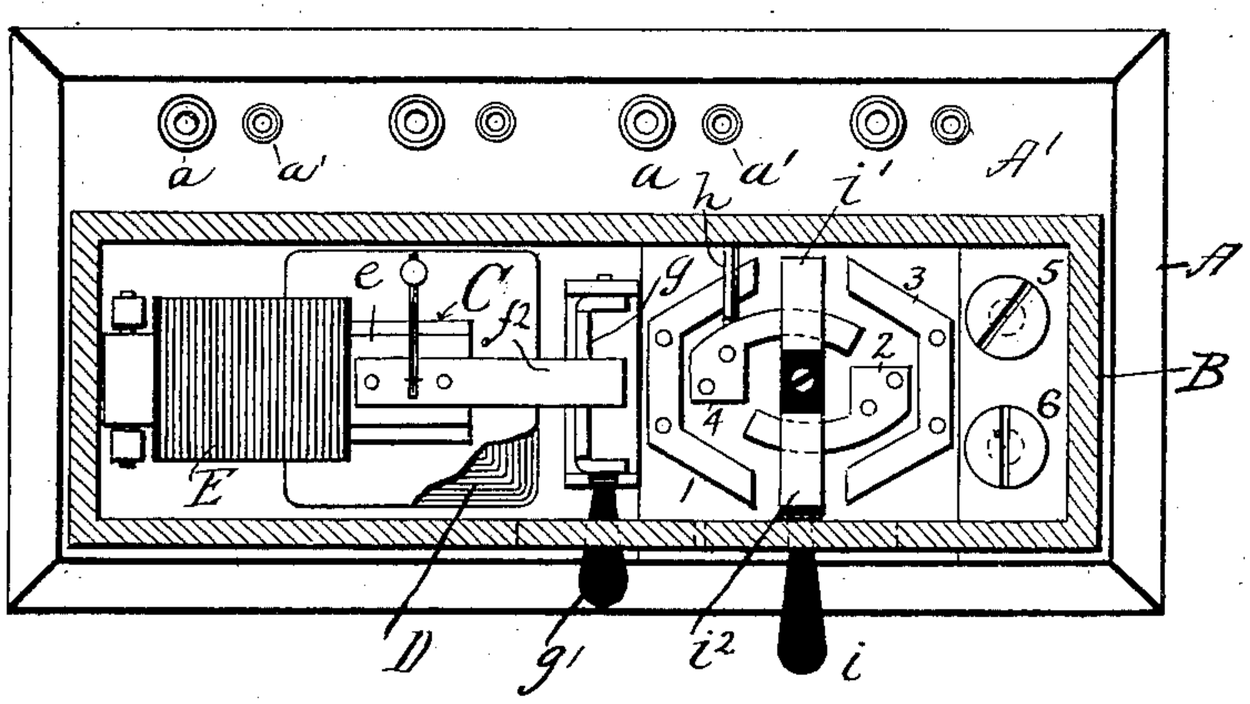
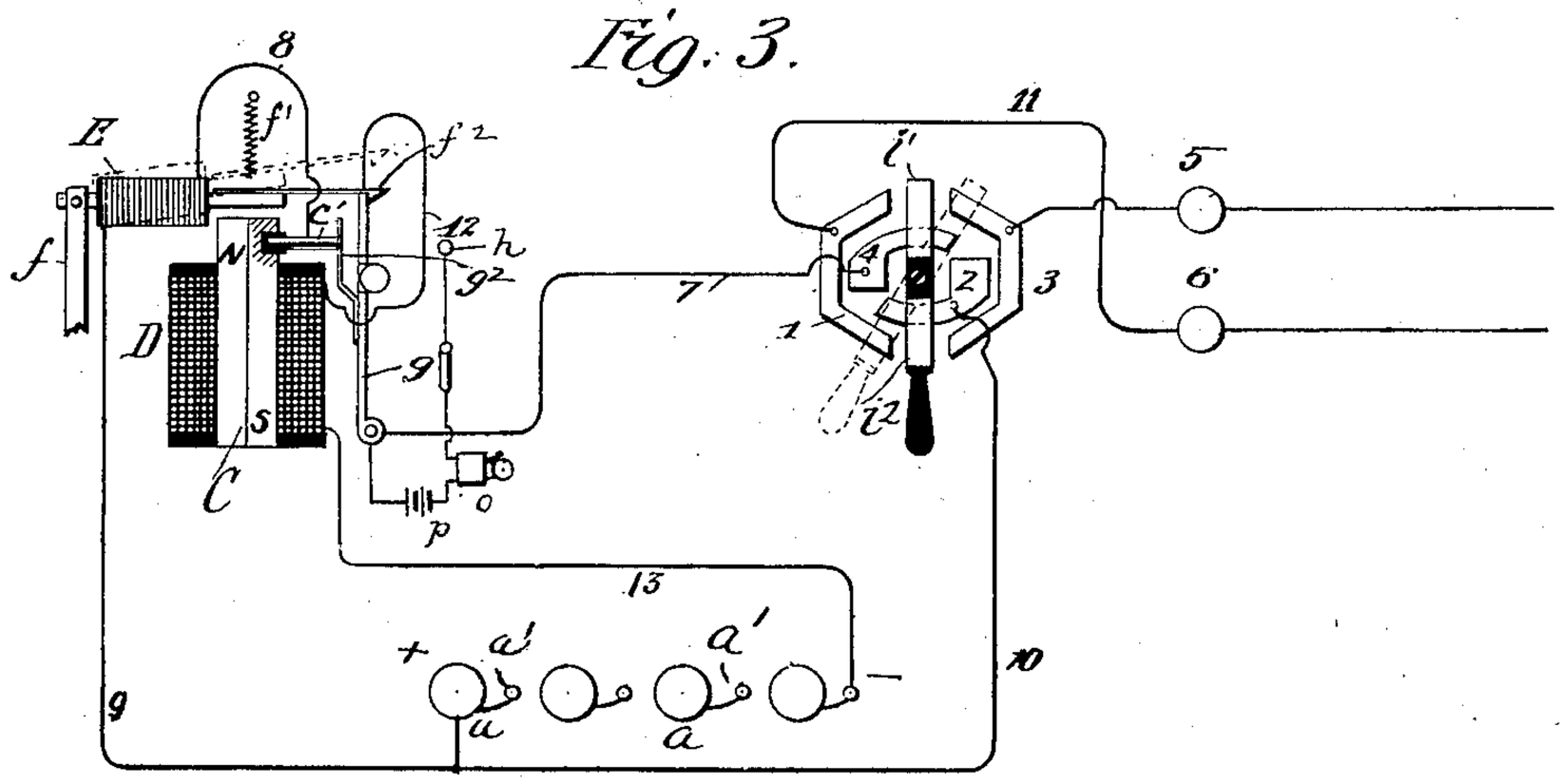


Fig. 3.



Witnesses
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No. 735,384. Patented August 4, 1903.

UNITED STATES PATENT OFFICE.

MILLER REESE HUTCHISON, OF NORWOOD, NEW JERSEY, ASSIGNOR TO HUTCHISON ACOUSTIC COMPANY, A CORPORATION OF NEW JERSEY.

CHARGING-SWITCH.

SPECIFICATION forming part of Letters Patent No. 735,384, dated August 4, 1903.

Application filed November 26, 1902. Serial No. 132,842. (No model.)

To all whom it may concern:

Be it known that I, MILLER REESE HUTCHISON, a citizen of the United States, residing at Norwood, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Charging-Switches, of which the following is a full, clear, and exact description.

This invention relates to charging-switches for storage batteries, the object being to provide a simple and efficient device for the use of persons not familiar with electrical apparatus and others and by means of which the charging-current cannot be allowed to pass through the battery in the wrong direction.

My improved apparatus includes an electromagnet and a permanent magnet acting upon each other, in combination with a circuit-closing lever and a latch for said lever controlled by the coöperation of the magnets.

It also includes means for preserving the permanency of the permanent magnet, to thereby overcome an objection to the use of such magnets in apparatus of this character.

In the accompanying drawings, Figure 1 is a central vertical section of the improved switch with parts in elevation. Fig. 2 is a horizontal section through the casing, showing the mechanism in plan; and Fig. 3 is a diagram of the circuits.

A is a base of insulating material, such as slate or wood, and B is a box or cover adapted to rest upon the base and cover all except a portion A′ along one side thereof. On the said uncovered portion are fixed a number of terminals a and a', to which the cells of a storage battery may be connected in series by means of plugs or in any suitable manner. Mounted upon the base is a permanent magnet C, consisting of four bars bunched together and secured on end to the base by means of the screws c. Surrounding this permanent magnet is an electrical helix D, for a purpose which will hereinafter appear, and mounted upon the magnet is a contact-pin c', set into an insulating-socket, as shown in Fig. 3.

E is an electromagnet whose soft-iron core e projects from both ends of the helix, one end being pivotally connected with the upper end of a standard f, while the other end projects over the pole of the permanent magnet C and is normally retracted therefrom by a spring f'. The pole-piece of this magnet carries a latch or hook f^2, reaching forward and adapted to engage with the upper end of a lever g. This lever is pivoted near the base and has a handle g' projecting through a curved slot in the casing B for hand manipulation. The lever also carries a contact-spring g^2, adapted to engage with the pin c' when the lever is thrown to the vertical position. This spring-contact also serves to throw the lever out of contact with the pin when the handle is released and the latch f^2 does not retain it. Fixed to the base A are also the metallic parts 1 2 3 4 of a pole-changing switch, of which i is the circuit-controlling element, pivoted at the center and provided with two metallic insulated plates i' and i^2.

5 and 6 are the binding-posts for the wires of the charging-circuit. h is a back-stop for lever g and is in circuit with an alarm o and battery p, as will hereinafter appear.

The circuits will be explained in connection with the operation which follows. Assuming that the terminals of the battery are always connected in the same way with reference to polarity to the terminal points a and a', the function of the switch will be to prevent any current except that of the proper polarity for charging to flow through the battery. The polarity of the charging-current, whose circuit leads to the posts 5 and 6, may change at any time. Hence the apparatus is intended to detect such changes, so that a reversal of polarity can be made and the charging properly accomplished without injury to the battery. In the normal condition the lever g stands in the inclined position shown in dotted lines in Fig. 1 and the magnet E is tilted upward in the position shown in dotted lines in Fig. 3. To charge the battery, the pole-changing switch-lever i is thrown either to the right or left. We will assume it to have been thrown to the left, as shown in dotted lines in Fig. 3. Then lever g is thrown to its vertical position to bring the two contacts c' and g^2 together. The complete circuit will thus be established as follows: from post 5 to plate 3, bridge-piece i',

plate 4, wire 7, lever g, spring g^2 pin c', wire 8, magnet E, wire 9, wire 10, plate 2, bridge-piece i^2, plate 1, and wire 11 to post 6. Now if we assume that the north pole of the permanent magnet C is at the upper end and that the current flowing through the magnet E is such as to produce south polarity in its pole-piece, which projects over the permanent magnet, the attraction of the two poles for each other will draw magnet E downward and cause the hook f^2 to engage with the upper end of lever g and hold the parts in the position to which they were moved by hand, thus indicating that the current is flowing through the battery in the proper direction for charging. The charging-current will then, however, be directed through helix D, as follows: from lever g to hook f^2, wire 12, helix D, wire 13, through the battery and wire 10, as before. Some of the current may or may not still continue through the coil E in parallel. At all events the permanent magnet is now strong enough to hold the hook in engagement with lever g until the current for any reason ceases or its polarity is changed. In case the polarity of the current in magnet E in the first instance is such as to produce a north pole in the pole-piece above the permanent magnet there will be a repulsion between it and the north pole of the permanent magnet and the hook will not engage lever g. Consequently when the hand is removed from the handle g' the lever will drop back to its inclined position and open the circuit, and none of the current which momentarily flows through magnet E will have passed through the battery. The return of the handle g' will also indicate to the person manipulating the device that the battery is not being charged. He will thereupon throw the pole-changing lever i to the opposite position, which will cause current to flow in the proper direction through the magnet E, and then moving the lever g, as before described, the charging will be properly accomplished.

The winding of helix D is such that the current traversing it will tend to strengthen the polarity of the permanent magnet, and thus insure the integrity of the circuit during the charging period. This vitalizing of the permanent magnet during the charging period also increases the permanency of the magnet.

To notify the operator at any time when the current ceases or its polarity changes during the charging process, I arrange to have lever g close the alarm-circuit $h\ o\ p\ g$, which it does when either of said events occur. This circuit would also be closed at the beginning of the charging operation in case lever g should fall back on account of wrong polarity of current.

Having described my invention, I claim—

1. In a charging-switch, the combination of a permanent magnet, a movable electromagnet having a pole within coöperative range of the permanent magnet, a latch carried by the electromagnet, and a circuit-closing lever adapted to be retained by said latch.

2. In a charging-switch, the combination of a fixed permanent magnet, a pivoted electromagnet having a pole within coöperative range of the permanent magnet, a spring normally restricting said pole, a latch carried by said electromagnet, a pivoted circuit-closing lever, a pair of contacts controlling the circuit of said electromagnet, one of which is carried by said lever, the latch being adapted to engage the lever when the current flows in one direction only.

3. In a charging-switch, the combination of a permanent magnet, an electrical helix surrounding the same, an electromagnet movably mounted and carrying a latch, a lever controlling the circuit of said electromagnet, and means whereby said electrical helix will be thrown into circuit when the current through the electromagnet is in a proper direction for charging.

4. In a charging-switch, the combination of a permanent magnet, an electrical helix surrounding the same, a pivoted electromagnet having a pole-piece within coöperative range of the permanent magnet, a spring normally retracting the electromaget from the permanent magnet, a latch carried by the electromagnet, a lever controlling the circuit of the electromagnet and adapted to be engaged by said latch and a circuit extending from said latch through said electrical helix, substantially as described.

In witness whereof I subscribe my signature in presence of two witnesses.

MILLER REESE HUTCHISON.

Witnesses:

FRANK S. OBER,

WALDO M. CHAPIN.