No. 781,072. PATENTED JAN. 31, 1905.

R. L. HIGHT.

SELF WINDING ELECTRIC CLOCK.

APPLICATION FILED JAN. 7, 1904.

Fig. 1.

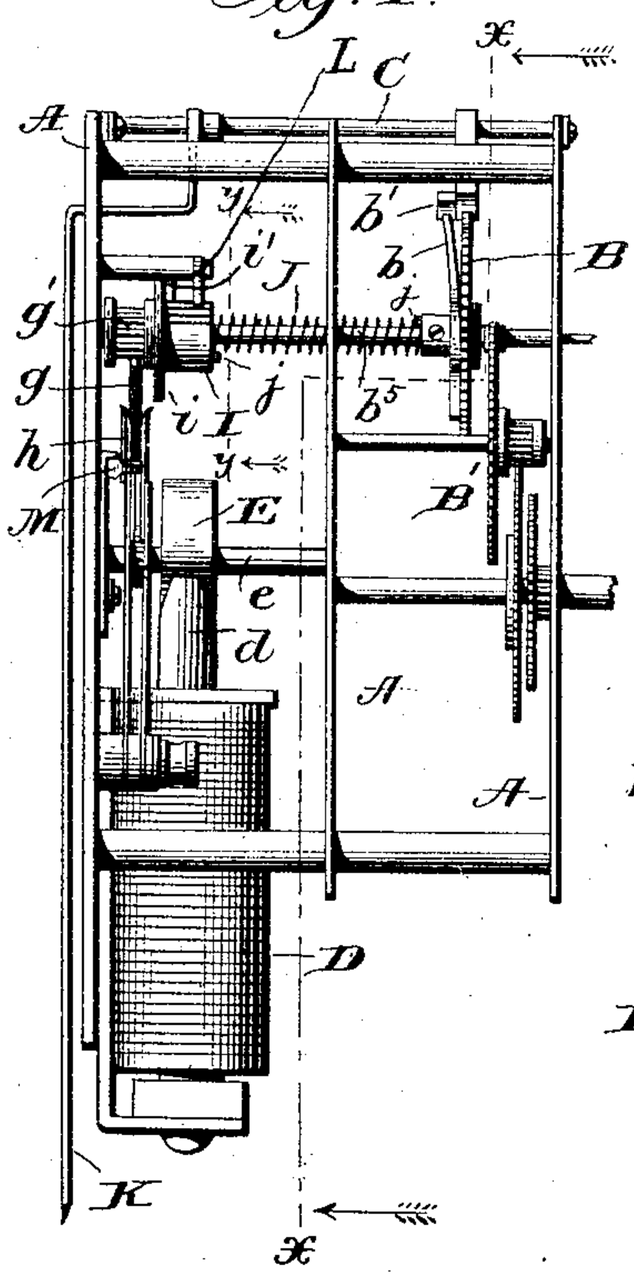


Fig. 2.

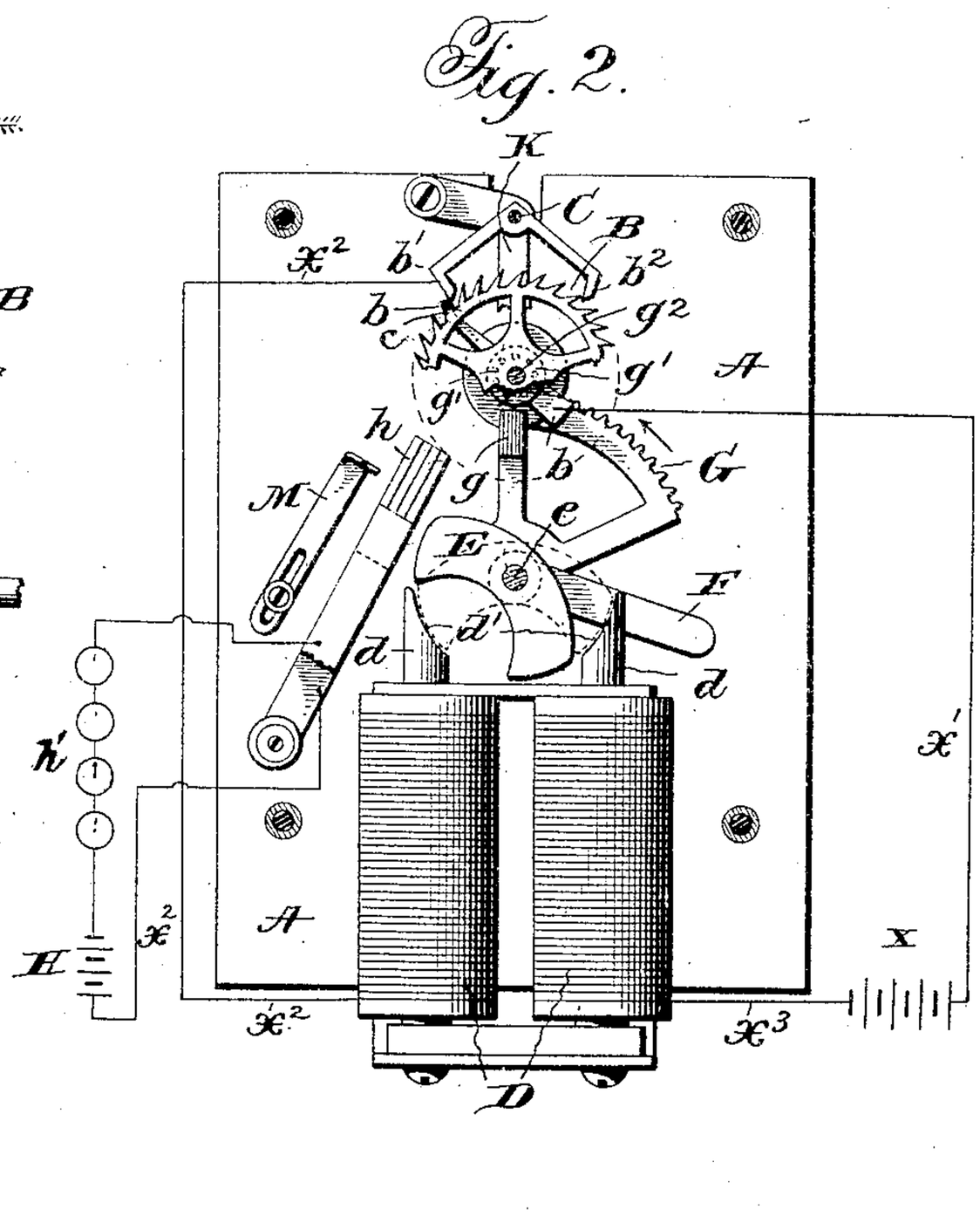


Fig. 3.

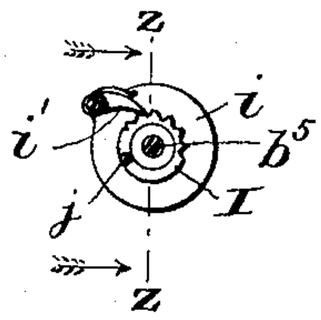


Fig. 4.

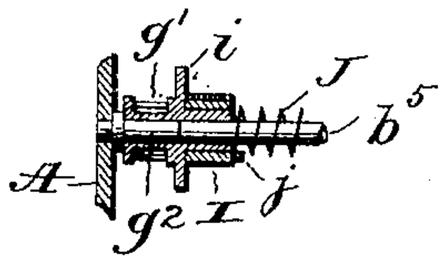
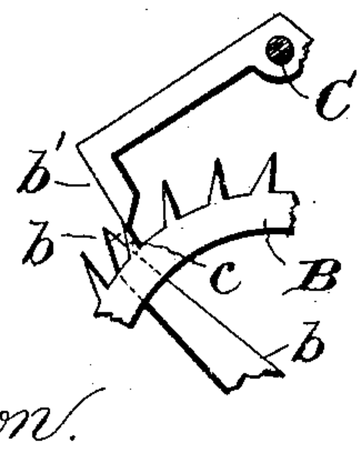


Fig. 5.



Witnesses:
Jas. E. Hutchinson.
Thos. P. Straith.

Inventor:
Robert L. Hight,
By Munn & Milans Attorneys.

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UNITED STATES PATENT OFFICE.

ROBERT LESTER HIGHT, OF DECATUR, ILLINOIS.

SELF-WINDING ELECTRIC CLOCK.

SPECIFICATION forming part of Letters Patent No. 781,072, dated January 31, 1905.

Application filed January 7, 1904. Serial No. 188,102.

To all whom it may concern:

Be it known that I, ROBERT LESTER HIGHT, a citizen of the United States of America, residing at Decatur, in the county of Macon and State of Illinois, have invented certain new and useful Improvements in Electric Clocks, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in electrically-controlled clocks, and has for its primary object the provision of a clock of this character having electromechanical means for insuring regular and accurate manipulation of the hands and preferably, though not necessarily, in combination with circuit-controlling means whereby subordinate or outlying clocks may be synchronously actuated.

With the foregoing objects in view a convenient embodiment of the invention includes in an electric circuit a circuit-closer, one member of which is carried by the escape-wheel of the clock, while the other is carried by its anchor, said circuit including a magnet, which in turn is operatively related to a specially-adapted armature, the immediately-associated parts of which coöperate with devices for periodically winding a spring connected to the escape-wheel, said spring imparting the desired movement to the escape-wheel, through the medium of which the clock-hands, both the minute and hour, or, if found expedient, the minute-hands only, are shifted.

The many novel details in the construction and arrangement of the several parts will be apparent from the detailed description hereinafter when read in connection with the accompanying drawings, forming part hereof, and wherein a preferable embodiment is illustrated.

In the drawings, Figure 1 is a side elevation of a clock somewhat dismantled to more clearly show the salient features of the invention. Fig. 2 is a vertical section on the line $x\ x$ of Fig. 1. Fig. 3 is a sectional view on the line $y\ y$ of the same figure. Fig. 4 is a section on line $z\ z$, Fig. 3; and Fig. 5 is a detail view.

Referring more specifically to the drawings, wherein like reference characters refer to corresponding parts in the several views, A designates the ordinary frame of a clock; B, the escape-wheel thereof; C, the escape-anchor, and B′ the operating-train for the hands.

X represents a local circuit for a purpose to be hereinafter defined, and the manner of completing this circuit will now be referred to. To one face of the escape-wheel B and insulated therefrom a contact-point b is secured, or said point may be otherwise mounted, so as to be in adjacence with said escape-wheel and rotatable therewith, the ends of said point being arranged immediately at the side of one of the teeth of the escape-wheel and of the same general shape as said tooth, whereby said contact-point in its travel with the escape-wheel may at predetermined intervals, in the present instance once each minute, come in contact with its coöperating point b', projecting laterally from one of the pallets of the anchor C, the opposite pallet of the anchor having a similarly-projecting portion b^2 in the nature of a jewel or other non-conducting substance of a weight to properly balance the anchor, but of a character to produce no effect electrically upon contact with the point b. The circuit X may take any desired course through partial wiring and metallic elements of the clock works and frame or through a complete system of wiring, the latter being conventionally shown in Fig. 2. In this figure it will be noted that a lead x' runs from the point b to the battery or electrical source X, while a lead x^2 runs from the point b' through certain magnets D, to be presently reverted to, connected to the opposite pole of the battery by a wire x^3.

The magnets D, above referred to, are conveniently arranged side by side upon the back plate of the clock, at the lower portion thereof, and have parallel cores d oppositely inclined or slightly curved on their inner faces d', between which a rocking armature E, mounted upon the rock-shaft e, works, the ends of said armature being of substantially the same curvature as the inner faces of the magnet portions d. Projecting laterally from the armature is a weight F for maintaining the same in the position shown in Fig. 2 when the magnets D are deënergized. The arma-

ture also carries a toothed segment G, provided at one edge with a contact g, arranged to under certain conditions bridge the terminals h of the circuit H, including the subordinate clocks h', to be synchronously actuated under the control of the clock now being specially considered. The teeth of the segment G mesh with a pinion g', loosely supported by a stub-shaft g^2, projecting forwardly from the back plate of the clock. The pinion g' has a flange i, carrying a spring-pressed dog i', so arranged that in the movement of the pinion the same will engage the teeth of a ratchet I, loosely sleeved upon the shaft b^5 of the escape-wheel, said shaft being in turn loosely supported in the end of the hub of the pinion g', as clearly shown in Fig. 4. Coiled about the escape-wheel shaft and arranged intermediate the hub of the escape-wheel and that of the ratchet I is a spring J, the ends of which are respectively connected, through the medium of screws j, to said hubs of the ratchet and escape-wheel.

The operation of the clock may now be followed. The spring J being initially wound tightly to put the same under tension and the pendulum K started, the escape-wheel anchor will permit the spring to gradually unwind with the rotation of the escape-wheel, such rotation of the escape-wheel being under the influence of said spring and operating the train B′ for shifting the hands. The spring will but partially unwind during each complete rotation of the escape-wheel, and it is for the purpose of rewinding or restoring the normal power of the spring that the other instrumentalities in the local circuit X, controlled by the contact-points b and b', are provided. When during the rotation of the escape-wheel the contact-point b is engaged by the coöperating point b' on the anchor, the local circuit is completed, which energizes the magnets D. This energization of the magnets attracts the armature E, whereby the same rocks into the horizontal position shown by dotted lines in Fig. 2, or with its ends in transverse alinement with the projecting cores d of the magnets, throwing the segment G in the direction of the arrow, (also elevating the weight F,) which rotates the pinion g' in the direction of the arrow. The pinion carrying the dog i' will in its movement rotate the ratchet I in the same direction as the direction of rotation of said pinion, thereby effecting the desired rewinding of the spring J, the pallets of the anchor maintaining a regularity of movement of the escape-wheel during the rewinding operation, and a locking-dog L, secured to a stationary portion of the clock-frame, engaging the ratchet, preventing reverse rotation of said ratchet and consequent immediate unwinding of the spring. The movement of the armature just above described causes the contact g to bridge the terminals h of the outgoing circuit H, which closes said circuit and causes actuation of the subordinate clocks h'. An adjustable stop M prevents excessive movement of the segment to the left. As soon as the contact-points b and b' separate and the magnets D consequently deënergized the weight F will restore the parts to the position indicated by full lines, Fig. 2.

The length of contact between the points b and b' may of course be varied to suit the conditions of different systems; but I have found that a very efficient contact is afforded by making the tooth of the escape-wheel immediately adjacent to the point b (said tooth being shown at c) somewhat shorter than the end of the contact-point and positioning the same slightly in advance of said contact-point, whereby the contact-point can engage the under side only of the point b', carried by the anchor.

It is to be understood that although certain disclosures have been made herein it is simply for the purpose of facilitating the impartation of a full understanding of the invention and that the invention is in no sense limited to any special structural features, excepting in so far as any such may be specifically included in the hereto-appended claims; also, that slight changes and alterations may be made without departing from the spirit of the invention.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is—

1. In an electric clock, electrically-controlled, means for actuating parts thereof, including a circuit-closer comprising the escape-wheel, its anchor, a contact-point movable with the escape-wheel, and a coöperating point carried by the anchor, the tooth of the escape-wheel immediately adjacent to the contact-point carried thereby being shorter than the contact-point, whereby the contact-point can engage the under side only of the contact-point carried by the anchor.

2. In a system of electric clocks, a master-clock, electrically-controlled means for actuating the parts thereof, including a magnet, a rocking armature, a segment carried by said armature, and means on said segment for closing an auxiliary circuit containing a series of secondary clocks.

3. In an electric clock, the combination with an escape-wheel shaft, an escape-wheel and the anchor therefor, of a spring operatively associated with said escape-wheel for actuating the same, and electrically-controlled means for successively winding said spring, including a stub-shaft secured to the clock-frame and abutting against the end of the escape-wheel shaft and forming a continuation thereof, a flanged hub loosely mounted on the stub-shaft and the end of the escape-wheel shaft, a pinion rigidly secured to said hub on one side of the flange, a ratchet-wheel loosely secured upon the hub

on the other side of the wheel, a dog secured to the flange of the hub and coöperating with the ratchet-wheel, a magnet, a rocking armature and connecting instrumentalities between said armature and said dog and ratchet.

4. In an electric clock, the combination with an escape-wheel shaft, an escape-wheel and the anchor therefor, of a spring operatively associated with said escape-wheel for actuating the same, and electrically-controlled means for successively winding said spring, including a stub-shaft secured to the clock-frame and abutting against the end of the escape-wheel shaft and forming a continuation thereof, a flanged hub mounted loosely on the stub-shaft and the end of the escape-wheel shaft, a pinion rigidly secured to said hub on one side of the flange, a ratchet-wheel loosely secured upon the hub on the other side of the wheel, a dog secured to the flange of the hub and coöperating with the ratchet-wheel, a magnet, a rocking armature therefor, and a segment movable with said armature and meshing with the pinion on the hub.

5. In an electric clock, the combination with an escape-wheel shaft, an escape-wheel and the anchor therefor, of a spring operatively associated with said escape-wheel for actuating the same, and electrically-controlled means for successively winding said spring, including a stub-shaft secured to the clock-frame and abutting against the end of the escape-wheel shaft and forming a continuation thereof, a flanged hub loosely mounted on the stub-shaft and the end of the escape-wheel shaft, a pinion rigidly secured to said hub on one side of the flange, a ratchet-wheel loosely secured upon the hub on the other side of the wheel, a dog secured to the flange of the hub and coöperating with the ratchet-wheel, a locking-dog secured to the clock-frame and coöperating with said ratchet-wheel to prevent backward movement thereof, a magnet, a rocking armature and connecting instrumentalities between said armature and said dog and ratchet.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT LESTER HIGHT.

Witnesses:
FRANK CURTIS,
MAC E. CROSSMAN.