G. H. RUPLEY.

ELECTRIC CLOCK WINDING MECHANISM.

APPLICATION FILED AUG. 10, 1908.

1,023,684.

Patented Apr. 16, 1912.

Fig. 1.

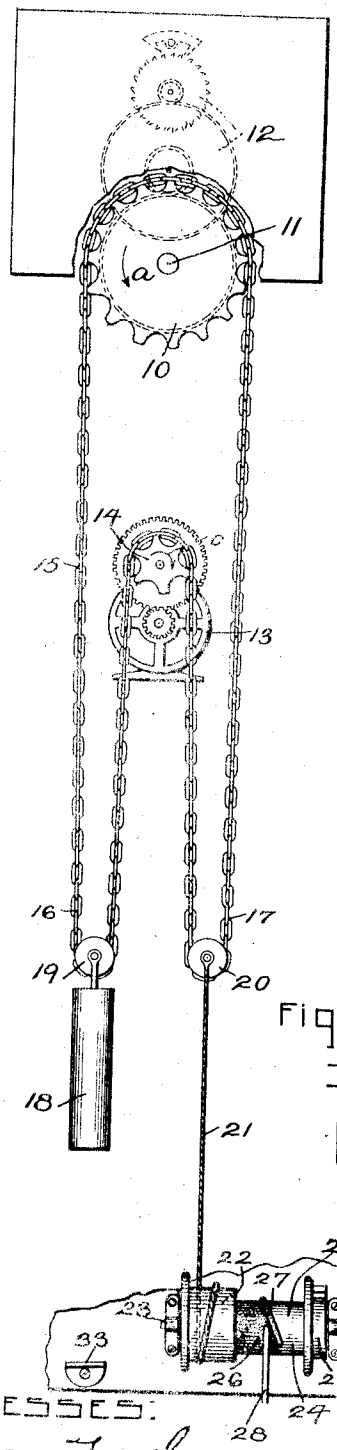


Fig. 2.

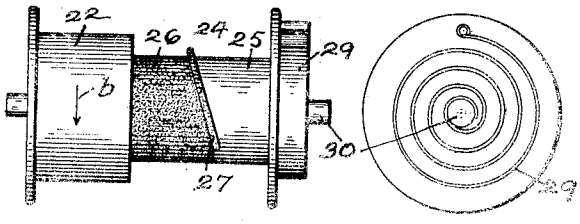
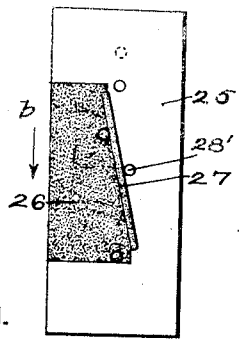


Fig. 3.

Fig. 4.



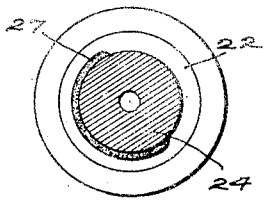


Fig. 6.

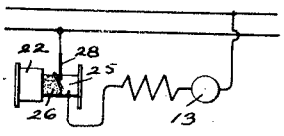
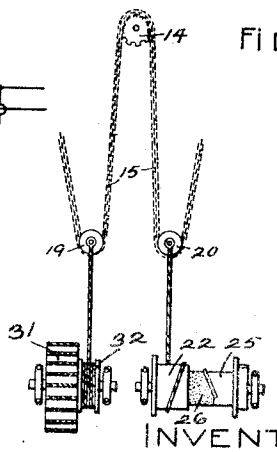


Fig. 5.



WITNESSES:

M. Ray Taylor

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INVENTOR:

GEORGE H. RUPLEY.

BY Frank K. Seabolt

ATTY.

UNITED STATES PATENT OFFICE.

GEORGE H. RUPLEY, OF SCHENECTADY, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, OF ONE-HALF TO FRANK J. SEABOLT AND ONE-FOURTH TO EDWARD C. HALL, OF SCHENECTADY, NEW YORK, AND ONE-FOURTH TO EDWARD F. PICKFORD, OF WASHINGTON, DISTRICT OF COLUMBIA; MABEL H. HALL EXECUTRIX OF SAID EDWARD C. HALL, DECEASED.

ELECTRIC CLOCK-WINDING MECHANISM.

1,023,684. Specification of Letters Patent. Patented Apr. 16, 1912.

Application filed August 10, 1908. Serial No. 447,808.

To all whom it may concern:

Be it known that I, GEORGE H. RUPLEY, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Electric Clock-Winding Mechanisms, of which the following is a specification.

This invention relates to the automatic winding of clock mechanisms and the like, and has for its object the provision of means whereby an electric current will be periodically utilized to effect the winding of the clock mechanism after a predetermined amount of energy has been consumed.

My invention relates more specifically to the winding of clocks of the type known as weight clocks in which energy is stored by means of a weight instead of a spring, the arrangement being such that an electric motor is periodically energized to lift the weight a predetermined amount.

One of the objects of my invention is to provide means whereby a clock mechanism of this character may be connected to an electric lighting or power circuit, and will wind and rewind to restore energy to the clock mechanism at intervals and require no attention.

A further object of my invention is to provide against failure of operation of the motor due to failure of current or other cause. This object I accomplish by arranging the parts so that if the power should fail when it becomes time for the mechanism to be wound, the clock mechanism will continue to operate for a definite period, and, when the power returns, the weight is lifted to its highest point so as to fully restore the energy. Furthermore the lifting of the weight of my mechanism is accomplished without removing the strain of the weight from the clock mechanism so that the pull of the weight is uniform at all times even while the weight is being lifted.

Further objects of my invention will appear in the course of the following specification in which I have shown my invention embodied in concrete form for purposes of illustration.

In the drawing disclosing my invention, Figure 1 shows, somewhat diagrammatically, my invention applied to a clock mechanism; Fig. 2 represents a side and end elevation of the contacting drum; Fig. 3 shows the contact drum developed on a flat surface; Fig. 4 shows a sectional view of the contact drum; Fig. 5 shows my invention employing a spring instead of a weight; and Fig. 6 is a diagram of the circuit connections.

Referring to the drawing, 10 represents a sprocket wheel suitably mounted upon an arbor 11 so as to operate the clock train 12. This sprocket is arranged so as to operate the clock mechanism when driven in the direction of the arrow *a*. An electric motor 13 is placed so as to store energy in the clock mechanism. The construction of this motor forms no part of my invention and may be of any well-known and suitable design. A sprocket wheel 14 is geared to the armature of the motor and is engaged by an endless chain 15 which passes over the sprocket 10 so as to form two loops 16 and 17, one on each side of the motor. A weight 18 or its equivalent, a spring, is movably connected to the loop 16 by means of a sheave 19, and a sheave 20 is likewise mounted in the loop 17. A flexible cord 21 is secured to the sheave 20 and passes over a drum 22 mounted in bearings 23. This drum comprises a plain portion to which one end of the cord 21 is attached so as to wind up the cord and a contacting portion 24 of smaller diameter. This latter portion has a conducting metal surface 25 and an insulating surface 26 separated by a flange or rib 27 arranged at an angle to the axis of rotation. A spring contactor 28 having a brush 28′ is arranged so as to engage either the conducting or insulating portion of the drum and be deflected from one surface to the other by the flange 27. This drum is given a spring tension or bias in a direction to wind up the cord 21 in any suitable manner, as for instance by means of a spring 29 or its equivalent. This spring has its inner end secured to the shaft 30 while its outer end is secured to the flange on the drum. The shaft 30 is fixed in the bearings 23 and when the drum is rotated it places a tension on the spring.

29 so that the drum has a tendency to rotate in the direction of the arrow *b*.

The mode of operation of my device is as follows: During the normal operation of the clock, the weight 18 is exercising a pull on the chain 15 so as to rotate the sprocket, the sheave 19 slipping along the chain as the weight descends. During this movement of the weight, the motor is stationary. As the weight travels downward and the sprocket 11 rotates in the direction of the arrow, the loop 17 is shortened and the cord 21 rotates the drum against its spring tension. During this movement the brush 28' is in engagement with the insulating surface 26 so that the motor circuit is open. The brush engages the flange 27 and is deflected as the drum rotates. When it reaches the end of the flange it snaps over onto the conducting portion 25 so as to close the motor circuit as shown in Fig. 6. The motor now rotates in sprocket 14 in the direction of the arrow *c* thereby lifting the weight 18 and at the same time lowering the sheave 20, the drum 22 taking up the slack in the cord 21 as the drum rotates in response to its spring tension. During the rotation of the drum the contactor remains in engagement with the conducting surface 25 and is again deflected by the flange 27. When it reaches the end of the flange it again snaps over onto the insulating surface and stops the motor. It is quite evident that a spring may be substituted as an equivalent for the weight 18, and in Fig. 5 I have shown a clock spring 31 and a drum 32 connected to sheave 19 so as to operate in place of the weight in an obvious way.

While my device thus far described is adapted for use with any electric energy since the motor may be arranged for any desired potential, I have shown it in connection with a lighting or power circuit for which it is very well adapted. On circuits of this kind the power not infrequently fails for short or long periods. In fact in some places the current is off for a certain portion of the day. I have provided against this contingency by so arranging my winding mechanism that the weight 18 will continue to descend and operate the clock train after the time when the motor is supposed to operate to lift the weight and when the motor does operate the weight will be lifted to its original position. This I accomplish by having the insulating surface 26 form only a portion of the drum so that the contactor may continue to rotate around the drum in contact with the conducting surface as shown in dotted lines in Fig. 3. In other words when the contactor 28 snaps over onto the conducting portion 25 and the motor fails to operate to reverse the drum, the drum may continue to rotate in the same direction with the contactor in engagement with the conducting surface instead of with the insulating surface so that when the power returns, the motor will be immediately energized and the motor will rotate until the contactor snaps off the flange onto the insulating portion. The weight is thereby restored to its highest point and the movement continues as before. Failure of current thus in no way affects the operation of the clock since the tension of the weight has remained the same and has not been affected by the winding. If, however, the power should remain off for an unusual length of time, the weight 18 will engage the stop or bracket 33 and the clock will stop with the motor circuit closed so that at any time should the power come on, the weight will be lifted in the usual way. It will be seen that the clock will continue to operate without any attention whatsoever and the weight is never removed from the clock mechanism even during the winding. The mechanism for accomplishing this result is of the very simplest character and may be applied to existing clocks without making any substantial change therein.

While I have described my invention in connection with a certain type of clock mechanism and as operating in a definite way for purposes of illustration in accordance with the requirements of the patent statutes, it should be understood that I do not limit my invention thereto since various modifications will suggest themselves to those skilled in the art without departing from the spirit of my invention. It should likewise be understood that I regard a spring and a weight as equivalents and have so used the terms throughout the specification and claims.

What I claim as new and desire to secure by Letters Patent of the United States, is,

1. The combination with clock mechanism, of operating means therefor comprising an electric motor, an endless driving chain arranged to form two loops, a weight movably suspended in one of said loops, and a circuit controlling device permanently biased to move in one direction connected to one of said loops.

2. The combination with clock mechanism, of operating means therefor comprising an electric motor, an endless driving chain arranged to form two loops, a weight movably suspended in one of said loops, and a rotary circuit controller permanently biased to rotate in one direction connected to one of said loops.

3. The combination with clock mechanism, of operating means therefor comprising an electric motor, an endless driving chain arranged to form two loops, a weight for actuating the clock mechanism movably suspended in one of said loops, and a circuit controlling device permanently biased

to move in one direction connected to the other loop so as to be moved thereby and return when released.

4. The combination with clock mechanism, of operating means therefor comprising an electric motor, an endless driving chain arranged to form two loops, a weight movably suspended in one of said loops, and a rotary circuit controlling device for the motor permanently biased to rotate in one direction connected to one of said loops to be moved thereby continuously against the bias and return in response to the bias.

5. The combination with clock mechanism, of operating means therefor comprising an electric motor, an endless driving chain arranged to form two loops, a weight movably suspended in one of said loops, and a drum controlling device for the motor connected to one of said loops so as to be rotated in one direction against a bias and returned in response to the bias.

6. The combination with clock mechanism, of operating means therefor comprising an endless motor, an endless looped driving chain, a weight movably suspended in a looped portion of said chain, and a circuit controlling device for the motor permanently biased to move in one direction arranged to be moved continuously against the bias when the weight moves in one direction and return in response to its bias when the weight moves in the opposite direction.

7. The combination with clock mechanism, of operating means therefor comprising an electric motor, an endless driving chain arranged to form two loops, a weight for actuating the clock mechanism movably suspended in one of said loops, and a circuit controlling device for the motor permanently connected to the other of said loops so as to move continuously therewith in opposite directions, the motor circuit being open during one direction of movement and closed during the other.

8. The combination with clock mechanism, of operating means therefor comprising an electric motor, an endless driving chain arranged to form two loops, a weight movably suspended in one of said loops, and a drum controlling device for the motor connected to one of said loops so as to be rotated thereby a predetermined amount in one direction and returned, the motor circuit being open during one direction of movement and closed during the other.

9. The combination with clock mechanism, of operating means therefor comprising an electric motor, an endless driving chain arranged to form two loops, a weight for actuating the clock mechanism movably suspended in one of said loops, and a circuit controlling device for the motor permanently connected to the other so as to be moved thereby in one direction against a bias and returned therewith in response to its bias, the motor circuit being open during one direction of movement and closed during the other.

10. The combination with clock mechanism, of operating means therefor comprising an electric motor, an endless driving chain arranged to form two loops, a weight movably suspended in one of said loops, and a drum controlling device for the motor connected to one of said loops so as to be rotated in one direction a predetermined amount against a bias and returned in response to the bias, the motor circuit being open during one direction of movement and closed during the other.

11. The combination with clock mechanism, of operating means therefor comprising an electric motor, an endless driving chain arranged to form two loops, a weight movably suspended in one of said loops, and a drum controlling device for the motor biased to rotate in one direction connected to the other so as to be moved thereby against the bias with the motor circuit open and return therewith in response to the bias with the motor circuit closed.

12. The combination with clock mechanism, of operating means therefor comprising an endless chain, a weight mounted thereon, a motor for lifting the weight up the chain, and a controlling device for said motor arranged to be moved a predetermined distance alternately by the motor and weight, and means whereby the weight and member continue to move in one direction with the motor circuit closed after the predetermined movement upon the failure of the motor to operate.

13. The combination with clock mechanism, of operating means therefor comprising an endless looped driving chain, a weight movably suspended in a looped portion thereof to actuate the clock mechanism, an electric motor for lifting said weight, a circuit controlling device arranged to alternately open and close the motor circuit after the weight is lifted and descends a predetermined amount, and means whereby the weight continues to descend with the motor circuit closed after it has moved the predetermined amount upon the failure of the motor to operate.

14. The combination with clock mechanism, of operating means therefor comprising an endless chain, a weight mounted thereon, a motor for moving the weight up the chain and controlling means for said motor comprising contacting members, one of which moves with the weight a predetermined distance in one direction with the motor circuit open and in the opposite direction with the motor circuit closed, and means whereby the weight and member con-

tinue to move in one direction with the motor circuit closed after a predetermined movement upon failure of the motor to operate.

15. The combination with clock mechanism, of operating means therefor comprising an endless driving chain, a weight suspended thereon to actuate the clock mechanism, an electric motor for lifting said weight, a circuit controlling device arranged to open the motor circuit after the weight is lifted a predetermined amount and close the circuit after it has descended, said weight being arranged to continue its descent after the predetermined movement upon the failure of current, and means whereby the motor restores the weight to its highest position upon the return of current.

16. The combination with clock mechanism, of operating means therefor comprising an electric motor, an endless looped driving chain, a weight movably suspended in a looped portion of said chain, and a circuit controlling device for the motor independent of the weight but arranged to move continuously therewith in one direction with the motor circuit open and in the opposite direction with the motor circuit closed.

17. The combination with clock mechanism, of operating means therefor comprising an electric motor, an endless driving chain arranged to form two loops, a weight movably suspended in one of said loops, a circuit controlling device connected to one of said loops so as to move a predetermined amount in one direction with the motor circuit open as the weight descends and in the opposite direction with the motor circuit closed as the weight is lifted, and means whereby the weight continues to descend with the motor circuit closed after it has moved the predetermined amount on the failure of the motor to operate.

18. The combination with a clock mechanism, of operating means therefor comprising an electric motor, an endless driving chain arranged to form two loops, a weight movably suspended in one of said loops, and a drum circuit controlling device connected to one of said loops to be moved continuously therewith.

19. The combination with a clock mechanism, of operating means therefor comprising an electric motor, an endless driving chain arranged to form two loops, a weight movably suspended in one of said loops, a circuit controlling device for the motor connected to one of said loops to move continuously therewith and a spring contact cooperating with said device and permanently engaging the same.

20. The combination with a clock mechanism, of operating means therefor comprising an electric motor, an endless driving chain arranged to form two loops, a weight movably suspended in one of said loops and a circuit controlling device for the motor connected to one of said loops and independent of the weight, said device comprising a movable contact and a spring contact coöperating therewith.

21. The combination with a clock mechanism, of operating means therefor comprising an electric motor, an endless driving chain arranged to form two loops, a weight movably suspended in one of said loops and a circuit controlling device for the motor connected to one of said loops and independent of the weight, said device comprising a rotatable drum and a spring contact coöperating therewith.

In witness whereof, I have hereunto set my hand this 8th day of August, 1908.

GEORGE H. RUPLEY.

Witnesses:

MARGARET A. DELEHANTY,

CHARLOTTE SECOR.