W. H. KALLENBACH & C. C. BERTSCH.

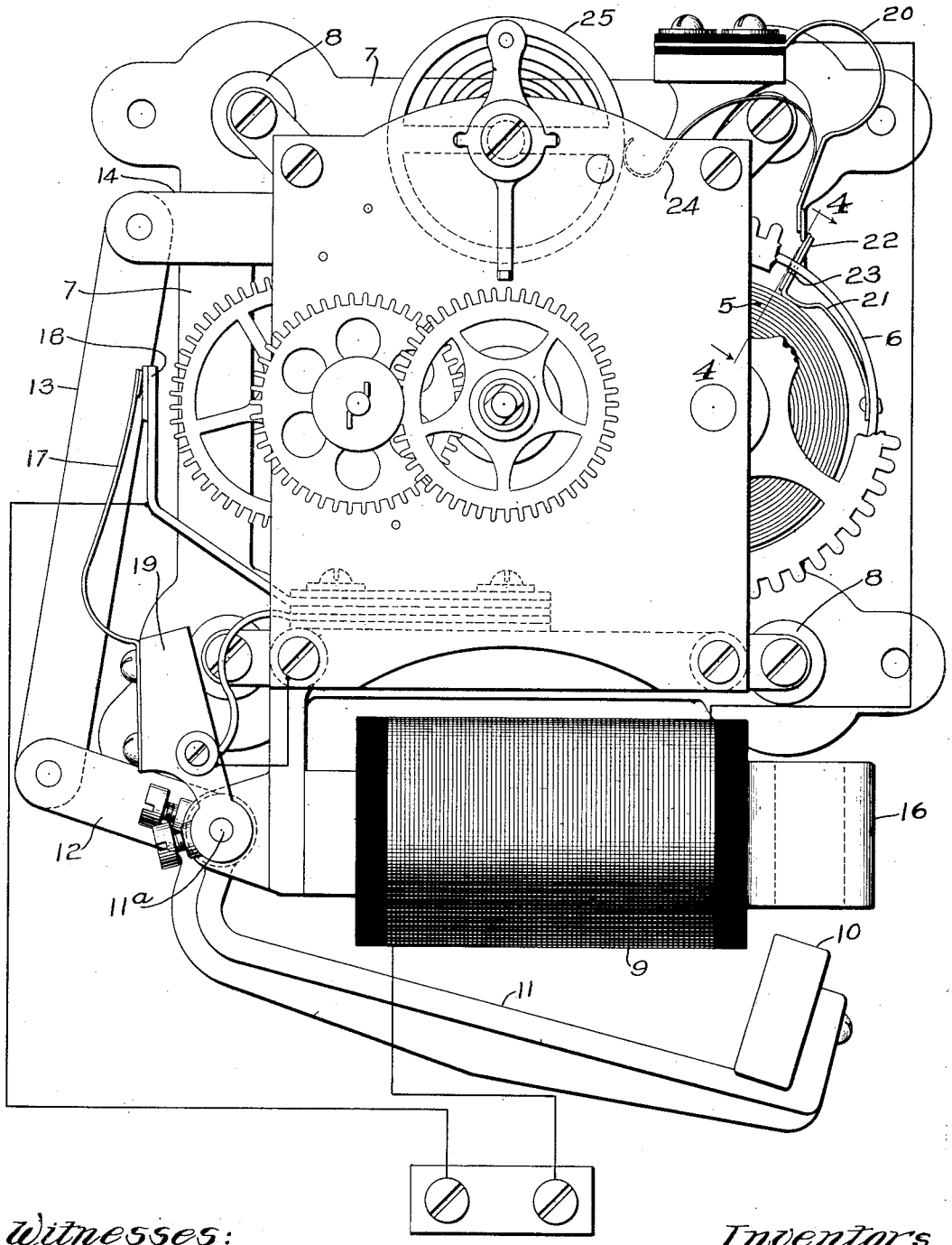
ELECTRIC SELF WINDING CLOCK.

APPLICATION FILED JUNE 18, 1910.

1,219,108.

Patented Mar. 13, 1917.

2 SHEETS—SHEET 1.



Witnesses:
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Fig. 1.

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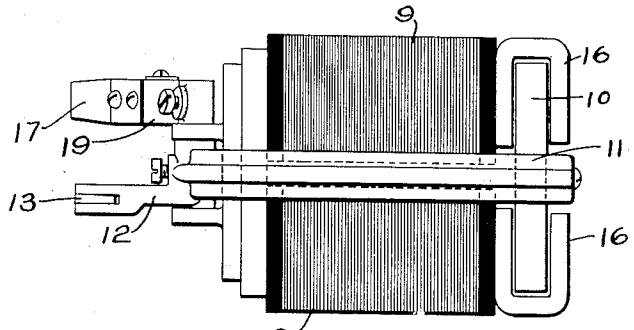


Fig. 2.

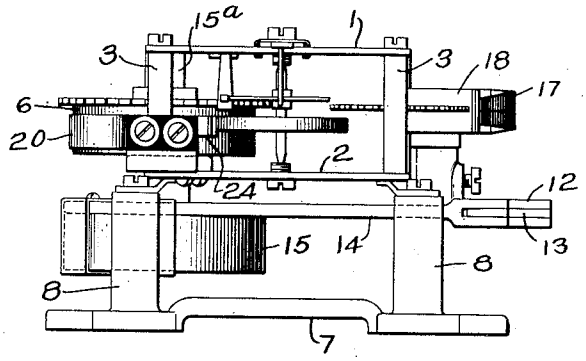


Fig. 3.

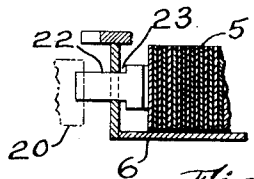


Fig. 4.

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UNITED STATES PATENT OFFICE.

WALTER H. KALLENBACH, OF JAMAICA PLAIN, AND CHARLES C. BERTSCH, OF FOREST HILLS, MASSACHUSETTS.

ELECTRIC SELF-WINDING CLOCK.

1,219,108. Specification of Letters Patent. Patented Mar. 13, 1917.

Application filed June 18, 1910. Serial No. 567,588.

To all whom it may concern:

Be it known that we, WALTER H. KALLENBACH and CHARLES C. BERTSCH, citizens of the United States, residing at Jamaica Plain and Forest Hills, respectively, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Electric Self-Winding Clocks; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to certain new and useful improvements in electric self winding clocks and more particularly to that type of electric self winding clock in which an electromagnet is employed for rewinding the main spring when the latter has uncoiled. This type of clock is arranged with a circuit closer which is normally inoperative but which is actuated upon the uncoiling of the main spring, to close a circuit including an electromagnet. The energizing of the electromagnet operates through a train of mechanism to rewind the main spring and when the main spring has been wound to its full extent the circuit closer will be rendered inoperative and remain so until the main spring has again uncoiled.

One object of the present invention is to provide that when the source of electrical energy has become exhausted the clock mechanism will be immediately stopped with the circuit closer in operative position and ready to immediately rewind the clock upon replenishing the source of electrical energy. A further object of the invention is to provide means for causing a greater range of movement of the armature of the electromagnet and consequently a longer stroke to the operating mechanism for rewinding the main spring in order that the main spring may be rewound more expeditiously. Still further objects of the invention are to provide improvements in the various details comprising the machine and tending to increase the efficiency and better the mode of operation of the same.

With the above ends in view the invention comprises the following details of construction and arrangement of parts more particularly described in the following specification and pointed out in the appended claims.

In the accompanying drawings illustrating the preferred form of invention,

Figure 1 represents a plan view of a clock with the improved mechanism for rewinding the same applied thereto;

Fig. 2 is a left hand elevation showing the operating magnet and improved pole pieces and armature therefor;

Fig. 3 is an elevation of the clock shown in Fig. 1 looking at the same from the right hand side; and

Fig. 4 is a section taken on the line 4—4 showing a detail of the circuit closer operated by the main spring.

In the illustrated embodiment of the invention an ordinary type of clock mechanism is shown mounted between the two supporting plates 1 and 2, which are spaced apart by the standards 3, and operated by a spring 5 inclosed in the drum 6. The clock mechanism is mounted as a whole upon a sub frame comprising a base 7 and standards 8 attached to the plate 2 at their outer ends. The rewinding mechanism which operates upon the main spring comprises a primary mover or electromagnet 9 which, upon being energized, attracts the armature 10 and oscillates the supporting arm 11 which is pivoted below the electromagnet 9. The movements of the armature are transmitted to the main spring 5 by an arm 12 which is mounted upon the shaft 11^a integrally with the supporting arm 11 and has pivoted to its free end a connecting lever 13. The connecting lever 13 is fastened at its other end to a lever 14 which operates upon a clutch 15 mounted upon the shaft 15^a to which the inner end of the main spring is fastened. The clutch 15 operates upon movement of the lever 14 in one direction only. The construction of the clutch and general arrangement of the rewinding mechanism is similar to that shown and described in Letters Patent No. 984,008, dated February 14, 1911.

The pole pieces of the electromagnet 9 comprises a pair of U-shaped members 16 which are mounted with their free ends opposite each other and are adapted to inclose

the armature of the magnet when the armature has been attracted. It will be noted that as the armature is inclosed by the pole pieces when it has been drawn toward the magnet, the action is that of a solenoid rather than the ordinary action which takes place between an electromagnet and its armature. Owing to the improved form of pole pieces, the action of the magnet is noiseless and there is no tendency for the armature arm 11 to bend out of shape due to the pull of the magnet upon the armature. The oscillations of the armature are secured by an alternate energizing and deënergizing of the electromagnet as is common in mechanisms of this general type. The circuit is normally closed through contacts 17 and 18 when the armature has been released by the magnet, movement of the armature toward the magnet, however, breaking the circuit by movement of the contacts 17 and 18 apart. The movable contact 17 is fastened to the supporting block 19, the supporting block being fixed to the rock shaft 11^a and oscillated upon movement of the armature arm 11. A relatively long contact is obtained by constructing the movable contact 17 of spring metal and bending it in such a manner that it is eccentric to the support 19. Owing to this construction the movement of the armature arm 11 will not immediately move the contacts 17 and 18 apart to break the circuit but the contact 17 will slide along the contact 18 which not only closes the circuit for a greater length of time but makes the contacts self cleaning. It can easily be seen that the feature of having the contact surfaces self cleaning is of considerable advantage in a mechanism of this type inasmuch as it is entirely inclosed and should be operative without attention for a long period.

The primary circuit closer employed for actuating the rewinding mechanism when the main spring has become uncoiled comprises a stationary spring contact 20 and a movable spring contact 21 fastened to the inner surface of the drum 6. As the main spring shaft revolves once in every six hours to close the circuit, it can be seen that there is a repeated tensioning and relaxing of the spring 21 and it is necessary that the form of the spring be such that it shall not lose its elasticity or shape under the repeated stresses to which it is subjected. It is also advisable at certain times to remove the clock mechanism in order that it may be repaired or cleaned and in such cases it is necessary to provide means to prevent the complete uncoiling of the main spring 5 and consequent forcing of the contact spring 21 out of its proper alinement. In the improved form of contact spring which forms a part of the present invention, the spring is shaped in such a manner that the bearing between the main spring and contact spring is immediately adjacent to the portion 22 of the spring which extends out laterally through a slot in the drum and engages the stationary contact 20. The portion 22 of the spring 21 is shouldered at 23 which forms a stop and prevents movement of the spring beyond a certain point, as would otherwise be the case, due to the tendency of the main spring to completely uncoil when the clock mechanism has been removed.

The source of electrical energy for the rewinding mechanism ordinarily comprises one or more cells of some commercial form of dry battery and it is important that a means be provided for stopping the mechanism of the clock with the circuit closer in its operative position when the batteries have become exhausted. If this were not done the energy which still existed in the main spring would continue to operate the clock mechanism and carry the contact 21 past the contact 20, opening the circuit and the clock would finally stop in some position with the circuit opened, necessitating an auxiliary means for closing the circuit when new batteries were put in and the clock rewound. The device which is employed in the present case for preventing this occurrence comprises an S-shaped spring 24 which is fastened at one end to a portion of the stationary contact 20 and is adapted to bear against the balance wheel 25 of the clock mechanism when the batteries have become exhausted and will not operate to rewind the main spring. In order that this operation may be more clearly understood, it will be assumed that the source of electrical energy has become exhausted and that the circuit has been closed through the contacts 20 and 21. As the main spring is not rewound to allow the contact 21 to spring inwardly out of engagement with the contact 20, the continued rotation of the drum 6 will force the contact 20, through its engagement with the contact 21, in the same direction and press the spring 24 against the periphery of the balance wheel 25, effectually braking it and stopping the operation of the clock mechanism. The stopping of the clock mechanism will be a notification that the source of energy has been exhausted and upon the replenishing of this the clock will be immediately rewound, owing to the fact that the circuit closer is in its operative position. The various electrical connections for completing the circuit between the various parts of the electromagnet, circuit closer and source of electrical energy, are not herein described as they form no part of the present invention and have been fully described in the Letters Patent previously referred to.

It is to be understood that the invention is not limited to the particular construction

and arrangement of parts set forth herein but may be varied within the scope of the appended claims.

Having specifically described one form of the present invention and the preferred mode of operating the same, what is claimed, is:—

1. An electric self-winding clock, having, in combination, clock mechanism comprising a main spring, means for automatically rewinding the clock mechanism comprising an electrically operated prime mover, a circuit closer for closing the circuit and actuating the prime mover having a movable contact member, a spring contact member, the movable contact member adapted to be moved outwardly and engage the spring contact member upon uncoiling of the main spring and to move the spring contact member upon continued uncoiling of the main spring, and means connected to and operated by the movement of the spring contact member for stopping the operation of the clock mechanism upon failure of the source of electrical energy with the circuit closer in operative position, substantially as described.

2. An electric self winding clock, having, in combination, clock mechanism, rewinding mechanism therefor comprising an electromagnet and armature, an armature supporting arm, a shaft about which it oscillates, a pair of relatively movable contacts operated by movement of the armature to alternately open and close the circuit including the electromagnet, one of the contacts being mounted eccentrically upon the shaft whereby the contacts have a sliding engagement with one another, substantially as described.

3. An electric self winding clock, having, in combination, clock mechanism comprising a main spring, rewinding mechanism adapted to rewind the main spring when the latter has uncoiled a predetermined amount, a circuit closer governing the operation of the rewinding mechanism and controlled by the uncoiling of the main spring, and a brake attached to the circuit closer and adapted to operate upon the clock mechanism to stop the same upon the failure of the rewinding mechanism to operate when the circuit closer is in operative position, substantially as described.

4. An electric self winding clock, comprising a main spring, rewinding mechanism therefor, a drum inclosing the main spring, a circuit closer which controls the operation of the rewinding mechanism comprising two relatively movable contacts, one of the contacts being attached to the inside of the drum and having a portion extending laterally through the periphery of the drum to engage with the second contact member, and a shoulder formed on the laterally extending portion of the first contact member adapted to engage the periphery of the drum and act as a stop to prevent movement of the contact member beyond a predetermined point, substantially as described.

5. An electric self-winding clock comprising a main spring, rewinding mechanism therefor comprising an electrically operated prime mover, a circuit closer adapted when in operative position to close the circuit and energize the prime mover, and means mounted upon the circuit closer and adapted to prevent uncoiling of the main spring beyond a predetermined amount when the clock mechanism is removed, substantially as described.

6. An electric self winding clock, having, in combination, a clock mechanism and rewinding mechanism therefor comprising an electromagnet, an armature therefor, a pair of relatively movable contacts operated by movement of the armature to alternately open and close the circuit including the electromagnet, and means for supporting the contacts arranged to secure a sliding engagement between the contact members whereby the circuit is closed for a longer period of time, substantially as described.

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