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H. W. PORTER.

WINDING MECHANISM FOR SELF WINDING ELECTRIC CLOCKS.

APPLICATION FILED SEPT. 4, 1906.

Fig. 1.

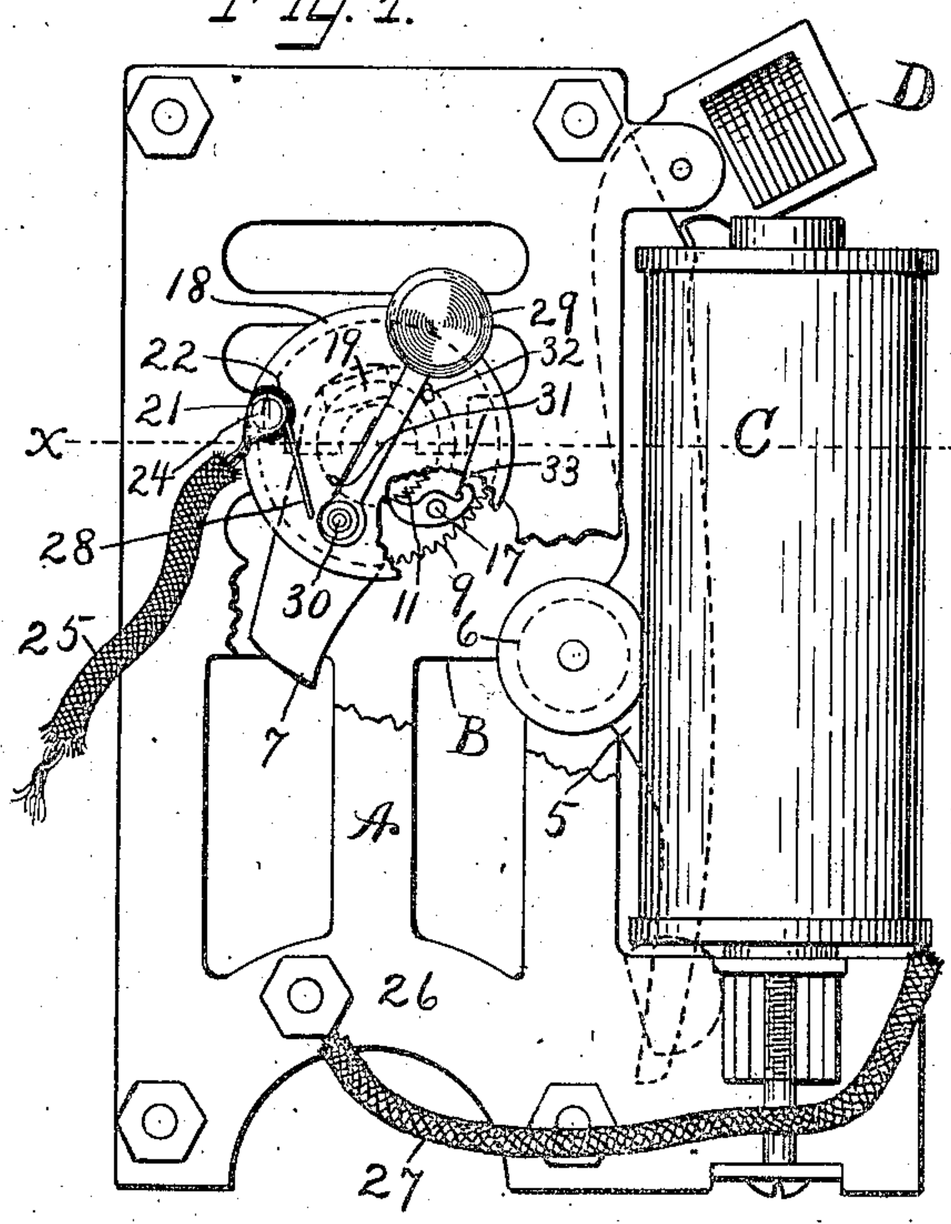


Fig. 2.

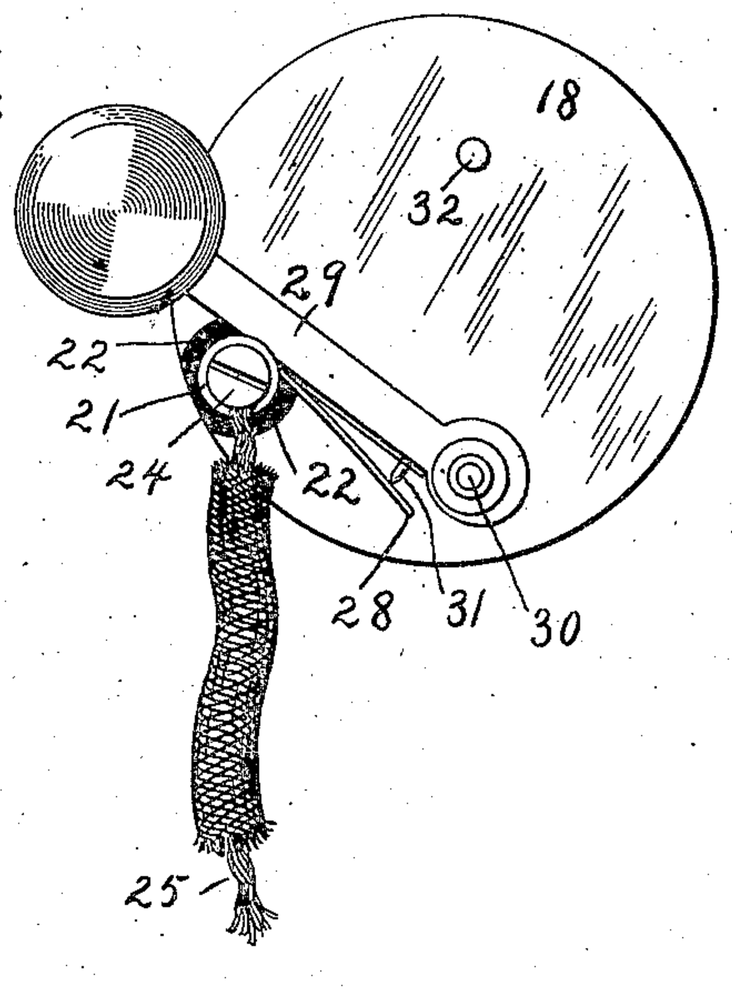


Fig. 3.

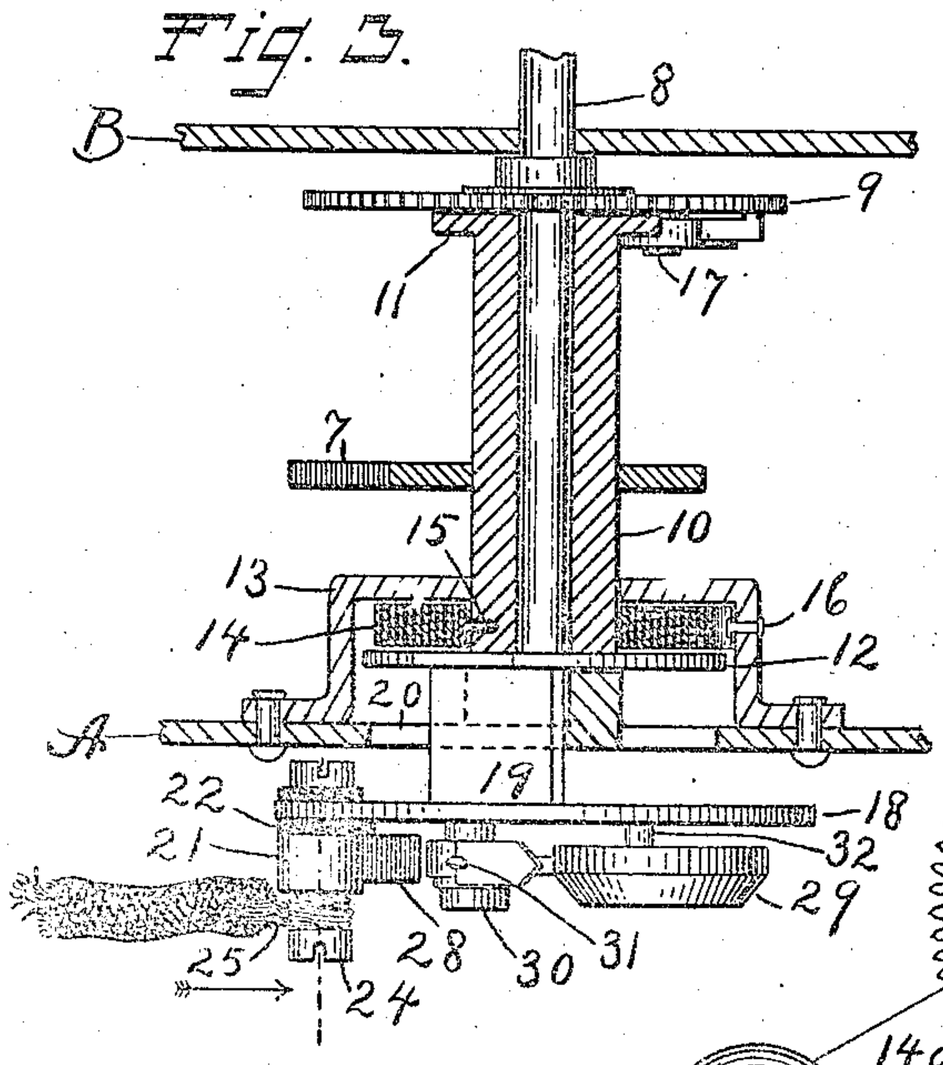


Fig. 4.

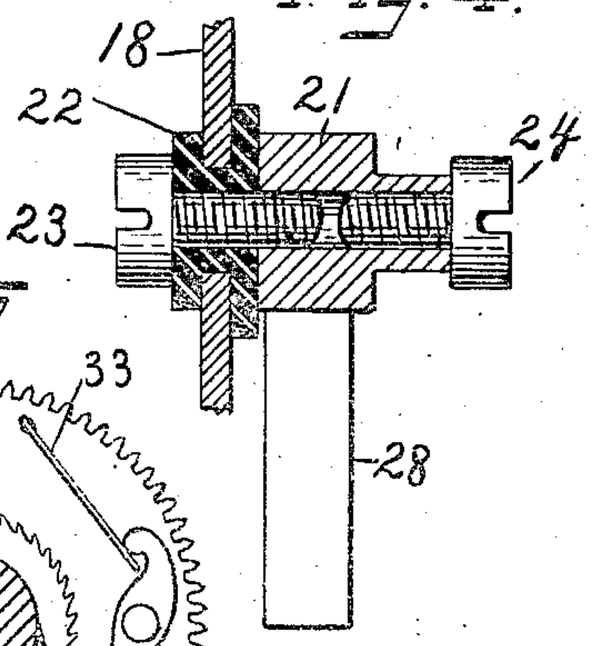
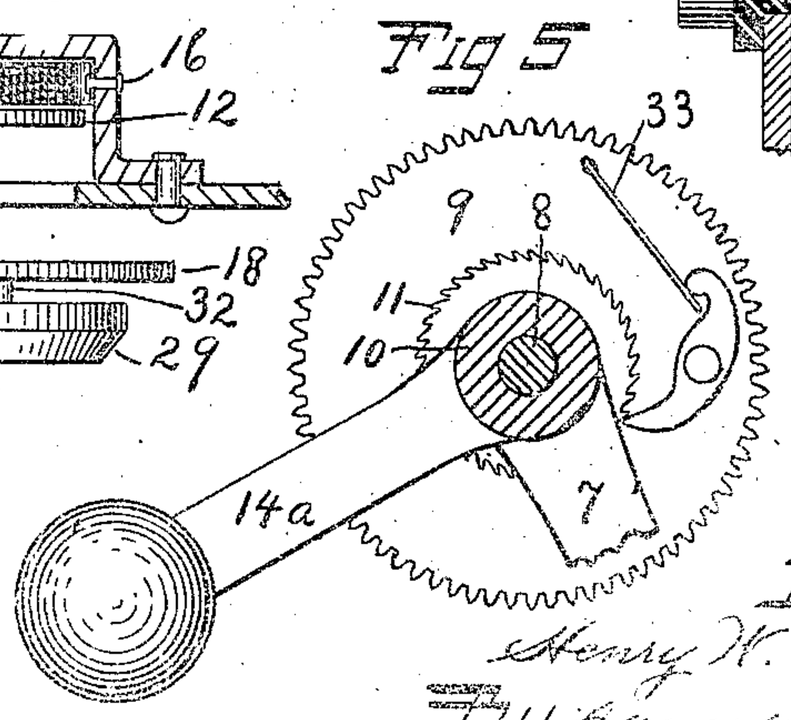


Fig 5



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WINDING MECHANISM FOR SELF-WINDING ELECTRIC CLOCKS.

No. 842,971. Specification of Letters Patent. Patented Feb. 5, 1907.

Application filed September 4, 1906. Serial No. 333,270.

To all whom it may concern:

Be it known that I, HENRY W. PORTER, a citizen of the United States, residing at Forestville, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Winding Mechanism for Self-Winding Electric Clocks, of which the following is a specification.

My invention relates to improvements in winding mechanism for self-winding electric clocks; and the objects of my improvement are simplicity of construction and efficiency in operation, particularly as to the contact mechanism.

In the accompanying drawings, Figure 1 is a broken-out elevation of my winding mechanism and so much of a clock as is necessary to show its connection therewith, the contact-making devices being shown in the position they have immediately after rewinding. Fig. 2 is a corresponding elevation, on an enlarged scale, of the contact-making devices in the reverse position—that is, when contact has been made to connect the circuit for rewinding. Fig. 3 is a sectional plan of the main parts of Fig. 1 on the line *x x*. Fig. 4 is an enlarged sectional view of the insulated binding-post and a portion of the plate to which it is connected. Fig. 5 is a transverse section, partly broken away, showing a modified form of winding mechanism, the scale being the same as that of Figs. 2 and 3.

A and B designate the movement-plates of a clock-movement, which may be of any ordinary construction.

C is an electromagnet, and D the armature therefor, the latter having rigidly connected therewith the swinging arm or lever 5, bearing a friction-roller 6 for engaging and actuating the oscillating arm 7 of the winding mechanism.

The main shaft 8—that is, the shaft to which the winding mechanism is applied—may be mounted in any ordinary manner for rotating and driving the clock-train. The main wheel 9 is mounted on the said shaft 8 to rotate therewith. As shown, the two ends of the shaft 8 are supported by the two movement-plates. Upon this shaft is a sleeve which constitutes the spring-hub 10 and has formed thereon or rigidly secured thereto a ratchet wheel or disk 11 at one end and a plate or arm 12 at the other end, while the oscillating arm 7 is rigidly attached to its middle portion in the plane of the friction-roller 6 of the armature arm or lever 5. A bridge 13 is rigidly attached to the movement-plate A, and the spring-hub 10 passes through the said bridge, as shown in Fig. 3, the body of the bridge through which the spring-hub passes being far enough from the plate or arm 12 on the end of the said hub to make room for an ordinary coiled spring 14 between them. The inner end of the spring is secured by a hook or pin 15 to the spring-hub, while its outer end is secured by a pin 16 to the bridge 13, after the usual manner of connecting such springs. A pawl 17 is pivoted on the main wheel 9 in position to engage the ratchet wheel or disk 11, the pawl being actuated in the direction to engage the said disk by a spring 33, all substantially as in ordinary clock-winding.

The parts thus far described of themselves are not of my invention, and any ordinary mechanism or mechanisms may be substituted therefor as an equivalent or equivalents. My invention resides in the contact-making devices and the combination thereof with the other parts.

A plate or disk 18 is rigidly mounted on the spring-hub 10, but on the opposite side of the plate A, the said plate or disk 18 being connected with the said hub through the bracket 19 (shown by broken lines in Fig. 1) and plate or arm 12, which is directly connected with the said hub. These parts have an oscillating movement, and the bracket 19 passes through an opening 20 in the movement-plate A, which opening is made large enough to permit of the desired range of oscillating movement. A binding-post 21 is mounted on the plate or disk 18 and insulated therefrom. As shown, this binding-post is secured by the bushing 22, of insulating material, and the screw 23. It is also provided with a screw 24 for securing thereto the conductor or wire 25 for electrical connection, while the movement-plate A is provided with a binding-post 26 for the other wire or conductor 27. Upon the binding-post 21 is a yielding contact-arm 28. Upon the plate or disk a weighted arm 29 is pivoted at 30 below the center or axis on which the said plate

oscillates. Upon that side of this arm which faces the yielding contact-arm 28 is a contact-piece 31, which i preferably in the form of a point standing at about a right angle to the length of the weighted arm.

When the plate or disk 18 is in the wound-up position, as shown in Figs. 1 and 3, the weighted arm bears upon the stop 32, which prevents the arm from dropping back too far and which drives the arm forwardly as the plate or disk 18 turns or moves in the running down of the clock. The lower end of the arm 7 moves forwardly toward the right as the clock runs and carries the top of the weighted arm toward the left with the unwinding of the spring 14. When the disk carries the weighted arm past its dead-center, it immediately falls by gravity into the position shown in Fig. 2. The contact is first made when the said arm and yielding contact-arm 28 are in a position nearly parallel with each other, and the said arm yields to permit the weighted lever to move a little after making the contact to carry the said weighted lever into the position shown in Fig. 2 and positively stop the said arm from moving further in that direction. The binding-post therefore serves the double function of a connection for the wire and a stop to limit the movement of the weighted arm in one direction. In coming into the position shown in Fig. 2 the point 31 moves along with a scraping or wiping action on the face of the yielding contact-arm toward the lower end of the said arm. The momentum of the weighted arm in falling over into the position shown in Fig. 2 is sufficient to overcome the force or strength of the yielding arm and deflect it as shown. As soon as the weighted arm is thus thrown over to make the contact the magnet and armature move the lever 5 and friction-roller 6 toward the left to bring the said roller against the oscillating arm 7 of the spring-hub 10 and force the said arm back into the position shown in Fig. 1, thereby rewinding the spring from its inner end, so that as the clock runs the plate 18 is again carried far enough to repeat the contact-making for rewinding as the parts reach a given position in the unwinding of the spring or running down of the clock. When the weighted arm and connected parts are operated through the armature-lever 5 to move the said arm from the position shown in Fig. 2 to that shown in Figs. 1 and 3, the contact-piece 31 first wipes the face of the yielding contact-arm in the direction of the length of the said arm until the weighted and yielding arms are substantially parallel with each other, and then the contact is broken at the upper end of the path thus wiped. This action always keeps a clean contact-face on the yielding arm 28 below the point of first contact and final separation, which surface will not be fouled by sparking.

If desired, a weight may be employed instead of a spring. Such a modification is illustrated in Fig. 5, in which a weighted lever 14ª is made rigid with the spring-hub or winding-hub 10, the other parts being the same as before described, with the spring omitted. This weighted lever has an oscillating movement over a small fraction of a circle, the said weighted lever being illustrated in its lowermost position ready to be rewound by lifting it higher up and then letting it fall down again with the running of the clock, and so on repeatedly.

I have herein used the word "binding-post" in the broad sense of a connecting device for one of the conductor-wires and not specifically as to its post-like form. For convenience of distinction between the two contact-surfaces I have called one contact an "arm" and the other a "piece." These constitute a pair of contacts. The arm 7 is an oscillating arm of the winding sleeve or hub in both of the constructions shown.

It is apparent that some changes from the specific construction herein disclosed may be made, and therefore I do not wish to be understood as limiting myself to the precise form of construction shown and described, but desire the liberty to make such changes in working my invention as may fairly come within the spirit and scope of the same.

I claim as my invention—

1. In a self-winding electric clock, the combination of an oscillating arm of the winding mechanism with an oscillating plate moving with the said arm, a weighted arm pivoted on the said plate below its axis of oscillation, an insulated binding-post mounted on the said plate and carrying the other one of the contacts, and stops for limiting the swinging movement of the said weighted arm on the said oscillating plate.

2. In a self-winding electric clock, the combination of an oscillating arm of the winding mechanism with an oscillating plate moving with the said arm, a weighted arm pivoted by its lower end to the said plate, a contact-piece in the form of a point projecting from the said arm near its pivoted end, an insulated binding-post mounted on the said plate and carrying a yielding contact-arm for being engaged by the said contact-piece, and stops for limiting the movement of the said weighted arm on the said oscillating plate.

3. In a self-winding electric clock, the combination of a main wheel and shaft mounted to rotate together, a winding-hub, a ratchet and pawl for connecting the said hub and wheel for moving forwardly together and permitting an independent backward movement of the said hub, means for driving the said hub forwardly in the running of the clock, an oscillating plate rigidly connected with the said winding-hub, a weighted arm pivoted on the said plate and adapted to fall

over when the said plate reaches a given position, a pair of contacts mounted on the said plate and insulated from each other when out of contact, and electrically-operated devices connected with the said contacts for moving the said winding-hub backwardly when the said oscillating plate carries the weighted arm into a position to fall over and bring the contacts into engagement.

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