

L. ERICSON.
 CONTROLLING MECHANISM FOR CLOCK MOVEMENTS.
 APPLICATION FILED JULY 7, 1910.

Patented Apr. 24, 1917.

1,223,778.

Fig.1

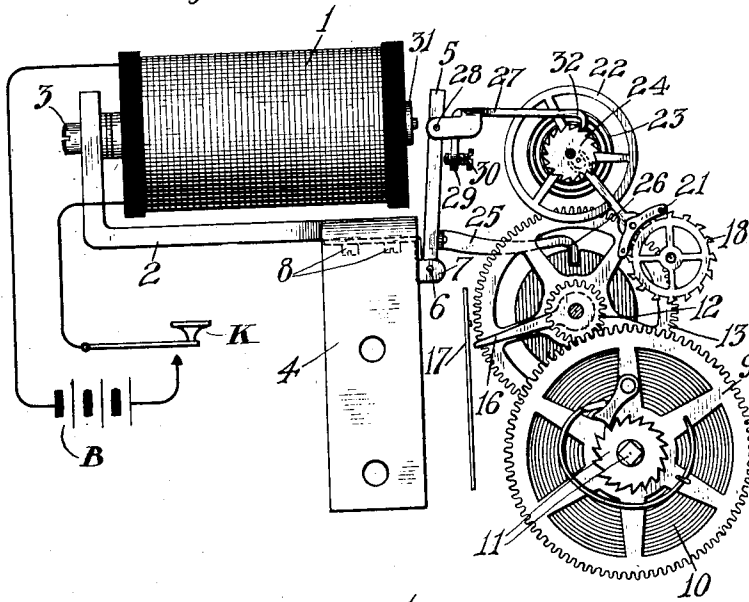


Fig.2.

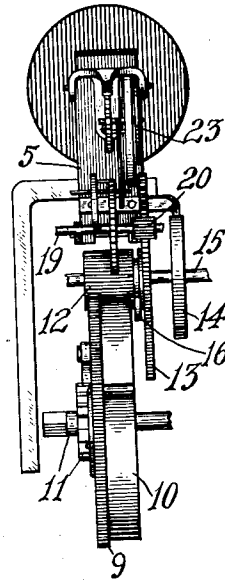


Fig.3.

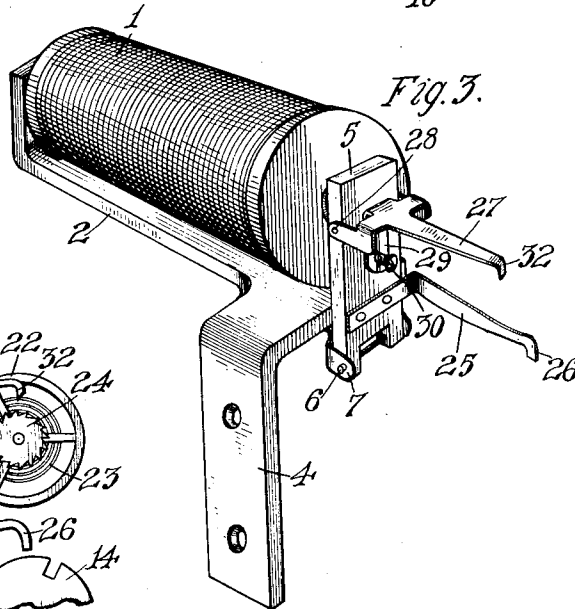
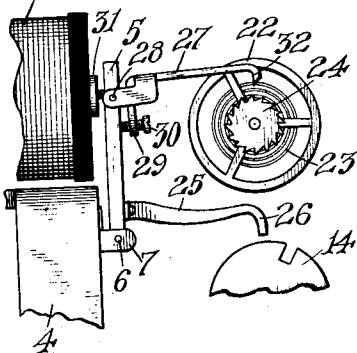


Fig.4.



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UNITED STATES PATENT OFFICE.

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CONTROLLING MECHANISM FOR CLOCK-MOVEMENTS.

1,223,778.

Specification of Letters Patent.

Patented Apr. 24, 1917.

Application filed July 7, 1910. Serial No. 570,730.

To all whom it may concern:

Be it known that I, LAWRENCE ERICSON, a citizen of the United States of America, residing in Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Controlling Mechanism for Clock-Movements, of which the following is a specification.

My invention relates to controlling mechanism for clock movements, the said invention being adapted to start a clock movement in its operation and to again stop the movement thereof.

My invention is adapted for controlling the starting and stopping of clock mechanism, whereby such mechanism will run for a definite period, by apparatus cooperating directly with the balance wheel shaft, being more particularly directed to such starting apparatus which is electrically controllable at some point distant from the clock mechanism.

As is well known, the balance wheel of a clock movement is delicately adjusted and the hair spring cooperating therewith is also very delicate. Consequently, any mechanism cooperating directly with such a balance wheel must not place any undue strain upon its shaft or bearings.

To this end I have worked out my starting mechanism, to operate directly upon a member carried upon the balance wheel shaft, without causing any undue strain upon such shaft, and which is simple, and positive in its operation.

In the mechanism of my invention I preferably employ an electromagnet having a starting pawl pivoted to the armature thereof, the said armature engaging a ratchet wheel or stop movable with the balance wheel. When the armature of the said electromagnet is attracted, the pawl is moved to rotate or start the balance wheel and thereafter disengages itself from the said ratchet wheel. The said balance wheel is thereby started and continues to reciprocate until the stop or ratchet wheel is again engaged by the pawl, when the movement of the clock mechanism is stopped.

I have not shown a complete clock mechanism, but it is believed enough is shown to indicate the operation of the controlling device. While I have shown a particular clock mechanism, it is to be understood that my controlling mechanism will operate

equally well in connection with any movement having a reciprocating balance wheel.

Referring to the accompanying drawing in which like reference characters indicate like parts, Figure 1 is a side elevation, showing the controlling mechanism of my invention operating in connection with a clock movement.

Fig. 2 is an end view of the structure shown in Fig. 1;

Fig. 3 is a perspective view of the electromagnet and the controlling pawl operating in connection therewith, and

Fig. 4 is a view of part of the electromagnet with the armature attracted and showing the pawl disengaged from the ratchet wheel or stop.

The electromagnet 1 is shown secured to the pole piece 2 by means of the screw 3, the said pole piece having the extending bracket 4 integral therewith. The armature 5 is pivoted by means of the pin 6 to the bracket 7, the said bracket being secured to the under side of the pole piece 2 by means of the screws 8. Sufficient mechanism of the clock movement has been shown to indicate the operation of the controlling mechanism.

The clock movement shown comprises the main gear 9 driven by the spring 10 with the usual winding mechanism 11, the gear 9 being in mesh with the pinion 12. The said pinion 12, the gear 13 and slotted cam 14 are all securely fastened to the shaft 15. Also adjustably fastened to the shaft 15 is the contact arm 16 which is adapted to make contact with the contact spring 17. The pallet wheel 18 is secured to the shaft 19 and is adapted to be rotated by the gear 13 which is in mesh with the small pinion 20, the said pinion 20 being securely fastened to the shaft 19. The pallet 21 is adapted to engage the teeth of the pallet wheel 18 when the said pallet 21 is vibrated, due to the reciprocating motion of the balance wheel 22.

Operating in connection with the said balance wheel 22 is the usual hair-spring 23. Secured to the same shaft with the balance wheel 22 is the ratchet wheel or stop 24, the said ratchet wheel being adapted to partake of the same movement as the balance wheel. The arm 25 is riveted to the armature 5, the said arm having a catch 26 normally resting in the slot of the cam 14 as shown in Fig. 1. The starting pawl 27 is loosely pivoted to

the armature 5 by means of the pins 28, the said pawl 27 normally resting in engagement with a tooth of the ratchet wheel 24 and preventing any movement thereof while the said pawl is in engagement with the said ratchet wheel.

Extending downwardly from the pawl 27 is the arm 29, the said arm being slotted as shown in Fig. 3 and the adjusting screw 30 being threaded into the said arm 29. The arm 29 is preferably slotted and is tapped and by springing the two halves together, it is possible to keep the screw 30 tight within said threaded arm, obviating the use of a lock-nut.

An energizing circuit for magnet 1 is provided, preferably comprising a simple manually operated key K, a battery B and conductors connecting the key and battery with the winding of magnet 1. While I have illustrated the controlling circuit for magnet 1 as a simple manually controlled circuit, it is apparent that such circuit may be closed in any other desired manner.

To operate the controlling mechanism, the electromagnet 1 is energized, attracting the armature 5. The said armature 5 now moves toward the core 31, the pawl 27 thereby rotating the balance wheel 22 toward the left. The pawl 27 continues to move toward the left with the armature 5 and continues in engagement with the ratchet wheel 24 until the adjusting screw 30 comes into contact with the armature 5. The armature 5 continues its movement, the catch 32 is moved out of engagement with a tooth of the ratchet wheel 24 and assumes the position shown in Fig. 4, the arm 25 also being moved out of engagement with the cam 14 as shown in Fig. 4.

The balance wheel 22 having been started by the movement of the arm 27, and the end 26 of arm 25 having moved out of engagement with the cam 14, the balance wheel 22 reciprocates and the clock mechanism runs, receiving power from the spring 10.

The magnet 1 having only received a momentary energization, releases its armature 5 allowing the end 26 to rest upon the periphery of cam 14 and holding the catch 32 of pawl 27 free of ratchet wheel 24.

The mechanism now continues running, the arm 16 in its travel making and breaking contact with the contact spring 16. When the cam 14 has made one revolution, the end 26 of the arm 25 drops into the slot of the said cam 14 allowing the armature 5 to retract to its normal position. Due to the full retraction of the armature 5, the pawl 27 rides over the teeth of the ratchet 24 and engages one of the said teeth, preventing a further operation of the balance wheel and its associated mechanism until the armature 5 is again attracted.

By the use of the pivoted pawl 27 and its

adjusting means, a very fine adjustment of the said pawl 27 is secured. In this manner it is possible to adjust the period of engagement after the armature 5 has started to move and the pawl 27 is being drawn back to give the escapement mechanism its starting movement, and the time subsequent thereto, when the arms 27 and 25 are lifted from engagement with their respective wheels to permit the mechanism to run.

What I claim as new and desire to secure by Letters Patent is:

1. In a controlling mechanism, the combination with a motor driven clock movement provided with a balance wheel normally at rest, of a serrated stop movable with said balance wheel, an electromagnet and armature, a member controlled by said armature for effectively connecting and disconnecting the motor and mechanism of said clock movement, a pawl pivotally secured to said armature for engaging said serrated stop to positively move the balance wheel when the armature is attracted, said pawl and member being so arranged that the motor is effectively connected to said clock movement before said pawl starts the movement of said balance wheel, and adjusting means whereby the period of engagement between said pawl and said stop after said armature has started to move in its attraction may be varied.

2. In a controlling mechanism, the combination with a motor driven clock train provided with a balance wheel normally at rest, of a serrated disk movable with said balance wheel, an electromagnet and armature, a lever controlled by said armature for effectively connecting and disconnecting mechanism of said clock train and the motor, a pawl pivotally secured to said armature for engagement with said serrated disk whereby when said armature is moved said pawl moves said balance wheel after said lever has effectively caused the motor mechanism to be connected to said balance wheel, adjustable cooperating means between said pawl and armature to cause said pawl to disengage from said disk and whereby the period of engagement between said pawl and disk after said armature has started to move may be varied.

3. A controlling device of the class described including a motor driven clock movement provided with a balance wheel, the motor normally tending to operate said clock movement, an electromagnet provided with an armature carrying an operating member associated with said clock movement for controlling the application of the motive power to mechanism of said clock movement, and a pawl member carried by said armature for positively moving the balance wheel of said clock movement when the said armature is attracted to insure the

positive operation of the balance wheel and clock movement by the motor.

4. A device of the character described including a motor driven clock train having a balance wheel, a ratchet wheel movable with
5 said balance wheel, a magnet and armature associated with said clock train, a restraining member carried by said armature to prevent the motor from normally operating
10 said balance wheel, and a lever also carried by said armature for engaging said ratchet wheel to positively move the balance wheel, said restraining member and said lever op-

erating in such a manner that when the armature of the magnet is attracted, the restraining member permits the motor mechanism to be effectively connected to the balance wheel before the lever positively operates the said balance wheel. 15

Signed by me at Chicago, county of Cook, 20 and State of Illinois, in the presence of two witnesses.

LAWRENCE ERICSON.

Witnesses:

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