Feb. 28, 1933. M. REINER 1,899,722

SELF WINDING WATCH

Filed Dec. 11, 1929

Fig. 1.

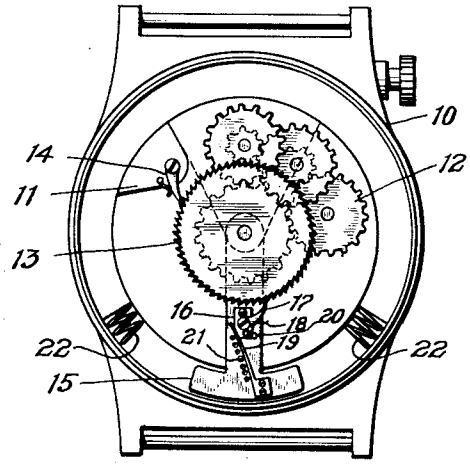
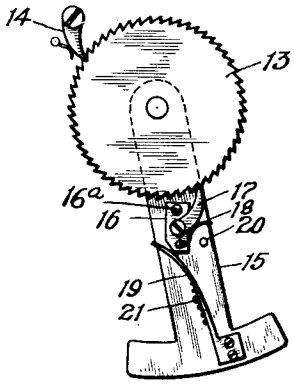


Fig. 2.



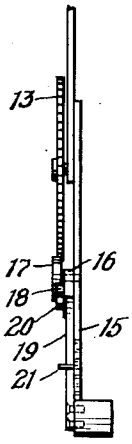


Fig. 4.

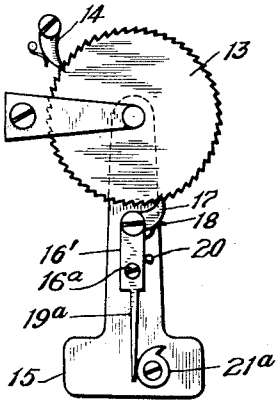


Fig. 3.

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UNITED STATES PATENT OFFICE

MAX REINER, OF BRONX, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO PERPETUAL SELF WINDING WATCH CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE

SELF-WINDING WATCH

Application filed December 11, 1929. Serial No. 413,170.

This invention relates to watches and more especially to watches equipped with means for effecting winding of the main spring upon movement of the watch.

An object of this invention is a self-winding watch provided with improved and efficient means for effecting winding of the main spring upon movement of the watch and preventing overwinding of such spring.

A watch embodying the invention is provided with a weighted pendulum which is caused to oscillate by movement imparted to the watch, usually while being worn. A ratchet wheel or the like is geared to the winding train of the watch and the pendulum is provided with a pawl by means of which unidirectional rotation is imparted to the ratchet wheel upon oscillation of the pendulum. The pawl is mounted on the pendulum in such a manner as to be capable of linear movement relatively thereto and resilient means are provided tending to maintain the pawl in engagement with the teeth of the ratchet wheel. When the resistance of the main spring to winding exceeds the tension of the resilient means acting on the pawl the pendulum will swing without movement of the pawl, the aforementioned resilient means yielding to permit such action. Overwinding of the watch is thus prevented.

Other objects, novel features and advantages of the invention will be apparent from the following specification and accompanying drawing, wherein:

Fig. 1 is a rear view of a watch embodying the invention.

Fig. 2 is a similar view somewhat enlarged of the pendulum, ratchet wheel and pawl.

Fig. 3 is a side view of Fig. 2, and

Fig. 4 is a view similar to Fig. 2 of a modified embodiment of the invention.

Referring now to Figs. 1 to 3, the case 10 may be of any suitable design and within it is suitably mounted the watch movement 11. The main spring gear wheel 12 is connected through a suitable winding train with a ratchet wheel 13, rotation of which in one direction is prevented by a pawl 14. A weighted pendulum 15 is pivotally supported co-axially with the ratchet wheel 13 and a lever 16 is mounted on the pendulum by means of a pivoted pin 16^a. The lever 16 pivotally supports a pawl 17 which is adapted to engage the teeth of the ratchet wheel 13 and which is pressed into operating position by a spring 18. A leaf spring 19 is attached at one end to the pendulum and its other end bears against the lever 16 to maintain said lever in contact with the pin 20 carried by the pendulum. The pendulum 15 is provided with a series of sockets adapted to receive a pin 21 by means of which the tension exerted by the spring 19 on the lever 16 may be varied. Resilient abutments 22 are provided to be engaged by the enlarged portion of the pendulum 15 to cushion the pendulum at either end of its stroke.

Counter-clockwise movement of the pendulum 15 causes counter-clockwise rotation of the ratchet wheel 13 which rotation is effective through the winding train to wind the main spring. Upon clockwise movement of the pendulum the pawl 17 rides over the teeth of the ratchet wheel which is prevented from moving clockwise by the pawl 14. After the watch has been sufficiently wound up, the resistance of the main spring to winding will exceed the tension exerted by the spring 19 on the lever 16. The lever will then swing on its pivot upon counter-clockwise movement of the pendulum and the ratchet wheel 13 will remain stationary, Fig. 2. This action will continue until the main spring has run down sufficiently that its resistance to winding no longer exceeds the tension exerted by the spring 19, whereupon oscillation of the pendulum will again effect rotation of the ratchet wheel 13.

In Fig. 4 the pendulum 15 has mounted thereon, by a pivot pin 16^a a lever 16′ provided with a resilient extension 19^a which engages the surface of an eccentric adjusting member 21^a. A pawl 17 is pivoted to the lever 16 and is pressed by spring 18 into engagement with the teeth of the ratchet wheel 13. The pendulum is provided with a pin 20 against which the main portion of the lever 16′ is held by reason of the engagement of the projection 19^a with the adjusting member 21^a. The operation of this embodiment is similar

to the operation of the embodiment disclosed in Figs. 1 to 3 inclusive.

It is of course understood that various modifications may be made in the structure above described without in any manner departing from the spirit of the invention as defined in the appended claims.

I claim:

1. In a self-winding watch, a pendulum, a ratchet wheel, a lever pivoted to said pendulum, a pawl carried by said lever to cooperate with said ratchet wheel, and resilient means tending to maintain predetermined relation between said pawl and pendulum.

2. In a self-winding watch, a pendulum, a ratchet wheel, a lever pivoted to said pendulum, a pawl carried by said lever to cooperate with said ratchet wheel, resilient means tending to maintain predetermined relation between said pawl and pendulum, and means for varying the tension of said resilient means.

3. In a self-winding watch, a pendulum, a ratchet wheel, a lever pivotally supported by said pendulum, a pawl carried by said lever and being adapted to engage the teeth of said ratchet wheel, a stop carried by said pendulum, and a resilient member tending to maintain said lever in contact with said stop.

4. In a self-winding watch, a pendulum, a ratchet wheel, a lever pivotally supported by said pendulum, a pawl carried by said lever and being adapted to engage the teeth of said ratchet wheel, a stop carried by said pendulum, a resilient member tending to maintain said lever in contact with said stop, and an adjustable member for varying the tension of said resilient member.

5. In a self-winding watch, a pendulum, a ratchet wheel, a pawl supported by said pendulum for linear movement relative thereto, a leaf spring attached at one end to said pendulum and having its free end tending to maintain predetermined relation between said pawl and pendulum.

6. In a self-winding watch, a pendulum, a ratchet wheel, a pawl supported by said pendulum for linear movement relative thereto and adapted to cooperate with said ratchet wheel, a leaf spring attached at one end to said pendulum and having its free end tending to maintain predetermined relation between the pawl and pendulum, and a row of recesses in said pendulum adapted to receive a pin to be engaged by said spring whereby the tension thereof is varied.

7. In a self-winding watch, a pendulum, a ratchet wheel, a lever pivotally supported by said pendulum, a pawl pivoted to said lever, resilient means tending to maintain said pawl in engagement with the teeth of said ratchet wheel, a stop carried by said pendulum, a leaf spring attached at one end to said pendulum and having its free end bearing against said lever to press the latter into engagement with said stop.

8. In a self-winding watch, a pendulum, a ratchet wheel, a lever pivotally supported by said pendulum, a pawl pivoted to said lever, resilient means tending to maintain said pawl in engagement with the teeth of said ratchet wheel, a stop carried by said pendulum, a leaf spring attached at one end to said pendulum and having its free end bearing against said lever to press the latter into engagement with said stop, and a row of apertures in said pendulum to receive a pin to be engaged by said leaf spring whereby the tension thereof may be varied.

9. A winding mechanism comprising an oscillatable member, a ratchet wheel, a pawl mounted on said oscillatable member for bodily movement relative thereto and being adapted to cooperate with said ratchet wheel, positive means for limiting movement of the pawl in one direction relative to said oscillatable member, and resilient means tending to oppose movement of the pawl relative to the oscillatable member in the opposite direction.

10. Winding mechanism comprising an oscillatable member, a ratchet wheel, a pawl mounted on said oscillatable member for bodily movement relative thereto and being adapted to cooperate with said ratchet wheel, positive means to limit movement of the pawl in one direction relative to said oscillatable member and resilient means co-operating with said positive means normally to hold said pawl in position of rest relative to said oscillatable member.

In testimony whereof, I have signed my name to this specification.

MAX REINER.