

W. H. EBELHARE.
 RATCHET MECHANISM FOR WATCH MOVEMENTS.
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971,496.

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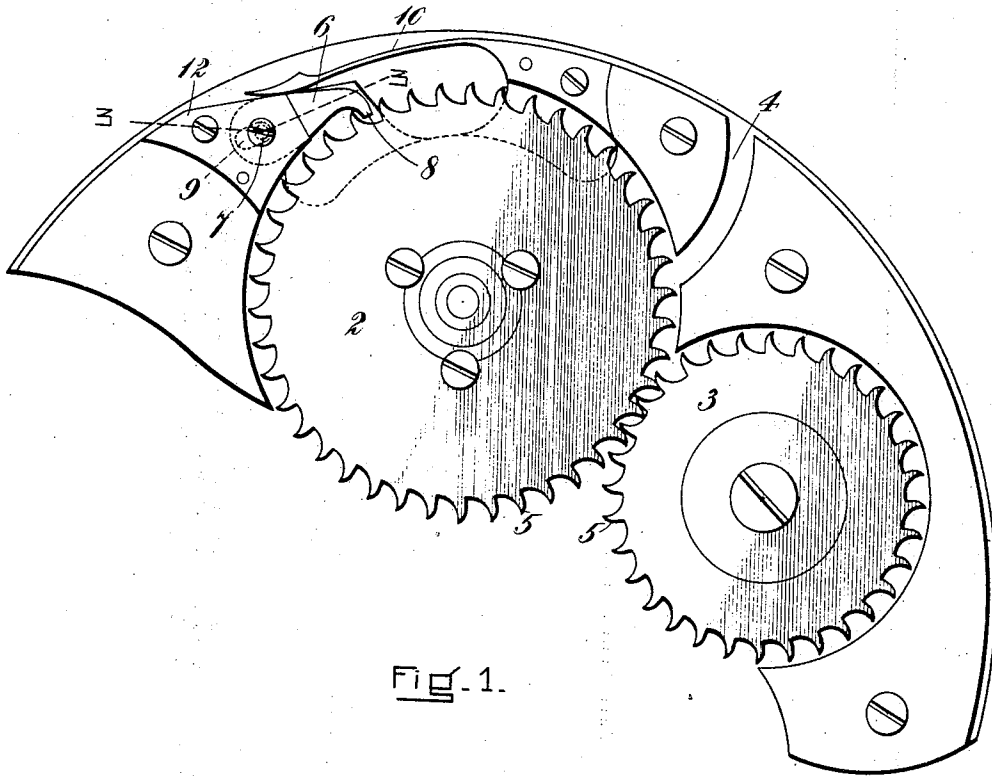


Fig. 1.

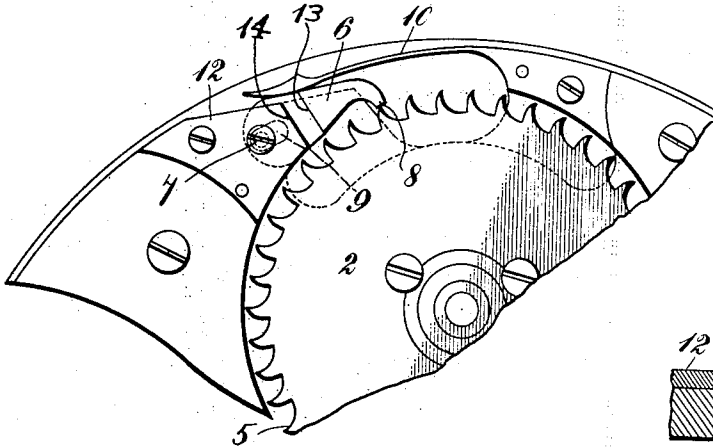


Fig. 2.

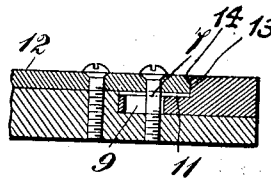


Fig. 3.

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RATCHET MECHANISM FOR WATCH-MOVEMENTS.

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To all whom it may concern:

Be it known that I, WILLIAM H. EBELHARE, a citizen of the United States, and resident of Waltham, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Ratchet Mechanisms for Watch-Movements, of which the following is a specification.

In the ratchet mechanism which forms a part of the winding train of a watch movement it is desirable that the click or detent which locks the ratchet wheel against retrograde movement shall be so constructed and arranged that after it has dropped behind an advancing tooth of the ratchet wheel it shall be capable of receding or moving backward to a limited extent, the object of this arrangement being to provide for a corresponding backward movement of the ratchet wheel under the influence of the main spring and thereby prevent said spring from being wound so tight as to render it immovable and therefore ineffective to operate the watch mechanism, a result which is liable to occur in case the main spring is not allowed to loosen itself slightly after being tightly wound up.

The present invention, which relates to click mechanisms of the type above referred to, is particularly intended to provide a mechanism of this character which shall be simple in construction and of such durability and efficiency as to render it suitable for use in high-grade watch movements, and resides in certain features of construction and arrangement which are hereinafter set forth.

In the accompanying drawing:—Figure 1 is a plan view of a portion of a watch movement showing the ratchet wheel combined with a click mechanism embodying my invention, as preferably constructed; Fig. 2 is a view similar to Fig. 1, but showing the parts in a different position; and Fig. 3 is a transverse sectional view on the line 3—3 of Fig. 1.

In the drawing, 2 indicates the ratchet wheel of the watch movement and 3 indicates one of the adjacent wheels in the winding train, these wheels being journaled on studs carried by the plate 4 in the usual manner and provided with intermeshing teeth 5 which, in the particular construction illustrated, are of the type known at "wolf's teeth," although the form of these teeth is not material to the present invention.

Adjacent to the periphery of the ratchet wheel 2 is located a detent 6 which is pivotally mounted on a fixed pin 7 and extends forward therefrom substantially in the direction in which the adjacent teeth of the ratchet wheel 2 move in winding the watch, said detent being provided at its forward or free end with an inwardly-turned portion 8 adapted to drop between adjacent teeth of the wheel 2.

At its pivoted end the detent 6 is slotted substantially in the direction of its length, as at 9, the pivot pin 7 being passed through the slot 9 and into the plate 4, so that the detent is capable of a limited longitudinal movement with respect to said pin, in addition to its pivotal movement, and a spring 10, which is rigidly secured at one end to the plate 4, is arranged to bear at its free end against the detent 6 in such manner as to press the terminal portion 8 of the said detent toward the ratchet wheel 2. There is also provided a fixed stop to limit the rearward movement of the detent 6, to which end the rear end portion of the detent is preferably recessed on its upper face, as at 11, to receive one end of a plate 12 which is rigidly secured to the plate 4, the vertical shoulder 13 thereby formed on the detent being shaped to bear against and conform to the front edge 14 of the plate 12, as shown in Figs. 1 and 3, when the detent is at the limit of its rearward movement, in which position the front wall of the slot 9 is located slightly ahead of and therefore out of contact with the pivot pin 7.

As thus constructed, when the watch is wound the teeth of the ratchet wheel 2 move in the direction indicated by the arrow in Fig. 1, and during the initial movement of said wheel 2 the pressure of the spring 10 upon the detent 6 holds the terminal portion 8 of the latter in contact with the tooth which is next behind it to a sufficient extent to cause the detent to be drawn bodily forward by the advancing tooth until such movement is arrested by the engagement of the pivot pin 7 with said detent at the rear end of the slot 9, whereupon the portion 8 of the detent moves outward and inward over the successive advancing teeth of the ratchet wheel 2 in the usual manner. When the winding operation is stopped, however, the re-action of the main spring tends to rotate the ratchet wheel 2 in the opposite direction, with the result that the rear face

of that tooth which is next in advance of the terminal portion 8 of the detent 6 engages said portion 8 and pushes the detent bodily rearward until the shoulder 13 on the detent brings up against the front edge 14 of the plate 12, whereupon the rearward movement of the detent is arrested and said detent acts as a stop to prevent further reverse movement of the ratchet wheel. The engagement of the conforming surfaces 13 and 14 under the pressure of the main spring also resists any turning movement of the detent upon its pivot and thus overcomes any possible tendency of the detent to be thrown out of engagement with the ratchet teeth. The reverse movement of the ratchet wheel which has taken place as above described, however, results in loosening the main spring sufficiently to prevent it from becoming bound, thus leaving it effective for its intended purpose, and this reverse movement may evidently be given any desired extent by forming the slot 9 and the recess 11 of suitable lengths.

It will be observed that the parts of the click mechanism above described are of simple construction and that the play of the spring 10 is slight in proportion to its length, so that the mechanism is very durable as well as positive and efficient in operation. The various moving parts of the mechanism are located in suitable recesses which are readily cut in the plate 4, and the presence of the plate 12 in the recess 11 serves to completely cover the slot 9, whereby said slot is prevented from accumulating dirt and the detent is prevented from moving away from said plate 4, all these parts being so arranged as to be flush with one another on their upper surfaces. The engagement of the stop surfaces 13 and 14 also serves to take up the rearward thrust exerted on the detent by the ratchet wheel and thus prevents this thrust from being transmitted to the pivot pin 7, so that there is no tendency for this pin to become loosened and a strong and durable construction results.

Since the various parts have but little thickness, the mechanism is well adapted for use in thin watch movements, as will be evident.

I claim as my invention:—

1. In a watch movement, the combination with the ratchet wheel of a detent adapted to engage the teeth of the same at its free end and provided with a slot extending substantially in the direction of the peripheral movement of said wheel, a fixed pivot pin

passing through said slot, a spring arranged to press the free end of the detent into contact with the teeth of the ratchet wheel, and a fixed stop to arrest the rearward movement of the detent and hold it out of contact with said pivot pin.

2. In a watch movement, the combination with the ratchet wheel of a longitudinally-slotted detent located adjacent to the periphery of the wheel and extending substantially in the direction of the forward movement thereof, said detent being provided with a stop shoulder, a fixed pivot pin passing through the slot in the detent, a spring arranged to press the free end of the detent into contact with the teeth of the ratchet wheel, and a plate overlapping the rear end of the detent and providing a stop surface adapted to engage the shoulder on the detent and limit the rearward movement of the latter.

3. In a watch movement, the combination with the ratchet wheel of a detent adapted to engage the teeth of the same at its free end and provided with a slot extending substantially in the direction of its length, the slotted portion of said detent being recessed on its upper surface, a spring arranged to press the free end of the detent into contact with the teeth of the ratchet wheel, a fixed plate extending into the recess in the detent and overlying the slot therein, and a fixed pivot pin passing through said plate and slot.

4. In a watch movement, the combination with the ratchet wheel of a detent adapted to engage the teeth of the same at its free end and provided with a slot extending substantially in the direction of its length, the slotted portion of said detent being recessed on its upper surface, a fixed pivot pin passing through said slot, a spring arranged to press the free end of the detent into contact with the teeth of the ratchet wheel, and a fixed plate extending into the recess in the detent and overlying the slot therein, the front wall of said recess and the front edge of said plate providing conforming stop surfaces adapted to prevent rearward and turning movements of the detent.

In testimony whereof, I have hereunto subscribed my name this 31st day of January, 1910.

WILLIAM HENRY EBELHARE.

Witnesses:

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