(No Model.)

D. GRUEN.

STEM WINDING WATCH.

No. 493,584. Patented Mar. 14, 1893.

Fig. I.

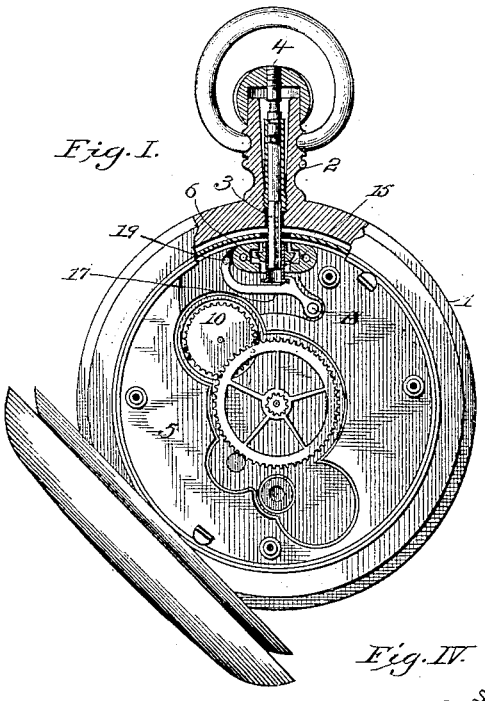


Fig. II.

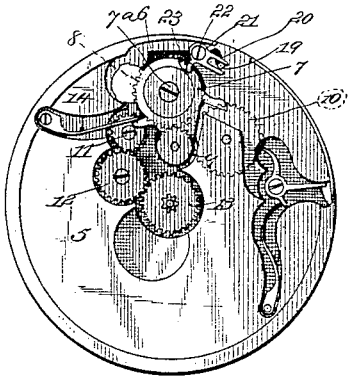


Fig. III.

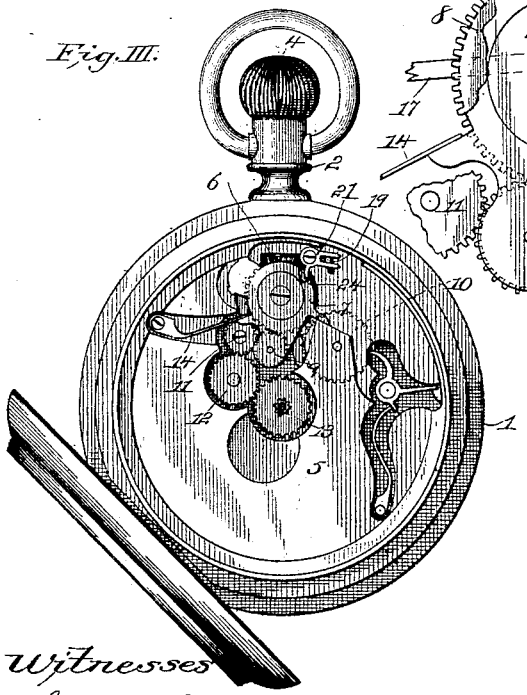


Fig. IV.

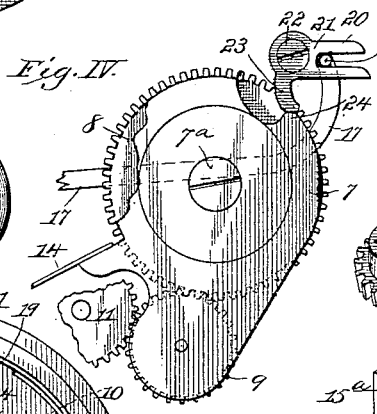
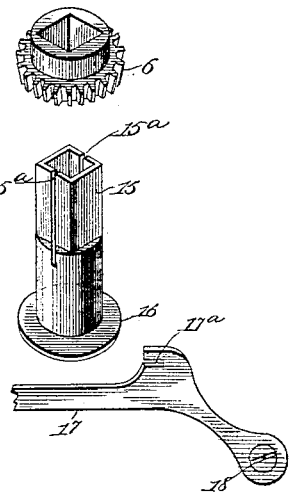


Fig. V.



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UNITED STATES PATENT OFFICE.

DIETRICH GRUEN, OF COLUMBUS, OHIO.

STEM-WINDING WATCH.

SPECIFICATION forming part of Letters Patent No. 493,584, dated March 14, 1893.

Application filed June 6, 1892. Serial No. 435,662. (No model.)

To all whom it may concern:

Be it known that I, DIETRICH GRUEN, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented a new and useful Improvement in Stem-Winding Watches, of which the following is a specification.

My invention relates to watches in which the winding and hands setting train is shifted from the winding to the setting position, and vice versa, by the longitudinal movement of an arbor contained within the pendant and by the rotation of which the winding and setting movements are effected.

The object of my improvement is to communicate the shifting movement to the train yoke by the longitudinal movement of a short stem arbor having positive connection with a shifting device, within the movement, without the intervention of a spring the said positive connection being moreover of such a character as to permit the ready insertion of the watch movement in the case, and its removal therefrom so that watch movements containing my improved stem winding and setting attachment are adapted for immediate application to watch cases in common use, containing short stem arbors, and hence may be applied to such cases interchangeably to suit the wishes of the purchaser. To this end I construct the customary bevel pinion, employed to transmit rotary motion from the stem arbor to the winding and setting train, with a square eye of sufficient size to receive a spring clutch which engages the square end of the winding arbor by friction when the movement is inserted in the case and is thus made to partake of the rotary and longitudinal movements of the winding arbor, transmitting the rotary movement to the beveled pinion and thence to the winding and setting train in the customary manner, and in its longitudinal movement sliding through the square eye of the beveled pinion and imparting positive movement in either direction to a shifting lever, the free end of which is connected by a wrist pin with one arm of a cam lever, the other arm of which bears on a suitable cam surface on the train yoke, so as to shift the train by a positive movement into gear with the hands setting wheels when the stem arbor is drawn out and restore it to its normal position, in gear with the winding wheel, when the stem arbor is pushed in. A spring is provided to hold the train in its normal position, in gear with the winding wheel, when uncontrolled by the stem arbor, as when the movement is out of the case.

In order that my invention may be clearly understood by others skilled in the art, I will proceed to describe it in detail, with reference to the accompanying drawings, in which:—

Figure I is a rear view of a watch movement with my improvement applied, showing in section, the case-stem, the beveled pinion and the clamp or clutch, which seizes the end of the winding arbor, and transmits its rotary movement to the bevel pinion and its longitudinal movement to the shifting lever. The parts are here shown in their normal position, in which the stem arbor is pushed in, and the train is in gear with the winding wheel. Fig. II is an opposite or front view of the movement, detached from the case, also showing the parts in normal position with the train in gear with the winding wheel. Fig. III is a front view of the watch showing the position of the parts when the stem arbor is drawn out and the train in gear with the hands setting wheels. Fig. IV is a detail view on a larger scale showing the cam lever on the front of the movement plate, a portion of the train-yoke on which it bears and the wrist pin which imparts motion to said cam lever from the shifting lever on the rear side of the plate. The parts are here shown in the same position as in Fig. III. Fig. V is a perspective view on a still larger scale showing the spring clutch and beveled pinions detached and fragments of the winding arbor and of the shifting lever with which the spring clutch engages so as to transmit the longitudinal movement of the winding arbor.

1 represents the case-center; 2, the pendant thereof; 3, the winding arbor having rotary and longitudinal movement within the pendant, and 4, the crown secured to the outer end of the arbor for imparting the rotary and longitudinal movements thereto, and to force back the cover catch when this is used, as in a hunting case watch. All these parts may be of the usual construction found in cases

as now commonly supplied by watch case manufacturers to the watch manufacturers and the watch making trade.

5, represents the movement plate applied and secured within the case-center in customary manner, and upon which is mounted the bevel pinion, 6, for transmitting rotary motion from the stem arbor to the oscillating train-yoke, 7, which carries a wheel 8, turning on the center, 7^a, on which the train yoke 7 oscillates and constantly in gear with the beveled pinion; also an intermediate wheel 9 which is normally in gear with the winding wheel 10, but when the train yoke is shifted in the opposite direction engages with a pinion 11, on the movement plate, so as to transmit motion through this and the intermediate wheel 12, to the cannon wheel 13 for setting the hands. These parts may likewise be of usual construction. When the train yoke is uncontrolled, as when the movement is out of the case, it is held in its normal position in gear with the winding wheel 10, by means of a spring 14.

For imparting positive motion from the stem arbor 3 to the train yoke 7, I employ the following device: The beveled pinion 6 is constructed with a square eye of sufficient size to receive a square clutch 15, so that the pinion may derive rotary motion from the said clutch, but the latter may slide freely within the pinion, 6. The clutch 15, is split longitudinally as shown at 15^a in Fig. V and formed square on the inside, thus providing a pair of spring jaws adapted to grip and adjust themselves to the square on the end of the stem arbor 3. The inner end of the clutch 15, is formed with a flange or collar 16, which engages by a notch 17^a, a shifting lever 17 pivoted to the movement plate at 18, and at its free end carrying a wrist pin 19, projecting through a slot in the plate and engaging with the forked end 20 of a cam lever 21, fulcrumed at 22, and bearing by the extremity of its free arm 23, upon a cam surface 24, on the train yoke 7.

The operation is as follows:—When the movement is out of the case the train rests in its normal position, with the train in gear with the winding wheel 10, as shown in Fig. II. To insert the movement in the case the square end of the stem arbor 3, is first introduced within the spring clutch 15, and the movement is then inserted and secured in the usual way. The act of setting it in position within the case center causes the clutch 15, to grip the square of the stem arbor 3, with sufficient force to insure their moving together. The longitudinally movable stem arbor and the train yoke are now in positive connection without the intervention of any spring, so that when the stem arbor is drawn out the clutch 15, moving with it, will draw the lever 17, in the same direction, and this acting through the medium of its wrist pin 19, operates on the cam lever 21, and this on the cam surface 24, of the train yoke 7, so as to shift the train to the position shown in Fig. III in gear with the setting wheels, where it is fimly locked by the extremity of the free arm of the lever 21 bearing on the train yoke directly in the line of motion. This simple device prevents the accidental detachment of the gear from the setting wheels, and makes the setting either forward or back certain and positive. By turning the stem arbor in either direction the hands may then be set forward or backward in customary manner. This done the stem arbor is again thrust into its normal position, imparting a reverse movement to the bell crank lever, the action of which, operating in conjunction with the spring 14, restores the train to its normal position, in gear with the winding wheel as shown in Fig. II. It will be understood that the construction of the spring clutch forming part of the watch movement and sliding longitudinally through the bevel pinion therein, adapts the device to engage automatically with an ordinary square winding arbor in the case pendant, of indeterminate length, so that the device is not limited to any particular length or form of pendant arbor, provided only that the clutch is adapted to grip the arbor so as to be moved longitudinally thereby and derive rotation therefrom when the movement is once set in position there is no moving friction between the spring clutch 15, and the stem arbor 3. The frictional contact between them affords ample resistances to prevent their longitudinal separation and this insures their moving together.

The longitudinal movement of the arbor within the pendant is limited by suitable stops and this prevents any excessive pull on the arbor and precludes the probability of its accidental separation from the clutch. Hence after it is once set in position in the movement it never will change or shift relatively to the clutch. It will also be understood that the spring clutch automatically adjusts itself to the size of the square end of the stem arbor, so that any slight variation in size is compensated for. When the movement is inserted in the case the short stem arbor slips within the spring socket in the movement to any necessary extent but engages therewith with sufficient friction to move the train shifting lever to the full extent of its stroke by the outward pull and inward push of the arbor. The two parts of the winding arbor, mounted in the pendant and watch movement respectively adjust themselves to one another automatically and are thus adapted to work to gether in watch cases and movements of different styles.

Having thus described my invention, the following is what I claim as new herein and desire to secure by Letters Patent:

1. A longitudinally moving clutch in the watch movement, constructed with a spring socket to receive a winding arbor of indeterminate length, in a case-pendant; in combination with a train yoke with which the clutch is connected for shifting it, and with a pinion

through which winding and setting motion is transmitted to the train, substantially as set forth.

2. The hollow clutch 15 in the watch movement constructed with a pair of spring jaws forming a square clamping socket, in combination with the longitudinally sliding winding arbor in the case-pendant, engaging by friction with the square socket in the clutch 15 as described.

3. The combination of the pinion 6 in the watch movement having a square eye, the square clutch 15 also mounted in the watch movement sliding in the eye of the pinion 6 and imparting rotation thereto, and the longitudinally moving arbor 3, in the pendant engaging by friction with the clutch 15, substantially as and for the purpose set forth.

4. The combination of the spring clutch 15, the beveled pinion 6, within which it slides, and the shifting lever 7, moved by the longitudinal movement of the spring clutch 15, substantially as described.

5. The combination of the longitudinally sliding spring clutch 15, beveled pinion 6, shifting lever 17, pin 19 forked lever 21, and train yoke 7, substantially as and for the purposes set forth.

6. The combination of the sliding clutch 15, shifting lever 17, pin 19, forked lever 21, train yoke 7, and spring 14, substantially as and for the purposes set forth.

7. The hollow clutch 15 constructed with a square spring socket, a cylindrical body and a base flange or collar substantially as and for the purpose set forth.

8. The combination of the winding arbor in the case-pendant and a train shifting mechanism in the movement provided with a clutch sliding longitudinally in the bevel pinion and constructed with a square spring socket engaging with the winding arbor by friction as herein explained, for the purpose set forth.

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