(No Model.)

3 Sheets—Sheet 1.

G. E. HART.

STEM WINDING WATCH.

No. 418,130. Patented Dec. 24, 1889.

Fig. 1.

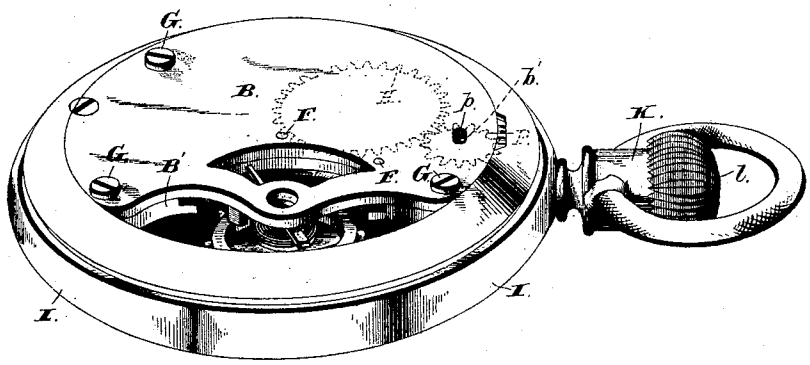
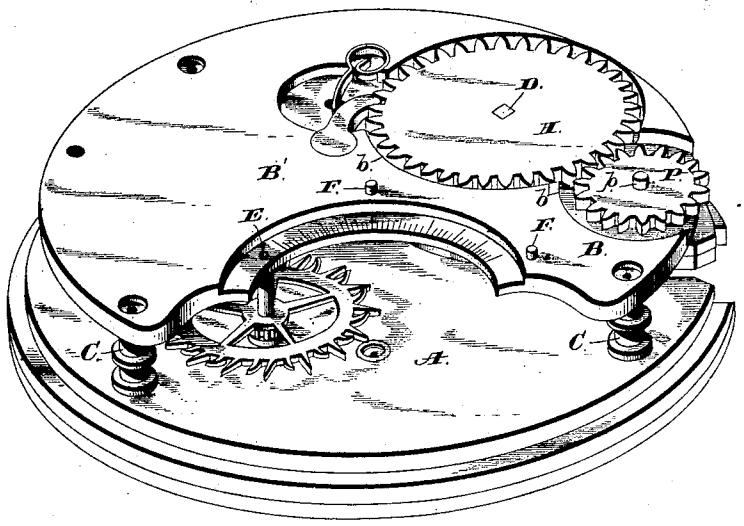


Fig. 2.



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(No Model.) 3 Sheets—Sheet 2.

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Fig. 3.

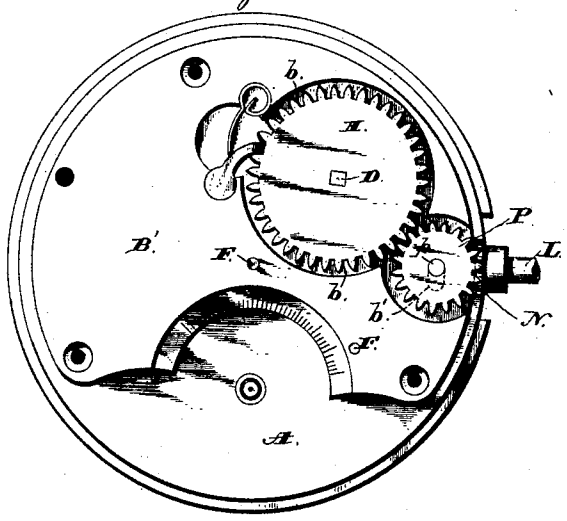
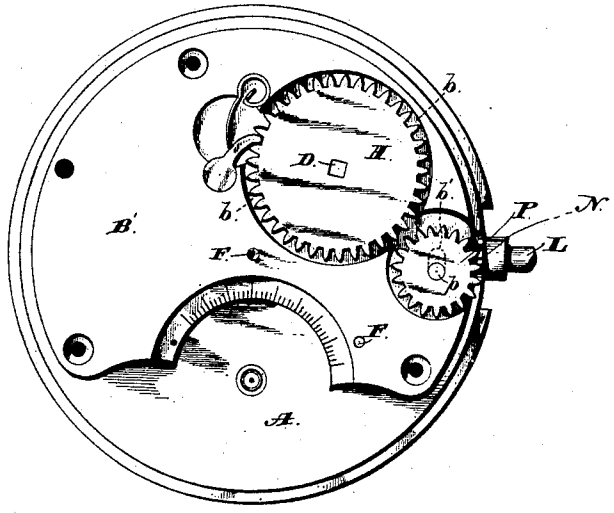


Fig. 4.



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(No Model.) 3 Sheets—Sheet 3.

G. E. HART.

STEM WINDING WATCH.

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Fig. 5.

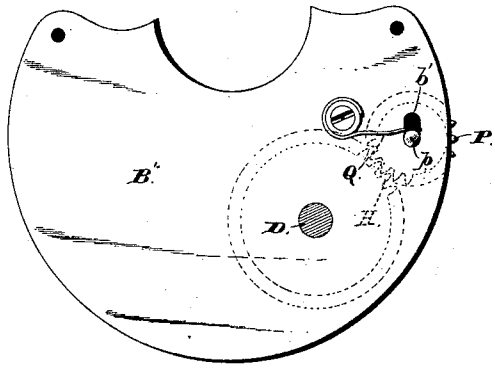


Fig. 6.

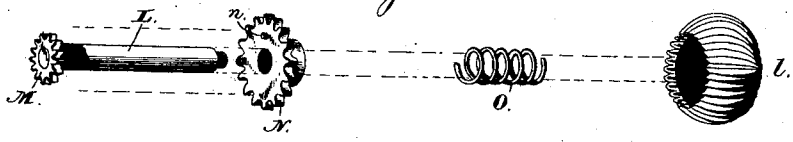


Fig. 7.

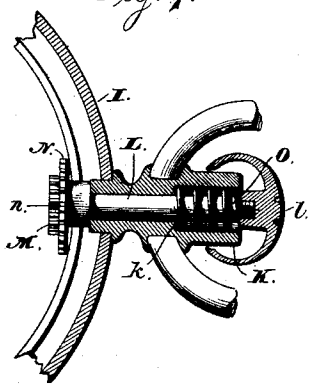
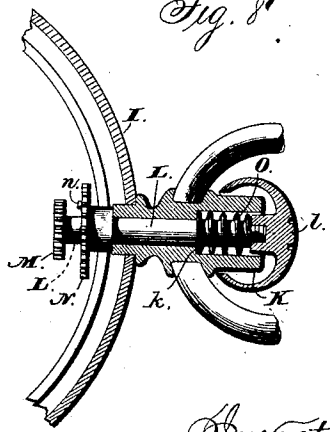


Fig. 8.



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UNITED STATES PATENT OFFICE.

GEORGE E. HART, OF WATERBURY, CONNECTICUT, ASSIGNOR TO THE WATERBURY WATCH COMPANY, OF SAME PLACE.

STEM-WINDING WATCH.

SPECIFICATION forming part of Letters Patent No. 418,130, dated December 24, 1889.

Application filed November 30, 1887. Renewed November 26, 1889. Serial No. 331,590. (No model.)

To all whom it may concern:

Be it known that I, GEORGE E. HART, of Waterbury, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Stem-Winding Watches; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of my watch from the rear side, the back case being removed. Fig. 2 is an enlarged perspective view of the movement from the rear, separated from the case and with the outer section of the back plate removed. Figs. 3 and 4 are plan views of the same, with the outer section of the back plate removed, and show, respectively, the intermediate wheel out of and in engagement with the winding-wheel. Fig. 5 is a plan view of the lower side of the back plate separated from the movement. Fig. 6 is a perspective view, enlarged, of the stem-arbor and connecting parts separated from each other; and Figs. 7 and 8 are sections upon the line of the axis of the case-pendant, and show, respectively, the relative positions of parts when the stem-arbor is in its normal position in engagement with the winding-train, and when in engagement with the hands-setting train.

Letters of like name and kind refer to like parts in each of the figures.

The design of my invention is to render more simple the stem winding and setting mechanism of a watch without lessening its efficiency and durability; to which end my said invention consists, principally, in the construction and operation of the gearing used for transmitting the motion of the stem-arbor pinion to the spring-arbor, substantially as and for the purpose hereinafter specified.

It consists, further, in the means employed for connecting the winding-pinion to or with the stem-arbor, substantially as and for the purpose hereinafter shown.

It consists, finally, in the construction and combination of the parts composing the stem-winding train, substantially as and for the purpose hereinafter set forth.

In the carrying of my invention into practice I employ a movement in which is a front plate A and back plate B, that are connected together and secured in relative positions by means of the usual pillars C and C. Between said plates are journaled a mainspring-arbor D and escape-wheel arbor E, together with the intermediate arbors and wheels and pinions that constitute an ordinary time-train. The rear or back plate is composed of two flat sections, one of which B is secured directly upon the ends of the pillars C and C, while the second section B′ is superimposed upon the outer face of said section B, and is secured thereto by means of steady-pins F and F and screws G and G, which latter pass through suitable openings in each of said sections, and have their threaded ends contained within correspondingly-threaded axial openings that are provided in the ends of said pillars.

Within the outer face of the inner section B of the back plate, around and concentric with the mainspring-arbor D, is provided a recess *b*, within which is contained a toothed wheel H, that engages with said arbor and constitutes the winding-wheel. Said wheel is rotated when desired by the following described means, viz:

Surrounding the movement is a case-center I, from which projects radially outward a pendant K of usual form, within which pendant is journaled a stem arbor L, that is rotatable by means of a crown *l* upon its outer end, and is adapted to have a certain amount of longitudinal motion. Secured rigidly upon the inner end of the arbor L is a pinion M, while in rear of the same, but inside of the case-center, is a second larger pinion N, which is loosely journaled upon said arbor, so as to permit the latter to have motion independent of said pinion. A spur *n*, which is secured to and projects forward from the inner side of said pinion N, is adapted to engage with the teeth of said pinion M when said arbor L is at the outer limit of its longitudinal motion, as shown in Fig. 7, but is released from such engagement whenever such arbor is moved longitudinally inward, as seen in Fig. 8. A spring O, coiled around said arbor and having one of its ends bearing against the inner end of the crown and its opposite end

in contact with a shoulder *k*, that is formed within the pendant K, operates to hold said arbor with a yielding pressure at the outer limit of its longitudinal motion in position to permit said pinions M and N to be engaged.

The pinion M, in addition to furnishing means for connecting the arbor L and pinion N, is used for communicating the motion of said arbor to the hands-setting train, but as such forms no part of this invention no further description of it is necessary.

As seen in Fig. 1, the pinion N projects upward beside the back plate B at a point near but at one side of the winding-wheel H, where it engages with an intermediate wheel P, which is adapted to rotate in the same plane as said winding-wheel. The wheel P is provided upon opposite sides with two journals *p* and *p*, that project into and are contained within two corresponding slots *b'* and *b'*, that are formed in the inner and outer sections of said back plate. Said slots are formed lengthwise upon the line of a circle which is parallel with the adjacent periphery of said back plate, so that while they permit of such freedom of motion of said journals as to enable said wheel P to be moved into and out of engagement with said winding-wheel they insure the constant engagement of said wheel P with said pinion N.

A light spring Q, secured upon the inner face of the inner section B and having its free end in engagement with the lower journal *p* of the wheel P, operates to hold the latter with a yielding pressure normally in engagement with the winding-wheel H, but such spring may be omitted without change of the operation of parts. If, now, the stem-arbor be rotated in one direction, it will cause the stem-arbor to be rotated so as to wind the mainspring; but if said arbor is rotated in the opposite direction the intermediate wheel will be automatically moved out of engagement with said winding-wheel, and the teeth of the former will ratchet over the teeth of the latter.

It will be seen that the connection between the stem-arbor and winding-pinion is positive, and for its action requires no spring, except such as is used for holding said arbor at the outer limit of its motion, while as it is in constant engagement with the intermediate wheel the only back ratchet mechanism necessary is such as exists between said intermediate wheel and the mainspring-wheel, which ratchet mechanism does not depend for its action upon springs, and is not liable to get out of order.

Having thus described my invention, what I claim is—

1. As an improvement in stem-winding watches, a stem-arbor which is adapted to be rotatively engaged with a winding-pinion that is journaled thereon, and such engagement maintained by a positive rigid connection and without the use of a ratchet, substantially as and for the purpose specified.

2. As an improvement in stem-winding watches, a stem-arbor and a winding-pinion that is journaled thereon, which parts without the use of a ratchet are rotatively engaged by a rigid positive connection when the arbor is at the outer limit of its motion, and are free to rotate independently when said arbor is moved longitudinally inward, substantially as and for the purpose shown.

3. As an improvement in stem-winding watches, the combination of a rotatable longitudinally-movable stem-arbor, which is normally held at the outer limit of its longitudinal motion by means of a spring, a pinion that is journaled upon the inner end of said arbor, and means, substantially as shown, whereby said parts are rotatively engaged in both directions by a rigid positive connection when said arbor is at the outer limit of its longitudinal motion, and are free to rotate independently when said arbor is moved longitudinally inward, substantially as and for the purpose set forth.

4. As an improvement in stem-winding watches, the combination of a rotatable longitudinally-movable stem-arbor, a toothed pinion, which is rigidly secured upon the inner end of such arbor, a pinion that is journaled upon said arbor in rear of said fixed pinion, and a spur or stud which is provided upon one of said pinions, and is adapted to engage with two of the teeth of the other pinion when said arbor is at the outer limit of its longitudinal motion, substantially as and for the purpose shown and described.

5. As an improvement in stem-winding watches, a winding-train in which is a wheel that has its arbor journaled directly within the movement-plate, is constantly in engagement with one of the wheels of the train and is automatically moved into or out of engagement with another wheel of said train by rotation in opposite directions, substantially as and for the purpose specified.

6. As an improvement in stem-winding watches, in combination with a winding-wheel upon the mainspring-arbor and a pinion upon the stem-arbor, an intermediate wheel which has its arbor journaled directly within the movement-plate and is adapted to maintain a constant engagement with said pinion and to be moved bodily into or out of engagement with said winding-wheel, substantially as and for the purpose shown.

7. As an improvement in stem-winding watches, in combination with the winding-wheel and with a stem-driven wheel, an intermediate wheel which is in constant engagement with the latter and has its arbor journaled within elongated pivot-openings, whereby by rotation in opposite directions said intermediate wheel will be automatically moved into or out of engagement with said winding-wheel, substantially as and for the purpose set forth.

8. As an improvement in stem-winding watches, in combination with a stem-driven

wheel, an intermediate wheel which is in constant engagement therewith and is secured upon an arbor that is adapted to be moved in a line perpendicular to its axis, whereby the rotation of said stem-driven wheel in one direction will cause said intermediate wheel to automatically move into engagement with the next wheel of the train, and the rotation of said stem-driven wheel in an opposite direction will cause said intermediate wheel to automatically move out of engagement with the said adjacent wheel, substantially as and for the purpose shown and described.

9. As an improvement in stem-winding watches, the combination of a stem-driven wheel, an intermediate wheel which is in constant engagement therewith and is secured upon an arbor that is adapted to be moved in a line perpendicular to its axis to cause said intermediate wheel to engage with or to be released from engagement with an adjacent wheel, and a spring which operates to hold said intermediate wheel normally in position for such engagement, substantially as and for the purpose specified.

10. As an improvement in stem-winding watches, in combination with a stem-driven wheel and with a winding-wheel, an intermediate wheel which is in constant engagement with the stem-driven wheel and by rotation is adapted to be automatically moved into or out of engagement with said winding-wheel and is normally held in such engagement by means of a spring, substantially as and for the purpose shown.

11. As an improvement in stem-winding watches, the combination of the stem-driven wheel, the winding-wheel, the intermediate wheel having the pivots of its arbor contained within elongated openings, and the spring which operates to hold said intermediate wheel with a yielding pressure at one limit of its lateral motion, substantially as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 22d day of November, 1887.

GEORGE E. HART.

Witnesses:
CHARLES S. CHAPMAN,
GEO. E. TERRY.