(No Model.)

C. T. HIGGINBOTHAM.

STEM WINDING AND SETTING WATCH.

No. 440,878. Patented Nov. 18, 1890

Fig. 1.

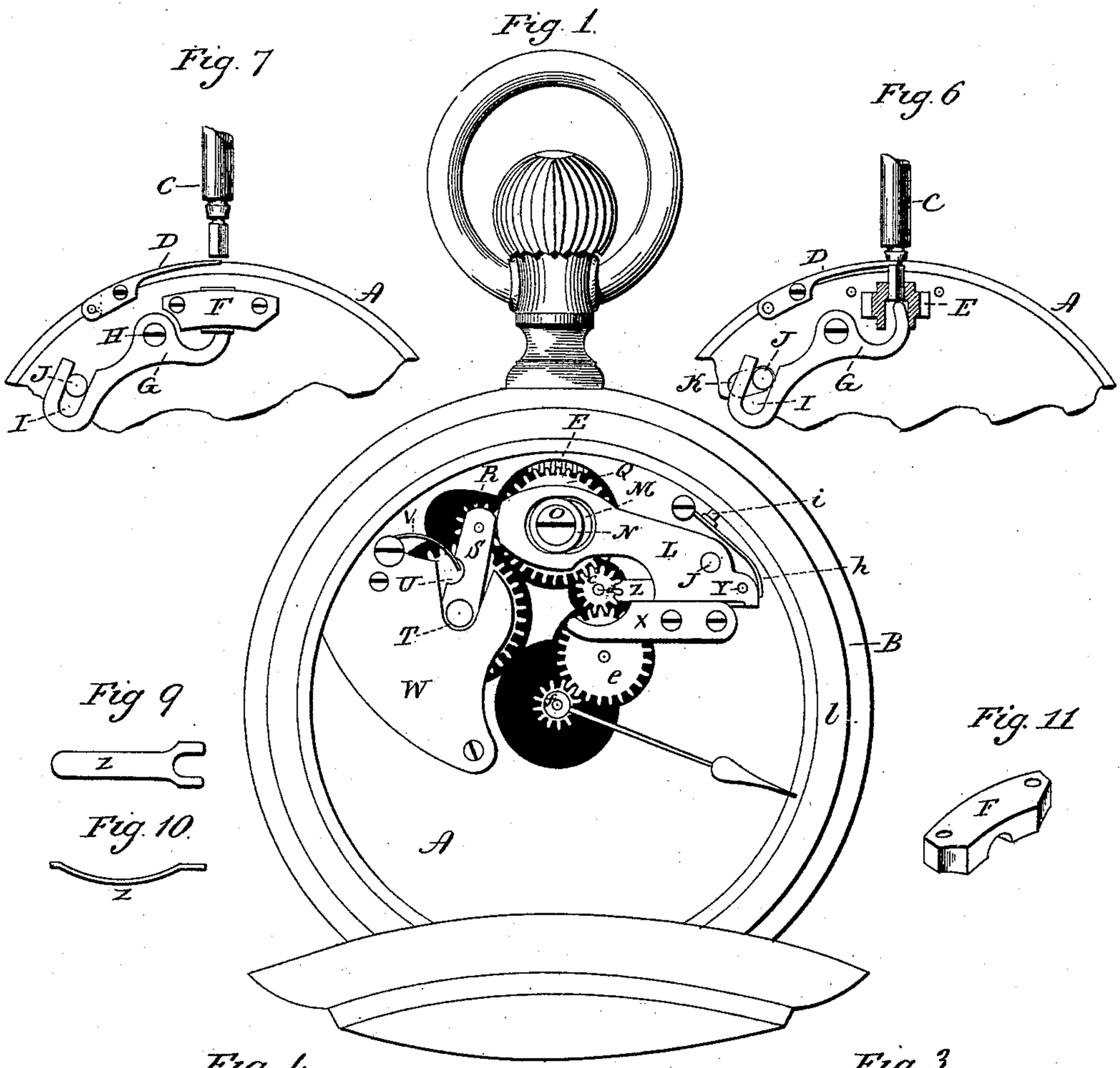


Fig. 7

Fig. 6

Fig. 9

Fig. 10.

Fig. 11

Fig 4

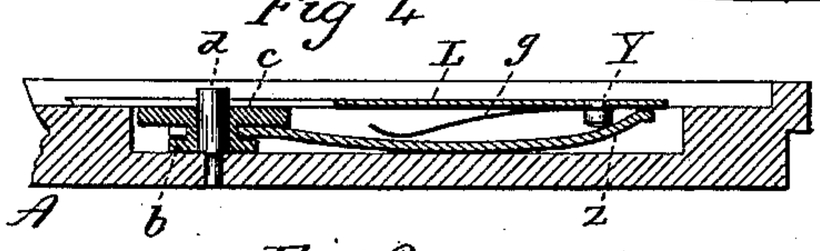


Fig. 3

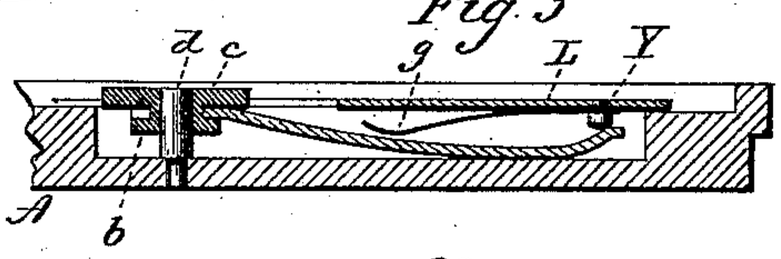


Fig. 2.

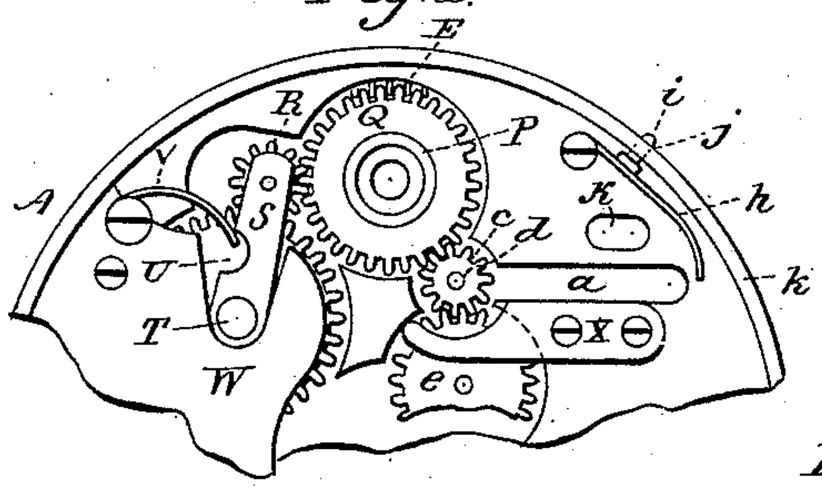


Fig. 5

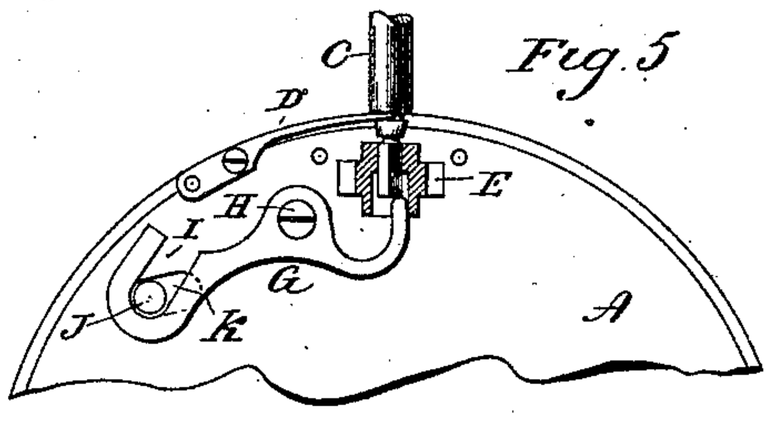
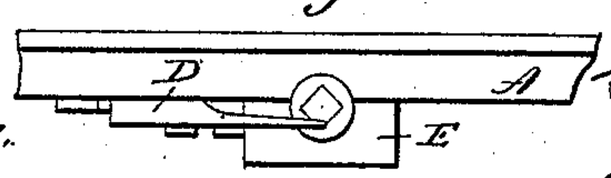


Fig. 8.



Witnesses.
L. K. Shumway.
Lillian D. Kelsey.

Chas. T. Higginbotham
Inventor
By attys
Edwd. A. Seymour

UNITED STATES PATENT OFFICE.

CHARLES T. HIGGINBOTHAM, OF THOMASTON, CONNECTICUT, ASSIGNOR TO THE SETH THOMAS CLOCK COMPANY, OF SAME PLACE.

STEM WINDING AND SETTING WATCH.

SPECIFICATION forming part of Letters Patent No. 440,878, dated November 18, 1890.

Application filed February 7, 1890. Serial No. 339,570. (No model.)

To all whom it may concern:

Be it known that I, CHARLES T. HIGGINBOTHAM, of Thomaston, in the county of Litchfield and State of Connecticut, have invented new Improvements in Watches; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a view in elevation of a stem-winding and stem-setting watch with the dial removed to show my improved winding and setting mechanism; Fig. 2, a detached broken view in elevation of the lower movement-plate with my improved mechanism having the sliding coupler, the winding-screw, and the winding-cap, which have been removed; Fig. 3, an enlarged broken view, in vertical longitudinal section, showing the rocking bar, the rising wheel, and the sliding coupler in their normal positions, in which the said wheel is cut out of gear with the setting-train; Fig. 4, a similar view showing the same parts with the coupler moved inward, the inner end of the rocking bar depressed, and the wheel in position for gearing into the setting-train; Fig. 5, a detached broken view in elevation of the inner face of the lower movement-plate and showing the winding-arbor, the winding-pinion, and the operating-lever all in their normal positions; Fig. 6, a similar view of the same parts in adjustment for setting the watch, the winding-arbor being thereto pulled outward; Fig. 7, a similar view of the same parts, together with the winding-pinion bridge; Fig. 8, a plan view of the same parts; Fig. 9, a detached plan view of the rocking bar; Fig. 10, a detached view thereof in side elevation, and Fig. 11 a detached perspective view of the winding-pinion bridge.

My invention relates to an improvement in stem-winding and stem-setting watches, the object being to disconnect the coupler employed for cutting the winding and setting trains into gear from both of the said trains, so that when it is acting upon one train it cannot interfere with the action of the other; to insure against the cutting of the setting-train into gear, and thereby disturbing the integrity of the watch as a time-piece by the accidental breakage or displacement of any one or more of the springs forming elements of the winding and setting mechanism; to provide for keeping the setting-train cut out of gear with the winding-train when the movement is removed from its case in that class of watches in which the setting-train is cut into gear with the winding-train by pulling out the winding-arbor, and to produce a strong and durable winding and setting mechanism.

With these ends in view my invention consists in a sliding coupler having no direct connection with either the winding or the setting train; in a construction of parts and arrangement of springs whereby the breakage or displacement of the latter cannot operate to cut the setting-train into gear; in an automatic tension relief for the coupler-spring adapted to operate when the movement is removed from the case, and in certain details of construction and combinations of parts, as will be more particularly hereinafter described, and pointed out in the claims.

As herein shown, my improved mechanism is applied to a movement which may be of any approved construction, only its lower plate A being shown. This movement is mounted in a watch-case B, which may also be of any approved construction, and includes a winding-arbor C, connected with the movement by a spring D, attached to the plate A thereof and having its extreme lower end squared to enter a corresponding opening formed in the winding-pinion E, held in place by the winding-bridge F, and having its opposite end recessed to receive one arm of the operating-lever G, which is pivoted to the inner face of the plate by a screw H, the end of the lever entering the recess being directly engaged by the winding-arbor C, the squared end whereof is longitudinally movable in the winding-pinion. The other end of the operating-lever has an inclined open slot I, formed in it to receive an operating-pin J, passing through an elongated slot K, formed in the movement-plate A and projecting inwardly from the outer end of a sliding coupler L, the outer end of which is guided as it is reciprocated by means of the said pin J and slot K.

The inner end of the said sliding coupler L, which carries no wheel itself, is provided with an elongated opening M, extending in the direction in which the coupler slides and having its inner wall shouldered to form a bearing for a shouldered winding-cap N, through which the winding-cap screw O passes and enters the movement-plate A, the inner end of the said sliding coupler being guided by the said winding-cap screw and winding-cap co-operating with the elongated shouldered opening. The winding-hub P, formed in the movement-plate A and concentric with the winding-cap screw O, forms a bearing for the winding-wheel Q, which is of ordinary construction, and meshes into the winding-pinion E, before mentioned. An intermediate winding-wheel R is mounted in position to gear into the main winding-wheel Q in the lower face of the outer end of a movable carrier in the form of a swinging bar S, the center of which is concentric with the winding-arbor T, the said bar being provided in its outer edge with a notch U to receive an end of a spring V, which exerts a constant tendency to move the free end of the bar inward, and thus cut the intermediate winding-wheel R into gear with the teeth of the main winding-wheel Q. As herein shown, the fulcrumed end of the said swinging bar S is held in place by the ratchet-bridge W, which is of ordinary construction. The outer end of the sliding coupler L is held down and in place by means of a minute-wheel bridge X, secured to the movement-plate A, the adjacent edges of the coupler and bridge being thereto appropriately shouldered. An operating-stud Y, mounted in the lower face of the outer end of the sliding coupler L is provided for engagement with the outer end of a movable carrier in the form of a longitudinally curved or bowed rocking bar Z, free at both ends and located in a long recess *a*, formed for it in the outer face of the movement-plate A and having its inner end forked to enter a groove encircling a hub *b*, formed upon the inner face of a rising wheel *c*, mounted so as to move freely upon a shouldered stud *d*, entered into the movement-plate A or formed integral therewith, as may be convenient. The function of the said rising wheel *c* is to couple the main winding-wheel Q with the minute-wheel *e*, which is of ordinary construction and meshes into the cannon-pinion *f*. A spring *g*, having its outer end secured to the under face of the sliding coupler L by means of the operating-stud Y, extends inwardly over the rocking bar Z and exerts a constant tendency to depress the inner end thereof, and so depress the rising wheel *c* and cut the same into mesh with the minute-wheel *e*. A coupler-spring *h*, the function of which is to move the sliding coupler in one direction, has its free end engaged with the extreme outer end thereof and its other end secured to the movement-plate A. A tension-relief pin *i*, mounted in a suitable opening *j*, formed in the flange *k*, encircling the movement-plate A, is arranged for the engagement of its inner end with the outer face of the said spring *h* and for the engagement of its outer end with the inner edge of the case-center *l* when the movement is mounted in its case.

Having now described in detail the construction of my improved winding and setting mechanism, I will set forth the mode of its operation.

When the movement is in the case, the winding-arbor is normally pushed inward, as shown by Fig. 5 of the drawings. In this position of the winding-arbor the inclined slot I of the operating-lever will co-operate with the pin J of the sliding coupler to hold the same in the position in which it is shown by Fig. 1 of the drawings, in which the other parts of my improved mechanism are also shown in their normal or winding positions. By reference to that figure of the drawings it will be observed that the main winding-wheel and the intermediate winding-wheel are in mesh. The position of the rising wheel *c* at this time is clearly shown by Fig. 3 of the drawings, which represents it in its elevated position in which it is cut out of mesh with the minute-wheel *e* of the dial-work of the watch. It will be seen that any movement of the winding-arbor, whether it is turned to wind the watch or ratcheted back, cannot possibly disturb the setting-train of the watch, inasmuch as the sliding coupler is not moved during the operation of winding and is only indirectly connected with the setting-train. When it is desired to set the watch, the winding-arbor is pulled outward by its crown, whereby the pressure which it normally exerts upon the operating-lever G is removed and the spring *h* permitted to act in throwing the sliding coupler inward within the limit allowed to it by the length of the elongated slot *a*, formed in the movement-plate A. As the sliding coupler moves inward, its extreme inner end pushes against the outer end of the swinging bar S and moves the same outward sufficiently to cut the intermediate winding-wheel R out of gear with the main winding-wheel, whereby the winding-train of the watch is temporarily retired. The same movement of the sliding coupler causes the operating-stud Y to clear the extreme outer end of the rocking bar Z, which is turned abruptly upward at that point, and thus permit the spring *g* to depress the inner end of the said rocking bar, and thus cut the rising wheel *c* into gear with the minute-wheel *e*, whereby the setting-train is cut into gear for setting the watch, the winding-train being meanwhile kept retired by the continued engagement of the extreme inner end of the sliding coupler with the free end of the swinging bar S. After the watch has been set, the winding-arbor is forced inward again by means of its crown, with the effect of causing the operating-lever G to move the sliding coupler outward again against the tension of the spring *h*, and thus restore the

parts of my improved mechanism to the positions in which they are shown by Figs. 1 and 3 of the drawings.

It has already been seen how the winding and setting mechanism of the watch is sustained in a normal condition of readiness to be operated for winding the watch by means of the pressure imposed upon the operating-lever by means of the winding-arbor. When, however, the movement is removed from the case, this pressure is absent, and in order to provide for sustaining the parts of the watch in the same adjustment the sliding coupler must be relieved of the tension of the spring *h*, employed to move it inward. This relief is provided for in the tension-relief pin *i*, which, although normally pressed inward by the case, is free to move outward when the movement is removed from the same, and thus so far relieve the spring *h* from tension that it will not act upon the sliding coupler, which will then be held in its normal position in which the setting-train is cut out of gear by the action of the spring V, which, as before described, exerts a constant tendency to hold the swinging bar in position for the intermediate winding-wheel to mesh into the main winding-wheel, and at the same time to push the sliding coupler outward. In this tension-relief pin I therefore provide for keeping the setting-train cut out of gear or retired, even when the movement is out of the case, this being desirable, as otherwise the movement could not be run out of the case without imposing upon it the additional duty of running the main winding-wheel and the winding-pinion. It may be remarked in this connection that if it is desired to cut the setting-train into gear when the movement has been removed from the case a simple pressure of the finger-nail against the outer end of the tension-relief pin will impose the required tension upon the coupler-spring *h* for throwing the sliding coupler inward and so permitting the depression of the rising wheel and cutting it into gear with the minute-wheel.

The advantage of disconnecting the sliding coupler, which in one position cuts the winding-train into gear and the setting-train out of gear, and in another position cuts the winding-train out of gear and the setting-train into gear from both of the said trains, is apparent, inasmuch as under this construction it becomes impossible to disturb or injure the train temporarily retired, whichever it may be, whereas under prior constructions, employing a rocking coupler carrying elements of each train at its respective ends, there is an opportunity for interfering with the retired train in case the parts become in the slightest degree deranged or are not carefully managed.

It will be further observed that the breakage of one, two, or all of the springs V, *g*, and *h* cannot possibly permit the setting-train to be cut into gear and so affect and impair the integrity of the operation of the watch as a time-keeper. Thus if the spring V should break, the sliding coupler would not be permitted to move inward on that account under the tension of the spring, because the said coupler is positively held in its normal position, in which the setting-train is cut out of gear by the winding-arbor. In case the spring *g* should break, the rocking bar would not on that account be allowed to move, because in the normal adjustment of the parts the outer end of the said bar is engaged with the operating-stud Y. Yet again, if the spring *h* should break, the adjustment of the parts would be unaffected, except in so far as the pressure against the winding-arbor would be relieved in a measure. Furthermore, in case the spring *h* should break, the spring V, if intact, would exert an effort to keep the sliding coupler in its normal position independent of the adjustment of the winding-arbor. It will thus be seen that in my invention I have provided for keeping the setting-train normally cut out of gear even when the movement is out of its case, for disconnecting both the winding and setting trains from the sliding coupler by which they are operated, so that it is impossible to interfere with the train cut out while the other is being utilized, and for guarding against the accidental cutting-in of the setting-train, and so destroying the integrity of the operation of the watch as a time-keeper by the accidental breakage of any one, two, or more of the springs employed in the winding and setting mechanism.

I wish to further call attention to the strong and durable character of the parts employed by my improved mechanism, which in every case are of such construction that they may be made to stand all of the strain imposed upon them in any ordinary usage of the watch.

It is apparent that some changes and alterations in the construction herein shown and described may be made. I would therefore have it understood that I do not limit myself to such construction, but hold myself at liberty to make such variations from it as fairly fall within the spirit and scope of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a stem-winding and stem-setting watch, the combination, with a winding-train, of a movable carrier carrying one of the wheels thereof, a setting-train, a movable carrier carrying one of the wheels thereof, and a sliding-coupler carrying no wheels itself, but connected with the said carriers, so as to move the same and alternately cut their wheels into and out of gear, substantially as described.

2. In a stem-winding and stem-setting watch, the combination, with a winding and a setting train, of a sliding coupler carrying no wheels itself, but independently connected with each train so as to alternately cut them into and out of gear, a spring for moving the

said coupler in one direction, and means for automatically moving it in the opposite direction, substantially as described.

3. In a stem-winding and stem-setting watch, the combination, with a movement-plate thereof having a long narrow recess formed in it, of a longitudinally-bowed rocking bar located in the said recess and resting upon the floor thereof, a rising wheel forming an element of the setting-train of the watch, carried at one end of the said bar, and means entering the said recess to engage with the other end of the bar to rock it to lift the said wheel, substantially as described.

4. In a stem-winding and stem-setting watch, the combination, with a winding-train, of a swinging bar carrying one of the wheels thereof, a setting-train, a movable carrier carrying an element thereof, and a sliding coupler carrying no wheels itself and constructed to directly engage the outer end of the swinging bar to move the same and connected with the movable carrier of the setting-train, so that it alternately moves the said carriers, substantially as described.

5. In a stem-winding and stem-setting watch, the combination, with a sliding coupler for alternately cutting the winding and setting trains into and out of gear, of a spring operating on the coupler to move it for cutting the setting-train into gear and an automatic tension-relief device loosely mounted in and projecting beyond the edge of the watch-movement and constructed to have its outer end engaged by the watch-case when the movement is therein and to have its inner end in contact with the spring, whereby the spring is placed under tension by the watch-case and relieved of tension when the movement is removed therefrom, substantially as described.

6. A winding and setting mechanism for a stem-winding and stem-setting watch, having a sliding coupler carrying no wheels itself, a rising wheel forming an element of the setting-train, a longitudinally-bowed rocking bar located beneath the sliding coupler in a recess formed in one of the movement-plates and rocked in one direction thereby, and a spring for rocking the said bar in the other direction, substantially as described.

7. In a stem-winding and stem-setting watch, the combination, with a winding-train, of a movable carrier carrying a wheel thereof, a setting-train, a longitudinally-bowed rocking bar for carrying a rising wheel forming one element of the setting-train, a sliding coupler carrying no wheels itself, located above the said rocking bar, an operating-stud carried by the coupler and projecting from the under face thereof to engage with the outer end of the bar, which it rocks in one direction, and a spring, also carried by the coupler, to rock the bar in the opposite direction, substantially as described.

8. A winding and setting mechanism for a stem-winding and stem-setting watch, having a sliding coupler and an operating-lever provided with an inclined slot and connected through the said slot with the sliding coupler, in combination with a longitudinally-movable winding-arbor adapted to be engaged with one end of the said lever, substantially as described.

9. A winding and setting mechanism for a stem-winding and stem-setting watch, having a coupler for alternately cutting the winding and setting trains into gear, a spring for moving the said coupler in the direction required for cutting the setting-train into gear, and a tension-relief pin movably mounted in the movement of the watch and having its inner end arranged to be engaged with the said spring and its outer end arranged to project beyond the edge of the movement, substantially as described.

10. A winding and setting mechanism for a stem-winding and stem-setting watch, having a sliding coupler provided at one end with an elongated shouldered opening to receive the winding-cap and winding-cap screw, substantially as described.

11. A winding and setting mechanism for a stem-winding and stem-setting watch, having a sliding coupler to alternately cut the winding and setting trains into gear, and a bridge for holding the outer end of the said coupler in place, the adjacent ends of the coupler and bridge being thereto appropriately shouldered, substantially as described.

12. A winding and setting mechanism for a stem-winding and stem-setting watch, having a sliding coupler, a swinging bar carrying an element of the winding-train and arranged to be swung by the sliding coupler so as to cut the said element out of gear, a rising wheel forming an element of the setting-train, a rocking bar longitudinally curved or bowed and connected at one end with the said rising wheel and rocked in one direction by the sliding coupler, a spring for rocking the said rocking bar in the opposite direction, a spring for moving the sliding coupler in one direction, and an operating-lever for moving the sliding coupler in the opposite direction, substantially as described.

CHARLES T. HIGGINBOTHAM.

Witnesses:
JOHN H. ALCOTT,
HENRY HUGUENIN.