No. 721,361. PATENTED FEB. 24, 1903.

O. F. ENGWALL.

WATCH REGULATOR.

APPLICATION FILED FEB. 26, 1900.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.

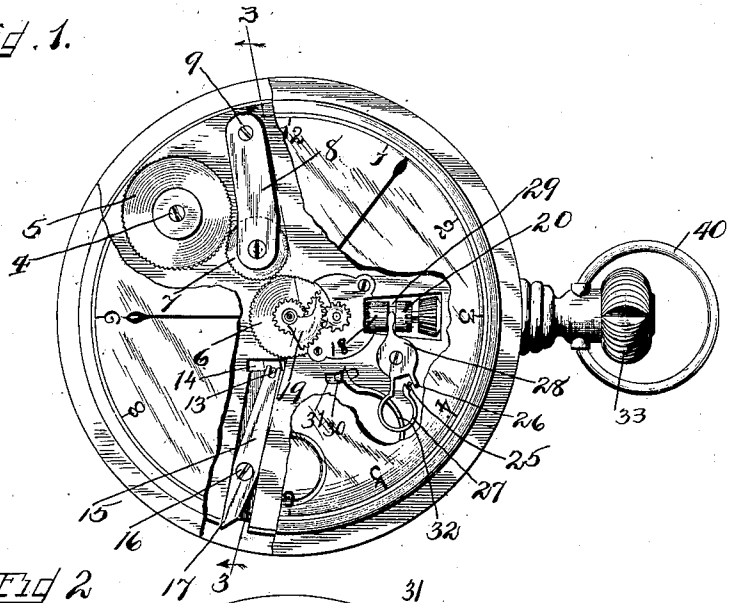


Fig. 2

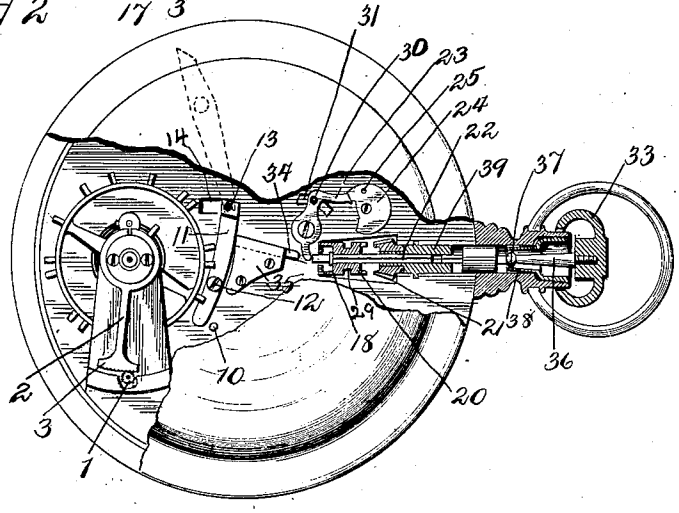


Fig. 3.

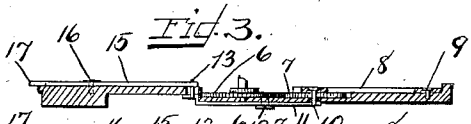
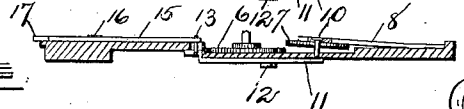


Fig. 4.



Witnesses
J. B. Keir.
Ira D. Perry

Inventor
O. F. Engwall
By Ellis & Holt Pmrs Attys

THE NORRIS PETERS CO., WASHINGTON, D. C.

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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 5.

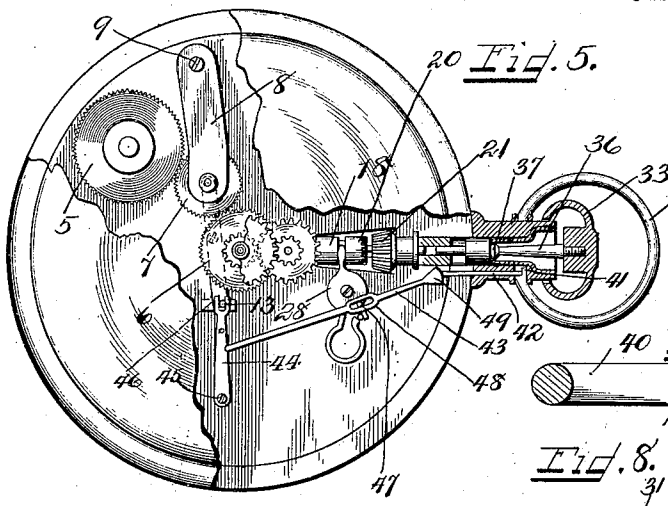


Fig. 6.

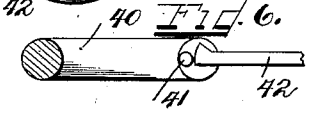


Fig. 8.

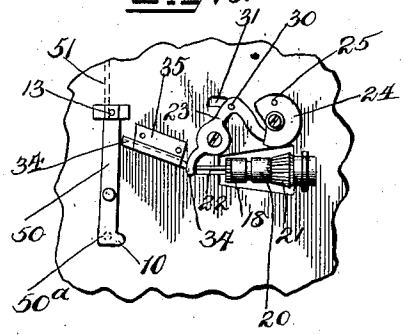
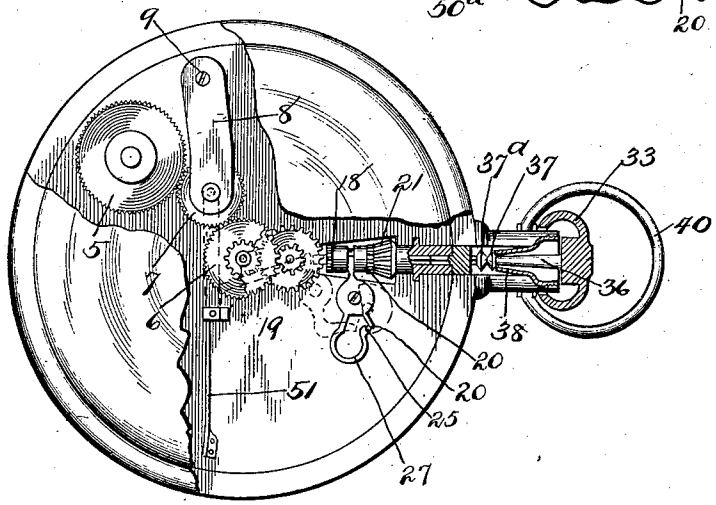


Fig. 7.



Witnesses

J. B. Keir

Ira D. Perry

Inventor

O. F. Engwall

By Elliott & Hopkins

Attys

THE NORRIS PETERS CO., WASHINGTON, D. C.

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O. F. ENGWALL.

WATCH REGULATOR.

APPLICATION FILED FEB. 26, 1900.

NO MODEL. 3 SHEETS—SHEET 3.

Fig. 9.

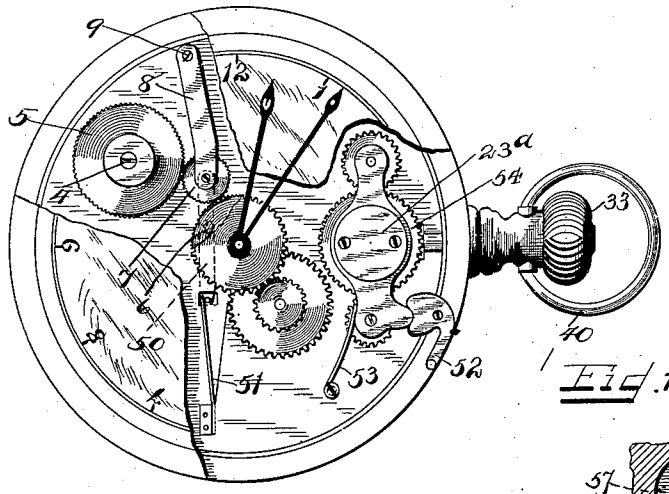


Fig. 13.

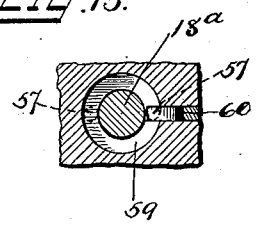


Fig. 10.

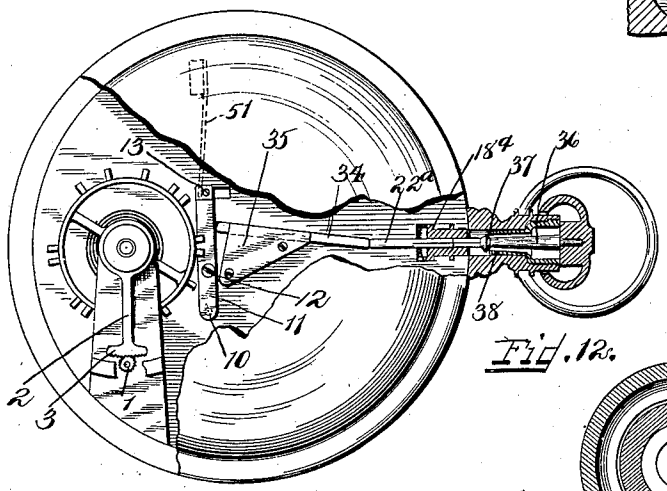


Fig. 12.

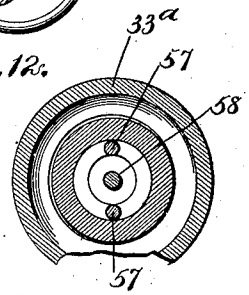
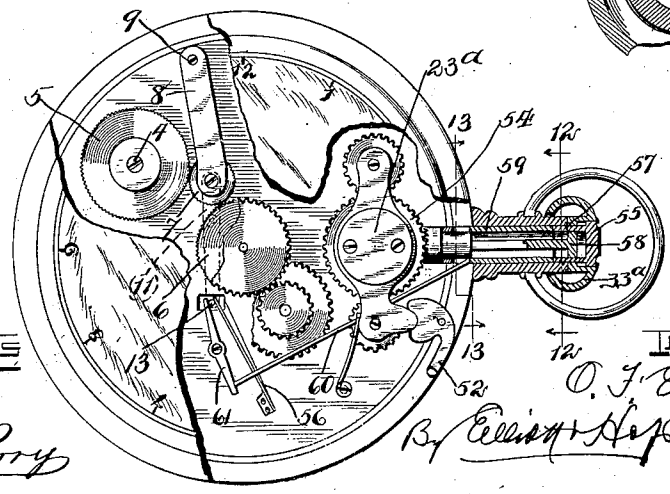


Fig. 11



Witnesses
J. B. Weir
Ira D. Perry

Inventor
O. F. Engwall
By Elliott & Hopkins
Attys

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

OSCAR F. ENGWALL, OF CHICAGO, ILLINOIS, ASSIGNOR OF TWO-THIRDS TO CHARLES D. PEACOCK, JR., AND AXEL BONDE, OF CHICAGO, ILLINOIS.

WATCH-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 721,361, dated February 24, 1903.

Application filed February 26, 1900. Serial No. 6,439. (No model.)

To all whom it may concern:

Be it known that I, OSCAR F. ENGWALL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Regulators for Timepieces, of which the following is a full, clear, and exact specification.

My invention relates to devices for automatically changing or altering the regulator of a timepiece proportionately to any alteration made in the position of the hands when setting the timepiece to the correct time after running either fast or slow—such, for example, as that shown and described in United States Letters Patent No. 635,760, issued to me October 31, 1899; and my present invention has for its object to provide simple and efficient means whereby the governor or regulator may be caused to move in unison with the hands when it is desired to simultaneously set and regulate the timepiece and after the operation is completed to automatically throw the regulator out of connection with the hands and the setting mechanism.

A further object of my invention is to provide a pivoted lever which when oscillated to one position will hold the disengageable connection which brings the regulating and setting mechanisms into coöperation out of action and when oscillated to another position will permit such disengageable connection to connect the aforesaid mechanisms.

With these ends in view my invention consists in certain features of novelty in the construction, combination, and arrangement of parts by which the said objects and certain other objects hereinafter appearing are attained, all as fully described with reference to the accompanying drawings, and more particularly pointed out in the claims.

In the said drawings, Figure 1 is a face view of a timepiece or watch, partly broken away, showing the same supplied with my improvements, all parts unnecessary for an understanding of the invention being omitted from this and the following views. Fig. 2 is a view of the timepiece looking from the reverse side, partly in section. Fig. 3 is a detail sectional view taken on the line 3 3, Fig. 1, showing the setting and regulating mechanisms connected together. Fig. 4 is a similar view showing the disengageable gear or connection thrown out of action. Fig. 5 is a view similar to Fig. 1, showing the improvements applied to a stem-setting watch in which the regulating mechanism is thrown into action by turning the bow of the watch down against the face. Fig. 6 is a detail of the mechanism whereby the bow produces the aforesaid action. Fig. 7 is a view similar to Fig. 5, showing the improvements applied to a stem-setting watch in which the stem is provided with a double-click mechanism whereby the watch may be set by pulling out the stem one click and regulated by pulling it out an additional click. Fig. 8 is a detail view of the reverse side of the watch to that shown in Fig. 7, illustrating the means whereby the regulating mechanism is thrown out of action by the inward movement of the setting-stem. Fig. 9 is a view similar to Fig. 1, showing the improvements applied to a stem setting and winding watch in which the regulating mechanism is controlled by a spring which throws it into action, the regulating mechanism being thrown out of action by the inward movement of the setting-stem. Fig. 10 is a view of the reverse side of the watch to that shown in Fig. 9, partly in section. Fig. 11 is a view similar to Fig. 9, showing means whereby the regulating mechanism may be thrown into action by pressing a separate button set in the end of the setting-stem and is thrown out of action by a continuously-acting spring. Fig. 12 is an enlarged transverse sectional view taken on the line 12 12, Fig. 11; and Fig. 13 is an enlarged transverse sectional view taken on the line 13 13, Fig. 11.

Like signs of reference indicate like parts throughout the several views.

1 represents a pinion by means of which the regulator-lever 2, having a segment-rack 3 engaging with the pinion 1, is moved toward "fast" or "slow" for varying the speed of the timepiece, and this pinion 1 is on a shaft 4, which passes through the watch-movement and is connected to a gear-wheel 5 on the opposite side, and arranged between this gear-wheel 5 and the canon-pinion 6 or pinion by

means of which the hands of the watch are turned is a disengageable connection or gear 7, which is mounted upon an outwardly-deflectible arm or plate 8, secured by screw or other suitable device 9 to the movement-plate. The spring-arm 8 exerts a normal tendency to force the idler 7 in between and in engagement with the pinions 5 6, so that when the pinion 6 of the hands-arbor is rotated a like rotation will be imparted to the gear-wheel 5, and consequently to the regulator, for changing the speed of the watch proportionately to the distance the hands are moved. The shaft or pintle 10 of the idler 7, however, projects through the watch-plate, as more clearly shown in Fig. 2, and is adapted to be depressed, so as to force the idler 7 out of engagement with either or both of the wheels 5 6 by means of a lever 11, pivoted at 12 to the watch-plate or to any other suitable support and adapted to have its end crowded over the pintle 10 for forcing and holding the idler 7 out of engagement when it is not desired to change the regulator. The other end of this lever 11 is provided with a pin 13, which projects through a slot 14 in the watch-plate and engages with the end of an operating-lever 15, arranged on the other side of the watch-plate, it being pivoted at 16 and having a thumb-piece 17 projecting from the side of the plate, so as to be accessible by the thumb-nail of the operator, whereby the lever 11 may be oscillated in either direction for either bringing it into or out of engagement with the end of the pintle 10. In order, however, that the lever 11 may be automatically thrown into engagement with the pintle 10 for disengaging the idler 7 as soon as the setting movement of the watch is restored to its normal position and in condition for winding the watch, I employ in a watch-movement of this type the mechanism which I will now describe.

18 represents the crown-gear by which the watch is set when such gear engages with the usual train of gears which connects it with the hands-arbor wheel 19, as usual, when the gear 18 is forced inward in the position shown in Figs. 1 and 2, and 20 represents the crown-gear, which engages a crown-gear on the bevel-gear 21, that effects the winding of the watch through the usual or any suitable mechanism when the crown-gear 20 is forced outwardly. These crown-gears 18 20 are connected together, as usual, and slide on a squared pin 22 of the ordinary construction, having a projecting end, as clearly shown in Fig. 2, which engages with one end of the leg or lever 23, whose other end is engaged by a cam or lock 24, having a pin 25, which passes through the watch-plate and engages between two portions 26 27 of the lever 28, which causes the crown-gears 18 20 to slide back and forth on the pin 22, the crown-gears being formed with a groove 29, in which the end of the lever 28 engages, as usual. The leg 23 is provided, as usual, with a pin 30, which passes through a slot 31 in the watch-plate and is engaged by the usual spring 32, which imparts a normal tendency to the leg or lever 23 to force the pin 22 outwardly and rotate the cam or lock 24 toward the right, and consequently force the crown-gears 18 20 inwardly; but as soon as the stem 22 is forced inwardly the inertia of the spring 32 will be overcome and the opposite oscillation of the leg 23, resulting from the pressure of the pin 22 against the leg or lever 23, will rotate the cam-plate 24 to the left, and consequently throw the crown-gears 18 20 outwardly in condition to effect the winding of the watch as soon as the stem is turned.

In the position shown in the drawings, Figs. 1 and 2, the parts are in readiness for setting the watch and also regulating it at the same time, the lever 11 being out of engagement with the pintle 10 and the idler 7 consequently connecting the gear 5 with the pinion 6. As soon as the pin 22 is forced inwardly, however, as a result of the operator pressing the crown 33 inwardly, as is usual after the setting of the watch is finished, the end of the lever 23 which is engaged by the inner end of the pin 22 will be forced against a slide 34, which in turn will engage with the lever 11 and force the end of the latter over the end of the pintle 10, and as a consequence throw the idler 7 out of engagement with the gear 5 and pinion 6, the slide 34 being held in place by any suitable keeper 35, secured to the watch-plate.

The example of my invention illustrated in the figures of the drawings just described is of the type known as the "stem setting and winding," in which the setting operation is accomplished by first pulling out the crown 33 of the stem and then turning it, as usual, the crown 33 being secured to a stem 36, which has a knob 37, adapted to be engaged by a split sleeve 38 as the stem 36 is pulled outwardly, thus producing a click and holding the crown-gear 18 in engagement with the gears which impart the movement of the setting-stem to the hands, the stem 36 being independent from the stem 22, but having a squared end engaging in the usual squared coupling-sleeve 39. It will be understood, however, that the mere pulling out of the crown 33 of the setting-stem will not throw the parts in position for regulating the watch, the lever 11 being in engagement with the end of the pintle 10 and holding the idler 7 out of engagement; but should it be desired to also regulate the watch while it is being set the lever 11 will be thrown out of engagement with the pintle 10 by means of the thumb-piece 17 either after or before the crown 33 is pulled out. Then, as has already been explained, the idler 7 will be thrown out of engagement automatically by the inward movement of the crown 33.

In the form of my invention shown in Figs. 5 and 6 I have dispensed with the thumb-lever 15 17 and have utilized the movement of

the bow 40 for throwing the idler 7 into engagement with the gear 5 and pinion 6, the idler being thrown out of engagement automatically by the inward movement of the stem-crown 33 in the manner already described with reference to Figs. 1 and 2. In accomplishing this I provide one end of the bow 40 where it enters the stem of the watch-casing with a lug or pin 41, which is eccentric to the axis of the end of the bow, but which when the bow is turned in one direction, preferably down against the face of the watch, presses against the outer end of a pin 42, whose inner end is adapted to engage the outer end of a slide 43, whose inner end engages one end of a lever 44, pivoted at 45 and having a fork or slot 46, engaging the pin 13 of the lever 11, which crowds the idler 7 out of engagement with the gear 5 and pinion 6. Thus it will be seen that should the bow 40 be turned down in the manner described the regulating mechanism would be operatively connected with the hands of the watch; but in order that this connection may not occur unless it is desired to regulate the watch I provide means whereby it requires a second action or movement to throw the slide 43 into position to be engaged by the pin 42. This mechanism may consist of a pin 47 on the lever 28, so that when the lever 28 is oscillated in the direction which carries the crown-gear 18 down into engagement with the train of gears which imparts movement to the hands from the setting-stem the slide 43 will be pulled over into line with the pin 42, and when the crown 33 is forced in after setting the watch the slide 43 by the same means will be carried out of line with the pin 42, and the regulating mechanism will not be affected by the movement of the bow 40 in either direction, the slide 43 being provided with a slot 48, in which the pin 47 works, and the end of the slide being provided with a beveled head 49, so as to force itself into line with the pin 42 should the latter be at the limit of its inward movement before the slide 43 is oscillated toward it. It will also be seen that the pin 42 is arranged to one side of the axis of the end of the bow 40, so that the lug 41 will engage with the pin 42 only when the bow 40 is turned in one direction.

In the form of my invention shown in Figs. 7 and 8 the construction is such that an outward pull on the winding and setting crown 33 producing one click will put the parts in position for setting the watch only and a further pull, producing a second click, will put them in position for simultaneously setting and regulating the watch. In this form the pintle 10 is engaged by a lever 50, which is similar to the lever 11 for the same purpose, already described, excepting that its face, which engages with pintle 10, is elongated or widened, as shown at 50^a, in order that it will require a longer movement of the lever 50 to clear the pintle 10. In this form of the invention, however, the lever 50 is forced from over and out of engagement with the pintle 10 by means of a spring 51, so that as soon as the position of the slide 34 will permit the spring 51 will carry the enlargement 50^a of the lever clear of the pintle 10 and throw the regulating mechanism into action, the spring 51 being continually in engagement with the pin 13 on the lever 50, which corresponds in construction and function with the pin 13 on the lever 11. Both of the aforesaid clicks therefore result in a partial movement of the lever 50; but it requires the second click to permit the spring 51 to force the enlargement 50^a out of engagement with the pintle 10. In the position shown in the drawings the winding and setting crown 33 is at the limit of its inward movement. If now the crown should be pulled out until the first knob 37 enters the sleeve 38, the parts would be in position for setting only; but should the crown be pulled out again to permit the second knob 37^a to enter the sleeve 38 the slide 34 will have receded a sufficient distance to permit the spring 51 to force the enlargement 50^a off the pintle 10 and throw the regulating mechanism into action. After the regulating and setting operation is finished the parts will be restored to their normal position (shown in Fig. 8) by forcing the crown 33 inward to its full limit, which, as before described, will cause the slide 34 to crowd the lever 50 over the pintle 10.

In the form of my invention shown in Figs. 9 and 10 the lever 11 is thrown out of engagement with the pintle 10 by means of spring 51, the same as in the form shown in Figs. 7 and 8; but this action cannot take place until the winding and setting crown 33 is pulled out to produce one click, as a result of the knob 37 engaging in the sleeve 38. In this form the yoke employed for connecting the setting-stem with the hands or with the train of gears which turn the hands and also with the arbor of the mainspring consists of the well-known form of oscillating lever 23^a, controlled by a thumb-piece 52 in the side of the watchcase, and a spring 53, whereby the outward movement of the thumb-piece 52 will throw one end of the lever 23^a inwardly to operatively connect the winding-crown 33 with the hands, and when the thumb-piece 52 is thrown inwardly the spring 53 will destroy such connection and automatically connect the winding-crown 33 with the arbor of the mainspring, as is usual and well understood in this type of movement, the longitudinal movement of the winding and stem crown 33 being utilized in this instance solely for forcing the lever 11 back into engagement with the pintle 10 after the regulating operation is finished. This is accomplished by means of a pin 22^a, passing through the crown-gear 18^a, which imparts the rotation of the winding and setting stem 36 to the pinion 54, commonly mounted on the axis of the lever 23^a, the crown-gear 18^a in this instance, however, being permanently in engagement with the

pinion 54. Thus it will be seen that when the winding and setting crown 33 is forced inwardly the stem 36 will engage the pin 22ª, which in turn will engage the slide 34, before described, and this in turn engaging the lever 11 forces the latter back onto the pintle 10. When the crown 33 is pulled outwardly, the slide 34 being relieved permits the spring 51 to force the lever 11 off the pintle 10.

In the form of my invention shown in Figs. 11 to 13, inclusive, the parts are placed in position for regulating the watch by pressing upon a countersunk button 55, seated in the winding and setting crown 33ª. The lever 11 is thrown out of engagement with the pintle 10 by means of this button 55, and it is forced into engagement with the pintle 10 by means of a spring 56, bearing continually against the pin 13 of the lever 11. The button 55 is provided with two stems 57, which pass inwardly through a web 58 inside the crown 33ª and at their inner ends are connected to a cylindrical portion or collar 59, arranged in the stem of the watchcase and adapted to bear against the upper end of a slide 60, whose lower end engages with one end of a lever 61, the other end of the latter being in engagement with the pin 13, so that pressure against the button 55 will oscillate the lever 61 and force the lever 11 off or out of engagement with the pintle 10 and permit the watch to be simultaneously set and regulated by the rotation of the crown 33ª, the thumb-piece 52, before described, having previously been thrown out in a familiar manner, and as soon as pressure against the button 55 is released the spring 56 will again force the lever 11 into engagement with the pintle 10, and thus throw the regulating mechanism out of action, the setting mechanism being thrown out of action by forcing the thumb-piece 52 inward to its normal position.

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

1. In a regulating mechanism for timepieces the combination of the setting mechanism, the regulator, a disengageable or shiftable gear between said regulator and setting mechanism, a winding and setting stem having a double-click longitudinal movement, means for operatively connecting said stem with the setting mechanism at the first click of said longitudinal movement, means operatively related to said stem for holding said gear out of engagement and means for effecting the engagement of said gear at the second click of said longitudinal movement, substantially as set forth.

2. In a regulating mechanism for timepieces the combination of the setting mechanism, the regulator, a disengageable or shiftable gear between said regulator and setting mechanism, a setting-stem having a double-click longitudinal movement, means for operatively connecting said stem with the setting mechanism at the first click of said longitudinal movement and a restraining member for holding said gear out of engagement movable with said stem during both clicks but adapted to release said gear at the second click of said longitudinal movement, substantially as set forth.

3. In a regulating mechanism for timepieces the combination of a setting mechanism, a regulator, a disengageable or shiftable gear between said regulator and setting mechanism, a setting-stem having a double-click longitudinal movement, means for operatively connecting said stem with the setting mechanism at the first click of said longitudinal movement, a movable restraining member for holding said gear out of engagement held against movement in one direction by said stem, means for moving said restraining member in the opposite direction as said stem is pulled out, said restraining member being so proportioned as to release said gear at the second click of said longitudinal movement of the stem, substantially as set forth.

4. In a regulating mechanism for timepieces, the combination of a regulator, a longitudinally-movable winding-stem, the hands-arbor, a disengageable connection between said hands-arbor and regulator, comprising a pin, the movement-plate having a slot through which said pin projects, a pivoted lever having one end adapted to oscillate over and depress said pin in said slot, a longitudinally-sliding rod arranged in the same plane with said lever and adapted to impinge the other end thereof for throwing said lever in one direction, a spring for throwing said lever in the opposite direction, and means operatively relating said longitudinally-movable stem to the said sliding rod for oscillating said lever in one direction when the stem is pushed inwardly, substantially as set forth.

OSCAR F. ENGWALL

Witnesses:
EDNA B. JOHNSON,
F. A. HOPKINS.