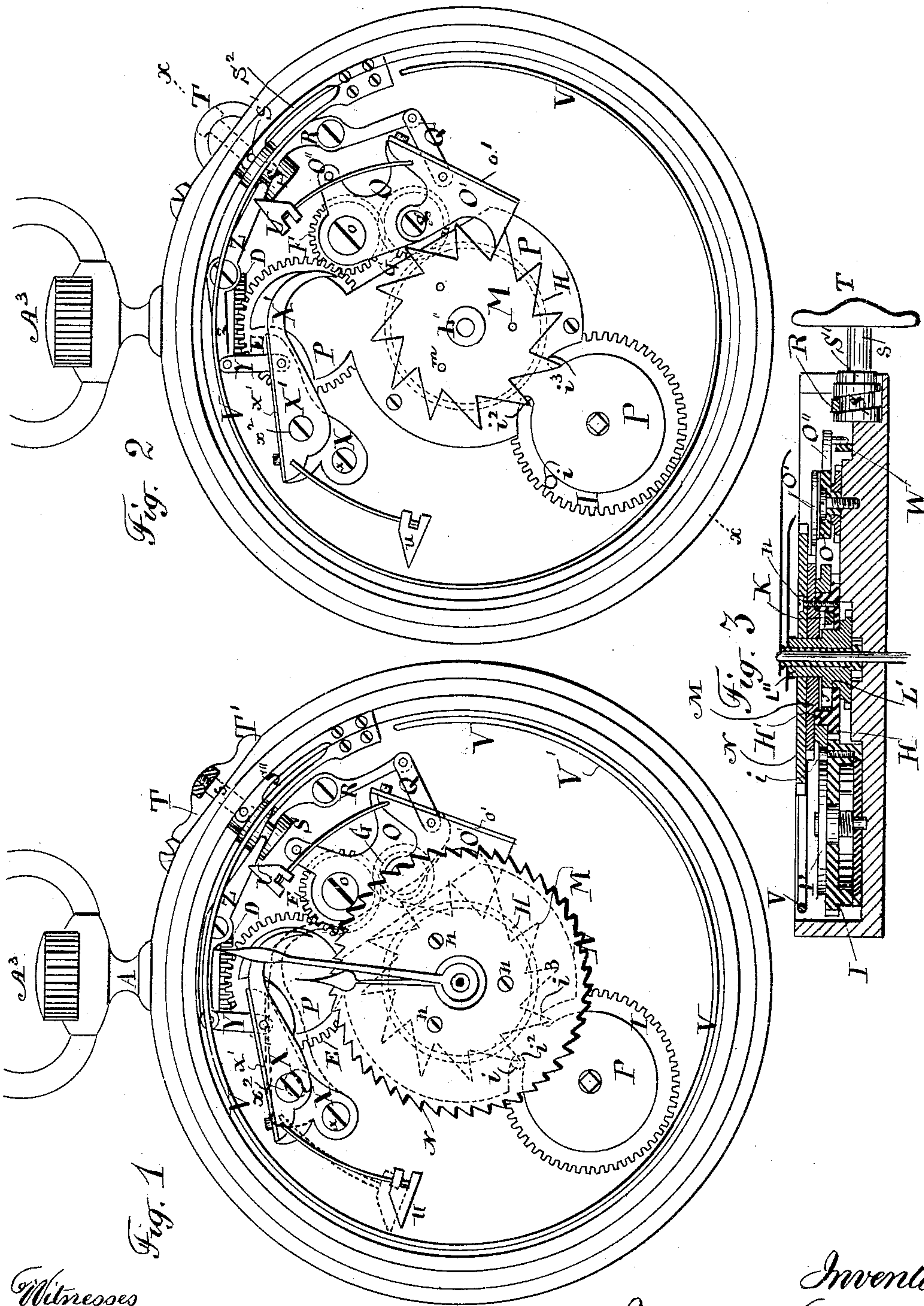


J. WALZER.
STRIKING WATCH.

No. 383,260.

Patented May 22, 1888.



Witnesses

Char H. Smith
J. Staib

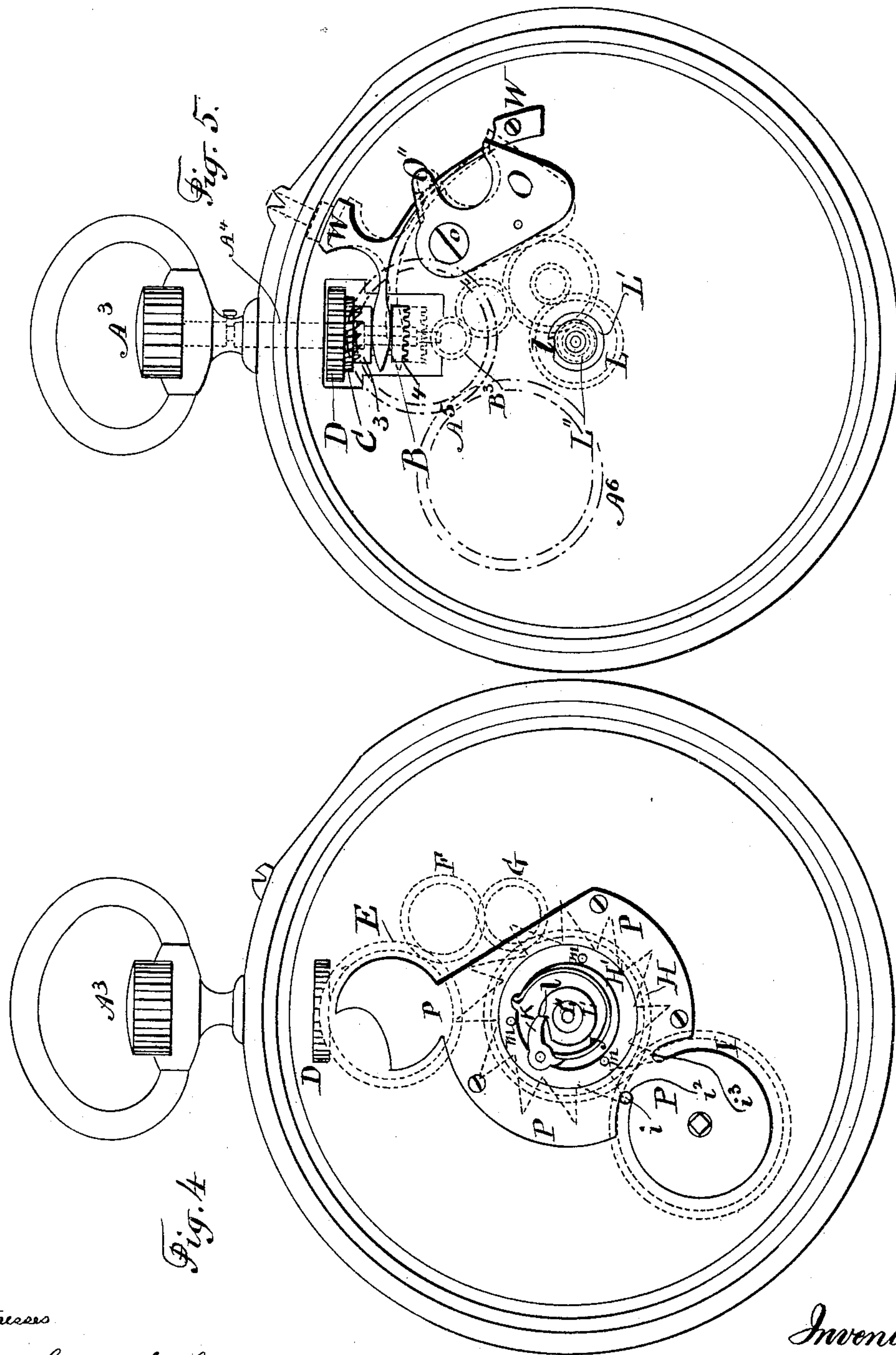
Inventor.

Justin Walzer.
for Lemuel W. Ferrell.
att'y

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UNITED STATES PATENT OFFICE.

JUSTIN WALZER, OF CHAUX-DE-FONDS, SWITZERLAND.

STRIKING-WATCH.

SPECIFICATION forming part of Letters Patent No. 383,260, dated May 22, 1888.

Application filed December 20, 1886. Serial No. 222,070. (No model.) Patented in Belgium May 31, 1886, No. 73,178.

To all whom it may concern:

Be it known that I, JUSTIN WALZER, of Chaux-de-Fonds, Switzerland, have invented an Improvement in Repeating-Watches, (for which I have received a patent in Belgium, dated May 31, 1886, No. 73,178,) of which the following is a specification.

The object of my present invention is to provide a repeating mechanism of simple construction that can be applied to ordinary stem winding and setting watches and be operated by the winding and setting stem after the sounding mechanism has been brought into position for action by the turning of a button upon the watch-case ring.

In the drawings, Figure 1 is an elevation of the watch with the dial-plate removed and with the parts of the repeating mechanism out of action. Fig. 2 is a similar view with the hands and quarter-wheel removed and with the repeating mechanism in position for striking the hours. Fig. 3 is a section of the striking mechanism at about the line $x x$, Fig. 2, without the case. Fig. 4 is an elevation showing the arbors of the hour and minute hands and the spring-pawl that controls the striking mechanism. The gearing for actuating the striking mechanism is shown by dotted lines in this figure; and Fig. 5 is an elevation of a portion of the stem winding and setting mechanism and of the device for throwing said mechanism out of action when the repeating mechanism is thrown into action.

The winding and setting stem A^4 is provided with a crown, A^3 , as usual, and upon a squared portion of the stem is a clutch-wheel, B, the ratchet-teeth 3 of which normally meshes with the similar teeth on the pinion C, that is loose upon said stem. This pinion C is always in gear with the wheel A^5 , and this latter meshes with the teeth upon the spring-barrel A^6 of the watch. This wheel A^5 and spring-barrel A^6 are shown by dotted lines in Fig. 5. There is a third wheel, D, upon the winding and setting stem, and said wheel D is upon a squared portion of said stem and always turns therewith, and said wheel D gears into the wheel E of the train of gearing F G H, that actuates the sounding mechanism. When the parts are in the position shown in Fig. 5, the mainspring can be wound up by turning the crown A^3 and its stem through the pinion C, wheels A^5 , and gear-teeth upon said spring-

barrel A^6 . When the push-piece W is pressed fully in, the ratchet-teeth 3 of the pinion B are disconnected from the pinion C and the teeth 4 are moved into gear with the wheel B³ of the hand-setting mechanism, and the hands can be set by turning said crown and its stem. When the wheel B occupies an intermediate position and is not in gear with either the pinion C or the wheel B³, as shown by dotted lines in said Fig. 5, then the turning of the crown and its stem actuates only the repeating mechanism.

The wheel G is upon the swinging plate O, the pivot of which is the axis o of the wheel F, and said wheels D, E, F, and G are always in gear with each other; but the wheels G and H are in gear only when the plate O is moved to bring the repeating mechanism into operation, as hereinafter explained. This plate O also carries the hammer-tail O', pivoted at g , and having a spring-shank and the hammer U for striking the hours. The spring o' , that is screwed at one end to the plate O, acts on the tail O' to cause the hammer to strike.

The wheel H is fitted to turn loosely upon the hub L' of the arbor L² of the hour-hand, and this wheel H is kept in place by the plate P, that is screwed to the main plate of the watch. Said wheel H has a circular flange, H', passing up through a circular opening in said plate P, and the wheels M N are secured to the wheel H by screws $n n n$ passing into holes at $m m m$, Fig. 4, in said flange H'. These wheels H M N turn as one wheel.

The wheel M has twelve teeth and actuates the hammer U for striking the hours, and the wheel N has forty-eight teeth and actuates the hammer u for striking the quarter-hours. The arbor L² of the hour-hand passes freely through a central hole in the wheels M N, and in the hub L' of said arbor L² there is a notch forming a stop at l for a pawl, K, to take against. This pawl K is pivoted to the wheel H, and a spring, J, keeps the outer end of said pawl against the hub L'.

It is now to be understood that in the normal condition of the watch the wheels H, M, and N are stationary, but that they can be rotated by turning the crown A^3 and its stem after the plate O is moved and the wheels B C disconnected, and the wheel G brought into gear with the wheel H. The amount of the rotation of said wheels H, M, and N, however, is lim-

ited by the pawl K coming in contact with the stop *l* on the arbor of the hour-hand. Thus, if the hour-hand has just passed 1 on the dial, the wheels H M N can be turned only one-twelfth of a complete revolution, when the end of the pawl K will come in contact with the stop *l* and arrest their further rotation. As the wheel M has twelve teeth, it will be turned but one tooth, and the hammer-tail O' will be moved once by the tooth of the wheel M and only one blow be given by the hammer U upon the sonorous wire or sounder V, thereby indicating that it is one o'clock. If the hand has just passed 2 on the dial, the stop *l* will be at such a distance from the pawl K that the wheels H M N can be rotated one-sixth of a complete revolution before their rotation is stopped by the pawl K coming against the stop *l*; hence the wheel M will be turned two teeth, the hammer-tail O' acted on twice by the teeth of the wheel M, and two blows be given by the hammer U upon the sounder V to indicate that it is two o'clock. In like manner the other hours are struck.

When the wheels H M N are rotated, the barrel I is also rotated by the wheel H gearing into the teeth upon said barrel I, and a spring within that barrel is wound up, and the function of this spring is to return the wheels H M N after each striking operation to the normal position they occupied before the repeating mechanism was brought into operation.

Before explaining how the quarter-hours are struck it is necessary to first describe how the repeating mechanism is brought into action.

The swinging plate O is connected to a lever, R, by the link Q, and one end of said lever R is within a groove of the cam S, which cam is at the inner end of a stud, *s*, that passes through the watch-case center, and at the outer end of this stud *s* there is a turn-button, T, for rotating said stud and cam. The button T and parts operated by it occupy the position shown in Fig. 1 when the repeating mechanism is out of action; but when the button T, stud *s*, and cam S are given a quarter-rotation by turning the button said cam acts through the lever R and link Q and swings the plate O into the position shown in Fig. 2, bringing the hammer-tail O' between two of the teeth of the wheel M and the gears G and H together. At the same time a pin, O³, on the plate O is brought against the spring-lever W and shifts the ratchet-wheel B to its intermediate position, (indicated by dotted lines in Fig. 5,) so that the crown A³ and its stem can be turned for rotating the wheels H M N through the wheels D E F G, and the hour struck, as aforesaid, without the winding or setting mechanism being operated by the turning of the crown and stem.

The hammer-tail X', carrying the spring-shank and hammer *u* for striking the quarter-hours, is pivoted at X² to the swinging plate

X and is acted upon by the spring *x'*. Said plate X is pivoted at *x* to the watch-plate, and it is connected to the lever Z by the link Y. After the hour has been struck, as before described, the button T must be given a further quarter-rotation in the same direction as it is first turned to effect the striking of the quarter-hour. This further rotation of the button T causes the cam S to move the lever Z and swing the plate X until the end of the hammer-tail X' is behind one of the teeth of the wheel N, as indicated by dotted lines in Fig. 1, and the parts are in position for striking the quarter-hour. The shape of the cam-groove in cam S is such that this further rotation of said cam does not move the lever R.

To strike the quarter-hours: Suppose the watch indicates twenty minutes past two. The button T is turned and then the crown and stem are turned, as before described. The wheels H M N will be rotated, so that the wheel M turns two teeth and a third before the pawl K is arrested by the stop *l*, and the hammer-tail O' will be lifted twice and two blows be given by the hammer U. As soon as the hours are struck the crown and stem must be released before giving the second quarter turn of the button T. As soon as the crown and stem are released the spring-barrel I turns back the wheels H M N one-third of a tooth of the wheel M, when the rotation of said wheels is arrested by the tooth of the wheel M that last lifted the hammer-tail O' coming in contact with said hammer-tail. During this backward movement of the wheels H M N the pawl K was carried away from the stop *l*. The crown and stem are now to be turned in the same direction as first turned, (the button T having first been given its second quarter-rotation,) and the wheels H M N are rotated the same distance forward as they were turned backward by the spring in I—viz., one-third of a tooth of the wheel M or one and one-third tooth of the wheel N—before the pawl K again comes in contact with the stop *l*, and in so doing the hammer-tail X' is moved once and one blow is given by the hammer *u* upon the sonorous wire V, thereby indicating that the minute-hand of the watch is between the quarter and the half hour. If the minute-hand is between the half and the three-quarter hour, then the tooth of the wheel M that last lifted the hammer-tail O' passes beyond it a distance equal to two tooth of the wheel N, and the hammer-tail X' will be lifted twice and two blows be given by the hammer *u*. If the minute-hand is between the hour and the first quarter, then the tooth of the wheel M that last lifted the hammer-tail O' will not move beyond the same a distance equal to one tooth of the wheel N. Consequently when the crown and stem are turned the hammer-tail X' will not be lifted to its full extent and no blow will be given by the hammer *u*, and the person operating the repeater will know that the minute-hand has not passed the first quarter-hour. When the

button T is turned back to the position shown in Fig. 1, the cam S acts through the levers R and Z to return the parts to the normal position shown in Fig. 1, with the wheel G disconnected from the wheel H, the clutch-wheel B connected to the pinion C, and the hammer-tails O' X' clear of the teeth of the wheels M N. As soon as said hammer-tails are clear of said wheels the spring-barrel I rotates the wheels H M N back to the position they occupied before the repeating mechanism was brought into operation. A pin, *i*, upon the spring-barrel I, coming in contact with the plate P at *i*², limits the return movement of the wheels H M N and insures their stopping at the proper place. This pin *i*, by coming in contact with the plate P at *i*³, prevents the wheels H M N being turned more than a complete revolution in their forward rotation.

In order to insure the button T being held in any one of the three positions to which it can be turned, I provide three notches at S' in the cam S, and into one of these notches, according to the position of the button, passes the hooked end of a spring, S², and holds said button securely from accidental displacement, but allows for the button being turned by the thumb and finger.

I claim as my invention--

1. In a stem winding and setting watch, the combination, with the stem A⁴ and the wheels B, C, and D, of the wheel E, the swinging plate O, wheels F and G, hammer-tail O', and hammer and pin O², means, substantially as specified, for moving the plate O, the clutch-lever W, the hour-cannon L², a stop upon said cannon, the wheels H and M, the pawl K, and spring J, carried by said wheel H, the spring-barrel I and pin upon the spring-barrel, and stops for limiting the rotation of the barrel, substantially as specified.

2. In a stem winding and setting watch, the combination, with the stem A⁴ and the wheels B, C, and D, of the wheel E, swinging plate O, wheels F and G, hammer-tail O', and hammer and pin O², the clutch-lever W, the hour-cannon L², a stop upon said cannon, the wheels H, M, and N, the pawl K and spring J, carried by said wheel H, the spring-barrel I, stops for limiting the rotation of the barrel I, the swing-plate X, hammer-tail X', and hammer, the button T, cam S, levers R Z, and links Q Y, substantially as specified.

3. The combination, in a stem winding, setting, and repeating watch, of the stem A⁴, wheels B, C, and D upon said stem, the wheel E, swinging plate O, wheels F and G, and pin O², the wheel H, loose upon the cannon of the hour-hand, the clutch-lever W, the button T,

cam S, lever R, and link Q, whereby the partial rotation of the button and cam separates the wheel B from C and connects the wheels G and H, so that the stem can be turned for operating the repeating mechanism without actuating the winding or setting mechanism, as set forth.

4. The combination, with the swinging plates O X and parts carried by them, the levers R Z, and links Q Y, of the button T, cam S, having notches therein, and the safety-spring S², having a hooked end to enter one of said notches, according to the position of said cam, and prevent accidental displacement of said cam, as set forth.

5. The combination, with the hour cannon L² and its stop *l*, of the wheel H, fitted to turn loosely upon said cannon, a circular flange upon said wheel H, the pawl K and spring J, carried by the wheel H, the plate P, having a circular opening to receive the flange H', and the wheels M N, secured to the flange H' of the wheel H, substantially as and for the purposes specified.

6. The combination, with the spring-barrel and intermediate gear and the setting and repeating mechanism in a watch, of the stem A⁴, the wheels B, C, and D upon said stem, and mechanism, substantially as set forth, for moving the gear B so that the winding, setting, and repeating mechanism are operated by the one stem, as set forth.

7. The combination, with the stem winding and setting mechanism, of the striking mechanism, gearing for actuating the striking mechanism, and mechanism, substantially as specified, for shifting the ratchet-pinion to an intermediate position out of contact with both the winding and setting mechanism and simultaneously bring the striking mechanism into gear to be actuated by turning the stem, substantially as set forth.

8. The combination, with the striking mechanism, of a stop upon the arbor of the hour-hand and a spring to turn the striking mechanism back to its normal position, and a pawl to come into contact with the stop on the arbor of the hour-hand, so that the number of strokes on the striking mechanism is determined by the distance the striking mechanism is moved by hand before it is arrested by the stop on the arbor of the hour-hand, substantially as set forth.

Signed by me November 11, 1886.

JUSTIN WALZER. [L. S.]

Witnesses:

BUCHER DATUGLER,
ALFRED KISSLING.