

(No Model.)

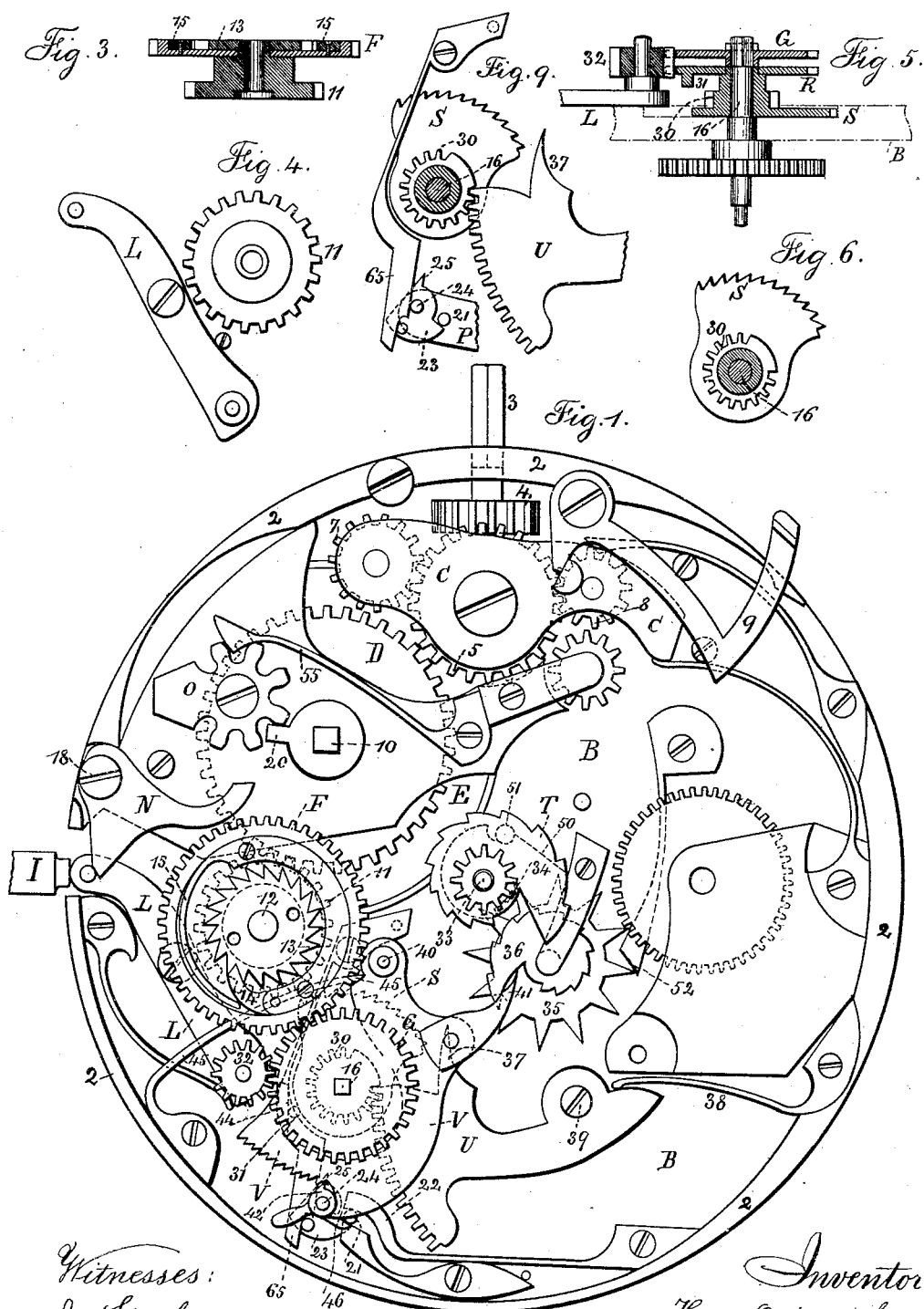
2 Sheets—Sheet 1.

H. O. STAUFFER.

REPEATING WATCH.

No. 383,256.

Patented May 22, 1888.



Witnesses:
J. Staib
Chas. N. Smith.

Inventor:
Henri Onésime Stauffer.
per Lemuel W. Terrell
Att'y

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Fig. 2.

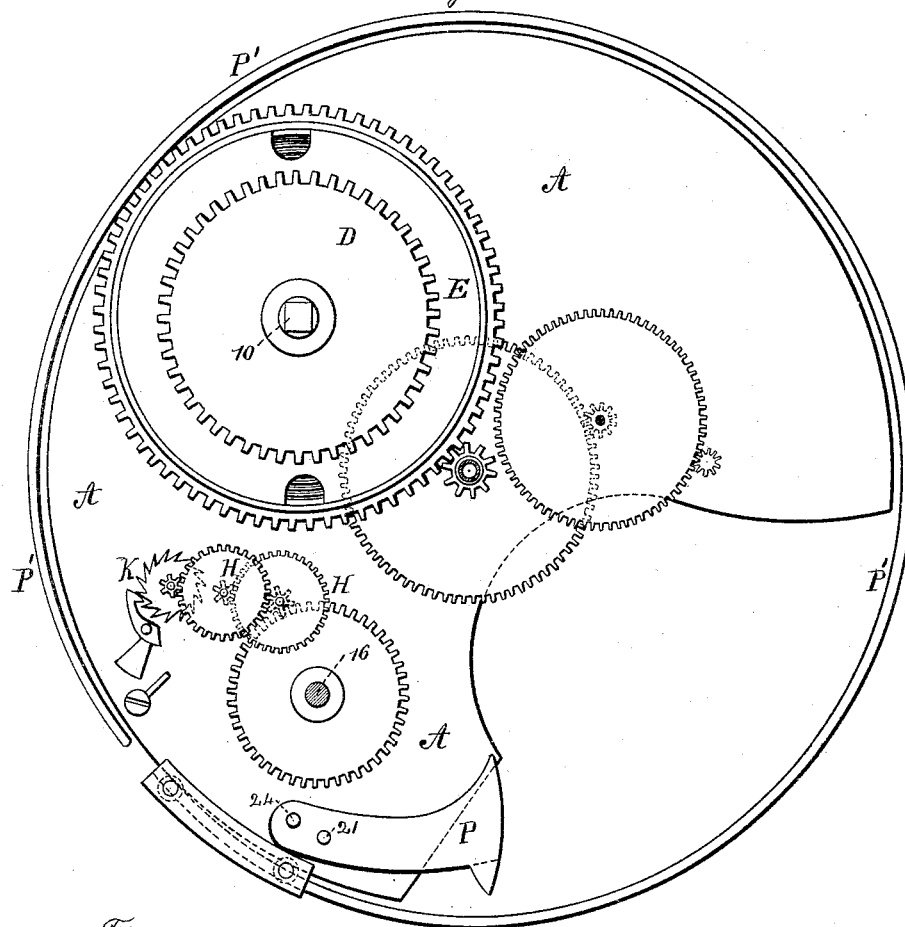


Fig. 8.

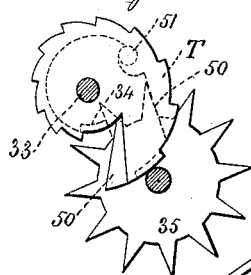
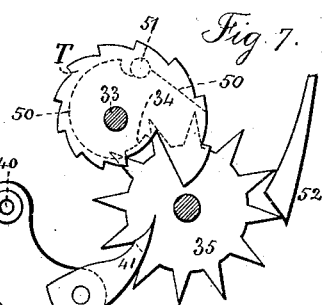
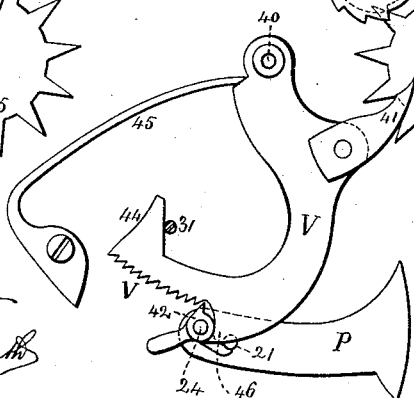


Fig. 7.



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UNITED STATES PATENT OFFICE.

HENRI ONESIME STAUFFER, OF PONTS-MARTEL, NEUFCHÂTEL, SWITZERLAND.

REPEATING-WATCH.

SPECIFICATION forming part of Letters Patent No. 383,256, dated May 22, 1888.

Application filed June 18, 1887. Serial No. 241,690. (No model.)

To all whom it may concern:

Be it known that I, HENRI ONESIME STAUFFER, of Pons-Martel, Neufchâtel, Switzerland, have invented an Improvement in Repeating-Watches, of which the following is a specification.

Repeating-watches have heretofore been made in which a bell is introduced that will be struck when a push-pin in the case is depressed, and the number of blows will first indicate the hour and then the minutes approximately, one blow corresponding to each five minutes.

A watch of the general character is described in Letters Patent No. 325,851, granted September 8, 1885. In this character of watch it has been usual to employ two bells—one for the hours and the other for the minutes—and difficulty has arisen because the mainspring was employed for running the time-gearing, and also for striking the hours and minutes, and this spring was run down rapidly by the frequent striking of the watch, and hence the watch might stop at a time that would involve great inconvenience.

My present invention is made with reference to preventing the mainspring from being exhausted by preventing the striking mechanism coming into action after the mainspring has been unwound to about half of its strength, so that there will be a reserve force sufficient to continue the time mechanism for, say, about thirty hours after the striking mechanism ceases to be operative. Thereby an effort to strike the watch will call attention to the necessity of winding the same. Besides this I make use of but one bell, and arrange the striking mechanism so that the hour will first be struck, then there will be a pause, and after that the strokes to indicate the minutes will take place, and my mechanism is very much simplified and the watch cheapened.

In the drawings, Figure 1 shows the watch-movement with the face and hands removed and the hour and minute wheels taken off. Fig. 2 is a diagrammatic view of the train of gearing to the escapement-pallet that regulates the speed of the striking mechanism, showing also the bell and the hammer. The other figures (Figs. 3, 4, 5, 6, 7, 8, and 9) show the

detached parts, these all being on a magnified scale.

The case, face, and hands are to be of any desired character, and the watch-plates A and B receive between them any ordinary train of gearing and escapement and balance, which need not be herein described, and around the watch-plate B is a rim, 2, upon which the back of the face rests. The winding-stem 3 and pinion 4 act upon the wheel 5, the center of which forms the pivot for the lever C, at the ends of which are the pinions 7 and 8, the latter acting through any suitable gearing for setting the hands when the detent 9 is acted upon. The pinion 7 gears into the wheel D upon the arbor 10 of the spring-barrel E. I do not apply the ratchet-wheel and pawl directly to the spring-barrel, as heretofore usual; but I employ a small wheel, 11, upon a stud, 12, which wheel 11 gears into the wheel D, and around the tubular arbor of this wheel 11 is a gear-wheel, F, recessed in its surface for the reception of the ratchet-wheel 13, pawl 14, and spring 15, and this wheel F gears into a wheel, G, that has a square fitting the arbor 16, so that this arbor 16 will always be revolved if this gear-wheel F is turned, and the arbor 16 is provided with a train of gearing, H, to an escapement-pallet or pulsator, K, which prevents the striking mechanism running too fast whenever it is brought into action. The push-pin I passes through the case, and its inner end acts upon the swinging lever L, that brings into action the striking mechanism, as hereinafter described, and there is a swinging detent, N, pivoted at 18 on the bridge of the spring-barrel, and one end swinging toward the stop-wheel O, and upon the arbor of the spring-barrel is a tooth, 20, to turn this stop-wheel one notch every revolution of the spring barrel in winding it up.

It is now to be understood that when the winding-stem is actuated and the wheel D revolved the small wheel 11 will also be rotated, together with the ratchet-wheel 13, and the pawl 14 will hold the wheels and spring as wound up, and every revolution of the arbor of the spring-barrel one tooth of the stop-wheel O will be taken up, and when the stop-wheel

O has been turned by the unwinding of the mainspring until its projection comes opposite the inner end of the swinging detent N said stop-wheel then blocks the detent so that the pin I cannot be pushed in. This prevents the spring being used for actuating the striking devices, and at this time the spring has sufficient power to continue to drive the time mechanism, say, for thirty hours or more, because the time mechanism takes its power from the gear-wheel upon the edge of the spring-barrel, as usual, but the striking mechanism takes its power from the arbor of the spring-barrel.

The hammer P is between the plates A B, and P' is the bell, the latter being in the form of a wire supported upon a block between the two watch-plates, and upon the hammer is a stud, 21, passing up through a slot in the plate B, and there is a spring, 22, to give motion to the hammer, and a spring-pawl, 23, on a stud, 24, which spring-pawl acts upon the stud 21, and has a tooth, 25, at one end, against which one of the striking-ratchets operates, as herein-after mentioned.

Upon the arbor 16 is a tubular arbor, at one end of which is a gear-wheel, R, fastened to the tubular arbor, and at the other end is a segmental ratchet, S, and around the tubular arbor is a stop-pinion, 30, and there is a pin, 31, on the under side of the gear-wheel R, and upon the swinging lever L is a long pinion, 32, adapted to gear into the wheel G and into the wheel R; hence when this pinion 32 is in gear with these two wheels G and R they can be revolved together.

Upon the arbor 33 of the minute-hand is the minute snail-wheel T, and beneath this is a pin, 34, that turns the star-wheel 35, to which is connected the hour-snail 36, so that the proper part of the hour-snail is brought into position by the pin 34 as the minute-hand passes the 12 on the dial.

There is a toothed segment, U, pivoted at 39, and the teeth of this segment act upon the stop-pinion 30 to revolve it and the segmental ratchet S and gear-wheel R in the opposite direction to the movement of the wheel G and arbor 16; hence when the push-pin acts on the lever L to swing the pinion 32 out of gear with G and R the wheel G will commence to turn, and its movement will be regulated by the train of gearing H and pulsator or escape-ment-pallet K, and instantly the spring 38 will turn the toothed segment U and revolve the stop-pinion 30, gear R, and segmental ratchet S backwardly until the finger 37 upon U comes in contact with the snail-cam 36, and at that time the proper number of ratchet-teeth upon the segmental ratchet S, corresponding to the hour, will have run past the tooth 25 of the spring-pawl 23, swinging the same away from the hammer-stud 21 and against the action of a small spring, 65. The moment the stop-pin I is released, which should be almost instantaneously, the pinion 32 moves back to place and connects the gear-wheels G

and R, so that the wheel R, its tubular arbor, and the segmental ratchets S revolve with the arbor 16, and the teeth on the ratchet S, passing by the tooth 25 of the spring-pawl 23, swing such spring-pawl and actuate the hammer, giving the proper number of strokes upon the bell to denote the hour, and then the end of the segmental ratchet S clears the spring-pawl; but the wheel R continues to revolve a half-revolution before the movement is stopped; but during this half-rotation after the hour has been struck the bell is struck the proper number of times to indicate the minutes by the means next described.

The toothed rack V is on a pivot, 40, and its finger 41 acts in connection with the minute-snail T, and there is a spring, 45, which causes said toothed rack to swing until the finger 41 takes against the step of the snail-cam that may be in its path. This takes place at the time the toothed segment U acts upon the pinion 30 to turn the same backwardly, and upon the stud 24 is a second spring-pawl, 42, and the teeth upon V slide past this spring-pawl, and the number of teeth sliding past depends upon the minute-snail T, and upon this toothed rack V is an arm, 44, and the parts are so made and timed that after the striking has taken place a pause occurs, and then the pin 31 comes in contact with the arm 44 and pulls the toothed rack V around with it, causing the teeth of the rack to act upon the second spring-pawl, 42, and strikes the hammer as many times as there are teeth between the second spring-pawl and the end of the toothed rack, so that there will be one stroke for every five minutes that the hand has passed by the hour; hence by this improvement I am able to make use of one hammer and bell and insure the proper pause between the striking of the hour and the striking of the minute blows.

It will be noticed that upon the toothed rack V there is a horn, 46, which comes in contact with the second spring-pawl, 42, at the termination of the strokes, and the pin 31, remaining in contact with the arm 44, stops the further movement of any of the striking parts, and they hence remain in the position shown in Fig. 1 until the push-pin I and swinging lever L are moved to disconnect the wheels G and R and allow the latter to be turned backwardly by the toothed segment U and its spring 38, as before mentioned.

The blank space on the stop-pinion 30 could be used in stopping the rotation of the cannon and gear wheels G and R if the toothed segment U is removed in cleaning or adjusting the parts.

The pin 34, that is made use of in moving the star-wheel 35, is upon a small plate, 50, having the arbor 33 for its center, which plate I call a "surprise." A limited amount of swinging movement is allowed this surprise by a stud, 51, in a slot in the said plate. As the hands approach the hour, the bell may strike the hour, and also eleven to indicate the given hour and fifty-five minutes, and the parts are

to be so placed that the pin 34 will turn the star-wheel 35, and the movement thereof will be completed by the spring and incline 52, as usual, and this must take place exactly as the minute-hand is at 12, and in so doing the surprise 50 is swung forward and its edge forms a short continuation of the most distant step upon the minute-snail T. The object of this is to prevent the finger 41 of the toothed segment V dropping down against the step of the snail nearest the arbor, and said surprise holds the toothed segment so that it cannot move at all, and the hour alone will be struck should the push-pin be acted upon at any time during the first five minutes of the hour. Were it not for the use of the surprise the watch might strike the hour and then strike eleven strokes in addition during the first minute of the hour. By the time the minute-hand indicates five minutes the second step of the snail T farthest from the arbor is adjacent to the finger 41, and one blow will be struck upon the bell after the hour has been struck, and so on for each step of the snail.

From the foregoing description of the operations it will be understood that after the striking mechanism is stopped by the swinging detent N and stop-wheel O the spring will still exert its power in propelling the time-movement, and thereby the spring will run down, and upon rewinding the tooth 20 upon the arbor of the spring-barrel will turn the stop-wheel O in the reverse direction until the projection of the stop comes in contact with the incline upon the end of the spring 55. It is, however, necessary to continue to wind up the spring until its maximum power is attained; hence the tooth 20 as it comes around each time partially swings the stop-wheel O against the action of the spring 55, and such tooth escapes out of the stop-wheel and the spring returns the stop-wheel to its former position, and this takes place every revolution of the arbor of the spring-barrel until the spring is fully wound up.

I claim as my invention—

1. The combination, with the spring-barrel and winding-stem, of the swinging lever C and intermediate wheels, the wheel 11, gearing into the wheel upon the arbor of the spring-barrel, the gear-wheel F, connected therewith, and the ratchet-wheel 13, pawl 14, and spring 15 upon the said wheel F, substantially as set forth.

2. The combination, in a striking-watch, of a spring-barrel and the train of gearing for the time mechanism receiving its motion from the spring-barrel, a train of gearing and striking

mechanism receiving its motion from the axis of the spring-barrel, and a stop mechanism to prevent the striking mechanism being brought into action before the power of the spring is exhausted, so that the time-movement of the watch can continue the desired number of hours after the striking mechanism has been stopped, substantially as set forth.

3. The combination, with the spring-barrel and the wheel D, of the gear-wheels 11 and F, ratchet-wheel and pawl, the gear G and the arbor 16 driven by the same, the train of gearing to regulate the speed of the striking mechanism, a tubular arbor around the arbor 16, and a wheel, R, corresponding to the wheel G, a segmental ratchet and striking mechanism, a push-lever, and pinion 32 on the same, connecting the wheels G and R, substantially as set forth.

4. In a striking-watch, the combination, with the bell and hammer, of a stud and two spring-pawls upon the stud and two segmental ratchets acting upon the respective spring-pawls one after the other, whereby the hour is struck upon the bell and then strokes are made by the same hammer and bell to indicate the minutes, substantially as set forth.

5. The combination, with the hammer and the spring-pawls for acting upon the same, of a snail moving with the minute-hand, an hour-snail moved at the end of each hour, swinging levers and fingers acting with the respective snails, a segmental ratchet, S, pinion 30, gear R, and pin 31, substantially as specified, for striking the hour and then striking the minutes after a pause by the revolution of the wheel R and pinion 30, substantially as set forth.

6. The combination, with the spring-barrel and the train of gearing for the time mechanism receiving motion from the spring-barrel and the train of gearing and striking mechanism from the axis of the spring-barrel, of the stop-wheel having a projection at one side and a tooth on the arbor of the spring-barrel for moving the stop-wheel, the detent N and push-pin, and the spring-pawl with an inclined end acting against the teeth of the stop-wheel and against the projecting stop to allow the wheel to move as the finger passes by the stop-wheel in completing the winding of the spring, substantially as set forth.

Signed by me this 7th day of May, 1887.

HENRI ONESIME STAUFFER.

Witnesses:

WILLIAM LESQUEREUX,
LUC HENRI STAUFFER.