

(No Model.)

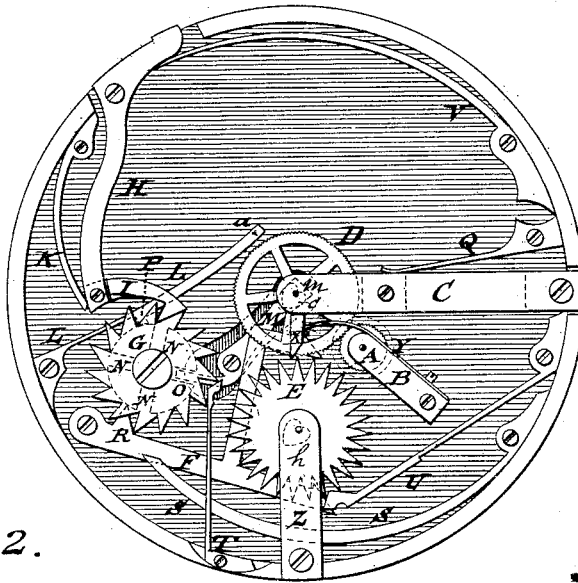
W. E. HUGUENIN.

CHRONOGRAPH.

No. 263,411.

Patented Aug. 29, 1882.

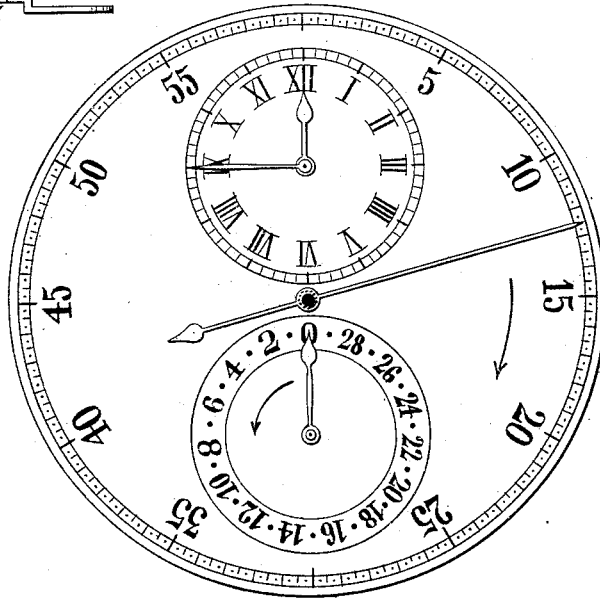
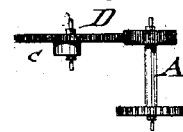
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



*Fig. 4.*

WITNESSES:

*Joh. H. Rosenbaum.*

*Otto Risch.*

INVENTOR

*William E. Huguenin*

BY

*Paul Goppel.*

ATTORNEY

# UNITED STATES PATENT OFFICE.

WILLIAMS E. HUGUENIN, OF LOCLE, SWITZERLAND.

## CHRONOGRAPH.

SPECIFICATION forming part of Letters Patent No. 263,411, dated August 29, 1882.

Application filed January 16, 1882. (No model.) Patented in France September 1, 1880, No. 138,524.

*To all whom it may concern:*

Be it known that I, WILLIAMS EDWARD HUGUENIN, of Locle, in the Canton of Neuchâtel and Republic of Switzerland, have invented a new and useful Improvement in Chronographs, (for which I have obtained a patent in France, bearing date September 1, A. D. 1880, No. 138,524,) of which the following is a specification.

This invention refers to improvements in stop-watches or chronographs which are used for timing races, by physicians, and for other purposes; and the invention relates more especially to a stop-watch in which the starting of the quarter-second hand is accomplished instantly and without recoil, and in which, after each revolution of the quarter-second hand, a minute wheel and hand is moved forward so as to indicate the minutes. For this purpose the dial is arranged with a separate small minute-dial divided into thirty parts, with a small hour and minute dial, and with a circumferential quarter-second subdivision. The starting of the quarter-second hand is accomplished by means of a fulcrumed lever, which is arranged intermediately between the usual actuating ratchet-wheel, pawl, and lever mechanism and the movable bridge of the quarter-second wheel, so that the latter may be thrown in or out of gear with the transmitting-gear of the movement.

In the accompanying drawings, Figure 1 represents a top view of my improved stop-watch with dial removed and drawn on an enlarged scale. Figs. 2 and 3 are detail side views, respectively, of the pivoted bridge of the quarter-second wheel and of the gearing by which the quarter-second wheel receives its motion from the watch-movement; and Fig. 4 is a top view, in about natural size, of the dial used in connection with my improved stop-watch.

Similar letters of reference indicate corresponding parts.

The entire mechanism for working the quarter-second and minute hands of my improved stop-watch or chronograph is arranged immediately below the dial, the circumference of which is divided into quarter-seconds, along which the quarter-second hand moves. Above the arbor of the quarter-second hand is arranged a dial of a diameter of somewhat less

length than the radius of the entire dial, for the usual hour and minute hands, and below said arbor a second smaller dial of the same size as the hour and minute dial, as shown in Fig. 4. The second smaller dial is divided into thirty parts, to indicate minutes, by an extra minute-hand, which is actuated in connection with the quarter-second hand and simultaneously shifted therewith to the point of starting. This arrangement of the dials has the advantage that all the hands and dials of my chronograph are at the face of the watch and at one side of the movement.

The extra minute and quarter-second hands receive their motion from an arbor, A, which turns at its lower end in the casing of the watch-movement, and receives motion from the movement by a gear-wheel at its lower end. The upper end of the arbor A turns in a fixed bridge, B, and transmits its motion by a minutely-divided pinion near its upper end to the quarter-second wheel D, which is also provided at its circumference with fine teeth, so as to properly intermesh with the transmitting-pinion of the arbor A. The quarter-second wheel D turns in bearings in a bridge, C, which is pivoted at its outer end to a pivot-screw, *e*, and provided at its inner end with a shorter piece, *d*, below the main piece C, for supporting the arbor of the quarter-second wheel D. A spring presses upon one side of the movable bridge C, and tends to throw it, together with the quarter-second wheel, sidewise and into gear with the transmitting-pinion of the arbor A. From the fixed bridge B extends over the quarter-second wheel D a spring, Y, against which abuts a finger, X, secured to the top of the quarter-second wheel D, when the turning mechanism is in a position of rest, said spring Y serving for the purpose of preventing the recoil of the quarter-second wheel D at the moment of starting the same.

The drawings show the quarter-second and minute wheels D and E in a position of rest, while the hands are designed to point to zero—the starting-point—the wheel D being held in position by the pin *a*. On starting the timing mechanism the wheel D is released and is free to turn backward before it reaches the transmitting-pinion and meshes with it, without the interposition of some obstacle. To obviate this

result, which would be fatal to the object of the invention, the spring Y is provided, which not only prevents the wheel from turning backward, but guides the finger X to the right point of engagement with the spur-wheel. The spring Y constitutes a zero spring-stop. At each forward revolution of the wheel D the finger X comes in contact with, bends, and overrides the spring Y before reaching zero; but as soon as the spring is released it instantly recovers its normal position and serves as a brace against the finger, holding the latter in place at the zero-point whenever the hand is turned back. This is an essential feature of my invention, as thereby the quarter-second hand begins to move without any oscillating or lost motion as soon as it is started. The finger X has the further purpose to engage a spur-wheel, E, provided with thirty pointed teeth, after each revolution of the quarter-second wheel and move it for the distance of one tooth. The arbor of the minute spur-wheel E turns at its lower end in a step-bearing of the casing and at its upper end in a bridge, Z. The arbors of the quarter-second wheel D and of the spur-wheel E are extended through the dial and provided respectively with a quarter-second hand and a minute-hand, which move, however, in opposite directions to each other along their respective dials, as shown clearly by the arrow in Fig. 4. As the arbor of the quarter-second hand has to have some play, owing to its being supported in a movable bridge, the face-dial is provided with a central aperture large enough to admit this motion. A check-pawl, U, retains the minute spur-wheel E in position when it is not moved forward by the finger X. Both the quarter-second wheel D and the minute spur-wheel E are provided with the well-known heart-cams *c h*, which serve to return the hands simultaneously to the starting-points on the quarter-second and extra minute dials by a double shifting-lever, F. The shifting-lever F is pivoted at its outer end and acted upon by a spring, S. A lever, M, is fulcrumed to the casing of the watch-movement and arranged to engage by its inner end arm the lower part, *d*, of the bridge C, and by its outer end the radial recesses N of a raised plate at the under side of a centrally-pivoted ratchet-wheel, G. This ratchet-wheel is provided with fifteen teeth and a check-pawl, T. The ratchet-wheel G is engaged by a pawl, I, at the inner end of a fulcrumed push-lever, H, the opposite outer end of which is acted upon by a spring, V, and provided with a push-piece which passes through the case of the watch to the outside, and which serves for successively starting, stopping, and returning the hands of the timing mechanism in the usual manner in stop-watches. A spring, K, acts upon the heel of the pawl I so as to throw the same clear of the teeth of the ratchet G at each depression of the push-lever H and into the next tooth on the release of the same. A spring stop-lever, L, which is rigidly affixed to the move-

ment at its outer end, is thrown by its inner free end toward the circumference of the quarter-second wheel D, so as to engage the teeth of the same by a pin, *a*, and thereby stop the wheel D whenever the motion of the quarter-second hand is to be stopped. A heel or projection, P, at the middle portion of the spring-arm L serves to engage the recesses N at the under side of the ratchet-wheel G in a similar manner as the inner end of the lever M. A projection, R, of the double shifting-lever F is also thrown at the proper time into one of the recesses N whenever the quarter-second and minute hands are to be returned to the starting-points.

The different operations of starting, stopping, and returning the quarter-second and minute hands are all accomplished by the push-lever H, pawl I, and ratchet-wheel G with its recesses N at the under side in the usual well-known manner. The quarter-second hand and extra minute-hand may always be in motion to be stopped and returned to the starting-points, or they may be used only when required.

Whenever the timing attachment is desired to be used the push-lever H is depressed, and thereby the pawl I thrown into one of the teeth of the ratchet G. Simultaneously the heel or projection P of the spring stop-lever L drops into one of the recesses N, and the pin *a*, at its outer end, L, into the toothed circumference of the quarter-second wheel D, so as to instantly stop the quarter-second hand. The arm O of the lever M, being at that moment outside of one of the recesses N and in contact with the raised plate, is thrown sidewise, and serves to throw by its inner end the bridge C, together with the second-hand wheel D, sidewise, so that it cannot mesh any more with the transmitting-wheel of the arbor A. The shifting-lever F, being, with its tooth R, also outside of one of the recesses N and resting upon the circumference of the raised plate at the under side of the ratchet G, is retained in a position away from the heart-cams, but ready to engage the same by the next movement of the push-lever H. By pressing a second time on the outer end of the push-lever H the ratchet G advances another tooth, the heel or projection P of the stop-lever L leaves the recess N, while the pin *a* releases at the same time the second-hand wheel D. The arm O of the lever M remains in the same position as before—outside of one of the recesses N; but as the tooth of the double shifting-lever F is dropped into one of the recesses N the lever F is thrown inwardly and engages the heart-cams of the quarter-second and minute wheels D and E, and returns thereby the quarter-second and minute hands to the starting-points at zero on their respective dials. By pressing upon the push-lever H a third time the different parts assume the position shown in Fig. 1 of the drawings, the stop-lever L and shifting-lever F being raised away re-

spectively from the quarter-second wheel D and the heart-cams, while the arm O of the lever M drops into one of the recesses N, so that the bridge C is thrown sidewise by its spring Q, and consequently the quarter-second wheel D thrown into mesh with the transmitting-wheel of the arbor A. The quarter-second hand consequently starts instantly, and moves on until it has completed one revolution. Its finger X will then move the minute-wheel, indicating thereby successively the minutes until the hands are stopped again by the next depressing of the push-lever and returned to the starting-points in the manner desired.

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

1. In a stop-watch, the combination of the centrally-pivoted quarter-second wheel D, the finger X, secured to the top of said wheel 20 D, the spring Y, and the fixed bridge B and movable bridge C, substantially as described.

2. The wheel D, finger X, spring Y, and bridges B and C, in combination with the spur-wheel E, cams *c* and *h*, check-pawl U, and the arbors of wheels D E, moving the quarter-second and minute hands in opposite directions, substantially as described. 25

3. The combination of ratchet-wheel G, pawl I, lever H, spring K, recessed plate, spring stop-lever L, pin *a*, wheel D, heel P, projection R, double shifting-lever F, lever M, arm O, finger X, spring Y, and bridge C, substantially as described. 30

In testimony whereof I have signed this specification in the presence of two subscribing witnesses. 35

WILLIAMS ED. HUGUENIN.

Witnesses:

T. DURAR,  
M. MORÉ.