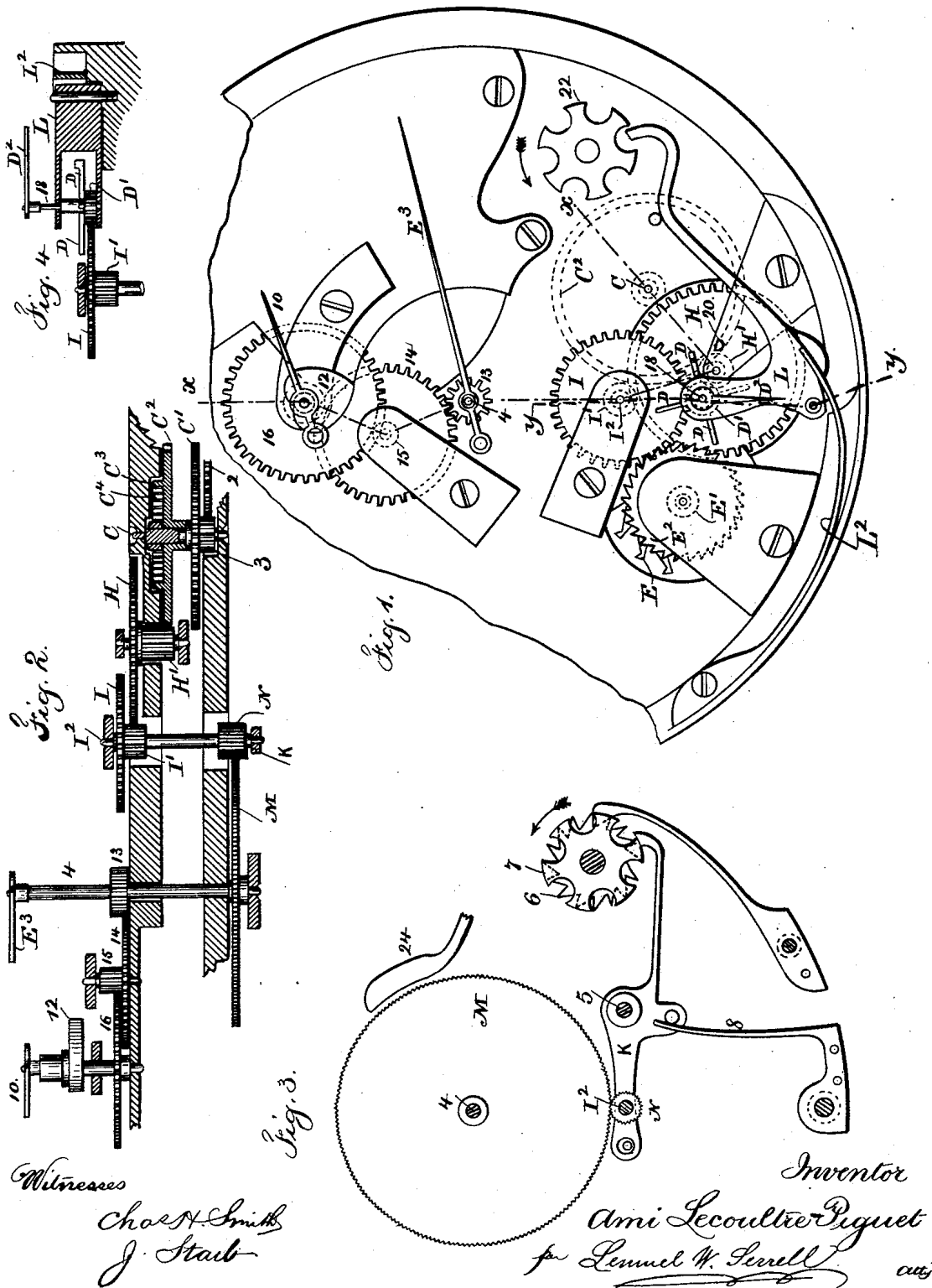


(No Model.)

A. LECOULTRE-PIGUET.
STOP WATCH.

No. 435,699.

Patented Sept. 2, 1890.



UNITED STATES PATENT OFFICE.

AMI LECOULTRE-PIGUET, OF BRASSUS, SWITZERLAND.

STOP-WATCH.

SPECIFICATION forming part of Letters Patent No. 435,699, dated September 2, 1890.

Application filed June 7, 1889. Serial No. 313,452. (No model.) Patented in Switzerland February 13, 1889, No. 163.

To all whom it may concern:

Be it known that I, AMI LECOULTRE-PIGUET, watch-maker, of Brassus, in Switzerland, have invented an Improvement in Stop-Watches,

of which the following is a specification.

Letters Patent in Switzerland corresponding with the present invention were granted February 13, 1889, No. 163, upon application filed December 4, 1888.

My present invention is designed as an improvement upon the device set forth in Letters Patent granted to me in England, No. 13,625, October 25, 1888, and in the United States January 4, 1887, No. 355,403.

The object of my present invention is to connect the split-second hand and its train-operating mechanism with the second-hand or with the second-hand and minute-hand in order that the said hands may move in unison with the split-second hand. These hands and their connecting-gears are all started simultaneously by the first movement of a push-pin and are stopped by a brake-lever that is brought in contact with the surface of one of said gears, said brake-lever being operated by the second movement of a push-pin, and a lever and heart-cam are employed for returning the second and minute hands simultaneously to their normal or zero position, and they are operated by the third movement of a push-pin simultaneously with the disengagement of the split-second mechanism.

In the drawings, Figure 1 shows a portion of the watch-plate in a magnified size. Fig. 2 is a section through the plates and elevation of the wheels and pinions at the line *x x* of Fig. 1. Fig. 3 is a separate view of the starting mechanism; and Fig. 4 is a section at the line *y y* of the plates, the wheels and pinions being in elevation.

A mainspring and train of gearing is made use of of any ordinary character, and this is made to drive the escapement-wheel E and give motion by any desired escapement to the balance-wheel, which is not shown in the drawings. Hence this escapement-wheel E, the ratchet-wheel E², and the driving-pinion E' (shown by dotted lines in Fig. 1) are constantly rotated. The arbor C is also constantly rotated from the train of gearing by any suitable gear, a part of which is repre-

sented at 2, Fig. 2, that gives motion to the pinion 3 of said arbor C.

Upon the arbor C is a gear-wheel C², which is loose and turned by friction between the arbor C and said wheel C². I prefer to obtain friction by a coiled spring C⁴, the inner end of which is fastened firmly to the arbor C by a collar, and the outer end of this coiled spring presses against the annular flange C³ upon the wheel C², and when the wheel C² is stopped the end of the coil-spring C⁴ rubs around within the annular flange C³, and when the wheel C² is allowed to turn the friction of the coil-spring against the annular flange C³ is sufficient to rotate such wheel C² and the parts connected with it, and should there be any difference in the movement of the arbor C and the wheel C² the coil-spring C⁴, which is like the hair-spring of a watch, allows for this difference of movement. The wheel C² gears into a pinion H', with which is connected a wheel H, gearing into a pinion I' adjacent to the wheel I upon the arbor I², and this arbor passes through the plates of the watch and is supported by the lever K, and upon the arbor I² is a fine-toothed pinion N, gearing into the wheel M, the arbor 4 of which passes through the watch-plates and is provided with a hand E³, which is adapted to indicate seconds. This lever K is pivoted at 5, and its short arm carries one end of the axis of the pinion N. Its long arm engages the cam-wheel 7, and a stud on its shortest arm engages the spring 8, and there is a push-pin and pawl acting upon the ratchet-wheel 6 of the cam-wheel 7, against the periphery of which cam-wheel the end of lever K rests when the pinion N is in contact with the wheel M; but when the push-pin is operated to bring one of the notches of the cam-wheel contiguous to the end of the lever K, the spring 8, operating the lever K, releases the pinion N from the wheel M. Hence this wheel M, the hand E³, and the minute-hand 10 can all be brought back by the lever of ordinary construction acting upon the heart-cam 12 to restore the parts to their normal position.

Upon reference to Figs. 1 and 2, it will be seen that the train of gearing 13 14 15 16 connects the second-hand arbor 4 with the arbor of the minute-hand 10, and by placing the

heart-cam 12 on the arbor of the minute-hand this will be returned to the normal position, and in so doing the second-hand E^3 may be revolved several times, but will be returned

5 to its normal position.
The independent quarter-second hand D^2 is, upon a short arbor 18, supported by a lever L, and there is a pinion D' , driven by the wheel I, the pinion I' of which receives motion from the wheel H, that is driven by the
10 wheel C^2 , as before mentioned, and upon the arbor 18 are the wings or arms D, and there are four of these, and the proportion of the wheels and pinions is such that this arbor 18
15 is adapted to rotate once in a second, and by reference to Fig. 1 it will be seen that the escapement-wheel E is to be provided with fifteen teeth and the ratchet-wheel E^2 with thirty teeth. Hence with a balance vibrating twice
20 a second four teeth of the ratchet-wheel E^2 will pass each second, and when the end of the lever L is not acted upon by the cam-wheel 22 the spring L^2 will move the lever L and bring the wings D sufficiently near to the
25 ratchet-teeth E to cause the end of each wing in succession to pause against a tooth of the ratchet-wheel and to be liberated as such tooth passes from contact with the end of the wing, so that the arbor 18 and hand D^2 will
30 indicate one-quarter second. Upon the first push of the push-pin the ratchet-wheels 6 and the cams 7 and 22, which are all on the same axis, will be turned. The cam 7 will act upon the lever K and bring the pinion N into
35 contact with the wheel M, and the hands E^3 and 10 will instantly commence to revolve, and at this same moment the cam-wheel 22, passing from beneath the end of the lever L, allows the wings D to come into contact with
40 the ratchet-wheel E^2 and the quarter-second hand D^2 be revolved. The second push of the push-pin will bring into action a brake-lever 24 against the side of the wheel M or any other suitable wheel in the train to stop
45 all of the hands instantly, as usual in stop mechanism, and it will be apparent that in consequence of the wheel M and pinion N remaining in gear, and the wheel I and pinion D' being in gear, neither hand can move; but
50 the wheel C' of the time-train can continue to revolve because the end of the spring C^4 will slide within the annular rib C^3 . When the third push of the push-pin is given, the lever K is released and the spring 8 separates
55 the pinion N from the wheel M, and simultaneously the ordinary lever is brought against the heart-cam 12, and the hands E^3 and 10 are returned to their normal position, and the cam 22 acts upon the lever L, swinging
60 the wings D away from the ratchet-wheel E^2 , and in consequence of the pinion N and wheel M being separated, the spring C^4 can turn the wheels H I and pinions I' and D suf-

ficient to swing the wings D and the hand D^2 around to the naught (0) or zero point, there
65 being an upward projection on one of the wings D, which comes into contact with an overhanging stationary stud or projection 20, to arrest the movement of the hand at the naught (0) or zero point, and it will be ob-
70 served that the first push of the push-pin turning the ratchet-wheel 6 the cam-wheels 7 and 22 allows the lever L to be moved by the spring L^2 sufficiently to separate the wing from the stop 20, and allow the frictional mechanism to
75 revolve the train of gearing.

It will be apparent that the stop 20 may be upon a stationary portion of the watch or it may be formed by the end of the lever receiving its motion from the cam-wheel 22,
80 and that the lever which acts in connection with the heart-cam 12 and with the break or stop 24 may be of any desired character, as these are well known in stop-watches.

I claim as my invention—

85 1. The combination, in a stop-watch, with the split-second train-operating mechanism and the pinion I' , its axis, and the pinion N, operated by the split-seconds mechanism, of the wheel M, its arbor 4, and the second-hand
90 E^3 upon said arbor, and a lever K, receiving the axis of the pinions I' and N adjacent to said pinion N, and a cam for moving said lever K to engage or disengage the pinion N with the wheel M, substantially as and for
95 the purposes set forth.

2. The combination, in a stop-watch, with the split-second train-operating mechanism and the pinion I' , its axis, and the pinion N, of the cam-wheel 7, the wheel M, its arbor 4,
100 and the second-hand E^3 upon said arbor, the lever K, pivoted at 5, its short arm carrying one end of the axis of the pinion N, its long arm engaging the cam-wheel 7, a stud upon the said lever, the spring 8 to move the lever
105 K and disengage the wheels M N, and the brake-lever 24, substantially as specified.

3. The combination, in a stop-watch, with the minute-hand 10 and its train of gear, of the second-hand E^3 , its arbor 4, the pinion 13,
110 engaging the minute-hand train, the wheel M, the pinion N, the lever K, receiving one end of the axis, of the pinion N, and a cam for moving said lever, and a train of gearing for driving the second and minute hands in
115 unison, and a brake acting on the wheel M for stopping said hands, and a heart-cam for returning said hands together to the zero-point, substantially as set forth.

In testimony whereof I have signed my
120 name to this specification in the presence of two subscribing witnesses.

AMI LECOULTRE-PIGUET.

Witnesses:

ELMER SCHNEIDER,
LYELL T. ADAMS.