

(No Model.)

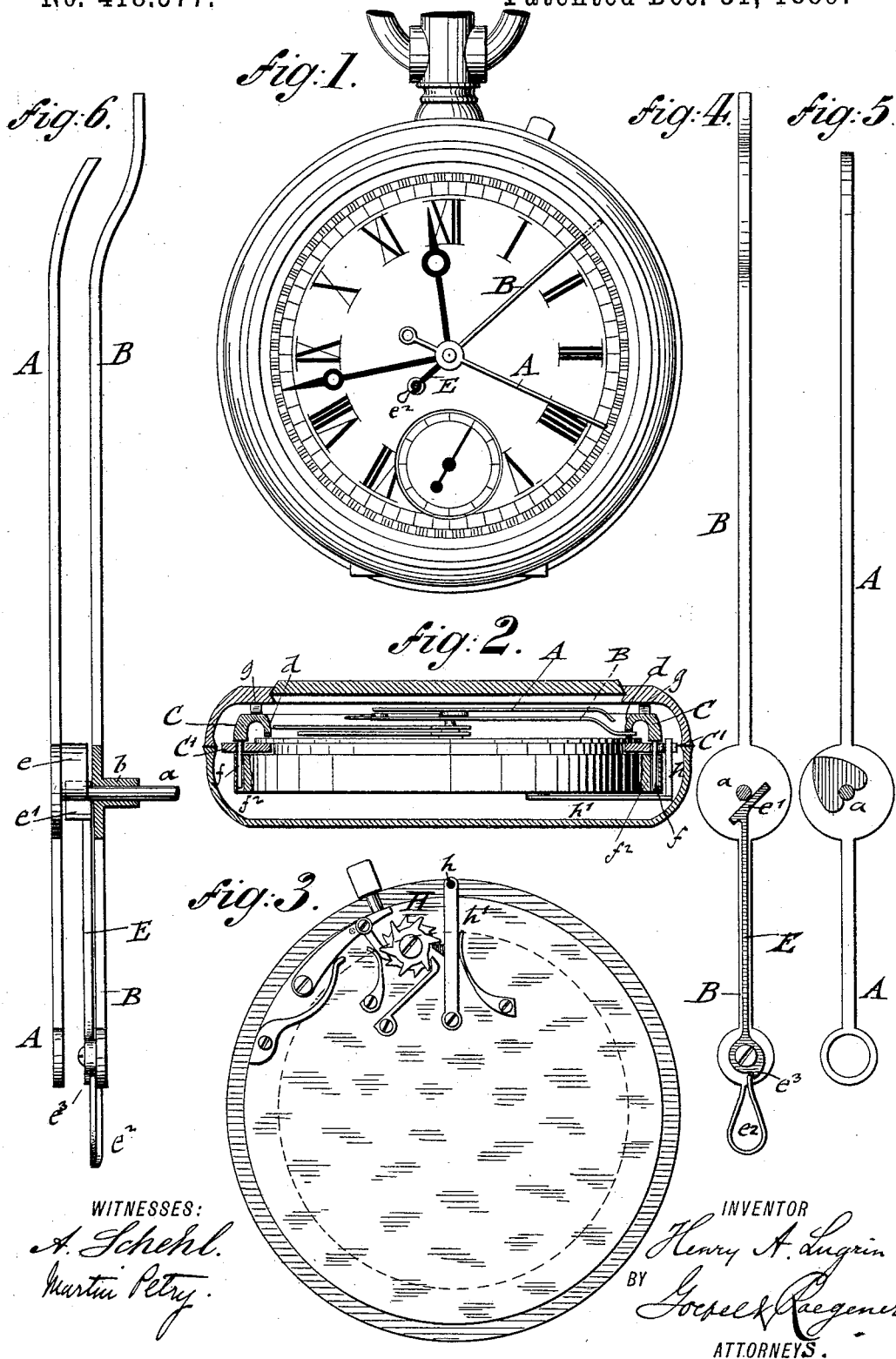
H. A. LUGRIN.

2 Sheets—Sheet 1.

STOP WATCH.

No. 418,577.

Patented Dec. 31, 1889.



WITNESSES:  
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INVENTOR  
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(No Model.)

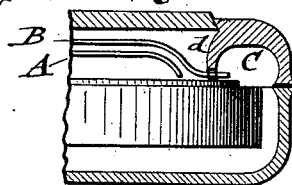
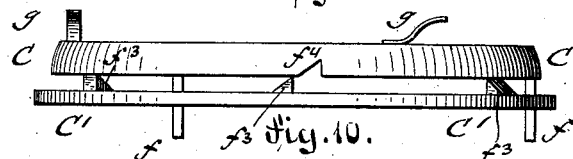
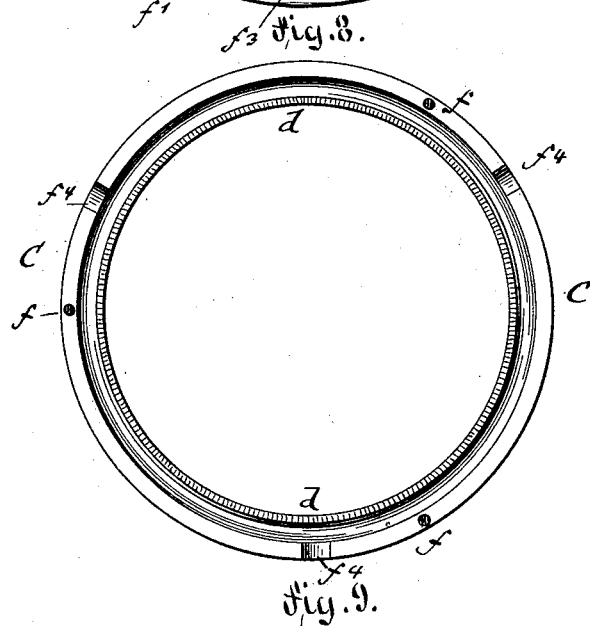
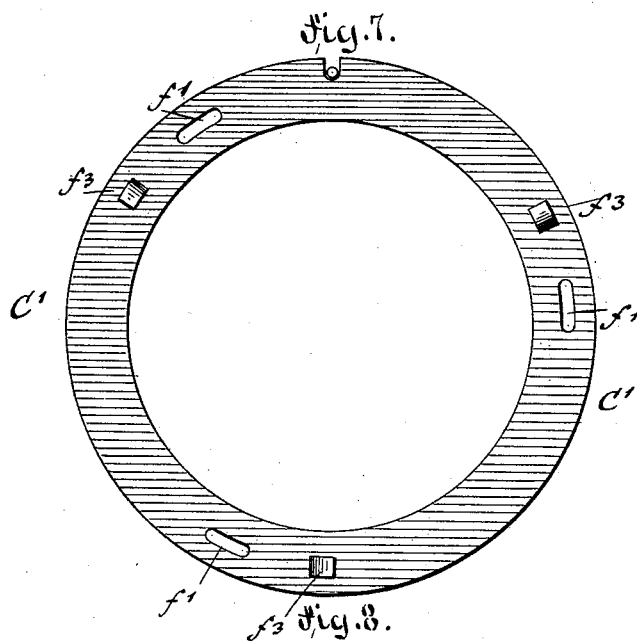
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2 Sheets—Sheet 2.

STOP WATCH.

No. 418,577.

Patented Dec. 31, 1889.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

HENRY A. LUGRIN, OF BROOKLYN, NEW YORK.

## STOP-WATCH.

SPECIFICATION forming part of Letters Patent No. 418,577, dated December 31, 1889.

Application filed August 1, 1889. Serial No. 319,434. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY A. LUGRIN, of Brooklyn, in the county of Kings and State of New York, a citizen of the United States, have invented certain new and useful Improvements in Stop-Watches, of which the following is a specification.

This invention relates to an improved stop-watch of that class in which, besides the quarter-seconds hand, a split-quarter-seconds hand is employed for the purpose of permitting the taking of two observations in timing races, regattas, &c.; and the invention consists of a stop-watch in which the split-quarter-seconds hand is operated by means of mechanism located on the face of the watch above the dial, so as to dispense with the necessity of a brake-disk and brake for the split-seconds hand. For this purpose the split-quarter-seconds hand is made longer than the quarter-seconds hand and stopped either by contact with the bezel of the dial-covering glass, said bezel being provided with a roughened or knurled edge that instantly stops the split-quarter-seconds hand, or by means of an independent stop-ring operated by suitable mechanism and guided along inclines of a base-ring, on which the said stop-ring is guided by suitable pins. The split-quarter-seconds hand is made to fly after the quarter-seconds hand by means of a spring-actuated lever which is pivoted to the split-seconds hand and provided with an inclined end or shoe for engaging the heart-cam on the arbor of the quarter-seconds hand, so that as soon as the end of the split-seconds hand is released by the stop-ring the same can fly after the quarter-seconds hand and then be returned with the same to the starting-point.

The invention consists, further, of certain details of construction, which will be fully set forth hereinafter, and finally pointed out in the claims.

In the accompanying drawings, Figure 1 represents a front elevation of a stop-watch with my improved split-quarter-seconds hand. Fig. 2 is a vertical central section of the same, showing a stop-ring for arresting the split-quarter-seconds hand. Fig. 3 is a detail showing the mechanism located on the top of the movement for operating the quarter-seconds hand and the stop-ring of the split-seconds

hand. Figs. 4 and 5 are respectively a top view of the split-quarter-seconds hand and a bottom view of the quarter-seconds hand, drawn on a larger scale. Fig. 6 is a side view, partly in section, showing the arrangement of the quarter-seconds hand above the split seconds and the lever and heart-cam connection of said hands. Figs. 7, 8, and 9 are details of the stop-ring and its operating mechanism, and Fig. 10 is a detail vertical transverse section of a stop-watch with a modified stop device for the split-quarter-seconds hand.

Similar letters of reference indicate corresponding parts.

In the drawings, A represents the quarter-seconds hand of a stop-watch of any approved construction. The quarter-seconds hand A is attached to the end of its arbor *a* and operated by means of the usual pawl-and-ratchet mechanism, (not shown in the drawings,) by which the starting, stopping, and returning of the quarter-seconds hand is accomplished in the usual manner. The split-quarter-seconds hand B is applied loosely by a hollow arbor *b* to the arbor *a* of the quarter-seconds hand A, the hollow arbor being supported in suitable bearings of the movement. The split-quarter-seconds hand B, instead of being operated by a brake mechanism located on the top of the watch-movement or below the dial, is in my present invention operated by mechanism located on the face side of the movement above the dial. For this purpose the split-quarter-seconds hand B is made longer than the quarter-seconds hand A, and thereby adapted to be engaged by a stop-ring C, that is arranged either as an independently-movable ring on the face of the movement or made integral with the bezel of the dial-covering glass. In both cases the stopping of the split-quarter-seconds hand B is accomplished by a roughened or knurled edge on the stop-flange *d* of said ring or bezel, which flange engages the outer end of the split-quarter-seconds hand, as shown clearly in Figs. 1 and 2, and thereby stops the same, while the quarter-seconds hand continues to move over the dial without the split-quarter-seconds hand. The split-quarter-seconds hand B is retained in line with the quarter-seconds hand A by means of the usual lever and heart-cam devices, which also serve to

send the split-seconds hand after the quarter-seconds hand as soon as the split-seconds hand is released. For this purpose the heart-cam *e* is applied to the under side of the enlarged middle part of the quarter-seconds hand A next to the arbor *a* and engaged by the inclined end or shoe *e'* at the inner end of a lever E, that is located in line with and above the shorter arm of the split-quarter-seconds hand B, pivoted to the outer end of the shorter arm and acted upon by a loop-shaped spring *e<sup>2</sup>*, that is preferably made integral with the split-quarter-seconds hand B. The free end of the spring *e<sup>2</sup>* engages a projecting heel *e<sup>3</sup>* on the eye-shaped outer end of the lever E, as shown clearly in Fig. 4. When the inclined shoe *e'* of the lever E presses evenly on both sides of the broad end of the heart-cam *e*, both hands A and B are retained in line with each other and move together over the dial, as shown in Fig. 6. When, however, the longer split-seconds hand is arrested by the stop-ring C, the quarter-seconds hand A continues its motion and causes the heart-cam *e* to move along the shoe of the spring-actuated lever E. As soon as the split-quarter-seconds hand is released by the lifting of the stop-ring the pressure of the shoe of the lever E on the heart-cam *e* causes the split-seconds hand to fly instantly after the quarter-seconds hand, so that the hands are again in line with and above each other.

Different mechanism may be employed for stopping and releasing the split-quarter-seconds hand B. In the drawings I have shown two different mechanisms; but it is obvious that other constructions may be used. In Figs. 2, 3, 7, 8, and 9 the split-quarter-seconds hand B is stopped by the inwardly-bent flange *d* of a stop-ring C, the edge of said flange being roughened or knurled, as shown in Figs. 2 and 8. This stop-ring C is provided with guide-pins *f*, which pass through slots *f'* of a guide-ring C' into guide-sockets *f<sup>2</sup>* of the movement. The guide-ring C' is provided with inclined lugs *f<sup>3</sup>*, along which the stop-ring C can be guided by inclined notches *f<sup>4</sup>* into raised or lowered position. The base-ring C' is guided in an annular groove of the watch-movement and adapted to shift for the length of its slots *f'* on the guide-pins of the stop-ring C. The stop-ring C and guide-ring C' are held in contact with each other by means of flat springs *g*, which are attached to the upper part of the stop-ring C, as shown in Figs. 2 and 9, the free ends of said springs being engaged by the cap or bezel of the watch-case. The guide-ring C' is engaged by a pin *h*, which is located at the outer end of a pivoted and spring-actuated lever *h'*, that is actuated by means of a push-lever and a pawl-and-ratchet mechanism H, as clearly shown in Fig. 3. This operating mechanism produces the shifting of the guide-ring C' in one or the opposite direction, and thereby either the raising or lowering of the stop-ring C.

When it is desired to start the quarter-sec-

onds hands, the stop-ring is raised, so as to release the outer end of the split-quarter-seconds hand, which is accomplished by pressing in the push-lever and operating by the pawl-and-ratchet mechanism H the oscillating arm *h'* and by the pin *h* the shifting guide-ring C', so that by the sliding of the inclines *f* along the corresponding notches *f<sup>4</sup>* of the stop-ring the latter is raised, and thereby the split-quarter-seconds hand liberated, so that the same is free to move with the quarter-seconds hand. Both hands are then started in the usual manner and moved over the dial until the first timing observation is to be made, which is accomplished by lowering the stop-ring and engaging the outer end of the split-quarter-seconds hand, so as to stop the same. This is accomplished by shifting the guide-ring into its former normal position and returning the stop-ring along the inclined lugs of the base-ring into its lowermost position, as shown in Fig. 2.

By making the knurled stop-flange *d* integral with the bezel of the dial-covering glass the mechanism for stopping the split-quarter-seconds hand and releasing the same is considerably simplified. In this case the bezel is raised before the timing observation is to be made, so that both quarter-seconds hands can move together over the dial. As soon as the split-quarter-seconds hand is to be stopped the bezel is pressed down, so that its stop-flange locks the split-quarter-seconds hand, as shown in Fig. 10. As soon as the bezel is opened again the split-quarter-seconds hand is released and made to fly by the action of its lever and heart-cam after the quarter-seconds hand, with which it continues its motion until both hands are stopped and returned to the starting-point by the usual pawl-and-ratchet mechanism. The bezel is then pressed again and locked in the usual manner.

It is obvious that the position of the relative quarter-seconds and split-quarter-seconds hands may be reversed—that is to say, the split-quarter-seconds hand may be placed above the quarter-seconds hand, instead of below the same, as shown in Fig. 10. In either arrangement, however, the fly-back mechanism by which the split-quarter-seconds hand is made to fly after the quarter-seconds hand is located between the two hands and above the dial of the watch. The fly-back mechanism is covered by the uppermost hand, with the exception of the loop-shaped spring on the end of the split-seconds hand. By arranging the stop and fly-back mechanism for the split-quarter-seconds hand on the face of the watch above the dial the brake-disk and brake for the split-quarter-seconds hand may be dispensed with, and thereby the construction of stop-watches with split-quarter-seconds hands considerably simplified.

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

quarter-seconds and split-quarter-seconds hands with mechanism arranged above the dial for stopping or releasing the split-seconds hand, substantially as set forth.

5 2. In a stop-watch, the combination of the quarter-seconds and split-quarter-seconds hands with a fly-back mechanism for the split-seconds hand, located between the hands above the dial, substantially as set forth.

10 3. In a stop-watch, the combination, with the quarter-seconds and the split-quarter-seconds hands, which latter is applied by a tubular arbor to the arbor of the quarter-seconds hand, of mechanism for stopping or releasing  
15 the split-quarter-seconds hand, said mechanism being located above the dial, and a fly-back mechanism located above the dial and between the quarter and split-quarter seconds hands, substantially as set forth.

20 4. In a stop-watch, the combination of the quarter-seconds hand having a heart-cam, the split-quarter-seconds hand applied to the arbor of the quarter-seconds hand, and a spring-actuated lever pivoted to the split-seconds  
25 hand and provided with an inclined end or shoe, said heart-cam and spring-actuated lever being located between the hands, substantially as set forth.

30 5. In a stop-watch, the combination of the quarter-seconds hand, the split-quarter-seconds hand, made of greater length than the quarter-seconds hand, and a stop-ring or bezel provided with an inwardly-bent stop-flange having a grooved or knurled edge for engaging  
35 or releasing the outer end of the split-quarter-seconds hand, substantially as set forth.

6. In a stop-watch, the combination of the

quarter-seconds hand, the split-quarter-seconds hand, a fly-back mechanism located be- 40  
tween said hands on the face of the dial, a stop-ring having an inwardly-bent and knurled stop-flange, and means for raising or lowering the stop-ring, so as to release or stop the  
45 split-quarter-seconds hand, substantially as set forth.

7. In a stop-watch, the combination of the quarter-seconds hand, a split-quarter-seconds hand being longer than the quarter-seconds hand, a stop-ring having an inwardly-bent 50  
and knurled stop-flange, and means for raising or lowering the stop-ring, so as to release or stop the split-quarter-seconds hand, substantially as set forth.

8. In a stop-watch, the combination of the 55  
quarter-seconds hand, the split-quarter-seconds hand, a stop-ring having an inwardly-bent and knurled stop-flange, a shifting guide-ring having slots, guide-pins on said stop-ring extending through said slots into guide-sock- 60  
ets of the movement, inclined lugs on said base-ring engaging corresponding notches on the stop-ring, a pivoted lever having a pin for engaging the guide-ring, and a pawl-and-ratchet mechanism for operating said pivoted 65  
lever for shifting the base-ring, and thereby raising or lowering the stop-ring, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in pres- 70  
ence of two subscribing witnesses.

HENRY A. LUGRIN.

Witnesses:

W. REIMHERR,  
JOHN ALONZO STRALEY.