(No Model.)

H. A. LUGRIN.

STOP WATCH.

No. 331,417. Patented Dec. 1, 1885.

Fig. 1.

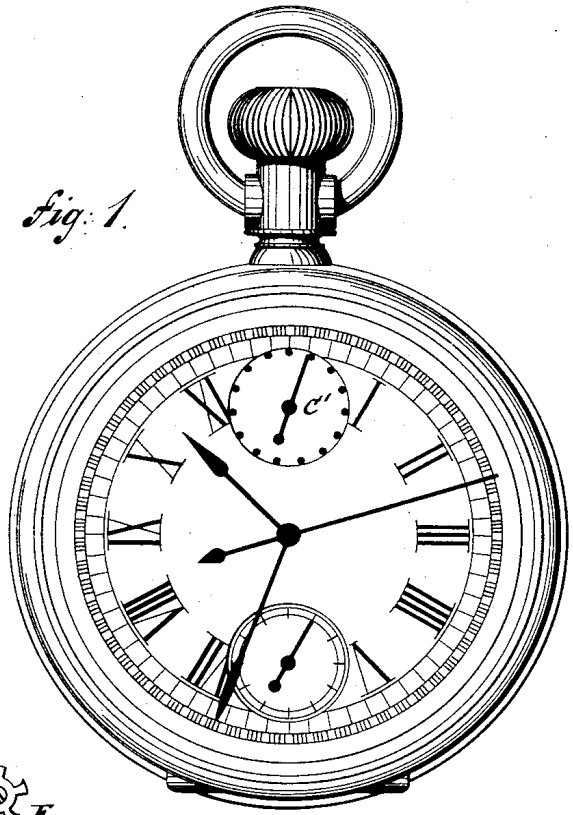


Fig. 3.

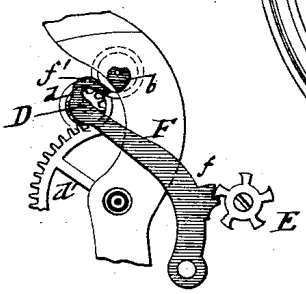


Fig. 4.

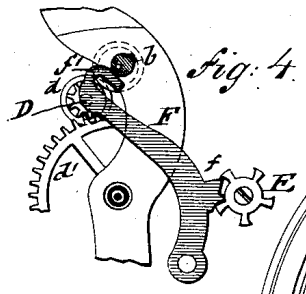


Fig. 2.

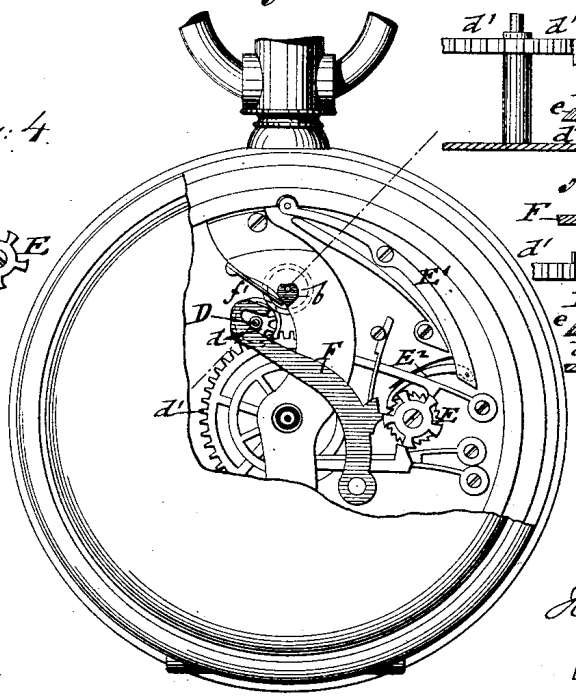


Fig. 5.

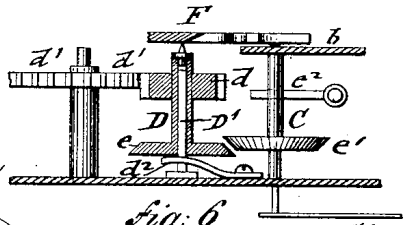
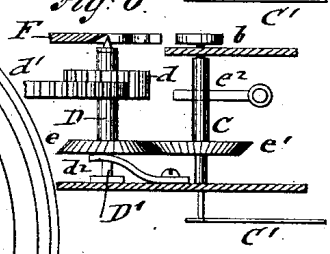


Fig. 6.



WITNESSES

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HENRY A. LUGRIN, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF AND PROSPER NORDMANN, OF SAME PLACE.

STOP-WATCH.

SPECIFICATION forming part of Letters Patent No. 331,417, dated December 1, 1885.

Application filed May 15, 1885. Serial No. 165,560. (No model.)

To all whom it may concern:

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

This invention relates to certain improvements in the stop-watch for which Letters Patent have heretofore been granted to me under date of September 28, 1880, No. 232,737, whereby not only quarter-seconds but also minutes are indicated by the timing attachment; and the invention consists of a stop-watch in which the center-wheel is connected by an intermediate hollow and spring-actuated arbor carrying a pinion and a minutely-toothed bevel-wheel, which latter meshes with a similarly-toothed bevel-wheel on the arbor of an auxiliary minute-hand, said arbor being provided with a heart-cam, by which the auxiliary minute-hand is returned to the starting-point by means of a lever and the usual ratchet-wheel mechanism. The lever acts by its beveled edge on the conically-tapering upper end of the hollow intermediate arbor, which is guided on a fixed spindle and supported on a spring that lifts said arbor and throws its toothed bevel-wheel into gear with the bevel-wheel of the auxiliary minute-hand whenever the pressure of the lever on the hollow arbor is released.

In the accompanying drawings, Figure 1 represents a front elevation of my improved stop-watch. Fig. 2 is a rear elevation of the same with a part of the case broken away. Figs. 3 and 4 are details showing the actuating-lever in different positions. Figs. 5 and 6 are detail side views, partly in section, of the mechanism by which the auxiliary minute-hand is operated.

Similar letters of reference indicate corresponding parts.

The quarter-second hand of my timing attachment to stop-watches is set in motion by any approved mechanism, preferably, however, by that shown in the patent granted to me under date of September 28, 1880, No. 232,737, as will more fully appear by reference to said patent.

In connection with the mechanisms that operate the quarter-second hand is also operated, by the usual double ratchet-wheel E, an auxiliary lever, F, that is pivoted to the top plate of the watch-movement and provided with a recessed heel, *f*, that is engaged by the teeth of the double ratchet-wheel E, as shown in Figs. 2, 3, and 4. The outer end, *f'*, of the lever F is made of hook shape, and beveled at the edge back of the hook, so as to engage the conically-tapering upper end of a hollow arbor, D, that is located intermediately between the arbor of the center-wheel and the arbor C of an auxiliary minute-hand, C', that is arranged at the upper part of the dial. The hollow arbor D is guided on a fixed post or spindle, D', attached to the main plate of the movement, as shown in Figs. 5 and 6. The conically-tapering end of the arbor D forms a part of a cap that is secured rigidly to the hollow arbor D. The hollow arbor D is rotated by means of a pinion, *d*, which meshes with the center-wheel *d'* of the movement. The hollow arbor D is provided with a minutely-toothed bevel-wheel, *e*, said arbor being acted upon by a band-spring, d^2, which has the tendency to lift the hollow arbor D, so as to throw the minutely-toothed bevel-wheel *e* into mesh with a similarly-toothed but inverted bevel-wheel, *e'*, that is keyed to the arbor C of the auxiliary minute-hand C'. The arbor C carries at its upper end a heart-shaped cam, *b*, which is engaged by the hook-shaped end *f'* of the shifting-lever F whenever the auxiliary minute-hand is to be returned to the starting-point. The beveled edge of the lever F passes readily over the conically-tapering end of the arbor D and lowers it against the tension of the spring d^2, whereby the bevel-wheel *e* is thrown out of mesh with the bevel-wheel *e'*, and thereby the motion of the auxiliary minute-hand C interrupted.

The entire timing attachment is operated by the crown and key-pipe of the stem-winding watch, an intermediate lever and pawl, E' E^2, and the double ratchet-wheel E, as shown in Fig. 2, the quarter-second hand and the auxiliary minute-hand being simultaneously started by pressing the crown down and throwing the actuating-levers of the quarter-second hand and of the auxiliary minute-hand into proper positions.

By moving the lever F into the position

shown in Fig. 2 the end of the same clears the upper conical end of the hollow arbor D, so that the spring d^2 lifts the arbor D and throws the bevel-wheel e into mesh with the bevel-wheel e', as shown in Fig. 6. The auxiliary minute-hand is thereby started, so as to move along its dial once every minute when the quarter-second hand has accomplished one entire rotation over the main dial.

The auxiliary minute-hand indicates the full minutes which the quarter-second hand has accomplished, and forms thereby a convenient auxiliary for counting the rotations of the quarter-second hand. A friction-spring, e^2, bears on the shank of the auxiliary minute-hand C, so as to hold it steadily in position, and facilitate the throwing in or out of mesh with the bevel-wheels e e' and the instant forward motion of the auxiliary minute-hand without recoil whenever the intermeshing takes place.

By pressing the crown of the stem-winding watch down a second time the lever F is moved over the tapering end of the hollow arbor D, as shown in Fig. 3, so that the same is depressed against the tension of the spring d^2, the bevel-wheels e e' thrown out of mesh with each other, and the auxiliary minute-hand stopped. The teeth of the intermeshing gear-wheel d on the hollow arbor D have to be wide enough to keep said gear-wheel always in mesh with the transmitting center-wheel d', whether the hollow arbor is in raised or lowered position, as shown, respectively, in Figs. 5 and 6.

By pressing on the crown a third time the lever F is moved so as to engage by its hook-shaped end the heart-cam, and return thereby the auxiliary minute-hand to the starting-point. This takes place simultaneously with the return of the quarter-second hand to its starting-point. In this position of the lever F the hollow arbor D is retained in depressed state, as shown in Fig. 5. The auxiliary minute-hand of the timing attachment of the stop-watch works thus in connection with the quarter-second hand, and indicates the full minutes, while the quarter-second hand indicates the quarter-seconds, so that races and regattas can be timed with great convenience without requiring the counting of the rotations of the quarter-second hand.

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

1. The combination, with the center-wheel of a watch-movement, of an intermediate spring-pressed arbor having a pinion meshing with the center-wheel and a minutely-toothed bevel-wheel, an auxiliary arbor having a similarly-toothed bevel-wheel, a heart-cam, and a minute-hand, a lever adapted to engage the upper end of the intermediate arbor, and mechanism, substantially as described, for operating the lever so as to start, stop, or return the auxiliary minute-hand, substantially as set forth.

2. The combination, with the center-wheel of a watch-movement, of an intermediate hollow arbor having a pinion meshing with said center-wheel and a minutely-toothed bevel-wheel, a fixed spindle on which the hollow arbor is supported, a spring bearing on the lower end of said arbor, an arbor carrying the auxiliary minute-hand and having a minutely-toothed gear-wheel, and an operating-lever whereby the minute-hand is started, stopped, or returned, substantially as set forth.

3. The combination, with the center-wheel of a watch-movement, of an intermediate hollow arbor having a conically-beveled cap at the upper end, a pinion meshing with the center-wheel and a minutely-toothed bevel-wheel, a fixed spindle for supporting the hollow arbor, a lifting-spring bearing on the lower end of the hollow arbor, an auxiliary arbor having a minutely-toothed bevel-wheel, a minute-hand, and a heart-cam, and an operating-lever having a hook-shaped end and a beveled edge back of the hook-shaped end, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

HENRY A. LUGRIN.

Witnesses:
PAUL GOEPEL,
SIDNEY MANN.