(No Model.) 2 Sheets—Sheet 1.

R. G. JENNINGS & E. KUHN.

STOP WATCH.

No. 558,958. Patented Apr. 28, 1896.

Fig. 5.

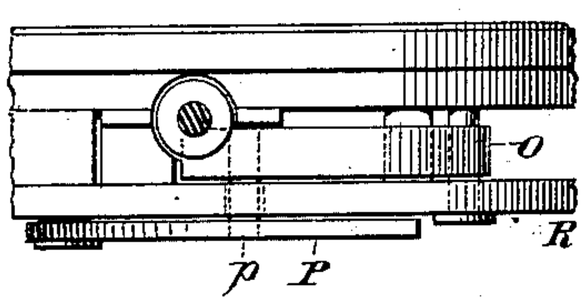


Fig. 1.

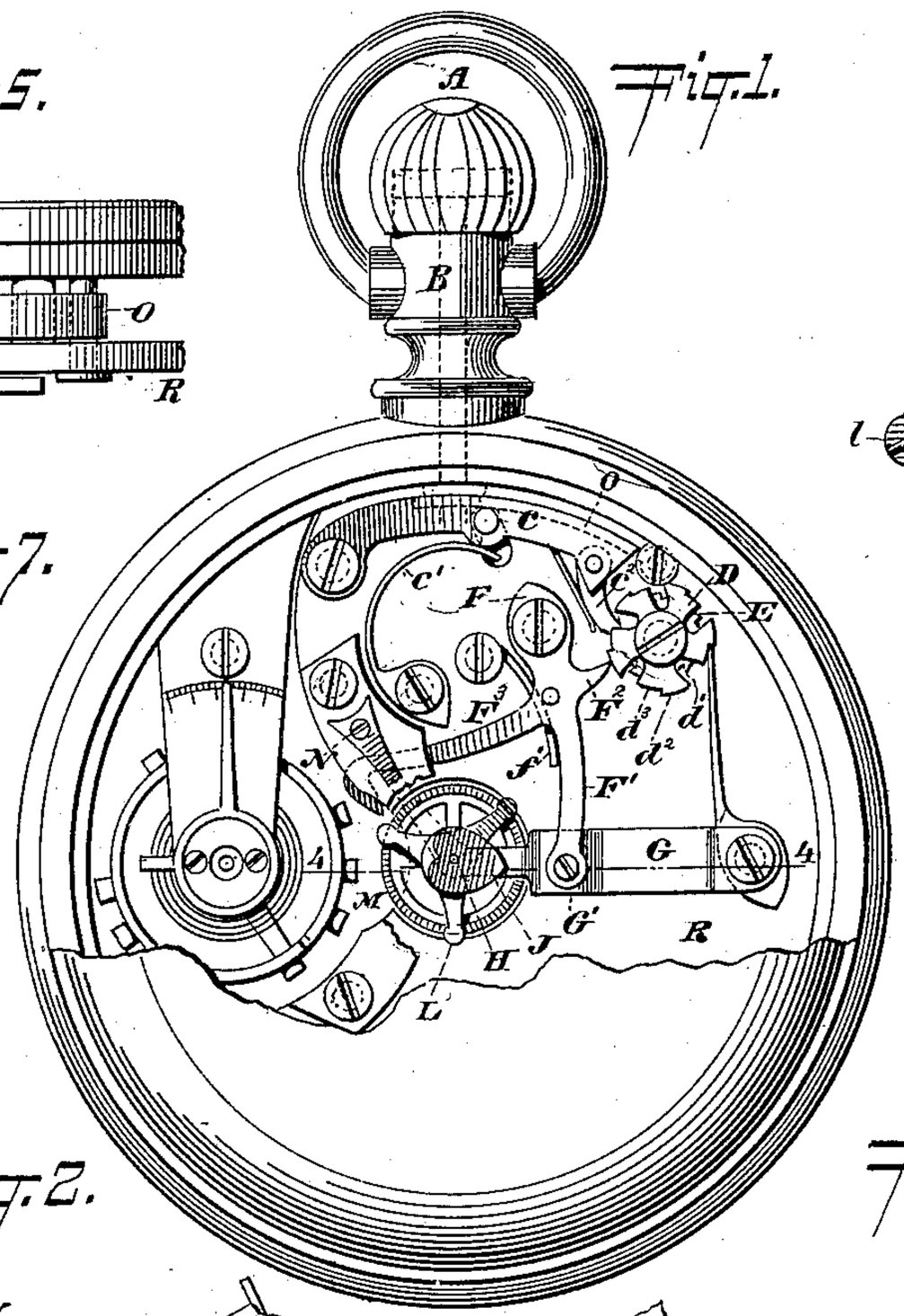


Fig. 6.

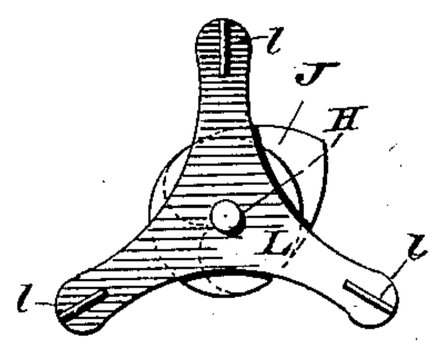


Fig. 7.

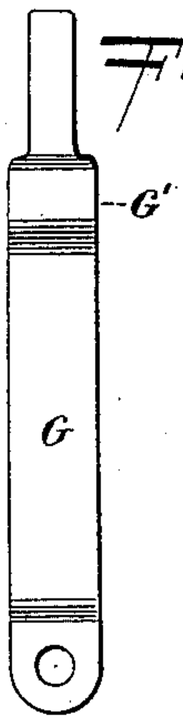


Fig. 2.

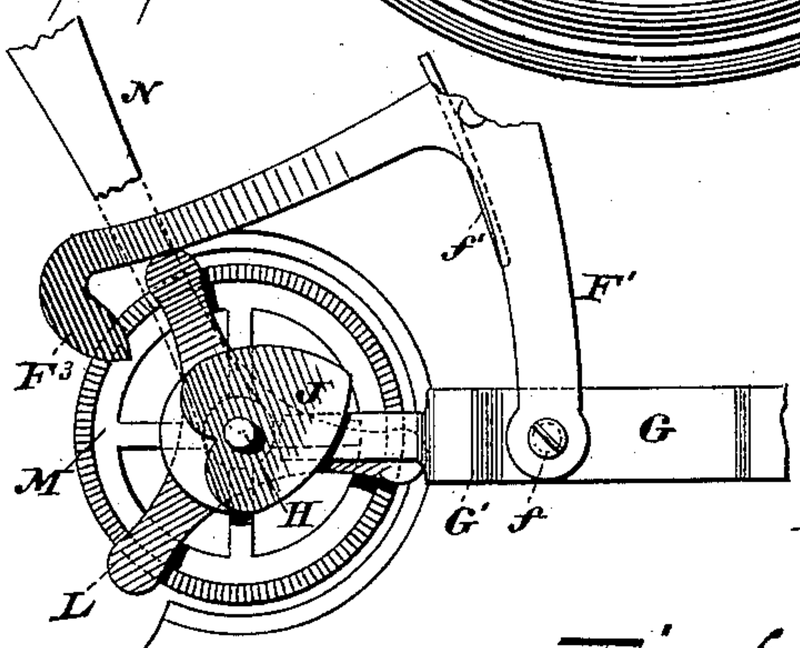


Fig. 3.

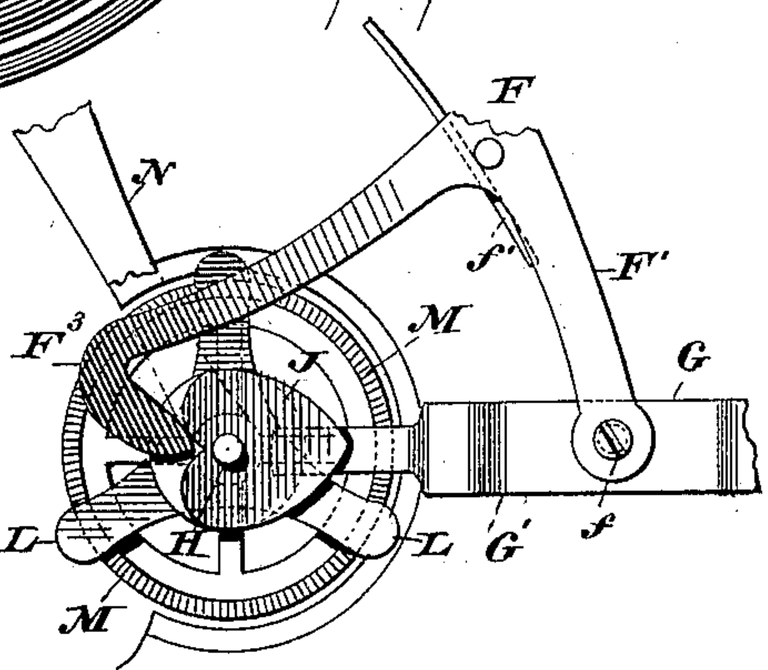
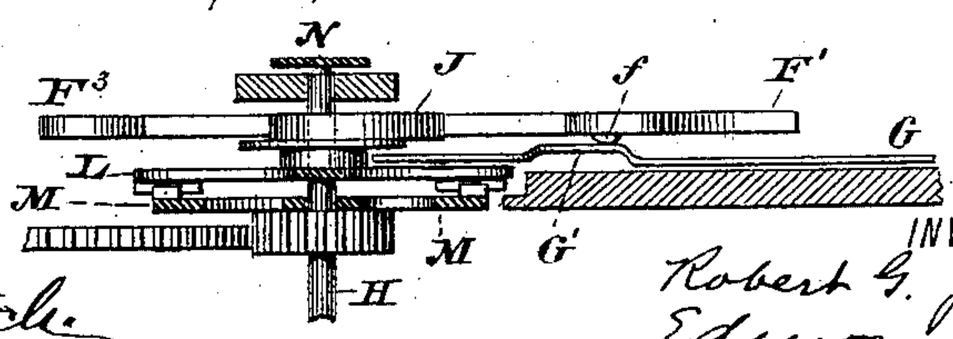


Fig. 4.



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(No Model.) 2 Sheets—Sheet 2.

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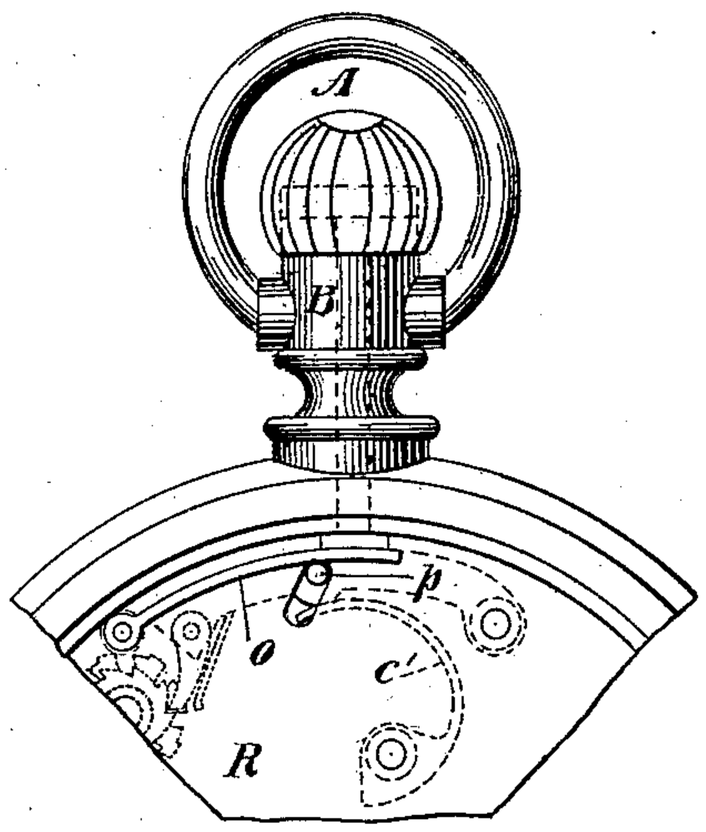
STOP WATCH.

No. 558,958. Patented Apr. 28, 1896.

Fig. 8.



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UNITED STATES PATENT OFFICE.

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STOP-WATCH.

SPECIFICATION forming part of Letters Patent No. 558,958, dated April 28, 1896.

Application filed May 25, 1892. Serial No. 434,246. (No model.)

To all whom it may concern:

Be it known that we, ROBERT G. JENNINGS, residing at New York, county of New York, and EDMOND KUHN, residing at Brooklyn, county of Kings, State of New York, have invented new and useful Improvements in Stop-Watches or Chronographs, of which the following is a full, clear, and exact specification.

This invention relates to certain improvements in stop-watches—or, to speak more exactly, start, stop, and fly-back watches—particularly that class in which the sweep seconds-arbor is movable longitudinally and may be brought into or out of engagement with the train by clutch-wheels.

It consists in the combination and novel arrangement and construction of certain parts whereby an independent or sweep seconds-hand may at the proper time be brought into engagement with the train of the watch, then disengaged therefrom, and finally the hand may be brought back to its initial position pointing to "12."

It consists also in the combinations and arrangements of parts hereinafter set forth and claimed.

Our invention is illustrated in the accompanying sheet of drawings, in which—

Figure 1 is a plan view of a watch, showing the arrangement and combination of parts constituting our improvement. Fig. 2 is an enlarged view of the clutch mechanism and operating mechanism, showing their position when the sweep-hand has been stopped. Fig. 3 is a similar view showing the same when the sweep seconds-hand has been returned to its initial position. Fig. 4 is an enlarged sectional view taken on the line 4 4, Fig. 1. Figs. 5, 6, 7, and 8 are views showing in detail certain parts hereinafter more fully described.

In the drawings, A is the crown of the watch.

B is a spindle, which in the drawings is adapted to wind or set the watch and also actuate the stop-watch mechanism. This stop-watch mechanism consists of a compound lever *c*, a step-wheel D, and ratchet E, and of a claw-shaped lever F, one arm F′ of which carries a toe F^2, which bears against the periphery of the step-wheel D. This arm is also provided with a downwardly-projecting screw-pin *f* on its under surface. The other arm F^3 of the claw-shaped lever F is pointed, as shown in Figs. 2 and 3. Beneath the arm F′ of the claw-shaped lever is placed a spring G. This spring has an upward bend G′ near its free end and is adapted to be depressed by the arm F′ when the pin *f* thereof slides upon said bend G′.

In the center of the watch is placed a longitudinally-movable arbor H, which carries the sweep seconds-hand. Upon this central arbor H is keyed the heart-cam J and the engagement-piece L. This engagement-piece L by preference has three arms, as shown in the drawings, Fig. 8, from the under surface of which project knife-edge teeth *l*. Below this engagement-piece L is placed the idle-wheel M, which is constantly in gear with the train of the watch and rotates freely around the central arbor H. The upper surface of this idle-wheel M is notched or indented, forming thereby gear-teeth, into which the knife-edge teeth *l* are adapted to fit when the engagement-piece L and the idle-wheel M are brought into contact.

The end of the spring G, when not depressed by the arm F′ of the claw-shaped lever, presses against a collar on the under surface of the heart-cam J and normally tends to lift the longitudinally-movable central arbor H and acts as a brake. On the end of said central sweep seconds-arbor H rests a spring N, which constantly tends to depress said arbor H, but is more than balanced by spring G. The arm F, which is provided with a pointed end, is adapted, when actuated in the manner hereinafter described, to strike against the periphery of the heart-cam J and thereby return it to its normal position. (Shown in Fig. 3.) The push-lever *c* is pressed upward by suitable spring *c′* and carries at its free end a spring-pressed toe c^2, which fits into the teeth of the ratchet E. The ratchet E and step-wheel D are formed so as to act substantially as one piece. The claw-shaped lever F is held by the action of the spring *f′* outward, so that the toe F^2 thereof is always held against the periphery of said step-wheel D. The step-wheel D has upon its periphery steps of three different elevations d' d^2 d^3. In the normal position the sweep seconds-hand is at "12," the heart-shaped cam J, claw-shaped lever F,

and engagement-piece L assuming the positions shown in Fig. 3. In such position the spring G raises said longitudinally-movable arbor H, (overcoming the pressure of the spring N,) and the engagement-piece L is thereby raised from contact with the gears in the surface of the idle-wheel M. In this position the toe F^2 of the claw-shaped lever F rests in the lowest step-wheel D.

To start the sweep seconds-hand, the crown or other suitable push-piece A is depressed, thereby actuating the lever *c*, which in turn, through the toe-piece c^2, actuates the ratchet E and step-wheel D. The step-wheel D then raises the toe F^2 of the claw-shaped lever F from the lowest step d' to the highest step d^2, in which position the arms of said claw-shaped lever F assume the positions shown in Figs. 1 and 4, the arm F′ sliding over the spring G until the pin *f* thereof rests upon the projection G′ of said spring. In this position the spring G is depressed, and the longitudinally-movable central arbor H, by virtue of the pressure exerted on its upper end by the spring N, is also depressed until the teeth on the engagement-piece L engage on the geared surface of the idle-wheel M. The sweep seconds-arbor H is then rotated by the idle-wheel M by its connection with the engagement-piece L. After the seconds-hand has traveled the required length of time the crown A or push-piece is again depressed, thereby actuating the lever, ratchet, and step-wheel in the manner above described until the toe of the claw-shaped lever rests on the intermediate step d^3. The claw-shaped lever F then assumes the position shown in Fig. 2, the arm F′ and the pin *f* being slid off from the projection G′ of the spring G. The spring G is then permitted to resume its elevated position and in so doing bears upon the under surface of the heart-cam J and thereby elevates the arbor H. The spring G, when released by movement of the lever F, bearing upon the under surface of the cam, acts as a brake and instantly stops and holds the sweep seconds-arbor from further movement.

The construction described, in which the lever F is claw-shaped and acts upon the spring G by depressing it, has this advantage—namely, that it leaves the part of the lever which actuates the spring open for inspection and adjustment, and, also, that by it when the clutch members are together, since the spring G at this time is positively actuated by the lever, its position can be exactly determined, so that it will not bear upon the parts of the clutch or in any way hinder the movement of the arbor. The spring N bears upon a point and causes little friction. The spring G, when free to act, bears upon a large surface, causing much friction at a time when it is useful. When not free to act, the parts can be so adjusted that it will not touch any moving part or cause any friction. The engagement-piece L and its teeth *l* are thereby lifted out of engagement with the idle-wheel M and the motion of the seconds-hand instantly suspended. To return the seconds-hand to its initial or starting point at "12" the crown A or push-piece and lever *c* are depressed. The step-wheel and ratchet are thereby actuated until the toe F^2 of the claw-shaped lever F rests in the lowest step d' of the step-wheel D. At this stage the claw-shaped lever F assumes the position shown in Fig. 3, and in doing so the point of the arm F^3 strikes against the periphery of the heart-cam J and rotates the arbor H until the point of the arm F^3 rests in the crotch of the heart-shaped cam J.

One of the principal features of our invention consists in the arrangement and connection of the lever *c* and the push-piece when said push-piece is the crown A. In our present invention the push-lever *c* consists of two separate arms O P. One arm, O, a lever of the second class, is pivoted in the frame of the watch, preferably upon the case-screw, and its free end is placed beneath the push-piece or an extension thereon and is actuated thereby. The other arm, P, a lever of the third class, is placed parallel to the arm O and pivoted to the upper surface of the bed-plate R. Between the pivot and the free end of this lever-arm P is a pin *p*, preferably fixed to the lever-arm P (see Figs. 1 and 5) and projecting beneath the free end of the lever-arm O between the pivot of the lever O and the push-piece. When the crown A is actuated, the free end of the lever O is depressed, which in turn depresses the pin *p* of the lever-arm P, whereby said lever-arm P is depressed. It will be seen by this arrangement that friction of the contact between the push-lever and the push-piece is greatly lessened, and that the motion imparted to the push-piece is transmitted by said levers to the actuating mechanism quickly and without jar. Moreover, the arrangement is very compact and the space occupied is small.

It is obvious that the surface of the engagement-piece and idle-wheel may be provided with any means of engagement, such as gear-teeth or frictional contact, without departing from the spirit of our invention.

Having now described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a stop-watch, the combination of the step-wheel and levers for revolving the same with the sweep seconds-clutch and the clutch-operating mechanism consisting of the spring G having a projection G′ said spring normally tending to keep the clutch members out of engagement and the claw-shaped lever F, one arm of which acts directly upon the projection G′ of spring G, so as to permit the engagement of the clutch members while the other operates the fly-back, substantially as described.

2. The combination of the longitudinally-

movable arbor H, with the spring N adapted to depress the same and with the spring G, adapted to raise said arbor, and with the claw-shaped lever F, one arm of which F′, is adapted to slide over and depress said spring G, so as to permit the spring N to throw the arbor into connection with the moving parts of the watch, while the other arm releases the arbor permitting it to move, substantially as described.

3. In a stop-watch, the combination with start, stop and fly-back mechanism of the step-wheel with its revolving levers, the claw-shaped lever F one arm of which actuates the fly-back mechanism, while the other throws out of action a spring controlling the start and stop mechanism, substantially as described.

4. In a stop-watch, the combination of a spindle, connected with the crown of the watch, the lever O pivoted at one end and having the spindle bearing on its other end, a lever pivoted at one end having a projection upon which the lever first named bears and carrying a pawl upon its free end and a step-wheel carrying a ratchet operated by said pawl, substantially as described.

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