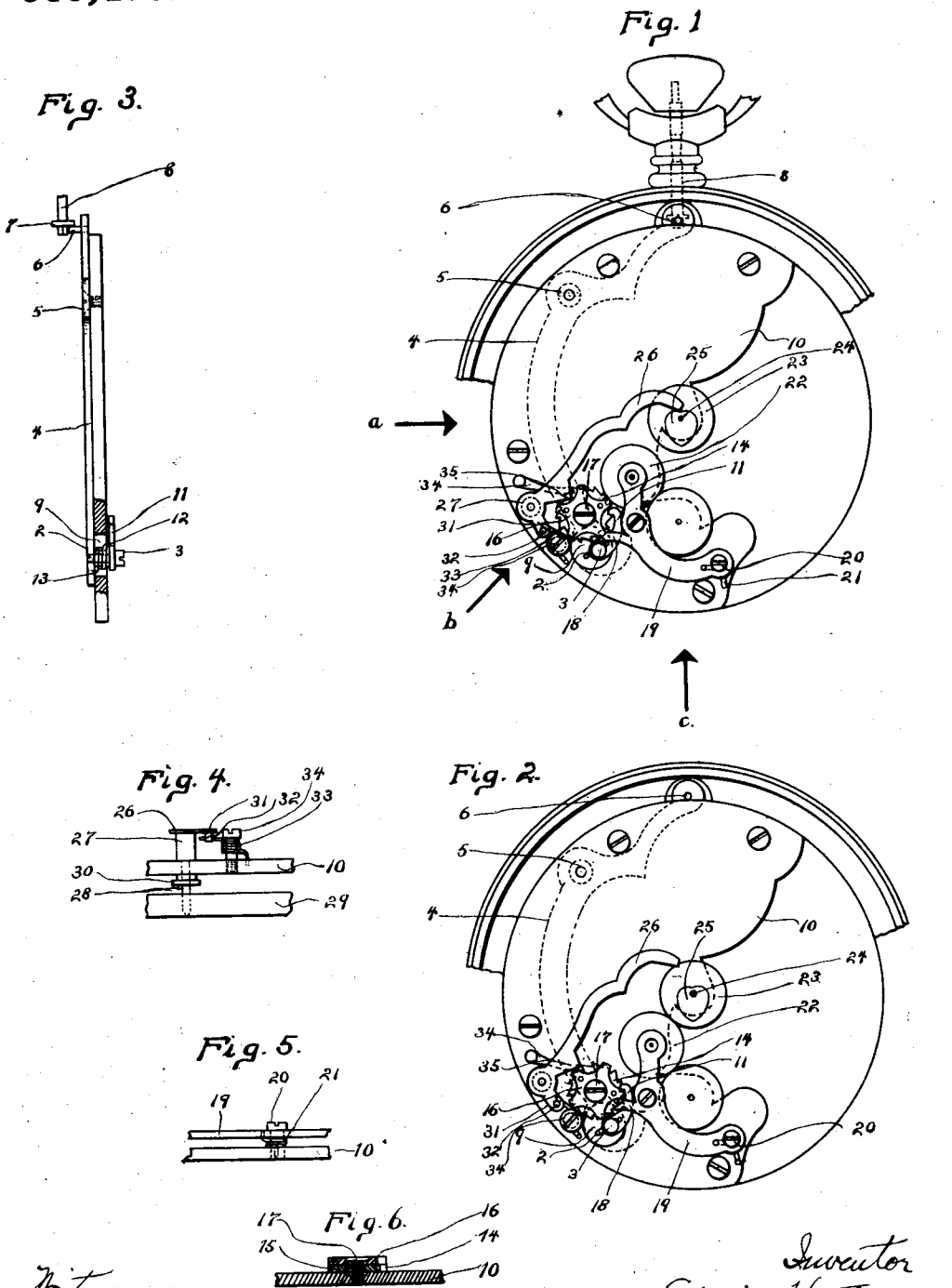


E. HART.  
CHRONOGRAPH WATCH.  
APPLICATION FILED MAY 25, 1911.

999,498.

Patented Aug. 1, 1911.



Witnesses  
M. P. Nichols.  
C. L. Need

Inventor  
Edwin Hart  
by Seymour H. Earle  
Frederic Earle  
attys

# UNITED STATES PATENT OFFICE.

EDWIN HART, OF WATERBURY, CONNECTICUT, ASSIGNOR TO THE NEW ENGLAND WATCH CO., OF WATERBURY, CONNECTICUT, A CORPORATION.

CHRONOGRAPH-WATCH.

999,498.

Specification of Letters Patent.

Patented Aug. 1, 1911.

Application filed May 25, 1911. Serial No. 629,290.

*To all whom it may concern:*

Be it known that I, EDWIN HART, a citizen of the United States, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Chronograph-Watches; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1 a broken plan view of a stop-watch or chronograph embodying my invention, with the center chronograph-wheel held in its normal or zero position by the co-action of the fly-back lever with the heart-cam. Fig. 2 a corresponding view with the parts shifted for putting the chronograph into action. Fig. 3 an edge view of the watch-movement, looking in the direction of the arrow *a*, a portion of the three-quarter plate being broken away to show the coiled spring employed for the operation of the push-lever and the hook-pawl. Fig. 4 a broken edge view of the movement, looking in the direction of the arrow *b* and showing the arrangement of the coiled spring employed for operating the fly-back lever. Fig. 5 an edge view of the movement, looking in the direction of the arrow *c* and showing the arrangement of the coiled spring employed for the operation of the intermediate lever. Fig. 6 a broken sectional view showing the mode of mounting the ratchet-wheel and castle-wheel upon the three-quarter plate.

My invention relates to an improvement in that class of chronograph or stop-watches in which the chronograph mechanism is for the most part superimposed upon the three-quarter plate and cut into and out of action by the longitudinal movement of the winding and setting stem; the object of my present invention being to greatly simplify and cheapen the construction of the chronograph mechanism, as well as to secure greater reliability of performance and an economy of space, by employing spiral springs instead of flat springs as heretofore.

With these ends in view my invention consists in a watch having certain details of construction and combinations of parts

as will be hereinafter described and pointed out in the claim.

In carrying out my invention as herein shown, I employ a coiled spring 2 encircling the push-lever stud 3 mounted in the push-lever 4 which swings upon the push-lever screw 5. The said push-lever 4 carries a push-lever pin 6 which co-acts with an annular shoulder 7 near the extreme inner end of the winding-and-setting stem 8. The said stud 3 reaches upward through a clearance-hole 9 in the three-quarter plate 10 and at its projecting upper end carries a hook pawl 11 which receives the upper end 12 of the spring 2 the lower end 13 of which is entered into the inner end of the said lever 4. The said pawl 11 engages with the teeth of a ratchet-wheel 14 turning upon a stud 15 mounted in the plate 10, the said ratchet wheel 14 and the castle-wheel 16 secured to it, being held upon the stud by means of a retaining-screw 17 as shown in Fig. 6. The arms of the castle-wheel 16 co-act with the finger 18 of an intermediate lever 19 hung upon a stud 20 in the three-quarter plate 10 and operated by a spiral spring 21 encircling the said stud 20 and having one of its ends entered into the said plate 10 and its opposite end entered into the lever 19 which the spring exerts a constant effort to swing inward so as to bring the fine teeth of the intermediate chronograph-wheel, carried by the lever 22 into engagement with the teeth of the center-chronograph wheel 23 which is mounted upon a shaft 24 carrying at its inner end a heart-cam 25 and provided upon its outer end with a seconds pointer which is not shown. The heart-cam 25 is operated to restore the seconds pointer to its zero position, by means of a fly-back lever 26 secured to a post 27 having a shank 28 which passes through the three-quarter plate 10 and through the pillar-plate 29 which latter corresponds to the back-plate of an ordinary watch movement. A split collar 30 on the shank 28 holds the same against end-wise play. At its outer end the lever 26 has an arm 31 having a finger 32 receiving one end of a coiled spring 33 encircling a screw 34 mounted in the three-quarter plate 10, which the opposite end of the spring 33 enters, whereby the spring 33 exerts a constant effort to throw the fly-back lever into engagement with the heart-cam 25.

It will be seen from the foregoing description that the push-lever 4, the intermediate lever 19 and the fly-back lever 26 are operated by spiral springs instead of by the flat springs heretofore generally employed, spiral springs being more efficient and reliable, taking up less room and requiring less delicacy of construction, installation and adjustment.

I wish to particularly call attention to the fact that the spiral spring 2 not only exerts a constant effort to keep the hook-pawl 11 engaged with the teeth of the ratchet-wheel 14 but also exerts a constant effort to swing the push-lever 4 inward. When the stem 8 is thrust inward, the shoulder 7 thereof acts upon the pin 6 to swing the lever 4 upon the stud 3. Now as the nose of the hook-pawl 11 is at this time engaged with a tooth of the ratchet-wheel 14, the effect will be to turn the same from right to left in which movement the pawl will be swung outward with the effect of coiling the spring 2 and hence increasing its tension. The effort of the spring 2 to uncoil swings the lever 4 inward and causes the hook of its pawl 11 to engage with another tooth of the wheel 14. It thus appears that the single spring 2 suffices both for the operation of the said lever 4 and for the hook-pawl 11. The arms of the castle-wheel 16 co-act as usual with the finger 18 of the intermediate lever 19 for the oscillation thereof, as well as with the cam 35 of the fly-back lever 26 for the oscillation thereof. The castle-wheel is held in its several positions by a spring-arm 34.

What I particularly wish to emphasize is that I have cheapened the construction and increased the reliability of stop or chrono-

graph watches as well as secured economy of space by using spiral in place of flat springs, and in particular by using the single spiral spring 2 for the operation of the push-lever 4 and hook pawl 11.

I claim:—

In a chronograph or stop-watch, the combination with a pivotal push-lever, of a winding-and-setting stem co-acting with one end of the said lever, a stud mounted in the other end of the lever, a hook pawl carried by the said stud, a spiral spring encircling the said stud and having one end entered into the said lever and the opposite end entered into the said pawl whereby the said spring is placed under tension by the operation of the said lever by the said stem, a ratchet-wheel and a castle-wheel revolving together, the former co-acting with the hook pawl, a fly-back lever operated by the castle-wheel, a spiral spring for the operation of the fly-back lever, an intermediate lever operated by the castle-wheel, a spiral spring for the said intermediate lever, an intermediate chronograph-wheel carried by the intermediate lever, a center chronograph-wheel for co-action with the intermediate chronograph-wheel, and a star-cam mounted upon the same shaft as the center chronograph-wheel and acted upon by the fly-back lever.

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

EDWIN HART.

Witnesses:

CHARLES SCHMIDT,  
J. A. HUDNER.