March 29, 1932. T. PASTOR 1,851,593

STOP WATCH

Filed Feb. 3, 1930

Fig. 1

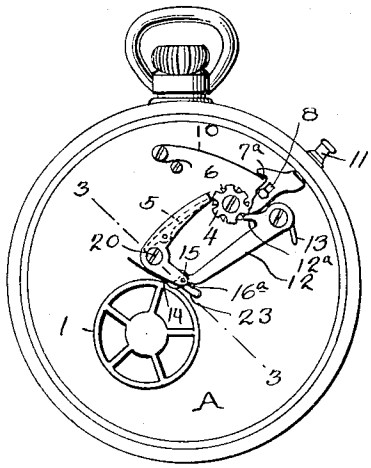


Fig. 2

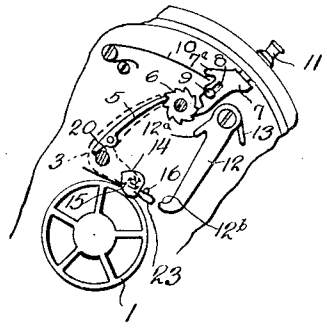


Fig. 3

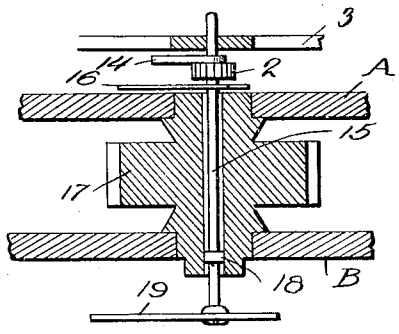
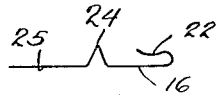


Fig. 4



Inventor
Thomas Pastor

By Benjamin Webster
Attorneys

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UNITED STATES PATENT OFFICE

THOMAS PASTOR, OF WATERBURY, CONNECTICUT

STOP WATCH

Application filed February 3, 1930. Serial No. 425,494.

This invention relates to stopwatches and more particularly to those embodying the time-piece features.

This invention has for its objects, among others, first, to improve the instrumentality for holding the sweep hand in the inoperative position and second, to provide means whereby when the operative mechanism is thrown into mesh a minimum of vibration is imparted to the sweep hand. Other objects are to facilitate a quick and accurate assembly in manufacture by eliminating one spring and so constructing and positioning another spring that it does the work both of itself and the eliminated spring in the way also lowering the manufacturing cost.

Reference is made to the drawings which are hereby made a part of this specification in which

Figure 1 is a plan view of a stopwatch of the class described with the back removed.

Figure 2 is a view similar to Figure 1 but with the detent lever removed,

Figure 3 is a section along the line 3—3 of Figure 1 as viewed from the left, and

Figure 4 is a plan view of the combined tension and friction spring.

Similar numerals of reference indicate like parts throughout the drawings in which letter A designates the back plate which in the model shown is a single flat disc a part of which is cut away (not shown) for access to the hairspring. A fine-toothed wheel 1 is mounted to turn continuously on the third wheel pinion extended through the back plate. This wheel is adapted to mesh with and actuate a fine-toothed pinion 2 secured to the needle staff 15. A detent lever 3 is mounted on and is adapted to oscillate on a pillar 20 fastened in the backplate A. The longer arm of the L-shaped detent lever 3 engages the surfaces of a castle cam 4, which has six equidistant camming surfaces with six recesses therebetween and which is rotatably mounted on the back plate A. Mounted beneath and pinned to the castle cam 4 and rotatable therewith in a clockwise direction only under the control of the click-spring pawl 5 which meshes with the ratchet teeth, is a ratchet 6 having eighteen equidistantly spaced teeth adapted to be engaged in turn by the push lever 7 which has a thumblike extension 7*a* and a slot 8 therein which in cooperation with the setscrew 9 fastened in the back plate, limits the thrust of said lever. A spring 10 secured to the back plate, engages the thumb 7*a* tending to hold the push lever 7 in the retracted position. A push pin 11 radially mounted in a bushing in the centerband engages a tab or rightangled extension (not shown) of the push lever 7. The flyback lever 12, adapted to oscillate on a pillar on the backplate has a thumb 12*a* adapted to engage and interact with the castle cam 4 and its recesses, being held in continuous engagement therewith by a coil spring 13. When the thumb 12*a* is in a recess as shown in Figure 1, the end 12*b* engages the heart cam 14, which is fast to the needle staff 15 which in turn has a bearing in the short arm of the detent lever 3. Within the center wheel 17, which rotates between the front plate B and the back plate A is a small axial cylindrical core against the lower inner wall of which a small collet 18 fast on the needle staff 15, rotates. A movement of the short arm of lever 3 in which staff 15 has a bearing, carries the pinion into and out of mesh with the fine-toothed wheel 1. The spring 16 both carries the pinion into meshing position and when the pinion is out of mesh also holds the staff 15 and with it the sweep hand 19 against turning. This spring embodies an improvement over the construction shown in my Patent No. 1,493,125.

Referring to Figure 4 the spring 16 is preferably made of small steel wire and at approximately the middle has a V-shaped bend the inner edges of which are adapted to press against the staff 15; the end of extension 25 is adapted to lie against the pillar 20 while the opposite end of the spring has a bent-back extension 22 by which the spring 16 is adapted to be secured to the back plate A by stud 16*a* fast in the plate. The spring 16 as mounted, is always tending to press the staff 15 and with it the pinion 2 into meshing or actuating engagement with the fine-toothed periphery of the continuously rotating chronograph wheel 1, in this manner giving

to the sweep hand 19 a quick and unretarded start without any lost-motion whatsoever. By means of the snug fit of the bearing of the detent lever 3 on the pillar 20, which is easily accomplished with simple watchmakers' tools, I practically eliminate any lost-motion or retarded action and thereby produce in a simple and inexpensive mechanism a quicker start of the sweep hand than is obtainable in the more expensive stopwatches that possess more complicated actuated mechanism. The very quickness of the start, although enhancing the actual recording precision of the instrument, none the less would often cause a vibration of the staff 15 and a simultaneous vibration of the sweep hand 19 as it starts to register on the dial, which vibration often creates the erroneous idea in the mind of the user that a gain or loss is being accumulated by the instrument in starting. This erroneous idea seriously lessens the utility of the instrument and it is important to limit the sweep hand vibration in starting. The staff 15 lies between the inner edges of the V-shaped bend 24 in the spring 16. When the staff 15 is moved away from the wheel 1 by the movement of detent lever 3 in which it has a bearing, the staff presses harder into the V-shaped portion 24 and pushes the spring 16 back, in this manner simultaneously increasing its tension and so the inner edges of the V-shaped portion grip the staff 15 more tightly. This friction grip overcomes all other friction and prevents any friction that may be developed by the staff or its collet 18 from turning the sweep hand 19 when the actuating wheel 1 and pinion 2 are out of mesh. On the other hand when the stopwatch is started and the staff 15 travels toward the wheel 1 the friction grip of the V-part 24 is lessened gradually, the inner edges still steadying the staff 15 and preventing vibration as the points of the teeth on the pinion 2 pick up the points of the teeth on wheel 1. Obviously in those cases of engagement when the coincidence of teeth is point to point there is then the greatest tendency to vibration of the staff 15 and simultaneously to oscillation of the sweep hand 19; in this position the inner edges of the V-shaped part 24 are still in sufficient tension contact with the staff 15 to prevent vibration until the teeth have sunk home to full meshing position.

Having now described and particularly pointed out a preferred embodiment of my invention, I do not choose to limit myself except as in the appended claim.

I claim:

In a watch having a rotatable and laterally movable shaft, a spring formed in one plane and having between its ends a V-shaped bend adapted to engage said shaft, the ends of said spring being adapted to rest against fixed parts of the watch whereby relative lateral movement of the shaft varies the frictional engagement of the V-bend therewith.

Signed at Waterbury, in the county of New Haven and State of Connecticut, this twenty-ninth day of January, A. D. 1930.

THOMAS PASTOR.