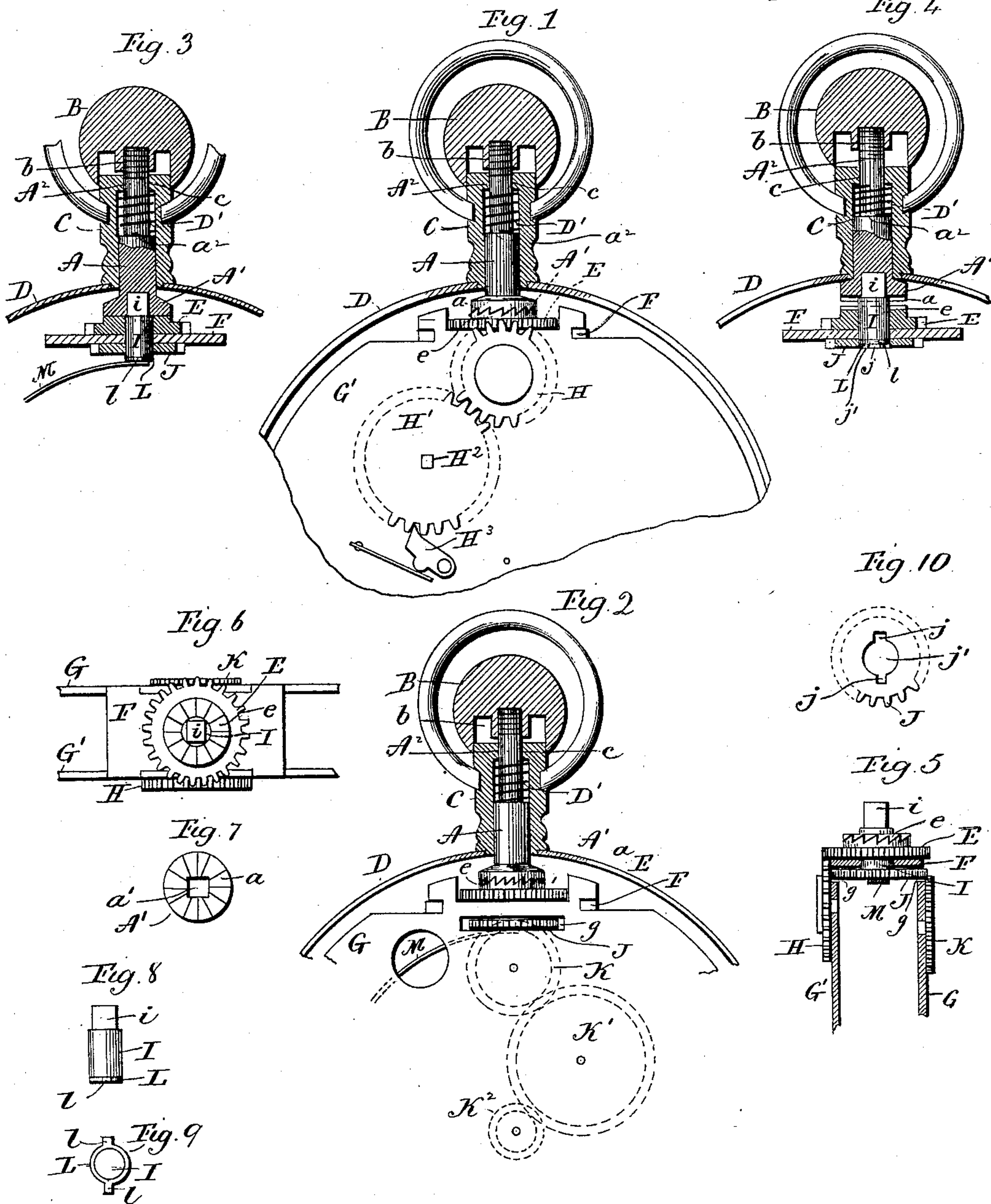


(No Model.)

W. E. PORTER.
STEM WINDING AND SETTING WATCH.

No. 567,409.

Patented Sept. 8, 1896.



Witnesses:

J. H. Shumway.
Lillian D. Kelly.

Wilson E. Porter.

Inventor.

By Atty.

Earle Symon

UNITED STATES PATENT OFFICE.

WILSON E. PORTER, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO THE
NEW HAVEN CLOCK COMPANY, OF SAME PLACE.

STEM WINDING AND SETTING WATCH.

SPECIFICATION forming part of Letters Patent No. 567,409, dated September 8, 1896.

Application filed December 22, 1894. Serial No. 532,661. (No model.)

To all whom it may concern:

Be it known that I, WILSON E. PORTER, of New Haven, in the county of New Haven and State of Connecticut, have invented a
5 new Improvement in Stem - Winding and Stem-Setting 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
10 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 view, partly in elevation and partly in vertical section, of a stem-
15 winding and stem-setting watch constructed in accordance with my invention, looking toward the winding-train and showing the watch in its normal adjustment for winding; Fig. 2, a similar view taken from the
20 opposite side of the watch, showing the setting-train and representing the watch in the same adjustment; Fig. 3, a less comprehensive sectional view showing the watch in the same adjustment; Fig. 4, a similar view
25 showing the watch adjusted for setting; Fig. 5, a broken view, in side elevation, showing the movement detached from the watchcase; Fig. 6, a detached plan view of the parts shown in Fig. 5; Fig. 7, a reverse end view
30 of the winding and setting arbor; Fig. 8, a detached view, in side elevation, of the auxiliary arbor; Fig. 9, a reverse end view thereof to show its coupling-head; Fig. 10, a detached plan view of the setting-wheel.

35 My invention relates to an improvement in stem-winding and stem-setting watches, the object being to produce a reliable, durable, and convenient winding and setting mechanism, not liable to derangement, and
40 constructed with particular reference to making the assemblance of the movement with the case and its removal therefrom an easy matter.

45 With these ends in view my invention consists in certain details of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

I will preface my description of my present invention with the statement that it is
50 an improvement upon an invention disclosed

in an application filed by me under date of May 31, 1894, Serial No. 512,969.

In carrying out my present invention I employ a longitudinally-movable and rotary winding and setting arbor A, which I shall
55 hereinafter speak of as the "main" arbor. This arbor is constructed at its lower end with a circular ratchet-head A', located at a right angle to it and having its lower face provided with a circular series of face ratchet-teeth a, 60
as shown in Fig. 7, which also shows that the said face of the head has a square socket a', formed in its center in line with the longitudinal axis of the arbor. The outer end of the arbor is furnished with a reduced stem 65
A², threaded at its extreme outer end to receive the crown B, which may be of any approved construction, and has an internally-threaded socket b, adapting it to be applied to the threaded extremity of the stem A². 70
The said arbor is mounted for longitudinal and rotary movement in the pendant C, which may be of any approved construction, and is attached to the case D of the watch. The outer end of the pendant is constructed with 75
an inwardly-projecting shoulder c, which forms a bearing for the stem A², and also a point of impingement for the outer end of the spiral main-arbor spring D', located in the outer end of the pendant, encircling the inner 80
portion of the stem A² and impinging at its inner end against the shoulder a², formed between the stem and the body of the arbor. This spring exerts a constant effort to move the arbor longitudinally inward and maintain 85
the teeth a of its ratchet-head in engagement with a corresponding series of teeth e of a ratchet formed upon the outer face of a winding-wheel E, which has bearing upon the outer face of a bearing-plate F, mounted in 90
the upper edges of the front and back movement-plates G and G' of the watch in a plane at a right angle to the said plates, which are suitably notched to receive it. The teeth of the said winding-wheel E project beyond the 95
planes of the outer faces of the said movement-plates, as clearly shown in Figs. 5 and 6, and engage with an intermediate winding-wheel H, which in turn meshes into the ratchet-wheel H', mounted upon the spring- 100

arbor H^2 and held against rotation by means of a spring-actuated pawl H^3 , as shown in Fig. 1. I may say here that the winding-wheel E, the intermediate winding-wheel H, and the ratchet-wheel H' are always in mesh. When the teeth a of the ratchet-head A' are engaged with the teeth e of the winding-wheel E, the watch will be wound if the arbor is turned forward, while, on the other hand, if it is reversed in the direction of its rotation it will "ratchet back" against the tension of the spring D by the sliding of the teeth a backward over the teeth e .

The square socket a' , formed in the center of the ratchet-head A' and located in line with the longitudinal axis of the arbor, receives the square upper end i of a short auxiliary setting-arbor I, which is longitudinally movable and rotatable in the winding-wheel E, the bearing-plate F, and also in the setting-wheel J, the upper face of which bears against the inner or under face of the bearing-plate F, and which is held in place by the entrance of its edges into long narrow slots $g g$, formed in the movement-plates parallel with and just below the bearing-plate F. The said setting-wheel meshes into an intermediate setting-wheel K, which in turn meshes into the dial-wheel K' , which is meshed into and driven by the cannon-pinion K^2 , all in the usual manner. I would also call attention to the fact that the setting-wheel J, the intermediate setting-wheel K, the dial-wheel K' , and the cannon-pinion K^2 are always in mesh. It is to be understood, also, that the winding-wheel E, the bearing-plate F, and the setting-wheel J, are provided with openings for the reception of the said auxiliary arbor I, which is adapted at its lower end to be coupled with the setting-wheel J. As herein shown, the adaptation of the auxiliary arbor for the purpose mentioned consists in providing its lower end with a coupling head or plate L, having two coupling-lugs ll , projecting in opposite directions, and adapted to enter coupling-slots $j j$, leading out of the central opening j' of the setting-wheel. A spring M, lighter than the arbor-spring D, is secured within the movement in any approved manner, and engages with the coupling-head L, located at the lower end of the auxiliary arbor. This spring M, which I shall hereinafter call the "auxiliary-arbor" spring, may be constructed and arranged in other ways, but it will always be inferior in power to the main-arbor spring D. When the force of the spring D is relieved, the auxiliary spring M is brought into action for moving the auxiliary arbor outward, so as to enter the lugs ll of its coupling-head into the slots $j j$ of the setting-wheel, whereby the auxiliary arbor is coupled with that wheel, so that when it rotates the same will rotate also and actuate the setting-train, composed of wheels K and K' and the cannon-pinion K^2 . On the other hand, when the auxiliary spring M is overpowered by the main-arbor spring D, the

auxiliary arbor will be forced inward, so as to clear the said coupling-lugs from the said coupling-slots, after which the rotation of the auxiliary arbor with the main arbor will be without effect upon the setting-wheel and the setting-train.

Having now described my improved construction, I will proceed to set forth the mode of its operation. The power of the main-arbor spring being superior to that of the auxiliary-arbor spring the latter will normally be overcome and the teeth of the ratchet-head of the main arbor will be maintained in engagement with the ratchet-teeth upon the winding-wheel E, so that the watch will normally be in readiness for winding or "ratcheting back," according to the direction in which the main arbor is rotated by the crown connected with it. The auxiliary arbor being coupled for rotation with the main arbor through the socket therein and through its square upper end will also rotate therewith during the winding or ratcheting back without ever disturbing the hands of the watch, inasmuch as the auxiliary arbor is at such time maintained in a position in which its coupling-head clears the setting-wheel. For the purpose of setting the watch the crown is grasped by the fingers and the main arbor drawn outward against the tension of the main-arbor spring D, whereupon the auxiliary-arbor spring M will assert itself and move the auxiliary arbor outward through the setting-wheel J, the bearing-plate F, and the winding-wheel E until the lugs l of the coupling-head at the inner end of the auxiliary arbor have been entered into the slots $j j$ of the setting-wheel, whereby the said wheel is coupled for rotation with the auxiliary arbor. I should also note that the auxiliary arbor follows the main arbor outward and is not uncoupled therefrom, but remains coupled therewith, so as to be rotated thereby. If now the main arbor is rotated, the auxiliary arbor will also be rotated, with the effect of rotating the setting-wheel, and hence actuating the setting-train; but the winding-wheel will not now be rotated, inasmuch as its face ratchet-teeth e were disengaged from the teeth a of the ratchet-head A' of the main arbor when the same was drawn outward. After the watch has been set it will return to its winding position when the outward draft upon the crown is relieved and the main-arbor spring D allowed to reassert itself and overcome the inferior auxiliary spring, which it at once does, and pushes the auxiliary arbor inward, so as to disconnect it from the setting-wheel.

It will be seen that under my improvement the auxiliary arbor is organized with the watch-movement, and that the same may be inserted into and removed from the case without removing the auxiliary arbor therefrom. Furthermore, the described construction enables me to form the ratchet-head at the inner end of the main arbor with ease and

avoids the danger of derangement incident to having the means for coupling the setting-wheel with the main arbor attached thereto by screw-threads.

5 It is apparent that in carrying out my invention I may make some changes in the construction herein shown and described. Thus the lower end of the auxiliary arbor might be adapted in some other way to be coupled
10 with and uncoupled from the setting-wheel, and the outer end of the said arbor might be made in some other form than square in order to adapt it to be coupled for rotation with the inner end of the main arbor. I would there-
15 fore have it understood that I do not limit myself to the exact construction herein shown and described, but hold myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of my inven-
20 tion.

I am aware, however, that an auxiliary arbor was shown in a patent granted before my application, and also that the use of a strong and a weak spring in opposition to each other
25 and in combination with a winding-stem was disclosed in a patent prior to my application. I do not, therefore, claim either of those ideas broadly.

30 Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a stem-winding and stem-setting watch, the combination with a longitudinally movable and rotatable main arbor, of a spring
35 coacting with the said arbor and normally pushing the same inward, a winding-wheel adapted to be normally coupled with the said arbor, a longitudinally movable and rotatable auxiliary arbor located in line with the inner
40 end of the main arbor, coupled therewith for rotation thereby, and passing through the said winding-wheel but rotating independently thereof, a setting-wheel normally disconnected from the auxiliary arbor, but adapt-
45 ed to be coupled therewith when the same, which passes through it, is moved outward, and an auxiliary spring coacting with the auxiliary arbor, inferior in power to the spring coacting with the main arbor, and arranged
50 to force the auxiliary arbor longitudinally outward to couple it with the setting-wheel when the main arbor is drawn outward against the tension of its spring, and disconnected from the winding-wheel, substantially as and
55 for the purpose set forth.

2. In a stem-winding and stem-setting watch, the combination with a longitudinally movable and rotatable main winding and setting arbor, of a longitudinally movable and rotatable auxiliary arbor located in line with
60 the inner end thereof, and coupled therewith for rotation thereby, winding and setting wheels respectively adapted to be coupled with the main winding and setting arbor and the auxiliary arbor, and to have the latter
65 passed through both of them, a spring coacting with the main arbor for forcing the same longitudinally inward to couple it with the winding-wheel, and a spring inferior in power to that coacting with the main arbor, com-
70 bined with the auxiliary arbor and arranged to move the same longitudinally outward for coupling it with the setting-wheel when the main arbor is drawn outward against the tension of its spring and uncoupled from the
75 winding-wheel, substantially as described.

3. In a stem-winding and stem-setting watch, the combination with the movement-plates thereof, of a bearing-plate mounted in the upper edges of the said movement-plates
80 in a plane at a right angle thereto, a winding-wheel having bearing upon the outer face of the said bearing-plate, a setting-wheel having bearing against the inner face thereof, a longitudinally movable and rotatable main ar-
85 bor adapted to be coupled with the winding-wheel when moved inward for rotating the same, an auxiliary arbor located in line with the inner end of the main arbor, coupled therewith for rotation thereby, and passing
90 through the said winding and setting wheels and through the said bearing-plate, a spring coacting with the main arbor to force the same inward and couple it with the winding-wheel, and an auxiliary-arbor spring inferior in
95 power to the spring of the main arbor, and operating to move the auxiliary arbor longitudinally outward to couple it with the setting-wheel when the main arbor is drawn outward and disconnected from the winding-
100 wheel against the tension of its spring, substantially as described.

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

WILSON E. PORTER.

Witnesses:

FRED. C. EARLE,

LILLIAN D. KELSEY.