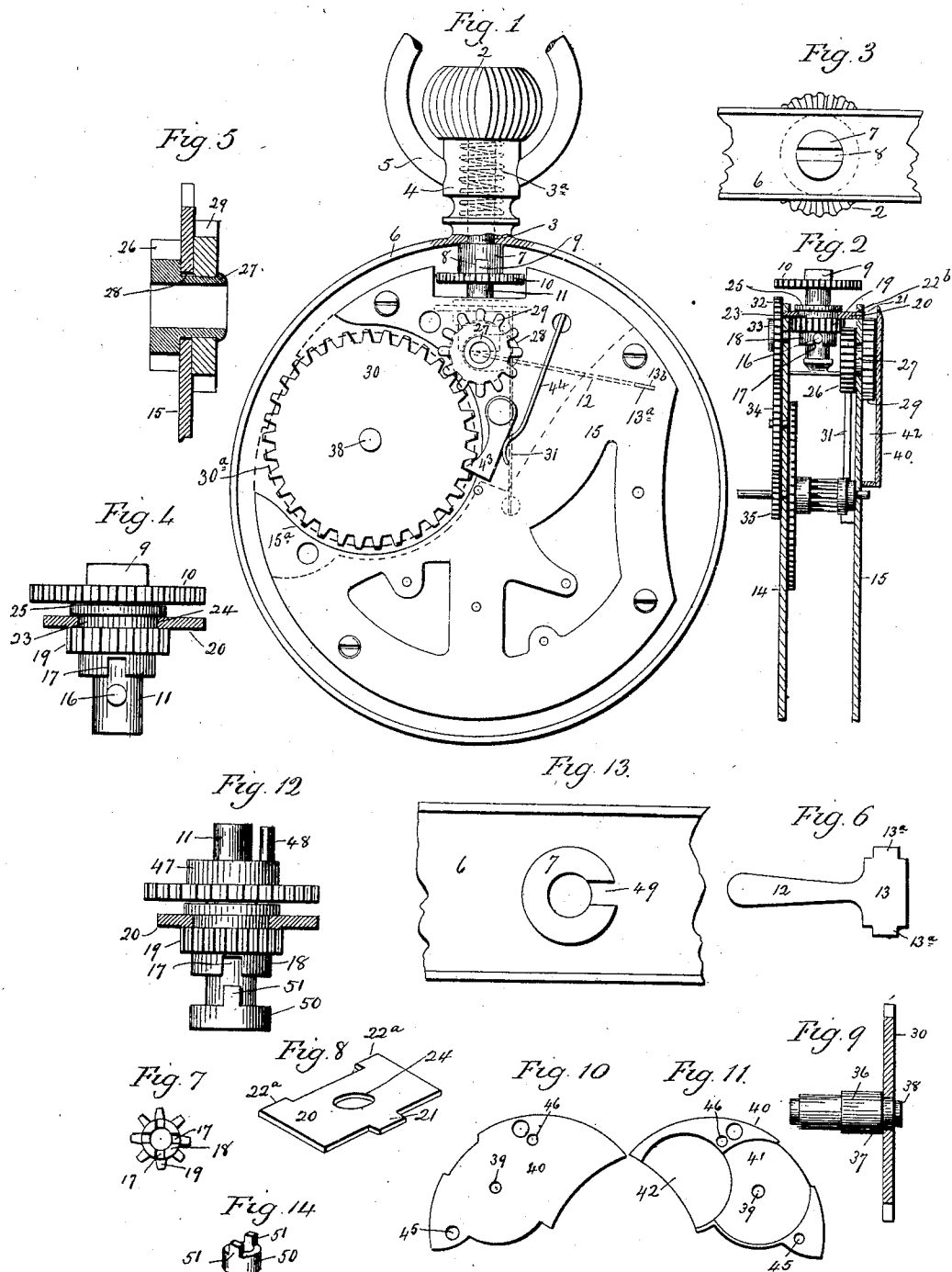


A. BANNATYNE.
WINDING AND SETTING WATCH.

(Application filed Dec. 4, 1900.)

(No Model.)

2 Sheets—Sheet 1.



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No. 672,728.

Patented Apr. 23, 1901.

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Fig. 15

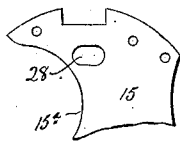
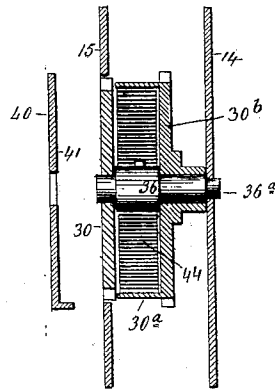


Fig. 16



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UNITED STATES PATENT OFFICE.

ARCHIBALD BANNATYNE, OF WATERBURY, CONNECTICUT, ASSIGNOR TO
THE WATERBURY CLOCK COMPANY, OF SAME PLACE.

WINDING AND SETTING WATCH.

SPECIFICATION forming part of Letters Patent No. 672,728, dated April 23, 1901.

Application filed December 4, 1900. Serial No. 38,651. (No model.)

To all whom it may concern:

Be it known that I, ARCHIBALD BANNATYNE, of Waterbury, in the county of New Haven and State of Connecticut, have invented a 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 figures 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 view, partly in elevation and partly in section, looking at the outer face of the rear movement-plate of my improved watch with its segmental cap removed; Fig. 2, a view of the watch, partly in elevation and partly in vertical central section, but showing only the winding and setting instrumentalities of the watch and some parts directly connected therewith; Fig. 3, a broken view, in inside elevation, looking at the coupling-head located upon the inner end of the winding and setting spindle; Fig. 4, a detached view showing the operating-spindle and the parts immediately associated therewith; Fig. 5, a sectional view showing the construction and arrangement of the inner and outer intermediate winding-pinions; Fig. 6, a detached plan view of the spring of the operating-spindle; Fig. 7, a detached reverse plan view of the winding-pinion, showing its coupling-hub and the coupling-notches therein; Fig. 8, a detached perspective view of the bridge in which the said pinion is mounted; Fig. 9, a detached view showing the mode of staking the main winding-wheel to the winding-arbor; Fig. 10, a detached plan view of the segmental cap; Fig. 11, a detached reverse plan view thereof; Fig. 12, a detached view showing a modified form of the parts represented by Fig. 4; Fig. 13, a view showing a modified form of the parts illustrated by Fig. 3; Fig. 14, a detached plan view of the modified coupling-head shown in Fig. 12; Fig. 15, a broken view of the front movement-plate to show the elongated clearance slot or opening formed therein for the "ratcheting back" of the inner and outer intermediate winding-pinions; Fig. 16, an enlarged sectional view through the rear and front movement-plates

and through the main arbor, the main winding-wheel, the main time train-wheel, the mainspring, and the barrel inclosing the latter, together with a sectional view of the cap, which is lifted as preparatory to the removal of the said arbor and wheels without disturbing the front and rear movement-plates.

My invention relates to an improvement in stem-winding and stem-setting watches, the object being to produce a simple, durable, and reliable mechanism constructed with particular reference to reducing the number of parts to the minimum and to constructing and arranging those parts so as to avoid their derangement or breakage.

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.

In carrying out my invention as herein shown I provide the crown 2 with a rotatable and longitudinally-movable winding and setting spindle 3, mounted in the pendant 4, which carries the ring 5 and which is secured to the ring-like central portion 6 of the watch-case. A spiral spring 3^a, also located within the pendant 4, coacts with the said spindle, so as to normally hold it at the limit of its outward movement. The projecting inner end of the said spindle is furnished with a coupling-head 7, formed with a diametrically-arranged coupling-slot 8, which receives a coupling-key 9, formed integral with and extending directly upward from a setting-pinion 10, itself formed integral with the upper end of a longitudinally-movable and rotatable spindle 11, virtually constituting a continuation of the winding and setting spindle 3, with which it is arranged in line. For the sake of convenience I shall call this spindle 11 the "operating-spindle." It will be understood that when the watch-movement is inserted into the watchcase the key 9 will be entered into the coupling-slot 8 of the coupling-head, whereby the two spindles will be coupled together, so that the rotation of the former will be communicated to the latter.

A flat sheet-metal spring 12, having a head 13, is mounted between the front and rear movement-plates 14 and 15 of the watch, in a

plane at a right angle to the planes thereof, in position for the engagement of the extreme end of the spring with the extreme lower end of the operating-spindle, which the spring exerts a constant effort to normally maintain at the limit of its longitudinal outward movement. For the purpose of being so mounted the head 13 of the spring is formed at its opposite ends with lugs 13^a 13^b, which are entered into suitable openings 13^b, formed in the plates 14 and 15 aforesaid. The spindle 11 is provided below its longitudinal center with a coupling-pin 16, driven transversely through it and adapted to have its ends entered into the respective notches of two pairs of coupling-notches 17, formed in a coupling-hub 18, made integral with the lower face of the winding-pinion 19, through which the spindle 11 passes and in which it is free to have longitudinal movement, and in which it is also free to have rotary movement when it is pushed inward so as to clear the ends of the coupling-pin 16 from the notches 17 of the hub 18. The said winding-pinion 19 is journaled, with a capacity for rotation, in a single sheet-metal bridge 20, located near the pendant 4 and at a right angle to the movement-plates 14 and 15, in which it is mounted, being constructed for that purpose with fingers 21, 22, and 22^a, formed upon its opposite edges and entered into suitably formed and arranged openings 22^b, formed in the said movement-plates. For the purpose of mounting the winding-pinion 19 in the bridge 20 it is constructed with an upwardly-projecting bearing collar or bushing 23, the edge of which bears upon the walls of a circular bearing-opening 24, formed in the bridge, as clearly shown in Fig. 2. This collar terminates in a flange 25, engaging with the upper face of the bridge, as also shown in Fig. 2, whereby the winding-pinion 19 is held in place, but left free to rotate.

Normally the operating-spindle 11 will be held at the limit of its outward longitudinal movement through the medium of the operating-spindle spring 12, already described. At this time the ends of the coupling-pin 16 will be entered into a pair of the notches 17, whereby the spindle 11 will be coupled with the winding-pinion 19, which through the medium of the said spindle will also be coupled with the winding and setting spindle 3, the turning movement of which in either direction will be transmitted to the winding-pinion 19. The said pinion 19 is constantly in mesh with an inner intermediate winding-pinion 26, bearing against the inner face of the inner movement-plate 15 and formed with a long outwardly-projecting hollow hub 27, passing through an elongated slot or clearance-opening 28, formed in the said plate and permitting the hub to move back and forth in discharging the function known in this class of mechanisms as "ratcheting back." The projecting outer end of the hub 27 has rigidly mounted upon it an outer intermediate winding-pinion 29, larger in diameter than the pinion 26 and

bearing against the outer face of the movement-plate 15 and normally kept in mesh with the main winding-wheel 30 through the medium of a spring 31, secured to the inner face of the inner plate 15 and engaging with the inner intermediate pinion 26, as shown in Fig. 1. When the crown 2 is turned from right to left in the normal position of the parts of the winding and setting mechanism, the intermediate pinions 26 and 29 will be moved from right to left in the elongated slot 28, so as to carry the teeth of the pinion 29 into full engagement with the teeth of the main winding-wheel 30, which will then be rotated in winding the mainspring, which is not shown; but when the crown 2 is turned from left to right the spring 31 will yield and permit the intermediate winding-pinions 26 and 29 to move from left to right within the limits of the length of the elongated slot 28, in which the hub 27 has lateral as well as rotary movement, as already described. This movement of the wheels 26 and 29 from left to right permits the teeth of the wheels 29 to clear the teeth of the main wheel, whereby the function of ratcheting back is accomplished.

As clearly shown in Fig. 2, the setting-pinion 10 normally clears the intermediate setting-pinion 32, mounted upon the outer face of the front movement-plate 14 upon a stud 33. The said pinion 32 is constantly in mesh with a minute-wheel 34, which is also constantly in mesh with the cannon-pinion 35, the said wheel 34 and cannon-pinion 35 being located upon the outer face of the front movement-plate 14. (Shown in Fig. 2.) Normally the rotation of the winding and setting stem 3 has no effect upon the pinion 32, the wheel 34, and the cannon-pinion 35, inasmuch as the setting-pinion 10 is normally out of mesh with the pinion 32. When, however, it is desired to set the watch, the spindle 3 is forced longitudinally inward by pressure upon the crown 2 against the tension of its own spring 3^a and against the tension of the operating-spring 12 of the operating-spindle 11, which is forced inward at the same time, whereby the setting-pinion 10 is brought into mesh with the intermediate setting-pinion 32, and whereby also the ends of the coupling-pin 16 are pushed out of engagement with the notches 17 in the hub 18 of the winding-pinion 19. Now when the spindles are rotated in either direction through the medium of the crown 2, the setting-train, including the pinions 10 and 32, the wheel 34, and the pinion 35, will be actuated, without, however, disturbing the winding-train, for the reason that the operating-spindle 11 will rotate inside of the winding-pinion 10 and its bearing collar or bushing 23. When the watch has been set, the inward pressure upon the crown 2 is removed, permitting the springs 12 and 3^a to reassert themselves in moving both spindles outward, whereby the setting-pinion 10 is disengaged from the intermediate setting-pinion 32, and whereby the ends of the coupling-

pin 16 are entered into a pair of the notches 17 in the coupling-hub 18 of the winding-pinion 19, leaving the watch again in its normal adjustment for winding.

5 The main winding-wheel 30 is staked directly onto the inner end of the winding-arbor 36, which for this purpose is formed with a shoulder 37, located adjacent to the inner trunnion 38 of the arbor, the said trunnion
10 having bearing in a bearing-opening 39, formed for its reception in a segmental cap 40, the inner face of which is formed with a recess 41 to receive the wheel 30 and also with a recess 42 to clear the outer intermediate
15 winding-pinion 29, the main winding-wheel pawl 43, and the spring 44 thereof. The rear movement-plate 15 is cut away, as at 15^a, for the reception of the rear end of the drum 30^a, which receives the mainspring, and which is
20 shown by broken lines in Fig. 1, this opening 15^a being spanned, as it were, by the said cap 40. The said barrel 30^a is rigidly connected with the main time-train wheel 30^b, which is mounted so as to turn freely upon
25 the main arbor 36, the forward end of which is formed with a trunnion 36^a, having bearing in the front movement-plate 14. The outer end of the spring 44 is connected with the barrel 30^a, and hence with the main time-
30 train wheel 30^b. It will be seen from the foregoing description that the main winding-wheel 30, the main time-train wheel 30^b, the barrel 30^a, and the mainspring 44 are all organized with the main arbor 36, so as to form,
35 in a sense, an independent organization, which may be introduced into and removed from the watch-movement through the opening 15^a in the rear movement-plate without being in any way dismembered, even to the removal
40 of the main winding-wheel 30. For the purpose, however, of introducing or removing this organization the cap 40 must be removed; but that is a simple matter. The construction just described secures a marked economy
45 of space and affords protection for the parts just mentioned, the cap being secured in place by screws passing through its screw-holes 45 and 46.

50 Instead of employing a coupling-key 9, formed integral with the setting-pinion 10, I may, if preferred, provide the upper end of the spindle 11 with a collar 47, furnished with a coupling-pin 48, as shown in Fig. 12, and form the coupling-head 7 of the winding and
55 setting spindle 3 with a radial slot 49 for the reception of the said pin. Instead also of providing the operating-spindle 11 with a coupling-pin 16 I may provide it at its lower end with a head 50, formed with a pair of
60 coupling-lugs 51, arranged to enter the coupling-slots 17, formed in the collar 18 of the winding-wheel 19.

In view of the modifications suggested and of others which may obviously be made, I
6 would 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 invention.

Having fully described my invention, what
70 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 movement-plate formed with a clearance opening or slot, 75 of an inner intermediate winding-pinion located on the inside of the said plate, and an outer intermediate winding-pinion located on the outside of the said plate and rigidly connected with the other pinion and rotating
80 therewith, and also vibrating therewith in the said clearance opening or slot for "ratcheting back."

2. In a stem-winding and stem-setting watch, the combination with a movement- 85 plate formed with a clearance opening or slot, of an inner intermediate winding-pinion located against the inner face of the said plate, an outer intermediate winding-pinion located against the outer face of the said plate, formed 90 with a hub extending through the said opening or slot, and having the inner intermediate winding-pinion rigidly secured to it, whereby both of the said pinions rotate together and both vibrate together in the said clearance 95 opening or slot for "ratcheting back."

3. In a stem-winding and stem-setting watch, the combination with the movement-plate and pendant thereof, of a winding and setting spindle located in the said pendant, 100 an operating-spindle located in line with the said spindle and mounted between the said movement-plates, means for coupling the two spindles together, a spring normally holding the operating-spindle at the limit of its 105 outward movement, a winding-pinion through which the operating-spindle passes and with which the said spindle is normally coupled, an inner intermediate winding-pinion constantly in mesh with the said winding-pin- 110 ion, an outer intermediate winding-pinion rigidly connected with the said inner intermediate winding-pinion and meshing into the main winding-wheel, the said inner intermediate and outer intermediate winding-pinions 115 being rigidly connected together through one of the movement-plates for rotation and "ratcheting-back" vibration together, and a setting-pinion rigidly secured to the said operating-spindle and engaging with a member 120 of the setting-train when the operating-spindle is pushed inward against the tension of its spring.

4. In a stem-winding and stem-setting watch, the combination with the movement- 125 plates and pendant thereof, of a bridge located between the plates at a right angle to the planes thereof, a winding-pinion located below the said bridge, and provided with a bearing or bushing extending upward through 130 the same, a longitudinally-movable and rotatable operating-spindle passing through the said bridge, bushing, and pinion, a winding and setting spindle mounted in the said pend-

ant, means for coupling the contiguous ends of the said spindles together, a spring coacting with the operating-spindle for normally holding it at the limit of its outward movement, means carried by the operating-spindle for normally coupling the same with the said winding-pinion, a setting-wheel located upon the operating-spindle at a point above the said bridge, means constantly connecting the said winding-pinion with a member of the winding-train of the watch, and means for connecting the said setting-pinion with a member of the setting-train of the watch, and brought into play when the operating-spindle is pushed inward against the tension of its spring, at which time the said spindle is uncoupled from the said winding-pinion.

5. In a stem-winding and stem-setting watch, the combination with the movement-plates and pendant thereof, of a winding and setting spindle mounted in the said pendant,

an operating-spindle located between the said movement-plates in line with the said winding and setting spindle, means for connecting the said operating-spindle with the main winding-wheel and the cannon-pinion of the watch, and a flat sheet-metal spring engaging directly with the inner end of the operating-spindle and exerting a constant effort to push it longitudinally outward, and provided at its outer end with a head the opposite ends of which are secured to the said movement-plates with respect to the planes of which the spring is located at a right angle.

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

ARCHIBALD BANNATYNE.

Witnesses:

A. J. STORZ,

A. MACGREGOR.