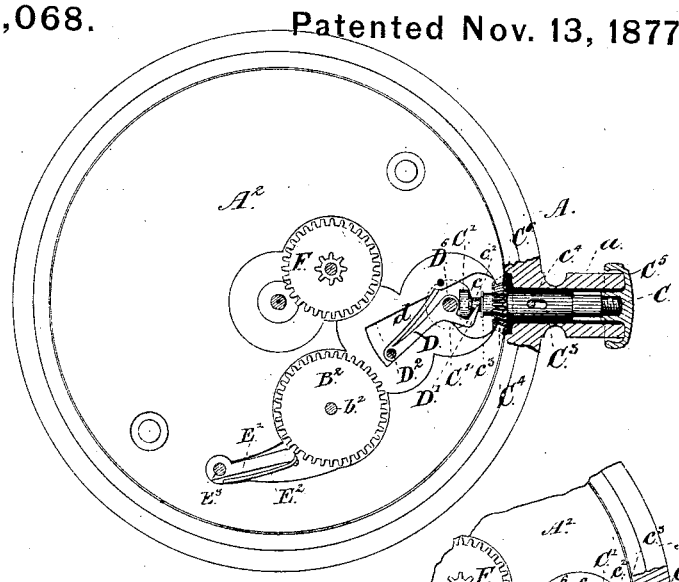
2 Sheets—Sheet 1.

R. WHITTAKER.

Watch.

No. 197,068. Patented Nov. 13, 1877.

Fig. 1.



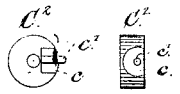


Fig. 5.

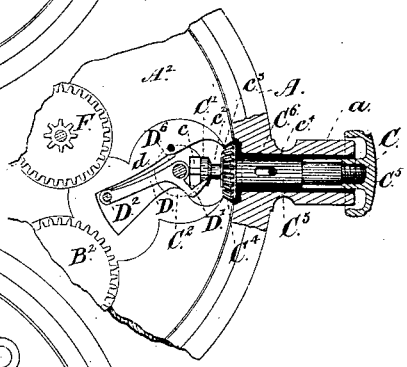


Fig. 2.

Fig. 3.

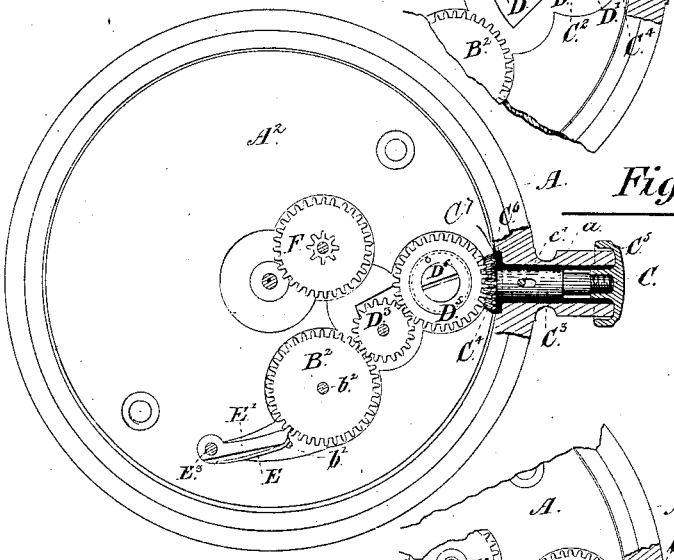
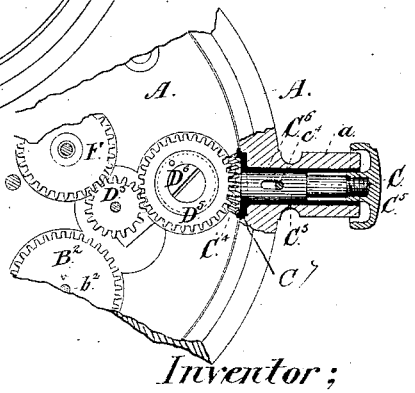


Fig. 4.



Witnesses;

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2 Sheets—Sheet 2.

R. WHITTAKER.

Watch.

No. 197,068. Patented Nov. 13, 1877.

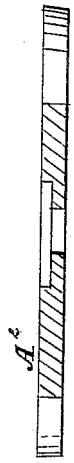


Fig. 10.

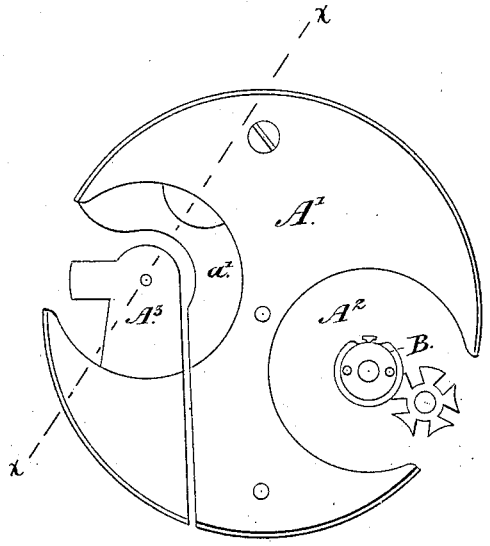


Fig. 6.

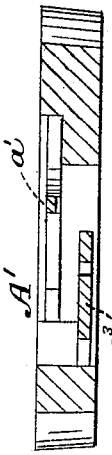


Fig. 11.

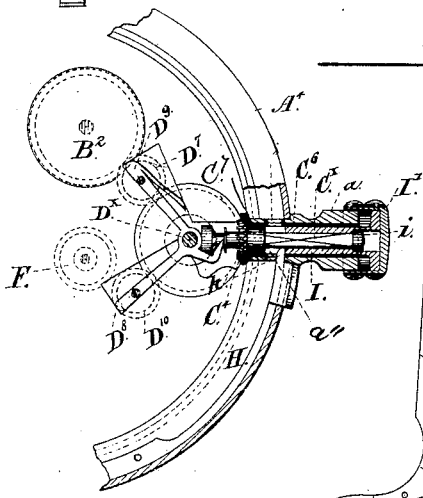


Fig. 8.

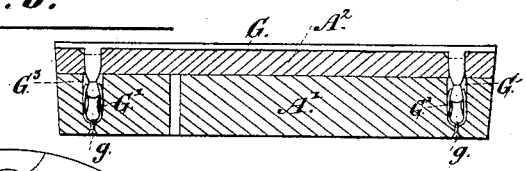


Fig. 9.

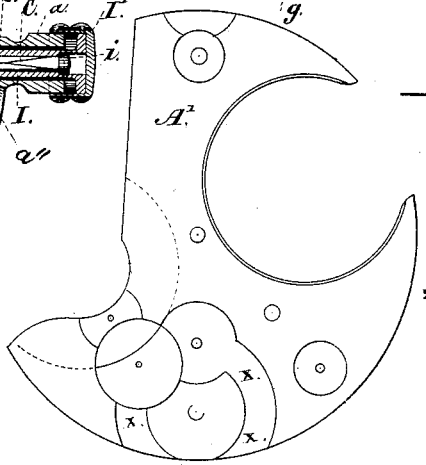
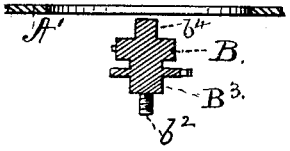


Fig. 7.

Fig 12.



Witnesses:

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Hugh Aird

Inventor:

Richard Whittaker

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UNITED STATES PATENT OFFICE.

RICHARD WHITTAKER, OF TORONTO, ONTARIO, CANADA.

IMPROVEMENT IN WATCHES.

Specification forming part of Letters Patent No. **197,068**, dated November 13, 1877; application filed November 20, 1874.

To all whom it may concern:

Be it known that I, RICHARD WHITTAKER, of the city of Toronto, Province of Ontario, Canada, have invented Improvements in Watches, of which the following is a specification:

My invention relates more particularly to improvements in the keyless mechanism of going-barrel watches, sometimes called "stem-winding and stem-setting watches;" the object of my invention being to simplify and strengthen the mechanism for winding up the mainspring and for setting the hands.

In the accompanying drawings, Figures 1, 2, 3, and 4 are plan views of the winding and setting mechanism of an open-faced watch constructed according to my invention. Fig. 5 is a detail of the winding-spindle socket. Fig. 6 is a plan of the top plate. Fig. 7 is a plan of the back of the top plate. Fig. 8 is a plan of the winding, setting, and locking mechanism of a hunting-case watch constructed according to my invention. Fig. 9 shows the manner in which the dial-plate is secured to the watch. Fig. 10 is a sectional view through the plate A^2; Fig. 11, a sectional view in the line $x\ x$ of Fig. 6; and Fig. 12, a cross-section through the axis of the barrel-arbor.

For the purpose of clearly describing the invention, I will divide the specification into sections, beginning with—

The solid top plate.—A is the case of an open-face watch, which contains the top and bottom plates A^1 and A^2. The top plate is solid, instead of being made, as usual, to fit on pillars, and when fitted in the case lies directly in contact with lower plate. Counter or opposite sinks to those usually turned in the lower plate are turned out of the top plate for the pinions, arbors, and wheels to work in. The large channel $x\ x\ x$, Fig. 7, is turned out for the purpose of examining the heights, depths, and freedoms of the third, fourth, and scape wheels. The scape-bar, which is usually a distinct piece screwed onto the lower or pillar plate, I leave solid with and forming a part of the top plate, making the bar much stronger. A^3 is the balance-cock, which, in three-quarter-plate watches, usually projects a little above the top plate, but which I sink about as much below the surface of the top plate.

The advantages gained by this construction of top plate, scape-bar, and balance-cock are that the watch is pressure-proof—that is, it cannot be stopped by pressure applied on the sides, and saves the making and fitting of scape-bar, four pillars, and from six to nine screws; further, it allows the entire thickness of the top and lower plates to be given to the bearing-surfaces of the keyless mechanism, thus making them and allowing them to be made much stronger than in any watch now in use, without adding to the thickness of the watch.

The winding and setting mechanism.—B is the barrel-arbor, having two pivots, the lower one of which, B^3, fits within a hole cut in the lower plate, and the upper one, b^4, is adapted to receive and aid in supporting the barrel. On the opposite face of the lower plate a sink, b^1, is sunk, to receive the click or winding-up wheel B^2. The hole in the click-wheel B^2 is tapped with a left-handed thread, the wheel fitting on a similarly-threaded stud, b^2, projecting from the end of the barrel-arbor, and when screwed home slightly binds the arbor to the lower plate A^2. When the keyless mechanism has to be worked from the upper plate, as in the case of chronographs, quarter-second, and some ordinary watches, the same principle will apply, but a right-hand screw must be used instead of a left-hand one. The advantages of this arrangement of the barrel-arbor, stop and click wheels are, it saves a bar, and from five to eight screws, and is stronger than any other existing arrangement.

a is the usual hollow stem or pendant of the watch, through which passes the spindle C. The front end of this spindle is enlarged, forming a collar, C^1, which fits within a cylindrical recess, c, sunk in the socket-piece C^2. From the center of this recess a stud, c^1, projects, entering a hole drilled to receive it in the end of the spindle. The diameter of the spindle C, immediately behind the collar C^1, is reduced for a short distance, forming a groove, c^2, but is enlarged again to form the flange c^3, which prevents the spindle being

drawn out. C^3 is a sleeve encircling the spindle C, to the front end of which the bevel-wheel C^4 is fastened. The sleeve, and with it the wheel, is caused to revolve, when the spindle is turned, by means of the projecting stud c^4 (attached to the spindle) working in an elongated slot cut in the sleeve. At the same time the spindle may be drawn out or pushed in the length of the slot without affecting the sleeve or bevel-wheel.

D is a spring-lever or shifting-bar pivoted on the pin D^6, and working in a suitable recess sunk in the lower plate A^2. One end, D^1, of the bar D fits within the groove c^2 on the spindle C. To the other and longer end an upright stud, D^2, is fitted, around which revolves the toothed wheel D^3. D^5 is a toothed wheel revolving on the same center as the shifting-bar D, gearing into the bevel-wheel C^4, and also into the toothed wheel D^3. B^2 is the winding-up wheel, attached to the barrel-arbor, as before described. F is the minute-wheel. *d* is a spring, either attached to the bar D or cut from the solid bar, which, pressing against the side of the recess, always throws the long end of the shifting-bar to the right, constantly keeping the wheel D^3 in gear with the winding-up wheel B^2, except in the hunting-cased watch, in which the barrel, and consequently the shifting-bar, works on the left-hand side of the pendant. The spring then throws the longer end of the bar to the left. The position and size of the wheel D^3 and the minute-wheel F are such that when the shifting-bar is thrown over to the left side of the slot they will gear.

To wind up the watch, turn the button C^5 forward in the usual way. In order to set the hands, turn the button back about half a turn with a slight outward tension. This action draws the collar C^1 hard against the short end D^1 of the pivoted shifting-bar D, causing the longer end to compress the spring *d*, and to travel to the left side of the recess, carrying with it the toothed wheel D^3, which leaves the winding-up wheel B^2, travels around the periphery of the wheel D^5, and gears with the minute-wheel F. The operator can then, by simply turning the button backward or forward, arrange the hands as desired. On letting go the button, the spring *d* forces the shifting-bar to its former position, throwing the wheel D^3 out of gear with the minute-wheel into gear with the winding-up wheel again.

The pin D^6 not only acts as the pivot on which the shifting-bar D and the wheel D^5 work, but also passes through the center of the socket-piece C^2, keeping it in position; and, finally, by entering a tapped hole in the top plate, binds the two plates A^1 and A^2 firmly together.

The advantages of this arrangement of the winding-up and setting mechanism are that it is simple and strong. Many existing mechanisms are liable to alter the time of the watch by being undesignedly pulled into gear with the motion or hand wheels. With my construction such accidents cannot occur, as the winding-and-setting wheel cannot remain connected with the motion-wheels, but flies out of gear with them, immediately the outward tension ceases on the button, into gear with the barrel-wheel, locking the shifting-bar.

Existing mechanisms, for the most part, require the operator to push in the winding-button or shut the case to remove the shifting-bar—an operation that is liable to be forgotten in the hurry of business, and also from the fact that the setting of the hands is not of frequent occurrence in a good watch.

Another important advantage is, the shifting-bar not only works upon a hardened-steel center, but it also works between two surfaces of tempered steel.

Fig. 5 represents two views of the stem-socket piece C^2 and stud C^1. This socket fits within a recess sunk in the top plate A^1, and equalizes the pressure from one end to the other of the spindle C in the pendant, and prevents the bevel-wheel depth of pendant from wearing shallow, thus strengthening a weak point in all mechanisms.

C^6 is a steel bushing fitted in the pendant to receive the sleeve and hub of the winding-button. The inner end of the bushing is flanged and hollowed out, as shown at C^7, to receive the back of the bevel-wheel C^4.

E^1 is the click of the barrel-wheel B^2, working in a recess sunk in the lower plate A^2. The click-spring E is attached to the head of the click (instead of the tail, as usual) by screw or rivet, or it may be cut out of the solid. The click is attached to the plate by a stud, E^3, screwed through the plate and click. The stud E^3 projects about three-sixteenths of an inch at the back of the lower plate, and fits, when the plates are together, into a hole sunk in the top plate to receive it, forming a strong steady-pin for the connection of the two plates. The advantage of this construction is that a strong spring with little action is secured, and, therefore, the spring is not likely to break.

Dial-plate fastening.—In Fig. 9, G is the dial-plate, which is secured to the top plate by the springs G^1, secured in the holes G^3, as shown by the screws *g*. These springs clasp an inverted cone turned on the dial-feet G^2. One of the springs is sunk in a hole drilled in the top plate, the other in the balance-cock. The advantages of this arrangement are that time is saved in putting on and taking off the dial-plate, and that the dial cannot move; further, the feet are not likely to be injured in repairing or using, and the springs, being sunk, cannot get broken by the repairer of the watch when he is brushing the plate or cock.

The hunting-case watch.—In this class of watch the winding-and-setting mechanism, while remaining substantially the same in principle, is of necessity modified in some

parts to meet the difference in construction between the hunting-case and the open-face watch.

In Fig. 8, A^4 is the inclosing-case of a hunting-case watch. *a* is the stem or pendant. At one side of the pendant a slot, *a''*, is cut within the case, through which passes the end *h* of the lock-spring H. The end of the spring when at rest presses against the inner end of the push-piece I. This push-piece is squared on the spindle $C^\times$, and is fastened to the spindle by a cylindrical nut, *i*, which is allowed a sufficient amount of end play within a suitable cavity bored in the outer end of the push-piece I. The outer end of the push-piece is flanged, and has attached the winding-button I'. The periphery of this button is fluted instead of being milled, as usual. C^4 is the bevel-wheel, squared on the spindle $C^\times$, and revolving within a steel bushing, C^6, as in the open-face watch. The inner end of this bushing is enlarged, the face being finished concave to receive the convex back of the bevel-wheel C^4. $D^\times$ is the shifting-bar, pivoted, as before, but provided with two arms, D^8 and D^9, working in sinks cut in the plate, either or both arms being provided with springs bearing against the face of the sink to keep the bar in position. On each arm a toothed wheel is pivoted, both gearing into the wheel D^5, and operated from the bevel-wheel C^4, as in the open-face watch.

On the arm D^9 the wheel D^7 is pivoted, which gears into the winding-up wheel B^2. On D^8 the wheel D^{10} is pivoted, which, when the spindle is drawn out, gears with the minute-wheel F.

The action of the spring on the shifting-bar keeps the wheels D^7 and B^2 always in gear, except when the spindle is pulled out to adjust the hands; then the spring is compressed, the bar moves over, taking the wheel D^7 out of gear and placing D^{10} in gear with F, D^{10} returning to its former position when the tension on the spindle ceases.

I claim as my invention—

1. The scape-bar *a'*, fashioned from and forming a part of the solid top plate A^1, arranged substantially as described, and for the purpose specified.

2. The combination of the barrel-arbor B, constructed as herein specified, plate A^2, stud b^2, and winding-up wheel B^2, substantially as herein set forth.

3. The combination of the click-spring E with the head of the click E^1, substantially as specified.

4. The combination of the spindle C, provided with a collar, C^1, and stud c^4 of the slotted sleeve C^3, and bevel-wheel C^4, these parts being constructed and operating conjointly, as shown and described.

5. The spindle provided with a collar, C^1, groove c^2, and flange c^3, in combination with a single or a double armed spring shifting-bar arranged and operating substantially as described, and for the purposes specified.

6. The combination of the bevel-wheel C^4, wheel D^5, pivoted on the pin D^6, and wheel D^3, pivoted on the spring shifting-bar D, these parts being arranged and operating substantially as described, and for the purpose specified.

7. The wheel D^3, pivoted on the spring shifting-bar D, and operated in the manner hereinbefore described, in combination with the minute-wheel F, arranged and operating substantially as described, and for the purpose specified.

8. The wheel D^3, pivoted on the spring shifting-bar D, and operated in the manner hereinbefore described, in combination with the winding-up wheel B^2, arranged and operating substantially as described, and for the purpose specified.

9. The spindle-socket C^2, with recess *c* and projecting stud c^1, in combination with the spindle C, arranged and operating substantially as described, and for the purpose specified.

10. The push-piece I, with winding-button I' attached, in combination with the spindle $C^\times$, with nut *i* attached, substantially as set forth.

11. The case lock-spring H, with reduced end *h* entering the hollow pendant *a* from either right or left hand side, through and working in a slot, *a''*, in combination with the push-piece I, arranged and operating substantially as described, and for the purpose specified.

12. The toothed wheels D^{10} and D^7, severerally pivoted on the arms D^5 and D^9, and operated in the manner hereinbefore described, in combination with the minute-wheel F and winding-up wheel B^2, as shown in Fig. 8, these parts adapting the invention to hunting-case watches, and being arranged and operating substantially as and for the purpose specified.

13. The dial-feet G^3, attached to the dial G, in combination with the clasp-springs G^1, arranged and operating substantially as described, and for the purpose specified.

14. The lower plate A^2, with sink A^5 cut through the entire thickness of the plate to allow of depth and strength in the construction of the shifting-bar D and winding-and-setting mechanism, arranged substantially as described, and for the purpose specified.

15. The bushing C^6, fitted within the pendant *a*, with collar C^7, having a concave face to receive the convex back of the bevel-wheel C^4, arranged substantially as described, and for the purpose specified.

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