

Patented Oct. 7, 1879.

UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN STEM-WINDING WATCHES.

Specification forming part of Letters Patent No. **220,233**, dated October 7, 1879; application filed June 17, 1879.

To all whom it may concern:

Be it known that I, PAULINE HORTENSE GONTARD, of Cortébert, Switzerland, have invented Improvements in Keyless Watches; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed sheet of drawings, making a part of the same.

My improvements relate to that class of watches in which the spring is wound up and hands are set at the right time by simply acting on the knob of the pendant, without making use of any key.

These improvements have for their object, first, increasing the height of the barrel in keyless watches; second, reducing the number of the screws, the smaller ones, which are liable to be lost or have their thread broken, being dispensed with; third, simplifying the mechanism of keyless watches, so as to make it very easy to take the work to pieces or to put it up again and fasten it into its box or case. Besides, my improved watches are provided with a special spring-catch or ratchet-stop, as will be described.

In the accompanying drawings, Figure 1 shows a watch mechanism embodying my improvements. Fig. 2 shows a detached view of the bevel-gear for connecting the winding-spindle to the ratchet mounted on the barrel-arbor. Fig. 3 shows the winding-spindle taken out of the watch. Fig. 4 represents a small barrel or sleeve, to be placed on the spindle. Fig. 5 shows a detached view of the bevel-pinion. Fig. 6 represents a pinion which acts as a clutch. Fig. 7 shows an elevation of the barrel-arbor. Fig. 8 shows a plan view of the same. Fig. 9 is a section through 1^x 2^x, Fig. 1. Fig. 10 is a similar section, but showing an arrangement slightly different from that represented in the former figure. Fig. 11 represents a part of the watch with the barrel and gear-wheels taken out. Fig. 12 shows the device for putting into gear the mechanism for setting the hands. Fig. 13 is a section through 3 4, Fig. 12. Fig. 14 is a similar section, but showing the different pieces in other positions.

In all figures same letters of reference indicate identical parts.

A A' is a barrel-plate—the only support

for the barrel. B B' is a spring-catch, which is fastened to A A', and is ended by a double head, 1 2, acting as a catch. A small screw is fixed on the head 1 2, so as to facilitate disengaging the said head in order to unwind the mainspring.

C C' is a toothed wheel fixed on the barrel-arbor. D is the crown-wheel, which inter-gears with wheel C C'. The double head or catch 1 2 comes in between both wheels, the part 1 engaging in the teeth of wheel D, while part 2 engages in the teeth of wheel C C'. This last wheel is fixed on the barrel-arbor by the following device: The barrel-arbor is made in one piece, with a disk, F F', as shown in Figs. 7 and 8, the said disk being provided with a projection, E, in which a tapped hole is bored down the level of the origin of a thread cut on the outside of the arbor for receiving the nut on which the mainspring is wound.

On the disk F F' are screwed three or any other suitable number of screws, with cylindrical heads, fitting into corresponding holes bored into the part C' of the toothed wheel C C'. The said wheel is firmly secured on the disk F F' by means of a big screw, G', screwing into projection E. This device for securing the wheel C on the barrel-arbor is far better than the ordinary arrangement, which simply consists in ending the barrel-arbor by a square fitting into a corresponding hole bored in the center of the ratchet. It is then very difficult to get the wheel to turn perfectly true, and it is impossible for the watch-maker to set it right when the points of the arbor have been cut off. All these difficulties are avoided by making use of my system, and it becomes very easy to take the wheel off, since the only screw which has to be removed is the big screw G'.

Instead of placing on the disk F F' three small screws, as described, I sometimes use three pins, secured on the said disk or on the ratchet, and fitting into holes bored into the other piece.

The crown-wheel D is carried by a fixed cap, G, provided with three ears and secured by means of three screws, 3, 4, and 5. The screws 3 and 4 pass freely through the corresponding ears of the cap G, and are screwed

into the plate of the watch. They keep the cap pressed against the barrel-bar and secure the said bar on the watch-plate.

The third screw is preferably only screwed into the barrel-bar A, and is in that case engaged in a slot, *r*, cut into the cap G, so that when the said barrel has to be removed the screws 3 and 4 only have to be taken off, while the third one, 5, is simply untightened; but the slot *r* is only a modification, and may be dispensed with.

The cap G is provided with a round projection, which is intended to receive a nut, Q, holding the crown-wheel D, as shown in Fig. 9. The nut Q is secured by one screw, H, only. It carries three small screws or three pins engaging in corresponding holes bored into the cap. This arrangement is similar to that described for securing wheel C on the barrel-arbor.

I sometimes hold the crown D against the cap by a simpler device, as shown in Fig. 10. Instead of the crown-nut, I use a projection, Q, made in one piece with the cap G. It receives the crown-wheel, which is held there by a wide-headed screw, H.

The device for winding up the spring and setting the hands is composed as follows: A bevel-pinion, J, which intergears with the crown D, is mounted loosely on a sleeve, K, which is itself carried loosely by the winding-spindle I. The sleeve K is engaged at one of its extremities into a recess, N, cut into a pinion, L, which is intended to come into gear with the minute work when the hands have to be set, or to act as a clutch for the pinion J. To that last effect the pinion L, in which is bored a square hole, P, fitting on a corresponding square, O, of the spindle I, and which is thus carried round by the rotation of the said spindle, is provided on its upper part with teeth, while the under part of the pinion J is equally provided with teeth made to fit into the intervals of those of the pinion L.

This last pinion is secured on the sleeve K by means of a screw, R, which never has to be taken out when the work is taken to pieces. It only wants then to be a little unscrewed. The sleeve K is provided with a groove, S, in which engages the end T of a spring, T T', fixed against the inside of the watch-case.

When all the works are placed in the case the spindle I, provided with a milled head covering the pendant of the watch, is held in by a screw, U, screwing into the watch-case. The screw U is provided with a long cylindrical head, engaging in a groove, V, cut into spindle I, and recessed on one side, as shown in Fig. 3. The spindle I may be taken out only when the head of screw U is turned in a suitable position, which is ascertained by a point being brought in correspondence with a mark on the watch-case.

The working of the mechanism is easily understood from the above description. When the pieces are in the situation shown in Figs.

1 and 11, the upper part of pinion L is clutched with the lower part of pinion J. If the spindle I is then made to turn, the pinion L will follow the motion and act upon the crown D, which is in gear with the wheel C C'. The barrel-arbor is thus made to revolve, and the spring will be wound up. If a pressure is applied on the thumb-piece Y, the spring T T' will bend in its thin part *p q* and its end T will press down the sleeve K, carrying the pinion L. This last pinion will be disengaged from pinion J, and at the same time will come into gear with the hand-wheels. Action being then applied to the head of spindle I, the hands may be moved one way or the other and set at the right time. When the sleeve K is thus pushed away from pinion J the said pinion is held in position by its adjustment in the watch-plate, as usual. The only peculiarity is that the sleeve K slides in the pinion J and on the spindle I, carrying the pinion L, while in other watches the pinion L only is made to move.

In case it should be desired that the pressure had not to be maintained all the time while the hands are set, and in order to avoid any projection out of the case, I sometimes use the following arrangement instead of the thumb-piece Y. (See Figs. 12, 13, and 14.) The spring T T' is still placed as above described. It bears against a cylinder, *d e f*, pivoted at one end in the case. In its pivot a tapped hole is bored, so that a small screw, *h*, with a wide head, may be screwed into it and secure it against the watch-case. The cylinder *d e f* is provided with a flat or depression, under which the spring may be engaged, as shown in Fig. 13, and it carries a lever, *m*. When the watch-case is closed and the lever is in the position indicated in dotted lines, (see Fig. 12,) the spring T is left free, so as to allow the play of the click while the mainspring is being wound up; but if the lever *m* is turned up into the position marked in full lines, (see Fig. 12,) the cylinder *d e f* acts as a cam and presses the spring T down, so that the pinion L comes into gear with the minute-wheel, and the hands may be set right by the head of spindle I being acted on. This arrangement I use chiefly for watches with a spring-lid.

I claim—

1. The barrel-arbor carrying disk F F', which has the projection E, in combination with the toothed wheel C C' and screw G, substantially as herein shown and described.

2. In a keyless watch, the combination of the barrel-arbor, provided with a disk, F F', the toothed wheel C C', mounted on a cylindrical projection of the barrel-arbor, the pins forced or screwed into the disk F F', and engaging into the toothed wheel so as to take it round with the said disk, all as described, and for the purpose set forth.

3. The spring-catch B B', consisting of the double-pointed head 1 2, which is attached to

one end of the spring B, substantially as and for the purpose herein shown and described.

4. The special arrangement of pinion J, as described, spring T T', and thumb-piece Y or lever-piece *d e f m*, the said spring T T' being located in the case, where it stays when the work is taken out.

5. The combination of the pinion J, pinion

L, sleeve K, and spindle I with the single connecting-screw R, substantially as herein shown and described.

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Witnesses:

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