



INDICATING DEVICE FOR RESERVE ENERGY

The present invention relates to a watchmaking part, more specifically to a mechanism that allows the energy stored in a watch to be measured and displayed.

Hand-wound mechanical watches inevitably have a winding system, called the winding mechanism. It is via this system that energy is transmitted manually to the barrel, the watch's energy accumulator. The winding mechanism is also used for other functions, such as setting the time or changing the date.

By turning the crown when the sliding pinion is engaged in the winding pinion, the crown wheel is made to rotate. This latter, by turning the ratchet, itself fixed to the arbour, thus arms the barrel in a traditional watch. The calculation of the number of turns for winding/unwinding is perfectly mastered.

In order to increase the autonomy of a watch, the use of movements with double barrels, such as shown in patent CH 610465, in particular figure 2, is known to be used. The above-mentioned winding principle is applicable to watches of this type.

It has been proved useful to indicate the autonomy of such watches, whether they are of the single or double-barrel type. This indication is called "reserve working-energy".

Such a device is described in document EP O 568 499. This device is complicated and requires numerous components, and is only applicable to single-barrel watches.

The objective of the present invention is to propose a device for showing the reserve working-energy of double-barrel watches, not only those wound by hand, but also those wound automatically.

The objective is attained by a reserve-energy device consisting of two barrels, one so-called winding and the other so-called unwinding, a star-wheel connected to a means of display, in which the winding barrel comprises a winding pin activating a winding lever that rotates the star wheel in a positive direction, the



unwinding barrel comprises an unwinding pin activating an unwinding lever that rotates the star wheel in a negative direction, the latter being kept in position by a jumper.

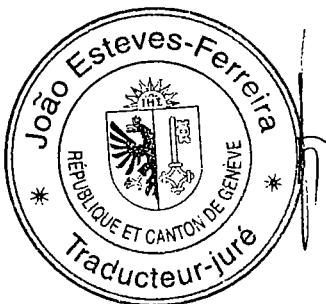
The present invention is applicable primarily to watches equipped with two barrels. The particularity of the double-barrel mechanism resides in the fact that, during winding, only one barrel rotates, the second remaining immobile. Conversely, during unwinding, the second barrel rotates while the first remains immobile.

The great autonomy of the double-barrel system makes it useful to have a display of the reserve working-energy. For this, the existing double-barrel mechanism is utilized with the addition of two levers. The addition of a reserve-energy indicating mechanism will affect the barrels as well as the display.

Winding is effected by turning the crown wheel, the sliding pin being in its engaged position with the winding mechanism pin. This latter meshes with the crown wheel, itself driving the ratchet (fixed on the unwinding-barrel arbour). The barrels are thus armed, and execute their primary function, i.e. to store the energy necessary for the watch to function. A winding pin was fixed to the winding barrel. Following the rotating movement of this barrel, the aforementioned pin comes into contact with a lever, whose oscillation at the opposite end activates the star wheel on which the display is situated.

Winding is effected by means of an oscillating mass, whose rotation is ensured by movements of the arm and, via a combination of ratchets and gear-trains, winds up the spring. The barrel is thus armed and executes its primary function, i.e. to store the energy necessary for the watch to function. A winding pin has been fixed to the winding barrel. Following the rotating movement of this barrel, the aforementioned pin comes into contact with a lever, whose oscillation at the opposite end activates the star wheel on which the display is situated.

The two levers, i.e. the winding lever and the unwinding lever, are disengaged from the star wheel by release springs. This allows the star wheel to be freed up for the action of the lever, which is in the process of oscillating.



A supporting jumper on the star wheel guarantees that the latter remains in the position determined by the action of the levers.

Each of the levers is mounted on an axle pin, one of the ends being positioned facing the teeth of the star wheel, the other being placed opposite the barrel pin.

The invention will be understood better thanks to the following detailed description and by referring to the attached drawings in which:

Figure 1 represents a reserve-power indicator with its winding mechanism,

Figure 2 represents a reserve-power indicator with its unwinding mechanism,

Figure 3 represents a view from above, illustrating both the winding and the unwinding mechanisms,

Figure 4 represents, in cross-section, the reserve-energy indicator with its positive/negative rotation mechanism and two superposed barrels,

Figure 5 represents the reserve-energy indicator with its positive/negative rotation mechanism and two barrels side by side,

Figure 1 describes the part specifically for arming the barrels, with its mechanism for operating an indicating wheel (star wheel) 3 by a winding lever 4.

A first lever, called winding lever, is mounted on a axle pin 11 joined to a bridge that is not represented here. One of the extremities of this lever 4 has a pin 14, the other being terminated by a drive pin 13. This winding lever 4 is kept in its rest position by a release spring 6 resting on the pin 12, the said spring having the function of restoring the winding lever 4 to its rest position, i.e. outside the circumference of the star wheel 3. The impulse given by the pin 14 allows rotation of the star wheel by one tooth in the positive direction (winding direction).



The winding barrel 1 has a winding pin 9 placed at the periphery of barrel 1. At each turn of this barrel, the winding pin 9 drives the pin 13 of the winding lever 4, the said lever rotating to engage in the teeth of the star wheel 3 thanks to the driving pin 14.

In figure 2, the part responsible for winding has been voluntarily left out. The unwinding lever 5 includes a pin 15 at one of its extremities, represented by dotted lines in the drawing, driven by an unwinding pin 10 fixed to the unwinding barrel 2. At each rotation of this barrel 2, the unwinding lever 5 oscillates around its axle pin 11 and drives the star wheel 3 one tooth in the so-called negative direction (unwinding direction).

This unwinding lever 5 is held in its rest position by a release spring 7 applying pressure by means of a pin 16, the said spring having the function of restoring the winding lever 5 to its rest position, i.e. outside the circumference of the star wheel 3.

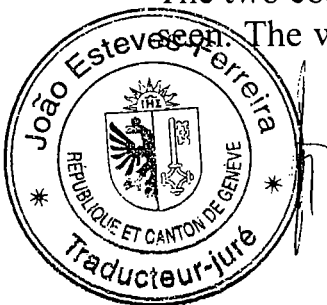
The function of jumper 8 is, on the one hand, to ensure that the star wheel 3 remains in its indicating position, and on the other, to participate in the oscillation.

In effect, with each impulse of either the winding pin 14 or the extremity of the unwinding lever 5, the jumper 8 permits advancement of the movement by one tooth.

Figure 3 represents a view of the complete mechanism with its two levers from above. These latter are mounted on the same arbour 11, and the double function of winding and unwinding can be seen.

Figure 4 is a cross-section of the mounting through a plane determined by the barrel arbours and the star wheel. The arbour of the star wheel 3 is fixed to the display system of the working-energy reserve, in our case a calibrated cylinder 17. This latter indicates the working-energy reserve through a window that serves as a fixed reference point.

The two coaxially mounted barrels, each with a driving pin placed on top, can be seen. The winding lever 4 takes its movement from the pin 9 fixed to the upper



barrel 1, while the unwinding lever 5 takes its movement from the pin 10 fixed to the lower barrel 2.

The location of the pins on the barrels is not important in itself, being either on the plate of the barrel, as illustrated on the unwinding barrel 2, or on the cylinder as illustrated on the winding barrel 1.

Figure 5 represents a variant of the invention with the two barrels mounted in the same plane. The invention system is equally as applicable in this case, the principle difference residing in the fact that each lever has its own arbour, namely 11' and 11".

The same elements are found again, namely the pins on the barrels 1 and 2 that cause each lever respectively to oscillate.

It should be noted that other forms of display can be used within the scope of this invention, for example by means of a simple pointer situated on the star wheel, the scale for indicating the working-energy reserve being marked on a dial in this case.

In addition, there may be more than one pin per barrel, depending on the method of display chosen. Indeed, if there are a considerable number of teeth on the star wheel, it may be desirable to cause advancement by two teeth per turn of the barrel.



CLAIMS

1. Device of working-reserve energy, consisting of two barrels (1, 2), one referred to as winding (1) and the other as unwinding (2), a star-wheel (3) connected to a means of display (17), in which the winding barrel comprises a winding pin (9) activating a winding lever (4) rotating the star wheel (3) in a positive direction, the unwinding barrel (2) comprises at least one unwinding pin (10) activating an unwinding lever (5) rotating the star wheel (3) in a negative direction, the latter being maintained in position by a jumper (8).
2. A device according to claim 1, where the winding lever (4) is returned to its rest position by a return spring (6), allowing the winding lever (4) to disengage from the star wheel (3).
3. A device according to claim 1, where the unwinding lever (5) is returned to its rest position by a return spring (7), allowing the unwinding lever (5) to disengage from the star wheel (3).
4. A device according to claims 1 to 3, where the star wheel (3) is maintained in position by a jumper (8).
5. A device according to one of the claims 1 to 4, where the two barrels are mounted on the same arbour and the winding (4) and unwinding (5) levers are mounted on a common arbour.
6. A device according to claims 1 to 4, where the two barrels are mounted in the same plane, each lever having its own axle pin.
7. A watch including the device according to claims 1 to 6.

