March 9, 1926. 1,576,120

J. HARWOOD

WRIST WATCH AND OTHER WATCH

Filed Oct. 8, 1923

FIG. 1.

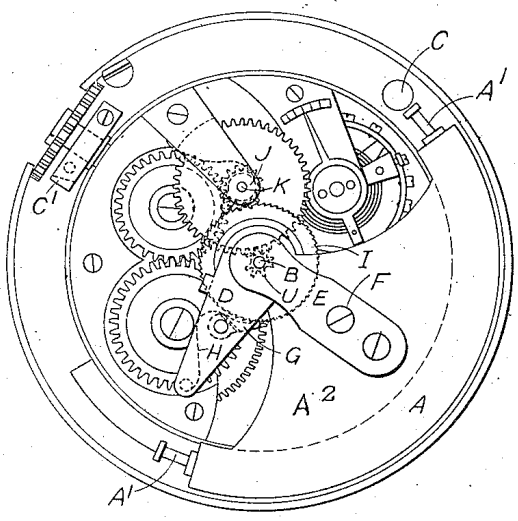


FIG. 2.

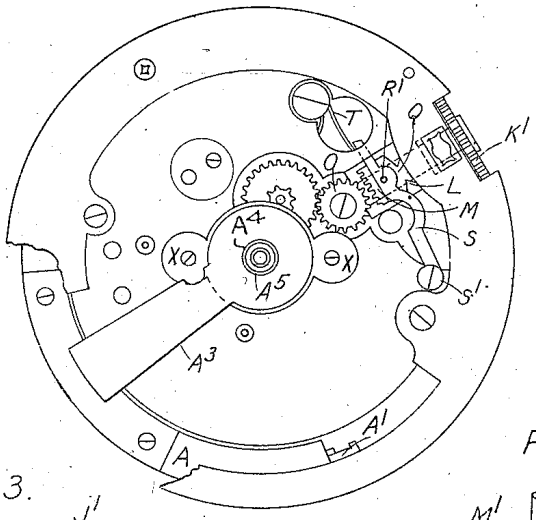


FIG. 3.

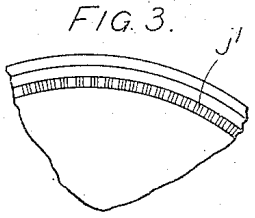


FIG. 4.

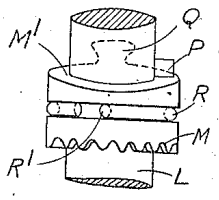
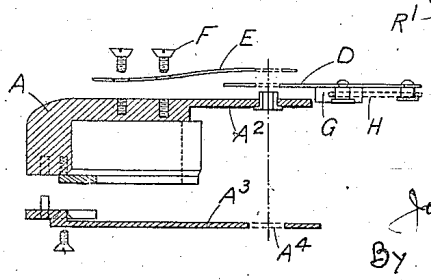


FIG. 5.



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UNITED STATES PATENT OFFICE.

JOHN HARWOOD, OF BALDRINE, LONON, ISLE OF MAN.

WRIST WATCH AND OTHER WATCH.

Application filed October 8, 1923. Serial No. 667,373.

To all whom it may concern:

Be it known that I, JOHN HARWOOD, a subject of the King of Great Britain, and resident of Baldrine, Lonon, Isle of Man, have invented certain new and useful Improvements Relating to Wrist Watches and Other Watches, of which the following is a specification.

This invention relates to wristlet and other watches, its object being to provide a watch with a self-winding movement whereby the need for any protruding parts through the case such as the usual winding stem is eliminated, the case being thus rendered practically dust and waterproof. Overwinding of the watch is also prevented, the likelihood of main springs being broken being thus reduced, and by reason of the fact that the spring under ordinary conditions would only run down say 9 to 12 hours, a more even torque is given to the train. As the setting of the hands in ordinary watches is effected from the usual winding stem which protrudes through the case and which in this invention is eliminated means are provided in the present invention for setting the hands otherwise than by means of such stem.

According to this invention, the winding of the main spring is effected by an oscillating weight pivoted within the watch, the oscillation of this weight when the watch is being worn turning a plate or member frictionally connected to the weight which plate acts by means of a spring controlled click or pawl to wind the main spring, the frictional drag between the weight and the plate being ineffective to move the plate, and consequently further to wind up the main spring, after the resistance of the main spring to winding becomes greater than the frictional grip on the plate and in this way overwinding is prevented. The hands or set by turning the bezel in one or other direciton, crown teeth on the underside of the bezel engaging and rotating a pinion, a pin on the stem of which engages a cam face on a crown gear which first brings the crown gear into engagement with the motion wheels and then positively drives such wheels to set the hands. As, therefore, the winding and set hands mechanism is entirely within the case no ports or apertures are necessary in the wall of the case.

In the accompanying drawings which illustrate the invention by way of example, Fig. 1 is a rear view showing the oscillating weight and friction plate for winding the watch, Fig. 2 is a front view under the dial showing the means for setting the hands and the front axis of the weight, Fig. 3 being a fragmentary detailed view of the crown ring teeth in the bezel, and Fig. 4 is a detail of the crown gear showing the cam face and friction spring for holding the crown gear. Fig. 5 is a radial section through the oscillating weight, friction plate and control spring, the parts being separated in order to show them clearly.

The watch is fitted with a weight A of any suitable form but preferably more or less semi-circular, pivoted at the rear on an extension of the set hands arbor or centre pinion pivot B, spring buffers A^1 being fitted at each end of the weight to prevent knocking or shock to the watch movement during the oscillatory movement of the weight which movement is limited by the stops C and C^1.

A plate D pivoting about the same axis as the weight is frictionally connected to the weight A by means of a control spring E which is secured to the weight by two screws, one of which F serves to adjust the pressure of the control spring on the friction plate D and in this way the frictional drag between the weight A and plate D may be adjusted. The friction plate D carries on its underside a pawl or click G which engages a ratchet wheel I, the spring H keeping the pawl G in engagement with the ratchet. Rotating with the ratchet I is a pinion U which engages and drives the first toothed wheel of the winding train. It will be seen, therefore, that if the movement be held on edge and turned clockwise looking from the back as in Fig. 1, the weight A being at the bottom and at its left extremity, an anti-clockwise movement will be given to the ratchet wheel I and its pinion U, the wheel I being held from returning after movement by a second pawl or click J pivoted on the pinion K. In this manner the whole winding train

is turned each time the wearer drops his hand and raises it again in the case of a wristlet watch.

Overwinding is prevented by the action of the friction plate D which carries the pawl G, inasmuch as when the main spring is wound and its resistance to further winding thus increases the friction plate D will be driven clockwise until ultimately it meets the cock C^2 and as the wound spring offers resistance in the other direction, the friction plate will not return under the drag of the spring E but will remain stationary, although the weight may continue to oscillate under the movement of the wearer, the spring E riding idly to and fro over the friction plate D. The weight is carried at the back by a radial arm A^2 and at the front by an arm A^3 Fig. 5 screwed to the weight. The front axis about which the weight pivots is shown in Fig. 2, an eye A^4 in the arm A^3 engaging a bush A^5 on a plate X which bridges the hands motion work. In this way as the watch is being worn the weight oscillates to and fro about its pivots and by the frictional drag of the spring E on the plate D the pawl G is moved to and fro round the ratchet wheel I and so winds up the main spring until such time as the further resistance of the main spring to winding permits the weight to oscillate idly, the spring E then merely riding frictionally over the stationary plate D. No protruding winding stem is thus required and the watch movement is thus completely enclosed.

As, however, the winding stem has been eliminated some other than the usual means must be provided for setting the hands. This is effected by making the usual bezel a rotary fit and turning it angularly forwards or backwards. Normally the set hands gear is out of mesh in the position shown in Fig. 2. On the inside face of the bezel, as shown in Fig. 3, is a gear ring formed of crown teeth J^1. When the bezel is in position on the case these teeth J^1 engage a pinion K^1 mounted on a stem L, and loose on the stem L is a crown gear M which is capable of longitudinal sliding movement on the stem L as well as rotary movement thereon. On the upper edge of the crown gear is a slope or cam face M^1 engaged by a pin P in the stem L and from the higher portion of the cam face M^1 a stop Q projects. Resiliently gripping a groove in the crown gear M is a ring spring R, the radial end R^1 of which is inserted into a hole in a return lever S pivoted at S^1, and pressed out by a spring T. The action of this return spring is normally to hold the crown gear out of engagement with the intermediate wheel O which engages and drives the motion wheels for setting the hands. When it is desired, therefore, to set the hands the bezel is rotated in one or other direction, the primary movement of the bezel turning the pinion K^1 and causing the pin P to bear against the cam face M^1, the grip of the spring R on the crown gear being sufficient to hold it against any tendency to rotate with the pin, a reaction being thus set up which forces the crown gear M along its stem L into engagement with the intermediate wheel O. At this point the pin P engages the stop Q and further movement of the bezel then positively turns the crown gear which rotates the motion wheels to set the hands. After setting the hands, in order that the crown gear M may disengage from the intermediate wheel O, the bezel is backwardly rotated through an angular distance corresponding to five minutes on the dial, this movement being sufficient to bring the pin P back to the lowest point of the cam face M^1 and permit the spring T to return the lever S taking with it the crown gear M by means of the spring R which engages the lever S.

Considerable advantages accrue from such a construction of watches, for instance, owing to the fact that no parts protrude through open ports in the case the latter remains dust and waterproof. The watch merely requires to be worn in order that it shall be kept wound up. Overwinding cannot take place by reason of the merely frictional connection between the weight and the plate D, and, therefore, all usual breakages caused through overwinding such as pulling out of barrel hooks, main spring breakages, breakages of keyless wheel teeth and barrel teeth are avoided.

The prominent weakness in present day watch construction namely the need for bevel or crown winding gear is eliminated, while by eliminating any necessity for apertures in the watch case, at least 50 per cent of the stoppages usual in watches will be avoided, such stoppages in most instances being entirely due to the presence of dust, grit, or to overwinding.

I claim:

1. A self winding watch comprising, an oscillating weight, a pawl carrying plate frictionally connected to the weight, and a pawl on said plate adapted to be moved by the oscillations of the weight to turn the winding train.

2. A self winding watch comprising, an oscillating weight, a pawl carrying plate frictionally connected to the weight, said weight and plate being pivoted about the same axis, spring buffers on the weight engaging stops at each end of its travel, and a pawl on said plate adapted to be moved by the oscillations of the weight to turn the winding train.

3. A self winding watch comprising an oscillating weight, a pawl carrying plate frictionally connected to the weight, said weight

and plate being pivoted about the same axis, a pawl on said plate adapted to be moved by the oscillations of the weight to turn the winding train, and an adjustable spring frictionally connecting the weight to the pawl carrying member whereby although the frictional drag of the weight on the member is normally sufficient to wind the main spring the weight may override the member when the main spring resistance reaches a certain limit.

In testimony whereof I affix my signature.

JOHN HARWOOD.