J. THOMSON.

WATCH-ESCAPEMENTS.

No. 194,744. Patented Aug. 28, 1877.

Fig. 3.

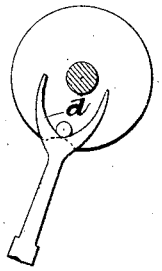


Fig. 1.

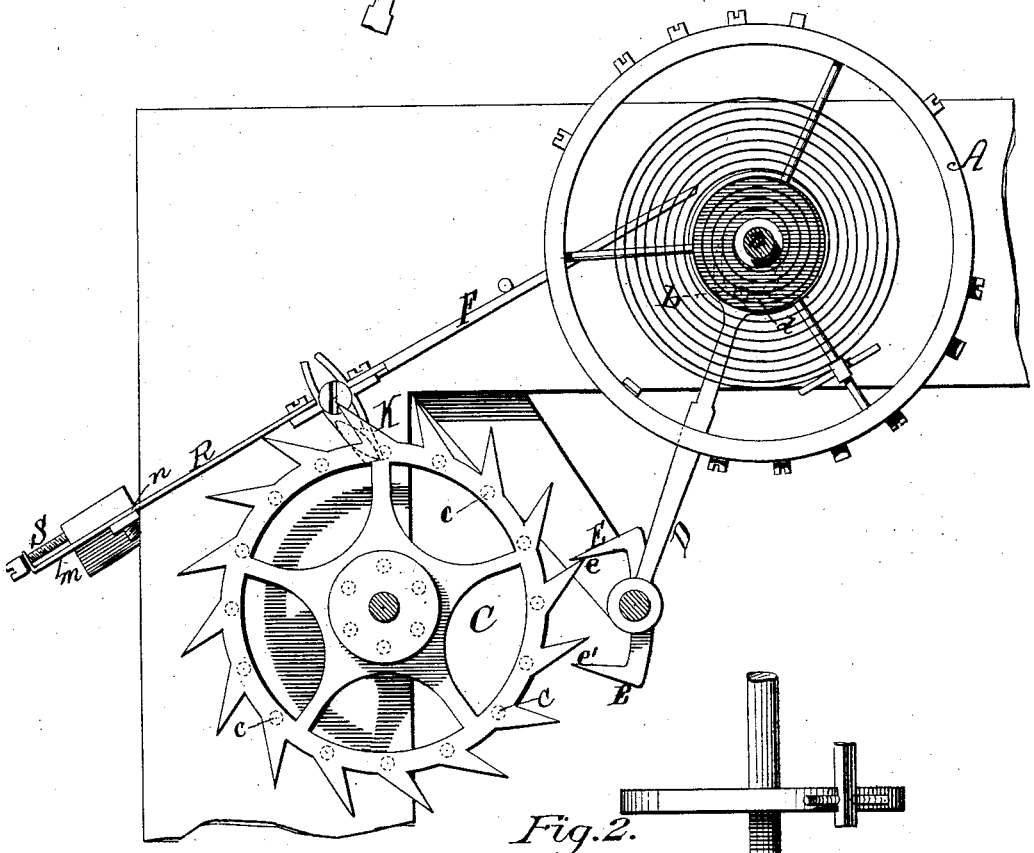
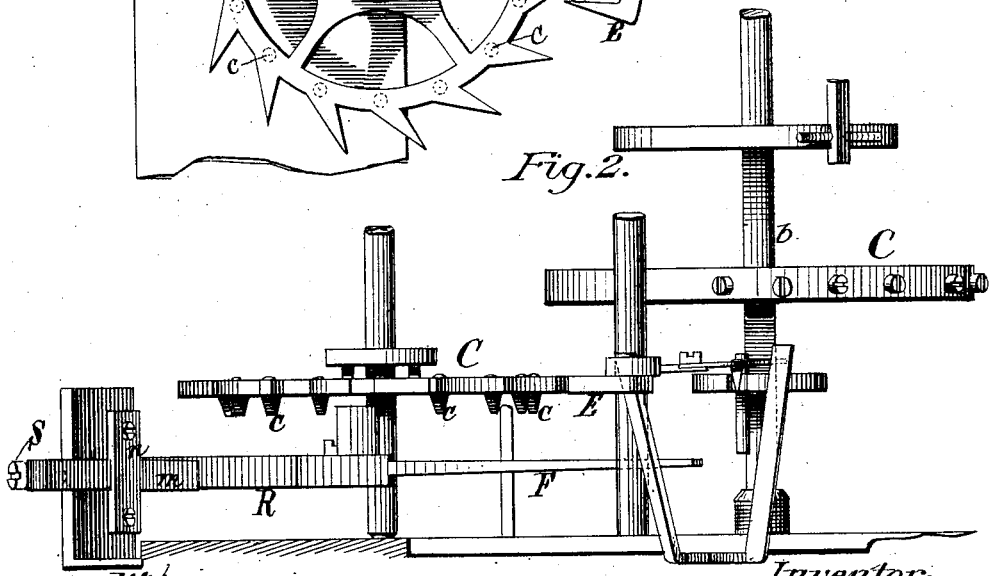


Fig. 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

JOHN THOMSON, OF ROCHESTER, NEW YORK.

IMPROVEMENT IN WATCH-ESCAPEMENTS.

Specification forming part of Letters Patent No. **194,744**, dated August 28, 1877; application filed March 29, 1877.

To all whom it may concern:

Be it known that I, JOHN THOMSON, of Rochester, in the county of Monroe, State of New York, have invented certain Improvements in Watches, of which the following is a specification:

This invention relates to certain improvements in the escapement of watches and other time-pieces.

The balance-wheel of a watch, like the pendulum of a clock, is the device which measures or divides the time as indicated by the hands and dial, and upon the accuracy of the actuation of said balance-wheel depends its perfect performance.

In watches and similar time-keepers as heretofore constructed the balance-wheel receives its impulses from the escape-wheel through the medium of the escapement-lever directly, and hence is subject to all the irregularities dependent upon imperfections in the main gearing of the watch, or resulting from changes of temperature, or the decomposition of the lubricant and collection of dirt upon the parts. Or, in other words, the balance-wheel, instead of controlling the power, is controlled by it, and thus holds a secondary position, so to speak, instead of the first. For this reason a watch, in order to keep correct time, must be finely constructed in every particular, and even when most perfectly constructed it cannot be relied upon for more than three or four months, as a general rule.

The object of my invention is to overcome these defects, and produce a watch or other time-keeper that will run with regularity despite inaccuracies or imperfections of workmanship, change of temperature, or the decomposition of the oil or collection of dirt; and to this end my invention consists in imparting the impulses to the balance-wheel by an independent impulse-spring, set in motion by the escapement-wheel, but acting by its own tension to actuate the balance-wheel, whereby a regular and uniform motion will be transmitted to said balance-wheel entirely independent of the irregularities of the main works of the watch, as more fully hereinafter described.

In the drawings, Figure 1 is a top or plan view of my invention; Fig. 2, a side elevation; and Fig. 3 is a detached view of the roller-journal and lever.

The letter A represents the balance, and *b* its roller-jewel, constructed in the usual manner, and C the escape-wheel, which is constructed in the usual manner, with the exception that it is provided with a series of projections or pins, *c*, on one side, corresponding in number to its teeth, for the purpose to be hereinafter explained. The letter D represents the lever, the pallets E of which straddle the teeth of the escape-wheel, as usual. The working of the pallet-faces *e e'* is substantially the same as that in common use; but the lever-fork *d* is quite different, being two or three times wider than the ordinary. Following the motion of the balance, as indicated by the arrow, the roller-jewel *b* will enter the fork, carrying the lever with it, until the escape-wheel tooth is relieved at the pallet *e'*. As the tooth passes over the pallet-face it will force the lever D forward in the same direction as the movement of the balance. It is this forward movement that gives to the balance of an ordinary "lever"-watch its momentum; but in this case the lever-fork is made so wide that no impetus whatever is given with this action, the pallet *e* being simply set forward sufficiently to receive another tooth of the escape-wheel, and the fork placed in the best position for receiving the roller-jewel on its return vibration.

The operation just described, having relieved the escape-wheel tooth at *e'*, allows the escape-wheel to come forward to the pallet *e*. The manner in which the balance-wheel receives its momentum will now be seen. The impulse-spring R, pallet K, and arm F may be in one piece, but are shown as separate and connected together. As shown, one of the projections or pins *c* on the balance-wheel has depressed the spring by coming in contact with the pallet-face K, holding it in tension until the forward movement of the escape-wheel deprives it of its support, whereupon it comes sharply forward, and the stroke end of the arm F, coming in contact with the roller-jewel *b*, gives to the balance its momentum.

Upon the return vibration of the balance the escape-wheel will be again released, and the impulse-spring again depressed into act-

ing position, when the operation first described will be repeated.

In order to have perfect control of the motor of the balance, and to do away with ever having to alter the fine hair-spring, I place at the base of the impulse-spring a fine tension-spring, *m*, passing through a guideway, *n*, and moved back and forth, as the case may require, by the screw S.

Upon turning the screw to the right, the grooved head will force the spring through the guideway, adding power to the stroke of the impulse-spring. Upon reversing the screw the power is decreased.

It is evident that with the above-described escapement I can produce a fine time-keeping watch at a low price. All that is necessary is a common quality of train-work and main-spring and a finely-adjusted balance and hair-spring.

In the matter of regulation, the balance deriving its sole movement from the impulse-spring, the first strike is the same as the last, and, being entirely outside of the fluctuations of the main or first power, must run uniformly for a long time.

With this escapement it will be practicable to make watches of long-running time, and requiring winding but once in a week or longer. It may also be applied to clocks, but, requiring some different arrangement of details, will form the subject of separate applications for Letters Patent.

I do not intend to limit my invention to the precise details hereinbefore described, as modifications may be made embodying the same principle.

It will be observed that in this escapement the train-work is stopped when the balance is receiving its impulse, and in action only when the balance is entirely free of the impulsator and lever.

What I claim, and desire to secure by Letters Patent, is—

1. In combination with the balance-wheel of a watch or other time-keeper, an impulse device operated by the escape-wheel, but acting independently of the same and the escape-lever to impart the impulse to the balance-wheel, whereby a regular and uniform motion is imparted to said wheel.

2. In combination with the escape-wheel and the balance-wheel of a watch-escapement, the adjustable spring R, its pallet K, and extension F, whereby the impulses are imparted to the balance-wheel, substantially as set forth.

3. The combination of the balance-wheel A, the lever D, the escape-wheel C, and the impulse device F K R, the whole arranged to operate substantially as set forth.

4. In combination with the spring R, the spring *m* and screw S, for adjusting the tension of the spring R, substantially as and for the purpose specified.

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Witnesses:

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