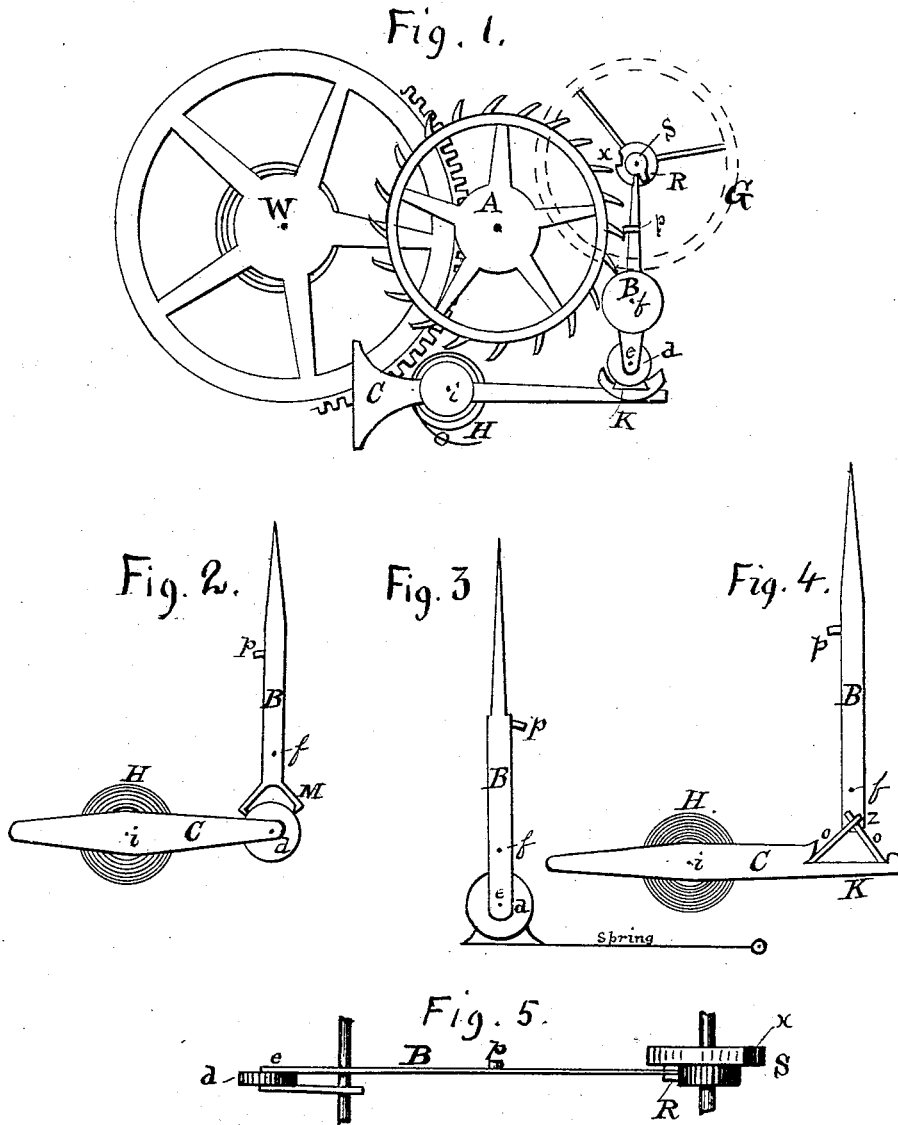


C. HOLES.

ESCAPEMENTS FOR WATCHES.

No. 185,323.

Patented Dec. 12, 1876.



WITNESSES:
Geo. A. Rathbun
Robt. M. Chamberlain.

INVENTOR.
Charles Holes.
By E. M. Jean
 ATTORNEY.

UNITED STATES PATENT OFFICE.

CHARLES HOLES, OF RIDGWAY, PENNSYLVANIA.

IMPROVEMENT IN ESCAPEMENTS FOR WATCHES.

Specification forming part of Letters Patent No. **185,323**, dated December 12, 1876; application filed November 15, 1876.

To all whom it may concern:

Be it known that I, CHARLES HOLES, of Ridgway, in the county of Elk and State of Pennsylvania, have invented certain new and useful Improvements in Escapements for Watches, Chronometers, &c.; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention consists in the application of a hair-spring to the lever in the movements of watches, chronometers, clocks, &c., instead of the springs heretofore used, rendering the adjustment much easier, putting it in the power of the maker to regulate the friction with greater exactness, and by a reduction of friction a lessening of power required in the mainspring, also enabling the balance-wheel to do its work of unlocking with greater ease.

I am aware that escapements are now made with the lever placed on a pivot in the middle, and a hair-spring applied to that; but, in addition, they require a second spring to accomplish the work performed by my own spring.

In Earnshaw's chronometer-escapement there are two flat springs, one on the side of the lever below the pallet, and the other a prolongation of the lever at the end farthest from the balance, and which, being the sole fastening of the lever, holds or returns it in position by its elasticity. These springs are difficult to regulate, and when used in watches are liable to "set" or to retard the movement; but in my device, when the lever is driven out of position to allow a tooth to escape, it is immediately caught and brought back by the combined action of the hair-spring, notch, and pulley, with a minimum friction. The delicacy of the hair-spring, and the ease with which it can be regulated by lengthening or shortening it, enable the watch to be nicely regulated and susceptible of a quicker motion of the balance.

My improvement I consider valuable also on account of its great range of adaptability, as it can be used and adjusted with accuracy

in the finest lady's watch or the heaviest marine chronometer. It will work with a light or heavy balance, quick or slow motion.

In order to enable others to better understand my invention, I will describe it more fully.

Figure 1 is a plan view of my invention. Figs. 2, 3, and 4 are modifications of the same. Fig. 5 is a section of the lever B.

A represents the scape-wheel. B is a lever, carrying the pallet-jewel *p*, which engages with the teeth of the scape-wheel A; C, another lever, turning on a pivot, *i*, around which is coiled a hair-spring, H, to take the place of the usual springs in the chronometer-escapements, and serves both as a "detent" and unlocking-spring. *f* is the pivot on which the lever B turns. The lever C has a dovetail-shaped notch, K, which catches the pulley *d*, which turns on a pivot, *e*, in the end of the lever B. S is the roller on the staff of the balance G, and carries the roller-jewel R, with which the lever B engages, and the notch X, which is struck by the teeth of the scape-wheel, giving the balance its impulse.

In the modification shown in Fig. 2, the pulley *d* is attached to the end of the lever C, instead of B, and the fork M takes the place of the notch K in the lever C. In Fig. 3 the lever C, with its hair-spring, is replaced by a simple straight spring. In Fig. 4 the pulley *d* is replaced by two straight pieces, *o o*, hinged to the lever B at Z, and working in a notch in the lever C.

These three modifications I consider as mere equivalents of my device; but I prefer the mode described, and as shown in Fig. 1.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The lever B, provided with the pallet-jewel *p* and pulley *d*, in combination with the lever C, provided with the notch K and hair-spring H, substantially as shown, and for the purpose set forth.

CHARLES HOLES.

Witnesses:

ROBERT M. CHAMBERLAIN,
D. C. OYSTER.