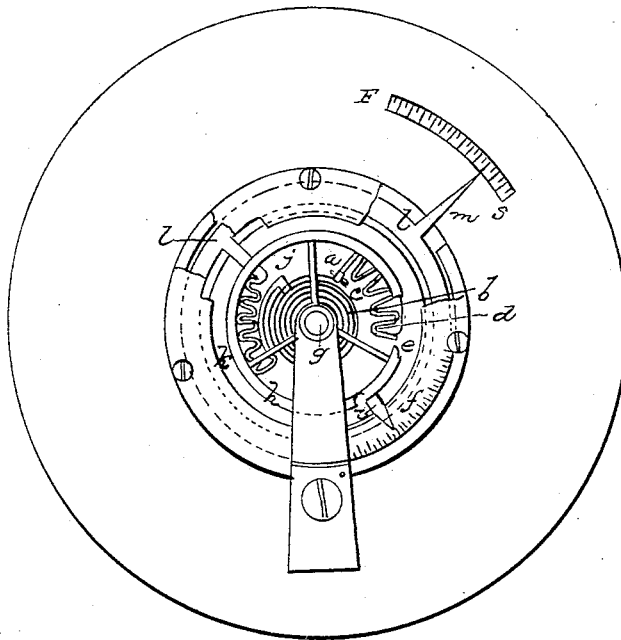


S. HITTEL.

Watch.

No. 48,942.

Patented July 25, 1865.



WITNESSES:

Met Leamy
J M Combs

INVENTOR.

S Hittel
By Lunn & Co

UNITED STATES PATENT OFFICE.

SAMUEL HITTEL, OF DETROIT, MICHIGAN.

IMPROVEMENT IN WATCHES.

Specification forming part of Letters Patent No. 48,942, dated July 25, 1865.

To all whom it may concern:

Be it known that I, SAMUEL HITTEL, of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement in Time-Keepers; 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 make and use the same, reference being had to the accompanying drawing, forming part of this specification.

The drawing represents a sectional plan or face view of this invention on an enlarged scale.

In connection with the movable hair spring stud a curve-spring is used for the purpose of overcoming the effect of the atmosphere on the hair-spring and of keeping the watch in beat.

The invention consists, also, in an undulating spring attached to the regulator in such a manner that the effect of the atmosphere on the balance is overcome, said regulator connecting directly to the hair-spring.

It is a well-known fact among watch-makers that the process of putting watches in beat is very tedious. It requires an expert hand to remove the pin that fastens the hair-spring to the stud without injury to said spring, and on account of this great difficulty watch-makers rarely, if ever, get a watch in perfect beat, thus often preventing the best of watches from keeping accurate time. This difficulty is overcome by the simple and quick process which I use, and which enables any one to put the watch in perfect beat without causing any injury whatever. This purpose is effected by making the hair-spring stud *a* movable. The end of the hair-spring *b* is secured in the stud *a* by means of a pin, *c*, in the usual manner; but said pin is not calculated to be removed when once secured. The hair-spring stud is secured to the loose end of a curve-spring, *d*, which extends from a ring, *e*, which is held in position by an annular cap, *f*, and to which a

revolving motion round the spindle *g* of the balance *h* can be imparted by a pointer or index, *i*. This index points on a scale marked on the surface of the cap *f*, and by turning it back and forth the beat of the balance can be regulated in a short time with perfect accuracy. By the curve-spring the effect of the atmosphere on the hair-spring is counteracted, this effect being such that it (the hair-spring) will uncoil and expand in the ratio of two to one under heat, and under cold it will coil up and contract in the same proportion. By this expansion and contraction of the hair-spring the watch is put out of beat, and I have therefore adjusted the undulating spring in such a manner that by its expansion and contraction that of the hair-spring is counteracted, and the correct beat of the watch is not disturbed.

The regulator *j* is secured to the lower end of a spring, *k*, which extends from a ring or segment, *l*, moving in a circular groove under the cap *f*. The position of this ring is adjusted by an index, *m*, pointing to a suitable scale, whereby the speed of the watch is adjusted. The expansion and contraction of the balance is overcome by the opposing expansion and contraction of the curve-spring, and the motion of the balance is rendered independent of the influence of the atmosphere.

I claim as new and desire to secure by Letters Patent—

1. The curve-spring *d*, in combination with the movable stud *a* and hair-spring *b*, constructed and operating substantially as and for the purpose described.

2. The curve-spring *k*, in combination with the regulator *j*, hair-spring *b*, and balance *h*, constructed and operating substantially as and for the purpose specified.

SAMUEL HITTEL.

Witnesses:

FRED. I. SIMMONS,
ALEXANDER GRAY.