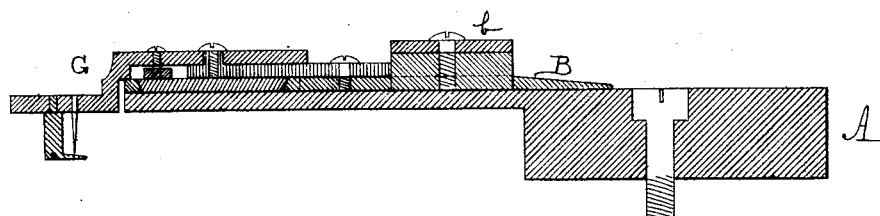
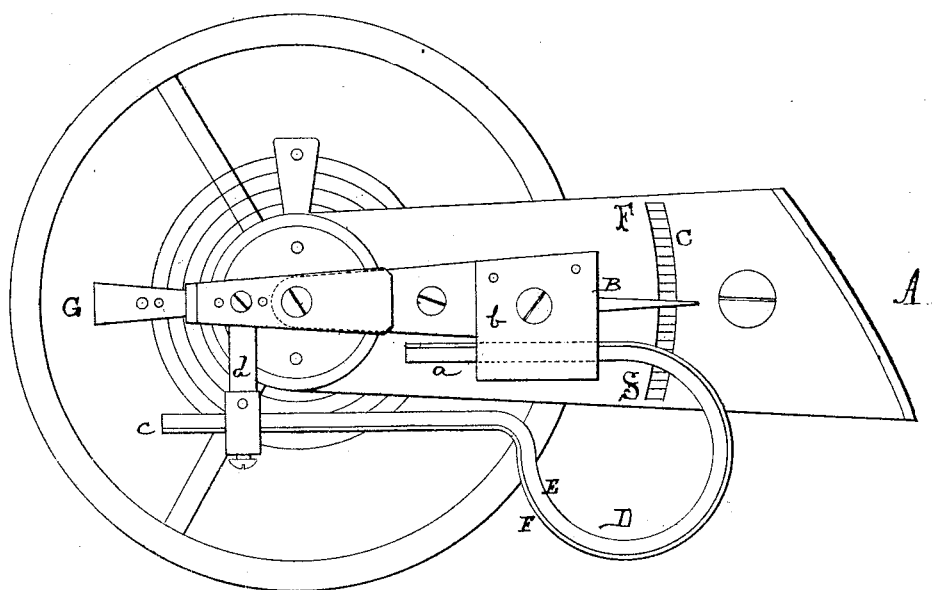


J. P. CLARK.

Improvement in Compensating Watch-Regulators.

No. 114,644.

Patented May 9, 1871.



WITNESSES.

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UNITED STATES PATENT OFFICE.

JEDEDIAH P. CLARK, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN COMPENSATING WATCH-REGULATORS.

Specification forming part of Letters Patent No. **114,644**, dated May 9, 1871.

To all whom it may concern:

Be it known that I, JEDEDIAH P. CLARK, of the city and county of Philadelphia, and State of Pennsylvania, have invented new and useful Improvements in Regulators for Watches; and I do hereby declare the following to be a clear and exact description of the nature thereof, sufficient to enable others skilled in the art to which my invention appertains to fully understand and use the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a top or plan view of the regulator of a watch with my invention applied thereto. Fig. 2 is a central longitudinal section thereof.

Similar letters of reference indicate corresponding parts in the two figures.

It is well known that the balance-wheel of the most accurate watch makes about eighteen thousand vibrations in one hour, and the greatest difficulty to be overcome in the regulation of a watch is to make those divisions of time equally exact. A poorly-constructed compensating-balance is almost certain to get "out of weight" in expanding and contracting, and the variation of a plain-balance watch, when subjected to the heat of the body, after it has been regulated to a uniform temperature of sixty to seventy degrees, is much more than most watch-makers appreciate.

My invention is designed to produce a reliable compensating-regulator; and it consists in a curb or arm attached to and moving with the regulator, for the purpose of automatically lengthening and shortening the working part of the hair-spring relatively to the slightest change of temperature, virtually keeping the spring the same length in heat or cold.

Referring to the drawings, A represents the bridge of a watch, provided with the regulator-index B and scale C.

D represents the compensating-curb. It consists of a piece, E, of zinc, brass, or other suitable metal, and a piece, F, of steel, which pieces are arranged together, forming a compound strip, which is secured to and moves

with the regulator. The inner side or piece of the curb is a metal that expands in heat and contracts in cold much more than steel. In the present case the inner side or piece of the curb is zinc. The expanding and contracting properties of zinc and steel in heat and cold are in a ratio of about four to one, (4 to 1.) The curb is of curved form, and one end is firmly attached to the index, as at *b*. The other end, *c*, is adjustably connected to a piece, *d*, which is pivoted to the portion G of the regulator, which carries the regulating-pins, which lengthen and shorten the working part of the hair-spring, said portion G being jointed to the other portion of the regulator. The curb can be readily lengthened and shortened as required by sliding it in and out of the index, which is slotted for that purpose, and the end *c* can be attached nearer to or farther from the center of the jointed portion G, and, when once properly adjusted, it can be permanently fastened or marked, so that in cases of subsequent removal it can be afterward replaced in the same spot. It will be seen that the curb does not interfere with the manipulation of the regulator proper, but moves with it as it sweeps over the scale.

The operation is as follows: When the inner metal of the curb expands or contracts, it forces the pin end of the regulator in a circle corresponding with the hair-spring, thus moving the pins to counteract the lengthening and shortening of the spring—that is to say, in cases of heat and expansion the hair-spring expands as well as the curb. The hair-spring is thus lengthened, and will cause the watch to run slower; but the expansion of the curb at once acts on the regulator in such a manner as to shorten the working part of the hair-spring, and thus bring the speed of the watch to the proper regulation. In cases of contraction the hair-spring shortens and the contraction of the curb causes the regulator to lengthen the working part of the spring, whereby the speed is again equalized.

The curb, as hereinbefore stated, can be applied to any kind of a watch, and will be found to be simple and practical for the purpose intended.

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

The combination and arrangement of the compound compensating curb or strip E F with the regulating-arm or index B, and with the pivoted arm G, carrying the pins for adjusting the hair-spring, whereby the compen-

sating-curb is caused to expand and contract laterally, as described.

The above specification of my invention signed this 3d day of March, 1871.

JEDEDIAH P. CLARK.

Witnesses:

JOHN A. WIEDERSHEIM,

PERCY V. KNEASS.