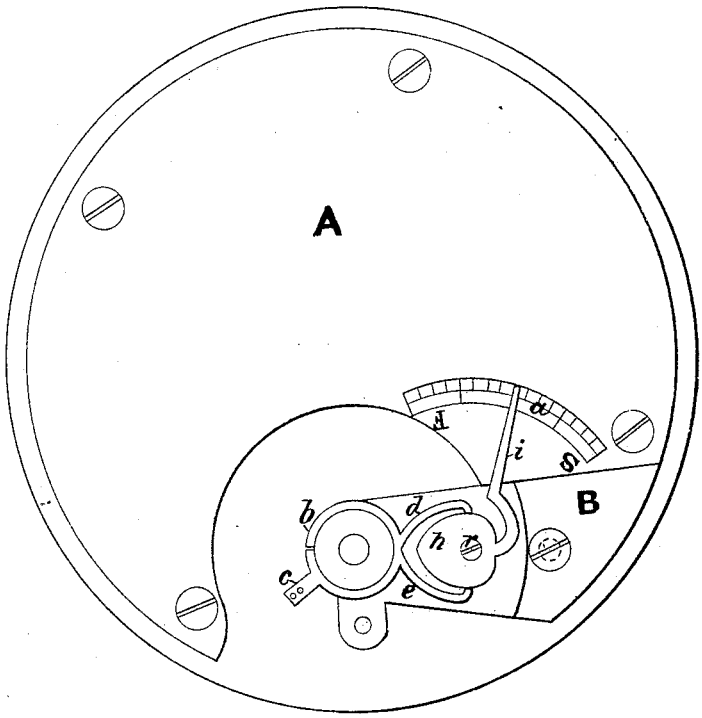
C. V. WOERD.

Micrometer-Regulator for Watches.

No. 197,710. Patented Nov. 27, 1877.



Witnesses.

M. Wilde.

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UNITED STATES PATENT OFFICE.

CHARLES V. WOERD, OF WALTHAM, MASSACHUSETTS, ASSIGNOR TO AMERICAN WATCH COMPANY, OF SAME PLACE.

IMPROVEMENT IN MICROMETER-REGULATORS FOR WATCHES.

Specification forming part of Letters Patent No. **197,710,** dated November 27, 1877; application filed November 3, 1877.

To all whom it may concern:

Be it known that I, CHARLES V. WOERD, of Waltham, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Micrometer-Regulators for Watches, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings.

The object of my invention is a micrometer-regulator which is free from many imperfections found in those now in use, and which combines simplicity of form with regularity of motion and extreme delicacy of adjustment; and my invention consists in producing a micrometer-regulator which insures regularity and uniformity of motion, in such a manner that equal distances moved by the pointer on the index-plate causes also equal distances to be passed by the regulating-arm, and the prevention of all backlash; and I accomplish this by constructing the regulator in two pieces, one of which is an ordinary ring movable about the axis of the balance, and terminating in a projection holding the curb-pins, and provided with two slightly-flexible arms, the latter being operated by the second piece, which is a heart-shaped cam with pointer.

Referring to the drawing, A represents the top plate of a watch, with the index-plate *a* attached thereto. B is the cock. To the circular projection at the upper end is snapped the ring *b*, with the projection or regulating-arm *c*, and the two curved and elastic arms *d e*, which, for the purpose of preventing all slackness caused by wear, are sprung against the curves of the heart-shaped cam *h*, which latter is pivoted at *r*, and has attached to it the index *i*, pointing to the divisions of the scale on the index-plate *a*.

It will be seen that the ratio of the pointer *i* and curved arms *d e* to the eccentricity of cam *h* and regulating-arm *c* is so great that the motion of the index *i* for every division on the scale produces but a very minute motion of arm *c*, by which the acting part of the hair-spring is lengthened or shortened; and, further, that the distance between the points of contact of the arms *d e* with the cam *h* remains always the same, whatever may be the position of the cam, and also the rise and descent of these points are equal for equal angular motions of the cam; consequently the motion of arm *c* will also be equal and uniform; but the angular motion of the cam *h* is produced by the position of the pointer *i*, and therefore equal motions of the pointer *i* result in equal motions of arm *c*. The points of the arms *d e* being always in contact with the curves of the cam, no backlash or any other disturbance can possibly occur to arm *e* until the index *i* is set in motion.

By this simple and neat mechanism great security and nicety of adjustment of the hair-spring is obtained, and a most useful micrometer-regulator added to the improvement in watches.

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

A micrometer-regulator for watches, consisting of the heart-shaped cam *h*, with index *i*, in combination with the arms *d e*, constructed and operated substantially as above described.

CHAS. V. WOERD.

Witnesses:
WM. H. WRENN,
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