(Model.)

S. L. GAARDER.

WATCH REGULATOR.

No. 459,278. Patented Sept. 8, 1891.

Fig. 1.

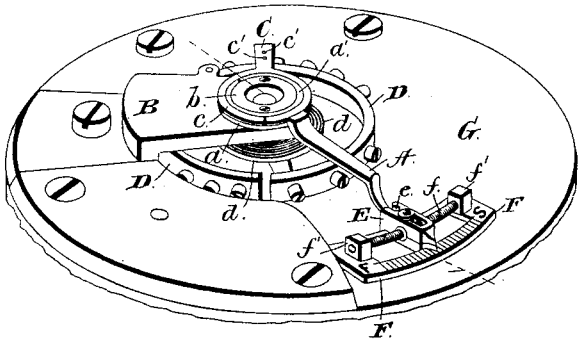


Fig. 2.

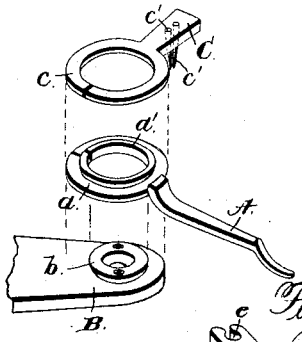


Fig. 3.

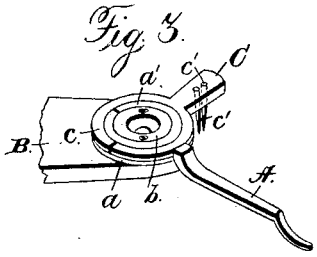


Fig. 4.

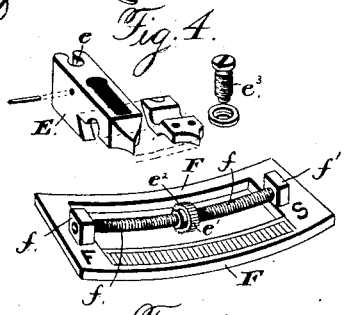
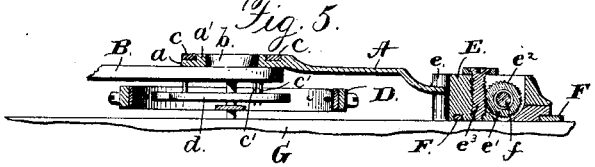


Fig. 5.



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UNITED STATES PATENT OFFICE.

SIMON L. GAARDER, OF STARBUCK, MINNESOTA.

WATCH-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 459,278, dated September 8, 1891.

Application filed July 19, 1890. Serial No. 359,281. (Model.)

To all whom it may concern:

Be it known that I, SIMON L. GAARDER, of Starbuck, in the county of Pope, and in the State of Minnesota, have invented certain new and useful Improvements in Watch-Regulators; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is an enlarged perspective view of my regulating mechanism as applied to a watch-movement. Fig. 2 is a like view of the parts of the regulator and of the pivotal end of the balance-cock separated from each other. Fig. 3 is a perspective view of the parts of said regulator combined. Fig. 4 is a like view of the parts of the micrometer device separated from each other, and Fig. 5 is a section upon line *x x* of Fig. 1.

Letters of like name and kind refer to like parts in each of the figures.

In the regulation of watches it is desirable that the regulator-bar should occupy a position substantially at the center of the graduated scale over which its end passes when the watch has been brought to correct time; but with the construction heretofore employed such adjustment is practically impossible without changing the length of the hair-springs or the positions or weights of the balance-screws. Should the length of hair-spring be changed, the balance is thrown out of beat, and the position of the spring-collet must be correspondingly changed to place said balance again in beat, while should the position or weight of the balance-screws be varied the adjustment of said balance for variations of temperature would be destroyed.

The object of my invention is to render practicable a speedy and accurate adjustment of the operative length of the hair-spring of a watch; and to such end my said invention consists, principally, in a watch-regulator which is provided with a part for supporting the curb-pins, that is separately constructed and is independently movable upon or around the pivotal center of the regulator bar or pointer to permit an adjustment of the hair-spring without moving the bar or pointer, substantially as and for the purpose hereinafter specified.

It consists, further, in a watch-regulator which has its curb-pins supported upon and carried by a part that, while capable of independent motion, is adapted to be moved by and with the regulator bar or pointer, substantially as and for the purpose hereinafter shown.

It consists, further, in a watch-regulator in which the regulator-bar is connected with a block that is adapted to be moved laterally in each direction, and is so moved, when desired, by means of a worm-nut, which is journaled therein and engages with a stationary screw, and a worm that is journaled within said block and engages with the peripheral teeth of said worm-nut, substantially as and for the purpose hereinafter set forth.

It consists, further, in the combination of the regulator-bar, the independently-movable curb-pin support, the laterally-movable block, and means whereby said block may be moved within its limits, substantially as and for the purpose hereinafter shown and described.

It consists, finally, in the construction and combination of parts, substantially as and for the purpose hereinafter specified.

In the carrying of my invention into practice I employ a regulator bar or pointer A, of ordinary form, except that it has no curb-pins or means for attaching the same, and at its inner end provide the usual divided hub *a*, which is adapted to engage with a round boss *b* upon a balance-cock B and operates to pivot said arm upon said cock and to hold the former by friction in any position to which it is adjusted.

Upon the upper side of the hub *a* is formed an annular flange *a'*, upon which is pivoted a hub *c*, that is formed upon one end of a bar C, which hub is divided at one point and by friction caused by the inward spring of its arms operates to confine said bar in place upon said flange and to hold it with a yielding force in any desired radial position with relation to the regulator-arm A. Said bar or arm is provided with curb-pins *c'* and *c'*, which, when a balance D is in place, project downward upon each side of the hair-spring *d* and operate in the usual manner to define and limit its operative length. As thus constructed and combined, it will be seen that as the curb-pin arm is pivoted upon the reg-

ulator-bar it will be moved by and with the latter and that it may be independently moved, when desired, for which purpose the frictional contact between said arm and bar is less than between the latter and the balance-cock. When now it is desired to regulate a watch, the bar A is set at mid-position and the arm C turned in the desired direction until the vibrations of the balance are approximately correct, after which the adjustment is completed by slight movements of the outer end of said regulator-bar. With a little care the adjustment can be effected without moving the outer end of said regulator-bar materially out of its mid-position, as no movement of the latter is necessary except such as is required for securing a slight variation in the rate of the balance. The outer end of the regulator-bar A is contained within a notch *e*, that is formed within an oblong block E, which block rests upon and is adapted to travel over a curved open plate F, that is attached to or upon the contiguous movement-plate G. A nut *e'*, having peripheral worm-teeth e^2 e^2, is journaled within said block and engages with and is adapted to travel over a screw *f*, that is curved longitudinally to correspond to the curvature of said plate F and has its ends confined within bearings *f'* and *f'*, which are provided at the ends of the latter. If now the nut *e'* is rotated within the block E, its travel over the screw *f* will cause said block and the outer end of the regulator-bar A to be moved in the same direction. Such rotation of said nut is effected by means of a worm e^3, which is journaled vertically within said block in engagement with the worm-teeth e^2 and e^2, so that by turning said worm by means of a screw-driver inserted into a slot in its upper end said worm-nut will be rotated. The threads of said screw and worm have fine pitches, so that one revolution of the latter will cause but an infinitely small movement of the outer end of the regulator-bar.

The advantage of the micrometer adjustment will be obvious, as it enables variations to be effected in the rate of the balance, which would be impracticable by other means, while in consequence of the independently-movable curb-pin arm the employment of such fine adjusting mechanism is rendered practicable and the regulation of a watch having the same short and easy.

While the mechanism for effecting the coarse and fine adjustments are preferably used together and are, when combined, mutually advantageous, they are capable of separate use and may be so used, if desired.

Having thus described my invention, what I claim is—

1. A watch-regulator which is provided with a part for supporting the curb-pins, that is separately constructed and is independently movable upon or around the pivotal center of the regulator bar or pointer to permit an adjustment of the hair-spring without moving the bar or pointer, substantially as and for the purpose specified.

2. A watch-regulator which has its curb-pins supported upon and carried by a part that while capable of independent motion is adapted to be moved by and with the regulator bar or pointer, substantially as and for the purpose shown.

3. As an improvement in mechanism for regulating watches, a regulator bar or pointer which is frictionally pivoted upon the balance-cock and a curb-pin arm that is frictionally pivoted upon the regulator bar or pointer, substantially as and for the purpose set forth.

4. A regulator for watches, constructed of two parts, one consisting of a journaling-hub and an indicator or pointer bar and the other a hub and an arm carrying the curb-pins, said parts being frictionally held together, so that the second may have a movement independent of the first and yet be moved thereby when desired, substantially as and for the purpose specified.

5. A watch-regulator in which the regulator-bar is connected with a block that is adapted to be moved laterally in each direction and is so moved when desired by means of a worm-nut which is journaled therein and engages with a stationary screw, and a worm that is journaled within said block and engages with the peripheral teeth of said worm-nut, substantially as and for the purpose shown and described.

6. The combination of the regulator-bar, the independently-movable curb-pin support, the laterally-movable block, and means whereby said block may be moved within its limits, substantially as and for the purpose specified.

7. In combination with a regulator-bar, the laterally-movable block, the curved stationary screw, the worm-nut, and the worm journaled within said block, substantially as and for the purpose shown.

In testimony that I claim the foregoing I have hereunto set my hand this 12th day of June, A. D. 1890.

SIMON L. GAARDER.

Witnesses:

K. L. BREVIG,

OLUF E. KJEABST.