2 Sheets—Sheet 1.

E. MacNUTT.

WATCH-REGULATOR.

No. 169,458. Patented Nov. 2, 1875.

Fig. 1

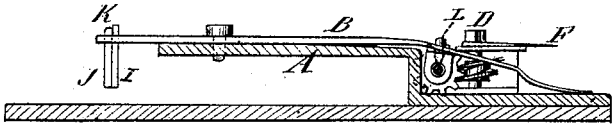


Fig. 2

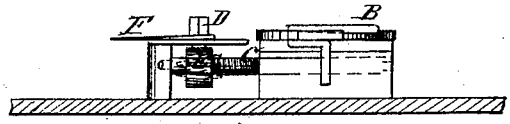
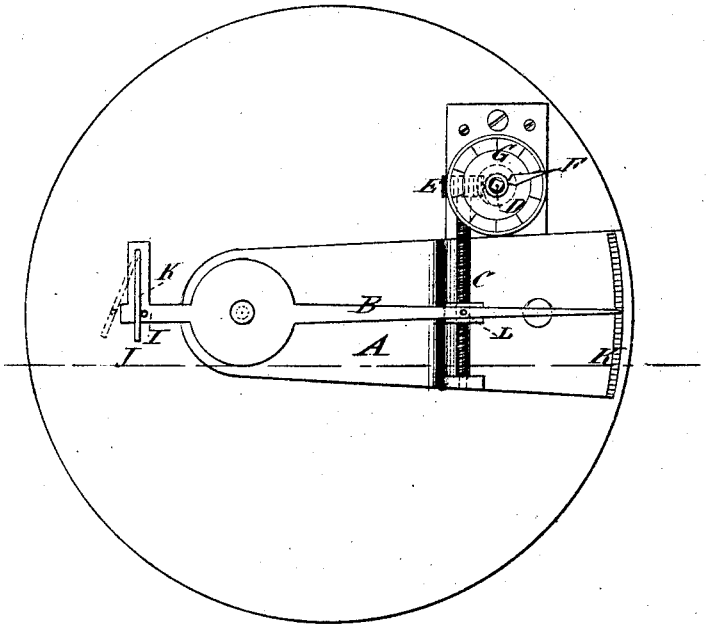


Fig. 3



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2 Sheets—Sheet 2.

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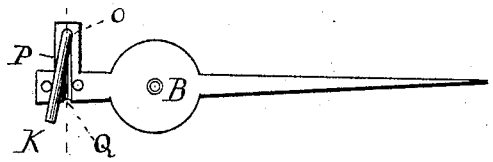

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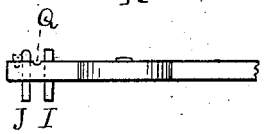

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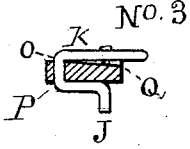

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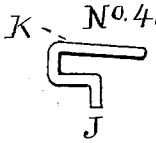

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UNITED STATES PATENT OFFICE

EZRA MAC NUTT, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN WATCH-REGULATORS.

Specification forming part of Letters Patent No. **169,458**, dated November 2, 1875; application filed May 8, 1875.

To all whom it may concern:

Be it known that I, EZRA MAC NUTT, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and Improved Watch-Regulator, of which the following is a specification:

The object of my invention is threefold: first, to enable the operator to move the regulator-pointer in the minutest desirable degree with perfect accuracy and facility; second, to enable any watchmaker about to clean the watch to secure the position of the screw-nut on the shaft which controls the regulator-pointer, so that, after the watch has been cleaned and the removed parts replaced, the exact former position of the regulator-pointer will be restored, and consequently the heretofore necessity of retaining the watch for some days to reregulate it is avoided; and, third, to provide for closing the movable curb-pin into contact with the hair-spring, so as to avoid any sliding motion of the same upon the spring, and consequently the liability of moving the spring, and thus altering the effective length of the same.

That part of my invention which relates to the first object named consists of a bridge screwed down firmly to the watch-plate, the upper part of which bridge is made in the form of a circular dial-plate, divided on its upper surface by radial lines into ten equal parts, and in the center of said plate the upper journal of a worm projects perpendicularly a short distance above the plate, and carries at a right angle thereto a fixed slender arm, which will successively point to the said divisions if the worm be rotated, and the said worm gears with a ten-toothed worm-wheel, which is fixed on the near end of a very finely-threaded screw-shaft, which is supported by its journals in a position a little above and parallel to the watch-plate, and carries a round screw-nut, which is provided with a set-screw pin, which projects radially from one of its sides freely through an oblong hole made longitudinally through the indicating end of the regulator-pointer, in such a manner that if the slender arm which projects radially over the dial-plate be moved around the length of one of the ten spaces on the latter the worm will be moved one-tenth of a full rotation on its journals, and the screw-shaft, with which the worm connects through its worm-wheel, will at the same time be moved only the one-hundredth part of a full rotation, and consequently the advanced or retracted movement, as the case may be, of the said screw-nut, which operates the regulator-pointer, will be inappreciable to the naked eye of the operator in regulating the watch; but nevertheless the regulator-pointer will have been moved at the same time in the direction intended; and it follows, of course, that if one complete or full circuit of the said arm be made over the dial-plate the screw-shaft which carries the nut will be moved only the one-tenth of a complete rotation, and that in order to move the said screw-shaft one complete rotation the dial-pointer must be moved around ten complete circuits over the dial-plate; and the threads of the shaft which carries nut being, as they are, exceedingly fine in size and pitch, one complete rotation of said shaft will move the nut along only one thread, and consequently the index end of the regulator-pointer would be moved over a space so small that it would hardly be visible to a naked eye. The lower journal of the worm has its bearing in a corresponding hole in the base of the bridge, and the projecting portion of the upper journal thereof may be squared to receive over it the barrel of a common watch-key in rotating the worm; but as the rotary movement of the same requires so little power that a common pin, or even a delicate quill tooth-pick applied to the pointer, will be sufficient for the purpose, a key will not be required.

In view of the above explanations this part of my invention may be said to be micrometrical in its operation as a watch-regulator.

That part of my invention which relates to the second object named consists in the construction and application of the set-screw pin which projects radially from one side of the screw-nut through an oblong hole in the regulator-pointer, and carries the latter, as has just been explained; and for that purpose it would answer as well if it were rigidly or immovably fixed in the nut; but it could not as a fixed pin serve the purpose of the second object; and therefore I construct and apply it to the nut as a set-screw, whereby the former can

at any time be firmly fixed or prevented from any change in its position upon the screw-shaft that carries it, when it becomes necessary to clean the watch and it shall be desirable to preserve the exact regulation existing before the requisite separation of other parts ot the regulator. The restoration of the regulation, of first-class watches especially, immediately after they have been cleaned, is a matter of much importance both to the owner and to the watch-maker, as it avoids the trouble and delay consequent upon the daily efforts to find the original position of the nut on the screw-shaft.

All American watches and the greater portion of foreign watches are so constructed that the hair-spring is not required to be released or unpinned, at either end, from its immediate attachments, when taking the watch apart for ordinary repairs and cleaning; and, as the said attachments cannot be reapplied in any other than their original positions, the original regulation will be restored as soon as the dismembered parts are again put together.

The regulator-pointer can be readily lifted out of contact with the projecting set-screw, and the latter turned down so as to allow the regulator-pointer to be moved the full distance from side to side by hand, as required when the operator is putting in a new hair spring or adjusting an old one. A changing of the hair-spring will, of course, require that the watch be retained for some time by the watch-maker, in order to find a true regulation.

That part of my invention which relates to the third object named consists in the peculiar construction and operation of the movable curb-pin, whereby the latter can be closed and opened with greater facility, and, in closing, will not be liable to slide on the hair-spring and, consequently, move it out of place, nor cease to hold the spring firmly when closed. As the movable curb-pin is carried by the regulator-pointer together with the stationary one, it is necessary that the two should release the hair-spring before the regulator-pointer is moved; otherwise the latter would injure the spring or draw it out of place. In this part of my invention the shorter end of the regulator-pointer is provided with a lateral extension at a right angle to the regulator-pointer, and directly opposite to the pair of curb-pins when the latter are closed together. At the mid-width of the said lateral extension, and near its free end, a small hole is drilled, and into this hole a piece of springy wire is inserted, and the projecting ends of the said wire then bent toward each other against the respective upper and under sides of the said extension, so that they will clasp the latter between them. From the center of the hole in which the bent wire is retained a round-bottomed groove is made in the upper side of the extension and end of the regulator-pointer, so as to be at a right angle to the length of the latter, or, which amounts to the same line of direction, parallel with the side edges of the said lateral extension. The object of this groove is to receive the upper portion of the bent wire, which will spring into it and thus be held sufficiently secure to prevent its being moved out accidentally. Close to the one side of the said groove a small hole is drilled and the stationary curb-pin is secured therein in the usual manner, but with its upper end projecting sufficiently above the upper surface of the regulator-pointer to serve as an infallible stop, which will prevent the upper arm of the wire from being forcibly pushed out of its groove in that direction. At a short distance from the opposite side of the groove another stop is fixed directly opposite to the first-described one, which prevents the said upper arm of the wire from being forcibly moved too far, as will immediately be explained.

The free end of the upper wire may now be cut off so as to have it project a little beyond the edge of the regulator-pointer. The lower arm of the springy wire is now bent downward at a right angle, or, (which amounts to the same direction,) into a position perpendicular to the under side of the said regulator-bar, and consequently parallel to the stationary curb-pin before described. It is then to be cut off so as to be of the same length as the stationary one. As the two arms of the springy wire are parallel to each other, it will be readily understood that, as the upper arm is moved out of or into the groove, the movable curb-pin will recede from, or come into contact with, the stationary curb-pin, and thus accordingly release or secure the end of a hair-spring which may be between them, and that as the movable curb-pin, with its springy arms, is of delicate construction, a very light or delicate pressure only is required to move the pin either into or out of contact with the end of a hair-spring between them. When the upper arm of the movable pin is moved out of its groove, it rests in that position upon the flat surface between the groove and its stop. But the most important feature in this part of my invention consists in the fact that the movable curb-pin is caused to come into direct contact with, and to separate from, the hair-spring at a right angle to the radius or straight line between it and its center of movement, and therefore there cannot occur any sliding or drawing motion upon the hair-spring which could possibly move it, and consequently destroy the prior accuracy of the regulation which it is desirable to retain for the reasons hereinbefore set forth.

Referring to the accompanying drawing and diagrams 1 2 3 4, Figure 1 is a longitudinal sectional elevation of my improved regulating apparatus taken on the line *x x* of Fig. 3. Fig. 2 is a front elevation, and Fig. 3 is a plan view.

Similar letters of reference indicate corresponding parts.

A is the bridge of the regulator-pointer B; C, the finely-threaded screw-shaft which connects with the worm-gear E and carries the

nut, with its set-screw pin, and operates the regulator-pointer B; F, the index arm of the dial-plate; and G, the dial-plate, which also forms the upper part of the bridge that supports the upper journal of the worm. I is the stationary curb-pin, and J the movable one, consisting of the lower portion of the bent springy wire K, which swings horizontally from the hole O in the curb, or lateral extension P, so as to enable the operator to either clamp the usual hair-spring between the curb-pins I and J, or release it, as occasion may require, as before explained, and L is the set-screw pin (in the nut which is carried by the screw-shaft C) that enters the oblong hole in the regulator-pointer B, and thus moves the latter when the watch is being regulated, and holds it securely afterward, and also enables the watch-maker about to clean the watch to fix securely the original correct position of the said nut on the screw-shaft C, so that in restoring the disconnected parts the original correct regulation will necessarily be restored. The object in making the hole in the regulator-pointer, through which the set-screw pin L passes, of an oblong form is to allow the pin or set-screw L to move freely therein, or without binding, which could not be the case if the hole were round, or if that part of the regulator-pointer be laid in a straight groove in the nut, because the nut is moved in a straight line and the regulator-pointer in a curved one.

All the parts of my invention can be applied to, or detached from, the watch-plate by means of the one screw which passes through the base of the dial-bridge. In order to remove or detach the same, the regulator-pointer B is first lifted off from the nut and moved to one side out of the way. Then the one screw which holds the dial-bridge firmly on the watch-plate is withdrawn, thus releasing the whole invention, so that it can be lifted and set aside, with the exception of the curb-pins I and J, which are fixed to the regulator-pointer.

Having thus minutely described my improvement in watch-regulators, it will be understood, without any further explanation, that it is not only simple in construction, but can be applied to almost any watch with facility, and afterward be readily and accurately regulated by any inexperienced person, or even by a child capable of guiding a dress-pin or a quill tooth-pick.

I claim as my invention—

1. The combination of the set-screw pin L, with the screw-nut on the shaft C, of the watch-regulator described, for the purpose of rigidly fixing the said nut upon the screw C, as occasion may require, as before set forth.

2. The movable curb-pin J, constructed to operate as described, in combination with the groove *q* in the curb or lateral extension P of the regulator-pointer B, and the stationary curb-pin I, for the purposes set forth.

EZRA MAC NUTT.

Witnesses:

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CHAS. H. MAC NUTT.