

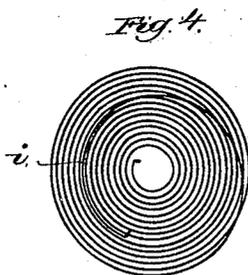
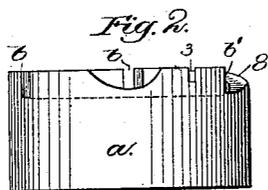
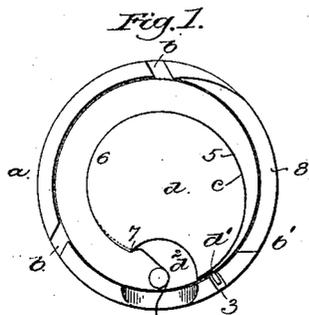
(No Model.)

J. LOGAN.

MANUFACTURE OF HAIR SPRINGS.

No. 287,448.

Patented Oct. 30, 1883.



Witnesses.

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UNITED STATES PATENT OFFICE.

JOHN LOGAN, OF WALTHAM, MASSACHUSETTS.

MANUFACTURE OF HAIR-SPRINGS.

SPECIFICATION forming part of Letters Patent No. 287,448, dated October 20, 1883.

Application filed June 4, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN LOGAN, of Waltham, county of Middlesex, State of Massachusetts, have invented an Improvement in Manufacture of Hair-Springs, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to a method and apparatus for making hair-springs for watches; it being intended to produce what is known as the "Breguet" spring, or one in which the regulator-pins engage a circular portion of the spring concentric with the balance-pivot and lying above the plane of the main portion of the spring, it constituting what is called the "over-coil." These springs have heretofore been made from an ordinary spring, in which the coils are all in one plane, a sufficient portion of the outer coil being bent by hand to the proper shape to form the over-coil after the spring is otherwise finished and tempered. This manipulation requires great skill and training on the part of the operator, and thus greatly increases the cost of the spring, and the bending operation taking place after the spring is tempered is detrimental to it.

My present invention consists in first bending the spring to the proper shape and subsequently tempering it while held in the said shape; and the invention also consists in a tempering-box adapted to form a spring in the desired shape and retain it so while being tempered.

Figure 1 is a plan view of the tempering-box for making hair-springs in accordance with this invention; Fig. 2, a side elevation thereof, the cover of the box being removed; Fig. 3, a similar elevation of the cover by itself, and Fig. 4 a plan view of one of the springs.

The tempering-box *a* consists of a metallic cylinder recessed or bored for a certain depth, and provided with lateral passages *bb'*, through which the ribbons (preferably three in number) to form the spring are wound into the said box in the usual manner, the projecting ends of two of the said ribbons being cut off at the outer surface of the box, and the said ribbons, when coiled in the box, being retained therein by a cover, *d*, (shown as provided with a pro-

jection, *d'*), entering a notch, 3, in the side of the box *a*, to hold the said cover in definite position with relation to the said box. The main portion of the three coiled ribbons is thus confined in the box *a* below the under surface, 4, of the cover *d*, (see Fig. 3,) the upper surface of which is provided with a templet or spring-shaping shoulder, *e*, which, as shown in Fig. 1, begins at a point substantially tangential to the periphery of the said cover and curves inward by a spiral line, 5, to a certain distance from the said periphery, the remainder of the said surface being a curve, 6, concentric with the center of the box *a* and cover *d*. The shoulder or templet *e* is of gradually decreasing depth, it being substantially the whole depth of the cover at the starting-point tangential with the periphery thereof, and gradually diminishing in depth, as shown in Fig. 3. The end of the ribbon that is wound in through the opening *b'* in the side of the box, instead of being cut off even with the outside of the said box, is wound around the templet *e*, to form the over-coil, as shown at *i*, Fig. 4, of the same shape as the said templet and lying above the plane of the remaining coils of the spring, and the end of the said ribbon is drawn around the stud *d'* on the cover of the box *d*, as shown in Fig. 1, and by suitable pliers is pressed in around the end 7 of the concentric portion 6 of the templet, thus drawing it tightly around the said templet and securing it in place, the guiding portion of the templet being slightly undercut, as indicated in dotted lines, Fig. 1, and in Fig. 3, near the end 7. The three springs, two of ordinary form and one of the Breguet form, are then tempered in the usual manner, and when removed from the box the over-coil of the Breguet spring will retain the exact shape of the templet *e*, and is consequently more accurate than when bent by hand after the spring is tempered, and is also of better quality.

The side of the box *a* is preferably cut away, as shown at 8, on one side of the opening *b'*, through which the ribbon is drawn in, to facilitate the winding of the ribbon upon the templet *e*.

It is obvious that the said templet *e* may be of any desired shape—as, for instance, passing

in a substantially straight line from near the point *b'* to the beginning of the concentric curve 6.

If desired, the templet might be arranged for winding more than one of the springs contained in the box upon it; but it will generally be preferable to make only one of each set of springs in this manner, so as to avoid inaccuracies arising from the thickness of the different superimposed coils of ribbon.

I claim—

1. That improvement in the art or method of making Breguet springs, or springs in which the outer coil departs from the plane of the spiral curve, forming an over-coil, which consists in coiling a portion of the untempered ribbon that is to form the spring in a spiral curve, and bending the remaining portion of the said untempered ribbon into the proper shape for the over-coil, thus giving the entire ribbon while untempered its ultimate or finished shape or configuration, and subsequently tempering the said ribbon while retained in the said ultimate shape or configuration, substantially as described.

2. The box for tempering hair-springs, combined with the cover provided with a templet for shaping the outer or over coil of the ribbon to form the spring previous to its being tempered in the said box, substantially as described.

3. The box provided with openings for the introduction of the ribbons to form the springs, combined with the cover to confine the main portion of the coiled ribbons beneath it, provided with a templet on its upper surface, whereby a portion of one of the said ribbons may be bent and held in definite shape above the main coiled portions, substantially as described.

4. The box provided with openings for the introduction of the ribbons, and with a notch, 3, combined with the cover having a projection to enter the said notch and a templet or shaping-surface on its upper side, substantially as described.

5. The box provided with inlet-openings for the introduction of ribbons, and having its periphery cut away at the side of one of the said openings, combined with the cover provided with a templet, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN LOGAN.

Witnesses:

JOS. P. LIVERMORE,
BERNICE J. NOYES.