(No Model.)

J. LOGAN.

METHOD OF MAKING WATCH SPRINGS.

No. 377,489. Patented Feb. 7, 1888.

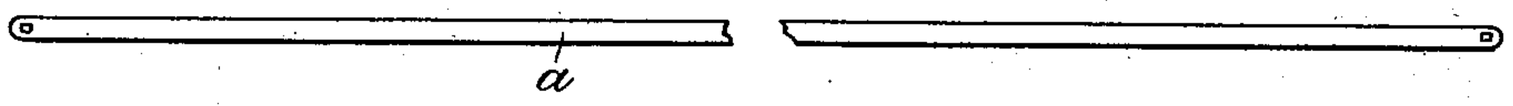

Fig. 1.

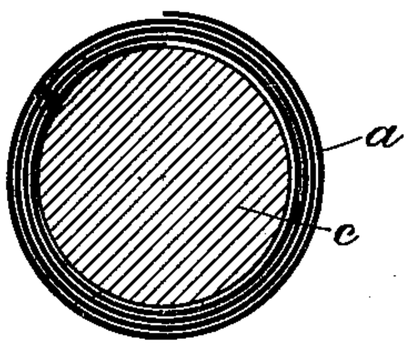

Fig. 2.

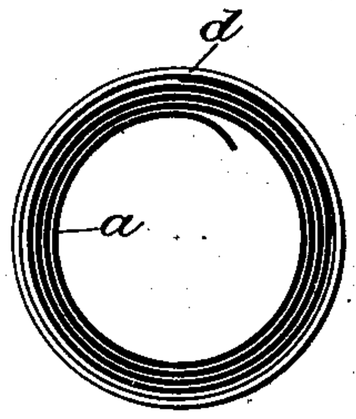

Fig. 3.

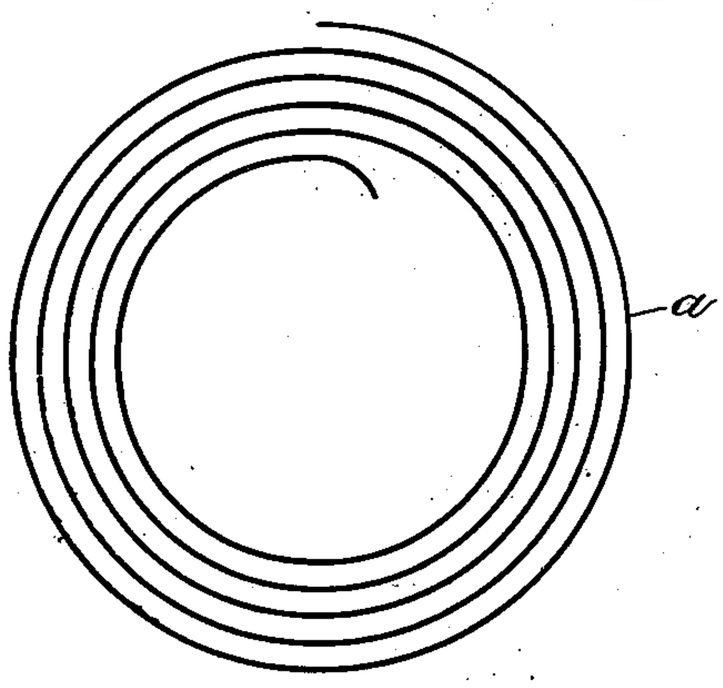

Fig. 4.

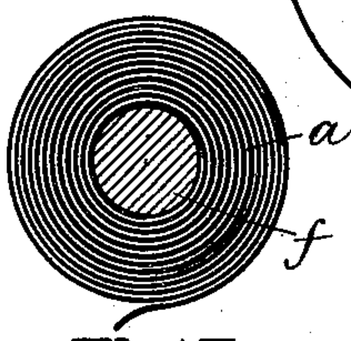

Fig. 5.

Fig. 6.

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UNITED STATES PATENT OFFICE.

JOHN LOGAN, OF WALTHAM, MASSACHUSETTS.

METHOD OF MAKING WATCH-SPRINGS.

SPECIFICATION forming part of Letters Patent No. 377,489, dated February 7, 1888.

Application filed September 30, 1887. Serial No. 251,090. (No model.)

To all whom it may concern:

Be it known that I, JOHN LOGAN, of Waltham, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Mainsprings for Watches, &c., and the Method of Making the Same, of which the following is a specification.

The motive power of a watch is stored up in the mainspring, which may be described as a narrow ribbon of tempered steel which is coiled up in the "barrel." When the spring is wound up—*i. e.*, coiled closely upon itself around the barrel-arbor, to which the inner end of the spring is attached—the effort of the spring is to uncoil itself or "straighten out;" but as the arbor, to which the inner end of the spring is ordinarily fastened, is prevented from turning, the spring of course reacts upon the inclosing-barrel, to which its outer end is attached, and causes it to turn as fast as the action of the train will allow. In an ordinary pocket-watch the room which can be given to the barrel and its inclosed mainspring is of necessity quite limited, and therefore the great desideratum is to get a spring as thin as possible, that there may be length sufficient to give the requisite number of turns to the barrel to run the watch certainly not less than twenty-four hours, and preferably thirty-six to forty hours. If, however, the spring be made too thin, the result will be that its action will be so weak as to fail to impart a proper motion to the balance, which will be unsteady in action and easily stopped.

The object of my invention is to provide a spring which may be made thinner than the ordinary spring, and at the same time be so formed as to possess the life or "pull" which will enable it to drive the train the desired length of time without sensible loss of power.

My invention therefore consists in the improved spring and the method of making the same, hereinafter described and claimed.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a view of the ribbon of which my improved spring is made. Fig. 2 represents a view of the spring as coiled on the larger arbor or winder. Fig. 3 represents a view of the spring, coiled as shown in Fig. 2, transferred to a holder or capsule. Fig. 4 represents the spring, coiled as shown in Fig. 2, after the tempering operation, the spring being released. Fig. 5 represents the spring as coiled the second time. Fig. 6 represents the completed spring released. Figs. 2, 3, 4, and 5 show the spring considerably enlarged.

The same letters of reference indicate the same parts in all the figures.

In carrying out my invention I make the spring in the ordinary form of a straight ribbon, *a*, Fig. 1, and after determining the length of spring to be used I punch in each end of it an eye, *b*, of the same form as that ordinarily punched in the inner end only, each eye being formed to engage a stud or pin on an arbor. Then, the temper having previously been drawn sufficiently low to allow of safely coiling the spring on a large arbor, *c*, say three or four times the size of the barrel-arbor, one end of the ribbon is engaged by the eye therein with the larger arbor, and the ribbon is tightly coiled thereon, as shown in Fig. 2. Then while the ribbon is so coiled it is transferred to a circular cup or capsule, *d*, (shown in Fig. 3,) and then is submitted to the action of a sufficient degree of heat to produce a safe spring-temper. When cool, the spring is removed from the cup, when it will be found "set" in the form of a helical or flat spiral. (Shown in Fig. 4.) I then coil the spring on an ordinary arbor or winder, *f*, but in a reverse direction, as shown in Fig. 5, and commencing with the other end of the spring, so that when coiled the second time the end of the spring which was hooked to the winding-arbor at the first winding will be the outer end and will have a backward or reverse curve, and the entire spring will "open" to a much greater extent than a spring coiled in the ordinary manner, as shown in Fig. 6. As the ability of a spring to open is the measure of its power or effectivenesss, it is evident that springs made in this manner will possess a greater power and consequent value than those coiled in the ordinary manner.

Having thus described my improved method, I desire to claim—

1. The improved method hereinbefore described of making mainsprings, the same consisting in coiling the steel ribbon from which the spring is to be made on an arbor of greater

diameter than the barrel-arbor to which the completed spring is to be applied, then tempering it while it is so coiled, and finally coiling the spring in a reverse direction on a smaller arbor, as set forth.

2. The improved method hereinbefore described of making mainsprings, the same consisting in first partially drawing the temper of the steel ribbon from which the spring is to be made, then coiling the same on an arbor of greater diameter than the barrel-arbor to which the completed spring is to be applied, then tempering it while it is so coiled, and finally coiling the spring in a reverse direction on a smaller arbor, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 28th day of September, A. D. 1887.

JOHN LOGAN.

Witnesses:
D. H. CHURCH,
EDWARD A. MARSH.