(No Model.)

E. KARTHAUS.

MAINSPRING FOR WATCHES.

No. 397,504. Patented Feb. 12, 1889.

Fig. 1.

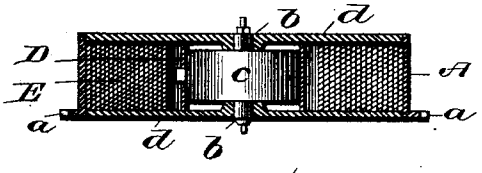


Fig. 2.

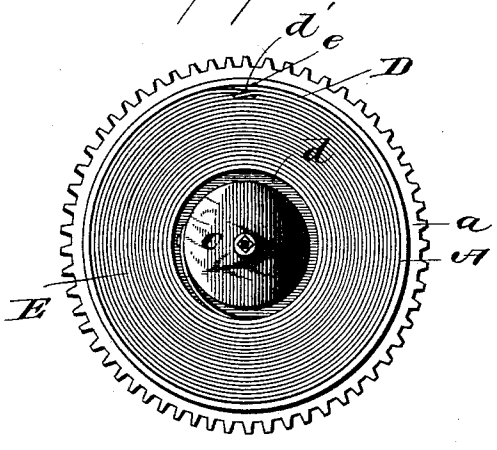
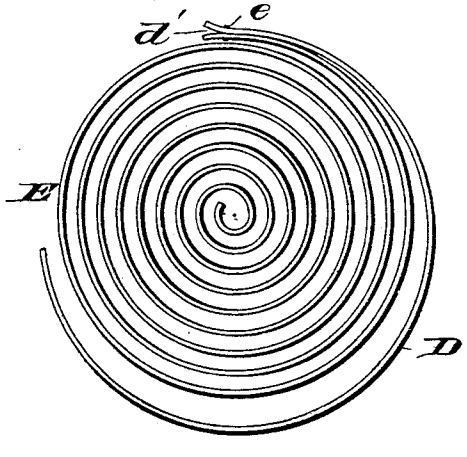


Fig. 3.



Witnesses:

Wm. H. Dishiell

A. L. Heaton

Inventor:

Ernest Karthaus

by Edson Bros.

his Attorneys

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

ERNEST KARTHAUS, OF HUNTSVILLE, ALABAMA.

MAINSPRING FOR WATCHES.

SPECIFICATION forming part of Letters Patent No. 397,504, dated February 12, 1889.

Application filed February 14, 1887. Serial No. 227,558. (No model.)

To all whom it may concern:

Be it known that I, ERNEST KARTHAUS, a citizen of the United States, residing at Huntsville, in the county of Madison and State of Alabama, have invented certain new and useful Improvements in Mainsprings for Watches, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in mainsprings for watches, that will be hereinafter fully described, and particularly pointed out in the claims.

This invention relates to an improvement in that class of mainsprings in which the outer end thereof is connected with a tension-spring encircling the inner periphery of the barrel, the object of this construction being to prevent the overwinding of the spring by causing the tension-spring to slip and relieve the spring when undue pressure is caused to bear upon the latter, and thereby guard against the breakage of the spring from overwinding, and also to prevent injury to the watch-movement in the event of breakage of the spring from a change in temperature or other causes.

The primary object of my invention is to provide a strong and durable tension device which is adapted for holding the end of either a strong or weak mainspring equally as well and without the aid of cavities in the barrel or projections in the device, and which will not release the same from the barrel except in the event of overwinding the spring; and to these ends my invention consists, essentially, in a tension-spring fitting closely against the inner periphery of the barrel, and having the outer coil of the mainspring secured thereto in such a manner as to leave a space or seat between the outer end of the mainspring and the end of the tension-spring, the space or seat being designed to receive the unattached or free end of the tension-spring.

In order to enable others to understand my improvements, I will first proceed to describe the same in connection with the accompanying drawings, in which—

Figure 1 is a vertical sectional view, on an enlarged scale, of a watch-barrel, mainspring, and winding-arbor. Fig. 2 is a similar plan view showing the spring coiled within the barrel and one of the cap-plates of the latter removed. Fig. 3 is an enlarged view of the mainspring removed from the barrel, and with its coils opened and the tension-spring attached to the outer end of the mainspring.

Referring to the drawings, in which like letters of reference denote corresponding parts in all the figures, A designates the barrel of a mainspring of a watch or other time-keeper, which has the usual ratchet or spur wheel, *a*, formed integral therewith or suitably secured thereto, and this barrel is further provided with two heads, *d*, which are preferably removably secured in place in any suitable or well-known manner, these heads being provided with suitable aligned openings, *b*, for the passage of the winding-arbor *c* of the mainspring. The interior wall or surface of the barrel is made perfectly smooth, and is devoid of lugs or openings commonly resorted to in other devices.

I employ a tension-spring, D, which is of such a diameter or size as to closely hug the interior wall of the barrel, and this tension-spring has the outer end or coil of the mainspring E secured thereto in the manner which I will hereinafter describe.

The tension-spring D is formed of a spring plate or strip of hard smooth steel, which is properly tempered, and to one end of this tension-spring is permanently connected the free end of the outer coil of the mainspring by means of a rivet, *e*, which passes transversely through the meeting lapped ends of the mainspring and tension-spring, as clearly shown in Fig. 3. This rivet is passed through the mainspring and tension-spring at a suitable distance from the ends thereof, so as to provide or leave a fork or seat, *d'*, in front of the rivet, and this fork or seat receives the free end of the tension-spring that closely hugs the inner periphery of the barrel, and is held in place by frictional contact with the barrel only. The rivet is preferably provided on its inner end with a shoulder, which imparts considerable strength thereto and closely connects the ends of the tension-spring and mainspring together.

The elasticity of the tension-spring is sufficient to hold it in close contact with the inner periphery of the barrel and permit the proper or full winding of the mainspring without

allowing the spring to slip or move in the barrel, thereby holding the said tension-spring under proper tension solely by frictional contact with the barrel. When, however, undue tension or pressure is brought to bear upon the mainspring by overwinding the same, changes in temperature, or other causes, it follows that the tension-spring is bowed inwardly or forced radially, which will reduce the degree of pressure or force with which the tension-spring presses upon the inner wall of the barrel, and thereby permit the said spring to slip or turn in the barrel and relieve any undue pressure upon the mainspring. Furthermore, this slipping of the tension-spring will not cause a loosening or unwinding of the mainspring. On the contrary, the latter is maintained in its fully-wound-up state without having become loosened in the slightest degree.

The herein-described tension-spring employed by me is so constructed or contrived that it will be impossible for either of its ends to become displaced and slide upon the other, so as to decrease the diameter of the tension-spring and in this manner destroy the frictional contact between it and the barrel. It may also be stated that the free end of the tension-spring is held between the mainspring and the other end of the tension-spring in such a perfect manner that the greater the pull or draw exerted upon the mainspring the firmer will the free end of the tension-spring be clamped in the seat or fork formed by and between the mainspring and its tension-spring. Should the coiled friction-spring lose its required tension or force by reason of a careless insertion into or removal from a watch-barrel, the rivet can be tightened, when the two ends of the tension-spring and mainspring are brought closer together.

I am aware that heretofore a watch-spring has been fitted loosely in the barrel, with the outer coiled end thereof thickened and provided with a projection, which, as the spring is wound up, slips into small cavities in the inner periphery of the barrel, and thereby produces a clicking sound, giving notice that the spring is sufficiently wound, and that an analogous effect has been produced by means of an independent steel loop provided with a projection that slips or enters into the cavities in the watch-barrel. This movable loop is also provided with a projection for the outer end of the mainspring, and upon the latter being wound the loop is caused to slide and the projection thereon made to enter the nearest channel in the inner cylindrical face of the barrel, making the click to indicate that the spring has been fully wound up.

I am also aware that the outer end of the mainspring of a watch has been interlocked or engaged with one end of an auxiliary friction-spring passing around the interior of the barrel, but in a reverse direction to that in which the mainspring is coiled, the outer or free end of the auxiliary spring overlapping the end thereof which receives the mainspring and bearing against the interior face of the barrel. This construction has been found defective because the connection between the main and auxiliary springs, being merely a tenon on the auxiliary spring and an eye in the mainspring, is not strong enough to always withstand the strain to which the mainspring is subjected in the act of winding. Moreover, it also follows that a tension-spring made in the described manner will become loose and slide within the barrel before the mainspring is fully wound up, this latter result being due to the fact that the free end of the auxiliary spring is permitted to slide upon the outer end of said spring and the barrel whenever a slight radial displacement of the end of the auxiliary spring bearing the mainspring takes place. As this radial movement goes on before the full winding of the mainspring, the diameter of the tension-spring is reduced thereby and the frictional contact between the same and the watch-barrel broken to such an extent as will cause the tension-spring to slip around and turn in the watch-barrel.

My invention wholly remedies these defects, as the ends of the tension-spring are prevented from becoming detached and slipping past one another, so that the frictional contact with the barrel is maintained at all times, except when the mainspring has been overwound, when the tension-spring will slip to such a degree as to relieve the mainspring of all undue tension and the danger of breaking the same. I also wholly dispense with the use of cavities and projections, and provide a device for holding the mainspring, which is held in place solely by frictional contact with the barrel of the time-keeper.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a going-barrel and a mainspring of a watch or other time-keeper, of a tension-spring completely encircling the mainspring, and having both ends thereof secured to the outer coil of the mainspring and to one another in such a manner as to prevent the ends of the tension-spring from sliding past one another, said tension-spring being fitted tightly in the going-barrel to be held by frictional contact against the inner periphery of the barrel and capable of a radial movement inwardly upon the mainspring by an excessive strain upon the latter, substantially as described, for the purpose set forth.

2. The combination, with a going-barrel and a mainspring, of a tension-spring completely encircling the mainspring and having one end permanently united to the outer coil of the mainspring, the unattached or free end of the tension-spring being detachably connected to the united ends of the tension-spring and mainspring to prevent the ends of the

tension-spring from sliding past one another, the coiled friction-spring being capable of a radial movement inwardly upon the mainspring when an excessive strain is exerted upon the latter, substantially as described, for the purpose set forth.

3. The combination, with the going-barrel and a mainspring, of a tension-spring encircling the mainspring, said tension-spring having one end thereof secured to the outer coil of the mainspring by a transverse rivet, which passes through the tension-spring and mainspring at a suitable distance from the ends of the same to form a seat or fork, the unattached or free end of the said tension-spring being fitted in the fork or seat, and thereby held against sliding past the same, substantially as described, for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ERNEST KARTHAUS.

Witnesses:
JOE E. COOPER,
JNO. W. COOPER.