(No Model.)

C. GULLBERG.

MAINSPRING WINDER.

No. 342,745. Patented May 25, 1886.

Fig. 1

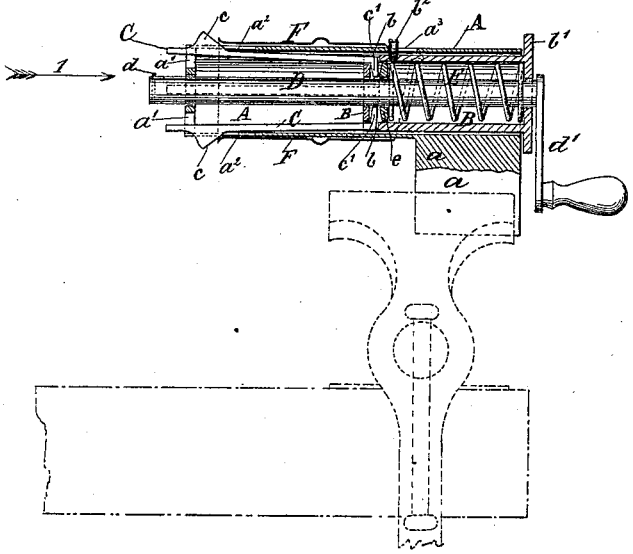


Fig. 2

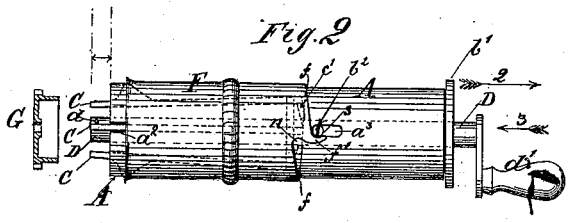


Fig. 3

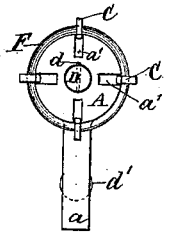
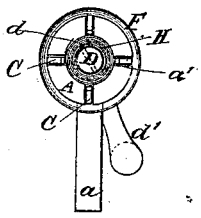


Fig. 4



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UNITED STATES PATENT OFFICE.

CARL GULLBERG, OF JERSEY CITY, NEW JERSEY.

MAINSPRING-WINDER.

SPECIFICATION forming part of Letters Patent No. 342,745, dated May 25, 1886.

Application filed January 21, 1886. Serial No. 189,236. (No model.)

To all whom it may concern:

Be it known that I, CARL GULLBERG, a citizen of the United States, and a resident of Jersey City, in the county of Hudson and State of New Jersey, have invented a new and useful Improvement in Mainspring-Winders, of which the following is a specification.

The object of my invention is to furnish to the trade an improved tool for winding mainsprings for watches of any size into coils of any diameter required to suit their respective barrels and inserting them into said barrels without exchanging any parts of the said tool to adapt it to the different sizes.

The invention consists in the construction and combination of parts hereinafter described and claimed, whereby a spring is wound upon a revoluble spindle within an expansible holder adjusted to confine the coil of the spring within the desired diameter, then entered into the barrel and pushed off from the holder, the latter being withdrawn into the casing by means of a sliding movement provided between the two, so that either the holder or its casing may be considered as stationary relatively to the other, which moves. The tool is likewise adapted to remove a spring from its barrel and allow it to expand gradually while unwinding, thereby avoiding the damage caused to watch-springs when raised out of the barrel so as to become released instantaneously by their own expansion.

Aside from winding watch-springs, the tool is also adapted for use when other articles—such as a string or wire—are desired to be coiled within a certain compass.

In the accompanying drawings, Figure 1 represents a longitudinal section of a mainspring-winder constructed according to my present invention and in position ready for use. Fig. 2 is a top or plan view of the same. Fig. 3 is an end view of the same, seen in the direction of arrow 1, Fig. 1, the adjustable spring-holding bars being spread, as in Fig. 1. Fig. 4 is a similar end view of Fig. 2, seen in the same direction, the adjustable holding-bars being contracted, as in Fig. 2, and a wound spring shown as held between them.

The frame of the tool consists of a tube, A, provided with a projection or tail-piece, *a*, by which it may be clamped in a vise, as shown in dotted lines in Fig. 1, and thus kept stationary in a horizontal position, so as to enable the operator to use his two hands—one for winding the spring and the other for holding it while winding. The tube A is closed at one end, and the closed end is perforated in the center to form a bearing for the winding-spindle D, whose other end has its bearing in the central perforation in the outer closed end of another tube, B, which is fitted inside of the tube A in such a manner that by means of the flange *b'* around its outer end it may be grasped and slid in the tube A, inward or outward, as the case may be. The spindle D is turned by means of a hand-crank, *d'*, and at the end opposite to the crank it has a small pin, *d*, onto which is hooked the inner perforated end of the watch-spring, so as to cause it to wind around the spindle when the crank *d'* is turned. A pin, b^2, screwed into the side of the tube B, projects through a slot, a^3, in the outer casing or frame, A, and limits the throw of the sliding movement in the tube B, besides serving another purpose, which will hereinafter appear. The front end of the tube B has corner slots, *b*, in which are inserted the angularly-bent ends *c'* of bars or elbow-levers C, three or more in number, (preferably four,) which act as the holders to confine the coil within the proper diameter for its insertion in the barrel. When the bars C are inserted in the slots *b*, in manner as shown in Fig. 1, they rest upon the bottom edge of the slot *b* in the inner closed end of the tube B, and their ends *c'* are bent toward the center of the spindle at an angle slightly obtuse to the main body of the bar C, as shown, and a washer, *e*, convex on its forward surface, and perforated and fitted to slide upon the spindle D, is pressed forward against the extreme inner ends of the parts *c'* by means of a spiral spring, E, surrounding the sleeve D loosely, and inserted in the tube B, between its fixed outer end and the said sliding washer. The forward end of the bars C project through and are guided in proper guide slots, *a'*, in the closed end of the frame-tube A, and each bar C is provided on the outer surface with an incline, *c*, which, when the bars are left free to expand by the pressure of the aforesaid spiral spring E, project through side slots, a^2, in the tube A, which said side slots are sufficiently

long to allow the said inclines *c* to remain projected, and thus the bars expanded, as in Fig. 1, when the tube B, to which the said bars are fulcrumed and held, is slid back, as before stated.

Fig. 1 shows the bars C in position of maximum expansion. In order to contract them, and thereby adjust the distance between the outer ends of two opposite bars to correspond with the desired diameter within which the spring is intended to be coiled, for insertion into a spring-barrel or for some other purpose, I provide outside of the tube-frame a sleeve, F, which is capable of turning and sliding upon the said tube A.

All that is necessary to contract the holders C C C C is to slide the sleeve F outward against the incline *c;* but in order to do this gradually and to retain the sleeve in the adjusted position the inner end of the sleeve is cut off, so as to form a spiral incline, *f*, at the end of which is a projection, *f'*, whereby are formed two stops, *n s*, one at each end of the said spiral incline, and the said incline acts against the aforesaid pin b^2, which serves as a stop against the inward sliding movement of the sleeve F, caused by the counter-pressure of the inclines *c*, which pressure again is effected by the expansion of the spring E. In the position shown in Fig. 1 the end stop, *n*, of the incline *f* rests against the pin b^2.

To contract the holder C C C C more or less, or to its minimum, as shown in Fig. 2, the sleeve F is turned downward toward the operator more or less, according to the degree of contraction desired, or until, as in Fig. 2, the end stop, *s*, of the incline *f* rests against the said pin b^2.

To wind the spring, for instance, as at H, to suit the size of the barrel G, (shown in section opposite to the end of the tool in Fig. 2,) the sleeve F is turned as in Fig. 2, to adjust the curve of the holder to the proper diameter. The spindle D, if partly withdrawn, as in Fig. 2, is pushed forward in the direction of arrow 3 until its free end projects beyond the ends of the bars C, as in Fig. 1. The inner end of the spring is then, by its small perforation, hooked upon the pin *d* of the spindle, after which the spindle is again drawn back, or in the direction of arrow 1, Fig. 1, so as to assume the position in Fig. 2, in which the end of the spindle does not project beyond the bars C. The crank *d'* is then turned until the spring H is completely wound, inclosed within the bars C, as in Fig. 4. The spring thus being wound, the barrel G is put over the ends of the holder C C C C, to surround them, like a cap, and, while thus held with one hand pressed against the end of the tube-frame A, the flange *b'* of the inner sliding tube, B, is grasped by the other hand and pulled back as far as the pin b^2 can slide in the slot a^3 of the tube A—that is, until the outer ends of the bars C are pulled back far enough to get flush with or within the end surface of the tube A. The outer end, D, of the spindle, which is not affected by the sliding of the tube B, thus remains within the barrel G, while the bars C slide off from the spring, allowing it to expand within and be confined by the barrel G.

It is evident that the tool can be used in substantially a similar manner to remove the spring from the barrel, so as not to allow it to be released instantaneously by its own expansion, whereby springs often are damaged.

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

1. In a tool for winding mainsprings, &c., the combination of a frame, a coil-winding spindle fitted to turn and slide in the said frame, and a coil-limiting holder surrounding the said spindle and capable of a sliding movement relative to the said frame for removing the wound coil from the said holder.

2. In a tool for winding mainsprings, &c., the combination of a frame, a coil-winding spindle fitted to turn and slide in the said frame, and an expansible holder adjustable to limit the diameter of the said coil, the said holder surrounding the said spindle, and being capable of a sliding movement relative to the said frame for removing the wound coil from the said holder.

3. In a tool for winding mainsprings, &c., the combination of a hollow frame, A, adapted to be held stationary, a coil-winding spindle, D, and a tube or piece, B, both slidable in the said frame, and a coil-confining holder projecting through the end of the said frame A, around the said spindle, the said holder being attached with its inner end to the said slide-piece B, to be withdrawn thereby within the end surface of the frame A, for removing the wound coil from the said holder.

4. In a tool for winding mainsprings, &c., the combination of a hollow frame, A, adapted to be held stationary, a coil-winding spindle, D, and a tube or piece, B, both slidable in the said frame, and a coil-confining holder consisting of bars C, having inclines *c*, and being fulcrumed at their inner ends to the said sliding piece B, and actuated to move on their fulcra so as to spread at their outer ends, and a surrounding sliding sleeve, F, actuating the said inclines *c*, to limit and adjust the expansion of the said holder, substantially as set forth.

5. In a tool for winding mainsprings, &c., the combination of a hollow frame, A, adapted to be held stationary, a coil-winding spindle, D, and a tube or piece, B, both slidable in the said frame, and a coil-confining holder consisting of bars C, having inclines *c*, and being fulcrumed at their inner ends to the said sliding piece B, and actuated to move on their fulcra so as to spread at their outer ends, and a surrounding sliding sleeve, F, provided with the spiral incline *f*, working in conjunction with the stop b^2, secured in the tube B, said sleeve actuating the said inclines *c*, to limit and adjust the expansion of the said holder, substantially as set forth.

6. In a tool for winding mainsprings, &c.,

the combination of a hollow frame, A, adapted to be held stationary, a coil-winding spindle, D, and a tube or piece, B, both slidable in the said frame, and a coil-confining holder consisting of elbow-levers C, sliding with their outer ends in guides a' in the tube A, and having inclines c, and being fulcrumed at their inner ends to the said sliding piece B, and actuated by the sliding washer e and spring E, to move on their fulcra so as to spread at their outer ends, and a surrounding sliding sleeve, F, provided with the spiral incline f, working in conjunction with the stop b^2, secured in the tube B, said sleeve actuating the said inclines c, to limit and adjust the expansion of the said holder, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 12th day of January, 1886.

CARL GULLBERG.

Witnesses:
A. W. ALMQVIST,
T. M. CROSSMAN.