Feb. 16, 1943. C. HILL 2,311,230

SPRING WINDING DEVICE

Filed April 7, 1942

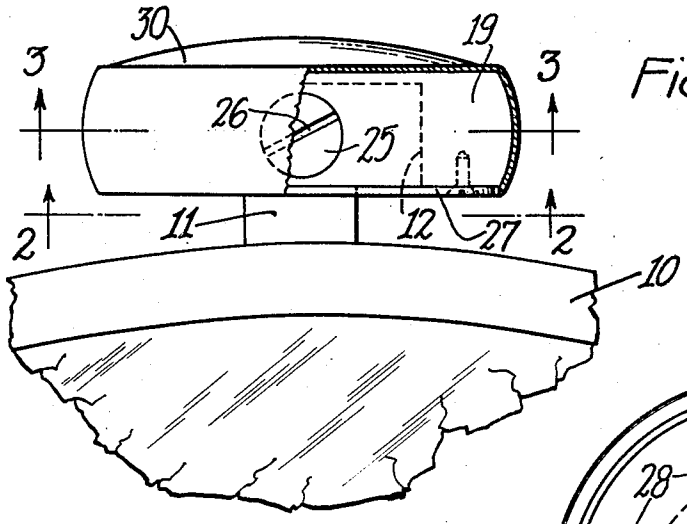


Fig. 1.

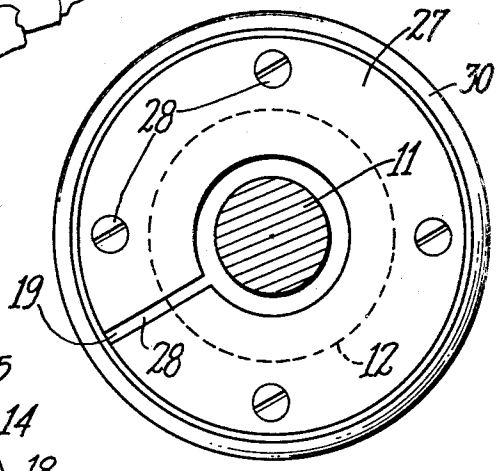


Fig. 2.

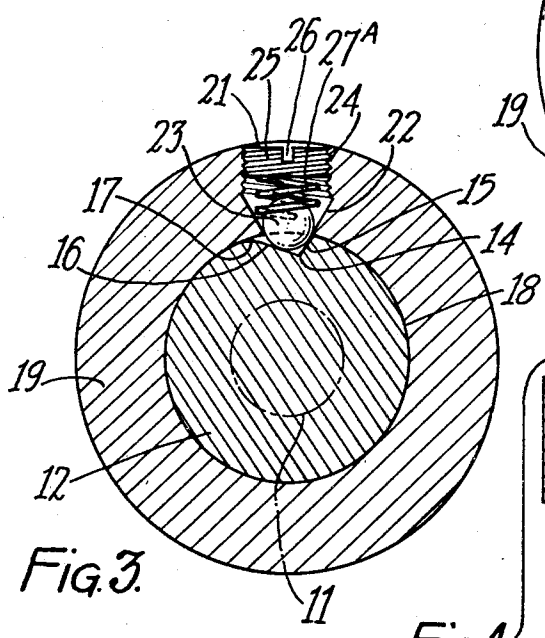


Fig. 3.

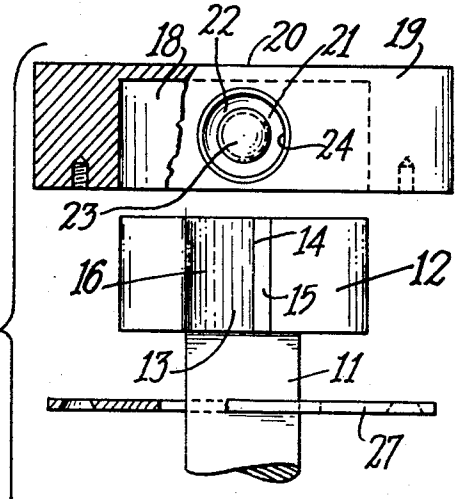


Fig. 4.

INVENTOR.
CHARLES HILL
BY John J. Lynch Atty.

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2,311,230

SPRING WINDING DEVICE

Charles Hill, Reno, Nev.

Application April 7, 1942, Serial No. 437,959

1 Claim. (Cl. 58—83)

This invention relates tc spring winding devices and in particular to means employed in connection with spring winding shafts as used in watches to prevent overwinding, said device being automatic in its use and functioning without attention of the operator.

A particular object of the invention is to provide a means for preventing the overwinding and conseqeunt breaking of springs in watches that can be applied to the winding stem of a watch without being evident, and thus not detracting from the appearance of the watch and at the same time providing a device which may be set to yield at the moment the spring becomes properly wound, so that no damage to the spring can occur from overwinding or so that no stripping of the gears can occur when the tendency is to wind the watch beyond an amount ordinarily necessary to properly tension the spring.

While I have particularly referred to the use of my device in connection with a watch, it is to be understood that it can be applied to any instrument in which a spring is wound to provide the operating force and in which it is advantageous tc guard against a too forceful a winding of the spring so that it will not freeze or break or cause breakage of the parts associated with the spring.

A still further object of the invention is to provide a device of the character referred to which has few parts, is simple to manufacture, can be readily incorporated in spring wound devices without materially altering the parts thereof, and which can be employed in watches without increasing the size of the parts thereof.

Changes and variations may be made in the construction shown and described without departing from the principles of the invention or sacrificing its chief advantages; hence such invention is not to be confined to the structure shown in the accompanying drawing, in which:

Figure 1 is an enlarged fragmentary view of the stem portion of a watch showing the application of my invention thereto,

Figure 2 is a section taken on the line 2—2 of Figure 1 showing the arangement of a locking ring employed in the device,

Figure 3 is a section taken on the line 3—3 of Figure 1 showing my improved tension device as used in conjunction with the stem of a watch, and

Figure 4 is a combination view showing the various parts of the device in disassembled relation, the spring and adjusting plug being omitted for the sake of clarity.

Referring to the drawing in detail, 10 indicates the fragment of a watch, which includes the usual spring to be wound, intermediate winding gears, hand set and other parts controlled by the stem 11. The stem 11 is either depressed or pulled out to position the mechanism for hand setting operation and as all these parts are well known in the art, it is not believed that illustration thereof is necessary. The overwinding of the spring in addition to tensioning it to the breaking point causes the stripping of the winding gears and as each individual spring may vary in its tension due to variations in the tempering of the steel, it is necessary that the device as employed in each watch or device be originally set so that overwinding of the spring is prevented. To this end I provide on the upper end of the winding stem 11, a hub 12, which may be an integral part of the stem or may be suitably secured thereto in any manner desired. The hub 12 is transversely slotted as at 13 on its peripheral face to provide a ball seat 14 formed at the intersection of a radial abutment wall 15 and a slanting or oblique wall 16, the latter of which terminates at the peripheral surface of the hub in a rounded portion 17 or radius, so that a gradual lifting of the ball occurs as the spring being wound is gradually tensioned to its safe maximum. Should the incline of the wall 16, referred to hereinafter as the seat wall, be too sharp, the ball would not unseat gradually and the spring would be wound to its maximum before complete unseating of the ball would occur. It is desired to bring the spring to fully wound condition gradually and this is done by a combination of degree of slant of the seat wall 16 and the adjusted tension on a spring.

The hub 12 fits with close sliding association into the recess or pocket 18 of a ball carrier 19 which is closed at one side as at 20 and is provided with a ball retaining hole 21, the ball holding portion of which is conical as at 22 to suspend the ball 23 therein so that the protruding portion of said ball rests on the seat wall 16 in the ball seat 14. The ball retaining hole 21 is formed in the periphery of the carrier disk 19 and in its upper portion is threaded as at 24 to receive the tensioning screw stud 25, which through the medium of its screw driver slot 26 may be threaded into and out of the hole 21 to tension a spring 27A disposed intermediate the stud 25 and the ball 23. The adjustment of the stud 25 varies the force with which the ball rests on the seat wall 16. As the spring of the watch or device is wound, the tension thereof increases and the spring is wound

through the carrier disk 19, hub 12 and stem 11 until the tension approaches maximum, at which time the ball gradually rides up on the seat wall 16 and onto the periphery of the hub as the spring is fully wound and continued winding movement of the carrier disk 19 will not produce any effect on the winding stem 11. Each time that the disk 19 makes a complete revolution after the spring is fully wound, the ball will snap into the ball seat 14 with an audible click, thus giving the owner of the watch audible warning that the spring of the watch has been fully wound.

In order to prevent separation of the parts 12 and 19, I provide a disk collar 27, split as at 28 so that it can be passed over the stem 11, which is secured to the under side of the ball carrier 19 by suitable screws 28. The collar extends over the edge of the hub 12 and prevents it from coming out of the carrier 19, when the stem is moved for setting the hands of the watch or clock.

If desired, the stem crown 30, which is usually knurled may be force fitted over the ball carrier 19 as shown in Figure 1 and the coil adjusting spring stud 25 will be covered. The crown cap 30 will be applied after the tension of the spring 24 has been properly adjusted to coact with the tension of the watch spring to provide the winding release for which my invention is intended.

I claim:

In a spring winding device, in combination, a winding stem having an integrally formed cylindrical hub portion, a groove in the periphery of said portion extending transversely thereof and comprising a radial wall disposed at an acute angle to the diameter of the hub portion to provide a ball drop and an abutment wall, and an adjacent contiguous wall gradually sloping from the bottom of the radial wall and terminating at the peripheral surface of the hub in a rounded portion, said walls at their juncture constituting a ball seat, a ball carrier of cylindrical shape presenting an inner medial recess opening at one side of said carrier to receive the hub in closely fitting relation, said carrier having a bore radially thereof providing a straight threaded portion and a ball retaining conical portion, through which a ball extends into said hub groove, a ball in the bore, a threaded plug closing the threaded end of the bore, a spring between said ball and said plug and arranged to be tensioned by adjustment of the plug in said bore, so that the ball will yieldably connect the hub and carrier for turning movement until a spring being wound by the winding stem reaches a predetermined tension, and the ball being arranged to ride along said gradually sloping wall to reach the periphery of said hub to permit free turning movement of said carrier with respect to said hub, said ball being arranged to snap into said seat on succeeding revolutions of the carrier to produce an audible signal that the wound spring has been fully tensioned, a disk radially slotted for passage over the stem for positioning against the open side of said ball carrier and the disk extending over said hub to hold the same in place within said carrier, and means for attaching the disk to said carrier, and an externally knurled crown cap force fitted over said carrier to conceal the latter and the spring tensioning stud plug.

CHARLES HILL.