H. AXTELL.

CROWN FOR WINDING STEMS OF WATCHES.

APPLICATION FILED DEC. 14, 1909.

951,672.

Patented Mar. 8, 1910.

Fig. 1.

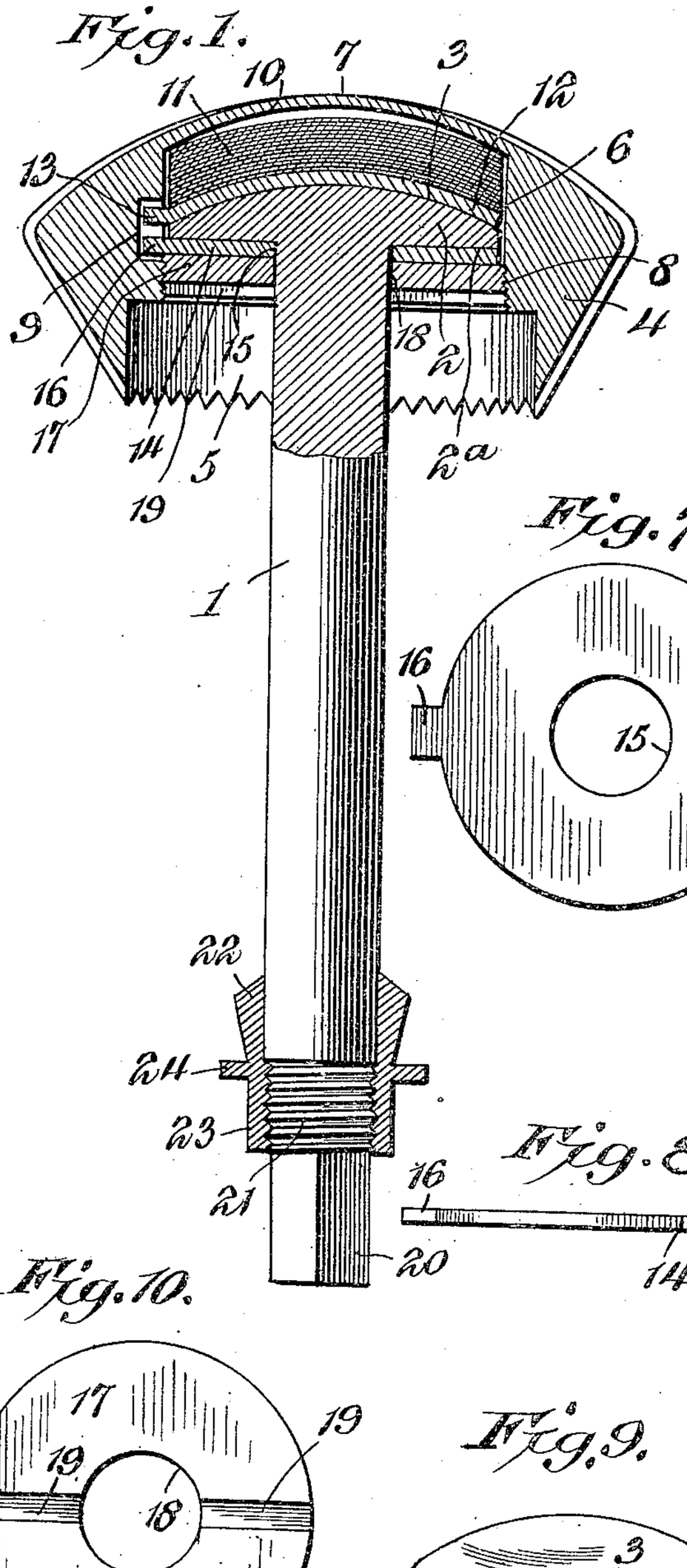


Fig. 2.

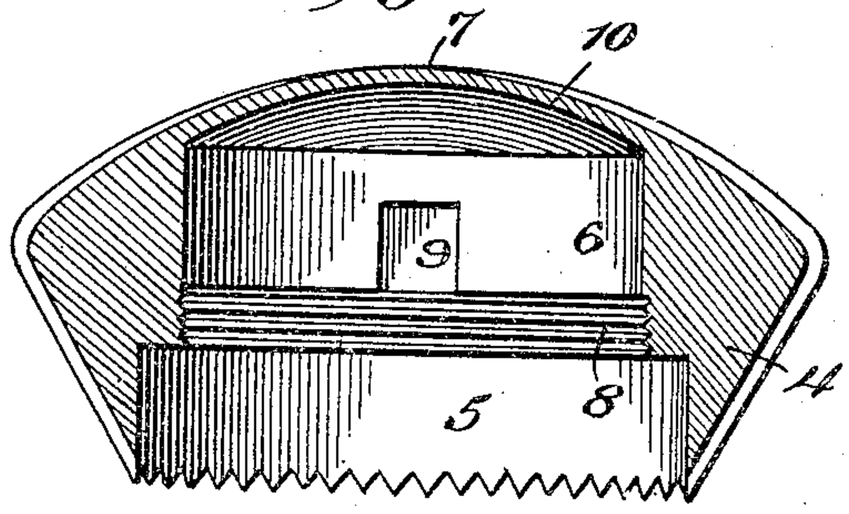


Fig. 3.

Fig. 7.

Fig. 4.

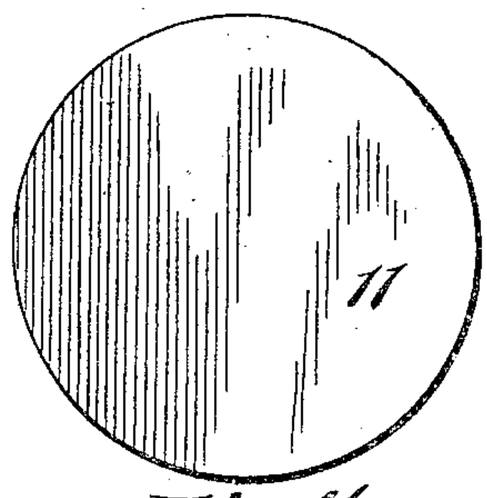


Fig. 5.

Fig. 8.

Fig. 6.

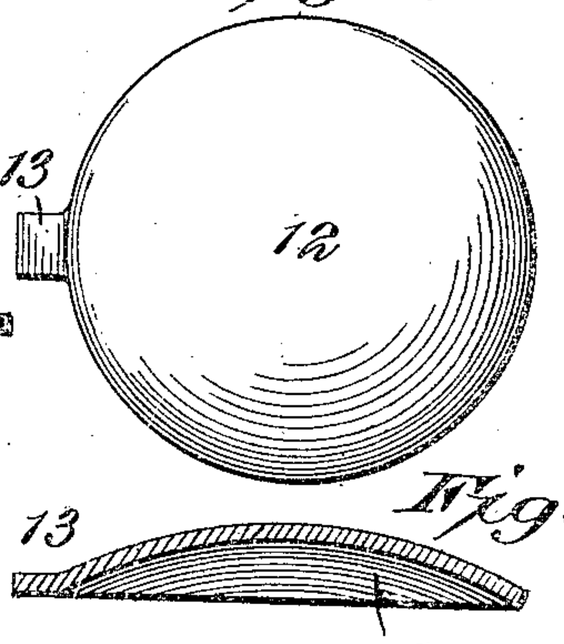
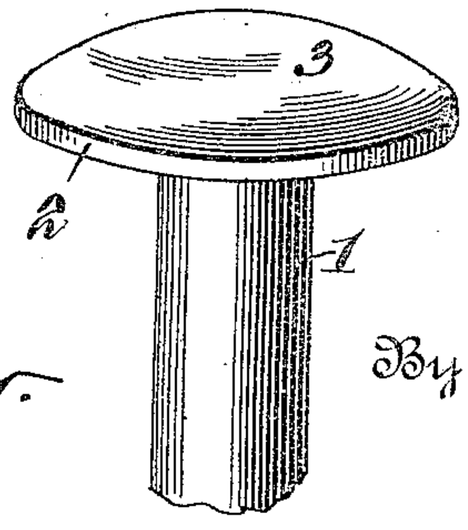


Fig. 10.

Fig. 9.



Witnesses

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UNITED STATES PATENT OFFICE.

HENRY AXTELL, OF BERKELEY, CALIFORNIA.

CROWN FOR WINDING-STEMS OF WATCHES.

951,672. Specification of Letters Patent. Patented Mar. 8, 1910.

Application filed December 14, 1909. Serial No. 533,043.

To all whom it may concern:

Be it known that I, HENRY AXTELL, citizen of the United States, residing at Berkeley, in the county of Alameda and State of California, have invented a new and useful Crown for Winding-Stems of Watches, of which the following is a specification.

This invention relates to crowns for the winding stems of watches, and is in the nature of an improvement upon my former patent No. 909,515, dated Jan. 12, 1909.

The principal object of the invention is to provide a stem winding mechanism of novel construction for watches, whereby an overwinding of the watch spring and a liability to a breakage or strain of the mechanism, are entirely prevented, irrespective of the amount of rotation imparted to the said crown.

In my former patent, the crown is provided with a recess in the top in which is threaded a perforated cap plate. This construction is very objectionable, as it permits the egress of lubricant and the ingress of moisture, and thereby materially shortens the life of the crown.

Another object of the present invention is to provide a crown construction, whereby the danger of moisture entering and affecting the interior mechanism, and the lubricant leaving the same, is avoided.

A still further object of the invention is to provide a device of the class described which is extremely simple in operation, positive and durable in construction, and cheap to manufacture.

With these and other objects in view, the invention consists in the construction and novel combination of parts hereinafter fully described, illustrated in the accompanying drawing, and pointed out in the claims hereto appended; it being understood that various changes in the form, proportion, size, and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawing:—Figure 1 is a transverse sectional view showing my improved crown and mechanism mounted on a winding stem of a watch. Fig. 2 is a transverse sectional view of the crown. Fig. 3 is a plan view of one of the disk springs. Fig. 4 is an edge view of the same. Fig. 5 is a plan view of the concavo-convex cap. Fig. 6 is an edge view of the same. Fig. 7 is a plan view of the washer. Fig. 8 is an edge view of the same. Fig. 9 is a detail perspective view of the key-stem head, and Fig. 10 is a plan view of the tension ring.

Like reference numerals designate corresponding parts in all the figures of the drawing.

Referring to the drawing, 1 designates a key-stem having an integral head 2 formed on the upper end thereof, the upper surface 3 thereof being convexed, and the under surface 2^a being flat. A crown 4 is provided on its underside with a bore 5 and a counter bore 6, the said counter bore terminating short of the top wall 7 of the crown. The crown is made of steel with the usual corrugations and covered with gold, silver, or other metal. The counter bore is interiorly threaded near its outer end as shown by the numeral 8, and the wall above the threaded portion 8 is cut-out to form a pocket 9. The upper or inner edge 10 of the counter bore is concaved to conform to the shape of the top 3 of the head 2.

A plurality of disk springs 11 are arranged one upon the other within the counter bore. These springs are normally flat, as shown by reference to Figs. 3 and 4 of the drawing, and are formed of brass, steel, or other suitable metal, and range from one to four one-thousandths of an inch in thickness. While thirteen of these springs have been shown in the drawing, I do not wish to limit myself to any particular number, and they may vary from ten to twenty-five or more, depending upon the circumstances. The springs must be very thin to avoid breaking and a sufficient number must be used to give force enough down on the key-head cap to create friction on the head of the key stem and cause the turning of the crown to effect the winding of the watch.

Arranged directly below the springs 11 is a concavo-convex key-head cap 12 which is formed of hardened steel, and is provided with a projection or toe 13 which is seated within the said recess 9 of the crown and is held thereby from movement independent of the crown. The springs lie upon the convex side of the said cap, and the convex surface of the head 2 of the stem 1 is arranged directly below and bears against the concaved face of the said cap.

A disk washer 14 formed of hardened steel, having a central opening 15 and a projection or toe 16, is arranged to engage the

flat underside 2^a of the head 2, the opening 15 receiving the stem 1 and fitting the same closely, and the projection or toe 16 being retained within the recess 9 of the crown, and prevented from rotating independently of the crown.

An externally threaded tension ring 17 has a central opening 18 and a transverse groove 19 formed therein. The stem 1 is arranged within the opening 18 and the said ring is screwed in the counter bore 6 engaging the threads 8. The transverse groove 19 formed on the underside of the ring, is adapted to be engaged by a suitable wrench or other tool for rotating the same.

From the foregoing, it will be readily apparent that as the various parts are assembled, and the tension ring is screwed into engagement, the said ring will cause the head 2 of the stem 1 to be forced upwardly, the movement causing the flat disk springs 11 to assume a concavo-convex shape corresponding to the head cap 12, and furthermore by the adjustment of the ring 17, the tension of the springs 11 upon the cap 12 can be easily regulated, and the winding force of the crown varied as desired.

A lubricant, preferably graphite because of its non-freezing quality, is employed between the head 2 and the cap 12, and the washer 14.

In operation the friction exerted on the head 2 of the winding stem by the head cap 12 through the springs 11 must be greater than the tension of the main spring when the latter is unwound, so as to cause the cap 12 to frictionally grip the head 2 of the stem 1 and wind the said main spring when the crown head 4 is turned. The springs 11 cause the head 2 of the stem to be frictionally engaged by the plate 12 and the washer 14, and, because of the fact that both the plate and the washer are respectively provided with projections or toes 13 and 16 which are arranged within the recess 9 of the crown, they will be rotated with the said crown, and the stem 1 will be caused to rotate therewith. When the main spring has been completely wound, the tension thereof will then exceed the frictional resistance on the head 2 produced by the parts 11, 12, and 14, and as a result, the stem 1 will not be rotated, notwithstanding that rotation may be imparted to the said crown.

It will be noted that the washer 14 prevents the key-head from turning the tension ring 17 when the said key-head slips.

By forming the key stem and the head in one piece, the crown cannot be disengaged from the key stem when setting the hands of the watch, as is often done with crowns in general use.

The lower end of the stem 20 is squared to fit the winding gears of watches. Directly above the said end, the stem is threaded, as shown by the numeral 21, for securing a combined nut and bulb, the bulb 22 being adapted to fit the spring sleeve (not shown) used in many watches. Intermediate of the nut 23 and the bulb 22 is an integral collar 24 adapted to stop the spring sleeve from slipping over the nut 23 in setting the hands of the watch, and to prevent the crown and key from pulling too far out of the watch. The combined nut and bulb can be made as large as desired without making the key stem larger than necessary.

It will be seen that the cap 12 fits closely the outer or upper face of the head of the stem and provides increased friction surface thereon.

What I claim is:—

1. A device of the class described comprising a key stem having an integral head, a crown having a solid top and bored out from the underside to receive the head, a plurality of tension springs arranged in superimposed relation within the bore between the top of the crown and the key stem head, and means for retaining the head within the crown and regulating the pressure of the springs upon the head.

2. A device of the class described comprising a key stem having an integral head, a crown having a solid top and partially bored out from the underside to receive the head, a cap and washer respectively arranged above and below the head and engaging the crown for rotation therewith. a plurality of tension springs arranged one upon another within the bore between the cap and the top of the crown, and means for closing the bore and retaining the head therein and regulating the friction between the springs, cap, washer and head.

3. A device of the class described comprising a key stem having an integral head, a crown having a solid top and partially bored out from the underside to receive the head and provided with a recess in the wall of the bore, a cap and washer arranged above and below the head and each provided with an integral projection which engages in the said recess of the crown for rotation therewith, a plurality of tension springs arranged within the bore between the cap and the crown, and means for closing the bore and retaining the head therein and regulating the friction between the springs, cap, washer and the head.

4. A device of the class described comprising a key stem having an integral rounded head, a crown having a solid top and partially bored out from the underside to receive the head, the top of the bore being concaved and conforming to the shape of the head, the crown having a recess in the wall of the bore, a concavo-convex cap arranged on the head of the stem, a flat washer arranged under the head, the cap

and the washer each having a projection which engages in the recess of the crown for rotation therewith, a plurality of tension springs arranged within the bore between the cap and the top of the crown, and means for closing the bore of the crown and retaining the head therein and regulating the friction between the head and the cap and washer.

5. A device of the class described comprising a key stem having an integral convex head, a crown having a solid top and partially bored out from the underside to receive the head, the top of the bore being concaved and conforming to the shape of the head, the crown having a recess in the wall of the bore, a concavo convex cap arranged on the head of the stem, a flat washer arranged under the head, the plate and the washer each having a projection which engages in the recess of the crown for rotation therewith, a plurality of superimposed flat disk metal springs arranged within the bore between the cap and the top of the crown, and means for retaining the head within the bore and compressing the springs between the cap and the top of the crown and thereby regulating the friction between the head and the cap and washer.

6. A device of the class described comprising a key stem having an integral convex head, a crown having a solid top and bored out from the underside to receive the head, the top of the bore being concaved and conforming to the shape of the head, a plurality of superimposed flat disk metal springs arranged within the bore between the top of the crown and the head, and means arranged directly below the head and adjustably engaging the wall of the bore for retaining the head therein and regulating the pressure of the springs upon the head.

7. A device of the class described comprising a key stem having an integral convex head, a crown having a solid top and bored out from the underside and also counter bored to receive the head, the top of the counter bore being concaved and conforming to the shape of the head, and the wall of the counter bore being threaded and having a recess formed at one side, a concavo-convex cap arranged on the head of the stem, a washer arranged under the said head, the cap and the washer each having a projection which engages in the recess of the crown for rotation therewith, a plurality of superimposed flat disk metal springs arranged within the counter bore between the cap and the top of the crown, and an exteriorly threaded tension ring arranged directly below the washer and surrounding the stem and adapted to engage the threaded portion of the counter bore for compressing the springs between the cap and the concaved top of the crown and thereby regulating the friction between the head and the cap and washer.

8. A key stem having a squared end and a threaded portion contiguous thereto, a combined integral bulb and nut interiorly threaded and screwed on the stem above the said end, and a collar intermediate of the said bulb and nut and integral therewith.

9. A device of the class described comprising a key stem having an integral head, a crown having a solid top and bored out from the underside to receive the head, a plurality of tension springs arranged in superimposed relation within the bore between the top of the crown and the key stem head, a cap interposed between the head and springs and rotatable with the crown, and means for retaining the head within the crown and regulating the pressure of the springs upon the head.

10. A device of the class described comprising a key stem having an integral convex head, a crown having a solid top and bored out from the underside to receive the head, the top of the bore being concaved and conforming to the shape of the head, a plurality of superimposed flat disk metal springs arranged within the bore between the top of the crown and the head, a concavo-convex cap fitting closely the head and arranged below the springs and rotatable with the crown, and means arranged directly below the head and adjustably engaging the wall of the bore for retaining the head therein and regulating the pressure of the springs upon the head.

11. A device of the class described comprising a key stem having an integral head, a crown having a solid top and partially bored out from the underside to receive the head, a cap and washer respectively arranged above and below the head and engaging the crown for rotation therewith, a plurality of tension springs arranged one upon another within the bore between the cap and the top of the crown, and a tension ring arranged below the washer and engaging the walls of the bore of the crown to retain the parts within the latter and regulate the frictional resistance between the cap, springs, washer and head.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

HENRY AXTELL.

Witnesses:
GEORGE S. THOMSON,
L. A. WILLS.