

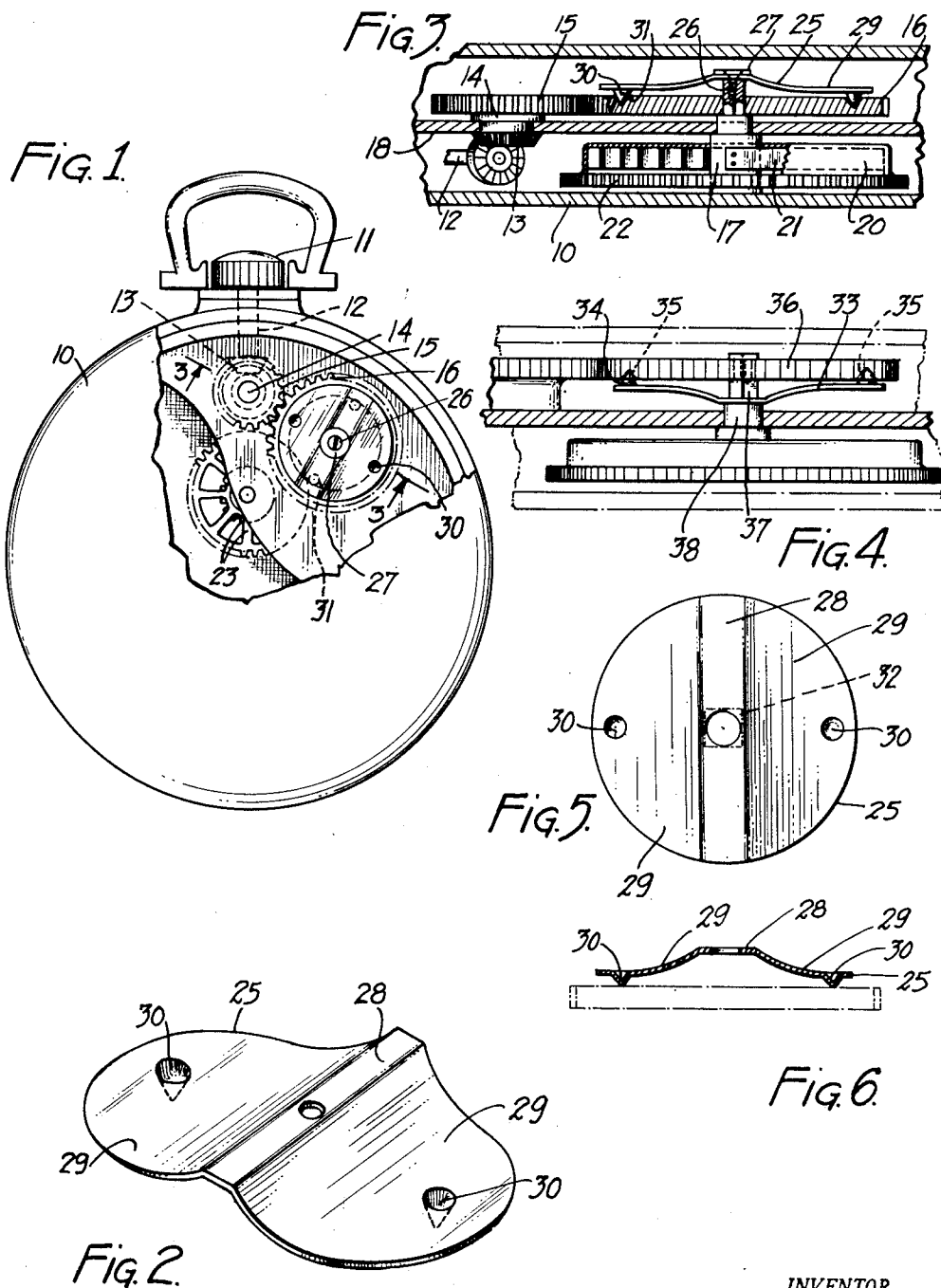
Feb. 23, 1954

C. HILL ET AL
WATCH WINDING MEANS

2,669,833

Filed April 24, 1951

3 Sheets-Sheet 1



INVENTOR.
CHARLES HILL &
CHARLES K. JOHNS
BY
John J. Lynch
att.

Feb. 23, 1954

C. HILL ET AL
WATCH WINDING MEANS

2,669,833

Filed April 24, 1951

3 Sheets-Sheet 2

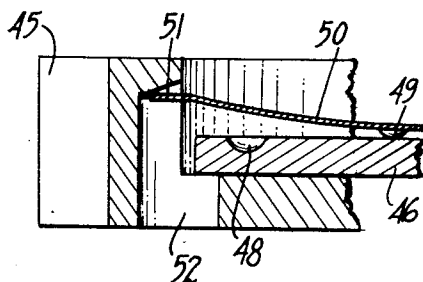
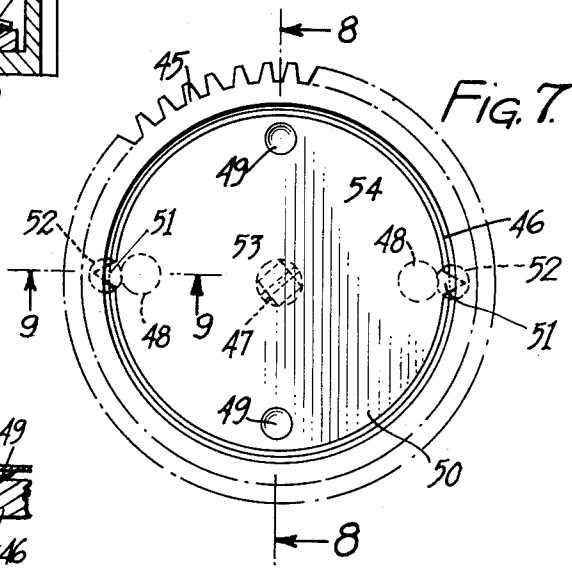
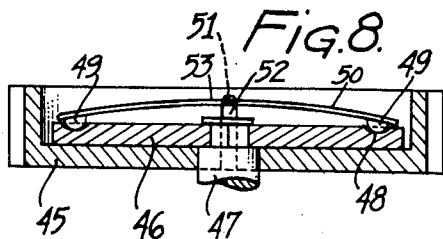


Fig. 9

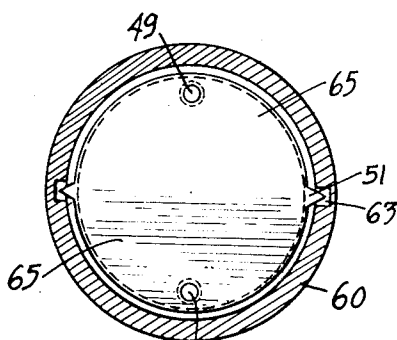
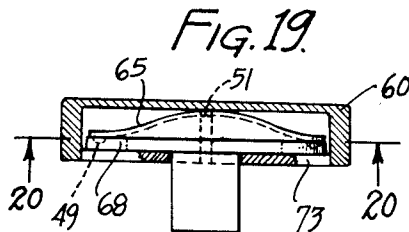


Fig. 20



INVENTORS:
CHARLES HILL &
CHARLES K. JOHNS
BY

John F. Lynch
Atty.

Feb. 23, 1954

C. HILL ET AL
WATCH WINDING MEANS

2,669,833

Filed April 24, 1951

3 Sheets-Sheet 3

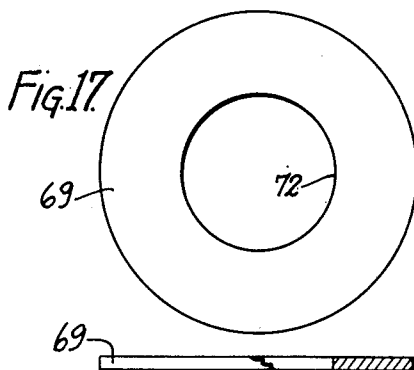
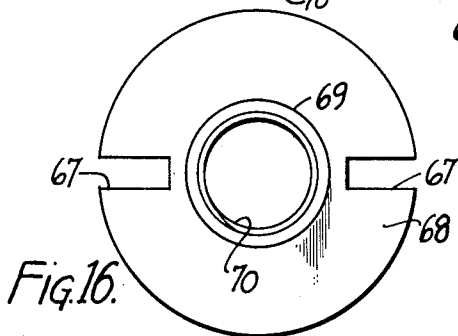
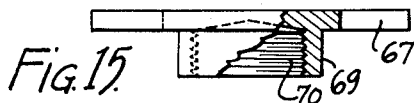
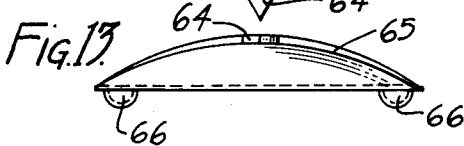
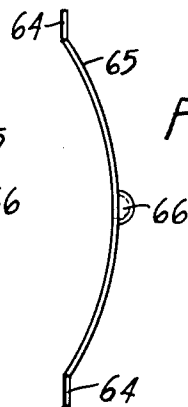
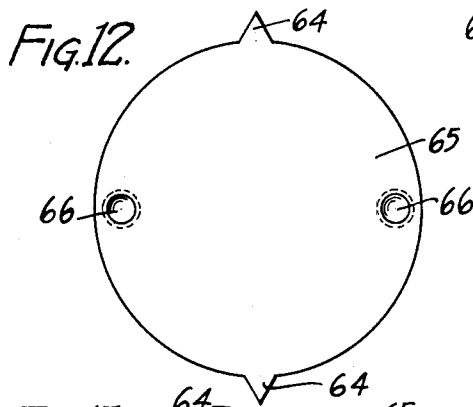
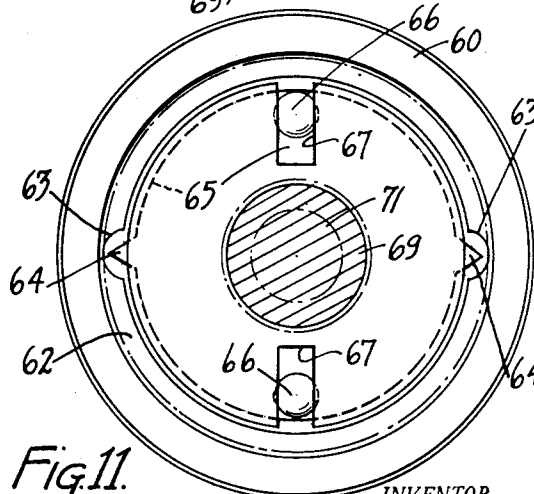
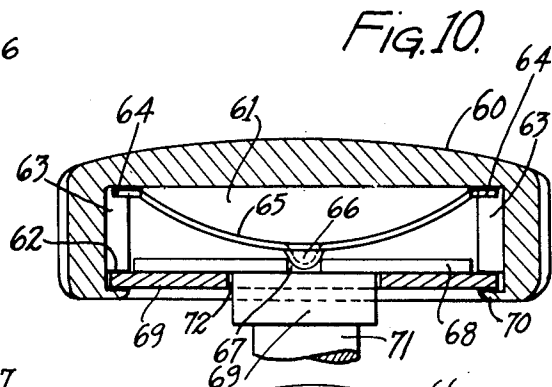


Fig. 18.



INVENTOR.
CHARLES HILL &
CHARLES K. JOHNS
BY

John J. Lynch
att.

UNITED STATES PATENT OFFICE

2,669,833

WATCH WINDING MEANS

Charles Hill, Reno, Nev., and Charles K. Johns,
New York, N. Y.

Application April 24, 1951, Serial No. 222,699

2 Claims. (Cl. 58-83)

1

This invention relates to winding means and in particular to the type adapted to be used in watches to protect the same against damage due to excess winding effort.

A particular object of the invention is to provide means that will guard against overwinding of the watch spring, stripping of the winding gears, excess strain on the main spring, and rupture of the parts involved in the winding action so that the watch is protected and the person winding the same is prevented from overwinding the same.

A still further object of the invention is to provide in the very small watches used today particularly, a spring tension disk that may be applied to the smallest watches in use and to the crown or winding gears thereof, that is to the main winding wheel, the crown winding wheel or the crown itself. The device of the invention may be applied to watches of any size, that is men's pocket watches, water-resistant watches, self winding timepieces and in general to any spring wound article where it is desired to protect the parts as above set forth.

A still further object of the invention is to provide a safety device that has a minimum number of parts that can be manufactured as a part of the watch, or as a separate unit and that can be put into the very narrow space allowed in small watches without impairing the efficiency of its operation as a protective device and one that lends itself to easy and quick adjustment to the parts.

Further objects of the invention provide for the use of a winding disc having a tensioning action that relieves under winding effort and one which may be applied above or beneath either of the winding wheels referred to, and which will provide an audible click to warn that the watch has been fully wound and one that involves the use of a minimum number of additional parts to be applied to the watch.

With these and other objects in view, the invention comprises certain constructions herein-after described and then particularly pointed out in the claims, and a preferred embodiment of our invention is illustrated in the accompanying drawings, in which:

Figure 1 is a view of the back of a watch with the parts broken away to disclose the interior construction and the application to the winding wheel of the present invention.

Figure 2 is a view in perspective of a spring tension disk used in connection with the winding wheel of the watch to protect the latter,

2

Figure 3 is an enlarged section taken on the line 3-3 of Figure 1 showing the relative arrangement of the parts,

Figure 4 is a fragmentary view of the mechanism disclosed in Figure 3 showing the positioning of the disk beneath the main winding wheel,

Figure 5 is a plan view of the disk shown in Figure 2, and

Figure 6 is a view in cross section taken through the disk illustrated in Figure 5 showing diagrammatically the action of the disk when relieving the driving tension on the winding wheel to permit the latter to continue to rotate.

Figure 7 is a plan view of a watch gear in which a modified construction permits of quick assembly of the parts,

Figure 8 is a section taken on the line 8-8 of Figure 7,

Figure 9 is an enlarged fragmentary section taken on the line 9-9 of Figure 8,

Figure 10 is a vertical section through a watch crown showing the relation of the parts,

Figure 11 is a bottom plan view of the watch crown shown in Figure 10,

Figure 12 is a plan view of a spring disk,

Figure 13 is an edge view of the disk shown in Figure 12,

Figure 14 is an edge view of the disk shown in Figure 12 but taken at right angles to the view of Figure 13,

Figure 15 is a side view of a drive disk,

Figure 16 is a bottom plan view of the disk shown in Figure 15,

Figure 17 is a plan view of a closure disk,

Figure 18 is an edge view, partly in section of the closure disk of Figure 17,

Figure 19 is a vertical section through a crown showing the modified form of spring disk, and

Figure 20 is a section on the line 20-20 of Figure 19 showing the crown turned at ninety degrees to the latter.

This application is a continuation-in-part of our application Serial No. 761,956, filed July 18, 1947, for Spring Winding Devices, now abandoned, and a continuation-in-part of application No. 565,342, filed November 27, 1944, now Patent 2,571,378, issued October 16, 1951.

Referring to the drawing in detail, 10 indicates a watch, which for the purpose of illustration only, is depicted as a man's pocket style watch which includes the usual winding crown member 11, winding stem 12 operated thereby, the bevel gear combination 13 to operate the stud shaft 14 to which is secured a crown winding pinion 15 meshing with and driving a main

3

winding gear 16 supported on the arbor 17. As shown in Figure 3, the arbor 17 journaled in plate 18 and otherwise mounted in the watch case in the well known manner, passes through a winding drum 20 and has secured thereto one end of a main spring 21. The other end of the spring is suitably connected to the periphery of the drum to drive the same so that the gear teeth 22 formed thereon actuate the watch mechanism in the known manner through the associated gearing 23.

The arbor 17 in that portion which passes through the winding gear 16 may be square or round as desired and the winding gear 16 is provided with a round opening so that it is free to revolve on the arbor at all times. The arbor and the winding gear however will rotate together while the watch is being wound through the medium of a spring tension disk used as a winding medium and indicated as at 25, in Figure 3.

The upper end of the arbor 17 is provided with a screw 26 and protrudes above the upper level of the main winding gear 16 to support on its upper surface the disk 25, which is secured in place by a lock disk and said screw. The lock disk 27 may be dispensed with if desired.

The spring tension disk 25 is circular in shape, although it can be shaped otherwise if deemed necessary, and is provided with a diametrically disposed flat center ridge 28 and downwardly curved lateral portions 29 at opposite sides of the ridge 28 constituting spring or tension wings or parts that yieldably resist upward flexing movement so that, when the dimples 30 formed therein adjacent the periphery thereof are seated in depressions or dents 31 in the face of the driving gear with which said disk 25 is associated and the main spring of the watch has been fully wound, the resistance of the latter will cause the dimples 30 to leave the seats 31 of the driving gear to allow the latter to revolve freely without further acting on the main spring.

While we have shown the disk 25 in association with the main winding gear 16 it is to be understood that it could be located on the shaft 14 in association with the crown winding gear 15 and would serve the purpose equally as well. Also, the upper end of the arbor 17 may be round in that portion within the hub of the gear 16 and may be squared to fit into a square hole 32 in disk 25 as indicated in outline in Figure 5. The position of the flexed disk 25 is indicated in Figure 6 where it is shown in relation to the gear with which it is associated, to illustrate its position when the main spring has been fully wound and the gear is free to revolve without producing a spring winding action. The disk 25 may be used in self-winding watches and in any watch having the arbor or shaft indicated.

In the form of the invention shown in Figure 4, the spring tension disk 33 is reversed in position so that its dimples 34 engage the pockets 35 in the under side of the main driving gear 36 which is free to rotate on the square end 37 of the arbor 38. This disk 33 is identical with disk 25. In this adaptation of the disk, the use of a holding or lock disk such as 27 is not necessary, the disk 33 being held in place by the driving gear which has a round central bore, but is kept on the arbor by the usual screw employed for that purpose.

The number of seats or pockets that may be employed in the driving or winding gears may vary, and in Figure 1, four are shown although any number may be used depending upon the conditions of use. The warning signal that the

4

spring is fully wound is produced by the snapping into the seats of the gear of the dimples of the disk so that an audible alarm is given which can be also felt or sensed by the person holding or in contact with the watch.

In the operation of our device, the gears 15 and 16 produce winding motion to turn the disk 25 due to its association under tension with gear 16 so that the arbor 17 will wind the spring 21 until it is fully wound. When it is wound, it will offer a resistance that will overcome the tension of the curved side wing portions of the disk 25 to retention of the dimples in their seats, with the result that they will lift out and free the gear for rotation independently of the winding disk 25, thus preventing any further winding of the spring or strain on the gear teeth and associated parts that might be damaged if they were not so protected by the action of the disk.

In the form of the invention shown in Figs. 7, 8, and 9 which is an improvement on Figs. 13, 14 and 15 of our application Serial No. 27,654, filed May 18, 1948, the face of the gear or spring winding member 45 may support a drive disk 46 which fits over the square shank of an arbor 47 and is recessed to provide spaced peripherally arranged hemispherical seats 48 into which fit the projected nubs or hemispherical protrusions 49 of a free spring disk 50 having peripheral ears 51 for free engagement with vertical slots 52 formed in the side wall of the gear 45 as by drilling part of the way into the gear. The disk 50 is of arcuate shape in cross section on a diameter through said ears and is assembled as by flexing so that the ears can be snapped into the slots 52 and thus can turn the disk 50 with the gear, thus eliminating the need for securing the disk to the gear by other fastening means. When the resistance of the spring reaches its wound maximum, the disk 50 yields and the nubs 49 thereof leave their seats and thereafter provide a warning click to notify the person winding the watch that the spring is properly wound. The disk 50 is arched diametrically to provide a high central part 53 in which the ears 51 are formed and downwardly bowed flanking portions or sides 54 in which the nubs 49 are formed.

In a form of the invention shown in Figures 10 to 18 inclusive, a crown 60 constitutes the spring winding member, it being understood that our invention can be used in the gear 45 or in the crown 60, the latter preferably, because crowns in which our invention is embodied can be readily made up, sold and applied as a separate unit to watches in which it is desired to prevent overwind of the spring by application of our device. The crown 60, like the gear, presents a cavity 61 formed to provide an annular shoulder 62 which is drilled at diametrically opposite sides of the cavity to provide vertical slots 63 in the wall into which extend the projecting ears 64 formed on the periphery of a free spring disk 65 when the latter is placed in the cavity of the crown. The spring disk is a solid member of circular form and of arcuate shape along the diameter thereof passing through said ears 64 so that hemispherical protrusions 66 located at diametrically opposite points of the high part of the arched disk may seat in the open ended slots 67 of a drive disk 68. The disk 68 has a hub 69 into the threaded pocket 70 of which is screwed the exposed end of the winding shaft 71 of the watch. When the spring disk 65 is positioned in the crown as shown in Figure 10 it will transmit the turning movement of the crown through its ears

5

64 and protrusions 66 to the drive disk 68 until the spring of the watch is fully wound and the spring disk 65 yields to let the protrusions 66 ride into and out of the slots 67 to provide an audible signal that the watch has been fully wound. The disk 68 is supported in place in the cavity in engagement with disk 65 by a closure ring 69 which is held in place on the annular shoulder 62 by the peened over edge 70 of the crown material and provides a central opening 72 through which the hub 69 extends.

In Figures 19 and 20 the spring disk 63 and the drive disk 68 are held in the crown 60 by a closure ring 73 which is force fitted into the open side of the crown.

Our invention is not to be restricted to the precise details of construction shown since various changes and modifications may be made therein without departing from the scope of the invention or sacrificing the advantages derived from its use.

What we claim is:

1. A watch crown comprising a hollow crown member having opposed slots in the inner wall thereof, a flexible circular disk arched laterally to provide high and low peripheral points, projecting ears at the low points of the disk resting in the bottom of said slots, rounded protuberances at the high points of said disk, a drive plate positioned over said disk in the hollow of the crown and presenting open ended slots in which said protuberances seat under yielding pressure afforded by the arched shape of said disk, a hub on said plate and a ring plate for closing the open side of the crown and through

6

which said hub protrudes for attachment to the winding stem of a watch.

2. A watch spring winding device comprising a hollow circular winding member presenting an interior annular wall having diametrically opposed slots extending inwardly in said wall from one face of the member, a flexible circular disk closely fitting within the hollow of said member and being arched laterally to provide a pair of opposite high points on the periphery thereof and a pair of opposite low points on the periphery thereof, a drive plate positioned in the hollow of said member axially of said disk and presenting radially disposed recesses, ears in one pair of said points extending into said wall slots, protuberances in the other pair of said points for seating in the recesses of said drive plate under yielding pressure afforded by the arched shape of said disk and spring winding means connected to said drive plate and extending out of said winding member.

CHARLES HILL.
CHARLES K. JOHNS.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
680,067	Phillips	Aug. 6, 1901
909,515	Axtell	Jan. 12, 1909

FOREIGN PATENTS

Number	Country	Date
208,577	Switzerland	May 1, 1940
251,442	Switzerland	Aug. 16, 1948