United States Patent [19]

Ikehata et al.

[11] **3,879,934**

[45] **Apr. 29, 1975**

[54] **FIXING MEANS FOR WINDING CROWN IN BACK WINDING WATCH**

[75] Inventors: **Yukio Ikehata,** Ichikawa; **Katsutoshi Maeda,** Tokyo, both of Japan

[73] Assignee: **Kabushiki Kaisha Daini Seikosha,** Tokyo, Japan

[22] Filed: **Aug. 30, 1974**

[21] Appl. No.: **502,191**

[52] **U.S. Cl.** ..... **58/88 B**

[51] **Int. Cl.** **G04b 37/00**

[58] **Field of Search** ..... 58/63, 88 B, 90 B

[56] **References Cited**

UNITED STATES PATENTS

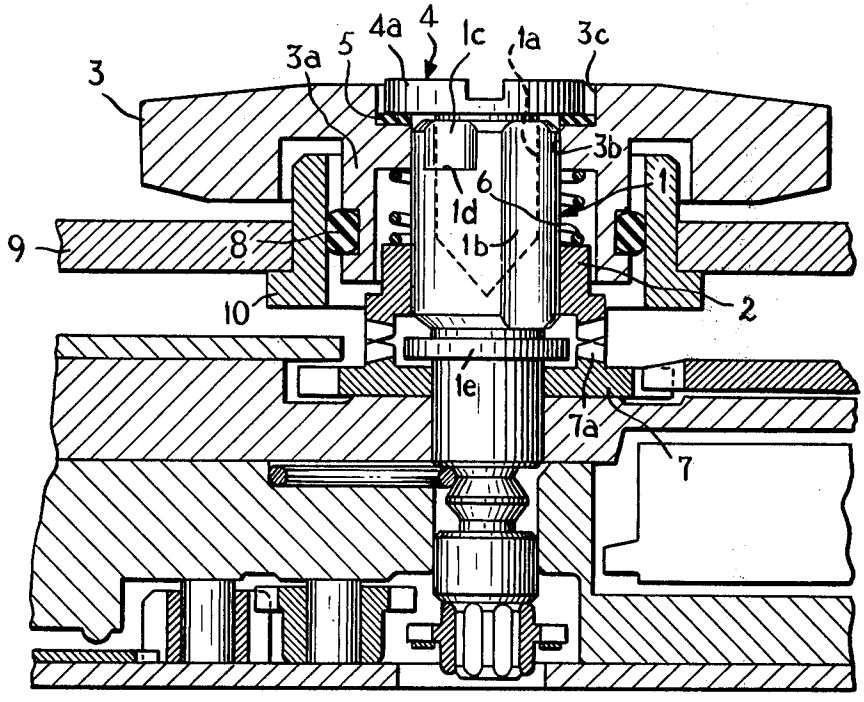
3,064,415	11/1962	Polo	58/63
3,499,280	3/1970	Erard	58/63

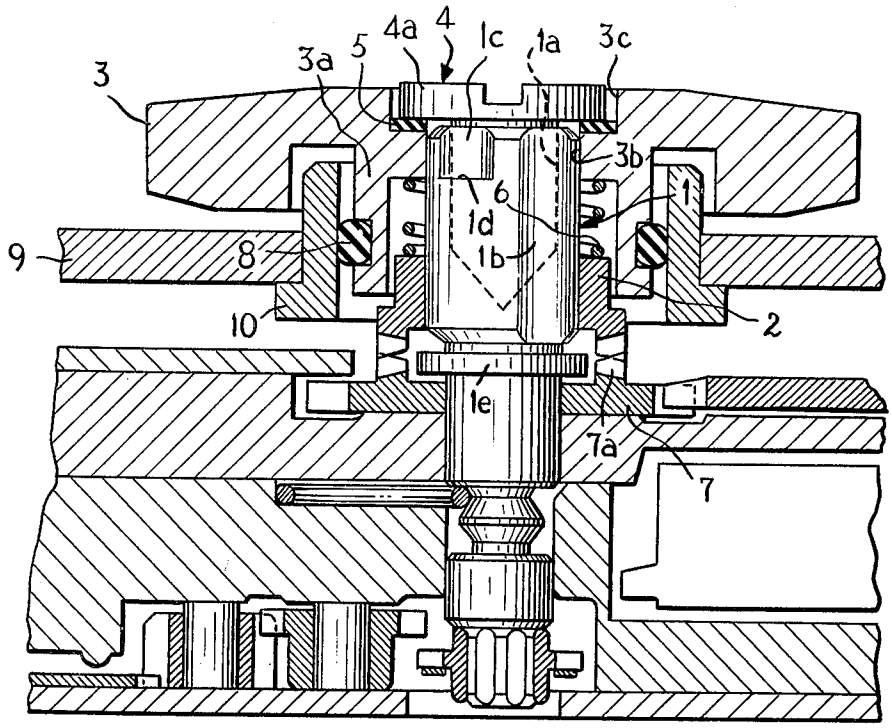
Primary Examiner—George H. Miller, Jr.
Attorney, Agent, or Firm—Robert E. Burns; Emmanuel J. Lobato; Bruce L. Adams

[57] **ABSTRACT**

A winding crown in a back winding watch is fixed on a winding stem having a first chamfered portion having a pair of opposed flat surfaces extending in an axial direction. A second chamfered portion axially of the winding stem provides two pairs of opposed or opposite flat faces so that in cross-section, the winding stem is substantially square. Furthermore, the end of the two chamfered portions of the outer end of the winding stem has a stepped portion against which the winding crown seats. The crown is provided with a central aperture that along a portion thereof is squared in cross-section or complementary to the cross-section of the winding stem so that it does not rotate relative thereto and along a portion of the aperture opening circular for receiving the head of a screw that is received in a tapped axial bore of the end of the winding stem.

2 Claims, 1 Drawing Figure




3
3a
5
4a
4
1c
1a
3c
3b
6
1d
1b
1
9
8
10
2
1e
7a
7

FIXING MEANS FOR WINDING CROWN IN BACK WINDING WATCH

BACKGROUND OF THE INVENTION

This invention relates generally to winding stems for watches and more particularly to an improved winding stem for a back winding watch.

Conventional fixing means for fixing a winding crown on the back winding watch winding stem are generally provided with an opening generally rectangular or square in cross section to conform to a rectangular or square cross section on the winding stem. The crown is therefore prevented from rotating relative to the winding stem. However a clutch gear fixedly mounted on the round portion of the winding stem and rotatable by the rotation of the winding crown and a winding gear axially slidable on the winding stem to permit reversal of the winding crown the winding gear fails to engage with a ratchet gear teeth when the winding crown is rotated in a direction reverse to the winding direction. Thereby excessive wear of the teeth of both gears takes place.

In other conventional watch structures the winding stem has a square portion on which are movably mounted the clutch gear and the winding crown is provided with a stop portion exactly positioned in a position for controlling the winding position of the winding stem when being returned from the winding position or second position. The clutch gear meshes with the ratchet teeth of the winding gear under the control of biasing force of the spring. However in such cases it is hard to make the stop portion in the winding crown so that production costs are increased. Furthermore, if the square portion of the winding stem is divided into a large and small diameter portion through the intermediary of a stop portion so as to exactly position the winding crown in the first and second positions thereof the screw for fixing the winding crown loosens the screw because the diameter of the screw inevitably becomes smaller in the smaller diameter part of the winding stem.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide fixing means for fixing a winding crown in a back winding watch allowing reversal of the rotation direction of the winding crown on the winding stem.

Another object of the present invention is to provide a winding stem having a stepped portion to exactly position the winding crown.

The watch embodying the means for fixing a crown on a watch stem has a winding stem that is rotational for winding a winding mechanism and is movable axially from the winding position to a hand-setting position. The winding stem has a first axial portion having a pair of opposite flat axial surfaces on which a clutch gear is disposed for axial movement relative to the winding stem and for rotation therewith. A second axial portion of the winding stem is disposed as an end portion of the winding stem on the first axial portion which has two pairs of flat surfaces and a stepped portion between said axial portions.

The end of the winding stem has a tapped blind axial bore on the end thereof extending axially into the first axial portion. The crown has a central through opening complementary with the second axial portion of the winding stem for a certain axial extent of the opening

and having inward projections seated on said stepped portion of the winding stem to accurately position the crown axially of the winding stem. A screw disposed extending through said opening in the crown and threaded into the tapped bore secures the crown on the winding stem. The screw has a round head received in a round portion of the through opening of the crown.

BRIEF DESCRIPTION OF THE DRAWING

Other objects and advantages of the means for fixing a crown on a watch according to the invention will appear from the following description of an example of the invention. The novel features will be particularly pointed out in the appended claims and sole figure which is a fragmentary side elevation view of a watch provided with a winding stem and fixing means with a crown thereof in accordance with the invention.

DESCRIPTION OF A PREFERRED EMBODIMENT

As illustrated in the drawing a winding stem **1** extends axially into a watch structure. The winding stem is generally circular in cross section but an axial end section thereof is provided with a tapped axial bore or hole **1***a*. This axial section comprises a first chamfered portion **1***b* having a pair of opposed or opposite flat faces or surfaces and a second chamfered portion **1***c* having two pairs of opposed flat faces so as to have a generally square or rectangular cross section on the first chamfered portion **1***b* by means of a pair of stepped portion **1***d*. A clutch gear is disposed on the first chamfered portion **1***b* for axial movement thereon and rotation therewith. This gear has an opening conforming to the cross section of the related stem portion **1***b*.

A winding crown **3** is fixed to the winding stem **1** and is provided with a tubular or cylindrical axial projection **3***a*. into which the winding stem **1** extends and is received therein with clearance between it and the cylindrical portion **3***a*. The crown is provided with a through central opening **3***b* the cross section of which conforms to or is complementary to the cross section configuration of the second chamfered portion **1***c* of the winding stem **1**. An upper portion of this through opening **3***b* in the drawing is circular with a shoulder or step **3***c* formed between the different cross sections of the opening. In order to fix the winding crown to the winding stem so that it does not rotate the second chamfered portion **1***d* of the winding stem fits on the first axial portion **3***b* of the winding crown and the winding crown is pressed down so that its lower surface around the hole portion **3***b* contacts with the opposed stepped portions **1***d* of the winding stem. A screw **4** is screwed into the tapped bore **3***a* of the winding stem and the head thereof is received in the greater diameter opening portion **3***c* of the winding crown. In this way the winding stem **3** is fixed between the opposed step portion **1***d* of the winding stem **1** and a head **4***a* of a screw **4**. A first gasket **5** insures water tightness at the joint between the head of the screw and the shoulder on the crown.

A spring **6** is disposed about the winding stem within the axial cylindrical projection **3***a* of the winding crown **3** and urges the clutch gear **2** to engage with ratchet teeth **7***a* of a winding gear **7**. The winding stem is provided with a collar **1***e* which lifts the clutch gear **2** and disengages it from the winding gear **7** when the winding stem is actuated axially from the winding position

thereof to its hand-setting position at which time a hand-setting mechanism is set by rotation of the shaft. This mechanism is shown at the lower part of the drawing but is not part of the invention.

In order to further insure the fluid-tightness of the watch a gasket **8** is disposed in a circumferential gasket groove in the tubular portion **3***a* of the crown effecting a seal between a casing member **9** and a sleeve **10** thereon and the second gasket.

The present invention has several advantages as follows: Since the winding stem includes the first chamfered portion which has a pair of opposed flat faces to axially slidably mount the clutch gear and the second chamfered portion has two pairs of opposed flat faces to fixedly mount the winding crown, the reversal of the winding crown may be effected by the sliding movement of the clutch gear. Furthermore, the winding stem includes the stepped portion which is formed between the first and second chamfered portions and permits the winding crown to be exactly positioned axially when the winding stem is returned to the winding or first position after having performed a hand-setting operation. It is not necessary therefore to form a stop portion on the winding crown thereby production costs are reduced. Furthermore, the diameter of the screw for fixing the winding crown can be relatively large so that any loosening of the screw does not take place.

What I claim is:

1. In a watch, a winding stem mounted for rotation for winding a winding mechanism and for driving a hand-setting mechanism, means mounting said winding stem rotationally and for movement axially between

two operative positions corresponding to a first position for driving said hand-setting mechanism and a second position for setting the hands, said stem having a first axial portion having opposite flat surfaces, a clutch gear on said first axial portion movable axially thereon and rotational with said winding stem, a second axial portion on said winding stem having flat surfaces and a stepped portion on an end of said winding stem, a crown on said second portion having a through opening receiving said stepped portion and having inward projections seating on said stepped portion, said crown opening having a circular configuration along an axial extent thereof and a configuration along an axial extent thereof complementary to the cross section of said second portion for rotation with said winding stem and having said projections thereon seated on said stepped portion defining the axial position of said crown, said winding stem having a tapped blind bore extending from an end thereof axially into said first portion of said winding stem, a screw holding the winding stem seated axially against said stepped portion, said circular configuration of said through opening having a diameter greater than the transverse dimension of said complementary configuration, portion thereof, and said screw having a head fitting into said through opening along said axial extent thereof having said circular configuration.

2. In a watch according to claim **1**, including a coil spring between said projections and said clutch gear biasing said clutch gear away from said crown.

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