

WATCH WITH ROTATING ELEMENT

The invention relates to the field of horology. It concerns more specifically a watch of the type including a rotating inner element fitted with a control member that can be actuated from the exterior of the case.

Such watches are known and marketed. They are, conventionally, dive watches comprising a rotating inner bezels. One can also find watches whose dial rotates in order to create an aesthetic or surprising effect, or watches fitted with a rotating polarizer inserted between the dial and the crystal.

Whatever the type of rotating element, it is actuated using a control member accessible from the exterior of the case. This type of control member is generally formed of a stem passing through the case radially, a crown secured to the outer end of the stem and a pinion secured to its inner end. An assembly of this type is illustrated in Figure 1, which shows a partial cross-section of a watch comprising a mobile element.

The watch shown in Figure 1 comprises, in a conventional manner, a case 10 formed of a middle part 2, a cap 14 and a back cover 16 together defining a housing 18 in which a movement 20 is mounted. A crystal 22 closes the case 10 in a water resistant manner. A dial 24 is mounted on movement 20. A circular recess 26 made in middle part 12 forms a shoulder 28 at the height of dial 24. A rotating bezel 30, inserted between dial 24 and crystal 22, is partially housed in circular recess 26, which axially positions and guides the latter in rotation. The bottom face of rotating bezel 30 includes a first flat circular portion 32a arranged opposite the periphery of dial 24 so as to conceal the same, and a second flat circular portion 32b abutting shoulder 28. It further comprises an intermediate circular portion 32c located between the first and second flat portions 32a and 32b and forming a contrate toothing 34.

A control member 36 actuates rotating bezel 30. For this purpose, a hole 38 passes radially through middle part 12. An intermediate tube 40 having a particularly well-finished inner surface state is screwed inside hole 38. A stem 42 of longitudinal axis AA is mounted inside tube 40 such that the ends thereof project outside and inside case 10. A crown 44 is secured to a first proximal end, whereas a pinion 46 is secured to a second distal end. The stem 42-crown 44-pinion 46 assembly forms the control member 36 of bezel 30. The latter is arranged in middle part 12 such that pinion 46 meshes with contrate toothing 34. The rotation of crown 44 actuated by the user, thus causes bezel 30 to rotate inside case 10.

Pinion 46 is secured to the distal end of stem 42 by screws and by bonding. This method of securing pinion 46 guarantees the axial and angular positioning of the latter relative to stem 42, which allows the transmission of the rotational movement of

latter relative to stem 42, which allows the transmission of the rotational movement of the control member 36 to bezel 30. However, it will be observed that such a method of securing by screws and bonding is so strong that it is practically definitive. During a maintenance service, it is almost impossible to dismantle control member 36 without
5 breaking stem 42. A simple solution to this problem consists in using a stem 42 whose end, having a square cross-section, is engaged in a hole in pinion 46 that also has a square cross-section. Pinion 46 is thus locked angularly. Axial positioning can be achieved using a circlip arranged at the end of stem 42, in a groove located in immediate proximity to pinion 46, on the distal side. In order to do this, stem 42 must
10 be slightly longer than in the case of securing by screws-bonding, which cannot be envisaged because of the lack of space between pinion 46 and movement 20.

The invention overcomes this difficulty by proposing the use of a securing part that is arranged, not on the movement side, as in the previously proposed solution, but on middle part 12 side. This securing part is anchored in stem 42 and pinion 46 in
15 order to position pinion 46 axially.

More specifically, the invention concerns a timepiece comprising a case and a crystal together defining a housing for a movement, and further comprising an element that can move in rotation actuated by a control member including a stem of longitudinal axis AA passing radially through the case, a crown mounted on a first
20 proximal end of the stem and a pinion fixedly mounted in rotation on a second distal end of the stem, characterized in that the control member is fitted with a part for axially securing the pinion on the stem, arranged on the proximal side of the stem, the securing part including:

- a slit ring mounted to be locked axially and radially on a first of the
25 pinion/stem elements, and
- axial locking means for the second of the stem/pinion elements, secured to the slit ring.

Because of the securing part arranged on the proximal side of stem 42, control member 36 of the rotating element can be disassembled and reassembled without
30 any risk of breaking stem 42.

Other features and advantages of the present invention will appear more clearly from the following detailed description of an example embodiment of a watch according to the invention, this example being given purely by way of non-limiting illustration, with reference to the annexed drawings, in which:

- Figure 2 illustrates an exploded partial cross-section of a watch according to
35 the invention, and

- Figure 3 shows an exploded partial view of an advantageous embodiment of a control member present in the watch according to the invention.

The watch shown in Figure 2 comprises, like the watch shown in Figure 1, a case 10 formed of a middle part 12, a cap 14 and a back cover 16 together defining a housing 18 in which a movement 20 is mounted. A crystal 22 closes case 10 in a water resistant manner. A dial 24 is mounted on movement 20. A rotating bezel 30 fitted with a contrate toothing 34 is inserted between dial 24 and crystal 22. It is actuated by a control member 36, comprising a stem 42, a crown 44 and a pinion 46.

The watch shown in Figure 2 differs from the watch shown in Figure 1 in that pinion 46 is not screwed and bonded to the inner end of stem 42. In fact, pinion 46 is fixedly mounted in rotation on the end of stem 42. A removable securing part 48, located on the proximal side of stem 42, is anchored in stem 42 and pinion 46 so as to position the latter axially. Securing part 48 is also abutting on intermediate tube 40 such that it opposes any axial movement of stem 42 towards the exterior of middle part 12.

The structure of control member 36 fitted to the watch according to the invention and, in particular, the method of securing pinion 46 to stem 42, appear more clearly in Figure 3. The distal end 50 of stem 42 has a square cross-section. A circular groove 52 is made in proximity to end 50. Pinion 46 includes a toothed portion 54 for cooperating with contrate toothing 34, and a short stem 56 in which a circular groove 58 is made. Pinion 46 is pierced with a central hole 60 of square cross-section, such that pinion 46 is angularly and radially positioned in relation to stem 42. Of course, any other shaped cross-section allowing transmission of torque, such as a triangular or hexagonal cross-section, could be employed.

Securing part 48 is formed of a ring 62 and an L-shaped rigid arm 64 secured to ring 62 and extending axially from the periphery thereof. Ring 62 is slit so as to have a certain radial flexibility, the slot flaring slightly outwards. This feature facilitates assembly of ring 52 by pressure on a cylindrical part. Ring 62 is mounted in groove 52 such that it is positioned axially and radially on stem 42. The L-shaped rigid arm 64 is then engaged in groove 58, which has the effect of locking pinion 46 axially. Thus mounted, control member 36 can fulfil the function of transmitting the rotational movement from crown 44 to rotating bezel 30, while being easy to disassemble.

Of course, the watch according to the invention is not limited to the embodiment that has just been described and various simple alterations and variants can be envisaged by those skilled in the art without departing from the scope of the invention as defined by the annexed claims.

It will be noted, for example, that circular groove 58 could be replaced by a simple hollow in which the L-shaped arm 64 engages. In a second variant, the securing part could be formed of two rings of the same type as ring 62, connected to each other by a rigid arm. In a third variant, end 50 and short stem 56 could be
5 pierced with a hole perpendicular to axis AA of stem 42. The L-shaped arm 64 would then be formed of a rigid portion extending axially and a stem extending radially into the holes made in end 50 and stem 56. Finally, it will be noted that control member 36 can actuate any rotating element, such as a bezel, a dial or a polarizer.

CLAIMS

1. Timepiece including a case (10) and a crystal (22) together defining a housing (18) for a movement (20), and further including an element that is mobile in rotation (30) actuated by a control member (36) including a stem (42) of longitudinal
5 axis AA, passing radially through said case (10), a crown (44) mounted on a first proximal end of said stem and a pinion (46) fixedly mounted in rotation on a second distal end of said stem (42), characterized in that said control member (36) is fitted with a part (48) for axially securing said pinion (46) on said stem (42), arranged on the proximal side of said stem (42), said securing part (48) including:
 - 10 - a first slit ring (62) mounted so as to be locked axially and radially on a first of the pinion (46) / stem (42) elements, and
- means for axially locking the second of the pinion (46) / stem (42) elements, secured to said slit ring (62).
2. Timepiece according to claim 1, characterized in that said slit ring (62) is
15 mounted in a circular groove (52, 58) made in a first of the pinion (46) / stem (42) elements.
3. Timepiece according to any of claims 1 and 2, characterized in that said axial locking means are formed of an L-shaped arm (64).
4. Timepiece according to claim 3, characterized in that said L-shaped arm
20 (64) is engaged in a hollow (52, 58) made in a second of the pinion (46) / stem (42) elements.
5. Timepiece according to claim 4, characterized in that said hollow (52, 58) is a circular groove.
6. Timepiece according to any of claims 1 and 2, characterized in that said
25 locking means are formed of a second slit ring connected to said first slit ring (62) by a rigid arm.
7. Timepiece according to claim 6, characterized in that said second slit ring is mounted in a circular groove (52, 58) made in a second of the pinion (46) / stem (42) elements.
- 30 8. Timepiece according to any of claims 1 to 7, characterized in that said stem (42) includes one end with a square cross-section (50) and in that said pinion (46) is pierced with a hole (60) of square cross-section in which said end (50) is engaged.