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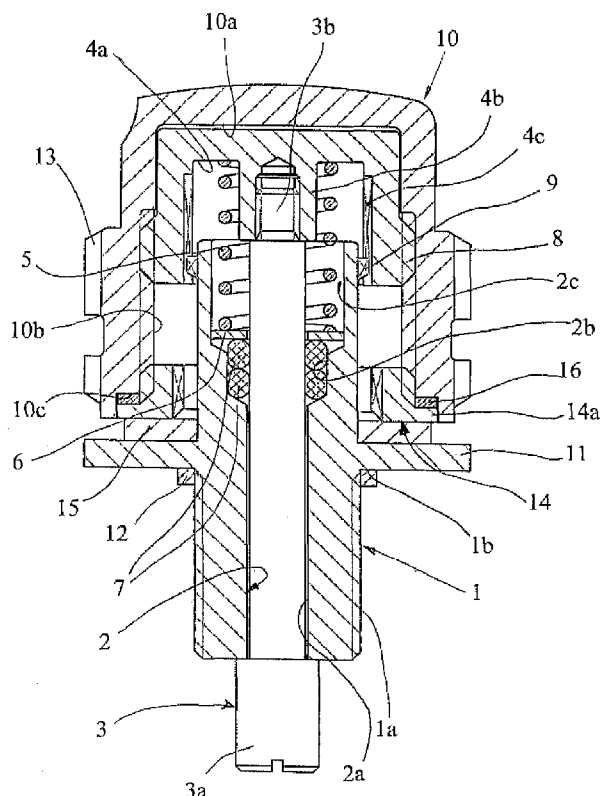
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(54) Title: PUSH BUTTON FOR WATER-TIGHT WATCH CASES



(57) Abstract: Push button for water-tight watch cases comprising a locking cap (10) screwed to a head (4) of the actuation screw (3). The cap (10) has a greater axial extension with respect to the head (4) so as to extend beyond it towards the case. An abutment ring nut (14) is screwed to the cap (10) near the free edge, in an unlocking and locking configuration the ring nut (14) respectively abutting on the head (4) and on the case. First sealing means (15) are moreover provided interposed at the abutment of the ring nut (14) in the locking configuration, and second sealing means (16) are provided interposed at the connection between the ring nut (14) and the cap (10), so that the latter is the actual push element of the button and at the same time protects its internal components, at least in the locking configuration, from the entrance of water.



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TITLE

PUSH BUTTON FOR WATER-TIGHT WATCH CASES

DESCRIPTIONField of the invention

The present invention refers to the watch-manufacturing field, and in particular it concerns a new push button for watch cases.

Background of the invention

For driving the mechanism inside a watch case, push buttons projecting from the case can be provided, especially in chronograph watches. These buttons can be actuated by manually imparting a simple axial pressure. A typical known configuration of a button device of this type provides for a tubular body which is engaged in a hole formed in the case. Inside the tubular body, a stem axially slides, which acts on the mechanism. Such stem is also called "screw" since the inner end, i.e. that which is engaged with the mechanism, has an enlarged, screw-head shaped head, while the other end, the outer-one, has a threaded section on which the actual driving head of the button is coaxially fixed. The head is cup shaped and slides along the outside of the body, hindered by a spring which is housed, again with coaxial arrangement, within the cup and the tubular body (compressed between them) and on the outside of the screw.

Since a water-tight closure of the case must be assured, in order to protect the mechanism from water infiltrations, there is the problem of providing the button with appropriate hydraulic seals. In particular, the possible critical areas can be localized in the connection between the case and the tubular body, and in that between the screw and the tubular body. In the first

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case, the connection is a stable one, usually screwed, whose water-tightness can be easily ensured with a common washer. In the second case, in a suitable chamber formed in the tubular body, immediately close to the region of slidable contact between the body and the screw, one or more O-rings are arranged which are compressed by the spring.

This second seal is not sufficiently secure, considering also that the O-rings are stressed at each use of the button, and can thus be worn, deformed or displaced. Additionally, the above described configuration permits in any case the entrance of water inside the button, i.e. inside the body, in the chamber housing the spring, and the O-rings represent the only sealing barrier which opposes the entrance of water directly inside the case.

Still according to the prior art, the push button can be equipped with an outer ring nut, screwed externally on the body, to be axially moved towards the case, up to an abutment position thereon in which the axial displacement of the button is locked. This type of lockable button has the advantage of effectively preventing accidental actuation of the button, but its water-tight reliability is exactly the same as explained above.

Summary of the invention

The present invention proposes to resolve such problem, providing a new configuration of a mechanism-driving button for watch cases, in particular of lockable type, which ensures a water-tight reliability which is considerably greater with respect to known buttons.

A particular object of the present invention is to

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provide a button of the above mentioned type in which water cannot leak within the device, at least in the locking configuration, thus making the internal components less subject to deterioration.

Such objects are achieved by the push button for water-tight watch cases according to the invention, the essential features of which are defined in the first of the appended claims.

Brief description of the drawings

The characteristics and advantages of the push button for water-tight watch cases according to the present invention will be apparent from the following description of an embodiment thereof, given as purely exemplifying and not limiting with reference to the attached drawings, wherein:

- figure 1 is a perspective view of the button according to the invention;
- figure 2 represents an axial section of the button of figure 1, in a locking (or of prevented actuation) configuration and
- figures 3 and 4 are axial sections of the device, in unlocking configuration and, respectively, in release and actuation position.

Description of the preferred embodiment

With reference to above figures, a button according to the invention has a general structure equal to or substantially referable to that of the prior art, mentioned in the introductory part of the present description. In particular, a generally cylindrical tubular body 1 is provided with a threaded portion 1a for engagement with a suitable seat formed in the case (not shown). This connection is made water-tight via a ring 2,

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housed in a chamber 1b defined by a disc-shaped flange 11 at the base of the threaded portion 1a.

The conduit defined axially within the body 1, generally indicated at 2, has a guide portion 2a for the slidable housing of a screw 3, equipped (again in accordance with the prior art) with an end 3a, inside the case, for engagement with the watch mechanism (in turn not shown), and a threaded end 3b, outside the case and the body 1. At the threaded outer end 3b, a substantially cup-shaped head 4 is connected. To the purpose, the head 4 is provided with a tubular sleeve 4b projecting centrally and axially within the cavity 4a defined on the concave side. A helical spring 5 is arranged around the screw 3, being partially housed in an enlarged portion 2c of the conduit 2. The spring 5 is axially compressed at one end by the head 4, while at the opposite end it urges, with the interposition of a washer 6, a couple of sealing O-rings 7 accommodated within a central chamber 2b of the conduit 2, of intermediate width between the enlarged portion 2c and the guide portion 2a for the screw 3.

Returning to the head 4, this is axially extended so as to be superimposed on the body 1, which results partially fit within the cavity 4a. In the surface of said cavity, an axial grooving 4c is formed for coupling with a corresponding profile 9 of the body 1, so that the head 4 can slide axially with respect to the body but is locked by it (mounted in a fixed manner on the case) with regard to the rotation.

In the outer surface of the head 4, a threaded crown 8 is formed on which, according to the invention, a cylindrical cap 10 is screwed, the head 4 being housed within a cavity 10a of the same cap. The cap 10 is in

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practice coaxially screwed on the outside of the head 4, projecting - along with the related threaded segment 10b complementary to the crown 8 - to a greater extent than the head. The screwing/unscrewing of the cap leads to the displacement between a locking configuration and an actuation permission configuration, as will be better explained below. A distribution of protrusions 13 radially extends along the outside of the cap to assist its manual grip.

In further detail, the inner threaded segment 10b of the cap 10 stops before the free edge of the cap itself. Near such edge, an enlargement of the cavity 10a forms a chamber 10c. On the segment 10b, at the end adjacent to the chamber 10c, an annular abutment ring nut 14 is also engaged, which by partially obstructing the cavity 10a acts as an abutment element of the cap 10.

In particular, in the locking configuration (figure 2) the abutment is against a first sealing gasket 15 arranged on the flange 11 of the body 1, while in the unlocking configuration (figure 3) the ring nut 14 abuts on the head 4. The size of the cap 10 is such that, in the locking configuration, the assembly of the head 4 and screw 3 does not undergo any axial pressure stress, being maintained in a release position, i.e. of no actuation. The seal of the connection between ring nut 14 and cap 10 is secured by a second gasket 16 arranged in the chamber 10c and closed by a lip 14a projecting externally from the ring nut itself.

In use of the button according to the invention, the cap 10 therefore represents the component on which the push action is imparted by the user. The screwing of the cap leads, as seen, to the locking configuration

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represented in figures 1 and 2, in which due to the forced abutment between the ring nut 14 and the first gasket 15, the exercise of an axial pressure on the same cap 10 cannot lead to any drive transmission on the head 4 and, consequently, on the screw 3. This is therefore a configuration which protects the push button from accidental actuation and in which the cap 10 clearly protects all of the components of the device, blocking the leakage of water due to the gaskets 15 and 16.

By unscrewing the cap 10 to the unlocking configuration, in which the abutment of the ring nut 14 against the head 4 prevents the complete unscrewing and therefore detachment of the cap, the stop to the axial movement of the head 4 and screw 3 is removed. The pressure actuation can be transmitted by pushing on the cap 10 (figure 4), integral with the head 4 as far as the axial displacement is concerned. When the button is back to the release position, and there is no more need to push the button, the inverse process, i.e. that of rescrewing the cap, will once again lead to the locking configuration.

Thanks to the button according to the invention, it is therefore possible to ensure greater water-resistance properties with respect to traditional configurations, since the O-rings 7, at least in the locking configuration (which is however that of normal use of the watch, taking into account that the button is very rarely actuated under water or in wet settings), is not the only sealing element, and represents instead a secondary sealing with respect to the external sealing provided by the gaskets 15 and 16. The latter keep all of the internal components of the device protected from water contact, with the

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consequent advantages in terms of reliability and lower deterioration.

Moreover, the mounting of the device is carried out just as easily as with the known devices. First, the body 1 complete with screw 3 and spring 5 is screwed on the case. The head 4 is then inserted in the cap 10, on which the ring nut 14 is then mounted. The assembly thus obtained is then positioned and fixed at the threaded end 3b of the screw 3.

The materials with which the various components and in particular the sealing elements are made will be chosen from among the traditional materials, based on the common knowledge of the man skilled in the art. Variants and/or modifications can in any case be brought to the push button for water-tight watch cases according to the present invention without departing from the protective scope of the invention itself as defined by the appended claims.

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CLAIMS

1. Push button for a water-tight watch case comprising: a tubular body (1) fixed to said case; an actuation screw (3) slidable in a water-tight manner within said tubular body (1) along a common central axis, said screw (3) being provided with an inner end (3a) inside the case and an outer end (3b) outside said case and said body; elastic hindering means (5) for opposing the sliding of said screw (3) between a release position and an actuation position, in which, respectively, said inner end (3a) is disengaged from and engaged with a mechanism of said watch; a head (4) connected to said outer end (3b) of said screw (3); means (9, 4c) for preventing the rotation of said head (4) and said screw (3) around said central axis; and locking means (10), coaxially screwed to said head (4), displaceable along said axis with respect to said head (4) between a locking configuration, in which by abutting on said case or said body (1) they stop the sliding of said screw (3) from the release position towards the actuation position, and an unlocking configuration in which they permit said sliding, characterised in that said locking means comprise a cap (10) surrounding said head (4), having greater axial extension with respect to the same so as to axially project, with a free edge, from the head towards said case, and an abutment ring nut (14) screwed to said free edge of said cap (10) for abutting on said body (1) or said case in said locking configuration, first sealing means (15) being further interposed at the abutment of said ring nut (14) in said locking configuration, and second sealing means (16) being interposed between said ring nut (14) and said cap (10), whereby the latter is the actual push element of the

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button and at the same time protects its internal components, at least in said locking configuration, from the entrance of water.

2. The button according to claim 1, wherein said tubular body (1) is provided with a threaded portion (1a) for engagement with a seat formed in said case, a disc-shaped flange (11) projecting from the body close to said threaded portion (1a), said first sealing means (15) for the abutment of said ring nut being arranged on said flange (11).

3. The button according to claim 1 or 2, wherein said ring nut (14) is screwed on a threaded segment (10b) inside said cap (10), said head (4) being in turn engaged with said threaded segment (10b) and partially obstructing the cavity (10a) defined by the cap (10).

4. The button according to claim 3, wherein said threaded segment (10b) stops before said free edge of the cap (10), an annular chamber (10c) being formed near said free edge for enlarging said cavity and housing said second sealing means (16), said annular chamber being closed by a lip (14a) projecting externally from said ring nut (14).

5. The button according to claim 3 or 4, wherein said threaded segment (10b) of said cap is engaged with a crown (8) projecting from said head (4).

6. The button according to any of the previous claims, wherein a distribution of protrusions (13) radially extends along the outside of said cap (10) to assist its manual grip.

7. The button according to any of the previous claims, wherein said ring nut (14) is sized so as to abut on said head (14) in said unlocking configuration.

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8. The button according to any of the previous claims, wherein said first and second sealing means (15, 16) comprise respective gaskets of annular shape.

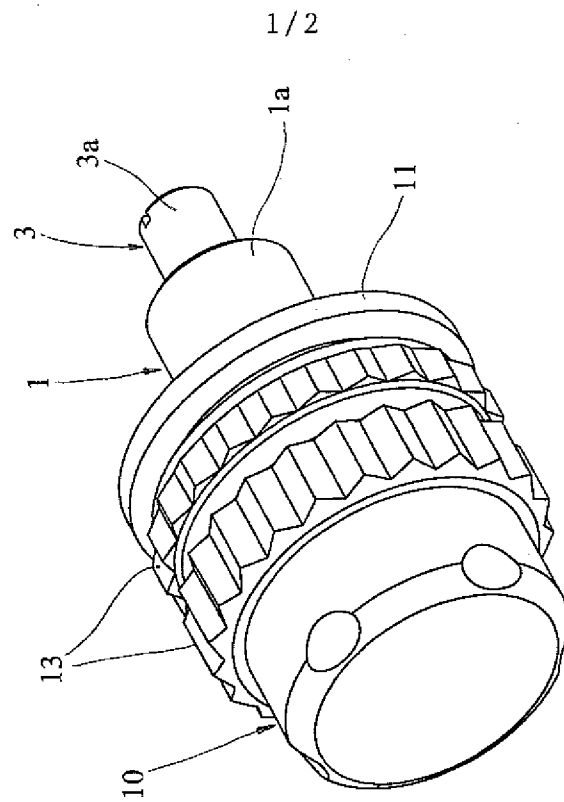


Fig. 1

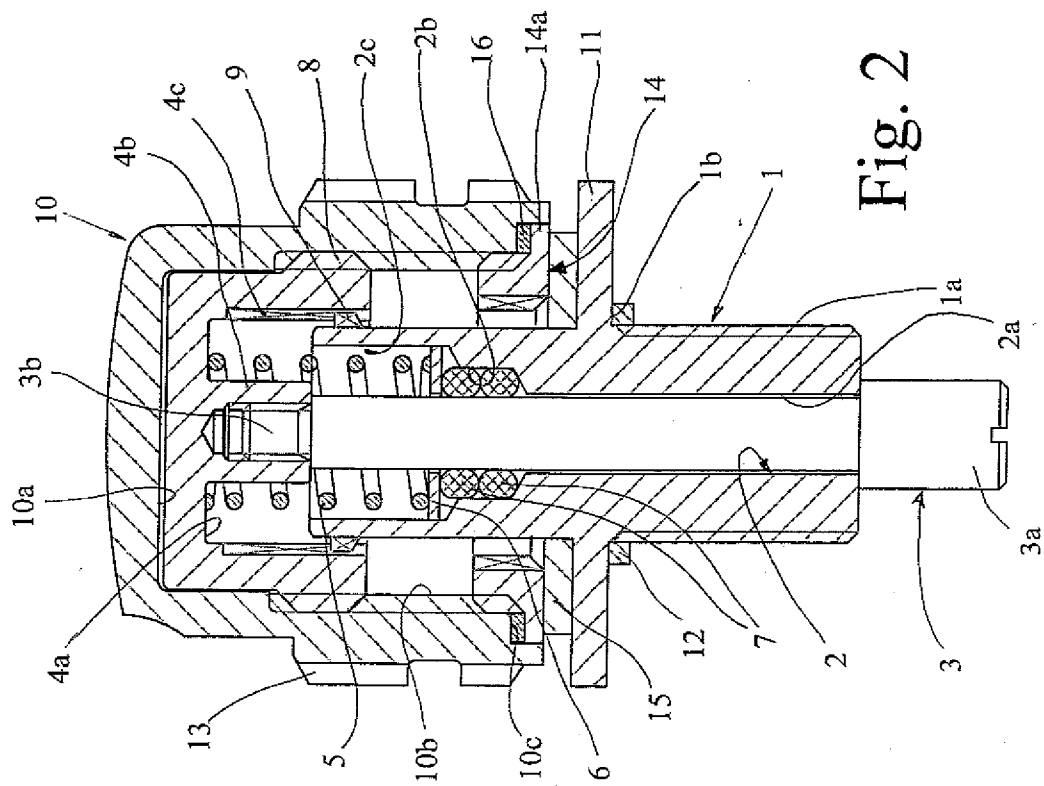


Fig. 2

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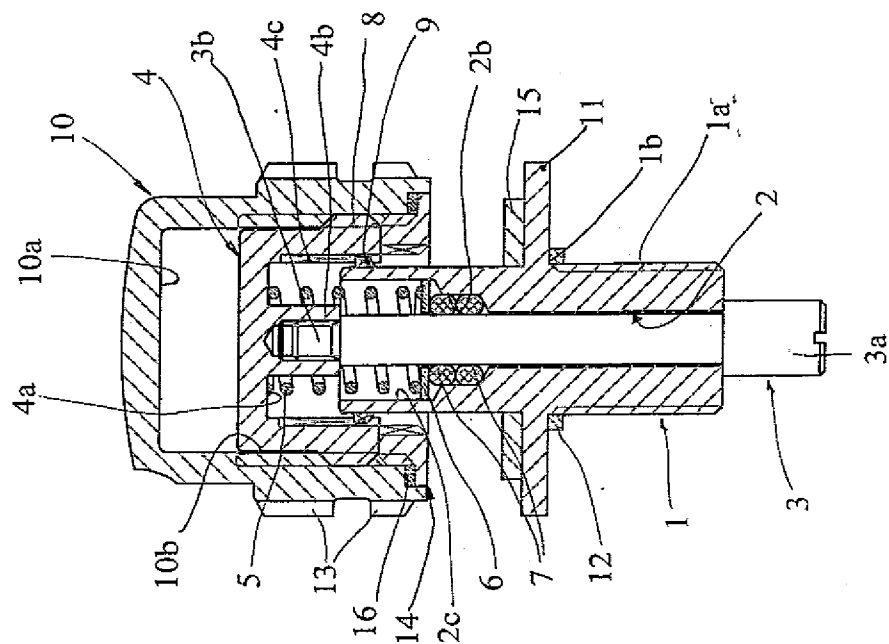


Fig. 3

