

PATENT SPECIFICATION

(11) 1 269 874

DRAWINGS ATTACHED

- (21) Application No. 20473/70 (22) Filed 28 April 1970
 (31) Convention Application No. 820 190 (32) Filed 29 April 1969 in
 (33) United States of America (US)
 (45) Complete Specification published 6 April 1972
 (51) International Classification G 04 b 37/10
 (52) Index at acceptance G3T A10C1



(54) WATCH CROWN

(71) We, TIMEX CORPORATION, a Corporation organized under the laws of the State of Delaware, United States of America, of Waterbury 20, Connecticut, United States of America, do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to horology and more particularly to a crown for a waterproof watch.

It has generally been thought desirable that a watch should be waterproof. Watches, even when treated with care, occasionally may become wet, for example, due to rain or accidental immersion. When watches were a luxury item, they were treated with considerable care. Wrist watches were removed from the wrist before washing the hands. However, wrist watches are no longer considered a luxury item and they are often treated carelessly—they are left on when washing the hands, when going out in the rain, or even when swimming or bathing. People nevertheless expect that their watches will continue to operate, despite the adverse treatment to which they subject them. There is a demand that even relatively low-priced watches be waterproofed.

The demand for low-priced waterproof watches has presented difficulties to watch manufacturers. Some of the devices which provide waterproofness in a watch are too expensive to be utilized in low-priced watches. On the other hand, there have been proposed various waterproofing methods which, although low in cost, are impractical or only operate for a short time and thereafter cease to protect the watch.

The problem of waterproofing inexpensive watches has been particularly acute in relation to the watch crown. The watch crown is used in a mechanical watch to wind the mainspring and to set the hands. In winding the mainspring the watch crown is connected to a winding staff which is co-axially rotatable within a tubular pendant fixed to the watch case and the winding staff is turned upon rotation of

the crown. The crown is pulled outward away from the case and rotated in order to set the hands.

To waterproof the watch crown it has been proposed to provide within the watch crown a sealing element which seals with the tubular pendant. However, to be satisfactory the sealing element must satisfy many requirements. It must keep the watch waterproof during the normal position of the crown, that is, with the crown pressed inwardly against the watch case. It must also prevent leakage of water into the pendant when the crown is pulled outward in order to set the hands. In addition, it must permit the crown to rotate in relationship to the pendant, both in its winding and hand-setting positions. It is important that the rotation of the crown should not cause the waterproofing seal to become worn out; for, if that seal should fail, water may flow from outside of the crown, through the pendant and into the watch, harming or destroying its mechanism.

It is an object of the present invention to provide a crown for a watch, which crown provides a waterproof seal, is relatively inexpensive, and may be assembled with a minimum of labour.

It is a further object of the present invention to provide such a crown which does not readily wear out with use, which provides a waterproof seal between the crown and the pendant, and yet permits rotation of the crown.

In accordance with the present invention there is provided a waterproof watch crown comprising a crown body adapted to fit over a watch case tubular pendant, said crown body having an internal cavity and means adapted to fit within the said case pendant and to be attached to the winding stem of a watch, an elastic gasket within said cavity and an annular hard washer attached at the open end of said crown body to partly close said cavity and retain said gasket within said cavity, wherein said gasket viewed in cross-section has a flat washer-like portion clamped tightly between said hard washer and said crown body and an integral tubular portion at the inner edge

of said flat portion and extending inwardly of said cavity away from the open end, said tubular portion having an arcuate inner face to be pressed against the pendant and a cylindrical outer face.

5 A preferred waterproof watch crown has a plastics or metal crown body, preferably having conventional knurling. A pedestal, integral with the body, protrudes from the cavity. The
10 pedestal has a bore which is an interference fit, or is otherwise formed so that it may be fastened, either permanently or removably, to the winding stem of the watch. The cavity is adapted to fit over the tubular pendant which
15 protrudes from the case of the watch. The elastic gasket is held within the cavity by a metal or plastics hard washer which is clamped, glued or otherwise joined to the crown body. The flat washer-like portion of
20 the gasket is firmly positioned between the washer and a ledge formed in the crown body. The outer cylindrical surface of the tubular portion is held against a circumferential wall of the cavity of the crown body. The curved
25 inner face of the tubular portion of the gasket is, when the crown body is in its position on the pendant of the watch, compressed against the pendant. The gasket is firmly held within the crown body even when the crown body
30 is removed from the watch. It will not fall out of the crown body and may be exactly centered within the cavity of the crown body. The curved face of the gasket permits rotation of the crown body without binding. At the
35 same time the gasket provides an excellent seal against water.

A preferred embodiment of the present invention will now be described by way of illustration, with reference being made to the accompanying drawings, in which:—

40 Figure 1 is a side cross-sectional view of a watch crown according to the present invention in its position on the watch;

45 Fig. 2 is a side view, the left half being in cross-section, of the crown removed from the watch;

Fig. 3 is a cross-sectional view of the gasket ring; and

50 Fig. 4 is a view of the watch crown from below.

As shown in Figs. 1 and 2, the watch crown includes a crown body 1 made from metal or plastics. The body 1 has an exterior set of conventional external teeth (knurlings) 2 to enable the crown to be conveniently gripped. A
55 cavity 3 is formed within the body 1. The body has a hollow tubular pedestal portion 4 which protrudes from the cavity 3. The pedestal portion 4 has a bore 5 which is adapted to grip external teeth 6 of the winding and setting stem 7 of the watch. Alternatively, the bore of pedestal 4 may have internal screw threads adapted to be screwed to exterior screw threads of the stem 7. The stem 7 is
60 a round staff which is rotatable within a tubu-

lar pendant 8. The tubular pendant 8 is integral with, and protrudes from, the bezel or other portion of the watch case (not shown).

The cavity 3 has a first, enlarged cylindrical cavity portion 12 and, above the first portion, 70 a second smaller cylindrical cavity portion separated from the first portion by a step which provides an annular, downwardly inclined ledge 17. An annular, flat hard washer 10 of metal or plastics is attached to the crown body 1 at the bottom of the cavity 3 within the first, enlarged cylindrical cavity portion 12 to partly cover the cavity and retain within the cavity a gasket 13. The attachment of the washer 10 may be, as shown, by turning a lip 80 11 of the crown body over the washer 10 to clamp the washer in place or alternatively by adhesive or other means of attachment. The radially outer face of the washer 10 may be close to, or rest against, the internal wall of the cavity portion 12 of the crown. The gasket 13 which is shown separately in cross-section in Fig. 3, is an elastic gasket preferably made of a mouldable elastic material, for example the synthetic plastics resin polyurethane. The gasket 13 is moulded with integral lower and upper portions 14 and 15. The lower portion 14 is a flat, annular washer-like portion and the upper portion 15 is an upright tubular portion at the radially inner edge of the lower portion 14. The tubular portion 15, viewed in cross-section has a convexly curved radially inner face 16 and a cylindrical radially outer face. The lower portion 14 of the gasket 13 is clamped tightly within the crown body between the axially upper (internal) face of the washer 10 and the ledge 17 of the crown body 1.

When the crown is assembled on to the pendant of the watch as seen in Fig. 1, the curved inner face 16 of the tubular portion 15 of the gasket is compressed against the pendant 8 to form a seal between the watch crown and the case pendant against passage of water. The curved face 16 presents the same type of low resistance surface to the pendant 8 as would be presented by an "O" ring. However, the gasket 13 presents the advantage, as compared to an "O" ring, of being firmly held in place within the crown body. Due to its being compressed between the ledge 17 and the upper surface of the washer 10, the gasket prevents water leakage between the washer and the crown.

WHAT WE CLAIM IS:—

1. A waterproof watch crown comprising a crown body adapted to fit over a watch case tubular pendant, said crown body having an internal cavity and means adapted to fit within the said case pendant and to be attached to the winding stem of a watch, an elastic gasket within said cavity and an annular hard washer attached at the open end of said crown body to partly close said cavity and retain said gasket within said cavity, wherein said gasket 130

of said flat portion and extending inwardly of said cavity away from the open end, said tubular portion having an arcuate inner face to be pressed against the pendant and a cylindrical outer face.

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20 the gasket is firmly positioned between the washer and a ledge formed in the crown body. The outer cylindrical surface of the tubular portion is held against a circumferential wall of the cavity of the crown body. The curved
25 inner face of the tubular portion of the gasket is, when the crown body is in its position on the pendant of the watch, compressed against the pendant. The gasket is firmly held within the crown body even when the crown body
30 is removed from the watch. It will not fall out of the crown body and may be exactly centered within the cavity of the crown body. The curved face of the gasket permits rotation of the crown body without binding. At the
35 same time the gasket provides an excellent seal against water.

A preferred embodiment of the present invention will now be described by way of illustration, with reference being made to the accompanying drawings, in which:—

40 Figure 1 is a side cross-sectional view of a watch crown according to the present invention in its position on the watch;

Fig. 2 is a side view, the left half being in cross-section, of the crown removed from the watch;

45 Fig. 3 is a cross-sectional view of the gasket ring; and

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lar pendant 8. The tubular pendant 8 is integral with, and protrudes from, the bezel or other portion of the watch case (not shown).

The cavity 3 has a first, enlarged cylindrical cavity portion 12 and, above the first portion, a second smaller cylindrical cavity portion separated from the first portion by a step which provides an annular, downwardly inclined ledge 17. An annular, flat hard washer 10 of metal or plastics is attached to the crown body 1 at the bottom of the cavity 3 within the first, enlarged cylindrical cavity portion 12 to partly cover the cavity and retain within the cavity a gasket 13. The attachment of the washer 10 may be, as shown, by turning a lip 11 of the crown body over the washer 10 to clamp the washer in place or alternatively by adhesive or other means of attachment. The radially outer face of the washer 10 may be close to, or rest against, the internal wall of the cavity portion 12 of the crown. The gasket 13 which is shown separately in cross-section in Fig. 3, is an elastic gasket preferably made of a mouldable elastic material, for example the synthetic plastics resin polyurethane. The gasket 13 is moulded with integral lower and upper portions 14 and 15. The lower portion 14 is a flat, annular washer-like portion and the upper portion 15 is an upright tubular portion at the radially inner edge of the lower portion 14. The tubular portion 15, viewed in cross-section has a convexly curved radially inner face 16 and a cylindrical radially outer face. The lower portion 14 of the gasket 13 is clamped tightly within the crown body between the axially upper (internal) face of the washer 10 and the ledge 17 of the crown body 1.

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1. A waterproof watch crown comprising a crown body adapted to fit over a watch case tubular pendant, said crown body having an internal cavity and means adapted to fit within the said case pendant and to be attached to the winding stem of a watch, an elastic gasket within said cavity and an annular hard washer attached at the open end of said crown body to partly close said cavity and retain said gasket within said cavity, wherein said gasket



- viewed in cross-section has a flat washer-like portion clamped tightly between said hard washer and said crown body and an integral tubular portion at the inner edge of said flat portion and extending inwardly of said cavity away from the open end, said tubular portion having an arcuate inner face to be pressed against the pendant and a cylindrical outer face.
- 5 2. A watch crown as claimed in claim 1, wherein the cavity in said crown body comprises a first enlarged cylindrical cavity portion extending inwardly of the crown body from the open end thereof and a second smaller cylindrical cavity portion extending inwardly from said first portion, the wall between said first and second portions forming a ledge, the washer-like portion of said gasket being clamped between said ledge and said hard washer.
- 10 3. A watch crown as claimed in claim 1 or claim 2, wherein the means adapted to be attached to the winding stem is a tubular pedestal.
- 15 4. A watch crown as claimed in any one of the preceding claims, wherein the hard washer is of metal and is clamped in place within the crown body.
- 25 5. A watch crown as claimed in any one of the preceding claims, wherein the gasket is a moulded synthetic resin gasket.
- 30 6. A watch crown as claimed in any one of the preceding claims, wherein the gasket is moulded polyurethane.
- 35 7. A waterproof watch crown substantially as hereinbefore described with reference to the accompanying drawings.
- 40 8. A watch fitted with the waterproof watch-crown as claimed in any one of the preceding claims.

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