

PATENT SPECIFICATION

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COMPLETE SPECIFICATION

DRAWINGS ATTACHED

Waterproof Watch Casing

I, HANS ULRICH KLINGENBERG, a Swiss citizen, of Alfermée/Biel, Switzerland, do hereby declare the invention, for which I pray that a patent may be granted to me, 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 waterproof watch casings and relates particularly to a vacuum-sealed watch casing wherein the back of the watch casing or the crystal is held in fluid-tight manner by vacuum action against a sealing member disposed in the central part of the casing.

It has been proposed to vacuum-seal a watch casing so as to prevent moisture from penetrating the inside of the casing as well as to prevent, in the event of temperature or pressure differences, condensation on the inner surface of the crystal. However, such proposals involve the use of a valve mounted in the watch casing to withdraw air from the interior thereof and are thus very complicated and expensive.

Other proposals involve the use of mechanical means for engaging the crystal. They also involve the use of indicator means, for example, a small manometer, which is used for insuring a continuous control of the vacuum or the moisture content of the air inside the casing.

It is an object of the present invention to provide a vacuum-sealed watch casing which can be assembled in a very simple manner and effectively sealed without complicating its structure.

Another object of the present invention is to provide a waterproof watch casing wherein the connection between either the crystal or the bottom part, and the central part of the casing is effected solely and exclusively by the creation of a substantial vacuum in the casing.

According to the invention a waterproof watch casing comprises a central portion adapted to receive a watch movement and having a peripheral wall formed with an annular seat for the peripheral portion of a closure member which is maintained in sealing engagement with said seat by the differential air pressure acting on opposite sides thereof when the interior of said central portion has been substantially emptied of air.

Two embodiments of the invention will be further described with reference to the accompanying drawings, wherein:

Figure 1 is a vertical, cross-sectional view through one form of watch casing, and,

Figure 2 is a fragmentary vertical sectional view on a larger scale of a second form of watch casing.

Referring to Figure 1, the watch casing includes a central part 2 and an integral back portion 1. The central part 2 has a recess 2a which includes a shoulder on which a sealing ring 4 is seated. The sealing ring provides a seat for a crystal 3 and the crystal, without the use of any other fastening means, is held tightly against the sealing ring 4 by virtue solely of the differential air pressure acting on opposite sides thereof when the watch casing is substantially exhausted of air.

The watch casing may be assembled in a very simple manner by placing the casing, with the crystal in position, into the chamber of a vacuum pump.

When the chamber is evacuated the air in the watch casing lifts the crystal and flows into the chamber from which it too is evacuated. The crystal is then pressed into engagement with the sealing ring 4 by a manually operated rod passing through the top of the chamber and the chamber is vented to the atmosphere. Due to the low

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pressure existing in the interior of the casing, the crystal 3 is pressed in airtight fashion against the sealing ring 4 and is held tightly in this position.

- 5 It is not necessary to provide means for indicating the presence of a near-vacuum in the casing since the crystal 3 would fall from its seat if the difference in air pressure acting on opposite sides thereof was not
10 sufficiently great.

- In the form shown in Figure 2, a protective crystal 5 is provided and is permanently secured by means of an undercut recess 2b in the central casing part 2. The protective
15 crystal is seated on a sealing ring which is mounted on a shoulder portion of the recess and is permanently held in place by the undercut portion 2b. The crystal 5 is snapped into position in the usual manner
20 and is provided with an opening 5a which connects the space outside the crystal with the interior of the watch casing. The crystal 3 overlies the crystal 5 and there is a space between the two crystals which is in communication through the opening 5a with the
25 interior of the watch casing.

- The central casing part 2 is formed with a rim 2c which has an upwardly and inwardly extending undersurface that extends over
30 the edge of the crystal 3 and its dimensions are so chosen that the underside of the rim does not touch the upper surface of the crystal when the latter is held tightly in place after evacuation of the watch casing.

- 35 The manner of assembling the watch casing of Figure 2 may be the same as that described in connection with the watch casing of Figure 1.

- In this case, the collapse of the near-vacuum in the interior of the casing, and due to the opening 5a, also in the space between the crystal 5 and the crystal 3 would result in the crystal 3 becoming detached from its
40 seat. However, the rim 2c prevents it from being completely separated from the watch casing.

- In the two embodiments shown, the crystal constitutes the part that is held against the sealing member solely by the
45 difference in air pressures acting on opposite sides thereof when the watch casing is evacuated. However, it would be possible to secure the crystal firmly in air-tight fashion to the central casing part and secure
55 the back portion to the central casing part solely by the use of differential pressure in the manner described.

- Also, while in the illustrated embodiments, the back portion is shown in one
60 piece with the central casing part of the watch casing, it would be quite feasible to provide a casing wherein the back portion is fastened to the central casing part in any

suitable manner, as for example by screw threads or the like.

Also, it is possible to provide a watch casing comprising an inner casing and an outer casing the space between which is substantially exhausted of air. A casing of this type is suitable for watches that are
65 used in low pressure environment. In this case, the excess pressure existing between the two casings would prevent the crystal from falling out for reasons other than collapse of the near-vacuum inside the
70 second casing.

From the foregoing, it is to be understood that the various embodiments will provide a vacuum type waterproof watch casing that can be fabricated in a simple manner, and
80 in which, without the use of additional parts, the crystal is held tightly in place. It will also afford the possibility of controlling the maintenance of the vacuum in the interior of the watch casing.

WHAT I CLAIM IS :—

1. A waterproof watch casing comprising a central portion adapted to receive a watch movement and having a peripheral wall formed with an annular seat for the
85 peripheral portion of a closure member which is maintained in sealing engagement with said seat by the differential air pressure acting on opposite sides thereof when the interior of said central portion has been
90 substantially emptied of air.
2. A watch casing according to claim 1, wherein a sealing member is provided for interposition between the peripheral portion of the closure member and its seat on said
95 central portion.
3. A watch casing according to claim 1 or 2, wherein said closure member is a crystal.
4. A watch casing according to claim 3, wherein said central portion is cup-shaped with its upper rim inturned to overlie the peripheral portion of said crystal without
100 contacting it and the peripheral wall of said central portion is provided, below said first annular seat, with a second annular seat for the peripheral portion of a second crystal having an aperture therein.
5. A watch casing according to any preceding claim, wherein the or each seat forms
105 part of an internal shoulder on the wall of said central portion.
6. A waterproof watch casing substantially as hereinbefore described and as shown in Fig. 1 or Fig. 2 of the accompanying
110 drawings.

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suitable manner, as for example by screw threads or the like.

Also, it is possible to provide a watch casing comprising an inner casing and an outer casing the space between which is substantially exhausted of air. A casing of this type is suitable for watches that are used in low pressure environment. In this case, the excess pressure existing between the two casings would prevent the crystal from falling out for reasons other than collapse of the near-vacuum inside the second casing.

From the foregoing, it is to be understood that the various embodiments will provide a vacuum type waterproof watch casing that can be fabricated in a simple manner, and 80 in which, without the use of additional parts, the crystal is held tightly in place. It will also afford the possibility of controlling the maintenance of the vacuum in the interior of the watch casing. 85

30 The central casing part 2 is formed with a rim 2c which has an upwardly and inwardly extending undersurface that extends over the edge of the crystal 3 and its dimensions are so chosen that the underside of the rim does not touch the upper surface of the crystal when the latter is held tightly in place after evacuation of the watch casing.

1. A waterproof watch casing comprising a central portion adapted to receive a watch movement and having a peripheral wall formed with an annular seat for the peripheral portion of a closure member which is maintained in sealing engagement with said seat by the differential air pressure acting on opposite sides thereof when the interior of said central portion has been substantially emptied of air.

2. A watch casing according to claim 1, wherein a sealing member is provided for interposition between the peripheral portion of the closure member and its seat on said central portion. 100

3. A watch casing according to claim 1 or 2, wherein said closure member is a crystal.

4. A watch casing according to claim 3, 105
wherein said central portion is cup-shaped
with its upper rim inturred to overlies the
peripheral portion of said crystal without
contacting it and the peripheral wall of said
central portion is provided, below said first 110
annular seat, with a second annular seat for
the peripheral portion of a second crystal
having an aperture therein.

5. A watch casing according to any preceding claim, wherein the or each seat forms part of an internal shoulder on the wall of said central portion.

6. A waterproof watch casing substantially as hereinbefore described and as shown in Fig. 1 or Fig. 2 of the accompanying drawings. 120

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