

PATENT SPECIFICATION

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(54) WATCH-CASE

(71) We, KABUSHIKI KAISHA SUWA SEIKOSHA, a Japanese Company, of 3-4, 4-chome, Ginza, Chuo-ku, Tokyo, Japan, 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:—

This invention concerns a watch case.

According to the present invention, there is provided a watch case resistant to the ingress of water and comprising an outer case body within which is mounted an inner base body, the outer and inner case bodies being respectively provided with adjacent recesses; a watch glass; a resilient sealing gasket which is interposed between the watch glass, or a member sealingly secured to the latter, and the inner case body, the watch glass, or the said member sealingly secured thereto, being engaged by the outer case body or by a part secured to the latter; at least one resilient bar or leaf spring which is mounted in a recess in the inner case body and which has spaced apart integral projections each of which extends into a recess in the outer case body and each of which has a surface which engages a radial surface of the recess in the outer case body, the or each resilient bar or leaf spring causing the watch glass, or the member sealingly secured thereto, and the inner case body to be clamped together with the resilient sealing gasket interposed therebetween.

The said integral projections are preferably provided at end portions of the or each resilient bar or leaf spring.

Each said integral projection may have an inclined surface which assists the introduction of the projection into a respective said recess in the outer case body.

The watch glass, or the member sealingly secured thereto, may be engaged by an integral bezel part of the outer case body.

The inner case body preferably constitutes the back cover of the watch case.

The invention also comprises a watch provided with a watch case as set forth above.

The invention is illustrated, merely by way

of example, in the accompanying drawings, in which:—

Figure 1 and 2 are broken-away sectional views of a watch case known to the Applicants, Figure 1 being a section taken on the line I—I of Figure 2, and Figure 2 being a section taken on the line II—II of Figure 1.

Figures 3 and 4 are broken-away cross-sectional views of a first embodiment of a watch-case according to the present invention, Figure 3 being a section taken on the line III—III of Figure 4, and Figure 4 being a section taken on the line IV—IV of Figure 3.

Figure 5 is a side perspective view of an inner case body and a resilient bar or leaf spring which form part of the structure shown in Figures 3 and 4.

Figure 6 shows at (a), (b), (c), (d), (e), (f) and (g), a number of alternative forms of projections which may be provided on the said resilient bar or leaf spring.

Figure 7 shows at (a), (b), (c), (d), (e), (f), (g), (h), and (i) a number of alternative cross-sections of the said resilient bar or leaf spring, and

Figure 8 is a broken-away cross-sectional view of a second embodiment of a watch case according to the present invention.

In Figures 1 and 2 there is shown a watch case 10 known to the Applicants. The watch case 10, which is resistant to the ingress of water, comprises an outer case body 11 within which is mounted an inner case body 12. The outer case body 11 is provided at its upper end with an integral bezel part 13, while the inner case body 12 constitutes the back cover of the watch case 10.

A watch glass 14, which may be made of organic or inorganic material, has a peripheral flange portion 15 which underlies and is engaged by the bezel part 13. A resilient sealing gasket 16 is interposed between the flange portion 15 of the watch glass 14 and the inner case body 12.

The outer case body 11 is provided internally with a recess 20. The recess 21 faces and is disposed adjacent to a recess 21 which

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is formed in the outer surface of the inner body member 12. A main portion 22 of a resilient bar or leaf spring 23 is housed in the recess 21, the resilient bar or leaf spring 23 being provided with pins 24 which extend into the recess 20. The pins 24 engage a lower surface 25 of the recess 20, with the result that the resilient bar or leaf spring 23 causes the watch glass 14 and the inner case body 12 to be clamped together with the resilient sealing gasket 16 interposed therebetween. Such clamping thus prevents the ingress of water into the interior of the watch case.

In the structure shown in Figures 1 and 2, however, the water-tightness of the construction will be impaired if there is any inaccuracy in the mounting of the pins 24 on the resilient bar or leaf spring 23. Consequently, it is difficult with the construction of Figures 1 and 2 to ensure reliable water-tightness. Moreover, in order to be able to fix the pins into the resilient bar or leaf spring 23, it is necessary to make the width of the resilient bar or leaf spring 23 fairly great, and this in turn means that it is necessary to provide the inner case body 12, and hence the outer case body 11, with a considerable axial length. Such an arrangement therefore impairs the appearance of the watch.

It is also possible to provide an arrangement (not shown) in which water-tightness is obtained by directly engaging the inner case body with the outer case body, a gasket being interposed between the inner case body and the watch glass. This conventional structure, however, is complicated to make and does not provide reliable water-tightness.

In Figures 3, 4 and 5, there is therefore shown an embodiment of a watch-case resistant to the ingress of water, according to the present invention which is generally similar to that shown in Figures 1 and 2 and which, for this reason, will not be described in detail, like reference numerals indicating like parts.

In the construction of Figures 3, 4 and 5, however, the resilient bar or leaf spring 23, and its pins 24, are replaced by a resilient bar or leaf spring 26, a main portion 27 of which is housed in a recess 30 which is disposed at the outer periphery of the inner case body 12. The resilient bar or leaf spring 26 is provided, at each of its opposite end portions, with an integral projection 31 which extends into a recess 32 provided at the inner surface of the outer case body 11, the recesses 30, 32 being disposed adjacent to each other. The integral projections 31 engage a lower surface 33 of the recess 32 which extends radially thereof, with the result that the watch glass 14 and the inner case body 12 are clamped together with the resilient sealing gasket 16 interposed therebetween to

effect water-tightness. Each projection 31 has an inclined top surface 34 which assists the introduction of the projection 31 into the recess 32.

If desired, instead of providing a single annular recess 32 in the outer case body 11, the latter could be provided with spaced apart recesses for receiving the two projections 31.

As will be appreciated, in the case of the construction shown in Figures 3, 4 and 5, water-tightness can be obtained by the use of a small number of component parts and without requiring a complicated and difficult manufacture. Furthermore, since it is not necessary to provide the leaf spring or resilient bar 26 with pins, the width of the resilient bar or leaf spring 26 can be made less than that of the resilient bar or leaf spring 23 and consequently the axial extent of the recess 30, 32 does not need to be as great as the axial extent of the recesses 20, 21. As a result, the axial thickness of the watch-case of Figures 3 and 4 is less than that of Figures 1 and 2.

The watch case of Figures 3, 4 and 5 can readily be assembled by mounting the watch glass 14 above the inner case body 12 with the resilient sealing gasket 16 interposed therebetween, introducing the resilient bar or leaf spring 26 into the recess 30, and forcing the outer case body 11 down into the position shown in Figure 3.

In the case of a substantially rectangular watch as illustrated in Figures 3, 4 and 5, opposite sides of the watch case may be provided with separate resilient bars or leaf springs. The construction of the present invention is also however applicable to a circular or elliptical watch case, in which case the resilient bar or leaf spring may extend around a part only or around substantially the whole of the inner case body.

In Figure 6 there are shown perspective views of a number of different resilient bars or leaf springs which may be employed in the watch case of the present invention.

In the case of the resilient bars or leaf springs 35 to 39 and 41, shown in Figure 6(a), 6(b), 6(c), 6(d), 6(e) and 6(g) respectively, the main portion of the resilient bar or leaf spring is rectangular in cross-section, whereas in the case of the resilient bar or leaf spring 40 shown in Figure 6(f), the main portion of the resilient bar or leaf spring is circular in cross section.

Each of the end portions 42 of the resilient bar or leaf spring 35 is bent back on itself to provide a projection corresponding to the projection 31, this projection being provided with an inclined top surface 34.

The resilient bar or leaf spring 36 has end portions 43 each of which extends at a right angle to the main portion thereof so as to provide a projection corresponding to

the projection 31, each end portion 43 being provided with an inclined top surface 34.

The leaf spring or resilient bar 37 has end portions 44 each of which has been bent downwardly into an inverted U-shape. The curvature of this inverted U-shape is such as to provide an inclined top surface and therefore enables one to dispense with an inclined top surface 34.

The resilient bar or leaf spring 38 has end portions 45 each of which has been provided with a hairpin bend, each end portion 45 extending at right angles to the main portion of the resilient bar or leaf spring 38 and being disposed on opposite sides of the latter. Each end portion 45 is provided with an inclined top surface 34.

The resilient bar or leaf spring 39 has end portions 46 each of which has been bent to provide it with a castellated shape. In this case, the end portion 46 has inclined side surfaces 47 but no inclined top surface 34.

The resilient bar or leaf spring 40 has end portions each of which extends at right angles to the main portion thereof and which is chamfered to provide the inclined top surface 34.

The resilient bar or leaf spring 41 is provided with integral end portions 50 of increased thickness each of which acts as a projection, each end portion 50 being chamfered to provide an inclined top surface 34.

As shown in Figure 7, the leaf spring or resilient bar 26 may have a number of alternative cross-sections. Thus in Figure 7(a), the cross-section is rectangular; in Figure 7(b) it is barrel-shaped, in Figure 7(c) it is substantially rectangular with rounded ends; in Figure 7(b) it has a shape resembling a convex lens; in Figure 7(e) it is substantially rectangular but with one convex side; in Figure 7(f) it has a shape resembling a concave lens; in Figure 7(g) it is substantially rectangular, but has a concave side; in Figure 7(h) it is substantially elliptical; and in Figure 7(i) it is substantially circular.

Naturally, in addition to the shapes specifically shown in Figure 7, combinations of the shapes shown therein therein, or the use of different shapes, is also possible.

In Figure 8 there is shown an embodiment of a watch-case, resistant to the ingress of water, according to the present invention, which is generally similar to that of Figures 3 and 4, and which for this reason will not be described in detail, like reference numerals indicating like parts.

In the case of the Figure 8 construction, however, the watch glass 14 is not provided with a peripheral flange portion 15 and is instead sealingly secured to a frame member 52 which is disposed between the bezel part 13 and the resilient sealing gasket 16. The watch glass 14 and the frame member 52 are

sealed and secured to each other by adhering them or caulking them together.

Thus in the construction of Figure 8, the resilient bar or leaf spring 26 causes the frame member 52 and the inner case body 12 to be clamped together with the resilient sealing gasket 16 interposed therebetween.

WHAT WE CLAIM IS:—

1. A watch case resistant to the ingress of water and comprising an outer case body within which is mounted an inner case body, the outer and inner case bodies being respectively provided with adjacent recesses; a watch glass, a resilient sealing gasket which is interposed between the watch glass, or a member sealingly secured to the latter and the inner case body, the watch glass, or the said member sealingly secured thereto, being engaged by the outer case body or by a part secured to the latter; at least one resilient bar or leaf spring which is mounted in a recess in the inner case body and which has spaced apart integral projections each of which extends into a recess in the outer case body and each of which has a surface which engages a radial surface of the recess in the outer case body, the or each resilient bar or leaf spring causing the watch glass, or the member sealingly secured thereto, and the inner case body to be clamped together with the resilient sealing gasket interposed therebetween.

2. A watch case as claimed in claim 1 in which the said integral projections are provided at end portions of the or each resilient bar or leaf spring.

3. A watch case as claimed in claim 1 or 2 in which each said integral projection has an inclined surface which assists the introduction of the projection into a respective said recess in the outer case body.

4. A watch case as claimed in any preceding claim in which the watch glass, or the member sealingly secured thereto, is engaged by an integral bezel part of the outer case body.

5. A watch case as claimed in any preceding claim in which the inner case body constitutes the back cover of the watch case.

6. A watch case substantially as hereinbefore described with reference to and as shown in Figures 3 to 8 of the accompanying drawings.

7. A watch provided with a watch case as claimed in any preceding claim.

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the projection 31, each end portion 43 being provided with an inclined top surface 34.

5 The leaf spring or resilient bar 37 has end portions 44 each of which has been bent downwardly into an inverted U-shape. The curvature of this inverted U-shape is such as to provide an inclined top surface and therefore enables one to dispense with an inclined top surface 34.

10 The resilient bar or leaf spring 38 has end portions 45 each of which has been provided with a hairpin bend, each end portion 45 extending at right angles to the main portion of the resilient bar or leaf spring 38 and being disposed on opposite sides of the latter. Each end portion 45 is provided with an inclined top surface 34.

15 The resilient bar or leaf spring 39 has end portions 46 each of which has been bent to provide it with a castellated shape. In this case, the end portion 46 has inclined side surfaces 47 but no inclined top surface 34.

20 The resilient bar or leaf spring 40 has end portions each of which extends at right angles to the main portion thereof and which is chamfered to provide the inclined top surface 34.

25 The resilient bar or leaf spring 41 is provided with integral end portions 50 of increased thickness each of which acts as a projection, each end portion 50 being chamfered to provide an inclined top surface 34.

30 As shown in Figure 7, the leaf spring or resilient bar 26 may have a number of alternative cross-sections. Thus in Figure 7(a), the cross-section is rectangular; in Figure 7(b) it is barrel-shaped, in Figure 7(c) it is substantially rectangular with rounded ends; in Figure 7(b) it has a shape resembling a convex lens; in Figure 7(e) it is substantially rectangular but with one convex side; in Figure 7(f) it has a shape resembling a concave lens; in Figure 7(g) it is substantially rectangular, but has a concave side; in Figure 7(h) it is substantially elliptical; and in Figure 7(i) it is substantially circular.

35 Naturally, in addition to the shapes specifically shown in Figure 7, combinations of the shapes shown therein therein, or the use of different shapes, is also possible.

40 In Figure 8 there is shown an embodiment of a watch-case, resistant to the ingress of water, according to the present invention, which is generally similar to that of Figures 3 and 4, and which for this reason will not be described in detail, like reference numerals indicating like parts.

45 In the case of the Figure 8 construction, however, the watch glass 14 is not provided with a peripheral flange portion 15 and is instead sealingly secured to a frame member 52 which is disposed between the bezel part 13 and the resilient sealing gasket 16. The watch glass 14 and the frame member 52 are

sealed and secured to each other by adhering them or caulking them together.

Thus in the construction of Figure 8, the resilient bar or leaf spring 26 causes the frame member 52 and the inner case body 12 to be clamped together with the resilient sealing gasket 16 interposed therebetween.

WHAT WE CLAIM IS:—

1. A watch case resistant to the ingress of water and comprising an outer case body within which is mounted an inner case body, the outer and inner case bodies being respectively provided with adjacent recesses; a watch glass, a resilient sealing gasket which is interposed between the watch glass, or a member sealingly secured to the latter and the inner case body, the watch glass, or the said member sealingly secured thereto, being engaged by the outer case body or by a part secured to the latter; at least one resilient bar or leaf spring which is mounted in a recess in the inner case body and which has spaced apart integral projections each of which extends into a recess in the outer case body and each of which has a surface which engages a radial surface of the recess in the outer case body, the or each resilient bar or leaf spring causing the watch glass, or the member sealingly secured thereto, and the inner case body to be clamped together with the resilient sealing gasket interposed therebetween.

2. A watch case as claimed in claim 1 in which the said integral projections are provided at end portions of the or each resilient bar or leaf spring.

3. A watch case as claimed in claim 1 or 2 in which each said integral projection has an inclined surface which assists the introduction of the projection into a respective said recess in the outer case body.

4. A watch case as claimed in any preceding claim in which the watch glass, or the member sealingly secured thereto, is engaged by an integral bezel part of the outer case body.

5. A watch case as claimed in any preceding claim in which the inner case body constitutes the back cover of the watch case.

6. A watch case substantially as hereinbefore described with reference to and as shown in Figures 3 to 8 of the accompanying drawings.

7. A watch provided with a watch case as claimed in any preceding claim.

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