

PATENT SPECIFICATION

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(54) WATERTIGHT WATCH CASE

(71) We, KABUSHIKI KAISHA SUWA SEIKOSHA, a Japanese company, of 3-4, 4-chome, Ginza, 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:—

The present invention relates to watertight watch cases.

According to the present invention there is provided a watertight watch case comprising a case body having external and internal surfaces which are respectively substantially rectangular and circular when the watch case is viewed in plan, and a substantially circular case back which is retained in a position in which it engages the substantially circular internal surface of the case body and is sealed to the latter, a glass having a peripheral portion whose front surface is mounted within and sealed to an end wall of the case body, and rigid spacing means interposed between the rear surface of the peripheral portion of the glass and the case back, the arrangement being such that when the case back is in the said position, the glass is forced by the rigid spacing means towards the said end wall of the case body.

The case back may be screwed into the internal surface of the case body, the case back and case body having opposed surfaces between which a gasket is located.

The rigid spacing means may comprise a glass-fitting ring which engages the rear surface of the peripheral portion of the glass, and a case ring which engages both the glass-fitting ring and the case back.

Moreover, there may be mounted within the case a watch movement which is held in position by engaging both the case ring and a movement-fitting ring, the movement-fitting ring engaging the glass-fitting ring.

[Price 25p]

Preferably, the front surface of the peripheral portion of the glass has a peripheral groove in which is mounted a gasket which engages the said end wall.

The invention is illustrated, merely by way of example, in the accompanying drawings, in which:

Figure 1 is a cross-sectional view showing one known example of a waterproof watch case;

Figure 2 is a plan view of an inner case body used in the watch case shown in Figure 1;

Figure 3 is a plan view showing another example of an inner case body of a known waterproof watch case;

Figure 4 is a cross-sectional view showing another known example of a waterproof watch case;

Figure 5 is a cross-sectional view showing one embodiment of a waterproof watch case according to the present invention; and

Figure 6 is a plan view from the front of the watch case of Figure 5.

In Figures 1 and 2 there is shown a conventional waterproof watch case 10 known in Japan comprising an inner case body 11, and an outer case body 12 each of which is rectangular when the watch case is viewed in plan. The watch case 10 is provided with a glass 13 a peripheral portion 14 of which is interposed between an end wall 15 of the outer case body 12 and a gasket 16, the gasket 16 being engaged by the inner case body 11. A spring 17 interconnects the inner case body 11 and outer case body 12 and urges the former against the gasket 16.

Alternatively, as shown in Figure 3, the inner case body 11 may be resiliently interconnected to the outer case body 12 by two leaf springs 20, 21.

The watch case shown in Figures 1 and 2, or in Figures 1 and 3, has the following

[Price 75p]

drawbacks. Manufacture of the rectangular inner case body 11 and outer case body 12 must be very precise to ensure that the finished watch case is waterproof. Furthermore, it is difficult to provide a satisfactory spring connection between the inner case body 11 and the outer case body 12, both of which are rectangular in shape.

Usually, the spring 17, as shown in Figure 2, or the springs 20, 21 as shown in Figure 3, are fixed to the inner case body 11 by means of welding or caulking and engage with the outer case body 12, thereby compressing the gasket 16. Due to difficulty in manufacture and the instability of the structure, the springs 17, 20, 21 easily deform, and the gasket 16 soon gets loose. Therefore, it is difficult to maintain perfect watertightness over a long period. In addition to the drawbacks mentioned above, it is necessary to manufacture afresh parts such as the inner case body 11 and the gasket 16 each time a new design is introduced, due to the fact that the outer case body 12 and the inner case body 11 are both of rectangular form. This restricts variation of the design.

Figure 4 shows another example of a conventional waterproof watch case, known in Japan, of rectangular form.

In Figure 4 there is shown a watch case 22 having a case body 23 having external and internal surfaces 24, 25 which are respectively substantially rectangular and circular when the watch case is viewed in plan. The watch case 22 has a case back 26 which closes the back of the case body 23, an O-ring gasket 27 being inserted between the case back 26 and the case body 23. At the front of the watch case 22 there is provided a glass 30 having a front face which is rectangular, the periphery of the glass being circular. The glass 30 is secured to the case body 23 by means of a tension ring 31, and being sealed to the case body by a subsidiary gasket 32. The watch case 22 houses a movement 33 which is secured in position by a case ring 34, a movement-fitting spring 35 being interposed between the case back 26 and the case ring 34 to urge the latter against the tension ring 31.

In the case of the construction shown in Figure 4, the tension ring 31 tends to shift downwardly when the glass 30 is pressed from above, which is the reason why the subsidiary gasket 32 is provided. Furthermore, the presence of the tension ring 31 makes the shape of the glass 30 a very complicated one and one whose dimensions must be produced to very close tolerances.

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subsidiary gasket 32 is provided. Furthermore, the presence of the tension ring 31 makes the shape of the glass 30 a very complicated one and one whose dimensions must be produced to very close tolerances.

In Figures 5 and 6 there is shown, in contrast to the above, a waterproof watch case 36 according to the present invention comprising a case body 37 having external and internal surfaces 40, 41 which are respectively substantially rectangular and circular when the watch case is viewed in plan. A substantially circular case back 42 is screwed into the internal surface 41 of the case body 37, the case back 42 and case body 37 having opposed surfaces 43, 44 respectively between which an O-ring gasket 45 is located to seal the case back 42 to the case body 37.

A glass 46 has a front face which is rectangular. The glass 46 has a peripheral portion 47 whose front surface 50 is mounted within an end wall 51 of the case body 37 and whose periphery is circular. The front surface 50 has a peripheral groove 52 in which is mounted an O-ring gasket 53 which sealingly engages the end wall 51.

A rigid glass-fitting ring 54 engages the rear surface 55 of the peripheral portion 47 of the glass 46. A rigid case ring 56 engages both the glass-fitting ring 54 and the case back 42. Thus, in contrast to the arrangement of Figure 4, which incorporates the spring 35, the glass-fitting ring 54 and the rigid case ring 56 which are interposed between the case back 42 and the rear surface 55 of the peripheral portion 47 of the glass 46, constitute a rigid spacing means such that when the case back 42 is screwed into the sealed position shown in Figure 5, the glass 46 is forced by rigid spacing means 54, 56 towards the end wall 51 of the case body 37, thus compressing the gasket 53.

A watch movement 57 is held in position by engaging both the case ring 56 and a movement-fitting ring 60, the movement-fitting ring 60 engaging the glass-fitting ring 54.

Thus in the construction of Figures 5 and 6, the case back 42 may be of conventional construction, it being tightened in the axial direction to ensure watertightness on the rear side. As for the front side, the glass 46 is sealed in position by the force of the case back 42 exerted in the axial direction through the glass-fitting ring 54 and the case ring 56.

The construction shown in Figures 5 and 6 has advantages as follows. Firstly, complicated manufacturing techniques, such as are required for producing watertight watch cases of the form wherein both the outside and the inside are rectangular, are

unnecessary. The same techniques required for producing a conventional watertight watch case of circular shape are sufficient to produce a watertight watch case of rectangular form as shown in Figures 5 and 6. In addition to the ease of manufacture, it is possible to use a screw-type case back 42 and the O-ring gasket 53 can therefore be given a uniform compression, so as to ensure a high degree of watertightness. Since the groove 52 tightly fixes the position of the gasket 53, the watertightness is superior to that of the construction shown in Figure 4. By eliminating the tension ring 31 which requires to be manufactured to close tolerances, the shape of the glass 30 and its manufacture are simplified. Naturally, no subsidiary gasket, corresponding to the gasket 32, is necessary. Elimination of the movement-fitting spring 35 of Figure 4 simplifies the construction and permits easy assembly and disassembly.

25 WHAT WE CLAIM IS:—

1. A watertight watch case comprising a case body having external and internal surfaces which are respectively substantially rectangular and circular when the watch case is viewed in plan, and a substantially circular case back which is retained in a position in which it engages the substantially circular internal surface of the case body and is sealed to the latter, a glass having a peripheral portion whose front surface is mounted within and sealed to an end wall of the case body, and rigid spacing means interposed between the rear surface of the peripheral portion of the glass and the case back, the

arrangement being such that when the case back is in the said position, the glass is forced by the rigid spacing means towards the said end wall of the case body.

2. A watch case as claimed in claim 1 in which the case back is screwed into the internal surface of the case body, the case back and case body having opposed surfaces between which a gasket is located.

3. A watch case as claimed in claim 1 or 2 in which the rigid spacing means comprise a glass-fitting ring which engages the rear surface of the peripheral portion of the glass, and a case ring which engages both the glass-fitting ring and the case back.

4. A watch case as claimed in claim 3 in which there is mounted a watch movement which is held in position by engaging both the case ring and a movement-fitting ring, the movement-fitting ring engaging the glass-fitting ring.

5. A watch case as claimed in any preceding claim in which the front surface of the peripheral portion of the glass has a peripheral groove in which is mounted a gasket which engages the said end wall.

6. A watertight watch case substantially as hereinbefore described with reference to and as shown in Figures 5 and 6 of the accompanying drawings.

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- 5 In addition to the ease of manufacture, it is possible to use a screw-type case back 42 and the O-ring gasket 53 can therefore be given a uniform compression, so as to ensure a high degree of watertightness. Since the groove 52 tightly fixes the position of the gasket 53, the watertightness is superior to that of the construction shown in Figure 4. By eliminating the tension ring 15 31 which requires to be manufactured to close tolerances, the shape of the glass 30 and its manufacture are simplified. Naturally, no subsidiary gasket, corresponding to the gasket 32, is necessary. 20 Elimination of the movement-fitting spring 35 of Figure 4 simplifies the construction and permits easy assembly and dis-assembly.

25 WHAT WE CLAIM IS:—

1. A watertight watch case comprising a case body having external and internal surfaces which are respectively substantially rectangular and circular when 30 the watch case is viewed in plan, and a substantially circular case back which is retained in a position in which it engages the substantially circular internal surface of the case body and is sealed to the latter, a 35 glass having a peripheral portion whose front surface is mounted within and sealed to an end wall of the case body, and rigid spacing means interposed between the rear surface of the peripheral 40 portion of the glass and the case back, the

arrangement being such that when the case back is in the said position, the glass is forced by the rigid spacing means towards the said end wall of the case body.

2. A watch case as claimed in claim 1 45 in which the case back is screwed into the internal surface of the case body, the case back and case body having opposed surfaces between which a gasket is located.

3. A watch case as claimed in claim 1 50 or 2 in which the rigid spacing means comprise a glass-fitting ring which engages the rear surface of the peripheral portion of the glass, and a case ring which engages both the glass-fitting ring and the case 55 back.

4. A watch case as claimed in claim 3 in which there is mounted a watch movement which is held in position by engaging both the case ring and a 60 movement-fitting ring, the movement-fitting ring engaging the glass-fitting ring.

5. A watch case as claimed in any preceding claim in which the front surface of the peripheral portion of the glass has a 65 peripheral groove in which is mounted a gasket which engages the said end wall.

6. A watertight watch case substantially as hereinbefore described with reference to and as shown in Figures 5 and 6 of the 70 accompanying drawings.

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