

PATENT SPECIFICATION

(11)

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(21) Application No. 54266/74 (22) Filed 16 Dec. 1974

(31) Convention Application No.

142 254/73

(32) Filed 18 Dec. 1973 in

(33) Japan (JA)

(44) Complete Specification published 15 Dec. 1976

(51) INT. CL.²G04B 37/00

(51) Index at acceptance

G3T A2B A2C

(19)



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(54) NON-CIRCULAR 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 relates to non-circular watch cases.

According to one aspect of the present invention there is provided a non-circular watch case comprising: a case body which supports a non-circular glass; a non-circular back cover; a spring member fixed to the back cover and engaging with an inner surface of the case body; and removal means on the back cover and co-operating with the case body to facilitate removal of the back cover from the case body.

Preferably the glass is mounted in a watertight manner on the case body.

A gasket may be compressed between the back cover and the case body.

The said inner surface of the case body preferably is inclined to the axis of the case body in a direction such that the spring member engaging therewith urges the case body and the back cover into contact.

The non-circular watch case may be in combination with an operating member for operating a watch movement, the operating member being provided in a side of the case body.

In the preferred embodiment the removal means comprises a projection on the back cover which engages with the case body, the projection being used as a fulcrum during removal of the back cover from the case body.

According to a further aspect of the present invention there is provided a watch having a watch case as recited above.

The invention is illustrated, merely by

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

Figure 1 is a cross-section of part of one conventional non-circular watch case;

Figure 2 is a cross-section of part of another conventional non-circular watch case;

Figure 3 is a cross-section of part of one embodiment of a non-circular watch case according to the present invention;

Figure 4, consisting of Figures 4(a), 4(b), 4(c) and 4(d), illustrates various forms of a spring of the watch case of Figure 3;

Figure 5 is a cross-section of part of a second embodiment of a non-circular watch case according to the present invention; and

Figure 6, consisting of Figures 6(a), 6(b), 6(c) and 6(d), illustrates various forms of a spring for the watch case of Figure 5.

In the following description the terms "upper", "lower", "inner" and "outer" etc. refer to the directions as seen in the drawings. Furthermore, like parts in the drawings have been designated by the same reference numerals.

Referring first to Figure 1, there is illustrated one conventional non-circular watch case. In this conventional watch case a gasket 3 is disposed between a lower surface of a non-circular glass 1 and an upper surface of a non-circular back cover 2. A pin 6, secured to a resilient leaf spring 5 fixed to the back cover 2, is engaged within a groove 4a of a non-circular outer case body 4, the upper surface of which engages over an outer step portion of the glass 1. It will be appreciated that this arrangement causes the gasket 3 to be compressed.

Since an outer operating member, such as a winding crown, is necessarily attached to the back cover, if the outer operating member is not removable a watch movement 7 disposed within the watch

case cannot be detached from the back cover 2 when it requires repairing or when it is desired to replace a battery driving the watch movement. To remove the operating member for battery replacement is inconvenient.

It is known to provide such a watch case with a battery cover in the back cover 2 to facilitate replacement of the battery.

However, this necessitates increasing the overall thickness of the back cover and this is disadvantageous insofar as it increases the difficulty of manufacture and the cost of the resulting watch case. Furthermore, since the pin 6 is secured to the resilient leaf spring 5, the pin 6 cannot be positioned with any accuracy and the groove 2a in the back cover has to be made large in both the horizontal and vertical directions, and consequently the watch case has to be made of relatively large size. Moreover, since the gap between the case body 4 and the back cover 2 is relatively large, water, e.g. sweat, has a tendency to infiltrate into and remain in this gap and this is undesirable from the point of view of watertightness and corrosion resistance, and besides this gap is conspicuous and unsightly.

Figure 2 illustrates another conventional non-circular watch case. In this watch case, an engaging dowel 13a is formed on a flange 13 secured to a non-circular back cover 12. The dowel 13a is engaged within a recess 14a of a case body 14. Since both the dowel and the case body are rigid, elastic deformation occurs at the time of assembling and disassembling the watch case and the dowel and/or the case body are subjected to wear. Therefore, the reproducibility at the time of assembling and disassembling the watch case is poor. Further, since it is difficult to position accurately the dowel 13a in the recess 14a during assembly of the watch case, the back cover cannot, in consequence, be securely fixed to the case body. In addition, since an upper end part 13b of the flange 13 supports and locates a watch movement 17 via a frame 16 (or in some cases directly), the upper end part 13b of the flange is also deformed during assembly. Therefore, the stability of the watch movement 17 within the watch case is by no means assured.

A non-circular watch case according to the present invention is illustrated in Figure 3. A non-circular glass 21 is fixed to an upper part of a non-circular case body 24 in a watertight manner by means of, for example, adhesive. A non-circular back cover 22 is fitted into the case body. A spring 25, which has the shape of any one of the examples shown in Figure 4, is disposed in a groove 22a in the back cover

22. The spring 25 may, for example, be spot welded or caulked so that it is maintained in the groove 22a.

An inclined surface 24a is provided on the central part of the inner surface of the case body 24. A gasket 26 is disposed between the case body 24 and the back cover 22, and compressed in the vertical direction. The angle θ of the inclined surface 24a to the axis of the case body 24, i.e. the vertical, and the hardness of the gasket 26 are so chosen that the component of force in the vertical direction applied by the spring 25 to the case body 24 is always larger than the force required to compress the gasket 26. It is desirable that the angle θ is between 5° and 45° and that the hardness of the gasket 26 is between HS 40 and HS 60.

An outer operating member 27, such as a winding crown, is secured to an outer operating shaft 28, such as a winding stem. A gasket 29 is disposed in a groove 28a in the operating shaft 28, the gasket 29 being an interference fit within an aperture 24c through which the operating shaft 28 passes. A movement 23 is mounted on a non-circular frame 30 which rests upon the upper end of the back cover 22, a gasket 31 being disposed between the frame 30 and the case body 24. A dial disc 32, supported by a lower dial frame 33, is made of a material having high magnetic permeability. A frame 34 made of a material having high magnetic permeability is formed as a lining to the back cover 22. A battery 35 is also disposed within the watch case.

A projection 22b is formed on the back cover 22 to facilitate removal of the latter from the case body 24, the projection 22b being disposed adjacent to a cord-lug 24b on the case body 24, the projection 22b being used as a fulcrum during removal of the back cover from the case body.

In the conventional watch case of Figure 1, the groove 2a must not penetrate through the back cover 2 if the watch case is to be waterproof, and consequently the watch case is of relatively large size. On the other hand it is immaterial, from the point of view of waterproofness of the watch case of Figure 3, whether the groove 22a extends through the back cover 22, and as a result the watch case may be made of relatively small size.

Figure 5 illustrates another embodiment of a non-circular watch case according to the present invention. A central part of a spring 45, which may have the shape of any one of the examples shown in Figure 6, is secured by means of, for example, spot welding or caulking in a groove 43a of a back cover frame 43 fixed to, by means of brazing, and forming part of a

non-circular back cover 42.

The inner surface of a non-circular case body 44 is provided with an inclined surface 44a with which the spring 45 is engaged. A non-circular glass 41 is fixed to the case body 44 not by adhesive, as in the watch case of Figure 3, but by pressing the non-circular glass 41 by means of a non-circular frame 48 into contact with the inner wall of the case body 44, a non-circular glass gasket 47 being disposed between the glass 41 and the frame 48 to ensure watertightness. A non-circular groove is provided in the back cover for a gasket 46 which is compressed between the back cover and the case body. The inclined surface 44a and the gasket 46 may be of similar construction to the inclined surface 24a and the gasket 26 described in relation to the embodiment of Figure 3. It has been found more advantageous, from the point of view of manufacture, to provide the groove for the gasket 46 in the back cover 42 rather than in the case body 44.

A watch movement 49 is mounted in the watch case by means of the frame 43 which contacts the back cover. A lower frame 50 for a dial disc is made of a material having high magnetic permeability and formed by means of a drawing process, and the gasket 51 is disposed on the lower frame 50 between the latter and the frame 48. If desired, the gasket 51 may be omitted. A relief recess portion 43b is provided in the frame 43 for a battery 52.

In the embodiments of the present invention described above, if the watch movement is rectangular, then the spring 25 or the spring 45 may be substantially linear as illustrated in Figures 4 and 6 respectively. In the event that the watch movement is circular or part circular, even though the watch is non-circular, the spring 25 or the spring 45 will be arcuate.

Regardless of the shape of the watch movement the watch cases according to the present invention and described above are non-circular and can be made extremely thin and of small size compared to the conventional watch cases illustrated in Figures 1 and 2. Furthermore, servicing of a watch, e.g. the replacement of a battery and repairing of the watch movement, can be facilitated by removing only the non-circular back cover by utilising the elastic deformation of the spring. The watertightness of the watch cases of Figures 3 and 5

is further improved by eliminating the conventional defect of water being trapped in the gap between the case body and the back cover. Moreover, the function, design and outer appearance of the non-circular watch cases of Figures 3 and 5 can be improved.

WHAT WE CLAIM IS:—

1. A non-circular watch case comprising: a case body which supports a non-circular glass; a non-circular back cover; a spring member fixed to the back cover and engaging with an inner surface of the case body; and removal means on the back cover and co-operating with the case body to facilitate removal of the back cover from the case body.

2. A non-circular watch case as claimed in claim 1 in which the glass is mounted in a watertight manner on the case body.

3. A non-circular watch case as claimed in claim 1 or 2 in which a gasket is compressed between the back cover and the case body.

4. A non-circular watch case as claimed in any preceding claim in which the said inner surface of the case body is inclined to the axis of the case body in a direction such that the spring member engaging therewith urges the case body and the back cover into contact.

5. A non-circular watch case as claimed in any preceding claim in combination with an operating member for operating a watch movement, the operating member being provided in a side of the case body.

6. A non-circular watch case as claimed in any preceding claim in which the removal means comprises a projection on the back cover which engages the case body, the projection being used as a fulcrum during removal of the back cover from the case body.

7. A non-circular watch case substantially as herein described with reference to and as shown in Figures 3 and 4 or 5 and 6 of the accompanying drawings.

8. A watch having a watch case as claimed in any preceding claim.

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non-circular back cover 42.

The inner surface of a non-circular case body 44 is provided with an inclined surface 44a with which the spring 45 is engaged. A non-circular glass 41 is fixed to the case body 44 not by adhesive, as in the watch case of Figure 3, but by pressing the non-circular glass 41 by means of a non-circular frame 48 into contact with the inner wall of the case body 44, a non-circular glass gasket 47 being disposed between the glass 41 and the frame 48 to ensure watertightness. A non-circular groove is provided in the back cover for a gasket 46 which is compressed between the back cover and the case body. The inclined surface 44a and the gasket 46 may be of similar construction to the inclined surface 24a and the gasket 26 described in relation to the embodiment of Figure 3. It has been found more advantageous, from the point of view of manufacture, to provide the groove for the gasket 46 in the back cover 42 rather than in the case body 44.

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Regardless of the shape of the watch movement the watch cases according to the present invention and described above are non-circular and can be made extremely thin and of small size compared to the conventional watch cases illustrated in Figures 1 and 2. Furthermore, servicing of a watch, e.g. the replacement of a battery and repairing of the watch movement, can be facilitated by removing only the non-circular back cover by utilising the elastic deformation of the spring. The watertightness of the watch cases of Figures 3 and 5

is further improved by eliminating the conventional defect of water being trapped in the gap between the case body and the back cover. Moreover, the function, design and outer appearance of the non-circular watch cases of Figures 3 and 5 can be improved.

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2. A non-circular watch case as claimed in claim 1 in which the glass is mounted in a watertight manner on the case body.
3. A non-circular watch case as claimed in claim 1 or 2 in which a gasket is compressed between the back cover and the case body.
4. A non-circular watch case as claimed in any preceding claim in which the said inner surface of the case body is inclined to the axis of the case body in a direction such that the spring member engaging therewith urges the case body and the back cover into contact.
5. A non-circular watch case as claimed in any preceding claim in combination with an operating member for operating a watch movement, the operating member being provided in a side of the case body.
6. A non-circular watch case as claimed in any preceding claim in which the removal means comprises a projection on the back cover which engages the case body, the projection being used as a fulcrum during removal of the back cover from the case body.
7. A non-circular watch case substantially as herein described with reference to and as shown in Figures 3 and 4 or 5 and 6 of the accompanying drawings.
8. A watch having a watch case as claimed in any preceding claim.

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