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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 relates to watch cases.

In a conventional watch case, known in Japan, in order to keep the structure waterproof, a synthetic rubber packing which is comparatively soft, is inserted between an inorganic glass and a case body. To prevent disengagement, the packing, the glass and the case body are retained together by a bezel. As the packing is flexible it is difficult to maintain the watch case waterproof when it is subject to high pressure. Comparatively soft material has to be used for the packing so that it can easily be inserted between the case body and the glass. This has the result that it is not the packing itself which retains the glass in the case body and, for this reason, a bezel is necessary. Therefore, the cost of such a watch case is high.

In order to eliminate these defects of the conventional watch case, attempts have been made to make the packing of elastic material which is harder than rubber. Such packings, however, are broken or considerably deformed when the watch case is assembled.

According to one aspect of the present invention there is provided a watch case comprising a synthetic resin or soft metal ring having an L-shaped cross-section; a glass; and a case body having a radially inner peripheral surface which is inclined towards the axis of the case body and having a minimum diameter portion disposed in a plane which intersects the radially outer peripheral surface of the glass, said ring being radially compressed between the glass and the case body and having a guide surface to facilitate assembly of the ring in the case body.

Prior to assembly of the watch case, the radially inner peripheral surface and the adjacent axially glass supporting surface of

the ring may be disposed at an angle of less than 90° to one another.

According to a further aspect of the present invention, there is provided a watch having a watch case as recited in the two preceding paragraphs.

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

Figure 1 is a cross-section of a ring forming part of a watch case according to the present invention;

Figure 2 is a cross-section of the combination of the ring of Figure 1 and a glass; and

Figure 3 is a cross-section of an assembled watch case according to the present invention.

Referring to the drawings, there is shown a watch case for a watch (not shown) according to the present invention in various stages of assembly. A waterproof ring 1 made either of synthetic resin, for example, polycarbonate or ABS resin, or of soft metal, is annular and has an L-shaped cross-section. The minimum diameter a of the ring is smaller than the maximum diameter of an inorganic glass 6. A radially inner peripheral surface 3 of the ring is smooth and is angularly spaced apart from a glass supporting surface 2^1 , formed on a part 2 of the ring, by an angle θ_1 , which is less than 90° . That is to say, the radially inner peripheral surface 3 is inclined towards the axis (not shown) of the ring. The radially inner peripheral surface 3 and the glass supporting surface 2^1 are so shaped that they are in complete contact with the corresponding surfaces, i.e. a radially outer peripheral surface 6^1 and a base 6^{11} of the glass 6, when the ring is assembled therewith as shown in Figure 2. The radially outer peripheral surface 6^1 is angularly spaced apart from the base 6^{11} by an angle θ_2 , which is 90° .

The radially outer peripheral surface 4 of the ring is also inclined towards the axis of the ring in like manner to the radially inner peripheral surface 3. When the ring 1 is assembled with the glass 6 the radially inner peripheral surface 3 and the radially outer

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Price 75p

peripheral surface 4 are parallel to one another and co-axial with the axis of the ring. The radially outer peripheral surface 4 may be made parallel to the axis of the ring once the latter has been assembled with the glass by some suitable finishing process. Thus, exact dimensions to the ring may be obtained.

A guide surface 5 is provided on the ring 1. The intersecting point between the guide surface 5 and the radially outer peripheral surface 4 of the ring is axially spaced apart from the plane of the glass supporting surface 2¹ by a distance *b* to facilitate assembly of the watch glass structure and to reduce the possibility of breakage of the glass.

The watch case includes a case body 7, a radially inner peripheral surface 8 of which is angularly spaced apart from a ring supporting surface 9 by an angle θ , which is less than 90° and which is finished to a smooth surface by a buff cloth. A guide surface 10 is provided at the free end of the radially inner peripheral surface 8. The radially inner peripheral surface 8 and the guide surface 10 intersect at a portion 11 which defines the minimum diameter *c* of the case body. This portion 11 is disposed in a plane which intersects the radially outer peripheral surface 6¹ of the glass as is best seen in Figure 3. The minimum diameter *c* of the case body 7 is arranged to be smaller than the maximum diameter of the ring 1 before it is assembled in the case body 7 so that, in the assembled watch case the ring is radially compressed on the line X—X to take the shape shown in Figure 3 and tightly to be engaged by the case body.

The above described watch case is assembled as follows:

The glass 6 is placed in abutting relationship with the radially inner peripheral surface 3 of the ring 1 as shown in Figure 2 so that the base 6¹ of the glass contacts the glass supporting surface 2¹. The guide surface 5 of the ring is then placed adjacent to the guide surface 10 of the case body. Then the upper surface of the glass is pressed towards the case body by a pushing jig so that the glass and the ring are inserted into the case body as a whole to achieve the watch case illustrated in Figure 3. Because the radially outer peripheral surface 6¹ of the glass is tightly engaged with the radially inner peripheral surface 3 of the ring and the radially inner peripheral surface 8 of the case body is tightly engaged with the radially outer peripheral surface 4 of the ring, the ring is radially compressed in the

direction of X—X at the portion 11; thus a watertight seal is produced between the glass and the case body. The compression of the ring 1 not only ensures that the watch case is waterproof but also ensures that the glass is retained in position.

As shown in Figure 3, the radially inner peripheral surface 8 of the case body 9 is inclined towards the axis of the case body so it is difficult to remove the glass from the ring once the watch case has been assembled.

The above described watch case is advantageous because the ring is not broken or deformed when the watch case is assembled, and the watch case remains waterproof for a long time. Besides, the material of which the ring is made is harder than the conventional rubber packing so the ring is not deformed when the watch case is subject to high pressure so that it remains waterproof. Moreover, the radially inner peripheral surface 8 of the case body is inclined towards the axis thereof so the watch case is easily assembled and the glass is retained in position. A bezel, used in the conventional watch case, is unnecessary so the watch case is simplified and its cost is reduced.

WHAT WE CLAIM IS:—

1. A watch case comprising a synthetic resin or soft metal ring having an L-shaped cross-section; a glass; and a case body having a radially inner peripheral surface which is inclined towards the axis of the case body and having a minimum diameter portion disposed in a plane which intersects the radially outer peripheral surface of the glass, said ring being radially compressed between the glass and the case body and having a guide surface to facilitate assembly of the ring in the case body.
2. A watch case as claimed in claim 1 in which, prior to assembly of the watch case, the radially inner peripheral surface and the adjacent axially glass supporting surface of the ring are disposed at an angle of less than 90° to one another.
3. A watch case substantially as herein described with reference to and as shown in the accompanying drawings.
4. A watch having a watch case as claimed in any preceding claim.

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peripheral surface 4 are parallel to one another and co-axial with the axis of the ring. The radially outer peripheral surface 4 may be made parallel to the axis of the ring once the latter has been assembled with the glass by some suitable finishing process. Thus, exact dimensions to the ring may be obtained.

A guide surface 5 is provided on the ring 1. The intersecting point between the guide surface 5 and the radially outer peripheral surface 4 of the ring is axially spaced apart from the plane of the glass supporting surface 2¹ by a distance *b* to facilitate assembly of the watch glass structure and to reduce the possibility of breakage of the glass.

The watch case includes a case body 7, a radially inner peripheral surface 8 of which is angularly spaced apart from a ring supporting surface 9 by an angle θ , which is less than 90° and which is finished to a smooth surface by a buff cloth. A guide surface 10 is provided at the free end of the radially inner peripheral surface 8. The radially inner peripheral surface 8 and the guide surface 10 intersect at a portion 11 which defines the minimum diameter *c* of the case body. This portion 11 is disposed in a plane which intersects the radially outer peripheral surface 6¹ of the glass as is best seen in Figure 3. The minimum diameter *c* of the case body 7 is arranged to be smaller than the maximum diameter of the ring 1 before it is assembled in the case body 7 so that, in the assembled watch case the ring is radially compressed on the line X—X to take the shape shown in Figure 3 and tightly to be engaged by the case body.

The above described watch case is assembled as follows:

The glass 6 is placed in abutting relationship with the radially inner peripheral surface 3 of the ring 1 as shown in Figure 2 so that the base 6¹¹ of the glass contacts the glass supporting surface 2¹. The guide surface 5 of the ring is then placed adjacent to the guide surface 10 of the case body. Then the upper surface of the glass is pressed towards the case body by a pushing jig so that the glass and the ring are inserted into the case body as a whole to achieve the watch case illustrated in Figure 3. Because the radially outer peripheral surface 6¹ of the glass is tightly engaged with the radially inner peripheral surface 3 of the ring and the radially inner peripheral surface 8 of the case body is tightly engaged with the radially outer peripheral surface 4 of the ring, the ring is radially compressed in the

direction of x—x at the portion 11; thus a watertight seal is produced between the glass and the case body. The compression of the ring 1 not only ensures that the watch case is waterproof but also ensures that the glass is retained in position.

As shown in Figure 3, the radially inner peripheral surface 8 of the case body 9 is inclined towards the axis of the case body so it is difficult to remove the glass from the ring once the watch case has been assembled.

The above described watch case is advantageous because the ring is not broken or deformed when the watch case is assembled, and the watch case remains waterproof for a long time. Besides, the material of which the ring is made is harder than the conventional rubber packing so the ring is not deformed when the watch case is subject to high pressure so that it remains waterproof. Moreover, the radially inner peripheral surface 8 of the case body is inclined towards the axis thereof so the watch case is easily assembled and the glass is retained in position. A bezel, used in the conventional watch case, is unnecessary so the watch case is simplified and its cost is reduced.

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2. A watch case as claimed in claim 1 in which, prior to assembly of the watch case, the radially inner peripheral surface and the adjacent axially glass supporting surface of the ring are disposed at an angle of less than 90° to one another.
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