

DESCRIPTION

The present invention relates to a wristwatch case comprising a crystal, a frame, designed to house a movement equipped with hands, said frame exhibiting a circular outer periphery having no projections, and a base fastenend removably to the frame with the bottom edge of said frame having two diametrically opposed undercuts that each accomodate one end of a band, the shape of each undercut being essentially the same as the shape of the band inserted therein, and said base being shaped to cover said undercuts without projecting from said circular outer periphery of the frame when the case is closed.

A watch case of the type described above is disclosed in patent CH-A-355 095. The patent describes a frame in which two undercuts or recesses have been fashioned. Within each of the undercuts is inserted a band end that flares into a dovetail shape and is held within the undercut by virtue of the fact that the flared end has the same shape as the undercut. The band is held in place axially when the base of the case is applied to the underside of the frame. No water-tight gasket is located between the base and the frame. This arrangement shares with the present invention the advantage of concealing the entire system for attaching the band to the case, thus creating the illusion that the band is of a piece with, and not separate from, the watch case.

However, the abovementioned patent has several drawbacks. The first is that it requires special flared band ends. The flared portion may either be integral with, or connected to, the rest of the band, but either way it prevents the use of standard band ends with continuous or straight edges

such as are found presently on the market. The second drawback is that it requires complicated recesses to be machined into the frame, which may be very difficult to accomplish if the frame is made of substances such as ceramics that are not easily susceptible to machining. A third drawback is that the attachment will not withstand the high tensile stresses that may be exerted on the band, since in such cases the band, which is typically made of leather or plastic, may become deformed and be pulled out of its housing. In any way, these maintaining means require a certain length for the engagement of the band end, this length being able to be shortened when utilizing the means which will be shown in the present invention.

In one particular arrangement, an attempt was made to retain the band by means of pins integral with a molded watch crystal and a ring screwed onto the base of the frame. This construction, described in document JP-U-1 149 226, has the disadvantage of being fragile, since the plastic pins break easily. It is also complicated, simply due to the presence of the ring.

Document CH-B-347 490 describes means for attaching a band to a watch case which comprise two ears attached to the watch. These ears project laterally from the watch and each extremity of the band is fixed to one of these ears by means preventing the utilization of pins. On the contrary of what is shown in the present invention, the circular outer periphery has projections, so that the attaching means are prominent. Thus for the greatest part of the described embodiments, the attachment of the bracelet to the watch case is visible. Moreover, no water-tight gasket is present.

The construction shown in document US-A-2 225 474 comprises an outer casing part and an inner casing part encased the one in the other, these parts

being arranged in order to retain a bracelet by means of two diametrically opposed ears which are visible, ears which the present invention seeks to avoid. No water-tight gasket is present. Starting from this arrangement, one does not see how one could adapt said arrangement to the case of the present invention since when the base is fixed to the frame, one permits simultaneously the attachment of the bracelet and the water-tightness of the watch.

Patent FR-A-935 435 sets forth an attachment of a bracelet to a watch which avoids the utilization of an ordinary clasp. The cited patent concerns a system added to a watch, the latter comprising its own casing. Here the bracelet is maintained by hooks which are not covered by undercuts as in the present invention. Thus in the cited patent, the bracelet is not retained with security. Moreover, the water-tightness of the watch is not solved.

The present invention avoids the above-mentioned drawbacks by means which appear in the claims.

The invention will be understood upon consideration of the following description which sets forth two embodiments given solely by way of example and illustrated by the drawing in which :

Fig. 1 is a top view, partially cut away, of one embodiment of the watch case of the invention;

Fig. 2 is a cross-section along line II-II of Fig. 1;

Fig. 3 is a cross-section along line III-III of Fig. 1;

Fig. 4 is a top view, partially cut away, of a second embodiment of the watch case of the invention;

Fig. 5 is a cross-section along line V-V of Fig. 4; and,

Fig. 6 is a cross-section along line VI-VI of Fig. 4.

Fig. 1 is a top view of a first embodiment of the watch case of the invention. The case is identified generally as 1, and the band ends as 2. Circle 3 designates the outer circumference of case 1, and circle 4 the inner circumference of a frame 5. The watchface in Fig. 1 is partially cut away at 6:00 o'clock in order to show how band 2 is fastened to case 1.

Fig. 2, which is a cross-section along line II-II of Fig. 1, reveals frame 5, which is shaped like a ring delimited by circles 3 and 4. Frame 5 is covered with a glued or welded crystal 6. The interior of frame 5 serves to house a movement 7 and the watchface 8, which are held in place by a spacer 9 and a ring 10. Movement 7 has hands 22 that turn about an axis 23. In order to conceal frame 5 and spacer 9, crystal 6 is plated with metal plating 11 having an inner edge 12. A base 13 is removably fastened to frame 5 by means of screws 14 as shown in Fig. 3. A gasket 15, known perse, serves to seal the watch. Figs. 1 and 2 also show that the underside of frame 5 contains two diametrically opposed undercuts that each accommodate one end 2 of the band. The shape of undercuts 16 is essentially the same as the shape of the band ends 2 that are inserted therein. When base 13 is applied to frame 5, undercuts 16 are covered, so that band end 2 is contained between the base and the frame.

In accordance with the invention, at least one projection 17 is formed integral with base 13. The projection extends into undercut 16 and passes through a matching opening 18 provided in the band end 2 in such a way that the end is fastened to the case when the cover is applied to the underside of the frame.

In a variant of this general embodiment, Figs. 1 and 2 show base 13 as having two projections

17, each protruding integrally from the base. The base, with its projections or protrusions, is produced by turning and milling. To reinforce the points of attachment of band end 2 to case 1, a grommet 19, which may be made of metal, may be built into the band end.

This variant, in which the protrusions are shaped like segments of a crown, allows for maximum reduction of the overall thickness of the watch and is therefore particularly suitable for a ladies watch. Of course, in this embodiment, the openings 18 in the band end will also be shaped like segments of a crown.

Fig. 2 also shows that one surface 20 of undercut 16, extending opposite that part 21 of the base 13 that covers said undercut, combines with said part 21 to form two planes between which band end 2 is sandwiched, said planes being perpendicular to the axis 23 of the hands 22, thereby causing band end 2 to emerge from the case in a plane that is perpendicular to the axis. This arrangement is to be used for small-diameter watches, particularly ladies watches, of which the diameter is on the order of at most 22 mm.

Fig. 3 is a cross-section along line III-III of Fig. 1 and shows the manner in which base 13 is fastened to frame 5 by means of screws 14. Fig. 1 shows that four attachment points are provided. Frame 5 contains holes 24 into which plugs 25 are driven. The plug is then drilled and tapped, using as a reference interior bore 4 of frame 5. This technique is designed for use in cases where the frame is made of a hard material such as a ceramic. The plugs would not be needed if the frame were made of steel or a precious metal.

Fig. 4 is a top view of a second embodiment of the watch case of the invention. This second

embodiment is distinguished from the first only by its attachment system, and by the fact that the band ends are angled with respect to the axis of the hands of the watch. Therefore, details of construction that are identical to those set forth with reference to Figs. 1, 2, and 3 will not be repeated, and the same reference numerals are used to identify identical parts.

Figs. 5 and 6, which are cross sections along lines V-V and VI-VI, respectively, of Fig. 4, show that the underside of frame 5 has two diametrically opposed undercuts 16 that each accommodate a band end 2. The base 13 supports two projections 30 for each undercut 16, with the projections taking the shape of straight pins driven into the base. In order that the pin will be well anchored within the base, the base widens or is made thicker in the region 31 where the base covers undercut 16. Pins 30 extend into undercut 16 and pass through a corresponding opening 32 fashioned in band end 2. In this embodiment, openings 32 are simple circular holes drilled into the band end, the diameter of the openings being adjusted to the diameter of pins 30. As in the preceding embodiment, the band end may be reinforced with a grommet 19. Figs. 5 and 6 also show that one surface 33 of undercut 16, extending opposite that part 34 of base 13 that covers the undercut, combines with part 34 to form two planes, between which the band end 2 is sandwiched, with the planes being inclined with respect to the axis 23 of watch hands 22, at least near the periphery of case 1, thereby causing the band end 2 to emerge from the case in a plane that is inclined with respect to the axis 23.

The use of pins to fasten the band, and the arrangement by which the band ends emerge from the case

at an angle, are designed especially for use with large-diameter watches, e.g., 40 mm. In such cases, greater thickness is available for use, which makes it possible to reinforce the base at the points where the pins 30 are inserted, and to use a fastening system that is simpler than the one using crown segments as in the previous embodiment. Similarly, the angling of the band ends is justified in view of the large diameter of the case. This arrangement enables the band to follow the shape of the wrist from the very point at which it emerges from the watch case. If one wishes to reinforce the band end at the attachment points, it is possible, as in the preceding embodiment to use a reinforcing grommet 19, which would also be angled, as shown in Figs. 5 and 6.

The two embodiments described above are particularly appropriate if the frame 5 is made of a very hard substance such as a ceramic or metal carbide. In the case of ceramics, undercuts 12 can be formed directly by sintering, without requiring any subsequent operations. Only the surfaces that will receive crystal 6 and movement 7 need be machined. It is obvious that the frame might be made of another substance such as stainless steel or a precious metal such as gold.

It will also be noted that in the construction disclosed, all of the tensile stress is borne by projections that are parts of the base of the watch case. The frame is free of any stress. This is advantageous in cases where the frame is made of a ceramic material, which may crack or even break if subjected to certain mechanical stress.



CLAIMS

1. Wristwatch case comprising a crystal (6), a frame (5), designed to house a movement (7) equipped with hands (22), said frame (5) exhibiting a circular outer periphery (3) having no projections, and a base (13) fastened removably to the frame (5) with the bottom edge of said frame (5) having two diametrically opposed undercuts (16) that each accomodate one end (2) of a band, the shape of each undercut (16) being essentially the same as the shape of the band (2) inserted therein, and said base (13) being shaped to cover said undercuts without projecting from said circular outer periphery (3) of the frame (5) when the case is closed, characterized by the fact that a water-tight gasket (15) is located between the frame (5) and the base (13), and at least one projection (17, 30) integral with the base (13) extends into each undercut (16) to pass through a matching opening (18, 32) fashioned in the band (2) so as to fasten said end (2) to said case when the base (13) is applied to the underside of said frame (5).

2. Case according to claim 1, characterized by the fact that the base (13) has two projections per undercut (16) and each band end (2) has two corresponding openings.

3. Case according to claim 2, characterized by the fact that each projection is a cylindrical pin (30) driven into the base (13).

4. Case according to claim 2, characterized by the fact that each projection comprises a protrusion (17) forming one piece with the base (13).

5. Case according to claim 1, characterized by the fact that the projection (17) takes the shape of a segment of a crown.

6. Case according to claim 1, characterized by the fact that each band end (2) is reinforced with a grommet (19) at the point of attachment to the case.



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7. Case according to claim 1, characterized by the fact that the frame (5) is a ceramic ring.

8. Case according to claim 1, characterized by the fact that the frame (5) is a ring made of a precious metal.

9. Case according to claim 1, characterized by the fact that the face (20) of the undercut (16) extending opposite that part (21) of the base (13) that serves to cover said undercut (16) combines with said part to form two planes, between which the band end (2) is sandwiched, with said planes being perpendicular to the axis (23) of the hands (22) so as to cause said end to emerge from the case in a plane perpendicular to said axis (23).

10. Case according to claim 1, characterized by the fact that the face (33) of the undercut (16) extending opposite that part (34) of the base (13) that serves to cover said undercut (16) combines with said part to form two planes, between which the band end (2) is sandwiched, with said planes being angled with respect to the axis (23) of the hands (22), at least in the area near the periphery of the case, so as to cause said end (2) to emerge from the case in a plane that is inclined with respect to said axis (23).