

DESCRIPTION

The invention concerns a watchcase including a first unit comprising a caseband and a back cover together defining a housing intended to receive a movement and a second unit comprising a crystal and fixing means for fixing the crystal to the first unit.

Such a case is described in the document EP-A-097 393.

According to this document, the fixing means comprises an elastomeric seal which can be cured, disposed between the crystal and the caseband. This fixation of the crystal to the caseband is undismantable and has certain drawbacks if the crystal happens to break since it is required to unweld the remaining pieces of crystal, to remove the remaining pieces of the seal and to weld a new crystal with a new seal. These operations are critical and time consuming and further require a specific equipment to achieve the curing of the seal, the curing being achieved at relatively high temperature.

Swiss patent 649 435 also describes a case in which the caseband is of metal, and the crystal of mineral material bears a metallized layer around the edge of its inner surface. These two parts are assembled to one another by solder adhering, on the one hand, to the metallic layer and, on the other hand, to the case. This type of assembly enables the obtaining of a strong and liquid tight joint between the case and the crystal. It nevertheless gives rise to difficult problems in respect of after-sales service. Effectively, if the crystal should be broken, it is necessary to remove the remaining pieces of the crystal, then to resolder a new crystal. This operation is difficult since it is indispensable that the solder not overflow into the space comprised between the crystal and the caseband.

The purpose of the present invention is to overcome the drawbacks of the above-mentioned prior art by supplying a case in which the after-sales service is considerably simplified while at the same time enabling a reduction of the manufacturing cost of the watch.

This purpose is attained thanks to the fact that the second unit further includes a plastic support annulus connected to the crystal in an unremovable manner and assembled with the first unit by removable means.

In addition, the document FR-A-908 125 discloses a watchcase comprising a caseband, a crystal and a back, and the fixing means of the crystal to the caseband comprises welded or screwed lugs to the caseband. Accordingly, this document does not bring any solution to the problem set since, in case of a crystal breakage, it is necessary to dismantle the welded or screwed connections, which takes also much time.

The invention will be better understood through reading of the following description made with reference to the drawings given by way of example and in which :

- Figure 1a is a perspective view of a watch obtained in accordance with the invention;
- figure 1b is a partial cross-section according to line bb of figure 1a; and
- figures 2 to 4 represent three other embodiments.

The watch shown on figure 1a includes a case comprising a caseband 10, a crystal 12 and a back cover 14 which define a housing on the interior of which is found a movement 16 bearing display means 18, in particular a dial and hands. This watch furthermore includes means formed by clasps 20 for fastening the crystal to the caseband.

The caseband 10 comprises an external support member 21 of annular form and an internal ring 22 surrounded by the external member 21, both being of rectangular cross-section.

The external support member 21 is of plastic and defines the lateral faces of the watch. It cooperates with the fastening means in a manner which will be set forth in detail hereafter.

The back cover 14 and the internal ring 22, both formed of stainless steel, are welded to one another or could be formed in a single piece. Ring 22 is provided with a shoulder 24 on its interior face and with a rib 26 on its outer face. The upper portion of ring 22 which is adjacent to crystal 12 includes a groove 28. Shoulder 24 serves to support movement 16 and enables the fastening thereof within the caseband. More precisely, this movement is locked between the crystal 12 and the shoulder 24 by means of a flange 30 the outer dimensions of which are equal to the inner dimensions of ring 22 and the thickness of which is equal to the distance between the crystal and the dial borne by movement 16.

Rib 26 cooperates with a groove 32 borne by the inner face of the support member 21 thus fixing together by a snap assembly member 21 and ring 22.

Groove 28 which is borne by ring 22 enables the housing of a sealing gasket 34. This gasket is furthermore guided by the outer surfaces of the flange 30.

As already mentioned, the means for fastening the crystal to the caseband are formed by clasps 20. The latter are fixed to the four corners of the watch and may be preferably formed from a stainless steel wire. Thus, as may

be seen on figure 1b, these clasps have the general form of a stirrup with a base 35 supported on the crystal and two lateral branches each comprising three segments. The first segments 36 extend over the thickness of the crystal and a portion of the caseband, the second segments 38 converge towards one another and form respectively with the first an obtuse angle and the third segments 40, contacting one another, extend parallel to the first segments 36.

To retain the clasp 20 on the caseband this latter includes in the outer support member 21 a first hole 42 which opens on the bottom side and two oblique holes 44 which extend from the sides of the caseband to the interior of hole 42.

The segments 38 of clasps 20 are each housed in an oblique hole 44 while the two end segments 40 are clamped together in hole 42.

In order to effect the assembly of the crystal 12 to the outer member 21 of the caseband, crystal 12 is arranged on member 21 and the branches of each clasp 20, initially in U-form, are engaged into holes 44 up to their ends, and thus coming together in hole 42, emerge from the bottom of member 21. Tension is then exerted on the extremities in a manner to assure a good application of the clasp to the crystal. When this has been completed, it is sufficient to cut the ends of the clasp flush with the hole 42 in order to obtain the structure shown on figure 1b.

The assembly thus formed may then be fastened to the internal ring 22 by means of the snap assembly which is obtained by the rib 26 of ring 22 and the groove 32 of member 21.

It may be advantageous that segments 40 of clasps 20 include striations on their surfaces coming into contact with the caseband which will improve their maintenance in place.

In the watch shown in cross-section of figure 2, one finds once again the caseband 10 and the crystal 12 superposed and aligned edge to edge, the back cover 14, the movement 16 and the display means 18. The special structure of caseband 10 with an external support member 21 and an internal ring 22, as well as the assembly means for the movement, are identical to those which have been described in respect of figure 1a. In this embodiment, the fastening means of the crystal to the caseband include rivets 48 of stainless steel, each comprising a head 50, a cylindrical body 52 and a ring 54 fastened to the end of body 52. A single rivet is shown on the drawing. The body 52 of each rivet 48 is housed in coaxial holes 56 and 58 which respectively traverse crystal 12 and the support member 21. Its free end is slightly concave and exhibits an upset forming a small outer flange which assures blocking of ring 54.

In order to assemble crystal 12 and the support member 21, crystal 12 is placed on member 21 in a manner to place in correspondence holes 56 and 58. The body 52 of rivets 48 is then introduced into the holes and rings 54 put in place on their ends. The fastening is then obtained by upsetting the end of body 52, the outer flange of which will then be urged against ring 54. To assure a better maintenance of this fastening it is further possible to provide a weld or solder joint between ring 54 and body 52, for example by an electrical weld. In order to reduce the risks of breaking the crystal, a ring 59 in flexible material may advantageously be interposed between head 50 and crystal 12. The assembly thus formed is thereafter snap-fastened onto the internal portion 21 of the caseband.

Figures 3a and 3b show a further embodiment in which will be seen only crystal 12 and the external member 21 of the caseband 10. The back cover, the movement and the internal portion of the caseband which have not been drawn may be similar to those shown on figures 1a and 2. In this watch, crystal 12 is fastened to member 21 by means of rivets 59 which are of plastic. A rivet is shown in pre-assembled position on figure 3a and after assembly on figure 3b.

Each rivet 59 includes a cylindrical body 60 the upper end of which is extended by a set of claws 62 arranged in a crown and each is provided with a shoulder 66 which is intended to bear against crystal 12 and by a groove 68 on the inner part of the crown in which is borne the edge of a decoration element 70 such as a stone. The lower end of each rivet includes two rows of spurs 64', 64".

Rivets 59 are each retained in holes 72 and 74 provided respectively in crystal 12 and the outer member 21 of the caseband.

When a rivet 59 is in a pre-assembled position, as may be seen on figure 3a, the claws 62 are spread apart, while the lower spurs 64' are hooked to a shoulder 76 ending hole 74. In this position, element 70 may be placed on the interior of grooves 68. In order to drive the rivet into the caseband, a force is applied to element 70 and claws 62 so as to cause the rivet to slide along the interior of holes 72 and 74 and thus to force the upper spurs 64" to bear against shoulder 76. During the axial displacement of the rivet, the crown formed by claws 62 closes on itself so that the element 70 is retained in grooves 68.

In this embodiment the decorative element 70 may be formed of any desired material, e.g. a sapphire, ruby or any other precious or semi-precious material or a simple decoration.

The watchcase shown on figure 4 includes the same basic elements as those of figures 1a and 2, i.e. a caseband 10, a crystal 12, a back cover 14, a movement 16 and display means 18. The caseband 10 likewise comprises an outer support member 21 of plastic and an internal ring 22, the latter being integrally formed with the back cover 14. This case is different from the cases previously described and shown since here the crystal 12 is curved, exhibiting a structure either of cylindrical or spherical form.

The means for the assembly of the crystal to the caseband are here also formed by rivets one of which, bearing reference 78, is shown on the drawing. These rivets of stainless steel include a cylindrical body 80, the lower extremity of which terminates in spurs 82 while the upper extremity is fastened to the crystal by means of welding 84. In order to facilitate the assembly by welding, it is of course understood that the lower surface of the crystal must be coated with a layer of metal 86. The support member 21 of this watch includes blind holes 88 of a cross-section less than that of the body 80 each intended to receive a rivet 78.

In order to effect the assembly of the crystal and the caseband, one commences by fastening rivets 78 onto crystal 12 by welding. The crystal thus arranged is then positioned so that the body 80 of each of rivets 78 corresponds with one of the holes 88. A force is then applied to the crystal 12 in order to cause the rivets 78 to penetrate into the holes 88 and to press the crystal against

the outer member 21. The crystal may, furthermore, be subjected to ultrasonic vibrations which assists penetration of the rivets to the interior of holes 88 and brings about melting of the plastic in contact with the spurs 82. The fastening is thus improved.

In the different embodiments which have just been described, the permanent assembly formed by the crystal and the outer member of the caseband is relatively inexpensive since not only may it be assembled in an automatic manner but also and above all the cost of the external portion of plastic and the assembly means for the two elements is inconsequential relative to that of the crystal. Furthermore, since this assembly is fixed to the remainder of the watch by a simple snap-on system, its replacement in case of breakage of the crystal requires only a very small effort by the servicing person.

On initial consideration, it would appear aberrant to associate a noble material such as sapphire with a material often considered as cheap such as plastic material. This anomaly is only apparent. It is readily determined effectively that the basic mechanical and aesthetic characteristics of the watch are defined by its upper surface, above all when the crystal is curved and aligned edge to edge with the sides of the caseband.

The watchcase such as described and claimed may exhibit numerous variants.

Thus, for example, the fastening means of the crystal to the plastic support member may come from the material of the latter in the form of nipples engaging in bevelled cut-outs in the crystal. The fastening is then effected by deformation of the nipples which are urged against the bevels.

In another variant, the crystal, which exhibits a spherical structure, is aligned edge to edge with the back cover. From this there results that the caseband is entirely masked. It nevertheless maintains its basic function, i.e. rigid fastening of the crystal and of the back cover to the watch.

It is also possible to obtain a case in which the seals are obtained from material of the support member or overmoulded from a more flexible material.

Finally, the caseband may likewise exhibit variants. It could thus be formed of a single support member, the back cover being then fastened by a bayonet attachment for instance.

CLAIMS

1. Watchcase including a first unit comprising a caseband (10) and a back cover (14) together defining a housing intended to receive a movement (16) and a second unit comprising a crystal (12) and fixing means (20, 48, 59, 78) for fixing the crystal to the first unit, characterized in that said second unit further includes a plastic support annulus (21) connected to the crystal (12) in an unremovable manner and assembled with the first unit by removable means (26, 32).

2. Watchcase as set forth in claim 1, characterized in that the plastic support annulus (21) is snap fitted onto the first unit.

3. Watchcase as set forth in claim 1 or 2, characterized in that the first unit comprises an internal element (22) which constitutes a fitting for the movement (16).

4. Watchcase as set forth in claim 3, characterized in that said internal element is integral with said back cover.

5. Watchcase as set forth in claims 1 to 4, characterized in that the crystal (12) is in edge to edge alignment with the support annulus (21).

6. Watchcase as set forth in claims 1 to 5, characterized in that the crystal (12) is fixed by clasps (20).

7. Watchcase as set forth in claims 1 to 5, characterized in that the crystal (12) is fixed onto the plastic support annulus by rivets (48, 59, 78).

8. Watchcase as set forth in claim 7, characterized in that said rivets (48) include each a cylindrical body (52) provided with an upset end and a ring (54) mounted on the cylindrical body and retained by said upset end.

9. Watchcase as set forth in claim 8, characterized in that said body (52) and said ring (54) are additionally fixed together by welding.



10. Watchcase as set forth in claim 7, characterized in that the rivet (59, 78) is engaged in a hole (74, 88) in the support annulus and includes spurs (64', 64", 82) which cooperate with the walls of said hole to prevent disassembly.

11. Watchcase as set forth in claims 7 to 10, characterized in that said rivet (59) includes a head formed from a plurality of claws (62) arranged in a crown, each provided with a shoulder (66) bearing on the crystal (12) and with a groove (68), the set of grooves serving to retain a decorative element (70).

12. Watchcase as set forth in claims 7 to 10, characterized in that the lower surface of the crystal (12) bears a metallized layer (86) to which said rivet (78) is welded.

13. Watchcase as set forth in claims 1 to 12, characterized in that said crystal is of mineral material.

14. Watchcase as set forth in claim 13, characterized in that said material is sapphire.

