

DESCRIPTION

The known watchcases of the type as defined in the preamble of claim 1 are exclusively usable with watches with digital display means. The parts in which clamping screws of the glass are engaged, are formed of tapped feet machined as a whole piece with a frame in which the liquid crystal cell of the display is adjusted (JP-A-55 70 770 and US-A-4 281 406).

The limitation of that glass fixing mode to the watches with digital display is due to the fact that the glass and its frame are set in the glass snap of a usual caseband which also constitutes a bezel of the case whereby the frame must extend inwardly of the case to a sufficient extent in order to hide the feet it carries and which are thus located inside the case, in the space normally reserved for the watch movement.

Furthermore, a frame made integral with feet has not a simple shape and its manufacture is not especially cheap. A different frame must also be made not only for every shape and sizes of the case, but also for each particular frame feet location.

In addition, the finishing operations of the visible face of the case, especially of the bezel upper face which surrounds the dial, are much more difficult with a non-circular case than with a circular one. Finally, the appearance of the case visible face (colour and shape) can only be varied within very narrow limits, chiefly because of the material of the case, its vulnerability or the resistance its opposes to machining operations.

The document DE-C-808 340 discloses a watch case having a massive glass traversed through and trough by tapped tubes in which screws are engaged allowing a direct mounting of the case bottom to that glass.

The patent application FR-A-2 397 668 discloses a watch case comprising a glass glued to a caseband and fixed thereto a bottom, either by screws traversing the caseband trough and trough and glued by their head, or by tapped

bushings mounted in recesses machined on the rear face of the caseband and receiving shorter screws integral with the bottom.

The object of the invention is to remedy with the drawbacks of the above-mentioned prior art, by providing a watchcase comprising :

- a glass and a caseband, the glass being removably fixed to the caseband by screws engaged in the bottom side of said watchcase,

- a glass fixation unit including tapped elements and at least a frame supporting the tapped elements, this fixation unit being securely fixed to said glass by gluing, whilst said tapped elements are engaged by said screws, characterized in that said frame has an essentially planar form, said elements being constituted by sockets independent from said frame and individually fixed thereto by means of a socket collar formed around the bottom of the sockets, the fixation unit thus formed by the frame and by the sockets fixed thereto, and thus securely fixed by gluing to the glass, constituting, with the glass, a unitary block prior to assembly with the watchcase, this unitary block - glass and glass fixation unit - being adapted such that it wholly covers the upper face of the caseband of the watchcase so as to constitute, in combination with the dial and the hands borne by a movement that said watchcase is intended to receive, the entirety of the face of the watchcase visible to the wearer, in that said frame is glued under non-transparent ornamental pieces, which are definitively adjoining said glass, in that said ornamental pieces are constituted by a flat frame glued directly under the periphery of the glass, in that the frame bearing said sockets is made from base metal and is glued under the frame which constitutes said ornamental pieces and which entirely covers said frame, and in that each of said socket collars is constrained between these two frames, in a housing of the base metal frame.

Since the glass and the unit solid therewith cover entirely the caseband upper face according to the characteristics of claim 1, the glass area, which remains transparent within said unit, is relatively large so that analogical display means may appear there through without difficulty. Moreover, since the ornamental pieces constituting the case visible face are solid with the glass and accordingly protected by the same, the appearances range which the case can be awarded is substantially amplified. In addition, the frame bond to the glass is a flat relatively thin piece which can be produced in great series in a single step, while also forming the lodgings for the sockets, by punching it out of a sheet metal band. On the other hand, the sockets have always the same shape and sizes which do not depend on the case sizes and shape so that these sockets can be lathe-turned in great series. Finally, gluing said frame to the glass has the advantage over the mechanical fixing means by fitting pieces in one another, not only to admit larger tolerances, but also to avoid internal stresses in the glass which can jeopardise its resistance, in particular if the latter is a sapphire.

It must also be pointed out that the invention makes it possible to manufacture great series of identical casebands for a given watch movement and a given shape of case, since the glass fixation units corresponding to that watch movement and to that shape of the case, all have the same geometrical shape so that it is possible to render any one of them with one of said casebands and nevertheless to produce numerous different watch patterns by securing glasses having different ornamental pieces to said casebands.

The special embodiments as defined by claim 5 have not only the advantage to leave the inner space of the caseband entirely free for the watch movement, but also to provide positioning means for the glass as accurate as they are simple.

As to the embodiments as defined in claim 6, they are characterized by the simplification they afford, in the manufacturing of the case as well as in the mounting thereof.

Finally, those defined in claim 7 have the advantage of comprising a shield protecting the case against any deterioration caused by foreign bodies with which it may enter into contact by accident.

One embodiment and some modifications of the wrist-watch case according to the invention are represented diagrammatically and by way of example only in the drawing, in which :

- figure 1 is a sectional view showing that embodiment,
- figure 2 is a partial sectional view of a modification,
- figure 3 is a plan view of the bottom side of the embodiment of figure 1, and
- figure 4 is a plan view of the bottom side of the case according to another modification.

The peculiarities of said embodiment are shown on figure 1. The case according to that embodiment generally has a rectangular shape having truncated corners (figure 3). The upper case face, which is the sole being visible when the watch is carried, is wholly covered by the glass 1 consisting of a sapphire having bevelled edges. A thin flat frame 2 is glued under the periphery of glass 1. It is made of a precious or seem-precious stone (cat's eye, lapis lazulli, aqua-marine, tourmaline, opal, amethyst, malachite, jasper, coral, etc.). It can, however, simpler be made out of a gold spangled coloured material or even a hard metal or a base metal having its face glued to the glass nicely finished so as to constitute a decorative design. The mechanical properties (hardness, brittleness) of the material of frame 2, which constitutes the ornamental piece of the case, are immaterial, because that frame is protected

by the sapphire glass and can thus not be deteriorated by foreign bodies or chemical agents.

A second frame 3 of base metal is glued under frame 2. It is also flat and is provided with openings 4, usually four in number, for the passage of sockets 5. The latter are formed with a collar 6 around their bottom, which takes place in a lodging 7 of frame 3, which is formed in its face glued to frame 2. Collars 6 are thus caught between frames 2 and 3. Moreover, they are secured to said frames, as well as the bottom of sockets 5 by the glue binding the frames 2, 3 to each other. The unit comprising the two frames 2, 3 and the sockets 5 is itself solid with the glass 1 so that the whole can be handled as a single piece when assembling the case. The glues nowadays offered on the market enable joining the pieces described in an indissoluble manner and so as to obtain an adhesion of several kgp/mm².

The sockets 5 are provided with a tapped bore to enable securing the unit solid with the glass 1 to the caseband 8 of the case by means of screws 9 which are engaged into those sockets by inserting them from the "bottom" side of the case. On this side, the screws 9 could directly enter the caseband. In the embodiment disclosed, these screws 9 however secure at the same time an independent bottom 10 to the caseband 8.

As shown in figure 1, bottom 10 comprises a flat metallic plate 11 and a thin layer 12 of soft material lining the inner face of piece 11 to which it strongly adheres. Layer 12 preferably consists of an elastomer, for instance that sold under the trademark "VITON", which is mould under pressure in piece 11 so as to form what those skilled in the art call a "metal-elastomer junction". Piece 11 covers the whole lower face of caseband 8. Its edges 13 are bent upwards at right angles so as to come in abutting engagement with caseband 8 when screws 9 are screwed down in sockets 5. Besides the fact that with such an engagement no gap appears between the caseband and the bottom, the bearing

of two metallic pieces against each other has the advantage to limit the pressure strength on layer 12. The latter has, indeed, a peripheral lip somewhat higher than edges 13 of piece 11 and which is flattened out by the caseband 8 lower face in the position represented in figure 1, so as to form a tight seal between the caseband and the bottom, whatever shape these pieces may have. Layer 12 is moulded in one piece, on the one hand, with two projections 14 which are substituted for the conventional screws fixing the watch movement 15 in the caseband 8 and assume the function of those screws, and, on the other hand, with four pillars 16 which firmly hold the parts of dial 17 projecting beyond of the watch movement in abutting engagement with a shoulder 18 of caseband 8. In its central area, on the inside of its periphery lip and between projections 14 and pillars 16, the layer 12 could be interrupted and thus leaving bare piece 11 of bottom 10 in order to make place for the thickest part of movement 15, for example for the battery in an electronic watch.

To provide a passage for the screws 9, the caseband 8 is bored through and through, however at different diameters. In their larger upper part 19, these bores of caseband 8 are adjusted to sockets 5 in order the unit comprising the glass 1 is exactly positioned on caseband 8, whereas the lower bore parts 20 are only a little larger than screws 9 in order that the caseband 8 compresses the lip described here above of layer 12 all around screws 9 and presses the material of this lip against a smoothly and polished part of said screws. The latter pass with some free play through bores 21 of the metallic piece 11 of bottom 10.

The tight seal of the gap between the glass and the caseband is ensured by a gasket 22 extending along the inner edges of frames 2, 3, the height of which at rest being a little greater than the thickness of both frames 2, 3. Once screws 9 are screwed down into sockets 5, the gasket 22 is consequently compressed in axial direction between the glass

1 and the inner rim 23 of caseband 8, the rim thus looking like a flange. A thin metallized layer 30 is coated under the area of the glass, which extends over gasket 22 and the inner edge of frame 2 in order to hide this gasket and the possible irregularities of the edge of frame 2, while adding a supplemental ornament to the visible face of the case. By means of masks it is, indeed, possible to obtain a rigorous demarcation of very thin metallized lines such as arabesques for instance.

To avoid the stress caused in the glass 1 by the compressed gasket 22, the frames 2, 3 could be enlarged inwardly up to the inner edge of flange 23 and the gasket be located under these frames in a groove of the caseband. With such a modification, the glass 1 would be free from any internal stress as desirable in the case of a sapphire glass.

The manufacture of the three independent pieces of the case disclosed is easy. Since the frames secured under the glass 1 are flat, their machining is easy. Since their fixation to the glass together with sockets 5 occurs by gluing, that step does not raise any problem. On the other hand, machining the caseband 8 is very simple too. Its outer side face 24 is the sole one which must be submitted to fine finishing operations, since it is the sole caseband face which is apparent on the watch. Besides that face, the case areas having some extension and being visible are protected by the sapphire glass. As regards the outer edge of frame 3, the thickness of which is smaller than half a millimetre, it can be serrated and thus constitute an original decorative case element. Due to its very simple shape, the bottom 10 is also very easy to be manufactured.

The case according to the present invention permits easier assembly of the watch components than any other presently known cases since it suffices to set borings 19 of caseband 8 onto sockets 5 of the glass unit, then to set the bottom onto the caseband and to screw down the screws 9.

Mounting the movement 15 into that case does not require any particular operations, it suffices to deposit the same in caseband 8 wherein projections 14 and pillars 16 of the bottom automatically hold it in place as soon as the case is closed by means of screws 9.

Figure 2 shows a modification of the embodiment disclosed here above. In this case, glass 27 does no longer cover the whole case upper face. It is glued only onto the inner zone of the upper face of a frame 28, made of hard metal. The inner edge of frame 28 is flush with that of flange 23 formed on the caseband 8 which is the same as that of figure 1. A frame 3, identical with that of the embodiment disclosed, is glued under frame 28. The collar 6 of sockets 5 is caught in the same manner as that disclosed with reference to figure 1, so that the latter are solid the glass 27. A watertight gasket 29, the height of which is somewhat greater than the thickness of frame 3, is inserted between frame 28 and caseband 8.

In this modification, the free space reserved for the watch hands between the dial 17 and the glass 27 is a little higher than in figure 1, because of the thickness of the hard metal frame 28. Higher horal symbols can accordingly be provided on the dial 17.

In the disclosed examples, one may observe that the watch appearance chiefly depends on the ornamental pieces glued under the glass. Thus, by gluing different ornamental pieces under a series of glasses, a large scale of different patterns can be produced while manufacturing big series of identical casebands and identical bottoms. Assembling the cases according to the invention and mounting the watch movement into these cases always occur in the same manner regardless of the cases shape which can be rectangular, square, trapezoidal or in the form of any polygon with straight or curved edges or even circular.

Figure 3 shows the contour of caseband 8 of the embodiment disclosed here above in a plan view from the

bottom side and it shows the locations 21 of the screws 9 securing at the same time the bottom 10 and the glass. As regards to figure 4, it shows that a circular bottom 32 can just as well be secured to the caseband together with the glass by means of screws inserted into bores 33.

CLAIMS

1. Watchcase comprising :

- a glass (1, 27) and a caseband (8), the glass being rigidly fixed to the caseband by screws (9) engaged in the bottom side of said watchcase,

- a glass fixation unit (2, 3, 5, 30; 3, 5, 28) including tapped elements (5) and at least a frame (3) supporting the tapped elements (5), this fixation unit being securely fixed to said glass by glueing, whilst said tapped elements (5) are engaged by said screws (9), characterized in that said frame (3) has an essentially planar form, said elements being constituted by sockets independent from said frame (3) and individually fixed thereto by means of a socket collar (6) formed around the bottom of the sockets (5), the fixation unit thus formed by the frame (3) and by the sockets (5) fixed thereto, and thus securely fixed by glueing to the glass (1, 27), constituting, with the glass, a unitary block prior to assembly with the watchcase, this unitary block - glass and glass fixation unit - being adapted such that it entirely covers the upper face of the caseband (8) of the watchcase so as to constitute, in combination with the dial and the hands borne by a movement that said watchcase is intended to receive, the entirety of the face of the watchcase visible to the wearer, in that said frame (3) is glued under non-transparent ornamental pieces (2, 28), which are definitively adjoining said glass (1, 27), in that said ornamental pieces are constituted by a flat frame (2, 28) glued directly under the periphery of the glass (1, 27), in that the frame (3) bearing said sockets (5) is made from base metal and is glued under the frame (2) which constitutes said ornamental pieces and which entirely covers said frame, and in that each of said socket collars (6) is constrained between these two frames (2, 3), in a housing of the base metal frame (3).



2. Watchcase according to claim 1, characterized
- in that the frame (2) constituting said ornamental elements is composed of one or a plurality of bands of precious or semi-precious stones,

- and in that the glass (1) extends outwards up to the outer edge of the caseband (8).

3. Watchcase according to claim 1, characterized
- in that said frame (2) constituting said ornamental element is made out of base metal,

- and in that its upper face secured to said glass is finely machined so as to constitute a decorative design.

4. Watchcase according to claim 1, characterized
- in that said frame (28) constituting said ornamental element is made out of hard metal

- and in that only its inner area is secured to said glass (27).

5. Watchcase according to any one of the preceding claims, characterized in that said sockets (5) and said screws (9) are engaged respectively in bores (19, 20) which traverse the frame (8) and whose diameter is adapted to that of these sockets (5) and of these screws (9).

6. Watchcase according to claim 5, characterized in that said glass securing screws (9) simultaneously secure an independent bottom (10) to the caseband (8) of the watchcase.

7. Watchcase according to any one of the preceding claims, characterized in that the glass (1, 27) consists of a transparent monocrystalline sapphire.

