

DESCRIPTION

The present invention relates to watches of the type having a case, a dial, hands as well as means for fixing the dial in the watch.

In conventional watches, the dial is of metal and generally has welded pins which engage in holes in the base plate and are secured to the latter by means of screws or dial screws. In this case, the decoration is achieved by means of appliques fitted in the metal. This metal, generally brass, can be coated with a layer of varnish or of another electrolytically deposited noble metal. Motifs such as the Trade Marks or the minute marks can be pad printed on the dial.

Dials of this type render it very difficult to make extensive use of colour.

Dials are also known which are executed in an aluminium sheet with the upper and lower surfaces plane and parallel. These dials, notably used in watches sold under the Trade Mark SWATCH (registered Trade Mark) are covered with a decoration in several colours by means of silk screen printing or transfer processes.

Patent application FR-2 212 573 discloses another solution in which several dials called respectively front, intermediate and base dials are stocked to enclose in a sandwich a photograph or other formed by the intermediate dial, whereas the front dial is transparent and exhibits indicators, in particular intended to provide time information, made by printing, cutting or engraving.

This arrangement comprises a dial made of an organic material and means to position the dial in the watch, said means comprising a first and a second part, the positioning first part which is axially, radially and angularly fixed and positioned in the case being intended to receive the second part which is engaged with the dial and associated to its periphery, whereas the second part provides an annular groove opening towards the hands axis. The first part comprises in addition an angular abutment engaged in the annular groove, to ensure the axial positioning of the dial, this angular abutment cooperating with at least an angular counter-abutment arranged on the second part.

Moreover, patent US-554 511 describes the mounting of a dial on a watch movement by the means of a metallic support element provided, on the one hand, with a peripheral edge maintaining the dial radially and, on the other hand, pins intended to be fixed directly on the movement.

Patent FR-1 338 863 discloses the mounting of a dial on support element of the above-mentioned type, through peripheral notches on the support element, receiving the corresponding pins of the dial.

It is also possible to make dials of organic materials, of plastics material, for example. This solution has hitherto only been used for inexpensive watches. It has, indeed, been found that this type of material lacks rigidity and that it is consequently easily deformed when certain parameters such as temperature or relative humidity change. Depending on the way

in which the dial is fixed, these deformations can cause disengagement of the hour wheel or even stripping of the hands.

It is an object of the present invention to enable the use of organic materials for the manufacture of dials without affecting the reliability of the watch.

According to the present invention therefore there is provided a watch comprising a case with a glass, a case band, a back, a movement, hands, a dial of an organic material and means for positioning the dial in the watch, these positioning means comprising a first and a second part, the first part which is fixed and positioned axially, radially and angularly in the case being intended to receive the second part which is integral with the dial and disposed at the periphery thereof, this first part defining an annular groove open towards the axis of the hands, said first part comprising at least an angular stop engaged in the annular groove to ensure axial positioning of the dial, this angular stop cooperating with at least an angular counter stop provided in the second part, this watch being characterized in that the first part of the positioning means cooperates with an organ, such as directly the glass or a ring forming, for example, a flange, to define the annular groove which opens towards the axis of the hands and in which the second part which is integral with the dial is freely engaged, while the angular stop and the angular counter stop of these positioning means cooperate with play, said positioning means providing a loose fitting of the dial to permit and absorb at least its radial deformation whilst still positioning the dial in the watch, both angularly and axially.

It has been found that the special configuration of the dial positioning means of the dial of the watch as claimed make it possible to eliminate any flexion of the dial, with the result that they allow for radial deformation whilst still positioning the dial precisely, both angularly and axially.

The use of organic materials for the manufacture of dials is an inexpensive solution which, moreover, opens up many new possibilities both from the aesthetic and technical point of view. Aesthetically it is thus possible to produce dials using photographic processes with very varied decorations, more so than is, for example, possible by silk screen printing. From the technical point of view, certain thin sheet organic materials, such as polyester for example constitute a carrier which is well suited for photographic emulsion and permit both sufficient rigidity to provide the necessary stability of shape to a dial and a flexibility permitting assembly line working, up to the operation of insertion into the watch. To this is added an economic advantage. The price of a dial manufactured as described above by photographic means is less than that of a dial made by a single silk screen printing process. Hitherto the manufacture of a fantasy dial required three to ten successive printing passes. Organic materials also make it possible to produce three dimensional dials by heat moulding, which is much more difficult to realise using metal dials.

The invention will be better understood from the following description, made with reference to the drawings in which :

- Figures 1 and 2 respectively represent sectional and plan views of a watch according to a first embodiment of the invention; and

- Figures 3 and 4 illustrate a watch according to a second embodiment of the invention, also in section and in plan.

In figures 1 and 2, it is shown a watch with a case 10, a movement 12, a dial 14 and hands 15.

The case 10, for example in aluminium alloy, has a back 16 and a case band 18 formed in a single piece, and a glass 20 engaged in the case band and resting against an annular planar surface 22 of this latter. The dial 14 is mounted on the movement 12 by means of a dial support 24. The latter is formed from a thin metal plate, for example of 0.15 mm thick steel, having bent parts.

More precisely, the support 24 has in its central part two tongues 26 extending perpendicularly to the plane of the watch towards the inside of the movement. These tongues 26 engage in holes 27 of the movement 12 which, in conventional constructions, are adapted to receive the pins of the dial. Only one tongue 26 and one hole 27 are shown in Figures 1 and 2.

In addition the periphery of the support 24 has four curved parts spaced evenly apart and extending towards the front of the watch to form the pins 28. The height of the pins 28 is slightly greater than the thickness of the dial 14. The latter has cut-away portions 30 into which the pins 28 engage to ensure the correct angular positioning of the dial 14.

The support 24 is accommodated in a hollow 32 of the case band with its periphery resting against the base 33 of the hollow 32. The support 24 also has a cut-away portion 34 provided in one of the pins 28 and into which penetrates a boss 36 projecting from the side 37 of the hollow 32 and integral with the case band.

A ring 38 is interposed between the glass 20 and the pins as a flange. In this manner, the support 24 is positioned and fixed radially by the side 37 of the hollow 32, axially by the base 34 and the ring 38 and angularly by the boss 36, whilst the dial 14 is positioned axially, with a little play, by the support 24 and the ring 38 which together define an annular groove opening towards the axis of the hands. In addition, the dial is also positioned angularly with a little play by means of the pins 28, these pins thus not interfering with radial deformation of the dial.

It is clear that in Figure 1 the space between the ring 38 and the dial 14 has been exaggerated in order to simplify study of the drawing.

Alternatively, the support 24 could be in a soft magnetic material thus functioning as a magnetic screen.

It should also be noticed that the support 24 thus serves as positioning means not only for the dial, but also for the movement 12 in the case 10. There is thus no need for a fitting ring.

The manufacture of the dials will be considered in greater detail below.

In the second embodiment shown in Figures 3 and 4 the watch has a case 40 forming a bottom plate into which are fixed different modules, schematically represented by 42. This case 40 comprises a case band 44 fabricated in one piece with a back 45 as well as a glass 46. A dial 48 covers the modules 42. The time is shown by means of hands 49.

The glass 46 and the case band 44 are made from materials capable of being thermowelded and are welded to one another. More precisely, the glass 46 has a rib 50 which engages in a groove 52 of the case band. During the welding operation, for example by means of ultrasound, the portion of the annular extremity of the rib 50 and the base of the groove 52 become hot and together form an area 54 ensuring the firm fixing of the glass 46 to the case band 44. In this area 54 the materials forming the glass 46 and the case band 44 flow into one another by the welding process.

The case band 44 has an annular hollow 56 the depth and diameter of which are slightly greater than the thickness and diameter respectively of the dial. Projecting from the base of the hollow 56 are two bosses 58 the height of which is equal to the depth of the hollow 56 and placed at 12 and at 3 o'clock.

The hollow 56 is covered by the glass 46, thereby defining an annular groove 57 in which the dial 48 is retained. The dial 48 also has two cut-away portions 60, each gripping one of the bosses 58 and extending radially towards the inside of the dial. These cut-away portions 60, in cooperation with the bosses 58,

angularly position the dial, but without preventing a radial deformation thereof.

The dial 48 situated in the hollow 56 is held in position axially by the base of the hollow 56 and the lower face of the glass 46.

Alternatively, the dial 48 can advantageously be fixed to the case band by a drop of glue. In this instance the case band need have only one boss 58. This drop of glue simplifies the assembly of the watch without preventing radial deformation of the dial.



CLAIMS

1. Watch comprising a case (10, 40) with a glass (20, 46), a case band (18, 44), a back (16, 45), a movement (12, 42), hands (15, 49), a dial (14, 48) of an organic material and means for positioning the dial in the watch, these positioning means comprising a first and a second part, the first part which is fixed and positioned axially, radially and angularly in the case (10, 40) being intended to receive the second part which is integral with the dial and disposed at the periphery thereof, this first part defining an annular groove (39, 56) open towards the axis of the hands, said first part comprising at least an angular stop (28, 58) engaged in the annular groove (39, 56) to ensure axial positioning of the dial, this angular stop (28, 58) cooperating with at least an angular counter stop (30, 60) provided in the second part, characterized in that the first part of the positioning means cooperates with an organ, such as directly the glass (48) or a ring forming, for example, a flange (38), to define the annular groove (39, 56) which opens towards the axis of the hands and in which the second part which is integral with the dial is freely engaged, while the angular stop (28, 58) and the angular counter stop (30, 60) of these positioning means cooperate with play, said positioning means providing a loose fitting of the dial to permit and absorb at least its radial deformation whilst still positioning the dial in the watch, both angularly and axially.

2. Watch according to claim 1, characterized in that said first part comprises a dial support (24) immobilized in the



case band and formed by a sheet of metal with, on its periphery, pins (28) extending axially in the direction of the glass and whose height defines the width of the annular groove (39), the ring (38) resting on the pins while it is retained by the glass (20), in that at least one of the pins constitutes the angular stop, and in that the dial comprises at least one cut-away portion (30) forming a counter stop cooperating with said stop.

3. Watch according to claim 1, characterized in that the case band (44) and the glass (46) are of thermoweldable plastics material and define the annular groove (56), and in that the angular stop is formed by a boss (58) integral with the case band (44), while the dial (48) has a cut-away portion (60) forming the counter stop, into which the boss penetrates.

4. Watch according to claim 3, characterized in that the dial (48) has two cut-away portions (60) angularly staggered at 90° from each other and in that the case band (44) has two bosses (58) each cooperating with one of the cut-away portions (60).

5. Watch according to claim 3, characterized in that the dial (14, 48) is further fixed to the case by means of a drop of glue diametrically opposed to the boss (58).

6. Watch according to any of claims 1 to 5, characterized in that the upper face of the dial (14, 48) is covered with a photograph.