

DESCRIPTION

The present invention concerns timepieces having special aesthetic effects which confer to them an original and attractive decorative aspect.

To bestow to timepieces an attractive and original aspect has been a constant care among watchmakers ever since horology came into existence.

Such care has been expressed over the course of epochs and in accordance with fashion through numerous variations in the choice of materials, forms and colours to fashion the various outer elements of timepieces or further in special arrangements of such elements relative to one another.

One has, for instance, in patent CH-30479, crafted a watch comprising a movement the balance wheel of which, normally invisible from the exterior of the watch, is located on the dial side and appears through an opening arranged in such latter at 6 o'clock in order to give the watch an unusual aspect.

In another type of watch called skeleton watch it has been conceived to render the entire movement visible after having provided the baseplate and the bridge of this latter with open work in order to render visible the parts normally hidden under these elements and thus to make apparent the complexity with which such parts are interlocked.

In contrast to these skeleton watches, there are the so-called mysterious watches and clocks which are timepieces whose back cover is as transparent as the watch glass and whose hands seem to rotate alone, without any movement driving them. The patent CH 24 680 partially discloses a timepiece of this type wherein the movement is arranged inside the minute hand.

It has also been proposed in patent CH 665 078 to craft a watch exhibiting special effects which consist in causing the periodic appearance of an image formed with the help of the indicating parts constituted for example by a concentrically arranged day disc and day of the month ring, on which the name and the numbers of the days are replaced by parts of the image and which form the dial of the watch.

Timepieces, such as watches or clocks, whose minute indicating member is formed by a disc which rotates both about itself and about the central axis corresponding to the hour hand and minute hand axis in classical timepieces, are also known. Timepieces of this type are disclosed for example in patent application WO 88/02 507 and in patent CH 676 074.

In patent application WO 88/02 507, the minute disc carries a minute scale and rotates, on the one hand, clockwise, about the central axis of a dial provided with an hour scale, at the rate of one revolution by 12 hours and, on the other hand, about itself, anticlockwise, at the rate of 11 revolutions per revolution about the axis of the dial. In this case, the timepiece does not comprise any hour indicating member, and the time is indicated by the point of contact between the minute disc and the hour scale on the dial.

In patent CH 676 074, on the other hand, the minute disc which completes one revolution in 12 hours, clockwise, and which carries only a minute index in the shape of an arrow, is mounted on an hour indicating member, formed by a disc or a ring, which also rotates clockwise, about an axis passing through its centre and identical to the central axis of a dial provided with an hour scale.

When the hour indicating member is a disc, the latter is affixed to the end of a shaft of the movement of the timepiece, the shaft extending through a central opening of the dial and being hidden by the hour disc which is above it.

On the other hand, the minute disc in this case is placed near the edge of the hour disc so that its centre can act as an index for indicating the time, the minute being given by the direction of the minute index.

When the hour indicating member is a ring, its inner edge is provided with a toothing which engages a gear-wheel affixed to the end of a shaft of the movement and the hour is then given by an index born by the upper face of this ring, which rotates about a circular dial affixed to the inner face of the glass of the timepiece. In this case, the minute disc, which again indicates the minute via the direction of its index, can be placed, for example, approximately equidistant from the outer and inner edges of the hour indicating ring, and be located at the periphery of the timepiece movement.

Whatever the shape of the indicating member, the minute disc is affixed to the end of a shaft which passes through this member and which carries, at its end, a pinion which engages a fixed gear wheel having an axis identical to the axis of the hour disc or ring driving shaft.

Moreover, the hour and minute indicating members and the parts which drive them are mounted on bearings to reduce the friction.

Finally, among the timepieces which exhibit special effects, one can also mention those which include inside their case one or more elements which have no relation with the indication of the time. This is for example the case of the watch disclosed in patent US 4 734 895 which comprises a support arm for a decorative element which radially extends from the central axis and which is rotatably mounted about this axis so that the decorative element such as a diamond can freely rotate in a zone located at the periphery of the dial.

The applicant proposes to bring a new way to add, in a timepiece, a touch of attraction and originality unusual in timekeeping functions.

The invention therefore concerns a timepiece identical to that of patent CH 676 074, i.e. a timepiece which comprises a case provided with a crystal, a movement surmounted by a dial placed in a housing of the case and at least one indicating element, said movement itself comprising a baseplate, motor means, driving means intended to drive said indicating element, a gear train comprising at least one wheel coupling said driving means to said motor means, an oscillating system to regulate the movement of the gear train and a support element driven in rotation in the vicinity of the edge of said baseplate and bearing at least one element of the timepiece visible from outside of the latter.

In conformity with the invention, the element of the timepiece which is borne by the support element is a constituent part of the movement and not an indicating element as is the case in the timepiece disclosed in patent CH 676 074.

Thanks to this feature, a constituent part of the movement, which is normally fixed above the baseplate, can be animated thereby conferring on the timepiece in which it is intended to be installed, a particularly original aspect without such feature having a damaging effect on the operating precision of the movement.

According to a preferred embodiment of the invention, the movement is a mechanical movement and the support element bears the oscillating system, such latter comprising a regulating element and an escapement.

Utilization of a mechanical movement enables conferring to already moving elements, in the case at hand the oscill-

ating system, a supplementary mobility of a type such that the animation effect of such element is accentuated.

According to an advantageous characteristic of the invention, the support element has a generally planar form and comprises a central cavity provided on its edge with teeth through which it is driven.

Other characteristics and advantages will appear upon reading of the description which follows of an embodiment of the invention, given by way of illustration and not intended to be limiting, in connection with the attached drawings, in which :

- Figure 1 is a top view of an embodiment of a wristwatch equipped with a timepiece movement according to the invention;

- figure 2 is a partial cross-section of a wristwatch along line II-II of figure 1 showing the manner of assembling and driving the support element; and

- figure 3 is a top view, partially stripped, of an embodiment of the timepiece movement according to the invention, the dials and hands having been omitted.

Referring initially to figures 1 and 2, there is seen a timepiece, here a wristwatch, designated by the general reference 1, and equipped with a timepiece movement 2 according to the invention. While retaining similar dimensions, such timepiece could be a pocket watch or a pendant watch.

Such timepiece comprises a case 4 exhibiting, in a known manner, a caseband 6 closed by a back cover 8 and by a crystal 10 in order to define a housing 12. The movement 2, housed in housing 12, is surmounted by a dial 14 and two indicating elements, respectively for hours 16 and minutes 18.

The movement 2 comprises in a standard manner a baseplate 20 on which are mounted motor means 22, an oscillating system 24 and driving means 26, 27 for the indicating parts 16 and 18 formed respectively by the hours pipe and the cannon pinion. Furthermore, the movement comprises a gear train 28 coupling the motor means 22 to the driving means 26, 27 and of which only the wheels and pinions necessary for understanding the invention have been shown. The movement also comprises a standard winding and time setting system of which only a crown 30 is shown.

In the embodiment shown, the motor means 22 are formed by a spring (not shown) and enclosed in a barrel. Such barrel is housed in a cavity 32 provided in the baseplate 20 and is mounted between the bottom of such cavity 32 and a barrel bridge 34. Such barrel comprises a drive wheel 36 which forms a first wheel of the gear train 28. Such wheel 36 is in mesh with a center pinion 38 which itself bears a center wheel 40. The center wheel 40 which furthermore bears indirectly the minutes indicating element 18, meshes with a reduction pinion 42. This latter bears a reduction wheel 44 which meshes with an entry pinion 46. Such pinion 46 also bears an entry wheel 48 meshing indirectly with the oscillating system 24 which is to be described in greater detail hereinafter.

It will be noted that all these pinions and wheels are pivoted in a known manner between stones provided respectively in recesses in the baseplate and bridges (not shown).

According to the invention, the movement furthermore comprises a support element 50 intended to support at least one element making up the movement. In the described embodiment, the element making up the movement, which is borne by the support element 50, is the oscillating system 24. Such support element 50 has a generally planar

form and shows a cavity 52 in its central portion. The support element 50 is mounted substantially at the surface of the baseplate and is driven in rotation in the vicinity of the edge of this latter by the entry wheel 48 which meshes with interior teeth 54 provided on the edge of the cavity 52.

As is clearly seen from figures 1 and 3, such support element 50 has the form of a star comprising three branches 56, 58, 60 extending at 120° relative to one another and one 60 of which bears the oscillating system 24. The other two preferably bear compensating masses 62. Such compensating masses are selected and arranged in order to balance the oscillating system and may for instance take the form of decorative objects.

As is well understood, the support element may assume any other form as long as it maintains a generally planar form. According to one variant, one could provide the use of a support element having the form of a simple ring, or yet of a star comprising any number of branches. It is self-evident that whatever be the form of the support element 50, this latter will be balanced by means of compensating masses chosen and arranged in an appropriate fashion.

Referring now more particularly to figures 2 and 3, it is seen that each branch of the support element 50 rests on the baseplate 20 through a roller 64 which runs on a circular track 66 extending entirely over a diameter of the baseplate. This track 66 is formed by a polished ring of hard material, for example tempered steel, inset in the base 68 of a circular cup-formed part 70 hollowed out in its center. Such cup is fixed to the baseplate. Each branch also comprises two other rollers 72, 74 respectively running on roller tracks 76, 78 inset in the interior wall 80 of the cup 70 and a flange 82 extending

perpendicular to the wall and towards the interior of the cup. The rollers 64 and 72 bring about the axial guiding of the support element 50 at the surface of the baseplate and the rollers 74 bring about radial guidance.

It is self-evident that such rollers may be replaced by other guide means and by way of example the person skilled in the art could provide the use of ball-bearings or the like.

The oscillating system comprises essentially a regulator 84 and an escapement 86. The regulator 84 comprises in a standard manner a balance wheel 88, a balance spring 90 mounted on a balance staff 92 which is pivoted between two stones, respectively provided in the upper surface of the branch 60 and in a bridge 94 secured onto such branch. Bridge 94 also bears an index 96 provided with index pins.

It will be noted that the balance wheel extends substantially in the plane of dial 14 so that it is at a small distance from the crystal and better visible through the latter.

Furthermore, an anchor 98 pivoted between branch 60 and a bridge 100 secured to this latter cooperates on the one hand with the balance staff 92 and on the other hand with an escapement wheel 102. The escapement wheel 102 is borne by an axis 104 also pivoted between branch 60 and bridge 100. Such axis 104 also bears an escapement pinion 106, this latter and the escapement wheel extending on either side of the plane of branch 60 in a manner such that wheel 102 is found above branch 60, that is to say, in the direction of the side of crystal 10 and pinion 106 is located below branch 60, that is to say in the direction of the side of baseplate 20. The pinion 106 meshes with a toothed ring 108 fixed to the baseplate.

Thus, in contrast to traditional movements in which the entry wheel generally called seconds wheel meshes directly with the escapement pinion, the entry wheel 48 meshes, in accordance with the invention, with teeth 54 in order to drive the support element 50 in rotation around the center of the movement. This rotation of the support element 50 enables the escapement pinion 106 to roll on the toothed ring 108 and thus to provide the necessary force to the balance wheel through the escapement wheel 102 and anchor 98 in order that it may oscillate.

In providing the gear train 28 and toothing 54 with an appropriate number of teeth, the support element 50 bearing the oscillating system 22 may be animated with rotational movement around the chapter ring of the watch at a rate of one revolution per minute so that, in addition to the attractive decorative effect given by the mobility of the oscillating system around the dial, such support element advantageously indicates seconds.

In the embodiment which has just been described, the timepiece comprises a single barrel, but it is well understood that it may comprise two if such would appear necessary, for example if the energy provided by a single barrel is insufficient to drive the support element equipped with the oscillating system and the compensating masses.

As is well understood, the invention is not limited to the embodiment which has just been described and one may provide for example the use of this same concept with an electro-mechanical timepiece movement. In such embodiment the rotor of an electric motor may be pivoted in one branch of the support element 50, such same branch forming the stator of the motor and bearing the windings, while the other two branches of the support element bear respectively the power cell and the circuit providing the time base. Connection tracks between the different elements

borne by the support element may be formed on this latter in a manner such that the entire electrical part of the movement is borne on the mobile portion of the system. In such case, the axis of the rotor furthermore bears a wheel which meshes with a toothed crown fixed to the baseplate, while the interior teeth of the support element drive a wheel pivoted on the baseplate which wheel drives in turn a gear train coupled to the driving elements for the indicators.

It will be noted furthermore that the support element 50 and the bottom of the cup 70 of the movement described hereinabove exhibit in an advantageous manner smooth visible surfaces which may be easily decorated. One may for instance engrave them, enchase them or indeed provide them with precious stones by setting.



CLAIMS

1. Timepiece comprising a case (4) provided with a crystal (10), a movement (2) surmounted by a dial (4) placed in a housing (12) of the case and at least one indicating element (16, 18), said movement comprising itself a baseplate (20), motor means (22), driving means (26, 27) intended to drive said indicating element, a gear train (28) comprising at least one wheel coupling said driving means to said motor means, an oscillating system (24) to regulate the movement of the gear train and a support element (50) driven in rotation in the vicinity of the edge of said baseplate and bearing at least one element of the timepiece visible from outside of the latter, said timepiece being characterized in that the element of the timepiece borne by said support element (50) is a constituent element of said movement.

2. Timepiece according to claim 1, characterized in that said movement (2) is a mechanical movement and in that the support element (50) bears said oscillating system (24), which comprises a regulating element (84) and an escapement (86).

3. Timepiece according to one of claims 1 or 2, characterized in that said support element (50) has a generally planar form and comprises a central cavity (52) provided on its edge with teeth (54) by which it is driven.

4. Timepiece according to claim 3, characterized in that said escapement (86) exhibits an escapement pinion (106) which rolls on teeth (108) which are at least indirectly united with said baseplate (20).

5. Timepiece according to claim 3, characterized in that said support element (50) has the general form of a star, one (60) of the branches of which bears said oscillating system (24).



6. Timepiece according to claim 5, characterized in that the branches (56, 58) not bearing the oscillating system (24) bear compensating masses (62).

7. Timepiece according to any one of the preceding claims, characterized in that said movement (2) further comprises guiding means (64, 66, 72, 74, 76, 78) for said support element (50) on said baseplate (20).

8. Timepiece according to claim 7, characterized in that said guiding means comprise rollers (64, 72, 74) mounted for rotation in the support element (50), the rollers running on circular guide tracks (66, 76, 78) provided on said baseplate (20).

9. Timepiece according to claim 7, characterized in that said guide tracks (66, 76, 78) comprise a ring of hard material inset into said baseplate (20).

10. Timepiece according to one of claims 2 to 9, characterized in that said regulating element (84) comprises a balance spring (90) and a balance wheel (88) and is mounted for rotation between two pivots respectively provided in a branch (60) of said support element (50) and in a bridge (94) extending from such branch.

11. Timepiece according to claims 3 and 10 in which said escapement (80) is provided with an anchor (98), characterized in that said anchor (98), the escapement wheel (102) and the escapement pinion (106) are pivoted on said branch (60) bearing said oscillating system (24).

12. Timepiece according to claim 11, characterized in that said escapement wheel (102) and said escapement pinion (106) extend on either side of said plane of the branch (60) bearing said oscillating system (24).



13. Timepiece according to any one of claims 3 to 12, characterized in that said dial (14) extends substantially above and beyond said central cavity (52) of said support element (50).