

MECHANISM FOR DISPLAY OF ANIMATED DRAWINGS, FIGURES OR SIGNS
ON A TIMEPIECE DIAL

The object of the invention is a mechanism for display of animated drawings, figures or signs on a timepiece dial.

For a number of years, "novelty" models (of a "fun" or psychedelic nature) have existed on the watch market, including certain Swatches or Silberstein watches or the Opus III by Harry Winston.

All of these timepieces present the particularity of being original and in line with a fashion mood, but in general their major fault is difficulty in reading the time.

The display mechanism according to the invention can equip a manual winding, automatic, quartz or autoquartz basic movement and presents the particularity of animating the dial of the watch by reconstituting a given pattern for a chosen period (from one minute to 24 hours).

The additional mechanism for display of animated drawings, figures or signs on a timepiece dial is characterised in that it comprises at least one toothed wheel placed under an opening of a dial of a timepiece and driven by means of a mobile which is itself linked with the basic

movement of the timepiece, the toothed wheel being surmounted by a small plate carrying a drawing, a figure or a sign designed to be animated in relation to the dial.

According to one mode of execution, the mechanism comprises several toothed wheels linked with each other or controlled separately or in groups.

The mechanism may comprise a first series of 12 toothed wheels placed on the outer part of the mechanism and second series of 6 toothed wheels placed between the centre of the dial and the first series of 12 toothed wheels.

In a preferred mode of execution, the small plates surmounting the toothed wheels are disks designed to rotate in a corresponding opening of the dial. The disks may be positioned at the same level as the dial or positioned to stand out with respect to the level of the dial or inlaid under the dial.

The mechanism may be constructed to animate at least one or several groups of disks. The disks are generally used to animate a design or an image. They may however, in a variant, animate the hour, the minute, the month, the days of the week, the seasons, the equinoxes, the solstices, day and night, etc.

The drawing represents, as an example, a mode of execution of a mechanism for display of animated drawings, figures or signs on a timepiece dial, the object of the invention.

In the drawing:

- figure 1 is a schematic top view of the mechanism,
- figure 2 is a top view of the mechanism, the dial of the mechanism having been equipped with figures to be animated,

- figure 3 is view similar to that in figure 1, the mechanism having been placed in animation,
- figure 4 is a top view of the drive device of a mechanism as shown in figures 1 to 3,
- figure 5 is a cross section along the line $\underline{V} - \underline{V}$ in figure 4.

The mechanism shown in the drawing is presented in the form of an additional module which can equip timepieces, notably a manual winding basic movement, an automatic movement or a quartz or autoquartz movement. It presents the particularity of animating the dial of the timepiece by reconstituting a given pattern or drawing for a period chosen beforehand, for example one minute, one hour or 12 or 24 hours.

Fig. 1 explains the layout of moving parts of the dial. This layout is not exhaustive and may be modified at will, but the figure represents an example of a drawing, made in accordance with the quantity of possible dial designs.

The mechanism (1) consists of twelve disks (2) distributed uniformly on the minute track of a dial (3) and placed midway between the positions of the hour pointers. Alternatively, the position of the disks (2) could coincide with the point at which the pointers indicating the hours are usually located.

An additional series of six disks (4) of the same diameter as the disks (2) are distributed concentrically around the dial (3) and positioned at an angular half-pitch value with respect to the first series of twelve disks (2). All of the disks (2 and 4) will be driven by the mechanism as described below and the disks (2 and 4) will be placed in corresponding openings in the dial (3), so that they are in the same plane as the dial (3).

When the mechanism (1) drives the disks (2 and 4), the uncut part of the dial (3) retains the decoration in a fixed way; the 18 disks, for their part, may be animated in rotation at a speed chosen between less than a minute and more than a day (fig. 2 and 3). The image represented in figure 2 is thus broken up and it is reconstituted after a certain period of time to return to the drawing in Fig. 2.

In the case cited above, the disks (2 and 4) are trailing, that is to say they move in a linear fashion, forming the drawing on the dial progressively without ever really stopping on the image. The mechanism (1) can however be constructed to pause on the reconstituted image. In addition, a disk or a series of disks (2 and 4) can be driven independently from the others, so as to obtain special visual effects during the partial or complete reconstitution of the image.

The mechanism carrying the disks (2 and 4) is represented in Fig. 4 and functions as follows: The wheel or mobile (10) is attached to a mobile which is part of the basic movement of the timepiece which is fitted with the additional mechanism (1), like for example the hour wheel of a basic calibre or its minute wheel work, or any other mobile.

The mobile (10) rotates in the clockwise direction and meshes directly with a mobile (11) which rotates in the anti-clockwise direction. The latter drives a wheel (12) in the clockwise direction. The wheel (12) is identical to the other 17 wheels (12 and 13) composing the mobile (18 including it). These 18 wheels successively represent the 6 inner wheels (12) and the 12 outer wheels (13). Each of these wheels carries a disk (2, 4). These disks are visible on the dial side and give by their movement the desired animation on the dial side. In our case, it is an added patch which has a disk effect and which is attached to these wheels (12, 13). As can be seen in the drawing, these wheels (12, 13) have the same diameter. The wheel (12)

rotating in the clockwise direction is positioned at the same height level as the other 5 wheels (12) in its group, causing the mobiles to rotate alternately in the clockwise and anti-clockwise direction. The number of wheels in the group being even, this enables the last wheel to mesh with the first wheel without blocking it as it is rotating in the opposite direction. These 6 wheels can therefore be driven by any one of these 6 wheels. In other words, the pinion (11) may be located angularly all around the mobile (10) in such a way as to mesh with one of the 6 wheels (12).

The 12 outer wheels (13) of the same diameter as the 6 wheels cited above are positioned at a different height so that the teeth of these wheels do not touch the lower wheels (12). The pinion (14) acting on 2 different heights receives its speed of rotation from the group of 6 wheels and redistributes it to the group of 12 wheels. This pinion (14) may be positioned at any point provided that its pitch diameter is tangent to a wheel in the inner group and tangent to a wheel in the outer group. The number of wheels in the group of 12 being even, the direction of rotation of the mobile is alternately clockwise and anti-clockwise, therefore allowing the describing of a loop without stopping the mobiles.

Figure 5 shows the two levels of meshing of the group of 6 wheels and the group of 12 wheels. It represents a cross section between an inner wheel (12) and an adjacent outer wheel (13). We notice in the cross section in fig. 5 the two level heights between the inner wheels (12) and the outer wheels (13). On these wheels (12 and 13) are placed patches (not shown) representing the disks in figs. 1 to 3.

The mechanism represented in the drawing may comprise an impulse device (not shown) constructed to move the disks (2 and/or 4) in jerks of 30° for example on each jump. It would thus be possible to indicate the time using the 12 disks (13); the design or image placed on the disks (13) would then be the succession of numbers representing the twelve hours and the

image would thus be broken up with the exception of a single disk indicating the time. The movement (successive recomposing of the numbers) is timed by the impulses received by the centre mobile of our module when it is assembled on a jumping hour movement or module. The jumping hour movement or module inevitably contains an hour wheel which jumps, as its name suggests, from hour to hour, making jumps of 30° .

The advantage of this arrangement is that it is possible to indicate the time without an hour hand if desired, the number representing the current hour being recomposed in one go and remaining displayed for a full hour.

Reading of the time becomes easier than in the case of a trailing mechanism like the previous one, but another advantage is that it is possible to use the hour hand of the basic mechanism, for two purposes:

- to allow easy standard reading of the time;
- to use this hour hand or the number (according to the choice or the taste of the final wearer) as a second time zone.

The hour hand can be replaced by a transparent disk (sapphire disk) comprising a translucent area of a different colour so as to indicate the place at which the recomposed number must be read, thus facilitating quick reading of the time.

The mechanism which has just been described in figures 1 to 5 of the drawing offers the following possibilities:

- The disks (2 and 4) may or may not appear on the dial, that is to say that it is possible to move only one of them or a desired number between 1 and 18 or several groups of disks.
- The disks (2 and 4) are or are not positioned at the same level as the level (0) of the dial (they may stand out or be inlaid).
- The design or the decorations of these dials may or may not represent a coherent design.
- The disks (2 and 4) may be treated galvanically or by all currently known means of dial decoration, i.e. mounted, jewelled, engine-turned, transferred; engraved, cut, etc.
- The disks (2 and 4) may all be identical transfers or they may be different, grouped by type or not.

The mechanism is constructed to perform the action of disassembling and reconstituting a single design, sign or logo or several designs, signs and logos on the same dial.

The mechanism may control the 12 outer disk (2) in one of the ways cited above, but rotate the 6 inner disks (4) (or only one of these disks) at a speed different from that of the 12 outer disks (2), so as to indicate for example AM/PM by means of coloured disks alternately representing day and night.

The mechanism has the possibility of added to a mechanism with a tourbillon carriage or any other mechanism implying that one or more disks are not used. For example, 8 disks may be removed to allow the tourbillon carriage to pass through.

With regard to the materials used: Depending on the range and quantity of the parts manufactured, the components forming the mechanism (dials, disks (2 and 4), wheels (12, 13), etc.) may be made of machined or injected synthetic materials or machined or injected metal.

According to a preferred mode of execution, the mechanism cited as an example has an external diameter of 30 mm and contains disks visible on the dial side with a diameter of 5.7 mm. The dial has a thickness of 0.4 mm.

Obviously, for the same principle used in a smaller-sized watch, for example a ladies' watch, or a watch of intermediate size, the dimensions of the dial and the disks will be different.

Finally, the number of these disks may vary between 1 and 50.

The mechanism may furthermore be used for larger timepieces (ranging from small clocks to floral clocks in squares in large towns).

The series of 6 inner disks (4) may be replaced by 7 disks which indicate the day of the week (Monday to Sunday) and the series of 12 outer disks (2) would indicate the months and the transfer or design of the dial which could comprise the four seasons, the equinoxes and the solstices, etc.

According to a variant of the mechanism, it is possible cover the gears of the 18 mobiles (12, 13) of the module shown in Fig. 4 with a plate. This plate then comprises 18 holes of small diameter positioned on the axes of rotation of the 18 wheels enabling pins to come out through the holes to move objects attached to their end. These objects may take the form of

small plates of various shapes (all possible geometrical shapes) with the aim either of animating parts in three dimensions or using them as “covers” for the lower plate.

These shapes may give the impression of being actuated by each other. For example, with half-circles alternately showing “hearts” and “spades”, the whole dial can be decorated alternately with “hearts” and “spades”.

These parts added at the end of the pins may be shapes capable of passing from one part to another a precious stone mounted in a cylindrical cap so that this stone indicates the minute. If 12 disks complete one revolution in 10 minutes, or one half-turn in 5 minutes, they carry the stone from one module to another along a gallery milled in the basic dial in 12×5 minutes = 60 minutes.

Finally, it is possible for the disks required to be rotated not to be located in the same parallel plane as the plane in which the hours and minutes are indicated. For example, it is possible to imagine a conical bezel with disks arranged in a circular fashion in the plane of the cone and, in order to operate the small disks in another plan, their being linked with a carbon fibre cable or equivalent.

CLAIMS

1. Mechanism for display of animated drawings, figures or signs on the dial of a timepiece having a basic movement comprising at least a first series of toothed wheels, each of said wheels of said first series of toothed wheels being placed under an opening of the dial and carrying a small plate located above the dial and bearing a drawing, figure or sign to be animated in relation to the dial; characterised in that each of said toothed wheels of said first series of toothed wheels meshes with two adjacent toothed wheels of said first series of toothed wheels to form a continuous closed gear train and in that one of said toothed wheels of said first series of toothed wheels is driven by a mobile which itself is driven by the basic movement of timepiece.
2. Mechanism as claimed in claim 1 characterised in that it further comprises a second series of toothed wheels, each of said wheels of said second series of toothed wheels being placed under an opening of the dial; and each of said toothed wheels of said second series of toothed wheels meshing with two adjacent toothed wheels of said second series of toothed wheels to form a second continuous closed gear train; and each of said toothed wheels of said second series of toothed wheels carrying a small plate located above the dial and bearing a drawing, figure or sign to be animated in relation to the dial; and one of said toothed wheels of said second series of toothed wheels meshing with a mobile meshing with one toothed wheels of the first series of toothed wheels.

3. Mechanism according to claim 2 characterised in that one of said series of toothed wheels comprises twelve toothed wheels and is located on the outer part of the mechanism.
4. Mechanism according to claim 3 characterised in that the other of said series of toothed wheels comprises six toothed wheels and is placed between the center of the dial and the one series of toothed wheels.
5. Mechanism according to claim 3 or 4, characterised in that the small plates surmounting the toothed wheels are disks designed to rotate in a corresponding opening in the dial.

6. Mechanism according to claim 5, characterised in that the disks are positioned at the same level as the dial.
7. Mechanism according to claim 5, characterised in that the disks are positioned to stand out with respect to the level of the dial or be inlaid under the dial.
8. Mechanism according to claim 5, characterised in that the mechanism is constructed to animate at least one or several groups of disks.
9. Mechanism according to claim 5, characterised in that the disks are used to display any chosen design, image or sign, or the hour, the minute, the month, the days of the week, the seasons, the equinoxes, the solstices, day and night etc.
10. Mechanism according to claim 1 or 5, characterised in that the disks and the dial are treated galvanically or are mounted, jewelled, engine-turned, transferred, engraved, cut, etc.
11. Mechanism according to claim 1 or 5, characterised in that it is constructed to drive the small plates or the disks at constant speed.
12. Mechanism according to claim 5, characterised in that it is constructed to drive the small plates or the disks in jumps corresponding to an instantaneous angular movement of, for example, 30°.

13. Mechanism according to claim 5, characterised in that the dial has a diameter of 30 mm, the disks visible on the dial side having a diameter of 5.7 mm and the dial having a thickness of 0.4 mm.
14. Mechanism according to claim 5, characterised in that it is produced with its components, its disks and its dial made of injected or machined synthetic material or injected or machined metal.
15. Mechanism according to claim 5, characterised in that the dial and its disks present one or several designs or logos.
16. Mechanism according to claim 1 or 5, characterised in that the small plates are disks, hearts, spades, clubs, etc., or are fitted with precious stones or decorations.