

Analogue display device

This invention relates to an analogue display device on a previously chosen course. The analogue display device is usually in the form of an additional module cooperating with an existing calibre. The device or module has the specific
5 feature of changing the indication of the minutes on the dial. The minute hand moves along a previously defined path or track printed on the dial.

The device according to the invention, comprising an indicator for a value to be displayed mounted on a rotary
10 staff, is characterised in that it comprises controls for the indicator arranged in such a way that its free end follows the course chosen in accordance with the rotation around the staff.

According to a first embodiment, the indicator controls
15 may comprise a longitudinal groove sliding on two pins mounted on a guide arm, which itself is attached to the rotary staff.

The indicator controls may comprise a transverse groove guided by a pin mounted on an arm kinematically linked to the guide arm.

20 According to a second embodiment, the indicator controls comprise a pinion comprising partial toothing that meshes with toothing placed inside a recess made in the indicator, running on from the longitudinal groove.

The toothing may comprise two facing sections placed on
25 either side of the recess, the pinion meshing with the two facing sections of the toothing one after the other and thus causing a to-and-fro motion of the indicator of the value to be displayed.

According to a preferred embodiment, the indicator of the value to be displayed is a hand.

The analogue display device on a previously chosen course is usually mounted on a timepiece.

5 As a variant, the device may be used to indicate any specific value in any technical field, such as temperature indication, electric voltage or current indication, size indication, capacity indication, etc.

10 The drawing shows, as an example, several embodiments of the analogue display device according to the invention.

In the drawing:

figure 1 is a schematic view of an analogue display on a conventional watch around a circular track,

15 figure 2 is a schematic view of a first embodiment of an analogue display around an oval track,

figure 3 is a top view of a hand used to achieve the display shown in figure 2,

figure 4 is a view of the mechanism designed to drive the hand in figure 3,

20 figure 5 is a view showing the operation of the mechanism in figure 4 when the hand in figure 3 is being driven,

figure 6 is a cross-section through the drive staff of the hands in the mechanism in figures 2 to 5,

25 figures 7 to 10 show variants of hands or tracks of the device,

figure 11 is a view of a second embodiment of an analogue display around an oval track,

figure 12 is a view, on an enlarged scale, of the display hand in figure 11,

figure 13 is a similar view to the view in figure 12, showing the end and beginning of the meshing of the hand, and

5 figure 14 is a view of the embodiment in figure 11 around a diamond shaped track.

Figure 1 shows a conventional watch 1 on which the minute hand 2 travels in a circular motion. The free end of the hand 2 thus covers a circle 3, in such a way as to follow the course or track of the minutes shown on the dial.

In the embodiment shown in figure 2, the free end or tip of the minute hand 4 travels in an oval 5 that represents the chosen course or track printed on the dial 6. It will be obvious to a person skilled in the art that the minute hand 4 is shown as an example, and that the hand 4 could be the hour hand, the second hand, or an indicator for any other information, such as the day, month, year, etc.

The hand 4 shown in a top view in figure 3 has two grooves 7 and 8. The groove 7 may have a configuration chosen depending on the path that the end of the hand 4 is supposed to follow, and the groove 8 is a longitudinal groove along the axis of the hand.

The hand 4 is driven by an additional device or module mounted on a timepiece (not shown). The additional device or module, which will be described below with reference to figure 6, comprises two arms 9 and 10 (figure 4) assembled one on top of the other at the centre of the movement of the timepiece.

The arm 9 completes one full rotation per hour and is attached to the hour indicator on the timepiece, and the arm 10 is also driven by the hour indicator in such a way as to complete two full turns per hour. Pins 11, 12 and 13 are driven into the arms 9 and 10, and the hand 4 is placed on the arms 9 and 10, in such a way that the groove 7 coincides with the pin 13, with the groove 8 being positioned by the pins 11 and 12. Thus, the groove 8 is used to guide the minute hand and make it complete one turn in one hour. The pin 13 driven into the arm 10 is used to guide the hand 4 along an ovoid path.

Thus, as shown in figure 5, the path of the hand 4 on the dial is defined by the rotating speed of the arm 10 relative to the arm 9, and by the shape of the groove 7. The groove is used to refine the curve of the route of the track, depending on the shape of the groove. It can be straight or curved.

For the case in point, it was decided that the arm 10 should rotate twice as quickly as the arm 9, as the aim is for the hand to be larger at midday and six o'clock, and smaller at three o'clock and nine o'clock.

Figure 6 shows a cross-section of the control mechanism for the hand 4 in figures 3 to 5.

The indicator hand 4, in this case the minute hand, is positioned right at the top of the stack in the mechanism in figure 6. A wheel 14 is attached to the cannon-pinion of the base calibre 15, and therefore completes one turn per hour. The pinion 16 and the wheel 17 form a gear that allows for the speed of the wheel 18a to be increased. In the case in point, two turns per hour for an oval. The arm 9, which drives the

hand 4, is pushed onto the wheel 18a. Then, to drive the arm 10 that completes two turns per hour, a single gear 18 is installed between the wheels 14 and 19. Arm no. 3 therefore completes two turns per hour.

5 The hour hand is pushed onto the hour wheel 19. The mechanism described above is mounted on a plate 20 that is placed on the base calibre or the timepiece.

 The hand 4 may be different shapes, for example the shape shown in figure 7. As a general rule, the shape of the hand 10 will be determined by the constraint caused by the presence of the necessary hand controls, in particular the two grooves 7 and 8 (figure 5). Moreover, the path followed by the free end of the hand can also be chosen in line with artistic or practical criteria to suit the shape of the timepiece. The 15 path of the free end of the hand shown in figure 8 is an example. In this case, the arm 10 (figure 5) rotates three times as quickly as the arm 9. In the example in figure 9 or 10, the arm 10 completes four full rotations to one rotation completed by the arm 9.

20 The example in figure 10 can be applied to the production of a square watch, as can the example in figure 9, for which the entire device must simply be rotated by 45° relative to the timepiece.

 The second embodiment of the analogue display device 25 shown in figures 11 to 14 comprises a dial 21 on which a previously chosen course or track 22 is printed. In figure 11, the track 22 is an oval shape. It may however be any other

shape, for example square, and the display component 23 may be an hour, minute or second hand or any other indicator.

The device in figures 11 to 13 is made up principally of three parts:

- 5 A hand 23 containing rack tothing 24;
- An arm 25 guiding the hand and its two pins 26 and 27;
- A partly toothed pinion 28.

10 The two pins 26 and 27 designed to guide the hand 23 are driven onto the arm 25. The inside of the hand 23 comprises the tothing 24. The pinion 28 placed at the centre of the calibre comprises partial tothing 29. It rotates clockwise, meshing with the tothing 24 on the hand 23. To obtain an oval shape as shown in figure 14 with the mechanism described
15 above, the path of the hand is defined by the rack 24 used. The device described can also be oriented by 360° relative to the base calibre.

The device in figures 11 to 13 operates as follows:

20 Once the pinion 28 reaches the end of its travel with the right-hand part of the tothing 24 (figure 13), it meshes with left-hand part, and so on. The hand 23 therefore moves to-and-fro between its maximum position and its minimum position. Figure 13 shows the minimum position of the hand. In the case in point, it is located at 3 o'clock or 9 o'clock.

25 The path of the hand 23 is defined by the rotating speed of the pinion 28 relative to the arm 25. If the pinion 28 moves twice as quickly as the arm 25, the result will be an oval (figure 11), whilst if it moves four times more quickly,

the path will be virtually square (figure 14). It must be noted that these paths cannot be changed by varying the shape of a part. Only the speed of the mobiles 25 and 28 can be acted upon. The shape of the pinion cannot be changed given
5 that it meshes with the rack 24 on the hand 23. If the number of teeth is changed, this simply results in better meshing, and not in any change in the track of the hand.

CLAIMS

1. Analogue display device on a previously chosen course,
comprising an indicator for a value to be displayed
5 mounted on a rotary staff, characterised in that it
comprises controls (7, 8, figure 3; 24, 29, figure 12)
for the indicator arranged in such a way that its free
end follows the chosen path in accordance with the
rotation around the staff.
- 10 2. Device according to claim 1, characterised in that the
indicator controls comprise a longitudinal groove (8,
figure 3) sliding on two pins (11, 12, figure 3; 26, 27,
figure 12) mounted on a guide arm (9, figure 4 and 25,
figure 12), which itself is attached to the rotary staff.
- 15 3. Device according to claim 2, characterised in that the
indicator controls comprise a transverse groove (7,
figure 3) guided by a pin (13, figures 4 and 5) mounted
on an arm (10, figure 4) kinematically linked to the
guide arm (9).
- 20 4. Device according to claim 2, characterised in that the
indicator controls comprise a pinion (28, figure 12)
comprising partial toothing (29) meshing with toothing
(24, figures 12 and 13) placed inside a recess made in the
indicator, running on from the longitudinal groove.
- 25 5. Device according to claim 4, characterised in that the
toothings (24, figure 12) comprises two facing sections
placed on either side of the recess, the pinion (28)
meshing with the two facing sections of the toothing (24)

one after the other, and thus causing a to-and-fro motion of the indicator for the value to be displayed.

6. Device according to claim 1, characterised in that the indicator for the value to be displayed is a hand
5 (figures 11 to 14).
7. Use of the display device according to any one of claims 1 to 6, characterised in that the device is mounted on a timepiece.
8. Use of the display device according to any one of claims
10 1 to 6, characterised in that the device is used to indicate any specific value in any technical field, such as temperature indication, electric voltage or current indication, size indication, capacity indication, etc.