

"TIMEPIECE"

The present invention relates to a timepiece of the kind having at least one mobile decoration or ornament.

5 A timepiece, e.g. a dove clock, is known having a casing from which a dove or other decoration or ornament appears from a door which opens at every hour.

Similarly, a so-called "karakuri" or puppet clock is known having decorations such as dolls which are rotated during the playing of a melody by an orgel or music box.

10 In recent years, moreover, full-scale puppet clocks have become popular. This type of clock is used to attract the attention of customers in public facilities such as department stores and supermarkets.

15 In such prior art dove and puppet clocks, however, the positions at which the decorations such as doves or puppets have emerged have been different from the time indicating positions of the clocks, and the clock dials have been immovable.

20 According, therefore, to the present invention, there is provided a timepiece comprising a timepiece movement; a dial which is mounted in front of the timepiece movement and which has at least one movable part; a dial moving mechanism for moving the movable part or parts into and out of a normal time indicating position; drive means for operating the dial moving mechanism, the operation of the drive means being controlled by the timepiece movement; and at least one mobile decoration or ornament which is disposed behind the dial and which is visible at the time when the
25
30 movable part or parts has or have been moved out of the said normal time indicating position, the drive means

effecting movement of the or each mobile decoration or ornament at that time.

Preferably, the dial comprises two movable parts which are rotatably mounted on a common shaft.

5 Preferably, each of the movable parts of the dial is connected by an arm to a travelling nut, each said travelling nut being mounted on and meshing with a lead screw driven by the drive means.

10 The timepiece may comprise a casing within which are mounted the timepiece movement, the drive means and the dial moving mechanism, the casing being disposed behind and being spaced from the dial, and the or each mobile decoration or ornament being disposed between the dial and the casing.

15 The drive means may comprise a first drive motor which operates the dial moving mechanism and a second drive motor which operates the or each mobile decoration or ornament. Alternatively, a single drive motor may be provided for operating both the dial moving mechanism
20 and the or each mobile decoration or ornament.

The or each mobile decoration or ornament may be mounted in a basket which moves around a circular locus but remains at all times in substantially the same position with respect to the horizontal.

25 Preferably, the or each decoration or ornament is rotatably mounted in the basket and is moved into engagement with a member which causes it to be rotated about its axis of rotation.

30 The arrangement may be such that the drive means starts on receiving exact hour signals transmitted from the timepiece movement at preset times, e.g. at exact hours; drive is thus transmitted via the dial moving mechanism to the parts of the dial which turn open about the said common shaft; simultaneously the mobile

decorations or ornaments disposed behind the dial appear to work; and the parts of the dial are closed by reversing the drive means after a given period has passed.

5 The invention is illustrated, merely by way of example, in the accompanying drawings, in which:-

10 Figure 1 is a front elevation of a timepiece according to the present invention, Figure 1 showing the portions of the parts when a dial of the timepiece is opened;

 Figure 2 is a front elevation in section of the timepiece of Figure 1 showing a dial opening/closing mechanism thereof;

15 Figure 3 is a front elevation of the timepiece of Figure 1 showing a mechanism thereof for driving mobile decorations; and

 Figure 4 is a front elevation of the timepiece of Figure 1 showing the timepiece with the dial closed.

20 Terms such as "vertical" and "left" and "right", as used in the description below, are to be understood to refer to directions as seen in the accompanying drawings.

25 In Figure 1 there is shown a timepiece according to the present invention comprising a dial which is generally designated at 1 and which consists of a movable right hand portion 1a and a movable left hand portion 1b which exhibit a bilateral symmetry with respect to a straight line which connects an hour numeral 12 on the dial 1 to an hour numeral 6 thereon. Normally, the right hand portion 1a and the left hand portion 1b are, as illustrated in Figure 4, in a closed state.

30 Provided in front of the dial 1 are an hour hand 3a and a minute hand 3b which are arranged to be rotated

by a timepiece movement 2 (Figure 2).

Disposed at the rear of the dial 1 and spaced from the latter is a cylindrical casing 4 within which the timepiece movement 2 is mounted. A decoration plate 4a is provided in front of the casing 4, and mobile decorations or ornaments B are interposed between the decoration plate 4a and the dial 1. As shown in Figure 1, the mobile decorations or ornaments B can be seen from the outside when the dial 1 is opened.

The dial 1 is openable and closable about a fixed shaft 5 (Figure 2) by means of a dial moving or opening/closing mechanism A which is mounted within the casing 4. The dial opening/closing mechanism A will now be explained in conjunction with Figure 2.

Mounted within the casing 4 are a support plate 6, on which is mounted both the timepiece movement 2 and a drive motor 7 which is controlled by the timepiece movement 2 so that the drive motor 7 operates at predetermined set times, e.g. at the exact hours. Two lead screws 8 and 9, each of which extends in a vertical direction, are rotatably mounted on the support plate 6 adjacent opposite sides thereof. A belt 10 extends between a belt pulley 9a, which is mounted on the lead screw 9, and a belt pulley 7a which is mounted on a drive shaft 7b of the drive motor 7. Secured to the lower parts of the lead screws 8 and 9 are belt pulleys 8a and 9b respectively each of which has the same diameter as that of the pulleys 7a, 9a. A belt 11 extends between the pulleys 8a, 9b. Thus the two lead screws 8 and 9 are driven simultaneously by the drive motor 7.

Nuts 12 and 13 are mounted on and mesh with the lead screws 8 and 9 so that the rotations of the latter by the drive motor 7 cause ascent and descent of the nuts 12, 13. On the undersides of the right hand

portion 1a and the left hand portion 1b of the dial 1, joints 14 and 15 are fixed in positions corresponding to the two o'clock and ten o'clock positions respectively on the dial 1. The joints 14 and 15 are linked via arms 16 and 17 to the nuts 12 and 13. Each of the arms 16 and 17 passes through an opening 4b formed in a side wall surface of the casing 4, the opposite ends thereof being pivotable about the joints 14 and 15 respectively as well as about the nuts 12 and 13 respectively, thus constituting a link mechanism.

The mobile decorations or ornaments B as shown in Figures 1 and 3, comprise four decorations or ornaments 19 which are respectively mounted in angularly spaced apart baskets 18. Each of the baskets 18 is rotatably mounted on a shaft 18a carried by one of the arms of a cross-shaped member 20.

The centres of gravity of the baskets 18 are positioned below the shafts 18a. Fixed to the centre of the cross-shaped member 20 by means of screws is a gear 21 which is coaxial with the rotational centre of the hour hand 3a and of the minute hand 3b. The gear 21 meshes with a pinion 22 which is mounted on a shaft (not shown) driven either by a second drive motor (not shown) or by the drive motor 7.

A through-hole 23 is provided in the central part of the cross-shaped member 20 and of the gear 21 so as to permit a hand spindle 2a extending from the timepiece movement 2 to pass therethrough.

The decorations or ornaments 19 which are rotatably mounted with respect to the baskets 18 may be of two kinds one of which, as illustrated in Figure 1, projects from the basket 18 and the other of which (not shown) can be retracted into the basket 18 as to be invisible. Alternatively, and preferably, the

decorations or ornaments 19 may be movable into and out of the baskets 18 between positions in which they are respectively visible and invisible.

5 Provided in a position corresponding to the hour numeral 12 in front of the decoration plate 4a is a shade 24 (Figure 1) imitating a cloud, for concealing one of the four decorations or ornaments 19. A projection 25 (Figure 3) which is engageable by the decorations or ornaments 19 is disposed at the back of the shade 24. The decorations 19 therefore enter the
10 shade 24 and strike against the projection 25.

Subsequently, each of the decorations or ornaments 19 rotates through 180 degrees about its shaft 18a, and another decoration (not shown) which is hidden inside
15 the basket 18 appears from the shade 24.

The operation of the timepiece shown in the drawings will now be described.

When the preset time, e.g. an exact hour, is reached, the drive motor 7 is operated by a signal from
20 the timepiece movement 2 so as to rotate the lead screws 8 and 9. Concurrently with the rotations of the lead screws 8, 9, the nuts 12 and 13 are raised from the positions indicated by the chain lines of Figure 2 and cause the right and left hand portions 1a and 1b of the
25 dial 1 to turn about the fixed shaft 5 with the help of the arms 16 and 17, thus opening the dial 1. When the nuts 12 and 13 go up to the positions indicated by the solid lines of Figure 2, the drive motor 7 ceases to work, and the dial 1 is fully opened (Figure 1).

30 The pinion 22 is rotated by the said second drive motor (not shown) whereby the gear 21 rotates clockwise. This in turn causes rotations of the baskets 18. The centres of gravity of the baskets 18 are lower than the shafts 18a, and hence the baskets 18 are, as in the case

of fairground vehicles, kept invariably in constant or substantially constant positions with respect to the horizontal while moving around a circular locus. When a basket 18 enters the shade 24, the decoration or ornament 19 strikes the projection 25 and thereby rotates through 180 degrees about the shaft 18a. As a result, another decoration or ornament (not shown) emerges from the basket 18 and leaves the shade 24.

In this way, the baskets 18 rotate about the hand spindle 2a, and, after a predetermined period has passed, the mobile decorations or ornaments B cease to move, and the drive motor 7 is rotated reversely as a result of a signal from the timepiece movement 2. Then, the dial opening/closing mechanism A effects operations reverse to those performed when opening the dial 1, with the result that the dial 1 is closed and reverts to the state shown in Figure 4.

Note that the fixed shaft 5 is disposed above the hour numeral 12, but the arrangement is not limited to this. Thus the fixed shaft 5 may, of course, be positioned below the hour numeral 6.

In the embodiment described above, the timepiece is thus provided with mobile decorations, wherein the dial is opened at the preset hours to show an attractive movement of the decorations so as to give an unexpected and unique effect.

CLAIMS

1. A timepiece comprising a timepiece movement; a dial which is mounted in front of the timepiece movement and which has at least one movable part; a dial moving mechanism for moving the movable part or parts
5 into and out of a normal time indicating position; drive means for operating the dial moving mechanism, the operation of the drive means being controlled by the timepiece movement; and at least one mobile decoration or ornament which is disposed behind the dial and which
10 is visible at the time when the movable part or parts has or have been moved out of the said normal time indicating position, the drive means effecting movement of the or each mobile decoration or ornament at that time.
- 15 2. A timepiece as claimed in claim 1 in which the dial comprises two movable parts which are rotatably mounted on a common shaft.
3. A timepiece as claimed in claim 2 in which
20 each of the movable parts of the dial is connected by an arm to a travelling nut, each said travelling nut being mounted on and meshing with a lead screw driven by the drive means.
4. A timepiece as claimed in any preceding claim
25 comprising a casing within which are mounted the timepiece movement, the drive means and the dial moving mechanism, the casing being disposed behind and being spaced from the dial, and the or each mobile decoration or ornament being disposed between the dial and the casing.
- 30 5. A timepiece as claimed in any preceding claim in which the drive means comprises a first drive motor



which operates the dial moving mechanism and a second drive motor which operates the or each mobile decoration or ornament.

6. A timepiece as claimed in any preceding claim in which the or each mobile decoration or ornament is mounted in a basket which moves around a circular locus but remains at all times in substantially the same position with respect to the horizontal.

7. A timepiece as claimed in claim 6 in which the or each decoration or ornament is rotatably mounted in the basket and is moved into engagement with a member which causes it to be rotated about its axis of rotation.

8. A timepiece substantially as hereinbefore described with reference to and as shown in the accompanying drawings.
