

"HOUR CHIMING CLOCK"

5 The present invention relates to hour chiming clocks having hour indicating means for indicating hours in association with hour displaying means and hour chiming means for chiming at least hours.

In a known arrangement of an hour chiming clock, hours are visually emphasised when chiming by the use of moving ornaments such as dolls.

10 Such movements act simply to attract attention by exhibiting ornamental effects.

The invention seeks to provide an hour chiming clock which emphasises visually the particular hour being chimed.

15 According to the present invention, an hour chiming clock comprises an hour indicating means for indicating hours in association with hour displaying means, an hour chiming means for chiming at least hours, units of the hour displaying means being disposed around the circumference of the hour indicating means at positions corresponding to hour indicating positions, and driving means for differentiating the display mode of the unit of the displaying means in the hour indicating position corresponding to the hour indicated by the hour indicating means from the displaying modes of the other units of the displaying means in the other hour indicating positions during chiming of the hour by the hour chiming means.

25 Other aspects of the invention are evident from the appended claims.

30 One embodiment of the invention is hereinafter particularly described by way of example and with reference to the accompanying drawings, in which:-

Figures 1(A), 1(B) and 1(C) are frontal elevations

of an embodiment of a clock according to the present invention at different times;

Figure 2 is a block diagram of the clock and its operating mechanism; and

Figure 3 is a flow chart of the operation of the clock.

The embodiment of a clock according to the invention shown in Figures 1(A), (B) and (C) comprises an hour or time indicating means 1, and includes a face 10 having displaying means 3 around its periphery, and hour and minute hands 11 and 12 driven by means (not shown) to indicate time by reference to the displaying means 3.

The displaying means 3 is composed of the first twelve numerals arranged in succession so that the hour hand 11 points at the appropriate numeral at the appropriate time, each numeral being mounted on its own independently movable face portion 13. Concealed behind each face portion 13 is a non-numeric distinctive display 14, such as an ornament in the shape of a doll. The displays 14 may be different from each other as well as from the numeral-bearing portions 13, for example by the use of different dolls. Different colours may also or alternatively be used to distinguish between the displays 14 and the numeral-bearing portions 13. The displays 14 may be on the reverse sides of the numeral-bearing portions 13, if the latter are made to be pivotable through 180° . Alternatively, the portions 13 may pivot inwardly or outwardly through 90° to reveal the displays 14 behind, and for this purpose may be divided.

It would also be possible to provide a displaying means 3 electrically energisable to display each of the hour identifying numerals, with alternative means to

energise a non-numeric distinctive display at a location where the hour identifying numeral was not displayed by energisation.

5 The hour and minute hands 11 and 12 of the hour
indicating means 1 (Figure 2) are driven by signals from
a clock circuit 7. The circuit 7 is connected to a
control circuit 5 and supplies signals which, inter
alia, indicate the approach and completion of a
10 revolution of the minute hand 12 (indicating a change of
hour) and the angular disposition of the hour hand 11
(indicating which hour has been reached). The control
circuit 5 is connected to a storage circuit 6 to derive
information stored therein from time to time. The
control circuit 5 is connected to supply signals to an
15 hour chiming means 2 and a melody circuit 8 connected
thereto, to initiate appropriate melodies at each hour.
The control circuit 5 is also connected to supply
signals to driving means 4 by which the displaying means
3 may be operated to alter the state of the displays
20 independently, collectively or successively.

 In the following description of the operation of
the hereinbefore described embodiment of a clock according
to the invention, the individual units of the displaying
means 3 will be defined as open if the non-numeric
25 display 14 is visible, and closed if the numeral
indicating portion 13 is visible.

 At all times, the positions of the hour and minute
hands 11 and 12 indicate the present time in
correspondence with the state of the clock circuit 7
30 (Figure 2). If the time is not one at which an hour is
to be chimed, only the unit of the displaying means 3 at
the hour indicating position (2 in Figure 1(A))
corresponding to the hour indicated by the hands is
open. Thus the displaying means 3 displays an ornament

only at the hour indicating position corresponding to the hour indicated by the hands whilst all the remaining units of the displaying means 3 display numerals.

5 When signals from the clock circuit 7 indicate that the minute hand 12 is about to reach the upright position indicating an exact hour (Figure 1(B)), the control circuit 5 generates a signal to the driving means 4 so that all the units of the displaying means 3 are closed by drive signals from the driving means 4 10 allowing all the non-numeric displays to be rendered visible.

Subsequently, a start melody A signal is transmitted from the control circuit 5 to the melody circuit 8, and the hour chiming means 2 makes melodies 15 corresponding to respective hours in response to melody signals transmitted from the melody circuit 8. At this time, the units of the displaying means 3 perform a variety of attractive opening and/or closing motions in response to driving signals sent from the driving means 20 4 on the basis of data stored in the storage circuit 6.

Upon completion of the various attractive opening and/or closing motions of the respective units of the displaying means 3, only the unit of the displaying means 3 in the hour indicating position corresponding to 25 the hour indicated by the hour hand 11 of the hour indicating means 1, is closed, so that only the numeral 3 (Figure 1(B)) is visible at the hour indicating position whilst at all the other positions the ornaments are visible.

30 After completion of the melody A, a stop melody A signal is transmitted from the melody circuit 8 to the control circuit 5. An hour chime signal is sent from the control circuit 5 to the hour chiming means 2 in response to the stop melody A signal, and the hour

chiming means 2 strikes a number of times determined by the exact hour reached.

Next, the control circuit 5 transmits a start melody B signal to the melody circuit 8 which in turn transmits a melody signal to the hour chiming means 2 which makes a given melody in accordance with the melody signal therefrom. At this time, the respective eleven units of the displaying means 3 subsequent to the already closed unit at the 3 o'clock position are sequentially closed in due order 4, 5, 6, 7, 8, 9, 10, 11, 12, 1 and 2, so that all the units of the displaying means 3 are closed and exhibit numerals.

Subsequently, only the unit of the displaying means 3 in the hour indicating position corresponding to the hour indicated by the hour hand 11 is opened (Figure 1(C)). Then that unit shows its ornament, while all the other units of the displaying means 3 exhibit numerals.

Upon completion of the above-described operation, the displaying means 3 remains as shown in Figure 1(C) until the next hour comes round.

It will be appreciated that in the case of a clock in which the displaying means 3 includes individual units, each consisting of a plate carrying on one side the appropriate hour numeral and on the other side an ornament in two dimensional representation, the plate is preferably pivoted about a central axis, which may be vertical or horizontal. Such a plate may be pivoted electromagnetically between its closed and its open position, or may be rotated to provide a changing display effect. Each plate would have a magnet or a magnetisable body, and the driving means would include static driving coils, energisation of which would effect such pivoting or rotating.

Whilst one embodiment of clock according to the

invention and its operation has been described, it will be appreciated that many variations of construction and operation are possible within the scope of the invention.

5 Thus the units of the displaying means 3 following a change of hour may be in opposite disposition to that shown in Figure 1(A), so that only the numeral of the hour just passed will be displayed.

10 The units of the displaying means 3 need not all be fully opened before the hour is struck by the chiming means.

15 The melody A need not start to be emitted at the exact hour, but may be started beforehand so that the hour is struck at the hour, either the first or last strike being at the exact moment of the hour.

20 The change of display mode (open/close) of the units of the displaying means 3 may be sequentially altered from that described, so that the unit in the hour indicating position (3 o'clock in Figure 1(B)) is first opened, and then the others are closed in due order (4,5...2).

25 The sequential order of the opening/closing modes of the units of the displaying means 3 may be reversed (in the example given, 2,1,12...4) or the changes may occur at random.

30 There may be provided a sensor for detecting ambient brightness, in conjunction with illuminating means operable to brighten only the unit of the displaying means 3 disposed in the hour indicating position corresponding to the hour indicated by the hour hand during the night on the basis of output from the sensor.

 The clock may be a 24-hour analogue clock, in which case the displaying means would have twenty four

units.

Alternatively, the hour indicating means may be of the digital type.

Although the displaying means in the foregoing embodiment are composed of the hour displaying units marked with numerals and ornaments concealed behind the hour displaying units, a wide variety of modifications other than this arrangement may be made. The requirement is that the displaying means are driven so as to differentiate the display mode of the unit of the displaying means in the hour indicating position associated with the hour indicated by the hour indicating means from the display mode of the units of the displaying means in other hour indicating positions while the hour chiming means chimes the hour. The displaying means may involve the use of, for example, a doll of a three dimensional configuration, the arrangement being such that dynamic and static modes of the units of the displaying means correspond to opening/closing states of the units of the displaying means in the foregoing embodiment.

The clock chiming means could be arranged to strike the quarters or half hours, in which case the unit of the displaying means in the hour indicating position associated with the hour indicated by the hour indicating means would not change, except at the full exact hour.

In a clock according to the present invention, the display mode of the unit of the displaying means in the hour indicating position associated with the hour indicated by the hour indicating means is differentiated from the display mode of the units of the displaying means in other hour indicating positions. With this arrangement, the displaying means visually emphasises

the present time, as well as having an ornamental function.

When the display modes of the units of the displaying means are sequentially reversed starting from the one disposed in the hour indicating position corresponding to the hour indicated by the hour indicating means or from the adjacent unit after chiming the hour, the observer is able to recognise that a series of motions of the units of the displaying means is finished by such sequential reversal.

CLAIMS

- 5 1. An hour chiming clock comprising an hour
indicating means for indicating hours in association
with hour displaying means, an hour chiming means for
chiming at least hours, units of the hour displaying
means being disposed around the circumference of the
10 hour indicating means at positions corresponding to hour
indicating positions, and driving means for
differentiating the display mode of the unit of the
displaying means in the hour indicating position
corresponding to the hour indicated by the hour
15 indicating means from the displaying modes of the other
units of the displaying means in the other hour
indicating positions during chiming of the hour by the
hour chiming means.
2. A clock as claimed in claim 1 wherein the
20 displaying means is composed of hour displaying units
marked with numerals and non-numeric displays concealed
behind the numeral displaying units.
3. A clock as claimed in claim 2, in which each
unit of the displaying means has two display modes, in
one of which the numeral is visible and in the other of
25 which the non-numeric display is visible.
4. A clock as claimed in claim 2 or 3, in which
the non-numeric display is in the form of an ornament,
such as a doll or the like.
5. A clock as claimed in any preceding claim, in
30 which, prior to chiming, the display modes of the units
undergo a sequence of changes.
6. A clock as claimed in any preceding claim, in
which, after chiming, the display modes of the units are
sequentially reversed starting with the unit in the hour



indicating position, whose display mode is differentiated from those of the other units.

5 7. A clock as claimed in any of claims 1 to 5, in which, after chiming, the display modes of the units are sequentially reversed starting with the unit adjacent the unit in the hour indicating position, whose display mode is differentiated from those of the other units.

10 8. An hour chiming clock substantially as hereinbefore particularly described with reference to the accompanying drawings.
