

PATENT SPECIFICATION

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(54) DIGITAL ALARM WATCH

(71) We, KABUSHIKI KAISHA DAINI SEIKOSHA, a Japanese company of 31-1, 6-chome, Kameido, Koto-ku, Tokyo, Japan, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to digital alarm watches.

Generally, in a conventional electronic digital watch having a quartz crystal element, amendment of the time indication is complicated because a relatively large number of switching members are necessary to effect this amendment. In a mechanical watch displaying a time indication in hours, minutes and seconds, it is possible to amend the seconds and minutes hands by a rotary operation and a pulling operation of a stem. However, in a digital electronic watch it is necessary to provide at least three switches for the same purpose.

Recently, due to developments in electronics, digital electronic watches having a plurality of functions have been developed so that the number of switches required is increased further. However, the switching operations in an electronic watch have to be simple for most people. Further, there is a danger of forgetting how to amend the time indication since it will usually be performed rarely.

According to the present invention there is provided a digital alarm watch comprising: first, second and third switching members; a display device; display illuminating means; alarm sounding means; and a selecting circuit, said first switching member being arranged to cause a date indication and a seconds indication to be selectively displayed by the display device, the second switching member being

arranged to control operation of the illuminating means and the switching off of the alarm sounding means, and the third switching member being arranged to condition the selecting circuit.

Preferably said second and third switching members are arranged to cause, when operated, amendment of the time indication produced by the display device.

The watch may include memory means for memorising a time when an alarm is to sound and a coincidence circuit for energising the alarm sounding means when the actual time displayed by the display device coincides with the present time memorised in the memory means.

The watch, in the preferred embodiment includes a further switching member for controlling the operation of the second and third switching members.

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

Figure 1 is a plan view of one embodiment of a digital alarm watch according to the present invention;

Figure 2 is a block diagram of the watch of Figure 1.

Referring to the drawings there is illustrated one embodiment of a digital alarm watch according to the present invention. The digital alarm watch 1 has an hours display portion 2 for displaying an hours indication, a minutes display portion 3 for displaying a minutes indication and a display portion 4 for selectively displaying a date indication and a seconds indication. When the display portion 4 displays the date indication, a date display 5 consisting of the word DATE is visible.

The digital alarm watch has a first channel display portion 6, a second channel display portion 7, a third channel display portion 8 and a lamp 12 for lighting all the

display portions in low ambient light conditions.

A first switch operating member 9 is of the push-pull type, namely a stem member, and moves a switch A and a switch B (Figure 2) between ON and OFF positions. Push type operating members 10, 11 operate switches C and D respectively between ON and OFF positions. A switch E and a switch F are in a first position shown in Figure 2 when the switch B is in the OFF position. When the switch B is in the ON position, the switches E, F move to a second position. The lamp 12 is lit when the switch operating member 10 is operated to cause the switch C to go to the ON position and when the switch B is in the OFF position and consequently the switches E and F are in their first positions. A buzzer 33 is de-energised by the operation of a stopping circuit forming part of a buzzer driving circuit 32 when the switch operating member 10 is operated to cause the switch C to go to the ON position and when the switch B is in the OFF position and consequently the switches E and F are in the first position.

The contents of a time-keeping counter 23 and memory circuits 25, 26, 27 are selectively displayed by a display device 30 together with one of the channel display portions 6, 7, 8 the information displayed being selected by means of a channel selecting circuit 28 operated when the switch operating member 11 is operated to cause the switch D to go to the ON position and when the switch B is in the OFF position and consequently the switch F is in its first position. The switch B is moved to the ON position when the switch operating member 9 is pulled.

A time indication produced by the display device 30 can be amended as follows. Normally, the selecting circuit 28 is in the position shown in Figure 2 so that the display device 30 displays a time of day indication. The switch operating member 11 is operated once so that the switch D is in the ON position and the selecting circuit 28 passes the output from the memory circuit 25 to an amending device 29. The switch operating member 10 is then operated so that the switch B is in the ON position and consequently the switches E, F are in their second positions and then the switch member 10 is operated so that the switch C is in the ON position, closure of the switch C conditioning the amending circuit 29 so that the display of respective display portions 2, 3, 4 corresponding to the content of the memory circuit 25 is amended to pre-set therein an alarm time. Repeated operation of the switch operating members 9, 10, 11 selects various time data to be amended

and causes amendment of the display of the time data so selected. When the switch B is in the OFF position the selecting circuit 28 returns to the position shown in Figure 2. Thus, operation of the switch operating member 10 sets the date and minutes indication and operation of the switch operating member 11 sets the hours and seconds indications. The selective display of the date indication and the seconds indication by the display portion 4 is determined by a switching circuit 24 operated by the switch A controlled by the switch operating member 9. The buzzer 33 is driven by a coincidence circuit 31 via the buzzer driving circuit 32 when the memorised time indication in the memory circuits 25, 26, 27 coincides with the time information from the counter 23 which is driven by a time standard signal generator 21 via a frequency dividing circuit 22.

In the above digital alarm watch, the date indication and seconds indication are selectively displayed by the display portion 4 when the switch operating member 9 is pushed. The switch operating member 11 when pushed, controls the selecting circuit 28 to select the memory circuit the contents of which are to be reset.

The switch operating member 10 is used to de-energise the buzzer and to light the lamp 12 in a single operation and to amend the part of the time indication selected for amendment by the switch operating member 11. Therefore, the switch operating members 10, 11 have a plurality of functions so that it is possible to reduce the number of externally operated switch operating members.

WHAT WE CLAIM IS:—

1. A digital alarm watch comprising: first, second and third switching members; a display device; display illuminating means; alarm sounding means; and a selecting circuit, said first switching member being arranged to cause a date indication and a seconds indication to be selectively displayed by the display device, the second switching member being arranged to control operation of the illuminating means and the switching off of the alarm sounding means, and the third switching member being arranged to condition the selecting circuit.

2. A watch as claimed in claim 1 in which said second and third switching members are arranged to cause when operated amendment of the time indication produced by the display device.

3. A watch as claimed in claim 1 or 2 including memory means for memorising a time when an alarm is to sound and a coincidence circuit for energising the alarm sounding means when the actual time dis-

display portions in low ambient light conditions.

A first switch operating member 9 is of the push-pull type, namely a stem member, and moves a switch A and a switch B (Figure 2) between ON and OFF positions. Push type operating members 10, 11 operate switches C and D respectively between ON and OFF positions. A switch E and a switch F are in a first position shown in Figure 2 when the switch B is in the OFF position. When the switch B is in the ON position, the switches E, F move to a second position. The lamp 12 is lit when the switch operating member 10 is operated to cause the switch C to go to the ON position and when the switch B is in the OFF position and consequently the switches E and F are in their first positions. A buzzer 33 is de-energised by the operation of a stopping circuit forming part of a buzzer driving circuit 32 when the switch operating member 10 is operated to cause the switch C to go to the ON position and when the switch B is in the OFF position and consequently the switches E and F are in the first position.

The contents of a time-keeping counter 23 and memory circuits 25, 26, 27 are selectively displayed by a display device 30 together with one of the channel display portions 6, 7, 8 the information displayed being selected by means of a channel selecting circuit 28 operated when the switch operating member 11 is operated to cause the switch D to go to the ON position and when the switch B is in the OFF position and consequently the switch F is in its first position. The switch B is moved to the ON position when the switch operating member 9 is pulled.

A time indication produced by the display device 30 can be amended as follows. Normally, the selecting circuit 28 is in the position shown in Figure 2 so that the display device 30 displays a time of day indication. The switch operating member 11 is operated once so that the switch D is in the ON position and the selecting circuit 28 passes the output from the memory circuit 25 to an amending device 29. The switch operating member 10 is then operated so that the switch B is in the ON position and consequently the switches E, F are in their second positions and then the switch member 10 is operated so that the switch C is in the ON position, closure of the switch C conditioning the amending circuit 29 so that the display of respective display portions 2, 3, 4 corresponding to the content of the memory circuit 25 is amended to pre-set therein an alarm time. Repeated operation of the switch operating members 9, 10, 11 selects various time data to be amended

and causes amendment of the display of the time data so selected. When the switch B is in the OFF position the selecting circuit 28 returns to the position shown in Figure 2. Thus, operation of the switch operating member 10 sets the date and minutes indication and operation of the switch operating member 11 sets the hours and seconds indications. The selective display of the date indication and the seconds indication by the display portion 4 is determined by a switching circuit 24 operated by the switch A controlled by the switch operating member 9. The buzzer 33 is driven by a coincidence circuit 31 via the buzzer driving circuit 32 when the memorised time indication in the memory circuits 25, 26, 27 coincides with the time information from the counter 23 which is driven by a time standard signal generator 21 via a frequency dividing circuit 22.

In the above digital alarm watch, the date indication and seconds indication are selectively displayed by the display portion 4 when the switch operating member 9 is pushed. The switch operating member 11 when pushed, controls the selecting circuit 28 to select the memory circuit the contents of which are to be reset.

The switch operating member 10 is used to de-energise the buzzer and to light the lamp 12 in a single operation and to amend the part of the time indication selected for amendment by the switch operating member 11. Therefore, the switch operating members 10, 11 have a plurality of functions so that it is possible to reduce the number of externally operated switch operating members.

WHAT WE CLAIM IS:—

1. A digital alarm watch comprising: first, second and third switching members; a display device; display illuminating means; alarm sounding means; and a selecting circuit, said first switching member being arranged to cause a date indication and a seconds indication to be selectively displayed by the display device, the second switching member being arranged to control operation of the illuminating means and the switching off of the alarm sounding means, and the third switching member being arranged to condition the selecting circuit.

2. A watch as claimed in claim 1 in which said second and third switching members are arranged to cause when operated amendment of the time indication produced by the display device.

3. A watch as claimed in claim 1 or 2 including memory means for memorising a time when an alarm is to sound and a coincidence circuit for energising the alarm sounding means when the actual time dis-



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played by the display device coincides with the preset time memorised in the memory means. as herein described with reference to and as shown in the accompanying drawings. 10

4. A watch as claimed in any preceding claim including a further switching member for controlling the operation of the second and third switching members.
5. A digital alarm watch substantially

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