United States Patent

Polin et al.

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[54] TIME-SETTING DEVICE FOR AN ELECTRONIC WATCH

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[51] **Int. Cl.**.....**G04c 3/00,** G04b 27/00

[58] **Field of Search** 58/23, 34, 35, 85.5

[56] **References Cited**

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[57] **ABSTRACT**

The invention concerns a time-setting device for an electronic watch. This time-setting device is original in that it comprises only one control member to set the watch at different setting speeds. Furthermore, this control member is formed by a pushbutton which is made alike the winding and setting crown of an ordinary mechanical watch to be immediately familiar to the user.

7 Claims, 4 Drawing Figures

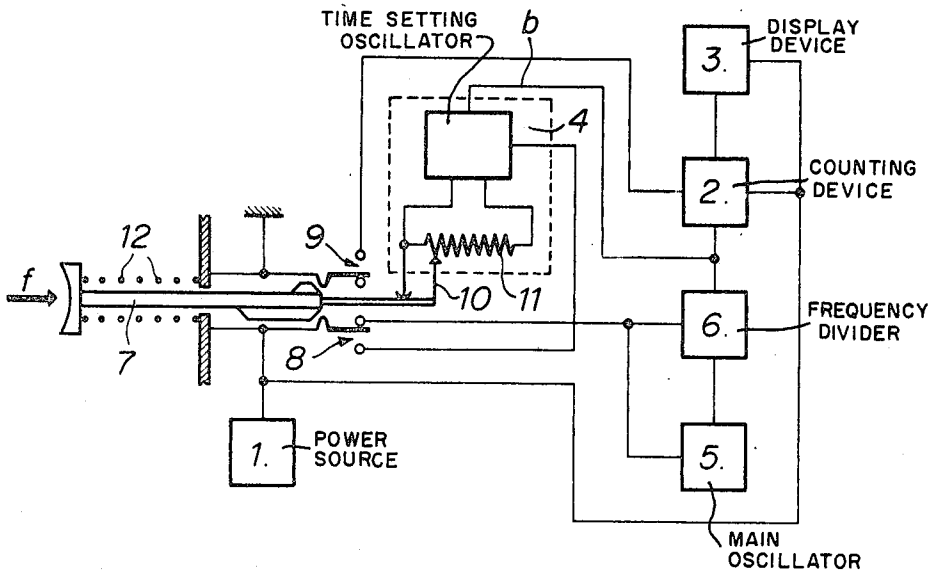
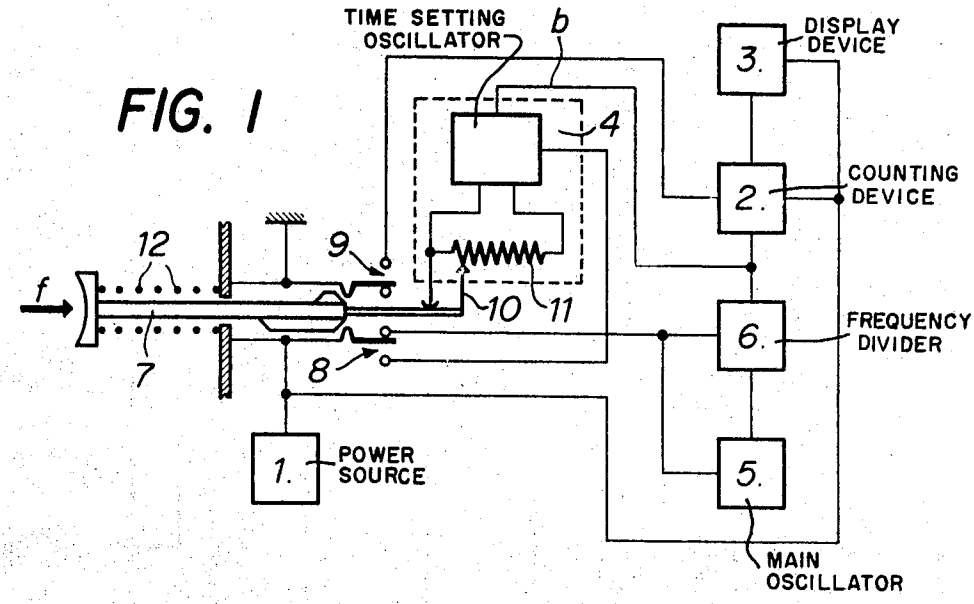


FIG. 1



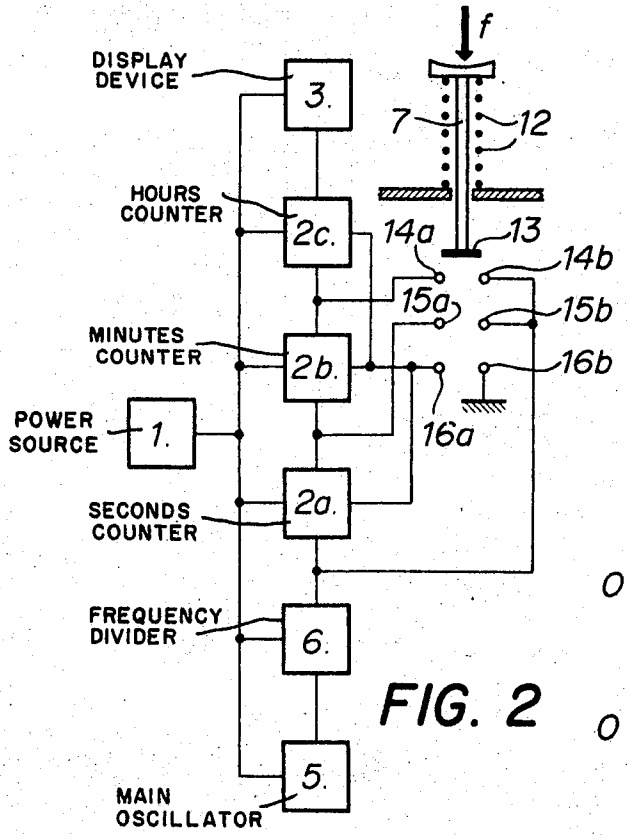


FIG. 2

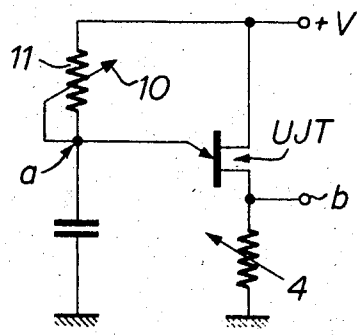


FIG. 3

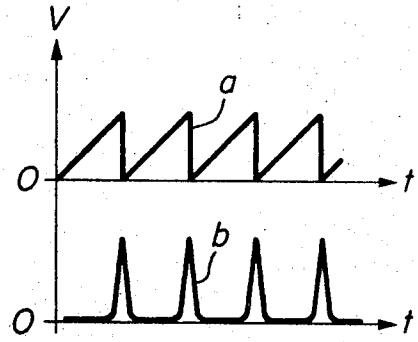


FIG. 4

TIME-SETTING DEVICE FOR AN ELECTRONIC WATCH

The present invention has for its object a time-setting device for an electronic time indicator and more particularly for an electronic watch.

The now available electronic watches or clocks comprise time-setting circuits of two different types. The ones are used to reset once for each 24 hours to the time indicated in a determined position for example 12 o'clock. Thus once a day at 12 o'clock the time setting is automatically effected which permits to avoid the working errors from one day to the other. Such time-setting devices are not always adapted to portable electronic watches which have to be able to be set at any moment of the day and if possible at one or several setting speeds.

There are electronic watches the time-setting circuit of which comprises two control switches and causing, when actuated, the feeding of the hours counter or of the minutes counter with a signal of a higher frequency than the one corresponding to the normal working of the watch. One may thus advance the time indicator at two different speeds, both greater than the normal working speed by injection of a frequency for example of 1 c.p.s. at the input of the minutes counter or at the input of the hours counter.

The drawback of such devices resides on the one hand in the fact that in order to effectuate the time setting of the watch it is necessary to manipulate two or several switches and on the other hand in the fact that there is one or several distinct speeds which are definite for the timing setting.

The present invention tends to remedy to these drawbacks and has for its object a time-setting device of an electronic watch which distinguishes itself by the fact that it comprises only one actuating member controlling the time setting of the watch at two different speeds at least.

The attached drawing shows schematically and by way of example two embodiments of the time setting device according to the invention.

FIG. 1 shows a block scheme of a first embodiment of the time-setting device.

FIG. 2 is a block scheme of a second embodiment of the time-setting device.

FIG. 3 is the diagram of the time-setting oscillator used in the first embodiment of the device.

FIG. 4 shows the shape of the input voltage and of the output voltage of the oscillator shown on FIG. 3.

FIG. 1 shows very schematically an electronic watch comprising a power source **1** feeding permanently a counting device **2** and its display device **3** and temporarily, as will be seen later on, either a time-setting oscillator **4**, or a main oscillator **5** as well as a frequency divider **6** fed by the main oscillator **5** and feeding the counting device **2**.

The time-setting device comprises only one control member, represented in the form of a pushbutton **7**, actuating on the one hand two contactors **8** and **9** and on the other hand the sliding contact **10** of a variable resistor **11** of the time-setting oscillator **4**.

The control member is maintained in rest position shown by means of a return spring **12**. In this rest position the contactor **8** connects the power source **1** to the main oscillator **5** and the frequency divider **6** which are thus fed, whereas the contactor **9** is unactive, and that the variable resistor **11** is at its lower value.

One will see that the time-setting oscillator **4** is a relaxation-type oscillator using only one unijunction transistor UJT. This oscillator delivers an output signal shown in *b* at FIG. 4 when the voltage across the variable resistance **11** is the one shown in *a* on this same FIGURE. This oscillator presents the characteristic of having an output signal the frequency of which depends upon the value of the resistor **11**. The value of the different elements of this time setting oscillator **4** is determined so that the frequency of its output signal *b* be always higher than the frequency of the signal *c* normally delivered by the frequency divider **6** and be variable in a range of at least 1 to 50.

The output signal of this time setting oscillator is delivered to the input of the counting device **2**.

The contactor **9** permits to set to zero, that is to a state corresponding for example to 12 o'clock the counting device **2** and its display **3** by connecting certain points of the circuit of these elements to the ground.

The working of this time setting device is the following:

In normal working of the watch the control member **7** is in its rest position shown and the time setting oscillator **4** is not fed whereas the main oscillator **5** as well as the frequency divider **6** are fed by the energy source **1**; the watch works normally.

When the user intends to set the watch he displaces the pushbutton **7** in the direction of the arrow *f* against the action of the spring what causes:

a. The actuation of the contactor **9** and the setting to zero, respectively in a state corresponding for example to 12 o'clock the counting device and its display **3**. This is important for a precise count setting.

b. The actuation of the contactor **8** causing the feeding of the time-setting oscillator **4** through the power source **1** and the disconnection of this source from the main oscillator **5** and from the frequency divider **6**.

c. The progressive modification of the value of the resistor **11** by displacement of the sliding contact **10**. Thus the frequency of the output signal *b* of the time-setting oscillator **4** increases progressively in function of the displacement of the control member **7** so that the rapid time setting at first and then a slow time setting and thus a precise one can be effected. It has to be noted that the time setting speed is chosen and adjusted by the user in pushing more or less the pushbutton **7**.

By releasing the pushbutton **7** the user reinstalls the normal working of the watch.

This time-setting device is very interesting since it permits setting an electronic watch by means of only one control member which can be realized mechanically so that it looks like the setting crown of a usual watch. In this way a minimum adaptation effort is required from the user.

The device described enables thus to realize the functions and to obtain the following advantages:

a. The operator may control the sole control member in such a way that the hours and the minutes are advanced at a speed which can be controlled by the pressure he makes on this member.

b. The hours and the minutes are advanced simultaneously exactly as during the time setting of a conventional watch.

c. The time-setting speed, that is the advance of the hours and the minutes, may be very progressively.

d. The main oscillator is stopped during the time setting so that the last minute, after the time setting, represents 60 seconds before it springs to the next minute what enables a very precise and exact time setting.

In a second embodiment shown at FIG. 2 the clock or electronic watch comprises also a power source **1** which feeds directly a main generator **5**, a frequency divider **6**, a counting device comprising a seconds counter **2***a*, a minutes counter **2***b* and an hours counter **2***c* connected in series and feeding a display device **3**.

The time-setting device comprises also a control member **7**, mounted in order to correspond as much as it is possible to the winding crown of a conventional watch, constituted by a pushbutton maintained in a rest position shown by a return spring **12** for which the movable contact **13** of the pushbutton is inactive.

A pressure in the direction of the arrow *f* on the pushbutton **7** enables according to the amplitude of the displacement, to cause the contacts **14***a*, **14***b*; **15***a*, **15***b* or **16***a*, **16***b* to realize the different functions described herebelow.

When the pushbutton **7** is displaced completely, its movable contact connects electrically the fixed contacts **16***a* and **16***b* what causes the zero setting, or in a particular state corresponding to 12 o'clock 00 minutes 00 seconds of the counters **2***a*, **2***b*, **2***c* by connecting the ground to their zero setting connections.

By releasing the pushbutton 7 by about one-third of its stoke, the movable contact 13 connects the fixed contacts 15*a* and 15*b* causing thus the feeding of the minutes counter 2*b* with a signal taken between the seconds counter 2*a* and the frequency divider 6 so that the time setting of the display 3 occurs a speeded up rhythm corresponding to 1 minute for the passage of 1 hour to the next, the signal delivered by the frequency divider being of 1 c.p.s.; and at one second for the passage of each minute to the following.

Finally when the movable contact 13 of the pushbutton 7 connects the fixed contacts 14*a* and 14*b*, a signal taken at the output of the frequency divider 6 is delivered at the input of the hours counter 2*c* so that one realizes a speeded up time setting at a rhythm corresponding to one second for the passage of each hour.

This second embodiment of the device is more simple than the one described first, mainly due to the fact that it does not necessitate a special generator for the time setting, however this time setting can be effected only at a certain number of predetermined speeds, two in the example shown and corresponding to the use of signals existing in the electronic watch. The number of time-setting speeds may naturally be increased but a continuous variation of this time setting speed can not be obtained.

In a variant which is not shown it is possible to use a pushbutton of the type described in reference to FIG. 2 with a time-setting generator delivering two, three or more signals of different frequencies.

The main advantage of all the solutions described resides in the fact that there is only one time-setting member which can be realized in such a manner as to be alike the crown of the winding of a classic watch.

It is evident that variants can be foreseen where the displacement of the control member could be angular instead of being linear.

What I claim is:

1. Time-setting device for an electronic watch, characterized by the fact that it comprises only one control member to set the watch at at least two different speeds, said control member shunts, according to its position, either the seconds counter or the seconds and minutes counter of the watch.

2. Device according to claim 1 characterized by the fact that the control member is constituted by a pushbutton.

3. Device according to claim 1, characterized by the fact that the control member causes in one of its service positions the resetting to zero of the counting device of the watch.

4. Time-setting device for an electronic watch, characterized by the fact that it comprises only one control member to set the watch at at least two different speeds, said control member causes, depending upon its position, the feeding of a counting device of the watch through signals of different frequency, the frequency of which being higher than the one of the normal working signal, a time-setting generator of a variable frequency, and by the fact that the position of the control member determines the frequency of the output signal of this generator which feeds the counting device, the frequency variation of the output signal of the time-setting generator being continuous in function of the displacement of the control member.

5. Device according to claim 4, characterized by the fact that the zero setting generator is a relaxation oscillator comprising one unijunction transistor, the voltage of the emitter of which is controlled by a variable resistor the value of which is in its turn determined by the position of the control member.

6. Device according to claim 4, further comprising a main generator and a frequency divider, and characterized by the fact that the feeding of the zero setting generator is interrupted during the normal working of the watch whereas during the time setting the main generator and the frequency divider of the watch are not fed.

7. Device according to claim 6, characterized by the fact that the feeding of the time-setting generator and the main generator as well as the frequency divider of the watch is controlled by the control member of the time-setting device.

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