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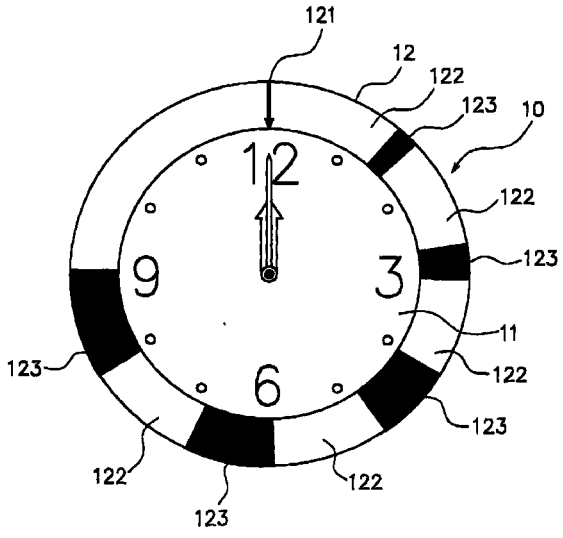
(54) Alarm clock and alarm clock simulating indicator

(57) The present invention provides an analog alarm clock (10) including a dial plate (11) with time positions thereon, and an annular member (12) rotatably fitted around the dial plate (11). The annular member (12) has a front face, which displays thereon an initial position, and a REM sleep period (123) extending around the circumferential periphery of the annular member (12) with the initial position as a starting point in such a manner as to be comparable to the time positions on the dial plate (11).

FIG. 1



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Description

BACKGROUND OF THE INVENTION

Background of the Invention

[0001] The present invention relates to an alarm clock and alarm clock simulating indicator.

Description of the Prior Art

[0002] Various types of alarm clocks adapted to sound are known, which have elaborate ornamental appearances for their dial plates, etc, unique sounds and various other features.

[0003] Meanwhile, it is known that, like animals of the higher order with developed cerebral cortex, a human experiences in his sleep the cycle of Rapid Eye Movement Sleep, known as REM sleep and non-REM sleep, which is exactly repeated based upon a constant biorhythm.

[0004] Of these two sleep phases, REM sleep is characterized by that, although a brain has enhanced metabolism, resting muscle activity is suppressed, allowing the body to be led into a relaxed condition. Since the body temperature rises, during REM sleep, to nearly that of the subject in an awakening period, it is preferable for the subject to wake up during REM sleep.

[0005] On the other hand, non-REM sleep, during which the cerebral cortex is rested at various levels, is characterized by body temperature, aspiration, blood circulation, hormone secreting, immunity, and other body functions, whose states are far from those in an awakening period. Therefore, it is not preferable for the subject to wake up during non-REM sleep. If the subject is forcibly woken up, he is likely to feel uncomfortable and/or induce lassitude.

[0006] FIG. 5 illustrates a common sleep pattern for a healthy adult subject, in which "A", "B" and "C" respectively represent elapsed time from the sleep onset, non-REM sleep, and REM sleep. As illustrated in FIG. 5, non-REM sleep B, which occurs immediately after the sleep onset, shifts from shallow sleep phases (1 and 2) to deep sleep phases (3 and 4). As the time elapses, non-REM sleep shifts back to the shallow sleep phases, and then the first REM sleep C appears. After that, non-REM sleep and REM sleep are alternately repeated at an interval of about 90 minutes. As illustrated in FIG. 5, a time period of each REM sleep C gradually increases, and an interval in time between the disappearance of REM sleep C and the appearance of the next REM sleep C is about 70 minutes.

[0007] As described above, a healthy adult subject experiences non-REM sleep and REM sleep which are alternately repeated by little and little at an interval of about 90 minutes in a sleep episode. Therefore, if an alarm clock can be set to sound during the subject is in REM sleep suitable for easy awakening, natural or comfortable awakening is obtainable.

[0008] However, a conventional alarm clocks does not have a function that allows the user to know which time period in the sleep episode is suitable for comfortable awakening, or to easily set an alarm time lying in non-REM sleep. The presence of non-REM sleep and REM sleep themselves is also not a common knowledge for the users.

[0009] Under the present situation, the user therefore decides an awakening time based upon a desirable sleeping time period, before setting an alarm time of the alarm clock. This alarm-time setting manner causes frequent occurrence of actuation of alarming sound or other awakening stimulus, at the time that the user is in the deep sleep phase, with the result that the user cannot be easily woken up by the sound, and hence he feels uncomfortable or languor after the awakening.

SUMMARY OF THE INVENTION

[0010] The present invention has been conceived to solve the above problem. It is an object of the present invention to provide an alarm clock and an alarm clock simulating indicator that allow the users to easily set an alarm time in a shallow sleep phase, or REM sleep phase suitable for easy awakening.

[0011] According to one aspect of the present invention, there is provided an analog alarm clock including a dial plate with time positions thereon, and an annular member rotatably fitted around the dial plate. The annular member has a front face, which displays thereon an initial position, and a REM sleep period extending around the circumferential periphery of the annular member with the initial position as a starting point in such a manner as to be comparable to the time positions on the dial plate.

[0012] With the above arrangement where the front face of the annular member displays thereon the initial position, and the REM sleep period extending around the circumferential periphery of the annular member with the initial position as a starting point, the user can easily find the time lying in the REM sleep period of his sleep by rotating the annular member along the circumferential periphery of the dial plate so as to bring the initial position to the time at which the user falls asleep, the current time, or the other time, and checking the time position of the dial plate against the REM sleep period displayed on the front face of the annular member. Whereby, even if the user does not know the presence of REM sleep itself, he can easily set the alarm time in the REM sleep period suitable for easy awakening.

[0013] According to another aspect of the present invention, there is provided an analog alarm clock including a dial plate with time positions thereon, and a rotating member having a circumferential periphery and connected to an hour hand for integral rotation therewith on the dial plate. The rotating member has a front face, which displays thereon a REM sleep period extending

around the circumferential periphery of the rotating member with an initial position of the rotating member as a starting point in such a manner as to be comparable to the time positions displayed on the dial plate. The initial position corresponds to the position of the rotating member, above which the hour hand exists. With this arrangement, the user can easily find the time lying in the REM sleep period of his sleep with the current time regarded as his sleep start time.

[0014] According to still another aspect of the present invention, there is provided a digital alarm clock including a means for stepwisely selecting a REM sleep period as an alarm setting time. With this arrangement, the user can easily set an alarm time in the REM sleep period.

[0015] According to another aspect of the present invention, there is provided a clock simulating indicator including a first member having a circumferential periphery and a design thereon simulating a dial plate of a clock with time positions thereon, and a second member having a circumferential periphery and rotatably connected to the first member. The second member has a front face, which displays thereon an initial position, and a REM sleep period extending around the circumferential periphery of the second member with the initial position as a starting point in such a manner as to be comparable to the time positions on the first member.

[0016] With the above arrangement where the second member has the front face, which displays thereon the initial position, and the REM sleep period extending with the initial position as a starting point the user can easily find the time lying in the REM sleep period of his sleep by rotating either the first member or the second member so as to bring the initial position displayed on the second member to the time position corresponding to the time at which he falls asleep, the current time or the other time, and checking the time position displayed on the first member against the REM sleep period on the second member. After finding the time lying in the REM sleep period by using the indicator, the user sets an alarm time of a separate alarm clock. The user can thus easily set the alarm time in the REM sleep period suitable for easy awakening.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The above, and other objects, features and advantages of the present invention will become apparent from the detailed description thereof in conjunction with the accompanying drawings wherein.

FIG. 1 is a schematic plan view of a dial plate and its periphery of an alarm clock according to a first embodiment of the present invention.

FIG. 2 is a schematic plan view of a dial plate and its periphery of an alarm clock according to a second embodiment of the present invention.

FIG. 3 is a schematic plan view of a dial plate and its periphery of an alarm clock according to a third embodiment of the present invention.

FIG. 4 is a schematic plan view of an indicator according to a forth embodiment of the present invention.

FIG. 5 is a model diagram representative of a common sleep pattern of a healthy adult subject.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0018] With reference to the attached drawings, the description will be made for embodiments of present invention.

[0019] FIG. 1 is a schematic plan view of a dial plate and its periphery of an analog alarm clock according to a first embodiment of the present invention. As illustrated in FIG. 1, an analog alarm clock 10 includes a dial plate 11 with time positions thereon, an annular member 12 rotatably fitted around the circumferential periphery of the dial plate 11.

[0020] The annular member 12 has a front face, which distinctively displays thereon a sleep-onset line 121 with an arrowhead, and non-REM sleep periods 122 and REM sleep periods 128 which extend around the circumferential periphery with the sleep-onset line as a starting point in such a manner as to be comparable to the time positions on the dial plate 11.

[0021] In actual use, the user rotates the annular member 12 to bring the sleep-onset line 121 to the time position displayed on the dial plate 11, at which he desires to fall asleep. For example, when the user falls asleep at twelve at night, the annular member 12 is rotated to allow the arrowhead of the sleep-onset line 121 to stand at the position of "12" on the dial plate 11. Whereby, the times lying in the REM sleep periods can be recognized at sight, and hence remarkably easy alarm setting can be achieved. In the embodiment of FIG. 1, the third REM sleep period 123 is present between the positions of "6" and fifty past "6", so that the user can easily wake up when the alarm time is set in this time period.

[0022] The sleep-onset line 121, the non-REM sleep periods 122 and the REM sleep periods 123 can respectively take various appearances in addition to those illustrated in FIG. 1. For example, a sleep-onset point may be used for the sleep-onset line 121. The REM sleep periods 123 each may have two opposite edges or the start time and finish time displayed in line. Alternatively, the non-REM sleep periods each may be painted in a contrasting color in the manner contrarily to the arrangement of FIG. 1. In addition to the diagrammatic representation in FIG. 1, the elapsed time positions from the sleep onset may be displayed.

[0023] Other than the direct fitting arrangement of the annular member 12 around the dial plate 11, an indirect fitting arrangement via an outer frame or the like fitted around the dial plate 11 may be employed.

[0024] This embodiment may be applied to various analog clocks or watches such as standing clocks, bracket clocks, pocket watches, wristwatches and stop watches.

[0025] The description will be now made for the analog alarm clock according to a second embodiment.

[0026] FIG. 2 is a schematic plan view of the dial plate and its periphery of the analog alarm clock according to the second embodiment of the present invention. As illustrated in FIG. 2, an analog alarm clock 20 of this embodiment includes a dial plate 21 with time positions thereon, and a rotating member 22 connected to an hour hand 23 via the lower surface thereof for integral rotation therewith on the dial plate 21.

[0027] The rotating member 22 has a front face which displays thereon non-REM sleep periods 222 and REM sleep periods 223 in such a manner as to be comparable to the time positions displayed in the circumferential direction on the dial plate 21, with the portion connected to the hour hand 23 regarded as the initial position or starting point. That is, the sleep-onset line 121 in the first embodiment corresponds to the hour hand 23. In this embodiment, the elapsed time positions from the sleep onset is displayed in addition to the diagrammatic representation discriminating the non-REM sleep periods 222 from the REM sleep periods 223, as illustrated in FIG. 2. It is a matter of course that the diagrammatic representation can solely be displayed in the manner as the first embodiment.

[0028] The alarm clock according to this embodiment does not require the user an additional setting in actual use, and hence allows the simple setting of the alarm time. Specifically, the integral rotation of the rotating member 21 and the hour hand 23 allows an instant recognition of the times which lie in the REM sleep periods 223 displayed on the front face of the rotating member 22, with the current time (sleep start time) as an initial setting time of the sleep episode. The user can thus easily set an alarm time of the alarm clock in the REM sleep periods.

[0029] The REM sleep periods 223 and the non-REM sleep periods 222 on the rotating member 22 may respectively take various appearances in addition to those of FIG. 2, and this embodiment is also applicable to various clocks and watches, in the same manner as that of the first embodiment.

[0030] The description will be now made for a digital alarm clock according to a third embodiment of the present invention.

[0031] FIG. 3 is a schematic plan view of the digital alarm clock according to the third embodiment of the present invention. As illustrated in FIG. 3, a digital alarm clock 30 has a timer function, and includes a time display member 31 in the form of an LCD screen, a REM sleep period display member 32 located below the time display member 31 for displaying REM sleep periods therein, alarm time set buttons 33, and time adjust buttons 34 for adjusting the alarm time in each REM sleep period. The digital alarm clock 30 of this embodiment also includes a start button 35 for actuating the timer function after the alarm setting, and a reset button 86 for stopping the alarming, or resetting the alarm time.

[0032] In actual use, the user first selects a particular REM sleep period, during which the alarm signal is to be produced, by means of the set buttons 33. A cursor 311 then appears at the position corresponding to the selected REM sleep period displayed on the REM sleep period display member 32 below the time display member 31, and the setting time simultaneously appears in the center of the time display member 31 ("3:00" in FIG. 3).

[0033] If desired, the alarm time is adjustable within each REM sleep period by the time adjusting buttons 34. Specifically, based upon the fact that each REM sleep continues for a specified time period, and a continuous time period of each REM sleep gradually increases as the time elapses from the sleep onset, the alarm time can be adjusted. For example, when the first REM sleep period with a reference time of 1.5 hr., has been selected, the time adjustable range is 10 minutes. When the second REM sleep period with a reference time of 3.0 hr., has been selected, the time adjustable range is 20 minutes. For the third REM sleep period with a reference time of 4.5 hr., the fourth REM sleep period with a reference time of 6.0 hr., and the fifth REM sleep period, the alarm time is also adjustable within a specified time range of each REM sleep period.

[0034] According to the above arrangement, the timer function is actuated by pressing the start button 35 to sound at the setting time within either one of the REM sleep periods. The alarm time can be reset by pushing the reset button 36.

[0035] As long as the REM sleep periods can be stepwisely selected as the alarm setting time, the present invention can take various forms. For example, the REM sleep period display member 32 is preferably provided along with the cursor 311 for the convenience in setting the alarm time. However, it is possible to employ the arrangement where the REM sleep periods are stepwisely selectable solely by the alarm time set buttons 33 and the time display member 31 adapted to display the alarm setting time at the center thereof. In addition, this embodiment is not necessarily limited to the digital alarm clock having the timer function. Rather, it is applicable to digital alarm in various forms such as standing clock, bracket clock, wristwatch and pocket watch.

[0036] The description will now be made for a clock simulating indicator according to a forth embodiment of the present invention.

[0037] FIG. 4 is a schematic plan view of the clock simulating indicator according to the forth embodiment of the present invention. As illustrated in FIG. 4, an indicator 40 of this embodiment includes a first member 42 having a circumferential periphery and a design thereon simulating the dial plate of a clock with time positions

thereon, a second member 42 having a circumferential periphery and rotatably connected to the lower side of the first member 41 via a pin 43 for the rotation around the pin 42 with respect to the first member 41.

[0038] The second member 42 has a front face, which distinctively displays thereon a sleep-onset line 421 with an arrowhead, and non-REM sleep periods 422 and REM sleep periods 423 which extend around the circumferential periphery of the second member with the sleep-onset line 421 as a starting point in such a manner as to be comparable to the time positions displayed on the first member 41.

[0039] In actual use, the user rotates the second member 42 to move the sleep-onset line 121 to the time position of the first member, at which he desires to fall asleep. Whereby, the times lying in the REM sleep periods can be recognized at first sight and hence remarkably easy alarm setting for a separate alarm clock can be achieved.

[0040] According to the arrangement of the indicator of FIG. 4, the second member 42 has a diameter larger than that of the first member 41. However, the present invention is not necessarily limited to this arrangement. Specifically, the first member 41 may have a diameter larger than the second member 42, as long as the display simulating the dial plate of the clock on the first member 41 is distinguishable from the REM sleep periods 423. Alternatively, both members may have an equal diameter and be overlapped to one another with an upper member made of a transparent material As in the first embodiment, the sleep-onset line 421, the REM sleep periods 423 and the non-REM sleep periods 422 on the second member 42 may respectively take various appearances in addition to those illustrated in FIG. 4.

[0041] This specification is by no means intended to restrict the present invention to the preferred embodiments set forth therein. Various modifications to the alarm clock and the alarm clock simulating indicator, as described herein, may be made by those skilled in the art without departing from the spirit and scope of the present invention as defined in the appended claims.

Claims

1. An analog alarm clock comprising:

a dial plate with time positions thereon; and
an annular member rotatably fitted around said dial;
said annular member having a front face, which displays thereon an initial position, and a REM sleep period extending around the circumferential periphery of said annular member with said initial position as a starting point in such a manner as to be comparable to the time positions on said dial plate.

2. An analog alarm clock comprising:

a dial plate with time positions thereon;
a rotating member having a circumferential periphery and connected to an hour hand for integral rotation therewith on said dial plate; and
said rotating member having a front face, which displays thereon a REM sleep period extending around said circumferential periphery of said rotating member with an initial position of said rotating member as a starting point in such a manner as to be comparable to the time positions on said dial plate, said initial position corresponding to the position of said rotating member above which the hour hand exists.

3. A digital alarm clock comprising;

a means for stepwisely selecting a REM sleep period as an alarm setting time.

4. A clock simulating indicator comprising:

a first member having a circumferential periphery and a design thereon simulating a dial plate of a clock with time positions thereon;
a second member having a circumferential periphery and rotatably connected to said first member; and
said second member having a front face, which displays thereon an initial position, and a REM sleep period extending around said circumferential periphery of said second member with said initial position as a starting point in such a manner as to be comparable to the time positions on said first member.

FIG. 1

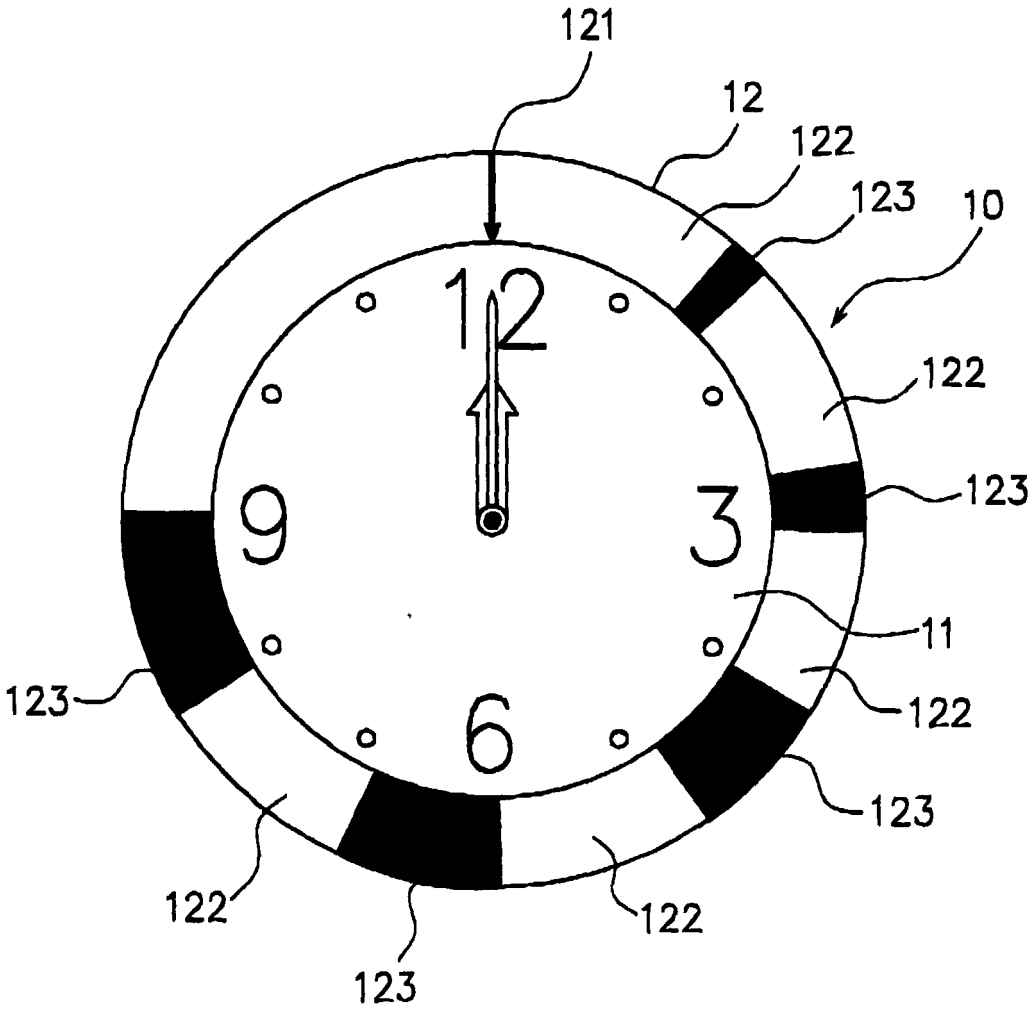
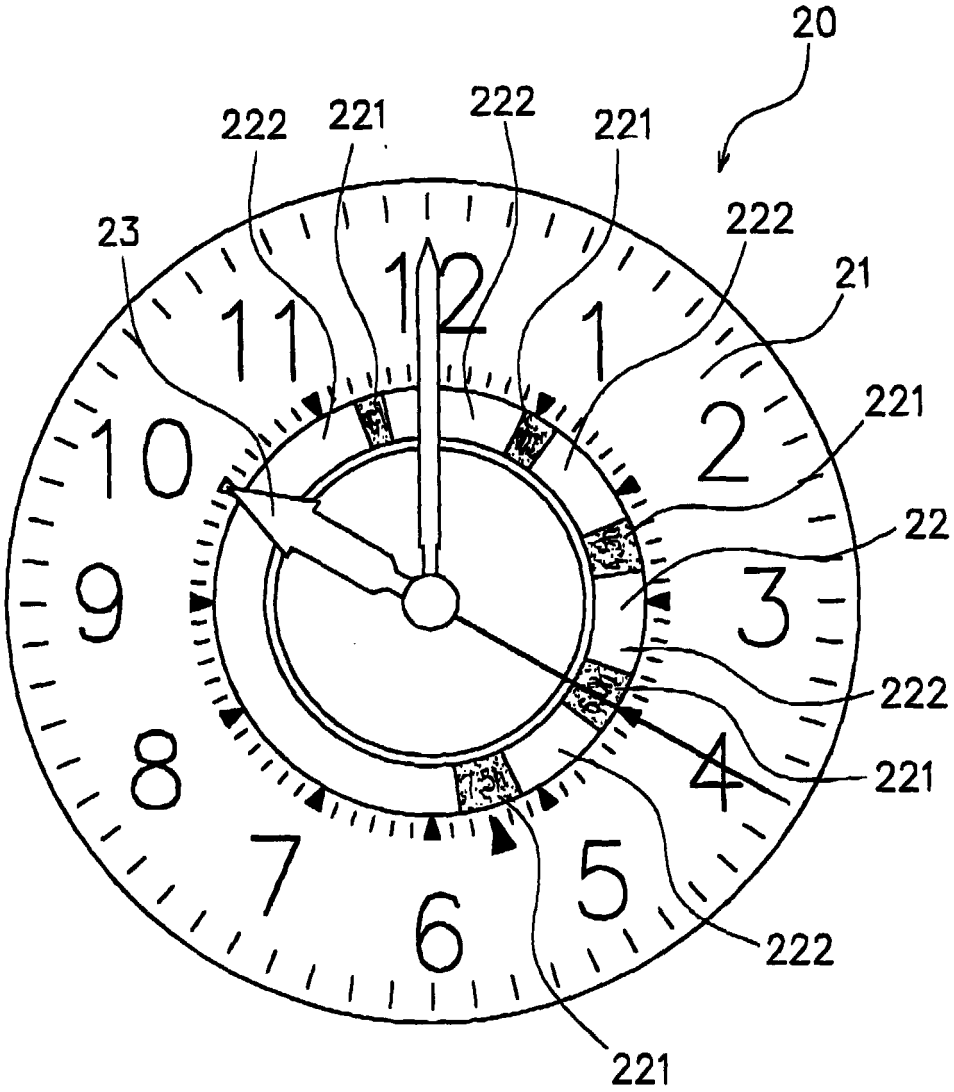


FIG. 2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11

FIG. 3

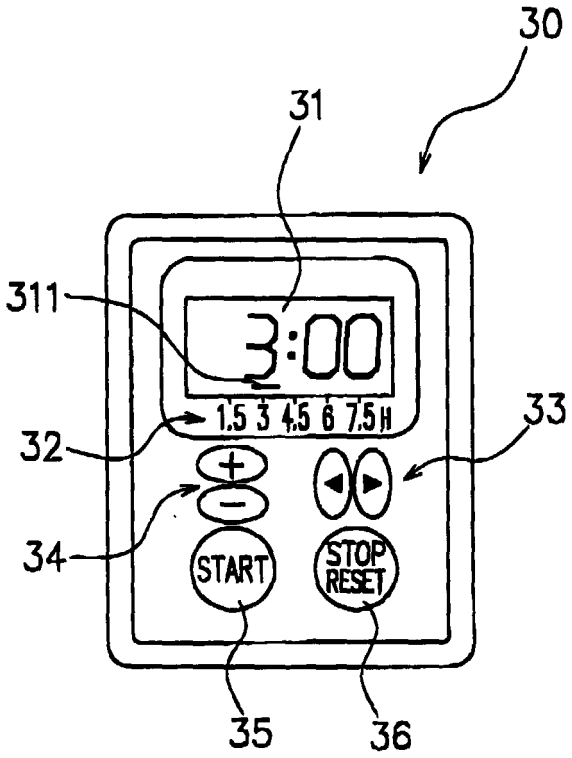

FIG. 4

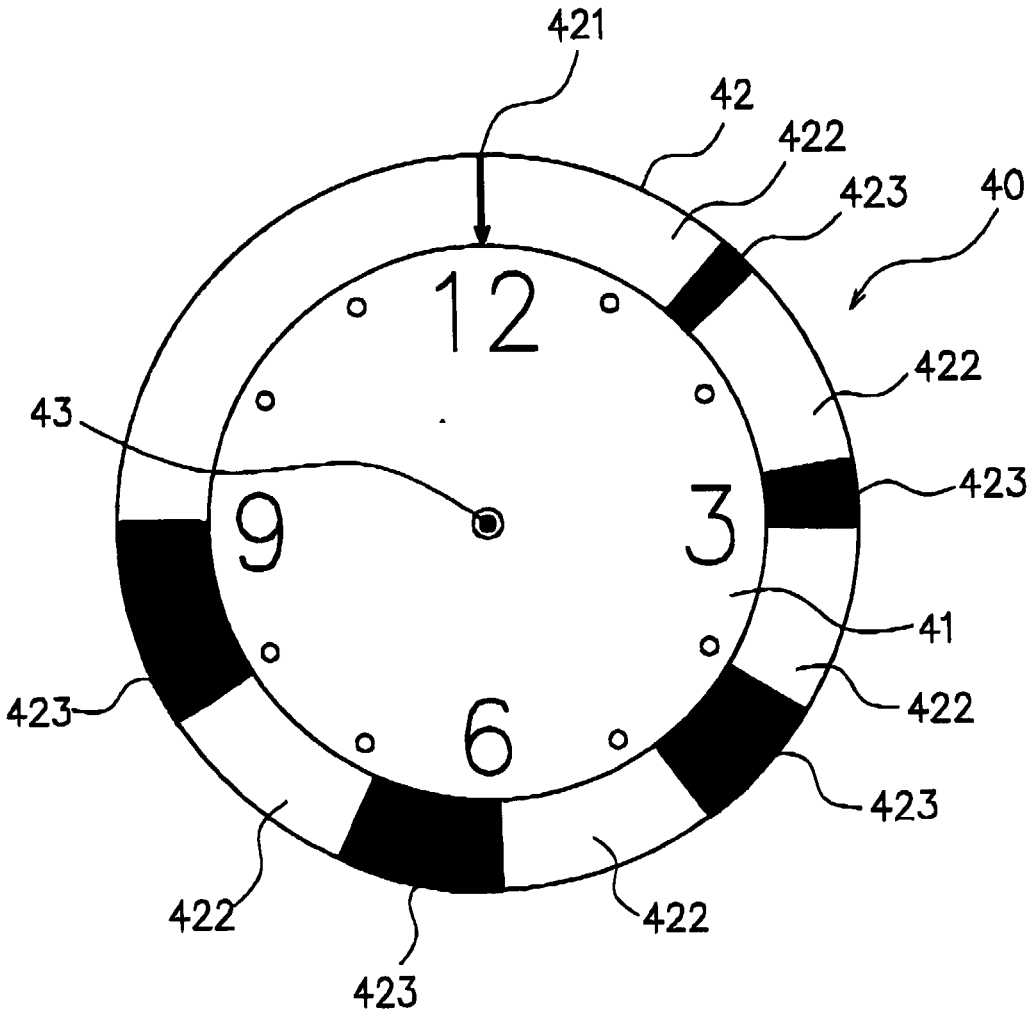

FIG. 5