

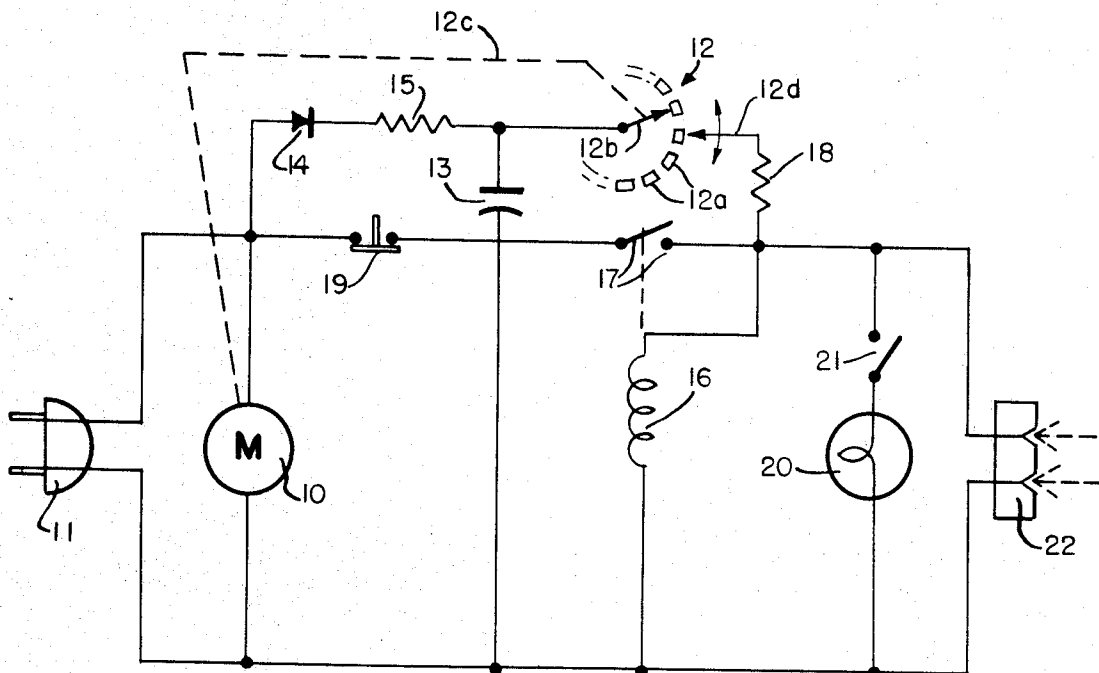
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REMINDER CLOCK

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1

3,533,226 REMINDER CLOCK

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ABSTRACT OF THE DISCLOSURE

A reminder clock includes a settable 24-hour timer arranged to discharge a capacitor, at a preset time of day, through the coil of a relay operative, when energized, to actuate a persistent alarm. The timer and relay circuit includes a manually actuatable interrupt switch operative to de-energize the relay and shut off the alarm, to recycle the clock for alarm operation at the same preset time one day later.

BACKGROUND OF THE INVENTION

Various forms of reminder clocks have been suggested in the past for initiating an alarm or providing some other form of sensible reminder or alerting indication at a preselected time of day. In a broad sense, conventional "alarm clocks" effect an alerting function of this general type. The clock mechanism or circuit employed in conventional alarm clocks is normally set to operate on a 12-hour cycle and, in the absence of premature termination of the alarm, operates to sound or otherwise give an alarm signal for a predetermined relatively short interval of time, after which time the alarm is automatically terminated.

Conventional alarm clocks of the types described above do not, in the absence of special design, normally operate on a 24-hour cycle; and therefore cannot conveniently be used in situations wherein it is desired to give only a single alarm at a preset time of day during a 24-hour cycle, e.g., at 7:00 p.m. (as opposed to both 7:00 a.m. and 7:00 p.m.). Moreover, conventional alarm clocks do not operate to give a persistent alarm for an indefinite period of time, and do not necessarily require human interposition to terminate an alarm once commenced. If, therefore, the alarm commences at a time when no one is within sight or sound of the alarm, the alarm may automatically terminate before a desired reminder function is actually accomplished.

In an effort to modify these operational characteristics of known alarm clocks, more complex timing mechanisms have been suggested in the prior art for performing a reminder function. These more complicated arrangements characteristically include a timing mechanism associated with a settable control mechanism operative to initiate an alarm on a particular day in the future, or at a particular hour in the day. The settable control mechanism takes various forms including notched or punched tapes or cards operative to permit closure of an electrical switch at a particular time; and these known circuits are sometimes arranged to cause an alarm signal to persist until manually terminated. Such persistent alarm arrangements assure that a desired reminder or alerting function is accomplished even though the person to be reminded does not hear or see the alarm until some appreciable time after it has commenced. This particular type of reminder operation is ordinarily effected, however, at considerable increase in the cost and complexity of the overall timer mechanism.

At the present time, no simple, inexpensive reminder clock mechanism is available which, once set to a particular time of day, operates to provide a single alarm

2

during a 24-hour period which alarm persists indefinitely until manually terminated; nor is any such simple or inexpensive timing mechanism available which includes means for quickly resetting the mechanism to terminate an alarm and recycle the clock for the automatic sounding or giving of a further alarm at the same preset time one day later. A simple and inexpensive mechanism of this type is highly desirable, however, particularly for the purposes to be described hereinafter.

Under some circumstances, drug doses must, to be effective, be administered at least once during a 24-hour period. A notable example of this involves the administration of birth control pills which must be taken by a woman daily to be effective. The precise time at which any such pill must be taken is not crucial so long as a required dose is taken during each 24-hour period; but if a single such daily dose is omitted, the entire monthly regimen of pill administration may be rendered ineffective. Because of this characteristic of birth control pill administration, various reminders have been suggested heretofore taking the form of mechanical dispensing devices, mechanical counters, etc.; but such known reminders have been far from effective. Automatic reminder clocks have not been considered for use in reminding a woman to take her daily birth control pill primarily because of the complexity and the resultant relatively great cost which characterizes persistent alarm reminder clocks suggested heretofore.

The present invention is concerned with a timing mechanism capable of use as a pill reminder, and comprising an electrically operative device which is so simple and inexpensive that it can be readily acquired and used by persons of very modest means, and which nevertheless gives a daily, persistent, quickly resettable alarm of the type required to assure the taking of a daily birth control pill.

SUMMARY OF THE INVENTION

The reminder clock of the present invention comprises a 24-hour timer which operates to initiate an audible and/or visual alarm at a specific time of day, e.g., 8:00 p.m., and to maintain the alarm in its "on" condition indefinitely until an acknowledgement switch is depressed. The persistent alarm functions to remind a woman that her daily birth control pill has not yet been taken; and, when the alarm comprises a light placed close to the woman's bed, it stays on and ostensibly interferes with sleep if the subject goes to bed without taking the pill and depressing the acknowledgement switch. Once a pill is taken, and the acknowledgement switch depressed, the light or other alarm is extinguished, and the timing system automatically recycles for renewed operation at the same preset time on the next day.

In a preferred form of the invention, to be described, the timing circuit includes a capacitor adapted to acquire a trickle charge from a main power line. A 24-hour timer, which includes an appropriate time setting mechanism, is arranged to discharge the capacitor through the coil of a relay at a preselected time of day; and the relay, thus energized, closes its own holding contacts, and connects a lamp, other alarm, or power receptacle to the home power line to initiate an alarm signal. The signal continues indefinitely until terminated by a manually actuatable interrupt switch in series with the relay coil; and operation of said manual switch causes the signal to be terminated and automatically recycles the overall mechanism for a further alarm-giving operation at the preset time on the next day.

The specific circuit employed to accomplish the foregoing functions is simple and inexpensive, and lends itself to ready use per se as a reminder mechanism for bedside use, or for incorporation in a conventional alarm

3

clock or clock-radio. Moreover, the circuit arrangement is such that spurious operation of the alarm is positively avoided, thereby to assure that a single persistent alarm is initiated once during a 24-hour period, terminating only upon manual actuation of the interrupt switch, and without possible renewal prior to the next occurrence of the preset time.

BRIEF DESCRIPTION OF THE DRAWING

The drawing comprises a schematic diagram of a preferred reminder clock circuit constructed in accordance with the present invention.

DESCRIPTION OF A PREFERRED EMBODIMENT

The pill reminder of the present invention is essentially an electric clock provided with a 24-hour cycle timer switch for closing a light circuit (for example to a bed lamp), or otherwise initiating an alarm or distinctive signal, at a selected time (e.g. 8:00 p.m.). The alarm then persists after the preselected time until an acknowledgement switch is manually depressed or actuated, even though this does not occur until many hours later. When the acknowledgement switch is finally actuated (for example at 1:00 a.m.) the alarm signal is terminated, and the timer is automatically recycled to turn the light on again or to otherwise re-initiate the alarm, upon next occurrence of the same preselected time (i.e., 8:00 p.m.).

The purpose of the pill-reminder is to remind a person taking birth control pills that she must take her daily pill. By selecting an early evening hour for initiation of the alarm, she minimizes the possibility of going to bed before the alarm commences. She need not be present when the alarm commences, as would be the case with a conventional alarm clock. However, since the alarm persists until acknowledged by appropriate depression of a button, it is practically impossible for her to go to sleep without being reminded to take her pill, i.e., after all room lights have been turned off, a self-contained pill-reminder light or a separate bed lamp will still be on and ostensibly will interfere with sleep.

The pill reminder to be described can be packaged in various forms. It may comprise a separate unit housed in an appropriate casing containing its own alarm device. Indeed, when so packaged the unit may be provided with a drawer holding a supply of pills and so arranged in respect to an acknowledgement switch that the drawer must be opened and reclosed before the alarm is terminated, thus requiring intimate contact with the required pills to terminate the alarm. Alternatively, the device to be described hereinafter may be incorporated into an appropriate housing with a conventional electric alarm clock, and adjustment knobs may be provided to separately regulate the conventional clock and the pill reminder device. The device may also be incorporated into a clock radio of conventional construction. In all of these various embodiments, the alarm may be visual, audible, or a combination of both.

As will become apparent from the subsequent description, moreover, the pill reminder of the present invention, rather than being provided with its own alarm device, can be provided with an electrical receptacle into which external alarm-giving devices may be plugged, e.g., a conventional bed lamp; and the pill reminder in this form operates to provide energization to such an external device at a preselected time. Indeed, in this particular form of the invention, the device can be used for other purposes, e.g., as a general timer to turn on a light in the home, or energize an appliance, at a preselected time.

The drawing illustrates one embodiment of the invention capable of use for the various purposes described above. The timing circuit itself comprises a clock motor 10 connected to a 60-cycle AC line, e.g., through a line cord and plug 11 which is intended to be permanently inserted into a powered outlet receptacle. Clock motor

4

10 continually drives a 24-hour timing switch 12 which, in the form shown in the drawing comprises a plurality of conductive segments 12a, wiper 12b associated with segments 12a and coupled at 12c to motor 10, and a further manually settable wiper 12d also associated with conductive segments 12a. The arrangement is such that wiper 12b completely sweeps all of segments 12a in sequence during each 24-hour period; and the switch 12 is closed, for purposes to be described, when wipers 12b and 12d are both in engagement with the same segment 12a, an event which occurs at a time preselected by the prior positioning of manually movable wiper 12d. Other 24-hour timing arrangements may be used.

A capacitor 13 is connected across the power line, in parallel with motor 10, through a charging circuit comprising a rectifier 14, and a relatively high series trickle charge resistance 15. Charging circuit 14, 15 operates to charge capacitor 13 to approximately peak line voltage under the circumstances to be described hereinafter.

The circuit further includes an electro-mechanical relay comprising a relay coil 16 operating to close a relay contact set 17 when energized. As will be apparent to those skilled in the art, electro-mechanical relay 16, 17 may be replaced by an appropriate solid state switching circuit if desired. In the form illustrated, one end of relay coil 16 is permanently connected to one side of the power line, and the other end of coil 16 is connected via an optional capacitor-discharge resistor 18 of relatively low value to manually settable wiper 12d of the clock switch 12. The upper end of coil 16 is also connected through normally open relay contact set 17, and through a normally closed momentary manually actuatable acknowledgement button 19, to the other side of the line. A resistor of appropriate value, or a suppressor diode, may be placed in shunt with relay coil 16 to suppress contact arcing and radio noise if so desired or required.

The alarm portion of the system comprises a lamp 20 which is connected in parallel with relay coil 16 so as to be connected directly across the line when contact set 17 and acknowledgement button 19 are both closed. Lamp 20 is optional and, if provided, may be connected in series with an on-off switch 21 to permit the lamp circuit to be disabled. In addition, the alarm portion of the circuit includes a power receptacle 22 which is adapted to be connected directly across the main power line when contact set 17 and acknowledgement switch 19 are both closed so as to provide, under these circumstances, power to an external alarm giving device, lamp, or appliance plugged into receptacle 22.

In the operation of the device, manually settable wiper 12d is preliminarily adjusted in position to select a time at which the alarm is to be initiated. The 24-hour timer clock motor 10 continually drives wiper 12b across the various conductive segments 12a so as to close switch 12 only at the selected time. Before this selected time is reached, clock switch 12 is open. Moreover, under these same circumstances, relay coil 16 is not energized, and contact set 17 is open. The only circuit elements connected across the power line under these circumstances, therefore, comprise motor 10, and the capacitor charging circuit 13, 14, 15. Capacitor 13 accordingly acquires a significant charge approximating peak line voltage.

When the time selected by wiper 12d is reached, wipers 12b and 12d engage the same conductive segment 12a thereby closing clock switch 12 and completing a capacitor discharge circuit from capacitor 13 via resistor 18 through relay coil 16. Resistor 18 is optional and, in any event, is of relatively low resistance value, being provided simply to control the discharge time constant and peak current of capacitor 13. The flow of discharge current through coil 16 energizes the relay to close contact set 17; and a holding circuit is accordingly completed across relay coil 16 via contact set 17 and normally closed acknowledgement button 19 to maintain the relay in its energized condition. The holding circuit 17, 19 further

5

supplies line voltage across lamp 20 (assuming that switch 21 is closed) and to power receptacle 22 so as to initiate an alarm simultaneously with energization of coil 16.

Holding circuit 17, 19 assures that relay coil 16, and the alarm-giving elements 20, 22 are maintained in an energized condition even after timer motor 10 moves wiper 12b beyond the segment 12a selected by wiper 12d. Accordingly, the alarm, once initiated, persists. This persistent alarm may be terminated only by depressing acknowledgement button 19, which operates to break the holding circuit for the relay, deenergizing coil 16, opening contact set 17, and deenergizing alarm elements 20 and 22.

It should be noted that capacitor 13, once discharged, cannot be effectively recharged so long as either contact set 17 or clock switch 12 is closed. Accordingly, once the alarm is initiated, it persists until acknowledgement switch 19 is depressed; and until that event occurs, capacitor 13 cannot recharge. This assures that the alarm cannot be inadvertently sounded at some time between depression of acknowledgement button 19 and the next subsequent closure of clock switch 12. This characteristic of the circuit will become more apparent from the following description.

Clock switch 12 may be of the momentary closure type. If this type of switch is employed, momentary closure of switch 12 at the selected time closes contact set 17 in holding circuit 17, 19 to initiate alarm 20, 22. This operation also prevents recharging of capacitor 13 due to shunting of the capacitor charging circuit by the relatively low impedance of coil 16 via holding circuit 17, 19. The fact that switch 12, if of the momentary closure type, operates to reopen immediately after its closure, assures that switch 12 has no further role to play in the circuit operation until next occurrence of the preset time; and operation of the alarm, and recharging of capacitor 13, is governed solely by the holding circuit 17, 19, and more particularly by manual switch 19.

Most commercially available 24-hour timers are not of the momentary closure type, however, and operate to maintain the timer switch in a closed condition for several minutes to an hour following initial closure. This characteristic of commercial 24-hour timers does not alter the operation described.

More particularly, once switch 12 closes, capacitor 13 discharges through relay coil 16 to close contact 17 thereby shunting the capacitor charging circuit by the low impedance of coil 16. This assures that, for this initial condition, capacitor 13 cannot charge. Moreover, the closure of contact set 17 connects alarm 20 and/or 22 directly across the line to initiate the sounding of the alarm. If the person to be reminded is in the immediate vicinity of the reminder clock when the alarm commences, it is possible that she may promptly depress acknowledgement switch 19 at a time when (due to the previously described characteristics of commercial 24-hour timers) timer switch 12 is still closed. The depression of button 19 opens holding circuit 17, 19. Relay coil 16 and alarm 20, 22 will still be connected across the line via closed switch 12, but will under these circumstances be connected to the line through the relatively high resistance 15. Coil 16 is thus prevented from drawing sufficient current through switch 12 to maintain its energized state. By the same token, the energization of alarm 20, 22 is reduced to such value that the alarm is terminated. Moreover, the relatively low impedance of coil 16 is still connected across the capacitor charging circuit via relatively low resistance 18 and switch 12 to prevent recharging of capacitor 13.

Thus if switch 19 is depressed at a time when switch 12 is still closed, the alarm is nevertheless terminated and recharging of capacitor 13 is prevented. This condition will persist until such time as continued drive by motor 10 moves wiper 12b beyond selected segment 12a to remove the low impedance shunt from the capacitor charging circuit, at which time capacitor 13 can commence re-

6

charging. Reinitiation of alarm 20, 22 cannot, however, again take place until such time as wiper 12b again comes into contact with the selected segment 12a.

Thus alarm 20, 22 is initiated and maintained only when and so long as contact set 17 is closed. Moreover, so long as switch 12 is closed, the capacitor charging circuit is shunted by a relatively low impedance, and capacitor 13 cannot charge. These characteristics of the relatively simple circuit illustrated thus assure that a single persistent alarm is initiated only once during a 24-hour period, the alarm terminates only upon manual actuation of switch 19, and the alarm cannot be reinitiated following such actuation of switch 19 until the next subsequent occurrence of the time selected by clock switch 12.

Having thus described our invention, we claim:

1. A reminder clock comprising continuously operable timer means arranged to complete a single cycle of operation in a 24-hour time interval, settable first switch means coupled to said timer means for temporary operation at a single preselected time during said 24-hour time interval, electrically actuatable alarm means, a source of electrical energization, circuit means responsive to said temporary operation of said first switch means for coupling said source to said alarm means to energize said alarm means thereby to initiate an alarm signal at said preselected time, said circuit means including holding circuit means for maintaining said alarm means in an energized state after said preselected time has passed and after said temporary operation of said first switch means has ceased thereby to cause said alarm signal to persist indefinitely, and manually operable second switch means coupled to said holding circuit means for selectively interrupting the energization of said alarm means from said source to terminate said persistent alarm signal.

2. The combination of claim 1 wherein said timer means comprises an electric clock motor connected to said source of electrical energization, said first switch means comprising a movable switch member driven by said clock motor.

3. The combination of claim 1 including capacitor means, charging circuit means coupling said capacitor means to said source for charging said capacitor means, said first switch means being coupled to said capacitor means to discharge said capacitor means in response to said temporary operation of said first switch means, said circuit means including control means responsive to the discharge current of said capacitor means for energizing said alarm means and for closing said holding circuit means.

4. The combination of claim 3 wherein said control means includes an electro-mechanical relay, the coil of said relay being connected to receive said discharge current of said capacitor means, said holding circuit including switching contacts arranged to be selectively closed in response to energization of said relay by flow of said discharge current through said relay coil.

5. The combination of claim 4 wherein said manually operable second switch means comprises a normally closed switch in series with said relay contacts.

6. The combination of claim 1 wherein said alarm means comprises an electrical receptacle connected for selective energization from said source and adapted to plugably receive an external alarm-giving device.

7. The combination of claim 1 wherein said alarm means comprises a lamp.

8. A reminder clock comprising a source of electrical energization, an electric clock motor connected across said source, switch means coupled to said clock motor for operation at a preselected time, capacitor means, means connecting said capacitor means to said source for charging said capacitor means, relay means comprising a coil and contact means arranged to be selectively closed upon energization of said coil, first circuit means including said switch means for selectively connecting said relay coil to said capacitor means to dis-

7

charge said capacitor means through said relay coil to energize said relay coil at said preselected time, electrically operable alarm means, and second circuit means including said contact means for simultaneously connecting said alarm means and said relay coil to said source to initiate and maintain a persistent alarm signal in response to the flow of discharge current from said capacitor means through said relay coil.

9. The combination of claim 8 wherein said second circuit means includes manually operable switch means for selectively disconnecting said relay coil and said alarm means from said source to terminate said persistent alarm signal.

5

10

8

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