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 [21] Appl. No. **812,595**  
 [22] Filed **Apr. 2, 1969**  
 [45] Patented **June 8, 1971**  
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[54] **CLOCK-OPERATED SWITCH TIMING DEVICE  
 WITH IMPROVED MANUAL OPERATING MEANS**  
 6 Claims, 9 Drawing Figs.

[52] U.S. Cl. .... **200/38,**  
**200/172**  
 [51] Int. Cl. .... **H01h 43/10,**  
**H01h 3/02**  
 [50] Field of Search .... **200/38, 39,**  
**172**

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**ABSTRACT:** A clock-operated switch timing device has a dial settable to the time of day and has "on" and "off" pointer arms which when depressed can be shifted to any desired setting on the dial to cause a toggle switch to be operated to "on" and "off" positions at the time settings of the respective arms. The switch is movable bodily out of and back into driving relationship with the pointer arms by manually shifting a selector panel at the side of the device to "manual" and "automatic" positions. An on-off control button is inset in the selector panel and is manually shiftable relative to the panel to operate the switch manually to on and off positions as desired.

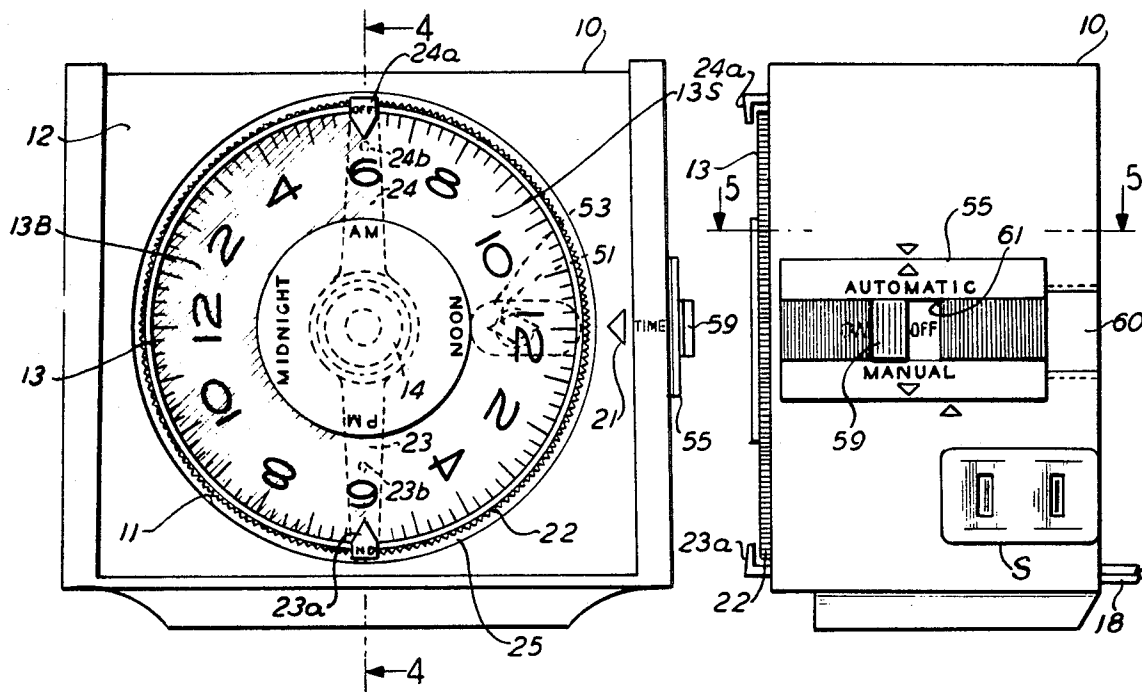


FIG. 1

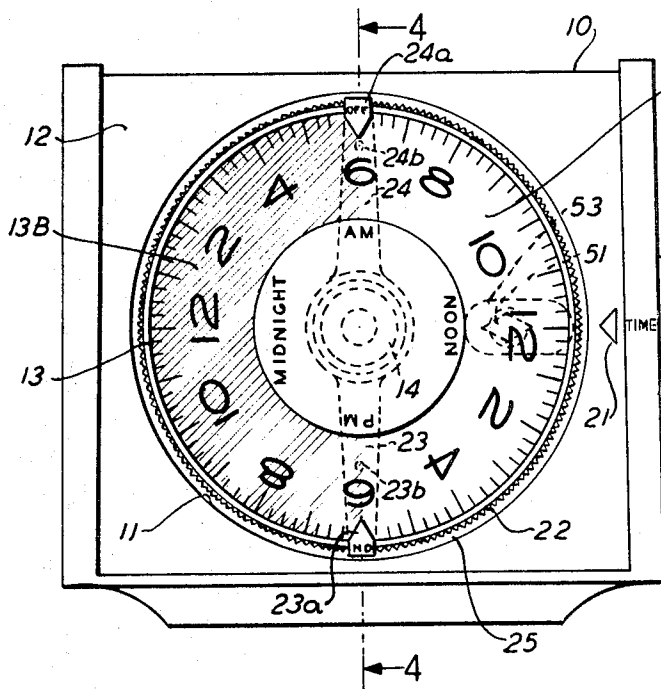


FIG. 2

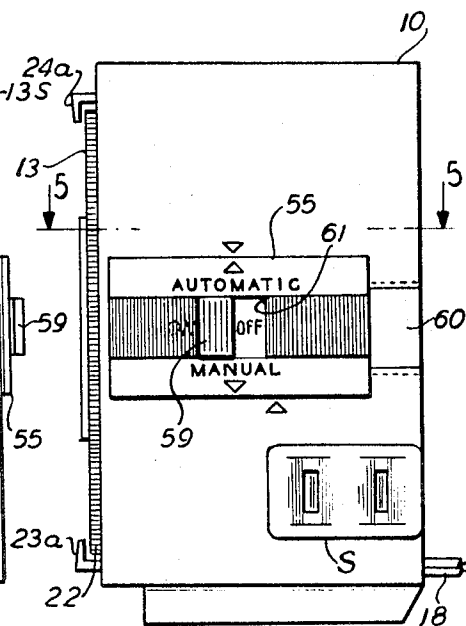


FIG. 3

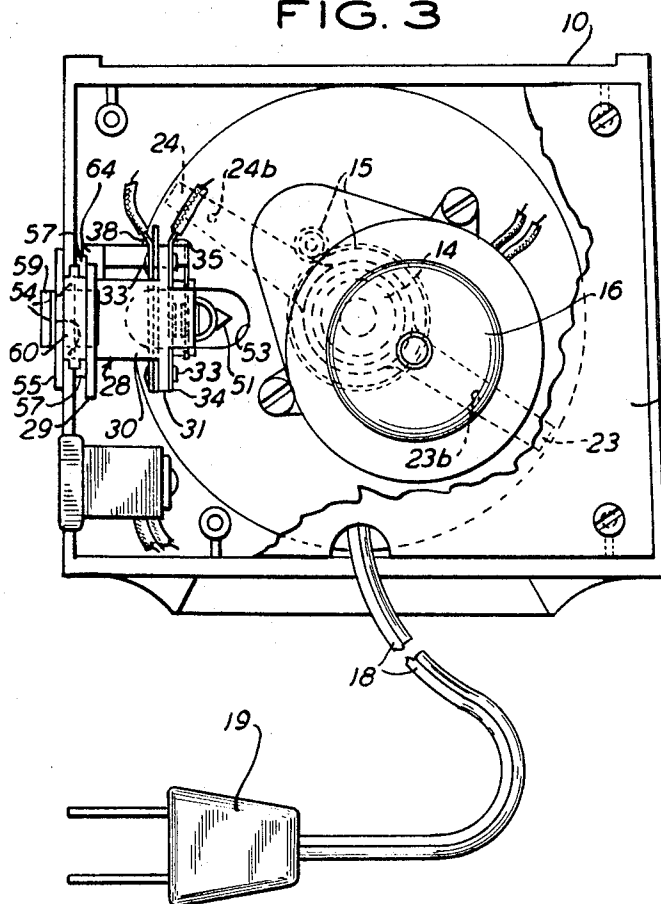
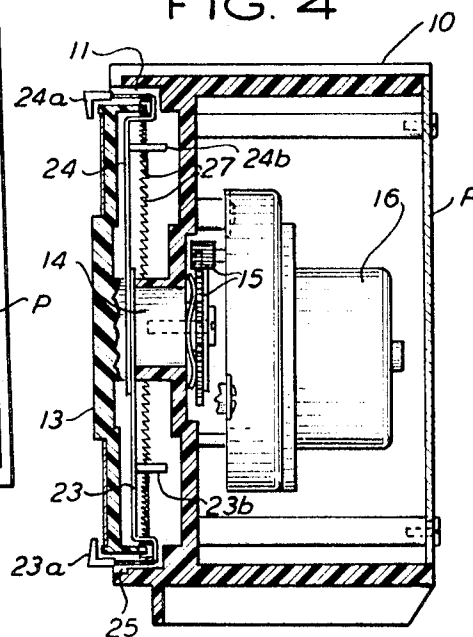


FIG. 4



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FIG. 5

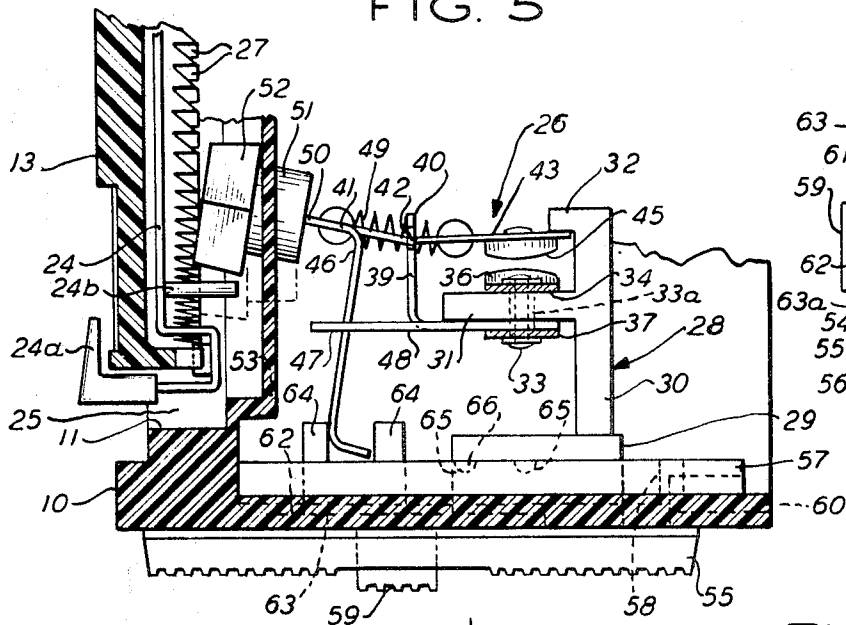


FIG. 8

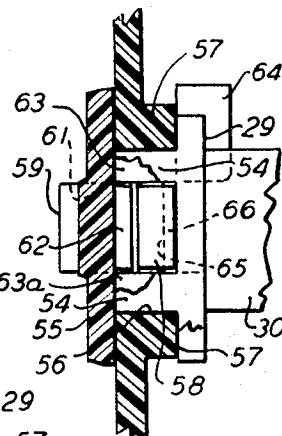


FIG. 7

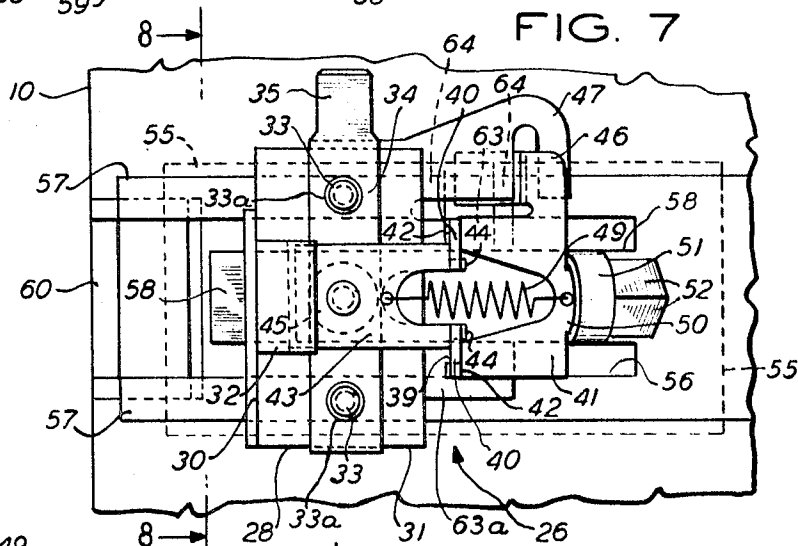


FIG. 9

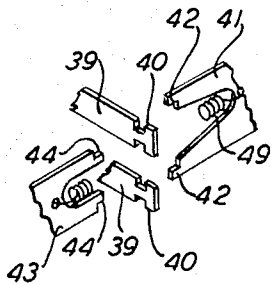
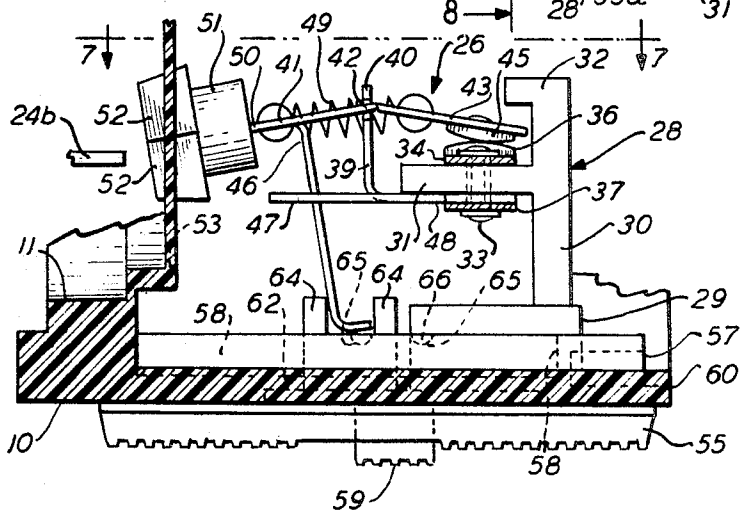


FIG. 6



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# CLOCK-OPERATED SWITCH TIMING DEVICE WITH IMPROVED MANUAL OPERATING MEANS

The present timing device is adapted especially for controlling appliances such as coffee pots, electric heaters, radios, television receivers and other similar devices which are to be turned on and off automatically at preselected times and which are also desirably turned on and off manually at other times. It is only necessary to plug the timing device into a receptacle and plug the appliance into the timing device, and then set the dial at the time of day and set the on and off pointer arms when the appliance is to be turned on and off.

An object of the invention is to provide a clock-operated timing device which can be set conveniently for automatic or manual operation, and which regardless of its manual or automatic setting can be manually operated to on and off positions at will.

Another object is to provide such timing device with a novel control mechanism including a shiftable selector panel on the side of the case for shifting the switch bodily between positions for automatic and manual operation, and an on-off button carried with the selector panel but movable relative thereto to operate the switch manually into on and off positions at will.

Another object is to provide such clock-operated switch timing device which is of a simple, durable and economical construction.

These and other objects and features of the invention will be apparent from the following description and the appended claims.

In the description of my invention reference is had to the accompanying drawings, of which:

FIG. 1 is a front elevational view of the present switch timing device;

FIG. 2 is a right-hand side elevation of this device;

FIG. 3 is a rear elevational view with the back cover removed;

FIG. 4 is a vertical sectional view taken on the line 4-4 of FIG. 1;

FIG. 5 is a fractional horizontal section taken on the line 5-5 of FIG. 2 showing the switch in open position;

FIG. 6 is a view similar to FIG. 5 showing the switch in closed position;

FIG. 7 is a fractional view as seen from the line 7-7 of FIG. 6;

FIG. 8 is a fractional sectional view taken on the line 8-8 of FIG. 7; and

FIG. 9 is a fractional exploded view of the switch activating arm, switch blade and cooperating support arms.

The present clock-operated switch timing device has a molded plastic case 10 of a rectangular shape with an open back. The case has a circular recess 11 in its front wall 12. A dial 13 is set in the recess with clearance around its periphery and with the front portion of the dial projecting beyond the front wall of the case. This dial has a shaft 14 journaled in the case at the center of the recess and coupled by reduction gearing 15 to a small synchronous motor 16 mounted on the back side of the front wall 12. The motor is connected to an electric cord 18 terminating in a male plug 19 to be connected in a suitable receptacle of a 110 volt AC source not shown.

The dial 13 has two time scales on its front face each running from 1 to 12 preferably with one-half face 13S of the dial from 6 AM to 6 PM provided with a silver background and with numbers in black and the other half face 13B of the dial from 6 PM to 6 AM provided with a black background and with numbers in silver. A pointer 21 on the front wall registers with the dial to indicate the time of day. In order that the dial can be set readily to the time of day it has a friction slip coupling with the shaft 14. A toothed peripheral surface 22 on the dial enables it to be gripped firmly so that it can be turned readily by hand.

Pivoted on the shaft 14 at the back side of the dial are two arms 23 and 24 made of spring metal. These arms have outer

end portions bent over to extend forwardly past the periphery of the dial through the space 25 between the dial and the peripheral wall of the recess 11, and have pointers 23a and 24a as of plastic molded on the tips thereof. These pointers register with the rim of the dial so that the time setting of the arms relative to the dial is readily visible. The pointers 23a and 24a are marked "on" and "off" to indicate the function of the respective arms is to shift a switch 26 of the timing device to on and off positions when the time of day reaches the setting of the arms. The arms are biased into latching engagement with a notched edge 27 at the back side of the dial corresponding to the peripheral teeth 22. However, upon depressing the pointers the arms are unlatched from the toothed edge 27 to permit the arms to be shifted to any desired time setting relative to the dial. External connection to the switch is made via a plug socket S.

The toggle switch 26 has a molded plastic frame 28 comprising a base 29 from which extends a post 30 rectangular in cross section. The post has a wing at right angles thereto intermediate the length thereof which forms a terminal board 31. On the outer end of the post is a lug 32 which forms a stop at a spacing from the terminal board. Secured to the outer side of the terminal board 31 by two rivets 33 is a terminal strip 34 having a connector lug 35 at one end and having a switch contact 36 mounted at the center thereof. On the inner side of the terminal board 31 is a metal bar 48 and a terminal strip 37 secured by the same rivets 33 but insulated therefrom by insulating sleeves 33a. The terminal strip 37 has a connector lug 38 (FIG. 3) at one end. The metal bar 48 has two spaced support arms 39 extending from the intermediate portion thereof which are bent over at right angles to extend past the back side of the terminal board 31 (FIGS. 5, 6, 7 and 9). The tip portions 40 of the support arms 39 are notched at both sides. A switch actuating arm 41 of a U-shape has two legs with notched end portions 42 pivotally engaging the outer tip portions 40 of the support arms. Similarly, a U-shaped switch blade 43 has two legs with notched end portions 44 pivotally engaging the inner tip portions of the two support arms. The switch blade carries a switch contact 45 engageable with the contact 36. The actuating arm 41 has a finger 46 at one side passing with clearance through a slotted lug 47 extending from the metal bar 48 (FIGS. 5, 6 and 7). This engagement of the side finger 46 with the slotted lug 47 provides a stop to limit the actuating arm to a definite overcenter movement. A tension spring 49 passing through the space between the tip portions 40 of the support arms 39 is connected at its ends respectively to the central portions of the U-shaped actuating arm 41 and the U-shaped switch blade 43. This spring biases the actuating arm 41 overcenter and biases also the switch blade 43 overcenter against either the stop lug 32 in one direction or the switch contact 36 in the other direction.

The actuating arm 41 has a forwardly extending finger 50 on which is mounted a molded cylindrical cam member 51 having two diametrically opposite tapered ridges 52. This cam member extends through a clearance opening 53 in the front wall 12 of the case and is located with the ridges 52 positioned on a radius line of the dial 13. The on and off pointer arms 23 and 24 have pins 23b and 24b staked respectively thereto at intermediate and outer end portions thereof at a radial spacing of less distance than the diameter from tip to tip of the cam member 51 so that upon movement of the "on" pointer arm 23 past the cam member 51 the actuating arm 41 is cammed outwardly to throw the toggle switch 26 to closed position, and so that when the "off" pointer arm 24 is subsequently moved past the cam member 51 the actuating arm 41 is cammed inwardly to throw the toggle switch to open position.

The base 29 of the switch frame 28 is joined integrally by two spaced tie bars 54 (FIGS. 3 and 8) to a selector panel 55 parallel with the base. In a sidewall of the case is a slot 56 running from near the front wall 12 of the case through the back edge of the sidewall. This sidewall has inner reinforcing ribs 57 along the side edges and closed end of the slot 56. Extending lengthwise of the slot from the rib 57 at the inner end

thereof is a tongue 58 which is inset from the sidewall and flush with the inner side of the rib 57. This tongue has a lesser width than the slot leaving clearance spaces at each side thereof for the tie bars 54. The switch frame 28 is slidably mounted in the slot 56 with the base 29 and selector panel 55 slidably engaging the rib 57 and the outer face of the sidewall respectively, and with the tie bars 54 slidably engaging the edges of the slot 56 and the tongue 58 extending slidably through the space between the two tie bars. The selector panel 55 serves as a finger piece for shifting the toggle switch 26 from its automatic position wherein the switch is operable by the on and off pointer arms 23 and 24 to a manual position wherein the switch is operable only by an on-off control button 59. The selector panel has a length less than the width of the sidewall preferably by approximately the distance of its movement between automatic and manual positions. The end portion of the slot 56 not covered by the selector panel 55 when the panel is in its forward automatic position is closed by a filler strip 60 having a tongue and groove engagement with the ribs 57. This filler strip is secured in place by a back panel P closing the back of the case.

The on-off button 59 is positioned in a central rectangular opening 61 (FIG. 2) provided in the selector panel 55. This button is a projecting part of a slide plate 62 mounted in the slot 56 between the selector panel 55 and the tongue 58. This slide plate has guide flanges 63 and 63a (FIGS. 7 and 8) along its upper and lower edges which extend slidably through the spaces between the tongue 58 and ribs 57 beyond the tie bars 54. On the upper flange 63 beyond the rib 57 are two vertical lugs 64 embracing an end portion of the side finger 46 on the actuating arm 41 to couple the manual on-off button 59 to the toggle switch. Thus, when the control button 59 is in a forward position relative to the selector panel the actuating arm is tilted to open the switch contacts, and when the control button is in a rearward position the actuating arm is reversely tilted to close the switch contacts. These positions of the button are marked by "off" and "on" legends at the sides of the button 59 which are visible respectively when the button is in its forward and rearward positions relative to the selector panel (FIG. 2). Since the control button is carried with the selector panel the switch is not thrown as the selector panel is shifted between automatic and manual positions; vice versa, the switch can be thrown to on and off positions when the selector panel is in either of its automatic or manual positions except when in the automatic position the manual shifting of the switch would be prevented when the pointer arms are engaging the cam member 51.

On the inner face of the middle portion of the tongue 58 are two spaced notches 65 (FIGS. 5 and 6) and on the confronting face of the base 29 is a ridge 66 which registers with the respective notches as the selector panel is moved to automatic and manual positions to detent the selector panel in these positions.

#### I claim:

1. A clock-operated timing device comprising a case, a settable dial on a wall of said case having a center shaft journaled for rotary movement, means for driving said dial at a fixed rate to indicate the time of day by the positioning of the dial relative to the case, an on-off toggle switch having an actuating arm shiftable overcenter to place said switch in on and off positions, said actuating arm having a cam member on the free end portion thereof positioned adjacent to said dial, two switch operating members on said shaft carried with said dial independently manually adjustable to selected time settings relative to the dial, means on said respective switch operating members to engage said cam member at the respective time settings of said switch operating members for operating the switch to on and off positions at said respective time settings, manual means on said case for shifting said switch bodily out of and back into driving relationship with said switch operat-

ing members at will, a frame for said switch slidably mounted on a sidewall of said case and having an exterior finger piece for shifting the switch into and out of driving relationship with said switch operating members, said finger piece having a central opening, and a manual button slidably mounted in said opening and coupled with said actuating arm for manually shifting said switch between on and off positions by movement of the button relative to said finger piece.

2. The switch timing device set forth in claim 1 including a frame for said switch slidably mounted on a sidewall of said case and having an exterior finger piece for shifting the switch into and out of driving relationship with said switch operating members, said finger piece having the shape of a panel provided with a central opening, and a manual button slidably mounted in said opening and coupled with said actuating arm for manually shifting said switch between on and off positions by movement of the button relative to said panel.

3. A clock-operated timing device comprising a case, a settable dial on a wall of said case having a center shaft journaled for rotary movement, means for driving said dial at a fixed rate to indicate the time of day by the positioning of the dial relative to the case, an on-off toggle switch having an actuating arm shiftable overcenter to place said switch in on and off positions, said actuating arm having a cam member on the free end portion thereof positioned adjacent to said dial, two switch operating members on said shaft carried with said dial independently manually adjustable to selected time settings relative to the dial, means on said respective switch operating members to engage said cam member at the respective time settings of said switch operating members for operating the switch to on and off positions at said respective time settings, manual means on a sidewall of said case for shifting said switch bodily out of and back into driving relationship with said switch operating members at will. Said sidewall having a slot parallel with said shaft running out of the back of the sidewall, and said switch having an integral frame provided with inner flanges and an outer selector panel slidably embracing respectively the inner and outer faces of said sidewall lengthwise of said slot, said selector panel constituting a finger piece for bodily shifting said switch.

4. The switch timing device set forth in claim 3 wherein said sidewall has a tongue of lesser width than said slot inset from the outer face of said sidewall and running from the closed end of the slot to a distance short of the back end of said panel, and a detent between said tongue and said frame for releasably retaining the switch in its respective positions wherein it is in and out of driving relationship with said switch operating members.

5. The switch timing device set forth in claim 3 including a filler piece in the outer end of said slot to close the portion of the slot which is exposed when said selector panel is in its forward position, and means on the back side of said case retaining said filler member in said slot.

6. The switch timing device set forth in claim 3 wherein said sidewall has a tongue of lesser width than said slot inset from the outer face of said sidewall and extending from the closed end of said slot towards the open end of the slot, and said selector panel has a central rectangular opening, including a slide member interposed between said selector panel and said tongue and having a central button in said opening having a width less than the length of said opening and forming a finger piece whereby said slide member can be manually shifted lengthwise of said slot, said slide member having top and bottom flanges embracing said tongue and top and bottom lugs extending from said flanges and embracing the inner face of said sidewall, and a side finger on said actuating arm having a portion engaging one of said lugs for causing said actuating arm to be shifted to open and close said switch as the slide member is shifted manually relative to said selector panel.