

Fig. 1.

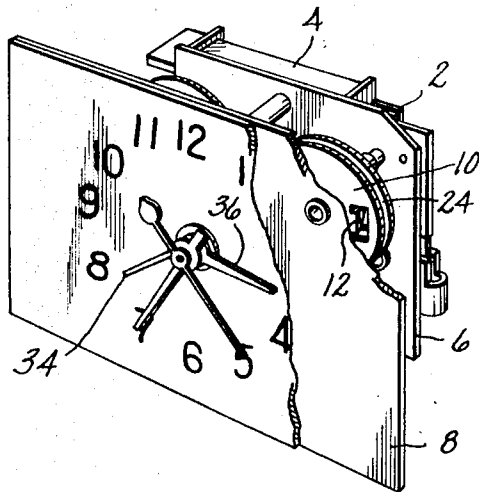


Fig. 2.

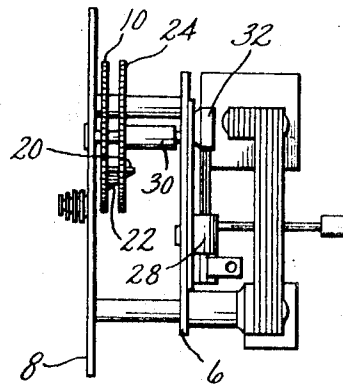


Fig. 5.

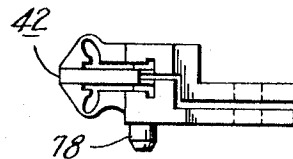


Fig. 3.

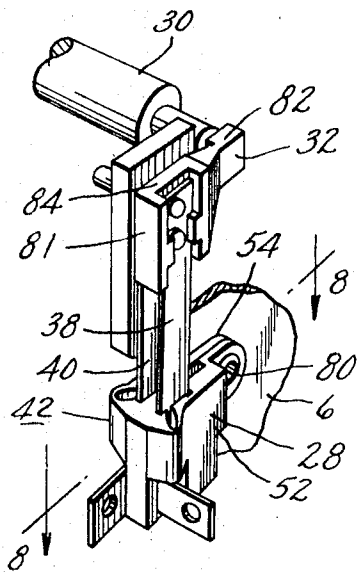


Fig. 4.

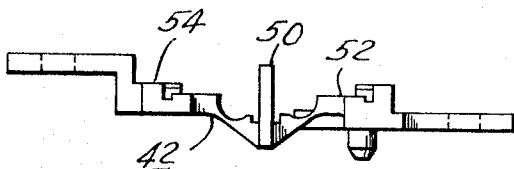
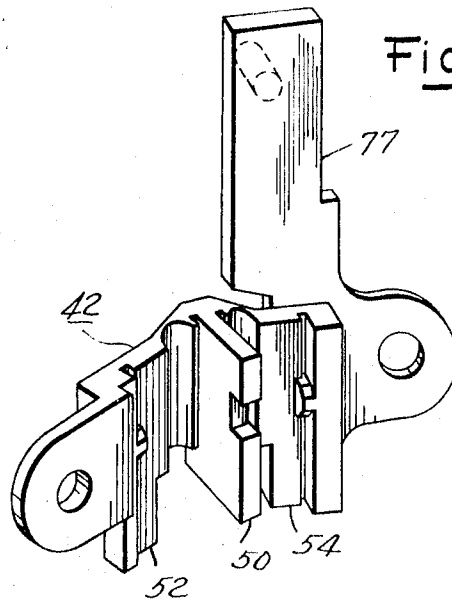
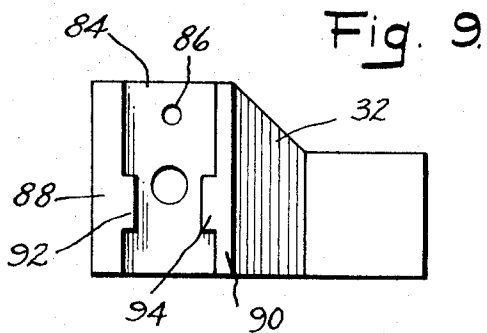
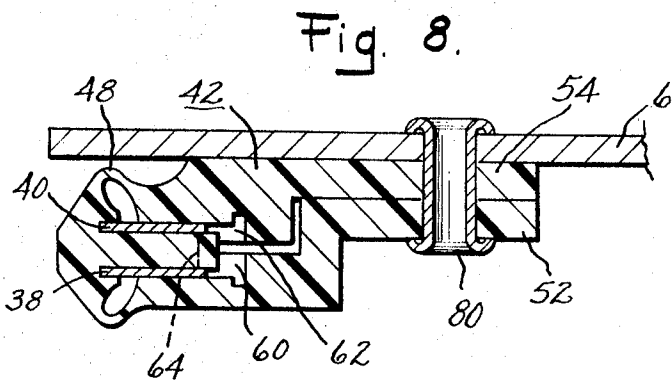
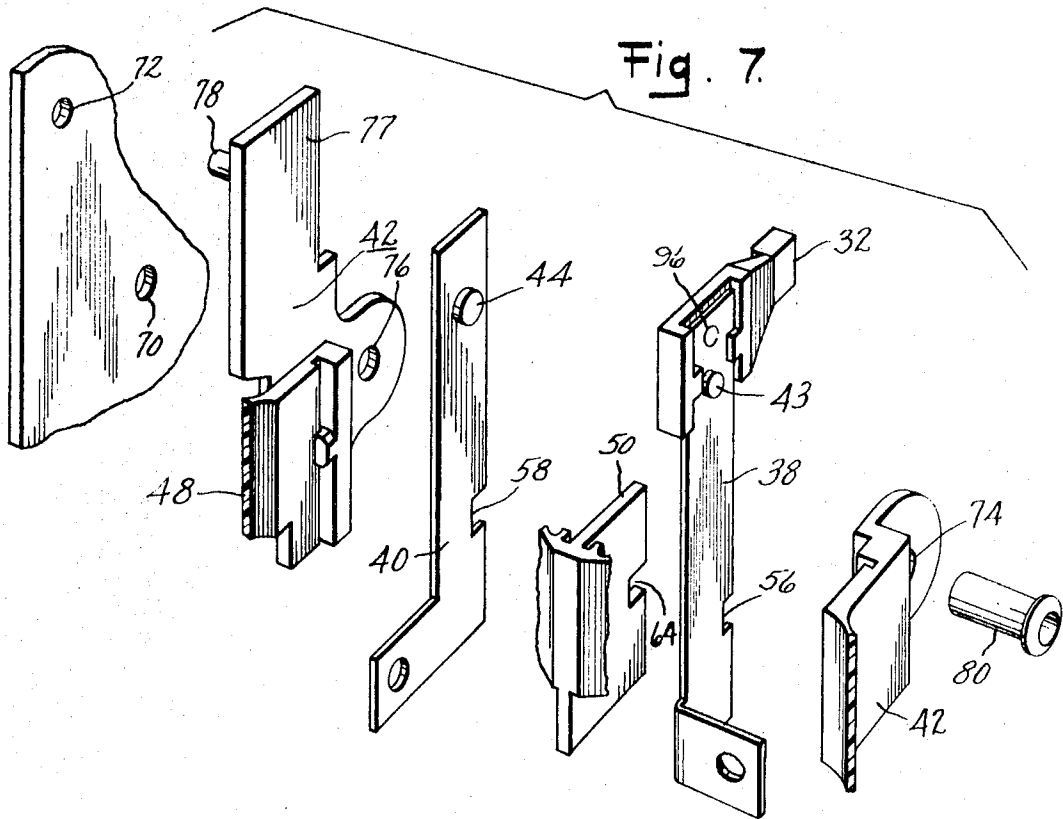


Fig. 6.



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CLOCK TIMER SWITCH

BACKGROUND OF THE INVENTION

This invention relates to a clock timer, and more particularly, to an improved switch and switch-mounting arrangement for a clock radio timer.

It is well known in the clock radio timer art to provide a switch which is automatically closed at a preset time in order to turn on a radio so that one may wake up to music. A known timer of this type is shown in a prior U.S. Pat. No. 3,432,625 to Polonsky dated Mar. 11, 1969, assigned to the same assignee as the present invention. As shown in the patent coaxially mounted gears are provided with interacting cam surfaces for causing relative axial movement of the gears at a predetermined time for actuating a switch. My invention is concerned with such a clock timer and particularly a switch mechanism for such a clock timer which may be inexpensively manufactured and readily connected to the timer using a minimum number of parts.

SUMMARY OF THE INVENTION

Accordingly, it is a primary object of this invention to provide an improved switch arrangement for a clock timer having a minimum number of parts which may be readily manufactured and assembled to each other.

In accordance with one of the aspects of this invention, a mounting plate of a clock timer is formed with an aperture for receiving a unique switch mounting block. The switch-mounting block is formed of a single piece of plastic material and includes a generally flat central portion and two generally flat side portions which are connected to the central portion by integrally formed flexible hinges. In this manner, the side portions may be folded toward the central portion as the covers of a book may be folded toward the body of the book. A pair of switch blades are uniquely gripped in spaced relationship between the central portion and the side portions of the mounting block. Both of the side portions of the mounting block are provided with apertures of approximately the same size as the aperture which is formed in the mounting plate of the clock and a suitable eyelet, rivet or screw is placed through the apertures in the side portions of the switch mounting block and the aperture in the mounting plate for effectively holding the switch-mounting block and the switch blades on the clock-supporting structure. Moreover, the side portion of the switch-mounting block which is positioned in contact with the mounting plate of the clock may be provided with a protuberance which extends into another aperture formed in the switch-mounting plate for preventing any pivotal movement of the switch-mounting block and the switch blades about the rivet or eyelet.

With this arrangement, a unique switch and switch-mounting arrangement having a minimum number of parts may be readily mounted on a clock timer. Thus, a very simple yet effective construction has been achieved.

BRIEF DESCRIPTION OF THE DRAWING

Other specific and attendant advantages of this invention will be apparent from the following description taken in connection with the accompanying drawing in which:

FIG. 1 is a front perspective view of a clock radio timer embodying my invention with parts broken away to show details of construction;

FIG. 2 is a right side elevational view of the clock timer shown in FIG. 1;

FIG. 3 is a perspective view of my improved switch and switch-mounting arrangement;

FIG. 4 is a side elevational view of my improved switch-mounting block in its flat or open position;

FIG. 5 is a side elevational view of my unique switch block in its closed position;

FIG. 6 is a perspective view of my unique switch block in a partially opened position;

FIG. 7 is an exploded perspective view of my unique switch block, switch blades and clock-mounting plate construction with hinge portions of the switch block broken away to show details of construction;

FIG. 8 is a cross-sectional view of the switch block and switch blade construction taken along the line 8-8 of FIG. 3; and

FIG. 9 is a top plan view of my switch actuator construction.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawing and first particularly to FIGS. 1, 2 and 3, there is shown a clock timer which includes my unique switch and switch-mounting arrangement. As shown in FIG. 1, the clock timer may be driven by a conventional timing mechanism including a self-starting synchronous motor. Portions of the motor stator magnet core and energizing coil are shown at 2 and 4, respectively.

A supporting structure including a baseplate 6 and a front plate 8 spaced from plate 6 and arranged generally parallel thereto is provided for supporting the clock mechanism. A cam gear member 10 having a projecting cam portion 12 located thereon is rotatably mounted on the supporting clock framework. The cam portion 12 comprises an abrupt axially extending surface 20 located on one side thereof and a sloping surface 22 located on the other. A second cam gear member 24 having abrupt cam surfaces formed by a slot 26 is also rotatably mounted on the clock supporting structure, and is axially movable to actuate my unique switch arrangement 28. As shown more particularly in FIGS. 2 and 3, the axially movable cam gear 24 is fixed to a shaft 30 which extends rearwardly through an aperture 31 in baseplate 6 for cooperation with my unique switch actuator 32.

The position of cam gear 10 and the alarm set time is indicated on a face of the clock timer by an indicating hand 34 in a manner well known in the art. Also, in a manner well known in the art, cam gear member 24 is driven by the timing mechanism of the clock through a suitable gearing arrangement so that it makes one revolution every twelve hours, and its position is indicated on the face of a clock by hour hand 36. The principle portions of the structure so far described are illustrated and described in greater detail in U.S. Letters Patent No. 2,768,332, issued Oct. 23, 1956 to D. E. Protzmann et al. and assigned to the same assignee as the present invention.

SWITCH AND SWITCH MOUNTING ARRANGEMENT

According to this invention, there is combined with the aforescribed alarm clock elements a uniquely designed and positioned switch and switch-mounting arrangement 28. With particular reference to FIGS. 2, 3 and 7, it can be appreciated that the switch includes a pair of switch blades 38 and 40 having a pair of switch contacts 43 and 44 mounted at their upper ends. The rearwardly extending shaft 30 of the cam gear member 24 normally abuts the end of switch actuator 32 to hold the switch blades in a spread-apart or open position. At the time preset by hand 34 and its associated cam gear 10, the abrupt cam surface 20 on cam gear 10 becomes aligned with the abrupt cam gear surface formed by slot 26 and the cam gear 24 and its associated shaft 30 moves rapidly toward the time set cam gear 10 to the position shown in FIG. 2. During this movement, the end of shaft 30 is moved forwardly to thereby permit the switch actuator 32 to also be moved forwardly to close switch contacts 43 and 44.

The improved switch arrangement 28 includes a uniquely formed and positioned switch-mounting block 42 for holding the switch blades 38 and 40, and for inexpensively mounting the switch blades on the clock-supporting plate 6. As shown more particularly in FIGS. 4, 5 and 6, the unique switch block may be integrally molded of Noryl, nylon or other suitable material which may be provided with integral hinges 46 and 48 that can be folded without breaking the plastic. As shown, the integrally formed switch block includes a generally flat central wall portion 50 and two generally flat sidewall portions 52 and 54 for permitting the switch blades 38 and 40 to be

conveniently gripped between the sidewall portions 52 and 54 and the central wall portion 50.

As shown more particularly in FIGS. 6 and 7, each of the switch blades 38 and 40 are provided notches 56 and 58 which are received by complementary studs 60 and 62 which are integrally formed with the sidewall portions 52 and 54 of the unique switch block. The central wall portion 50 of the unique switch block is also provided with a notch 64 for receiving the projecting studs 60 and 62 in order to securely hold the switch blades on the switch block without permitting longitudinal movement of the blades. As shown more particularly in FIG. 8, in assembled position stud 62 on wall 54 extends within the notch 58 of switch blade 40 and partially within the notch 64 in the central wall of the switch block, and stud 60 on wall 52 extends through notch 56 of switch blade 38 and partially within notch 64 formed in the central wall 50 of the switch block. By this construction, the switch blades are securely held on the switch block in spaced-apart relation and are prevented from longitudinal movement by the studs 60 and 62. It can also be appreciated that the formed inner walls 66 and 68, respectively, of wall portions 52 and 54 of the switch block prevent lateral movement of the switch blades 38 and 40.

My unique switch block is also provided with integrally formed means for holding the switch block 42 on the supporting plate 6 of the clock timer structure. As shown more particularly in FIG. 7, the mounting plate 6 of the clock is formed with two spaced-apart apertures 70 and 72 and the switch block is provided with apertures 74 and 76 formed at sidewall portions 52 and 54, respectively. As shown more particularly in FIGS. 7 and 8, the apertures 74 and 76 are approximately the same size as aperture 70 and a suitable eyelet or screw 80 may be passed through these apertures for securely holding the mounting block on the baseplate 6 of the clock.

As shown more particularly in FIGS. 6 and 7, the sidewall portion 54 of my unique switch block 42 includes an upwardly extending portion 77 and a protuberance 78 extends rearwardly from portion 77 and is received within aperture 72 of the timer-mounting plate 6. With this construction the protuberance 78 and its cooperating aperture 72 prevent any pivotal movement of the switch-mounting block 42 and the switch blades about the eyelet or screw 80.

My improved switch construction also includes a unique integrally formed actuator 32 which may be readily slid onto the contact end of switch blade 38. The actuator 32 may also be integrally formed of Noryl plastic, and as shown more particularly in FIG. 3, it includes a generally U-shaped sleeve portion 80 for receiving switch blade 38 and a laterally extending portion 82 for cooperation with the rearwardly extending shaft 30 of gear 24. As shown more particularly in FIG. 9, the sleeve portion includes a bottom wall 84 having a recess 86 formed therein and two sidewall portions 88 and 90 having inwardly extending projections 92 and 94 formed thereon. With particular reference to FIG. 7, it can be seen that the switch blade 38 is provided with an inwardly extending dimple 96 for cooperating with the recess 86 formed in the bottom wall of the sleeve portion of the switch actuator. With this arrangement the switch actuator 32 may be readily connected to the switch blade 38 by simply sliding the sleeve portion 86 onto the end of blade 38. Thus, the end of the blade 38 is slid under the outwardly extending projections 92 and 94 so that the inside surface of the switch blade slides on the inside of the bottom wall 84 of the switch actuator until the dimple 96 on the switch blade becomes aligned with the recess 86 in the sleeve portion and at that moment the dimple 96 on the switch blade snaps into the recess 86 on the sleeve portion to securely hold the switch actuator 32 to the switch blade 38.

From the foregoing description, it will be appreciated that my unique switch and switch-mounting arrangement is achieved with the use of a minimum number of parts which are uniquely formed and connected to each other so that the switch may be readily connected to an existing clock-supporting structure. In order to mount the switch blades, it is merely

necessary to place the blades between the central portion 50 and the side portions 52 and 54 of the switch block, close the side portions of the switch block and place an eyelet or screw 80 through the switch block and aperture 70 in the clock-mounting plate. During this operation, it can also be appreciated that the rearwardly extending protuberance 78 on the switch block will be positioned within aperture 72 on the clock-supporting plate 6. In order to connect the actuator 32 to the switch, it is merely necessary to slide the sleeve of the actuator onto the end of switch blade 38. Thus, an exceedingly simple yet reliable switch and switch-mounting structure has been achieved.

What I claim is:

1. In a clock timer mechanism the improvement comprising:
 - a. a supporting structure including a baseplate having an aperture formed therein;
 - b. a switch-mounting block formed of a single piece of plastic material, said block including a generally flat central portion and two generally flat side portions connected to the central portion by integrally formed flexible hinges;
 - c. a pair of switch blades, one of said switch blades being gripped between the generally flat central portion of said switch block and one of the flat side portions of said block, and the other switch blade being gripped between the generally flat central portion of said block and the other flat side portion of said block;
 - d. an aperture formed in each of the side portions of said mounting block, said apertures being approximately the same size as the aperture which is formed in said baseplate; and
 - e. securing means extending through the apertures formed in the side portions of said switch block and the aperture formed in said baseplate for securely holding said switch blades in spaced relation to each other and to said clock baseplate.
2. A clock timer mechanism as defined in claim 1 wherein another aperture is formed in said mounting plate and a protuberance formed on one of the flat side portions of said block extends through said aperture for preventing pivotal movement of the switch-mounting block and the switch blades about the securing means.
3. A clock timer mechanism as defined in claim 1 wherein notches are formed in each of said switch blades and inwardly extending studs are integrally formed in each of the side portions of said switch-mounting block for insertion within said notches in order to prevent longitudinal movement of said switch blades with respect to said switch-mounting block.
4. A clock timer mechanism as defined in claim 1 wherein a notch is formed in the generally flat central portion of said switch block and the studs on each of the side portions of said switch block extend part way into the notch formed in the central portion of said switch block.
5. A clock timer mechanism as defined in claim 1 wherein a switch actuator is fixed to one of said switch blades and said switch actuator comprises:
 - a. a generally flat sleeve portion having a bottom wall and two upstanding sidewalls;
 - b. a recess formed in the bottom wall of said switch actuator for cooperating with a dimple formed on the said switch blade; and
 - c. inwardly extending studs integrally formed on said sidewalls of said actuator for holding said switch blade whereby said actuator may be quickly connected to said switch blade by simply pushing said sleeve over said blade with the blade passing between said bottom wall and said inwardly extending studs until said dimple snaps into said recess to thereby securely hold said actuator on said switch blade.
6. A clock timer comprising:
 - a. a supporting structure including a baseplate having a plurality of apertures formed therein;
 - b. a timing mechanism mounted on said baseplate;

- c. a cam gear wheel and a shaft rotatably mounted on said supporting structure and continuously rotated as a function of time by said timing mechanism, said shaft extending through one of the apertures formed in said baseplate, said cam gear wheel and said shaft being axially movable at a preset time for actuating a switch; 5
- d. a switch-mounting block formed of a single piece of plastic material, said block including a generally flat central portion and two generally flat side portions connected to the central portion by integrally formed flexible hinges; 10
- e. a pair of switch blades, one of said switch blades being gripped between the generally flat central portion of said switch block and one of the flat side portions of said block, and the other switch blade being gripped between the generally flat central portion of said block and the other flat side portion of said block; 15
- f. an aperture formed in each of the side portions of said mounting block, said apertures being approximately the same size as another one of the apertures which is formed 20

- in said baseplate;
- g. securing means extending through the apertures formed in the side portions of said switch block and the another one of the apertures formed in said baseplate for securely holding said switch blades in spaced relation to each other and to said clock baseplate;
- h. an integrally formed actuator positioned between said cam gear wheel shaft and one of said switch blades for moving said of one of said switch blades to close the switch when said cam gear wheel is moved axially at the present time.
- 7. A clock timer as defined in claim 6 wherein said actuator includes a generally flat bottom wall and two upstanding sidewalls for securing the actuator to said switch blade.
- 8. A clock timer as defined in claim 7 wherein an outwardly extending dimple is formed on the end of said one of said switch blades for reception in a recess formed in the bottom wall of said actuator for holding said actuator on said switch blade.

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