May 17, 1960 L. J. LAVIANA ET AL 2,937,247

SWITCH TIMER ATTACHMENT

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FIG. 1

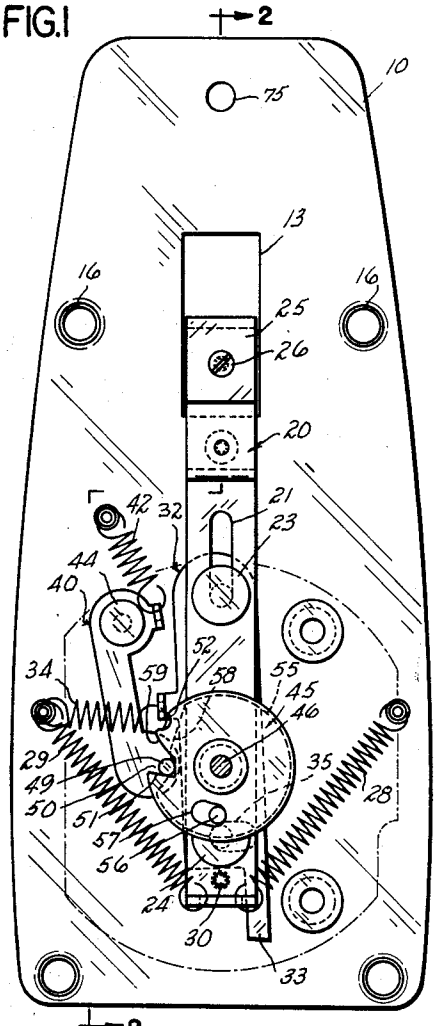
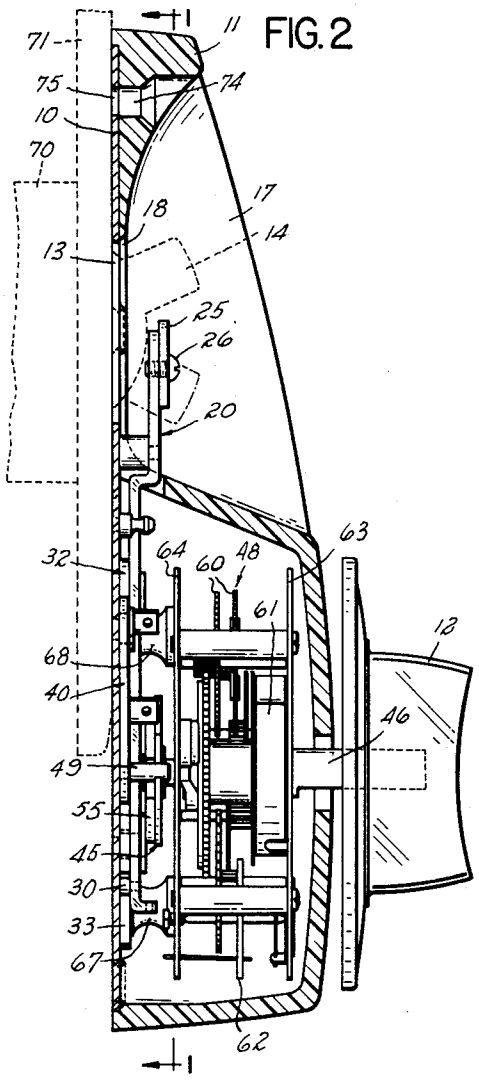


FIG. 2



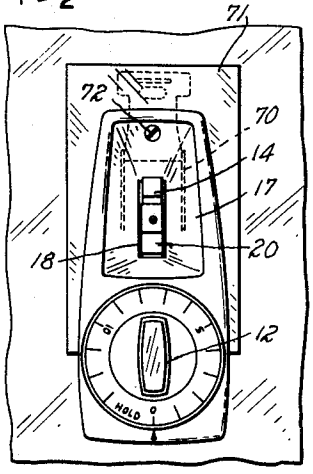


FIG. 3

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FIG. 4

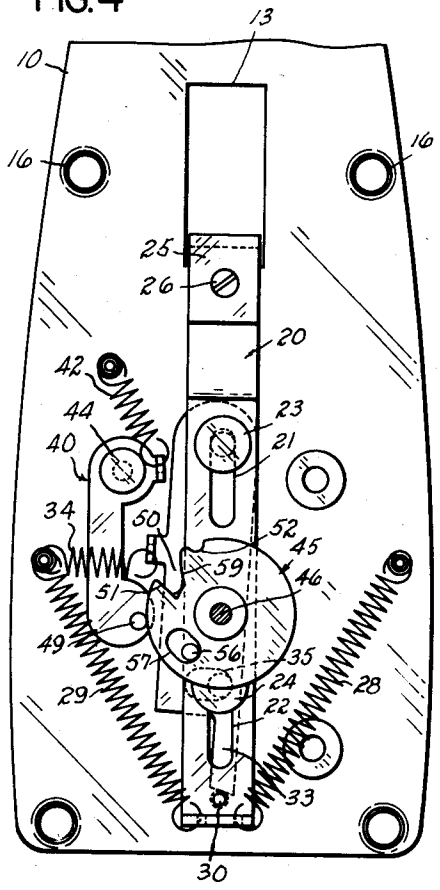
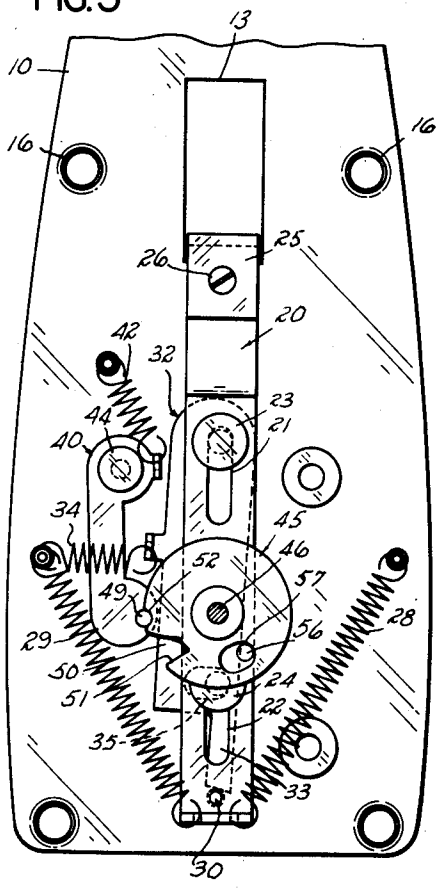


FIG. 5



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SWITCH TIMER ATTACHMENT

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8 Claims. (Cl. 200—38)

This invention generally relates to devices for automatically operating switches and more particularly to an attachment for operating toggle switches of the type ordinarily used in house lighting circuits, etc., after the lapse of a pre-determined time interval.

It is an object of this invention to provide a toggle switch timer that is easily installed as an attachment for toggle switches and which can be used to turn a switch "on" or "off" after the lapse of a timed interval.

A further object of this invention is to provide a toggle switch timer that is easily installed as an attachment for standard toggle switches by utilizing the standard switch wall plate mounting fixtures.

It is an additional object of this invention to provide a toggle switch timer attachment having improved appearance features while permitting easy installation for effective operation of standard toggle switches.

Other objects will be in part obvious and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereafter set forth and the scope of the application of which will be indicated in the appended claims.

In the drawings:

Fig. 1 is a cross-section view of a preferred embodiment of the mechanism taken along the lines 1—1 of Fig. 2;

Fig. 2 is a partial cross-section view of the operating mechanism taken generally along the lines 2—2 of Fig. 1;

Fig. 3 is a front elevation view of the timer installed on a conventional toggle switch;

Fig. 4 is a partial cross-section view taken along the lines 1—1 of Fig. 2 with the operating mechanism in the timing position; and

Fig. 5 is a partial cross-section view taken along the lines 1—1 of Fig. 2 with the operating mechanism in the "hold" position.

Referring to the drawings and particularly Figs. 2 and 3, it is seen that a preferred embodiment of the switch timer of this invention includes a base or mounting plate **10**, a cover **11** and a timer operating handle **12**. Plate **10** is provided with a generally rectangular opening **13** dimensioned so that the sidewalls thereof are closely adjacent the conventional toggle switch operating handle **14** but do not interfere with the normal longitudinal operation of handle **14**. Cover **11** is releasably secured to plate **10** by conventional fasteners which pass through apertures **16** to engage the sidewalls of cover **11**. Access to switch handle **14** is provided through aperture **17** in cover **11**, aperture **17** having sidewalls which taper inwardly to describe an inner aperture **18** whose dimensions are approximately the same as those of aperture **13** in base plate **10**. Thus, switch operating handle **14** is accessible for normal movement after the switch timer has been installed.

To effect automatic movement of toggle switch handle **14**, trip bar **20** is slidably mounted on base **10** in spaced

relationship thereto and in longitudinal alignment with aperture **13** by the cooperation of elongated slots **21** and **22** (see Fig. 4) and pedestals **23** and **24**. As most clearly seen in Fig. 2, variation in the effective length of trip bar **20** is provided by end plate **25** which is adjustably secured to trip bar **20** by fastener **26**. The force to move trip bar **20** into engagement with operating handle **14** is provided by springs **28** and **29**. The use of a pair of such springs insures the application of balanced operating forces to trip bar **20** and materially reduces the wear on pedestals **23** and **24** as well as the sidewalls of slots **21** and **22**.

To hold trip bar **20** in a retracted position such as that shown in Figs. 4 and 5, latch pin **30** is provided on trip bar **20** in a position extending towards mounting plate **10**. Latch pin **30** cooperates with latch **32** which is pivotally mounted on pedestal **23** underneath trip bar **20** so that longitudinal latch extension **33** is biased into holding engagement with latch pin **30** by spring **34** as shown in Figs. 4 and 5. The limits of pivotal movement of latch **32** are determined by the dimensions of lateral slot **35** and its engagement with pedestal **24**. Movement of latch **32** to the right so as to release trip bar **20** is provided by cam follower **40** which is pivotally mounted to base **10** at point **44** and which is urged towards latch **32** by spring **42**. The forces exerted by latch spring **34** and cam follower spring **42** are so related that abrupt movement of follower **40** into engagement with latch **32** provides sufficient force to drive follower **40** to the right and release latch pin **30** as hereinafter explained.

Control of cam follower **40** and therefore control of the point of release of trip bar **20** for movement towards switch operating handle **14** is provided by cam **45** which is supported for rotation on shaft **46** and which is driven by the timing mechanism generally designated as **48** and knob **12** affixed to shaft **46**. Upstanding pin **49** on follower **40** rides on the periphery of cam **45** whose normal radius is sufficient to hold follower **40** out of engagement with latch **32**. Slot **50** is of sufficient depth to permit contact of follower **40** with latch **32** and is provided with a steep leading edge **51** to insure rapid engagement between follower **40** and latch **32**. A shallow notch **52** is provided adjacent notch **50** and is contoured to engage pin **49**. This engagement prevents rotation of cam **45** and determines the "hold" position as hereinafter explained.

Positioned beneath cam **45** and mounted on shaft **46** for rotation therewith is plate **55** having a radius slightly less than the radius of cam **45** and which is provided with an irregularly shaped portion **58**. Driving engagement between cam **45** and plate **55** is provided by the engagement of upstanding pin **56** carried by plate **55** with the sidewalls of slot **57** in cam **45**. This engagement also serves to rotate cam **45** when shaft **46** is rotated by knob **12** or by timing mechanism **48**. Irregular portion **58** of plate **55** is dimensioned to effect removal of pin **49** from slot **50**, such removal being normally prevented by the steep sidewalls of the slot. That is, rotation of shaft **46** in a clockwise direction will drive plate **55** relative to cam **45** by an amount determined by the length of slot **57** thereby causing irregular portion **58** of plate **55** to cam pin **49** out of slot **50**. Rear wall **59** of slot **50** has sufficient slope to cam pin **49** out of slot **50** without the assistance of plate **55** when knob **12** is rotated to the "hold" position position as hereafter explained.

The timed rotation of cam **45** and therefore the timed release of trip bar **20** is provided by a conventional spring-driven timing mechanism **48** having a plurality of gears **60** driven by main spring **61** at a controlled rate determined by a conventional escapement **62**. The timing mechanism is mounted between plates **63** and **64**

which, in turn, are mounted on pedestals 67 and 68 on mounting plate 10.

The toggle switch timing attachment of this invention is easily arranged to turn a switch "on" or "off" after the lapse of a pre-determined time interval. Referring to Figs. 2 and 3, it is seen that a conventional switch 70 having a conventional face plate 71 with operating handle 14 extending therefrom, readily accepts the switch timer attachment simply by removing face plate fastener 72, positioning toggle switch operating handle 14 in aperture 13 and re-inserting fastener 72 through aperture 74 in cover 11 and aperture 75 in mounting plate 10. The attachment can be mounted in either the normal position of Fig. 3 or an inverted position (not shown) by utilizing either the upper or lower face plate mounting screw and, in each position, handle 14 is accessible for normal operation. The engagement of the sidewalls of aperture 13 in mounting plate 10 with toggle switch operating handle 14 prevents rotation of the attachment about the fastener 72 so as to permit rotation of knob 12 to effect operation of the timing mechanism.

After the attachment has been installed in the aforementioned manner and as shown in Fig. 3, the trip bar 20 is manually pushed downwardly and knob 12 is rotated, thereby permitting latch pin 30 to engage latch extension 33 so as to hold trip bar 20 in the retracted position. The desired time interval is set on the face of operating knob 12 by rotating knob 12 in a clockwise direction thereby winding spring 61. Cam 45 is then rotated in a timed controlled manner by timing mechanism 48 until leading edge 51 of slot 50 passes underneath pin 49 thereby permitting spring 42 to snap cam follower 40 into engagement with latch 32. The impact on contact between cam follower 40 and latch 32 drives latch extension 33 to the right so as to release latch bar 20 for movement under the force of springs 28 and 29. Latch bar 20 will then engage operating handle 14 to move it to the dotted line position of Fig. 2. It is noted that latch extension 33 is provided with a laterally tapered end to reduce the force necessary to release pin 30.

To reset a timed interval after operation of the attachment, knob 12 is merely rotated clockwise from the zero position thereby permitting plate 55 to bring edge 56 in engagement with pin 49 to cam pin 49 out of engagement with slot 50.

If it is desired to have normal switch operation without removing the attachment from the wall plate, it is merely necessary to rotate knob 12 to the "hold" position shown in Figs. 3 and 5. At this position, pin 49 rests in shallow slot 52, at which point the timing mechanism 48 is prevented from rotating, cam follower 40 is moved to the left out of engagement with latch 32 and trip bar 20 can be manually forced downward into the "latching" position, at which point it will stay until the knob is turned from the "hold" position.

From the foregoing description, it is apparent that the toggle switch timer of this invention provides economical automatic control of a conventional wall switch. Further, the timer is easily installed to turn the switch "on" or "off" and does not require the services of a mechanic or an electrician, but rather provides an ideal accessory for installation and use by the homeowner. The improved toggle switch timer is economical to manufacture and is durable and reliable in operation.

As will be apparent to persons skilled in the art, various modifications and adaptations of the structure above described will become readily apparent without departure from the spirit and scope of the invention, the scope of which is defined in the appended claims.

We claim:

1. A timer for toggle switches and the like having apertured switch plates associated therewith comprising a mounting plate, means for mounting said mounting plate in fixed position relative to the toggle switch, a trip bar slidably mounted on said mounting plate for movement into engagement with the switch operating handle, spring means urging said bar towards the handle, a latch mounted on said plate and movable into latching engagement with said bar when said bar has been moved away from said switch operating handle against the force of said spring means, and means including a timer to move said latch out of engagement with said trip bar after a preselected time interval thereby to release said bar for longitudinal movement under the force of said spring into engagement with the switch operating handle.

2. A timer for toggle switches and the like comprising a mounting plate, an aperture in said mounting plate to receive the operating handle of the switch, means for mounting said plate in switch handle receiving position, a trip bar slidably mounted on said mounting plate for movement toward said aperture and into engagement with the switch operating handle, spring means urging said bar towards said aperture, a latch mounted on said plate and movable into latching engagement with said bar when said bar has been moved away from said switch operating handle against the force of said spring means, and means including a timer to move said latch out of engagement with said trip bar after a pre-selected time interval thereby to release said bar for longitudinal movement towards said aperture under the force of said spring means.

3. A timer for toggle switches and the like comprising a mounting plate, an aperture in said mounting plate to receive the operating handle of the switch, means for mounting said plate in switch handle receiving position, a trip bar slidably mounted on said mounting plate for movement toward said aperture and into engagement with the switch operating handle, spring means urging said bar towards said aperture, a latch mounted on said plate and movable into latching engagement with said bar when said bar has been moved away from said switch operating handle against the force of said spring means, means including a timer to move said latch out of engagement with said trip bar after a pre-selected time interval thereby to release said bar for longitudinal movement towards said aperture under the force of said spring means, and a cover secured to said mounting plate, said cover being dimensioned to permit access to the toggle switch operating handle for manual operation thereof.

4. The timer for toggle switches and the like as set forth in claim 2 wherein said cover is provided with an aperture in substantial alignment with said aperture in said mounting plate whereby the operating handle of the toggle switch is accessible for manual movement.

5. A timer for toggle switches and the like having apertured switch plates associated therewith comprising a mounting plate, a first aperture in said mounting plate dimensioned to receive the switch operating handle and having longitudinal sidewalls closely adjacent the switch operator, a second aperture in said mounting plate positioned opposite a mounting aperture of the switch plate, a trip bar slidably mounted on said mounting plate for movement towards said first aperture and into engagement with the operating handle, spring means carried by said mounting plate urging said bar towards said aperture, a latch pivotally mounted on said plate and engageable with said bar when said bar has been moved away from said first aperture, and means including a timer to move said latch out of engagement with said bar after the lapse of a pre-selected time interval thereby to release said bar for movement under the force of said spring means towards said aperture.

6. A timer for toggle switches and the like and having apertured switch plates associated therewith comprising a mounting plate having a first aperture dimensioned to receive the switch operating handle and a second aperture positioned opposite a mounting aperture in the switch plate, a trip bar slidably mounted on said mounting plate for movement towards said first aperture and

into engagement with the switch operating handle, spring means urging said bar towards said aperture, a latch mounted on said plate and engageable with said bar to hold said bar away from said aperture, and means to move said latch out of engagement with said bar after a pre-selected time interval thereby to release said bar for movement towards said aperture under the force of said spring, said last named means including a timer having a latch release time adjusting knob mounted on said mounting plate on the opposite end thereof from said second aperture.

7. A timer for toggle switches and the like comprising a mounting plate, an aperture in said mounting plate to receive the switch operating handle, a trip bar slidably mounted on said mounting plate for movement toward said aperture into engagement with the operating handle, spring means urging said bar towards said aperture, a latch pin mounted on said trip bar and extending towards said mounting plate, a latch pivotally mounted on said plate and underneath said bar in generally longitudinal alignment therewith, said latch having a projection extending longitudinally away from said aperture, said projection being engageable with said latch pin to hold said trip bar away from said aperture against the force of said spring, and means including a timer to pivot said latch to move said projection out of engagement with said latch pin after a pre-selected time interval thereby to release said trip bar for movement towards said aperture.

8. A timer for toggle switches and the like comprising a mounting plate, an aperture in said mounting plate to receive the operating handle of the switch, means for fastening said mounting plate in switch handle receiving

position, a trip bar slidably mounted on and in spaced relationship to said mounting plate for movement towards said aperture, a first spring urging said bar towards said aperture, said bar having a latch pin fastened thereto and extending towards said mounting plate, a latch pivotally mounted on said plate underneath said trip bar, said latch having an end projection engageable with said latching pin to hold said trip bar away from said aperture against the force of said first named spring, a cam follower pivotally mounted adjacent said latch and movable into engagement therewith to pivot said latch out of engagement with said latch pin, a second spring urging said cam follower towards said latch, a cam carried by said mounting plate and engageable by said follower, said cam having a radial notch at one point thereon whereby said cam is permitted to pivot under the force of said second spring into engagement with said latch to release said latch pin therefrom, and means including a timer for moving said cam into latch releasing position after the lapse of a pre-determined time interval thereby to release said trip bar for movement under the force of said first named spring towards said aperture and into engagement with the switch operating handle.

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