April 20, 1965 L. M. KEEFE 3,178,947

TOGGLE SWITCH ACTUATING MEANS

Filed Nov. 8, 1962

FIG. 2

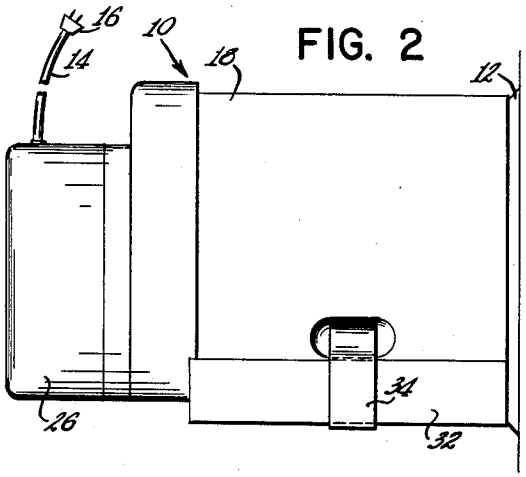
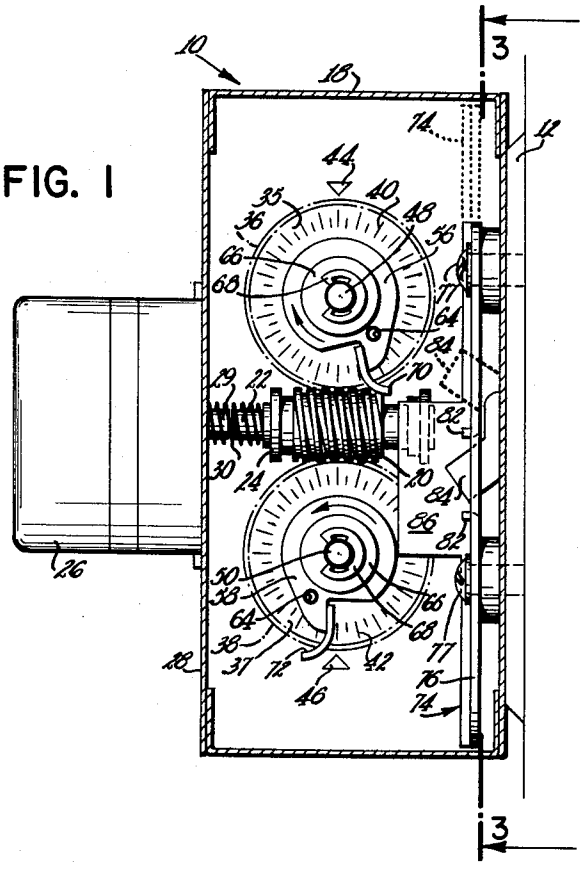


FIG. 1



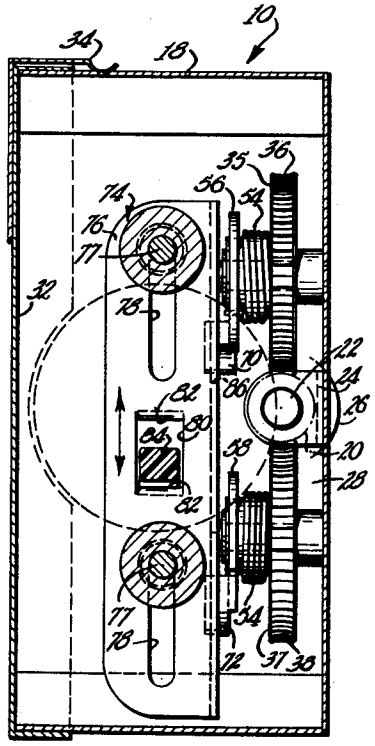


FIG. 3

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TOGGLE SWITCH ACTUATING MEANS

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The present invention relates to devices for automatically operating toggle switches of the type ordinarily used in house lighting circuits on a predetermined schedule and in particular, to devices of this nature which may be adjusted to vary the ratio of "on" time to "off" time.

There exists a need at the present time among householders for a device to automatically turn lights on and off that may easily be adapted to existing toggle switches. In order to utilize many of the currently available devices for regulating lighting circuits in an on-off manner it is necessary to cut into the existing electrical lines, a task that in many localities may be done legally only by a licensed electrician and is generally beyond the scope of most householders. There are also other devices into which a lamp or other lighting device may be plugged and which will automatically turn the device on and off at a predetermined time, but are limited in their application and are not designed to operate toggle switches.

The device of the present invention consists of a simple unobtrusive device whihc may be readily attached to an existing wall switch or switch box and which will turn on and subsequently turn off the circuit on a repetitive basis, so that if the householder is away from his home for a period of weeks, the device automatically performs the function without reset.

A device of this type must be produced at a low enough cost to make wide distribution economically feasible. If the cost of a unit is to high, the market for such a device is drastically reduced and the unit becomes commercially impractical. It is also essential that the device be compact and unobtrusive so it will not present an unsightly appearance.

Accordingly, 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 utilized to cyclically turn a switch on and off, with a preset time interval.

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

Another object of this invention is to provide a low cost timing device for toggle switches.

Still another object of the present invention is to provide a toggle switch actuating mechanism which employs a conventional synchronous timing motor.

These and other features, objects and advantages of the present invention will, in part, be pointed out with particularity and will, in part, become apparent as the following description proceeds, taken in conjunction with the accompanying drawing which forms an integral part thereof.

In the various figures of the drawing like reference characters designate like parts.

In the drawing:

FIG. 1 is a side elevation of the unit partially in section.

FIG. 2 is a plan view of the present device.

FIG. 3 is an elevational view taken along line 3—3 of FIG. 1.

Referring now to FIG. 1, there is shown the unit designated generally by the reference numeral **10**. The unit is

mounted over a conventional wall switch cover plate **12** by any suitable means which may be substituted for the screws holding the wall plate in place or by the screws themselves if they are of the proper length. A power cord **14** and plug **16** are provided for connection to an external power source.

A housing **18** is utilized as a chassis to support various elements of the apparatus of the present invention. Thus the worm **20** and connecting shaft **22** are mounted in U-shaped bracket **24** which, in turn, is mounted upon housing **18** by conventional means (not shown) such as by welding or riveting. A conventional synchronous geared timer motor **26** is suitably secured to the front face **28** of housing **18**. Timer output shaft **29** extends through an aperture in front face **28** to thereby engage shaft **22** through tightly wound coupling spring **30**. Bearings are suitably journaled in the spaced legs of U-shaped bracket **24** to thereby facilitate a smooth sliding connection between worm **20** and bracket **24**. An access door **32** is removably secured to housing **18** by spring latch **34** which provides a convenient means for gaining entrance to the controls within the housing. Said access door may be easily slipped on or off the housing.

As shaft **22** rotates, it turns worm **20** which is in meshing engagement with worm gears **36** and **38**. Disposed upon faces **35** and **37** of worm gears **36** and **38** by any suitable means, such as paint, are indices **40** and **42**, respectively. Said indices suitably divide the faces of the gears into time periods predetermined by the rate at which timer **26** rotates the worm shaft. Pointers **44** and **46** provide reference marks for indices **40** and **42**, respectively.

Shafts **48** and **50** secured to housing **18** by well known means, such as riveting or staking, support worm gears **36** and **38**, respectively. Torsion springs **54** are interposed between discs **56** and **58** and their respective worm gears and are wound around shafts **48** and **50** each in an opposite direction from the other. One end of each of the torsion springs is in fixed engagement with discs **56** and **58** at apertures **64**. The other end of each torsion spring is unconnected and bears against the face of its corresponding gear. Washers **66**, in coperation with retaining rings **68**, serve to hold the torsion springs and discs in place. Cams **70** and **72** depending outwardly of discs **56** and **58**, but integrally a part thereof, provide a means to engage slidable toggle actuator **74**, as will be explained in greater detail hereinbelow.

It will be understood that either disc may be adjusted by the householder to any position about its corresponding shaft simply by twisting the disc with his fingers in a direction opposite to that which would tighten the corresponding torsion spring, as illustrated by the appropropriate arrows in FIG. 1, thereby "loading" said spring.

In plate **76** of actuator **74** are cutouts **78** which are generally rectangular in shape, said cutouts being in slidable cooperative engagement with studs **77**. Cutout **80** is interposed between cutouts **78** in plate **76**. Depending outwardly from two ends of cutout **80** towards the front of said unit are tabs **82**. Cutout **80** provides a means whereby a toggle **84** may be engaged by actuator **74**.

Depending outwardly from actuator **74**, but integrally connected thereto is rectangularly shaped follower plate **86**. Plate **86** lies in the same plane as that of the motion of cams **70** and **72**.

In employing the device of the present invention, the unit is mounted over the conventional outlet box cover plate. The unit includes means for engaging the protruding lever of the standard single throw toggle switch, such as is used for control of lighting in the home. The unit is then adjusted by manually rotating the discs there-

by setting up a timed sequence of intermittent on-off operations that are cyclical in nature.

Thus, for example, disc 56 may be manually rotated in a clockwise direction to move said cam into abutting engagement with follower plate 86 which slides actuator 74 thereby moving toggle 84 into the position shown in FIG. 1. Disc 56 is then locked into the position shown in FIG. 1 by manual rotation in a counterclockwise direction thereby tightening the corresponding torsion spring. Disc 58 is then manually rotated and locked into position in a similar manner but in the opposite direction, as indicated by the appropriate arrows. The unit has now been adjusted such that the amount of time necessary for disc 58 to rotate to the position at which cam 72 engages follower plate 86, which slides said plate and thereby moves toggle 84 into the position indicated by the dotted lines in FIG. 1, and the additional time that is required for disc 56 to then rotate to its follower plate engaging position will determine the cycle of on-off operation of the unit. It will be noted that many combinations of on-off time sequences may be established merely by manually adjusting the discs, as explained hereinabove.

The motor is now energized by plugging power cord 14 and plug 16 into a convenient outlet. It can be understood from the foregoing that the unit may be left completely unattended from this point onward since it has been adjusted and will automatically repeat the on-off sequence upon rotation of the shaft by the timer motor. The simplicity and ease by which the unit may be adjusted is of particular importance since the unit is designed primarily for ordinary households.

It will be appreciated that this device is of simple inexpensive construction and can readily be installed by unskilled personnel. It may thus be sold to the general public at low cost. The device further is of very small compact dimension and is unobtrusive in the home.

A particularly noteworthy feature of this invention is the simplicity of parts employed. The timer motor utilized is a conventional low cost unit such as is employed in clock assemblies. Another noteworthy feature of the invention is that the device may be left unattended for indefinite periods of time and provide protection for a home where the occupants are away for any number of days at a time since it will set lights on and off at timed intervals during the day and night.

There has been disclosed heretofore the best embodiment of the invention presently contemplated and it is to be understood that various changes and modifications may be made by those skilled in the art without departing from the spirit of the invention.

What is claimed is:

1. In combination with a wall-mounted toggle switch having an outwardly extending handle;

a housing means having a removable cover;

means for mounting said housing proximate to said handle;

an electrical, direct drive, single speed motor disposed on said housing means;

first gear and shaft means driven by said motor;

a plurality of rotatable second gear means operatively engaged by said first gear and shaft means;

a plurality of stub shafts secured to said housing and rotatably supporting said second gear means;

toggle switch actuating means arranged to rotate together with each of said rotatable second gear means during operation of the apparatus and adapted to be rotated independently of said second gear means to reset the apparatus;

toggle switch engaging means adapted to be moved by said toggle switch actuating means; and

means for adjusting the position of said toggle switch actuating means independently of each other and relative to said second gear means.

2. A device as in claim 1 wherein each of said toggle switch actuating means includes a cam portion adapted to move said toggle switch engaging means in an intermittent cyclical to-and-fro motion.

3. A device as in claim 2 wherein said toggle switch engaging means includes a protruding portion arranged whereby said cam portion may alternately engage said protruding portion.

References Cited by the Examiner

UNITED STATES PATENTS

1,286,527	12/18	Burton et al.	
1,378,153	5/21	Trotter.	
2,346,694	4/44	Maris	137—624.16 X
2,501,526	3/50	Lancks.	
2,535,371	12/50	Rapp	137—624.15
2,611,283	9/52	Askren et al.	
2,937,247	5/60	Laviana	200—38

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