Jan. 5, 1971 J. BRIECHLE 3,553,611

ROTARY ELECTRIC CIRCUIT INTERRUPTER

Filed July 7, 1969 2 Sheets-Sheet 1

Fig. 1.

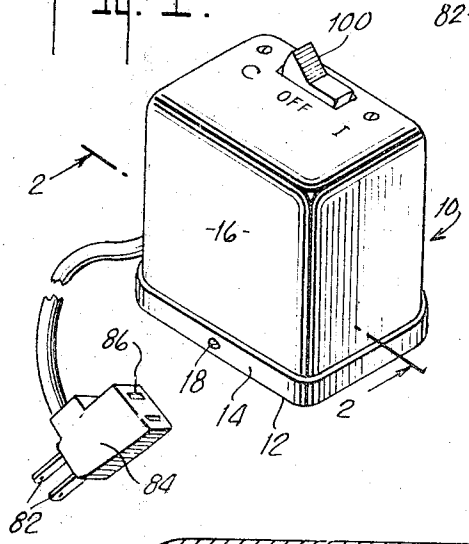
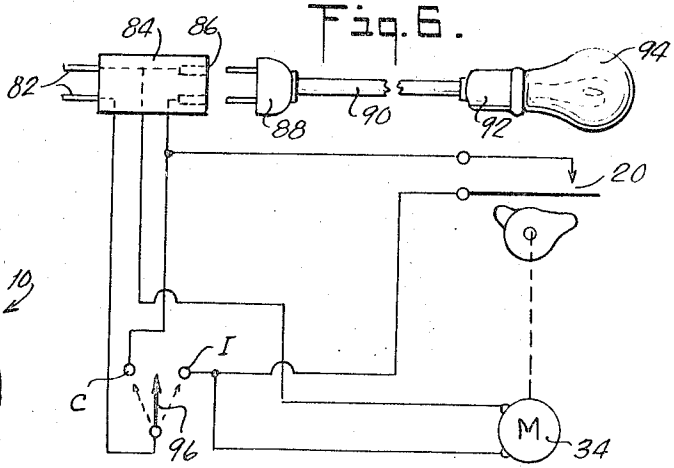
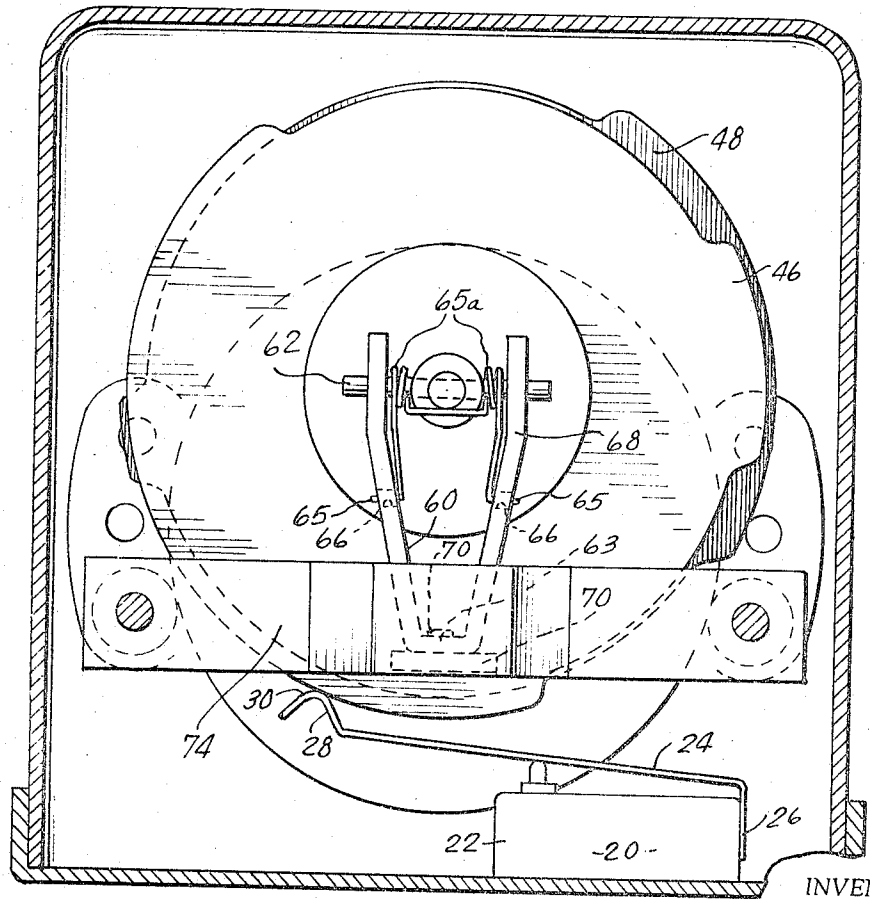


Fig. 6.



3



5 5

Fig. 2.

3

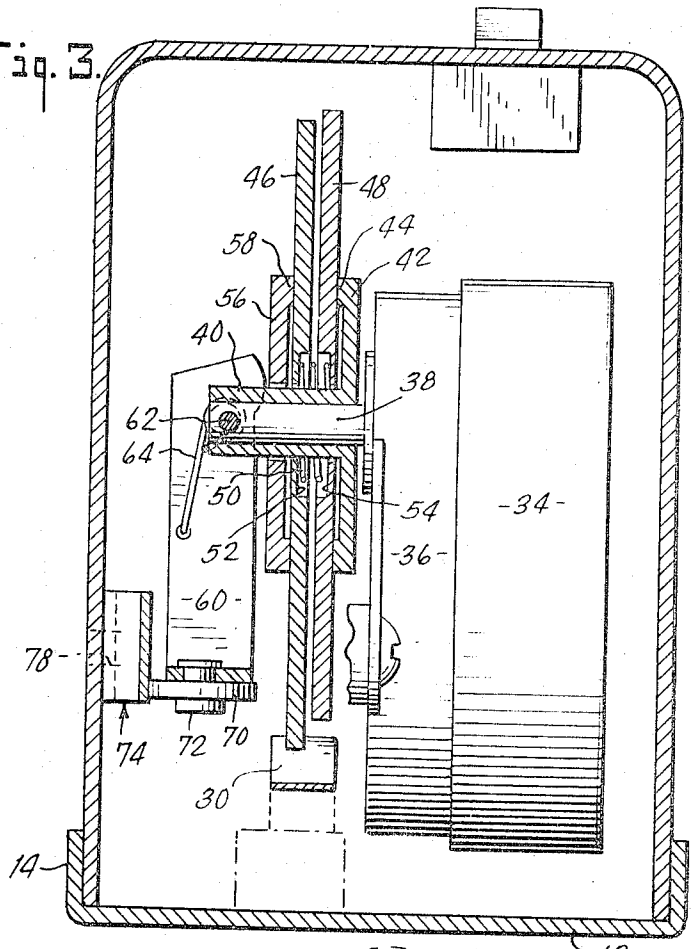
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Fig. 3.



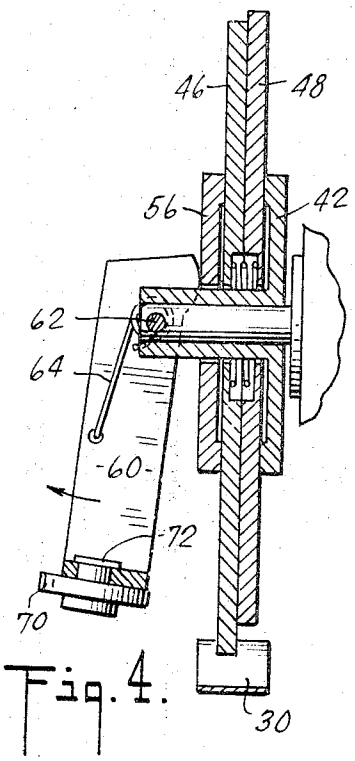


Fig. 4.

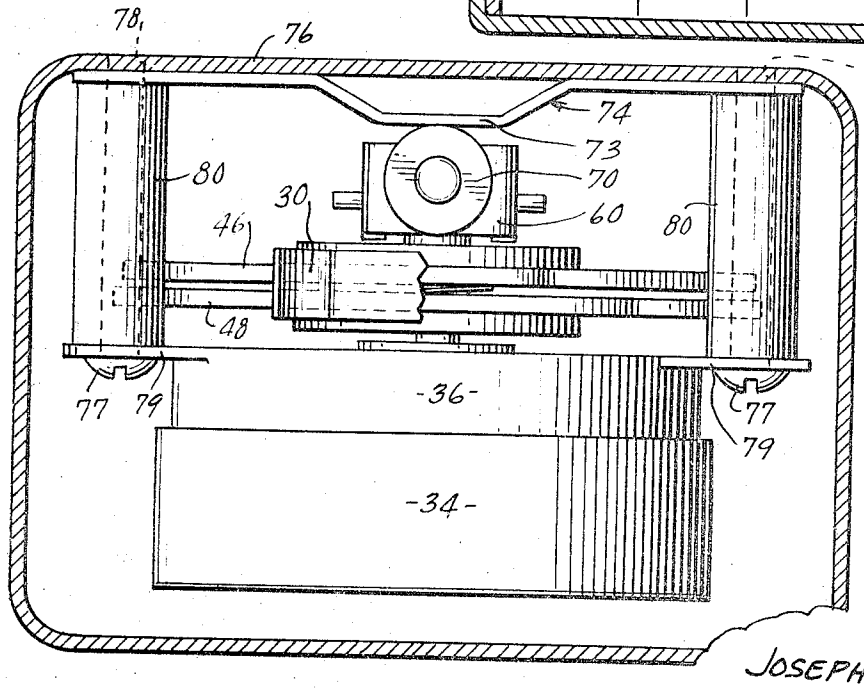


Fig. 5.

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3,553,611

ROTARY ELECTRIC CIRCUIT INTERRUPTER

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U.S. Cl. 335—68 6 Claims

ABSTRACT OF THE DISCLOSURE

A device for providing electrical impulses of various lengths at various time intervals and for varying the length and intervals of said impulses by having a plurality of disc cams with random circumferentially spaced lobes loosely mounted on a rotatable shaft and adapted to be frictionally driven one by the other, means for intermittently varying angularly in an unpredictable manner, the relationship of the lobes on the cams to one another and an electrical instrumentality operable by said cams.

The present invention relates to a rotary electric circuit interrupter, and constitutes an improvement over the device disclosed and claimed in U.S. Pat. No. 3,435,388, dated Mar. 25, 1969, granted to Frank R. Hormann.

It has long been customary for persons when they leave their home unattended after dark to let certain electric lights illuminated to give the impression, to burglars who may contemplate robbing the home, that someone is present at the home. A burglar observing such a condition over a period of time may soon come to the conclusion that no one is at home because the lights are on continuously. Another method of deterring burglars is to connect certain of the lights on the premises to a mechanical timer which alternately turns a light or lights on and off, but the pattern of such timer is repetitious and an astute burglar can readily determine this fact.

The primary object of my invention is to provide an electric current interrupter to control for a long period of time in a random non-repetitive pattern, the on and off intervals of house lights, or of a radio in an unattended home as a deterrent to burglary.

A further object of the invention is to provide a device of the character set forth in the preceding paragraph with which the control of the on and off intervals will be automatically varied in an unpredictable manner.

A still further object of the invention is to provide a device of the character set forth which can be set in operation by merely plugging it into an electric current outlet.

A still further object of the invention is to provide a device of the character set forth which is in the form of a compact unit which is simple in construction and can be manufactured and sold at a relatively low price.

The invention will be more fully understood and appreciated from the detailed description which follows when considered in connection with the accompanying drawings which illustrate a preferred embodiment of the device and wherein:

FIG. 1 is a perspective view of the device embodying the invention.

FIG. 2 is a transverse vertical section taken substantially along the plane of the line 2—2 of FIG. 1.

FIG. 3 is a section taken along the plane of the line 3—3 of FIG. 2 and shows the disc cams in unclamped relation.

FIG. 4 is a fractional view of FIG. 3 and shows the disc cams in clamped or coupled engagement.

FIG. 5 is a horizontal section taken along the plane of the line 5—5 of FIG. 2.

FIG. 6 is a schematic wiring diagram of the device.

Referring to the drawings, the device comprises a substantially rectangular container 10 consisting of a base or bottom 12 having an upstanding perimetral flange 14 and a deep cover or casing 16 engaging within the flange and adapted to be secured to the base by screws 18.

Mounted in the base is a normally open micro-switch 20 contained within a casing 22 which has secured thereto one end 26 of a leaf spring 24, the other end 28 of which is bent to the form of an inverted V to provide a cam follower 30 for a plurality of cams, hereinafter described.

Within the cover 16 is a self-starting synchronous motor 34 such as used in electric clocks contained within a casing and having coupled to it speed reducing means 36 which has an output shaft 38. The speed reducing means is chosen to impart to the shaft 36, one revolution in from forty minutes to eight to ten hours. Fixedly mounted on the shaft 38 and projecting beyond the free end thereof is a sleeve 40 which at its end opposite to the projecting end has a flange 42 which at its inner face is peripherally thickened as shown at 44.

Mounted loosely in axially spaced relation on the sleeve 40 are a pair of friction disc cams 46 and 48. In a broad sense the sleeve may be considered as a part of the shaft 38 as it is rotatable therewith. Normally the cams 46 and 48 are spaced apart slightly by a weak spiral spring 50 mounted in confronting annular grooves 52 and 54 in the cams 46 and 48. Also loosely mounted on the sleeve 40 for engagement with the outer face of cam 46 is a disc 56 which at its innerface is peripherally thickened as shown at 58. Each of the cams has random circumferentially spaced high spots or lobes of different circumferential length. The cam 48 peripherally has a larger lobe radius than the lobe radius of cam 46 and also has a larger inner radius than the inner radius of cam 46. However, the inner radius of cam 48 is slightly smaller than the lobe radius of cam 46. The disc cams are normally urged into frictional clamping engagement with each other by a spring biased substantially V-shape lever 60 which is pivotally mounted adjacent its free ends on a pin 62 which extends transversely through the sleeve 40 near its unflanged end and is urged into engagement with the disc 56 and through said disc with cam 46 by a tension spring 64 of generally U-shape, the free ends 65 of which are anchored in holes 66 in the opposite arms 68 of the lever 60 and intermediate portions 65*a* of said spring are coiled around the pin 62.

The lever 60 is preferably formed from flat stiff metal or the like and has a flattened bight 63 whereat it carries a roller or cam follower 70 which is secured to said lever by a loose rivet 72. As is evident from FIGS. 3 and 4 the pivot points of the lever on the pin 62 and the rivet mounting of the roller are preferably located on the opposite sides of the median line of the lever.

As the shaft 38 rotates, and carries with it the lever 60, the roller 70 rides over the high portion 73 of a stationary cam 74 to pivot the lever around the pin 62 to release the biasing force of the spring 64 on the disc cams 46 and 48 whereby the spring 50 causes disengagement of said cams, while the shaft 32 and the flanged sleeve 40 continue their rotation until the cam follower 70 has moved past the high portion 73 of cam 74. When this takes place the spring 64 again moves the disc cams 46 and 48 into clamping engagement and rotation with the shaft 38 by virtue of the frictional engagements of the disc 56, the disc cams 46 and 48 and the flange 42 on sleeve 40.

The stationary cam 74 is clamped against the wall 76 of the cover 16 by a pair of screws 77 threaded into tapped holes 78 in the wall 76 after being passed through a pair of lugs 79 fixed to the casing of the speed reducer 36 and through a pair of spacing sleeves 80. By said cam mounting construction the motor 34, speed reducer 36, cams 46

and 48, discs 42 and 56, and the lever 60 are all supported by the cover or casing 16.

The cams 46 and 48 are adapted to engage the cam follower 30 either individually or simultaneously, depending upon the relationship of the high spots or lobes on the cams during their rotation. The small radii of the cams 46 and 48 are so chosen to permit them to ride over the cam follower 30 without activating the microswitch. Preferably the arcuate lengths of the lobes and the arcuate spaces between the lobes are different on the respective cams.

Referring to the circuitry shown in FIG. 6 a two prong end 82 of a three wire plug 84 is adapted to be connected to an electric power outlet (not shown). The plug 84 has a socket 86 adapted to receive a two prong plug 88 of a two wire extension cord 90 connected to a lamp socket 92 into which is screwed a lamp bulb 94. The plug 84 is connected through wiring to a single pole double throw switch 96, the motor 34 and the microswitch 20 in the manner shown. The switch 96 has a finger control lever 100 which extends outwardly from the top of the casing 10 whereas it has the legends "I" for intermittent, "Off," and "C" for continuous.

In the operation and use of the device as a burglary deterrent, the plug 84 is connected to a source of electric current and when the switch 96 is in its "Off" position, both the lamp 94 and the motor 34 are off. When the switch is thrown to the left terminal "C" the lamp will be on continuously. When the switch is thrown to the terminal "I" the motor is on continuously and the illumination of the lamp is controlled by the microswitch 20, i.e., when a high spot or lobe on either of the cams 46 or 48 engages the follower 30 and depresses the spring 24 it closes the normally open microswitch. When a lobe on either disc cam 46 or 48 is in engagement with the cam follower 30 while the cam follower 70 is riding over the high portion 73 of the cam 74 and the disc cams are disengaged from each other by the spring 50, as shown in FIG. 3, the disc cam whose lobe is in engagement with the cam follower 30 will be held stationary since such frictional engagement is designed to be greater than the frictional engagement between the other disc cam and the annular portions 44 or 58 on the flange 42 or the loose sleeve 58 respectively. At said time the other disc cam continues to rotate until the disc cams 46 and 48 are again clamped together by the V-lever as shown in FIG. 4. This relative rotation between the disc cams 46 and 48 will automatically and progressively vary the angularity between the cam lobes in an unpredictable manner.

Where the device is to be used when house occupants are away for long periods, the device may be hooked up with either a mechanical timer or a photoelectric relay for controlling operation during the hours of darkness.

What I claim is:

1. In a rotary electrical circuit interrupter having an electric motor, a shaft driven by said motor through speed reducing means, a plurality of disc cams loosely mounted on said shaft in axially spaced relation, resilient means normally biasing said cams into clamping random angular relation to rotate said cams with the shaft as a unit, cam follower means engageable by the cams as they rotate, means operable to overcome the biasing of said resilient means to alter the random angular relation of the cams to one another, an electrical circuit in which is connected an electrical instrumentality responsive to an electric current and switch means operable by the cam follower means upon rotation of the cams to periodically make and break the flow of current in said electrical circuit, characterized in that the resilient means is carried by a lever which is rotatable with the shaft, a cam follower carried by the lever, a stationary cam engageable by the follower as the shaft rotates to periodically overcome the biasing action of the resilient means.

2. An electrical circuit interrupter according to claim 1 wherein all the recited elements are mounted in a closed container and are supported by the walls of said container.

3. An electrical circuit interrupter according to claim 1, wherein there are two disc cams with the cam lobes peripherally disposed thereon in arbitrary circumferentially spaced rotation, one of said cams has a larger lobe radius and a larger inner radius than the lobe radius and the inner radius on the other cam respectively, and the inner radius of the one cam is slightly smaller than the lobe radius on the other cam.

4. An electrical circuit interrupter according to claim 1 wherein the lever is bifurcated and is pivotally mounted to oscillate longitudinally of the shaft on a pin which passes transversely through the shaft and the resilient means normally applies force on the pin to bias the lever to hold the disc cams in clamped relation.

5. An electrical circuit interrupter according to claim 4 wherein the lever is substantially V-shape and the cam follower on the lever is mounted at the bight of the lever.

6. An electrical circuit interrupter according to claim 4 wherein the resilient means is a U-shape coiled tension spring the free ends of which are anchored one to each arm of the bifurcated lever and the intermediate portion of the spring acts on the pin to urge the lever into biasing relation to the disc cams.

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HAROLD BROOME, Primary Examiner

U.S. Cl. X.R.

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