United States Patent

Marshall, Jr.

[15] **3,643,052**

[45] **Feb. 15, 1972**

[54] PULL CHAIN OPERATOR FOR ROTARY SWITCH SHAFT

[72] Inventor: **Robert Marshall, Jr.**, 3425 N.E. Ainsworth, Portland, Oreg. 97211

[22] Filed: **Jan. 21, 1971**

[21] Appl. No.: **108,526**

[52] U.S. Cl. .....**200/172 R**, 200/161, 200/51.15

[51] Int. Cl. **H01h 3/10**

[58] Field of Search.....200/172 R, 51.15, 161

[56] **References Cited**

UNITED STATES PATENTS

984,053	2/1911	Weber, Sr.	200/161
2,595,851	5/1952	Holzapfel	200/161 X

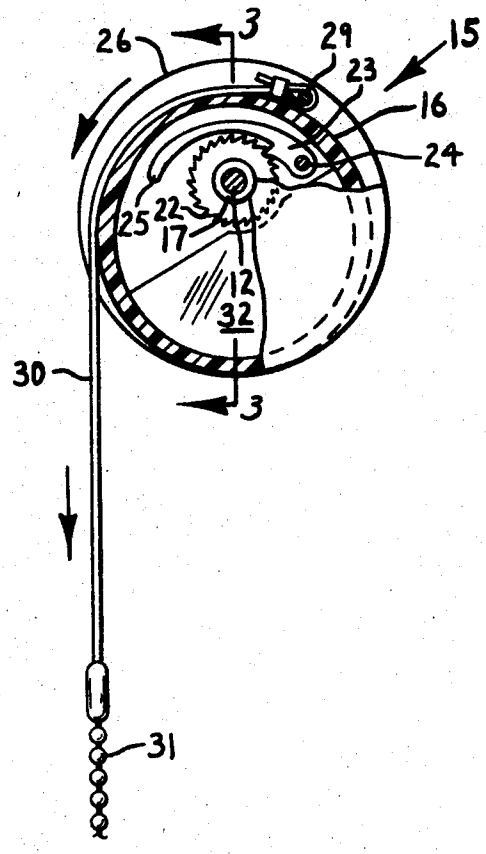
Primary Examiner—David Smith, Jr.

Attorney—Lee R. Schermerhorn

[57] **ABSTRACT**

An internally threaded tube forming a supporting hub for the device is mounted on the rotary switch shaft in a socket for a three-way light bulb in place of the conventional knob on the switch shaft. An eccentric drum is rotatably mounted on the tube and a ratchet gear in the drum is fixedly mounted on the tube. A pawl in the drum engages the ratchet gear. A pull chain on the drum rotates the switch shaft through fractional revolutions to switch the light circuit to low, medium, high and off in successive manipulations. A counterweight in the drum returns the drum and pull chain to starting position after each actuation of the switch.

9 Claims, 6 Drawing Figures



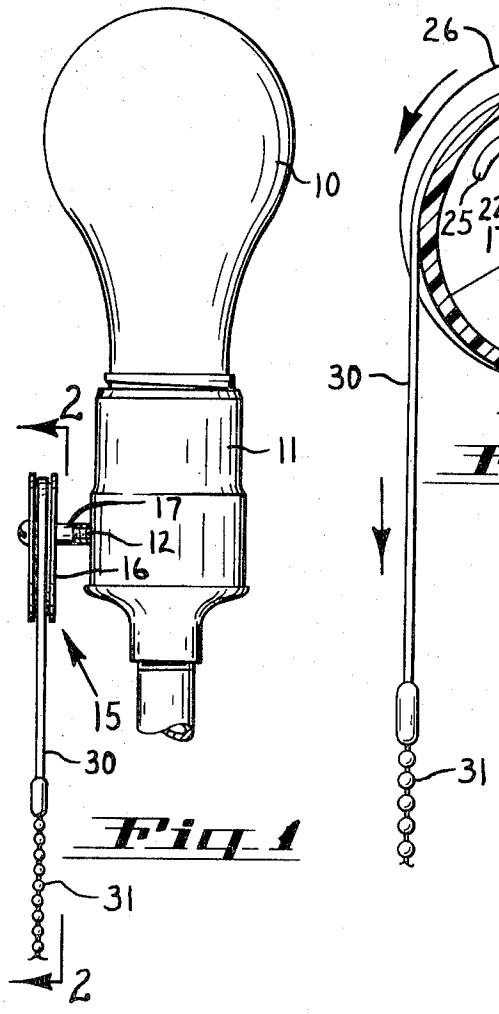


Fig 1

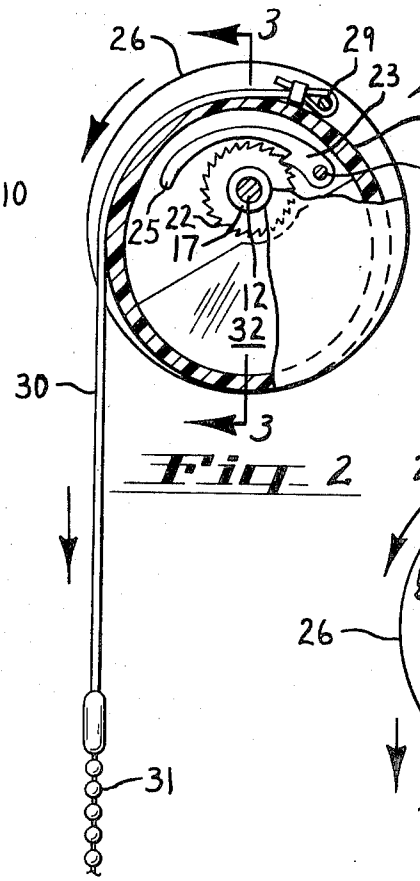


Fig 2

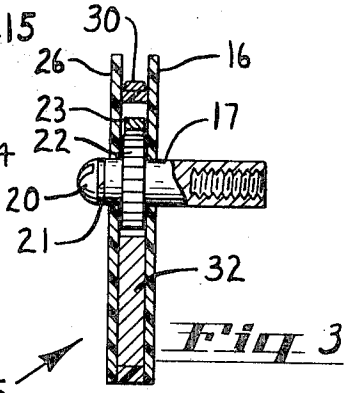


Fig 3

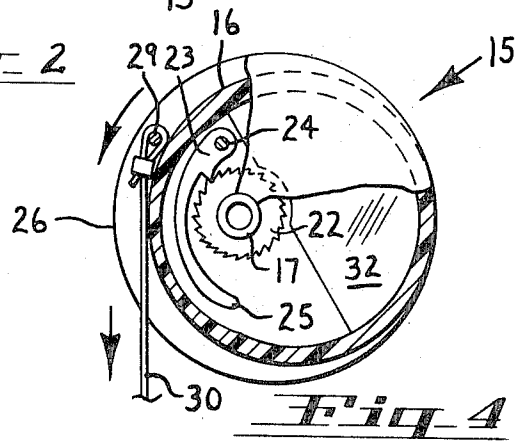


Fig 4

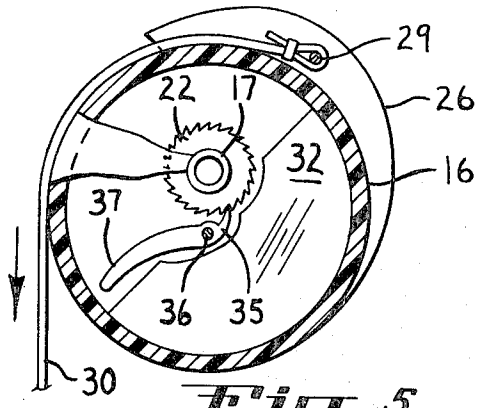


Fig 5

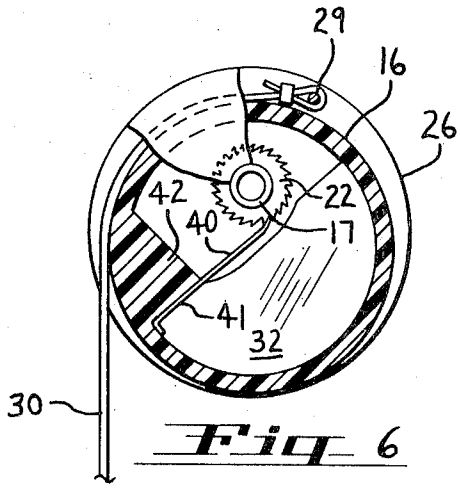


Fig 6

INVENTOR
ROBERT MARSHALL JR.
BY
Lee R. Schermerhorn
Attorney

PULL CHAIN OPERATOR FOR ROTARY SWITCH SHAFT

BACKGROUND OF THE INVENTION

This invention relates to a pull chain operator for a rotary switch shaft and is of particular advantage in connection with conventional sockets for three-way light bulbs which are switched in successive 90° rotations of the switch shaft to low, medium, high and off positions.

Lights of this type are often used in floor lamps where the light socket switch is out of reach of a person sitting in a chair by the lamp or lying in a bed alongside the lamp. Pull chain sockets heretofore provided for three-way lamps have been relatively complicated and expensive and cannot readily be substituted for the more common rotary knob type of socket switch usually furnished in floor lamps.

An accessory type of device has been proposed heretofore to convert a rotary knob switch into a pull chain switch but in this case a spring was utilized to return the pull chain after each operation of the switch. The use of a spring for this purpose necessitates a stationary anchor for one end of the spring and this requires either a special form of light socket or some modification of a conventional socket which cannot be accomplished readily by the ordinary user.

Objects of the invention are, therefore, to provide a pull chain operator for a rotary switch shaft which may be readily applied by the user to a common type of electric switch, to provide a pull chain attachment which may be installed on the socket of a three-way light bulb by merely unscrewing the switch knob, to provide a pull chain operator of the type described which does not require a spring return for the pull chain and to provide a pull chain operator having a gravity actuated counterweight to return the pull chain.

SUMMARY OF THE INVENTION

The present device comprises, essentially, merely a tubular hub for mounting on a threaded switch shaft after the conventional knob has been unscrewed and a drum for the pull chain rotatably mounted on the tubular hub. Fixedly mounted on the tubular hub is a ratchet gear which is engaged by a pawl on the drum. Successive pulls on the chain thereby rotate the switch shaft through quarter turns to low, medium, high and off positions, the chain being raised to starting position after each switch actuation by a counterweight in the drum.

The invention will be better understood and the foregoing and other objects and advantages will become apparent from the following description of certain preferred embodiments illustrated on the accompanying drawing. Various changes may be made in the details of construction and arrangement of parts and certain features may be used without others. All such modifications within the scope of the appended claims are included in the invention.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is an elevation view of a three-way light bulb and socket equipped with a pull chain operator embodying the invention;

FIG. 2 is a view on the line 2—2 in FIG. 1 with parts broken away, showing the device in normal rest position;

FIG. 3 is a view on the line 3—3 in FIG. 2;

FIG. 4 is a view similar to FIG. 2 showing the parts in actuated position;

FIG. 5 is a view similar to FIG. 2 showing a modification; and

FIG. 6 is a view similar to FIG. 2 showing a further modification.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 1 shows the upper end of a floor lamp having a common form of three-way light bulb **10** and socket **11** with a rotary switch shaft **12** which is threaded to normally receive a knob. When the operator is facing the knob, a first quarter turn to the right rotates the switch shaft to low position, a second quarter turn rotates it to medium position, a third quarter turn rotates it to high position and a fourth quarter turn rotates it to off position. In FIG. **1** the conventional knob has been replaced by a first embodiment of the present device which is indicated in its entirety by the numeral **15**.

The device **15** in FIGS. **1** to **4** comprises, essentially, a drum **16** mounted for rotation on a hub **17**. Hub **17** preferably comprises a tube which is internally threaded in its inner end at **18** to fit the projecting threaded end of the switch shaft **12**. For a purpose which will presently be explained, the outer end of tube **17** is provided with an internal left-hand thread to receive a left-hand threaded screw **20** and lock washer **21**.

Disposed within the drum **16** a ratchet gear **22** is fixedly mounted on tube **17** for engagement on its upper side by a pawl **23** which is pivotally mounted on a pin **24** in the drum **16**. Pawl **23** has an elongated weighted end **25** extending away from the pivot pin **24** above ratchet gear **22**. Adjacent the pivot pin **24** the drum has an anchor pin **29** for one end of a lightweight flexible plastic cord or band **30** which is connected at its other end to the pull chain **31**. A portion of the drum has side flanges **26** to retain the band **30** on the drum. Band **30** and chain **31** are referred to collectively as a pull chain.

On the opposite side of the drum from pawl **23** the drum contains a lead counterweight **32**. In order to make the device as small and inexpensive as possible, the drum is preferably eccentrically mounted on tube **17** so that its lower side in FIG. **2** is considerably farther from the axis of rotation than its upper side. With a given diameter of drum, this arrangement gives the counterweight greater mechanical advantage for lifting the band **30** and chain **31**.

This advantage is enhanced by using only a short length of metal chain **31** and connecting it to a length of the very lightweight plastic band **30** which materially reduces the load that must be lifted by the counterweight. Also, the band **30** exhibits less tendency to jump out of the pulley groove between side flanges **26** than does a metal chain. It is desirable to include at least a short length of chain for the benefit of persons unfamiliar with the device. People are accustomed to using simple two-position on and off pull chain switches whereas the purpose of a hanging end of plastic band might not be apparent.

The parts are shown in normal rest position in FIG. **2** wherein counterweight **32** is displaced from bottom position by an angle which balances the weight of band **30** and pull chain **31**. The arcuate weighted end **25** of pawl **23** overhangs ratchet gear **22** and holds the pawl in engagement with the upper side of the ratchet gear. When chain **31** is pulled downward in the direction of the arrows, drum **16** is rotated counterclockwise a quarter turn to its FIG. **4** position thereby rotating switch shaft **12** to its next switching position. Counterweight **32** has moved upward where it is in a position to rotate the drum clockwise back to its FIG. **2** position as soon as the pull chain is released. During this return movement, pawl **23** overrides the sloping teeth on the ratchet gear which is then held stationary by the switch mechanism in socket **11**.

The purpose of screw **20** is to provide means for removing the device from the lamp socket. There is ordinarily insufficient space between socket **11** and drum **16** to permit a firm grasp of tube **17** by the fingers and it is desired to make the device both attachable and removable without special tools. By applying a screwdriver to the slot in the screw **20**, the tube **17** may be turned clockwise in FIG. **2** to unscrew the tube from switch shaft **12**. A screwdriver is not necessary in applying the device since pawl **23** makes it possible to turn tube **17** counterclockwise in FIG. **2** by merely rotating the drum **16** itself. Counterclockwise rotation in FIG. **2** is clockwise rotation to an operator facing the end of switch shaft **12** which is equipped with right-hand threads.

Since the pull chain drum is returned by a counterweight instead of a spring, the present device is entirely independent of the shell of socket **11** and the socket is not utilized to provide a stationary spring anchor. With a spring return, a special form of socket is necessary or else the socket fixture must be modified in some way.

The modification in FIG. 5 is similar to the construction just described except in this case the pawl 35 is pivotally mounted on a pin 36 which is on the underside of the axis of rotation in rest position. This pawl has a weighted end 37 projecting on the opposite side of pivot 36 to raise the pawl into engagement with the under side of the ratchet gear 22. In order to make the device small and compact, a portion of the counterweight must be relieved to accommodate the pawl but this is not a disadvantage because with the pawl in this position, its weight supplements the weight of the counterweight to provide useful return torque to the drum. FIG. 5 shows the device in normal rest position. In operation, the drum 16 rotates a quarter turn counterclockwise as in FIG. 4.

The modification in FIG. 6 is similar to the foregoing embodiments except that in this case the pawl 40 is a spring pawl rather than a gravity actuated pawl. This pawl is a light cantilever spring arm having an end portion 41 mounted on an internal lug 42 in the drum 16. FIG. 6 shows the parts in rest position and the operation is the same as described above in connection with FIGS. 1 to 4.

Having now described my invention and in what manner the same may be used, what I claim as new and desire to protect by Letters Patent is:

1. A pull chain operator for a rotary switch shaft comprising a hub member adapted for mounting on said shaft, a ratchet gear fixedly mounted on said hub member, a drum rotatably mounted on said hub member, a pawl on said drum engageable with said ratchet gear, a pull chain on said drum arranged to rotate the drum a fraction of a turn in a direction to operate the switch, and a counterweight on said drum arranged to rotate said drum in the opposite direction after operation by said pull chain.

2. A switch operator as defined in claim 1, said pawl being gravity actuated into engagement with said ratchet gear.

3. A switch operator as defined in claim 1, said pawl being spring actuated into engagement with said ratchet gear.

4. A switch operator as defined in claim 1, said drum being eccentric to said hub and shaft.

5. A switch operator as defined in claim 1, said pull chain including a flexible band wrapped on said drum.

6. A switch operator as defined in claim 1, said ratchet gear, pawl and counterweight being contained in said drum.

7. A switch operator as defined in claim 1, said hub member comprising an internally threaded tube.

8. A switch operator as defined in claim 7, one end of said tube being adapted for threaded connection with said switch shaft, and a screw in the opposite end of said tube having a screwdriver slot for turning said tube on said shaft.

9. A switch operator as defined in claim 1, said hub member comprising an internally threaded tube for threaded engagement with said switch shaft, said drum being eccentric to said tube, and said ratchet gear, pawl and counterweight being contained in said drum.

* * * * *