

March 14, 1967

G. R. LAWSON
THREE-POSITION SWITCH

3,309,544

Filed Feb. 21, 1961

2 Sheets-Sheet 1

FIG. 1.

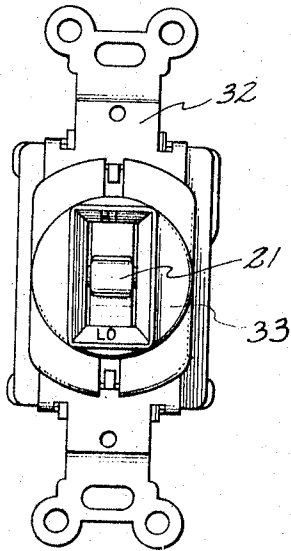


FIG. 2.

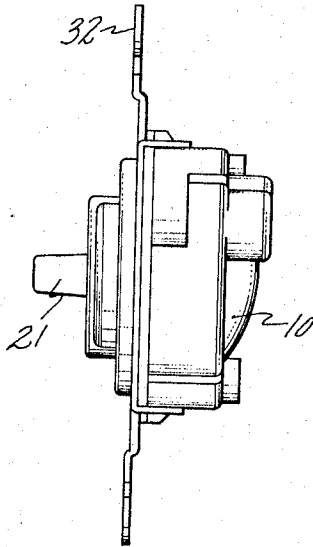


FIG. 3.

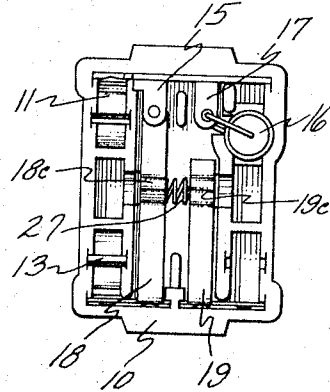


FIG. 4.

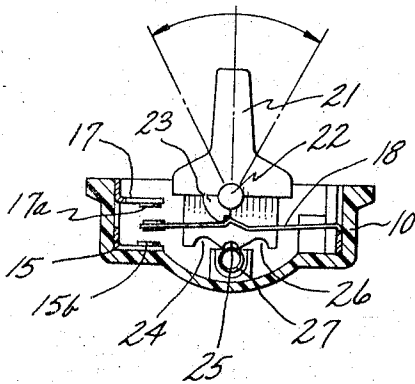


FIG. 5.

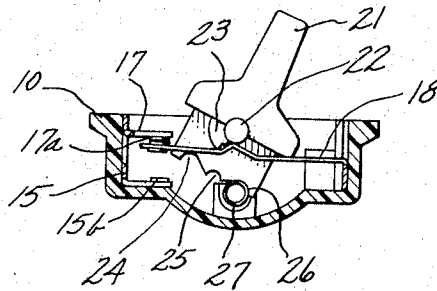
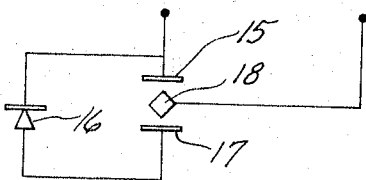


FIG. 6.



Inventor:
Gustaf R. Lawson

by Allard A. Bradlock

His Attorney

March 14, 1967

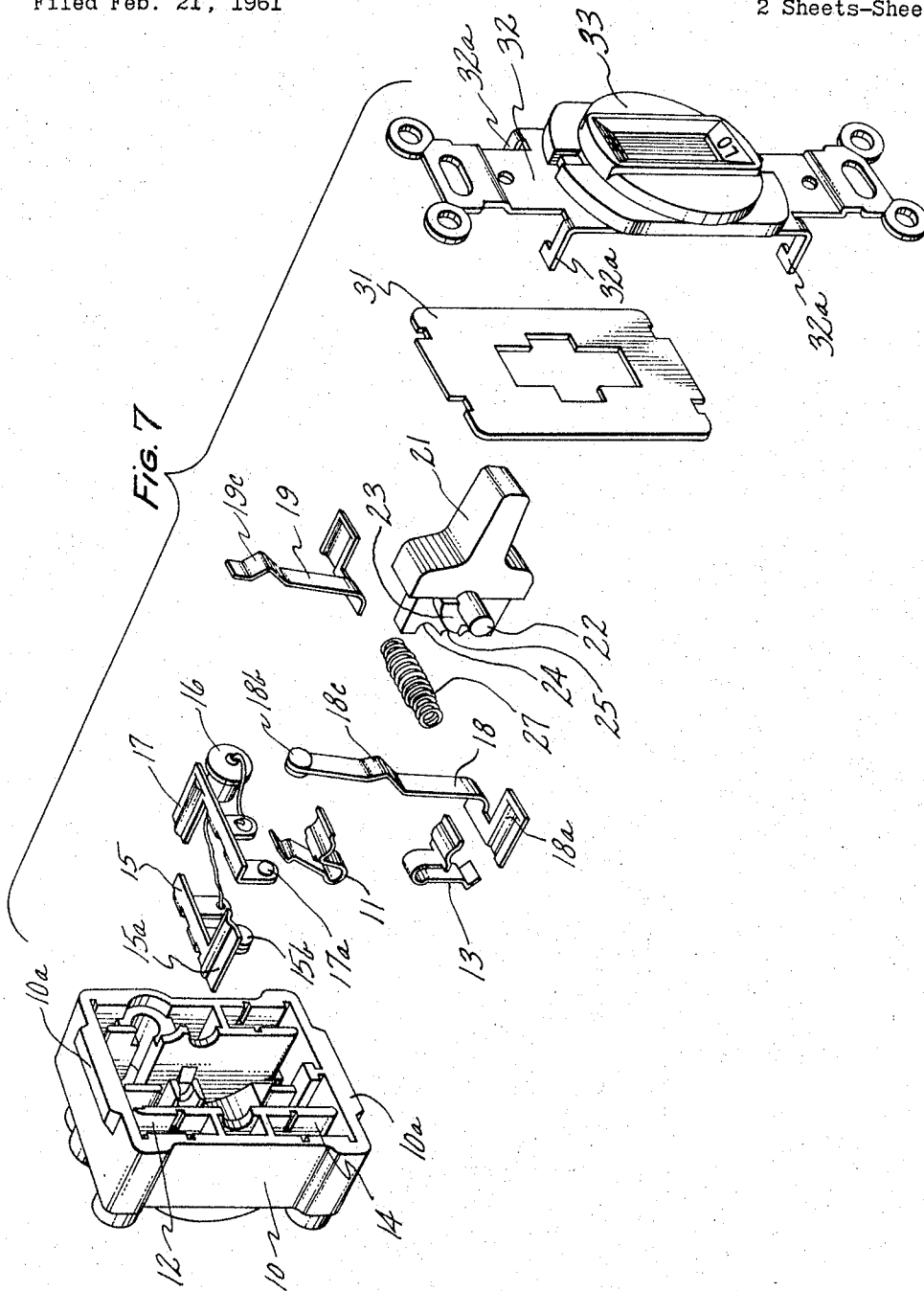
G. R. LAWSON

3,309,544

THREE-POSITION SWITCH

Filed Feb. 21, 1961

2 Sheets-Sheet 2



Inventor:
Gustaf R. Lawson
by Allard A. Bradlock
His Attorney

1

2

3,309,544

THREE-POSITION SWITCH

Gustaf R. Lawson, West Warwick, R.I., assignor to General Electric Company, a corporation of New York
 Filed Feb. 21, 1961, Ser. No. 90,821
 4 Claims. (Cl. 307-146)

The present invention relates to a switch for electric lamps. More particularly, the invention relates to a switch for achieving two levels of lighting intensity in a lamp circuit.

Morton Patent No. 2,896,125 described a lamp switching mechanism in which a dry rectifier was switched into an alternating current lamp circuit to provide half-wave rectification of the current thereby reducing the effective voltage by slightly more than half and reducing to a corresponding degree the intensity of light emitted by lamps in the circuit. The present invention is directed to a switch mechanism for switching a rectifier into and out of a lighting circuit to achieve two levels of lighting after the manner of the Morton patent.

One of the objects of the present invention is to provide a three-position light-dimming switch utilizing a single manual-control trigger.

Another object of the present invention is to provide a light-dimming switch of dimensions small enough for the switch to fit into a conventional wall switch box.

Another object of the invention is to provide a light-dimming switch which can be readily substituted for a conventional light switch.

Other objects of the invention will be apparent from the following specification considered in conjunction with the drawing wherein:

FIG. 1 is a front view of the switch showing the trigger protruding through a conventional mounting strap;

FIG. 2 is a side view of the switch illustrated in FIG. 1;

FIG. 3 is a view of the switch illustrated in FIG. 1 with the cover and trigger removed;

FIG. 4 is a sectional view of the switch housing and trigger and marking the rotational angle of the trigger;

FIG. 5 is a view similar to FIG. 4 with the trigger operated to close the rectifier-shunting circuit;

FIG. 6 is a schematic diagram illustrating the circuits which may be controlled by operation of the switch; and

FIG. 7 is an exploded perspective view of the elements making up the switch.

Briefly stated, in accordance with one of its aspects, the present invention is directed to a three-position switch comprising a housing formed by a recessed base and cover member, a pair of fixed contacts in register with each other in the housing, a dry rectifier connected across the fixed contacts, a first terminal to which one of fixed contacts is connected, a movable spring contact blade having motion between the fixed contacts, the movable contact blade having a detent-engaging lateral ridge across the center portion thereof, a second terminal to which the movable contact blade is connected, a manually operable trigger movable about a pivotal axis between two extreme at-rest positions and a midway at-rest position, a detent on the base of the trigger in engagement with the movable contact blade and the lateral ridge thereof for causing the movable contact blade to engage one of the fixed contacts in one extreme position and the other fixed contact in the opposite extreme position while holding the movable contact out-of-contact with the fixed contacts in the midway position, the base portion of the trigger having a bottom edge on the interior of the housing forming an indexing cam surface and being displaceable by movement of the cam surface whereby the spring member when in engagement with the spring pockets maintains the trigger in one of its three at-rest positions.

The back portion of the switch consists of a housing 10

of molded plastic material such as a phenolic in which integral interior partitions are provided for the purpose of seating and positioning the functional elements hereinafter described. A first spring terminal 11 is positioned in a recess 12 of the housing 10 and a second spring terminal 13 is positioned in a recess 14. The terminals 11 and 13 are accessible to conductor leads (not shown) extending through apertures (not shown) extending through the base of the housing 10. The terminals 11 and 13 are those disclosed in Benander Patent No. 2,705,785. Obviously, other terminals such as conventional screw terminals could be substituted for the spring terminals 11 and 13. The terminal 11 is in spring engagement with a portion 15a of a first fixed contact 15 positioned against the upper wall of the housing 10. The first fixed contact 15 is connected to a dry rectifier 16 which is in turn connected to a second fixed contact 17 which is equipped with a contact tab 17a positioned directly above and in register with a contact tab 15b on the first fixed contact 15.

The second spring terminal 13 is biased against a portion 18a of a movable spring contact blade 18 having a fixed end anchored against the bottom wall of the housing by the portion 18a and a movable end equipped with contact tabs 18b positioned between the contact tabs 15b and 17a of the first and second fixed contacts. The central section of the movable contact 18 is curved to provide a lateral ridge 18c engageable by a trigger detent as more fully explained hereinafter. It will be seen that the movable contact blade 18 can engage either the first fixed contact 15 or the second fixed contact 17 and the clearances between the contact tabs 15b and 17a of these contacts are sufficient to enable the movable contact 18 to have a position in between where it is out-of-contact with both of the fixed contacts.

As best shown in FIGS. 4 and 5, movement of the movable contact 18 is controlled by a trigger 21 having integral pivot pins 22 which seat on integral bearings molded into the housing 10. The trigger 21 has a detent 23 which engages the movable contact 18 and controls its positioning with respect to the fixed contacts. The base of the trigger 21 consists of a cam surface which includes three spring pockets 24, 25, and 26. This cam surface engages a coil spring 27 which is positioned in the housing in parallel alignment with the axis of the trigger 21. The central portion of the spring 27 has free vertical movement and thus the spring exerts biasing pressure against the spring pockets 24, 25, and 26 forming the cam surface of the trigger 21. The pressure of the spring 27 against the spring pockets 24, 25, and 26 serves to index the trigger in three positions—two extreme positions exemplified by the arrow in FIG. 4, showing the angle of rotation of the trigger and a central position in which the trigger 21 is in the position illustrated in FIG. 4.

In order to equalize pressures against the trigger 21 a spring arm 19 is positioned on the opposite side of the trigger 21 from the movable contact arm 18. The spring arm 19 is made of the same gauge metal as the movable contact 18 and a companion detent (not shown) is provided to engage the arm 19. The only function of the spring arm 19 and its lateral ridged portion 19c is to equalize the forces exerted against the trigger 21 in order to insure balanced wear on the parts and trouble-free operation of the switch.

The trigger 21 and other elements are maintained in the housing 10 by a sheet of insulating material 31 which is in turn held in position by a conventional metal mounting strap 32 having portions 32a which are bent around lips 10a on the housing 10. The mounting strap 32 has mounted thereon a bezel 33 of molded insulating material on which the intensity indicators "Hi" and "Lo" appear. The bezel 33 frames the trigger 21 and the outer surface is visible when the switch is installed.

3

Referring to FIG. 4, when the trigger 21 is in its center neutral position, the detent 23 maintains the movable contact 18 out of contact with both of the fixed contacts 15 and 17. When the trigger 21 is moved to the position illustrated in FIG. 5, the detent 23 rotates so that its contacting surface is tilted away from the movable contact 18 and the spring bias of the contact itself enables it to engage the tab 17a of the second fixed contact 17 thereby establishing a circuit through the dry rectifier 16 to reduce the effective voltage of the circuit and reduce by slightly more than half the intensity of any lamps in the circuit. If the trigger is now turned to the opposite extreme, the detent 23 rides over the lateral ridge 18c in the movable contact 18 whereby the contact engages the first fixed contact 15 to shunt the dry rectifier 16 and enable the lamps in the circuit to glow with full intensity.

Switches constructed in accordance with this invention can easily handle incandescent lighting circuits of as much as 300 watts with a small rectifier (relative dimensions are given accurately in the drawings) without having the heat generated in the rectifier reach a dangerous level. The dry rectifiers used in this invention are readily available on the open market and are, therefore, not described in detail here. In general, these elements are materials such as silicon or germanium having a treatment which enables them to pass currents in one direction while impeding the reverse flow. Thus, when connected in an alternating circuit, they have the effect of eliminating current flow in one direction thereby reducing the effective power to the load.

While the invention has been described with the reference to a specific embodiment thereof, it is intended that it be limited in scope only as may be necessitated by the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A three-position switch comprising a housing formed by a recessed base and cover member, a pair of spaced fixed contacts in register with each other in said housing, a dry rectifier connected across said contacts, a first terminal to which one of said fixed contacts is connected, a movable spring contact blade having motion between said fixed contacts, said movable contact blade having a detent-engaging lateral ridge across the center portion thereof, a second terminal to which said movable contact blade is connected, a manually operable trigger movable about a pivotal axis between two extreme at-rest positions and a mid-way at-rest position, a detent on the base of said trigger in engagement with said movable contact blade and the lateral ridge thereof for causing said movable contact blade to engage one of said fixed contacts in one extreme position and the other of said fixed contacts in the opposite extreme position while holding said movable contact out-of-contact with said fixed contacts in the

4

mid-way position, the base portion of said trigger having a bottom edge on the interior of said housing forming an indexing cam surface with three spaced spring pockets, and a spring member in said housing engaged by said cam surface and being displaceable by movement of said cam surface whereby said spring member when in engagement with said spring pockets maintains said trigger in one of its three at-rest positions.

2. A light-dimming switch comprising a housing of molded insulating material, a first fixed contact positioned in said housing near the base thereof, a terminal connected to said first fixed contact, a second fixed contact spaced in overlying relationship with respect to said first fixed contacts, a dry rectifier connected between said fixed contacts, a movable contact blade having a free end movable between said fixed contacts and selectively engageable therewith and oppositely positioned fixed end, said contact blade having a lateral raised portion near the center thereof, a second terminal connected to the fixed end of said movable contact, a manually operable pivotally mounted trigger having two end and one central at-rest positions, a detent on the base of said trigger in engagement with said movable contact blade and movable across the lateral raised portion thereof, said detent being movable through an arc to position said movable contact blade in selective engagement with a fixed contact and a position intermediate of said fixed contacts, the base portion of said trigger having a bottom edge on the interior of said housing forming an indexing cam surface with three spaced spring pockets, a spring member in engagement with said cam surface and displaceable by movement of said cam surface whereby said spring member when in engagement with said spring pockets maintains said trigger in one of its three at-rest positions, and a housing cover through which said trigger protrudes.

3. A light-dimming switch as claimed in claim 2 wherein the cover retains the trigger in position in the housing.

4. A light-dimming switch as claimed in claim 2 wherein the spring member is a coil spring axially parallel with the pivotal axis of the trigger and its central portion is engaged by the trigger cam.

References Cited by the Examiner

UNITED STATES PATENTS

2,807,683	9/1957	Bettencourt	200—683
2,896,125	7/1959	Morton	315—272
2,969,442	1/1961	Benander	200—153.13

JOHN F. COUCH, *Primary Examiner.*

MILTON O. HIRSHFIELD, LLOYD McCOLLUM,
Examiners.

A. W. LEWIS, A. SCHWARTZ, K. D. MOORE,
Assistant Examiners.