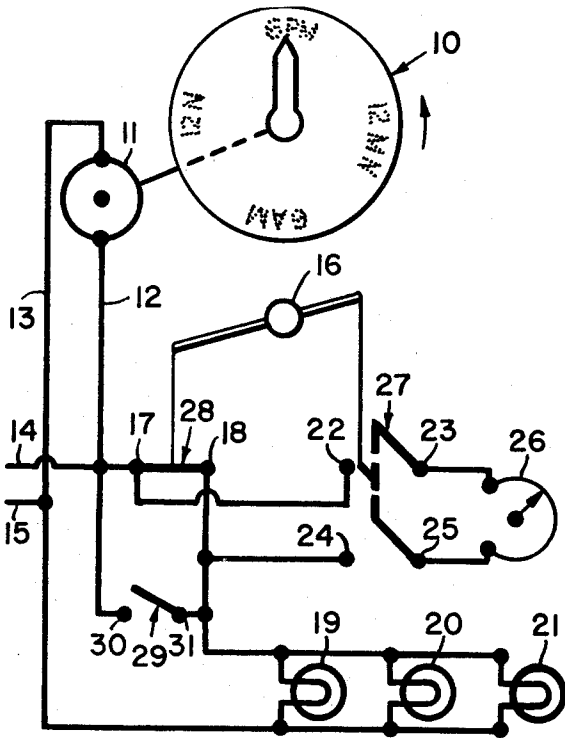


[72] Inventor **Clifford D. Erdmann**
15338 Leonard St., Spring Lake, Mich.
49556
[21] Appl. No. **840,907**
[22] Filed **July 11, 1969**
[45] Patented **Sept. 7, 1971**

[56] **References Cited**
UNITED STATES PATENTS
3,350,581 10/1967 Stein, Jr. 307/141 X
3,361,942 1/1968 Ojelid 307/141 X
Primary Examiner—Robert K. Schaefer
Assistant Examiner—H. J. Hohauser
Attorney—Glenn B. Morse

[54] **TIMECLOCK DIMMING CONTROL**
2 Claims, 3 Drawing Figs.
[52] U.S. Cl. **307/141**
[51] Int. Cl. **H01h 7/00**
[50] Field of Search 307/141,
141.4, 141.8, 117, 112; 200/38; 317/148.5, 141

ABSTRACT: A control system for electrical circuits having "off" periods, "full on" periods, and periods of limited current flow. A timer-controlled switch mechanism incorporates a dimmer unit into a load circuit exclusively during periods of limited current flow, keeping the dimmer isolated completely during other phases of the control cycle.



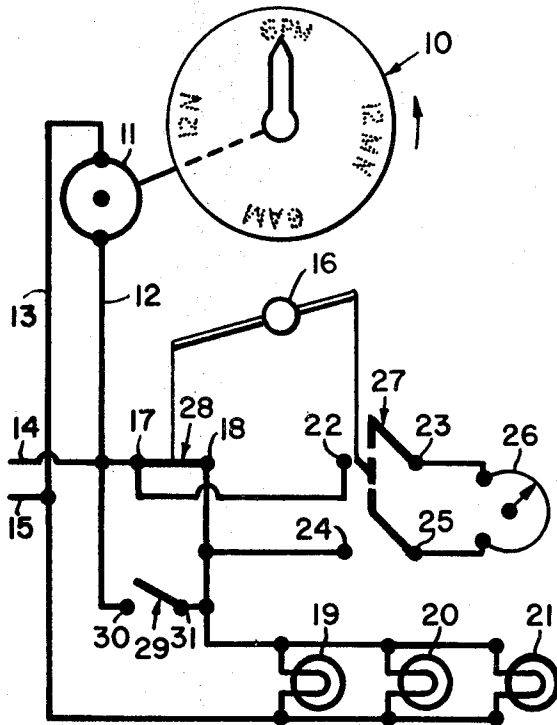


Fig. 1

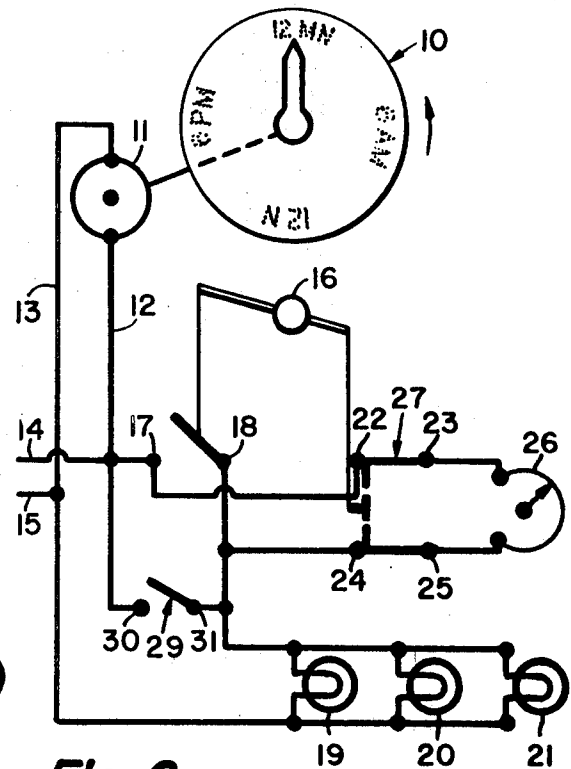


Fig. 2

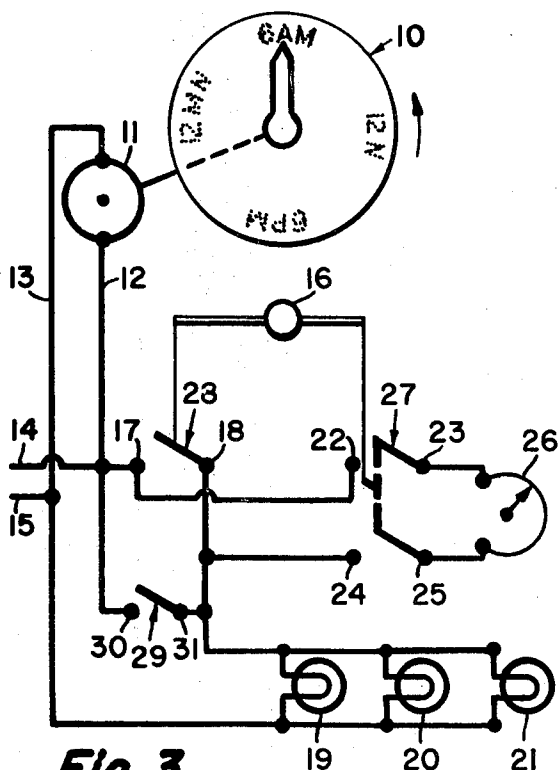


Fig. 3

INVENTOR
Clifford D. Erdmann
BY

Gene B. Erwin

ATTORNEY

TIMECLOCK DIMMING CONTROL

BACKGROUND OF THE INVENTION

In many types of electrical circuits, it becomes desirable to establish not only the usual "off" and "on" phases of a control cycle, but to add to this a period in which a limited current flow is provided. This type of control cycle is useful in lighting circuits in apartment building hallways, in parking lots, floodlight circuits, and in other commercial and industrial lighting applications in which the illumination requirements vary as a function of time. The use of timer-controlled switches to establish predetermined "off" and "on" periods is conventional, and dimming controls have also been developed as standard items of commercially available equipment. These dimming units are essentially rheostats, or other forms of variable resistance. This form of device is usable in conjunction with filament lamps, and the fluorescent variety can be dimmed through the use of a variable ballast. Both of these forms of control are referred to in this application under the general term "dimmer".

Applicant's experience with the commercially available units has clearly shown that something is required beyond the mere incorporation of a dimmer in series with a load during some phase of the control cycle. Utilizing standard equipment, and the established practice for incorporating it into a control system, applicant has found that excessive contact damage results, together with a tendency to burn out the variable resistance of the dimmer. This latter phenomenon is rather curious, as the dimmer is supposedly incorporated in the circuit only during certain phases of the control cycle; and in these phases, it has been functioning entirely within its established load limits. The conclusion has been reached that it is not enough to merely permit a circuit to be closed through the variable resistance during certain phases of the cycle, but also to completely isolate the dimmer from the circuit during the periods in which it is not actively functioning. It is possible that the problems encountered by applicant in conventional dimmer installations may be due to the reactance-capacitance effect of the dimmer as long as one terminal of it is associated with the remainder of the circuit. Be that as it may, applicant has found that the arrangement summarized and described herein functions with a high degree of reliability under all operating conditions that have been encountered.

SUMMARY OF THE INVENTION

A conventional timer-control actuator is provided with two switches which are operated in opposite relationship by the actuator. One of these switches opens and closes the load circuit directly. The other switch opens and closes both sides of the circuit to the dimmer unit simultaneously, thus establishing an alternate circuit in series with the load. Since these two switches are oppositely actuated, it becomes mechanically inherent that the dimmer is disconnected from the circuit entirely during the full "on" phase of the control cycle, as well as during the "off" phase. An intermediate position of the actuator establishes a condition in which both switches are in the "off" condition, which corresponds to a phase of the control cycle in which the lighting (or other equipment) is completely off.

DESCRIPTION OF THE DRAWING

In the drawing, FIGS. 1, 2, and 3 are schematic diagrams il-

lustrating, respectively, the "on," "dimmed," and "off" phases of the control cycle. The same circuit components are present in all three of the diagrams.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the schematic diagrams, the timer generally indicated at 10 is provided with a clock motor 11 receiving current from the lead wires 12 and 13. These wires are connected, respectively, to the line wires 14 and 15. The motor 11 may be considered as running continuously. During the "on" phase of the cycle shown in FIG. 1, the actuating rocker 16 positioned by the timer 10 by a conventional mechanism (not shown) closes the circuit between the points 17 and 18. This condition establishes a closed circuit from the line wires 14 and 15 through the load represented by the incandescent lamps 19-21. In this phase of the cycle, the rocking actuator 16 has opened the circuit between the points 22-23 and 24-25, thus completely isolating the rheostat 26 from the remainder of the circuitry. The points 22-25 may be considered as constituting a switch indicated generally at 27, and the points 17 and 18 as constituting the switch 28. A testing switch 29 can be used to close the circuit between the points 30 and 31 independently of the switches 27 and 28 when it becomes desirable to check the load for burned out lamps, or for other purposes.

FIG. 2 illustrates the phase of the control cycle in which the dimmer 26 is functioning. The switch 27 has now been closed by the rocking actuator 16 so that an electrical circuit is continuous between the points 22 and 24, thus placing the lamps 19-21 in series relationship with the line 14 and 15. In FIG. 3, an intermediate position of the locking actuator 16 results in placement of the switches 27 and 28 in a condition in which neither establishes a closed circuit. The line 14 and 15 is thus electrically isolated from the load provided by the lamps 19-21, as far as the transmission of substantial electrical energy is concerned.

The arrangement described in conjunction with the illustrated schematic diagrams is extremely useful in increasing the effective life of light bulbs, and in reducing the cost of illumination by providing only that which is necessary. The timer 10 is normally settable by the owner of the premises so that the particular "off," "on," and "partially on" phases can be established to whatever periods are desired. The timer unit (which would include the rocking actuator 16 as well as the dimmer rheostat), are conventional items readily available on the market. The switches 27 and 28 are selected for the characteristics required by the present invention, and the entirety of the control unit can easily be incorporated in a simple installation.

I claim:

1. A control system for electrical equipment, said system comprising:

a timing device including clock means and actuating means responsive to said clock means, and also including first and second switch means operable by said actuating means reverse relationship with respect to each other, said first switch means having open and closed positions to open and close a first electrical load circuit, said second switch means

2. A system as defined in claim 1, wherein said actuating means includes a rocking actuator operating said switches oppositely to inherently prevent simultaneous closure of both of said switches.

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,603,807 Dated September 7, 1971

Inventor(s) Clifford D. Erdmann

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Claim 1 should be as follows:

1. A control system for electrical equipment, said system comprising :

a timing device including clock means and actuating means responsive to said clock means, and also including first and second switch means operable by said actuating means in reverse relationship with respect to each other, said first switch means having open and closed positions to open and close a first electrical load circuit, said second switch means having open and closed positions to open and close a second electrical load circuit which includes a dimmer, said second switch means operating on said second load circuit on both sides of said dimmer, said actuator being adapted to place said switch means in a condition in which said first switch is closed while said second switch is open, a condition in which said first switch is open and said second switch is closed, and an intermediate condition in which both said switches are open.

Signed and sealed this 3rd day of April 1973.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents