Patented Oct. 18, 1938

2,133,608

UNITED STATES PATENT OFFICE

2,133,608

COLOR SCREEN CONTROL

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Application April 2, 1936, Serial No. 72,441

8 Claims. (Cl. 240—3.1)

This invention pertains to the control of color screens in connection with lights such as theatre spotlights and floodlights. Each light is usually equipped with a number of color screens adapted to be selectively placed before the light in order to provide the desired colored effects.

The lights are usually at the back of the auditorium and the screens are mounted on the lights. It is customary for the operator to manipulate the screens by remote control from a position on the stage.

An object of the present invention is to provide mechanism suitable for use with either direct or alternating current, for noiseless control of screens, to start them from rest slowly, to move them quickly and positively, and then bring them to rest slowly and without jar.

Fig. 1 is a side view partly broken away and partly in section of the light with four colored screens and the control mechanism.

Fig. 2 is a view taken from the left of Fig. 1 showing the light and a color screen in its operative and inoperative position.

Fig. 3 is a fragmentary view showing the screen mechanism with the screen in operative position.

Fig. 4 is a cross-sectional view on line 4—4 of Fig. 1 showing the motor, gearing and screen actuating parts with the screen indicated in inoperative position.

Fig. 5 is a detail view on line 5—5 of Fig. 1.

Fig. 6 is a detail view on line 6—6 of Fig. 1.

Fig. 7 is a diagrammatic view showing the relays, rotary switches, motors and wiring diagram.

In the drawings, 10 is a spotlight, to the side of which is attached a box-like housing or frame 12 which supports the screen control mechanism. Four screens 14 are shown, each being secured by a clamp 16 to one of the concentric shafts 18, 20, 22, 24 supported for rotation in the upper part of frame 12. Each screen is balanced about its axis by a counterweight 26.

Mounted on frame 12 are four motors 28, each driving a train of speed reducing gearing. The final gear of each train, designated 30, is provided with a crank pin 32 connected at 33 by link 34 to a crank arm 36 fast on one of the shafts 18, 20, 22 or 24.

Figs. 3 and 4 show the parts just described in their two at-rest positions. In Fig. 4 screen 14 is in normal inoperative position, and in Fig. 3 it is in operative position in front of the light. Fig. 2 shows both positions, the full-line screen at the right being in normal position and the broken-line screen at the left being in operative position in front of the light 10.

As will be explained, when a motor 28 is energized, it moves its corresponding crank pin 32 through a half revolution and then stops. With crank 32 at either the top or bottom of its stroke and with its corresponding screen at either inoperative (Fig. 4) or operative (Fig. 3) position, the half revolution of crank pin 32 is sufficient to rotate arm 36 and its attached screen from one of its positions to the other. It will be appreciated that during the first and last portions of the stroke, crank 32 is moving at right angles to link 34, the result being that the screen starts slowly and smoothly from its position of rest, accelerates gradually until the crank pin (and screen) reaches its maximum speed at midstroke, and then decelerates gradually to the end of the stroke, thus bringing the screen to rest slowly and without jar. The movement is positive at all stages because it has the full power of the motor behind it, yet there is no jar, jerk or noise at any point. The motor control will now be described.

Fast on each shaft 18, 20, 22, 24 is a rotary switch 40 of non-conducting material provided with a metal plate 41 set into the cylindrical surface thereof. The plate is shaped as indicated in Fig. 7 to leave exposed the insulated areas 42, 44 at the ends of the rotary switch. An insulating bar 46 supports a set of three brushes, 48, 50, 52 in contact with each rotary switch. Brushes 48 at the left and brushes 52 at the right of each set are in contact with plate 41 for approximately half the rotary switch travel, and with insulated areas 42, 44, respectively, during the rest of the travel. Brush 50 is always in contact with plate 41. Brush 48 is shown in Fig. 5 and brush 52 is shown in Fig. 6. Brush 50 is a duplicate of brush 48 and is therefore invisible behind brush 48 in Fig. 5.

Operation of the apparatus may readily be understood from Fig. 7 which shows the system in diagrammatic form. When switch 54 is closed, lamp 56 is lighted, current flowing from source 58 through switch 54, line 60, lamp 56 and line 61 to ground.

Each screen is controlled by a switch 62. Whenever a screen is in normal inoperative position its switch 62 is open, and brushes 48, 50 and 52 are related to the rotary switch as indicated diagrammatically in the three units to the left in Fig. 7, brush 48 being on insulation 42, while the other two brushes are on metal plate 41. Above each rotary switch in Fig. 7 is shown