Aug. 11, 1931. H. A. KLIEGL 1,818,718

SYNCHRONOUS CONTROL OF COLOR SCREENS

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FIG.1.

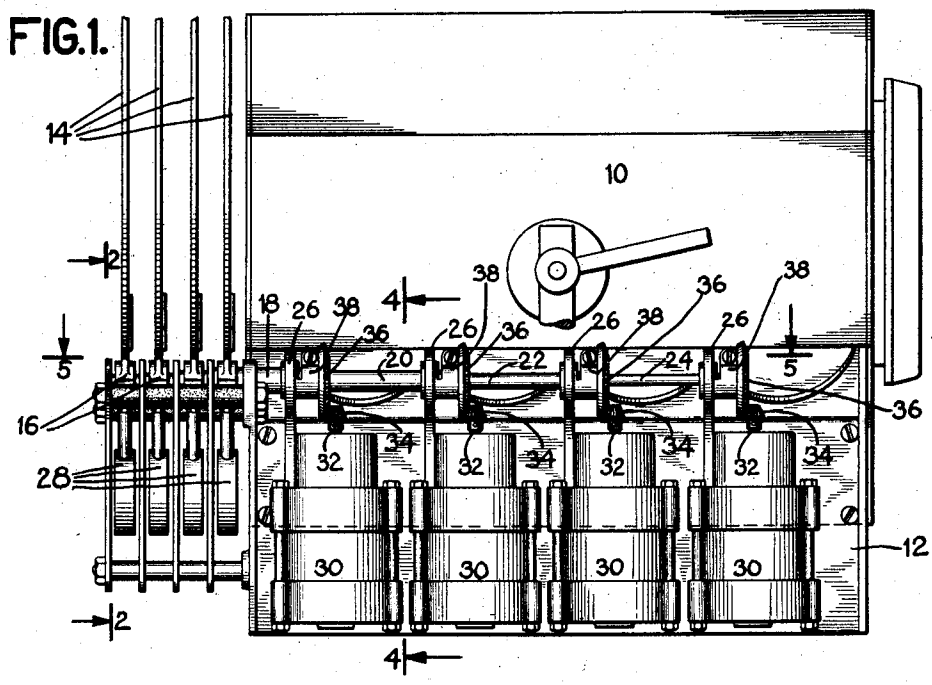


FIG.2.

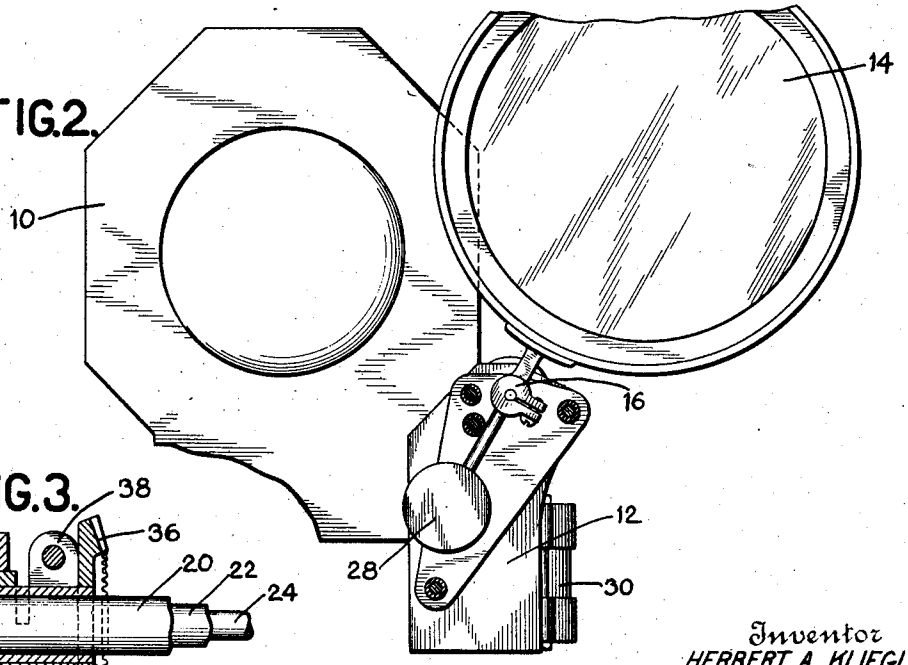
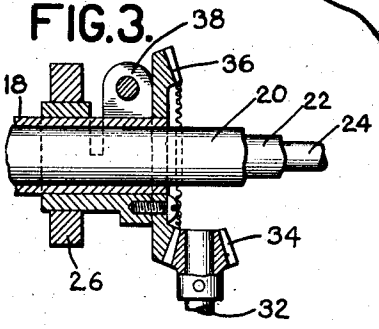


FIG.3.



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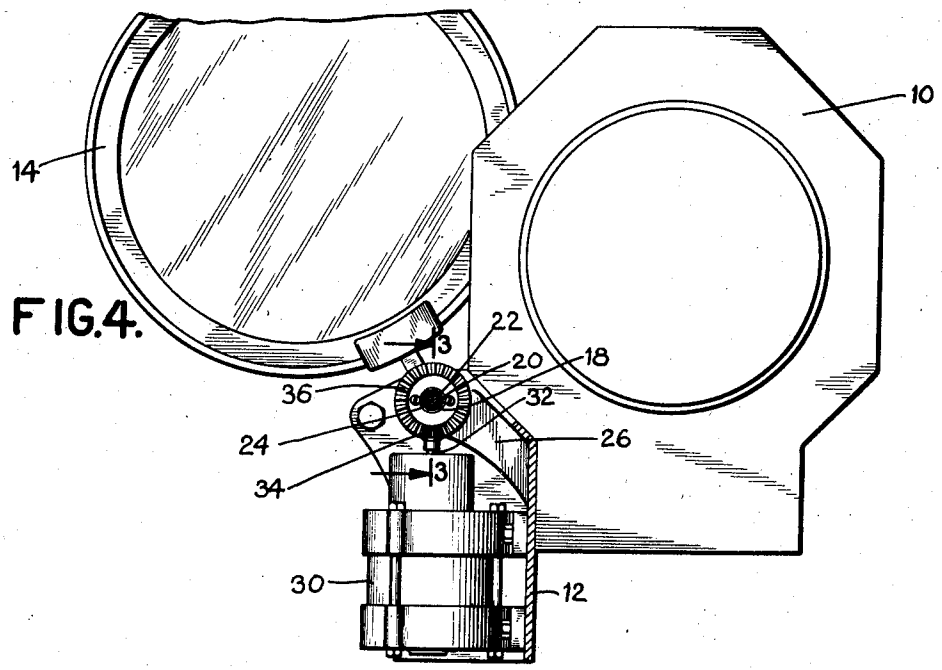
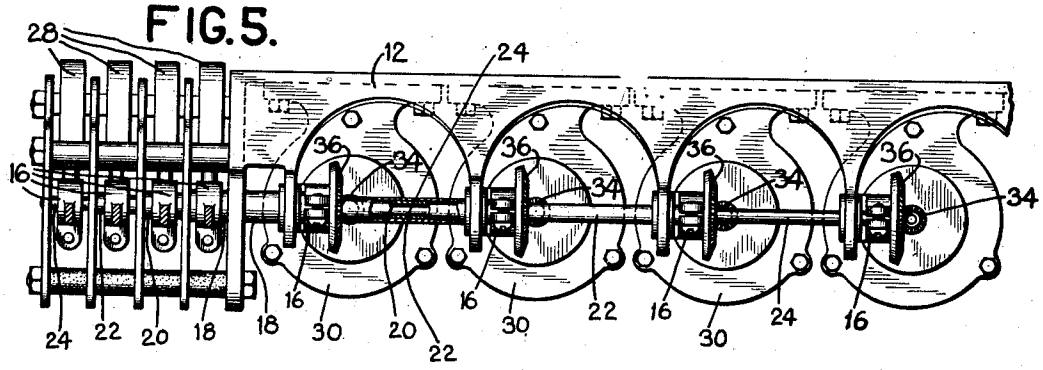


FIG.4.

FIG.5.



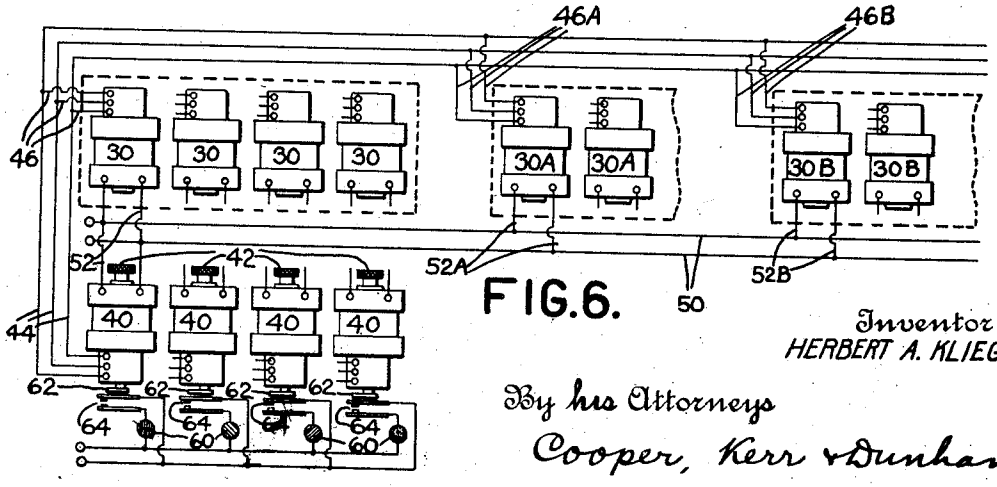


FIG.6.

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UNITED STATES PATENT OFFICE

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SYNCHRONOUS CONTROL OF COLOR SCREENS

Application filed June 20, 1929. Serial No. 372,282.

This invention pertains to the control of color screens in connection with the illumination of theatre stages.

Spot lights for such work are usually equipped with a number of color screens adapted to be selectively placed before the light in order to provide the desired illumination color effects.

Devices have been used heretofore by which the operator was enabled to manipulate the screens from a distance, as for instance when the lights were at the back of the auditorium and the operator on the stage. Such devices have usually been operated electromagnetically, a solenoid at the light being energized to actuate a screen whenever the operator would close a switch. Great difficulty has been encountered in securing dependable operation of such arrangements because of fluctuating line voltage, dusty contacts, noise of solenoids when used with alternating current, noise and breakage of screens due to slamming, etc. These troubles were multiplied when it was necessary to actuate screens on several spot lights simultaneously, as is often required.

The object of the present invention is to overcome all the above difficulties by the use of the Selsyn control system. This system consists of a motor and generator which are some respects like three-phase induction motors, but have shuttle wound rotors with definite poles whose windings are connected by slip rings to a single phase, alternating current source of excitation. The generator is located at the point of actuation and the motor at the point of reception. When the generator is turned by the operator the motor turns synchronously therewith in the same direction, at the same speed, and through the same arc. This system is well known and is not claimed per se but only in connection with mechanism adapting it for the purpose intended.

Further and other objects and advantages will be apparent from the specification and claims, and from the drawings which show by way of illustration what is considered the preferred form of the invention.

Fig. 1 is a side view of a spot light with four color screens each operable by a Selsyn motor.

Fig. 2 is a front view of the spot light and screens, on the line 2—2 of Fig. 1.

Fig. 3 is a fragmentary detail on the line 3—3 of Fig. 4.

Fig. 4 is a cross-section on the line 4—4 of Fig. 1.

Fig. 5 is a cross-section on line 5—5 of Fig. 1.

Fig. 6 is a wiring diagram including the generators and lights for giving a visual indication to the operator as to the positions of the screens.

In the drawings, 10 is the spot light, to the side of which is bolted a box-like housing or frame 12 which supports the entire control mechanism. Four screens 14 are shown, each being secured by a clamp 16 to one of the concentric shafts 18, 20, 22, 24, which are supported for rotation in brackets 26 on the upper part of frame 12. Each screen is balanced about its axis by a counterweight 28 on the opposite side of its shaft.

Mounted on frame 12 are four Selsyn motors 30, the shaft 32 of each motor being provided on its upper end with a bevel pinion 34 engaging a bevel gear 36 fast on one of the shafts 18, 20, 22, 24 in such manner that when any motor 30 rotates its shaft 32, one screen shaft is rotated and the screen attached to the other end thereof is also moved. Fig. 3 shows gear 36 secured to hollow shaft 18 by means of sleeve-like clamp 38.

The Selsyn generators 40, shown in Fig. 6, are each provided with a knob 42 by means of which the generator rotor is rotated by the operator. The rotor of each generator 40 is wired to the rotor of each motor 30 by three wires 44 and the three wires 46 leading therefrom. Line wires 50 are connected to motor and generator by wires 52. With this arrangement, whenever the knob 42 on any generator is rotated through any given arc, the motor 30, wired to that generator will turn through the same arc and the particular screen geared to that motor will be moved.

It will be apparent that the above described arrangement provides very convenient means for moving the screens from op-

erative to inoperative position, and vice versa. There will be no movement of a screen until knob 42 is rotated. When rotation of a knob 42 occurs, the corresponding screen will be moved to the desired point and held there until the operator again moves the knob.

It is sometimes desired to control screens of the same color simultaneously on a number of lights. This is easily accomplished in the present system by simply extending wires 44 and connecting motors thereto. Fig. 6 shows motors 30A and 30B of second and third lights connected by wires 46A and 46B to lines 44, and by wires 52A and 52B to the supply lines 50.

In order to give the operator a visual indication as to the positions of the screens there is a colored light 60 at each generator 40, of the same color as the screen or screens controlled by that generator. When any generator is rotated to place a screen in operative position, a cam 62 fast on the protruding shaft of the generator closes the adjacent switch 64 to light the corresponding colored lamp 60 and to hold it lighted until the generator and screen are returned to their normal positions.

It is to be understood that the invention is not limited to the specific construction and embodiment herein described but may be used in other ways without departure from its spirit as defined by the following claims.

I claim—

1. In apparatus of the class described, in combination, a spot light, a screen having operable and inoperable positions relatively to said spot light, a manually rotatable generator remote from said light, and a motor operatively connected to said screen, said motor and generator being electrically interconnected so that rotation of said generator through any arc will cause said motor to rotate through a certain arc, whereby said screen may be moved between its operable and inoperable positions at the will of the operator.

2. The invention set forth in claim 1 in which means is provided operable automatically when said generator is rotated for indicating to the operator the position of the screen.

3. In apparatus of the class described, in combination, a plurality of color screens at different locations and means for simultaneously controlling the positions of said screens, said means comprising a motor geared to each screen, and a manually rotatable generator remote from said motors, said generator and motors being electrically interconnected so that rotation of said generator will cause said motors to rotate, whereby said screens may be simultaneously moved at the will of the operator.

4. A color control apparatus for a spot light, comprising in combination a plurality of color screens movably mounted on said light, a plurality of motors mounted on said light, a plurality of concentric shafts each operatively connecting one of said motors to one of said screens whereby each of said screens may be moved by the motor associated with said screen, each of said motors being so electrically interconnected with a remote manually rotatable generator that rotation of any generator will cause rotation of the motor interconnected therewith whereby the screen geared to that motor may be moved at the will of the operator.

5. In combination, a spot light for color control apparatus, a plurality of color screens, a motor for each color screen connected thereto to move the same from operative to inoperative position, a plurality of generators, electrical connections between the armatures of said motors and generators, and a source of current connected in parallel to the fields of said motors and generators whereby upon rotation of the generator armature a substantially corresponding rotation of the associated motor armature is obtained.

6. In combination, a spot light for color control apparatus, a plurality of color screens, a motor for each color screen connected thereto to move the same from operative to inoperative position, a plurality of generators, electrical connections between the armatures of said motors and generators, a source of current connected in parallel to the fields of said motors and generators whereby upon rotation of the generator armature a substantially corresponding rotation of the associated motor armature is obtained, and means operated in the rotation of the generator armature for indicating the position of the screen connected with the associated motor.

7. In combination, a spot light for color control apparatus, a plurality of color screens, a motor for each color screen connected thereto to move the same from operative to inoperative position, a plurality of generators, electrical connections between the armatures of said motors and generators, a source of current connected in parallel to the fields of said motors and generators whereby upon rotation of the generator armature a substantially corresponding rotation of the associated motor armature is obtained, and an indicating lamp arranged in parallel in the source of current and in series with a switch actuated in the rotation of the generator armature.

8. In apparatus of the class described in combination, a plurality of spot lights, a plurality of independently operated pivoted screens having operable and inoperable positions, manually rotatable members remote from said light, reversible electrical motors for driving the screens and electrical trans-

mission means interconnecting said motors and members whereby rotation of any member in either direction will cause a particular screen to move correspondingly and synchronously with said member for the purpose set forth.

9. In combination, a spot light for color control apparatus, a plurality of color screens, a reversible electric motor for each color screen connected thereto to move the same from operative to inoperative position, a plurality of reversible generators, and electrical connections between said generators and motors whereby rotation of any generator in either direction will cause a particular screen to move correspondingly and synchronously with said generator.

10. In combination, a spot light for color control apparatus, a plurality of color screens, a reversible electric motor for each color screen connected thereto to move the same from operative to inoperative position, a plurality of reversible generators, electrical connections between said generators and motors whereby rotation of any generator in either direction will cause a particular screen to move correspondingly and synchronously with said generator, and means operated in the rotation of the generator for indicating the position of the screen connected with the associated motor.

In testimony whereof I hereto affix my signature.

HERBERT A. KLIEGL.