L. McCORMICK.

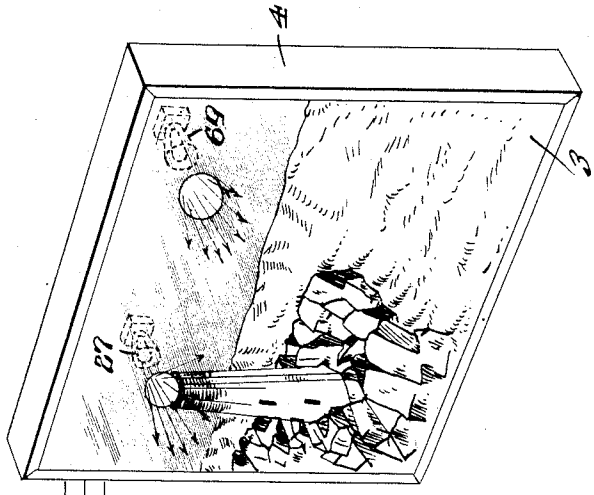
MOVING PICTURE APPARATUS.

APPLICATION FILED DEC. 12, 1916.

1,256,147.

Patented Feb. 12, 1918.

2 SHEETS—SHEET 1.



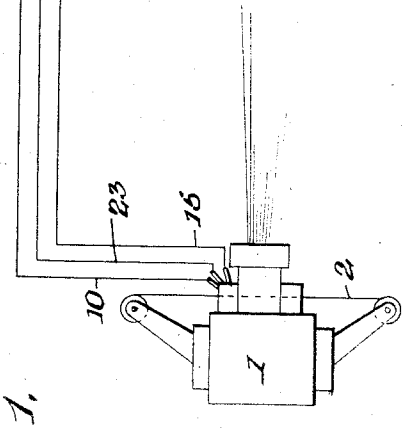


Fig. 1.

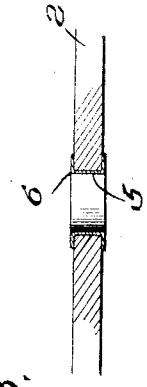


Fig. 3.

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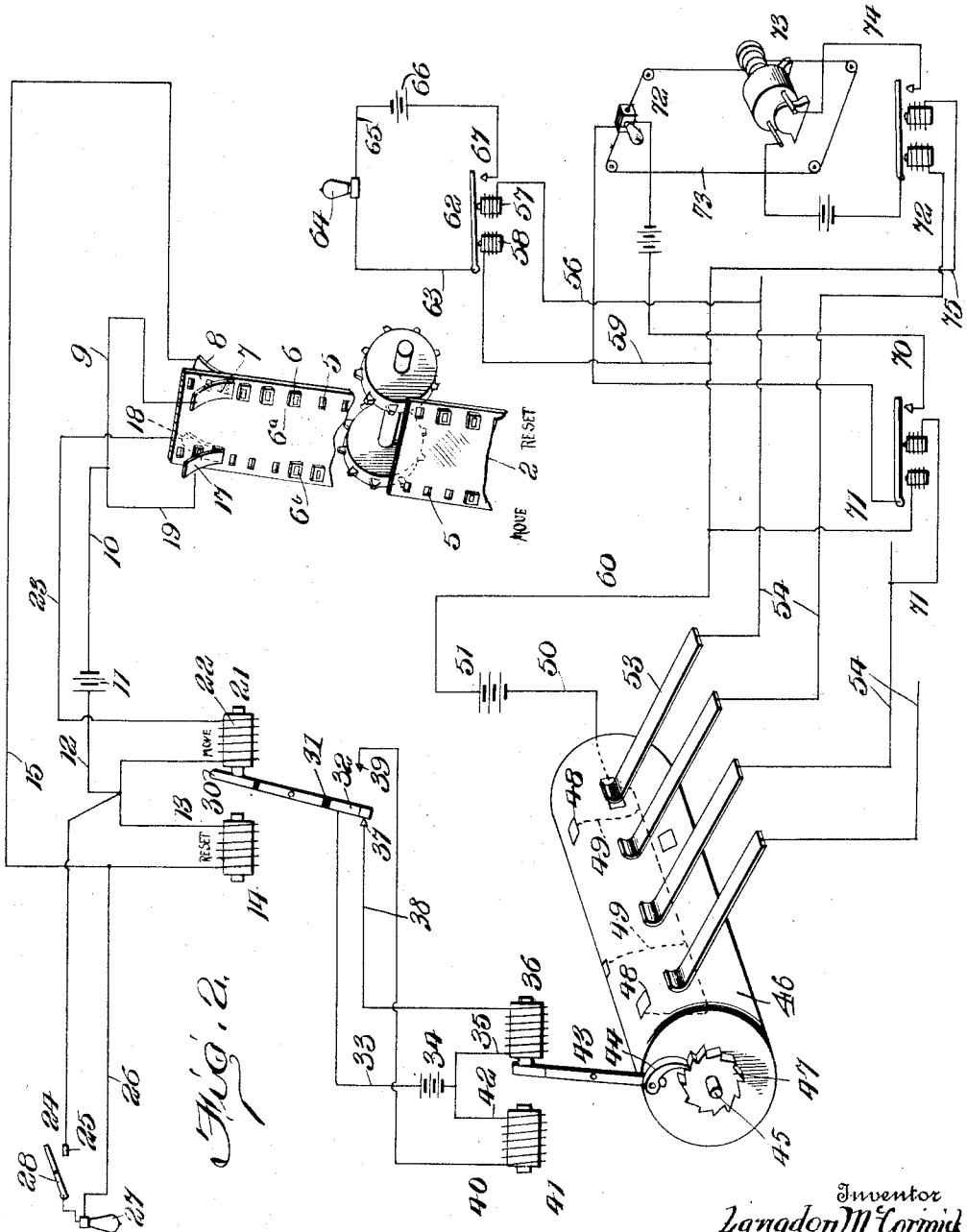


Fig. 2.

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UNITED STATES PATENT OFFICE.

LANGDON McCORMICK, OF NEW YORK, N. Y.

MOVING-PICTURE APPARATUS.

1,256,147. Specification of Letters Patent. Patented Feb. 12, 1918.

Application filed December 12, 1916. Serial No. 136,479.

To all whom it may concern:

Be it known that I, LANGDON McCORMICK, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Moving-Picture Apparatus, of which the following is a specification.

This invention relates to improvements in means for automatically controlling the lamps located to show light where actual light is or is intended to be shown in a picture on a screen on which moving pictures are produced.

In my allowed applications for patents, Serial Numbers 831,015, filed April 10, 1914; 58,896, filed October 30, 1915; and 95,039, filed May 3, 1916, I have shown and described means for showing light in pictures appearing on a screen, where the representation of light is shown. My present invention has for its object to provide special means, controlled by the moving picture film for automatically and electrically controlling the lamps or other devices to coöperate with the pictures produced.

A further object of the invention is to utilize the feeding perforations in the film as a means for receiving the contacts to make and break circuits for controlling the lights, the contacts also serving as a means for strengthening the film edges.

A further object of the invention is to provide means controlled by contacts on the moving picture film to open and close various battery circuits, and operate relays etc. to automatically and intermittently move a contact cylinder for throwing in selected lights or devices to be used in rendering the pictures on the screen more realistic.

The invention also comprehends improvements in the details of construction and arrangement of parts which will be hereinafter described and particularly pointed out in the claims.

In the drawings:—

Figure 1 is a conventional view of a moving picture machine and a screen, to illustrate the application of my invention.

Fig. 2 is a diagrammatic view to illustrate the various circuits.

Fig. 3 is a detail cross section of the film to illustrate one of the eyelets.

1 indicates a moving picture apparatus, 2 the moving picture film, 3 a translucent screen, and 4 a casing located back of the screen and in which the various devices operated in connection with the pictures being reproduced are located.

The usual openings 5 in the film are employed to receive the various contacts for controlling the circuits, to light the lamps and to extinguish same. Near one edge of the film and in the openings 5 are inserted metal eyelets 6, to throw in a battery circuit to actuate a magnet, so as to light the lamps. To insure perfect contact, the eyelets are preferably arranged in groups, as shown, each group 6^a of the series employed to light the lamps being arranged on opposite sides of the film and marked "reset," this term being employed in connection with these particular eyelets, as the latter in this series are used to close a circuit to reset other mechanism to be described.

Located to bear on the opposite faces of the film, and just previous to the entering of the film through the condenser, and in the path and movement of the reset eyelets 6, are curved resilient contacts 7 and 8 fixed to the frame of the moving picture apparatus as shown conventionally in dotted lines in Fig. 1. Connected to the fixed contact 7 is a wire 9, and branching therefrom is a battery wire 10, attached to a battery 11, and from the battery extends a wire 12, and branching therefrom is a wire 13, connected to a magnet 14, and extending from the latter is a wire 15, leading to the fixed contact 8.

Near the opposite edge of the film the eyelets are arranged in groups 6^b, and are indicated in Fig. 2 by "move," this term being employed to indicate that the eyelets 6^b are used to close a circuit to move other devices to be described. On opposite faces of the film and coöperating with the "move" groups of the eyelets are resilient contacts 17 and 18 fixed to the frame of the moving picture apparatus and in transverse alinement with the fixed contacts 7 and 8. The groups of eyelets 6^a and 6^b are of course arranged out of transverse alinement with each other to properly actuate the magnets, as will presently appear. The eyelets extend through the openings in the film to the opposite surfaces or faces thereof to engage and coöperate with the fixed contacts 7—8 and 17—18.

Attached to the fixed contact 17, is a wire

19, which joins the wire 9, hence the battery wire 10. The branch wire 13 is extended, from where it joins the battery wire 12, and connects with a magnet 21, as shown at 22. From the magnet 21, leads a wire 23, connected with the fixed contact 18.

A wire 24 extends from the battery 11 to a contact 25, and a wire 26 extends from the return wire 15, to an impulse lamp 27, wired to a switch 28, adapted to coöperate with the contact 24. The switch 28 is arranged to be used when it is desired to bring the impulse lamp 27 into use. When the current passes through the magnet 14, the lamp is arranged to light by a part of the current, the other part passing through the magnet, it being necessary of course to throw the switch 28 against the contact 24 when it is desired to utilize the lamp in connection with the picture produced on the screen.

The cores 14 and 21, of the magnets are spaced apart, and operating between them is a pivotally mounted armature 30, the lower end of which is divided by insulation, indicated at 31, to form a contact surface 32. Extending from the contact surface is a battery wire 33, connected to a battery 34, and branching from the wire on the opposite side of the battery is a branch wire 35, connected to a magnet 36, and connected to a contact 37, adjacent the contact surface 32, by a return wire 38. On the opposite side of the contact surface 32, is a contact 39, connected by a wire 40, leading to a magnet 41, which is connected by a branch wire 42, with the branch wire 35 and battery 34.

The magnets 36 and 41, are spaced apart, and operating between same is a pivoted armature 43 provided on its lower end with a pawl 44.

Suitably mounted on a shaft 45 is a cylinder 46, of insulated material provided at one end with a ratchet wheel 47, with which the pawl 44 engages. The contact cylinder is provided on its periphery with properly disposed contacts 48, connected by branch wires 49, with a battery wire 50, and battery 51. Supported adjacent the contact cylinder on the periphery thereof are spring contacts 53, and extending from each contact is a wire 54, which leads to various devices, such as lamps, signals, etc., to be used in connection with the picture being produced on the screen. Connected to one of these wires 54 is a wire 56 connected to a magnet 57. A second magnet 58 is wired to the magnet 57 and a wire 59 extends therefrom and is connected to a return wire 60, attached to the battery wire 51.

62 indicates an armature disposed above the magnets 57 and 58, and connected to one end is a wire 63, leading to a high tension lamp 64. Extending from the lamp is a wire 65, leading to a battery 66, from which a wire leads to a contact 67, disposed adjacent the free end of the armature 62. This lamp circuit is only brought into play when an exceedingly high power light is required, the battery of course being of sufficient voltage to produce the desired result.

It is not deemed necessary to show all the other wires 54 connected up with devices, as they all have branches, and the return circuit passes through wire 60. It may be stated, however, that the wires 54 may be connected to motors, or other actuating devices, as shown in Fig. 2. For instance, a lamp circuit 70, and branches 71 are connected to one of wires 54 and the wire 60, in exactly the same manner previously described. This circuit controls a movable lamp 72, which may be moved by a motor, and drum, and cables 73, actuated by a circuit 74, controlled by a circuit through branch wires 75 and one of the wires 54. This lamp may be revolved to give a lighthouse effect, to represent the raising or lowering of the moon, or to give cloud effects, fire, lightning, and such things where synchronizing with the picture is not essential.

In operation, a film is provided with as many groups of "reset" eyelets as it is desired to produce lights in the picture to be produced. These eyelets are of course disposed at points where the lights are necessary according to the pictures on the film, and of course the corresponding group of "move" eyelets are arranged on the films at points necessary to extinguish the lights. It may also be stated that the contacts on the insulated contact cylinder are arranged at the proper places to make the necessary circuits to light the lamps or actuate the other devices to coöperate with the pictures being produced on the screen.

For instance, as shown in Fig. 2, but one contact is shown to engage the resilient contact 53, hence in one revolution of the contact cylinder the lamp will be lighted but once. However, if the picture being produced requires the use of this light for more than one occasion other contacts will be provided. But one is shown in the drawing, and it is to be understood that this is merely illustrative, as it is evident that as many more contacts as may be necessary can be readily supplied to suit any particular film.

In the position shown in the diagram (Fig. 2) a group of "move" eyelets are shown as passing between the fixed contacts 17 and 18, which throws in the battery 11, and energizes the magnet 21. The circuit passes through the battery wires 10, 12, to the magnet 21, and thence through the return wire 23 to the fixed contact 18. This circuit is closed just previous to the film entering the light rays of the condenser of the moving picture apparatus, with the result

that the contact cylinder is actuated to bring into position predetermined contacts 48, to light or put out the lamps or operate other devices. When the magnet is energized it attracts the armature 30, which brings the end against contact 37, and energizes the magnet 36, the circuit being completed through the wire 35, battery 34, and return wire 33, connected to the armature 30.

When the magnet 36 is energized, the armature 43 is attracted, and the movement pulls on the pawl 43, the contact cylinder is turned, which of course shifts the position of the various contacts 48. In the instance shown, one of the resilient contacts 53 is positioned to be in circuit with a contact 48.

The circuits just described are for the purpose of changing the light or lights behind the screen, as will be understood.

Now let it be assumed that the "reset" eyelets 6^a come between the fixed contacts 7 and 8. The circuit is closed through wires 9 and 10, battery 11, wires 12 and 13, to magnet 14, and returns through wire 15. The magnet 14 is thus energized, and the armature 30 is attracted, this circuit is closed through the same battery 11, used in closing the circuit previously described.

Immediately the armature 30 engages the contact 39, a circuit is established through wire 33, battery 34, branch wire 42, magnet 41, and return wire 40, with the result that the magnet is energized and the armature 43 is attracted. This movement of the armature causes the pawl 44 to ride over the ratchet wheel 47, to a new position for a subsequent operation, hence the "reset" eyelet contacts reset the contact cylinder operating means, and establish a circuit to cause the circuit to lamp 64, to be established, and of course any other lamp or devices connected to the wires 54 to be lighted or operated as the case may be.

When the contact cylinder is set as shown in the drawings, current is established through battery 51, wire 50, contacts 48 and 53, wires 54 and 56, magnets 57 and 58, wires 59 and 60. When the magnets 57 and 58 are energized the armature 62 is attracted, and it engages contact 67, and through battery 66, lights the lamp 64, located immediately behind the screen to register with some feature in the picture requiring actual light, as described in my before mentioned application. Of course if the lamps are to be wired to move with the successive pictures, a motor or other means will be actuated by the closing of a circuit through one of the wires 54.

The battery 66 is much stronger than battery 51, to produce a light of sufficient candle power to accomplish the desired result, each battery being of the proper size to operate the lamp or other device to be brought into use.

The parts remain in this position until a group of "move" eyelets interrupt the circuit.

During the period that the "reset" eyelets are in circuit, and every time one of said eyelets passes between the contacts, and switch 28 is properly set, the current imparts an impulse current through the wires 24 and 26, and the impulse lamp 27 flickers, this being due to the fact that this lamp is connected in parallel with the "reset" circuit. This, of course, is only an illustration of the possibilities of the application of the invention, this lamp being used in connection with a moving picture machine where it is necessary to produce actual light or a series of actual lights on a screen. The lamps may be arranged behind the screen in groups, or placed in accordance with the spots on the picture where light or lights are to appear, and the contacts and the wires 54 can be so arranged to obtain absolute registration with the pictures.

The eyelets, in addition to being employed as contacts, are effective in strengthening the edges of the film, and since the feed wheels engage them, it is obvious a more positive contact on the film is obtained.

What I claim is:—

1. In combination, a translucent screen, a moving picture film having feed wheel engaging openings in each edge, metal eyelets disposed in certain of the openings, the eyelets in one edge of the film being out of alinement with the eyelets in the opposite edge of the film, a pair of contacts disposed at each edge of the film to coöperate with the eyelets, each pair of said contacts engaging opposite surfaces of the film, two magnets with an armature between, one pair of contacts being electrically connected with one of the magnets, the other pair of contacts being electrically connected with the other magnet, a lamp, and a circuit under the control of the armature for lighting the lamp or extinguishing the same.

2. In combination, a moving picture machine including feed wheels, a moving picture film having openings in each edge and in which the feed wheels engage, metal eyelets disposed through certain of the openings in the edges of the film and out of transverse alinement, a translucent screen, a pair of contacts to coöperate with the eyelets in one edge of the film, a pair of contacts to coöperate with the eyelets in the opposite edge of the film, two magnets and an armature between, a circuit connected to one pair of contacts and one of the magnets, a second circuit connected to the other pair of contacts and the other magnet, a contact cylinder having separated contacts, means including an armature and a pawl for operating the contact cylinder, and controlled by

the said magnets and armature, contact members in the path of movement of the separated contacts on the contact cylinder, a lamp behind the screen, and a lamp circuit connected with the separated contacts and the contact members.

3. In combination, a moving picture machine, a film and translucent screen, metal contacts carried by the film, a lamp disposed in rear of the screen to show actual light in a picture produced on the screen, fixed metal contacts located adjacent the opposite edges of the film, circuits between the fixed metal contacts including magnets and a battery, an electric circuit between the magnets and the lamp, whereby when one of the contacts carried by the film on one edge thereof engages the fixed contacts adjacent thereto a circuit is closed and the lamp is lighted, and when one of the contacts carried by the film on the opposite edge thereof engages the adjacent fixed contacts one of the other circuits is closed and the lamp circuit is opened and the lamp is extinguished.

4. In combination, a moving picture machine, a film, and translucent screen to show actual light in a picture produced on the screen, metal contacts mounted on opposite edges of the film, a pair of magnets each adapted to be brought into circuit at different times by the metal contacts on the film, a lamp circuit controlled by one of the magnets to light the lamp or extinguish same in coöperation with the picture produced on the screen, said lamp circuit being opened to extinguish the lamp when the other magnet is brought into circuit by the contacts carried by the film.

5. In combination, a moving picture machine, a moving picture film having metal contacts on opposite edges thereof, the metal contacts on one edge being out of alinement with metal contacts on the other edge, a translucent screen, circuits controlled by the contacts including a pair of magnets, an armature between said magnets, and a battery, a lamp circuit controlled by one of the first mentioned circuits, a lamp in the lamp circuit, a movable circuit closer, circuits controlled by the armature to actuate the movable circuit closer, devices located behind the screen to coöperate with the pictures produced on said screen, and circuits controlled by the movable circuit closer for actuating the devices.

6. In combination, a moving picture machine, a moving picture film having contacts on opposite edges thereof, the contacts on one edge being out of alinement with the contacts on the opposite edge, a screen, circuits controlled by the contacts including a pair of magnets and an armature between said magnets, a lamp circuit controlled by one of the first mentioned circuits, a lamp in the lamp circuit, a movable circuit closer, means for operating the movable circuit closer, circuits controlled by the armature to actuate the movable circuit closer operating means, circuits adapted to be opened and closed by the movable circuit closer, a lamp, and a lamp circuit including a magnet connected to one of the circuits adapted to be opened and closed by the movable circuit closer to light or extinguish the light in the last mentioned lamp.

7. In combination, a moving picture machine, a film, a translucent screen, contacts near the opposite edges of the film, the contacts on one edge being out of alinement with the contacts on the opposite edge, fixed contacts disposed in the path of movement of the contacts on each edge of the film, a pair of magnets and an armature between the magnets, wires extending from one pair of fixed contacts on one edge of the film to one of the magnets, a battery connected to one of the wires, wires extending from the fixed contacts on the opposite edge of the film and extending to the other magnet, the latter wires connected to certain of the first mentioned wires to utilize the battery for energizing the magnet at different times, a lamp behind the screen, a circuit between the lamp and the armature, said latter circuit being controlled by the armature.

8. In combination, a moving picture machine, a moving picture film having at determinate points on its edges eyelets with which the feeding means engage, said eyelets extending through the film to the opposite surfaces thereof, means for feeding the film through said machine, a translucent screen, means for producing a light to show actual light on the picture produced on the screen where the representation of light would appear in said picture, means for automatically and electrically controlling the light including fixed contacts arranged to coöperate with the opposite surfaces of the eyelets, whereby light is produced or extinguished behind the screen.

9. In combination, a moving picture machine, a moving picture film having at determined points on opposite edges thereof, metal eyelets with which the feeding means engage, means for feeding the film through the machine, a translucent screen, a lamp in rear of the screen to show actual light on the picture produced on said screen, electrical means for moving the light to register with a particular part of the picture, and means for opening and closing the lighting circuit and opening and closing the circuit of the electrical means for moving the light including fixed contacts, said metal eyelets engaging the fixed contacts in the movement of the film.

10. In combination, a moving picture machine, a moving picture film having metal

feeding eyelets at particular points, a translucent screen on which the moving pictures are exhibited, a lamp positioned in rear of the screen to show actual light where the lights would appear in a particular place on a picture, a lamp circuit, and a circuit including a pair of magnets, an armature therebetween, and fixed contacts coöperating with the metal eyelets, whereby when certain eyelets engage certain fixed contacts one of the magnets is energized and operates the armature and the lighting circuit is opened or closed.

In testimony whereof I affix my signature in the presence of two witnesses.

LANGDON McCORMICK.

Witnesses:
M. BERLER,
C. BRESLIN.