

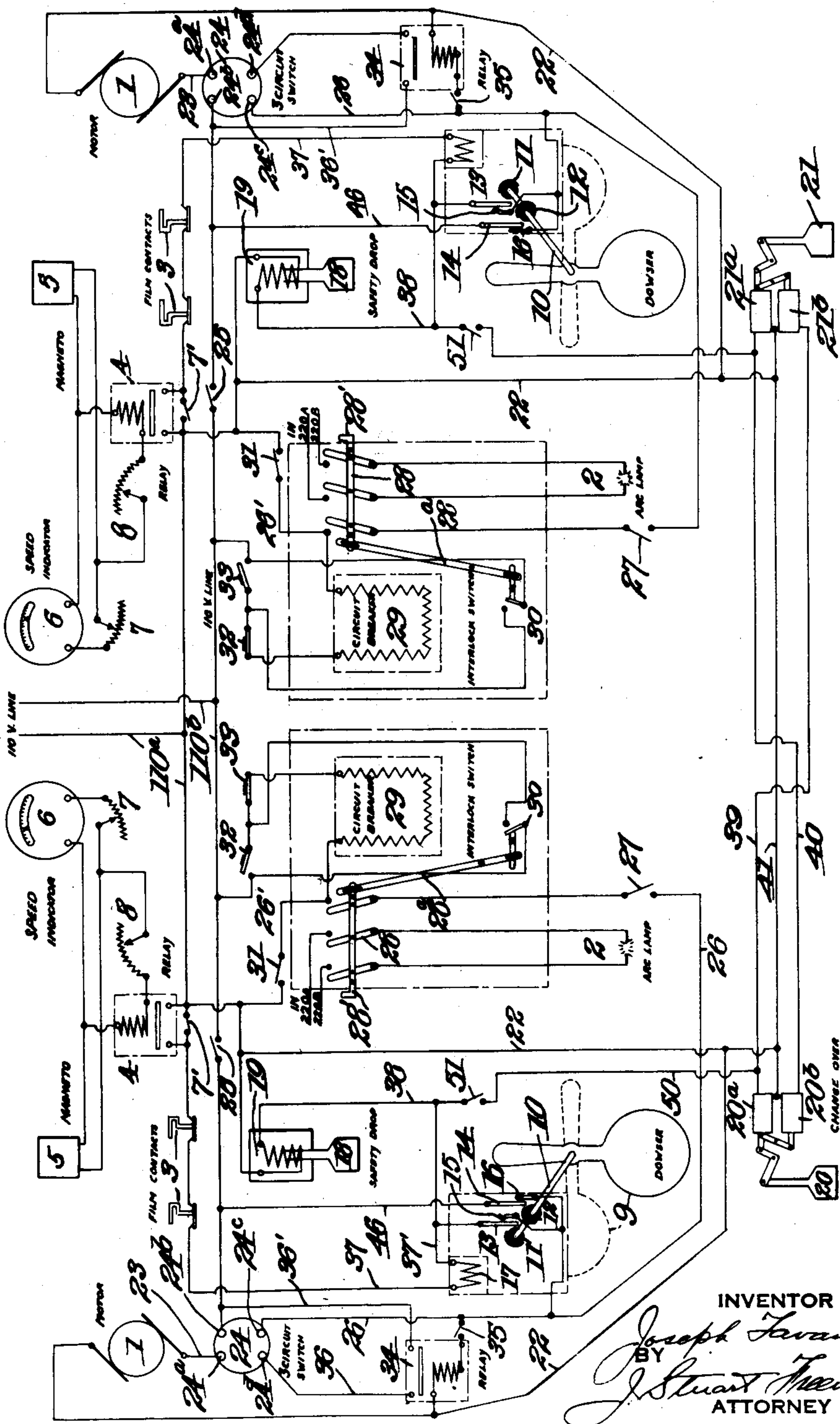
Aug. 20, 1935.

J. TAVANI

2,011,919

OPERATION OF MOTION PICTURE PROJECTING APPARATUS

Filed March 9, 1929



INVENTOR
Joseph Tavani
BY
Stuart Newman
ATTORNEY

UNITED STATES PATENT OFFICE

2,011,919

OPERATION OF MOTION PICTURE
PROJECTING APPARATUS

Joseph Tavani, Philadelphia, Pa.

Application March 9, 1929, Serial No. 345,638

7 Claims. (Cl. 88—17)

This invention is based upon and comprises an improvement over the disclosures in copending application Serial No. 241,815.

The object is to provide in electrically operated and controlled motion picture apparatus improvements in the circuits and in the combination and construction of the various equipment and accessories, whereby the operation of the apparatus is more flexible under widely varying conditions than heretofore.

Another object has been to provide for the simultaneous operation of so-called "change-over" devices, comprises a double-solenoid actuated slide or blinder, whereby the operator at either of a pair of projecting machines can effect the functioning of the respective change-overs as well as start or stop the corresponding motors, safety drops, dowsers, etc., of the respective machines, as the case may be.

A further object has been to provide for the operation of either of a pair of projecting machines selectively, and independently of certain portions of the electrical equipment when and as the latter may become disarranged or injured in some manner, the various operating accessories coupled together in the circuits being substantially entirely independent of one another in many cases, as hereinafter described.

With these and other objects and methods of operation in mind, the invention comprises numerous details of construction and interconnection between the various elements such as are fully brought out in the following description, when read in conjunction with the accompanying drawing which illustrates diagrammatically the method of connecting the several elements electrically in order to produce the desired results.

Referring to the drawing, a standard voltage line is represented by the wires 110^a and 110^b, this current being used to operate the motors 1 which respectively, drive the two motion picture projecting apparatus (not shown in entirety), while a line carrying a higher voltage to light the usual lamp (or lamps) is shown at 220^a and 220^b, the lamp being represented by the wires 2 which lead to it. The two projectors shown are practically duplicates, and unless modified, the following specific description of one projector, applies to both projectors.

The power line 110^a is completed through one or more "film contacts" 3 or switches, which are normally closed but which are designed to be opened by the breakage of the film in any one of several places in the projecting apparatus, the line 110^a being also completed through the arma-

ture of a relay 4, which is actuated by a magneto 5 which rotates with the shaft of the motor 1, the purpose of the magneto in addition to energizing said relay being to actuate a speed indicator 6, for visually indicating the speed at which the motor is running and thereby the speed at which the film exposures are being made by the apparatus. The reading of said speed indicator (of special design) is brought into accord with the speed of the motor by means of a rheostat 7, while the sensitivity of the relay 4 is controlled by a second rheostat 8. A switch 7' in line 110^a, cuts relay 4 in and out of the circuit.

Closely associated with or as an actual part of the projecting apparatus is a dowsers 9, carried by a shaft 10, upon which latter are mounted cams 11 and 12, that in the course of movement of the dowsers, from operative (full line) to inoperative (dotted line) position, force flexible switch elements 13 and 14 outwardly into engagement with contacts 15 and 16, respectively, the movement of the element 14 being in advance of the element 13, that is, when the dowsers has been raised but a slight portion of its 90° arc, element 14 engages contact 16, followed by element 13 engaging contact 15 when the dowsers approaches its inoperative, substantially horizontal position. In this latter position the dowsers is retained by the coil 17 when energized.

A so-called safety drop 18 is also provided in order to shield the film from the rays and heat of the lamp, and said drop is normally held in its upper position when a film is being projected, by means of a solenoid coil 19. In addition to the dowsers and safety drop, there is also interposed in front of the projecting machine a so-called change-over 20, which prevents the light rays from the machine even when running from reaching the screen, this change-over being duplicated by a second such device at 21, operatively positioned with respect to the companion projecting machine, and comprising respectively solenoids 20^a, 20^b and 21^a, 21^b. Electrical connections between these sets of solenoids are such that when one change-over is raised the other is simultaneously lowered and vice versa, by the actuation of either of the dowsers 9 and 9' of the respective projecting machines, as hereinafter described.

One side of the motor 1 is connected through a wire 22 with line wire 110^a, while the other side of the motor is connected through a wire 23 and a three-circuit or three-way switch 24 to the other side 110^b of the line. The changes from the different contacts of switch 24 are made before the associated motor and arc have been started. The

motor wire 23 actually connects with a terminal 24^a of said switch and from this terminal connections can be made across the switch to terminals 24^b, 24^c and 24^d selectively. When 24^a—24^b is made, the motor is connected directly to the line wire 110^b through a suitable switch 25. When 24^a—24^c is made, the motor is connected by a wire 26, in which is positioned a suitable switch 27, to the third blade of a three-blade knife (or similar) switch 28, the other two blades connecting the lamp 2 to the current carrying wires 220^a and 220^b. This switch is provided with a handle 28' or in fact any suitable means for holding the switch closed in the event that the circuit breaker coil 29 and/or the interlock switch 30 fail to operate. Handle 28' and switch 30 of each projector are connected by a lever 28^a, pivoted at 28^b, so that switch 28 will open as associated switch 30 closes, and vice versa. The wire 26 above-mentioned is connected beyond the knife switch 28 through a wire 26' to the line 110^a through a switch 31. Start and stop switches 32 and 33 are connected across the circuit breaker 29 as shown in the drawing. Switches 31 and 32 are adapted to be manually set. Again, referring to the three-way switch 24, when the connection 24^a—24^d is made, there is interposed in the motor lead 23 a relay 34 by way of wires 23'. In this manner the operation of the motor is then dependent upon the closing of the relay armature by its retaining coil, which in turn is connected through a switch 35 with the leads 22 and 26, so that with switch 35 closed and the lights lit, the relay maintains the motor in operation when switch 24 is in the position 24^a—24^d, and the dowser 9 is in raised position.

In addition to the foregoing connections, the terminal 24^d is connected by a wire 36 to one of the relay terminals, while the other of said terminals is connected by a wire 36' to the supply lead 110^b; the retention coil 17 of the dowser 9 is connected upon one side by a wire 37 to the supply lead 110^a, while upon the other side it is connected indirectly to the lead 110^b by means of a wire 37', which actually connects with the wire 38, which at one end connects with the safety drop 18 and at its other end connects with the wire 39, extending between the change-over solenoid coils 20^a and 21^b, the coils 20^b and 21^a being connected by a wire 40, while a neutral wire 41 connects together the connections between the two sets of coils 21^a and 21^b on the other; the dowser switch elements 13 and 14 are connected respectively to the wires 37' and the supply lead 110^b. In each projecting machine the wire 38 is connected through a wire 50 with the wire 39 through a switch 51. When a dowser is operated or raised, the changeover shutter of the same machine, will not operate unless switch 51 is closed. The switch 51 of one machine must be on while the switch 51 of the other machine is off, to operate the changeover for either machine. After such operation, the closed switch 51 is opened.

In the operation of this improved grouping and interconnection of motion picture control apparatus, there are hereinafter pointed out the several switch arrangements and corresponding operations designed to bring about the desired results as specified:—

With all of the several elements inactive, including the motor 1, magneto 5, speed indicator 6, the dowser 9 and safety drop 18 in their lowered positions, and with main switch 28 open, switch 31 closed, switch 27 open, and 24^a—24^b (of switch 24) connected, switch 25 is closed with

the result that the motor 1 starts, the circuit breaker 29 automatically closes the main switch 28, thus lighting the arc light. The dowser 9 is then manually raised, which first operates to raise the local changeover shutter 20 and shortly thereafter in its horizontal position operates to raise the safety 'drop shutter 18 and energizes the dowser-retaining coil 17. The local projecting machine is then in full operation and the film is exposed upon the usual screen.

When 24^a—24^c (of switch 24) are connected, raising the dowser 9 serves to start the motor, raises the safety drop and operates the changeover, if switch 25 is closed, if switch 31 is closed (to previously light the arc) and switch 27 is closed.

When 24^a—24^c (of switch 24) are connected, with switches 25 and 27 closed and switch 31 open, actuation of the top switch 33 throws off all apparatus, that is, it extinguishes the arc, stops the motor, permits the dowser to drop and thereby permits the safety drop to fall. On the other hand, with 24^a—24^c connected and switches 33, 31 and 27 in the positions mentioned, actuation of the start switch 32 serves to light the arc, after which manual operation of the dowser can then start the motor, raise the safety drop and operate the change-over if other than in the necessary position for projecting a film from the local projecting machine.

The opening of the dowser in the case of each machine, occurs before the opening of the safety drop of the same machine, or in other words, the safety drop begins to open when such dowser is practically at a stop. On the other hand, in starting a machine, the safety drop thereof, drops or closes before the dowser of such machine is closed.

In order to change from one machine to the other, switch 51 must be open, whereupon closing switch 49 and then raising the dowser 9' of the other machine starts the second motor (not shown) and subsequently in substantially raised position reverses the former positions of the respective change-overs, raises the local safety drop of the second machine and energizes the second dowser-retaining coil 17'.

If at any time the film breaks, either or all of the one or more film contacts 3 operate to break line 110^a, with the result that the safety drop immediately falls, the motor stops, the dowser drops (having switch 27 closed and switch 31 open) and the arc is extinguished. If, however, switch 31 should be closed and switch 27 open, the arc alone will remain on.

If the speed indicator 6 indicates that the speed of the motor has fallen below a predetermined point (usually 60 R. P. M.) the relay 4 acts as does a break of the film to cause a cessation of the operation of the projecting machine as last-above described, that is, when switch 7 is open. To re-commence the operation of the several elements, switch 7 must first be closed until the motor 1 reaches a sufficient speed to cause the magneto to energize the relay 4 and close the line 110^a, after which switch 7 is again opened in order to again make the operation of the device sensitive to and dependent upon the maintenance of a given predetermined motor speed.

With 24^a—24^d (of switch 24) connected, if the dowser contacts 15 and 16 fail, the relay 34 continues operation of the motor 1 with the switch 35 closed and the dowser itself may be held open

by the coil 17 (if in working order) or by a weight upon the handle of the dowser.

Having thus described my invention, what I claim and desire to protect by Letters Patent of the United States is:—

1. In combination with a pair of motion picture projecting machines, a driving motor for each machine, an automatically and electrically operated change-over shutter for each machine, means interconnecting the change-over shutters whereby one change-over shutter opens as the other closes, a dowser for each machine, electric circuit means including contact members coacting with and operative upon a partial movement of the dowser of one machine to start the motor thereof, and electric circuit means including contact members coacting with the last mentioned dowser to cause operation of said change-over shutters upon a further movement of the last mentioned dowser, opening the change-over shutter of the last mentioned machine and simultaneously closing the change-over shutter of the other machine.

2. In combination with a pair of motion picture projecting machines, a driving motor for each machine, an automatically and electrically operated safety-drop for each machine, an automatically and electrically operated change-over shutter for each machine, means interconnecting the change-over shutters whereby one change-over shutter opens as the other closes, a dowser for each machine, electric circuit means including contact members coacting with and operative upon movement of the dowser of one machine to start the motor thereof, and electric circuit means including contact members coacting with the last mentioned dowser to cause operation of said change-over shutters and opening of the safety-drop of the last mentioned machine, opening the change-over shutter of the last mentioned machine and simultaneously closing the change-over shutter of the other machine.

3. In combination with a pair of motion picture projecting machines, a driving motor for each machine, an automatically and electrically operated change-over shutter for each machine, means interconnecting the change-over shutters whereby one change-over shutter opens as the other closes, a dowser for each machine, electric circuit means having mechanism including contact members operative by the dowser of one machine to start the motor thereof, an electric circuit means having mechanism including contact members to cause operation of said change-over shutters, opening the change-over shutter of the last mentioned machine and simultaneously closing the change-over shutter of the other machine.

4. In combination with a pair of motion picture projecting machines, a driving motor for each machine, an automatically and electrically operated safety-drop for each machine, an automatically and electrically operated change-over

shutter for each machine, means interconnecting the change-over shutters whereby one change-over shutter opens as the other closes, a dowser for each machine, electric circuit means including contact members coacting with and engageable upon a partial movement of the dowser of one machine to start the motor thereof, and electric circuit means including contact members coacting with the last mentioned dowser and engageable through a further movement of said last mentioned dowser to cause operation of said change-over shutters and opening of the safety drop of the last mentioned machine, opening the change-over shutter of the last mentioned machine and simultaneously closing the change-over shutter of the other machine.

5. In combination with a pair of motion picture projecting machines, an automatically and electrically operated change-over shutter mechanism common to both machines, a dowser for each machine, electric circuit means including contact members coacting with and operable through movement of the dowser of one machine to operate said change-over mechanism to open the change-over mechanism to open the change-over shutter of the last mentioned machine and close the corresponding change-over shutter of the other machine, and electric circuit means including contact members coacting with and controlled by subsequent movement of the dowser of said other machine to open the change-over shutter of said other machine and close the remaining change-over shutter.

6. In combination with a pair of motion picture projecting machines, an automatically and electrically operated change-over shutter mechanism common to both machines, a safety drop for each machine, a dowser for each machine, electric circuit means including contact members coacting with and operable through movement of the dowser of one machine to raise the safety drop of the last mentioned machine and operate said change-over mechanism to open the change-over shutter of the last mentioned machine and close the corresponding change-over shutter of the other machine, and electric circuit means including contact members coacting with and controlled by another movement of the dowser of said other machine to open the change-over shutter of said other machine and close the remaining change-over shutter.

7. In combination with two projectors each having a dowser, two change-over shutters, one for each projector, solenoids on each projector, means connecting the solenoids to the change-over shutters, and an electrical interconnecting means cooperating with the dowsers and the two change-over shutters by which the opening of the dowser on either machine actuates the solenoids, opening the change-over shutter at that machine and closing the change-over shutter at the other machine.

JOSEPH TAVANI.