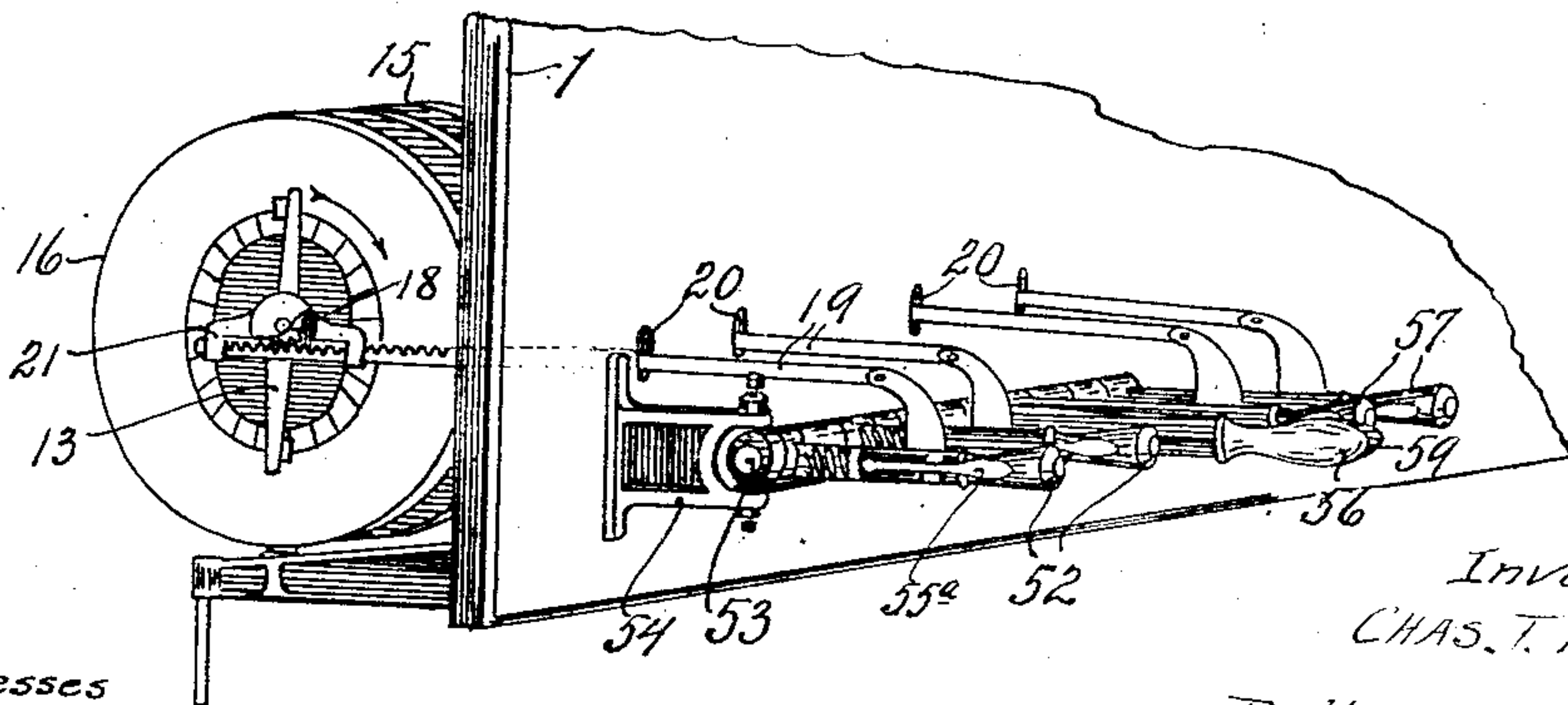
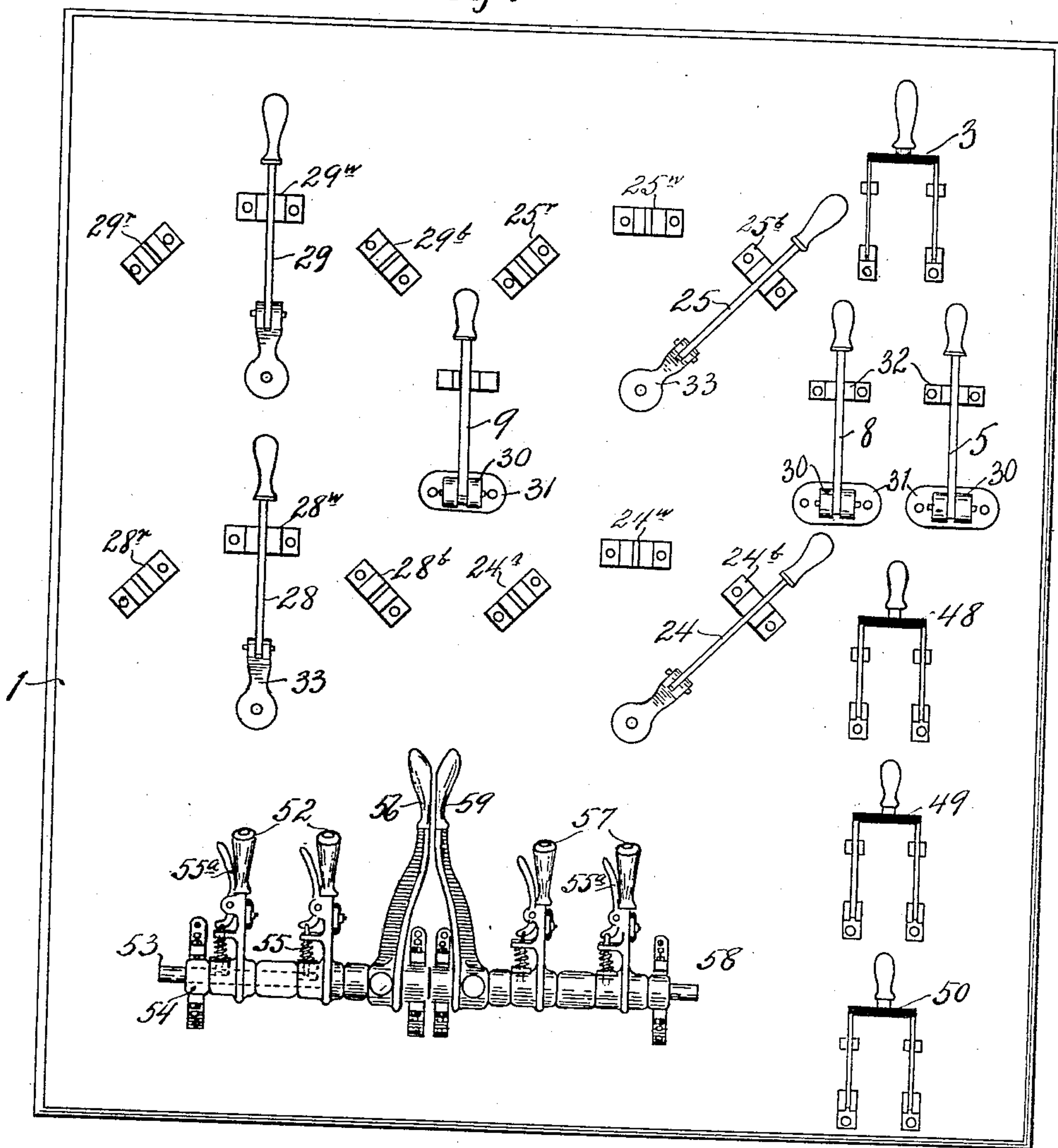


925,732.

2 SHEETS—SHEET 1.

Fig 1



Witnesses

Lloyd Johnson
J M Dewberry

Fig 2

Inventor
CHAS. T. WADDELL

By His Attorney

Rev. D. Johnston Jr.

C. T. WADDELL.
ELECTRICAL SWITCHBOARD FOR THEATERS.
APPLICATION FILED FEB. 21, 1906.

925,732.

Patented June 22, 1909.

2 SHEETS—SHEET 2.

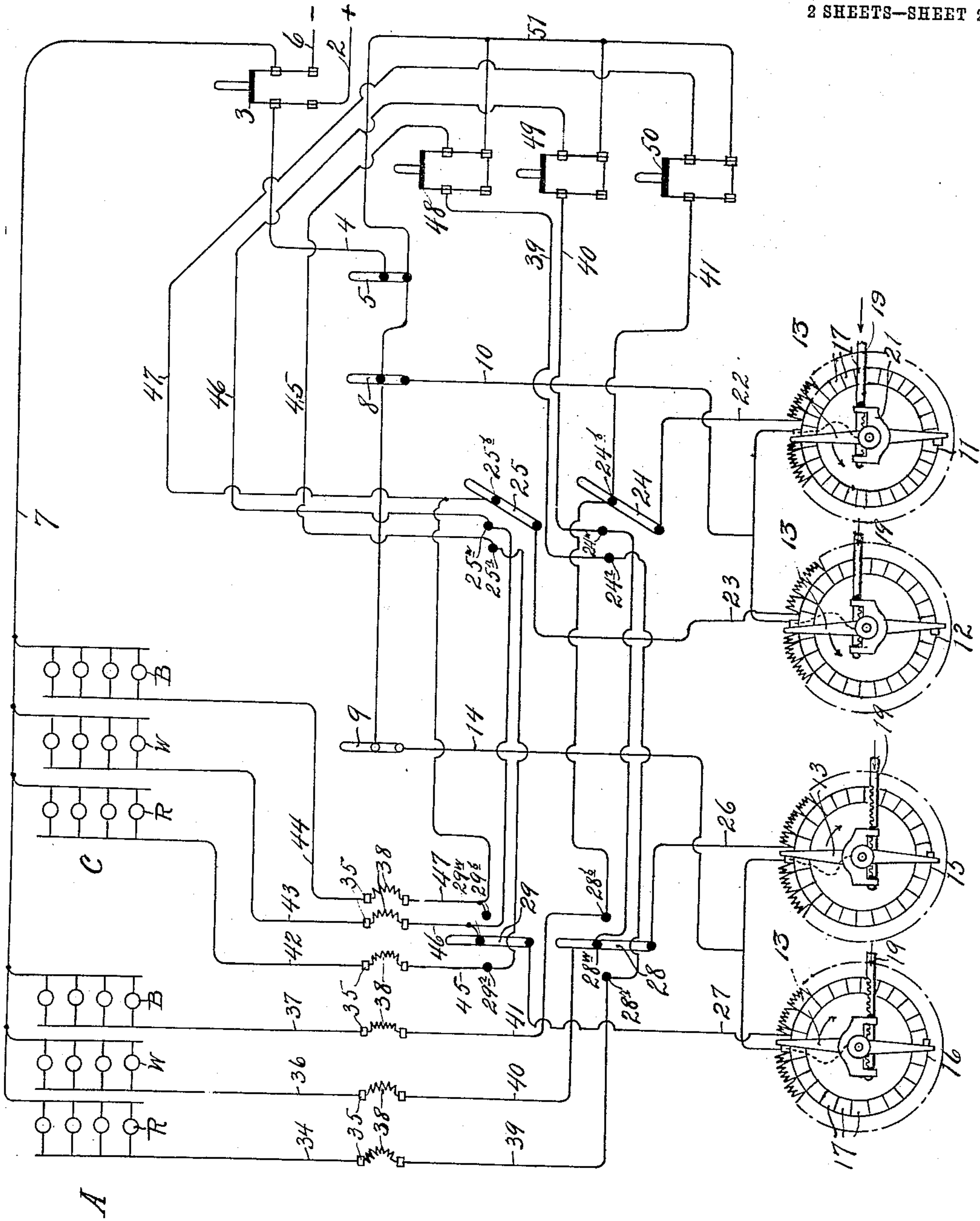


Fig 3

Witnesses
Lloyd Johnson
J. M. Deuberry

Inventor
CHAS. T. WADDELL

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R. D. Johnson Jr.

UNITED STATES PATENT OFFICE.

CHARLES THOMAS WADDELL, OF BIRMINGHAM, ALABAMA.

ELECTRICAL SWITCHBOARD FOR THEATERS.

No. 925,732.

Specification of Letters Patent.

Patented June 22, 1909.

Application filed February 21, 1903. Serial No. 302,222.

To all whom it may concern:

Be it known that I, CHARLES THOMAS WADDELL, a citizen of the United States, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented new and useful Improvements in Electrical Switchboards for Theaters, of which the following is a specification.

My invention relates to an electric switch board for providing in a novel and rapid manner various electric lighting effects for theatrical stages by means of different colored incandescent lamps which are disposed in banks and connected up in a comparatively simple manner to the switch board.

It is my purpose to produce a very simple switch board which may be a one or two pole board, as desired, and which is capable of being easily manipulated to produce either the dissolving or blending of colors or the instantaneous transition from one color to another, a minimum number of dimmers being required for this purpose and the connections being such that it is possible to control all the lights from the dimmers and switches of one part of the board while setting the switches and dimmers of the other part of the board to produce any desired light effect when the lamps are cut into their control.

One important feature of my invention is the improved operating mechanism for the dimmers and the manner in which they are connected up with the color switches. The chief advantage of this part of my invention consisting in the provision of two independently controllable dimmers or banks of dimmers capable of acting in opposition on the same bank or banks of lights. As a preferred construction I arrange the operating mechanism of the two banks of dimmers so that their controlling handles may be moved together in the same direction with reverse effects in the two banks *i. e.*, as one bank of dimmers cuts resistance into their circuits, the other bank cuts resistance out of their circuits, and vice versa. This is designed to facilitate the manipulation of the dimmers to produce the blending of colors.

My invention further comprises other novel construction and arrangement of parts, which for the sake of illustration, I have shown in the accompanying drawings embodied in a single pole 110 volt switch board controlling two separate banks of three color lamps.

Figure 1, is a front view of a switch panel

showing the several switches and the controlling mechanism for the dimmers. Fig. 2, is a perspective side view of the lower portion of the panel indicating the dimmer operating mechanism in different position from that shown in Fig. 1. Fig. 3, is a diagrammatic view of the circuits, the dimmers occupying the position shown in Fig. 2.

Similar reference characters refer to similar parts throughout the drawings.

The current enters the switch panel 1 by a wire 2 and, under the control of the left hand side of the two point master switch 3, is conducted by a wire 4 to a switch 5. The right hand side of the main switch 3 is connected to the main wire 6 and when closed, connects said wire with a wire 7 in circuit with one side of all the incandescent lamps. The switch 5 when closed gives current to master color switches 8 and 9, which control the right and left hand banks of the color switches. From the switch 8 when closed, the current flows by a wire 10 to dimmers 11 and 12, the wire 10 branching to each dimmer and being connected to its respective contact arm 13. In a similar manner the switch 9 gives current by a wire 14 to the contact arms 13 of dimmers 15 and 16. These dimmers comprise a plurality of resistance coils (not shown), which are severally connected to plates 17 of the commutator over which the contact arms 13 move. Each contact arm is fixed to a gear wheel 18, Fig. 2, adapted to mesh with the teeth of a rack bar 19 which projects through an opening 20 in the panel, being supported at its inner end so as to slide in a hanger 21 fixed to the dimmer. As the rack bars are moved in or out, the contact arms 13 are moved over the commutators and act to cut resistance into or out of the circuits which lead from these dimmers to the color switches as will now be described.

From the dimmers 11 and 12, the current flows by wires 22 and 23 to the three point color switches 24 and 25, respectively, constituting the right hand bank of color switches. In a similar manner the dimmers 15 and 16 are connected by wires 26 and 27 to the three point color switches 28 and 29, constituting the left hand bank of color switches. The switches 5, 8 and 9 are single point switches and may be of any desired construction. As illustrated the switch arms are similar in construction and are each pivoted between studs 30, integral with a contact post 31,

which passes through the panel 1. These switch arms engage contact clips 32 which pass through the panel to which they are connected, the several clips and contact posts being connected at the rear of the panel to their respective wires, as shown in Fig. 3. In the case of the three point color switches, the several switch arms are pivotally connected to swivel blocks 33 which are rotatably mounted in the switch panel and connected behind the panel to the several wires 22, 23, 26 and 27. Each of these color switches is adapted to co-act with three contact clips similar to 32, which are connected to different colored lamps of the bank of lights adapted to be controlled by that particular color switch.

I have illustrated my invention in connection with two banks of lights A and C, which may be the proscenium and the foot lights, respectively, or the lights in any other part of the stage. Each bank of lights, as illustrated, comprises three groups of color lamps, preferably, red, white and blue and designated by the reference letters R, W and B, respectively. Each group of lights may comprise any desired number of lamps of any desired colors, all of which are connected at one side to the wire 7. At the other side the group of red lamps R, of the bank A, is connected by one or more wires 34 to a fuse block 35. The white and blue lights of that bank are connected by wires 36 and 37 to similar fuse blocks 35. Fuses 38 connect these blocks with wires 39, 40 and 41, each receiving current from the two lower color switches 24 and 28 in the following manner. The wire 39 in circuit with lamps R, is connected to the contact clips 28^r and 24^r, the wire 40 in circuit with lamps W, is connected to the switch clips 28^w and 24^w; and the wire 41 in circuit with lamps B, is connected to the switch clips 28^b and 24^b. The red, white and blue lamps of the bank of lights C are similarly connected by wires 42, 43 and 44 to the fuse blocks 35 and through the fuses 38, respectively receive current through wires 45, 46 and 47. The wire 45 connects with clips 25^r and 29^r of the upper color switches; the wire 43 with the clips 25^w and 29^w; and the wire 44 with the clips 25^b and 29^b. This cross connection between the corresponding clips of the color switches in each bank is desirable for the purpose of reducing the amount of wiring, but it is not essential to the operation of my invention and therefore separate wires may lead from each color clip to a separate fuse block and be there connected in any desired manner to the lamps.

As thus far described current can flow to the lamps only through the dimmer circuits. I desire, however, to provide a means to shunt the current around the dimmers to the lamps for the purpose of bringing them instantly to full candle power by the mere

closure of a switch and without disturbing the dimmers. To this end I connect all the lights of a given color to a color shunt switch which receives current from the main circuit, preferably from the switch 5. To simplify wiring, I continue the wires 39 and 45, which supply current to all the red lamps, beyond the color switches and connect them to each side of a two point color switch 48. In like manner the wires 40 and 46, supplying current to all the white lamps, are connected to the switch 49 and the wires 41 and 47 supplying current to all the blue lamps are connected to the switch 50. These switches 48, 49 and 50 are connected by a wire 51 to the local master switch 5 and constitute the shunt color switches which normally stand open. When the switch 5 is closed, if the switch 48 is also closed, the current is shunted by wires 51, 39 and 45 around the dimmers and all of the red lights are thrown on at full candle power without regard to the position of the switches 8, 9, or the color switches.

The mechanism which controls the dimmers 15 and 16, comprises two rack bars 19 which pass through openings 20 in the panel and are swivelly connected to levers 52 mounted on a shaft 53 journaled in bearing blocks 54 bolted or otherwise secured to front of the panel. The levers 52 are provided with spring pressed dogs 55 adapted to interlock with the shaft 53 when not lifted out of engagement with the shaft by the grip levers 55^a. Keyed to the inner end of the shaft 53 is the master handle 56, which turns the shaft and the levers 52 when the latter are interlocked with the shaft, thus controlling the left hand bank of dimmers. The rack bars for the dimmers 11 and 12 are similarly connected to levers 57 mounted on an independent shaft 58 preferably disposed in alinement with the shaft 53 and provided with a master arm 59 disposed adjacent to the master 56. The details of construction of the levers 52 and 57 form no particular part of my present invention, they being shown for the purpose of illustrating devices by which the several dimmers may be independently controlled by their respective hand levers or moved in a group by master handles 56 and 59. Other devices for providing this operation may be used. I desire, however, to have the master handles so disposed that they may be grasped with one hand and moved together. It will be noted that the rack bars for the dimmers 15 and 16 are disposed below the gears 18, while the rack bars for the dimmers 11 and 12 are disposed above the gears 18. The effect of this is to give the contact arms of the two banks of dimmers opposite direction of movement when their rack bars are moved in the same direction. Thus, if the rack bar of the dimmer 15 is moved outwardly, as in Figs. 2 and

3, resistance is cut out of the circuit to the wire 26, switch 28 and the white lamps of bank A, whereas, if the rack bar for the dimmer 11 is moved outwardly, resistance is cut into the circuit of the wire 22, switch 24 and the blue lamps of bank A. It thus follows that as the master handles 56 and 59 are thrown downwardly to the position shown in Fig. 2, the contact arms for the dimmers 15 and 16 are moved to a position of no resistance, while the arms of the dimmers 11 and 12 are moved to a position of full resistance.

It is preferable to use multipointed switches, such as shown in the drawings, since this prevents the circuit being closed through the dimmers on more than one of the lighting circuits. However, other switch means may be employed, such as are in general use, to close the circuits in the manner desired.

In operation, assuming that the contact arms of the dimmers and their operating mechanism are in the position shown in Figs. 2 and 3, and that all of the switches are open, current is admitted to the board by closing the main switch 3, which gives current to one side of the lamps and to the switch 5. Upon closing switch 5, the current flows to the color master switches 8 and 9 and also to the other shunt switches 48, 49 and 50. By closing the switches 8 and 9, current flows through the several dimmers to the color switches 24, 25, 28 and 29. Assuming that the color switches 28 and 29 are closed on the clips 28^w and 29^w, current will flow at full voltage through switch 9, dimmers 15 and 16, switches 28 and 29, and wires 40 and 43 to the white lights in the banks A and C which will burn at full candle power. By moving the color switches 24 and 25 into contact with the clips 24^b and 25^b, current will tend to flow in a similar manner through the wires 41, 47, 37 and 44 to the blue lamps in the banks A and C, but there being full resistance to the flow of the current at the dimmers 11 and 12, the lamps will give no light. By grasping the master 56 and raising it, resistance may be cut in the circuits to all the white lamps to dim them gradually or by moving either lever 52, the white lamps of either bank may be dimmed. By raising the master 59, resistance may be cut out of all the blue lights so that they gradually brighten to full candle power, or the blue lights in either bank may be brightened by the independent operation of the levers 57. By grasping both masters and moving them upwardly, all of the white lights will be gradually dimmed as the blue lights brighten. This gives the desired blending of colors and enables the transition from full white to full blue to be effected rapidly or slowly as may be desired and without requiring the use of but one hand of the operator. To dissolve

the blue and produce a red light, the switches 28 and 29 may be changed to clips 28^r and 29^r, and by lowering the master handles together, the blue lamps will be dimmed as the red lamps brighten, thus producing a gradual and even blending and dissolving of colors which gives the most beautiful effects. If it is desired to throw on the full white, red or blue lights, this may be done without disturbing the position of the color switches or the dimmer handles by operating the proper color shunt switch 48, 49 or 50. When any full light effect is thrown on by closing one of the shunt color switches, the switch 8 or 9, or both of them may be opened to cut the dimmers out of circuit and to enable the color switches and the dimmers to be adjusted in any desired manner to produce instantaneously a change from full light effect to any desired half light or dimming effect by closing the switches 8 and 9 as the color shunt switch or switches are opened. Since two of the color switches, under the control of independent dimmers are adapted to supply current to the different colored lights of each bank, it follows that when the dimmer 11 and color switch 24 is set for the desired light effect in the bank A, switch 28 may be opened and the dimmer 15 set in any other position desired, after which switch 28 may be closed or switch 9 may be opened and both the dimmer 15 and switch 28 set so that they may be cut into circuit to produce instantly any desired half light effect.

From the above description, it will be evident that any of the light effects now produced may be readily obtained from my improved switch board and that in addition thereto, I am enabled to simplify the manner for producing these effects and to produce many additional blending and dissolving effects which would not be possible without a very complicated construction. It will also be seen that my improved switch board calls for a minimum amount of wiring.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a lighting system for stages, the combination with a border light comprising various colored electric lamps in separate circuits, two independent multi-point switches and circuit connections controlled thereby, each adapted to control the distribution of current to said several circuits, and two independently operable dimming devices which control the voltage of the current distributed by said switches to said circuits.

2. In a lighting system for stages, the combination with a bank of incandescent electric lamps, of a plurality of circuits which include groups of said lamps, and two independent controller mechanisms operating simultaneously on said bank of lamps, said mechanisms

each comprising switch means to distribute the current to said circuits, and variable resistance means to increase the voltage of the current distributed by one of said switch means while decreasing the current distributed by the other of said switch means.

3. In a lighting system for stages, the combination with a plurality of electric lamps arranged in one group and two or more lighting circuits which include groups of said lamps, of means to distribute and regulate the current to said lamps, said means comprising two switch devices included in each of said lighting circuits, and an independent voltage regulating means adapted to supply currents of different potential to said switch devices.

4. In a lighting system for stages, the combination with a plurality of border lights, of a variable resistance means included in the main supply circuit for said lights, of two or more color circuits for each border light, two or more independent switches for connecting one side of each of said color circuits to said resistance means, the other side of said circuits being connected to the supply circuit, and a single switch means to shunt the current around said resistance means to all of the corresponding color switches of all the border lights.

5. In a lighting system for stages, varicolored electric lamps connected at one side to the supply circuit, a separate lighting circuit connected to the other side of each series of lamps of like color, two circuits leading from the supply circuit to switch means adapted to connect each of said supply circuits with each of the color lighting circuits, dimmers in said switch circuits, and separate switches, each adapted to connect all the lighting circuits including lamps of the same color direct to the supply circuit.

6. In a lighting system for theatrical stages, a switch board, a plurality of lamps, a main switch to admit current to the board and to one side of said lamps, circuits to lead the current from said main switch to a color master switch and to a plurality of shunt color switches, circuits including dimmers which lead from said color master switch to a plurality of color switches, and a plurality of lighting circuits each connected to one side of a group of lamps of the same color, said circuits being adapted to receive current from said color switches and said color shunt switches, substantially as described.

7. In a lighting system for theatrical stages, a plurality of varicolored lamps, a switch board, a main switch, two or more master color switches, a bank of color switches controlled by each master color switch, a plurality of dimmers, and a plurality of lighting circuits each connected to a group of lamps of like color, and circuit connections on the board adapted to pass current from said main switch to both master

color switches and thence through a separate dimmer to each color switch, each lighting circuit being adapted to receive current from a color switch in each bank.

8. In a lighting system for theatrical stages, the combination with varicolored lamps and a number of lighting circuits leading to each group of varicolored lamps, of a number of multi-point switches, two of which control the connection between the light circuits for each group of lamps and one side of the supply circuit, and independently controllable dimmers which regulate the voltage of the current in the circuits for each pair of multi-point switches.

9. In a controlling mechanism for stage lighting, varicolored lamps arranged in independently controllable groups or border lights, a number of lighting circuits for each border light, two independently controllable dimmers in circuit with each border light, said dimmers comprising contact arms connected to one side of the supply circuit, switch means and circuit connections controlled thereby to connect said dimmers with the lighting circuits for their respective border lights, said dimmers being arranged in two banks, means to supply current to each border under the control of two dimmers, one in each bank of dimmers, means to adjust said dimmers independently, master devices adapted to move the dimmers of each bank together, said banks being connected to the other side to said supply circuit.

10. A theatrical switch board comprising two banks of dimmers, means to adjust each dimmer separately to cut resistance into or out of its respective circuit, master devices for adjusting the dimmers of each bank together, said master devices being in position to be grasped and moved together, means operated by said master devices to give said dimmers reverse movements as the masters are moved in the same direction, and circuit connections from corresponding dimmers of each bank to different circuits leading to a group of lights, the dimmers of one bank being adapted to cut resistance into their circuits, and the dimmers of the other bank to cut resistance out of their circuits as said masters are moved in the same direction.

11. In a theatrical switch board, a switch panel, two banks of dimmers having independent operating devices for each dimmer which project through said board, a lever connected to each device, a master lever connected to the levers of each bank of dimmers, said masters being disposed in juxtaposition, and means to give a reverse operation to the contact arms of the two banks of dimmers as said masters are moved together, in combination with circuit connections leading from said dimmers to varicolored lamps arranged to form a border or foot light.

12. In a lighting system for theatrical

stages, the combination with a plurality of border lights each comprising groups of lamps of different color, or a separate circuit for each group of lamps of the same color in each border light leading to a controller switch board, two independently operable dimmers for each border light, switches and circuit connections controlled thereby to simultaneously deliver current under the control of each pair of dimmers to the circuits for each border light.

13. In a lighting system for theatrical stages wherein a number of border lights are employed comprising varicolored lamps, a separate circuit leading to lamps of the same color in each border light, and a switch board to control the delivery of current to said circuits, said switch board comprising multi-point switches, two of which control the delivery of current to the several circuits of each border light, supply circuits for said multi-point switches, and independently operable dimmers in the supply circuit for each multi-point switch.

14. In a lighting system for theatrical stages wherein a plurality of border lights comprising varicolored lamps are used, a separate circuit leading to the lamps of the same color in each border light, a switch board to control the delivery of current to said circuits comprising two sets of multi-point switches, each of said circuits being connected to a corresponding point of two of said multi-point switches, and an independently operable dimmer controlling the potential of the current delivered to each multi-point switch.

15. In a lighting system for theatrical

stages, separate banks of varicolored lamps, a circuit connecting the lamps of the same color in each bank with one branch of the supply circuit and with a switch board, a plurality of multi-point switches mounted on said board, each multi-point switch having a point for each different color in a bank, and each of the circuits from a bank being connected to the corresponding points of two multi-point switches, and independently controllable means to vary the potential of the current delivered to each multi-point switch.

16. In a lighting system for theatrical stages, a bank of lights A, circuits 34, 36 and 37 connected to different colored lights in said bank, two multi-point switches for said bank comprising the switch arms 24 and 28, and the switch points 24^b, 24^w and 24^r, and 28^b, 28^w and 28^r, the switch points 24^b and 28^b being connected to the circuit 37, the points 24^w and 28^w being connected with the circuit 36, and the points 24^r and 28^r being connected with the circuit 34, a dimmer 15 and a circuit connection therefrom leading to the switch 28, a dimmer 11 and a circuit connection therefrom leading to the switch 24, means to operate said dimmers independently, and means to connect the bank of lamps A and said dimmers with a supply circuit, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CHARLES THOMAS WADDELL.

Witnesses:

THOS. J. WINGFIELD,
NOMIE WELSH.