

J. J. FANNING.
INCANDESCENT ELECTRIC LAMP CONTROLLER.

No. 454,038.

Patented June 16, 1891.

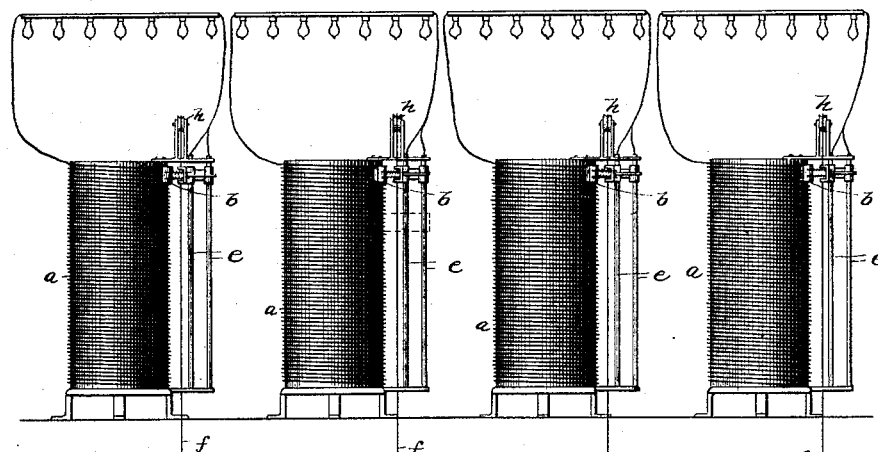


Fig. 1.

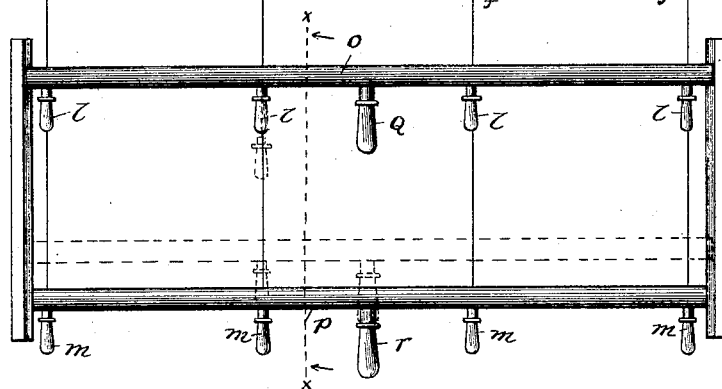
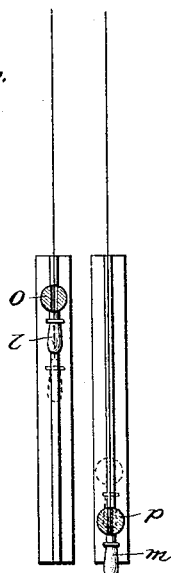


Fig. 2.



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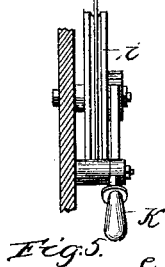
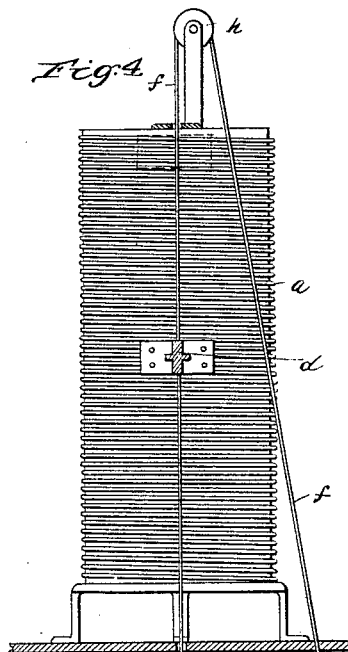
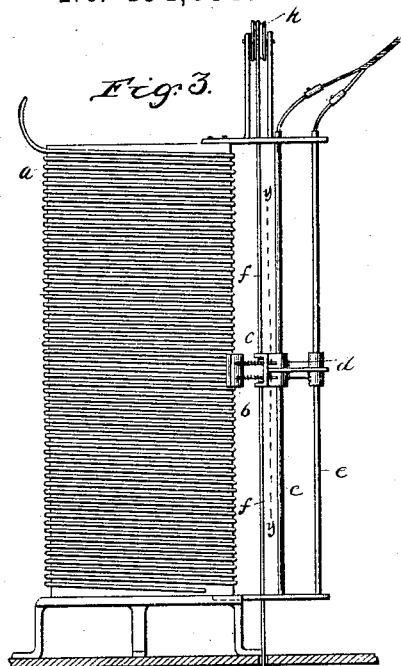


Fig. 7.

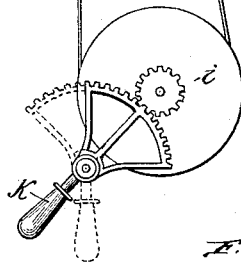
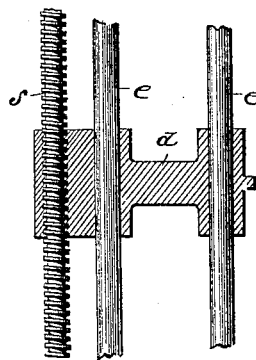
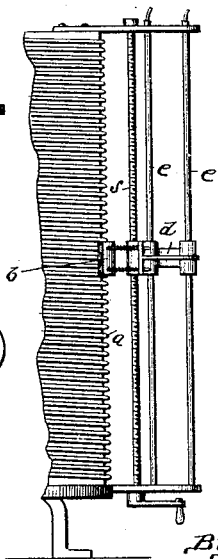
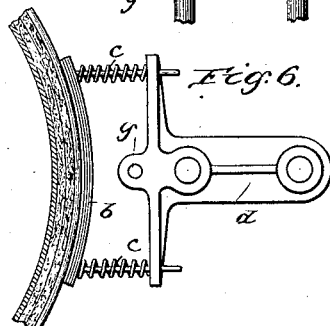
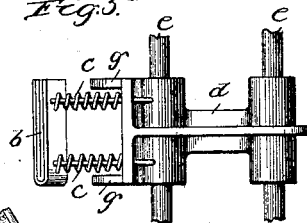


Fig. 8.



Witnesses.
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UNITED STATES PATENT OFFICE.

JOHN J. FANNING, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO JOHN BAIRSTOW, OF SAME PLACE.

INCANDESCENT-ELECTRIC-LAMP CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 454,038, dated June 16, 1891.

Application filed November 4, 1890. Serial No. 370,325. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. FANNING, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Incandescent-Electric-Lamp Controllers, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

Incandescent electric lamps have been found especially useful in connection with scenic exhibitions on account of the softness of the light and the fact that the lamps may be controlled as to number and brilliancy with the greatest facility.

Incandescent lamps have been found of special advantage in giving the effects of sunrise and sunset on this account. The apparatus, however, for controlling the lamps either in separate groups or all together has been cumbersome and expensive and far from satisfactory in its operation.

A special requirement of the apparatus for controlling and changing the brilliancy of the lamps is that its action should be so uniform and gradual that there will be no abrupt changes in the light, so that the effect may be the gradual change from light to darkness, which causes the beholder such esthetic pleasure. Moreover, this gradual change in the light must be as to speed under the control of the manager. Therefore no fixed mechanical movement would be suitable for the varying scenic fluctuations or changes required upon the stage. I have accordingly devised a form of rheostat in connection with incandescent electric lamps with apparatus for manipulating the same either separately with different groups of lamps or simultaneously to control several groups, in order that the most artistic and pleasing effects in illumination may be readily obtained with apparatus which, though simple and cheap, is durable and effective. The rheostat which I have devised and which I consider the preferable form consists of wire wound about a cylinder, which wire should be of less size or area in cross-section as it approaches the lower portion of the cylinder or the open end of the wire. Thus a coil of ordinary galvanized wire,

consisting of two hundred and twenty-nine feet of No. 7 wire, two hundred and twenty feet of No. 10 wire, and one hundred and ninety-four feet of No. 12 wire I have found sufficient to control a group of sixty-one sixteen-candle incandescent lamps, the pressure being one hundred and fifteen volts. Each lamp taking about half an ampère would make the capacity of the coil at the commencement thirty and one-half ampères. The whole coil when inserted would reduce the current about one-half—that is, to about one-fourth of an ampère for each lamp. When thus reduced, the lamp is practically put out, its filament appearing red and giving out not to exceed one candle-power of illumination. The rheostats may conveniently be placed above the stage, and the brushes I preferably mount upon vertical standards at the sides of the coils. By means of suitable cords connected with the brushes the brushes may be raised and lowered to bring more or less of the resistance of the coil into the circuit. Each brush should be provided with two cords, one connected directly thereto and the other passing over a pulley above, so that on pulling down the cord attached directly to the brush-carrier the brush will be lowered, while on pulling down the other cord which passes over the pulley the brush will be raised. I have sometimes used an endless cord passing over a pulley, the brush being secured to one side of the cord.

My invention will be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a view illustrative of four groups of incandescent lamps with rheostats, one for each group, connected therewith and means for separately or simultaneously moving the brushes. Fig. 2 is a transverse vertical sectional view of the bars with which the rheostat-cords are connected and the guides for the same, as seen from section-line *xx* of Fig. 1. Fig. 3 is a side elevation of the rheostat, with the endless cord connected with the brush for raising and lowering the same. Fig. 4 is a front elevation thereof as seen from section-line *yy* of Fig. 3. Fig. 5 is a detailed side view of the brush mounted upon the upright rods or guides. Fig. 6 is a plan view thereof. Fig. 7 is a modification showing a

screw operated by a crank for raising and lowering the brush. Fig. 8 shows a modification of the coil of the rheostat and the brush, the coil being surrounded by the brush or frictional sliding contact-maker, which is adapted to be moved up and down over the same.

Like parts are indicated by similar letters of reference throughout the different figures. The rheostat proper, as shown most clearly in Fig. 3, consists of wire *a*, wound upon a cylinder of insulating material, the different convolutions being separated from one another. If required, the lower convolutions may be of smaller wire than the upper convolutions. I have in practice found that three different sizes may be advantageously employed in the same coil, the upper third of the coil being No. 7 wire, the next third or middle portion being of No. 10 wire, and the lower portion being of No. 12 wire.

The brush proper *b* may consist of copper ribbons or strips folded together, as shown, and constantly pressed against the side of the coils upon the cylinder by springs *c*. The brush-holder *d* should be of metal, and is of course electrically connected with the brush. The rods *e*, being also of metal, serve as one terminal for the loop or circuit with which a group of lamps is connected. These rods being placed vertically at the side of the cylinder serve as guides for the holder *d*, mounted thereon. The cord *f* for moving the brush may be attached to the holder at *g*. This cord passes over the sheave *h*, mounted above the cylinder.

In Figs. 3 and 4 I have shown a wheel *i*, with which the cord is in frictional engagement for operating the same. This wheel is provided with a pinion, with which a segment-gear meshes, said segment-gear being provided with a handle *k* for operating the same to turn the wheel *i* in either direction.

In Figs. 1 and 2 the cord *f* of each of the rheostats is cut in two at the bottom and provided with handles *l m*. The handles *l* may be considered as connected each with that portion of the cord leading directly to the sliding contact-maker, while the other handles *m* are connected each with that portion of its cord leading over the pulley *h*. Thus by pulling down on any handle *l* the brush of the corresponding rheostat will be lowered to introduce the coil of the rheostat into the circuit of a particular group of lamps.

The bars *o p* are provided with handles *Q*

7. Thus by taking hold of the handles *Q* all the rheostats may be operated together.

As shown in Fig. 7, the brush-holder is tapped out to receive the screw *s*, which may be turned by a crank to raise and lower the brush.

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

1. The combination, with a group of incandescent lamps, of a rheostat consisting of wire wound upon the cylinder of insulating material, the different convolutions being separated from one another and the wire forming the lower portion or portions of the coil being of less area in cross-section than the wire forming the upper portion of the coil, the vertical rods or guides *e*, with which one end of the circuit is electrically connected, and the brush mounted thereon, said brush upon its inner surface conforming to the shape of the cylinder and being constantly pressed against the same by spring-pressure, with means for moving the brush up and down to gradually introduce the resistance of the rheostat into the circuit, substantially as and for the purpose specified.

2. The resistance-coil *a* of a rheostat, consisting of convolutions of bare wire, the different convolutions having the same diameter and placed vertically, the wire forming the lower portion of the coil being smaller than the upper portion thereof, the upper end of the coil being connected with one end of a circuit containing incandescent lamps, in combination with the brush of sliding frictional contact-piece *b*, constantly pressed against the coil to come in contact with two or more of the same, the guide upon which the brush-carrier is mounted electrically connected with the other end of the circuit, and means for operating the brush from below to raise and lower the same while constantly pressed against two or more of the convolutions of the coils, whereby the resistance of the circuit containing the lamps may be gradually increased to reduce the current about one-half and thereby to practically extinguish the lamps, substantially as and for the purpose specified.

In witness whereof I hereunto subscribe my name this 1st day of November, A. D. 1890.

JOHN J. FANNING.

Witnesses:

GEORGE P. BARTON,
ELLA EDLER.