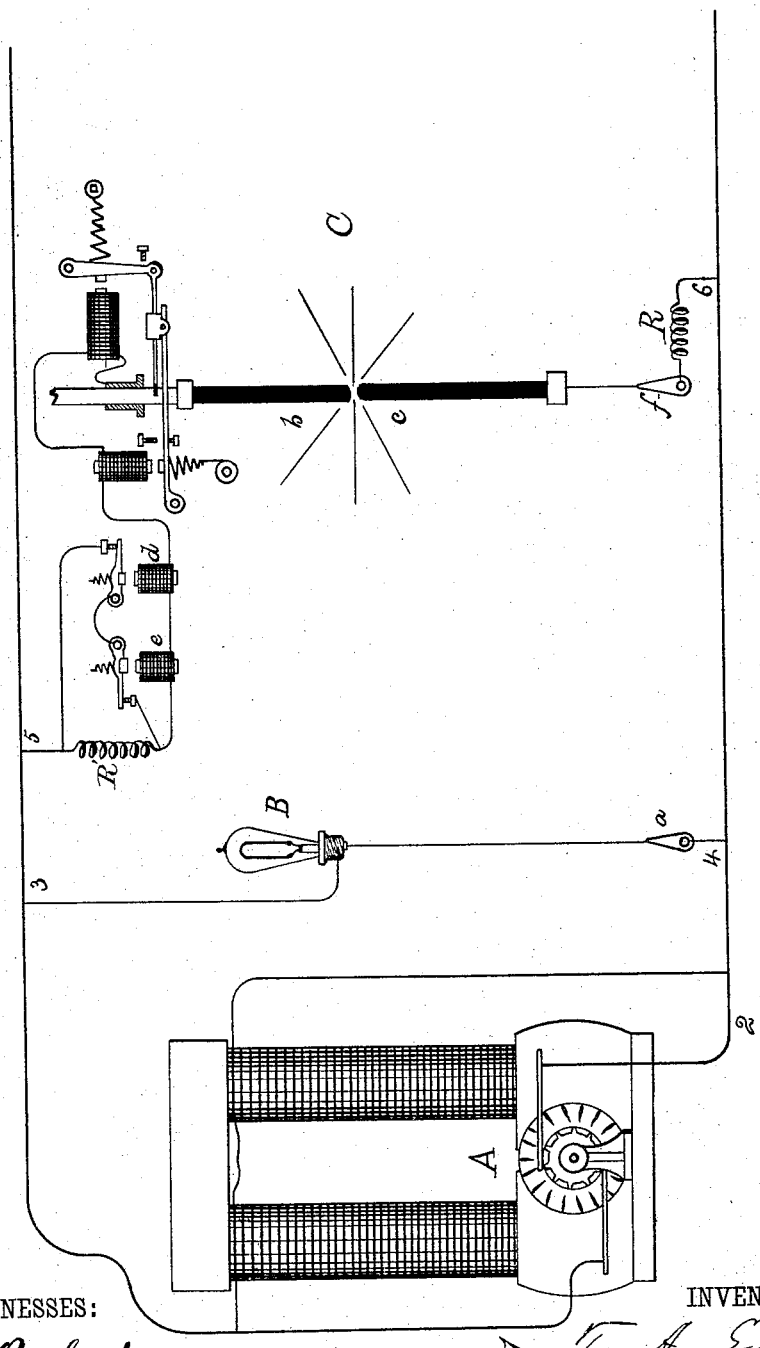
(No Model.)

# T. A. EDISON.

## SYSTEM OF ELECTRIC LIGHTING.

No. 476,527. Patented June 7, 1892.




WITNESSES:

E. C. Rowland.

H. Wheeley

INVENTOR:

T. A. Edison by

Rich'd N. Dyer.

Atty

# UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF MENLO PARK, NEW JERSEY, ASSIGNOR TO THE EDISON ELECTRIC LIGHT COMPANY, OF NEW YORK, N. Y.

## SYSTEM OF ELECTRIC LIGHTING.

SPECIFICATION forming part of Letters Patent No. 476,527, dated June 7, 1892.

Application filed August 7, 1882. Serial No. 68,659. (No model.) Patented in England August 19, 1882, No. 3,976; in Belgium January 3, 1883, No. 60,002; in Italy January 27, 1883, No. 15,026, and in France April 16, 1883, No. 148,852.

*To all whom it may concern:*

Be it known that I, THOMAS A. EDISON, of Menlo Park, in the county of Middlesex and State of New Jersey, have invented a new and useful Improvement in Systems of Electric Lighting, (for which I have obtained Letters Patent in England, No. 3,976, dated August 19, 1882; in Belgium, No. 60,002, dated January 3, 1883; in Italy, No. 15,026, dated January 27, 1883, and in France, No. 148,852, dated April 16, 1883;) and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon.

The object I have in view is to produce a simple and efficient method or arrangement for working arc and incandescing lamps in the same system of electric lighting and from the same source of electrical energy. This I accomplish by arranging such lamps in separate cross or multiple-arc circuits, each of which is controlled independently of all others by a circuit-controller.

The arc lamp used for the purpose is preferably that set forth in my specification, Case No. 437, the circuit being completed through the electrodes of the lamps only; but any regulating mechanism may be employed with the addition of the safety device described in said specification. An additional resistance is placed in the circuit of each arc lamp, so as to reduce the effective difference of potential at the arc below that which is used in other circuits having incandescent lamps, since to secure economy in distribution it is desirable that an electro-motive force of at least one hundred volts should be employed, which is higher than can be satisfactorily used with an arc lamp, but is entirely suited to an incandescent lamp.

The end accomplished by the proper adjustment of relative resistances, whether in the construction of the two kinds of electric lamps or by the providing of additional resistances in the circuits of the arc lamps, is to insure the normal operation of the lamps of different character under the same conditions—viz., when subjected to the constant difference of potential which is maintained between the conductors of the main circuit, from which the branch circuits of both the incandescent and arc lamps are taken.

The accompanying drawing is a view, partly diagrammatic, illustrating the invention.

A is a dynamo or magneto electric machine, from which run the main conductors 1 2. Incandescing electric lamps B are located in multiple-arc circuits 3 4 from 1 2, each of such circuits being controlled by a circuit-controller *a*. Other multiple-arc circuits 5 6 contain arc lamps C.

The arc lamp preferred is that set forth in my specification, Case No. 437, in which the circuit is completed through the carbon-electrodes *b c* only; but any regulating mechanism may be employed provided with the safety device controlled by the electro-magnets *d e*.

The arc-lamp circuit is controlled by a circuit-controller *f*, and may be made and broken at will without noticeably affecting the other lamps of the system.

It will be evident that with the devices and circuits arranged as shown, should the electrodes of any arc lamp touch, thereby tending to form a short circuit, the magnet *d* will be energized by the increased flow of current. The armature of said magnet will be drawn from its back contact and open the short circuit around the resistance R′, thereby throwing said resistance into operative series relation with the arc and increasing the resistance of the branch to such an extent as to prevent an abnormal flow of current. In this manner the heating or burning of the apparatus is avoided and current is not diverted from the other lamps of the system. Other means for preventing a short circuit may be used. The armature of magnet *e* falls back when the circuit is opened, for example, at the switch *f*.

R is the extra resistance in the arc-lamp circuit, which will be greater or less according to the difference of potential employed in the circuit. I prefer to employ one hundred volts or upward, for which the incandescent lamps will be entirely suited without any additional resistance, but which cannot be practically used with an arc lamp. The extra resistance reduces the effective difference of

potential at the electrodes of the arc lamp to the desired point.

What I claim is—

1. The combination, with a constant-potential main circuit having a difference of potential greater than can be effectively used with an arc lamp, of incandescing electric lamps located in multiple-arc branch circuits from such main circuit, arc lamps in other multiple-arc branches from the main circuit, and resistances in the separate arc-lamp circuits to reduce the difference of potential effective at the electrodes of the arc lamps, substantially as set forth.

2. The combination, with a constant-potential main circuit having a difference of potential greater than can be effectively used with an arc lamp, of incandescing electric lamps located in multiple-arc branch circuits from such main circuit, arc lamps in other multiple-arc branches from the main-circuit resistances in the separate arc-lamp circuits to reduce the difference of potential effective at the electrodes of the arc lamps, and circuit-controllers for each of the multiple-arc circuits, substantially as set forth.

3. The combination, with the same circuit, of incandescent lamps in multiple-arc circuits therefrom, arc lamps also located in multiple-arc circuits therefrom, a resistance for each of such arc-lamp circuits, and a circuit-controller in each arc-lamp circuit and a magnet for operating the same in series with the arc lamp, whereby the formation of a short circuit is prevented, substantially as described.

4. The combination, with the same circuits, of incandescent lamps in multiple-arc circuits therefrom, arc lamps also located in multiple-arc circuits therefrom, a resistance for each of such arc-lamp circuits, and two electro-magnets located in each arc-lamp circuit, having armature-levers closing a shunt around such resistance at their back and front contacts, respectively, substantially as set forth.

5. The combination, with the same circuits, of incandescent lamps in multiple-arc circuits therefrom, arc lamps also in multiple-arc circuit therefrom, the circuit of each arc lamp being completed only through the electrodes thereof, a circuit-controller for each arc-lamp branch, and a magnet in series with the arc lamp and operated by increase of current for operating said circuit-controller, whereby a short circuit is prevented when the lamp-electrodes touch, substantially as described.

6. The combination of a main circuit, incandescent lamps in multiple-arc circuits therefrom, an arc lamp also in a multiple-arc circuit therefrom, the circuit of the arc lamp being completed only through the electrodes thereof, a resistance, and a circuit-controller for throwing it into or out of circuit for preventing a short circuit when the electrodes of the lamp touch, substantially as described.

7. The combination of a main circuit, incandescent lamps in multiple-arc circuits therefrom, an arc lamp also in a multiple-arc circuit therefrom, a safety device normally not operative in the arc-lamp circuit, and a controller to throw said safety device into operation for preventing a short circuit when the electrodes of the arc lamp touch, substantially as described.

8. The combination, with the same circuit, of incandescent lamps in multiple-arc circuits therefrom, arc lamps also located in multiple-arc circuits therefrom, a circuit-controller in each arc-lamp circuit, and one or more magnets for operating the same in series with the arc lamp, substantially as described.

This specification signed and witnessed this 12th day of June, 1882.

THOS. A. EDISON.

Witnesses:

RICHD. N. DYER,

EDWARD H. PYATT.