

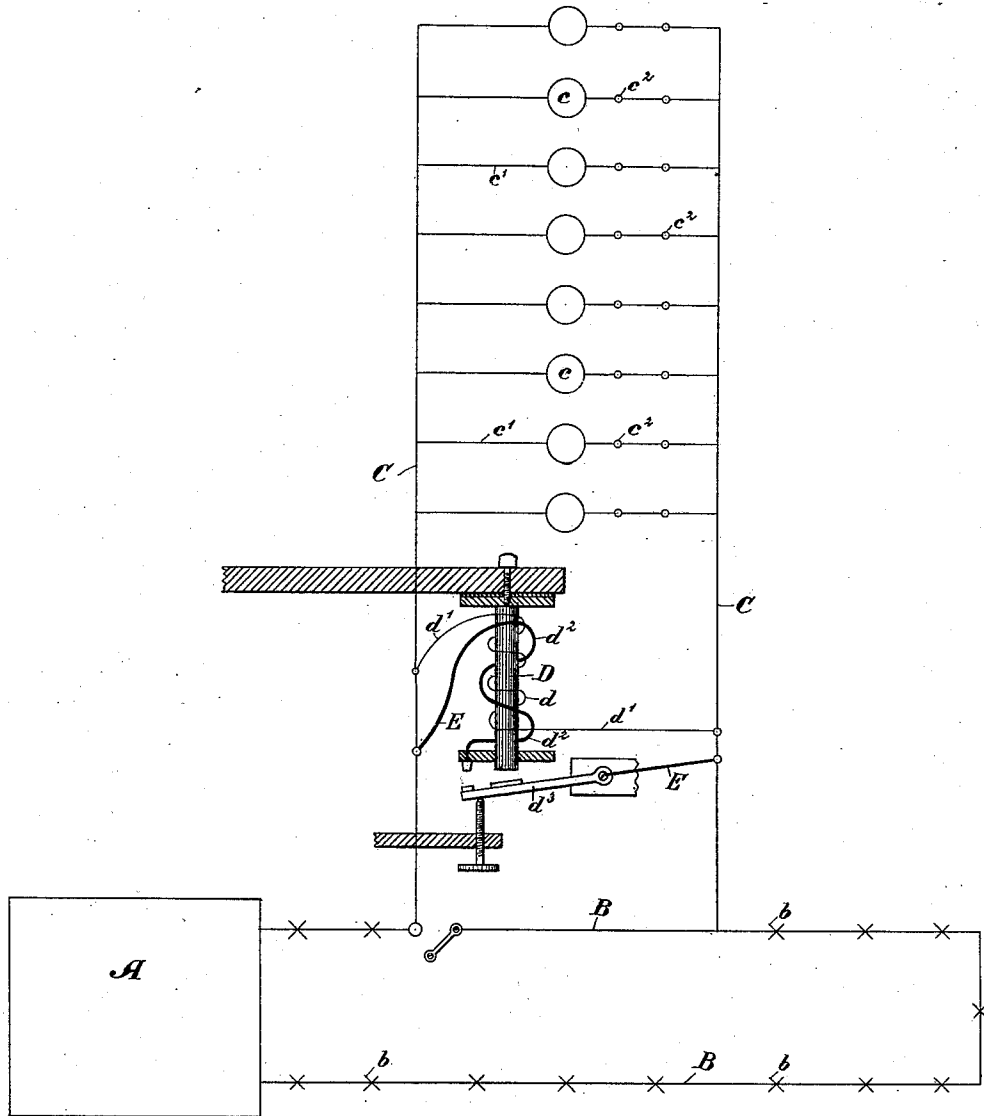
(No Model.)

H. P. BROWN.

ARC AND INCANDESCENT ELECTRIC LIGHTING.

No. 352,035.

Patented Nov. 2, 1886.



Witnesses:

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UNITED STATES PATENT OFFICE.

HAROLD P. BROWN, OF CHICAGO, ILLINOIS.

ARC AND INCANDESCENT ELECTRIC LIGHTING.

SPECIFICATION forming part of Letters Patent No. 352,035, dated November 2, 1886.

Application filed August 7, 1885. Serial No. 173,840. (No model.)

To all whom it may concern:

Be it known that I, HAROLD P. BROWN, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Arc and Incandescent Electric Lighting, of which the following is a specification.

Heretofore in operating multiple-arc groups of incandescent lamps from an arc-light or high-tension circuit it has been usual to provide each incandescent lamp of the group or its branch wire with a separate resistance equal to that of the lamp, which, in case of the failure of the lamp, is put into the circuit in its place, in order to prevent the other or remaining lamps of the group from receiving an undue proportion of the current and being thereby injured or destroyed.

In the present invention each multiple-arc group of incandescent lamps is provided with an additional branch wire, in which is included a fine-wire or high-resistance helix of an electro-magnet, so that only a small fraction of the total current will pass through it. The armature-lever of this electro-magnet operates to close a short circuit around the group of incandescent lamps when moved from its normal position by the increased attraction of the electro-magnet or its core. The electro-magnet is also provided with a coarse-wire or low-resistance coil, which is included in this short circuit, so that when the short circuit is once closed by the electro-magnet, due to an increase of current in its fine-wire coil, the coarse-wire coil will energize the core and keep the short circuit closed. When all the lamps of the group are in use the fine wire or high-resistance coil of the electro-magnet, which is in parallel or multiple arc with the lamps, only receives its normal amount of current, and the armature or switch lever remains in its retracted or normal position. The moment, however, one or more lamps in the group is extinguished or fails to act the high-resistance coil receives more than its normal share of the current, thus energizing the core and moving the armature-lever to close the short circuit, and thereby cut out the remaining lamps of the group before they can receive any injury from the excess of current. The armature-lever may be adjusted to close the short circuit when only one lamp of the

group fails, or not until two or more lamps in the group shall have failed, if the excess of current due thereto in the remaining lamps of the group would not endanger them. The fine-wire and coarse-wire helices are both preferably wrapped around the same core; but they may have separate cores, if desired, and other or equivalent means than the coarse-wire helix may be used to keep the short circuit closed.

In the accompanying drawing, which forms a part of this specification, I have shown a diagram of circuits embodying my invention.

In said drawing, A represents a dynamo-machine or other generator or source of electricity; B, a main or arc light circuit, in which may be included in series a number of arc lights, as *b*, and one or more groups of incandescent lights.

C represents an incandescent lamp-circuit, in which are included in multiple arc a number of incandescent lamps, *c*, on the branch wires *c'*. Each branch wire *c'* is furnished with a switch, *c''*, by which the lamp may be lighted or extinguished.

D is the core of an electro-magnet, which is provided with a fine-wire or high-resistance helix, *d*, that is included in a branch circuit, *d'*, like one of the lamps, so that this helix is in multiple arc with the lamps.

E is a short circuit around the group of incandescent lamps, which remains normally open, and which, when closed, cuts out all the lamps. The electro-magnet is provided with a coarse-wire or low-resistance coil, *d''*, which is included in the short circuit E. The armature-lever *d'''* of the electro-magnet is either a switch or operates a switch which closes the short circuit E, when said lever is moved from its normal position by the increased attraction of the magnet. The helix *d* should be of such high resistance that it will receive only a small fraction of the current when the same divides between it and the lamps, and the helix *d''* should be of such low resistance as to offer little obstruction to the free passage of the current through the short circuit.

I do not herein claim, broadly, a shunt-circuit or cut-out mechanism around an electric light or other translating device, as I am well aware that such cut-outs are old, and that sepa-

rateshunt-circuits have been provided around each separate incandescent lamp of the group, such shunt having usually included therein a resistance to take the place of the extinguished lamp in the group, as hereinbefore stated; and I am also aware that arc lamps when arranged in series have each been provided with a short-circuit or cut-out mechanism to prevent the extinguishment of one light causing the extinguishment of all the other lights in the circuit or series, as is shown and described in the Letters Patent No. 234,456, to C. F. Brush, dated November 16, 1880. Nor do I herein claim as forming any part of my invention the "safety device for shutting off the current from the main wire to the house in case the wires should get crossed, or from any other cause the current passing to the house should become in excess of that required for the burners," as shown and described in English Patent No. 5,306, of December 28, 1878, and wherein an electro-magnet or device for breaking or opening the loop wire or circuit which supplies a group of lamps in parallel is arranged in series with the group.

In my invention the coil of the electro-magnet is on a branch wire in parallel with the lamps of the groups, so that in case one or more of the lamps should be extinguished the

cut-out mechanism will be operated to save the remaining lamps from injury.

I do not herein claim, broadly, the combination, with a group of incandescent lamps, of an electro-magnet included in a branch circuit around the group, a short circuit around the group, and a switch operated by said electro-magnet to close said short circuit in case of the failure of one or more of the lamps, as that forms the subject-matter of a divisional application to be filed by me prior to the issue of a patent herein, to be known as "Division B" hereof.

I claim—

The combination, with a group of incandescent lamps in multiple arc, of a short circuit around said group, an electro-magnet having a coil included on a branch in multiple arc with the lamps, and a switch operated by said electro-magnet for closing said short circuit in case of the extinguishment of one or more of the lamps, said short circuit having included therein a helix for the purpose of keeping said short circuit closed, substantially as specified.

HAROLD P. BROWN.

Witnesses:

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