

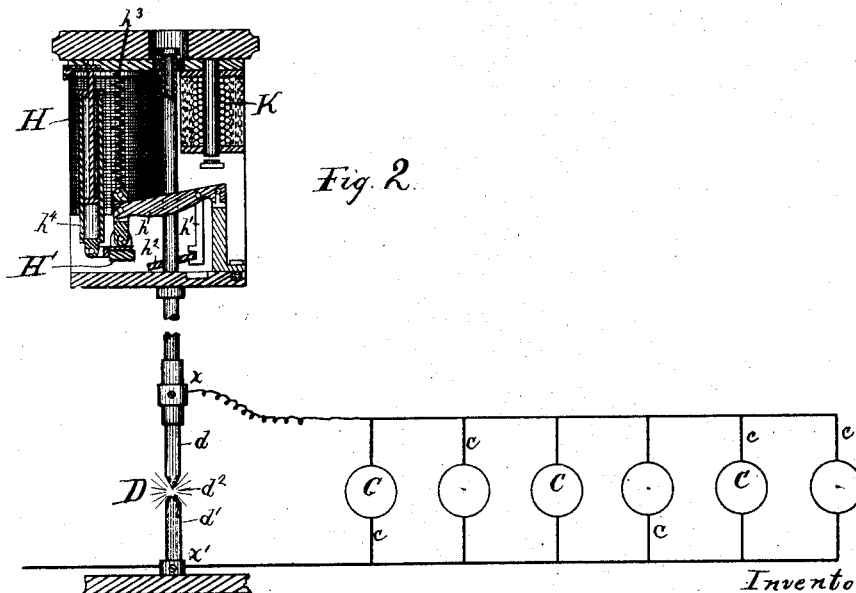
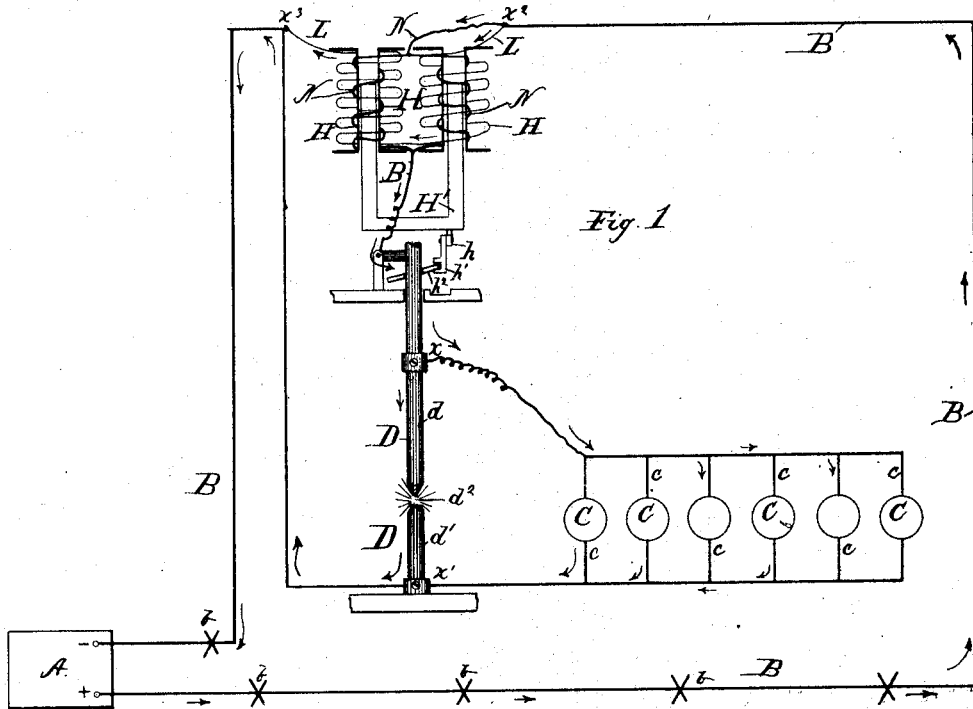
(No Model.)

H. P. BROWN.

SYSTEM OF ARC AND INCANDESCENT ELECTRIC LIGHTING.

No. 422,910.

Patented Mar. 11, 1890.



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UNITED STATES PATENT OFFICE.

HAROLD P. BROWN, OF CHICAGO, ILLINOIS.

SYSTEM OF ARC AND INCANDESCENT ELECTRIC LIGHTING.

SPECIFICATION forming part of Letters Patent No. 422,910, dated March 11, 1890.

Application filed November 23, 1885, Serial No. 183,698. (No model.)

To all whom it may concern:

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

This invention relates to means of operating on one and the same circuit arc and incandescent electric lights, the latter being arranged in one or more multiple-arc groups and the former being in series with each other and with the multiple-arc group or groups.

The object of the invention is to provide a means of automatically shunting a greater or less portion of the current around the group of incandescent lamps, according to the number of lamps in use in the multiple-arc group at any one time, so that whatever may be the number in use each incandescent lamp will always receive its normal amount of current; and to this end the invention consists, in connection with an arc-light or high-tension circuit having one or more arc lights or other translating devices included therein in series, of a multiple-arc group of incandescent lamps or other like translating devices, a variable-resistance shunt or derived circuit around said group through which more or less of the current may be shunted, and an electro-magnet or solenoid the coil of which is included in a shunt or derived circuit around said group for controlling and varying through suitable devices the resistance of said shunt.

The variable-resistance shunt around the multiple-arc group of incandescent lamps may conveniently consist of the adjustable carbons of an arc lamp, the resistance being varied by varying the distance between the carbons, the opposite terminals of the group being connected to the carbons. In this way when desired either the arc light or in its stead the group of incandescent lamps may be used by simply connecting or disconnecting the terminals of the group with the carbons, and also the arc light and one or more incandescent lamps of the group may be burned simultaneously, as the amount of current required for one or two incandescent lamps will not materially dim the arc light. This is a matter of convenience in many locations—as, for example, in a drug-store, the front of which may be lighted by an arc light,

while the space behind the prescription-case is lighted by one or more incandescent lights.

In the accompanying drawings, which form a part of this specification, and in which similar letters of reference indicate like parts, Figure 1 is a diagram view showing a system of circuits and devices embodying my invention; and Fig. 2 is a sectional view of the mechanism for varying the distance between the carbons, and thereby the resistance of the shunt.

In said drawings, A represents a dynamo or other source of electric energy; B, a main working-circuit leading therefrom, in which is or may be included a number of arc lights *b* in series.

C C C are incandescent lamps or other electrical devices arranged in multiple-arc group on suitable branches *c*. This group of incandescent lights takes the place of one of the arc lights in the series, and other like groups may be used in place of other arc lights, if desired; but as the connections are the same in each group only one is shown in the drawings.

D is a variable-resistance shunt or derived circuit around the group of incandescent lamps C C C, consisting, in the case shown in the drawings, of the carbons *d* and *d'* and the arc *d²* between them, the resistance being varied by varying the distance between the carbons. The resistance-shunt and the incandescent-lamp-circuit currents divide at *x* and reunite at *x'*.

Z is a shunt or derived circuit about the group of lamps C C C, &c., dividing from the main circuit at *x²* and reuniting at *x³*, in which an electro-magnet or helix H of high resistance is included. The movable core or armature H' of the magnet or solenoid H operates through a lever *h* and link *h'* to close and release a clutch or ring *h²* about the movable carbon *d* or its holder, and thus to raise or lower the carbon *d*, and thereby automatically increase or decrease the resistance of the shunt D. A coarse-wire or low-resistance helix N is also wrapped in the opposite direction around the spools of the magnet H, and operates differentially, or so as to oppose the magnet H, and this coarse-wire coil is included in the main circuit B. A spring *h³* and dash-pot *h⁴* serve to regulate the motion of the core. This mechanism for moving or adjusting the carbon *d* is of a well-known construction com-

monly in use in arc lamps, and does not, therefore, require a detailed description.

K represents the usual cut-out magnet by which the whole apparatus may be short-circuited.

In operation, if, for example, one or more of the lamps C C, &c., in the multiple-arc group happens to break or is extinguished, the resistance through the remaining lamps and through the carbons *d d'* will be thereby increased, and thus force more than the normal amount of current through the shunt Z and its high-resistance helix H, and thereby permit the core H to descend and cause the clutch or ring *h*² to release the carbon-rod *d*, when it will, by its own gravity, approach the carbon *d'*, and thus diminish the resistance through the shunt D, until the remaining lamps in the group receive only their normal amount of current and the helix H is again restored to its normal strength, when the clutch or ring *h*² will be again lifted or closed on the carbon-rod and its further descent arrested. When, on the other hand, an additional lamp or lamps is or are lighted in the group, the effect will be to diminish the total resistance through the lamps and the carbons or resistance-shunt D, thus causing less than the normal amount of current to flow through the shunt Z and high-resistance helix H, so that the core H' will be lifted by the force of the coarse-wire coil or helix N in the main circuit, and thus separate the carbons *d d'* and increase the resistance through them until the lamps in the group again receive the normal amount of current, when the normal current will also flow through the shunt or derived circuit Z and helix H, and thus arrest the further separation of the carbons.

While the carbons *d d'* and arc between them furnish a convenient variable resistance or rheostat for the shunt-circuit, and the clutch or ring through which the movable carbon-rod slides by its weight when the clutch is released by the controlling-magnet H a convenient means for varying the resistance, the variable resistance may be formed in any well-known manner commonly in use, and other mechanical means may be employed for varying the resistance through the action of the controlling-magnet.

I claim—

1. The combination, with an arc-light circuit having a number of arc lights included therein in series, of a multiple-arc group of incandescent lamps, also included in series in said arc-light circuit, a shunt or derived circuit around said group, in which are included the carbons of an arc light, a shunt or derived circuit around said group having included therein a high-resistance electro-magnet or helix, its movable core or armature, a clutch or ring operated by said movable core or armature to grasp or release the movable carbon, and a coarse-wire or low-resistance helix, also surrounding said core and included in the main circuit, whereby the resistance

of said shunt through said carbons may be varied to compensate for the lighting or extinguishment of one or more of the incandescent lamps in the multiple-arc group, substantially as specified.

2. The combination, with a group of multiple working-circuits and electrical devices included therein, of a resistance-circuit around said group and an electro-magnet in a shunt or derived circuit to the group of working-circuits and arranged to vary or control the resistance-circuits, substantially as specified.

3. In an electrical system of distribution, the combination, with a group of multiple working-circuits in series with other and similar groups of electrical devices of the kind described, of a resistance-circuit around said group and an electro-magnet in a shunt or derived circuit to the group of working-circuits and arranged to control or vary the resistance-circuit, substantially as specified.

4. The combination, with a group of multiple working-circuits and devices for utilizing the current flowing therein, of a normally-open shunt or derived resistance-circuit and an electro-magnet included in a shunt or derived circuit to the group of working-circuits and arranged to control the resistance-circuit, substantially as specified.

5. In an electrical system of distribution, the combination, with a group of multiple working-circuits in series with other and similar groups of electrical devices of the kind described, of a resistance-circuit around said group, an electro-magnet in the direct or main circuit, an opposing magnet in a shunt or derived circuit to the group of working-circuits, and means for controlling the resistance-circuit, substantially as specified.

6. The combination, with a series of multiple working-circuits, of a shunt-circuit around said group, a variable resistance or rheostat connected with said circuit, and means for operating said variable resistance or rheostat, whereby more or less of its resistance is brought into the shunt-circuit, and an electro-magnet in a shunt to the group of working-circuits for controlling the action or operation of the rheostat mechanism, substantially as specified.

7. The combination, in an electric-lighting system and connected with the same circuit, of an electric-arc lamp or lamps, a group of incandescent or similar lamps, the resistance of each of which remains normally constant and arranged in multiple arc, an electro-magnet in a derived circuit around said group of lamps, and a variable resistance in a branch around said group of lamps controlled by the electro-magnet, substantially as specified.

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Witnesses:

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