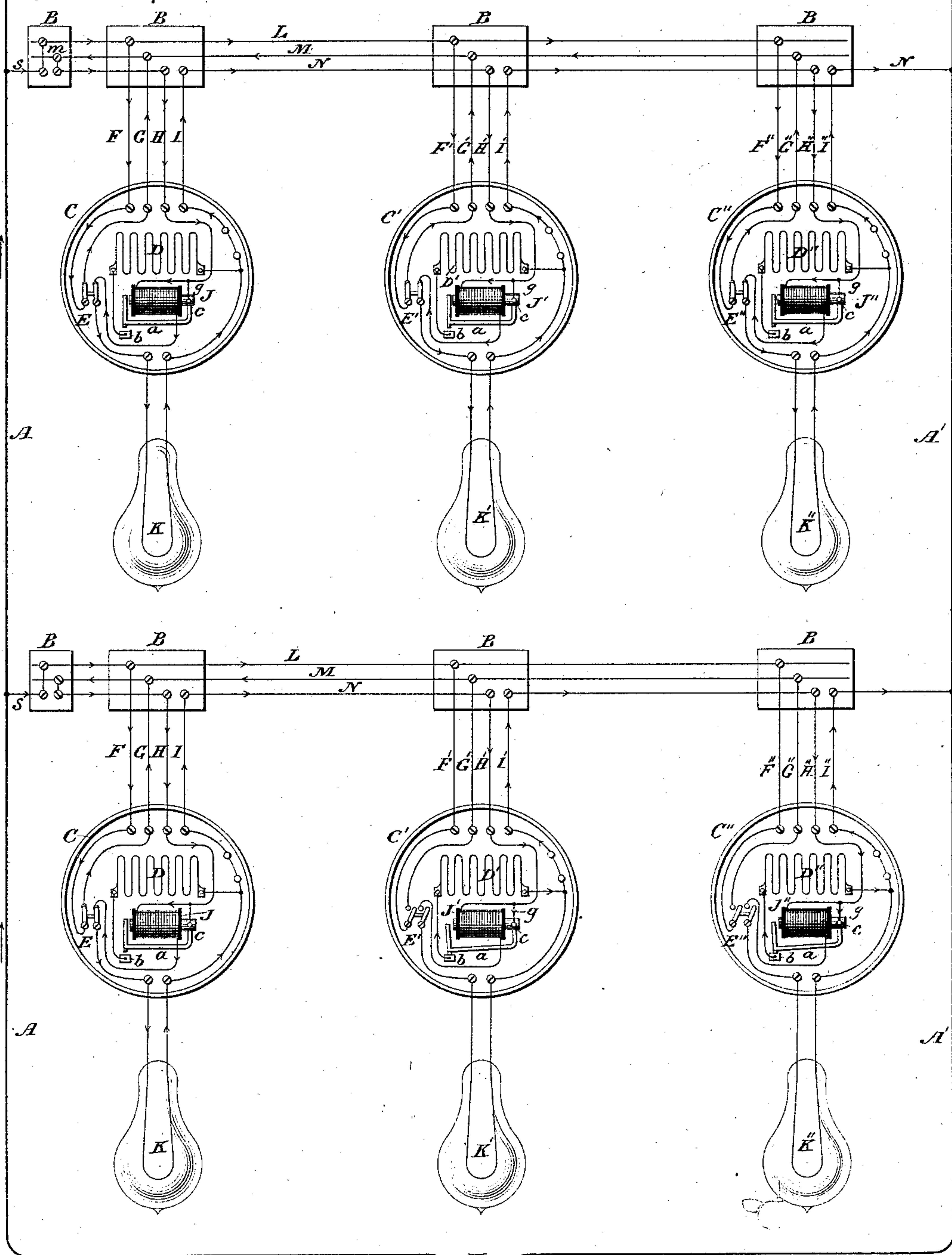


(No Model.)

W. STANLEY, Jr.
SYSTEM OF ELECTRIC LIGHTING.

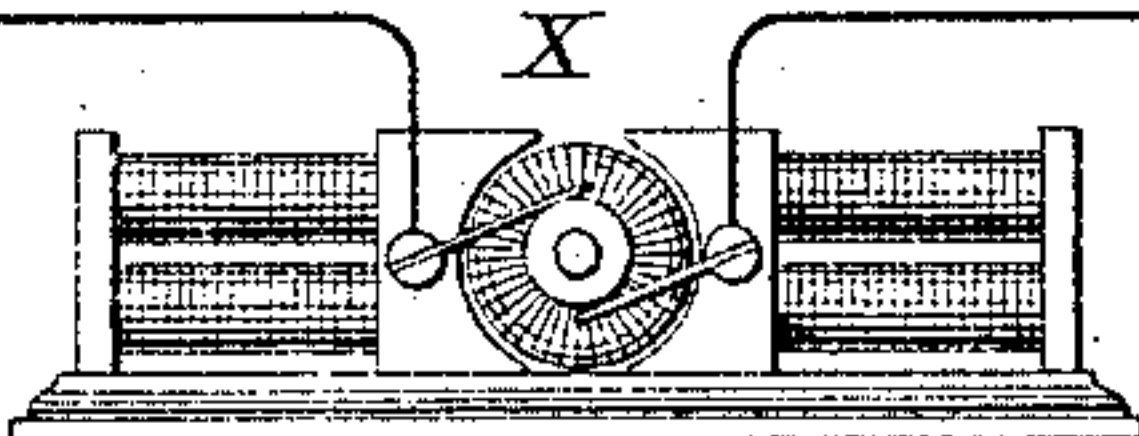
No. 333,564.

Patented Jan. 5, 1886.



Witnesses

Geo. W. Breck.
Carrie E. Ashley



By his Attorney

Inventor
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UNITED STATES PATENT OFFICE.

WILLIAM STANLEY, JR., OF PITTSBURG, PENNSYLVANIA.

SYSTEM OF ELECTRIC LIGHTING.

SPECIFICATION forming part of Letters Patent No. 333,564, dated January 5, 1886.

Application filed September 30, 1885. Serial No. 178,613. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM STANLEY, Jr., a citizen of the United States, residing in the city of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Systems of Electric Lighting, of which the following is a full and exact specification.

My invention relates to a system of lighting in which two or more incandescent electric lamps (or other devices operating in an equivalent manner) are placed in series to one another in cross-circuits between the main conductors leading from a generator of electricity.

In the drawing annexed hereto and forming a part of this specification I have shown three such lamps in each cross-circuit; but the number may be varied, if desired, it being understood that the same number of lamps (when the lamps are of equal resistance) should be placed in each cross-circuit.

My invention consists in arranging and connecting the wires constituting each cross-circuit in the manner hereinafter shown, and connecting with the wires and lamps switches and resistances in such a way that the resistance in each cross-circuit shall remain constant so long as any lamp therein is lighted, and so that each cross-circuit shall be interrupted and no current pass through it when no lamp in it is lighted.

In carrying my invention into effect I make each cross-circuit consist of two auxiliary wires besides the wire forming the lamp-circuit proper, which may be called the "series wire." The two auxiliary wires are connected at intervals by cross-circuits, one for each lamp. One of the auxiliary wires is connected to one of the main conductors, and to the other auxiliary wire is connected the wire forming the lamp-circuit proper, which is also connected to the other main conductor. Thus each cross-circuit between the mains is composed of two sections, which are in turn connected by cross-circuits. Each of the cross-circuits connecting the auxiliary wires is controlled by a manual switch, which at the same time and in the same manner controls the circuit through the corresponding lamp. In each of the lamp-circuits is placed a cut-out of the usual construction, consisting of an electro-magnet, which, when the lamp-circuit is in-

terrupted, operates a switch to close the circuit through a corresponding resistance. So long as any one of the cross-circuits between the auxiliary wires is closed the cross-circuit between the mains is complete, and current will flow through the lamp that is in circuit and through the resistances corresponding to the other lamps. Conversely, when all the cross-circuits between the auxiliary wires are open the cross-circuit between the mains will be open, and all the lamps and resistances in it will be out of circuit, so that all waste of current energy is prevented.

The system is illustrated in the drawing, which shows a diagram of two cross-circuits between main conductors A A', leading from a generator of electricity, X.

K K' K'' are the lamps; L M, the auxiliary wires; N, the lamp circuit proper or series wire.

F G F' G' F'' G'' are the wires forming the cross-circuits between the auxiliary wires L M, and H I H' I' H'' I'' wires leading from the wire N to the terminals of the lamps.

E E E are double manual-switches, one part of each of which is located in a lamp-circuit and one part in the corresponding cross-circuit, so as to open or close both the lamp-circuit and the cross-circuit by the same movement.

J J J are the electro-magnets in the lamp-circuits, each having an armature, *a*, pivoted at *c*, and making contact, when released by the magnet, with a stop, *b*. In a shunt around each of the lamps is a resistance, D, which is thrown into circuit by the falling of the armature *a* when the corresponding lamp is thrown out of circuit.

B B B are wiring-blocks for facilitating the connection of the wires composing the cross-circuits.

C C C are blocks containing the resistances, the cut-outs, and the double switches.

The wire L is attached to the main A either directly or by a wire, *s*, as shown in the drawing. The wires L M are connected by the cross-circuits F G. The wire N is connected at one extremity to the main A and at the other to the wire M at a point, as *m*, between the main A and the cross-circuit between the wires L M nearest to the main A.

The course of the current through a cross-

circuit when all the lamps in it are burning is as follows: From the main A by wire *s* to wire L, and thence by the cross-circuits F G F' G' F'' G'' to wire M, along wire M to point *m*, to wire N by wire H, around electro-magnet J, and through switch E to the lamp K, thence by wire I back to wire N, and along it to wire H' and lamp K', and so to each succeeding lamp, and, finally, by wire N to main A.

If one of the lamps be thrown out of circuit, the corresponding cross-circuit between the wires L M will be broken at the same time by the action of the double switch E. The corresponding magnet J will be demagnetized, its armature *a* will fall, making contact with the stop *b*, and the current will flow from the wire H through wire *g* and armature *a* to the stop *b*, and thence through the resistance D to wire I, and so on as before. When the last lamp is thrown out of circuit, all the cross-circuits between the wires L M will be open. If when all the lamps in a cross-circuit are extinguished one of them be put in circuit, the resistances corresponding to the other lamps will be put in circuit without affecting their lamps. Thus if the lamp K' be thrown into circuit the cross circuit F' G' will be closed at the same time by the movement of the switch E, and the current will flow from wire L to wire M, thence to wire N, and then first through the resistance D, then through the lamp K', and then through the resistance D''. What has been stated in regard to one cross-circuit applies to all the cross-circuits in a system.

In such a system as I have described there is no interruption of the remaining lamps in a circuit upon the turning out of one lamp, and the circuit is immediately established upon the turning in of one lamp, the others being out of circuit, without the operation of any automatic or manual devices other than the switch controlling the lamp put in circuit.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a system of electrical distribution having translating devices in cross-circuits between the mains, the combination, in each cross-circuit, of a series wire to which the translating devices are connected in series to one another, two auxiliary wires, one of which is connected to one of the mains and the other to the series wire, and cross-circuits between

the auxiliary wires, substantially as and for the purposes set forth.

2. In a system of electrical distribution having translating devices in series in cross-circuits between the mains, the combination, in each cross-circuit, of as many paths for the current between the mains as there are translating devices in the circuit, and means for opening one of the paths between the mains as each translating device is cut out, to the end that when the last translating device is cut out the whole circuit shall be open, substantially as set forth.

3. In a system of electrical distribution having incandescent lamps in series in cross-circuits between the mains, the combination, with each lamp, of a resistance, means for automatically establishing the resistance in place of the lamp when the latter is extinguished, a switch in multiple arc between separate sections of the cross-circuit, a switch in the lamp-circuit, and means for opening or closing both switches at the same time, substantially as and for the purposes set forth.

4. In a system of electrical distribution having cross-circuits between the mains and translating devices in series in the cross-circuits, the combination, in each cross-circuit, of a wire, L, connected with one of the mains, a wire, N, connected with the other main, a wire, M, connected with the wire N, cross-circuits between the wires L and M, and means for opening or closing the cross-circuits between the wires L and M at the same time with the lamp-circuits, substantially as and for the purposes set forth.

5. The combination, with a main circuit, of cross-circuits, each consisting of two sections connected, respectively, to the wires forming the main circuit, incandescent lamps connected in series in one of the sections, cross-circuits equal in number to the lamps between the sections, and switches, each of which is adapted to open or close at the same time one of the cross-circuits between the sections and a corresponding lamp-circuit, substantially as and for the purposes set forth.

WILLIAM STANLEY, JR.

Witnesses:

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W. H. MANSFIELD.