

(No Model.)

2 Sheets—Sheet 1.

W. L. CANDEE.

SWITCH FOR ELECTRIC LIGHT SYSTEMS.

No. 260,937.

Patented July 11, 1882.

Fig. 1.

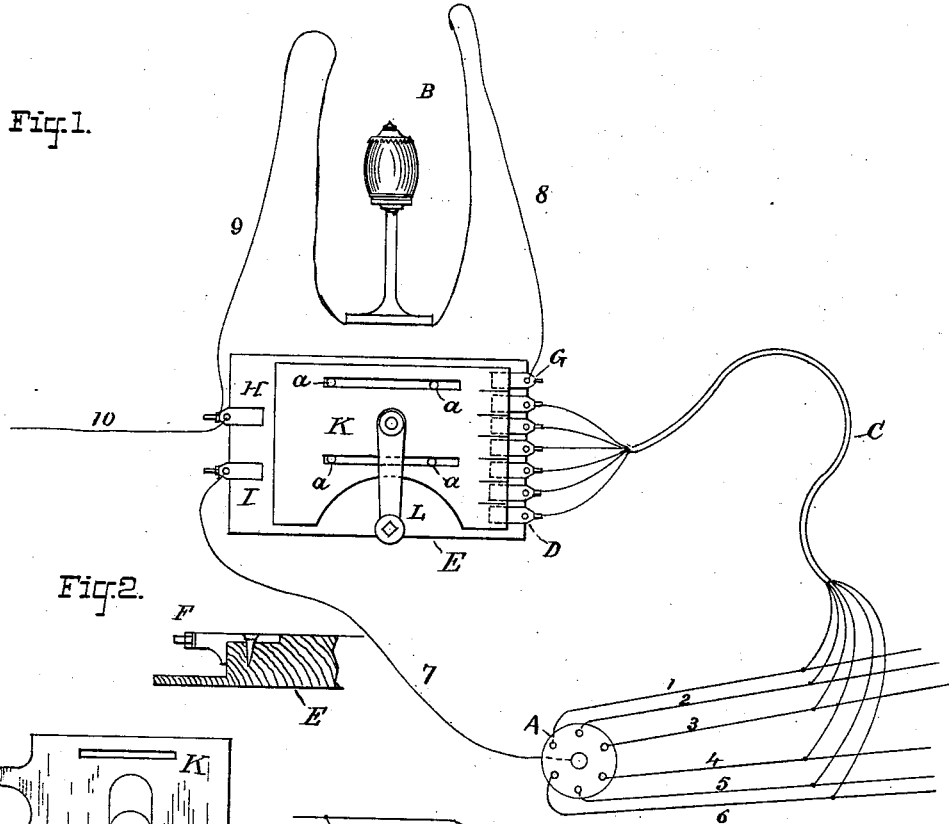


Fig. 2.

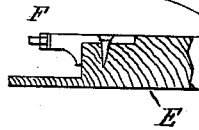


Fig. 3.

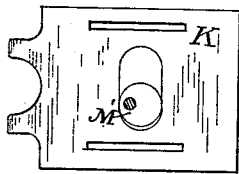
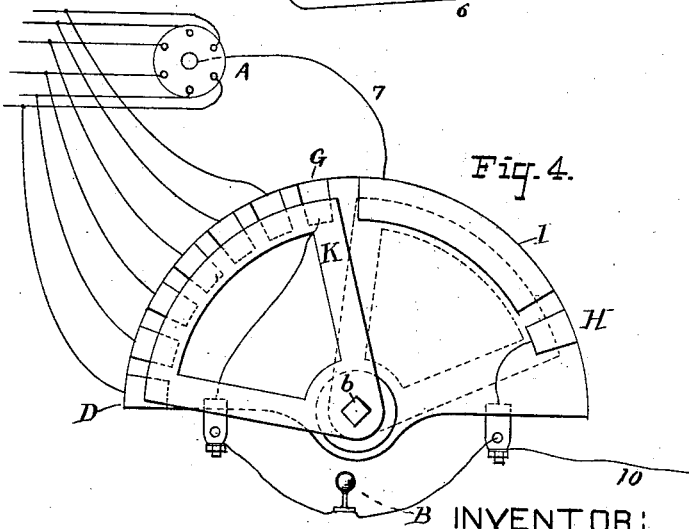


Fig. 4.



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(No Model.)

2 Sheets—Sheet 2.

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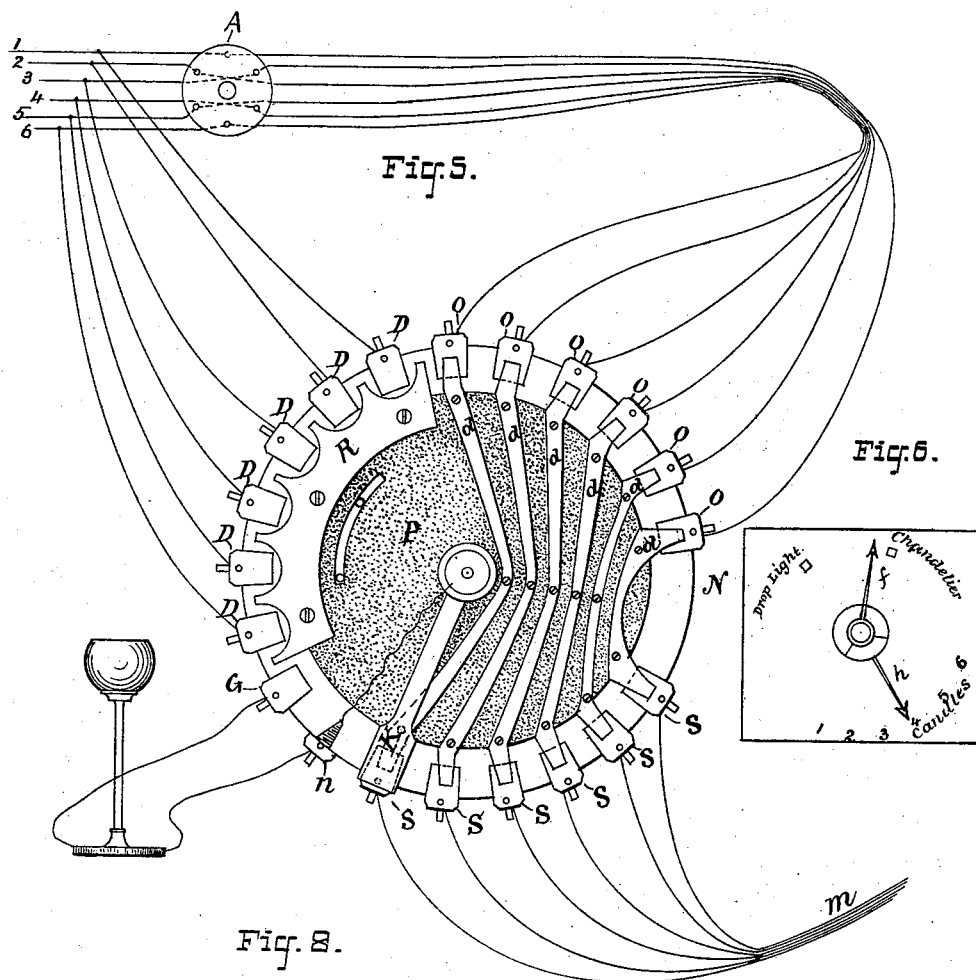


Fig. 5.

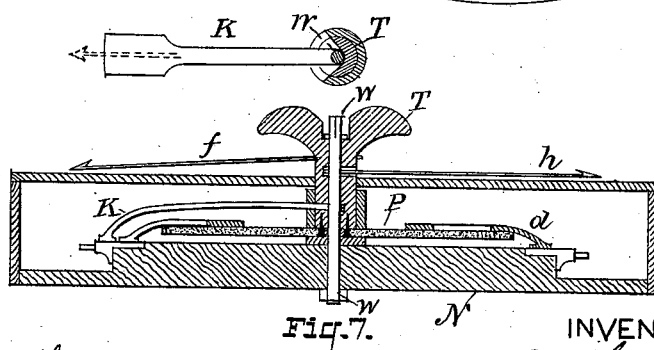


Fig. 7.

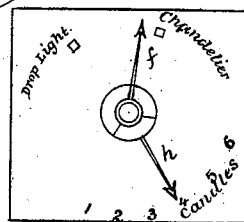


Fig. 6.

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UNITED STATES PATENT OFFICE.

WILLARD L. CANDEE, OF BROOKLYN, NEW YORK.

SWITCH FOR ELECTRIC-LIGHT SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 260,937, dated July 11, 1882.

Application filed May 3, 1882. (No model.)

To all whom it may concern:

Be it known that I, WILLARD L. CANDEE, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Switches for Electric-Light Systems, of which the following is a specification.

My invention relates to electric-light systems in which a number of general circuits are employed, the current being shifted from one circuit to another when the lights upon the first circuit are nearly or wholly consumed.

My invention is designed more particularly for application to the Jablochkoff system of electric lighting, in which each of the two or more general circuits passes through the Jablochkoff candles of a chandelier, suitable arrangements, automatic or otherwise, being employed to shift the current from one circuit to another in succession as the candles are consumed; and my object is to provide a means whereby the lighting-current may at any point of the system be transferred at pleasure and without interference with other chandeliers or lights of the same system from the chandelier and the candle which is for the time being in action in said chandelier to a drop-light or stand-light containing a single candle and located in a branch circuit at any point near to or remote from the chandelier.

My invention consists, generally speaking, in taking from each of the general-circuit wires a branch wire, which is made to terminate normally in a contact plate, stud, or surface of a switch, and in employing a spring or connecting-plate operated by hand, and so arranged as to bridge, when operated, the several contact studs or points of the branch wires simultaneously with a contact stud or point joined to one end of the wire which is connected to the drop-light or stand, so that whichever general circuit is in use the drop-light circuit will be connected to an operating-circuit, while, moreover, the branch wires being normally disconnected, (since they terminate in separate contact plates or studs,) no cross-connection is formed from the wire of a circuit in use to some other wire, while the chandelier is connected in the general circuits. In conjunction with the above arrangement of the circuit-con-

nections, I cause the general circuit or circuits for the chandelier to be normally completed through the switch in such a way that when the switch is operated to connect in the drop-light or stand-light the general circuits through the chandelier are interrupted. In order to prevent interruption to other lights in the same system, the parts are by preference so arranged that the branch wires are connected to the drop-light wire at the moment before the general circuits through the chandelier are broken, and vice versa.

My invention consists, further, of certain specific constructions of switch for producing the above-mentioned changes, the nature of which will be hereinafter described, and then specified in the claims.

Referring to the accompanying drawings, Figure 1 is a plan view of one construction and arrangement of circuits employed in carrying out my invention. Fig. 2 is a partial section of the switch block or base, showing the construction and manner of attachment of a contact plate or surface. Fig. 3 is a top view of the connecting spring or plate whereby the circuit is completed between the various contact plates or surfaces. Fig. 4 is a plan view of a modified form of switch. Fig. 5 is a view of another form of switch, in which the connecting-plate has a circular instead of a rectilinear motion, like the connecting-plates shown in Fig. 1, and which is adapted to be placed at any point of the general system—as, for instance, between the generator and another chandelier—the form shown in Fig. 1 being only designed for use in connection with the terminal chandelier of a system. Fig. 6 is a top view of the switch-box reduced in size, showing the operating-pointers and indications upon the box-cover. Fig. 7 is a vertical diametrical section of the switch; and Fig. 8, a detail view, showing how a limited movement is permitted to one of the two concentric pointers independent of the other.

Referring to Fig. 1, which represents a switch designed for use with the chandelier at the terminal of a system remote from the generator, or with the chandelier of a system to which but one chandelier is connected, A represents diagrammatically a chandelier of any ordinary construction, containing six Jabloch-

koff candles or other lights, supplied by six general-circuit wires, 1 2 3 4 5 6, in the usual manner, said circuits, after passing the chandelier, being merged in a common conductor, 7, as is ordinary when but one chandelier is used in the system, or when that chandelier is the terminal one of the system.

B represents the drop-light or stand-light to be switched into connection with the operating-circuit. From each general-circuit wire 1 2 3 4 5 6 runs a separate wire, carried through a cable, C, or in any other suitable manner, to one of six contact plates or studs, (represented at D,) which are separately secured to the base-block E, and are insulated from one another in the usual way. By preference the plates D are constructed in the manner shown in Fig. 2. As here indicated, the plate is flush, or nearly so, with the top of the block E, and terminates in a binding-screw connection, F, projecting beyond the base-block and serving for attachment of the branch wire running from the general circuit.

G represents a contact plate or stud similar to the plate D, but insulated therefrom, and forming the termination of a wire, 8, leading from one pole of a drop or stand light, B, the other pole of which is connected by a wire, 9, with a contact-plate, H, upon the opposite end of the block E from the plates D. The contact-plate H is also connected to a wire, 10, which forms the return-conductor to the generator of the system. The common return-wire 7, leading immediately from the chandelier, is connected to a similar contact-plate, I. A reciprocating connecting-plate, K, mounted upon the block E, and movable to and fro through a handle, L, by any suitable mechanical device, is adapted to rest either upon the contact-plates D G simultaneously or simultaneously upon the plates H I. The latter is its normal position when the chandelier A is in use. The plate K, which may be operated by an eccentric, M, Fig. 3, engaging with the edges of a slot in the plate and connected to the spindle to which handle L is joined, is of such length that when it is at the extremity of its movement in one direction and in contact with plates at one end of block E it is out of contact with the plates at the other. It is also of the proper length to make contact with the plates at one end at the instant before it breaks contact with those at the other. The ends of the plate should be slit so that it may make sure contact, and studs *a a*, fixed in the base-block and projecting through slots in the plate, serve to limit its movement.

The operation is as follows: When the chandelier is in use the plate K rests on the two plates H I, bridging them and connecting the wires 7 10, so that the current on any one of the general circuits 1 to 6 may return to the generator in the ordinary way. In this position of the plate K it is out of contact with the plates D G, so that the branch wires terminating in plates D are out of connection with the

wire 8, leading to the drop-light. If it is desired to bring the drop-light B into use, the arm L is turned so as to carry the plate K into connection with the contacts D and G and out of connection with the plates H I, thus interrupting the general circuit through the chandelier, but simultaneously, or at the moment before the interruption takes place, forming the connection between all the branch wires and the wire 8 of the drop-light, so that the electric current from whichever of the general wires is in use will flow through its branch wire and contact-plate D, connecting-plate K, contact-plate G, wire 8, lamp B, wire 9, and return-conductor 10.

It is obvious that the plate K might be made to control the general circuits by interrupting and completing the individual wires instead of interrupting and completing the return-conductor 7, and that other modifications might be made in the circuits without changing the principle of operation. Such an arrangement would, however, render it necessary to employ as many plates I as general-circuit wires, as will presently appear from the description of the switch to be employed, at a point between the generator and another chandelier, or between two chandeliers.

In the modification shown in Fig. 4 the connecting-plate K is supposed to have a circular instead of a rectilinear movement, being mounted at *b* upon a suitable spindle or pivot. When in the position shown in full lines the plates D, forming the terminals of the branch wires, are connected, as before, to the plate or contact surface G, forming one terminal of the branch containing the drop-light, the other terminal of which connects with the return-circuit wire 10 through a binding post, as shown. The connection between the arc-shaped plate I, connected to the chandelier, and the plate H, connected to wire 10, being then uncompleted, the chandelier is out of circuit. When the switch-plate K is turned to occupy the position shown in dotted lines, H and I are connected; but all of the plates D are disconnected from G, so that no current can pass to the drop-light. The latter arrangement is adapted only for use with a chandelier which is used alone upon the general circuits, since, as will be observed, the plate K, in passing from the position shown in full lines to a position where it will connect plates H I, will interrupt the flow of current on the general-circuit wires. The plates may, however, be so arranged with relation to one another that no interruption shall occur.

Figs. 5, 6, 7 illustrate a form of my switch adapted for use at any point of a system, and with any number of chandeliers in the same general circuits.

A represents the chandelier, and 1 2 3 4 5 6 the general-circuit wires, which, instead of being merged in a common conductor after passing through the chandelier, are continued on independently of one another to the can-

dles of another chandelier through the switch to be described.

The chandelier, being of any ordinary construction, need not be described in detail.

5 The switch is constructed as follows:

N represents a circular block of any suitable material, upon which the parts of the switch are mounted.

10 D, D, &c., are contacts, points, or plates mounted on the edge of the block N, either in the manner before described or in any other suitable manner, and connected respectively with the general-circuit wires 1 2 3 4 5 6.

15 G is the contact point or plate connected to one pole of the drop-light.

P represents a plate of insulating material, which carries a circuit-closing plate, R, adapted to bear simultaneously upon the points D D, &c., and G, and also carries six separate 20 insulated circuit-closing plates or springs, *d*, each of which is adapted to complete the circuit between one of the six plates O O, &c., connected to the chandelier, and one of six similar plates, S, to which are attached the 25 general-circuit wires leading through cable *m* to the next chandelier of the system. The plate P is so constructed and mounted that it can turn through the small arc of a circle to a sufficient distance to bring the connecting 30 plates or springs *d* into and out of contact with the points O S, and also to move the plate R into and out of contact with the plates D G. For this purpose it is attached in any suitable manner to the stem T, carrying a 35 pointer, *f*. The movement of the plate P may be belimited by means of pins passing up through a slot in the plate, as shown in Fig. 5.

40 Passing down through the stem T, and movable independently thereof, is a metal spindle, W, carrying a pointer, *h*, and a contact-spring, *k*, attached to the spindle in any suitable manner, and projecting through a semicircular opening in T, as indicated in Fig. 8. Spindle 45 W may be turned so as to cause the spring *k* to make contact with any one of the plates S, and is electrically connected in any suitable manner with a binding-post, *n*, to which latter is connected a wire from one pole of the drop-light B, the other pole of said light being connected, as before mentioned, to the contact 50 plate or point G.

The parts being thus constructed and connected, the operation is as follows: When the chandelier is in use the switch is in the position shown in the drawings, and the various 55 general circuits are completed independently of one another through the plates O, springs *d*, and plates S, so that the candles in the various chandeliers on those circuits may be consecutively thrown into circuit as occasion requires. The drop-light B is out of circuit, 60 plate R being disconnected from contact-plate G. If the drop-light B is to be employed, it is first necessary to ascertain which one of the general-circuit wires is in use, which having 65 been done, the pointer *h* is first turned so as to

bring the spring *k* into connection with the plate S of that general-circuit wire, thus making the proper connection from one pole of the drop-light. To make connection from the 70 other pole, the pointer *f* is turned so as to move the plate P and cause the plate R to make contact with the plates G and D D, &c. In this operation the springs *d* are carried out of connection with the plates O S, thus breaking the general circuits through the chandelier, so that the current upon the particular wire in use now flows to its contact-plate D, and through R to G, and to the drop-light, 75 the continuation being to post *n*, and through the spindle and spring *k* to the plate S, upon which the spring rests, and through the general-circuit wire to the next chandelier.

In order to prevent interruption to the general circuit, the parts are so arranged and 85 portioned that the plate R will come into contact with its points D at the instant before the springs *d* break contact with studs or points O S, and vice versa.

To remove the drop-light from circuit the 90 plate P is merely restored to its original position. The spring *k* need not be moved.

Many modifications in the manner of mounting and operating the circuit-closing devices may be employed without departing from the 95 spirit of my invention. The construction shown illustrates but one method of carrying out the same.

It will also be obvious that the circuit-closing devices themselves may be modified in 100 many ways.

What I claim as my invention is—

1. The combination, substantially as described, of two or more circuit-wires, a chandelier included in said circuits, a switch 105 plate or connector for completing the connection between the chandelier and the wire or wires forming the continuation of the circuit, switch contact points or studs connected to the various wires, and a circuit-closer for completing 110 the circuit between said contact-points and a contact-point forming one terminal of a branch wire containing a single light.

2. The combination, substantially as described, in an electric-light system employing 115 a number of general-circuit wires that are used in turn, of a branch wire from each general circuit to a contact point or surface of a switch, and a conducting plate or spring arranged in the manner described, to bridge all of said 120 contact-plates simultaneously with a contact plate or point connected to a wire leading to a drop-light.

3. The combination, substantially as described, of a chandelier containing several electric lights or candles, each fed by an independent circuit-wire, a drop or stand light 125 connected to a branch wire, contact plates, points, or studs forming the independent terminals of branch wires from the general circuits, a circuit-closer for completing the circuit between 130 said plates, points, or studs and the drop-

light, a circuit closer and breaker for breaking and closing the general circuits or their common return-wire, and means for simultaneously operating said circuit closing and breaking devices, as described.

4. The combination, substantially as described, of two or more general-circuit wires, including a chandelier, a branch wire containing a drop-light or stand-light, and means, as described, for simultaneously connecting all of said general-circuit wires to the drop-light and breaking the general-circuit wires around the drop-light containing the chandelier.

5. The combination, substantially as described, of the base-block and the contact-plate D, let into the edge of the block flush with the top surface, and formed at its portion projecting laterally from the block into a binding-post.

6. The combination, substantially as described, of an electric-light chandelier, two or more general-circuit wires, a switch interposed in said circuit-wires, contact points, plates, or studs connected to said circuits on either side of the switch, and circuit-closing springs *d*, mounted upon a common support and adapted to complete said circuits at the same time.

7. The combination, substantially as described, of a base-block of insulating material, contact plates or studs, each connected to one of several circuit-wires leading to an electric-light chandelier, and a circuit-closing plate constructed as described, and adapted to rest upon all of said contact plates or studs at once and upon a contact plate or stud connected to a stand-lamp.

8. The combination, substantially as described, of an electric-light chandelier, two or more independent general-circuit wires, switch devices for simultaneously breaking said independent circuits, means for completing a connection between all of said circuit-wires, and one pole of a stand or drop light, operating simultaneously with the circuit-breaking devices, and an independent circuit-closer connected to the other pole of the stand or drop light for connecting the latter to any one of the general circuits at a point beyond the circuit-breaker.

9. The combination, substantially as described, of the insulating-plate P, attached to stem T and carrying the circuit-closing springs *d*, and spindle W, carrying circuit-closing spring *k*, and movable independently of the stem T, so that connection may be made with any line-circuit point S before the circuit is broken by the turning of plate P.

10. The combination of the stem T, insulating-plate P, circuit-closing springs and plate *d* R, contact studs or points arranged about plate P, and connected in the manner described to the general circuits, to the drop-light, and to the chandelier, and independently-movable spindle W, carrying circuit-closing spring.

Signed at New York, in the county of New York and State of New York, this 21st day of April, A. D. 1882.

WILLARD L. CANDEE.

Witnesses:

WM. H. CHURCH,
ROBERT J. CUMMINGS.