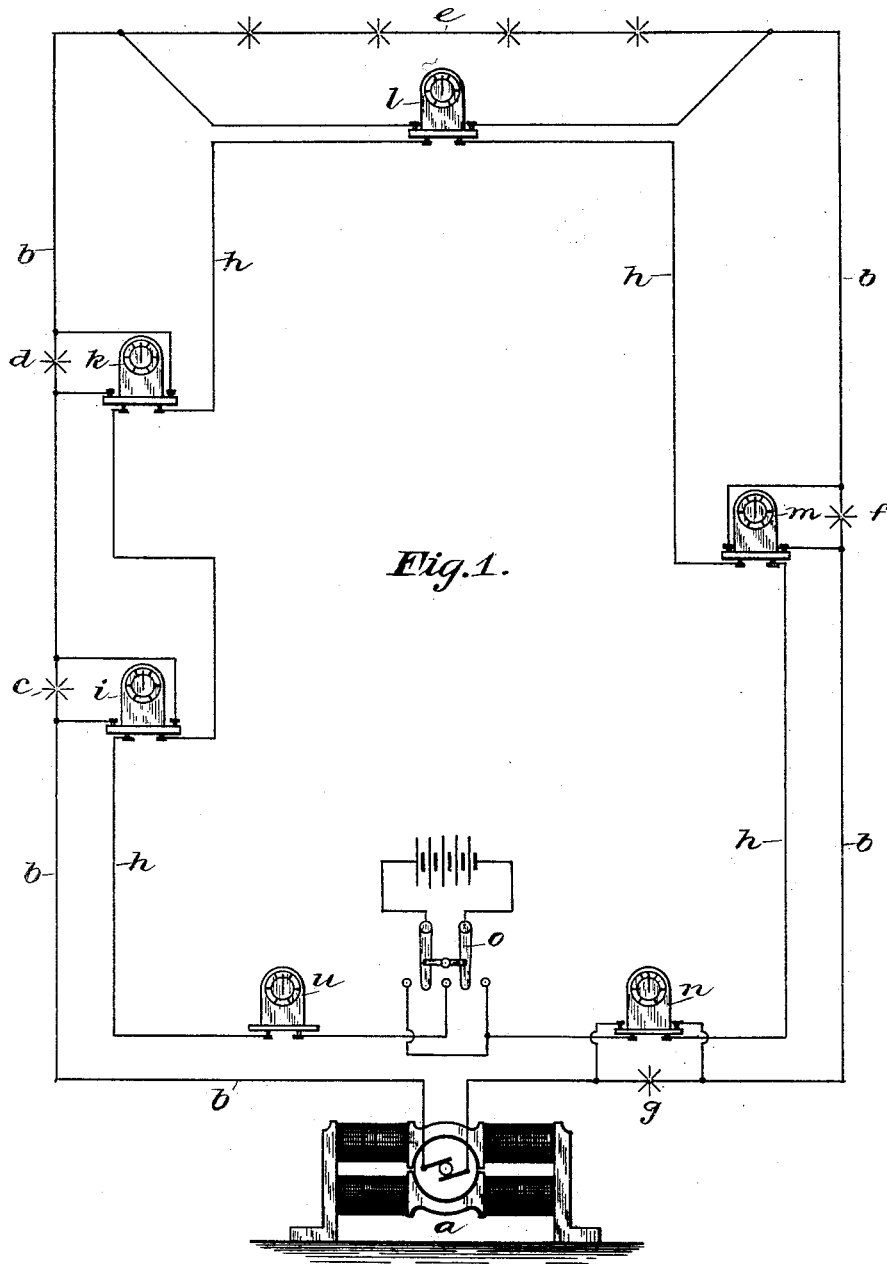


B. E. SUNNY.  
ELECTRIC LIGHT SYSTEM.

No. 385,020.

Patented June 26, 1888.



Witnesses:

Chas. S. Hawley.  
Albert A. Parker.

Inventor:

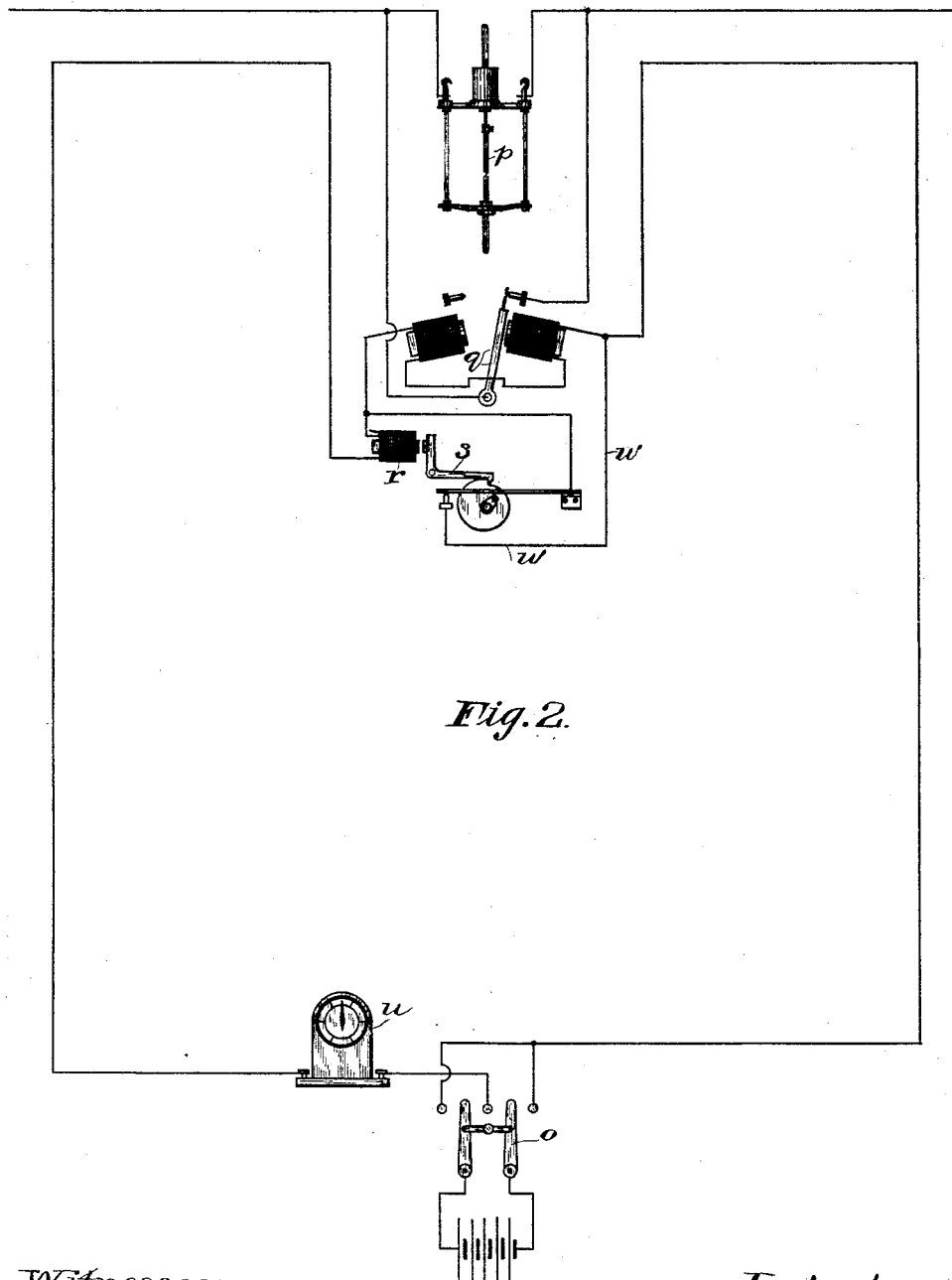
Bernard E. Sunny.  
By George A. Boston,  
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# UNITED STATES PATENT OFFICE.

BERNARD E. SUNNY, OF CHICAGO, ILLINOIS.

## ELECTRIC-LIGHT SYSTEM.

SPECIFICATION forming part of Letters Patent No. 385,020, dated June 26, 1888.

Application filed March 5, 1888. Serial No. 266,183. (No model.)

*To all whom it may concern:*

Be it known that I, BERNARD E. SUNNY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Electric-Light Systems, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to electric lighting; and its object is to provide means of controlling the duration of service of different lamps of the system from the central station.

In arc systems of electric lighting the lamps are placed in series. Fifty or more lamps may be placed in the same circuit. These lamps, however, will be distributed among several different customers or users, and the different users are charged a rate which is determined by the duration of service. For example, at one place of business lamps may be required until eight o'clock in the evening, and at another store until twelve o'clock. It is therefore necessary to provide for cutting out the lamps of different customers at different hours, in order that there may be no useless burning of the lamps.

Heretofore it has been usual to send an attendant from point to point along the arc circuit to cut out the lamps of different customers at different times. In certain cases customers have no need of service in the early part of the evening, and therefore it has been necessary to send a man to switch the lamps of such customer into circuit at the proper time. It has also been attempted to determine the duration of service of lamps of different customers by the amount of carbon consumed, leaving the customers to cut the lamps in and out of circuit at will. This latter method of determining the service has been found unsatisfactory, by reason of its inaccuracy and the liability of customers to make mistakes as to the actual duration of the service. For these reasons it is of great advantage to absolutely control the time of service from a single point, preferably the central station. This I have accomplished by means of an independent circuit extending to different users' stations in connection with an electro-magnetic switching device at each of said stations operated by

current sent over the independent circuit from the central station, as hereinafter described.

I will describe my invention in connection with an arc system of electric lighting. It is evident, however, that the electro-magnetic switching device and independent circuit might be used for cutting out or in any other form of electric illuminating device from its circuit.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a diagram showing a single arc-light circuit with a series of arc lamps included therein, with an independent circuit passing from the central station through the different users' stations and switching apparatus, whereby any one or more of the lamps may be cut in or out of circuit at pleasure. In Fig. 2 I have illustrated, somewhat in detail, a polarized switching device, in connection with circuit-opening mechanism, for cutting lamps in or out of the arc circuit.

Referring to Fig. 1, the dynamo-electric machine *a* supplies current to the circuit *b*. This circuit *b* may contain any desired number of lamps. I have shown five users' stations upon this circuit—that is to say, stations *c*, *d*, *e*, *f*, and *g*. The circuit *h* extends through circuit-changing devices *i*, *k*, *l*, *m*, and *n*, placed, respectively, in connection with different users' stations. By means of a pole-changing switch, *o*, current may be sent in either direction, as desired, over the circuit.

By means of the electro-magnetic switching devices at the different stations included in the independent circuit the lamp or lamps of any subscriber may be cut in or cut out of the lamp-circuit by sending current over the independent line in the proper direction.

In Letters Patent No. 339,718, granted Ernest P. Warner, April 13, 1886, is shown an individual electric signal device of the character required in my system herein described. I have not, therefore, considered it necessary to illustrate the circuit-changing devices used at the different users' stations more in detail.

In Fig. 2 I have shown a lamp, *p*, in an arc-circuit and a shunt-wire closed by the same, said shunt-wire including the armature-lever *q*, which forms a part of my polarized electro-magnetic switch. The pole-changing switch *o* is arranged in such manner that when turned

to the right current will be sent in one direction, and when turned to the left current will be sent to line in the opposite direction. Armature-lever *q* is shown in its normal position, the lamp *p* being cut out.

Referring now to Fig. 1, it will be understood that a similar polarized electro-magnetic switch is provided in connection with each of the different clocks shown.

The magnet *r* (shown in Fig. 2) is usually termed the "starting" magnet of the circuit-opening mechanism, since when it is energized its armature, which carries the dog *s*, is lifted, so as to start the mechanism. The circuit-opening mechanisms are thus all started simultaneously. The cams, however, are placed in different positions, so that the shunt-wire around the electro-magnets of the polarized electro-magnetic switching device of one mechanism only will be brought into circuit at once. The time during which any particular electro-magnetic switch is included in the circuit is indicated upon the time-indicator *u* at the central station. Thus while the pointer of the indicator *u* is passing over the space during which the shunt-wire *w* of any particular indicator is open the operator, by means of the switch *o*, may send current in the desired direction to cut out or cut in the lamp or group of lamps of that particular station.

By providing a polarized electro-magnetic switching device, as described, the different lamps may be brought into circuit or disengaged from the circuit. If said device were not polarized, the armature *q*, which is a permanent magnet, could be moved positively only in one direction.

My invention admits of various modifications which will readily suggest themselves to those skilled in the art, and I therefore do not limit myself to the construction shown.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with an arc-light circuit having the lamps thereon distributed at different stations, of an independent circuit containing individual electro-magnetic circuit-changing devices, said devices being distributed at different stations, a polarized electro-magnetic switch device connected with each individual electro-magnetic circuit-changing device, and included in a shunt-wire around a particular lamp or lamps, and a battery and pole-changing switch at the main station, whereby the lamp or lamps of any station may be brought into the arc circuit or disconnected therefrom, substantially as described.

2. The combination, with an arc-light circuit, including lamps arranged in series, of

an independent circuit connected with an electro-magnetic circuit-opening mechanism at a particular station, a shunt-circuit around the lamp or lamps of said station, including the armature of an electro-magnetic switch, the electro-magnets of said electro-magnetic switch device being included in said independent circuit, a shunt-wire, *w*, normally closed around said coils, said shunt-wire being open at a particular period of time during the movement of the electro-magnetic circuit-opening mechanism, and the switch and battery at a central station, whereby the electro-magnetic switch may be operated when said shunt-wire is opened, as described.

3. The combination, with an electric-light circuit including lamps placed at different subscribers' stations, of an individual electric circuit extending from the central office through a circuit-opening mechanism placed at each of the different stations, and polarized electro-magnetic switch devices, one placed in connection with the shunt-wire around the lamp or lamps of each station and the individual circuit-opening mechanism of said station, and a battery and pole-changing switch at the central station, whereby during the simultaneous operation of the various individual circuit-opening devices the lamp or lamps of any station may be brought into circuit or disconnected therefrom, substantially as described.

4. The combination, with a circuit including an individual circuit-opening mechanism, of means for throwing current of opposite polarities thereon, and an electro-magnetic switch included in said circuit and a shunt-circuit around the electric arc-lamp which is opened or closed by said electro-magnetic switch accordingly as current of one polarity or the other is sent to line.

5. The combination, with a circuit including an individual circuit-opening mechanism, of means for throwing current of opposite polarities thereon, and an electro-magnetic switch included in said circuit, and a shunt-circuit around an electric illuminating device included in the electric-light circuit, said shunt-circuit being opened by the electro-magnetic switch when current of one polarity is sent over the independent circuit, and closed thereby when current is sent in the opposite direction over said independent circuit, substantially as and for the purpose specified.

In witness whereof I hereunto subscribe my name this 2d day of March, A. D. 1888.

BERNARD E. SUNNY.

Witnesses:

GEORGE P. BARTON,  
CHAS. G. HAWLEY.