

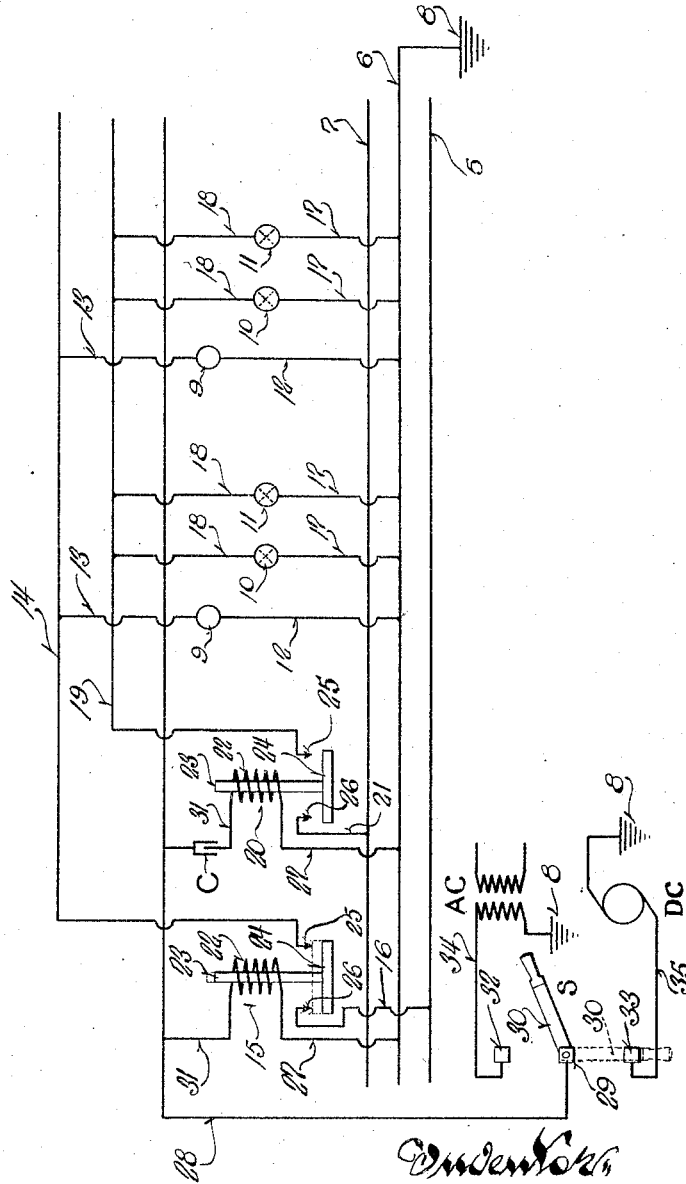
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S. B. HOOD

STREET LIGHTING SYSTEM

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*Witnessed*  
— Samuel B. Hood —

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# UNITED STATES PATENT OFFICE.

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## STREET-LIGHTING SYSTEM.

Application filed August 20, 1924. Serial No. 733,120.

*To all whom it may concern:*

Be it known that I, SAMUEL B. HOOD, a citizen of the United States, and resident of Minneapolis, in the county of Hennepin and State of Minnesota, have invented new and useful Improvements in Street-Lighting Systems, of which the following is a description, reference being had to the accompanying drawing, which is a part of this specification.

This invention relates to certain new and useful improvements in street lighting systems and refers more particularly to a control for street lighting systems in which it is desired to burn all of the lights of a cluster, station or district at one time and to extinguish one or more lights of the cluster, station or district at another time.

Heretofore, all-night and part-night street lighting has been accomplished by running separate series circuits to the lights of the clusters, stations or districts which is objectionable, as it involves a complex system which is to be avoided in that it is expensive to install and operate. Having the above and other objectionable features in mind, this invention has as one of its objects the provision of a street lighting system in which but a single control circuit is employed for connecting one or all of the lights of a cluster, station or district with a source of current.

It is another object of this invention to provide a system of the character described, wherein failure of one control relay to actuate will in nowise affect the operation of the remaining relay or relays.

A further object of this invention resides in the provision of a street lighting system of the character described wherein the characteristics of direct and alternating current are brought into play to actuate the controls for extinguishing one or more lights of a cluster, station or district.

And a still further object of this invention resides in the provision of a street lighting system of the character described which may be extended over an indefinite area and still be controlled from a single point or master switch.

With the above and other objects in view which will appear as the description proceeds, my invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described

and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

In the accompanying drawing, I have illustrated one complete example of the physical embodiment of my invention constructed according to the best mode I have so far devised for the practical application of the principles thereof, and in which:

The single view is a diagrammatic view of a portion of the street lighting system embodying my invention.

Referring now more particularly to the accompanying drawing, the numerals 5, 6 and 7 designate the main service lines or conductors of a three phase circuit, one line 6 being connected with a ground 8, although it is to be understood that my improved system may be employed in connection with any other type of circuit.

The lights or lamps may be grouped in clusters, stations or districts of two or more, three lights 9, 10 and 11 being shown in the accompanying drawing, or the lights may be arranged in clusters and any number of clusters included in each station or district. One side of each light 9 of the clusters, stations or sections is connected with the ground line 6 by a conductor 12 and with the main line 5 through a conductor 13, a conductor 14, a relay switch 15, to be later described, and a conductor 16. The lights 10 and 11 each have one side connected with the ground line 6 by a conductor 17 and with the main line 7, through a conductor 18, a conductor 19, a relay switch 20, to be later described, and a conductor 21.

In the drawing, but one station or district having the lights arranged in clusters is illustrated, but it will be understood that any other arrangement of lights may be employed, and that any number of stations or districts may be utilized, as described in my copending application, filed August 2, 1924, Serial Number 729,850.

The relay switch 15, comprises a magnetic coil 22 with which an armature 23, carrying a movable contactor 24, cooperates the contactor 24 being engageable with stationary contacts 25 and 26 to which the conductors 14 and 16 are respectively connected. One end of the coil 22 is con-

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5 nected with the ground line 6 by a conductor 27 and the other end thereof is connected with a conductor 28, which is electrically connected with a terminal 29, pivotally mounting the switch blade 30 of a double-throw master switch S, by a conductor 31.

10 The relay switch 20 is identical in construction with the relay switch 15 with the exception that the stationary contact 26 may be connected with the line 7 by conductor 21 and a condenser C is interposed in the conductor 31 connecting one end of the coil thereof with the conductor 28, and, therefore, the reference characters applied to the relay switch 15 are applied thereto and the description of one will suffice for both. Interposing the condenser C in the conductor 31 leading from the magnetic coil of the relay switch 20, renders the relay inoperative when direct current is employed, whereas the relay 15 responds to either direct or alternating current.

20 The switch S has two stationary contact clips 32 and 33 with which the blade 30 is selectively engageable, the contact 32 being connected with a source of alternating current A C by a conductor 34 and the contact 33 being connected with a source of direct current D C by a conductor 35.

30 In the illustration of my invention shown in the accompanying drawing, all of the lights burn when the switch S is actuated to connect the relays with the source of alternating current and only the lights 9 burn when the source of direct current is connected in the relay circuits. This is accomplished by interposing the condenser C in the circuit of the relay 20 and providing sources of alternating and direct current adapted to be selectively connected in the relay circuits.

40 In my co-pending application previously mentioned, is illustrated a system wherein the lights burn upon failure of the relays, and, in the illustration of the present invention, the relays are of the inverse type wherein failure of the relays extinguishes the lights. Thus deenergization of the coils 22 whether by opening of the switch S or by an interruption of the relay circuits, results in the opening of the light circuits and effects a more economical operation, since the day-light period is much longer than the night period. It will, however, be understood that the type of relays illustrated in my co-pending application may be employed.

50 Assuming the blade 30 of the switch S is in open position as illustrated by full lines, the circuits of the relays 15 and 20 are broken, and the lights 9, 10 and 11 extinguished, their circuits being broken. When it is desired to burn all of the lights, the switch blade 30 is electrically engaged with the contact 32, connecting the conductor 28 with the source of alternating cur-

rent A C through the conductor 34, contact 32, switch blade 30 and terminal 29. The coils 22 of the relays 15 and 20 are thus energized, the current flowing from the conductor 28, through conductors 31, the magnetic coils 22 of the relays, through conductors 27 and to the ground 8 through the line 6.

75 The resulting energization of the coils 22 actuates the armatures 23 to engage the movable contactors 24 with the stationary contacts 25 and 26, the relay 15 closing the circuits of the lights 9 from the line 5, through conductor 16, contacts 26, 24 and 25, conductor 14, conductors 13, the lights 9 and back to the negative line 6 through the conductors 12. The lights 10 and 11 have their circuits closed, the current flowing from the line 7, through the conductor 21, contacts 26, 24 and 25 of the relay 20, conductor 19, conductors 18, the lights 10 and 11, conductors 17 and to the ground 8 through the line 6.

90 When it is desired to break the continuity of the circuits of the lights 10 and 11, and at the same time maintain the continuity of the light or lights 9, the switch blade 30 is swung out of engagement with the contact 32 and into engagement with the contact 33, as illustrated in dotted lines. The source of alternating current is thus disconnected from the conductor 28 and the source of direct current connected therewith through the conductor 35, contact 33, switch blade 30 and terminal 29. There being a condenser interposed in the conductor 31 of the relay 20, as previously described, relay 20 does not respond to direct current and is, consequently, rendered inoperative, breaking the continuity of the circuits of lights 10 and 11. The relay 15, however, responds upon engagement of the switch blade 30 with the contact 33 to connect the conductor 28 with the source of direct current, as previously described, and the lights 9 connected across the lines 5 and 6. When it is desired to open the circuits of all of the lights, the switch blade 30 is moved to its full line position illustrated in the drawing, disconnecting the sources of current from the conductor 28.

105 From the foregoing description taken in connection with the accompanying drawing, it will be readily evident to those skilled in the art to which an invention of this character appertains that the principle of this invention is capable of use in connection with other than street lighting systems and where the term light, cluster, station or district is employed the same applies equally as well to any other type of device to which this system may be applicable.

120 What I claim as my invention is:

1. In a street lighting system including a plurality of lights, service lines and light

circuits for connecting the lights across the service lines, means utilizing the characteristics of alternating and direct current to render certain of the light circuits inoperable when one current is used and to close all of the light circuits when the other current is used.

2. In a street lighting system including a plurality of lights, service lines and light circuits for connecting the lights across the service lines, a control means for each light circuit, one of the control means being operable by either alternating or direct current and the other control means being operable only by alternating current, and means for connecting all of the control means with either alternating or direct current.

3. In a street lighting system including a plurality of lights, service lines and independent light circuits for independently connecting certain of the lights across the lines to illuminate the same, a source of alternating current, a source of direct current, a control means within each light circuit for opening and closing the same, actuating circuits for the control means and means within the control means actuating circuits whereby one of the control means is rendered inoperable upon connection of its actuating circuit with a source of direct current to render the light circuit controlled thereby inoperable and whereby both of said control means actuate upon connection of the actuating circuits with a source of alternating current to close the light circuits controlled thereby.

4. In a street lighting system including a plurality of lights, service lines, a light circuit for electrically connecting a light across the service lines to illuminate the same and a second light circuit for electrically connecting other of the lights across the service lines to illuminate the same, a relay switch interposed in one light circuit and responsive to either alternating or direct current, a relay switch interposed in the other light circuit and responsive only to alternating current, a circuit including the relay switches, a source of alternating current, a source of direct current, and means operable to connect either of said sources of

current with the circuit of the relay switches.

5. In a street lighting system including a plurality of lights, service lines, a light circuit for electrically connecting certain of the lights across the service lines to illuminate the same and a second light circuit for electrically connecting other of the lights across the service lines to illuminate the same, a relay switch interposed in one light circuit, a relay switch interposed in the other light circuit, a control circuit, relay circuits for connecting the relay switches with the control circuit, a condenser interposed in one relay switch circuit, a source of alternating current, and means operable to connect either of said sources of current with the control circuit, both of said relay switches actuating upon connection of a source of alternating current with the control circuit and but one of the relay switches operating upon connection of the control circuit with the source of direct current.

6. In a street lighting system including a plurality of lights, service lines, a light circuit for electrically connecting certain of the lights across the service lines to illuminate the same and a second light circuit for electrically connecting other of the lights across the service lines to illuminate the same, a relay switch interposed in one light circuit, a relay switch interposed in the other light circuit, a control circuit, relay circuits for connecting the relay switches with the control circuit, a condenser interposed in one relay switch circuit, a source of direct current, a source of alternating current, and means operable to connect either of said sources of current with the control circuit, both of said relay switches actuating upon connection of a source of alternating current with the control circuit to complete all of the light circuits and connect the lights across the lines and but one of the relay switches operating upon connection of the control circuit with the source of direct current to complete only the light circuit controlled thereby and connect the light thereof across the lines.

In testimony whereof I affix my signature.  
SAMUEL B. HOOD.