

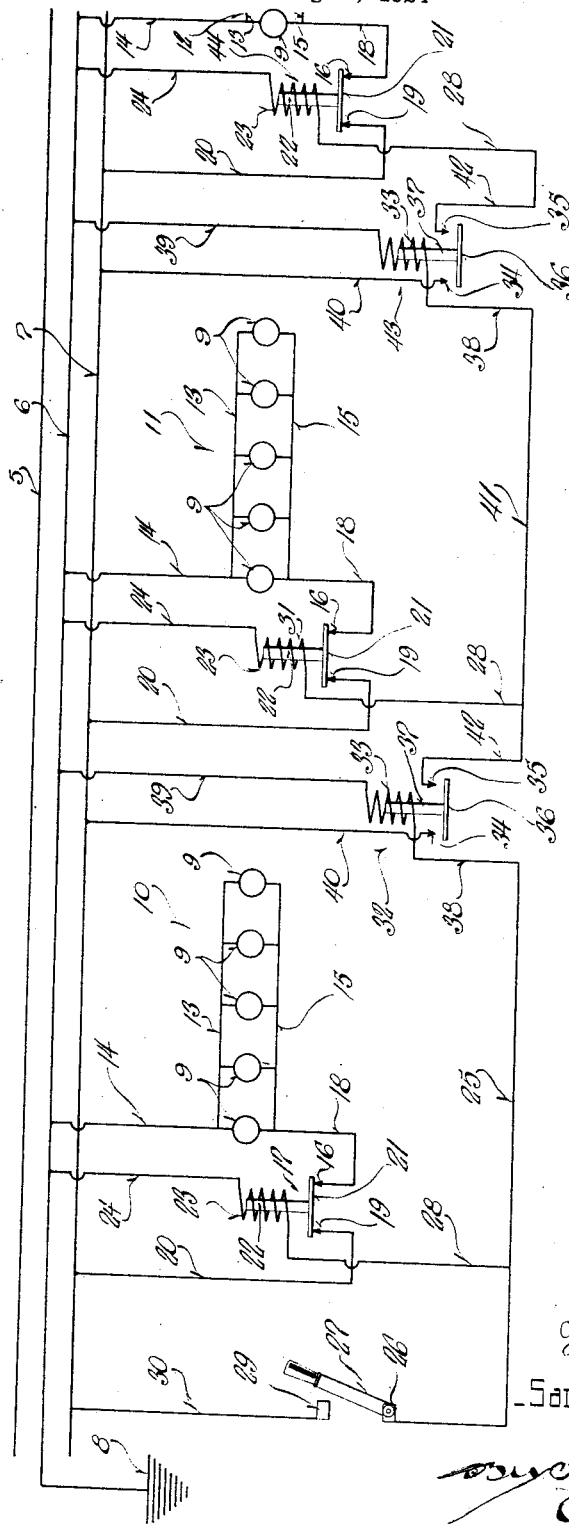
June 4, 1929.

S. B. HOOD

1,716,271

STREET LIGHTING SYSTEM

Filed Aug. 2, 1924



invented by
Samuel B. Hood

by Stra M. Jones
Attorney

UNITED STATES PATENT OFFICE.

SAMUEL B. HOOD, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO LINE MATERIAL COMPANY, OF SOUTH MILWAUKEE, WISCONSIN, A CORPORATION OF WISCONSIN.

STREET-LIGHTING SYSTEM.

Application filed August 2, 1924. Serial No. 729,850.

This invention relates to certain new and useful improvements in street lighting systems and refers more particularly to the control therefor.

5 Street lighting systems of the type heretofore employed have been objectionable in that failure of the control switch circuits resulted in the extinction of the lights, thus proving a decided menace.

10 Having this objectionable feature to the present street lighting systems in mind, this invention has as one of its objects the provision of an improved system, wherein failure of any of the control circuits results in the lights remaining lit, rather than being extinguished, it being preferable to have the lights burn during the day than to be extinguished during the night.

15 Another objectionable feature of the street lighting systems heretofore employed has been that failure of the control circuit of any one section resulted in the failure of all succeeding section controls, the current for the controls being picked up from the preceding section; and this invention has as another object the provision of an improved system wherein the failure of the control circuit of any one section in nowise disturbs the operation of the controls for circuits of the other sections.

20 Attempts have been made to adapt cascade or sectional circuits to street lighting systems, but without success as the amount of copper necessary to carry the required current for actuating the controls has been excessive; and this invention has as a further object the provision of an improved street lighting system wherein the current for the section control circuits is picked up from the line at each section, thus relatively reducing the amount of copper required.

25 It is a still further object of this invention to provide a street lighting system which may be extended over an indefinite area and still be controlled from a single point.

30 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 illustration of a portion of a street lighting system embodying my invention.

35 Referring now more particularly to the accompanying drawing, 5, 6 and 7 designate the main service lines or conductors of a three phase circuit, although it is to be understood that my improved system may be employed in connection with any other type of circuit, one line 6 being connected with a ground 8. As is customary, the lights 9 are arranged in sections or districts which may cover any desired area such as a street square, or a larger territory, and in the drawing three sections or districts 10, 11 and 12, are illustrated, the lights 9 of the section or block 10 having their negative sides connected with a common conductor 13, which is in turn connected with the line 6 by a conductor 14, and their positive sides connected with a common conductor 15 which is in turn connected with the contact 16 of a magnetically actuated section switch 17, to be later described, by a conductor 18.

40 The switch 17 has another stationary contact 19, similar to the contact 16, which is connected with the line 7 by a conductor 20, and the contacts 16 and 19 are adapted to be bridged by a movable contactor 21 which is normally urged to circuit making position. The movable contactor 21 of switch 17 is actuated by an armature 22 connected therewith and adapted to be attracted by a magnetic coil 23 to disengage the contactor 21 from the contacts 16 and 19. One end of the coil 23 is connected with the negative line 6 by a conductor 24 and the other end thereof is connected with a conductor 25 leading to one pole 26 of a master control switch 27 by a conductor 28, the other pole 29 of the master control switch being connected with the line 7 by a conductor 30.

45 The switch 17 may, if desired, be of the type illustrated in Figure 1 of my Patent Number 1,653,283 and is so designed that when the coil 23 is de-energized and consequently exerting no influence on the armature 22, the movable contactor 21 bridges the contacts 16 and 19 and completes the circuit

of the lights 9 of the section 10, from the line 6, through the conductor 20, contacts 19, 21 and 16, conductor 18, conductor 15, through the lights, conductor 13 and through the
 5 conductor 14 to the ground line 6. This circuit results when the master switch 27 is open or when the master switch 27 is closed and the continuity of the circuit through the coil 23 is broken for any reason, as by a break
 10 in the line.

As illustrated, the switch 17 obtains the current for energization of its magnet coil 23 directly from the main line, having its coil connected with the line through the master switch 27. The switches of the succeeding light sections, likewise have their operating coils directly connected with the line through relay switches, as hereinafter described. Interposed between coil 23 of the
 15 switch 31 of the light section or district 11 and the line 7 is a relay switch 32, which works inversely to the switches 17 and 31 in that it is normally open and is held closed by energization of its magnetic coil 33.

The relay switch 32 has two stationary contacts 34 and 35 adapted to be bridged by a movable contact 36 with which an armature 37, arranged within range of the magnetic influence of the coil 33, is connected.
 20 One end of coil 33 is connected with the conductor 25 by a conductor 38 and the other end thereof is connected with the line 6 by a conductor 39. The contact 34 is connected with line 7 by a conductor 40 and the other stationary contact 35 is connected with a
 25 conductor 41 by a conductor 42, the conductor 28 leading from the coil 23 of the switch 31 being electrically connected with the conductor 42.

As many relay switches are provided as there are light sections or districts and in the drawings but two such relays are disclosed, and, as they are identical in construction and operation, the description of the relay
 30 switch 32 will suffice for the last relay switch 43. The circuits of the relay switch 43 and the switch 44 of the light section 12 are identical with those of the other switches, the relay switch contacts 34 and 35 being connected with the line 7 and the coil 23 of the
 35 switch 44 by the conductors 40 and 42—28, respectively.

With switch 27 open, as illustrated in the drawing, the continuity of the circuit in
 40 which the magnetic coils 23 of the switches 17, 31 and 44 are included, is broken, as well as the continuity of the circuits including the magnetic coils 33 of the relay switches; and the lights 9 of the sections or districts are connected with the lines 6 and 7 through
 45 their respective switches as illustrated, the movable contactors 21 bridging the stationary contacts 16 and 19.

When it is desired to extinguish the lights,
 50 switch 27 is closed to connect the magnetic

coils of the switches and relay switches across the lines 6 and 7; the circuits when three sections or districts are employed, as illustrated in the drawing, being as follows:

The coil of the first switch is connected
 55 across the service lines and energized through the switch 27, part of conductor 25, conductor 28, through the magnetic coil 23 and to the line 6 through conductor 24, and the armature 22 is raised by the magnetic influence of
 60 the coil 23 carrying with it the movable contact 21 to break the continuity of the circuit of the lights of section 10 at the contacts 16 and 19.

The first relay switch 32 is also connected
 65 across the service lines and energized, the circuit being through the switch 27, conductor 25, conductor 38, coil 33 and to the line 6 through the conductor 39, energization of coil 33 attracting the armature 37 there-
 70 to and carrying with it the movable contactor 36 to bridge the stationary contacts 34 and 35. Engagement of the movable contactor 36 with the stationary contacts 34 and 35 connects the coil 23 of the switch 31 across
 75 the service lines, the current flowing from line 7, through conductor 40, contacts 34, 36 and 35, conductor 42, conductor 28, through the coil and to line 6 through conductor 24.

The energization of the coil 23 of the
 80 switch 31 attracts its armature 22 thereto carrying with it the contact 21 to separate the contacts 16 and 19 and break the continuity of the circuit of the lights of section 11, as will be readily evident. As the contacts
 85 of the relay switch 32 close, the coil of the next relay switch 43 is connected across the service lines, the circuit being from the line 7, through conductor 40, contacts 34, 36 and 35 of relay switch 32, conductor 42, con-
 90 ductor 41, conductor 38, through the coil 33 thereof and to the line 6 through the conductor 39. As the coil 33 of the relay switch 43 is energized, the armature 37 thereof is attracted thereto carrying with it the con-
 95 tactor 36 to bridge the contacts 34 and 35 and close the circuit of the coil 23 of the switch 44 in the next section through the conductor 40, contacts 34, 36 and 35 of the relay switch 43, conductor 42, conductor 28, and through
 100 coil 23 to the line 6 through the conductor 24. Energization of the coil 23 attracts the armature 22 and disengages the contact 21 from the contacts 16 and 19, breaking the continuity of the circuit of the lights of the sec-
 105 tion 12 to extinguish them.

Additional light sections or districts may be added to the system by continuing the circuit from the conductor 42 of the last relay
 110 switch, employing as many additional light section switches and relay switches as there are added districts or sections, without in any way affecting their operation or necessitating the use of heavy copper for the main-
 115 tenance thereof, inasmuch as the current for
 120

125

operating the adjacent switches is obtained directly from the line.

The failure on the part of any light section switch will result in the burning of the lights of that section, but will in nowise affect the actuation of the succeeding sections, and the failure of any relay switch will render the succeeding one inoperable but will result in the light of the succeeding sections remaining in circuit across the line.

From the foregoing description taken in connection with the accompanying drawing, it will be 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, district or section is employed the same applies equally as well to any other type of device to which this system may be applicable.

What I claim as my invention is:

1. In a street lighting system, service lines, a light, a circuit for connecting said light across the lines, a switch in said light circuit and operable to break the continuity thereof, said switch having an actuating magnet coil, a circuit for connecting the coil of the switch across the line to energize the same and actuate the switch, a master switch included in said coil circuit, a second light, a circuit independent of the first circuit for connecting the second light across the lines, a switch in said second light circuit and operable to break the continuity thereof, said switch having an actuating magnet coil, a circuit for connecting the coil of the second mentioned switch across the lines to energize the same and actuate the switch, a relay switch in the coil circuit of the second switch and operable to complete the continuity thereof, said relay switch having an actuating magnet coil, and a circuit for connecting the coil of the relay switch across the lines through the master switch, whereby closing of the master switch closes the circuits including the coils of the first mentioned switch and the relay switch to energize the same and break the circuit of the first light and complete the circuit of the coil of the second mentioned switch, completion of the circuit of the second mentioned switch coil actuating its switch to break the continuity of the second light circuit.

2. In a street lighting system including a plurality of lights divided into sections, service lines and section circuits for independently connecting the lights of the sections across the lines to illuminate the same, a section control switch interposed in each section circuit and including a movable contactor adapted to, when in one position, break the continuity of the section circuit in which it is interposed, a magnetic coil and an armature connected with the movable contactor

and adapted to be attracted by the magnetic coil upon energization to actuate the movable contactor, a conductor connecting one end of each section control switch magnetic coil with one line, a conductor connecting the other end of the control switch coil of the first section with another line, a master switch interposed in said last named conductor, a relay switch including a pair of stationary contacts, a movable contactor adapted to bridge the stationary contacts, a magnetic coil and an armature connected with the movable contactor and adapted to be attracted to the magnetic coil upon energization thereof, a conductor connecting the other end of the second section control switch coil with one stationary contact of the relay switch, a conductor connecting the other stationary contact of the relay switch with another service line, a conductor connecting one end of the magnetic coil of the relay switch with one service line, and a conductor connecting the other end of the relay switch coil with the conductor of the control switch in the first section in which the master switch is included, whereby closing of the master switch connects the coil of the first section control switch and the coil of the relay switch across the lines to energize the same, energization of the relay switch coil engaging its movable contactor with its stationary contacts and connecting the coil of the second section control switch across the lines.

3. In a street lighting system of the character described, service lines, independent light circuits adapted to be connected across the lines, a switch interposed in each light circuit for opening and closing the same and including an actuating magnet coil, independent circuits for connecting the magnet coils across the lines, a relay switch interposed in each magnet coil circuit except the first, and having an actuating magnet coil adapted to be connected across the lines, and a control switch adapted, upon closing to complete the circuit of the coil of the switch in the first light circuit and connect the coil of the first relay switch across the lines which closes the circuits of the coil of the switch in the following light circuit and of the following relay switch, whereby all of the coils are energized and the light circuits opened.

4. In a street lighting system of the character described, service lines, a light circuit adapted to be connected across the lines, a switch in the light circuit for opening and closing the same and including an actuating magnet coil adapted to be connected across the lines, a primary switch for connecting the magnet coil across the lines, a second light circuit adapted to be connected across the lines independently of the first-mentioned circuit, a switch in the second light circuit for opening and closing the same and includ-

ing an actuating magnet coil adapted to be
connected across the lines independently of
the first-mentioned switch coil, and a relay
switch including a magnet coil adapted to be
5 connected across the lines by the primary
switch, said relay switch connecting the coil
of the second-mentioned switch across the
lines to actuate the switch.

5. In a street lighting system of the char-
acter described comprising service lines, in-
dependent successive circuits adapted to be
10 connected across the lines, switches in each
circuit for opening and closing the same, a

relay switch for each switch except the first,
means whereby actuation of a relay switch 15
causes its associated switch and the succeed-
ing relay switch to function, and a master
switch adapted to cause the first first-men-
tioned switch and the first relay switch to
function whereby actuation of the master 20
switch causes the actuation of all switches
and relay switches.

In testimony whereof I affix my signa-
ture.

SAMUEL B. HOOD.