L. A. HAWKINS.
ELECTRIC LAMP.
APPLICATION FILED MAY 1, 1914.

1,132,008. Patented Mar. 16, 1915.

FIG. 1

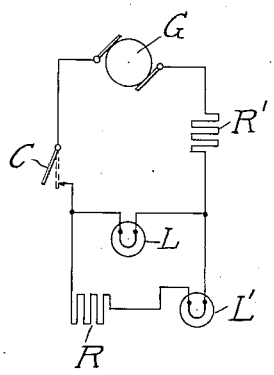
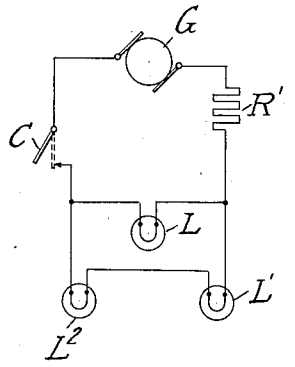


FIG. 2



WITNESSES

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UNITED STATES PATENT OFFICE.

LAURENCE A. HAWKINS, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRIC LAMP.

1,132,008. Specification of Letters Patent. Patented Mar. 16, 1915.

Original application filed November 29, 1907, Serial No. 404,211. Divided and this application filed May 1, 1914. Serial No. 835,722.

To all whom it may concern:

Be it known that I, LAURENCE A. HAWKINS, a citizen of the United States, residing at Schenectady, in the county of Schenectady and State of New York, have invented certain new and useful Improvements in Electric Lamps, of which the following is a specification.

My invention relates to electric lamps, and particularly to means for controlling two lamps so that if one burns out the other becomes illuminated.

One feature of my invention is the provision of means for accomplishing this result without relays or moving parts.

The present application is a division of my co-pending application filed November 29, 1907, Serial No. 404,211, for signal systems, issued July 7, 1914, as Patent No. 1,102,916.

I will describe two arrangements of apparatus embodying my invention, and will then point out the novel features thereof in claims.

In the accompanying drawings, Figure 1 is a diagrammatic view showing one arrangement of apparatus embodying my invention, and Fig. 2 is a view similar to Fig. 1 but showing a modification embodying my invention.

Similar reference characters refer to similar parts in each of the views.

Referring first to Fig. 1, L and L′ are incandescent electric lamps connected in parallel and supplied with current from a source G which, as here shown, is a direct current generator. The circuit for the lamps may be opened and closed by a contact C which may be operated by any suitable means. A resistance R′ is included in the circuit in series with both lamps, and a second resistance R is in series with one lamp L′. If lamps L and L′ are designed to operate on the same voltage, and resistance R′ is the proper value, then when the filaments of both lamps are intact the voltage at the terminals of lamp L will be the normal value, but the voltage at the terminals of lamp L′ will be below normal and of such value that this lamp is not illuminated. If, then, lamp L burns out, the voltage drop across resistance R′ and R decreases because of the decrease of current flow, so that the voltage across the terminals of lamp L′ increases, and if the value of resistance R is correct this voltage will be that at which the lamp is designed to operate so this lamp will then become illuminated. For example, if the voltage of generator G is 550, and if each lamp L and L′ is designed to operate at 110 volts, the value of resistance R′ should be such that when both lamps are intact the drop across this resistance is approximately 440 volts, that is, the value of this resistance should be approximately four times the resistance of the parallel branches comprising lamps L and L′ and resistance R. If the value of resistance R is approximately equal to the resistance of a 110-volt lamp, then when both lamps are intact the voltage at the terminals of lamp L′ will be insufficient to illuminate this lamp; but if lamp L burns out, the drop across lamp L′ will become approximately 110 volts so this lamp will then become illuminated.

It follows from the foregoing that resistance R may be in the form of a 110-volt lamp, as shown in Fig. 2, in which lamp L^2 is substituted for the resistance R of Fig. 1.

My invention is particularly well adapted for use in signals, such for example as signals used for railway signaling. In such cases, lamp L would be the main lamp and lamp L′ would be a reserve lamp which would become illuminated when lamp L burns out. It will be noted that when lamp L is burning, the current which flows through lamp L′ will be sufficient to keep the filament of the latter lamp hot, thus reducing the chance of breakage of this filament due to jarring or vibration.

Although I have here shown only two arrangements of apparatus embodying my invention, it is understood that various changes and modifications may be made therein within the scope of the appended claims without departing from the spirit and scope of my invention.

Having thus described my invention, what I claim is:

1. In combination, two electric lamps and a source of current, a circuit including said lamps in parallel and said source, a resistance in series with one of said lamps, and a second resistance in series with both lamps of such value that the voltage at the terminals of the parallel branches is normally the voltage at which the lamps are designed to

operate, the value of the first-mentioned resistance being such that if the lamp in the other branch burns out the voltage at the remaining lamp will become the voltage at which the lamp is designed to operate.

2. In combination, two electric lamps and a source of current, the normal voltage of each lamp being approximately one-fifth the voltage of said source, a circuit including said lamps in parallel and said source, a resistance in series with one lamp and having a value approximately equal to the resistance of the lamp, and a resistance in series with both lamps and of a value approximately equal to four times the resistance of the parallel branches.

3. In combination, three electric lamps and a source of current, a circuit including one of said lamps in parallel with the other two in series and said source, and a resistance in series with the lamps and having a value approximately equal to four times the resistance of the parallel branches.

4. In combination, two electric lamps and a source of current, a circuit including said lamps in parallel and said source, and resistances proportioned and arranged to give the normal lamp voltage at the terminals of only one lamp as long as both lamps are burning and to give the normal voltage at the terminals of the other lamp if the first burns out.

In testimony whereof I affix my signature in presence of two witnesses.

LAURENCE A. HAWKINS.

Witnesses:
BENJAMIN B. HULL,
MARGARET E. WOOLLEY.

Correction in Letters Patent No. 1,132,008.

It is hereby certified that Letters Patent No. 1,132,008, granted March 16, 1915, upon the application of Laurence A. Hawkins, of Schenectady, New York, for an improvement in "Electric Lamps," were erroneously issued to "General Electric Company, a corporation of New York," as owner of said invention, whereas said Letters Patent should have been issued to *The Union Switch and Signal Company, a corporation of Pennsylvania, as assignee by mesne assignments,* as shown by the records of assignments in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 20th day of April, A. D., 1915.

[SEAL.]

J. T. NEWTON,
Acting Commissioner of Patents.