

(No Model.)

E. THOMSON & E. W. RICE, Jr.  
ELECTRIC INCANDESCENT LAMP.

No. 529,429.

Patented Nov. 20, 1894.

FIG. 1.

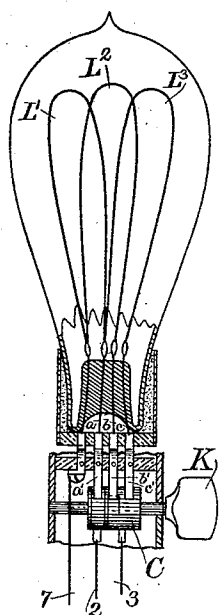


FIG. 2.

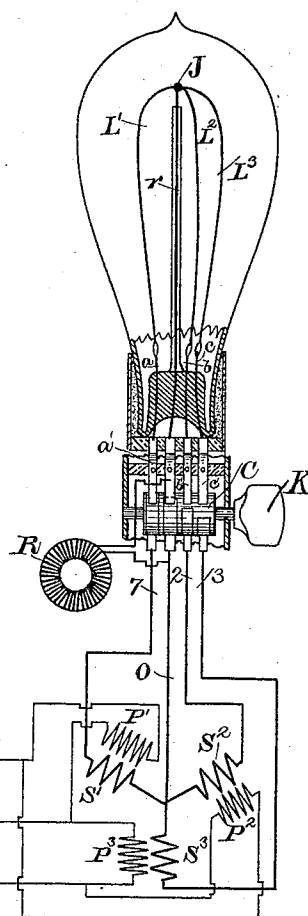
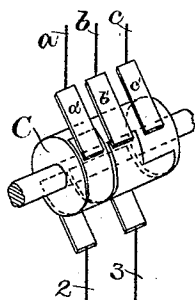


FIG. 3.



WITNESSES.

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# UNITED STATES PATENT OFFICE.

ELIHU THOMSON, OF SWAMPSCOTT, AND EDWIN WILBUR RICE, JR., OF LYNN,  
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## ELECTRIC INCANDESCENT LAMP.

SPECIFICATION forming part of Letters Patent No. 529,429, dated November 20, 1894.

Application filed February 8, 1892. Serial No. 420,676. (No model.)

*To all whom it may concern:*

Be it known that we, ELIHU THOMSON, residing at Swampscott, and EDWIN WILBUR RICE, Jr., residing at Lynn, in the county of Essex, State of Massachusetts, citizens of the United States, have invented certain new and useful Improvements in Incandescent Lamps, of which the following is a specification.

The present invention relates to electric lamps suitable for operation with multiphase currents or the systems in which waves successively lagging or shifted in period are used on three or more lines or mains. Such a system may feed its lamps directly or through multiphase transformers.

The object of the present invention is to provide means whereby an illuminating unit may be obtained, the brilliancy of which may be raised or lowered while preserving the efficiency of the same, and which is especially adaptable to be used with the three-phase systems mentioned.

In the accompanying drawings Figure 1 is a sectional view of a lamp and controlling device adapted for use in our invention. Fig. 2 shows a somewhat modified form showing also circuit connections. Fig. 3 is a separate view of the circuit controller.

In Fig. 1 is shown a lamp having three light giving conductors in the form of three loops attached to four leading-in wires in such manner that two of the wires connect each to a pair of ends of the light giving loops while the other two connect to independent single ends. In the lamp neck or socket are arranged connections whereby these four leading-in connections are carried down, one of the wires having a double connection to the light giving loops, being connected directly to line as at 7, while the other three are individually connected to three separate ends or terminals shown as springs bearing on a commutator or cylinder C under control of the key K, the rotation of which commutator or cylinder C serves as a means of controlling the connection between the other two lines, 2 and 3 and the wires to the lamp.

The commutator, shown separately in Fig. 3, consists of metal plates mounted on the

face of an insulating cylinder to enable connection to be made in the first position from line to wire *a* and to the two lamp loops, connected therewith. Wire 3 may be connected at the same position with both wires *b*, *c*, which are the singly connected wires of the lamp. In this case all three loops  $L'$ ,  $L^2$ ,  $L^3$ , of the lamp receive equal potential and have full brilliancy. On turning the key K so that the commutator moves from this position, the first effect is to rupture connection with wire *c* as shown in Fig. 3. This cuts out the filament or loop  $L^3$  and reduces the candle-power of the lamp to the light emitted from the other two loops. On further moving the commutator C the wire *b* is cut off from connection with wire 3 and this cuts out of connection loop  $L^2$  and leaves loop  $L'$  still in circuit. A further movement of rotation of C disconnects wire *a* from wire 2 and open-circuits the loop  $L^2$  and extinguishes the lamp. A reverse movement relights the lamp in the reverse order.

In Fig. 2 the lamp is modified, in that it is made with three branching loops  $L'$ ,  $L^2$ ,  $L^3$ , with a central common return *r* from the middle point J of the loops giving four wires as before to the lamp. In this case a movement of the key K, assuming that two loops are connected, is made to disconnect the wire leading from  $L^3$  to wire 3. A further movement disconnects loop  $L^2$  from wire 2 leaving loop  $L'$  still burning. A still further movement opens a shunt around a small reactive coil R which is inserted in the connection from the middle wire and the connection O, but shunted by the key K until the movement has been made which opens the said shunt. Finally, the movement of the key K disconnects the wire leading from the free end of the loop  $L'$  to the wire 7 and extinguishes the lamp. A reverse movement first puts the loop  $L'$  into connection with wire 7 and the return wire O has the reactive coil in it. This causes by the reaction the loop  $L'$  to burn at low brilliancy, say one or two candle power and the lamp consumes very little energy. The turning of the key K next cuts out the reactive coil by shunting it and brings

the loop  $L'$  to full brilliancy. A further movement connects wire 2 with the free end of loop  $L^2$  and brings that loop to brilliancy. A still further movement fully lights the lamp by connecting wire 3 and the wire leading from  $L^3$ . In this way four grades of illumination are obtainable together with the extinguishing of the lamp when desired. In working this last form of lamp from a three phase system, the main wires are led to a transformer having three primaries  $P'$ ,  $P^2$ ,  $P^3$  and three secondaries  $S'$ ,  $S^2$ ,  $S^3$ , the secondaries having a common joint which is connected to the wire O while the other free ends are connected to the wires 1, 2, 3, as shown.

By our invention great adjustability and the highest economy are obtainable in the illuminating power of the lamps and a sixteen candle power lamp may be run down in candle power through a number of stages without loss of efficiency, as the filaments are not run at a dull red so as to give much heat with a large consumption of energy and little light.

It is apparent that this invention is available in any case where a plurality of circuits are in proximity to a single lamp, so that one,

two or more of the circuits may be brought into requisition to supply the lamp.

What we claim as new, and desire to secure by Letters Patent, is—

1. The combination with three lines carrying three phase currents, three transforming devices having their primaries respectively connected to said lines and their secondaries connected to three connections and a common return, and three incandescent lamp filaments connected respectively to such connections, and all connected to said common return.

2. The combination with a plurality of circuits carrying multiphase currents, of a plurality of incandescent lamp filaments having separate connections to said circuits and to a common return, a reactive coil in said return, and circuit controlling devices for all said connections.

In witness whereof we have hereunto set our hands this 5th day of February, 1892.

ELIHU THOMSON.

EDWIN WILBUR RICE, JR.

Witnesses:

JOHN W. GIBBONEY,  
AXEL EKSTRÖM.