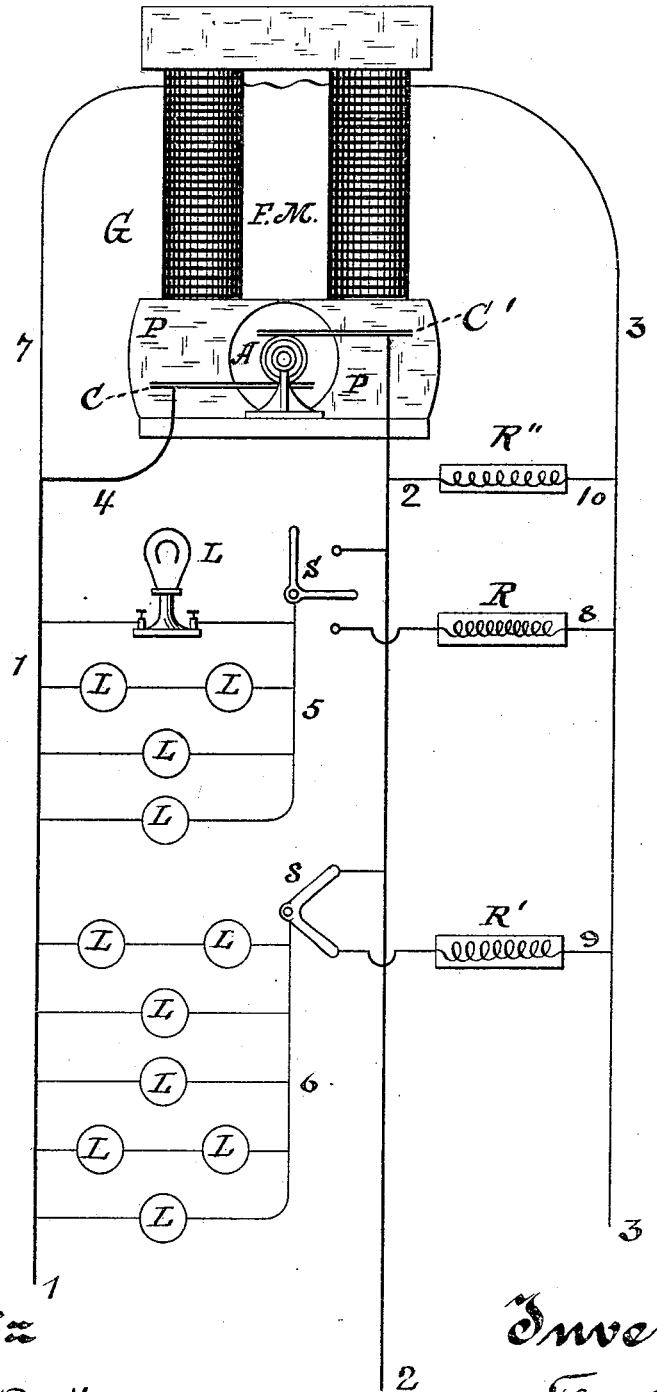
(No Model.)

T. A. EDISON.

SYSTEM OF ELECTRIC LIGHTING.

No. 248,422. Patented Oct. 18, 1881.



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SYSTEM OF ELECTRIC LIGHTING.

SPECIFICATION forming part of Letters Patent No. 248,422, dated October 18, 1881.

Application filed January 31, 1881. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Menlo Park, in the county of Middlesex and State of New Jersey, have invented a new and useful Improvement in Systems of Electric Lighting; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

In systems of electric lighting wherein a large number of lamps are supplied with current from one generator, or from a number of generators at a central station, the amount of energy generated should be proportioned to the demand—that is, as the number of lamps is increased a greater amount of energy should be supplied, and vice versa—in order that the light furnished by each lamp may be kept nearly uniform irrespective of the number in use.

In prior applications I have shown various means and methods of so regulating the generative capacity of the generators, and the invention in this case relates to another method therefor, the object being to furnish means whereby when one or a number of lamps are thrown into circuit the act of so throwing them into circuit shall also automatically, and at the same time, put into operation means whereby the generative capacity of the generator shall be proportionately increased.

The invention is more particularly applicable to systems wherein there are a number of lamps, with their multiple-arc circuits, which may be connected in one sub-system, which it is practicable to control by one circuit-closer, as, for instance, on ships where the system may be divided into sub-systems, one for the cabin, one for the deck, and so on, as may be desired, or in cities, where the street-lamps may be arranged in special circuits or sub-systems. To accomplish this, main conductors, as usual, lead from the generator, and across them, in groups or sub-systems, are a number of multiple-arc or derived circuits containing lamps, one circuit-closer being arranged to control the circuit for one lamp or an entire group.

The field-magnet coils of the generator are in multiple arc to the main circuit, one terminal being connected directly to one of the conductors thereof, while the other terminal is carried to the groups, and from it branches are led, one at each group, arranged to be closed by the circuit-closer controlling the circuit of that group.

In each branch or derived circuit of the field-coils is a resistance so proportioned that as a group is turned on or used only such an amount of current is allowed to flow through the field-coils as will suffice to give or to increase the degree of magnetic intensity of the field-magnets, so as to insure the generation of just enough current to properly supply that group. The act of turning on the group first used closes the circuit to the field-coils, so that the generator is energized just when and to that extent that call is made upon it. If, now, another group be turned on, another multiple-arc or branch circuit for the field-coils is closed. As these circuits to the field-coils are derived circuits the closure of two diminishes the net resistance of the field-coil circuit, permitting a flow of increased current through the field-coils, increasing the magnetic intensity of the field-magnets, and, of course, the generative capacity of the generator. This is illustrated in the drawing, wherein G is a generator composed of the field-magnets F M, with polar extensions P P, between which is the revolving armature A, on whose commutator take the commutator-springs C C′. From the generator lead the main conductors 1 2, across which are the groups of multiple arcs 5 6, containing lamps L. The coils of the field-magnets are connected on one side by a wire, 7, directly to 1 of the main conductors. Upon the other a conductor, 3, leads to the most remote group, from which branch conductors lead at each group, as shown at 8 and 9, each branch having a resistance, R or R′. Each group is provided with a key or switch, S, constructed, as shown, so as to close simultaneously the circuit of its group and a branch circuit to the field. 3 8 S, group 5 1 7, forms one, and 3 9 S, group 6 1 7, a second derived or multiple-arc circuit for the field-magnet coils. If, now, S of group 5 be closed it closes the circuit of 5, and simultaneously

one circuit for F M, giving the proper degree of magnetization to P P for the work to be performed. If, then, S of group 6 be closed it puts into circuit the lamps of that group, closing simultaneously the next derived circuit, thus diminishing the total resistance of the field-circuit, increasing, consequently, the current therein and the degree of magnetization of P P, strengthening the generator to meet the increased demand upon it.

The resistances R R′ are proportioned, as before stated, so that only the needed amount of current to properly energize the field-magnets will be permitted to pass through the field-circuit. As groups are turned off it is evident a reverse operation takes place.

In addition to the multiple-arc circuits of the field described, another, 10, may be used, having a resistance, R″, which circuit is constantly closed, so that a certain definite amount of current may be permitted to pass through the field-coils, but not sufficient to bring the lamps up to the standard candle-power, the closure of a branch circuit sufficing to throw enough current through such coils to bring the light up to the required standard. Only one generator and two groups are shown, as they are sufficient to show the principle of the invention; but it is evident that any needed number of generators and groups or single lamps may be used with the same automatic regulation of generative force.

What I claim is—

1. The combination, with a generator and a lamp or group of lamps, of means for automatically regulating the generative force of the generator by regulating the current, energizing the field-of-force coils simultaneously with controlling the lamp or group of lamps, substantially as set forth.

2. The combination, with a generator and a lamp or group of lamps, of multiple-arc or derived circuits for the field-of-force coils, one such circuit being connected to each group of lamps, substantially as set forth.

3. The combination, with a generator and a lamp or group of lamps, of multiple-arc or derived circuits for the field-of-force coils, one such circuit being connected to each lamp or group of lamps, and controlled by the circuit-closer or switch of such lamp or group of lamps, substantially as set forth.

4. The combination, with a generator and a lamp or group of lamps, of multiple-arc or derived circuits for the field-of-force coils, one for each lamp or group of lamps, and a constant closed multiple-arc or derived circuit, substantially as set forth.

This specification signed and witnessed this 20th day of January, 1881.

THOS. A. EDISON.

Witnesses:
WM. CARMAN,
CHAS. CLARKE.