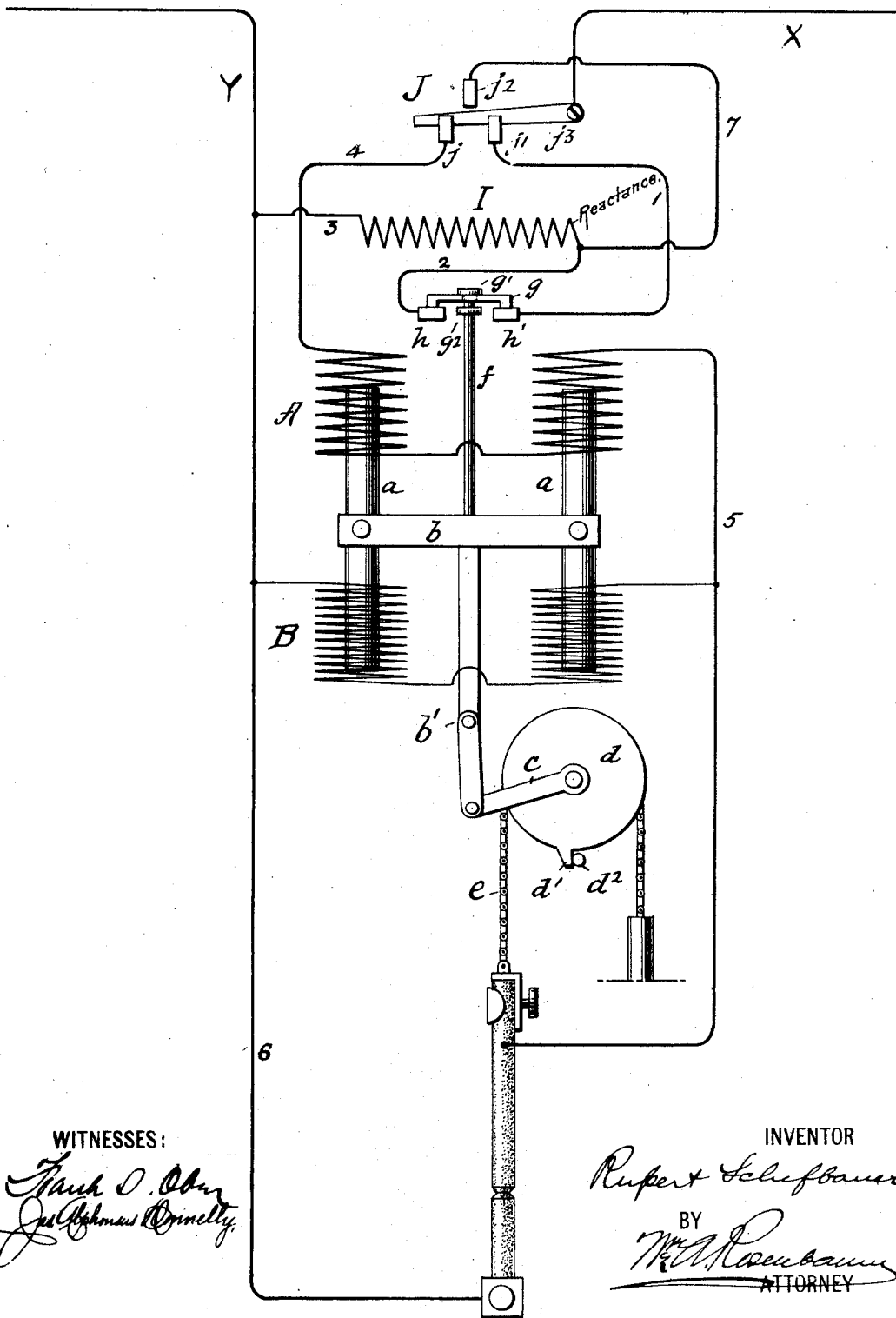


No. 667,584.

Patented Feb. 5, 1901.

R. SCHEFBAUER.  
ELECTRIC ARC LAMP.  
(Application filed May 1, 1900.)

(No Model.)



WITNESSES:

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# UNITED STATES PATENT OFFICE.

RUPERT SCHEFBAUER, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO THE  
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## ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 667,584, dated February 5, 1901.

Application filed May 1, 1900. Serial No. 15,130. (No model.)

*To all whom it may concern:*

Be it known that I, RUPERT SCHEFBAUER, a citizen of the United States, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Electric-Arc Lamps, of which the following is a full, clear, and exact description.

This invention relates to alternating-current arc-lamps.

In alternating-current lighting systems wherein the lamps are connected in series from a constant-potential generator it has been customary to use at the station or at a substation a regulating-transformer for the purpose of maintaining a constant current notwithstanding variations in the number of lamps in operation from time to time. This regulator is at all times a consumer of power, since it is constantly in circuit whether all the lamps in the circuit are burning or not, and its ohmic resistance, self-induction, &c., are always opposing the electromotive force of the line.

It is therefore the object of my invention to provide a lighting system of this character in which the regulator referred to is not an element and the losses accompanying its use are avoided. I accomplish this by providing each lamp with an inductive-reactance controller which is normally out of circuit, but which is brought into circuit to perform its function of maintaining a constant current on the line whenever from any cause a lamp is cut out of circuit. In this way when all lamps are burning no losses are sustained, and when one or more lamps are out only such losses are suffered as the inductive-reactance controllers attached to those lamps create.

My invention consists of the devices and combinations hereinafter described, and particularly pointed out in the claims.

The accompanying drawing illustrates diagrammatically a lamp constructed according to my invention.

The main regulating magnet or solenoid is indicated by A, and the shunt magnet or solenoid by B. These magnets oppose each other in acting upon common cores *a a*. The cores are connected together by a cross-piece *b*, from which a connection *b'* leads to a bail

*c*, pivotally hung on the center of a drum *d*, over which a carbon-carrying chain *e* passes. The drum contains a clutch mechanism, fully described in Letters Patent 636,358, issued in my name November 7, 1899, to which reference is here made. According to the construction of said clutch the lifting of the bail *c* after a slight independent movement causes the drum to rotate with the bail and so lift the upper carbon to strike the arc. When the bail is lowered, the lug *d'* finally strikes the stop *d''*, which releases the clutch and allows the carbon to feed downward by its own weight. The cross-piece *b* also carries an upwardly-extending rod *f*, having loosely fitted thereon a conducting-bridge *g*, located between two stops *g'* and *g''* on the rod, so that the bridge-piece will have a slight movement independent of the rod in order to insure good contact at both ends. The extremities of this bridge-piece are adapted to make contact with two anvils *h* and *h'*.

I indicates an inductive-reactance coil constructed to develop when connected in line a counter electromotive force substantially equal to that consumed by the normal arc.

J is a hand-switch arranged when in one position to bridge two contacts *j* and *j'* and when in the other position to engage with a contact *j''*.

One side X of the main circuit leads to the arm *j''* of the hand-switch. From contact *j'* wire 1 leads to contact *h'*, and from contact *h* a wire 2 leads to one end of the reactive coil I. From the other end of the said coil a wire 3 leads to the other side of the main circuit, (indicated by Y.) From contact *j''* wire 7 leads to wire 2 or that end of coil I to which wire 2 is connected. The shunt-coils B are connected across wires 5 and 6.

The operation is as follows: When the lamp is not burning, the cross-bar *b* is held in its lowest position by gravity and the carbon electrodes are in contact and cut-out *g* closed. Normally when the lamp is in this condition the switch J is in the position shown in the drawing, the coil I being in parallel with magnet A. When the current is turned on, it will at first flow over the following paths— to wit: from wire X to switch-arm *j''*, contact *j'*, wire 1, contact *h'*, bridge-piece *g*, contact

h, wire 2, reactive coil I, and wire 3 to the  
 main conductor Y; also, from contact *j* by wire  
 4 to the main coils A, wire 5, through the car-  
 bons, and wire 6 to the main conductor Y.  
 5 Thus the current will be divided between the  
 inductive-reactance coil I and the main coils  
 A, which will allow less than the normal elec-  
 tromotive force in the coils A; but sufficient  
 magnetism will be developed therein to lift  
 10 the cross-piece *b*, during which movement the  
 independent motion of the bail *c* will be con-  
 sumed and the bridge-piece *g* lifted to open  
 the circuit through coil I. This allows the  
 full current to flow through the magnet A  
 15 and the upper carbon will be lifted at once  
 and the arc established by the full electromo-  
 tive force and the chattering or hammering  
 of the carbons avoided. The action of the  
 lamp in regulating the arc is then the same  
 20 as in other lamps of the same class. In case  
 the lamp is cut out by hand by throwing the  
 switch-arm *j*<sup>3</sup> onto the contact *j*<sup>2</sup> then the cir-  
 cuit of the main magnets A is opened at *j* and  
*j*<sup>1</sup> and they are at once deenergized and the  
 25 inductive-reactance coil I is thrown into the  
 main circuit by wire 7. The counter electro-  
 motive force of self-induction in the coil I  
 overcomes substantially the same proportion  
 of the voltage of the line as was consumed by  
 30 the arc when the lamp was burning, so that  
 upon the removal of the lamp from the cir-  
 cuit the coil I will nevertheless keep the cur-  
 rent constant in the series circuit and the  
 proper operation of the lamps thereon will  
 35 continue. In case the arc becomes abnormally  
 long or a carbon breaks or is entirely con-

sumed the shunt-magnet B is strongly ener-  
 gized and pulls down the cross-piece *b* until  
 the bridging-piece *g* closes the circuit across  
*h* and *h*<sup>1</sup>, thus establishing a path for the cur- 40  
 rent through coil I, deenergizing the magnets,  
 and breaking the arc. It will therefore be  
 seen that under any condition in which the  
 lamp may be cut out the current will be main-  
 tained constant and there will be no losses in 45  
 the circuit when all lamps are burning.

Having described my invention, I claim—

1. In an alternating-current arc-lamp, the  
 combination of the regulating-magnets, an  
 inductive reactance, manually-controlled 50  
 switch, and connections whereby the switch  
 can either cut out the lamp and cut in the in-  
 ductive reactance, or, throw the lamp and  
 inductive reactance into parallel with each  
 other, substantially as described. 55

2. In an alternating-current arc-lamp, the  
 combination of the regulating-magnets, an  
 inductive reactance, a hand-operated switch,  
 connections whereby the switch can either 60  
 cut out the lamp and cut in the inductive re-  
 actance, or, throw the lamp and inductive re-  
 actance into parallel with each other, and an  
 automatic cut-out in circuit with the induc-  
 tive reactance and operated by the regulat- 65  
 ing-magnets, substantially as described.

In witness whereof I subscribe my signature  
 in presence of two witnesses.

RUPERT SCHEFBAUER.

Witnesses:

WM. A. ROSENBAUM,  
 JAS. ALPHONSUS DONNELLY.