

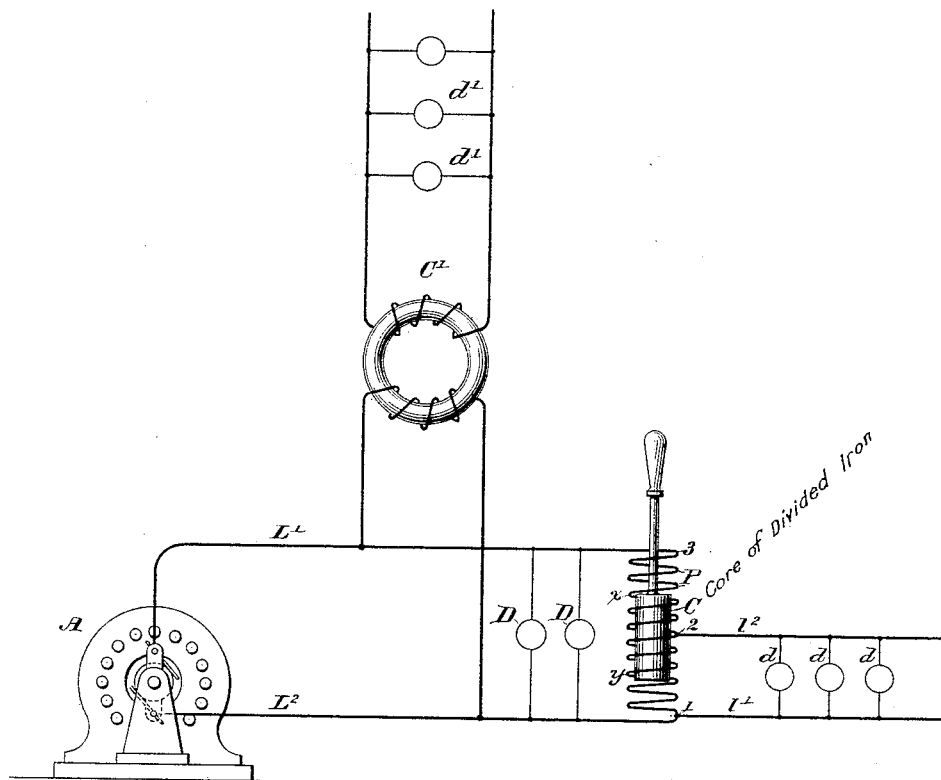
(No Model.)

R. BELFIELD.

REGULATOR FOR ELECTRIC CIRCUITS.

No. 386.956.

Patented July 31, 1888.



Witnesses,

*Carrie C. Ashley.*  
*Edward Thorpe.*

Inventor.

*Reginald Belfield.*

By his Attorneys

*Pope Edgcomb & Terry.*

# UNITED STATES PATENT OFFICE.

REGINALD BELFIELD, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE WESTINGHOUSE ELECTRIC COMPANY, OF SAME PLACE.

## REGULATOR FOR ELECTRIC CIRCUITS.

SPECIFICATION forming part of Letters Patent No. 386,956, dated July 31, 1888.

Application filed October 29, 1887. Serial No. 253,697. (No model.)

*To all whom it may concern:*

Be it known that I, REGINALD BELFIELD, a subject of the Queen of Great Britain, residing at Pittsburg, in the county of Allegheny, in the State of Pennsylvania, have invented certain new and useful Improvements in Regulators for Secondary Electric Circuits, of which the following is a specification.

The invention relates to apparatus employed in connection with electric circuits supplied with alternating, pulsatory, or intermittent currents for regulating the brilliancy at which the lamps included in the secondary circuits of induction-coils or electric converters may be caused to burn.

The object of the invention is to provide convenient means for turning down any desired lamp or increasing their brilliancy as required without causing any material waste or useless consumption of electric current.

The invention consists, generally, in connecting between two distributing-conductors, leading from an electric converter or generator, a coil of insulated wire provided with a movable core of less length than the coil, and in deriving from a portion of the coil a secondary circuit, in which the lamps to be regulated are included. By varying the position of the core with reference to the portion of the coil included in the secondary circuit the brilliancy at which the lights will be operated may be varied.

In the accompanying drawing there is shown in diagram an organization of circuits and apparatus for carrying out the invention.

Referring to the figure, A represents a suitable source of alternating, intermittent, or pulsatory electric currents, and  $L^1$   $L^2$  conductors leading therefrom to a work-circuit. Between the conductors  $L^1$   $L^2$ , at any desired point, there is connected a coil, P, of insulated wire. Within this coil there is included a core, C, formed, preferably, of divided iron in a manner well understood. This core is provided with a handle or other convenient means for adjusting its position with reference to the coil. The core and coil are so organized that their positions may be changed relatively to each other. From one terminal, 1, of the coil P a conductor,  $L'$ , is derived. A second

conductor,  $L''$ , is led from an intermediate point, 2, in the length of the coil P. The conductors  $L'$  and  $L''$  are designed to constitute a secondary electric circuit, and between them are connected translating devices  $d$   $d$ , which are in this instance the lamps to be regulated. These are here shown as being connected in multiple arc.

It is evident that the counter electro-motive force developed in the coil P by reason of the passage of the current from the generator A through the coil, and the consequent magnetization of the core C, will be dependent upon the position of the core within the coil. In the position shown the counter electro-motive force will be developed for the most part in the portion of the coil included between the points  $x$  and  $y$ . Now, as the core is moved toward the point 1 the counter electro-motive force will be developed more and more in the portion between the points 1 and 2, and less between the point 2 and the terminal 3. Therefore, when the core is between the points 1 and 2 the lights  $d$  will burn at their highest brilliancy. When the core is moved toward the point 3, the brightness of the lamps will be diminished, and when the core is entirely withdrawn from between the points 1 and 2 the lamps will be extinguished. The portion of the coil which is at any time out of the magnetic influence of the core will act as idle wire, and consequently there will be no material loss of current. It should be observed, however, that as the core is drawn toward the terminal 3 its secondary circuit becomes less and less perfect, and consequently the current traversing the coil will be gradually diminished, and when it is entirely withdrawn from the section 1 2 practically no current will pass.

This organization of apparatus is especially convenient wherever it is desired to regulate the brilliancy of a portion of the lamps supplied from a given circuit, so as to maintain them at any desired brilliancy, while others, supplied from the same source, are kept at a different candle-power—as, for instance, in a theater the footlights  $d$   $d$  may be lowered while other lamps, D D, included between the conductors  $L^1$  and  $L^2$ , may be caused to burn at a constant candle-power. Other lights may be

included in the secondary circuits of other converters, C', as indicated at *d' d'*.

The regulators may be applied independently of each other to different portions of the same circuit, or a single regulator may be employed for controlling all the lights in a given circuit.

I claim as my invention—

1. The combination, with a source of alternating, intermittent, or pulsatory electric currents, of a single coil of insulated wire included in circuit with said source, translating devices, a circuit including the latter in series with a portion only of said coil, and a single core at all times entirely within the inductive influence of said coil, but movable therein with reference to the last-named circuit, whereby the brilliancy of the lights may be regulated.

2. The combination of a source of alternating, intermittent, or pulsatory electric currents, a coil of insulated wire included in the circuit derived therefrom, a circuit including a portion of said coil, translating devices included in the last-named circuit, and a core movable with reference to said coil, whereby it may be placed within said portion of the coil or withdrawn therefrom to a greater or less

extent into another portion of the same coil at will.

3. A regulator for electric circuits, consisting of a continuous coil of insulated wire and a core movable with reference thereto, whereby it may be caused to occupy different positions therein without being removed therefrom.

4. The combination of a source of electric currents, a coil of insulated wire included in its circuit, translating devices included in series with a portion of the coil and in multiple arc with another portion of the coil, and a core movable within said coil.

5. The combination of a source of electric currents, one or more translating devices included in its circuit, a coil of wire one portion of which is in series with the translating devices and the other in direct shunt upon the translating devices, and a core movable in the coil.

In testimony whereof I have hereunto subscribed my name this 12th day of October, A. D. 1887.

REGINALD BELFIELD.

Witnesses:

JENNIE P. ASHLEY,  
CHARLES A. TERRY.