

(No Model.)

O. B. SHALLENBERGER.  
ADJUSTABLE INDUCTIVE RESISTANCE.

No. 380,945.

Patented Apr. 10, 1888.

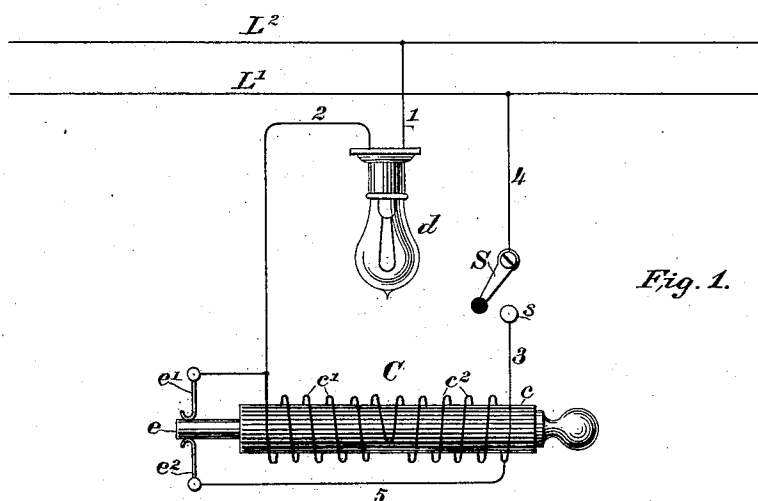


Fig. 1.

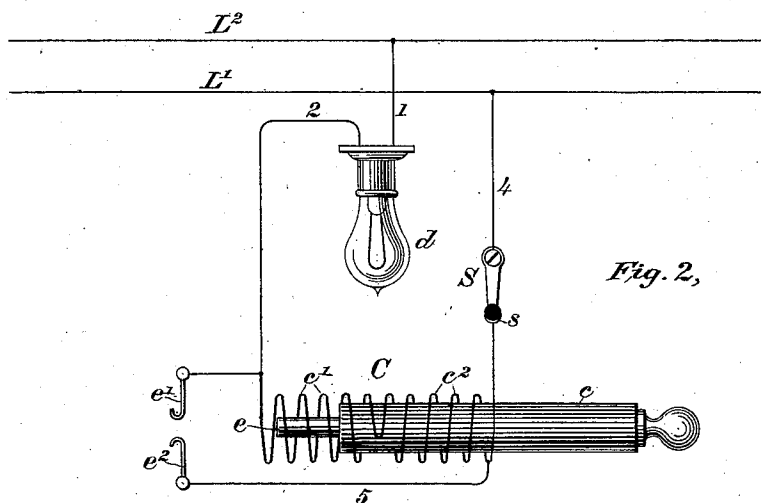


Fig. 2.

Witnesses.  
Geo. W. Breck  
Eugene J. Reilly

Inventor.  
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By his Attorneys  
Pope, Edgcomb & Terry.

# UNITED STATES PATENT OFFICE.

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## ADJUSTABLE INDUCTIVE RESISTANCE.

SPECIFICATION forming part of Letters Patent No. 380,945, dated April 10, 1888.

Application filed September 1, 1887. Serial No. 248,471. (No model.)

*To all whom it may concern:*

Be it known that I, OLIVER B. SHALLENBERGER, a citizen of the United States, residing in Rochester, Beaver county, in the State of Pennsylvania, have invented certain new and useful Improvements in Adjustable Inductive Resistances, of which the following is a specification.

The invention relates to the construction of inductive resistances employed for controlling currents in electric circuits.

The object of the invention is to provide a convenient form of adjustable inductive resistance, the value or effect of which may be increased as the core is withdrawn from the coils.

The invention consists in applying to a core of soft iron oppositely-wound coils of insulated wire, which have equal and opposite effects upon the core when the latter is in its normal position, thus producing no inductive resistance. As the core is withdrawn, however, it is gradually removed from the field of one coil, and thus the value of the other coil greatly increases until its full effect is obtained. The device is further provided with a short-circuiting switch or cut-out, which serves to short-circuit the coils when the core is in its normal position.

The invention will be described in its relation to an electric-light system.

In the accompanying drawings, Figure 1 illustrates the invention, the core being inserted within the two coils; and Fig. 2 shows the core partly removed.

Referring to the drawings,  $L^1$  and  $L^2$  represent the main lines of an electric-light circuit, and  $d$  a translating device capable of being included in circuit between the lines. For this purpose a conductor, 1, leads from the line  $L^2$  to the lamp  $d$ , and a conductor, 2, leading from the lamp is connected with one terminal of the coils  $c'$  and  $c''$  of an inductive resistance, C. The other terminal of the coils is connected by a conductor, 3, with a switch-point,  $s$ , and the switch, S, applied to this point is connected by a conductor, 4, with the line  $L^1$ . The coils  $c'$  and  $c''$  of the inductive resistance are oppositely wound, as shown, and may be of equal value or of an equal number of turns. The core  $c$  is capable of being withdrawn from the coils a greater or

less distance; but as the coils are placed side by side it will be first withdrawn from the coil  $c'$ . It will be seen thus that as it is being withdrawn from the coil  $c'$  the inductive resistance established in the circuit will be gradually increased until its maximum is reached, which will be when the coil  $c'$  no longer has any appreciable opposing effect.

As it is desired in some instances to remove the resistance of the coils  $c'$  and  $c''$  when no inductive resistance is required, a contact-spring,  $e'$ , is connected with the conductor 2, and a second contact-spring,  $e''$ , is connected by a conductor, 5, with the conductor 3. When, therefore, the core is inserted within both coils,  $c'$  and  $c''$ , a circuit-closing point,  $e$ , passes between the springs  $e'$  and  $e''$ , and thus completes the connections of a short-circuit around the coils. As the core is withdrawn from the coils, however, the point or pin  $e$  is withdrawn from the springs, thus interrupting the connections of the short-circuit.

In Fig. 1 the switch S is shown as being open, and the lamp  $d$  is thus out of circuit. In Fig. 2 the switch S is closed, and at the same time the inductive resistance is withdrawn partially from the coil  $c'$ . By means of this resistance the brilliancy at which the light  $d$  will burn may be regulated, thus affording a convenient means for turning down the lamp.

I claim as my invention—

1. The combination, with an incandescent electric lamp and a circuit supplying currents thereto, of an adjustable inductive resistance for turning down the lamp, consisting of magnetizable material and opposing coils of wire wound about the same, both of which are normally included in circuit, substantially as described.

2. The combination, with an incandescent electric lamp, of opposing coils placed in the circuit thereof in series, a core of soft iron applied to said coils and acted upon by currents traversing the same, and means for withdrawing the core a greater or less distance from one of said coils.

3. The combination, with an incandescent electric lamp, of opposing coils placed in the circuit thereof, a core of soft iron applied to said coils and acted upon by currents travers-

ing the same, means for withdrawing the core  
a greater or less distance from one of said coils,  
a short-circuiting device or shunt around said  
coils, and a circuit-closer completing the con-  
5 nections of the same when the core is within  
both coils.

4. An adjustable inductive resistance con-  
sisting of opposing coils connected in series in  
an electric circuit, a core of soft iron acted  
10 upon thereby, and means for withdrawing the  
core from one of the coils, thereby increasing  
the inductive resistance, substantially as de-  
scribed.

5. The combination, with two opposing  
15 coils and a core of soft iron acted upon there-

by, and capable of being withdrawn a greater  
or less distance from one of the coils while  
still remaining under the inductive influence  
of the other coil, of a short-circuiting device  
about said coils, closed by said core when the 20  
latter is in the inductive field of both of said  
coils.

In testimony whereof I have hereunto sub-  
scribed my name this 4th day of August, A.  
D. 1887.

OLIVER B. SHALLENBERGER.

Witnesses:

W. D. UPTGRAFF,  
L. B. STILLWELL.