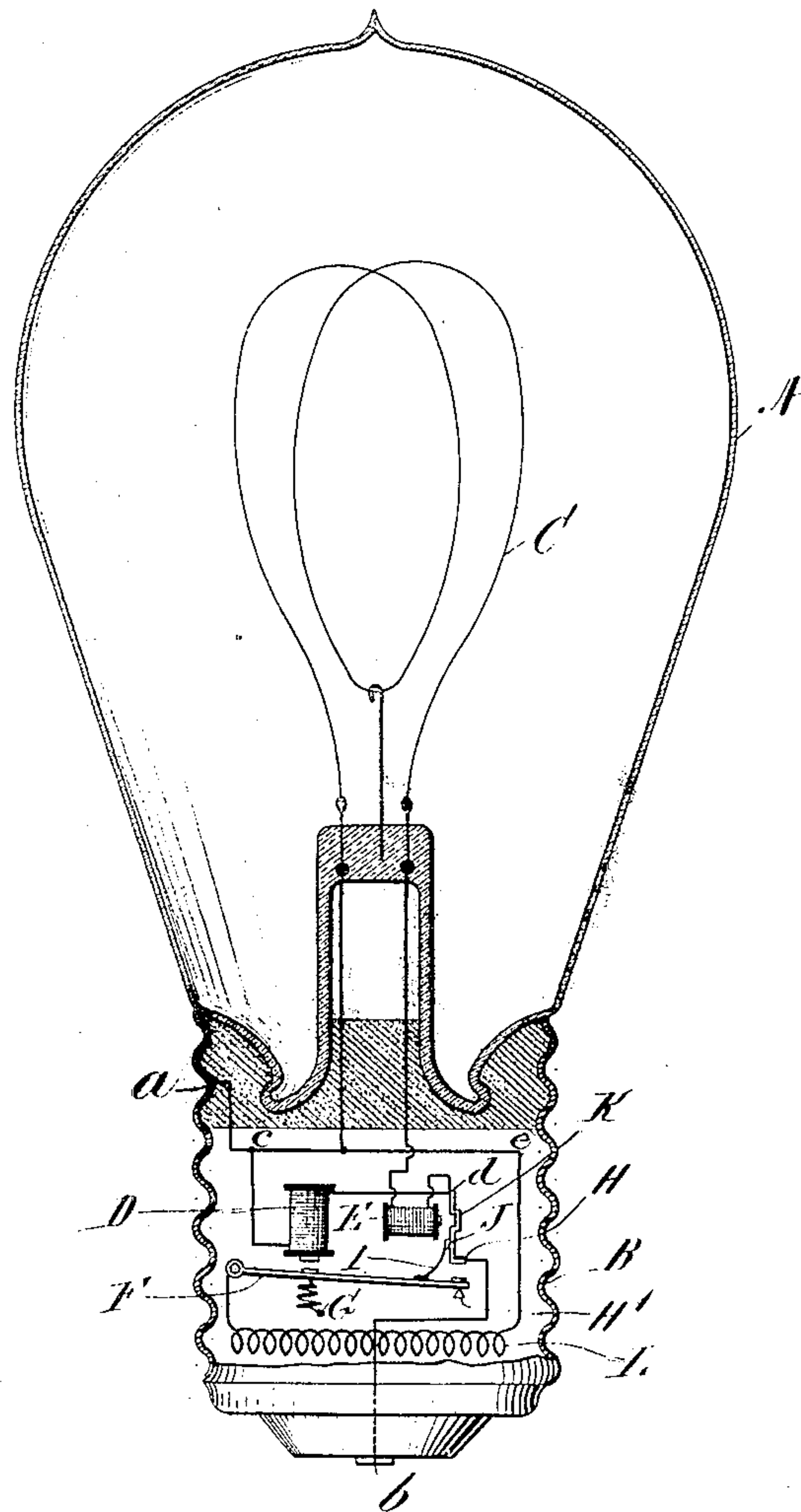


C. C. WOODWORTH.  
INCANDESCENT LAMP.  
APPLICATION FILED JULY 1, 1908.

925,790.

Patented June 22, 1909.



WITNESSES =

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Patrick J. Conroy.

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# UNITED STATES PATENT OFFICE.

CHARLES C. WOODWORTH, OF PORTLAND, OREGON.

## INCANDESCENT LAMP.

No. 925,790.

Specification of Letters Patent.

Patented June 22, 1909.

Application filed July 1, 1908. Serial No. 441,286.

*To all whom it may concern:*

Be it known that I, CHARLES C. WOODWORTH, a citizen of the United States, and a resident of Portland, in the county of Multnomah and State of Oregon, have invented a new and useful Improvement in Incandescent Lamps, of which the following is a specification.

My invention relates to incandescent lamps adapted to be connected in series with a high potential circuit.

The object of my invention is to provide an incandescent lamp which may be connected in series with a high potential distribution system and which is so constructed and arranged that, in case of a burn-out, the line will not be opened and the other lamps will remain at or near their normal voltage.

With this object in view my invention consists of an incandescent lamp which may be of the ordinary type provided with an automatic cut-out in its base and so constructed as to connect a compensating resistance in series with the power circuit and in shunt with the lamp filament when the latter for any reason is ruptured as in case of a burn-out.

My invention also consists in magnetically operated means for so connecting the said compensating resistance in series with the power circuit and in shunt with the filament and at the same time short-circuiting said magnetically operated means so that all the power circuit current passes through the compensating resistance.

My invention further consists in means for locking in predetermined position the moving parts of said automatic cut-out and in magnetically operated means for releasing said moving parts and placing them in their original position.

In the drawing which accompanies and forms a part of this specification, the figure represents an incandescent lamp partly in section constructed in accordance with the present invention.

In the figure, A represents an incandescent lamp of the ordinary type, for example, an "Edison lamp" provided with a filament C and secured in the usual manner to the metallic base B. The base of the usual incandescent lamp is filled with plaster of paris or other material in which the leads from the filaments to the lamp terminals are embedded. I have found that the space occupied by said material in the base of the

lamp is ample to carry the automatic cut-out and resistance hereinafter described; but it will be understood that I do not limit myself to a lamp of the ordinary type carrying such devices in its base, except as specified in the appended claims.

In the specific example which I have illustrated for the purpose of more fully disclosing my invention, D represents an electromagnet connected in series with the lamp terminals *a b* and in shunt with the filament C, the points *c d* indicating the juncture of the terminals of the filament with the terminals of said magnet D. The magnet D is wound to have the resistance higher than that of the filament, so that during the normal operation of the lamp, the said magnet is not sufficiently energized to attract its armature F which is normally held against its back-stop H' by the spring G.

E represents an electromagnet connected in series with the lamp terminals *a b* and in series with the filament C.

L is a compensating resistance which preferably is equal to the resistance of the lamp filament, and as shown, said resistance has one terminal connected to the armature F of the magnet D and the other terminal connected to the terminal *a* of the lamp.

K represents a conductor of any suitable shape provided with a notch or other retaining device adapted to hold the armature J which is connected by the spring I to the armature F and which is insulated from the latter as shown. The lower end of the member K serves as a front-stop H to the armature F.

It will be understood of course that the several elements above described are secured in any suitable manner to the base of the lamp and that they may be insulated therefrom in any of the usual ways if necessary.

The operation is as follows: When there is a circuit through the filaments, the current passes from the lamp terminal *a* through the filament and then through the magnet E to *d* K H and finally to the lamp terminal *b*. Inasmuch as the armature J of the magnet E is outside the field of force of the latter during the normal operation of the lamp, it follows that said armature is normally inactive. Should the circuit through the filament be opened as by disruption due to burn-out or other cause, the magnet D will carry all the current of the power circuit and will attract its armature



F to its front-stop H, said armature being retained in its attracted position by the armature J which is sprung into the notch K, thereby connecting across the terminals 5 *c d* of said magnet the compensating resistance L, so that the line current now passes through said resistance by the path *a c e L F H b* and the continuity of the power circuit as well as the normal voltage of the re-  
 10 maining lamps is maintained. When a burn-out has been discovered, the lamp is replaced by a new lamp and may be opened and have its filament renewed. When such renewed lamp is connected in circuit, a cer-  
 15 tain amount of current flows through the filament and its serially connected magnet E by the path *a c C E d H b* and energizes said magnet E, thereby causing the attraction of the armature J and the release of the  
 20 armature F to its normal position, thereby cutting the resistance L out of the power circuit and sending the entire current through the filament.

I do not wish to be understood as limiting  
 25 myself to the apparatus and arrangement of circuits above described, inasmuch as it will be apparent that many modifications may be made in both the apparatus and circuit ar-  
 rangements without departing from the  
 30 principle of my invention.

I claim:

1. The combination with an incandescent lamp of a resistance mounted in the base thereof, an electromagnet connected in shunt  
 35 with the lamp filament, a connection from the armature of said magnet to said resistance, a connection from the front-stop of said armature to one of the lamp terminals, an electromagnet in series with the filament  
 40 and the lamp terminals, and an armature cooperating with the last mentioned magnet and secured to but insulated from the first mentioned armature.

2. The combination with an incandescent  
 45 lamp of a resistance mounted in the base thereof, an electromagnet in series with the

lamp terminals and in shunt with the fila-  
 ment, an armature cooperating with said magnet and arranged to connect said resist-  
 50 ance in series with the lamp terminals and in shunt with said magnet and filament, means for locking said armature in its at-  
 tracted position and means for releasing said armature.

3. The combination with an incandescent  
 55 lamp of a resistance mounted in the base thereof, an electromagnet in series with the lamp terminals and in shunt with the fila-  
 ment, an armature cooperating with said magnet and arranged to connect said resist-  
 60 ance in series with the lamp terminals and in shunt with said magnet and filament, means for locking said armature in its at-  
 tracted position and magnetically operated means for releasing said armature. 65

4. The combination with an incandescent  
 lamp of a resistance substantially equal to the resistance of the lamp filament mounted  
 70 in the base of the lamp, an electromagnet of higher resistance than the said filament con-  
 nected in series with the lamp terminals and in shunt with said filament, an electromag-  
 net connected in series with said terminals and in series with said filament, a connection  
 75 from one of said lamp terminals to one terminal of said resistance, a connection from the other terminal of said resistance to the  
 armature of the first mentioned magnet, a connection from the front-stop of said arma-  
 80 ture to the other of the said lamp terminals, a spring armature connected to but insulated from the first mentioned armature, and  
 means for securing said spring armature in predetermined position within the field of  
 85 force of the last mentioned magnet.

In testimony whereof, I have hereunto  
 subscribed my name this 8th day of June,  
 1908.

CHARLES C. WOODWORTH.

Witnesses:

O. S. BRYANT,  
 F. C. WHITTEN.