

(No Model.)

W. E. NICKERSON.  
INCANDESCENT ELECTRIC LAMP.

No. 503,770.

Patented Aug. 22, 1893.

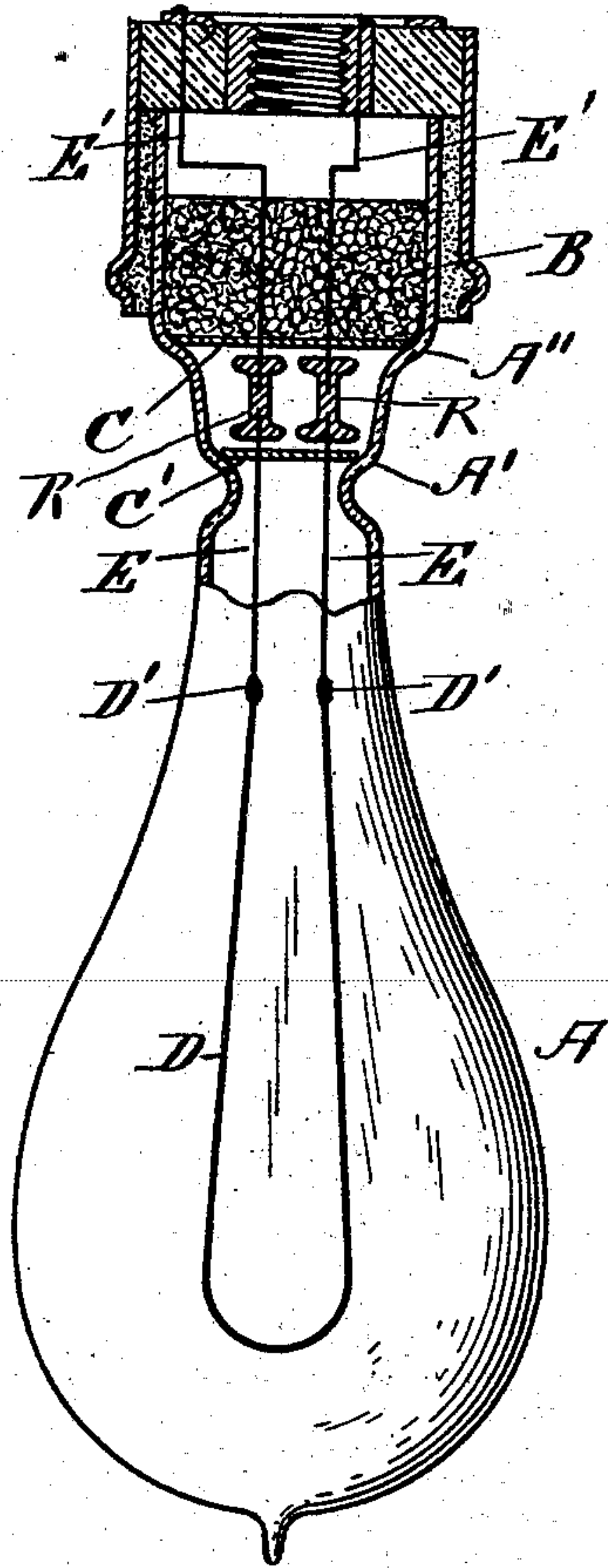


FIG. 1.

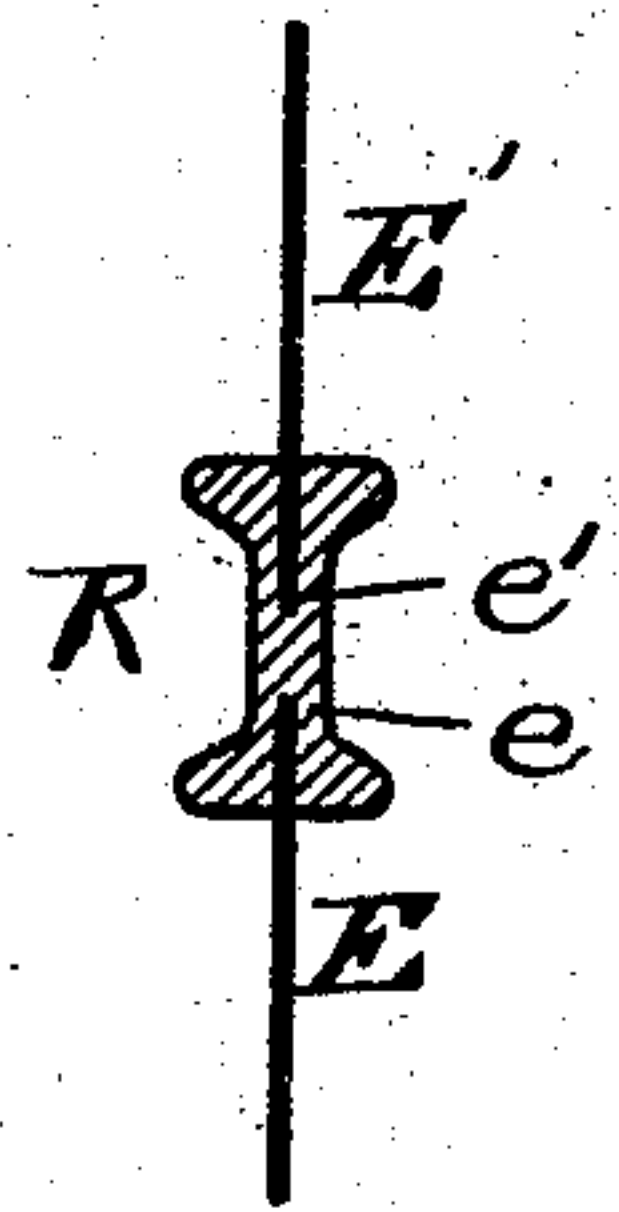


FIG. 2.

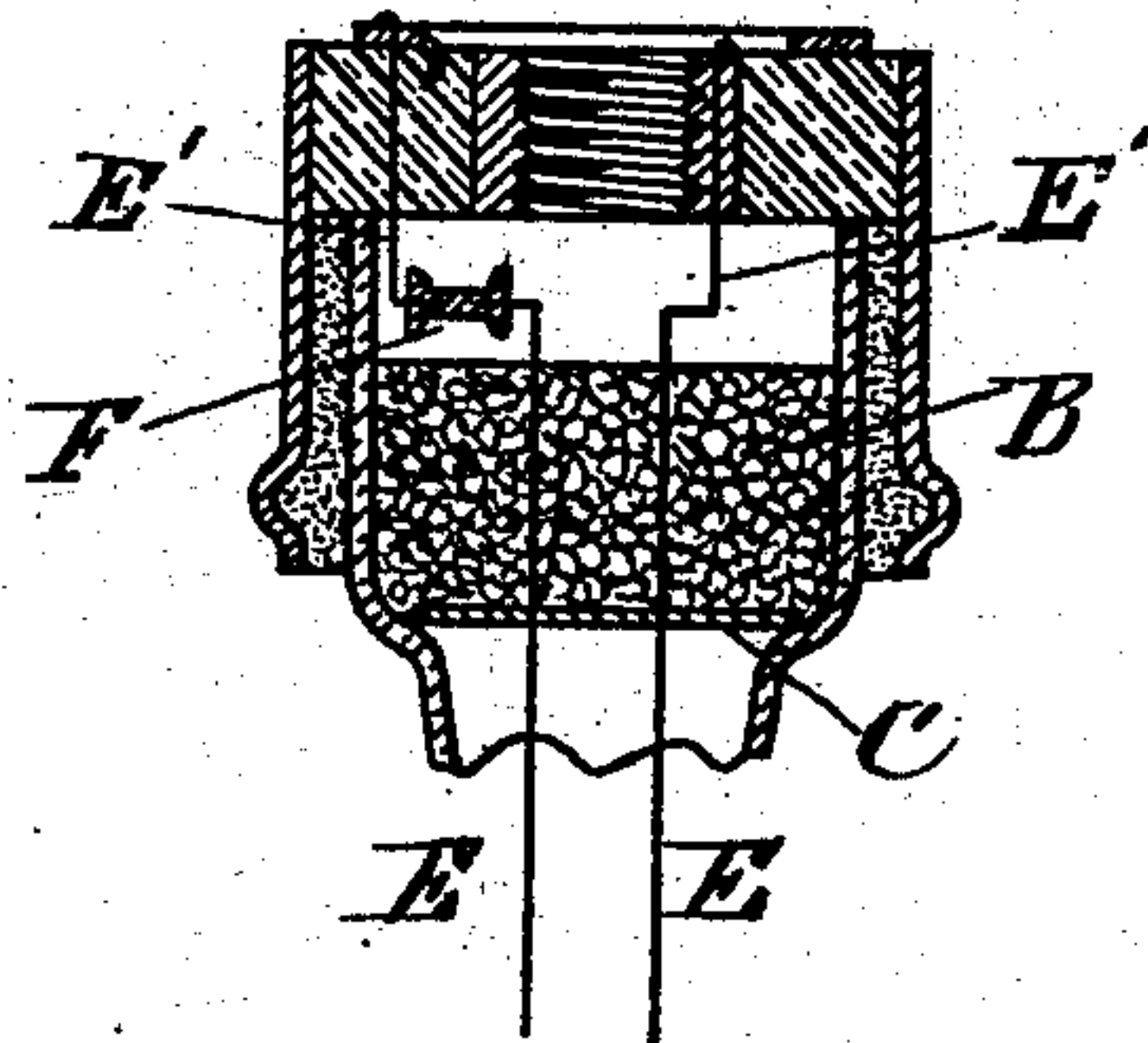


FIG. 3.

WITNESSES  
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# UNITED STATES PATENT OFFICE.

WILLIAM EMERY NICKERSON, OF CAMBRIDGE, MASSACHUSETTS.

## INCANDESCENT ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 503,770, dated August 22, 1893.

Application filed July 3, 1893. Serial No. 479,505. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM EMERY NICKERSON, of Cambridge, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Incandescent Electric Lamps, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to that class of incandescent electric lamps in which a fusible cement is used for closing the neck of the bulb air-tight, more especially when the cement used, is composed wholly or in part of substances of organic origin.

The object of my invention is, in case a lamp is defective, to prevent the generation of excessive heat, by cutting out the filament from the electric circuit when a certain temperature has been reached. This object I attain by means of the device illustrated in the accompanying drawings, in which—

Figure 1, shows in vertical section a lamp embodying my device. Fig. 2, shows a detail enlarged. Fig. 3, shows a modification.

In the drawings, A, Fig. 1, is the globe of an incandescent electric lamp having shoulders at A' and A''. The neck of the lamp is closed air-tight, and the leading-in wires supported, by the plug of fusible cement B, which rests upon the disk C. The disk C rests upon the shoulder A''.

D is the filament, attached to the leading-in wires E E', E E' at D' D'. C' is a heat reflecting disk, resting upon the shoulder A', and adapted to reflect back the heat of the filament, and prevent thereby, the softening of the cement plug B.

R R are bodies of fusible metal, into each end of which, the leading-in wires E E' penetrate a short distance, but do not extend entirely through. This construction is shown more fully in Fig. 2, which shows one of the fusible metallic bodies in vertical section, each part of the leading-in wires terminating at the points *ee'* respectively. These bodies are best attached to the wires by being cast upon the ends thereof. Their use, is to break the electric circuit by fusing, whenever a temperature sufficiently above the normal has been reached within the lamp, and thereby prevent the blowing out or collapsing of the

lamp bulb. These bodies may be made of an alloy, consisting of tin, lead and bismuth, or other metals, in such proportion as to fuse at a temperature of from 200° to 300° Fahrenheit or as desired. They also act incidentally as radiators, whereby the heat of the leading-in wires is taken up and dispersed by radiation, instead of being conducted into the cement plug.

Instead of the fusible metal section being inserted in the circuit as above described, it may be placed on a wire at a point between the top of the cement plug and the brass cap by which the lamp is surmounted as shown at F Fig. 3.

If a cement which is capable of evolving a carbonaceous gas when subjected to excessive heat, is used in closing the neck of an incandescent electric lamp bulb, the latter may under certain circumstances become filled to a greater or less extent with carbonaceous gases. When this occurs, the filament is built up or "treated," by the deposition of carbon upon its surface, through the decomposition of the gases. In consequence of this much more current is allowed to pass through the lamp and an amount of heat may be produced, sufficient to liquefy the cement, allowing it to run into the lamp, or even heat enough may be generated to soften and destroy the bulb. The above described action may take place, for instance, when a lamp of the class referred to, leaks very slightly when new, and afterward on being put into operation becomes tight. The action then may be as follows:—The small amount of air which has leaked into the lamp causes it, by convection and otherwise, to become hot. The abnormal amount of heat thus generated, softens the cement and allows it to close up the original leak. If the heat has been sufficient to allow a small portion of the cement to flow into the lamp, or to generate gas, then a treating or building up of the filament takes place, whereby its cross section is increased and its resistance diminished. An increased amount of current is thus allowed to flow through the filament, which still further raises the temperature of the lamp, generating more gas, which in turn further builds up the filament, allowing still more current to pass, and so on



until the lamp may attain a temperature sufficiently high to fuse the cement and allow it to run into the lamp, or to soften the glass of the bulb, either causing it to blow out or collapse, according as the pressure of the gas within the lamp, is greater or less than that of the temperature.

The gist of my invention consists in placing in circuit on the leading-in wires of an incandescent lamp, a section of a fusible metal, whereby the current will be cut off by the fusion of this metal, before a temperature sufficiently high has been reached within the lamp, to blow out or collapse the bulb, when from any cause gas or air has destroyed the vacuum in the lamp globe.

I claim—

1. In an incandescent electric lamp, in which the neck of the lamp bulb is closed air-tight by a fusible cement, a section of fusible

metal in the circuit as described, whereby the electric current is cut off by the melting of said metal, if the lamp becomes overheated, substantially as and for the purpose set forth.

2. In an incandescent electric lamp, the combination of a glass globe A having a neck adapted to be sealed air-tight by a fusible cement, filament D, leading-in wires E E', E E', cement plug B, and section of fusible metal R in circuit, adapted to melt and break said circuit if the lamp becomes overheated, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 1st day of July, A. D. 1893.

WILLIAM EMERY NICKERSON.

Witnesses:

FRANK G. PARKER,  
EDWARD S. DAY.