(No Model.)

H. S. MAXIM.

ELECTRIC LAMP.

No. 252,392. Patented Jan. 17, 1882.

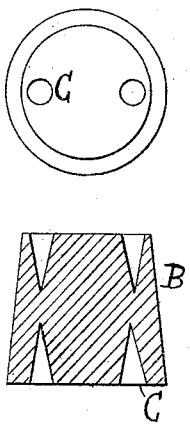

Fig. 2

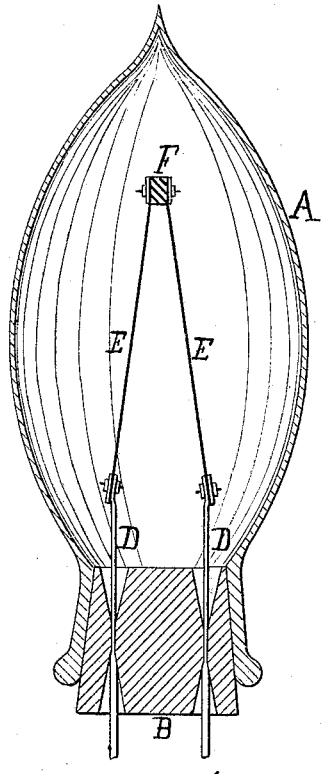

Fig. 1

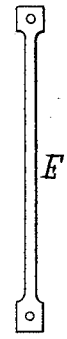

Fig. 3

Witnesses
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UNITED STATES PATENT OFFICE.

HIRAM S. MAXIM, OF BROOKLYN, ASSIGNOR TO THE UNITED STATES ELECTRIC LIGHTING COMPANY, OF NEW YORK, N. Y.

ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 252,392, dated January 17, 1882.

Application filed March 25, 1881. (No model.)

To all whom it may concern:

Be it known that I, HIRAM S. MAXIM, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Electric Lamps, of which the following is a specification.

The object of my invention is to lessen the cost, without impairing the efficiency, of incandescent lamps, and this I effect by the methods employed in their manufacture, which I have hereinafter more fully set forth and claimed.

The two most important steps in the production of the lamps above mentioned are the manufacture of the carbon-conductors and the sealing of the metallic wires supporting the same into the glass. These two steps have heretofore been accomplished in substantially the following manner:

A loop or strip of the desired material is first cut out, and this is carbonized either in its original shape or while bent to the form of a loop, with the object of obtaining as large a radiating surface as possible within small compass. This entails considerable difficulty and expense, as the loops are liable to warp and break.

Secondly, the metal conductors are sealed into the glass either directly or by the interposition of a metallo-vitreous cement, such as that described in Patent No. 236,833; but this necessarily involves the delicate operation of glass-blowing, and requires the highest order of skilled workmanship for its successful attainment.

With a view to avoid these difficulties in the manufacture of incandescent lamps I have devised the following methods of producing a complete lamp at a greatly reduced cost.

To form the conductor, I first cut out separate straight strips of paper or other material with broadened ends and of about one-half the usual length. These I carbonize in the usual manner, and join two of them in the form of a V to opposite sides of a small block of metal or carbon by nuts and screws, or by any of the known forms of clamps used for such purposes. The free ends may then be united to the metal supporting-conductors of any incandescent lamp, and the conducting medium thus formed from the amount of radiating-surface presented will answer all the requirements of the horse-shoe-shape loops and M's now generally employed.

To complete the sealing, I have adopted the following method: I cast in a mold or die a glass stopper, nearly perforated at two points by conical indentations formed in the course of molding on opposite sides of the stopper. Then, by a drill applied in the indentations, I form comparatively small perforations completely through the glass. Through the holes thus obtained the small ends of slightly-tapering copper wires are drawn, and the spaces around the wires filled with powdered gum-copal. The whole is then subjected to a high temperature, and the wires drawn through until they completely and tightly fill the perforations. In being drawn through the glass, as through a die, the wires carry along with them a small quantity of the copal, which forms, when cold, an absolutely tight joint. The stopper, when completed by the addition of a carbon-conductor, which is united to the ends of the wires, may be fitted into the open end of an ordinary lamp-globe by a ground-glass joint, which, for additional security, may have a thin film of cement or gum between its faces.

The drawings hereto annexed illustrate the lamp complete and its several component parts.

Figure 1 is a view of the lamp entire. Fig. 2 is a plan and section view of the glass stopper; and Fig. 3 represents one of the carbon conductors.

A is the lamp globe, with a neck, into which is fitted by a ground joint, either with or without cement, the stopper B.

C C are the indentations, as described, formed in the process of molding, and which serve as receptacles for cement or gum when it is desired to employ the same as an additional security against the access of air into the globe.

D D are the copper conductors drawn through the stopper, and to which are attached the free ends of the conductors E E, the other ends of which are united, as shown, by clamps or otherwise, to F, which is a small mass of metal or carbon of such degree of conductivity as not

to become heated to incandescence by the passage of the current.

It may be observed that the strips F, instead of being made as described, may be composed of any of the carbonaceous compounds used in incandescent lighting.

A lamp thus made is both durable and cheap, and may be constructed by any ordinarily-skilled workman. The exhaustion of the confined air is effected as in other forms, and much that involves the art of glass-blowing is dispensed with in its manufacture.

I am aware that a straight carbon in an incandescent lamp is not broadly new; nor do I claim, broadly, herein a ground-glass stopper containing the conducting-wires; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. A carbon conductor for electric incandescent lamps composed of independent straight strips or filaments of carbon, the ends of which are connected respectively to a small mass of conducting material and to the supporting-conductors, as set forth.

2. The combination, with the globe of an incandescent electric lamp, of an air-tight stopper of glass having partly conical perforations and conducting-wires of ductile metal contained therein, as set forth.

3. The method herein described of sealing the metallic conductors of an incandescent lamp, which consists in drawing under a high temperature the tapering ends of the same through perforations in a glass stopper, either with or without the addition of a fusible gum, as set forth.

4. The ground-glass stopper B, having metallic wires D D embedded therein, and the conical indentations C C, for retaining a suitable cement or gum.

In testimony whereof I have hereunto set my hand this 23d day of March, 1881, and in the presence of two subscribing witnesses.

HIRAM S. MAXIM.

Witnesses:
JAS. C. ROBINSON,
A. M. AKE.