

(No Model.)

L. B. MARKS.
ELECTRIC ARC LAMP.

No. 521,936.

Patented June 26, 1894.

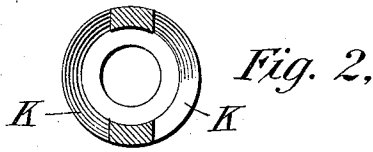


Fig. 1,

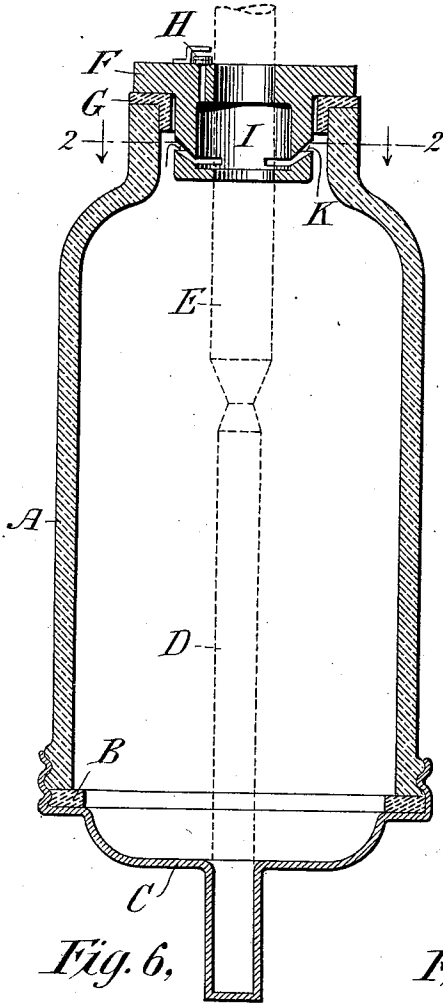


Fig. 3,

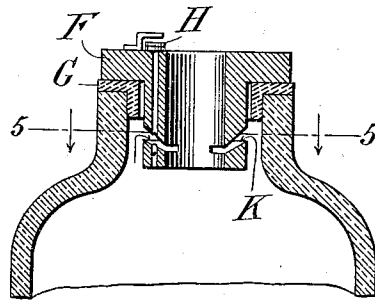


Fig. 4,

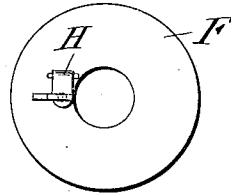


Fig. 5,

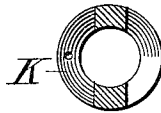


Fig. 6,

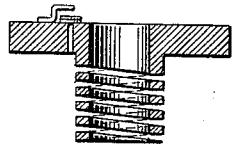


Fig. 7,

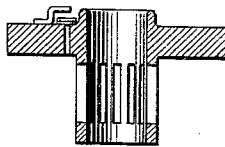
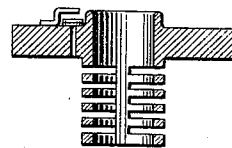


Fig. 8,



Witnesses
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By his Attorneys
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Inventor

UNITED STATES PATENT OFFICE.

LOUIS B. MARKS, OF NEW YORK, N. Y., ASSIGNOR TO THE ROYAL ARC
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ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 521,936, dated June 26, 1894.

Application filed March 30, 1894. Serial No. 505,665. (No model.)

To all whom it may concern:

Be it known that I, LOUIS B. MARKS, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Electric-Arc Lamps, of which the following is a specification.

This invention relates to electric arc lamps of the incandescent arc type, such as described in Patents Nos. 503,538 and 503,539, issued to Louis E. Howard, August 15, 1893.

The object of the invention is to increase the life of the electrodes, thus reducing the number of carbons required for any definite period of service and reducing the number of times in which the lamp requires trimming during such period.

In lamps of the type referred to the arc is surrounded by a transparent or translucent inclosure so arranged that the gases developed by the action of the arc may escape, but that the external air finds difficult access to the inclosure. In the Howard type of lamp in order to practically exclude all air from the inclosure it is necessary to have a comparatively close fit between the carbons and the walls of the feed opening. With commercial carbons it is difficult to insure a free feed of the movable carbon without allowing an appreciable amount of air to enter the inclosure by reason of irregularities in the carbons, namely, that they may vary slightly in diameter, or may be irregular in contour, or may not be perfectly straight, or have other peculiarities by which in order to insure safe transit the feed opening would not permit free transit of the carbon if a close fit. By making the feed opening large enough to permit easy transit of commercial carbons, pure air is liable to enter the chamber surrounding the arc through one side of the opening while the gaseous products of the arc are passing out on the other side of the opening. I find, however, that the feed opening may be made sufficiently large to admit of perfect freedom of transit for commercial carbons if means are provided in the inclosure or some attachment thereof by which the gaseous products of the arc may be made to form a gas check against the entrance of air. Such a result may be attained in a great variety of ways,

some of which will be hereinafter noted. By such a provision any air which may enter the inclosure will be diluted with a portion of the gaseous products of the arc and thus the mixture will contain less oxygen per unit of volume and therefore will result in a prolonged life of the carbons.

My invention consists therefore in forming a check against the entrance of air by providing the inclosure with an opening in which any inflowing air will be met by a body of gaseous products of the arc which will tend to dam it off and by admixture therewith will dilute it.

The invention in a narrower phase consists in providing a duct in open communication with the inclosure and with the feed opening by which a body of gas from the arc will be supplied to the feed opening through an independent channel and will serve to dilute any entering air.

The several features of novelty of the invention will be more particularly hereinafter described, and will be definitely indicated in the claims appended to this specification.

In the accompanying drawings, which illustrate the invention, Figure 1 is a vertical median sectional view of an arc inclosure embodying one form of my improvements. Fig. 2 is a sectional view of a plug through which the movable electrode moves, the section being taken on the plane indicated by the line 2—2 in Fig. 1 looking in the direction indicated by the arrows. Fig. 3 is a sectional view of a top of an inclosure such as shown in Fig. 1, taken on a different vertical plane, and showing the relation of the transverse gas duct to the valve duct, the plug having a somewhat different construction. Fig. 4 is a top plan view of the plug shown in Fig. 3. Fig. 5 is a sectional view of the plug shown in Fig. 3, the plane of section being indicated on the line 5—5 looking in the direction of the arrows; and Figs. 6, 7 and 8 illustrate modified forms of construction all serving to produce dilution of the air with the gaseous products of the arc.

A represents an inclosure formed of transparent or translucent material, preferably glass. As shown in the drawings, it is closed air-tight at the bottom by means of a washer

B of asbestos or other suitable material, and a metallic screw cup C provided with a socket for the reception of the negative electrode D. The positive electrode E moves through an opening in a metallic plug F supported on the top of the inclosure, but separated from the walls thereof by a heat non-conducting washer of asbestos G. The plug is preferably located in the top of the inclosure and the positive electrode arranged to feed downwardly. This arrangement is more desirable, since the gases developed by the arc being comparatively heavy escape less rapidly. The invention is not, however, restricted to a movable electrode feeding from above, nor to a gas vent located in the top of the inclosure.

The organization thus far described is mounted in operative relation to the mechanism of an arc lamp in which any regulating apparatus of approved pattern may be used.

The positive electrode E is preferably made the movable electrode, since, by reason of its more rapid consumption in the arc, periodic feeding is desirable, and it is better to have this electrode above the other electrode D so as to take advantage of the crater formed by the arc for illumination of areas below the lamp. The movable electrode passes through an opening formed in the plug F and forms a comparatively close fit, being of a size to permit a ready transit of a commercial electrode when feeding.

In the Howard type of lamp above referred to the metallic plug is vertically pierced with an opening provided with a gravity valve H, permitting the exit of gases from the inclosure when the pressure becomes sufficient to lift the valve.

With an organization as thus far described the positive electrode may attain a life of one hundred hours and upward with carbons twelve inches in length, the negative for the same life having only one-quarter of this length. It is found, however, that the life of the positive may be nearly doubled and that of the negative enormously increased by arranging the ducts through which the outflowing gases pass so that any air which enters through portions of said ducts will meet a body of stationary or inflowing gas. This end is accomplished in the device shown in Fig. 1 by providing an enlarged chamber I within the plug and transversely perforating the plug, as at K. The chamber I thus becomes filled with the gases developed by the arc and any inflowing air is diffused in the gas and the quantity which reaches the inclosure is diluted, as it were, so that per unit of volume it contains less oxygen than would be the case without such dilution. The same result may be attained in a variety of ways, as, for example, in Fig. 3, where the chamber I is dispensed with and the transverse opening K is arranged so as to embrace a considerable portion of the inner wall of the plug and the gas vent leading to the valve H. The

transverse opening will preferably be given a downward slant as indicated in Figs. 1 and 3 so that gases passing from the chamber through said duct will strike an incoming current of air and be readily drawn with it into the inclosure. There may be one or more ducts K as desired, as shown in the drawings, see particularly Figs. 2 and 5. These ducts may be semi-circular grooves, formed by sawing or casting, extending through the wall of the plug, or they may be otherwise formed. For example, in Fig. 7 the lower portion of the feed opening is provided with a series of vertical slots or perforations through which gas from the envelope may enter the annular space around the carbon and arrest and dilute any inflowing air, or, as in Fig. 8, these slots may be arranged horizontally, or any other arrangement by which the gas from the arc may be directed upon the path of inflowing air may be provided, as, for example, in Fig. 6, where an open spiral forms a continuation of the feed opening and serves to direct gas against the carbon and check in-draft. It will thus be seen that any air entering the thin annular space between the movable electrode where such is employed and the wall of the inclosure, will be met by a body of gas from the inclosure before it arrives at the interior of the inclosure and by admixture with the same will be diluted; moreover, the body of gas supplied through the lateral ducts acts to a certain extent as a dam to the inflowing air, also tending to form the entering air into eddies which obstruct its entrance to the chamber, and thus checks the draft, thereby practically preventing oxygen-bearing gas from reaching the inner portion of the inclosure. In cases where the outside air could have no access to the movable electrode, the ducts will be arranged in suitable co-operative relation to the passages provided for egress of the gases developed by the arc.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An arc lamp having the arc surrounded by a transparent or translucent inclosure provided with a passage for the egress of gases developed by the arc, and a gas check formed by a body of gas in said passage to decrease the entrance of air to the inclosure.

2. An arc lamp having the arc surrounded by a transparent or translucent inclosure provided with a passage for egress of gases developed by the arc, and an auxiliary passage communicating with the inclosure on one side and with an intermediate portion of the egress passage on the other.

3. An arc lamp having the arc surrounded by a transparent or translucent inclosure provided with a passage for egress of gases developed by the arc, and an auxiliary transverse passage communicating with the inclosure and egress passage.

4. An arc lamp having the arc surrounded by a transparent or translucent inclosure pro-

vided with a closely fitting opening through which the movable electrode is fed, and a passage from the inclosure to an intermediate portion of said opening for the purpose described.

5 5. An arc lamp having the arc surrounded by a transparent or translucent inclosure, and a plug in said inclosure provided with a closely fitting opening for transit of the movable electrode, said opening being enlarged at an intermediate point for the purpose described.

10 6. An arc lamp having the arc surrounded

by a transparent or translucent inclosure, and a plug in said inclosure provided with a 15 closely fitting feed opening for transit of the positive electrode, and an auxiliary transverse passage between the opening and the inclosure for the purpose described.

In testimony whereof I have hereunto sub- 20 scribed my name this 26th day of February, A. D. 1894.

LOUIS B. MARKS.

Witnesses:

F. S. DOYLE,

LOUIS E. HOWARD.