No. 620,117. Patented Feb. 28, 1899.

D. GERTIN.

ARC LAMP FOR ELECTRIC LIGHTING.

(Application filed Sept. 15, 1898.)

(No Model.)

Fig. 1.

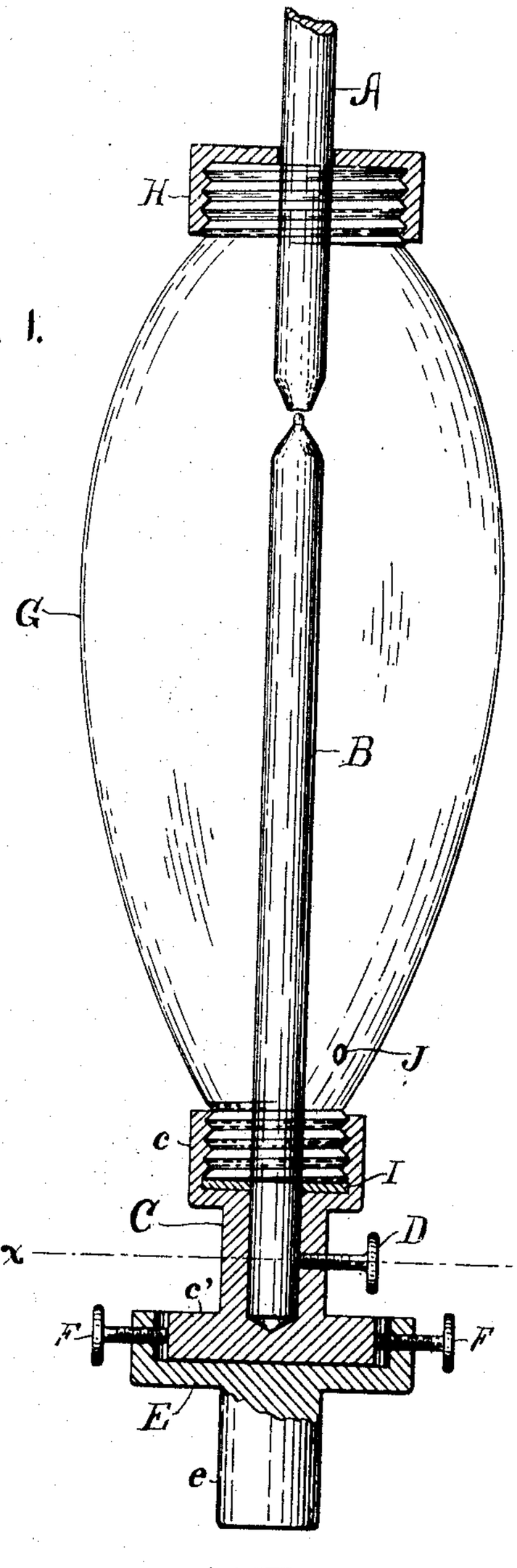
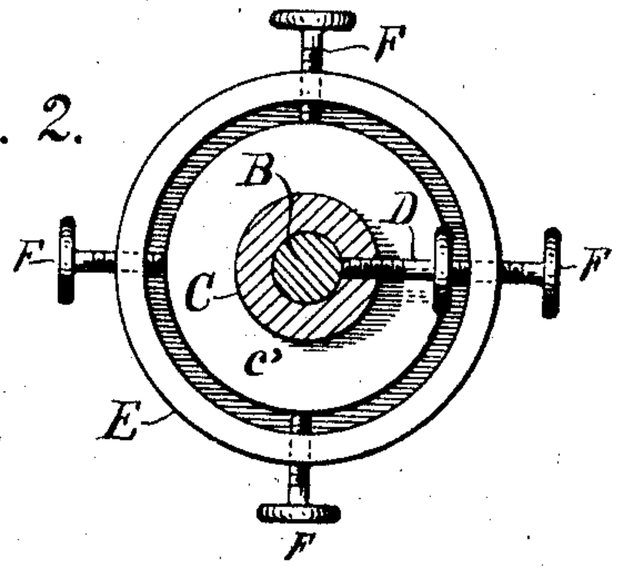


Fig. 2.



WITNESSES:

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ARC-LAMP FOR ELECTRIC LIGHTING.

SPECIFICATION forming part of Letters Patent No. 620,117, dated February 28, 1899.

Application filed September 15, 1898. Serial No. 690,988. (No model.)

To all whom it may concern:

Be it known that I, DAVID GERTIN, a citizen of the United States, residing at Corning, in the county of Steuben and State of New York, have invented certain new and useful Improvements in Arc-Lamps for Electric Lighting, of which the following is a specification.

My invention relates more particularly to arc-lamps in which either a direct or alternating current of electricity of high tension is used; and the objects of my improvements are, first, to inclose the arc with a glass globe or other transparent or translucent envelop, through which there shall be a limited circulation of air and whereby a more perfect and continuous arc shall be formed between the carbons and the life of the carbons lengthened to a very appreciable degree; second, to improve the construction of the inclosing globe or envelop, and, third, to provide means for adjusting the lower carbon and the globe or envelop, so as to bring them into perfect alinement with the upper carbon. I accomplish these objects by the construction and arrangement of parts illustrated in the accompanying drawings, in which—

Figure 1 represents a side elevation, partly in section, of a portion of a lamp embodying my improvements; and Fig. 2, a transverse section of the same on line *x x* in Fig. 1.

Similar letters refer to similar parts in the two views.

A and B represent the upper and lower carbons of the lamp, the lamp-frame and feed mechanism being omitted, as they form no part of my present invention. The lower carbon B is set in a socket in the lower cap-piece C and fastened therein by means of the thumb-screw D. The cap C is screw-threaded at *c* to receive the lower end of the glass globe or envelop G. The lower portion of this piece C is flanged at *c'* and sets in a socket-piece E, wherein it is made laterally adjustable in any direction by means of the four adjusting-screws F F F F. The socket-piece E is provided with the downward projection or stem *e*, which may be so fashioned as to be attachable to the lower portion of any lamp-frame. The globe G is fastened air-tight to the lower cap-piece C by screwing it down against an asbestos washer I. The upper portion of the globe is also screw-threaded and provided with a metal cap H, through a hole in the center of which the upper carbon will just pass freely. As the commercial carbons are not made exactly true, there will be a slight air-space around the carbon where it passes through the cap H, which space will be sufficient to allow for the escape of the heated gases produced while the lamp is in operation, thereby creating an upward current of air around the arc.

In the lower portion of the globe G, positioned below the lowest position of the arc, is a small hole J of a size to admit air into the globe in just sufficient quantity to supply the fresh air necessary to produce this upward current and insure a proper formation of the arc between the carbons without undue wastage or burning away of the carbons.

In operation when the current is turned on and the arc is established an upward circulation will be established within the globe and a limited current of air will pass in at the lower portion of the globe through the hole J, diffuse within and around the bottom of the globe, rise around the arc, and escape through the small air-space around the upper carbon in cap H, the screw-joint between the cap H and the top of the globe being practically air-tight and the escape only taking place around the upper carbon. The air before entering the restricted opening J comes in contact with the heated globe and is thereby heated before it enters the globe, and thus there is no possibility of a cold draft of air coming up around the arc, as there would be were the air admitted through the lower cap or globe-support. The opening is so small that it will be impossible for cold air to enter the globe, and the air and gases within the globe after the lamp is once in operation will be kept at a constant temperature. I have found that by the use of a globe constructed in this manner the arc is evenly and uniformly produced between the carbons, the light being cast on all sides around the arc with equal intensity and without the liability of the arc to run around the carbons, and thereby cast a shadow from side to side, as is the case where the air

is all excluded from the arc. Moreover, in inclosed arcs where the air is all excluded the intense heat generated by the arc will generally melt or otherwise destroy the globe.

Arc-lamps inclosed in the manner herein set forth will burn equally as well at high or low tensions—as high as ten amperes and over—with very little wastage of the carbons, the lower carbon especially outlasting by twenty to twenty-five times the lower carbons of other types of arc-lamps.

By varying the size of the hole J according to the amperes of a given lamp the globe may be made to produce better results; but ordinarily a hole of about one-sixteenth-inch diameter will answer practically as well for all purposes. Besides admitting the air the hole J performs an additional function, as I have found that this hole in the globe does away with the liability of the globe to crack at this lower constricted extremity, as is quite generally the case with inclosing globes of this form owing to excessive expansion and contraction.

By using the screw-cap at the top of the globe I do away with the heavy caps now in use and avoid any possibility of the cap being caught and lifted up by any of the upward movements of the upper carbon. By means of the lower cap adjustably set in the socket E, I am enabled readily to bring the lower carbon and the globe G into proper alinement with the upper carbon. Moreover, by screw-threading the globe G at top and bottom into the cap-piece it is held firmly by said cap-pieces in axial alinement with the carbons, and the walls of the globe will be always equidistant from the arc, so that injury from uneven and localized heating is entirely obviated.

I am aware that heretofore lamps of the inclosed-arc type have been made in which a current of air entering from below the globe or envelop is caused to pass upwardly around the arc and pass out through a perforate cap at the top of the globe; but in no case heretofore am I aware that the air has been admitted through the globe or envelop itself, and in thus admitting the air I believe I attain an advantage over the former art, inasmuch as the air must be heated before it enters the globe, whereas when admitted around the lower carbon below the globe the air must come in in a more or less cool state, tending to reduce the temperature within the globe and around the arc, and, moreover, it will strike the hot globe from the inside and bottom, causing uneven expansion and contraction and a consequent breakage of the globe. Also it has been proposed to admit air in small quantities at the top of the globe or envelop and cause it to circulate downward therein and then upward around the arc by suitably-arranged ducts; but the intense heat generated within the necessarily-restricted confines of the globe or envelop prohibits a proper circulation of this nature.

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

1. In an arc-lamp, a globe or envelop for the arc closed at the bottom and having a restricted orifice in its peripheral walls for the admission of air below the arc and a passage above the arc for the escape of the gaseous products of the arc.

2. In an arc-lamp, a globe or envelop for the arc provided with a restricted orifice in its peripheral walls for the admission of air below the arc and having cap-pieces at the top and bottom, the top cap-piece being perforated to allow for the escape of the gaseous products of the arc.

3. In an arc-lamp, the combination, with a globe or envelop for the arc, of a cap-piece tightly secured to the top of the globe and provided with a central aperture through which the upper carbon slides, a restricted passage for the egress of gases formed thereby around said carbon, a cap-piece hermetically sealing the bottom of the globe, in which said cap the lower carbon is also secured, and a restricted orifice in the peripheral walls of the globe for the admission of air below the arc.

4. In an arc-lamp, the combination, with a globe or envelop for the arc, of a cap-piece at the top by which the globe is held in axial alinement with the upper carbon, a cap-piece at the bottom in which the globe and lower carbon are held in axial alinement with one another, a socket-piece to receive the bottom cap-piece, means for laterally adjusting said cap-piece in the socket-piece, and means by which to attach the socket-piece to a lamp-frame.

5. In an arc-lamp, the combination, with a globe or envelop for the arc, of a combined globe-cap and carbon-holder by which the lower carbon is held in axial alinement with the globe, a flanged base on said cap and holder, a socket-piece to receive said base, set-screws in the socket-piece for the lateral adjustment of said base, and a downward projection or stem by which to attach the socket-piece to a lamp-frame.

In testimony whereof I have affixed my signature in presence of two witnesses.

DAVID GERTIN.

Witnesses:
EUGENE DIVEN,
C. TRACEY STAGG.