J. L. DINSMOOR.

ARC LAMP.

APPLICATION FILED MAR. 11, 1911.

1,025,130.

Patented May 7, 1912.

2 SHEETS—SHEET 1.

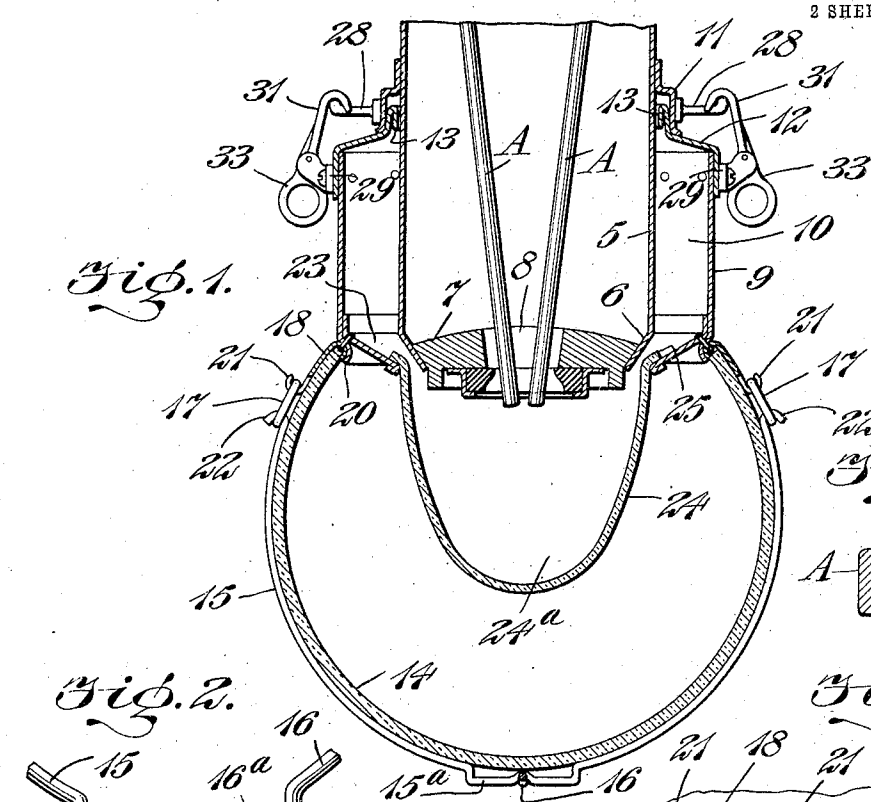


Fig. 1.

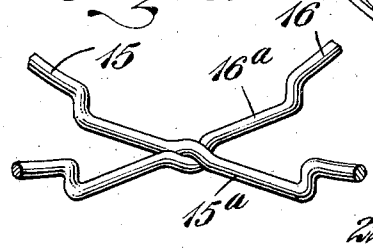


Fig. 2.

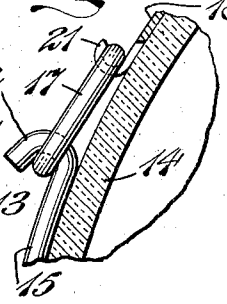


Fig. 4.

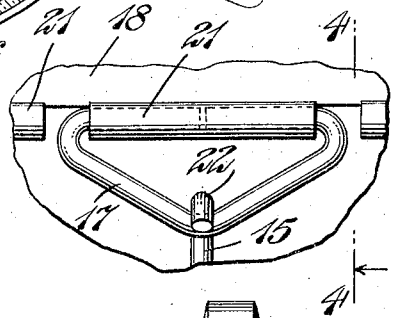


Fig. 3.

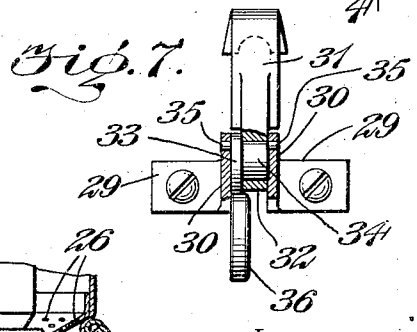


Fig. 7.

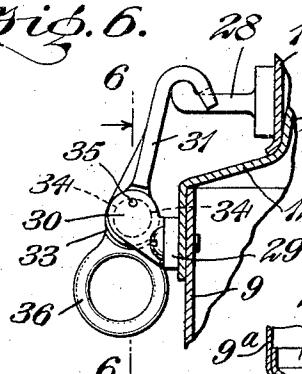


Fig. 6.

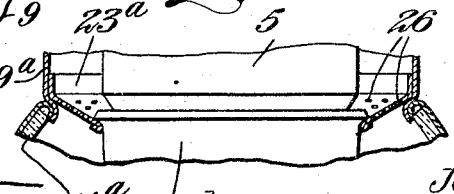


Fig. 8.

WITNESSES:

A. C. Abbott

J. F. Mothershead

INVENTOR

John L. Dinsmoor

BY

Griffin & Bernhard

Attorneys

J. L. DINSMOOR.

ARC LAMP.

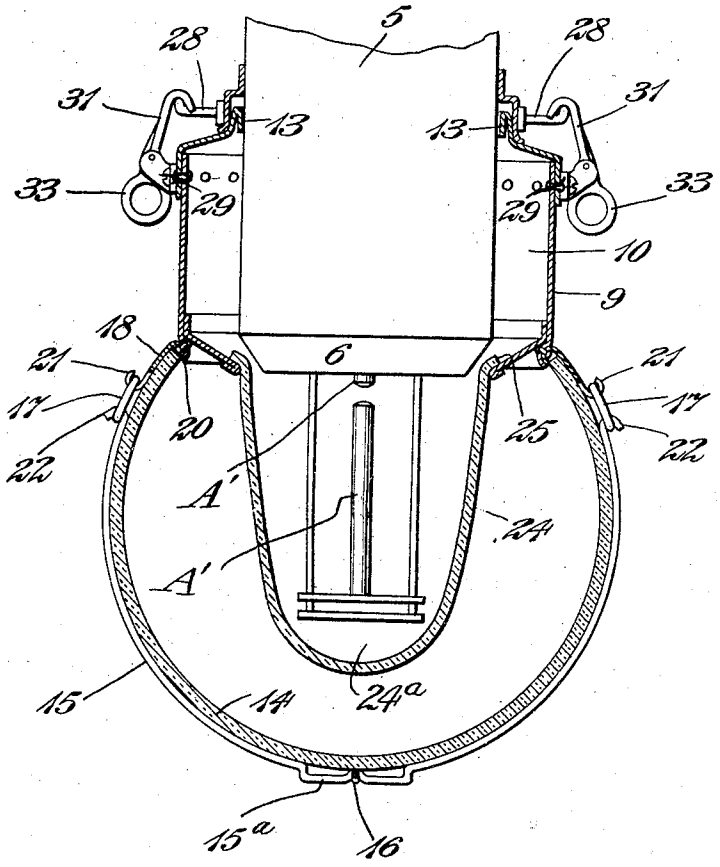
APPLICATION FILED MAR. 11, 1911.

1,025,130.

Patented May 7, 1912.

2 SHEETS—SHEET 2.

Fig. 5.



WITNESSES:

H. C. Talbott

J. P. Mothershead

INVENTOR

John L. Dinsmoor

BY

Griffin & Bernbord

Attorneys

UNITED STATES PATENT OFFICE.

JOHN L. DINSMOOR, OF NEW YORK, N. Y.

ARC-LAMP.

1,025,130. Specification of Letters Patent. Patented May 7, 1912.

Application filed March 11, 1911. Serial No. 613,905.

To all whom it may concern:

Be it known that I, JOHN L. DINSMOOR, a citizen of the United States, residing in the city of New York, borough of Manhattan, county and State of New York, have invented a certain new and useful Arc-Lamp, of which the following is a specification.

This invention is an arc lamp, and it pertains, more particularly, to means for inclosing the arc produced by the flow of current from one to the other of a pair of converging carbons such as are usually employed in lamps of the flaming arc type.

A salient feature of this invention consists of means whereby a large proportion of the dust arising from the combustion of the carbons is carred upwardly into, and deposited upon the surfaces of, a chamber provided above the inner of two globes, although some of the carbon dust, such as the heavier particles thereof, will lodge within the inner globe, thus precluding the accumulation of carbon dust within the outer globe, thereby keeping the globes substantially free from obstructing the rays of light from the arc, it being practically impossible for the carbon dust to lodge upon the inner surface of the outer globe.

When the lamp is in operation, the arc burns in an atmosphere composed, mainly, of the gases evolved from the arc, the flame being contained in a substantially tight chamber, whereby prolonged service of the carbons is secured with carbons of a proper quality, thus resulting in an increased number of hours service without renewing the carbons.

Provision is made for obtaining access easily and quickly to the carbons for the purpose of trimming the lamp, and, also, making it easy to clean the surfaces of the inner globe and the chamber above said globe, it not being necessary, in practice, to brush out carbon dust from the outer globe for the reason that but little, if any, carbon dust can lodge upon the inner surfaces of said outer globe.

In the accompanying drawings, I have illustrated one practical embodiment of the invention, but the construction shown therein is to be understood as illustrative, only, and not as defining the limits of the invention.

Figure 1 is a vertical section through a part of a flaming arc lamp embodying the present invention. Fig. 2 is a detail view illustrating the positions of the supporting bails for an outer globe at the points where said bails cross each other. Fig. 3 is a detail view illustrating means for attaching an end portion of the bail to a vertically adjustable sleeve or shell of the lamp casing. Fig. 4 is a section on the line 4—4 of Fig. 3. Fig. 5 is a vertical section through an axis carbon lamp embodying the salient features of the invention, for the purpose of precluding the lodgment of carbon dust upon the inner surfaces of the inner and outer globes. Fig. 6 is a side view of one means for detachably connecting the vertically adjustable sleeve to an internal casing of the lamp. Fig. 7 is a section partly in elevation, the plane of section being indicated by the dotted line 6—6 of Fig. 5. Fig. 8 is a detail view through a part of a lamp illustrating another form of supporting member or ring whereby an inner globe is adapted to be suspended within an outer globe and in a position to inclose the arc. Fig. 9 is a cross section through a pair of converging carbons of a particular shape which it is preferred to use.

5 designates a casing adapted for inclosing carbons, A, said casing being of any preferred construction. The lower part of the casing is flanged at 6 and fits tightly around a lower member 7, sometimes termed a "burn plate," said burn plate being provided with slots 8 for the passage of carbons, A. A sleeve or external shell 9 incloses the lower part of casing 5, said sleeve being concentric with casing 5 so as to produce an intermediate chamber 10. Secured rigidly to the outside of casing 5 is a flange 11, with which coöperates an inwardly extending flange 12, provided with an upwardly extending shoulder 13. Flange 12 is attached by suitable means, as for example by riveting, to sleeve 9, the shoulder 13 of said flange 12 being adapted to fit within an annular space provided between casing 5 and flange 11, as shown clearly in Fig. 1. The employment of the two flanges 11, 12 on the casing and sleeve, respectively, enables the sleeve to be fitted to said casing in a manner to exclude rain or snow from chamber 10. The shouldered part 13 on the flange of sleeve 9 is intended to fit tightly within flange 11 so as to minimize the leakage of arc gases from chamber 10 and to likewise minimize the entrance of atmospheric air into said chamber 10.

14 is an outer globe of any usual or preferred construction, said outer globe being supported by the lower portion of sleeve 9. For this purpose bails 15, 16, links 17, and a ring 18 are employed. The ring 18 is attached firmly by suitable means, as by riveting, to the lower edge of sleeve 9, said ring being provided with an internal groove 20 within which is fitted or seated the upper edge of globe 14. The ring is provided, also, with eyes 21 adapted to receive loops 17. As shown in Fig. 3, each loop is substantially triangular, the end portions of the loop are slipped into eyes 21 of ring 18, and the eye 21 is then bent over the inserted ends of the loop so as to retain the latter against accidental displacement on the ring.

The bails 15, 16 are positioned at right angles to each other so that they will cross or intersect at the bottom of the globe 14. Said bails are bent at 15^a, 16^a, respectively, to facilitate the operation of placing them in position and to enable said bails to fit compactly to the bottom portion of the globe. Each bail is provided at its respective ends with the hooks 22 which are fitted into the loops 17 at the apices of the triangular portions thereof, as shown more clearly in Fig. 3, whereby the hooked ends of the bails are precluded from sliding within the loops.

A globe supporting member 23 is attached to sleeve 9 on the interior thereof. Said member is in the form of a ring which inclines inwardly from the sleeve and downwardly toward the lower portion of casing 5. This globe supporting member is preferably imperforate, and it operates to substantially prevent a downward circulation of arc gases into chamber 14, and, also, to prevent a deposit of carbon dust upon the inner surfaces of said globe. An arc inclosing globe 24 is suspended from the inner edge portion of member or ring 23. Said globe 24 is closed on all sides except the top, the top edge of the globe 24 being shown as having a flange 25 which rests upon the inner edge portion of supporting member or ring 23, whereby globe 24 is suspended from said ring. Globe 24 is positioned within globe 14 so as to be substantially inclosed thereby, and the chamber 24^a of said globe 24 has free communication with the chamber 10 of external casing or sleeve 9.

When the lamp is in operation, converging carbons, A, pass downwardly through slots 8 in member 7, so that the lower ends of said carbons are within chamber 24^a of the inner globe. The flaming arc passes from one carbon to the other, and thus generates heat and gases within chamber 24^a. The combustion of the carbons produces also, a powder or dust which is suspended in the atmosphere composed, mainly, of arc gases. These gases tend to flow upwardly within the chamber of the inner globe and to pass into the chamber 10 of external shell or sleeve 9, the gases carrying with them the fine particles of carbon dust. The shell 9 being exposed to the atmospheric air, the walls of said shell are relatively cooler than the inner globe, whereby carbon dust suspended in the arc gases will become deposited upon the inner surfaces of shell 9 and the outer surface of that part of casing 5 which is enveloped by said shell 9. The arc burns in a substantially tight chamber of inner globe 24, to which chamber atmospheric air is not freely admitted, and this results in prolonged life and service of the carbons, thus making it unnecessary to trim the lamp so frequently. The main advantage secured, however, is that the glass ware, *i. e.*, the inner and outer globes, will not become coated with carbon dust to such an extent as will substantially interfere with the dispersion of the light. Furthermore, the employment of the imperforate ring 23 precludes, for all practical purposes, the settling of carbon dust upon the inner surface of globe 14. It is to be observed that the imperforate ring 23 is positioned at the upper portion of globe 14 between the chamber of said globe 14 and the chamber 10 of shell 9. Accordingly, the imperforate ring substantially cuts off communication between the chambers of shell 9 and globe 14, and thus carbon dust deposited within chamber 10 will not pass into globe 14. It is not desired to limit the invention, however, to the employment of an imperforate ring 23 for entirely cutting off communication between the chambers of shell 9 and globe 14. In Fig. 7 of the drawings I have shown a ring 23^a attached to shell or sleeve 9^a and adapted to suspend an inner globe 24^b within an outer globe 14^a. The ring 23^a of Fig. 7 is provided with a number of small apertures 26 which secures communication between a chamber of sleeve 9^a and the chamber of globe 14^a so that the heavier arc gases will settle into the chamber of the globe through said perforations 26, the effect of which is to gradually fill the globe chamber with dilute arc gases. In the practical operation of the lamp, however, very little, if any, carbon dust will settle upon the inner surface of globe 14^a for the reason that substantially all the carbon dust will be collected in the sleeve 9^a.

From the foregoing description it is apparent that the heat radiated from the flaming arc will heat the arc gases, which gases will have a tendency to flow upwardly from the inner globe chamber into a comparatively cooler chamber of sleeve 9, said upwardly flowing gases carrying with them the finely divided carbon dust, this operation taking place in both forms of lamp

shown respectively in Figs. 1 and 7. In Fig. 1, however, the outer globe chamber is cut off from communication with the chamber of the attached sleeve 9, and, accordingly, no carbon dust can settle upon the inner surface of the outer globe, the latter remaining in a clean condition at all times. This is a very desirable feature for the additional reason that in case the outer globe should be broken, as sometimes happens in mills and factories, the lamp will continue to operate with practically the same carbon life, but it is found that, under such conditions, the inner globe will become coated with carbon dust to a greater extent than would be the case were the outer globe in good condition.

In Figs. 1, 6 and 7 of the drawings there is shown a novel clamping device whereby the shell 9 may be easily and quickly attached to, or detached from, casing 5 of the lamp. Said casing is shown as having studs 28 extending from opposite sides of the flange 11. The external casing or sleeve 9 is provided at opposite sides, and near the upper edge, with brackets 29, each bracket having lugs or ears 30. A hooked shaped member 31 is adapted for engagement with the stud 28, said hooked shaped member being provided at its lower portion with an eccentric strap or loop 32. An operating piece 33 is provided with an eccentric 34 and with pivotal pins 35, said operating piece being provided, also, with a finger loop 36. The eccentric 34 of the operating piece is positioned between the ears 30 of the bracket, said eccentric fitting loosely in the eccentric strap 32 of hook 31. Said operating piece 33 is pivotally supported in bracket 29 by the pivots 35 fitting in apertures of ears 30, whereby the pivoted operating piece is adapted to be turned inwardly or outwardly on the horizontal axis afforded by pins 35. When the operating piece is swung outwardly, the eccentric 35 is turned for the purpose of moving hook 31 in an upward and outward direction, thereby disengaging said hook from stud 28. But when the operating piece is turned in a downward and inward direction, the eccentric operates the hook 31 so as to draw it into engagement with stud 28. The shell 9 and globes 14, 24 suspended from said shell, are connected to the lamp casing by two of these clamping devices.

It is evident that the operator may manipulate the members 33 of the clamping devices so as to easily and quickly release them from engagement with the studs 28, whereby sleeve 9 and globes 14, 24 may be lowered away from the lamp casing and the carbons. Access is thus easily obtained to the carbons and to the interior of shell 9 and globe 24. The operator is enabled to remove the burned carbons and replace them with fresh carbons, and the inner surface of sleeve 9, the outer surface of casing 5, and the inner surface of globe 24 may be thoroughly cleaned of carbon dust.

A salient feature of the lamp resides in the facility for cleaning the surfaces upon which the carbon dust will lodge, thus overcoming one of the serious objections existing in lamps of the converging carbon type. The sleeve 9 with the two globes can be lowered easily and quickly, thus enabling the workman to brush or wipe out the inner surface of the gas chamber formed by the sleeve, and, also, to remove the inner globe from the supporting ring or member, whereupon the inner globe can be inverted to empty the carbon dust, said globe being wiped out to more effectually clean it. It is not necessary, ordinarily, to clean the inner surface of the outer globe, for the reason that practically no carbon dust lodges in it, but should it be desirable to clean the inner surface of said outer globe, this can be performed easily when the inner globe is detached.

The parts can be replaced with ease and facility, the clamping devices being operated quickly to retain the sleeve and the globes in their operative positions.

The invention is preferably employed in conjunction with flaming arc lamps, employing converging carbons, wherein the vertical dimensions of the inner globe are reduced, as compared with the vertical dimensions of an inner globe necessary to be used in arc lamps employing carbons disposed in axial alinement. The employment of an inner globe in a flaming arc lamp secures an upward flow of the dust-laden arc gases, the surfaces of the inner globe being heated substantially uniformly by the flaming arc, so that there results practically no deposit of the carbon dust upon the inner surface of the inner globe. The upwardly flowing arc gases pass into a gas chamber formed, in the present instance, by the attached sleeve, the surface of said gas chamber being relatively cooler than the surfaces of the inner globe surrounding the arc, the result of which is to precipitate the carbon dust upon the surface of the gas chamber.

While it is preferred to employ the invention in conjunction with an arc lamp of the flaming type employing converging carbons, the invention may be employed, also, in conjunction with lamps having co-axially positioned carbons, as shown in Fig. 5 of the drawings, in which event it is necessary to use an inner globe of longer vertical dimensions to accommodate the lower carbon and its holder, but it is found that an inner globe of increased vertical dimensions will not become heated uniformly by the arc, as a result of which certain portions of the inner globe will be cooler than other por-

tions of the same globe. Accordingly, the arc gases present in the inner globe will deposit carbon dust upon those surfaces of said inner globe which are relatively cooler, some of the carbon dust being carried with the heated gases into the upper gas chamber so as to be deposited upon the surface of said gas chamber.

It is well known that a flaming arc when inclosed has its conductivity reduced owing to the absence of oxygen, and, further, that when carbons of circular cross section are used, the flame has a tendency to creep or swirl around the outer shells of the carbons, at the ends thereof, thus contributing also to increased resistance of the arc. This increased resistance requires, ordinarily, a higher arc voltage to produce an equal amount of luminosity. Furthermore, it is more difficult to retain the regulating features of the lamp when the flame is extended and operated at a higher arc voltage, owing to the variable sectional amount of carbon material to be consumed, since the space between the interior and exterior surfaces of the carbons will vary in practically a ratio of 1 to 8, while in the case of coaxially arranged carbons the arc will vary in length between maximum and minimum points of separation in practically uniform ratio.

While the carbons may be composed of a variety of mixtures to produce a steady arc, it is possible to obtain a more nearly uniform length of arc flame by reducing the sectional amount of carbon material when considered longitudinally with the arc.

I employ two coreless carbons, substantially rectangular in cross section and so positioned that the wide flat faces of the carbons are in opposing relation substantially as shown in Fig. 9, so that the arc flame will flow from the wide flat face of one carbon to the wide flat face of the other carbon, the dotted lines in Fig. 9 illustrating the direction of the flow of current from one carbon to the other.

The objectionable creeping of the arc around the carbons is overcome by employing carbons substantially rectangular in cross section, with their wide flat faces in opposing relation, for the reason that the carbon material affords a path of lower resistance for the current to flow through and the wide flat surfaces of the carbons introduce a larger path for the arc flame and do not attract it. The employment of coreless carbons reduces the cost of manufacture and provides a more durable and stronger construction, thus eliminating breakage to a large degree of the carbons during transportation and handling thereof.

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

1. In an arc lamp of the class described, a shell or casing provided with a cooling chamber, an imperforate ring positioned within, and attached to, said shell or casing, an arc inclosing globe closed at the bottom and suspended from said imperforate ring, the chamber of said arc inclosing globe communicating freely with the cooling chamber of said shell or casing, and a closed outer globe supported by the shell or casing and substantially inclosing the inner globe, the chamber of said outer globe being substantially cut off from communication with the cooling chamber by said imperforate ring, said cooling chamber being positioned above the arc inclosing globe and being closed against the circulation of air and gases therethrough.

2. In an arc lamp, an inside casing, an external sleeve fitted to the inside casing for movement vertically with respect thereto, means for retaining the external sleeve in fixed relation to the inside casing, an outer globe closed against the admission of atmospheric air and supported by the external sleeve, and an inner globe positioned within the outer globe and suspended from the external sleeve, said inner globe being closed at the bottom thereof, both of said globes being movable with the external sleeve relative to the inside casing, said inside casing and the external sleeve producing above the inner globe a cooling chamber which communicates freely with said inner globe, said cooling chamber being closed against the circulation therethrough of atmospheric air or the arc gases emanating from the inner globe.

3. In an arc lamp, an inside casing, an external sleeve fitted to said casing, said sleeve being movable relative to said casing, means coöperating with the sleeve and the casing for closing the space between them when the sleeve is raised to a predetermined position relative to the casing, an outer globe suspended from the external sleeve, said outer globe being closed to preclude the admission of air thereto, and an inner globe suspended from the sleeve, said inner globe being closed at its bottom and having its upper part in free communication with a cooling chamber between the casing and the sleeve, both of said globes being movable with the sleeve.

4. In an arc lamp, a lamp casing, an outer globe closed to preclude the admission of atmospheric air thereto, a cooling chamber substantially enveloping the lower part of the lamp casing and positioned above the outer globe, said cooling chamber being closed to preclude the inflow of air and the outflow of arc gases, an inner arc-inclosing globe positioned within the outer globe, said inner globe being closed at its bottom and the chamber thereof having free communication at its upper part with the cooling cham-

ber to permit of an upward flow of dust laden arc gases into the cooling chamber, whereby the dust will accumulate within the cooling chamber and be retained therein against return to the inner globe or to the outer globe, and means for cutting off communication between the cooling chamber and the chamber of the outer globe.

5. In an arc lamp, an outer globe, a single cooling chamber positioned above said globe, said cooling chamber being closed against the circulation therethrough of arc gases and of atmospheric air, an inner globe closed at its bottom and surrounding the arc, said inner globe having free communication with said cooling chamber, and means for substantially precluding communication between the outer globe and said cooling chamber, whereby heated gases with carbon dust suspended therein are free tc flow upwardly from the inner globe, said cooling chamber acting as a reservoir for the products of combustion.

6. An arc lamp embodying a lamp casing, a sleeve enveloping the lower part of said lamp casing and producing therewith a cooling chamber, said cooling chamber being provided with means for precluding the circulation through said chamber of arc gases and atmospheric air, a closed bottom inner globe the chamber of which is in free communication with the cooling chamber to permit an unrestricted upward flow of dust laden arc gases into said cooling chamber, and an outer globe attached to the external sleeve, said outer globe producing a dead air chamber between the inner and outer globes.

7. An arc lamp embodying a lamp casing, a single sleeve concentric with and exterior to the lower part of said lamp casing, said sleeve being movable vertically relative to the lamp casing and said sleeve forming with the lamp casing a cooling chamber, an outer globe and an inner globe both suspended from the single sleeve and movable therewith relative to the lamp casing, each globe being closed at the bottom and the inner globe having free communication with the cooling chamber, and means for precluding the circulation through the cooling chamber of atmospheric air and the dust laden arc gases which flow upwardly from the inner globe.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN L. DINSMOOR.

Witnesses:
H. I. BERNHARD,
J. F. MOTHERSHEAD