(No Model.)

W. BAXTER, Jr.

AIR TIGHT ELECTRIC ARC LAMP.

No. 306,998. Patented Oct. 21, 1884.

Fig. 3.

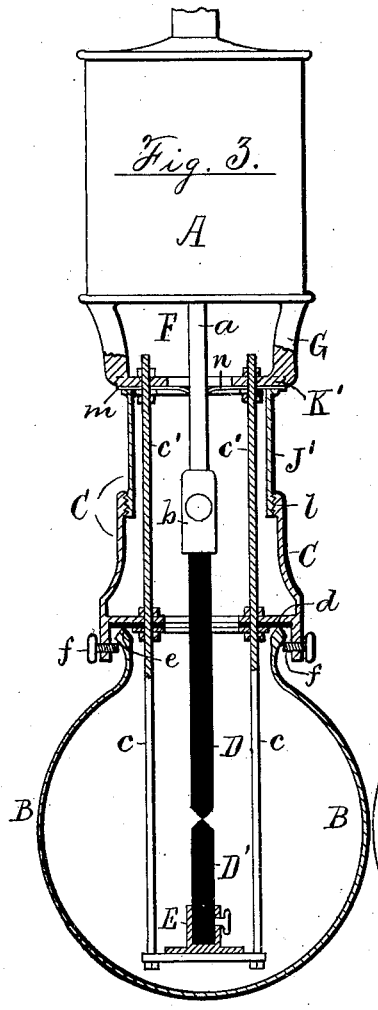


Fig. 1.

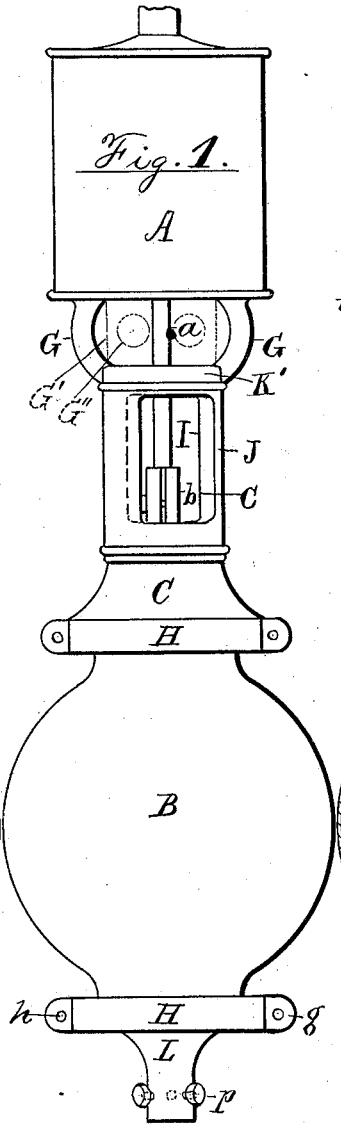


Fig. 2.

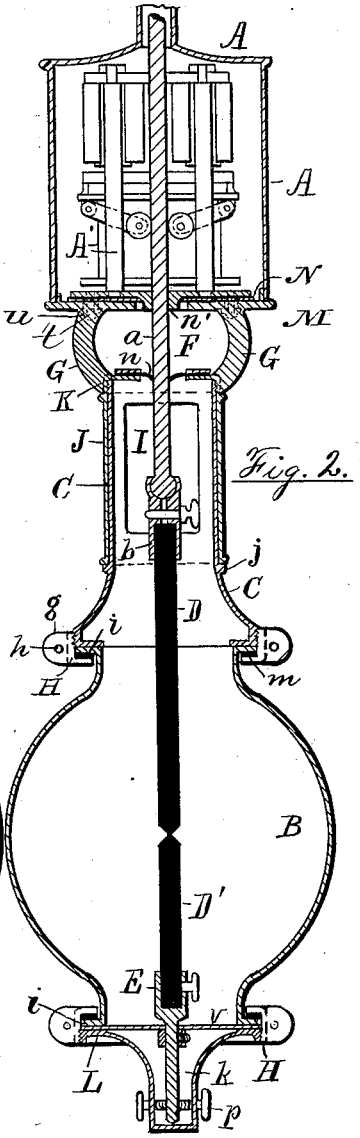


Fig. 5.

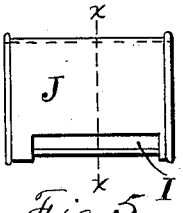


Fig. 6.

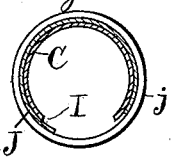
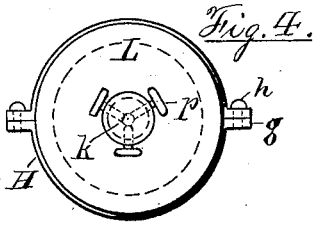


Fig. 4.



Attest

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UNITED STATES PATENT OFFICE.

WILLIAM BAXTER, JR., OF JERSEY CITY, NEW JERSEY.

AIR-TIGHT ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 306,998, dated October 21, 1884.

Application filed May 21, 1883. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM BAXTER, Jr., a citizen of the United States, residing in the city of Jersey City, in Hudson county, New Jersey, have invented certain new and useful Improvements in Air-Tight Electric-Arc Lamps, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to certain improvements in air-tight arc-lights; and it consists in certain devices for adjusting the carbons without removing the air-tight globe or receiver, and in a special construction for insulating the regulator, and for preventing the access of gases from the combustion-chamber thereto.

The improvements will be understood by reference to the annexed drawings, in which Figure 1 is a side view of an electric-arc lamp provided with my invention. Fig. 2 is a central vertical section of the same, the view being taken from the opposite side. Fig. 3 is an alternative construction of the lamp. Fig. 4 is a view of the bottom side of the lower-carbon holder in Fig. 2. Fig. 5 is a side view of the rotatable sleeve detached, and Fig. 6 is a section of the same on line *x x* in Fig. 7.

The lamp structure consists, essentially, of the casing A, containing the regulator devices, the globe B, containing the lighting-arc, and the trunk C, forming a connecting-chamber between the two for the play of the long upper carbon and its rod. The regulator is shown in Fig. 2 of the construction heretofore used by me, but any other may be used in carrying out my invention. The carbon rod for the upper movable electrode is lettered *a*, and is shown with a split clamp at *b*, grasping the upper carbon, D. The lower-carbon holder E is shown in three forms, carrying the lower carbon, D′, in such manner that it may be adjusted to the center of the upper carbon.

In this invention the casing A is separated from the trunk C by an open space, F, into which the air circulates freely, while it is entirely excluded from the trunk and the globe beneath it by suitable packings at *n* and *n′*, the difference of pressure within and without the globe being inconsiderable in my method of operating the arc, and there being, therefore, no tendency to a continued circulation through the packed joints. This construction prevents the rapid consumption of the carbons by oxidation, and at the same time affords the operator a means of manipulating the carbon-rod *a* whenever the regulator is deranged without opening the globe or trunk. As it is quite common for the carbon-rod to get dirty and to move stiffly from some slight obstruction of the regulator, the open space F affords a great convenience in twisting the rod *a* or moving the same up and down readily when thus temporarily obstructed.

To secure access for the operator's fingers to the space F, the casing may be connected with the trunk C by two or three legs, G, as shown in the drawings, or by a cylinder with large uncovered openings in the sides, as indicated at G′ G″ in dotted lines in Fig. 1, G′ being the cylinder, and G″ the open holes therein.

The globe shown herein is secured to the trunk C exclusively, and its lower end may therefore be of closed form, as in Fig. 3, or have the lower-carbon holder fastened therein, as in Fig. 2. In the former case, rods *c c* are secured inside the trunk to suspend the lower-carbon holder inside the globe, and in such case the latter must be removed to replace the lower carbon.

To make a tight joint when the globe is replaced against the lower end of the trunk C, the latter is provided with a yielding annular packing, *d*, and the edge or mouth of the globe is formed with a wedge shape or corner, *e*, to make it jam easily into the packing when pressed thereto by the holding set-screws *f*.

In Fig. 2 is shown the other construction for the globe, in which the latter is made with an open bottom, through which the lower carbon or holder may be inserted without detaching the globe from the trunk. The carbon-holder is removably secured to the lower end of the globe by a split-ring coupling, H, fitted over a flange, *i*, upon the mouth of the globe, and provided with an internal screw-thread, to screw upon the periphery of the lower-carbon-holder seat L. A similar coupling-ring is shown in Fig. 2, securing the globe to the

lower end of the trunk, which is formed with an external screw-thread for the purpose, the ring being provided with an annular flange to clamp the flange *i* upon the globe, and being formed in two halves, united by lugs *g* and screws or rivets *h*, to apply it to the globe readily. A packing, *m*, is shown inserted between the flange *i* and that on the ring H, to prevent the latter from pressing the glass flange unequally. The flange *i* is shown fitted to the trunk and lower-carbon holder without any packing, and is intended to have a ground joint at such points if not often removed; but if it is removed frequently a soft packing may be interposed, to make the joint substantially air-tight.

The removal of the globe from the trunk except for cleaning is obviated by providing an aperture, I, in the side of the trunk and providing it with a tight removable door or covering. Two methods of forming and covering such an aperture are shown in the drawings, Figs. 1 and 2 showing the main body of the trunk formed of a cylindrical tube, having a rotating sleeve, J, applied to its outside. Coincident openings are made in the trunk and sleeve, and the latter, being fitted tightly to the tubular trunk, serves to close the opening tightly when the sleeve is rotated half-way around.

In Fig. 1 the openings in the trunk and sleeve J are shown nearly coincident, and Fig. 8 shows in section their relation in the same positions. In Fig. 2 the openings in both are indicated at I, and the sleeve is shown kept in place upon the trunk by a bead, *j*, at the bottom and an internally-screw-threaded socket, K, at the top, the socket being formed at the margin of a flange (like K′ in Fig. 3) formed at the lower end of the legs G, and serving to attach them removably to the top of the trunk to apply the sleeve.

In Fig. 3 a different mode of exposing an aperture in the trunk is shown—viz., by forming the upper half of the trunk entirely distinct from the lower and screwing it into the latter internally. The lower half, to which the globe B is attached, is connected by rods *c′ c′* to a flange, K′, formed upon the ends of the legs G, and the upper half of the trunk is thus made movable vertically without deranging the adjustment of the other parts. When lowered, by screwing the movable tube J′ down inside the trunk, the carbon rod *a* is fully exposed for manipulation, and its clamp *b* is readily opened for removing and inserting a fresh carbon. When the tube J′ is raised by lifting it into contact with the screw-thread *l* and turning it to screw upward, the top end of the tube is forced into contact with the under side of the flange K′, which is furnished with a soft packing-ring, *m*, to form a tight joint. The flange K′ and socket K require alike that the carbon rod *a* should pass through them without admitting air to the trunk C. Both are therefore shown provided with a flexible diaphragm, *n*, through a hole in which the rod passes snugly, as set forth in an application, No. 81,676, previously filed by me; but any other form of tight joint may be applied thereto. By the use of the aperture I a fresh carbon can be inserted into the top of the globe without disconnecting the latter, and by twisting the rod with the fingers at the space provided at F the carbon can be fully adjusted to a true central position. Its straightness can also be tested by the same method, and when it is adjusted centrally the lower carbon can be arranged by means I have devised to coincide exactly with its point. For such purpose the carbon-holder may be arranged to tilt, as shown in Fig. 2, where a diaphragm of sheet metal is clamped to the globe with the lower-carbon holder E inserted vertically in a hole in its center. The seat L, carrying the holder E and the diaphragm *e*, is provided with a recess, *k*, into which the shank of the holder projects, and three screws, *p*, are inserted through the sides of the recess from the outside, so that the holder can be tilted and held in the required position beneath the upper carbon.

By the construction in Fig. 2 I am enabled to adjust the carbons, or either of them, while the light is burning and without removing or deranging the globe B.

To facilitate the insulation of the trunk and its attachments from the regulator, I have devised the construction shown in Fig. 2, where M is the bed-plate of the casing A, and N is a disk or plate of insulating material upon which the entire regulator rests, and through which screws *t* are passed with insulating-collars *u* of the usual construction to hold the regulator to the plate M. By this construction the entire casing A and the trunk, globe, and lower-carbon holder are insulated from the regulator, and may have their proper electrical connections made at pleasure and in any desired manner, the same not being shown herein, as they form no part of my invention.

The term "air-tight" in the present specification is not to be taken literally, as the receiver in my construction is not operated under a vacuum or pressure, and there is therefore no especial tendency to a circulation therein. The external and internal pressures therefore adjust themselves by passage of the gases through the smallest opening, and a practically air-tight lamp is secured (in which fresh oxygen is excluded from the carbons) if all the joints are made tight, except that through which the slender carbon-rod is allowed to move easily. It is especially desirable that the bottom of the receiver should be kept really air-tight, as in my construction, for the carbonic products of combustion are heavy and have no tendency to rise and escape through the carbon-rod packing except when temporarily expanded by some rise in temperature, and it is at such particular time that they are likely to be forced into the regulator-casing if

the receiver and casing are not separated, as shown herein.

In my former application, No. 81,676, I have described the mode of making the carbon-rod joint practically air-tight, the object of my present improvements being to facilitate the introduction, removal, and adjustment of the carbons in such lamps.

An important advantage secured by the provision of the open space F between the casing and trunk is that the gases resulting from the combustion of the carbons are entirely prevented from gaining access to the interior of the casing and impairing the working of the regulator.

It is well known that the corrosion of some parts of such mechanism is sufficient to prevent the movements of the same, and to thus arrest the operation of the most essential part of the lamp.

It is obvious that any gas escaping from the upper part of the trunk past the packing *n* would be at once dissipated into the air, and that the passage of the rod *b* through a snugly-fitting hole, as at *n'*, secures entire protection for the inner mechanism from external influences.

I am aware that the union of a regulator-casing and a receiver by means of a trunk or tubular connection is not new, and I do not therefore make any claim to such combination herein.

I am also aware that it is not new to secure the lower carbon in the bottom of a glass receiver, and that other elements of my invention have been used before in combinations different from those claimed herein.

I am also aware that an electric lamp has been described in United States Patent No. 264,006 with an opening in the side of the trunk to gain access to the carbons; but my invention of an air-tight door for the same purpose is an improvement thereon, because it excludes the air from the burning carbons, which the said patent made no claim to do, because the arc was not operated in an air-tight globe or receiver. I do not therefore claim a door, broadly, and hereby disclaim such part of United States Patent No. 264,006, limiting my improvement and claim exclusively to a door adapted to operate in connection with an air-tight lamp of the class I have described herein.

I am also aware that lower-carbon holders have been provided with means for feeding the carbon longitudinally from the exterior of the receiver, and that it is not therefore new to support or feed a carbon in the bottom of a receiver. My means for adjusting the carbon laterally are not, however, adapted for feeding it at all, and I therefore consider the function of my adjusting device essentially different from those I allude to, while I disclaim any construction for feeding the lower carbon to or from the other.

Having thus set forth my invention, I claim the same as follows:

1. The combination, in an electric-arc lamp, of a regulator and its inclosing-casing, a practically air-tight receiver inclosing contiguous carbon points, a carbon-rod extended from the regulator into the tight receiver, a trunk or connection having an open space, F, between the regulator and receiver, and a packing or slip joint applied to the carbon-rod, where it passes from the receiver or connection into the open space F, substantially as and for the purpose set forth.

2. The combination, with the globe or receiver B, sustained by its upper flange only, of the seat L, provided with diaphragm and recess *k* beneath the same, and sustaining the carbon-holder E within the tight receiver, and the adjusting-screws *p*, extending through the walls of the recess *k* and operated to adjust the carbon-holder from the outside of the same, as and for the purpose set forth.

3. The combination, with the casing A, globe B, and trunk C, constructed air-tight, as described, and separated by an open space, F, for the purpose set forth, of the carbons and carbon-holders, and the regulator insulated from its inclosing-casing, substantially in the manner shown and described.

4. The combination, with the casing A, globe, B, and trunk C, constructed air-tight, as described, and separated by an open space, F, for the purpose set forth, of the means, substantially as described, for sliding one end or part of the trunk inside the other to expose the carbons.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WM. BAXTER, JR.

Witnesses:
J. MILLER SMITH,
WALTER J. KNIGHT.