

(No Model.)

P. H. FIELDING.
ELECTRIC ARC LAMP.

No. 576,103.

Patented Feb. 2, 1897.

Fig. 1.

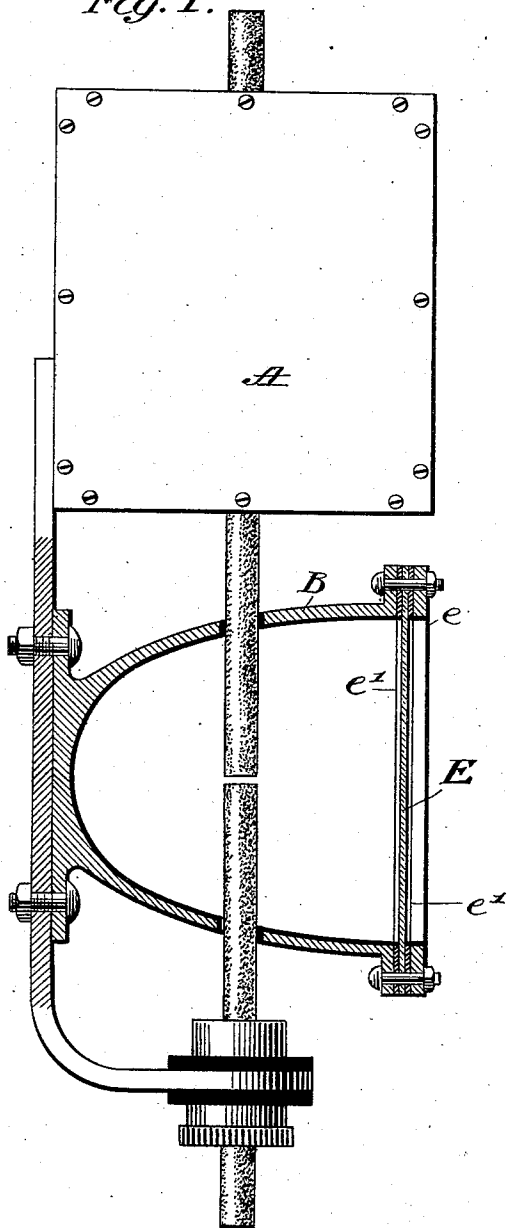


Fig. 2.

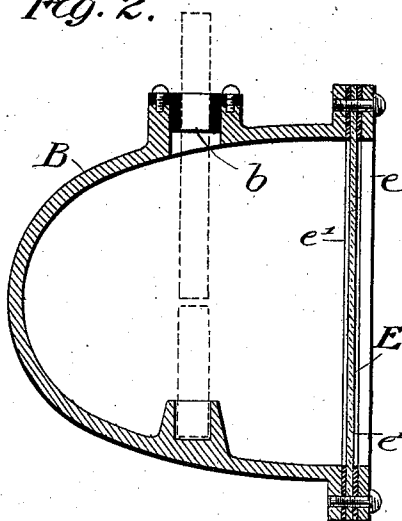
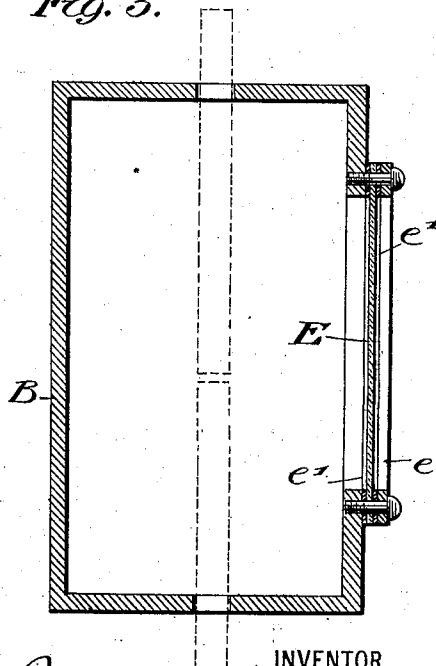


Fig. 3.



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ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 576,103, dated February 2, 1897.

Application filed April 23, 1896. Serial No. 588,734. (No model.)

To all whom it may concern:

Be it known that I, PHILIP H. FIELDING, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Arc-Lamps, of which the following is a full, clear, and exact description.

This invention relates to that class of arc-lamps known as "projection-lamps" and used for the purpose of stage illumination, stereopticons, railroad-headlights, search-lights, and similar purposes, the principal feature of which is that the light is required to be thrown in one direction instead of being diffused in all directions, as in lamps used for general illumination.

The invention consists of certain new and novel devices for securing greater economy of operation and steadiness of action than is possible with those lamps now in use.

The so-called "inclosed-arc" lamps consist of a small arc-inclosing chamber, air-tight at all points except where the upper carbon enters it, and having vent enough at this point to allow the escape of the expanded and heated gases from the chamber, but sufficiently tight to prevent any material interchange between the contents of the chamber and the surrounding atmosphere. The above-mentioned chamber is of such small dimensions that the oxygen of its contained air is quickly destroyed when the arc is established between the carbons, and thereafter the arc continues to burn in an atmosphere practically devoid of free oxygen. By this means several important results are obtained, the carbons burn away very slowly, and the light is more steady than in carbons exposed to the free action of air. There is no hissing or sputtering when the arc is first established. Owing to the very slow consumption of the carbons the feeding takes place only at infrequent intervals, thus again contributing to the steadiness of the light. The carbons in this type of lamp burn to flat ends and not pointed, as in the exposed arc, which fact prevents the troubles occasioned by their slipping past each other when the lamp is not in action. Furthermore, the arc-inclosing chamber acts as a perfect spark-

arrester, avoiding all danger of fires from that source.

Notwithstanding all of the above advantages the lamps of the inclosed-arc type are useless for the purposes I have named, as the arc-inclosing chamber, being a delicate globe of glass, will not withstand the rough usage to which such lamps are subjected, and, being highly heated when in action, are liable to fracture from drafts of cold air or from drops of water falling upon them.

In my lamp I have provided an arc-inclosing chamber of such substantial character that it is easily able to endure any treatment such lamps are subjected to and from which the light issues only in the direction desired. This is accomplished by transforming the frame or structure of the projecting lamp into an air-tight arc-inclosing globe or case, as will now be described with reference to the accompanying drawings, in which—

Figure 1 is a view of a complete lamp, the arc-inclosing structure being in section. Figs. 2 and 3 show modifications in the form of the arc-inclosing chamber.

A represents the case containing the feeding mechanism, which may be of any desired form or character, the exact description of said mechanism not being essential to my invention.

B represents the case of the arc-inclosing chamber. It is constructed of any desired heat-resisting and opaque material. I have used porcelain or stoneware for this purpose successfully, but prefer to construct it of metal, such as cast-iron or sheet-steel.

The carbons C and D enter the chamber, as shown, through perforations fitting quite closely therein, being merely free enough to slide easily, but not free enough to allow of any material circulation of air.

If the case B is of metal or other conducting substance, at least one of the carbons must pass through a bushing or lining of insulating material inserted in one or both of the holes, as shown in Fig. 2. I prefer to make a reflecting-surface on the inside of chamber B by lining it with a hard white enamel. If this is done, the enamel, being a non-conductor, may be extended through the

openings for the carbons and thus act as the insulating-bushing; or, if it be desired, the inner surface of B may be polished, thus making it a metallic reflector, in which case, of course, the bushings must be used.

E represents the window through which the light from the arc is projected. This window may be made of glass or of any desired transparent or translucent material, or may be colored any desired tint without departing from the spirit of my invention; but I prefer to make it of mica, this being very transparent and at the same time mechanically strong and not liable to injury. The transparent material, of whatever character, is to be secured by means of a clamping-ring *e*, with packing-rings *e'* interposed at the joints to render them air-tight and heat-resisting, asbestos being the best material for packing.

If the arc-inclosing chamber B is made of the proper curvature upon its inner surface and then lined with some good reflecting material, nearly all of the light developed at the arc will be projected from the window E, thus making a very efficient piece of apparatus.

If desired, one or more small additional windows might be inserted in the wall of B; as, for instance, a piece of dark-ruby glass might be inserted, which would furnish means for the operator to inspect the working of the arc at any time. Other slight changes may be made without in any way departing from the spirit of my invention, which consists, essentially, in providing an opaque air-tight arc-inclosing chamber and furnishing said chamber with a transparent or translucent window for the passage of the light, and also

in so designing these parts that they will be mechanically strong and durable.

Fig. 2 represents a modification of the arc-inclosing chamber, in which the lower carbon does not penetrate the wall of the chamber, but is held in a holder attached to the inside of said chamber, the chamber in this case being constructed of conducting material. This modification is rendered possible by the extremely-slow consumption of the negative or lower carbon, and might be used in places where it is desired to have the lamp as short as possible.

In Fig. 3 the arc-inclosing chamber is shown in the form of a cylinder. The carbons penetrate its interior from either end, and the window for the passage of light is formed, as shown, in its side.

Having thus described my invention, I claim—

In an arc-lamp, an opaque case made of heat-resisting material having a reflector formed on its inner surface and provided with a transparent window, openings in the case to admit the carbons, said openings being substantially air-tight and the case being hermetically sealed at all other points, whereby the life of the carbons is prolonged and the heat of the arc does not tend to injure the case, substantially as described.

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

PHILIP H. FIELDING.

Witnesses:

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