

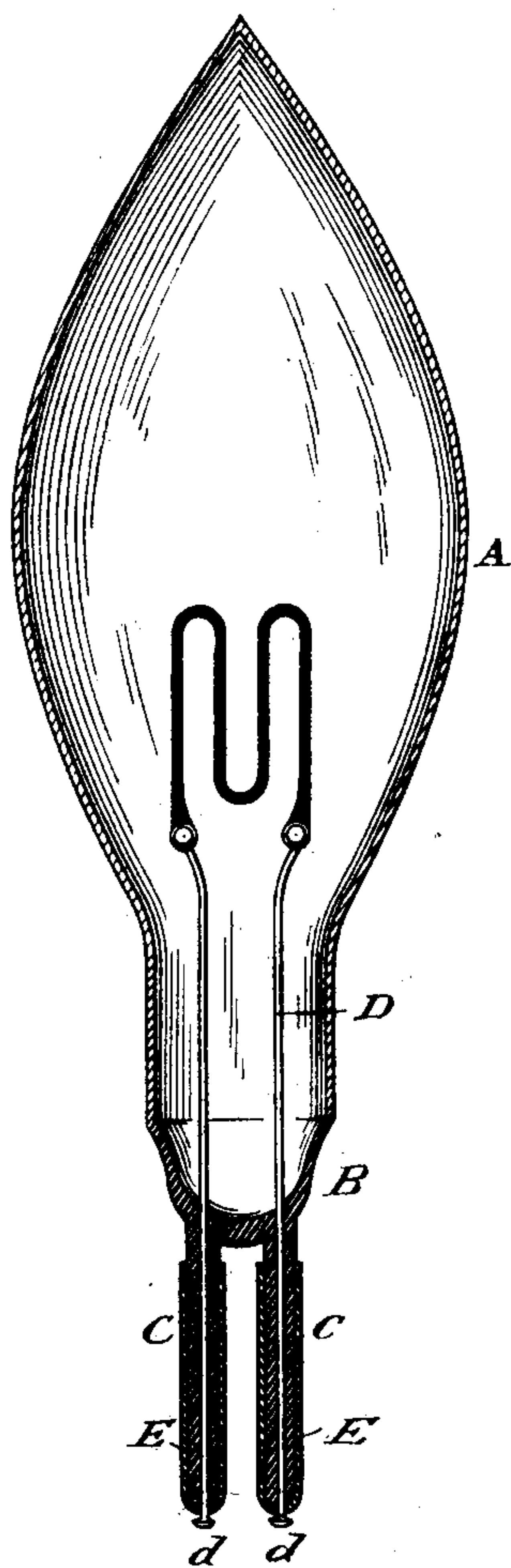
(No Model.)

E. WESTON.  
ELECTRIC LAMP.

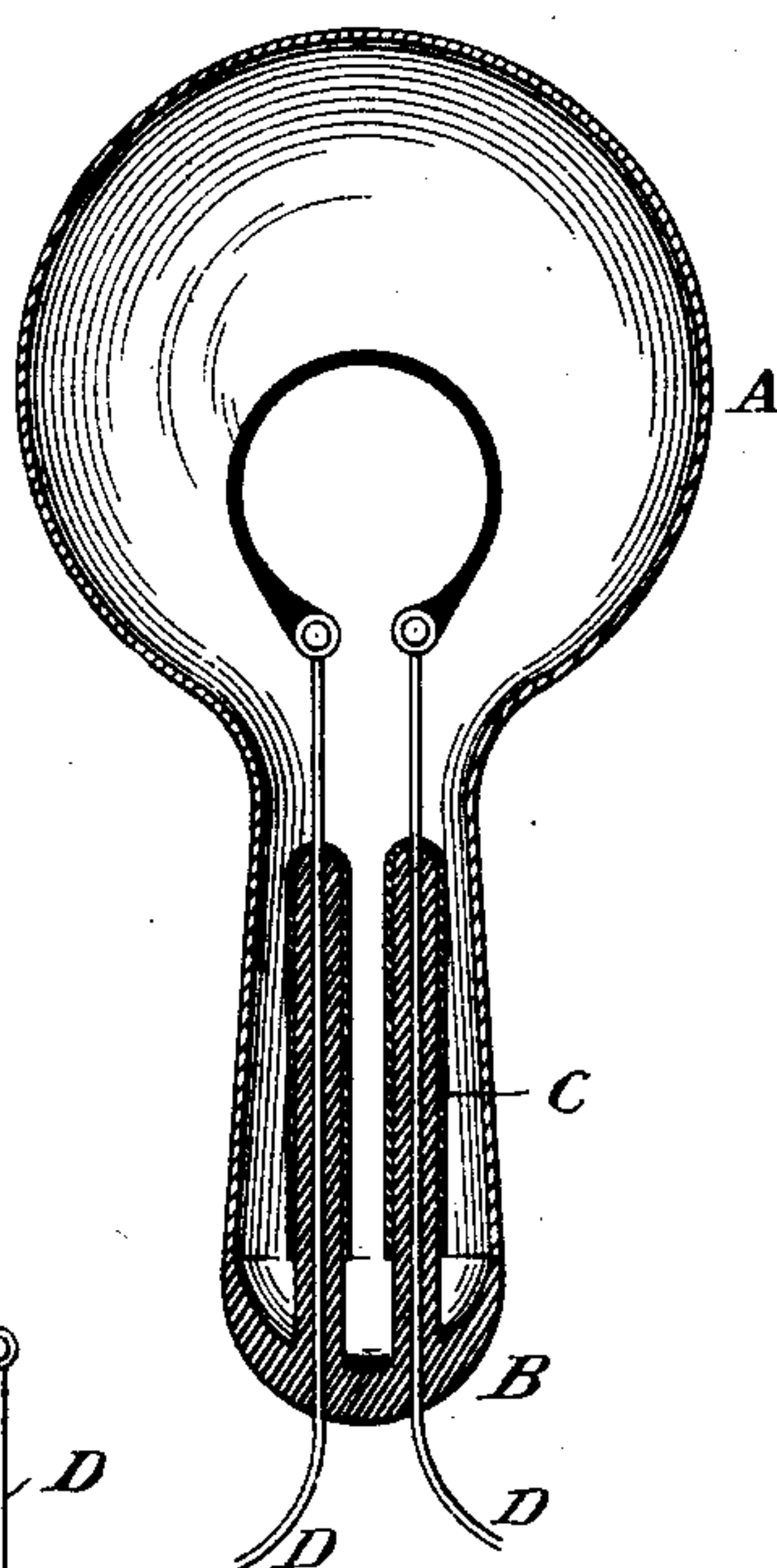
No. 255,363.

Patented Mar. 21, 1882.

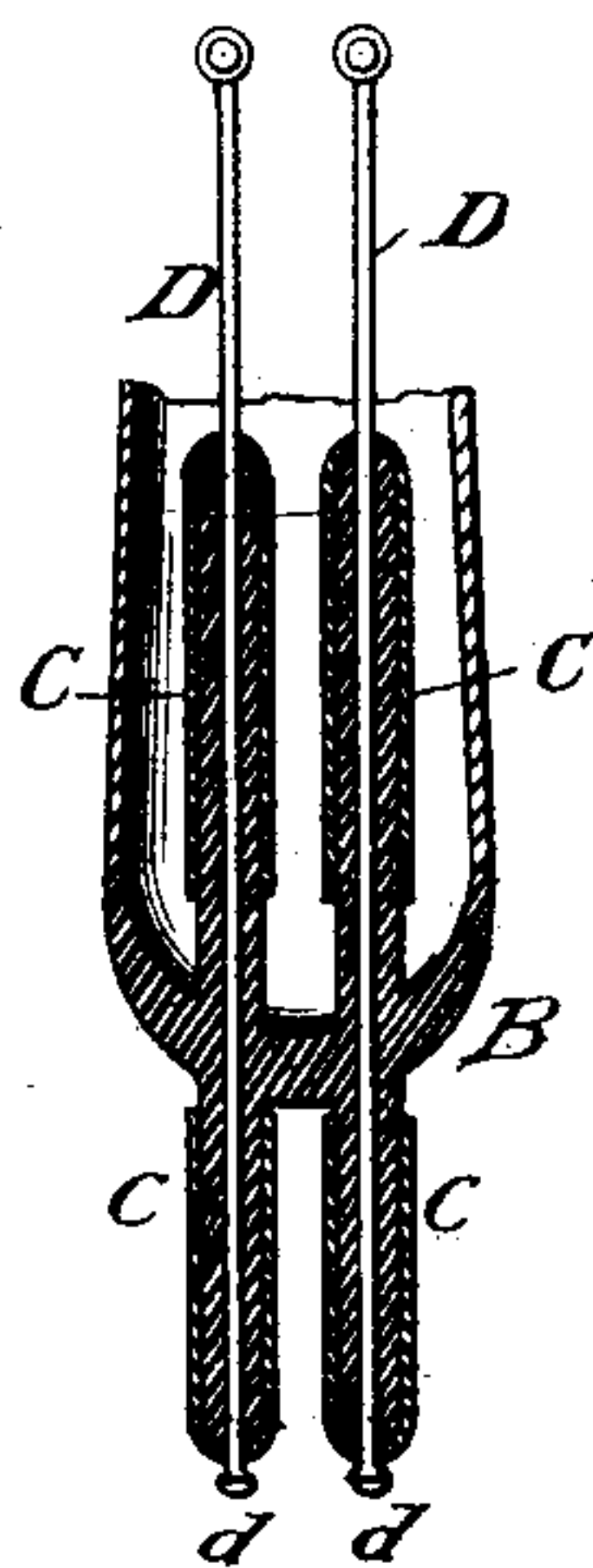
*Fig.1.*



*Fig.2.*



*Fig.3.*



*Attest:*

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# UNITED STATES PATENT OFFICE.

EDWARD WESTON, OF NEWARK, NEW JERSEY, ASSIGNOR TO THE UNITED STATES ELECTRIC LIGHTING COMPANY, OF NEW YORK, N. Y.

## ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 255,363, dated March 21, 1882.

Application filed August 10, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD WESTON, of Newark, in the county of Essex and State of New Jersey, have invented certain new and  
5 useful Improvements in Electric Lamps, of which I declare the following to be a full, clear, and exact description, reference being made to the drawings accompanying and forming a part of the specification.

10 My invention pertains to the manufacture of electric lamps wherein a conducting-strip of carbon or similar refractory substance attached to metallic supporting-conductors is hermetically sealed within an exhausted globe or receiver; and it relates particularly to a novel  
15 method of sealing into the lamp the said supporting-conductors, that is distinguished from the methods heretofore resorted to for accomplishing this object by its greater simplicity and effectiveness.

Previously to my invention the sealing in of the conductors has been effected in a variety of ways, the best known and most important of which are in substance as follows: The wires  
5 are passed through air-tight glands in a metal cap, which is then secured to the open end of a transparent receiver, or they are embedded or sealed directly into a mass of glass, which is united by the application of heat to the globe.  
30 The conditions of a stable vacuum—an essential feature in the lamps as now made—are probably never reached in the former case, while in the latter they have been attained only by the highest degree of skilled workmanship and the employment of a metal—such as platinum—which possesses approximately the same coefficient of expansion under high temperatures as glass. These difficulties are not encountered in the construction of the lamp made according to my invention, in pursuance of which I form a lamp in  
40 two separate parts, one constituting the inclosing globe or receiver, the other a sealing-base and support for the conductors and carbon. The former is of any desired shape, and has an open  
45 neck, through which the carbon-conductor, when mounted, is inserted, and which is then closed by welding to its rim the base. The character of this latter, with certain restrictions, may be indefinitely varied. A simple  
50 disk of rather thick glass may be used; but I

prefer to make it in the form of a shallow cup, the thickness of the sides being the same as that of the main portion. In the bottom of the base two or more tubes of glass are set by the ordinary method of welding, extending either  
55 above or below or on both sides of the cup, and through these tubes I pass short lengths of wire of any good conducting metal and of a diameter as nearly as possible equal to that of the interior of the tubes. To bridge over this air-space  
60 between the wires and the glass, and thus form a perfectly air-tight seal for the wires, I coat the tubes on and near the ends projecting from one side of the base with a thin film of metal. This is applied both to the glass and to the wires  
65 where they leave the glass, so that the two are united by a delicate conducting-surface. A convenient way of forming this coating is to apply by a brush a mixture of chloride of platinum and oil of lavender to the adjacent surfaces  
70 of the glass and the wires, and then to apply heat thereto until only the film of platinum remains. This is then exposed to a high temperature until it is fused into the surface of the glass, when the whole is immersed in an electro-  
75 plating bath and a coating of copper of sufficient thickness to insure a perfectly air-tight and durable seal deposited thereon. To the free ends of the wires projecting up from the concave surface of the base the carbon is then attached  
80 and the base joined to the lamp in the usual manner, after which the globe is exhausted.

In the accompanying drawings I have shown in section portions of lamps of slightly-different character embodying my invention. 85

In Figure 1 the globe A is closed by a base, B, to which the tubes C C are fixed by being welded into apertures formed therefor in the usual way. Through the tubes C C metal conductors D D are passed, their ends being flattened slightly, as shown at *d d*, for the purpose  
90 of forming convenient contact-surfaces. In this case the tubes project only from the bottom of the base outside the lamp, and the coatings of metal are applied thereto in the manner above  
95 described, E E designating the coatings. An advantage of this form is that the ends of the tubes, with their coatings of metal, may be used as the terminals of the lamp, and the connections from the line made directly therewith. 100



In Fig. 2 the position of the tubes is reversed, in this case they being attached to the base so as to extend up into the globe. Here the sealing is effected in the same way, but is entirely  
5 within the globe. Still another form would be to extend the tubes on both sides of the base, as is shown in Fig. 3, in which case the seal may be applied at either or both ends, as may be desired, and in fact a great number of modi-  
10 fications are possible, all of which follow directly from the above and differ in no essential particulars from them.

In the preceding glass is mentioned as the material composing the sealing-tubes. It will,  
15 however, be found advisable in most instances to use a glass which contains in its composition a larger proportion of metal—such as the oxides of iron and copper—than is usual, for I have found that the metal coating more readily adheres to  
20 this than to ordinary glass. So, too, instead of platinum, other metals may be used for the conducting-coating, such metals being gold, silver, iridium, and in general any metal that can be applied to glass in a similar manner to the above  
25 and which will not seriously oxidize under the heat necessary to fuse it into the surface of the glass.

In forming the preliminary metallic film it is safer to apply several coatings, owing to the  
30 extreme thinness of the film remaining after the application of heat, and it is particularly to be observed that the film thus formed must be incorporated with the glass, and for this reason it must be exposed to a temperature suffi-  
35 ciently high to fuse it into the surface of the

glass. Otherwise it is almost certain to peel off the instant it is placed in the electroplating bath.

Having thus described my invention, what I claim as new, and desire to secure by Letters  
40 Patent, without reference to the specific character of the lamps to which the invention may be applied, is—

1. The method of sealing metallic conductors in glass, which consists in forming between  
45 the said conductors and the glass a film or coating of conducting metal, fusing the same into the surface of the glass, and then forming a coating of metal thereon by electro-deposition, substantially as set forth. 50

2. The combination, in an electric lamp, of tubes or projections welded to the glass forming the globe, with metallic conductors passing through and united to the said tubes by imper-  
55 vious films or coatings of metal incorporated with the glass, substantially such as described.

3. The combination, in an electric lamp, of tubes or projections welded to the glass forming the globe, with metallic conductors passing through and sealed into the said tubes by  
60 connecting films of conducting material covered and strengthened by a coating of metal electro-deposited thereon, substantially as set forth.

In testimony whereof I have hereunto set  
65 my hand this 6th day of August, 1881.

EDWARD WESTON.

Witnesses:

PARKER W. PAGE,  
CLAYTON KNEELAND.