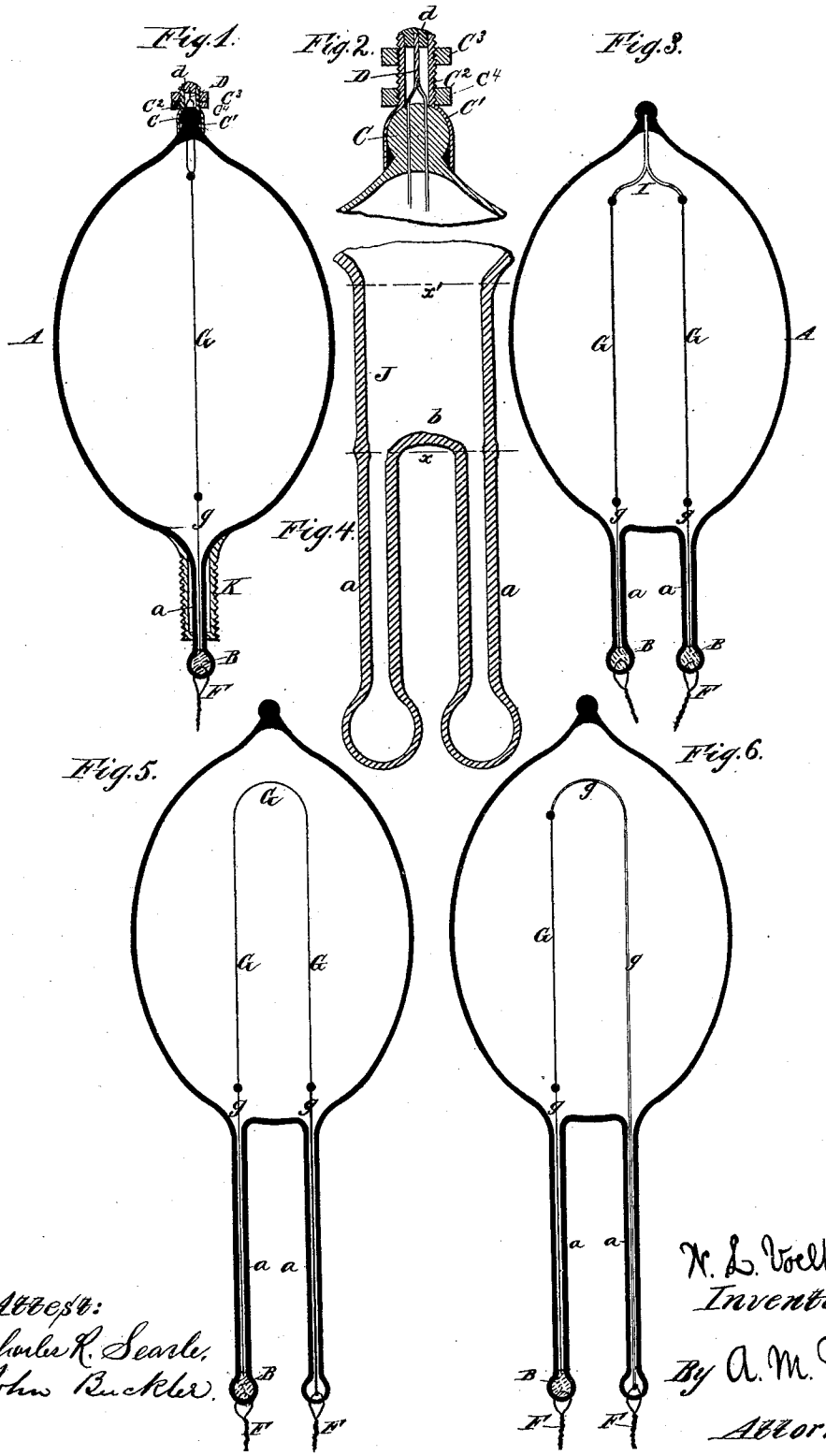
(No Model.)

# W. L. VOELKER.

## ELECTRIC LAMP.

No. 247,227. Patented Sept. 20, 1881.




Witnesses:
Charles K. Searle,
John Buckler.

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# UNITED STATES PATENT OFFICE.

WILLIAM L. VOELKER, OF MORTON, PENNSYLVANIA.

## ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 247,227, dated September 20, 1881.

Application filed June 7, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM L. VOELKER, of Morton, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Electric Lamps, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention relates especially to that class of electric illuminators known as "incandescent lamps," and has for its object the production of an effective and durable device wherein the arrangement of the carbon or carbons is such as to obviate danger of breaking when heated to the necessary degree by the passing current of electricity; and my invention involves certain novel and useful combinations or arrangements of parts and peculiarities of construction and operation, all of which will be hereinafter first fully described, and then pointed out in the claims.

In the drawings, Figure 1 is a sectional view of a lamp wherein a single straight carbon is employed. Fig. 2 is an enlarged section of the top connection upon said lamp. Fig. 3 is a sectional view of a lamp employing two straight carbons; and Fig. 4 is an enlarged section of the base of the lamp, illustrating the construction of the same. Figs. 5 and 6 are modified forms of my lamp.

Like letters of reference, wherever they occur, indicate corresponding parts in all the figures.

A is a glass bulb inclosing carbon or carbons G, the air being exhausted from said bulb by the well-known means. The lower extremity of bulb A in Fig. 1 is elongated, so as to form a tube, *a*, said tube being slightly enlarged at bottom, forming a receptacle for a small quantity of mercury or equivalent conducting-fluid, B. At the top of the glass bulb A is formed an enlargement, C, through which one conductor from the line-wire to the inclosed carbon passes. C′ is a metal cap, fitting over the enlargement C. At the top of this cap is a screw-threaded projection, $C^2$, provided with nut $C^3$, for the purpose of making connection with the lamp.

$C^4$ is a nut, against which the wire forming the connection may be clamped; or, if desired, a shoulder, constituting a bearing for the same, may be formed upon the cap, around the screw-threaded projection therefrom.

D is the connection with the upper extremity of the carbon, said connection being soldered or otherwise secured to the metal upon the cap at *d*. In placing the cap upon the glass it may be affixed thereto by use of plaster or any other preferred material. Other clamping devices might be used upon the metallic cap-piece secured to the glass bulb in the manner described.

It is well known that in order to secure the maximum illuminating-power of lamps belonging to this class the conductor from the exterior of the lamp through the glass to the carbon should be of low resistance; but where large wire is used there is great danger of cracking the glass, by reason of the heat generated by the current of electricity passing over said wire. To overcome this difficulty and still attain the end desired, I divide the conducting-wire upon the exterior of the glass into two or more strands, F, pass them through the glass at different places and at some distance from each other, reuniting them upon the interior of the lamp. By this method the heat is distributed over a large space of glass, and there is practically no danger of cracking the same by too rapid expansion.

To the lower extremity of carbon G, Fig. 1, I electroplate or otherwise attach a short wire, *g*. This wire extends downward, nicely fitting in tube *a*, the lower end thereof dipping into mercury B, completing the electric circuit. By this mode of construction it will be seen that the expansion of the carbon caused by passing a current of electricity therethrough, will not strain it in any way, as it is practically free at its lower extremity.

At the base of the lamp, as shown in Fig. 1, I affix by means of plaster, or in any other preferred manner, a screw-threaded collar, K, for the purpose of securing the lamp to a bracket, chandelier, or other suitable support.

In the lamp shown in Fig. 3 two straight carbons are employed, united at top by the metal yoke I, affixed to the glass forming the bulb, as shown. These carbons are provided at their lower extremities with metallic connections *g g*, which extend down the tubes at the

base of the lamp into the mercury, the operation of the lamp being the same as before explained.

Fig. 4 illustrates the mode of constructing the tubes and lower portion of a lamp wherein two tubes are employed. For convenience the parts are shown enlarged. The tubes *a* are first united by heat at *b*, as shown by the dotted line *x*. The large section of tube J, forming the neck of the bulb A, is now united to the tubes *a*, and bulb A affixed thereto at the dotted line *x'*, the small bulbs, for containing the mercury upon the lower extremity of the small tubes, being first blown therein.

In Fig. 5 the glass portion of the lamp is constructed in the same manner and of the same shape as described for Fig. 3, but only one of the bulbs upon tubes *a* contains mercury, and the carbon is bent in form, the supporting-yoke I being dispensed with. The metal attached to the carbon upon one extremity is connected directly to the line-wire communicating with the exterior of the lamp, said wire being of such size as to fit the tube *a* and support the bent carbon bearing the other metal connection communicating with the mercury in the bulb upon the opposite tube, thus allowing the carbon to freely expand and contract, as before.

In Fig. 6 the construction and operation of the lamp are the same as in Fig. 5, with the exception of the metallic support for the carbon extending around the curve, the carbon attached thereto being straight.

My improved lamp may be placed in any form of support, and in practice will be found economical to make and keep in order, the danger of breaking of either carbon or glass bulb is overcome, and it will be found to admirably answer the various uses and purposes for which it is intended.

Having now fully described my invention, what I claim as new herein, and desire to secure by Letters Patent, is—

1. In an electric lamp, an incandescent strip or filament whose terminal or terminals dip freely into a mass of conducting-liquid for the purpose of making the electrical connection, and at the same time allowing free expansion of the filament, substantially as shown and described.

2. In an electric lamp, the combination of the enlargement C, metallic cap-piece C', and clamping or connecting device upon said cap-piece for making connection with the outside or main conductor.

3. The combination of the hollow metallic cap-piece screw-threaded upon its exterior, the clamping-nut, and the conductor leading or extending through the bulb supporting said cap-piece, substantially as shown and described.

4. In an electric lamp of the character herein specified, a carbon held in electric contact at its upper extremity, and having free contact at its lower extremity with the other pole of the circuit, substantially as shown and described.

5. In an electric lamp, the cap C', screw-threaded projection $C^2$, nut $C^3$, and solder *d*, the whole combined and arranged to operate substantially as shown and described.

6. The herein-described method of constructing the lower portion of the glass bulb of an electric lamp by first forming the tubes *a* and then uniting them to a short section of tube, J, to which the bulb is to be attached, said tubes *a* extending below the bulb upon the exterior thereof, substantially as shown and described.

7. In an electric lamp of the character herein specified, the combination, with bulb A, of the carbon G, conductors D *g*, and mercury B, substantially as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand in the presence of two witnesses.

WILLIAM L. VOELKER.

Witnesses:

CHARLES R. SEARLE,

F. W. HANAFORD.