

(No Model.)

H. S. MAXIM.  
Electric Lamp.

No. 237,198.

Patented Feb. 1, 1881.

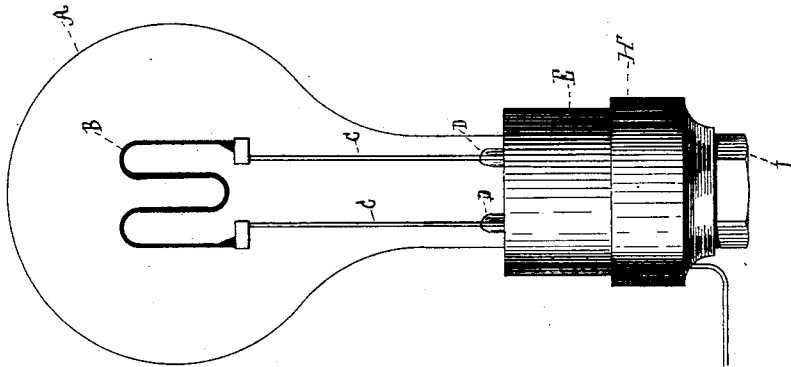


Fig. 2.

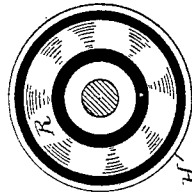


Fig. 3.

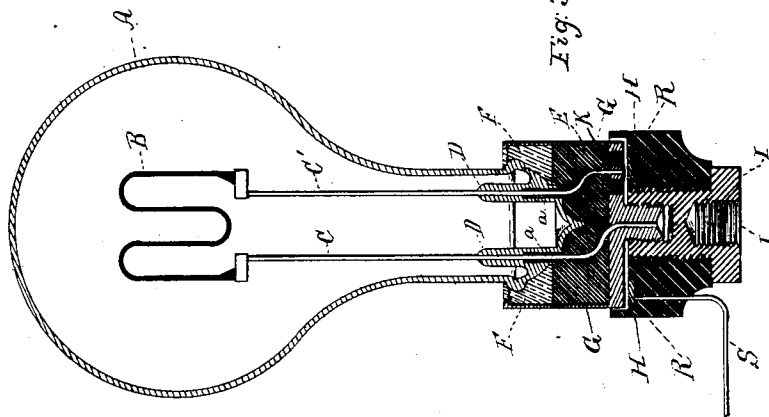


Fig. 1.

Witnesses.

L. H. Latimer,  
Edward E. Curtis

Inventor.

Hiram S. Maxim

# UNITED STATES PATENT OFFICE.

HIRAM S. MAXIM, OF BROOKLYN, ASSIGNOR, BY MESNE ASSIGNMENT,  
TO THE UNITED STATES ELECTRIC LIGHTING COMPANY, OF NEW  
YORK, N. Y.

## ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 237,198, dated February 1, 1881.

Application filed March 9, 1880. (No model.)

*To all whom it may concern:*

Be it known that I, HIRAM S. MAXIM, of the city of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Electric Lamps, of which the following is a specification, reference being had to the accompanying drawings, which form a part hereof.

My invention relates to electric lamps having a continuous incandescent conductor inclosed in a sealed glass globe exhausted of air; and it consists in an improved method of sealing the globe where the electrical connections pass into it, and in an improved device for opening and closing the circuit of such lamp.

In the drawings, Figure 1 is a vertical section of a lamp constructed in accordance with my invention. Fig. 2 is a side elevation, and Fig. 3 is a horizontal section of the base of the same.

Similar letters of reference indicate like parts in each.

A is a globe, made entirely of glass, inclosing the incandescent part of the lamp.

B is an incandescent conductor of carbon, made in any convenient form, but preferably arranged entirely above its supports, as shown in the drawings. This conductor should be made of high or low resistance, according as a large machine of high electro-motive force is used to operate many lamps, or a small machine is used to operate few lamps.

C C' are platinum supports clamped to the lower ends of the carbon conductor. They serve, also, as conductors of the current to the carbon, and pass through the globe at D D', where tubes of glass, constructed in one piece with the globe, are drawn up about the platinum connections, and sealed to them. These tubes are made tapering, so as to leave capillary spaces *a a* between the platinum wires and the tubes below the point where they are sealed.

E is the base of the lamp, constructed of metal or any other suitable material.

F is plaster-of-paris, cementing the globe to the base.

G is shellac or copal, melted and poured into the base when inverted, so as to cover the

entire lower end of the globe and fill up the tubes *a a* about the connections.

H is a sub-base, constructed of vulcanite or other insulating material with a metallic core, I. It screws onto a nipple on the under side of the base, and has a socket, J, for attaching it to an ordinary gas-fixture. The connection C is carried down and joined to the metallic part of the base, but the connection C' terminates in a metallic plug, K, carried out slightly beyond the lower surface of the base, but entirely insulated from it.

R is a ring of metal inserted in the vulcanite part of the sub-base and flush with its upper face, directly under the end of the plug K, so that when the base is screwed down the plug will form a contact with the ring. The connection C' is continued outside of the sub-base in the wire S, which is joined to the ring R, while the connection C is continued through the gas fixture and pipe.

The carbon conductor B is mounted upon the supports C C', and the supports are sealed into the globe A at D D', before the air is removed from the globe. The air is then exhausted as perfectly as possible by means of a proper air-pump through an opening in the bottom of the globe, (not shown in the drawings,) and an atmosphere of hydrocarbon vapor, preferably vapor of gasoline, is then admitted into the globe, and this atmosphere is in turn exhausted as perfectly as possible, thus leaving a highly attenuated or rarefied atmosphere of hydrocarbon vapor in the globe, which is then hermetically sealed. The base is then cemented to the globe, and melted shellac and copal, or other resinous gum free from oxygen, is poured into the inverted base, so as to fill the capillary spaces *a a* and cover the lower end of the globe where the connections emerge from it. The base is then mounted upon its sub-base, and the whole is attached to an ordinary gas-fixture. One connection from the generator of electricity is attached to the gas-pipe and the other to the wire S, and the lamp is ready for use.

The operation of this lamp is as follows: The base is screwed down upon its sub-base by turning the lamp, and the plug K is brought

into contact with the ring R, thus completing the electrical circuit of the lamp, and a current of electricity passes through the carbon B, heating it to incandescence. Nearly all of the carbon in the slight residuum of hydrocarbon vapor left in the globe is precipitated upon the carbon conductor, or unites with any trace of oxygen present, and an almost perfect vacuum is established.

10 If there is any imperfection in the sealing of the globe about the connections, or if any slight cracks are made in the base of the globe by the unequal expansion and contraction of the parts, all leakage of air into the globe is  
15 effectually prevented by the gum or wax G, and even if heat enough is generated in the conductors to melt the gum the part in the tubes *a a* will be prevented by capillary attraction from dropping out, and the sealing of  
20 the connections will remain perfect.

I do not claim, however, in this application, the use of an attenuated atmosphere of hydrocarbon vapor or gas in the globe of such a lamp, as I have made such use of hydrocarbon  
25 the subject of a previous application filed October 4, 1878; but

Having described my invention, what I

claim as new, and desire to secure by Letters Patent, is—

1. The combination of the globe A with the platinum connections C C', and the capillary spaces *a, a* filled with gum or wax, substantially as described. 30

2. The combination, with the globe of an incandescent electric lamp, of glass tubes extending up into said globe and surrounding the supporting-conductors of the incandescent part of the lamp, the spaces in the said tubes being packed with a solid sealing substance. 35

3. The combination of the base E, carrying the plug K, with sub-base I and the ring R, substantially as described. 40

4. In an electric lamp, the combination of a continuous incandescent conductor mounted upon electrical connections of platinum with a globe of glass inclosing such conductor and sealed directly to said electrical connections, and wax or gum applied to said globe where the electrical connections pass through it, substantially as described. 45

HIRAM S. MAXIM.

Witnesses:

MAURICE B. HULL,  
HENRY HINE.