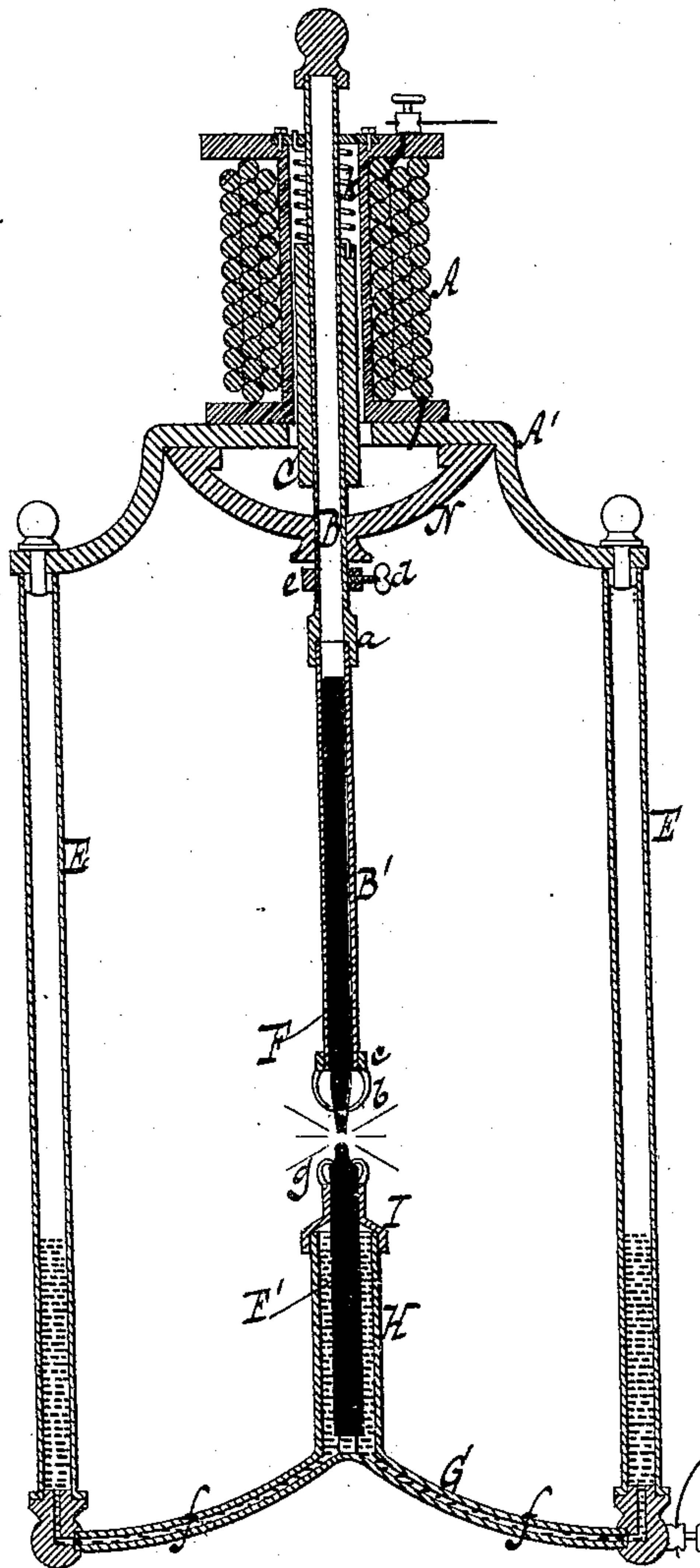


(No Model.)

L. DAFT.  
ELECTRIC LAMP.

No. 249,019.

Patented Nov. 1, 1881.



Witnesses  
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# UNITED STATES PATENT OFFICE.

LEO DAFT, OF GREENVILLE, NEW JERSEY.

## ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 249,019, dated November 1, 1881.

Application filed December 20, 1880. (No model.)

*To all whom it may concern:*

Be it known that I, LEO DAFT, a subject of the Queen of Great Britain, residing at Greenville, in the county of Hudson, in the State of New Jersey, have invented new and useful Improvements in Electric Lamps, of which the following is a specification.

My invention relates to electric-light mechanism; and it consists in the following specific device, or its equivalent, whereby the carbon sticks usually employed are automatically adjusted and kept in such a position and relation to each other that a continuous and effective light shall be had without the necessity of manual interference.

My invention also relates to the arrangement and construction of the frame supporting the electric lamp, as will hereinafter appear, whereby a perfect insulation between the two carbons is effected and the light is improved.

The drawing represents a sectional front view of my lamp.

In this drawing, the letter A designates a helix of insulated wire in the form of a tube or hollow cylinder, which rests upon the upper yoke or traverse, A', connected by glass tubes E E with the lower traverse, G.

Within the axial cavity of the helix A is contained the iron core C and the rod B, which latter is fixed or firmly secured to the core and moves together therewith freely within the cavity of the helix, the rod being guided in the top plate of the helix and in a bridge, N, which is secured to the under side of the traverse A'. The rod B is by preference made in two sections, which are united by a screw-coupling, a, and in the lower tubular section, B', is placed loosely the upper or positive carbon, F, so that the carbon moves freely therein and can descend by its inherent gravity.

To the lower end of the tubular section B' of the rod B are secured carbon-detaining fingers b, which extend from an annular head, c, screwed or otherwise secured to the end of the section B'. These fingers b are by preference made of platinum, porcelain, or other refractory material, to avoid injury thereto by the heat to which they are exposed when the lamp is in operation, and their points bear against the tapering sides of the lower end of the carbon F in such a manner that as the carbon is consumed the fingers allow it to sink down automatically and with-

out requiring any manual interference until nearly all the carbon is consumed, while at the same time any upward motion of the rod B and core C is shared by the carbon.

On the rod B is secured by a set-screw, d, a ring, e, which acts as a stop to the upward motion of the parts, as hereinafter more fully explained.

The traverse G is fully insulated from the traverse A by being connected thereto through the glass tubes E E, as before stated. From the traverse G rises a tube, H, which communicates with the interior of the glass tubes E E by channels f in the traverse G, and into which is placed the lower or negative carbon, F'.

On the top of the tube H is firmly secured a cap, I, which forms the guide for the lower carbon, F', and from the upper end of which branch detaining-fingers g, by preference made of refractory material. These fingers are so shaped that they bear against the sides of the tapering end of the lower carbon, F', and by this means the carbon is prevented from being forced up beyond the desired point by its impelling device, next described. Through the glass tubes E E the holder H is supplied with a liquid—such as mercury—in such a manner that it has a tendency to force the carbon F' upward, and hence the carbon moves upward automatically as it is consumed, and its point maintains the required position without manual interference. When the carbons F F' have been properly adjusted, and before a current of electricity is passed through the lamp, the rod B sinks down until the point of the carbon F meets that of the carbon F'.

In the cavity of the helix A is inclosed a spring, k, which surrounds the rod B and is connected at one end to the upper end of the core C, and at its opposite end to the cap closing the cavity in the helix, thus constituting a support for both the core and the rod. The tension of this spring k is so adjusted that it counterbalances the weight of the core C and rod B when the two carbons are in contact, and by its means the core is rendered susceptible to slight variations in the electric current.

It is obvious that a weight can be substituted for the spring k.

Now, one pole of a battery or other suitable source of electricity being attached to the traverse G, while the other pole is connected



through the helix to the traverse A', the electric current passes from the latter through the helix A, rod B, and carbons F F' down to the traverse G, thus completing the circuit. The  
 5 core C, by the force of the axial magnetism thus created, is drawn up within the cavity of the helix, carrying up with it the rod B and carbon F, and as the carbons are thus separated the electric light is produced. By a proper  
 10 adjustment of the tension of the spring k or its substitute the carbon F is raised by the core C exactly to the desired distance from the carbon F', provided the strength of the electric current remains uniform; but in order to prevent the rod B from rising up too far, the stop  
 15 e is applied to it, and so adjusted that the carbon F can be raised only a little beyond the desired distance. As the carbons burn away the carbon F sinks down by its inherent gravity, and the carbon F' is raised by the action of the  
 20 liquid in the holder H, and hence a constant voltaic arc is maintained at one and the same point or focus; but if, from some cause—such, for instance, as the formation of a crater on the  
 25 negative carbon, which is liable to break off—the voltaic arc should be increased, thereby diminishing the strength of the electric current, owing to the increased resistance, then the magnetism of the helix is weakened, and accordingly the core. The rod B and the carbon  
 30 F move downward, by force of gravity, until the consequent shortening of the voltaic arc increases the strength of the current and stops the downward movement; or if, from any  
 35 cause, the voltaic arc should be increased, and consequently the force of the electric current weakened, to such an extent that the core C, rod B, and carbon F are permitted to sink down until the point of the carbon F comes in  
 40 contact with the point of carbon F', then the strength of the current increases instantly to such an extent that the core and rod B are raised until caught up by the stop e, and the correct voltaic arc is immediately restored. If  
 45 the carbon F has been consumed, the lower tubular section, B', of the rod B is unscrewed, and after a fresh carbon has been introduced, said section is replaced. If the carbon F' is consumed, the cap I is taken off, so that a fresh  
 50 carbon can be introduced into the holder H.

An additional advantage of the glass tubes E E, connecting the traverses A' G, is that they produce much less shade than the metallic rods or standards usually employed in electric lamps.

I am aware that the detaining-fingers have been applied to a carbon-holder which is connected to the armature of an electro-magnet by clamping devices, the carbon being forced  
 60 downward by means of a weight arranged in the holder, and also that the axial magnetic core has been used in combination with a rod sliding through it, and such not being within the scope of my invention, I hereby disclaim  
 65 the same.

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

1. In an electric lamp, the combination, with the helix A and its axial magnetic core C, of a rod, B, which is fixed to the core and slides  
 70 freely in the helix together therewith, a carbon placed loosely into the lower hollow end, B', of the rod B, and detaining-fingers arranged on the lower end of said rod to act upon the conical end of the gravitating carbon, all constructed to operate substantially as described,  
 75 for the purpose set forth.

2. In an electric lamp, the combination, with the helix and its loose axial magnetic core C, of a rod, B, which is fixed to the core and slides  
 80 freely in the helix together therewith, a carbon placed loosely into the lower hollow end, B', of the rod B, detaining fingers arranged on the lower end of said rod to act upon the conical end of the gravitating carbon, and a stop,  
 85 e, secured to the rod B, all constructed to operate substantially as described, for the purpose set forth.

3. In an electric lamp, the combination, with the helix A and its loose axial magnetic core  
 90 C, of a rod, B, which is fixed to the core and slides freely in the helix together therewith, a carbon placed loosely into the lower hollow end, B', of the rod B, detaining-fingers arranged on the lower end of the rod to act upon the  
 95 conical end of the gravitating carbon, and a balance spring or weight supporting the core and rod, all constructed to operate substantially as described, for the purpose set forth.

4. In an electric lamp, the combination, with  
 100 the helix A and its loose axial magnetic core C, of a rod, B, which, is fixed to the core and slides freely in the helix together therewith, a carbon placed loosely into the lower hollow end, B', of the rod B, detaining-fingers arranged  
 105 on the lower end of the rod to act upon the conical end of the gravitating carbon, a stop, e, fastened to the rod B, and a balance spring or weight supporting the core and rod, all constructed to operate substantially as described,  
 110 for the purpose set forth.

5. The combination, in an electric lamp, of a holder, H, for the lower carbon, constructed to receive a liquid, such as mercury, whereby the carbon is automatically forced upward, and  
 115 detaining-fingers arranged on the upper end of the holder to act on the conical end of the carbon, substantially as described, for the purpose set forth.

6. The combination, in an electric lamp, of  
 120 two carbons, F F', a holder, B B', in which the upper gravitating carbon, F, is free to move, detaining-fingers, which are attached to the holder B B' and allow the carbon F to sink down by its inherent gravity as its point is  
 125 consumed, a holder, H, for the second or lower carbon, F', constructed to receive a liquid, such as mercury, whereby the lower carbon is automatically forced upward, and detaining-fingers arranged on the upper end of the holder H to  
 130 bear against the conical end of the lower carbon, all constructed to operate substantially as described, for the purpose set forth.

7. In an electric lamp, the combination, with



the helix A and its loose axial magnetic core C, of a holder, B B', fixed to the core and sliding together therewith in the helix A, a carbon placed loosely into said holder, detaining-fingers *b*, arranged on the lower end of the holder B B' to act on the conical end of the gravitating carbon, a holder, H, for the second or lower carbon, F', constructed to receive a liquid, such as mercury, whereby the lower carbon is automatically forced upward, and detaining-fingers arranged on the upper end of the holder H to act on the conical end of the lower carbon, all constructed to operate substantially as described, for the purpose set forth.

8. In an electric lamp, the combination, with the helix A and its loose axial magnetic core C, of a holder, B B', fixed to the core C and sliding together therewith in the helix A, a stop, *e*, secured to said holder, a carbon, F, placed loosely in the holder, detaining-fingers *b*, arranged on the lower end of the holder to act

on the conical end of the gravitating-carbon, a holder, H, for the second or lower carbon, F', constructed to receive a liquid, such as mercury, whereby the lower carbon is automatically forced upward, and detaining-fingers arranged on the upper end of the holder H to bear against the conical end of the lower carbon, all constructed to operate substantially as described, for the purpose set forth.

9. In an electric lamp, the combination, with the traverse A' and the holder B B', for the upper carbon, F, of glass tubes E E, a traverse, G, and suitable channels leading from the glass tubes into the holder H, substantially as described, for the purpose set forth.

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

LEO DAFT. [L. S.]

Witnesses:

W. HAUFF,

E. F. KASTENHUBER.