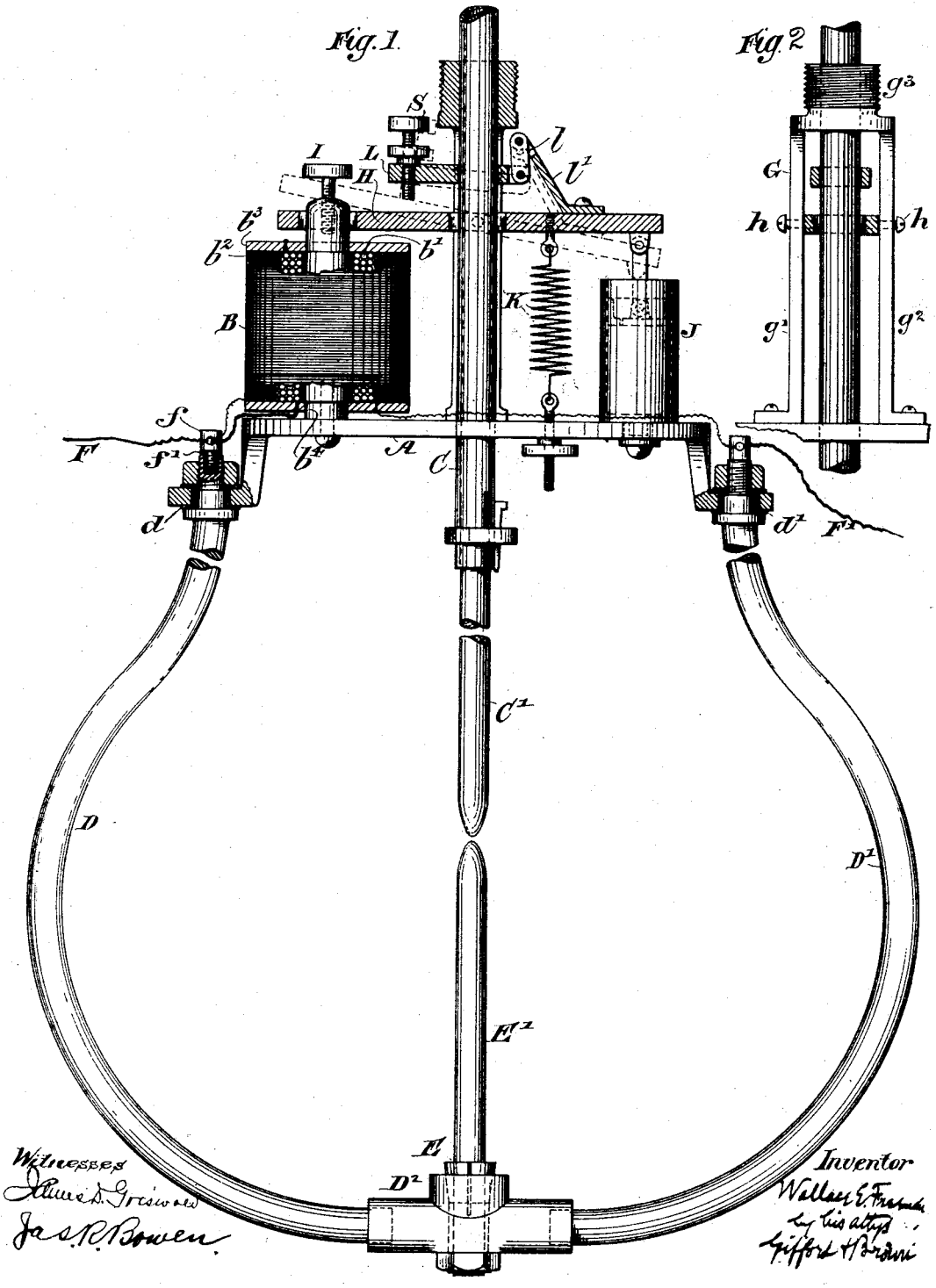
(No Model.)

W. E. FREEMAN.

ARC LIGHT.

No. 344,802. Patented June 29, 1886.



UNITED STATES PATENT OFFICE.

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ARC LIGHT.

SPECIFICATION forming part of Letters Patent No. 344,802, dated June 29, 1886.

Application filed June 2, 1886. Serial No. 203,939. (No model.)

To all whom it may concern:

Be it known that I, WALLACE E. FREEMAN, of Astoria, Queens county, State of New York, have invented a certain new and useful Improvement in Voltaic-Arc Electric Lamps, of which the following is a specification.

I will describe a lamp embodying my improvement, and then point out the various features in the claims.

In the accompanying drawings, Figure 1 is a sectional elevation of a lamp embodying my improvement. Fig. 2 is a sectional side view of a portion thereof in a plane at right angles to Fig. 1.

Similar letters of reference designate corresponding parts in both figures.

A designates a plate, upon which is mounted an electro-magnet, B, and mechanism operating in conjunction therewith for controlling the descent by gravity of a rod, C, which forms a holder for the upper carbon, C', of the lamp. From the plate A extend downwardly metallic rods D D' to a metallic connecting-piece, D^2, which has secured to it a holder, E, for the lower carbon, E', of the lamp. The rods D D' are insulated from the plate A by means of washers *d d'*, of rubber or other insulating material, and they are secured to the plate by means of nuts engaging with screw-threads upon the upper end portions above the portion of the plate A through which they pass. The upper ends of the rods D D' are shown as provided with means for the attachment of circuit-wires F F'. The rod D', as shown, has the wire F' attached directly to it; but the rod D has a metallic piece, *f*, connected to it, but insulated from it by an intermediate washer of insulating material, *f'*, and the circuit-wire F is attached to the piece *f*. The circuit-wire is not, therefore, in electric communication with the rod D. The electro-magnet B has two reversely-wound coils, $b' b^2$, both of which at one end are in electrical communication with the piece *f*, to which the circuit-wire F is fastened. The other end of the coil *b'*, which is of coarse wire, is fastened to a metallic plate, b^3, which is arranged above the coils $b' b^2$. This metallic plate is in electrical communication with the metallic core b^4 of the electro-magnet. The core b^4, being secured to the metal plate A, is in electrical communication with the latter. Mounted upon the plate A is a frame, G, having two parallel leg-like portions, $g' g^2$, and an intermediate portion, g^3, at the upper ends of the latter. The rod C, forming the holder for the upper carbon, extends through a hole in the plate A between the leg-like portions $g' g^2$ of the frame G, and through a hole in the intermediate portion, g^3, of the frame G. The portion g^3 of the frame G may be secured to any device for suspending the lamp, it being for this purpose provided externally with a screw-thread. The rod C is in electrical communication with the plate A. Consequently an electric current traversing the circuit-wire F will pass from the piece *f* to one end of the coil or coarse wire *b'* of the electro-magnet, thence through the plate b^3 and core b^4 to the plate A, thence to the rod C, and from the latter to the upper carbon, C'. Passing from the upper carbon, C', to the lower carbon, E', it proceeds from the holder E of the latter to the piece D^2, and thence along the rod D' to the wire F'. The coil b^2 of the electro-magnet is of fine wire. As already mentioned, it is connected at one end with the piece *f*, to which the circuit-wire F leads. The other end of this coil is connected to the end of the rod D' having the circuit-wire F' attached to it. The coil b^2 of the electro-magnet is therefore in a shunt or derived circuit.

H designates a lever forming the armature for the electro-magnet B. It extends between the leg-like portions $g' g^2$ of the frame G, and is fulcrumed to the latter by screws *h*. It has a large hole, through which the upper-carbon-holder rod C extends. This holder is so large that the lever does not at any time touch the rod. At one end it extends over the electro-magnet B, and is provided with a hole, which enables it to surround the upper end of the core b^4 of the electro-magnet. A screw, I, is fitted into the upper end of this core. This screw may be adjusted into different positions. The head is of such size that it will form a stop limiting the upward movement of the armature-lever. The other end of the armature-lever H is connected with the piston of a dash-pot, J. A spring, K, which is connected to the arm of the lever that is connected with the dash-pot, and also with the plate A, retracts the armature-lever from the electro-magnet whenever the electro-magnet will per-

mit of this. The dash-pot prevents the action of the spring from being too sudden. The end of the spring which is connected with the plate A is connected thereto by a screw and nut, affording provision for varying the tension of the spring.

L designates a clamp-lever consisting of a flat plate having through it a hole slightly larger diametrically than the rod C, forming the holder for the upper carbon, so that when this clamp-lever is in a horizontal position it will not grip said rod, but when adjusted into an oblique position it will grip and hold the rod. At one end this clamp-lever is connected by a link, *l*, to an arm, *l'*, fastened to and extending from the armature-lever H. It is therefore hung from the armature-lever. At the other end the clamp-lever has fitted to it a screw, S. This screw S may be adjusted to extend more or less below the clamp-lever, and it has combined with it above the clamp-lever a jam-nut, whereby it may be secured in any position. When the electric current is caused to traverse the circuit-wire F, the electro-magnet B will attract the end of the armature-lever H which is adjacent thereto, and consequently raise the other end or arm of said lever, thereby rocking the clamp-lever into an oblique position, so that it will grip the carbon-holder C, and also elevating it bodily, so as to raise the rod C, for the purpose of establishing an arc between the carbons. As the elongation of the arc increases through the consumption of carbon, the resistance of the main circuit of the lamp is augmented. The effect of the coil *b'* of the electro-magnet in the main circuit is thereby weakened, and the effect of the coil b^2, which is in the shunt-circuit, is thereby strengthened. Consequently the electro-magnet is de-energized in time sufficiently to release the armature-lever, whereupon the end of the latter which is adjacent to the electro-magnet is rocked, and, coming in contact with the screw S, shifts the clamp-lever, so as to cause the other to release the rod C. Then the rod C descends by gravity until the upper carbon has been fed downward sufficiently to restore the normal length of arc.

It will be seen that by my improvement I cause the armature-lever not only to engage the clamp-lever with the upper-carbon holder-rod, but also to positively disengage it therefrom.

I am aware that in other devices of this kind a support for the clamp-lever is flexibly pivoted to the armature, and the clamp-lever is placed under the armature, and its grip upon the carbon-holder is broken and its movement limited by adjustable stops upon a rod which depends from the armature-lever. The operation of such a device is very similar, but it varies in construction from my device, which is more simple, and at the same time equally effective.

I do not claim the above construction; but

What I do claim is set forth in the following claims:

1. In an electric lamp, the combination of a pivoted armature-lever, a carbon-holding rod passing through said lever at its axial line, a rigid support upon the armature-lever, and a clamp-lever depending by a link therefrom at one end, and extending over the armature-lever, with the other end free, which free end is provided with an adjustable screw and jam-nut, and an electro-magnet in circuit with the carbon-holders, the core of which is provided with an adjustable screw-stop, whereby the sensitiveness of the clamp and the movement of armature may be varied at will, substantially as shown and described, and for the purpose set forth.

2. In an electric lamp, the combination of pivoted armature-lever, carbon-holding rod passing through said lever at its axial line, a rigid support upon the pivoted armature-lever, clamping-lever depending therefrom by one end, and extending over the armature-lever, and an electro-magnet, the core of which is provided with an adjustable screw-stop limiting the movement of the said pivoted armature-lever, substantially as shown and described, and for the purpose set forth.

3. In an electric lamp, the combination of pivoted armature-lever, a carbon-holding rod passing through said lever, a rigid support upon the pivoted lever, and a clamp-lever depending therefrom by one end, and extending over the armature-lever, with the other end free, and provided with an adjustable screw and jam-nut, whereby when the clamp-lever falls it will grip the carbon-holding rod, and be freed when armature-lever, rising, comes in contact with said adjusting-screw, substantially as shown and described, and for the purpose set forth.

4. In an electric lamp, the combination of carbon-holders, an electro-magnet in circuit therewith, an armature-lever, H, having a hole through which the core of the electro-magnet may extend, and a screw, I, fitted to the core of the electro-magnet, substantially as specified.

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Witnesses:
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