(No Model.) 2 Sheets—Sheet 1.

W. K. FREEMAN.

ELECTRIC ARC LAMP.

No. 264,270. Patented Sept. 12, 1882.

Fig. 1.

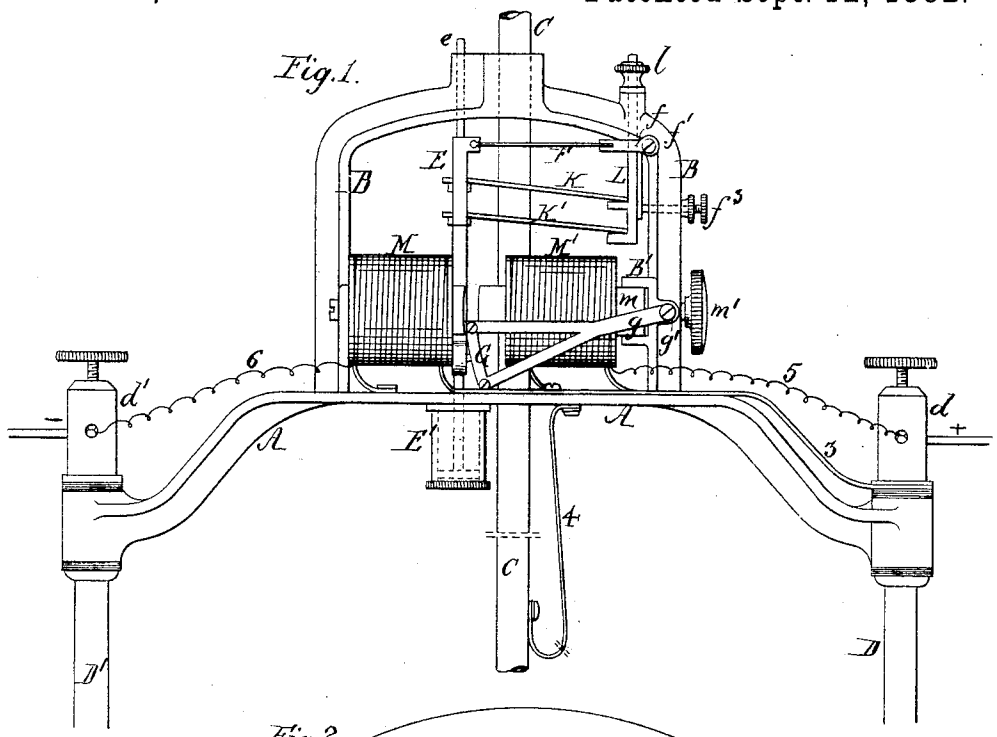
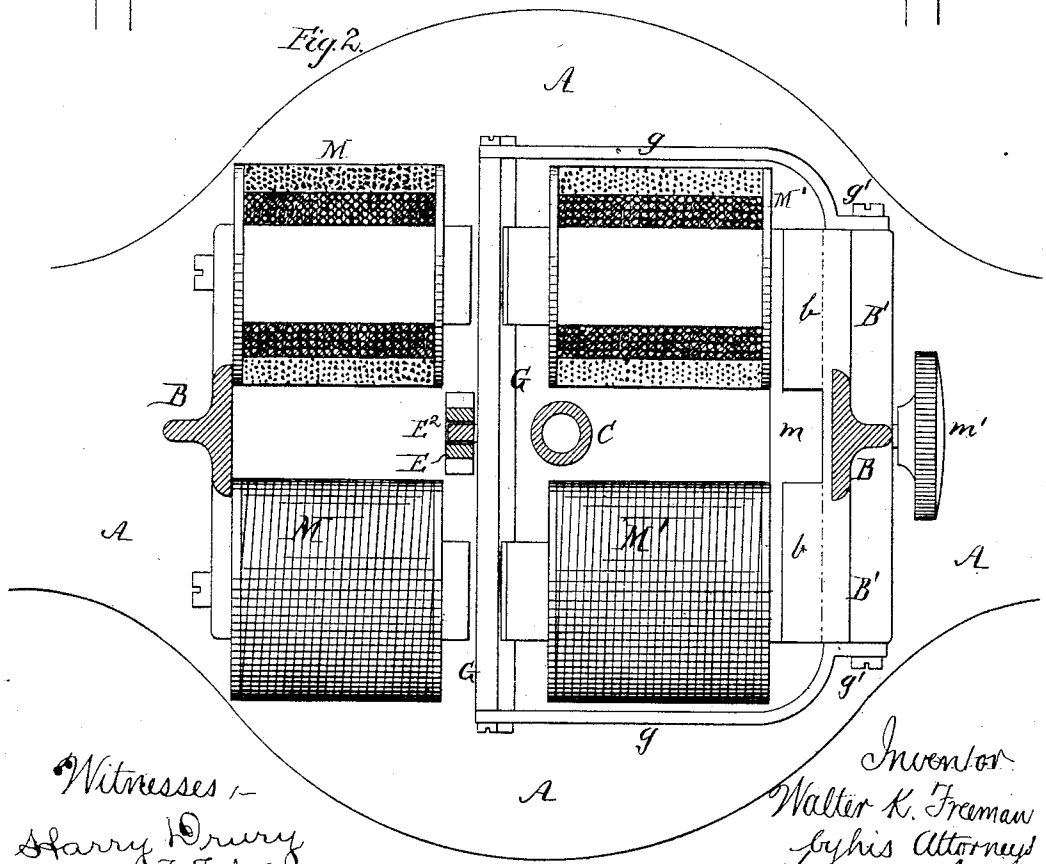


Fig. 2.



Witnesses:—
Harry Drury
James F. Tobin

Inventor
Walter K. Freeman
by his Attorneys
Hobson & Lord

N. PETERS. Photo-Lithographer. Washington, D. C.

(No Model.)

2 Sheets—Sheet 2.

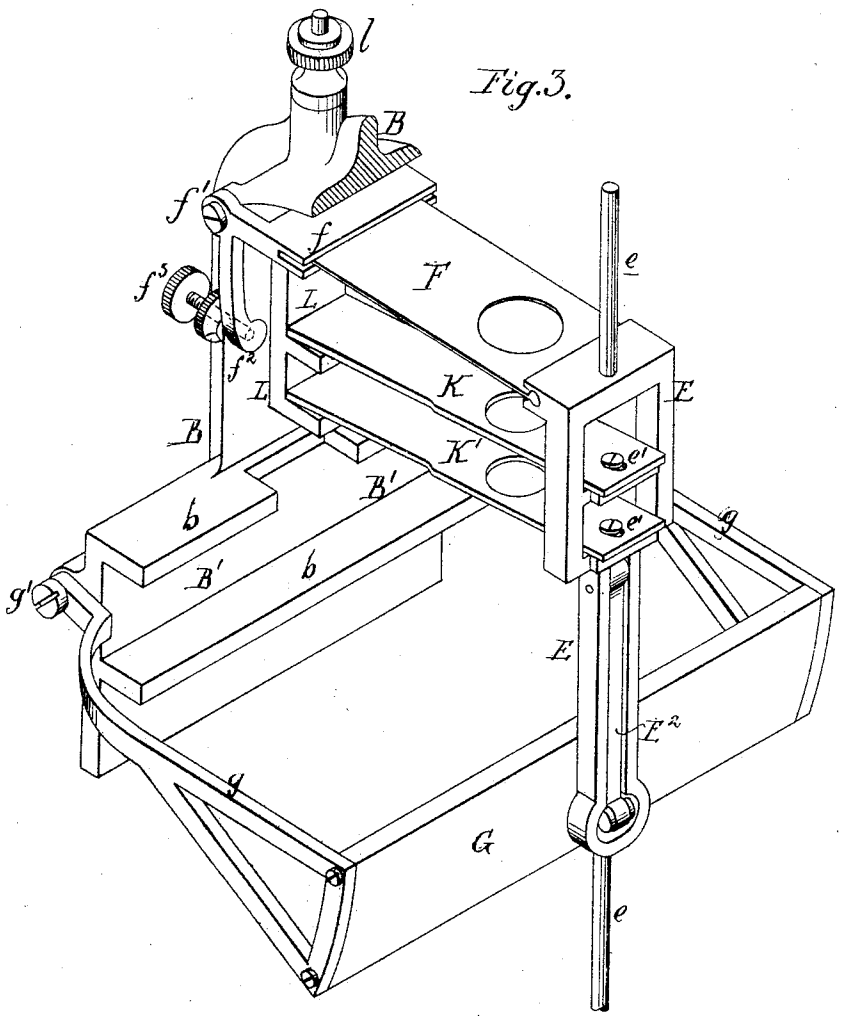
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Fig. 3.



Witnesses:—
Harry Drury
James F. Tobin

Inventor
Walter K. Freeman
by his Attorneys
Howson & Sons

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

WALTER K. FREEMAN, OF BROOKLYN, NEW YORK, ASSIGNOR TO W. F. JOBBINS, OF EAST ORANGE, NEW JERSEY.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 264,270, dated September 12, 1882.

Application filed June 12, 1882. (No model.)

To all whom it may concern:

Be it known that I, WALTER K. FREEMAN, a citizen of the United States, and a resident of Brooklyn, New York, have invented certain Improvements in Electric-Arc Lamps, of which the following is a specification.

My invention consists of certain improvements in the construction of regulating devices for the carbons of electric-arc lamps, as more fully described hereinafter.

In the accompanying drawings, Figure 1, Sheet 1, is a side view of sufficient of the lamp to illustrate my invention; Fig. 2, an enlarged sectional plan on the line 1 2, Fig. 1; and Fig. 3, Sheet 2, a perspective view of a part of my improved regulating devices.

A is the upper cross-bar of the lamp-frame, and to the ends of this bar are secured, with the usual insulation, the binding-posts *d d'* and the vertical rods D D', carrying at their lower ends the lower-carbon holder.

On the enlarged flat portion of the cross-piece A is mounted the arch B, carrying the regulating devices, and in the top of the arch and the center of the cross-piece is guided the movable carbon-holder C.

E is a vertical frame, to which are loosely pivoted at *e' e'*, Fig. 3, the clamping-plates K and K', and which carries at its upper and lower ends guide-rods *e e*, the upper rod passing through an opening in the arch, while the lower rod carries a plunger working in a dash-pot, E', on the under side of the cross piece A. The frame E is connected by a link, E^2, to lugs on an armature, G, which is acted on by the poles of the double-wound electro-magnets M M', set face to face with the armature between them. The armature G is carried by arms *g g*, which are pivoted at *g'* to an extension, B', of the arch B, and on this point *g'* as a center the armature can have a limited movement from the position shown in Fig. 1 to a position opposite the centers of the poles of the electro-magnets, the polar faces being curved from the same radius. The cores of the magnets M M are connected together, and are carried by a widened portion of the arch B, while the cores of the coils M' M' are carried by a connecting-piece, *m*, which fits and is guided between flanges *b b* on the extension B' of the arch B, and on the back of this connecting-piece bears a set-screw, *m'*, by which the electro-magnets M' M' may be adjusted to bring their polar faces nearer to or farther from the armature G.

In a notch in the upper end of the frame E fits the outer end of a flat spring, F, which at its inner end is secured to a jaw, *f*, pivoted at *f'* to the arch B. An arm, f^2, on this jaw projects downward, and is acted on by a set-screw, f^3, by which the tension of the spring may be nicely adjusted to balance the frame E and the parts carried by it.

The outer ends of the clamping-plates K K' rest on projections on a supporting-bar, L, which has a shank passing up through an opening in the arch and threaded for the reception of a nut, *l*, by which the supporting-piece L may be adjusted vertically, and the clamping-plates K K' consequently set to the proper angle. I make use of two clamping-plates, K K', set at slightly-different angles, so that if one clamp should not act the other will.

The electro-magnets M M and M' M' are double wound—that is, they are wound in one direction with thick wire in the main working-circuit and in the opposite direction with fine wire in the shunt-circuit 5 6, between the two binding-posts *d d'*.

Supposing the current to enter at *d*, the main circuit is through the conductor 3, to the coils M' M', to the cross-piece A, and from a branch from the conductor 3, through the coils M' M', to the cross-piece, and from the latter, through the conductor 4, to the carbon-holder C, carbons, lower-carbon holder, rod D', and out at *d'*, the coils of the two pairs of electro-magnets thus being in the two branches of a loop-circuit.

The electro-magnets are so wound with the different coils that when a current is first passed through the lamp the current in the main-circuit coils will cause the cores to attract the armature G, raise the frame E and clamping-plates, and consequently the movable carbon-holder C, and so form the electric arc. As the resistance in the main circuit increases with the consumption of the carbons and the current leaks through the shunt-circuit coils,

which are wound in the opposite direction to the main-circuit coils, the magnetic effects on the opposing coils will neutralize each other and the cores will cease to attract the armature, which will then drop, and with it the frame E and clamping-plates K K′, so as to allow the carbons to approach again in the usual way.

I do not desire to claim in this case the combination of the clamp-carrying frame with the flat pivoted spring and adjusting-screw, as that forms the subject of a separate application.

I claim as my invention—

1. The combination of the movable carbon-holder of an electric-arc lamp with two sets of electro-magnets with their poles face to face, and having their coils wound in opposite directions in the main and shunt circuits, a clamp-carrying frame, and an armature connected to the frame and having a movement between the poles of the electro-magnets, all substantially as set forth.

2. The combination of a vertical frame, E, guided at its upper end in the arch, and having a dash-pot at its lower end, clamping-plate carried by and armature connected to said frame, with a movable carbon-holder, and electro-magnets having their coils wound in opposite directions in the main and shunt circuits.

3. The combination of two sets of electro-magnets in the main and shunt circuits, and having their poles face to face, with an intermediate armature carried by arms *g*, pivoted to the arch, a movable carbon-holder, and a clamp-carrying frame.

4. The combination of the movable carbon-holder and clamp-carrying frame with an armature connected to said frame, two sets of electro-magnets, and devices for adjusting one set toward or from the armature, substantially as set forth.

5. The combination of the two sets of electro-magnets and intermediate armature with a guided frame, E, carrying clamping-plates, and connecting-link E^2.

6. The combination of the movable carbon-holder of an electric lamp with two clamping-plates set at different angles, and operating devices, all substantially as set forth.

7. The combination of the movable carbon-holder, frame E, and clamping-plate with a clamp-support, L, carried by a fixed part of the lamp, and adjusting device therefor.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WALTER K. FREEMAN.

Witnesses:

JOHN H. KATTENSTROTH,

HUBERT HOWSON.