(No Model.) 2 Sheets—Sheet 1.

C. A. HUSSEY.

ELECTRIC ARC LAMP.

No. 258,581. Patented May 30, 1882.

Fig. 1.

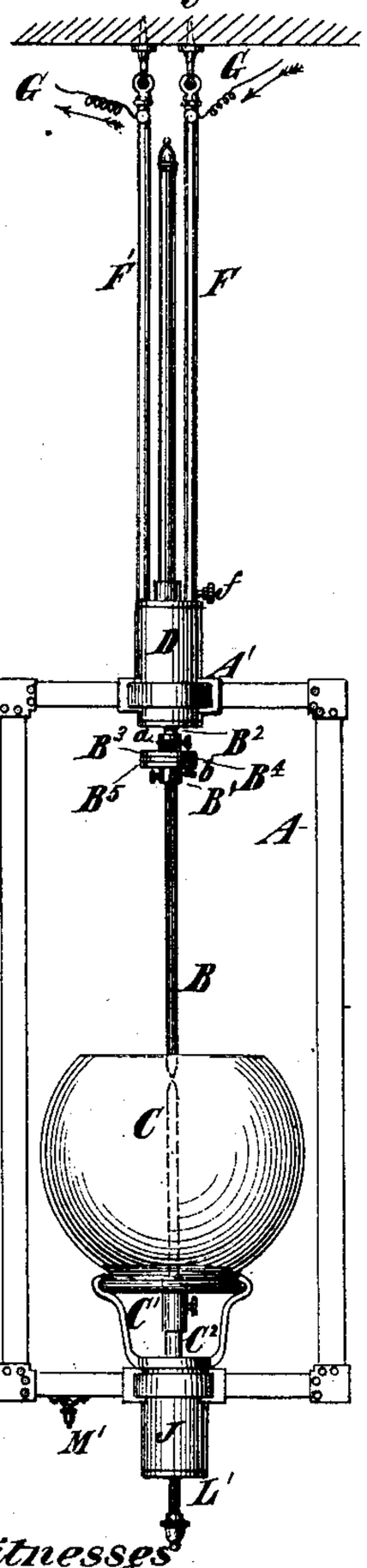


Fig. 6.

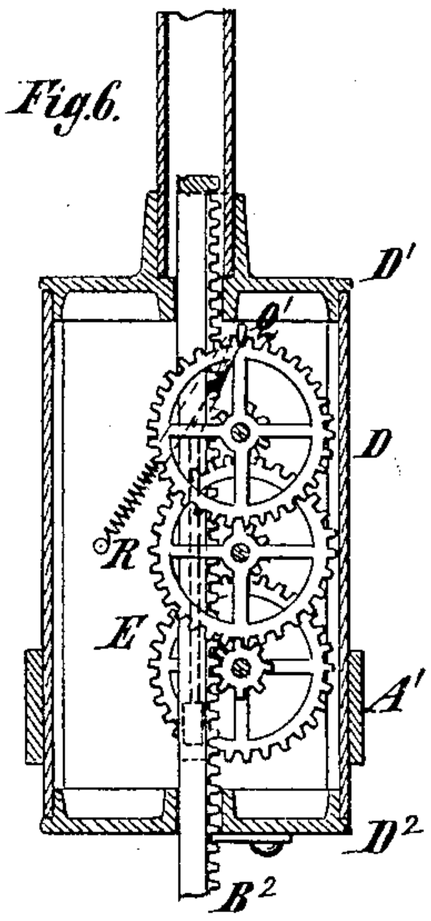


Fig. 7.

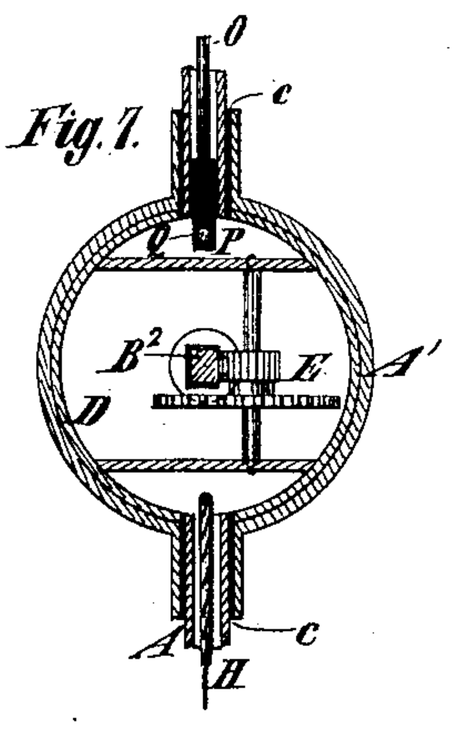


Fig. 4.

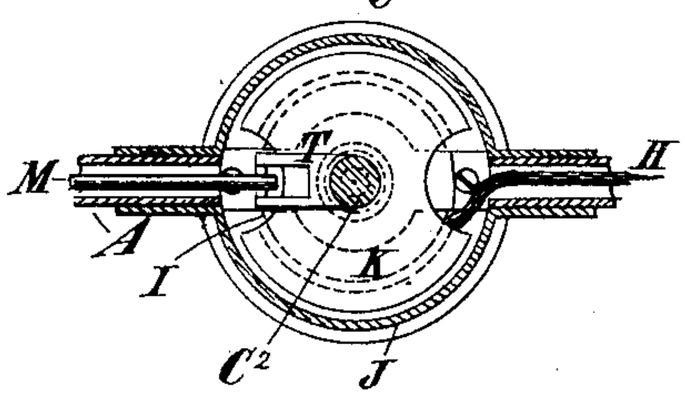
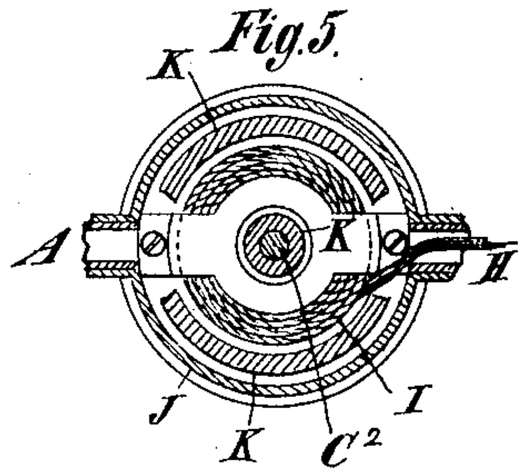


Fig. 5.



Witnesses
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Thomas E. Birch

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By his Attorney
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(No Model.) 2 Sheets—Sheet 2.

C. A. HUSSEY.

ELECTRIC ARC LAMP.

No. 258,581. Patented May 30, 1882.

Fig. 2.

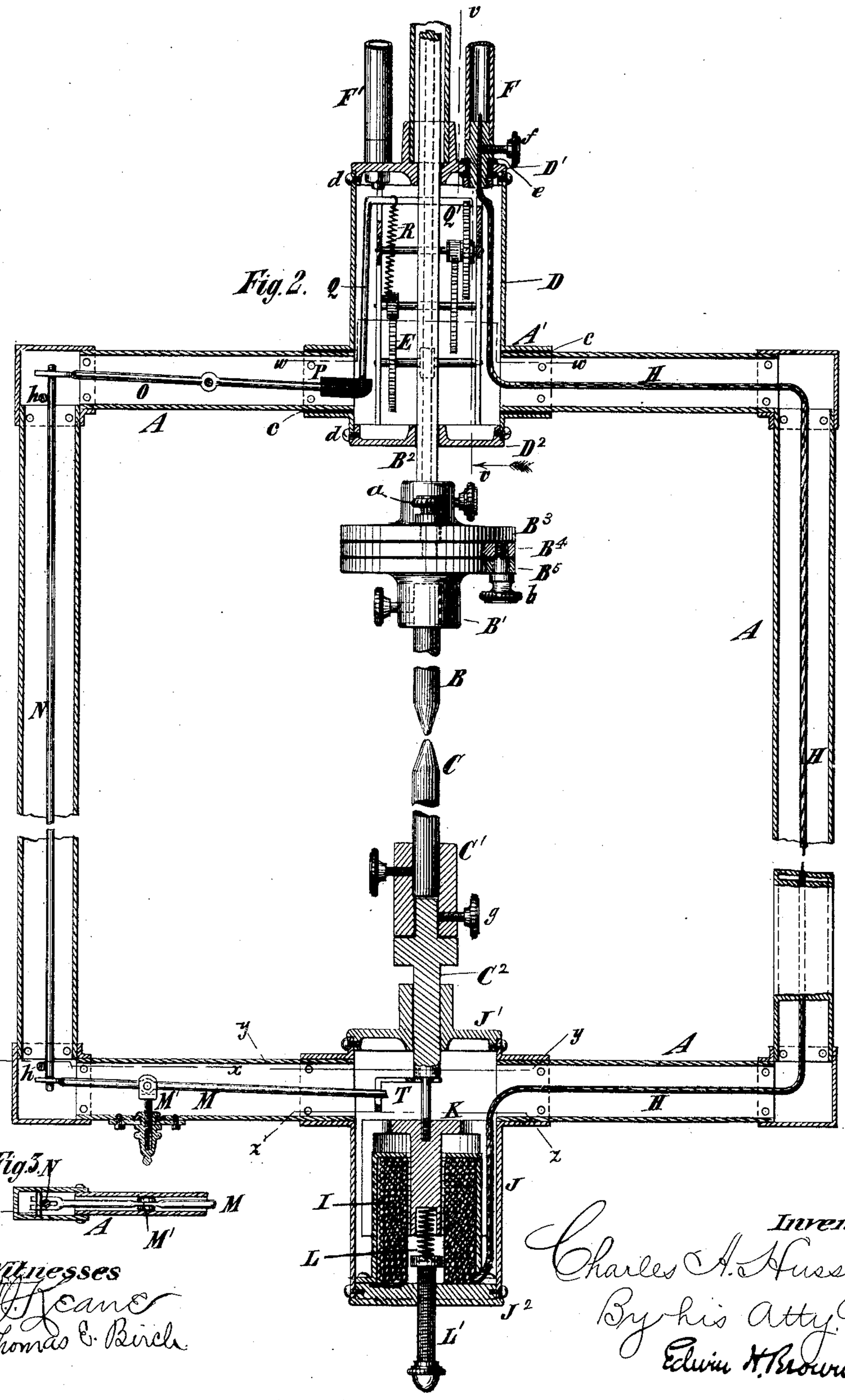

Fig. 3.

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UNITED STATES PATENT OFFICE.

CHARLES A. HUSSEY, OF NEW YORK, N. Y., ASSIGNOR TO THE HUSSEY ELECTRIC COMPANY, OF SAME PLACE.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 258,581, dated May 30, 1882.

Application filed May 25, 1881. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. HUSSEY, of the city, county, and State of New York, have invented certain new and useful Improvements in Electric Lamps, of which the following is a specification.

My improvements consist in the combination, in an electric lamp, of a single electric circuit, an electro-magnet or solenoid in said circuit, an armature for said magnet or solenoid directly connected with the lower carbon, a train of wheel-work for controlling the feed of the upper carbon, a dog for controlling said wheel-work, a lever adapted to be actuated by said armature, but so arranged that the armature may have a given range of movement before acting upon the lever, and means for transmitting motion from said lever to said dog to effect the disengagement of the latter from said wheel-work and permit the feed of the upper carbon. The armature of the magnet or solenoid in the above combination preferably has the lower carbon supported directly upon it, and the aforesaid lever may have a fulcrum-piece which is adjustable, to adapt the lamp for electric currents of different potentials, as hereinafter fully described.

The improvements also consist in the combination, with a carbon-holder and its supporting-rod, of two or more plates connecting said holder and rod and a pivot or pivots connecting said plates eccentrically to said holder and rod, so that the plates may be swung laterally relatively to each other to adjust said carbon-holder into line with the opposite carbon-holder. The said pivot or pivots may consist of a screw or screws, which also serve as a means of clamping the plates together after adjustment.

The improvements also consist in a novel combination of parts hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a view of a complete lamp embodying my improvements. Fig. 2 is a central vertical section thereof on a larger scale, certain portions being broken away to economize space. Fig. 3 is a horizontal section of the lamp on the same scale, taken at the plane of the line *x x*, Fig. 2. Fig. 4 is a horizontal section of the lamp on the same scale, taken on the plane of the line *y y*, Fig. 2. Fig. 5 is a horizontal section of the lamp on the same scale, taken on the plane of the line *z z*, Fig. 2. Fig. 6 is a vertical section of the lamp on the same scale, taken mainly on the plane of the line *v v*, Fig. 2, but also through the tube in which the rod of the upper-carbon holder moves; and Fig. 7 is a horizontal section of the lamp on the same scale, taken mainly on the planes of the line *w w*, Fig. 2.

Similar letters of reference designate corresponding parts in all the figures.

A designates the frame of the lamp, here shown as of rectangular form, and made up of tubular sections united with elbows by cross-pins or rivets.

B and C designate respectively the upper and lower carbons of the lamp.

B′ designates the holder for the upper carbon, consisting of a socket adapted to receive said carbon and a set-screw for retaining said carbon in its socket.

B^2 designates a rod, to which the holder B′ for the upper carbon is connected. As here shown, the said holder B′ is connected to its rod B^2 by means of three plates, B^3 B^4 B^5, which may be of circular form. The plate B^3 is affixed to the rod B^2 by a socket fitting the rod and a set-screw passing the socket and impinging against the rod. The plate B^4 is affixed to the plate B^3 by means of a screw, *a*, passing through the plate B^3 and screwing into the plate B^4. The plate B^5 is secured to the plate B^4 by means of a screw, *b*, passing through the plate B^5 and screwing into the plate B^4. It has the holder B′ affixed to it.

The screws *a* and *b* are about one-quarter of the circumference of the plates apart when the plates are coincident with each other, and they form pivotal connections between the plates, which they respectively secure together. Their heads also serve to clamp the plates in different positions to which they may be adjusted. The said plates thus combined afford provision for shifting the upper carbon laterally into line with the lower carbon. This is of great advantage in many cases, notably when either carbon is bent longitudinally, for even if the points of the carbons, when inserted in their

holders, are in line, they may, after burning, become out of line, and then one may be adjusted into line with the other. If the plate B^3 had a swiveling connection with the plate, B^5 could be dispensed with and the holder B′ affixed to the plate B^4.

On the rod B^2 of the upper-carbon holder is a longitudinally-arranged rack, which gears into a pinion forming part of a train of wheels or wheel-work, E, whereby the descent of the said rod in feeding the upper carbon is rendered practically uniform and reduced to the desired speed. This train of wheels E is inclosed in a case, D, which is connected with the frame A by means of a surrounding band, A′, provided with sockets for the reception of the sections of said frame, with which it is directly connected. Between these sockets and the said sections of the frame gaskets *c* of insulating material are fitted, so as to obviate any electrical connection between the said case D and the frame A.

The case D is provided with removable caps D′ and D^2, having rims which fit within the case and are secured there by screws *d*. The cap D′ has connected with it an upwardly-projecting tube in which the rod B^2 of the upper-carbon holder moves.

F F′ designate two metal rods (shown as made hollow) whereby the lamp is suspended. At their upper ends (see Fig. 1) they are provided with binding-screws, to which electric-circuit wire G is connected, and as they are made of metal they serve as conductors for the electric current. Between the rod F and the cap D′ is fitted a bushing, *e*, to prevent electrical communication from the said rod to the cap. A plug forming the lower part of the rod F is provided with a recess, in which fits the naked end of a wire or conductor, H, which is insulated except at its said end. A set-screw, *f*, serves to secure the said end of the wire in place.

When it is desired to remove the cap D′ the screws *d* are loosened, and the set-screw *f* is also turned to release the wire H, whereupon said cap and its appurtenances may be taken off and access to the case afforded. The cap and its appurtenances may be secured by a reverse operation.

The wire or conductor H extends down through the hollow frame A of the lamp to an annular electro-magnet or solenoid, I, arranged in a case, J, which is provided with caps J′ and J^2, that are secured in place similarly to the caps D′ and D^2. This case J is also secured to the frame A of the lamp similarly to the case D. The electro-magnet or solenoid I is mounted on the cap J^2.

K designates the armature of the electro-magnet or solenoid. It consists, as here shown, of a disk extending over the top of the electro-magnet or solenoid, a central core or portion extending inside the latter, and two segmental portions fitting outside it. These segmental portions are employed in lieu of a cylindric portion to afford a passage for the wire or conductor H on one side.

L designates a spring fitting at one end against the central core or portion of the armature.

L′ designates a screw working through the cap J^2 of the shell J and bearing against the lower end of the spring. The spring tends to force the armature upward, and may be compressed more or less by adjusting the screw to suit electric currents of different potentials.

The holder C′ for the lower carbon consists of a socket fitted upon a rod, C^2, and secured there by a set-screw, *g*. It is provided with a set-screw for retaining said carbon within it. The rod C^2 is connected to the armature K.

M designates a lever pivoted to a fulcrum-piece, M′, within the lower part of the frame A. One end extends into proximity to a tappet, T, attached to the rod C^2, and hence when said rod rises the lever is shifted. The lever M is not connected with the armature K, although it is actuated thereby, and the armature and the rod C^2 supporting the lower carbon may be raised some distance before the tappet T strikes against and moves the lever M. The other end is forked and embraces a notched portion of an upright rod, N. The upper end of this rod N is notched, and fits within the forked end of a lever, O, which is pivoted within the upper part of the frame A. The rod N is kept in place within the forked ends of the levers M and O by pins *h*, extending across the section of the frame A containing said rod. At the inner end of the lever O it is connected by a piece of insulating material, P, with a bar, Q, the upper end, Q′, of which forms a dog or device which, by engaging with one of the wheels in the train of wheel-work E, blocks the latter so as to prevent it from operating and allowing the upper carbon to feed downward.

A spring, R, tends to hold the dog Q′ in engagement with the train of wheel-work. The case D forms a support for the wheel-work E and dog or device Q′, and the lower case, J, forms a support for the magnet or solenoid I, while the lever M, rod N, and lever O constitute the means through which the armature K actuates the dog or device Q′.

The fulcrum-piece M′ for the lever M consists of a screw bifurcated at the upper end and receiving the said lever within it, and a nut fastened to the frame A, receiving the lower end of the screw within it, and adapted to be turned from outside said frame to raise or lower the said screw.

It will be seen that all the mechanism of this lamp is concealed and protected by the hollow frame A and the cases D and J. The electric circuit extends from the wire G to the rod F, thence to the wire or conductor H, thence through the electro-magnet or solenoid I, thence to the cap J^2 of the shell J, and thence through the case J and its cap J′ to the rod C^2, holder C′, and lower carbon, C. Thence it

extends to the upper carbon, B, thence through the holder B′, plates B^3 B^4 B^5, and rod B^2 to the cap D′ of the case D, and thence through the rod F′ to the circuit-wire G. As soon as a current of electricity is sent through the lamp the electro-magnet or solenoid attracts the armature K, and thereby draws down the lower carbon and forms the voltaic arc. When by the burning away of the carbons the arc becomes materially prolonged the resistance in the electric circuit thereby becomes augmented, and the electro-magnet or solenoid consequently is weakened. The spring L then raises the armature and also the lower carbon, thereby shortening the voltaic arc. When the armature rises sufficiently it rocks the lever M, and thereby releases the dog Q′ from the train of wheel-work E, permits the rotation of the train of wheel-work, and allows the upper carbon to feed downward.

As the upper carbon descends the arc is shortened, the resistance in the circuit is reduced, and the electro-magnet or solenoid recovers its normal strength. The lower carbon is then drawn down, and the spring R draws down the dog Q′ into engagement with the train of wheel-work and stops the feed of the upper carbon. The lamp continues to operate in this way, and the carbons are kept in the proper relation to each other. When the current of electricity is stopped the spring L raises the lower carbon, and through the lever M and the mechanism with which it is connected the dog Q′ is made to release the train of wheel-work and permit the upper carbon to feed down to the lower carbon. The lamp is thus left ready for further use when the current of electricity starts again, for as soon as the current starts the solenoid I draws down the lower carbon and establishes the arc between it and the upper carbon. The screw L′ provides for adjusting the spring L so as to adapt the armature for use with electric currents of different potentials. The adjustable fulcrum-piece M′ for the lever M also provides for adapting the lamp to electric currents of different potentials and to burn with a longer or shorter voltaic arc.

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

1. In an electric lamp, the combination of a single electric circuit, an electro-magnet or solenoid in said circuit, an armature for said electro-magnet or solenoid directly connected with the lower carbon, a train of wheel-work for controlling the feed of the upper carbon, a dog for controlling said wheel-work, a lever adapted to be actuated by said armature, but arranged so that the armature may have a given range of movement before acting upon the lever, and means for transmitting motion from said lever to said dog to effect the disengagement of said dog from said wheel-work and permit the feed of the upper carbon, substantially as specified.

2. In an electric lamp, the combination of a single electric circuit, an electro-magnet or solenoid, I, and an armature, K, therefor, contained in a case, J, the lower carbon, C, connected with said armature, the upper carbon, B, the train of wheel-work E for controlling the feed of the upper carbon, and the device Q Q′ for regulating the operation of said wheel-work, contained in a case, D, a hollow frame, A, connecting the cases D and J, and the lever M, rod N, and lever O, arranged within said hollow frame, substantially as specified.

3. In an electric lamp, the combination of a single electric circuit, the electro-magnet or solenoid I and its armature K, the lower carbon, C, directly connected with said armature, the upper carbon, B, the wheel-work E, the dog Q′, controlling said wheel-work, the lever M, connected with said dog and adapted to be actuated by said armature, but arranged so that the armature has a given range of movement before acting upon it, and the fulcrum M′, adapted to be adjusted to suit currents of different potentials, substantially as specified.

4. In an electric lamp, the combination, with a carbon-holder and its supporting-rod, of two or more plates connecting said holder and rod, and a pivot or pivots connecting said plates eccentrically to said holder and rod, so that the plates may be swung laterally relatively to each other to adjust said carbon-holder into line with the opposite carbon-holder, substantially as specified.

5. In an electric lamp, the combination, with a carbon-holder and its supporting-rod, of two or more plates connecting said holder and rod and a screw or screws pivoting said plates together eccentrically to said holder and rod, so that the plates may be swung laterally relatively to each other, and also serving to clamp the plates together after such lateral adjustment, substantially as specified.

6. The combination of the case D, containing a train of wheel-work, E, the removable cap D′, insulating-bushing *e*, suspending-rod F, wire or conductor H, and set-screw *f*, substantially as specified.

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