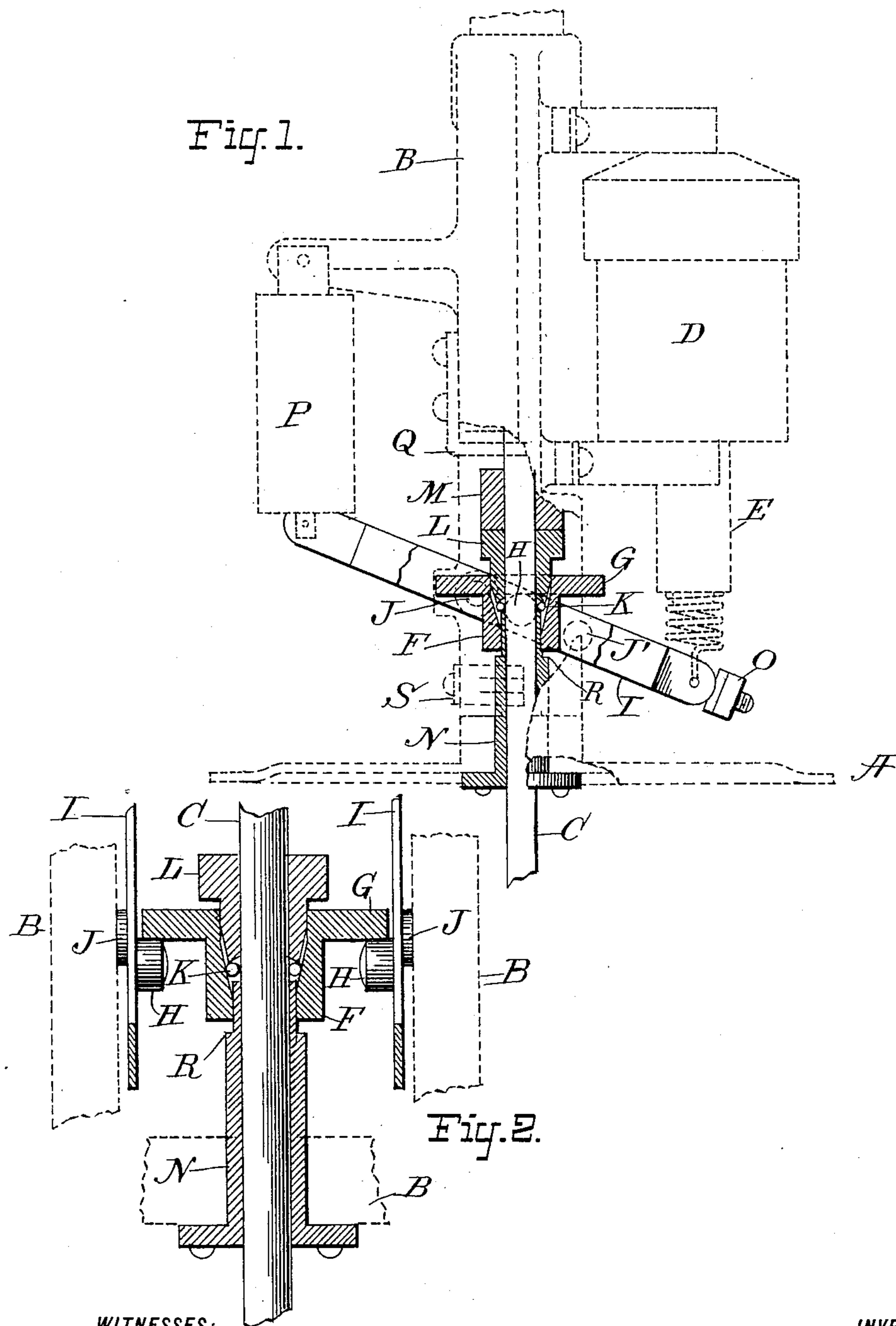


(No Model.)

J. H. J. HAINES & A. B. FERNALD.
ELECTRIC ARC LAMP.

No. 560,792.

Patented May 26, 1896.



WITNESSES:

William H. Capel.
D. H. Decker

INVENTORS

John H. J. Haines

Alexander B. Fernald

BY *J. C. Townsend*

ATTORNEY

UNITED STATES PATENT OFFICE.

JOHN H. J. HAINES, OF NEW YORK, N. Y., AND ALEXANDER B. FERNALD,
OF JERSEY CITY, NEW JERSEY.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 560,792, dated May 26, 1896.

Application filed January 7, 1896. Serial No. 574,650. (No model.)

To all whom it may concern:

Be it known that we, JOHN H. J. HAINES, a resident of New York, in the county of New York and State of New York, and ALEXANDER B. FERNALD, a resident of Jersey City, in the county of Hudson and State of New Jersey, citizens of the United States, have invented a certain new and useful Arc-Lamp, of which the following is a specification.

This invention relates to electric-arc lamps, and particularly to feeding mechanism therefor.

The object is to construct feeding mechanism in which the descent of the carbon shall be so gradual that there will be no perceptible variation in the arc when once struck. This object is attained by what may be called a "ball-clutch," in which the balls provide a perfectly even movement for the carbon-carrying rod and yet, when necessary, serve to hold said rod against movement.

The invention consists in the construction, combination, and arrangement of parts hereinafter described, and set forth in the claims.

In the accompanying drawings, which form a part of this specification, Figure 1 represents so much of an arc-lamp as is necessary to illustrate the invention, the novel features being represented in full lines in vertical section and the old features in dotted lines. Fig. 2 represents in like manner in detail, on an enlarged scale, the invention in operation.

A indicates the base-plate of the lamp, from which depends, in the usual manner, the frame for supporting the lower carbon. Upon this plate is mounted a frame, as B, to which the feeding mechanism of the lamp is secured and through ways in which the carbon-carrying rod C moves. D is the feed-magnet, here shown as a solenoid with the core E. The feeding mechanism operated by this magnet consists of what may be termed an "inclined ball-seat," a collar or sleeve F, having a conical inner surface and an exterior flange G, which rests upon stud-rollers H, projecting inwardly from the open lever I, balls, as K, which rest between the carbon-carrying rod and the conical surface of the seat, a weight, as L M, surrounding the rod and resting upon the balls, and a tripping device, as N, surrounding the rod and ex-

tending up into the seat F, said device being preferably secured to the plate A. It is also well to form this device as shown in the drawings, so that it may furnish a guide for the carbon-carrier, as it may be turned up and fitted to the rod much easier than the plate A. The collar F, being mounted as shown, is free to move in any direction upon the studs H, and so prevent the balls from wearing tracks in the rod.

The lever I in an alternating-current lamp, as that illustrated, is fulcrumed in the frame B at J, which fulcrum is sufficiently to one side of studs H to provide for the elevation of the rod and its carbon sufficient to strike the arc. In a direct-current lamp this fulcrum would simply be placed at the other side of studs H, as indicated in dotted lines at J', where the weight of the core would overbalance the weight of the carbon-rod, the magnet being in a shunt or derived circuit. These changes and modifications incident upon converting an alternating-current lamp into one for use on a direct current are understood by electricians and will not be further dwelt upon here. Suffice it to say that we have used our feeding mechanism in both forms of lamps.

The lever I may be provided with a weight, as at O, for adjusting the balance of the parts. A dash-pot, as P, may also be connected to the lever to steady the movement thereof, as is common in arc-lamps.

By using the lever mechanism, as shown, for operating upon the ball-seat a more effective and accurate feeding action is obtained than can be had in any other way.

The weight resting upon the balls is shown divided transversely into the parts L M; but it may obviously be formed in one part. The object in using the two portions shown is to facilitate assembling the parts of the feed mechanism. The lower end of the weight and also the upper end of the tripping device are preferably ground to fit the balls, though they may be plain. As shown in Fig. 2, the groove in the weight inclines toward the rod C, so as to force the ball against the rod, thereby providing a quicker and firmer grip.

The plate Q, which serves as the upper guide for the carbon-carrier, also serves as a

stop to limit the upward movement of the lever I, while the shoulder R on the tripping device may serve as a stop for the downward movement of said lever.

5 The brush for passing current to the carbon-carrier is shown at S as bearing thereon through an opening in the side of the tripping device.

As stated, the lamp illustrated is designed
10 for use on an alternating-current circuit and has its carbons touching when not in use. Its operation is as follows: Current being turned on, the magnet is energized, the lever I tilted thereby, and the ball-seat carried upward,
15 which causes the balls to wedge in between the inclined surface of the seat and the rod, thus clutching the rod and carrying it and its carbon along until the arc is properly struck, the weight on the balls causing them to move
20 readily clutch the rod. Then as the arc lengthens the rod will descend until the balls reach the upper edge of the collar N, where they will rest between it and the weight while the inclined seat moves farther down, thereby
25 releasing the balls and allowing them to rotate and permit the descent of the rod to such a point as will cause the current through the magnet to again raise the seat and effect the clutching of the rod. The balls being held
30 between the weight and the releasing device and against the rod, a rolling friction is maintained between them and the rod, thereby insuring an accurate and gradual descent of the rod and its carbon. These movements, sub-
35 sequent to the striking of the arc, are almost imperceptible, and recur at such frequency as to cause practically a continuous descent of the carbon in compensation for the combustion thereof.

40 Many changes may be made in the size, shape, and formation of the parts and mechanical expedients may be resorted to necessary to adapt the feeding mechanism to a direct-current circuit without departing from
45 the invention herein set forth.

What we claim as our invention is—

1. The combination with the carbon-carrying rod, of the ball-seat, balls therein resting between the seat and rod, a weight resting upon the balls and having a groove for the
50 balls inclined toward the rod, the feed-magnet, a connection between the ball-seat and magnet by which the former is raised and lowered, and a tripping device for loosening the grip of the balls upon the rod, as and for the
55 purpose set forth.

2. The combination with the feed-magnet, of the lever operated thereby, the clutch mechanism mounted to move freely and to rotate upon studs projecting from said lever, and a
60 fixed releasing device for the clutch mechanism, substantially as set forth.

3. The combination with the cylindrical carbon-carrying rod, of the inclined ball-seat surrounding it and provided with an exterior
65 flange, balls resting between the incline of the seat and the rod, a lever pivoted to the frame of the lamp and controlled by the feed-magnet, antifriction-rollers carried by said lever and supporting the ball-seat by its flange,
70 and a releasing device for unseating the balls to allow the carbon-rod to feed downward.

4. The combination with the carbon-carrying rod and the feed-magnet, of the inclined ball-seat controlled in its movements by said
75 magnet, balls resting between the incline and the rod, a weight resting upon the balls, and a tripping device for lifting the balls from the incline, said weight and tripping device being so constructed as to hold the balls be-
80 tween them when released from the seat, as and for the purpose set forth.

Signed at New York, in the county of New York and State of New York, this 4th day of January, A. D. 1896.

JOHN H. J. HAINES.

ALEXANDER B. FERNALD.

Witnesses:

WM. H. CAPEL,
D. H. DECKER.