(No Model.)

F. N. PIKE.

ELECTRIC ARC LAMP.

No. 551,046. Patented Dec. 10, 1895.

Fig. 1.

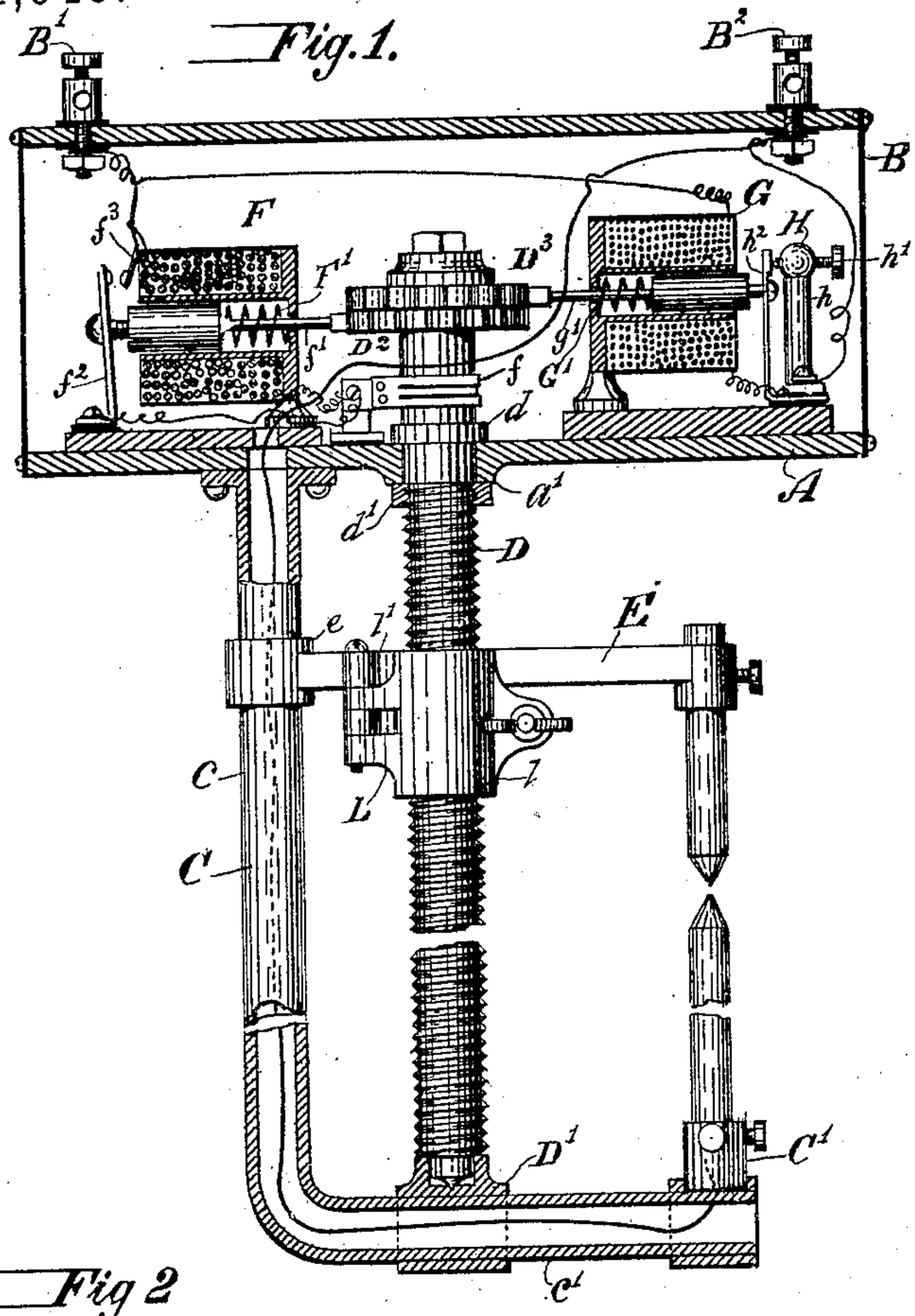


Fig 2

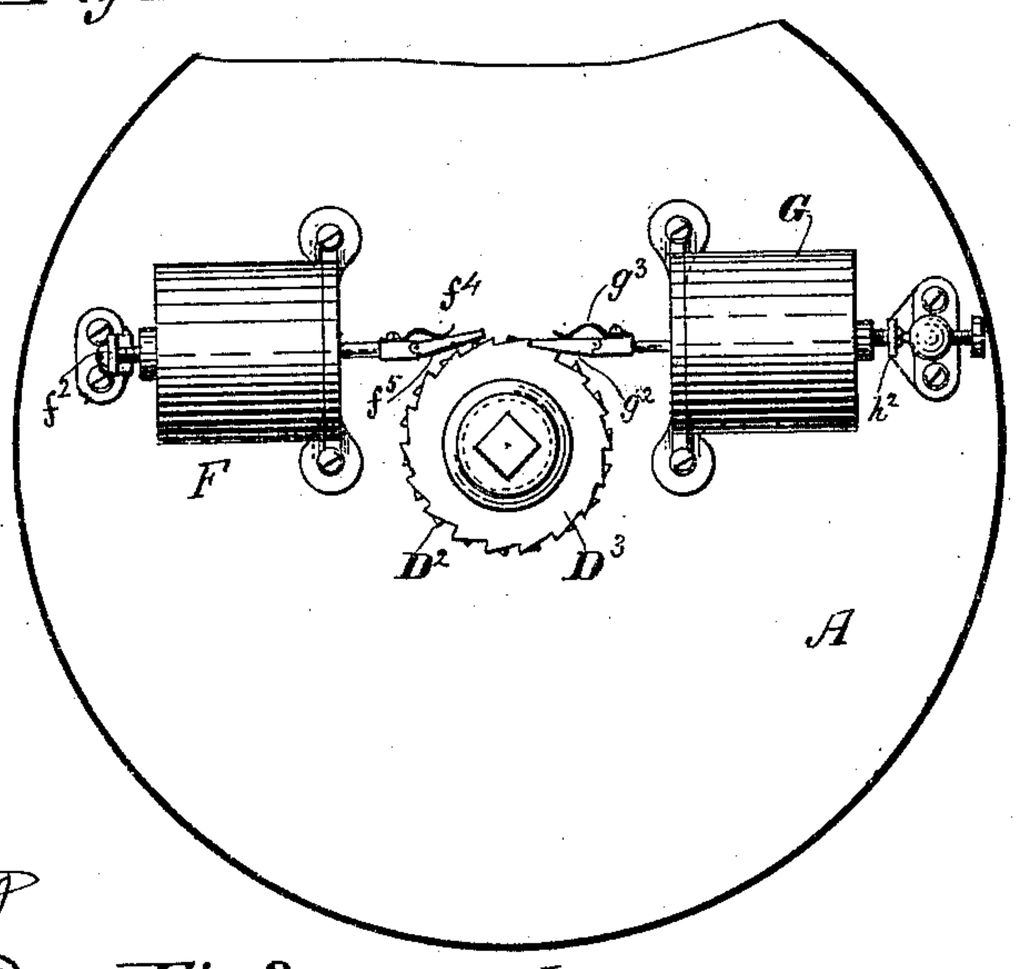
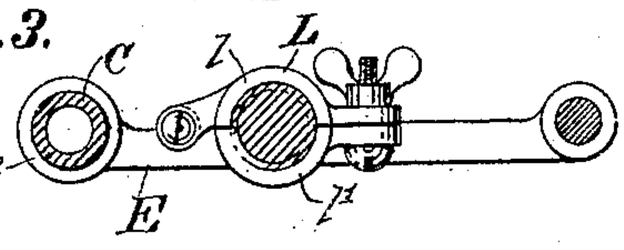


Fig. 3.



WITNESSES:

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FREDERICK N. PIKE, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF AND EDWARD N. DICKERSON, OF SAME PLACE.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 551,046, dated December 10, 1895.

Application filed June 27, 1894. Serial No. 515,829. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK N. PIKE, of the city, county, and State of New York, have invented a new and useful Improvement in Electric-Arc Lamps, of which the following is a full, true, and exact description, reference being had to the accompanying drawings.

I will describe an arc lamp embodying my improvement and then point out the novel features in claims.

As my improvement relates particularly to supports for carbons in an arc lamp and a method for feeding the same, I will describe those parts to which my invention relates and only incidentally describe such other parts as may be necessary to fully set forth the nature of my invention.

To fully understand my invention, reference may be had to the accompanying drawings, in which similar letters of reference designate corresponding parts.

Figure 1 shows a side elevation of an arc lamp embodying my improvement, some parts being represented in section, while to economize space other portions are omitted. Fig. 2 shows a top view thereof, certain parts being omitted. Fig. 3 shows a top view of a carbon-support embodied in the invention.

Referring by letter to the drawings, A designates a platform or support which carries some of the operative parts of an arc lamp embodying my improvement. It is shown as being disk-like in form. For the protection of these operative parts a cup-shaped protecting-piece B may inclose them, being suitably attached to the platform A. This protecting-piece may be of the form shown or of any desirable or suitable construction. Binding-posts B′ B^2 may be suitably secured to the protecting-piece and insulated from the same for the retention of the line or main wires.

Suitably attached to the lower portion of the support or platform A and extending downward therefrom is shown a rod C, which comprises two arms or portions *c c′*, forming, preferably, a right angle with each other. Near the extremity of its lower arm the rod C carries a suitable carbon-support C′, insulated therefrom. The rod C may be hollow to receive an insulated wire leading to the lower carbon.

In the support or platform A is journaled a shaft or rod D, extending downward therefrom and suitably journaled at its lower portion in a bearing D′, attached to the lower arm *c′* of the rod C. Where this shaft or rod passes through the support A the latter may advantageously be enlarged to form a boss or hub *a′*. Collars *d d′* are affixed to that portion of the shaft passing through the platform or support A, on both sides thereof, to prevent longitudinal movement of the shaft. The collars may be secured to the shaft by any suitable means—as, for example, by making one of the collars integral with the shaft and providing the other with a screw-thread, as shown, or by any other method, as by shrinking or riveting. Below the platform this shaft is screw-threaded, preferably, throughout its length to a point immediately above its lower support.

E represents a support for the upper carbon. It comprises a piece extending from the vertical arm *c* of the rod C to a point over the lower-carbon support. At the inner end, or that end in proximity to the vertical arm, it is provided with an enlargement or boss *e*, through which the vertical arm *c* passes, and on which it may slide from one end to the other. At the outer portion the arm E is adapted to support a carbon rod forming the upper carbon of the lamp. Intermediate of the outer and inner portions the support E is suitably constructed to engage with the threaded portion of the shaft or rod D. As here shown this construction comprises a nut L, attached to the arm. It may be made in two portions *l l′*, which are hinged together at one side and provided with a clamping device at the opposite side, whereby the two parts may be clamped upon the threaded shaft to engage therewith. This construction affords a ready means for disengaging the upper-carbon support for the insertion of a new carbon and subsequent adjustment of the same.

It will be readily perceived that the rotation of the shaft in one direction will cause the carbons to approach, while a reverse ro-

tation will cause the carbons to recede. For the production of these opposite movements of the shaft its upper portion may be provided with ratchet-wheels D^2 D^3, whose teeth face in opposite directions and which are moved by pawls in a manner to be explained.

On the platform or support A are suitably mounted two solenoids F and G, with their axes in line with their respective ratchet-wheels D^2 and D^3. The solenoid F is in series with that portion of the circuit leading to one of the carbons—in this case the upper carbon. One of the terminals of the solenoid F is in electrical connection with the upper-carbon support through the agency of the spring *f*, while the remaining terminal may be connected to one of the binding-posts B′.

The solenoid G is in a derived circuit, or, in other words, it forms the ordinary shunt-coil between the carbons. One terminal of this solenoid may be connected to the binding-post B′, while the remaining terminal is connected to the main line leading from the opposite carbon through an interposed circuit-breaker II.

The cores of the solenoids F and G are extended in the form of stems or rods f' g' to nearly the peripheries of their respective ratchet-wheels, where they carry pawls f^5 g^2, pressed into engagement with the ratchet-teeth by springs f^4 g^3. These pawls are prevented from passing beyond the action of the springs f^4 g^2, under the influence of the latter, by shoulders formed upon the pawls, which coact with corresponding shoulders on the rods or stems. F′ and G′ are helical springs serving to thrust out the cores of the solenoids when they are released by the cessation of the current.

By the successive insertion and withdrawal of the core of one of the solenoids it will be readily perceived that the threaded shaft D is given an intermittent rotary motion in one direction, and by a similar movement of the other core the shaft is moved similarly in the opposite direction. For the purpose of giving this vibratory movement to the core of the solenoid G there is provided what I may term a "circuit-breaker" H, comprising an upright post or pillar *h*, which may be in direct electrical connection with the portion of the circuit leading to the lower carbon. At its upper portion this upright is provided with a contact-screw *h*′. The coacting contact-piece h^2 consists of a conducting-piece secured on an insulating-support at its lower portion in such a manner that its upper portion may have a movement toward and away from the contact-screw under the influence of the solenoid-core, to which it is secured by a screw or otherwise to permit of such movement. To piece h^2 one terminal of the coil G may be secured. Under the combined action of the returning-spring G′ and the circuit-breaker H it is evident that the core, and consequently the pawl g^2, will have a vibratory motion when the current passes.

Turning, now, to the main-line solenoid F, in order to communicate the necessary vibratory movement to the core of this solenoid I may provide a device for successively short-circuiting its coil and replacing the same in circuit. This device comprises an upright arm f^2, of conducting material, mounted on the platform or support A, or appurtenance thereof, in such a manner that its upper portion may have a motion toward and away from a depending piece f^3, with which the arm f^2 may contact. The piece f^2 is shown as being insulated from its support. The vibratory motion is imparted to the piece f^2 by the core of the solenoid F, with which it is connected by a screw, as shown, or other suitable means adapted to permit of that motion. Pieces f^2 and f^3 are in electrical connection with the lamp-circuit, as shown. When the pieces f^2 and f^3 are in contact, the core of the solenoid is demagnetized on the passage of the current, as then the coil of the solenoid is cut out of circuit by the pieces f^2 and f^3. The two contact-pieces then separate through the action of the spring F′, allowing the current to again pass through the solenoid-coil. It is evident, therefore, that there is a constant tendency to a vibratory movement of the core of solenoid F as long as current passes.

Having thus described in detail the essential parts of an arc lamp embodying my improvement, the general action of the same is as follows: Normally the carbons are separated from each other. When the circuit through the main line is closed, the current passes through the shunt-coil G, energizing and de-energizing the same in the manner before explained. Through the action of the attached pawl and the corresponding ratchet-wheel the shaft D is rotated and the carbons caused to approach each other. When contact is made, the circuit through the main coil F is closed, and its core and attached pawl move the shaft to separate the carbons, thus establishing the arc. In this position of the carbons the current passing through the shunt-coil is much reduced. If, however, the carbons become too widely separated under the influence of the main coil or by their burning away, the shunt-coil acts to feed them together, that coil which is most strongly energized predominating over the other in respect to the force which it applies to its corresponding ratchet-wheel.

In case the lamp is used on an alternating circuit the cores of the solenoids may be laminated or subdivided in the well-known manner.

It will be seen that the construction of the lamp permits of its operating in whatever position the lamp may be placed. It may thus be attached to a vertical wall projecting horizontally therefrom or even be placed in a po-

sition reverse from that represented. By extending the portion c' on the opposite side of c an additional set of carbons may be used.

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

1. In an arc lamp, the combination of an arm comprising a longitudinal portion and a transversely extending portion, a carbon support secured to the transversely extending portion, a carbon support movable lengthwise of the longitudinal portion of the arm, a screw engaging with a nut supported by the second carbon support, ratchet wheels secured to the end portion of the screw, solenoids whose cores are provided with pawls for actuating the ratchet wheels and means for producing a vibratory movement of the cores to actuate the screw, substantially as specified.

2. In an arc lamp, the combination of a fixed carbon support, a movable carbon support, a screw for actuating the latter support, ratchet wheels secured to the end portion of the screw, solenoids whose cores are provided with pawls for actuating the ratchet wheels, one of said coils being comprised in the main circuit and the other in a derived circuit of the lamp, mechanism operated by the movement of one core to effect a break in the circuit through its solenoid, and mechanism operated by the movement of the other core to effect a short circuiting of its solenoid, substantially as specified.

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

FREDERICK N. PIKE.

Witnesses:

ANTHONY GREF,

JAC. KLEMANN, Jr.