(No Model.)

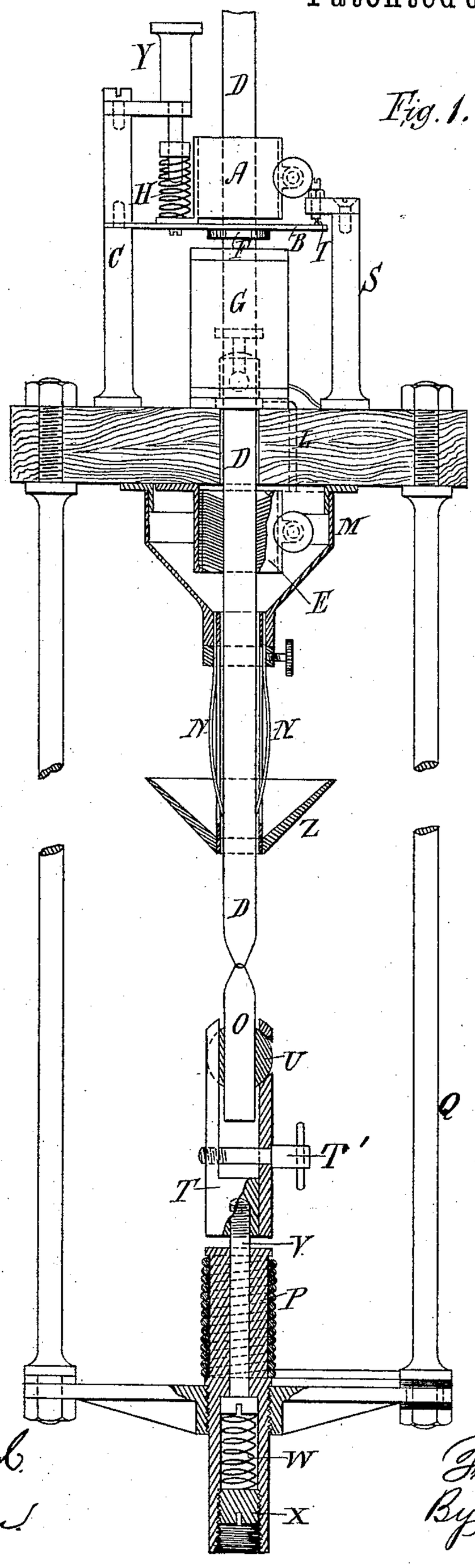
2 Sheets—Sheet 1.

F. M. NEWTON.

ARC LAMP.

No. 300,999. Patented June 24, 1884.

Fig. 1.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

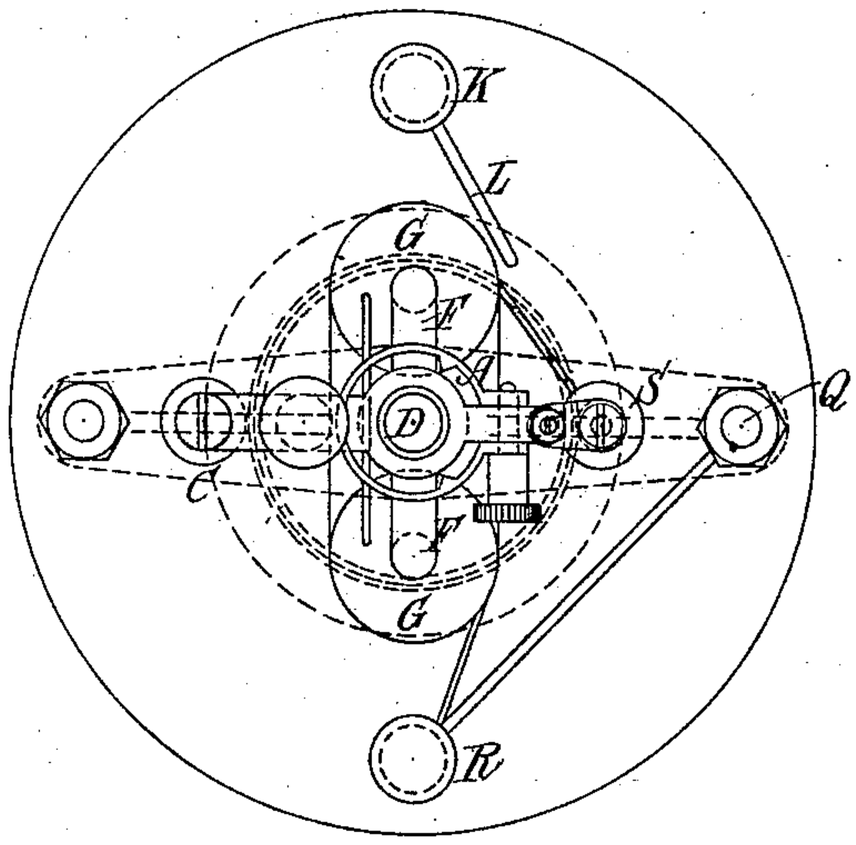


Fig. 3.

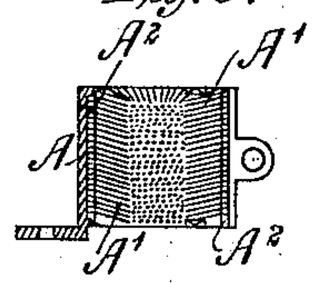
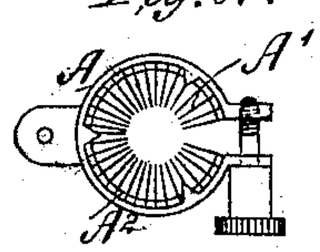


Fig. 4.



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UNITED STATES PATENT OFFICE.

FRANCIS MURRAY NEWTON, OF BELFAST, COUNTY OF ANTRIM, IRELAND.

ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 300,999, dated June 24, 1884.

Application filed November 28, 1883. (No model.) Patented in England March 31, 1883, No. 1,623.

To all whom it may concern:

Be it known that I, FRANCIS MURRAY NEWTON, a subject of the Queen of Great Britain and Ireland, residing at Belfast, in the county of Antrim, Kingdom of Great Britain and Ireland, have invented a new and useful Improved Electric-Arc Lamp, of which the following is a specification.

In an electric-arc lamp according to my invention, the feeding of the carbon or of its holder, or it may be of both carbons or holders, is effected by a device moving with a vibrating or reciprocating motion. During the forward or acting portion of this vibrating or reciprocating motion, the device takes a firm hold of the carbon or its holder, and during its backward or idle stroke the device slides freely over the said carbon or its holder. Thus an intermittent feed is imparted to the carbon during the time that the above-mentioned device is in vibration or reciprocation. During the intervals, when the carbon is not actually moving forward, it is held by a second device, which offers sufficient resistance to its forward motion to maintain it in position against the influence of gravity, jarring, and the like, and a similar or still greater resistance against its backward motion, so that the carbon may not be carried back by the idle stroke of the vibrating device. If the vibrating device is properly adjusted, it will be sufficient for the second device to give an equal pressure in both directions after the manner of a brake. The vibrating device derives its motion from an electro-magnet or solenoid in the main circuit, or in a derivation thereof, or in a shunt-circuit round the arc, according as the lamp is intended to burn alone, or in parallel circuit, or in series. This magnet or solenoid acts upon an armature or core, which, in the course of its motion, operates a make-and-break arrangement, by which some or all of the convolutions of the conductor on the magnet or solenoid are short-circuited or cut out of circuit; hence the power of the magnet is, so long as the vibrating motion is kept up, alternately increased and diminished. The arc is struck either by lowering the negative carbon by an electro-magnet or solenoid, or the whole of the previously-described feed-arrangement may be raised by similar means.

Referring to the accompanying sheet of drawings, Figure 1 is an elevation, partly in section, of an arc lamp embodying my invention, the cover being supposed to be removed. Fig. 2 is a plan of the same. Fig. 3 is a sectional view of the device A, and Fig. 4 a plan of the same.

A is a vibrating device hinged or pivoted by the arm B to the standard C, and surrounding the carbon or electrode. Its interior is provided with fingers, feelers, or cams, here shown as elastic wires A′, fixed in a foundation, A^2, of metal, leather, or india-rubber, after the manner of wire-card filleting. The points of these wires normally inclose a cylindrical space rather less in diameter than the carbon D (or holder) they are intended to grasp, and hence when the carbon D (or holder) is passed through them from above they are deflected, and thus form a series of toggle-like arms, which oppose but a very slight resistance to the motion of the device A (relatively to the carbon D) in one direction, but take a firm grip on the carbon D when the device A is moved in the other direction. E is a stationary device similar in construction to the vibrating device A. It obtains sufficient frictional hold of the carbon D to maintain it against motion in the direction of the arc in opposition to the action of gravity, jarring, and the like, but cannot retain it against the additional impulse of the forward stroke of the vibrating device A. In the opposite direction the device E obtains a firm grasp, as already explained with regard to A. The diameter of the space inclosed by the points of the elastic fingers, both in A and E, can be varied by screws, which draw the sides of the case more tightly together. The vibration of the device A is effected by the electro-magnet G, which is situated in a shunt-circuit around the arc in a manner which is well understood. This magnet attracts an armature, F, connected to the vibrating device A; but so long as the arc does not exceed its normal length the attraction is not sufficient to overcome the power of the spring H. When, however, the length of the arc increases beyond the determined amount, the attraction of the magnet overcomes the spring, and the armature, with the device A, is drawn down. Immediately

it has moved the shunt-circuit is broken where it crosses the contact-points at I, the magnet loses its power, and the armature rises, carrying the device A with it into position, ready for the next stroke, which occurs immediately the contact-pieces touch, unless the previous stroke has reduced the arc to the desired length. The course of the current through the lamp is as follows: It enters at the terminal K, passes by the wire L to the casing M, thence through the contact-springs N N to the upper carbon, D, across the arc to the negative carbon O, and from its holder to the core of the electro-magnet P. One end of the coil surrounding P is connected to the core, and hence it receives the current which is conveyed from the other end of the coil by a wire to the rod Q, and thence by a second wire to the other terminal, R. The shunt-circuit passes up through the positive carbon from the contact-springs N N to the device A, thence to the pivoted arm B, and through the contact-pieces I to the column S, and through the electro-magnet G to the terminal R. The arc is struck by the electro-magnet P, which attracts an armature, T, at the bottom of the ball-and-socket-jointed carbon-holder U.

The position of the carbon may be adjusted by the socket-jointed carbon-holder U, and the ball in the socket-joint can be tightened or loosened by the screw T'. The ball may be either split, so as to let the carbon pass through it, or solid, so as to press on one side of the carbon, or it may be hollow.

The motion of the armature, which is guided by the non-magnetic pin V, is opposed by the spring W, which can be adjusted by the screwed plug X. Similarly, the resistance offered to the attraction of the magnet G can be varied by the screw Y.

Z is a deflecting-cup to shield the lamp from the rising gases, and M is a dust cap or casing to protect the fixed device E and mechanism above.

The springs N N, which convey the current to the upper carbon, may in some cases be made to perform the office of the fixed device E, as well as their own.

I am aware that catches have been used which press firmly against the sides of a rod supporting a carbon, and thus prevent its downward motion, but so placed as to permit its motion in an upward direction. Nor do I herein claim, broadly, elastic fingers or feelers set in a foundation of metal, leather, or india-rubber, which take a frictional hold of the carbon, feeding it forward when moving in one direction, and slide over it when moving in the opposite direction, as the same are described and claimed in my pending application No. 113,016; but

What I claim is—

1. In an electric-arc lamp, the fixed carbon-holder E, provided with fingers, feelers, or wires set in a foundation of metal, leather, or india-rubber, or other suitable material, and a suitable adjusting device, such as shown, whereby the hold upon the carbon is increased or diminished, substantially as described.

2. In an electric-arc lamp, the combination of an electro-magnet or solenoid whose circuit is closed or short-circuited whenever the device makes its stroke, with the vibrating or reciprocating device A, formed of elastic fingers, as described, and the fixed braking carbon-holder of the same kind, substantially as described.

3. In an electric-arc lamp, the combination of the spring H, provided with an adjusting-screw, Y; carbon-holder A, pivoted arm B, contact-piece I, column S, electro-magnet G, fixed carbon-holder E, casing M, contact-springs N N, and dust-cap Z, substantially as described.

4. In an electric-arc lamp, the spring H, pivoted arm B, vibrating carbon-holder A, electro-magnet G, and stationary carbon-holder E, substantially as described.

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