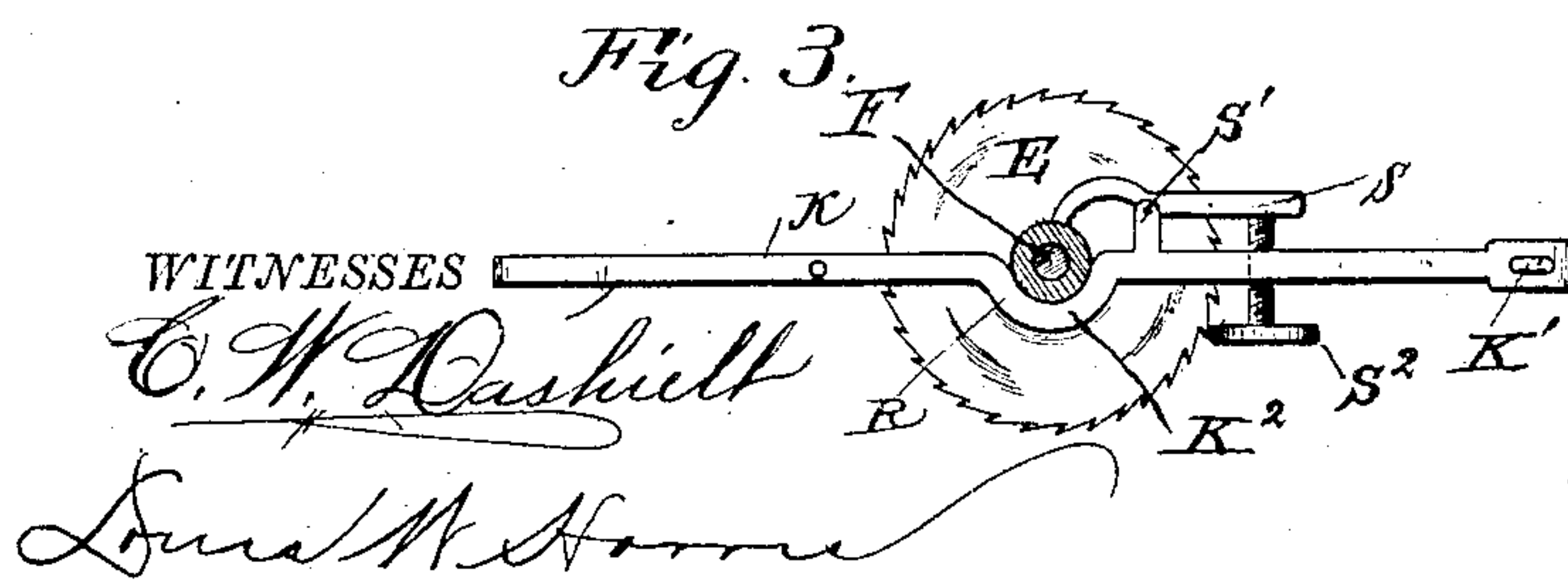
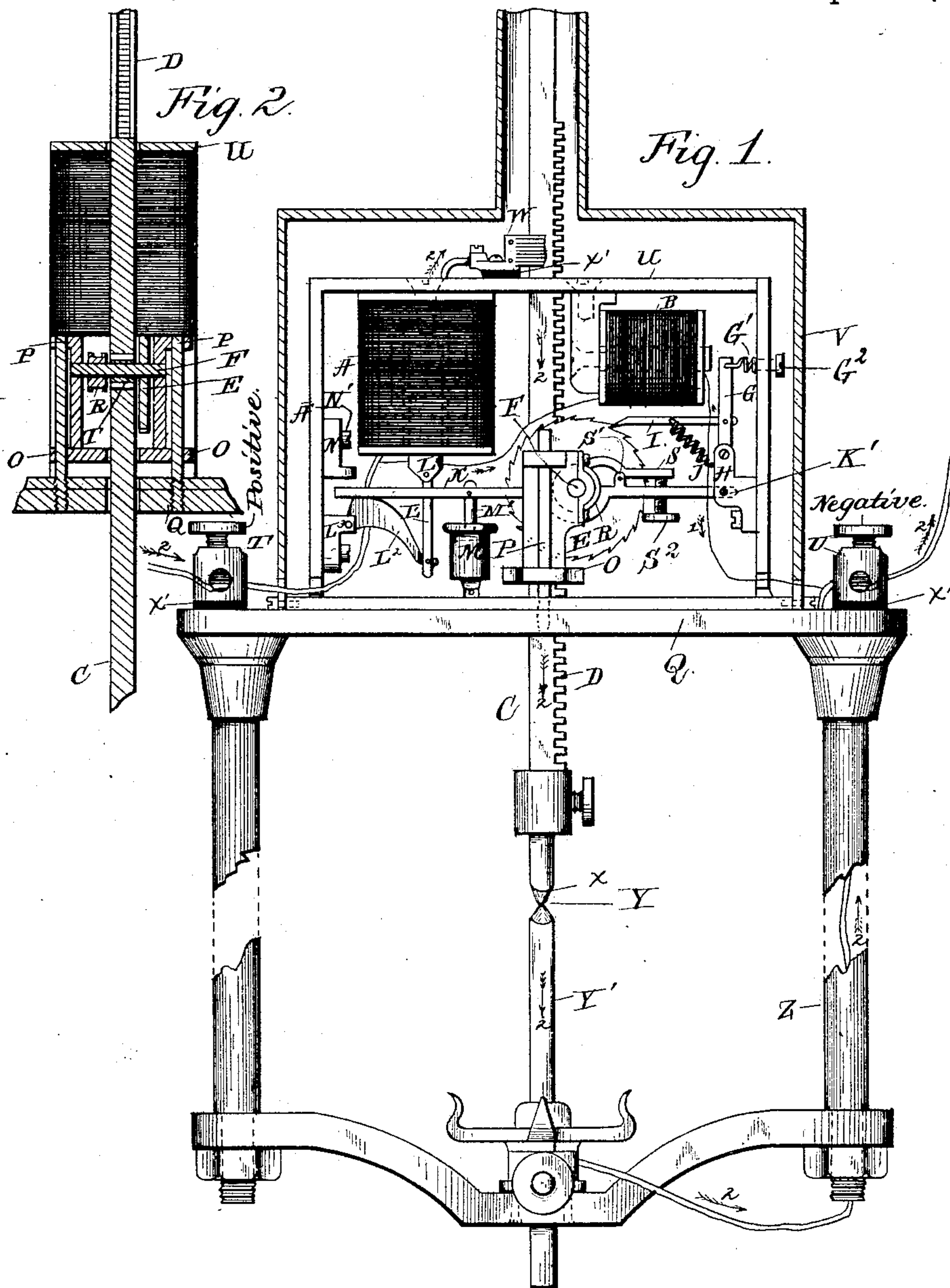


(No Model.)

W. F. BUCKLEY.  
ELECTRIC ARC LAMP.

No. 315,473.

Patented Apr. 14, 1885.



WITNESSES

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# UNITED STATES PATENT OFFICE.

WILLIAM F. BUCKLEY, OF CLEVELAND, OHIO.

## ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 315,473, dated April 14, 1885.

Application filed July 5, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM F. BUCKLEY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Electric-Arc Lamp, of which the following is a specification, reference being had to the accompanying drawings.

This invention has relation to electric-arc lamps; and it has for its objects to produce a lamp of the class referred to that shall be adapted especially for use in factories, at mast-heads, and on locomotives, and elsewhere where a jarring or swinging motion is imparted to the lamp, as well as in places where it shall be stationary, and that shall possess superior advantages in point of simplicity, durability, and general efficiency; and the invention consists in the construction and novel arrangement of parts, as will be hereinafter fully described, and particularly pointed out in the claims.

In the drawings, Figure 1 is a view, partly in elevation and partly in section, of an electric-arc lamp embodying my improvements. Fig. 2 is a partial vertical transverse sectional view. Fig. 3 is a detail view of the ratchet-wheel, friction-drum, and levers K and S.

Referring by letter to the accompanying drawings, A' designates the frame of the lamp, and V the thin metal casing or hood which incloses the lamp and rod.

Q is the iron base of the lamp.

A designates the main solenoid or sucking-magnet, and B the shunt-magnet wound with fine insulated copper wire and connected in shunt-circuit with the main circuit, as shown by fine lines marked with arrows 1.

C is the hollow carbon rod provided with the toothed rack D.

E designates a ratchet-wheel secured to a small shaft, F, upon which is secured a pinion, T, which engages the rack D.

G is a small lever pivoted at its lower end to the bracket H on the frame. The upper end of the lever G is connected to the spiral spring G', regulated by a set-screw, G<sup>2</sup>, and said lever G is acted upon by the shunt-magnet B.

I indicates a pawl loosely pivoted to the armature G, and held in engagement with the

ratchet-wheel E by a coiled spring, J, connected to said pawl and to the bracket H.

K is a lever provided with an oblong hole, K', near one end, for the purpose of permitting the lever to lift without binding, the said lever K being pivoted to the bracket H.

L is an iron core having a rod, L', pivoted at its lower end, and is adapted to move freely up and down in the solenoid A. The rod L' passes down through a slot in the lever K, and is pivoted at its lower end to the lower end of a cam-lever, L<sup>2</sup>, the latter being fulcrumed in a bracket, L<sup>3</sup>, secured to the frame A' below the lever K.

M designates a dash-pot filled with any suitable liquid for the purpose of preventing a too sudden movement of the lever K through the medium of the dasher M', pivoted to said lever K.

N is a bracket secured adjustably to the frame A' above the lever K by a set-screw, N', for the purpose of limiting the distance that the lever K shall move upward.

O is a metal frame which moves vertically on the posts P P, which are screwed into the iron base Q of the lamp. The lever K is provided with a half-circle, K<sup>2</sup>, near its middle, which fits the under side of the drum R on the shaft F. A lever, S, pivoted to a stud, S', on the lever K, bears upon the drum R and regulates the friction between the drum R and lever K, a set-screw, S<sup>2</sup>, being used to adjust the lever S.

T is the positive binding-post, and U the negative binding-post, both being properly insulated from the iron base Q.

W is a brush insulated from the frame A' and bearing against the rod C.

X' designates the insulating material at the brush and at the binding-posts.

The operation of the lamp is as follows: The current enters at the positive binding-post and follows the lines in the direction of arrows 2 around the wire of solenoid A to the brush W, which bears on the rod C, down the rod C, across the arc Y to the negative carbon Y', up the hollow side rod, Z, to the negative binding-post, and out on the main line. As the current traverses the main solenoid A the resultant magnetism draws up the iron core L and operates the cam-lever L<sup>2</sup> through the rod



L', and carries up the end of the lever K against the bracket N. The lever K is bound tightly between the cam and the bracket N, and is held firmly thereby, so that a slight  
 5 change of current in the solenoid will not release the pressure of the cam L<sup>2</sup> against the lever K, and it is only released when the current to the lamp is shut off, when the weight of the iron core L bearing on the end  
 10 of the lever of the cam will bear the cam-lever down and release the lever K and allow it to fall and bring the carbons together. As the resultant magnetism aforesaid draws up the lever K it carries with it the frame O, by  
 15 which action, and by reason of the friction of the half-circle K<sup>2</sup> in the lever K and the pressure of lever S, the ratchet-wheel E is prevented from turning, and thereby admits of the carbon rod being lifted, and the arc is  
 20 thereby established. The friction between the drum R and lever K should be just sufficient to prevent the ratchet-wheel E from turning while the carbon rod is being lifted. Any suitable form of friction mechanism will  
 25 answer for this purpose. When the arc is of normal length, there is but a small percentage of the current shunted through the fine-wire magnet B, and the lever or armature G is not affected at this time; but as the carbons burn  
 30 away the arc becomes abnormally long and its resistance proportionally greater, which causes more current to be shunted through the magnet B, which then draws up the armature G, which motion turns the ratchet-wheel  
 35 E through the loose pawl I and overcomes the friction on the drum and forces the carbon rod down, thus feeding the carbons.

By reason of the fact that the carbon rod is forced down to feed the carbons this lamp is  
 40 not disturbed by jarring or swinging motions, such as it would receive while suspended from the ceiling of a shop or factory, or from the mast-head of a vessel, or when in use as a head-light on a locomotive, or in use on a railway-

car of any kind, as would be the case if it depended on gravitation only for the feeding operation. 45

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is— 50

1. The combination of the frame A', the solenoid, and shunt-magnet secured to the frame, the shunt-magnet being connected in shunt-circuit with the main circuit, posts P, frame O on said posts, shaft F, journaled in frame O, and ratchet-wheel E, pinion T, and drum R, fast to said shaft, pivoted lever K, having bend K<sup>2</sup>, lever S, pivoted to lever K and bearing against the drum, armature G, pivoted to the frame A', a pawl pivoted to  
 55 said armature and engaging with the ratchet-wheel, rod C, having rack D, which engages with pinion T, cam-lever L<sup>2</sup>, pivoted to frame A' and supporting the free end of lever K, rod L', connected to cam-lever L<sup>2</sup> and to the core  
 60 of the solenoid, and a stop to regulate the play of lever K, substantially as described. 65

2. The combination of the solenoid, the pivoted lever K, pivoted cam-lever L<sup>2</sup>, supporting the free end of lever K, and connected to the core of the solenoid, and a stop for limiting the play of lever K, substantially as described. 70

3. The combination of the solenoid, the pivoted lever K, pivoted cam-lever L<sup>2</sup>, supporting the free end of lever K and connected to the core of the solenoid, a stop for limiting the play of lever K, the dash-pot, and the dasher connected to lever K, substantially as described. 75

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses. 80

WILLIAM F. BUCKLEY.

Witnesses:

L. A. RUSSELL,  
 J. M. ADAMS.