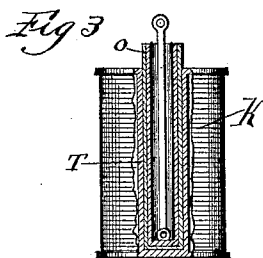
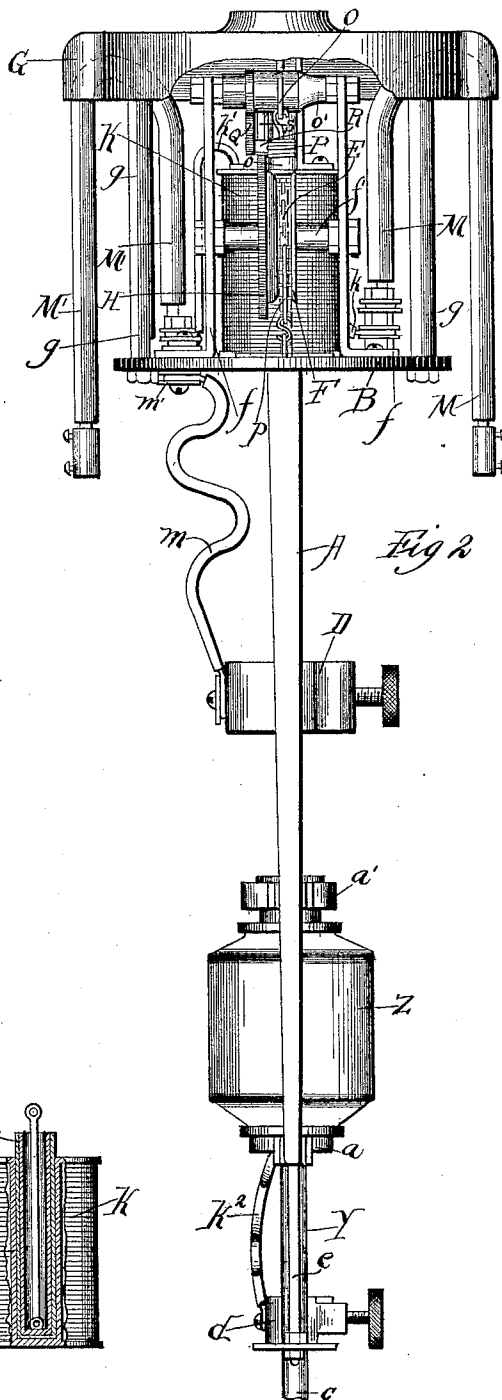
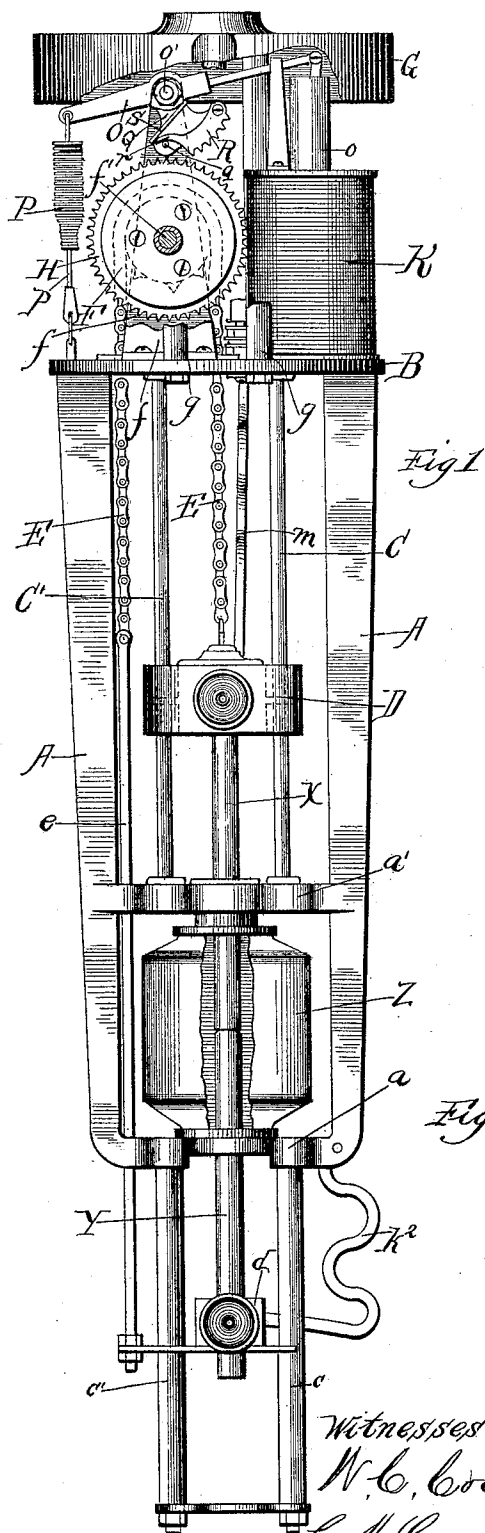


(No Model.)

J. A. MOSHER.
ELECTRIC ARC LAMP.

No. 573,830.

Patented Dec. 22, 1896.



Witnesses
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ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 573,830, dated December 22, 1896.

Application filed October 22, 1896. Serial No. 609,755. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. MOSHER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electric-Arc Lamps; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to the regulating mechanism of an arc-lamp of the type known as "gravity-feed," its object being to secure simplicity of construction with high efficiency; and it consists in a chain or cable hung over a sheave and carrying at its ends the two carbon-holders, the upper one of which is superior in weight to the lower, so that by its descent it raises the lower carbon; a ratchet-wheel mounted in conjunction with the sheave; a spring-controlled pawl for coöperating with the ratchet-wheel and mounted upon a rock-lever; a solenoid the coil of which is in series with the arc for actuating the pawl, so as to separate the carbons; a retractile spring for acting in opposition to the solenoid, and various parts and arrangement of parts, as hereinafter set forth.

In the drawings, Figure 1 is a side elevation of the lamp, some of the parts being broken away to show the internal construction. Fig. 2 is a side elevation transverse to the direction of view of Fig. 1; and Fig. 3 is a central internal section of the solenoid, taken on the line 3 3 of Fig. 1.

The lamp shown in the drawings is of the type commonly known as the "inclosed-arc" lamp, the tips of the carbons x y entering a globe Z of diaphanous material. This feature, however, forms no part of the invention claimed in this application.

The frame of the lamp consists of the two vertical arms A A , pendent from a plate B , upon which the regulating mechanism is mounted, and joined by a pair of cross-arms a a' in vertical alinement, between which is secured the arc-inclosing envelop z . A pair

of vertical guide-rods C C' is mounted between the plate B and the upper cross-bar a' , the holder D of the upper carbon x running upon these rods and being suspended from one end of a chain or cable E . A similar pair of vertical guide-rods c c' is pendent from the lower cross-arm a' , and the holder d for the lower carbon y slides upon these rods and is suspended from the opposite end of the chain or cable E by means of a rod e .

The chain or cable E is hung upon a sheave F , which is journaled in a pair of floor-hangers f f , mounted upon the plate B by means of the shaft f' . A ratchet-wheel H is fixed upon the shaft f' .

A helix K is mounted upon the plate B and is in series with the lamp, one of its ends k being connected with one of the terminals M of the main line and its other end k' being electrically connected with the frame of the lamp through the plate B and thence with the lower carbon y by means of the flexible connection k^2 , leading from the lower end of one of the arms A to the carbon-holder d . The other terminal M' of the main line is connected with the upper carbon-holder D by means of the flexible connection m , leading from a binding-post m' , secured to but insulated from the plate B and in electrical connection with the terminal M' . Some of the wires leading through the head of the lamp are shown in the drawings as being insulated by being inclosed within rubber tubing.

A rock-lever O is fulcrumed upon a shaft o' , journaled in the upper ends of the floor-hangers f f , and at one end carries a core o , which enters the helix K , forming therewith a solenoid. The opposite end of the rock-lever O is secured to a retractile spring P , which is attached to the plate B and is provided with a simple form of turnbuckle p , by means of which its tension may be adjusted. A lateral arm Q projects downwardly from the shaft upon which the rock-lever O is fulcrumed, and is in fixed relation to this lever. The arm Q is extended laterally toward each end of the rock-lever O , and to one of these extensions a ratchet-pawl R is pivotally attached, the opposite end of the pawl being provided with an arm r , which normally rests upon a stud g , set in the side

of the opposite extension of the arm Q, and held in contact therewith by means of a leaf-spring S, secured to the shaft *o'*, and bearing against the upper side of the arm *r*.

5 When the lamp is cut out from the circuit, the spring P draws the core *o* out of the helix K and throws the pawl R out of engagement with the ratchet-wheel II. When the current is turned onto the lamp, it energizes the
10 helix K, which draws down the core *o* and brings the pawl R into engagement with the ratchet-wheel II, so as to rotate the latter and thereby raises the carbon *x* and lowers the carbon *y*, establishing an arc between these
15 two electrodes. The weakening of the current by an undue elongation of the arc weakens the hold of the helix upon the core and permits the spring P to raise the latter, thereby moving the pawl R in the opposite direction
20 and turning the ratchet-wheel II so as to cause the mutual approach of the carbons. This action compensates for the consumption of the carbons until the pawl allows the ratchet to escape it, the energy of the solenoid being
25 increased, however, so quickly by the increase of the current due to the approach of the carbons that the pawl always catches the next succeeding tooth of the ratchet-wheel.

I am aware that I am not the first to regulate by means of a ratchet-wheel an electromagnet-controlled segmental pawl similar to the one shown in this application, but in regulating devices of this character it is found that when the segmental pawl is brought into
30 action by the movement of the solenoid-core it is quite as apt to have its teeth register with the points of the ratchet-wheel teeth as with the spaces between them, and consequently the mechanism is locked. This difficulty is
35 wholly obviated by mounting the segmental pawl pivotally upon the arm attached to the rock-lever and holding it in position for action by means of a spring which yields in the event of the contact of the points of the teeth
40 of the pawl and ratchet-wheel, usually causing the intermeshing of the teeth, though not always.

The too abrupt action of the core of the solenoid is prevented by lining the helix with
50 a tube T, closed at its lower end, so as to constitute the cylinder of a dash-pot, of which the core *o* is the plunger.

The regulating mechanism is covered by a cap G, secured to the plate B by means of a
55 number of posts *g*. In practice the head of

the lamp is of course inclosed, but I have not deemed it necessary to show the casing.

I have described the arm Q as being mounted upon the shaft *o'*; but it will be seen that it is essentially a part of the lever O. While
60 I prefer the solenoid form of electromagnet because of the long range of the movement of its core or armature and because it enables me to combine the electromagnet and the dash-pot, any other type may be employed,
65 if desired. The form of pawl shown and the manner of mounting it upon the rock-lever I regard as the best that can be devised, but any construction in which the pawl has a yielding contact with the ratchet-wheel will
70 come within the scope of my invention. Neither is the precise form of connection between the ratchet-wheel and the carbon-carrier material.

I claim as my invention—

75 1. In an electric-arc lamp the combination with a vertically-reciprocating carbon-holder, of a ratchet-wheel, mechanical connection between the holder and the wheel whereby they move together, a lever, a pawl for coöperating
80 with the ratchet and being pivotally attached to the lever, a spring for holding the pawl to the limit of its movement upon its pivot toward the ratchet-wheel, an electromagnet
85 connected with the lever and adapted to move it to bring the pawl into engagement with the ratchet-wheel so as to raise the carbon-holder, and a retractile spring acting upon the lever in opposition to the electromagnet.

90 2. In an electric-arc lamp having its electrodes drawn together by gravity, the combination with the carbon-carrier, of a ratchet-wheel coöperating therewith, a lever, a pawl for coöperating with the ratchet-wheel to separate the electrodes and being movably
95 attached to the lever, a spring for holding the pawl in its advanced position upon the lever, an electromagnet having its coil in series with the lamp, connection between the lever and the magnet whereby the latter tends to
100 engage the pawl with the ratchet-wheel, and a retractile spring for opposing the action of the magnet.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN A. MOSHER.

Witnesses:

LOUIS K. GILLSON,
RICHARD H. WYMAN.