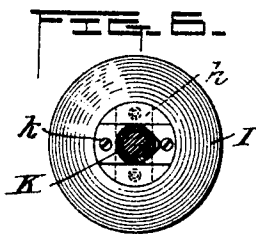
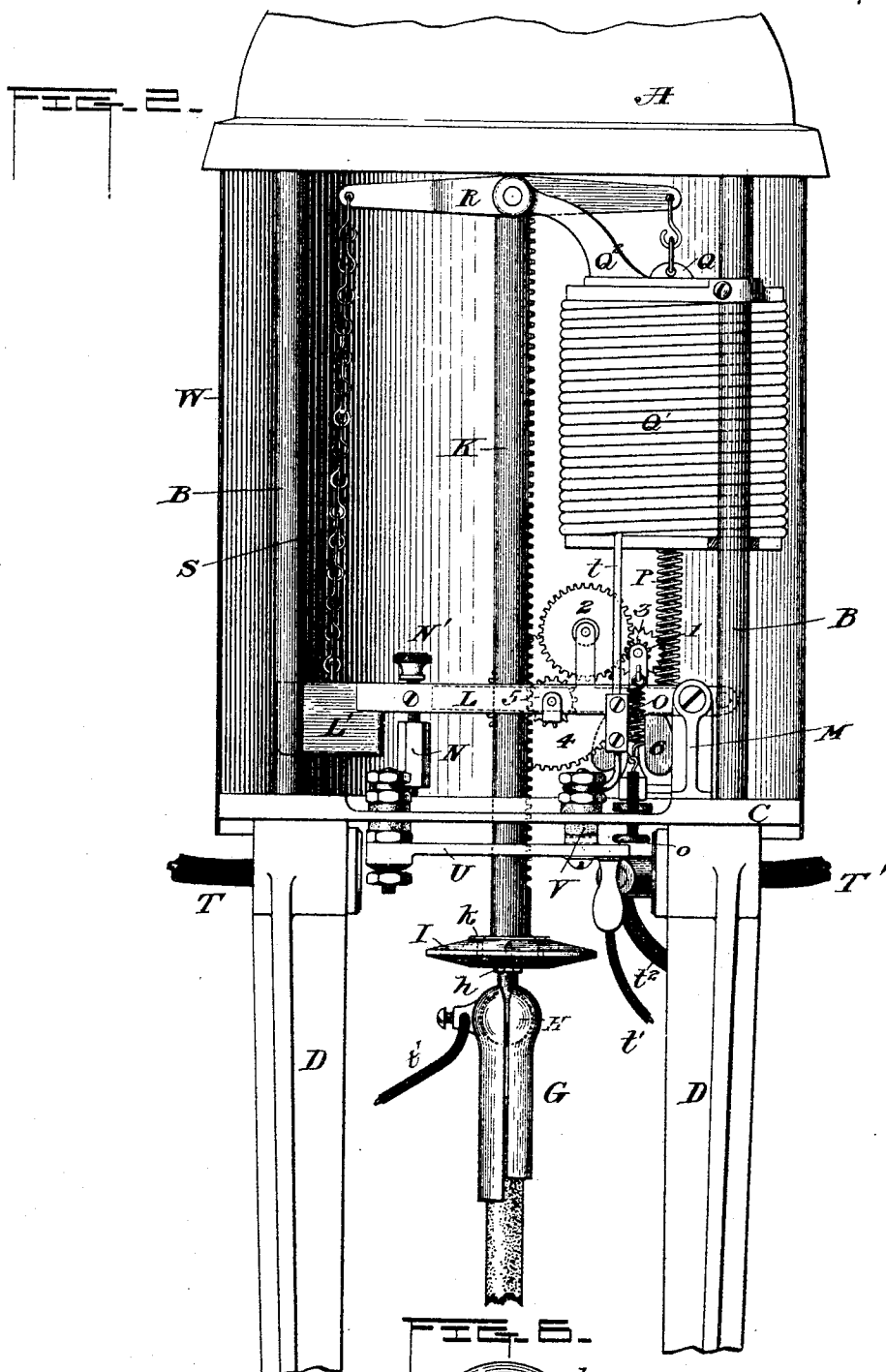


E. R. KNOWLES.
ALTERNATING ELECTRIC ARC LAMP.

No. 516,822.

Patented Mar. 20, 1894.



Witnesses
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UNITED STATES PATENT OFFICE.

EDWARD R. KNOWLES, OF MIDDLETOWN, CONNECTICUT, ASSIGNOR TO THE
SCHUYLER ELECTRIC COMPANY, OF CONNECTICUT.

ALTERNATING ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 516,822, dated March 20, 1894.

Application filed January 9, 1893. Serial No. 457,815. (No model.)

To all whom it may concern:

Be it known that I, EDWARD R. KNOWLES, a citizen of the United States, residing at Middletown, in the county of Middlesex and State of Connecticut, have invented certain new and useful Improvements in Alternating Arc Lamps, of which the following is a specification.

My invention relates to electric arc lamps, and it is an improvement upon the one patented to me September 15, 1891, No. 459,510.

The present invention consists in certain details of construction hereinafter set forth and particularly pointed out in the claims.

In the drawings,—Figure 1 is a side elevation of the lamp, the casing being in section. Fig. 2 is an enlarged view of the regulating mechanism. Figs. 3 and 4 are side and edge views of the magnet core. Figs. 5 and 6 are views of the connector for the upper carbon holder.

The frame of the lamp consists of a cast metal hood A, from which, or from a top plate secured thereto, is suspended by rods B a base plate C for the regulating mechanism. Hangers D depend from the base-plate and support the lower carbon holder E and shade-holder F. The upper carbon-holder G consists of a split clamp having at its upper end a spherical cavity to fit the ball H depending from a cross-bar *h*, which is fastened to the under side of a plate I of insulating material, preferably slate. To the upper side of the plate I is secured the foot *k* of the hollow feed-rack K, the foot *k* being preferably arranged at right angles to the cross-bar *h* so as to avoid any interference of the screws which fasten them to the plate I.

The rack K is constructed as set forth in my former patent above mentioned, being a tube sliding on a stationary rod depending from the hood A, or the top plate secured thereto. The gears 1, 2, and escapement wheel 3, as in my former patent, are carried on an inner frame fulcrumed on the axle of the gears 4, 5, which is journaled in the outer frame L, hinged at one end on standards M, and playing vertically at the other end between adjustable stops N, N'. A weight L' tends to keep the frame down upon the lower stop, and a spring O exerts a constant downward

pull upon the free end of the inner frame, to keep the escapement 6 in engagement with its detent, as fully set forth in my said patent. To this end of the inner frame is attached one end of a spring P, the upper end of which is connected with the core Q of the electromagnet Q', which is supported on the rods B. The upper end of the core is hung on a beam R, which has an eye to encircle the rack K and is fulcrumed at its middle on suitable supports, such as arms Q² projecting from the top-plate of the magnet Q'. The farther end of the beam is connected by a chain S with the weight L'.

The core Q is built up of alternate laminations of sheet iron and insulation, and is jacketed with insulation *q*, preferably asbestos paper. It is of such a size that it slides with some friction in the spool of the magnet Q', so that too sudden movements are prevented, and a decided change of strength in the current is required to effect it.

The supply mains T T' are fastened in sockets in the hangers D, the circuit being by way of the switch U to binding post V, thence by wire *t* to the magnet Q', thence by wire *t'* to the positive carbon, and from the negative carbon by the wire *t*² to the main T'.

The operation of the regulating mechanism is as follows: When no current is passing the weight L' rests on its lower stop and by means of the chain, beam, core and spring, lifts the free end of the inner frame, releasing the escapement and allowing the rack K to feed down by gravity until the carbons touch. When the switch U is closed, the current passes, and energizes the magnet Q', sucking down the core Q and thereby locking the escapement, and at the same time lifting the weight L' and the frame L, and with it the rack K, thereby striking the arc. When the carbons have burned away and the current has become weakened by the resistance of the increased length of the arc, the weight L' overcomes the attraction of the magnet and the friction of the core, and drops, thereby pulling up the core and releasing the escapement, and permitting the gearing to turn and feed down the rack sufficiently to make up for the shortening of the carbons. By interposing a spring between the core and the

inner frame, instead of making a rigid connection as in my former patent, the action of the escapement is rendered more delicate, since the tension of the spring O increases as the inner frame is lifted, so that but a slight movement of the frame can take place before the springs O and P balance each other. This permits a considerable movement of the core Q with but a small movement of the inner frame. By means of the tension screw o the action can be very finely adjusted.

The mechanism is inclosed in a removable sheet metal casing W.

Having thus described my invention, what I claim is—

1. In an arc lamp, the combination with a carbon holder having a cross bar, of a feed rack having a transverse foot, and a plate of slate interposed between them, substantially as described.

2. In an arc lamp, the combination with the two part clamp G, of the ball H engaged thereby, the bar h attached to said ball, the slate disk I surmounting said bar, and the feed rack K having a foot k secured to the upper side of the disk I, substantially as described.

3. In an arc lamp, the combination with a carbon-holder having a cross-bar, of a feed-rack having a transverse foot, and a plate of insulating material, on opposite sides of which said cross-bar and foot are secured, at right angles to each other, substantially as described.

4. In an arc lamp, the combination with a feed-rack and gearing, of an outer frame hinged at one end, an inner frame fulcrumed upon the outer frame and carrying said gear-

ing, a weight on the free end of the outer frame, a pivoted beam, connected at one end with the weight, and a sucking magnet, the core of which is connected at one end with the beam and at the other end with the inner frame, substantially as described.

5. In an arc lamp, the combination with the feed-rack and gearing, of an outer frame hinged at one end, and carrying a weight at the other end, an inner frame carrying the gearing and fulcrumed upon the outer frame, an escapement adapted to be released when the inner frame is tilted, a spring exerting a downward pull on the inner frame, a sucking magnet, and a spring connecting its core with the inner frame, substantially as described.

6. The combination with the rack and gearing, of the outer frame hinged at one end, the adjustable stops limiting the movement of the other end, the weight supported on that end of said frame, the inner frame carrying the gearing and its escapement, and fulcrumed on the outer frame, the beam pivoted above said frames, and connected at one end with said weight, the sucking magnet with its core connected with the other end of the beam, the spring connecting the core with the inner frame, and the adjustable spring exerting a downward pull on said frame, substantially as described.

In testimony whereof I have hereunto affixed my signature in presence of two witnesses.

EDWARD R. KNOWLES.

Witnesses:

MAX LOEWENTHAL,
J. A. KENISTON.