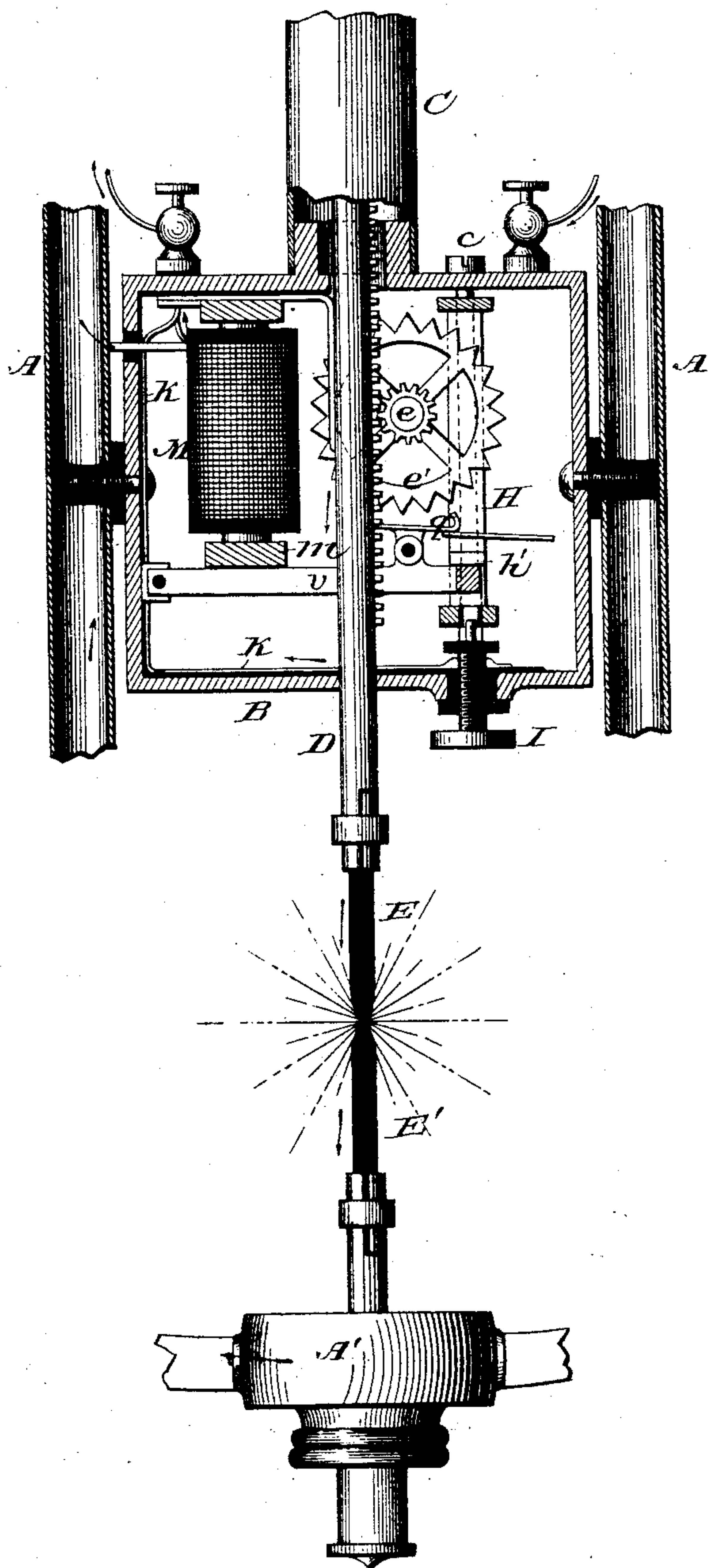


(No Model.)

R. R. MOFFATT.
ELECTRIC ARC LAMP.

No. 286,144.

Patented Oct. 2, 1883.



Witnesses:
John Becker
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UNITED STATES PATENT OFFICE.

RICHARD R. MOFFATT, OF BROOKLYN, NEW YORK.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 286,144, dated October 2, 1883.

Application filed June 5, 1882. (No model.)

To all whom it may concern:

Be it known that I, RICHARD R. MOFFATT, of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Electric Lamps; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

My invention relates to that class of electric lamps known as the "arc system;" and it consists in a novel, simple, and effective means for automatically changing the course of the electric current through the lamp when from any cause an abnormal resistance occurs in the arc-circuit, or the electric current therein is interrupted by the breaking of a carbon or by the non-action of the feed mechanism, so that other lamps that are located in the same electric circuit will not be interrupted, and that will automatically re-establish the arc when the carbons in said lamp shall come together again.

The annexed drawing represents a longitudinal vertical section of one form of device embodying my invention, showing its adaptation to a lamp the details of which are more fully illustrated and set forth in United States Letters Patent No. 258,244, granted to me May 23, 1882, and to which I refer; but I desire it to be distinctly understood that in my present invention I do not in any degree limit myself to the carbon-separating devices shown in said patent, or to any definite means for separating the electrodes or governing them in their relation to each other, as my invention is equally applicable to various forms of arc-lamps.

In the accompanying drawing, A represents the frame of the lamp; B, the metal case that contains the mechanism that forms the arc and regulates the feed movement of the upper-carbon holder.

C is a tube secured to the case B, and may be provided with means at its upper end by which the lamp can be suspended.

D is the upper-carbon holder, provided with a rack.

H is a frame-piece provided with extension-pieces, through which pass rods *e*, which serve to hold the frame H in position, and to guide it

in its upward and downward movement an escapement-wheel, *e'*, and pinion *e* are mounted in the frame H.

I is an adjusting-screw, upon which the bottom of the frame H rests, (when down.) Its object is to control the movement of the frame H, and thereby regulate the size of the arc. This adjusting-screw is insulated from the case B and frame H, and has a metallic or other suitable connection, K, with the negative binding-post. A central prolongation of the adjusting-screw I is made to extend through the bottom of the frame H.

M is an electro-magnet forming part of the main or arc circuit, and is secured to the case B, as shown in the drawing. *m* is its armature, which is attached to a tilting frame-piece, *v*, one end of which is pivoted to the side of the case B. The other end operates within the frame-piece H. An escapement, *g*, is pivoted to the frame-piece *v*, and is arranged to engage with and operate the escapement-wheel *e'*. The frame *v* rests upon the end of the prolongation of the adjusting-screw I when down. A space is left between the upper face of the frame *v* and the lug *h'* on the frame-piece H, which permits the end of the frame *v* to be raised a sufficient distance (before acting upon the frame H through its lug *h'*) to cause the escapement *g* to become engaged with the escapement-wheel-*e'* in the operation of forming the arc. The frame A' supports the lower-carbon holder, and is properly insulated from the case B and tube C. The current from the generator, when the lamp is giving light, enters the lamp through the binding-post marked +, passing, as indicated by the arrows in the drawing, through the upper-carbon holder D, the carbon-electrodes E E', the frame A' and A, the wire of the electro-magnet M, to the binding-post marked —, and hence to the generator, (or other source.)

The operation of this invention is as follows: When the circuit is first closed, the electric current has two courses through the lamp—*i. e.*, one through the carbon-electrodes and electro-magnet M, as indicated by the arrows, the other through the adjusting-screw I and the metallic or carbon conductor K. Notwithstanding this division of the current, the electro-magnet M (in each lamp in the circuit) be-

comes active and will attract its armature, thus raising the free end of the frame *v*, engaging the escapement *g* with the escapement-wheel *e'*, and pressing upon the lug *h'* raises the frame *H*, the racked carbon-holder *D*, and its carbon, thus separating the electrodes *E* and *E'*, when the arc will appear. The carbons, as they are consumed, are fed forward as shown in the Letters Patent above referred to, or in any other suitable manner. If the arc is broken by accident or intent, the electro-magnet ceases to attract, when its armature falls, together with its frame *v* and the frame-piece *H*. Then the end of the frame *v* will rest upon the adjusting-screw *I*, closing a circuit through it and the conducting-rod *K* with the binding-post marked —, cutting out the lamp, thus preventing interference with the proper action of other lamps on the same circuit. If the lamp is normally in an operative condition, and its "cut out" has been caused by some trivial interruption—as, for instance, by a carbon breaking, and thus destroying the arc—the light will be automatically re-established upon a reunion of the electrodes, as the current is then divided between two circuits, in one of which is located the electro-magnet *M*, which becomes sufficiently powerful (with a weak current) to raise its armature and break the circuit through the adjusting-screw *I* before it operates to separate the carbons, thus causing the entire electric current to pass

through the main or light circuit when the electro-magnet *M* becomes sufficiently powerful to separate the electrodes and form the arc. 35

If desired, the pivoted armature-frame *v* may be so balanced, by means of a spring or other suitable device, that it can be operated by the electro-magnet *M*, even when a small portion of the current is passing through its helix, and the strength of the magnet may be increased by the introduction of a resistance in the shunt or cut-out circuit; but it is not necessary that it be greater than that in the main or lamp circuit. In some cases it may be advisable to use an axial electro-magnet as an equivalent for the electro-magnet *M*. 45

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

The combination, in an electric lamp, of the electro-magnet *M*, its armature *m*, pivoted lever *v*, moving train-frame, and the regulating-screw *I*, the latter insulated from the frame and arranged so as to support and regulate its downward movement, with means for closing and breaking a shunt or cut-out circuit through the lever *v* and regulating-screw *I*, substantially as specified. 55

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Witnesses:

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