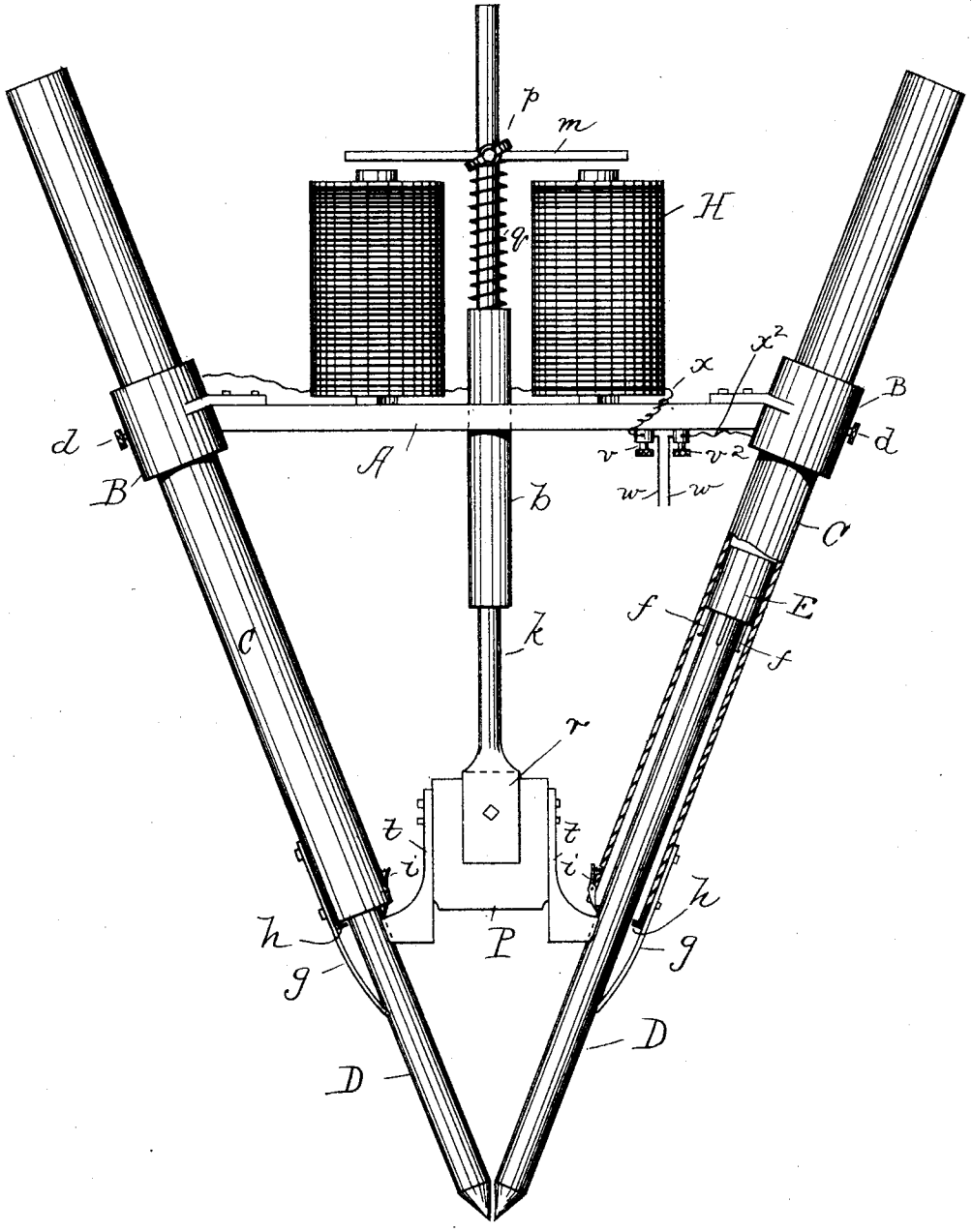
(No Model.)

E. H. CROSBY.

ELECTRIC ARC LAMP.

No. 537,633. Patented Apr. 16, 1895.



WITNESSES.
Matthew M. Blunt.
H. Church.

INVENTOR.
Edward H. Crosby
By C. A. Snow & Co.,
ATT'YS.

UNITED STATES PATENT OFFICE.

EDWARD H. CROSBY, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO OTIS M. SHAW, OF SAME PLACE.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 537,633, dated April 16, 1895.

Application filed August 13, 1894. Serial No. 520,150. (No model.)

To all whom it may concern:

Be it known that I, EDWARD H. CROSBY, of Boston, in the county of Suffolk, State of Massachusetts, have invented certain new and useful Improvements in Electric-Arc Lamps, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawing, forming part of this specification, in which the figure is a side elevation of my improved arc lamp.

My invention relates especially to an improvement in arc lamps whereby the construction is greatly simplified and the cost very much reduced, while the efficiency of the lamp is increased.

A special object of the invention is a device for automatically feeding the carbons and providing a lamp which is portable and can be inverted or used with the carbons in horizontal position.

In the drawing, A represents a base-plate of any ordinary insulating material centrally through which a vertically arranged metallic tube, *b*, passes. At each end of the base-plate downwardly inclined metallic sleeves, B, are rigidly secured. Through these sleeves brass tubes, C, pass and are adjustable vertically therein by means of set-screws, *d*. These tubes form holders for the sticks of carbon, D, said tubes being appreciably larger in diameter than the carbons. The upper ends of the carbons are detachably mounted in weighted followers, E, which are fitted to slide freely in the tubes, C. Spring arms, *f*, on the followers grasp the inner ends of the carbons. To each tube at its lower outer end a flat spring, *g*, is bolted; the free end of the spring being grooved to conform to the surface of the carbon and said springs tending to force the free ends of the carbons toward each other. An inwardly projecting lip, *h*, on the lower end of the tubes will intercept the follower and prevent its dropping out when the carbons are exhausted. On the opposite side of the lower ends of the tubes there is a spring-pushed dog, *i*, the toe of which engages the carbons and prevents them from being forced upward into the tubes or dropping downward into the tubes when the lamp is inverted. Any shape of tooth may be substituted for the pawl or dog to hold the carbon. The coils of an electro-magnet are mounted on the base, A. A rod, *k*, is fitted to slide freely through the tube, *b*. To the upper end of said rod the armature, *m*, is secured by means of a thumb-screw, *p*, whereby it is adjustable on said rod. A push-spring, *q*, is interposed between the upper end of the tube, *b*, and the armature, *m*, holding said armature out of contact with the poles of the magnet. The lower end of the rod is provided with a clamp, *r*, and in said clamp a piece of fire-brick or soapstone, P, is held. To each outer edge of said insulating material, P, a metallic leg, *t*, is bolted; the foot thereof being grooved to conform to the face of the carbon stick and engaging the same adjacent the pawls, *i*. Binding-posts, v, v^2, are supported on the base and receive the line wires, *w*. A wire, *x*, leads from one post, *v*, to the adjacent coil of the magnet, thence across into the companion coil and connects with one sleeve, B. A wire, x^2, leads from the opposite post, v^2, into contact with the opposite sleeve, B. Any suitable resistance which may readily be graduated may be placed in the circuit as the ohms are reduced, and the ampères increasing the current from the line wire, *w*, entering at the post, *v*, from the resistance coil, passes into the adjacent coil of the magnet, thence into the sleeve, B, and tube, C, at the opposite side through the carbon held in said tube, thence to the opposite carbon and holder through the return at the post, v^2. The magnet being thus charged the armature is drawn downward against the pressure of the spring, *q*, driving the legs, *t*, against the carbons, D, and forcing said carbons outward against the pressure of the springs, *g*, which separates the points of the carbons and forms an arc.

The current is taken principally into the carbons through the springs, *g*, a point materially nearer the arc than is common in lamps of this description and which adds greatly to the efficiency. As the arc increases, the spring will act to draw the block, P, upward freeing the carbons in a manner which will be readily understood. Should the carbons accidentally break the followers, E, will prevent them from

dropping out of the tubes. The carbons can be consumed until only a very short piece is left. By this arrangement of parts I find that a greatly increased candle power results from the same amount of current, the carbons heating to a white heat for a very appreciable distance above their points. The carbons burning away sufficiently to lessen the power of the arc and thus decrease the current in the magnet, the spring, *q*, will force the armature upward releasing the carbons from the pressure of the feet, *t*, and permit the springs, *g*, to push their points nearly into contact when the current will become strong enough to again charge the magnet and drive them downward into a smaller arc. I find in actual test that this is accomplished without objectionable "jumping" or flicker of the light, the carbons being at all times locked and not falling by gravity.

All the disadvantages incident to pivoting diagonally-arranged holders for carbons in this class of lamp are obviated by my improved feeding and locking device.

The lamp is portable and can be interposed in an incandescent circuit, it being of great practical value for use in scenic effect where the well known lime or calcium lights are employed.

Having thus explained my invention, what I claim is—

1. In an electric arc-lamp two diagonally arranged fixed supports of conducting material in combination with carbons fitted to slide and move laterally in said supports, the free ends of said carbons outside of said supports being normally spring-pushed into engagement with each other; an electro-magnet in the circuit of which said supports are interposed; a non-conductive material actuated by the armature of said magnet into engagement with the free ends of said carbons and arranged to consecutively spread the same in opposition to their springs; lock the carbons against gravity movement and feed said carbons toward each other at determined points in the variation of the current.

2. In an electric arc lamp, two diagonally converging fixed supports of conducting material in combination with carbons fitted to slide and move laterally in said supports; springs on the supports forcing the free ends of said carbons toward each other; an electro-magnet in the circuit of which said supports are interposed and an insulating material actuated by the armature of said magnet and engaging said carbons in opposition to said springs, substantially as and for the purpose set forth.

3. In an electric arc lamp two downwardly converging tubes of conducting material in combination with carbons fitted to slide and move laterally in said tubes; springs on the tubes forcing the free ends of said carbons toward each other; a dog or tooth for preventing the return of the carbon; an electro-magnet in the circuit of which said tubes are interposed; an insulating material actuated by the armature of said magnet and engaging said carbons in opposition to said springs, substantially as and for the purpose set forth.

4. In an arc-lamp, two diagonally arranged carbons mounted to slide in fixed tubular supports, of conducting material and having lateral movement therein in combination with springs on said support pushing the free ends of said carbons toward each other; an electro-magnet in the circuit of which said supports are interposed mechanism actuated by the armature of said magnet for engaging the carbons in opposition to said springs; a follower fitted to slide in said support and detachably secured to the inner end of the carbon and a projection on the lower end of said support in the path of said follower.

5. In an arc lamp, the combination of the electro-magnet and its spring-pushed armature with an insulating material, P, supported from said armature; the rigid tubes, C, in the circuit of said magnet; the carbons, D, fitted to slide in said tubes; the springs, *g*, on the tubes engaging said carbons and a projection on the tubes for preventing the upward movement of the carbons therein, all being arranged to operate substantially as described.

EDWARD H. CROSBY.

Witnesses:
KATHARINE DURFEE,
O. M. SHAW.