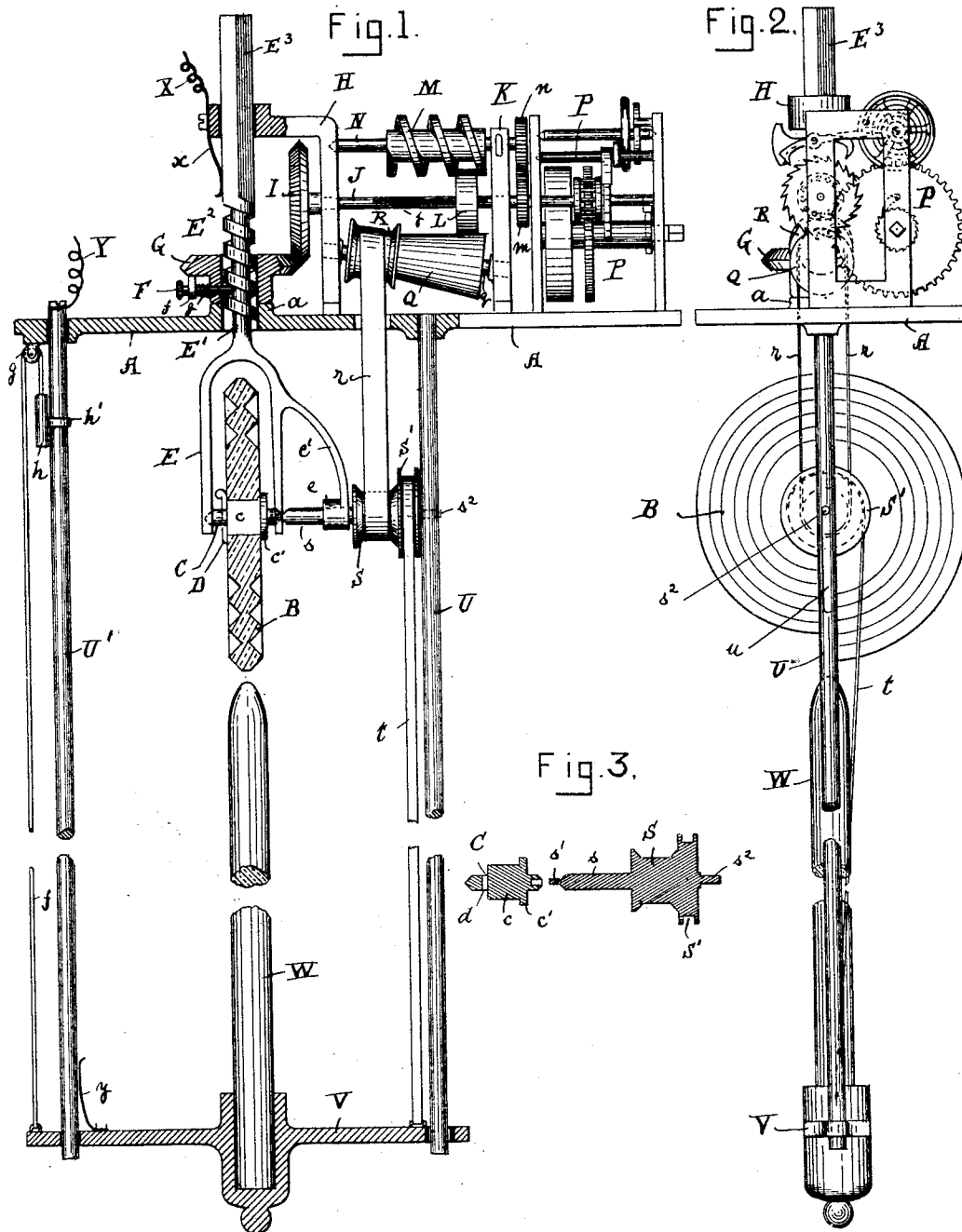


(No Model.)

H. W. LIBBEY.
ELECTRIC ARC LAMP.

No. 460,587.

Patented Oct. 6, 1891.



Witnesses.
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UNITED STATES PATENT OFFICE.

HOSEA W. LIBBEY, OF BOSTON, MASSACHUSETTS.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 460,587, dated October 6, 1891.

Application filed January 12, 1891. Serial No. 377,527. (No model.)

To all whom it may concern:

Be it known that I, HOSEA W. LIBBEY, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Arc Lamps, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to that class of arc lamps in which a disk carbon is employed for the positive electrode and a pencil carbon for the negative electrode; and the invention consists in the peculiar manner of operating the electrodes and in the mechanism therefor.

Referring to the accompanying drawings, Figure 1 represents an arc lamp embodying my invention. Fig. 2 is a side view of the same. Fig. 3 is a detached view of the disk-carbon holder.

A represents a plate that may be supported in any suitable manner, and provided with a boss *a* in the center of the lamp, this boss *a* having a circular opening through it.

B is a disk carbon having a square hole in its center. This carbon is mounted upon a holder C, having a square boss *c* (see Fig. 3) to fit into the hole in the carbon, and a flange *c'*, against which one side of the carbon rests, and it is held in place by a pin D, passed through a hole *d* in the holder. Each end of the holder is tapered, and the ends fit into correspondingly-formed recesses in the saddle E, that is formed in one with a rod E', having a screw-thread E². The upper end E³ of this rod is formed square, as shown. The rod E' passes through the hole in the plate A, and is supported by a pin F of insulating material, that is mounted in a bearing *f*.

G is a bevel-wheel, which rests upon the boss *a*, and through which the rod E' also passes. The upper square end E³ of the rod passes through a square hole in the standard H, secured to the plate A. A small spiral spring *g* is placed around the pin F, between the bearing *f* and the hub of the wheel G.

I is a bevel-wheel in gear with the wheel G. This wheel I is mounted on the end of a shaft J, carried by the standard H and standard K, that is also secured to the plate A. The shaft J is formed with a feather *j*, and has mounted thereon a friction-roller L, that is free to be moved along the shaft J, and is operated by

means of a worm M, mounted upon a shaft N, carried by standards H K. Motion is communicated to the shaft J by suitable clock-work P, and from the shaft J to the shaft N by means of cog-wheels *m n*, and the friction-roller L communicates motion to a conical drum Q, mounted upon a shaft *q*, carried by the standards H K. Upon this shaft is also mounted a pulley R, which by an elastic endless band *r* communicates motion to a pulley S, formed in one with a shaft *s*. One end of this shaft is formed with a screw-thread *s'*, that is passed through one arm of the saddle E and is screwed into the end of the carbon-carrier. The shaft *s* is supported in a bearing *e* on the end of an arm *e'*, projecting from the saddle E. The shaft is formed with a grooved wheel S', the outer end *s²* working in a slot *u* formed in the rod U. The shaft *s'*, pulley S, and grooved wheel S' are made of some suitable insulating material, such as hard rubber. The rod U forms one of the guides for the arm V, that carries the negative or pencil carbon W, U' being the other rod or guide. To the grooved wheel S' is secured one end of a belt or band *t*, the other end of which is secured to the arm V, so that as the shaft *s* rotates the belt or band *t* is wound upon the grooved pulley, thus raising the arm V and carbon W. On the end of the arm V opposite the belt *t* is secured a cord *f*, that passes over a pulley *g*, and has at its other end a weight or counter-balance *h*, which is provided with band or loop *h'*, that passes around the rod U', so that it cannot swing about.

The positive wire X is connected to a spring or bush *x*, secured to but insulated from the standard H, and its lower end is in connection with the upper end E³ of the saddle-rod. The negative wire Y is connected to the upper end of the rod U', which is by a spring or brush *y* connected to the bar V.

The upper end of the rod U' is insulated from the plate A and the bar U is insulated from the bar V, through which it passes. The saddle-rod is also insulated from the plate A, bevel-wheel G, and standard H, through which it passes.

To operate the lamp, the clock-work P is wound up and the electric current turned on, which passes down the saddle-rod and saddle

through the carbon holder C to the disk carbon B, thence to the pencil carbon W through bar V, brush *y*, to rod U', and thence to the negative wire Y. The clock-work being in motion causes the shafts J and N to rotate, and with them the worm M and friction-wheel L, which latter communicates motion to the cone Q and pulley R, which by belt *r* rotates the wheel *s*, and with it the disk carbon B, and at the same time the wheel S' winds up the band *t*, thus raising the bar V and feeding the pencil carbon up. At the same time the wheel I on shaft J communicates motion to the wheel G, thereby allowing the saddle and saddle-rod to fall, thus feeding the disk-carbon down. As the disk carbon is consumed it has to be gradually driven at a quicker speed, so that its surface-speed will always be the same. This is accomplished by means of the friction-pulley L, cone-drum Q, and worm M, for as the shafts are rotated the friction-pulley L is by the worm M caused to travel along the cone-drum Q from its large to its small end, of course the speed of the same will be gradually increased. To reset the lamp, the shaft *s* is turned so as to detach it from the carbon-holder C. The arms of the saddle E are then sprung sufficient to allow the holder to be taken out. The pin F is then withdrawn and the saddle pushed up to its highest point, where it is retained by the pin F as soon as the latter is released. The bar V is now drawn down to its lowest point, the pulley S being free to rotate independently of the pulley R. New carbons are then inserted and the clock-work wound up, and the lamp is again ready for use.

Although I have described the mechanism as being driven by clock-work, of course any other suitable or convenient motive-power may be employed.

I claim—

1. In an arc lamp, the combination of the saddle for carrying the carbon-holder, the saddle-rod having a screw-thread thereon, the upper end of said rod being square, the spiral disk carbon journaled in said saddle, the pencil carbon, and mechanism for operating the same to keep the carbons a suitable distance apart, substantially as set forth.

2. In an arc lamp, the combination of the saddle and saddle-rod having a screw-thread thereon and an upper square end, the spiral disk carbon mounted in said saddle, and mechanism for rotating the spiral disk carbon as it descends, whereby the surface speed of said carbon is gradually increased, substantially as set forth.

3. In an arc lamp, the spiral disk carbon mounted in a saddle on the end of a rod having a screw-thread and square end, and a pin passing through the boss of a bevel-wheel for supporting said rod, so that it descends as the bevel-wheel rotates, substantially as set forth.

4. In an arc lamp, the spiral disk carbon mounted in a saddle on the end of a rod having a screw-thread and square end, a pin in the boss of a bevel-wheel through which said rod passes, and mechanism for rotating said bevel-wheel, in combination with a cone-drum, friction-pulley, and a screw for moving said pulley on the drum, and a pulley and belt for imparting a gradually-increased rotary motion to the spiral disk carbon, substantially as set forth.

5. In an arc lamp, a disk carbon and mechanism for lowering said carbon and imparting a gradually-increased rotary motion thereto, in combination with a pencil carbon and mechanism for raising said carbon toward the disk carbon as they are consumed, substantially as set forth.

6. In an arc lamp, a spiral disk carbon B, mounted in a saddle E, rod E', screw E², square end E³, the plate A, standard H, bevel-wheel G, pin F, the bevel-wheel I, shafts J N G, friction-pulley L, worm M, cone-drum Q, pulley R, elastic belt *r*, pulley S, groove-wheel S', band *t*, plate V, pencil carbon W, and suitable clock-work for imparting motion thereto, substantially as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 28th day of October, A. D. 1890.

HOSEA W. LIBBEY.

Witnesses:

CHAS. STEERE,
EDWIN PLANTA.