(No Model.)

F. A. LA ROCHE.

ELECTRIC ARC LAMP.

No. 583,060. Patented May 25, 1897.

Fig. 1.

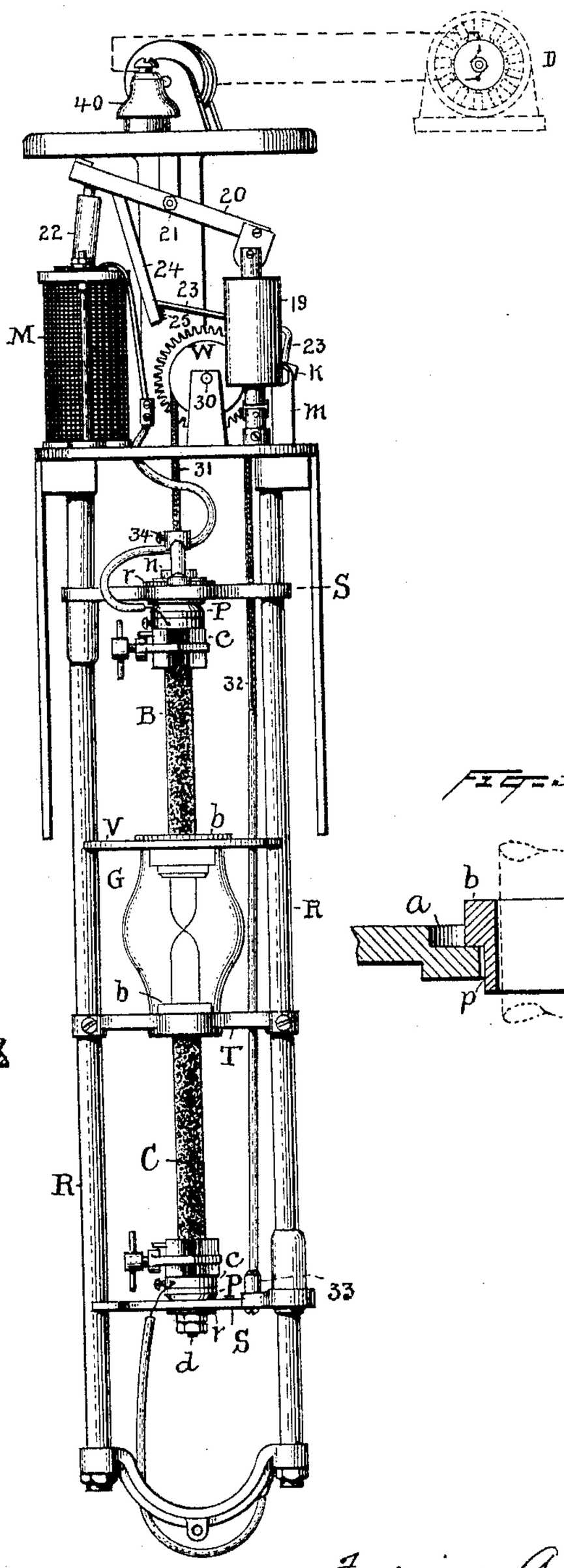

Fig. 2.

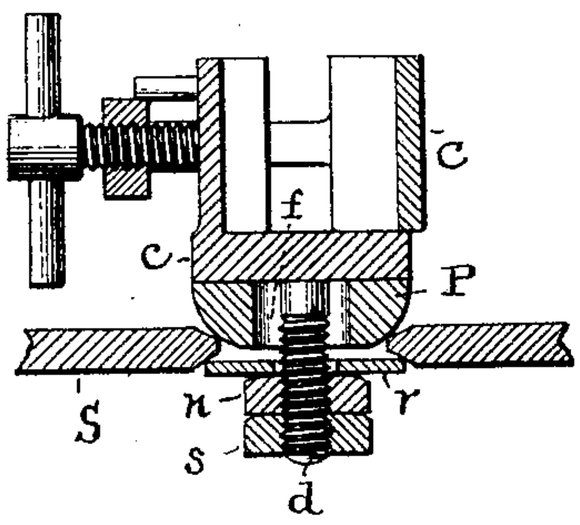

Fig. 3.

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UNITED STATES PATENT OFFICE.

FREDRICK A. LA ROCHE, OF NEW YORK, N. Y.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 583,060, dated May 25, 1897.

Application filed December 22, 1896. Serial No. 616,584. (No model.)

To all whom it may concern:

Be it known that I, FREDRICK A. LA ROCHE, a citizen of the United States, and a resident of New York, in the county and State of New York, have made certain new and useful Improvements in Electric-Arc Lamps, of which the following is a specification.

My invention is an improvement in alternating-current arc electric lamps.

The object of my invention is to provide an arc-lamp in which the arc is confined within an inclosed diaphanous and comparatively restricted chamber with means for passing the electrodes through close-fitting apertures in the wall of the chamber and feeding the electrodes toward each other to maintain the arc at a fixed focal point.

The invention provides for feeding the carbons or electrodes through these close-fitting apertures in the inclosed chamber smoothly and regularly, while binding, lodging, or constriction is obviated. I provide an upper and a lower carbon. The upper carbon is suspended or supported so as to have universal movement and the lower carbon is supported upon a universal bearing by gravity. The free ends of both carbons have the capacity of moving in the circumference of a circle, and if one carbon should tend to bind and tilt the chamber or the bushing in the aperture in the chamber both carbons have the capacity to accommodate themselves to the changed condition and to feed without binding upon the edges of the apertures through which they pass. In this manner the two carbons operate and coöperate to release themselves from any binding tendency due to any irregularity in the surface or form of either. Both carbons are held in suitable clamps having a centering-pin fixed thereto. Between the external surface of this clamp and the supporting strip or plate I place a separate piece having its surface shaped to form a suitable complementary surface for the contact-surface of the clamp, but the other surface of this separate piece is convex or semiglobular and rests upon or against a supporting surface or support, which may be either plane or have a suitable concavity. There is a perforation in the described separate piece larger in diameter than the diameter of the described centering-pin, and the pin passes through this perforation and through a similar perforation in the supporting plate or strip. This form of support forms a universal bearing for the carbon and permits the free end of the carbon to move in the circumference of a circle.

The accompanying drawings illustrate my invention.

Figure 1 is a complete view of my invention. Fig. 2 is a detail view showing the universal joint for suspending or supporting the carbons, with particular reference to the lower carbon; and Fig. 3 is a section showing the bushing and aperture in the lower side of the inclosed chamber.

B and C are carbon rods or pencils forming the two terminals or electrodes of the circuit. Supporting-platforms S for the carbons slide on vertical rods R. There is a chain or flexible cord 31 32 uniting the supports S and being connected at points 33 34, respectively. This cord or chain passes around the drum of the wheel W, journaled at 30. The gravity of the upper carbon and its support imparts a constant tendency to both carbons to feed toward each other.

M is a solenoid-magnet included in the circuit in series with the carbons and an alternating-current generator D, supplying current to the lamp by suitable electrical connections with the terminal screw-posts 40. The armature 22 of magnet M is pivoted to the arm 20, the latter being pivoted at 21. Arm 20 is connected at one end to the dash-pot 19. The arm 23 is pivoted to the support *m* and carries a knife-edge *k*, engaging the teeth of the wheel W. The bar 20 is connected to the opposite end of the arm 23 through the medium of a short helical spring 25 and a rod 24. When the carbons are in contact and the proper strength of current flows in the coil of the magnet M, the armature 22 is attracted. The knife-edge *k* takes into the teeth of the wheel W and rotates the wheel in a reverse direction, separating the carbons a sufficient distance to strike the arc.

G is an inclosed substantially air-tight chamber, preferably of diaphanous or transparent material, as glass. It is supported in a substantially stationary position upon the table T, fixed upon the rods R. A section of this table is shown in Fig. 3. At the upper

extremity of the globe G there is a circular metal plate V, having its lower surface coated with a reflecting material, as vitreous enamel or asbestos paint. Both the table T and the plate V form part of the inclosing walls of the chamber G. Both V and T are perforated, and there is a bushing *b*, of electrical insulating fireproof material, placed in each, through the center of which there is a close-fitting aperture, and the carbons, as C, Fig. 3, pass through these bushings, and access of air is practically prevented. The bushings *b* are capable of sidewise movement permitted by the annular space *p*, and there is a circular space *a* around the bushings *b*, into which the edge of the chamber G fits, a suitable fireproof packing being employed to prevent access of air. Asbestos rings are employed for this purpose with success. The means of suspending or supporting the electrodes B and C so that they may feed toward each other without binding in the close-fitting perforations described is novel with me and of vital importance. The lower carbon is supported by gravity, resting upon its support S. The upper carbon is suspended from its support S. Both carbons are supplied with similar clamps *c*, and there is a universal joint of the same construction between each clamp and its support. I will describe the support of the lower carbon by reference to Fig. 2. The lower face of the clamp *c* is a plane surface. A threaded pin *d* projects from the center. There is a separate piece of metal P, having a suitable complementary surface to receive the surface of the clamp *c*. The opposite face or surface of the piece P is convex or arc shaped, and the surface of the support S with which it engages may be slightly concaved or not. I have shown the edge of the aperture in S as being chamfered off on both sides. There is a central perforation *f* in the piece P of greater diameter than the diameter of the pin *d*. On the opposite side of the support S there is a ring *r*, having an interior diameter greater than the diameter of the pin *d*. The ring *r* is held in position by the nut *n*, and this nut *n* has a convex contact-surface, and there is a set-nut *s*. The distance between the ring *r* and the piece P should be such as to permit of moving the free end of the carbon in the circumference of a circle. In other words, the described connection furnishes a universal joint. Regarding the upper carbon B it is suspended from the convex-surfaced nut *n*, and the piece P engages the lower side of the support S instead of the upper side, as in the case of the lower carbon C.

In the operation of the apparatus when carbons vary in either dimension or form there is a tendency to bind against the walls of the perforation or passage into the chamber.

By the described universal-joint support for both carbons the moving parts accommodate themselves to these irregularities or to any substantially similar abnormal conditions, and by yielding and accommodating their line of movement or both to such conditions the carbons are fed toward each other with a smooth, even, uniform, and uninterrupted progression.

What I claim, and desire to secure by Letters Patent, is—

1. In an arc electric lamp the combination of a diaphanous air-tight chamber inclosing the arc and having two apertures in the wall of said chamber at opposite points, two carbon rods, one for each aperture, passing through and making close sliding contact with the wall thereof, a free and independently-movable bushing for each aperture, a suitable clutch for each carbon rod and means for affording universal movement to each clutch, substantially as described.

2. In an arc electric lamp the combination of a diaphanous air-tight chamber inclosing a fixed arcing-point only, two apertures in the wall of said chamber at opposite points, two carbon rods, one for each aperture, passing through and making close sliding contact with the wall, a free and independently-movable bushing for each aperture, a suitable clutch for each carbon rod and means for affording universal movement to each clutch, substantially as described.

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