(No Model.)

J. DU SHANE.

ELECTRIC ARC LAMP.

No. 274,744. Patented Mar. 27, 1883.

Fig. 1.

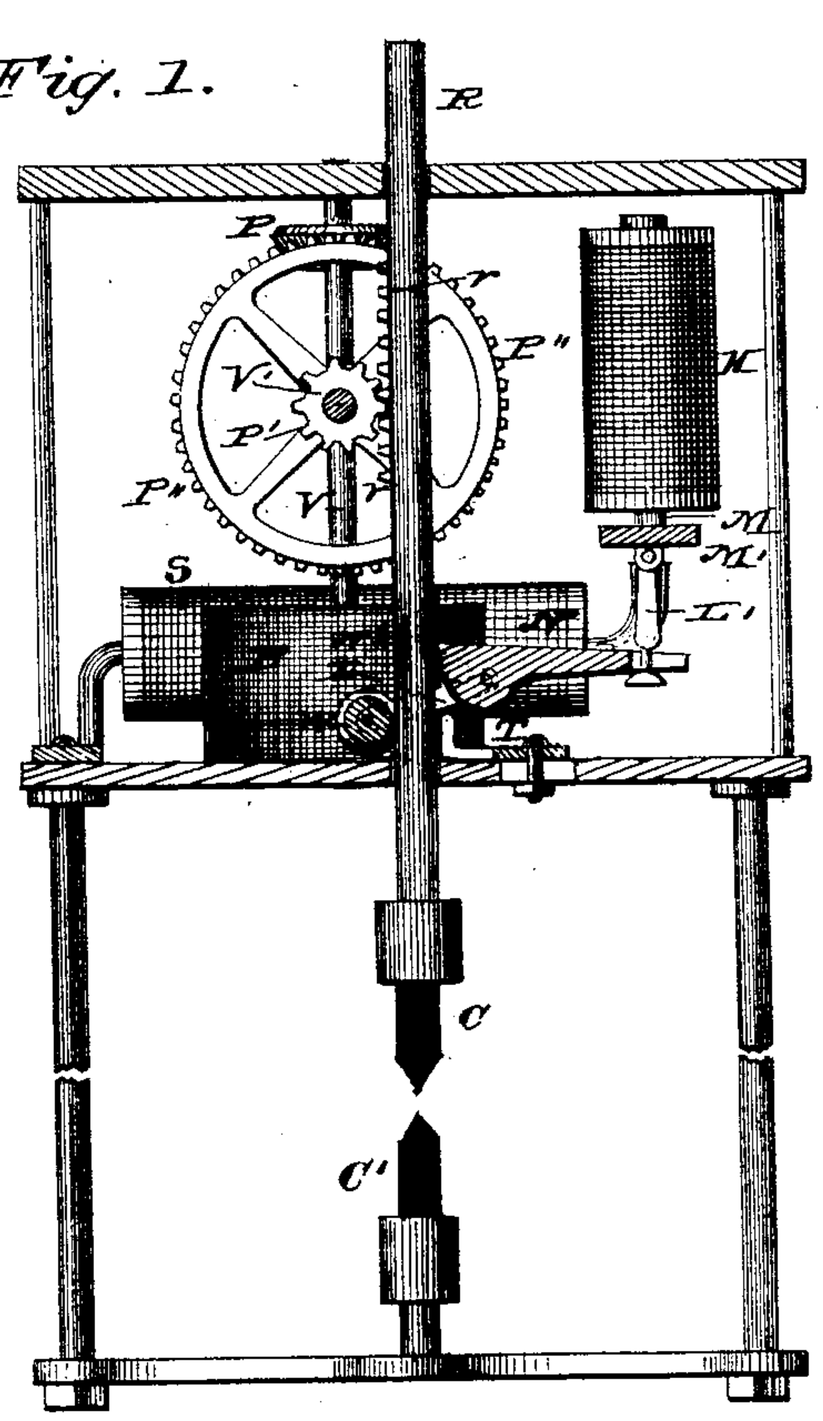


Fig. 2.

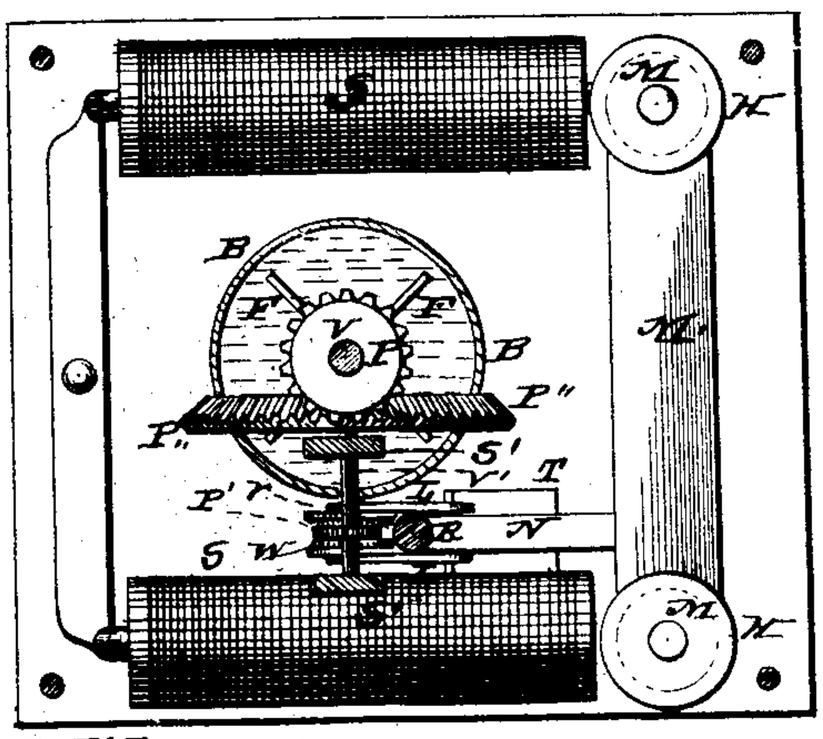
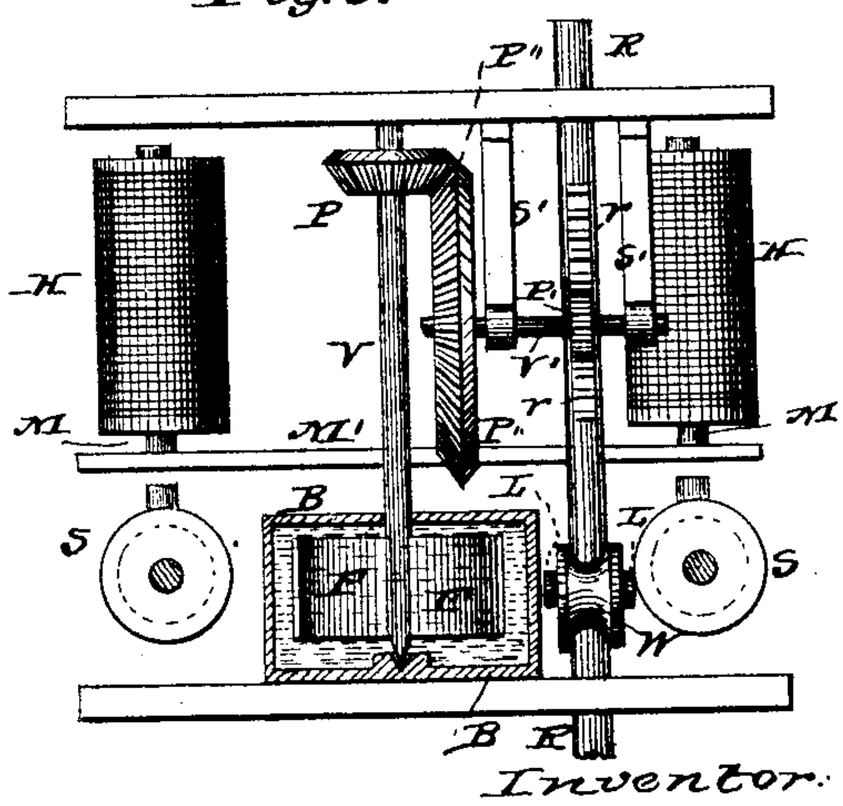


Fig. 3.



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UNITED STATES PATENT OFFICE.

JAMES DU SHANE, OF SOUTH BEND, INDIANA.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 274,744, dated March 27, 1883.

Application filed August 2, 1882. (No model.)

To all whom it may concern:

Be it known that I, JAMES DU SHANE, of South Bend, in the county of St. Joseph and State of Indiana, have invented certain new and useful Improvements in Regulators and Carbon-Feeding Devices for Electric Lamps; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification, in which—

Figure 1 is a side view, partly in section. Fig. 2 is a horizontal section, and Fig. 3 is a central vertical section.

My invention relates to an improved regulator and carbon-feeding device for electric lamps, and is intended by gradual and easy movements to avoid jerking the electrodes, and to maintain a steady light by means of the special devices and arrangement of parts hereinafter fully set forth and described.

In the drawings, H H represent the main helices of low resistance, which are included in the main circuit of the lamp through the carbon electrodes.

S S are two electro-magnets of high resistance, which are included in a shunt-circuit around the arc, and are preferably located with their poles on a line with the axes of the main helices H H.

M M are the soft-iron cores, which may be in one piece or united by the piece M′, and extend, respectively, into the main helices H H, where they are suspended over the poles of the shunt-magnets in position to be drawn down by their attractive force when the greater portion of the current is shunted through them by reason of the too great separation of the carbons, and consequent abnormal resistance of the arc and decrease of attraction in the main helices. The rod R extends upward between the magnets and carries the upper carbon, and is also provided with the rack *r* on one side thereof. The cam-lever N is secured by link L′, or otherwise pivoted to the piece M′, connecting the cores, and it is so placed that its inclined bearing-surface N′ will impinge against the carbon rod when its outer end is raised. The links L are used to connect the cam-lever N with the wheel or roller W, which is movably secured on the opposite side of the carbon rod, the said links forming the fulcrum for the eccentrically-pivoted bearing-surface of the lever. The hangers *s s′* are suitably secured to the top of the link and support the shaft V′, to one end of which is secured the pinion P′, which meshes with and is actuated by the rack on the carbon rod, and on the other end of the said shaft is the beveled-gear wheel P″, which meshes with a similar wheel, P, on the vertical shaft V, secured to the top of the lamp and suitably pivoted at its lower end in the box B. The radial arms constituting the fan F extend from the lower end of the shaft V, and are wholly contained within the box B, in which is also glycerine, mercury, or other medium denser than air. The wheel W is suitably grooved to allow the passage of the rack, and at the same time act as a guide therefor. When the wheel, links, and lever are in a condition of equilibrium about the rod R, it is firmly held between them, and is thereby moved vertically to the same extent as and by the cores M, and continues to sink gradually as the carbons are consumed until feeding becomes necessary, which takes place gradually and smoothly in the following manner:

The tripping device, consisting of the adjustable plate T, is so placed that the descent of the rod R with the gripping mechanism brings the links L into contact therewith at a point very near the pivot upon which the cam-lever turns. The rod continues to descend as the carbon is consumed, and the links, resting upon the edge of the plate T, form a fulcrum for the lever N, the inclined bearing-surface of which is by the continued depression of its outer end slid or forced a short distance up the rod R, which at the same time descends a short distance, carrying the wheel W with it, its descent being limited and retarded by the pressure of the wheel and cam, which is gradually but quickly applied as the combination is brought into equilibrium, and thereby tightened against the rod by the upward movement of the cores M. The pinion P′, fan F, and the necessary intermediate parts are moved by the rise and fall of the rod R, and they serve to further guard against jerking or unevenness of movement in said rod. The box B, containing the fan F, being partly filled with a medium denser than air—as glycerine, mer-

cury, &c.—it offers a resistance to the rotation of the said fan proportioned to the length and breadth of the arms thereof. While the gripping mechanism is changing its hold, the carbon is gradually and comparatively slowly fed downward without jerking, and the feeding is accomplished without the carbon rod having been at any time entirely liberated and allowed to fall, the fan F meanwhile rotating slowly in the box B. When by the approach of the electrodes, as described, the main part of the current again passes through helices H H, and they regain their attractive force as the cores M are raised, the cam-lever N gradually rolls the wheel W up the rod until the cam, links, and wheel are in equilibrium and the rod suspended, when the parts, as a whole, will again settle down slowly as the carbons are consumed until the links rest upon the fulcrum T and the feeding of carbon is repeated. The rod R can be easily pushed upward when necessary for the introduction of fresh carbon, to facilitate which the box B may be mounted on a pivot, and while normally held steady by a suitable pin it may be liberated and allowed to rotate with shaft V while the rod R is being raised.

It is obvious that equally good results may be obtained by attaching a vertical rack to the core or armature of the working-magnets and connecting the pinion P′ therewith. This arrangement would alter the position of the retarding device and free the carbon rod entirely for its upward movement without departing from the spirit of my invention. The wheel W may be rigidly secured to the links, and thereby produce sliding instead of rolling friction, if desired, the essential feature of my invention being the gradual relaxation of grip secured by the use of an eccentrically-pivoted cam-lever, and a frictional device linked so as to move with it and bearing against opposite sides of the carbon rod, and also in the submerged retarding device heretofore described. The current entering the lamp passes through the helices H H, down rod R, through the carbons C C′, and out through an insulated portion of the frame. The shunt-magnets S S are connected with a wire leading from the point of entry and across the lamp through them in the ordinary manner.

The particular arrangement of helices, cores, and magnets is not herein claimed, as they form the subject of a separate application for Letters Patent.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. An electric-lamp regulator consisting of a cam-lever actuated by the varying attraction of main and shunt helices and impinging against a vertical carbon-carrying rod, a friction-wheel linked thereto and bearing against the opposite side of the carbon rod, and an adjustable fulcrum whereby the gripping mechanism is tripped to feed the carbon, substantially as shown and described.

2. The cam-lever secured at one end to a core operated by high and low resistance magnets, said cam impinging against the carbon rod and eccentrically secured to a wheel resting against the said carbon rod, adapted to suspend the carbon rod and gradually release the same for feeding, substantially as described.

3. In an electric-lamp regulator, the cam-lever, friction-wheel, and connecting-links, arranged to secure the lever and wheel on opposite sides of the carbon rod, in combination with the adjustable tripping device and the working-magnets, whereby the gripping device is traveled up the carbon rod without entirely releasing said rod for feeding, substantially as shown and described.

4. The cam-lever N, links L, wheel W, and link L′, in combination with the carbon rod R, trip T, cross-piece M′, and the differential working-magnets of an electric lamp, substantially as shown and described.

5. In an electric-lamp regulator, the liquid-containing box, fan, and connecting mechanism, in combination with the carbon rod R, wheel W, links L, lever N, trip T, and the differential working-magnets, substantially as shown and described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JAMES DU SHANE.

Witnesses:
SAM H. DU SHANE,
ROBERT P. KIZER.