(No Model.)

C. J. VAN DEPOELE.

ELECTRIC FOCUSING LAMP.

No. 304,377. Patented Sept. 2, 1884.

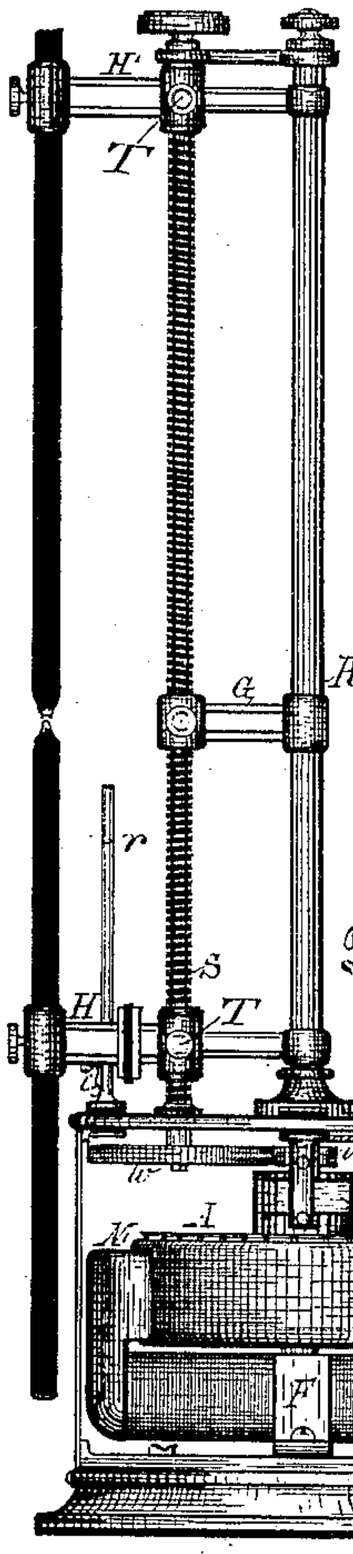

Fig. 1.

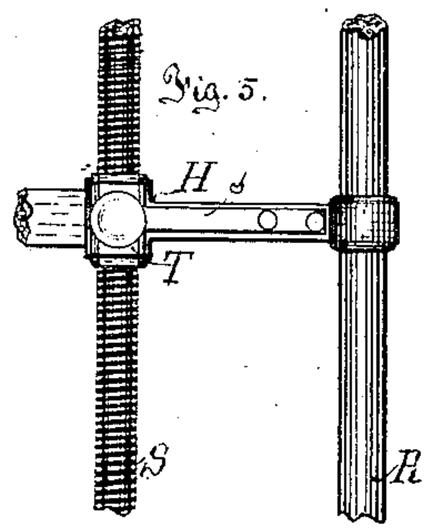

Fig. 5.

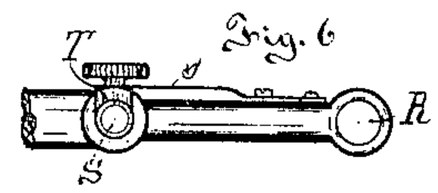

Fig. 6.

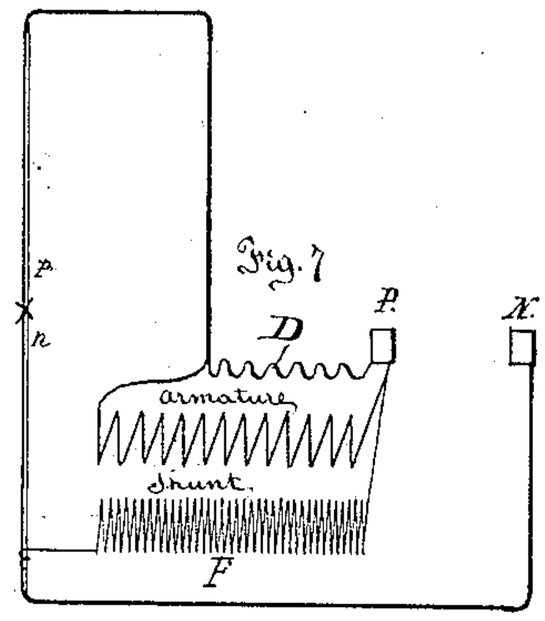

Fig. 7.

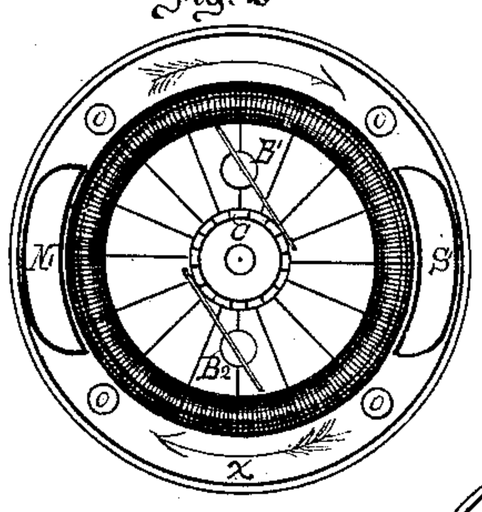

Fig. 2.

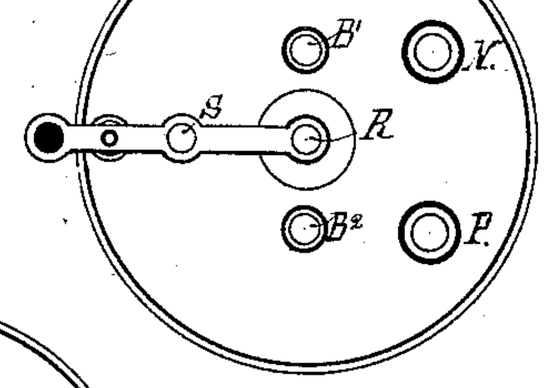

Fig. 3.

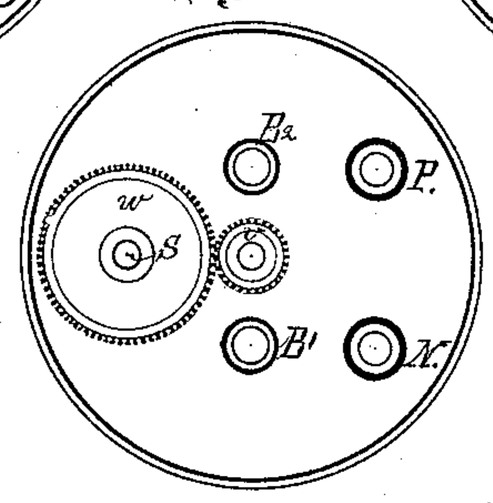

Fig. 4.

Witnesses:
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UNITED STATES PATENT OFFICE.

CHARLES J. VAN DEPOELE, OF CHICAGO, ILLINOIS.

ELECTRIC FOCUSING-LAMP.

SPECIFICATION forming part of Letters Patent No. 304,377, dated September 2, 1884.

Application filed February 23, 1884. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. VAN DEPOELE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electric Focusing-Lamps, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to a new and useful improvement made in electric-arc lamps of that class called "focusing-regulators;" and it consists, especially, in the construction of parts, as also in the arrangement of the electric circuits, producing a steady feed of the carbon.

The following is a full description of the apparatus, reference being had to the annexed drawings, forming part of this specification.

Figure 1 is a side elevation of the lamp complete, with its sides removed, showing the motor, the gearing, the screw, &c. Fig. 2 is a plan view of the motor and bottom plate, *x*, as seen when the top *z* is removed. Fig. 3 is a plan view, looking over top of lamp, showing the binding-posts, brush-holders, carbon-holders, &c. Fig. 4 is a plan view of top *z* when removed from lower part and turned up, showing the gear working the screw-feed, &c. Fig. 5 is an enlarged elevation of part of the screw, the guide-rod, the carbon-holder, &c. Fig. 6 is a horizontal view of the carbon-carrier, &c. Fig. 7 is a diagram of circuits and connections in the lamp.

In the above figures similar letters refer to similar parts.

A is the armature; B, the brush. B′ and B^2 are brush-holders; C, commutator. D is a suitable resistance placed in the main or carbon circuit of the lamp for the purpose of diverting the required proportion of current to the coils of the armature which are connected in derivation therefrom; F, field-magnet; N′ and S′, north and south poles of field-magnet; *o o o o*, four posts holding top and bottom plates of lamp together. *w* is large gear-wheel; *v*, pinion driven by armature A, and engaging in *w*, driving the screw S; H and H′, carbon-carriers provided with screw-thread worked by screw S. H has its front part insulated from the rear, a rod, *r*, passing through proper opening in H, the latter provided with a spring-contact, *i*, in order to insure good contact between these parts, which are connected to the negative pole of the lamp. G is a guide to the screw S. R is a standard, and at the same time a guide-rod, keeping the carbon-carriers in perfect line with each other. T is a part-nut held in place against the screw S by means of spring *s* whenever the lamp is in operation or otherwise, except when it is desirable to move the carbons independent from each other. By pulling T out of contact with S the carbon-carriers can be slipped either up or down, since no thread is cut in the carbon-carrier, the screw passing loosely through the latter when disengaged from the part-nut T.

Fig. 7 indicates the circuits in the lamp as follows: The current enters at P; part of the current passes through resistance D and part through armature to all metallic parts of lamp and to top carbon, from top carbon to lower one, and by proper conductor back to N, or negative pole. The shunt around the field-magnet is taken between the two poles of the lamp, as usual.

In operation the lamp works as follows: On establishing the current from a proper source by means of the posts N and P, the carbons being in contact with each other, the current will circulate through the armature A, and the current entering the latter, so as to react upon the poles of the field-magnet F, will cause the armature to revolve and separate the carbons. Soon current enough will pass through the shunt around the field-magnet F, so as to magnetize its poles with the same polarity as the revolving armature and oppose the further rotation of the armature, preventing the carbons from being unduly separated. Now, on the increased distance of the carbons, caused by their consumption, more current will flow through the shunt around the field-magnet, when, finally, it will repel the poles in the armature and cause the latter to revolve in opposite direction from what it did at first, thus feeding the carbons toward each other until a balance again exists between the field-magnet and its armature, when feeding

will be stopped until the distance between the carbons augments and feeding proceeds, as above described, and so on until the carbons are consumed.

The action of the motor is as follows: Supposing the carbons to be in contact, the moment we establish the current, at this period there is no perceptible current passing through the shunt-coils of the field-magnet; consequently the iron poles will be influenced by the magnetism in the armature, and the brushes, being appropriately placed with relation to the poles of the field-magnet, will cause the armature to revolve in the direction indicated by the arrows. (See Fig. 2.) This will cause the carbons to be separated. More and more current will circulate through the coils of the field-magnet, (which are the usual high-resistance shunt around the arc,) magnetizing the latter with the same polarity as that in the armature. As soon as the poles in the said field-magnet are magnetized to the same degree as the poles of the armature, rotation will be prevented. However, in a short time the distance between the carbons will augment, and soon the field-magnet poles will overbalance the magnetism in the armature, producing repulsion between their respective poles, causing the armature to revolve in the opposite direction from what it did at first, when the carbons will be fed down until the balance is re-established. Thus it will be seen that the slightest variation of the arc will be responded to by the motor, keeping the light at all times normal. The screw-rod S has a right and left thread cut upon it, and so proportioned that the top carbon will be moved twice as fast as the lower one, to compensate for the unequal consumption of the carbons, and thus keep the luminous point at the same place. As above stated, the screw-rod is fitted loosely in the sleeves of the carbon-carriers, and a part-nut is made to engage in the thread of the rod when the points of the carbons have been put in proper relation with each other, so that by disengaging the part-nut T from the rod S the carbon-carriers can be moved either way without turning the rod S. Further, the rod S can be turned either way by a thumb-button from its upper end, as seen in Fig. 1, which enables the carbons to be moved toward or from each other by hand.

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

1. In an electric lamp, an electric motor having armature-coils placed in derivation around a resistance located in the main circuit, and an iron field-magnet energized by coils located in a derivation or shunt of high resistance spanning the arc of the lamp.

2. In an electric focusing-lamp, an electric motor consisting of an armature energized by coils placed in a derivation around a resistance in the main circuit, and a field-magnet energized by coils of high resistance located in a derivation around the arc of the lamp, and arranged substantially as described, whereby the armature is caused to revolve in a direction to separate the carbons until sufficient current will be diverted through the shunt, including the field-magnet, to magnetize the latter sufficiently to actuate the motor to feed the carbons.

3. In a focusing electric lamp, the combination, with a field-magnet wound with coils of high resistance located in a shunt around the arc, of an armature wound with coils in a derivation around a resistance located in the main or carbon circuit, an oppositely-threaded screw-shaft, carbon-holders detachably and adjustably mounted on said shaft, and connections between the armature and the shaft whereby the movements of the armature are communicated to the carbon-holders.

4. The combination, with the armature A and field-magnet F, suitable commutator and brushes, and the coil D, of carbon-holders H H′, mounted on suitable guide-rod, R, and slotted at one side, and provided with part-nuts T T, fitting said slots in the carbon-carriers, and the screw-shaft S, oppositely threaded at its upper and lower portion, the pitch of said upper portion, or that controlling the positive carbon, being sufficiently greater to maintain the point of ignition in a practically fixed position.

5. The combination, with armature A, field-magnet F, pinion *v*, gear-wheel *w*, and screw-shaft S, of suitable carbon-holders fitting around said screw-shaft and provided with the movable portion forming part-nuts T T, as described.

6. The combination, with armature A, field-magnet F, screw-shaft S, and connections between said armature and shaft, of the carbon-holders H′ and H, the latter being insulated from its support and provided with the connecting-rod *r*, as described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES J. VAN DEPOELE.

Witnesses:

NORMAN T. GASSETH,

THEO. P. BAILEY.