(No Model.)

C. J. VAN DEPOELE.

ELECTRIC ARC LAMP.

No. 257,989. Patented May 16, 1882.

Fig. 2

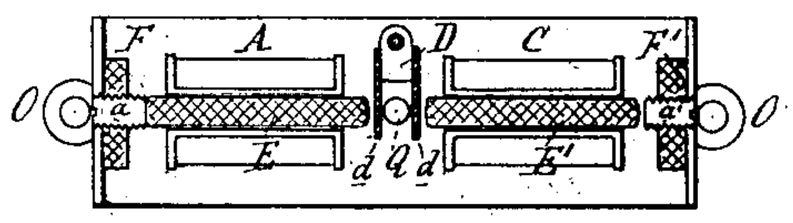


Fig. 1

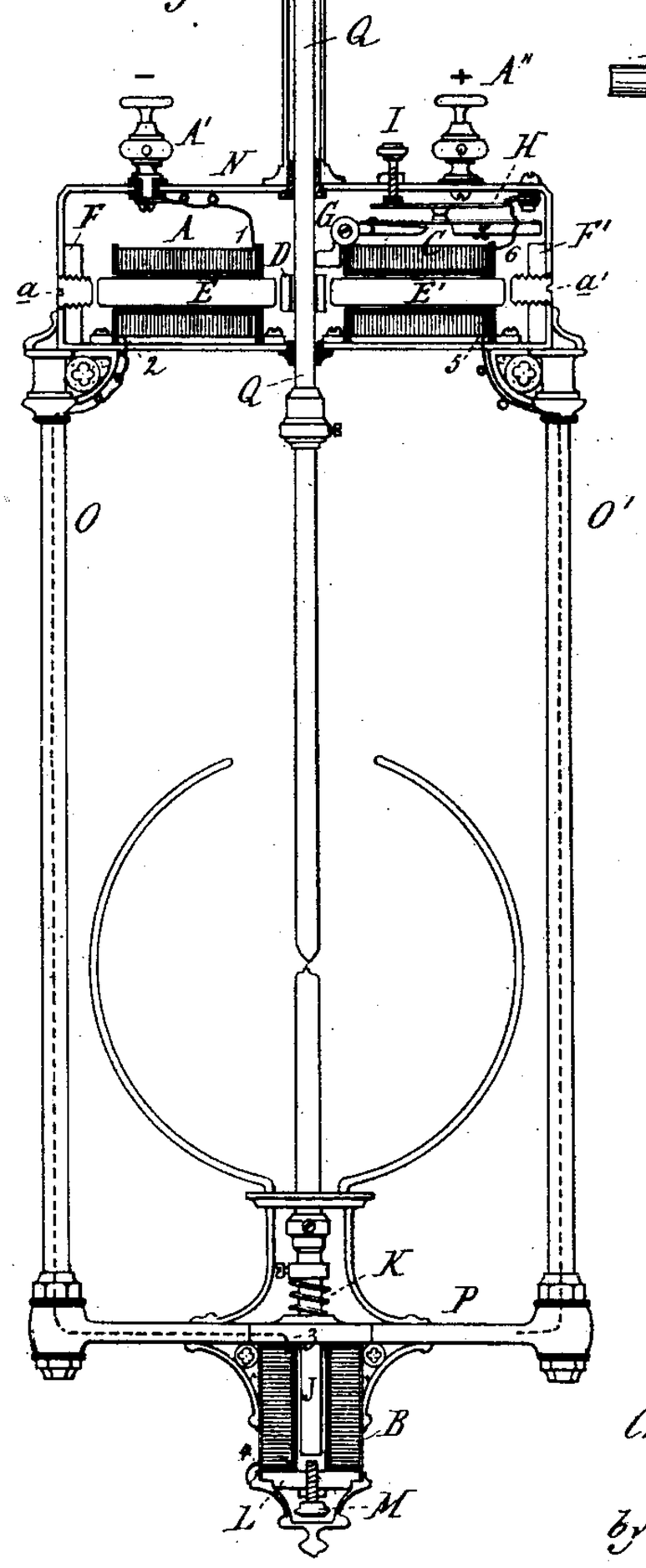
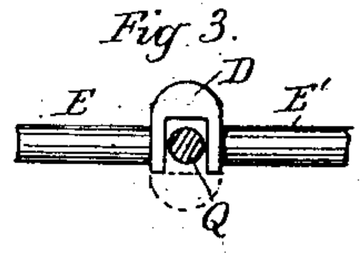


Fig. 3.



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CHARLES J. VAN DEPOELE, OF CHICAGO, ILLINOIS.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 257,989, dated May 16, 1882.

Application filed July 8, 1881. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. VAN DEPOELE, of Chicago, in the county of Cook and State of Illinois, have invented an Improvement in Electric-Arc Lamps, of which the following is a specification.

The nature of my invention relates to certain new and useful improvements in that class of electric lamps known as "arc-lamps," whereby the feeding of the carbon points is carried on imperceptibly when required.

The invention consists in the peculiar combination of details of construction by means of which the above-named action is produced, the result being a perfectly steady light, therein differing from those lamps in which the carbons are perceptibly fed by means of clamping devices of various kinds, which, on the reaction of the current, allow said carbons to drop, thus causing a constantly-recurring flickering every time the clamping device is actuated.

Figure 1 is an elevation, partially in section, of my improved lamp. Fig. 2 is a horizontal cross-section through the central line of the upper magnets. Fig. 3 is a detail view of the cores and the stop-plate.

In the accompanying drawings, A represents an electro-magnetic coil connected by a post, A′, with one pole of a battery or dynamo-machine, so that the current enters at 1 and leaves it at 2, and by means of a conducting-wire passing through the tube O, as represented in dotted lines, is carried to the coil of the electro-magnet B, entering said coil at 3 and leaving it at 4, where the coil is electrically and permanently connected by its brass spool or other equivalent device with the lower-carbon holder and with the cross-bar P. The electro-magnet coil B is employed to separate the carbon points when the current is established, which it does by means of its core J supporting the lower carbon point. The cross-bar P is connected by a wire running through the tube O′ with the electro-magnet C, which regulates or retards the drop or feed of the upper or positive carbons by means of a vibrating lever, G, the current entering the coil of magnet C at 5 and leaving it at 6, where it is carried by a wire-connection to the insulated spring H, the circuit being completed through the vibrating lever G, which is in metallic contact with the opposite pole of the battery through the frame N and post A^2 by means of its pivot or any other suitable connection.

D is a metal plate, provided with a hole or slot, through which the perfectly smooth and round upper-carbon holding rod Q has a loose vertical motion. This plate is placed between the cores E E′ of the electro-magnets A C, and when pivoted between them, as shown in Fig. 2, its center should be made of some non-magnetic metal, while its ends *d* are made of iron, in order that it may be within the magnetic action of the cores E E′. Instead of pivoting this plate D, however, it may be securely fastened to the inner ends of the cores E E′, so as to reciprocate positively with them, as represented in Fig. 3, in which case it should be made entirely of some non-magnetic metal, in order to properly insulate the cores magnetically from each other. The movement of the cores, and consequently of the plate D, is regulated by the iron adjusting-screws *a a′*, which screw respectively into soft-iron disks F F′, situated at opposite sides of the frame N, so that less or greater activity may be given to the plate D, according to the length of arc desired.

The vibrating lever G, which, as before stated, is electrically connected with the frame N, is provided with a short arm adapted to press against the side of the carbon-holding rod Q at every downward movement of the long arm of the lever, thereby preventing said rod from falling too rapidly through the plate D when it is feeding. The lever should be provided with a retractile spring, which, to avoid confusion, is not shown in the drawings. On every upward movement of the lever the carbon rod is allowed to drop; but as the vibrations of the lever are very rapid the rod cannot fall more than a hair's breadth at a time, thereby making the lowering of the rod very gentle and steady, and almost imperceptible until the rods are the proper or normal distance apart.

The spring-contact H is regulated by the screw I, and acts as a circuit-breaker to the

lever G, to produce the necessary vibrations of the latter.

The lower carbon is supported on a spring, K, which raises it when there is no current passing, the downward movement being regulated by the set-screw M, passing through the soft-iron disks L, which acts as an armature for the core J.

Having described the details of construction of my improved lamp, I will now proceed to explain their function and operation.

When there is no current passing the upper or positive carbon falls until its point rests upon the top of the lower or negative carbon, which is held up by the spring K. On establishing the current the magnet A becomes active, and its core E, becoming magnetized, moves toward the soft-iron disk F, which attracts it, and this movement draws the plate D tightly against and holds up the carbon rod Q. At the same time the current passing from the lower to the upper carbon excites the magnet-coil B, which causes its core J to move downward upon the screw M, so as to establish the arc or proper distance between the carbon points, the current passing from the upper carbon and carbon rod Q to the binding-post A through the top or case N. The current now being established the distance between the carbon points gradually increases, owing to the consumption of their adjacent ends, and consequently the resistance of the current passing through them increases in a like ratio, until the current becomes so weak that the magnet A is no longer able to pull the plate D sufficiently hard against the rod O to hold up the latter, when, unless otherwise prevented, the upper carbon would drop upon the lower carbon, so that a constantly-recurring flicker would result every time the feed or drop takes place. To obviate this defect, which I have perfectly succeeded in doing, I employ the electro-magnet C, through the coils of which, when in action, flows a pulsating or intermittent current, influencing and actuating the core E′, plate D, and the vibrating lever G.

By the use of the electro-magnet C, when the resistance between the carbon points becomes too great the current, instead of passing directly to the post A″ through the upper carbon, passes through the cross-bar P, magnet C, spring H, lever G, and case N to the binding-post A^2. The magnet C, upon becoming magnetized, attracts the armature *x* of the vibrating lever G, thus causing the short arm of this lever to press against the rod Q. The downward movement of the armature *x* breaks contact with the spring H, and the magnet C, losing its power, allows the armature *x* and the lever G to regain their first position, where, as soon as the contact is made with the spring H, the action is repeated. The movement thus given to the lever G is so rapid as to produce a low hum or buzz, and is continued until the upper carbon has been fed sufficiently to allow the current to take a short circuit through it to the post A^2, when the magnet C, being cut out of the circuit, releases the core E′ and allows the core E to pull the plate D firmly against the rod Q.

From the above it will be readily understood that each downward movement of the lever or stop G will cause its short arm to press against the rod Q, while each upward movement of said lever allows the rod to drop, and therefore, owing to the great rapidity of the vibration of the lever, the rod, with the carbon attached to it, is allowed to fall very gradually as fast as it consumes, the result being a perfectly steady and normal light.

It will also be seen that when a current passes through the lamp the plate or yoke D and the magnet A normally hold and support the carbon rod, while the lever G and the magnet C feed the same when the pressure of the yoke or plate D is lessened.

I do not desire to limit myself to the exact mechanism I have described to secure a steady and automatic feed for carbon points in electric-arc lamps, whereby the distance between such carbon points is regulated automatically without "flickering," as such feed may be had by vibrating devices of other construction, but not without interfering with the spirit of my invention.

What I claim as new is—

1. In an electric lamp, a brake or stop constructed and adapted to alternately hold and release the carbon, in combination with suitable means for giving said brake or stop a rapidly-vibrating movement, substantially as and for the purpose specified.

2. In an electric-arc lamp, and in combination with a suitable device for normally holding the upper carbon, a stop or brake adapted to vibrate rapidly to or from the carbon-holder, whereby it will alternately hold and release the carbon only when it becomes necessary to feed the same, substantially as and for the purpose specified.

3. In an electric-arc lamp, and in combination with a suitable device for normally holding the upper carbon, a stop or brake constructed to vibrate rapidly and to alternately act on the carbon when feeding is necessary, and a suitable circuit-breaker, substantially as and for the purpose specified.

4. In an electric-arc lamp, and in combination with the upper carbon or carbon-holder thereof, the plate D, magnets A C, cores E E′, and a vibrating stop, substantially as and for the purpose described.

5. In an electric-arc lamp, and in combination with the carbons thereof, the electro-magnets A C, means for passing a steady current through the magnet A and a rapidly-pulsating current through the magnet C, and devices actuated by said magnets for normally holding the upper carbon and gradually allowing the same to fall when feeding is necessary, substantially as and for the purpose specified.

6. In an electric-arc lamp, the carbon-holding rod Q, in combination with the plate D, embracing said rod, the magnets A C, the cores E E′, the vibrating lever or stop G, and a suitable automatic circuit-breaker, substantially as and for the purpose specified.

7. In an electric-arc lamp, the carbon-holding rod Q, in combination with the plate D, core E, vibrating core E′, vibrating lever or stop G, and a suitable circuit-breaker, as and for the purpose specified.

8. In an electric-arc lamp, and in combination with the cores E E′ and the plate D, operating substantially as described, the screws *a a′*, whereby the position of the upper-carbon holder may be regulated.

9. In an electric-arc lamp, the combination of the lower-carbon holder, upper-carbon holding rod, Q, plate D, cores E E′, magnets A B C, lever or stop G, disks F F′, spring-contact H, and suitable electric and magnetic connections between the various parts, substantially as described.

CHARLES J. VAN DEPOELE.

Witnesses:
JOHN SCULLY,
ALBERT WAHL.