(No Model.) 2 Sheets—Sheet 1.

C. J. VAN DEPOELE.

ELECTRIC ARC LAMP.

No. 262,333. Patented Aug. 8, 1882.

Fig. 1

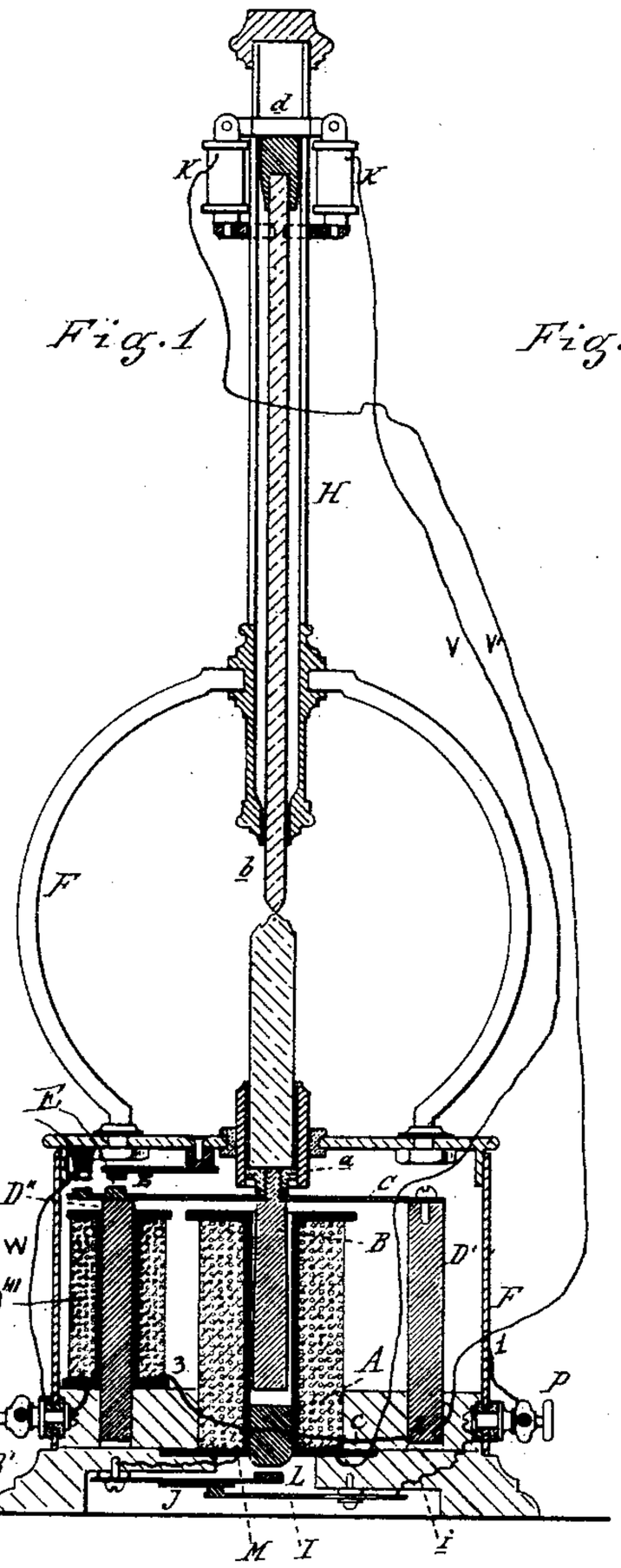


Fig. 3

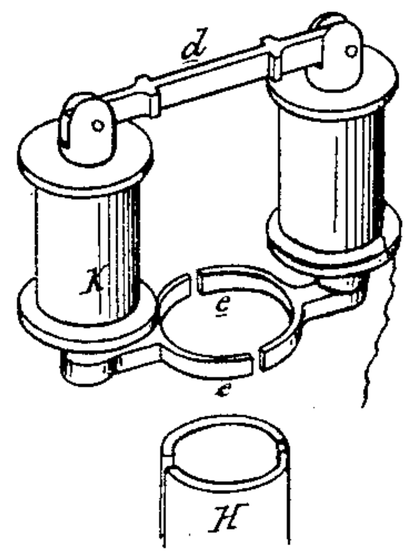
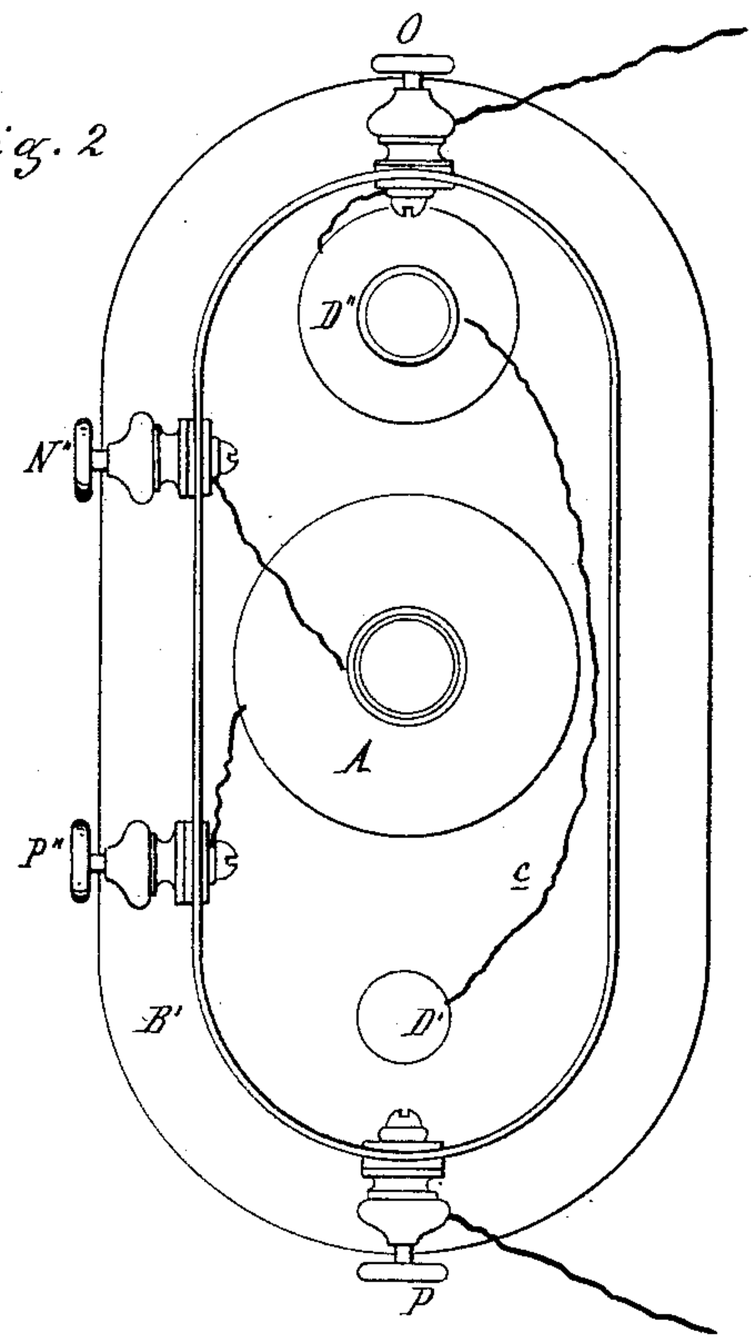


Fig. 2



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(No Model.)

2 Sheets—Sheet 2.

C. J. VAN DEPOELE.

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Fig. 4.

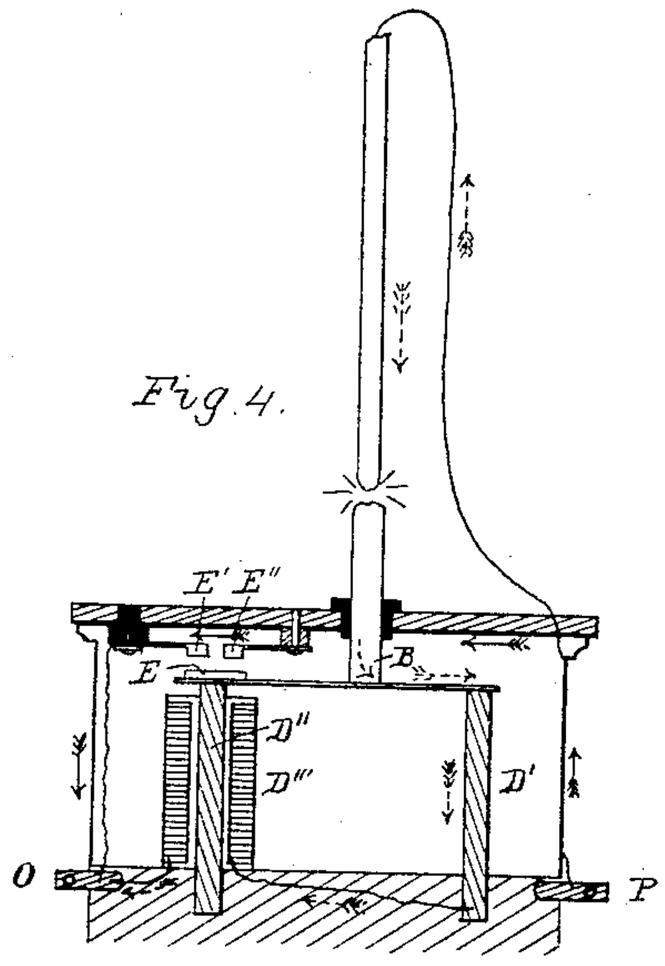

Fig. 5.

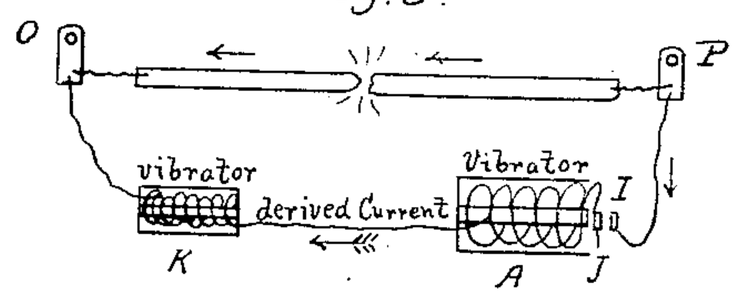

Fig 6

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CHARLES J. VAN DEPOELE, OF DETROIT, MICHIGAN.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 262,333, dated August 8, 1882.

Application filed August 12, 1880. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. VAN DEPOELE, of Detroit, in the county of Wayne and State of Michigan, have invented an Improvement in Electric-Arc Lamps and a System of Electric Lighting, of which the following is a specification.

The nature of my invention relates to certain new and useful improvements in the construction of that class of electric lamps wherein two carbon points are employed, and in a system of electric lighting by means of which the light is made perfectly steady and easy of management, while at the same time an unlimited number of lamps may successfully be put in circuit, giving a result heretofore unattainable by any known system.

The invention consists in the novel construction of the lamp, its operation, and connections, as more fully hereinafter described.

Figure 1 is a vertical sectional elevation of my lamp. Fig. 2 is an enlarged cross-section through the line X X, Fig. 1. Fig. 3 is an enlarged perspective view of the magnets and clamp for the upper carbon. Fig. 4 is a detail sectional view with the magnet A and its connections of Fig. 1 removed. Fig. 5 is a diagram showing the passage of the derived current through the vibrator-magnets, and Fig. 6 is a diagram showing how isochronous vibrations are produced in all the lamps in the circuit by a derived or separate current.

In the drawings, A represents an electro-magnet, and K K a pair of electro-magnets, all included in the same circuit, and through which is passed an intermittent current by a derived or a separate wire, said intermittent current passing through the magnets independent of the main current, which passes through the carbons to produce the light. The magnet A is provided with an armature, B, attached to the spring C, which supports the lower-carbon holder *a* and the lower carbon, and has a constant upward tension when not held down by the electro-magnets or the weight of the carbons. The spring is secured at one end to a simple post, D′, by a screw, and has its other end arranged above a second post, D″, forming the core of the electro-magnet D‴ included in the main or light-giving circuit.

E are spring contacts, which will be more fully hereinafter described.

F is the metal frame of the lamp, carrying at its top the tube H, preferably of brass, which incloses the upper carbon point, *b*.

B′ is the base to which the device is attached.

A proper connection being made with a battery, dynamo-machine, or other source of electricity, the carbons will become incandescent at their points and will emit a weak light; but as soon as the vibrators (hereinafter explained) are put into operation the light becomes powerful and steady, as the arc appears at every impulse of the vibrator and continues as long as the current and the vibrations are kept up and the carbons last, said vibrations being so rapid that the temporary weakening of the light caused at each vibration by the approach of the carbons to each other is imperceptible. The main (light) current passes from the binding-post P (see Fig. 4) to the frame F at 1, through said frame and tube H to the upper carbon, to and through the lower carbon to the spring C, from the spring to the post D′, and thence by the wire *c* from the point 2 to the electro-magnet D‴ at 3, and through said electro-magnet to the post O. The upper carbon is attached to cross-bar D, which is pivotally connected to the cores of the magnets K and slides in vertical slots in the tube H. The poles *e* of the electro-magnets K K are semicircular in form, so as to nearly embrace the tube H, but not touch each other, so that when the current is passing through the magnets the poles will move toward each other and clamp against the tube. Hence when the intermittent current is passed through the magnets the poles *e* will alternately clamp the magnets and carbon to the tube and let them fall. As the same intermittent current also passes through the magnet A, it will be seen that as the poles *e* clamp against the tube H and hold the upper carbon stationary the spring C, by the action of the magnet A, lowers the lower carbon and produces the arc, and when the current stops momentarily the spring and lower carbon rise and the clamping device of the upper carbon releases its hold upon the tube and allows said upper carbon to fall as fast as it is consumed.

The electro-magnet D‴ is for the purpose of making a short circuit through the lamp when the carbons are consumed or inactive, so

as not to interrupt other lamps in the same circuit. To understand the action of this electro-magnet D''' in relation to the spring C and contacts E, we will suppose that the top carbon is removed or consumed from one lamp of a series, while it is necessary that the other lamps in the series should be kept in operation. On removing said carbon the light-current is broken and prevented from passing from the frame F to the lower carbon and the magnet D''', and this demagnetizes the magnet D''' and allows the spring C, relieved both from the weight of the carbon and the influence of the magnet D''', to rise and come in contact with the contact-points E' E''. (See Fig. 4.) This movement of the spring allows the main current to make a short circuit from the frame F through the contacts E² E E' and wire W to post O.

The intermittent current through the magnets A K, for feeding, is produced as follows: Part of the current is shunted from the main current at the post P by the wire *i*, from which it passes to the spring-contact I and spring J, carrying the armature L, through the wire M to the magnet A, from the magnet A by wire V to the magnet K, from the magnet K by the wire V' to the post D', and through said post and the wire *c* and magnet D''', or the spring C, contacts E, and wire W, to the post O. The portion of the main current diverted through the magnets A K excites said magnets K, lifts the armature L of the spring J, and interrupts the current between J and I. At every contact between J and I the armature B will be drawn down and the poles *e* of the magnets K drawn together; and at every break the armature, obeying the spring C, will rise and the poles *e e* loosen their grasp, so that the lower carbon will follow or vibrate with every pulsation communicated to the armature B. The rapidity of the pulsations can be regulated by sliding the spring-contact J nearer to or farther from the armature L, the spring I being adjustably secured to the base to allow of this movement.

Instead of having a separate "interrupter" at each lamp for producing the intermittent current, all the lamps in the circuit can be connected by a separate conducting-wire, through which an intermittent current is caused to pass by single circuit breaker or interrupter, which may be located either in the line or in one of the lamps, said separate wire being connected to the lamps by the posts P'' and N'', having direct connections with the magnets A K.

Reference to Fig. 7 will render it perfectly clear how the vibrations are made isochronous in all the lamps.

G'' represents a battery or generator having poles P⁴ and N⁴ properly connected with the lamps in circuit. The passage of the current will cause the carbon points to give a weak light, requiring great power, considering the amount of light emitted, and, as the current is only passing through the carbon, they will remain in contact and continue to give but little light. As, however, the top and bottom feeding-magnets are wound with conductors of the proper resistance, and are connected from lamp to lamp by a separate line, commencing at A⁴ and terminating at B³, the current being interrupted at B' by the magnetic vibrator M', the current passing through all the lamps and magnets will render the action of all the lamps isochronous, and all will emit light of the same power.

Instead of using a derived circuit, as shown in the figure just described, an entirely separate current may be used to produce the vibrations or the separation of the carbons.

What I claim is—

1. In an electric lamp, the combination, with the upper and lower carbons and the magnets for operating said carbons, of means for sending a steady current through the carbons and a separate intermittent current through the magnets, and a spring supporting the lower carbon and constructed to close a short circuit when the steady current is interrupted, substantially as described.

2. In an electric lamp, the combination, with the upper and lower carbons, of means for sending a steady current through said carbons, the electric magnet D''', the spring C, supporting the lower carbon, a circuit-breaker, E, and suitable electric circuits between the parts named and the terminal connections, substantially as described.

3. In an electric lamp, the combinaton, with the upper and lower carbons included in the main steady circuit, as described, of a separate electro magnet or magnets for operating each carbon, a spring supporting the lower carbon, an armature secured to said spring, and means for causing an intermittent current to pass through the magnets of both carbons, substantially as described.

4. In an electric lamp, the combination, with two carbons included in a steady main circuit, as described, of means for rapidly vibrating one of said carbons and feeding either carbon toward the other by a separate or derived circuit, substantially as set forth.

5. In an electric lamp, the combination, with the upper and lower carbons, of a magnet or magnets for each carbon, and means for simultaneously sending an intermittent current through said magnets, whereby the lower magnet will receive a rapid vibration and the upper magnet be allowed to fall gradually, substantially as described.

6. In an electric lamp, the combination, with the lower carbon and means for rapidly vibrating said lower carbon, of the upper carbon and a device for rapidly and alternately clamping and releasing said upper carbon, substantially as described.

7. In an electric lamp, the combination, with a vibrating lower carbon, of an upper carbon, a clamping device to support and release said carbon, an electro magnet or magnets for operating the clamping device, and suitable means for sending an intermittent current

through said magnet or magnets, substantially as described.

8. In an electric lamp, the combination, with the lower carbon, of the upper carbon, the support H, the magnets K K, armatures *e e*, embracing the support, and suitable means for sending an intermittent current through said magnets, substantially as described.

9. In an electric lamp, the combination, with the lower carbon, of the upper carbon, the slotted tubular support H, the electro-magnets K, having armatures *e e* to embrace the support H, the bar *d*, carrying the upper carbon and magnets, and means for sending an intermittent current through said magnets, substantially as described.

10. In an electro-magnet, the combination of the lower carbon, spring C, armature B, and magnet A, of the upper carbon, support H, magnets K, clamps *e e*, and means for simultaneously sending an intermittent current through the magnets A K K and a steady current through the carbons, substantially as described.

11. In an electric lamp, the combination, with the upper and lower carbons and devices, substantially as described, for operating them by an intermittent current, of a circuit-breaker for causing said intermittent current and means for regulating the rapidity of the movements of said circuit-breaker, substantially as described.

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Witnesses:
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CHARLES J. HUNT.