(No Model.)

F. D'A. GOOLD.

ELECTRIC ARC LAMP.

No. 491,548. Patented Feb. 14, 1893.

Fig. 1.

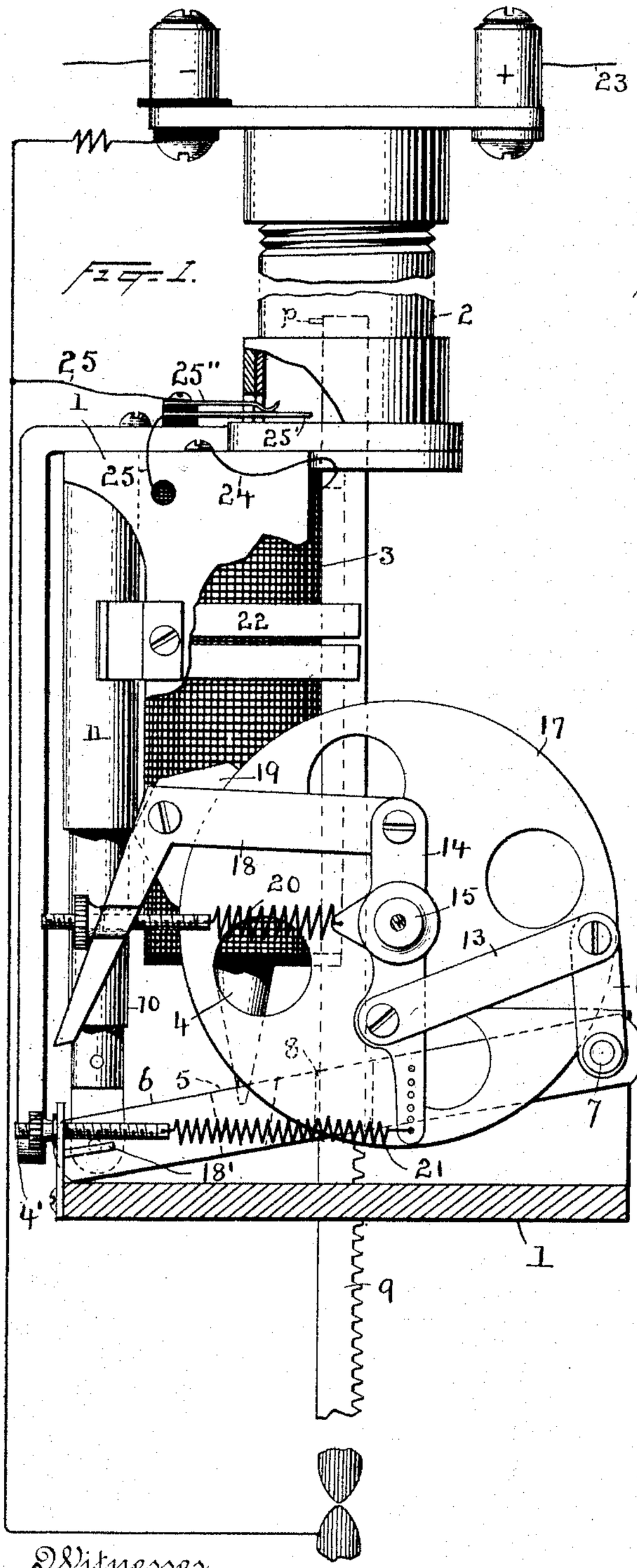
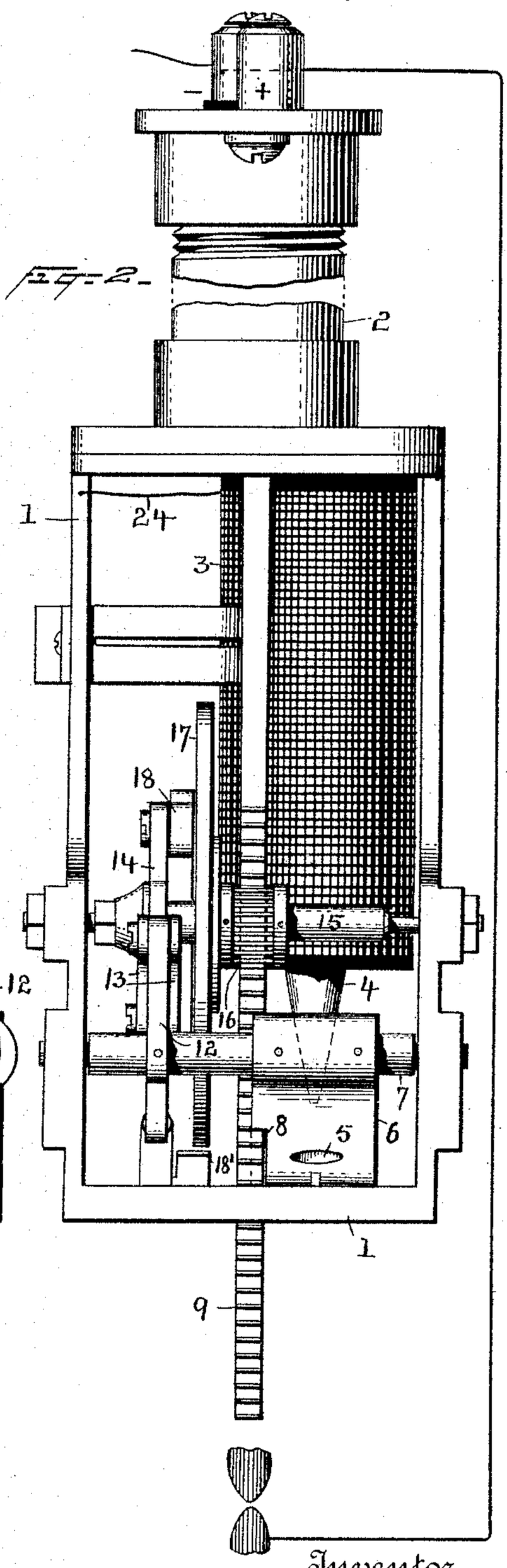


Fig. 2.



Witnesses
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UNITED STATES PATENT OFFICE.

FREDERICK D'A. GOOLD, OF SCHENECTADY, ASSIGNOR TO THE EDISON GENERAL ELECTRIC COMPANY, OF NEW YORK, N. Y.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 491,548, dated February 14, 1893.

Application filed April 15, 1892. Serial No. 429,275. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK D'A. GOOLD, a citizen of the United States, residing at Schenectady, county of Schenectady, and State of New York, have invented a certain new and useful Improvement in Feed-Movements for Constant-Potential Arc Lamps, of which the following is a specification.

The present invention relates to mechanism for controlling the movable carbon of an arc lamp, and especially a lamp designed for use on constant potential circuits; and the invention consists in the carbon feed movement and in the several combinations hereinafter described and claimed.

The lamp to be described belongs to the variety known as gravity feed lamps. When out of use, the carbons are not in contact, but the lamp terminals are connected through a shunt coil, which is the only coil employed in the lamp, and which, when the lamp circuit is closed, operates to form the arc and then to control the feed of the carbon.

In the accompanying drawings, Figure 1 is a side view of the lamp, with the frame broken away to more clearly show the working parts; Fig. 2 is a view of the lamp at right angles to Fig. 1.

The lamp is provided with a cast metal frame 1, which supports the tube 2, into which the upper carbon carrying rod or rack projects, and which supports also the working mechanism of the lamp. Said mechanism consists of a solenoid or coil 3, having a projecting core forming a pole-piece 4, this, preferably, being conical and projecting into an opening 5 of corresponding shape in the armature 6, rigidly secured to a pivot spindle 7, which has bearings in the two opposite sides of the frame 1. The opposite pole of the magnet consists of an L-shaped bar of iron, secured to the coil at the upper end and having its lower end rounded forming a pole 4′ in close proximity to the rounded end of the armature. This construction gives a low resistance to the magnetic circuit, and hence, a strong magnet, while allowing the armature to move freely. In one side of the armature is, or may be, formed a notch or groove 8, through which the carbon carrying rack-bar 9 passes, but this is simply to save space and is unnecessary so far as the operation of the lamp is concerned. At the opposite end of the armature from its pivot, is connected a plunger 10, adapted to work in the dash-pot cylinder 11 to insure slow and steady movement of the armature. On the pivot spindle 7 is also rigidly fixed an arm 12, to the upper end of which is connected a link 13, the opposite end of which is secured to the lever 14, which has a bearing on the shaft 15, this being the shaft that carries the pinion 16 in gear with the carbon feeding rack, and which carries also a disk or brake-wheel 17. To the upper end of lever 14 is pivoted or secured one end of the angle lever 18, which has pivoted to it at its angle a brake-shoe 19, resting on the periphery of the brake-wheel, the lever being normally held in position to cause the brake-shoe to hold the wheel by the adjustable, spiral spring 20.

The lower end of the angle lever 18 is adapted to strike against the upper face of the stop-plate 18′, as the lever and brake-shoe are carried down by the upward movement of the armature. As soon as the brake-lever strikes said stop, the least further movement of the armature releases the brake-shoe gradually from the brake-wheel and the carbon feeds down slowly. A second adjustable spring 21 acts on the lever 14, in opposition to the magnet and armature.

22 is a contact spring in metallic connection with the frame of the lamp and bearing against the carbon carrying rod.

The circuit connections of the lamp are as follows: From line 23 to post +, which is in metallic connection with the frame of the lamp; thence to wire 24, through the shunt coil, to wire 25, to insulated spring 25′, which normally bears against spring 25″, to the insulated negative binding-post or terminal, and out to line. The post — is also connected to the lower carbon. A pin *p* is placed near the upper end of the rack so that when the carbon is nearly consumed the pin will strike spring 25′, moving it away from 25″, thus opening the shunt circuit.

When the circuit to the lamp is first closed, the shunt coil attracts its armature, gradually raising it, thereby moving the rod down until the carbons touch. The moment they do so,

the bulk of the current passes through them and de-energizes the coil, allowing the armature to drop back to its former position, thus pulling apart the carbons, (the armature being heavy enough for this purpose,) and being operatively connected with the carbon through the pinion 16 and levers 12, 13, 14 so as to establish the arc. As this grows longer, the resistance increases, more current is sent through the shunt coil, thereby gradually raising its armature, causing the upper carbon to slowly descend, since movement of the armature is positively communicated to the pinion 16 in gear with the rack. When the armature has moved far enough to bring the lower end of lever 18 against stop 18′ the slightest further movement throws the brake-shoe back so that it releases the wheel, allowing the carbon to fall slowly, thus again partially short circuiting the coil so that its armature falls and raises the carbon.

What I claim is,

1. The combination, in an arc lamp, of a shunt coil or magnet, an armature therefor, a carbon carrying rod, a pinion in gear therewith, a brake-wheel for controlling movement of said pinion and rod, a brake-shoe bearing against the wheel, a pivoted lever, one end of which is connected to said brake-shoe and the opposite end of which is operatively connected to the armature, whereby as the armature is raised by the shunt coil the carbon rod is fed forward, substantially as described.

2. The combination, in an arc lamp, of a coil or magnet, an armature therefor, a carbon carrying rod, a pinion in gear therewith, a brake-wheel for controlling movement of said pinion and rod, a lever pivoted on the axis of said brake-wheel and pinion, a lever carrying a brake-shoe secured to said pivoted lever on one side of its pivot, the lever on opposite side of pivot being operatively connected to the armature, and means for carrying the brake-shoe away from the brake-wheel after a predetermined movement of the armature, substantially as described.

3. The combination, in an arc lamp, of a movable carbon carrying rack, a pinion in gear therewith, a brake-wheel on the axis of said pinion, a lever pivoted on said axis, the lever on one side of its axis being connected to an armature, so that when the latter is moved said lever is moved, a brake-lever connected to said pivoted lever on the opposite side of the axis, a brake-shoe carried by the brake-lever and resting against the brake-wheel, an armature, a shunt coil in position to attract said armature, and means to disengage the brake-shoe from the brake-wheel after a definite movement of the armature, substantially as described.

4. The combination, in an arc lamp, of the brake-wheel, the lever pivoted on the axis of said wheel, the brake-lever secured to said pivoted lever on one side of its pivot, the link or arm secured thereto on the opposite side thereof, the pivoted armature, the arm secured to pivot of the armature and to said link, and a coil or magnet adapted to attract the armature, substantially as described.

5. The combination, in an arc lamp, with a carbon carrying rod and feed mechanism, of a magnet and armature for operating the same, said armature having an opening in it, and said magnet having a pole projecting into said opening, and a second pole in proximity to the end of the armature, substantially as described.

6. The combination, in an arc lamp, with a carbon carrying rod and feed mechanism, of a magnet and armature for operating the same, said armature being pivoted and having an opening in it between the pivot and the end of the armature opposite the pivot, said magnet having a pole projecting into said opening, and a second pole in proximity to the end of the armature, substantially as described.

7. The combination, in an arc lamp, of the carbon carrying rod, a brake-wheel in gear therewith, a brake-shoe held against said wheel when the lamp is out of use, a shunt magnet or coil, an armature therefor, and means operated thereby for gradually moving the brake-wheel, the brake-shoe and the carbon carrying rod forward, and means for moving the brake-shoe from the brake-wheel, whereby it is caused to release its grip on the brake-wheel and allow the carbon carrying rod to slip forward, substantially as described.

This specification signed and witnessed this 11th day of April, 1892.

FREDK. D'A. GOOLD.

Witnesses:

CHARLES M. CATLIN,

A. W. ANDREWS.