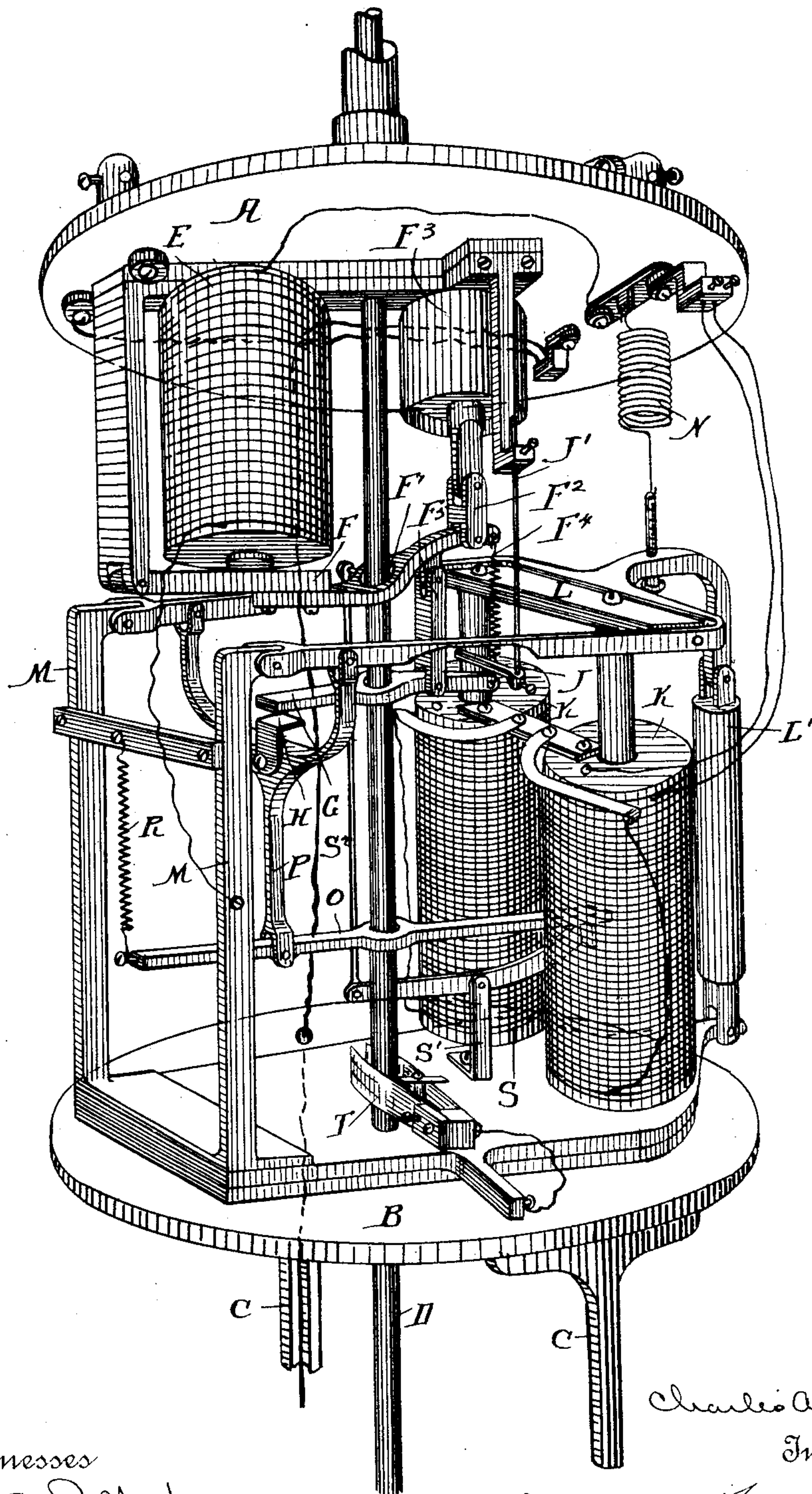


(No Model.)

C. A. PFLUGER.  
ELECTRIC ARC LAMP.

No. 473,955.

Patented May 3, 1892.



Witnesses  
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# UNITED STATES PATENT OFFICE.

CHARLES A. PFLUGER, OF CHICAGO, ILLINOIS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE STANDARD ELECTRIC COMPANY, OF ILLINOIS.

## ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 473,955, dated May 3, 1892.

Application filed July 16, 1890. Serial No. 358,983. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES A. PFLUGER, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Electric-Arc Lamps, of which the following is a specification.

My invention relates to arc lamps, and has for its object to provide a cheap and simple form of regulator for arc lamps.

It is illustrated in the accompanying drawing, which shows a perspective view of an arc lamp embodying my improvements.

A is the top of the frame containing the regulating mechanism; B, the bottom.

C C are the downward projections from the bottom plate, which connect with the support for the lower carbon. (Not shown herein.)

D is the upper-carbon rod.

E is the main-circuit magnet, fixedly secured to the upper part of the case and having exposed below it the pivoted armature F, which is provided with the aperture F', through which the carbon-rod passes, the link F<sup>2</sup>, by which it is connected with the piston of the dash-pot F<sup>3</sup>, the spring F<sup>4</sup>, and the link F<sup>5</sup>, whereby it supports the upper or carbon-separating clutch G. This clutch has connected with it the rest H and the releasing-stop J, which is adjustably supported on the rod J'.

K K are the coils of a shunt-solenoid, and to their movable cores is secured the U-shaped frame L, one end of which is linked to the movable cylinder L' of a dash-pot and the arms of which are pivotally connected with the standards M M.

N is the retracting-spring opposing the action of the solenoids upon the frame.

O is the lower or carbon-feeding clutch, supported from the arms of the pivoted U-shaped frame by the link P, and supported at its outer end by the spring R. The clutch O is prolonged and at one end is in proximity to the releasing-stop S, which is pivoted on the standard S' and supported at its other end by the rod S<sup>2</sup>, which is attached to the armature F of the main-circuit magnet, so that the stop S rocks on its pivot with the motion of the armature F. It will also be observed that the rest H

is on the link or arm P, and hence is movable with the motion of the pivoted frame.

T are the brushes to more effectually deliver the current to the carbon-rod. The connections can of course be made in any convenient manner, but are shown here in such manner that the main-circuit magnet E is placed in the main circuit and in series with the carbons, while the shunt-magnets K, which are of higher resistance than the main-circuit magnet, are placed in a shunt between the binding-posts of the lamp, but not in circuit with the carbons. When the lamp is out of circuit, the carbons are in contact, the stop S holding the clutch O horizontal in opposition to the spring R and the rest H holding the clutch G horizontal in opposition to the spring F<sup>4</sup>, so that neither of such clutches engages the upper rod and the latter is free to move. When the current is applied, the main-circuit magnet rises, lifting the clutch G from its rest H, whereupon it clamps the carbon-rod and carries it up until by the engagement of the other end of the clutch with the stop J the carbon-rod is released. The rising of the standard, however, rocks the stop S on its pivot and permits the lower clutch O to clutch the rod and prevent it from falling down when it is released by the upper clutch. The derived-circuit solenoids then continue the feeding. The solenoids and magnets are interchangeable in this device, and the arrangement of parts, springs, dash-pots, levers, stops, &c., could be largely changed.

The use and operation of my invention are as follows: In exhibiting my lamp I have removed the cut-out, which of course would ordinarily be employed in the usual manner, for the purpose of rendering the action of the remaining parts more easily understood. The law of the operation and the action of the lamp will be clearly understood from an inspection of the drawing. When the main-circuit electro-magnet or solenoid is energized or excited by the current passing through the lamp, the upper clutch is lifted and carries with it the upper-carbon rod, it being assumed that the two carbons are in contact at the time of starting and that the main-circuit magnet is in the same



circuit with the carbons. This separating of the carbons is the office of the main-circuit magnet, and the adjustment of the stops, clutch, &c., may be such as to cause the establishment of the arc by such separation. The continuance of the upward motion of the upper clutch will bring its end against the stop, and thus will speedily throw the clutch into a horizontal position and free it from the rod. In the meantime a portion of the current has been shunted into the derived-circuit electro-magnet or solenoid, so that it is energized or excited and begins to operate the levers or the pivoted frame connected with it. This obviously imparts motion to the lower clutch, which grasps the upper-carbon rod and sustains and prevents it from falling back, so as to bring the two carbons into contact after it has been released by the upper clutch. The shunt-magnet then continues to feed the carbons in much the usual manner, the upper-carbon rod being permitted to slide through the clutch from time to time by the engagement of the lower clutch with its stop.

I have shown this device as applied to the form of lamp shown in the drawing; but it is obvious that great variation in construction and application could be had without departing from the spirit of my invention. I do not wish to be limited to the use of clutches alone, as other devices accomplishing substantially the same results could be substituted for them, and the real gist of the invention consists in employing two separate clutches, one of which is distinctively a feeding-clutch, though assuming other offices also, and the other is distinctively a carbon-separating clutch, though it might perform other offices, and in actuating these clutches in any suitable manner and by any suitable mechanism, whether the same be respectively a main and shunt magnet, or otherwise; and, structurally considered, the lamp presents two constantly-traversed circuits, one including a magnet or solenoid and the carbons, the other including a magnet or solenoid, but not the carbons, and two clutches, which are respectively operated each by one of said circuits.

It will be observed that this invention relates to gravity-feed arc lamps, or lamps in which the feeding of the upper carbon is caused by gravity, and it will also be ob-

served that the entire operation is made to depend upon the lifting-clamps, one of which lifts the carbon to establish the arc in the first instance and the other of which lifts or rises and also falls for the purpose of maintaining the arc and permitting the upper carbon to feed downwardly. It will also be observed that these two clamps or clutches are independently actuated each by its own electro-magnet or solenoid.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is as follows:

1. An arc lamp provided with two separate and distinct gravity-clutches, a main-circuit magnet or solenoid always in circuit and working solely upon one of such clutches, a stop to throw such clutch out of operation when the arc has been established by its agency, and a derived-circuit magnet or solenoid to actuate the other clutch and regulate the arc.

2. In an arc lamp, a combination of an arc-establishing device consisting of a clutch and actuating main-circuit magnet or solenoid always in circuit with an arc-regulating device consisting of a clutch and actuating derived-circuit magnet or solenoid, each clutch and its associated magnet or solenoid normally inactive during the operation of the other clutch and its associated magnet or solenoid.

3. In an arc lamp, the combination of a fixed main-circuit magnet or solenoid always in circuit, a clutch actuated thereby, and a stop to throw such clutch out of action when the arc is established, with a fixed derived-circuit magnet or solenoid, a spring-frame actuated solely thereby, and an arc-regulating clutch supported on the frame.

4. In an arc lamp, the combination of a movable carbon-support which is moved solely by gravity toward its opposed support with two distinct devices adapted one to separate the carbons and establish the arc and then go out of action, said device containing a main-circuit magnet always in circuit, the other to sustain the movable support and regulate the arc until it is again extinguished.

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Witnesses:

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