(No Model.)

J. J. WOOD.

ELECTRIC LAMP.

No. 256,091. Patented Apr. 4, 1882.

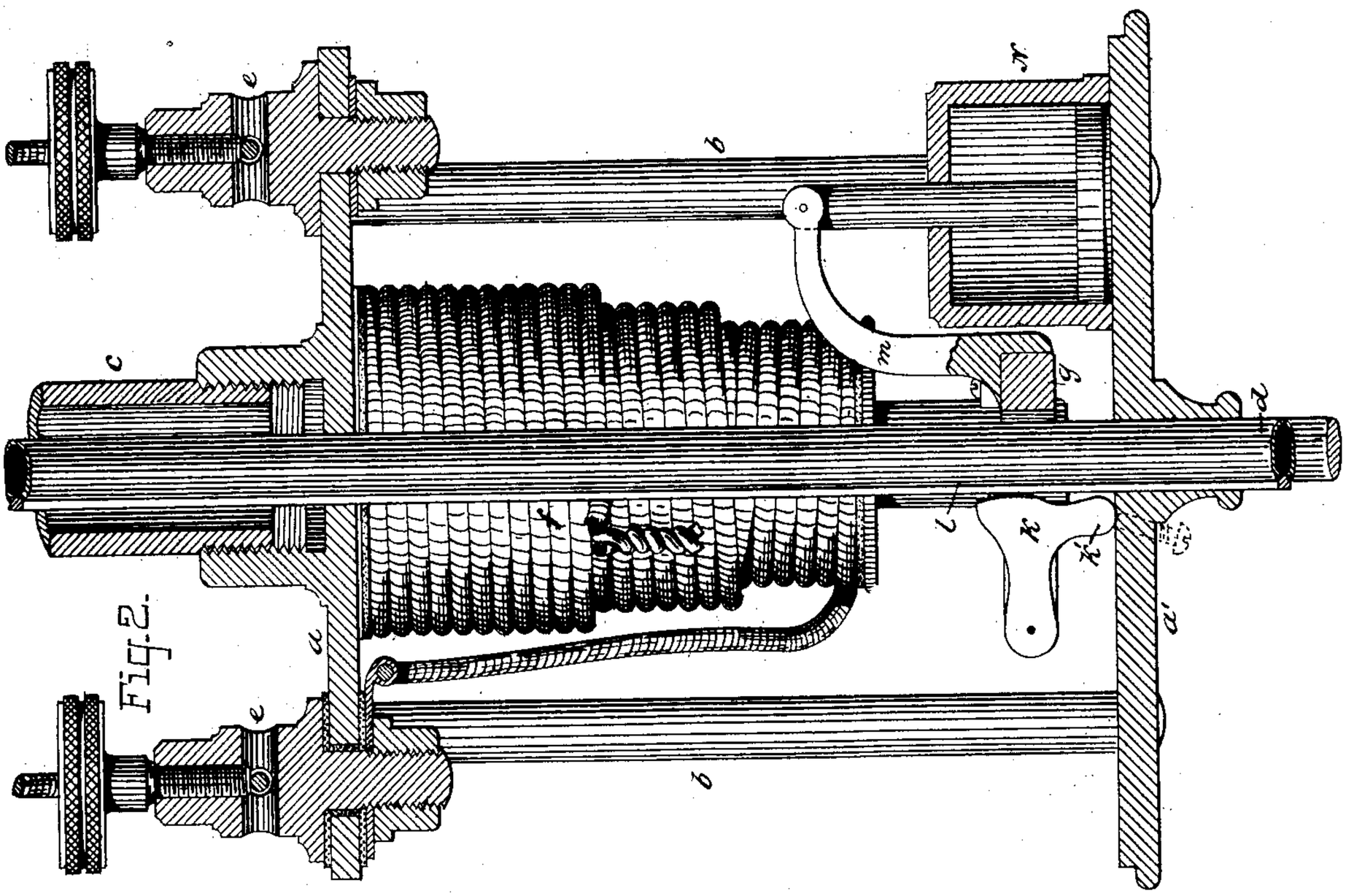

Fig. 2.

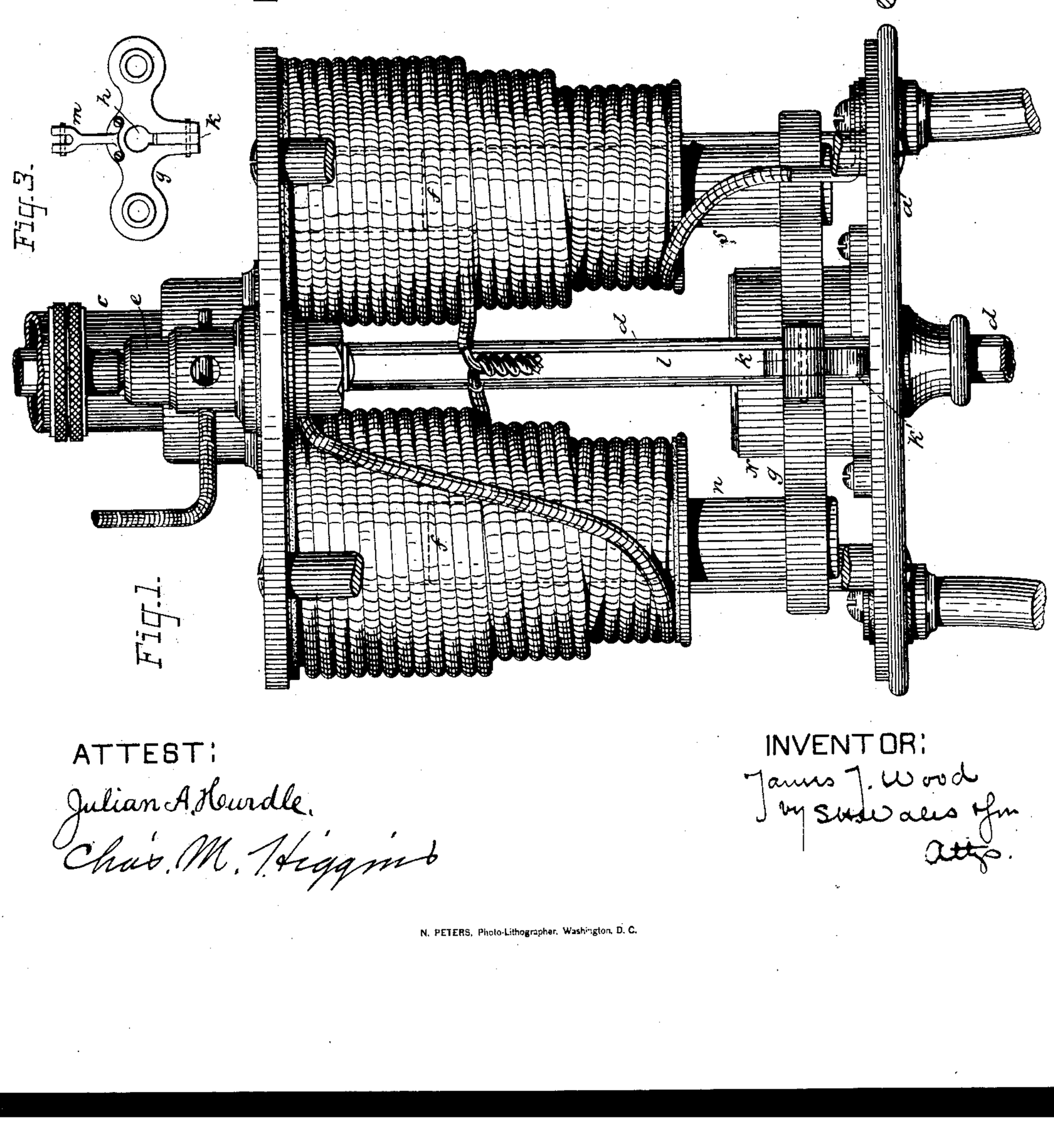

Fig. 1.

Fig. 3.

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ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 256,091, dated April 4, 1882.

Application filed January 14, 1881. (No model.)

To all whom it may concern:

Be it known that I, JAMES J. WOOD, of Brooklyn, Kings county, New York, have invented certain new and useful Improvements in Electric Lamps, of which the following is a specification.

This invention relates to that class of lamps where the magnet acts directly on the carbon-holder by means of a clutch connecting therewith, which gripes when the magnet attracts to raise the carbon for separation, and relaxes when the magnet weakens to allow the carbon to descend for feed. My improvement may be stated to consist in a certain form and arrangement of such clutch, in connection with the armature, whereby greater simplicity and directness of action are attained, as hereinafter set forth.

Figure 1 of the drawings annexed is a front elevation of the regulating or main portion of my improved electric lamp. Fig. 2 is a side sectional elevation thereof; and Fig. 3 is a plan view, on a reduced scale, of the armature or movable core of the magnet, in which my improvement is chiefly located.

The frame of the lamp consists, as usual, of two circular heads, *a a'*, fixed together by the rods *b* and suspended by the tube *c*, which screws into a hub in the upper head. The mechanism of the lamp is included between the heads, as usual. The carbon-holder *d* is free to move through central openings in the heads *a a'*. The binding-posts *e e* are fixed on the upper head, and the circuit-wires connect therewith, and thence to the regulating-magnet to the carbons and generator, in the usual manner, as will be readily understood—that is, the current enters by the positive post shown on the right of Fig. 2, and thence descends through the frame of the lamp and the upper-carbon holder and carbon and passes to the lower carbon. The current thence ascends or returns through one of the harp-rods shown on the right of Fig. 1, flows through the coils of the solenoid *f*, one end of which connects with the harp-rod, while the opposite end connects with the negative insulated post on the head *a*, as seen on the left of Fig. 2, from which post the current returns to its source.

Now, the form of regulating-magnet which I prefer to use is, more properly speaking, a double solenoid, as seen at *f f* in Figs. 1 and 2, and its armature or movable core is also double, or is practically a horseshoe form of electro or temporary magnet, the iron cores *n s* or poles of which move freely in the bores of the solenoid, while said cores are joined by the iron cross-bar *g*, which forms their neutral section. This form of magnet, which is now being generally adopted in lamps of this class, has the advantage of giving a large and powerful stroke with a comparatively small amount of coil-wire, which is of course of great advantage in an electric lamp.

On reference to Figs. 1 and 2 it will be observed that the coil portion of the magnet or solenoid is fixed to and depends from the upper head, *a*, and that the armature hangs toward the lower head. Hence gravity constantly tends to retract the armature from the solenoid toward the lower head, thus dispensing with springs for this purpose, while, on the other hand, the attraction of the solenoid lifts the armature, as will be readily understood. Now, the cores or poles *n s* of the armature are preferably made hollow, as seen in Fig. 3, to remove unnecessary weight, and it may also be observed from this figure that the cross-bar *g* of the armature has a central bore, *h*, in which the carbon-holder *d* is free to move, as shown in Figs. 1 and 2. In a lateral slot which extends from the central bore, *h*, is pivoted a gravitating pawl or dog, *k*, which constantly tends to wedge itself against the carbon-holder, as seen best in Fig. 2, thus clutching the carbon-holder to the armature, and thereby forming the essential part of the clutch before referred to. The engaging face of the pawl is preferably serrated with fine ratchet-teeth facing upward, as seen best in Fig. 2, and on the engaging side of the carbon-holder a spline, *l*, is preferably keyed onto the same, which may be plain or have corresponding teeth to afford a more positive engagement with the pawl. A toe, *k'*, projects from the pawl toward the lower head, and when the armature is retracted or has fallen sufficiently so that the toe rests upon the lower head, the pawl becomes thereby raised out of engagement with the carbon-holder, so as to permit the same to freely descend. When the armature is raised, however, the pawl at once gravitates into engagement

and firmly clutches the holder with the armature. Hence when the separation of the carbon points of the lamp, or, in other words, when the length of the arc is normal, the attraction of the magnet is sufficient to keep the armature, with the carbon-holder clutched thereto, in a suspended condition, the toe of the pawl *k* being raised out of contact with the head *a'*, but vibrating slightly to or from the same as the arc or strength of current varies slightly one way or the other. As the separation of the points slowly increases, however, the toe of the clutch slowly approaches the head *a'*, and as soon as it touches the same with any appreciable force the pawl relaxes its gripe on the carbon-holder, allowing the same to escape and descend the space of a few teeth, so as to give the necessary "feed" to the carbon. As this movement at once shortens the arc, increases the force of the current, and also the attraction of the magnet, it results in an instantaneous raising of the armature, causing the clutching of the carbon-holder and its suspension as before, till the next feed movement is required, as will be readily understood.

A curved arm, *m*, rises from the cross-bar *g* and connects to the piston of a dash-pot, *n*, charged with glycerine, which acts to retard the sudden motions of the armature under the action of the magnet, so as to render the movement smooth and prevent any quick, jerky motion, which would cause too obvious a flicker of the light.

It may now be appreciated that this form of mechanism is not only simple and compact, but peculiarly direct and efficient in action, and as both the clutch and dash-piston are connected directly with the armature, and as the magnet or solenoid acts directly on the armature in one way and gravity acts directly in the other way, the construction is greatly simplified, the number of parts reduced, and more positive and certain actions of the parts insured.

It may also be observed on reference to the drawings that the magnet and armature are arranged centrally in the lamp, each spool and core thereof being placed equidistant on either side of the carbon-holder, which represents the central axis, while the cross-bar *g* of the armature crosses and encircles the carbon-holder centrally, thus effecting a balanced symmetrical arrangement of parts. Furthermore, it will be seen that the tubes of the solenoid serve as direct guides for the cores of the armature to guide the armature and its clutch-bar *g* in direct line with the carbon-holder, while the lower head, *a'*, serves as a fixed definite stop for the clutch-pawl *k* to seat against, thus causing one part to serve several purposes, and thereby greatly contributing to simplicity, compactness, and directness of action.

The toe *k'* of the pawl may contact with any fixed definite stop instead of the head *a'*. Indeed, in lieu of having it contact directly with the head, it may contact with the tip of a set-screw adjustable in the head, so that any desired play may be given to the armature or clutch to render the action more or less sensitive, as illustrated by dotted lines in Fig. 2.

I prefer to have the carbon inserted in the lower end of the metallic tubular carbon-holder *d*, as usual, and have the pawl engage directly with the carbon-holder, as shown; but of course the pawl may engage directly with the carbon itself through a slot in the tubular carbon-holder, which may then be fixed to act as a tubular guide for the carbon to feed through as the movements of the armature and pawl may allow.

What I claim is—

1. An electric lamp constructed with two fixed frame heads, *a a'*, in combination with a carbon-holder moving through the same, and a depending solenoid, *f f*, fixed to the upper head, and with gravitating cores *n s*, guided in the tubes of the solenoid parallel with the carbon-holder, and joined by a cross-bar, *g*, which approaches the lower head, with a clutch-pawl, *k*, pivoted on said cross-bar to engage the carbon-holder by an upward movement, and adapted to seat directly against the lower head when retracted to release the holder, substantially as herein shown and described.

2. The combination, with the carbon-holder *d* and solenoids *f f*, with the cores *n s* and connecting cross-bar *g*, embracing the carbon-holder and provided with the clutch-pawl *k*, of the dash-pot *n* and curved overhanging arm *m*, connecting the dash-piston with the clutch and core-bar *g*, substantially as and for the purpose set forth.

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Witnesses:
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