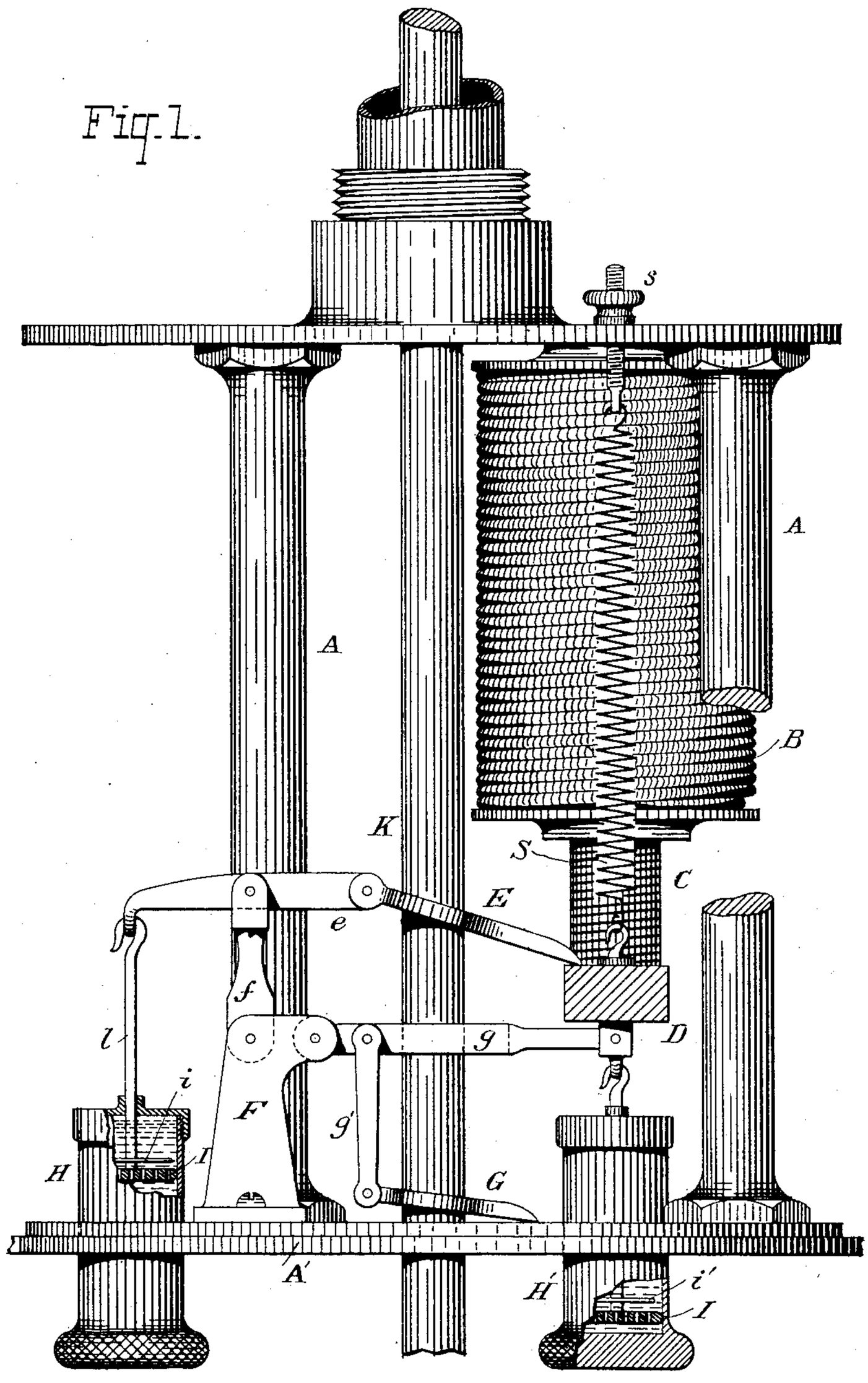
(No Model.) 3 Sheets—Sheet 1.

A. G. WATERHOUSE.

ELECTRIC LAMP.

No. 255,223. Patented Mar. 21, 1882.

Fig. 1.



ATTEST:

Julian A. Hurdle.
Parker W. Page

INVENTOR:

Addison G. Waterhouse

(No Model.) 3 Sheets—Sheet 2.

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Fig. 3

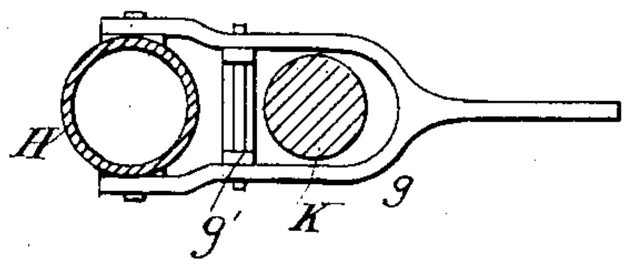


Fig. 4.

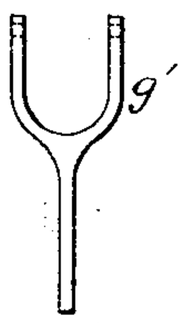
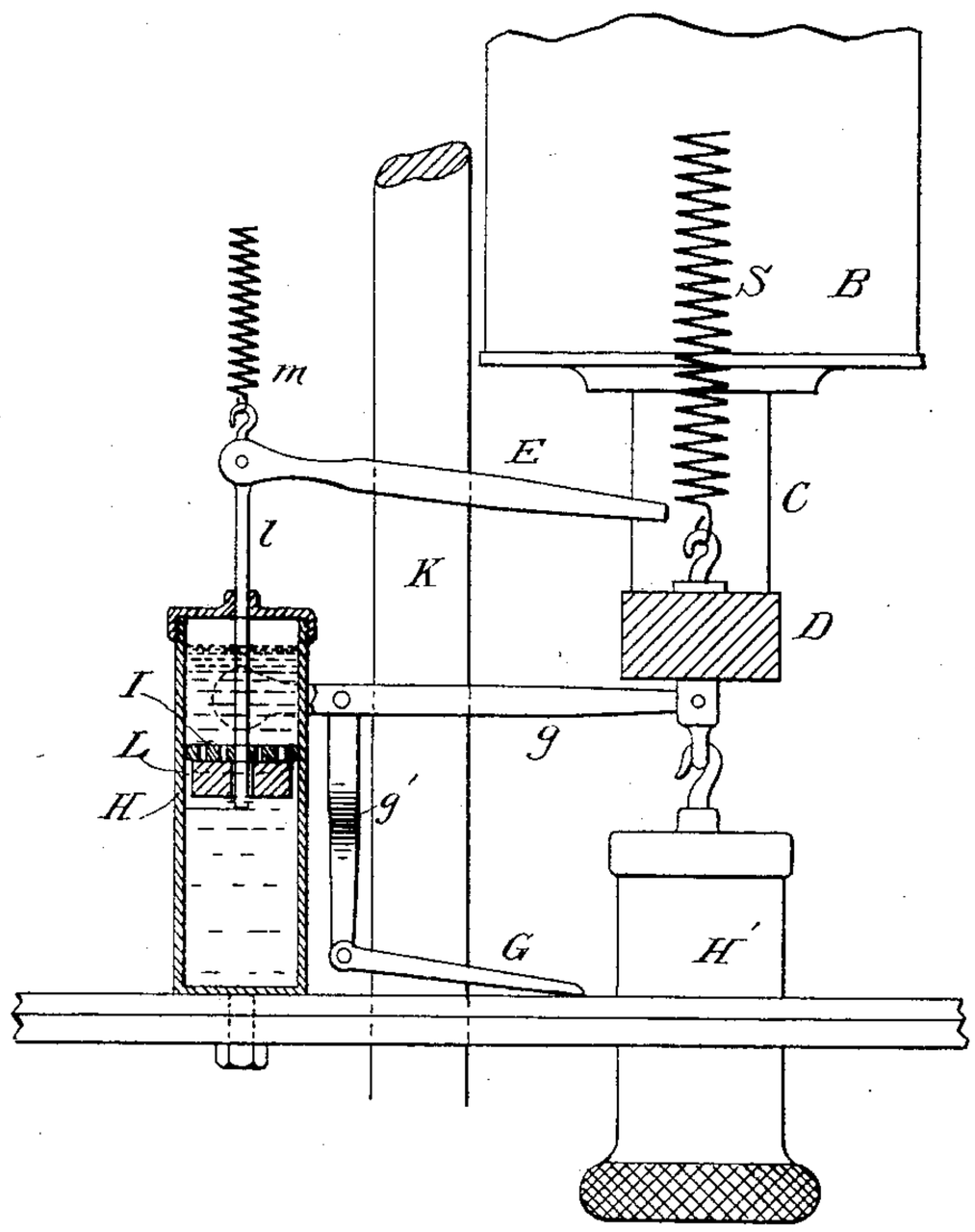


Fig. 2.



ATTEST:

Julian T. Hurdle.
Parker W. Page.

INVENTOR:

Addison G. Waterhouse

(No Model.) 3 Sheets—Sheet 3.

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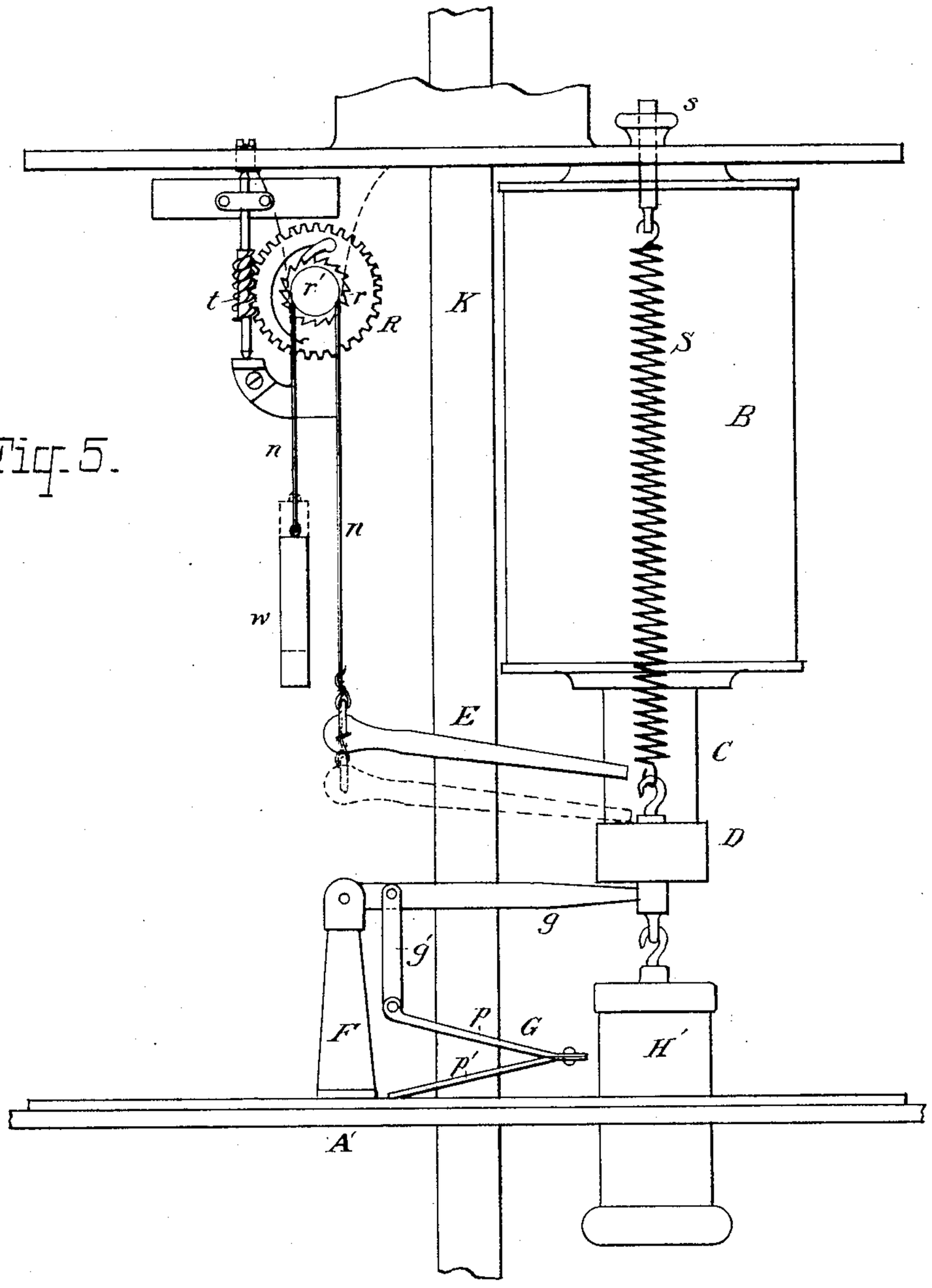
Fig. 5.



ATTEST:

Julian A. Hurdle.

Parker W. Page.

INVENTOR:

Addison G. Waterhouse

UNITED STATES PATENT OFFICE.

ADDISON G. WATERHOUSE, OF NEW YORK, N. Y., ASSIGNOR TO THE UNITED STATES ELECTRIC LIGHTING COMPANY, OF SAME PLACE.

ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 255,223, dated March 21, 1882.

Application filed December 3, 1881. (No model.)

To all whom it may concern:

Be it known that I, ADDISON G. WATERHOUSE, residing in New York, in the county and State of New York, have invented certain new and useful Improvements in Electric Lamps, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

My invention is directed to the improvement of electric lamps in which a gravitating carbon, with its holder, is controlled and adjusted by means of one or more electro-magnets or their equivalents through the instrumentality of a clamp or clutch.

The main object of the invention is to prevent the carbon from dropping suddenly when released by the feeding-clutch, and to cause it to descend gradually until the requisite feed movement has been attained, by this means producing a steady and uniform light. For attaining these objects I employ, in conjunction with the carbon-carrier or holding-rod, two independent clamps or clutches. These are arranged to alternately gripe and liberate the said rod, so that it is at all times supported by one or the other and permitted to move only as fast as the retarding mechanism connected with one or both of the clutches may determine.

In the accompanying drawings my invention is illustrated, in a practical form, as applied to an electric lamp of peculiar construction. I would here state, however, that the present application concerns no special kind of lamp nor magnets, that illustrated being simply selected for sake of illustration, and not specifically claimed herein, as I purpose making separate application therefor.

Figure 1 is a side elevation of a carbon-controlling mechanism embodying my present invention; Fig. 2, a similar view, partly in section, of a portion of a lamp containing a slightly-modified arrangement of clamps; Figs. 3 and 4, details of the clamp or clutch mechanisms; Fig. 5, an outline illustration of another and equivalent form of the clamp.

Similar letters of reference indicate corresponding parts in all the figures.

A A represent the supports of the case or frame containing the feed mechanism.

B is one of a pair of helices fixed to the upper part of the frame. C C are the cores, composed of soft iron or soft-iron wire wound in a solid coil. When thus constructed the iron wire of the coils is included in a shunt-circuit about the lamp. A metal bar, D, connects the two cores C C, and the whole is sustained by a spiral spring, S, capable of adjustment by means of a screw, *s*.

Below the bar D is set a dash-pot, H′, containing a liquid—such as glycerine or oil—and having a piston composed of a perforated plate, I′, over which is laid a thin plate, *i*′. The piston is connected by a suitable rod with a hook or bar, D. When thus arranged the piston I′ is readily forced down, the liquid flowing through the perforations; but when lifted the plate *i*′ closes the perforations, so that it can only rise slowly.

F is a standard rising from the base A′ of the frame at a position at right angles to the center of bar D. Pivoted thereto is a bifurcated arm, *g*, the free end of which is hinged or otherwise connected to the bar D. Between the branches of arm *g* passes the carbon-carrier K.

G is a clamp or perforated plate surrounding the carbon-carrier, resting on the base A′ at one end and connected to the arm *g* by means of a link, *g*′, at the other. As the bar D is raised by the attraction of the helices for the cores C the arm *g* is carried up and the clamp G tilted, thus causing it to gripe the carrier K, the dash-pot H′ acting to prevent too rapid upward movement. In this respect the action of the parts differs in no wise from certain other forms of lamp now in use. When the diminishing attraction of the helices B allows the cores and bar D to descend sufficiently for feeding, the clamp G is brought to a horizontal position and liberates the carrier K, which drops by its own weight often beyond the point at which the requisite amount of feed is attained. This is due mainly to the fact that an appreciable time is required for the feed-magnets to overcome the inertia of the moving parts and draw them up to the point necessary for arresting the descent of the carbons, or that the downward movement of the carrier is so rapid as not to allow the

magnets time to recover their power. This I overcome by the following means:

To the standard F is either pivoted or fixed an upright, *f*, to the upper end of which is pivoted a bar, *e*, connected at one end to the piston-rod *l* of a dash-pot, H, similar in every respect to the dash-pot H′, and carrying at the other end a swinging perforated plate or clamp, E′. The clamp E has a tail-piece resting on the bar, by which it is raised or lowered, as the case may be. When the bar D is raised the clamp G is caused to bind and raise the carrier-rod K. The clamp E at the same time is raised without affecting the rod K, while the plunger or piston I sinks by its own weight in the dash-pot H. The lever-arm *e* thus tilts or moves upward, following the bar D. When the latter begins to descend the clamp E is brought into engagement with the rod K, and when the rod is finally released by the clamp E′ its whole weight is transferred to the clamp E, and as this latter is retarded in its descent by the resistance to upward movement of the plunger I, the movement of the carrier will be slow and even, allowing the magnets to regain their power before the carbon has fed too far. In practice the mechanism is so arranged that the ascending bar D meets the descending clamp E just before it has reached the desired limit of downward movement, so that the carrier will be securely held by the clamp G before the said clamp E liberates it.

In Fig. 2 a modification of the same principle is illustrated. Here the magnets, the cores, cross-bar, and dash-pot H′ remain the same. The arm *g* is pivoted by preference to the dash-pot H, thus dispensing with the standard. From the arm *g* the link *g′* depends and connects with the clamp G. The clamp E in this case engages, as before, with the bar D. Its opposite end, however, is connected directly with the piston-rod of a dash-pot, in which the piston I is perforated, and has under it a float, L, so that the resistance is greater to the downward movement than to the upward. A spiral spring, *m*, connected to any convenient portion of the lamp-frame, acts to draw up the piston or plunger. As the bar D ascends the clamp E rises with it without affecting the rod K, while the clamp G, on the other hand, is caused to raise it. On the descent of the bar D the clamp E drops and engages the rod K, which can descend only so fast as the piston or plunger is forced downward through the liquid in the dash-pot H. Other modifications of this are possible, as shown in Fig. 5. In this case the dash-pot H is supplanted by any suitable retarding mechanism. That shown consists of a drum, F′, provided with a ratchet and spring-pawl, which allows it to turn freely in one direction, a wheel, *k*, gearing with a vertical spindle having a worm, F, and a fan or brake. A cord, *n*, by which is suspended a weight, *w*, is connected to the clamp E, and passes by one or two turns over the said drum. By this arrangement the clamp E is drawn up freely by the weight *w*, which turns the drum or pulley F′, but is retarded in its descent and when in engagement with the rod K by means of the gearing described. In this figure is also shown an improved form of clamp which I design using in connection with the mechanism above described. It consists of two plates of resilient metal united in any proper manner at one end, and constructed with a tendency to spread apart. These plates (designated respectively *p* and *p′*) are perforated in the usual manner to surround the rod K. At its free end plate *p* is connected by link *g′* with the arm *g*, while plate *p′* rests upon base A′. When the bar D is lowered the two plates are brought together by the weight of the bar, the cores, and their appurtenances; but when the latter are raised the plates spread and both gripe the rod.

It will be seen from the above that the specific character of the mechanism employed may be greatly varied without departing from the spirit of my invention.

Without, therefore, confining myself to the details shown, what I claim as new and of my invention is—

1. In an electric lamp, the combination of a carbon-carrier, an electro magnet or magnets, a feed-controlling clamp connected therewith, and a supplementary clamp, in conjunction with suitable retarding mechanism, arranged to engage with the carrier when the same is released by the magnets, substantially as set forth.

2. The combination, with a carbon-carrier, an electro magnet or magnets, and a feed-controlling clamp connected therewith, of a supplementary clamp pivoted or suspended above the first, and a retarding device for limiting its movement in one direction, substantially as set forth.

3. The combination, with a carbon-carrier, an electro magnet or magnets, and movable armature therefor, of a clamp adapted to engage with and raise the said carrier, and a pivoted or suspended clamp, in conjunction with suitable retarding mechanism, and adapted to engage with the carrier and impede its descent, substantially as set forth.

4. The combination, with a carbon-carrier, of a clamp or clutch composed of two perforated plates of resilient metal connected together at one edge, substantially as shown.

ADDISON G. WATERHOUSE.

Witnesses:
W. FRISBY,
R. F. BARNES.