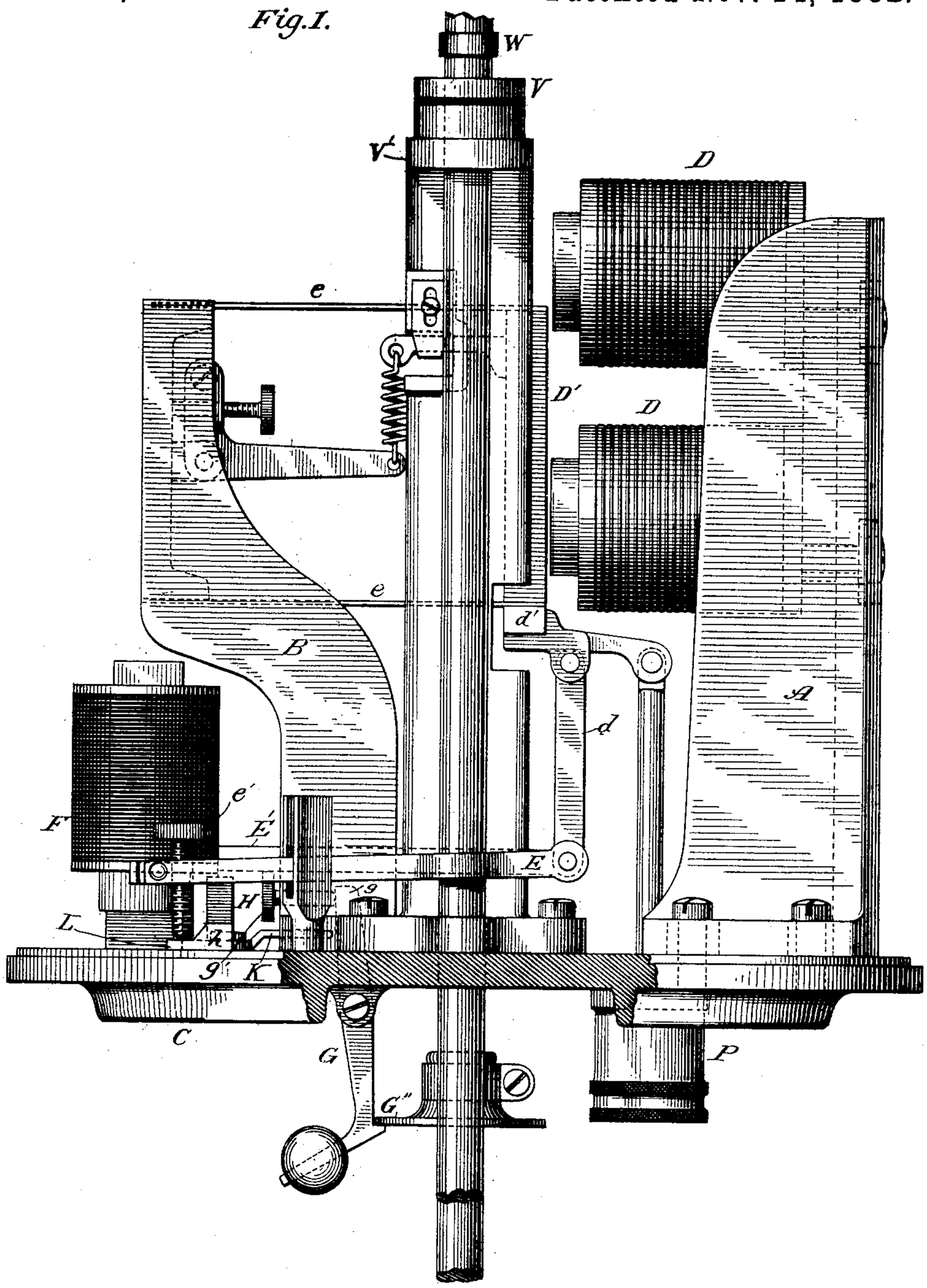
(No Model.) 3 Sheets—Sheet 1.

E. WESTON.

ELECTRIC ARC LAMP.

No. 267,474. Patented Nov. 14, 1882.

Fig. 1.



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(No Model.) 3 Sheets—Sheet 2.

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ELECTRIC ARC LAMP.

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Fig. 2.

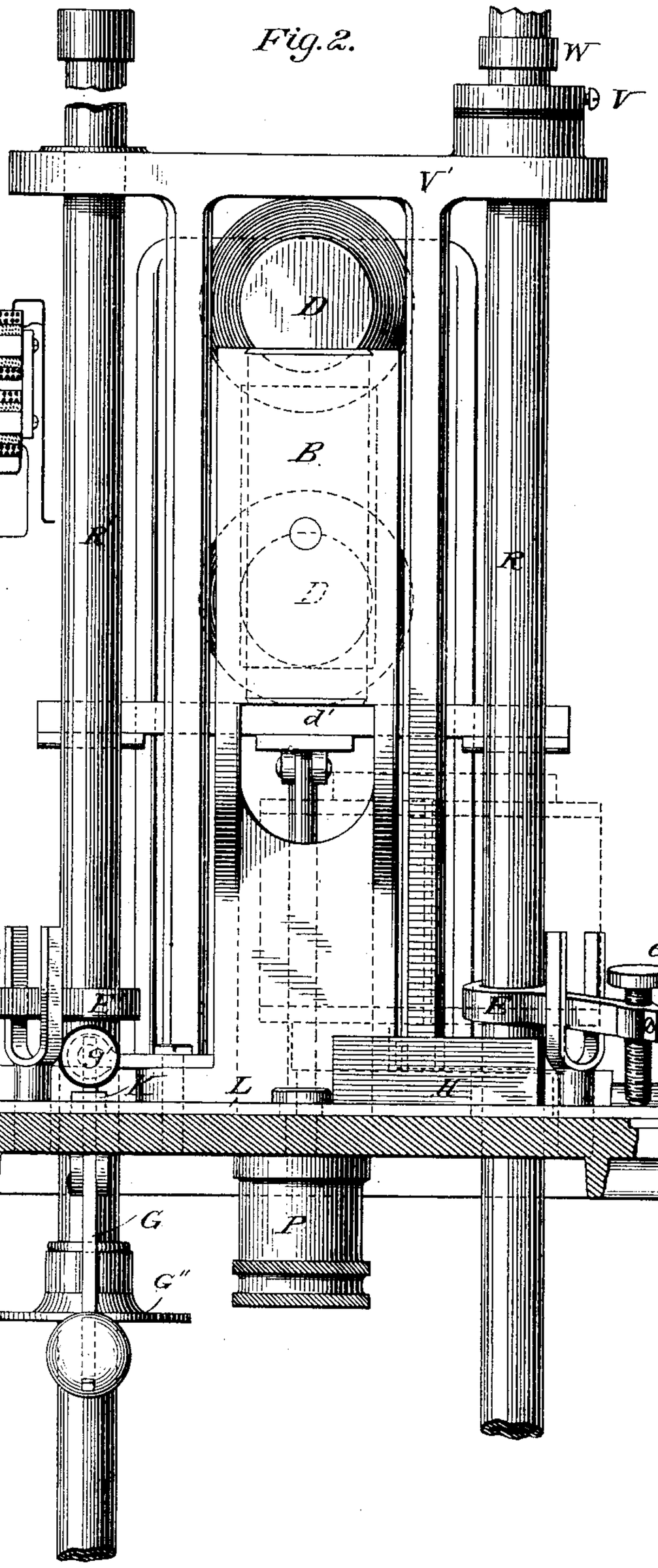
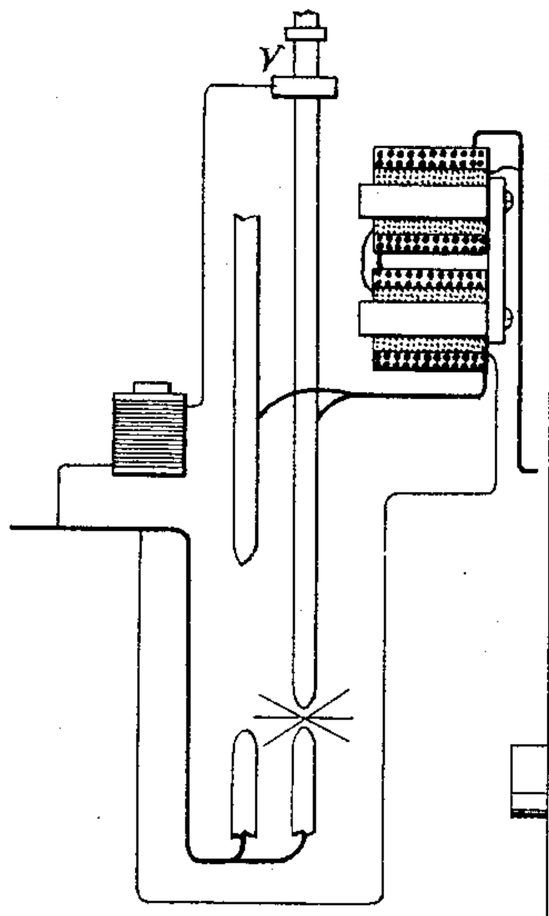


Fig. 5.



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(No Model.) 3 Sheets—Sheet 3.

E. WESTON.

ELECTRIC ARC LAMP.

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Fig. 3.

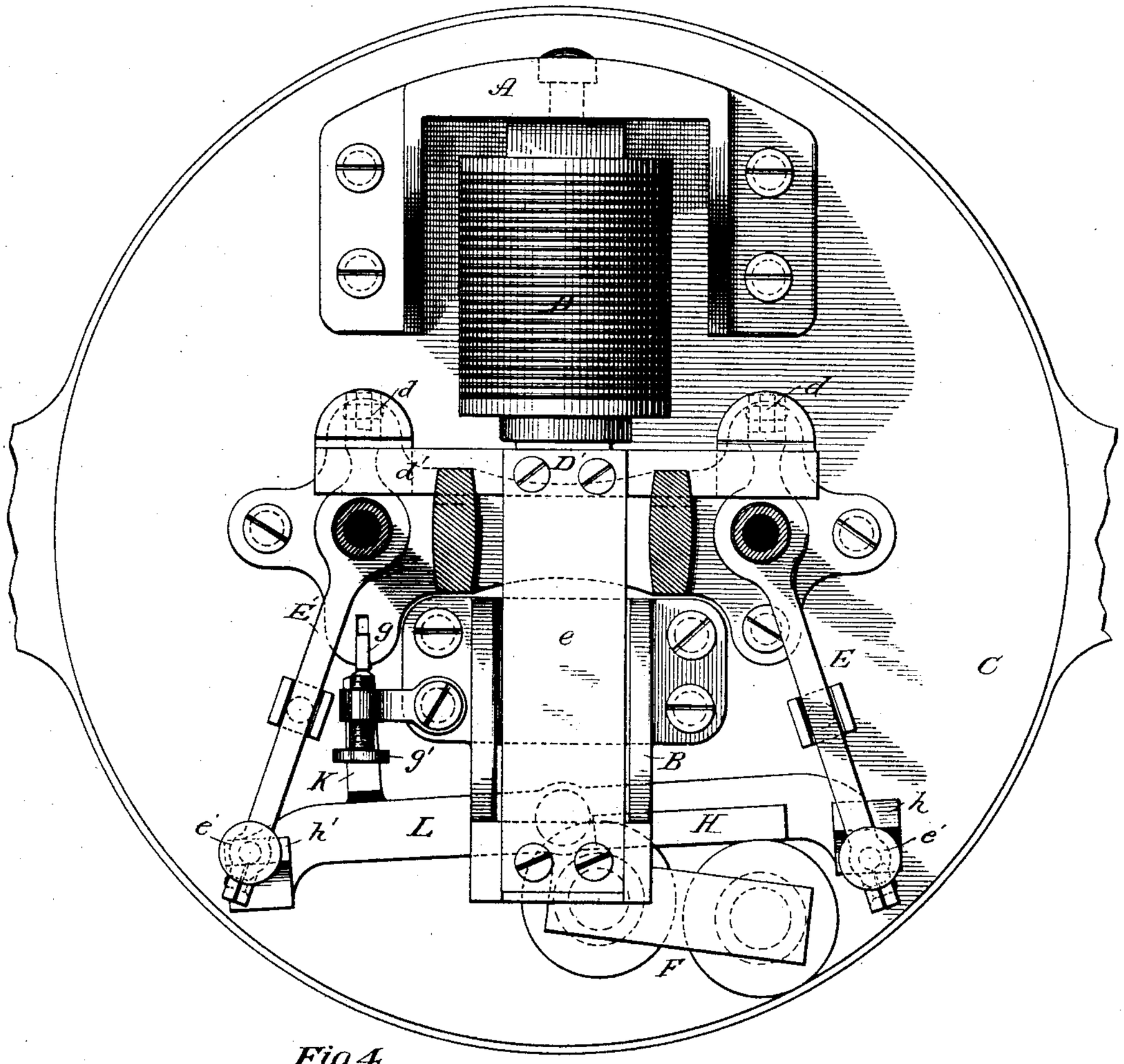
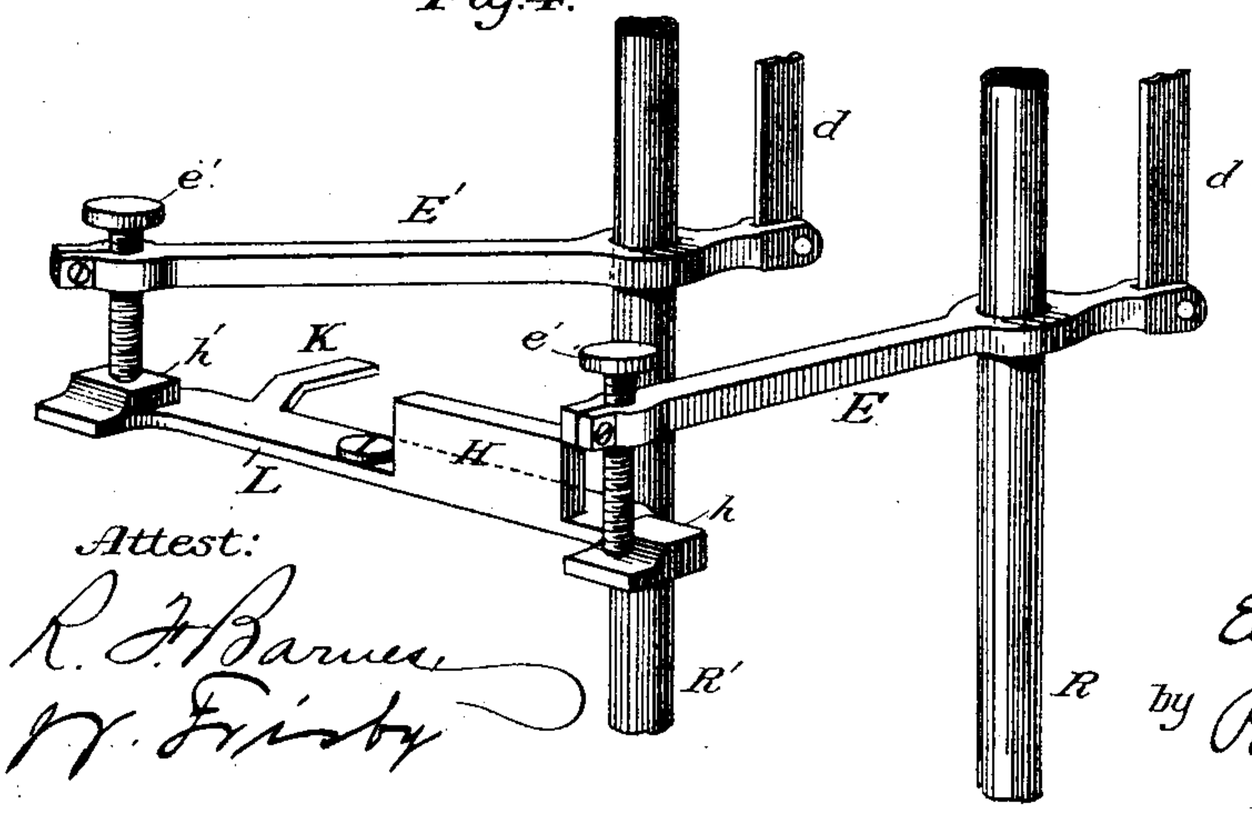


Fig. 4.



Attest:

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UNITED STATES PATENT OFFICE.

EDWARD WESTON, OF NEWARK, NEW JERSEY, ASSIGNOR TO THE UNITED STATES ELECTRIC LIGHTING COMPANY, OF NEW YORK, N. Y.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 267,474, dated November 14, 1882.

Application filed February 1, 1882. (No model.)

To all whom it may concern:

Be it known that I, EDWARD WESTON, a subject of the Queen of Great Britain, and resident of Newark, in the county of Essex and State of New Jersey, 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 present invention relates to electric-arc lamps, employing, in conjunction with a single set of feed-regulating magnets, two sets or pairs of carbon pencils, and independent feeding devices connected therewith, which, by the consumption of the carbons, are brought successively under the controlling influence of the aforesaid magnets.

In the lamps constructed according to my invention the carbons are fed and adjusted through the instrumentality of clutch mechanism of the kind described by me in former applications, and consisting essentially of a plate or bar connected at one end to the movable armature or its equivalent and resting at the other end upon the stationary lamp-frame. The said plate or bar is perforated and surrounds the carbon-carrier. If the armature be raised and the plate connected therewith tilted a short distance, it grips the carrier, so that the position of the latter depends upon the elevation of the armature.

In the construction of my lamp, I have taken advantage of the fact that a definite tilt or inclination must be imparted to the clamp before it grips the carbon-carrier by allowing one of the clamps to remain in its normal position, while a block or plate is inserted between the free end of the other and the lamp-frame, by which the clamp is tilted in a reverse direction as far as can be done without moving the carrier. Under these conditions the clamp could only raise its carrier by being tilted to a position to which the armature could bring it only by being raised beyond its normal range of motion. The armature will not be sensibly affected by this clamp therefore, while the other will be caused to perform its normal functions. Both carriers are in electrical contact with the frame of the lamp to which the current is brought, so that the circuit will be between the positive and negative lamp-terminals, through whichever pair of carbons may be in contact or between which the arc is formed. In order to regulate this, the carbons that are designed to be consumed last are separated by a catch which holds the upper carbon a short distance from the other.

To withdraw the plate from the clamp and to release the catch above mentioned, and allow the second set of carbons to ignite when the first pair has been consumed, I employ an electro-magnet in a circuit arranged to be closed by an adjustable stop on the carbon-carrier of the first pair, and a shifting-lever of peculiar construction, the character and arrangement of which will be readily understood by reference to the annexed drawings, in which—

Figure 1 shows in side elevation the working parts of my improved lamp; Fig. 2, a side elevation at right angles to Fig. 1, a portion of the supporting-base being omitted, and the electro-magnets shown in dotted lines. Fig. 3 is a plan and part sectional view of the above; Fig. 4, a perspective of the clutch mechanism detached; Fig. 5, a diagrammatic illustration of the arrangement of circuits.

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

Upon plate C are fixed the now well-known mechanisms employed by me in the construction of electric lamps, to wit: a bipolar magnet, D D, supported by standard A and wound with two sets of coils in opposite directions, one in the main or lamp circuit, the other in a shunt about the lamp; an armature, D′, in face of said magnets and supported by flat springs *e*, secured by a standard, B, a tension device for regulating the armature, and a dash-pot, P, for precluding sudden movement or vibration in the moving parts. This form of lamp-regulator, it is to be observed, is employed in this case only in illustration of the invention, as it may be varied in a great number of ways and many other forms used in its stead.

To the armature D is clamped a light bar, *d′*, to the opposite ends of which the links *d* are hinged. These links connect with the ends of clamping plates or bars E E′, of ordinary

construction, and serve to tilt the clamps when the armature is raised. The ends of the clamps E E′ rest upon the plate C, or are provided with adjustable stops or screws *e e′*.

R R′ are two parallel carbon-carriers, controlled by the above-described clamps.

F is an electro-magnet, the coils of which are in a normally-open circuit. It is arranged with its poles downward and fixed between the free ends of the clamps.

H is an iron block, serving as an armature to magnet F, and forming part of or otherwise connected with a pivoted lever, L. Said lever is formed with wedge-shaped enlargements *h h′* on its ends, which are forced under one or the other of the stops *e e′* as the lever is swung on its pivot, and by this means either clamp may be raised. Magnet F is wound with an insulated wire that is connected to the negative lamp-terminal at one end and to an insulated metal collar or stop, V, suitably secured to the top of a frame, V′.

On carbon-carrier R is a fixed or adjustable stop or collar, W, which is to be placed at such a point that it may come in contact with collar V and arrest the descent of the carrier when the carbon carried thereby has been nearly consumed.

On carrier R′ is an adjustable collar, G″, with the edge of which a weighted catch, G, pivoted to the lamp-frame, is arranged to engage. The lever G, forming the catch, extends up through the plate C as an arm, *g*, which lies in the path of movement of a projection, K, on lever L. A binding-screw, *g′*, properly set in an arm clamped to plate C, is employed to limit the movement of arm *g* in one direction.

The operation of the above-described devices is as follows: The lamp being provided with carbons, the carrier R′ is raised and sustained by the catch G. The lever L is shifted to bring the enlarged end *h′* under the screw *e′* on clamp E′. In this condition the current will pass through the set of carbons of which the upper one is connected to carrier R, and these will be consumed, the armature D′ having only to sustain the weight of carrier R. When this latter has descended sufficiently to bring the stop W into contact with collar V a portion of the current is directed through the coils of magnet F, the effect of which is to shift the lever L, thus lowering clamp E′ into position, to be affected by the movement of the armature D′, and releasing the carrier R′ from the catch G. At the same time clamp E is raised by enlargement *h*, so that the armature D′ has now the weight of carrier R′ only to sustain.

The coils of magnet F or the circuit in which the same are included should be of very high resistance, so that when the second set of carbons is brought into circuit only a very small portion of the current will flow through the coils of F. Provision may be made for disrupting the circuit through the magnet F after it has performed its allotted functions, if so desired, the lever L forming a convenient means of effecting this in several well-known ways.

The principles of construction and operation involved in the above are evidently attained in many variations in the specific character of the mechanism employed. I have made use of a specified form of lamp in illustrating the nature of the invention claimed, but I regard the same as applicable to many others.

What I claim as of my invention, without reference to the specific character of the regulating mechanism with which the same is or may be combined, is—

1. In an electric lamp containing two sets of carbons, the combination, with the electro-magnet, of independent feed mechanisms, one for each set of carbons, a pivoted armature-lever adapted to be shifted to maintain either of said feed mechanisms out of operation, and an electro-magnet independent of the feed-magnets, arranged to shift the said lever, for the purpose of bringing into operation the second set of carbons when the first has been consumed, substantially in the manner described.

2. In an electric lamp containing one set of feed-controlling magnets and two sets of carbons, the combination, with the removable armature, of two independently-connected clutch mechanisms, one for each set of carbons, a pivoted armature-lever adapted to be shifted to raise the free end of either of the said clutch mechanisms, and an independent electro-magnet for shifting the lever, substantially in the manner described.

3. In an electric lamp containing two sets of carbons and independent feed mechanisms therefor, the combination, with one of said sets, of mechanism for maintaining the same inactive and out of circuit, an electro-magnet in a normally-open branch circuit for bringing the same into action, and a stop or equivalent on the carrier of the other set, arranged to close the branch circuit through the magnet when the said carrier has descended a predetermined distance, substantially as set forth.

4. In an electric lamp containing two sets of carbons, as described, the combination, with the clamps or clutch mechanisms, of devices for maintaining the free ends in a slightly-elevated position, for the purpose of keeping them out of engagement with the carbon-carriers, as set forth.

5. The combination, with the armature D′, clamps E E′, and carbon-carriers controlled thereby, of armature-lever L, having beveled enlargements *h h′*, substantially as and for the purpose set forth.

6. The combination, with a carbon-carrier, as R′, in a lamp containing two sets of carbons, of an adjustable collar, *g″*, and a pivoted sustaining hook or catch, G, having an arm, *g*, extending into the path of movement of the shifting mechanism, as and for the purpose set forth.

7. The combination, with the armature D′, clamps E E′, and carbon-carriers R R′, of lever L, having beveled enlargements *h h′*, and arm K, an electro-magnet, F, for shifting the position of the lever, and a weighted catch, G, arranged to be tipped by arm *k*, all substantially as set forth.

In testimony whereof I have hereunto set my hand this 20th day of January, 1882.

EDWARD WESTON.

Witnesses:
M. J. DEWITT,
J. P. DENGLER.