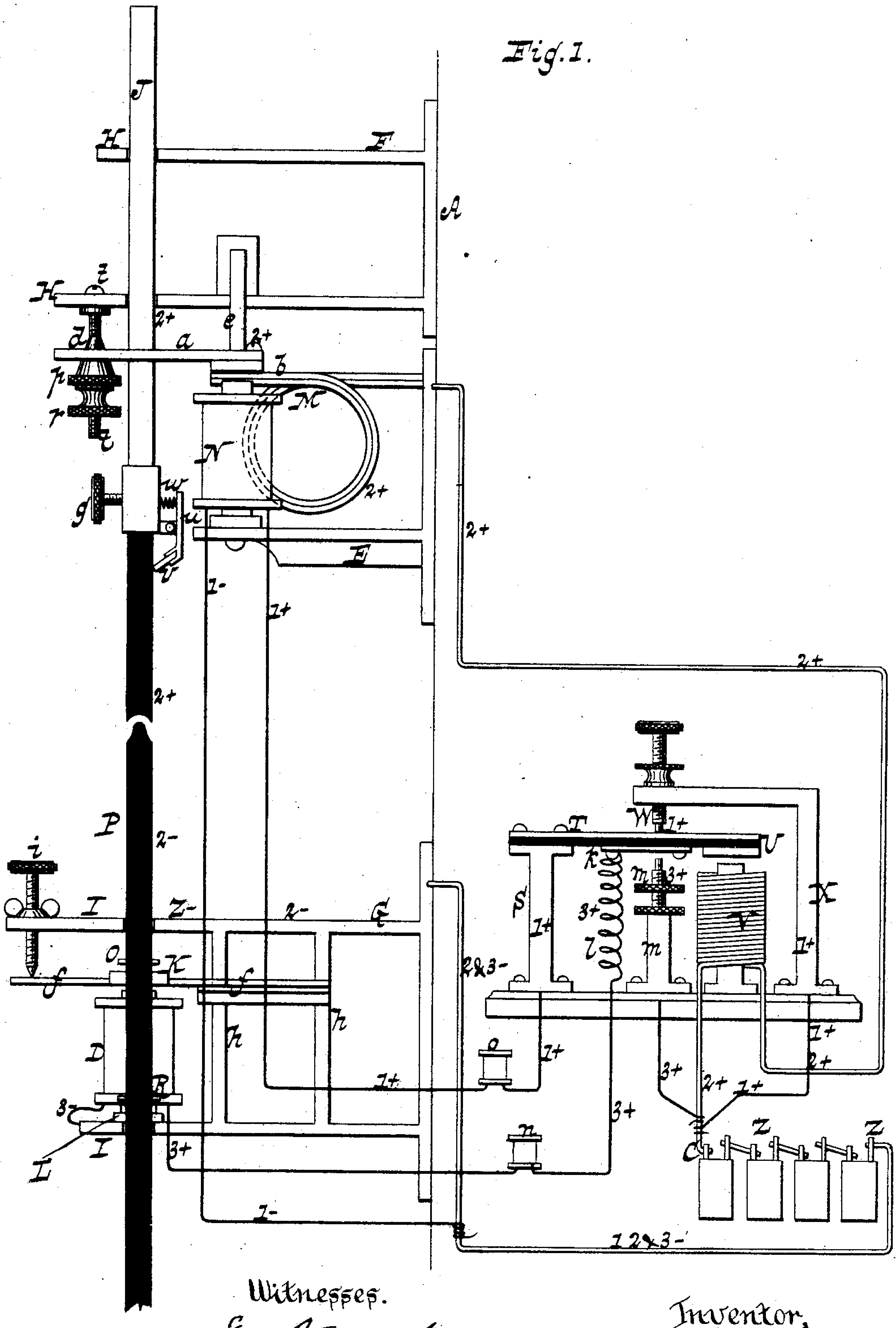
(No Model.) 2 Sheets—Sheet 1.

W. G. LEVISON.

Electric Lamp.

No. 239,811. Patented April 5, 1881.



Witnesses.

E. Nugent

Thos. S. Grimwood

Inventor.

W. Goold Levison

(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

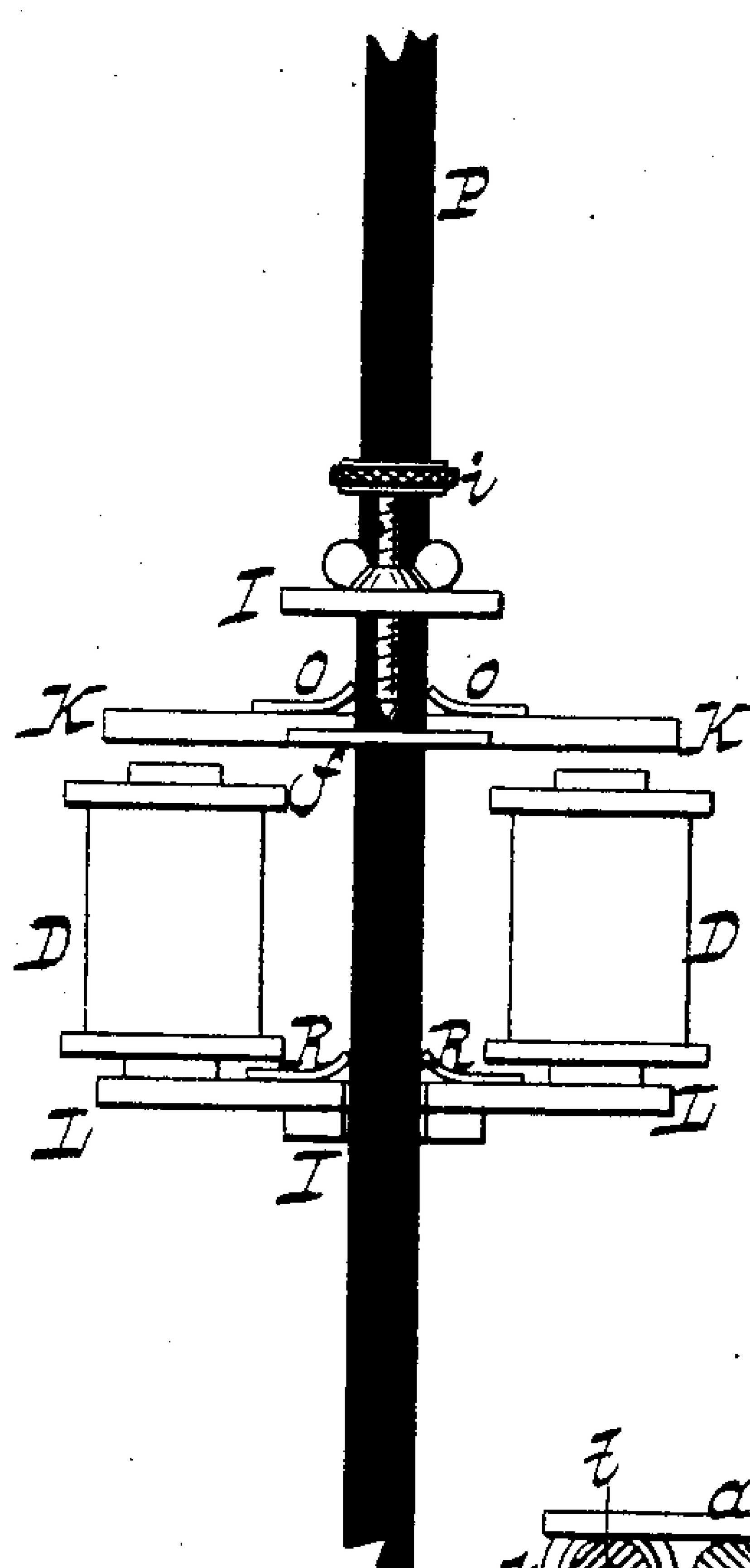


Fig. 3.

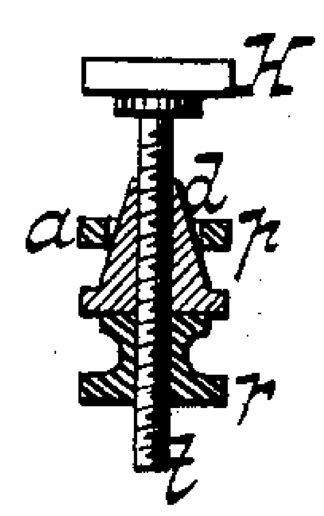
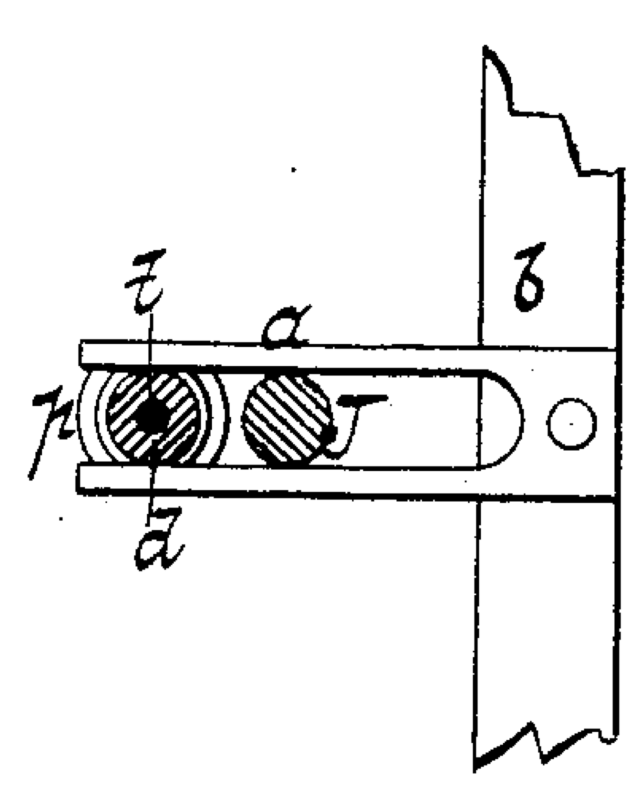


Fig. 4



Witnesses

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UNITED STATES PATENT OFFICE.

W. GOOLD LEVISON, OF BROOKLYN, NEW YORK.

ELECTRIC LIGHT.

SPECIFICATION forming part of Letters Patent No. 239,811, dated April 5, 1881.

Application filed August 25, 1880. (No model.)

To all whom it may concern:

Be it known that I, WALLACE GOOLD LEVISON, of the city of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Electric Lamps; and I hereby declare the following to be a full, clear, and exact description of the invention, and such as will enable others skilled in the art to which it belongs to make and use it, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to that variety of electric lamps known as "focusing carbon-point electric lamps;" and it consists, first, of a device for automatically feeding the lower carbon rod in proportion as it is consumed, and thereby preserving the light at or near a certain fixed point; second, of an improved clutch for operating the upper carbon; third, of a device for distributing a portion of the light current or the whole of a separate current expressly employed for the purpose at the proper time, to a magnet which is part of said device for feeding the lower carbon, and by which magnet said device is operated; fourth, of a device to interrupt the action of the lamp when the upper carbon is consumed.

In the drawings, Figure 1 is a side elevation of my focusing-lamp, which is formed by the addition of my device for feeding the lower carbon, and the substitution of a different clutch for supporting the upper carbon in a lamp which is otherwise substantially the same as that described in Letters Patent No. 227,025, granted to me April 27, 1880, and it includes a side elevation of my device for distributing the current to the upper and lower magnets at the proper moment, when the light current alone is depended upon to operate the feeding mechanism. Fig. 2 is a front view of the device for feeding the lower carbon. Figs. 3 and 4 are, respectively, a front view and plan of the clutch for supporting the upper carbon, of which a side view is shown at *a d c* in Fig. 1.

I shall first describe my device for feeding the lower carbon, (represented in Figs. 1 and 2,) and in both figures G represents the frame or support, through perforations in which, I I, the carbon P is guided in a line with the upper carbon rod, J.

D D represent the two spools of an electro-magnet of great resistance, supported by a back piece of soft iron, L L, which is fixed to the frame G, and is so perforated as to allow the carbon rod P to pass through it and between the spools of the magnet. Upon this back piece two or more springs, R R, are riveted in such a manner that they tend to lie flat upon it, and when so lying project slightly over the hole through which the carbon rod P passes. The rod P may therefore with some force be pushed through the lower guide, I, and between these springs, which are thereby raised or bent upward, as shown; but the carbon rod P cannot be again drawn out down between them, because they then clamp it and hold it firmly.

K is an armature held above the magnet D by the spring *f*, which is fastened to the frame G at *h h*, and which must be strong enough to lift the carbon rod, through the springs or clamps R R just described, to a height or distance regulated by the set-screw *i*.

O O is a second pair of springs set to project slightly beyond or over a hole in the armature K, and similar to but slightly weaker than those fixed to the back piece, L, as described.

It is evident that if the magnet D, Figs. 1 and 2, attract its armature, the lower springs, R R, will hold the carbon rod P and prevent its being pushed down, and the upper springs, O O, will yield and move down upon the carbon rod P until the armature comes in contact with the poles of the magnet. If then the magnet D cease to act the spring *f* will lift the armature K, and since the upper springs, O O, clamp the carbon rod rigidly, this will be lifted with the armature to a height regulated by the said screw *i*, and this will be repeated every time the circuit of the magnet is closed and opened, and by continued repetition of these movements a carbon rod of any desired length may be fed upward through the guides I I.

I shall next describe my improved clutch for operating the upper carbon rod, J, and it consists of an elastic metal fork, perhaps preferably made of steel, (represented by the letter *a* in Figs. 1, 3, and 4,) firmly fixed to the armature *b*, and of such a width between the branches that it closes upon and by its own elasticity clamps and sustains the rod J.

t is a screw firmly fixed to the frame or guide H; and *d* is a cone of metal wider at its base and narrower at its apex than the distance between the branches of the fork, and enlarged at its base into a milled head, whereby it may be raised or lowered on the screw *t* at pleasure and firmly fixed thereon at any height by the extra thumb-screw *r*.

If the armature *b* is held down by the magnet N, *a* is spread out or opened by the cone *d*, and the rod J is released and falls through until the carbon points touch. If then N ceases to be a magnet, it is evident that the spring M will lift the armature *b* and the fork *a*, which thereupon closes upon and clamps the rod J, lifts it more or less, and thereby separates the carbon points to a distance dependent upon the position of the cone *d* upon the screw *t*.

I shall next describe my device for distributing the currents to the carbon points and the two magnets, and it is the same as that shown in Letters Patent No. 227,025 except that the spring T, instead of being a simple strip of spring metal, is partly made of hard rubber, or some other suitable elastic insulator, and has a strip of platinum or other suitable metal connecting with the column S fastened on its upper side, which, when the spring is raised, completes the metallic connection between the platinum-pointed set-screw W and the column S, and a shorter piece of platinum or other suitable metal, *k*, on its under side, which, when the spring is held down by the magnet V attracting its armature, completes connection between the wire 1+ and the platinum-pointed set-screw *m*. The wire from the positive or + pole of the battery is connected by branches 1+ with the column X, 2+ with the magnet V, and by 3+ with the set-screw *m*. From *l*, which is a coil or spring of the conducting-wire, having no power as a spring, the wire 3+ continues to the magnet D, which feeds the lower carbon; but the wire includes, if necessary, a resistance-coil, *n*, between *k* and the magnet to which it leads. From the opposite spool of the magnet V a wire designated as 2+ leads to the upper carbon rod, J, and from S a wire, 1+, also, if necessary, including a resistance-coil, *o*, leads to the magnet N, which feeds the upper carbon rod downward. From the opposite spool of the upper magnet, N, the wire 1— proceeds. From the opposite spool of the lower magnet, D, a wire, 3—, leads, and from the lower carbon the supporting-frame and the wire 2— leads the return current. These return-conductors may be all joined together, and from the junction either or all the currents proceed by a single wire to the opposite pole of the battery Z.

I shall next describe my device for interrupting the action of the lamp when the upper carbon is consumed, and thereby preventing injury to the carbon-holders; and it consists of a lever, *u*, hinged to the carbon-holder and holding at one end a plate of clay or porcelain, *v*, pressed against the carbon rod by a spring, *w*, acting against the opposite end of the lever. When the carbon is so far burned away that the light arrives at the point where the porcelain plate is pressed against it, the plate slips between the carbon points, and thereby prevents further action of the lamp.

The operation of the lamp is a follows: When the electric current is first sent through the lamp the carbon points are separated, and since the current cannot pass that way and make a magnet of V, the spring T remains in contact with W. Neither, therefore, can the current pass from *m* to *k*, and hence to the lower magnet, D, because of the break between *m* and *k*, and the armature of the lower magnet, D, remains raised by its spring *f;* but the current can go from W to T, and hence through S and the resistance-coil *o*, to the upper magnet, N, and thence by the return-wire 1— back to the battery, and N therefore draws down its armature and allows the upper carbon to fall and make contact with the lower carbor. As soon as such contact occurs the current will pass through the branch wire 2+, actuate the magnet V, then pass through the carbon rod between the points to the frame G, and from thence, by return-wire 2—, to the opposite pole of the battery Z, first, because by this route it encounters less resistance than by X W S, &c.; and, secondly, because, though but a part go this way, the magnet V will pull down its armature, and the spring T break contact at W, and thereby prevent the current from longer passing by X W S, &c., to N. The magnet N will therefore release its armature, which is lifted by the spring M, lifts with it the upper carbon, and by thus separating the carbon points produces the light.

It is evident that so long as the current flows through V and the light continues, the spring being held down by V makes contact between *m* and *k*, and thereby opens a way for the current to pass through *l o*, the lower magnet, D, and return-wire 3— to the battery at Z, and much of the current would pass this way, and so diminish the light, but for the high resistance encountered by it in the coil *n*, which must exceed that of the voltaic arc between the points; but still a portion goes this way and causes the lower magnet, D, to hold down its armature until, by the wear of the carbon points, the current through V becomes so weak that V releases its armature. If the spring T be strong this happens before the light goes out, and then one of the most important features of this device becomes appreciable, for simultaneously with the release of the spring T contact between *m* and *k* is broken and the armature of the electro-magnet rises and feeds upward the lower carbon. The very important feature referred to is that a certain short but definite interval of time elapses between the break-contact at *m k* and the make-contact at W T, and during this interval the lower carbon is fed upward and held ready to meet the downward movement of the upper carbon, which follows the contact between W and T precisely as at starting the lamp. Everything being properly adjusted, the light varies in intensity with a single spring at M within certain small limits; but with a compound spring, M, these variations are greatly or entirely diminished or compensated, as shown in Letters Patent No. 227,025, previously granted to me April 27, 1880, and the feeding of the lower carbon does not affect the operation of the upper mechanism, as therein and herein described.

It is evident that the magnets N and D may be made movable and the armatures fixed, or cores of soft iron fixed to the armatures and working in open coils or spools of wire might be substituted for either or both magnets, and, working noiselessly, might be better than the magnets described; or a spring perforated to admit the passage of the lower carbon and carrying the small springs O O would answer the same purpose as the perforated armature K; and the lower pair of springs, R R, might be fixed to the supporting-frame G, and the perforated back piece may be thus dispensed with, and a magnet with a plain ordinary back piece and armature might then be arranged to operate the spring; or instead of such magnets single coils with soft-iron cores might then be employed, instead of double spools; also, instead of the double springs R R and O O, two loose collars of metal—such as the plate or collar described in Letters Patent No. 227,025, previously cited—might be substituted.

It is also evident that the magnets D and N may be made of sufficient resistance to obviate the necessity for using resistance-coils, and that extra batteries may be used for operating these magnets, and the same break-piece or distributer employed by properly arranging the connection, and the use of the lighting-circuit or branches of the lighting-circuit for operating these magnets be thereby avoided. All of these, however, I would consider to be merely equivalents for the devices herein described.

It will be understood, also, that the improvement described operates efficiently in lamps in which the upper carbon is fed as consumed.

Having now described my invention and its mode of operation, what I claim as new, and desire to patent, is—

1. In an electric lamp, the magnet and its armature, and the springs for clasping and adjusting the lower carbon, the said magnet being in a shunt-circuit from the main lighting-current and actuated thereby, in combination with a break-piece, as described, a magnet actuated by the main lighting-current and its armature, said break-piece making and breaking the current of the magnet adjusting the lower carbon, substantially as herein specified.

2. In an electric lamp, the combination of a fork and a fixed or adjustable cone acting to support and feed the upper carbon, substantially as described.

3. In an electric lamp, the combination, with a magnet in the arc or light circuit and its armature, of a break-piece, magnets for feeding the upper and lower carbons, connections, and contact-points, as described, whereby the current to the magnet feeding the lower carbon is broken before the current to the magnet for feeding the upper carbon is made, substantially as specified.

4. In an electric lamp, the combination of a magnet, its armature, and an insulating-spring, metallic surfaces thereto affixed, and two or more contact-points, whereby said armature may open or close branch circuits to operate the magnets that control the feeding mechanism of the lamp, substantially as described.

5. An electro-magnet, its armature, an insulating-spring, provided with contact-plates, carrying said armature, contact-points, and a three-branched connection with an electric source, all arranged substantially as shown and described, so that the lighting-current will not break itself, but will be automatically changed in direction and distributed to the carbon points and to magnets operating the feeding mechanism at proper points, as set forth.

6. In an electric lamp, the combination, with a carbon-holder, of a lever, a spring, and a clay or porcelain plate, constructed as described, whereby the porcelain is brought between the carbon points and the circuit broken when the carbon is sufficiently consumed.

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Witnesses:
E. NUGENT,
THOS. S. GRIMWOOD.