

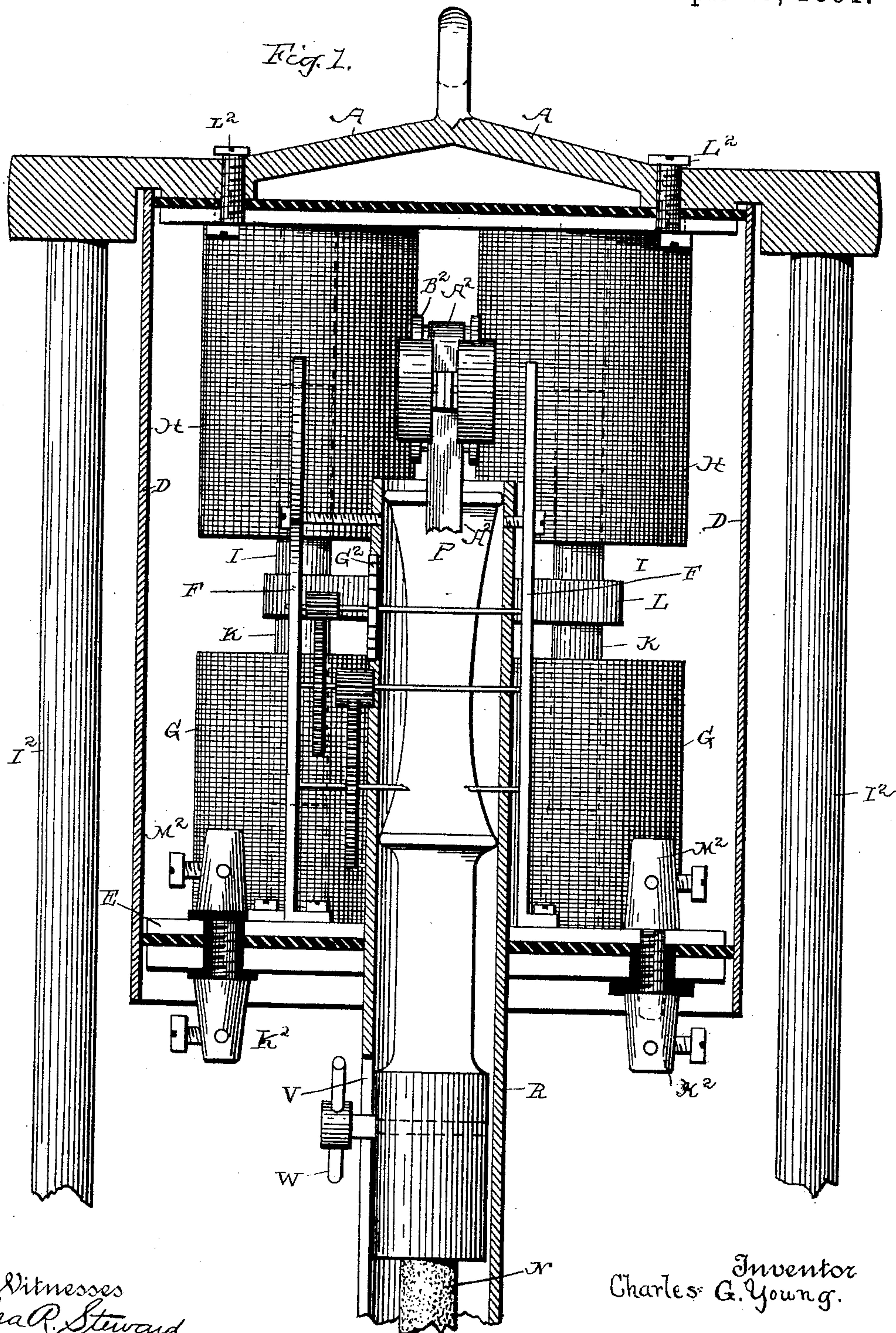
(No Model.)

3 Sheets—Sheet 1.

C. G. YOUNG.
ELECTRIC ARC LAMP.

No. 451,101.

Patented Apr. 28, 1891.



Witnesses
Wm. R. Steward.
H. A. Cooper

Inventor
Charles G. Young.

By his Attorney

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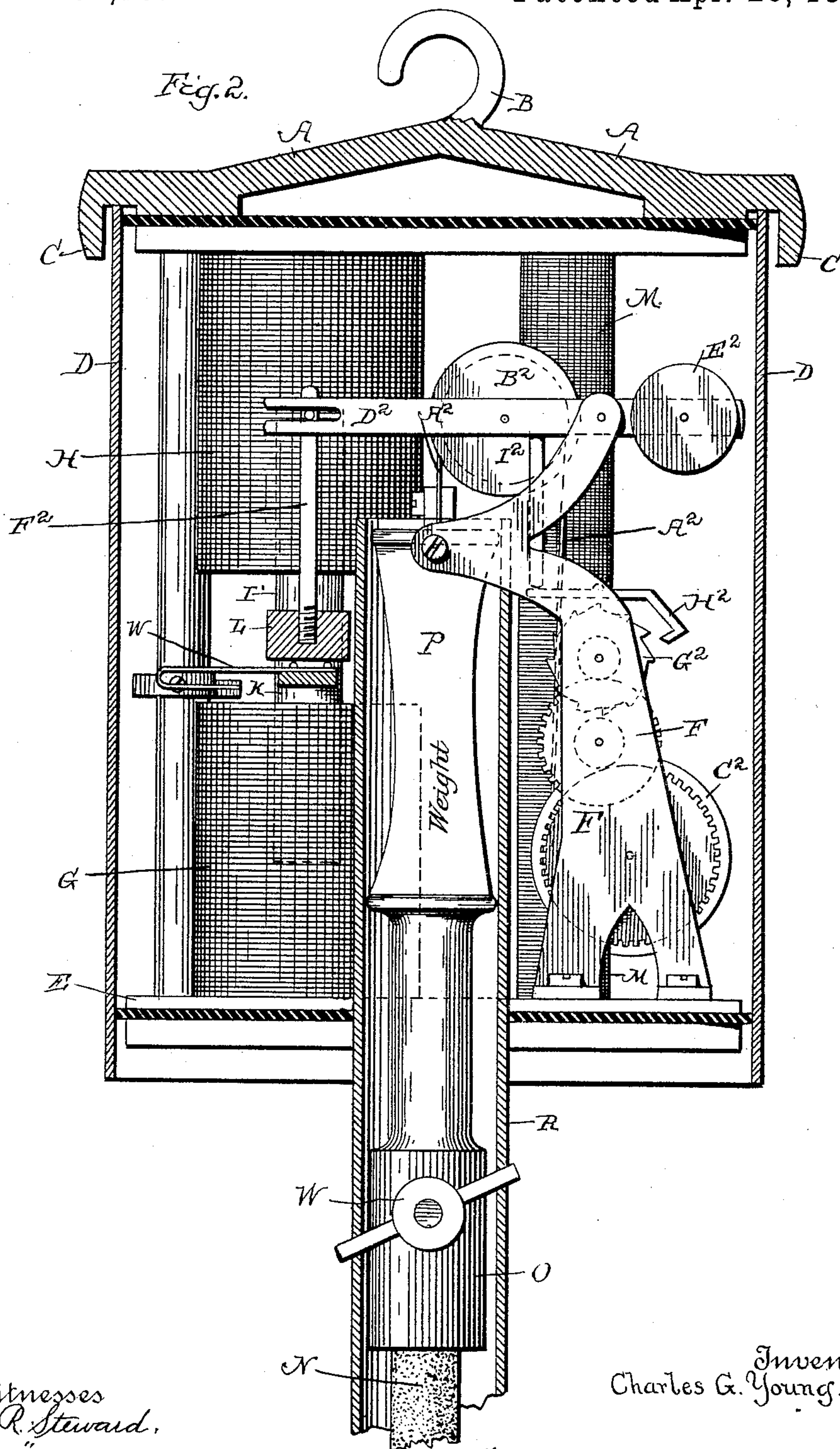
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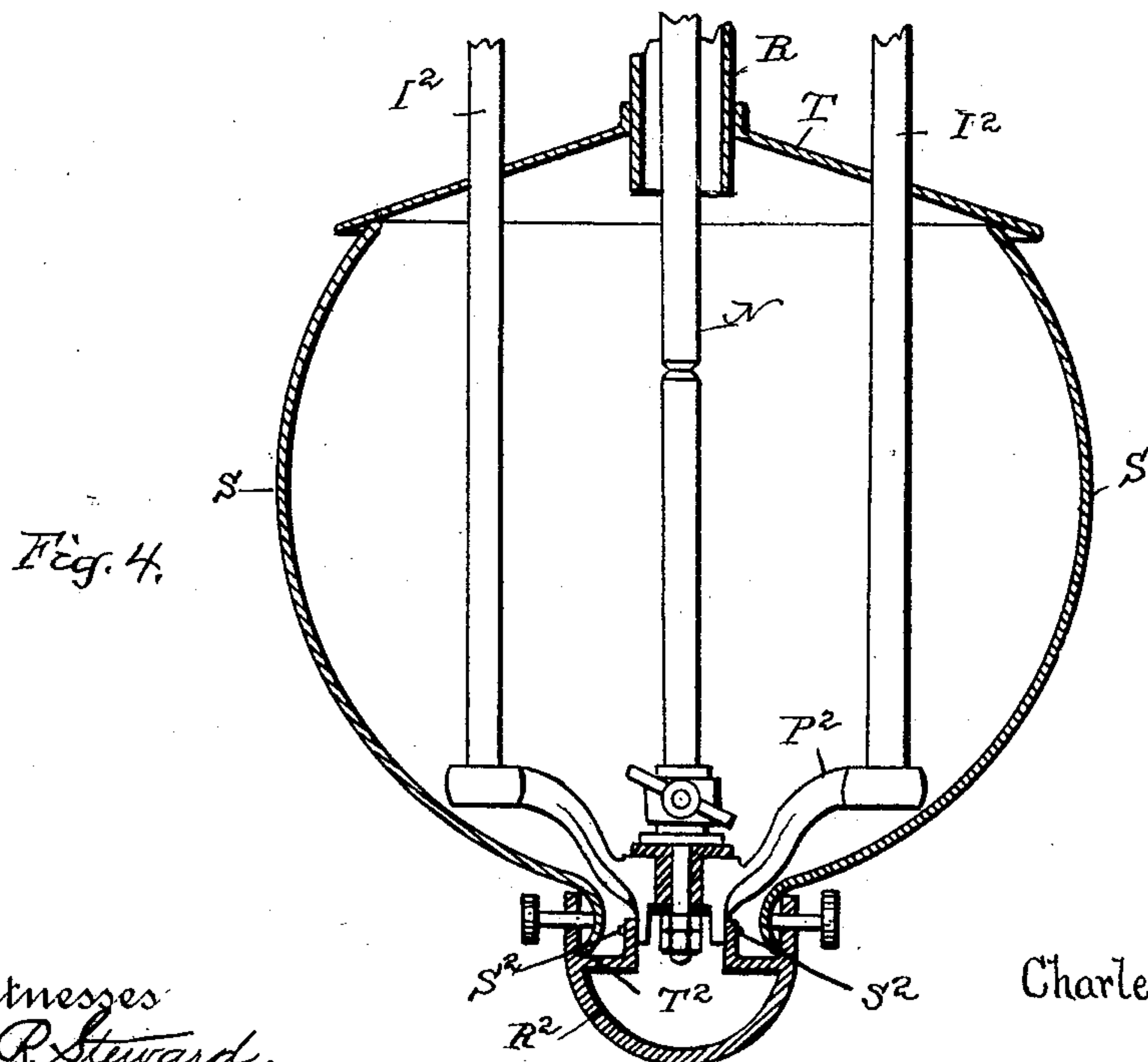
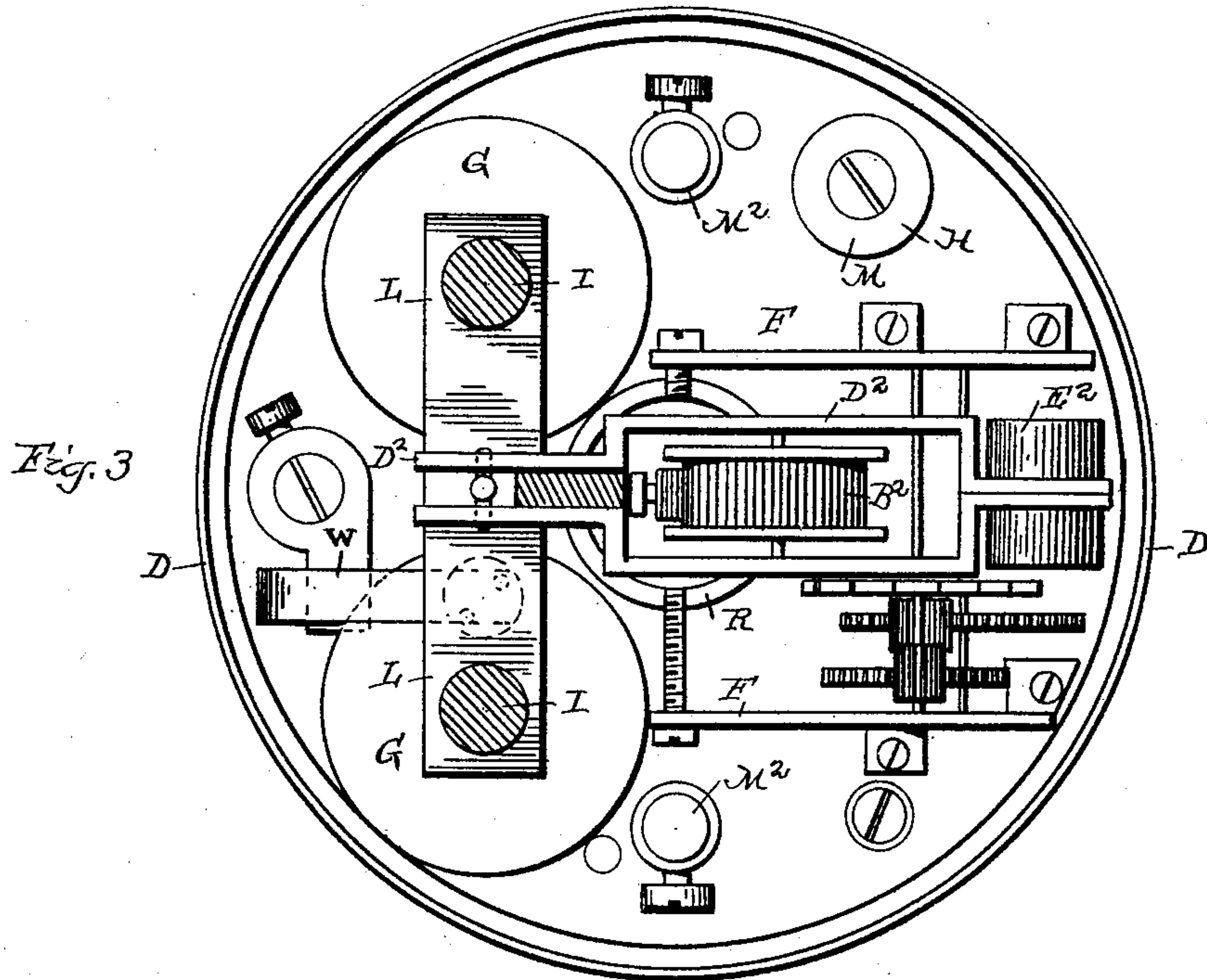
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UNITED STATES PATENT OFFICE.

CHARLES GRIFFITH YOUNG, OF NEW YORK, N. Y.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 451,101, dated April 28, 1891.

Application filed January 3, 1889. Serial No. 295,331. (No model.)

To all whom it may concern:

Be it known that I, CHARLES GRIFFITH YOUNG, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Electric-Arc Lamps, of which the following is a specification.

My invention relates to that class of electric-arc lamps in which carbon sticks or pencils are employed and a feed movement of the upper pencil or crayon is permitted as the carbons consume by the electric current. In constructing lamps of this character it has been usual to employ a tube extending upward from the lamp-case to provide a protection for a feed rod or carrier to which the carbon pencil or rod is attached.

One of the objects of my invention is to do away with this tube by so constructing the lamp as to render it unnecessary to employ a long rod or carrier for attachment of the carbon. By my construction I am enabled to produce a lamp shorter and smaller in every respect than the forms of lamp in ordinary use, while at the same time preserving the capacity of the lamp for use on ordinary arc-light circuits.

A further object of my invention is to provide a lamp which shall require no hood, but shall be absolutely weather-tight in all situations, and which shall further be equally adapted to indoor or outdoor use.

My invention relates, also, to the feeding and supporting mechanism for the carbon, the object in the construction devised by me being to secure a prompt and certain movement of the carbon in the operations of forming the arc, feeding, and compensating for fluctuations in the strength of current.

Other features of my improved lamp are the means for protecting and guiding the upper carbon as it feeds; the means for closing the top of the lamp-globe, so as to exclude insects and dirt; the construction of combined globe-holder and ash-cup, whereby the possibility of ashes falling out while the lamp either indoors or outdoors is in use is overcome; the special provision for hanging the lamp, and other features of construction whereby the appearance and the compactness of the lamp are improved, its action rendered certain and

regular, breakage of the carbon prevented, and facility of trimming attained.

The special features of improvement constituting my invention I will now proceed to describe in connection with the accompanying drawings, forming a part of this specification, and will then particularly specify in the claims.

In the accompanying drawings, Figure 1 is a vertical section through the upper portion of the lamp, part of the mechanism being shown in side elevation. Fig. 2 is a vertical section through the casing of the lamp, taken at right angles to that of Fig. 1, the mechanism being shown in edge view. Fig. 3 is a plan of the lamp mechanism, the parts being shown in cross-section on the line X X, Fig. 1. Fig. 4 is a vertical section through the globe, ash-holder, and protective cap of the upper portion of the globe, the other parts being shown in section.

A indicates the top plate of the lamp, provided with a hook B for hanging the same and with a depending flange or water-shed C exterior to the usual casing D, the upper end of which latter passes up beneath the flange C, so as to thoroughly protect the works of the lamp against the danger of wet or moisture introduced through the top of the casing. The plate A is preferably made of some metal and carries depending posts or rods of any suitable construction, which support the bottom plate E. Upon the plate E are mounted the magnets G and frame F, which carries the feed-regulating mechanism. The magnets G are the usual derived-circuit magnets of an electric-arc lamp. Magnets H, secured to a plate which is supported from or forms a part of the upper plate A, are the usual main-circuit magnets of the electric lamp, and serve, when the lamp is started, to lift the upper carbon to form the arc. The magnets H G are the usual double-spool magnets, each of which has a core I I or K K, such cores being connected by the usual or proper cross head or piece L.

At M is indicated a spool of plain platinum wire or other artificial resistance, which is thrown into a branch circuit when the lamp is thrown out of action after the manner well understood in the art.

The upper or positive carbon rod or pencil of the lamp is indicated at N. The carbon is supported by the usual clamping devices (indicated at O) from a weight P, of any suitable material, preferably a good conductor, which weight moves and is guided in a tube R, extending down, as indicated in Fig. 4, nearly to the upper edge of the lamp-globe S. The tube R not only guides the weight P, but protects the carbon pencil N from any possible breakage, and with the cap or cover plate T, passing or supported from its lower end, thoroughly covers the mouth of the globe S, so as to effectually prevent the introduction of dirt, insects, or other foreign matter. The rod R has a slot in its side, as indicated at V, through which passes the clamping-screw for securing the upper carbon N to its holder. The clamping-screw is provided with a proper handle W, as indicated, and said screw, in connection with the slotted tube R, serves to prevent the turning of the weight V and the carbon rod as they feed downward. The inner surfaces of the tube are large, and may serve to assist in conveying the electric current to the weight and carbon-lamp, provided said weight be made to slide rather closely in said tube. The surfaces, being thoroughly protected, are not affected by dirt, as is commonly the case.

The carbon rod and weight P are sustained by a band or ribbon A², which passes vertically up over a movable pulley B² and returns downwardly upon the opposite side of said pulley to connect with a drum C², that is relatively fixed, and is for such purpose mounted on a frame-work F below the pulley. The band or ribbon is wound upon said drum. The band or ribbon A² is made of copper in order to form an excellent connection to the positive carbon of the lamp and to give flexibility in positions where the lamp is subjected to jar, thus causing a much steadier operation of the light. The pulley B² is mounted to turn in a lever D², provided with the usual retracting-weight E² and connected by a rod F² with the cross-bar L, to which the cores of the magnets are secured. The lever D² sustains the relation to the mechanism of the ordinary carbon-lifting or arc-forming lever in electric-arc lamps, inasmuch as when said lever is lifted or turned by the action of the main-circuit magnets it serves to raise the upper carbon-carrier to form the arc and also determines the position of the carbon-carrier when the lighting-current fluctuates in strength.

The drum C² connects by a suitable reducing-gear train mounted in the frame F with a detent-wheel G², a detent of which, also mounted in the frame, is indicated at H². The position of the detent-lever and its engagement with the detent-lever B² are determined by the position of the lever D², which by means of a depending rod or arm I² may engage with the heel or extension of the detent-lever H². When no current is passing

through the lamp, the weight of the cores for the magnets depresses the lever D² and raises the detent H² out of engagement with the detent or stop wheel, thus permitting the drum C² to revolve freely and allow the weight D to fall, carrying with it the upper carbon into contact with the lower carbon.

It will be understood that the lamp mechanism is connected with the positive pole of the circuit, as usual in the art, so that current is conveyed to the weight P through the strap or ribbon A². In the operation of the lamp the lever D² is raised at the start, and, lifting the pulley B², raises the weight P and the upper carbon. At the beginning of the movement of the lever it may move a short distance before the lifting movement takes place, inasmuch as a little movement is required before the arm I² frees the detent H² sufficiently to engage with or stop the rotation of the wheel G². Until this occurs the band A² will be wound off of the drum C². When, however, the movement of the lever D² is carried sufficiently far to stop the wheel G², then the end of the ribbon which is connected to the drum being held fast the pulley will rise and lift the weight P. The movement produced under this condition of the parts will obviously give a double motion to the weight P after the well-known principle of a movable pulley. In the same manner the lowering of the weight and carbon will take place at double the speed of the pulley when the current fluctuates. Hence there is produced a quick movement of the parts both in establishing the arc and in feeding downward or in compensating for fluctuations of the current, and a quick and reliable action of the devices is the result.

After the establishment of the arc the derived-circuit magnet G gradually acquires a superior power, as well understood, and lowers the lever D², thus compensating for the burning away of the carbons until finally the detent H² frees the detent-wheel G², and the weight P is free to feed the carbon downward. In practice I make the weight of the part P and the carbon-clamping devices O very large in proportion to the greatest weight of the carbon pencil. By this means I more readily overcome any slight friction, and I moreover obtain a length of arc which is practically the same during the whole period of burning, inasmuch as the differences in weight of the combined carbon and attached parts is proportionately very little less after the carbon is burned out than it is when the carbon is complete. Hence no practical change in the adjustment of the lamp occurs during operation, as is the case with many forms of lamp where the differences in the weight upon the carbon-sustaining lever at different times give rise to a disturbance of adjustment and an increase in the length of arc as the carbon rod wears away.

It will of course be understood that the drum C² is provided with any ordinary take-

up spring for winding up the slack of the ribbon when the weight and the carbon-holder or clamp are raised at the time of the insertion of a fresh carbon.

5 The rods which sustain the lower carbon are indicated at I^2 , and are attached at their upper ends to the top plate A in any suitable or proper manner. These rods pass down within the lamp-globe S, as indicated
10 in Fig. 4, so that contact of the globe with the carbons is entirely prevented.

The wires which lead current to the lamp are connected to the binding-posts K^2 K^2 , mounted in the lower plate of the lamp in any
15 proper manner. One of these binding-posts, which is the positive binding-post of the lamp, is in electrical contact with the lower plate and frame of the lamp, as usual in the art. The other, which serves for the attachment
20 of the negative wire, is insulated from such plate.

When the lamp is suspended by the hook B out of doors, the circuit or leading wires to the lamp are carried down the outside of the
25 tube or casing and are attached to the binding-posts K^2 K^2 in the usual manner. Being supported under the lamp, they may be protected from injury and may be readily inspected. The casing D is preferably continued
30 downward below the lower plate to assist in this protection.

When it is desired to suspend the lamp in a room, for instance, directly by the wires conveying current thereto, I pass such wires down
35 through openings in the top plate A and attach them to binding-posts M^2 M^2 , also supported on the lower plate of the lamp and corresponding to the posts K^2 K^2 . In fact, the binding-posts may be upon opposite ends of
40 the same spindle, as clearly shown. The wires pass through the upper plate A through openings which are normally closed tightly by blocks or plugs L^2 L^2 . These blocks or plugs are kept in place when the lamp is used out
45 of doors, so that the lamp is thoroughly protected from moisture. When the lamp is to be used indoors, all that is required is to remove the blocks L^2 L^2 and introduce the supporting-wires through the openings, so that
50 they will be out of sight.

The lower-carbon holder is of any suitable construction, and is supported by the cross-bar P^2 , connecting the rods A^2 .

The ash cup or receiver is indicated at R^2 , and is supported from the cross-bar P^2 by a
55 bayonet-joint, catch, or other device, the pins of which are indicated at S^2 . The ash cup or receiver likewise supports the globe S, as clearly shown, the lower edge of the globe
60 resting upon an annular seat or flange T^2 and being secured in place by the usual screws or pins. The ash-cup is thus thoroughly closed at its top by the globe, and the possibility of the ashes blowing out by becoming displaced
65 while the lamp is in use is entirely avoided. It will be seen, further, that on removing the

ash-cup the globe is removed with it, thus facilitating the operation of trimming.

By my construction I am able to make a lamp that is from fifteen to eighteen inches
70 shorter than the usual forms of arc lamps.

By using a current of four or five ampères common twelve-inch carbons will last about twelve hours, so that it is possible to do away with the ordinary double or duplex lamps.
75

For the purpose of automatically cutting out the lamp in case the carbon should fail to feed or in case the main-circuit magnet should lose its power, so that its core will fall
80 away, I provide the cut-out spring, (indicated at W,) which is arranged in the path of the cross-bar L and is supported upon a post of the lamp, as shown. The cross-bar L being
85 connected to the positive wire of the lamp and the spring to the negative side of the lamp through the resistance M, it is obvious that the closure of the contact will cut out
90 the lamp and substitute a resistance therefor, thus preserving the circuit for other lamps used in series with the lamp cut-out.

What I claim as my invention is—

1. In an electric-arc lamp, the combination, substantially as described, with the upper carbon, of a movable pulley, a lever carrying
95 said pulley and connected with the lifting-magnet of the lamp, a drum mounted on stationary supports below the pulley, a detent-wheel geared to said drum, and a supporting band or ribbon connected at one end to the
100 upper carbon and passing around the movable pulley to the stationary drum, the two parts of the band on opposite sides of the pulley being substantially parallel, as and for the purpose described.

2. In an electric-arc lamp, the combination,
105 substantially as described, with a carbon for the lamp, of a movable pulley, a lever or support therefor connected with the lifting-magnet of the lamp, a stationary take-up drum, a band or ribbon connected to the carbon of
110 the lamp and passing around the movable pulley to the stationary drum, the two parts of the band on opposite sides of the pulley being substantially parallel, and a detent-wheel geared to said drum, as and for the pur-
115 pose described.

3. The combination, in an electric-arc lamp, of an upper-carbon carrier, a weight P, to which the carbon is attached, a ribbon or band at-
120 tached at one end to said weight and passing up over a movable pulley which is carried by a lever actuated by a magnet of the lamp, a stationary take-up drum mounted below said lever and having the end of the ribbon oppo-
125 site that connected to the weight wound upon it, and a detent for the drum, controlled by said lever.

4. The combination, with the carbon-carrier, of a movable pulley mounted on the arc-forming lever, the sustaining-band passing
130 up from the carrier, over said pulley, and down upon the opposite side, an independent drum

mounted independently of the movable pulley, upon which drum said band is wound, a detent-wheel connected to the drum, and a detent for said wheel, controlled by the lever 5 which carries the movable pulley.

5. In an electric-arc lamp, the combination, substantially as described, of binding-posts supported beneath the lower plate of the lamp, a top plate for the lamp, having openings over 10 the lamp mechanism normally closed by removable plugs or stoppers, and binding-posts within the lamp for the attachment of wires passed through said openings.

6. In an electric-arc lamp, the combination, 15 substantially as described, of a weight P, sustaining the upper carbon of the lamp, a pulley B², mounted on lever D², a take-up drum C², mounted on the frame of the lamp independently of the pulley B², a cord or band A², 20 attached at one end to the weight P and passing over the pulley and attached at its opposite end to the take-up drums C², mounted

below the pulley B², a detent-wheel geared to the drum, and a detent therefor engaged by an arm or projection from lever D². 25

7. The combination, substantially as described, in an electric-arc lamp, of a carbon carrier or support, a tube R, forming a guide and protection for the same, a plate T, attached to the lower end of said guide, a cover-plate 30 for the lamp, carrying rods or posts I², suspended from the top plate outside of the lamp-casing and independently of such casing and the base-plate and extending down through the plate T, and a globe supported from the 35 bottom of said rods I² and having its upper end arranged to meet the plate T.

Signed at New York, in the county of Westchester and State of New York, this 7th day of November, A. D. 1888.

CHARLES GRIFFITH YOUNG.

Witnesses:

W. M. NORTON,

C. F. PURDY.