

(No Model.)

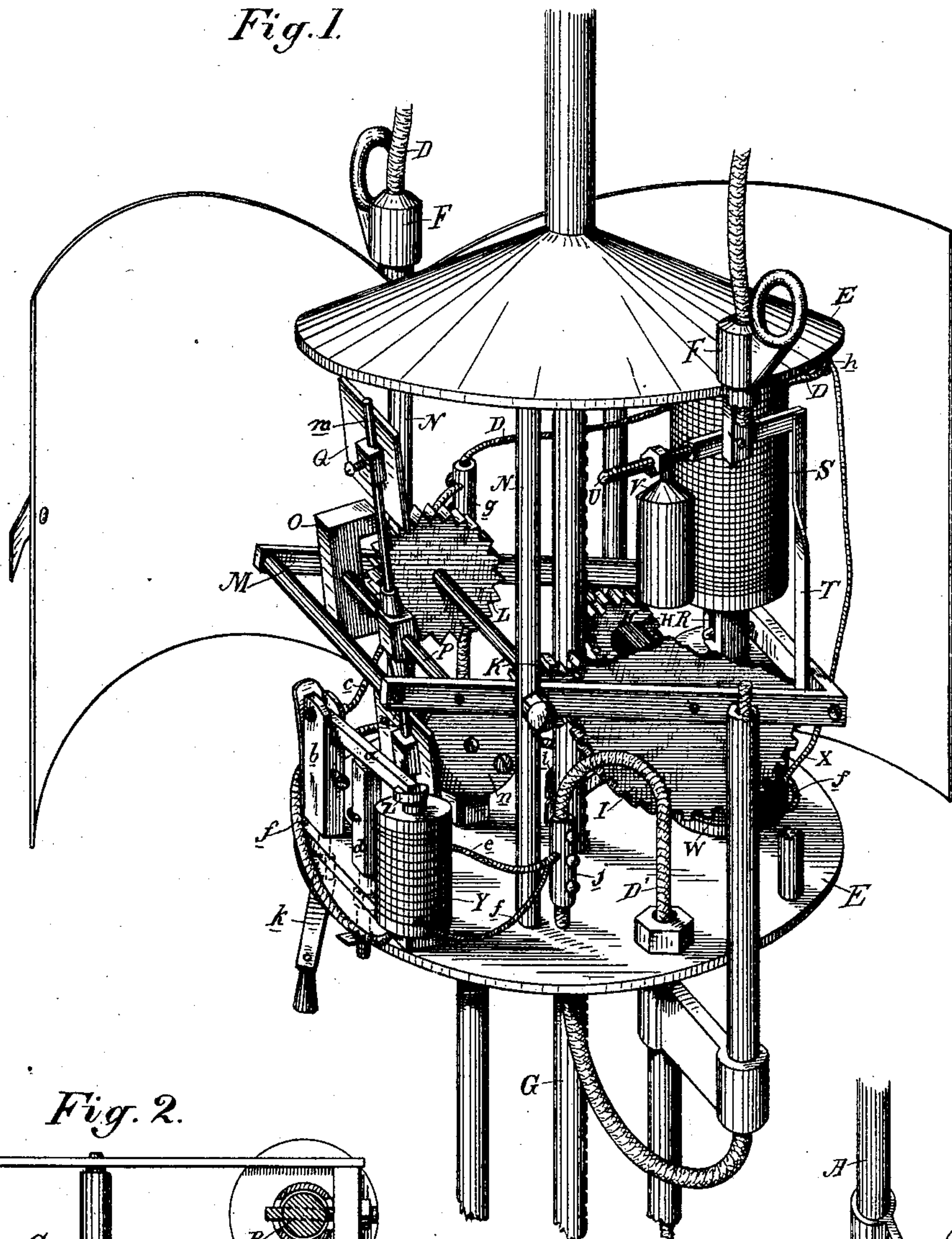
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G. A. WIESE.  
ELECTRIC ARC LAMP.

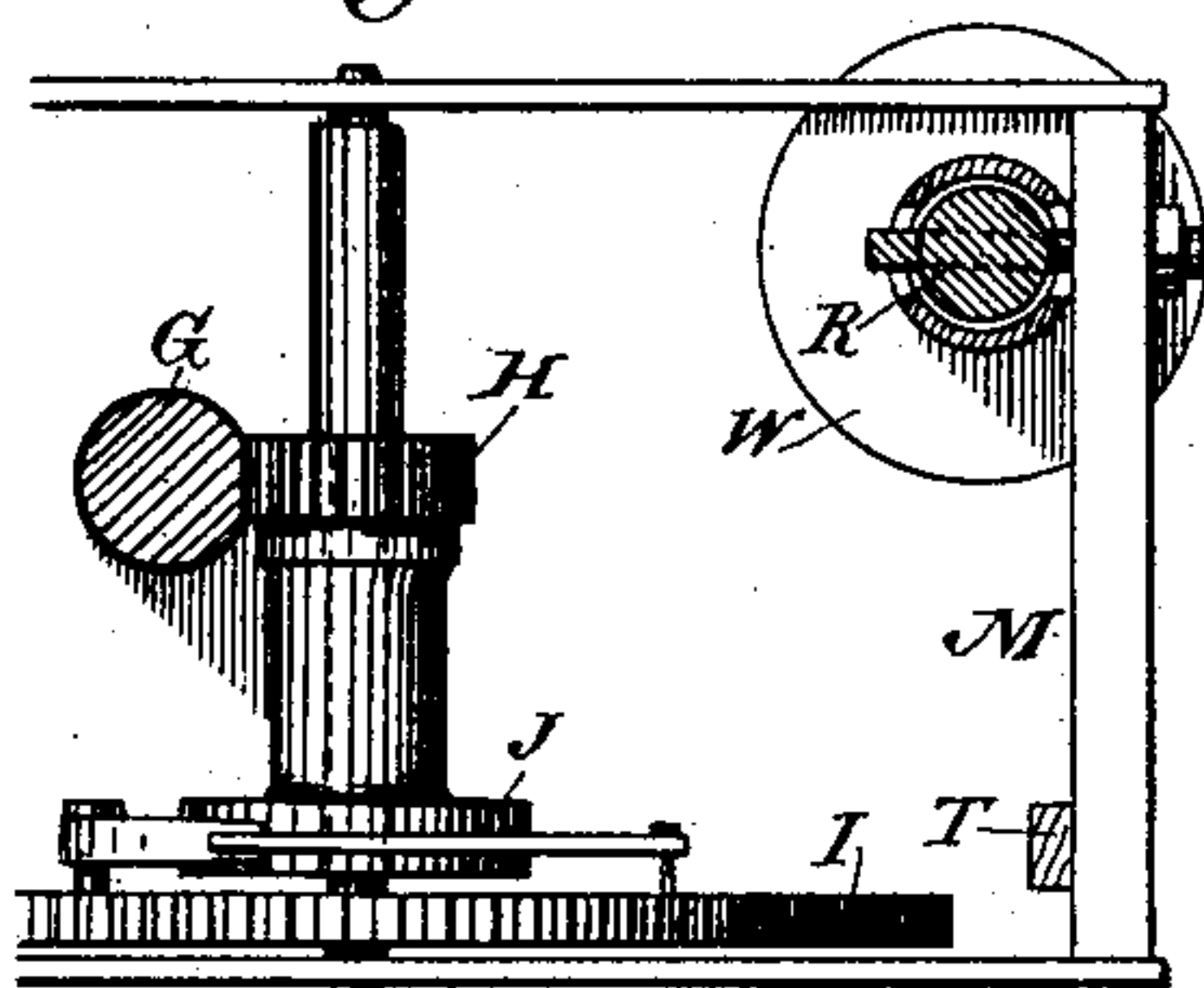
No. 361,663.

Patented Apr. 19, 1887.

*Fig. 1.*



*Fig. 2.*



Witnesses,  
Geo. H. Strong.  
J. H. House

Inventor,  
G. A. Wiese  
By Derwent Co. atty

(No Model.)

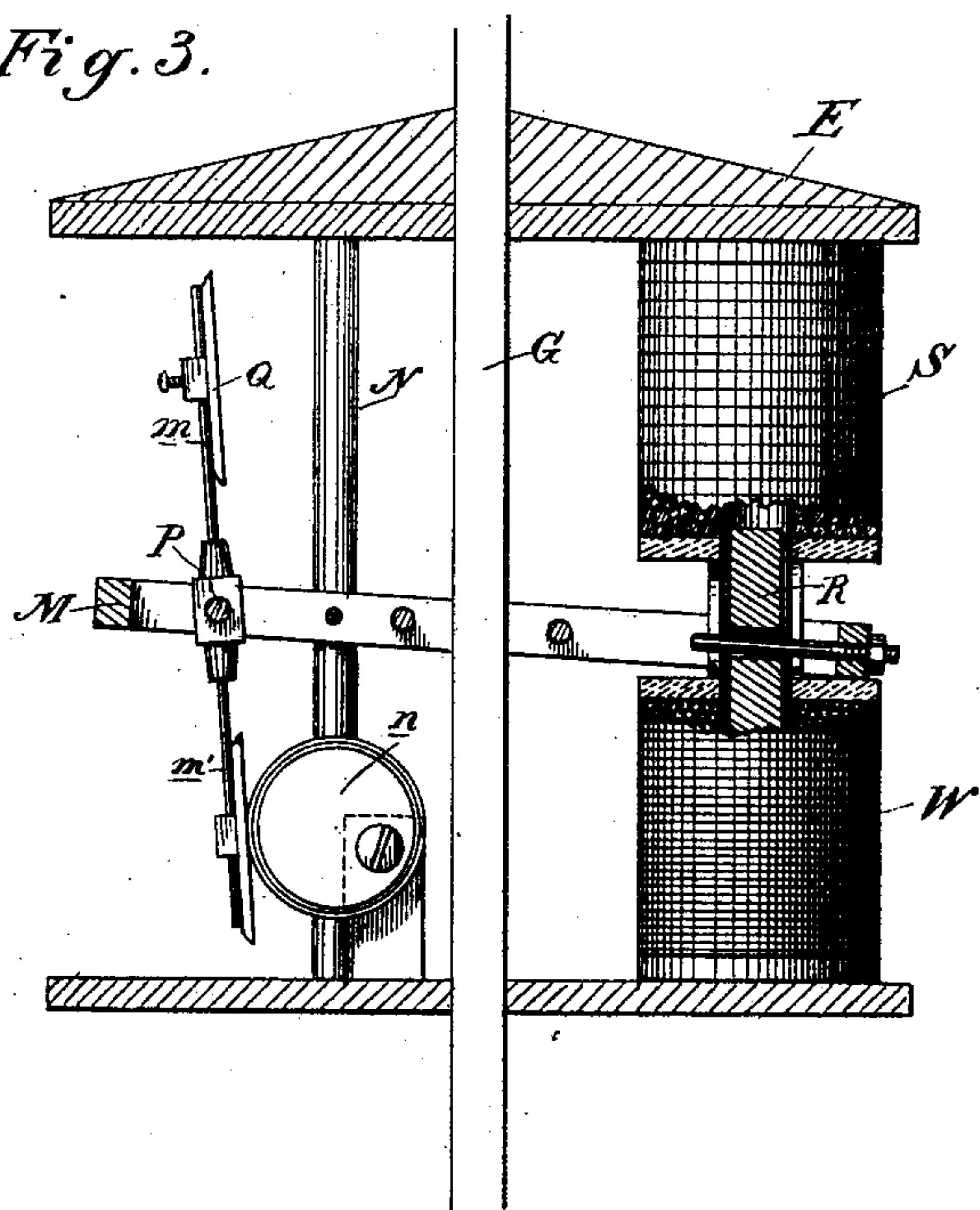
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*Fig. 3.*



Witnesses,  
Geo. H. Strong,  
J. H. Stone.

Inventor,  
G. A. Wiese  
By Dewey & Co.  
attys



# UNITED STATES PATENT OFFICE.

GUSTAV A. WIESE, OF SAN FRANCISCO, CALIFORNIA.

## ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 361,663, dated April 19, 1887.

Application filed November 27, 1886. Serial No. 220,096. (No model.)

*To all whom it may concern:*

Be it known that I, GUSTAV A. WIESE, of the city and county of San Francisco, State of California, have invented an Improvement in Electric-Arc Lamps; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to certain improvements in electric-arc lamps; and it consists in the construction and combination of devices, which I shall hereinafter fully describe and claim.

Figure 1 is a view of the lamp with the mechanism attached. Fig. 2 is a transverse section of the positive carbon, carrying-rod, pinion, gear, and pawl and ratchet. Fig. 3 is a section showing the oscillating arms of the escapement and the adjustable stop, also the magnets and frame M.

A A are the side rods of an electric-arc lamp, having the lower ends united by the yoke B, from the center of which a socket, C, arises, within which the lower or negative carbon is secured by a set-screw; and D' is the negative wire connecting with this carbon, and it is led, for convenience, through one of the hollow side rods, A, up through the plate E of the regulating mechanism, being carried from thence upward and outward through the suspending-rod F, so as to be connected with the circuit in the usual manner.

Upon the lower plate or table E to which the side rods, A, are secured, is supported the regulating mechanism. Through the center of this plate the rod G slides freely, the lower end being provided with a socket to receive and hold the upper adjustable or positive carbon of the arc.

One side of this rod has rack-teeth, which engage with corresponding teeth of a pinion, H, upon the horizontal shaft of the gear-wheel I. This pinion turns loosely upon the shaft, and is connected by means of a pawl and ratchet, J, with the gear-wheel I, so that when the weight of the carbon-suspending rod is brought upon the pinion it causes the latter and the gear-wheel to rotate, and when it is desired to slip the rod up it is pushed up, and the pinion will rotate independently of the gear-wheel by turning loosely upon the shaft.

The gear-wheel I engages with a pinion, K,

upon the shaft of the escapement-wheel L. The shafts of all these wheels are journaled in the sides of a frame, M, which is pivoted between two vertical posts, N, extending between the upper and lower plates E. The pivot-points about which this frame moves are situated just behind the shaft of the escapement-wheel, so that the frame may be moved up and down about the points. O is the escapement which engages the teeth of the wheel L, the escapement being fixed upon a shaft, P, which is also journaled in the frame M, but upon the opposite side of its fulcrum from the shafts of the gear-wheel I and the escapement-wheel L.

Arms *m m'* extend vertically upward and downward from the shaft P, the upper one having an adjustable weight, Q, fixed upon it, so as to regulate the speed at which the escapement moves, while the lower one engages an eccentric or stop, *n*, when it is desired to stop the movement of the escapement.

The outer end of the frame M has a cross-bar connected with the soft-iron bar or core R, which extends vertically upward into the coil S and downward into the coil W, hereinafter described, these coils being rendered temporarily magnetic when the current passes through them.

T is an arm extending upward from the frame M, and U is a lever fulcrumed to the upper plate E of the apparatus, having one end connected with the arm T, and having an adjustable weight upon its opposite end, so as to partially counterbalance the weight of the frame and the gear-wheels upon it. The weight V may be moved upon the lever U, so as to adjust the weight to the power which it is desired that the magnet shall have before moving the frame.

The operation of this device will be as follows: When the frame stands in its normal position, the escapement and escapement-wheels, the shafts of which are upon opposite sides of the fulcrum of the frame, will stand with such relation to each other as to act to allow the upper positive carbon-holding rod, G, to move downward by the action of the escapement and the connected gearing before described. As the upper carbon approaches the lower one and shortens the arc the resistance of the cur-



rent of electricity is decreased and a larger volume passes through the main coil S, and, acting thus to draw the soft-iron bar upward into the coil, it raises the outer end of the frame M, turning it about its pivots, so that the shaft of the escapement-wheel is raised relatively to the pivot of the frame, while the shaft of the escapement-pawl O is depressed until the arm *m'* strikes the adjustable stop *n*, so that no further action can take place and the downward movement of the upper carbon is arrested. As soon as the carbon is wasted away, so that the arc is again increased and the tension of the current is also increased, an increased portion of the current will flow through the coil W, situated below the coil S, and by thus increasing its power it will act upon the core R and draw it down, moving the frame M and escapement mechanisms into position to again act and allow the positive carbon to descend. The weight of the frame M is counterbalanced by the weighted lever U, so that the varying power of the two magnets S and W will act upon the core R and move the frame M, as above described. The stop *n* is shown in the present case as an eccentric disk mounted upon a shaft, with a screw, by which it is adjusted to act with any desired movement of the escapement-carrying frame. In this manner the operation is kept up until it is necessary to again renew the carbon, which is done by simply slipping the rod G up to its highest point and introducing another. The coil of fine wire forming the electro-magnet W stands in line below the coil S, as before described, and has the wires X connecting with it from the main wires of the lamp, as shown.

Y is a small electro-magnet, having an armature, Z, fixed to a lever-arm, *a*, so as to stand just above the end of the electro-magnet Y. The outer end of this lever-arm is fulcrumed to a post, *b*, which has a wire, *c*, connecting it directly with one of the main wires of the lamp between its point of entrance into the lamp and the coil S, by which the device is regulated.

*d* is a post extending upward from the lower plate E to a point near the center of the lever *a*, but not forming a contact with the lever unless the armature is drawn down into contact with the core of the magnet. This post has a wire, *e*, extending from it to another one of the main wires, so that when the armature is drawn down a contact is made between the lever-arm *a* and the top of the post *d* and direct communication is formed between the positive and negative main wires of the lamp without passing through the carbons, and the lamp is thus cut out of the circuit. *f* are wires, one of which connects with the electro-magnet W and the other with the main wire D', these two wires *f* connecting with the coil or electro-magnet Y, and when by any reason the tension of the current becomes too great a sufficient portion of the current will pass through these wires to cause the

electro-magnet Y to act to draw the armature Z downward, thus producing a connection between the lever-arm *a* and the post *d* and through the wires *c* and *e*, forming a direct communication between the main wires of the lamp, thus cutting it out of the circuit automatically. The positive main wire D of the upper carbon enters the suspending-rod F and passes downward through it, and thence upward through the lower plate E of the apparatus and into a binding-post, *g*, from which the wire, *e*, for cutting out is led, as before described. Thence from this binding-post the main wire leads into and forms the coil S, which, with the finer coil W, operates the oscillating frame M of the escapement, and passes out to a screw, *h*, upon the upper plate E, from which, through one of the posts which unite the two plates E, the current passes, and thence through the elastic plate or brush *i*, the end of which rests against the positive carbon-carrying rod G. The negative wire D' for the lower carbon enters, as before described, through the opposite one of the suspending-rods F, passing downward through it, thence upward through the bottom plate E, and into a binding-post, *j*, from whence it passes downward through the side of the rod A, as before described. From the binding-post *j* the wire, *e*, for cutting out leads to the post *d*, as before described, below the plate. The posts *a* and *d* pass through the lower plate E of the device, and a switch, *k*, serves to unite them when it is desired to cut the lamp out of the circuit for any purpose without waiting for it to be done automatically.

The lamp here shown is an outdoor one, designed to have a cover or case; but an indoor lamp may be suspended from a central rod, and the main wires may lead directly into the lamp-case.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an electric-arc lamp, the lower stationary carbon and the upper movable one, with the controlling escapement, gearing, and pinion by which the rack carrying the upper carbon is allowed to move downward by gravitation, in combination with a frame horizontally fulcrumed, and having the escapement pivoted upon one side of its fulcrum and the escapement-wheel upon the opposite side, and an electro-magnet with which one end of the frame is connected, so as to be raised and throw the escapement out of action, substantially as herein described.

2. In an electric-arc lamp, the horizontally-fulcrumed frame having one end connected with the armature of the magnets, whereby it is raised or depressed by the varying resistance of the current, in combination with the vibrating escapement pivoted upon one side of the fulcrum about which the frame moves, the escapement-wheel with which it engages, journaled upon the opposite side of said fulcrum, and the eccentric or adjustable stop



against which the lower vibrating arm strikes to stop the movement of the carbon-carrying mechanism and the carbon when the latter has approached to a proper distance from the negative carbon, substantially as herein described.

5 3. In an electric-arc lamp, a frame horizontally fulcrumed, having one end attached to the armature of the magnets, by the varying resistance of which the frame is tilted about  
10 its fulcrum, the escapement-wheel journaled upon one side of the fulcrum, and the vibrating escapement pivoted upon the opposite side, with the eccentric or adjustable stop whereby the vibration of the escapement is arrested, in

combination with the horizontal lever-arm fulcrumed in the standard which depends from the upper plate of the casing, the link connecting one end of the lever with the fulcrum of the frame, and an adjustable weight, with the screw and set-nuts upon the opposite end  
20 of the lever, substantially as herein described.

In witness whereof I have hereunto set my hand.

GUSTAV A. WIESE.

Witnesses:

GEO. H. STRONG,  
S. H. NOURSE.