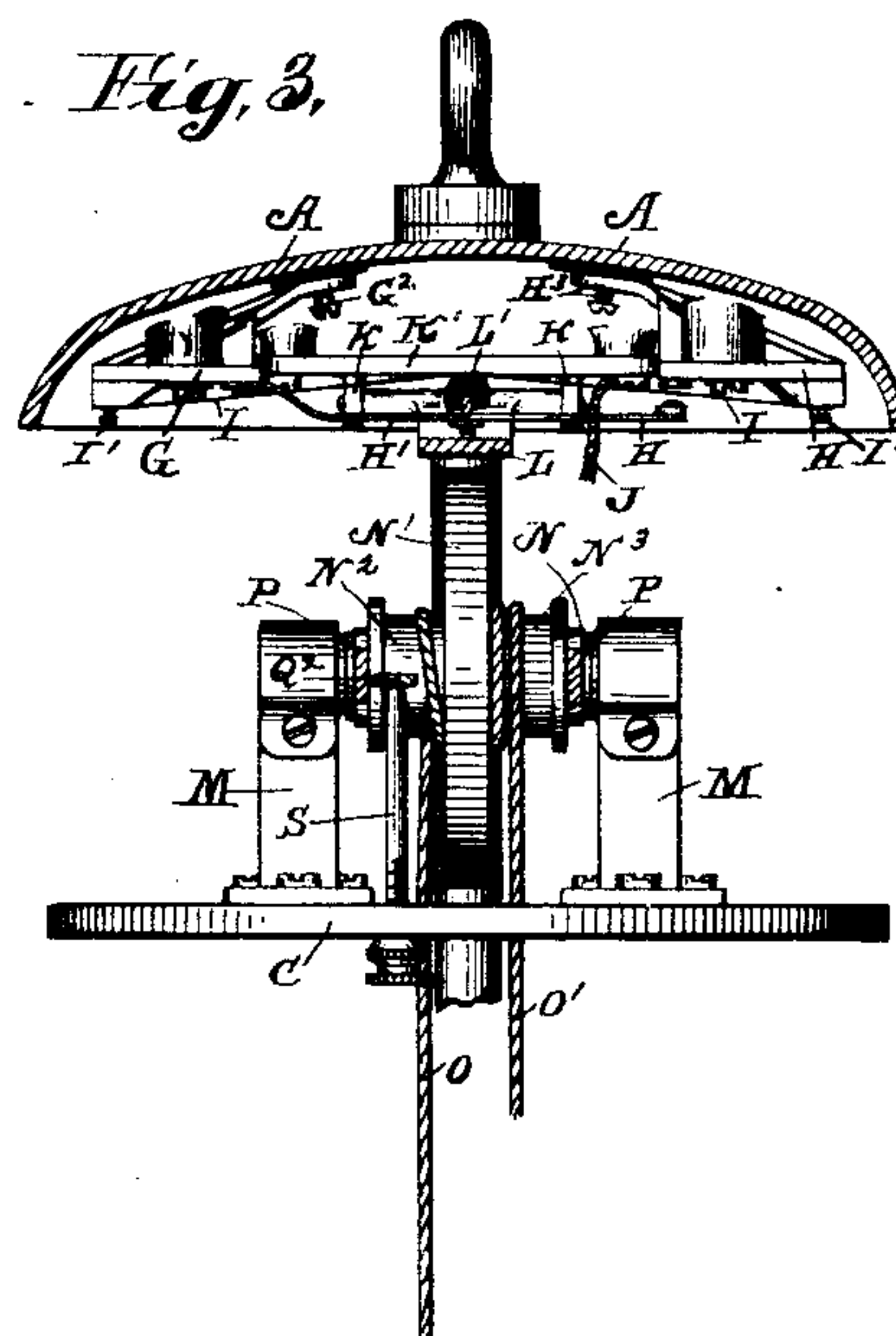
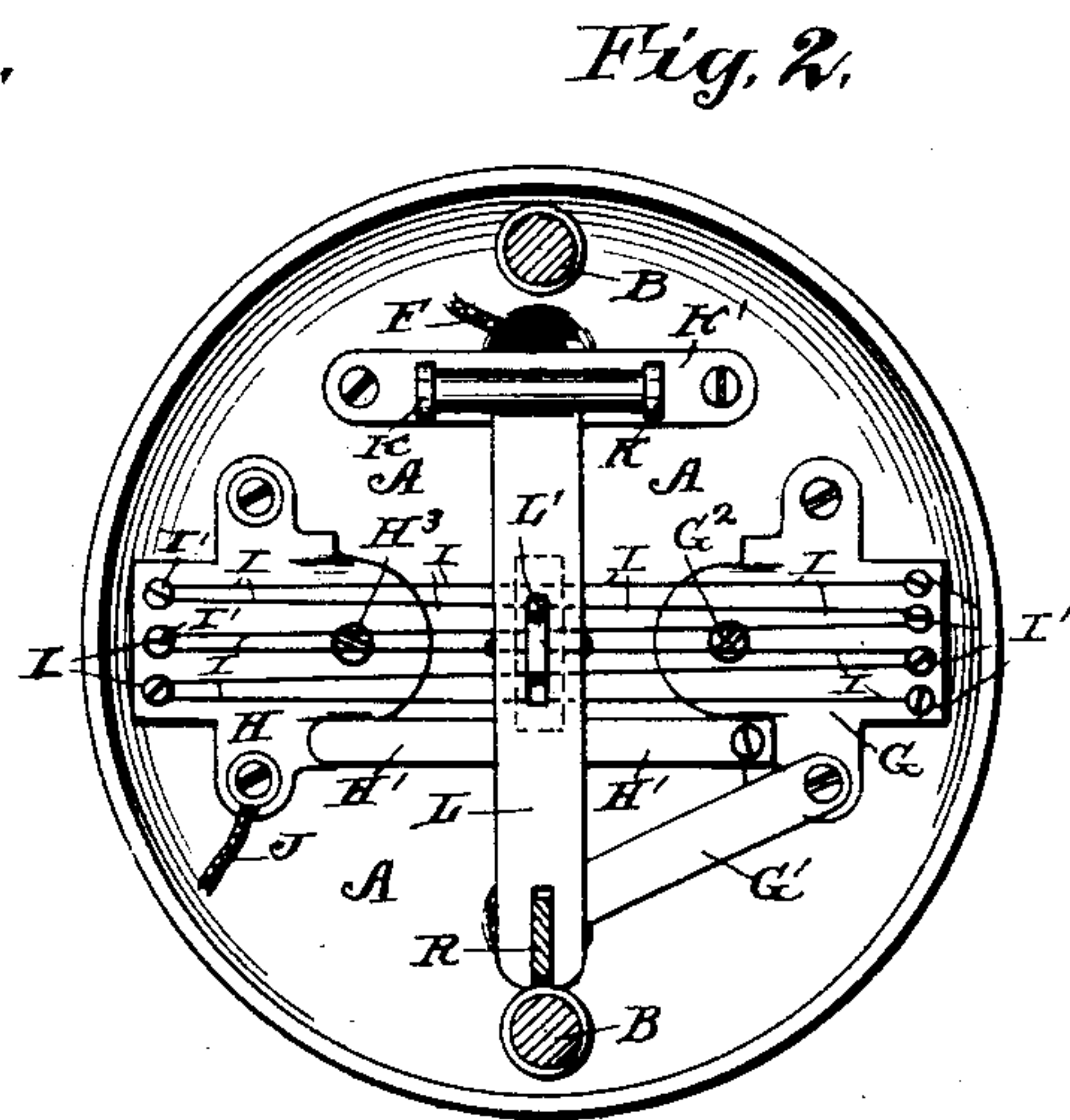
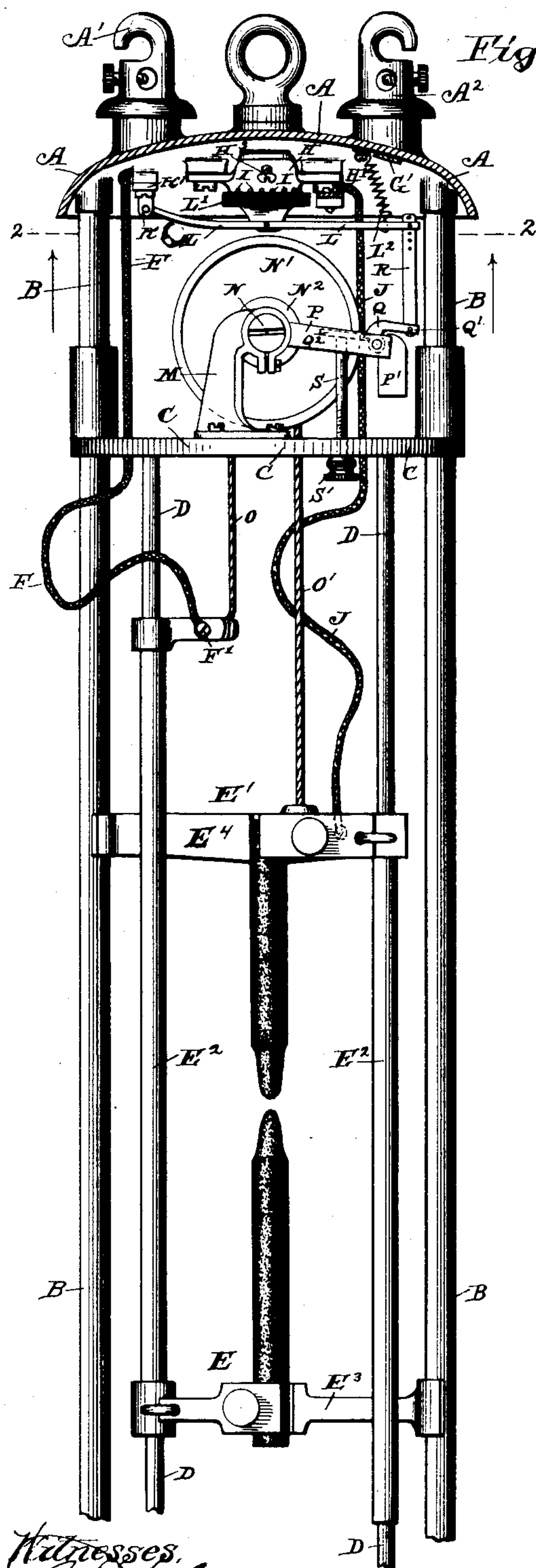


(No Model.)

S. E. NUTTING.
ELECTRIC ARC LAMP.

No. 542,490.

Patented July 9, 1895.



Witnesses,
J. H. Thompson
J. G. Smith

Inventor,
Samuel E. Nutting.
By S. M. Brainard
His Atty.

UNITED STATES PATENT OFFICE.

SAMUEL E. NUTTING, OF OAK PARK, ASSIGNOR TO GEORGE W. FURBECK
AND JOSEPH KETTLESTRINGS, OF CHICAGO, ILLINOIS.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 542,490, dated July 9, 1895.

Application filed September 8, 1894. Serial No. 522,413. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL E. NUTTING, a citizen of the United States, residing at Oak Park, county of Cook, State of Illinois, have
5 invented a new Improvement in Arc Lamps; and I declare the following to be a full, clear, and concise description of the same.

My invention relates to arc lamps wherein the feed of the carbons is controlled by the
10 action produced by the expansibleness of certain parts due to heat caused by the resistance to the current of electricity passing through that portion of the circuit. I dispense with the electromagnets and dash-pots
15 ordinarily used, thereby greatly simplifying the device, cheapening the construction, and greatly improving the efficiency of carbon-feeding mechanism.

Referring to the drawings, Figure 1 is a side
20 elevation of the main portion of an arc lamp embodying my invention, the top plate being in section in order to disclose the operative parts. Fig. 2 is a bottom plan view of the top plate, taken on the line 2 2, Fig. 1. Fig. 3 is
25 a view transverse to Fig. 1 and having the lower part of the lamp cut away.

Similar letters refer to like parts throughout the specification and drawings.

A is the top plate of an arc lamp. Depend-
30 ing from A and secured in suitable lugs are the side rods B. Secured upon the side rods B at a little distance below the top plate A is a circular plate C. Depending from the circular plate C and between the side rods B
35 are the insulated supplemental guide-rods D, having mounted thereon the carbon-carrying racks E E', said racks consisting of tubes E² telescoping the guide-rods D, and having secured thereon the cross-bars E³ E⁴, adapted to
40 hold the carbons. The top plate A is provided with suitable binding-posts A' A². Passing downwardly from the binding-post A' through the plate C to the carbon-carrying rack E is the flexible conductor F, secured at its lower
45 end to the rack E by means of the screw F'. Connecting the binding-post A² to the insulated cross-head G is a connector G'. Placed opposite the insulated cross-head G is a similar cross-head H. The cross-heads G H are
50 secured to and insulated from the top plate A. Passing from the cross-head G to the cross-

head H are a number of small wires I, consisting of one wire passed back and forth about the small screws I', secured in the cross-heads G H. In order to secure a proper tension to the
55 wires I, I have provided the inwardly-extending portions of the cross-heads G H with set-screws G² H³, said screws being adapted to tilt the cross-heads G H, so as to increase the distance between the points of attachment of the
60 wires I to the cross-heads G H, thus tightening the wires. Secured to the cross-head H by means of the screw H' is another flexible conductor J, said conductor passing downwardly through the circular plate C to the upper-car-
65 bon rack E', to which it is attached.

Pivoted between the depending lugs K of the plate K', secured on the under side of the top plate A, is a lever L. Pivotaly mounted
70 upon and about midway of the lever L is an insulated bridge L', upon which the cross-wires I rest. Interposed between the top plate A and the lever L, near its outer end, is a distended coil-spring L², said spring tend-
75 ing at all times to raise the lever L, thus keeping the bridge L' in close contact with the cross-wires I.

Mounted in suitable standards M upon the circular plate C is the shaft N, having secured thereon the brake-wheel N', provided on
80 either side with the drums N² N³, upon which are oppositely wound the depending cords or chains O O', said cords or chains being secured at their lower ends to the carbon-racks E E', respectively. Pivoted upon the shaft
85 N is the stirrup P, said stirrup having the brake Q pivoted therein, said brake adapted to engage the periphery of the brake-wheel N'.

Connecting the outwardly-extending arm Q' of the brake Q to the lever L is a link R,
90 said link being provided with a series of holes whereby a proper adjustment is secured. The outer end or loop portion of the stirrup P is provided with a weight P'. This weight is designed to insure the release of the brake
95 from contact with the brake-wheel N'. In order to properly adjust the brake Q, I have provided the stop S, extending upwardly from the circular plate C and having the check-nut S' thereon to secure the stop against
100 movement when properly adjusted.

By reference to Figs. 1 to 3 it will be seen

that the stop S comes in contact with a forwardly-extending arm Q^2 of the brake Q.

The operation of my invention will be readily understood.

5 It will be seen that the current of electricity entering the binding-post A' will pass downwardly through the flexible conductor F to the carbon-rack E, thence into the lower carbon, thence through the voltaic arc to the
10 upper carbon and rack E' , thence upwardly by means of the flexible conductor J to the cross-head H, thence through the wires I to the cross-head G, and finally to the binding-post A^2 through the connector G' . The current
15 in passing through the wires I, meeting more or less resistance, produces sufficient heat to expand the wires, the amount of said expansion being due to the strength of the current passing through the circuit. By reference to
20 Figs. 1 to 3 it will be seen that as the wires I expand the lever L will be raised by the contraction of the spring L^2 , interposed between the lever L and top plate A. Interposed between the lever L and the wires I is a
25 bridge L' , pivotally mounted to the lever L, in order that it may be automatically adjustable to the difference in the expansiveness of the wires. A small gage of wire is used because of its sensitiveness to variations of
30 temperature, thus securing to the lever L and connected parts a delicate and quick action.

My purpose in employing several parallel wires of small diameter and considerable length is to insure an almost instantaneous action of the feed mechanism, for it will be seen
35 that six small wires will expand approximately six times as rapidly as one wire equal in size to the six small ones.

I do not wish it to be understood that I
40 confine myself to a number of wires, as shown, but might employ a metallic ribbon to connect the fixed cross-heads and carry the current of the circuit of the lamp.

By reference to Fig. 1 of the drawings it
45 will be seen that the outer end of the lever L is connected to the rearwardly-extending arm Q' of the brake Q by a link R, adapted to rock the brake Q on its bearings in the stirrup P until said brake contacts with the
50 periphery of the brake-wheel, when further upward motion of the lever L and connecting parts will cause the brake-wheel N' to rotate upon its axis and impart a corresponding motion to the drums $N^2 N^3$, which in turn will
55 separate the carbons by actuating the carbon-racks through the winding of the cords or chains O O' upon the drums $N^2 N^3$.

When a perfect arc is secured, the wires I cease to expand, owing to a decrease in the
60 heat due to a less current traversing the circuit.

In order to prevent overheating of the wires I, I have provided a short-circuiting device H' , consisting of a suitable conductor secured
65 at one end of the cross-head G and so adjusted that when the lever L has moved upwardly a certain distance it will cause the opposite end

of the conductor H' to contact with the cross-head H and thus shorten the circuit and thereby relieve the wires I of excessive current, yet
70 in no wise interfering with or reducing the current supplied to the carbons.

External atmospheric temperatures will have little effect upon the wires I, owing to the fact that the cross-heads G H, to which the
75 wires are secured, are attached to the metal top plate A, which would be affected by any variation or change that might affect the wires. For example, if a lamp embodying the above-described construction be carried from a warm
80 room into a refrigerator the metal of the top plate A will contract nearly if not quite as much as the wires I, thus preserving nearly the same relation of parts under any or all conditions.
85

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

1. An arc lamp, having a carbon-controlling mechanism, consisting of an electrical conductor secured directly between fixed cross-heads, said conductor and said cross-heads suitably placed in the circuit of said lamp, means for stretching or tightening said conductor, and a movable part adapted to bear directly against said conductor all substantially
90 as set forth and shown.

2. An arc lamp having a carbon controlling mechanism consisting of a number of small parallel wires secured to fixed cross-heads
100 and placed in the circuit of said lamp, said wires adapted to expand and contract by the action of the temperature resultant upon the resistance to the current in passing through said wires, a lever placed transversely to said
105 wires, said lever adapted to bear against said wires midway between the points of attachment of the wires to the fixed cross-heads, said lever also adapted to respond to any action of the wires due to expansion or contraction,
110 and a suitable carbon actuating mechanism, all substantially as set forth.

3. An arc lamp, having a carbon controlling mechanism consisting of a suitable conductor secured at either end to fixed cross-heads and
115 placed in the circuit of said lamp, and a carbon actuating mechanism consisting of a spring actuated lever suitably connected to the brake and brake wheel and relative parts, said lever adapted to bear centrally against
120 said conductor and its part to be actuated thereby, all substantially as and for the purpose set forth.

4. In an arc lamp, a short circuiting device placed between fixed cross heads connected
125 by a thermo electric conductor, said short circuiting device adapted to automatically close and relieve said conductor of excessive current, all substantially as set forth.

SAMUEL E. NUTTING.

Witnesses:

JO. KETTLESTRINGS,
D. G. BUTTS.