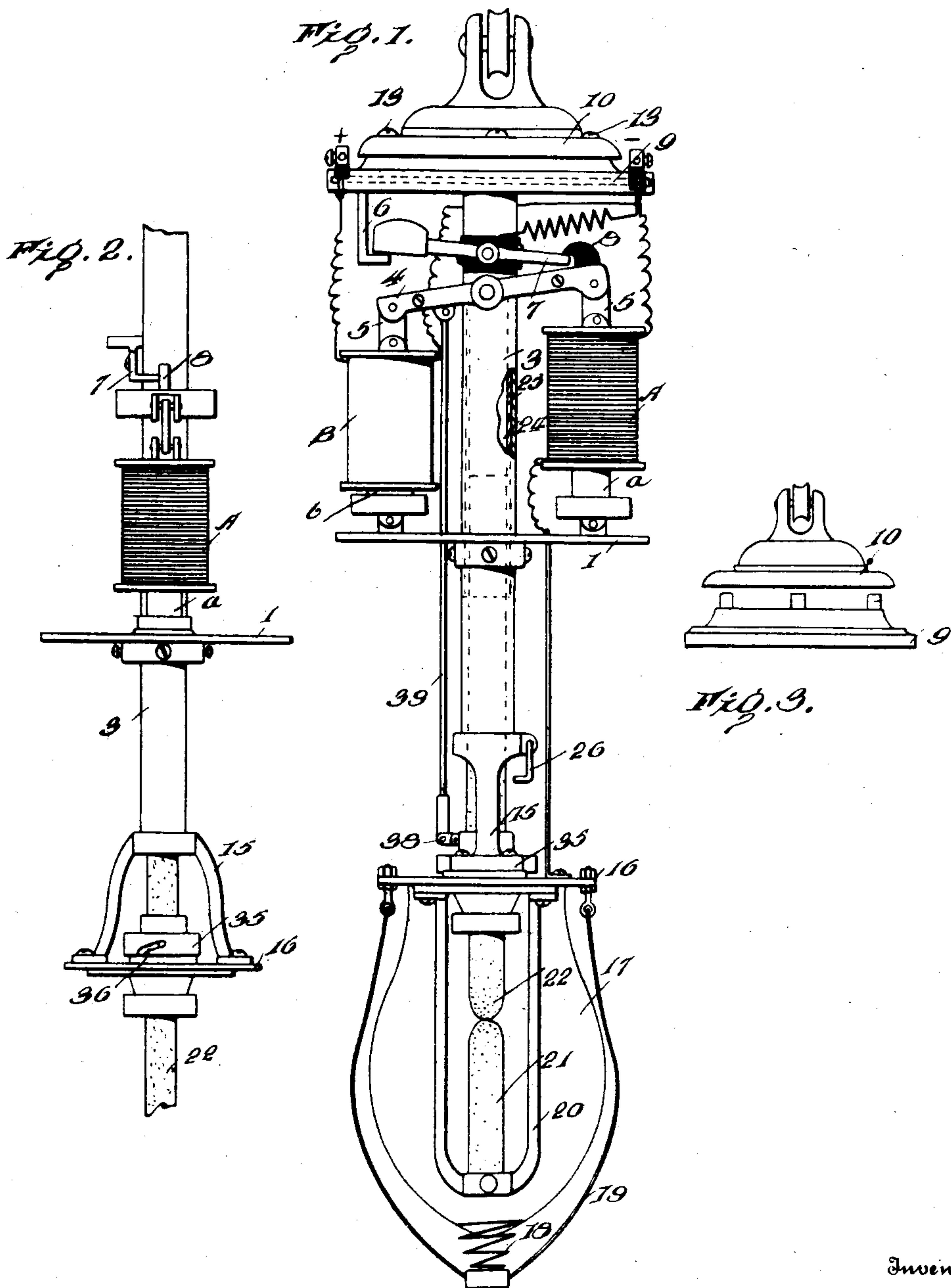


No. 869,914.

PATENTED NOV. 5, 1907.

G. M. LANE.
ELECTRIC ARC LAMP.
APPLICATION FILED MAR. 24, 1905.

2 SHEETS—SHEET 1.



Witnesses
J. M. Lane
W. A. Handson

Inventor
G. M. Lane.

By
R. A. Racy, Attorney

UNITED STATES PATENT OFFICE.

GEORGE M. LANE, OF LANOKA, NEW JERSEY, ASSIGNOR OF ONE-THIRD TO ORIAN F. LANE
AND ONE-THIRD TO DANIEL S. HOLMES, OF FORKED RIVER, NEW JERSEY.

ELECTRIC-ARC LAMP.

No. 869,914.

Specification of Letters Patent.

Patented Nov. 5, 1907.

Application filed March 24, 1905. Serial No. 251,821.

To all whom it may concern:

Be it known that I, GEORGE M. LANE, a citizen of the United States, residing at Lanoka, in the county of Ocean and State of New Jersey, have invented certain new and useful Improvements in Electric-Arc Lamps, of which the following is a specification

This invention appertains to electric lighting and to lamps of the arc type having a rectilinearly movable electrode fed by gravitative force and embodying an automatic cut out for shunting the lamp under abnormal conditions.

The invention aims to improve the general structure of the lamp and to render the feed controlling mechanism more sensitive, whereby the quality and character of the light is materially improved and flickering obviated.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result, reference is to be had to the following description and accompanying drawings.

While the invention may be adapted to different forms and conditions by changes in the structure and minor details without departing from the spirit or essential features thereof, still the preferred embodiment thereof is shown in the accompanying drawings, in which:

Figure 1 is an elevation of an electric arc lamp embodying the invention. Fig. 2 is an edge view of the lamp, the upper and lower portion being broken away. Fig. 3 is a detail view of the head of the lamp, the parts being separated. Fig. 4 is a vertical central section of the head of the lamp showing the arrangement of the parts when assembled. Fig. 5 is a vertical central section of the plate and adjunctive parts against which the upper end of the globe closes. Fig. 6 is a horizontal section on the line $x-x$ of Fig. 5. Fig. 7 is a detail perspective view of the sleeve for supporting the packing dogs. Fig. 8 is a top plan view of the vibrating lever. Fig. 9 is a diagrammatic view showing the direction of the current when the lamp is in operation. Fig. 10 is a view similar to Fig. 9 showing the relation of the parts and the direction of the circuit when the lamp is out of action.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings, by the same reference characters.

The mechanism for controlling the feed of the movable electrode is substantially the same as employed in arc lamps and comprises main magnet A and shunt magnet B. Each of the magnets comprises a solenoid and a core, the solenoids being movable, whereas their respective cores a and b are relatively fixed, being attached to the lower plate 1 of the frame. The upper

plate 2 of the frame is connected to the lower plate 1 in any determinate manner, preferably by means of the tube 3 in which the movable electrode and its holder operate. The vibrating lever 4 is preferably composed of similar parts, having their end portions brought together and their middle parts separated so as to receive the tube 3. The parts of the lever embracing opposite sides of the tube 3 are fulcrumed to the latter in such a manner as to insure movement of the lever upon slight disturbance of the equilibrium. The end portions of the vibrating lever are connected by links 5 to the respective solenoids to admit of the latter occupying a perpendicular position at all times. The solenoid cores a and b are pivotally connected at their lower ends to the plate 1 so as to move and adapt themselves to the solenoids A and B and preclude any possibility of binding between them which would detract from the sensitiveness of the feed mechanism.

A bracket 6 is pendent from the plate 2 and constitutes one terminal of the cut out, and a lever 7 fulcrumed intermediate of its ends to the tube 3 constitutes the other terminal of the cut out. The end of the lever 7 adjacent to the bracket 6 is weighted and the opposite end is connected with the vibrating lever 4 so as to move therewith. A hook 8 extends upward from one end of the lever 4 and overhangs the adjacent end of the lever 7 and upon abnormal downward movement of the solenoid of magnet B the lever 7 is moved so as to permit the weighted end to rest upon the bracket 6, thereby cutting the lamp out of circuit. Under normal conditions, the levers 4 and 7 occupy a position with the weighted end of the lever 7 elevated from the bracket 6, thereby interrupting the cut out circuit. The head of the lamp comprises ring 9 and cap 10. The ring 9 has a pendent flange which encircles the plate 2, and the cap 10 has its center portion raised to provide a chamber 11 and is provided with a pendent flange spaced from the approximately horizontal portion of the ring 9. Openings 12 are formed in the plate 2 to provide ventilation for the housing or casing, not shown, inclosing the working parts in the accustomed manner. Spacers 12 are interposed between the cap 10 and ring 9 and are connected to said cap by screws or like fastenings 13. Bolts or like fastenings 14 connect the plate 2, ring 9, and cap 10.

A spider or yoke 15 is provided at the lower end of the tube 3 and is connected to the plate 16 against which the upper end of the globe 17 closes, said globe being pressed upward by means of a spring 18 interposed between its lower end and the lower portion of a bail 19, pendent from the plate 16. A hanger 20 connected to the plate 16 supports the lower electrode or carbon pencil 21. The upper electrode or carbon pencil 22 passes through the plate 16 and enters the tube 3 and

is attached to a holder 24 having an opening 25 in its side to receive the bent end of a hook 26 pivotally connected to hook or spider 15 and adapted to fix the position of the holder when trimming the lamp. A
 5 ring 27 pendent from a plate 28 attached to plate 16 receives a sleeve 29 having transverse slots 30 in opposite sides in which are inserted packing dogs 31 of similar formation and having their inner ends notched to form an opening through which the electrode 22
 10 snugly passes. Pins 32 are supported at their ends to opposite sides of the sleeve 29 adjacent to the inner ends of the slots 30, and the dogs 31 are pivotally supported thereon and normally incline inward and downward, as shown most clearly in Fig. 5. A collar or
 15 gland 33 has its central portion entered into a vertical flange 34 surrounding the opening in the plate 16 through which the electrode 22 passes. The outer flange of the gland 33 overlaps the flange 34 and is adapted to be confined thereon by the inner flange of a collar 35
 20 fitted to the flange 34 and having bayonet slots 36 at opposite points to receive pins 37 extended outward from the flange 34. The gland 33 has a limited horizontal movement to adapt itself to the position of the electrode 22.

25 The binding post + is electrically connected with the frame of the lamp, whereas the binding post — is electrically insulated from said frame. The bracket 6 connected to the frame is in electrical connection with the binding post +. The solenoid of the electro-
 30 magnet B has one terminal of its helix electrically connected with the + binding post and its opposite terminal in electrical connection with the — binding post. The — binding post is electrically connected with the lever 7 and with one terminal of the helix of
 35 the electro-magnet A. The lever 7 is electrically insulated from the frame and from the lever 4, the connecting link 5 being of some dielectric material. The lever 4 is insulated from the frame as is also the spider or yoke 15.

40 Under normal conditions when the lamp is burning, the circuit is as follows: Starting from the + binding post, thence through frame of lamp, tube 3, electrodes 22 and 21, hanger 20, electro-magnet A to — binding post. Should the arc abnormally lengthen, or either electrode
 45 become broken so as to increase the resistance, the cur-

rent will be as follows: From the + binding post through electro-magnet B to the — binding post, and should the resistance in the circuit or path including the electro-magnet A exceed the resistance in the path including the electro-magnet B, the levers 4 and 7 will move un- 50
 til arrested by the free end of the lever 7 engaging with the bracket 6, when the lamp will be short circuited, *i. e.*, the current starting from the + binding post through bracket 6, lever 7 to the — binding post. When the lamp is in prime condition and the arc tends to lengthen, 55
 thereby increasing the resistance to the current through the electro-magnet A, a part of said current will be shunted through the electro-magnet B and attract its core *b* with the result that the lever 4 is moved to permit a lowering of the upper electrode 22, thereby shortening 60
 the arc. The variation to the resistance of the current through the electro-magnets A and B results in a proper feed of the upper electrode so as to maintain an arc of given length. A rod 39 connects one arm of the lever 4 with the feed dog 38 which grips the upper electrode 65
 and permits proper feed thereof according to the vibratory movements of the lever 4 determined by the shifting of the current from one electro-magnet A to the other in the well known manner.

Having thus described the invention, what is claimed 70
 as new is:

1. In an electric arc lamp, the combination of a plate having an opening for the passage of the movable electrode and provided with a ring surrounding said opening, a sleeve arranged within said ring and having transverse 75
 slots at diametrically opposite points, and dogs fitted in said slots and having their inner ends notched to snugly receive the movable electrodes.
2. In an electric arc lamp, the combination of a plate having an opening for the passage of the movable electrode 80
 and provided with a ring surrounding said opening, a sleeve arranged within said ring and having transverse slots at diametrically opposite points, dogs fitted in said slots and having their inner ends notched to snugly receive the movable electrode, and pins arranged transversely of 85
 the sleeve adjacent to the inner ends of the transverse slots and adapted to pivotally support said dogs.

In testimony whereof I affix my signature in presence of two witnesses,

GEORGE M. LANE. [L. S.]

Witnesses:

LOUIS R. ROSE,
 IRA C. SMOCK.