

E. J. GUAY.
MAGAZINE ARC LAMP.
APPLICATION FILED JULY 21, 1909.

1,062,907.

Patented May 27, 1913.

2 SHEETS—SHEET 1.

Fig. 1.

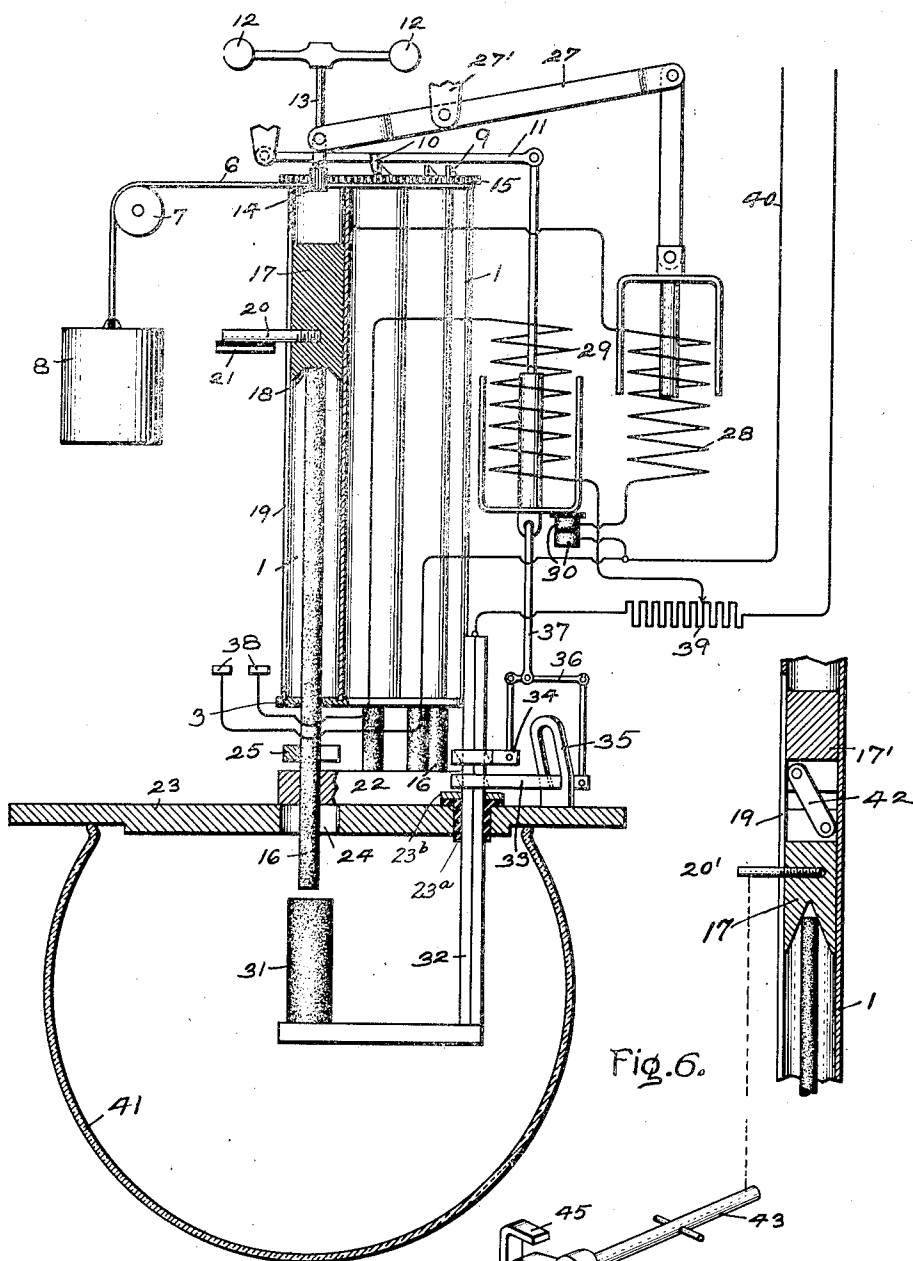
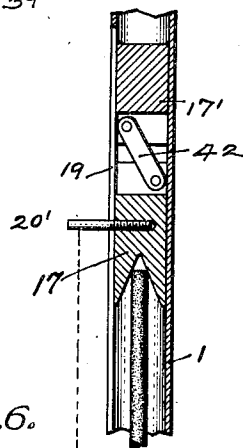
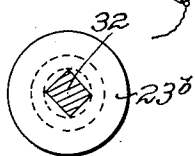


Fig. 6.



Witnesses:
M. Ray Taylor.
J. Ellis Chen

Fig. 7.



Inventor:
Emile J. Guay,
by *Alfred J. Davis*
Att'y.

E. J. GUAY.
MAGAZINE ARC LAMP.
APPLICATION FILED JULY 21, 1909.

1,062,907.

Patented May 27, 1913.

2 SHEETS-SHEET 2.

Fig. 2.

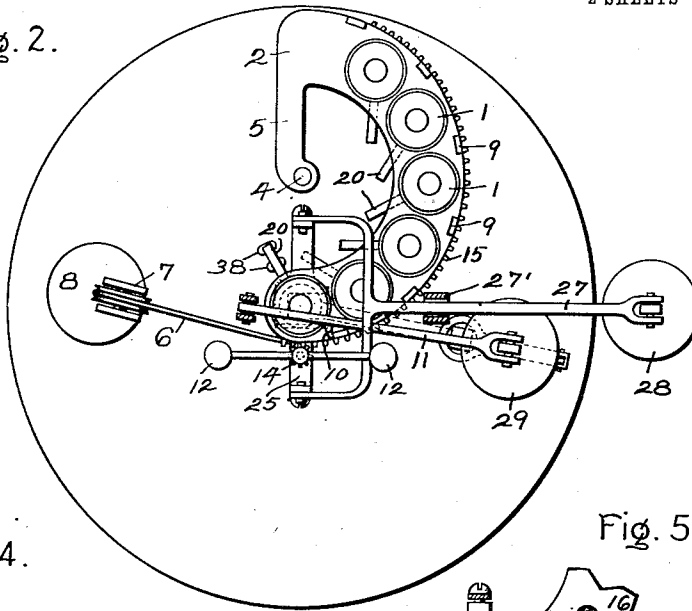


Fig. 4.

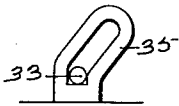


Fig. 5.

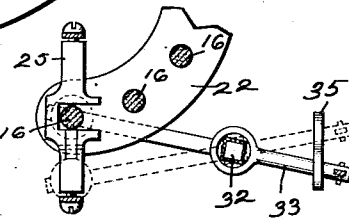
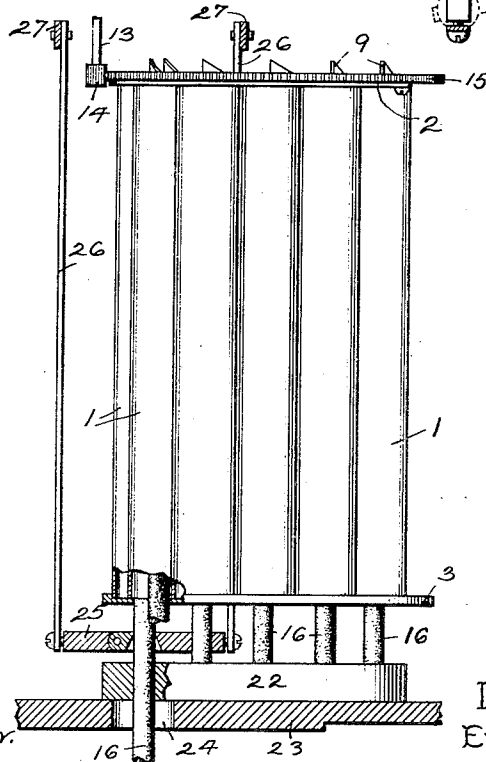


Fig. 3.



Witnesses:

W. Ray Taylor.
J. Ellis Ellis.

Inventor:

Emile J. Guay.

by *Alfred J. Davis*
Att'y.

UNITED STATES PATENT OFFICE.

EMILE J. GUAY, OF LYNN, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

MAGAZINE ARC-LAMP.

1,062,907.

Specification of Letters Patent.

Patented May 27, 1913.

Application filed July 21, 1909. Serial No. 508,789.

To all whom it may concern:

Be it known that I, EMILE J. GUAY, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Magazine Arc-Lamps, of which the following is a specification.

This invention relates to electric lighting, and especially to that class of arc lamps in which a plurality of electrodes are automatically fed in succession into operative position, so that the lamp will burn for many hours without needing attention at the hands of the lamp trimmer.

The object of my invention is to simplify the construction and render it compact and easy to inspect and repair, besides insuring reliability in operation and durability in service.

With these ends in view, I provide a single lower negative electrode of considerable size, and a plurality of upper positive electrodes smaller in diameter than the negative and carried side by side in a magazine which is laterally movable, so that said electrodes will be brought in succession into alinement with the lower electrode; the movement being effected automatically whenever an upper electrode has been burned down to a predetermined length. The movement of the magazine is preferably in a circular arc in order to render the lamp more compact. The magazine itself is therefore curved, and is provided with radial arms pivoted at the center of the circular arc. A weight or its equivalent constantly tends to turn the sector-like magazine, and an escapement is provided which permits it to move step by step as the electrodes are consumed, one after another. Just before each movement of the magazine, the lower electrode is drawn to one side to permit the unconsumed end of the old electrode to drop down into the globe or other receptacle.

In the accompanying drawings, Figure 1 is a view showing the lamp circuits diagrammatically and a part of the mechanism in elevation and vertical section; Fig. 2 is a top plan view; Fig. 3 is an elevation of the magazine; and Figs. 4, 5, 6 and 7 are details.

The drawings do not attempt to show the complete construction of the lamp, or the

actual arrangement of the parts, but merely illustrate the salient features in a manner conducive to easy understanding of the invention.

The magazine is composed of a plurality of cylindrical tubes 1 arranged side by side and preferably on a cylindrical curve. They are secured at their upper and lower ends to top and bottom plates 2, 3 which, if the magazine is curved, are segments of flat rings. The curve of the magazine is struck from a center 4 at which are located pivots for arms 5 extending radially from said magazine, so that it can rotate in a circle passing through the centers of the tubes 1. A cord 6 is attached to the magazine and passes over a pulley 7 to a weight 8 which thus tends to turn the magazine. Ratchet teeth 9 on the magazine are engaged by a detent pawl 10 on a lever 11 and serve to regulate the movements of the magazine, as hereinafter set forth. A pair of fly-balls 12 are mounted on a shaft 13 which has a pinion 14 meshing with gear-teeth 15 on the upper edge of the magazine. These balls act as a drag to limit the speed of movement of the magazine. The bottom plate 3 has a series of holes, each at the center of a compartment tube 1 and of suitable size to permit an electrode 16 to slide freely through it. In each tube is a weight 17, preferably having a socket 18 adapted to rest upon the upper end of the electrode and to feed it downward when required. Each tube has a longitudinal slot 19 to permit an arm 20 on said weight to project outside of the tube. The arm carries a bridging contact 21 for a purpose hereinafter set forth.

The lower ends of the several electrodes project through the holes in the bottom plate and rest on a stationary support, preferably a plate 22 supported on the platform 23. The plate and platform have registering holes 24 of a suitable size to permit an electrode to slide freely through them. Just above the plate 22 and below the magazine, is a clutch 25 for raising the electrodes, said clutch being open on one side so that each electrode can slide into it laterally as the tubes are brought one after another into line with the holes 24. The clutch is operated by rods 26 which pass up on each side of the magazine to a forked lever 27 which is pivoted to stationary support 27', and is at one end pivotally connected with the

movable core of the series solenoid 28. A shunt solenoid 29 has its core connected with the escapement lever 11. This latter core also carries one of two contacts 30 which control the circuit of the series solenoid.

The lower electrode 31 is much larger than any of the upper electrodes so as to have the same life as the entire group of said upper electrodes. The lower electrode is carried by a square upright rod 32 passing up through an insulated bushing 23^a in the plate 23. This bushing is provided with a circular opening through which the upright rod 32 passes and in which it can freely turn. A washer 23^b is provided with a squared opening which is adapted to fit snugly over the rod 32, and rests upon the bushing 23^a.

Two clutches 33, 34, engage said rod the former having a long lever-arm engaging with a stationary guide 35 which rises obliquely from the platform 23. Both clutches are connected to a bar 36 which is connected by a link 37 to the core of the shunt solenoid 29. The circuit of said solenoid is closed at the contacts 38 by the bridging contact 21 when an electrode has been consumed to such a point that the weight 17 has descended far enough to bring said contacts together. A portion of the steadying resistance 39 for the lamp is also included in the circuit of the shunt solenoid.

The operation is as follows: Current entering by the positive lead 40 passes by the contacts 30 to the solenoid 28 and draws down the lever 27, thereby clutching an upper electrode 16 and drawing the arc. The arc continues to burn until the clutch 25 is tripped when the upper electrode descends into engagement with the lower electrode, and the arc is again struck all in a manner well understood in the operation of any multiple lamp with a single regulating magnet. When the upper electrode has burned away enough to let the contact 21 bridge the contacts 38, the shunt solenoid 29 (whose circuit is of less resistance than that of the coil 28) is energized and lifts the escapement lever 11, releasing the detent pawl 10 from the tooth 9 and permitting the weight 8 to turn the magazine forward one step to bring the next compartment tube 1 in line with the lower electrode. The lifting of the core of the solenoid 29 breaks the lamp circuit at the contacts 30, thereby dropping the clutch 25 and releasing the electrode. It also lifts the rod 32, and the oblique guide 35 causes said rod to rotate at the same time, thereby swinging the lower carbon out from under the waste end of the upper electrode, which thereupon drops into the globe 41. After the lever-arm of the clutch 33 reaches the end of the guide, the clutch 34 continues to lift the rod 32 and raises it through the

clutch 33, thus giving the latter a new hold on the rod a little farther down, so that when the parts return to their normal position the lower electrode will have been raised to compensate for what has been consumed, and the arc will thus be kept at the same point in the globe. The turning of the magazine is damped by the fly-balls 12, so that when the circuit of the solenoid 29 is broken by the arm 20 moving away from the contacts 38, the escapement lever can drop and catch the next tooth 9. The dropping of the core of this solenoid also swings the lower electrode back into place in time for it to catch the fresh upper electrode as it slides down through the holes 24. At the end of the downward movement of said core, the contacts 30 are closed, reestablishing the lamp circuit.

Fig. 6 shows a modified weight or follower for the upper carbon designed to give a good contact with the tube 1 and cooperating with a modified form of circuit closer of the contacts 21 and 38 shown in Fig. 1. The weight consists of two portions 17 and 17', one above the other, connected by a diagonal link 42 which causes the two portions to crowd against opposite sides of the tube and insure a good sliding contact therewith. This is an important feature, as the construction forbids the use of flexible cables to carry the current to the electrodes. The projecting arm 20' of the weight cooperates with a lever 43 which is arranged to be struck and tilted by said arm. The opposite end of the lever 43 carries a loose bridging contact piece 44 insulated from the lever and adapted to close against the contacts 45 when the lever is tilted.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative, and that the invention can be carried out by other means.

Having now fully described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. A magazine arc lamp having a plurality of tubes grouped in a segment of a circle, a gravity feed electrode in each tube which is free to drop therefrom, a single lower electrode, means for moving said magazine step by step and for simultaneously moving the lower electrode laterally out of alinement with the upper electrode at each step by step movement, a clutch for separating the upper electrode from the lower, and means for rendering said clutch inoperative after the lower electrode is swung to one side in order to permit the spent electrode to drop from its tube.

2. An arc lamp having a rotatable magazine comprising a plurality of tubes grouped in a segment of a circle, a gravity-feed electrode in each tube, means for rotating said magazine, a pawl and ratchet escapement therefor, and means comprising a shunt solenoid for controlling said escapement.

3. An arc lamp having a rotatable magazine comprising a plurality of tubes grouped in a segment of a circle, a gravity feed electrode in each tube, a single lower coöperating electrode, means for rotating said magazine, a pawl and ratchet escapement therefor, a series magnet and mechanism responsive to the energization of said magnet for separating the upper electrode from the lower, a shunt magnet and means operatively connected to said solenoid for controlling said escapement, and for opening the circuit of said series magnet.

4. An arc lamp having a rotatable magazine comprising a plurality of tubes grouped in a segment of a circle, a weight and cord for rotating said magazine, ratchet-teeth on said magazine, a lever having a detent pawl engaging with said teeth, and a shunt solenoid for actuating said lever.

5. An arc lamp having a rotatable magazine comprising a plurality of tubes grouped in a segment of a circle, each tube having a longitudinal slot, a weight in each tube having an arm extending through said slot, and means comprising a solenoid controlling the rotation of said magazine, and means controlled by said arm for controlling said solenoid.

6. An arc lamp having a single lower electrode, a plurality of tubes grouped in the segment of a circle arranged above the lower electrode, a gravity feed electrode in each tube, means for moving said tubes successively into alinement with the lower electrode, a plate located below said tubes having an opening registering with said lower electrode, means for gripping the upper electrode and separating the same from the lower electrode to strike the arc, and means responsive to the movement of the upper electrode for rendering said last named means inoperative so that the spent electrode may drop from its tube and for simultaneously moving the lower electrode laterally out of alinement with the upper electrode.

7. An arc lamp having a single lower electrode, a plurality of tubes grouped in the segment of a circle arranged above the lower

electrode, a gravity feed electrode in each tube, means for moving said tubes successively into alinement with the lower electrode, a plate located below said tubes having an opening registering with said lower electrode, means for gripping the upper electrode and separating the same from the lower electrode to strike the arc, and means responsive to the movement of the upper electrode for rendering said last named means inoperative so that the spent electrode may drop from its tube and for simultaneously moving the lower electrode laterally out of alinement with the upper electrode and for raising the same to compensate for its consumption.

8. In an arc lamp, a single lower electrode, a magazine located above the lower electrode containing a plurality of electrodes, means for moving said electrodes successively into alinement with the lower electrode, a plate located below said magazine having an opening registering with the lower electrode, mechanism comprising a series magnet for separating the upper electrode from the lower, and mechanism comprising a shunt magnet for rendering the first named mechanism inoperative when the upper electrode is substantially consumed and permitting the upper electrode to drop from the magazine and for moving the lower electrode laterally out of alinement with the upper.

9. In an arc lamp, a single lower electrode, a magazine located above the lower electrode containing a plurality of electrodes, means for moving said electrodes into alinement with the lower electrode, a plate located below the magazine having an opening in alinement with the lower electrode, mechanism comprising a series magnet for separating the upper electrode from the lower, and mechanism comprising a shunt magnet for rendering the first named mechanism inoperative when the upper electrode is substantially consumed and thus permitting the upper electrode to drop from the magazine and for moving the lower electrode laterally out of alinement with the upper and for simultaneously lifting the lower electrode to compensate for its consumption.

In witness whereof, I have hereunto set my hand this nineteenth day of July, 1909.

EMILE J. GUAY.

Witnesses:

JOHN A. McMANUS, Jr.,

CHARLES A. BARNARD.