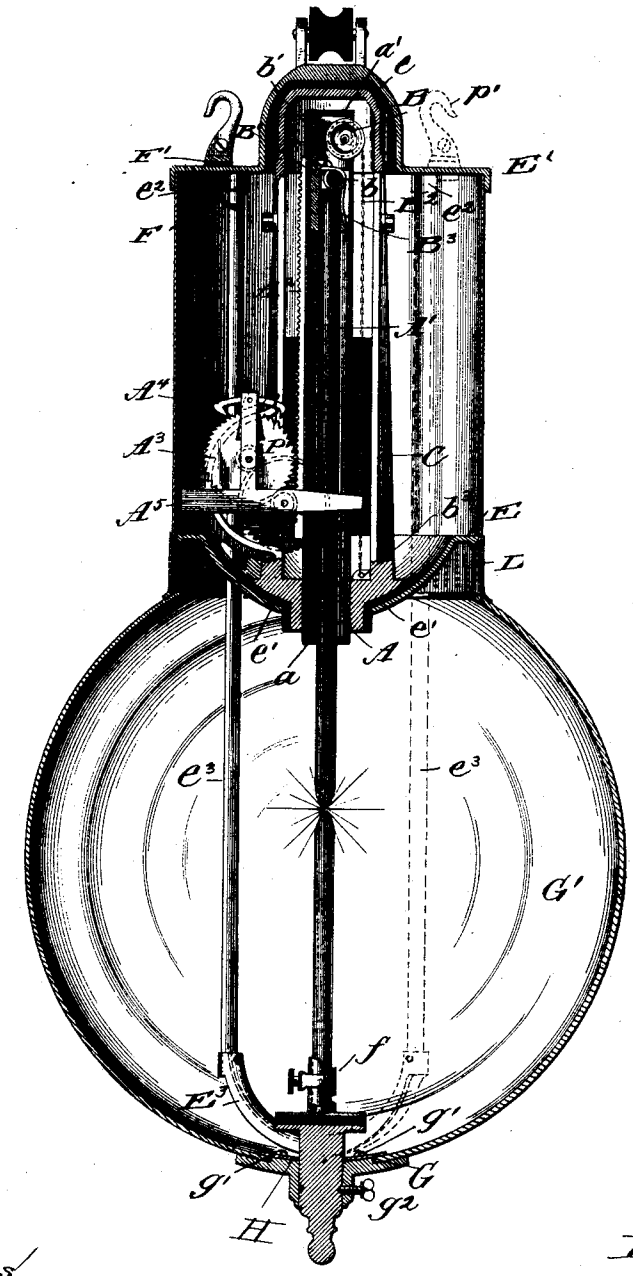
(No Model.) 3 Sheets—Sheet 1.

J. A. MOSHER.

ELECTRIC ARC LAMP.

No. 472,064. Patented Apr. 5, 1892.

Fig. 1.



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(No Model.) 3 Sheets—Sheet 2.

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Fig. 3.

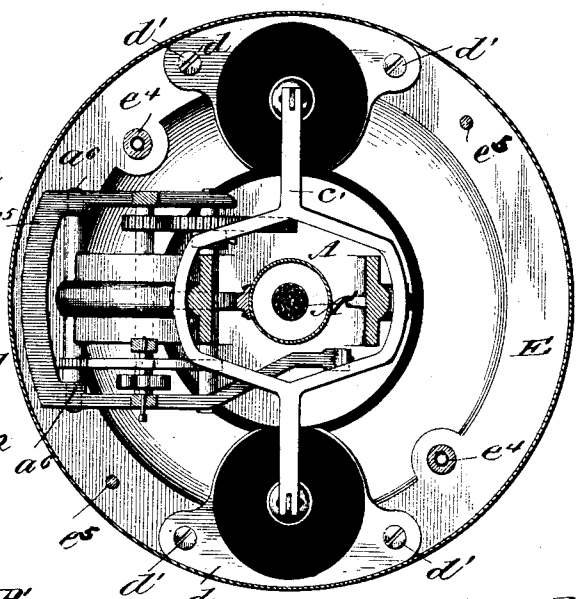


Fig. 5.

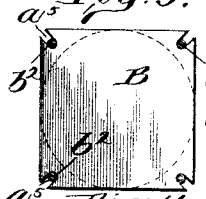


Fig. 4.

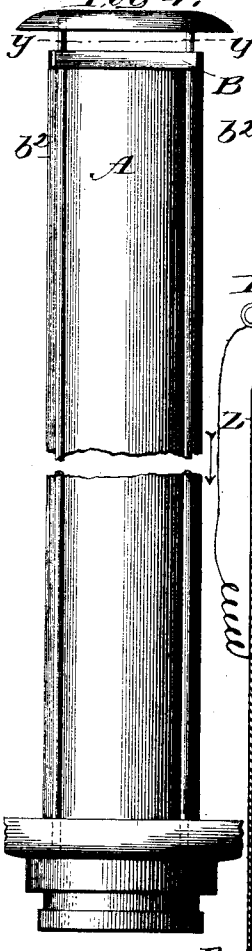
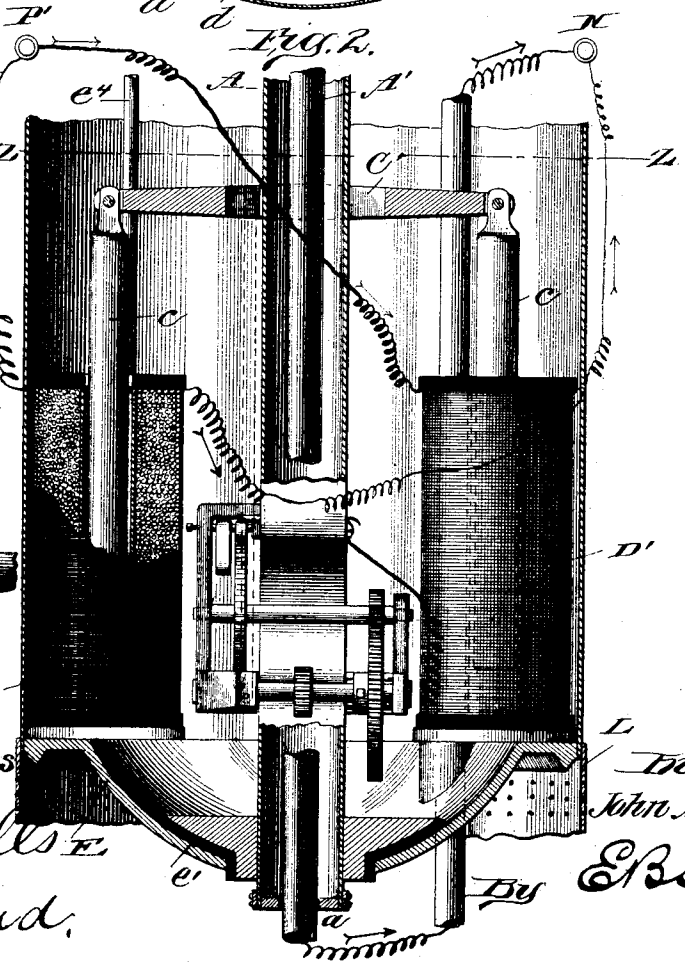


Fig. 2.



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(No Model.) 3 Sheets—Sheet 3.

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ELECTRIC ARC LAMP.

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Fig. 6.

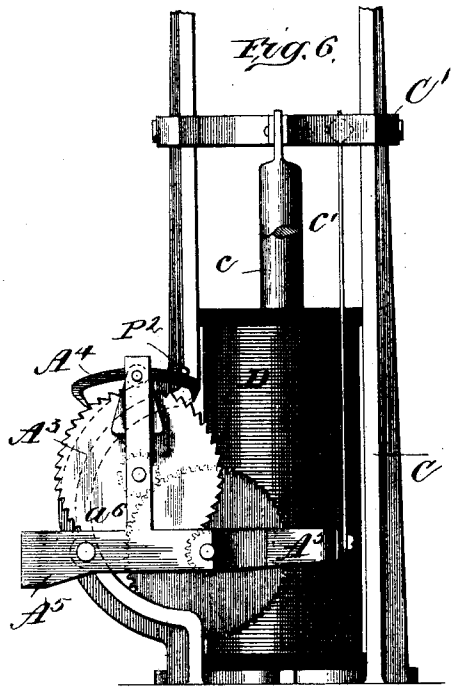


Fig. 7.

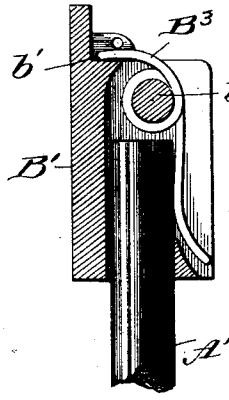


Fig. 8.

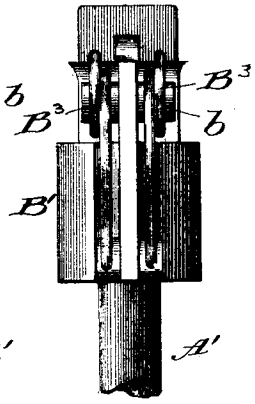


Fig. 9.

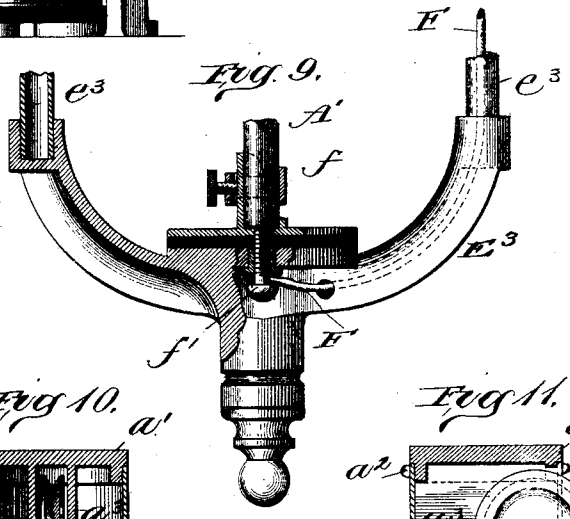


Fig. 10.

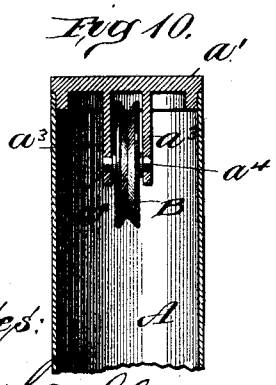
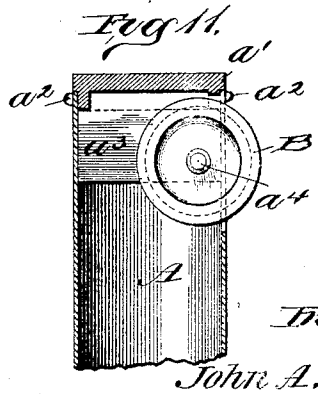


Fig. 11.



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UNITED STATES PATENT OFFICE.

JOHN A. MOSHER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE MOSHER ARC LAMP COMPANY, OF ABILENE, KANSAS.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 472,064, dated April 5, 1892.

Application filed June 20, 1891. Serial No. 396,950. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. MOSHER, a citizen of the United States, residing at Chicago, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Arc Lamps, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in electric-arc lamps; and it has for its objects, among others, to provide an all-night lamp through the use of a single carbon only and at the same time decrease the length of lamp as commonly used. To accomplish this, I do away with the carbon rod and provide a guide for the carbon and feed both guide and carbon direct. The guide is fed downward a distance equal to half the length of the total amount of carbon consumed. The total length of lamp when constructed to burn the ordinary length of carbons—seven and twelve inches—is twenty-four inches. When constructed for all-night use, the total length is thirty-eight inches. I improve materially in the details of construction of the various parts. I simplify the same in many ways.

Other objects and advantages of the invention will hereinafter appear, and the novel features thereof will be specifically defined by the appended claims.

The invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, and in which—

Figure 1 is a vertical central section through the lamp. Fig. 2 is an enlarged sectional detail at right angles to Fig. 1. Fig. 3 is a cross-section on the line $z\ z$ of Fig. 2. Fig. 4 is a detail in side elevation of the central tube. Fig. 5 is a cross-section on the line $y\ y$ of Fig. 4, looking down. Fig. 6 is a detail in side elevation of the train of gears and one of the magnets. Fig. 7 is a detail, partly in section and partly in elevation, of the carbon-holder. Fig. 8 is a view looking at right angles to Fig. 7. Fig. 9 is an enlarged detail of the yoke. Fig. 10 is an enlarged detail of the upper end of the central guide-tube and its pulley. Fig. 11 is a similar view at right angles to Fig. 10.

Like letters of reference indicate like parts throughout all the views in which they occur.

Referring now to the details of the drawings by letter, A designates a tube, preferably of brass, provided with a cap a at its lower end, as shown in Fig. 1, to allow the carbon A′ to pass through a hole therein. At its upper end it is provided with a head a', resting thereon and held thereto in any suitable manner, as by the screws a^2, as seen in Fig. 11. This head is provided with downwardly-extending ears a^3, in which is supported a shaft a^4, which carries a pulley B, preferably grooved, as shown in Fig. 10.

B′ is a carbon-holder. It is provided with means for the attachment thereto of a chain B^2 and with a spring or springs B^3, which are coiled around a shaft b, with one end arranged to bear against the carbon, as seen best in Figs. 7 and 8, and the other end having a bearing upon a shoulder or offset b' on the holder, as shown in Fig. 7. By means of this form of holder I am enabled to put carbons in or out without manipulating a screw, this being necessary, as the carbon-holder is always confined within the tube A.

The head a' at the upper end of the tube A is constructed square, as shown in Fig. 5, with slots or notches a^5 at the corners to correspond with and receive the rods b^2. These rods extend from top to bottom of the frame C and form a guide for the top of the tube A. This frame is preferably a cast frame, through the bottom of which the tube A passes, forming a guide for the bottom of said tube. The chain B^2 passes over the pulley B and is connected with this frame, as shown at b^3. (See Fig. 1.)

The tube A is provided with a rack A^2, in which is engaged the usual train of gears A^3, as shown in Fig. 1, and pendulum-escapement A^4. (See the same figure.) This train of gears and escapement are mounted on a movable frame A^5, which frame is pivoted on the cast frame C, which is provided with lugs a^6 for this purpose, as seen best in Fig. 3.

The frame C carries the walking-beam C′, which has attached at each end a magnet-core c. The walking-beam is connected with the movable frame A^5 by the rod c'.

D and D′ are the usual magnets or solenoids, D being the derived-circuit magnet, and D′ the main-circuit magnet. Castings *d* are secured to the bottoms of the magnets in such a manner as to be electrically insulated from the same, and then the castings are secured to a disk E, as shown at *d′* in Fig. 3.

E′ is a casting that forms the top of the lamp. It fits over the top of the frame C and is electrically separated therefrom by insulation, as shown at *e* in Fig. 1. The disk E fits the bottom of the frame C similar to the casting E′ and is insulated therefrom, as shown at *e′* in Fig. 1. The casting E′ is provided upon its under face with bosses e^2, into which side rods e^3 are secured in any suitable manner, said rods passing through the disk E, which is also provided with bosses e^4 therefor, as seen in Fig. 3, and the said side rods are then passed down and are secured to the yoke E^3, that forms the bottom of the lamp. The disk E is held in place by vertical rods e^5, which are screwed into the casting E′ and pass down through the disk and receive nuts. By this means the disk is drawn up, firmly clamping the frame C between the disk and the casting E′, thus forming a complete frame for the lamp and also keeping the outside of the lamp insulated.

The yoke E^3 carries the lower carbon-holder *f*, as seen best in Figs. 1 and 9, which holder is electrically insulated from the yoke, as seen in Fig. 9, and is held in position by screw *f′*, as seen in said Fig. 9. The negative wire F is connected to this screw, and connection to the lower carbon is thus made. The wire F is passed up in the groove of the yoke, as seen in Fig. 9, and through one of the side rods e^3 and makes connection with the negative binding-post F′, as seen in Fig. 1.

G is my improved globe-holder. It will be seen upon reference to Fig. 1 that the globe G′ has no flange at the bottom, but is left plain, with only a small hole at the bottom. The globe-holder is provided with a step or offset *g*, into which the globe rests.

H is a thin disk somewhat larger than the hole in the bottom of the globe, and this disk is secured by screws *g′* or otherwise to the globe-holder, as seen in Fig. 1, the globe and globe-holder being secured by means of set-screws g^2, so that the globe and holder can be reversed or turned upside down and the holder replaced again on the yoke, thus allowing the trimmer to trim the lamp and dust and wipe out the globe.

On reference to Fig. 1 it will be seen that the globe extends up to the disk E, and the remainder of the space is occupied by a perforated metal or wire screen L, as shown best in Figs. 1 and 2. This screen is secured to the bottom of the outside case of the lamp and extends down to the top of the globe, thus making a spark-arrester, as well as serving to keep out bugs and the like.

P′ is the positive binding-post. (See Figs. 1 and 2.)

P^2 is a pin or stop for the pendulum of the train of gears, as shown in Figs. 1 and 6. This stop is affixed to the frame C in any suitable manner.

The lamp works in the following manner: When the lamp is at rest, the carbons are together. When the current is turned on, it passes from the positive binding-post to the solenoid or main-circuit coil, and then to the frame C, being connected as shown in Fig. 2, making connection with the carbon. The derived circuit passes from the positive binding-post direct to the solenoid, and then to the negative post. Thus the magnet is attracted, causing the walking-beam to be tilted, which would also raise the movable frame and cause the tube A to be lifted, which would separate the carbons and form the arc. As the movable frame is raised the pendulum is brought up against the stop P^2, thus blocking the train of gears. As the arc lengthens the main-circuit coil diminishes in power and there is more current forced around the derived circuit or solenoid, owing to the resistance in the arc being increased, and the derived-circuit magnet will be attracted, thus tilting the opposite end of the walking-beam, releasing the pendulum, and allowing the tube A to be lowered, thus feeding the carbon. As the pulley B is attached to the tube A, it follows that the farther the tube feeds down and the nearer the said pulley is brought to the point of attachment of the chain to the frame the more the carbon-holder is allowed to descend down the tube, or when the tube has descended to a point so as to bring the pulley where the chain is fastened the carbon-holder will be at the bottom of the tube A instead of at the top, as it is when the tube is shoved up to its fullest extent. The carbon-holder is made heavy enough not to stick in the tube A and to always keep the chain tight. By this arrangement I only have to allow the tube A to descend just half the distance of the total amount of carbon consumed. For example, if there should be fifteen inches of carbon consumed, including both upper and lower carbons, I would only have to allow the tube A to be lowered seven and one-half inches, and the carbon-holder would also be allowed to descend down the tube A seven and one-half inches, making the distance required, so that all that is necessary to make an all-night lamp is to construct the lamp a little longer.

By making the lamp thirty-eight inches long the same length carbon can be used that is used or consumed in the usual double-carbon lamps plus about five inches, as there will only be a waste of two stubs instead of four, as in the double-carbon lamps.

Modifications in detail may be resorted to without departing from the spirit of the invention or sacrificing any of its advantages.

What I claim as new is—

1. In an electric-arc lamp, the combination, with the guide-tube and the carbon-holder arranged to move in the tube, of the movable frame carrying feed mechanism and a chain or cord attached to and supporting the holder and the other end attached to the movable frame and passed over a pulley on the tube, as set forth.

2. In an electric-arc lamp, the combination, with the guide-tube, of the carbon-holder movable within the tube, the pulley carried by the tube, means for feeding the tube, a chain or cord attached to the holder, and a movable frame supported by said chain or cord, as set forth.

3. In an electric-arc lamp, the combination, with a guide-tube and the carbon-holder movable therein, of the chain passed over a pulley on the tube and connected with the holder, and means for feeding the tube, as set forth.

4. In an electric-arc lamp, the combination, with a guide-tube and a carbon-holder movable therein, of the movable frame, the train of gears on said movable frame, and connections, substantially as specified.

5. In an electric-arc lamp, the combination, with the guide-tube and the carbon-holder movable therein, of the movable frame, the train of gears thereon for feeding the tube, the connection between the said frame and the carbon-holder, and the rack on the said tube, as set forth.

6. In an electric-arc lamp, the combination, with the guide-tube and the carbon-holder movable therein, of the movable frame connected with the tube, the walking-beam on the movable frame, and the connections, substantially as described, between the frame and holder and between the walking-beam and tube, as set forth.

7. In an electric-arc lamp, a carbon-holder having a spring for holding the carbon and an offset for the bearing of one end of the spring, said spring being coiled around the shaft, with one end arranged to bear upon the carbon and the other in said offset, as set forth.

8. In an electric-arc lamp, the combination, with the guide-tube and the carbon-holder therein, of the rack on the tube, the train of gears for actuating the same, the movable frame on which the train of gears is mounted, and the frame to which the movable frame is pivoted, as set forth.

9. In an electric-arc lamp, the combination, with the disk E and the magnets, of the castings secured to the bottoms of the magnets and secured to and electrically insulated from the disk, the frame C, the movable frame and the feed mechanism carried thereby, and the walking-beam on the said frame carrying the magnet-cores, as set forth.

10. In an electric-arc lamp, the combination, with the disk, the magnets supported thereon, and the frame C, with its walking-beam, of the magnet-cores carried by said walking-beam, the guide-tube, the train of gears, the movable frame, the chain passed over a pulley on the tube and connected with the carbon-holder, and the stop on the frame C, as and for the purpose specified.

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

JOHN A. MOSHER.

Witnesses:

ELMER WECK,

R. CAHN.