No. 635,862. Patented Oct. 31, 1899.

E. S. LEA.

ELECTRIC ARC LAMP.

(Application filed Aug. 8, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

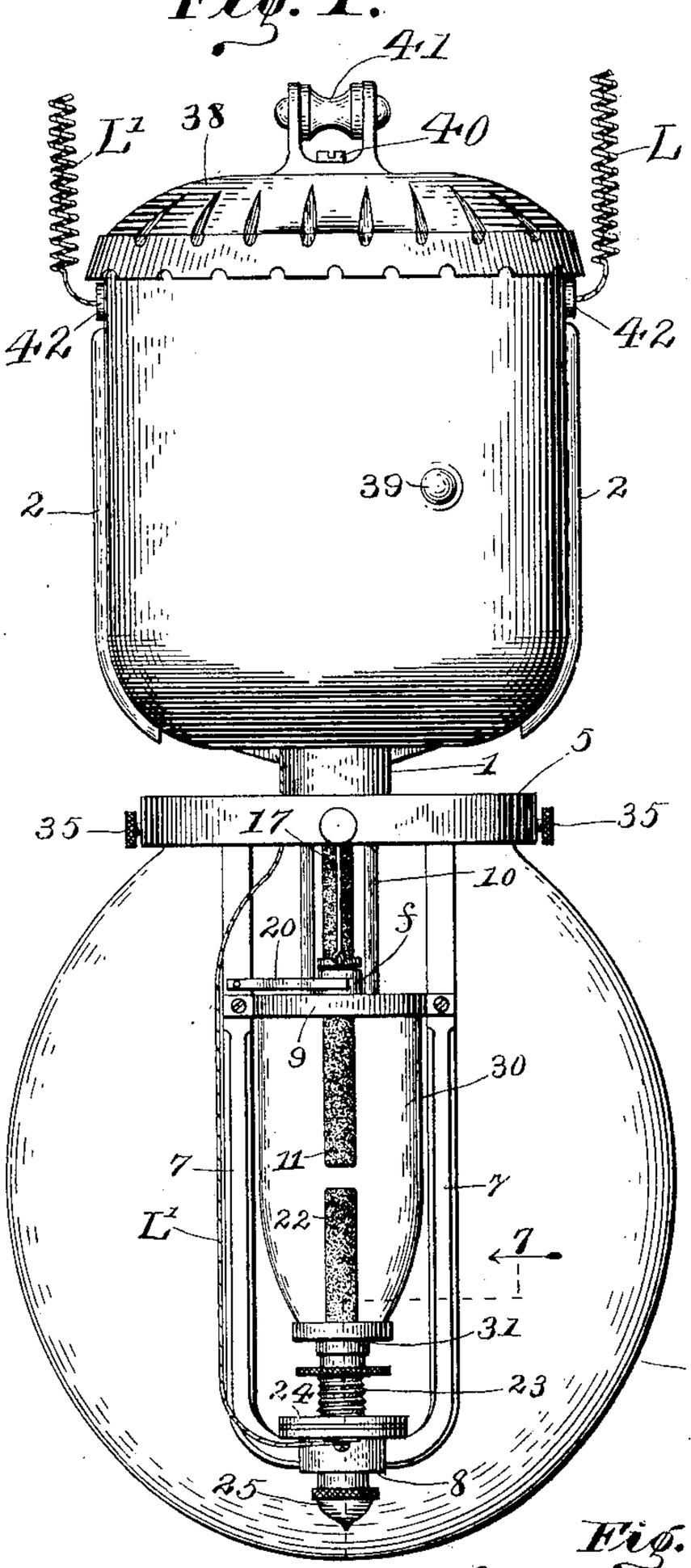


Fig. 2.

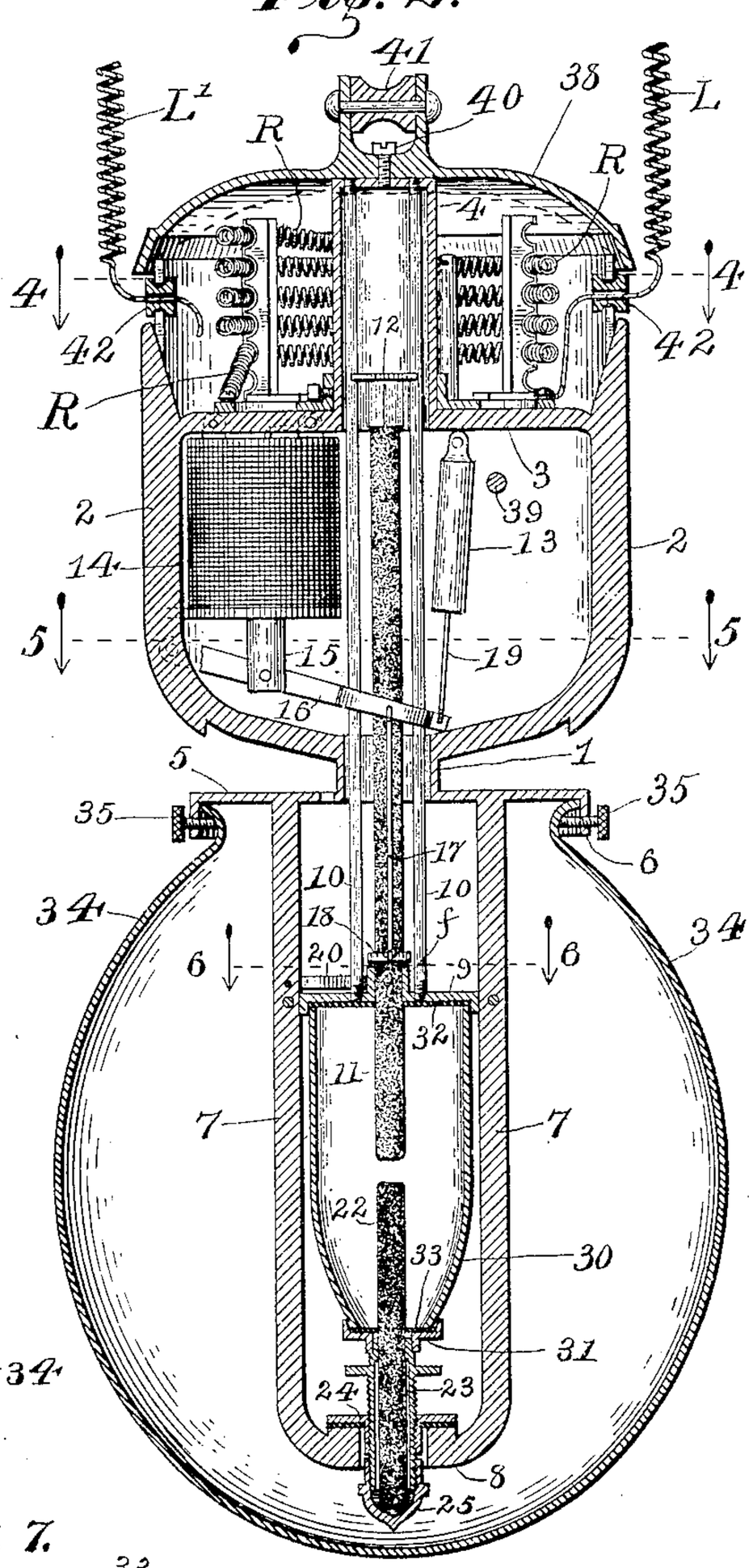
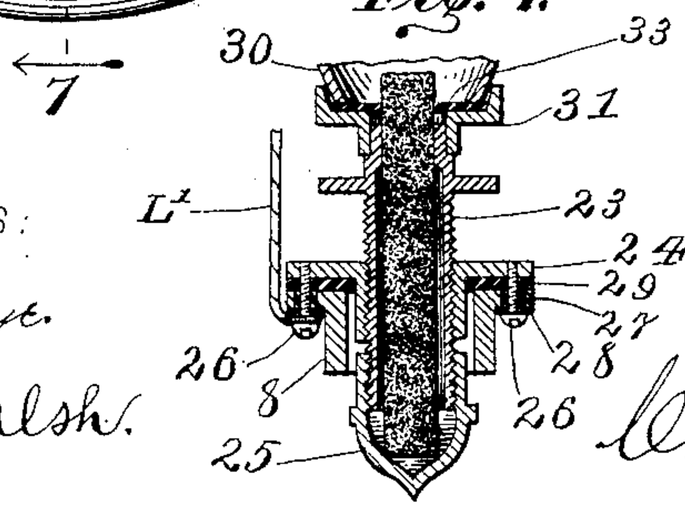


Fig. 7.



WITNESSES:

C. S. Frye.

J. A. Walsh.

INVENTOR

Edward S. Lea,

BY

Chester Bradford,

ATTORNEY.

No. 635,862. Patented Oct. 31, 1899.

E. S. LEA.

ELECTRIC ARC LAMP.

(Application filed Aug. 8, 1898.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 3.

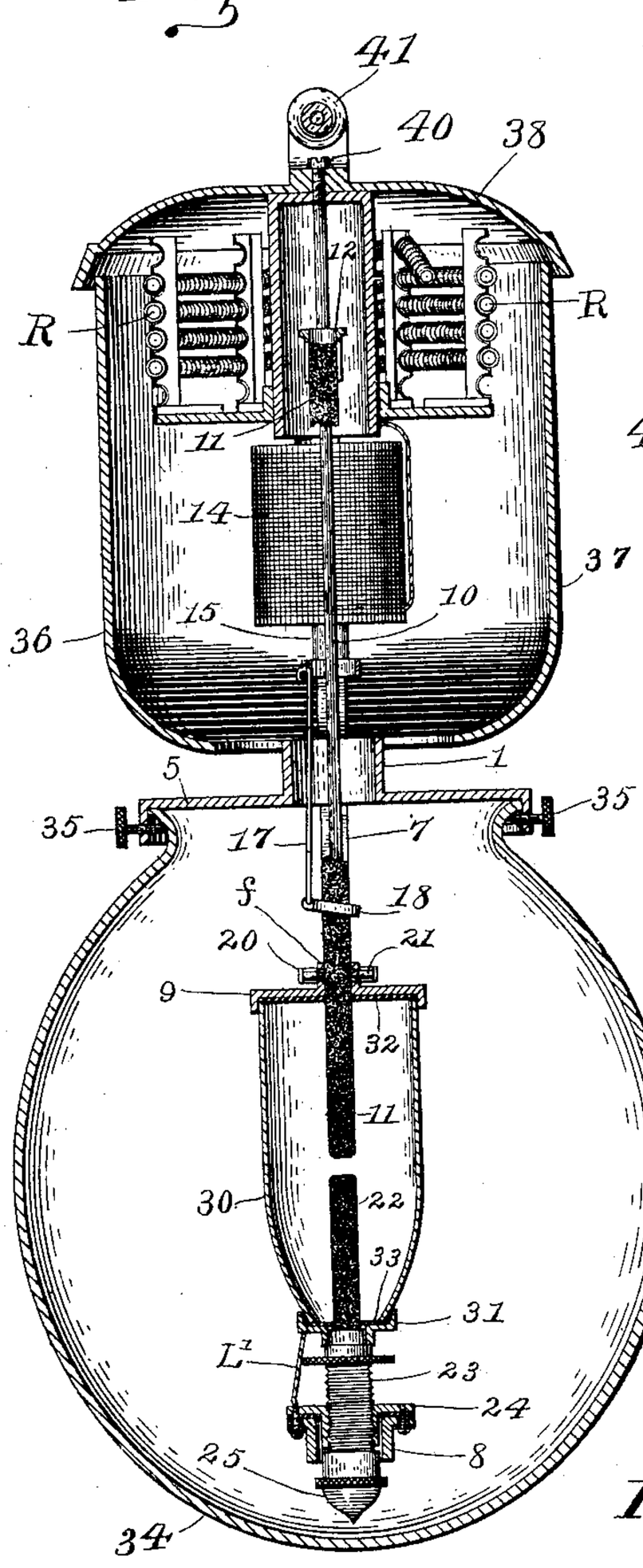


Fig. 4.

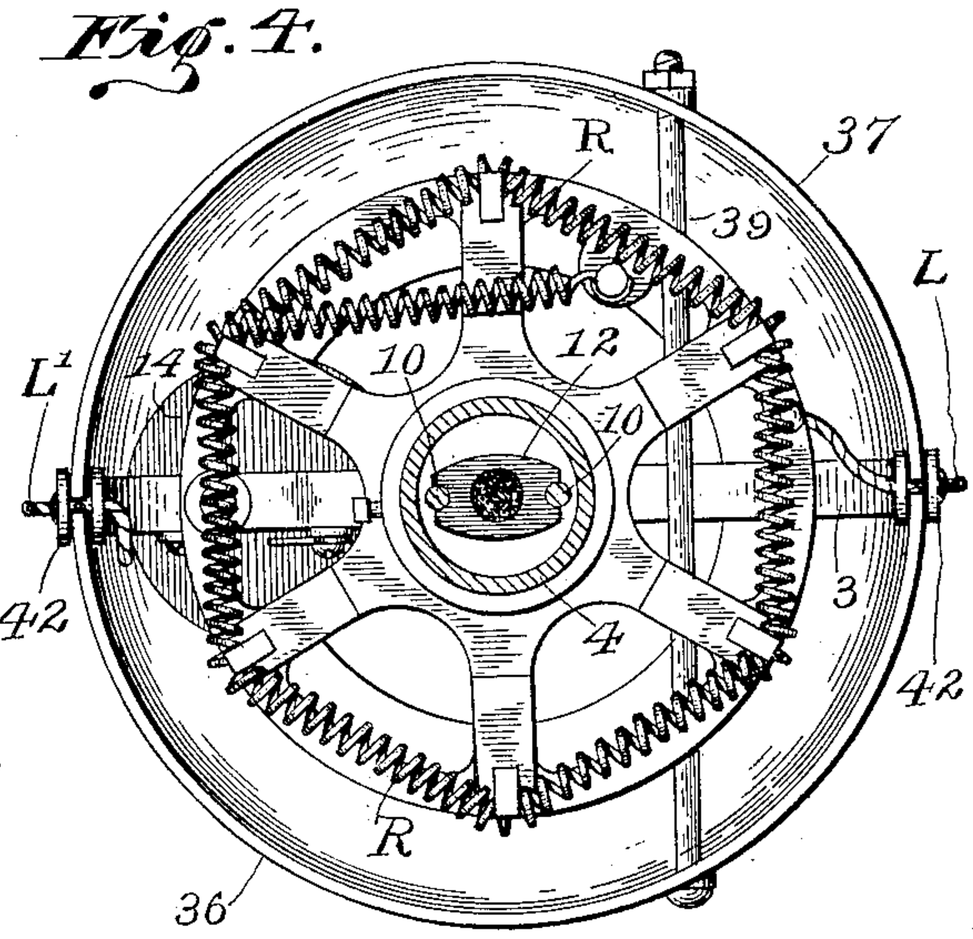


Fig. 5.

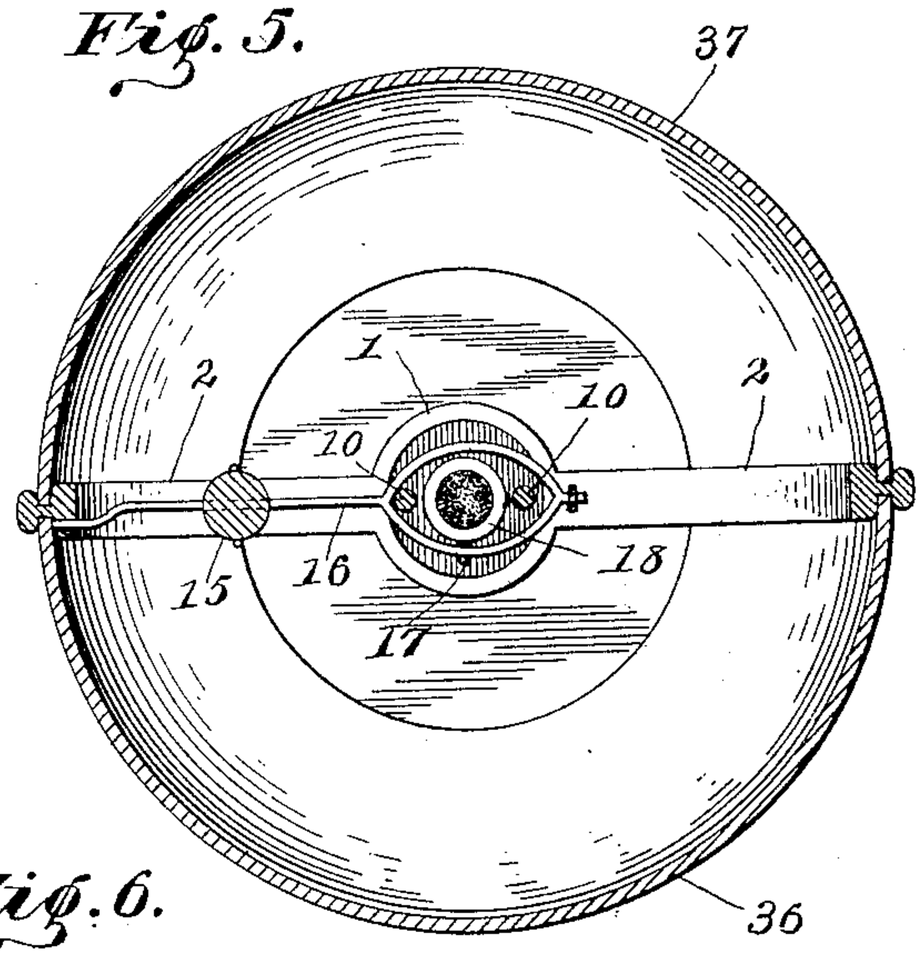
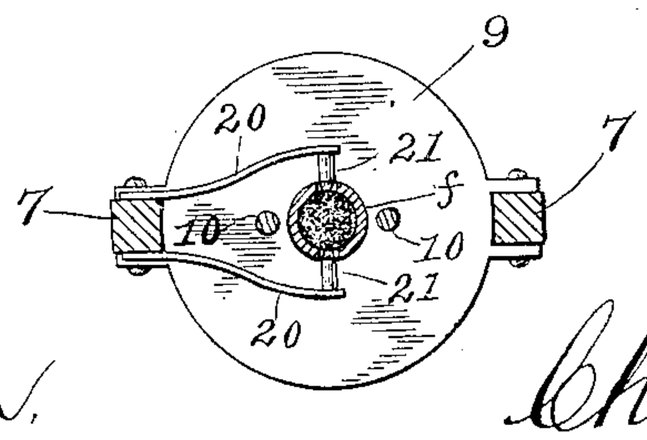


Fig. 6.



WITNESSES:

C. S. Frye.

J. A. Walsh.

INVENTOR

Edward S. Lea,

BY

Chester I. Bradford,

ATTORNEY.

UNITED STATES PATENT OFFICE.

EDWARD S. LEA, OF ELWOOD, INDIANA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE LEA MANUFACTURING COMPANY, OF SAME PLACE.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 635,862, dated October 31, 1899.

Application filed August 8, 1898. Serial No. 688,099. (No model.)

To all whom it may concern:

Be it known that I, EDWARD S. LEA, a citizen of the United States, residing at Elwood, in the county of Madison and State of Indiana, have invented certain new and useful Improvements in Electric-Arc Lamps, of which the following is a specification.

The object of my invention is to produce a simple and inexpensive but highly-efficient electric-arc lamp of that variety which is especially adapted to use where an electric current of high voltage is used; and it consists in various improvements in the construction and arrangement of parts of such a lamp whereby various advantages are attained, as will be hereinafter more particularly described and claimed.

Referring to the accompanying drawings, which are made a part hereof and on which similar reference characters indicate similar parts, Figure 1 is a side elevation of an electric-arc lamp embodying my present invention; Fig. 2, a central sectional view of the framework and inclosing casing and globes, showing the interior and the mechanism in side elevation in the same position as in Fig. 1; Fig. 3, a view of a similar character to Fig. 2, but showing the apparatus as when seen from a point at right angles from the point of view for Fig. 2; Fig. 4, a horizontal sectional view as seen when looking downwardly from the dotted line 4 4 in Fig. 2; Fig. 5, a view as seen from the dotted line 5 5; Fig. 6, a view as seen from the dotted line 6 6, and Fig. 7 a detail sectional view as seen from the dotted line 7 7 in Fig. 1. Figs. 4 to 7, inclusive, are on a larger scale than Figs. 1 to 3.

The frame of my improved lamp consists of a single casting, as will be best understood by an examination of Fig. 2. In detail it consists of a tubular neck or central portion 1, from which rise arms 2, having grooves in their sides to receive the casing, as will be presently explained, and near their tops is the cross-bar 3, to which is suspended certain parts of the apparatus, as will be hereinafter described, and extending up centrally from this cross-bar is a tubular extension 4, having a closed upper end. Below the tubular neck 1 is the plate 5, having a flange 6, which receives the outside globe, and extending downwardly from said plate are the arms 7, which are united at the bottom by a cross-bar 8, in which is a socket to receive the mechanism by which the lower carbon and the inner globe are held and controlled, as will be presently explained. This peculiar form of frame possesses, as will appear hereinafter, considerable advantages, while at the same time, as nearly all machine-work is obviated, it is very inexpensive.

Secured to the arms 7 of the frame at a suitable point is the plate 9, which serves as a cap to inclose the upper end of the inner globe and also as a support for the lower ends of the bars or ways 10, by which the upper end of the upper carbon is guided in its descent, while a central perforation in said plate 9 serves to permit the passage of the carbon to within the inner globe. This perforation is preferably surrounded by a flange *f*, rising some little distance above the upper side of the plate 9, which gives both a greater adjacent surface around the carbon, so that it is better protected in operation and serves as a strike or contact to release the carbon-clutch. The rods 10 at their upper ends enter similar perforations in the upper closed end of the tubular extension 4. These rods are commonly formed from brass rod or wire of a suitable size, and the only labor involved in putting them in place is merely to drill the four holes, two in the upper end of the tubular extension 4 and two in the plate 9, and insert said rods therein, where they may be secured either by threading the holes and the entering portions of the rods or in any other desired manner. The holes being located by means of templets exact positions are readily secured, and consequently a perfect track for the cross-head on the upper end of the upper carbon is provided at a merely nominal expense. The upper carbon 11 has a cross-head 12 on its upper end, which is merely an oblong piece having notches in its ends which embrace the two bars 10 and having a thin metal split socket secured to its under side, into which the extreme upper end of the carbon 11 may be placed, the sides of said socket being of spring metal, and thus adapted to clasp the carbon with sufficient force for the purpose. The dash-pot 13 and solenoid 14 are suspended to the cross-bar 3, and the core 15 of said solenoid is directly on the lever 16,

which is connected by the rod 17 to the carbon-clutch ring 18. The operation of this clutch is that it grips and lifts and holds the carbon 11 until by reason of the lengthening of the arc the current is weakened and the solenoid loses its energy, when it descends until the ring 18 comes in contact with the flange *f* on the plate 9, which surrounds the carbon, which immediately releases said carbon and allows it to drop in a manner which is well understood by those skilled in the art. The plunger 19 of the dash-pot operates in the usual and well-known manner. Secured to the arms or frame members 7 is a pair of spring-arms 20, which, as best shown in Fig. 6, carry upon their inner ends contact-points 21, which pass through suitable perforations in the flange *f* and come in immediate contact with the sides of the carbon 11. The frame, being included in the positive portion of the electric circuit, conducts the electric current to these spring-arms and through them and their points to the carbon 11, the course of the incoming current being from the line-wire L, through the resistance R to the solenoid 14, one end of the coil of which is connected to the frame at some suitable point, preferably to the cross-bar 3. The frequent movement of the carbon 11 in contact with the points 21 scours the latter and keeps them free from dirt and corrosive matter, so that a good contact, and consequent free passage of the current, is continually maintained.

The lower carbon 22 is carried in a tubular adjustable socket 23, which in turn is carried in a flanged tubular nut 24, carried upon but insulated from the cross-bar 8, forming the lower extremity of the frame. I insert these carbons through the lower end of the tubular socket 23 and provide a screw-cap 25 therefor. It is only necessary in putting one of these lower carbons in position to remove this screw-cap 25, insert the carbon 22, and replace the screw-cap. The carbons 11 may be passed through said socket and thence up to position prior to the introduction of the carbons 22. The adjustability of the tubular socket 23 is for another purpose, as will be presently explained. The course of the electric current after leaving the carbon 11 is through the carbon 22, the socket 23, its insulated support 24, and out over the outgoing line-wire L'. The method of securing the part 24 in place and of insulating the same from the frame is best shown in Fig. 7, where the screws 26 (one of which serves as a binding-screw) are clearly shown as separated from the metal of the frame by the insulating material 27 28, while the support 24 is shown as insulated from the frame by the plate of insulating material 29.

The inner globe 30 is secured between the plate 9 on the frame parts 7 and a swiveling socket-piece 31, carried on the upper end of the tubular socket 23. Said swiveling socket-piece is merely a plate with a flange to engage the lower end of said globe, mounted to turn on the upper end of said socket 23, a suitable shoulder being formed thereon near its top to support said part. Both the plate 9 and the part 31 have annular flanges running around the rims within which the respective ends of the globe 30 enter, and I also place within these parts disks 32 and 33, of asbestos, to aid in making close joints, so that the globes shall be substantially air-tight. These small and comparatively air-tight globes, as has been discovered in comparatively recent times, enormously increase the durability of the carbons, and consequently not only reduce the expense in the providing of the carbons themselves, but also very much reduce the amount of care and labor required in maintaining the lamp in operative condition.

The outside globe 34 is an ordinary round or oval globe and incloses the lower portion of the lamp completely. It is preferably secured to the plate 5, forming part of the frame, by thumb-screws 35, as best shown in Figs. 2 and 3.

The upper and principal portion of the mechanism of the lamp is inclosed by a cover composed of the parts 36, 37, and 38. The parts 36 and 37 are substantially semicylindrical in form and their edges enter grooves in the sides of the arms 2 and may be held in position therein by any convenient means, such as a bolt 39. The part 38 is a cap-piece, which forms a roof or cover to the lamp, including the casing sides 36 and 37, and is preferably attached rigidly to the frame. A machine-screw 40, passing through its central portion and entering the upper end of the closed tubular extension 4 of said frame, is a convenient means of making this attachment. Above this screw is the hanger 41, by which the lamp is suspended in place. Notches are cut in the sides of the cover-halves 36 and 37, within which insulators 42 are placed, through which the line-wires L and L' pass. As will be readily seen, this cover as a whole is secured in place merely by the bolt 39 and the screw 40, and is thus convenient to manipulate, while, being formed of thin cast metal, it is very inexpensive.

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

1. In an electric-arc lamp, a frame composed of the tubular neck 1, the arms 2, cross-bar 3, tubular extension 4, plate 5, and downwardly-extending arms 7 united at their lower end, the whole being composed of a single casting, substantially as shown and described.

2. The combination, in an electric-arc lamp, of the frame, including the cross-bar 3, the dash-pot 13 suspended near one side of the frame on the under side of said cross-bar, the solenoid 14 suspended near the other side of the frame, also from the under side of said cross-bar, a lever 16 pivoted at one end to one side of the frame adjacent to said solenoid and extending across beneath said solenoid and dash-pot, and connected by a pivot connec-

tion to the core of the solenoid and also to the piston of the dash-pot, a hanger 17 connected to said lever at a point between its connections with said core and piston, and extending downward and connected to the carbon-clutch, and said carbon-clutch arranged to be operated through said mechanism, all substantially as set forth.

3. The combination, with the frame of an electric-arc lamp, of a cover for the mechanism thereof, consisting of the two semicylindrical parts 36 and 37 the edges whereof engage with suitable grooves in the upper portion of the frame, a bolt 39 by which they are connected together, and a cap-piece 38 secured to the upper end of said frame, above and covering the upper edges of said semicylindrical parts, substantially as shown and described.

4. The combination, in an electric-arc lamp, of the frame having the arms 2 with grooves in their opposite sides, semicylindrical cover parts 36 and 37 the edges whereof fit into said grooves, said edges being also notched, insulators resting within the openings formed by the notches, and a cap-plate 38 secured to the upper end of the frame and covering the same and the upper edges of said semicylindrical cover parts, substantially as shown and described.

5. The combination, in an electric-arc lamp, of the frame, embodying the cross-bar 3, the dash-pot and solenoid suspended from the under side of said cross-bar, the lever connected to the core of the solenoid and the piston of the dash-pot, and pivoted to the frame at one end, the carbon-clutch connected to said lever by a rod, whereby it is operated, rods joined to the upper portion of the frame and extending to below said clutch, a plate 9 mounted on the lower ends of said rods, and serving as a guide to the carbon and a top to the inner globe, and also forming a strike with which the carbon-clutch will contact and be operated, substantially as set forth.

6. In an electric-arc lamp, the combination of the frame formed in one piece and embodying the cross-bar 3 supporting the carbon-clutch-operating mechanism, the lower portion of said frame supporting a double globe, the plate 9 serving as the top to the inner globe and the guide to the lower end of the carbon mounted on the lower ends of rods which extend to the top of the frame and are secured thereto, the spring-arms 20 having contact-points arranged as described, and the adjustable support for the lower end of the inner globe, all substantially as set forth.

In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 4th day of August, A. D. 1898.

EDWARD S. LEA. [L. S.]

Witnesses:
CHESTER BRADFORD,
JAMES A. WALSH.