

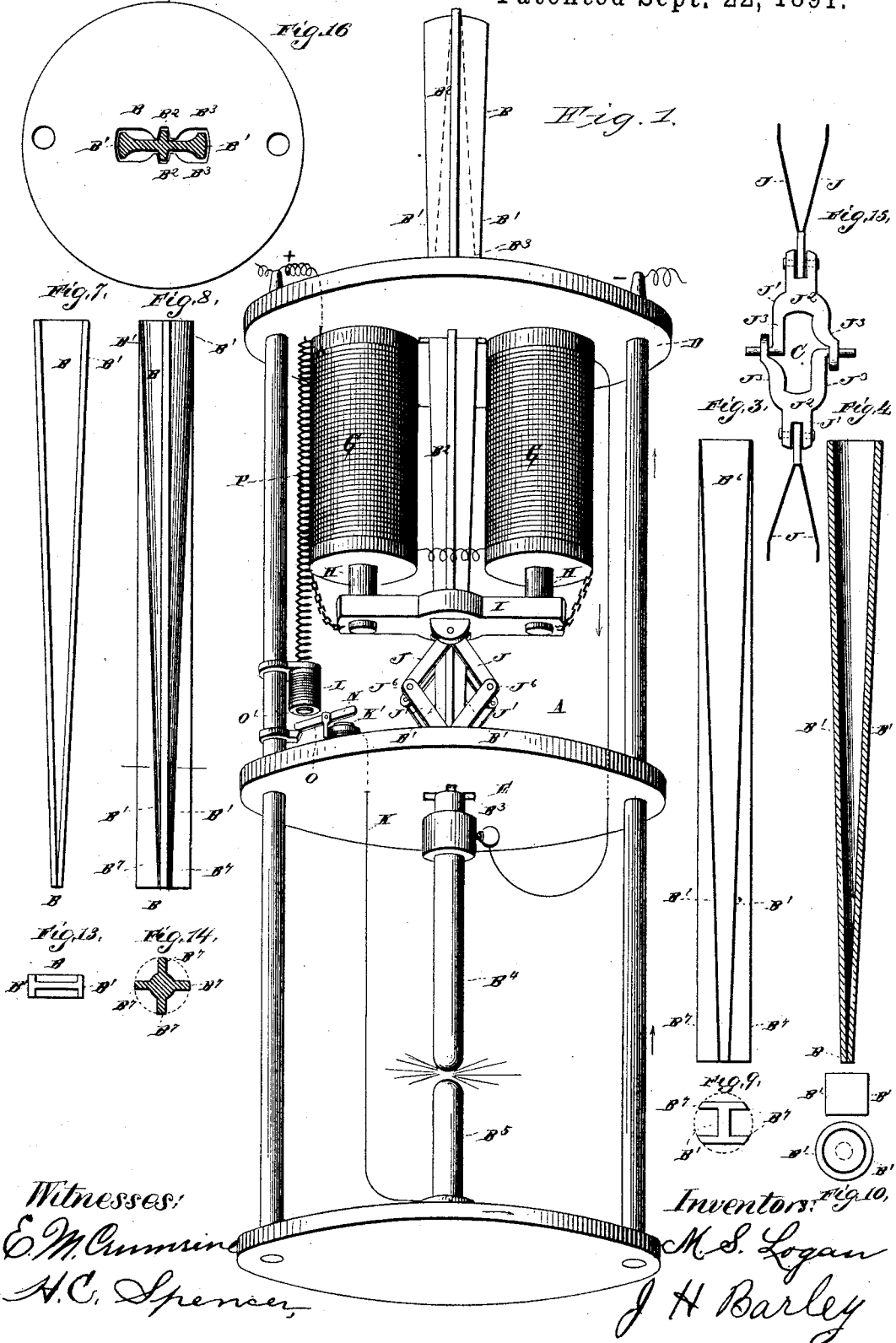
(No Model.)

2 Sheets—Sheet 1.

M. S. LOGAN & J. H. BARLEY.  
ELECTRIC ARC LAMP.

No. 459,757.

Patented Sept. 22, 1891.



Witnesses:  
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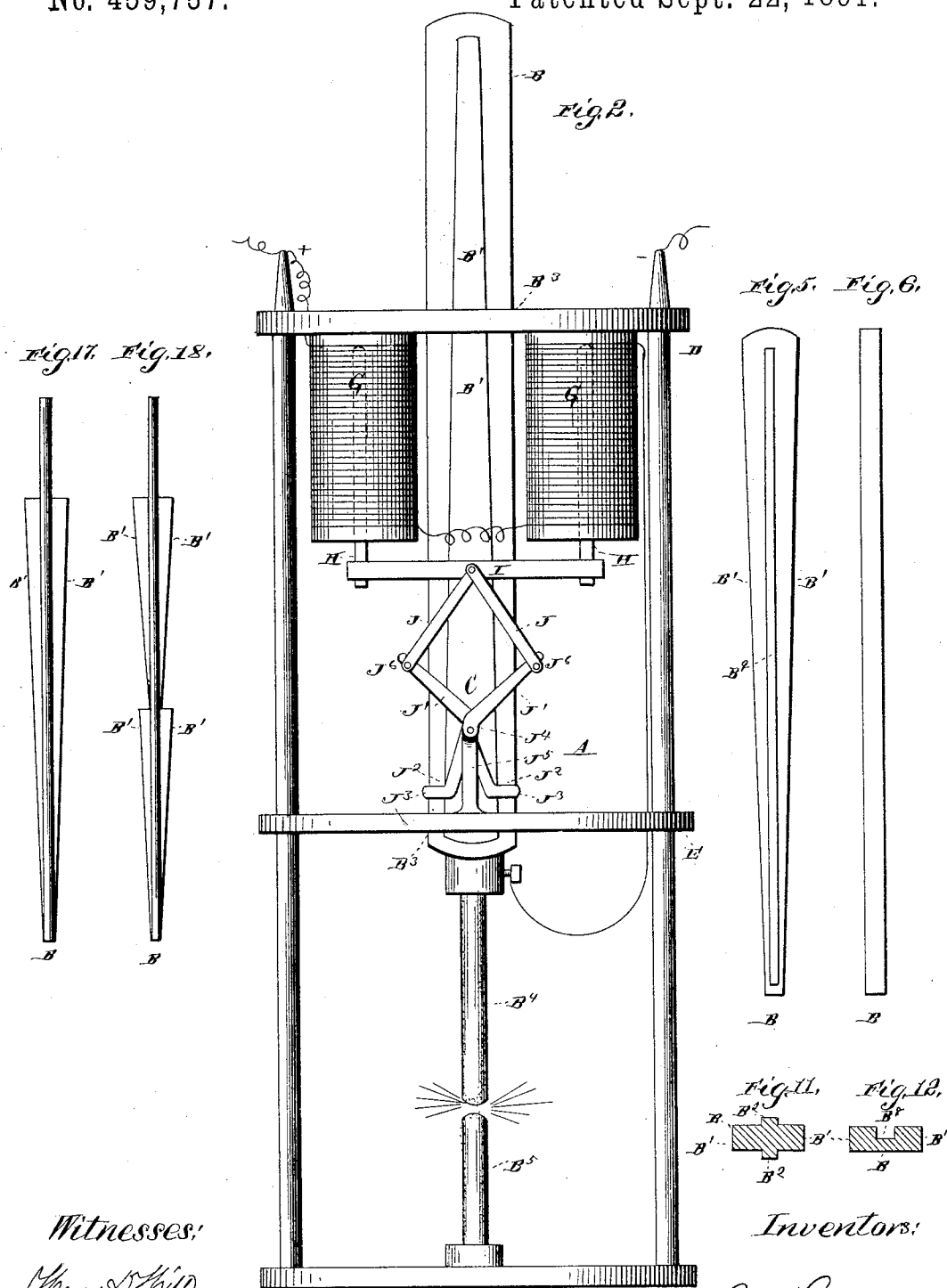
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# UNITED STATES PATENT OFFICE.

MAURICE S. LOGAN, OF OTTERVILLE, AND JAMES H. BARLEY, OF SEDALIA,  
MISSOURI.

## ELECTRIC-ARC LAMP.

**SPECIFICATION** forming part of Letters Patent No. 459,757, dated September 22, 1891.

Application filed January 19, 1891. Serial No. 378,345. (No model.)

*To all whom it may concern:*

Be it known that we, MAURICE S. LOGAN, of Otterville, Cooper county, and State of Missouri, and JAMES H. BARLEY, of the city of Sedalia, county of Pettis, and State of Missouri, both citizens of the United States, have invented certain new and useful Improvements in Electric-Arc Lamps; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to certain improvements in electric-arc lamps; and it consists, first, in the employment of a carbon-holding rod having tapering surfaces with one or more of its longitudinal side or edge surfaces made oblique or out of parallel alignment with the opposite side or edge surface thereof, in combination with a clutch or other suitable feed mechanism adapted to engage with the oblique or inclined surface or surfaces of said rod.

It further consists, second, in the employment of a carbon-holding rod or rods in an electric-arc lamp having the longitudinal side or edge surface or surfaces thereof oblique or inclined in relation to each other, in combination with a clutch or other feed mechanism controlled by the magnetic force of one or more suitable magnets and adapted to engage with the exterior or interior oblique surfaces of said rod, controlling the longitudinal movement thereof.

It further consists, third, in an improvement in the construction of a cut-out, which will be hereinafter more fully described.

The object of this invention is to furnish an electric-arc lamp provided with an improved carbon-holding rod having a clutch or other suitable feed mechanism engaging with the oblique surface or surfaces of said rod, whereby a steady uniform feed movement is attained.

The above-mentioned object and advantages are attained by the improved mechanical construction, as herein described, and illustrated in the accompanying drawings, forming part of this specification, and to the letters of reference marked thereon, as will be

hereinafter more fully described, and pointed out in the claims.

Referring to the drawings, Figure 1 is a perspective view of our improved lamp. Fig. 2 is a modification of same in side elevation. Figs. 3, 4, 5, 6, 7, 8, 17, and 18 are side and edge views of our improved carbon-holding rod, showing slight variations in the special manner of forming the rod with longitudinal diverging surfaces; and Figs. 9, 10, 11, 12, 13, and 14 are views of same in cross-section. Fig. 15 is a plan side view of a detail drawing of one form of a feed-clutch mechanism extended. Fig. 16 is a top view of the upper plate, showing one form of the carbon-holding rod in cross-section inserted into a suitable guideway in the center of said plate.

Referring to the drawings, A represents the lamp, and B the carbon-holding rod, having one or more oblique surfaces.

C is a clutch mechanism, which may be constructed in any suitable manner and adapted to engage with the exterior or interior oblique longitudinal surface or surfaces of said rod.

In the embodiment of our invention we provide a suitably-constructed frame having upper and lower plates D E, provided with suitable guideways B<sup>3</sup> for the carbon-holding rod to pass through.

The solenoid-magnets G G are composed of wire coils of high and low resistance wound differentially, the low-resistance coil being interior and in series with the arc and the high-resistance coil exterior and forming a shunt-circuit around the arc.

H H are the cores of the magnets, and I the armature-plates, to which the cores are attached.

To the armature-plate the upper ends of the arms J J of a clutch mechanism are pivotally attached, having their lower ends connected with the upper ends of the clutch-arms J' J', the lower ends of which are bifurcated, forming shoulders J<sup>2</sup> and arms J<sup>3</sup>, straddling over the rod B and pivotally joined together, with said shoulders J<sup>2</sup> engaging with the oblique surface of said rod, as shown at Figs. 1 and 15, the carbon-rod B, as constructed and shown at Fig. 1, having its two

opposite side or edge surfaces B' made oblique or out of parallel alignment with each other, and is also provided with a central guiding-rib B<sup>2</sup> on one or both sides thereof, passing through suitable guideways B<sup>3</sup>, formed through the upper and lower bars or plates D E, keeping said rod and carbon B<sup>4</sup> attached thereto in a central line with the lower carbon B<sup>5</sup>. The magnets G G, when energized by the passage of the current, lift the cores H H and armature-plate I, to which the clutch C is attached, causing the clutch to grasp the inclined surface of the carbon-holding rod B, lifting it until the arc has reached its normal length, when the force of the magnets balances the force of gravity, and when the resistance in the arc becomes too great the force of the magnets is weakened, allowing the coils to descend until a balance is again produced. By reason of the consumption of the carbons and the consequent lowering of the coils H H the lower part of the clutch will either come in contact with the plate E or the pivot J<sup>4</sup> will engage with the top of the post J<sup>5</sup>, causing the jaws or shoulders J<sup>2</sup> of said clutch to gradually release their force of contact or grasp on the oblique surfaces B', said oblique surfaces preventing any sudden or excessive slipping of said rod, which is frequently the case when a carbon-holding rod is used having parallel surfaces. The cores H H, having a downward movement within certain limits, permit the hinge-joints J<sup>6</sup> J<sup>6</sup> of the clutch to spread apart in consequence of the peculiar construction of the carbon-holding rod passing through said clutch until it reaches the desired limit of its downward movement, which point is regulated to conform with the length of carbon used.

The leading novel feature of this invention consists in the employment of a carbon-holding rod having oblique or diverging surface or surfaces, with which the feed mechanism engages, as shown. What we mean by saying that the longitudinal side or edge surfaces of the carbon-holding rod are made oblique or out of parallel alignment with the opposite side or edge surface thereof is that the oblique surfaces B' B' of said rod above described diverge, varying in distance apart transversely in the direction of their length. This may be accomplished by varying the special shape or form of constructing the rod B, which may be made either conical or pyramidal shaped, having either a solid or hollow interior, as shown at Figs. 4 and 10, and may be provided with guiding wings or flanges B<sup>7</sup>, the outer longitudinal surfaces thereof made parallel and adapted to pass through a suitable opening in the plate D E, as shown at Figs. 9 and 14, or the rod may be made in the form of a wedge, having two parallel tapering sides B<sup>6</sup> and two oblique surfaces B', and may have guiding-ribs B<sup>2</sup> on one or both of its parallel sides, or it may have four wings or flanges B<sup>7</sup> at each of its oblique corners, as shown at Figs. 3 and 9, or said

rod may be made flat on its two opposite parallel sides and the other two longitudinal surfaces thereof made oblique or diverging and provided with guiding-ribs B<sup>2</sup> on said parallel sides, or in lieu of said ribs a longitudinal guiding-groove B<sup>8</sup> may be formed on one or both of its sides, or said groove may extend through the rod, forming a slot B<sup>9</sup>, extending any desired distance up the central portion thereof, substantially as shown at Figs. 5, 6, 11, and 12, or the rod constructed as shown at Fig. 7, when secured in position in the lamp, will be vertical at one of its sides or edges and the opposite surface thereof B' oblique, as shown at said figure, and, if preferred, the sides may be grooved out in order to lighten its weight, as shown at Figs. 13 and 16, or said rod may be formed as shown at Fig. 2, having a longitudinal slot or opening forming two longitudinal oblique interior surfaces B'. In this instance the feed mechanism or clutch C is slightly changed in form, the foot or lower portions J' are bifurcated, straddling the side of the rod, while the shoulders J<sup>2</sup> engage with the interior inclined or longitudinally-diverging surfaces B' B' thereof, performing the same functions in feeding the carbons as the other forms of the rod before described, or the rod B may be formed having one, two, or more offsets, each longitudinal portion thereof having diverging surfaces B' B', as shown at drawings, Figs. 17 and 18.

We do not restrict ourselves to making the longitudinal oblique surfaces of said rod plane or straight, as they may have a slight longitudinal curvature, if desired, or the rod B, if preferred, may be made of carbon material, having oblique surfaces adapted to engage with the feeding-clutch and to be consumed in the lamp. We also provide a suitable cut-out consisting of two magnets K L, one of which is wound with fine wire and in the same circuit with the fine-wire coils on the magnets G G, and the other magnets wound with coarse wire in an independent circuit of low resistance around the arc when the pivoted bar N makes contact with the open ends of the circuit at the contact-points K' and O'. The magnet K, being in the shunt or regulating circuit, increases in magnetic force as the resistance in the arc increases until it attracts lever N with sufficient force to bring it in contact with the point K', while the end O makes contact with the point O'. The magnet L is immediately magnetized by the passage of the current, making the contact secure.

P is a resistance-coil in the cut-out circuit, of any desired resistance.

The direction of the circuit through the lamp is indicated by arrows, as shown at Fig. 1.

We are aware of Patents No. 273,888 and No. 297,076 for electric-arc lamps.

Having fully described our invention, what we claim as new and useful, and desire to secure by Letters Patent, is—

1. An electric-arc lamp provided with a carbon-rod having longitudinally-diverging surface or surfaces, in combination with a suitable feed mechanism adapted to engage  
5 with said diverging surface or surfaces of said rod, substantially as and for the purpose specified.

2. An electric-arc lamp provided with a carbon-holding rod having interior or exterior longitudinally-diverging surfaces, in combination with a friction feed mechanism engaging with said interior or exterior longitudinally-diverging surfaces of said rod, substantially as specified.

15 3. An electric-arc lamp provided with a carbon-holding rod having two longitudinally-diverging edges, in combination with a feed mechanism engaging with said longitudinally-diverging edges of said rod, substantially as specified.

20 4. An electric-arc lamp provided with carbon-holding rod or rods having one, two, or more offsets, each longitudinal portion thereof having diverging surfaces, in combination  
25 with a friction feed mechanism adapted to engage with said diverging surfaces of said rod or rods, substantially as specified.

30 5. In an electric-arc lamp, the combination of a carbon-holding rod having longitudinally-diverging surface or surfaces, a suitable guide

for said rod, a clutch feed mechanism consisting of pivoted levers J J and J' J', having contact-shoulders J<sup>2</sup> J<sup>2</sup>, adapted to engage with the diverging surface or surfaces of said rod, and a post or other suitable stop engaging  
35 with said clutch, substantially as and for the purpose specified.

6. In an electric-arc lamp, the combination of a carbon-holding rod having longitudinally-diverging surface or surfaces provided with  
40 ribs or wings adapted to pass through suitable guides for said rod, a clutch feed mechanism consisting of pivoted levers having bifurcated lower portions provided with contact-shoulders adapted to engage with the diverging  
45 surface or surfaces of said rod, substantially as and for the purpose specified.

7. A carbon-holding rod for an electric-arc lamp, composed of carbon material, having longitudinally-diverging surface or surfaces  
50 with which the feed mechanism engages, substantially as and for the purpose specified.

In testimony whereof we affix our signatures in presence of two witnesses.

MAURICE S. LOGAN.  
JAMES H. BARLEY.

Witnesses:

RUSSELL JENNINGS,  
JAMES M. BYLER.