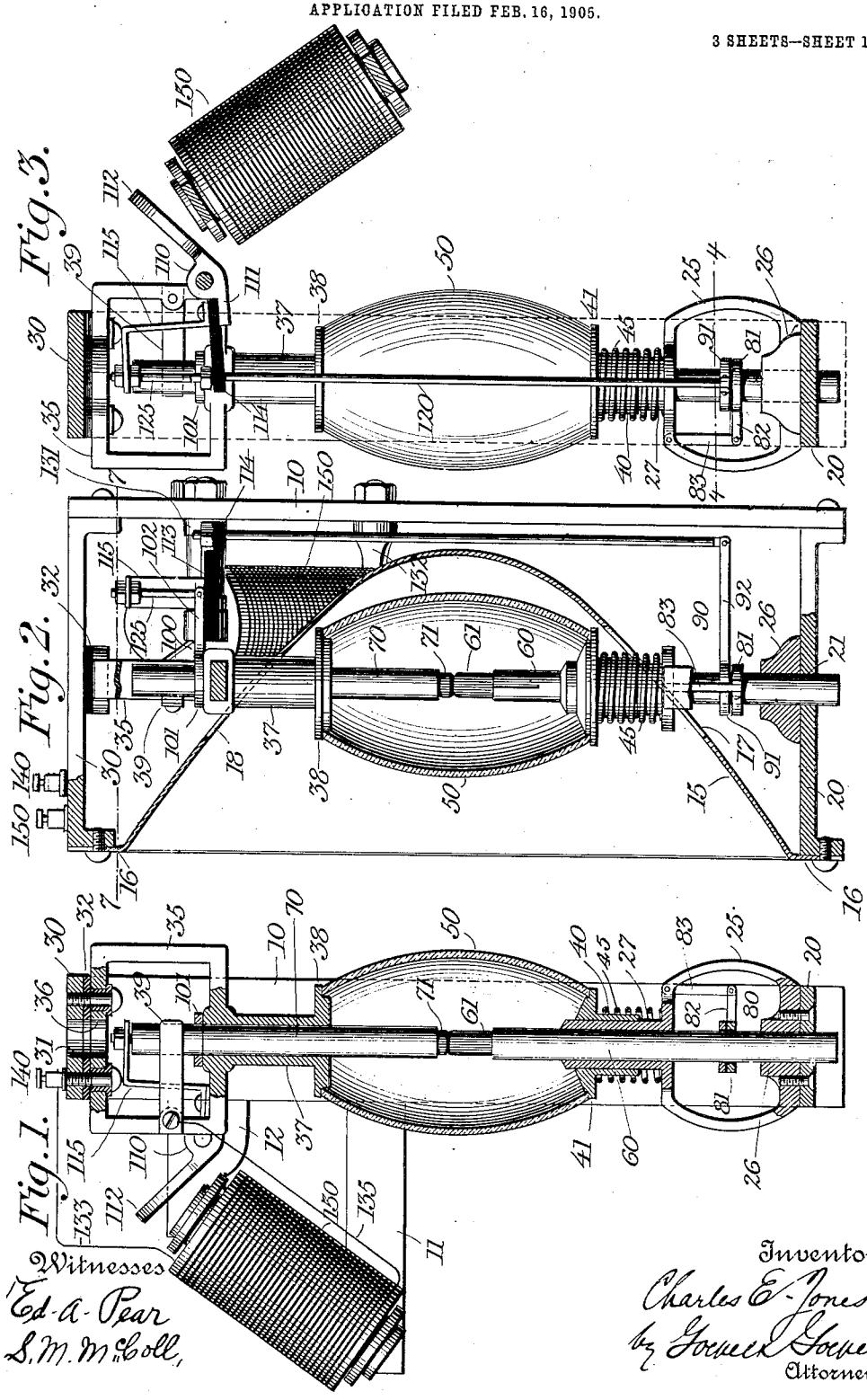
No. 839,482. PATENTED DEC. 25, 1906.

C. E. JONES.

ELECTRIC ARC LAMP.

APPLICATION FILED FEB. 16, 1905.

3 SHEETS—SHEET 1.



Witnesses
Ed. A. Pear
L. M. McColl,

Inventor
Charles E. Jones
by Goepel & Goepel
Attorneys.

No. 839,482. PATENTED DEC. 25, 1906.

C. E. JONES.

ELECTRIC ARC LAMP.

APPLICATION FILED FEB. 16, 1905.

3 SHEETS—SHEET 2.

Fig. 7.

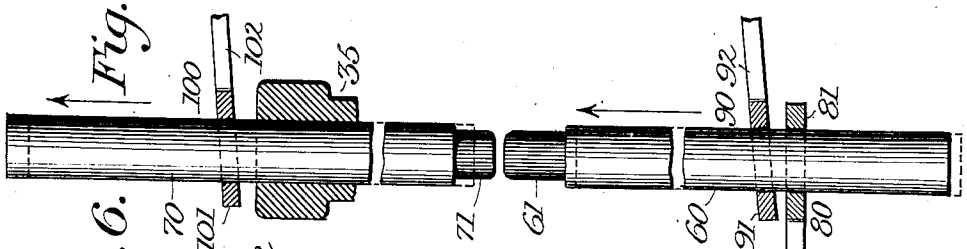


Fig. 6.

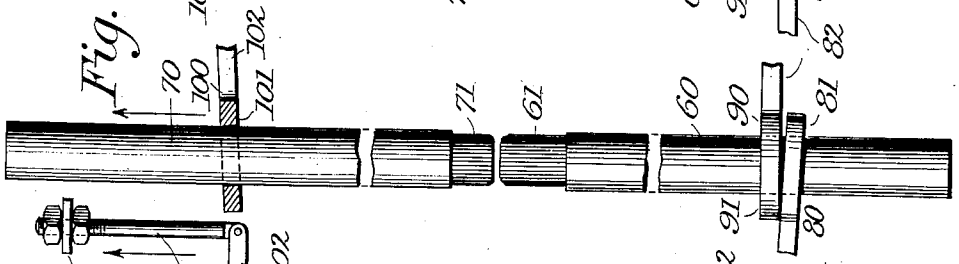


Fig. 5.

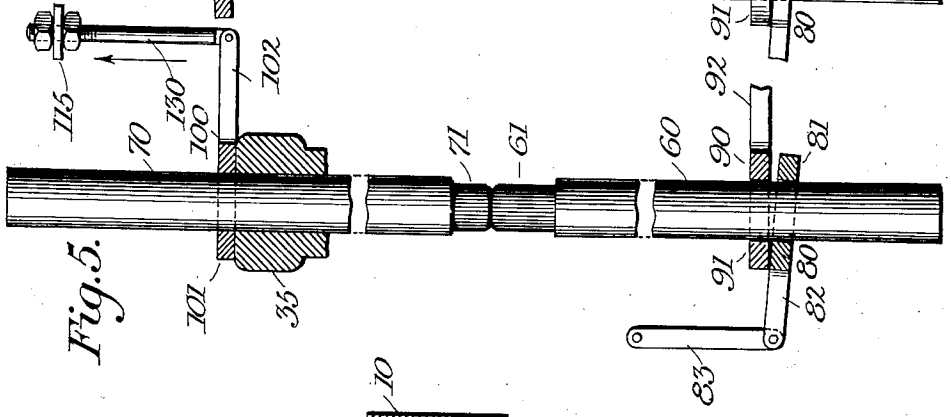
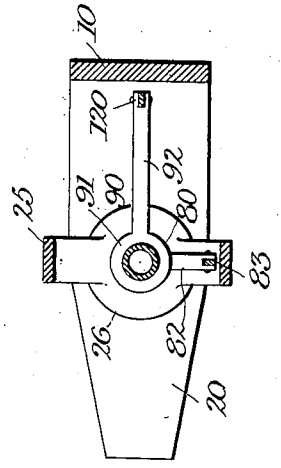


Fig. 4.



Witnesses
Edward A. Spear
S. M. McColl.

Inventor
Charles E. Jones
by Goepel & Goepel
Attorneys.

No. 839,482. PATENTED DEC. 25, 1906.

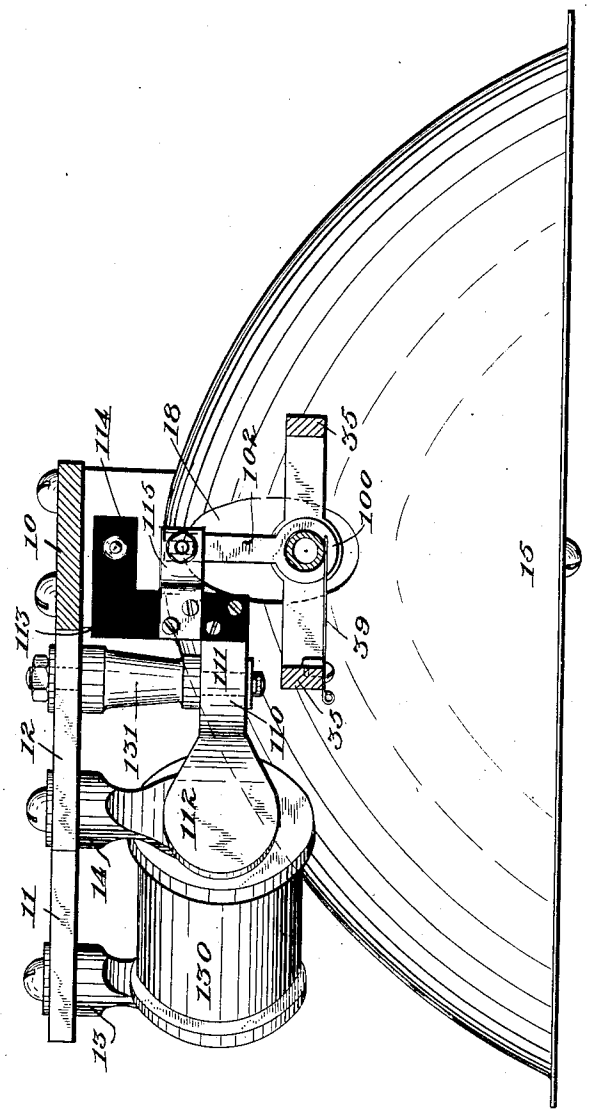
C. E. JONES.

ELECTRIC ARC LAMP.

APPLICATION FILED FEB. 16, 1905.

3 SHEETS—SHEET 3.

Fig. 8.



Witnesses

Fannie Fick

H. J. Dahrbier

Inventor

Charles E. Jones

By his Attorneys Gowen & Gowen

UNITED STATES PATENT OFFICE.

CHARLES E. JONES, OF NEW YORK, N. Y.

ELECTRIC-ARC LAMP.

No. 839,482. Specification of Letters Patent. Patented Dec. 25, 1906.

Application filed February 16, 1905. Serial No. 245,896.

To all whom it may concern:

Be it known that I, CHARLES E. JONES, a citizen of the United States of America, and a resident of New York, in the borough of the Bronx, in the State of New York, have invented certain new and useful Improvements in Electric-Arc Lamps, of which the following is a specification.

This invention relates to improvements in electric-arc lamps of that class which are known as "focusing-lamps" in which the focus of the arc is retained at the required point in a reliable manner by comparatively simple mechanism and which are especially designed for use as headlights for locomotives.

The invention consists of the relative arrangement of the differential carbon-lifting clutches and their actuating mechanism.

The invention further consists in the relative arrangement of the inclined electromagnet, the armature, the clutches, and the reflector.

In the accompanying drawings, in which the same parts are denoted by the same reference characters throughout the several views, Figure 1 represents a front view, partly in elevation and partly in central vertical section, the reflector being removed. Fig. 2 represents a side view, partly in vertical section and partly in elevation and including the reflector. Fig. 3 represents a rear view, in vertical section, on a line just in front of the supporting-standard. Fig. 4 represents, on an enlarged scale, a horizontal section on line 4 4 of Fig. 3, omitting the reflector and showing in plan the check and lifting clutches for the lower carbon. Fig. 5 represents, on an enlarged scale in section and in elevation with parts broken out, the upper and lower carbons and their controlling-clutches, the check-clutch being in active position grasping the lower carbon and the lifting-clutch being out of active position and the upper carbon resting on the lower carbon, the check-clutch being shown in shifted position for convenience of illustration. Fig. 6 is a similar view to Fig. 5, showing the relations which the parts assume in the first part of the lifting stroke of the armature, the clutch for the upper carbon having gripped the upper carbon and lifted it away from the lower carbon, the latter remaining in the grasp of the check-clutch. Fig. 7 is a similar view to Figs. 5 and 6, showing the relations of the parts at or near the latter end of the lifting stroke of the armature, showing both clutches in action, the lower carbon being lifted the feeding distance and the upper carbon being lifted sufficiently above the lower carbon to form the electric arc. Fig. 8 represents an enlarged horizontal section on line 7 7 of Fig. 2.

The frame of this electric-arc headlight-lamp comprises when constructed in its preferred form a back plate, which may be a central vertical standard 10, a forwardly-extending bracket-arm 20, secured to said standard at the lower end thereof, a forwardly-extending bracket-arm 30, secured to said standard at the upper end thereof, and a lateral extension for the support of the electromagnet, preferably in the form of two arms 11 and 12, disposed one above the other and extending in the same direction from and preferably integral with the upper part of said standard, the upper arm 12 being shorter than the lower arm 11.

A parabolic reflector 15, provided with a circumferential flange 16, is secured at diametrically opposite points by means of screws or other suitable fastening devices to the outer ends of the bracket-arms 20 and 30, and its central portion extends inward to a point near the standard 10. This reflector is provided above and below its center in front of the standard 10 with holes 17 and 18, through which the carbons extend. This construction of frame and reflector constitutes a very strong and compact device.

A skeleton frame or bracket 25 is disposed on the lower bracket-arm 20 about midway of the length thereof. The bottom bar of this frame is provided with an apertured boss 26, the aperture of which registers with an aperture 21 in the bracket-arm 20. The top bar of the frame 25 is provided with an upwardly-projecting tubular extension 27, which is in alinement with the apertured boss and, together with said bars, serves as a guide for the lower carbon.

A skeleton frame 35, preferably in rectangular form, is secured to the under side of the bracket-arm 30 and insulated therefrom by the insulation 32. The top bar of this skeleton frame has an aperture 36, which registers with an aperture 31 in said bracket-arm, and the lower bar is provided with a dependent tubular extension 37, which serves as a guide for the upper-carbon holder. This guide is provided at its lower end with a flange 38, which is preferably rabbeted.

A sliding sleeve 40, provided at its upper end with a flange 41, is adapted to slide on the tubular extension 27. A spiral spring 45 rests at its lower end on the top bar of the frame 25 and engages at its upper end the flange 41 of the sliding sleeve. A lamp-globe 50 is disposed between the flange 38 of the tubular extension 37 and the flange 41 of the sliding sleeve 40, and the latter under the action of the spring 45 serves as a clamp to hold the globe in place. The lower-carbon electrode 61 is adapted to slide in the tubular guide 27 and the apertured boss 26 and is preferably provided with a sheath 60 of metal. The upper-carbon electrode 71 is adapted to slide in the tubular guide 37 and is preferably provided with a sheath 70 in the form of a metallic tube. An automatic check-clutch 80 engages the lower carbon 61 and holds it against downward movement and permits it to move upward freely under the action of its lifting-clutch. This check-clutch is in the form of a ring 81, provided with a short lateral arm 82, the latter being pivoted at its outer end to the lower end of a pendulous link 83, which is hinged at its upper end to the bracket 20 or other suitable support. The ring 81 is of a diameter sufficient to permit the carbon 61 to slide freely through it when in horizontal position. This clutch falls normally into an inclined position, in which the ring bites the carbon 61 at diametrically opposite points and in connection with the fixed tubular guide grasps and holds said carbon against vertical descent, as shown in Figs. 5 and 6, and when said carbon is lifted to feed it upward said clutch in frictional contact therewith is lifted thereby and loosens its grip thereon, permitting the latter to pass upward, as shown in Fig. 7.

The actuating feed mechanism for the carbons comprises two lifting devices in the from of ring-clutches 90 and 100, connected with the same actuating-lever and having a differential action upon the respective carbons. The clutch 90 for the lower carbon comprises a biting-ring 91, having a radial elongated arm 92, and the clutch 100 for the upper carbon comprises a similar ring 101, having a shorter radial arm 102, the shorter arm being one-half the length, more or less, of the elongated arm. The outer ends of the lateral arms 92 and 102 are connected by intermediate mechanism with the actuating-lever 110, which is pivoted at the outer end of a forwardly-projecting stud 19, attached to the arm 12. This actuating-lever is in the form of an elbow-armature and comprises a short arm 111 and a longer upwardly-inclined arm 112. The short arm 111 is provided with an extension, preferably composed of insulating material and comprising an arm 113, extending from the inner end of said lever-arm 11 rearward to a point near the standard 10, and a lateral arm 114, projecting from said arm 113. A rod 120 is connected at its upper end to the arm 114, and the arm 102 of the ring-clutch 100 is pivoted to the lower end of said rod. This rod is longitudinally adjustable at its connection with the arm 114 or otherwise. A Z-shaped bracket 115 is attached at its lower end to the arm 113 of the extension of the armature 110, and its upper end projects laterally in the same direction as the arm 114 in a plane above the latter. This bracket is fixed on the armature-lever and practically constitutes a part thereof. A short rod 125 is loosely and adjustably connected at its upper end with the upper laterally-projecting end of the bracket 115, and the arm 92 of the clutch 90 is pivoted to the lower end of said rod. This Z-shaped bracket 115, with its dependent rod 125, permits a loose connection of the clutch and gives the latter a free movement on the carbon. The rods 120 and 125 thus directly connect the clutches with the actuating-lever, and the lever has a positive control over the grip and release of carbons—that is, the upward swing of the lifting end of said actuating-lever tilts the clutches into biting position in respect to the carbons and the downward swing thereof tilts said clutches out of biting position, and the grip or release is not dependent upon a gravity-ball or other mechanism operative independently of said actuating-lever.

An electromagnet 130 for controlling the feed mechanism for the carbon electrodes 61 and 71 is disposed behind the reflector 15, the lower end of said magnet being supported on a forwardly-projecting ear 13, attached to the long lateral arm 11, and the upper end on a similar ear 14, attached to the short arm 11. By this arrangement the magnet is screened behind the reflector near the circumference thereof and its pole is in position for contact of the elbow-armature.

The operation of this electric-arc headlight-lamp will now be stated. Assuming that the parts are in the positions shown in Fig. 7, the carbons being in contact, a closing of the circuit causes the current to flow from the positive terminal 140 through the wire 133, through the coil of the electromagnet 130, through the wire 134, through the brush 39, through the upper-carbon holder 70, through the upper-carbon electrode 71, through the lower-carbon electrode 61, through the lower-carbon holder 60, through the frame 25, through the bracket-arm 20, through the standard 10, and thence through the bracket-arm 30 to the negative terminal 150. The electromagnet 130 being thus energized and the armature 110 attracted thereby, the outer arm of said armature 111 swings toward the core of the magnet, and the inner arm 112, with its insulated extension 113 114, swings upward. This upward movement of the inner end of the armature

110 operates to tilt and lift the clutches 100 and 90 and causes the rings thereof to bite the upper and lower carbons 61 and 71 and lift both differentially; but the arm of the clutch 90 being shorter than the arm of the clutch 100 and both being moved the same distance the clutch 90 promptly assumes a biting incline in relation to the upper carbon, grasping and moving it upward, and the incline of the clutch 100, owing to its longer arm being less than that of the clutch 90, the ring of the clutch 100 is tardy in gripping the lower carbon, and the latter is moved upward during the latter portion only of the upward movement of the inner end of the armature. By this differential movement of the carbons the upper carbon is moved upward before the lower carbon starts, the points of the carbons are separated, and an electric arc is formed. As the resistance of the arc increases to such an extent that little current passes through the coil of the electromagnet, the armature drops back by gravity through the weight of the carbon-adjusting rods out of engagement with the core of the electromagnet. In this downward movement of the armature the feeding-clutches 100 and 90 are brought into horizontal position and release their grips on the carbon-holders. When the lower carbon 61 is thus released by its feeding-clutch 90, it is held in adjusted position by the check-clutch 80, which acts as an escapement, and the upper carbon being released falls by gravity toward the lower carbon. The alternating attraction and release of the armature thus produces an intermittent feed of the carbon in such a manner as to maintain the arc in the focus of the reflector and insure the proper length of arc.

I claim as my invention—

1. The combination of a supporting-frame, guides disposed in vertical alinement for the upper and lower carbon electrodes, an automatic clutch for the lower carbon, differential lifting-clutches disposed in alinement with said guides and each having a positively-actuating grip for lifting the upper and lower carbons respectively, an actuating-lever positively controlling said grip, rods directly connecting said lifting-clutches respectively with said lever, and means for operating said actuating-lever.

2. A compact electric headlight whereof the back plate and reflector are disposed in close proximity and the actuating-electromagnet placed in inclined position in the space between said plate and the outer part of said reflector, said magnet being provided with an armature which is in elbow form to adapt it to its function when the magnet is in said position.

3. The combination of a supporting-frame, a reflector, guides disposed in vertical alinement for the upper and lower carbons, an automatic clutch for the lower carbon, differential lifting-clutches disposed in line with said guides for lifting the upper and lower carbons respectively, an elbow-armature with which said lifting-clutches are connected, and an inclined electromagnet for operating said armature disposed behind the reflector adjacent to the periphery thereof.

4. The combination of a supporting-frame, guides disposed in vertical alinement for the upper and lower carbons, an automatic clutch for the lower carbon, differential lifting-clutches disposed in alinement with said guides, for the upper and lower carbons, respectively, each comprising a biting-ring and a radial arm, the arm of the upper lifting-clutch being shorter than the arm of the lower lifting-clutch, an actuating-lever disposed above said clutches, pendulous rods connecting said lever with the arms of both said clutches respectively, and means for operating said actuating-lever.

5. The combination of a supporting-frame, guides in vertical alinement for the upper and lower carbons, an automatic clutch for the lower carbon, lifting-clutches for said carbons respectively disposed in the same vertical plane, an armature having extensions in different planes, pendulous rods suspended from said extensions, and connected with said clutches, and an electromagnet for actuating said armature.

6. The combination of a supporting-frame, guides disposed in vertical alinement for the upper and lower carbons, an automatic check-clutch for holding the lower carbon, lifting-clutches for the upper and lower carbons comprising biting-rings provided with radial arms, the arm of the upper clutch being shorter than that of the lower clutch, an armature having a lateral extension at its rear end, a rod depending from said lateral extension and connected with the arm of the lower clutch, a Z-shaped bracket mounted on said armature, a rod depending from said bracket and connected with the arm of the upper clutch, and an electromagnet for actuating said armature.

7. In an electric-arc lamp the combination of upper and lower carbons, clutches therefor, an electromagnet, a pivoted armature actuated thereby, an insulating-plate carried by said armature, an upwardly-extending bracket carried by said plate, a rod connecting said bracket with the clutch for the upper carbon, and a second rod connecting said insulating-plate with the clutch for the lower carbon.

8. In an electric-arc lamp, the combination of upper and lower carbons, clutches engaging them, an electromagnet disposed adjacent to the upper carbon, an elbow-armature actuated at one end by said electromagnet, a horizontal L-shaped insulating-plate attached to the opposite end of said arma-

ture and extending rearwardly therefrom, a rod connecting the rearward portion of said plate with the clutch of the lower carbon, a bracket attached to said plate and extending upward and laterally therefrom, and a rod suspended from the upper portion of said bracket between the upper carbon and the first-named rod and connected to the clutch of the upper carbon.

9. In an electric-arc lamp, the combination of a frame comprising an upright standard having arms extending laterally from one side thereof, an electromagnet mounted on said arms and disposed at an inclination to the vertical, an elbow-shaped armature pivoted adjacent said electromagnet and coacting therewith, an insulating-plate carried by said armature, upper and lower carbon lifting clutches, and means connecting said insulating-plate with both of said clutches.

10. In an electric-arc lamp, the combination of a back plate, bracket-arms extending forward from the top and bottom of said plate, a concavo-convex reflector secured at opposite points of its periphery to said arms and extending backward therefrom toward said plate and provided with holes at diametrically opposite points above and below its center, frames mounted on and dependent respectively from said bracket-arms at intermediate points thereof, guides disposed in vertical alinement on said frames and passing through the holes in said reflector, an automatic clutch for the lower electrode, differential lifting-clutches for said electrodes, an elbow-armature pivoted at one side of the line of said electrodes between said upper frame and said back plate, a long rod dependent from said armature behind said reflector and connected with the lifting-clutch for the lower electrode, a short rod forward of said long rod and dependent from an elevation of said armature, and an electromagnet for operating said armature disposed in inclined position behind said reflector between the back plate and the outer part of said reflector.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

CHARLES E. JONES.

Witnesses:

PAUL GOEPEL,

C. P. GOEPEL.