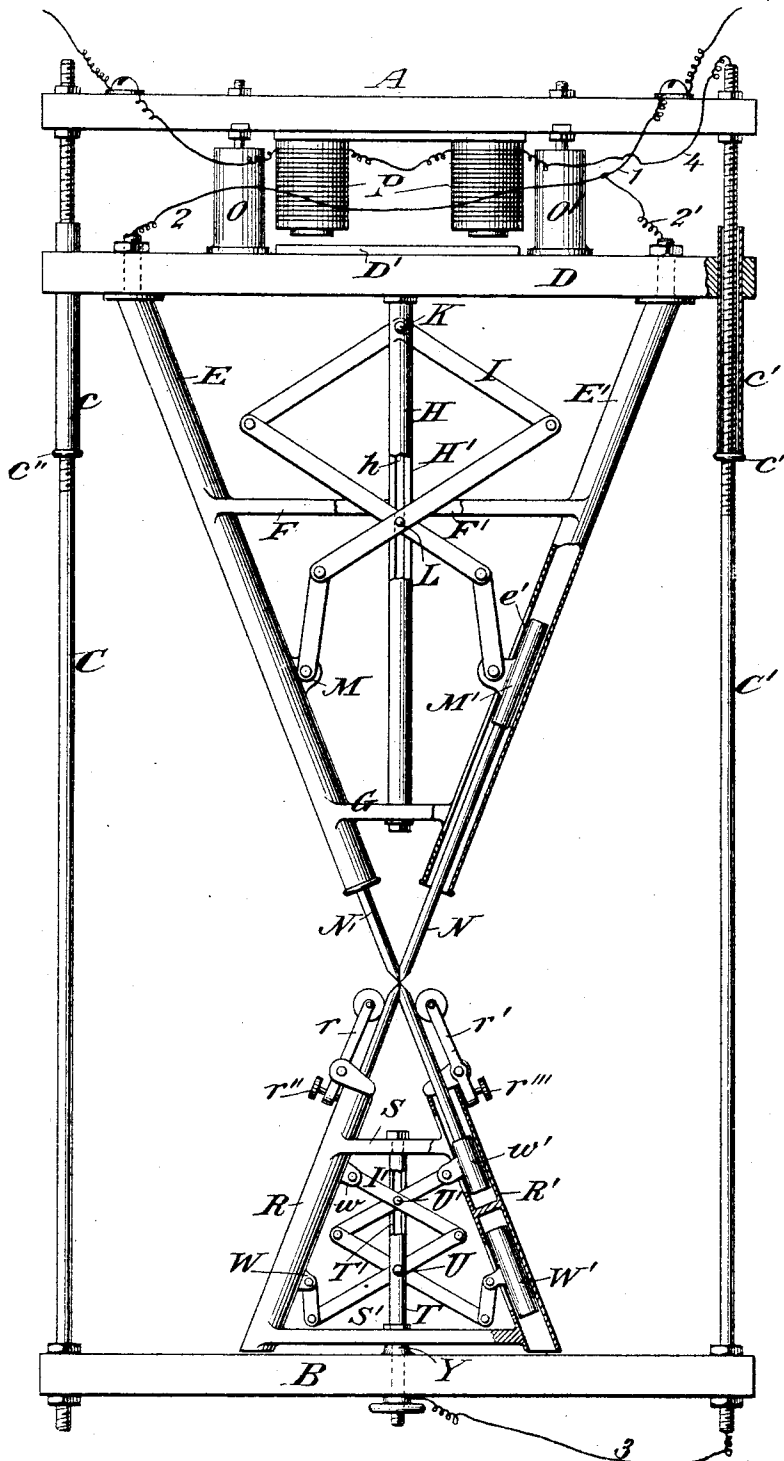


(No Model.)

J. E. WOOLVERTON.  
ELECTRIC ARC LAMP.

No. 514,583.

Patented Feb. 13, 1894.



Witnesses:-

D. H. Hayward  
Henry Mann

Inventor:-

John E. Woolverton  
by his atty.  
Nicholas M. Goodlett Jr

# UNITED STATES PATENT OFFICE.

JOHN E. WOOLVERTON, OF NEW YORK, N. Y., ASSIGNOR TO THE WOOLVERTON  
GLOW ARC ELECTRIC LIGHT COMPANY, OF SAME PLACE.

## ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 514,583, dated February 13, 1894.

Application filed September 22, 1892. Serial No. 446,642. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN E. WOOLVERTON, a citizen of the United States, residing at New York city, in the county of New York, State of New York, have invented a new and useful Improvement in Glow-Arc Electric Lamps, of which the following is a specification.

My invention relates to arc lamps and its object is to provide simple and efficient means for positively feeding the carbons or electrodes of the lamp and to permanently maintain the arc of the lamp in fixed relative position.

The invention consists of the construction hereinafter set forth.

The drawing shows a vertical projection of my lamp.

A and B are upper and lower cross bars united by the rods C and C' to form a frame. Another cross bar D is provided with sleeves c and c' sliding on the rods C C' at their upper ends. Check-nuts c'' and c''' are screw threaded on the rods beneath the sleeves and serve to limit their downward movement. On the upper side of the cross bar D' is fixed a bar of magnetizable metal to serve as an armature. Upon the under side of the bar D' are fixed a pair of converging tubes E and E', slotted on their opposing faces as seen at e'. These tubes are firmly united by means of a pair of brace rods F and F' and a single brace rod G. A pair of tubes slotted upon their opposing faces, as shown at h, are fixed at their upper ends to the lower side of the bar D' and at the lower ends to the brace rod G, passing between the brace rods F and F'. A pair of lazy tongs are hung between the tubes H and H' at K, and their pivot L is extended at each so as to pass into the tubes through their slots.

The tubes E and E' are provided with a pair of movable carbon holders M and M', having lugs protruding through their slots, to which the free ends of the tongs are pivotally connected. The carbons or electrodes N and N' are firmly fixed in these carbon holders.

Upon the lower cross bar B, directly beneath the tubes E and E', is mounted a pair of converging tubes R and R', united by the upper and lower brace rods S and S'. These tubes are rotatably supported in place by means of

a pivot Y, on the bar B, upon which the rod S' rests. The rods S and S' are united by a pair of tubes T T', slotted upon their inner faces, and between these tubes are a pair of lazy tongs I', pivotally connected at their upper ends to a pair of movable carbon holders w, w', in the tubes R and R', and pivotally connected at their lower ends to the movable weights W and W' also in the tubes R and R', but below the holders w, w'. The tongs I' are provided with two pivots u, u' which are extended so as to pass into the tubes T, T', through their slots and freely move therein as the tongs are operated. The tubes R and R' at their upper ends are provided with the regulating levers r and r', respectively, adapted to bear through antifriction rollers upon the carbons fixed in the holders w, w'. These levers have regulating screws r'' and r''', and operate to hold the ends of the lower carbons together and at the same time prevent undue friction between the carbon holders and their tubes.

Between the cross bars A and D are fixed a pair of dash pots O, O', and upon the lower side of the bar A, above the armature D', is mounted an electro-magnet P. The circuit of the lamp is from the wire 1, through the branch wires 2, 2', through the tubes E and E', upper carbons N', lower carbons, tubes R R', brace rod S', pivot Y, wire 3, rod C', wire 4, coils P and out to the main circuit. The current through this circuit energizes the coils P and attracts its armature D', thus lifting the bar D and with it the upper carbons N and N'. The arc is then formed. The upper carbons, protruding from their tubes E and E', converge, and meet in firm contact, in which position they are constantly held by reason of their own weight and that of their lazy tongs. The lower carbons in the same way meet in a common point beneath the upper carbons and are held in this position by means of the weights W and W', operating upon the carbons through the lazy tongs I'. The tubes E, E' and R, R' serve to guide the carbons in their movement. As the carbons are consumed their own weight and that of their lazy tongs positively feed them forward. The lazy tongs perform a very important function in effecting an equal feeding of both of the carbons of a pair thus pre-

venting one carbon of a pair from slipping past its mate and coming into contact with the carbons of the other pair. Both pairs are thus fed uniformly and evenly, and in the form of lamp I have shown the arc is maintained in a constant focus. I prefer to use lazy tongs to accomplish this function but do not wish to be limited to this particular means, as other means may be substituted therefor without departing from the broad spirit of my invention.

Other electrodes may of course be substituted for the carbons. Moreover, if desired, for one electrode of one or both pairs may be substituted a non-arcng electrode, the circuit in this case traversing only the arcng electrodes. Thus a rod of magnesium or other incandescing substance may take the place of the electrode N' or R' or both and the arc of the lamp will still as before be maintained in a constant focus, the light from the magnesium being added to the light from the arc. In place of the magnet P for separating the electrodes, a solenoid or other electro-magnetic means may be substituted.

Various other changes may be made without departing from the spirit of my invention.

What I claim, and desire to secure by Letters Patent, is—

1. In an arc lamp the combination of a pair of converging rods, one at least of which is an arcng electrode, and a corresponding arcng electrode, with means for equalizing the feed of the pair of rods comprising a pair of lazy tongs mechanically connected therewith, substantially as set forth.

2. In an arc lamp, the combination of a pair of upper converging rods and a pair of lower converging rods, one at least of each pair being an arcng electrode, with means for equalizing the feed of both members of each pair of rods comprising a pair of lazy tongs mechanically connected therewith, substantially as set forth.

3. In an arc lamp, the combination of a pair of upper converging rods and a pair of lower converging rods, one at least of each pair being an arcng electrode with means for equalizing the feed of both members of each pair of rods comprising guide tubes for the rods

and a pair of lazy tongs mechanically connected therewith, substantially as set forth.

4. In an arc lamp, the combination of a pair of upper converging rods, one at least of which is an arcng electrode,—and a lower arcng electrode, with means for equalizing the feed of said pair of upper rods comprising a pair of lazy tongs mechanically connected with the said pair of rods, and guide tubes therefor, substantially as set forth.

5. In an arc lamp, the combination of a pair of upper converging rods, one at least of which is an arcng electrode,—and a lower arcng electrode, with means for equalizing the feed of said pair of rods, comprising a pair of lazy tongs mechanically connected with the said rods and guide tubes for the rods,—and electro-magnetic means for separating the electrodes controlled by the circuit for the lamp, substantially as set forth.

6. In an arc lamp, the combination of a pair of upper converging rods, a pair of lower converging rods, one at least of each pair being an arcng electrode, with means for equalizing the feed of both members of each pair of rods comprising a pair of lazy tongs for each pair of rods and guide tubes for the rods, substantially as set forth.

7. In an arc lamp, the combination of a pair of upper converging rods, a pair of lower converging rods, one at least of each pair being an arcng electrode, with means for equalizing the feed of both members of each pair of rods comprising a pair of lazy tongs for each pair of rods, guide tubes for the rods, and electro-magnetic means for separating the electrodes controlled by the circuit for the lamp, substantially as set forth.

8. In an arc lamp, the combination of a main frame having a pair of vertical rods, a cross bar for supporting a pair of lazy tongs carrying a pair of converging rods, one at least of which is an electrode, and moving up and down on said vertical rods, with electro-magnetic means for operating the cross bar.

JOHN E. WOOLVERTON.

Witnesses:

OSCAR WEHLE,  
L. J. CONLEY.