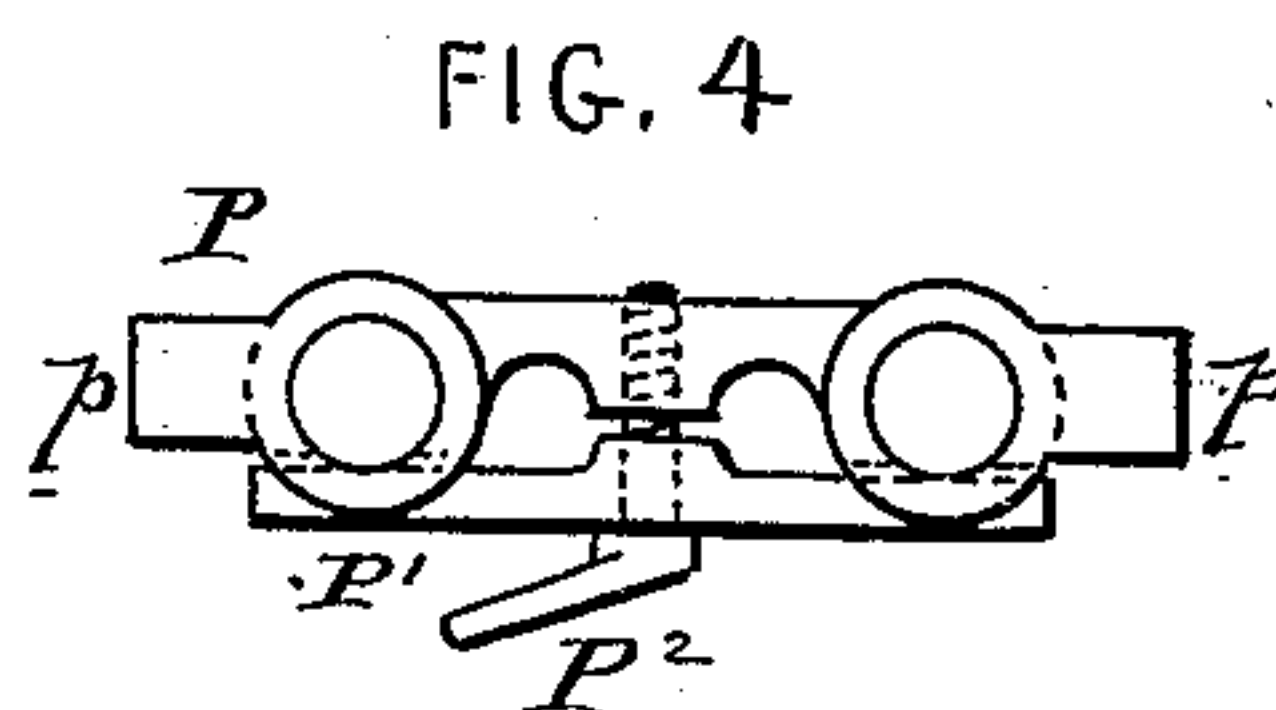
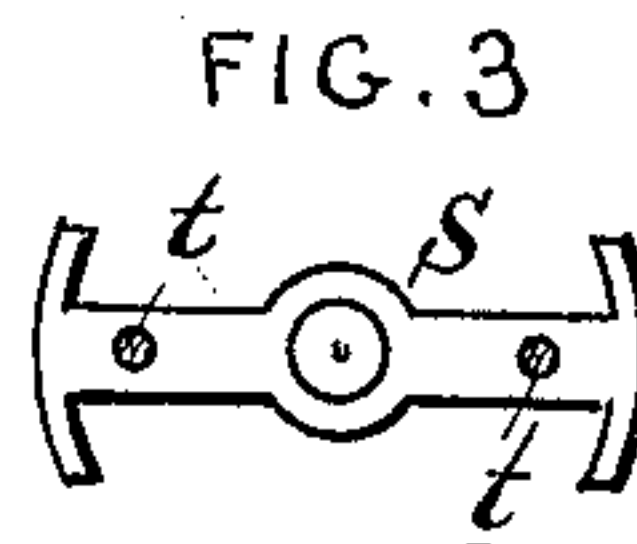
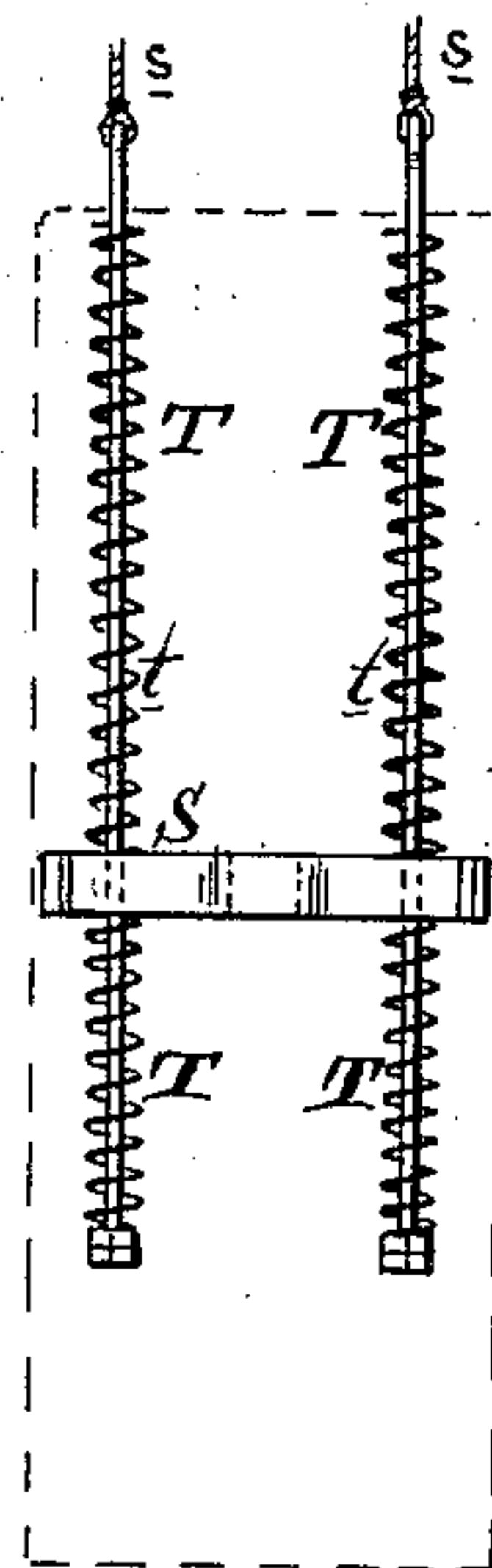
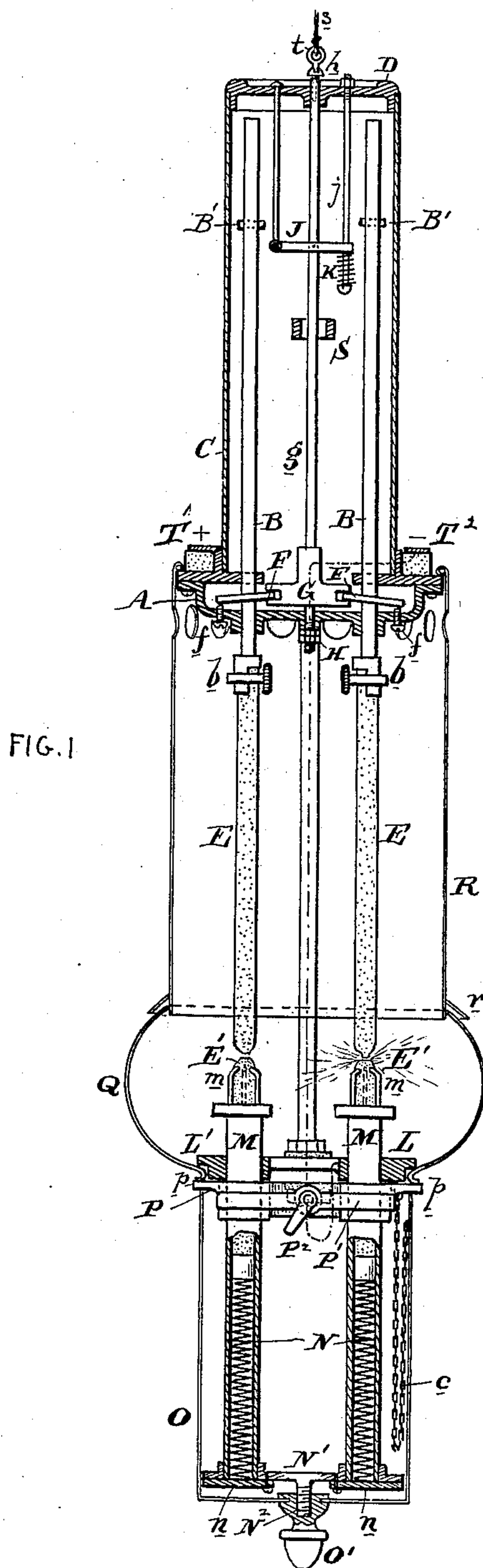


(No Model.)

R. M. HUNTER.  
ELECTRIC ARC LAMP.

No. 509,168.

Patented Nov. 21, 1893.



Attest  
*H. R. Matherwell*

Inventor  
*R. M. Hunter*



# UNITED STATES PATENT OFFICE.

RUDOLPH M. HUNTER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO  
THE THOMSON-HOUSTON ELECTRIC COMPANY, OF CONNECTICUT.

## ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 509,168, dated November 21, 1893.

Application filed June 29, 1893. Serial No. 479,118. (No model.)

*To all whom it may concern:*

Be it known that I, RUDOLPH M. HUNTER, of the city and county of Philadelphia and State of Pennsylvania, have invented an Improvement in Electric-Arc Lamps, of which the following is a specification.

My invention has reference to electric arc lamps, and consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings which form a part thereof.

This application, Case No. 257, has particular reference to arc lamps especially adapted to operate in the manner set forth in Letters Patent No. 493,360, patented to me on March 14, 1893, and while embodying the general principles of the lamp set out in said Letters Patent, being so combined with duplicate carbon holders that the lamp is what may be termed a double carbon or all night lamp.

My object is to provide a construction of lamp which shall be condensed into the smallest possible space and especially designed to be supported upon the free end of a light laterally projecting arm from a lamp post of the character set out in the aforesaid Letters Patent, and more particularly for use in connection with the lamp post structure set out in my application, Case No. 256, Serial No. 479,117, filed June 29, 1893.

My improved lamp comprehends certain constructions which are especially adapted to the lamp post set out in the aforesaid Letters Patent and in the application specified, but which are also adapted to be used in various connections and with various types of regulators.

In carrying out my invention I provide two vertical feeding rods for the two upper carbons, and two independent supporting clamps adapted to respectively operate said rods, and combine therewith a single feeding device for operating said supporting clamps for the purpose of successively feeding the two carbon holder rods. Furthermore, I provide at the lower part of the lamp two guide tubes provided with claws at the top. The negative carbons are fed up through the tubes under the action of springs and held from passing

freely therethrough by claws. The arc is thus maintained in a definite place and a very small inclosing globe may be employed. I employ a surrounding tubular casing above and below the globe for the purpose of preventing sparks flying outward, for collecting the carbon dust given off by the arc, and for ornamental appearance.

Various details of construction are specified hereinafter and are illustrated in the drawings by reference to which a better understanding of the various improvements will be had.

Figure 1 is a sectional elevation of an electric lamp embodying my invention. Fig. 2 is an elevation of the supporting devices. Fig. 3 is a plan view of a portion of the supporting devices; and Fig. 4 is a plan view of the clamp for holding the globe in position.

A is a casting of suitable shape and provided with guides for the two carbon holding rods B, B, having carbon holders *b* at their lower extremities. The casting A has secured to it upon the upper side a light tube C which acts as a shield about the rods B, B and the other apparatus of the lamp. The tube C is provided at the top with a head D.

F, F are two lifter rings of any well known construction and are adapted to be moved upward by a head G so as to lift the two rods B, B. When the head G is lowered, the rings F strike the adjustable screw stops *f* which trip the rings and allow the rods B, B to feed downward. The adjustable stops *f* are so adjusted that one ring F feeds before the other to insure one of the carbons being fed downward until consumed before the arc is formed between the second pair of carbons. The lifter head G is secured to a rod *g* which is guided at the bottom in the casting A and at top in the head or cap D. Lock nuts *h* at the bottom limit the upward movement of the rod *g* and the head G. The rod *g* is pressed upward with an elastic pressure by a cross arm J which is pivoted to the rod *g*, and at its other end is forced upward by a spring K carried upon a guide rod *j* which may be adjusted vertically to vary the tension of the spring as will be evident by an examination of the draw-



ings. The extreme upper part of the rod *g* is provided with an adjustable screw *h* which is directly actuated by the regulator in the manner set out in my patent aforesaid, and also as clearly disclosed in my pending application above referred to. It will now be understood that if the part *h* is depressed, one of the carbon rods *B* will feed its carbon *E* downward maintaining the arc between the said carbon *E* and the corresponding lower carbon *E'*. While the other carbon holder and its carbon are raised and lowered they are not moved sufficiently to cause the feeding action to the rod. After the first carbon is fully consumed, its rod is supported by the shoulder collar or pin *B'*, thereof acting in contact with the casting *A*, and remains suspended while the second carbon and its rod are fed downward by the continued action of the head *G* and rod *g*.

*L* is a bottom plate which is connected to and insulated from the casting *A* by tubular rods *l* as is customary in arc lamps. This plate *L* is provided with two vertical guide tubes *M, M* provided at their upper parts with retaining claws *m* which limit the upward movement of the lower or positive carbons *E'*.

*N* are springs adapted to press the carbons *E'* upward to compensate for their consumption. These springs *N* are inclosed within the tubes *M* and are held in position by caps *n* hinged to the underside of a cross bar *N'* carried upon the lower ends of the tubes *M*.

*Q* is a globe of glass or porcelain and is supported by an adjustable clamp *P* carried upon the tubes *M, M*. The clamp *P* is clearly shown in Figs. 1 and 4. It consists of a casting provided with two holes so as to be guided vertically upon the tubes *M* and furnished with a clamping bar *P'* pressed against the tubes by a clamping screw *P<sup>2</sup>*.

The clamp *P* is provided with lateral projections *p* which project under the base of the globe and press it upward against the annular rim *L'* of the plate *L* and thus hold it securely in position, and at the same time permit of its easy removal. When the clamp *P* is lowered the globe descends with it, and then by a lateral shifting and depressing of one side of the globe it may be readily removed from the lamp.

*R* is a polished metallic casing provided with a series of holes near its top for the escape of hot gases and vapors and is furnished further with an inward projection at the upper portion so that it hangs upon the casing *A*, though this is not essential. The lower part of the case *R* projects slightly into the top of the globe *Q* and is provided with an outwardly extending flange *r* to shield the space between the globe and the case. I prefer to make the space between the lower end of the case *R* and the globe *Q* large enough to permit the ready passage of air so as to assist in keeping the lamp cool.

*O* is a lower casing and is adapted to fit up to the under side of the globe. It is prevented

from turning by the clamp *P*. The lower part of the case *O* is provided with a hand nut *O'* adapted to screw upon a threaded projection *N<sup>2</sup>* extending downwardly from the cross bar *N'*. When the case has been pressed up into position, the turning of the nut *O'* holds it in such position. When it is desired to insert new carbons the nut *O'* is turned to release the case *O* which is then lowered and hangs to one side by means of a chain *c*.

The dust due to the disintegration of the carbons and all cinders and sparks are retained in the lamp and collected in the case *O*. The cases *O* and *R* combined with the small globe *Q* give a very highly finished effect to the lamp in practice. By making the lower carbons feed up to the claws *m*, the arc is maintained at substantially one position, and for this reason the globe *Q* may be exceedingly small, being only the size of an ordinary globe to a gas burner. Sufficient air enters around the lower part of the lamp to keep it cool, and more or less air may be permitted to enter by providing suitable holes as may be desired.

*T*, and *T'* are the terminals of the lamp. One of these terminals is connected with the casing *C*; the other terminal is connected with the lower plate *L* as indicated in dotted lines, the conductor passing down through one of the hollow rods *l*.

The lamp is suspended in substantially the manner set out in my aforesaid patent and pending application. In the particular construction shown in this application I employ a cross bar *S* arranged within the casing *C* and provided with a large central opening through which the rod *g* freely works. The cross bar is somewhat curved upon its ends so as to fit the interior of the case *C*. Two vertical rods *t, t* are connected at *s s* to the lifting cords for lifting the lamp up to the end of the lamp post arm. Springs *T, T* encircle the rods *t* so as to sustain the lamp with an elastic support and at the same time permit the cords to be drawn tight. When the lamp enters its guides in the manner described in the aforesaid Letters Patent and application, the springs *T* hold it firmly in position so that the screw *h* is in the right position to be actuated by the electric regulator devices. It is quite evident that the lifting solenoids of the regulator, such as set out in my patent and application, Case No. 256 aforesaid, might be applied directly to the rod *g* acting as a core and inclosed within the case *C*, for the lamp is excellently adapted to permit the regulator to be arranged within its case. The special form of lamp however, is more particularly designed for use in connection with the electric lamp post wherein the regulator is supported upon the post proper and at a considerable distance from the lamp which it regulates and with which connection is made by a fine wire and levers.

While I prefer the construction shown I do not limit myself to the details thereof as



they may be modified in various ways without departing from the principles of my invention.

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

1. In an electric lamp, the combination of the lamp frame or case, with two carbon feeding rods provided with carbon holders, feeding devices for each of the rods, and a vertically movable part adapted to operate both of the feeding devices and extending upward through the top of the frame or case into an exposed position.

2. In an electric lamp, the combination of the lamp frame or case, with two carbon feeding rods provided with carbon holders, feeding devices for each of the rods, a vertically movable part adapted to operate both of the feeding devices and extending upward through the top of the frame or case into an exposed position, and a spring device to normally hold the feeding devices in an upward position and thereby suspend the carbons out of contact.

3. In an electric lamp, the combination of the lamp frame or case, with two carbon feeding rods provided with carbon holders, feeding devices for each of the rods, a vertically movable part adapted to operate both of the feeding devices and extending upward through the top of the frame or case into an exposed position, a spring device to normally hold the feeding devices in an upward position and thereby suspend the carbons out of contact, and adjusting devices for adjusting the extent of the movement of the feeding devices.

4. In an electric lamp, the combination of the lamp frame or case, with two carbon feeding rods provided with carbon holders, feeding devices for each of the rods, a vertically movable part adapted to operate both of the feeding devices and extending upward through the top of the frame or case into an exposed position, two carbon holders at the lower part of the lamp provided with claws to limit the upward movement of the carbons, and spring actuated devices to feed the lower carbons upward to compensate for their consumption.

5. In an electric lamp, the combination of the lamp frame or case, with two carbon feeding rods provided with carbon holders, feeding devices for each of the rods, a vertically movable part adapted to operate both of the feeding devices and extending upward through the top of the frame or case into an exposed position, two carbon holders at the lower part of the lamp provided with claws to limit the upward movement of the carbons, spring actuated devices to feed the lower carbons upward to compensate for their consumption, a globe, and a supporting clamp for the globe carried upon the lower carbon holders.

6. In an electric lamp, the combination of the lamp frame or case, with two carbon feed-

ing rods provided with carbon holders, feeding devices for each of the rods, a vertically movable part adapted to operate both of the feeding devices and extending upward through the top of the frame or case into an exposed position, two carbon holders at the lower part of the lamp provided with claws to limit the upward movement of the carbons, spring actuated devices to feed the lower carbons upward to compensate for their consumption, a globe, a supporting clamp for the globe carried upon the lower carbon holders, a dust casing inclosing the lower carbon holders below the globe, and a hand operated clamp device for adjustably securing the dust case in position.

7. In an electric lamp, the combination of the lamp frame or case, with two carbon feeding rods provided with carbon holders, feeding devices for each of the rods, a vertically movable part adapted to operate both of the feeding devices and extending upward through the top of the frame or case into an exposed position, two carbon holders at the lower part of the lamp provided with claws to limit the upward movement of the carbons, spring actuated devices to feed the lower carbons upward to compensate for their consumption a globe, a supporting clamp for the globe carried upon the lower carbon holders, a dust casing inclosing the lower carbon holders below the globe, a hand operated clamp device for adjustably securing the dust case in position, and a chain connecting the dust case with a portion of the lamp structure whereby when the case is lowered it hangs to one side to permit the ready renewal of the carbons.

8. In an electric lamp, the combination of the lamp frame or case with two carbon feeding rods provided with carbon holders, feeding devices for each of the rods, a vertically movable part adapted to operate the feeding devices and extending upward through the top of the frame or case into an exposed position, two carbon holders at the lower part of the lamp provided with claws to limit the upward movement of the carbons, spring actuated devices to feed the lower carbons upward to compensate for their consumption, a globe, a supporting clamp for the globe carried upon the lower carbon holders, a dust casing inclosing the lower carbon holders below the globe, hand operated clamp device for adjustably securing the dust case in position, and an upper removable case arranged between the upper part of the frame or case of the lamp and the top of the globe whereby the upper carbons are inclosed and sparks retained.

9. In an electric lamp, the combination of the main frame of the lamp, upper carbon holders and their feeding devices, two vertical tubular holders for the lower carbons provided with retaining devices at their top, springs to press the carbons upward through said tubular holders, a vertically movable guide clamp guided upon the tubular hold-



ers and movably clamped thereon, and a globe supported by said clamp and adapted to be clamped between a portion of the main frame and the adjustable clamp.

5 10. In an electric lamp, the combination of the casting or frame A having guides for the vertical feeding rods B B provided at their lower parts with carbon holders, the upwardly extending tube or case C provided at the top  
10 with a cap or head D, suitable feeding devices for the carbon holder rods B B, a vertical spring actuated feeding rod g arranged within the tube or case C and extending upwardly through the top of the head D, and suitable  
15 lower carbon holders.

11. In an electric lamp, the combination of the main frame provided with a tubular casing at the top, the upper feeding rods for the upper carbons and the feeding devices there-  
20 for, inclosed by said casing, a transverse bar arranged within the casing, two lifting rods extending down into the casing and through the transverse bar, and springs encircling the said rods for supporting the lamp with an  
25 elastic support.

12. In an electric lamp, the combination of the upper carbon holders and upper feeding

devices, with two tubular holders for the lower carbons, a cross bar at the bottom of the tubular holders, a dust case inclosing the lower  
30 parts of the tubular holders, and a hand operated clamping device between the case and the cross bar for detachably holding the dust case to the said cross bar.

13. In an electric lamp, the combination of  
35 a main frame, a lower tubular carbon holding guide having claws or stops at its upper part to limit the upward movement of the lower carbon, a spring or upward pressure device for feeding the lower carbon upward, a ver-  
40 tically movable feeding rod and holder for the upper carbon, feeding devices for operating the upper carbon rod, and a globe inclosing the adjacent ends of the upper and lower  
45 carbons supported by the lower carbon holder and having a vertical height less than the length of movement of the feeding rod for the upper carbon.

In testimony of which invention I have hereunto set my hand.

R. M. HUNTER.

Witnesses:

HELEN L. MOTHERWELL,  
ERNEST HOWARD HUNTER.