(No Model.) 2 Sheets—Sheet 1.

R. M. HUNTER.

ELECTRIC ARC LAMP.

No. 499,676. Patented June 13, 1893.

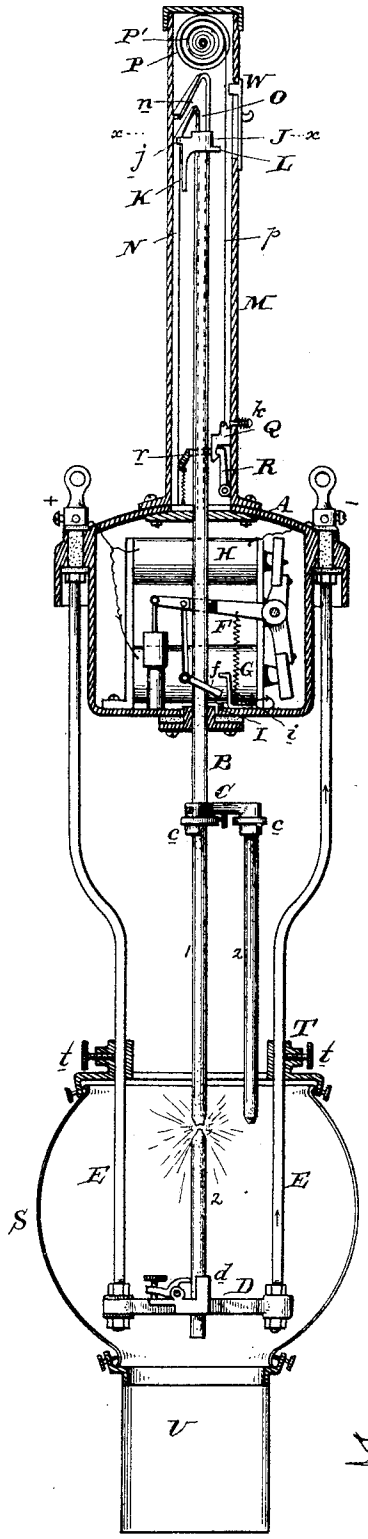

FIG. 1

Attest
C. M. Dieterich
H. L. Motherwell.

Inventor
R. M. Hunter

(No Model.)

2 Sheets—Sheet 2.

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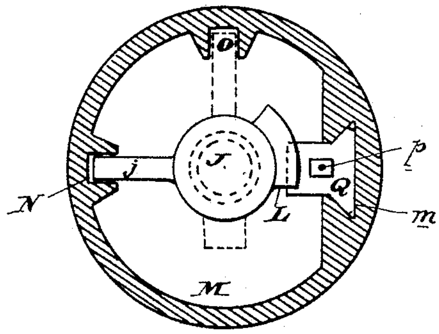
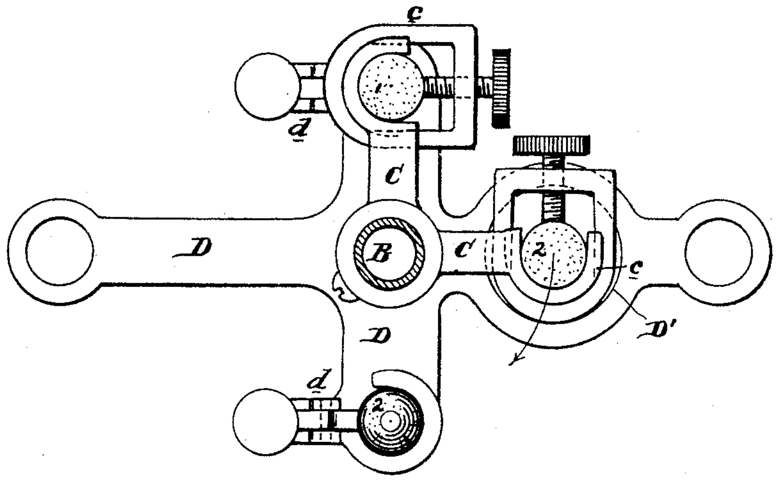


FIG. 2.

FIG. 3



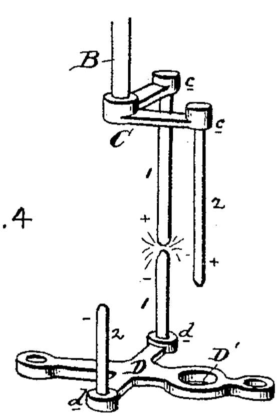


FIG. 4

Attest

Inventor

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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. 499,676, dated June 13, 1893.

Application filed March 28, 1893. Serial No. 467,988. (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 Arc Lamps, of which the following is a specification.

My invention has reference to 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. 245, comprehends improvements upon that class of arc lamps known as double carbon lamps and sometimes called all night lamps from the fact that they have two sets of carbons which are consumed in pairs, one set being brought into operation after the consumption of the other set. In the common form of lamps of this description it has been customary to provide two sets of carbon holders each movable independently of the other and combined with regulator mechanism and independent feeding devices adapted to bring the said independent carbon holders into operation successively, that is to say, to feed one carbon holder until its carbon is completely consumed, and then bring into feeding operation the second carbon holder. In all of those cases there were two independent feeding devices for the carbon holder rods, that is to say, one for each rod.

In carrying out my invention I dispense with the duplicate carbon holders, duplicate rods, and duplicate feeding devices, and instead arrange both of my movable carbons in a single holder frame carried by a single rod operated by a single feeding device, and combine therewith, suitable means to raise the carbon holder after one set of carbons has been fully consumed, rotate it upon its axis to bring the second set of carbons into operative position, and then permit the further action of the regulator to regulate the consumption of the second set of carbons. This construction I have found in practice excellently adapted to the purpose.

It is quite evident that the carbon holders may be shifted relatively by various modifications of my invention. Hence my improvement may be broadly stated as comprising the combination of two pairs of carbon holders, a single electric regulator to move the two pairs of carbon holders relatively toward each other, and means controlled by the regulator for shifting one or more of the carbon holders after two of the carbon holders have been brought into the closest position, whereby the second set of carbon holders of the two pairs of holders may bring its carbons into operative position.

Referring to the drawings: Figure 1 is a sectional elevation of an arc lamp embodying my invention. Fig. 2 is a cross section on line x—x. Fig. 3 is a sectional plan view at or about the letter B in Fig. 1; and Fig. 4 is a perspective view illustrating the relative positions of the carbons and their holders.

A is the frame of the lamp containing the regulator.

B is a vertically movable carbon holding rod provided at its lower end with a carbon holder C having two independent clamps c arranged at an angle to each other with respect to the carbon holder rod B, as is very clearly shown in Figs. 3 and 4. The carbons 1 and 2 are thus supported at a suitable distance apart so that the carbon 2 does not obstruct much light during the consumption of carbons 1, 1. It will be noticed that these carbons 1 and 2 carried by the rod B move vertically simultaneously and to the same extent. As the rod B is fed downward for the consumption of the carbons 1, the carbon 2 carried by the holder C passes through an aperture D′ in the base frame D to permit complete consumption of the carbons 1.

The base plate D is secured to the rods E, E fastened in any suitable manner to the frame A, and is provided with clamps d, d for the lower carbons so located that the upper carbon 1 may operate in alignment with the lower carbon 1, and the upper carbon 2 be out of alignment with the lower carbon 2 during the consumption of the carbons 1, 1 and then upon raising the rod B and rotating it, the movable carbon 2 may be brought into alignment with the stationary lower carbon 2 and the remainder of the upper movable carbon 1 thrown out of alignment with the remainder of the lower carbon 1. The rod B may be fed downward by any suitable con-

struction of regulator, one type of which is shown in Fig. 1. Referring to this regulator, the perforated lifter *f* encircles the rod B and is moved vertically by a pivoted lever F having armatures adapted to the magnets H and G. The magnet H is a high resistance magnet wound with a shunt coil connecting with the terminals of the lamp, and the magnet G is a low resistance magnet having its coil in series with the carbons. When the lifter *f* strikes the shoulder I, the carbon rod B is liberated and falls, and when the rod B is moved upward the lifter *f* has its free end brought in contact with the bracket *i* and is thus held in position to permit easy upward movement of the rod B. The upper end of the rod B is provided with a head J having a heel L, a guide finger *j* and a shoulder K. The interior of the tube M upon the upper part of the case A is provided with two vertical grooves N and O connected at the top by an oblique groove *n*. In these grooves the guide finger *j* moves. It will now be observed that if the rod were lowered and was then raised to its full extent and then liberated it would be thrown a part of a revolution (in the construction shown, a quarter of a revolution) and then caused to descend in its newly adjusted position. In the first case the carbons 1, 1, would be kept in alignment, and in the second case the carbons 2, 2 would be kept in alignment.

Arranged in the upper part of the tube M is a cylinder P provided with a coiled spring P′ adapted to cause it to wind upon itself a lifting cord *p* having one end connected to the cylinder and at the other end to a slide Q guided in any suitable manner upon the interior of the tube M. The guide may be formed as indicated at *m* in Fig. 2. Pivoted to the lower part of the tube M is a lever R having an inclined face *r* and held by a suitable spring, or if desired, by its own weight. This lever R catches upon the slide Q and holds it in its lowermost position.

The lamp being set for operation is as indicated in Fig. 1. As the carbons 1, 1 are consumed, the rod B descends, and when the carbons are fully consumed, the shoulder K strikes the part *r* of the lever R and trips the slide Q. The spring P then comes into play and through the cylinder P and cord *p* lifts the slide Q, and this pressing upon the heel L raises the carbon holding rod B. When the finger *j* reaches the oblique groove *n* the rod is turned, and when the said finger is brought over the vertical groove O and the carbons 2, 2, brought into alignment, the heel L will have turned off of the slide Q and the carbon rod B falls a short distance to bring the two carbons 2, 2 into operative position and the lamp continues to burn. On resetting the lamp, the rod B is moved up to its fullest extent. The slide W is then pulled down bringing the slide Q approximately to the position of the dotted lines *x*—*x*. The rod B is then turned to bring the finger *j* into the groove N and this action throws the heel L over the slide Q, and in lowering the rod B the slide Q is drawn down until it is caught upon the arm R. The rod B is then lifted to the position shown in Fig. 1 and new carbons inserted. As the shoulder K would trip the arm R the instant the rod B was lowered to the full extent and thus permit the slide Q to be drawn up again, I provide a small spring catch *k* which is temporarily pushed inward when the rod B is drawn down so that the slide Q is held against rising when the rod B is pushed upward to the position shown in Fig. 1. As soon as the rod B is raised to the smallest extent the arm R catches the slide Q and the pressure on the spring catch *k* may be removed.

S is the globe and is secured to a frame T guided upon the rods E, E, and adjusted in position by clamping screws *t*. The lower part of the globe is provided with a cup U which collects the ashes and refuse from the burning carbons. When the lamp is being trimmed the globe may be lowered upon the rods E, E.

I do not confine myself to the details of construction herein set out for resetting the carbon rod for the purpose of bringing the second pair of carbons into the alignment, as it is quite evident that the same operation may be performed in a variety of ways.

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

1. In an arc lamp, the combination of two carbon holders to support one of each set of carbons, a vertically movable holder provided with two carbon holder clamps arranged at a different distance apart than the two first mentioned carbon holders, electrically actuated feeding devices for feeding the movable holder, power devices for raising the movable carbon holder clamps after the same have been fully lowered, and means to shift the said movable carbon holder clamps whereby one pair of carbons shall be brought into line and after being consumed the carbons of the other pair brought into line.

2. In an electric lamp, the combination of two stationary carbon holders, two vertically and laterally movable carbon holders adapted to be brought successively over the respective stationary carbon holders electrically actuated feeding mechanism to feed the movable carbon holders toward the stationary carbon holders, power devices for raising the movable carbon holders after being fully lowered, mechanical devices for moving the movable carbon holders laterally upon being raised, and an automatic trip device for throwing the power devices into action after the carbon holders have been fully lowered.

3. In an electric lamp, the combination of two stationary carbon holders, two vertically and laterally movable carbon holders adapted to be brought successively over the respective stationary carbon holders, electrically actuated feeding mechanism to feed the movable carbon holders toward the stationary car-

bon holders, power devices for raising the movable carbon holders after being fully lowered, mechanical devices for moving the movable carbon holders laterally upon being raised, an automatic trip device for throwing the power devices into action after the carbon holders have been fully lowered, and means for disengaging the power devices from the movable carbon holders after the same have been fully raised.

4. In an electric lamp, the combination of two fixed carbon holders, a vertically movable rod, two movable carbon holders carried by the rod and arranged at a different distance apart than the two stationary carbon holders, feeding devices for feeding the vertically movable rod to compensate for the consumption of the carbons, guiding devices for causing the rod to be turned through a portion of a revolution upon being fully raised, power devices for raising the carbon rod, and a locking device for holding the power devices out of action until the rod is fully lowered, whereby the two sets of carbons carried by the holders are successively consumed under the action of a single regulator or feeding device.

5. In an electric lamp, the combination of two fixed carbon holders, a vertically movable rod, two movable carbon holders carried by the rod and arranged at a different distance apart than the two stationary carbon holders, feeding devices for feeding the vertically movable rod to compensate for the consumption of the carbons, guiding devices for causing the rod to be turned through a portion of a revolution upon being fully raised, power devices for raising the carbon rod, a locking device for holding the power devices out of action until the rod is fully lowered, and a trip for releasing the rod from the power devices after being fully raised whereby it is free to be fed downward by the electric regulator or feeding device.

6. In an electric lamp, the combination of two independent carbon holder frames, each of which is provided with two carbon holders but arranged at different distances apart, electrically actuated feeding devices for causing a relative movement between the carbon holder frames to maintain the arc during the consumption of the carbons, and mechanical devices for automatically shifting the position of one of the carbon holder frames relatively to the other, whereby after the consumption of one pair of carbons the lamp is reset and the consumption of the second pair of carbons takes place.

7. In an arc lamp, the combination of two stationary carbon holders, two movable carbon holders, a single electrically actuated regulator or feeding device to simultaneously feed the two movable carbon holders toward the stationary carbon holders, and mechanical means for automatically moving one of the movable carbon holders to throw its carbon into alignment with the corresponding carbon of the stationary carbon holders, whereby with a single feeding mechanism or regulator two pairs of carbons may be successively burned.

8. In an arc lamp, the combination of two fixed carbon holders, a vertically movable and rotatable rod carrying two movable carbon holders, feeding devices for feeding the said rod vertically, and mechanical devices for rotating the rod upon raising it, whereby the two sets of carbons may be successively burned and regulated by a single regulator and feeding device.

9. In an arc lamp, the combination of a pair of vertically movable carbon holders, a single electric regulator to feed said carbon holders, a second pair of carbon holders adapted to operate in connection with the first mentioned pair of carbon holders, and means controlled by the regulator for shifting the carbon holders of the two pairs relatively so as to bring one holder of each pair successively into operative position, whereby one pair of carbons is consumed and then a second pair is brought into position to maintain the arc.

10. In an arc lamp, the combination of two pairs of carbon holders, a single electric regulator to move the two pairs of carbon holders relatively toward each other, and means controlled by the regulator for shifting one or more of the carbon holders after two of the carbon holders have been brought into the closest position, whereby the second set of carbon holders of the two pairs of holders may bring their carbons into operative position.

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

R. M. HUNTER.

Witnesses:
ERNEST HOWARD HUNTER,
HELEN L. MOTHERWELL.