(No Model.) 2 Sheets—Sheet 1.

R. DRYSDALE.

ARC LAMP.

No. 524,462. Patented Aug. 14, 1894.

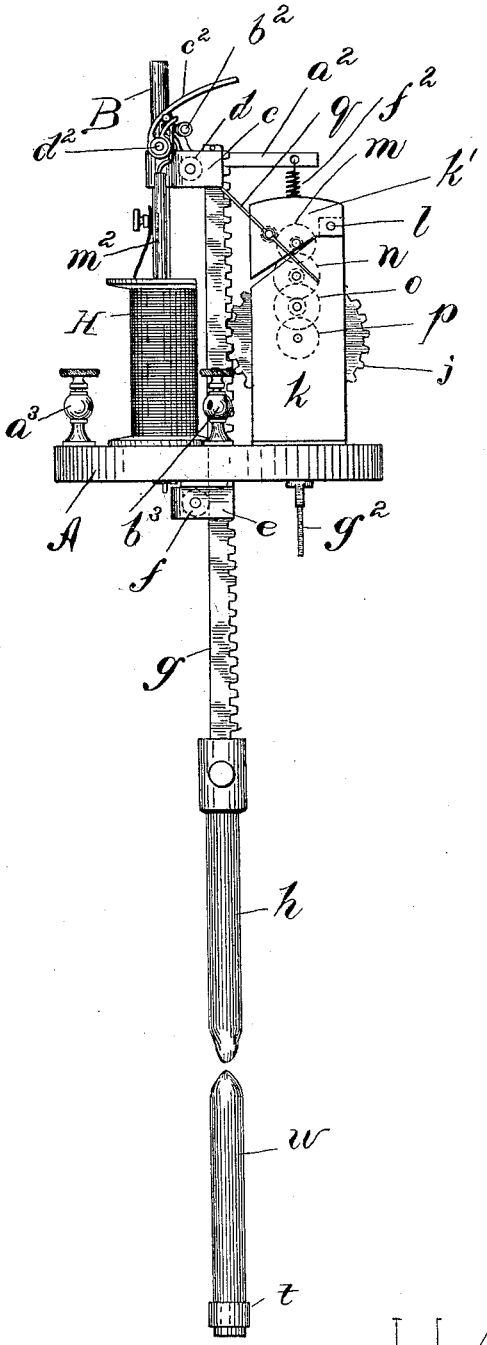

FIG. 1.

WITNESSES.

Arthur F. Randall.

Robert Wallace.

INVENTOR.

Robert Drysdale

By Macleod Calvert & Randall

his attorneys

(No Model.) 2 Sheets—Sheet 2.

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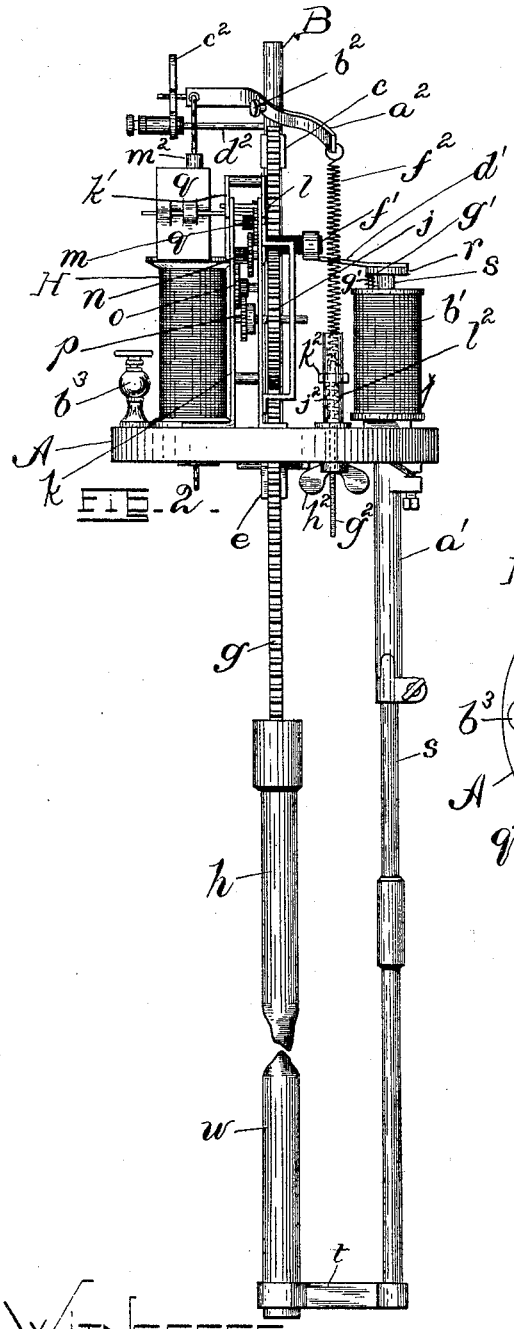

FIG. 2.

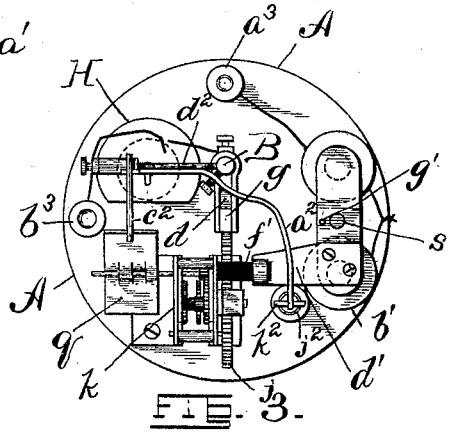

FIG. 3.

WITNESSES.

Arthur J. Randall

Robert Wallace.

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UNITED STATES PATENT OFFICE.

ROBERT DRYSDALE, OF EVERETT, MASSACHUSETTS.

ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 524,462, dated August 14, 1894.

Application filed January 14, 1893. Serial No. 458,373. (No model.)

To all whom it may concern:

Be it known that I, ROBERT DRYSDALE, a subject of the Queen of Great Britain, residing at Everett, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Arc Lamps, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention has for its object to provide an improved arc lamp which may be employed with dynamos of different outputs and the same steadiness of light obtained, which is durable, simple in construction and not liable to get out of order and which is comparatively inexpensive.

My invention relates more particularly to the mechanism by means of which the carbons are maintained at a proper distance apart while the lamp is in use.

The novel features of my invention are pointed out in the claims which are appended hereto and made a part hereof.

In the accompanying drawings, to which reference is made in the following specification I have shown my invention in the best form now known to me.

In said drawings, Figure 1 is a front elevation and Fig. 2 is a side elevation of my improved lamp with the case removed. Fig. 3 is a plan view.

A is a base preferably of wood, and preferably disk-shaped although as will be obvious the precise shape, or material employed is not essential.

On the base A is mounted an upright B upon which is a guide-arm *c* which is rigidly secured to said upright B and which carries an anti-friction roll *d*. A similar guide arm *e* is secured below the base A and is provided with a similar anti-friction roll *f*. The guide arms *c e* are for the purpose of steadying the vertical movement of the rack *g* at the lower end of which is mounted the positive carbon *h*. The rack *g* projects through a hole in the base A and the anti-friction rolls *d f* are for the purpose of securing the free movement of the rack *g*. The rack *g* is in mesh with the gear *j* which is pivoted between one of the uprights *k* which supports the gear mechanism and a bracket k^3 secured on said upright. The upper portions *k'* of the uprights are separated from the lower portions thereof and are secured together and pivoted to the lower portions at *l*. The gear *m* and its pinion are journaled in the upper portions *k'* of the uprights and when said upper portions are raised on their pivot *l* the gear *m* and its pinion are out of engagement with the train of gears *n*, *o*, *p*, and the gear *j* and are thus free to be rapidly revolved, to raise or lower the rack *g* quickly, when it is desired to put new carbons in the lamp or when for any purpose the rack *g* is to be raised or lowered rapidly. The upper portions *k'* of the uprights are normally raised as shown Fig. 1, when the lamp is not in use. In the upper parts *k'* of the uprights is journaled a fan *q* which is provided with a pinion which is in mesh with the gear *m*.

When the parts *k'* are down throwing the gear *m* into engagement with the train of gears *n*, *o*, *p* and *j* the movement of the gears is governed by the fan and the rack *g* can then be only slowly raised or lowered.

When the train of gears are in engagement and their operation is governed by the movement of the fan, the rack *g* and its carbon will fall slowly by gravity and it will be clear that if the movement of the fan be stopped, the descent of the rack *g* and the carbon will be stopped and that they will only fall as the fan is allowed to turn.

For the purpose of holding the upper portions *k'* of the uprights *k* down so that the train of gears will be in engagement with the gear *m*, when the lamp is in operation, and of raising said upper portion so that the said train of gears will be out of engagement when the lamp is not in operation, I provide the armature *r* which is secured to the upper end of the vertical rod *s*, upon a lateral extension *t* of which is secured the negative carbon *w*.

For the purpose of guiding the vertical movement of the rod *s*, a sleeve *a'* through which said rod passes is secured to the lower face of the base A as shown and the rod *s* extends upwardly through a hole in the base A and between the magnets *b'*. The armature *r* extends laterally over the poles of the said magnets and when said magnets are energized the armature is drawn down and by means of the arm *d'* which is secured thereto and which engages an insulated stud or pin

f' which projects from one of the portions k' of the frame, acts to draw down the portions k' and thus to throw the gear m into engagement with the train of gears. As soon as the current has ceased to pass through the magnets b' the armature r is raised by means of a spiral spring g' which is placed between the armature and the base A. As the magnets b' are energized when the lamp is in use, the movement of the positive carbon h is at such time controlled by the movement of the fan q while at other times as previously described the carbon h may be freely raised or lowered without moving the fan q.

It will be clear that if while the lamp is in use the movement of the fan q be governed properly the length of the arc may be nicely adjusted and maintained. To govern the movement of the fan automatically I provide the bent lever a^2 which is pivoted on the stud b^2 set in the upright B. The end of the lever a^2 plays in a recess or slot in the curved arm c^2 which is set on a stud d^2 fast in the upright B. The other end of the lever a^2 is provided with a spiral spring f^2 which is secured to a vertical rod g^2 which projects through the base A. The lower end of the rod g^2 is provided with a thumb nut h^2 by means of which the rod may be adjusted vertically, the upper end of the rod projecting into a sleeve j^2 set on the base. The upper end of the rod g^2 is provided with a cross piece k^2 which lies in vertical slots in the sleeve j^2 and which prevents the rod from turning and guides it in its vertical movement. A spiral spring l^2 is placed inside the sleeve j^2 underneath the cross-piece k^2 and serves to hold the rod g^2 up in position. The spring f^2 which is connected, as previously stated, with the end of the lever a^2 is secured to the upper end of the rod g^2 and as the rod g^2 is moved to a higher or lower position by means of the thumb nut h^2, the tension of the spring f^2 may be diminished or increased as will be obvious. The spring f^2 normally acts to hold the end of the lever a^2, with which it is connected, down and thus to raise the other end of the lever a^2 and the arm c^2 and to keep the arm c^2 out of the path of the fan q.

H is a solenoid having a core m^2 which depends from the arm a^2 upon which the shank of the core is hung. When the solenoid is energized by means of the passage of a current therethrough, the core m^2 is immediately drawn down carrying the end of the lever a^2 to which it is attached downwardly and swinging the arm c^2 downwardly into the path of the fan q thus interfering with the movement of the fan and stopping the train of gears and the downward movement of the rack g and carbon h. A very slight movement of the solenoid core is thus multiplied in the movement of the end of the arm c^2 which engages the fan. When, however, the arc has grown slightly longer than it ought to be by reason of the wasting of the carbon, the solenoid allows the core m^2 to rise slightly freeing the fan q and allowing the carbon to descend. As soon as it has descended until the arc is of the proper length, the arm c^2 is again moved downwardly slightly into the path of the fan q and the downward movement of the carbon h is arrested. By this arrangement the mechanism may be finely adjusted so that the fan will be allowed to revolve at each movement with an intermittent period of rest while the carbon is burning and thus the length of the arc may be maintained at substantially a constant figure, securing great steadiness in the light.

It will be noted that the mechanism is inexpensive, and simple, and not likely to get out of order. It may be regulated by turning the thumb screw h^2 without opening the case which incloses the mechanism. No high resistances or shunt coils are employed.

Binding posts are shown at a^3 b^3 by means of which the electric wires are connected with the device. The current enters at b^3 passes through the solenoid to the upright B, thence down the rack g through the carbons, through the rod s and sleeve to the magnets b', thence out by the post a^3.

To adjust the lamp for various outputs of current it is only necessary to turn the adjusting nut h^2 thus varying the tension of spring f^2 and increasing or diminishing the resistance of the core m^2 to the action of the solenoid coil.

What I claim is—

1. An arc lamp having a movable rack carrying a carbon, gear mechanism provided with a fan and engaging said rack, a movable frame in which said fan is mounted and an electro magnet in circuit with the lamp for governing the position of said frame, a movable arm for engaging said fan, said arm being moved into engagement with said fan by means of a solenoid in circuit with the lamp, and out of engagement with said fan by means of a spring-impelled lever, substantially as set forth.

2. An arc-lamp having a movable rack carrying a carbon, a fan geared to said rack, an electro-magnet in circuit with the lamp, means operated by said electro-magnet for breaking and re-establishing the train of connections between the fan and the rack, a movable arm for engaging said fan, a lever engaging said arm to move the same, a spring acting on said lever to move the arm out of engagement with the fan, and a solenoid acting to move the lever and throw the arm into engagement with the fan, all substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT DRYSDALE.

Witnesses:
WM. A. MACLEOD,
ROBERT WALLACE.