(No Model.)

J. A. MOSHER.

ELECTRIC ARC LAMP.

No. 467,610. Patented Jan. 26, 1892.

Fig. 1.

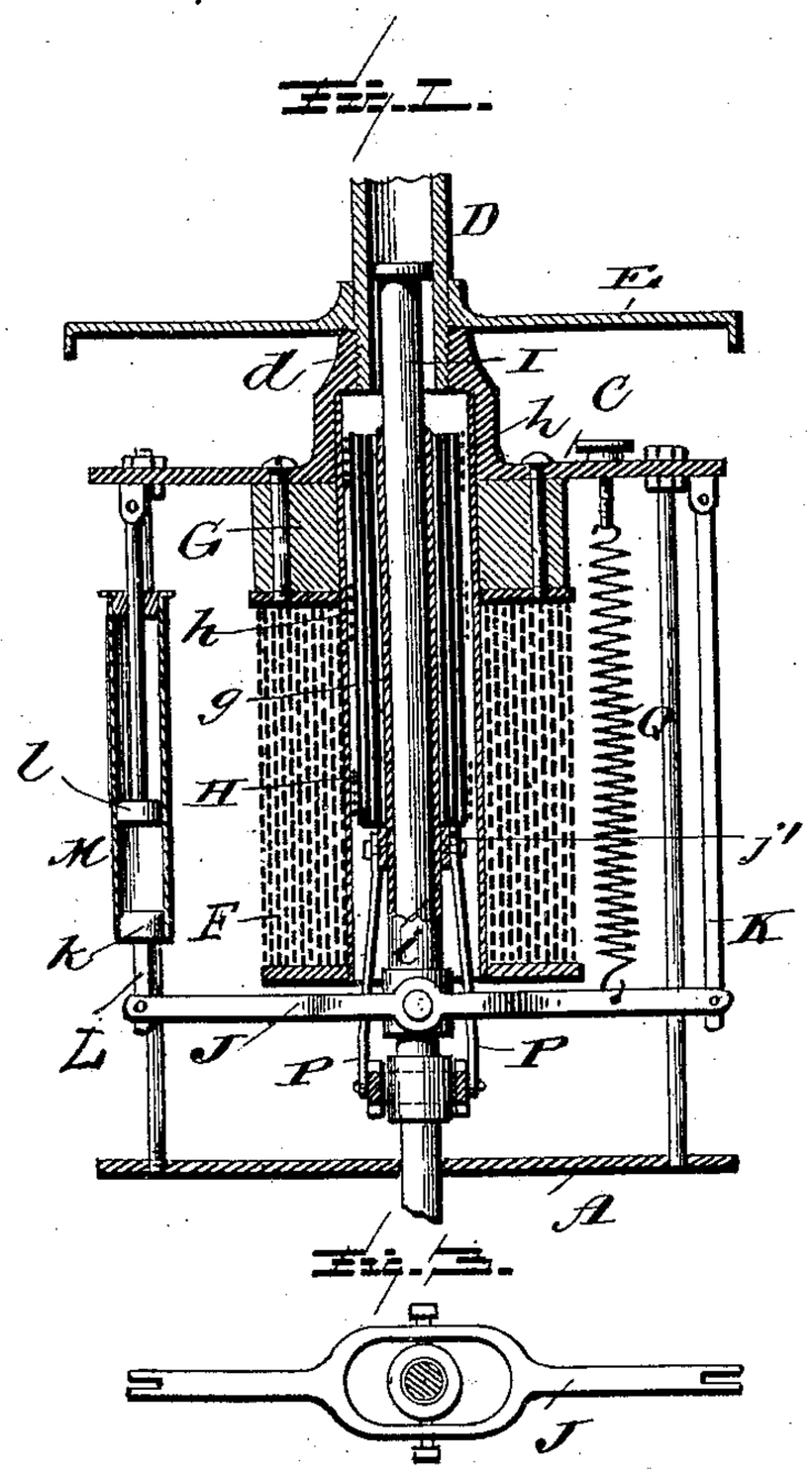


Fig. 2.

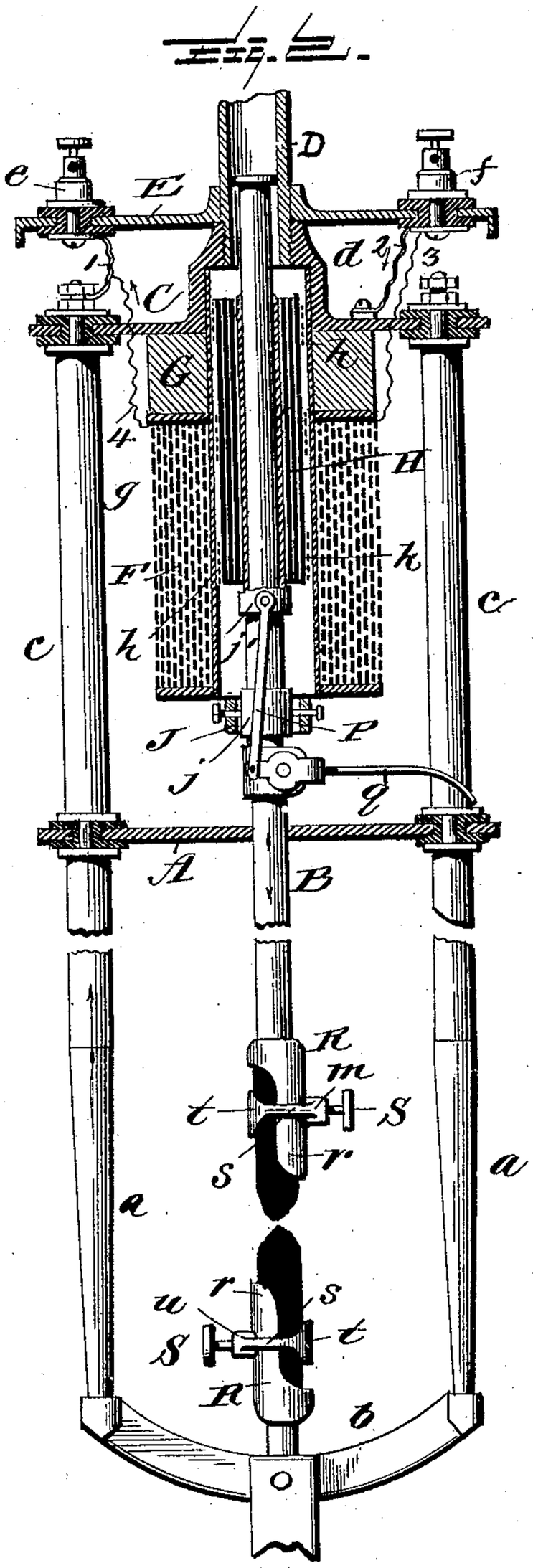


Fig. 3.

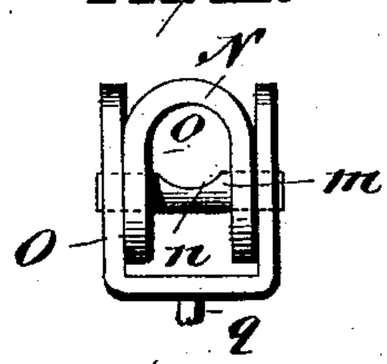
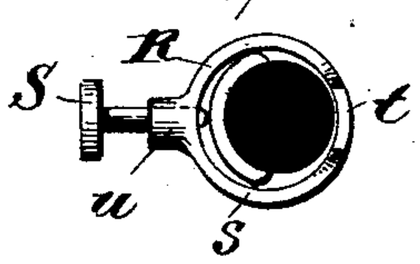


Fig. 5.



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UNITED STATES PATENT OFFICE.

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ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 467,610, dated January 26, 1892.

Application filed January 24, 1891. Serial No. 378,956. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. MOSHER, a citizen of the United States, residing at Abilene, in the county of Dickinson, State of Kansas, 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.

This invention relates to certain new and useful improvements in electric-arc lamps; and it has for its objects, among others, to provide improved mechanism whereby I am enabled to employ a derived-circuit coil instead of a main-circuit coil, arranged so that the action of the magnet is reversed. Thus when the lamp has no current on the core will be lifted, together with its suspended parts, to the fullest extent by a spring and the carbons separated. When the current is turned on to the lamp, the only path for it is through the derived circuit, and thus the core is drawn down till the carbon points touch. There is then practically no current passing through the coil and the core is instantly drawn up by a spring provided for that purpose, thus forming the proper arc to which the lamp is regulated. As the arc lengthens the resistance increases and more current is forced through the derived circuit, which operates, as before stated, to depress the core to a point which permits the lamp to feed by releasing the pressure of a feed device. Thus the lamp is governed by pressure alone, enabling me to burn two lamps in series successfully and economically. I employ a novel form of grip device and also an improved carbon-holder.

The essential novel feature in the present instance is the improved method of feeding by reversing the movement of the magnet-core, so that its movement when the current is in the solenoid is down instead of up and the spring employed does the work formerly required of the magnet. The carbon rod drops by force of gravity; but the magnet-core and suspended parts are supported by the spring, the tension of which is sufficient to lift the parts named to their fullest extent. Hence no feed can take place uutil the magnet-core and suspended parts are lowered sufficient to operate or lessen the grip device. The magnet-core is forced down by the current passing through the solenoid, and the pressure of strength of the solenoid is in proportion to the amount of current passing through the coil, and the amount of current passing through the coil is governed by the distance between the carbon points or length of the arc. If the arc should get too long, the strength of the solenoid would be such that the magnet-core would be drawn down with great force. Hence the core, which manipulates the grip device, is positive. When the grip is released, the carbon rod simply drops until it is again arrested by the grip. I should consider it a forced feed as far as releasing the grip on the rod is concerned. As soon as the rod is released it drops; but gravity has nothing to do in causing it to be released. It will be seen that as soon as the carbon rod is released it is evident that the spring is released of just that much weight and will instantly lift the core. Thus the rod will be caught by the grip, and the same operation would be repeated were it not for the carbons getting closer together at each movement, and the shorter the arc is the less power the solenoid has. Thus the spring is enabled to hold the magnet-core in suspension until the arc is lengthened by consumption of carbon and the solenoid increased in power sufficient to cause the same action to be repeated.

Other objects and advantages of the invention will hereinafter appear, and the novel features thereof will be specifically defined by the appended claims.

The invention is clearly illustrated in the accompanying drawings, which, with the letters and figures of reference marked thereon, form a part of this specification, and in which—

Figure 1 is a vertical section, with parts in side elevation, of my improvement. Fig. 2 is a vertical section taken at right angles to Fig. 1, with parts in side elevation. Fig. 3 is a plan of the grip-device-operating lever. Fig. 4 is a like view of the grip device. Fig. 5 is a plan view of the carbon-holder with a piece of carbon held therein.

Like letters and figures of reference indicate like parts throughout the several views in which they occur.

Referring now to the details of the drawings by letter, A designates a supporting-disk

through an aperture in which the upper carbon rod B is designed to work. This disk is properly insulated and carries the depending rods *a*, the lower ends of which are connected by a yoke *b*, which supports the lower-carbon holder, as seen in Fig. 2. Extended upward from this disk are the rods *c*, to the upper ends of which is attached the disk C, properly insulated and provided with an upwardly-extended interiorly-threaded neck or boss *d*, as seen in Figs. 1 and 2, and into which is threaded the tube D, and sleeved upon this tube and supported upon the upper end of this neck or boss is the disk or plate E, which carries the binding-posts *e* and *f*, as seen in Fig. 2.

F is a derived-circuit coil connected up, as shown in Fig. 2, by the wires 1, 2, 3, and 4.

G is a block, preferably of wood, between the disk C and the solenoid, as shown in both Figs. 1 and 2.

H is the core of the solenoid, composed, preferably, of the concentric plates *g* and binding-wires *h*, as seen in Figs. 1 and 2, and sleeved on the tube *i*. (See Figs. 1 and 2.) Extending downward from the core is the tube *i*, which is attached to or provided with the bands or analogous provisions *j* and *j'*, and to the lower ring or band *j* is connected the walking-beam J, (shown best in Fig. 3,) and to one end of this walking-beam is pivotally connected the pendulous arm K, the upper end of which is pivotally connected with the disk C, as seen in Fig. 1. To the other end of this beam is pivotally secured an arm L, which carries a head *k* and cylinder M of a dash-pot or cushioning device, the piston *l* of which is fixed relatively to the disk C, from which the rod is pivotally suspended, as seen in Fig. 1. By this arrangement I increase the efficiency of both the dash-pot and the spring now to be described, the latter performing its functions with the minimum of expansion.

The grip device is shown best in Fig. 4, and consists of the transverse pin *m*, having a curved depression *n*, and on this pin is pivoted the yoke-shaped piece N, the carbon rod being designed to work in the opening *o* thus formed. On this pin is the reversely-arranged substantially yoke-shaped piece O, which is connected with the ring or band *j'* on the core by means of the links P, as seen in Figs. 1 and 2, the said piece O carrying a horizontal arm *q*, which is designed to contact with some fixed part—as, for instance, the disk A—at a predetermined period, as will hereinafter appear.

Q is a spring connecting the walking-beam with the disk C, as seen in Fig. 1.

R is my improved carbon-holder. It consists of a casting *r*, which is constructed to be attached to the carbon rod, being, preferably, screw-threaded, as shown in Fig. 2, for that purpose. This casting is open on one side, and the carbon is held in place after being inserted in the said casting by means of a clamp, which consists of the band or ring *s*, having an enlarged portion *t* to embrace and form a broad bearing on the carbon, as seen in Fig. 2. This band or ring has a screw-threaded boss or enlarged neck *u*, as seen best in Fig. 5, through which works the set-screw S, which bears against the vertical portion of the casting, so as to firmly hold the carbon without coming in contact therewith. Hence there is no danger of breaking the same. The vertical portion of the casting is provided with a depression wherein the ring sets when it is in position.

The operation will be readily understood from the above description when taken in connection with the annexed drawings, and, briefly stated, is as follows: When the lamp has no current on, the spring Q operates on the walking-beam J and lifts the core and its suspended parts to their fullest extent, separating the carbons. When the current is turned on to the lamp, the only path for it is through the derived circuit. Hence the cord is drawn down till the carbon points touch, thus forming a natural path for the current through the carbons, there being then practically no current passing through the coil, and the core is instantly drawn up by the spring C, thus forming the arc. Now as the arc lengthens the resistance is increased and more current is forced through the derived circuit, overcoming the force of the spring, and the core is depressed and the grip device is actuated to release its hold on the carbon rod and the carbon is fed downward. The grip device is actuated by the movement of the core.

What I claim as new is—

1. The combination, with the derived-circuit coil and its core and the carbon rod, of the sleeve surrounding the rod, the collars on said sleeve, the walking-beam pivoted on the core and the pendulous arms K, and the locking-grip carried thereby and having a horizontal arm extending from the side of the pivot opposite the connection of said arms and adapted to engage some fixed part, substantially as specified.

2. In an electric-arc lamp, the combination, with the disk C, the supporting-disk A, and the plate E, detachably secured to the tube D above the disk C, and the block G, supported beneath the disk C, of the derived-circuit coil and the movable core, the carbon rod, the tube surrounding the same, and the pendulous grip supported from said sleeve and actuated by the movement of the core, substantially as specified.

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

JOHN A. MOSHER.

Witnesses:
A. M. MOORE,
S. C. MOSHER.