No. 647,219. Patented Apr. 10, 1900.

W. J. COCHRAN.

ELECTRIC ARC LAMP.

(Application filed Oct. 21, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

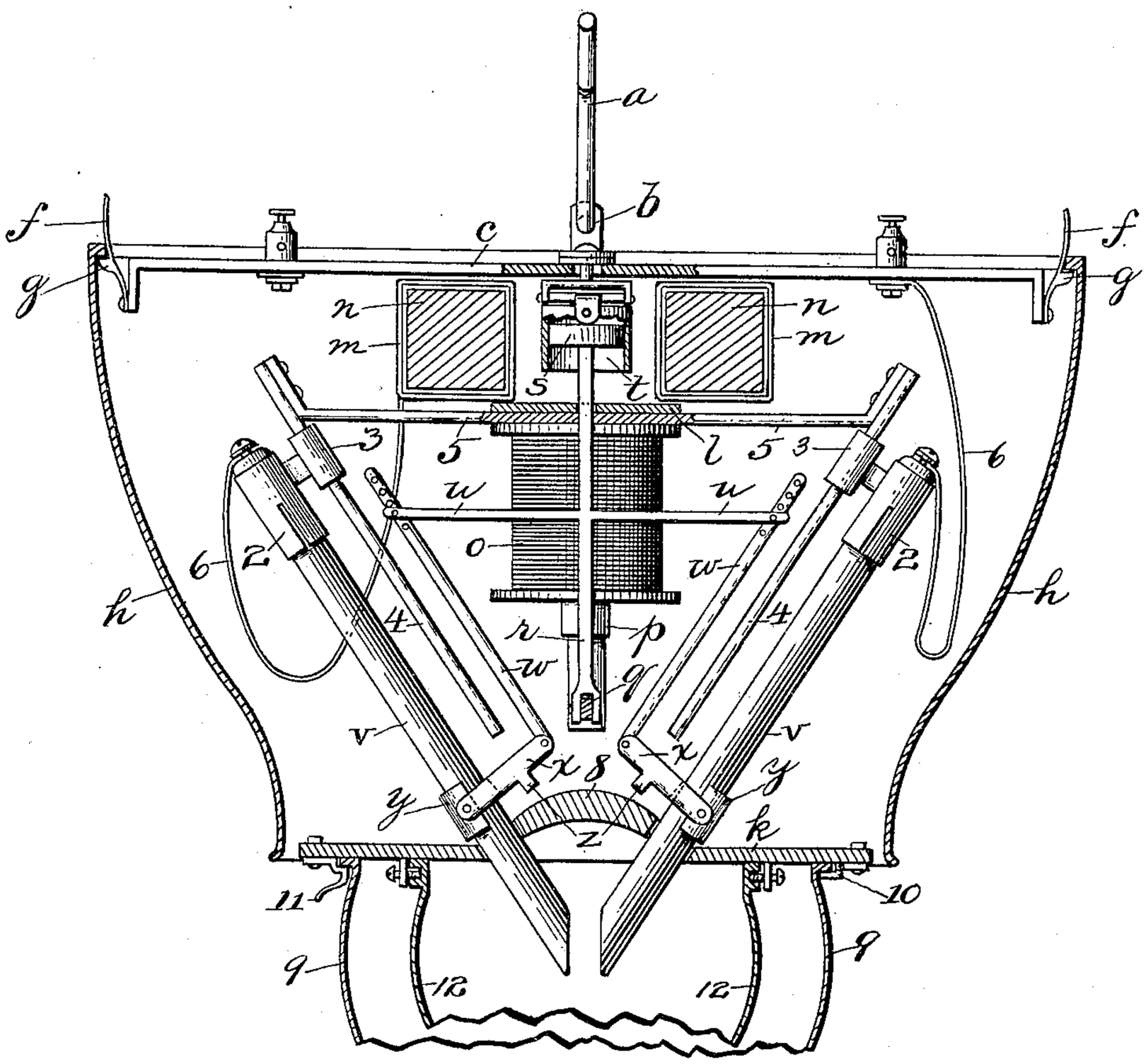

Fig. 4.

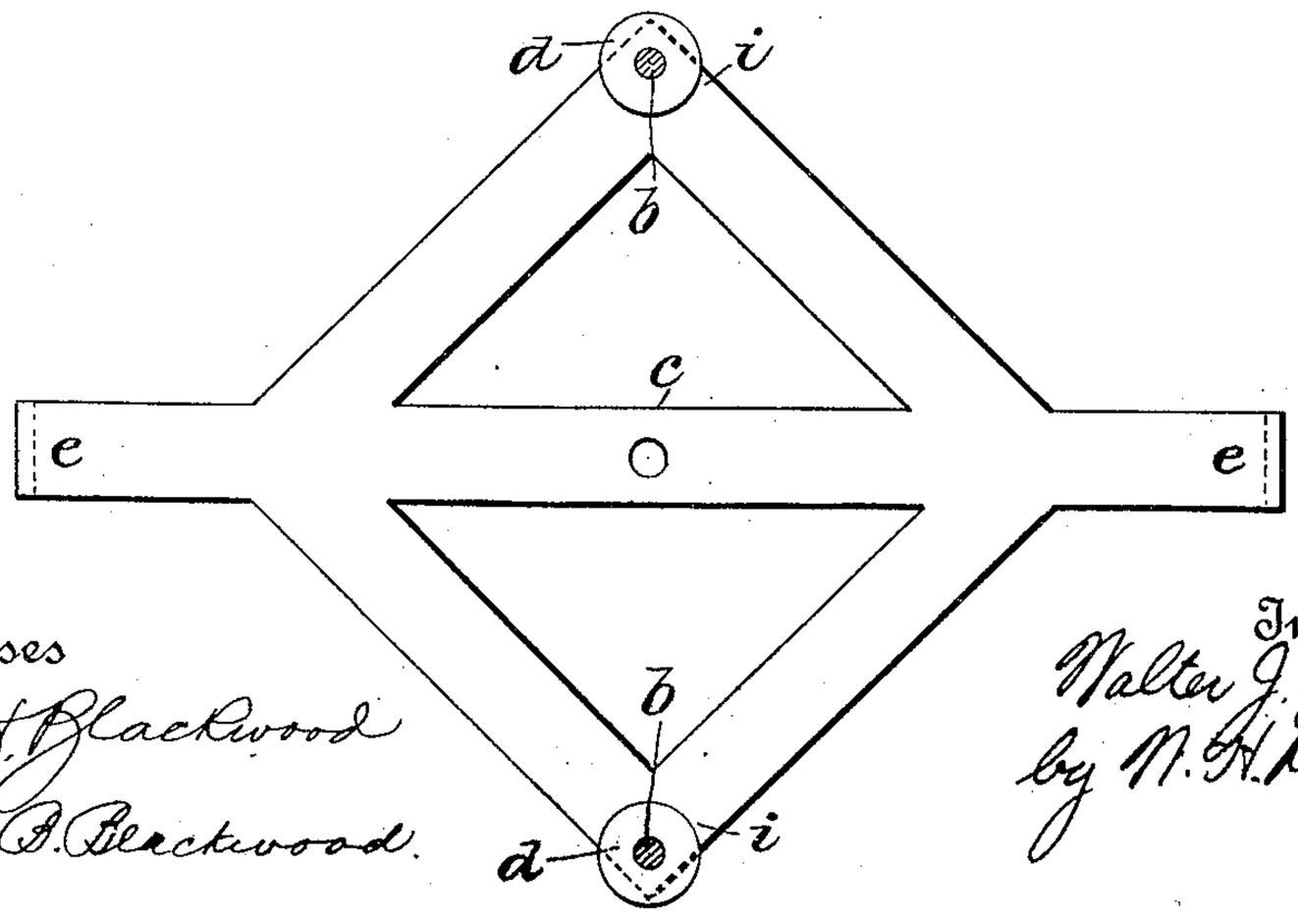

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Fig. 2.

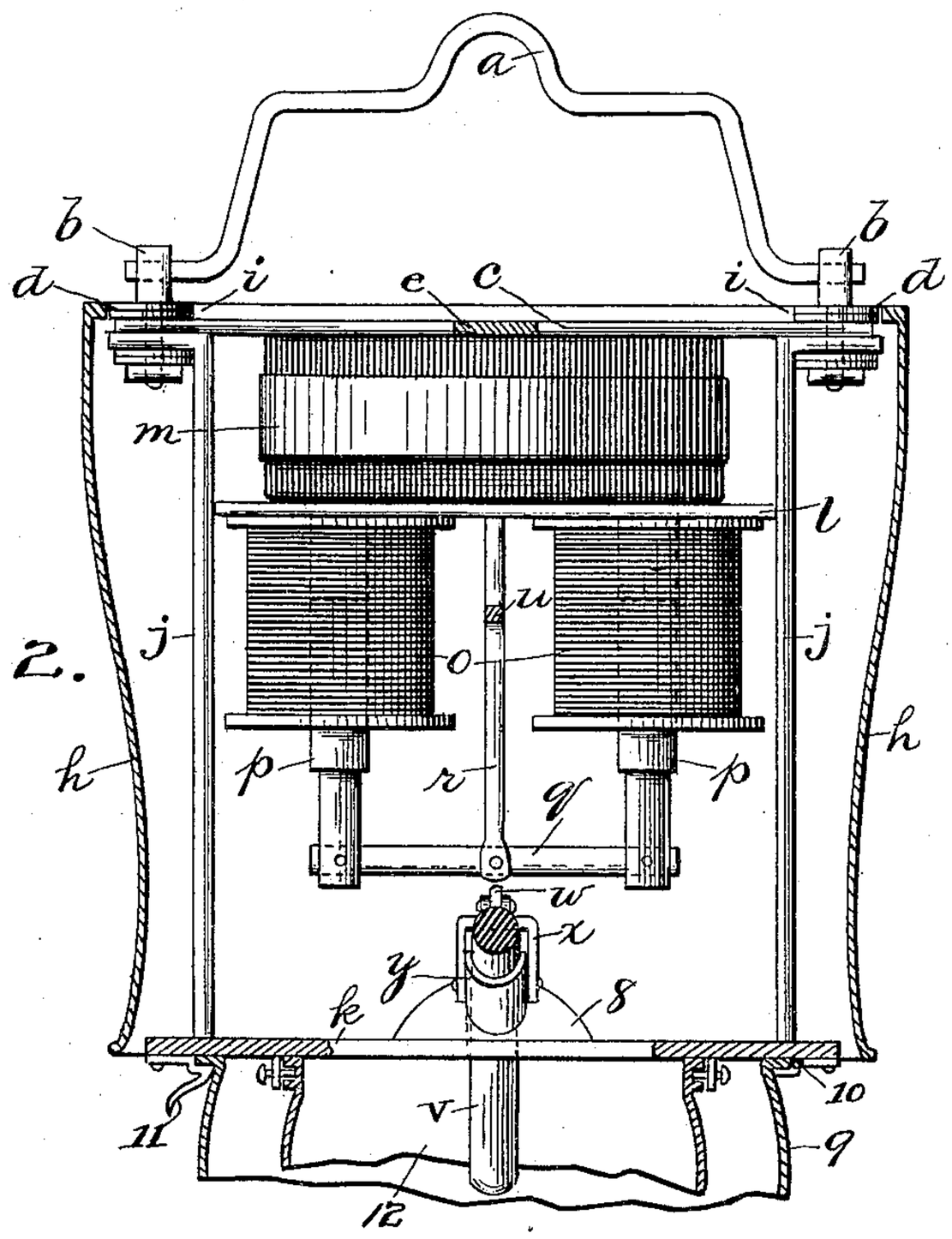
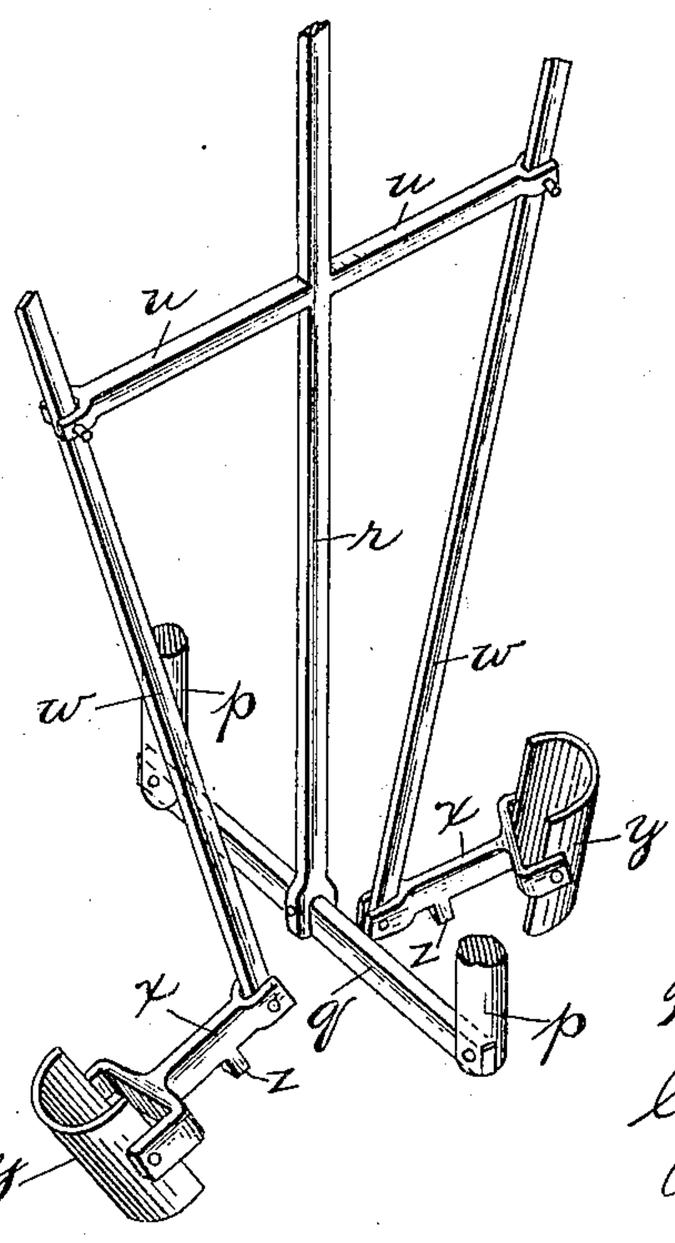


Fig. 3.



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UNITED STATES PATENT OFFICE.

WALTER J. COCHRAN, OF LE ROY, NEW YORK, ASSIGNOR TO DAVID J. BISSELL, OF SAME PLACE.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 647,219, dated April 10, 1900.

Application filed October 21, 1899. Serial No. 734,363. (No model.)

To all whom it may concern:

Be it known that I, WALTER J. COCHRAN, a citizen of the United States, residing at Le Roy, in the county of Genesee and State of New York, have invented a new and useful Arc-Lamp, of which the following is a full, clear, and exact specification, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to electric-arc lamps; and it consists of certain improvements on the lamp described and claimed in my allowed application for Letters Patent, Serial No. 703,191.

The objects of my present invention are to increase the strength of the arc-maintaining and carbon-lifting device to thereby make it more responsive to the controlling action of the current, to render the line of lifting force of the said carbon-controlling device more nearly parallel with the direction of the arc-striking movement of the carbons, so as to thereby lessen the friction between the moving parts and afford a better grip to the carbon-clutches, to provide novel means to release the grip of the clutches in feeding the carbons, to provide improved means of holding and feeding the carbons and suitable contact means in connection therewith, and to provide an improved supporting-plate for the lamp-cover.

To these ends my invention consists of the parts and their combinations, as hereinafter set forth and particularly claimed.

In the accompanying drawings, which illustrate my invention, and in which like letters and numerals refer to the same parts throughout the several views, Figure 1 is a front elevation, partly in section, of the lamp; Fig. 2, a side elevation, partly broken away; Fig. 3, a detail perspective of the parts comprising the arc-maintaining and pick-up device separated from the coils and other parts of the lamp, and Fig. 4 a detail plan view of the plate supporting the cover.

Referring to the drawings, a is the handle of the lamp, by means of which it is supported. The handle a is pivoted to stud-bolts b, secured in plate c and having insulating-washers d between the bolts and plate. The plate is of the form shown in Fig. 4 and has arms e, which are provided at their ends with spring-clutches consisting of stiff outwardly-bent vertical springs f, each having a shoulder or ledge g, on which a flange or bead of the cover h at the upper end thereof is supported. The cover also bears against the plate c at the ends of arms i, where the handle ends are bolted to the plate and is thereby steadied. The cover is shaped to fit arms e and i. Clamped to the plate at the ends of arms i are the legs j of the framework, which are fixed at their lower ends to a reflector and carbon-guide plate k. Mounted on a bracket l, fixed to and between legs j, is a choke-coil m, having a core n. Secured to the bottom of the bracket are two working magnets o, preferably of spool form. Each working magnet is provided with a sliding core or armature p. The lower ends of the armatures extend for some distance below the magnets and are connected so as to move together by a cross-bar q. To the center of this cross-bar is attached a vertical rod r, extending up between the two magnets. To the upper end of this rod is secured a piston-head s, moving in a dash-pot t, which is screwed or swiveled to the cover-supporting plate c. Secured to the vertical rod about midway of its length and at right angles thereto are arms u, extending to within a short distance of the carbons v. Pivoted to the end of each of these arms is a connecting-rod w, and to the lower end of each connecting-rod is pivoted a clutch-jaw x, which is forked and pivoted by its forked ends to another jaw y, forming a pivoted clutch which embraces and engages the carbon v. The clutch-jaws x and arms u are of such length that the connecting-rods w are normally parallel to their respective carbons v. The outer jaw y of each clutch is wider than the inner jaw, so as to afford a larger bearing-surface for the carbons when the latter are gripped by the clutches. Each jaw x is provided with a depending projection z, for the purpose hereinafter described.

The armatures p, cross-bar q, rod r, with arms u, connecting-rods w, each parallel to its respective carbon, and the pivoted clutches constitute my novel carbon gripping and lifting device for maintaining and regulating the arc between the carbons.

The carbons are carried at their upper ends

in resilient carbon-holders 2, formed of split sleeves. Integrally formed with the carbon-holders by lugs are sliding sleeves 3, which are carried and adapted to slide on converging rods 4, secured to horizontal supporting-arms 5 of the bracket *l*. By means of flexible wires 6, attached by washers and clamping-screws to the carbon-holders, the carbons are respectively electrically connected to a binding-post in the plate *c* and to the choke-coil *m*. Suitable wire connections may be made between the choke-coil and working magnets and the other binding-screw to complete the circuit. At its center the plate *k* is provided with a dome 8, forming a convex surface on the upper side of the plate and a concave surface on the lower side thereof. The lower concave side forms a reflecting-surface. The converging carbons extend through apertures in the plate, being guided thereby, and just below the plate they approach to within a sufficient distance to form the arc.

A globe 9 is hinged at 10 to the under surface of the plate and is fastened thereto in closed position by a spring-catch 11. An inner globe 12 for forming a more air-tight chamber around the arc may or may not be employed in addition to the globe 9.

The operation of the invention is as follows: Normally when the current is on and the circuit completed the working magnets being energized will attract and hold in raised position the armatures *p*, which will in turn support the vertically-moving central rod, and the connecting-rods *w* thus hold the inner jaws of the clutches tilted against the carbons, so as to grip and support the latter. When the ends of the carbons have burned such a distance apart as to no longer strike an arc, the circuit will be broken, and the working magnets being deënergized will release the armatures, which will permit the central rod and connecting-rods to descend, and thereby lower the clutches, which will in their descent strike the plate *k* and be thus relaxed, so as to release the carbons. The projections *z* on the inner jaws of the clutches will contact with the dome at the same time the outer jaws strike the plate, and hence the clutches will be held open and out of gripping contact. On their release the carbons will feed through the guide-apertures in the plate and meet or approach each other, and thus reëstablish the circuit. Thereupon the armatures will again be attracted by their magnets and draw up the connecting-rods and their clutches, causing the latter to grip and pick up or lift the carbons until the proper arc is struck. The connecting-rods being long and normally parallel to the carbons and their carriers move with but little friction and give the clutches a firm grip on the carbons, and in lifting the carbons in the direction of their axes move in substantially the same direction, and hence along the line of least resistance. The dash-pot prevents a too-violent movement of the central vertically-moving rod.

The form of carbon-holders shown permits the ready removal of the carbons and their replacement by fresh carbons and also enables the holders themselves to be easily slipped on and off their supporting-rods.

Having thus described my invention, what I claim is—

1. In an arc-lamp, in combination, with the converging carbons and supports for said carbons, and means to permit said carbons to slide freely up and down on said supports, a vertically-movable rod, a working magnet on each side of said rod, armatures in said magnets, said armatures being attracted away from the arcing-point of the carbons by the magnets, means of connection between said armatures and between the same and the rod, pivoted carbon-clutches movable bodily to lift said carbons, and pivoted connecting-rods between said clutches and vertically-moving rod, substantially as described.

2. In an arc-lamp, in combination with converging carbons a pair of working magnets, carbon-supports and means to permit said carbons to slide freely up and down on said supports, an arc-maintaining and pick-up device for the carbons, comprising a vertically-movable rod, a cross-bar on said rod, a magnet, an armature secured to each end of said cross-bar, arms on the vertical rod near the upper end thereof, pivoted clutches, and pivoted connecting-rods between the ends of said arms and said clutches, said armatures attracted by said magnets away from the arcing-point of the carbons so as to lift said connecting-rod and clutches and thus raise and separate the carbons, substantially as described.

3. In an arc-lamp, in combination with carbons converging to an apex, carbon-supports, and means to permit said carbons to slide freely up and down on said supports, a vertically-movable rod, an armature, means at the lower end of the rod to engage said armature, cross-arms on said rod at the upper part thereof, pivoted clutches for said carbons, connecting-rods between said arms and clutches and substantially parallel to said carbons, said clutches movable bodily by the attraction of the armature to lift and separate the carbons, substantially as described.

4. In an arc-lamp, in combination with the converging carbons, supports for said carbons, means to permit said carbons to slide freely up and down on said supports, bodily-movable clutches, an arc-maintaining and pick-up frame pivoted to said clutches, a magnet controlling said frame, and a flexible wire connecting each carbon and the lamp-circuit, substantially as described.

5. In an arc-lamp, in combination with converging fixed rods separated at their lower ends, a carbon-holder for each rod consisting of a split sleeve to receive the carbon, a sec-

ond sleeve integral with the first and slidably mounted on said rod so that it can be slid off the end thereof, said split sleeve electrically connected to the lamp-circuit, substantially as described.

6. In an arc-lamp, in combination with the carbons, an arc-maintaining and pick-up device, pivoted carbon-clutches consisting of inner and outer jaws, a carbon-guiding plate with which both jaws of each clutch are adapted to contact to release their grip on the carbons, projections on said inner jaws adapted to contact with said plate at the same time that the outer jaws contact with said plate, substantially as described.

I hereunto affix my signature, in the presence of two witnesses, this 25th day of September, 1899.

WALTER J. COCHRAN.

Witnesses:
ARCHD. SINCLAIR,
B. F. HENDERSON.