(No Model.)

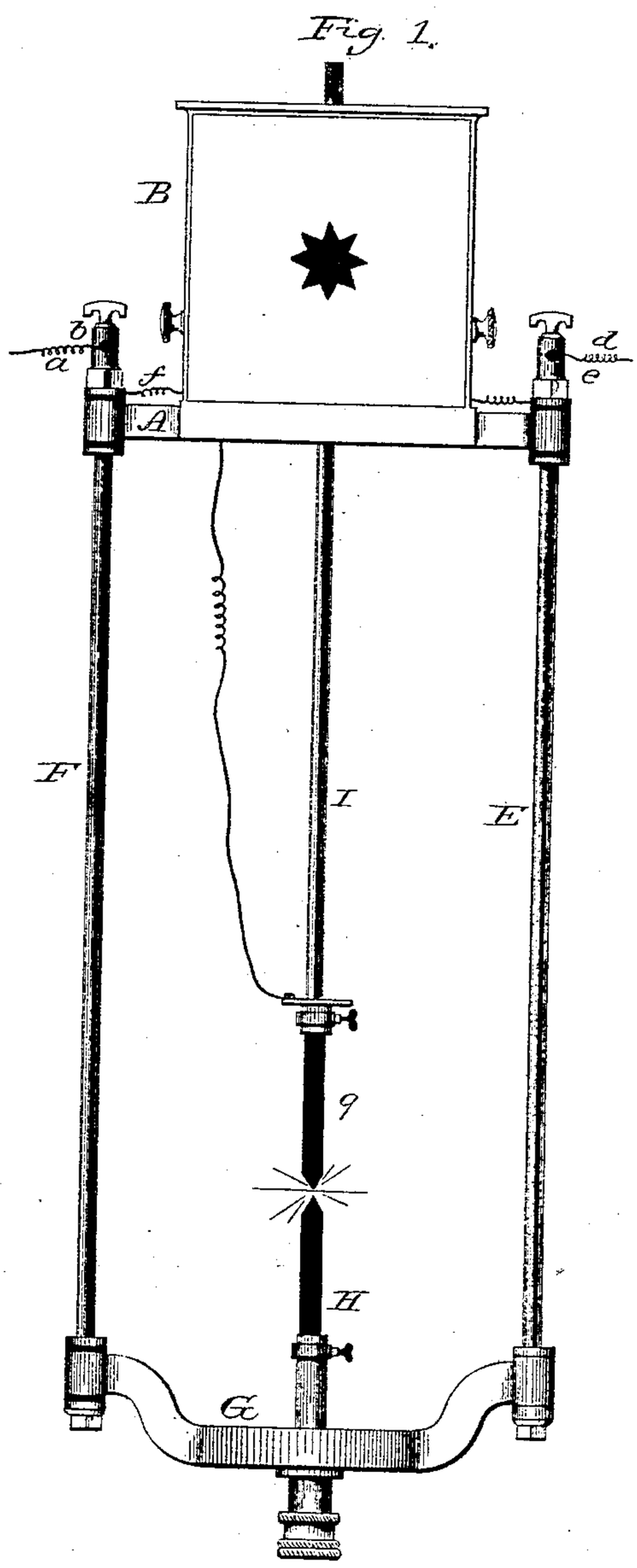
3 Sheets—Sheet 1.

C. H. HAYES.

ELECTRIC ARC LAMP.

No. 292,113. Patented Jan. 15, 1884.

Fig. 1.



Witnesses.
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Jos. D. Earle.

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(No Model.)

3 Sheets—Sheet 2.

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ELECTRIC ARC LAMP.

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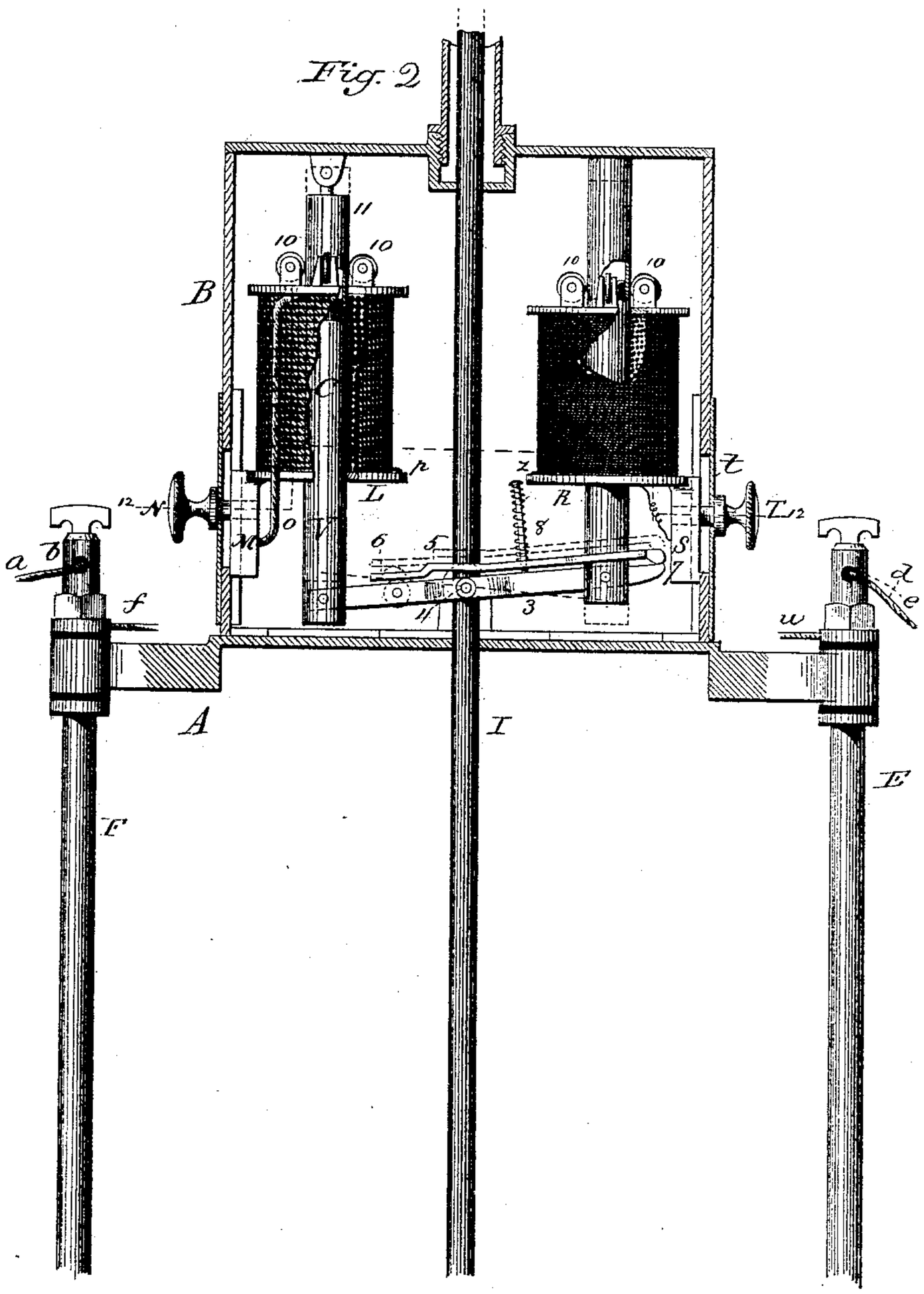
Fig. 2



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(No Model.) 3 Sheets—Sheet 3.

C. H. HAYES.

ELECTRIC ARC LAMP.

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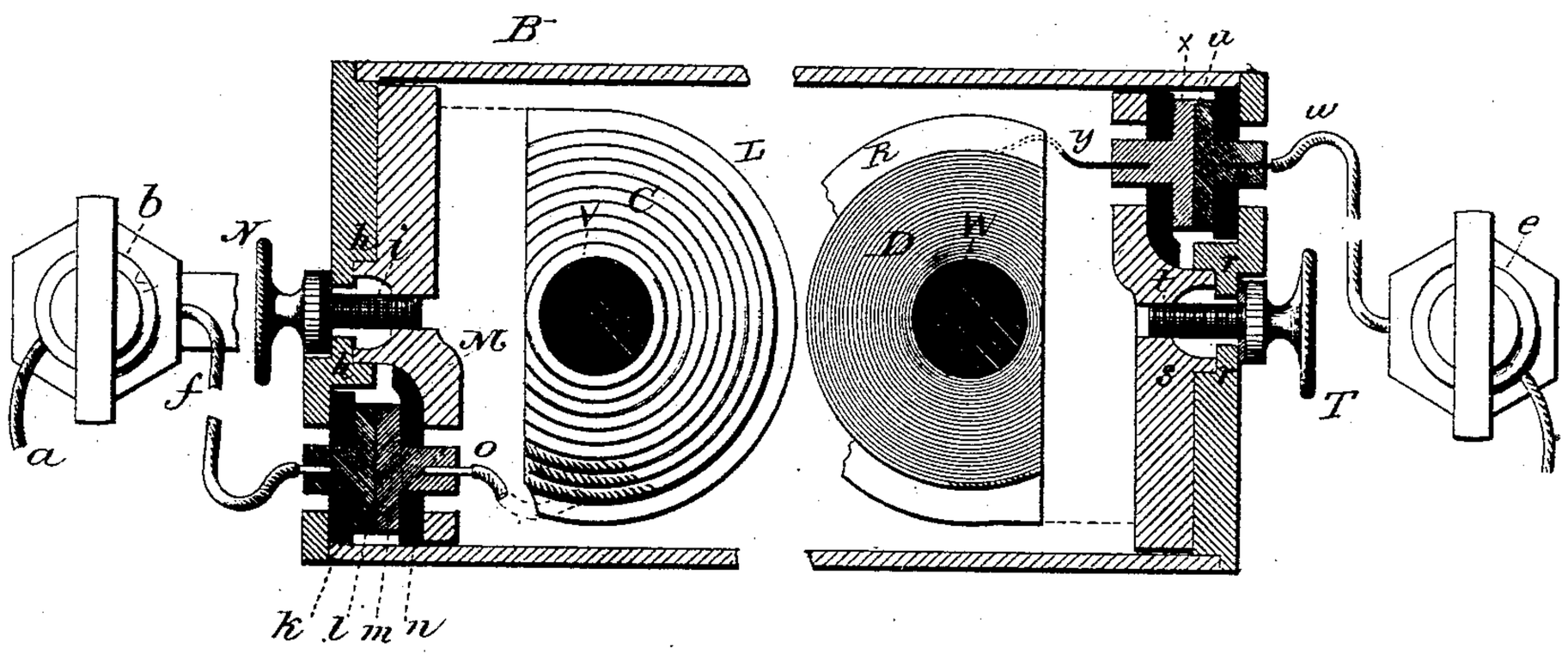
Fig 3



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UNITED STATES PATENT OFFICE.

CHARLES H. HAYES, OF ANSONIA, CONNECTICUT, ASSIGNOR TO WALLACE & SONS, OF SAME PLACE.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 292,113, dated January 15, 1884.

Application filed November 10, 1883. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. HAYES, of Ansonia, in the county of New Haven and State of Connecticut, have invented a new Improvement in Electric-Arc Lamps; and I do hereby declare the following, when taken in connection with accompanying drawings, and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a front view of the lamp complete; Fig. 2, a sectional front view of the clutch mechanism and its inclosing-case enlarged; Fig. 3, a transverse section on line 12 12 of Fig. 2.

This invention relates to an improvement in that class of electric-arc lamps which are constructed to be used upon a circuit including several lamps, and with special reference to the feeding mechanism, the object being the arrangement of the principal and shunt magnets in such position that they may be readily adjusted to increase or diminish the power of the magnets, as occasion may require; and the invention consists in the arrangement of the principal and shunt magnets upon brackets within an inclosing-case, the brackets made adjustable vertically by means of slots in the case and set-screws extending from the bracket through said slots, whereby either of the magnets may be readily raised or lowered with relation to their cores, as occasion may require, and as more fully hereinafter described.

A represents the cross-bar at the top, upon which the case B is arranged to inclose the principal magnet C and the shunt-magnet D.

From the cross-bar A rods E F extend downward to the lower cross-bar, G. The lower cross-bar supports the fixed carbon H. The rod F is insulated from both the cross-bars A and G. The rod E is in electric connection with the lower cross-bar, G. The positive wire *a* is secured to the insulated post *b*. The negative wire *d* is secured to the post *e* in electric connection with the rod E.

From the post *b* a wire, *f*, is in metallic connection with one end of the coil of the principal magnet, the other end of the coil of said principal magnet in connection with the frame, as more fully hereinafter described, so that the circuit is from the positive wire *a* through the magnet to the frame, thence through the upper adjustable carbon-rod, I, through the lower carbon, and out through the rod E and line *d*. The principal magnet-coil C is arranged upon a bracket, L. This bracket extends from a vertical slide, M, arranged between guides *h h* in the side of the case A, and so as to be readily moved up and down between said guides. Through the side of the case is a vertical slot, *i*, and through this slot a set-screw, N, extends into the slide M, and so that by loosening the set-screw the bracket, with the coil thereon, may be raised or lowered to any desired position, and there set by returning the screw N. At one side (see Fig. 3) the bracket is insulated from the case. This insulation is produced by, say, a piece of hard rubber, *k*, upon the surface of the case, a metallic plate, *l*, resting on this hard rubber, and the wire *f* in connection with this plate *l*.

Upon the plate *l* a second like metallic plate, *m*, bears, and between this second plate, *m*, and the bracket is an insulating material, *n*. To this plate *m* one end, *o*, of the coil of the magnet C is attached. The plate *l* is fixed in the case, and the plate *m* fixed to the bracket, and so as to move with it. These two plates make electric connection between the magnet and the wire *a*, and permit the bracket to move up and down, the plate *m* sliding on the plate *l*. Upon the opposite side the bracket is in direct metallic connection with the case, as shown. The other end of the coil of the magnet is in connection with the bracket, as at *p*. Upon the opposite side of the case is a like bracket, R, projecting from a vertical slide, S, arranged between vertical guides *r*, and so as to slide up and down, and carrying the shunt-magnet coil D. Through that side of the case is a vertical slot, *t*, through which a set-screw, T, extends into the bracket, as upon the opposite side. This bracket R is in metallic connection with the case at one side, but on the opposite side is insulated therefrom, in like manner as the bracket upon the opposite side, *u* representing the stationary plate, from which a wire, *w*, runs to the post *e*; *x* the plate fixed to the bracket which rides upon the stationary plate *u*, and insulated from

the bracket. One end, *y*, of the shunt-coil is in connection with this plate *x*, the other end, *z*, of the coil in connection with the bracket.

V is the iron core of the principal magnet C, and W the iron core of the shunt-magnet, the two cores connected by a lever, 3, hung in the bottom of the case, as at 4, and so as to turn on that point 4 as a pivot when the one core rises and the other falls.

5 is the clutch-lever, one end resting upon the lever 3 on the principal magnet side of the fulcrum 4, as at 6. Through this lever 5 is a hole, substantially of the diameter of the rod I, and so that when the lever 5 stands in a position to bring the plane of the hole at right angles to the rod the rod moves freely through it. The lever 5 extends to the other side of the fulcrum, and so that when the core V of the principal magnet is down—as, say, in the condition of a broken circuit—that end of the lever 5 will rest upon the lever 3, as at 7. At this time the plane of the hole through the lever 5 is at right angles to the axis of the rod T; but when the core V rises, as in closing the circuit, it raises the end 6 of the lever 5, causing the hole in the lever to clamp upon the rod I, and therefore to raise the rod I with the lever 5, as indicated in broken lines.

Upon the lever 5 a light spring, 8, is arranged to bear, so that when the core V drops the clutch-lever 5 will be forced down with it into the position seen in Fig. 2, which leaves the rod free to move, as before described. When the circuit is closed, the core V rises, as before described, and seen in broken lines Fig. 2, the rod I is raised, taking with it the upper carbon, 9, thereto attached, and so as to form the arc between the carbons, and in this position the parts will be held until the carbons shall have been consumed to such an extent that the arc becomes so long that the shunt-magnet will be the stronger. Then the core of the shunt-magnet will rise, drawing down the core of the principal magnet, as seen in Fig. 2, in which position the weight of the rod I will cause it to descend to reduce the arc between the carbons and restore the current in that direction, when the principal magnet, overcoming the power of the shunt-magnet, will draw its core upward and raise the rod I and the carbon it carries, as before described. As the power of the two magnets to operate the clutch varies according to their relative position to their respective cores, if the power is required to be greater, then the coil should be raised, and vice versa. If, therefore, the power of the principal magnet-coil upon its core is required to be increased, it is only necessary to loosen the screw N to release the bracket, and then lifting the screw upward through the slot take with it the bracket and magnet-coil to the position desired, and there secure it by re-turning the screw; or, if desired to reduce the power, reverse the operation and the same with regard to the shunt-magnet.

To insure the perfectly free working of the cores through their respective magnet-coils, I arrange anti-friction rolls 10 on the upper end of the coils, between which the upper ends of the cores will work, it being understood that the upper ends of the cores are of non-magnetic material, as indicated.

To prevent a blow or thump in the drawing up of the principal magnet, I arrange a dash-pot, 11, in the upper end of the core, as seen in Fig. 2. By this construction the magnets may be adjusted with relation to the work to be performed without opening the case or in any wise disturbing the mechanism of the lamp.

I claim—

1. In an electric-arc lamp, the principal magnet-coil arranged upon a bracket adjustable within the inclosing-case with relation to its core, in connection with the clutch mechanism, said bracket in electric connection with the case, one end of the coil of the magnet in connection with the bracket, the other end in connection with a metallic surface movable with the bracket, but insulated therefrom, said movable metallic surface in connection with a fixed metallic surface insulated from the case, but in connection with the positive wire, substantially as described.

2. In an electric-arc lamp, the principal magnet-coil arranged upon a bracket adjustable within its inclosing-case with relation to its core, in connection with the clutch mechanism, said bracket in electric connection with the case, one end of the coil of the magnet in connection with the bracket, the other end in connection with a metallic surface movable with the bracket, but insulated therefrom, said metallic movable surface in connection with a fixed metallic surface insulated from the case, but in connection with the positive wire, the case constructed with a slot parallel with the axis of the magnet, and a clamping device through said slot and in connection with the bracket, whereby the bracket and the magnet-coil it carries may be adjusted from outside the case, substantially as described.

3. In an electric-arc lamp, the shunt-magnet coil arranged upon a bracket adjustable within its inclosing-case with relation to its core, in connection with the clutch mechanism, said bracket in electrical connection with the case, one end of the coil of the magnet in connection with the bracket, the other end in connection with a metallic surface movable with the bracket, but insulated therefrom, said movable metallic surface in connection with a fixed metallic surface insulated from the case, but in connection with the negative wire, substantially as described.

4. In an electric-arc lamp, the shunt-magnet coil arranged upon a bracket adjustable within its inclosing-case with relation to its core, in connection with the clutch mechanism, said bracket in electric connection with the case, one end of the coil of the magnet in connection with the bracket, the other end in con-

nection with a metallic surface movable with the bracket, but insulated therefrom, said metallic movable surface in connection with a fixed metallic surface insulated from the case, but in connection with the negative wire, the case constructed with a slot parallel with the axis of the magnet, and a clamping device through said slot and in connection with the bracket, whereby the bracket and the magnet-coil it carries may be adjusted from outside the case, substantially as described.

CHARLES H. HAYES.

Witnesses:
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LILLIAN D. KELSEY.