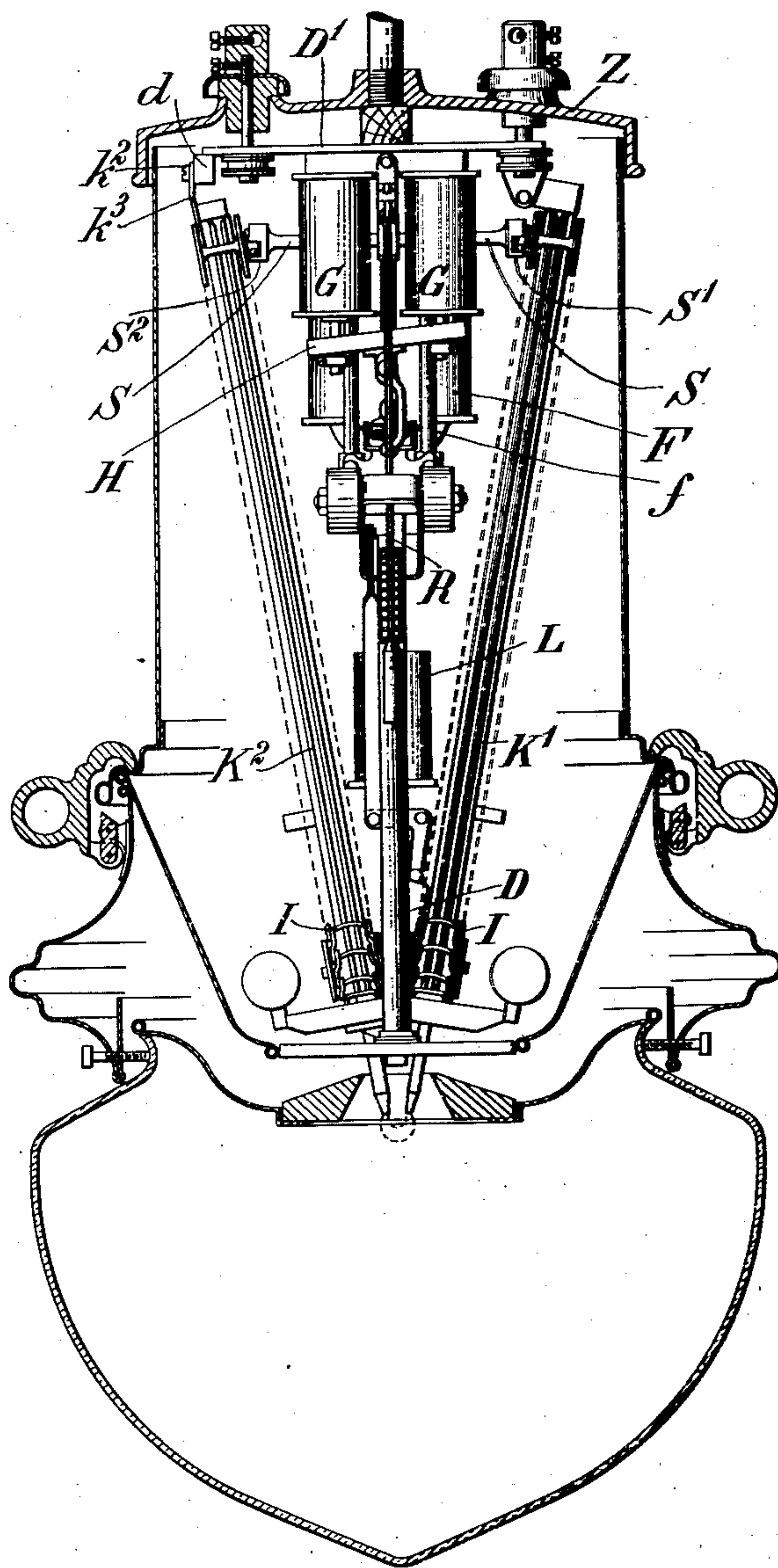


914,869.

Fig.1.



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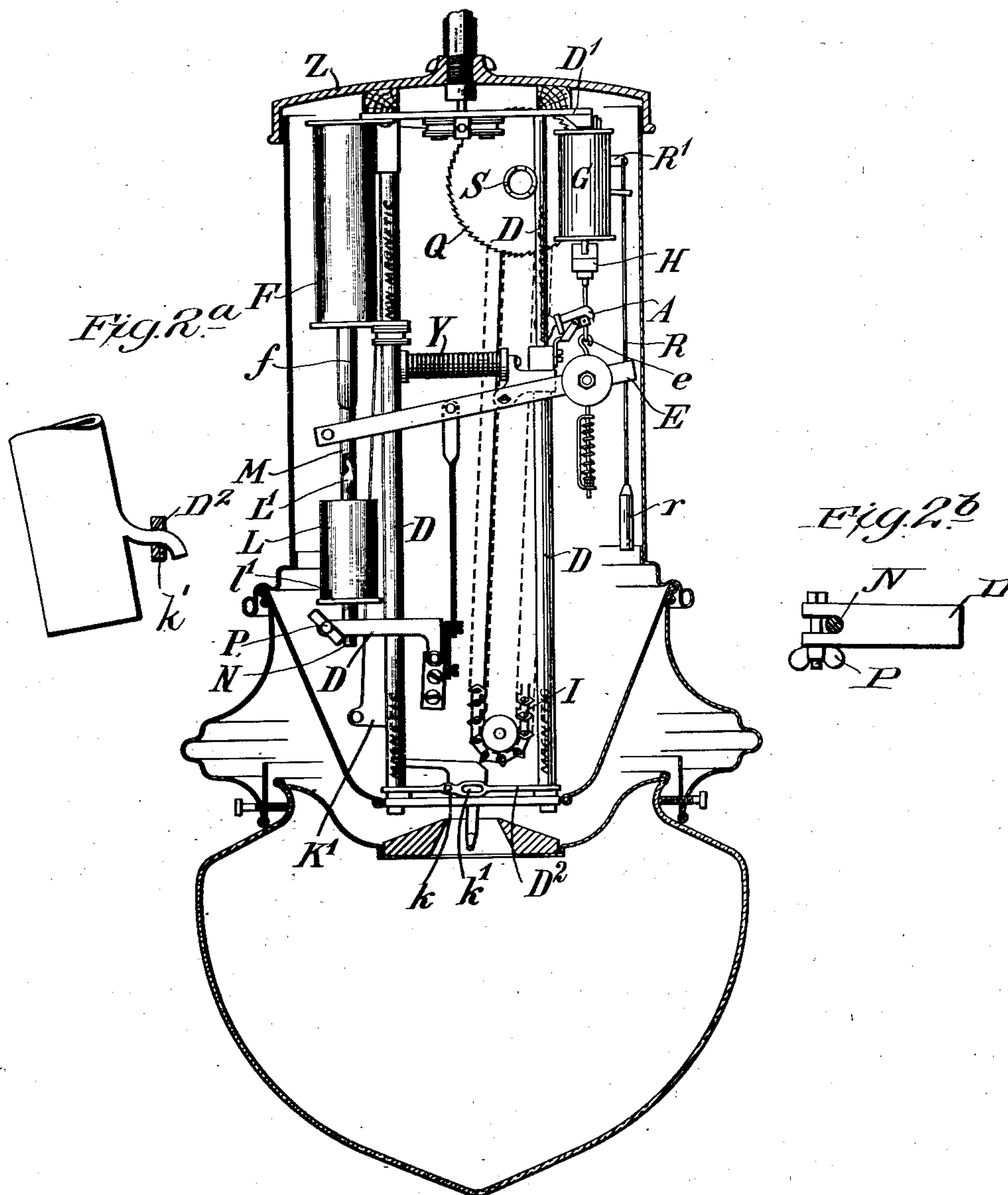
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C. OLIVER.
ELECTRIC ARC LAMP.
APPLICATION FILED JULY 1, 1907.

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Patented Mar. 9, 1909.
4 SHEETS—SHEET 2.

Fig. 2.



—Witnesses.—

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—Inventor.—

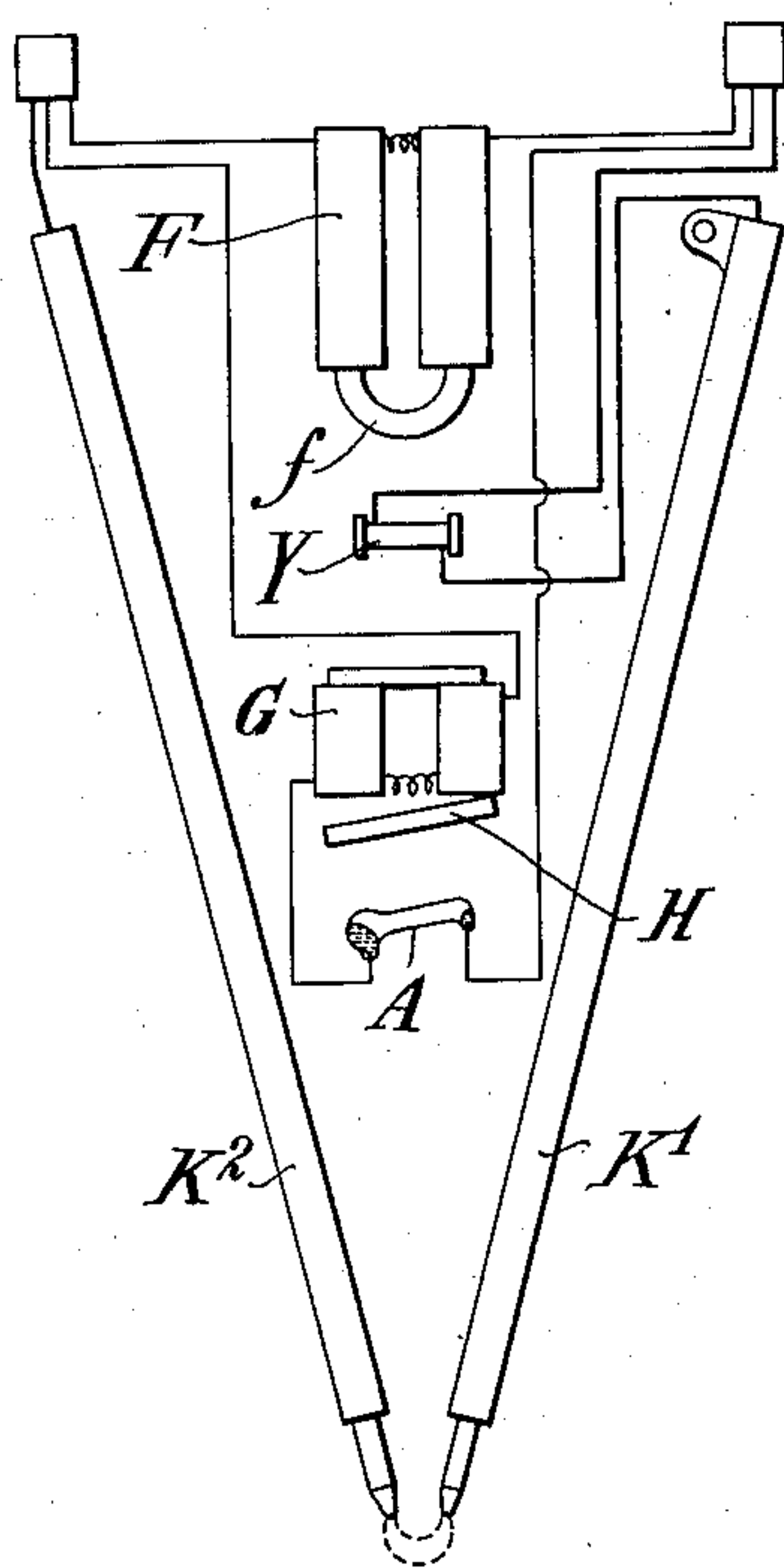
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4 SHEETS—SHEET 3.

Fig. 3.



—Witnesses.—

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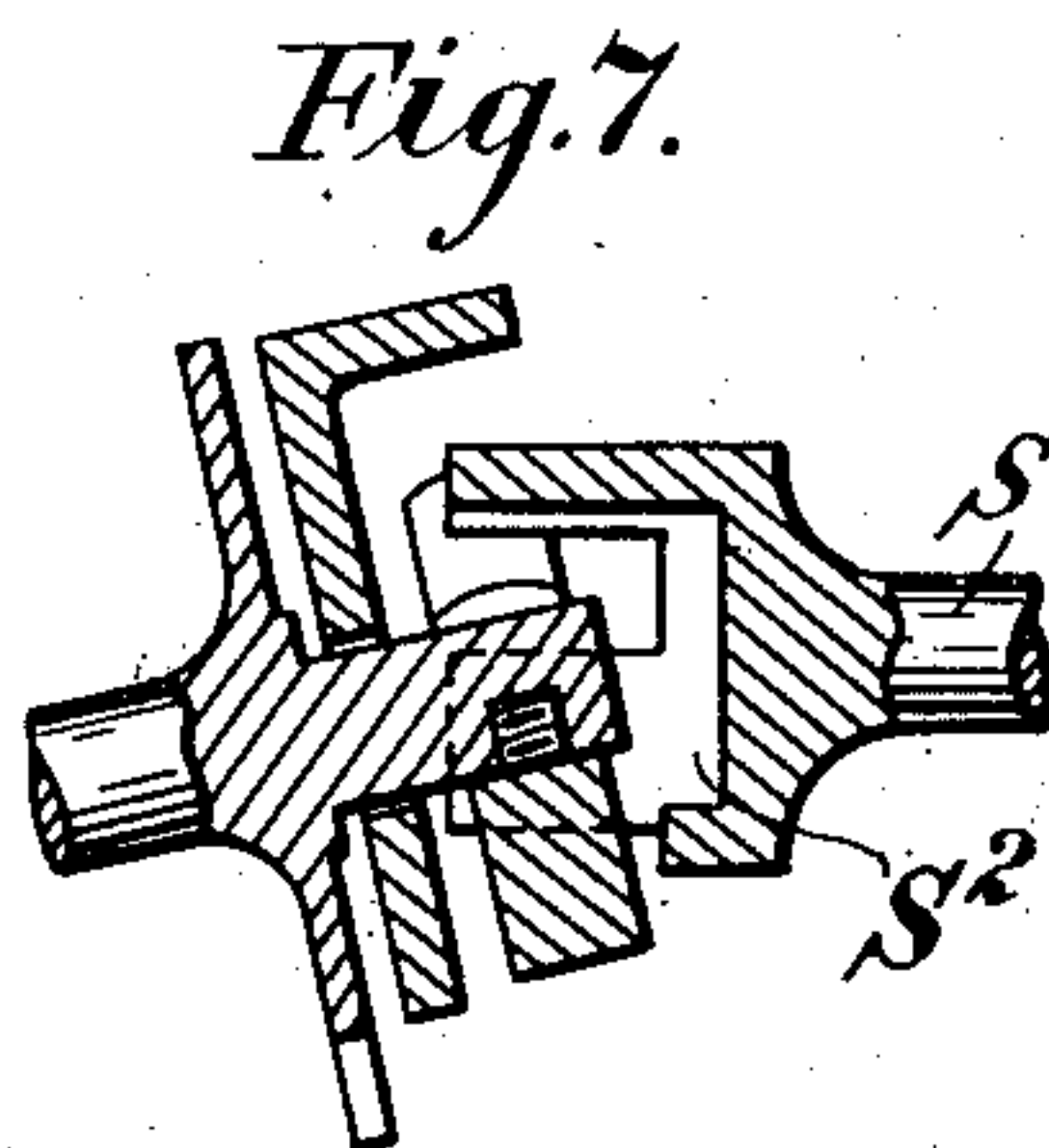
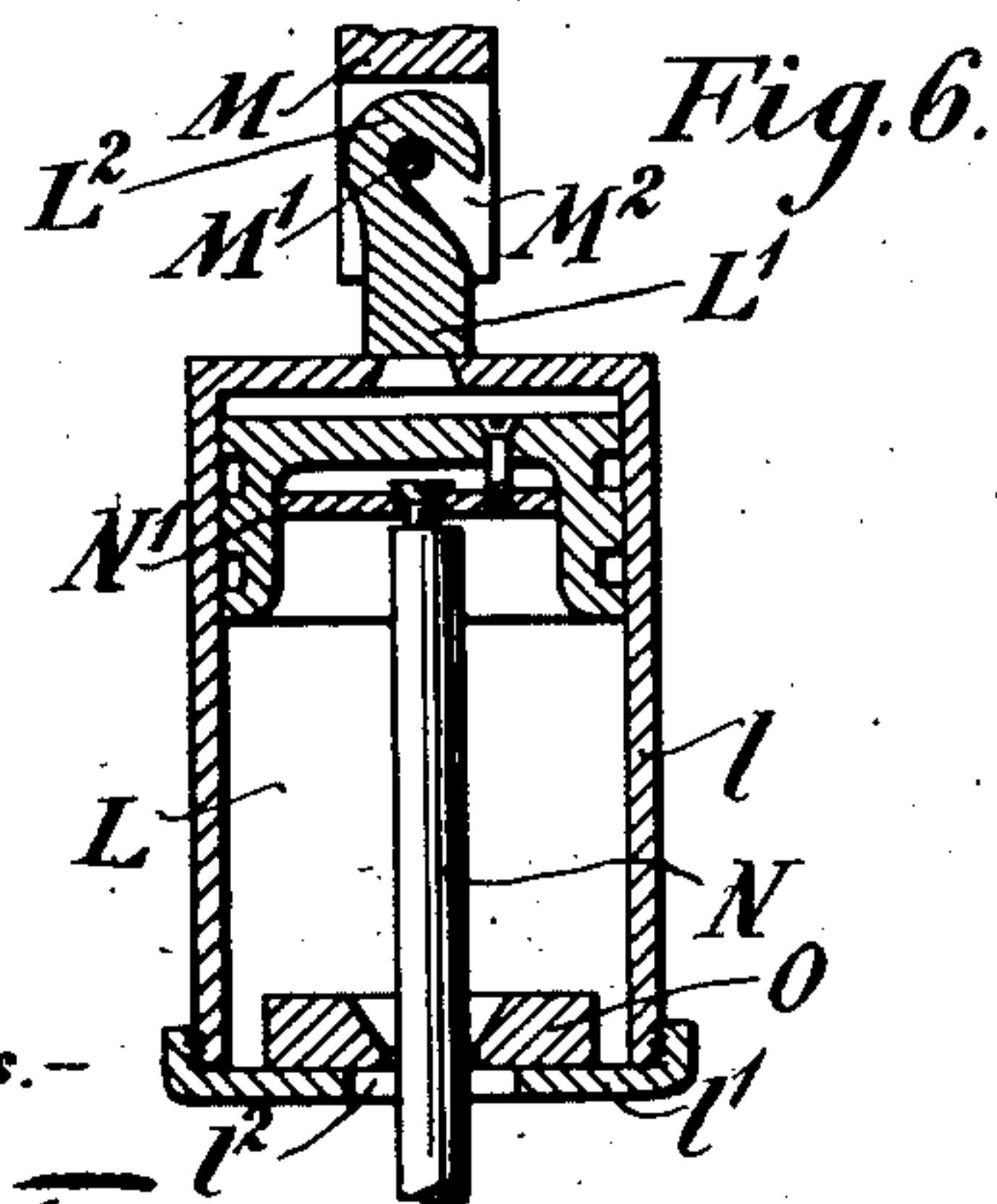
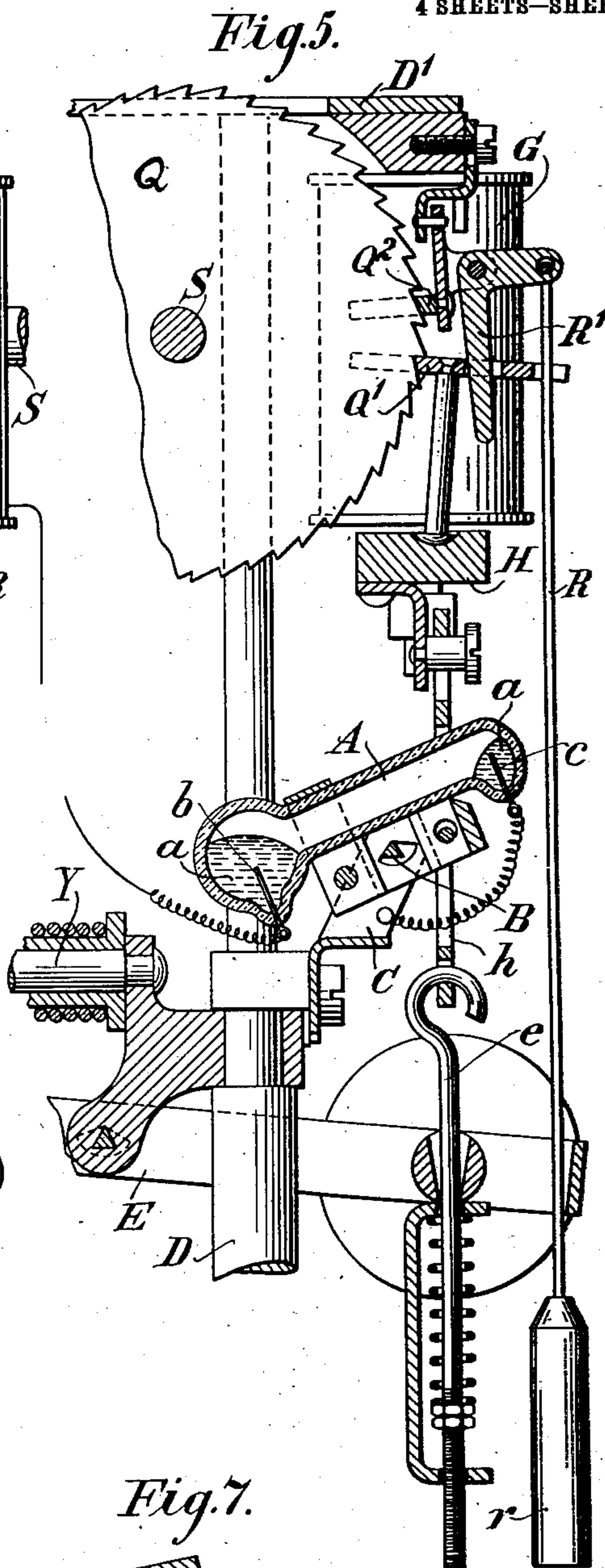
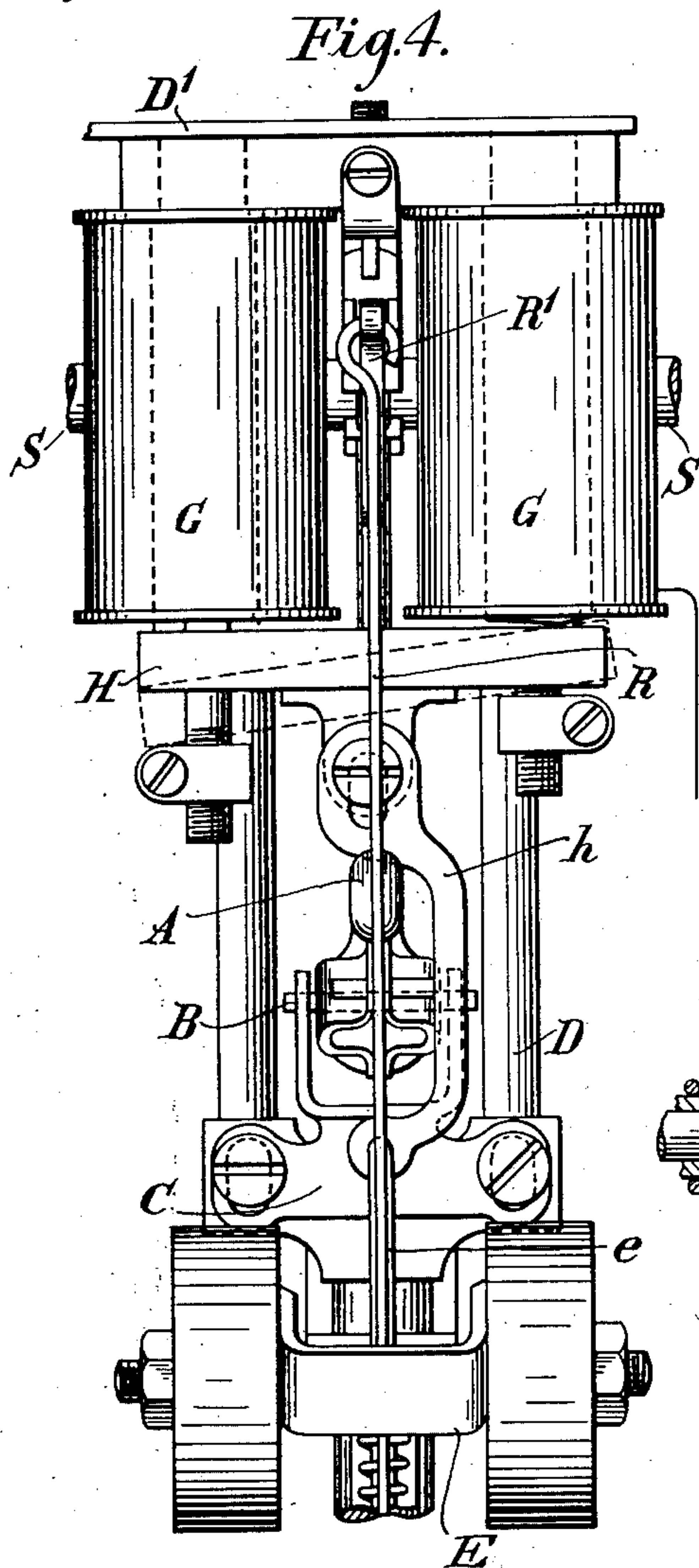
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4 SHEETS—SHEET 4.



—Witnesses.—

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UNITED STATES PATENT OFFICE.

CHARLES OLIVER, OF WOOLWICH, ENGLAND.

ELECTRIC-ARC LAMP.

No. 914,869.

Specification of Letters Patent.

Patented March 9, 1909.

Application filed July 1, 1907. Serial No. 381,795.

To all whom it may concern:

Be it known that I, CHARLES OLIVER, electrical engineer, a subject of the King of Great Britain, residing at Cambridge Place, Burrage Road, Woolwich, in the county of Kent, England, have invented certain new and useful Improvements in or Relating to Electric-Arc Lamps, of which the following is a specification.

Heretofore it has been proposed to construct a flame arc lamp or other electric arc lamp having two magazines or storage chambers each located above the burning point and each adapted to hold a plurality of carbons which are automatically and successively brought into position to act as the electrodes, and the said two magazines so inclined to one another as to cause the downwardly projecting points of the electrodes to meet at the burning points, with electrically operated means to move one (or both) of said magazines or storage chambers toward or away from the other to thereby move one electrode toward or apart from the other for the purpose of striking and maintaining the arc, and wherein motor driven mechanism such as endless traveling chain—provided with fingers extending through a slot of the magazine—is arranged in conjunction with each magazine in suchwise as to positively engage each electrode in succession and positively force same downward as and when required for the purpose of feeding said electrodes; as set forth in my British Patent No. 15453 of 1904.

Now my present improvements relate more particularly to flame arc lamps of the aforesaid type but may be utilized with any other arc lamps to which same may be applicable; and my present improvements comprise or relate to:—First. An inclosed mercury switch for automatically making and breaking contact in the circuit of the electrically operated means by which the electrode feeding mechanism is operated; which inclosed mercury switch must be exhausted of atmospheric air as far as practicable. Second. Arranging and mounting the dash-pot—employed in conjunction with the solenoids—in suchwise as to enable same to be readily detached for the purpose of cleaning etc. such dash-pot; and furthermore relates to certain improvements in the construction and mounting of such dash-pots. Third. Means to readily disconnect the chains which form the feeding mechanism on the maga-

zines from the electrically operated means which actuate such chains for the purpose of facilitating trimming etc. Fourth. Arranging and mounting one of the magazines (advantageously the magazine which is not adapted to swing or not otherwise movable) so that same can be readily detached and removed from the lamp to facilitate cleaning etc. And the invention relates to various other details in the construction of the framework of the lamp and the mounting of the various parts of the lamp thereon etc. etc.

I will now proceed to describe the several features of improvement with reference to the drawings hereunto annexed.

Figure 1 is a view of a magazine arc lamp—having the present improvements applied thereto—with the outer casing shown in section and the interior mechanism shown in elevation. Fig. 2 is a similar view to Fig. 1 but at right angles thereto and having one of the magazines removed. Fig. 3 is a diagrammatic view showing the electrical connections to the various parts of the lamp. Fig. 4 is a local view—in elevation—on an enlarged scale—of the electro motor and inclosed mercury switch. Fig. 5 is a vertical sectional view at right angles to Fig. 4 showing the said switch in section and also showing the clutch or means interposed between the electro motor and the traveling endless driving chains operated by said electro motor to enable the former to be readily disconnected from the latter. Fig. 6 is a local vertical sectional view—on the same enlarged scale—of the dash-pot and means for detaching same. Fig. 7 is a local sectional view—on an enlarged scale—of the detachable coupling for the removable magazine.

Mercury switch.—According to this invention I employ a mercury switch A which is formed by a body of mercury *a* hermetically inclosed in a vessel of any suitable material (advantageously a glass vessel in the form of a horizontally disposed glass tube hermetically sealed and exhausted of atmospheric air as far as practicable) which is pivotally mounted or otherwise mounted so as to be adapted to be rocked or moved in suchwise that the mercury *a*—which normally lies in one end of the vessel in which the contact point *b* is located and clear of the contact point *c* located within and at the other end of said vessel—can be caused to move over or on to said contact point C so as to thereby electrically connect the said contact points B

and C; for example, as shown this mercury switch A may be pivotally mounted at B so as to be adapted to be rocked upon its supports B on a bracket C carried in the frame D of the lamp at a convenient point just above (or it may be below) the cradle or beam E which latter (when rocked by the regulating coils F) will by means of the connecting rod or link E tilt said mercury vessel A from its normal position *e. g.* as shown in Figs. 2 and 5 (with the mercury off one of the contacts) into such position that the mercury connects both said contacts *b* and *c* whereby a local circuit is completed through the electro-magnet G which through the medium of the armature H operates the endless chains I (or other feeding mechanism) and upon movement of the armature H taking place toward its electro-magnet G thereupon (through any suitable connection—such as the link *h*) it tilts or rocks the mercury vessel A back again to its normal position so that the mercury is removed from one of the contacts and the circuit thereby broken through said electro-magnet G; and thus the making and breaking of this local circuit through the electro-magnet G which operates the feeding mechanism is effected through the medium of this mercury switch which latter—being closed in—consequently is not affected in any way by the fumes dust and deposits arising from the burning points of the carbons.

Dash-pot.—The dash-pot L employed in conjunction with the electro regulating solenoid or regulating coils F in such lamp is, according to the present invention, so arranged and mounted as to be readily detachable; this arrangement enabling such dash-pot to be readily cleaned etc.; and furthermore the dash-pot itself may be specially constructed arranged and mounted as follows:—The cylindrical or other barrel part *l* of the dash-pot L is provided with a rigid extension rod or arm *L*¹ the outer end *L*² of which is hooked or formed in such wise as to be adapted to engage on or over a pin *M*¹ in a tubular extension or recess *M*² in the end of an arm or tube *M* attached to the solenoid core *f* which is controlled by said dash-pot L; the arrangement being such as to permit this hooked end *L*² to be readily detached when the dash-pot L itself is displaced—but, when the dash-pot L is secured in its position then the joint is such that the parts cannot become disconnected. The plunger rod or piston rod N of said dash-pot extends through the cap or cylinder end (which is advantageously a removable screw cap *l*¹) at the opposite end of the said cylinder or barrel *l* advantageously through a hole *l*² of larger diameter than the said plunger rod N so as to allow some amount of lateral play between said plunger rod N and the cap *l*¹; and in order to exclude dust etc. from gaining access to the interior of the barrel *l* I insert a closely

fitting washer O on said plunger rod N between the plunger N¹ and the inside of the cap *l*¹ so that said washer O (fitting closely round the plunger rod N) may have lateral motion with said plunger rod N in any direction within said barrel *l*. Means—such as a small clamping screw D or other suitable clamping device—are mounted on the frame D of the lamp adjacent to such dash-pot L or in such position as to be adapted to engage and firmly hold the outer end of the plunger rod N and thus fixedly hold same in operative position during the working of the lamp; while on releasing said plunger rod N from said clamping device P this enables the dash-pot L to be unhooked at its other end from the extension M on the solenoid core *f* and thereby enables the dash-pot L to be detached and entirely removed from the lamp as aforesaid (for cleaning etc.)

Means to disconnect the feeding mechanism.—The electrically operated means G and H which actuate the feeding mechanism, comprising the aforesaid endless chain I on each magazine K¹ K² operate through the ratchet Q and pawls Q¹ and Q² arranged in suchwise as to prevent the return movement of the ratchet Q as the chains I are racked round; and I provide the weighted rod R on the bell R¹ (or any other suitable means) so that by moving this weighted rod R upwardly said ratchet Q is released from said pawls Q¹ and Q² and thus enable the endless chains I to be moved freely by hand; and when said rod R is released the weight *r* on said rod R normally serves the additional purpose of maintaining said pawls Q¹ and Q² in engagement with the ratchet teeth Q—instead of employing springs for this purpose as heretofore. The ratchet Q is fixed rigidly on and to the shaft S which is rotated by the electro motor G H *e. g.* in the manner described in my former patent No. 15453 of 1904; and this shaft also carries the couplings S¹ and S² by which the gear wheel such as S³ carrying the endless chains I respectively are driven.

Detachable Magazine.—In the case where one of the magazines K¹ and K² is fixed and only one K¹ made movable I so mount the non-swinging magazine K² that it can be readily detached when desired to facilitate cleaning etc. and for this purpose the magazine K² may advantageously be mounted and detached as follows:—At the lower end of the said magazine K² same is provided with a lug or projection (or lugs or projections) which enters a corresponding socket or recess or recesses *k k*¹ adapted to receive same in the lower part of the frame D of the lamp, while the upper end of the said magazine K² is attached by a screw or other suitable means to a fixed part of the frame D for example by a single screw *k*²—passed through a lug *k*³ in the upper end of the magazine K²—screwed

into a downwardly projecting fixed bracket or extension d on the upper part of the frame D; so that by removing said screw k^2 or attachment at the upper end of the magazine k^2 , the latter can be readily detached and removed from the lamp as will readily be seen.

Framework carrying the lamp components.—

The framework D on which the various components of the lamp are mounted comprises the top plate D^1 and the bottom plate D^2 connected by the rigid uprights D. The lower part of said special frame is arranged in conjunction with an electro-magnet Y mounted on said frame and located midway or thereabout between the top and bottom plates D^1 and D^2 and in circuit with the lower parts of said uprights D which lower parts—for this purpose—are formed of magnetic material (the upper parts of one or both of said uprights D being made of non-magnetic material) whereby the lower parts of said uprights D in conjunction with said electro-magnet Y serve, after the manner of a horse-shoe magnet, to act on the arc flame to deflect same.

What I claim is:—

1. In an electric arc lamp, the combination of a magazine carrying a plurality of electrodes and having near its lower end a curved lug, a supporting frame inside the lamp provided with a slot with which said lug

is adapted to engage, and a detachable fastening means securing the upper end of said magazine to said frame, substantially as described.

2. In an electric arc lamp, the combination of magazines containing electrodes, means for feeding said electrodes, a frame for supporting the magazines and feeding means, comprising top and bottom plates connected by rigid uprights, the upper part of the uprights and the lower plate being made of non-magnetic material, and the lower part of said uprights being made of magnetic material, substantially as described.

3. In an electric arc lamp, the combination of magazines containing electrodes, step-by-step means for feeding said electrodes toward each other at intervals, including a toothed pivoted wheel, electrically operated means for operating said feeding means, including a pivotally mounted inclosed mercury switch, an electro magnet in circuit with said switch and connections between the armature of said magnet and said toothed wheel, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

CHARLES OLIVER.

Witnesses:

G. GANDER,
F. L. RAND.