

(No Model.)

2 Sheets—Sheet 1.

F. THONE.

ELECTRIC ARC LIGHT.

No. 348,799.

Patented Sept. 7, 1886.

Fig. 1.

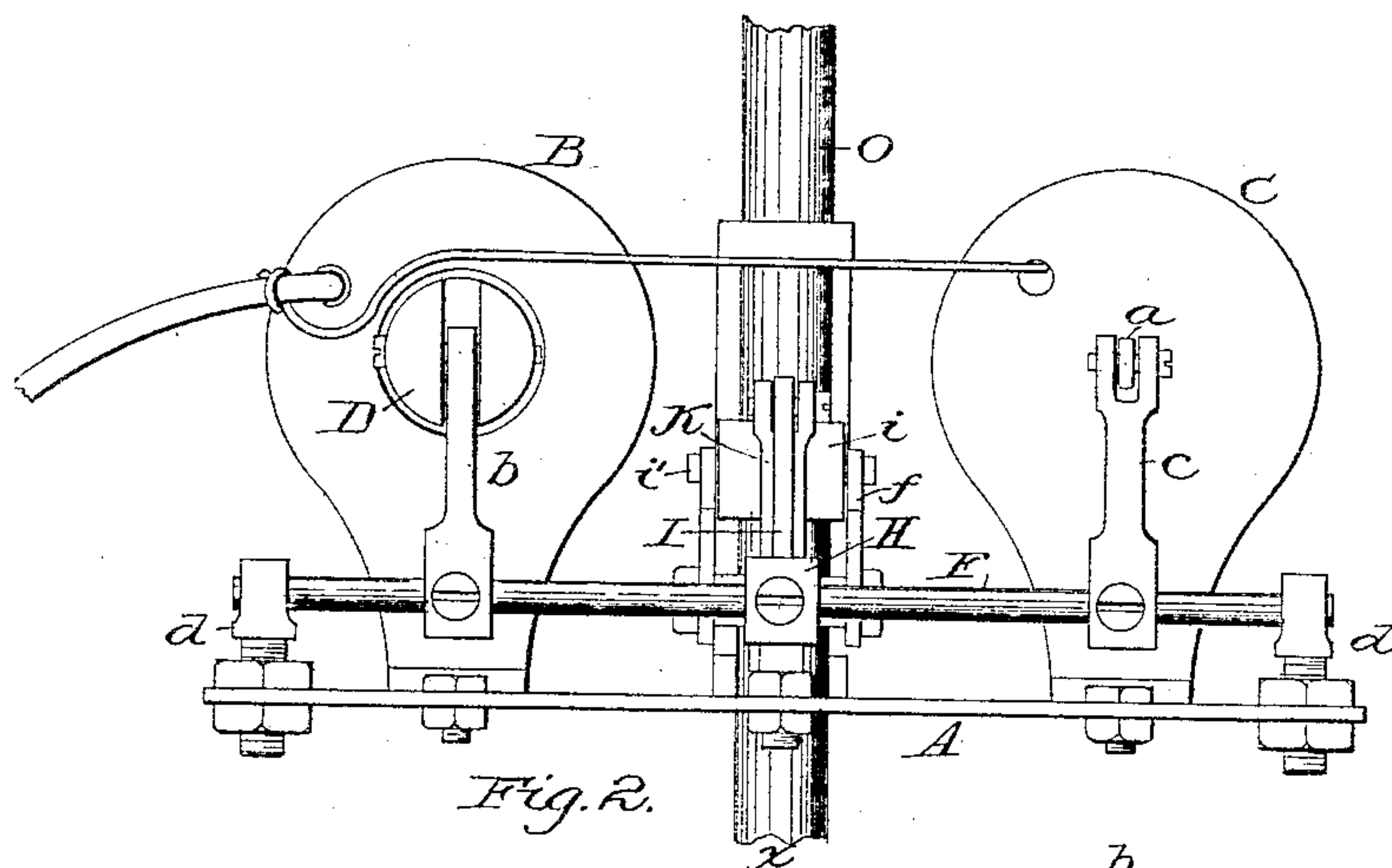
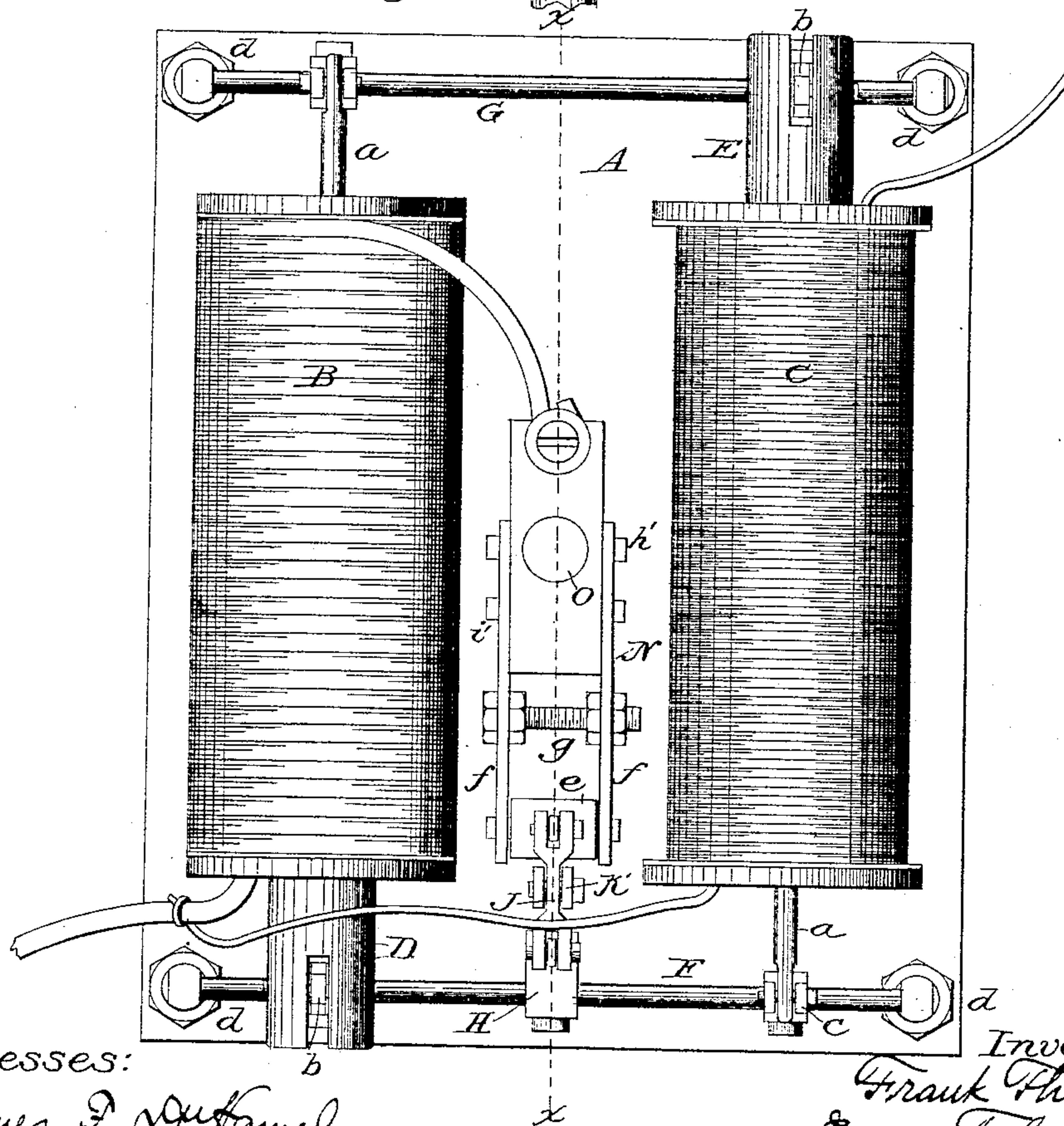


Fig. 2.



Witnesses:

James P. Dufanel
Walter C. Dodge.

Inventor:

Frank Thone,
Eugene F. Arnold Atty.,
by Dodge & Son,
Associate Attys.

(No Model.)

2 Sheets—Sheet 2.

F. THONE.

ELECTRIC ARC LIGHT.

No. 348,799.

Patented Sept. 7, 1886.

Fig. 3.

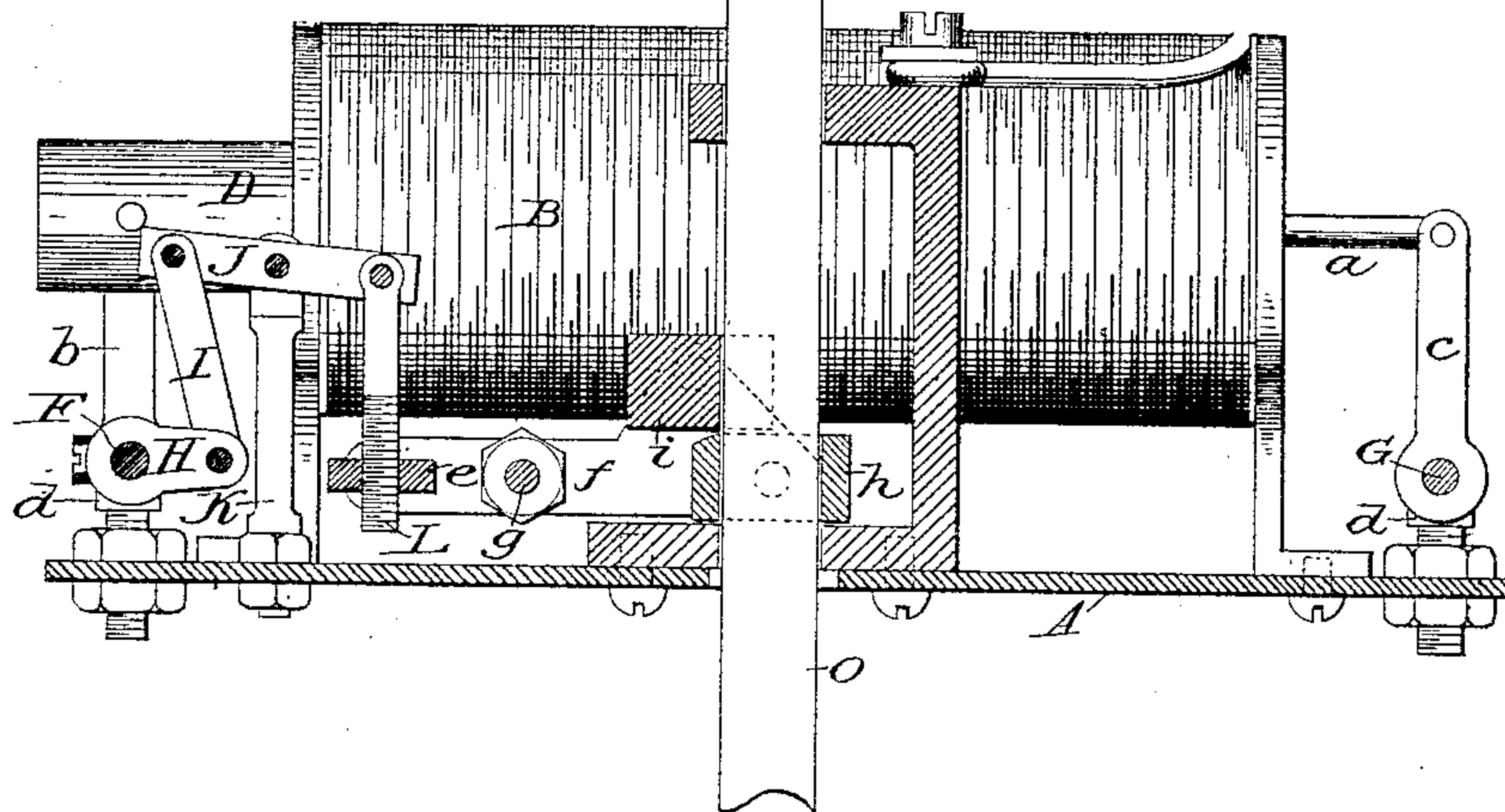
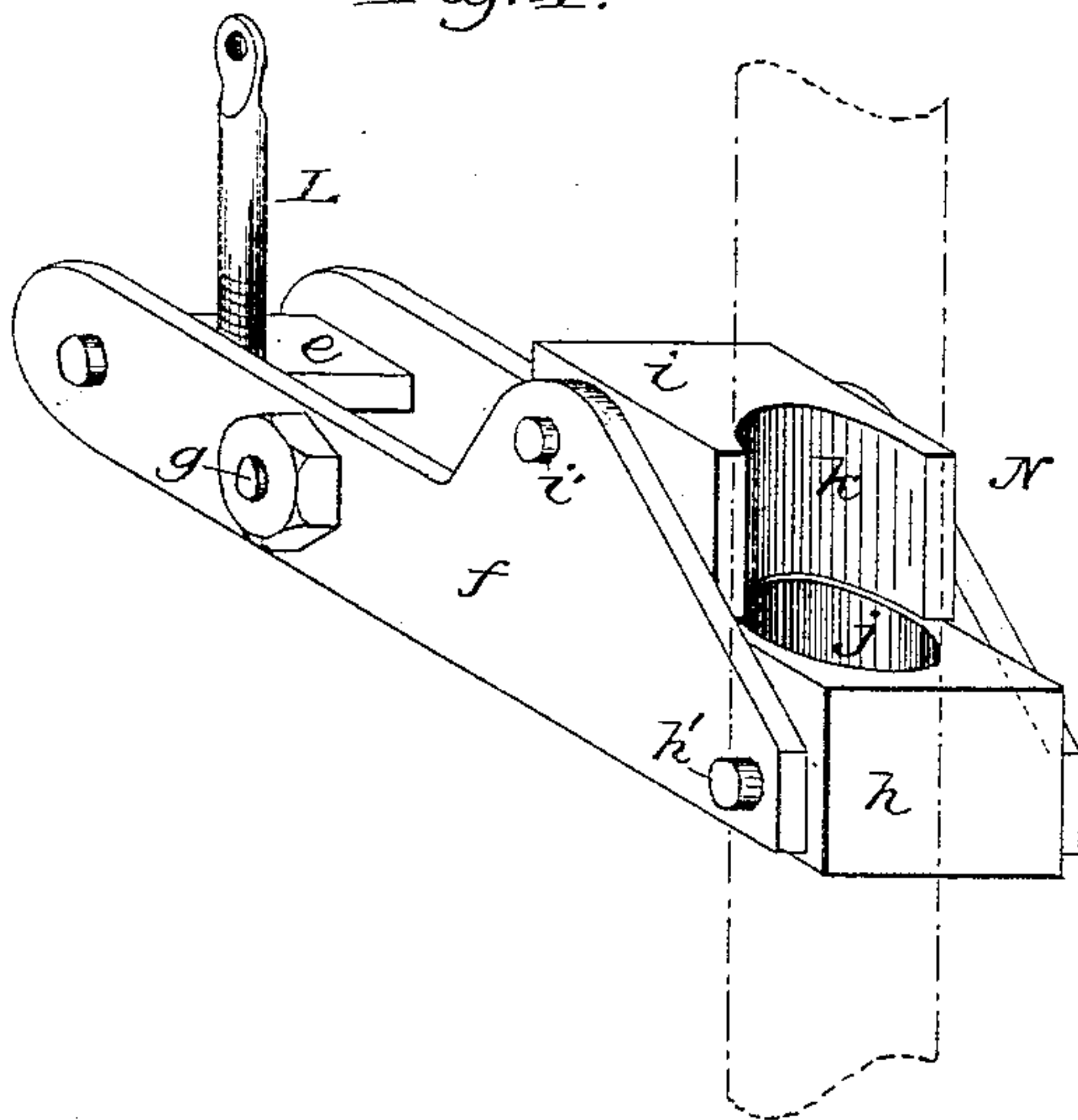


Fig. 4.



Witnesses:
James P. Duffin
Master S. Dodge

Inventor:
Frank Thone,
Eugene P. Arnold, Atty.,
by Dodge & Son
Assoc. Attorneys.

UNITED STATES PATENT OFFICE.

FRANK THONE, OF FORT WAYNE, INDIANA.

ELECTRIC-ARC LIGHT.

SPECIFICATION forming part of Letters Patent No. 348,799, dated September 7, 1886.

Application filed March 24, 1886. Serial No. 196,384. (No model.)

To all whom it may concern:

Be it known that I, FRANK THONE, a citizen of the United States, residing at Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Electric-Light Regulators; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention consists in novel mechanism for feeding and regulating the carbons or electrodes of arc lights, and relates particularly to that class of such devices which depend for their operation upon the differential action of two electro-magnets, one in the main or light circuit and the other in a shunt or derived circuit.

In the accompanying drawings, Figure 1 is an end elevation of my improved mechanism; Fig. 2, a top plan view of the same; Fig. 3, a vertical section on the line *x x* of Fig. 2, and Fig. 4 a perspective view of the clamp and lifter which controls the upper carbon carrier or rod.

Such parts as are necessary to produce a complete working-lamp and are not herein described and shown may be of any usual or approved construction, my invention concerning only the regulator or feed mechanism, and the description and illustrations being accordingly confined thereto. The differential action of two electro-magnets—one in the main or light circuit and the other in a circuit derived therefrom—is now very generally utilized for regulating and controlling the position of the movable carbon or electrode, and such idea is therefore not broadly claimed by me. My invention is confined to novel mechanism based upon or embodying that principle, and adapted, by reason of advantageous construction and arrangement of parts to give ease and certainty of action with great delicacy or sensitiveness of regulation.

Referring again to the drawings, A indicates a plate or bed, which ordinarily constitutes the head or top of the lamp-frame, and from which the lower carbon holder and globe-

holder are usually suspended by means of brass side bars, one of which commonly serves to carry the current to the lower carbon or electrode.

Mounted side by side, and a short distance apart upon the bed or plate A, are two coils or helices, B and C, the helix B being wound with coarse wire in the main or light circuit, and the helix C being wound with finer wire in a shunt or derived circuit passing around the arc or the electrodes between which the arc is formed, this being a common arrangement in lamps of this class. Both helices B and C are hollow, and have arranged within them, respectively, movable iron cores D and E. The core D protrudes from one end of coil B, and core E protrudes in a similar manner from the opposite end of coil C, and the two cores are so connected that as one core is drawn into its helix the other is simultaneously and equally withdrawn from the other helix. This connection is illustrated in Figs. 1, 2, and 3, wherein both cores are represented as provided with a stem or extension, *a*, which is carried through the end of the coil opposite that from which the core projects, and each core is sustained and guided by an upright arm, *b*, and a link, *c*, which jointly cause the cores to maintain always a position parallel with the axes of their respective coils. The arms *b b* are secured, respectively, to two rock-shafts, F and G, journaled in supporting-stems *d d*, and extending across bed or plate A at right angles to the axes of the coils or helices B C, as plainly shown in Figs. 1 and 2, and the links *c c* are or may be loosely mounted upon the respective rock-shafts. The arms *b b* and links *c c* are pin-jointed or otherwise so connected with the cores and their stems that the parts may move freely.

H indicates a radial arm, rigidly secured by a set-screw or equivalent means to the rock-shaft F. The outer end of said arm H is connected by a link, I, with one end of a rocking lever, J, pivoted at a point between its ends in a vertical post or support, K, rising from the bed or plate A, as best shown in Fig. 3.

From the opposite end of the lever J is hung a threaded rod or stem, L, which passes through a correspondingly-threaded hole in a plate, *e*, which plate is journaled in side bars, *f f*, held together by a bolt, *g*, either shouldered or pro-

vided with nuts on the inner as well as the outer faces of the side bars, *f f*, to prevent said bars from binding upon the plate *e* or upon the pivoted blocks *h* and *i*, which constitute the clamping device of the lifter N. The block *h* is provided with a circular hole, *j*, through which the upper-carbon rod or holder passes, and in which it may move freely, except when pressed against one wall of said opening by the block *i*, which is formed with a semicircular seat or depression, *k*, in its face, to receive the carbon rod or holder O. The block *h* has its journals *h'* seated freely in holes in the side bars, *f f*, and the block *i* has its journals *i'* similarly seated in holes therein above those of block *h*. The journals *h'* of block *h* are located on a line passing through the axis of rod O, and consequently the block has of itself no tendency to cramp or bind upon the rod; but the pivots or journals *i'* of block *i* are back of said line and somewhat back of the middle of block *i*, so that the forward or recessed end of the latter naturally falls and rests upon block *h*, presenting its upper edge or corner to the rod O, and clutching or cramping the same while supported on the opposite side by the walls of the opening *j* in block *h*. From this description it will be seen that if the rear end of lifter N be raised by the rod L, the side bars, *f f*, being free to turn or swing upon the journals of the plate *e*, will fail to rise until the rod is cramped or caught by the clamp or clutch *h i*, whereupon the lifter and rod will rise, the latter carrying with it the upper carbon, and thus effecting the required separation of the two carbons or electrodes. When the rod L is again lowered, the rear end of lifter N falls, the clutch releases the rod O, and the clutch permits the rod to fall and establish contact between the two carbons or shorten the space between them to the proper working distance. This alternating action is brought about, as in other lamps of this character, by the burning away of the electrodes and the consequent lengthening of the arc, which increases the resistance in the main circuit, weakens coil B, increases the current in the derived or shunt circuit, and strengthens the coil C, causing the core E to be drawn within coil C and the core D to be withdrawn proportionately from coil B. This action, through the arms *b b*, rocks the shafts F and G, raises arm H, and through the link I elevates the end of lever J, to which said link is connected, thereby depressing the opposite end of said lever J, lowering threaded stem L, and loosening the hold of the clutch on the rod O. As the clutch thus releases its hold, the rod moves down, shortens the space between the electrodes, or establishes actual contact, whereupon the current again passes

almost wholly through the coil B, which, drawing in its core D, causes the lifter N to be raised through the action of the intermediate parts and separates the carbons to their proper working distance.

In order that the parts may be nicely adjusted to each other the stems *d d*, in which the rock-shafts F G are journaled, are threaded and provided with nuts above and below the bed or plate A, as shown in Figs. 1 and 3. By adjusting said stems the axes of the cores and coils may be made to coincide exactly, and by adjusting the stem J up or down the lifter may be properly adjusted with reference to its controlling or actuating mechanism. When lowered, the lifter N rests upon bed or plate A and assumes a horizontal position.

The construction above set forth gives excellent practical results. Proper insulation will be made wherever required, to prevent short-circuiting.

Having thus described my invention, what I claim is—

1. The herein-described regulator for arc lamps, consisting of coils B C, respectively included in the main and derived circuits, and wound with coarse and fine wire, cores D and E, movable within said coils, rock-shafts F G, arms *b b*, and links *c c*, connecting the cores and rock-shafts, radial arm H, link I, rocking lever J, stem L, lifting device N, carried by stem L, and rod O, passing through said lifting device.

2. In an electric-lamp regulator, a clutch consisting of side bars, *f f*, plate *e*, and blocks *h i*, journaled in said side bars, and lifting-stem L, threaded and passing through a correspondingly-threaded hole in plate *e*.

3. In an electric-lamp regulator, a clutch consisting of a frame, a block, *h*, journaled therein and provided with a hole through which the carbon-carrier rod may freely pass, and a block, *i*, pivoted in said frame above the block *h*, and having its pivots nearer the end removed from the rod, whereby the block *i* is caused to cramp upon the rod when the frame is tilted, but to release the same when the frame assumes a horizontal position.

4. In combination with coils B C, cores D E, and lifter N, rock-shafts F G, and intermediate connections between said rock-shafts and the cores and lifter, and adjustable supports for the rock-shafts, all substantially as described and shown.

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

FRANK THONE.

Witnesses:

WILLIAM P. BREEN,
OWEN T. HEATON.