

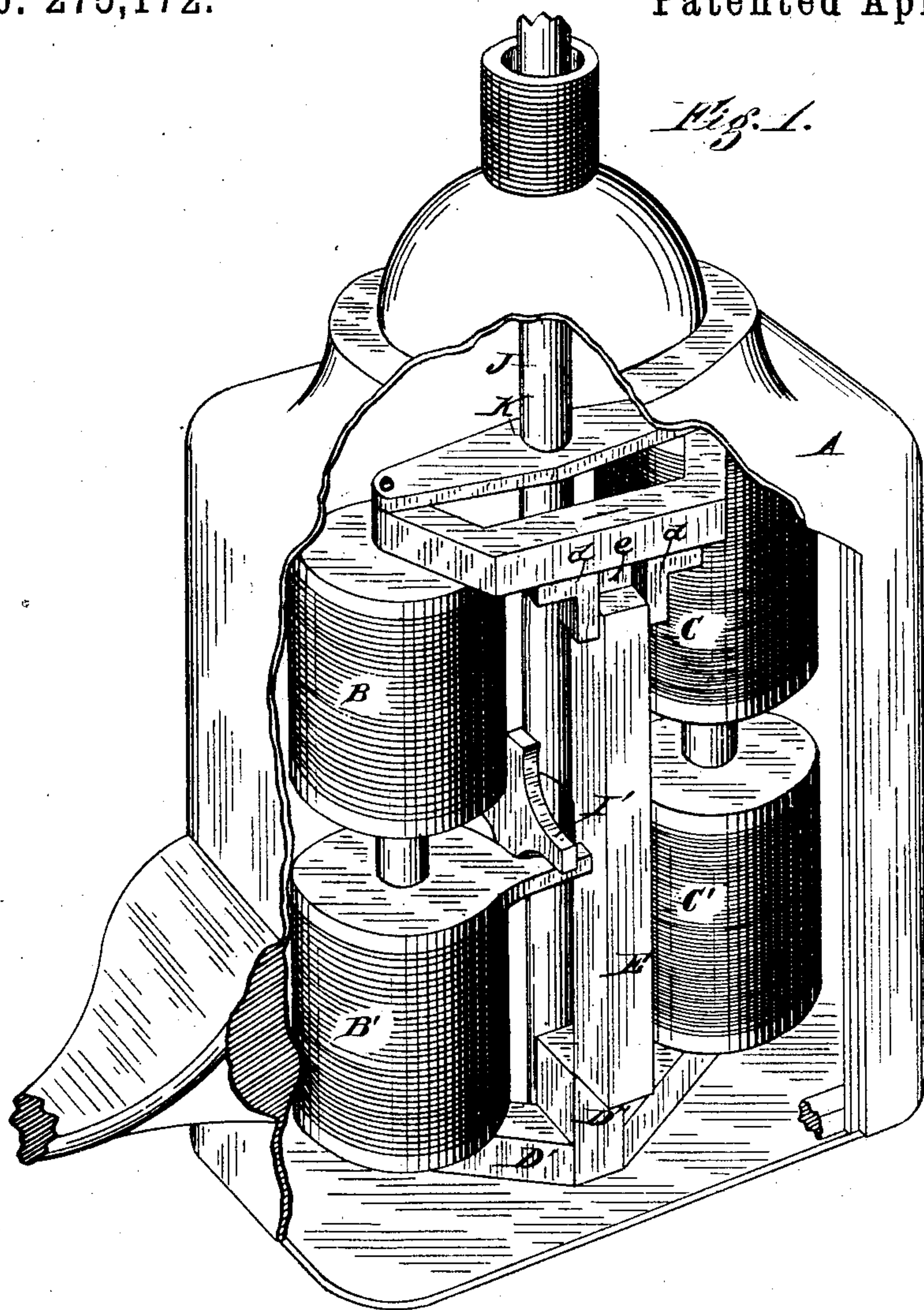
(Model.)

3 Sheets—Sheet 1.

E. A. EDWARDS.  
ELECTRIC ARC LAMP.

No. 275,172.

Patented Apr. 3, 1883.



*Attest,*

*John E. Miles,  
Jno. E. Jones*

*Inventor,*

*Edgar A. Edwards,  
by Wood & Boyd  
his Attorneys &c.*

(Model.)

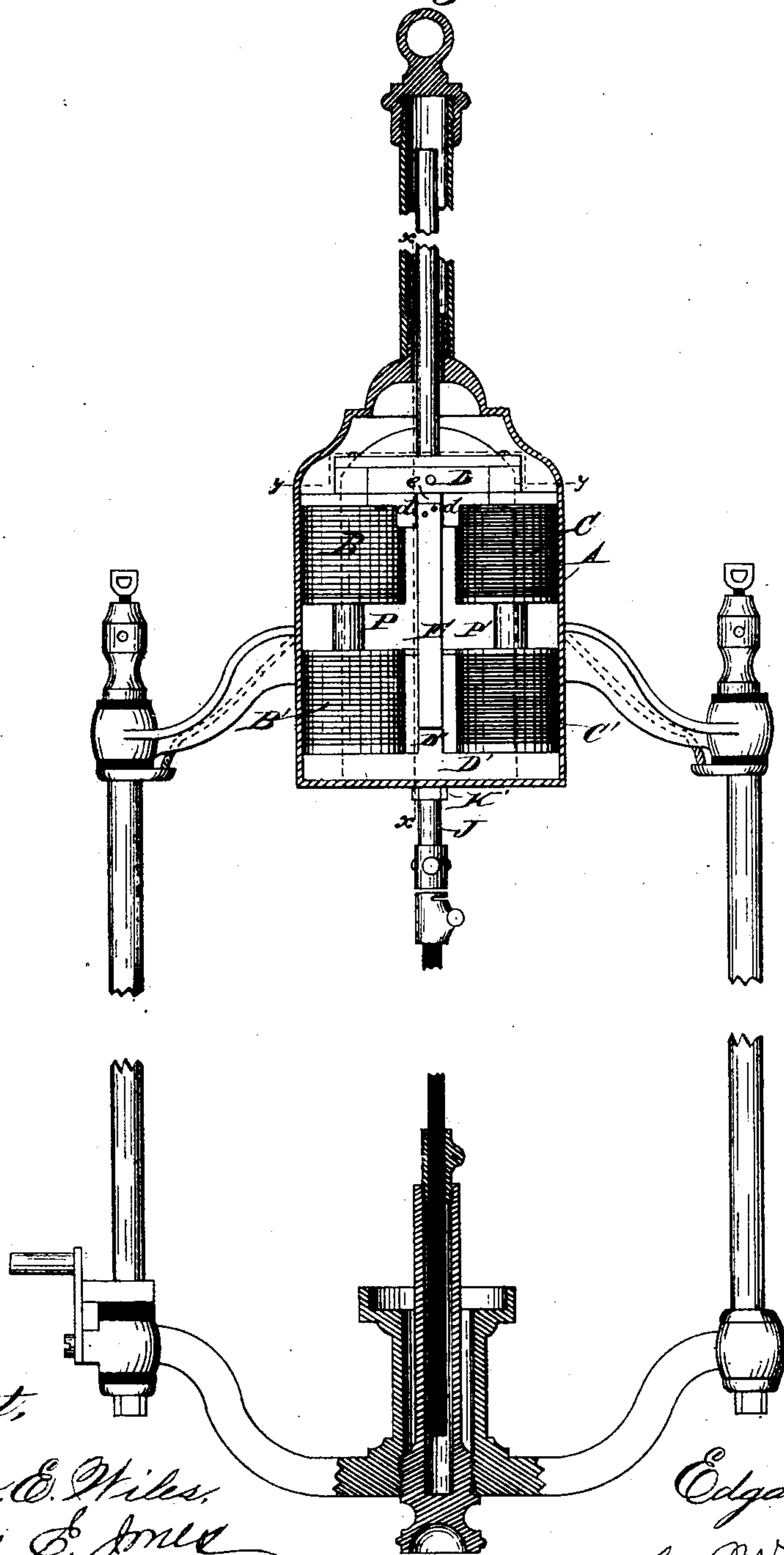
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*Fig. 2.*



*Attest,*

*Jno. E. Stiles,  
Jno. E. Jones*

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(Model.)

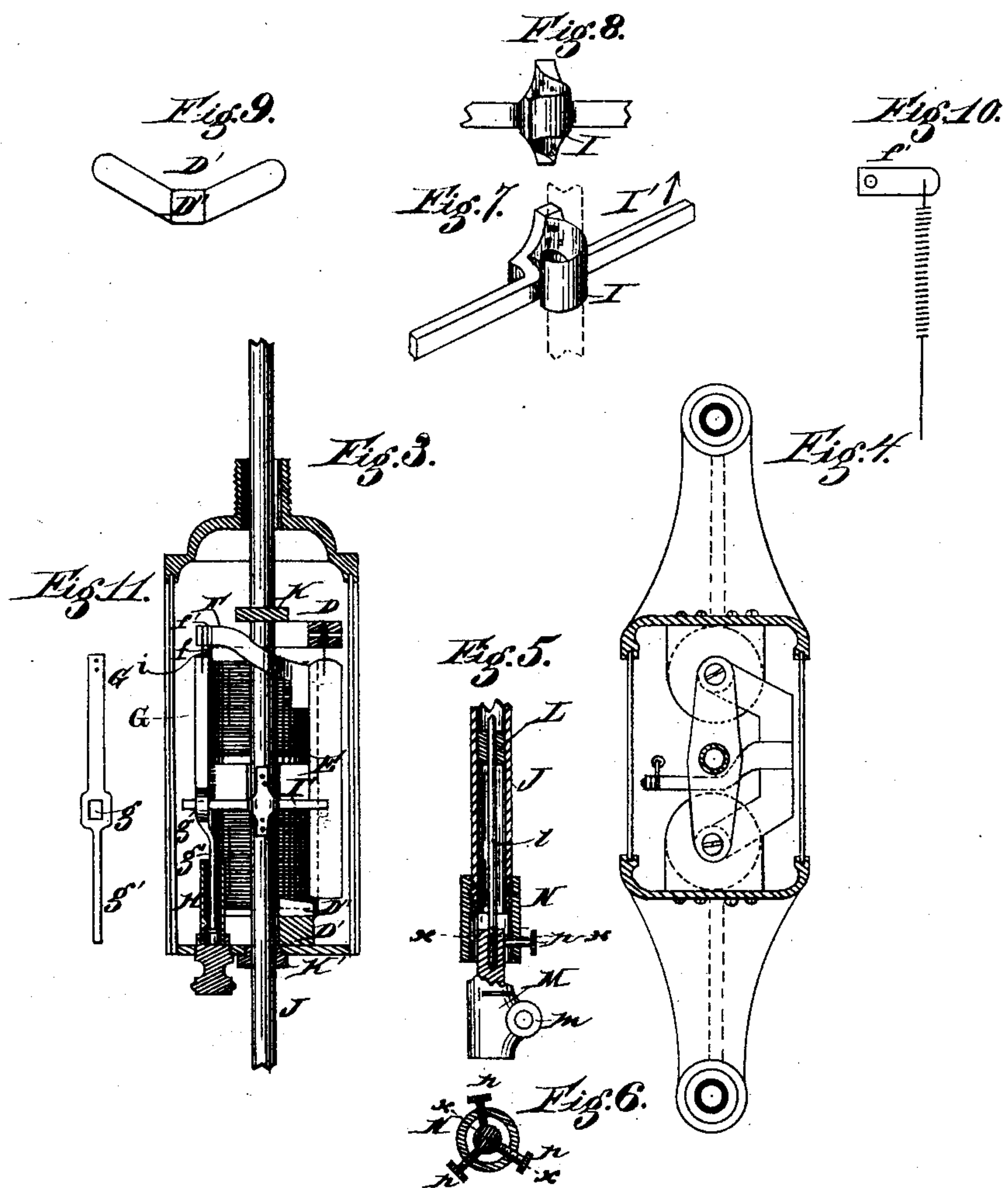
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ELECTRIC ARC LAMP.

No. 275,172.

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Attest,

Jno. C. Wiley.

Jno. C. Jmel

Inventor,

Edgar A. Edwards.

by Wood & Boyd

his Attorneys etc



# UNITED STATES PATENT OFFICE.

EDGAR A. EDWARDS, OF CINCINNATI, ASSIGNOR TO O. M. GOTTSCHALL,  
TRUSTEE, OF DAYTON, OHIO.

## ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 275,172, dated April 3, 1883.

Application filed October 17, 1882. (Model.)

*To all whom it may concern:*

Be it known that I, EDGAR A. EDWARDS, a citizen of the United States, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Electric Lights, of which the following is a specification.

My invention relates to an improvement in electric-light regulators, or mechanism for adjusting the carbons in an electric light of the voltaic-arc type.

The features of my invention will be set forth in the description of the accompanying drawings, of which—

Figure 1 is a broken perspective elevation. Fig. 2 is a side elevation of the lamp with one side of the case removed, showing the regulating mechanism. Fig. 3 is a section on line *x x*, Fig. 2; Fig. 4, a cross-section, line *y y*, Fig. 2. Fig. 5 is a detail view of the upper-carbon-rod holder and centering device. Fig. 6 is a section on line *x x*, Fig. 5; Figs. 7 and 8, detail views of the clutch; Fig. 9, the lower yoke; and Fig. 10 shows a tension-spring for regulating the movement of the armature; Fig. 11, front elevation of lifting-arm.

A represents the cast-metal case containing and protecting the operative mechanism; B B', the helices of the principal magnet.

C C' are the fine-wire helices of the shunt-magnet; D D', maximum polar yokes uniting the two cores of the magnets P P'. These yokes are of soft iron, and are polar extensions and points of maximum polarity having an upwardly-projecting lug, D''.

E is a vibrating pendulous armature, suspended by a thin spring, *e*, secured to polar yoke D.

*d d* are soft-iron lugs, secured to yoke D in such a manner as to magnetically charge the upper end of armature E, which is pivoted at the top in close proximity to the polar extension D, while the lower end swings in close proximity to the polar extension D', so as to divert sufficient magnetism from the closed magnetic circuit to operate the armature, and through it the clutch mechanism.

F is a metal arm, secured to the upper end of armature E in such a manner that its outer end shall rise or fall with the vibrations of armature E.

*f'* is a piece of metal secured rigidly to end of arm F, and to which spring *i* is attached.

G represents a connecting-rod attached to the end of arm F by spring *f*, and having slot *g*, which engages the end of the clutch-lever I; also, an extension, *g'*, which acts as a plunger-rod in dash-pot H.

I is a clutch, made by securing the two ends of a coiled or twisted metal spring to arm I'. This spring is made of pendulum-spring steel, so as to yield and grasp the entire circumference of the rod, and forms a sensitive clutch.

J represents the vertically-moving carbon-rod, having upper bearing, K, and lower bearing, K'.

L represents a fixed perforated plug, secured to the inside of the lower end of the vertically-moving carbon-rod J, having rigidly secured to it the upper end of a flexible steel rod, *l*, to the lower end of which is secured the carbon-clamp M.

N represents a metal collar tapping into the lower end of carbon-rod J, and having centering set-screws *n*, whose points bear against the shank of clamp M.

P P' represent the stationary cores of the magnets.

The operation of the mechanism is effected differentially by the combined action of the coarse-wire magnet B B', which carries the principal amount of current supporting the arc, and the fine-wire magnet C C', which is connected in shunt so as to form a by-path for a small percent. of the current—a connection well known in the art. The helices of the main magnet B B' and shunt-magnet C C' are wound in such manner that they are caused to induce opposite polarities in the same polar yoke or magnet—that is to say, the main magnet B B' will induce north polarity in the upper and south polarity in the lower polar yoke, while the shunt-magnet C C' will induce south polarity in the upper and north polarity in the lower polar yoke. The position of the parts as shown in the drawings represents the lamp before the current is turned on. When the current is sent through the lamp the magnetism made by the principal helices charges the yokes D D', which in turn charge armature E, the lower end of which moves toward lug D'', thus causing the end of arm F to move verti-



cally upward, carrying connecting-rod G, with its loop, which elevates the end of arm I', causing the clutch to grasp the carbon-rod J and raise it, thus making the initial carbon separation. The increase of the length of the arc by the disintegration of the carbons shunts a larger proportion of current through the fine-wire helices, thus increasing their magnetism, which acts to neutralize the magnetism of the principal helices B B', thus decreasing the magnetic attraction between lug D'' and armature E, which then moves away from lug D'', thus lowering the clutch mechanism until the end r of arm I' comes in contact with its rest, and when the clutch is tripped and rod J slides downward, when the same movement is repeated.

The object of the device shown in Figs. 5 and 6 is to provide suitable mechanism for securing the carbons axially. The slender steel rod l acts as a universal joint, which is centered by means of thumb-screws n.

It is obvious that in place of the springs e f pivots or other suitable mechanical connections may be used.

The clutch I is made of thin spirally-twisted spring-steel, with upper and lower projecting twists, i i, which yieldingly holds the carbon-rod J in a vertical position, and an extremely sensitive clutch, and is one feature of my invention herein described.

The pendulous armature I have found to be very sensitive, and the operation of the adjusting mechanism materially benefitted by its use. I do not claim a helical friction-clamp surrounding the carbon-holder, and the friction of which is varied by endwise movement.

I claim—

1. In an electric lamp, the combination of two differential magnets united at either end

by maximum polar yokes, with a pendulous armature pivoted to one of said yokes, and a polar extension on the other yoke, which is projected to be in close proximity to the free end of the pendulous armature, substantially as and for the purpose described.

2. An electric lamp having a principal and a shunt electro-magnet, the axial cores of which are vertical and united by yokes at either end, one of which yokes is provided with a maximum polar piece, D'', for operating a pendulous armature pivoted to one of said yokes to adjust the carbons, substantially as herein set forth.

3. In an electric lamp, the adjusting mechanism composed of pendulous armature E, arm F, rigidly attached to the pivoted end of armature E, connecting link rod G, arm I', and clutch I, in combination with carbon-rod J, substantially as herein set forth.

4. In combination with the carbon-rod J, the flexible supporting-rod l, centering devices N n, and clamp M, substantially as herein set forth.

5. In combination with armature and arm F, the connecting link rod G, extended to form the dash-pot plunger-rod, substantially as herein set forth.

6. The combination, with the carbon-carrier, of a spring-clamp composed of a convoluted plate of metal through which the carbon-carrier passes, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

EDGAR A. EDWARDS.

Witnesses:

JNO. E. JONES,  
ADOLPH GLUCHOWSKY.