(Model.) 2 Sheets—Sheet 1.

E. A. EDWARDS.

ELECTRIC ARC LAMP.

No. 275,171. Patented Apr. 3, 1883.

Fig. 1.

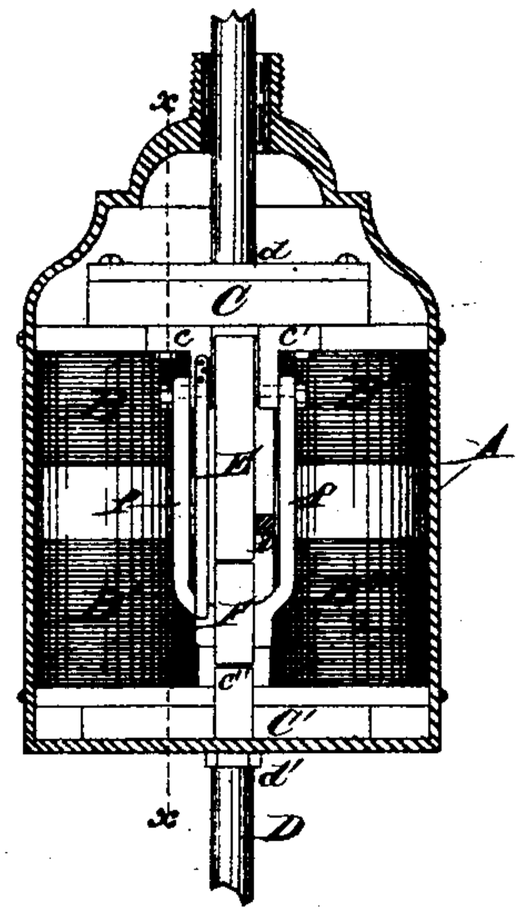


Fig. 4.

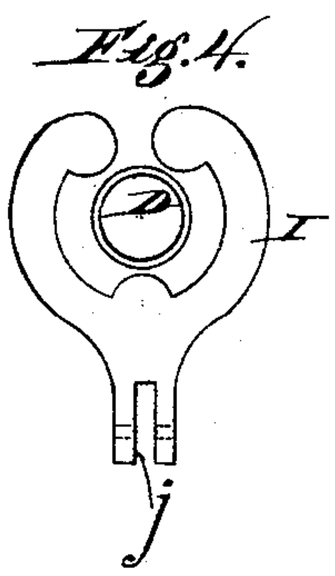
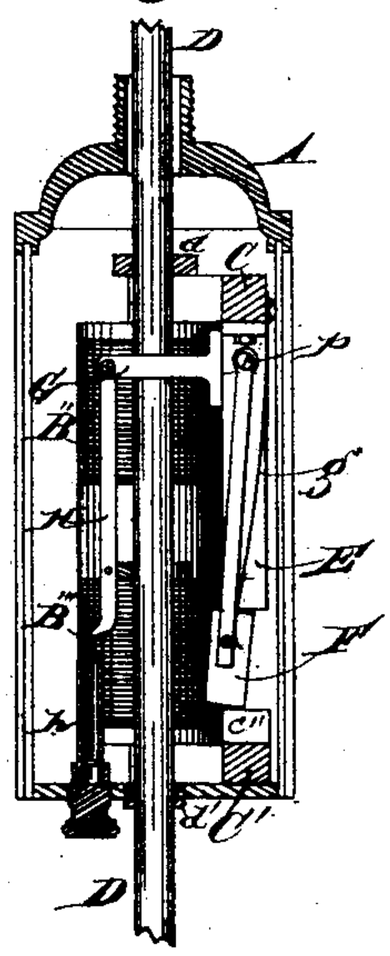


Fig. 2.



Attest,

Jno. E. Wiles.

Jno. S. Jones

Inventor,

Edgar A. Edwards.

by Wood & Boyd

his Attorneys &c.

(Model.)

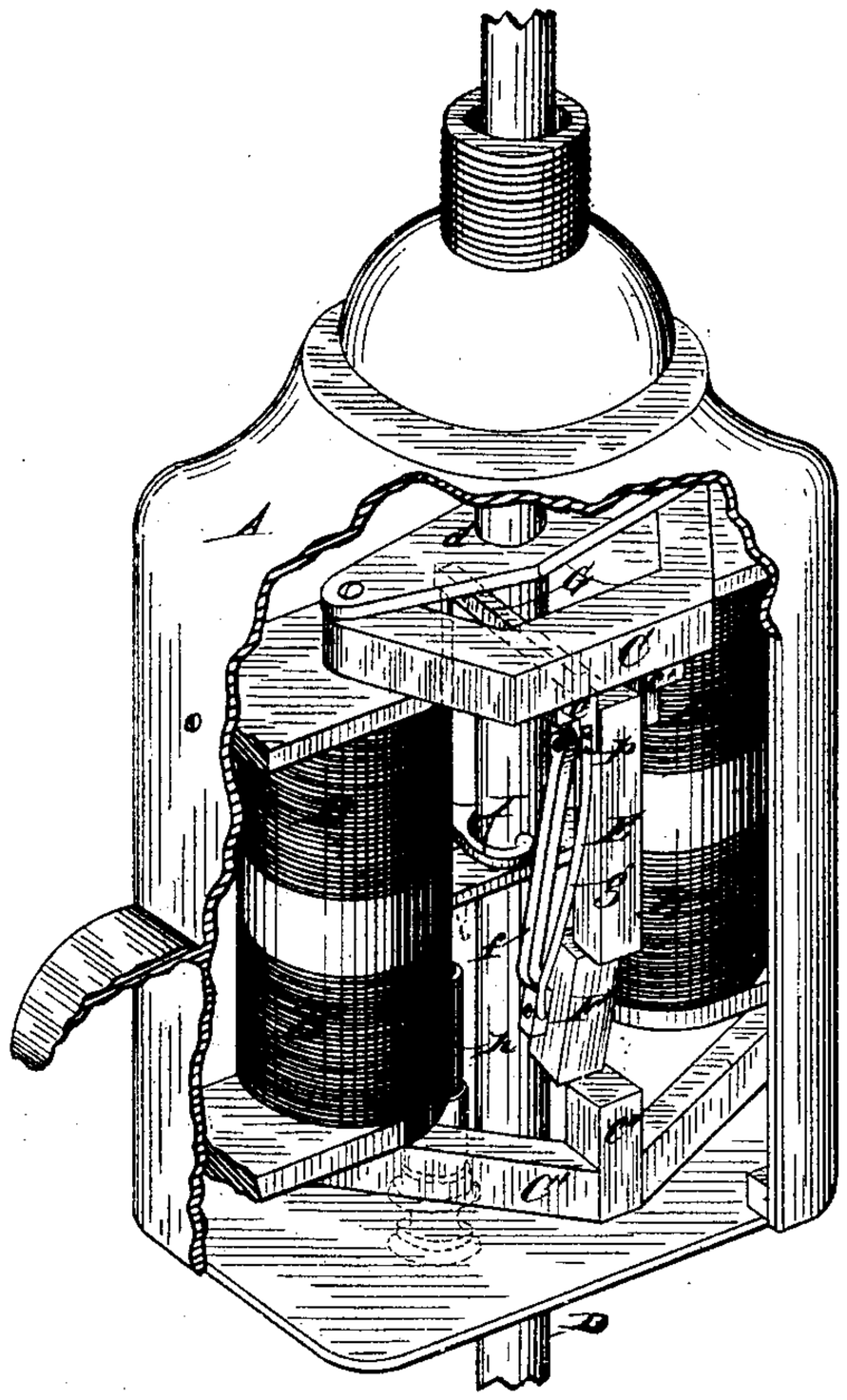
2 Sheets—Sheet 2.

E. A. EDWARDS.

ELECTRIC ARC LAMP.

No. 275,171. Patented Apr. 3, 1883.

Fig. 3.



Attest,

Jno. E. Giles.

Jno. L. Jones

Inventor,

Edgar A. Edwards.

by Wood & Boyd.

his Attorneys &c

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. 275,171, 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 certain improvements in electric-light regulators or mechanism for adjusting the feed of carbons in an electric lamp of the arc type, and more specifically to that class in which the carbons are manipulated by mechanism actuated by electro-magnets the circuits of which are wholly derived or form a by-path from the arc of considerable resistance, there being no coarse-wire magnets in my lamp, so that the adjustment is not effected differentially, as in most of existing serial lamps.

Several patents have been granted for effecting the regulation in shunt lamps by cutting in or out or regulating the resistance of the derived circuit by the normal or abnormal length of the arc; but this method is objectionable because of the spark always formed at the time and point of break, as well as causing the light to flicker or jump at periodic intervals. In my improvement these objectionable features are obviated, the operation of the lamp being wholly mechanical.

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

Figure 1 is an elevation of the adjusting mechanism, with half the case removed; Fig. 2, a section on line *x x*, Fig. 1; Fig. 3, a broken perspective elevation of the same; Fig. 4, detail view of carbon-rod clutch.

A represents a metal case; B B′ B″ B‴, the helices; C C′, the top and bottom magnetic yokes. From the centers of the yokes C and C′, respectively, the polar extensions *c c′* of the upper and *c″* of the lower yoke project toward each other. The helices B and B′ surround a common soft-iron core, and the helices B″ and B‴ surround a similar core. These cores are connected at their ends by the yokes C and C′, respectively.

D is the upper-carbon rod, sliding vertically in bearings *d d′*.

E and F are parts forming a compound magnetic armature, both suspended from the same point by means of a pin, *p*, passing through polar projections *c c′*. Part E of the compound armature is independently hinged on pivot *p* and diamagnetic arms *f* on the same pivot. The lower part of arms *f* is rigidly attached to the part F of the compound armature. The part E of compound armature swings freely upon pin *p*. Arms *f*, carrying part F of compound armature, also swing freely on pin *p* independently of part E, except through the magnetic attraction between E and F.

c″ represents a lug projecting from the yoke C′.

G is a lever-arm, rigidly attached to part E of compound armature; H, a vertically-depending connecting or lifting rod pivoted at the end of arm G, the lower end of which forms a plunger for the dash-pot *h*, which pot screws into the bottom of the case A.

g is a spring fastened to polar projection *c* and bearing against the lower end of arm *f*.

I is an open three point carbon-rod clutch, having slot *j*, in which arm H is placed or pivoted; *i*, a platform or floor on which clutch rests.

The operation of my device is as follows, the drawings representing the parts as in position before the current is sent into the lamp: The object of using two pairs of helices is to secure as much magnetism from a given resistance of wire and amount of current as possible, and the connection so made as that the positive of both magnets is sent into one yoke and the negative into the other. In the normal condition of the lamp the rod carrying the upper carbon is depressed, so that the upper rests upon the lower carbon, and the weight of said rod, acting through the clutch I, rod H, and arm G, swings the upper portion, E, of the compound armature outward, so that its lower end is out of line with the upper end of the portion F, and at the same time the springs *g*, bearing on the arms *f*, cause the said lower portion, E, to stand inwardly with the lower end out of line with the polar extension *c″* of the lower yoke. When the electric current is sent through the helices the yoke C, through its polar extensions *c c′*, communicates magnetism to the upper part, E, of the compound armature, and the tendency of the polar

extension c'' of the lower yoke, C′, is to attract the lower part, F, of the armature outward and into line; but this lower part of the armature is prevented from swinging outward by the springs g, and there is a reciprocal attraction between it and the lower end of part E, which causes said part E to swing inwardly and elevate the arm G, which acts through rod H and causes clutch I to grasp the carbon rod D and raise it, thus effecting the initial separation. Owing to the disintegration of the carbon, the arc becoming lengthened, more current is shunted through helices B B′ B″ B‴, thus increasing the magnetism of the cores and causing a stronger attraction to exist between yoke C, parts of armature E and F, and yoke C′, which partially overcomes the retractile resistance of spring g, causing F to move outwardly, carrying with it part E, thus depressing arm G, rod H, with clutch I, until clutch I rests upon platform i, where carbon rod D is released, slides through, and shortens the arc. The spring causes part F to immediately return to the first position, part E more slowly follows, because of the resistance of dash-pot h, when the same movement is again repeated.

I of course do not limit myself to the precise details of construction and arrangement shown in my drawings, as it will be obvious to persons skilled in the art that these may be varied without departing from the essential principles of my invention.

I represents the clutch, shown as having three bearing-points, i, being pivoted to rod H, making a positive, reliable, and sensitive clutch.

I claim—

1. In an electric-arc lamp, the combination, with one or more operating-magnets placed in derivation of the main circuit, of the compound armature composed of the part E, pivoted to one magnetic pole, and the part F, suspended near the free end of said pivoted part and adjacent to the other magnetic pole, the clutch connected intermediately with said pivoted part E, and means for retaining the part F out of line with the stationary magnetic pole to which it is adjacent, substantially as described.

2. In an electric-arc lamp, the combination, with an operating electro-magnet in a derived circuit, of the armature E, pivoted to one pole of the core of said magnet and having its free end arranged to be moved by the inductive action of the other pole of the arm G, projecting from said armature, the rod H, pivoted to said arm, and the clutch I, embracing the upper-carbon rod, substantially as described.

3. In an electric lamp, a compound armature consisting of a magnetic part, E, swinging freely on pin p, and magnetic part F, having diamagnetic arms f, swinging freely from pin p, in combination with operating electro-magnets having their helices placed in a derived circuit or by-path round the arc, substantially as herein set forth.

4. In an electric lamp, a compound armature the parts of which are independently hinged to one pole of a magnet, one part of said armature being suspended between the end of the other part and an adjacent magnetic pole, in combination with a spring and hinged arm for controlling the movement of said suspended part, substantially as herein set forth.

5. In an electric lamp, a compound armature the parts of which are independently hinged to one pole of a magnet, in combination with a swinging arm and plunger-rod of dash-pot pivoted thereto for regulating the movement of the member of the compound magnet with which it is connected, substantially as herein set forth.

6. In an electric lamp having two operating-magnets whose helices are placed in derived circuit or by-path round the arc, and having maximum magnetic yokes C C′, in combination with a compound armature having parts E and F, arm G, link H, clutch I, and dash-pot h, substantially as herein set forth.

7. In an electric lamp, the vertically-moving carbon rod D, in combination with an open three-point clutch, I, substantially as herein set forth.

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

EDGAR A. EDWARDS.

Witnesses:

JOHN E. JONES,

ADOLPH GLUCHOWSKY.