No. 618,848. Patented Feb. 7, 1899.

W. E. DENNIS.

ELECTRIC ARC LAMP.

(Application filed Jan. 22, 1898.)

(No Model.)

Fig. 1.

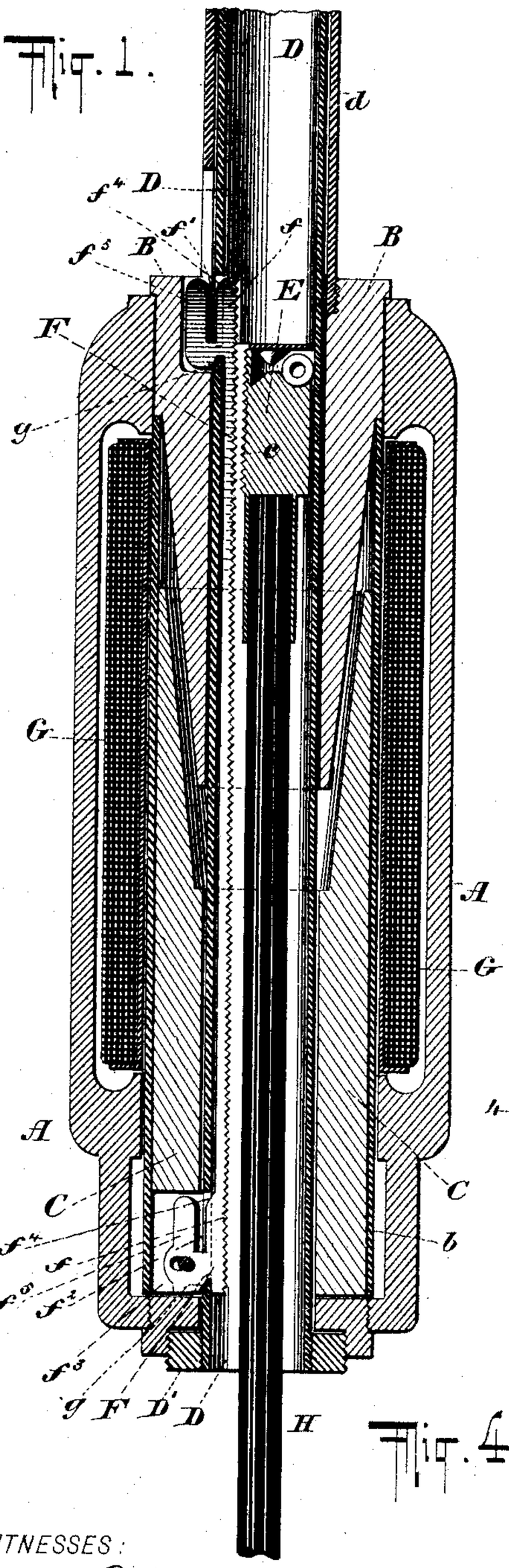


Fig. 2.

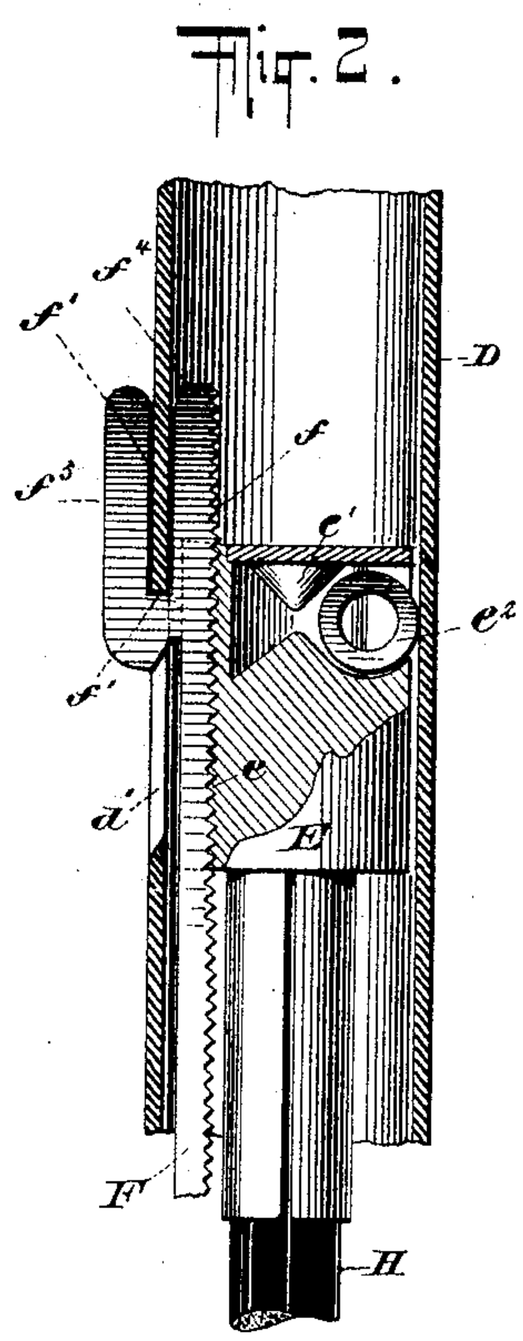


Fig. 3.

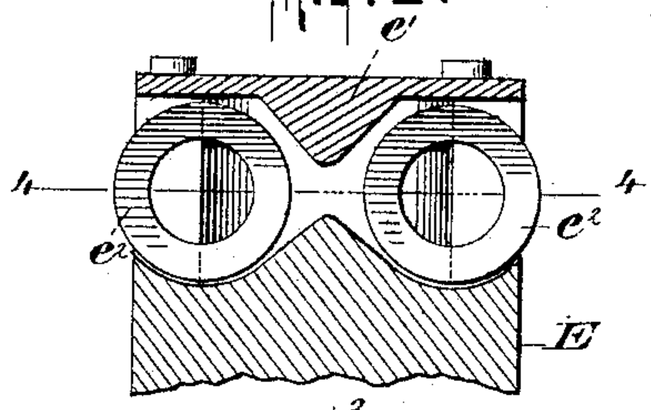
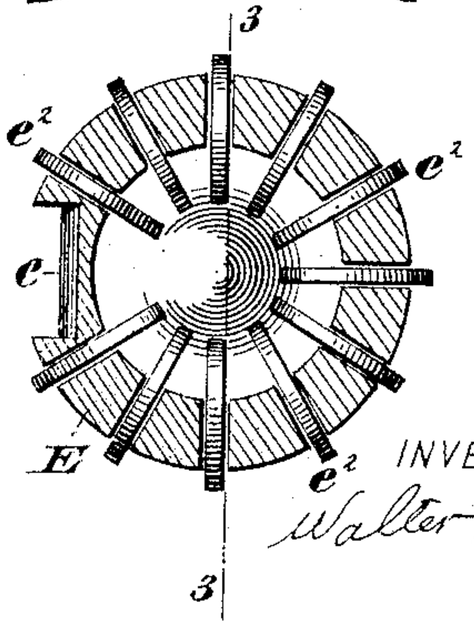


Fig. 4.



WITNESSES:

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ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 618,848, dated February 7, 1899.

Application filed January 22, 1898. Serial No. 667,526. (No model.)

To all whom it may concern:

Be it known that I, WALTER EDWARD DENNIS, a citizen of the United States of America, and a resident of the city, county, and State of New York, have invented and made certain new and useful Improvements in Means for Operating Electrodes of Arc-Lamps; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the drawings herewith, forming part thereof.

My invention relates to means for producing light through the medium of the usual carbon electrodes actuated by magnets and through the mediation of electric currents and differs from the usual method in the mechanism for adjusting one carbon in its relation to the other to form and retain the electric arc and in the means for transmitting the electric current from the parts which are stationary to the movable carbon electrode; and to carry out the new features of my invention it consists in certain combinations of elements fully set out in the specification and claimed at the end thereof.

In order that persons skilled in the art of electric-arc lighting, to which my invention appertains, may understand, construct, and use my invention, I will proceed to describe it, referring to the drawings, in which—

Figure 1 is a central vertical section of my invention, showing the operating armature and mechanism in its extreme downward position, so that the upper and lower carbons would be in contact and the electrical current established. Fig. 2 is a central vertical section of the same in part, the gripping-rack and carrier being locked together and in an upward position, the carbons being separated, the arc formed, and light being given out. Fig. 3 is an enlarged central section of the upper end of the carbon-carrier on line 3 3 of Fig. 4, showing the gravity contact rods or disks not sectioned. Fig. 4 is a partial cross-section of the upper part of the carbon-carrier on line 4 4 of Fig. 3, showing the gravity contact-disks, which disks are not sectioned.

A is the usual framework or body.

B is the usual annular magnet-core.

C is the usual annular armature.

D is a tube secured by a threaded thimble or nut D′ to the bottom of frame A and passes upward through the core B and the armature C.

E is a metal carbon-carrier and sustains the upper carbon electrode H in a tube. At its lower end it is provided with a slot or channel, preferably containing teeth *e* at its circumference.

F is a rack-bar provided with teeth *f* to agree with the teeth *e* on carrier E along its whole length.

G is the solenoid-helix, which is located in a recess in frame A, as usual, and surrounds a metal tube *b*, within which the armature C works up and down.

d is a tube attached to the upper part of the frame or body A by which it may be hung up in use, the usual hook not being shown.

e^2 are disks of conducting material located radially in slots in the carrier E, so that the surface of the disks gravitate beyond the circumference of the carrier E.

e′ is a conical weight which is intended to rest upon the inner surface of the disks when desired and add to their force of contact with the inner surface of the tube D to carry the electrical current from one to the other.

f are teeth on rack F and extend its whole length.

f′ are slots in tube D, one at the upper end and one at the lower end.

f^5 are ears which are attached to the rack-bar F, and at the ear at the lower end is attached to the armature C in a radial slot by a pin f^3, which passes through a slotted hole in said ear, so that the rack-bar F has the same throw on the armature.

f^4 are inclines formed upon the back of said rack-bar F to take under the inner surface of the tube D to throw the rack-bar teeth into mesh with the teeth on the carrier E when the armature C is moving upward and is intended to act in this manner as nearly instantaneously as possible.

g is a taper-slot on the rear of the ears f^5, which takes onto the outer surface of tube D to throw the rack-teeth *f* on rack F out of mesh with the teeth *e* on carrier E and permit the carrier E and its carbon H to drop upon the lower carbon electrode and thereby establish the electrical current.

Operation: The parts of the apparatus be-

ing in position, as represented on the drawings, Fig. 1, the carbons in contact and the helix-wires being electrically joined to a source of energy and a current established electrically, the core of the magnet B will be excited and the armature C will be drawn into its magnetic point of equilibrium or against the core B in exact accordance with the strength of the electrical current, which is regulated in the usual manner by a rheostat. As the core C rises, the tube D being stationary, the incline f^4 on the rack-bar F takes under the shoulder of tube D and throws the teeth f on bar F into mesh with the teeth e on carrier E and raises the carbon H away from its contact with the lower carbon and establishes the electric arc and light of a strength regulated by the rheostat. As the arc widens and the electric current weakens the armature tends to drop and carries the rack-bar F with it. Immediately this happens the taper-slots g take onto the tube D and release the carbon from its connection with the rack, so that at least one tooth will be slipped and the carbon H brought that much nearer the lower carbon and a stronger current established, which causes the armature C to again rise, and by the engagement of incline f^4 with the tube D throws the rack-bar again into engagement with carrier E and holds it until another lessening of current occurs, when the same operation is repeated. In other words, the relationship between the carbons is regulated automatically by the mechanism of my invention. The little disks e^2, resting as shown in the drawings in the carrier E, by their weight roll outward from the outer surface of the carrier E and bear upon the tube D, on the inner surface thereof, so that the electrical current is permanently established between the movable and stationary parts. It will be seen that these metallic disks e^2 bear at all times against metallic surfaces and at no time against the carbon H, so that there is no breaking of current in the apparatus except at the arc, and consequently no sparking and its attendant loss of electrical force and the evils which heretofore have lessened the value of the arc-lamp. Also at each time of cleaning or renewing or any other time the surfaces of the tube D and carrier-disks e can be easily wiped to insure a good electrical current. This whole arrangement of parts enables me to shorten the length of the arc-lamp and to place arc-lamps in positions where they have heretofore been excluded for want of proper height to accommodate the parts.

My invention as set out particularly in this specification is shown as applied to a magnet system having a hollow core and armature; but my invention is not confined to such a system. It is adaptable to any form of magneto system whether one or two or more magnets are used. The tube D and carrier E, with the rack and gripping device, may be operated with their other appliances by any system of magnets which may operate the rack back and forth.

Having now fully described my invention and the manner in which I have embodied it, what I claim as my invention, and desire to secure by Letters Patent, is—

1. In an arc-lamp, the combination consisting of the framework A, the helix G, the core B, the armature C, an inner fixed centralized tube as D passing through the armature and core, a continuous rack-bar, pivoted to the movable armature C; a carbon-carrier as E, within the tube D, provided with gravity contact-disks as e^2 and arranged substantially as described to carry a continuous electrical current from the fixed to the movable parts, the said rack and carrier being provided with means to lock together and unlock by the movements of the armature C, all constructed, arranged and combined to operate substantially as described whereby the carbon electrodes of an arc-lamp are controlled in their relationship the one to the other by the variations in the strength of the electrical current therethrough.

2. In a mechanism for operating the electrodes of an electrical arc-lamp the combination with the operating-magnets, helices, and armature, of the tube D inclosing the carrier E; the continuous rack-bar F, secured to the armature, or movable core, and arranged to move with the same, and to clutch the carrier E, and to release it by the movement of the armature or core, controlled by the electric current in its passage from one electrode to the other, all constructed to operate substantially as specified.

WALTER EDWARD DENNIS.

Witnesses:
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