(No Model.)

H. ANSOT.

ELECTRIC ARC LAMP.

No. 279,517. Patented June 19, 1883.

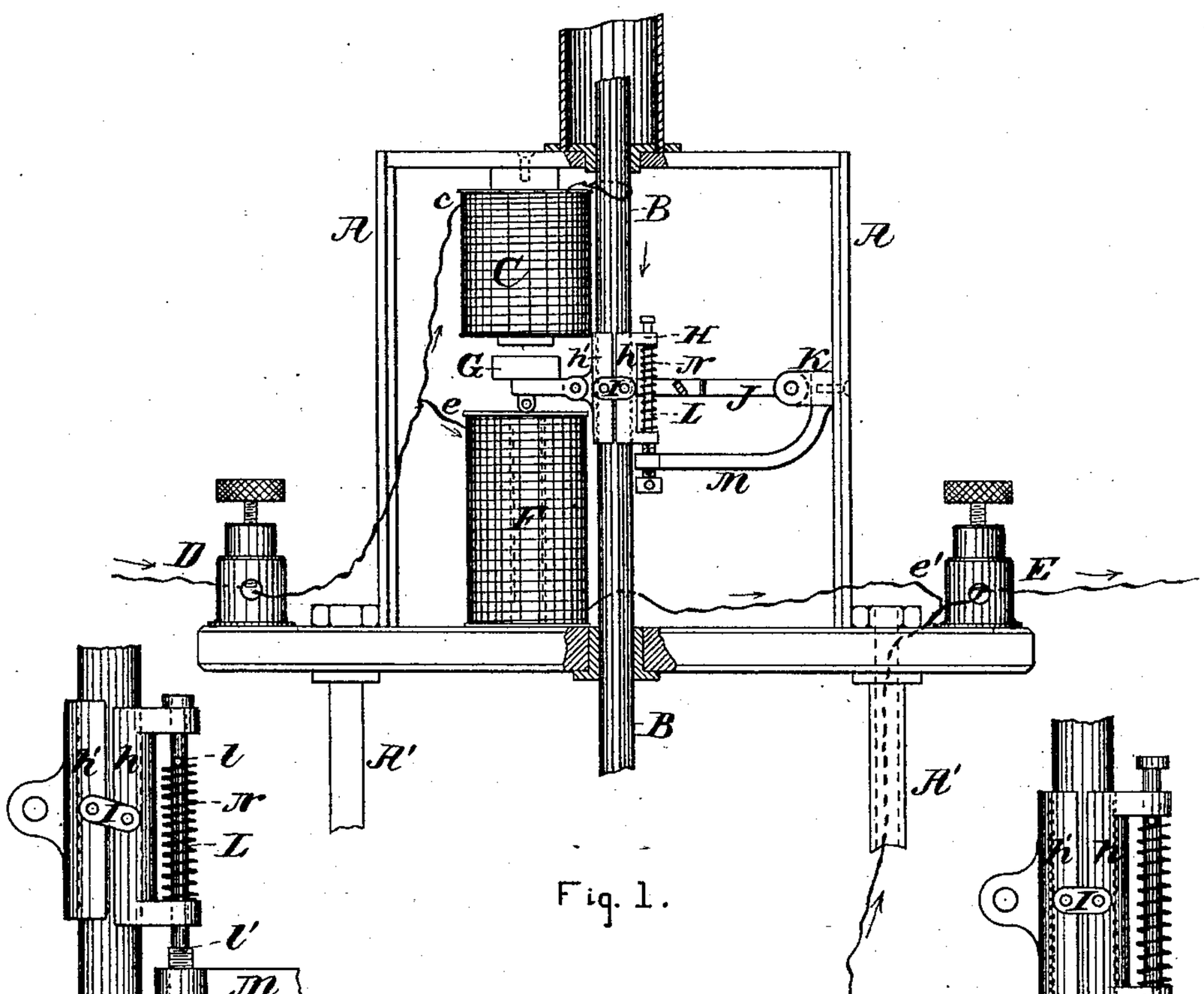

Fig. 1.

Fig. 4.

Fig. 3.

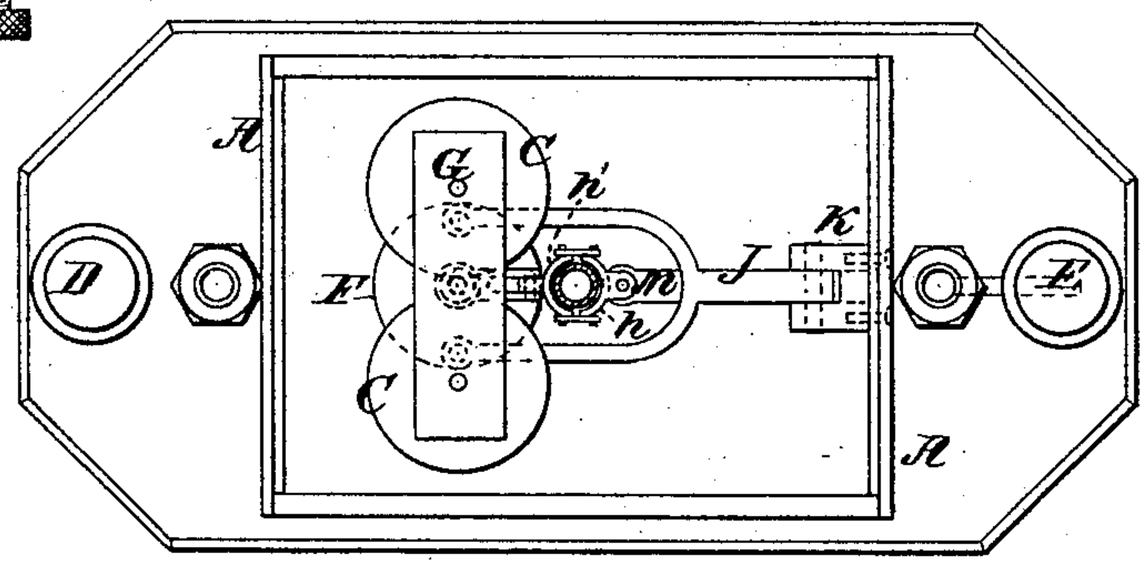

Fig. 2.

ATTESTS.

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ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 279,517, dated June 19, 1883.

Application filed April 27, 1882. (No model.)

To all whom it may concern:

Be it known that I, HENRY ANSOT, a citizen of the United States, residing in New York, State and county of New York, have invented certain new and useful Improvements Pertaining to Electric-Arc Lamps; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings.

My invention relates to that kind of electric lamps sometimes called "differential lamps," in which the adjustment of the carbons is accomplished by the relative resistance of a derived or shunt circuit, and of that part of the main circuit passing through the lamp; and it has for its object the providing of a feeding device for the carbons, whereby they shall first be separated to the extent required for the best working length of the voltaic arc, and maintained in such separate relation till the carbons are consumed to a point necessitating readjustment, when the carbon-supporting rod will be fed forward till the carbons touch, or to some fixed point, and again retracted to separate the carbons, as before; and my invention consists in an improved form of clamp or clutch arranged to engage with the carbon-supporting rod, which is composed of two separate parts linked or hinged together, one of which is operated by the armature or armatures of two magnets of different resistance.

Heretofore the clutches generally used to hold and lift the carbon-supporting rod of electric lamps have usually consisted of a circular ring or washer somewhat larger than the rod it encircled. Such a washer, when raised on one side, would be tilted against the rod, and by its angular pressure upon it take hold thereon and retain or lift it. This form of clutch is not even in its action and does not furnish that uniform feed of the carbons toward each other necessary to a steady light, for, having only an angular bearing upon the carbon-supporting rod, and the magnet which operates it being very sensitive to any changes in the volume or intensity of the current passing through the carbons, it releases and reclaims its hold upon the rod at every fluctuation of the current, and in such an irregular manner that the length of the voltaic arc is constantly changing and rarely uniform. Then, too, the bearing of such a ring upon the carbon rod being but a point, or, at the most, a line or edge, the rod speedily becomes abraded and indented—a condition which increases the already too irregular action of the ring-clutch, and renders it liable to bind on the rod and stop the operation of the lamp. That such form of clutch does not give the best results is further apparent when it is considered that the voltaic arc must have a certain fixed length with a given current in order to produce the best effect; that any deviation from this length, while it may not extinguish the light, changes its intensity, and that better practical results follow when the carbons are retained in one position as long as the light continues well developed and at suitable periods quickly readjusted, than to attempt to give them a continuous feed forward that shall allow for the modifying conditions of consumption, as the former course results in their being properly separated a greater proportion of the time, and the latter in their only approximating to such separation.

In the drawings accompanying this specification, Figure 1 is a side view or elevation of the box containing the regulating apparatus with the front removed. Fig. 2 is a plan or top view of the same with the top removed, and Figs. 3 and 4 are detail side views of the clutch employed by me in the open and closed positions. In these views the base of the lamp and the lower-carbon holder, as also the lower end of the upper-carbon holder, have been omitted, as they are of any common construction.

The letter A represents a box on the top of the lamp, containing the regulating apparatus, through the top and bottom of which passes the rod B, to which is attached the upper carbon of the lamp, and the letters A′ A′ represent side bars, which extend down a suitable distance and suspend the base of the lamp, from which projects the lower carbon.

C is an electro-magnet of large wire having a low resistance, and forms a part of the main circuit. The current entering at *c* from the binding-post D, passing on to the rod B and down through the carbons, returns in one of

the side bars, A′, and issues at the binding-post E.

F is a helix or solenoid composing a part of a shunt-circuit, *e e′*, external to the circuit through the carbons and joining the main line at D E, and, consisting of finer wire, it is of greater resistance than the helices of the magnet C. The core of this is free to play up and down therein, and is pivoted to the armature G.

Partially surrounding the rod B is a clutch, H, composed of the semi-cylindrical parts *h h′*, joined together by two links, I. One-half of this clutch *h′* is hinged to the armature G, and this armature has a further support on the fork J, vibrating in the fixed bearings K on the wall of the box A. The half *h* of this clutch rides on an adjustable rod, L, borne on the fixed arm M, and this rod L is provided with a spiral spring, N, bearing against a pin, *l*, in the rod and against one of the projections on the back of the clutch through which the rod L passes.

It will now be seen, the carbons being in contact and the post D having been connected to some source of electrical energy, that the current passes through the coils of the magnet C, down through the carbons and out at E; that under these conditions the armature G is drawn toward the poles of the magnet C, raising the half *h′* of the clutch as far as the connecting-links I will permit, thus clutching the rod B, and that, as this is accomplished before the armature has reached the full extent of its upward movement, its further motion serves to lift the rod B and the attached carbon, the spring N yielding for this purpose, thus separating the carbons and developing the voltaic arc between them. The upward movement of the armature is limited by the head of the rod L, against which the clutch strikes. It will also be seen that when the rod B has been clutched and raised a magnetic attraction in the helix F stronger than that in the helices C will draw its movable core down into it, allow the rod B to descend, bringing the carbons into contact, and release the grasp of the clutch on the carbon-supporting rod. Therefore, as the relative force of the helix F and of the helices of the magnet C depends upon the strength of the currents of electricity passing through them, and as this depends upon the relative resistance of their circuits, the one circuit consisting of the helix F and its connections to the main circuit D E, and the other consisting of the helices of the magnet C, the two carbons, and the arc between them, the resistance of the former being constant and that of the latter being variable and dependent upon the length of the arc or the distance of the carbons apart, as this distance increases by the consumption of the carbons the resistance of the circuit also increases, causing a proportionate deviation of the current to the helix F, and so augments its power that when the arc is of too great length it will attract the armature to it. As the armature descends, the carbon-supporting rod falls by the force of gravity till the carbons touch, and, the grasp of the clutch being loosened, feeds forward the upper carbon according to the amount which has been consumed. This lowers the resistance of the arc, whereupon a greater proportion of the electric current passes through the helices of the magnet than through the helix F, and generates a superior upward attraction upon the armature G, which, in conjunction with the clutch H, again lifts the carbon-supporting rod and separates the carbons, and this separate relation of the carbons is maintained until the attractive force of the helix F exceeds that of the helices of the magnet C, when the feed of the upper carbon downward is repeated.

Although the apparatus thus far described is fully operative, the operation of the clutch is more certain if a spring, N, be used to assist in bringing the parts of the clutch into a binding position by holding down one part while the other is being closed upon the carbon-supporting rod, thus expediting their action. Since the approach of the armature to the helix F will not unclasp the clutch until the half *h* has come to a stop, and this because the clutch has an equally rapid motion with the armature from the action of gravity and the spring N, the absolute contact of the carbons is insured whenever they move toward each other at all, and any partial, interrupted, or irregular feed thereof is prevented; but when it is desired that the carbons shall not touch, a stop, *l′*, is provided. In this case it is a shoulder on the rod L to arrest and loosen the clutch just before the core of the helix F has reached the limit of its downward movement and before the carbons have come in contact. In this case the clutch reasserts its control upon the carbon rod before the carbons have touched and keeps them separated as long as the current flows.

Different forms may be given to the component parts of the clutch, as may be suggested by the cross-section of the rod they support, without altering their essential features, which are their extended bearings, as distinguished from an angular or rounded bearing and their link or hinge connections.

What is claimed as new is—

1. In combination with the carbon-holder of an electric lamp, a clutch composed of two parts having extended bearing-surfaces, between which the carbon rod is grasped, such parts being linked or hinged together and operated independently of each other, substantially as and for the purpose set forth.

2. In combination with the carbon-holder of an electric lamp, a clutch composed of two parts having extended bearing-surfaces, between which the carbon rod is grasped, such parts being linked or hinged together and having independent motion, and a spring arranged to retain one of such parts in a fixed position while the other is being brought to engagement with the carbon-holder, substantially as described.

3. The combination, in an electric lamp, of

a carbon-holder, a clutch consisting of two extended bearing-surfaces, between which the carbon rod is grasped, such bearing-surfaces being linked together and having independent motion, and the armature or armatures of a magnet of high and one of low resistance arranged to operate one part of the clutch and cause it to engage with or disengage from the carbon rod, substantially as and for the purpose described.

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Witnesses:
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