(No Model.)

P. CLARKE.

ELECTRIC ARC LAMP.

No. 454,253. Patented June 16, 1891.

Fig: 1.

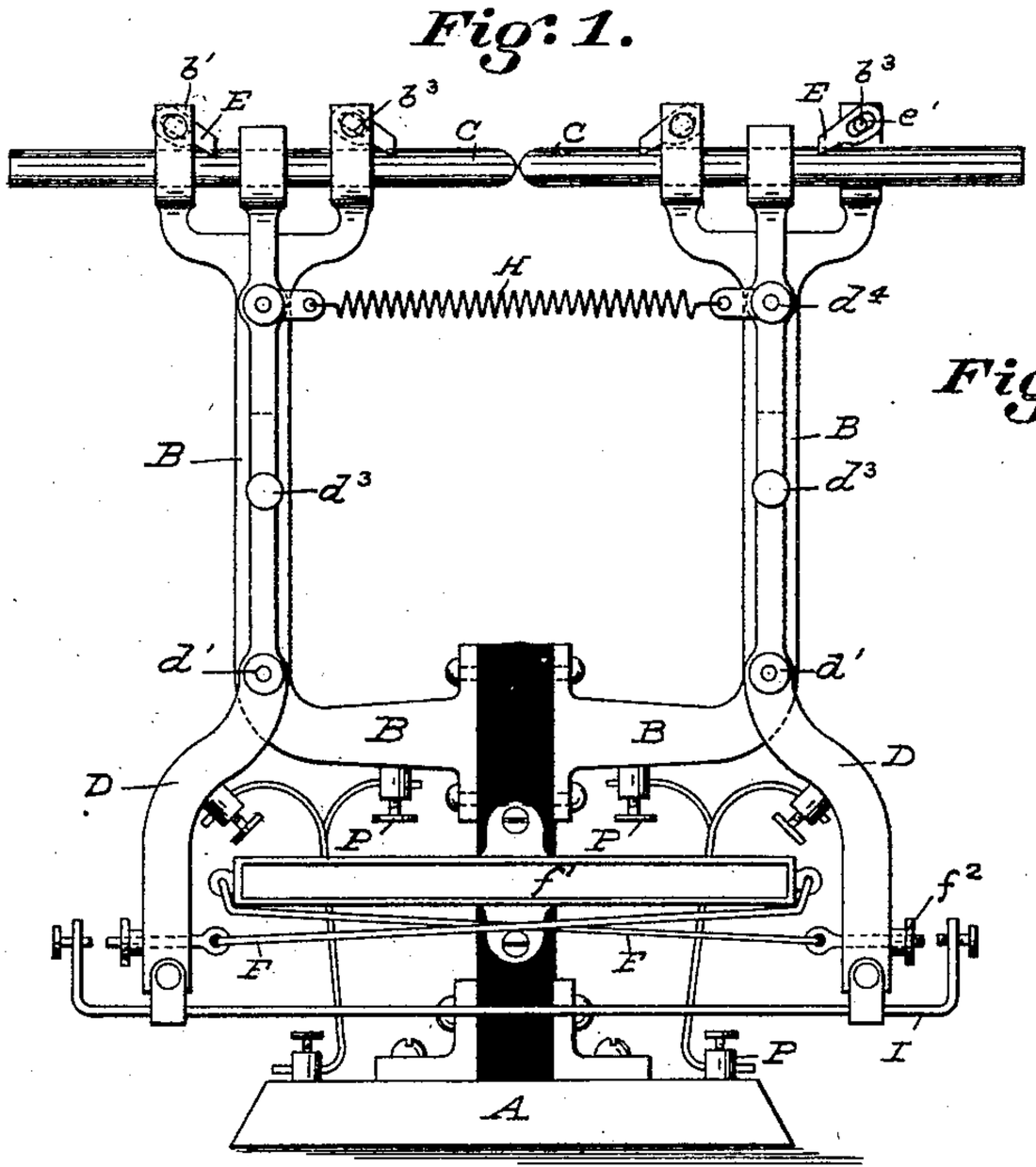


Fig: 3.

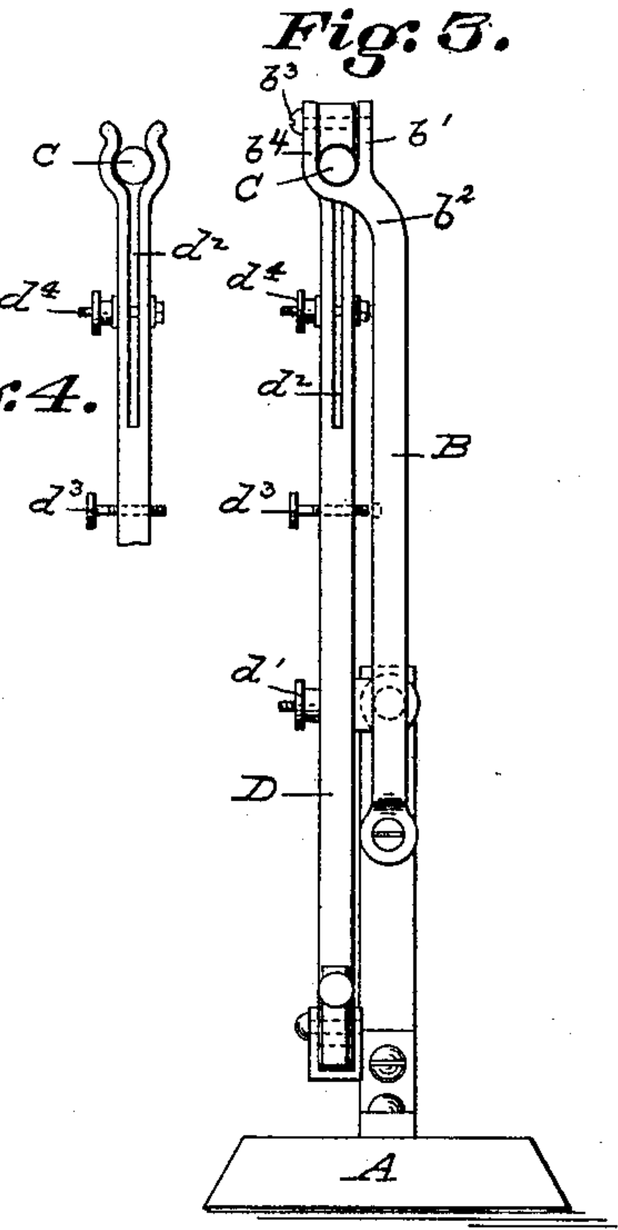


Fig: 4.

Fig: 2.

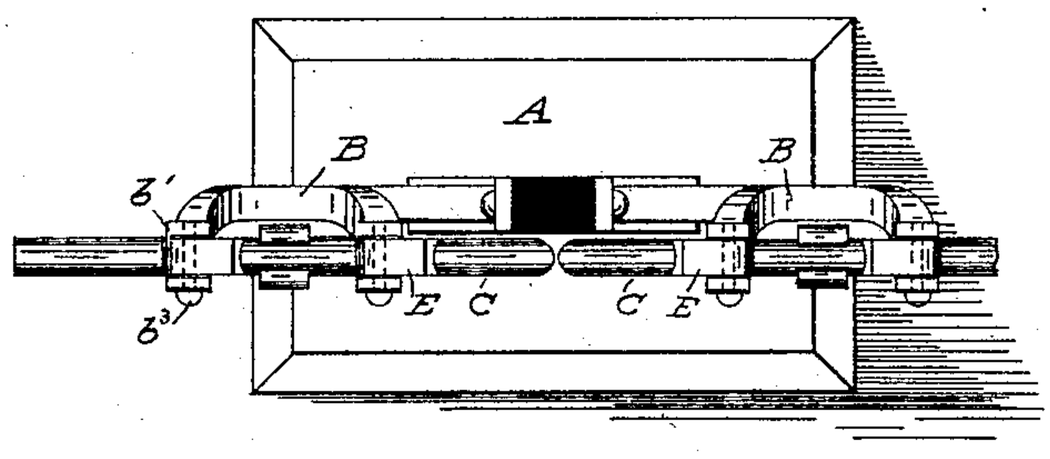
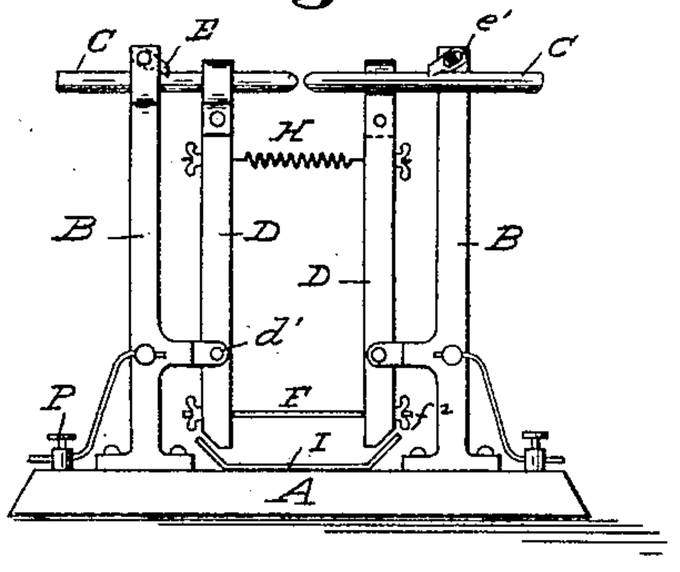


Fig: 5.



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UNITED STATES PATENT OFFICE.

POWHATAN CLARKE, OF BALTIMORE MARYLAND, ASSIGNOR OF ONE-HALF TO FREDERICK H. SMITH, OF SAME PLACE.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 454,253, dated June 16, 1891.

Application filed February 13, 1890. Serial No. 340,297. (No model.)

To all whom it may concern:

Be it known that I, POWHATAN CLARKE, of the city of Baltimore and State of Maryland, have invented a new and useful Method and Apparatus for Actuating One or Both of the Carbons of an Electric-Arc Lamp, of which the following is a full description.

The accompanying drawings illustrate the invention, of which—

Figure 1 is an elevation of the apparatus, showing a pair of fixed standards, the carbons, operating-levers, and dogs and expansion and contraction conductors, and returning-spring; Fig. 2, a top view showing forked guides in the ends of the standards, the carbons, and upper ends of the operating-levers; Fig. 3, a side or edge view showing one of the standards, operating-lever pivoted thereto, the forked top of standard and dog pivoted therein, the carbon, lever split to provide the requisite adjustment of friction on the carbon, and set-screw for fixing the lever when it is intended to move but one of the carbons. Fig. 4 shows a side view of one of the actuating-levers split at the upper part, and also showing the end of carbon with tightening-screw for adjusting the friction; Fig. 5, an elevation of the apparatus in simple form with single expansion-wire and means for closing circuit in case the wire burns out.

The device may be placed upon a stand or platform, may be hung or suspended upside down, may be fixed horizontally to a wall, and the carbons may be operated both together or one only while the other is fixed, and may work perpendicularly as well as horizontally.

I will now describe the form of apparatus which is illustrated in the drawings.

A is a base or other support of any insulating material, to which is properly secured the upright standard with the branching arms B properly insulated from each other. The upper ends of these arms may be forked, as shown at b', Figs. 1 and 2. The forking of these arms is for the purpose of providing a bearing for the carbons to insure an easy and straight movement. The arms are also bent, as shown at b^2, Fig. 3, to allow for clearance of the actuating-levers when the device is constructed in the form shown in Fig. 1.

C C are the carbons guided in the upper ends of the arms B.

D D are the actuating-levers for the carbons, suitably pivoted or fulcrumed, as shown at d'. The upper ends of these levers are split, as shown at d^2, Figs. 3 and 4, and rounded out to embrace the carbon. An adjusting-screw, as d^4, may be used for tightening or loosening the split end of the lever to adjust its grasp upon the carbon to move the same backward or forward by its friction, or slide upon the carbon when its movement is stopped by the dog. The bolt d^3 also passes through the lever and may be secured into a socket in the arm B to receive one of the levers when it is desired to operate but one carbon, while the other remains stationary.

The levers move the carbons forward in a direction approaching each other by the friction-grasp of the lever and also backward in the opposite direction until stopped. This stoppage is effected as follows: The upper ends of the arms B are slotted out or made in the form of a pocket, as shown at b^4, Fig. 3. Upon the bottoms of these pockets the carbons C rest and slide. The upper end of the pocket is crossed by a pin b^3, and upon this pin is hung the dog E, with its other end projecting toward the point of the carbon C. This end of the dog is rounded out to fit the curve of the carbon. The aperture in the dog through which the pin b^3 passes is elongated, as shown at e'. Viewing Fig. 1 to the right, one of the sides of the pocket is removed to show the slot in the dog. It is also shown to the right on Fig. 5. Thus it will be seen that the friction of the lever will move the carbon forward and also backward until the end of the elongated opening in the dog reaches the pin b^3, when it stops, and its other end impinging upon the carbon holds it and allows the clasp on the end of the actuating-levers D to slide upon the carbon, allowing the latter to remain at rest. The arms of the levers below the fulcrums are joined by a conductor F (shown in its simplest form as a straight wire in Fig. 5 and in the form of two wires joined to an interposed resistance f' in Fig. 1.) This interposed resistance f' may be made of fine wire or any suitable material. Where this conductor is joined to the levers,

adjusting-screws may be provided, as shown at f^2. Above the fulcrums the levers are also connected by the tension-spring H, which may also be provided with means for adjustment and should be properly insulated. The wire or conductor F is made of such size in cross-section as to be readily heated when a strong current is passing through it and cooled when the current diminishes, and the spring may be dispensed with if the conductor be of such construction as to operate the levers by its compression or tension. If it should happen that the wire should melt from the intensity of the heat, I have provided the supplemental conductor I, so that the levers may come in contact therewith and allow the current to flow.

The apparatus is intended to be used with either a continuous or alternating current, and when used with the latter I prefer to operate both of the carbons, and when used with the former one of the levers is secured by screwing the set-screw d^3 into the arm B.

The binding-posts P indicate the course of the conductors to and from the generator.

The operation of the device is readily understood. The binding-posts on the frame or platform are connected with the terminals of a battery, dynamo, or other generator. The carbons are in their normal condition when separated from each other, and this occurs when the conductor F is cool. The current, unable to overcome the resistance, will not cross the space between them, and in this condition the entire current is shunted through the conductor F, causing it to heat and expand. The spring H then acts to draw the points of the carbons together until the current flows readily through them, thus diminishing the current through the conductor F. This allows the latter to cool and contract. In so doing it separates the points of the carbon until the electric arc appears, and then the resistance between the points causes more of the current to flow through the conductor F, when it heats again and the spring H operates to draw them together. Thus the conductor F alternately heating and cooling, the carbons are moved and maintained at a proper distance apart; but as the carbons consume it will be seen that the clasp on the lever D, which surrounds the carbon, must at some time shift its position backwardly, so as to feed up the carbon as it consumes. Here the dogs E perform their work, sliding backward until the end of the elongated slot reaches the pin b^3, they hold the carbon and allow the clasp to slide upon it, taking a new hold when the forward movement begins. Thus it will be seen that the carbons are moved by the expansion and contraction of the conductor F. It is evident that the conductor F may be placed above the fulcrum and the spring below it. The device would operate in the same way, except that the normal position of the carbons would in that case be touching, the expansion of the conductor would allow the spring to open them, and the contraction would close them. If the device were turned upside down, the pawls E should be placed on the upper side of the carbons; or if allowed to remain as shown a slight spring may be provided to prevent them from falling out of place.

What I claim is—

1. In an electric-arc lamp, two standards furnishing supports for the carbons, two levers suitably pivoted and having a reciprocating movement and provided with means for impelling the carbons toward and away from each other, a spring connecting the levers, whose tension is exerted to approach the arms of the levers toward each other, and thereby impel the carbons, a conductor also connecting the arms of the levers, which when heated and expanded allows the spring to act to approach the carbons, and which when cooled and contracted operates in opposition to the spring to separate the carbons, in combination with means controlled by the resistance between the points of the carbons for shunting a greater or smaller current of electricity through the conductor, whereby the latter is heated or cooled, substantially as described.

2. In an electric-arc lamp, two standards furnishing supports for the carbons, two levers suitably pivoted and having a reciprocating movement and provided with means for impelling the carbons toward and away from each other, a spring connecting the levers, whose tension is exerted to approach the arms of the levers toward each other, and thereby impel the carbons, a conductor also connecting the arms of the levers, which when heated and expanded allows the spring to act to approach the carbons, and which when cooled and contracted operates in opposition to the spring to separate the carbons, in combination with means controlled by the resistance between the points of the carbons for shunting a greater or smaller current of electricity through the conductor, whereby the latter is heated or cooled, and means for stoping the carbons in their movement away from each other.

3. In an electric-arc lamp, two standards furnishing supports for the carbons, two levers suitably pivoted and having a reciprocating movement and provided with means for impelling the carbons toward and away from each other, a spring connecting the levers, whose tension is exerted to approach the arms of the levers toward each other, and thereby impel the carbons, a conductor also connecting the arms of the levers, which when heated and expanded allows the spring to act to approach the carbons, and which when cooled and contracted operates in opposition to the spring to separate the carbons, in combination with means controlled by the resistance between the points of the carbons for shunting a greater or smaller current of electricity through the conductor, whereby the latter is heated or cooled, and means for se-

curing one of the levers, substantially as described.

4. In an electric-arc lamp, two standards furnishing supports for the carbons, two levers suitably pivoted and having a reciprocating movement and provided with means for impelling the carbons toward and away from each other, a spring connecting the levers, whose tension is exerted to approach the arms of the levers toward each other, and thereby impel the carbons, a conductor also connecting the arms of the levers, which when heated and expanded allows the spring to act to approach the carbons, and which when cooled and contracted operates in opposition to the spring to separate the carbons, in combination with means controlled by the resistance between the points of the carbons for shunting a greater or smaller current of electricity through the conductors, whereby the latter is heated or cooled, and the dog E, pivoted to the arm B and provided with the slot c', substantially as described.

5. In an electric-arc lamp, the combination of two levers for moving the carbons, actuated by the expansion and contraction of a thermo-conductor, and the supplemental conductor I, arranged and operating substantially as described.

6. In a device for moving the carbon or carbons of an arc lamp, a lever attached thereto by a clutch to operate by friction, and means for loosening and tightening the clutch of the lever to the carbon, in combination with the pivoted dogs E, provided with means to allow the carbons to recede until stopped by the dogs and permit the clutch on the lever to slide upon the carbon.

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Witnesses:
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