

G. L. MARTIN & A. W. SCHREINER.

FLAMING ARC LAMP.

APPLICATION FILED FEB. 17, 1909.

942,730.

Patented Dec. 7, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

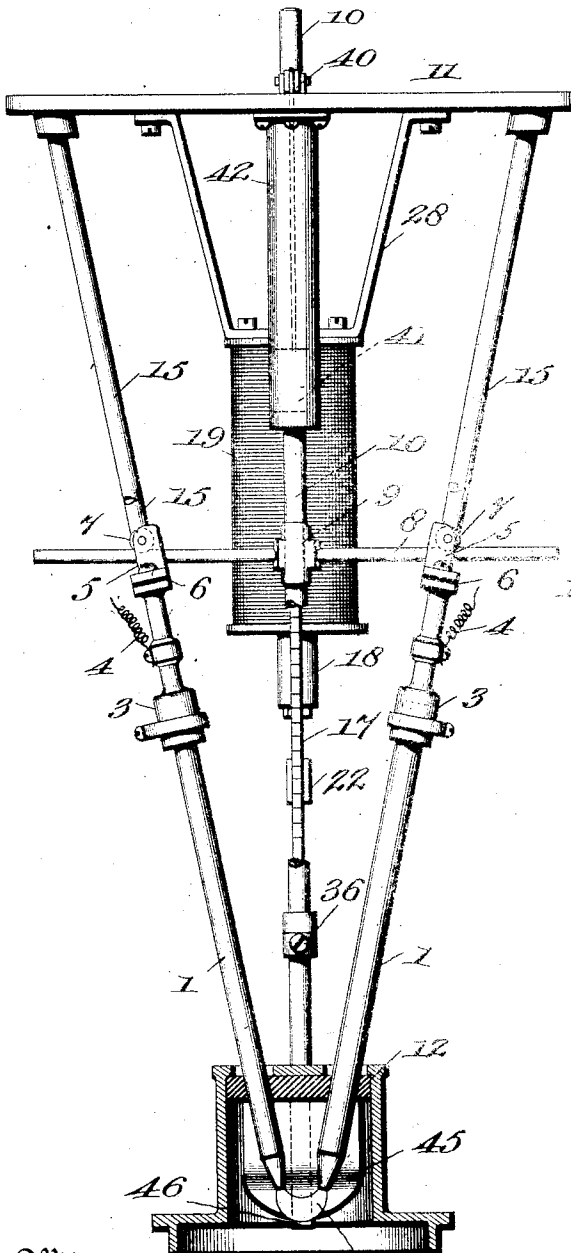
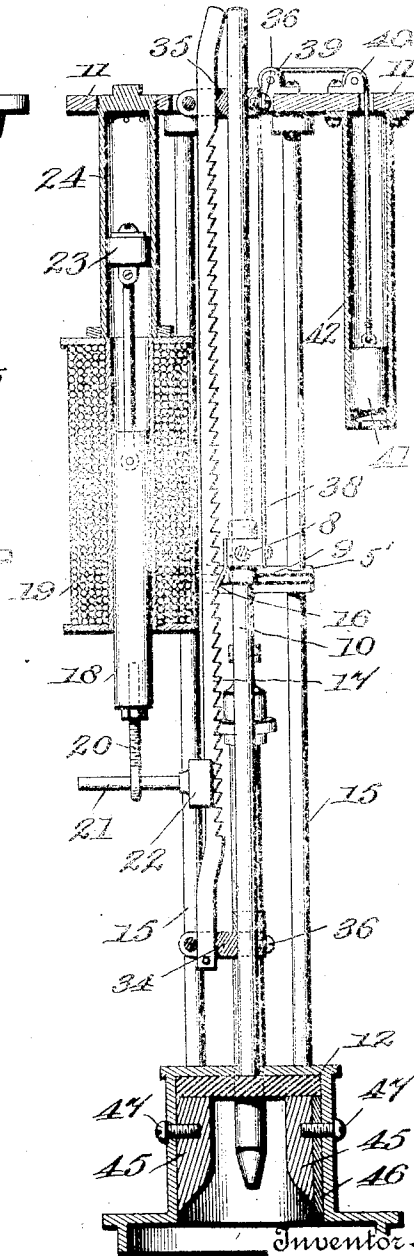


Fig. 2.



Witnesses

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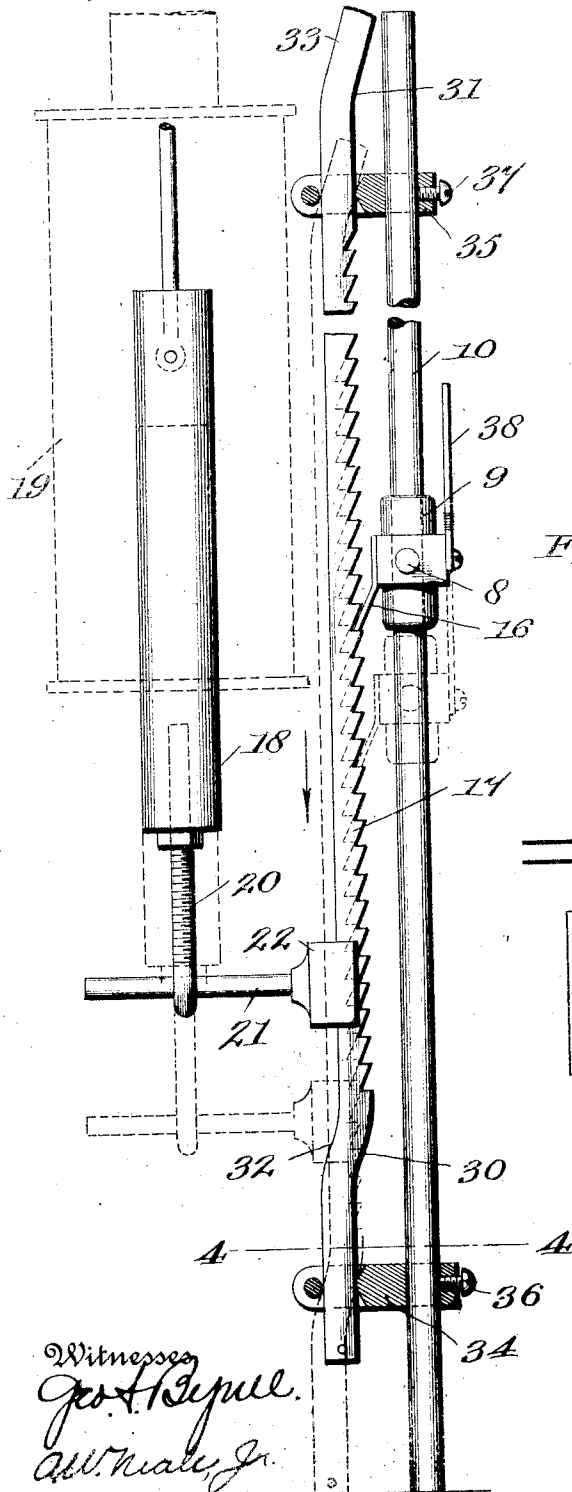


Fig. 4.

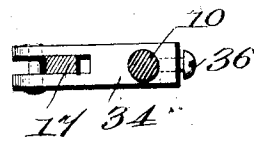
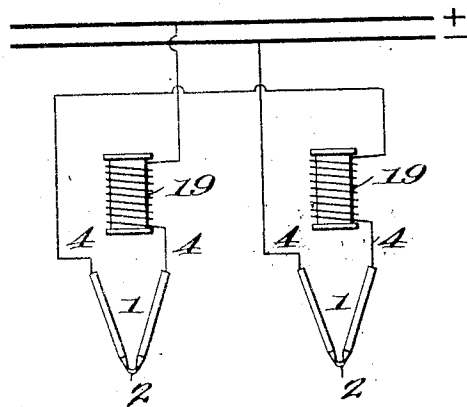


Fig. 5.



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UNITED STATES PATENT OFFICE.

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FLAMING ARC-LAMP.

942,730.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, GEORGE L. MARTIN and ARTHUR W. SCHREINER, citizens of the United States, residing, respectively, at Brooklyn, in the county of Kings and State of New York, and Evergreen, Long Island, New York, have invented certain new and useful Improvements in Flaming Arc-Lamps; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to feed mechanisms for arc lamps and the invention consists in the novel details of construction and combinations of parts more fully hereinafter disclosed and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification in which like numerals refer to like parts in all the views:—Figure 1 is an elevational view partly in section showing the invention applied to a lamp of the flaming arc type, Fig. 2 is a like view of the invention when seen at right angles to that of Fig. 1, Fig. 3 is an enlarged detail view of the feed mechanism proper, Fig. 4 a sectional detail view taken on the line 4—4 Fig. 3 and Fig. 5 a diagram of one form of the circuits employed.

1 represents the carbons which are of such a composition and are here illustrated in such a relation as to produce a flaming arc 2, but it will be understood that the invention is not confined to this type of lamp. Said carbons are held in the supports 3 which accommodate the feed wires 4 and carry at any suitable point the brackets 5 insulated as at 6 from said support, and preferably provided with the antifriction devices 7. These brackets 5 are extended, as shown in Fig. 2, and the rods 15 pass through the extreme ends 5' of the same as indicated in Fig. 2. Through the brackets 5 suitably passes the supporting rod 8 as shown. This rod is provided with a sleeve 9 which slides on the vertical guide rod 10 fixed to the upper frame plate 11 and the economizer 12 in any suitable manner.

The carbon holders 3, are provided with the usual sliding bearings on the usual inclined fixed guide rods 15 constituting a por-

tion of the lamp frame, and of course when the supporting rod 8 is moved they move up or down with it as will be readily understood.

In order to move the holders 3 up and therefore the carbons carried thereby, there is provided on the sleeve 9 a spring pawl or other friction device 16 adapted to be engaged by a rack 17 or other surface. This rack is given a vertical movement by means of the core 18 of the solenoid 19 through the adjustable connection 20 carried by the core, and the connection 21 carried by the lug 22 fixed to the rack. 23 represents a suitable plunger carried by the core 18, and 24 a perforated cylinder in which said plunger works, in order to permit a gradual ingress and egress of air the whole constituting a dash pot. The cylinder and solenoid are supported from the frame plate 11 as shown and in addition the stiffening brackets 28 may be supplied. It is evident that when the solenoid is energized the core 18 will rise and carry with it through the connections described the rack 17, sleeve 9 and carbons 1. On the other hand it is also evident that if the rack 17 should be laterally moved so as to disengage the pawl 16, there would be nothing to hold the carbons in their elevated position, and therefore they would descend under the action of gravity. In order to secure a lateral movement of the rack 17, its ends are provided with the cams 30 and 31 on one side of the rack bar, and the cams 32 and 33 on the other side. These cams pass through slots in the brackets 34 and 35 adjustably secured by the set screws 36 and 37 to the fixed rod 10. It is therefore evident that as the rack bar rises when in its full line position shown in Fig. 3, it will move longitudinally parallel to itself and carry the pawl 16 and sleeve 9 with it, but when it descends, the engagement of the cams 30 and 31 with the brackets 34 and 35, will force said bar to move laterally parallel with its length into the dotted line position shown in Fig. 3. In this latter position the pawl 16 will be disengaged and the carbons unsupported by the rack bar. It is also evident that, as the bar begins to rise from its dotted line position the cams 32 and 33 will come into action to laterally move said bar toward the pawl 16, and that if this counter lateral movement is quick

enough after the pawl is disengaged the said pawl will be caught before it has fallen very far. In fact, if the action is sufficiently quick the pawl may be dropped only a tooth at a time, no matter how close the teeth may be. Also secured to the sleeve 9 is a cord or other flexible connection 38 which preferably passes over the antifriction devices 39 and 40 supported on the frame plate 11, and which carries at its other end a counterbalancing weight 41, preferably housed in the cylinder 42. The weight 41 is so chosen that it leaves a slight preponderance of weight in the carbons, even after they have been partially consumed and when the rack 17 is disengaged from the pawl 16 the carbons will slowly descend under the action of gravity. As the carbons are inclined as shown, their tips approach as they descend thereby reducing the resistance between their points and increasing the current through the coils of the solenoid 19, which as shown in Fig. 5 are in series with the arc. But an increase of current through the solenoid, of course, causes the carbons to lift and their tips to separate through the connections above described, and therefore the current through the solenoid is immediately decreased and the carbon tips again allowed to approach under the action of gravity. In other words, it is clear that if the carbons did not burn away, their tips would be automatically kept at a substantially constant distance apart, so that a substantially constant or steady arc would be produced. As the tips burn away however, this condition is not disturbed, for no matter how much they may be consumed, it only results in separating them, and so far as the operation of the rack is concerned, a separation of the tips merely means more resistance in the lamp circuit and therefore a dropping of the carbons to restore the normal current. As a matter of fact, as the carbons burn away, the pawl 16 and the rack 17 slowly work their way downward, descending about one inch per hour, and the brackets 34 and 35 being adjustable thereby can be secured at the proper position, thereby to allow the cams 30, 31, 32 and 33 to come into action.

The economizer 12 may be of any suitable construction, but it is preferred to provide it with detachable cooling bosses 45 made of any suitable material for example of composition metal, or other suitable alloy, such as brass; and it is preferred to provide one of these bosses with a small arc steadying piece 46 of iron or steel not electrically connected with the lamp circuit to insure the steadiness of the flaming arc by offering a conducting path of less resistance for the magnetic lines of force than that offered by the air or the composition metal of the bosses. The less resistance offered to the magnetic lines of force by this steadying

piece 46, causes said lines of force to be more numerous in its neighborhood, than would otherwise be the case, and, as said lines of force control the arc, said piece is found to have a steadying effect upon the arc, in economizers. The action of economizers being well known, no further description is necessary, except to point out the advantages of being able to readily renew these cooling bosses or the steadying piece when they burn out, as they often do. The screws or other fastenings 47 are provided for this purpose.

The operation of the invention will be clear from the foregoing but may be briefly summarized as follows: To start the lamp, the carbon tips being together, the current is turned on as usual, whereupon the solenoid armature raises the rack and the latter raises and separates the carbons until the resistance is right for the arc. As the carbons burn away, the resistance increases, the rack and carbons therefore fall under the action of gravity and the tips are brought closer together. As the carbons continue to burn away the cam surfaces on the rack will cause the rack to become disengaged from the pawl 16, and the said pawl will move longitudinally of the rack until the tips have been adjusted sufficiently to make up for the consumption. It will be observed that this automatic feed does away with the usual clock work and numerous magnets; with the necessary forks or pegs for holding or adjusting the carbon points and which constantly burn out; that the cooling bosses can be readily removed and renewed; that the lamp is adapted for a direct current when two are in series at 110 volts across the line; or four lamps can be used in series at 220 volts; that the same mechanism may be used on both alternate current and direct current circuits with the usual change in alternate current magnet control; that by the use of a transformer one or more lamps may be joined in multiple while a large number of other lamps are on one circuit for street lighting. It will be also observed that there are no complicated clock gears or blow devices to get out of order; and that the cam surfaces compel positive lateral motions of the rack bar in both directions so that nothing is left to chance.

It is evident that other clutch mechanisms between the bar and sleeve 9 may be utilized, and that those skilled in the art may vary the details of construction and the movement of parts without departing from the spirit of the invention and therefore we do not wish to be limited to the details disclosed except as may be required by the claims.

What we claim is:—

1. In a feed mechanism for arc lamps, the combination of a magnet, a bar provided

with cam surfaces at each end an adjustable connection between the armature of said magnet and said bar for controlling said cam surfaces; carbon supports; a clutch mechanism between said supports and said bar; and adjustable means coacting with said cam surfaces to move said bar laterally and to disengage said bar from said clutch mechanism; substantially as described.

2. In a feed mechanism for flaming arc lamps provided with inclined carbons, the combination of a magnet; a bar provided with cam surfaces controlled thereby; carbon supports; a clutch mechanism between said supports and said bar; and adjustable means coacting with said cam surfaces to move said bar laterally to disengage said bar from said clutch mechanism; substantially as described.

3. In a feed mechanism for arc lamps, the combination of a magnet; a bar controlled thereby and provided with cam surfaces at each end; carbon supports adapted to fall under gravity when released; a clutch mechanism between said supports and said bar adapted to be released from said bar at intervals; and adjustable brackets with which said cam surfaces contact at intervals and thereby compel said bar to disengage said clutch mechanism, substantially as described.

4. In an arc lamp feed mechanism, the combination of a solenoidal magnet; a core therefor; a bar provided with cam surfaces at each end; connections between said core and said bar; carbon supports; a clutch mechanism between said supports and said bar comprising a sleeve; a rod on which said sleeve slides, and brackets on said rod against which said cam surfaces contact, substantially as described.

5. In an arc lamp feed mechanism, the combination of a solenoidal magnet; a core therefor; a dash pot controlling the movements of said core; a bar provided with cam surfaces at each end; adjustable connections between said core and said bar; carbon supports; a counterbalance for said supports; a clutch mechanism between said supports and said bar comprising a sleeve; a fixed rod on which said sleeve slides; and

brackets on said rod against which said cam surfaces contact, substantially as described.

6. In an arc lamp feed mechanism, the combination of a solenoidal magnet; a core therefor; a perforated cylinder fixed to said magnet and a piston sliding therein fixed to said core; a bar provided with cam surfaces at each end; connections between said core and said bar; carbon supports; a clutch mechanism between said supports and said bar comprising a sleeve; a supporting rod 8 connecting said supports and said sleeve; a counterbalancing weight for said supports; a flexible connection between said weight and sleeve; a rod on which said sleeve slides; and brackets on said rod against which said cam surfaces contact, substantially as described.

7. In a feed mechanism for arc lamps, the combination of a rod provided with teeth and a plurality of cams; means for causing said rod to move upwardly and permitting the same to move downwardly; adjustable brackets adapted to engage said cams and to cause said rod to move laterally and disengage said pawl in its downward movement; carbon supports; and a connection between said supports and said pawl; substantially as described.

8. In a feed mechanism for arc lamps, provided with inclined carbons, the combination of a rod provided with teeth; a pawl engaging said teeth; means, comprising an electro-magnet for causing said rod to move up and down; an adjustable connection between the armature of said magnet and said rod; means comprising cam surfaces on said rod for causing the same to move laterally and disengage said pawl; carbon supports; a counterbalance for the carbons and their supports; and connections between said supports and said pawl comprising the anti-friction rollers 7; substantially as described.

In testimony whereof, we affix our signatures, in presence of two witnesses.

GEORGE L. MARTIN.

ARTHUR W. SCHREINER.

Witnesses:

HENRY THOMPSON,

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