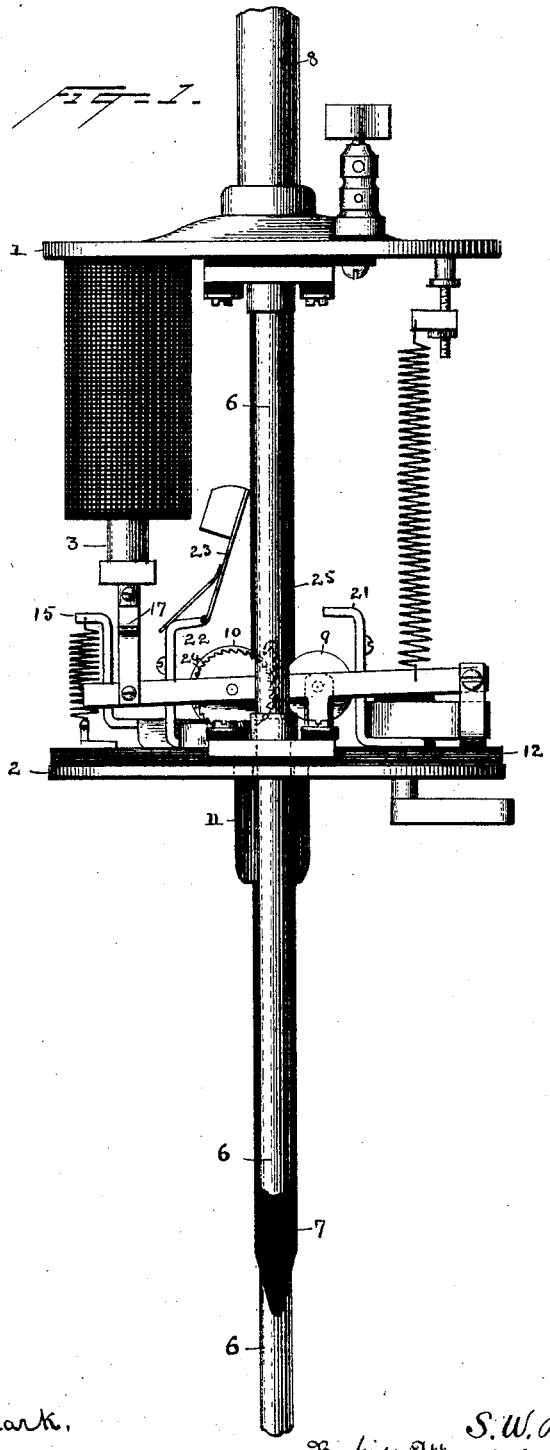
(No Model.) 2 Sheets—Sheet 1.

S. W. RUSHMORE.

ELECTRIC ARC LAMP.

No. 454,295. Patented June 16, 1891.

Fig. 1.



Witnesses
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Inventor
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(No Model.) 2 Sheets—Sheet 2.

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ELECTRIC ARC LAMP.

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Fig. 2.

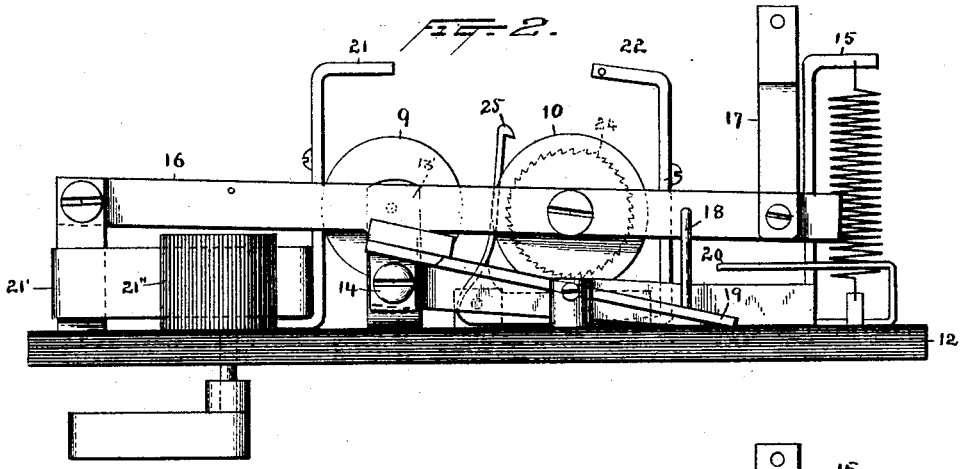


Fig. 3.

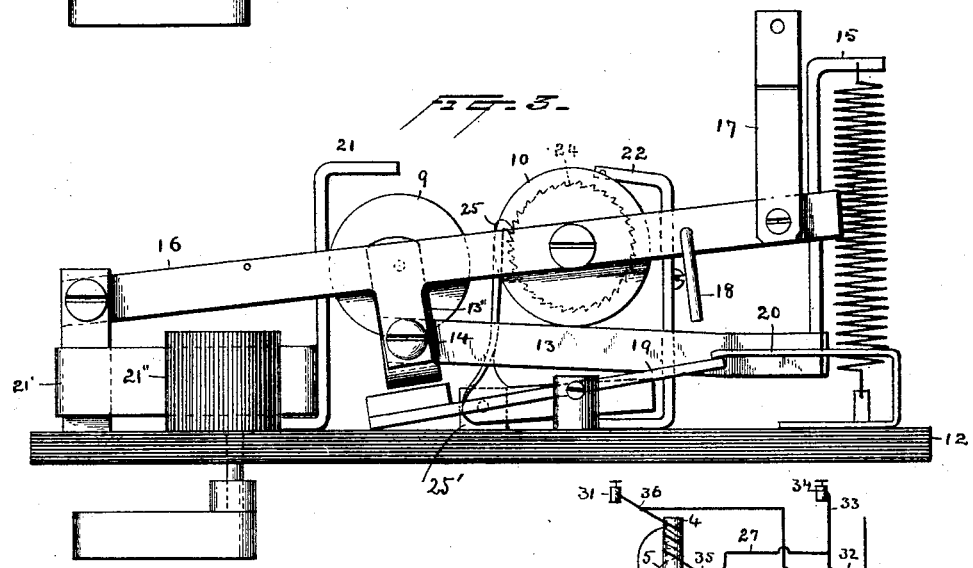
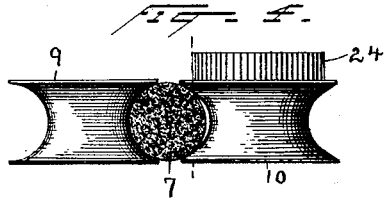


Fig. 4.



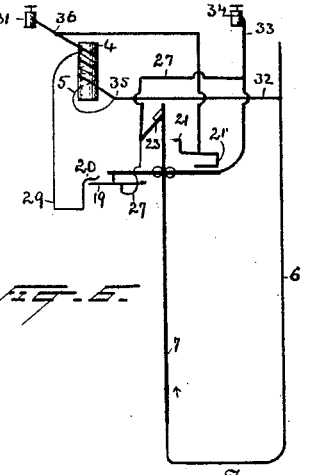
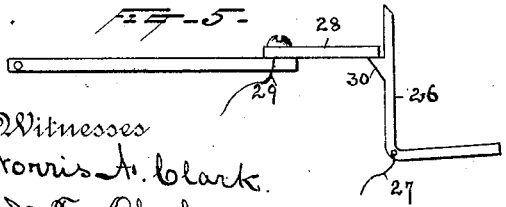


Fig. 6.

Fig. 5.



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UNITED STATES PATENT OFFICE.

SAMUEL W. RUSHMORE, OF BROOKLYN, NEW YORK.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 454,295, dated June 16, 1891.

Application filed February 16, 1891. Serial No. 381,553. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL W. RUSHMORE, a citizen of the United States, residing at Brooklyn, county of Kings, and State of New York, have invented a certain new and useful Improvement in Arc Lamps, of which the following is a specification.

The present invention relates to arc lamps, and the main object is to provide improved feed mechanism for the movable carbon; and the invention consists in the devices and combinations hereinafter described and claimed.

In the accompanying drawings, which illustrate the improvement, Figure 1 is a side view of the mechanism of an arc lamp, the casing being removed. Fig. 2 is a side view of a part of the lamp-clutch, looking in the opposite direction. Fig. 3 is like Fig. 2, except that certain parts are tilted slightly, as they would be during operation of the lamp. Fig. 4 is a plan of the gripping-rollers of the clutch. Fig. 5 shows a modified form of circuit-opener for the shunt-circuit, and Fig. 6 is a diagram showing the circuits of the lamp.

This invention constitutes an improvement on the lamp described in my application, Serial No. 374,255, dated December 10, 1890.

Referring to Fig. 1, the feeding mechanism of the lamp is shown mounted between two disks or plates 1 2. The main and shunt coils, which are wound concentrically, so as to act on the same core or armature 3, are supported from the upper plate.

In the diagram Fig. 6, 4 is the main coil, and 5 is the shunt-coil. The frame of the lamp is composed of rods or tubes 6, which extend from the upper plate 1, being secured to but insulated from said plate, through openings in the second plate, being also insulated from said plate, to the lower-carbon holder. The lower part of the rods, as well as the lower carbon, are omitted in Fig. 1, but the arrangement is indicated in the diagram. Heretofore the side rods which support the lower carbon have extended only from the lower plate. I find it very convenient and economical to extend them as described, thereby effecting a saving in the number of parts employed in the lamp.

7 is the upper movable carbon of the lamp and extends up into the tube 8 in the ordinary manner. It passes also between the two gripping-rollers 9 10 of the clutch. It also passes through a central insulating and fireproof bushing 11. This bushing screws into the lower plate and abuts against the layer of insulation 12, on which the clutch mechanism is mounted. This arrangement makes it impossible for the carbon to come in contact with exposed metallic parts of the lamp. The roller 9 is carried at the end of an angle-lever 13 13′, pivoted at 14 and having at one end an extension 15, to which a retracting-spring is connected. The end 13′ of the angle-lever is preferably U-shaped, and the roller 9 stands between the two arms. The pivot 14 is carried by an extension of the swinging or reciprocating frame 16, which carries the clutch-rollers. At the outer end of the frame 16 is a link 17, which is connected with the armature 3 and serves to communicate motion from said armature to the frame and clutch-rollers. The swinging frame also carries a pin 18, which is adapted to strike the pivoted lever 19 of a circuit-controller in the shunt-circuit of the lamp and move it away from the spring or circuit-terminal 20. On two opposite sides of the clutch-rollers are posts 21 22, forming circuit-terminals in a cut-out circuit. To the former is connected a spring 21′, which terminates near the post supporting the swinging frame. 21″ is a cam which when turned by a suitable handle moves the spring 21′ against said post or allows it to move away from it. This spring forms a switch by means of which the cut-out circuit may be closed manually before the carbon has been sufficiently consumed to allow arm 23 to descend to close said circuit. To the latter post is pivoted a circuit-closing arm 23, acted upon by a spring or weight, or both, and adapted to move against the former post to close the cut-out circuit; but said arm is normally held in the position illustrated in Fig. 1 by resting against the carbon.

On the gripping-roller 10 are ratchet-teeth 24, and adjacent to said ratchet-teeth is a stationary pawl 25, which is pivoted below the clutch to a block or lug 25′ on the plate 12. The groove in the roller 10 is preferably so shaped that the roller will grip the carbon at points in line with the periphery of the ratchet-wheel, as shown in Fig. 4. This is desir-

able in order to give the same surface speed to the roller at the gripping-points as is given to the ratchet-wheel.

Instead of the circuit-controller 19 20, shown in Figs. 2 and 3, the form illustrated in Fig. 5 is preferable. This consists of a pivoted angle-lever 26, to which one wire of the shunt-circuit 27 is connected, and a pivoted arm carrying a contact 28, which is connected to the wire 29 of the shunt-circuit. 28 rests, when the shunt-circuit is closed, on the tooth 30 of the lever 26. As the pin 18 moves downward it will strike the horizontal arm of lever 26, tilting said lever on its pivot until the tooth is withdrawn from under contact 28, when said contact falls, and the circuit will not be re-established until the contact is raised up upon the tooth 30 by the upward movement of frame 16.

The circuits will now be traced, referring especially to Fig. 6. The lamp-terminal 31 is connected to the main coil 4, thence by wire 32 to the side rod 6, thence through the carbons to the clutch, and by wire 33 to the opposite lamp-terminal 34. At 35 the shunt-circuit leaves the main circuit, passing through the shunt-coil 5, wire 29, to contact 20, (shown in the diagram out of contact with 19,) this being the position when the lamp is out of use. From 20 the circuit extends to 19, wire 27, to wire 33. The cut-out circuit is connected at the point 36 and to post 21. The opposite terminal of the cut-out circuit is connected to wire 27 and to terminal 34 of the lamp.

The operation of the devices above described will now be indicated. Suppose the lamp-circuit to be closed to the lamp by means of a suitable switch. Since the shunt-circuit is open, the current will all pass through the main coil 4, thereby attracting the armature 3 and raising the swinging frame and the clutch-rollers. When the frame and clutch are in their lowest position and the carbons are together, the roller 9 is moved back from the carbon, since the outer end of the lever 13 rests against the plate 12 or against a suitable stop, whereby the lever is moved on its pivot 14. As the armature raises the frame the spring connected to the outer end of arm 13 tends to prevent said arm from moving up with the swinging frame, and this draws the roller 9 against the carbon. As the armature continues to move the carbon is raised slightly, whereby an arc is established; but as the frame continues to move upward the pawl 25 engages with the ratchet on roller 10, and as said frame and roller continue to move up the pawl causes the roller to turn on its axis. The roller therefore rolls over the carbon, and the clutch does not carry the carbon up, owing to the fact that the parts are so proportioned that the upward movement of the clutch-roller and the rotating motion of the roller are the same. In practice it is not found necessary to positively engage both rollers of the clutch to cause them to revolve, although that might be done, if desired. As the frame and clutch move up, as just described, the lever 19 moves up into contact with spring 20 and closes the shunt-circuit, which tends to weaken the attraction of the armature 3. As the carbons consume at the arc the armature will gradually move down, and the clutch, which now grips the carbon, will carry said carbon along with it. When the carbons are thus brought near together, the pin 18 opens the shunt-circuit, when all the current is thrown through the main magnet and the armature is again drawn up and the clutch-rollers caused to roll over the carbon to grip it at a point higher up, as already described. It will be seen that when the frame of the clutch has moved downward to a certain point means are thrown automatically into operation to farther advance the carbon and to cause the clutch-roller to revolve.

I do not confine myself to the exact form of apparatus described, since it can be modified in some respects without departing from my invention.

Having thus described the invention, what I claim is—

1. A feeding device for arc-lamp carbons, consisting of a swinging or reciprocating frame moved in one direction by a magnet to establish the arc and moved in the opposite direction by the operation of a shunt magnet or coil, and a clutch consisting of two rollers carried by the frame, one of said rollers being movable toward and from the carbon, substantially as described.

2. A feeding device for arc-lamp carbons, consisting of a swinging or reciprocating frame moved in one direction by a magnet to establish the arc and moved in the opposite direction by the operation of a shunt magnet or coil, and a single clutch carried by said frame and having a clutch-roller movable toward or away from the carbon or carbon-rod, and means for moving said roller, substantially as described.

3. In an arc lamp, a feeding device consisting of a swinging or reciprocating frame carrying rollers adapted to grip and raise the carbon, one roller having ratchet-teeth, and a pawl supported independently of the frame normally out of engagement with the ratchet, but in position to engage the ratchet when the clutch is raised far enough to establish the arc to cause the clutch to roll over the carbon after forming the arc, substantially as described.

4. A clutch for arc-lamp carbons, consisting of a frame carrying clutch-rollers, a pawl engaging a roller of the clutch during movement away from the arc for turning the roller while it is moving away from the arc, means for causing said rollers to clutch the carbon during movement toward the arc, and means for disengaging the clutch at a predetermined point in the descent, substantially as described.

5. A clutch for arc-lamp carbons, consist-

ing of a swinging frame, a roller journaled to the frame, a second roller carried by an arm pivoted to the frame, and a stop for said arm for moving the second roller to disengage the clutch, substantially as described.

6. A clutch for arc-lamp carbons, consisting of a swinging frame, a roller journaled to the frame, a second roller carried by an arm pivoted to the frame, means for moving the arm to force the roller against the carbon, and a stop for said arm, substantially as described.

7. An arc-lamp reciprocating clutch having gripping-rollers for the lamp-carbon, one of the rollers being carried by a pivoted angle-lever, and a stop in the path of said lever when the clutch is moving toward the arc, whereby the lever is tilted to carry the roller away from the carbon, substantially as described.

8. An arc-lamp clutch consisting of a reciprocating frame, a gripping-roller carried by a lever pivoted to the frame, a co-operating gripping-roller, and a device in engagement with the latter roller while the clutch is moving away from the arc, substantially as described.

9. The combination, in an arc lamp having main and shunt circuit magnets or coils, of a swinging roller-clutch, a circuit-breaker in the shunt-circuit adjacent to a movable part of the clutch and in the path of movement thereof, said circuit-breaker consisting of a lever in the circuit and pivoted to a support not movable with the clutch mechanism, and a magnet affected by the circuit-controller to raise the clutch, substantially as described.

This specification signed and witnessed this 6th day of February, 1891.

SAMUEL W. RUSHMORE.

Witnesses:
JAMES C. BRYCE,
HENRY WEISKETTLE.