(No Model.) 3 Sheets—Sheet 1.

J. H. GUEST.

ELECTRIC ARC LAMP.

No. 260,975. Patented July 11, 1882.

Fig. 1.

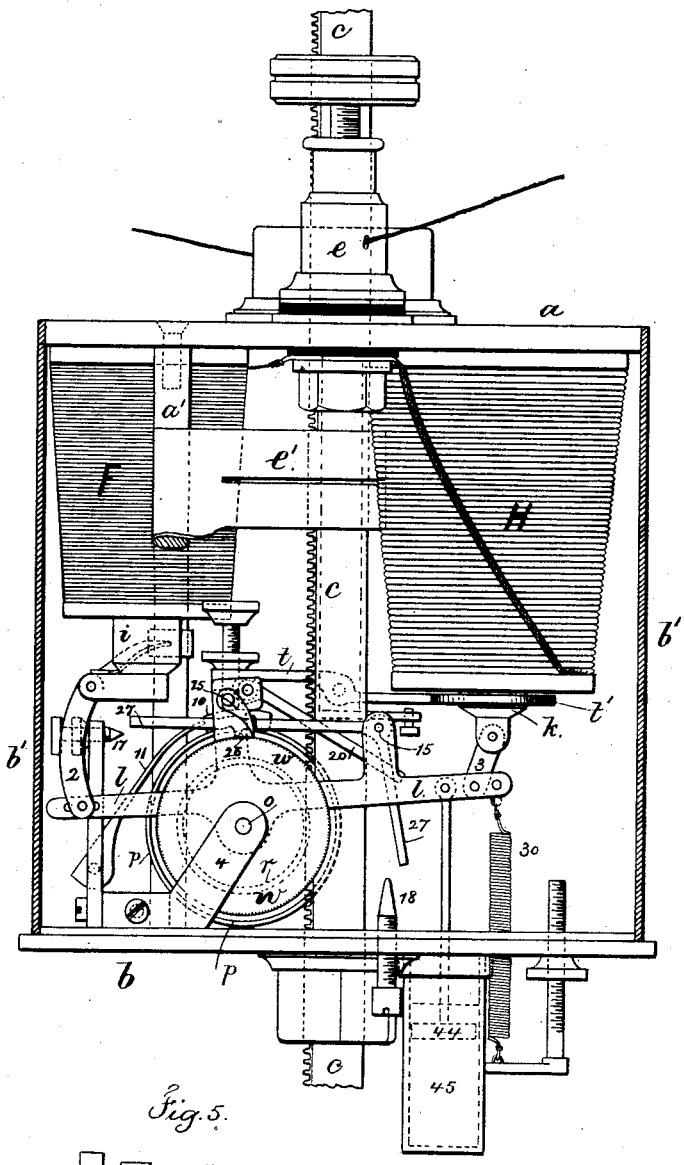
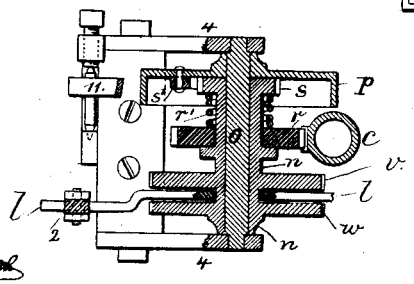


Fig. 5.



Witnesses
Chas. H. Smith
J. Stahl

Inventor
John H. Guest
per Lemuel W. Serrell
Atty

(No Model.) 3 Sheets—Sheet 2.

J. H. GUEST.

ELECTRIC ARC LAMP.

No. 260,975. Patented July 11, 1882.

Fig. 2.

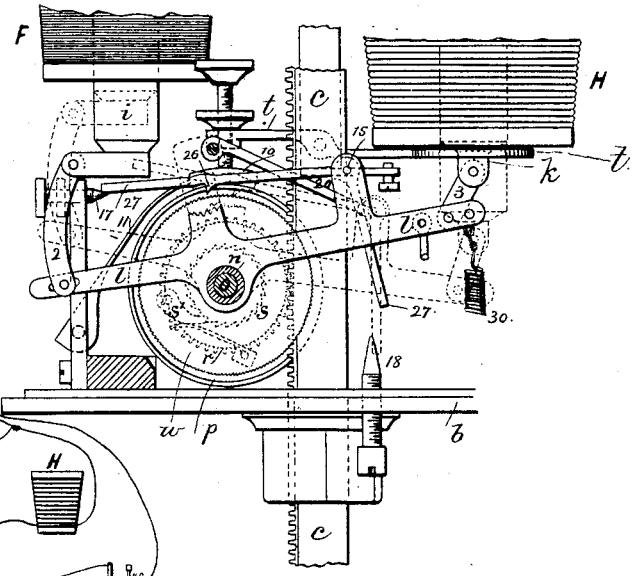


Fig. 4.

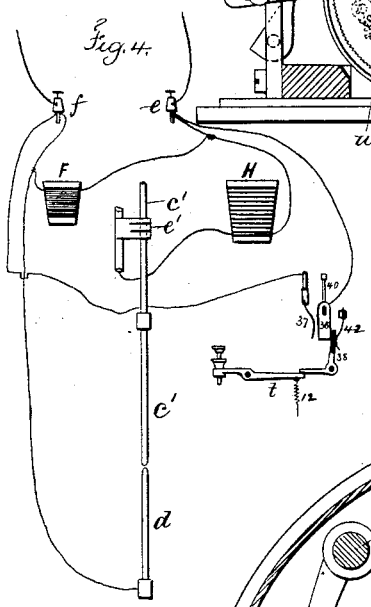
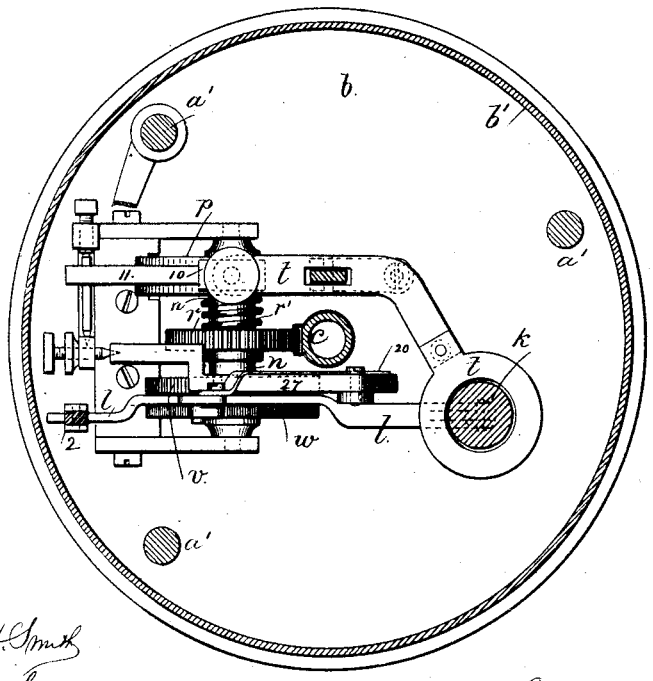


Fig. 3.



Witnesses

Chas. H. Smith

J. Hall

Inventor

John H. Guest

per Linnell W. Serrell Atty

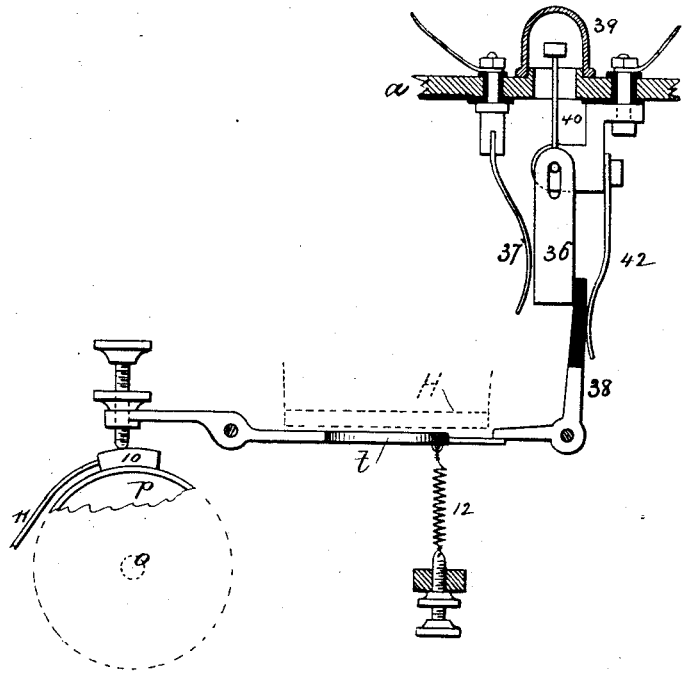
(No Model.) 3 Sheets—Sheet 3.

J. H. GUEST.

ELECTRIC ARC LAMP.

No. 260,975. Patented July 11, 1882.

Fig. 6



Witnesses

Chas. H. Smith

J. Stailey

Inventor

John H. Guest

per Lemuel W. Serrell

Atty

UNITED STATES PATENT OFFICE.

JOHN H. GUEST, OF BROOKLYN, NEW YORK.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 260,975, dated July 11, 1882.

Application filed May 23, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. GUEST, of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Electric-Arc Lamps, of which the following is a specification.

In some electric lamps there is one magnet for drawing down the lower carbon and establishing the arc and another magnet for giving a positive feed to the carbon as the arc increases and the current in the main circuit lessens.

The object of my present invention is to dispense with the magnet in the lower part of the lamp that separates the carbons, and at the same time obtain a positive feed from the differential action of electro-magnets, as distinguished from those electric lamps in which the feed is not positive or in which the arc is established by the same magnets and intervening mechanism which feeds the carbons.

In my present improvement I employ two pawls worked by the differential magnets. One of them serves to separate the carbons and the other to feed the carbons. As soon as the current is applied the first pawl acts to separate the carbons, and it is instantly thrown out of action, leaving the carbons under the control of the second pawl to feed the same as consumed.

In the drawings, Figure 1 is an elevation of the lamp mechanism in the act of separating the carbons. Fig. 2 is a corresponding view with part of the mechanism partially in section and with the separating-pawl disconnected. Fig. 3 is a sectional plan. Fig. 4 is a diagram of the circuit-connections. Fig. 5 is a section of the feed-wheels and shaft, and Fig. 6 represents the shunt-circuit connection and friction-lever.

The top plate, *a*, and bottom plate, *b*, are connected by the studs or columns *a'*, and a movable case, *b'*, surrounds the parts to protect the same. The tubular rack *c* receives at its lower end the carbon *c'*, and the lower carbon, *d*, is supported in any usual manner. The current from the insulated + binding-post *e* passes through the coarse-wire helix H, thence by the parts of the lamp or the spring-contact *e'* and carbon-holder rack *c* and carbons, and returns to the — binding-post *f*. The fine-wire helix F is in a shunt-circuit between the + and — binding-posts. The helices F and H have solenoid-cores *i k*, respectively, that are linked at 2 and 3 to the ends of the rocking lever *l*, which is free to be rocked or turned upon the sleeve *n* of the shaft *o*. The shaft *o* is in bearings or supports 4 4, and it has fixed permanently to it the friction-wheel *p*, and upon the sleeve *n* is a ratchet-wheel, *s*, the teeth of which engage with a spring-pawl, *s'*, pivoted on the inner face of the friction-wheel *p*. There is a pinion, *r*, upon the sleeve *n*, gearing into the rack-tube *c* of the carbon-holder. This pinion *r* is held against a collar on the sleeve by the spring *r'*. The friction is sufficient to hold the weight of the carbon-holder and carbon, but the rack may be moved up or down by hand. The directions of the ratchet-wheel teeth and pawl *s'* are such that the carbon-holder cannot descend without turning the friction-wheel, but the sleeve and ratchet-wheel can be turned in raising the carbon-holder.

On the periphery of the friction-wheel there is a pad, 10, that is carried by a spring, 11. It may bear constantly upon the friction-wheel with enough force to suspend the carbon and carbon-holder; but I prefer to use the lever *t* to apply pressure to the friction-pad, said lever *t* being acted upon by the attraction of the core of the solenoid H when the current passes through the lamp; but when the current through the lamp ceases, or nearly so, the solenoid no longer holds the lever *t*, and the same, being drawn down by the spring 12, (see Fig. 6,) relieves the pressure upon the friction-pad and allows the parts to turn by the weight of the carbon and holder. This permits the upper carbon to descend into contact, or nearly so, with the lower carbon, when the current through the lamp is considerably lessened or ceases. This lever *t* is formed with a soft-iron armature-ring at the end adjacent to the magnet H, so that the solenoid-core can pass freely through the same; but the magnetism set up in the core will draw this ring toward the helix when there is a current passing through H.

The sleeve *n* has upon it the two toothed wheels *v* and *w*, and the lever *l* is preferably between them. There are two pawls acted upon by the lever. One pawl, 25, standing in one direction, acts to turn the wheel *w* and

feed the carbon down, and the other pawl, 26, acts to raise the carbon and separate the same from the lower carbon. The teeth of the wheel *v* are fine, and the second pawl, 26, is a tooth upon a secondary lever, 27, pivoted upon the lever *l* at 15, and there are fixed stops at 17 and 18, preferably in the form of taper-pointed screws, and there is a flat friction-spring, 20, on the lever *l*, acting against the side of the secondary lever, 27, to hold the same in any position into which it may be moved. The pawl-tooth at 26 on this secondary lever is adapted to take the fine teeth of the wheel *v*.

Now, presuming the parts are in the position shown by dotted lines in Fig. 2, the weight of the solenoid-core *k* and the tension-spring 30 have drawn the lever *l* and fulcrum 15 of the lever 27 down until the screw-stop 18 at the base of the lamp is in contact with the end of the bent lever 27, has turned the same, and engaged the pawl-tooth 26 with the teeth of the wheel *v*. This is the position of inaction. When a current is turned on, the solenoid H instantly draws up the core *k* and lever *l*, and by tooth 26, which is engaged with the wheel *v*, the carbon is raised, and as the parts come into the position shown by full lines in Fig. 2 the tooth or pawl 26 is disengaged from contact with the wheel *v* by the end of the pawl-lever 27 coming into contact with the fixed stop 17. At the same moment the magnetism in H applies pressure to the friction-brake 10, and, the separation of the carbons being established, the feed is regulated and the distance preserved with uniformity by the differential action of the two magnets H F. If the carbons are too far apart, the current in F, preponderating, moves the lever and causes the pawl 25 to feed down the carbon by turning the wheel *w* and pinion *r*. As the carbons approach each other the increase of magnetism in H draws the core *k* up and moves the lever and pawl 26 to take the teeth of the wheel *v*. In this manner the proper separation of the carbons is established, and then the feed effected as required from time to time, and in case of the carbon breaking at its point or the current being turned off, the upper carbon descends into contact with the lower carbon, these operations being performed by the two solenoid-magnets, one in the main circuit and the other in a shunt.

In order to prevent any sudden movement of the solenoid-magnets or any vibrations that might make the lamp flicker, I employ a piston, 44, in a small cylinder, 45, containing glycerine or other suitable liquid. This forms a dash-pot, the piston of which is connected with the lever *l*, for the aforesaid purposes.

I have shown in Fig. 6 a modification of the shunt-circuit closer shown in my application filed March 20, 1882. In this Fig. 6 the contact-block 36 is provided with a stem, 40, extending through the top plate, *a*. If the lamp is extinguished or the current decreases in H below the minimum standard, the lever *t* is drawn down by the spring 12, and allows the spring 42 to act upon the lever 38 and press the contact-block 36 against the spring 37 and close the shunt-circuit between the + and — binding-posts. This shunt can be broken and the lamp restored to working condition by removing the small cap 39 and lifting the stem and the contact-block 36 so that the latter rests upon the upper end of the lever 38.

If desired, the wheels may be turned by clamping blocks similar to wheel feeds in sewing-machines instead of being operated upon by the pawls.

I claim as my invention—

1. The combination, with the carbon-holder, of a rack, a pinion engaged with such rack, ratchet-wheels *v* and *w*, a lever, solenoid-magnets in the main and shunt circuits connected to the said lever, two pawls or teeth acting in opposite directions, and stops to bring into action the pawl that acts to separate the carbons and to disconnect the same, substantially as set forth.

2. The lever *l* and pawl 25, in combination with the secondary lever, 27, having the tooth or pawl 26, pivoted to the lever *l*, the spring 20, the stops 17 and 18, the toothed wheels *v* and *w*, the pinion *r*, and carbon-holder and solenoid-magnets, substantially as set forth.

3. In combination with the carbon-holder rack, gear-wheel and toothed wheels, a lever, solenoid-magnets to move the same in opposite directions, two pawls—one to raise the upper carbon, the other to feed the same—stops to bring into action and to disconnect the pawl that acts to separate the carbons, a friction-wheel, a brake, and a lever actuated by the magnet in the main circuit to apply friction while the current is passing through the lamp and to relieve the friction when the light is extinguished, substantially as set forth.

4. In combination with the circuit-closing block 36, springs 37 and 42, and lever 38, the stem 40, passing through the top plate, and the removable cap, substantially as set forth.

5. The combination, with the carbon-holder and rack *c*, pinion *r*, levers and pawls acting in opposite directions, and the solenoid-magnets in the main and shunt circuits, of the dash-pot 45, and connection to the lever *l*, substantially as set forth.

Signed by me this 20th day of May, A. D. 1882.

J. H. GUEST.

Witnesses:
GEO. T. PINCKNEY,
CHAS. H. SMITH.