(No Model.) 2 Sheets—Sheet 1.

F. D'A. GOOLD.

ELECTRIC ARC LAMP.

No. 480,721. Patented Aug. 16, 1892.

Fig. 1.

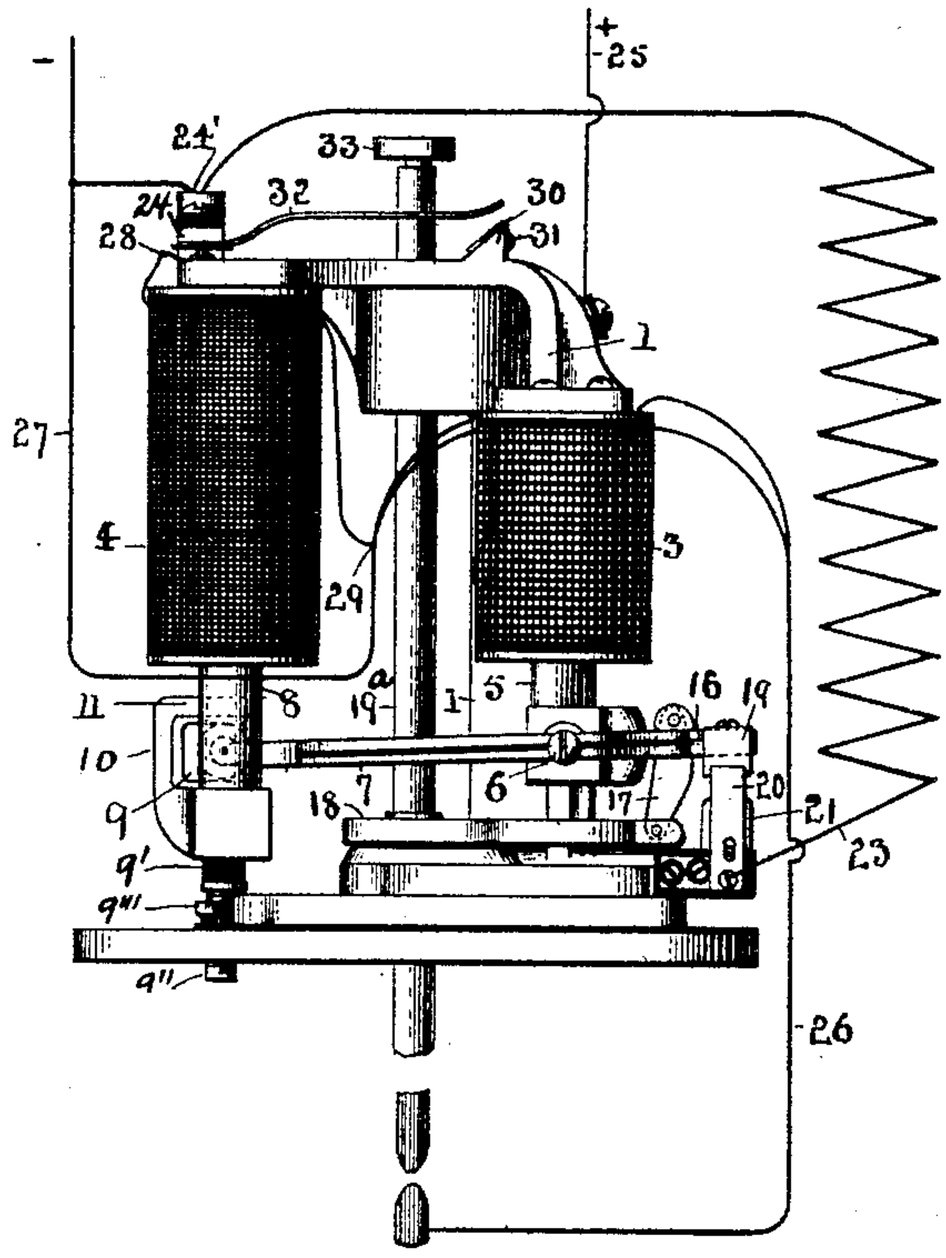
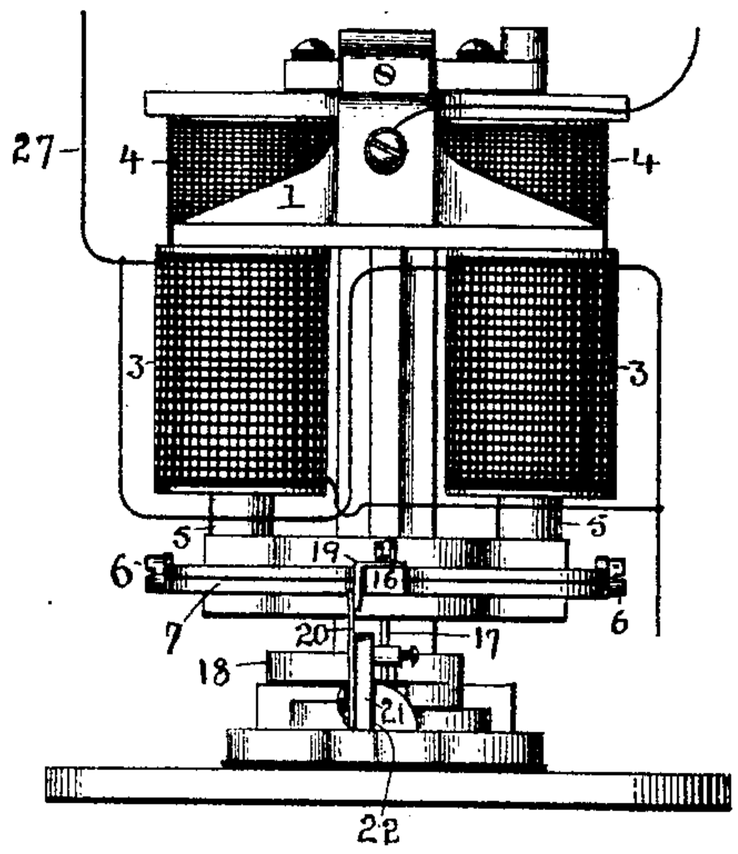


Fig. 2.



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(No Model.)

2 Sheets—Sheet 2.

F. D'A. GOOLD.

ELECTRIC ARC LAMP.

No. 480,721. Patented Aug. 16, 1892.

Fig. 3.

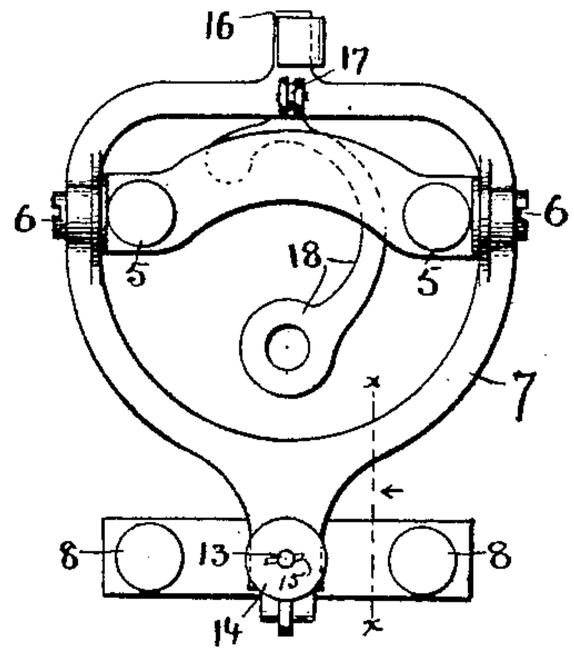


Fig. 4.

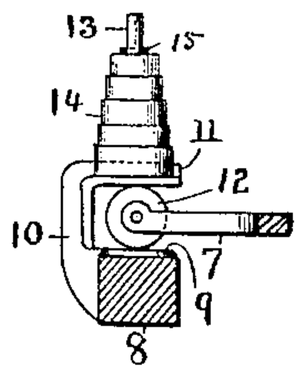
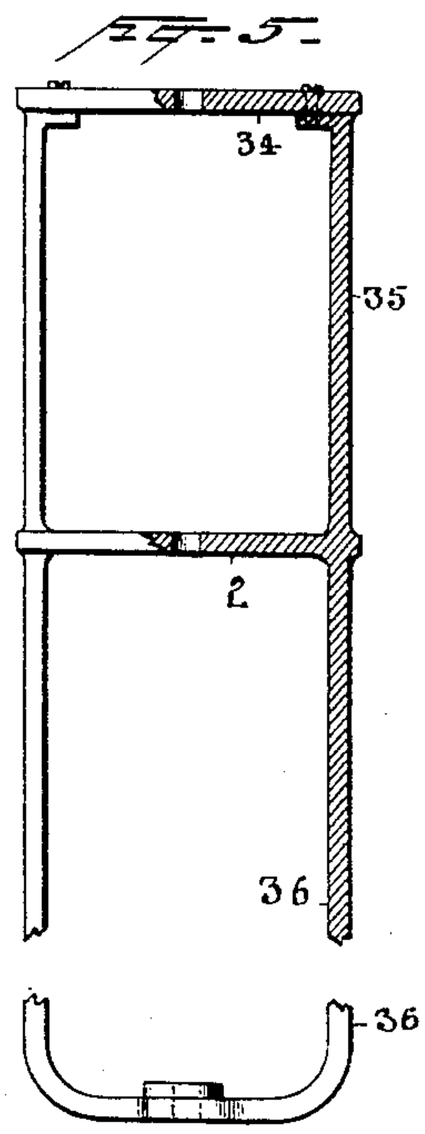


Fig. 5.



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UNITED STATES PATENT OFFICE.

FREDERICK D'A. GOOLD, OF NEW YORK, N. Y., ASSIGNOR TO THE EDISON GENERAL ELECTRIC COMPANY, OF SAME PLACE.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 480,721, dated August 16, 1892.

Application filed December 5, 1891. Serial No. 414,166. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK D'A. GOOLD, a citizen of the United States, residing at New York city, in the county 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 the arc establishing, feeding, and switch mechanism of arc lamps, the object being to simplify and improve certain parts of the mechanism; and the invention consists in an improved tilting mechanism for forming the arc and feeding the carbon, in cut-out circuits and circuit-controllers, and in the frame of the lamp, as hereinafter pointed out.

In the accompanying drawings, Figure 1 is a side view of the mechanism of a lamp, showing also the circuit connections. Fig. 2 is a view at right angles to Fig. 1. Fig. 3 is a plan view of the tilting frame and clutch detached from the lamp. Fig. 4 is a section on line *x x* of Fig. 3; and Fig. 5 shows the lamp-frame, a part thereof being in section.

The lamp mechanism consists, essentially, of the metal frame 1, which is supported on but insulated from the bottom 2, Fig. 5, of the inclosing box or frame. Supported by this frame 1 is a main-circuit magnet 3 and a shunt-magnet 4. The former magnet has an armature 5, pivoted at 6 to the tilting arm or frame 7. The pivot 6 forms one fulcrum for the tilting frame. The shunt-coil has an armature 8, and this armature is provided on its upper surface with a seat or bearing 9, preferably formed by a bracket 10, cast integral with the armature cross-piece. The bracket has an arm 11 above and parallel with the seat 9. When in its lowest position, the armature rests on the insulating-block 9′, which is supported on the adjusting-screw 9″, which is provided with a lock-nut 9‴. This provides simple and accurate means for adjusting the length of the arc and the delicacy of the feed.

The frame 7 is provided at its outer end with a roller or other suitable bearing 12, which rests on the seat 9 and is capable of slight longitudinal movement thereon and which forms a second fulcrum for the tilting frame. From the arm 11 projects a rod or pin 13, on which are counterbalance-weights 14. These are put on when the lamp is first adjusted and a pin 15 or a lead seal placed immediately over the same to hold them in place and to prevent their removal or loss. I find weights preferable to springs for a counter-balance, since the variation due to changes in temperature and various causes is much less. At the opposite end the tilting frame is provided with an arm 16 outside of both fulcrums, and to this arm is pivoted a link 17, which is connected at its lower end to the clutch plate or ring 18. This yielding link allows free movement of the tilting frame and allows the clutch to adjust itself to the carbon more readily than a ring-clutch rigidly secured to the tilting frame.

19ª is a carbon-carrying rod, which passes through an opening in the clutch-plate in the ordinary manner. The arm 16 also carries a contact 19 in metallic contact with said arm, and in line with the same is a contact-spring 20, supported directly on the face of the metal plate 21, which plate is supported on the frame of the lamp, but insulated therefrom by a mica or other plate 22. The spring 20 is secured so as to be readily removed without removing or disarranging the plate 21. This is desirable, since the contact-spring is the part most likely to become injured and to require replacing. To the plate 21 is connected one end of the resistance-shunt 23, the opposite end thereof being connected to the insulated plate 24 and post 24′. The positive terminal 25 of the lamp is connected directly to the metal frame 1, from which the circuit extends to the frame of the lamp through the carbons to wire 26, through the coils of the main magnet in multiple arc, and then by wire 27 to the negative terminal. The circuit of the shunt-coil branches from said circuit by wire 28, which is connected to the frame, the opposite end of the shunt-coil being connected to the main circuit at 29. On the frame 1 is cast a lug 30, to which is secured a contact-spring 31.

32 is a spring connected to plate 24 and in position to be struck by the head 33 on the carbon-carrying rod when the latter descends to its lowest position. The free end of the spring 32 is bent, as shown, so that when it is

pressed down onto contact 31 it will rest flatly thereon and will make a sliding contact.

Instead of making the inclosing and supporting frame of the lamp of upper and lower plates or disks held in the desired position by posts or bolts and having separate depending rods to support the lower carbon, I form the whole frame, except the top plate 34, which is removable, but is secured by screws or rivets, of a single casting, the bottom 2 of the box or frame which contains the feeding mechanism of the lamp being integral with the sides 35 and the depending arm or arms 36, which are designed to support the lower carbon. This frame is more easily constructed and is more rigid than those made in several sections, and there is no danger of the parts getting out of alignment, as is the case with old forms of lamp-frames.

When the circuit is first closed to this lamp, the main coil will be energized, attracting its armature, tilting the arm or frame 7 on its fulcrum 9, and through the link 17 and clutch 18 raising the carbon. This will throw a larger proportion of the current through the shunt-coil 4, and as the potential rises in said coil its armature will be gradually raised, tilting the frame 7 on its fulcrum 6. This moves the link 17 and the clutch 18 downward and gradually advances the carbon. If at any time the shunt-coil raises its armature too far, the circuit-controller 19 20 closes the resistance-shunt 23, thereby short-circuiting the shunt-coil 4 and allowing the weights 14 to move the tilting frame back toward its original position, and thus again establish the arc if there is nothing to prevent carbons touching. Should the rod stick, the cut-out acts, closing the circuit for other lamps. When the upper carbon has burned away and has been fed forward so that the head 33 strikes the spring 32, the entire lamp will be short-circuited without the interposition of any idle resistance.

What I claim is—

1. The combination, in an arc lamp, of stationary main and shunt coils, armatures therefor, a tilting arm or frame having a fulcrum on or connected to each armature, one of said fulcrums consisting of a wheel or other bearing adapted to move longitudinally on its seat, and a clutch-plate or other carbon-controlling device connected to said tilting arm or frame, substantially as described.

2. The combination, in an arc lamp, of the stationary main and shunt coils or magnets and armatures therefor, the tilting frame supported and operated thereby and having a fulcrum on each armature and projecting beyond the fulcrum on the armature of the main coil, and a carbon-clutch connected to said projecting part, substantially as described.

3. The combination, in an arc lamp, of stationary main and shunt coils, armatures therefor, a tilting arm or frame supported by said armature and having a fulcrum on or connected to each armature, a clutch connected to said tilting arm or frame, a cut-out circuit and circuit-controllers, and a counterbalance-weight on said tilting arm or frame and adapted to move the same when the cut-out circuit is closed, substantially as described.

4. The combination of the main and shunt coils and armatures, the tilting frame supported by the armatures and having two fulcrums, the carbon-clutch, the resistance-shunt circuit, and the circuit-controller therefor, closed by an abnormal movement of the armature of the shunt-magnet or by an abnormal movement of the main magnet-armature, and a short circuit closed when the carbons are consumed between the lamp-terminals around the magnets and said resistance-shunt circuit, substantially as described.

5. The combination of the main and shunt coils and armatures, the tilting frame supported by the armatures and having two fulcrums, the carbon-clutch, the resistance-shunt circuit, and the circuit-controller therefor, one member of the circuit-controller being carried by a part of said tilting frame projecting beyond one of said fulcrums, substantially as described.

This specification signed and witnessed this 30th day of November, 1891.

FREDERICK D'A. GOOLD.

Witnesses:

CHARLES M. CATLIN,

EUGENE CONRAN.