No. 757,847. PATENTED APR. 19, 1904.

F. SINDINGCHRISTENSEN.

ELECTRIC ARC LAMP.

APPLICATION FILED MAY 4, 1903.

NO MODEL.

Fig. 1

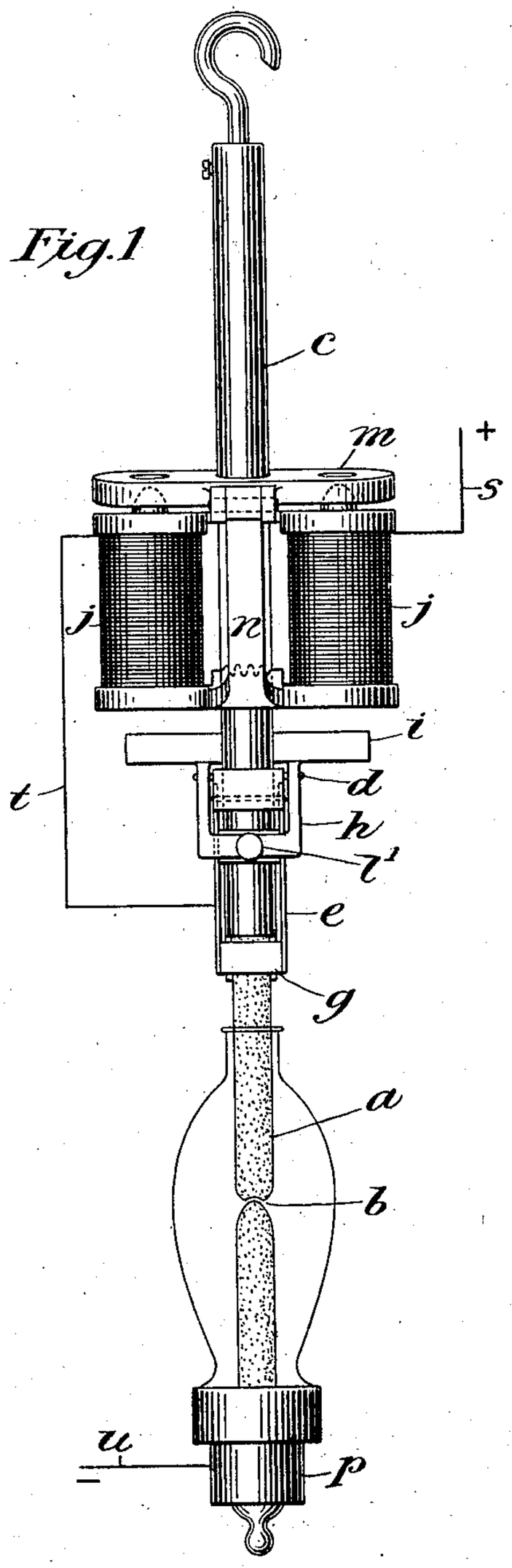


Fig. 3

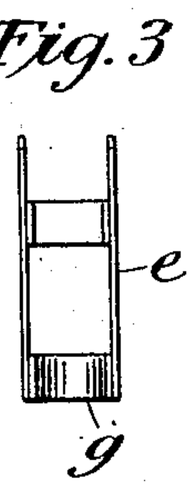
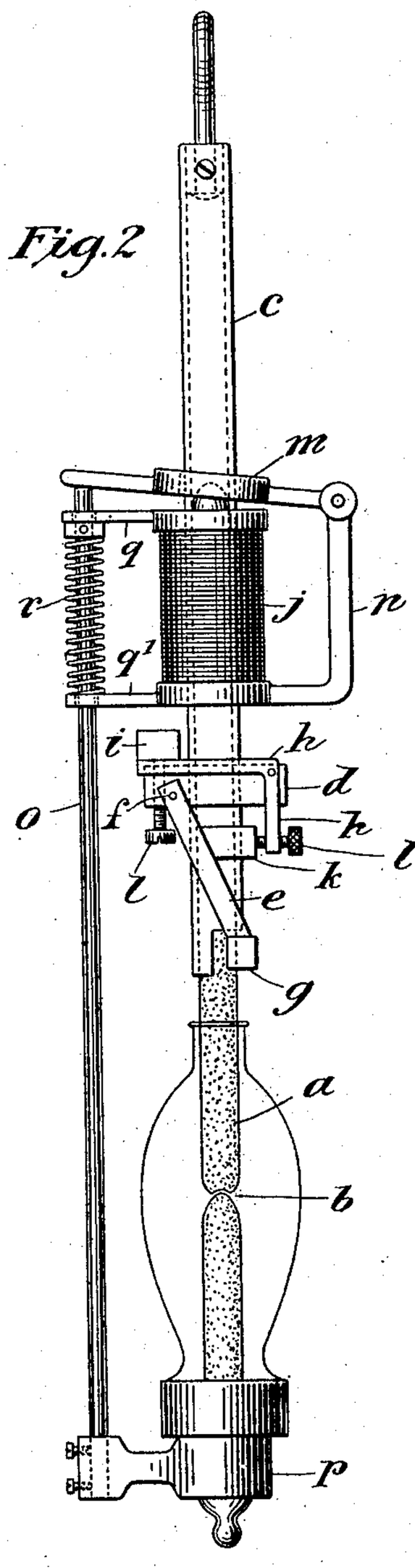


Fig. 2



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No. 757,847. Patented April 19, 1904.

UNITED STATES PATENT OFFICE.

FREDERIK SINDINGCHRISTENSEN, OF NEW YORK, N. Y., ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO COMMERCIAL CONSTRUCTION COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK, AND WILLIAM H. LOCKE, JR.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 757,847, dated April 19, 1904.

Application filed May 4, 1903. Serial No. 155,476. (No model.)

To all whom it may concern:

Be it known that I, FREDERIK SINDINGCHRISTENSEN, of the borough of Brooklyn, in the city and State of New York, have invented certain new and useful Improvements in Arc-Lamps, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

This invention relates to electric-arc lamps; and its general object is to improve the construction of such lamps with a view toward simplifying in certain particulars the complex mechanism of which arc-lamps as a general rule are composed.

One reason for the complex and intricate nature of arc-lamp mechanisms is due to the particular requirements of the feeding device, the obstacle in the way of providing simpler mechanism being the difficulty of securing thereby the requisite steadiness and delicacy of action for the feeding device.

In accordance with the present invention, a simple feeding mechanism is provided, which at the same time effects the requisite steady and delicate feeding action required. The improved feeding mechanism comprises a braking device engaging the carbon and operatively connected with the lamp-magnet, whereby the carbon is gradually fed downwardly, and inasmuch as the downwardly-feeding carbon is never positively connected to the armature or core of the lamp-magnet the carbon can have no upward movement, and the feeding thereof will accordingly be gradual and steady. Furthermore, inasmuch as the carbon with such a feeding mechanism will move only in a downward direction under gravity some means outside of the feeding mechanism should be provided to form the arc. Accordingly, the arc forming and feeding mechanisms are made separate and distinct instead of being combined, as is usual, and both mechanisms are arranged to be controlled by the lamp-magnet.

The invention will be more particularly described hereinafter with reference to the accompanying drawings, in which—

Figure 1 is a view in front elevation of an arc-lamp embodying the invention. Fig. 2 is a view thereof in side elevation, and Fig. 3 is a detailed view in elevation of the braking-lever of the feeding mechanism.

The upper carbon *a* is arranged to be fed down, as usual, to the arc *b*, and for this purpose the upper carbon is loosely held in a guide-tube *c*, upon which mechanism is arranged for effecting the proper feeding of said carbon as the lamp continues in operation. Such mechanism may comprise a bracket *d*, secured upon tube *c* in any convenient manner, a double-armed braking-lever *e*, pivoted at *f* upon the bracket *d* and provided with a shoe *g*, which extends through a recess in tube *c* and bears against the carbon *a*, and a second lever *h*, also pivoted upon bracket *d*. One end of lever *h* is connected with an armature *i* near the lower ends of a pair electromagnets *j*, while the other end of said lever bears against a projection *k* upon braking-lever *e*, whereby upon the actuation of the armature by the magnets the lever *h* will swivel upon its pivot and cause the lower end of the lever to press tightly against the projection *k* on lever *e* and bring the brake-shoe *g* hard against the upper carbon. Screws *l* and *l'* are provided, one in the bracket *d* and the other on the lower end of lever *h*, in order to adjust, respectively, the position of armature *i* with respect to the lamp-magnets *j* and the position of the lower end of lever *h* with respect to the projection *k*.

The electromagnets *j* may be mounted in any suitable manner upon the tube *c*, and above the upper ends of said magnets is an armature *m*, hinged at one end to a standard *n*, which is fastened to the magnets or to any other fixed part of the frame or lamp. On the other end of the armature *n* is a rod *o*, which carries the lower carbon-holder *p* and is adapted to move vertically in guides *q* and

q', secured to the electromagnets or to the lamp-frame. A spring r is provided, one end of which engages the rod o and the other end a relatively fixed part, such as guide q', whereby the armature m may be kept normally raised above the electromagnets j. The armature m is placed in such a position above the upper ends of the magnets as to be capable of being actuated by a relatively weak current, while the armature i is so related to the magnets as to be capable of being operated only by a relatively stronger current or by the increased polarity brought about at the lower ends of the magnets by transforming them into a single horseshoe-magnet in the manner presently to be described.

When the lamp is in operation, current flows into one of the magnets j through a conductor s and after traversing said magnet in one direction enters the other magnet j, which it traverses in the opposite direction and then flows out through conductor t into the upper carbon, from which it enters the lower carbon and then passes out of the lamp through conductor u. As soon as the current is turned on the armature m is drawn down upon the tops of the magnets j and forms a yoke between the magnets and unites their cores.

Before the cores of the magnets are united in the manner just described the corresponding ends of these magnets are of opposite polarity, while at the very moment the armature i effects the union of the cores these two individual magnets lose all polarity at their ends and are transformed into a single horseshoe-magnet with double the original polarity at its lower end. Immediately as this occurs the armature i, which controls the feeding mechanism, is attracted by the combined magnets and brakes the upper carbon. Simultaneously with the movement of armature m occurs the lowering of the lower-carbon holder p. The movement of the armature m and lower-carbon holder is very sudden, and the upper carbon, owing to the slight pressure of the brake-shoe which bears against the same, cannot drop with such rapidity of movement, and consequently is braked by the upward movement of the armature i, while the corbons are still drawn apart with the consequent formation of the arc between the carbons. As the lamp continues in operation and the current in the magnet varies the upper armature m, and consequently the lower carbon, will be held substantially stationary, while the lower armature i will be moved to and from the lower end of the magnet, thus operating the feeding mechanism and feeding the upper carbon downwardly into the arc. The variation of the current, it will be understood, causes an alternate tightening and relaxation of the brake upon the upper carbon, which brings about a gradual and steady feeding of the upper carbon downwardly into the arc at a rate determined by the speed of its consumption.

It will thus be seen that the feeding mechanism and the arc-forming mechanism are separate and distinct and are operated by the same magnets. It will be obvious that if desired the feeding mechanism and the arc-forming mechanism might be operated by a single magnet instead of the double magnet above described. In such a case, however, the weakening of the current in the single magnet would permit a slight raising of the lower carbon, as well as a lowering of the upper carbon as the latter is burned away, while in the case of the double magnet united in the manner heretofore referred to there is no movement of the lower-carbon holder except when current is turned onto and off from the lamp.

Through the adjusting-screws l and l' the armature i may be set in such a position that the attraction between it and the lamp-magnet will vary approximately directly with the mechanism excited by the current.

I claim as my invention—

1. In an arc-lamp, the combination of arc-forming mechanism, feeding mechanism, an electromagnet in which the variations of current are adapted to operate directly the feeding mechanism, and connections independent of the feeding mechanism between the magnet and the arc-forming mechanism.

2. In an arc-lamp, the combination of arc-forming mechanism, feeding mechanism including a brake bearing against the carbon, an electromagnet having an armature connected with the arc-forming mechanism, and another armature connected with the brake.

3. In an arc-lamp, the combination of an arc-forming mechanism, feeding mechanism including a brake bearing against one of the carbons, two electromagnets side by side, an armature at one end of said magnets connected with the arc-forming mechanism and adapted when attracted by said magnets to unite their cores, and an armature at the other end of said magnets connected with the brake.

4. In an arc-lamp, the combination of arc-forming mechanism, feeding mechanism including a brake bearing against one of the carbons, an electromagnet, an armature at one end of the magnet normally held away from the magnet, a carbon-holder supported by the armature, and an armature at the other end of the magnet connected with the brake.

5. In an arc-lamp, the combination of arc-forming mechanism, feeding mechanism, an electromagnet, an armature at one end of the magnet, a rod secured to the armature, a spring engaging the rod and a relatively fixed part to hold the armature normally away from the magnet, a carbon-holder upon the rod, and an armature at the other end of the magnet connected with the feeding mechanism.

6. In an arc-lamp, the combination of arc-forming mechanism, an electromagnet, an armature for the magnet connected with the arc-forming mechanism, a brake bearing against

the upper carbon, and another armature operated by the electromagnet and connected with the brake.

7. In an arc-lamp, the combination of arc-forming mechanism, an electromagnet, an armature for the magnet connected with the arc-forming mechanism, a carbon-guide, a lever bearing against the carbon, and another armature operated by the magnet and operatively connected with the lever.

8. In an arc-lamp, the combination of arc-forming mechanism, an electromagnet, an armature for the magnet connected with the arc-forming mechanism, a carbon-guide, a lever pivoted upon the guide and bearing against the carbon, another armature operated by the electromagnet, and a second lever interposed between the first-named lever and the second-named armature.

9. In an arc-lamp, the combination of a double magnet, an armature for transforming the double magnet into a single horseshoe-magnet, a holder for the lower carbon secured to said armature, feeding mechanism including a brake bearing against the upper carbon, the holder and the feeding mechanism being separately controlled by the magnet.

10. In an arc-lamp, the combination of a double magnet, an armature so related to the magnet as to be capable of being actuated by a relatively weak current, another armature so related to the magnet as to be capable of being operated only by a relatively stronger current, a holder for the lower carbon connected with the first-named armature, and feeding mechanism for the upper carbon connected with the second-named armature, whereby as the current in the magnet varies during the operation of the lamp the first-named armature and consequently the lower carbon will be held substantially stationary while the second-named armature will be moved to and from the magnet and the upper carbon will be fed downwardly into the arc.

11. In an arc-lamp, the combination of a double magnet, an armature at the upper end of said magnet and adapted when actuated to transform the double magnet into a single horseshoe-magnet, another armature at the lower end of said magnet, a holder for the lower carbon connected with the first-named armature, a feeding mechanism for the upper carbon connected with the second-named armature, whereby as the current in the magnet varies during the operation of the lamp the first-named armature and consequently the lower carbon will be held substantially stationary while the second-named armature will be moved to and from the magnet and the upper carbon will be fed downwardly into the arc.

This specification signed and witnessed this 25th day of April, A. D. 1903.

FREDERIK SINDINGCHRISTENSEN.

Witnesses:
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