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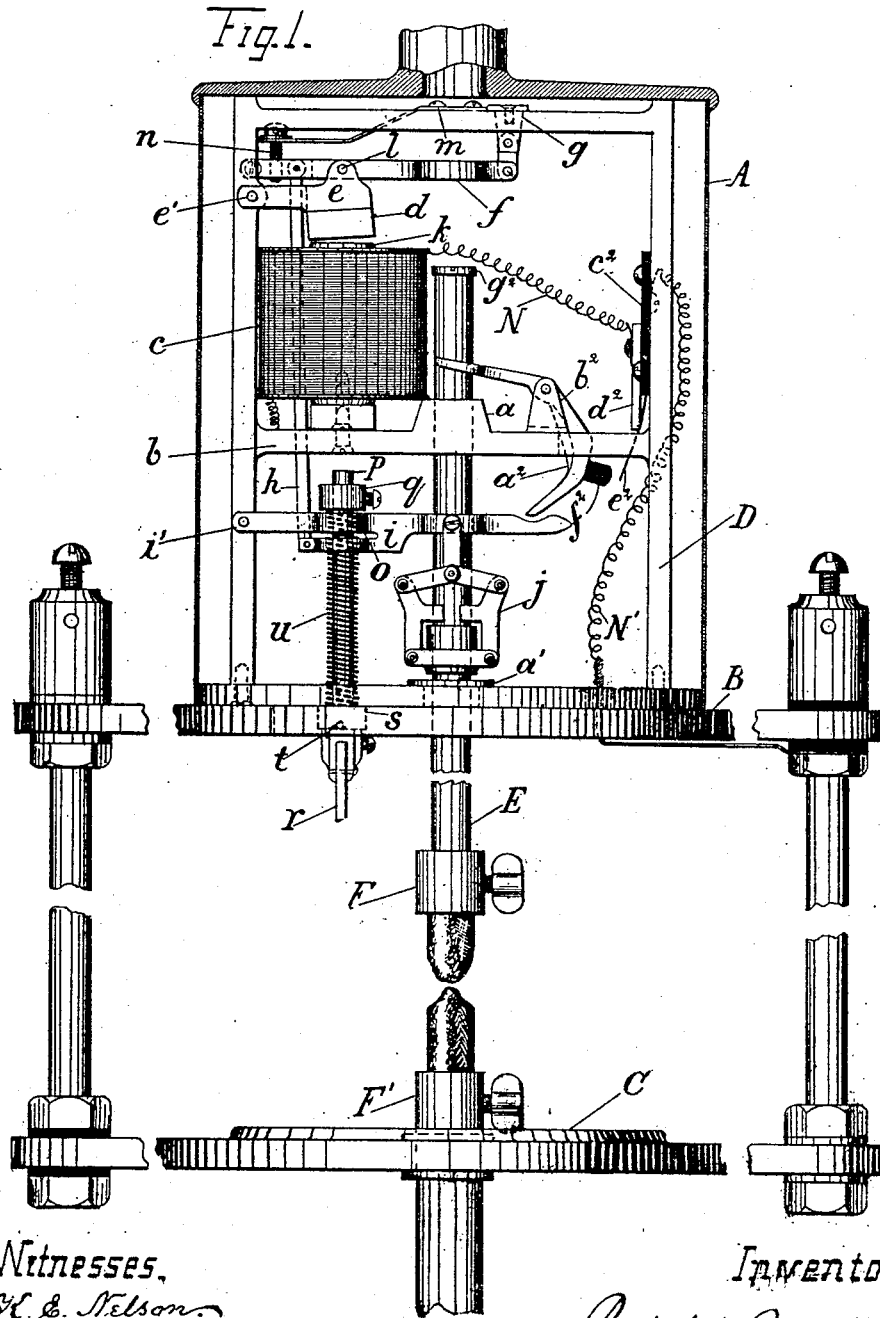
(No Model.)

2 Sheets—Sheet 1.

R. SEGERDAHL.
ELECTRIC ARC LAMP.

No. 518,654.

Patented Apr. 24, 1894.



Witnesses,
H. E. Nelson
John Skillestad

Inventor,
Rudolph Segersdahl

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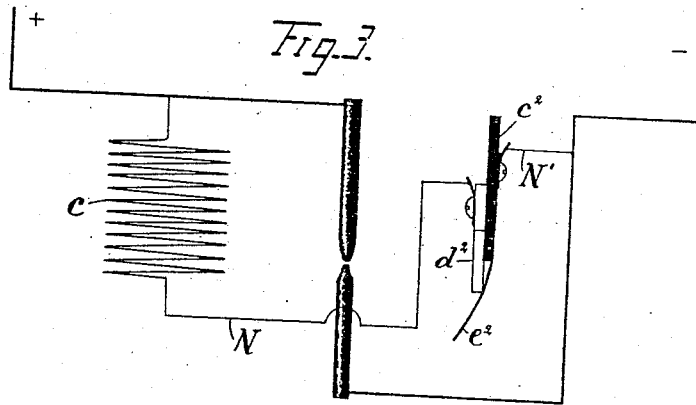
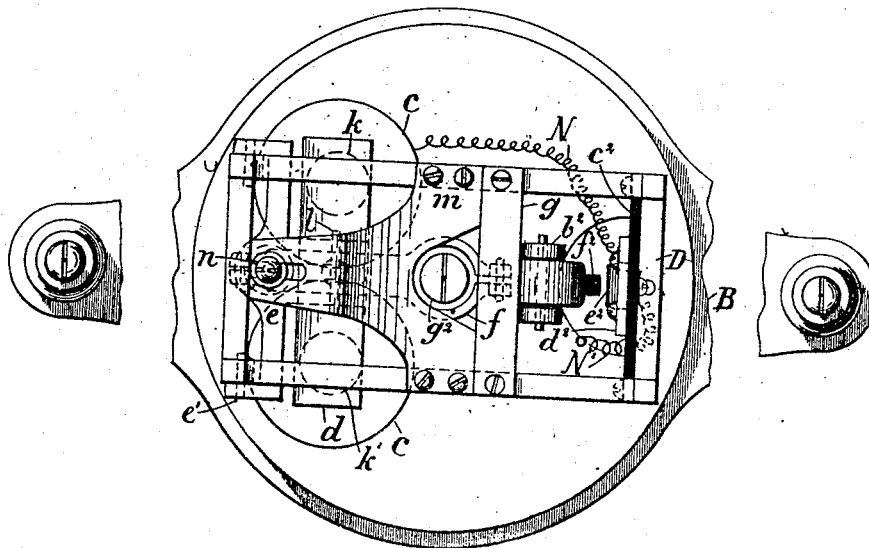


Fig. 2.



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UNITED STATES PATENT OFFICE.

RUDOLPH SEGERDAHL, OF CHICAGO, ILLINOIS.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 518,654, dated April 24, 1894.

Application filed September 29, 1893. Serial No. 486,801. (No model.)

To all whom it may concern:

Be it known that I, RUDOLPH SEGERDAHL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Electric Lamps, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention refers more particularly to that class of electric lamps used in circuits of a constant potential, and therefore commonly called incandescent circuit arc lamps, but it will readily be understood that my invention is not dependent on the character of the circuit, and I claim it can be used to advantage in any arc-lighting system.

In the ordinary form of arc lamps of this class, the feeding mechanism consists of an electro-magnet of high resistance shunted around the arc, and an armature located in close proximity to the poles of said electro-magnet and arranged to operate a lever, or series of levers, in connection with a clutch-mechanism, to govern the feed-rod with its carbon, so that when the arc gets above its normal length the electro-magnet is sufficiently energized to attract its armature to produce a movement of the clutch-mechanism that permits the feed-rod or its equivalent with its carbon to descend, and establish the proper length of arc between the carbons. Certain irregularities in the feeding action in lamps operated on the above principle are facts well known in the art; the arrangement of the above mentioned armature in reference to the poles of the electro-magnet being invariably such, that on the feeding point when the electro-magnet should produce but a slight movement of the armature just enough to decrease the friction of the clutch on the feed rod, to allow the same to descend no farther than is required to compensate for the carbon consumed and to retain the proper resistance of the arc, a sudden attraction of the armature is liable to take place, which tends to open the clutch and allow the carbon points to come together, thus destroying the effect of the light and causing great variations in the resistance of the lamp circuit. Again, the sudden momentum of the feeding-mechanism has

a tendency to permit a pumping action of the feed-rod, this being noticeable almost every time the feed action takes place, and causes what is commonly called "winking of the arc." Attempts have hitherto been made to obviate the above-mentioned defects in the feeding action of arc-lamps by having the feed rod geared into a train of wheels which are adapted to retard any sudden descent of the feed-rod. Also various forms of dash-pots have been applied in different manner in the present form of arc-lamps and made to serve the same purpose. Such an arrangement fails to remove the cause, and only accomplishes the object intended, "partly," and at the expense of making a complicated mechanism. In my lamp herein described I make use of a simple gravity-feed action; the armature that controls the movement of the clutch-mechanism is arranged in a certain manner in reference to the poles of the feed-magnet, whereby a gradual attraction of the armature can be obtained so as to control the clutch-mechanism in such manner that it arrests the feed-rod in its descent at the instant the normal length of arc is established. I am thus enabled to obtain a feed action in arc-lamps that maintains an arc of practically uniform resistance between the electrodes.

My invention further consists in the arrangement and combination of parts as hereinafter described and claimed.

In the accompanying drawings, Figure 1, is a front view in elevation of a lamp in which I have embodied my invention and with its mechanism exposed. Fig. 2, is a top view of the same; and Fig. 3, is a diagram of the circuits of the lamp.

Like parts are indicated by similar letters of reference throughout the several views.

The feeding-mechanism is located at the top of the lamp in the usual way and is preferably inclosed within a casing —A— which is supported on the metallic cross-piece —B— of the lamp frame. To this cross-piece inside the casing —A— is secured a metallic frame —D— in which the greater portion of the feeding and regulating mechanism is located. The carbons are supported in the usual way, the lower one on a metallic cross-piece —C— of the lamp, the upper one on a metallic feed-rod —E—.

F—F'— are carbon holders and may be of any suitable construction to serve the purpose. The feed-rod —E— extends up through the frame —D— and is adapted to slide in the bearings —a—a'— placed respectively at the top and bottom of the frame —D—. The frame —D— is divided into two sections by a shelf —b—. The feeding or shunt-magnet —c— which is wound with fine wire and is of high resistance is located in the upper section and secured to this shelf —b—. The armature —d— of the feed-magnet is secured to the lever —e— which is hinged at —e'— to the frame —D—. The lifting-lever —f— is connected by a connecting-rod —h— to the clutch-lever —i— which is pivoted at —i'— to the frame —D—. This clutch-lever carries the clutch —j— which is of a well-known form adapted when drawn up to grasp the feed-rod —E— and when lowered until it strikes the top of the bearing —a'— adapted to release the feed-rod —E—. The outer end of the clutch-lever —i— is arranged to operate a cut-out device by means of which the feed magnet —c— is held out of circuit when the carbon in the lamp has been consumed to a certain point, and which will be more fully referred to hereinafter. The lifting-lever —f— is hinged at —l— to the lever —e—.

At the top of the frame —D— is secured the spring-plate —m— extended to reach under the head of the adjustable screw —n— in the lifting-lever —f—. By means of this screw the tension of the spring-plate —m— is regulated to overcome the weight of the feed-rod —E— with its carbon and to maintain the respective carbon points a distance apart; this being their normal position in my lamp until the feed-magnet —c— becomes sufficiently energized by the current to attract the armature —d— which in its turn acts to lower the lifting lever —f— and the clutch-lever —i— until it allows the clutch —j— to strike the bearing —a'— adapted to release the feed rod —E—; thus permitting the same to descend and form a circuit through the carbons. As will be observed the feed-magnet —c— is in a series connection in the lamp circuit until the upper and lower carbons form a contact with one another, when a shunt circuit is formed; thus at the instant the carbon points touch one another the feed magnet —c— is for a moment short circuited and de-energized, the armature —d— is released and the proper length of arc is established between the carbon points by its return action caused by the tension spring —m—, after which the proper feeding of the carbon is repeated by the responsive action of the feed-magnet —c— to the varying resistance of the arc. I prefer to use a magnet construction as shown; the feed magnet —c— being of the ordinary double pole type and having flat poles K—K'. The armature —d— which is also flat, is arranged to operate across the top of the poles K—K'—

and is preferably secured to the lever —d— in a manner to maintain an inclined position in regard to the pole face; as I have found when the armature is placed in this position a uniform movement of the same toward the poles of the magnet may be attained, and that it also reduces the effect of the sluggishness of the electro-magnet on the receding action of the armature from the poles, to a minimum, so that the clutch mechanism may be governed by the same, in a manner to effect a gradual and delicate feed of the carbon which is the object desired. It is obvious that any other form or construction of electro-magnet, or armature, may be used to advantage, and I do not therefore wish to be understood as limiting myself to the particular construction shown.

The slot —o— in the clutch lever —i— is intended to facilitate the adjustments of the lamp; as the length of the connecting rod —h— determines the proper movement of the clutch —j— I can by forcing together or spreading the slot —o— attain the adjustment the condition of the mechanism may require.

I have hereinabove referred to the position of the feed-rod in my lamp before the current is passed through the same, it being held up by the action of the spring —m— until it is released by the action of the feed-magnet —c—. It is desirable that the feed rod —E— should be released to accommodate the operation of renewal of carbons, and I accomplish this by means of the arbor —p— projecting through the frame —B— and the clutch-lever —i—. At the upper end of this arbor I secure a collar —q— arranged to act against the top surface of the lever —i—. To the lower end of the arbor —p— is secured a thumb-piece —r— which serves to turn the arbor —p— in any desired direction. At the bottom of the frame —B— a cam —s— is secured, and against which the projecting pin —t— in the arbor —p— acts; so that by turning the thumb-piece —r— the collar —q— is made to press against the clutch-lever —i— to lower the same enough to release the feed rod —E—. The coil spring —u— is applied to press against the collar —q— so that in its normal position it is held away from the clutch lever —i—. I have also made reference to the fact that in my lamp the feed-magnet —c— is exposed to the full current pressure until the carbon points come together, or the arc is established. If exposed to the current pressure for any length of time, which might take place for lack of proper attention when the carbons are consumed, it may cause the feed-magnet to burn out; to obviate this, I have provided my lamp with an automatic cut-out device to break the circuit in the feed-magnet —c— when the carbons in the lamp are consumed to a certain point. It consists of the lever, —a²— pivoted in the bracket —b²— on the shelf —b—, its upper-arm is fork-shaped and is arranged to straddle the feed-rod —E—, the lower arm is

made to overbalance the upper arm. To the side of the frame —D— is secured an insulating block —c²—, to the inner side of this block is secured a contact point —d²—, on the opposite side of the insulating block —c²— is secured a spring contact —e²—. The negative terminal of the feed-magnet —c— is broken; the respective ends —N—N'— connected to contact —d²— and the spring —e²— respectively, so that when the spring contact —e²— is in a position to press against the contact —d²— there is a closed circuit through the feed-magnet —c—. In the lower arm of the lever —a²— is secured an insulating block —f²—. The feed-rod —E— in its descent by means of the stop screw —g²— moves the lever —a²— until the insulating knob —f²— strikes the spring —e²— and forces it away from the contact —d²— the circuit in the feed-magnet —c— is thus broken and the clutch-lever —i— returns to its normal position; in so doing its outer end forces itself against the lower end of the lever —a²—, thus locking the same to prevent the circuit in the feed-magnet —c— being again closed when the stop screw —g²— is raised with the feed-rod —E—. After the carbons in the lamp are consumed, the operation of renewal of carbons consists in lowering the clutch-lever —i— as above referred to; this permits the lever —a²— returning to its normal position so that the circuit in the feed-magnet —c— is again completed through contacts —d²—e²— and the lamp made ready for action.

35 Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination in an electric lamp, of a governing electro-magnet, with an armature therefor, a lifting lever having one end linked in a suitable connecting point to the frame of the lamp and its other end to the clutch mechanism that controls the action of the movable electrode, said lifting lever also being movable with said armature, a tension spring adapted to establish the arc between the respective electrodes in the lamp, and means to regulate the tension of said spring, whereby said electrodes are normally held a distance apart.

2. In an electric arc-lamp the combination with the feed-magnet, its armature and armature lever, of a lifting-lever which at one end is linked in a suitable connecting point to the frame of the lamp and at its other end to the clutch mechanism to operate the feed rod, said lifting-lever also being connected to the armature and movable therewith, and a tension spring secured to the frame of the lamp substantially parallel with the movement of said lifting-lever and arranged to operate the free end of the same, whereby the weight of the feed-rod with its carbon is sustained, substantially as set forth.

3. The combination in an electric arc-lamp, of a feed magnet shunted around the arc, its armature and armature lever, with a lifting lever which at one end is linked in a suitable

connecting point to the frame of the lamp and its other end linked to the clutch mechanism to operate the feed-rod, said lifting lever also being connected to the armature lever and movable therewith, and a tension spring adapted to raise the free end of said lifting lever and the clutch mechanism with the feed rod whereby the respective carbons are normally held out of contact with one another, substantially as set forth.

4. In an electric arc-lamp having its feed-rod raised and held by the action of a tension spring —m— lifting-lever —f— clutch-lever —i— and the clutch —j— means whereby said feed rod is released, consisting of an arbor —p— projecting through the frame of the lamp and the clutch-lever —i—, said arbor being provided at its upper end with a collar —q— and at its lower end with a thumb-piece —r—, a pin or stud —t— secured in said arbor and arranged to act against the cam —s— secured to the frame of the lamp and adapted to lower the clutch mechanism to release the feed-rod, substantially as set forth.

5. In an electric arc-lamp provided with a mechanism consisting of a feed-magnet its armature and armature lever, a lifting lever at one end linked to the frame of the lamp and at its other end by means of a connecting rod —h— to the clutch lever —i— supporting the clutch —j— and the feed-rod —E—, the proper adjustment of said mechanism being dependent on the length of said connecting rod, means whereby to facilitate said adjustment, consisting of having that portion of the clutch lever —i— into which the connecting rod —h— is held, "movable," and adapted to be raised or lowered as the condition of the mechanism may require, substantially as set forth.

6. The combination in an electric arc lamp, provided with a suitable feed-magnet, of a cut-out device arranged to throw the said feed-magnet out of circuit automatically when the carbon is consumed to a certain point, consisting of a normally closed contact in circuit with said feed magnet, a cam lever —a²— pivoted to the frame of the lamp and arranged to move in the direction of said contact by the action of the descent of the feed-rod —E— and to open the circuit at said contact, and the clutch-lever —i— arranged so that when it returns to its normal position after the shunt circuit in the lamp is broken, it acts to lock said cam-lever, whereby the circuit in the feed-magnet after being broken by the action of the feed-rod is maintained open by the action of the clutch-lever until the operation of renewing the carbons in the lamp takes place, substantially as set forth.

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Witnesses:

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