(No Model.) 3 Sheets—Sheet 1.

C. E. SCRIBNER.

ELECTRIC ARC LAMP.

No. 418,757. Patented Jan. 7, 1890.

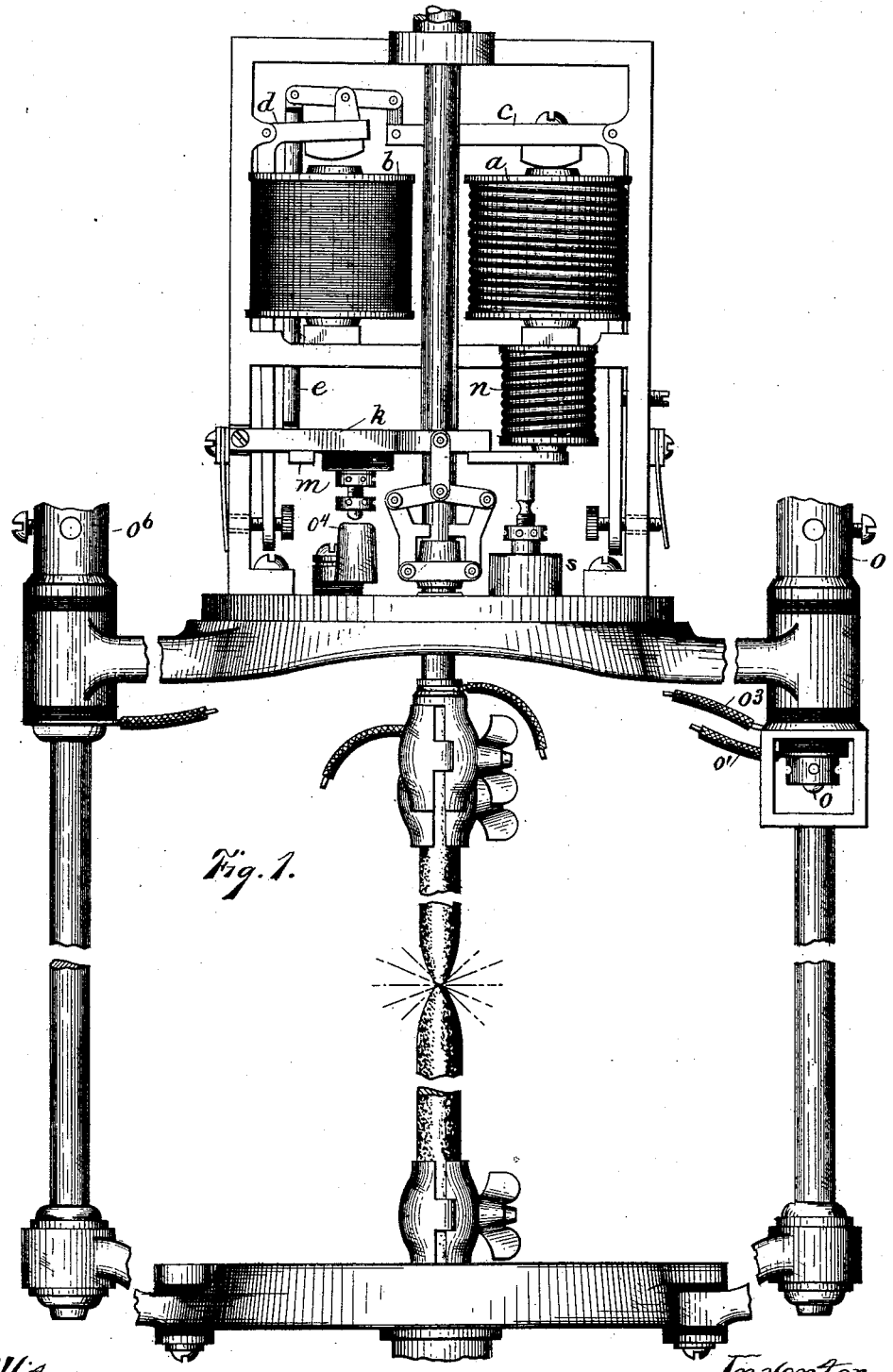

Fig. 1.

Witnesses.
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(No Model.) 3 Sheets—Sheet 2.

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Fig. 2.

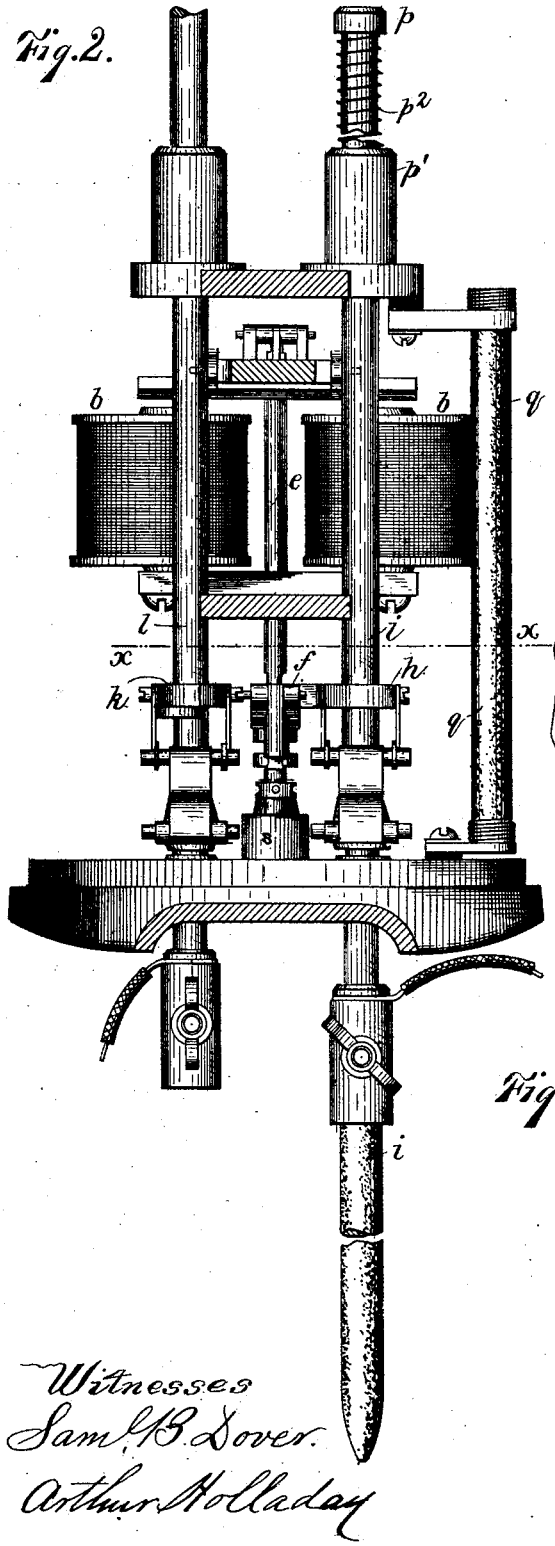
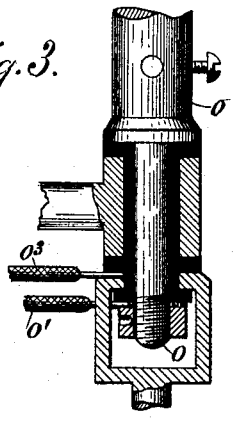


Fig. 3.



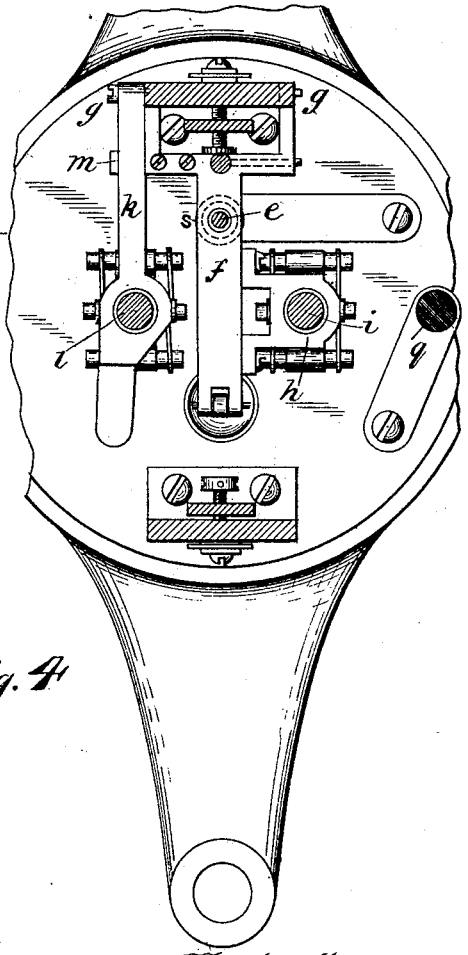


Fig. 4.

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(No Model.) 3 Sheets—Sheet 3.

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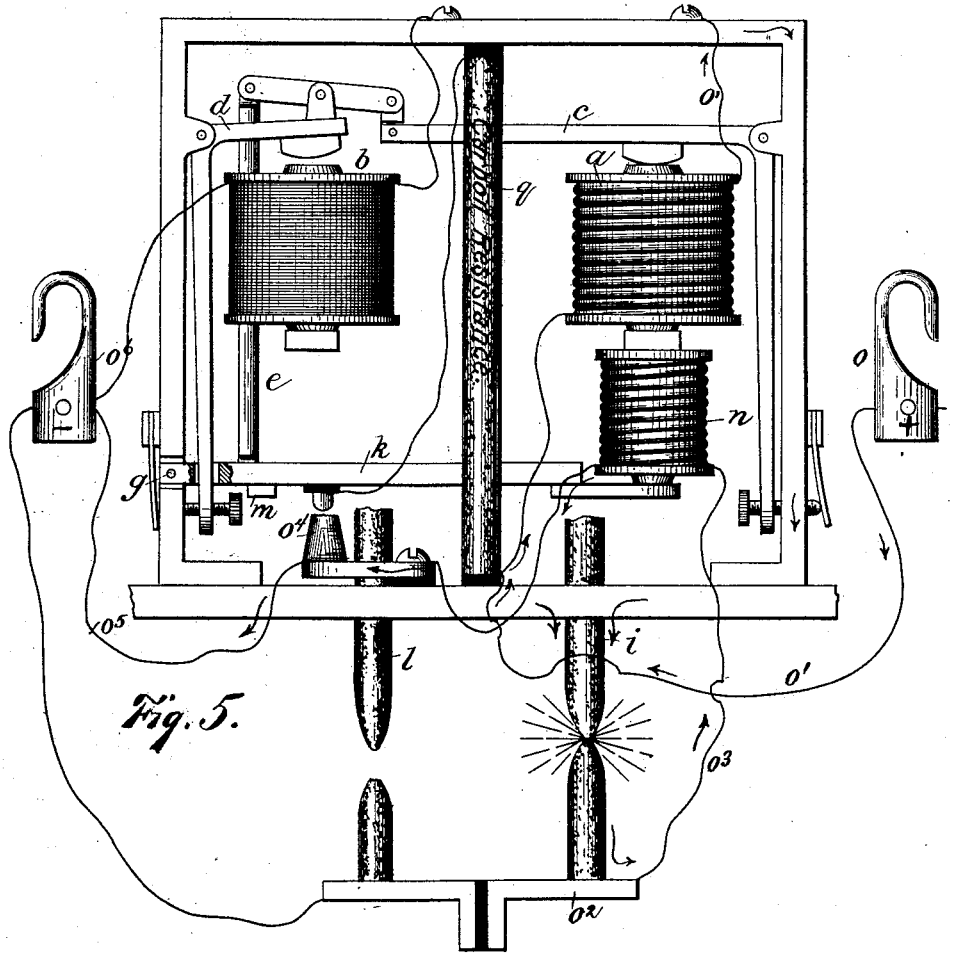
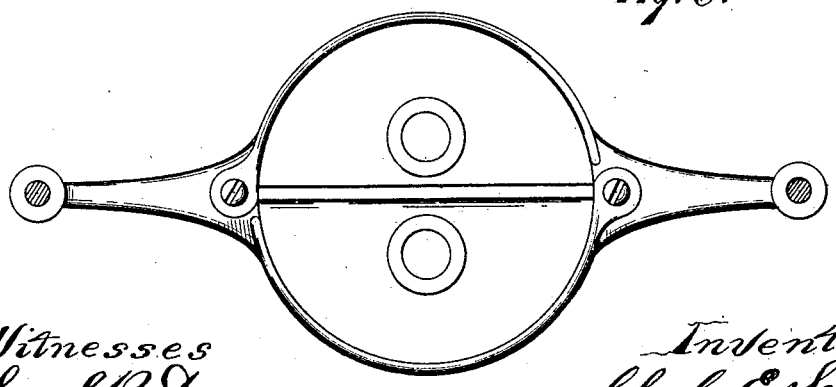


Fig. 5.

Fig. 6.



Witnesses
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UNITED STATES PATENT OFFICE.

CHARLES E. SCRIBNER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WESTERN ELECTRIC COMPANY, OF SAME PLACE.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 418,757, dated January 7, 1890.

Application filed October 3, 1885. Serial No. 178,865. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. SCRIBNER, 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 Double-Carbon Arc Lamps, (Case 100,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to electric-arc lamps; and it consists in the combination of levers, circuits, and mechanism whereby two sets of carbons may be used, the one after the other, in the same lamp, the arc of the second being established automatically immmediately after the arc of the first set is extinguished.

In a prior application, Case 70, Serial No. 116,102, filed December 31, 1883, for electric lamps, now pending, I have described and claimed an arc lamp in which the arc is regulated by means of a balanced-lever mechanism connected with the clutch which carries the rod. In my present application I have shown the same balanced-lever mechanism in order that the action of the lifting and feeding magnets may be exerted independently to regulate the arc. I have, however, provided different levers, which carry the clutches, respectively, of the different sets of carbons and a small magnet of low resistance, which is brought into circuit with the arc of the first set of carbons and which serves to hold up the lever carrying the clutch of the second set as long as the arc of the first set continues to burn. The holder which carries the two lower carbons consists of two sections, one section being insulated from the other. The section which carries the lower carbon of the first set is brought into circuit with the small magnet and the arc of the first set when said arc is established. The other section may be connected directly with the line or hook leading out. I provide also a cut-out which works automatically to extinguish the first arc when the carbons of the first set are consumed. This automatic cut-out also serves to cut out the lamp when the carbons of the second set are consumed.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a double-carbon arc lamp embodying my invention, certain parts thereof being broken away. Fig. 2 is a view showing the rods and the levers and clutches for operating the same. Fig. 3 is a detailed view of one of the side posts or rods and the circuits connected therewith. Fig. 4 is a plan view upon line *x x* of Fig. 2. Fig. 5 is a diagram illustrative of the circuits. Fig. 6 is a top view of the sectional globe-pan.

Like parts are indicated by similar letters of reference throughout the different figures.

As shown in Fig. 1, the lifting-magnet *a* and the feeding-magnet *b* are connected with the balanced levers *c* and *d*, and the link *e*, connected with the lever *f*, is raised and lowered by the action of the feeding-magnet or the lifting-magnet, as the case may be, independent of the action of the other magnet, as described in said pending application. This lever is preferably placed about midway between the two carbon-rods and pivoted to the frame at point *g*. Lever *f* is extended laterally by the piece *h*, as shown more clearly in Fig. 4, said piece *h* being provided with an opening for the carbon-rod *i* of the first set. The lever *k* is pivoted also at *g* and carries the clutch of the rod *l* of the second set. This lever *k* rests upon the arm *m*, projecting from the lever *f*, while the second arc is burning, but is lifted by the action of small magnet *n*, which I term a "retaining-magnet," from said arm *m* and held in its elevated position, so that it will not be operative as long as the first arc continues to burn. The lug or arm *m* in Figs. 1 and 5 is shown about one thirty-second of an inch below the lever *k*—that is to say, the lever *k* is lifted away from the arm *m* and held in this position by the force of the retaining-magnet *n*, as before described.

The circuit may be traced, as shown in Fig 5, from the hook *o* by wire *o'*, through the lifting-magnet to the frame of the lamp, and thence through the carbons of the arc of the first set to the insulated section o^2 of the carbon-holder, and thence by wire o^3 through the small magnet *n* to the lower contact o^4 of the automatic cut-out, and thence by the wire o^5 to the hook o^6. Thus as long as the arc of the first set continues to burn magnet *n* is

included in the circuit, and lever k is held up thereby. Upon the upper end of rod i is provided a collar p, and under this collar about the rod above the stop p', I preferably place a coiled spring p^2, as shown in Fig. 2. As the carbons of the first set burn away the rod i will descend lower and lower, until finally its descent will be arrested by the stop p', when the rod can descend no farther. The arc will then increase until, the lever f continuing to descend, the upper contact-point of the cut-out carried by said lever comes against the lower contact o^4. The current will thereupon be shunted through the resistance q and the arc will be extinguished. The circuit of magnet n will thus be broken and immediately lever k will fall, resting upon the arm m. Thereupon the rod l of the second set will be fed, bringing the carbons of the second set together. The circuit will thereupon be established, and the current again passing through the lifting-magnet, but not including the small magnet, will cause the second set of carbons to be separated, so as to establish the second arc.

It will be observed that when the current is first sent to the lamp there are two circuits or branches, one of which extends from the hook o through the lifting-magnet, the frame, the first set of carbons, and small magnet n to hook o^6, while the other circuit or branch may be traced from said hook o to the frame, as before described, and thence through the second set of carbons instead of the first, and thence to the section of the carbon-support which carries the lower carbon of said second set, and thence to the hook o^6 and out. We have thus at the moment of starting the two derived circuits, each branch of which passes through a different set of carbons. Since the branch through the first set of carbons includes the small magnet n, the circuit of the second set will be broken by the action of said small magnet as soon as it gets current. Since lever f is retarded by the dash-pot and lever k is free to move at once, it follows that the second set will be separated more quickly than the first set, and hence there will be no liability of the arc forming first at the second set.

By reference to Figs. 1 and 3 it will be seen that the "line in" passes from the hook o to wire o', and after passing through the arc of the first set and the insulated section of the support which carries the lower carbon of the first set the circuit continues to the side rod and by wire o^3 through the small electro-magnet n, and thence the circuit may be traced to "line out," as before described.

The dash-pot s is of well-known construction. It is connected with the lifting-lever f to retard and steady its motion.

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

1. In an electric-arc lamp, the combination, with two sets of carbons, of the support divided into insulated sections, one section for each of the lower carbons, derived circuits, one through each of said sets of carbons, and the levers carrying the clutches of the different carbon-rods, one of said levers being retarded by a dash-pot and the other free to respond to the action of an electro-magnet, and said electro-magnet and circuits, whereby one set of carbons is separated before the other, substantially as and for the purpose specified.

2. The combination, in an arc lamp, with the carbon-rods $i\,l$, of the clutches supported by different levers, one of said levers extending over the arm or portion m of the other lever, the small electro-magnet for suspending the aforesaid lever above said arm or portion m, the main circuit connected through said magnet while the first arc is burning, and switching apparatus for shunting out said arc when the carbons are about consumed and breaking the branch through said magnet, and at the same time closing the circuit through the second set of carbons, substantially as and for the purpose specified.

3. In an electric-arc lamp, two sets of carbons, the carbon-rods, and the clutches supported by different levers, an electro-magnet n, included in the circuit of the arc of the first set for holding the lever suspended, which carries the clutch of the rod of the second set while the arc of the first set is burning, a stop for arresting the descent of the rod of the first set when the carbons of the first set are nearly consumed, a shunt-circuit including resistance around the arc of the first set and electro-magnet n, which shunt-circuit is closed automatically by the descent of the lever which carries the rod of the first set as the arc of the first set increases in length after the rod of the first set is arrested by the stop, whereby the arc of the first set is extinguished and the arc of the second set established automatically, substantially as and for the purpose specified.

4. In a double-carbon arc lamp, the combination, with the carbon-rods, of two lifting-levers, one of said levers being provided with a retaining-magnet to lift one of the rods out of operation, the said retaining-magnet being included in the circuit of the other carbon-rod, whereby one carbon-rod is held out of operation by the retaining-magnet when current is flowing through the other carbon-rod.

5. The combination, in an electric-arc lamp, with two sets of carbons and the carbon-rods, of levers k and f, for carrying the clutches, respectively, a retaining electro-magnet, and mechanism connecting said retaining-magnet with lever k, whereby lever k may be moved independently of lever f, substantially as described.

6. In a double-carbon arc lamp, the combination, with one of the carbon-rods, of a retaining-magnet and its armature, said retaining-magnet being included in circuit with the arc when the first set of carbons is burning, and an automatic cut-out for said lamp to

shunt out of circuit the said arc when such arc becomes abnormally long, said automatic cut-out in said act of shunting the said arc out of circuit acting also to shunt out the retaining-magnet, said retaining-magnet on being thus de-energized letting go of the carbon-rod of the second set of carbons previously held thereby and prevented from feeding to permit the said rod to feed the second set of carbons together to establish the second arc immediately after the extinguishment of the arc of the first set, substantially as and for the purpose specified.

7. In a double-carbon arc lamp, a support for the lower carbons, consisting of two insulated sections, one section for each of the carbons, substantially as and for the purpose specified.

8. The combination, with the side rod of an arc lamp, of an insulated post *o*, mounted thereon, the circuit *o'*, leading from said hook through the lifting-magnet, and thence through the circuit, and thence to the side rod, and thence by wire o^3 through a small magnet *n* to the contact o^4 of the cut-out, and thence to the other hook o^6, substantially as described.

9. In a double-carbon arc lamp, two carbon-rods, in combination with the circuit of the lamp including both of said carbon-rods, a retaining-magnet included in the circuit with one of the carbon-rods to be energized when current flows through that carbon-rod, and the armature of said retaining-magnet mechanically connected with the other carbon-rod to lift the said rod when said retaining-magnet is energized, substantially as and for the purpose specified.

10. In a double-carbon arc lamp, two carbon-rods, the circuit of the lamp including both of said carbon-rods, a retaining-magnet included in the circuit with one of the carbon-rods to be energized when current flows through that carbon-rod, and the armature of said retaining-magnet mechanically connected with the other carbon-rod to lift the said rod when said retaining-magnet is energized, in combination with a shunt around said retaining-magnet and arc, said shunt including a circuit-closing device controlled by the arc, whereby the said arc and retaining-magnet are shunted out of circuit automatically, substantially as and for the purpose specified.

11. In a double-carbon electric-arc lamp, two carbon-rods each provided with clutch mechanism for lifting and feeding the same and electro-magnetic devices in the main circuit and in the shunt of the arc, in combination with retaining mechanism to carry and hold out of use one of said carbon-rods and its clutch mechanism while the other carbon-rod and its clutch mechanism are carried and fed by the said electro-magnetic devices.

In witness whereof I hereunto subscribe my name this 21st day of September, A. D. 1885.

CHARLES E. SCRIBNER.

Witnesses:

GEORGE P. BARTON,

F. H. MCCULLOCH.