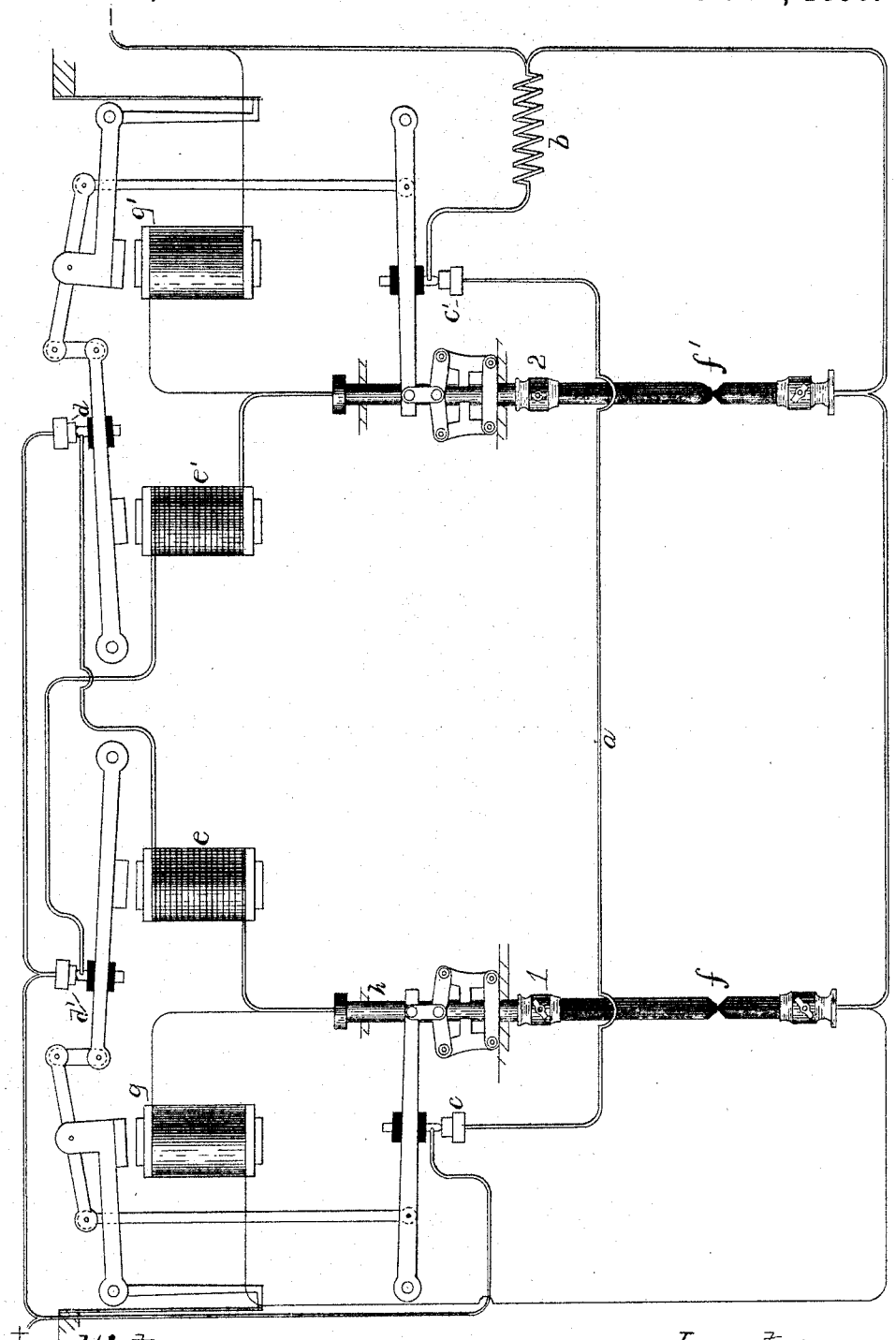
(No Model.)

C. E. SCRIBNER.

DUPLEX ELECTRIC ARC LAMP.

No. 491,603. Patented Feb. 14, 1893.



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DUPLEX ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 491,603, dated February 14, 1893.

Application filed October 27, 1890. Serial No. 369,407. (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 Duplex Arc Lamps, (Case No. 236,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to electric arc light systems and its object, speaking generally, is to provide for burning lamps in groups of two upon the same circuit, the different members or pairs of a group being provided with circuits and mechanisms constructed to cause one lamp to burn before the other. Each lamp may be provided with its own mechanism for starting and maintaining the arc. The magnetic device included in the main circuit for initially transferring power to separate the carbons may be termed, generally, the lifting mechanism, while the magnetic device included in the shunt around the arc for feeding the carbons responsively to changes in the electro motive force of the arc may be termed the feeding mechanism. In a broad sense the entire mechanism by which the carbons are moved may be termed the regulating mechanism, though some have termed the magnetic device in the shunt of the arc the regulating mechanism, since it is by the mechanism in the shunt of the arc that the feeding or regulation of the carbons is effected after the arc has been once established, this feeding being accomplished preferably independently of the lifting mechanism. In either sense of the term each lamp is provided with its own regulating mechanism.

My invention consists, first, in two lamps connected in multiple arc in the same circuit and provided with a shunt containing resistance around both of the lamps, each lamp having its own contact or cut out included in said shunt; second, in two lamps connected in multiple arc and provided each with a circuit closing device controlled by the lifting mechanism thereof, these contact points being placed reciprocally each in that part of the multiple circuit leading to the carbons of the other lamp so that the movement of the lifting mechanism of one lamp will hold open the circuit of the other lamp; third, in two lamps having their carbons normally in contact with a common shunt circuit including resistance around the lamps and means in each lamp while burning for holding open the circuit of the other lamp; fourth, in two lamps having each independent lifting and feeding mechanism and each provided with a separate set of carbons normally in contact, of a shunt around both the lamps and a cut out in said shunt for each lamp operated by the clutch mechanism thereof; and, fifth, in two lamps having their lifting magnets and carbons respectively in multiple arc, and means controlled by the lifting magnets when excited for reciprocally opening the circuit of the lifting magnet and carbons of the other lamp, the lifting magnet first actuated thus cutting out the lifting magnet and carbons of the other lamp.

The lifting and feeding mechanism of each lamp may be of the general construction described and shown in my patent No. 415,571, granted November 19, 1889, for electric lamps, in which the armature of the lifting magnet is actuated to separate the carbons when the current is first established and thereafter while the lamp is burning remains held down, the feeding being effected by the fine wire magnet in the shunt of the arc. Any other form of mechanism may, however, be employed, provided the lifting mechanism be so arranged that when provided with a contact or circuit closing device the said circuit closing device will be held open, while the lamp is burning.

My invention will be more readily understood by reference to the accompanying drawing, in which I have shown two arc lamps connected in multiple arc with circuits and connections embodying my invention.

The circuit + is normally closed around both lamps through the common shunt wire *a* which may contain a slight resistance *b*. In this shunt wire at each lamp I provide a cut out. Thus at lamp 1 I provide the cut out *c* and at lamp 2 the cut out *c'*; these cut outs *c* and *c'* being preferably operated by the clutch levers so that when either clutch lever is slightly moved its cut out will be opened.

The circuit through lamp 1 may be traced from the positive wire through contact or circuit closer d controlled by the lifting mechanism of lamp 2 and thence through lifting magnet e and carbons f and thence out by the negative wire. The circuit through lamp 2 in a similar manner may be traced to the contact or circuit closer d' controlled by the lifting mechanism of lamp 1 and thence through lifting magnet e' and carbons f' of lamp 2 and thence out by wire. The carbon regulating or feeding mechanism g of lamp 1 is placed in the usual manner in a shunt circuit around the carbons f. The carbon feeding mechanism g' of lamp 2 is placed in a shunt around the carbons f' of lamp 2. Thus the lifting magnet e and carbons f of lamp 1 and the lifting magnet e' and carbons f' of lamp 2 are placed in multiple arc. Moreover, these circuits are so arranged with respect to circuit closers d' d that whichever circuit closer d' d is first opened will act to prevent the circuit closer of the other lamp from being opened. Thus if lifting mechanism e' of lamp 2 acts first to open contact d the current will be cut off from the lifting mechanism e of lamp 1 so that circuit closer d' will remain closed and current will be thus maintained through lamp 2. On the other hand if when current is established cut out d' should be first opened lifting magnet e' will be cut out and prevent cut out d' from being opened so that current will be maintained through lamp 1.

In is preferable to adjust the two lamps uniformly, that is, to have the lifting magnets and their parts symmetrical in all respects since the accidental difference which will necessarily be found between the sets of carbons f and f' will be sufficient to cause one or the other of the lifting mechanisms to act in advance of the other, and it is wholly immaterial which lamp shall burn first. It is, however, desirable that both lamps should act alike in order that a uniform arc may be maintained during the entire service of the two lamps. Assume, for example, that circuit closer d' happens to open first. The current will then be directed through lamp 1 and lamp 1 will burn until its carbon rod shall be arrested by its stop h or in some other well known way. The electro motive force of the arc of carbons f will thus be abnormally increased and cut out c will be closed, thus extinguishing the arc, and since carbons f are now held from feeding, the circuit through lamp 1 will be held open between the carbons f. The lifting magnet e will thus be de-energized and its armature will be drawn back to the position shown to close the contact d'; the current will now be sent through lifting magnet e' and carbons f' of lamp 2; lamp 2 will thus be brought into service immediately after lamp 1 is extinguished so that I shall have the light continued until carbons f' of lamp 2 shall be consumed when the cut out c' acting in the usual way will close the shunt a around both the lamps.

Two lamps provided with circuits as above described may thus be made to take the place of a double carbon lamp.

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

1. In an arc light system two lamps each provided with lifting and feeding mechanism and connected in multiple arc, of contacts one for each lamp controlled by the lifting mechanism thereof, said contacts being placed reciprocally each in that part of the multiple circuit leading to the carbons of the other lamp, whereby when either lifting mechanism is actuated to separate the carbons of its lamp the contact controlled by said actuated lifting mechanism will be opened and held open.

2. The combination with two lamps adapted to burn one after the other and connected in the same circuit in multiple arc, of a shunt circuit containing resistance around both lamps passing through two contacts or cut outs, one controlled by the lever of each lamp whereby when the clutch lever of the lamp which is burning is lowered to close the contact or cut out controlled thereby both lamps will be shunted.

3. The combination with two lamps connected in multiple arc, of two contacts placed reciprocally in the multiple circuit including the other lamp, the carbons of each of said lamps being normally in contact, and a shunt around both lamps, including two cut outs one for each lamp, the feeding mechanism in each lamp in a shunt around the carbons thereof, and the lifting mechanism actuated a definite distance to separate the carbons of its lamp and establish the arc and hold open the contact in the multiple circuit including the other lamp.

4. Two lamps placed in multiple arc and provided with a shunt of low resistance around both, a cut out adapted to be closed on an abnormal increase of the electro motive force of the arc of its lamp being provided in said shunt at each lamp, the lifting magnet and carbons of the different lamps being reciprocally placed in circuit immediately after a contact which is opened by the force of the lifting magnet of the other lamp when first excited, whereby one lamp is caused to burn after the other, the lamp burning first whose lifting magnet is first sufficiently excited to open the contact controlled thereby.

5. In an electric arc lamp system two lamps each having a lifting and a feeding mechanism, the lifting and feeding mechanisms having independent control of the carbon rod movements, a circuit closer for each lifting mechanism controlled thereby, a main circuit and derived circuits therefrom, each derived circuit including one of the lamps and the circuit closer of the other lamp, whereby when either of the lamps is burning the circuit of the other lamp is held open at the circuit closer.

6. In an electric arc lamp system the combination with two lamps in derived circuit, the lifting mechanism of one lamp controlling a circuit closer in circuit with the other lamp, a shunt circuit including resistance about both lamps, said shunt circuit including in its circuit a circuit closer or circuit closers controlled by each lamp, whereby the circuit may be reciprocally shifted from one lamp to the other.

7. The combination in an electric arc lamp system, of a lifting mechanism and a feeding mechanism in each of two lamps, the two lamps being placed in multiple arc, the controlling electro magnet of the feeding mechanisms being in the shunt of the arc of its lamp, circuit closers operated by the lifting mechanism of each lamp, the circuit closer of each lamp being included in the circuit of the other lamp, a shunt circuit including resistance about the two lamps and circuit closers controlled by the clutch levers of the two lamps included in said shunt circuit.

In witness whereof I hereunto subscribe my name this 20th day of October, A. D. 1890.

CHARLES E. SCRIBNER.

Witnesses:
ELLA EDLER,
GEORGE P. BARTON.