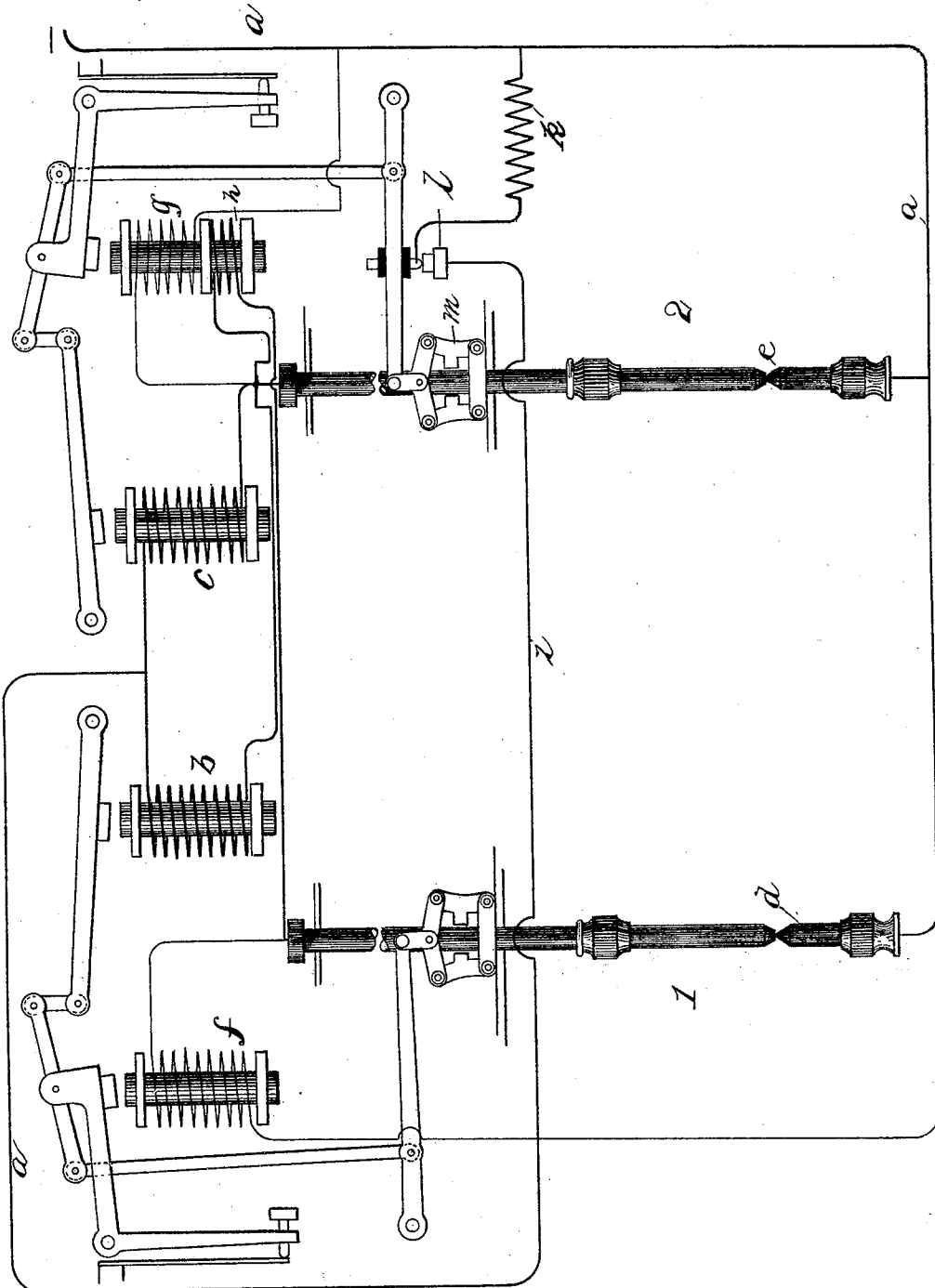


(No Model.)

C. E. SCRIBNER.
DUPLEX ARC LAMP.

No. 518,792.

Patented Apr. 24, 1894.



+ Witnesses,
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UNITED STATES PATENT OFFICE.

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

DUPLEX ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 518,792, dated April 24, 1894.

Application filed December 10, 1890. Renewed October 16, 1891. Serial No. 408,863. (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. 245,) 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.

The object of my invention is to provide circuits and apparatus whereby arc lamps may be burned in groups of two, the two lamps of each group being so constructed that one lamp will burn after the other. One of the principal features of my invention consists in providing a few turns of wire upon the feed magnets of one of the lamps to act in opposition to the fine wire winding thereof, said extra turns of wire being included in circuit with the carbons of the other lamp so that when the other lamp is burning the feeding magnet having this extra coil will be somewhat weakened by the current passing through this extra coil so that this differentially wound feed magnet will be prevented from operating its clutch mechanism to feed its carbon while the other lamp is burning, although the equal fine wire coils of the feed magnet of each lamp are in a shunt around the burning arc.

The circuit passes through the lifting magnets of the two lamps in multiple arc or derived circuit and thence in multiple through the two sets of carbons. Thus the lifting magnets and the carbons of the two lamps may be said to be in series multiple. A loop from the wire containing the carbons of one lamp is carried over to the feed magnet of the other lamp to include the extra coil of said feed magnet; the fine wire coils of the magnets of the two lamps are preferably provided with the same number of turns of the same size wire, and these coils are each in a shunt around the carbons of both lamps and the feeding mechanism of each lamp controlled by these fine wire coils should be adjusted to effect their respective feeds upon the same increase in the electro motive force of either arc. That lamp of a group having its feeding magnet provided with the extra coil included in circuit with the carbons of the other

lamp of the pair will be held out of employment until the carbons of the first lamp to burn being consumed and an abnormally long arc formed the fine wire coil of the differentially wound feeding magnet will have sufficient current to cause a feed of the carbons notwithstanding the comparatively slight opposition of the extra coil. The carbons of the second lamp to burn being thus brought together the arc of the first lamp will be shunted and extinguished, thus opening the circuit of the extra coil; the second lamp will thus burn until its carbons are consumed and the arc of the second lamp will be of the same average length as the arc of the first. When the arc of the second lamp is abnormally increased in length the cut out will come into action to close the circuit around both the lamps. In case the arc should first start at the lamp having the differentially wound feed magnet it will be extinguished at the first feed because the extra or auxiliary coil being out of circuit the two fine wire coils of the different feed magnets of the two lamps will act uniformly and thus the carbons of the lamp having the plain feed magnet not being burned away will be brought together and touch at the first feeding movement, thus shunting out the arc which was by chance started at the lamp having the differential magnet; the arc being established now at the lamp designed to burn first the extra coil of the differential feed magnet will be brought into action and so oppose the fine wire coil thereof, and thus prevent this differentially wound feeding magnet from attracting its armature sufficiently to feed its carbon.

My invention herein is adapted to apply to any of the well known forms of single arc lamps when it is desired to burn such lamps in series in groups of two. I will simply refer to the single carbon lamp shown in my Patent No. 415,571, granted November 19, 1889, for electric lamps, as one of the forms of single lamps to which my invention may be applied.

In the accompanying drawing which is illustrative of my invention I have shown the circuit connections between two arc lamps embodying my invention.

The main circuit + may be traced by wire *a* through lifting magnets *b c* in multiple are and thence in multiple arc through the carbons *d e* and thence out to line —. The feeding magnet *f* of lamp 1 is connected in a shunt around the carbons *d e* of both lamps. The fine wire coil of magnet *g* of lamp 2 is connected in a similar manner in a shunt around the carbons of both lamps; this magnet *g* is provided with an extra coil *h* wound oppositely to the fine wire coil, this extra coil of the feeding magnet of lamp 2 being directly in circuit with the carbons *d* of the first lamp so that any current passing through the carbons *d* will also find circuit through the extra coil *h*. The shunt circuit *i* around both lamps containing a slight resistance *k* is adapted to be closed at circuit closer *l* when the last lamp to burn, that is, lamp 2, is extinguished.

As is well known when two pairs of carbons *d e* are connected in multiple in circuits of low resistance only one pair will burn at once, though both pairs should be separated at the same time. When current is thrown on to wire *a* both lifting magnets *b c* will be energized and both pairs of carbons separated and the arc will be established between the members of one pair; and, first, we will assume that the arc is established between the carbons *d* of lamp 1. The current passing through this pair of carbons *d* will also pass through the extra coil *h* of feeding magnet *g* of lamp 2. Therefore, although the equal fine wire coils of magnets *f* and *g* are in shunts around the arc of lamp 1 that is burning the magnet *g* will not be so strongly magnetized as the magnet *f* of lamp 1 and hence, although the carbons of lamp 2 will be held separated while lamp 1 is burning, the carbons of lamp 2 will not be fed since the magnet *f* of lamp 1 will act quicker than magnet *g*. When, however, the rod of lamp 1 is arrested in its descent its arc will be abnormally increased until the current through the fine wire coil of magnet *g* will be sufficient to cause said magnet to attract its armature and so lower and open the clutch *m*, thus feeding the carbons of lamp 2 together; the elongated arc of lamp 1 will thus be shunted and extinguished, thus opening the circuit of extra coil *h*. Lamp 2 will thus be brought into service and burned until the descent of its rod is arrested, whereupon the cut out or shunt circuit will be closed at *l*. In case lamp 2 should upon the initial closing of the circuit through the lamps, be first to take the arc this arc would continue only until the carbons were burned away sufficiently to cause a

feeding together of the carbons. Now as carbons *e* would be burned away a short distance they would have to move farther to come together than would be required to bring carbons *d* of lamp 1 together; therefore as magnets *f* and *g* would be each equally excited carbons *d* would be fed together and touch at the same time when carbons *e* were burned far enough to feed; therefore at the first feeding movement the arc thus initially established at lamp 2 would be shunted by carbons *d* and the circuit being thus closed through carbons *d* and extra coil *h* of feeding magnet *g* it is evident that the arc would now be established and maintained between the carbons of lamp 1 until the descent of the rod of lamp 1 should be arrested.

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

1. The combination with a pair of electric arc lamps, of the lifting magnets and carbons thereof placed in series multiple, the fine wire coil of the feeding magnet of each lamp being each in a different shunt around the carbons of both lamps and an extra coil upon the feeding magnet of one lamp wound to oppose the fine wire coil thereof, said extra coil being included in circuit with the carbons of the other lamp, whereby one lamp is caused to burn after the other, substantially as and for the purpose specified.

2. The combination with the lifting magnets and carbons of two lamps placed in series multiple, of the feeding magnets of the two lamps each included in a different shunt around the carbons of both lamps and a loop connected between the feeding magnet and carbons of one of the lamps which includes turns of wire upon the core of the feeding magnet of the other lamp wound to oppose the fine wire coil upon the same core, substantially as and for the purpose specified.

3. The combination with two arc lamps each included in one branch of a divided circuit, of an electro magnet in shunt of the carbons in each lamp, regulating mechanism for each lamp controlled by the shunt magnets respectively thereof, and a helix included in the branch with one lamp and adapted to act upon the regulating mechanism of the other lamp in opposition to the shunt magnet thereof, substantially as described.

In witness whereof I hereunto subscribe my name this 29th day of November, A. D. 1890.

CHARLES E. SCRIBNER.

Witnesses:

ELLA EDLER,
GEORGE L. CRAGG.