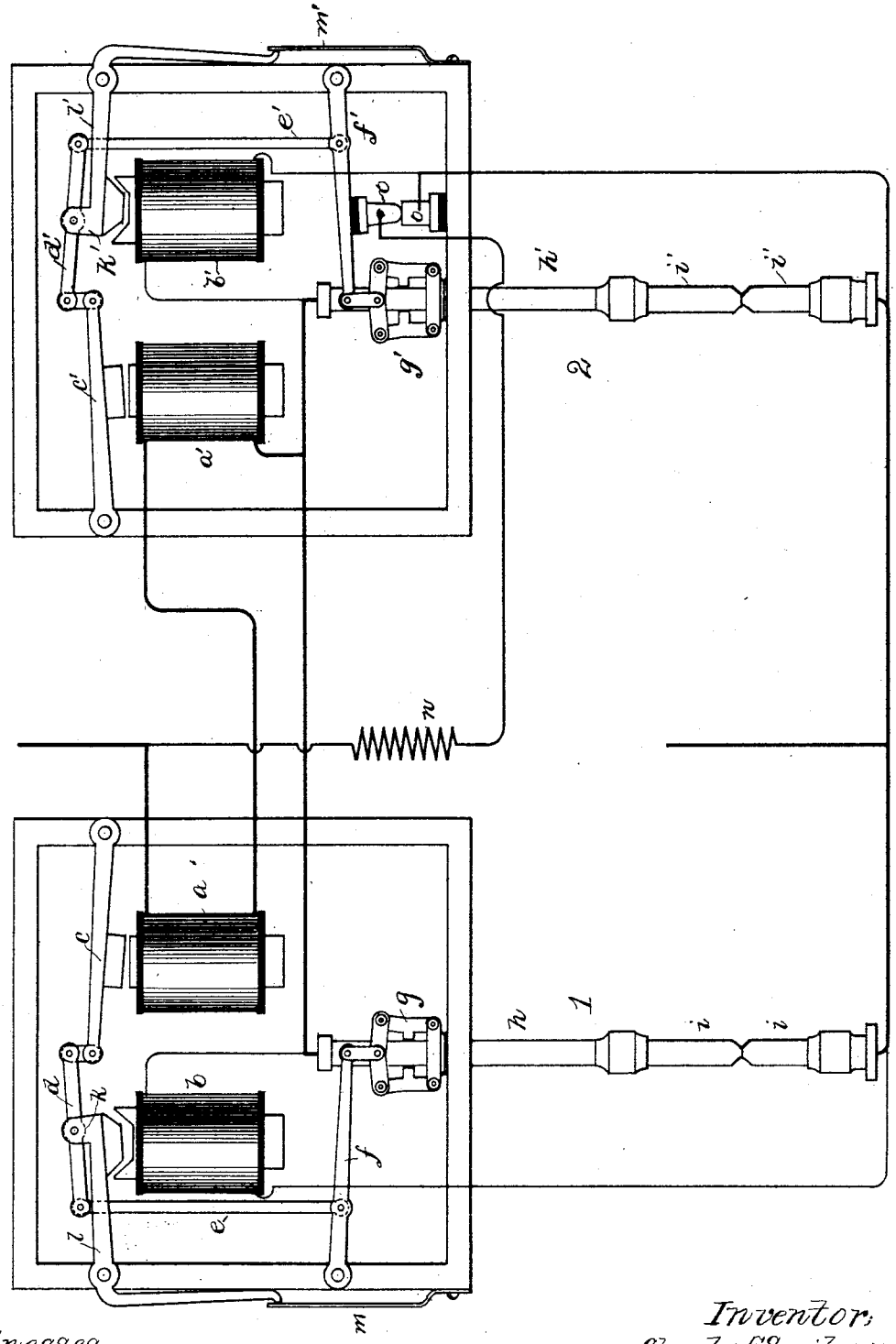
(No Model.)

C. E. SCRIBNER.

ELECTRIC ARC LAMP.

No. 514,506. Patented Feb. 13, 1894.



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ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 514,506, dated February 13, 1894.

Application filed August 1, 1891. Serial No. 401,371. (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. 274,) 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 arc light systems, and its object is to provide circuits whereby arc lamps may be burned in groups, the members of the different groups being so arranged preferably that one will burn after the other.

Heretofore double carbon arc lamps have been employed so constructed and arranged that two or more pairs of carbons may be burned in one and the same lamp structure. As shown in Letters Patent No. 147,827, granted Matthias Day, February 24, 1874, two sets of carbons are burned in alternate succession. In Letters Patent No. 219,208, granted Charles F. Brush, September 2, 1879, two independently adjustable pairs of carbons are controlled by one and the same motor mechanism, through the medium of a non-symmetrical lifter so that the upper member of one pair of carbons shall be first raised and separated from its mate, and immediately thereafter the upper member of the second pair raised and separated from its mate, so that the arc shall be established between the members of but a single pair, to wit: the pair last separated. Thus the pairs of carbons are burned in complete or reciprocal succession, the sequence of the burning being predetermined. In Letters Patent No. 261,472, granted Hans J. Muller, July 18, 1882, twin lamps are shown so arranged that when one has burned out its carbons the other will be automatically switched into circuit.

By use of my invention herein, the switching apparatus between the two lamps is dispensed with. Moreover, I am enabled to burn, if desired, more than two in the same group. Ordinarily, however, I have found that two are sufficient.

My invention herein may be applied to any of the well known forms of single lamps, and speaking generally, my invention consists in placing the lifting magnets in series, and the carbons in multiple, thus causing one lamp to burn after the other. This action results from the law of the electric current first disclosed as applied to electric arc lamps in the said Day patent, to wit: that when two pairs of carbons are connected in multiple arc only one pair will burn at a time, the arc being first formed between the members of the pair having the lesser resistance.

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

The pair of lamps illustrated are each of the general construction illustrated and described in my Patent No. 415,571, granted November 19, 1889. It will be observed that each lamp is an exact duplicate of the other, and that no part of the regulating mechanism of one lamp is connected with, or has any dependence upon or coaction with the regulating mechanism of the other. Thus, in lamp 1 we have the ordinary lifting magnet *a* and the ordinary fine wire or regulating magnet *b* in the shunt of the arc. The lifting magnet *a* when current is first established, draws down its armature lever *c*, and acting through the rocking lever *d*, link *e*, clutch lever *f* and clutch *g*, serves to lift the carbon rod *h* so as to separate the carbons *i*. This action having taken place, armature lever *c* remains held down and immovable during the entire time that the circuit remains closed through lifting magnet *a*. It will be observed that the rocking lever *d* is pivoted upon the fulcrum *k* of the armature lever *l* of feeding magnet *b*. A spring *m* resting against the arm of the pivoted armature lever *l* acts in opposition to magnet *b*. Thus, feeding magnet *b* placed in the shunt around the arc acts upon the clutch mechanism in the ordinary way to permit the upper carbon to descend as the carbons burn away. The same description would apply to lamp 2. That is to say, in lamp 2 we have lifting magnet *a'* and regulating magnet *b'*; when current is first established magnet *a'* draws down its armature lever *c'*, and by means of rocking lever *d'*, link *e'*, clutch lever *f'* and clutch

g', lifts the carbon rod h' so as to separate the carbons i'. The lever c' being thus moved when current is first established, remains down until the current is taken off from lifting magnet a'. The rocking lever d' is pivoted at k' to the armature lever l' of feed magnet b'. The spring m' is adjusted to press against the arm of the pivoted armature lever l' in opposition to the attractive force of feeding magnet b'. Thus I have described the two single lamps, and it will be seen that one is the exact counterpart of the other. In connection with one of the lamps I preferably provide the shunt n, which should have some slight resistance in order not to absolutely short circuit the lamp. The contacts o of this short circuit are arranged in my well known way.

As shown in the drawing the lifting magnets a a' of the two lamps are in series; and the pairs of carbons i i' of the two lamps are in multiple arc, all connected to the same circuit. The feeding magnet b of lamp 1 is in a shunt around the carbons i of its own lamp, and also around the carbons i' of the other lamp; in like manner the feeding magnet b' is in a shunt around the carbons i' of its own lamp, and also around the carbons i of lamp 1. The current upon entering the lamp at hook p traverses the main electro-magnet a of lamp 1, then the main electro-magnet a' of lamp 2, and these magnets are in consequence simultaneously energized and to the same extent. Each magnet will operate to draw down its own armature at the same time, and thus the carbons will be separated at the same time. The carbon rods being now held up springs m m' respectively acting through the respective lever mechanisms so as to keep the two pairs of carbons separated, an arc will be formed between the members of one pair of carbons, the current, according to the law of carbons in multiple shown in the Day patent, selects a pair of carbons which happens to have the least resistance; a small part of the current will pass through feeding electro-magnets b b' around the arc, and these electro-magnets will be energized greater or less according to the voltage of the arc. As the carbons of the burning pair consume, the arc will increase in length and cause a rise in its voltage, and consequently the current sent through the feeding magnets will be increased, and this will cause both of them to move their respective carbon rods down. Should the carbons of the non-burning pair be brought into contact the arc between the carbons of the other pair will go out, and a new one will instantly be established between the members of the pair thus brought into contact as they are again separated. This arc continuing to burn, a rise in its voltage will act to strengthen the current of its feeding magnet to the extent necessary to cause it to draw down its armature and lower the clutch to a point at which it will permit the rod to feed downward as this second pair of carbons are consumed.

Throughout the operation of the lamp, the arc between the carbons i is controlled solely by the feed electro-magnet b, while the arc which is formed between the carbons i' is controlled solely by the feeding electro-magnet b'. When one set of carbons has been consumed the descent of the carbon rod of that pair will be arrested by its stop coming against the frame of the lamp in a well known way or otherwise; whereupon the voltage of the arc will become sufficient to cause the feeding electro-magnet of the lamp which has not burned, to bring its carbons in contact and separate them. An arc being now established between this set, the lamp first to burn out will go out, and the other lamp which has been lighted will burn until its carbons are consumed, whereupon the automatic cut-out will be brought into service.

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

1. Two electric lamps each having a lifting magnet and a pair of carbons, and each having a feeding magnet in shunt around both the carbons, of circuits connecting the lifting magnets in series and the pairs of carbons in multiple, with each other and in series with said lifting magnets substantially as and for the purpose specified.

2. In an electric arc lamp system the combination with the lifting magnets of two different lamps connected in series, the sets of carbons of the two lamps connected in multiple with each other and in series with the lifting magnets, whereby both lifting magnets are energized to suspend their carbon rods no matter which lamp is burning.

In witness whereof I hereunto subscribe my name this 18th day of July, A. D. 1891.

CHARLES E. SCRIBNER.

Witnesses:
GEORGE P. BARTON,
GEORGE L. CRAGG.