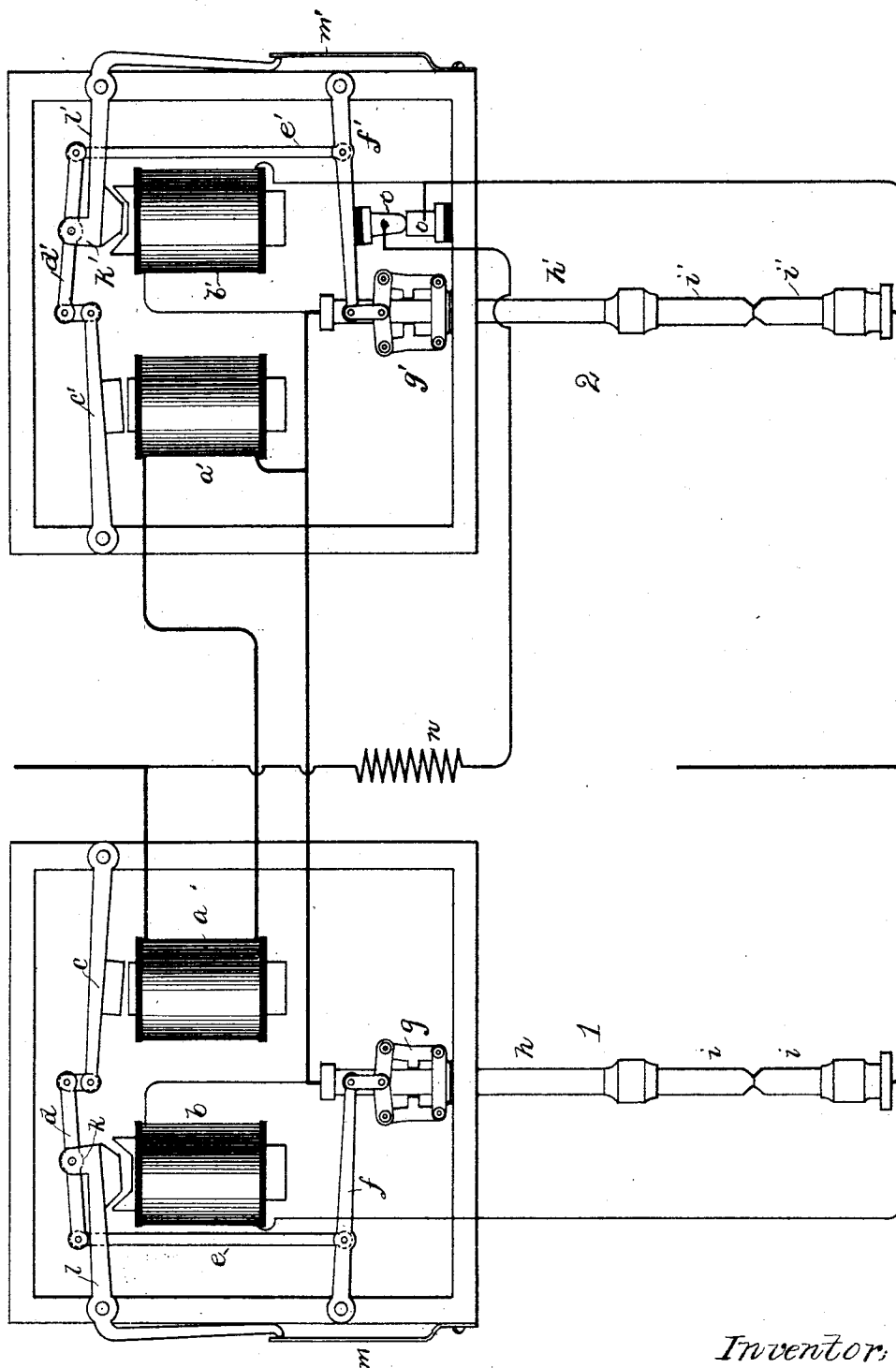


(No Model.)

C. E. SCRIBNER.
ELECTRIC ARC LAMP.

No. 514,506.

Patented Feb. 13, 1894.



Witnesses:

George L. Cragg
Ernest P. Harnen

Inventor,
Charles E. Scribner.
By Barton & Brown
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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. 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

5 g' , lifts the carbon rod h' so as to separate
 the carbons i' . The lever c' being thus
 moved when current is first established, re-
 mains 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 arma-
 10 ture lever l' in opposition to the attractive
 force of feeding magnet b' . Thus I have de-
 scribed 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
 15 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 mag-
 20 nets $a a'$ 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 cir-
 cuit. The feeding magnet b of lamp 1 is in
 a shunt around the carbons i of its own lamp,
 25 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
 30 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 ex-
 tent. Each magnet will operate to draw down
 35 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
 40 of carbons separated, an arc will be formed be-
 tween the members of one pair of carbons, the
 current, according to the law of carbons in mul-
 tiple shown in the Day patent, selects a pair of
 carbons which happens to have the least re-
 45 sistance; a small part of the current will pass
 through feeding electro-magnets $b b'$ around
 the arc, and these electro-magnets will be en-
 ergized greater or less according to the volt-
 age of the arc. As the carbons of the burn-
 50 ing 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 respec-
 55 tive 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 60
 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 arma-
 ture and lower the clutch to a point at which 65
 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 70
 which is formed between the carbons i' is
 controlled solely by the feeding electro-mag-
 net 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 75
 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 80
 and separate them. An arc being now es-
 tablished 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- 85
 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 90
 magnet and a pair of carbons, and each hav-
 ing a feeding magnet in shunt around both
 the carbons, of circuits connecting the lifting
 magnets in series and the pairs of carbons in 95
 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 com-
 bination with the lifting magnets of two dif- 100
 ferent lamps connected in series, the sets of
 carbons of the two lamps connected in mul-
 tiple 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. 105

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.