

(No Model.)

2 Sheets—Sheet 1.

C. E. SCRIBNER.
DUPLIX ARC LAMP.

No. 481,677.

Patented Aug. 30, 1892.

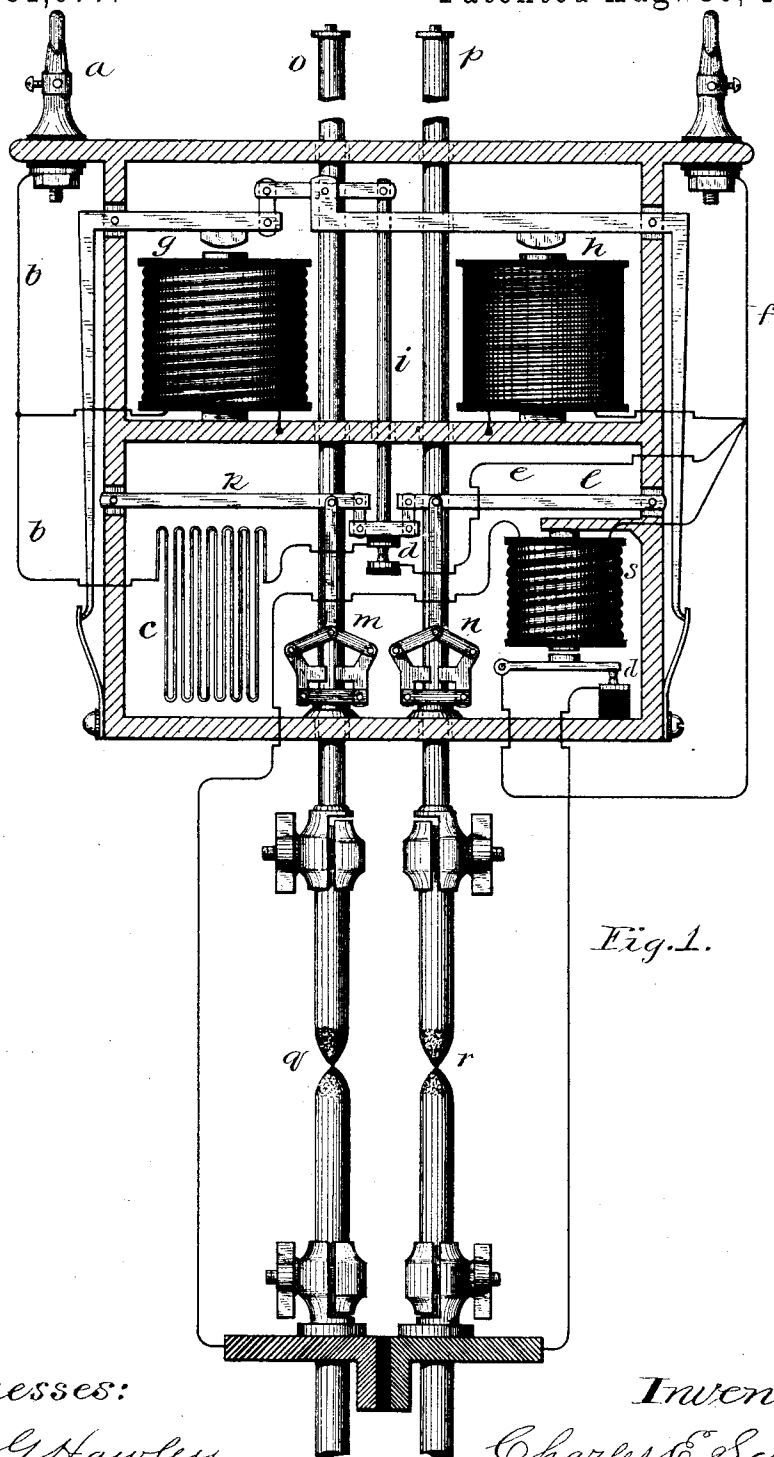


Fig. 1.

Witnesses:

Chas. G. Hawley
Chas. C. Woodworth.

Inventor:

Charles E. Scribner.
By George P. Barton
Attorney.

(No Model.)

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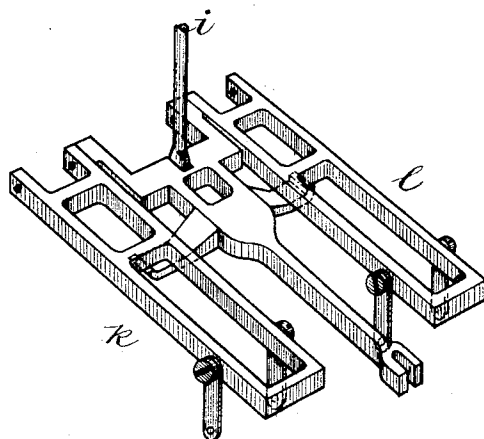


Fig. 2.

Witnesses:

Chas. G. Hawley.

Chas. C. Woodworth

Inventor:

Charles E. Scribner

By George P. Baston
Attorney.

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. 481,677, dated August 30, 1892.

Application filed July 3, 1888. Serial No. 278,917. (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 No. 166,) 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 that class of double-carbon arc lamps in which two sets of carbons are employed, with mechanism so arranged that one set will first be lighted and consumed and then the other set will be brought into circuit and consumed.

In Letters Patent No. 147,827, granted Mathias Day, Jr., February 24, 1874, for electric lights, the different sets of carbons are arranged so as to burn alternately—that is to say, one set will burn, say, ten minutes, and then the other, the arc alternating between the two sets until both sets are consumed. In the Day lamp the different sets of carbons are arranged in multiple arc—that is to say, in parallel circuits. When the circuit is closed through the two sets and the carbons of the different sets are separated, the arc is formed and persists between one pair only, owing to the fact that one of the parallel circuits or the other would not have the same resistance as the other. A greater amount of current would pass through the side having the lowest resistance, and this increased amount of current has the effect of still further diminishing the resistance of such circuit. This action results in the current being diverted to one side of the parallel circuits, so that there is not enough left in the other to maintain it.

In Letters Patent No. 219,208, granted Charles F. Brush September 2, 1879, mechanism is provided for separating one set of carbons positively before the carbons of the other pair separate. This construction results in a lamp in which the alternation of the arc between the different sets of carbons is prevented, yet with the serious objection that the average length of the two arcs will be different—that is to say, the average length

of the arc established between the carbons of the first set will be considerably shorter than the average length of the arc which is subsequently burned between the carbons of the second set.

In my patent, No. 418,757, granted January 7, 1890, (Case No. 100,) I have described and claimed as one feature thereof a globe pan or support for the lower carbons, consisting of two insulated parts or sections, one insulated section for each of the lower carbon-clamps. In my patent, No. 418,758, granted January 7, 1890, (Case No. 109,) the same globe-pan is illustrated in connection with the mechanism claimed, whereby one set of carbons is consumed before the other set begins to burn, the construction being such that the average length of the arc of one set will be the same as the average length of the arc of the other set. This is of special importance in electric lamps designed for low-potential systems, in which, as is well-known, the arcs are comparatively short—that is, of low resistance. In such systems it is evident that any considerable difference in the resistance of the arcs of the different sets would be a very serious objection.

My invention herein is designed to accomplish the same result as the invention described in my said patent, No. 418,758, the means, however, employed being different in construction and in mode of operation.

My invention consists, speaking in general, of the combination, in a double-carbon arc lamp in which the different sets of carbons are placed in parallel circuit, of a single electro-magnetic device for controlling a cut-out with its coil included in circuit with one set of carbons and its armature and back-stop included in circuit with the other set.

My invention further consists in the combination, with the sets of carbons, of mechanism constructed to initially lift the members of both pairs at the same time, a cut-out around the lamp which is opened by this initial movement, the sets of carbons being connected in multiple arc, and an electro-magnetic cut-out connected in circuit with one set and its armature and back-stop included in circuit with the other set, as hereinafter

described and claimed. By this construction when the lamp is brought into circuit the circuit of one set of the carbons will be opened before the clutches have grasped the rods to make the initial separations. The arc is thus caused to form and burn between one set of carbons only until said set is entirely consumed, whereupon, the rod of the upper carbon of the first set being arrested in its descent, the feeding-magnet in the shunt of the arc becomes so strong as to open the clutches and then cut the lamp out of circuit. This cutting of the lamp out of circuit serves to demagnetize the electro-magnet of the electro-magnetic cut-out device to allow its armature to fall back upon its back-contact, thus closing the circuit through the second set of carbons, whereupon the usual operation upon the starting of a lamp takes place, the first rod being held up by its stop, preventing any current from passing through the electro-magnet of the electro-magnetic cut-out device. The current therefore passes through the carbons of the second set, and these being drawn apart the second arc is established. The lifting and feeding mechanism belonging to each set of carbons I preferably make symmetrical, each part of one side being the counterpart of the corresponding part of the other side, since it is desirable that the arcs of the different sets of carbons shall burn at the same average length after the manner of the lamp illustrated and claimed in my patent, No. 418,758.

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

Figure 1 is a front view of a double-carbon lamp illustrative of my invention, the clutch-levers being pivoted to opposite sides of the frame of the lamp. Fig. 2 is a perspective view illustrative of the preferable manner of arranging the clutch-levers and the lifting-lever.

In Fig. 1 the lamp is shown in its normal position with the two carbons resting together ready to be lighted when the current is sent to line. Circuit may be traced from the hook *a*, by wire *b*, through resistance *c*, to upper contact of the cut-out *d*, and thence by wire *e* to the circuit-wire *f*. The coarse-wire electro-magnet or lifting-magnet *g*, of, say, one-tenth of an ohm resistance, is included in a shunt around resistance *c*. The fine-wire electro-magnet or feeding electro-magnet *h* is placed in the shunt of the arc in the well-known way. The link or rod *i* is so arranged with respect to the clutch-levers *kl* that when rod *i* is lifted said levers *kl* will also be lifted and with them at the same time the clutches *m n*. These clutches close, respectively, upon rods *o p*, and thus the two rods are separated simultaneously, and the action of the feeding mechanism tends to feed the rods simultaneously—that is to say, the link *i* on being raised raises simultaneously both the rods, the clutches *m* and *n* being caused to grip each its own rod and lifting the same. No arc

will, however, be formed between these second set *r*, because this set *r* is included in a distinct portion of the two parallel paths of the circuit, and the path containing this second set is automatically opened by the automatic cut-out before the arc could be established, in the following manner: The circuit through electro-magnet *g* passes to the frame of the lamp, as shown, and thence to the rods *o p*, and thence through the different sets *q r* of carbons. In the branch including the first set of carbons *q* I have placed an electro-magnet *s*, having a few turns of coarse wire, say of one-twentieth of an ohm resistance. In the circuit of the second set *r* of carbons I have included the armature and back-stop of said electro-magnet. These parallel circuits are united in the wire *f*. When circuit is closed through my lamp, enough current is shunted through lifting-magnet *g* to raise rod *i* sufficiently to open cut-out *d*, whereupon the entire current passes through electro-magnet *g* to the frame of the lamp and to the rods, the current dividing through the different sets, a portion of the current going through set *q* and electro-magnet *s* to line *f* and the other portion going through set *r*, the armature-lever and back-stop of said electro-magnet *s*, and thence to said line *f*. The parallel circuits, however, remain closed only for an instant—not long enough for the clutches to grasp the rods and separate the different sets *q* and *r*—for as soon as current is established through electro-magnet *s* its armature is lifted, so as to open the circuit of set *r*. Thus while both sets are simultaneously separated an arc will be formed and will persist only at one set—that is to say, at set *q*. The arc being established at set *q*, the set will continue to burn until rod *o* is arrested by its stop coming against the frame or otherwise. This rod *o* being arrested, the arc between set *q* will grow longer until its resistance will be so great that electro-magnet *h* in the shunt will be of sufficient force to draw down the armature of said feeding electro-magnet *h*, and with it the link *i*, far enough to close the cut-out *d*, thus cutting the lamp out of circuit. Rod *o* will, however, remain suspended and the set *q* cannot come together, but will be left in their separated relation. The circuit through electro-magnet *s* being thus interrupted, the armature of electro-magnet *s* will close upon its back contact, thus establishing a current through the second set of carbons and said armature-lever and stop. Circuit being thus closed, the lamp will operate to separate set *r* and establish the second arc, and this arc will persist until the second set of carbons is consumed—that is to say, until rod *p* is arrested by its stop coming against the frame or otherwise. Thereupon the arc of the second set will become of such high resistance that the lamp will be again, and this time permanently, cut out by the contact of cut-out *d*.

Having thus described my invention, I

claim as new and desire to secure by Letters Patent—

1. The combination, in a double-carbon arc lamp in which the different sets are arranged initially in closed parallel circuits, of a unitary electro-magnetic device for controlling the different sets, and an electro-magnetic cut-out with its coil included in circuit with one set and its armature and back-stop included in circuit with the other set, whereby the different sets are caused to burn in succession, substantially as described.
2. The combination, with the multiple circuit of an electric-arc lamp, of two sets of carbons and a unitary electro-magnetic device for controlling said sets of carbons, one set being included in each side of the said multiple circuit, clutch mechanism operated by electro-magnetic devices to separate said carbons at the same time, and an electro-magnetic cut-out or relay with its coil in circuit with one set of carbons and its armature in circuit with the other set of carbons for opening the circuit of the set of carbons in the side of the parallel circuit containing the armature immediately upon closing the circuit through the lamp, whereby one set of carbons is consumed before the other set begins to burn, substantially as and for the purpose specified.
3. The combination, with the multiple circuit of an electric-arc lamp, of two sets of carbons and a unitary electro-magnetic device for controlling said sets of carbons, one set being in each side of the said multiple circuit, clutch mechanism operated by electro-magnetic devices to separate and feed the carbons, and an electro-magnetic cut-out or relay with its coil in one parallel circuit and its armature in the other parallel circuit for opening the circuit of one set of carbons when the circuit is closed through the lamp, whereby one set of carbons is consumed before the other begins to burn.
4. The combination, with the two sets of carbons connected with the same circuit in multiple arc, a unitary electro-magnetic regulating mechanism therefor, and an electro-magnet included in that portion or side of the circuit containing the set of carbons first to burn, and its armature lever adapted to open the side or portion of said circuit containing the second set of carbons initially—that is, immediately on first closing circuit through the lamp—whereby the second set of carbons is prevented from burning until the first set is practically consumed or the descent of the rod of the first set arrested, substantially as and for the purpose specified.
5. In an electric-arc lamp, the combination, with two sets of carbons and a unitary mechanism for lifting and feeding the same, of an electro-magnetic cut-out with its coil included in circuit with one of said sets (the set first to burn) and the armature of said electro-magnetic cut-out mechanically connected with a key included in circuit with the other set of carbons, (the set last to burn,) whereby the circuit of the carbons last to burn is held open by said key as long as the arc persists at the first set, said circuit of the second set being automatically closed by said key when the arc of the first set is extinguished to bring said second set into active operation, substantially as and for the purpose specified.
6. In an electric-arc lamp, two sets of carbons having the lower members of each pair insulated from one another and included in different sides of the same circuit, of an electro-magnetic circuit-controller for automatically holding open one side of said parallel circuit while the arc is burning between the set included in the other side of said circuit, said electro-magnetic circuit-controller on the extinguishment of the arc acting to close the circuit which had been held open to permit the arc to be established between the second set of carbons.
7. The combination, in an electric-arc lamp containing two sets of carbons in multiple arc, the lower members of the two sets of carbons being insulated from one another, of mechanism for separating and feeding the same and an electro-magnetic circuit-controller having the coil thereof in circuit with one set of carbons and the contact or key controlled by the armature of said electro-magnetic circuit-controller included in the circuit of the other set of carbons between the lower carbon thereof and the point where the two parallel circuits unite.
8. The combination, with the sets of carbons of a double-carbon lamp, of mechanism for initially lifting simultaneously the upper members of both pairs, the cut-out around the lamp being opened by such initial movement, and the sets of carbons being connected in multiple arc, an electro-magnetic cut-out with its coils included in circuit with one set, and its armature and back-stop included in circuit with the other set, substantially as specified.

In witness whereof I hereunto subscribe my name this 23d day of May, A. D. 1888.

CHARLES E. SCRIBNER.

Witnesses:

GEORGE P. BARTON,
CHAS. C. WOODWORTH.