

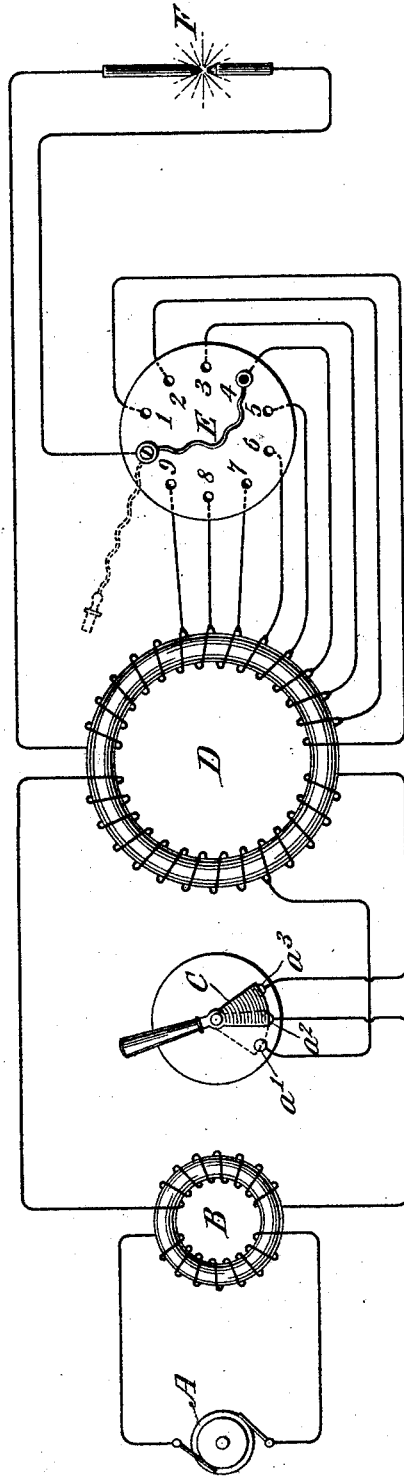
(No Model.)

T. SPENCER.

ALTERNATING CURRENT ARC LIGHTING SYSTEM.

No. 519,849.

Patented May 15, 1894.



Witnesses
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ALTERNATING-CURRENT ARC-LIGHTING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 519,849, dated May 15, 1894.

Application filed February 12, 1894. Serial No. 499,876. (No model.)

To all whom it may concern:

Be it known that I, THOMAS SPENCER, a citizen of the United States, residing in the city and county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Alternating-Current Arc Lighting, of which the following is a specification.

This invention relates to improvements in arc lighting by alternating currents, its objects being to permit an arc lamp to be supplied from the same circuit which supplies incandescent lamps and yet be operated at a maximum efficiency, and also to permit the operation of such a lamp at its highest efficiency on incandescent circuits of different voltages. In operating alternating arc lamps from the same transformer which supplies incandescent lamps, the difficulty is met that the voltage at which incandescent lamps are usually burned, which is either fifty or one hundred volts, is not the best for arc lamps, the latter requiring a lower voltage. It is therefore customary to interpose resistance in circuit with the arc lamp to cause sufficient drop in the voltage to permit an economical action of the arc. Such resistance, however, is wasteful of current by converting the latter into heat. I overcome this difficulty by providing means by which the voltage of the arc circuit may be adjusted to the exact degree most suitable for its best action without interfering with the voltage on the incandescent mains. Another difficulty in operating alternating arc lamps is that the potential should be higher at the moment of starting than when the lamp is in service, by reason of an increased resistance between the carbon points when cold. It is, moreover, desirable that an arc lamp may be burned upon different circuits run at different electrical pressures, so that it may be adapted for service in all existing systems, which in practice range from forty-five to sixty volts. By providing means for adjusting the voltage of the arc circuit to the best working point irrespective of the voltage on the incandescent mains, and means, also, for throwing an increased voltage, at the instant of starting, through the arc lamp, I meet all these difficulties.

The invention will be clearly understood

from a consideration of the accompanying drawing, in which is diagrammatically illustrated a system embodying my improvements. 55

A represents a source of alternating current, and B an ordinary transformer for incandescent circuits. In the organization illustrated I connect the secondary of this transformer through a starting switch C to the primary circuit of an auxiliary transformer D, the secondary of which discharges through an adjustable switch E so that more or less of the turns of said secondary may be thrown upon a circuit including an alternating arc lamp F. The starting switch C is provided with a series of contacts a' , a^2 , a^3 connecting with the terminals and an intermediate point of the primary circuit of transformer D. When the contacts a^2 and a^3 are bridged by the switch the entire primary coil of the transformer D is in circuit with the secondary of the transformer B, but when contacts a' and a^2 are bridged only part of the primary coil is in circuit. The switch E is provided with any suitable device such as a plug electrically connected with one terminal of the lamp and adapted to enter conducting sockets connected with different points of the secondary of the transformer D, the terminals of which are connected with the lamp. If the plug of switch E be placed in the socket 1 the entire secondary coil of transformer D will be in closed relation to the arc lamp. If in this position of adjustment the switch C bridges contacts a' and a^2 we will have a high voltage upon the arc F, so that the arc may be sprung, and after attaining its working resistance the starting switch C will be shifted so as to bridge another pair of contacts a^2 and a^3 , in which case all of the primary coil of transformer D may be in circuit, and consequently a lower voltage will be established at the lamp terminals. This voltage may, however, be varied to suit the different voltages of different systems, by fixing the plug in another socket 2, 3, 4, 5, 6, 7, 8 or 9, and thus the arc lamp voltage may be graduated before putting the switch C into action to the best working point. 100

While I have shown the switch E as an independent organization connected in the secondary circuit of an auxiliary transformer, I do not limit myself to such an organization.

Obviously, a switch having similar functions might be interposed in the primary circuit and the secondary be connected directly with the lamp terminals, or the auxiliary transformer D might in some cases be omitted and the starting switch and the adjusting switch E be coupled with the secondary of transformer B so as to cut a greater or a smaller number of convolutions of said coil into the arc lamp circuit, the principle in all cases being the same, that the voltage of the arc circuit is adjustable to admit of the application of the arc lamp to all existing commercial systems, and is also capable of increase at the moment of starting a lamp.

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

1. The combination with an alternating current arc lamp of means for adjusting the voltage at the lamp terminals to different strengths to adapt the lamp for operation upon circuits of different voltages, and means for lowering the voltage after the lamp has been thrown into action.

2. The combination with an alternating current arc lamp of a switch for coupling a variable number of turns of a transformer

winding in the lamp circuit, and means for lowering the voltage after the lamp has been thrown into action.

3. The combination with an alternating current arc lamp of an auxiliary transformer supplied through an incandescent lamp transformer, a switch for coupling different lengths of the secondary winding of said auxiliary transformer into the lamp circuit, and means for lowering the voltage after the lamp has been thrown into action.

4. The combination with an alternating current arc lamp of an auxiliary transformer supplied by the secondary winding of an incandescent lamp transformer and switching apparatus provided with contacts for connecting the lamp with different parts of the secondary winding of the auxiliary transformer and lowering the voltage by varying the primary winding of said transformer after the lamp has been thrown into action.

In testimony whereof I have hereunto subscribed my name this 8th day of February, A. D. 1894.

THOMAS SPENCER.

Witnesses:

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