(No Model.)

T. G. PORTIS.

ELECTRODE FOR ARC LAMPS.

No. 551,337. Patented Dec. 10, 1895.

Fig. 1.

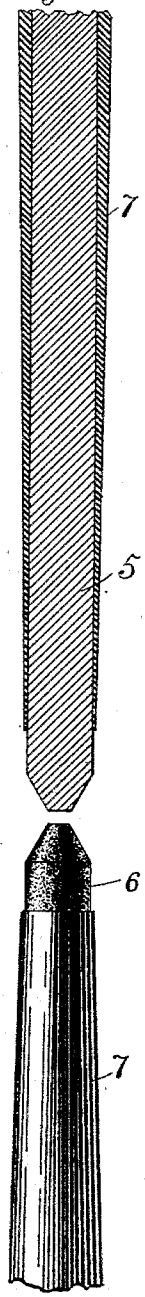


Fig. 2.

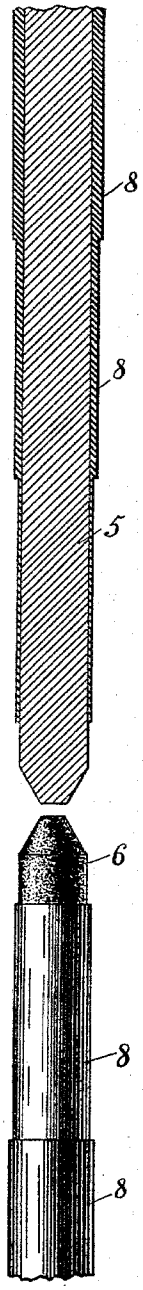
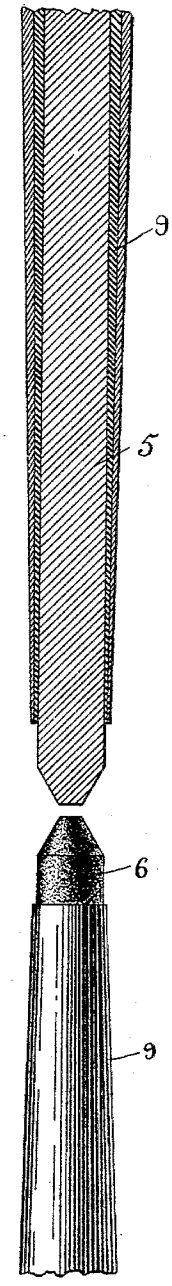


Fig. 3.



Witnesses
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UNITED STATES PATENT OFFICE.

THOMAS G. PORTIS, OF ST. LOUIS, MISSOURI.

ELECTRODE FOR ARC LAMPS.

SPECIFICATION forming part of Letters Patent No. 551,337, dated December 10, 1895.

Application filed May 14, 1895. Serial No. 549,272. (No model.)

To all whom it may concern:

Be it known that I, THOMAS G. PORTIS, a citizen of the United States, residing at the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Electrodes for Arc Lamps, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

The object of my invention is to prolong the life and conductivity of coated electrodes for arc lamps.

Arc-lamp electrodes are consumed more rapidly toward the end of a run than at the beginning, and this is true also of coated carbons, such as are described in Hazeltine's United States Patent No. 487,220, granted November 29, 1892.

My invention consists in an arc-lamp electrode having a coating which prevents the carbons consuming more rapidly at the end of their run; and for this purpose I increase the coating in thickness from the arc end of the carbons toward the outer ends. In the drawings accompanying this specification I have illustrated several ways in which this may be done, the coatings being greatly exaggerated to better show the invention.

Figure 1 of said drawings shows a pair of electrodes with coatings in accordance with my invention applied thereto, the upper electrode or carbon and its coating being in section and the lower electrode or carbon and its coating in elevation. Fig. 2 is a similar view illustrating another way of applying the coatings, and Fig. 3 a similar view illustrating still another form of coating.

5 is the upper carbon and 6 the lower. In Fig. 1 the coating 7 is applied to both the upper and lower carbons taperingly from the arc ends thereof toward the outer ends, so that the coating on both carbons is thinnest near the arc end of the carbons and thickest at the outer ends. This sort of a coating may be deposited on the electrodes by placing the arc ends of the carbon in a holder for plating and then immersing them in a suitable electrolytic bath. After a sufficient minimum amount of metal has been deposited thereon, the carbons are gradually drawn out of the bath, so that the ends remote from the arc will be heavily coated, the coating increasing in thickness progressively from the arc end.

In Fig. 2 is illustrated a modification wherein the coatings 8 are not taperingly deposited, as in Fig. 1, but are stepped upwardly from the arc ends to the outer ends, increasing in thickness toward the outer ends. This sort of a coating may be deposited by plating the minimum amount of metal thereon, then drawing the electrode out of the bath a certain distance and leaving the remaining part in the bath for some time longer, and then, after sufficient additional amount of metal has been deposited thereon, drawing the electrode farther out of the bath and depositing still additional metal upon the remaining part in the bath, and so on.

In Fig. 3 is illustrated a modification wherein two coatings 9, taperingly deposited on the carbons, are shown. This is the preferred form of the invention. These coatings are preferably of copper and zinc, as specifically set forth in the said Hazeltine patent. The way of coating these electrodes will be obvious from the description given with reference to that shown in Fig. 1.

The thickness of the coatings will depend to a large extent upon the material for the body of the electrode used and the electromotive force and strength of the current to which the electrodes are subjected. The variation or increase in the thickness of the coating will depend upon the lamp used and the variations in electromotive force. It will be obvious that a metallic coating of increased thickness, as herein set forth, will also increase the conductivity of the carbons.

Toward the latter part of a run in arc lamps the electromotive force increases perceptibly and more energy is available at this time to dissipate a coating upon the electrodes. In other words, while the heat of the arc is sufficient to melt and dissipate only a thin coating at the beginning of a run, the heat of the arc toward the latter part of a run is sufficient to dissipate a much thicker coating, which would not be dissipated at the first part of a run, but would hang down and envelop the arc, obstructing the light and causing trouble in other respects. I have attrib-

uted the greater available energy in dissipating a coating at the latter part of a run to the fact that the carbons being shorter their resistance is less and the upper carbon being materially reduced in weight the lifting magnets controlling said upper carbon do not have to expend so much energy as before in maintaining the upper carbon in its raised position. This available energy toward the latter part of the run, which was unavailable at first, may be used to dissipate a thicker coating, whereas the available energy in the first instance would not be sufficient to dissipate such heavy coating.

I have by means of this invention been enabled to materially increase the life of Hazeltine coated carbons.

In another application of even date herewith, I have set forth means whereby the electrodes may be coated to avoid casting objectionable shadows, so as to be used for indoor lighting. The coating on the upper or positive carbon in said application is, in two of the forms of the invention therein described, arranged the reverse of the coatings for the positive carbon herein set forth—that is to say, the coating in the forms of the invention set forth in my said application is thickest at the arc end on the upper carbon and thinnest at the upper end thereof. The lower carbons in those forms of that invention are arranged like the lower carbons in the present invention. The invention herein is adapted more particularly for outdoor lighting and is for materially increasing the life of the electrodes, while the invention in my said application accomplishes different results and has other objects in view. The coatings applied in this application to the electrodes are much thicker as a whole than the coatings applied in my other said application referred to.

Having fully set forth my invention, what I desire to claim and secure by Letters Patent of the United States is—

1. A pair of electrodes of an arc lamp having their arc ends lightly coated and their outer ends heavily coated.

2. A pair of electrodes of an arc lamp provided with coatings increasing in thickness from the arc ends thereof to the outer ends thereof.

3. A pair of electrodes of an arc lamp provided with coatings progressively and taperingly increasing in thickness from the arc ends thereof to the outer ends.

4. An electrode for an arc lamp, having a coating increasing in thickness from the lower end thereof to the upper end.

5. An electrode for an arc lamp having a protective covering composed of a plurality of coatings, the said protective covering being thinnest at the lower end thereof, and thickest at the upper end.

In testimony whereof I have hereunto set my hand and affixed my seal in the presence of the two subscribing witnesses.

THOMAS G. PORTIS. [L. S.]

Witnesses:

JOHN F. GREEN,

E. E. VERNELL.