

No. 714,277.

Patented Nov. 25, 1902.

A. BLONDEL.

COMPOSITE CARBON ELECTRODE FOR ARC LAMPS.

(Application filed Apr. 8, 1902.)

(No Model.)

Fig. 1.

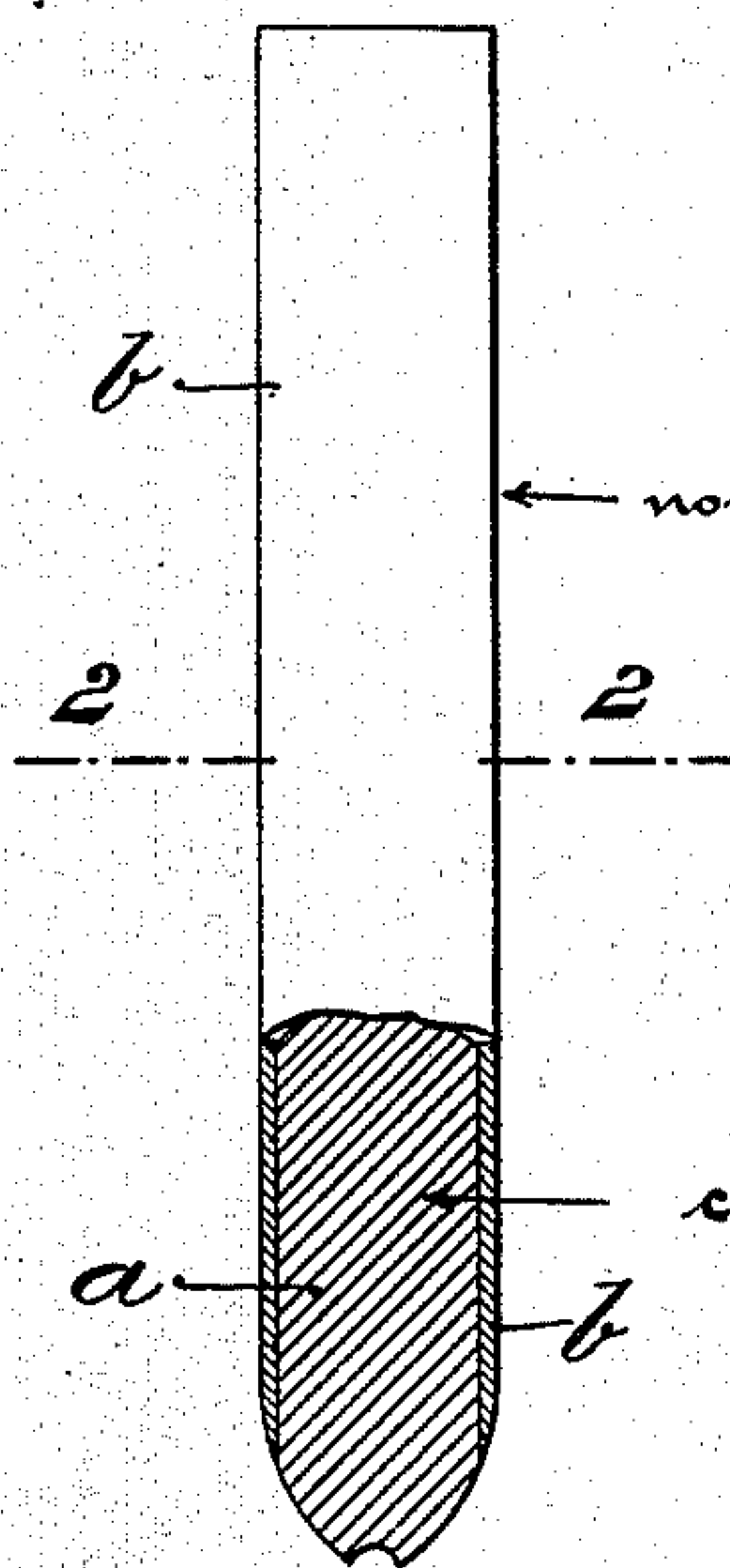


Fig. 3.

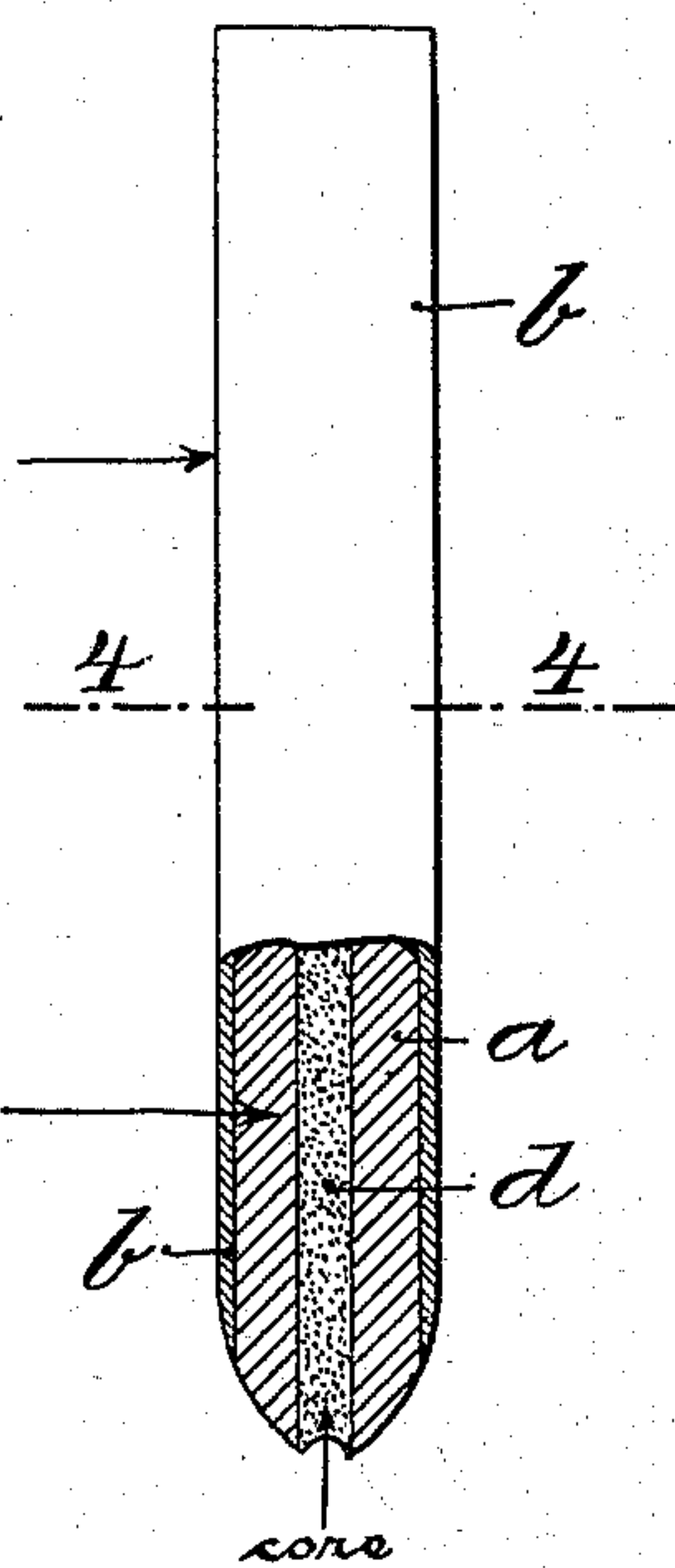


Fig. 2.

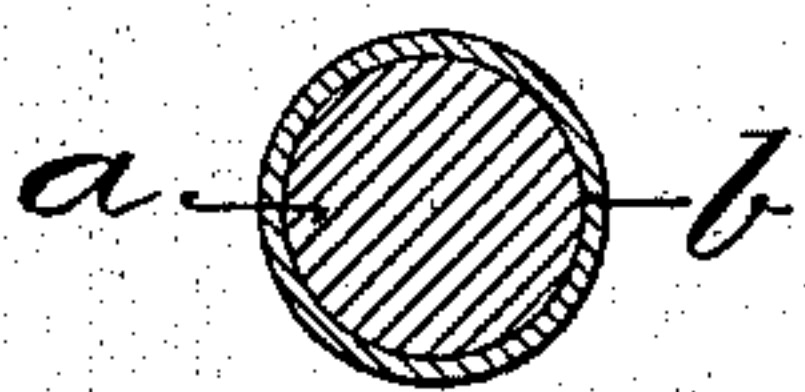
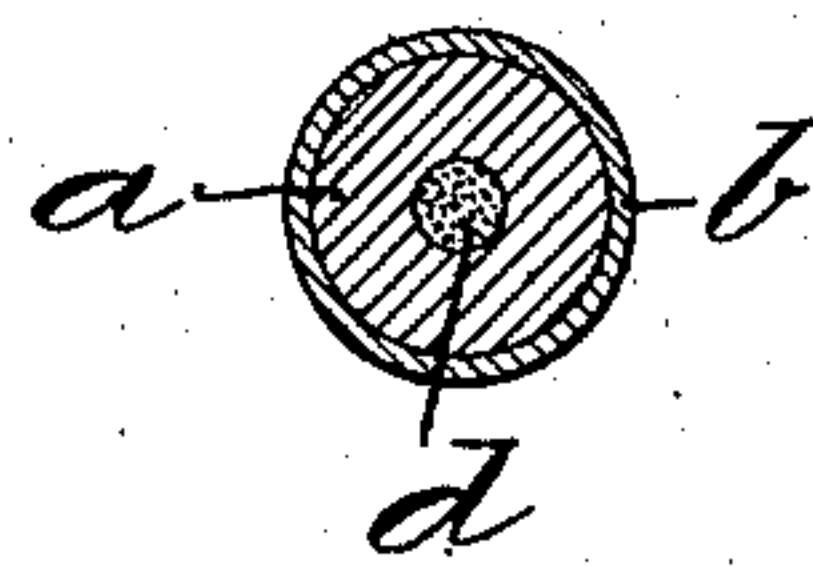


Fig. 4.



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UNITED STATES PATENT OFFICE.

ANDRÉ BLONDEL, OF PARIS, FRANCE.

COMPOSITE CARBON ELECTRODE FOR ARC-LAMPS.

SPECIFICATION forming part of Letters Patent No. 714,277, dated November 25, 1902.

Application filed April 8, 1902. Serial No. 101,953. (No model.)

To all whom it may concern:

Be it known that I, ANDRÉ BLONDEL, a citizen of the Republic of France, residing at Paris, France, have invented certain new and useful Improvements in the Manufacture of Electrodes for Electric-Arc Lamps, of which the following is a specification.

My invention relates to an improvement in the manufacture of carbon electrodes for arc-lamps in which to the carbon base are added coloring and light-producing salts—such, for instance, as salts of calcium, magnesium, barium, sodium, potassium, thorium, cesium, and the like—in order that the luminous efficiency of the arc may be enhanced. These composite carbons are well known in the art and have been tried by several scientists. The chief obstacle to the general employment of such carbons has been the fact that in the heating of the prepared carbon its salts in melting produce abundant scoræ, which either drop from the carbon or obstruct the arc. This obstacle is especially noticeable in lamps wherein the positive composite carbon is the upper electrode of the lamp. In an application for patent filed by me on March 26, 1902, under the Serial No. 100,024 one means for overcoming this obstacle is set forth, in which the positive composite carbon is used in the lamp as the lower electrode.

In my present invention a means is devised for making the electrode whereby all or nearly all of the scoræ are got rid of; and to this end the invention consists in forming the main part or body of the electrode of carbon combined with the salts of calcium, magnesium, and similar light-producing salts and in coating or inclosing said body with a substantially thin layer of non-scorifiable carbon. This layer consists either of pure carbon or carbon combined with a small percentage of the light-producing salts and serves to protect the main part or body of the electrode from being superficially burned or licked by the flames before the production of the arc required.

The nature and scope of my invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, in which—

Figure 1 is a view, partly in side elevation

and partly in section, of an electrode embodying main features of my present invention. Fig. 2 is a cross-sectional view taken on the line 2 2 of Fig. 1. Fig. 3 is a view similar to Fig. 1, but illustrating a modified form of electrode; and Fig. 4 is a cross-sectional view on the line 4 4 of Fig. 3.

Referring to Figs. 1 and 2 of the drawings, *a* represents the main body of the carbon, formed, preferably, of carbon mixed with a large proportion of coloring and light-producing salts. The body *a* is inclosed by a coating *b*, of non-scorifiable carbon. This coating *b* forms a substantially thin layer, within which the body *a* is inclosed, and it consists of either pure carbon or carbon combined with a small percentage of the coloring and light-producing salts.

In Figs. 3 and 4 a cored electrode is shown wherein the main body *a*, of carbon combined with a large proportion of the coloring and light-producing salts, incloses a core *d*, of alkaline salts—such, for instance, as tartrates, carbonates, borates, silicates of sodium or potassium, &c.—which, if desired, may also be mixed with coloring and light-producing salts. In this form of the invention the body *a*, which encircles the core *d*, is itself encircled by the coating *b*, of non-scorifiable carbon, as in the first form illustrated in Figs. 1 and 2.

In the carrying out of the invention it will be found that the following proportions are practicable: The body *a* is of seven millimeters diameter, and the coating *b* is of from one to two millimeters in thickness. Where a core *d* is used, the body *a*, of seven millimeters, is hollowed to receive the core *d*, of two millimeters diameter. In ordinary cases the body *a* is formed of a paste containing about equal quantities of carbon (such as used in the manufacture of ordinary electrodes) and of fluorid or phosphate of calcium and the coating *b* is formed of pure carbon. The core *d* is made of the alkaline salts used ordinarily in the fabrication of low-voltage and cored carbons—namely, the tartrates, carbonates, &c., of sodium or potassium, &c.

The function of the core is to give fixity or steadiness to the arc, and the presence of the core is not absolutely essential. When desired, if the core is dispensed with the steadiness of the arc may be enhanced by mixing

with the paste forming the body *a* of the lamp the alkaline salts or by impregnating the cylinder *a* after the paste has been heated to form the cylinder or pencil. It will be found
 5 that either in the core *d* or in the body *a* of the electrode the best results, so far as steadiness of the arc is concerned, will be obtained by using the salts of potassium. The thickness of the coating *b* may vary according to
 10 the circumstances under which the electrode is used. Under any circumstance, however, the coating *b* must burn a little more rapidly than the inclosed body *a*, so that the point of the composite body *a* may stand out some
 15 millimeters below the lower edge of the coating *b* and the arc form itself upon said point and not upon the coating *b*. If the positive electrode is used as the upper electrode of the lamp, it will be found that the coating *b* will
 20 burn more quickly than if the positive electrode is used as the lower electrode. Hence a difference in the thickness of the coating *b* under these varying conditions must be made. Again, pure carbon burns more rapidly than
 25 carbon combined with a small proportion of the light-producing salts, and hence this also must be considered in coating the electrode.

In preparing the electrode either of the following methods may be used:

30 First. The body of the carbon is made according to the usual continental method—namely, by drawing through a drawing-plate a paste formed of the mixture containing from ten per cent. to ninety per cent. of carbon
 35 and ninety per cent. to ten per cent. of the rare earths—such as the salts of calcium, magnesium, thorium, caesium, or the like—aggregated with tar under pressure. The pencils or rods are made either with or without the
 40 central bore, into which the core is to be introduced. They are then dried and cooked at a temperature sufficiently low not to volatilize the salts. After this the rods or pencils are introduced into a press containing carbon and
 45 tar and the coating pressed upon the rod or pencil. The whole is then cooked. The press used in applying the carbon coating is similar

to that used in covering cables with a coating of lead.

Second. A special drawing-press is constructed with two or more cylinders containing, respectively, the material for the body and the material for the coating of the rod or pencil. The cylinders feed through concentric pipes or separated pipes feeding concentric chambers, and the exit is through annular concentric drawing-plates. In this instance the electrode is made at one operation and needs only to be cooked and its core filled in the ordinary manner.

Third. The body of the pencil and the cylindrical coating are each made separately of the respective mixtures by the press, and then one is introduced into the other before the cooking process or after each has been separately cooked.

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

1. An electrode for electric-arc lamps, consisting of a body of carbon combined with light-producing salts and a substantially thin coating of non-scorifiable carbon, inclosing the body.

2. An electrode for arc-lamps consisting of a body of carbon with an addition of from ten per cent. to ninety per cent. of mineral substances and a coating of non-scorifiable carbon inclosing the body.

3. An electrode for arc-lamps, consisting of three concentric parts, the intermediate part or body of the electrode consisting of carbon combined with coloring and light-producing salts and inclosing the core or inner part and an outer part or coating consisting of non-scorifiable carbon inclosing the intermediate part or body of the electrode.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

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Witnesses:

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