

No. 700,649.

Patented May 20, 1902.

R. HOPFELT.  
ELECTRODE FOR ARC LAMPS.

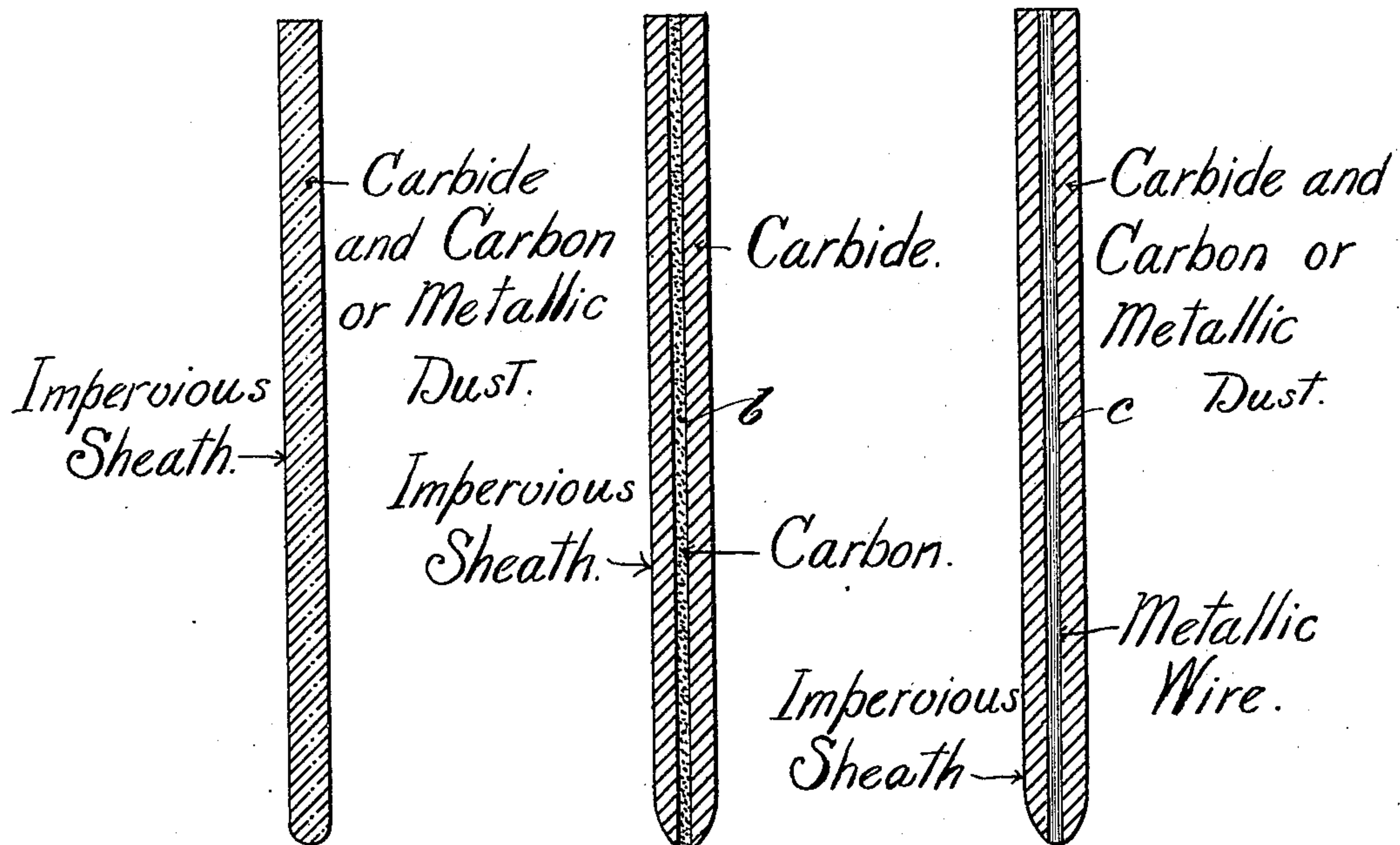
(Application filed Feb. 24, 1902.)

(No Model.)

*Fig. 1.*

*Fig. 2.*

*Fig. 3.*



INVENTOR  
ROBERT HOPFELT

By

*Howland Howland*

HIS ATTORNEYS

WITNESSES:

*P. W. Wright*

*Charles C. Abbe*



# UNITED STATES PATENT OFFICE.

ROBERT HOPFELT, OF BERLIN, GERMANY.

## ELECTRODE FOR ARC-LAMPS.

SPECIFICATION forming part of Letters Patent No. 700,649, dated May 20, 1902.

Application filed February 24, 1902. Serial No. 95,414. (No specimens.)

*To all whom it may concern:*

Be it known that I, ROBERT HOPFELT, a subject of the German Emperor, residing in Berlin, Germany, have invented an Improved Carbide Electrode for Arc-Lamps, of which the following is a specification.

In the manufacture of electrodes for arc-lights carbids which are decomposable by water form a very desirable element, because of their light-giving properties; but they have the disadvantage that their electrical conductivity is low. Carbids decomposable by water and suitable for the purpose in question are the metallic carbids, and particularly carbide of calcium.

It is the main object of my present invention to make such a carbide electrode of high conductivity. This object I attain by incorporating in the body of the carbide electrode a substance having good conductive properties.

In the accompanying drawings, Figures 1, 2, and 3 are sectional views of electrodes embodying my invention.

The incorporation of the conductive material in the body of the carbide may be effected in various ways. Thus I may add finely-divided metal-dust, Fig. 1, or put a wick *b*, Fig. 2, of solid carbon within the carbide electrode, or I may insert a metallic wire *c*, Fig. 3, therein, or, when using calcium carbide, by adding to the same carbon-dust up to ninety-five per cent. of the total mass. By the addition of carbon-dust in proper quantities the yellow-white color of the light peculiar to pure calcium carbide is furthermore avoided and a fine yellowish light, wholly resembling sunlight, is produced. Besides, the durability of this electrode in the air is increased thereby. By the insertion of the wire the solidity of the electrode is also increased, as will be hereinafter described.

If finely-divided metal-dust be mixed with the carbide, there is effected, besides a uniform combustion of the electrodes, at the same time a steadying of the arc-light. If a solid carbon pencil be employed in order to increase conductivity, the same result is obtained, as this, too, contributes to the steadying of the arc-light.

Of course the carbon wick must consist of a tightly-pressed and well-burned carbon, as

only this possesses the necessary conductivity. This carbon pencil differs from a wick sometimes used in carbon electrodes and consisting of unburned carbon-dust, and therefore intended to answer quite another purpose.

The envelopes of carbon formerly proposed, which were pressed around carbide electrodes, cannot be used, as the light-arc here would continually burn on the outer envelop and the carbide would not get a chance to evaporate. It is also impracticable to surround the carbide electrolytically with a casing of copper, since the carbide, as is known, is rapidly decomposed in water or acid.

As mentioned above, it is advantageous when employing calcium carbide to mix carbon-dust in proper quantities with the same. A greater brightness of the light is obtained if carbon up to ninety-five per cent. is added to the carbide.

Although only small portions of carbide will lie at the surface of such electrodes even after the most intimate mixture, yet such an electrode when the same is exposed for a long time to the air will be attacked by the moisture in the air, and it is therefore advantageous to surround these electrodes afterward with a superficial protecting-envelop of material impervious to water. A great number of bodies may be utilized for this purpose. They must fill this condition, however, that they contain no water, as otherwise the envelop itself when applied to the electrode would destroy the latter. Therefore the use of water-glass, as well as the galvanization of such electrodes, is debarred on account of the liquid containing water which would have to be employed. However, thin tubes of metal which are pressed tightly around the electrodes, as well as organic lacquers, varnishes, oil-paints, coats of asphalt, &c., may be advantageously employed. Tar which is burned after drying is especially suitable for the purpose. If such impregnation is carried out often enough, the electrode is covered with so impervious a layer of carbon that it may even be coppered afterward. As regards the solidity of such arc-lamp electrodes of carbide, it has been shown that even after they have been well heated in the furnace they easily burst on burning in the lamp, the



cause being transverse breaks arising from unequal expansion. These defects are avoided by the above-mentioned employment of a thin metal wire which is drawn lengthwise through the electrodes. It is of no special importance that this wire be exactly in the center of the electrodes. On burning the lower end of the wire melts, together with the carbid, so that a sufficient support is always provided in the electrode, and, on the other hand, the heat is carried off better through the whole electrode by the wire, so that transverse breaks will scarcely ever occur.

I claim as my invention—

- 15 1. An arc-light carbid electrode, consisting of carbid decomposable by water and conducting substances incorporated in the body of the carbid, and a superficial coating of a body impervious to water.
- 20 2. An arc-light carbid electrode, consisting

of carbid of calcium, a conducting substance incorporated in the body of the carbid and a superficial coating of a body impervious to water.

3. An arc-light carbid electrode, consisting of calcium carbid and carbon-dust mixed therewith and a superficial coating of a body impervious to water.

4. An arc-light carbid electrode, consisting of carbid decomposable by water and carbon mixed therewith and a metallic wire embedded in the electrode, as and for the purpose described.

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

ROBERT HOPFELT.

Witnesses:

AUGUST SIEGFRIED DOCEN,  
PAUL SHAAL.