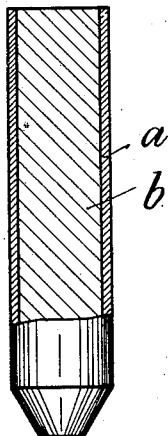


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ARC LAMP ELECTRODE.  
APPLICATION FILED OCT. 22, 1909.

1,009,291.

Patented Nov. 21, 1911.



Witnesses  
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# UNITED STATES PATENT OFFICE.

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## ARC-LAMP ELECTRODE.

1,009,291.

Specification of Letters Patent.

Patented Nov. 21, 1911.

Application filed October 22, 1909. Serial No. 523,977.

### *To all whom it may concern:*

Be it known that I, GEORG EGLY, a subject of the German Emperor, and residing at Treptow, near Berlin, Germany, have invented certain new and useful Improvements in Arc-Lamp Electrodes, of which the following is a specification.

My invention relates to arc lamp electrodes and a primary object is to provide an electrode containing phospho-boric acid.

As will be understood arc lamp electrodes consist of light emitting ingredients, such as compounds of the alkalis, alkaline earths and rare earths, together with carbon or carbonaceous material and a binder, the latter being sometimes of carbonaceous material such as tar or sometimes of water glass.

My invention has for its object by the addition of phospho-boric acid to improve the electrode, not only in its process of manufacture but also in its behavior under the action of the electric current, and also to improve the quality and character of the arc and the light emitted thereby.

Phospho-boric acid has the composition  $BPO_4$  and is obtained by the action of boric acid on phosphoric acid. For example, if pulverized boric acid be placed into concentrated phosphoric acid a treacly mass is firstly obtained in which boric acid and phosphoric acid are contained separately one beside the other. If this viscous mass be evaporated to dryness, an earthy, exceedingly highly refractory mass, phospho-boric acid, is obtained. The same product is also obtained when a mixture of the anhydrides of boric acid and phosphoric acid is heated to redness.

I may employ the phospho-boric acid either in its finished form, or in the form of the mixture of anhydrides, or in the form of an emulsion of boric acid in concentrated phosphoric acid. In the two last cases the phospho-boric acid is first formed in the carbon mass or in the finished electrode. Above all it causes very quiet burning and renders entirely non-injurious any impurities which the carbon or tar employed in the manufacture of the electrodes contains. It is related in certain respects in its action to boric acid on the one hand and to phosphoric acid on the other hand, but is without the disadvantages of these. For example boric acid and borates, which are well-

known quite generally for steadying the arc, are very readily fusible and favor under certain circumstances the formation of slag, whereas phospho-boric acid, on the contrary, is practically non-fusible. Further, both boric acid and phosphoric acid, when added by themselves alone to the carbon mass, act very unfavorably on the water-glass employed for binding the carbon. They cause the water-glass to stiffen and take from it its lubricity. If phospho-boric acid be employed instead, the water-glass retains its good properties. Phospho-boric acid is consequently very particularly suitable as an admixture for core masses which are to be worked up with water-glass.

Phospho-boric acid is distinguished from borates when used as an admixture with salts of the alkalis, earth alkalis or rare earths in that it possesses the advantage of regulating vaporization and also concentrates the arc and considerably increases the emission of light.

A further advantage is afforded by phospho-boric acid as compared with borates in that electrodes containing phospho-boric acid and provided with light emitting substances burn both with direct and also with alternating current with lamp tensions of up to 45 and indeed 50 volts without the arc being ruptured, whereas when carbons of the same kind containing borates are used the arc ruptures at about 35 volts particularly in the case of alternating current.

Part of one form of my improved arc lamp electrode is represented by way of example in vertical sectional elevation in the accompanying drawing wherein a designates the carbon shell surrounding the core b containing carbon, light emitting substances and phospho-boric acid.

By way of illustrative example of an electrode composition embodying my invention I mention the following composition: fluor-spar forty parts, carbon forty parts and phospho-boric acid three parts. These ingredients are mixed in the usual manner with as much water glass as will produce a moldable mass.

I claim:

1. An arc lamp electrode containing phospho-boric acid.
2. An arc lamp electrode containing phospho-boric acid and light emitting substances.
3. An arc lamp electrode consisting of a

shell of carbon surrounding a core composed of a mixture of carbon, light emitting substances and phospho-boric acid.

4. An arc lamp electrode consisting of a  
5 mixture of carbon, a light emitting substance, phospho-boric acid and water glass.

In testimony whereof I have signed my

name to this specification in the presence of two witnesses.

GEORG EGLY.

Witnesses:

HENRY HASPER,  
WOLDEMAR HAUPT.