UNITED STATES PATENT OFFICE.

PETER STIENS, OF LONDON, ENGLAND.

FILAMENT AND CARBON FOR ELECTRIC LAMPS.

SPECIFICATION forming part of Letters Patent No. 537,555, dated April 16, 1895.

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To all whom it may concern:

Be it known that I, PETER STIENS, electrical engineer and constructer, a subject of the Emperor of Germany, residing at 15 Carroun Road, Clapham Road, London, in the county of Surrey, England, have invented certain new and useful Improvements in Filaments and Carbons for Electric Lamps and in the Process of Making Them, of which the following is a specification.

With a view to improve the filaments and carbons for electric lamps and to increase the light which they emit, a treatment with boric acid has before been proposed. Up to the present time the advantages sought to be derived from this treatment have not been satisfactorily attained. The cause for this I find to be that the boric acid has not been suitably prepared. It is necessary that the boric acid should in the first place be burned or exposed to a high heat. This may conveniently be done in an open crucible of graphite. The crucible is placed in a furnace and it, with its contents, is raised to a white heat. The boric acid melts and while it is in this state the crucible is left in the furnace for two or three hours. The crucible is then lifted out and the charge poured upon a slab, preferably of graphite. When cold the glass like mass is pounded and sifted so as to obtain as fine a powder as is practicable.

I proceed to incorporate this burned boric acid with the filament or carbon.

If a filament suitable for an incandescent lamp is to be prepared say from vulcanized fiber (or it might be from any other of the solid materials commonly employed for the purpose) I prepare strips of suitable length and thickness. I place them in a vessel preferably of glass and I boil them, using sufficient water to enable the strips to move about freely in the water and in the water I have an excess of the finely powdered burned boric acid, that is to say, considerably more than the water is able to dissolve. I continue the boiling for some hours by which time the strips will appear white from the burned boric acid adhering to them. After having been thoroughly dried the strips are laid around a mandrel or otherwise brought to the form required and then they are carbonized and at a high heat in any of the ordinary ways. After carbonization the filament is carefully dusted over with the finely powdered burned boric acid and preferably to enable the powder the better to adhere I previously dip the filament into benzine. The filament being thus coated, I place it in a glass inclosure holding its ends by metal clips so that an electric circuit may be closed through it. I remove the air from the inclosure and when a good vacuum is obtained I open a connection with a flask containing benzol; or in any other of the well known ways I admit to the glass inclosure a carbonaceous vapor or gas. I again exhaust the inclosure down to a pressure of a few millimeters and then I pass an electric current through the filament commencing with a small current and gradually increasing it until the difference of potential between the two leads is much greater than it will be in the after use of the filament. The filament consequently emits a very brilliant light. On cooling the filament will be found to have a metallic luster. The after treatment in the manufacture of the lamp and the "standardizing" or adjusting the resistance is as heretofore.

If filaments are to be made from a liquid or semi-liquid material such for example as dissolved cellulose then I mix the finely powdered burned boric acid with the liquid or semi-liquid material and in this way I introduce as much of the powder as I can without interfering with the usual mechanical operations for producing filaments therefrom. The carbonization is conducted as heretofore; also after carbonization I expose the filaments to the further treatment with boric acid and carbonaceous vapor or gas as hereinbefore described; also in the manufacture of carbons for the arc lamp I use burned boric acid. I mix it with the other materials from which the carbons are molded. The quantity of burned boric acid so employed may be varied but ten per cent. will produce a good result. I can also with good effect boil the carbons with burned boric acid.

What I claim is—

1. A filament or carbon for electric lamps comprising in its composition burned boric acid.

2. The process of treating filaments or carbons in the course of manufacture, which consists in boiling them with burned boric acid.

3. The process of treating filaments or carbons in the course of manufacture, which consists in impregnating them with burned boric acid, and then heating them by the electric current in the presence of carbonaceous vapor or gas.

P. STIENS.

Witnesses:
ROBERT B. RANSFORD,
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