

UNITED STATES PATENT OFFICE.

EZECHIEL WEINTRAUB, OF LYNN, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

JOINING LAMP-FILAMENTS TO CURRENT-SUPPLY WIRES.

1,131,189.

Specification of Letters Patent.

Patented Mar. 9, 1915.

No Drawing.

Application filed October 27, 1909. Serial No. 524,942.

To all whom it may concern:

Be it known that I, EZECHIEL WEINTRAUB, a citizen of the United States, residing at Lynn, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Joining Lamp-Filaments to Current-Supply Wires, of which the following is a specification.

My present invention comprises an improved joint between a lamp filament and its platinum or other current supply wire. My invention also includes the method whereby such a joint can be produced.

I have discovered that the melting points of platinum, and also of nickel and iron are greatly reduced by the addition of a little boron, either pure or somewhat impure. The effect is so great that a relatively thick platinum wire when in contact with boron can be easily fused in a Bunsen flame. I have also discovered that if the end of a carbon filament is introduced into a bead of platinum containing a little boron formed by the fusion of the end of the wire while in contact with boron, the platinum borid will wet the carbon and form a very good joint. It is then possible to pull out the globule while it sticks to the filament, and thus get a longer and more gradual joint than is now obtained in ordinary commercial practice. Tungsten filaments can also be joined to platinum or nickel, or nickel alloy wires in this same way, though, if desired, the fusing operation may be effected by arc welding in hydrogen, or in a mixture of hydrogen and nitrogen, according to a procedure now well understood by lamp makers. Pure boron suitable for this work may be made by reducing boron chlorid with hydrogen in a high voltage alternating current arc, maintained between water-cooled copper electrodes. Reduction goes on in the hot zone of the arc, and some of the boron in finely divided condition is thrown out on the walls of the arc chamber, while some of it fuses on the electrodes themselves. It is not necessary, however, that pure boron shall be employed for the purpose of my invention. I can use impure boron, that is,

boron still associated with other elements introduced in the course of its manufacture, or even boron suboxid. For example, when boric anhydrid, B_2O_3 , is mixed in excess with magnesium and the mass is heated, a reaction takes place, the product of which consists of boron combined with magnesium, or with oxygen or both, according to the temperature of the reaction. At a temperature above 1300° C. the brown suboxid is the product of the reaction. Either product can be used for carrying out my invention.

What I claim as new, and desire to secure by Letters Patent of the United States, is:—

1. A fused joint between a filament and a current supply wire comprising a portion of said wire rendered readily fusible and capable of adhering to the material of the filament by the presence of boron.

2. A joint between a carbon filament and a current supply wire, comprising a bead of boron and a metal as essential ingredients and being fusible at the temperature of the gas flame.

3. The method of joining a filament to a current supply wire, which consists in adding boron material to the wire, producing a fusion of said material and the end of the wire and introducing the end of the filament into the fusion.

4. The method of adjoining a filament to a current supply wire which consists in forming a bead of fused metallic borid on the end of said wire and then embedding the filament end in said fused bead.

5. The method of joining a filament to a current supply wire, which consists in adding boron to the end of the wire, heating said end to form a borid bead which wets the end of said filament, and pulling out said bead into an elongated form.

6. The method of joining a filament to a current supply wire which consists in adding boron to the end of the wire, heating said end in an open flame to form a bead of fusible borid, introducing a carbon filament into said bead, and then pulling said bead into an elongated form.

7. The combination of metal wire, a fila-

ment and a bead joining said wire and said filament, comprising a compound of a metal and boron, said compound being fusible in a Bunsen flame.

- 5 8. The combination of a current supply conductor, a filament and a compound of boron and nickel adhering both to the wire and the filament, and joining the same.

In witness whereof, I have hereunto set my hand this 26th day of October, 1909.

EZECHIEL WEINTRAUB.

Witnesses:

JOHN A. McMANUS, Jr.,
CHARLES A. BARNARD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."