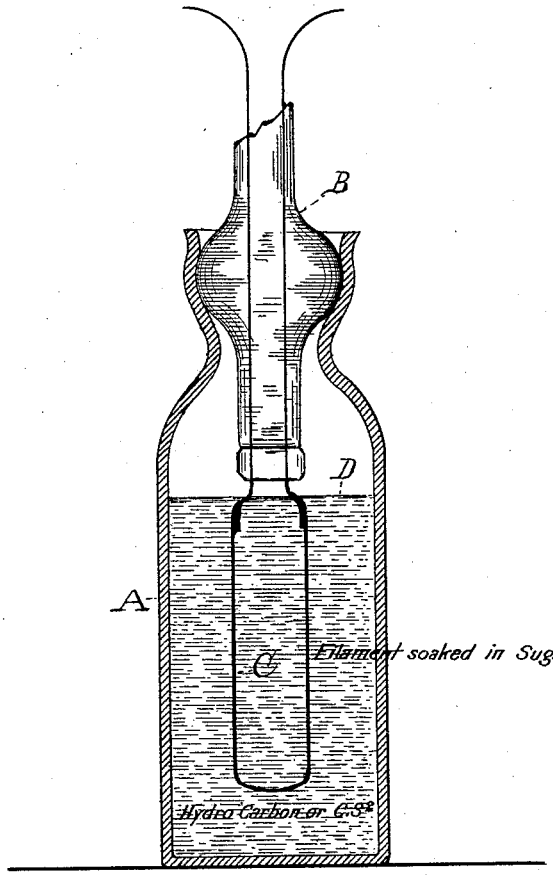
(No Model.)

T. A. EDISON.

MANUFACTURE OF CARBON FILAMENTS.

No. 411,016. Patented Sept. 17, 1889.



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UNITED STATES PATENT OFFICE.

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MANUFACTURE OF CARBON FILAMENTS.

SPECIFICATION forming part of Letters Patent No. 411,016, dated September 17, 1889.

Application filed October 20, 1882. Serial No. 74,789. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Menlo Park, in the county of Middlesex and State of New Jersey, have invented a new and useful Improvement in Methods of Testing and Treating Carbon Filaments, (Case No. 505,) of which the following is a specification.

The object I have in view is to produce a simple method and means for readily ascertaining the character and resistance of the incandescing carbon filament intended for use in an electric lamp before the same is used in a lamp, so that imperfect or spotted filaments, or those not having uniform resistance throughout their length, will not be employed, and the expense of making up imperfect lamps will be saved and the resistance of the filaments will be determined. In my Patent No. 239,372 is described a method of testing carbon filaments in a temporary vacuum before being permanently placed in inclosing-globes; but by my present invention the necessity of using a vacuum for testing the carbon filaments is avoided.

A further object of the invention is to provide a method of changing the resistance of the carbon filaments if it is found upon testing them that they are not of the desired total resistance and for ascertaining the character of the filaments at the same time that the resistance is changed and determined.

The first object is accomplished by immersing the carbon filament in a hydrocarbon oil, bisulphide of carbon, or other liquid whose gas is not decomposable when the filament is at a low red heat, and then passing an electric current through the filament and raising it to a dull red heat. The character of the filament and its resistance (if desired) can be promptly ascertained. The filament is protected from the oxygen of the air, while it is not allowed to reach a temperature sufficient to decompose to the slightest extent the gas of the liquid in which it is immersed, and hence there is no deposit upon the filament. A bright or dull spot in the filament can be seen at a glance and the filament discarded. A suitable vessel is provided to hold the liquid in which the filament is immersed and to permit a free escape of the gas rising from the liquid. If, after ascertaining the character and resistance of the filament, it is desired to change its resistance, rendering it of lower resistance, it is removed from the liquid and soaked in sugar or other carbonizable material not soluble in the liquid in which the filament is immersed for testing. The soaked filament is then again immersed in the inert liquid and is brought up to a red heat by the current. The sugar or other material is by this method decomposed and carbonized within the pores of the carbon filament. At the same time it is seen that the carbonization is an even one. This process may be repeated until the resistance of the filament is reduced to the desired point.

Instead of coating the filament with a carbonizable material and then immersing it in an inert liquid, the carbonizable material may be dissolved in or carried by the liquid and the coating and carbonization take place at the same time. However, I prefer the method before described.

In the accompanying drawing is represented a vessel containing the inert liquid, having the carbon filament immersed therein.

A is the vessel, having a suitable mouth to receive the glass tube B, in which the leading-in wires 1 2 are sealed, such wires carrying the carbon filament C.

D is the liquid in which the filament is immersed.

What I claim is—

1. The method of ascertaining the character of the carbon filament intended for use in an incandescing electric lamp, consisting in immersing the filament in a non-oxygenated liquid inert under the conditions described and then raising the filament to a red heat by passing an electric current therethrough, substantially as set forth.

2. The method of changing the resistance of a carbon filament, consisting in coating it with a carbonizable material, then immersing it in a liquid, and then raising it to a red heat by passing an electric current therethrough, said carbonizable material not being soluble in the liquid, and the gas of said liquid not being decomposable when the filament is at a red heat, substantially as set forth.

3. The method of carbonizing consisting in

raising a conductor in a liquid in the presence of a carbonizable material to a heat sufficient to carbonize the material by passing an electric current through said conductor, the liquid used not being decomposable under such heat, substantially as set forth.

4. The method of changing the resistance of a carbon filament and ascertaining its character and resistance, consisting in coating it with a carbonizable material, immersing it in a liquid, said carbonizable material not being soluble in the liquid used, and said liquid not being decomposable when heated in the presence of carbon, and then raising it to a red heat by the passage of an electric current therethrough, substantially as set forth.

This specification signed and witnessed this 19th day of October, 1882.

THOS. A. EDISON.

Witnesses:
H. W. SEELY,
RICHD. N. DYER.