(No Model.)

T. A. EDISON.

MANUFACTURE OF CARBON FILAMENTS.

No. 484,185. Patented Oct. 11, 1892.

Fig. 1.

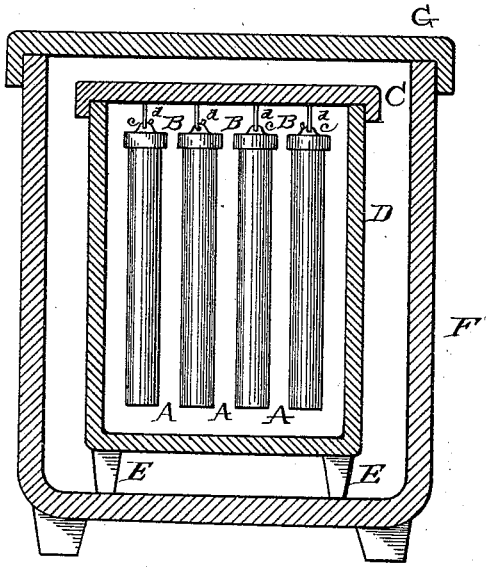


Fig. 2.

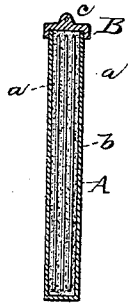
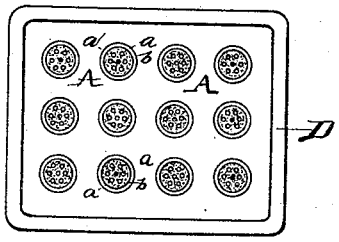


Fig. 3.



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MANUFACTURE OF CARBON FILAMENTS.

SPECIFICATION forming part of Letters Patent No. 484,185, dated October 11, 1892.

Application filed December 27, 1886. Renewed March 30, 1892. Serial No. 427,010. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Llewellyn Park, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in the Manufacture of Carbon Filaments, (Case No. 712,) of which the following is a specification.

The object of this invention is to produce carbon filaments for the incandescent conductors of electric lamps which by even carbonization will not be liable to become bent and distorted when electrically heated in the lamps.

My invention relates to the mode of carbonizing the filaments, which are first formed in the desired shape from suitable carbonizable material.

In carrying the invention into effect I employ tubes or other receptacles for the filaments, made of carbon or other material capable of withstanding high heat. In each of these tubes I place a suitable number of the filaments of carbonizable material and pack around and between them powdered carbon, preferably powdered anthracite coal, or other material of good heat conductivity and which will not fuse under the heat necessary for carbonization. Powdered corundum or silica may be used. A suitable number of these tubes are then suspended in a carbonizing-chamber out of contact with the walls of the chamber, the suspension being by hooks of carbon or other infusible material. When this carbonizing-chamber is heated equally on all sides in the furnace, the tubes or receptacles are all heated by radiation and by convected air-currents and not at all by conduction, and the tubes being so heated equally at all parts of their surfaces the filaments within them receive an even degree of heat, each filament being heated and carbonized the same at all points, whereby filaments of even structure are produced. The powdered material packed around the filaments, while it permits them to contract during carbonization, exerts upon them a sufficient pressure to keep them in shape and avoid the distortion which might otherwise occur.

To produce an even heat upon the walls of the chamber in which the carbonizing-tubes are placed, I prefer to place this chamber within another larger chamber, providing suitable standards or supports, so that an air-space is left entirely around the inner chamber, and the whole being placed in the furnace the inner chamber is heated by radiation from the walls of the outer one, and thus receives an equal degree of heat on all sides. The boxes or tubes and chambers all have detachable covers, which are preferably luted air-tight when the parts are in use.

In the accompanying drawings, Figure 1 is a section of the two chambers with the boxes in elevation; Fig. 2, a section of one of the boxes, and Fig. 3 a plan view of the inner chamber with its cover and those of the boxes removed.

Like letters refer to corresponding parts in all these figures.

A suitable number of filaments *a a* of carbonizable material are placed in the box or tube A, with powdered anthracite *b* or equivalent material packed around and between them. The boxes or tubes A have covers B, provided with eyes *c*, by which they are hung upon hooks *d*, depending from the inside of the cover C of the chamber D. The chamber D has feet E and is set in the outer chamber F, with an air-space surrounding it. The chamber F, with the cover G placed upon it, is placed in the carbonizing-furnace.

The operation and its effects have already been explained.

What I claim is—

1. The combination, with the receptacles for the filaments, of the chamber for receiving the same and means for suspending the receptacles in the chamber out of contact with the walls of said chamber, substantially as set forth.

2. The combination, with the receptacle containing the filaments and infusible heat-conducting powder, of the chamber for receiving the same and means for suspending the receptacle in the chamber out of contact with the walls, substantially as set forth.

3. The combination, with the receptacles for the filaments, of the chamber for receiving

the same and the hooks and eyes for suspending the receptacles within the chamber, substantially as set forth.

4. In carbonizing apparatus, the combination of the outer chamber, the inner chamber separated from the outer one by an air-space, and the receptacles for the filaments suspended within said inner chamber out of contact with the walls thereof, substantially as set forth.

This specification signed and witnessed this 20th day of December, 1886.

THOS. A. EDISON.

Witnesses:
WM. PELZER,
E. C. ROWLAND.