UNITED STATES PATENT OFFICE.

ARTHUR D. LITTLE, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE AMERICAN VISCOSE COMPANY, OF SAME PLACE.

CARBON FILAMENT AND METHOD OF MANUFACTURING SAME.

SPECIFICATION forming part of Letters Patent No. 532,468, dated January 15, 1895.

Application filed June 18, 1894. Serial No. 514,956. (No specimens.)

To all whom it may concern:

Be it known that I, ARTHUR D. LITTLE, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Carbon Filaments and Methods of Manufacturing the Same, of which the following description is a specification.

My invention relates to the composition and manufacture of filaments for incandescent lamps, whereby the percentage of carbon contained in the filaments is increased, and consists in the employment of a compound of cellulose and an organic acid, as for instance, acetic acid or its anhydride, the resulting product being subsequently formed into strips suitable for filaments, and then carbonized.

Carbon filaments have heretofore been prepared from various fibrous materials, as bamboo, card board, cotton and linen thread, and from cellulose more or less nearly approaching a condition known as amorphous cellulose, by ignition of the material out of contact with the air, and subsequent exposure of the heated filaments to the vapor of hydrocarbons after the usual manner which is well known.

It is difficult to prepare from cellulose, in its fibrous form, filaments which are entirely homogeneous in structure, and in which the carbon is distributed with precise uniformity throughout their lengths, and such inequalities of structure, and unequal distribution of the carbon cause the resistance of the filaments to vary at different points.

In accordance with this invention the cellulose is treated with an organic acid or its anhydride, such for instance, as acetic anhydride, and the reagent thus employed, itself being composed largely of carbon, does not introduce any objectionable material which must thereafter be removed.

In carrying out my invention I prefer to take a quantity of cellulose, with six to eight times its weight of acetic anhydride, and heat the same in a sealed tube, to say 180° centigrade, producing a solution of cellulose acetate, and then form the filament by forcing the solution thus obtained through a small aperture into water in which the cellulose acetate is insoluble, or by forming it into sheets of suitable thickness which may be done by pouring the solution upon glass, allowing it to dry, then dipping it into water, and stripping off the sheet, and finally drying and cutting it into strips. The strips obtained by either method are then carbonized and flashed as usual.

The cellulose acetate thus produced contains a large percentage of carbon, and the structure of the filament formed is therefore homogeneous, and no inequality appears in its resistance.

I claim—

1. The material for carbon filaments for incandescent lamps herein described consisting of a compound of cellulose and an organic acid.

2. The material for carbon filaments for incandescent lamps herein described composed essentially of cellulose acetate, produced by treating cellulose with acetic anhydride.

3. The method herein described of making filaments for incandescent lamps which consists in heating cellulose with an organic acid to a high temperature, forming filaments of the product thus obtained, and subsequently carbonizing them.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ARTHUR D. LITTLE.

Witnesses:

B. J. NOYES,

FLORENCE H. DAVIS.