UNITED STATES PATENT OFFICE.

GEORGE W. HICKMAN, OF WASHINGTON, D. C., ASSIGNOR TO THE VIADUCT MANUFACTURING COMPANY OF BALTIMORE CITY, OF BALTIMORE, MD.

MANUFACTURE OF CARBON FILAMENTS FOR INCANDESCENT LAMPS.

SPECIFICATION forming part of Letters Patent No. 302,135, dated July 15, 1884.

Application filed January 11, 1884. (No specimens.)

To all whom it may concern:

Be it known that I, GEORGE W. HICKMAN, of Washington, in the District of Columbia, have invented certain new and useful Improvements in the Mode of Manufacturing Carbon Filaments; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in the mode of manufacturing carbon filaments, the object being to produce material for such filaments of a very durable and flexible quality, and which may receive and retain any desired shape and have sufficient strength to maintain itself intact in any position and under any jarring or vibration to which a lamp is liable to be subjected while in use.

Although by the carbonization of various substances—such as paper, parchment, hair, silk and cotton threads, fibers of hemp, bamboo, and others—incandescing filaments have been obtained having proper electrical qualities combined with sufficient strength for use in stationary lamps and in shapes not involving a very great extent or length of filament between its end supports, there is still a desire to obtain a carbon filament which will endure the strains incident to travel, and which may be given graceful shapes and sufficient length to give extensive illumination without requiring multiplication of filaments in a single lamp, and consequent weakening of the electric current by division.

In my experiments, with a view to the production of a carbon filament having the desired qualities, as stated, I have found that the woody fiber of the stems of the dock-weed, when properly treated, yields a carbon which seems to leave nothing to be desired in this line. In treating these stems I remove the bark and pith, and cut the wood first into proper length, and then split it into narrow pieces, which I shave down to the desired size, which may reach even to the small diameter of a fine hair, with a length of several inches, so great is the toughness of the fiber. The pieces thus prepared I steep in dilute alcohol, (say equal quantities of proof spirit and water,) and find that a wonderful change in their condition is thus caused, the fiber becoming so pliable that it may be wound or coiled into greatly involved shapes with ease and safety from breakage. While the fiber is thus pliable I give it the desired shape, preferably by bending it about a refractory mold, and after securing the ends I dip the mold and fiber into melted pure paraffine, and then place them into a crucible and subject the same to the necessary heat for carbonizing the fiber. It seems that the paraffine causes a kind of cementation in the mass of fiber while carbonization is progressing, and replaces in the pores all expelled volatile matters, so that a compact, strong, and resilient filament of carbon is the result.

I have not illustrated in this application the carbon connected up for operation, as my claim is restricted to the process of manufacture. The form preferred by me is, however, that shown in a joint application of Hickman and McCoy, Serial No. 111,080, filed November 7, 1883. I believe that such a shape could not be given to a carbon filament made by any other process and from any other substance heretofore used, the diameter being sufficiently small to oppose a proper resistance to the current, and the strength after carbonization being such that the filament will support itself in all positions and resist all strains from jarring to which a lamp is ever likely to be subjected.

The fiber of the dock-weed stem contains gum, resin, sugar, starch, and oil, all of which are soluble or partly soluble in alcohol, and it would appear that any vegetable stem having these substances in its woody fiber will, with similar treatment, give a carbon filament similar to that obtained from the dock-stem, provided, of course, that the other conditions of similarity, known or unknown, are the same, and that adverse substances do not accompany those named.

In a pending application, hereinbefore referred to, I have claimed jointly with Joseph F. McCoy a process embodying, in addition to

the generic features set forth in my claims, the further step of bending or forming the filament into the desired shape. In this application, therefore, I disclaim such specific feature; but

I claim as my invention and desire to secure by Letters Patent—

The method of treating vegetable fiber for producing incandescent filaments, which consists in first steeping in alcohol, subsequently dipping in paraffine, and then carbonizing, substantially as set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

GEO. W. HICKMAN.

Witnesses:
A. B. DAVIT,
THOS. M. DOBBIN.