

UNITED STATES PATENT OFFICE.

JOHN H. FAIR, OF CHICAGO, ILLINOIS, ASSIGNOR OF TWO-THIRDS TO HERMAN G. GREEN AND ALBERT H. HANCOX, OF CHICAGO, ILLINOIS.

PROCESS OF OBTAINING CELLULOSE FROM VEGETABLE SUBSTANCES.

1,053,125.

Specification of Letters Patent.

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No Drawing.

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To all whom it may concern:

Be it known that I, JOHN H. FAIR, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Processes of Obtaining Cellulose from Vegetable Substances, of which the following is a full, clear, concise, and exact description.

My invention, broadly speaking, is a process for reducing vegetable substances for the purpose of extracting therefrom the cellulose in order that the resulting product may be utilized for making paper or for use as a fiber to be spun into yarn or used otherwise in the paper and textile arts.

In the art of manufacturing paper pulp, there are two processes that are well known; one which is the more common being known as the sulfite process and the other being known as the soda process.

My invention contemplates the reduction of a much greater variety of woods, weeds, grasses and other fibrous products than it has been possible to utilize either in the soda or the sulfite process of making paper pulp.

I have applied my invention to the reduction of not only hemlock, spruce, bass-wood and poplar, considered especially suitable, but also to lignum vitae, oak, southern pine, hickory and other woods with success. I mention in this connection that I have made use of small chips produced at the mill and known as hog refuse and sulfite tailings from the screen pulp, and undigested knots. The inner bark known as woodroom refuse I have reduced successfully; also cane, bamboo, Johnson grass, palmetto and okra stalks, also corn, sunflower and flax stalks and straw.

I have worked out my invention to produce the above results in various ways, as required by varying conditions. For a concrete instance I will first describe my process as applied to hemlock.

My process may be said to consist of two principal parts or steps; the first I designate as the pickling process; the second I designate as the rendering or cooking process. The hemlock chips are placed in a receptacle to be immersed in a solution of hydro-chloric acid and potassium chlorate. To a gallon of the hydro-chloric acid I add about two teaspoons full of potassium chlorate. The chips being immersed in this solution will

become thoroughly saturated and the fiber will be loosened up. The wood, however, remains firm after this pickling process is completed, which may take say twenty-four hours more or less, according to the size and nature of the chips. The chips are then removed from the solution and are in condition for the second step of the process, that is the rendering operation.

The rendering operation consists in placing the chips in a kettle of water which is brought to the boiling point. When the water comes to a boil I add a small amount of caustic potash or lye and thereupon the charge will be almost at once reduced to a fibrous condition. To five gallons of water I would add say a tablespoon full of caustic soda, or, the equivalent of lye. The solution remaining of the pickling bath and also the solution remaining of the rendering bath will be utilized for a second batch. In other words the pickling solution once formed may be used over and over again and the same may be said of the rendering solution. When a second batch or charge is placed in the pickling tank, enough hydro-chloric acid with potassium chlorate will be added to make up for what has been taken up in quantity and strength by the previous charge, and the same rule will apply to the rendering solution, that is enough water and caustic soda or lye will be added so that the solution will be sufficient in volume and of the proper strength to do the work required. In case the pickle solution is found of insufficient strength as, for example, when the charge consists of southern pine, I add to it preferably from half an ounce to one ounce of commercial nitric acid for each gallon of solution.

By my process I have found that the fiber or cellulose product from the standard woods is improved over and above the product obtained by the older and well-known commercial processes.

I claim:—

1. The process of extracting the cellulose or pure fiber from vegetable substances, which consists in placing the charge in a receptacle containing a solution of hydro-chloric acid and potassium chlorate, allowing the charge to remain therein until saturated to loosen the fiber and then subjecting the charge to a rendering operation which consists in placing the charge in a cauldron

of water, bringing the same to the boiling point, caustic potash or lye being added to the water; substantially as described.

2. The process of reducing vegetable substances which consists in placing the charge in a pickling bath consisting of hydrochloric acid, potassium chlorate and nitric acid, removing the same from the pickling bath and subjecting the charge to the action of water containing caustic soda raised to

the boiling point; as and for the purpose specified.

In witness whereof, I hereunto subscribe my name this eighth day of May, A. D., 1912.

JOHN H. FAIR.

Witnesses:

ALFRED H. MOORE,
McCLELLAND YOUNG.