

UNITED STATES PATENT OFFICE.

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MANUFACTURE OF VEGETABLE FIBER.

SPECIFICATION forming part of Letters Patent No. 266,771, dated October 31, 1882.

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To all whom it may concern:

Be it known that I, JENS HEINRICH CHRISTIANSEN, residing on Mones Island, county of Gloucester, and State of New Jersey, (P. O., Chester, Pennsylvania,) have invented a new and useful Improvement in the Manufacture of Vegetable Fiber; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention consists in a process or mode of treating the stalks and leaves of certain plants, commonly known as "flags" and "rushes," and belonging respectively to the genera *iris* and *juncus*, for the purpose of obtaining a filamentous fiber of suitable length, toughness, strength, and elasticity to adapt it for use in the manufacture of bagging, ropes, and other analogous articles. The flag being most valuable for this purpose by reason of its abundance and size and length of stalk, I will refer to it alone in the following description of the process. The flags are in best condition for treatment when they have attained full growth, since the fiber will then have maximum length and the requisite strength. They may, however, be used with good result when old or past bloom.

A quantity of flags having been selected for treatment, they are first softened by immersion in water, and then combed or hackled in the same manner as flax, thus reducing them to long, thin, narrow strips or strands. I then boil them, preferably in an open kettle, from twenty to thirty minutes in an aqueous solution of soda, lime, and soap. The proportions of these ingredients are as follows: water, one hundred gallons; carbonate of soda, (sal-soda,) five to ten pounds; slaked lime, five to ten pounds; soap, (bar or soft,) one to two pounds. During the time the boiling is in progress the flags should be moved about in the bath or frequently raised and lowered therein for the purpose of constantly bringing fresh caustic in contact with them, whereby the action of the alkali is facilitated, the gluten being softened or partly dissolved. To facilitate this dipping operation the material may be attached by spring-clamps or other suitable fastenings to bars of iron or wood, and thus suspended in the liquid. Said bars may be raised and lowered by any suitable means; but I employ for

this purpose a machine for which I propose to apply for separate Letters Patent. After removing the material from the bath it is stripped or rubbed lengthwise with the hand or any suitable appliance for the purpose of removing the adhering gluten, thus leaving the woody fiber clean. It is then mashed and well rinsed in water, and thus put in condition for final treatment, which consists in immersing it in a bath of water, one hundred gallons; boracic acid, one to two pounds; soap, (bar or soft,) two pounds; glycerine, one pound. This bath is heated to boiling-point, and the fiber allowed to remain therein from one to two hours. Upon removing it from such bath it is thoroughly washed and allowed to dry, preferably in the open air. This completes the process, and the product is a thread-like or attenuated fiber, having such degree of flexibility and strength as adapts it to be worked up into various useful articles, such as are usually made of hemp.

Instead of immersing the fiber in the bath of boracic acid, soap, and glycerine, as above described, I may first dip it in a bath of glycerine dissolved in water, (one-fourth pound to one pound of glycerine to one hundred gallons of water will suffice,) and next in a bath of sulphate of soda—that is to say, a neutral bath formed of greatly-diluted sulphuric acid and soda. Upon removing the fiber from this bath it is immersed in weak ammonia-water to remove any traces of acid, which, if left in the fiber, renders it brittle.

The first step of the process—to wit, hackling or combing the material into fine strips—is a very important, in fact an indispensable one, since it is thus prepared for the subsequent action of the caustic alkali, which then has access to the glutinous matter, and quickly destroys its adhesion to the woody fiber, whereas if stalks of flags or rushes are immersed intact in the alkali they are reduced to a condition in which the fiber is worthless for the purpose in view. After combing or hackling, the strips or strands thus produced must be prevented from entanglement during the subsequent operation of boiling, and for this purpose I confine them in bundles (from two to three inches in thickness) by means of wire, strips of tin, or other means of fastening; but

it is obviously necessary to untie these bundles after removal from the caustic-alkali bath in order to strip off the gluten. It is, however, practicable to dispense with tying in bundles 5 and to secure bunches of the strands at one end only, so that they will hang free in the bath. The only object to be attained in any case is to keep the strands or fibers straight, or at least prevent them from forming into 10 knots or snarls. The fiber is obtained without treatment in the boracic-acid bath; but the latter is employed to thoroughly clean the fiber and also bleach it to a slight degree.

Having thus described my invention, what I 15 claim as new, and desire to secure by Letters Patent, is—

1. The process of treating stalks and leaves of the plants hereinbefore specified, which con-

sists in hackling or combing them into strips, boiling the latter in an alkaline bath, next re- 20 moving the gluten and immersing the fiber thus obtained in a bath of boracic acid, soap, and glycerine, substantially as described.

2. The subsidiary process of treating stalks and leaves of the kind specified, which con- 25 sists in softening the same by immersion in water, next hackling or combing them to reduce them to long thin strips or strands, and boiling in an alkaline bath to soften and dissolve the adhering gluten, and finally removing the latter, as specified.

JENS HEINRICH CHRISTIANSEN.

Witnesses:

AMOS W. HART,
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