

UNITED STATES PATENT OFFICE.

JOHN B. N. BERRY, OF BALTIMORE, MARYLAND.

PROCESS OF MAKING PINE-NEEDLE FIBER.

SPECIFICATION forming part of Letters Patent No. 437,555, dated September 30, 1890.

Application filed March 21, 1889. Serial No. 304,177. (No specimens.)

To all whom it may concern:

Be it known that I, JOHN B. N. BERRY, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in the Process of Making Pine-Needle Fiber, of which the following is a specification.

The object of my invention is to supply a process for the making of vegetable wool or fiber from pine-needles, which shall economize time and reagents, and which shall produce a long staple fit for the best and strongest sacking and other cloths used for coarse purposes.

In considering the structure of the pine-needle I find that the fibers thereof are incased in successive layers of silica and resin, which are the principal obstructions in the converting of these needles into fiber fit for use in spinning and weaving. There is an outer layer of particularly-thick glazing of silicious material which it is necessary to remove by the use of alkalies, and also, as in my process, by previous mechanical means.

The first step in my process is breaking the needles. This is done, preferably, between tightly-pressed rollers, either smooth or corrugated, and is for the purpose of loosening the silica which surrounds the fibers in order to more thoroughly impregnate the needles with the alkali at the proper time and to allow said alkali to reach under this silicious layer and attack the silica at all surfaces at once. The needles having been thus rolled and pressed and the glazing loosened from the outside of the same, the next step in my process is to place them within a boiler strong enough to sustain a pressure of from two to nine atmospheres, or a temperature of from 212° to 350° Fahrenheit. Into this boiler I then introduce a solution of alkali, preferably barium hydrate or sodium hydrate or carbonate, according to the circumstances. This solution I raise to a temperature varying, as above indicated, from 212° to 350° Fahrenheit. The effect of this boiling or digesting is to dissolve the silica in the alkaline solution, converting it into soluble glass, which can be removed with the liquor. This boiling is carried on at this temperature for about five hours, according to various circumstances, and then the liquor is drawn off. After the

drawing off of this liquor warm or hot water is run onto the needles and the mass is well stirred for an hour or so for the purpose of rinsing out all the soluble glass and the saponified resin which remain among the fibers of the needles. When this has been accomplished there is still a remnant of alkaline water soaked into the needles, and to remove this I soak the mass for some time in a hot but weak solution of some acid, muriatic or nitric acid being preferred. This neutralizes the alkali and carries it off when the acid is drawn off from the mass, at the same time serving to precipitate the gum or resin in the needles. The needles are thus left in a soft mass; but each needle often carries a film of soluble glass or silicious matter which has not been entirely removed. In order to remove this film by the shortest possible operation, I prefer to run the needles thus treated between rubber or other pliable or partly-pliable rollers in order to crack off this coating, which is easily done away with by subsequent agitation of the needles in the rest of the process. The last remnants of silica having thus been removed, the mass should be digested at a temperature below boiling-point. I then cleanse the needles in successive baths of successively lower temperature in order to remove every trace of the silica. The next step in this process after this rolling is the drying of the needles, after which I hackle them and thoroughly decorticate them.

This produces the wool or fiber, from which excellent material may be spun and woven, which is particularly adapted to use in the making of coverings for cotton-bales and for use in making bags for fertilizer. Its adaptability for these purposes arises from the following facts: I find that when fiber from pine-needles is prepared as above disclosed it is very slow to catch fire, which is a property dividing this class of fiber decidedly from jute, inasmuch as this last-named material is excessively inflammable.

This fiber is also peculiarly refractory as against the influence of the acid in phosphates. Thus it is well adapted to be made into bags for containing phosphates.

I do not wish to be understood as limiting myself to the exact details and steps of the process as above described, as minor details

thereof may be varied without departing from the spirit of my invention.

What I claim is—

1. The process of making pine-needle fiber, consisting of the following steps, to wit: breaking the outer coating of the needles, boiling them under pressure in an alkali solution, digesting the mass at a temperature below boiling-point, washing in successive baths of water of successively lower temperatures, rolling the needles between elastic rollers, drying them, and then hackling them, substantially as specified.
2. The process of making pine-needle fiber, consisting of the following steps, to wit: breaking the outer coating of the needles, boiling them under pressure in a solution of barium hydrate or carbonate of soda, digesting the mass at a temperature below boiling-point,

washing in successive baths of successively lower temperatures, rolling the needles between elastic rollers, drying them, and then hackling them, substantially as specified.

3. The process of making pine-needle fiber, consisting of the following steps, to wit: breaking the needles, boiling them in a solution of barium hydrate, digesting the mass, washing in water, then washing in a dilute solution of acid, rolling the needles between elastic rollers, drying them, and then hackling them, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN B. N. BERRY.

Witnesses:

E. B. STOCKING,
EMMET L. MATTICE.