

UNITED STATES PATENT OFFICE.

JONATHAN KNOWLES, OF TRENTON, NEW JERSEY.

IMPROVEMENT IN PROCESSES OF TREATING VEGETABLE FIBER.

Specification forming part of Letters Patent No. **10,518**, dated February 14, 1854.

To all whom it may concern:

Be it known that I, JONATHAN KNOWLES, of Trenton, in the county of Mercer and State of New Jersey, have invented a new and Improved Process of Preparing Flax, Hemp, and other Similar Vegetable Fibers for Manufacturing into Yarn, Cloth, &c., of which the following is a full, clear, and exact description.

I take rotted or unrotted flax, cut into the desired length of staple, and boil it in a weak solution of soda or other alkali until the shives will readily separate from the fiber by rubbing. I then treat it with chloride of lime and chloride of soda, or any other preparation of chlorine which is its equivalent for this purpose, and with borax, common salt, saltpeter, Glauber's salt, Epsom salt, sal-ammoniac, alum, sulphates of zinc or copper, carbonate of ammonia, or any other salt the equivalent of these for this purpose. The effect of thus treating these fibers is simultaneously to bleach and subdivide each of them into numerous fine filaments, which are deprived of the hardness and rigidity peculiar to flax and that class of fibers and converted into a state very closely resembling cotton. Claussen and others have attempted to attain this object by separate processes of splitting and bleaching; but they have not been entirely successful, as the fiber prepared by them is greatly deficient in strength where it possesses the requisite softness and fineness, while by my process the fiber is left with unimpaired strength and at the same time is reduced into a fine, soft, and downy state, resembling fine cotton, suitable for carding, spinning, and weaving on such machinery as is now employed for performing these operations on cotton and wool.

To apply my process I take any quantity of flax, rotted or unrotted, and dressed or undressed, and cut into the required lengths. I then boil it in an alkaline solution for from three to six hours until the shives and fiber will readily separate, and afterward wash it in water and put it into a suitable vat, tub, or vessel; and for every hundred pounds of the fiber I pour into the vessel a quantity of clear liquor sufficient to cover it, composed of water in which ten pounds of chloride of lime have been stirred. The fiber must be agitated and worked about in the liquor so as to become thoroughly saturated as rapidly as possible, which will usually occupy from eight to ten

minutes, after which one pound of borax dissolved in water must be poured into the tub and agitated so as to mix it thoroughly with the fiber. As soon as the original fibers appear to be completely separated into their elementary filaments, which will be in from two to ten minutes, according to circumstances, (the exact time can only be determined by actual inspection,) they must be at once removed from the tub, the liquor pressed out of them, and then they must be washed in pure water to separate thoroughly all adhering chemicals, after which they must be dried, when they will be ready to be submitted to the action of the picker, cards, or other suitable machinery to render the mass flocculent, and to separate shives and other foreign matter in the same manner that cotton is prepared for spinning, &c.

I have tried the various salts above mentioned, but borax makes a better product than any of the others, yet I have obtained very good results by using the others, and all appear to act in the same manner upon the fiber, the difference being only in degree. I have not discovered the rationale of the action of the salts or of the chlorine upon the fiber, and therefore am unable to give any explanation on that point; but the result, of which there can be no doubt or uncertainty, shows unmistakably an improvement upon any process heretofore tried for cottonizing flax and other similar fibers.

I have above directed the fiber to be steeped in the chlorine solution before adding that of the salt, because I find the operation to be more rapidly performed in this way than when the order of mixture is reversed, yet the result appears to be the same, otherwise than in the consumption of time, whichever solution be used first. I have also mixed the saline or splitting and chlorine or bleaching solutions together in the vat before immersing the fiber, and the result produced in this way is as good; but the process is accompanied by an increased disengagement of offensive gas, which is objectionable. I have also prepared several successive lots of fiber in the same liquor, and found the process as perfect in its results in the last as the first, but taking a little longer time for its performance.

I have mentioned one pound of borax and ten pounds of chloride of lime as the proper quantities of these chemicals for the treatment

of one hundred pounds of flax. I may also add that I have found a saturated solution of common salt, one and a half pound of Glauber's salt and of saltpeter, two pounds of Epsom salt, about two pounds of sulphate of zinc, one pound of chloride of soda, and three quarters of a pound of sal-ammoniac to be the proper relative quantities of these several substances to produce the corresponding effect of one pound of borax; but the quantity of every article used will vary according to variations in its own quality and that of the flax or other fiber being operated on; but these things must, from their nature, be left to the judgment of the operator.

I have also tried various combinations of the above-mentioned salts, which operated very well, but were not quite as satisfactory as borax alone.

I have found that by heating or boiling the fiber in any of the foregoing solutions a much better effect is produced than when the solutions are used cold. The process is also hastened by heating, and I find that the agitation produced by admitting steam for heating into the bottom of the vessel is beneficial.

I am aware that Claussen has proposed to use in his process several of the salts I have mentioned, but in a different manner and with a different effect; but I make no claim to the

use of any substance in any process such as he describes, nor in any other in which the bleaching and splitting of the fiber are effected separately.

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

The method herein described of preparing vegetable fiber for picking, carding, spinning, and manufacturing into fabrics by such machinery as is usually employed for performing the corresponding operations on ordinary cotton and wool by, first, steeping or boiling it in a solution of alkali; second, washing it with water; third, steeping it in a solution of chlorine bleaching compound mixed with a solution of splitting salts to bleach and split it simultaneously; and, lastly, washing it with water and then drying it, as herein set forth, whereby the reduction of the fiber to its elementary filaments is expedited and the expense thereof lessened by dispensing with much of the tedious manipulation and treatment heretofore practiced, while at the same time the quality of the product is improved.

In testimony whereof I have hereunto subscribed my name.

J. KNOWLES.

Witnesses:

STEPHEN C. MILLER,
P. H. WATSON.