UNITED STATES PATENT OFFICE.

CHARLES DE LA ROCHE, OF PARIS, FRANCE, ASSIGNOR OF ONE-FOURTH TO FRANCIS IRSCH, OF NEW YORK, N. Y.

CHEMICAL RETTING AND UNGUMMING OF TEXTILE FIBERS.

SPECIFICATION forming part of Letters Patent No. 446,983, dated February 24, 1891.

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To all whom it may concern:

Be it known that I, CHARLÆS DE LA ROCHE, chemical engineer, a citizen of the French Republic, residing at Paris, in the French Republic aforesaid, have invented certain new and useful Improvements in the Chemical Retting and Ungumming of Textile Fibers, (for which I have applied for a patent in France on May 17, 1890, Deposit No. 192,551;) and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

Heretofore in separating textile fibers from plants, &c., the strongest and finest fibers have been secured by the ordinary process of retting, which is objectionable not only on account of the manual labor required, but also because of the uncertainty of the result and inequality of the product. Thus in every mass of material operated upon there is one portion which will be retted to a sufficient extent, producing a fine fiber, another portion which will not be sufficiently retted, while there is another portion which is over-retted, and consequently weakened. In any case the finest fibers produced are not wholly deprived of their gummy matters, whereby the complete separation of the fibers by the comb is prevented. Efforts have been made to overcome these difficulties by quick retting by using chemical agents as acids and alkalies, &c.; but while in some instances the operations are more rapidly performed and the gummy matters more readily extracted, the results have been either to weaken the fibers or to leave a part of the gum or other matters in the fibers.

The object of my invention is to remedy these defects and to eliminate the pectic, resinous, or gummy matter which, as I have discovered, are all liable to be dissolved and to disappear in presence of fatty acids. Besides, I eliminate other foreign substances, such as the lime and the greater part of the metallic salts, which constitute the coloring-matter of textiles, thus allowing a more perfect bleaching to be obtained in the discoloring bath without perceptibly altering the fiber.

To carry my invention into effect I employ the following means: First, the textile material is placed in a lixiviating apparatus and subjected to the action of a boiling solution of any ordinary soap in any suitable proportions—as, for instance, two (2) pounds of soap to each one hundred (100) pounds of water. The time varies, of course. Generally the boiling is continued for three or four hours. When it has been ascertained that the soap has penetrated the mass of fibers and that the latter are thoroughly impregnated therewith, I then introduce a decomposing-liquid. I employ, preferably, ammonium chloride (NH_4Cl) dissolved in water in sufficient quantity to decompose the weight of soap dissolved in the lixiviating-water—that is to say, about one part, by weight, of ammonium chloride to three parts of soap. The following reaction immediately takes place: The soap is decomposed in presence of the ammonium chloride into alkali and insoluble fatty acids not only in the solution but in and among the body of the fiber wherever the soap has penetrated, the chloride uniting with the sodium of the soap to form sodium chloride and the ammonium and fatty acid being set free. If any glycerine is present in the soap, it penetrates the fibers with the soapy water. The fatty acids dissolve and set free the resinous substances, which then come out and float on the surface of the lixiviating-water. The greater part of the lime and metallic salts are dissolved, on the other hand, by glycerine, if present, so that after two or three hours lixiviation the textile substances are found, on the apparatus being emptied, freed from all gums or resins, but impregnated with a fatty acid which has taken their place, and, being insoluble, remains there. There only remains now to subject them to the action of a new alkali slightly caustic to reconstitute the saponification of the fatty acids, so that the material will dissolve, and obtain a textile substance absolutely disintegrated and deprived of gummy matter. This new operation lasts about two hours, at the end of which the water is drawn off and can be used anew for the same operation. The textile substances are then thoroughly washed, as usual, and the bundles are finally drained and dried.

The above-described process can be used

upon plants like the flax and other similar material, as cut by the farmer without any previous operation to remove the woody portion of the material, the process itself serving to loosen the fibers from the other portions, so that the latter may subsequently be readily and more easily removed, thereby avoiding that preliminary complicated and tedious treatment which is practiced now and is not practicable in countries like the United States, where the price of labor is high. Furthermore, the loss which results from the outdoor exposure of the material through a long period of time, with great waste from storms and accidents of various kinds, is also averted.

The fiber produced by the above-described process is uniform in quality—that is, there is no portion which is overtreated or undertreated, while my treatment, instead of impairing the strength, results in a fiber which is throughout the mass as strong as nature made it, and consequently stronger than the best fiber produced by the ordinary retting or ungumming process. By my process, and especially for flax and similar textile plants, the bleaching becomes unnecessary, as it comes out white at the first operation of ungumming, and in this manner is entirely dispensed with. Further, the fiber above produced is more effectually freed from gums and resins than is possible by the ordinary process without being correspondingly weakened, and as a result it is possible with all classes of fibers, whether they be coarse or fine, to effectually comb out and separate the finer fibers, which in the ordinary hand process are gummed together, so that I am enabled to secure from coarse fibers, heretofore used only in the production of cordage, rope, and coarse articles, fine fibers capable of being spun to form threads and fabrics of the highest grades of linen.

In the treatment of textile substances, like china-grass and others derived from exotic countries and which contain a pectic matter much more refractory and abundant than that existing in the fibers of northern regions, it is necessary after the above-indicated rinsing to subject them to the action of borated water of a strength of one or two degrees by the alkalimeter. A hot solution of any of the forms of borate of soda has the property of dissolving all pectic or resinous matters. It will therefore be easily understood that if any remain in the textile filaments they will be completely dissolved in this solution, after which the fibers are washed, as usual. The bleaching, when necessary, is then proceeded with by any well-known means, and requires, however, much less time by making use of my process than others and needs less corrosive baths, as the fibers I obtain are absolutely freed from gummy resinous matters impeding or slackening the action of discoloring agents.

While by ordinary processes it is possible to remove the matters associated with the fibers to a certain degree, I have found that by my above-described process I can operate upon flax, hemp, china-grass, and other fibrous materials, so as to furnish products that are very much finer than result from the common modes of treatment, thus converting an inferior fiber for a superior use and into a higher product.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The process of disintegrating vegetable fibrous substances, which consists in saturating them with soapy water, then subjecting them to a solution of a decomposing-salt, whereby fatty acids are formed, dissolving the gummy resinous matter in the body of the fibers, and then using a solution of an alkali, whereby the fatty acids are saponified, substantially as described.

2. The method of disintegrating fibrous plants, which consists in boiling in a soap solution, then adding ammonium chloride and continuing the boiling, and subsequently subjecting the material to a solution of an alkali, substantially as described.

3. The method of disintegrating fibrous plants, which consists in boiling in a soap solution, then adding ammonium chloride and continuing the boiling, and subsequently subjecting the material to a solution of an alkali, and then washing with borated water, substantially as described.

CHARLES DE LA ROCHE.

Witnesses:
F. MENNONS,
Patent Agent, Paris.
H. PROUST,
Clerk to above.