

# UNITED STATES PATENT OFFICE.

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## TREATMENT OF VEGETABLE FIBROUS MATERIAL.

SPECIFICATION forming part of Letters Patent No. 301,069, dated June 24, 1884.

Application filed April 5, 1884. (No specimens.) Patented in Luxemburg April 2, 1884, No. 377, and in Italy April 18, 1884, XXXIII, 135, XVIII, 166—72.

*To all whom it may concern:*

Be it known that I, AUGUST PRINZ, a subject of the Emperor of Austria, residing at Meissen, Saxony, German Empire, have invented certain new and useful Improvements in the Treatment of Vegetable Fibrous Material; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in the treatment of vegetable fibers—such as hemp, flax, reed, nettle, gambo, hops, pyta, osier-bark, ananas, sida, apocynum, and other fibrous substances, and more especially jute—for the purposes of spinning and the manufacture of paper.

The invention relates more particularly to the chemical treatment of these and analogous fibrous substances, as well as to the treatment of the products or textiles thereof.

The methods heretofore employed in the preparatory treatment of these substances, so far as the chemical portion thereof is concerned, consist, chiefly, in the boiling of the fibers in a caustic-soda lye or in a lye of other alkalies. So far as I am aware, it has not been possible by this method to completely eliminate from the fibrous substances those incrustated, resinous, and starchy substances—such as pitch, resin, wood, starch, glue, and other resinous and starchy substances—without materially affecting the quality of the fibers treated. By means of my improved method I am enabled to overcome these difficulties and obtain, especially by treating jute fibers, a material from which the finest yarn can be spun with greater facility and economy than this could be done heretofore, and at the same time I obtain from the refuse a material of great value in the manufacture of paper. I am also enabled to impart to the products of such fibers, (spun or woven,) a greater density and the appearance of wool.

The invention consists, essentially, in macerating the mechanically-prepared fibers or other products in a dilute solution of hypochlorite of lime before treating the same with alkalies.

By this method it is possible to dissolve and eliminate, even without the application of heat, the greater portion of the adhesive and resinous elements from the fibers, especially that substance discovered by me which I call “jutine”—a resinous substance characteristic to jute—and prepare the fibers or their products for treatment with alkalies. By eliminating the greater portion of the foreign substances referred to before treating the fibers with alkalies, the quantity of the alkali and the time during which said fibers are exposed to the action thereof are materially reduced without impairing the strength of the fibers and imparting to them a peculiarly silky or woolly appearance and texture.

I am not aware that hypochlorite of lime has heretofore been used in the treatment of fibrous substances or their products. It is true chloride of lime has heretofore been employed for the purpose of bleaching fibrous substances and their products previously treated with alkalies, and it will be readily seen that there is no analogy or similarity in the results produced by the two methods—of maceration in a solution of hypochlorite of lime before treatment with alkalies and the method of bleaching by means of chloride of lime after treatment with alkalies. It may also be remarked that the fibers, after maceration in the solution of hypochlorite of lime, show but a very limited degree of decoloration; consequently a bleaching process cannot here come into question. Inasmuch as the greater portion of the resinous, gummy, and starchy substances are removed by the process of maceration, the fibers so treated may be utilized with advantage for many purposes without further treatment with alkalies. Where such fibers are, however, employed in the manufacture of yarns or textiles, I treat them with alkalies, as usual, after maceration.

In carrying out my process and before maceration of the crude fibers it is desirable to remove the roots and tips or ends of said fibers, for the reason that these portions are usually very rich in the substances to be removed or eliminated by the process. The bath is prepared by making a solution of chloride of lime



in water in the proportion of about one hundred kilograms of the former to about fifteen hundred liters of the latter, allow the same to settle, and draw off the clear liquid.

5 This solution is then preferably diluted by the addition of twice its volume of water, and is then ready for use. I employ about nine hundred liters of the solution to every fifty kilograms of the fibers or their products, (spun  
10 or woven.) The latter are laid horizontally in any suitable macerating tub or vessel, and the solution is then poured on and allowed to stand twenty-four hours, more or less, during which time the principal portion of the resinous, gummy, and starchy substances herein-  
15 before referred to, are dissolved or eliminated from the fibers without impairing or injuriously affecting the latter. After maceration the substances treated are subjected to pressure and then subjected to the action of caustic  
20 alkalies.

In the treatment of the fibers or their products with solutions of caustic alkalies I prefer to combine with the latter a hydrocarbon—  
25 such as benzine, naphtha, petroleum, or sulphuret of carbon—instead of alcohol, as has been proposed, for the reason that the hydrocarbons or sulphuret of carbon are not decomposed by the alkalies, and act as solvents  
30 for the resinous and gummy substances combined with the fibers. The treatment with caustic alkalies may be effected by boiling or by cold maceration when it is desired to impart to the fibers treated the appearance of  
35 animal fibers. When the hot process is resorted to, I preferably place the fibers vertically into receivers having perforated walls, which are then placed or suspended in the caustic-alkali bath. I have found that equal  
40 parts, by weight, of caustic alkali and fibers can be employed, the former being dissolved in sufficient water to form a solution of a strength of from 4° to 6° Baumé, to which I add about thirty parts, by weight, of a hydro-  
45 carbon or sulphuret of carbon. In this bath the material is boiled under a steam-pressure of from three to six atmospheres for two to five hours, after which it is withdrawn, washed, bleached, and dried. It will be found that the  
50 material so treated is free from resinous, gummy, or adhesive foreign substances, while the fibers will be thoroughly isolated from one

another and will have assumed a specially beautiful silky appearance, from which the finest yarn may be spun.

If it is desired to impart to the fibers or the products thereof a woolly and curly appearance, they are macerated in a concentrated cold solution of caustic alkali of about 45° Baumé. The duration of this process will depend upon  
60 the nature of the fibrous material treated, and may last as long as fifty hours, after which the material is washed in water, which, if desired, may be slightly acidulated. When so treated, the fibers expand, and then contract in spinning and weaving, which gives the yarn a  
65 closer twist and to the fabric a closer texture.

Having now fully described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The herein-described process of treating vegetable fibers or products therefrom (spun or woven) by maceration in an attenuated cold solution of chloride of lime.

2. The herein-described process of treating  
75 vegetable fibers or products therefrom (spun or woven) by maceration in an attenuated cold solution of chloride of lime, and by subsequent treatment with alkali lyes.

3. The herein-described process of treating  
80 vegetable fibers or products therefrom (spun or woven) by maceration in an attenuated cold solution of chloride of lime, and by subsequent boiling under pressure in an alkaline solution.

4. The herein-described process of treating vegetable fibers or products therefrom (spun or woven) by treatment in an alkaline lye with which is combined a hydrocarbon or sulphuret of carbon.

5. The herein-described process of treating vegetable fibers or products therefrom (spun or woven) by maceration in an attenuated solution of chloride of lime, and by subsequent boiling under pressure in an alkaline lye,  
95 combined with a hydrocarbon or a sulphuret of carbon.

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

AUGUST PRINZ.

Witnesses:

A. DEMELIUS,  
B. ROE.