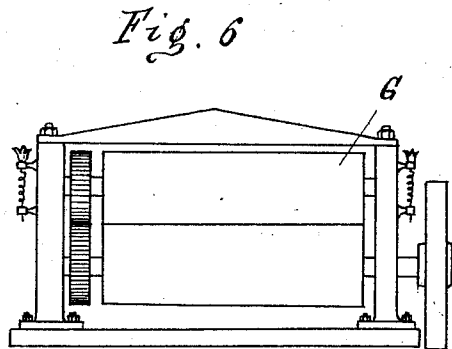
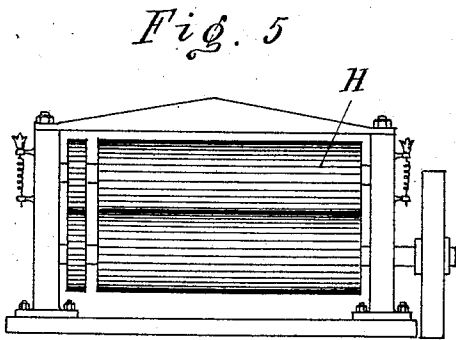
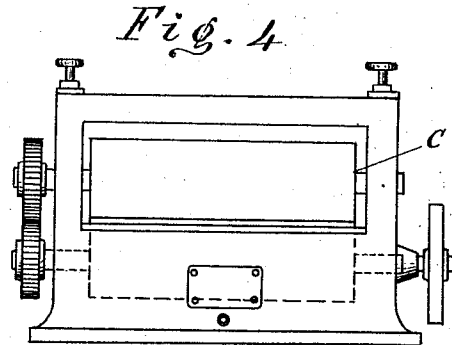
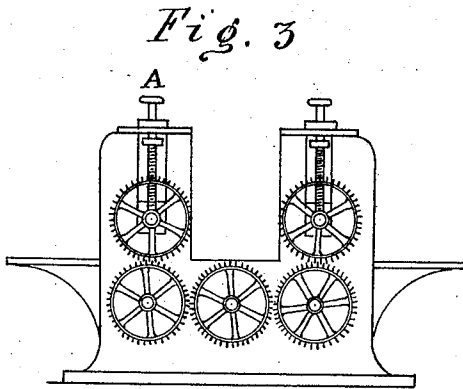
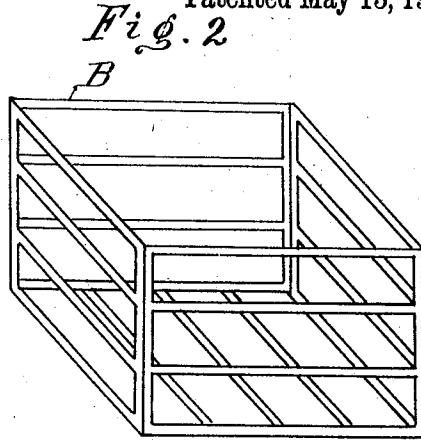
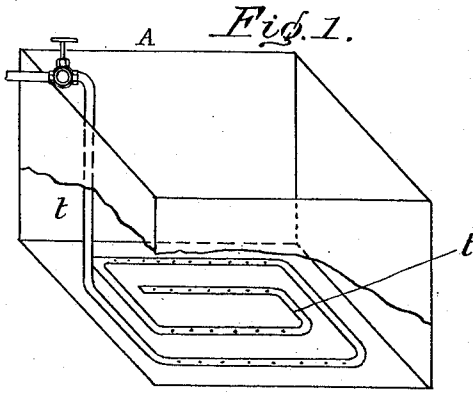


VINCENZINA DEL PRATO, NATA VISCARDI, GIOVANNI DEL PRATO,  
 VINCENZO DEL PRATO, CESARE DEL PRATO & MARIA DEL PRATO.  
 PROCESS FOR SEPARATING VEGETABLE OR ANIMAL FIBER.

1,061,902.

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Patented May 13, 1913.



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# UNITED STATES PATENT OFFICE.

VINCENZINA DEL PRATO, NATA VISCARDI, GIOVANNI DEL PRATO, VINCENZO DEL PRATO, CESARE DEL PRATO, AND MARIA DEL PRATO, OF NAPLES, ITALY.

PROCESS FOR SEPARATING VEGETABLE OR ANIMAL FIBER.

1,061,902.

Specification of Letters Patent.

Patented May 13, 1913.

Application filed March 1, 1911. Serial No. 611,622.

*To all whom it may concern:*

Be it known that we, VINCENZINA DEL PRATO, nata VISCARDI, GIOVANNI DEL PRATO, VINCENZO DEL PRATO, CESARE DEL PRATO, and MARIA DEL PRATO, subjects of the King of Italy, and residing at 75 Via Nazionale, Naples, Italy, have invented certain new and useful Improvements in Processes for Separating Vegetable or Animal Fiber, of which the following is a specification, reference being had therein to the accompanying drawing.

The object of the present invention is a combined chemical and mechanical process applicable for removing the gum from and separating textile fibers, and also for bleaching same.

The processes at present in use for treating textile fibers may be divided into two categories. The first category, applicable to vegetable fibers, comprises those processes in which the stems of the fiber plants are macerated in stagnant waters until the agglutinant substances which make the fibers adhere to each other and to the wood, are putrefied and may be removed and the fibers be separated by the aid of a mechanical treatment, that is by swinging the fibrous parts. The second category comprises processes which are based on the treatment of textile fibers by means of concentrated alkaline solutions under pressure or which are made to act upon these fibers for a considerable time (from four to six hours) so as to chemically attack the agglutinant substances which make the fibers adhere to each other and to the wood, until they are rendered soluble and until the fibers may be deterged and separated. These purely chemical processes however are not frequently used because the alkaline solutions, on account of their being concentrated and under pressure and as they have to act for a considerable time, affect not only the agglutinant substances but also the wood and the fibrous part itself so that the fibers lose their resistance and elasticity. While these last-named processes thus show great disadvantages in regard to the products obtained, the inconveniences of the first-named processes consist especially in their slowness and in that they impair the salubrity

of the places in which the maceration is effected. These inconveniences are completely avoided by the present invention by which also plants may be treated, and thus utilized, whose fibers it has been impossible to separate by the means at present in use.

Figure 1 is a diagrammatic perspective view of a tank for the process; Fig. 2 is a similar view of a cage for immersing the fibrous stems; Figs. 3 and 4 are end and side elevations respectively of rollers compressing the stems to drive out the mucilaginous agglutinant substances; Fig. 5 is a side elevation of grooved cylinders for softening the fibers, and Fig. 6 is a side elevation of rollers compressing the fibers during an intermediate stage of the process.

The present process is based on the following operations:—Into a receptacle such as A in Fig. 1 provided with a bent steam pipe *t* or some other suitable heating arrangement for keeping the liquid contained in it in boiling condition, a solution of bicarbonate of soda in the proportion of 10 to 1000 is poured and therein brought to boiling point. The stems of the refibrous plants to be treated, preferably placed in an iron cage as B, Fig. 2, are kept immersed in this solution for about 20 minutes. This alkaline bath to which the plants are thus submitted is however not sufficiently strong to completely attack the agglutinant substances, such as pectose vasculose, etc., which make the fibers adhere to each other and to the wood, but only just initiates the treatment of those substances, (without doing any damage to the fibers), by simply modifying their physical state, that is, by reducing them from a solid to a mucilaginous or gelatinous state. Bicarbonate of soda and not some other alkaline salt is used because a solution of the first-named develops, on boiling, carbonic acid which, by a mechanical action, initiates the separation of the fibers.

The plants, as soon as they are removed from the bath, are submitted to the action of rollers with smooth cylinders C, such as shown in Figs. 3 and 4. By these rollers the plants are compressed and a large quantity of the now mucilaginous agglutinant substances driven out of them. These substances are carried away by a jet of cold

water which is thrown on to the stems on their leaving the said rollers. By these operations a large part of the gummy substances has been removed while the remaining part is in a mucilaginous state, and the fibers may thus most easily be separated from each other and from the wood by one of the ordinary swingling procedures.

Hemp may have its fibers separated immediately after the aforesaid bath and whether it is wet or dry, the compression above mentioned is not necessary. If it is only desired to detach the fibers from the wood and not to split them so as to obtain them in the form of a band, a product which is very useful in the manufacture of ropes, the solution of bicarbonate of soda may be reduced from 10 to 1000 to 2 per 1000.

After the above described operations the fibers still contain, as has been said, a large quantity of agglutinant substances which have not been removed by the compression, and if the fibers were now immediately dried, they would again become rigid and woody and lose their elasticity. In order to remove the remaining mucilaginous substances the fibers are submitted to a further chemical treatment. If however after the above described operations the fibers have been allowed to dry and if in consequence the remaining agglutinant substances have again become solid and would thus be impervious to the reagents with which the fibers are now to be treated, the latter are a second time submitted to a bath containing a solution of bicarbonate of soda at 10 per 1000 in order to reduce the gummy substances again to a mucilaginous state. To this bath have to be submitted also those fibers which have been separated by other processes without their agglutinant substances having been removed, in case their treatment is to be continued with the present process. After this bath which, as has been said, is not necessary if the treatment has not been interrupted, the fibers are again submitted to the compressing action of smooth rollers such as G, Fig. 6, as above described. In this way, a further part of the agglutinant substances is mechanically removed, because the fibers, on account of their having been separated from the wood, are now much more flexible and the mucilaginous substances may be much more easily removed than during the first compression, when the fibers were still united to the woody part. The fibers are then washed in cold water and immersed for about 20 minutes into a cold bath containing chlorid of lime in the proportion of 10 to 1000. The bath reacts on the atmospheric carbonic acid and thus develops chlorin which in its nascent state reacts on the agglutinant substances remaining in the fibers. This is made possible by these substances being in

a mucilaginous state and, for this reason, pervious to the chlorin which passes through their whole mass. The agglutinant substances acted on by the chlorin become soluble and the fibers may thus be washed in a bath of cold water.

In order to completely remove the gum it may be necessary to submit the fibers to a second bath in a solution of chlorid of lime and subsequently wash them in cold water. Two of these baths however are as a rule sufficient to obtain fibers of an extraordinary whiteness and very superior to those which at present it is possible to obtain commercially. However these baths may be repeated over and over again, and in each successive bath a greater fineness and whiteness of the fibers is obtained. These successive baths in chlorid of lime not only remove the gum, but have at the same time another very important purpose, that is to bleach the fibers. After these baths in chlorid of lime and cold water the fibers are submitted to the action of a hydroextractor where under the action of centrifugal force the last traces of the agglutinant substances which are dissolved in the water adhering to the fibers, are removed. After the treatment in the hydroextractor the fibers are dried, but in drying they harden and have for this reason to be subjected to the action of a machine with grooved cylinders H as in Fig. 5, or of some other machine, such as those already in use, suitable for softening the fibers so that the latter regain their softness and flexibility.

In treating plants whose fascicles of fibers are covered by an impermeable membrane it is necessary, in order to submit them to the series of operations described, to first break this covering and strip the fibers by the aid of the machine shown in Figs. 3 and 4 so as to permit the alkaline solution of the first bath to act on the plants. The alkaline bath used for initiating the treatment of the vegetable fibers may also be used for the washing of wool and the scouring of silk, for wool however the temperature of the water must be from 50 to 60° C.

What we claim is:

A combined chemical and mechanical process for treating vegetable and animal fibers consisting in immersing same in a weak alkaline bath of about 20 minutes' duration and consisting of a boiling solution of bicarbonate of soda in the proportion of 10 to 1000, a successive removing of the agglutinant substances by compressing the fibers in a roller machine with smooth cylinders, a successive mechanical separation of the fibers, a second bath of bicarbonate of soda in case the fibers have been permitted to dry, followed by a second compression in a roller machine with smooth cylinders, and finally, several successive cold

baths in a solution of chlorid of lime in the proportion of 10 to 1000 in order to cleanse the fibers of the agglutinant substances which may have remained in them after the  
5 mechanical treatment.

In witness whereof we, the said VINCENZINA DEL PRATO, *nata* VISCARDI, GIOVANNI DEL PRATO, VINCENZO DEL PRATO, CESARE DEL PRATO, and MARIA DEL PRATO,  
10 have signed this specification at Naples in

the Kingdom of Italy this 10th day of February 1911.

VINCENZINA DEL PRATO, NATA VISCARDI.

GIOVANNI DEL PRATO.

VINCENZO DEL PRATO.

CESARE DEL PRATO.

MARIA DEL PRATO.

In the presence of two witnesses:

ASS. GIUSEPPE DEL PRATO,

PASQUALE LUANGO.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

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