

UNITED STATES PATENT OFFICE.

FREDERIC DAVID LOVELL, OF TAMPICO, MEXICO.

FIBROUS ABSORBENT RESILIENT MATERIAL AND PROCESS OF MAKING IT.

996,494.

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No Drawing.

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To all whom it may concern:

Be it known that I, FREDERIC DAVID LOVELL, a citizen of the United States, residing at Tampico, State of Tamaulipas, Mexico, have invented certain new and useful Improvements in Fibrous Absorbent Resilient Material and Process for Making It, of which the following is a specification.

My invention relates to a process for utilizing a part entering into the structure of the banana-tree which has hitherto not been made available for use in the industrial arts, by producing therefrom a fibrous, absorbent, resilient material somewhat similar to ordinary cotton waste, adapted to form an excellent substitute for waste as a wiping material, and particularly as a packing for car boxes and journals and all classes of axle bearings, as well as lending itself to a multiplicity of other uses. Owing to its great property of absorptivity it answers very well as a substitute for absorbent cotton for medical purposes. The same quality makes it available for making the small mats customarily used under glasses, in serving beverages, to protect the tables and take up spillings. For upholstering purposes, stuffing seats, mattresses, etc., the resilience of this new material combined with its softness make it very valuable, especially in view of its cheapness as compared to horse hair and other materials used for these latter purposes. Being a poor conductor of heat the fibrous product may be advantageously used for filling the spaces between double partitions and floors in dwellings, to assist in keeping them cool in summer and warm in winter, while at the same time deadening the sound. I have produced very serviceable felt-like inserts for foot-wear from the same material. Many other uses to which it can be put will develop as the material becomes better known. When compressed it should answer for filling casemates and compartments of war vessels, to automatically close up shot-holes after the manner of the cellulose obtained from the husks of cocoa-nuts, only in a much higher degree, owing to its greater resilience; but I have not had the appliances at my disposal to make the necessary tests. For purposes of identification I have designated this new material by the name "banana-wool." Banana-wool is obtained from the stalk or stem of any one of the many varieties of the banana-tree (*Musa sapientum*). As the stalk is either

left to rot or is cut off close to the ground and thrown away at the time the fruit is harvested its use for the present purpose is a clear gain. I am aware that the fibers of the stem have been used, by the natives of tropical countries where the banana is indigenous for textile purposes, especially in making rude cordage. It is also known to me that attempts have been made to use these fibers industrially by scientifically equipped experimenters; but to the best of my knowledge in the first case as well as in the second the results have been quite unsatisfactory, so that today the stems are considered of little or no value, excepting, perhaps as fuel. The fibrous residue of the stem after the juice and woody portions have been removed is not adapted for textile purposes because the fiber is too fine, not leaving it sufficient strength to stand the necessary operations. This defect, however, in no way militates against its use as an absorbent, as above outlined, to which use it has never to my knowledge been put.

The stem is made up of vertically extending leaf-like sheaths or layers. Each outer sheath infolds the inner one next to it, but without going all around it. This structure enables the sheaths to be readily separated, which is the first operation of the process. For the present this is done by hand, but suitable mechanical means are being devised to this end. The separate sheaths are next cut into lengths according to the length of separate bundles of fibers one desires to obtain, which depends on the use to which the banana wool is to be put. When the fiber bundles are very long, being resilient, and given a curling tendency in the making they tangle and twist up into a snarl, which for some purposes is very undesirable. If not cut to proper lengths before treatment, it is practically impossible to do so later on. These lengths are fed longitudinally, or end first between a pair of smooth-faced rolls or crushers, which squeeze out the greater part of the juice and press the sheaths out flat. After the material emerges from the rolls or crushers it is exposed to blasts of air which dry it sufficiently for the ensuing shredding. Care must be taken not to remove all the moisture before shredding lest the fibers become too brittle and break up into short straws. By carefully regulating the degree of compression, which may be varied by adjusting the position of the rolls

with respect to each other; and regulating the exposure to the air, the exact degree of moisture required in the material may readily be obtained. Now the semi-dried mass, all of which is available for making banana wool, is run through a pair or series of pairs of shredders, preferably consisting of toothed rolls. These cut the material into strips varying in width according to the spacing of the teeth along the face of the roll and according to the width of their cutting edges. The strips are really flat bundles of very fine fibers to which some woody matter adheres as made for the form of the wool which I have found best adapted for wiping and similar purposes for which cotton waste is used. As the number of fibers in each bundle is very considerable it is clear that by continuing the splitting any desired degree of softness of the product may be obtained. In preparing banana wool for use as a substitute for absorbent cotton, the splitting up is carried on by running the strips through toothed rolls having teeth as fine and as closely spaced as those of a comb, until the resulting product is as soft as cocoon silk. For such very fine subdivision I may also advantageously substitute for the shredding rolls a horizontally moving table which pulls the strips through the teeth of a fixed steel comb. The more the subdivision, the more the woody matter is removed. In the process of shredding the moisture is again reduced, by the squeezing to which the material is necessarily subjected.

When the desired degree of subdivision has been attained the resulting strips are run through a set of heated rolls, while still containing sufficient moisture to enable them to stand the compression and tension without breaking. These rolls serve to curl the strips so as to enable them to be readily united into a waste-like mass, the parts of which naturally intertwine and become knit together. It might appear that this were contradictory with the previous statement that very long strips are undesirable owing to their tendency to become tangled and snarled, as that would seem a desideratum in order to assist in the intertwining of the fiber bundles. But that is not the case; the

difference being that while it is desirable that one fiber bundle curl and twine around another, it is harmful to have one strip coil up and become tangled with its own parts, as thereby knots and lumps would be produced, diminishing the wiping and absorbing surface, and, at the same time, preventing the knitting of one strip with another. After being curled the banana wool is thoroughly dried by exposure to the sun and air or by any suitable known mechanical means, whereupon it is ready for being utilized in any one of the many ways indicated.

I claim:

1. A process for preparing a fibrous, resilient, absorbent material consisting of separating the stem of a banana tree (*Musa sapientum*) into its component sheaths; cutting said sheaths into suitable lengths, partially squeezing the juice out of said lengths and flattening them; partially drying said squeezed and flattened lengths; shredding said lengths into strips of desired width, said strips being flat bundles of fibers to which some woody matter adheres; curling said strips and thoroughly drying said curled strips.

2. A process for preparing a fibrous, resilient, absorbent material consisting of separating the stem of a banana tree (*Musa sapientum*) into its component sheaths; cutting said sheaths into suitable lengths, partially squeezing the juice out of said lengths and flattening them; partially drying said squeezed and flattened lengths; shredding said lengths into strips of desired width, said strips being flat bundles of fibers to which some woody matter adheres; curling said strips; thoroughly drying said curled strips, and impacting them into one mass by bringing a number of said curled strips together, and causing them to intertwine and become knit together by pressing them together and by the tendency to twist and unite imparted to them by said curling and by their natural elasticity.

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

FREDERIC DAVID LOVELL.

Witnesses:

EDUARDO ROMERO,
G. A. GUERRA.