

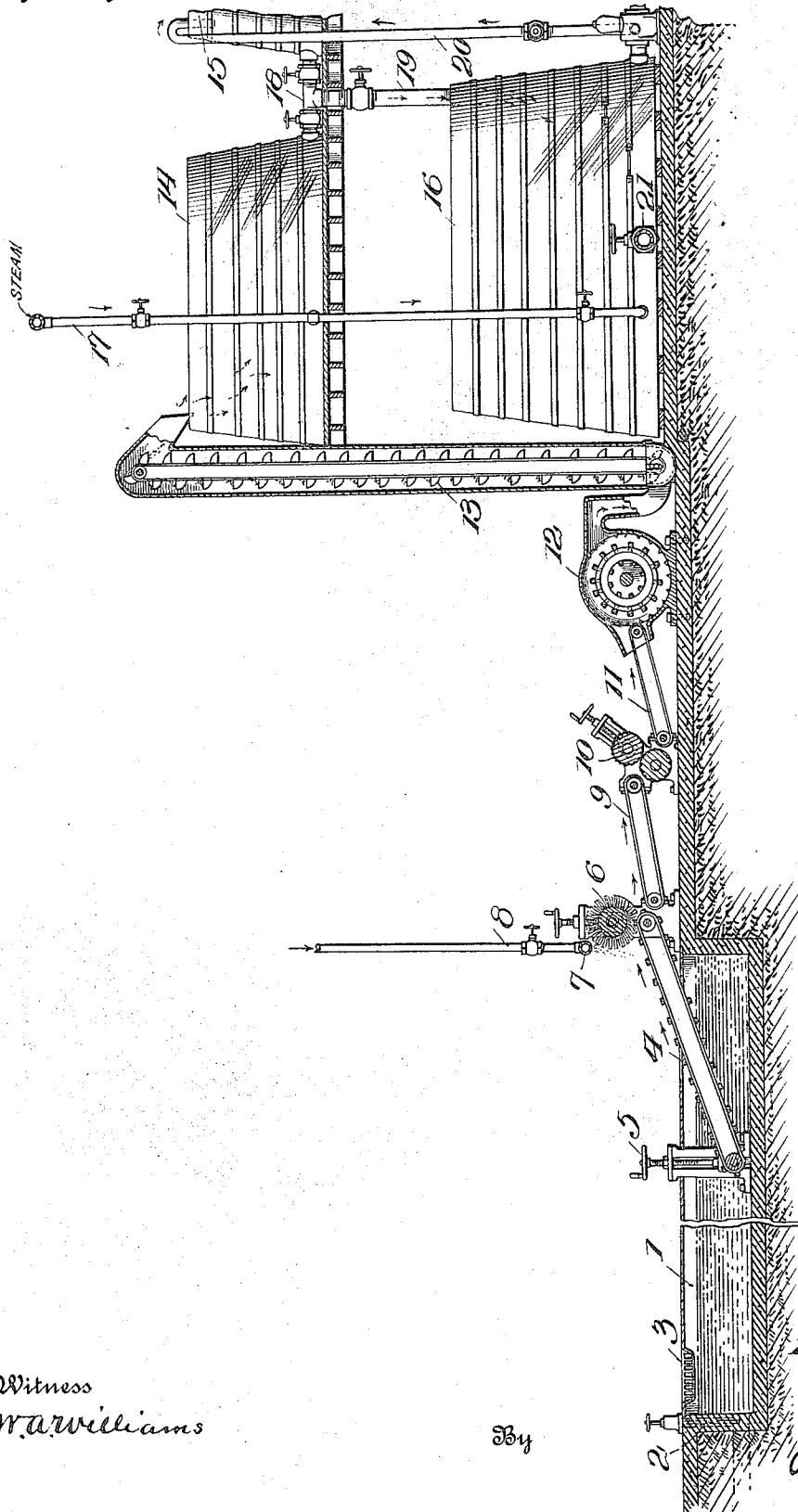
M. W. MARSDEN.

METHOD OF TREATING THE COTTON PLANT FOR THE RECOVERY OF ITS VALUES.

APPLICATION FILED OCT. 10, 1916.

1,229,181.

Patented June 5, 1917.



# UNITED STATES PATENT OFFICE.

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METHOD OF TREATING THE COTTON-PLANT FOR THE RECOVERY OF ITS VALUES.

1,229,181.

Specification of Letters Patent.

Patented June 5, 1917.

Application filed October 10, 1916. Serial No. 124,808.

*To all whom it may concern:*

Be it known that I, MARK W. MARSDEN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Methods of Treating the Cotton-Plant for the Recovery of Its Values, of which the following is a specification.

I have had considerable experience and large success in treating the so-called waste portions of the cotton plant, namely, the stalks, stems and roots, or what remains after harvesting, for the recovery of its values and particularly the fiber for the manufacture of paper and other products. These manufactures were eminently satisfactory as to strength and durability, but objection was made to the presence of dark scales or specks which gave the pulp or ultimate product a mottled or dirty appearance. To remove them it was necessary to use a powerful bleach, which, while it sometimes accomplished its purpose, left the product commercially unsatisfactory because of its weakening and otherwise detrimental effect upon the fibrous structure.

It is the object of my present invention to correct this evil and to provide an economical method and means for treating stock of the nature indicated whereby the fiber bundles may be recovered in their natural length and strength and the ultimate pulp product will be free from the dark or dirty color before alluded to.

I have discovered that the said scales or specks are caused in part by field dirt, but principally by a coating or incrusting substance of a dirty brown color, which adheres with great tenacity to the outer bark and heretofore has been ground up or disintegrated with the rest of the stock. Accordingly my invention contemplates the removal of this objectionable dirt or deposit prior to the mechanical reduction and digester treatment, and in the manner and by the means substantially as hereinafter described and claimed.

The accompanying drawing is a sectional-elevational view of apparatus suitable for practising the invention.

Having reference thereto, 1 represents an open tank or trough of considerable capacity, equipped with a gate valve 2, and with

a screened overflow 3. Water is admitted or supplied in any suitable way and caused to flow in a constant stream. The stalks, stems, roots and bolls are introduced therein and washed or soaked until the dirt and incrusting matter are softened. The bolls float away and the balance of the stock is picked up by or thrown onto a conveyer 4 and carried to a point where it is subjected to what may be termed the attrition action of a combined scrubbing and scouring or flushing arrangement. The conveyer 4 is disposed at an incline and its lower end may be adjusted with relation to the bottom of the wash tank by a screw spindle in a manner well understood. The scrubber is preferably a stiff rotary brush 6 adjustably mounted with relation to the conveyer 4. The purpose of the brush is to remove the dirt and incrusting matter, which it does in a very effective manner. Coöperating with the brush is a flushing device consisting of a shower or spray apparatus 7, supplied with water through a valved connection 8. The flushing device cleanses the brush and also relieves the stock of the matters released by the attrition or scrubbing action of the brush.

The stock thus freed of dirt and other adhering extraneous matter, is conducted by a conveyer 9 to the crushing rolls 10, from whence it is conducted by a conveyer 11 to a shredding machine 12. After being shredded the stock is ready for the next or leaching step and may be raised by an elevator 13 to a series of leaching tanks 14, 15 and 16, wherein it is subjected to the solvent action of heat and water. Sufficient heat is supplied by a steam line 17 to dissolve the readily soluble parts and to convert the starch and carbohydrates into saccharin. The liquor flows from one tank to another through valved connections 18 and 19, and, if desired, it may be forced from the lower tank to the upper tanks and re-circulated through the medium of a pump connection 20. This treatment is continued until the liquor has taken up sufficient of the soluble matters to be of the proper gravity, for example, from twelve to fifteen degrees Baumé more or less, for fermenting and distilling, &c., for the recovery of its values, the residue being a valuable fertilizer product. The bottom vat or tank, which may be termed

the concentration tank, is equipped with a discharge cock 21 through which the liquor may be drawn off for treatment.

After leaching, the fibrous mass is thoroughly washed to eliminate all of the free extractive matter, whereupon it is subjected to the usual or any suitable procedure for the manufacture of paper or other pulp-formed products. For example, it may be digested under a steam pressure of from seventy-five to one hundred pounds, more or less, for from four to six hours, more or less, according to the pressure required to dissolve the pectin and incrusting matter to a sufficient degree to admit of the disintegration or separation of the fiber when run through a beating engine. In order to hasten the reduction in the digester, a solution of soda, potash, or sulfid, may be employed in a weak form, for example, less than half the strength required for the reduction of wood pulp.

Evidently then, by my method of treatment I obtain a pulp of great strength and durability and free from fixed specks and other evidences of objectionable natural color. Under the old practice I found that the extractive matter reacted with the digester liquor to such an extent as to destroy the lignin and to greatly impair the strength of the bast fibers. Hence, from this viewpoint too it is a merit of the invention that I get rid of the extractive matter before the reduction treatment.

Having described the nature and object of the invention I claim:—

1. That improvement in the treatment of stock of the nature indicated for the recovery of its values, which consists in subjecting it as it comes from the field to the action of flowing water in order to remove the bolls and to loosen the field dirt, then subjecting it to continuous brushing and wetting to thoroughly remove the field dirt and loose coloring matter, and mechanically reducing the clean stock by first crushing and then shredding it.

2. That improvement in the treatment of stock of the nature indicated for the recovery of its values, which consists in subject-

ing it, prior to crushing or grinding, to the action of a volume of flowing water in order to remove the bolls and to soften the dirt and other adhering matter, removing the stock from the bath and while in transit subjecting it to scrubbing under a copious flow of water.

3. That improvement in the treatment of stock of the nature indicated for the recovery of its values, which consists in subjecting it, prior to crushing or grinding, to the action of a volume of flowing water in order to remove the bolls and to soften the dirt and other adhering matter, removing the stock from the bath and subjecting it to scrubbing with free access of water, mechanically reducing the clean stock to a uniformly divided state, and leaching out the extractive matter for its ultimate recovery in the form of useful by-products.

4. That improvement in the treatment of stock of the nature indicated for the recovery of its values, which consists in subjecting it, prior to crushing or grinding, to the action of a volume of flowing water in order to remove the bolls and to soften the dirt and other adhering matter, removing the stock from the bath and subjecting it to scrubbing with free access of water, mechanically reducing the clean stock to a uniformly divided state, removing the extractive matter, and digesting the stock remainder.

5. That improvement in the treatment of stock of the nature indicated for the recovery of its values, which consists in immersing the stock in water so as to remove the bolls and soften the dirt and other adhering matter, brushing and flushing the wet stock, then reducing it by crushing and shredding to a uniformly divided fibrous mass, and removing the extractive matter therefrom by subjecting the mass to a constantly circulating leaching liquor.

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

MARK W. MARSDEN.

Witnesses:

ALLAN I. HUCKINS,  
E. W. STRAIN.