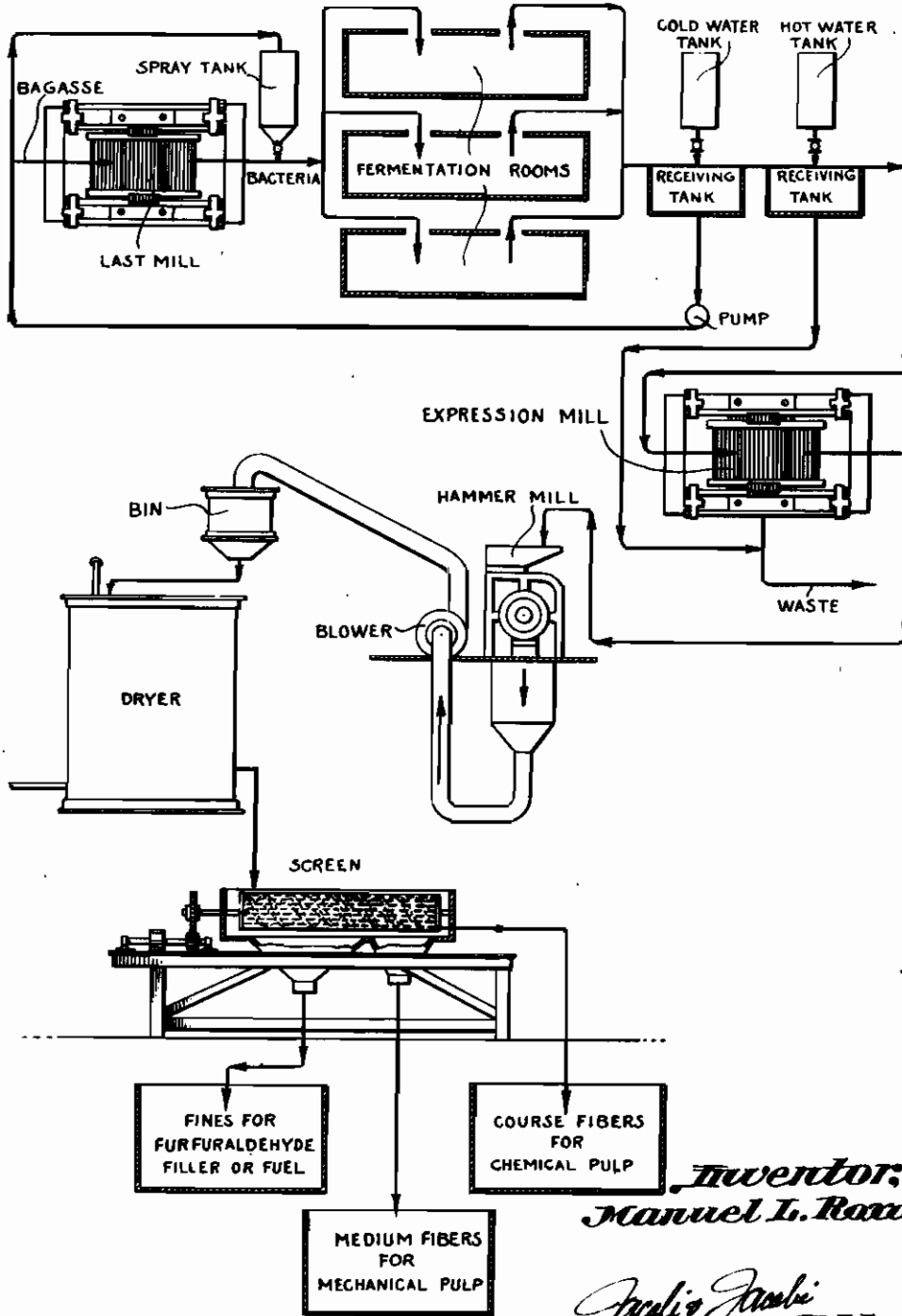


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PROCESSES FOR TREATING BAGASSE
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ALIEN PROPERTY CUSTODIAN

PROCESSES FOR TREATING BAGASSE

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The present invention relates to a bacteriological-mechanical process of treating bagasse for the production of pulp stock, plastic powder material and fines for filler in paper board, furfural distillation, or briquet manufacture for fuel or directly as fuel.

One of the objects of the invention is to convert last mill bagasse by bacteriological means involving the employment of selectively-fermenting micro-organisms into a high cellulose containing and easily workable bagasse material suitable for the production of pulp which can be utilized for high grade paper making purposes.

Another object of the invention is to treat the last mill bagasse by means of a selected strain and specially cultured micro-organism derived from the liquid of some naturally fermenting vegetable material, in conjunction with proper environmental media so as to enhance the growth and fermenting activity of the micro-organism inoculated for the purpose of eventually reducing principally the pectin, sugar, ash, wax, and to a light extent, the lignin contents of the bagasse material.

A further object of the invention is to subject the last mill bagasse to a process which involves selective bacterial fermentation, washing, removal of the excess moisture subjecting the fermented bagasse to the action of the disintegrator and followed by drying and screening the fibered material to separate the chemical pulp stock, the medium sized fibers suitable for mechanical pulp, plastic powder manufacture or low grade chemical paper stock and the fines for furfural distillation, or to be used directly as fuel or in the form of briquets or as filler for paper board or plastics.

Still a further object of the invention is to provide for a very economical process of treating bagasse and manufacturing pulping material suitable for transport by a series of biological and mechanical processes as herein described below.

Further objects of the invention will become apparent from the descriptions and claims herein below given:

The fundamental principle of the present invention is the selective action of the different micro-organisms on vegetable matter as affected by the strain of the micro-organism used and the conditions under which the reaction takes place, the rendition of the bagasse by the fermentation treatment to an easily workable material for the succeeding mechanical operations and the separation

of the bagasse material into portions suitable for separate and distinct uses.

While I am aware that bagasse has been subjected to microbiological reaction for preservation purposes and for converting the bagasse into semi-pulp material, I am not aware that it has been proposed to treat bagasse by a bacteriological-mechanical process to obtain different portions of the bagasse which are suitable for separate and distinct purposes as herein described below.

My process contemplates the following steps substantially in the sequence recited, although my invention is not limited thereto, the invention being set forth in the appended claims namely:

1. The inoculation of the last mill bagasse with bacteria cultures dispersed in aqueous solution containing the desired bacteria.

2. The fermentation of the said admixtures under carefully controlled conditions until the complete elimination of the sugars and other undesirable substances in the bagasse.

3. The washing of the fermented bagasse material; first to remove for use elsewhere part of the fermenting micro-organism, and second, to wash out the soluble substances.

4. The removal of the hydrostatic water in the material by passing through a three-roller mill.

5. The disintegration or fibrillation of the bagasse material by the action of the hammer mill or disintegrator.

6. Drying the fibrillated material in a dryer of a conveyor type with the use of hot air.

7. The fractional separation of the various grades of products by screening.

8. The coarse material may be baled for transport or converted to higher quality pulp; the medium grade is suitable for the manufacture of mechanical pulp, plastic powder or low grade paper stock and the fine grade, for furfural distillation, for fuel directly or in the form of briquet, or as filler or constituent of paper board and plastic boards.

A specific application of the process is as follows:

The bagasse as it comes out of the last mill is led through a conveyor to the fermenting boxes in the fermentation room. While on the conveyor, the material is inoculated with the desired fermenting micro-organism by sprinkling it with a suspension of the bacteria. The inoculated material is piled up in covered fermentation rooms and allowed to ferment for from twenty to forty eight hours, or any convenient length

of time. The bagasse after fermentation is then loaded on conveyors and sent to the expression mill. On the way to the expression mill the bagasse is washed first with cold water to collect the fermenting bacteria, and then with hot water to remove the soluble substances. The first washing is returned to the bacterial spray tank to serve as dispersing medium for the micro-organism and the hot water washings are thrown away or disposed of in some convenient manner. The wet material is passed through a three-roller mill to reduce the water content to about 70 per cent. It is then fed into a hammer mill or disintegrator wherein hot air is introduced while the material is fibrillated or disintegrated. The resulting fibrillated product consists of fibers of various lengths and comminuted pithy materials. The products are exhausted from the hopper of the hammer mill and blown to a storage bin, from which it is led to conveyor type of dryer heated with a countercurrent of hot air. The comminuted material comes out at a moisture content of about 10-15%. The separation of the fibers may conveniently be done by either of the following ways:

(1) Blowing to a semi-circular set of screens whereby the fines pass through the screen and the fibers are blown on and fractionally separated into the medium and coarse fractions, the coarser ones being blown farther.

(2) By passing thru a cylindrical shaking screen with a helical type of conveyor. Upon being shaken, the fines pass thru the slots of the screen, the medium fibers drop down at the end and the coarser fibers are conveyed outside. The coarser fibers are high in cellulose content, low in ash, hence suitable for paper making purposes either chemical or mechanical. The fine material contains more of the undecomposed pectinous and lignous substances and is low in cellulose content, and suitable as raw material for furfural distillation or briquet making or as filler.

The process is best used with bagasse coming

directly from the last mill of the central but it can also be applied to properly preserved material.

As a further disclosure of the invention, I say that my fermenting micro-organism was not isolated from bagasse though it may accidentally be found in it, but from some naturally retting ramie in the Industrial Laboratory of the Technical Department of the National Development Company, Manila, P. I., propagated in a culture medium containing agar 25 grams, sucrose 10 grams, peptone 10 grams, and salt mixture 5 grams per liter. The salt mixture is composed of:

	Parts by wt.
(NH ₄) ₂ HPO ₄ -----	50
K ₂ HPO ₄ -----	50
MgSO ₄ -----	10
NaCl-----	10
CaCl ₂ -----	10
FeSO ₄ -----	1

The bacterium is cultured in solutions of gradually increased pectin content. The culture is transferred into bagasse sufficiently submerged in water and to which the salt mixture is added in the proportion of 1.310 grams of the mixture to every liter of water used. This culture solution is the one inoculated directly into the bagasse. The inoculation is applied at a rate of around 50 gallons to a ton of bagasse. In the course of fermentation, heat and acidity are developed that no special precaution as to sterility is needed. The micro-organism was found to be attacking the pentosan, wax, and sugar contents of the treated material.

While the invention has been described in connection with a particular layout, it is obvious that it is by no means dependent on the particular equipment or arrangement indicated. The invention may be carried out in any device in which the operating conditions of the process as herein described are present.

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