

No. 747,520.

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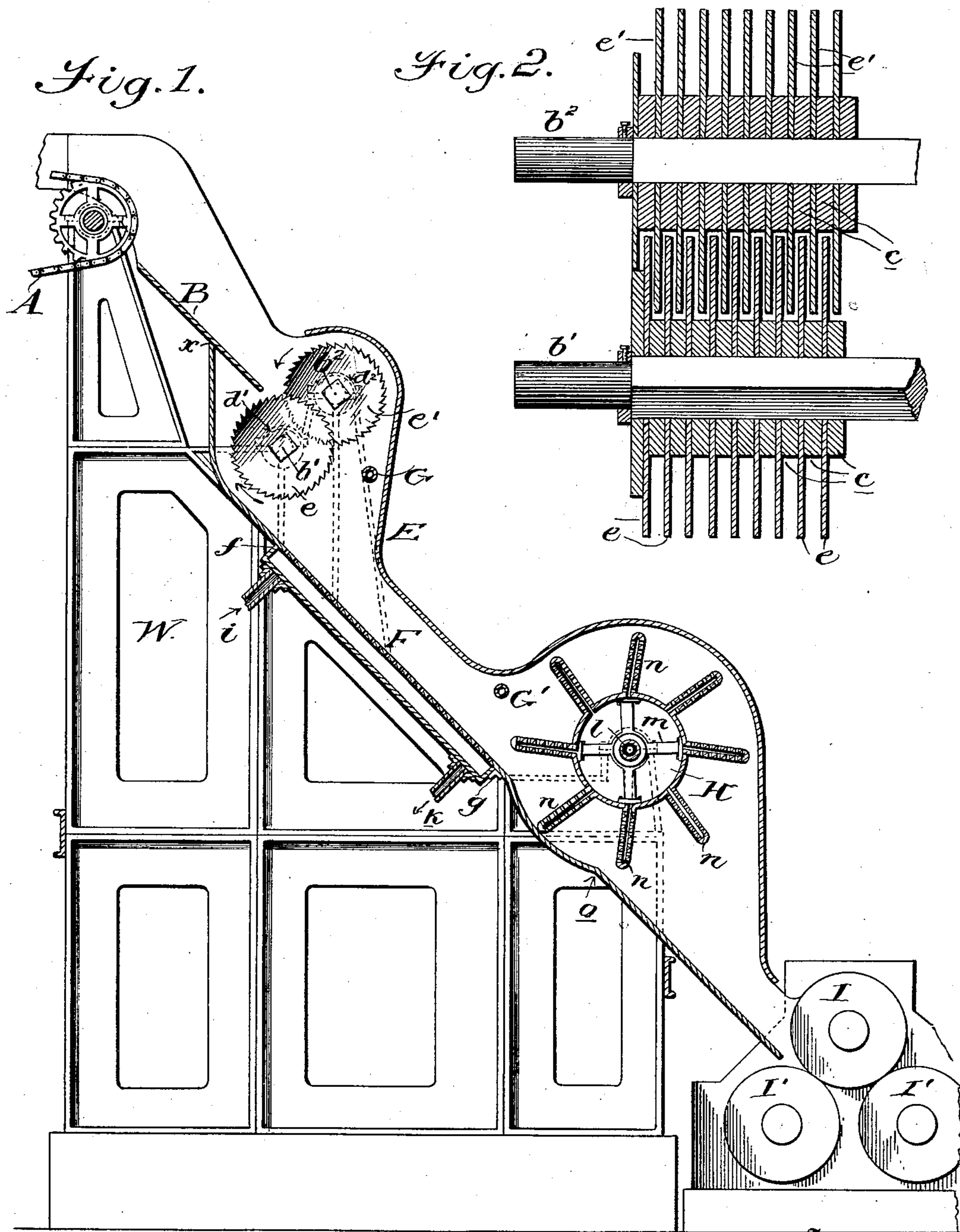
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PROCESS OF TREATING SUGAR CANE.

APPLICATION FILED SEPT. 25, 1903.

NO MODEL.

Fig. 1.

Fig. 2.



Witnesses
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UNITED STATES PATENT OFFICE.

MORIZ WEINRICH, OF YONKERS, NEW YORK.

PROCESS OF TREATING SUGAR-CANE.

SPECIFICATION forming part of Letters Patent No. 747,520, dated December 22, 1903.

Application filed September 25, 1903. Serial No. 174,601. (No specimens.)

To all whom it may concern:

Be it known that I, MORIZ WEINRICH, a citizen of the United States, residing at Yonkers, in the county of Westchester and State of New York, have invented new and useful Improvements in Processes of Treating Sugar-Cane, of which the following is a specification.

My invention relates to a certain new and useful process for treating sugar-cane, the objects of the invention being to defecate the juice of sugar-cane before the cane undergoes the ordinary milling process, whereby the defecation-scum will be retained in the bagasse, thus dispensing with the use of the defecators and scum-presses.

My invention consists, essentially, in dividing the cane into fine fibers and then saturating the fibers in the presence of heat with sufficient lime solution to neutralize the acidity of the juice or render it alkaline.

In the accompanying drawings I illustrate an apparatus suitable for carrying out my process, and wherein—

Figure 1 is a longitudinal sectional view of the apparatus which I erect between the end of the usual cane-carrier and the first cane-mill. Fig. 2 is a cross-section of the shredding devices.

While other arrangements may be found useful for carrying out my process, the one shown in the present drawings is particularly well adapted for furthering the objects I have in view, said apparatus being located between the end of the cane-carrier and the first grinding or cane mill.

The delivery end of the cane-carrier A connects with the upper or head end of the apparatus, and the cane is delivered from the carrier upon an inclined chute B. At or below the lower end of the chute I locate the devices for splitting or shredding the cane, said devices including a pair of transverse shafts b' b^2 , preferably square in cross-section and extending the full width of the chute and having their ends turned to form journals which are mounted in suitable boxes or bearings d' d^2 on an appropriate frame-work W.

On the aforesaid shafts b' b^2 are fixed a number of circular or other cutters e e' , herein shown as of the saw-blade type and so arranged that the upper portions of the blades of one series enter the spaces between the

lower portions of the blades of the other series, said blades of each series being separated from each other by suitable spacing means and the blades of one series designed to be revolved in a direction opposite to the rotation of those of the other series. For instance, the arrows shown on the drawings indicate that the saw-blades or cutters of the lower series e revolve upwardly, while those of the upper series e' revolve downwardly, the lower portions of the blades of one series overlapping those of the other series, as shown and as before described.

The saw-blades may have a diameter of from eighteen to thirty inches and a thickness of about one-fourth of an inch, and on the shafts between the blades are the iron or other spacing-rings c , which are about one-half an inch thick and of such diameter that the opposite saw-blades will just clear them, leaving a play of about one-fourth of an inch.

Below the shredding devices is a chute F, and above the said devices is a hood or covering E, which covers a portion of the shredding devices and thence extends downwardly over substantially the remaining portion of the apparatus, said hood serving to force the shredded cane to fall upon the lower chute F, which latter connects with the chute B at the point x back of the lower end of the latter chute and forms an angle under the lower shredder. For a greater portion of the length of the chute F the bottom thereof—say from the point f to the point g —is made double to form a steam-chamber, into the upper portion of which enters a steam-pipe i , while from the lower portion leads a pipe k for drawing off condensed water.

If desired, the bottom portion of the chute, which forms the top of the steam-chamber, may be finely perforated, so that the steam will enter through this bottom and penetrate the cane mass and accelerate the heating of the same.

Above the bottom of the chute F and under the cover or hood E are located the perforated pipes G G' , which extend across the whole width of the chute and which are designed to distribute boiling-hot lime-water or thin milk of lime over the shredded cane mass passing over the floor of said chute.

At the lower end of the chute F is a closed

drum H, made of sheet or plate metal, with hollow ribs or arms *n*, which communicate with the interior of the drum. The drum is secured by two or more spider or skeleton wheels *m*, fixed to the shaft *l*, mounted to turn in suitable bearings, said shaft extending full across the chute. This shaft may be hollow, or other suitable provision may be made for supplying the interior of the drum and the hollow arms with steam, and said arms are preferably finely perforated. From this description it will be seen that the shredded cane mass after passing along the chute F and subjected to the saturation of hot lime-water or thin milk of lime from the perforated pipes G G' will be caught up by the hollow arms or ribs of the drum H and carried upward and over the drum and subjected to a thorough heating by the steam escaping through the perforations of the arms, said perforations also serving as outlets for the condensed steam.

The cover E, before mentioned, extends over and concentric with the upper portion of the drum H, and from the point *g* to a point below the same and designated by the letter *o* the bottom of the chute F is curved to insure the arms or ribs *n* making a close fit, so that every particle of the cane mass will be taken up and carried around by these ribs and will be finally discharged therefrom and conducted by the final portion of the chute to the first cane-mill, shown by the rollers I I'.

The drum H may have a diameter of from eighteen to twenty-four inches, and the ribs *n* a height of from eighteen to thirty inches.

The general operation of this process will be understood from the following: The cane falling from the carrier A upon the upper chute B will be seized by the closely-set and fast-revolving saw-blades and torn and shredded into fine long fibers. The shredded cane mass while falling upon the steam-heated lower chute F is received at once by a spray of boiling or nearly boiling thin milk of lime of about 2° Baumé or of lime-water. This thin milk of lime or lime-water will penetrate quickly into the fibers of the finely-shredded cane, will mix with the juice, and will start at once the coagulation of certain impurities and the defecation of the juice. While sliding down the chute, which may be finely perforated, the cane mass becomes more heated and is then taken up by the heated arms or ribs of the slowly-revolving drum H. Here the cane mass receives another spray of boiling or almost boiling thin milk of lime or of lime-water which shall be sufficient for a complete defecation and for keeping it thoroughly soaked while remaining in the compartments between said arms, thus insuring a complete mixing of the milk of lime or of the lime-water with the juice and accomplishing thereby its defecation in the shredded cane. The drum delivers the treated cane mass to the roller-mills I I', where it will undergo single, double, or triple

milling, as desired. In most cases a double milling will insure a very high extraction, as the finely-shredded cane mass is easily to be crushed. Most of the coagulated impurities will be retained in the bagasse, so that the defecated juice coming from the mill contains only a little suspended matter. The boiling milk of lime of about 2° Baumé or the lime-water added through the pipes G and G' ought to amount from five to eight per cent. or from fifteen to twenty-five per cent., respectively, of the weight of the cane. The lime must be added in such quantities that it will fully neutralize the juice in the cane and may preferably render it alkaline. Since the quantity of the cane going over the carrier can be controlled, also the quantity of the lime-water or thin milk of lime of a known density to be distributed upon the shredded cane can be controlled, thus insuring a proper defecation of the juice contained in the shredded cane.

Instead of the described shredder any other suitable apparatus which will shred sugarcane into fine fibers may be used with this process, and instead of the described additional devices which will mix the shredded cane with milk of lime or with lime-water and will heat the mixture properly can be used in carrying out this process.

The juice coming from the mills shall be pumped into two or more tanks provided with stirring devices and steam-worms. In these tanks the juice is kept at a temperature of about 180° Fahrenheit and each tank full tested to its alkalinity. If the alkalinity should be above the desired degree, this can be easily corrected by adding some diluted phosphoric acid or some carbonic-acid gas or sulfurous-acid gas. The juice shall then undergo some mechanical filtration through cloth or bagasse or sand and can then enter at once the triple effect for evaporation. The mechanical filtration of the juice is now carried out on a great many plantations, so that it will generally not add to the expenses. Careful comparative tests have shown that cane treated by this process has produced a juice of about 1.5 points higher purity than by the ordinary method.

The great advantages of this process and apparatus over the ordinary methods are obvious. They mean, first, the almost instantaneous defecation of the juice after the comminution of the cane has begun, thus avoiding any decomposition of the juice; second, the suppression of the defecation-plant and of the filter-press plant; third, a high extraction of purer juice from the finely-comminuted and saturated cane mass.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The process of defecating sugar-cane juice before the cane undergoes the ordinary milling process consisting in first shredding the cane into fine fibers and then soaking it,

while being heated, with a lime solution heated substantially to the boiling-point and introducing enough lime to fully neutralize the acidity of the juice or to render it alkaline, and then delivering the treated cane mass to the ordinary cane-mills, substantially as set forth.

2. The process of defecating sugar-cane juice which consists in dividing the cane into fibers and substantially simultaneously therewith saturating the shredded mass with a lime solution heated substantially to the boiling-point to neutralize the acidity of the juice.

3. The process of defecating sugar-cane juice which consists in reducing the cane to a fibrous condition and substantially simultaneously therewith saturating the cane mass,

in the presence of heat, with a hot lime solution to neutralize the acidity of the juice.

4. The process of defecating sugar-cane juice which consists in first shredding the cane into substantially fine fibers, then subjecting the cane mass to the combined action of heat and the saturation of a hot lime solution sufficient to neutralize the acidity of the juice.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

MORIZ WEINRICH.

Witnesses:

JAMES S. FITCH,
M. F. WEINRICH.