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DISINTEGRATOR BAR AND METHOD OF DISINTEGRATING BAGASSE MATS

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Fig. 1

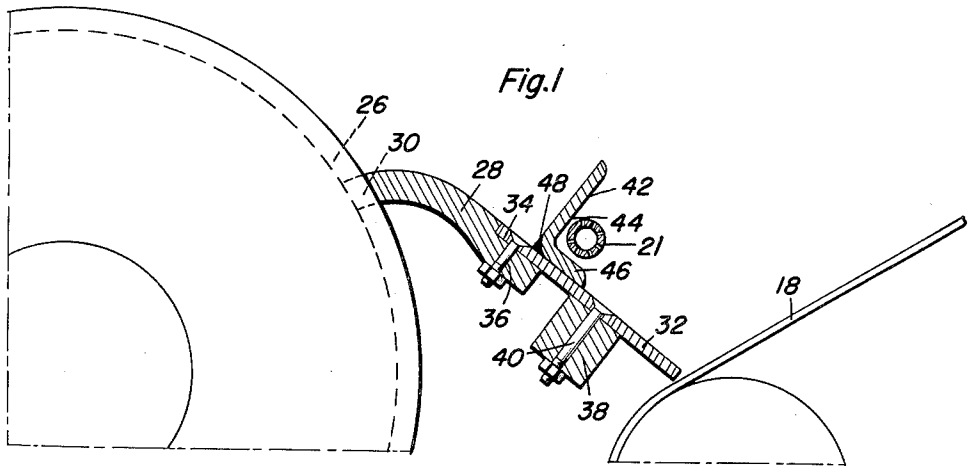
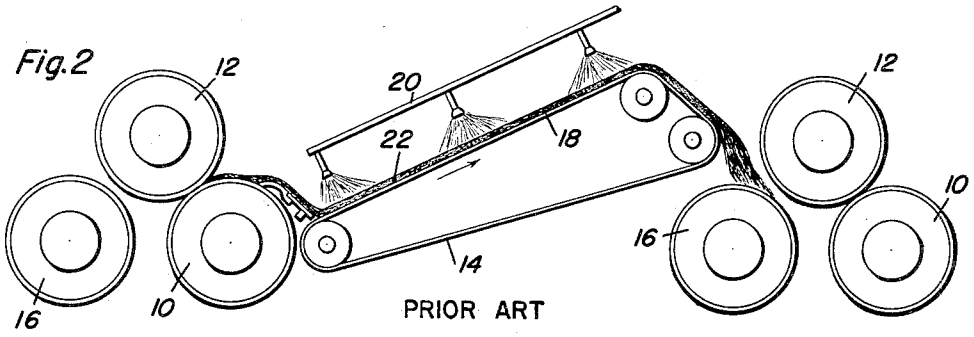


Fig. 2



PRIOR ART

Fig. 3

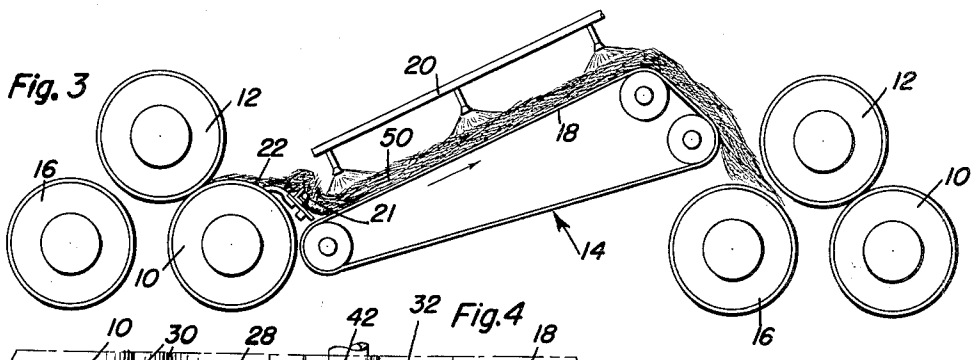
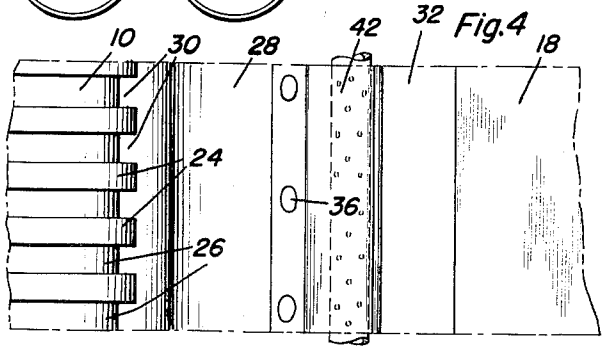


Fig. 4



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DISINTEGRATOR BAR AND METHOD OF DISINTEGRATING BAGASSE MATS

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This invention comprises a novel and useful disintegrator bar and method of disintegrating bagasse mats and more particularly relates to an apparatus and method specifically adapted for use in connection with the grinding rolls of sugar cane mills.

In order to extract the juice of the sugar cane, sets of rollers called tandems, pressed together by sets of hydraulic pistons are employed to expel the juice from the plant. At the same time, and in order to increase the efficiency of the process of extraction, after each milling operation by these tandems, the mat of bagasse or crushed sugar cane fibers, produced by the compressive crushing action of the tandem rolls, is sprayed with water or other liquid, obtained from rolls located further along the sugar cane mill.

The bagasse that leaves each one of the tandems, due to the fact that it has been submitted to terrific pressures, is of a very compact nature. It tends to maintain this compactness and relative position of the individual fibers of cane forming the components of the bagasse mat, during its travel from the outlet of one set of crushing rollers of the mill and throughout its passage along the intermediate carrier and up to the entrance of the next pair of rollers or the mill in line therewith. The bagasse is sprayed during its passage from one set of rollers to the next, at a time and in a condition when it is of an undesirable compacted nature, and the fibers thereof have not changed their position therein. Consequently, very little water penetrates the mat, and the same fibers are moistened over and over from one set of rollers or tandems to the next, the water penetrating the mat only in one quick moment as it receives the pressure in the following mill.

It is therefore the primary purpose of this invention to provide an apparatus and a method which will disintegrate or breakup this compactness of the bagasse mat and thus cause the individual fibers thereof to change their relative positions and render the mat more permeable to water or liquids.

A further object of the invention is to provide a means and a method whereby bagasse mats may be effectively disintegrated immediately after they leave a tandem in order to render the mat more permeable, and to apply water or liquid to the mat and thus enable a longer time of contact of the liquids with the juices contained in the cells in the bagasse prior to their next expressing operation in the next set of tandem rollers.

A further object of the invention is to provide an apparatus and a method whereby the application of water or liquids to the disintegrated bagasse mat may be effectively performed upon either the top or the bottom side of the disintegrated mat or both to thereby further increase the efficiency of the application of liquids to the mat.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a view in side elevation, parts being shown in vertical section, showing the turn plate associated with an expressing roller of a tandem and to which the mat disintegrating mechanism of this invention has been applied;

FIGURE 2 is a side elevational view showing a conventional turn plate prior to the introduction of the present invention applied to the end of a carrier and a preceding tandem roller assembly;

FIGURE 3 is a view similar to FIGURE 2 but showing a turn plate incorporating therein the present invention and illustrating the operation of this method in disintegrating the bagasee mat thereby; and

FIGURE 4 is an enlarged detail view in top plan of a portion of a turn plate, a carrier, and lower roll of a tandem, the turn plate having the disintegrating bar of this invention applied thereto.

Referring first to FIGURES 2 and 3 it will be seen that there is disclosed somewhat diagrammatically a portion of a conventional sugar cane mill in which sets of compressing rollers known as tandems, and comprising lower rollers **10** together with cooperating upper rollers **12** are disposed in series, any desired number of such tandems being employed as desired. The sugar cane from which the juice is to be expressed is fed through the series of tandems in sequence, a portion of the juice containing the fibers of the sugar cane being squeezed therefrom by the tremendous pressure and crushing action of the tandem rollers **12** and **10** as the cane fiber passes therethrough. In conventional operation, a carrier **14**, such as an endless belt conveyor or the like, is provided between successive sets of tandems, the upper surface of this carrier conveying the crushed cane from the preceding tandem to a feed roller **16** of the succeeding tandem by which the cane is fed into the crusher rollers **10** and **12** thereof. As the crushed cane is conveyed by the top flight **18** of the carrier, it is usually subjected to a spray of water, or other liquids such as those received from the various tandems, by means of any suitable apparatus such as a spray mechanism designated generally by the numeral **20**, and by **21**, mounted as shown in FIGURES 1 and 3.

As will be readily understood, the crushed and compressed fibers issuing from a tandem are of a very compact form or mat of bagasse, and as shown in FIGURE 2 are conveyed in this form by the carrier beneath the sprays **20** and to the succeeding tandem. Because of the compression of this bagasse mat, and the compactness and coherence of the fibers of the same, there is relatively little displacement of the fibers from the time they emerge in the form of a bagasse mat from the first tandem during their passage through the succeeding tandems of the sugar mill plant. Consequently, there is relatively little penetration of the liquid from the sprays **20** through this mat and relatively little further expressing of juices from the fibers of the mat during their subsequent passage through successive tandems. Thus, the efficiency of the operation of the sugar cane mill is less than its maximum because of the lack of changing positions of the fibers during their passage through the tandems and the relative impermeability of the mat to penetration by the spray of liquids because of the density and compactness of the bagasse mat.

The apparatus shown in FIGURES 1 and 4 and forming the subject matter of the present invention operates to alleviate the above mentioned conditions and disintegrate or disrupt the bagasse mat both to change the position of the fibers therein and thus increase the efficiency of further macerations and crushing of the fibers by passage through succeeding tandems; and also to render the mat and fibers much more receptive to the penetration thereof by liquids from the spray **20** and thereby enables such liquids to more efficiently remove the sweet juices from the fibers of the cane both before and during subsequent crushing operations thereon.

Referring now especially to FIGURES 1 and 4 it will be seen that the lower roller **10** is provided with the

usual annular ribs 24 thereon, with channels or grooves 26 being formed therebetween for receiving similar ribs of the upper roll 12. A turn plate 28 is disposed or mounted in such a manner that the marginal fingers 30 thereof will be received in the channels 26 between the ribs 24 to thus scrape and remove fibers from the rolls after the crushing operation is completed. At its rearward end, the turn plate has an extension plate 32 disposed in a shouldered recess 34 and retained therein by a countersunk bolt 36 which plate forms a tip and an extension for the turn plate 28 and directs the bagasse mat emerging from the tandem to the lower end of the upper flight 18 of the conveying means 14. The extension 32 usually is carried by a transverse supporting beam 38, being fixed thereto by a countersunk bolt 40 as shown in FIGURE 1.

In accordance with the present invention, there is fixedly secured to the extension 32, and to that portion of the same which rests upon the turn plate 28, a bar 42 which constitutes a disintegrator bar in accordance with the present invention for disintegrating the bagasse mat 22 previously discussed.

Conveniently, disintegrator bar 42 may comprise an angle member having perpendicular flanges 44 and 46, the latter fixedly secured as by welding 48 to the plate 32, at a position above the turn plate 28. The spray pipe 21 is fixedly secured as in FIGURE 1.

The actual dimensions of the upstanding flange 44 of the disintegrator bar 42 may be considerably varied.

This turn plate serves the dual functions of first, disintegrating the bagasse mat as set forth hereinafter and second, constituting a reinforcement for stiffening the relatively thin extension plate 32.

With the disintegrator bar applied as in FIGURE 1, the method indicated in FIGURE 3 will then be performed by the apparatus. As the bagasse mat 22 issues from the first set of tandems, it will strike the upward flange 44 of the disintegrator bar and this resistance to its movement will cause the mat to pile up and increase in thickness and flow over the top of the bar, as shown in FIGURE 3. This resistance will stretch and fluff up the mat so that a relatively thicker, fluffier and less dense mat 50 will result. In the mat 50, it is obvious that the transverse or secondary movement imparted to the mat relative to its longitudinal direction of travel, in addition to fluffing up the mat and thus decreasing its density and increasing its permeability to the spray 20, will also cause a relative displacement of the fibers of the mat so that when they reach the next tandem they will be in relatively different positions for engagement by the rolls of the tandem.

It will be understood that the method of this invention involving the interposing of a resistance to the normal direction of travel of the bagasse mats issuing from a tandem will produce an upward displacement of the mat with the foregoing advantages.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. In a sugar cane mill having a pair of roller tandems for successively pressing sugar cane, means for conveying a bagasse mat of pressed cane fibers from the first tandem to the second tandem; a turn plate for removing the mat from the first tandem and discharging it to said conveying means, a disintegrator bar secured to said turn plate and extending across the line of travel of the mat thereon and extending upwardly from the surface of the turn plate and presenting an abrupt upper edge whereby to impose a resistance to travel of the mat over the turn plate.

2. In a sugar cane mill having spaced first and second pairs of cane crushing rollers and a conveyor for transporting a bagasse mat from the first to the second set of rollers, a turn plate operatively associated with said first set of rollers for receiving a bagasse mat therefrom, said turn plate having an extension plate operatively associated therewith and with said conveyor for discharging said bagasse mat upon the latter, a disintegrator bar operatively associated with and projecting above at least one of said turn plate and extension and including an abrupt upper edge and extending across the path of travel of said bagasse mat thereon whereby to oppose resistance to movement of said bagasse mat and effect an upward motion and a vertical expansion of said mat to thereby fluff up and expand the mat and decrease its density and decrease the compactness of its structure.

3. The combination of claim 2, wherein said disintegrator bar is mounted upon and fixedly secured to said extension plate.

4. The combination of claim 2, wherein said extension overlaps and is secured to said turn plate, said disintegrator bar being mounted upon and fixedly secured to said extension plate upon that portion thereof which overlies said turn plate whereby to stiffen and strengthen said extension plate.

5. The combination of claim 2 including a spray means mounted upon said disintegrator bar for spraying the underside of a mat passing thereacross.

6. In a sugar cane mill having spaced first and second pairs of cane crushing rollers and a conveyor for transporting a bagasse mat from the first to the second set of rollers, a turn plate operatively associated with said first set of rollers and extending substantially entirely thereacross for receiving a bagasse mat therefrom, said turn plate having an extension plate operatively associated therewith and with said conveyor for discharging said bagasse mat upon the latter, means having an abrupt, upwardly projecting upper edge opposing a resistance to flow of the bagasse mat across said turn plate and extension and causing vertical expansion of said bagasse mat thereby altering the fiber disposition in the mat and decreasing the density of the latter.

7. The combination of claim 6, wherein said last mentioned means is mounted upon the extension plate, projects upwardly of the surface thereof and extends thereon transversely of the direction of travel of the mat.

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