

May 3, 1932.

N. KAY

1,856,484

CANE MILL ROLL

Filed Sept. 10, 1927

2 Sheets-Sheet 1

Fig. 1.

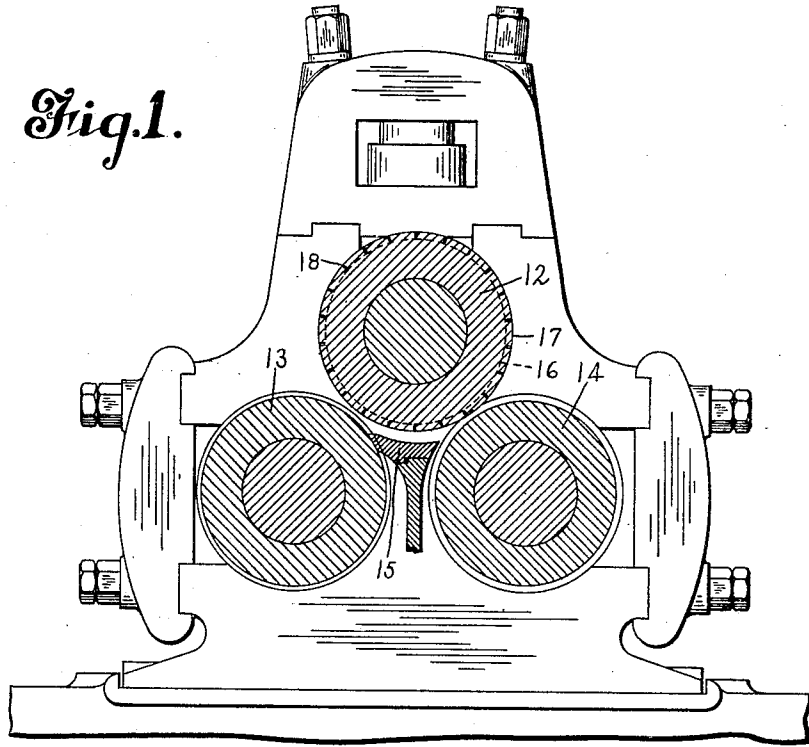
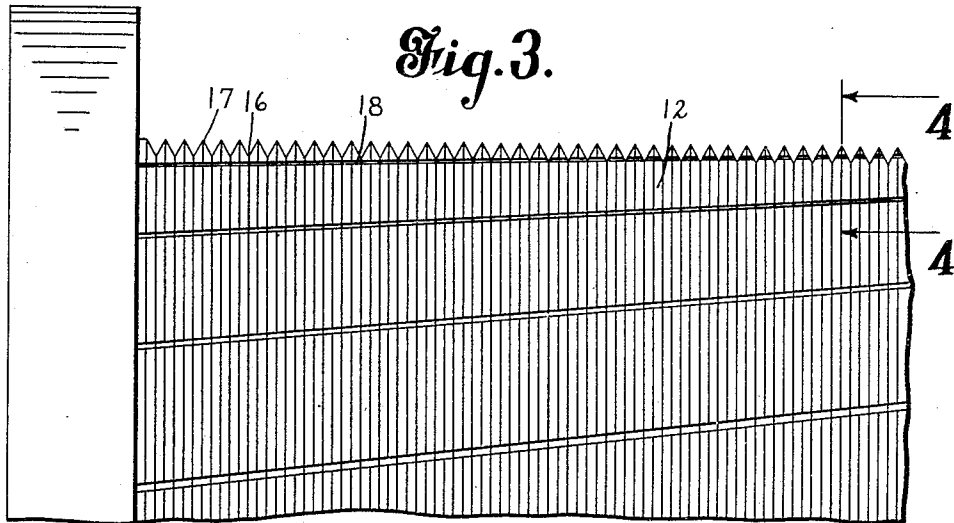


Fig. 3.



Inventor

Norman Kay

By *Goehnel & Bachlow*

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Fig. 2.

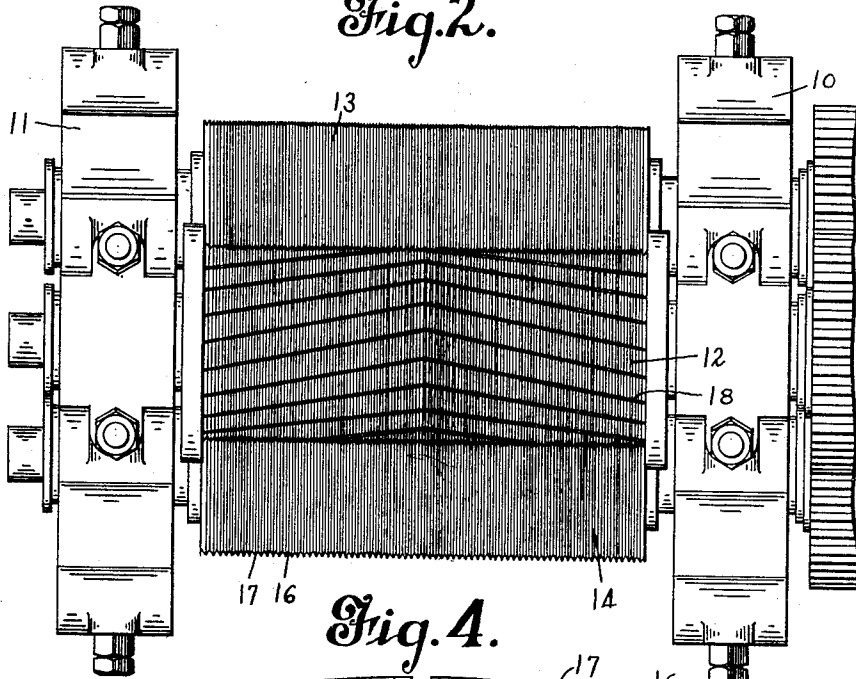


Fig. 4.

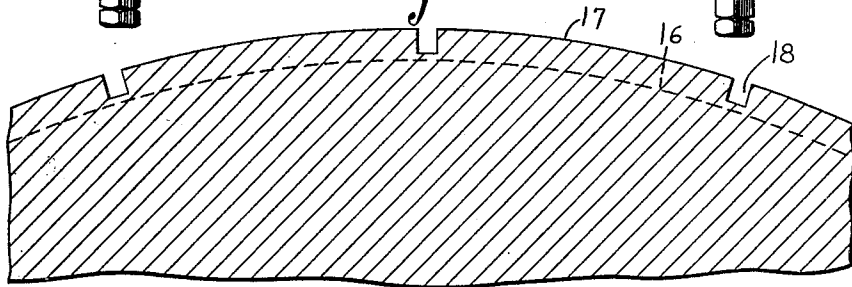
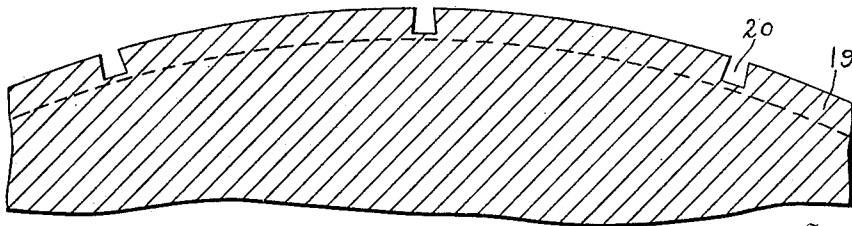


Fig. 5.



Inventor

Norman Kay

By *Rockwell & Bartholow*
Attorneys

UNITED STATES PATENT OFFICE

NORMAN KAY, OF JOBOS, PORTO RICO

CANE MILL ROLL

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This invention relates to rolls for cane grinding machines, and has particular reference to the surface configuration of the rolls for use in cane mills. Such mills usually consist of three rolls arranged at the vertices of a triangle. The upper of these rolls is termed the top roll, while the lower roll, which receives the cane, is termed the cane roll, and the third is usually called the discharge or bagasse roll. A unit of this character is usually preceded in a cane mill installation by one or more pairs of crusher rolls whose function is to disintegrate and shred the cane to prepare it for the work of the three-roll, or juice expressing mills.

While my invention is illustrated in connection with the rolls of a three-roll mill, it will, of course, be understood that it may also be applied to a two-roll mill, or a pair of crusher rolls.

The rolls of both three-roll mills and crushers are commonly provided with circumferential V-shaped grooves and ridges to effectively shred the cane and open up the cells in order to express the juice therefrom. When the surface of these ridges is smooth, it sometimes occurs that the cane will not be effectively drawn into the roll bite, but, on the other hand, considerable slippage will occur and the cane will not be advanced through the mill in the most effective manner.

One object of my invention is the provision of an improved cane roll which will grip the cane and effectively draw it into the roll bite.

Another object of my invention is to provide rolls for cane mills, or the like, having surface configurations, such that the cane will be caught and gripped by the rolls and will be effectively drawn in between them.

A still further object of my invention is the provision in one or more of the rolls of a cane mill of longitudinal grooves intersecting the circumferential grooves, such that the bagasse will be received and compacted within the longitudinal grooves and will render

the surface of the rolls rough at these points, so that it will grip the cane or bagasse and draw it forwardly through the mill.

To these and other ends, the invention consists in the novel features and combination of parts to be hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a sectional view of a three-roll mill stand embodying my invention;

Fig. 2 is a top plan view of the mill stand shown in Fig. 1;

Fig. 3 is an enlarged fragmentary plan view of the top roll of the mill;

Fig. 4 is a fragmentary sectional view on line 4—4 of Fig. 3, on an enlarged scale; and

Fig. 5 is a view similar to Fig. 4, showing a modification.

The cane mill which I have selected to illustrate as a preferred embodiment of my invention, as shown in Figs. 1 and 2, comprises the side frames or standards 10 and 11, between which are mounted a top roll 12, a cane roll 13, and a bagasse roll 14, there being a turn plate 15 between the cane roll and bagasse roll to scrape the cane or bagasse from the former and turn it so that it will pass between the top and bagasse rolls. All of these rolls, as shown, are provided with circumferential grooves 16 separating the V-shaped ridges or ribs 17. According to the usual practice, the cane enters between the top and cane roll where it is acted upon and shredded, to some extent, and is then passed between the top and bagasse rolls, the bagasse roll being set closer to the top roll than is the cane roll, so that the ridges of one extend into the grooves of the other to subject the shredded cane or bagasse passing therebetween to an effective squeezing or pressing action to express the juice therefrom.

To prevent any tendency of the rolls to slip over the cane and to ensure that the latter is positively drawn into the roll bite, I provide some or all of the rolls of the mill with

grooves, generally longitudinally disposed, which receive and hold the particles of bagasse, thereby giving the rolls a rough surface where the grooves are formed so that the cane will be caught and advanced through the mill. As illustrated in the drawings, only the top roll 12 is provided with such grooves, although it will be understood that they may be provided upon either or both of the other rolls, if desired. These grooves are shown in cross-section in Fig. 4 and designated by the numeral 18; and it will be seen that they are substantially rectangular in cross-sectional form so as to be provided with abrupt side-walls, which will effectively hold the particles of bagasse therein.

The grooves 18 are preferably, as shown, slightly shallower than the circumferential grooves 16, so that the teeth of the scraper bars used with such rolls will not catch in the longitudinal grooves, the latter grooves being relatively small in size—say $\frac{1}{16}$ of an inch wide—although variation in this respect may be resorted to if desired. Their depth will depend to some extent upon the depth of the circumferential grooves of the roll. The side walls of these longitudinal grooves or recesses are preferably spaced from each other at a distance substantially less than the distance between the apices of the circumferential ribs, as shown. As shown in Fig. 2, they preferably do not extend exactly parallel to the roll axes, but may be formed helically on the roll surface and, as shown in this figure, the grooves extending inwardly from the opposite ends of the roll meet at an apex at about the roll center, forming a double helical groove. It will be understood that a single helical groove, or even a straight groove, may also be used with good results.

When the mill is in operation, the particles of bagasse passing therethrough will lodge in the grooves 18 and become compacted therein very tightly. The grooves will be completely filled with this material, so that the roll at the point where the groove is provided will have a rough surface formed by the bagasse lodged therein. This rough surface will extend in a line across the roll surface, and as a number of such grooves are formed about the periphery of the roll, the latter will be provided with a corresponding number of roughened portions, which will grip the oncoming cane or bagasse and advance it through the mill. When the grooves are provided with abrupt walls as shown, so that the mouth of the groove is substantially no larger than the bottom thereof, there will be no tendency for the particles of bagasse to be forced out, but, on the other hand, they will be pressed firmly therein so that this compact filling of bagasse will, in effect, become a part of the structure of the roll itself.

In Fig. 5 of the drawings, I have shown a modification wherein the roll 19 is provided

with grooves 20 which are slightly under-cut so as to be somewhat wider at the bottom than at the mouth. When the bagasse has become firmly lodged in a groove of this character, it will, of course, be held firmly therein due to the under-cut walls of the groove, and there will be no danger of its being dislodged and dropping out. Such a groove may, in some instances, be preferable to a groove having straight walls, although I have found that the latter structure gives no trouble in this respect.

The longitudinal grooves may be spaced circumferentially about the roll to suit the conditions under which the rolls are used. In practice, I have found that very good results are obtained when they are approximately five inches apart, although this spacing is, of course, subject to variation.

While I have shown and described some preferred embodiments of my invention, it will be understood that it is not to be limited to all of the details shown, but is capable of modification and variation within the spirit of the invention and within the scope of the appended claims.

What I claim is:

1. A roll for cane mills or the like, having circumferential grooves and ridges and longitudinal cane trapping grooves intersecting said ridges, said longitudinal grooves being relatively shallow and narrow as compared to the circumferential grooves and adapted to receive and retain particles of bagasse to roughen the roll surface.

2. A roll for sugar cane crushing machinery, having circumferential grooves and ridges and longitudinal cane trapping grooves intersecting said ridges, said longitudinal grooves having abrupt sidewalls, whereby particles of bagasse will be caught and retained therein to fill the grooves and provide the roll with a continuous but roughened surface.

3. A roll for sugar cane crushing machinery, having circumferential grooves and ridges and longitudinal grooves intersecting said ridges, said longitudinal grooves having abrupt sidewalls, whereby particles of bagasse will be caught and retained therein to fill the grooves and provide the roll with a continuous but roughened surface, said grooves being arranged helically on the roll surface.

4. A roll for cane mills or the like, having circumferential grooves and ridges and generally longitudinally disposed cane trapping and retaining grooves cutting across said ridges, said last named grooves being relatively narrow and shallow and having abrupt side walls.

5. A cane mill, having a top roll, a cane roll, and a bagasse roll; all of said rolls having circumferential grooves and ridges, and one of said rolls being provided with gener-

ally longitudinally disposed narrow grooves intersecting said ridges, said last named grooves having abrupt side walls to receive and retain particles of bagasse therein.

5 6. In an apparatus for expressing juice from sugar cane, a pair of cooperating rolls, both of said rolls having circumferential grooves and ridges, and one of said rolls being provided with relatively narrow, abrupt
10 walled, longitudinally disposed grooves, intersecting said ridges.

7. In an apparatus for expressing juice from sugar cane or the like, a pair of cooperating rolls, one of said rolls having formed
15 therein narrow grooves extending generally longitudinally of the roll and adapted to receive and retain therein particles of material passed through the rolls, said grooves being
20 as wide at the bottoms as at the mouths thereof.

8. A roll for cane mills or the like, having circumferentially arranged grooves and ridges, and generally longitudinally disposed grooves cutting across said ridges, and
25 formed to trap and retain particles of bagasse to provide a roughened surface on the roll at the mouths of the grooves.

9. A roll for cane mills having circumferential V-shaped ribs and provided with a
30 plurality of recesses intersecting the ribs for trapping and holding the bagasse and thereby increasing the grip of the roll on the sugar cane during grinding, said recesses being provided with abrupt side walls spaced apart a
35 distance substantially less than the distance between the rib apices.

10. A roll for cane mills having circumferential V-shaped ribs and provided with a
40 plurality of recesses intersecting the ribs for trapping and holding the bagasse and thereby increasing the grip of the roll on the sugar cane during grinding, said recesses being provided with substantially parallel side
45 walls spaced apart a distance substantially less than the distance between the rib apices, said recesses extending downwardly into proximity to the bottoms of the grooves between the ribs.

11. A cane mill roll having circumferential V-shaped ribs, and longitudinal bagasse
50 trapping grooves intersecting said ribs, said longitudinal grooves having abrupt narrowly spaced side walls extending downwardly into proximity to the bottoms of the grooves
55 between the ribs to give said longitudinal grooves substantial depth so that they retain a substantial amount of bagasse.

12. A cane mill roll having its peripheral
60 portion formed as a continuous integral cylindrical member, said portion having circumferential grooves and ridges in its surface and also having longitudinal cane trapping
65 grooves intersecting said ridges, said last named grooves having abrupt side walls

whereby particles of bagasse will be caught and retained therein.

13. A roll for expressing juice from sugar cane having narrow grooves extending generally lengthwise thereof, said grooves being
70 as wide at the bottoms as at the mouths and adapted to produce the building up therein of bodies of bagasse acting as parts of the roll to increase the frictional action of the roll upon the cane.
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In witness whereof, I have hereunto set my hand this 31st day of August, 1927.

NORMAN KAY.

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