

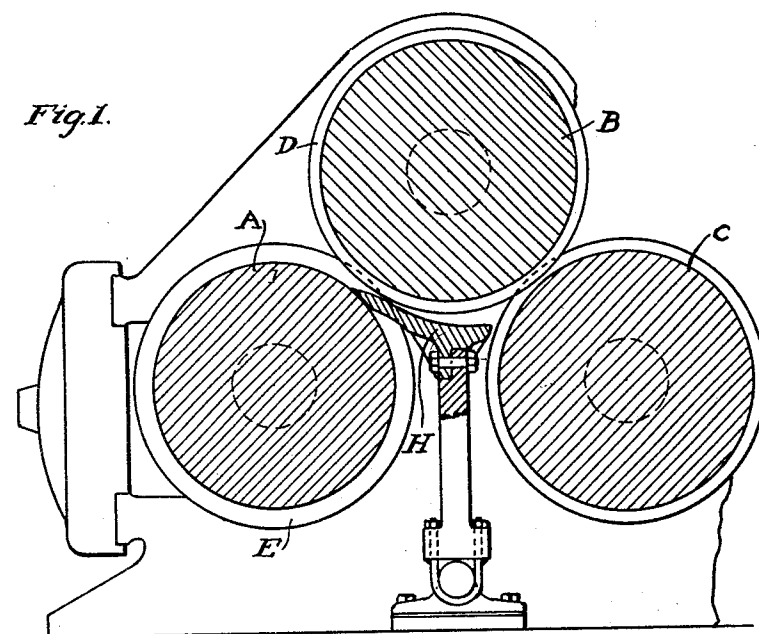
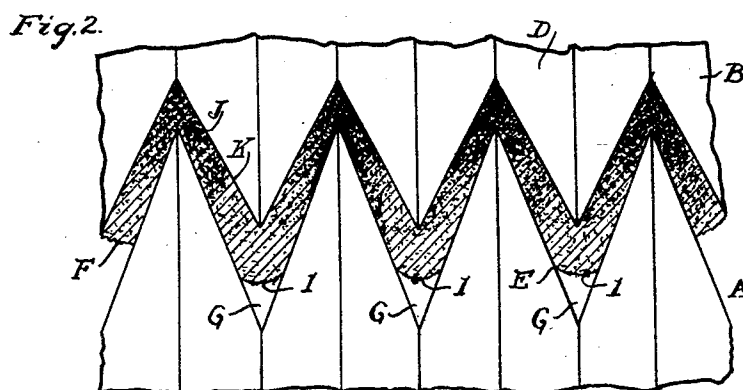
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SUGAR MILL CRUSHER ROLL

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SUGAR MILL CRUSHER ROLL

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My present invention relates to improvements in cane mills and similar apparatus including grooved rolls cooperating with each other to serve as means for crushing cane or bagasse.

Prior to this invention cane mills and crushers have been provided with upper and lower rolls having circumferential ribs, and it is customary to make the ribs of the upper roll conform to the shape and dimension of the ribs in the lower roll, both having the same degree of angle and pitch.

For example, in a three roller mill the circumferential, meshing ribs on all of the rolls are usually made exactly alike so that the ribs on the top roll will extend into corresponding grooves in both lower rolls, and the pitch of the ribs on these rolls is usually about one half inch on the mill rolls to four inches pitch on the crusher rolls. By the term "pitch" as herein used, I mean the distance from the center of one peripheral rib to the center of the next adjacent rib on the same roll.

In actual practice, it has been found in cane mills that the grooves between the ribs do not provide sufficient passageways large enough to quickly carry away the wave of juice which is forced backwardly into the cane or bagasse, as it enters between the rolls.

Therefore, the main object of my present improvement is to utilize the present efficient type of meshing circumferential ribs, and to provide a suitable means, in association therewith, to maintain the cane or bagasse feeding frictions intact without loss of efficiency, and to provide juice canals of sufficient area to lead all of the expressed juice away from the crusher point of the rolls, as fast as it may be extracted.

Another advantage accruing from my improved construction is that the milling capacity of the rolls is maintained as no ribs are removed in my improvement, and the juice is led freely backward into the cane or bagasse.

These and other capabilities will be apparent as the herein description proceeds, and it is obvious that modifications may be

made in my structure without departing from the spirit thereof or the scope of the appended claims.

In the drawing:

Fig. 1 is a cross sectional view of a characteristic three-roll crusher mill, with parts left out, and in which the present improvements are incorporated.

Fig. 2 is an enlarged, fragmentary view of some of the improved crusher roll ribs.

My present improvement, specifically, is best shown in Fig. 2 wherein there is disclosed portions of the ribs D and E upon associate crusher rolls A and B.

In Fig. 1 the mill is shown as a structure of the three roll crusher type, in which the ribs of the upper or floater roll B are in mesh with those of the lower fixed crusher rolls A and C.

These rolls, supported in a housing, as shown, are provided with circumferential V-shaped meshing ribs D, E, which are of the same pitch, but the angles of the respective side faces of which are unlike.

The feed or cane roll A is provided with angled ribs E which are longer and of a narrower angle than are the ribs D on the floater roll, the latter ribs being shorter and of a wider angle. In other words, while the diameters of the circles of the peripheral edges of the ribs D and E are alike, the diameters of the circles of the bases of the grooves G of the roll A are less than the diameters of the circles of the bases of the grooves between the ribs of the roll B. Also, crusher roll C may have ribs of similar height and angularity to those of the cane roll A.

The foregoing arrangement, as is illustrated fully at Fig. 2, at J, between the associate ribs G and D, cane or bagasse is engaged in receiving opening between rolls B and A, such opening J being divergent owing to differences of angularity between the boundary walls of the opening, on the associate rolls. In practice, the angle of the side faces of the ribs on roll B may be about 60°, while that of the surfaces of the ribs on the roll A may be about 45°. The pitch of the ribs on these coacting rolls, in prac-

tice, are alike and may be of any desired practical spacing.

Thus, the ribs D and E on the associate three-roll crusher, mesh as in Fig. 2, so that when the cane or bagasse F, Fig. 2, is passed therethrough under pressure, as shown, there is provided a series of juice canals G between the associate ribs; these canals, being of increased area, will lower the juice level in said canals, below the tips of the ribs so that the cane or bagasse cannot be loaded upward away from the tips of the ribs, and therefore remains in friction contact therewith and consequently retains the full feed and milling crushing capacity of the crusher.

Further, the increased depth and consequent increase of area of the juice canal provides means for a freer discharge of the juice backwards into the cane or bagasse. This structure balances the pressures on all sides of the ribs, and no side stress fractures can develop.

Considerable wedging force has heretofore been required to clean the canals between the ribs of the rolls and to free it of the compressed bagasse, which force is taken by the tips of the turnplate. This has caused erosion at and near the tips of the turnplate, thereby destroying the efficiency and life thereof.

In the improved structure, where the angle of the faces of the ribs in the feed roll and the angle of the ribs in the lower rolls of a set of crusher rolls is of unlike degree, the bagasse or cane is not compressed as tightly into the bottom of the canal G, between the ribs; in fact, it does not enter the root of the canals G, as is indicated by the curved bottoms 1 of the bagasse F, Fig. 2.

In the present instance, where the rib faces are of unequal angles, the tips of the turnplate H are not subjected to the same pressure and degree of erosive action and, therefore, the cleaning efficiency and the service life of a turnplate used in a feed roll is retained over a much longer period, all of which increases the efficiency of the milling equipment.

While I have shown and illustrated the usual three-roll mill herein, it is to be understood that two or more than three rolls may be arranged in accordance with the improvement herein submitted.

Having thus described my invention, what I claim is:

1. In a cane mill comprising a roll having thereon circumferential V-shaped ribs, said ribs having faces disposed at one angle, a roll cooperating with said first roll and having thereon circumferential V-shaped ribs with faces disposed at an angle differing from the angle of said first faces.

2. In a cane crushing mill comprising rolls having thereon cooperating circumferential V-shaped ribs, said ribs having faces disposed at one angle, another roll cooperating with

one of said first rolls and having thereon circumferential V-shaped ribs with faces disposed at an angle differing from the angle of said first faces, substantially as and for the purpose described.

3. In a cane crushing mill comprising a housing having therein a top roll, V-shaped circumferential ribs carried by said roll, said ribs having thereon faces disposed at one angle and providing channels therebetween, a second roll disposed below said first roll and having thereon and partly disposed in said channels circumferential V-shaped ribs with faces disposed at an angle differing from the angle of said first faces, the angle of said second faces being more acute than the angles of said first faces.

4. In a cane crushing mill having a housing, a top roll disposed therein, a circumferential V-shaped ribs carried by said roll and having side faces disposed at one angle, said ribs providing channels therebetween and having a certain pitch, a second roll disposed below said first roll and having thereon and partly disposed in said channels circumferential V-shaped ribs, said second ribs having the same pitch as said first ribs and including also side faces, said latter faces having an angle more acute than the one first mentioned whereby to provide deep channels to accommodate juice movement during the crushing operation.

5. In a cane crushing mill, the combination with a roll including circumferential V-shaped ribs, said ribs having a certain pitch, and side faces disposed at one angle; of a cooperating roll including circumferential V-shaped ribs having a pitch the same as that of said first ribs, and side faces disposed at an angle more acute than the angle of said first faces.

Signed at New York in the county of Richmond and State of New York, this 14th day of August A. D. 1929.

HERMAN J. B. SCHARNBERG.