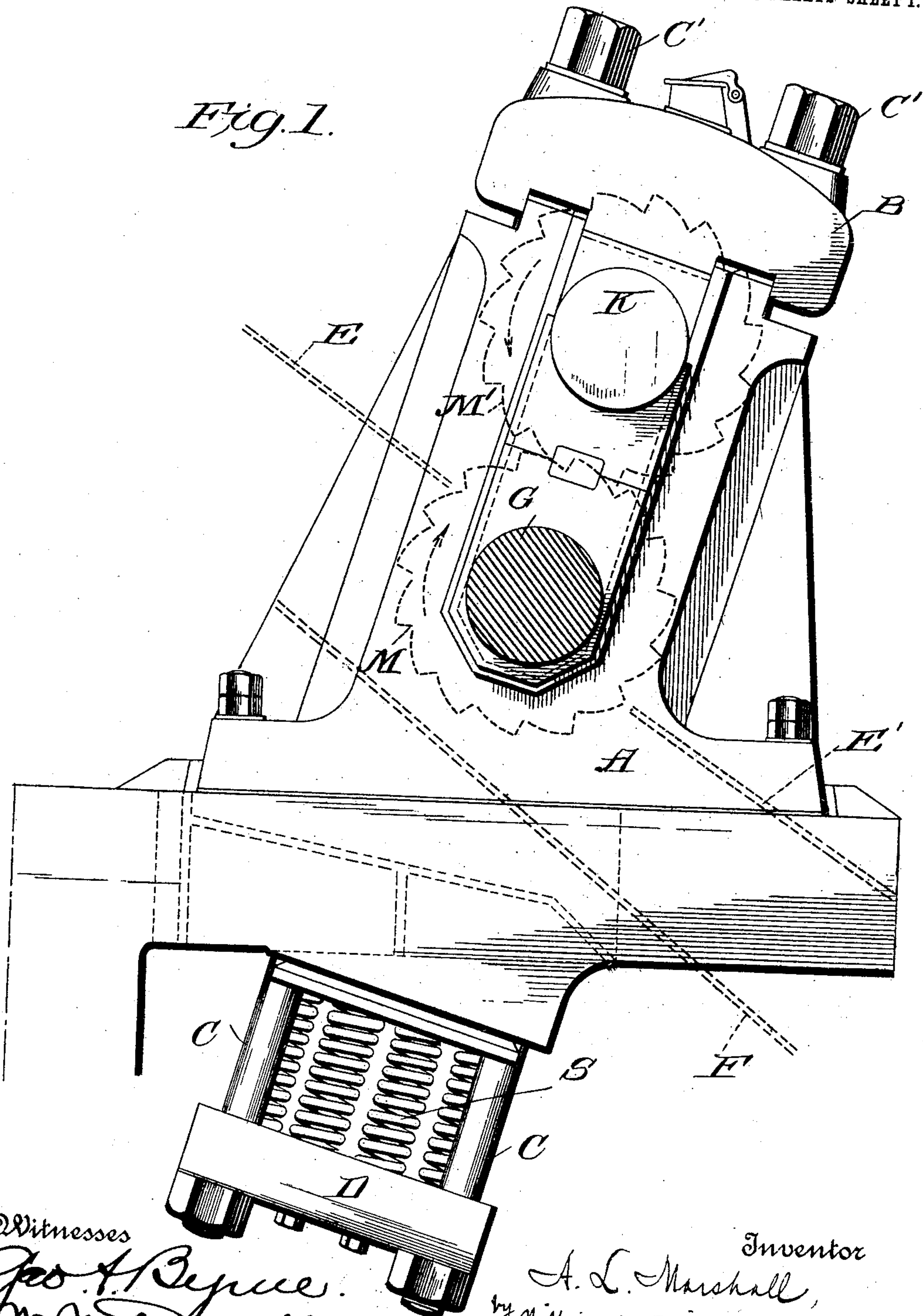


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A. L. MARSHALL.  
CANE CRUSHER.  
APPLICATION FILED MAY 20, 1809.

Patented Dec. 13, 1910.  
2 SHEETS—SHEET 1.

Fig. 1.



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# UNITED STATES PATENT OFFICE.

ALBERT L. MARSHALL, OF NEW ORLEANS, LOUISIANA.

CANE-CRUSHER.

978,767.

Specification of Letters Patent.

Patented Dec. 13, 1910.

Application filed May 20, 1909. Serial No. 497,263.

*To all whom it may concern:*

Be it known that I, ALBERT L. MARSHALL, a citizen of the United States, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented certain new and useful Improvements in Cane-Crushers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to improvements in cane crushers, intended for use in connection with mills for grinding cane.

In modern practice, the cane is carried between crushing rolls for breaking up, crushing, and tearing the cane before it is fed to the mill proper.

While passing through the crushers, a large proportion of the juice is extracted from the cane, and my present invention relates to the special form of crusher, whereby the hard shell of the cane is more satisfactorily crushed and broken and torn, and whereby a larger proportion of the juice is extracted in the transit of the cane through the crusher.

According to this invention, the rollers are cast with zigzag teeth running lengthwise and intermeshing, the striking feature of which is the shape of the surface of the teeth, which, when in motion, combine a rolling shear with a rolling contact. The cane is first gripped by the shearing edge of the teeth, then the revolving roller draws in the cane and shears it into pieces, while the contact of the bases of the intermeshing teeth as they roll together express the juice. On account of the absence of pockets on the lower roller, the expressed juice is free to flow unretarded into the juice pan. This combination insures that a light feed or a heavy feed of cane will be equally as well prepared, and that the resulting bagasse will be delivered to the front mill with a lower juice content than, I believe, is possible with any other existing machine.

My invention will be understood by reference to the accompanying drawings, in which the same parts are indicated by the same letters throughout the several views.

Figure 1 is an end view through the housing for the crusher rolls, and shows the driving shaft in cross section. Fig. 2 is a front view showing the intermeshing corrugated crushing rolls detached from the housing.

Fig. 3 is a section through the oppositely-disposed intermeshing teeth, on a larger scale, and illustrates the tearing, breaking and crushing effect of the interpenetrating teeth.

A represents the housing for the crusher, having the usual cap B, held down by the nuts C' on the tie bolts C, which tie bolts carry at their lower ends a cross head D, normally pressed downward by heavy springs, illustrated at S, or instead of these springs, the well known hydraulic ram attachment may be used to apply yielding pressure to the cap B.

E represents the chute for delivering the cane from the feed carrier or conveyer to the crusher, E' represents the chute for conveying the crushed cane from the crusher to the mill proper, and F represents the plate on which the crushed cane from the crusher passes to the mill.

G represents the shaft which is connected to the driving engine, which shaft carries the crusher roll M and the gear H. This gear H meshes with a similar gear I on the shaft K, carrying the other crusher roll M'. One of the crusher rolls M is preferably provided with flanged heads  $m$ , overlapping the ends  $m^2$  of the other crusher roll, whose annular head  $m'$  is of smaller diameter than the flanged heads  $m$ , as shown in Fig. 2. Thus it will be seen that the flanged head  $m$  prevents the escape laterally of the particles of cane while passing between the crusher rolls.

Each crusher roll is provided with a series of staggered teeth  $m^3$ , annularly disposed around the roller, between which teeth are a series of crotches  $m^4$ , the teeth on one roll projecting into the crotches on the other roll, as shown more clearly in Fig. 3.

The interpenetrating teeth on the two rolls are symmetrical, but reversely disposed, as shown in Fig. 3. Referring to said figure, the top of the tooth is preferably flattened somewhat, as at 1, which flat surface terminates in the cutting and tearing edge 2, adjacent to the straight face 3, which ends at the point 4 next to the flat face 5, which flat face changes at 6 into the curved compressing surface 7, which curved compressing surface 7 ends at 8, where the flat top of the next tooth begins.

The crushing rolls revolve in the direction of the arrows shown in Figs. 1 and 3. It will be noted that as the cane is fed to the crusher, it is caught by the front face 3 and



the sharp point 2 of the tooth, and will be dragged into the crusher and broken up and torn, while the curved pressing surfaces 7 will press on the cane after it has been  
5 broken and torn, extracting a large proportion of the juice, which will drip down on the bottom plate F, while the macerated stalks from which the juice has been partly extracted will be carried forward and fed to  
10 the mill in the usual way. By this particular arrangement, a strong and positive grip is secured on the round polished stalks of the cane, which at times are very slippery, and the stalks are dragged into the crusher where  
15 they are broken up, torn and part of the juice extracted before being fed to the mill, where the further extraction of the juice is secured in the usual way.

20 Since the amount of the cane fed to the crusher varies from time to time within wide limits, one of the crusher rolls, preferably the upper, is arranged to move bodily away

from the other, to accommodate the increased feed, and this movement of the rollers apart is permitted by means of the spring arrangement S, or the well-known hydraulic arrangement hereinbefore mentioned.

Having thus described my invention, what I claim and desire to secure by Letters Patent of the United States is:—

30 A cane crusher, comprising two rolls provided with a series of annularly-disposed interpenetrating teeth  $m^3$ , each tooth having a flat top 1, a cutting edge 2, a flat face 3, terminating at 4, another flat face 5 registering  
35 with the flat top 1 of the tooth, and a curved pressing face 7, substantially as described.

In testimony whereof, I affix my signature, in presence of two witnesses.

ALBERT L. MARSHALL.

Witnesses:

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W. J. CUMMINGS.