(No Model.)

H. A. HUGHES.

SHREDDING APPARATUS FOR CANE.

No. 443,522. Patented Dec. 30, 1890.

Fig. 1.

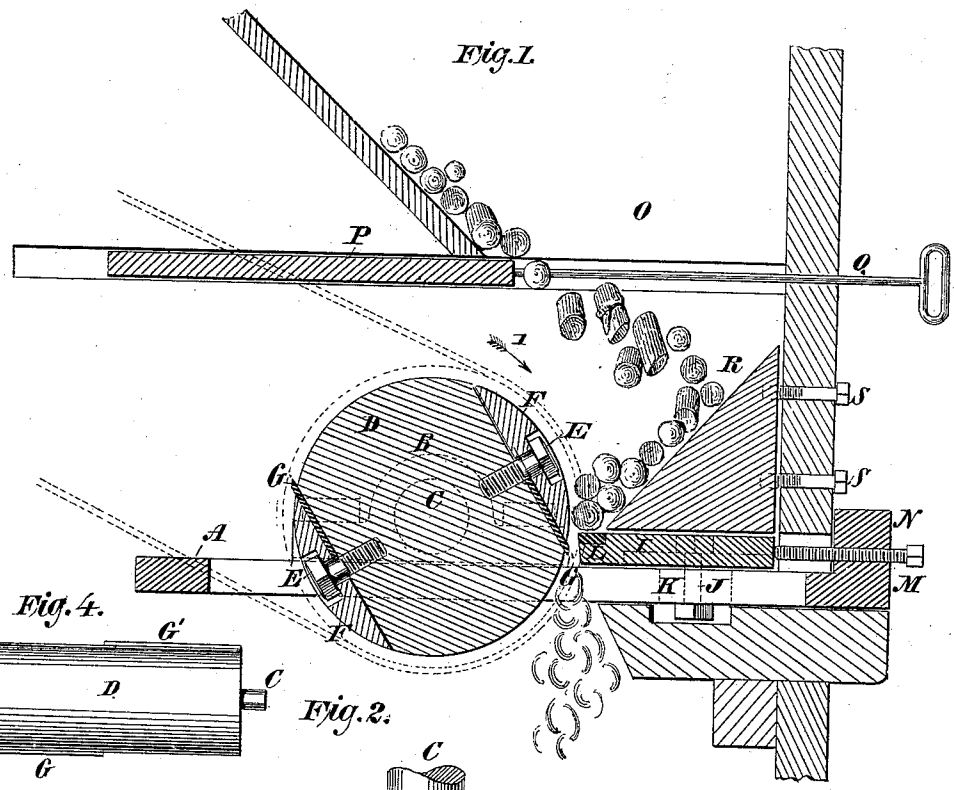
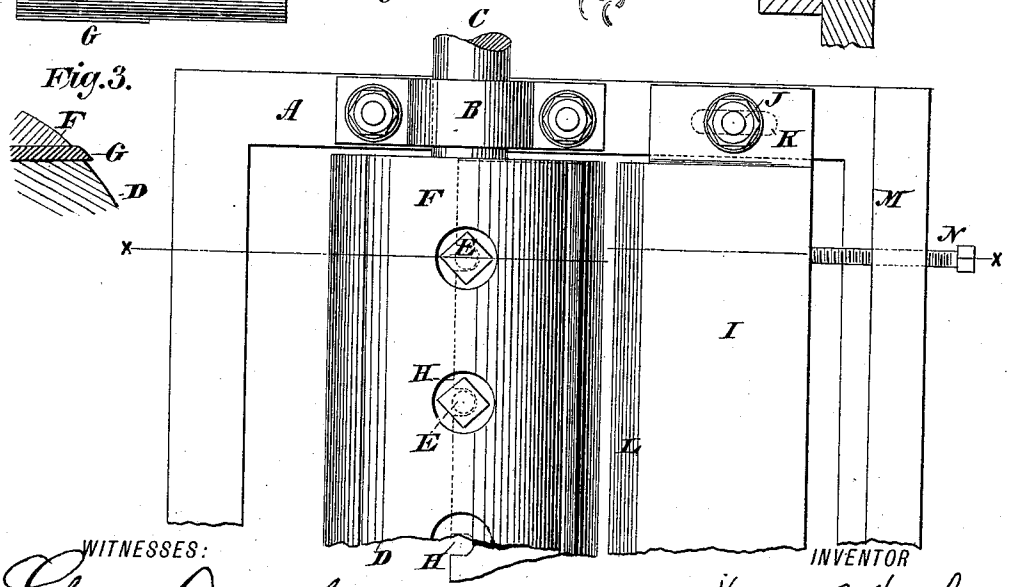


Fig. 4.

Fig. 2.

Fig. 3.



WITNESSES:

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SHREDDING APPARATUS FOR CANE.

SPECIFICATION forming part of Letters Patent No. 443,522, dated December 30, 1890.

Application filed December 27, 1887. Serial No. 258,968. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. HUGHES, of Rio Grande, Cape May county, New Jersey, have invented a new and useful Improvement in Shredding Apparatus for Cane, of which the following is a specification.

My invention relates to an apparatus for shredding sorghum cane preparatory to the extraction of the sugar therefrom.

My invention consists more particularly in the construction of the rotary shredding-knife and of the devices for regulating the supply of cane thereto.

In the accompanying drawings, Figure 1 is a vertical section of my apparatus on the line *x x* of Fig. 2. Fig. 2 is a partial plan view. Fig. 3 is an enlarged partial section of the knife-edge and adjacent portion of the knife-supporting cylinder, and Fig. 4 is a detail view illustrating an alternate arrangement of knives on the cutter-cylinder.

Similar letters of reference indicate like parts.

A is a supporting-frame, in which are suitable bearings B for the horizontal shaft C, on which shaft the knife-carrying cylinder is fixed. The body D of said cylinder is made preferably of solid metal and has two flat sides, against which are secured, by bolts E, the segmental portions F, which complete the cylinder. The bolts E enter the body D and their heads are countersunk, as shown in the segmental portions F. The knives G are plain bars or strips of metal clamped between the segmental portions F and the flat faces of the cylinder-body D. In order to receive said knives, suitable recesses may be made either in the segmental portions D, as shown in the drawings, or in the flat face of the cylinder-body. The bolts E pass through recesses H in the backs of the knives, as indicated by dotted lines, Fig. 2. By this arrangement as the protruding edges of the knives wear away the bolts E may be loosened and the knives set forward. The cylinder periphery is truly circular, no portion thereof being cut away. The knife-blades are so set that a plane produced through the edge of a blade and said cylinder shall subtend an arc of the circle bounding said cylinder. The distance of the said edge measured from a diametral line of said cylinder drawn at right angles to said plane, is less than the length of a radius of said circle; or in other words, the knives are set as is apparent from Figs. 1 and 3— that is, very slightly protruding beyond the truly circular periphery, but not with such clearance as is common in rotary cutters for planers and like machines which cut away the material presented. By reason of this small protrusion beyond the cylinder-surface there is a free space below the knife, and the knife operates to scrape or shred the material.

The cylinder is disposed in an opening in the horizontal supporting-frame A. Resting upon said frame in front of the cylinder is a cross bar or block or support I. Bolts J pass through openings in the ends of said bar and through elongated slots K in the frame A. At the edge of bar I (if said bar be of wood) and in proximity to the knife-cylinder may be secured a fixed plate L of metal; or the block I may be entirely of metal. Passing through the upward flange M of the frame A is a set-screw N, which bears against the rear side of bar I. By loosening the bolts J and suitably moving the set-screw N, the block I may be adjusted with its edge nearer to or farther from the path of travel of the knife-edge.

The cut cane to be shredded is placed in a hopper O, at the bottom of which is a sliding gate P, by adjusting which, by means of the handle Q, the supply of cane to the knife-cylinder may be regulated. The cane then falls upon the inclined slide R, which also may be adjusted nearer to or farther from the knife-cylinder by means of the set-screws S. On reaching the bottom of slide R the cane meets the swiftly-revolving knives while resting upon the block I. The edge of the knife travels in close proximity to the corner or edge of the plate L, so that the effect of the knife is not to chop the cane, but to scrape it into shreds sufficiently small to pass between the edge of the knife and the edge of the cutter-plate L or block I if the plate be absent. Now the pieces of cane are short cylinders, and they naturally place themselves longitudinally parallel to the cylinder. Consequently the effect of the knife is to tear or scrape away the longitudinally-running fibers, because its cutting-edge acts parallel to the direction of said fibers, splitting or shredding

them, as it were, from the main body. This is facilitated by the sharp corner or edge of the cutter-plate L. The result which I obtain is one which has long been sought, but, so far as I know, has never been accomplished—namely, the thorough disintegration of the fibrous structure of the cane and not mere chopping or comminution. The reason why this thorough fibrous disintegration is valuable and important is the increased ease and economy of extracting the sugar from cane so prepared. I have proved by repeated practical experimenting on a commercial scale that from sorghum cane thus treated the sugar may not only be economically extracted by diffusion, but by a process which amounts substantially simply to repeated washing in water at a temperature much lower than is ordinarily employed in any sugar-diffusion process with which I am familiar.

In connection with the knife-cylinder illustrated, which is rotated in the direction of the arrow 1 by the belt and pulley indicated by dotted lines in Fig. 1, I show but two knives. It will be obvious, however, that more knives similarly applied around the cylinder periphery may be employed, if desired. So, also, both or all the knives need not extend longitudinally along the whole length of the cylinder, but may be alternated, for example, with two knives. One knife may extend over part of the length and the other knife over the remainder, as indicated in the diagram, Fig. 4, in which D represents the cylinder, and the two knives are shown at G and G'.

I claim—

1. The combination of the rotary cylinder-body D, segmental piece F, blade G, interposed and clamped between said body D and piece F and having its edge protruding from the periphery of said cylinder, and block I, with inclined slide R, supported above said block, substantially as described.

2. The combination of the rotary cylinder-body D, segmental piece F, blade G, interposed and clamped between said body D and piece F and having its edge protruding from the periphery of said cylinder, and block I, with inclined slide R, supported above said block and adjustable nearer to or farther from said cylinder, substantially as described.

3. The combination of the rotary cylinder-body D, segmental piece F, blade G, interposed and clamped between said body D and piece F and having its edge protruding from the periphery of said cylinder, and block I, with inclined slide R, hopper O, and gate P, substantially as described.

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