Aug. 28, 1945. J. ALEXANDER 2,383,437

MILL

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Fig. 1

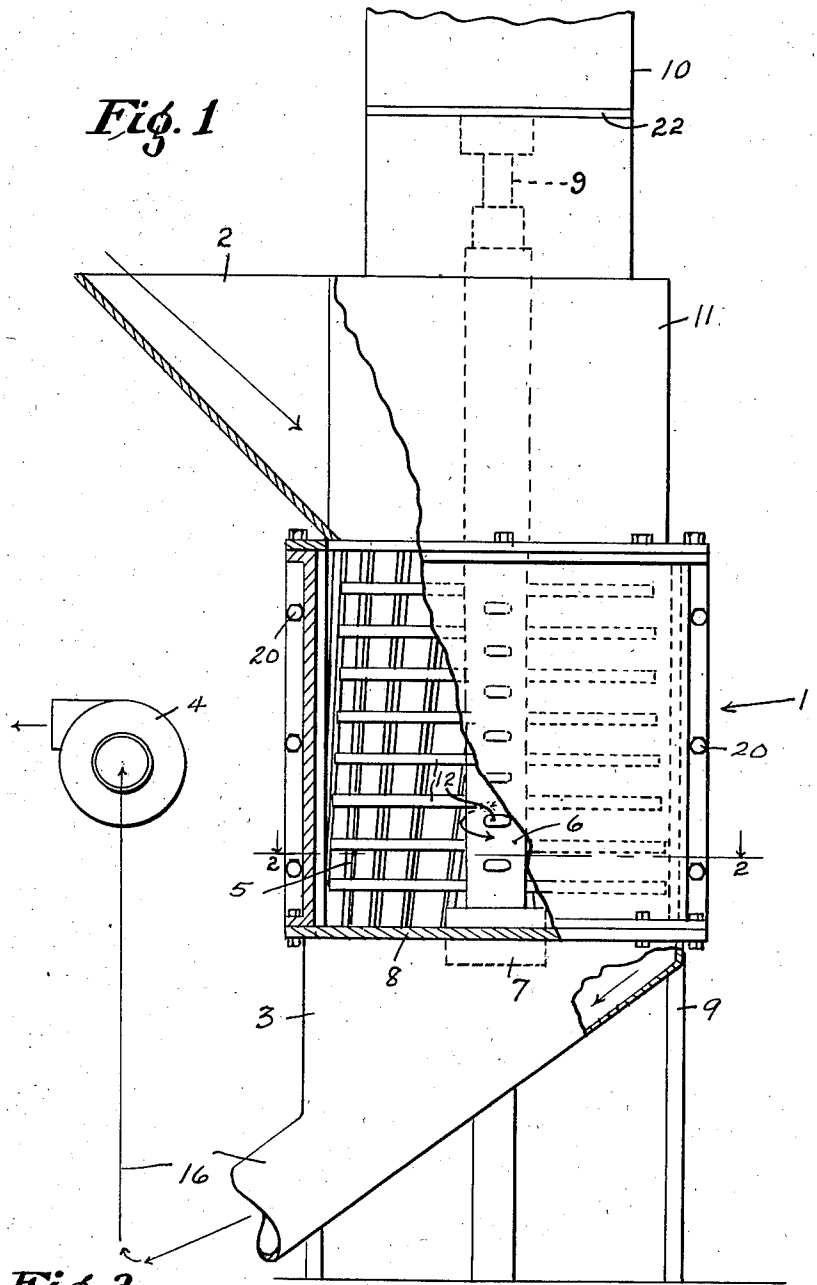


Fig. 3

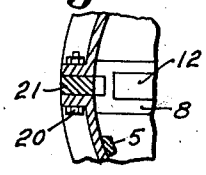
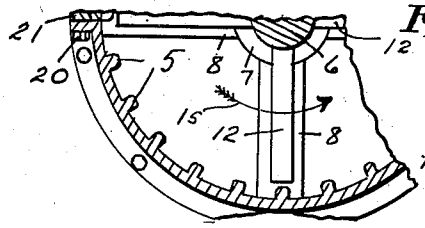


Fig. 2



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MILL

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3 Claims. (Cl. 241—154)

This invention relates to a mill for comminuting redwood bark, and has for objects a simple mill for rapidly breaking up redwood bark fibers into relatively short pieces without being subjected to excessively rapid detrimental wear.

Heretofore certain conventional mills that might be suitable for comminuting or breaking redwood bark into fine pieces are either too slow or are so subject to detrimental wear as to be impractical. Most of these mills have screens or grills that are worn out after only a short period of use. Where the bark is retained in a mill too long the resultant product lacks uniformity and some of the particles otherwise useful, are too fine. However, by my construction, which is similar in some respects to conventional mills, the redwood bark passes rapidly through the mill, yet the fibers are broken into the desired size and there is but little wear on the parts of the mill most subjected to wear.

In the drawing,

Fig. 1 is a part elevational, part sectional view of a mill and a suction blower generally used therewith is indicated diagrammatically.

Fig. 2 is a fragmentary sectional view taken along line 2—2 of Fig. 1.

Fig. 3 is a fragmentary sectional view through one side of the shell of the mill showing the connection between the shell halves.

In detail, the mill comprises a stationary, vertically disposed, cylindrical shell, generally designated 1 that is open at its upper end for receiving redwood bark that may be fed into the shell by way of a feed chute 2, and the lower end of shell 1 opens into a discharge hopper 3 that leads to a conduit with which a suction blower 4 or other suction means is connected for drawing the bark away from shell 1.

The walls of shell 1 are imperforate and have generally vertically extending ribs 5 projecting radially inwardly from their inner sides. These ribs 5 may be strips of metal secured to the shell 1 or they may be cast with the shell. They preferably are provided with "Stellite" inner edges, or other abrasive resisting metal.

A vertical shaft 6 extends into shell 1 to its lower end where it may be supported for rotation on a suitable thrust bearing 7 that is carried by spider arms 8 (Fig. 2) secured to frame 9 to which shell 1 is bolted. A motor 10 is connected with shaft 6 at its upper end above the shell 1, which motor may be secured on a housing 11 into which chute 2 opens, a wall 22 closing off the motor from the housing 11 so as to prevent dust entering the motor. Shaft 9 extends through a dust seal in said wall.

The portion of shaft 6 that is within shell 1 carries radially extending arms 12 in a plurality of rows, such as four equally spaced, vertical rows. These arms may be somewhat flattened in a horizontal plane at right angles to the axis of the shaft 6, as best seen in Fig. 1.

The upper arm in each row terminates a substantial distance at its outer end from the inner side of the shell 1 and from said ribs, the space between said outer ends of the arms and the shell being uniform. The lower arm in each row terminates at its outer end relatively close to each rib as the shaft rotates, and commencing with the upper arm in each row, those therebelow, in succession, are progressively longer, the bottom arm being the longest in each row.

The arms in adjacent pairs of rows are staggered relative to each other, and the spacing between arms in each row is preferably uniform. Also, the spacing between adjacent pairs of arms in each row is preferably substantially greater than the thickness of each arm.

The ribs 5 are preferably slanted relative to vertical, the lower end of each rib being slightly advanced in the direction in which the arms 12 are revolved, relative to the upper ends of the ribs, as best seen in Fig. 1. This slight slanting of the ribs is quite important to the accomplishment of the desired results.

The shaft 6 may be rotated in the direction of arrow 15 (Fig. 2) at a relatively high speed, say, about 1500 R. P. M. to about 2000 R. P. M. and the arms 12 are, of course, revolved upon such rotation. Redwood bark pieces are fed into the upper end of shell 1 through chute 2 and this bark is quickly broken up into relatively fine pieces from dust-like particles to pieces about 1/64 to about 1/8 inch in length. The material passes through the mill very rapidly and the broken and fine particles are drawn through the conduit 16 by section blower 4 from which it may pass into separators (not shown) to classify the material and the material so classified may be then baled or packaged for use.

Heretofore the conventional mills employed have quickly become worn out, requiring replacement of screens and hammers, etc. Also the material broken up has not been satisfactory.

However with this particular combination of elements and structure, the fiber passes through the mill freely without piling up and without staying in the mill too long a time. Also the ribs and hammers are not susceptible to rapid wear,

and last for many months without losing efficiency. The suction blower assists in keeping the mill clear of material that might otherwise tend to remain in suspension in the mill.

In order to quickly disassemble and assemble the shell 1 the latter is preferably made in two halves that may be bolted by bolts 20 to uprights 21 (Fig. 2). Suitable gaskets or packing may be provided wherever found necessary or desirable.

Having described the invention, I claim:

1. A mill for comminuting redwood bark comprising a stationary vertically disposed uniform diameter cylindrical shell; a shaft within said shell coaxial therewith and having a plurality of elongated arms extending radially therefrom; means supporting said shaft for rotation within said shell, means for so rotating said shaft in one direction whereby said arms will be revolved about the axis of said shaft in said one direction; a plurality of spaced ribs on said shell projecting inwardly from the inner cylindrical sides thereof and respectively extending substantially from end to end of said cylinder and similarly slanted relative to lines parallel with said axis and coincident with the inner sides of said cylinder; the said inclination of said ribs being such that they extend generally in the said direction of rotation from their upper to their lower ends, said arms being straight and free from beaters and enlargements thereon.

2. A mill for comminuting redwood bark comprising a stationary vertically disposed uniform diameter cylindrical shell; a shaft within said shell coaxial therewith and having a plurality of spaced annular rows of elongated equally spaced arms with the arms of each row extending radially from said shaft; means supporting said shaft for rotation within said shell, means for so rotating said shaft in one direction whereby said arms will be revolved about the axis of said shaft in said one direction; a plurality of spaced ribs on said shell projecting inwardly from the inner cylindrical sides thereof and respectively extending substantially from end to end of said cylinder and similarly slanted relative to lines parallel with said axis and coincident with the inner sides of said cylinder; the said inclination of said ribs being such that they extend generally in the said direction of rotation from their upper to their lower ends; said arms being rigid with said shaft and flattened with their greatest thicknesses horizontal, and the said hammers being spaced vertically and progressively longer from the uppermost arms downwardly; the arms of the lowermost rows thereof on said shaft terminating at their outer ends relatively close to said ribs and the arms of the uppermost rows thereof on said shaft terminating a substantially greater distance from said ribs than the arms of said lowermost rows.

3. A mill for comminuting redwood bark comprising a stationary vertically disposed uniform diameter cylindrical shell; a shaft within said shell coaxial therewith and having a plurality of elongated arms extending radially therefrom; means supporting said shaft for rotation within said shell, means for so rotating said shaft in one direction whereby said arms will be revolved about the axis of said shaft in said one direction; a plurality of spaced ribs on said shell projecting inwardly from the inner cylindrical sides thereof and respectively extending substantially from end to end of said cylinder and similarly slanted relative to lines parallel with said axis and coincident with the inner sides of said cylinder; the said inclination of said ribs being such that they extend generally in the said direction of rotation from their upper to their lower ends; a feed hopper over said cylinder opening into the upper end of the latter; said means for rotating said shaft being a motor disposed above said hopper and supported on said cylinder; and a conduit having a suction blower therein communicating with the lower end of said cylinder, said arms being straight and free from beaters and enlargements thereon.

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