Feb. 24, 1948. W. F. DANIELL 2,436,555

LOG DEBARKING APPARATUS

Filed July 15, 1944 3 Sheets-Sheet 1

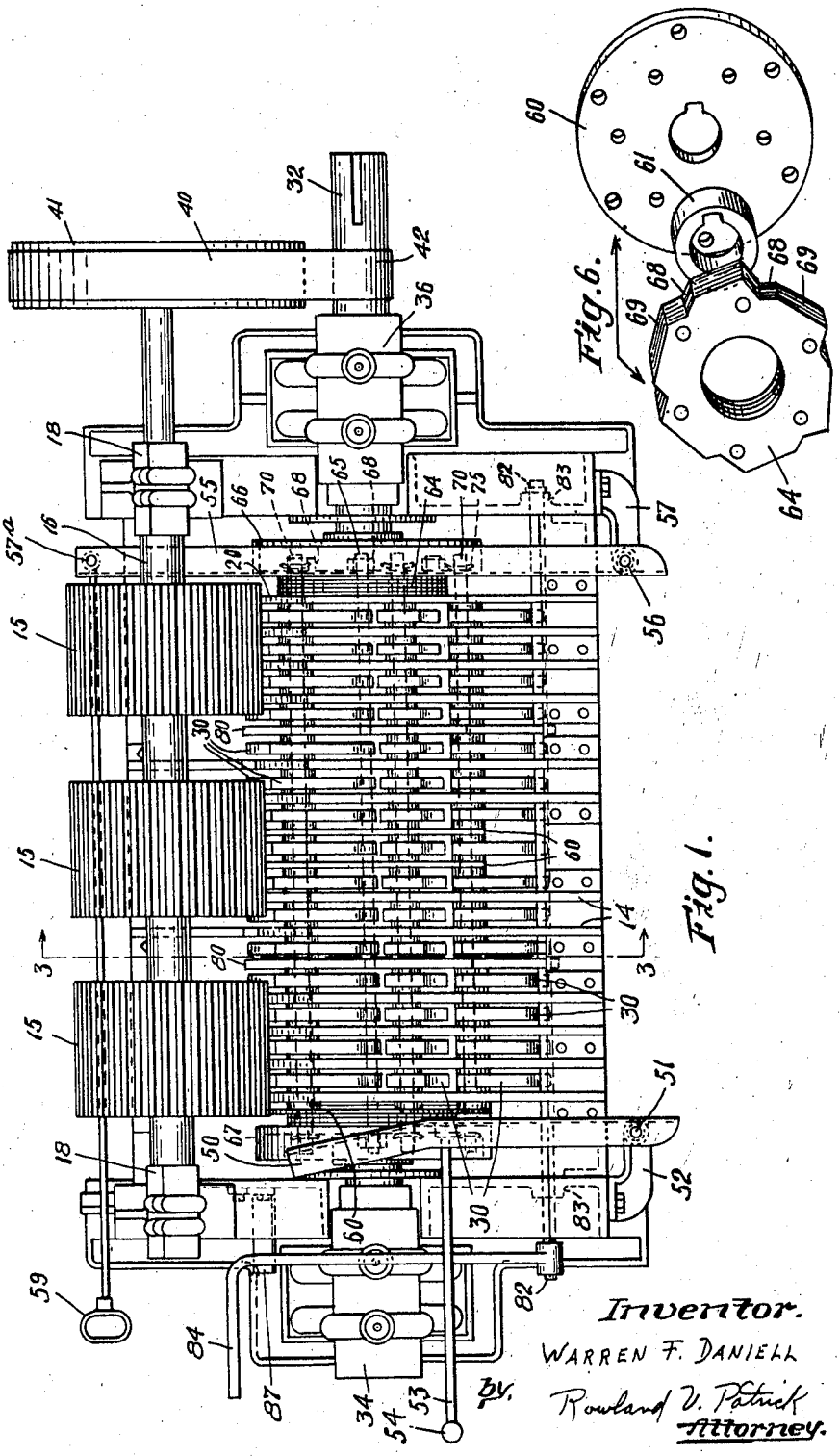


Fig. 1.

Fig. 6.

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LOG DEBARKING APPARATUS

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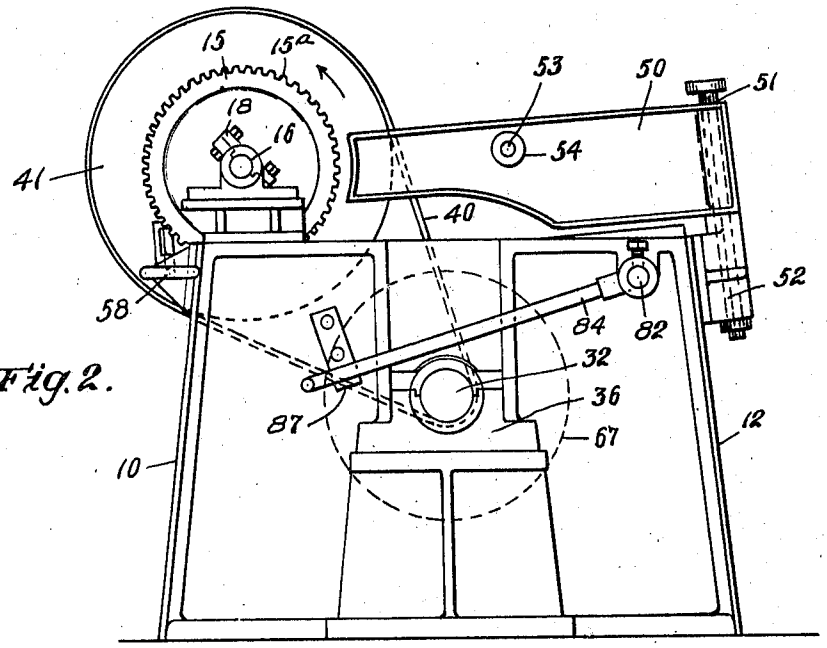


Fig. 2.

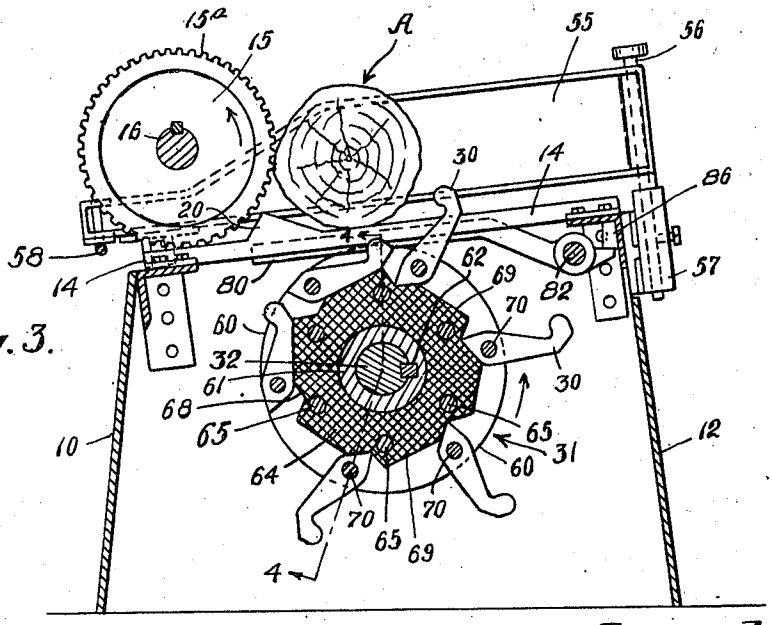


Fig. 3.

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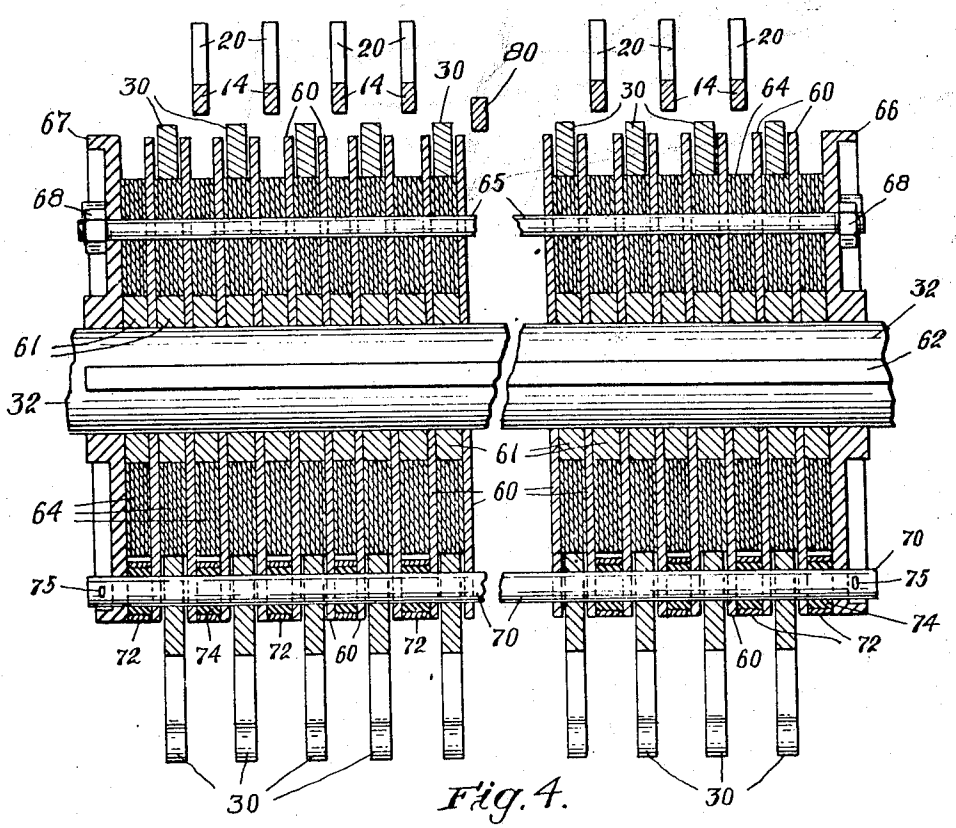


Fig. 4.

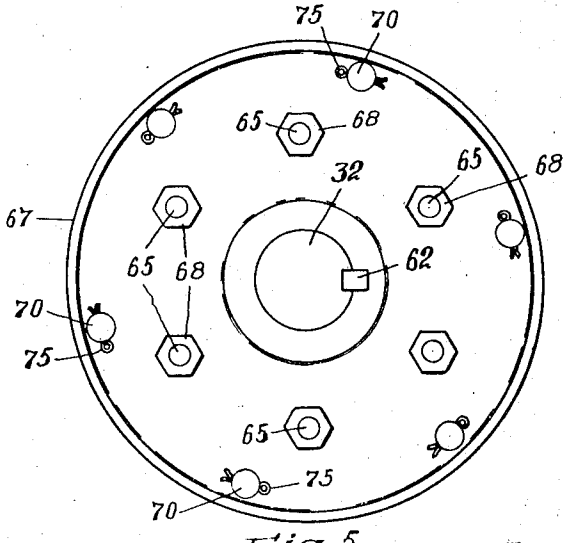


Fig. 5.

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2,436,555

LOG DEBARKING APPARATUS

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Application July 15, 1944, Serial No. 545,177

4 Claims. (Cl. 144—208)

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This invention relates to log debarking apparatus and has for an object the provision of an efficient rapid apparatus for removing bark from logs.

Inasmuch as the debarking is accomplished by striking the logs with a series of rapid, sharp, hammer blows, it is one object of the invention to minimize the noise, vibration, and wear appurtenant to usual impact debarking machines. Further objects of the invention are the provision of control devices for insuring complete bark removal and for discharging the debarked log from the apparatus.

In its preferred form, the apparatus has a slotted deck or grid bed for supporting a log during the debarking operation and utilizes centrifugally acted upon hammers which pivot under centrifugal action into paths of rotation projecting through the grid to impart a succession of rapid blows against the bark of a log supported on the bed. The bed has associated with it an arrangement for retaining the log in blow-receiving position and suitable mechanism designed to rotate the log relative to the bed and to move it, if necessary, longitudinally of the bed thus permitting the log to be subjected to blows at all surface points.

There is also associated with the apparatus a novel discharging mechanism for disposing of a log after the bark has been removed.

Details of the structure and operation of the apparatus will be better understood when described in connection with the accompanying drawings, wherein:

Fig. 1 is a plan of the apparatus;

Fig. 2 is an end elevation thereof;

Fig. 3 is a cross-sectional view taken along the line 3—3 of Fig. 1;

Fig. 4 is a detail cross-section of the hammer carrying drum taken along the line 4—4 of Fig. 3, but broken away centrally;

Fig. 5 is an end elevation of the drum shown in Fig. 4 (omitting the hammers); and

Fig. 6 is an exploded view of certain of the parts making up the drum shown in Fig. 4.

The apparatus comprises a frame, the sides 10 and 12 of which support a series of transverse, spaced bars or grids 14 forming collectively an inclined bed for supporting a log A to be debarked.

The bed is inclined to the left, as shown in Fig. 3, so that a log A supported on the bed will tend to roll under the influence of gravity to the left towards a series of log-turning rolls 15 mounted in longitudinally spaced relation on a shaft 16

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journalled in bearings 18, 18 carried by the frame.

As shown in Figs. 2 and 3, surfaces of the rolls 15 are desirably grooved in an axial direction so that they present a series of teeth 15a which will frictionally engage the log A as it is brought against the teeth 15a under the influence of gravity or otherwise.

The rolls 15 thus cooperate with the grids 14 of the log supporting bed to form a nip into which a log may be continuously urged. For the purpose of raising the point of contact between a log A and the rolls 15, the grids 14 are provided with upstanding inclined projections 20 (Figs. 3 and 4).

Debarking of the log is accomplished by blows imparted to the log by a series of hammers 30 which are pivotally mounted, in a manner to be presently described, on a drum assembly 31 carried by a shaft 32 which extends longitudinally of the machine and is supported in bearings 34 and 36. The position of the assembly 31 relative to the grids 14 and the position and proportion of the hammers 30 relative to the shaft 32 are such that during rotation of the shaft 32 the hammers 30 under centrifugal action pivot into paths of rotation projecting between the grids 14 of the log supporting bed, all as indicated in Fig. 3.

For the purpose of rotating the log turning rolls 15 in timed relation with the rotation of drum assembly 31, the shaft 16, carrying rolls 15, is driven from shaft 32, driving drum 31, by a belt 40 running over shaft 32 at 42 and around pulley 41 carried by shaft 16.

The log supporting bed is also provided at each end thereof with mechanism for retaining a log therebetween and for moving the log longitudinally of the bed. This mechanism includes at the left hand side of the bed, as shown in Fig. 1, a gate member 50 hinged for swinging movement about a vertical plane on a rod 51 supported in a bracket 52 extending from frame 12. Affixed to the member 50 is a rod 53 extending to the front of the machine and terminating in a handle 54 for operating the gate member 50 to move a log supported on the bed towards the right of the machine as shown in Fig. 1.

A similar gate member 55 is mounted at the other rear end of the machine for pivotal movement about a rod 56 similarly fixed in a bracket 57 extending from the frame 12. However, the gate member 55 extends below the shaft 16 and carries pivotally connected thereto at 57a a rod 58 extending to the front of the apparatus and

terminating in a handle 59. By proper manipulation of the control handles 54 and 59, a log may be moved in either direction for a short distance longitudinally of the bed. If desired, pivotal movement of gate members may be frictionally resisted to hold a log in a predetermined position longitudinally of the bed.

The hammers 30 are assembled upon the drum 31 in the following manner, reference being had to the detailed showing of Figs. 4, 5, and 6, as well as to the cross-sectional view of Fig. 3. The shaft 32 carries a series of disks 60 longitudinally spaced along the shaft. Disks 60 are held in spaced relation by the interposition therebetween of annular metal spacers 61 keyed to the shaft 32 by a key 62. Each of the annular spacers 61 is of a relatively small diameter compared with the diameter of the disks 60 and is surrounded by a further annular disk-like spacing member 64 formed of shock absorbing material such as laminated fabric, solid rubber, or other resilient or semi-resilient material. The entire assembly is held in assembled relation by a series of bolts 65, shown as six in number, extending axially of the assembly and passing through flanged metal end plates 66 and 67, respectively. Nuts 68 on bolts 65 compress the entire assembly into an axially rigid structure, the key 62 being keyed into the end plates 66 and 67.

The hammers 30 are pivoted in every other space between disks 60 on a second set of axially extending pivot rods 70, also six in number in the form shown, radially spaced on the drum 31 outwardly of the members 64. As shown in Fig. 3, the hammers are shaped at their inner ends in such manner that they cooperate with the resilient shock absorbing members 64 to limit the arc of rotation of the hammers 30 about the pivots 70.

As indicated in the drawings, the spacing of the disks 60 and intervening hammers 30 on the drum 31 is so related to the spacing of the grids 14 of the log supporting bed that the hammers, when extended from the drum, rotate in paths of rotation projecting through grids 14, so that each set of six hammers passes upwardly between two adjacent grids in each revolution of the shaft 32.

Thus, as shown in Fig. 3, the shaft 32, revolving in counter-clockwise direction, forces the hammers 30 under centrifugal action to be carried about the axis of shaft 32 in positions extending radially outwardly from the axis of the shaft as they rise to the right, further pivotal movement being prevented by contact of inner ends of the hammers with peripheral surfaces 68 of shock absorbers 64. Upon striking a blow against the log A, each hammer rebounds from the log in such manner as to pivot clockwise around its pivot 70 until it bumps against a peripheral surface 69 of the resilient material 64 from which it rebounds or is returned to extended position under the influence of centrifugal action prior to its return to impact position.

In order to further reduce the shock to the frame of the machine resulting from the blows imparted by the hammers 30, the pivots 70 pass loosely through the disks 60 and are mounted in resilient bearings 74 carried internally of annular spacers 72 (Fig. 4) positioned in spaces between disks 60 alternating with the hammers 30. As indicated in Fig. 5, the rods 70 may be held relative to the end plates 66 and 67 by cotter pins 75.

In addition, the machine is provided with means for ejecting a log A supported on the bed after the debarking operation has been completed. For this purpose, at suitably spaced intervals, grids 14 are omitted and are replaced by ejecting arms 80 extending parallel with the grids 14. The arms 80 are fixed to a shaft 82 extending longitudinally of the frame beneath the bed, this shaft 82 being journalled in bearings 83 for oscillation relative to the frame 12. At the forward end of the machine, there is connected to the shaft 82 a right angled lever arm 84 which acts as a handle for raising the arms 80 from an inoperative lowered position, as shown in Fig. 3, limited by stops 86 and 87 carried by the frame, upwardly through spaces between the grids 14 above the bed to raise a log supported on the bed therefrom and roll the log off the bed and from the apparatus.

The operation of the apparatus may be summarized as follows:

A log A is positioned on the inclined bed of grids 14 where it rolls against log-turning rolls 15. The shaft 32 is then revolved from a suitable power supply, rolls 15 simultaneously revolving in the same direction. Rotation of the shaft 32 revolves drum 31, and hammers 30 thus successively rise between the grids and strike a succession of sharp blows against the log A. Due to the location on the log of the points of impact, the log is continuously driven against the log-turning rolls 15 which tend to turn the log in a clockwise direction, as shown in Fig. 3.

In an apparatus wherein the maximum radius of the path of rotation of the hammers 30 is about 18 inches, I have secured satisfactory debarking by rotating the shaft 32 at 125 R. P. M., shaft 16 rotating about 22 R. P. M. The disks 60 are spaced on 3¼" centers to provide 17 sets of hammers, each set comprising 6 hammers, making a total of 102 hammers. At the speed given, this will provide 12,750 blows per minute to the bark.

If debarking does not proceed satisfactorily, results may be hastened by adjusting the log longitudinally of the bed by movement of handles 54 or 59 which are designed to move the log a distance at least equal to the distance between sets of hammers 30.

When the log has been completely debarked the ejecting arm control 84 is lifted to raise the ejecting arms 80 to lift the log A off the log supporting bed and roll it off the apparatus to the right, as shown in Fig. 3. The next log may then be rolled onto the bed for the debarking operation.

While the apparatus can be made of any convenient length, in the apparatus shown in the drawings, the bed is designed to accommodate logs four feet in length and the machine has been found particularly suitable for debarking hemlock.

I claim:

1. Log debarking apparatus having a grid forming an inclined bed for supporting a log to be debarked, a frictional log turning roll mounted along the lower edge of said bed and forming with said bed a log receiving nip, a rotatable hammer-carrying drum mounted below said grid, means for rotating said roll in a direction such that the side of said roll adjacent said bed moves upwardly with respect to the bed, means for rotating said drum in the same direction, and debarking hammers pivotally mounted on said drum and adapted to pivot under centrifugal action during rotation of said drum into paths of rotation projecting through said grid to carry

ends of said hammers against a log supported on said bed and drive the log towards said log receiving nip.

2. In log debarking apparatus having a bed for supporting a log to be debarked, a rotatable hammer-carrying drum assembly mounted adjacent said bed and comprising a rotatable shaft, a series of rigid disks spacedly mounted on said shaft, a plurality of radially spaced rods extending axially of said shaft and passing loosely through said disks, a series of hammers pivoted on said rods between some of said disks for movement under centrifugal action during rotation of said assembly in radial planes into paths projecting beyond the periphery of said disks, and annular spacers mounted about said rods between other of said disks, and resilient bushings mounted internally of said annular spacers and around said rods for resiliently mounting said rods to absorb reaction shocks imparted to said assembly by said hammers in pounding a log supported on said bed during rotation of said assembly.

3. In log debarking apparatus having a bed for supporting a log to be debarked and hammers spaced longitudinally of said bed for pounding a log supported on said bed, a gate member pivotally mounted at each end of said bed for movement about an axis disposed at right angles to the longitudinal axis of said bed, said gate members being movable about said axes in a direction generally parallel to the longitudinal axis of said bed for moving a log supported on said bed longitudinally thereof to expose the surface of the log throughout its longitudinal extent to the impact of said hammers.

4. In log debarking apparatus having a bed for supporting a log to be debarked, a rotatable hammer carrying roll assembly mounted adjacent said bed and comprising a rotatable shaft, a series of disks mounted in spaced relation along said shaft, a plurality of rods spaced radially outwardly of said shaft and extending axially of said assembly through said disks, a series of hammers pivoted on said rods in spaces between said disks for movement under centrifugal action during rotation of said assembly in radial planes into paths projecting beyond the peripheries of said disks, to pound a log supported on said bed, and resilient shock absorbing stops mounted about said shaft between said shaft and said rods and having surfaces defining the limits of pivotal movement in both directions of each hammer and acting to absorb the shock of the reaction impact of said hammers on said roll assembly in pounding said log, said hammers having free pivotal movement throughout their paths of movement between said surfaces.

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