DEBARKING MACHINE HAVING ANGULARLY RELATED GUIDE ROLLER AND FEED WHEEL


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14 Claims. (Cl. 144—208)

This invention relates to a novel machine of simple construction for debarking or peeling elongated pieces of wood such as tree trunks or limbs and has for its primary object to provide a machine which may be readily controlled and operated by one man.

Another object of the invention is to provide a debarking machine having novel adjustable features enabling the machine to be utilized for debarking pieces of wood of different diameters, for peeling or debarking the wood to different depths, and for feeding the wood through the machine at different speeds; and including a yieldably mounted cutterhead operable through an aperture in a log-supporting plate.

Other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawings, illustrating a presently preferred embodiment thereof, and wherein:

Figure 1 is a side elevational view of the machine; Figure 2 is an enlarged fragmentary horizontal sectional view thereof taken substantially along a plane as indicated by the line 2—2 of Figures 1 and 3; Figure 3 is a side view taken substantially central sectional view of the machine; Figure 4 is a cross sectional view of the machine taken substantially along a plane as indicated by the line 4—4 of Figure 3; Figure 5 (see Sheet No. 1) is a fragmentary plan view of a portion of the machine shown removed; Figure 6 (see Sheet No. 5) is an enlarged fragmentary cross sectional view taken substantially along a plane as indicated by the line 6—6 of Figure 3; Figures 7 and 8 are enlarged fragmentary sectional views along planes indicated by the lines 7—7 and 8—8, respectively, of Figure 6; Figure 9 is a plan view showing one of the knives of the cutterhead removed.

Figure 10, (see Sheet No. 2) is a fragmentary sectional view taken substantially along a plane as indicated by the line 10—10 of Figure 3; Figure 11 is a sectional view taken substantially along a plane as indicated by the line 11—11 of Figure 11; Figure 12 is an enlarged cross sectional view taken substantially along a plane as indicated by the line 12—12 of Figure 11; Figure 13 (see Sheet No. 4) is an enlarged fragmentary sectional view taken substantially along a plane as indicated by the line 13—13 of Figure 1, and Figure 14 is a fragmentary sectional view taken substantially along a plane as indicated by the line 14—14 of Figure 1.

Referring more specifically to the drawings, the debarking or wood peeling machine in its entirely and comprising the invention is designated generally 15 and includes a frame or supporting structure, designated generally 16. In its preferred form, the frame 16 includes longitudinally extending transversely spaced sides 17 having rear ends connected by a cross brace 18. Each side 17 is provided with a short upstanding post 19 at its forward end and two longer longitudinally spaced upstanding posts 20 and 21 which are disposed substantially intermediate of the ends of the sill. The upper ends of the four long posts 20 and 21 are preferably connected and braced by a channel 22 which is connected to the upper end of each of said posts. Thus, the frame 16 as viewed from in front or as seen in Figure 4 indicates a left side, designated generally 23, as seen in Figure 1, and a right side, designated generally 24 and shown in Figure 3.

The frame 16 also includes a front cross member 25, common to both sides 23 and 24, which is supported on and secured to the upper portions of the frame 16 and which extends outwardly therefrom, as seen in Figure 6. Each frame side 23 and 24 also includes a longitudinal beam 26, the intermediate portions of which are secured to the uprights 20 and 21 and the forward end of which beams 26 rest on and are secured to the front cross beam 25.

If desired and to make the machine 15 portable or more readily portable, the sills 17 may be provided with skids or may be supported on the ground engaging wheels.

A shaft 27 extends through lower portions of the rear uprights 21 and is journaled therein. A belt pulley 28 is fixed to the shaft 27 outwardly of the frame side 24 and is driven by an endless belt 29. The belt 29 may be driven in any suitable manner, not shown, as by a pulley on a power takeoff shaft of a tractor, by an engine mounted on the rear portion of the frame 16, or by any other suitable power source. The rear end of a cutter supporting frame 30 is swingably supported on the intermediate portion of the shaft 27 between the uprights 21 for vertical swinging movement, and extends forwards from said shaft. A multiple belt pulley 31 is fixed to the shaft 27 on one side of the frame 30 and a spacing sleeve 32 is loosely disposed on the shaft 27 between the belt pulley 31 and the adjacent right-hand upright 21. A spacing sleeve 33 is disposed on the shaft 27 between the other upright 21 and the adjacent side of the frame 30 to retain the shaft 27 against sliding movement in the frame 16 and to prevent sliding movement of the cutter supporting frame 30 on said shaft. A small belt pulley 34 is fixed to the shaft 27 on the outer side of the left-hand upright 21.

A shaft 35 is journaled in and supported by bearings 36 which are secured to the longitudinal member 37 above the shaft 27. A large belt pulley 38 is fixed to one end of the shaft 35, substantially in alignment with the belt pulley 34 and is connected to said belt pulley 34 by an endless belt 39.

An upper shaft 39 is journaled in bearings 40 which are fixed to the uprights 21 above the shaft 35. The shaft 35 is held against sliding movement in the bearings 41 by a sleeve 42 which is fixed thereto and engages the bearing 36 of the left frame side 23 and which is disposed between said bearings 36. A pinion 43 is fixed to the shaft 35 adjacent the right-hand frame side 24 and has a hub 44 engaging the bearing 36 of the left-hand frame side 23 and cooperating with the sleeve 42 to prevent sliding movement of the shaft 35 in the bearings 36. A large gear 44 is fixed to the upper end of the shaft 39 and meshes with the pinion 42. A sleeve 45 is loosely disposed on the shaft 39 between the gear 44 and the right-hand bearing 40.

A feeder wheel frame, designated generally 46, includes spaced longitudinal beams 47 having rear end portions turnably mounted on the shaft 39 for vertical swinging movement of the frame 46. One of the beams 47 is disposed between the gear 44 and a retaining sleeve 48 which is fixed to the shaft 39 and the other beam 47 is located adjacent the left-hand upright 21. A sprocket wheel 49 is fixed to the shaft 39 between said last mentioned beam and the retaining sleeve 48. The frame 46 has cross braces 50 which are connected to the beams 47 at points spaced from one another and from the ends of said frame 46, as seen in Figure 3.

A belt tightening bellcrank 51 is pivotally mounted at its apex by a pivot member 52 on the outer side of the left-hand upright 21, above and adjacent the belt pulley 28. A roller 53 is journaled in and is connected to the bellcrank 51 in a position to engage a flight of the belt 38 when the bellcrank 51 is rocked counterclockwise as seen in Figure 1. The belt tightening also includes a long lever 54 which is pivotally mounted near to but spaced from its rear end on a bolt 55 which is supported by a brace member 56 which extends between and is suitably secured to the outer sides of the left-hand uprights 20 and 21, near the upper ends thereof. An eyebolt 57 is adjusably secured to and depends from the rear end of the lever 54 and is connected to the other longer arm of the bellcrank 51 by a connecting member 58. The other
forward end of the lever 54 forms a handle which is disposed above the forward portion of the frame 16. A latch bar 59 having an outwardly facing toothed edge 60, as best seen in Figure 14, is secured to the forward end of the left-hand upright 20 and the teeth 60 thereof project beyond the outer side of said upright 20 and are inclined downwardly to selectively receive an upwardly inclined latch element 61 which is carried by the lever 54. The lever 54 has sufficient rocking movement or play transversely on the pivot 55 to permit the latch element 61 to be moved into and out of engagement with the teeth 60. The latch bar 59 is provided with a feature 70 which slides in a narrow groove 71 cut in the forward face of the frame 16. An axle 91 on which a roller 92 is journaled. An upright axle 93 rises from the sleeve 85 rearwardly of the yoke 90 and has an upright roller 94 journaled thereon. When the stud 87 is in engagement with the notch 86, the yoke 90 and roller 94 extend upwardly from the sleeve 85 and rod 82. By displacing the sleeve 85 forwardly of the rod 82 against the roller 94 and the stud 87, the feature 70 on the yoke 90 and roller 94 in horizontal positions and the rear sleeve end is provided with a second notch 86a to engage the stud 87, as seen in Figure 12, for supporting said roller 94. The rails 75 are fixed to and extend upwardly from the rearward periphery of the frame 16, and are connected by a plurality of belts 87 and roller 94 which are disposed on the yokes 90 and which yieldably support the frame 16 and, accordingly, the forward end of the frame 30.

As best seen in Figures 6, 7, and 8, the frame 30 forwardly of the crossbar 95 is provided with transversely aligned bearings 101 for supporting said shaft 102. A guide 103 is provided with a feature 87 which is in engagement with the notch 86, the yoke 90 and roller 94 extend upwardly from the sleeve 85 with the roller 94 and roller 94 are journaled thereon. When the stud 87 is in engagement with the notch 86, the yoke 90 and roller 94 extend upwardly from the sleeve 85 and rod 82. By displacing the sleeve 85 forwardly of the rod 82 against the roller 94 and the stud 87, the feature 70 on the yoke 90 and roller 94 in horizontal positions and the rear sleeve end is provided with a second notch 86a to engage the stud 87, as seen in Figure 12, for supporting said roller 94. The rails 75 are fixed to and extend upwardly from the rearward periphery of the frame 16, and are connected by a plurality of belts 87 and roller 94 which are disposed on the yokes 90 and which yieldably support the frame 16 and, accordingly, the forward end of the frame 30.

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forward ends and is provided with a plurality of depending fingers 129 which are disposed between the toothed portions 119 of the disks 118 to provide a cleaning device for the feed wheel 117. The beams 47 may be provided with a handle 130 which is fixed thereto and projects from the forward end, as seen in Figure 1. Stops 131 are secured to the inner sides of the standards 20 above the level of the log-guiding rollers 74 and are adapted to be engaged by the front cross brace 50 to limit downward swinging movement of the frame 46 to prevent the feed wheel 117 from striking the angle roller 74 or the top plate 64.

Assuming that a substantially straight length of wood such as a tree limb or trunk 132 is to be peeled or debarked, the sleeves 85 are positioned as illustrated in Figure 2, and the one in case the tree limb 132 is placed upon the top plate 64, the other end extending outwardly from the left side 23 of the machine 15. When thus disposed, a portion of the limb or trunk 132 will rest upon the roller 92 and against the roller 94 at the left side of the machine 15. Assuming that the feed screws 77 have been adjusted to position the log-guiding roller 74 at an angle as illustrated in Figure 5, the belt 29 is driven for driving the shaft 27 counterclockwise as seen in Figure 3. By the driving connection as previously described, this will cause the cutter head 103 to be revolved in the same direction and the shaft 35 will likewise be revolved counterclockwise and will be driven in the opposite direction or clockwise, as indicated by the arrows in Figs. 1 and 3.

Accordingly, the feed wheel 117 will be revolved clockwise as seen in Figure 1 and in so moving will initially ride over the trunk or limb 132 and will cause said trunk or limb to roll down the inclined top plate 64 and abut the angle roller 74. As the trailing end of the trunk 132 passes out of engagement with the feed wheel 117, the angle roller 74 will cause the trunk or limb 132 to be further propelled forward over the feed wheel 117 and the angle roller 74. As the trailing end of the trunk 132 passes out of engagement with the feed wheel 117, the angle roller 74 will cause the trunk or limb 132 to be further propelled forward over the feed wheel 117 and the angle roller 74.

As the trailing end of the trunk 132 passes out of engagement with the feed wheel 117, the frame 46 will swing downwardly and the portion of the strip 122, as seen in Figure 13, will come to rest upon the trunk 132. The frame 46 will swing downwardly until the trailing end of the trunk has slid past the cam surface 123, the cam surface tending to displace the trunk 132 toward the right-hand side of the machine. The frame 46 will then swing upwardly until the front cross piece 50 comes to rest upon the stops 131, as previously described.

It will be noted that since the crossbar 80 is swung by movement of the angle bar 67 relatively to another, the upright rollers 94 always remain slightly to the rear of the forwardmost portion of the angle roller 74 so that the tree trunk can slide past the rear portion of the log-abutting roller 74 and into the machine 15 and that the leading end of the tree trunk will not strike against the right-hand roller 94 when the trunk reaches the right-hand side 24 of the machine.

The machine 15 will also function efficiently for debarking or peeling crooked limbs or branches. When so employed, the sleeves 85 are displaced forwardly and then turned to horizontal inoperative positions and latched by means of the center rods 86, as previously described, so that the rollers 92 and 94 will not function. The crooked piece 132 can be revolved freely on the top plate 64 and the springs 100 will yieldably maintain the cutter head 103 in cutting engagement with the log, but the angle roller 74 will be revolved in the opposite direction to the cutting blades 104. For debarking or peeling very large diameter pieces 132 the roller 74 is adjusted rearwardly by turning both feed screws 77 or for very small diameter pieces the roller 74 is adjusted forwardly and toward the feed wheel 117. Any snow, ice, loose bark or other foreign material which may be picked up between the teeth 119 and the disks 118 will be dislodged therewith from the cleaning fingers 129 as the feed wheel 117 revolves.

Various modifications and changes are contemplated and may be made in the construction, arrangement and details of the present invention, without departing from the function or scope of the invention as hereinafter defined by the appended claims.

I claim as my invention:

1. A debarking or peeling machine of the character described comprising an elongated frame having a top plate adapted to support a log or the like to be debarked or peeled, said plate being provided with an opening, a feed wheel having a toothed periphery adapted to engage the log, a log-guiding and log-abutting roller idly journaled in said frame, means supporting said feed wheel and means driving said feed wheel to revolve the log about its longitudinal axis and for urging the log toward and into peripheral contact with said roller, means connected to said frame for yieldably supporting said cutter beneath said plate and yieldably urging a portion of the cutter upwardly through the plate opening and into contact with the periphery of the log, and means driving said cutter for debarking the log as the log is revolved on said plate.

2. A machine as in claim 1, said roller being disposed with its axis at an angle to the axis of the feed wheel, and manually operable means for angularly adjusting the rate of rotation of the log across the cutter relatively to the axis of rotation of the log about its longitudinal axis.

3. A machine as in claim 2, and means for moving said roller relatively to the plate toward and away from the feed wheel and means for adjusting the machine to logs of different diameters.

4. A machine as in claim 1, said plate being inclined downwardly in a direction toward said roller.

5. A machine as in claim 4, said means for adjusting means supported by said frame and adapted to position the ends of said roller including horizontal roller elements on which portions of the log rest and vertical roller elements against which the log is supported, said roller elements being directed by said feed wheel and the inclined plate.

6. A machine as in claim 5, and means connecting said log-supporting means to the means for angularly adjusting the roller.

7. A machine as in claim 6, supporting means adjustably supporting said horizontal and vertical roller elements in alignment with a longitudinal portion of the roller in the different adjusted positions of the roller.

8. A machine as in claim 7, means for supporting said horizontal and vertical roller elements in alignment with a longitudinal portion of the roller in the different adjusted positions of the roller.
elements relatively to the frame and latches associated with said last mentioned means for releasably latching and retaining said roller elements in either raised, operative positions or lowered, inoperative positions.

8. A machine as in claim 1, a depth gauge unit mounted on the rotary-cutter-supporting means and adjustable relatively to the rotary cutter for varying the cutting depth of the cutter.

9. A machine as in claim 1, said rotary-cutter-supporting means including an elongated frame swingably supported adjacent one end thereof on said first mentioned frame for vertical swinging movement, said rotary cutter being mounted adjacent the other free end of said cutter-supporting frame, and resilient hanger means suspended from said first mentioned frame and yieldably supporting the cutter frame near its free end and constituting a part of said yieldable supporting means.

10. A machine as in claim 1, said feed-wheel-supporting means comprising an elongated feed-wheel-supporting frame swingably mounted near one end thereof on said first mentioned frame for vertical swinging movement, said feed wheel being journaled on said feed-wheel-supporting frame adjacent its other free end about an axis disposed transversely of the feed-wheel-supporting frame for swinging movement toward and away from said roller.

11. A machine as in claim 10, said feed wheel comprising a plurality of disks having toothed peripheries and a plurality of spacing elements interposed between said disks.

12. A machine as in claim 1, a driven shaft journaled in said frame, means forming a direct drive between said drive shaft and the rotary cutter, and said feed-wheel-driving means being connected to and driven from said driven shaft and including meshing gears for driving the feed wheel in the opposite direction to the rotary cutter.

13. A machine as in claim 12, said feed-wheel-driving means including an endless drive belt, and a belt tightener engaging said drive belt and adjustable for varying the tension of the drive belt for varying the speed of rotation of the feed wheel relatively to the speed of rotation of the rotary cutter.

14. A machine as in claim 13, a manually actuated lever pivotally mounted on said elongated frame for actuating said belt tightener, and latch means associated with the frame and lever for maintaining said belt tightener in different adjusted positions.

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