June 4, 1957 N. G. LEFFLER 2,794,466

LOG-CENTERING FEED MECHANISM FOR DEBARKING MACHINE

Filed Feb. 15, 1954 3 Sheets-Sheet 1

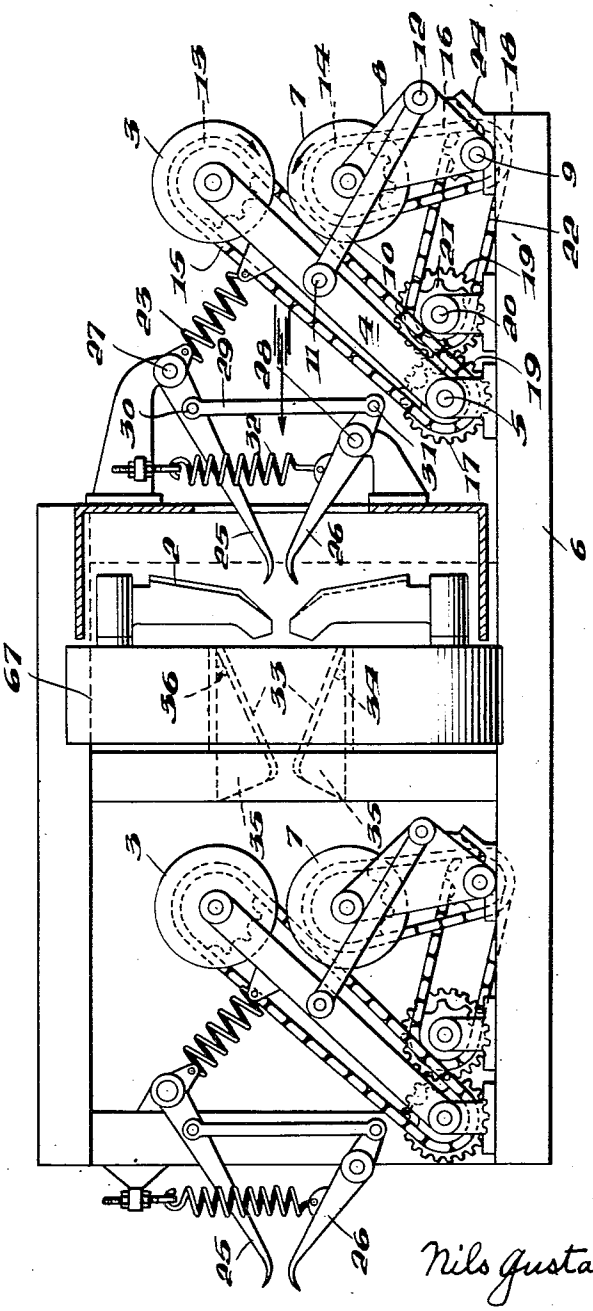


Fig. 1.

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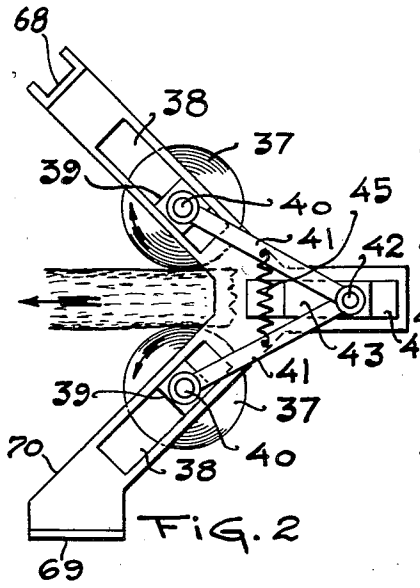


Fig. 2

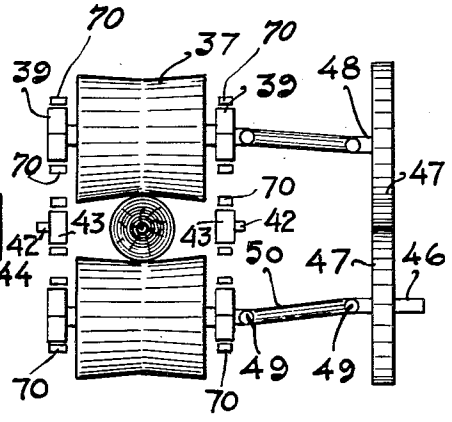


Fig. 3

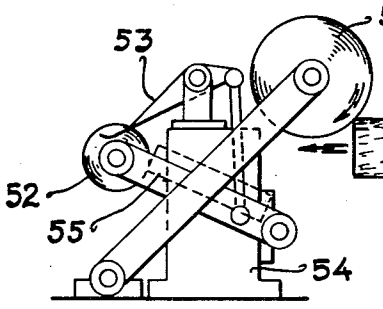


Fig. 4

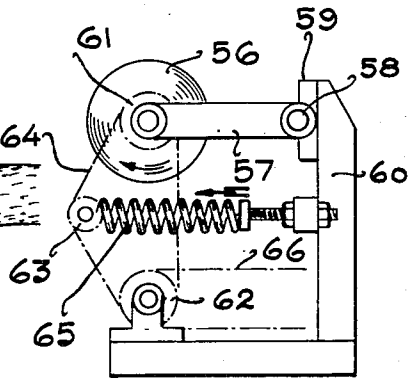


Fig. 5

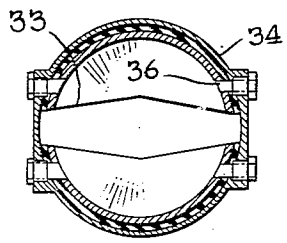
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LOG-CENTERING FEED MECHANISM FOR DEBARKING MACHINE

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FIG. 8



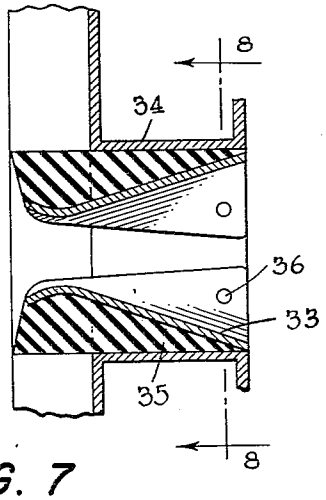
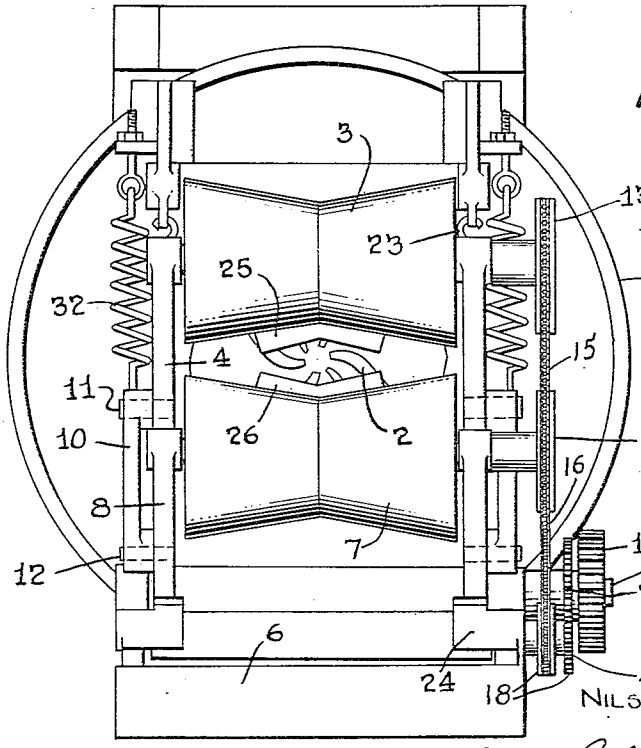


FIG. 7

FIG. 6



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LOG-CENTERING FEED MECHANISM FOR DEBARKING MACHINE

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Claims priority, application Sweden February 16, 1953

6 Claims. (Cl. 144—247)

In barking machines of the kind in which the log is fed into engagement with at least one debarking tool, in either a rectilinear, a helicoidal or a rotary motion, it is of the greatest importance that the feeding means be so shaped as to feed the log effectively with little or no damage to the wood.

With the hitherto known feeding means such a result has proved impossible to attain. Usually, feed rollers or rollers provided with means for engaging the bark or the wood of the log, such as spikes, grooves or the like are used. The required pressure between the log and the feed rollers is obtained substantially either by spring pressure, or by hydraulic or pneumatic pressure. Said pressure must then be chosen so high that the most difficultly fed logs will always be fed through the machine. This means that even and smooth logs, requiring a considerably smaller feeding pressure, will be subject to an unnecessarily high pressure, resulting in the wood being damaged by the spikes or the grooves of the feed rollers. It would probably be difficult to construct simple means that would automatically provide, for example, a hydraulic pressure that would suit the shape and character of each individual log. Hitherto, the roller pressure has been adjusted to suit the hard-to-feed logs, and the easy-to-feed logs were then fed with the same pressure.

My applications Ser. No. 317,980 filed Oct. 31, 1952 and 409,912, filed Feb. 12, 1954, now Patent No. 2,774,-397, disclose a device, in which the aforesaid drawbacks have been completely eliminated, other important advantages being, in addition, obtained. The following is a detailed description of one possible way of embodying said device, the scope of invention being in no way limited by said embodiment. As a matter of fact a great many embodiments, based on the idea of the invention, may be devised.

The invention is illustrated in the accompanying drawings. Figure 1 shows a side elevation of the machine, provided with a device in accordance with one embodiment of the invention, certain parts being shown in section. Figure 2, diagrammatically, shows a side elevation of another embodiment of the feeding mechanism. Figure 3 shows the feeding mechanism according to Figure 2, when viewed in the feeding path of the log. Figure 4 shows, diagrammatically, a side elevation of a third embodiment of the feeding mechanism. Figure 5 shows, diagrammatically, a side elevation of a fourth embodiment of the feeding mechanism. Fig. 6 is an enlarged-scale right-hand end elevation of the machine as it appears in Fig. 1. Fig. 7 is a longitudinal vertical section of the log-guide means, and Fig. 8 is a transverse vertical section on the line 8—8 of Fig. 7.

Referring to Figure 1 the direction of feed of the log is indicated by the arrow. By means of a conveyor, not shown, the log may be moved to the feeding-in mechanism of the machine. The term feeding-in mechanism applies to the feeding means located before a drum 67 carrying barking members 2. Said feeding-in mechanism

comprises a leading roller 3, mounted on an arm or fork 4, said arm or fork being swingably mounted on pivots 5, supported by brackets secured to a frame 6. In case a good centering of the log be desired, one more leading roller 7 should be provided, such roller being mounted on an arm or fork 8, said arm or fork being swingably mounted on pivots 9, supported by brackets, which are, likewise, secured to the frame 6. In order to guarantee centering of the log, the arms 4 and 8 may be interconnected by means of links 10, mounted on pivots 11 and 12, secured to the arms 4 and 8. By choosing, in a suitable way, the positions of the pivots 11 and 12, the lengths of the arms 4 and 8 and the positioning of the pivots 5 and 9 and the lengths of the links 10 it is possible to guide positively the rollers 3 and 7, so that their centers in various positions for various log diameters will, substantially, be situated along the same vertical center line and at the same time they will substantially, be located at the same distance from the horizontal center line of the machine. This effect could of course be obtained also by using other link systems.

In Figure 1 the leading feed rollers 3 and 7 are shown to be driven by means of a roller chain. Also other driving means could, of course, be used. Thus, the leading rollers 3 and 7 are provided with chain wheels 13 and 14, driven by means of chains 15 and 16 from chain wheels 17 and 18. For obtaining the correct direction of rotation of the leading rollers 3 and 7 a cylindrical toothed wheel 19 is provided on the same pivot 5 as the chain wheel 17 and another cylindrical toothed wheel 19′ is in engagement with the first-mentioned toothed wheel 19 and is secured to a pin 20. To this pin or shaft 20 also a chain wheel 21 is secured, said wheel, through the intermediary of a chain 22, driving the chain wheel 18, which is provided with two rims. For the purpose of wholly or partly counterbalancing the swinging parts a pair of tension springs 23 may be provided. Furthermore, stopping means 24 should be provided for the arm 8 or for the arm 4 so as to limit the movement of the arm towards the center of the log and to make it possible to adjust such limit of movement.

The leading rollers 3 and 7 are driven to rotate in the direction of the arrows and the power for driving the feeding-in mechanism preferably may be supplied through the intermediary of the pivots 5 and 9, respectively, of the chain wheels 17 and 18. If the same arrangement of trailing rollers or a similar one be provided at the log discharge end of the machine, as shown in Figure 1, the transmission of the driving power from either of the two chain wheels 17 or 18 to a corresponding chain wheel at the discharge end may take place by means of a chain connecting said wheels.

Either the tension or the compression of the springs 23 is initially so chosen that said springs will produce a contact pressure of the two leading rollers 3 and 7 that is below the pressure required for feeding the log through the machine. As will be later explained, the leading rollers are so mounted and are initially so spaced that, when the log is introduced from a feeding-in conveyor, a power component is obtained for increasing the contact pressure on the surface of the log as the log meets with increasing feeding resistance. This means that if the feeding resistance be low, the contact pressure of the rollers on the log will be low, and if, on the other hand, the feeding resistance be high, the contact pressure on the log will likewise be high, so as to feed the log through the machine. Thus, when working straight and easily fed logs, an unnecessarily high contact pressure of the rollers, which would damage, in part, the surface of the wood, is avoided.

If the described device is equipped with compression

springs 23, so as to hold the leading rollers 3 and 7 in their minimum-gap positions, a log may be easily introduced between the rollers beause the rollers, as described above, are biased toward each other by springs which exert a low pressure, such pressure not increasing until the log enters between and spreads the rollers.

It is possible also to use springs 23 which are under tension, the amount of tension being so chosen as to hold the leading rollers 3 and 7 in equilibrium while in their maximum-gap positions. When such initially wide spacing of the rollers is employed, the upper side of the roller 7 should be situated somewhat higher than the lower side of the log, when the log is resting on the feeding-in conveyor (not shown), so as to make certain that the roller 7 will always engage and initially feed the log. Later, as the log meets with feeding resistance caused, for example, either by guide plates located in front of the barking members, or by the barking members themselves, the log will be raised by the roller 7 until the log's axis coincides with the axis of the debarking drum 67, because such resistance will momentarily stop the log, causing the roller 7 to roll backwardly on the log and thus upwardly around the axis of the pivot 9. Such upward movement of the roller 7 will correspondingly lower the roller 3, which, when getting into contact with the upper part of the log, will take part in the feeding of the log, and since such simultaneous contact of the upper and lower rollers can occur only when the axis of the log coincides with the axis of the debarking drum, any log, regardless of its diameter, will be raised to the center of the drum 67 whenever the feeding effort of the lower roller 7, while acting alone, proves inadequate.

Since the leading rollers either are initially biased toward each other, or are maintained in initially spaced relation by relatively weak springs, it becomes possible to use small-diameter rollers, thus increasing the log-receiving gap without increasing the distance between their centers. The leading rollers can be positioned immediately adjacent the portion carrying the barking members, or one or more pairs of leading guide plates are positioned between the leading rollers and the barking members.

The feeding-in mechanism of the machine having now been described in detail, a description will follow of some of the other feeding or guide means that may be combined with the feeding-in mechanism. Thus, after passing the feeding-in mechanism the fore end of the log will meet leading guide plates 25 and 26, which are swingably mounted on pivots 27 and 28 and interconnected for simultaneous gap-increasing or gap-decreasing parallel movement by means of links 29 located on both sides of the guide plates and articulated to pivots 30 and 31. For the purpose of pressing the leading guide plates against the surface of the log springs 32 are secured either to the upper plate or to the lower plate, or to both plates, including suitable stretching means so as to provide for the required tension.

In the embodiment shown in Figure 1 the log, after passing the leading guide plates 25 and 26, will be engaged by the barking members 2 of the rotary drum 67. It may be desirable to provide within the drum 67 a couple of guide plates 33. Since there is the risk of bark assembling between the guide plates 33 and a stationary inner shell 34 around which the drum rotates, the means for pressing the guide plates against the surface of the log may consist of rubber plates 35, which are about the same width as the guide plates, and which may be wholly or partly hollowed out in order to reduce the pressure of the plates on a log. The guide plates are swingable on pivots 36, secured to the stationary inner shell 34. Of course it is possible also to use a combination of rubber plates or of some other elastic material, and springs. The guide plates 33 also in some other way may be screened off sideways, so that bark cannot get stuck between the same and the inner shell 34 thereby preventing the movement of the guide plates. The pivots 36 are not necessary since the guide plates may be held entirely by the rubber blocks.

The log, having passed through the portion carrying the barking members, next meets an arrangement of trailing rollers, which may be referred to as the discharge mechanism. Said mechanism may have trailing rollers arranged in a known manner or, as shown in the drawing, it may have the same or substantially the same arrangement as the feeding-in mechanism. Finally, in order to prevent the log from dangling, either trailing guide plates 25, 26 or additional trailing rollers may be provided for supporting the log after it leaves the discharge mechanism.

It is to be observed that the guide plates 25, 26 and/or the rollers 3, 7 may be rearranged so that they would appear in plan the same as they now appear in the side elevation of Fig. 1. Furthermore, the feeding-in and the discharge mechanisms may be inverted so that the roller 3 will rest against the underside of the log and the roller 7 will rest against the upper side of the log. Such an embodiment could be visualized by turning Figure 1 upside down. Of course, the invention includes also inverted image embodiments.

In order to illustrate the scope of the invention some further embodiments will be described.

According to Figure 2, showing diagrammatically a feeding mechanism according to the invention, two leading rollers 37 are guided at each end (only one end being shown) in guides 38 in a frame 70. Such guides may be embodied in the way shown in the drawing, viz. in such a manner that bearings 39 are mounted to slide in the guides 38, pivots 40 on opposite ends of the rollers 37 being adapted to turn in said bearings. In order that logs of different thicknesses shall always be held in the center of the barking drum 67, corresponding ends of the rollers 37 preferably are interconnected for simultaneous parallel movement by means of links 41, each pivoting at one end on one of the corresponding pivots 40 and at the other end on a common pivot 42 of a crosshead 43, which in turn is adapted to slide in a groove or in a guide portion 44 of the frame 70. A tension spring 45 connects the links 41 and exerts a slight pressure on the rollers so as to bias the rollers toward each other. Of course, feeding may be obtained also with one roller only, as described later in connection with Fig. 5. The two frames 70 are connected at their tops by the cross beam 68 and at their bottoms by the plate 69 which may be secured to the frame 6.

Figure 3 shows the device according to Figure 2 when viewed in the feeding path of the log. In this case, however, the parts 41 that interconnect the rollers for parallel movement as well as the spring 45, are not shown. On the other hand it shows, diagrammatically, how driving power may be transmitted to the rollers 37. A shaft 46 is driven directly from a motor or through the intermediary of a chain drive or the like. The driving power is transmitted to a shaft 48 by means of two toothed wheels 47. Both shafts 46 and 48 are mounted in bearings (not shown). From said shafts the rotary motion is then transmitted to the rollers 37 by means of universal joints 49 and the shafts 50, thus allowing the rollers to move in the guides 38. In case the rollers are driven by a driving device in such a manner that they will feed the log in the direction of the arrow (Fig. 2), there will be obtained a contact pressure on the log that will correspond to the feeding resistance. The angle of the guides can be changed from the angle shown in order to obtain another ratio between the contact pressure and the feeding pressure.

Figure 4 shows another embodiment of the invention. A leading roller 51 is mounted, driven and arranged in the same manner as the roller 3 in Figure 1 and meant to rest against the upper side of the log. After the roller 51, counting in the direction of feed, there is provided a conical guide roller 52 and a swingable guide plate 53,

which, as shown, may be interconnected for simultaneous gap-increasing or gap-decreasing movement in the same way as the guide plates 25 and 26, Figure 1. In the figure reference numeral 54 indicates a frame and reference numeral 55 a guide plate, guiding the log toward the roller and also preventing the log from getting stuck against said roller. It is not shown how the rollers 51 and 52 are driven.

In the devices described the axes of the rollers have arcuate movement mainly in the longitudinal direction of the log. The invention, however, also comprises embodiments in which the movement in the abovementioned direction is small or equal to zero. This is exemplified in Figure 5. A leading roller 56 has its axle journaled in free ends of a pair of arms 57 (only one of which is shown), opposite ends of said arms being turnably mounted on a rod 58, said rod being supported by brackets 59 secured to a frame 60. For driving the roller 56 a chain wheel 61 is secured to the roller. Over this chain wheel and over a chain wheel 62, which is mounted on the frame 60, and also over a chain wheel 63 a driving chain 64 is adapted to run. The chain wheel 63 is slidably guided by the frame (by means not shown) and keeps the driving chain 64 taut while the roller 56 moves up and down, and for this purpose said wheel is biased toward the left (as viewed in Fig. 5) by a spring 65. The chain wheel 62 is driven by a chain 66, which in turn may be driven by a chain wheel (not shown).

The log is caused to enter in the direction of the arrow and in such a manner that the roller 56 will rest against its upper side. The log having been introduced below the roller 56 and the continued feeding thereof taking place by means of the roller, the tension in the chain 64 will produce a contact pressure of the roller 56 on the surface of the log which is proportional to the feeding resistance.

I claim:

1. In a barking machine of the kind having at least one barking tool movable into and out of engagement with an axially fed log, the barking tool and such a log being relatively rotatable about an axis of the machine which coincides with a longitudinal axis of a log being debarked, there being in the feeding path of a log at least one driven rotatable member adapted to contact one side of such a log during a forward feeding thereof, an additional rotatable member interconnected with said driven rotatable member and disposed on an opposite side of such log, one of said rotatable members being mounted in swingable supporting means so that its axis of rotation and the swinging axis of the supporting means are situated on opposite sides of a longitudinal axis of such a log, the other of said rotatable members having its axis of rotation situated on that side of a longitudinal axis of such a log opposite to the axis of rotation of said one rotatable member, said other rotatable member being arranged in swingable supporting means having its swinging axis situated on the same side of a longitudinal axis of such a log as the swinging axis of the first-mentioned supporting means, at least said driven rotatable member contacting such log with a pressure which is variable directly with resistance to a forward feeding of such a log, whereby at least said driven rotatable member engages an incoming log and feeds such log until said log encounters resistance to feed, such resistance to feed causing said driven rotatable member to center such log with respect to the axis of the machine, whereupon said additional rotatable member engages such log, and both of said rotatable members cooperate to feed such log.

2. A barking machine according to claim 1, characterized by the supporting means of the two co-operating rotatable members having their swinging axes arranged below a horizontal axis of such a log.

3. A barking machine according to claim 1, characterized by the supporting means of the two co-operating rotatable members having their swinging axes arranged above a horizontal axis of such a log.

4. A barking machine according to claim 1, characterized by the two co-operating rotatable members being interconnected by two arms to obtain a simultaneous gap-increasing or gap-decreasing parallel movement of said two members.

5. A barking machine according to claim 4, characterized by the supporting means of the two co-operating rotatable members being interconnected by said two arms.

6. In a barking machine of the kind having at least one barking tool movable into and out of engagement with an axially fed log, the barking tool and such a log being relatively rotatable about an axis of the machine which coincides with a longitudinal axis of a log being debarked, there being in the feeding path of a log two driven rotatable members, one of which is adapted to contact one side of such a log and the other of which is adapted to contact an opposite side of such log during a forward feeding thereof, said two rotatable members being mounted in swingable supporting arms, interconnected by links, in such a way as to contact the log with a pressure which is variable with the resistance to the forward feeding of the log, the angle between the straight line through the axis of rotation of one of said rotatable members and through the swinging axis of its supporting arm and the longitudinal axis of the log increasing when the two rotatable members swing apart, while the corresponding angle between the straight line through the axis of rotation of the other rotatable member and through the swinging axis of its suporting arm and the longitudinal axis of the log decreases, whereby to equalize the resulting ratio between contacting pressure and feeding resistance affecting the two rotatable members.

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