Dec. 24, 1963 V. L. VALO 3,115,167

DEBARKING MACHINE

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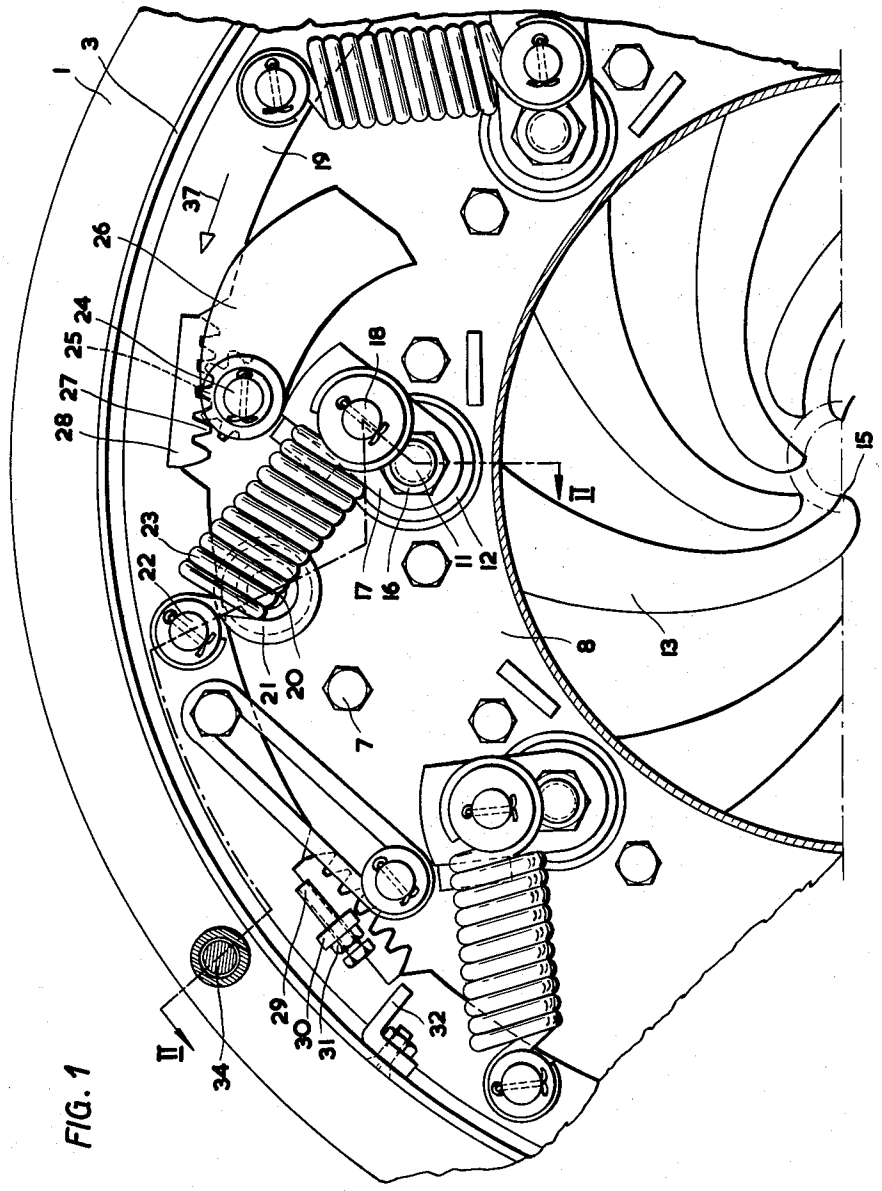


FIG. 1

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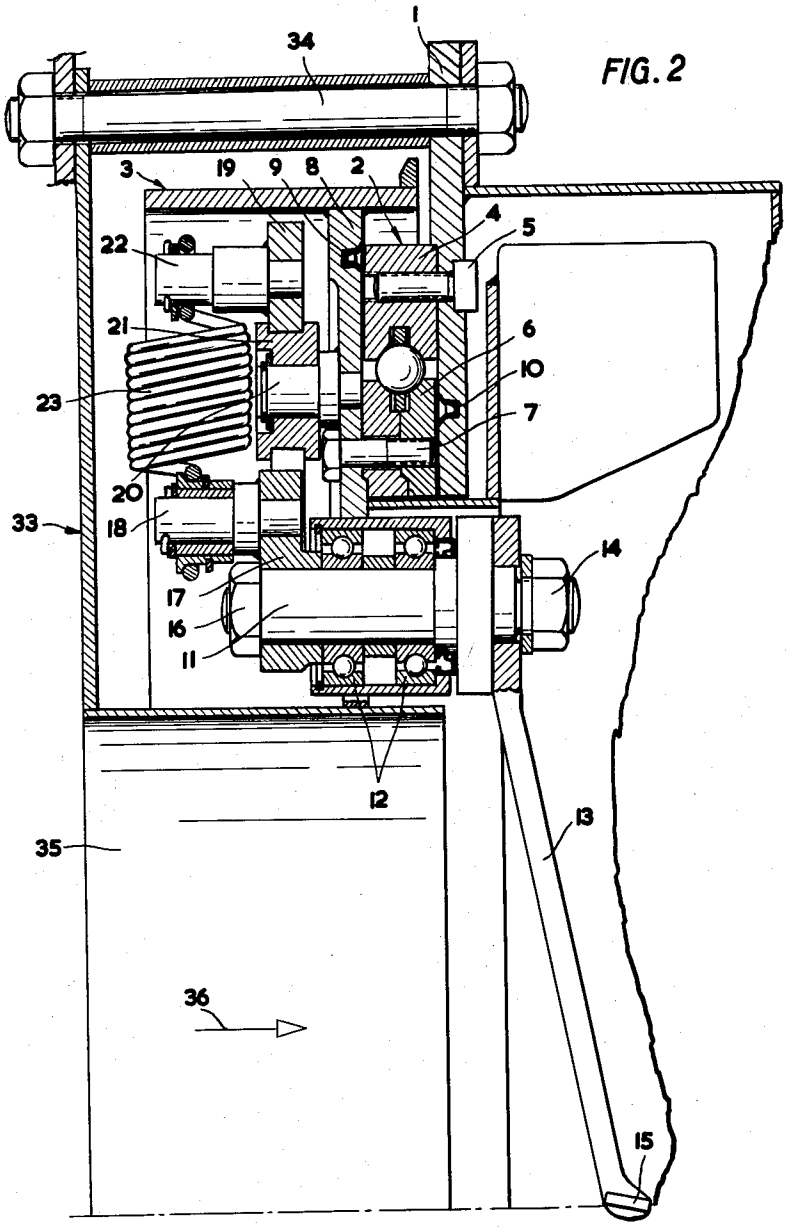
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FIG. 2



INVENTOR.

BY

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DEBARKING MACHINE

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This invention relates to an improved drum type debarking machine in which the logs to be debarked are fed one by one in their longitudinal direction through a rotatable drum comprising pivoted debarking arms, to which is applied a pressure caused by resilient elements. The ends of the debarking arms extend toward the rotation axis of the drum and are provided with debarking cutters which rest against the surface of the log in order to perform the debarking operation.

It is of importance in debarking machines that the debarking arms are arranged so that a resilient pressure against the surface of the log to be debarked is obtained for each one of the debarking cutters, and that the working pressure of the debarking arms acting upon the log surface is independent of the size of the log to be debarked. In debarking for example icy logs, the working pressure of the debarking arms has to be somewhat greater than the pressure normally required for ordinary dry logs, and in debarking logs, soaked in the water, the working pressure may be less than the pressure normally required for ordinary dry logs. The regulation of the working pressure, dependent on the dimensions and the quality of the logs, has, heretofore, caused great difficulties.

In known debarking machines the debarking arms have been arranged so that each of the arms is controlled by the action of separate elements such as weights or the like, suitably connected to the arms by means of for instance a spring, which weights while the debarking drum is rotating are acting by aid of the centrifugal force. Although such an arrangement has advantages, it also has, however, certain disadvantages. Thus, when the cutting pressure for the debarking cutters must be adjusted, each one of the weights must be adjusted separately into a new position, which of course is a most difficult and slow procedure. The adjusting of the weights must besides this be performed most precisely in order to obtain an equal working pressure for all the debarking cutters and in order to prevent the cutters from being unequally loaded by the spring which will result in an unevenly debarked log.

Attempts have been made in certain known debarking machines of drum type to eliminate these disadvantages by arranging all the debarking means so that they may be adjusted simultaneously. This has been made possible, for example, by providing the debarking drum with a ring element arranged concentrically pivotable in the drum and turnable around its axis in relation to the drum, each of the debarking arms being connected with the ring element by means of a spring or the like. By manually turning the ring element in relation to the drum, the force applied by the spring on the debarking arms is being simultaneously regulated for all the debarking arms. The most essential disadvantage with such an arrangement is that the ring element remains in its shifted position until a new adjustment of the adjusting means is performed, whereby the tensional effect in the spring elements caused by the ring element becomes constant during the whole adjustment interval. Thus, in case the debarking cutters should get jammed fast into a log during debarking because the cutting pressure for one reason or the other has increased to such an extent that the debarking drum is hereby stopped, the adjusting means must be released before the log can be loosened and the adjusting means again adjusted for the required cutting pressure, before the debarking performance can be continued.

The present invention has for its object to eliminate the above stated disadvantages. The invention is mainly characterized by a combination consisting of a spring stretching device rotating with the drum and displaceable in relation to the drum. The spring stretching device is connected to all the resilient spring elements acting on each of the debarking arms for adjusting the pressure upon the debarking arms caused by all of the spring elements. The combination further includes a displacing means for displacement of the spring stretching device. The displacing means is pivoted within the drum and arranged so that the means because of centrifugal force caused by the rotation of the drum act upon the spring stretching device. Adjusting means are also provided for limiting the displacement of said spring stretching device.

According to the present invention there is provided a device in which the working pressure for all the debarking cutters can be simultaneously adjusted in accordance with the size and the quality of the log. Because the displacing means is not effected by the centrifugal force while the drum is stationary, but is positioned in one of its terminal positions and the adjusting means thus is unloaded, the desired working pressure for the debarking cutters may most simply and quickly be adjusted by means of the adjusting means. The displaceing means is brought into function only after that the debarking drum is made to rotate, and by aid of the spring stretching device it will increase the tension of the spring elements so that a suitable working pressure is obtained. A debarking machine provided with a device according to the invention may most advantageously be used for debarking of logs of varying dimensions, straightness, quality of wood etc., because the regulation of the working pressure causes no difficulties. There is furthermore attained one most essential advantage, viz., that in case the rotation speed of the debarking drum gets slower because the debarking cutters for one reason or the other should get jammed, the displacing means moves immediately towards tis idle position and the strain on the spring elements is released. The stress applied by the debarking cutters on the log is therefore reduced and the debarking drum will return to its normal rotating speed. Such a release of the strain in the spring elements in response to disturbances during the debarking operation is thus performed quite automatically and renders it possible to carry on a continual debarking of logs.

The invention is more fully described in the following description in connection with the accompanying drawings, in which

FIG. 1 shows part of the debarking drum seen from the direction in which the logs are fed into the machine, and

FIG. 2 shows radial section of a debarking drum in a debarking machine.

The reference numeral 1 in the drawing indicates the frame plate, which is firmly secured to the frame of a conventional drum type debarking machine, not shown in the drawing. To the frame plate 1 is pivoted by means of a bearing 2 a cylindrical drum 3 rotatable about its axis, the axis of the drum being substantially horizontal. The outer ring 4 of the bearing 2 is secured to the frame plate 1 by bolts 5. The inner ring 6 is secured by bolts 7 to a supporting flange 8 which is ring-shaped and mounted on the inside of the drum perpendicular to its axis. The bearing housing is closed up by means of packings 9 and 10, placed between the outer ring 4 of the bearing and the supporting flange 8

and between the inner ring 6 of the bearing and the frame plate 1. The drum 3 is caused to rotate by means of a motor and belts are the like means in engagement with the mantle of the drum (not shown). To the supporting flange 8 is pivotally connected a number of axle pins 11 equally spaced and positioned on a circle concentric with the drum 3. The axle pins 11 extend in direction of the drum axis and are freely rotatable in their respective bearings 12. On that end of each of the axle pins 11 which is positioned towards the frame plate 1 is mounted a debarking arm 13 from one of its ends and secured by a nut 14 which is screwed on the threaded end of said axle pin 11, whereby the debarking arm 13 is prevented from being turned in relation to the axle pin 11. The opposite end of the debarking arms 13 is provided with a debarking cutter 15, by aid of which the debarking of logs is performed. The debarking arms 13 are of such dimensions and formed in such a way that each one of the debarking cutters 15 is positioned about the drum axis when the arms are in their idle position. On the opposite end of each of the axle pins 11 is mounted a lever arm 17. One of the ends of lever arm 17 is secured by a nut 16 which is screwed on the threaded opposite end of said axle pin 11, whereby the lever arm 17 is prevented from being turned in relation to the axle pin 11. The opposite end of the lever arm 17 is a given distance from the axle pin 11 and provided with a pin 18 extending in the same direction as the axle pin 11.

The debarking device further includes a spring stretching ring 19 which is arranged concentrically wtih the drum 3 and immediately inside of its periphery. Spring stretching ring 19 is supported by rollers 21 pivoted on pins 20 firmly secured to the supporting flange 8 in such a way that the spring stretching ring, when supported by the rollers, may be turned about its axis in relation to the supporting flange 8. The spring stretching ring 19 is provided with pins 22 arranged at equidistance from each other and extending parallelly with the pins 18 of the lever arms 17. The number of the said pins 22 being the same as that of the debarking arms. Between a pin 18 mounted on each lever arm 17 and the corresponding pin 20 on the spring stretching ring 19 is arranged a coil spring 23, which from its ends is stretched between the pins.

The supporting flange 8 is further on the inside of the spring stretching ring 19 provided with two pins 24 (see FIG. 1) extending from said ring, which according to the present embodiment are arranged symmetrically relative the diameter of the drum. Each of the pins 24 is provided with displacing means consisting of a pivotally mounted bushing 25, to which is eccentrically secured a weight 26 and which is provided with teeth 27 formed on the surface of the bushing. On the spring stretching ring 19 adjacent to each of the pins 24 there is secured a toothed bar 28 corresponding with the teeth 27, whereby the teeth on the bushing 25 and those on the bar 28 are interengaged. The teeth on the bar 28 and the bushing 25 are chosen so that when the weight 2c, due to the centrifugal force, is displaced from its idle position outwards to its outmost limited position, the rotary movement of the spring stretching ring 19 will cause stretching on every spring 23 within allowed tension limits.

For adjustment of the rotation angle, spring stretching ring 19 is provided with an adjusting screw 29, which can be screwed within a projection 30 secured to the spring stretching ring 19, and which can be locked into a desired position by means of a nut 31. Inside the drum 3 is secured a corresponding stop 32, which prevents further rotation of the spring stretching ring 19 when the head of the screw 29 is contacting the stop 32.

The debarking device is enclosed in a casing 33, which is fastened to the frame plate 1 by means of connecting bolts 34 and has a central opening 35, through which the logs to be debarked are fed into the device in the direction shown by the arrow 36.

Although FIGURE 2 only shows a portion of the debarking drum, it will be obvious from the aforesaid that the portion of the debarking drum which is not shown has a construction and arrangement fully corresponding with the portion illustrated in FIGURE 2, inasmuch that the debarking drum is provided with corresponding arrangements for every debarking arm.

The debarking drum is operating in the following way:

When the debarking drum is cause to rotate, the weights 26 are turned outwards until the head of the adjusting screw 29 contacts the stop 32. The gear connection between the bushing 25 and the toothed bar 28 of the spring stretching ring 19 forces spring stretching ring 19 to rotate in relation to the supporting flange 8 in a direction shown by the arrow 37, whereby the fastening pins 18 and 22 for the springs 23 are displaced from each other and the springs 23 are stretched until the movement of spring stretching ring 19 is interrupted when the adjusting screw 29 contacts the stop 32. The tension of the spring 23 may thus be regulated by turning the adjusting screw 29. The working pressure of the debarking cutters 13 may according to the invention thus be adjusted in a most simple manner when the debarking drum is not rotating, without having to overcome the tension of the springs 23, the moment of the displacing weights 26 etc.

The size of the weights 26 is of course dependent on the tension of the springs 23. The weights 26 are preferably dimensioned so that the displacing means by the action of the centrifugal force are capable of creating such a tension in the springs 23, that the highest possible working pressure on the debarking cutters can be attained, but that the displacing means are not able to overcome such a total tension in all the spring elements which should correspond to the greatest allowable working pressure on the debarking cutters. For instance, if the working pressure on account of a swell on the log surface increases above a certain value, the action of the spring stretching ring 19 caused by the tension of the springs 23 will thus exceed the action on spring stretching ring 19 caused by the centrifugal force applied on the weight, and the spring stretching ring 19 as a result of this will rotate back towards its starting position.

The drawings and the corresponding description are of course only intended to illustrate the inventive idea, and the device according to the invention may with regard to its details thus vary considerably within the scope and limits of the claims. Thus, for example, the coil springs 23 may be replaced by spring elements having a common action on one or several debarking arms. There may thus instead of springs, by means of which the pressure is applied to the debarking cutters resting against the log to be debarked, be used resilient bandlinks or the like. Furthermore the adjusting screw may be fixed to the supporting flange itself on the path of displacement of any of the weights, in which case the adjusting screw is limiting the outward motion of one of the weights and in this manner adjusting the turning motion of the spring stretching ring in relation to the supporting flange.

What I claim is:

1. A debarking machine of the drum type including a rotatable drum and debarking arms pivotally secured to said rotatable drum in circumferential spaced relation in which the logs to be debarked are fed one by one in their longitudinal direction axially through said rotatable drum, said debarking arms including first ends extending toward the rotation axis of said drum and including debarking cutters for resting against the surface of the log and arranged for performing the debarking operation, means connected to said debarking arms for yieldably urging said debarking cutters into debarking

contact with the log, said means comprising a plurality of resilient means each connected to one of said debarking arms in combination, a spring stretching means displaceably supported by said drum to rotate therewith, means for connecting said spring stretching means to all of said resilient means so that a displacement of said spring stretching means in relation to said rotatable drum increases the pressure caused by said resilient means upon said debarking arms, dipslacing means pivotably supported eccentrically on said rotatable drum for pivoting when subjected to the action of the centrifugal force caused by the rotation of said rotatable drum, means for coupling said displacing means to said spring stretching means for displacing said spring stretching means during the pivotal movement of said displacing means for increasing the pressure exerted by said resilient means, and adjusting means for limiting the displacement of said spring stretching means.

2. A debarking machine as claimed in claim 1, in which the stretching means includes a ring element including an axis pivoted within said rotatable drum concentrically with the axis of rotation of said rotatable drum and rotatable about its axis in relation to said rotatable drum.

3. A debarking machine of drum type in which the logs to be debarked are fed one by one in their longitudinal direction through a rotatable drum, debarking arms pivotally connected to said drum, a plurality of spring means for applying pressure to said debarking arms, said debarking arms including ends extending toward the rotation axis of said drum and including debarking cutters for resting against the surface of the log in order to perform the debarking operation, a ring element pivoted within said drum concentrically with the axis of rotation of the drum and rotatable about its axis in relation to said drum and connected to each of said

spring means in order to adjust pressure of all said spring means acting upon said debarking arms, said ring element including gear teeth, displacing means including weight means rotatably pivoted and diametrically arranged on said drum so that said weight means in response to centrifugal force are swung outward in relation to said drum, said weight means including gear teeth for engaging with the corresponding gear teeth of said ring element, whereby said displacing means and said ring element cooperate in such a way that the tension of said spring means increases when said displacing means are subjected to the action of centrifugal force, and adjusting means limiting the displacement of said ring element.

4. A debarking machine as claimed in claim 3, in which the adjusting means includes an adjustable screw secured to said ring element and a stopping member secured to said drum so that said adjusting screw contacts said stopping member when said drum is rotating fast enough to swing said weight means outwardly.

5. A debarking machine as claimed in claim 3, in which said adjusting means consist of a stopping member secured to said drum and arranged in the path of displacement of any of said weight means, said stopping member including an adjustable screw, for contacting said weight means when said drum is rotating fast enough to swing said weight means outwardly.

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