Sept. 27, 1955 H. V. ST. CLAIR 2,718,910

ROTARY-HEAD BARK-REMOVER HAVING PIVOTABLE KNIFE-CARRYING ARMS OPERABLE BY CENTRIFUGAL FORCE

Filed Oct. 31, 1952 3 Sheets-Sheet 1

Fig. 2

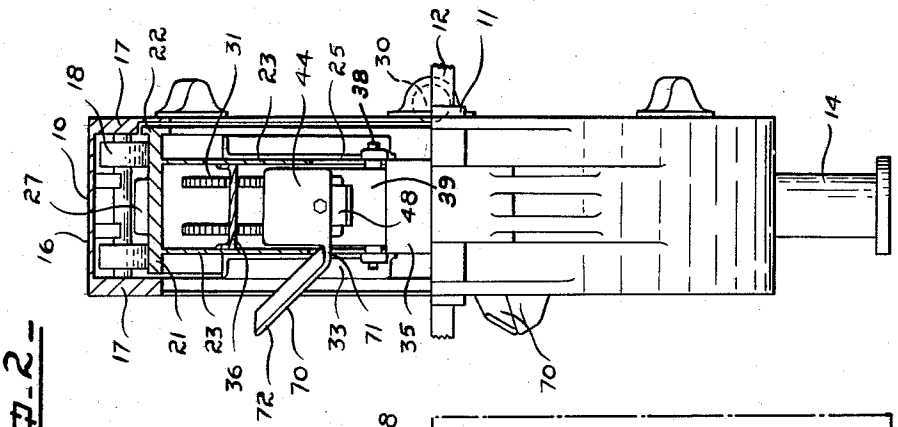
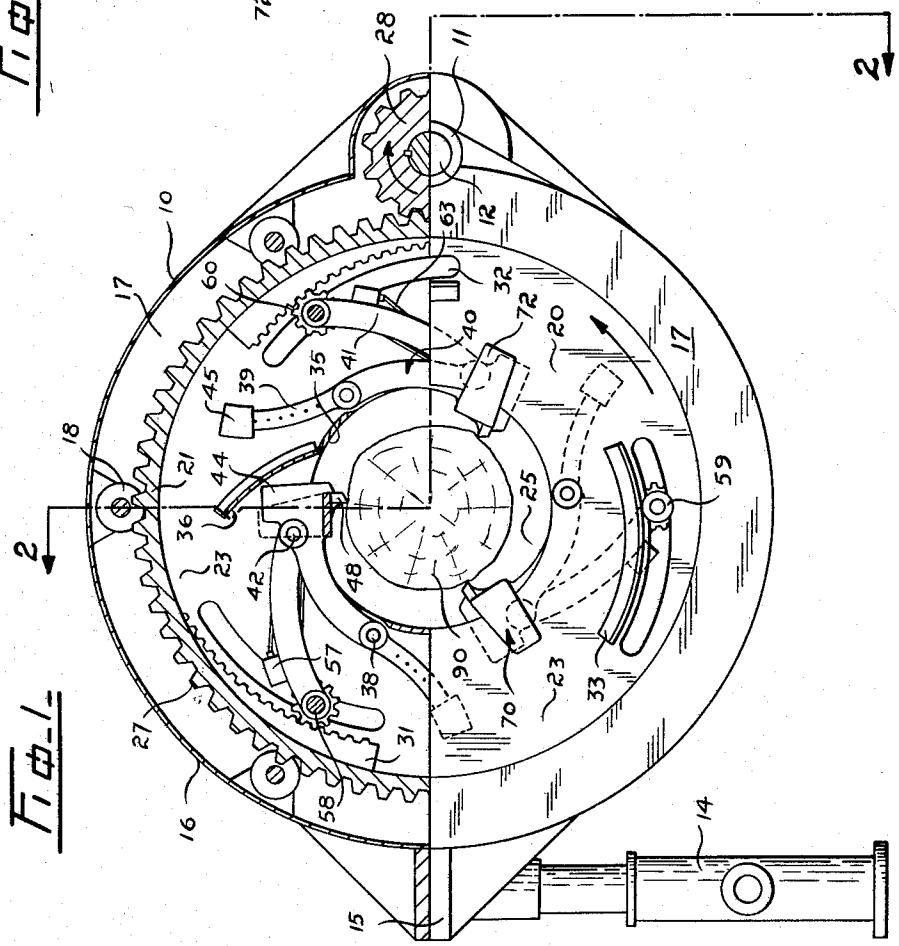


Fig. 1



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Fig. 3

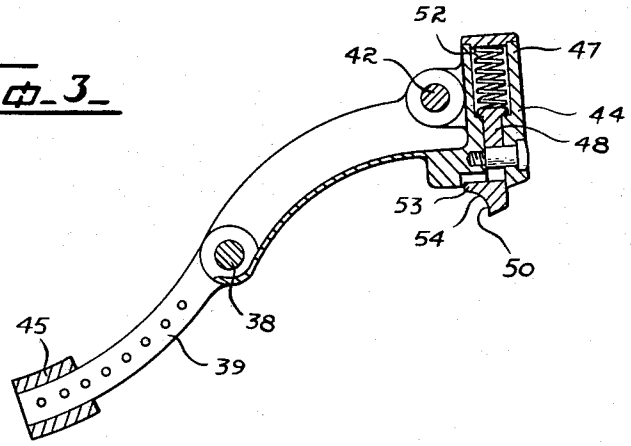


Fig. 5

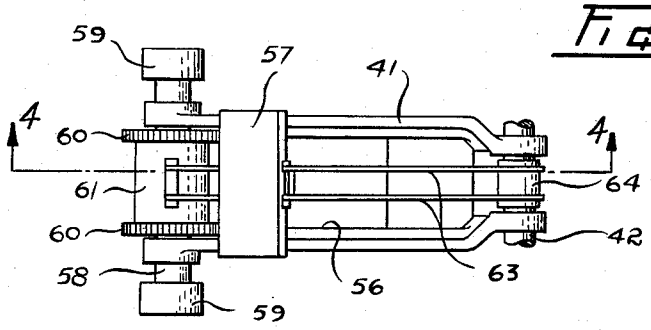
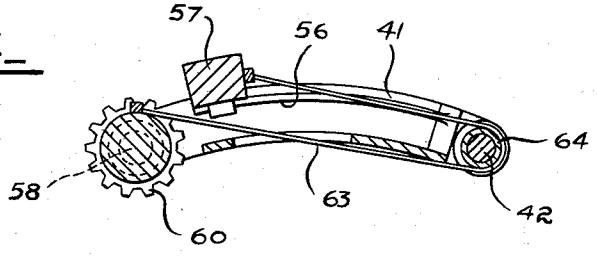


Fig. 4



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Fig. 6.

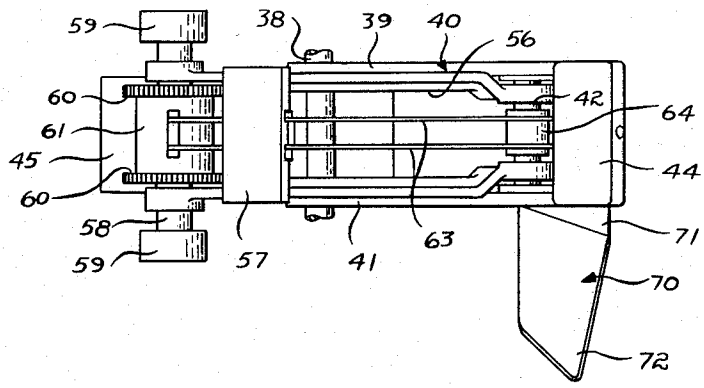
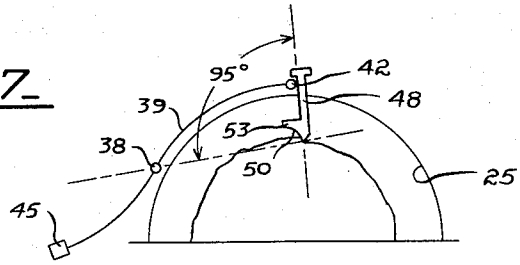


Fig. 7.



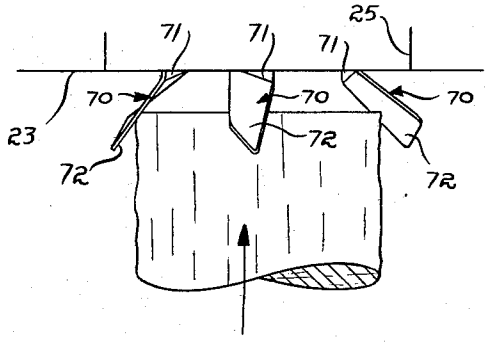


Fig. 8.

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ROTARY-HEAD BARK-REMOVER HAVING PIVOTABLE KNIFE-CARRYING ARMS OPERABLE BY CENTRIFUGAL FORCE

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Application October 31, 1952, Serial No. 318,116

12 Claims. (Cl. 144—208)

My invention relates to improvements in log barkers of the rotary type.

The objects of the invention are to provide a barker having a plurality of bark peeling knives, all of which are held down to their work by centrifugal motion and which are subject to individual movement, so that the irregularities of the contour of the log influence each of the knives separately and while permitting each knife to remove the bark down to the cambium layer of the wood; to provide that the projecting portions of said irregularities will serve to alter the depth of cut of each of said knives as required and prevent useful wood from being torn off the log and wasted. Further objects are to provide that each knife will advance toward and retract from the log with a relatively slow motion according to the need of depth of cut, so as to prevent shock resistance to rotation of the machine. A further object is to provide a thrust member to steadily support the knives in their individual working positions, so that chattering movement or irregular penetration of said knives will be avoided. A still further object is to provide that the setting of each knife will be accomplished entirely by automatic means without requiring any attention by the operator during the running of the machine.

Referring to the accompanying drawings:

Figure 1 is a front elevational view, showing the upper half in section, of the barker.

Figure 2 is a similar side elevational view taken on the line 2—2 of Figure 1.

Figure 3 is a detail longitudinal sectional view of the cutter lever.

Figures 4 and 5 are respectively sectional and plan views of the thrust arm and its counterbalance, the sectional view being taken on the line 4—4 of Figure 5.

Figure 6 is a plan view showing the assembled relationship of the thrust member and the cutter lever. Figure 7 is a diagrammatic view showing the angular relationship of the face of the cutter or knife blade to the pivot pin of the cutter lever. Figure 8 is a plan view showing the positions of the deflectors relative to a log entering the machine.

In the drawings like characters of reference indicate corresponding parts in each figure.

The numeral **10** indicates generally a cylindrical housing having at one side a trunnion **11**, which trunnion also serves as a bearing for a drive shaft **12**. The housing is mounted to swing in a vertical plane on the trunnion **11** and is supported by a suitable telescopic member **14** disposed below a horizontal lug **15** which extends radially from the housing **10**.

The housing **10** consists of an outer rim **16** and end flanges **17**, and circumferentially disposed rollers **18** are freely journalled between the end flanges to support a drum **20** concentrically within the housing **10**. The drum **20** consists of a peripheral rim **21** having a narrow flange **22** at one end and spaced annular internal flanges **23** intermediate the width of the rim **21**, each of which has an opening **25** through which the logs pass during the bark removing operation. Secured upon the rim **21** is a gear ring **27** which is adapted to be driven by a pinion **28** mounted upon the drive shaft **12**. The narrow flange **22** engages thrust rollers **30** which are suitably mounted upon the housing.

Spaced about the circumference of the drum **20** and secured to the inner periphery of its rim **21** are three pairs of arcuate and eccentric racks **31** which decrease in radius from the center of the drum progressively in the direction of rotation and parallel to each of said racks are arcuate guide slots **32** and arcuate guide tracks **33**. The slots **32** are formed in the annular flanges **23** and the guide tracks **33** are secured upon their outer faces. Closure plates **35** connect the inner peripheral edges of the flanges **23** at spaced intervals and extend tangentially as at **36** to prevent broken particles of bark from being carried around in the drum **20**.

Rockingly mounted on pins **38** which are supported between the flanges **23** are substantially S-shaped levers **39**, each of which forms part of a knife assembly generally indicated by the numeral **40** and all of which operate independently of each other. Each knife assembly includes a thrust arm **41** which is hingedly connected adjacent one end by a pin **42** to the lever **39**. The S-shaped levers are provided at one end with an integral cutter head **44** and with a counterbalance **45** at its opposite end.

The cutter head **44**, see detail view in Figure 3, is provided with a spring casing **47** from the base of which a cutter or knife blade **48** is slidably mounted to project substantially radially into the opening **25** to engage the log. The knife blade **48** is set at an angle to prevent undue penetration of the wood and to cause appropriate thrust to be applied to the edge of the bark to induce it to bend transversely of the log and become detached therefrom. The front or working face of the knife blade lies preferably in a first plane parallel to the drum axis and inclined in the direction of rotation of the drum so as to make an angle of 95 degrees with a second plane parallel to the drum axis and containing a line drawn through the pin **38** and the log-engaging edge of said blade, as shown particularly in Figure 7. The above mentioned angle may be varied approximately two degrees in either direction without either causing the blade to ride up above the bark or penetrate unduly into the wood. The knife blade **48** is urged outwardly from the cutter head by springs **52**. A deflector portion **53** having a ninety degree curve **54** is formed upon the leading face **50** of the knife blade **48** and is adapted to engage any knot protruding from the log and to cause said knife blade to retract into the casing **47** and jump the knot rather than tear it off and the springs **52** cause the knife to move into engagement with the bark immediately behind said knot and to do so simultaneously with the inward swing of the cutter head **44**.

The thrust arm **41**, see Figures 4 and 5, is a spaced member structure having tracks **56** upon which a counterweight **57** is slidably mounted and said arm journals at its outer end a shaft **58** which is fitted with rollers **59** which ride on the tracks **33**. The shaft **58** is also fitted with pinions **60** and a sheave **61**, which pinions engage the eccentric racks **31**. The sheave **61** has a cable **63** fastened to it and leading lengthwise of the arm **41**, around a bearing **64** at the cutter head end of said arm and attached to the counterweight **57**.

Secured to the cutter head **44** is a spreader **70** consisting of a plate **71** which extends from the side of the cutter head outwardly beyond the flange **17** on the infeed face of the housing **10** and has an angularly disposed vane **72** which projects at substantially an angle of forty-five degrees from the axis of the housing and is also at an angle of substantially forty-five degrees from the face of the adjacent flange **17** and is inclined rearwardly to the

direction of rotation of the drum **20**. The spreaders **70** are adapted to move across the opening **25** to be engaged by the end of a log about to enter said opening and to spread as the log proceeds into the drum, causing the several cutter heads **44** to spread apart until the log becomes engaged by each of the knife blades **48**, when said knives and their cutter heads **44** will ride in an operating position conforming to the diameter of said log. The knife assemblies **40** are so weighted that those which are mostly disposed above the horizontal axis of the machine, when the machine is at rest, will project their cutter heads **44** in towards the centre of the opening **25** or to a point where the smallest log to be fed through the machine will be engaged by the knife blades **48** of the so disposed assemblies. Obviously any knife assembly which, when the machine is at rest, is in a position below the axis of the drum **20** will lower until the plate **71** of its spreader comes to rest upon the inner perimeter of its adjacent flange **23**.

The position of the several cutter heads as shown in Figures 1 and 2, is that which they would assume when in contact with a log **90** and with the drum **20** running at appropriate speed.

It is intended that generally the drum should be rotated at a constant speed and it is necessary that each of the knife blades shall not penetrate the log beyond the thickness of its bark irrespective of the diameter of the log being barked. Each knife would remove a strip of bark approximately seven feet long from a two foot diameter log, or a strip three and a half feet long from a one foot diameter log.

The elements of each knife assembly are actuated by centrifugal force and assuming that the S-shaped levers **39** are more or less balanced, having regard to the character and condition of the bark to be removed, the centrifugal force necessary to hold the knife blade toward its work must be generated in the thrust arm **41** and in the counterbalance **45**. When the machine is operating upon a log, indicated by the numeral **90**, the outer or pinion end of the thrust arm tends to swing outwardly to increase its radius from the drum center and apply a thrust on its complementary cutter head. The resistance of the log to penetration by the knife blade counters this force, so that the blade will bear substantially upon the cambium layer of the log and break off the bark in flakes, or otherwise. If a protuberance or ridge on the log is encountered by the knife blade the cutter head will be forced outwardly to the extent of the log radius increase, causing the outer end of the thrust arm to move along its eccentric guide slots **32** in an anti-clockwise direction, and tending to decrease the force generated in the thrust arm per se, but since the sheave **61** simultaneously rotates in a clockwise direction the chain **63** is unwound therefrom to permit centrifugal force to move the counterweight **57** outwardly to add to the decreased force generated by the thrust arm so that the knife blade will continue to receive appropriate constant thrust. Should the knife blade reach a groove in the log, the resistance to inward swing of the cutter head is momentarily reduced, so that the outer end of the thrust lever can swing outwardly to a greater radius and the pinions **68** in turning in an anti-clockwise direction will cause the counterweight to move inwardly of the thrust arm where the centrifugal effect of the counterweight will substantially balance the force increase generated on the arm. The substantial counterbalancing of the inward thrust upon the cutter head due to the pinions and associated end parts of the thrust arm extending their radius and the inward movement of the counterweight **57** along said thrust arm, incidental to rotation of the sheave **61** enable said knife to follow the irregular peripheral contour of a log without sliding over the bark, jumping over longitudinal grooves or pockets, and without penetrating the wood beyond the cambium layer.

It will be understood that logs will be fed through the machine at a constant speed with one log following another as closely as possible, however, as soon as a log has passed beyond the knives, centrifugal force unimpeded by work to be done, will cause all the cutter heads **44** to move towards the axis of the drum **20**, which will cause the spreaders **70** to move across the opening so that another log on approaching the opening will be prevented from entering until the cutter heads are separated far enough to allow the knife blades to properly engage the wood.

When bark is being removed from a small log, the pinion end of each thrust arm will move outwardly towards its greatest radius, but the complementary counterweight will move inwardly so as to keep the inward knife blade thrust at appropriate magnitude. The thrust upon the cutter heads may need to be adjusted to conform to the general condition of the logs and their bark, which condition changes according to the time of year the logs are cut, the nature and normal thickness of the bark, the tree species and the length of time that the logs have been cut before barking, and the machine can be adjusted to suit any of the above log conditions by adjusting the weight mass or the disposition of the counterbalance **45** along the S-shaped levers **39**.

Following the jumping of a knife blade over a knot and the incidental compression of the springs **52**, said blade will spring outwardly from the cutter head simultaneously as said cutter head is swinging towards the log, so that the combined knife thrust will cause the blade to penetrate the bark closely beyond the knot and resume the bark removing process instantaneously.

What I claim as my invention is:

1. A rotary barker comprising a drum having an annulus through which a log is adapted to be passed, means for rotating the drum, a plurality of independently operable knife blades carried by the drum and pivotally mounted for arcuate reciprocatory movement across the annulus towards its center, a weighted member pivotally connected to the pivotal mounting for each knife blade, said member being attached to a drum part for reciprocatory movement radially of the drum and in an opposite direction to the radial movement of the knife, said knife and weighted member together with their pivotal connection being so disposed relative to the axis of the drum that centrifugal force generated by the rotation of the drum will be of greater magnitude on the weighted member than on the knife whereby said force will advance the knife blade inwardly to its bark-removing position.

2. A rotary barker comprising a drum having an annulus through which a log is adapted to be passed, means for rotating the drum, a plurality of independently operable knife blades carried by the drum and pivotally mounted for arcuate reciprocatory movement across the annulus towards its center, a weighted member, said member being in the form of a thrust arm having an outer end pivotally and slidably connected to a drum part, each of said knife blades having a support pivotally connected to the thrust arm adjacent its inner end, said outer end of the thrust arm being mounted to move arcuately and outwardly from the axis of the drum in response to centrifugal force generated by the rotation of the drum so as to force the knife blade into contact with the surface of a log passing through the annulus.

3. A rotary barker comprising a drum having an annulus through which a log is adapted to be passed, means for rotating the drum, a plurality of independently operable knife blades carried by the drum and pivotally mounted for arcuate reciprocatory movement across the annulus towards its center, a weighted member pivotally connected to the pivotal mounting for each knife blade, said member being attached to a drum part for reciprocatory movement radially of the drum and in an opposite direction to the radial movement of the knife, said knife and weighted member together with their pivotal connection being so disposed relative to the axis of the drum that centrifugal force generated by the rotation of the drum

will be of greater magnitude on the weighted member than on the knife whereby said centrifugal force will thrust the knife blade inwardly towards its bark-removing position, and means for progressively reducing the thrust upon the knife as it moves inwardly towards the center of the annulus.

4. A rotary barker comprising a drum having an annulus through which a log is adapted to be passed, means for rotating the drum, a knife assembly within the drum, said assembly comprising a lever pivotally mounted within the perimeter of the drum, said lever having a cutter head and a knife blade at one end, means for partly counterbalancing the lever against centrifugal force generated in response to rotation of the drum, a thrust arm having its inner end pivotally connected to the lever adjacent the cutter head, said thrust arm having a slidable and pivotal connection with a part of the drum beyond the radius of the pivotal mounting of the lever whereby as the outer end of the thrust arm moves arcuately and outwardly from the axis of the drum it will exert an inward thrust upon the cutter head.

5. A rotary barker comprising a drum having an annulus through which a log is adapted to be passed, means for rotating the drum, a knife assembly within the drum, said assembly comprising a lever pivotally mounted within the perimeter of the drum, said lever having a cutter head and a knife blade at one end, means for partly counterbalancing the lever against centrifugal force generated in response to rotation of the drum, a thrust arm having its inner end pivotally connected to the lever adjacent the cutter head, said drum having an arcuate eccentric slot located beyond the radius of the pivotal mounting of the lever, said thrust arm engaging the slot adjacent the outer end of the arm whereby said outer end is free to move arcuately and outwardly from the axis of the drum to exert an inward thrust upon the lever and its knife blade.

6. A rotary barker as claimed in claim 5 wherein more than one knife assembly is disposed in equally spaced relation circumferentially of the drum.

7. A rotary barker comprising a drum having an annulus through which a log is adapted to be passed, means for rotating the drum, a knife assembly within the drum, said assembly comprising a lever pivotally mounted within the perimeter of the drum, said lever having a cutter head and a knife blade at one end, means for partly counterbalancing the lever against centrifugal force generated in response to rotation of the drum, a thrust arm having its inner end pivotally connected to the lever adjacent the cutter head, said thrust arm having a slidable and pivotal connection with a part of the drum beyond the radius of the pivotal mounting of the lever whereby as the outer end of the thrust arm moves arcuately and outwardly from the axis of the drum it will exert an inward thrust upon the cutter head, a counterweight slidably mounted upon the thrust arm, and means for moving the counterweight towards the axis of the drum as the outer end of the thrust arm moves outwardly therefrom.

8. A rotary barker comprising a drum having an annulus through which a log is adapted to be passed, means for rotating the drum, a knife assembly within the drum, said assembly comprising a lever pivotally mounted within the perimeter of the drum, said lever having a cutter head and a knife blade at one end, means for partly counterbalancing the lever against centrifugal force generated in response to rotation of the drum, a thrust arm having its inner end pivotally connected to the lever adjacent the cutter head, said thrust arm having a slidable and pivotal connection with a part of the drum beyond the radius of the pivotal mounting of the lever whereby as the outer end of the thrust arm moves arcuately and outwardly from the axis of the drum it will exert an inward thrust upon the cutter head, a counterweight slidably mounted upon the thrust arm, and means for moving the counterweight towards the axis of the drum as the outer end of the thrust arm moves outwardly therefrom; said slidable and pivotal connection comprising an arcuate eccentric rack carried by the drum near its periphery, a pinion and a sheave connected for unitary rotation journalled at the outer end of the thrust arm, said pinion having meshing engagement with the rack and a flexible member connecting the sheave to the counterweight whereby the rotation of the sheave moves the counterweight lengthwise of the thrust arm.

9. In a rotary barker having a cutter head adapted to be drawn circumferentially about a log being fed through the barker, a knife blade slidably mounted within the cutter head, means for resiliently urging the blade towards its bark-removing position, and a deflector portion having a ninety degree curve extending across the leading face of the blade, said curve terminating at the log-engaging edge of the blade and said deflector portion forming part of the blade to slide therewith with respect to the cutter head.

10. A rotary barker comprising a drum having an annulus through which a log is adapted to be passed, a lever pivotally mounted upon a pin carried by a drum part, a knife blade supported at an inner free end of said lever to move across the annulus towards or away from the axis of rotation of the drum, a weighted member pivotally connected at its inner end to said inner free end of the lever and, at its outer end, slidably engaging a drum part for arcuate movement outwardly from or inwardly toward the drum axis, said arcuate movement occurring in an opposite direction, with respect to the drum axis, to that of the knife blade, said lever and weighted member being so disposed relative to the axis of the drum that centrifugal force generated in response to the rotation of the drum will be of greater magnitude on the weighted member than on the lever whereby said force will advance the knife blade inwardly towards its work, said knife blade having a leading face and a log-engaging edge, said face lying in a first plane parallel to the drum axis and inclined in the direction of rotation of the drum, said first plane making an exterior angle of ninety-five degrees with a second plane parallel to the drum axis and containing a line extending through the lever pivot pin and the log-engaging edge of said blade.

11. A rotary barker as recited in claim 10, wherein said exterior angle of ninety-five degrees may vary plus or minus two degrees.

12. A rotary barker comprising a drum having an annulus through which a log is adapted to be passed, a lever pivotally mounted upon a drum part and having an inner free end that can sweep across the annulus towards and away from the axis of rotation of the drum, said lever having a cutter head at said inner free end, a knife blade slidably mounted within the head and engageable with the periphery of a log passing through said annulus, spring means for urging the knife blade to project beyond the cutter head, and a weighted member so articulated between the lever and the drum that centrifugal force generated in response to the rotation of the drum will be of greater magnitude on the weighted member than on the lever, whereby said force will advance the head and the knife blade towards the log.

References Cited in the file of this patent

UNITED STATES PATENTS

314,876	Poole et al.	Mar. 31, 1885
1,248,700	Olson	Dec. 4, 1917
2,448,689	Schnyder	Sept. 27, 1948
2,581,829	Alexander	Jan. 8, 1952
2,692,623	Leffler	Oct. 26, 1954