Aug. 13, 1957 T. W. NICHOLSON 2,802,495

SWIVELED-SCRAPER-PLATE ROTARY-RING LOG BARKERS

Filed Feb. 1, 1954 4 Sheets-Sheet 1

Fig. 1.

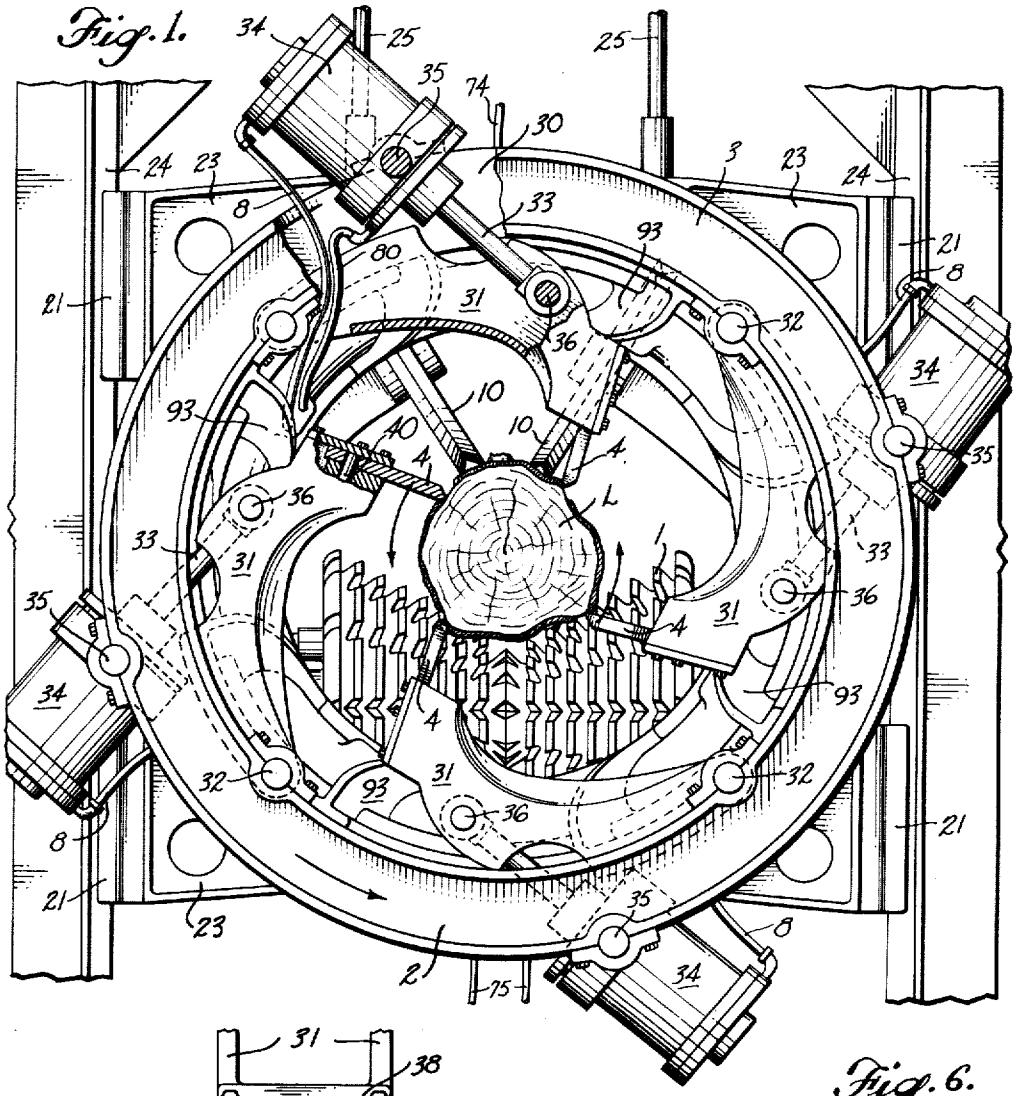


Fig. 5.

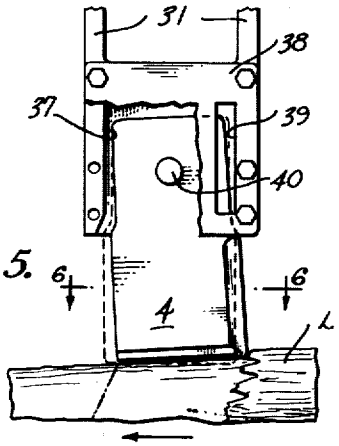
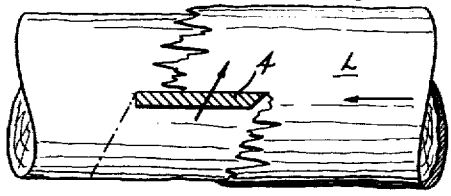


Fig. 6.



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SWIVELED-SCRAPER-PLATE ROTARY-RING LOG BARKERS

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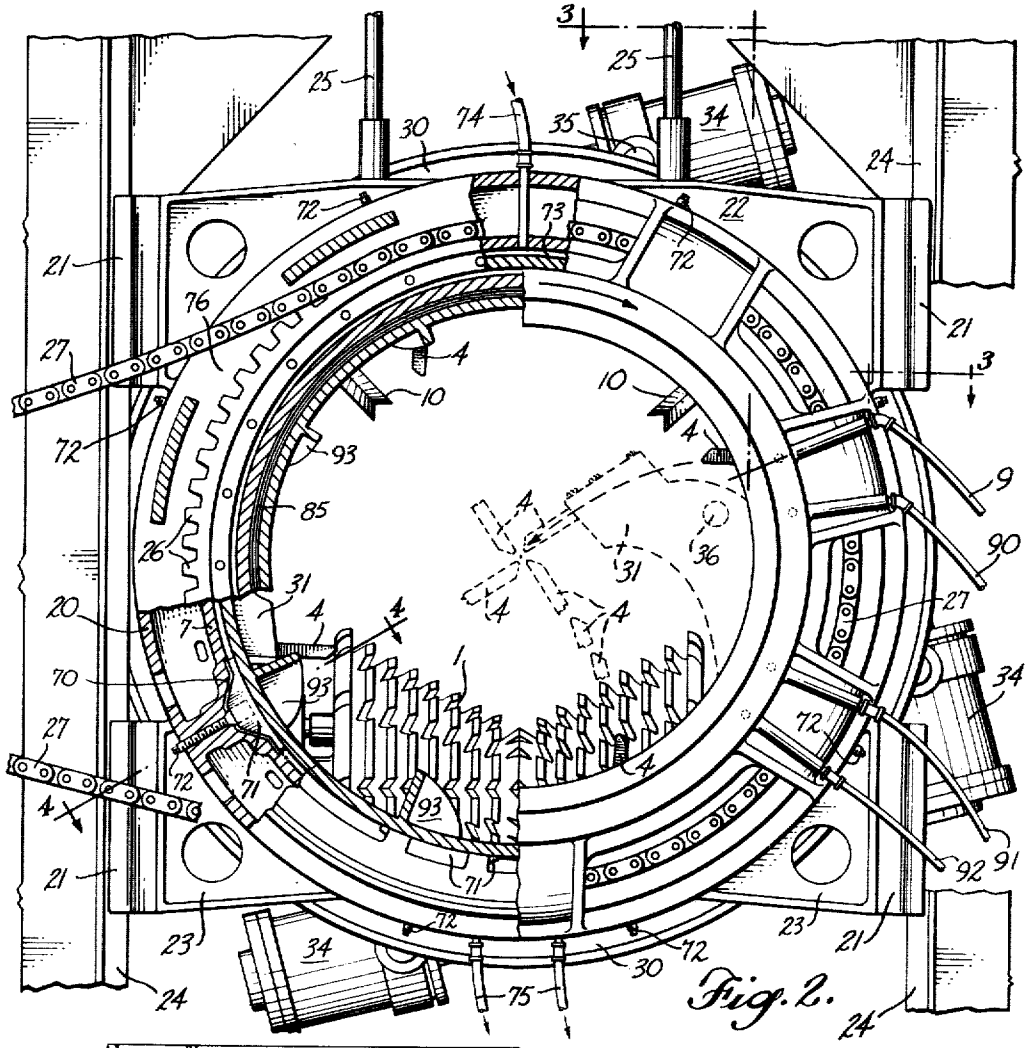


Fig. 2.

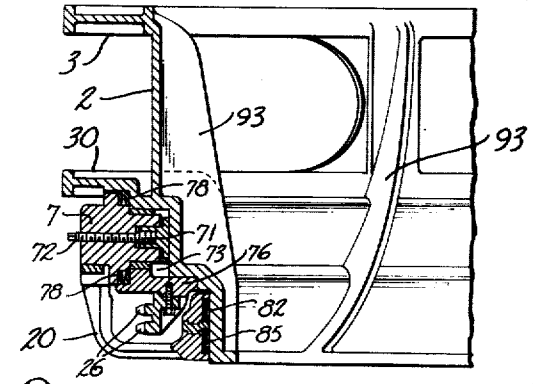


Fig. 4.

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SWIVELED-SCRAPER-PLATE ROTARY-RING LOG BARKERS

Filed Feb. 1, 1954 4 Sheets-Sheet 3

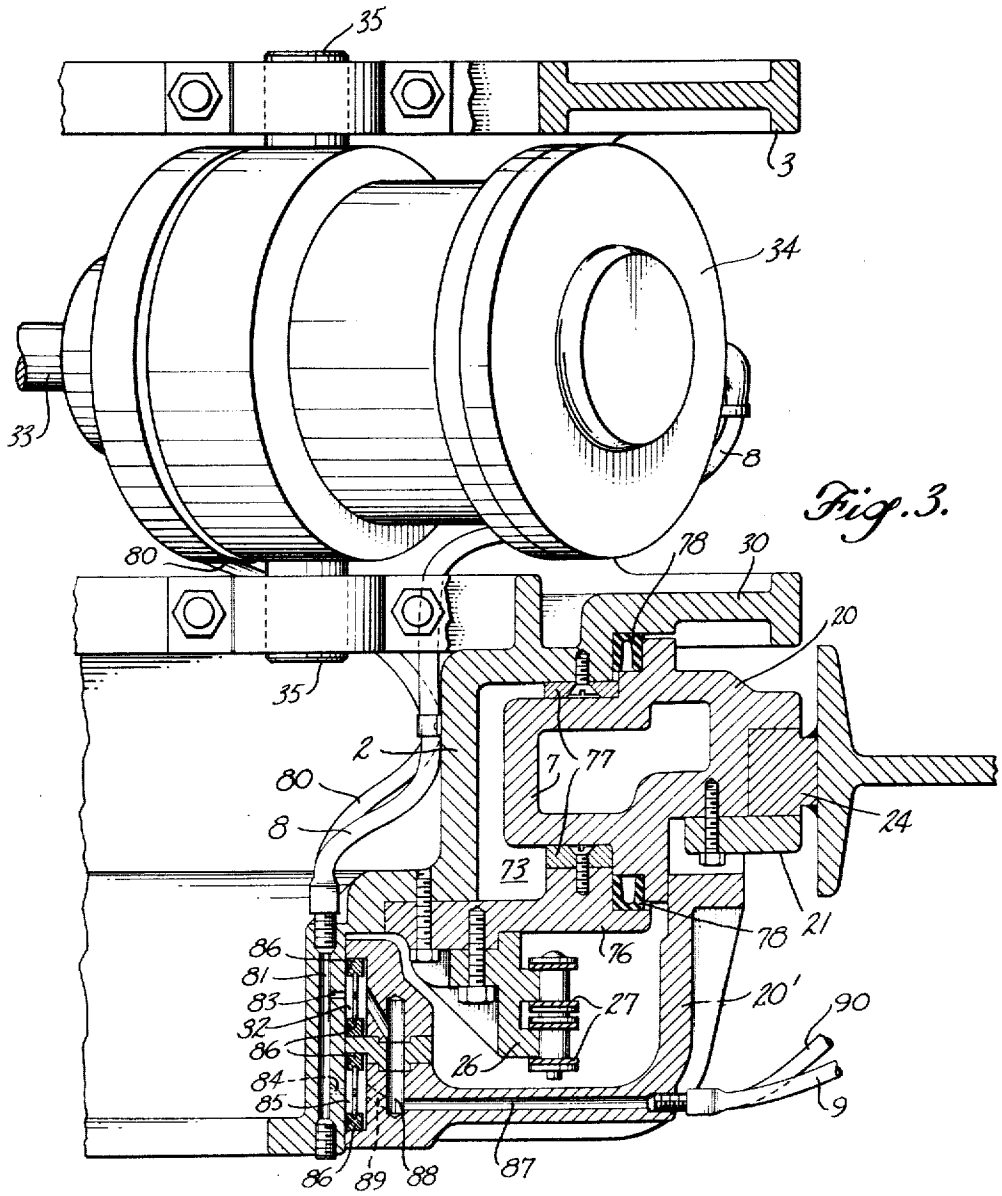


Fig. 3.

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SWIVELED-SCRAPER-PLATE ROTARY-RING LOG BARKERS

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Fig. 11.

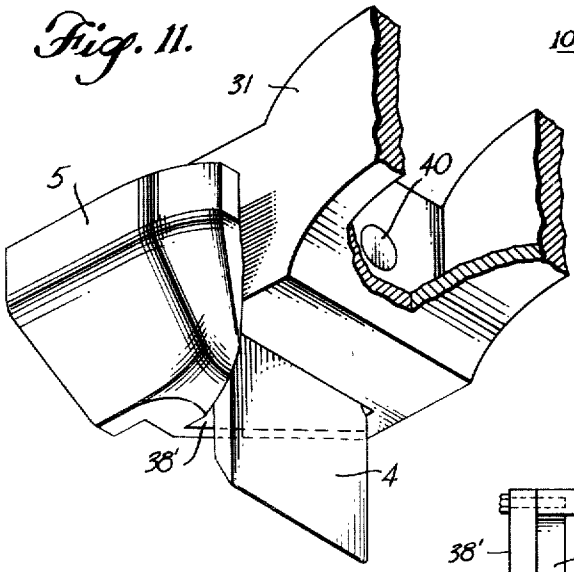
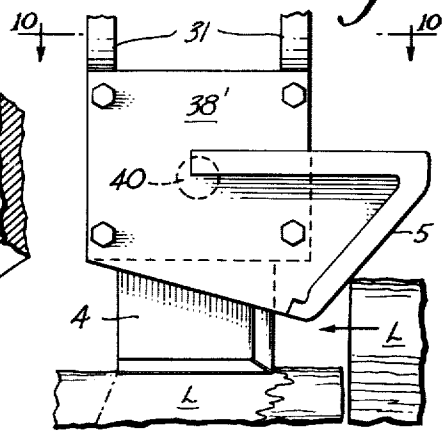


Fig. 9.



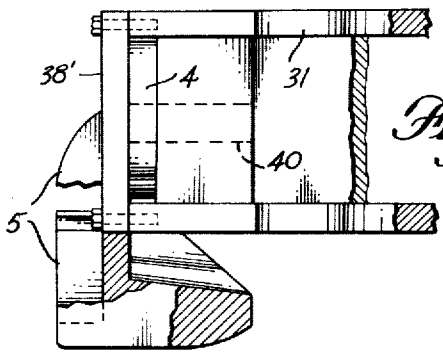
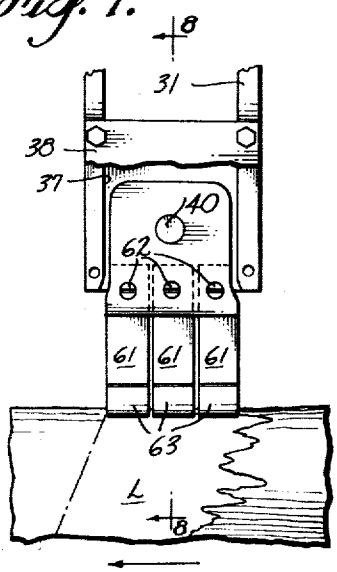


Fig. 10.

Fig. 7.



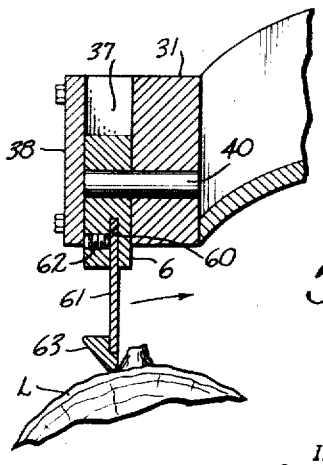


Fig. 8.

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2,802,495

SWIVELED-SCRAPER-PLATE ROTARY-RING LOG BARKERS

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Application February 1, 1954, Serial No. 407,361

9 Claims. (Cl. 144—208)

The present invention relates to a log barker of the type having a rotary ring through which a log to be barked is fed axially and nonrotatively. Such ring carries a plurality of barking tools engageable with the periphery of a log as the ring rotates and the log is fed through it. Such movement of the log may be effected by log-feed mechanism of the type disclosed in my copending application Serial No. 407,362, filed February 1, 1954.

The principal object of the log barker is to scrape the bark from the log rapidly and cleanly with minimum damage to the wood surface of the log beneath the bark. Various techniques have been employed heretofore for removing bark from logs including rossing off the bark by use of a rotary head, rasping off the bark by utilization of scraper points or links of chain, stripping or peeling off the bark such as by use of a barking spud or chisel blade, washing off the bark by a high-pressure jet of water, and rubbing off the bark by application to its outer surface of a large concentrated compression force. These various expedients have various disadvantages. Rotary rossing heads usually damage the wood beneath the bark excessively. Rasping tools are not very effective in removing bark, especially if it is thick. Barking spuds or chisels usually are slow in operation, and it is difficult to control the depth of cut so that frequently wood beneath the bark is wasted. Hydraulic barking machines usually are very expensive, and it is difficult to separate the bark refuse from the water to enable the water to be disposed of readily. Compression barking frequently is not very effective and requires very concentrated pressure over a small area to loosen the bark so that it can be rubbed off, and consequently the operation is slow. All these disadvantages are eliminated in the use of the present scraper-plate barker.

More specifically it is an object to utilize such a scraper-plate barker tool which is disposed substantially in a radial plane of the log so that its edge adjacent to the log extends lengthwise of it and the plate is mounted so that such edge can adjust itself within limits to the longitudinal contour of the log.

Another object is to support such a scraper plate so that it may be carried circumferentially around a log while the log and scraper plate also are moved relatively lengthwise to cause the log-contacting edge of the scraper plate to traverse a spiral path around the log. Also it is an object to guide movement of such a scraper plate from engagement with one log to engagement with a log of substantially larger diameter virtually automatically.

A further object is to press such a scraper plate against a log with substantially constant pressure, and for this purpose to provide pressure-exerting mechanism preferably operated by air and mounted on a rotary ring and to supply air effectively to such rotary ring for transmission to such air-pressure mechanism. A further object is to lubricate such a rotary ring for the purpose of reducing the friction between it and its mounting.

In view of the helical path about the log traversed by the scraper plate, it is an object to shape the leading edge

of the plate so that pressure of the bark on it will not tend to shift the plate away from bark-scraping position.

Additional objects inherent in the structure of the machine which is preferred will be pointed out in the following particular description of the mechanism shown in the drawings.

Specifically, the barker may incorporate a scraper plate of unitary or sectional character and having parallel leading and trailing planar faces which lie in planes extending substantially parallel to the axis of a log to be barked, the plate being supported for limited swinging about a pivot axis extending transversely of said planar faces. The plate-supporting pivot is mounted for movement toward and away from a log to be barked, such as by being carried by the end of a swinging arm. Such swinging arm is mounted on a ring rotatable about the axis of a log fed axially through it, and such ring is supported so that air may be supplied to the ring for actuation of the air cylinders.

Figure 1 is a fragmentary elevation of the log barker and shows an oncoming log and the outfeed side of the rotatable tool-carrying ring, and

Figure 2 is a similar elevation of the opposite or infeed side of such ring, parts in each figure being broken away and shown in section.

Figure 3 is an enlarged sectional view of the mounting ring taken on line 3—3 of Figure 2.

Figure 4 is a fragmentary detail view taken on line 4—4 of Figure 2.

Figure 5 is a trailing-face view of a scraper plate and its mounting, parts being broken away to show details of such mounting. Figure 6 is a sectional view through the scraper plate on line 6—6 of Figure 5.

Figure 7 is a trailing-face view of an alternate form of scraper plate of sectional type, and Figure 8 is a sectional view thereof along line 8—8 of Figure 7.

Figure 9 is a trailing-face view of a scraper plate, a plate mounting, and a guide shoe, and Figure 10 is a horizontal section on line 10—10 of Figure 9. Figure 11 is a bottom perspective view of the guide-shoe and scraper-plate assembly.

As discussed in greater detail in my application Serial No. 407,362, mentioned above, a log to be barked may be carried by ribbed rollers 1 against which the log is held by hold-down wheels 10, and by rotation of such rolls a log L is moved lengthwise through a log-barking machine. The ring 2 is mounted for rotation in a stationary ring 20, which is supported by slides 21 carried by opposite ends of an upper crossbeam 22 and a lower crossbeam 23. These slides engage upright guides 24 along which the slides may be moved by frame-supporting rods 25 so as to adjust the rings 2 and 20 into a position concentric with a log L depending upon its size. The ring 2 carries sprocket teeth 26 which are engaged by a drive chain 27 to rotate such ring relative to stationary ring 20.

As shown in Figure 3, the ring 2 includes two flanges 3 and 30 which are spaced axially of the ring a substantial distance to accommodate between them a plurality of swingable arms 31. These arms, preferably four in number, have one end mounted between the ring flanges 3 and 30 by a journal 32. Swinging of these arms is controlled by the piston rod 33 of an air cylinder 34 pivotally supported on the ring flanges 3 and 30 by a pivot 35. The end of the piston rod is pivoted to the arm 31 at a location remote from its pivot by an interconnecting pivot 36. Figure 3 shows that the rotary ring flanges 3 and 30 are spaced far enough to receive these cylinders between the ring flanges. Inward movement of the piston rod 33 with respect to its cylinder will swing the corresponding arm 31 outward about its pivot 32 to retract the arm into the space between the ring

flanges 3 and 30. Conversely, extension movement of the piston rod will swing the arm 31 to move its swinging end toward the log L shown in Figure 1.

The swinging end of each arm 31 carries a planar scraper plate 4 having flat leading and trailing faces disposed in planes extending substantially parallel to the axis of the arm pivot 32. Also, the angular relationship between the plate 4 and arm 31 will be such that in the various swung positions of the arm the leading face of the plate 4 will always be inclined toward a plane which lies tangent to a log's periphery at the zone of contact between the inner end of the scraper plate and such a log, so as to form an acute angle between the leading face of the scraper plate and said tangential plane, as distinguished from an obtuse or chiseling angle. In Figure 1 the scraper plate is shown as being mounted on a stub axle 40 extending lengthwise of the arm and transversely of the planar faces of the plate 4, and consequently providing an axis extending across, but spaced from the periphery of, the log. In Figure 5 such axle is shown as projecting into a recess 37 in the end of the arm, and such recess is substantially closed by a cover plate 38. This cover plate is provided with a slot 39 (shown in Figure 5) to enable any bark or other refuse which may work its way into the recess to escape from such recess.

All logs are tapered to some extent, and some logs may have a pronounced taper. Mounting of plate 4 on stub axle 40 will enable such plate to swing about this axle relative to arm 31 so that the log-engaging edge of the plate can align itself automatically with the log surface as shown in solid lines in Figure 5. The log-engaging end of the plate is beveled to form a ridge adjacent to the leading face of the plate, and this ridge is pressed against the wood of the log by the pressure of piston rod 33 on swinging arm 31. As the ring 2 is rotated around the log while the log is held against rotation by the log-feed mechanism, which may include rolls 1 and hold-down wheels 10, the ridge on the end of each plate 4 scrapes off a swath of bark approximately the width of the plate 4.

Because of the rotation of the scraper-plate-carrying ring 2 and the longitudinal movement of the log L, the swath from which bark is scraped, as shown in Figures 5 and 6, will be of spiral shape. Consequently, the speed of longitudinal feed of the log should be coordinated with the speed of rotation of ring 2 so that the spiral paths of successive scraper plates meet or overlap to a slight extent. For example, if four scraper plates are mounted equally spaced around the rotary ring 2 as illustrated in Figure 1, the log should be fed longitudinally a distance substantially equal to the width of a scraper plate for each quarter revolution of ring 2, or a distance equal to four times the width of such a plate for each complete revolution of ring 2. If the scraping edge of each plate 4 is eight inches in width, therefore, the log should be fed longitudinally approximately thirty-two inches for each revolution of ring 2.

If the leading edge of a scraper plate 4 shown toward the right of Figure 6 were square, bark remaining on the log alongside the barked swath would tend to exert a wedging action on the trailing corner of such leading edge which would exert a force tending to swing plate 4 about its axle 40 in a clockwise direction into the broken-line position shown in Figure 5. Such swinging movement would deflect the scraping edge of the plate from parallelism with the surface of the log wood beneath the bark. To avoid this tendency, therefore, the leading edge of the scraper plate is beveled to leave a ridge at the leading corner of such leading edge, that is, adjacent to the rotatively leading face of the scraper plate, as shown in Figures 5 and 6.

The pivotal mounting of each scraper plate on the swinging end of its supporting arm is also useful when such a plate is moved from the trailing end of one log into contact with the leading end of another log which is

larger than the preceding log. When such a larger log is reached, the ring-supporting slides 21 will be shifted upward along ways 24 to center the ring 2 with the new log. Also, particularly if there is a large difference in size between the preceding log and the succeeding log, air will be supplied to cylinders 34 to retract piston rods 33 and swing arms 31 outward. As the end of the larger log moves into the orbit of scraper plates 4, the air pressure in the cylinders 34 will be reversed so that the arms 31 again will be swung inward to engage the scraping edge ridges of plates 4 with the log.

If there is not a very great difference in size between a preceding log and a succeeding log, however, it is feasible to recenter the ring 2 with the new log without retracting the scraper plates. In that case the leading end of the larger log will strike the beveled leading edges of the scraper plates, and the shock of such engagement will be reduced greatly by the scraper plates 4 swinging about their axles toward the broken line position of Figure 5. Particularly when the scraper plates are swung to their fullest extent in the clockwise direction, the endwise pressure of the larger log will effect a wedging force on such plates which opposes the inward arm-swinging force produced by the cylinders 34 on arms 33. This wedging action will force the arms outward until the scraping edge of each plate 4 has moved outward to the periphery of the wood of the new log. Thereupon the plate will swing in a counterclockwise direction on its axle until its scraping edge is parallel with the wood surface beneath the bark of the new log, and the bark-removing action will then continue on the new log.

In order to assist outward swinging of arms 31 during transition from a smaller log to a larger log by increasing the wedging action of the larger log moving longitudinally, a shoe 5, as shown in Figures 9, 10 and 11, may be provided on a cover plate 38' covering the cavity in the end of the arm in which the plate-mounting axle 40 is located, and in which the pivotally mounted end of the scraper plate is received. This shoe has a log-engaging surface at the leading side of the arm, such surface sloping from a location adjacent to the leading edge of the scraper plate 4 outwardly and toward a log being fed to the barking machine, so that the periphery of the leading end of such a log will engage the sloping surface of the shoe before it reaches the scraper plate.

By such engagement with the shoe a wedging force is exerted on the swinging end of arm 31 to deflect it outward in opposition to the force exerted by the air cylinder 34 on the piston rod 33 so that when the log reaches the scraper plate it will engage only that portion projecting inwardly beyond the inner edge of cover 38'. Such projection should only be slightly in excess of the maximum thickness of bark on logs to be barked, such as approximately three inches.

When the larger log engages the beveled leading edge of the swiveled scraper plate it will swing such plate on its axle, as described previously, thus continuing the outward wedging force on the arm until the inner edge of the plate moves outward to the periphery of the wood beneath the bark of the log. At that time, as previously described, the plate will swing in the opposite direction about its axle until its inner edge again is parallel to and in contact with the surface of the log beneath the bark so that the leading face of the plate will push the bark off the log in a spiral swath.

To reduce the necessity of subjecting the leading edge of a scraper plate 4 to the wedging force of the end of a larger log, as described, as far as possible, logs should always be fed to the barking machine small end first, and the variation in log size should be as little as possible. If this practice is followed it will seldom be necessary for the operator to reverse the supply of air to cylinders 34 to effect positive retraction of the arms as a new log is fed into the barker blade-carrying ring. By such operation, therefore, even when the leading end of each succeeding

log is in abutment with the trailing end of each preceding log, the bark will be removed completely or almost so from such abutting log ends, and the wood will be damaged to the minimum possible extent.

While a bark-scraping plate such as discussed above operates entirely satisfactorily for removing bark from relatively clean logs, some bark may be left adjacent to knots which protrude from the surface of the log. The amount of bark thus left may be reduced if a composite scraper plate of the type shown in Figures 7 and 8 is employed. This plate includes a mounting butt-portion **6** pivotally supported on axle **40** in the swinging end of arm **31**. One edge of this mounting section has in it a slot **60** in which are received ends of a plurality of spring-steel web sections **61**. Each of these is secured in place by a set screw **62** threaded into a tapped hole in the mounting section **6**.

The free ends of the spring-steel strips **61** carry log-engaging blocks **63** so that the mounting plate **6**, the spring-steel strips **61** and the blocks **63** together constitute a composite bark-scraper plate. Blocks **63** are shaped so that together they provide a log engaging ridge of a shape similar to the ridge of the one-piece scraper plate previously described. The advantage of a composite plate, however, is that if one of the blocks **63** should strike a knot, another block may move close to or alongside such knot to scrape the bark adjacent to it from the log while another of the blocks or other blocks ride over the knot. The spring-steel strips should be sufficiently stiff to withstand the pressure exerted endwise on them collectively by the fluid-pressure piston and cylinder mechanism, yet sufficiently limber so that when one of the strips is deflected by engagement of its scraper block with a knot, the other strips will maintain contact with the log surface alongside such a knot.

In Figures 3 and 4 the structure for supporting the rotatable ring **2** from the stationary ring **20** is shown in greater detail. The beams **22** and **23** support directly a hollow annular member **7**, which, at circumferentially spaced intervals, has recesses **70** which receive bearing shoes **71** made of suitable bearing material such as brass. These shoes may be adjusted radially to center the rotary ring **2** accurately in the stationary ring **20** by screws **72** which are threaded into bores in the annulus **7**. Between the shoes **71** and between and extending circumferentially of the rings is left a space **73** into which lubricant in the form of heavy oil or light grease is supplied through a pipe **74**. This lubricant is drained from the space **73** by pipes **75**.

The portion of the ring **2** engaged by the shoes **71** is of channel shape, including a removable flange **76** bolted to the side of the ring remote from flanges **3** and **30** to complete the channel configuration. The opposite sides of this channel carry wear plates **77**, which may be of brass, engageable with opposite sides of the annulus **7** to resist thrust forces directed axially of the ring. These wear plates are in communication with the annular space **73** so that they likewise are lubricated by lubricant supplied to the space **73** through pipe **74**. Between the annulus **7** and the flanges of the U-shaped recess in ring **2** are mounted annular lubricant-seal-rings **78** for sealing the lubricant space **73**.

Air under pressure is supplied to opposite ends of the cylinders **34** and released from them through hoses **8** connected to the closed ends of the cylinders and hoses **80** connected to the piston-rod ends of the cylinders. The hoses **8** are connected to bores **81** appropriately located in circumferentially spaced positions around ring **2**, and these bores communicate with a groove **82** in the stationary ring **20'** through ports **83**. Similarly, hoses **80** communicate through bores corresponding to bores **81** and ports **84** with another annular groove **85** in the stationary ring **20'**. Within each of the grooves **82** and **85** are received spring-pressed pressure-seal-rings **86** which seal opposite edges of the grooves relative to the ring **2**.

With groove **82** communicates an air hose **9** through a radial bore **87** and an axial bore **88**. Another air hose **90** communicates with groove **85** through a radial bore corresponding to bore **87** and spaced circumferentially relative to it, and a bore **89**. Air may be supplied to the hoses **9** and **90** from a suitable source of air under pressure through appropriate control devices so that when air is supplied through the hose **9** the outer ends of cylinders **34** will be under pressure to effect inward swinging of arms **31**, whereas when air is supplied through hose **90** to the inner ends of the cylinders **34**, the arms **31** will be swung outward to retract the scraper plates. If desired, the hoses **9** and **90** may constitute both air-supply and air-exhaust conduits or, alternatively, such hoses may be utilized simply for supplying air under pressure, and additional hoses **91** and **92** communicating with grooves **82** and **85**, respectively, may be suitably controlled to exhaust air from the opposite ends of cylinder **34**.

As bark is scraped from a log by the plates **4**, the chips fall into the lower portion of the rotating ring and will be moved circumferentially upward by flanges **93** projecting inward from the inner periphery of the ring **2** and inclined relative to the axis of the ring. As the bark chips are thus raised, they will slide down the trough formed by the flanges **93** and the inner periphery of the ring, as indicated at the lower left portion of Figure 2, to be dumped beyond the log-discharge face of the rotary ring. Beneath the ring at this location may be provided a refuse conveyor to receive the chips of bark for removing them from the barking machine.

I claim as my invention:

1. A log-barking machine comprising log-supporting means, a flat scraper plate, means supporting said scraper plate generally radially of a log carried by said log-supporting means, and means operable to effect relative movement between said scraper plate and a log carried by said log-supporting means in the direction both longitudinally and circumferentially of such log with an edge of said plate engaged with such log to scrape bark therefrom in a helical path, a leading edge of said scraper plate being beveled from a leading face of said plate to its trailing face and said leading edge and said leading face including an acute angle therebetween.

2. A log-barking machine comprising log-supporting means, an elongated scraper plate disposed generally radially of a log supported by said log-supporting means and having a scraping portion engageable with such log, an arm movable relative to said log-supporting means and having a recess therein receiving a portion of said scraper plate remote from its scraping portion, a cantilever stub axle in said arm recess, said axle being carried by said arm, said axle providing a pivot axis extending transversely of said scraper plate and said axle supporting the portion of said scraper plate received in said recess for swinging of said scraper plate about said pivot axis, a cover plate disposed substantially parallel to said scraper plate and secured to said arm in a position extending across said recess and covering the unsupported end of said stub axle, and means operable to effect relative movement between said scraper plate and such log in a direction circumferentially of such log with said scraping portion of said plate engaged with such log to scrape bark therefrom.

3. The log-barking machine defined in claim 2, in which the cover plate has en elongated aperture therein through which foreign material may escape from said arm recess.

4. A log-barking machine comprising a ring, log-feed means operable to move a log lengthwise through said ring, a plurality of arms extending inwardly of said ring and pivotally mounted on said ring in circumferentially spaced relationship, scraper-plate means on the swinging inner portion of each of said arms and disposed generally radially of said ring for engagement of its radially inner

edge with the surface of such log, means operable to rotate said ring and thereby move each scraper-plate means around such log, a fluid-pressure member for each of said arms, variable in effective length to swing said arm about its pivot mounting, means effecting engagement between each of said fluid-pressure members and its corresponding arm at the same side of said arm's pivot mounting as said arm's scraper-plate means, and means supporting each of said fluid-pressure members from said ring at a location spaced circumferentially of the ring from the pivot mounting of the corresponding arm.

5. A log-barking machine comprising log-supporting means, a sectional scraper plate including a mounting, and a plurality of resilient strips supported at one end in said mounting in side-by-side substantially parallel, coplanar relationship, means supporting said scraper plate mounting to dispose the plane of said strips generally radially of a log supported by said log-supporting means, and means operable to effect relative movement between said scraper plate and such log in a direction circumferentially of such log with the ends of said strips remote from said mounting engaged with such log to scrape bark therefrom.

6. A log-barking machine comprising log-supporting means, a sectional scraper plate including a mounting, a plurality of resilient strips supported at one end in said mounting in side-by-side substantially parallel, coplanar relationship, and shoes on the ends of said strips remote from said mounting, means supporting said scraper plate mounting to dispose the plane of said strips generally radially of a log supported by said log-supporting means, and means operable to effect relative movement between said scraper plate and such log in a direction circumferentially of such log with said shoes engaged with such log to scrape bark therefrom.

7. A log-barking machine comprising log-supporting means, an elongated scraper plate disposed generally radially of a log supported by said log-supporting means and having a scraping portion engageable with such log, an arm movable relative to said log-supporting means and having a recess therein receiving an end portion of said scraper plate remote from its scraping portion, an axle in said arm recess, said axle being carried by said arm, said axle providing a pivot axis extending transversely of said scraper plate and said axle supporting the end portion of said scraper plate received in said recess for swinging of said scraper plate about said pivot axis, a cover plate disposed substantially parallel to said scraper plate and secured to said arm in a position extending across said recess, a shoe integral with said cover plate and having an inclined surface disposed ahead of the leading edge of said scraper plate, said inclined surface extending transversely of said scraper plate and containing a plane substantially parallel to said pivot axis, and including away from the leading edge of said scraper plate and away from said scraping portion, and means operable to effect relative movement between said scraper plate and such log in a direction circumferentially of such log with said scraping portion engaged with such log to scrape bark therefrom.

8. A log-barking machine comprising a ring, log-feed means operable to move a log lengthwise through said ring, a plurality of arms extending inwardly of said ring and pivotally mounted on said ring in circumferentially spaced relationship, a scraper plate mounted on the swinging end of each of said arms and disposed generally radially of said ring for engagement of its radially inner edge with the surface of such log, fluid-operated actuators mounted on said ring and connected to said arms, respectively, and each of said actuators being operable by variation in effective length to swing the arm connected to it relative to said ring, means operable to rotate said ring while said fluid-operated actuators are operable to move the inner edge of each scraper plate into contact with such log for scraping bark therefrom, a stationary ring supporting said first ring and having a nonrotating cylindrical surface adjacent to a rotating cylindrical surface of said first ring, two annular grooves disposed in side-by-side relationship in at least one of said cylindrical surfaces, means operable to convey fluid from said grooves respectively to opposite ends of said actuators, and means operable to supply fluid under pressure from said stationary ring to each of said grooves.

9. A log-barking machine comprising a ring, log-feed means operable to move a log lengthwise through said ring, a plurality of arms extending inwardly of said ring and pivotally mounted on said ring in circumferentially spaced relationship, scraper-plate means on the swinging inner portion of each of said arms and disposed generally radially of said ring for engagement of its radially inner edge with the surface of such log, means operable to rotate said ring and thereby move each scraper-plate means around such log, a fluid-pressure member for each of said arms, variable in effective length to swing said arm about its pivot mounting, first pivot means connecting each of said fluid-pressure members to its corresponding arm at a location between the swinging inner end of said arm and the pivot mounting of said arm, and second pivot means mounting each of said fluid-pressure members on said ring at a location spaced circumferentially of the ring from the pivot mounting of the corresponding arm in the same general direction that said arm extends from its pivot mounting but at a distance less than the spacing between said first pivot means and the pivot mounting of said arm.

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