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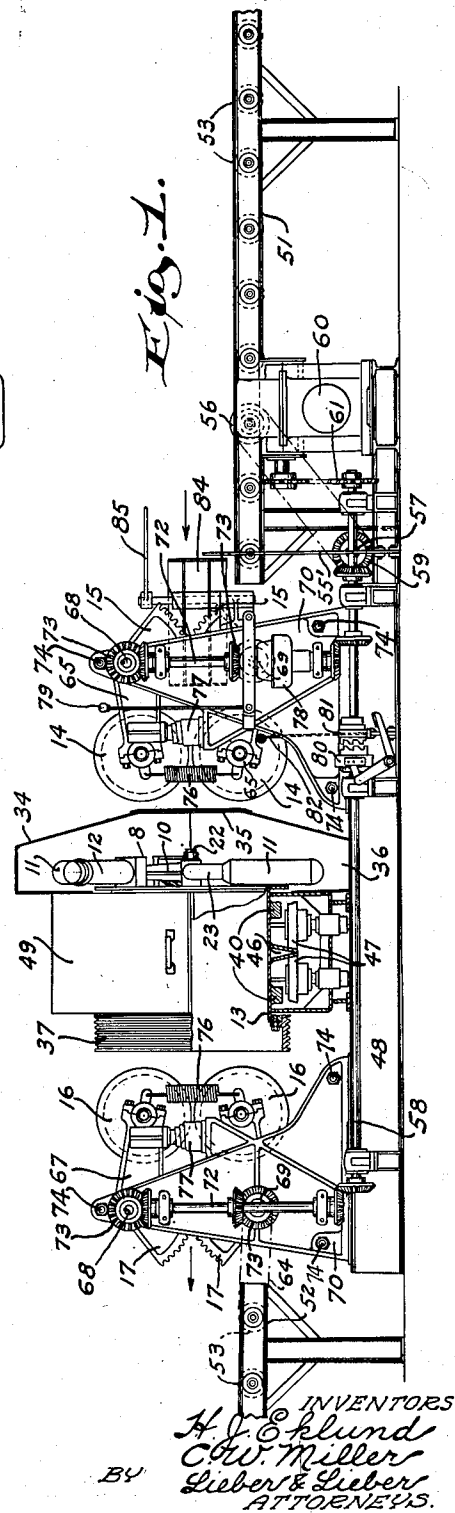
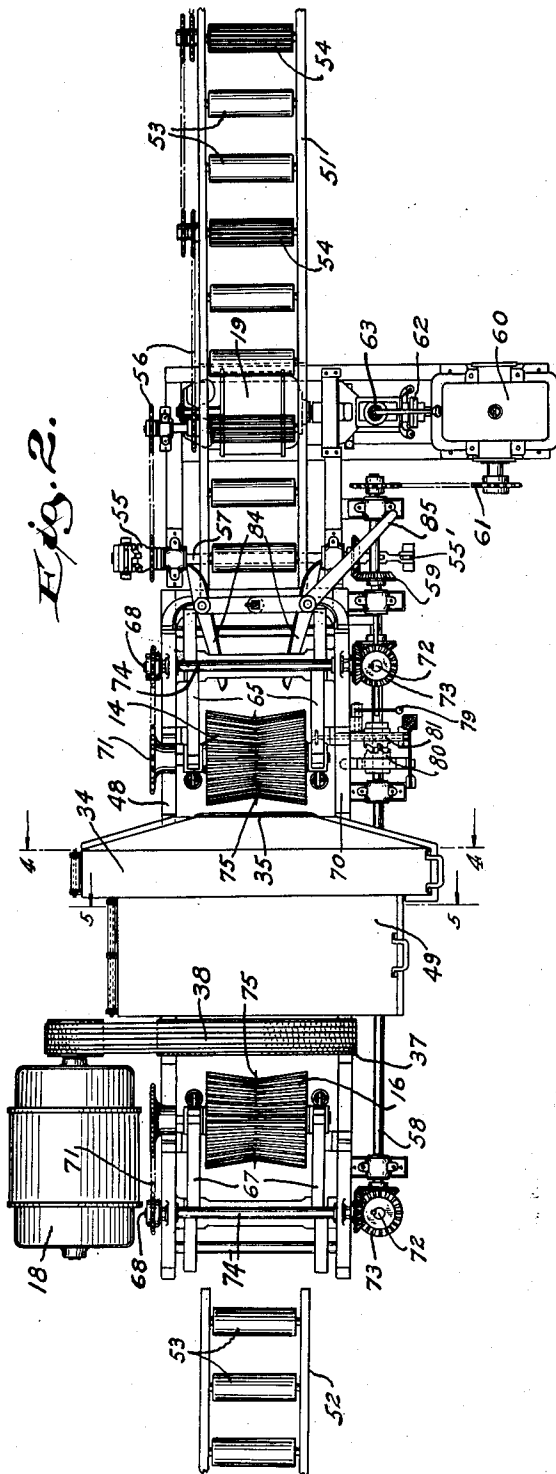
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2,625,968

MECHANICAL LOG BARKER

Filed April 21, 1949

2 SHEETS—SHEET 1



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2 SHEETS—SHEET 2

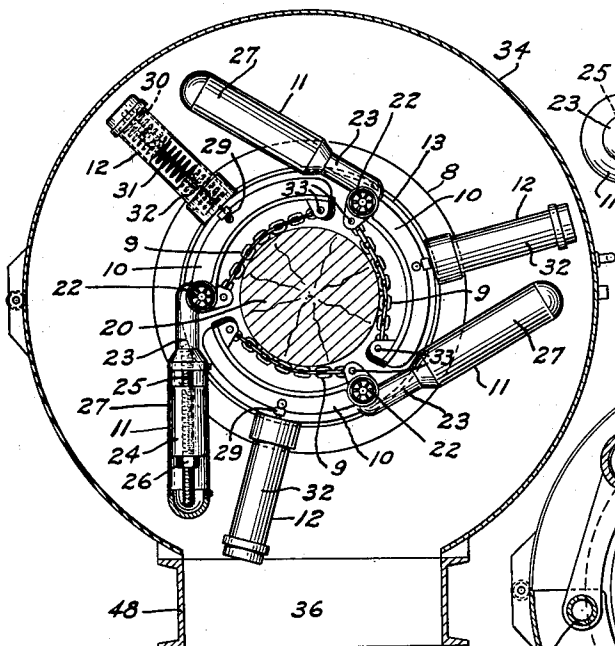


Fig. 4.

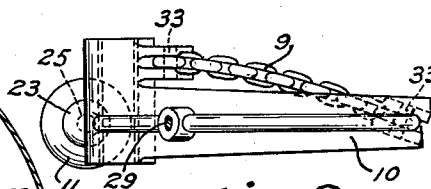


Fig. 6.

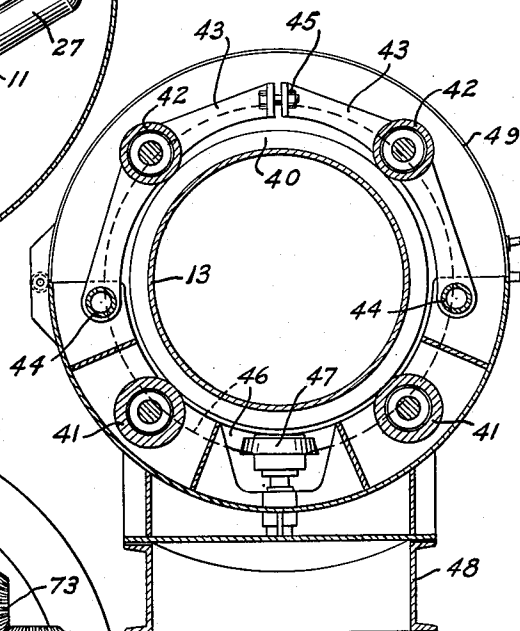


Fig. 5.

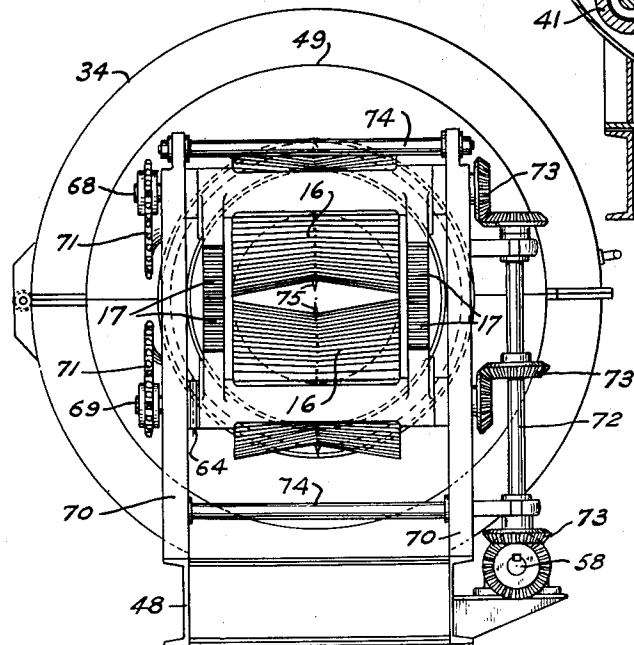


Fig. 3.

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UNITED STATES PATENT OFFICE

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MECHANICAL LOG BARKER

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The present invention relates generally to improvements in the art of debarking logs, and relates more particularly to various improvements in the construction and operation of mechanical equipment for removing the bark from logs of various diameters and especially from larger logs.

Many different kinds of mechanisms for removing the bark from logs, have heretofore been proposed and used with varying degrees of success, but none of these prior so-called log barkers are entirely successful and satisfactory in meeting varying conditions especially when operating on logs of relatively large diameter. While some of the prior log barkers may operate quite well on green logs, they will not do so when handling dry wood, and vice versa; and most of the previous debarkers for logs of large diameter have either been too complicated and difficult to manipulate, or they required excessive power and were too costly to operate and to maintain in operating condition. Then too, many of the prior log barking devices were incapable of treating relatively crooked logs and tree trunks of great length; and others were too frail to withstand the abuse and hard usage to which such equipment is necessarily subjected, for prolonged periods. Another difficulty encountered with most of the prior log barkers is their failure to properly accommodate successive rapidly advancing logs of various diameters, thus making the previous debarkers objectionable for diverse reasons.

It is therefore the primary object of our present invention to provide an improved log barking assemblage which substantially obviates the above-mentioned objectionable features, and which will effectively and quickly debark logs of diverse shapes, diameters and lengths at moderate cost and without endangering the operators.

Another important object of this invention is to provide a simple but sturdy mechanism for mechanically twisting and removing the bark from the periphery of longitudinally advancing successive logs with the aid of a series of helically disposed flexible and rapidly revolving elements such as chains or the like.

A further important object of the invention is to provide improved instrumentalities for guiding and longitudinally advancing logs through or past a revolving bark removing rotor, and for automatically accommodating and centralizing logs of varying diameters with respect to the debarking rotor axis.

Still another object of our invention is to provide a compact and powerful log barking unit

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which is flexible in its adaptations and conveniently manipulatable so as to thoroughly remove the bark from wet or dry logs in rapid succession.

An additional object of the present invention is to provide an improved log bark removing assemblage which may be readily installed at any suitable location and safely operated at moderate cost and with relatively few attendants, to most effectively debark diverse logs.

These and other objects and advantages of the invention will be apparent from the following detailed description.

A clear conception of the features involved in our present improvement, and of the construction and operation of a typical embodiment of the invention, may be had by referring to the drawings accompanying and forming a part of this specification wherein like reference characters designate the same or similar parts in the various views.

Fig. 1 is a somewhat diagrammatic and partly sectional side elevation of one of our improved log barkers, showing the feed rollers moved inwardly toward the axis of the debarking rotor as far as possible;

Fig. 2 is a similarly diagrammatic top view of the complete debarking unit shown in Fig. 1;

Fig. 3 is an enlarged end view of the apparatus looking toward the log discharge end of the unit;

Fig. 4 is a similarly enlarged transverse vertical section through the bark remover, taken along the line 4—4 of Fig. 2;

Fig. 5 is a likewise enlarged transverse vertical section through the equipment, taken along the line 5—5 of Fig. 2; and

Fig. 6 is a further enlarged outside view of one of the helical chain segments and its supporting lever.

While the invention has been disclosed herein as having been applied to a typical electric motor driven log barker embodying a rotor having only three flexible chain segments therein, it is not desired to unnecessarily limit the same by virtue of this restricted disclosure; and it is also contemplated that specific descriptive terms used herein be given the broadest interpretation consistent with the actual novelty of the improvement.

Referring to the drawings, the typical improved log barker shown therein by way of illustration, comprises in general a main barking rotor 8 having an annular series of three helically disposed flexible elements or chain segments 9 pivotally suspended therefrom by means of

arcuate supporting levers 10; a weight assemblage 11 rigidly associated with the pivoted end of each lever 10 for swinging the opposite end thereof and its chain segment 9 inwardly toward the rotor axis; a resilient power device or unit 12 coacting with the medial portion of each lever 10 for urging the same and its chain segment 9 outwardly away from the rotor axis; a rotor drum 13 revolvably supporting the chain and lever assemblages; upper and lower log centering feed rollers 14 swingably and rotatably associated with intermeshing gear segments 15 in advance of the rotor 8; upper and lower log centering discharge rollers 16 likewise swingably and rotatably associated with other intermeshing gear segments 17 beyond the rotor 8; a motor 18 for revolving the rotor 8 and its drum 13; and mechanism including another motor 19 for conducting and longitudinally advancing the successive logs 20 and for actuating the feed rollers 14, 16.

The arcuate chain supporting levers 10 are swingably suspended from one end of the rotor drum 13 by means of bushed or anti-friction pivot pins 22 as shown in Fig. 4, and each weight assemblage 11 for swinging these levers inwardly at normal speed consists of a sturdy base member 23 rigidly attached to or formed integral with the pivoted end of one of the levers 10 and having thereon a cylindrical weight 24 adjustable along a threaded spindle 25 and adapted to be locked in various positions of adjustment by a lock nut 26, each weight 24 normally being confined within a removable housing 27. Each of the resilient power units 12 for automatically urging the levers 10 outwardly so as to spread the chains away from the rotor axis when at rest or while revolving at slow speed, consists of a cable or rod 29 having one end pivotally attached to the adjacent lever 10 and being provided at its opposite end with an adjustable plate 30, while the medial portion of each cable or rod 29 is surrounded by a helical compression spring 31 interposed between the adjacent plate 30 and the end of the drum 13, and each spring 31 is housed within a tubular casing 32. Any other suitable type of power device 12 for thus spreading the chain segments 9 may be utilized in place of the springs 31; and while the helically disposed flexible bark removing elements have been shown as chain segments 9 the opposite ends of each of which are swingably secured to the adjacent levers 10 by pins 33, as shown in Figs. 4 and 6, these elements may also assume various forms adapted to wrap themselves about the logs 20.

The lever and chain assemblages are housed within a suitable enclosure 34 having a removable top cover, a log inlet opening 35, and bark outlet 36, as shown in Figs. 1 and 2; and the end of the supporting drum 13 remote from these assemblages is provided with a driving sheave 37 with which the propelling motor 18 is drivingly connected by means of endless V-belts 38. The mid-portion of the drum 13 is provided with a pair of spaced tires 40 each of which coacts with lower mounting rollers 41 at the bottom, and with steadying and retaining rollers 42 at the top, as illustrated in Fig. 5; and the upper rollers 42 of each pair are carried by the medial portions of supporting arms 43 the lower ends of which are secured to pivots 44 while the upper extremities thereof are detachably interconnected by bolts 45, so that by releasing these bolts 45 and swinging the four arms 43 outwardly, the drum 13 may be lifted away from the lower rollers 41. The mid-portion of the drum periphery, between the

tires 40, is also provided with a sturdy V-shaped flange 46 with which a pair of tapered rolls 47 coact as depicted in Figs. 1 and 5, in order to prevent axial shifting of the drum 13 and rotor assemblage, and the rollers 41, arms 43 and rolls 47 are all mounted upon a stationary main frame 48 of the barking unit while the drum 13 is normally confined in a housing 49 having a removable cover, as shown in the drawings.

The barking unit is preferably provided with a log supply conveyor 51 in advance of the feed rollers 14, and with a debarked-log conveyor 52 beyond the discharge rollers 16, and the supply conveyor may be provided with an inclined section of well known construction for elevating and depositing the successive logs thereon from a pond, lake or river. Both conveyors 51, 52 have a series of parallel horizontal log supporting and transfer rollers 53 and some or all of the rollers 54 of the supply conveyor 51 should be fluted and driven from the motor 19 so as to positively advance the successive bark covered logs 20 toward the debarking mechanism. The rollers 53, 54 of the log supply conveyor 51 are preferably driven from the motor 19 through a jaw clutch 55 on one side operable by a lever 55' on the opposite or operator's side of the unit, and this clutch 55 is interposed between a chain drive 56 and a transverse countershaft 57 which is connected to the main drive shaft 58 on the opposite side of the assemblage by bevel gears 59, see Fig. 2. The front end of the main drive shaft 58 is connected to a speed reducer 60 by a chain drive 61 and this reducer is in turn connected with the motor 19 through a flexible coupling 62 and a transmission mechanism 63. The drive shaft 58 is journaled in bearings carried by the main frame 48, and the rear end of the shaft 58 may also be drivingly connected as by a chain drive 64 to some or all of the rollers of the off-take conveyor 52.

While the log supply and discharge conveyors 51, 52 are relatively standard and constitute no part of the invention, the log feed and delivery rolls 14, 16 and their mountings are quite important in order to insure proper centering and advancement of the successive logs 20 through or past the bark removing rotor 8. The rolls 14, 16 are all fluted and provided with opposed frusto-conical portions as illustrated in Figs. 2 and 3 so that the cooperating upper and lower rolls of each set will properly engage and centralize logs 20 of various diameters while passing therebetween. Each of the rolls 14, 16 is mounted in bearings carried by arms 65, 67 formed integral with a complementary pair of the gear segments 15, 17, and the upper segments 15, 17 are swingably mounted upon transverse torque and roll driving shafts 68 while the lower rolls are similarly mounted upon transverse torque and roll driving shafts 69, all of which are journaled in side frames 70 rigidly interconnected by upper and lower tie-rods 74, as shown in Figs. 2 and 3. These shafts 68, 69 are drivingly connected to the rolls 14, 16 by chain drives 71 and are driven from the main drive shaft 58 through upright countershafts 72 and bevel gear sets 73 as shown in Figs. 1, 2 and 3, and transmit torque to the gear segments 15, 17 tending to constantly raise and lower the upper and lower rolls 14, and to simultaneously lower and raise the upper and lower rolls 16 respectively equal distances relative to the central axis of the rotor 8.

The mid-portions of the rolls 14, 16 may be provided with one or more rows of spikes 75

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adapted to dig into the logs 20, and the upper rolls of each set are of heavier construction than the lower rolls so that the added weight of the former will act through the gear segments 15, 17 to simultaneously lift the corresponding lower rolls. The upper and lower rolls of each set are constantly urged toward each other by powerful coil springs 76, and in order to limit the inward movement of the rolls 14, 16 of each set and to prevent contacting of these rolls, the upper segment arms 65, 67 are provided with stops which coact with volute springs 77 mounted in the side frames 70 on one side of the unit as shown in Fig. 1, and against stop brackets not shown but carried by the frames 70 on the opposite side. While the rear or discharge rolls 16 may be constantly rotated whenever the drive shaft 58 is being rotated, the rotation of the feed rolls 14 is preferably controllable by means of a friction clutch 78 operable by a lever 79; and a special coupling 80 adapted to operate a cam mechanism 81 connected to the lower front arm 65 by a chain 82, is provided for the purpose of positively spreading the intake rolls 14 when handling logs 20 of large diameter, see Figs. 1 and 2.

The discharge end of the deck of the log supply conveyor 51 is also provided with a pair of interconnected log guiding arms 84 which are operable by a lever 85 to direct the successive advancing logs 20 centrally between the feed rolls 14. The stationary enclosure 34 not only protects the operator from the rapidly revolving parts of the rotor 8, but also provides a collecting chamber for the removed bark. This bark drops by gravity through the lower discharge opening 36 from whence it may be removed in any suitable manner as with the aid of a transverse conveyor or the like. All of the bearings for the rollers 41, 42, 47 which coact with the rotor drum 13, and for the feed and discharge rolls 14, 16, are preferably of the anti-friction type, in order to reduce the power consumption to a minimum, and while the motors 18, 19 shown in the drawing are of the electric type, any other suitable sources of power such as internal combustion engines may be substituted where no electric current is available.

During normal operation of the improved log barker, the successive bark covered logs 20 are deposited upon the supply conveyor 51 and are advanced longitudinally between the guide arms 84 and toward the space between the feed rolls 14 which are normally rotating but are swung inwardly to their fullest extent by the spring 76 coacting with the supporting arms 65 of these rolls. If the advancing log 20 is of large diameter, the clutch 80 should be manipulated to initially spread the feed rolls 14 so as to permit the end of the log to enter between them, but if the log is of smaller diameter it will automatically spread the initial rolls 14 and will enter without difficulty. The guide arms 84 may also be manipulated by means of the lever 85 in order to insure such entry in the vertical central plane of the rolls 14, and as soon as the end of the log is encountered by the flutes and spikes 75 of the positively rotated feed rolls 14, it will be advanced by these rolls centrally of the rotor 8.

This forward or longitudinal advancement of the logs 20 is effected by the motor 19 and the rotor 8 may be revolved at any desired speed by the other motor 18. Whenever the rotor 8 is being revolved at slow speed, or when it is at rest, the levers 10 will be swung outwardly by

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the springs 31 so as to retract the chain segments 9 as far as possible away from the rotor axis, thereby permitting the end of the approaching log 20 to freely enter the space between these flexible elements. As soon as the log 20 thus enters the rotor 8, the speed of revolution thereof should be increased so as to cause the chain segments 9 to be forced inwardly under the influence of centrifugal force acting upon the weights 24, and to wrap these segments 9 snugly about the log 20 as in Fig. 4. After the flexible chains have been thus positioned they act along helical paths to tear the bark loose from the body of the advancing log with a screw-like action, and the removed bark thereafter drops by gravity through the discharge opening 36, while the stripped log continues to advance through the drum 13 and is eventually projected between the discharge rolls 16 onto the delivery conveyor 52. The discharge rolls 16 obviously spread apart automatically the same as the feed rolls 14, and since they too are positively rotated they will aid the feed rolls in positively feeding the logs through the unit.

It will thus be apparent that the positively rotated feed and discharge rolls 14, 16 act upon the successive logs 20 to centralize and positively advance the same through the rotor 8 and its drum 13 at the desired speed, while the revolving rotor chains 9 quickly and effectively tear or rasp the bark from the longitudinally advancing logs. The rotor 8 is effectively supported and prevented from moving longitudinally of its axis by a compact mounting arrangement consisting of the rollers 47 coacting with the sturdy flange 46 of the drum 13; and by locating the rotor drive 38 at the end of the drum 13 remote from the bark removing elements, this drive will not be affected by flying and falling bark. The drum mounting besides being compact also provides a rotor bearing of large diameter, and by enclosing the weights 24 and the springs 31 in smooth casings the bark fragments will slide off of these elements and will not accumulate thereon.

The rotor 8 and drum 13 are moreover normally effectively concealed within the housings 34, 49 but are freely accessible by merely lifting the covers of these housings. The rotor may also be quickly released from its mounting by removing the bolts 45 and swinging the arms 43 and rollers 42 outwardly after the housing covers are open. By utilizing anti-friction bearings throughout the power consumption is reduced to a minimum.

From the foregoing detailed description, it will be apparent that our present invention provides an automatic mechanical log barker which besides being simple, compact and durable in construction, is highly effective in operation and will handle logs of various diameters in either wet or dry condition. The rapidly revolving helical flexible chain segments 9 function to release and remove the bark with a twisting action, and may be forced against the peripheries of the logs 20 with any desired degree of pressure dependant upon the speed of rotation of the rotor 8 and the position of adjustment of the revolving weights 24. The feed and discharge rolls 14, 16 automatically accommodate logs of varying diameters, and also accurately centralize the successive logs relative to the rotor 8 and drum 13. The drum 13 moreover provides an effective and sturdy support for the rotor elements, and all of the drives are readily controllable by few attendants to rapidly remove even the most tenacious bark. All parts of the mechanism are normally safely

enclosed and guarded, but are also conveniently accessible for inspection and adjustment, and any suitable types of conveyors may be utilized to feed the logs 20 to and from the debarking zone. The springs 31 may also be replaced by any other type of power devices for spreading the chain segments 9 apart, such as hydraulic, pneumatic, or electro-magnetic means of well known construction.

It should be understood that it is not desired to limit this invention to the exact details of construction and operation of the log barking unit herein specifically shown and described, for various modifications within the scope of the appended claims may occur to persons skilled in the art.

We claim:

1. In a log barker, a rotor having thereon a lever provided with a fulcrum and an end swingable about the fulcrum and both the fulcrum and said end being located remote from the axis of rotation of the rotor, a flexible element having its opposite ends connected respectively to said fulcrum and to said swinging lever end but disposed in different planes perpendicular to said axis whereby said element is disposed helically relative to the rotor axis, means tending to swing said element and said lever end away from the rotor axis when the rotor is at rest, means associated with the opposite end portion of said lever for causing said element to swing toward said axis when said rotor is revolving, and means for feeding a log axially through said rotor and for revolving the latter.

2. In a log barker, a rotor having thereon an annular series of levers spaced uniformly about the rotor axis and each being provided with a fulcrum and with an end swingable about the fulcrum and both the fulcrum and said end being located remote from said axis, a flexible element connecting the fulcrum with the swinging end of each lever and having its opposite ends secured to the adjacent lever in different planes perpendicular to said axis whereby said elements are disposed helically to the rotor axis, means tending to swing each of said elements and said lever ends away from the rotor axis when the rotor is at rest, means carried by the opposite end portion of each lever for causing said elements to swing toward said axis when said rotor is revolving, and means for advancing logs axially through said rotor.

3. In a log barker, a rotor having thereon an annular series of levers each provided with a fulcrum and with an end swingable about the fulcrum and both the fulcrum and said end being located remote from the rotor axis, a flexible element connecting the fulcrum of each lever with its swinging end and having its opposite ends secured to the adjacent lever in different planes perpendicular to said axis whereby said

elements are disposed helically relative to the rotor axis, resilient means coacting with said rotor and with each lever for constantly urging each element away from the rotor axis, means carried by the opposite end of each lever for causing its element to move toward said axis under the influence of centrifugal force and in opposition to the adjacent resilient means when the rotor is revolving, and means for simultaneously revolving said rotor and for feeding logs longitudinally therethrough.

4. In a log barker, a rotor having a lever the medial portion of which is fulcrumed on the rotor while its opposite ends are swingable about the fulcrum toward and away from the rotor axis, a flexible element having its opposite ends connected respectively to said fulcrum and to one of said swinging lever ends in different planes perpendicular to said axis whereby said element is disposed helically relative to the rotor axis, resilient means interposed between said rotor and said element supporting lever end for constantly urging said element away from said axis, a weight carried by the other of said lever ends for urging said element toward said axis when said rotor is revolving, and means for revolving said rotor and for feeding logs axially therethrough.

5. In a log barker, a rotor having a lever the medial portion of which is fulcrumed on the rotor while its opposite ends are swingable about the fulcrum toward and away from the rotor axis, a flexible element having its opposite ends connected respectively to said fulcrum and to one of said swinging lever ends in different planes perpendicular to said axis whereby said element is disposed helically relative to the rotor axis, a spring interposed between said rotor and said element supporting lever end for constantly urging said element away from the rotor axis, a weight adjustable along the other of said lever ends for urging said element toward said axis under the influence of centrifugal force, and means for revolving said rotor and for advancing logs centrally therethrough.

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CLARENCE W. MILLER.

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