Dec. 25, 1956 A. E. ANDERSSON 2,775,274

BARK-REMOVING MACHINE HAVING SELF-LIFTING BLUNT-EDGE TOOLS

Filed Oct. 30, 1953 2 Sheets-Sheet 1

Fig. 1.

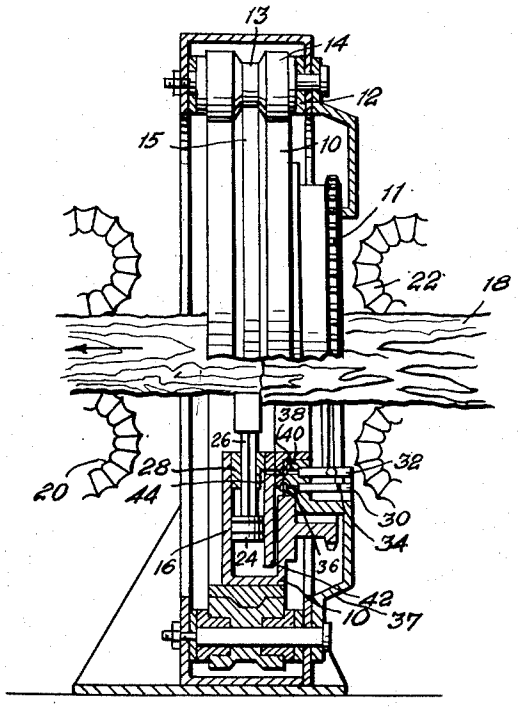


Fig. 2.

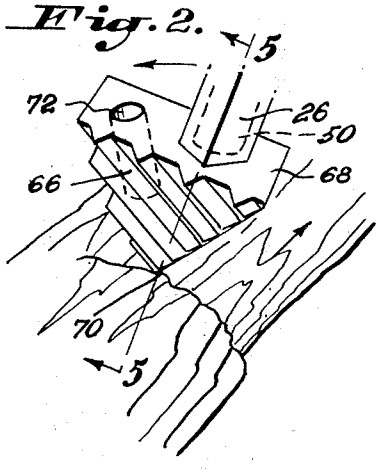
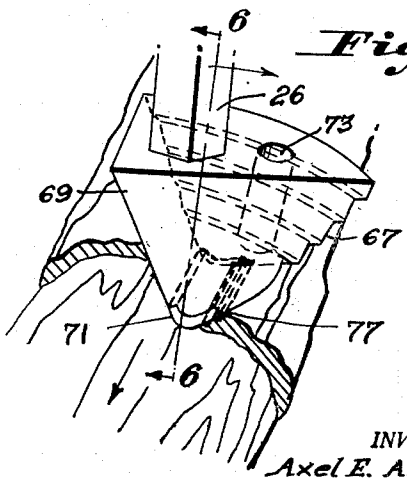


Fig. 3.



INVENTOR.
Axel E. Andersson

BY
Glascock Downing & Seebold
Attorneys

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Fig. 4.

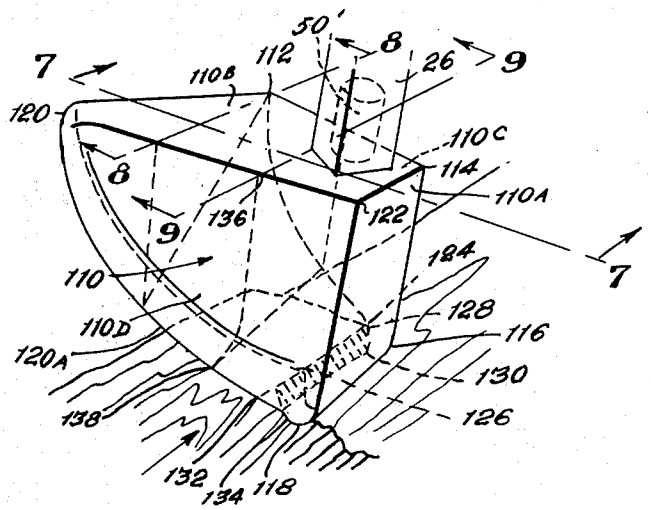


Fig. 5.

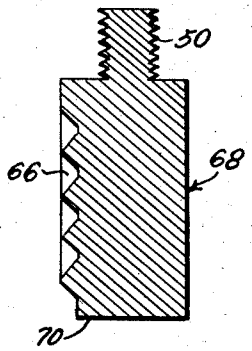


Fig. 6.

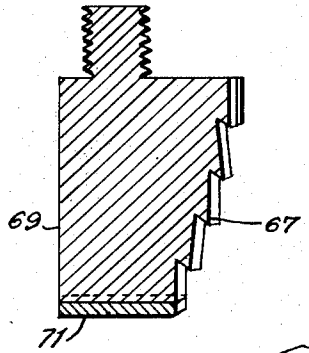


Fig. 7.

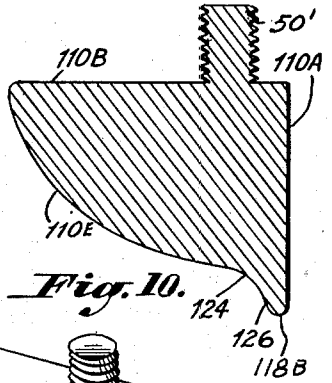


Fig. 8.

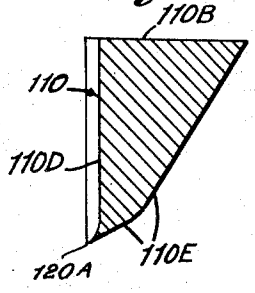


Fig. 9.

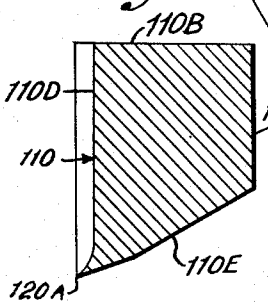
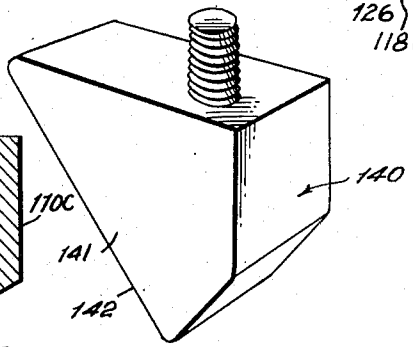


Fig. 10.



INVENTOR.
Axel E. Andersson

BY
Cescaé Downing & Seebold
Attorneys

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2,775,274

BARK-REMOVING MACHINE HAVING SELF-LIFTING BLUNT-EDGE TOOLS

Axel Erland Andersson, Gavle, Sweden

Application October 30, 1953, Serial No. 389,436

Claims priority, application Sweden March 8, 1951

19 Claims. (Cl. 144—208)

The present invention relates to the art of removing bark from logs, and this application is a continuation-in-part of my prior filed application, Serial Number 273,212, filed February 25, 1952.

Specifically, this invention relates to a mechanism for debarking logs that may have different size as regards diameter and different shapes when considering the irregularities of the surfaces of the logs.

Still more specifically, this invention relates to a log-debarking apparatus of the type embodied in my prior Patent No. 2,623,558, dated December 30, 1952, which is of the hollow-head type wherein logs are passed through a rotating hollow head while restraining the logs against rotation. The hollow head carries pneumatically pressed tools for obtaining a ready and thorough removal of the bark from the logs regardless of whether the logs have different diameters or whether the wood is a soft wood or a hard wood, and even in instances where the logs are crooked or knotted.

Specifically, this invention relates to an improvement in the aforedescribed type of apparatus with particular reference to the tools utilized therein and which tools are mounted for movement toward and away from the axis of the log being fed through the head. The tools are maintained against the log under what is termed elastic forces or pressure, for instance by compressed air means as in my prior patent, by weights, spring means or the like, with suitable regulating or controlling means being provided for controlling the pressure.

Consequently, the present invention has for a primary object to provide an improvement in the aforedescribed type of apparatus in which the tools efficaciously remove the bark from the underlying wood layer of the log while leaving the wood layer undamaged and relatively untouched.

More specifically, this invention has for an object to provide a tool which has a surface or surfaces thereon facing the oncoming logs, which in consequence of the rotation of the hollow head effects an automatic adjustment of the position of the tool relative to the axis of the log being fed when a succeeding log is of larger diameter than a preceding log, or in instances where the hollow head has been rotated with the tools in their inner position and no log in the machine, and which surface or surfaces comprises at least one sharp edge that engages the face of the butt end of such a succeeding log or of the first log fed to the head to automatically lift the debarking portion of the tool up and onto the surface of the log by a screwing action on such face as the head rotates.

Another and specific object of this invention is to provide each tool with a blunt bark-removing portion having an arcuate contour in a direction transversely of the axis of the feed of the logs and which bark-removing portion is of greater extent with relation to the axial direction of the log than the radius of a curvature of the arcuate contour, each tool further having an inclined face extending out and up from the blunt portion in the direction of rotation of the tool; and combined with each tool are means for moving the tool toward and away from the axis of the log being fed with the movement toward the log applying pressure to the tool to penetrate the bark and engage its underlying wood surface with the blunt bark-removing portion and engage a bark cross section with the portion of the inclined face immediately adjacent the blunt bark-removing portion and said means substantially continuously maintaining the surfaces of the blunt bark-removing portion and the adjacent portion of the inclined face in respective contact with such wood surface and such bar cross section of a log being fed with sufficient intensity regardless of irregularities in log contour and bark to remove the bark from the underlying wood principally by shearing force exerted in a tangential direction.

In connection with the aforegoing object, the blunt bark-removing portion of each tool is formed by a cylindrically convex surface, the axis of the cylinder extending substantially parallel to the axis of the log, and the length of the axis of the cylinder or the cylindrical axis of the body being greater than the radius of curvature of the cylindrical convex surface.

Further and more specific objects and advantages of the invention will be readily apparent from the following description taken in connection with the accompanying drawings disclosing non-limitative examples of the invention and in which:

Figure 1 is a schematic view partly in longitudinal cross section and partly in elevation of a debarking machine of the type involved with the tools being illustrated schematically.

Figure 2 is a perspective view of one form of a bark-removing tool.

Figure 3 is a perspective view of a modified form of a bark-removing tool.

Figure 4 is a perspective view of another modified view of the debarking tool.

Figure 5 is a cross-sectional view taken on line 5—5 of Figure 2.

Figure 6 is a cross-sectional view taken along lines of 6—6 of Figure 3.

Figures 7, 8 and 9 are cross-sectional views taken respectively along lines 7—7, 8—8 and 9—9 of Figure 4, and

Figure 10 is a perspective view of a simplified version of the type of tool illustrated in Figure 2.

As illustrated in Figure 1, the debarking machine consists of a rotatable frame comprising a drum **10**, which is supported by four rollers **14**, only two of which are shown, that are journalled in a frame **12**. Each of these rollers is provided with a central groove **13** that engages an annular flange **15** on the periphery of the drum **10**. This engagement of flange and groove restrains the drum against axial displacement. The drum carries a plurality of cylinders **16**, four or six depending on the number desired. These cylinders are directed radially inwards toward the axis of the drum **10**. It is, of course, possible that the cylinders can be directed inwardly so that they will lie at an angle relative to the surface of the log.

The log to be debarked is denoted at **18**, is shown as moving from right to left, and is fed by two pairs of feeding rollers **22** and **20**. The rollers of each pair are resiliently adjustable relative to one another and are forced against a log by suitable pressure-producing means, not shown, which can consist of a pneumatic cylinder-piston arrangement or springs. Inasmuch as the drum **10** is of small dimensions in the axial direction of the log, the axial distance between the two pairs of feeding rollers may be maintained at a minimum. This is of considerable importance and of great advantage when the logs to be debarked are bent, since the curved axis of such a bent log

cannot deviate very much from the rotational axis within the short distance between the feeding rollers. Additionally, the close spacing of the feeding rollers will permit ready removal of bark from logs of very small length such as for example, 1, 5 or less meters. As an example, the spacing of the rollers can be in the neighborhood of 2 ft.

The aforementioned inwardly directed cylinders **16** carry pistons **24** therein, each being provided with a piston rod **26** that carries the tool. The piston rods are square or rectangular in cross section and project through a similarly shaped opening in the end of the cylinders so that the rods will not rotate about their axes. The pistons are moved in the cylinders by compressed air which is supplied from a suitable source, not shown, through a conduit system including conduits **30** and **32**. A pressure-reducing valve **34** is mounted in conduit **30**. The conduits **30** and **32** communicate with annular channels **36** and **38** provided in part in an annular frame member **40** and in part in the drum. The member **40** bears under pressure against the annular surface of the drum. These annular or ring-shaped channels **36** and **38** respectively communicate with channels or passages **42** or **44**, all of which are formed in the drum and which carry the compressed air to the cylinder spaces on the opposite sides of the pistons **24**. Of course, it is to be understood that there is a channel system **42**, **44** associated with each of the cylinders **16**. This arrangement is similar to that embodied in my above mentioned prior patent. A shield **37** is bolted to the frame **12** and supports the conduits **30** and **32**. A ring gear **11** is fixed to the drum **10** and rotated by a pinion, not shown, which is driven by a suitable motor or engine, not shown. The pressure-reducing valve **34** regulates the air pressure supplied to cylinder **16** in a direction to urge the tools toward the logs and thereby the pressure applied against the log being fed. This regulation of pressure on the tools can be effected very quickly and conveniently even while the drum is rotating, and permits attainment of the most suitable pressure required for the debarking of different kinds of logs.

The nature and operation of the tool carried on the end of the piston rods **26** are of vital importance. In Figure 2, there is illustrated a bark-removing tool that consists of a metal body **68**, having a flat upper surface from which projects a screw **50**. The end of the piston rod **26** is provided with an internally threaded bore into which the screw **50** is engaged. The tool body has two faces, that is front and back, relative to the direction of the log feed, that are generally parallel and two opposite sides which converge at a substantial inclination to form a blunt edge member **70**. This blunt portion of the tool body constitutes the bark-removing portion and removes the bark from the log by a shearing action. The inclined face that extends upwardly from the blunt nose of the tool body and faces the direction of rotation is of substantial length so that a portion of it overlies the unbarked portion of the log and the part of this inclined face adjacent the blunt nose exerts a shearing action in a tangential direction by bearing against the cross section of the bark. The face of the tool body that is directed toward the oncoming log is provided with saw-tooth ridges or projections **66**. These projections are at an angle relative to the axis of the piston rod and they operate to lift the tool when a log being debarked is followed by a log of larger diameter. The tool will ride up onto the second log since these ridges will engage the face of the butt end of such second log and initiate a screw action when the tool is rotated around the log. The same lifting of the tool, that is the moving of the pistons inwardly in the cylinders, will be effected when the first log fed to the hollow head has a diameter larger than the spacing of the tools when they are all in their innermost position. It is also believed clear that these ridges are inclined in relation to the longitudinal axis of the log being debarked. A recess **72** is provided in the tool body in order to lighten the weight of the body.

In Figure 3, there is shown a modified form of the tool which consists of a metal body **69** mounted as before to the outer end of piston rod **26**. The face of this metal body **69** that is directed toward or faces the oncoming log or direction of log feed, is arcuate or arch shaped and is provided with saw-tooth-shaped ridges **67**. The bottom surface of the metal tool body **69** is constituted by the converging side surfaces of the body forming a blunt bark-removing portion **71**. This bark-removing portion is preferably constituted by a hard-metal covering or insert in order to prevent a too-rapid wear of the tool. This tool functions in a manner similar to that shown in Figure 2, in that the ridges **67** effect the elevation of the tool, that is, the retraction of the piston rod in its cylinder when a succeeding log has a larger diameter than the one just debarked. The pressure of the air in the cylinder, that is, the air that flows through the conduits **42**, is adjusted so that the blunt bark-removing portion of the tool is maintained in contact with the log with such intensity that the blunt end will penetrate the bark but not the underlying wood strata or layer.

Due to the shape of the tool, the friction between the tool and the bark when sufficient contact pressure is exerted and substantially continuously maintained, is greater than the force of adhesion that exists between the bark and the wood. In order to enhance this friction condition, it is desirable and preferable to indent the inclined surface of the tool body as shown diagrammatically at **77**. These indentations, however, should not extend so close to the rounded and blunt working-edge portion **71** that they will damage the surface of the wood. The rounded blunt bark-removing portion is supposed to extend substantially parallel with the longitudinal axis of the log and during the debarking operation after penetrating the bark substantially continuously slides on the wood surface without damaging the same. This, of course, assumes that the pressure force acting on the tool is not sufficiently high to cause the tool to penetrate the wood. The alteration of the inclined surface of the tool as at **77** can be accomplished by any suitable roughening operation. It is not limited to indentation since furrows can be formed in the inclined face and so spaced that ridges will be formed between adjacent furrows. This alteration of the surface increases the shear effect of the tool by increasing the frictional contact of the portion of the tool adjacent the blunt edge with the bark cross section. In practice and in the operation of machines constructed to debark logs in accordance with this invention, it is a relatively simple matter to select a tool-applying pressure which permits the tool to effectively remove the bark while not damaging the wood surface. This factor is true regardless of whether the wood is smooth, irregular, frozen or not, and whether the wood is pine, fir, spruce or different hard woods such as birch, ash, beech, oak and black gum.

The manner of operating the tools has the first advantage that the power consumption is extremely small and secondly, that wood losses are practically nil. In order to lighten this tool, suitable recesses **73** are provided therein. The bluntness of the bark-removing portion should be selected in accordance with the different kinds of wood. With birch and certain other kinds of wood, particularly hard woods, a small edge radius can be used and thus the tool may be termed a relatively sharp-edged tool. With softer woods, for example, pine and spruce particularly with smooth woods, a larger edge radius should be used, thus the tool is more blunt because this large edge radius prevents the wood from being scratched or marred.

In Figures 4 and 7–9, the tool illustrated consists of a solid steel body **110** limited by five surfaces, three of which are for the most part perpendicular to one another. One of these surfaces is bounded by the lines intercon-

necting points **114, 116, 118** and **122**. This surface **110A** constitutes the trailing side of the tool as regards its direction of travel. Another surface is bounded by the lines interconnecting points **112, 114, 122** and **120** and constitutes the top surface **110B**. The side of the tool remote from the unbarked portion of the log is denoted at **110C** and is bounded by the lines interconnecting points **112, 114** and **116**. The front surface **110D** of the tool that faces the oncoming log is bounded by the lines interconnecting points **118, 120** and **122**. This face or surface **110D** is substantially parallel to the helical path established by the relative rotation of the tool and the log as the log is fed forward. The surface of the tool body formed by interconnecting points **112, 116, 118** and **120** constitutes a feeler surface **110E** and acts to lift the tool over projecting knots and out of concavities or depressions in the log. There is a screw **50'** that connects the tool body to the piston rod **26**.

The edge of the tool that extends from **116** to **118** has a blunt edge **118B**, Figure 7, and is exposed substantially parallel to the axis of the log being fed. The tool, of course, is resiliently pressed against the log by the pneumatic-pressure means heretofore described. The tool is resiliently pressed against the log with such force that the blunt edge or nose **118B** penetrates the bark but is stopped by the surface of the wood proper. When the tool is moved relatively to the surface of the log, preferably in a helical path, the elastic force is of sufficient intensity or magnitude to insure that this blunt edge or nose will ride and slide on the surface of the wood but will not damage the wood surface. That part of the feeler surface **110E** bounded by lines **112, 116, 118** and **120**, which is adjacent to the blunt edge and which preferably has a steeper slope than the rest of the bottom surface of the tool, is indicated by the sharp turns at **124** and **126** formed in the lines extending between points **112** and **116** and points **118** and **120**. This portion of the bottom surface of the tool produces a force in a substantially tangential direction on the bark and against the cross section of the bark substantially represented by the surface formed between points **128, 130, 132** and **134**. This force which is always perpendicular to this last mentioned surface produces a shear stress between the bark and the underlying wood in a zone extending, from the area of contact of the tool with the edge of the bark, a short distance in the direction of the rotational movement of the tool.

Between the bark and the wood surface is the cambium layer sometimes called the sap layer. This cambium layer carries the sap to the different parts of the wood of the tree. It, therefore, generally has a higher moisture content than either the wood or the bark. The mechanical properties of the cambium layer exhibit a sharp difference as compared with the mechanical properties of the bark and wood joined by the cambium layer. This is true not only in the sap season, but also when the logs are frozen through or solid at for instance 0° F. It has been established through experiment that the shear stress in the cambium layer provided by the tangential force acting against the cross section of the bark when the tool is moved around the log with the blunt edge in contact with the wood surface at a pressure that will not damage this surface, causes a rupture in the cambium layer and the bark is removed in the form of small chunks or long slivers. As the fracture goes through the cambium layer, cambium appears both on the wood surface and on the inner surface of the bark that has been removed. Depending upon the species of tree and other circumstances such as temperature, pressure, condition of the wood and the like, the amount of the cambium layer on the wood surface can vary from a negligible amount to a thick white coating. As an example of the efficiency of the present invention, it is pointed out that three tools, in which the nose radius of the blunt edge was 1/8" and the length of the blunt edge was 1¾", thus an arrangement in which the ratio of length to radius is at least 8–1, were resiliently

pressed against a log with a total applied force of 200 pounds with the tools moving around the log four times a second. The log was a 15" diameter spruce log so that there was established a linear speed of 16 ft. per second of the tool relative to the surface of the log which had a rather dry bark-moisture-content of 54 percent. The power required to drive the head in which the tools were mounted was 13 H. P., when the linear feed rate in the axial direction was 90 ft. per second. When the same tools were used on spruce logs at a temperature of 5° F. the total resilient forces acting radially on tools had to be increased to 310 pounds. Similar tests were carried out on black gum and yellow pine logs, which species are quite suitable for the method of debarking described, as there is a sufficiently great difference in hardness between the wood and the bark.

Utilizing the immediate aforedescribed tool arrangement as applied to unfrozen spruce above mentioned, the debarking of yellow pine even at a rate of 150 ft. per minute provides satisfactory debarking. The debarking of yellow pine at a feed rate of 90 ft. per minute when considering a log diameter of 10" means a debarking capacity of 25 to 30 cords per hour, that is, 90 cu. ft. of solid wood per cord.

The tool body illustrated in Figures 4, 7 and 9 is provided with a lifting edge **120A** which extends between the points **118** and **120**. This edge is relatively sharp and projects outwardly from the surface of the face **110D** as shown in Figures 8 and 9 and as illustrated by the dotted lines between points **138** and **136** in Figure 4. With the hollow head operating and no logs present, the tool is in its innermost position, so that its lifting edge **120A** will engage and will tend to penetrate the face of the butt end of a fed log; and since the tool rotates relative to the log, a slight penetration of its lifting edge will produce a radially outwardly directed force sufficient to counteract the inwardly directed resilient force which is constantly applied to the tool. Consequently, the tool moves outwardly to the cylindrical surface of the log, upon which it immediately commences its debarking action.

It is clear therefore, that the debarking machine is automatic to the extent that no other impulses are required for retracting the tool when its lifting edge contacts the butt end of an oncoming log. This lifting action imparted to the tool will also occur if a log of larger diameter is fed end-to-end with and after a log of smaller diameter.

The tool body **140** illustrated in Figure 10 is a simplified version of that shown in Figure 2, in that the ridges or projections **66** have been eliminated. It still retains the feature of the blunt nose having a greater length in axial direction than the radius curvature of the nose. Additionally, when the face **141** of this tool body is at an angle with the longitudinal axis of the log being fed, the long inclined edge **142** functions to retract the pistons in the cylinder in a manner similar to the arrangement in Figure 4.

As is clearly indicated in the drawings, in each form of the invention the face of the tool that extends upwardly from the nose portion facing the direction of rotation is at a substantial angle to a tangent to the wood surface of a log being debarked through the zone where the face of the blunt portion or nose thereof engages the wood.

It is also to be pointed out that the inclination of the feeler face of the tool bodies in the several forms of the invention, that is the face that merges into the blunt nose and overlies the unbarked portion of the log with reference to the direction of rotation of the tool, will retract or guide the tool over humps and into cavities during debarking, and will thus constitute a guide when the tool is operating upon irregular portions of bark.

It will be apparent that various changes may be made in the construction of the debarking tools hereinbefore described as examples of the invention. If desired, certain features may be employed to the exclusion of others without departing from the function or scope of the invention, which is to be understood as embracing all forms of tools falling within the scope of the appended claims.

What I claim is:

1. In a barking machine and in combination with means for feeding a log axially of its length while restraining the same against rotation around its axis, a rotatable frame concentrically disposed around the path of movement of a log to be fed; a plurality of tool-supporting means mounted on and movable with the frame around such a log passing therethrough, said tool-supporting means having portions extending inwardly of the frame toward, and having their inner ends terminating in spaced relation to, the axis of a log being fed; a bark-removing body carried at the inner end of each tool-supporting means, said body including a blunt bark-penetrating and bark-removing portion formed by a cylindrically convex surface, the axis of the cylinder extending substantially parallel to the axis of a log being fed, and the length of said cylindrical axis being substantially greater than the radius of curvature of said convex surface, said body further having an inclined face extending outwardly at a substantial angle from a plane tangential to a log's periphery at the zone of contact of said body with such a log, and said face extending for a substantial distance in the direction of rotation of the body to constitute an outer or feeler surface portion that overlies an unbarked portion of a log being fed and an inner surface portion immediately adjacent said convex surface that exerts a shearing force in a substantially tangential direction on a cross section of the bark; means mounting the tool-supporting means for movement toward and away from the axis of a log to be fed; means for moving the tool-supporting means toward a log being fed while applying pressure to the tool-supporting means so that said blunt portion will penetrate a layer of bark and contact an underlying wood surface and so that said inner surface portion will contact such bark cross section, said pressure-applying means substantially continuously maintaining the blunt portion and said inner surface portion in respective contact with such wood surface and such bark cross section of a log being fed with sufficient intensity, regardless of irregularities in log contour and bark, to remove bark principally by shearing force exerted in a tangential direction.

2. In a barking machine and in combination with means for feeding a log axially of its length while restraining the same against rotation around its axis, a rotatable frame concentrically disposed around the path of movement of a log to be fed; a plurality of tool-supporting means mounted on and movable with the frame around such a log passing through the frame, said tool-supporting means having portions extending inwardly of the frame toward, and having their inner ends terminating in spaced relation to, the axis of a log being fed; a bark-removing body carried at the inner end of each tool-supporting means, said body including a blunt bark-penetrating and bark-removing portion formed by a cylindrically convex surface, the axis of the cylinder extending substantially parallel to the axis of a log being fed, and the length of said cylindrical axis being substantially greater than the radius of curvature of said convex surface, said body further having an inclined face extending outwardly at a substantial angle from a plane tangential to a log's periphery at the zone of contact of said body with such a log, and said face extending for a substantial distance in the direction of rotation of the body to constitute an outer surface portion that overlies an unbarked portion of a log being fed, and an inner surface portion immediately adjacent the convex surface, said inner surface portion and the adjacent convex surface exerting a shearing force on a cross section of such bark in a direction substantially coinciding with said tangential plane; means mounting the tool-supporting means for movement toward and away from the axis of a log being fed; means for moving each tool-supporting means and the bark-removing body toward a log being fed and for applying pressure to the bark-removing body so that said blunt portion will penetrate a layer of bark, and so that said blunt portion and said inner surface portion of the inclined face will make respective contact with an underlying wood surface and with such cross section of penetrated bark, said pressure-applying means substantially continuously maintaining such respective contact with sufficient intensity, regardless of irregularity in log contour and of bark to remove such bark principally by said shearing force; and said second surface portion of said inclined face having furrows therein for increasing the friction between said second surface portion and such cross section of bark.

3. In a barking machine and in combination with means for feeding a log axially of its length while restraining the same against rotation around its axis, a rotatable frame concentrically disposed around the path of movement of a log to be fed; a plurality of tool-carrying members mounted on and movable with the frame around a log passing therethrough, said members extending inwardly of the frame toward, and having inner ends terminating in spaced relation to, the axis of a log being fed; a bark-removing body carried at the inner end of each member, said body including a blunt bark-removing portion formed by a cylindrically convex surface, the axis of the cylinder extending substantially parallel to the axis of a log being fed, and the length of said cylindrical axis being greater than the radius of curvature of said convex surface, said body further having an inclined face extending outwardly from said blunt portion in the direction of rotation of the body at a substantial angle from a plane tangential to a log's periphery at the zone of contact of said body with such a log, and the body further including at least one edge that confronts an oncoming log and is relatively sharp as compared with the blunt bark-removing portion, said edge being engageable with the face of the butt end of an oncoming log to automatically lift the body up onto the surface of such a log by a screwing action as the frame rotates; means mounting the tool-carrying members for movement toward and away from the axis of a log being fed; and means for moving the tool-carrying members and bark-removing bodies toward a log being fed and for applying pressure to each bark-removing body so that the blunt portion and an adjacent portion of the inclined face of each body will penetrate a layer of bark and make respective contact with an underlying wood surface and a cross section of bark, said pressure-applying means substantially continuously maintaining such contact with such wood surface and bark cross section by a pressure of sufficient intensity, regardless of irregularities in log contour and bark to effect bark removal principally by a shearing force exerted on such bark cross section in a tangential direction.

4. In a barking machine as defined in and by claim 3, in which said body has a face that confronts an oncoming log, said sharp edge being one of a plurality of spaced and relatively sharp edges formed integral with said log-confronting face.

5. In a barking machine as defined in and by claim 4, in which the log confronting face and said plurality of sharp edges are arcuate.

6. In a barking machine and in combination with means for feeding a log axially of its length while restraining the same against rotation around its axis, a rotatable frame concentrically disposed around the path

of movement of a log to be fed; a plurality of tool-supporting means mounted on and movable with the frame around a log passing through the frame, said tool-supporting means having portions extending inwardly of the frame toward, and having their inner ends terminating in spaced relation to, the axis of a log being fed; a bark-removing body carried at the inner end of each tool-supporting means, said body including a blunt bark-penetrating and bark-removing portion formed by a cylindrically convex surface, the axis of the cylinder extending substantially parallel to the axis of a log being fed, and the length of said cylindrical axis being substantially greater than the radius of curvature of said convex surface, said body further having an inclined face extending outwardly at a substantial angle from a plane tangential to a log's periphery at the zone of contact of said body with such a log, and said face extending for a substantial distance in the direction of rotation of the body to constitute an outer surface portion that overlies an unbarked portion of a log being fed, and an inner surface portion immediately adjacent the convex surface, said inner surface portion and the adjacent convex surface exerting a shearing force on a cross section of such bark in a direction substantially coinciding with said tangential plane; means mounting the tool-supporting means for movement toward and away from the axis of a log being fed; means for moving each tool-supporting means and the bark-removing body toward a log being fed and for applying pressure to the bark-removing body so that said blunt portion and the inner surface portion of said inclined face will penetrate a layer of bark, and so that the blunt portion and said inner surface portion of the inclined face will make respective contact with an underlying wood surface and with such cross section of penetrated bark, said pressure-applying means substantially continuously maintaining such respective contact with sufficient intensity, regardless of irregularity in log contour and of bark to remove such bark principally by said shearing force; and said feeler surface terminating in a sharp edge facing an oncoming log.

7. In a machine for debarking logs, a rotatable annular frame through which a log is fed axially while restrained against rotation; a plurality of tool-supporting means mounted on and movable with the frame around a log being fed therethrough, each tool-supporting means having an inner end terminating in spaced relation to the axis of a log being fed, a bark-penetrating and bark-removing body carried by each inner end, said body including a blunt bark-penetrating portion having a surface which curves around an axis extending in a direction substantially parallel to the axis of a log being fed, said portion further being at least eight times longer in its axial direction than in its radial direction, said body further having an inclined face extending outwardly at a substantial angle from a plane tangential to a log's periphery at the zone of contact of said body and such a log, and said face extending for a substantial distance in the direction of rotation of the body so as to constitute an outer feeler surface that overlies an unbarked portion of a log being fed and an inner surface adjacent said blunt bark-penetrating portion, said blunt portion and said inner surface being adapted to exert force in a tangential direction against a cross section of penetrated bark, means for moving each tool-supporting means and bark-penetrating and bark-removing body toward a log being fed and for applying pressure to each tool-supporting means and body to cause the blunt portion of the body to penetrate a layer of bark so that said blunt portion and at least said inner surface of said inclined face will respectively contact an underlying wood surface and such cross section of bark, said pressure-applying means substantially continuously maintaining such contact by a pressure of sufficient intensity regardless of irregularities in log contour and bark, to continuously effect bark-removal principally by shearing force exerted in a tangential direction, said inner surface of said inclined face including converging outer and inner portions, said outer portion extending toward said tangential plane at a smaller exterior angle than said feeler surface and said inner portion extending toward said tangential plane at a larger exterior angle than said feeler surface.

8. In a machine for debarking logs, a rotatable annular frame through which a log is fed axially while restrained against rotation; a plurality of tool-supporting means mounted on and movable with the frame around a log being fed therethrough, each tool-supporting means having an inner end terminating in spaced relation to the axis of a log being fed, a bark-penetrating and bark-removing body carried by each inner end, said body including a blunt bark-penetrating portion having a surface which curves around an axis extending in a direction substantially parallel to the axis of a log being fed, said portion further being at least eight times longer in its axial direction than in its radial direction, said body further having an inclined face extending outwardly at a substantial angle from a plane tangential to a log's periphery at the zone of contact of said body and such a log, and said face extending for a substantial distance in the direction of rotation of the body so as to constitute an outer feeler surface that overlies an unbarked portion of a log being fed and an inner surface adjacent said blunt bark-penetrating portion, said blunt portion and said inner surface being adapted to exert force in a tangential direction against a cross section of penetrated bark, means for moving each tool-supporting means and bark-penetrating and bark-removing body toward a log being fed and for applying pressure to each tool-supporting means and body to cause the blunt portion of the body to penetrate a layer of bark so that said blunt portion and at least said inner surface of said inclined face will respectively contact an underlying wood surface and such cross section of bark, said pressure-applying means substantially continuously maintaining such contact by a pressure of sufficient intensity regardless of irregularities in log contour and bark, to continuously effect bark-removal principally by shearing force exerted in a tangential direction, said body further including a face directed toward an oncoming log, and said face having thereon at least one sharp edge extending transversely of the axis of a log being fed and engageable with the face of the butt end of an oncoming log to automatically lift each body up onto the surface of such a log by a screwing action on such face as the head rotates.

9. In a machine for debarking logs as claimed in claim 8, in which said inner surface of said inclined face includes converging outer and inner portions, said outer portion extending toward said tangential plane at a smaller exterior angle than said feeler surface, and said inner portion extending toward said tangential plane at a larger exterior angle than said feeler surface.

10. In a barking machine of the rotary hollow-head type adapted to have logs fed therethrough in end-to-end relation while such logs are restrained against rotation; a plurality of bark-removing tools supported by said head for rotation therewith and for movement toward and away from the axis of a log to be debarked, each tool including a blunt tip and converging leading and trailing faces which provide a wedge-shaped tool, said tip having greater length axially of a log than its extent transversely of a log, said tool further having a face extending transversely of the axis of the head and confronting an oncoming log, said last-mentioned face having at least one sharp edge thereon engageable with the face of the butt end of an oncoming log to automatically lift the tip of the tool up onto the surface of such a log by a screwing action as the head rotates; means for moving the tools toward a log being fed and for applying pressure thereto so that the tip and the portion of said leading face adjacent there-

to will penetrate a layer of bark, and make respective contact with an underlying wood surface and a cross section of bark, and said means maintaining sufficient pressure on the tools to maintain said contact substantially continuously regardless of irregularities of log contour and bark to remove bark principally by shearing force exerted in a tangential direction by said leading face on such cross section of bark.

11. In a barking machine of the rotary hollow-head type adapted to have logs fed therethrough in end-to-end relation while such logs are restrained against rotation; a plurality of bark-removing tools supported by said head for rotation therewith and for movement toward and away from the axis of a log to be debarked, each tool including a blunt tip portion of greater length axially of a log than its extent transversely of a log, each tool further having an inclined face extending outwardly from the tip at a substantial angle from a plane tangential to a log's periphery at the zone of contact of said tip with such a log, and for a substantial distance in the direction of rotation of the head; means for moving the tools toward a log being fed and for applying pressure thereto so that the tip and the portion of said inclined face adjacent thereto will penetrate a layer of bark, and make respective contact with an underlying wood surface and a cross section of bark, and said means maintaining sufficient pressure on the tools to maintain said contact substantially continuously regardless of irregularities of log contour and bark to remove bark principally by shearing force exerted in a tangential direction by the portion of the inclined face adjacent the tip on such cross section of bark.

12. In a machine for debarking logs, comprising in combination a rotatable annular frame through which a log is axially fed, a plurality of debarking tools carried by said frame and means mounting the tools for movement toward and away from the axis of rotation of the frame, each tool including a bark-penetrating and debarking portion constituted by a blunt edge adapted to make contact with a wood surface underlying such bark without damaging this surface, means for maintaining the tools and thereby the debarking portion in substantially continuous contact with such wood surface for removing bark by shearing force exerted substantially tangentially to a peripheral surface of a log being debarked, and the debarking portion of each tool having at least one relatively sharp edge integral therewith and facing the direction of log feed for engaging the face of the butt end of an oncoming log to automatically lift the debarking portion of the tool up onto the peripheral surface of an oncoming log by a screwing action on such face as the frame rotates.

13. In a machine for debarking logs as defined in and by claim 12, in which the tool includes a front portion with respect to the direction of rotation of the tool, and said front portion having furrows therein adjacent the blunt edge for increasing the friction between said front portion and such bark cross section of a log being debarked.

14. In a barking machine and in combination with means for feeding a log axially of its length while restraining the same against rotation around its axis, a rotatable frame concentrically disposed around the path of movement of such a log and through which such a log passes, a plurality of tool-carrying members mounted on and movable with the frame around a log passing therethrough, said members extending inwardly of the frame toward, and having inner ends terminating in spaced relation to, the axis of a log being fed, a bark-removing body carried at the inner end of each member, said body including a blunt bark-removing portion having an arcuate contour in a direction transversely of the axis of such a log, said portion having greater length in the axial direction of such a log than the extent of said arcuate contour and further having an inclined face extending from said blunt bark-removing portion toward the direction of rotation of the body, and the body further including at least one edge facing the direction of log feed that is relatively sharp as compared with the blunt bark-removing portion, means mounting the members for movement toward and away from the axis of a log being fed, and means for moving the members toward a log being fed while applying pressure thereto to maintain the surfaces of said bark-removing portion and at least a part of said inclined face in contact with a log being fed with sufficient intensity regardless of irreguarities in log contour and bark to disrupt the frictional adherence of bark to underlying wood strata to frictionally remove such bark from such underlying wood.

15. In a barking machine as defined in and by claim 14, in which such bark is removed in a helical path and in which said last-mentioned edge lies in a vertical plane at the same angle to the axis of such a log as the helical path.

16. In a barking machine as defined in and by claim 14, in which each said body includes a face on which said relatively sharp edge is located, said face having a plurality of said relatively sharp edges facing the direction of log feed.

17. In a barking machine as defined in and by claim 16, in which the face of each body embodying said plurality of sharp edges is arcuate.

18. In a barking machine and in combination with means for feeding a log axially of its length while restraining the same against rotation around its axis, a rotatable frame concentrically disposed around the path of movement of a log to be fed and through which such a log passes; a plurality of tool-supporting means mounted on and movable with the frame around such a log as the latter passes therethrough, said tool-supporting means having portions extending inwardly of the frame toward, and having their inner ends terminating in spaced relation to, the axis of such a log being fed; a bark-removing body carried at the inner end of each tool-supporting means and rigid therewith at least as regards the direction of rotation of the frame, said body including a blunt bark-penetrating tip portion having an arcuate contour in a direction transversely of the axis of such log, said bark-penetrating tip portion having substantially greater length in the axial direction of such log than the extent of the arcuate contour and said body further having an inclined face extending outwardly from said blunt bark-penetrating portion at a substantial angle from a plane tangential to the periphery of such a log at the zone of contact of said tip portion with such a log, and toward the direction of rotation of the body and constituting a feeler portion; means mounting the tool-supporting means for movement toward and away from the axis of a log being fed; means for moving the tool-supporting means toward a log being fed while applying pressure thereto to penetrate its bark with the blunt bark-penetrating tip portion and respectively contact the underlying wood surface of such a log with said tip portion and a bark cross section with the portion of said inclined face immediately adjacent said tip portion; and said last-mentioned means substantially continuously maintaining said respective contact with such wood surface and bark cross section of a log being fed by a pressure of sufficient intensity regardless of irregularities in log contour and bark to remove bark principally by shearing force exerted in a tangential direction on such bark cross section by the portion of the inclined face adjacent the tip.

19. In a machine for debarking logs, comprising in combination, a rotatable annular frame through which a log is axially fed while restrained against rotation around its axis; a plurality of debarking tools carried by such frame; means mounting the tools for movement towards and away from the axis of rotation of the frame; each tool including a blunt bark-penetrating tip portion having an arcuate contour in a direction transversely of the axis

of a log to be debarked, said tip portion having substantially greater length in the axial direction of such a log than the extent of the arcuate contour transversely of such a log, said tools further having an inclined face extending outwardly from said tip portion at a substantial angle from a plane tangential to the periphery of such a log at the zone of contact of said tip portion with such a log, and toward the direction of rotation of the tool, said inclined face including an inner portion adjacent the tip adapted to engage a bark cross section and an outer portion constituting a feeler surface that overlies an unbarked portion of a log during debarking; means for moving the tools toward a log being fed while applying pressure thereto to penetrate its bark with the blunt bark-penetrating tip portion and respectively contact the underlying wood surface of such a log with said tip portion and a bark cross section with the inner portion of said inclined face; and said last-mentioned means substantially continuously maintaining said respective contact with

such wood surface and bark cross section of a log being fed by a pressure of sufficient intensity regardless of irregularities in log contour and bark to remove bark principally by shearing force exerted in a tangential direction on such bark cross section by the inner portion of the inclined face.

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