Dec. 10, 1957 R. E. ANNIS, JR., ET AL 2,815,776

SELF-CENTERING LOG FEED FOR BARK-REMOVING MACHINES

Filed Dec. 21, 1954 4 Sheets-Sheet 1

Fig. 1.

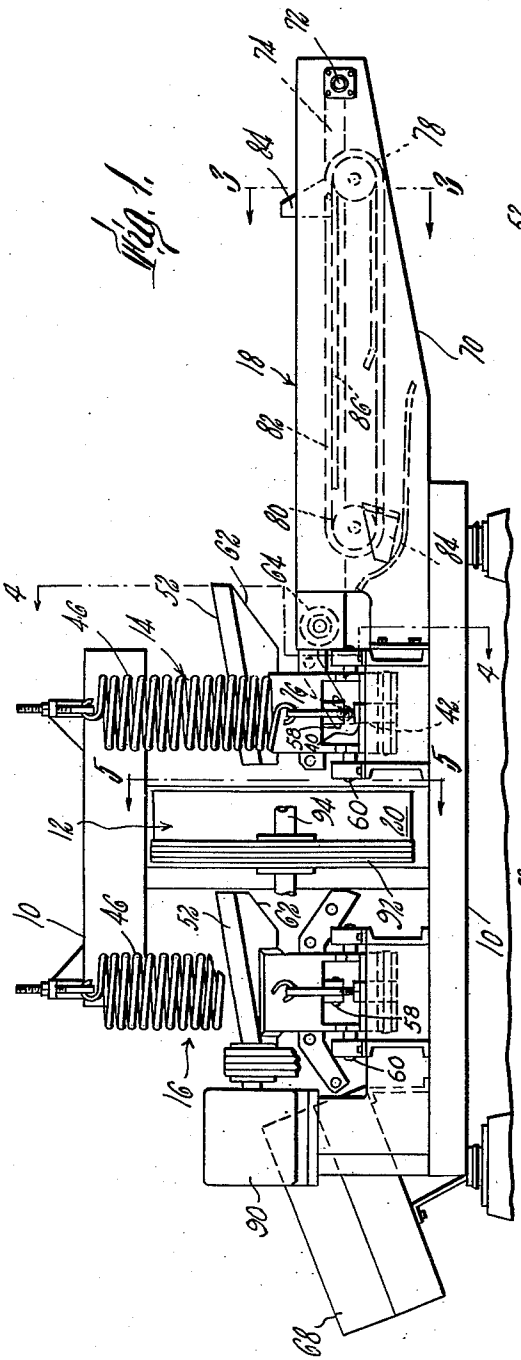
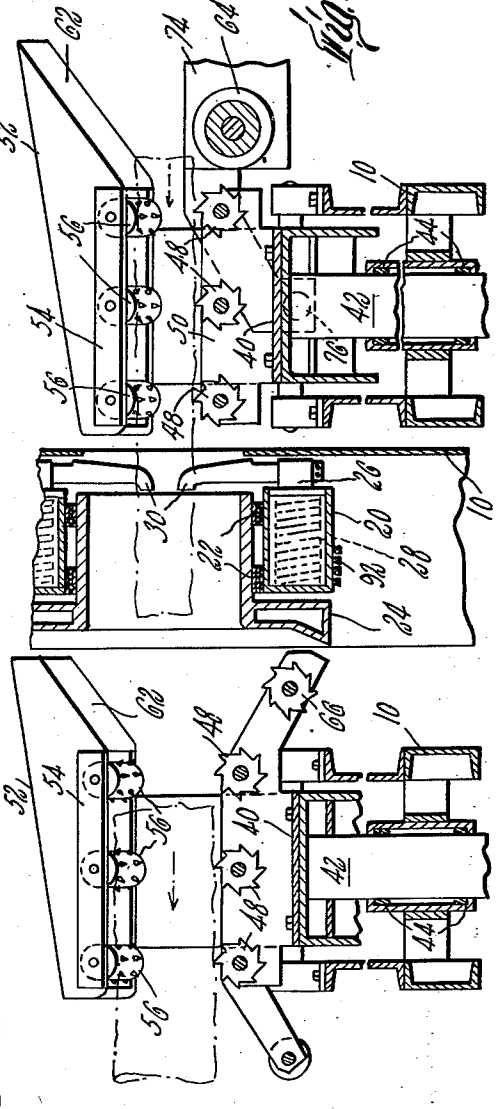


Fig. 2.



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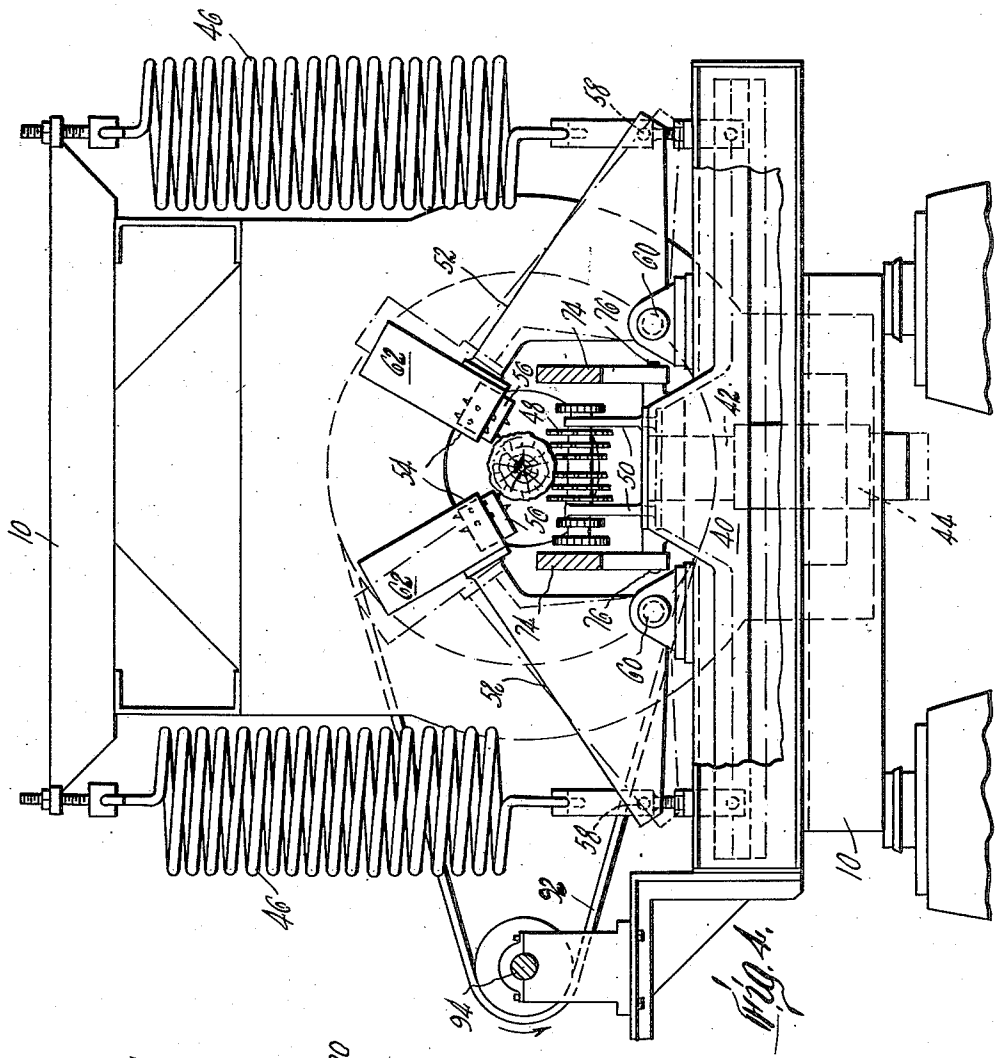


Fig. 4.

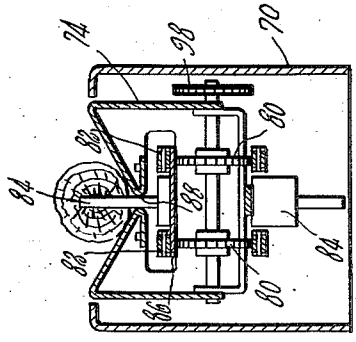


Fig. 3.

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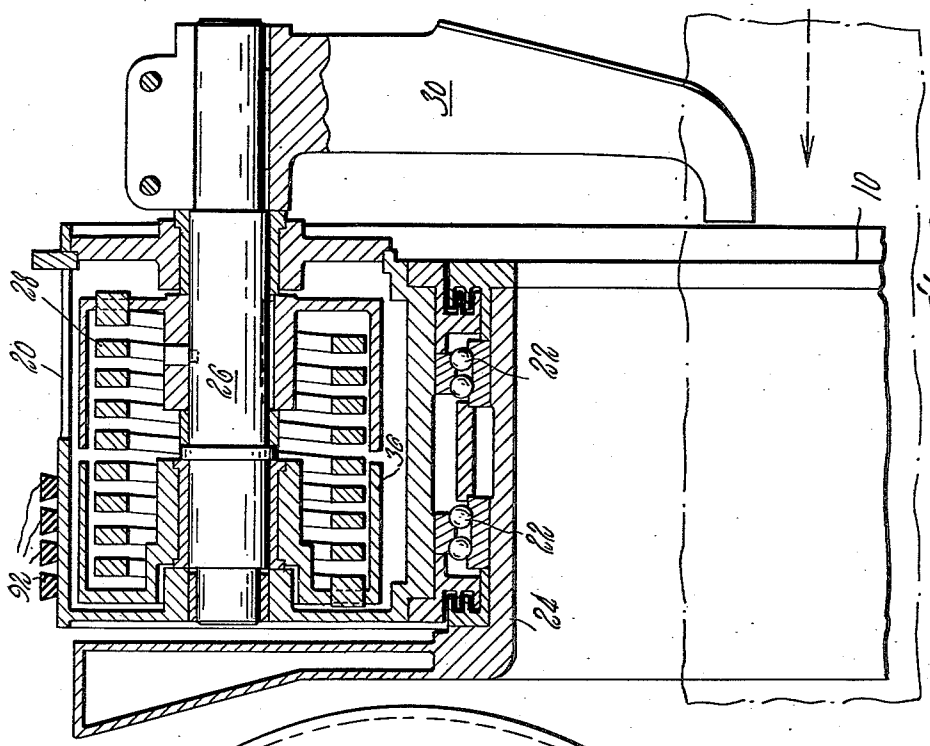


Fig. 6.

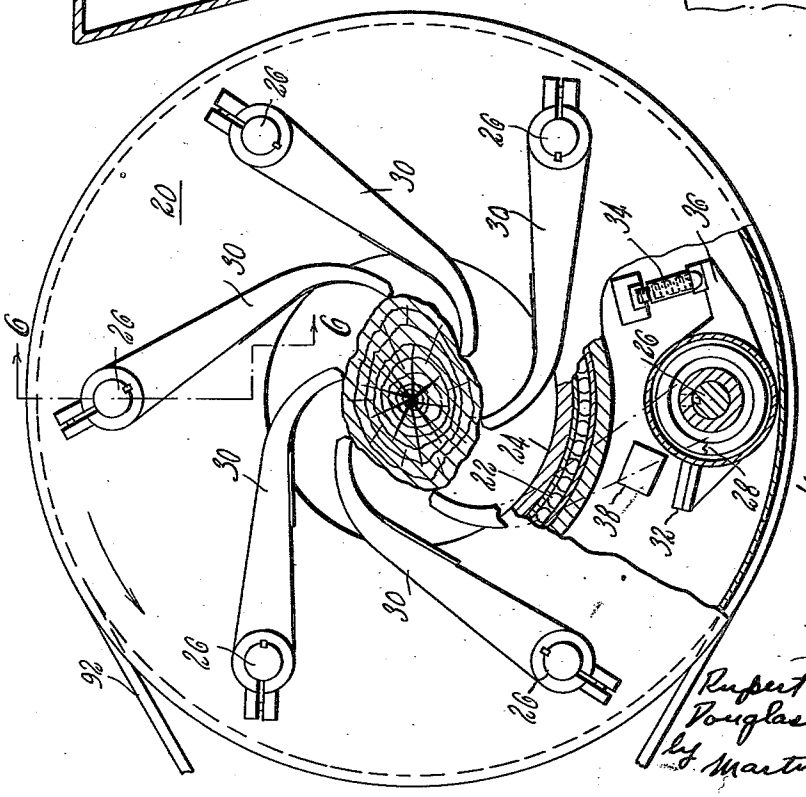


Fig. 5.

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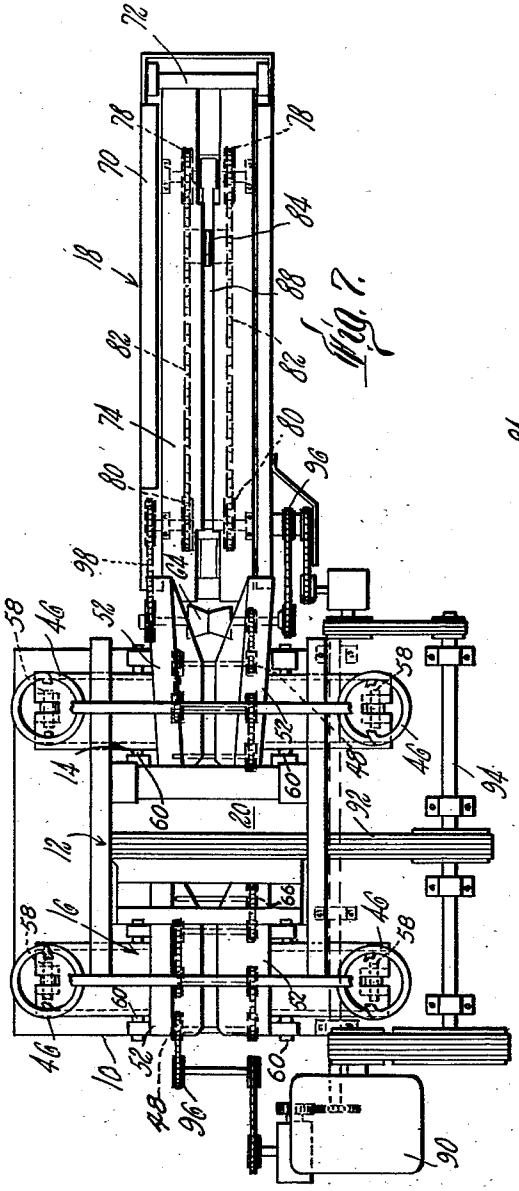


Fig. 7.

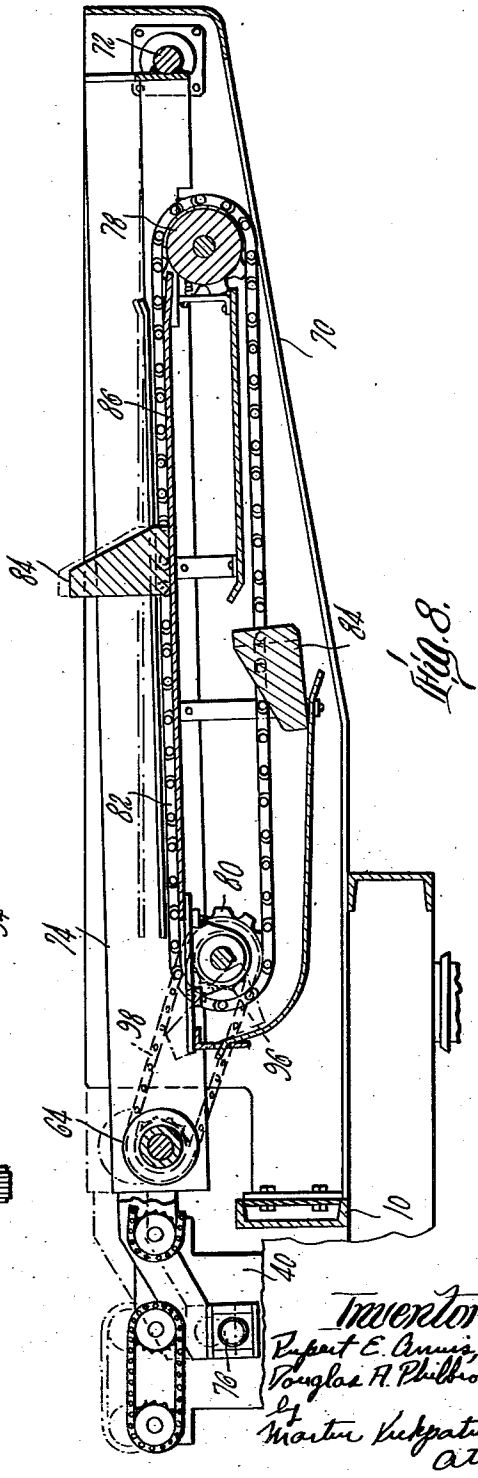


Fig. 8.

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SELF-CENTERING LOG FEED FOR BARK-REMOVING MACHINES

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Application December 21, 1954, Serial No. 476,642

4 Claims. (Cl. 144—208)

This invention relates to a machine for removing bark from logs, particularly from logs of relatively short length such, for example, as pulpwood logs.

Barking machines of the type having a plurality of bark-removing tools mounted in an annular rotating member through which a log is fed axially without rotation are known to the art and have proved entirely practical where saw logs of relatively long length are to be barked. In regions, such as Northeastern United States, however, logs cut for use in making pulp are quite short, commonly about four feet in length, and with such short logs the heretofore known barking machines could not operate successfully, principally due to the inability of their feed mechanisms properly to support without rotation a short log while feeding it through the annular rotating tool-carrying member where it was operated upon by the bark-removing tools.

Accordingly, it is an object of the present invention to provide a barking machine having a novel feed mechanism capable of handling logs of much shorter length than has heretofore been the case.

It is a particular feature of the barking machine of the present invention that it is self-opening, that is, each entering log to be barked itself successively opens the feeding elements and bark-removing elements of the machine in accordance with the diameter of that particular log. Hence, the barking machine of the invention is completely automatic in operation and need only be kept supplied with logs to be barked.

For the purpose of more fully explaining the barking machine of the invention, reference is now made to the following description of a preferred embodiment thereof, together with the accompanying drawings, in which:

Fig. 1 is a side elevation of the barking machine of the invention, certain parts being broken away;

Fig. 2 is a fragmentary and enlarged vertical longitudinal sectional view showing generally the feeding and bark-removing elements of the machine of Fig. 1;

Fig. 3 is a vertical transverse sectional view on the line 3—3 of Fig. 1 and shows a portion of the feeding mechanism not shown in Fig. 2;

Fig. 4 is an enlarged transverse vertical sectional view of one of the feeding mechanisms as shown in Fig. 2, taken on the line 4—4 of Fig. 1;

Fig. 5 is an enlarged fragmentary end elevation of the bark-removing mechanism of the machine of Fig. 1;

Fig. 6 is an enlarged longitudinal sectional view of a portion of the bark-removing mechanism and is taken on the line 6—6 of Fig. 5;

Fig. 7 is a plan view of the machine of Fig. 1 showing the power-driven means thereof; and

Fig. 8 is a fragmentary and enlarged vertical longitudinal section of that portion of the feeding mechanism not shown in Fig. 2.

Referring to the drawings and particularly to Figure 1 thereof, the barking machine according to the present invention includes a frame 10 upon which the various elements are mounted. Said frame may be arranged with fixed supports as shown, or may be mounted on suitable

wheels, the latter being particularly desirable since it enables the use of the machine at the source of the logs, which, among other things, eliminates the handling of bark removed from the logs.

In general, the major elements of the barking machine consist of a bark-removing mechanism (generally designated 12) mounted midway along frame 10, and a pair of feeding mechanisms mounted at either side thereof for moving a log axially through the bark-removing mechanism, a front feeding mechanism (generally designated 14) closely adjacent the bark-removing mechanism 12 at the forward side thereof and a rear feeding mechanism (generally designated 16) closely adjacent the bark-removing mechanism 12 at the rear side thereof. Preferably, a supplemental pusher feeding mechanism (generally designated 18) is mounted on frame 10 in advance of front feeding mechanism 14 to aid in feeding logs to the bark-removing mechanism 12.

The bark-removing mechanism, as best shown in Figs. 5 and 6 includes a drum-like element 20 rotatably supported by suitable bearings 22 on a stationary tube 24 which is itself mounted on frame 10. On drum 20 are rotatably mounted six shafts 26 spaced at equal distances from the central axis of the drum element and from each other and with their axes generally parallel to said central axis. Each of said shafts supports a bark-removing tool 30 for swinging movement toward and away from the central axis of drum 20, torsion springs 28 being interposed between each of said shafts 26 and drum 20 to urge said tools toward said central axis to remove the bark from a log being passed axially therethrough generally along said central axis. The working pressure of the torsion springs 28 may be adjusted by an adjusting screw 34 interposed between a torsion-spring-adjusting arm 36 and drum 20. The leading edge of the bark-removing tools 30 is slanted inwardly and rearwardly in the direction of log advance as shown by the arrows in the drawings, and is of a somewhat bowed shape departing at an angle of about 30 to 60 degrees to the tangent of a log in a direction against the relative movement of log and tool, to provide a scraping edge surface on the tool tip. Thus when the forward end of the log to be barked is moved against the tool edge and the drum 20 which carries the bark-removing members 30 is rotated in a direction counterclockwise in Fig. 5, the tool will be swung outwardly away from the central axis against the force of its spring 28, and said spring will maintain the tip of the tool 30 in contact with the log to scrape the bark therefrom. The tips of the tools 30 may extend for but a short distance axially of drum 20 and may be suitably spaced so that their total scraping area may be utilized to provide rapid bark removal, each tool tip traveling in a generally helical path around the advancing log adjoining said paths of the other tool tips. To prevent the tips of the tools from contacting each other when no log is in the bark removing mechanism, the tools are provided with arms 32 which contact a stop 38 on the drum 20 corresponding to a desired minimum distance of the tool tips from one another.

The front and rear log-feeding mechanisms, together with the supplemental feeding mechanism associated therewith, co-operate to present a log to, and centrally advance a log through, the rotating bark-removing mechanism while supporting it substantially on the central axis of said mechanism and preventing rotation of the log, so that the bark-removing tools will operate most effectively since the bark-removing mechanism itself provides very little log support. Furthermore, this necessary supporting function is provided even with relatively short logs, since the novel feed mechanism hereinafter described need extend for but a short axial distance adequately to support a log in cantilever and also may be placed closely

adjacent the bark-removing tools, both front and rear. Thus, by using such feed mechanism both in front of and behind the bark-removing mechanism and spaced closely thereto, logs as short as the separation between the supporting elements of said feed members will be adequately supported in cantilever to be operated upon by tools 30 and such log will be presented, supported, and held on the central axis of said mechanism irrespective of the diameter of the log.

The two log-feeding mechanisms being nearly identical, the forward one only of such mechanisms will herein be described in detail, and the modifications of the rear mechanism later pointed out. The forward log-feeding mechanism as shown best in Fig. 4, with Fig. 2 additionally providing a vertical central longitudinal sectional view thereof, in essence is a novel three-jaw self-centering chuck. The lower jaw of said chuck comprises a transversely extending beam 40 mounted below the central axis of drum 20 and having a vertical post 42 mounted thereon generally centrally thereof and extending downwardly through a suitable bearing 44 in frame 10 to permit vertical movement of beam 40 toward and away from the central axis. A pair of coil tension springs 46 are provided, one at each end of beam 40, extending upwardly between said beam and frame 10 of the machine to urge said beam yieldably upwardly toward the central axis.

For advancing a log, power-driven means are provided on beam 40, said means including a plurality of spur rolls 48, preferably three in number with their axes perpendicular to the central axis and spaced therealong to provide an adequate log support in cantilever. The spur rolls 48 are mounted in suitable bearings 50 midway along beam 40 and are driven by means hereinafter described to advance a log through the feed mechanism and present it to the bark-removing mechanism.

A pair of upper jaws comprising the other two jaws of the three-jaw chuck are each mounted to cooperate with the lower jaw to support a log. Each of such jaws comprises a lever 52 which has rotatably mounted at its upper inner free end in suitable bearings 54 a plurality of spur rolls 56 axially spaced for aiding the lower spur rolls 48 in supporting a log along the central axis without rotation, its other end being mounted on an end of beam 40 by a suitable pivot pin 58. Midway between its ends, lever 52 is supported by a fixed pivot shaft 60 mounted on frame 10. Thus, by such interconnecting lever, the upper jaw spur rolls 56 will be moved toward and away from the central axis in synchronism with the lower jaw spur rolls 48, and will similarly be urged toward said central axis by springs 46.

In order that the jaws may be opened automatically by an oncoming log, the upper jaws are each provided with a forwardly and outwardly extending cam surface 62, such surface extending forwardly on the inner and upper ends of levers 52 at an angle of about 30° to the central axis and extending forwardly and outwardly for a distance great enough to be actuated by the largest diameter log which the machine is intended to debark. A guide roll 64 of hourglass configuration is positioned in front of lower-jaw spur rolls 48 to guide logs generally centrally of said spur rolls.

The lower jaw of the forward feeding mechanism is preferably provided with supplemental means 18 for feeding a log to spur rolls 48 in alinement therewith. Such means, as best shown in Figs. 1, 3, and 8, comprises a pivotally mounted pusher conveyor mounted at one end of the lower jaw for vertical movement therewith. Thus an extension frame 70 is mounted on main frame 10 extending forwardly thereof. The extension frame 70 has mounted at its forwardmost end for pivotal movement about shaft 72 a swinging frame 74 of longitudinally concave cross section which has a slot 88 extending centrally of its upper surface, which latter frame is mounted at its rear end on stub shafts 76 on beam 40 for vertical movement therewith. The swinging frame 74 has mounted therein forward and rear pairs of chain conveyor sprockets 78 and 80 having a pair of endless chains 82 passed thereabout. Preferably two pusher dogs 84 are mounted on said chains for pivotal movement about their centers and each is supported in an upright position extending through slot 88 by a plate 86 which extends beneath the upper flight of chains 82 from the forward sprocket 78 to just short of the rear sprockets 80, the upright pusher dog being pivoted backward by the log, as it moves around sprocket 80. The guide roll 64 is preferably mounted on swinging frame 74 between rear sprockets 80 and forward spur rolls 48.

The rear feed mechanism is identical to the above described mechanism except in the provision on its lower jaw of a downwardly and forwardly slanted surface having an additional power feed roll 66 thereon to aid in receiving somewhat crooked logs from the bark-removing mechanism and passing them to output chute 68.

The various elements of the barking machine of the invention are all driven (Fig. 7) by a single electric motor 90 mounted on frame 10 at the rear end thereof, although a gasoline or Diesel engine may be used as well. Thus the drum 20 is driven on its outer surface by a plurality of V belts 92 driven from main shaft 94. The forward and rear lower jaw spur rolls 48 and 66 and the guide roll 64 are driven through suitable shafting from sprockets 96 mounted on main frame 10 and spaced from said spur rolls and guide roll to allow vertical movement thereof, and the rear conveyor sprocket 80 is driven from guide roll 64 by a suitable chain drive 98. Clutches may be provided for the various elements as desired.

In operation, a log placed on the concave upper surface of swinging frame 74 is moved toward the jaws of the forward feeding mechanism by pusher dog 84. As the advancing end of the log comes into contact with the cam surfaces 62 on upper jaw levers 52, the jaws are opened and the leading end of the log is engaged by lower jaw spur rolls 48 and is fed to the bark-removing mechanism while being supported in cantilever. The contact of the leading end of the log with the leading edges of the bark-removing tools 30 opens said tools until their tips contact the outer surface of the log, whereupon the bark is scraped from the outer surface of the log as it passes through the bark-removing mechanism, the bark-removing tools 30, by reason of springs 28, being pressed inwardly against the surface of the log so that the bark will be removed therefrom even though the log has flat or even concave portions. The rear feeding mechanism picks up the leading end of the log in the same manner as does the front, and supports the trailing end of the log in cantilever as it passes from the front feeding mechanism. The log, its bark removed, finally passes to outlet chute 68. As soon as a log clears the front feeding mechanism, a succeeding log may be fed into it, the pusher dogs 84 being spaced at distances that automatically prevent overfeeding, that is, the advancing of a succeeding log before a preceding log has cleared the front feeding mechanism.

It will be appreciated by those skilled in this art that various modifications may be made within the purview of the invention and the scope of the appended claims.

We claim:

1. A barking machine comprising bark-removing means including a plurality of bark-removing tools mounted for movement toward and away from a central axis to remove bark from a log being fed axially therethrough, and log-feed means for presenting a log to said bark-removing means, said feed means including a self-centering chuck having a lower jaw positioned below said central axis and mounted for vertical movement toward and away therefrom along a path perpendicular thereto, an upper jaw mounted substantially in said path of said lower jaw for swinging movement toward and away from said central axis substantially along said path, and having thereon a cam surface engageable by an oncoming log

to open said jaw, lever means for moving said lower and upper jaws in substantial synchronism to support a log substantially on said central axis and means normally urging said jaws toward said central axis.

2. A barking machine comprising bark-removing means including a plurality of bark-removing tools mounted for movement toward and away from a central axis to remove bark from a log being fed axially therethrough, and log-feed means for presenting a log to said bark-removing means, said feed means including a self-centering three-jaw chuck having a lower jaw positioned below said central axis and mounted for vertical movement toward and away therefrom and having power-driven roll means thereon for advancing a log through said feed means, a pair of upper jaws each mounted for swinging movement toward and away from said central axis about a fixed pivotal axis parallel to said central axis, and having a cam surface engageable by an oncoming log to open said jaw, lever means interconnecting said upper and lower jaws for moving said jaws in substantial synchronism to support a log substantially on said central axis, and spring means normally urging said jaws toward said central axis.

3. A barking machine comprising a frame; bark-removing means including a rotatable drum mounted on said frame, and a plurality of bark-removing tools mounted in said drum for swinging movement toward and away from the central axis thereof; and log-feed means for axially presenting a log to said bark-removing tools while preventing rotation thereof, said feed means including a self-centering three-jaw chuck mounted on said frame and having a lower jaw and a pair of upper jaws, said lower jaw being positioned below said central axis for vertical movement toward and away therefrom and having a power-driven roll thereon for advancing a log through said feed means, each of said upper jaws being mounted for swinging movement toward and away from said central axis and having a cam surface engageable

by an oncoming log to open said jaw, a pair of lever means interconnecting said upper and lower jaws for moving said jaws in substantial synchronism to support a log substantially on said central axis, each of said lever means being mounted on said frame for swinging movement about a fixed pivotal axis parallel to said central axis and having its lower end pivotally connected to said lower jaw and its upper end connected to said upper jaw, and spring means extending between said lower jaw and said frame to urge said lower jaw upwardly and thus urge said jaws toward said central axis.

4. A barking machine comprising bark-removing means including a plurality of bark-removing tools mounted for movement toward and away from a central axis to remove bark from a log being fed axially therethrough, and log-feed means for presenting a log to said bark-removing means, said feed means including a self-centering chuck having a lower jaw positioned below said central axis and mounted for vertical movement toward and away therefrom along a path perpendicular thereto, an upper jaw mounted substantially in said path of said lower jaw for swinging movement toward and away from said central axis substantially along said path, and having thereon a cam surface engageable by an oncoming log to open said jaw, interconnecting means linking said jaws for movement in substantial synchronism to support a log substantially on said central axis, and means normally urging said jaws toward said central axis.

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