Aug. 26, 1952 H. J. EKLUND ET AL 2,608,223

PORTABLE LOG DEBARKER

Filed Feb. 5, 1949 2 SHEETS—SHEET 1

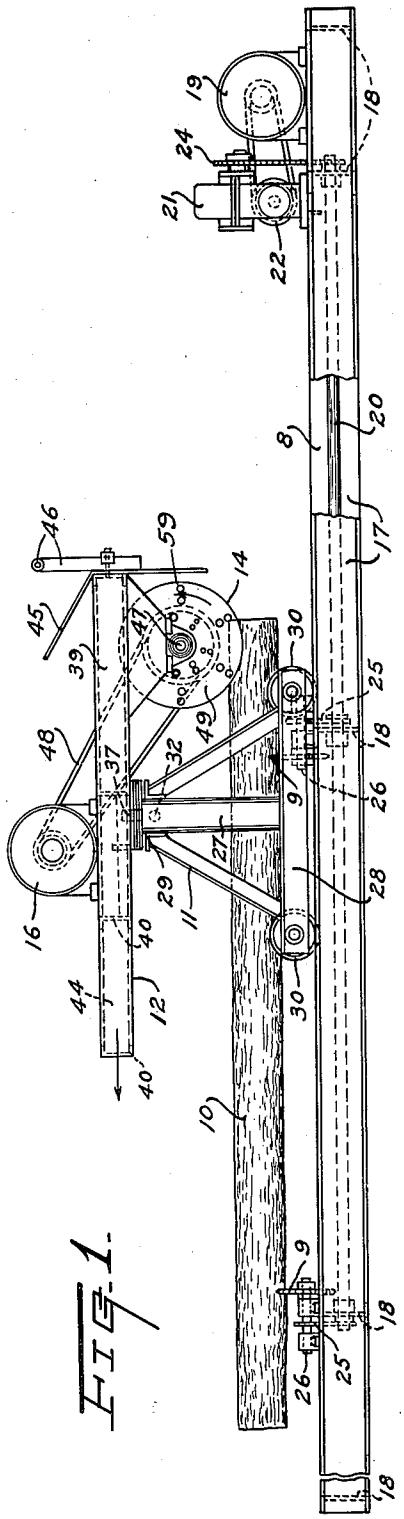


FIG. 1.

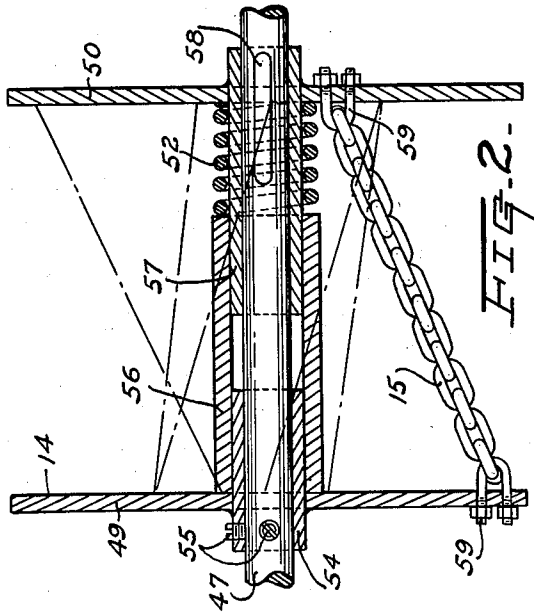


FIG. 2.

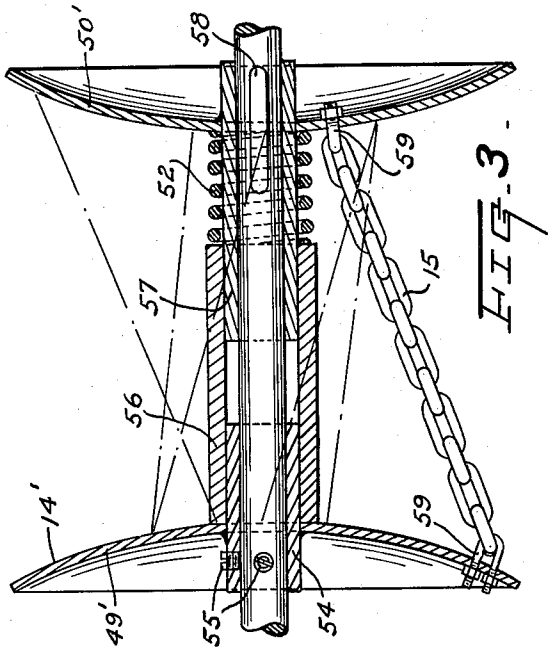


FIG. 3.

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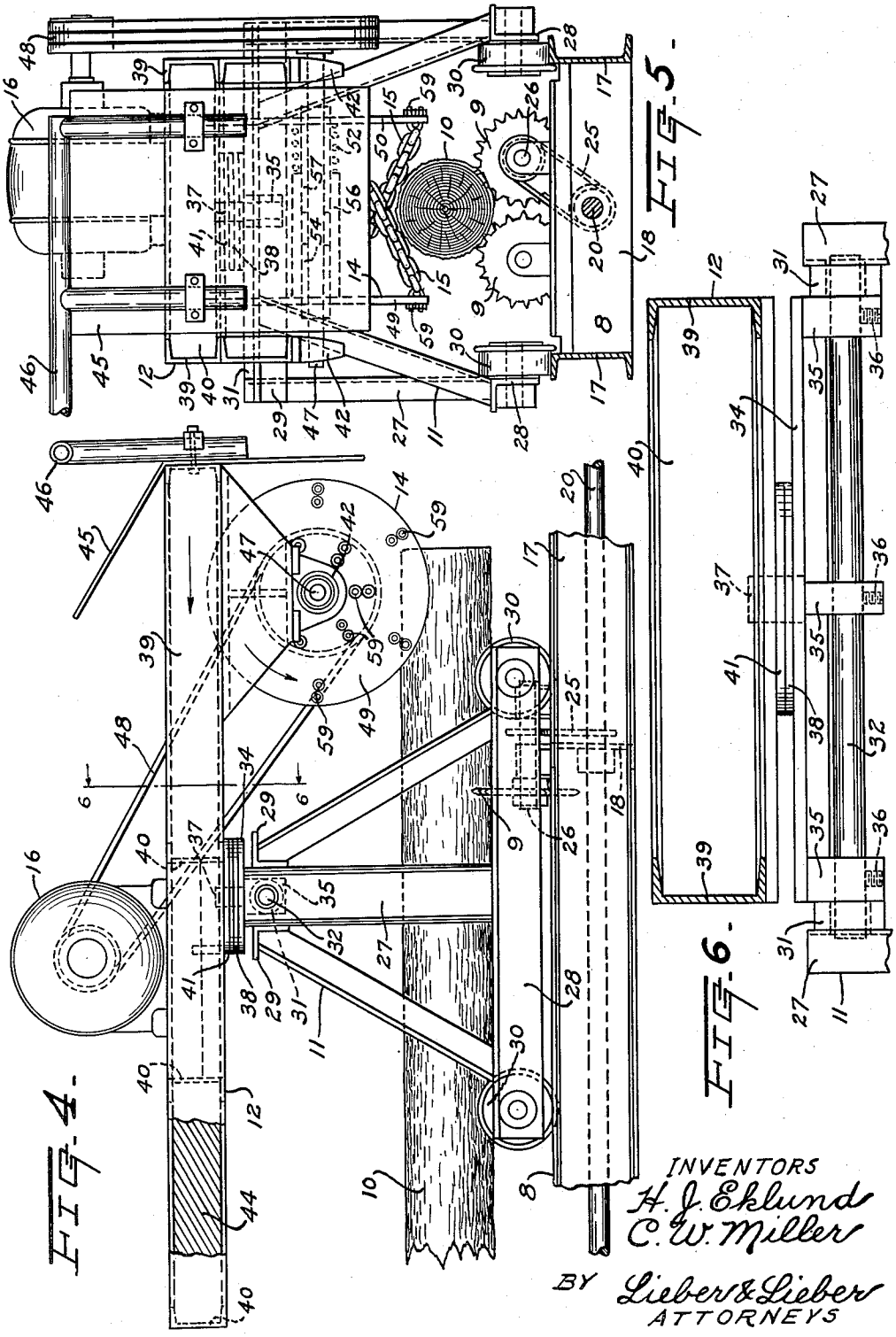


FIG. 4.

FIG. 5.

FIG. 6.

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PORTABLE LOG DEBARKER

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Our invention relates in general to improvements in the art of removing bark from logs, and relates more specifically to improvements in the construction and operation of mechanical log debarking equipment.

The primary object of our present invention is to provide improved mechanism for removing the bark from logs, which is simple and durable in construction, flexible in use, and highly effective in operation.

In the paper industry, it is desirable to remove the bark from pulp wood logs before they are disintegrated, and while many different types of devices have heretofore been proposed and used commercially, very few have proven successful and none have been found entirely satisfactory for all conditions of use. Some of these prior log debarkers may operate quite effectively upon certain species of logs, or on tree trunks freshly cut in the spring of the year, or on dry wood which has been soaked for a long time in ponds or streams or otherwise treated, but a machine adapted to operate with complete satisfaction on diverse types of logs at any season of the year and under varying conditions has not yet been marketed.

While some large scale permanent log barking installations located at the pulp and paper mills and fibreboard plants or other points of log concentration, have proven relatively successful as long as the wood supply has been abundant and in close range of the debarking equipment, these larger installations are not economical when it becomes necessary to transport the natural logs with the bark thereon, by rail, truck or water for any great distances. Considerable saving in cost may therefore be effected by removing the bark in close proximity to the zones of cutting of the logs; and since these cutting zones are frequently shifted from one locality to another, it is desirable to have the debarking equipment readily transportable and within the reach of small operators as well as larger organizations.

It is therefore an important object of the present invention to provide an improved log barking device which meets all of the above mentioned conditions and requirements, and which will function most effectively on logs of various kinds throughout the year.

Another important object of this invention is to provide a relatively inexpensive and lightweight but sturdy portable log debarking unit which may be conveniently transferred from place to place while being operable at moderate cost.

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A further object of the invention is to provide an improved installation for removing bark from logs of various diameters and lengths, which may be driven from available power sources, and which is conveniently manipulatable by a novice to quickly and most effectively release the bark from dry, frozen or green logs of diverse kinds.

Still another object of our invention is to provide a compact and efficient log barking rig composed of relatively few parts most of which are adapted to be produced from standard metal rod, bar and plate stock, and which may be firmly united by welding or otherwise and conveniently assembled or dismantled.

An additional object of this invention is to provide an improved revolving chain type of log debarker, wherein the removal of the bark is accomplished by combined impact and tearing action of one or more revolving taut chains or similar flexible elements adapted to be conveniently brought into coaction with all portions of the log peripheries.

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

A clear conception of the various improved features constituting our present invention, and of the construction and operation of a typical portable log barking unit embodying these features, 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 side view of a typical portable log debarker embodying our invention, with a natural log in place ready for removal of the bark;

Fig. 2 is a considerably enlarged central longitudinal section through one type of chain carrying rotor adapted to be employed in the unit of Fig. 1, showing only one of the flexible elements or chains complete, but also showing the center lines of a number of additional chains in dot-and-dash lines;

Fig. 3 is a similarly enlarged central longitudinal section through another type of chain carrying rotor adapted for use in the unit, likewise showing only one chain complete;

Fig. 4 is a moderately enlarged part sectional side view of the rotor supporting carriage of the unit shown in Fig. 1;

Fig. 5 is a similarly moderately enlarged and elevation of the carriage shown in Fig. 4; and

Fig. 6 is a further enlarged transverse vertical section through the rotor supporting turntable or

deck of the unit, the section having been taken along the line 6—6 of Fig. 4.

While the invention has been shown herein as having been applied to an electric motor driven portable debarking unit having only a single rotor carriage supporting a single six chain rotor, it is not our desire or intention to unnecessarily restrict the scope or utility of the improvement by virtue of this limited embodiment; and it is also contemplated that specific descriptive terms employed herein be given the broadest possible interpretation consistent with the disclosure.

Referring to the drawing, the typical portable log debarking unit shown comprises in general, an elongated frame or bed 8; several sets of spur wheels 9 mounted upon the bed 8 and adapted to rotatably support a log 10 about its own axis while preventing axial shifting of the log; mechanism for positively rotating the log 10 about its longitudinal axis through one or more of the spur wheels 9; a carriage 11 movable along the log 10 while supported upon the bed 8; a turntable or deck 12 rotatably and tiltably mounted upon the top of the carriage 11, and being movable with the latter along the log 10; a rotor 14 mounted upon the deck 12 and having a series of six normally taut flexible elements or cross-chains 15 thereon cooperable with the periphery of the log 10; and a rotor propelling motor 16 also carried by the deck 12.

The elongated frame or bed 8 may be constructed of any desired length from standard channel bars 17 which provide skids for effecting ready transportation of the assembled unit, and the top surfaces of these bars 17 constitute rails for the carriage 11. The side bars 17 of the bed 8 are spaced apart but firmly united by cross-beams 18 upon some of which the spur wheels 9 are rotatably mounted, and these wheels 9 have peripheral teeth adapted to bite into the periphery of the log 10 resting thereon, as depicted in Figs. 4 and 5. One set of the spur wheels 9 may be adjustable with its supporting cross-beam 18 along the bed 10 in an obvious manner so as to accommodate logs 10 of various lengths, and at least one spur wheel 9 of each cooperating set should be positively and continuously rotated so as to constantly revolve the log 10 about its longitudinal central axis while the spur wheel teeth effectively prevent axial shifting of the rotating log.

In order to thus constantly revolve the log 10, we provide a driving motor 19 at one extreme end of the bed 8 and which is drivingly connected to an elongated horizontal shaft 20 journalled in bearings carried by some of the cross-beams 18 mid-way between the side bars 17. The motors 16, 19 may be either electric or gasoline driven, or of any other suitable type, and the log rolling motor 19 is connected to a speed changing gear reduction unit 21 by an endless belt or chain drive 22, while the unit 21 is drivingly cooperable with the shaft 20 through another endless belt or chain drive 24, see Fig. 1. The elongated shaft 20 is in turn drivingly connected to the driven spur wheels 9 by local endless belt or chain drives 25 and spur wheel supporting counter shafts 26 as illustrated in Figs. 4 and 5, thus providing mechanism for positively and continuously revolving the logs 10.

The carriage 11 may also be formed of standard structural metal beams including opposite side columns 27 rising from the medial portions of lower side beams 28 and rigidly interconnected at their upper ends by angle bars 29, and the lower side beams 28 are provided with flanged rollers 30 adapted to ride along the rails formed by the bed bars 17 so that the carriage 11 may be freely transported along the bed 8 with the angle bars 29 travelling above the log 10, as in Figs. 1, 4 and 5. The upper ends of the upright columns 27 are provided with bearings 31 as shown in Fig. 6, and a horizontal pivot shaft 32 is journalled in these bearings 31 and spans the space between them. A transverse turn table supporting plate 34 has spaced depending lugs 35 secured thereto and embracing the pivot shaft 32, and these lugs 35 may be fastened to the shaft 32 by set screws 36 so that the plate 34 may rock with the pivot shaft relative to the carriage 11. The center of the rockable plate 34 is also provided with a sturdy upstanding pivot 37 and with an upper bearing plate 38 surrounding this pivot.

The turn table or rotor supporting upper deck 12 may likewise be constructed of standard metal stock and consists primarily of a pair of opposite side channels 39 firmly united by transverse channel beams 40 and having a lower bearing plate 41 coacting with the upper plate 38 of the rocker plate 34 about the pivot 37, see Figs. 4 to 6 inclusive. The bark removing rotor 14 is rotatably journalled in spaced bearings 42 suspended from one end of the deck 12 remote from the pivot 37, and the opposite end of the deck 12 is provided with a counter weight 44 while the rotor propelling motor 16 is also mounted on the deck near the counter weight 44 in order to aid in counter balancing the weight and action of the rotor 14. The end of the turn table 12 nearest to the bearings 42 is also provided with a suitable guard plate 45 and with a deck manipulating handle 46 as shown; and it will be apparent that this handle 46 besides facilitating movement of the carriage 11 along the bed 8 and log 10, also enables the operator to swing the deck 12 and rotor 14 about the pivot 37 laterally of the log, as well as about the pivot pin 32 toward or away from the log 10.

The improved bark removing rotor 14 may be constructed as shown in detail in Fig. 2, and comprises in general a horizontal supporting shaft 47 which is journalled in the bearings 42 and is disposed transversely of and above the log 10; an endless V-belt drive 48 drivingly connecting the motor 16 with one end of the shaft 47; a pair of spaced opposite end disks 49, 50 carried by the shaft 47 and being rotatable therewith; one or more flexible impact and tearing elements or chains 15 connecting the disks 49, 50; and resilient means such as a helical compression spring 52 normally tending to spread the end disks 49, 50 apart so as to maintain the chains 15 taut. While the end disks 49, 50 of the rotor 14 illustrated in Fig. 2 are flat, they may also be formed as shown in Fig. 3, wherein the rotor 14' is provided with concave or dished end disks 49', 50', but is otherwise constructed the same as in Fig. 2.

The rotor disks may be formed of heavy sheet metal and each of the end disks 49, 49', is rigidly attached to a hub sleeve 54 which is firmly secured to the shaft 47 by means of fastening screws 55 and is embraced by a longer sleeve 56. One end of the sleeve 56 abuts the end disk 49, 49', while the opposite end thereof engages one end of the spring 52 the opposite end of which coacts directly with the other disk 50, 50'. Each of these end disks 50, 50' is likewise rigidly attached to another hub sleeve 57 which is slidably con-

nected to the shaft 47 by a spline 58, and the hub sleeve 57 is embraced by the spring 52 and is slidable within the outer sleeve 56. The spring 52 thus tends to spread the end disks apart with considerable force at all times, and the tension of this spring may be varied with the aid of the fastening screws 55.

The flexible elements 15 may be formed of any suitable chain or cable stock and any desired number of these elements may be utilized. It is however preferable to provide at least two of these bark impact and tearing elements 15, inclined in opposite directions relative to their supporting disks, and having their opposite ends secured closely adjacent to these disks as by U-bolts 59 in order to make the full lengths of the elements available for bark removal. As illustrated in Figs. 2 and 3, we have provided six chain elements 15 equally spaced about the axis of the shaft 47 and three of which are inclined in one direction while the other three are oppositely inclined so as to produce a series of crossed chains adapted to revolve about the rotor axis, and all of which are normally maintained taut by the spring 52.

When the improved portable log barking unit has been properly assembled as above described, and a log 10 has been applied to the sets of spur wheels 9, the carriage 11 should be shifted along the bed 8 to the position shown in Fig. 1 whereupon the motors 16, 19 may be operated to simultaneously slowly rotate the log 10 about its longitudinal axis and to rapidly revolve the rotor 14. When idling, the movable end disk 50 of the rotor 14 is forced away from the fixed end disk 49 by the spring 52, thereby maintaining the cross-chains 15 taut; but when the rotor 14 is brought up to full speed these chains bow outwardly to some extent due to centrifugal force acting thereon and thus slightly decrease the distance between the rotor disks 49, 50. The handle 46 may then be utilized to lower the rotor 14 into peripheral contact with the rotating log 10, and to also slowly advance the carriage 11 along the bed 8. The farther down the rotor 14 is lowered into contact with the log 10, the more the sliding disk 50 is forced over towards the stationary disk 49, thereby slackening the chains 15. Those chains in contact with the log will to a greater extent wrap around the log while those not in contact with the log will bow outwardly due to the action of centrifugal force, and on their downward travel toward the log will effectively pound and loosen the bark. As soon as a chain 15 comes in contact with the log 10 it bends inwardly and drags along the wood taking the bark off. This combined impact and tearing action may be continued throughout the entire length of the constantly rotating log 10 thereby ultimately removing all of the bark by increments during manual advancement of the carriage 11.

The rapidly revolving flexible chains 15 tend to throw the removed bark particles away from the debarking zone, and the operator is protected therefrom by the guard plate 45. The universal mounting of the turn table or deck 12 afforded by the pivot shaft 32 and the pivot pin 37 permit the operator to move the rotor 14 bodily down or up as well as to swing it sidewise in either direction, so as to insure debarking contact with all portions of relatively crooked logs. The counter-balancing weight 44 associated with the upper deck 12 remote from the rotor 14 also facilitates manipulation of the turn table, and whenever debarking of a log 10 has been effected the operator may rapidly return the carriage 11 to a position in close proximity to the log driving unit at the extreme end of the bed 8 so as to permit unobstructed removal of the barked log 10 and application of a new one to the log supporting spur wheels 9.

From the foregoing detailed description, it will be apparent that our invention provides an improved log barking installation which besides being simple, compact and durable in construction, is highly efficient in operation and flexible in its adaptations. The unit is sufficiently small and self-contained so that it may be easily transported from place to place, and the deck 12 and carriage 11 are conveniently manipulatable since the rotation of the rotor 14 in the direction indicated tends to assist the operator in moving the carriage along the log 10. The combined pounding and tearing action of the flexible elements 15 effectively releases and removes the most obstinate bark from wet, frozen and dry logs; and it is to be distinctly understood that the elements 15 need not be linked chains but may be cables or any other suitable type of impact and tearing structure.

The impact and tearing elements 15 should preferably be attached as closely as possible to their carrying disks, and while the flat disks 49, 50 of Fig. 2 have proven satisfactory, the dished disks 49', 50', of Fig. 3 will permit these flexible elements to be brought into closer hugging, dragging and tearing contact with the bark throughout the entire chain lengths. The rotor 14, 14' may be revolved at variable speeds, and the logs 10 may also be rotated at any desired speed with the aid of the transmission unit 21 and are effectively prevented from shifting longitudinally by the spur wheels 9. The improved equipment is adapted to operate upon straight or relatively crooked logs 10 of various length and diameters whether dry, frozen or wet, and has in fact proven highly successful and satisfactory in actual use.

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

We claim:

1. A log barker comprising, a log support, a carriage, said support and carriage being relatively movable in a direction longitudinally of a log resting upon the support, a debarking rotor revolvable upon said carriage, said rotor having a pair of spaced coaxial disks drivenly connected to and relatively movable along a shaft disposed transversely of the log and also having an annular series of oppositely inclined normally taut chains spanning the gap between said disks, each chain having one end secured to one disk remote from the shaft axis while its opposite end is secured to the other disk nearer to said axis, and means associated with said rotor for constantly urging said disks apart to maintain the chains in taut condition.

2. A log barker comprising, a log support, a carriage, said support and carriage being relatively movable in a direction longitudinally of a log resting upon the support, a power driven debarking rotor revolvably mounted upon said carriage, said rotor having a pair of spaced coaxial disks drivenly connected to a shaft disposed transversely of and movable toward the log and also having an annular series of oppositely inclined

normally taut chains spanning the gap between said disks, each chain having one end secured to one disk remote from the shaft axis while its opposite end is secured to the other disk nearer to said axis and said disks being relatively movable along the shaft to flex the chains, and means carried by said rotor for constantly resiliently urging said disks apart to maintain said chains in taut condition.

3. A log barker comprising, a log support, a log debarking rotor cooperable with a log carried by said support, said rotor having an annular series of normally taut oppositely inclined chains revolvable by a shaft disposed transversely of and movable toward the log, each chain having one end secured to said shaft remote from the shaft axis and its opposite end likewise secured nearer to said axis, and means associated with said rotor for exerting a constant longitudinal resilient pull on each chain sufficient to maintain the latter in taut condition at all times.

4. A log barker comprising, a horizontally elongated portable bed, means carried by said bed for supporting and rotating a horizontal log about its axis while preventing longitudinal displacement of the log, said bed having spaced parallel rails on opposite sides of said log supporting means, a carriage supported by and being movable along said rails, a deck pivotally mounted upon said carriage and being tiltable about a transverse axis toward and away from the log and swingable laterally about an upright axis, and a rotor carried by said deck and having an annular series of flexible but normally taut impact elements successively revolvable toward the log periphery.

5. A log barker comprising, a horizontally elongated portable bed having spaced parallel rails, means carried by said bed for supporting a horizontal log above and between said rails and for rotating the log about its axis while preventing axial displacement thereof, a carriage supported by and movable along said rails, and a deck pivotally mounted upon said carriage and spanning the top of the log, said deck being universally tiltable about its pivotal mounting relative to the log periphery, and a debarking rotor carried by and tiltable with said deck.

6. A log barker comprising, a horizontally elongated portable bed having spaced parallel rails,

means carried by said bed for supporting a horizontal log above and between said rails and for rotating the log about its axis while preventing axial displacement thereof, a carriage supported by and movable along said rails, and a deck pivotally mounted upon said carriage and spanning the top of the log, said deck being tiltable both laterally and longitudinally about its pivotal mounting relative to the log periphery, and a rotor carried by said deck and having an annular series of flexible but normally taut impact elements successively revolvable toward the log periphery and movable thereacross.

7. A log barker comprising, a horizontally elongated portable bed having spaced parallel rails, means carried by said bed for rotatably supporting a horizontal log above and between said rails and for rotating the log about its axis while preventing axial displacement thereof, a carriage transportable along said bed upon said rails, and an upper deck tiltably mounted on said carriage and spanning the top of the log, said deck being tiltable toward and swingable laterally of the log periphery, a debarking rotor journalled on said deck for movement therewith, and means carried by said deck for revolving said rotor.

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