

Sept. 6, 1949.

F. H. SWIFT
HYDRAULIC BARKER

2,480,889

Filed Nov. 16, 1946

4 Sheets-Sheet 1

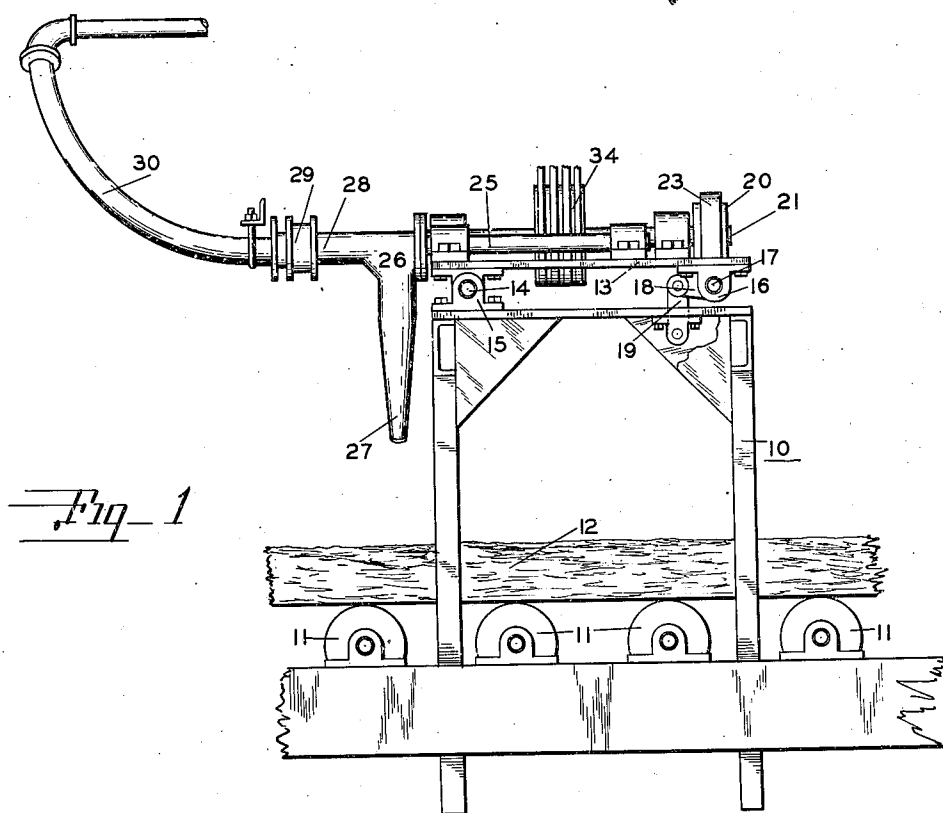


Fig. 1

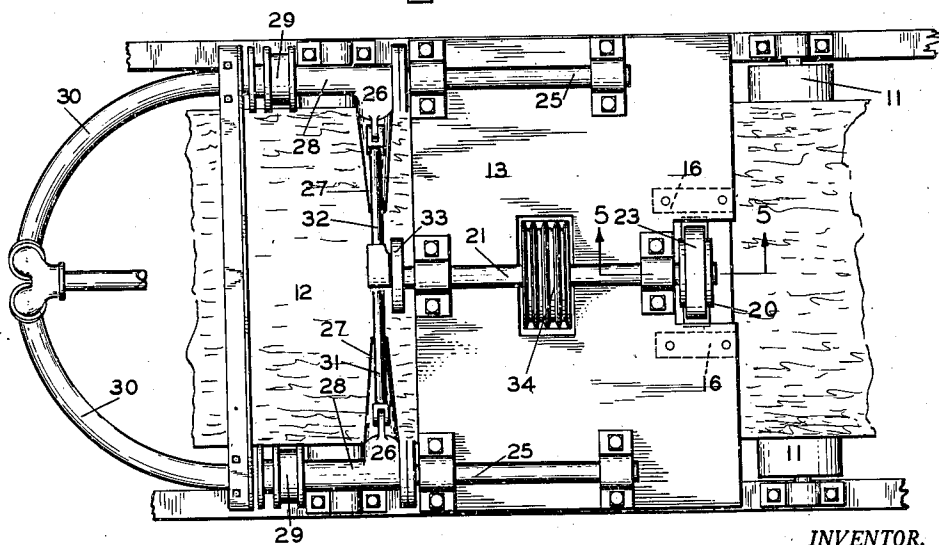


Fig. 2

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4 Sheets-Sheet 2

Fig 3

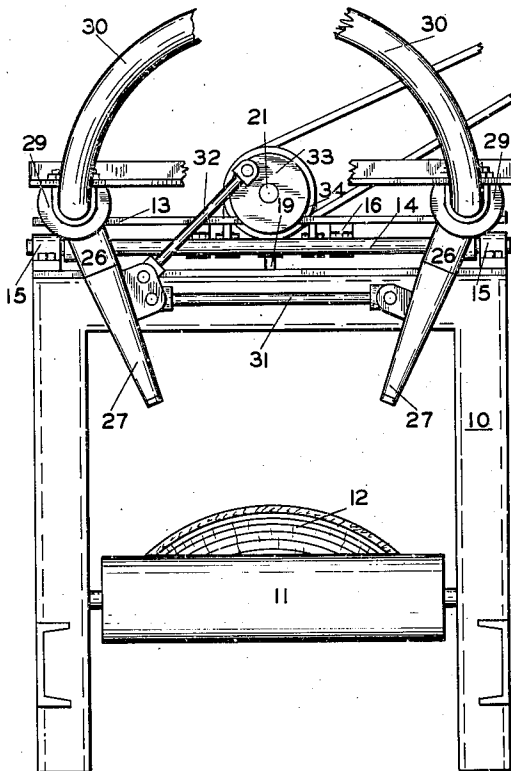


Fig 4

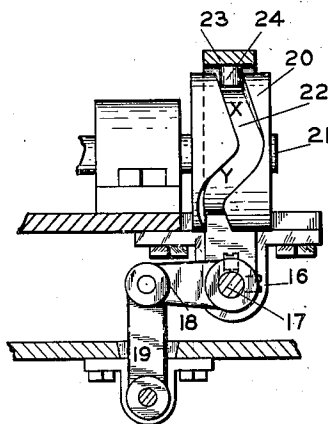
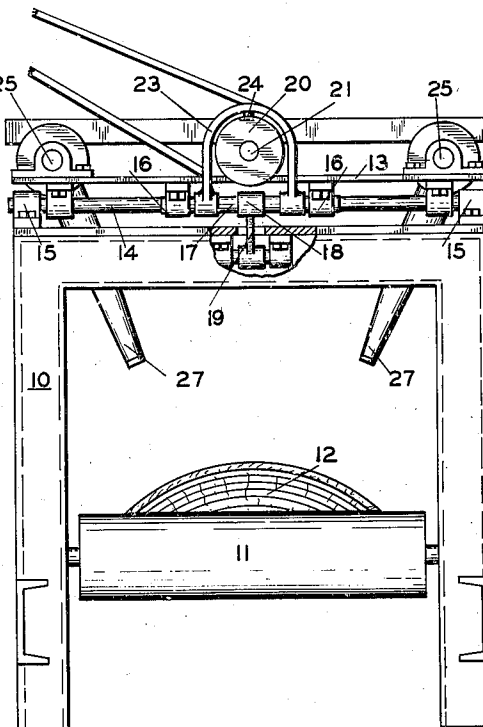


Fig 5

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4 Sheets-Sheet 3

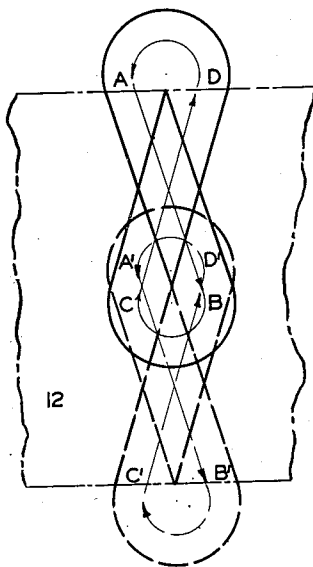
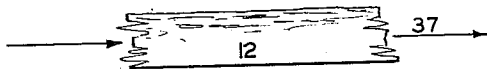
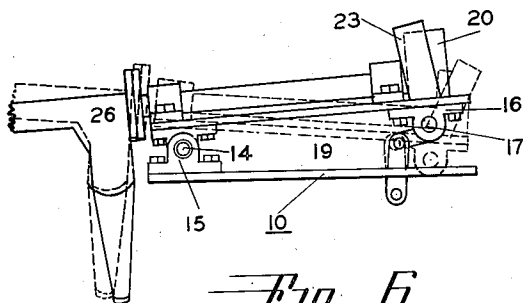


Fig 10

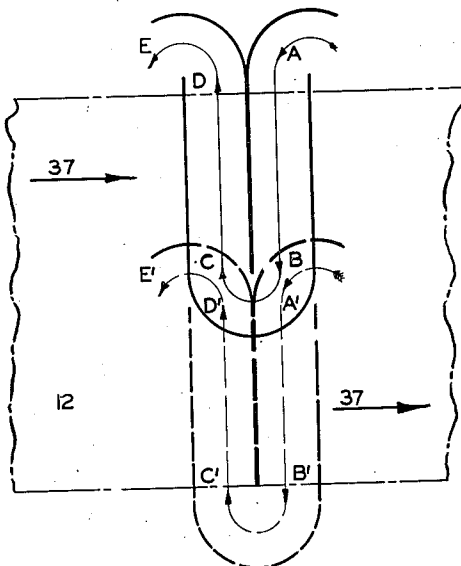


Fig 11

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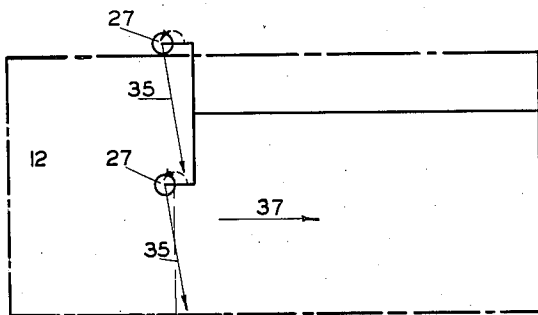


Fig. 7

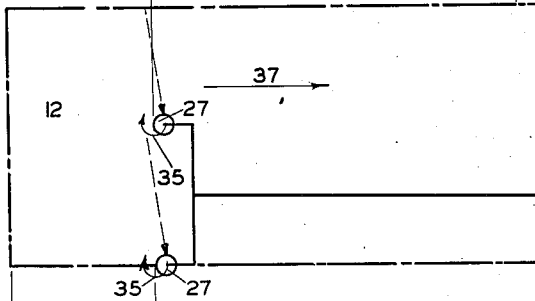
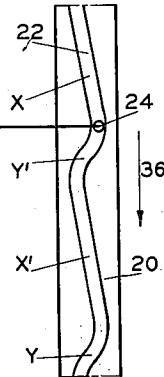


Fig. 8

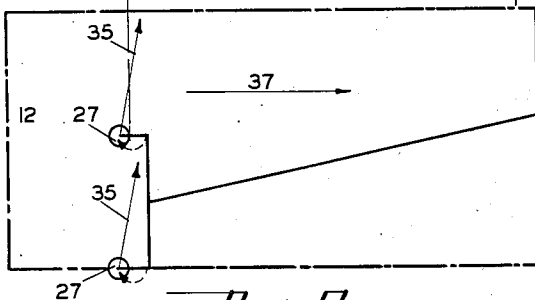
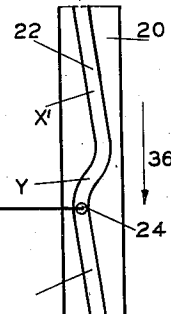
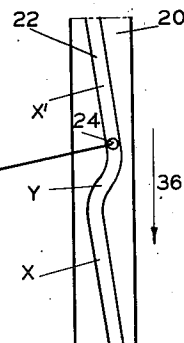


Fig. 9



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2,480,889

HYDRAULIC BARKER

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Application November 16, 1946, Serial No. 710,299

4 Claims. (Cl. 144—208)

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This application is a continuation in part of my pending application, Serial No. 538,360, filed under date of June 2, 1944, and entitled Hydraulic barker for slabs, which has subsequently matured into Letters Patent No. 2,413,341.

Like the invention described in my above mentioned previous application, the present invention relates to the removal, by hydraulic means, of the bark from wood, and, more specifically from slabs or cants.

This invention also relates to the general method of removing bark by hydraulic means which is described in my copending application, Serial No. 700,998, filed under date of October 3, 1946, entitled "Hydraulic debarking," and the device of the present invention is designed to carry out such method and debarking.

The object of the present invention is to provide a simple and practical machine in which the bark will be removed from slabs and cants by hydraulic means.

Another object of this invention is to provide a slab or cant barker which can be operated easily and economically in order that the debarking of slabs and cants can be carried on profitably.

A further object of this invention is to provide a practical hydraulic barker with a moving debarking nozzle for use on longitudinally moving slabs, in which the jet from the nozzle will be caused to move over the slab obliquely with respect to the line of movement of the slab, so that, as a resultant of the two directional movements, the path cut by the debarking jet will be perpendicular to the line of movement of the slab.

An additional object is to provide a hydraulic slab barker in which a pair of hydraulic debarking nozzles can be employed in the same manner and controlled by the same means.

Other objects and advantages of the invention will be apparent to persons skilled in the art from the following description in which reference is made to the accompanying drawings in which:

Fig. 1 is a side elevation of the barker;

Fig. 2 is a top plan view;

Fig. 3 is an end elevation taken from the left in Fig. 1;

Fig. 4 is an end elevation of the opposite end taken from the right in Fig. 1;

Fig. 5 is an enlarged fragmentary vertical section on the line 5—5 of Fig. 2, showing a detail of the means for tilting the nozzle carriage;

Fig. 6 is a fragmentary side elevation, similar in part to Fig. 1, illustrating the tilting of the nozzle carriage;

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Figs. 7, 8 and 9 are diagrammatic representations illustrating the position and movement of the debarking nozzles and the corresponding position of the cam-actuated tilting means for the nozzle carriage at different stages in the operating cycle;

Fig. 10 is a diagrammatic plan of the paths described by the jets from the two debarking nozzles on a stationary slab; and

Fig. 11 is a similar plan illustrating the resultant paths produced on the slab when the slab moves longitudinally through the machine.

Referring first to Figs. 1 to 4 inclusive, the device is mounted on a rigid frame structure, indicated in general by the reference character 10. In the lower part of the frame structure a series of rollers 11 are journaled. These rollers are driven in unison by suitable means (not shown), and support the slabs 12 and cause the slabs to be moved longitudinally through the device at a predetermined rate of speed.

A nozzle carriage 13 is supported on the top of the frame structure 10. This carriage is hinged, or pivotally mounted, at one end on the transverse rod 14. The ends of the rod 14 are supported in blocks 15. The other end of the carriage 13, (thus the right hand end as viewed in Fig. 1), is supported on a pair of bearing blocks 16 (Fig. 4) which in turn are supported on a rotatable stub shaft 17. The stub shaft 17 is rigidly secured in the end of an arm 18 (Fig. 1), the other end of which arm is pivotally connected to an upwardly extending link 19, and the bottom end of the link 19 has a pivotal mounting on the frame structure.

A wheel 20 is secured on the end of a shaft 21 which is rotatably mounted on the top of the carriage. The perimeter of the wheel 20 is formed with a cam groove 22 (see Fig. 5). An inverted U-shaped member 23 carries a downwardly extending roller 24 at the top, which roller rides in the cam groove 22 and thus acts as a cam follower. The bottom ends of the member 23 are rigidly secured to the stub shaft 17 (see Fig. 4). It will now be apparent from Figs. 4, 5 and 6 that rotation of the wheel 20, due to the engagement of the roller 24 of the member 23 in the cam groove of wheel 20, will cause member 23 to rock back and forth. However, the rocking of member 23 produces rocking of the stub shaft 17, and, since the stub shaft 17 is rigidly secured to the arm 18, the resulting rocking of the stub shaft 17 and arm 18 will cause up and down movement of the end of the carriage 13. The purpose of

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this up and down tilting movement of the carriage will be explained later.

A pair of shafts 25 (Figs. 2 and 4) are rotatably mounted on the carriage 13 at the sides. A nozzle assembly 26 is supported on the end of each shaft. Each nozzle assembly includes a debarking nozzle 27 and a supply pipe section 28 extending substantially at right angles thereto. A suitable swing joint 29 connects the end of each pipe section 28 to a hose 30 and the hoses 30 in turn are connected to a pipe line through which water under suitable hydraulic pressure (for example, 1200 pounds per square inch) is supplied.

Since the two nozzle assemblies 26 are supported on the rotatable shafts 25 these assemblies can swing transversely with respect to the carriage 13. The two assemblies are connected by a link 31 (Fig. 3) so that they will swing in unison. In addition, one of the nozzle assemblies is connected by a rod 32 to a crank wheel 33, the rotation of which causes the two nozzles 27 to swing back and forth in a path transverse with respect to the carriage 13, as apparent from Fig. 3. The crank wheel 33 is rigidly mounted on the end of shaft 21 (Fig. 2), to the other end of which shaft 21 the wheel 20 with the cam groove is mounted as previously described. A belt pulley 34, also mounted on shaft 21, and driven by suitable belt means from a motor (not shown) or other source of power, produces rotation of the shaft 21 and, with it, rotation of the two wheels 33 and 20.

The cam groove 22 of the wheel 20, as shown in Fig. 5, and as indicated diagrammatically in pattern in Figs. 7, 8 and 9, has two identical main sections x and x' connected by two somewhat abrupt curved sections y and y' . From the previous description it will now be apparent that as the wheel 20 is rotated the end of the carriage 13 which is supported by the stub shaft 17 and arm 18 will be alternately raised and lowered. During each complete rotation of the wheel 20 the corresponding end of carriage 13 will be raised and lowered twice. Furthermore, due to the pattern of the cam groove 22, the corresponding end of the carriage 13 will be raised slowly and then lowered more abruptly each time. This raising and lowering of the end of carriage 13, in other words, the tilting of carriage 13, causes the discharging ends of the nozzles 27 to be shifted back and forth in the direction of travel of the slab and thus in directions normal to the swinging movement imparted to the nozzle assemblies by the rotation of the wheel crank 33 previously described. The entire carriage tilting means is so constructed and arranged that this tilting of the nozzles (as shown in Fig. 6) is approximately equal in amount to the width of the jets discharged by the nozzles.

Since the wheel crank 33 and the cam groove wheel 20 are both secured to the same shaft 21 and thus both rotate in unison, with each complete rotation of the wheels each nozzle makes one complete swing transversely back and forth with respect to the direction of travel of the slab and also is tilted forwardly and backwardly twice, in the direction of slab travel, during its complete swing. The two wheels 33 and 20 are so positioned on their common shaft 21 that the abrupt curves of the cam groove 22 will engage the cam follower 24 when the crank pin of the crank wheel 33 is at either end of the horizontal diameter of its circular path and thus when the

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nozzles 27 are at or near either end of their transverse swings.

The results of the operation of the crank wheel 33 and cam wheel 20, and of their cooperation, upon the directed movements of the nozzles and the debarking jets delivered from the nozzles will now be more clearly understood from the diagrams constituting Figs. 7, 8 and 9. In these figures the circles 27 indicate the nozzles, the circle 24 indicates the roller or cam follower 24, the full line arrows 35 indicate the next immediate direction in which the nozzles will move, the dotted line arrows showing the preceding direction of nozzle movement, the arrow 36 indicates the direction of rotation of the cam groove wheel 20, and the arrow 37 indicates the direction in which the slab 12 travels through the barker.

Referring to Figs. 7 and 8, as the roller 24 passing through section x of the cam groove is moved to the left by the rotation of wheel 20, thus tilting the carriage upwardly, the nozzles will be tilted in the direction of travel of the slab during their transverse swing and will then move in the direction indicated by the full line arrows 35 in Fig. 7. When the roller 24 has reached the end of section x of the groove the nozzles will have reached the positions indicated in Fig. 8. While the roller 24 next passes through section y of the cam groove the nozzles will be quickly tilted back and assume the positions shown in Fig. 9. As the roller 24 is again moved to the left while passing through the next cam section x' the nozzles will travel in the direction indicated by the full line arrows 35 in Fig. 9, and so on.

The effect of the component directions of travel of the nozzles will be apparent from Figs. 10 and 11. First, in Fig. 10 it is assumed, for purpose of illustration, that the slab remains stationary instead of traveling longitudinally through the barker. The debarking jet from one of the nozzles, during the cycle previously described, would follow the path A, B, C, D in Fig. 10, (shown in full lines), and simultaneously the jet from the other nozzle would follow the corresponding path A', B', C', D' (shown in broken lines in Fig. 10). Now, in Fig. 11, the slab 12 is assumed to be moving at the predetermined prescribed speed longitudinally through the barker. As a result of the movement of the slab, (in the direction indicated by the arrow 37 in Fig. 11), the effect of the oblique travel of the debarking jets from the nozzles is to produce paths which are normal to the line of direction of the slab travel. The tilting of the nozzle jets back and forth in the direction of slab travel is approximately equal to the width of the jets, as previously mentioned. Consequently if the slab 12 moves a distance equal to the width of the jet path during each swing of the nozzles in either direction the debarked strips will adjoin each other as indicated in Fig. 11, the paths from the two debarking jets overlapping each other somewhat along the center line of the slab at the inner terminus of the transverse swing of each nozzle jet.

Of course it will be apparent from Fig. 3 that that the length of the link 31 connecting the two swinging nozzles 27, the length and positioning of the rod 32, and the size of the crank wheel 33 must be made such that the debarking jets from the nozzles will be properly spaced apart and will swing the desired distance, with their paths overlapping slightly at the center line of the slab surface, to cover the entire bark surface of the slabs passed through the barker.

From a study of the debarking operation it will be apparent that if there were no tipping of the nozzles, that is to say, if the carriage on which the nozzles are supported were not tilted during each swing of the nozzles, it would be impossible to cover the entire bark surface of a uniformly traveling cant or slab unless the cant or slab moved longitudinally a distance equal only to one-half the width of the nozzle jet path with each swing of the nozzle. Thus the uniformly traveling slab or cant could travel at only half the speed possible with my invention. Furthermore, in such an arrangement without any tipping of the nozzle, since the resulting paths of the jet on the surface to be debarked would be always oblique in alternate directions, it would be necessary to cover the surface twice to be debarked. Of course the debarking could also be accomplished without any tipping of the nozzle if the longitudinal movement of the cant or slab were intermittent and took place at the end of each nozzle stroke, but such an arrangement I consider much less desirable, besides necessitating a more complicated mechanism.

Various mechanical modifications could be made in the device which I have illustrated and described without departing from the principle or scope of my invention. It would also be possible to vary the number of nozzles employed, thus, for example, to have three nozzles swinging in unison from the carriage instead of two, in which case each nozzle would swing through a smaller angle, the paths of the nozzle jets being similar but shorter. Similarly it would be possible to employ only a single nozzle and have it swing through a sufficiently wide angle to move its jet entirely across the slab surface. But I consider the employment of two nozzles for slab barking to be the most practicable under ordinary circumstances. However, it is not my intention to restrict my invention to the particular structure and arrangement which I have described, or to limit the invention otherwise than as set forth in the claims.

I claim:

1. In a hydraulic barker, means for conveying pieces to be debarked longitudinally through the barker, a frame, a nozzle-supporting carriage on said frame, a hydraulic debarking nozzle directed against the bark surface of said pieces, said nozzle rotatably mounted on said carriage to swing in an arc transverse to the direction of travel of said pieces through the barker, rotating means on said carriage and connected to said nozzle for swinging said nozzle in alternate back and forth movements through said arc, means for tilting said carriage and therewith said nozzle in a direction corresponding to the direction of travel of said pieces during each swing of said nozzle, said tilting means including a rotating cam element mounted on said carriage, said cam element connected to and rotating with said nozzle swinging means, a cam follower for said cam element, a member on said carriage carrying said cam follower, an arm rigidly connected with said member, and linkage connected with said arm and mounted on said frame, said cam element and said rotating nozzle swinging means so designed and arranged that the tilting of said carriage and nozzle in said direction of travel of said pieces will take place during each transverse swing of said nozzle and the return tilting in the opposite direction will occur rapidly at the conclusion of each transverse swing of said nozzle, whereby the jet from said

nozzle will travel in oblique, forward-extending lines with respect to the direction of travel of said pieces, for the purpose stated.

2. In a hydraulic barker, means for conveying the pieces to be debarked longitudinally through the barker, a frame, a nozzle-supporting carriage on said frame, a plurality of hydraulic debarking nozzles directed against the bark surface of said pieces, said nozzles rotatably mounted on said carriage to swing in arcs transverse to the direction of travel of said pieces through the barker, rotating means on said carriage and connected to said nozzles for swinging said nozzles in alternate back and forth movements through said arcs, means for tilting said carriage and therewith said nozzles in a direction corresponding to the direction of travel of said pieces, during each swing of said nozzles, said tilting means including a rotating cam element mounted on said carriage, said cam element connected to and rotating with said nozzle swinging means, a cam follower for said cam element, a member on said carriage carrying said cam follower, an arm rigidly connected with said member, and linkage connected with said arm and mounted on said frame, said cam element and said rotating nozzle swinging means so designed and arranged that the tilting of said carriage and said nozzles will take place during each transverse swing of said nozzles and the return tilting in the opposite direction will occur rapidly at the conclusion of each transverse swing of said nozzles, whereby the jets from said nozzles will travel in oblique, forward-extending lines with respect to the direction of travel of said pieces.

3. In a hydraulic barker, means for conveying the pieces to be debarked longitudinally through the barker, a frame, a nozzle-supporting carriage on said frame, said carriage being normally horizontal, a pair of hydraulic debarking nozzles directed against the bark surface of said pieces, said nozzles mounted on said carriage to swing in arcs transverse to the direction of travel of said pieces through the barker, and connected so as to swing in unison, rotating means on said carriage and connected to said nozzles for swinging said nozzles in alternate back and forth movements through said arcs, said nozzles mounted at one end of said carriage, means for raising the other end of said carriage during each swing of said nozzles, a rotating cam element mounted on said carriage in said carriage raising means, said cam element connected to and rotating with said nozzle swinging means, a cam follower for said cam element, a member on said carriage carrying said cam follower, an arm rigidly connected with said member, and linkage connected with said arm and mounted on said frame, said cam element and said rotating nozzle swinging means so designed and arranged that the raising of said other end of said carriage will take place during each transverse swing of said nozzles and the return lowering of said carriage end will occur rapidly at the conclusion of each transverse swing of said nozzles, whereby the jets from said nozzles will travel in oblique, forward-extending lines with respect to the direction of travel of said pieces.

4. A hydraulic barker of the character described including rollers for conveying the pieces to be debarked longitudinally at predetermined rate of speed through the barker, a frame, a nozzle-supporting carriage on said frame, a pair of hydraulic debarking nozzles extending nor-

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mally in a substantially vertical plane and mounted on said carriage to swing in arcs transverse to the direction of travel of said pieces through the barker, said nozzles connected so as to swing in unison, rotating means on said carriage and connected to said nozzles for swinging said nozzles in alternate back and forth movements through said arcs, said nozzles mounted at one end of said carriage, means for raising the other end of said carriage during each swing of said nozzles, a rotating cam element mounted on said carriage in said carriage raising means, said cam element connected to and rotating with said nozzle swinging means, a cam follower for said cam element, a member on said carriage carrying said cam follower, an arm rigidly connected with said member, and linkage connected with said arm and mounted on said frame, said cam element and said rotating nozzle swinging means so designed and

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arranged that the raising of said other end of said carriage will take place during each transverse swing of said nozzles and the return lowering of said carriage end will occur rapidly at the conclusion of each transverse swing of said nozzles, whereby the jets from said nozzles will travel in oblique, forward-extending lines with respect to the direction of travel of said pieces, for the purpose stated.

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The following references are of record in the file of this patent:

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