

March 5, 1946.

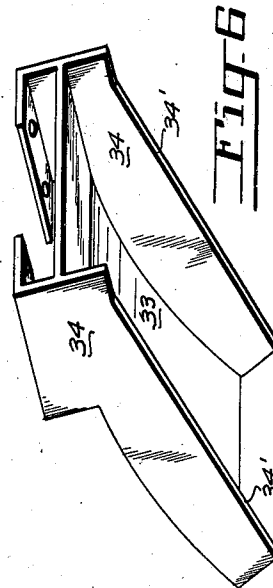
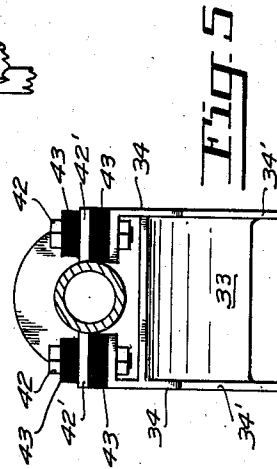
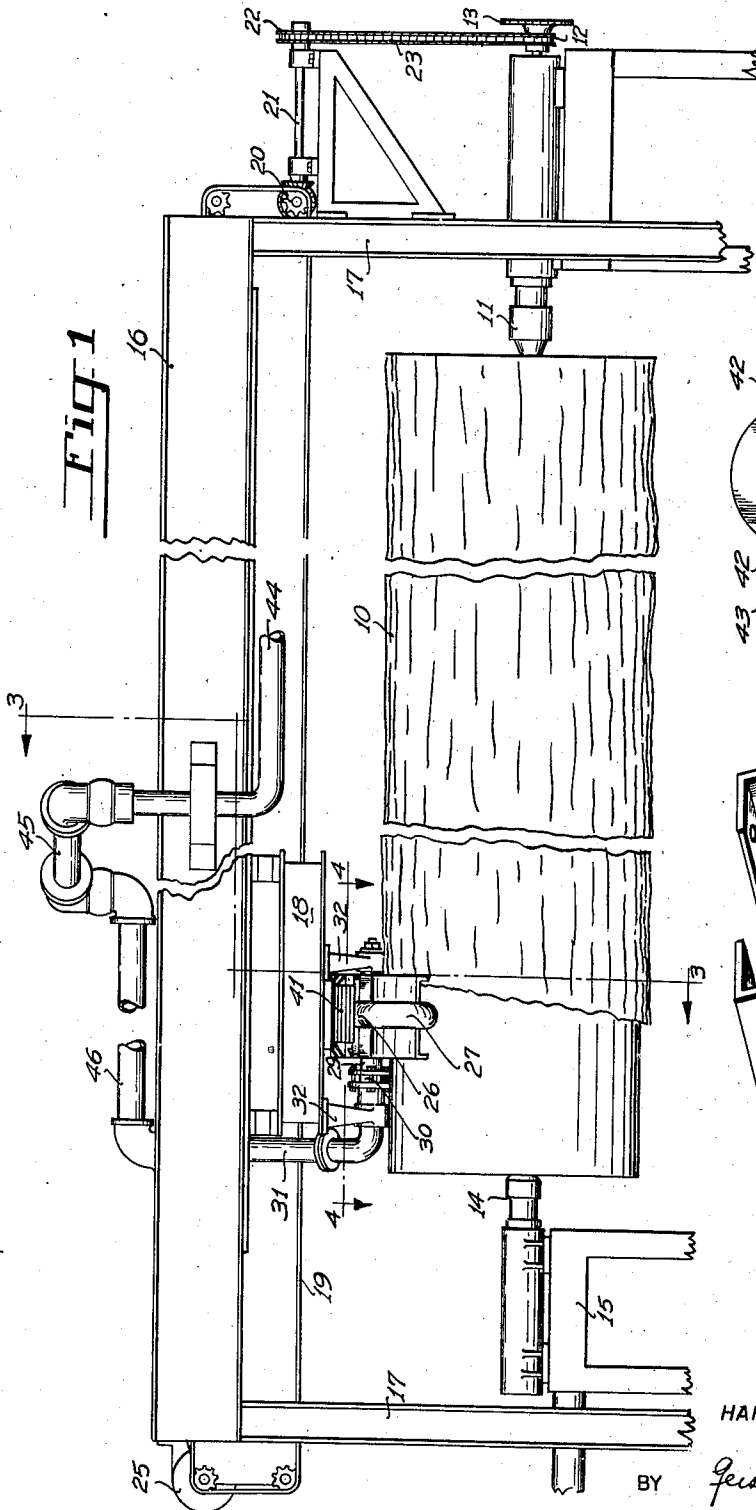
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2,395,845

HYDRAULIC LOG-BARKING MACHINE

Filed Jan. 4, 1943

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

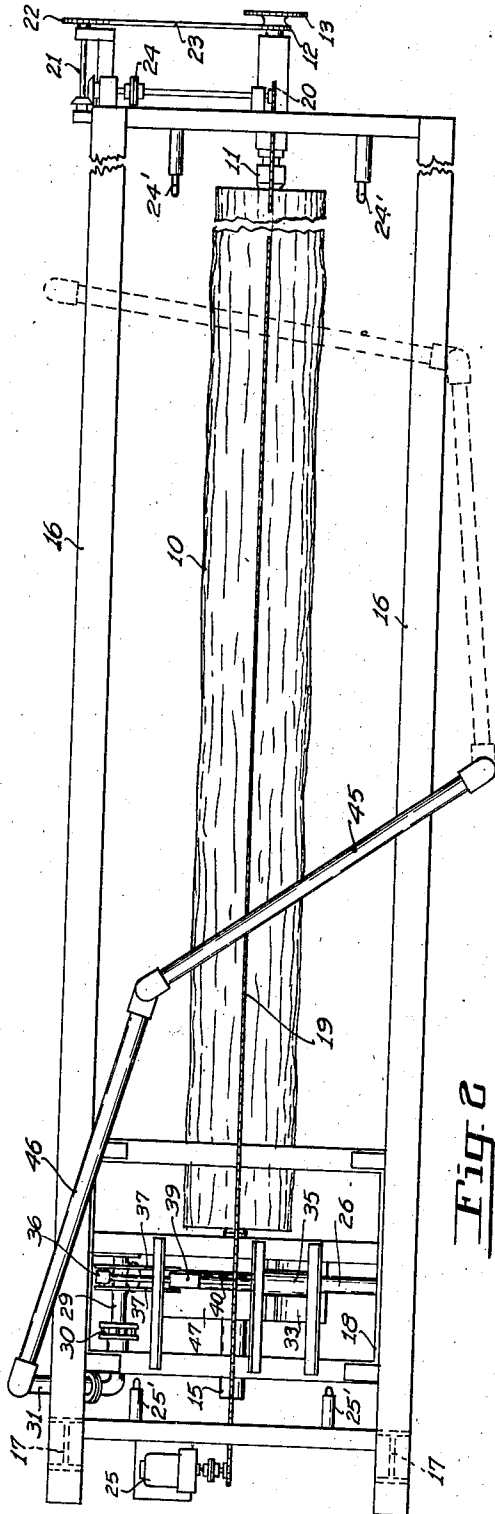


Fig. 2

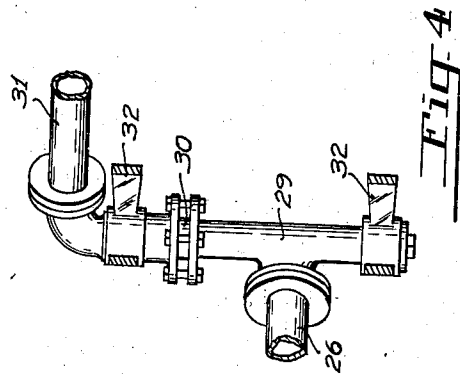


Fig. 4

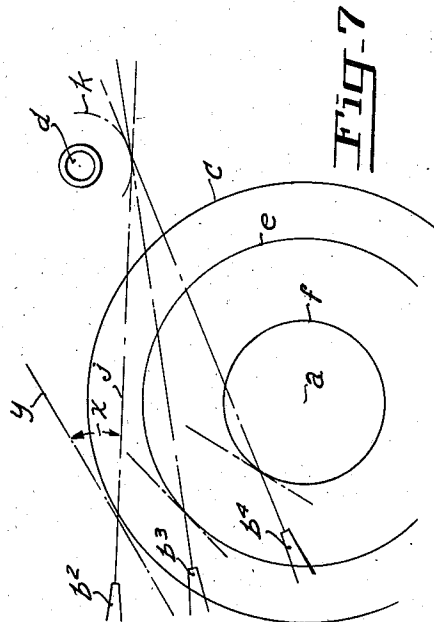


Fig. 7

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3 Sheets-Sheet 3

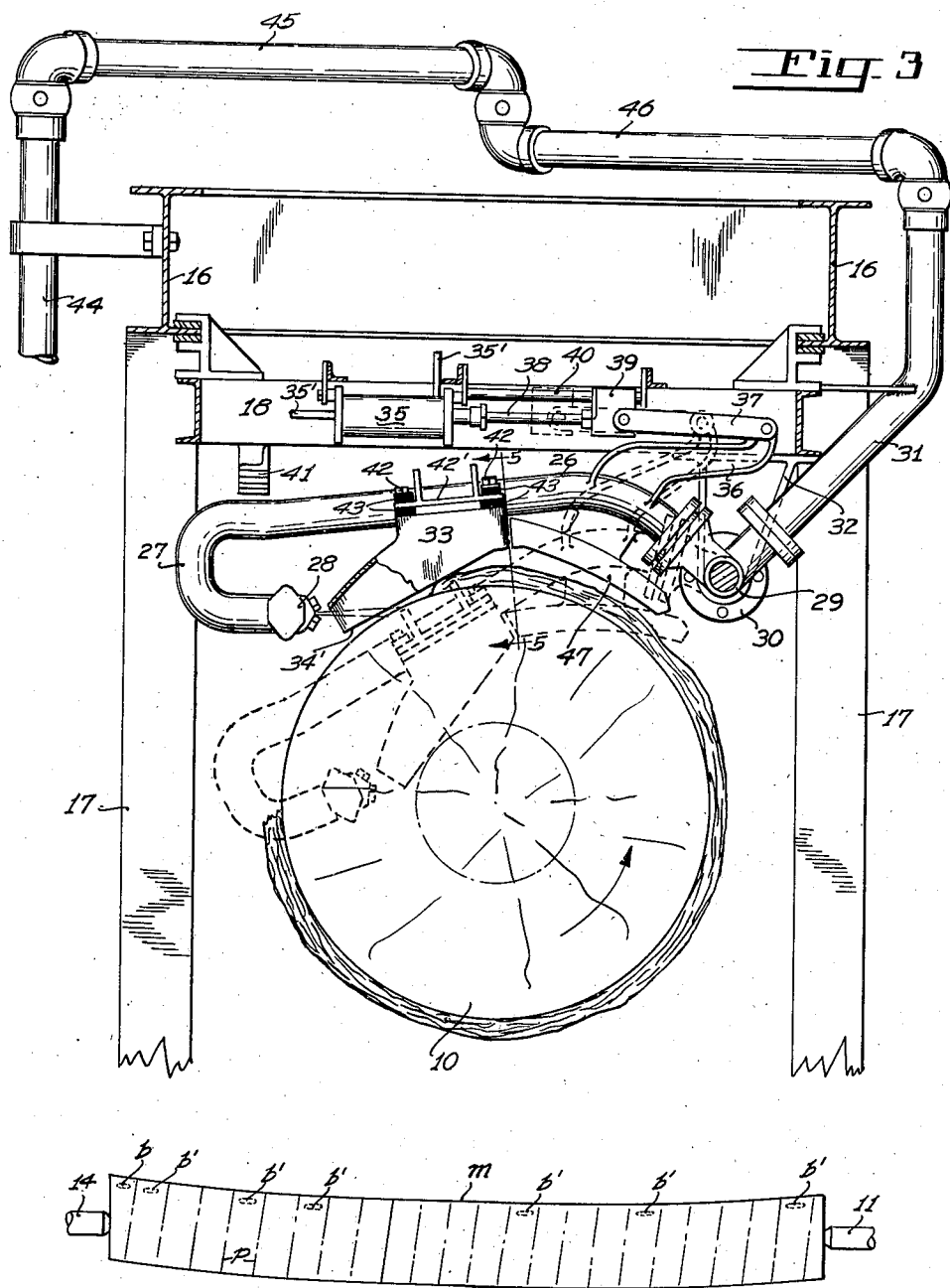


Fig. 8

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UNITED STATES PATENT OFFICE

2,395,845

HYDRAULIC LOG-BARKING MACHINE

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Application January 4, 1943, Serial No. 471,260

9 Claims. (Cl. 144—208)

This application is a continuation in part of my pending application, Serial No. 380,332, filed under date of February 24, 1941, and entitled "Hydraulic log-barking machine," now U. S. Letters Patent No. 2,328,545, dated September 7, 1943; and this present invention similarly relates to hydraulic debarking means adapted for use with logs of various diameters, and also with logs of varying diameters.

In the log-barking machine of my previous application I provide a circular saw located adjacent the debarking nozzle and so arranged as to cut a kerf in the bark slightly ahead of the point of impact of the debarking jet with the log in order to facilitate the removal of the bark by the jet. I have found, however, that with such wood as hemlock, and many other woods commonly used in the paper industry, it is possible to do the debarking with the hydraulic jet alone, provided sufficient force and speed of the jet as discharged from the hydraulic nozzle are maintained and provided location of the point of impact of the jet with respect to the discharging tip of the nozzle remains more or less constant. When such conditions prevail I have found that, with most varieties of wood, the debarking of the log can be done so rapidly by hydraulic means alone that only a few seconds are required for completely debarking a log of say twenty feet in length. When the debarking takes place so rapidly the saw, described in my previous application, cannot be used at all, since the saw cannot cut a kerf through the bark as rapidly as the jet from the nozzle will perform the debarking operation. With special logs, for example with large logs of Douglas fir, where the bark has a thickness of many inches, the debarking is not done so rapidly and then the use of the saw in combination with the nozzle is desirable. The present invention, however, is concerned specifically with the debarking of logs from which the bark can be quickly and easily removed by the use of the hydraulic nozzle alone, provided proper conditions are maintained, as above indicated.

One of the objects of this invention is to provide a hydraulic log-barking machine in which the debarking nozzle will always be properly positioned regardless of the size or regardless of any variations in the size of the log.

Another object of the invention is to provide such a machine in which the distance from the discharging tip of the nozzle to the point of impact of the jet with the log will be fairly constant regardless of the size of the log or the contour of the log.

An additional object is to provide a support for

the nozzle so arranged that the nozzle jet will always strike the log at the most efficient angle with respect to the log surface for the debarking.

One of the main objections to debarking devices in which the debarking of the log is done by mechanical means, such as the knife barkers more commonly employed for this purpose, is that a considerable waste occurs due to unavoidable and inadvertent chipping off of wood just below the bark. Since the best part of the wood for many purposes is located next to the bark it is most desirable that, in the debarking operation, only the bark should be removed and none of the wood under the bark. Even when the debarking is done hydraulically, care must be taken not to remove the wood below the bark layer. The force is so great which is now employed with debarking nozzles that it is possible to cut into the wood below the bark with the jet and, in fact, even to cut clear through the log with such a jet from a hydraulic nozzle. Consequently, even with hydraulic debarking, it is necessary to exercise proper care to avoid waste of material. This may be done by controlling the speed at which the debarking is done, so that there will be proper speed in moving the debarking nozzle and log with respect to each other to allow the jet to remove the bark and still not permit the jet to cut into the surface of the wood below the bark.

A still further object of this invention accordingly is to provide a hydraulic log-barking machine in which not only will the jet always be directed at the proper angle against the log, but in which also the speed at which the debarking is done may also be easily adjusted and controlled so that the debarking will take place in the most efficient manner and with the least waste of material.

These and other objects I have been able to obtain by pivotally mounting a debarking nozzle on a carriage arranged to move longitudinally along a log, in a log-barking machine, as the log is rotated, with the discharging end of the nozzle automatically held in desired position adjacent to the log surface and with the other end pivoted at a predetermined point in fixed relation to the log axis; and by otherwise arranging the nozzle and associated elements in my machine as hereinafter briefly described with reference to the accompanying drawings.

In the drawings:

Fig. 1 is a fragmentary side elevation of my log-barking machine;

Fig. 2 is a fragmentary top plan view of the same;

Fig. 3 is a fragmentary, and more or less diagrammatic, cross section taken on the line 3—3 of Fig. 1 drawn to a larger scale and also illustrating in broken line the position of the nozzle with a log of smaller diameter;

Fig. 4 is a fragmentary section taken on line 4—4 of Fig. 1 with the nozzle and nozzle shoe omitted and showing the pivotal connection for the nozzle;

Fig. 5 is a section through the nozzle taken on line 5—5 of Fig. 3;

Fig. 6 is a view in isometric perspective of the nozzle shoe, showing the same entirely removed from the nozzle;

Fig. 7 is a diagrammatic figure indicating the location and direction of the nozzle jet in the debarking of logs of different diameters; and

Fig. 8 is a diagrammatic representation of the debarking of a crooked log in my machine.

The log 10 (Fig. 1), during the debarking operation, is supported at the forward end of the machine by a suitable spur center carried on a spindle 11 which in turn is mounted in suitable thrust and radial load ball bearings. At the opposite end of the spindle 11 two sprocket wheels 12 and 13 are rigidly attached. The outer sprocket 13 is adapted to be connected to a suitable driving means (not shown) by which rotation is imparted to the spindle 11 and thereby to the log 10. It is assumed that such driving means will be provided with proper controls so that the speed of rotation imparted to spindle and log may be controlled as desired by the operator.

The log 10 is supported at the rear end on a spur attached to a spindle 14 which in turn is mounted in a slidable support 15, adjustable longitudinally in any suitable manner to provide for logs of different lengths. Such log-supporting means is described in my application, Ser. No. 380,332, previously referred to. The spindles 11 and 14 are in axial alignment and the log, when placed in the machine is assumed to be positioned, regardless of its size or of any variations in its contour, with its rotational axis also in alignment with the axes of the spindles 11 and 14. Means for lifting the log into this position is not shown, but various means may be employed, for example, the positioning means described in my copending application, Ser. No. 416,481, filed under date of October 25, 1941, and entitled "Load positioning means," now U. S. Letters Patent No. 2,352,885, issued July 4, 1944.

The machine includes a rigid top frame 16 supported at each end on a pair of uprights or columns 17. A carriage 18 is slidably mounted on the top frame 16 (as shown more clearly in Fig. 3). The carriage 18 is connected to the ends of a sprocket chain 19 which passes over a sprocket wheel 20 at the front end of the top frame 16. The sprocket wheel 20 is connected by suitable gearing to a shaft 21, which in turn is connected with the spindle 11 through the intermediary of sprocket wheels 22 and 12 and the connecting sprocket chain 23, so that rotation of the spindle 11 counter-clockwise, as viewed from the front end, will cause the carriage 18 to move towards the forward end of the machine at a predetermined rate of speed with respect to the rotational speed of the spindle 11 and log 10. A magnetic clutch, indicated at 24 in Fig. 2, is preferably interposed in this carriage-moving mechanism so that the carriage 18 may be disengaged at any time, if desired by the operator, and will be automatically disengaged when it reaches the limit of its forward travel and strikes the contact bumpers

24'. A separate electric motor 25 is preferably included in the carriage-moving mechanism, to be used for retracting the carriage at high speed back to its starting point at the rear of the machine, or back to any intermediate point as desired by the operator, and an automatic shut-off should be included in the control to the motor 25 to stop the operation of the motor when the carriage reaches the contact bumpers 25'.

The debarking nozzle includes a main section 26, shaped preferably as shown in the drawings, and a reversely curved portion 27 at one end which terminates in a nozzle tip 28 so formed as to direct a flat jet of water against the log surface in order to produce a bark-peeling action. The other end of the main section 26 is secured to a pipe joint 29 (Fig. 4) which in turn is joined by a swivel connection 30 to a supply pipe 31 attached to the carriage 18. The pipe joint 29 is rotatably supported in brackets 32 depending from the carriage 18, and the mounting of the nozzle is arranged so as to permit the discharging end or tip of the nozzle to swing up or down in a vertical arc.

A shoe 33, attached to the main nozzle section 26, is adapted to ride on the outer surface of the log during the debarking operation, and thus, when the nozzle is lowered into debarking position, the shoe keeps the nozzle tip 28 from actual contact with the log but enables the tip to ride very close to the log surface. While the shoe 33 may be made in any number of different shapes I have found it very satisfactory to have the shoe in the form of an inverted U or channel shape (as shown in Figs. 5 and 6) which enables the shoe also to serve as a shield confining the small splinters, into which the bark is broken by the force of the jet from the nozzle, within fairly narrow limits and thus aid in disposing of the same. A shield 47 (Fig. 3) at the end of the shoe aids further in confining and directing the bark splinters.

When the shoe is in this form the bottom edges 34' of the sides 34 provide the bearing surfaces or runners which ride on the outer surface of the bark as the log rotates and the carriage 18 moves towards the front of the machine. The shoe 33 may be attached to the nozzle in any desired manner and may be either rigidly or flexibly connected. In the machine illustrated in the drawings I have preferred to attach the shoe to the nozzle by means of bolts 42 extending through flanges at the top of the shoe and through fins 42' (Fig. 5) on the outside of the nozzle, and to interpose cushioning elements 43 of resilient material in order to absorb some of the vibration of the shoe which is caused in passing rapidly over the surface of a rough log.

The positioning of the debarking nozzle up or down with respect to the supporting carriage 18 is preferably done through the medium of a compressed air cylinder 35 (Fig. 3) mounted on the carriage 18. A suitable control valve element (not shown) is provided through which the cylinder 35 is connected to a source of compressed air through the ports 35'. A lever arm 36, rigidly connected to the pivotally-mounted nozzle, is connected at its upper end to a pair of links 37 which in turn are connected to the guide block 39 on the end of the piston rod 38 of the air cylinder 35. The guide block 39 of the piston rod 38 slides on a guide rod 40 mounted on the carriage 18. Thus when compressed air enters the port 35' at the left end of cylinder 35 (as viewed in Fig. 3), while air is allowed to be exhausted through the right hand port 35', the piston rod 38 will be moved to the right and this

will cause the nozzle assembly to be swung upwardly out of debarking position. To prevent the nozzle from striking against the carriage or frame when the nozzle is swung upwardly quickly I provide a nozzle bumper 41 on the carriage.

When the log is in place in the machine and ready for debarking and the carriage is positioned at the rear end of the log, the nozzle is lowered until the shoe rests on the outer surface of the log. This lowering of the nozzle is accomplished by allowing air to enter the port 35' at the right hand end of cylinder 35 (Fig. 3) and be exhausted from the left hand port 35'. The weight of the nozzle and shoe will keep the shoe in contact with the log surface and thus the nozzle tip will be held at the proper location with respect to the log. Should the surface of the log be very irregular, the air cylinder 35 will permit sufficient play in the up and down movement of the nozzle and shoe to enable them to follow the contour of the log, and at the same time the air cylinder and piston provide a desirable cushioning means preventing excessive bouncing of the shoe and nozzle when the log is being rotated rapidly and its surface is very irregular and also holds the nozzle against any kick back.

When the debarking is to be done entirely by the jet of water from a hydraulic nozzle in a debarking machine, I have found that the angle at which the jet is directed against the bark is important. Also I have discovered that variations in the distance between the discharging tip of the nozzle and the points of impact of the jet with the bark have a direct bearing on the efficiency of the debarking jet and that, in general, the effectiveness of the jet in breaking up and removing the bark decreases rapidly as this distance is increased. Consequently in designing a hydraulic log-barking machine in which the nozzle will automatically adjust itself for logs of various sizes and shapes, a chief difficulty which I encountered was the problem of keeping the discharging tip of the nozzle always sufficiently close to the log surface and at the same time keeping the jet directed in the proper manner. In solving this problem with my invention the reverse curve at the free end of the nozzle and the location of the fixed pivotal point of the nozzle with respect to the log axis, as provided in my construction, are essential features. It will be apparent from Fig. 3 that the pivotal point of the nozzle is at a fixed distance from the axis of the log and that the pivotal point and the discharging tip of the nozzle are located in adjacent log quadrants and will never be in the same quadrant. By having the pivotal point of the nozzle sufficient distance from the log axis (thus sufficient distance above and to the right of the axis as viewed in Fig. 3) this feature of having the nozzle tip and the pivotal point of the nozzle in different quadrants is maintained for both large and small logs as evident from Fig. 3. Due to the fact that the free end of the nozzle, during the debarking operation, is supported on the shoe which in turn rides on the surface of the log, and due to the fact that the location of the nozzle tip is fixed with respect to the shoe, the distance of the nozzle tip from the surface of the log, and thus the distance from nozzle tip to point of impact of the jet with the log, will vary very slightly, if at all, with different sizes of logs.

This important feature of my invention is illustrated diagrammatically in Fig. 7 in which d indicates the pivotal point of the nozzle, a is the

axis of the log in each case, c , e , and f indicate logs of different diameters, and b^2 , b^3 and b^4 represent corresponding positions of the nozzle tip. The distances of the nozzles b^2 , b^3 and b^4 from the logs c , e and f respectively will be found to be approximately the same.

In a log debarking machine embodying this invention, which is at present in actual operation, the distance from nozzle tip to point of jet impact measures approximately $6\frac{1}{2}$ inches where the diameter of the log is 54 inches; $6\frac{3}{4}$ inches where the diameter of the log is 36 inches; $6\frac{1}{2}$ inches where the diameter of the log is 24 inches; and $6\frac{3}{4}$ inches where the diameter of the log is 12 inches; thus bearing out this feature of my invention. In the machine referred to in the previous sentence the size of the jet as discharged from the nozzle tip is approximately $4\frac{1}{2}$ inches by $\frac{1}{2}$ inch, the nozzle discharges at the rate of about ten barrels per minute and the speed of the jet as it leaves the nozzle tip is about 275 feet per second. I mention these figures merely by way of illustration, inasmuch as the machine to which I refer and which is in use has been found highly efficient particularly for hemlock logs of the ordinary range of sizes.

By experiment I found that most efficient debarking is obtained when the jet strikes the surface of the log at such an angle that the center line of the jet would, if the log were cut transversely at that point, constitute a chord on the circular cut surface, cutting off a small segment inside the inner bark line, such as indicated by the broken line j in Fig. 7. Since the pivotal point d of the nozzle and the axis a of the log are relatively fixed, and since the discharging tip of the nozzle is always a constant radial distance from the pivotal point d , the center line of the jet, when the nozzle is used for debarking logs of different sizes would tend to be tangent to some imaginary circle of which d is the center, such as the circle indicated by the arc k in Fig. 7, the radius of the circle k , depending upon the curvature given the nozzle. With the arrangement of the nozzle and location of the pivotal point d as indicated in Fig. 7 it will be found that the angle at which the jet strikes the surface of the log (thus the angle x formed by the intersection of the chord j and a tangent y at the point of impact), will be substantially the same regardless of the sizes of logs used.

Since the nozzle-supporting carriage, in the preferred form in which I carry out my invention, is located above the log, I have found it more satisfactory to use an articulated pipe connection for supplying the water to the nozzle instead of the usual flexible hose. Referring to Figs. 1, 2 and 3, the pipe 44, connected to a suitable source of water under pressure, extends up the side of the machine and is connected by means of the pipe sections 45 and 46, having swivel couplings at their extremities, to the pipe 31 carried on the carriage 18. If a flexible hose were used it would be necessary to keep the hose supported and out of the way. The use of articulated pipe in place of the hose is more practical and more convenient and this is an added feature in my machine.

The debarking operation, as already indicated, is a relatively simple matter. Preparatory to the debarking, the nozzle is supported in raised position by the air cylinder and associated means on the carriage. After the log has been placed in position in the machine and is being rotated and the carriage is at the rear end of the log, the nozzle is lowered until the nozzle shoe rests on

the log in the manner previously described. The debarking then proceeds automatically, the carriage moving forward as the log rotates, and the bark is removed by the nozzle in a spiral path. No adjustment and no further manipulation of the nozzle are required. All that is necessary for the operator to do is to watch to see if the log is being rotated at the proper speed so that all the bark is being removed by the jet but none of the wood under the bark, and to increase or decrease the speed of rotation as required if this is not the case. When the debarking is completed and the carriage has reached the forward limit of its travel the nozzle is raised and the carriage is returned swiftly to the rear of the machine while the log is being removed and a new log set in its place.

The entire debarking operation is thus controlled merely by controlling the speed at which the log is rotated in the machine. Since the jet from the nozzle will strike the bark at the predetermined desired distance from the discharging tip of the nozzle, and since the jet will also strike the bark at the predetermined desired angle at all times, the most efficient use of the debarking jet is assured and is obtained without any adjustment of the nozzle regardless of the size of the log or of any variations in the size and shape of the log. Thus practically no skill is required on the part of the operator when debarking with this machine.

Since the carriage travels only once from the rear end of the log to the forward end of the log during the entire debarking operation, all waste of time in having the carriage moved back and forth during the debarking is avoided. This is an advantage over certain other types of hydraulic debarking machines in which the nozzle carriage is obliged to move back and forth innumerable times in the debarking of a single log.

A further important advantage of my machine is the fact that the debarking operation can be carried out just as efficiently with crooked logs as with straight ones, and in this respect my machine is believed to be much superior to other hydraulic debarking machines which are limited more or less to use with straight and regularly formed logs. The debarking of crooked and irregular logs heretofore has constituted somewhat of a problem.

Fig. 8 illustrates diagrammatically a crooked log *m* assumed to be in the machine described. As the log *m* is rotated and the carriage in the machine moves the nozzle from left to right (as viewed in Fig. 8), the nozzle *b* will occupy the successive relative positions indicated by *b'* with each complete rotation of the log. Since the nozzle shoe rests on the log at all times the nozzle, with each successive rotation of the log, will always be in the same relative position with respect to that portion of the log surface which is being debarked, and the debarking follows the same spiral path *p* as in the case of a straight log.

Many modifications could be made in the machine which I have illustrated and described without departing from the principle of my invention. I believe it is essential, however, in order to accomplish fully the objects of my invention, to employ a pivotally-mounted debarking nozzle in which the pivotal point is located on one side of the log while the discharging tip of the nozzle is located at the other side of the log, and also to form the nozzle with a curve adjacent

the tip in order to have the debarking jet directed against the log at a fairly constant angle of impingement.

I claim:

1. In a log-barking machine of the character described, including means for supporting the log for rotation and a carriage movable in a plane parallel to the rotational axis of the log, a debarking nozzle, said nozzle pivotally mounted on said carriage so as to swing in a plane perpendicular to the rotational axis of the log, a reverse curve in said nozzle between the discharging tip of said nozzle and said pivotal point, the location of said pivotal point and the distance of the discharging nozzle tip from said pivotal point adapted to cause said tip and said pivotal point always to be on opposite sides of a log in the machine for the purposes described.

2. In a log-barking machine of the character described, including means for supporting the log for rotation, a carriage movable longitudinally of the log and parallel to the rotational axis of the log, a debarking nozzle, said nozzle pivotally mounted on said carriage so as to swing in a plane perpendicular to the rotational axis of the log, said carriage and nozzle so arranged that the pivotal point of said nozzle will be a fixed distance from the rotational axis of the log at all times, a reverse curve in said nozzle between the discharging tip of said nozzle and said pivotal point, the location of said pivotal point and the distance of the discharging nozzle tip from said pivotal point adapted to cause said tip and said pivotal point always to be on opposite sides of a log in the machine, a shoe connected to said nozzle, said shoe adapted to rest against the surface of the log during the debarking and to keep the nozzle tip spaced a predetermined substantially fixed distance from the log surface, said reverse curve in said nozzle so arranged as to cause the jet from said nozzle to be discharged in a general direction towards said pivotal point, whereby the jet from said nozzle tip will strike the log surface at a substantially constant and predetermined angle when the nozzle is in debarking position regardless of the size of the log.

3. In a log-barking machine of the character described, including means for supporting the log for rotation and a carriage movable longitudinally of the log, a debarking nozzle, said nozzle pivotally mounted on said carriage so as to swing in a plane perpendicular to the rotational axis of the log, a reverse curve in said nozzle between the discharging tip of said nozzle and said pivotal point, the location of said pivotal point and the distance of the discharging nozzle tip from said pivotal point adapted to cause said tip and said pivotal point always to be on opposite sides of a log in the machine for the purposes described, a shoe mounted on said nozzle, said shoe adapted to ride on the surface of the log during the debarking and to keep the nozzle tip spaced a predetermined substantially fixed distance from the log surface, and means operated by fluid pressure, mounted on said carriage and connected with said nozzle, for holding said nozzle and shoe in debarking position and for lifting said nozzle and shoe out of debarking position.

4. The combination described in claim 3 with said shoe having side walls and a top portion adapted to act also as a shield in confining and directing the course of bark fragments produced by the nozzle jet.

5. In a log-barking machine of the character

described, including means for supporting the log for rotation, a carriage movable longitudinally of the log and parallel to the rotational axis of the log, a debarking nozzle, said nozzle pivotally mounted on said carriage so as to swing in a plane perpendicular to the rotational axis of the log, said carriage and nozzle so arranged that the pivotal point of said nozzle will be a fixed distance from the rotational axis of the log at all times, a reverse curve in said nozzle between the discharging tip of said nozzle and said pivotal point, the location of said pivotal point and the distance of the discharging nozzle tip from said pivotal point adapted to cause said tip and said pivotal point always to be on opposite sides of a log in the machine, a shoe mounted on said nozzle, said shoe adapted to ride on the surface of the log during the debarking and to keep the nozzle tip spaced a predetermined substantially fixed distance from the log surface, said reverse curve in said nozzle so arranged as to cause the jet from said nozzle to be discharged in a general direction towards said pivotal point, whereby the jet from said nozzle tip will strike the log surface at a substantially constant and predetermined angle when the nozzle is in debarking position regardless of the size of the log, means supported on said carriage and connected with said nozzle and adapted to aid in automatically holding said nozzle and shoe in debarking position regardless of irregularities in the log surface, a supply pipe on said carriage connected to said nozzle, and means including articulated pipe sections on said machine for connecting said supply pipe with a source of water under pressure.

6. In a log-barking machine of the character described, including means for supporting the log for rotation, means for rotating the log, a carriage movable longitudinally of the log and parallel to the rotational axis of the log, a debarking nozzle, said nozzle pivotally mounted on said carriage so as to swing in a plane perpendicular to the rotational axis of the log, a reverse curve in said nozzle between the discharging tip of said nozzle and said pivotal point, the location of said pivotal point and the distance of the discharging nozzle tip from said pivotal point adapted to cause said tip and said pivotal point always to be on opposite sides of a log in the machine, a shoe connected to said nozzle, said shoe adapted to rest against the surface of the log during the debarking and to keep the nozzle tip spaced a predetermined substantially fixed distance from the log surface, means for moving said carriage, said carriage moving means connected with said log rotating means so that said

carriage will move at a predetermined speed ratio with respect to the rotation of the log, whereby a change in speed of rotation will automatically cause corresponding change in the speed of travel of said carriage and nozzle and whereby the speed at which the debarking is done can be controlled merely by adjusting the speed of rotation of the log.

7. The combination described in claim 6 with said shoe having side walls and a top portion adapted to act also as a shield in confining and directing the course of bark fragments produced by the nozzle jet, and means supported on said carriage and connected with said nozzle and adapted to aid in automatically holding said nozzle and shoe in debarking position regardless of irregularities in the log surface.

8. In a log-barking machine of the character described, including means for supporting the log for rotation, a carriage movable longitudinally of the log, a debarking nozzle pivotally mounted on said carriage for movement in a plane substantially perpendicular to the plane of travel of said carriage, a discharging tip at the free end of said nozzle, a shoe connected with said nozzle, said shoe adapted to ride on the surface of the log and thereby to hold the tip of said nozzle a desired distance from the log surface at all times, a reverse curve in said nozzle between said discharging tip and said pivotal mounting, the distance between said pivotal mounting and said discharging tip being such that they will be located at opposite sides of the log for the purposes described.

9. In a hydraulic log-barking machine of the character described, means for supporting the log for rotation, means for rotating the log, a carriage movable longitudinally of the log, means for moving said carriage, a nozzle assembly pivotally supported on said carriage for movement in a plane substantially perpendicular to the line of travel of said carriage, said nozzle assembly including a shoe adapted to ride on the surface of the log and thereby to support the free end of said assembly, a debarking nozzle included in said assembly, said nozzle connected with a source of water under pressure, said nozzle having a discharging tip, and a curve adjacent the tip, the pivotal support of said assembly located at a fixed distance with respect to the axis of rotation of the log, and the pivotal support of said assembly and said discharging nozzle tip located in adjacent log quadrants whereby said nozzle assembly will automatically accommodate itself to variations in the diameter of the log and to logs of various diameters.

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