Nov. 16, 1948. F. H. SWIFT 2,453,947

HYDRAULIC TYPE LOG-DEBARKER HAVING PLURAL LOG-ROTATING CHUCKS INDEPENDENTLY REVOLVABLE ABOUT A COMMON AXIS

Filed Dec. 22, 1945

5 Sheets-Sheet 1

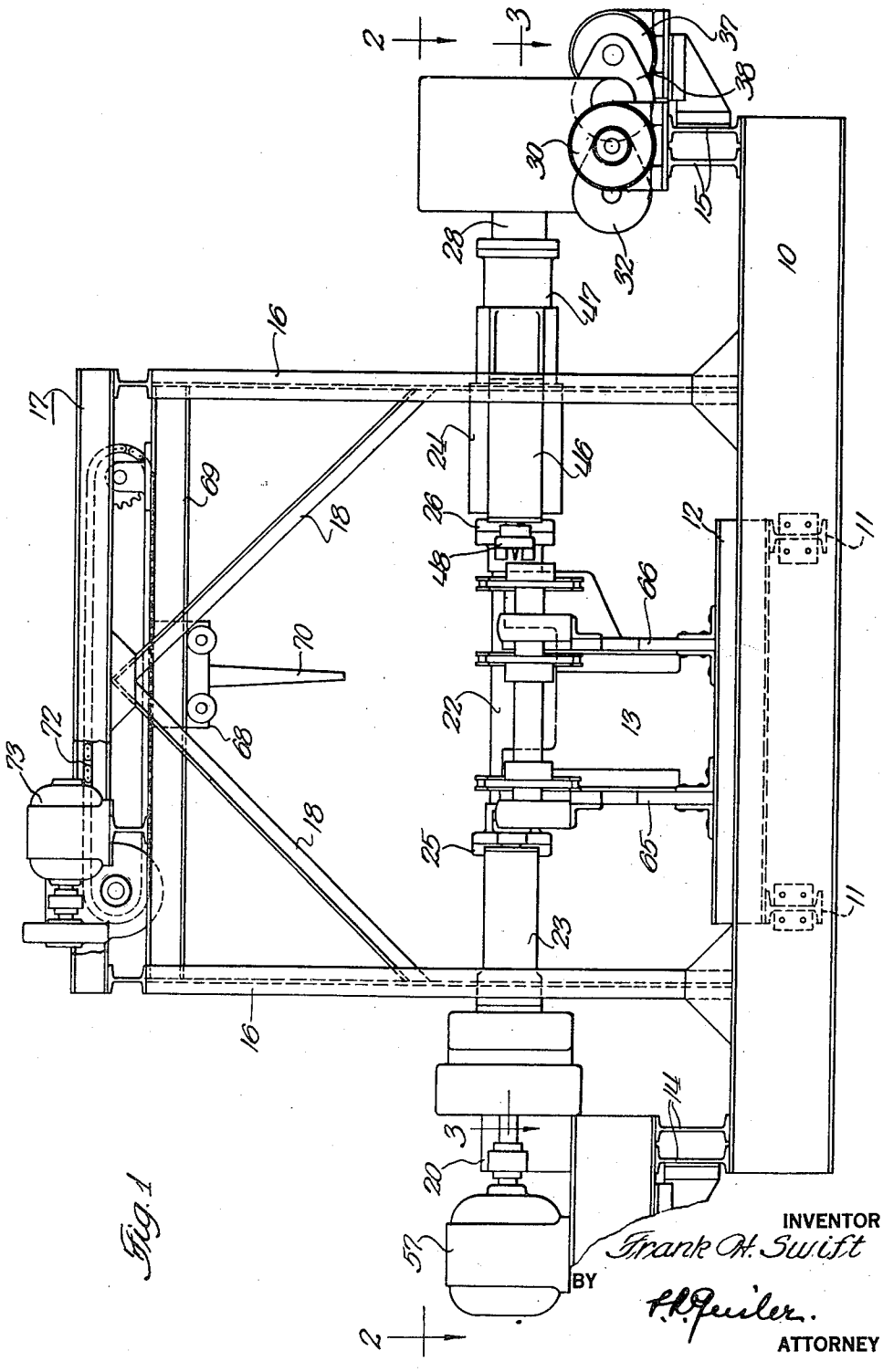


Fig. 1

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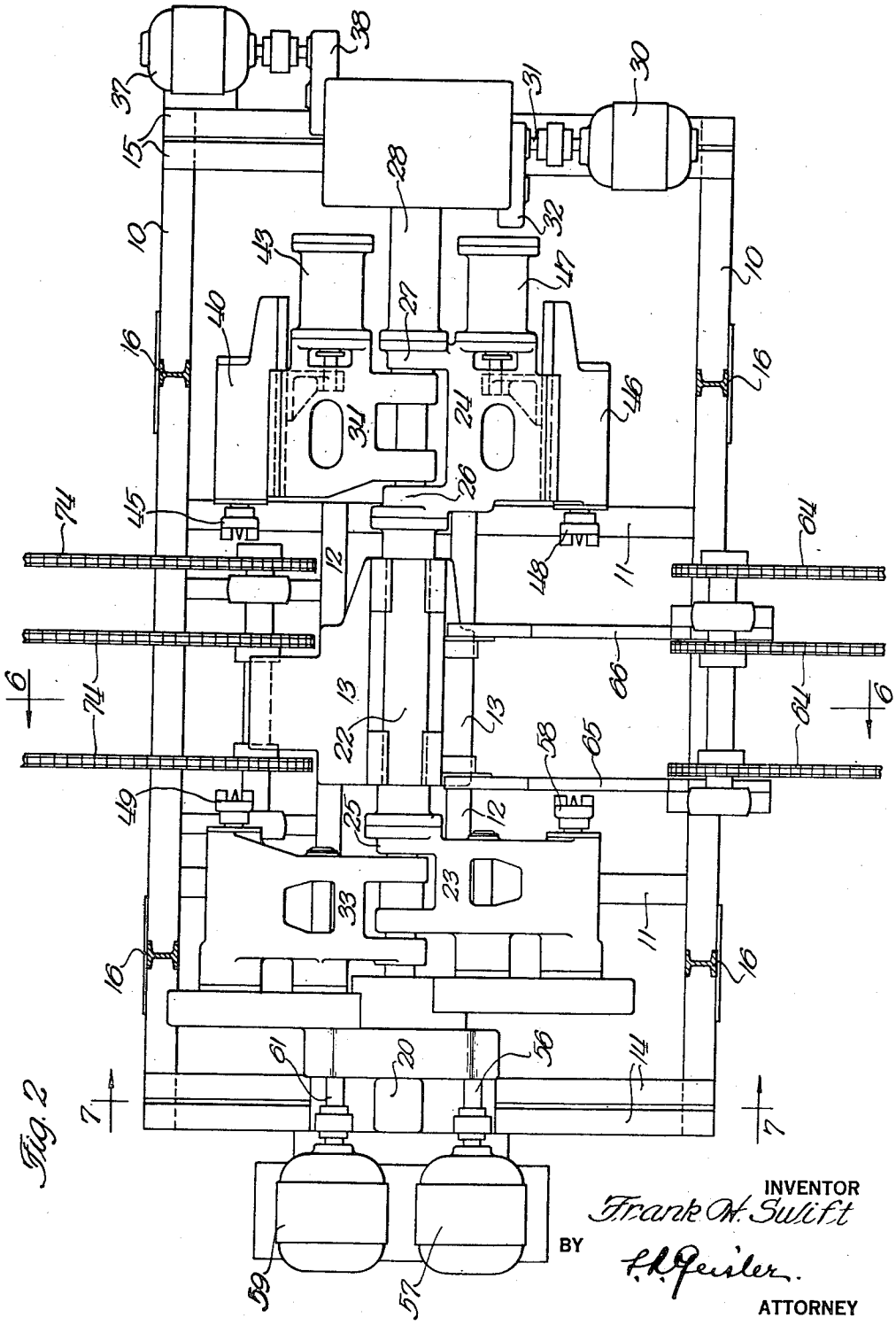


Fig. 2

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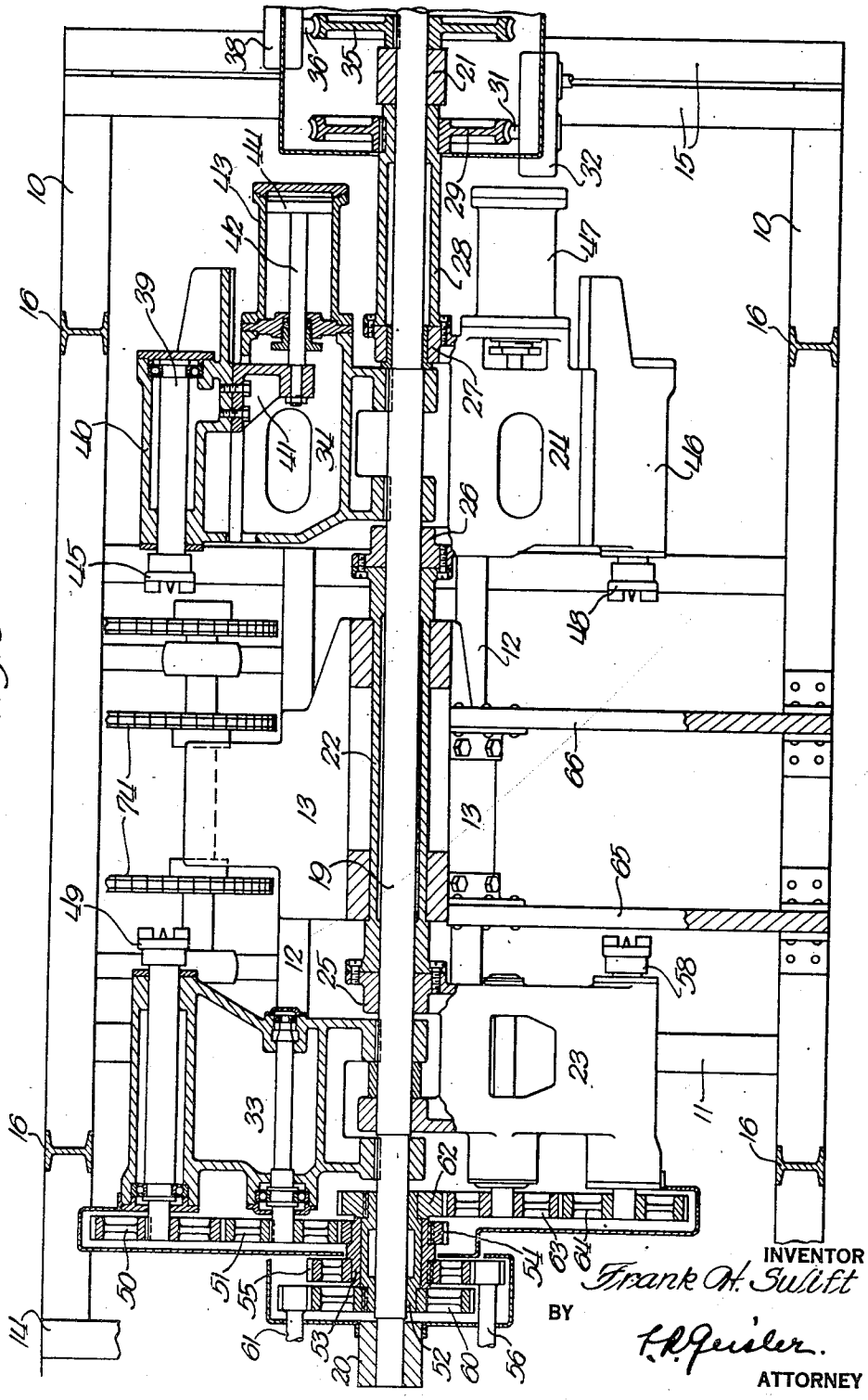
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HYDRAULIC TYPE LOG-DEBARKER HAVING PLURAL LOG-ROTATING CHUCKS INDEPENDENTLY REVOLVABLE ABOUT A COMMON AXIS

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5 Sheets-Sheet 3

Fig. 3



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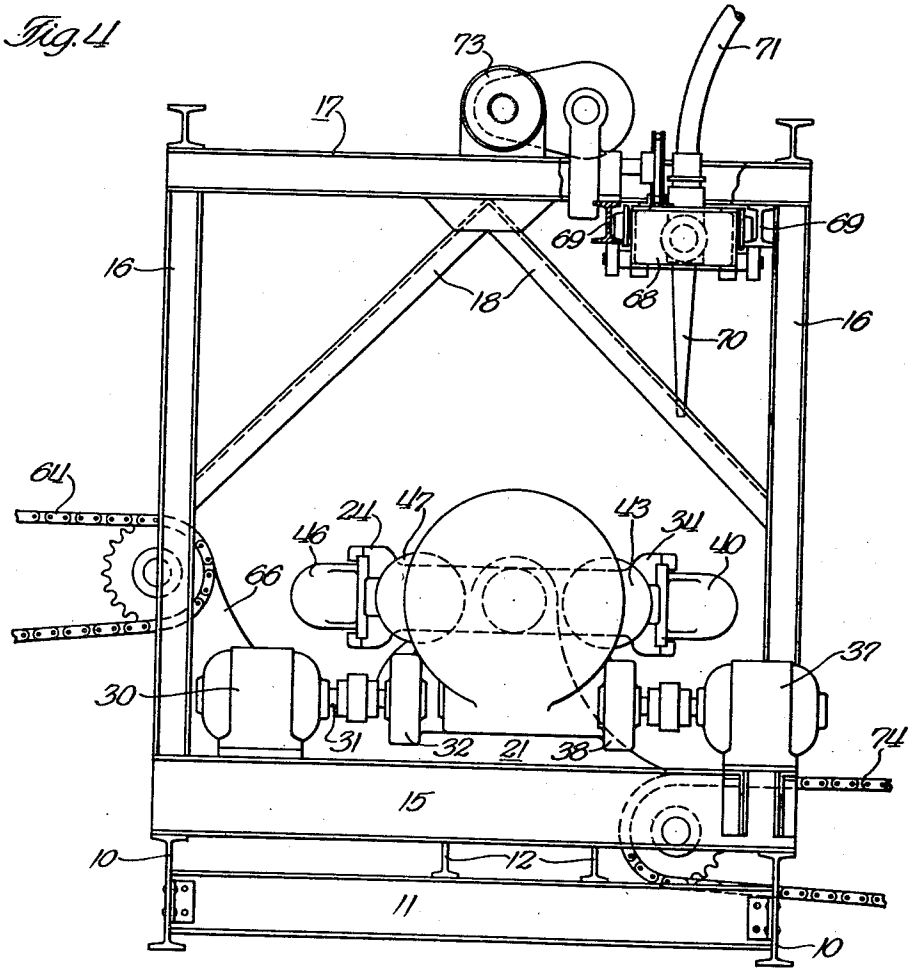
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Filed Dec. 22, 1945

5 Sheets-Sheet 4

Fig. 4



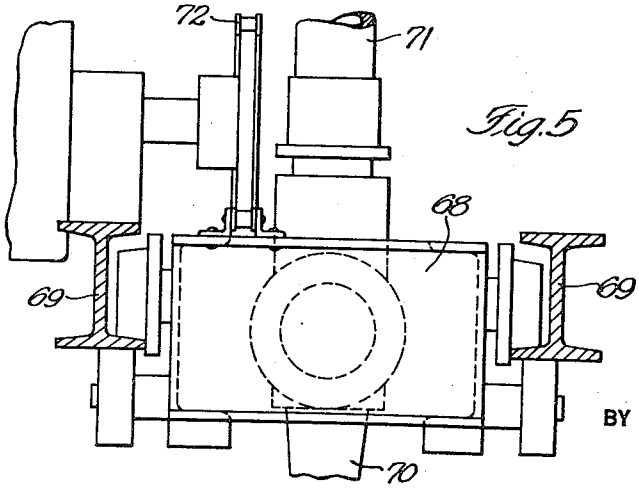


Fig. 5

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Filed Dec. 22, 1945

5 Sheets-Sheet 5

Fig. 6

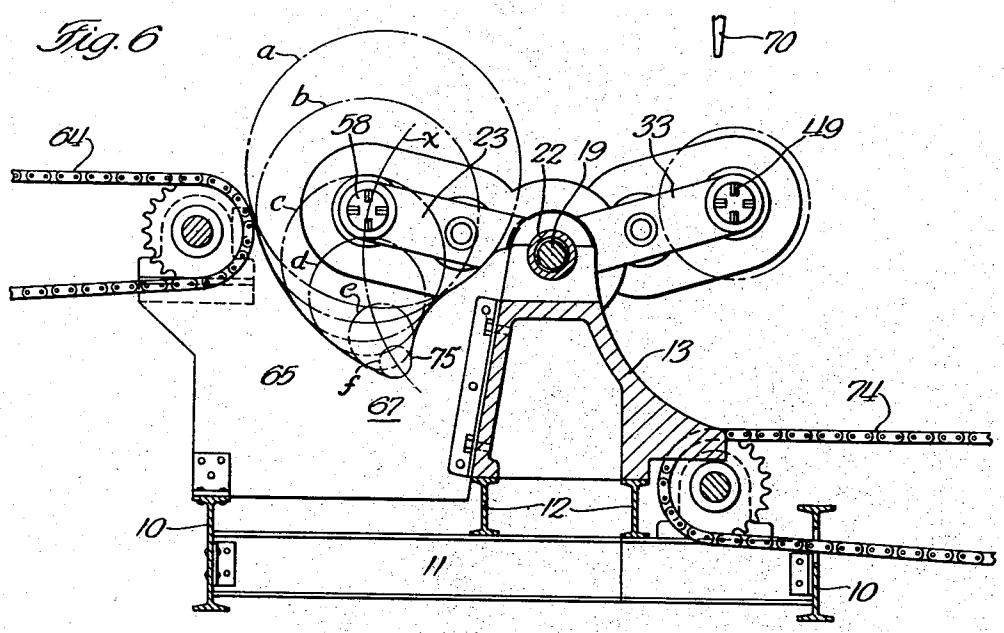
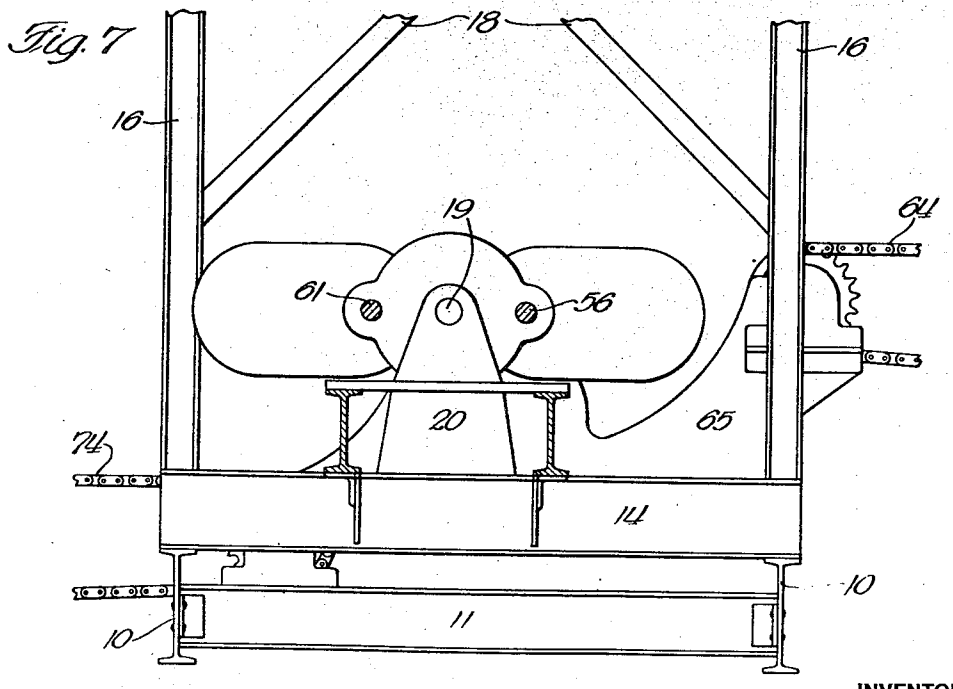


Fig. 7



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UNITED STATES PATENT OFFICE

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HYDRAULIC TYPE LOG DEBARKER HAVING PLURAL LOG-ROTATING CHUCKS INDEPENDENTLY REVOLVABLE ABOUT A COMMON AXIS

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Application December 22, 1945, Serial No. 637,002

5 Claims. (Cl. 144—208)

1

This invention relates in general to the debarking of logs by hydraulic means, and, more specifically, to the debarking of short length logs of various sizes.

At the present time short lengths of logs are generally regarded as unfit for debarking and consequently are customarily wasted or used merely as fuel. This is due to the fact that the debarking of such short length logs in ordinary log barking machines, if the machines are capable of handling short lengths, consume so much time and labor that the results are not considered justifiable. On the other hand such short logs, if they can be debarked economically, will yield much additional valuable wood for pulp mills.

The object of the present invention is to provide a hydraulic log barking machine which is particularly adapted for short lengths of logs, in which such logs can be profitably handled at a minimum cost in time and labor.

Another object of this invention is to provide a hydraulic barking machine for short logs which will handle logs of a wide range of diameters and which will be simple and easy to operate.

These objects and incidental advantages I attain by providing a double pair of positioning arms carrying supporting chucks for the logs, so arranged that, during the time one log is being debarked, another log can be loaded into the barking machine; and also by constructing and arranging the various parts of my machine substantially as hereinafter briefly described.

In the following description reference is to be made to the accompanying drawings, in which:

Fig. 1 is an elevation taken from the intake side of my machine, with the means for conveying the logs to the machine omitted for the sake of clarity;

Fig. 2 is a plan section taken on the plane indicated by the lines 2—2 of Fig. 1;

Fig. 3 is an enlarged fragmentary plan section on lines 3—3 of Fig. 1;

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

Fig. 5 is a fragmentary enlarged elevation of the hydraulic nozzle carriage shown in Fig. 4;

Fig. 6 is a fragmentary vertical transverse section corresponding to the lines 6—6 of Fig. 2; with part of the machine frame omitted for the sake of clarity; and

Fig. 7 is a sectional elevation on lines 7—7 of Fig. 2.

The machine is supported in a frame including a pair of main base members 10, connected by intermediate transverse beams 11, the latter supporting the central members 12. A central main standard 13 is supported on the members 12 (see Figs. 3 and 6). Pairs of end beams 14 and 15 are welded to the tops of the main base members

2

10 at each end. Four upright I-beams 16, with their bottom ends rigidly mounted on the base, support the top frame which is indicated as a whole by the reference character 17, and suitable braces such as 18, are provided to make the entire superstructure sufficiently rigid.

A main shaft 19 (Fig. 3) extends across the machine and is rotatably supported near each end on the standards 20 and 21 which are mounted on top of the pairs of end beams 14 and 15 respectively.

A rotatable tubular casing 22 (Figs. 1, 2 and 3) extends over the central portion of main shaft 19 and is also rotatably supported in the central standard 13. A pair of hollow log-carrying arms 23 and 24 are journaled on the main shaft 19 at each end of the tubular casing 22, and their adjacent journal portions 25 and 26 (see Fig. 3) are secured to the respective ends of the tubular casing 22. The arms 23 and 24 extend in the same plane and they and the tubular casing 22 are adapted to rotate in unison about the main shaft 19, as is apparent from Fig. 3. The outside journal portion 27 of the arm 24 is connected to a second tubular casing 28 (Figs. 2 and 3), to the right hand end of which (as viewed in Fig. 3), a worm gear 29 is keyed. A motor 30 (Figs. 1, 2 and 4), is connected to a worm shaft 31 (Fig. 3), through suitable reduction gears contained in a housing 32. The worm shaft engages with worm gear 29 and thus the log carrying arms 23 and 24 will be rotated in unison about the main shaft 19 whenever the motor 30 is operated.

A second pair of log-carrying arms 33 and 34 (Figs. 2, 3 and 6), similar to the arms 23 and 24, are keyed to the main shaft 19, as shown clearly in Fig. 3. A worm gear 35 is keyed to the right hand end of shaft 19 (as viewed in Fig. 3). A worm shaft 36, driven from a motor 37 (Fig. 2) through the intermediary of suitable reduction gears located within housing 38, engages the worm gear 35. Thus the pair of log-carrying arms 33 and 34 will be rotated in unison whenever the motor 37 is operated.

A chuck shaft 39 (Fig. 3) is rotatably mounted in a chuck carriage 40. The chuck carriage 40 is slidably mounted on the arm 34 (Figs. 2, 3 and 4). A bracket arm 41 (Fig. 3), secured to the chuck carriage 40, is attached to a piston rod 42 operating in a cylinder 43 which is carried by the arm 34. Suitable pneumatic or hydraulic means (such means not being shown in the drawings), is connected to the cylinder 43 so that the piston head 44, and with it the piston rod 42, chuck shaft 39 and chuck 45 can be moved in either direction. The chuck 45 carries suitable engaging pins or similar means adapted for engaging and holding the end of a log.

A similar chuck carriage 46, is slidably mounted on the arm 24, and similar means, including a

cylinder 47, are arranged to adjust the position of the chuck 48.

A chuck 49 (Fig. 3) is rotatably mounted in the arm 33 in axial alinement with chuck 45. To the inner end of the shaft of the chuck 49 a gear 50 is keyed. Gear 50 meshes with gear 51, also rotatably mounted in arm 33. A sleeve 52 is rotatably mounted on the main shaft 19 near the left hand end of the same, as viewed in Fig 3, and a second sleeve 53 is rotatably mounted on the outside of the sleeve 52. A ring gear 54, keyed to the inner end of the sleeve 53, meshes with gear 51. A gear 55, keyed to the outer end of sleeve 53, meshes with a gear on the end of shaft 56. Shaft 56 is driven by a motor 57 (Figs. 1 and 2). Thus operation of the motor 57 will cause the chuck 49 to rotate regardless of the position of the arm 33.

Similarly the chuck 58 rotatably mounted in arm 23, is rotated by motor 59. Thus a gear 60 (Fig. 3), keyed to the outer end of sleeve 52, meshes with a gear on the end of the shaft 61 which is driven by the motor 59. A ring gear 62, secured on the inner end of sleeve 52, meshes with the gear 63 which in turn meshes with gear 64 keyed to the shaft of the chuck 58.

The chucks 45, 48, 49 and 58 are all located at the same radial distance from the axis of the main shaft 19.

The logs to be debarked are delivered to the machine by suitable conveyor means, such as the endless transfer chains 64 (Figs 2 and 4). In order to hold and position each log prior to its engagement by the log-supporting arms of the machine, I provide a centering cradle or support composed of two identical, substantially vertical and parallel sides 65 and 66. The top edges of these sides constitute the cradle or support 67 having a groove of special formation, the shape of which is shown most clearly at 75 in Fig. 6. The bottom of said groove extends parallel to the man shaift 19 and is located approximately the same distance from the main shaft 19 as the chucks. The two sides of the groove are curved, the curvature being determined by the points of tangency of circles of decreasing radii having their centers located in the arc x (indicated by the dotted line in Fig. 6), being an arc of a circle similar to that described by the chucks as the pairs of log-carrying arms are rotated about the main shaft 19. In Fig. 6 the broken lines a, b, c, d, e and f, having their centers in the arc x, may also be regarded as representing logs of different diameters, thus illustrating how logs of such different sizes would be positioned in the groove of the support or cradle 67, as each log in turn is dumped into the cradle 67 from the transfer chains 64, and thus indicating that the centers of the logs will always be substantially in the arc indicated by the dotted line x.

A nozzle carriage 68 (Figs. 4 and 5), is mounted for travel on a pair of tracks 69 supported from the top frame 17. An adjustable, downwardly-extending hydraulic nozzle 70 is mounted on the carriage and is connected by a flexible hose 71 to a suitable source of water under sufficient pressure to enable a hydraulic jet to be discharged from the nozzle tip capable of removing the bark on the logs being treated in the machine. The nozzle carriage 68 is attached to an endless chain 72 (see also Fig. 1), driven from a reversible motor 73. Suitable reversible switches (not shown) are provided near each end of the track 69 and are connected to the motor 73 so that the carriage 68, and with it the nozzle 70, upon reaching the desired limit of its travel in one direction, will be returned to the opposite end of the tracks. Manual control means (not shown) is also provided for the motor 73 so that the nozzle carriage can be stopped at any desired point, and suitable speed controls are included in the motor controls so that the travel of the nozzle carriage can be regulated as desired to suit the nature and size of the particular log being debarked. Similarly, the motors 57 and 59, which control the rotation of the chucks 49 and 58, have speed controls so that the speed of rotation of the chucks can be regulated when desired.

Briefly, the operation of my machine is as follows: a log is delivered by the transfer chains 64 into the log positioning cradle 67 formed by the two cradle walls 65 and 66. A pair of log-carrying arms, for example the arms 23 and 24, are rotated (by operation of the motor 30), until their chucks 58 and 48 are approximately in line with the axis of the log. The operator then shuts off motor 30, temporarily stopping the rotational movement of the arms 23 and 24. The chuck 48 is now forced against the end of the log (by operation of the piston in cylinder 47) until the log is firmly secured between the two chucks 58 and 48. The arms 23 and 24 are now given further rotation until the log is in position under the debarking nozzle 70. The motor 59 is turned on in the meantime causing the log to be rotated while held under the debarking nozzle by the arms 23 and 24. As the log is rotated in this position the motor 73 causes the nozzle carriage to travel at a predetermined rate from one end of the log to the other, thus performing the desired debarking of the entire log.

During the debarking of this log the second log is delivered into the cradle from the transfer chains 64 and the second pair of arms 33 and 34 are moved (by the operation of motor 37), in clockwise direction (as viewed in Fig. 6), until their chucks 49 and 45 are in substantial alinement with the axis of the second log. The chuck 45 is then thrust against the end of the second log (by the operation of the piston associated with cylinder 43), until the second log is firmly secured between the chucks 49 and 45. When the debarking of the first log is completed the first pair of arms 23 and 24 are rotated further (in clockwise direction as viewed in Fig. 6), causing the first log to be moved outwardly away from contact with the debarking nozzle jet and down near the standard 13. Thereupon the chuck carriage 46, and with it the chuck 48, is withdrawn from the end of the log causing the first log to roll down on to the second group of transfer chains 74 and thus be conveyed away from the machine. In the mean time the second log, supported on the arms 33, 34, is moved into position under the debarking nozzle and rotated as previously described. While the second log is being debarked in the same manner a third log is delivered into the cradle and the first pair of arms 23 and 24 are moved further (in clockwise direction as viewed in Fig. 6), until their chucks are in proper position for engaging the third log; and so on.

Consequently, with my device, one log is being secured in place on a pair of arms and chucks while another log is being debarked. It is possible for a single operator, merely by manipulating the switches controlling the motors in my machine and by operating the control means for the two cylinders connected with their respective chucks, to take care of the debarking of short logs in rapid succession. Thus it will be found

that, with my machine, short length logs can be very profitably debarked and utilized the same as longer logs.

Of course it would be possible to adapt my machine for use with longer logs, and it is not my intention to limit my invention to logs of any particular length. But, in my opinion, the greatest value of my machine will be found in the debarking of logs which cannot be economically debarked in the various barking machines which are now being used for long logs. Minor structural changes could also be made in my machine without departing from the principle of my invention.

I claim:

1. In a hydraulic barker, two pairs of arms mounted for rotation about a fixed axis, means for rotating each pair of arms in unison independently of the other pair, the arms in each pair extending in the same plane, a chuck mounted in each arm for rotation on an axis parallel to said fixed axis, said chucks located an equal radial distance from said fixed axis, separate means for rotating one chuck in each of said pairs of arms, and means for moving one chuck in each of said pairs of arms in a direction parallel to said fixed axis, whereby to permit logs of different lengths to be supported between the chucks in each pair of arms, and whereby to enable one pair of arms to be moved into loading position while the other pair remain stationary.

2. A hydraulic barker of the character described including two pairs of arms mounted for rotation about a fixed axis, means for rotating each pair of arms in unison independently of the other pair, the arms in each pair extending in the same plane, a chuck mounted in each arm for rotation on an axis parallel to said fixed axis, said chucks located an equal radial distance from said fixed axis, separate means for rotating one chuck in each of said pairs of arms, means for moving one chuck in each of said pairs of arms in a direction parallel to said fixed axis, whereby to permit logs of different lengths to be supported between the chucks in each pair of arms and whereby to enable one pair of arms to be moved into loading position while the other pair remain stationary, and a debarking nozzle located above said arms and adapted to discharge a debarking jet against a log when supported in debarking position by the chucks of either of said pairs of arms.

3. In a hydraulic barker, a plurality of pairs of arms mounted for rotation about a fixed axis, means for rotating each pair of arms in unison independently of the other arms, the arms in each pair extending in the same plane, a chuck mounted in each arm for rotation on an axis parallel to said fixed axis, said chucks located equal radial distances from said fixed axis, separate means for rotating one chuck in each of said pairs of arms, a debarking nozzle, means for moving said nozzle in a direction normal to the direction of rotation of said arms, and means for positioning a log in said machine preparatory to engagement of the ends of the log by the chucks of a pair of said arms, whereby one pair of arms and chucks can be used for supporting and rotating a log in proper location for debarking by said nozzle while another pair of arms and chucks can be moved into engagement with another log preparatory to the similar debarking of said other log and thereby enable the debarking of logs to take place consecutively with a minimum loss of time.

4. In a hydraulic barker, a pair of arms mounted for rotation about a fixed axis, means for rotating said arms in unison, said arms extending in the same plane, a chuck mounted in each arm for rotation on an axis parallel to said fixed axis, said chucks located equal distances from said fixed axis, means for rotating one of said chucks, a debarking nozzle, and a stationary support for positioning a log in said machine to facilitate engagement of the ends of the log by said chucks preparatory to the moving of the log into debarking position with respect to said nozzle, said support having curved, downwardly sloping sides, the curvature of said sides being determined by points of tangency of circles of decreasing diameter having their centers arranged in the circular path described by said chucks when said arms are rotated, whereby logs of different diameter will be properly positioned by said support for engagement by said chucks and arms.

5. A hydraulic barker of the character described including a plurality of pairs of arms mounted for rotation about a fixed axis, means for rotating each pair of arms in unison independently of the other arms, the arms in each pair extending in the same plane, a chuck mounted in each arm for rotation on an axis parallel to said fixed axis, said chucks located an equal radial distance from said fixed axis, separate means for rotating one chuck in each of said pairs of arms, means for moving one chuck in each of said pairs of arms in a direction parallel to said fixed axis, whereby to permit logs of different lengths to be supported between the chucks in each pair of arms, and whereby to enable one pair of arms to be moved into loading position while the other arms remain stationary, a debarking nozzle moveable in a direction parallel to said fixed axis, and a stationary support for positioning a log in said machine to facilitate engagement of the ends of the log by the chucks of one of said pairs of arms preparatory to the moving of the log into debarking position with respect to said nozzle, said support having curved, downwardly sloping sides, the curvature of said sides being determined by points of tangency of circles of decreasing diameter having their centers arranged in the circular path described by said chucks when said arms are rotated, whereby logs of different diameter will be properly positioned by said support for engagement by a pair of said chucks and arms.

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