Jan. 2, 1968 R. M. BROWN 3,361,168

LOG BARKER

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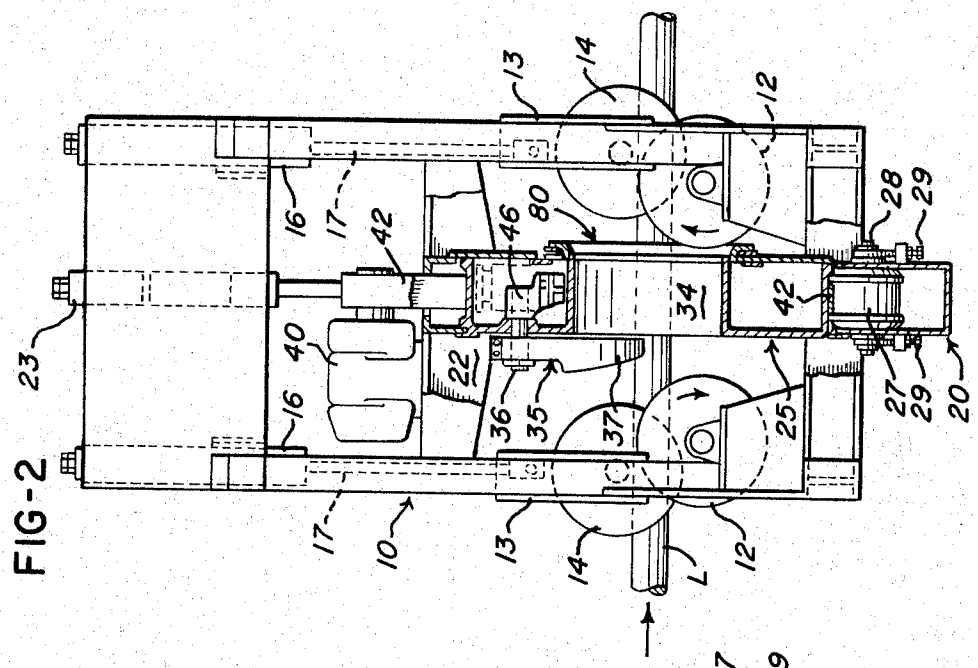


FIG-2

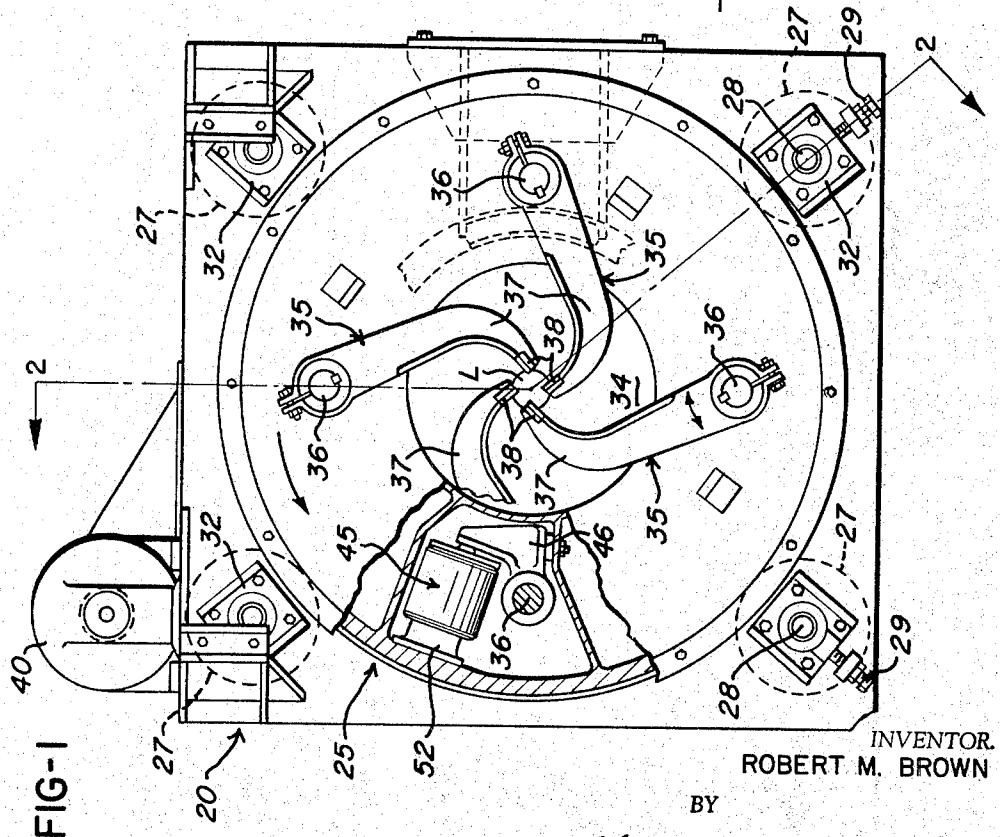


FIG-1

INVENTOR.
ROBERT M. BROWN

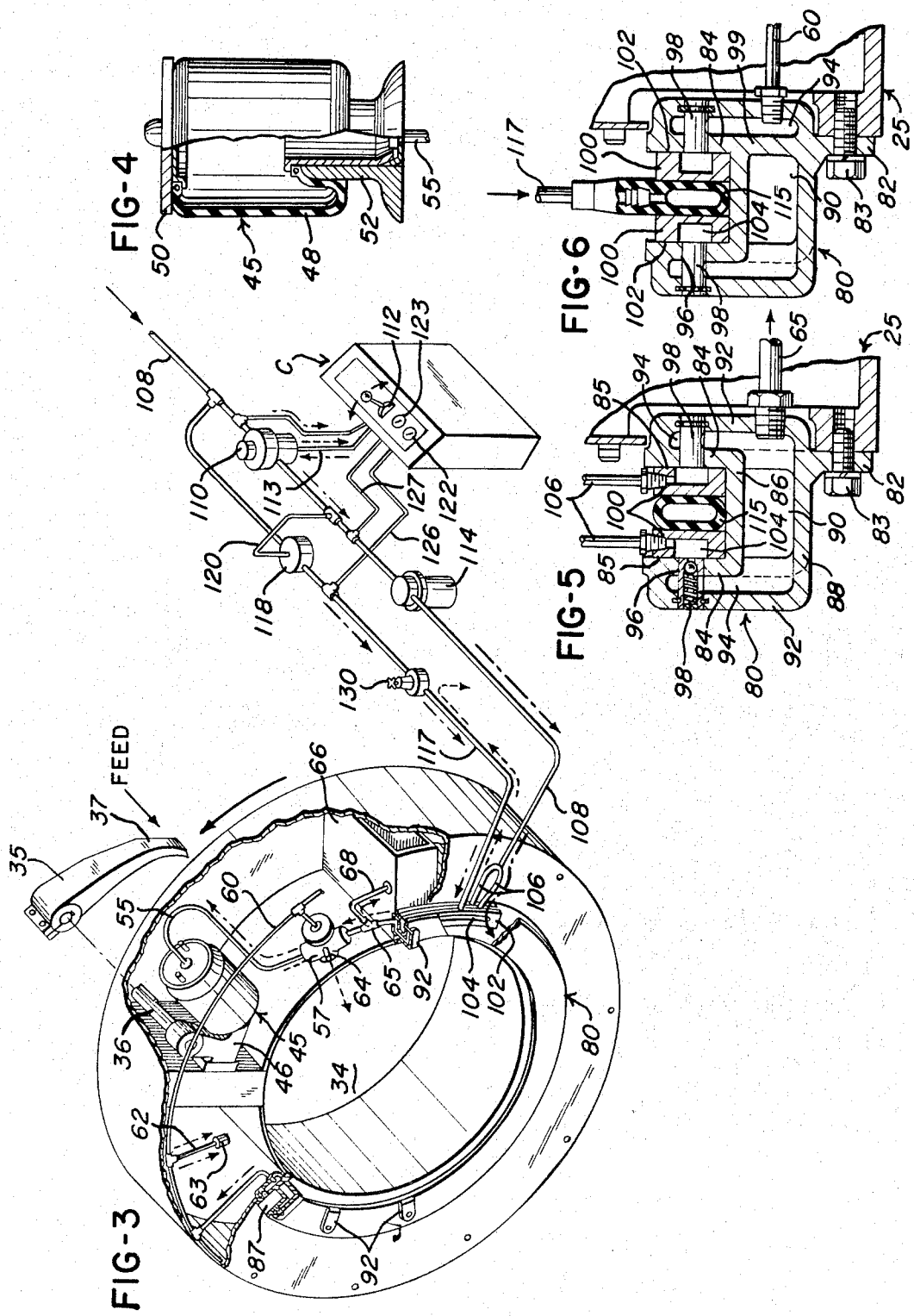
BY

Marshall, Bubel, French & Bugg
ATTORNEYS

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3,361,168

LOG BARKER

Robert M. Brown, Everett, Wash., assignor to The Black Clawson Company, Hamilton, Ohio, a corporation of Ohio

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This invention relates to apparatus for removing or stripping bark from logs, commonly known as a barker, and more particularly, to a control system for such barkers.

The present invention has special relation to the control system disclosed in Patent No. 3,145,098 which is assigned to the same assignee as the present invention. That is, the present invention is directed to an improved control system for a barker of the type comprising an annular rotor which carries a plurality of abrading arms arranged to scrape the bark from the log in a spiral manner as the log is fed axially through the rotor.

It is a primary object of the present invention to provide a simplified and dependable control system for operating a log barker whereby the requirements for periodic maintenance and repair are substantially reduced so that the barker can be operated with less expense and continuously for extended periods of time thereby providing for a substantial increase in capacity.

As another object, the present invention provides an improved control system which enables the abrading arms carried by the rotor to be adjusted quickly from a remote station to prevent jamming or abuse of the barker by a successive larger log or one having an odd shape, and in addition, permits adjustment of the debarking force applied by the abrader tips according to the type of log being debarked.

It is another object of the invention to provide a control system for a log barker including a rotor having a plurality of abrading arms pivotally mounted thereon, wherein movement of the arms is controlled by resilient air springs which eliminate sliding friction seals and thus substantially reduce the possibility of air leakage and thus a loss of effective control.

As a further object, the present invention provides a control system as outlined above wherein the air springs can be quickly deflated so that the barking arms open quickly to clear a protrusion on a log or to receive a larger succeeding log.

As another object, the invention provides a novel control system for a log barker as outlined above whereby air is supplied to the rotor through a sliding friction seal of uniform pressure, and wherein a change in the pressure of the air supplied to the rotor for moving the abrading arms results in a substantially proportionate change in the uniform sealing pressure for maintaining an effectively tight seal without unnecessary wear and also to provide for the quick deflating of the air springs.

Other objects and advantages of the invention will be apparent from the following description, the accompanying drawings and the appended claims.

In the drawings:

FIG. 1 is an end view, partly broken away, showing a rotor and its support housing for a log barker constructed in accordance with the present invention;

FIG. 2 is a view partly in side elevation and partly in section on the line 2—2 of FIG. 1 but on a smaller scale to show overall structure of the barker;

FIG. 3 is an exploded perspective view of the rotor and control system for operating the barker arms carried by the rotor;

FIG. 4 is an enlarged detail view, partly broken in section, showing one of the air springs for moving the barking arms in the rotor of FIGS. 1–3;

FIG. 5 is a sectional view of the air supply or pickup ring and showing the conduits for supplying air to the shoes; and

FIG. 6 is a section similar to FIG. 5 showing the conduit to the expandable tube for maintaining the sliding friction seal of uniform pressure between the air shoes and the air pickup ring.

Referring to the drawings, which illustrate a preferred embodiment of the present invention, the log barker shown in FIGS. 1 and 2 generally includes a main box-like frame **10** which rotatably supports a pair of motor driven V-shaped rollers **12** for supporting and feeding a log L through the barker. Slidably mounted on the frame **10** for vertical movement above each of the rollers **12** is a pair of guide members **13** which rotatably support a V-shaped hold-down roller **14** to force the log L into firm engagement with the corresponding feed roller **12**.

To provide a controlled hold-down pressure, hydraulic pressure cylinders **16** are mounted on the frame **10** and include downwardly extending piston rods **17** which are connected to the guide members **13**. Thus the position and force exerted by the hold-down rollers **14** can be adjusted according to the size of the log L which is fed onto the rollers **12** in the direction indicated by the arrow in FIG. 2.

Also mounted on the main frame **10** is a rotor housing **20** carried by an upper guide member **22** (FIG. 2) which slidably engages the frame **10** and is vertically adjustable by a hydraulic pressure cylinder **23** according to the size and centerline of the log L. An annular rotor **25** of generally hollow section is carried by the housing **20** and is rotatably supported thereon by four uniformly spaced rollers or wheels **27** mounted on the shafts **28**. The wheels **27** may be adjustably positioned for firmly engaging the rotor **25** by adjusting the screws **29** which position the bearing blocks **32** supporting the shafts **28**.

As shown in FIG. 2, the annular rotor **25** defines a cylindrically shaped opening **34** through which the logs L are fed and supports four abrading arms **35** which are pivotally supported by the shafts **36**. The barking arms **35** include curved end portions **37** having barking tips **38** removably mounted thereon. The rotor **25** is rotated within the housing **20** in the direction shown by the arrow in FIG. 1 by a motor **40** through a belt **42** which substantially surrounds the outer periphery of the rotor **25** and engages a drive pulley on the motor shaft. Thus as the rotor **25** is rotated counterclockwise (FIG. 1) by the motor **40**, the barking tips **38** scrape the bark from the log L after which the bark falls downwardly onto a suitable refuse conveyor (not shown) and is carried away. It is to be understood, however, that more or less abrading arms **35** may be employed according to the size of the logs which are normally handled, the horsepower output of the motor **40** and the desired capacity of the barker.

Mounted within the rotor **25** for rotation therewith are a series of four circumferentially spaced air springs **45** (FIG. 1) which are adapted to actuate or pivot the corresponding abrading arms **35** through lever members **46** rigidly mounted on the shafts **36**. As shown in FIG. 4, each air spring **45** includes a resilient flexible bellows-like member **48** having one end sealed to an actuator plate **50** and the opposite end sealed to a tubular hub **52** which is mounted on the rotor **25**. The air springs **45** are commercially available from several sources, and one particular type which has proved satisfactory is the Model RL #1000 manufactured by The Goodyear Tire & Rubber Co.

A primary advantage of the air springs **45** is the elimination of reciprocating and sliding seals which are commonly used in reciprocating type air cylinders for moving the abrading arms. Thus by employing the air springs **45** for moving the abrading arms, there is minimum chance for air leakage which results in more precise and depend-

able control over the movement of the arms. In addition, the air springs 45 provide improved sensitivity. That is, the abrader tips will follow an irregular log contour more accurately and with less damage to the log surface.

As logs of different sizes and shapes are fed through the rotor 25, the pressure within the air springs 45 can be adjusted or modified so that the tips 38 will exert a substantially constant and cushioned force against the log L to provide the most effective and uniform stripping of the bark. Furthermore, it is highly desirable that the pressure within the air springs 45 can be quickly adjusted from the remote control console C (FIG. 3) so that when the operator sees an obstruction on a log or an odd shaped log being fed into the barker, he can immediately release or reduce the pressure within the springs 45 thereby allowing the arms 35 to open or move outwardly due to centrifugal force.

Referring to FIG. 3, a conduit 55 connects each of the air springs 45 with a corresponding three-way normally closed valve 57 which is operated by air pressure within a pilot manifold line 60. Connected to the pilot line 60 is an exhaust line 62 through which pilot air is continuously discharged under the control of an adjustable bleeder valve 63. Each of the three-way control valves 57 is provided with a check valve 64 and is normally closed to the air supplied through the inlet conduit 65.

Also mounted within the annular rotor 25 for each of the air springs 45 is an air reservoir tank 66 which is connected to the conduit 65 by a line 68. The air reservoir tanks 66 are used to store air under pressure for providing an immediate supply of air for the air springs 45 when it is desired to move the abrading arms inwardly and the three-way control valves 57 are opened.

Air is supplied to the air inlet conduit 65 and the four air reservoir tanks 66 through an air pickup ring 80 having an inwardly extending flange 82 (FIGS. 5 and 6) which is mounted on the rotor 25 by a series of circumferentially spaced screws 83. As shown in the cross-sectional view of FIG. 5, the air pickup ring 80 includes parallel spaced and radially extending walls 84 having flat opposed inner planar surfaces 85 which cooperate with an intermediate wall 86 to define an annular groove 87 (FIG. 3) extending inwardly from the outer periphery of the ring. The outer walls 84 of the ring also cooperate with the intermediate wall 86 and inner wall 88 of the ring to define an annular chamber 90.

Spaced uniformly around the pickup ring 80 outwardly of the side walls 84 are a series of hollow bosses 92 each defining a short radially extending chamber 94 which is generally open to the annular chamber 90. Formed within each of the bosses 92 and extending through the outer walls 84 of the ring 80 are a series of axially aligned cylindrical ports 96 which provide inlets and outlets for the chambers 90 and 94 through the annular planar surfaces 85. Mounted within each of the ports 96 is a check valve 98 which normally seals the chambers 90 and 94 so that these chambers can be pressurized.

As shown in FIG. 5, each of the air inlet conduits 65 is connected directly to the chamber 90 through a hollow boss 92. Referring to FIG. 6, however, in two of the bosses 92 which are spaced diametrically opposite each other, the inner chamber 94 is blocked from fluid communication with the chamber 90 by an extension 99 of the inner wall 84. At these two locations, which are spaced 180° apart on the ring 80, the pilot manifold line 60 is connected to receive pressurized air from the corresponding chambers 94. If desired, however, the pilot manifold line 60 may be connected at only one or more than two locations depending on the speed of the rotor.

Mounted within an arcuate portion of the groove 87 defined by the ring 80 are a pair of parallel spaced arcuately formed air shoes 100 (FIG. 5) which are formed from a resilient low friction material, as for example, a material sold under the trademark Ryertex. As shown in FIGS. 3 and 6, the air shoes 100 conform to the curvature of the pickup ring 80, and formed in the outer face 102 of each air shoe is an arcuately extending channel 104 which is aligned with the path of the check valves 98 mounted within the ports 96. Pressurized air is supplied to the channels 104 formed within the air shoes 100 through a pair of air conduits 106 which are connected to the end of the main air supply line 108.

As shown in FIG. 3, mounted within the air supply line 108 is a pilot operated main control valve 110 which is controlled from the console C by a lever operated control valve 112 connected to the valve 110 by the pilot air line 113. Preferably, a lubricator 114 is also mounted in the air supply line 108 to provide a positive delivery of lubricating fluid to the air supply and thereby provide a film of lubricant between the flat faces 102 of the air shoes 100 and the sliding annular surfaces 85. This fluid, preferably oil, not only reduces wear of the air shoe faces 102 and the ring surfaces 85, but also provides for a positive bubble tight air seal between the shoes 100 and the rotating ring 80.

Spaced between the pair of air shoes 100 is an elongated arcuately formed resilient pressure tube 115 (FIGS. 5 and 6) which is connected by an air pressure line 117 (FIG. 6) through a pilot operated regulating valve 118 (FIG. 3) to the main air supply line 108 for inflating and deflating of the tube 115. As shown in FIG. 4, the regulating valve 118 is connected by a pilot air line 120 to the main air supply line 108 to provide for a proportional regulation of the valve 118 according to the air pressure within the supply line 108 downstream of the valve 110. The pressure within the air lines 108 and 117 is indicated on the pressure gauges 122 and 123 respectively through the connecting pressure lines 126 and 127. Also connected within the pressure line 117 to the resilient tube 115 is a quick exhaust valve 130 which is adapted to release the air pressure within the tube 115 immediately in response to a release of the air pressure within the supply line 108.

In operation, a log L is fed into the opening 34 through the rotor 25 by the V-shaped rollers 12 and 14 or some other feed mechanism such as a chain conveyor, while the rotor 25 is being driven by the motor 40. The barking arms 35 are pivoted inwardly until the tips 38 of the arms engage the surface of the log. The movement of the arms 35 and the force exerted by the tips 38 is controlled from the operating console C by actuation of the lever operated control valve 112 which controls the pressure of the air supplied to the air springs 45 and the reservoir tanks 67.

When the air within the air shoe channels 104 is increased above the air pressure within the chambers 90 and 94, those check valves 98 which are positioned opposite the air shoe channels 114 open so that the pressure within the chamber 90 and within the air inlet conduits 65 is increased. This increased air pressure within the air channels 104 also increases the air pressure within the two passageways 94 (FIG. 6) enclosed by the wall extension 99 and connected to the air pilot manifold line 60. The pressure increase in the pilot line 60 causes the three-way valve 64 to open thereby allowing pressurized air within the conduits 65 and reservoirs 66 to inflate the air springs 45 for moving the arms 35 inwardly until the tips 38 engage the surface of the log L.

When it is desirable to pivot or move the abrading arms outwardly to accommodate quickly an odd shaped or a larger log being fed into the barker, the air pressure within the springs 45 is decreased or released. This is accomplished by actuating the lever operated control valve 112, causing a corresponding reduction or cut off of the air pressure within the supply line 108 by operation of the pilot operated control valve 110. This air pressure reduction or cut off within the supply line 108 results in a corresponding reduction or cut off in the pressure line 117 by operation of the pilot operated regulator valve 118. Thus as the air pressure within the

air shoe channels **104** is reduced, air pressure within the resilient tube **115** is proportionately reduced.

A lower sealing pressure is desirable between the faces **102** of the shoes **100** and the planar surfaces **85** of the pickup ring **80** as the pressure within the line **108** is reduced to prevent unnecessary wear on the surfaces **85** or faces **102**. In fact, when the air pressure within the line **108** is cut off, the valve **130** immediately exhausts the pressure within the tube **115** thereby breaking the seal between the faces **102** and the surfaces **85** so that the pressure within the channels **104** is released. In this manner, cut off of the air within the supply line **108** enables the pilot line **60** and the two chambers **94** to exhaust immediately through the bleeder valve **63** and this, in turn, results in a responsive closing of the three-way valve **57** thereby locking the air pressure within the inlet conduits **65** and allowing the pressurized air within the air springs **45** to exhaust quickly as indicated by the dotted arrow (FIG. 3) through the chek valve **64** provided within the three-way valve **57**.

Preferably, a back pressure of approximately 2 p.s.i. is provided by the check valve **64** to keep the air springs **45** stable and to lock the arms **35** in an open position at low rotor speeds. It also becomes apparent that as the rotor speeds increase, the centrifugal force acting on the arms **35** will increase and thereby provide for a quicker exhaust of the air springs **45** after the pilot operated valve **57** is closed to the supply line by a reduction of the air pressure within the pilot manifold line **60**.

From the drawings and the above description, it can be seen that a control system constructed in accordance with the present invention provides several desirable features and advantages. Primarily, the invention provides a control system which is highly dependable and reduces substantially the need for periodic repairs and maintenance on the barker. This increased dependability is in part attributed to the mounting of the resilient air shoes **100** within the groove **87** formed within the outer periphery of the air pickup ring **80** so as to provide a uniform pressure between the faces **102** of the shoes and the surfaces **85** of the pickup ring. This construction has been found to eliminate the problem of small pieces of bark and other foreign particles from breaking the sliding seal between the air shoes and the pickup ring or causing damage to the relative sliding faces and surfaces.

Another advantage is provided by the resilient air springs **45** which require no sliding friction seal. These springs have been found to eliminate uncontrolled air leakage. A further important feature and advantage is provided by the resilient pressure tube **115** and the control valve **118** which provides for immediate exhaustion of the air pressure within the air shoe channels **104** which, in turn, provides for a responsive reduction of the air pressure within the pilot manifold line **60** in response to closing of the lever actuated control valve **112** at the control console C. Thus when the control valve **112** is closed, the opening or outward movement of the abrading arms **35** quickly follows so that the abrading tips **38** will receive a successive log of greater diameter without requiring a speed reduction of the rollers **12** which feeds the logs through the rotor.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. An improved pneumatic control system for a log barker including a rotatably supported annular rotor having a plurality of barker arms pivotally mounted thereon for scraping bark from logs of various sizes and shapes, and adapted to provide dependable service with minimum maintenance in addition to remote control for quick movement of the barker arms, said system comprising air operated means mounted within said rotor for pivoting said barker arms and to provide a cushion effect as the barker arms move over the irregular surface of the log, an air pickup ring connected to said rotor for rotation therewith and including a pair of opposed planar surfaces defining the sides of a radially extending circumferential groove, means defining a plurality of circumferentially spaced ports in at least one of said surfaces, conduit means connecting said ports to said air operated means, valve means within said conduit means for controlling the flow of air to and from said arm pivoting means, a check valve associated with each said port, air shoe means positioned within said groove and including faces slidably engaging said surfaces of said ring, means defining a chamber within said shoe means and open to a face thereof to provide fluid communication with said ports successively as said ring rotates, conduit means connecting said chamber within said shoe means to an air supply for providing air under pressure to said arm pivoting means through said check valves, and valve means within said latter conduit means for variably controlling the air supply pressure to said arm pivoting means for adjusting the force exerted by said barker arms against the log.

2. A system as defined in claim **1** wherein said air operated means includes a plurality of bellows-type air springs mounted within said rotor and connected to pivot corresponding said barker arms, conduit means connecting said ports to said air springs, and pilot operated valve means within said conduit means for controlling the air to and from said air springs.

3. A system as defined in claim **1** wherein said air shoe means includes a pair of spaced apart air shoes positioned within said groove and including faces slidably engaging said surface of said ring, an inflatable bag spaced between said shoes, first conduit means for connecting said chamber within one of said air shoes to an air supply, second conduit means for supplying air to said bag, and valve means for maintaining the pressure within said second conduit means substantially proportionate with the pressure within said first conduit means.

4. A control system as defined in claim **3** wherein said air shoes are formed from a flexible material for conforming to the irregularities of said surfaces on said pickup ring to provide a tight seal between said air shoe faces and said corresponding surfaces.

5. A control system as defined in claim **3** including a quick exhaust valve in said second conduit means for quickly exhausting the air pressure within said bag when the air pressure within said first conduit means is cut off so that said seal between said shoes and said pickup ring is immediately broken to provide for responsive operation of said pilot operated valve means within said rotor.

6. A control system as defined in claim **3** including means for introducing a lubricating fluid into said first conduit means for providing a positive sliding seal between said faces of said air shoes and said surface of said rings while preventing wear of said faces and said surfaces.

7. A system as defined in claim **3** including means defining a plurality of air reservoirs mounted within said rotor, said air operated means including a plurality of bellows-type air springs, conduit means connecting said reservoirs mounted within said rotor to said air springs, and pilot operated valve means within said conduit means for controlling the flow of air to and from said air springs.

8. A system as defined in claim **7** including first conduit means connecting said reservoir to said springs, a plurality of normally closed pilot operated valves within said first conduit means for controlling the flow of air to and from said springs, second conduit means connecting said ports to said first conduit means ahead of said pilot operated valves, pilot conduit means connecting said ports to said pilot operated valves for operating the same, air bleed off valve means connected to said pilot conduit

means, third conduit means connecting said chamber within one of said shoes to an air supply for providing air under pressure to said air springs, said reservoirs and said pilot operated valves through said check valves, and remote control valve means within said third conduit means whereby a shutoff of air to said air shoe causes air pressure within said pilot conduit means to bleed therefrom and actuate said pilot operated valves for exhausting said air springs to release the force exerted by said barker arms against the log.

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WILLIAM W. DYER, JR., *Primary Examiner.*

W. D. BRAY, *Assistant Examiner.*