United States Patent

Roberson

[15] **3,663,993**

[45] **May 23, 1972**

[54] APPARATUS FOR PLUCKING A DENSE MASS OF FIBERS

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[22] Filed: **Feb. 22, 1971**

[21] Appl. No.: **117,785**

Related U.S. Application Data

[63] Continuation of Ser. No. 865,845, Oct. 3, 1969, abandoned.

[52] **U.S. Cl.** ..... **19/80 R**

[51] **Int. Cl.** **D01g 7/06**

[58] **Field of Search** ..... 19/80 R, 81, 145.5; 146/70.1; 241/101.5

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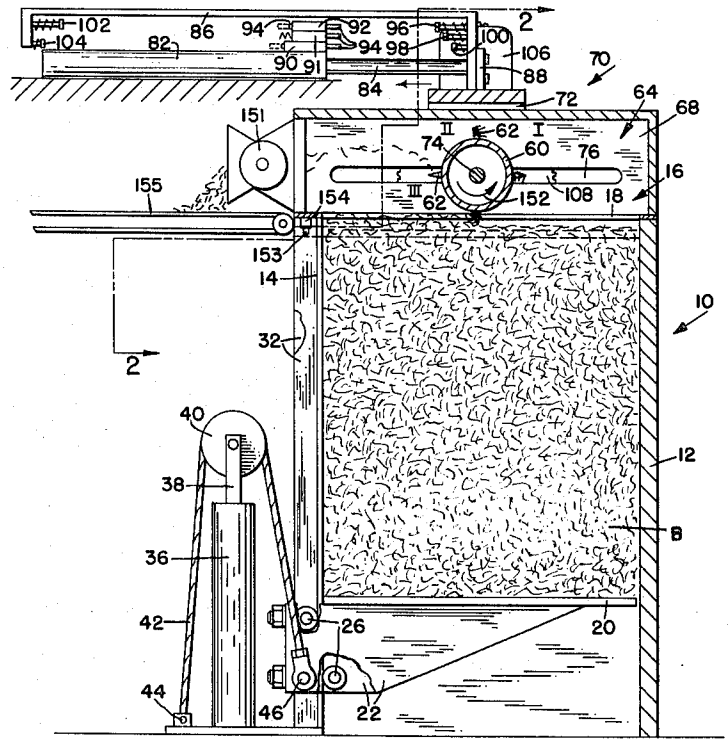
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[57] **ABSTRACT**

A fiber bale plucker in which the bale is maintained in plucking engagement with a plucking cylinder by a hydraulically operated lifting platform while the plucking cylinder, containing plucking pins traverses along the contacting surface of the bale in a plucking stroke. The plucking cylinder is operated from an air cylinder which can reverse the direction of the plucking cylinder for a return stroke. There are valves which are operated at the end of each stroke to change the operating direction of the air cylinder and to operate a hydraulic cylinder to move the bale away from the plucking cylinder at the end of a plucking stroke and to move the bale toward the plucking cylinder at the end of the return stroke of the plucking cylinder. Aerodynamic flow means are used to doff fibers from the plucking pins and to convey the fibers to their destination.

13 Claims, 3 Drawing Figures



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3 Sheets-Sheet 1

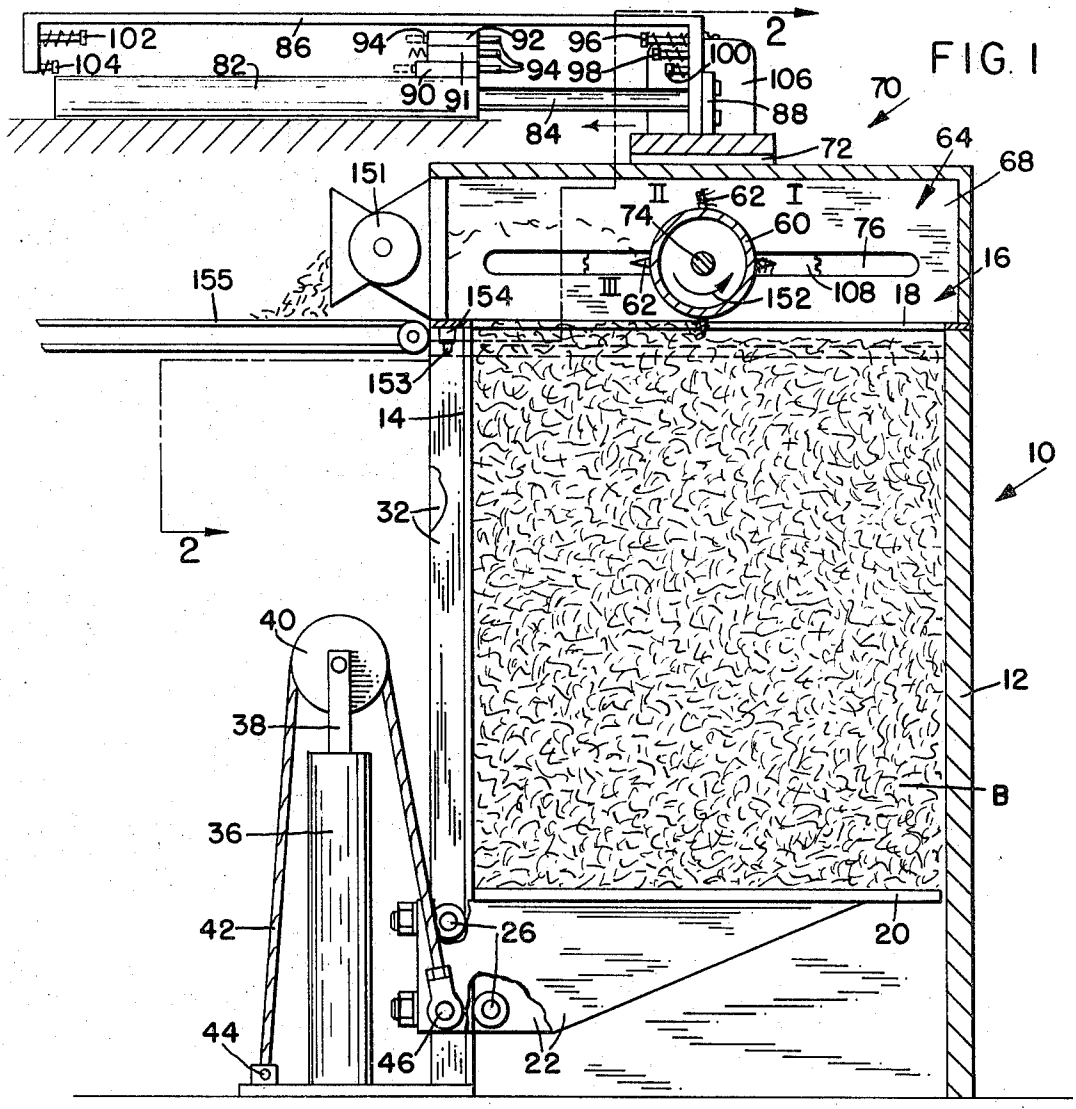


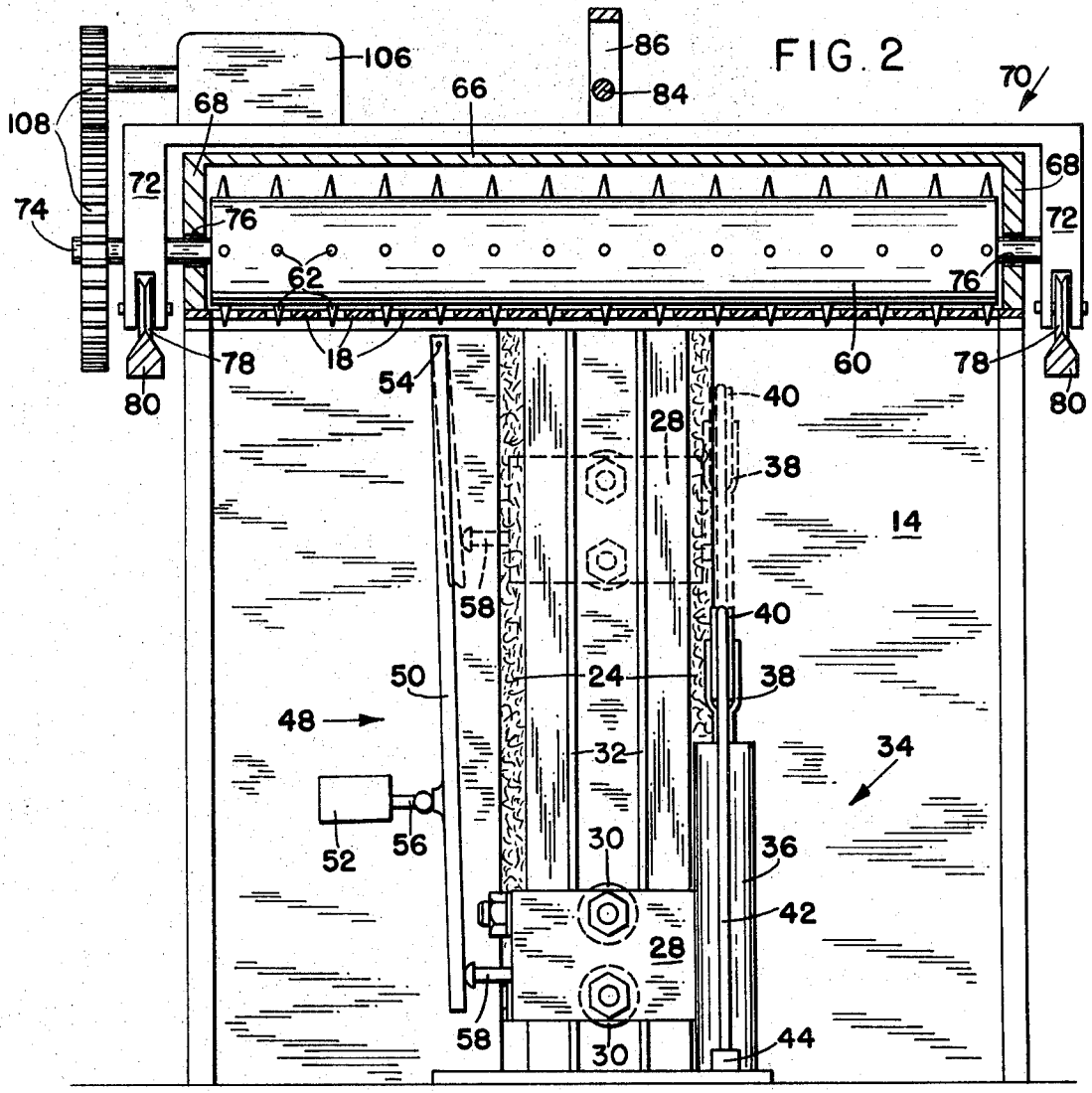
FIG. 1

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FIG. 2

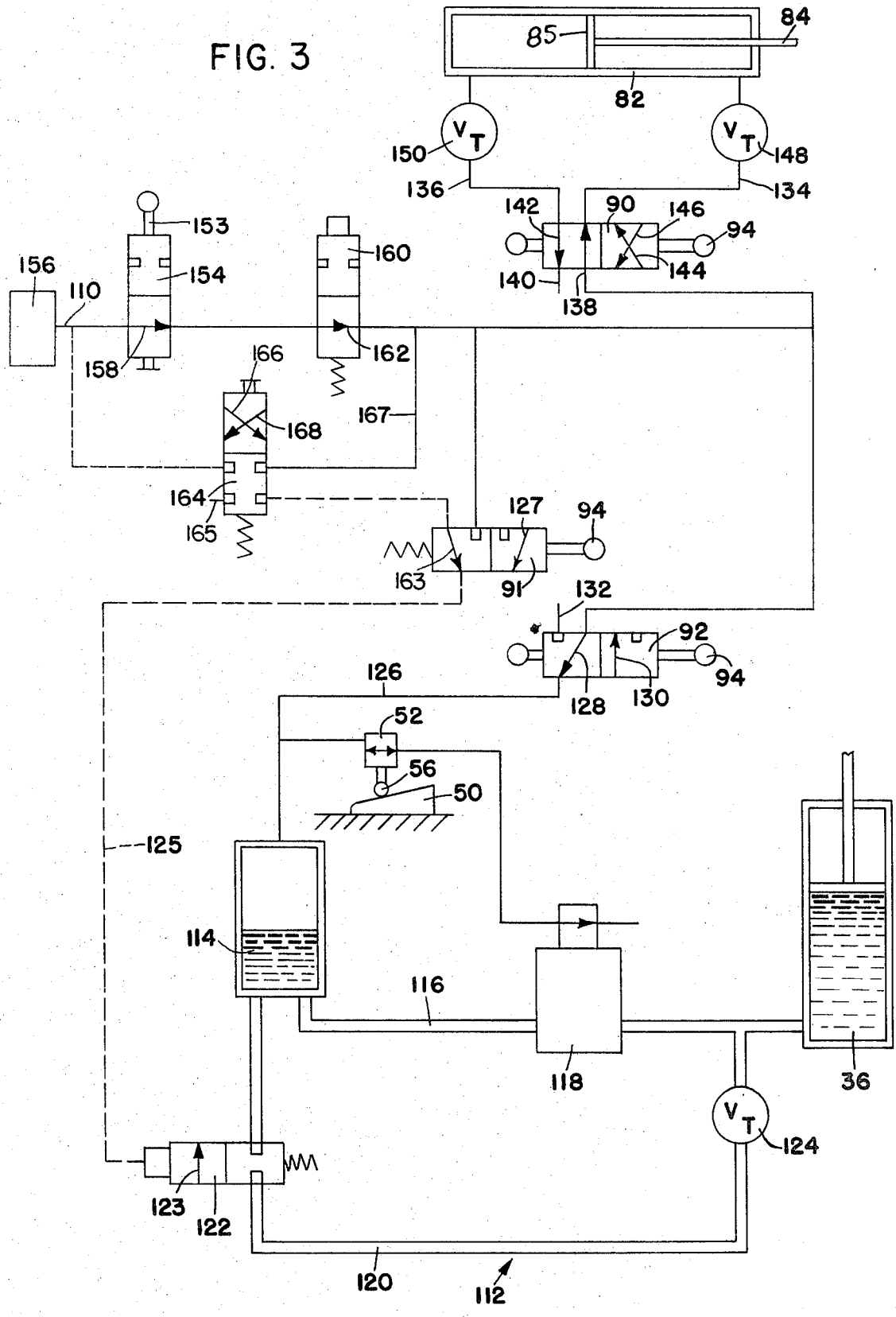


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FIG. 3


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APPARATUS FOR PLUCKING A DENSE MASS OF FIBERS

This application is a continuation of my co-pending application Ser. No. 865,845, filed October 13 1969, now abandoned entitled Apparatus for Plucking a Dense Mass of Fibers.

BACKGROUND OF THE INVENTION

This invention relates to apparatus for breaking up a closely compacted mass of textile fibers at a controlled rate. The invention is particularly adapted for disintegrating or plucking a bale of fibers as a preliminary step in the processing of the fiber into yarn. The disintegration of the bale includes the removal of layers made up of relatively small fibrous pieces.

Textile bales are made up of layers of fibers of different densities because of the manner in which bales are constructed. This means that fibers or tufts of fibers can be removed from some sides of the bale and in certain directions with greater ease than other sides and directions. There are variations in the degree of fiber entanglement extending into the bale from the point of plucking. It has been recognized which bale faces may be plucked to yield the highest plucking rate with minimum fiber breakage.

The industry has attempted to minimize the influence of fiber density within the bale by allowing the bale to expand within the plucker so as to relax some of its internal stresses and to pluck across the appropriate face which has the fiber density gradient. The latter has the effect of simultaneously blending tufts from one end of the bale to the other.

Plucking is usually accomplished by teeth or pins mounted in a holder which moves across one face of the bale. The pin holder is more commonly in the form of a rotating cylinder with the pins extending radially from its periphery.

The bale is positioned on one side of a bridge member made up of a plurality of spaced bars. The pin holder moves longitudinally of these bars, and the pins extend through the spaces between the bars and into the bale. Experience has shown that stresses on the pins can be decreased with less fiber damage as a result if each pin pulls fibers out through the opening in the bale made by the preceding pin. As the cylinder moves back and forth across the face of the bale, the ideal condition of direction of cylinder rotation with respect to traverse direction will exist for only one part of the cylinder reciprocation.

Another problem inherent in bale plucking comes as a result of the changing dimension of the bale as it is disintegrated. The relative positions of the bale and the plucking means must be constantly adjusted to maintain uniformity in the fiber plucking rate.

One solution to the problem of cylinder rotation with respect to traverse direction has been to place a plurality of bales on a merry-go-round. The bales are carried around in a circular path while units mounting rotating pins remain stationary. The principal disadvantage of this system is that it is impractical for single bale units. Another disadvantage is that the circular configuration wastes a great deal of floor space.

Another common problem in the industry is that of grooving. In conventional pluckers where the bale is always maintained against the bridge, grooves are cut into the bale by the pins, leaving ridges of stock between each bridge member and the bale. After the grooves reach a certain depth, the plucking rate drops to zero.

To solve the grooving problem, competitive machines have been made in which the bridges oscillate from side to side to smear the ridges into the grooves. This is a complicated solution since the cylinder would also have to be reciprocated or periodically removed from the bridge in timed relation so that there will be no relative movement between the bridge members and the pins in a direction perpendicular to the longitudinal axes of the bridge members.

Another solution to the grooving problem is to crush the ridges with the brute force of an increased static load on the bale against the bridge members. This is a step in the wrong direction since uniformity of bale pressure is essential for plucking uniformity. High loads will result in fiber damage.

It has been suggested to move the pin supporting cylinder away from the bridge members at the end of a plucking traverse and return it to the starting position before re-engaging the bale. The complexity of the plucking cylinder and the traverse mechanism make this approach impractical. It is important to maintain a constant depth of pin penetration into the bale. This would be very difficult to do if the cylinder were made moveable with a resulting degree of looseness.

It is also felt that stopping and reversing the rotational direction of the cylinder after each traverse would not be practical. The disadvantages of this approach would be that an excessive amount of power would be wasted accelerating and decelerating the cylinder, which is very massive, and an excessive amount of production time would be wasted.

SUMMARY OF THE INVENTION

It is a principal object of the present invention to provide a bale plucking mechanism in which uniformity of fiber plucking is maintained with a minimum of fiber rupturing.

A second object of the invention is the provision of means for doffing and collecting the tufts of fibers from the pins after they have been plucked.

Another object of the invention is the provision of novel means for maintaining uniform bale pressure for each plucking traverse during the entire disintegration of the bale.

The principal object of the invention is accomplished by moving the bale away from the plucking cylinder at the end of the plucking traverse of the cylinder while quickly returning the cylinder to the starting position. The bale is brought back into contact with the cylinder pins before the cylinder begins its next plucking traverse.

The plucked fibers are removed from the pins by pneumatic means and collected on a conveyor or receptacle.

The lowering and lifting of the bale is accomplished by hydraulic means which are operated in timed relation with the traversing of the cylinder. The amount of hydraulic pressure applied to the bale is automatically adjusted by pressure regulating means which indirectly senses the diminishing thickness of the bale during the course of lowering and lifting the bale.

In addition to the advantages of uniformity of fiber plucking and minimum fiber breakage, the present invention also allows the pins on the cylinders to be cleaned. Experience has shown that all plucking cylinders must periodically be disengaged from the bale and allowed to spin freely in order to clean themselves. The reason for this is that friction on the fibers will cause them to ignite and start a fire.

In the present application, this cleaning takes place after each traverse and as a result produces a more constant and uniformly cleaned condition. Since the cylinder is returned to its starting point very quickly, only a small amount of production time is expended and this expended time is put to good use for pin cleaning purposes.

Other objects and advantages of the invention will become apparent from the following detailed description when read in conjunction with the accompanying drawings in which:

FIG. 1 is a diagrammatic side elevation of the invention, parts being in section;

FIG. 2 is a vertical section on line 2—2, FIG. 1, looking in the direction of the arrows and illustrating the mechanism for automatically adjusting the lifting force on the bale;

FIG. 3 is a schematic diagram illustrating the hydraulic and pneumatic controls for operating and synchronizing the various motions of the invention.

DETAILED DESCRIPTION

I. BALE CONTAINER AND SUPPORTING MECHANISM

Referring to FIGS. 1 and 2, the enclosure or framework for the bale is generally indicated at 10. The framework includes front and rear vertical walls 12 and 14, respectively. One or more side walls (not shown) may also form part of the framework. A bridge, generally indicated at 16, is made up of

a series of spaced bars 18 which form the upper limits of the bale enclosure.

The bale, indicated at B, is supported by a moveable platform 20 which is cantilevered from the rear wall 14 by a pair of supports 22. These supports extend through a pair of slots 24 in wall 14 and are vertically slidable on wall 14 by means of bearing rolls 26 fixed to supports 22 and bearing on opposite sides of wall 14. A bracket 28 connects supports 22 and has mounted thereon guide rolls 30 which extend between a pair of vertical tracks 32, see particularly FIG. 2, for maintaining the platform in vertical alignment.

II. BALE LIFTING AND LOWERING MECHANISM

The bale lifting and lowering mechanism is generally indicated at 34 and includes a hydraulic cylinder 36. A piston rod 38 extends from cylinder 36 and supports a pulley 40 rotatably mounted thereon. A rope or cable 42 is anchored at one end at 44 and extends around pulley 40. The opposite end of rope 42 is attached at 46 to one of the supports 22.

Referring particularly to FIG. 2, there is shown pressure regulator means generally indicated at 48 and which include an elongated vertical cam bar 50 and a pressure regulator 52. Cam bar 50 is pivoted at 54 to wall 14 near the top thereof and extends downwardly at a slight angle toward bracket 28. An adjustable regulator plunger head 56 is fixed at a point near the lower end of the bar 50 and extends into pressure regulator 52. Movement of the plunger head toward the regulator (toward the left as viewed in FIG. 2) will cause the regulator to increase the pressure in piston 36 and movement away from the regulator will cause the regulator to decrease the pressure in piston 36. The manner in which regulator 52 controls the pressure of piston 36 will be more fully described as part of the description of the hydraulic-pneumatic diagram shown in FIG. 3. The plunger head 56 is caused to move toward and away from the pressure regulator 52 by a cam slider 58 adjustably mounted on one of the supports 22 which is nearest bar 50. Slider 58 bears against the side of bar 50 furthest from regulator 52. When cam slider 58 is at the lower end of bar 50, as shown in FIG. 2, plunger 56 is at its extreme inner position into the regulator 52. As cam slider 58 approaches the upper limits of bar 50, plunger 56 will be moved toward its extreme outer position away from the regulator 52. As the bale is eroded and becomes lighter, less hydraulic pressure is required to maintain the bale against bars 18 to maintain constant pressure between the bale and the bars 18. The erosion of the bale also means a decrease in its vertical dimension, allowing the platform to achieve a higher position. The higher the position of the platform, the higher will be the position of plunger 56 so that the pressure regulator 52 will decrease the pressure in cylinder 36. Since plunger head 56 and cam slider 58 are adjustable, the pressure in cylinder 36 can be controlled to exactly match the continually changing lifting requirements of the bale as it is disintegrated.

III. PLUCKING CYLINDER OPERATING MEANS

Referring to FIGS. 1 and 2, the plucking cylinder is indicated at 60 and has spaced rows of plucking pins 62. Cylinder 60 is positioned just above bars 18 so that the rows of pins extend between the bars and into the bale. Bars 18, in addition to forming the upper limits of the bale enclosure, also form the lower limits of a cylinder chamber indicated generally at 64. The upper limits of chamber 64 are formed by an upper plate 66 connected to the outer bars 18 by side walls 68 which complete the chamber. The cylinder 60 is supported in position by an inverted U-shaped carriage 70. The depending arms 72 of the carriage extend to the outside of side walls 68 and function as bearings for the ends of a shaft 74 which forms part of cylinder 60 and extends through slots 76 in the side walls. Grooved wheels 78 are rotatably mounted at the lower ends of arms 72 for engagement with a pair of appropriately shaped tracks 80. Wheels 78 allow the carriage 70 and cylinder 60 to be reciprocated along tracks 80.

The means for reciprocating the carriage 70 includes a fixed pneumatic cylinder 82 and piston 85 which has a piston rod 84 connected to and supporting an inverted U-shaped bracket 86 which is in turn connected to the carriage 70 through a mounting bracket 88. Mounted in fixed position on top of cylinder 82 are valves 90, 91 and 92 which are tacked one above the other, as shown in FIG. 1. Valve 90 is a traverse valve, valve 91 is a bale lowering valve and valve 92 is a pressure regulator valve which functions as part of the bale platform raising and lowering system. All of the valves 90, 91 and 92 have valve spools 94. Valves 90 and 92 are cam operated, fixed position valves whose spools 94 will remain in the position to which they are pushed until pushed from the opposite side. Valve 91 is a cam operated, spring return valve; which means that it will always remain in the position shown in FIG. 1 except when its spool 94 is shifted to the other position. The valves 90, 91 and 92 are in the position which they occupy during the plucking traverse of the cylinder, toward the left as shown in FIG. 1. When the cylinder reaches the end of its plucking stroke, the spools 94 of valves 92, 91 and 90 will strike spring-loaded plungers 96, 98 and 100, respectively, and in that order. This will shift the spools 94 of valves 92, 91 and 90 to their other positions. At the end of the plucking stroke, cylinder 82 operates to move the plucking cylinder at a high rate of speed toward the starting position, toward the right as shown in FIG. 1. As the plucking cylinder nears the starting position, spools 94 of valves 92 and 91 will strike spring-loaded plungers 102 and 104, respectively, and in that order. Spools 94 of valves 92 and 94 will be shifted back from their dotted line positions to their full line positions to begin a new plucking traverse. The exact manner in which valves 90, 91 and 92 cooperate with pneumatic cylinder 82 and hydraulic cylinder 36 to produce the synchronous movements of the plucking cylinder carriage and the bale lifting platform will be more fully described in the following sections which deal with the pneumatic-hydraulic systems and general operation of the invention.

The plucking cylinder 60 is rotated by a motor 106 fixed to the top of carriage 70. The cylinder is driven from the motor through gearing 108, as shown in FIG. 2.

IV. PNEUMATIC-HYDRAULIC SYSTEM

Referring to the diagram in FIG. 3, there is a main air supply line 110 and a closed hydraulic system indicated generally at 112. The hydraulic system includes hydraulic cylinder 36 and a reservoir 114. A hydraulic line 116 extends from reservoir 114 through an air actuated piston pump 118 to cylinder 36. A second hydraulic line (20 also connects reservoir 114 to cylinder 36 but passes through a pilot operated valve 122 which is spring biased in a normally closed position, as shown in FIG. 3. Valve 122 is operated pneumatically to shift to the open position and create a flow path indicated by arrow 123. Valve 122 is pneumatically operated by previously described bale lowering valve 91 by connecting valve 122 to the main air line 110 via an air line 125. Valve 91 is shown in the closed position in FIG. 3 and when it is shifted to the open position, line 125 is connected to the main air line through an air path in valve 91 indicated by the arrow 127. When valve 122 is so shifted, line 120 is opened to allow hydraulic fluid to flow from cylinder 36 to reservoir 114. The draining of fluid from cylinder 36 allows the bale platform to descend, the rate of which is controlled by a throttling valve 124 which restricts the fluid flow rate from cylinder 36 to reservoir 114. By moving valve 122 to the closed position and actuating pump 118, fluid is pumped from the reservoir to the cylinder 36 to raise the bale platform. Pressure regulator 52 controls the pressure of the fluid being pumped into cylinder 36 by pump 118. The pump's output hydraulic pressure is directly proportional to the input air pressure of the regulator.

An air line 126 connects regulator 52 to the main air line 110 via pressure regulator valve 92. Air is supplied to pressure regulator 52 and piston pump 118 through valve 92 when it is in the open position, as shown in FIG. 3, the path of which is

indicated by arrow 128. When valve 92 is moved to the closed position, toward the left in FIG. 3, the air is shut off to the regulator 52 and pump 118; simultaneously, an air exhaust path is created for these two components and the hydraulic fluid reservoir 114. This exhaust path is indicated by arrow 130 and extends from line 126 to an exhaust line 132.

Air cylinder 82 can be pressurized from either end for reciprocation of the carriage 70. Previously described valve 90 determines which side of cylinder 82 is pressurized. Valve 90 is connected to air line 110; and when it is in the position indicated in FIG. 3, air is allowed to flow to the right-hand side of cylinder 82 through an air line 134 and vented from the left side of the cylinder through an air line 136. The flow through valve 90 from air line 110 to line 134 is indicated by arrow 138 and the venting from air line 136 through the valve to a vent line 140 is indicated by arrow 142. When valve 90 is moved to its other position (toward the left in FIG. 3), line 110 is connected to line 136 through the valve in the path indicated by arrow 144, and line 134 is connected to vent line 140 via the path indicated by arrow 146.

When valve 90 is in the position shown in FIG. 3, piston rod 84 will be moved to the left; this movement represents the plucking traverse of the plucking cylinder 60. When valve 90 is in the other position which connects the left side of the cylinder as viewed in FIG. 3, the piston rod 84 will be moved toward the right; this movement represents the high speed return traverse of the plucking cylinder. The stroke speed of the cylinder 82 is controlled by control valves 148 and 150 which control the rate at which air is exhausted through lines 134 and 136, respectively. Both of the valves 148 and 150 will allow the air to enter the cylinder freely and can be adjusted for an infinite rate of venting.

V. AERODYNAMIC DOFFING

Air flow is used to assist the centrifugal forces to clean the plucking cylinder pins and to convey the fiber stock to a conveyor or the like 155 to be taken to its ultimate destination. Since the cylinder represents an obstruction to the air flow in cylinder chamber 64, the air molecules approaching the leading edge of the cylinder must accelerate. The law of mass conservation requires that velocity increase as the flow decreases. Air is drawn through the chamber 64 from right to left in FIG. 1 by a suction fan indicated at 151 and deposited on a conveyor 155. By regulating the air flow, it is possible to have the velocity of the air stream to be equal to the velocity of the pins as the air reaches region II as shown in FIG. 1. Thus, a tuft impaled on a pin would be struck from behind by a stream of air which cancels the effect still air would normally have on the tuft as it is moved by the pin. As a result, the tuft senses no relative air velocities, no aerodynamic drag, no frictional forces and is thereby free to be slung from the pin by centrifugal force.

In the event that fibers become entangled about a rough place on a pin, they will be violently shaken and become disentangled by eddy currents and violent flow reversals in region III. Region I is where air flow acceleration takes place. In order for the fibers to be doffed from the pins, the air flow through zone II is preferably equal to the pin velocity but may be slightly greater.

VI. GENERAL OPERATION

FIGS. 1, 2 and 3 illuestrate the invention during the bale plucking phase of operation. At this time, valve 122 is in the closed position to prevent hydraulic cylinder 36 from draining into reservoir 114 and valve 92 is in the open position to operate pressure regulator 52 and piston pump 118 and thereby maintain cylinder 36 in bale platform lifting condition.

Pressure is maintained against the bottom of the bale to hold it firmly against bridge bars 18 as cylinder 60 traverses from right to left in FIG. 1 while being rotated in the direction of arrow 152 by motor 106. Cylinder 60 is moved in the plucking direction as piston rod 84 is retracted within the cylinder 82, toward the left as viewed in FIGS. 1 and 3. Piston 85 is caused to move in this direction because valve 90 is in the position which allows air to flow to the right side of piston 84 through valve 148 and vent through valve 150 at a controlled rate as previously described.

As the plucking cylinder nears the end of its plucking stroke, valve 92 strikes plunger 96 and its spool is moved to the position which cuts off the air supply to pressure regulator 52 and piston pump 118 while simultaneously connecting these units and reservoir 114 to vent line 132. An instant later, valve 91 strikes plunger 98 and its spool is moved to the position which connects air line 125 to air line 110 to shift valve 122 to its open position. Fluid is thereby drawn from cylinder 36 to reservoir 114 via hydraulic line 120, causing cylinder 36 to lower the bale.

At the very end of the plucking traverse of the cylinder 60, valve 90 strikes plunger 100 and is shifted to its other position which allows air to enter the left side (as viewed in FIG. 3) of cylinder 82 through valve 150 and to vent from the right side of cylinder 82 through valve 148. This causes piston rod 84 to move from left to right (as viewed in FIG. 3) to move plucking cylinder 60 in its return stroke. Valve 148 is set for venting the right side of cylinder 82 at a high rate so that cylinder 60 is returned very quickly.

Shortly after plucking cylinder 70 begins its return stroke, valve 91 is released from plunger 98 and is returned by its spring to its original normally closed position. Air is thereby shut off to valve 122 which also returns to its normally closed position to prevent any further fluid drain from cylinder 36 to reservoir 114 and to stop the descent of the bale.

As plucking cylinder 60 nears the end of its return stroke, spool 94 of valve 92 strikes plunger 102 to shift the valve back to its position shown in FIG. 3 whereby air is reconnected to line 126 to operate pressure regulator 52 and piston pump 118. Actuation of units 52 and 118 forces hydraulic fluid from reservoir 114 to cylinder 36 to raise the bale to the upper position against bridge bars 18.

At the end of the return stroke of the plucking cylinder, spool 94 of valve 90 strikes plunger 104 to shift valve 90 to the position shown in FIG. 3, whereby air is connected to the right side of air cylinder 82 and vented from the left side through valve 150. With valve 90 in the position shown in FIG. 3, piston rod 84 is moved toward the left, thus causing plucking cylinder 60 to begin another plucking stroke.

As the bale is eaten away by each plucking traverse, platform 20 is raised to higher and higher levels during each lifting stroke to compensate for fiber loss. As the platform is raised to higher levels, cam slider 58 will engage cam bar 50 at an increasingly higher level and cause pressure regulator 52 to lessen the pressure at which pump 118 supplies fluid to cylinder 36 to compensate for the decreasing weight of the bale:

After the bale is completely plucked away and the platform 20 has reached the upper position indicated by dotted lines in FIG. 1, bracket 22 will strike the plunger 153 of a valve 154 located just beneath bars 18. Valve 154 is a normally open valve on main air line 110 which allows air to flow from an air supply 156; through the path indicated by arrow 158 in valve 154, to all of the air actuated components previously described. Depression of plunger 153 will cause valve 154 to close off the air supply to all of the air actuated components and stop operation of the machine.

A solenoid operated valve 160 may also be placed on air line 110 for the same purpose as valve 154. Valve 160 is normally closed, allowing air to flow from supply 156 to all the air components via the path 162. Valve 160 is operated to shift to its closed position upon receipt of an electrical signal from a destination point of the plucked fibers to control the flow of fiber stock. The electrical control may be set so that a signal is generated when there is too much stock being delivered and there is a need for temporarily stopping the bale plucking machine. After the stock at the destination point is sufficiently depleted, the electrical signal will stop and valve 162 will

return to its open position to enable the bale plucking machine to continue operation. The electrical signal may be induced photoelectrically, for example, from a card feed.

Valve **164** is a four-way, hand-operated, spring return valve used to manually lower the platform. Valve **164** is normally closed but when actuated, supplies air from line **110**, via the path indicated by arrow **166**, through valve **91** in the direction of arrow **163** to operate valve **122** and to simultaneously vent air from all of the remaining air components through vent line **167** via the path indicated by arrow **168** out through exhaust port **165**. Valve **154** should be moved to the open position to shut off air from supply **156** to all of the air components, before actuating valve **164**. All phases of operation of the machine will therefore cease except for the lowering of the platform **20** since valve **122** will be held in open position.

Having particularly described the invention, what is now claimed is:

1. Apparatus for plucking a bale of fiber comprising:
a. rotary plucking means;
b. a pair of elongated spaced guide members for supporting said plucking means;
c. means for rotating said plucking means;
d. means for traversing said rotary plucking means along the longitudinal axes of said guide members in one direction at a first rate of speed and in the opposite direction at a second rate of speed greater than said first rate of speed; and
e. means for presenting a bale of fiber in contact with said plucking means while said plucking means traverses in said one direction and for moving said bale out of contact with said plucking means while said plucking means traverses in the opposite direction.

2. Apparatus for plucking a bale of fiber comprising:
a. a bridge having a plurality of spaced members;
b. rotary plucking means disposed adjacent one side of said bridge and having a plurality of spaced pins adapted to pass between said spaced members;
c. means for rotating said plucking means;
d. means for traversing said rotary plucking means along the longitudinal axes of said members in one direction at a first rate of speed and in the opposite direction at a second rate of speed greater than said first rate of speed;
e. means for presenting a bale of fiber in contact with the other side of said bridge at a substantially constant pressure while said plucking means traverses in said one direction and for moving said bale out of contact with said bridge while said plucking means traverses in the opposite direction; and
f. means for doffing and collecting tufts of fiber from the pins of said plucking means.

3. The bale plucking apparatus set forth in claim **2** wherein said traversing means comprises:
a. means for supporting said plucking means for rotation, said supporting means being mounted for traversal along the longitudinal axes of said bridge members; and
b. a first fluid operated means for traversing said supporting means.

4. The bale plucking apparatus as set forth in claim **3** wherein said first fluid operated means comprises:
a. a fluid cylinder;
b. a piston reciprocable within said cylinder;
c. a piston rod connected to said piston and operatively connected to said supporting means;
d. means for selectively injecting fluid at either end of said fluid cylinder; and
e. means for selectively venting fluid from either end of said fluid cylinder.

5. The bale plucking apparatus as set forth in claim **3** wherein said supporting means for said plucking means comprises:
a. a carriage having a pair of spaced depending arms for rotatably mounting said plucking means therebetween;
b. roller means mounted on said depending arms; and
c. track means for supporting and guiding said roller means.

6. The bale plucking apparatus as set forth in claim **4** wherein said means for injecting fluid into said fluid cylinder comprises:
a. a source of pressurized fluid supply;
b. a first fluid line connected to one end of said fluid cylinder;
c. a second fluid line connected to the other end of said fluid cylinder;
d. a traverse valve connected to said source of pressurized fluid and operable to connect either said first fluid line or said second fluid line to said source of pressurized fluid; and
e. means for operating said traverse valve at the end of each traverse of said plucking means.

7. The bale plucking apparatus as set forth in claim **6** wherein said fluid venting means comprises a flow control valve in each of said first and second fluid flow lines.

8. The bale plucking apparatus as set forth in claim **2** wherein said spaced pins move in a direction opposite to said one direction of traverse when passing between said spaced members.

9. The bale plucking apparatus as set forth in claim **2** wherein said bale presenting means comprises:
a. a bale supporting platform mounted for moving said bale toward and away from said bridge;
b. a second fluid operated means for moving said platform; and
c. means responsive to the position of said platform for controlling the contact pressure between said bale and said bridge.

10. The bale plucking means set forth in claim **9** wherein said position responsive means comprises:
a. a reservoir containing fluid;
b. adjustable pump means for pumping said fluid from said reservoir to said second fluid operated means at variable pressures; and
c. means for controlling said pumping means in accordance with the position of said platform.

11. The bale plucking apparatus as set forth in claim **10** wherein said means for controlling the pumping means comprises:
a. a cam slider affixed to said platform;
b. a cam bar pivoted at one end and having a cam surface for engagement with said cam slider; and
c. a pressure regulator having a biased plunger extending therefrom and positioned for yieldingly forcing said cam bar into engagement with said cam slider, said pressure regulator being adapted for controlling the pumping pressure of said pump in accordance with the position of said plunger and said cam surface being so disposed that movement of said platform toward and away from said bridge will cause said cam bar to vary the position of said plunger.

12. The bale plucking apparatus as set forth in claim **2** wherein said doffing and collecting means comprises:
a. aerodynamic doffing means for creating an air flow across said pins when they are in the portion of their rotation furthest away from said bridge, said air flow being in the same direction of movement as said pins when they are in said furthest position for doffing tufts of fibers from said pins and;
b. conveyor means located on the side of said plucking means toward which said air flows for collecting tufts doffed from said pins.

13. The bale plucking apparatus as set forth in claim **12** wherein said aerodynamic doffing means is a suction fan located adjacent said conveyor means.

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