NEW GIN STAND FEATURES OFFER OPERATIONAL COST SAVINGS

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Abstract

A new model gin stand has been introduced to the market by Cherokee Fabrication Company, Inc. of Salem, Alabama. The prototype machine was installed in West Texas and tested before the end of the 2007 ginning season for about two weeks in January of 2008. This testing showed promising results and revealed opportunities for improvement in the gin stand and a need for greater capacities through the extractor-feeder preceding the gin stand. These changes have been made and the new design improvements were implemented for the 2008 crop season. Cherokee refers to this saw-type gin stand as the Avenger 174.

Introduction

The Cherokee Avenger 174 Gin Stand has 174 saws and is of a heavier construction than the previous Cherokee offering. This saw-type gin stand includes new patent-pending features designed to offer operational cost savings and ease of service. The procedure and results of an independent gin stand turn-out test is included.

Materials and Methods

Construction Features

A number of features new to Cherokee machinery can be found in this design, as well as some that are completely new to the industry. The heads and legs of the machine are made from 1-1/2" thick steel plate to provide stability and endurance. The rib rails are machined from 2" x 4" solid steel bar stock to resist bowing during heavy ginning loads. The agitator, picker roller, and optional upper moting screw conveyor are equipped with direct drive gearmotors. The upper moting screw motor is 1 horsepower, the picker roller motor is 1-1/2, and the agitator is equipped with a 10 horsepower motor. The saw shaft and brush cylinder pillow block bearings have concentric locks to help maintain rotational balance. Inspection holes with covers are included to help when setting the saw to brush engagement, the cut-off board behind the doffing brush, and the secondary air inlet in the bottom of the brush chamber.

Operational Features

One of the features immediately apparent is the large color control panel screen. This touch screen has one of the widest viewing angles available on the market today. The large display makes it easy to see the feeder rate, saw motor load, and agitator motor load. Each of these is displayed in a bar graph and a numeric percentage format. The touch screen also includes pushbuttons for the balance of the control requirements, including increasing or decreasing manual feed rate, automatic mode, breast in and out, and other features. Also displayed is readout of the gin hood pressure switch and confirmation of saw motor and feeder motor power.

One of the new features of the gin stand is a powered roll box door that can be opened at the touch of a button. A safety feature prevents the roll box door from opening unless the breast is out and the agitator motor is not powered up. Another new feature is the seed roll retainer, which swings up to support the bottom of the seed roll when the breast is pulled away from the saws. This helps keep the seed roll from falling out during normal ginning cycles. If the roll box door is opened, the seed roll retainer swings away to allow the seed to more easily escape out of the bottom of the roll box. The seed roll retainer is shown in Figure 1 with the breast in the ginning position (left) and the breast out of the ginning position (right). The seed roll retainer is shown in the normal ginning position with solid lines and in the retaining position with the dashed lines.

Air cylinders are used to provide the motion required to move the breast in and out, to open the roll box door, and to actuate the seed roll retainer. The gin stand comes equipped with a filter, regulator, and lubricator. In addition to the ceramic valves and high quality coalescing filter, a special water-absorbing lubricant is supplied to help prevent the air cylinders and ceramic valves from freezing in cold weather.

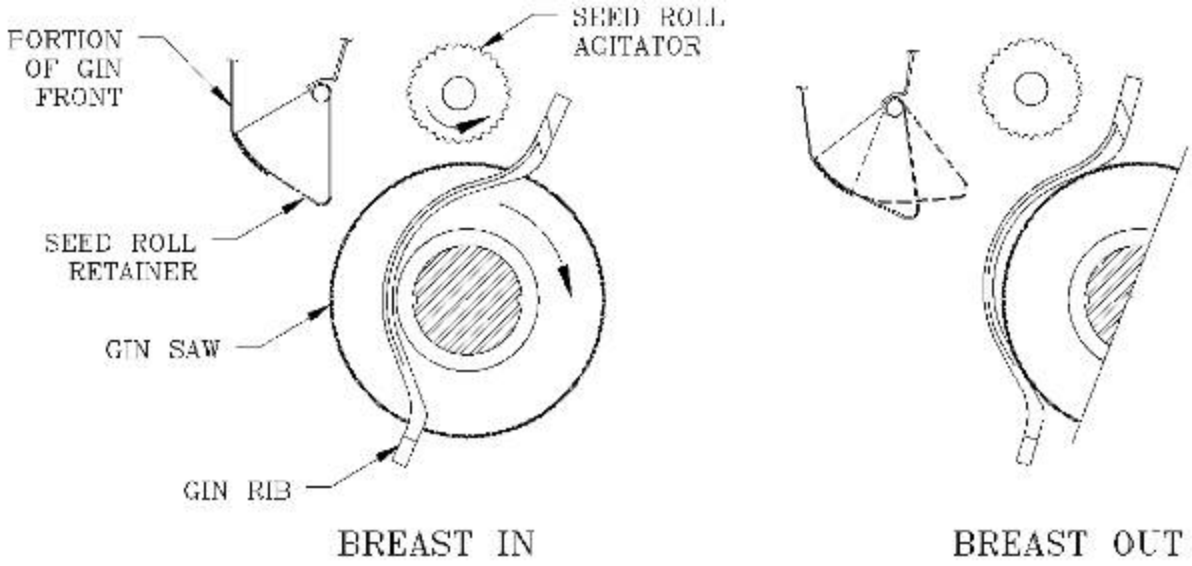

Figure 1. Seed Roll Retainer.

The agitator cylinder is also of a new design and ongoing experiments underway to further optimize the ginning capacity. The side of the machine has a large access hole so that agitator can be changed without having to disassemble the cylinder. The breast has a fixed pivot point near the floor and allows the front of the gin stand to be lowered to the floor to simplify saw cylinder changes.

The front of the gin stand has a pivoting fire door to allow cotton from the feeder to be sent directly onto the floor. This door is held in position by a simple counter-weight instead of pins or springs that could stick or become jammed when needed. The drive guards are made of heavy gauge steel and can easily support the weight of a man. The guards swing away in segments and are connected to each other with lift-off hinges.

Operational Savings

As gin stands have become wider and wider through the years, it has become more and more difficult to open the roll box door. With some models, the ginner must wait and have a helper to safely handle door, which can add to the down time. Quite often there are latches or pins that must be disengaged before the door can be opened and these can become bent or stick due to contamination. Since the Avenger 174 has a powered roll box door, a single ginner can open the door with ease.

The seed roll retainer found in the Avenger 174 can also reduce costs in at least three ways. First of all, many ginners risk choking up the seed line if all of the gin stands dump their seed rolls at the same time, which will cause a substantial loss of production for a period of time. Secondly, good lint is lost anytime a partially ginned seed roll is dumped, which reduces the overall turnout. Finally, there is no loss of production when the breast is returned to ginning position if the seed roll is already present, since it would otherwise take some amount of time to build up a new seed roll from scratch.

Original Installation

The first Avenger 174 was installed in January of 2008, at Southwest Gin in Morton, Texas. A new Cherokee Majestic 8000 extractor feeder was installed over the gin stand. Testing was performed to take advantage of the remainder of the 2007 season crop, being ginned at this facility. A 7-1/2 horsepower gearmotor was used for the original agitator motor and on-board amperage monitors revealed the agitator motor as the first limiting factor for ginning capacity. This gearmotor was then replaced with a 10 horsepower model.

The next limiting factor became the extractor feeder. Since the Avenger 174 is slightly wider than the previous Cherokee offering, it appeared that the ends of the stand were not being adequately fed. These factors led to the design and introduction of the Avenger 8000 Extractor Feeder, which was supplied with all of the Avenger 174 Gin Stands in the fall of 2008. The feeder was swapped out for the 2008 ginning season at Southwest Gin also. The new

feeder is slightly wider than the gin stand. Internally, changes were made to allow for a greater flow of cotton and the top speed of the inlet feedworks was increased by almost 15%.

Turnout Test

Decatur Gin Company in Bainbridge, Georgia, has a three-stand plant with two new Avenger 174 gins stands. The gin manager, Mike Greene, reported the results of turnout tests with all three stands. Cherokee was not involved or present for the testing. The tests were performed with one gin stand running at a time, and each gin stand ginned one complete module. All three modules were picked from the same field during the 2008 season. According to Mr. Greene, these tests revealed an increase in turnout of well over 1/2 of a percent for his gin plant. The total averages are reported below.

AVENGER 174 (#1 Gin Stand)	AVENGER 174 (#2 Gin Stand)	Existing 158 (#3 Gin Stand)
40.67%	40.73%	40.05%

Summary

The Avenger 174 Gin Stand enjoyed a successful initial season. New features make it an effective choice for a number of reasons including increased productivity, ease of use, ease of maintenance, and safety. The innovative control system is easy to see and operate, and the heavy construction will insure that these gin stands will be operating for many years to come.