

**CONTINENTAL EAGLE CORPORATION
NEW 9500 DOWN-PACKING SLIP BOX PRESS**

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Abstract

Continental Eagle Corporation introduces the new 9500 down-packing press for the cotton ginning industry for the 2002 gin season. The new Continental Eagle press is capable of baling cotton up to 55 bales per hour and is similar in design to the successful 950 press. The 9500 press uses less connected horsepower and is 3'3" shorter than the 950 press. The 9500 press is available in both a universal density 20" X 54" and a high-density 20" X 41" bale size model.

Introduction

Continental Eagle Corporation has been manufacturing cotton-ginning equipment for more than 170 years and manufacturing baling presses for more than 136 years. Continental Eagle has added an additional model to its long list of presses called the Model 9500 press. The 2001 Model 9500 is a slip box "down-packing" press that has a 20" X 54" box size. The 9500 is designed to press universal density bales (28 pounds/cubic foot) at a capacity that would be sufficient to handle two and three gin stands in a cotton ginning facility. There is also available a 20" X 41" high-density (32 pounds/cubic foot) 9500 press. This paper introduces the new 9500 press that Continental Eagle is offering for the 2002 ginning season.

Discussion

Design Objectives

Early in 2001, as a result of customer feedback, our sales force determined that the market has a requirement for a "down-packing" press that would fall between the two very successful 1986 Bespress and the 1995 950 press. Because of the recent success and the technology used on the 950 press, that model was chosen to be the baseline of the new press.

Specific design requirements for a 9500 press would include: a slip box design with minimum height requirements, a baling capacity of 35 and 55 bales per hour (two different options), quieter pumping units with reduced connected horsepower, and a work/access platform.

The Design

Since the 950 press would be used as the baseline for the new press, the same heavy structural design would be incorporated. In addition to the structure, the same basic hydraulic tramper and pusher, double pressing rams, auxiliary components and the hydraulic circuit would remain the same where possible.

The overall height of the 9500 press is 28' 2 5/8" (see Figure 1). The height of the 9500 press is 3' 3" less than the 950 press. The 28' 2 5/8" height of the 9500 press was achieved by reducing the box height of the 950 press by 22". In order to use a box this short (very close to the Bespress), "press dogs" were designed into the box to hold the cotton in the box when the boxes are rotated. An 11' X 20' work/access platform surrounds the front and rear of the press with an access ladder or optional stairs.

The proven 950 and our recently released 9300 press hydraulic pusher was slated for the new 9500 press. The pusher has a 49" tall face and a 2½" diameter by 54" stroke hydraulic cylinder. The hydraulic control block for the pusher has a unique feature that takes the pusher out of "regenerative mode" toward the end of the extend stroke. This feature increases the available force (4000 LBS @ 800 psi hydraulic pressure) to push the cotton charge into the charge box under the tramper. Ultra high molecular weight (UHMW) and special ceramic UHMW are used on all wear surfaces.

Because of the shortened press boxes, the length of the tramper cylinder was reduced from 120" on the 950 press to 102" on the 9500 press. A 6" diameter tramper cylinder was used on the 9500 press to reduce the operating pressure that would be seen in a shortened press box. The Continental Eagle Model 86 Bespress uses a 6" bore cylinder on the tramper. Lower operating pressure would result in smoother operation of the tramper and improve the consistency of bale weights. As with the 950 press, the 9500 press uses UHMW blocks on the guide rods in place of rollers.

The ram cylinders (bale pressing rams) stroke length decreased from 102" on the 950 press to 80" on the 9500 press. The 22" reduction in stroke length was directly related to the shortened press boxes. Two 10" diameter 6000-psi National Fluid Power Association (NFPA) cylinders were selected for the hydraulic rams. Two rams are used for a more even distribution of force when pressing a bale. Ten inch diameter cylinders are used because the oil flow requirement for two 10" diameter cylinders is less than two 12" diameter cylinders (as used on the 950 press). Less flow requirements reduce the horsepower requirements and the required pumping unit reservoir size. The maximum system operating pressure was increased from 5000 psi (maximum ram system pressure of the 950 press) to 5800 psi to offset the loss in pressing force with the decrease in the diameter of the press rams from 12" to 10".

The baling capacity (bales per hour) of the press would drive the pumping unit design. With the reduced diameter of the ram cylinders, a single high volume horsepower limited piston pump with a maximum operating pressure of 5800 psi would be utilized for the ram system. Vane pumps were selected for the tramper, stripper, pusher, and auxiliary components for their low noise level when operating. A single 750 gallon vertical tank design would be utilized for flooded suction pumps.

Pressure filters are located at the tramper and ram control blocks for contaminant removal. Pressure filters are also in the circuits of the stripper cylinders (raise/lower the boxes off the bale), pusher/belt feed and auxiliary circuits. A return line filter is also utilized on the tank for full time filtration on the cooler circuit.

The 9500 press is controlled by a programmable logic controller (PLC). Pushbuttons for every press operation are located on the face of the console for instant control access. The press console uses a touch screen for monitoring pressures, making operational adjustments and troubleshooting. With the HP limited piston pumps and simplified hydraulic circuit, there are fewer components in the hydraulic circuit to control, making the press easier to operate and troubleshoot. Switch mats come standard and cover the full rotational area when the boxes rotate.

The 9500 press uses the standard bale handling system that comes on the 950 press. This system incorporates a bale cart that transports the bale to the bagging area automatically. A retractable bale conveyor has been designed and is offered as an option.

Prototype Results

Two prototype 9500 presses were installed at Funston Gin in Funston, Georgia (see Figure 2) and at Sampson Gin in Newton Grove, North Carolina for the 2001 ginning season.

The actual cycle time for the prototype 9500 press (sold at 35 bale per hour (BPH) capacity) ended up at 90 seconds (40 BPH). This 90 second cycle time includes hand tying the bales with steel ties at a time of 30 seconds. If Continental Eagle's exclusive semi-automatic feed Jenglo wire tying system were used in place of hand tying, the tying time would be reduced from 30 seconds to 13 seconds at a resulting cycle time of 49 BPH (73 seconds cycle time).

The pumping unit performed well and operated as expected (see Figure 3). The pumping unit was much quieter with the vane and piston pumps than the pumping units of the 950 press. The two 100 horsepower motors connected to the pumps proved more than adequate, since neither motor load exceeds the rated 1.15 service factor of the motor.

The 10" diameter rams worked well with a typical ram operating pressure of 4200 psi required at tie position. The operating pressure of 4200 psi was typical with 6-7% moisture cotton at a 20 1/2" platen separation and bale weights ranging from 490 and 505 LBS.

Conclusions

Both prototype 9500 presses combined baled a total in excess of 80,000 bales for the 2001 gin season. The two prototype 9500 presses exceeded expectations on performance with a cycle time of 40 bales per hour when hand tying (30 seconds) with only 200 connected horsepower. The cycle time could be improved to 49 bales per hour using the Jenglo wire tying system.

A booster system is currently being designed to increase the press capacity to the 55 bales per hour rating with an addition of a 100 HP pump motor group.

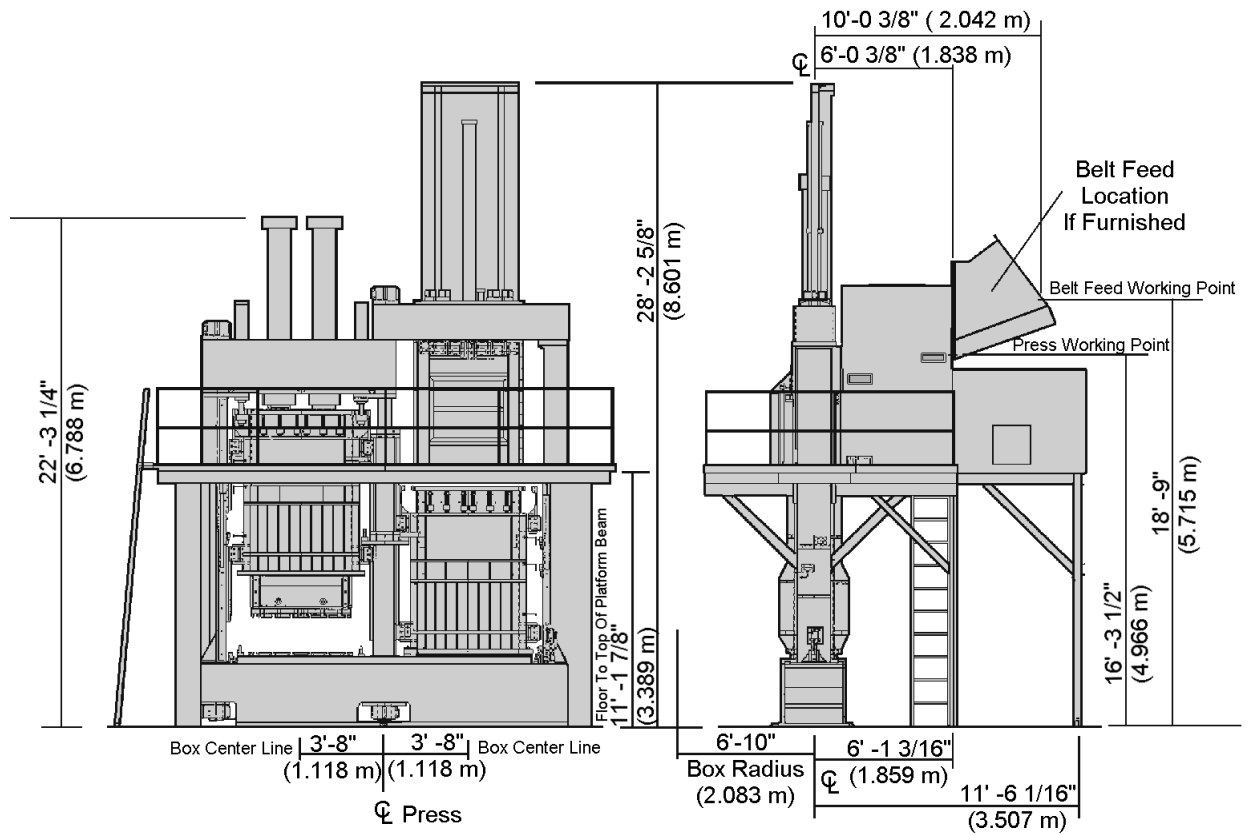


Figure 1. Continental Eagle's 9500 Press - General Dimensions.



Figure 2. Continental Eagle's 9500 Press at Funston Gin, Funston, Georgia.

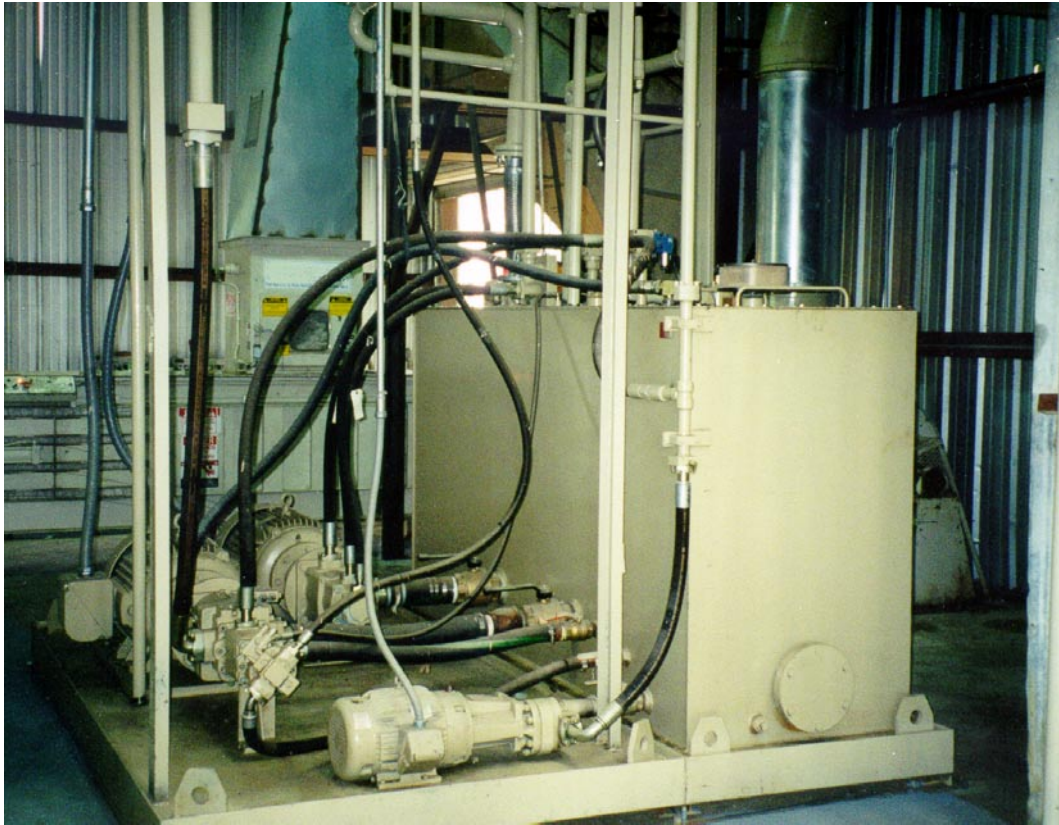


Figure 3. Continental Eagle's 9500 Press Pumping Unit at Funston Gin, Funston, Georgia.