

Stalk and Root Embedding Plow

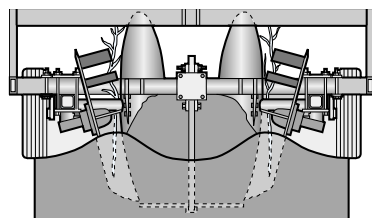


New Stalk and Root Embedding Plow Prevents Post Damage and Saves Time in Preparing Fields

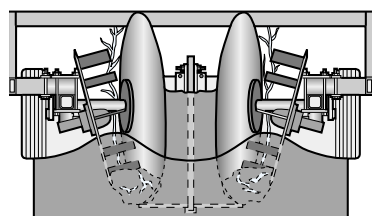
Disposing of cotton stalks and roots in the field after harvest is an energy-intensive operation. Nationwide, many cotton farmers use conventional tillage practices that involve shredding the stalks and making several tillage passes over the field to prepare a new seedbed. These tillage operations consume over one-half of farmers' annual fuel budget, and most farmers are frustrated with the high costs and time requirements. Over the last 50 years, farmers have tried several alternative tillage systems, all of which involve uprooting the cotton plants and mixing the crop residue into the soil. All uprooters have shortcomings, and none have gained wide acceptance across the Cotton Belt.

With assistance from DOE's Inventions and Innovation Program, the University of Arizona invented the Pegasus system—a stalk, root, and agricultural debris-burying tillage machine suited for burying row crops, especially cotton, to prevent pest damage and prepare fields for crops. The rapid plow-down design is a breakthrough in cotton tillage. A narrow moldboard plow opens a deep trench in the soil next to the crop row. Then a "stuffer disk" inserts the roots and stalks into the deep trench. The whole stalks are buried in a "rope" bundle under the bed where they decompose. The machine also forms new beds, leaving the field ready for the next crop.

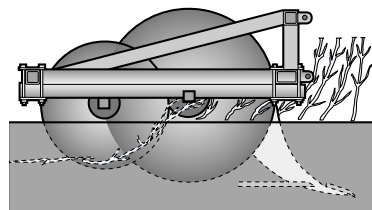
Rigorous research by the United States Department of Agriculture indicates dramatic savings in cost, time, and energy. There are no adverse effects. Yields with the Pegasus have ranged from the same as conventional methods to 12% greater than conventional methods.



Front View



Back View



Side View

Stalk and Root Embedding Plow

Overview

- ◆ Invented by the University of Arizona and being sold by the Rome Plow Company
- ◆ Commercialized in 1996
- ◆ 71 units operating in 2003

Energy Savings

(Trillion Btu)

Cumulative through 2003	2003
0.082	0.019

Emissions Reductions

(Thousand Tons, 2003)

Particulates	SO _x	NO _x	Carbon
0.0	0.0	0.0	0.410

Applications

- ◆ Breakthrough tillage technology for agriculture
- ◆ Cotton and other row-crop tillage

Capabilities

- ◆ Deeply entrenches whole stalks and roots into soil in one pass, eliminating need to shred stalks.
- ◆ Plows 7 acres/hour at 4.0 to 4.5 mph.

Benefits

Air Emissions Reductions

Eliminates stalk shredding, a large contributor to dust emissions, and cuts engine air emissions by 70% compared with conventional tillage practices.

Productivity

Requires 75% to 80% less time to dispose of crop residue and prepare a new seedbed compared with conventional tillage practices. Saves 4 to 7 repeat passes of tillage machinery to work and prepare fields. Results in cost savings of \$50/acre compared with conventional tillage practices.