

# Crop Drying Furnace Burns Corn Stalks

(Continued from cover page).

proved, at least to my satisfaction, that we can get steady, productive heat from stalks, straw and other crop residues. This burner will burn big round bales, square bales or trash — anything around the farm that's combustible. And, because it uses a heat exchanger, there's no contamination of the crop being dried with smoke, soot or other debris."

Wieweck used only 5 acres of stalks to dry his corn, which came in from the field at 24 to 25% moisture and was dried to about 13%. "Think what could be done with 200 to 300 acres of stalk residue. In addition to drying all my crops, I could heat my barn, my house and have enough left over to distill alcohol for running my tractor and more."

Wieweck didn't start building his burner until last September, but had spent months working the design out on paper. A trained engineer who recently left industry to farm full-time, he says he knew, once he had the design drawn up, that it would work. "I couldn't believe that no one had done it before."

The burner combines a controlled burning chamber with a direct-air heat exchange system, meaning there are two layers to the furnace and chimney. Inside, residue burns and gives off heat. The heat passes through the inside walls to the second layer, completely sealed off from the burning chamber and filled with

fresh air. That air heats up and is passed up the outside layer of the chimney and into the bin. Any smoke and ash exits through its own section of chimney outside.

It takes Wieweck "about a minute" to load the burner with a stack of corn stalks using his Hesston stalk mover. One stack will burn for seven hours — more than enough time to take out 10 points of moisture in 1,000 bu. of 24% moisture corn, says Wieweck.

Although his residue burner is built for his Stormor overhead bin dryer, he feels it will readily adapt to other bin drying systems. "I've already got plans for building a furnace for other types of bin dryers," says Wieweck, who has applied for a patent on his residue burning crop-dryer. He figures he saved about \$1,000 in fuel costs last year by using stalks to dry the 16,000 bu. of corn produced on his own farm. He invested \$2,000 worth of materials into the residue burner and "countless hours of engineering."

Here's a closer look at how it works: Individual stacks of corn-stalks (or straw or other crop residue) are loaded into the furnace and lit. If the fire isn't already burning, Wieweck uses a match, but says he would use propane to light hard to burn materials, such as moldy hay bales.

The furnace doors are shut and a small 1/10 hp. fan mounted at the bottom of one door is started. It feeds the fire oxygen and is connected to a thermostat measuring the temperature of the air leaving the burner and entering the dryer. When that air reaches drying temperature, the fan stops, stopping the fire. Wieweck says the fan runs 30 seconds out of every 5 minutes to maintain a 120° temperature. Three sides of the burning chamber (everything but the doors) are covered with a secondary chamber, with 4 inches of space between. A high-speed 36 in. fan forces air into the secondary chamber, up the chimney and into the bin. The air

A 1/10 hp fan (below) feeds furnace with oxygen and controls amount of heat generated. Lower photo shows nine pipes inside furnace which carry smoke and ashes out of burner. At right, Wieweck feeds stack of stalks into furnace.



## NEBRASKA RESIDUE BURNER

Another crop residue burner is now being tested and prepared for market by Middle State Manufacturing, of Columbus, Neb. The company tested a prototype of their burner on a Nebraska farm last fall, drying about 7,000 bu. of corn from 24% moisture to 14.5%, using 600-lb. round straw bales.

The prototype was tested on the Wallace Friesen farm, Henderson, Neb., with his bottom unload, continuous-flow bin dryer. Unlike the Wieweck burner, which operates independently, standard propane drying equipment was left on the Friesen dryer, ready to kick in should the burner run out of material or fail somehow.

Other differences: The Middle State burner does not make use of a heat exchanger. Air is pulled down through the top of the burner and mixed with the flame at the bottom of the burner. Heat is then drawn directly off the bottom of the burner and into the dryer.

Jerry Joseph, Middle State representative, told FARM SHOW that the temperature at the bottom of the burner is about 1200° when in operation, enough to burn up any smoke, odors or gases.

"The flame looks like a propane flame," he says. "It's blue and clean with no odor. There's no smoke at all with this system."

Also, the Middle State burner is loaded from the top. During the trial

run, bales were loaded with a makeshift truck boom, but Joseph says the company plans to have a loading hoist built into the system by the time it is released for market.

Rate of burn is regulated by opening and closing the air intake damper. Right now, the operation is manual but it will be automated, with thermostatic control.

The burner is portable so it can be moved from farm to farm. It's designed to hold two round bales but will burn anything combustible. One 600 lb. bale burns for about 4 hours.

Ten to 12 farmers throughout the Midwest have indicated they will purchase burners for use next year, says Joseph. "We'll work closely with these farmers to make improvements before entering the market full-scale in 1980. One North Dakota farmer plans to dry 122,000 bu. of corn with the burner," Joseph says.

Besides improving the burner, Middle State also plans to integrate the system with 100 hp European hot water engines for driving irrigations units.

Total projected cost of the system, including loading hoist setup, is \$6,000 to \$8,000. With new federal energy legislation, up to 20% of the purchase price, including investment credit, may be tax deductible.

For more information, contact: FARM SHOW Followup, Middle State Manufacturing, Columbus, Neb. 68601 (404 564-1411).

is warmed by the fire inside which reaches temperatures of 1,500°.

Ash and smoke inside the burning chamber are carried up and out of the chimney by nine 3-in. pipes. Fresh air on its way inside to dry corn rises in and around the pipes but is never exposed to smoke leaving the chimney.

That's all there is to it, explains Wieweck. "You control the burning of crop residue by controlling the amount of oxygen that reaches the fire. This system does it with a tiny fan, a simple thermostat and a sealed system."

The burner is 80 to 90% efficient. Attempts in the past to build residue burners have only been able to get around 10% of the heat possible out of the residue. As a result, according to Wieweck, they were wasteful and had to be filled too often. He adds that "one problem with using corn stalks is farmers say they don't have time to make stacks during harvest. Well, it took me 2 hrs. to make 18 stacks. I think that when the price of LP gas goes to 75¢ a gal., there will be plenty of time."

Wieweck says his residue burner can be used to provide heat anywhere its needed on the farm. Bigger burners, and higher density balers and stackers, will make the system even more useful. For instance, he thinks stacks made by the new Hesston high-density stacker will burn 20 hours or more.

Wieweck says he's available as a consultant to interested farmers and will custom-design a residue burning crop-dryer system to meet each farm's particular needs. The size and shape of the burner can be changed for different crop residues, and to fit different dryers. To get an idea of the price, he says he would sell his present burner for about \$4,000.

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Vol. 3, No. 1, 1979

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FARM SHOW is published bi-monthly. It does not accept advertising and focuses exclusively on new products and services, and product evaluations. The subscription rate is \$8 per year. Canadian and foreign subscriptions are \$11 per year.

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