



The Hall family burns corn cobs to heat their 12,000 sq. ft. shop (left) and their 1,500 sq. ft. temporary living quarters. A separate building 50 ft. from the shop (above right) houses the cob burner and cob storage (above and at right). An elevator at back corner of cob storage unit loads cobs into stove.



By Lorn Manthey, Contributing Editor

Cob Burner Heats Their Big Shop And Home

"We talked to commercial contractors who told us we needed a system that would produce more than a million btu's for our shop and cost \$40,000 to \$50,000 to install," says Dan Hall of Butterfield, Minn. "We decided that was way too much money so we bought a used boiler for a tenth of that and built our own system that burns corn cobs. Our son Mike said if it works we're way ahead, and if it doesn't we'll try something else. Turns out it works great and heats both our new 12,000 sq. ft. shop and 1,500 sq. ft. temporary living quarters."

The Hall's boiler is housed in a 24 by 42-ft. insulated building that for safety purposes is located 50 ft. away from the main shop. The boiler, which is 4 ft. wide, 6 ft. tall and 10 ft. long, produces about 400,000 btu's. The Halls use an old grain elevator to convey cobs into the boiler, which is thermostatically-controlled to turn off when it reaches 180 degrees.

"The cobs provide real uniform heat," says Dan. "The system is real easy to maintain. The boiler heats water that's piped into floor tubing spaced every 12 in. underneath the concrete shop floor. We have auxiliary forced air radiators to use in very cold weather, but they're hardly ever on. The shop has 16-ft. insulated sidewalls, an insulated roof and

about 3,000 sq ft. of 2nd floor storage. About 1,600 sq. ft. of space on the one end of the building is roughed in for living quarters."

Their home-built furnace burns corn cobs that Dan collects from area farmers. He gathers the cobs with a self-propelled cob harvesting machine built from a Gleaner Combine. The Halls were not yet ready to disclose details on their cob collector. Last year he collected about 400 tons to use for heating. He ran the cobs through an old rotary screener and sifted out a couple hundred bushels of small cobs and cracked corn that was used for feed. "I've used the harvester for several years and it does a great job," says Dan. "With my tractor fuel, equipment cost and labor for collecting cobs I figure the heating cost with this system is about 50% less than an LP boiler."

The Hall family, which includes Dan, Terese and their now adult sons Jeremy, Andy, Tony and Mike, has always been an enterprising group. When the boys were young, they tinkered with welding projects and helped Dan build a multi-use fencing machine from a self-propelled combine. The boys also tuned and rebuilt lawnmowers, car motors and snowmobiles. The oldest son Jeremy is now a welding instructor at a western Minnesota community college. Andy, Tony

and Mike have welding, repair, rebuilding and performance machining businesses that operate from the farm site. Dan and Terese operate a custom fencing business, and raise grass-fed beef and poultry.

Six years ago while Dan and Terese were attending Farmfest 60 miles away in Morton, Minn., a huge tornado churned through the Hall farm site, demolishing buildings, trees, machinery, equipment and killing livestock. "The days and weeks and months after that were incredibly stressful," says Terese, "but we had help from hundreds of people. We rebuilt little by little, and we're getting closer to where we want to be."

The basement of their home, where Andy, Tony and Mike huddled beneath the steps as the tornado tore the house away above them, is still intact. Today that basement is capped with a well-insulated metal building where Dan, Terese, Andy and Tony live in cramped but very manageable quarters. "I'm glad the side walls are 12 ft. tall," Terese says with a smile, "because we at least have a place to stack and hang things." It's close living quarters, neatly kept with a makeshift kitchen, an office, a flat screen TV and heat provided by the homebuilt cob burner. Eventually they'll move into the two-story living quarters adjacent to the shop, which the boys

have vowed will have an electric elevator to reach the second floor.

Dan says with a laugh "I guess they intend to keep us around even if we can't get around." About 3/4ths of that 204-ft. long building houses Andy's welding shop, Mike's machine shop and Tony's performance machining business. Terese has freezers for frozen packages of grass fed beef and poultry.

Outside the main building, equipment in various stages of repair awaits a spot in their sons' busy work schedule. Numerous riding lawnmowers set up for racing attest to at least a few hours of leisure in their days.

In the past few years, Dan and Terese replaced the destroyed wooden farm barns with hoop buildings to house their livestock and machinery and now their attention is on finishing those new living quarters. "Dan doesn't claim to be much of a carpenter," says Terese, "so it looks like I might end up hiring someone to finish our new house. At least with the cob-burning boiler, we'll always be warm."

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Gator-mounted, self-propelled ice fishing shack is made from treated plywood. A large ice auger stores on brackets mounted on front of shack.

"Gator" Ice Fishing House

Ed and Barb Rabehl, Birchwood, Wis., can convert their Deere Gator AMT 600 into a portable, self-propelled ice fishing shack. It's made from treated plywood with a plywood roof. There's a door on back with a built-in window, and 2 windows on the sides. A large ice auger stores on brackets mounted on front of the shack.

"The shack is about 5 ft. wide with 2 holes in the floor so my wife and I can both fish comfortably," says Ed. "It draws a lot of looks whenever I drive onto the ice. I can't go through deep snow with it, but due to the weight of the shack I can go through a fair amount of snow."

Lengths of 15-in. dia. pvc drop through the holes down to the ice to keep the cold out. "I open a window a little for ventilation and

use propane heat to stay warm. There's room in front for pails and fishing stuff, and we sit facing the rear with our feet on the lower part at the back."

He removed the dump box from the Gator, then drilled 4 holes in the Gator frame—one at each corner—and bolted the shack on. When the ice fishing season is over, the shack comes off and the dump box goes back on.

"To remove the shack I back into my shed and hook up ratcheting tie-down straps to some hooks in the ceiling. Then I lift the shack off the Gator and drive away," says Ed.

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Use the Smoke Pencil puffer stick to find leaks that let in cold air in the winter and hot air in the summer.

"Contractors, energy consultants and heating, ventilation and air conditioning technicians use the Smoke Pencil around duct work, doors, windows, chimney flues and more, finding and then sealing the leaks," says Jason Raddenbach, The Chimney Balloon. "Homeowners can use it too. The process is easy. Just create a negative pressure in the house, and pull the trigger on the smoke pencil near a suspected or possible leak. Follow the smoke to find the leak."

The smoke pencil releases a non-toxic, sweet smelling glycol, glycerin and water vapor solution, not actual smoke. A light on the pencil makes it easy to see the vapor cloud. To create the negative pressure in a house, turn the clothes dryer to fluff with no heat and turn on all bathroom vent fans.

"With the negative pressure, all the leaks and crevices will start drawing in air real strong," says Raddenbach. "The smoke pencil makes it easy to see where the air is coming from."

The Smoke Pencil has a locking trigger for safe toolbox storage. The Smoke Pencil and a 3 oz. bottle of non-toxic smoke fluid are priced at \$34.99. Smoke fluid refills are priced at \$4.99.

For a fine, but dense stream of smoke,



Smoke Pencil works great to find leaks that let in cold air in the winter and hot air in the summer.

get the SP Smoke Pencil Adapter Tip. The \$14.99 option has a small low velocity fan that forces the smoke out of the restricted tip. It's especially useful in small areas or where light air currents are difficult to detect.

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