

## Portable “Cold Frame” Serves As Year-’Round Garden

When Wayne Burleson’s wife Connie said no to the construction of a vegetable cold frame in her flower garden, he decided to build one on wheels. By the time he was done, he had a unit with in-floor heat, a thermostat, and automatic venting. Instead of just a cold frame, he realized he now had a winter garden.

“It’s a little pricy, but you can’t compare the taste and quality with what you buy in the store,” says Burleson. “At 5,000 ft. elevation, we have 90 days to get our vegetables ripe. With this setup, I can ripen peppers and other plants we could never grow outside.”

His mobile cold frame is a 2 by 4-ft. wooden box with 2 in. of insulation on the bottom and sides. The sides slope from about 3 ft. at the back to 2 ft. at the front. The slope ensures that all the plants get adequate light.

“I put a layer of sand in the bottom with a soil heater cable in it and a couple more inches of sand over it. I then filled the rest of the planting space in the box with a mixture containing equal measures of each compost, vermiculite and peat moss,” he says.

“The thermostat keeps it at 76 degrees.”

A set of rubber-tired wheels lets Burleson move it as needed. The top is a salvaged thermopane window. Realizing that when the sun came out, anything under the glass would fry, Burleson installed a greenhouse vent arm. It raises the window/roof when the air inside the box gets too warm. As it cools, the window is lowered back into place.

“My only mistake was not putting a domed top on it,” says Burleson. “When the snow came, it piled up, and I had to sweep it off.”

To keep the air temperature above freezing when the outside temperature gets closer to zero, Burleson also installed a grow light for heat. The plants also benefited from the light.

“The minute I turn on the grow light, everything grows like the dickens,” says Burleson.

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Wayne Burleson’s mobile cold frame has in-floor heat, a thermostat, and automatic venting. It’s a 2 by 4-ft. wooden box with 2 in. of insulation on the bottom and sides.



Cold frame’s sides slope toward the front, ensuring that all the plants get adequate light (left). A greenhouse vent arm raises the cover when air inside box gets too warm. As it cools, the window lowers back into place.

## “Plug-Proof” MudSmith Gauge Wheels

The open design of MudSmith replacement gauge wheels keeps planters and air drills going in conditions where the original wheels would likely plug up with wet soil. South Dakota farmers Roger Smith, his brother Duane, and nephew Jacob came up with the original design and tested it out for several years before selling some to neighbors. Now they’re marketing them for practically every brand in the field.

“We were under our corn planters and drills hundreds of times taking gauge wheels off and cleaning them out when we needed to be planting,” recalls Roger Smith. “When conditions are bad, you have to do it again and again.”

Smith points out that earlier planting dates and reduced tillage have added to the problem. Their new design with its open spokes eliminates the problem. It also opens up both access and visibility to disc opener hubs and scrapers.

“We’ve been running them on our own equipment for 3 1/2 years,” he says. “We were surprised how well they worked. We’ve had no more issues with plugging. They’re a 98 percent improvement over the original equipment. We designed them so you can use standard bearings and tires from your dealer.”

The MudSmith units feature a cast iron hub and simplified bearing replacement. Smith notes that original equipment gauge wheels require removing the tires, splitting the rim, and removing bolts to get at the bearing.

“With the MudSmith, you just remove the snap ring and replace the bearing,” says Smith. “We didn’t intend to sell them when we first made them for ourselves, but the response has been terrific.”

MudSmith gauge wheels are available in 3-spoke/4-in. tire, 3-spoke/2 1/2-in. tire, and 4-spoke/4-in. tire. Prices start at \$125 for the hub and rim assembly. The completely assembled wheel ready to bolt on the planter is



Open spoke design of new replacement gauge wheels keep them free of mud.

priced at \$165.

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## Heat Recovery Unit Adds Value To Genset

You can get more out of a stationary diesel engine than just electricity. Add a heat recovery unit and you can produce either hot water or steam.

While Martin Machinery’s main business is building gensets for primary power. Their heat recovery units have been used with their gensets to produce hot water for everything from therapeutic swimming pools in Russia to shrimp ponds in Venezuela to warming a floor in a welding shop.

Heat recovery units are largely custom made for the situation and the customer’s needs, explains Marcus Martin. Heat can be recovered from any or all of the engine jacket, oil or exhaust systems. In all cases, he cautions that heat removal needs to be controlled and balanced against heat needed for the engine to operate efficiently.

“There’s an acceptable operating temperature range determined by the engine manufacturer,” explains Martin. “We design systems that operate within that range. For example, engine jacket water will not be cycled through our recovery heat exchanger until the water temperature reaches the recommended operating range.”

The same parameters hold true for removal of exhaust or engine oil heat. Martin adds that exhaust temperature depends in part on the quality of the fuel, with higher quality fuel allowing more heat to be removed.

“Just like with a wood stove flue, you have to maintain a certain temperature to avoid condensation in the flue and buildup of particulates,” he says.

Sensors determine when there is “excess” heat that can safely be removed, and the computerized control system adjusts valves accordingly. When the excess heat is no longer needed, such as for heating a floor in the summer, engine jacket water is cycled to a radiator or other cooling system.

Martin also cautions against heat recovery units that attempt to use the OEM water pump. “Engine water pumps are designed to circulate water through the engine components,” he says. “We install a high flow pump that can push water through the jacket and then through a heat exchanger and back to the engine.”

Martin uses standard boiler tube for the heat exchanger and recommends yearly or twice yearly cleaning with approved boiler



Heat recovery unit, right, produces hot water using “waste heat” off this stationary diesel-powered generator.

cleaning equipment. The company also builds biogas generators for use on dairies. Recovered heat warms water that is then piped through the manure to boost methane production.

The company builds all sizes of gensets and matching heat recovery units starting at 45 kW. While the price varies by application, Martin says the basic heat recovery unit for

the 45 kW genset would start at about \$3,500. However, a complete package with computerized controls and fully assembled would run about \$8,500.

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