



Harry Benjamin assembled this heavy-duty greenhouse in his shop during the winter, welding together salvaged material to build it. Structure is anchored to a concrete floor.



There's a 3-ft. wide raised bed lining the walls and a 6-ft. wide bed at the center of the structure. All beds are raised 3 ft. above the floor.

## He Built A 20 By 36-Ft. Greenhouse For \$5,000

"I built it for my wife. She really enjoys working in it all year long," says Harry Benjamin, Shelby, Montana, who recently sent FARM SHOW photos of a 20 by 36-ft., climate-controlled greenhouse he built from scratch.

He used mostly salvaged materials. It's built stronger than most commercial greenhouses since it's anchored by a concrete floor and the frame is all welded together. It'll hold up in the highest winds," says Benjamin. "I spent about \$5,000 to build it but most of that was for new Lexan panels that cover the walls and roof. A commercial greenhouse of comparable size would have cost at least \$20,000, and it wouldn't be nearly as strong."

The greenhouse is fully heated during winter by a natural gas space heater and "air conditioned" during summer by a big squirrel cage fan built into one end. The fan kicks on automatically whenever the temperature gets above 90 degrees.

The walls mount on a base made from old railroad rails. The Lexan panels attach to a frame made from 2-in. dia. pipe. Inside, there's a 3-ft. wide raised bed lining the walls and a 6-ft. wide bed down the middle, with a wide alley on either side of it. All beds are raised 3 ft. above the floor. Automatic waterers above the beds, operated by valves, de-

liver a fine mist to the crops.

The greenhouse also contains a hot water tank, a sink, and cupboards. There's an awning decoration, built from scrap metal, on one end of the greenhouse with flowerpots hanging from it.

Benjamin built the entire structure during the winter inside his shop and used a 2-wheeled trailer to move it into place outside. He mounted one end of the greenhouse on the trailer and used a front-end loader to pick up the other end, then wheeled it into place, set it down, and blocked it up so that it was all level. Then he put in the concrete floor. "The floor slopes toward the middle where there are drains, which makes it easy to hose down. The water drains into our shelterbelt."

"My wife uses it to grow a wide variety of plants every month of the year except for December, January, and February. She can start gardening two months early, and last year she grew tomatoes all the way up until Thanksgiving. It's nice to have fresh food on the table almost all year long," says Benjamin.

"She has arthritis and can't get down on the ground like she used to. In the greenhouse she can work standing up. She grows carrots, radishes, tomatoes, cucumbers, zucchinis,

strawberries and raspberries as well as other crops. She has radishes, carrots, lettuce growing all the time. There are lights inside so she can go out and work at night if she wants to.

"We brought in high quality soil from another area. The food that's grown in it has a superb taste. And when you open the door there's a wonderful smell of things growing inside - it's very therapeutic."

Another benefit of the greenhouse, says Benjamin, is that food can be grown in a smaller area than it could be outside. "And there's no loss to raccoons, rabbits, deer, and birds."

Benjamin designed a handheld rototiller that makes use of an electric drill. It consists of a 2 1/2-ft. long, 1/2-in. dia. metal shaft with several L-shaped metal "tillers" welded onto the outer 18 in. The operator uses his left hand to hold onto a short length of pipe that surrounds the shaft next to the drill. The drill's left handle was lengthened to 18 in., allowing the operator to hold it stationary with his elbow. He can dig up to 1 1/2 ft. deep in the soil, guiding the rototiller back and forth along the beds.

Contact: FARM SHOW Followup, Harry Benjamin, Triangle Pipeline Co., L.L.C., 205



Benjamin designed this handheld rototiller that makes use of an electric drill.

S. Devon Rd., Shelby, Montana 59474 (ph 406 432-2196 or 406 460-2196).

## Plastic Liner Keeps Hay Moving Through Mower

The hassle of trying to clean hay out of a plugged-up mower prompted Don Pudwill, Leola, S. Dak., to build a "super slide" plastic liner for his New Holland hydroswing mower. It worked so well he recently began manufacturing the liners for sale.

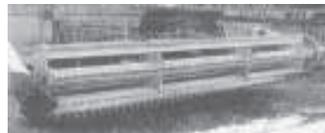
"It virtually eliminates plugging and saves a lot of hassle and downtime," says Pudwill.

The liners are made from heavy duty plastic and come pre-drilled. Installation requires removing the reel and drilling holes into the machine, then bolting the liner on. It takes about one hour.

They're designed for both hay conditioners and hydroswing mowers from 14 to 18 ft. long, and can be custom made for virtually any brand or model including New Holland, MacDon, Hesston, etc.

A liner designed for a 16-ft. hydroswing mower sells for \$160 plus S&H.

"It ensures a constant, even flow of material and is an inexpensive solution to a big problem," says Pudwill. "Unplugging a mower is irritating to no end because the hay gets plugged in there so tight. A lot of times the only way you can unplug it is to pull single strands of hay out one at a time. The problem is even worse if you have a lot of



Liners are made from heavy-duty pre-drilled plastic. Installation means removing reel to bolt liners on.

gopher mounds or ant hills. The dirt will hang up on the inside of the machine and won't allow hay to feed through like it should. The poly liner allows dirt to keep moving through, along with the hay. It won't make your mower 100 percent plug proof but it will make a big difference. We've installed many liners on new mowers that haven't even cut one acre yet, because the owners won't even take the machine out to the field until they're lined.

"It's designed for both newer and older machines. It also saves wear and tear on the machine because you don't have as many big wads of material going through the rollers and crimpers."

Contact: FARM SHOW Followup, The Plastic Works, 11449 359th Ave., Leola, S. Dak. 57456 (ph 605 439-3561).

## "Super Heater" Jump Starts Cold Engines

Cold weather means cold motors and slow starts. At 30 to 40° below zero, it can take 25 to 30 minutes to warm up an older engine. Super heating the antifreeze mixture can speed the process and make starting a snap. Ivan Behrmann has designed a heater that gets the job done fast.

"I've used it on log skidders, front-end loaders and big Cats in subzero weather," says Behrmann. "It can be made any size to match the engine."

He got the idea after seeing pickups used to warm up cold engines on big equipment. Hoses would be connected between engine blocks. The problem came when the ice-cold fluid from the engine being started would hit the pickup.

"If it is too cold, it will crack the block on the pickup," warns Behrmann.

His solution was to build a separate heater unit that could be hooked up cold to the cold engine, then warmed quickly. His Super Heater can be used anywhere and requires no power except a gas heating torch.

The heater consists of an antifreeze tank inside a chamber. A coupling on top of the tank accepts a standard 1/2-in. hydraulic

hose, which connects to a similar coupling installed on the cold engine. A second coupling at the bottom of the tank completes the circuit from the engine back to the tank.

A torch flame is directed through a hole in the bottom of the large steel pipe chamber opposite the intake coupling. The heat is deflected at the base and spirals upward and around the antifreeze solution tank, turning it into an internal heat exchanger. A port at the top of the pipe allows excess heat and smoke to disperse out and away from the unit.

"The Super Heater keeps any flame safely away from the motor being warmed," says Behrmann. "It only takes a few minutes for solution to start moving back and forth."

Behrmann charges \$375 (Canadian) plus shipping for units he builds himself. He can also provide drawings, installation instructions and a materials list.

Contact: FARM SHOW Followup, Ivan Behrmann, P.O. Box 469, Logan Lake, British Columbia, Canada V0K 1W0 (ph 250 523-6749; fax 250 523-6729).