

## Solar Collector Keeps Basement Toasty Warm

George Reissner, Jewett, Ill., built a portable solar collector panel that he uses to heat his basement.

The collector measures 24 ft. long by 12 ft. high and is 4 ft. wide at the base. It mounts on a steel-wheeled trailer so it can be easily moved. He has a workshop in the north side of his basement so he keeps the collector on the north side of the house, running insulated ductwork from the collector through a basement window.

The collector consists of a sheet of clear fiberglass on the outside with a sheet of aluminum, painted black, to absorb heat behind it that's screwed to sheets of plywood. There's 4 in. of space between the fiberglass and the aluminum. The back side of the plywood is covered by 1-in. thick Styrofoam insulation board. The insulation board attaches to a frame made from 2 by 4's.

Cold air enters through an opening at the bottom of one end of the collector. The air is

drawn in by a 10-in. fan that sets inside a 2-ft. sq. wooden box on the collector's floor, at the opposite end of the intake. The air zig zags back and forth from one side of the collector to the other, traveling through 8-in. wide notches that he cut into the 2 by 4's in the frame, and ends up at the top of the collector. The hot air is then drawn by the fan down through a double insulated fiberglass pipe back down into the box, where it continues through another fiberglass pipe into the basement.

"Even if the outside temperature is only 10 degrees, as long as the sun is shining the temperature in the basement will rise by two to four degrees during the day. However, it doesn't produce enough heat for my entire 2,200 sq. ft. house," says Reissner. "It also doesn't produce much heat on cloudy winter days. It could probably provide more heat, but I didn't want to spend money on an automatic thermostat system until I was sure how

well it would work.

"I spent about \$1,000 to build it, mostly for the fiberglass and insulation. I applied two coats of black paint made specially for barbecue grills. It costs \$250 per gallon."

Reissner also tried using the solar collector to dry corn in a 25,000 bu. grain bin. "I only used it on three loads of corn. I used an aeration fan to suck air through the corn but didn't get enough air movement to do much good. It didn't help that the corn was wet, at 20 to 21 percent moisture," notes Reissner.

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**George Reissner uses this home-built, 24-ft. long by 12-ft. high portable solar collector panel to heat the basement in his home.**



## Floating Plant Mats Help Clean Lagoons

Here's a new way to pull excess nutrients out of farm ponds and lagoons.

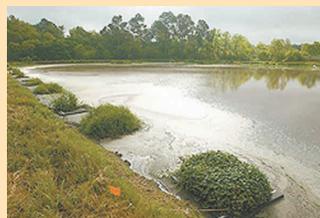
Floating "plant mats" are being tested by researchers at the University of Georgia. The idea is to make floating mats out of coarse coconut shells stretched between a plastic foam frame.

St. Augustine grass, common bermudagrass, Tifton 85 bermudagrass, and giant reed are all being tested in the mats. The first three grass mats can all be used as sod when removed from the water. The giant

reed has potential as a biomass source for biofuel.

The researchers are also planning to try the idea to remove nutrients from fish ponds, citrus greenhouse waste water ponds, and Florida canals, where water quality is poor.

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**Floating "plant mats" pull excess nutrients out of farm ponds and lagoons. Mats could be grown commercially for sod, or to burn as biomass, say researchers.**

## Pot-Bellied Stove Burns Waste Oil

"It's a cheap way to heat my shop," says Stephen Rothrock, Corydon, Ind., who burns waste oil in an old pot-bellied stove that he got for free.

He uses the stove to heat his 20 by 32-ft. uninsulated shop.

A small electric air compressor sends air through a 1/4-in. dia. steel tube that drops down 3 in. into the top of the stove. A 3/8-in. dia. copper tube runs alongside the steel tube, carrying oil from an 800-gal. boiler tank located outside the shop. The copper tube terminates right at the top of the stove, positioned so that a small stream of oil runs down the end of the tube, it splatters and spreads inside the stove.

Two valves control oil flow. One is an on-off valve and the other a metering valve. The oil tank is under about 10 psi of pressure to keep the oil flowing.

"It really provides a lot of heat - the oil burns with a bright yellow flame," says Rothrock. "I started using this idea eight years ago and go through an average of 375 gallons per year. It's easy to start, creates very little ash, and no black smoke. All I see coming out the chimney is clear heat. When it burns three quarts per hour it'll keep the magnetic thermometer on the stove pipe at about 550 degrees.

"It burns so hot I replaced the firebox with a 14-in. dia., 16-in. tall steel pipe. The top part of the stove also burned out because it's made from cast iron and contoured to fit the stove. I replaced it with a flat steel plate.

"I plan to adapt the burner to an outside wood furnace and use it with a thermostat to heat my home, water and shop."

He got the 800-gal. steel boiler tank for free from a neighbor. "I run the used oil through a screen to filter it and let the water



**Stephen Rothrock burns waste oil in this old pot-bellied stove, which he uses to heat his 20 by 32-ft. uninsulated shop.**

settle out in a 275-gal. tank before pumping the oil into the boiler tank. In the winter the big tank is capped so I can add the pressure to push the oil into the stove. Gravity would probably work just as well, though. A heat tape attached to the oil line keeps oil flowing during the winter."

The small diaphragm-type air compressor applies about 30 lbs. of pressure. He plumbed in a 1-quart reservoir to smooth out the air pulses in order to keep a steady supply of air going through the tube.

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## Hydraulic-Powered Hitch Pin

"My homemade power hitch lets me automatically hook up wagons without getting off the tractor," says Howard Weber, Neustadt, Ontario.

The hitch operates off tractor hydraulics and slides right over the tractor drawbar. It's held in place by a single pin and consists of a hydraulic cylinder with an 8-in. wide metal guide. A round metal "plug" attaches to the bottom of the wagon tongue, which guides the tongue into position to insert the pin. The tongue is held off the ground by springs.

The hitch pin is activated by a remote hydraulic lever in the cab.

"It's one of the handiest ideas I've ever come up with," says Weber, who made the conversion on his Deere 6410 tractor. "I don't have to leave the cab to hook or unhook implements."

To hook up a wagon, he backs up until the plug on the wagon tongue lines up between a pair of grooves on the guide, then extends the cylinder to drop the pin through the drawbar hole.

"I'll grab the tongue anywhere within an 8-in. 'capture' area. All I have to do is get close," says Weber. "I've used it for four years with no problems. The cylinder applies constant pressure to hold it down snug. It's built strong. I had a metal shop bend the metal.

"I use it when loading big square bales onto a 30-ft. long wagon which holds up to 30 big square bales. I use the tractor's front-end loader to load two bales at a time onto the wagon. I frequently hook up to the wagon to drive to another part of the field to load more bales. I drag a block on a short length of chain behind the wagon's rear wheels, so if I'm on a slope the wagon stays put when I pull the pin out."

The hitch is held in place on the tractor drawbar by a 5/8-in. dia. pin.



**Hitch is held in place by a single pin. An 8-in. wide metal guide brings tongue into alignment.**

Weber says he spent about \$1,000 to build the hitch. He's willing to custom build the hitch for others.

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