

# The Tire Stove

(Continued from cover page)

Denny Feneis have used their tire stove, fueled with old tires taken from their mountain of worthless tires, to heat their large paint shop in which they paint reconditioned industrial equipment. "We figure the tire stove cut our fuel bill 83%," says Jim, noting that "our 2,500 sq. ft. paint shop is an especially expensive building to heat because the air must be continually exchanged to exhaust toxic paint fumes. Without the tire stove, and the free heat it provides, we'd have to shut down our painting operation in winter. Heating that shop is like trying to heat your house when it's below zero, the wind is blowing and you've got all the windows open. Oil and gas have become too expensive to make it feasible to heat the large paint shop during the winter. Thanks to our tire stove, we've been able to keep it open, and have reduced our heating bill to virtually nothing in the process."

The original Feneis tire stove was 5 ft. square by 4 ft. high. Its firebox, made of ¼ by ½ in. plate steel, held six tires.

A newer, improved model is twice as large and burns 10 to 12 car or truck tires at once. Here, according to Jim, is how it works:

"We throw the tires 'as is' into the firebox and start them burning with kindling or whatever is at hand. Then, we close the door and limit the amount of oxygen so the tires will smolder, creating thick, black smoke inside the firebox. We actually burn the smoke given off by the smoldering tires.

"The smoke rises out of the firebox to the upper corner of the furnace where it filters through holes into the combustion chamber. A conventional oil furnace injector shoots a continuous oil flame into the chamber, igniting the smoke. (Natural gas would work just as well to ignite the smoke.) The burning smoke flows upward into an 80-ft. long series of 8-in. heat exchanger pipes that wind back and forth in front of the ventilators, bringing in cold air from the outside. The air is warmed as it passes between the pipes — which often are red hot — and directed into the paint shop. Warm air fouled by paint fumes is

exhausted at the other end of the building.

"If you hold a match in the smoke of a cigarette, the smoke will burn up and disappear. That's essentially what this furnace does to black tire smoke. The smoke burns up in the heat exchanger pipes, which are made from old ammonia cylinders. They're similar to a set of acetylene gas cylinders (8 in. in dia.) and are made from heavy steel that can withstand the heat of the burning tire smoke," Jim explains.

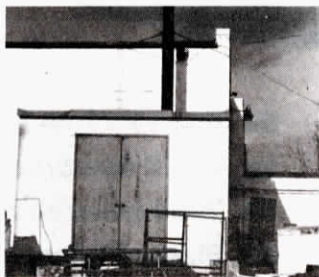
He and his father installed their tire stove in a small brick addition to the paint shop in such a way that it can be stoked from the outside. One tire heats their shop for about an hour so they stoke the stove morning and night with a full load of 10 to 12 tires. Jim notes that what little smoke comes out of the stack is as clear as that given off by a highly efficient wood burner.

Local fire officials have inspected the Feneis tire stove and apparently feel that it is completely safe as long as one load of "rubber tire fuel" is allowed to burn down most of the way before another load is added. That's because, when the firebox door is opened to add tires, oxygen fuels the fire, causing it to flare up into a roaring fire, explains Jim. "This is one of the problems that needs to be solved before the tire stove can be produced commercially, along with having more controls and determining the optimum amount of oil or gas we need to burn to ignite the black smoke," he told FARM SHOW.

Jim and his father have spent about \$5,000 in developing their tire stove over the past 2 years. As this issue of FARM SHOW went to press, Jim had temporarily dismantled the stove to make some improvements but planned to have it back together and "fired up" again soon. He has no literature on the tire stove but would be willing to visit with interested FARM SHOW readers by appointment.

For more information, contact: FARM SHOW Followup, Jim Feneis, Escoc Companies, 621 Lincoln Avenue S.E., St. Cloud, Minn. 56031 (ph 612 252-9711 or 252-6983).

Smoke exiting the tire stove continues to burn up through an 80-ft. long stack of 8-in. dia. pipe made from heavy steel ammonia tanks, left. The stove and pipes are housed in a small addition to the paint shop, below. The vent doors pictured open to let outside air pour freely over the large heated pipes and into the shop.



United Power's storage pile of rubber chips.

## ELECTRIC UTILITY BURNS 50% TIRE/COAL MIX

# "Chipping" Makes Old Tires Burn Better

United Power Association, of Elk River, Minn., has burned some 250 tons of old tires in its electric generating furnaces during the last two years and is now preparing to burn more than 2,000 tons of old tires at once in a 50% mixture with coal. Old tires are turned into chips to make them burn better, and to facilitate handling.

The company, which sells electricity to distributors throughout Minnesota, decided to go ahead with a big burn of old tires after tests with a rubber and coal mixture were monitored favorably by the state's pollution control agency.

Wayne Hanson, production engineer, says the chipped tire rubber which the company uses behaves much like coal when burned, and has about 16,000 btu's per pound, or about twice as many btu's per pound as coal. In the extreme heat of the generating station's furnaces the tires are completely combusted and whatever smoke is left from the tires is removed by pollution control equipment. Steel used in the bead, or in radials, also disappears completely, being oxidized by the extreme heat.

"One problem we've had is that there is less ash left after burning tire rubber than coal. Normally, a layer of ash from the coal protects the fire grates from the heat of the fire. So, because the rubber burns more completely, a partial mixture of coal is necessary when burning rubber," explains Hanson.

He adds that, so far as he knows, United Power Association is one of the first utilities in the country to experiment with tire rubber as fuel but he expects others to follow if further tests continue to prove successful. He notes that there are as many as 4 million tires thrown away in Minnesota alone each year that could yield 40,000 tons of high-grade tire fuel.

Handling is a problem in burning tires, unless they are processed in some way. UPA obtains its tire



The utility company says the tire chips are as easy to handle as coal.

chips from Schripteck Recovery Systems, Ltd., in La Crosse, Wis. The company recently developed a shredding machine that can tear up even steel-belted tires, bead and all. It makes chips 2 to 3 in. across from any tire up to truck size.

Tim Brady, vice president of marketing for Schripteck, told FARM SHOW there is a strong market for their machine across the country, although he says United Power Association is the first company he's heard of that's burning old tires for fuel. Other companies use various processes to extract the rubber in tires for re-use by manufacturers.

"We take our machine on the road to customers and supply their needs on a regular basis by shredding discarded tires in their area. Other customers buy their own machine," explains Brady. He's excited by the idea of developing small furnaces that can burn old tires. Groups of farmers could buy their own tire-shredding machine, or hire Schripteck to visit on a regular basis. He notes that tire chips are selling for as much as \$50 a ton, or about 50 cents for each of the 100 tires in a ton. The machine can also be used to shred wood pallets, tin and other waste products for fuel.

For more information, contact: FARM SHOW Followup, Schripteck Recovery Systems, Ltd., P.O. Box 2105, La Crosse, Wis. 54601 (ph 608 781-1180).

