

# Pelletizing Mower Powers Itself

By Dee Goerge, Contributing Editor

Imagine a machine that cuts hay and produces pellets in one pass, and then feeds these pellets into a burner that powers the machine.

Jason Force is in the process of building a tractor-sized prototype of his self-fueled, garden tractor-sized prototype that pelletizes grass clippings for fuel. What's more, the machine is remote-controlled so no driver is needed. He calls it the "Iron Goat".

Force, a George Mason University graduate, led an engineering team that came up with the concept of a mower fueled by the grass pellets it produces. When he realized it was ideal for agriculture, he began work on a larger prototype.

The fuel system is based on the principle of gasification, Force says. Except instead of wood, he uses grass – or hay.

"With this machine, you go directly from the hay field to processed pellets in one step," he explains. "The price for pelleted hay will be less than baled hay. You don't have to

buy multiple machines and you don't have the costs of moving and storing bales. The machine uses the hay as fuel."

The mower cuts the hay, runs it through a mechanical dewatering process, then pushes it through a dryer and a pelletizer. Heat for the dryer comes from the engine. About 20 percent of the pellets (2 to 3 percent moisture) are gasified to fuel the mower. The rest drop into a bin to be fed to livestock.

"I'm actively reaching out to farmers these days," Force says. "The current plan is that we would provide this as a service and sell pellets."

Force is working on the guidance system to move the Iron Goat. The machine moves so slowly, he notes, that it's not practical to have an operator.

"Its advantages are that it requires zero labor to operate, uses an inexpensive renewable fuel source, and produces a pelleted product at a significant discount over



Remote-controlled, garden tractor-sized mower pelletizes grass clippings and then feeds the pellets into a burner that powers the machine.

existing processes," he says. "The primary technical challenge right now is balancing equipment and development cost against lifetime maintenance."

Force welcomes anyone interested in the

technology to contact him.

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## Converted Trailer Makes Great Cattle Hauler

Gary Bueckert converted a semi trailer into a ground loading cattle hauler for less than a quarter the cost of a new one. The former 53-ft. van carries around 30 head at a time, broken up into 4 groups of 7, 10, 10 and 3.

"I sized the front pen so I could use it for calves when hauling cow/calf pairs," says Bueckert. "We moved the axles forward and lowered the last 7 ft. of the van to about 18 in. from the ground. It rides on air bag suspension, so when we deflate it, it drops another 4 in. closer to the ground. The cows step right on."

Dropping the rear section of the van nearer to ground level required Bueckert to cut away the floor surface and its I-channel supports.

"We extended the interior frame of the van sides down and installed a sub frame using 2 by 4-in. steel tubing for sides and for a rear bumper in case we had to pull it," says Bueckert. "Cross supports were 2 by 2-in. steel tubing and the old I-channel with 10-in. wide fir planking for the floor."

Once in the rear van section, it's easy for the cows to step up the heavy-duty ramp to the standard deck. Bueckert split the ramp in half because it was built so stout...too stout, he thinks now.

"If I were to redo it, I would build them with aluminum tubing instead of the 2 by 2 1/4-in. steel tubing," says Bueckert. "When the trailer deck is loaded, we hang the ramp on the walls to make room for the last 3 head."

Bueckert installed gates 12 ft., 29 ft., and

46 ft. from the front end. Each gate mounts to 2 by 2-in. steel tubing welded to the original trailer sidewall tubing frame.

"The sidewalls on a dry van are a little flimsy for hauling cattle," says Bueckert. "The added tubing stiffened it up."

The sidewalls were further strengthened when he attached 4-ft. wide, 3/4-in. plywood sheets immediately above the 1-ft. kick plate that ran around the interior. The plywood also sealed off the space behind the kick plate.

At the rear he installed a standard livestock trailer endgate. It opens the full width of the 8 1/2 ft. (outside) width of the trailer, or he can open a smaller sliding door in the gate. He also installed a 16 by 16-in. cleanout door on one side.

Ventilation is provided by 5 1/2-in. holes cut in the wall of each pen area and two in the front-end panel. The sizes were determined by the availability of a 5 1/2-in. hole saw. Bueckert allows that he would make them bigger if redoing it. However, like the rest of the trailer, they have worked well.

"I contacted the transportation department about modifications before I began," says Bueckert. "It has passed inspection every year without a problem."

Bueckert says he paid about \$6,000 for the used trailer and spent another \$6,000 on materials. That represents a considerable saving over the \$34,000 he had considered paying for a similar sized conventional livestock trailer. It's an even bigger savings over a new trailer.



Gary Bueckert saved the cost of a new cattle hauler by converting a semi trailer into this ground loading model. The former 53-ft. van carries about 30 head at a time.



He lowered the last 7 ft. of the van to build a ramp and also installed an endgate. Photo at right shows stalls inside trailer.

"New ground loading livestock trailers run about \$1,000 per foot or \$53,000 for one this size," says Bueckert.

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## Grip Strips Make Bale Loading Safer

Stacking square bales on hay wagons has been a much safer job since George Hubka added adhesive stair tread strips to the front of his wagons.

"Anyone who has ever been on a flatbed hay wagon stacking small square bales coming from the baler soon learns that the surface of the wagon bed can be slippery and dangerous," says the Dowling, Mich., farmer. "Especially with sudden braking and when traveling along sidehills."

Hubka purchased a 2-in. wide, 60-ft. long roll of adhesive fiber-backed, abrasive surface material that is used on steps in many commercial buildings and schools. He cut it in 3-ft. lengths and placed the strips 1 to 3 in. apart to create a 3-ft. square on the wagon.

"Any unpainted wooden surface needs to be primer painted where the strips will be placed," Hubka says. "They can also be used



Stair tread strips come in a 2-in. wide, 60-ft. long roll.

on any steel wagon bed, painted or unpainted as long as all dirt and loose material have been removed."

He adds that he also rounds the corners of the strips so they don't catch as easily.

The strips can be found at Gemplers (ph 800 382-8473; www.gemplers.com). A 50-ft. roll of 2-in. tape sells for \$24.35.

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"Grip strips" were made by cutting adhesive stair tread strips into 3-ft. lengths and placing them 1 to 3 in. apart on hay wagon.