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## Farmall Converted To "Hybrid Power"

Robert Braun, a retired automotive instructor and farmer, converted his gas-powered 1951 Farmall M into a hybrid dual-fuel tractor. He powers it with a 10-kW array of solar panels he erected on his farm.

To begin the transformation, a friend found a NetGain WarP 9 electric motor for Braun that produces up to 500 hp.

Initially, he thought he'd use a 48-volt electrical system to power the tractor but eventually decided to upgrade to 12 12-volt deep cycle lead acid batteries. This was partly because of the weight they would add, increasing traction, and partly because he didn't need the rapid recharge rates lithium-ion batteries delivered at their higher cost.

Since a 144-volt system is dangerous, Braun secured the batteries in two padlocked steel boxes, each holding six batteries. All external cabling was orange-wrapped for safety.

He decided to transfer the power into the tractor through the exterior belt pulley hous-

ing because it provides a direct drive into the gearbox and transmission. The belly pump is left engaged for the live hydraulics since it's running through the transmission. The PTO is also operable because power is going into the upper gear where the input shaft is.

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"It has a clutch lockout which you push down," Braun says. "An electromechanical solenoid connects, you manually engage the gearbox, and it's all set for electric."

Battery recharging is done from the farm solar system with a 240-volt charger.

The project was supported by a \$15,000 SARE grant from the USDA. "A complete report will be published when the project is done," Braun says.

Contact: FARM SHOW Followup, Robert Braun, Pigeon River Farm, E7148 Neitzke Rd., Clintonville, Wis. 54929 (ph 715-754-2425; pigeonriverfarm@outlook.com; www.pigeonriverfarm.com).

## Built-To-Order Attachments Made To Last

Order a root grapple, dirt blade, or bucket tooth bar from Everything Attachments (EA) and you know it is going to last. Items are made from heavy-duty, often hardened steel, and nearly all are made in EA's North Carolina shop.

"Other companies try to make things cheaper for a bigger profit," says Nate McAbee, Everything Attachments. "We find people are willing to pay more for products built to last. We make about 95 percent of what we sell, and we sell directly to the customer."

What you don't get with EA is next-day delivery, or possibly next week or perhaps even next month. Wait time can be as low as 2 weeks or as high as 6 mos. It all depends on orders received and the staff available to build them.

"Right now, we're fully staffed, so wait time is around 8 to 10 weeks," says McAbee. "Growing the workforce is our biggest challenge. If you could see how we make our attachments, you'd understand."

Everything starts with high-quality steel. Each part of an item, like a tooth bar for a bucket, is custom cut and milled. The final touch is adding the ears to fit the customer's bucket.

"Everything is handmade and hand cut out of the best material we can find," states McAbee.

McAbee says the wait time is worth it, and his customers agree. For those who want something faster, he has an answer.

"I tell them to go ahead and order from the competition," he says with a laugh, adding, "Maybe it'll last until you get ours. I'll get calls saying, 'I need yours because mine broke.'"

EA's website is like a Christmas toy catalog for adults owning tractors and skid steers. Tractor attachments alone are broken into 36 separate groups, with loader buckets broken into six subgroups with a total of 36 different buckets to choose from.

EA's most popular selling item is the 55-in. Wicked Root Grapple. In addition to being made with AR450 Hardox steel, it has toothed edges between the grapples for even greater gripping.

"When others break, the seller will tell the buyer they did something they shouldn't have," says McAbee. "We can't break ours. It'll last a lifetime. We've hooked an excavator to it and lifted the tractor it was attached to off the ground, and the grapple didn't bend."



**Everything Attachments Wicked Tooth Bar for bucket edges.**

What few products the company carries that they don't make are made by other American suppliers. The only exceptions are tillers from Sicma in Italy and the Agrimet product line from Canada. One thing the company promises it'll never do is to carry anything made in China.

"We're committed to offering American-made products from quality American manufacturers," declares owner Ted Corriher on the company website.

Almost as impressive as the list of products and commitment to quality are the company's videos. EA's YouTube channel has more than 55,000 subscribers and hundreds of videos.

While most are product promotion, many feature how-to-use content. Some are strictly informational. Many have received tens of thousands, even hundreds of thousands of views. "How to Plow a Garden with a 2-Bottom Plow" has recorded a million and a half views, while "How to Use a Landscape Rake (part 1)" has reached 1.8 million views. Combined with customer referrals, EA doesn't need to do much promotion.

"Word of mouth is our biggest sales tool," says McAbee. "We've been making the videos for 13 years, but we once went a year without doing any. When orders are coming in fast, we don't need to fuel the beast."

Contact: FARM SHOW Followup, Everything Attachments, 1506 Emmanuel Church Rd., Conover, N.C. 28613 (ph 866-581-5818; sales@everythingattachments.com; www.everythingattachments.com).

Claussen envisions the ST850 being used for reservoir tillage in the spring. In the summer, it can be used for side dressing nitrogen or sprinkling on cover crop seed between the rows and again in the fall to prepare the next year's strip.



## Get High-Speed, Low-HP Strip-Till And Boost Infiltration

Willmar Fabrication is introducing the Redball ST850 as a multi-purpose, low-hp., high-speed, strip-till tool. Initially developed as the RT850 for water infiltration and aeration, it retains those functions but emphasizes its strip-till advantages.

"Travelling in Europe, I saw what had been done to prevent erosion and get the ground warmed up in spring," says Steve Claussen, Willmar Fabrication. "We began developing the reservoir tillage concept 8 or 9 years ago."

Willmar had introduced a strip tillage unit 5 or 6 years earlier. Equipped with a shank and blade, row cleaners, and a disk to gather the dirt, it was slow and time-consuming, with 10 to 30 grease zerks per unit and a multitude of moving parts.

The RT/ST850 is dramatically simpler, with few moving parts and a rolling drum and knives designed for speed. Row units consist of 3/8-in. thick, 14-in. diameter steel

drums with one bearing each and one grease zerk. Each is equipped with five to fifteen 10 in. replaceable knives. Drum width and knife count vary by row spacing, from 22 to 40 in. rows. The heavy-duty drums are mounted on shafts between pillow block bearings inside steel plate housing. The drums hold the knives but also serve as depth wheels as they roll across the ground.

"The row units are heavy, weighing about 750 lbs. each on a 7 by 7-in. bar," says Claussen. "They're mounted on heavy-duty suspension with 16-in. of travel, 10 up and 6 down."

He notes that other tillage units with knives throw dirt, especially at higher speeds. The RT knives are curved to penetrate and withdraw easily, requiring minimal horsepower. At the same time, the left and right pitch of each knife fractures the soil without severely displacing it. Each knife insertion creates 8-in. deep, upside-down

cones that capture water, while the fractures in the soil allow the water to move out from the cones. Even at high speeds, the housing retains any dirt that is displaced.

"It works well for reservoir tillage, but we're not sure people understood its versatility," says Claussen. "Last summer, we decided to emphasize its potential for strip-till as well, rebranding it as the Redball ST850 for Strip-Till and Reservoir Tillage."

The only real changes were the addition of row cleaners and Y-drops ahead of the housing/drums/knives and a crumbler or drag teeth behind. The need for a crumbler or drag teeth may depend on the amount of residue and the job being done.

"Customers don't have to use our row cleaners, crumblers, or drag teeth," he says. "They can use their favorites or none at all."

Claussen envisions the ST850 being used for reservoir tillage in the spring. In the summer, it can be used for side dressing nitrogen or sprinkling on cover crop seed between the rows and again in the fall to

prepare the next year's strip.

"It will loosen the dirt, so it stays mellow all season," says Claussen. "After harvest with row cleaners, it can be used to make strips for the coming year."

He admits the seedbed created when used for strip-till may be different from what growers are used to with shanks or discs. However, so will the cost of the system and the speed of travel.

"The ST850 has very few moving parts and, as a result, costs considerably less," says Claussen. "If mounted on an existing toolbar, each row unit is priced at \$5,000."

The simple design also lends itself to speed and versatility. "You can drive as fast as you want and at only 20 to 25 hp. per row unit," says Claussen. "With a 12-row unit, you could cover 30 acres an hour."

Contact: FARM SHOW Followup, Willmar Fabrication, 2205 Hall Ave., Benson, Minn. 56215 (ph 320-843-1700; toll-free 877-332-2551; www.willmarfab.com).