



The 4-WD, 4-wheel steer tractor has 24 gears thanks to its doubled-up transmission.

"TRACTOR BOAT" IS PROPELLED THROUGH WATER BY ITS TIRES

First-Of-Its-Kind Amphibious Tractor

By C.F. Marley

You've never seen anything like this "tractor boat" built by Illinois farmer Kim Bickett and his brothers, Tim and Ed, which they say might be the first amphibious tractor ever built.

Kim says they needed a way to get around their farm, which is mostly river bottom land, in the spring when it's usually flooded. "There can be anywhere from a few inches of water to several feet. Sometimes it re-

quires a boat, sometimes a tractor, but we had nothing to get around in until we built this go-anywhere machine."

The 30-ft. long tractor-boat can cruise down the road at 50 mph, claw through muck halfway up its 38-in. tires, climb over 6-ft. tall embankments, or navigate in 16-ft. deep water. When fields on the southern Illinois farm are separated by bodies of water, the huge 9 1/2 ft. wide machine often runs through heavy mud one minute and deep water the next. Even though it weighs 16,000 lbs., "The Ultimate", as the Bicketts call it, never gets stuck.

Components from several military vehicles were used on the home-built tractor which is 4-WD, 4-wheel steer and has 24 gears. It's powered by a 454 Chevrolet engine. The front and rear axles were salvaged from a 10-ton Mack truck, and they're steered hydraulically. There's two transmissions - one automatic and the other a 4-speed - as well as a 2-speed transfer case. Tires are 18.4 by 38 in. with rice treads, mounted backwards for better action in the water.

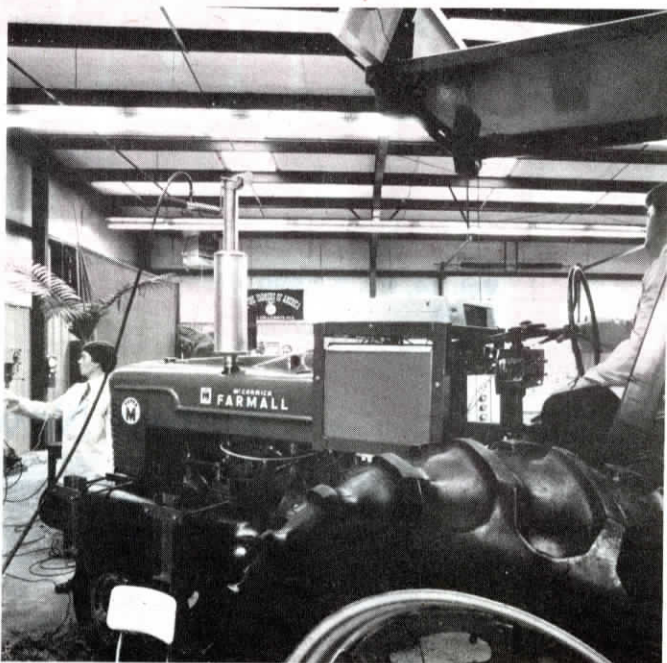
"We've carried 10 men on it at once in the water and it would carry more," says Kim. The tractor goes 3 to 4 mph in water, floating on the boat-shaped center body of the machine. Kim says he may add propellers for faster speed in water. He still doesn't know what the long-term effects of water will be on the newly-built machine but as a precaution he greases liberally and frequently checks oil in the gearboxes.

The Bicketts use the tractor to move irrigation pipe, check levies, transport equipment, and to pull other vehicles out of the mud. It has enough power to pull out tractors sunk into mud up to their frames, as it recently did for a neighbor.

Eventually Bickett plans to enclose the passenger and driver areas with a cab and install fenders to protect riders from getting a mud bath.

The tractor has both a straight hitch and ball hitch on back.

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"The engine required almost no modification to run on hydrogen," says Ricketts.

"FUEL OF THE FUTURE"

Ordinary Water Powers This Old Farmall "H"

Ordinary well water works better than gasoline or diesel fuel to power farm tractors because it burns clean and it's free, says an innovator from Tennessee who's converted a 1948 Farmall "H" to run on water by using electricity to extract hydrogen.

The tractor was originally propane-powered so it required only a few changes to run on hydrogen, such as boosting strength of the spark by closing plug gaps from .20 in. to .10 in. What amazes everyone who sees the tractor operate is that the only thing coming out of the exhaust is pure, clean water vapor because when hydrogen is burned it recombines with oxygen to turn back into water.

"It's the fuel of the future because we'll never run out of water and sun," says Dr. Cliff Ricketts of Middle Tennessee State University in Murfreesboro who built the hydrogen-power system with the help of students. Ricketts has been working on alternative fuel projects since the late 1970's when he built a pickup powered by 100 percent corn alcohol. He ran the truck for more than 25,000 miles with no problems at all. Once alcohol had been proven to work he started looking for an even better fuel.

Ricketts worked closely with Dr. Roger Billings at the American Academy of Science in Independence, Mo., who was the first person in the U.S. to power an internal combustion engine with hydrogen in 1967. Billings has developed several commercial hydrogen power systems and continues to develop new and more efficient ways of converting water to hydrogen.

Hydrogen is produced by running an electrical current through water. It splits the water molecules into their two components, hydrogen and oxygen. On Ricketts' Farmall, a solar panel supplies the electricity, which passes through water in the fuel tank. The oxygen generated by the system is ejected while the hydrogen is pumped to a normal welding tank mounted on the side of

the engine and fitted with a special low pressure regulator. It plumbs into the regular fuel line that feeds the engine where the hydrogen burns just like the propane that originally powered the tractor. Other than changing plug gaps, the only other change Ricketts made was to engine timing. "The tractor runs beautifully. We didn't modify the engine itself at all."

The small solar panel on the tractor doesn't produce enough hydrogen to keep the experimental tractor running continuously. Ricketts uses a supplementary electric motor to generate the hydrogen he needs.

"We just want to show people what can be done. I can imagine the day when entire barn roofs will be covered with photo cells that'll continuously produce fuel from water to power tractors, pickups, cars and all other internal combustion engines on the farm. Photovoltaic cells are becoming more and more efficient and more affordable. There will come a day when the price of fossil fuels will rise enough that we'll have to look for another source of fuel and we want to be ready," says Ricketts, noting that he's found it's relatively simple to convert any internal combustion engine to run on hydrogen.

Before converting the Farmall, he converted a gas-powered Briggs & Stratton engine with no problem at all. Ricketts has also started work on a hydrogen fuel cell which simply reverses the process of making hydrogen fuel. A fuel cell actually combines hydrogen and oxygen molecules to make water and in the process generates electricity. "This process has the potential to make every farm energy self-sufficient because it uses ordinary elements available for free all around us," says Ricketts, who's consulting with Dr. Roger Billings in developing the new technology.

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