



**Kleen Gun harnesses exhaust air generated by your pickup or tractor engine. It can be hooked up to siphon cleaning liquid from a container. Or, you can use it as a "dry" cleaner to blow out radiators, filters, etc. Can also be used to warm cold motors, remove ice from windshields, or to spray livestock.**

## NO ELECTRICITY OR WATER NEEDED

# Cleaning Gun Hooks to Pickup's Exhaust

Engine exhaust from your pickup or tractor powers the new X-O (exhaust operated) Kleen Gun introduced by Jones Enterprises, Colby, Kan.

You simply hook the portable cleaner to the exhaust pipe on your pickup, tractor or straight truck — no electricity or water pressure is needed.

Exhaust from the engine serves as an air compressor which siphons cleaning fluid through a special nozzle. Or, you can use the unit as a "dry" cleaner.

Using it with a 5/8 in. nozzle, for example, allows 25 times more air volume than the average 1/8 in. hose nozzle for extremely fast dry cleaning of all types of harvesting or haying equipment, or for blowing out radiators, air filters, and so forth.

Pressure is controlled by the rpm of the motor being used. A diesel engine produces a higher pressure than a gas engine due to higher compression, explains Bill Jones, of Jones Enterprises. To produce this high volume

of air pressure, a 350 cu. in. gas engine — or a medium to large 4 cycle diesel — with single exhaust and operating at a medium to fast idle, is recommended.

The Kleen Gun isn't recommended for use on automobiles and light duty pickups. The reason: Overheating might occur as the cooling systems are not generally designed for stationary use. "Hooking the Kleen Gun to the exhaust on a recommended vehicle doesn't hurt the engine," says Jones. "The unit is designed to create near equal pressure on both sides of the exhaust valves, the same as any air compressor. You need a fair size engine for power, a hand throttle, a tight exhaust system and, due to fumes, the unit must be used outside or in a well-ventilated area," explains Jones.

Retails for under \$200.

For more details, contact: FARM SHOW Followup, Jones Enterprises, Box 361, Colby, Kan. 67701 (ph 913 462-2418).

## "NEW WORLD WORKHORSE": FARM TRACTOR OF THE FUTURE

# All-Electric Tractor Being Developed

An all-electric farm tractor called the "New World Workhorse" is under development by a Missouri-based partnership led by Jim Downing, inventor and chief design engineer.

"We're satisfied that the conceptual problems have been solved and that we'll have a complete electrically-powered modular farm system in the field within a couple of years," he told FARM SHOW.

The partnership formed to develop the all-electric tractor is also the principle owner of Bear Industries, Sedalia, Mo., which manufactures gooseneck trailers and other farm equipment.

Downing has incorporated high frequency alternators, gas turbines and solid state control circuitry into the blueprints for a turbine electric tractor which he is confident will work and be economically feasible.

"This farm tractor of the future is based on an electric power generating unit," he explains. Electric power for driving its wheels and auxiliary implements is supplied by a gasoline-fired turbine turning a large alternator.

Downing predicts the all-electric tractor will pull the largest tillage equipment now built. "It will be able to do this without slipping, thanks to independent induction motors which power the four separate drive wheels. Power flows to the wheels without differential slippage. Today's tractors, not being electrically powered, supply power instead to the spinning wheel," he explains.

"Threshing heads, cutters, wind-

rowers, pickers and every other imaginable piece of auxiliary equipment will attach to either the front or back of the unit by way of forklift-like hitches. Truck beds, bins, and tanks of every sort will either be carried or pulled. When pulled, carrying beds may form a land train in which each trailing vehicle is separately powered — by its own drive wheels, connected by electric cable. Electric power is fed by simply plugging in to the vehicle ahead. Variable speed control of each pair of wheels, and of each auxiliary implement, will be achieved electronically through variation in the frequency of independently supplied alternating current. At all times, the turbine-alternator will run at a constant speed and, while running, never requires throttling. An infinite number of speeds, forward or reverse, will be available — while the operating speed of the auxiliary implement, or implements, will be separately controlled through cyclo-converters."

In short, the mobile unit Downing has designed is the basic building block for a complete system of modular agricultural equipment. "The same mobile unit can serve as a power-generating heavy tillage tractor before breakfast, a combine until after lunch, and a heavy duty forage harvester before supper and then a 200 kilowatt standby generator overnight," Downing explains. "At different seasons of the year, the vehicle can be variously configured as a tractor pulling plow bottoms, as a single-pass planter and chemical ap-

plicator, small-grain combine, or as a roadgrader or snow-blower."

Downing first considered the use of D.C. electric motors and generators, but abandoned them because they were "too bulky, heavy and costly." He also explored but gave up on hydraulics: "Hydro-static devices provide either high torque with low speeds, or high speeds with low torque, but it's impossible to obtain high torque over a wide speed range without the use of a transmission." Needing individual wheel motors with a very broad speed range, Downing also considered steam turbine engines. "They would work but their efficiency with variable speed operation would be terrible."

His solution: A. C. electric power with cyclo-converters, which provide variable speed control of alternating current. In checking with manufacturers of cyclo-converters, Downing was told that while it was theoretically possible to use them to control high-frequency A. C. current on mobile machinery, manufacturers warned that cyclo-converters may be expensive.

Undaunted, Downing is satisfied he figured out a way to make them work economically: "Electric power is the key to making a farm equipment system modular. A modular system is the key to lowering costs of farm machinery and the cyclo-converter is the key to mobile electric power."

Here's a recap of key features incorporated into the blueprints of his

all-electric tractor:

It's powered by a turbine engine, has four wheel drive, and has no transmission or clutch. It has completely variable speed forward and reverse, with a material transfer tunnel which runs through the base of the tractor. It has a standby generator capability, and can be equipped with several completely independent variable speed slave motor circuits for modular implements. Solid state electronic controls are modular for easy maintenance. Drive motors and gear reducers are self contained, totally enclosed and modular. All motors are 3 phase AC induction.

Downing believes his all-electric power system, when perfected, can be sold for much less overall cost than buying a separate machine for each job. "All machines will be modular and self contained, allowing quick interchange of parts and implements. You'll be able to switch from one machine to another in a matter of minutes. Implement design can be much simpler because drive (slave) motors can be placed where the job must be done and not where the drive shaft dictates. Implements can be much more compact and efficient due to this increased design flexibility."

Downing and his partners welcome inquiries on their "New World Workhorse" from anyone interested. We'll keep you posted on latest new developments. Meanwhile, interested parties can contact: FARM SHOW Followup, Virgil Clark, Bear Industries, Box 1625, Sedalia, MO. 65301 (ph. 816 827-2000).