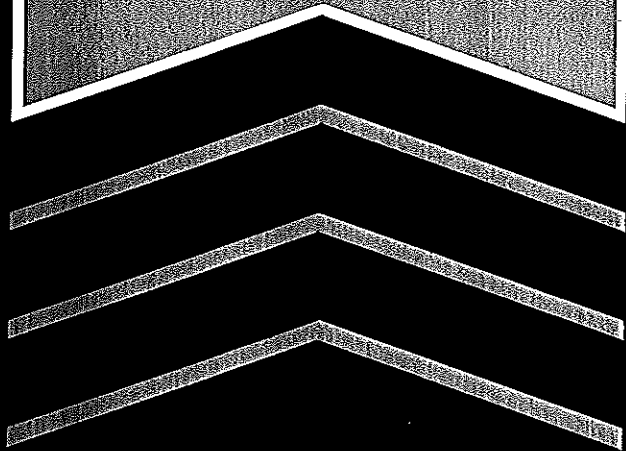


**AGRICULTURAL
ENGINEERING**

50

***OUTSTANDING
INNOVATIONS
1993***



A Presentation of New Developments

New technology and innovative applications of existing technology are featured in this 30-page section devoted to the 1993 AE 50 awardees. These new developments, techniques, advances and innovations were presented to the marketplace during 1992.

Agricultural Engineering magazine, sponsor of the award program, is pleased to be the instrument to bring these products and engineering developments to you.

Entries were solicited from hundreds of companies involved in the development of products and systems that are intended principally for use in the production, processing, research, storage, packing or transportation of agricultural products.

As you look through this section, you will see a variety of products, some of which you may not have seen before. In presenting the AE 50, it is our hope that there is something that will be of use to you in your work as a designer, developer, manager or another who is actively involved in engineering of agricultural, food and biological systems.

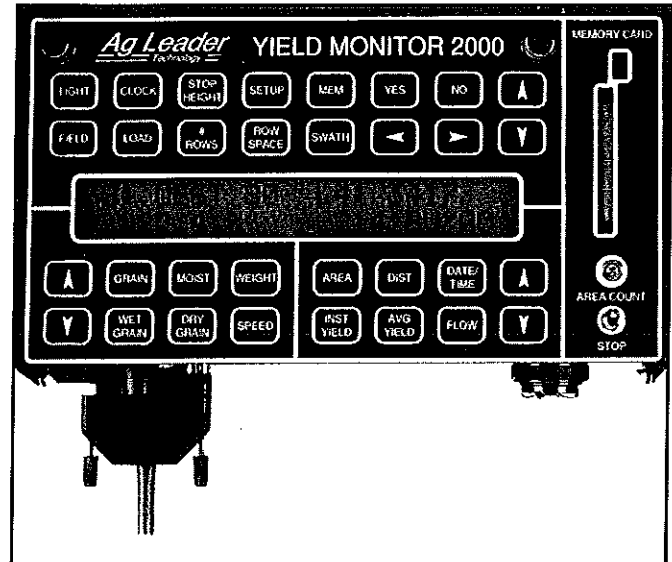
This is the eighth year that AE 50 awardees have been chronicled in *Agricultural Engineering* magazine. Since the beginning, we have strived to make this special section a source of valuable information.

To all the companies that submitted entries, *Agricultural Engineering* applauds you for the initiative and foresight that brought your products to market. And — to those 1993 AE 50 award-winning companies — WE SALUTE YOU!



Yield Monitor Continuously Measures Grain Flow

Ag Leader Technology's Yield Monitor 2000 continuously measures grain flow in standard combines to provide a display of crop yield during harvesting, allowing farmers to find areas in their fields with below-normal yields. The monitor also keeps electronic records of grain weight, grain moisture, area and yield for up to nearly 1,000 loads of grain that are organized by fields. Records can be transferred to a personal computer and printed to provide a complete and accurate harvest record. Farmers are using this monitor to obtain yield records on different farms, fields, hybrids and cultural practices at less cost and with less labor than with the use of scales. By interfacing the monitor to a Global Positioning System receiver, it can also collect data for yield maps. Ag Leader Technology, Ames, Iowa, (515) 232-5363.



Lawn and Garden Tractors Styled for Ease of Operation

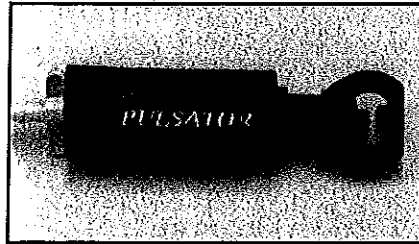
John Deere's 400 Series Lawn and Garden Tractors are styled for ease of operation, operator comfort, noise reduction and environmental concern. The tractors meet the proposed 1995 Emission Standards of the California Air Resources Board with the use of 20 and 22 hp liquid-cooled, gasoline or diesel engines. The Model 445 incorporates fuel injection for clean burn of the fuel. No-hassle mounting of front attachments to the tractor takes seconds using no tools and with no loose hardware. A foot-control hydrostatic transmission and fingertip control of the hydraulic functions allow for hands to be kept on the steering at all times. A deluxe, adjustable seat with four bar suspension and a tilt steering wheel allow for operator comfort. John Deere Horicon



Works, Horicon, Wisconsin, (414) 485-5527.

Pulsating Water Accumulator Pulse-Discharges Irrigation Water

Wade's WADE'RAIN PULSATOR™ is a flow-controlled water accumulator that pulse-discharges collected irrigation water through an irrigation micro-spray, jet or spinner. It is designed to accept a micro-spray at its discharge end and has inlets of either 3/16 in. male thread or 3/16 in. barb. PULSATOR accumulates flow-controlled water in an expandable silicone rubber chamber and explodes (pulses) the collect-

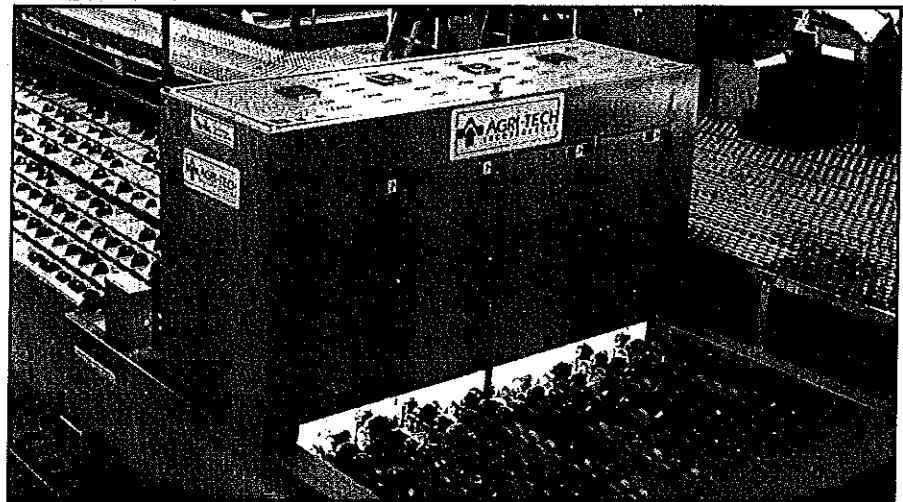


ed water through a micro-spray. High-velocity pulse-discharges create irrigated diameters normal to stan-

dard micro-sprays. However, PULSATOR discharges as little as 1 gph compared to 6 to 7 gph minimum for standard micro-sprays. It starts and stops operating at either 10 or 20 psi, depending on the model and can be retrofit into previously drip-irrigation systems without changing any of the pump/main/sub-main infrastructure. **Wade Manufacturing Company, Micro-Irrigation Division, Fresno, California, (209) 485-7171.**

Color Sorter Uses Full-Colored Spectrum Imaging

AGRI-TECH's Merlin® Color Avison Sorter can sort a wide variety of fruits and vegetables including apples, peaches, tomatoes and citrus. It uses full-colored spectrum imaging and inspects more than 90 percent of the surface area of each individual piece of fruit. Special color enhancement lighting chambers and advanced high resolution color imaging electronics sort fruit uniformly and consistently into eight simultaneous color grades, exceeding the USDA industrial standard (1972) by twofold. The algorithms are specially designed to allow optimum image feature extraction and processing of multi-colored and stripped varieties. It is user-friendly and allows flexible on-line programming. The Merlin has



gentle fruit orientation and a throughput of up to 3,600 fruit per

minute. **AGRI-TECH, Inc., Woodstock, Virginia, (703) 459-2142.**

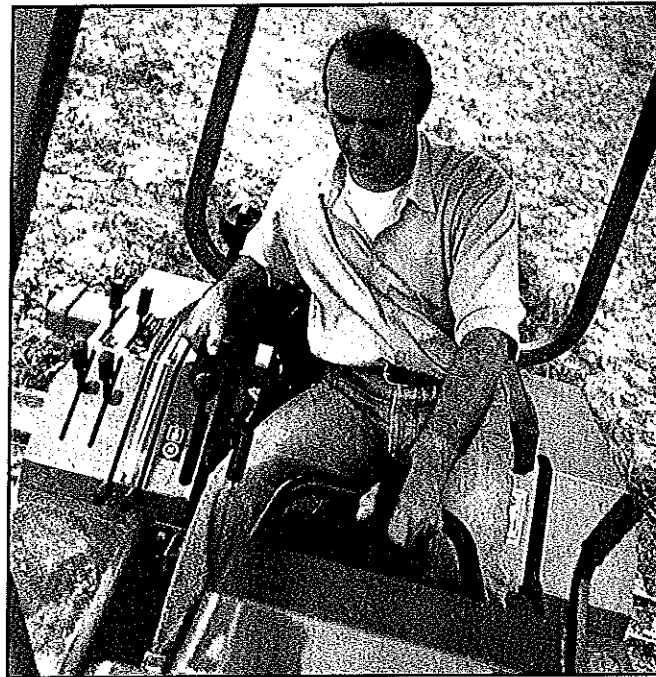
Microprocessor-Based System Controls Rate of Agricultural Chemicals

The TNi1740 Injection Control System is a microprocessor-based system that controls the rate of agricultural chemicals being injected into conventional field sprayers. It controls four chemicals simultaneously with the carrier flow. A metering pump is used with flowmeter feedback to detect empty tanks, plugged strainers, etc. The TNi1740 features chemical identification cards that recall application parameters programmed for each chemical. A monitor displays a complete set of application information at a single glance. Double shutoff quick couplers prevent chemical loss from disconnected hoses. Interchangeable tanks simplify chemical changes. A mechanical tank mixer is available for agitation of chemical slurries. **Micro-Trak® Systems, Inc.**, Mankato, Minnesota, (507) 257-3600, and **RHS Fertilizing/Spraying Systems, Inc.**, Hiawatha, Kansas, (913) 742-2949.



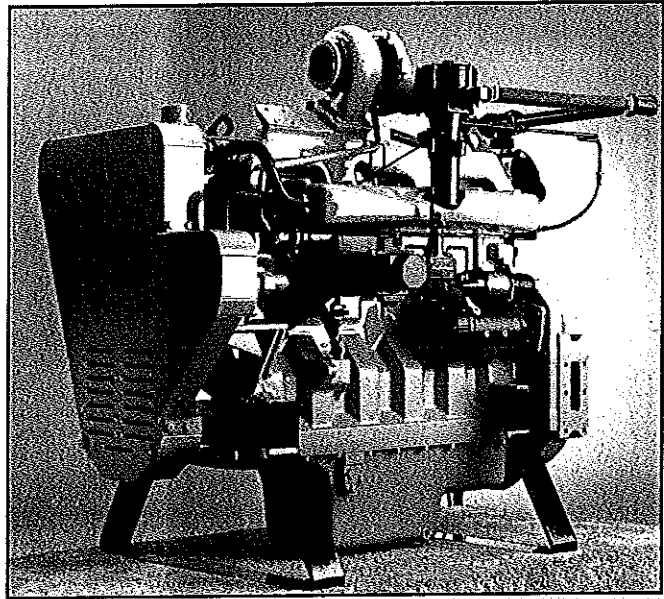
Full Drive System Controls Both Clutches and Brakes

The New Holland Fiat "Steering-O-Matic Full Drive" system is used to control both clutches and brakes for both tracks on the Fiat 85 Series agricultural crawlers with a single lever. The single lever actuates a proportional two-output hydraulic valve where the output pressure is proportional to the angle of the lever. Each of the outputs is controlling a steering clutch, and through a sequence valve, the steering brake; one output is linked to the right clutch and brake while the second is linked to the left clutch and brake. As the lever is moved right or left from vertical, the respective clutch pressure is gradually reduced and subsequently the brake pressure is gradually increased to the point where pivot steering occurs. **New Holland Fiat, S.p.A.**, Modena, Italy, (011) 39-59-203750.



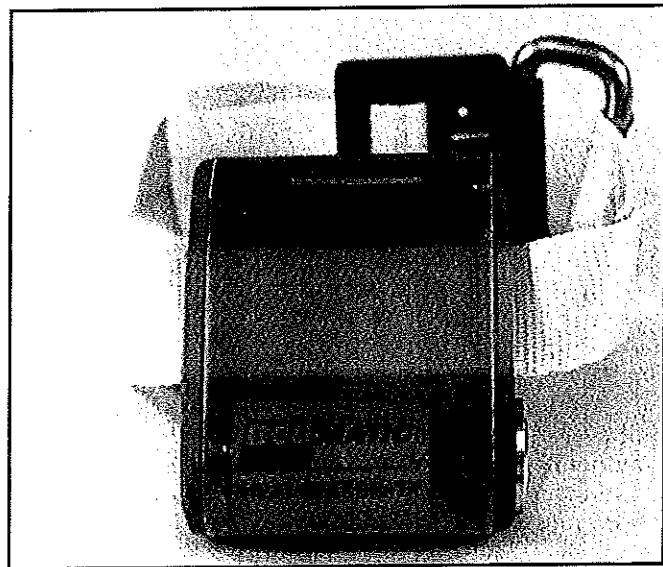
Natural Gas Engine Operates Efficiently with High Power Density

John Deere's 6076AFN30 Natural Gas Engine utilizes the latest "Lean Burn" combustion process that allows the engine to operate very efficiently with high-power density. It is offered in 112 kW and 149 kW continuous power configurations, and also low (2-8 psi) and high (18-30 psi) gas supply pressure options. The engine uses an all-electronic, single-fire, capacitive discharge (CD) ignition system with no moving parts and has adjustable spark advance via a potentiometer. The ignition system also has an adjustable overspeed shutdown safety feature as standard equipment, which will prevent engine damage in the event of a drivetrain failure. The platinum-tip spark plugs and redesigned valve train provide long service life in the irrigation marketplace. John Deere Engine Group, Product Engineering Center, Waterloo, Iowa, (319) 292-5348.



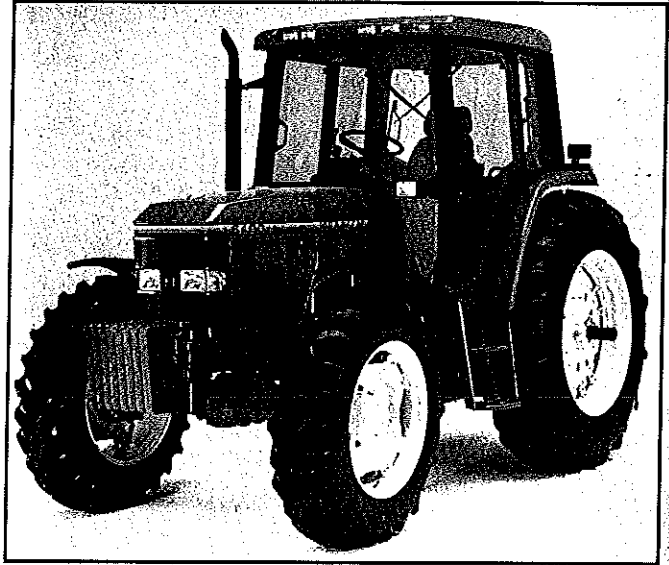
Smart Pedometer Predicts Estrous Periods of Milking Cows

Bou-Matic's Heat Seeker™ is a smart pedometer to predict estrous periods of milking cows by comparing recent activity to that of the previous two days. The electronics are encapsulated into a urethane puck that is attached to the rear leg of the cow with a trap and custom Teflon™-coated stainless-steel buckle. The pedometer sensitivity and other modes can be programmed using a hand-held magnet. The data is read out via an LED or transmitted automatically to a management computer. The unit is powered by a replaceable lithium battery with a low-battery indicator. Bou-matic, the Dairy Equipment Division of DEC International, Inc., Madison, Wisconsin, (608) 222-3484.



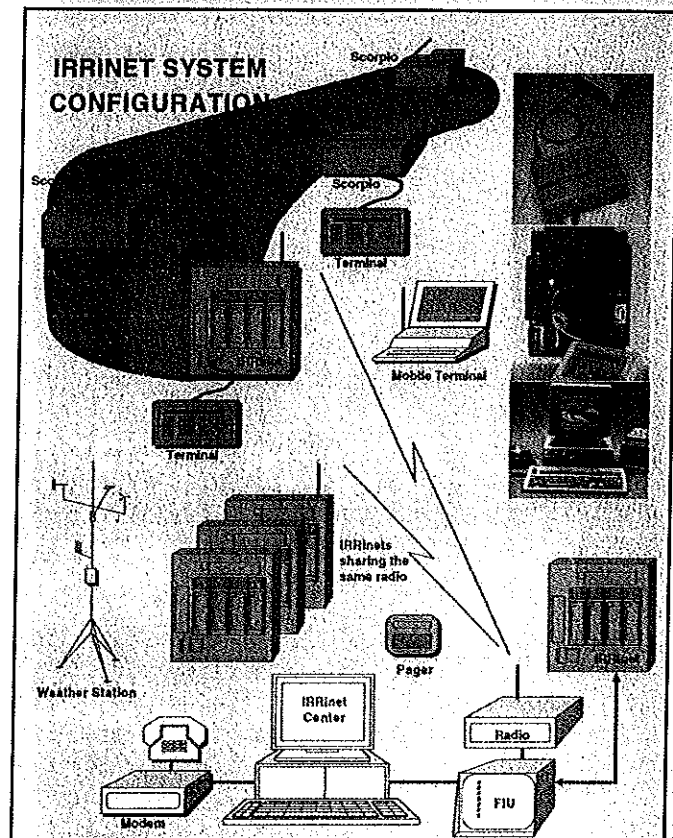
New Range of Agricultural Tractors

Deere & Company's new line of Agricultural Tractors ranges from 60 to 145 hp. This is the largest change in Deere tractors since the 1960s. These tractors feature modular construction, three new transmission types, new cabs located farther forward, increased reliance on electronics and a new appearance. They offer lower noise levels, better visibility, a wider speed range, more power shiftable speeds, R134A refrigerant, better air distribution within the cab, new hydraulic system, more compatibility with front implements and an electronically controlled 3-point hitch system on all models. John Deere Product Engineering Center, Waterloo, Iowa, (319) 292-8980.



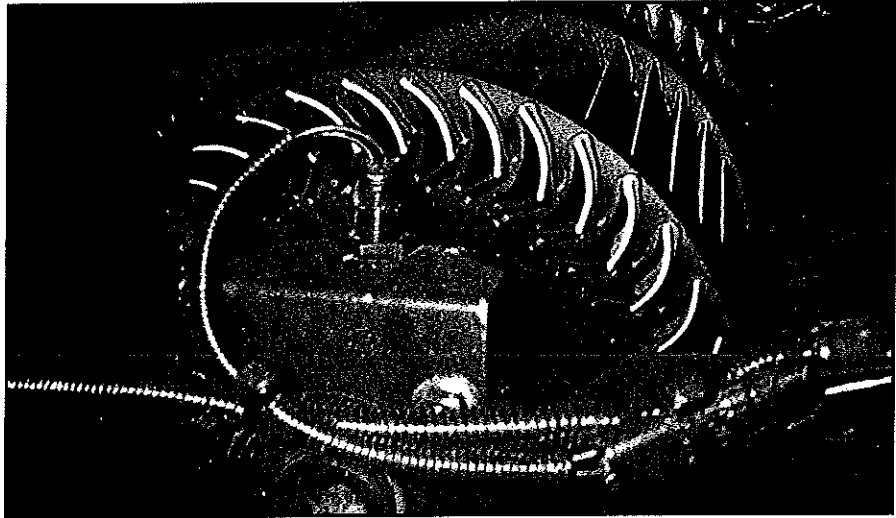
Central Irrigation Control System Fits Various Applications

Motorola's IRRInet™-Scorpio® System for Irrigation is a microprocessor-based controller with local processing capability that controls irrigation in various applications such as agriculture, turf, landscaping, etc. The IRRInet unit is designed to operate either as a stand-alone irrigation controller or as part of large distributed irrigation systems. The IRRInet can communicate with a central computer station over various communication links, such as conventional radio, trunked radio or wireline. A key innovation is the combined power and flexibility of the IRRInet-Scorpio system — where Scorpio radio remote units provide both output controls and sensor inputs as RADIO-REMOTE extensions of the IRRInet unit's logic. Valves, pump controls, actuators, and other controls can be located up to two miles away from the IRRInet controller, as well as sensors' inputs, without the need for running wires back to the controller — Scorpio provides the radio-remote terminal unit functions for IRRInet. Motorola, Sacramento, California, (916) 854-2807.



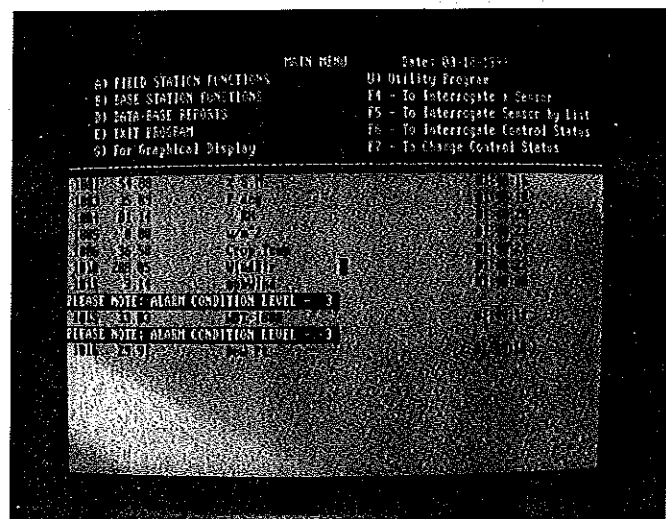
Fan System Brings Advantages to the Axial-Flow Combine

The Case IH Cross Flow™ Fan, from J I Case, which is installed on Case Axial Flow Combines, with its increased air flow capacity produces higher air velocities through sieves to enhance performance of cleaning systems in all types of agricultural crops. The unconventional configuration has allowed the cross-flow type fan to be fit into the axial-flow combine without extensive redesign of structural and component drive configuration. The unique chevron pattern of the fan blades gives more suitable air discharge to the cleaning system, while reducing fan noise level. The net result is combines that are more operator friendly. J I Case, Crop Harvest Engineering, Hinsdale, Illinois, (708) 887-2358.



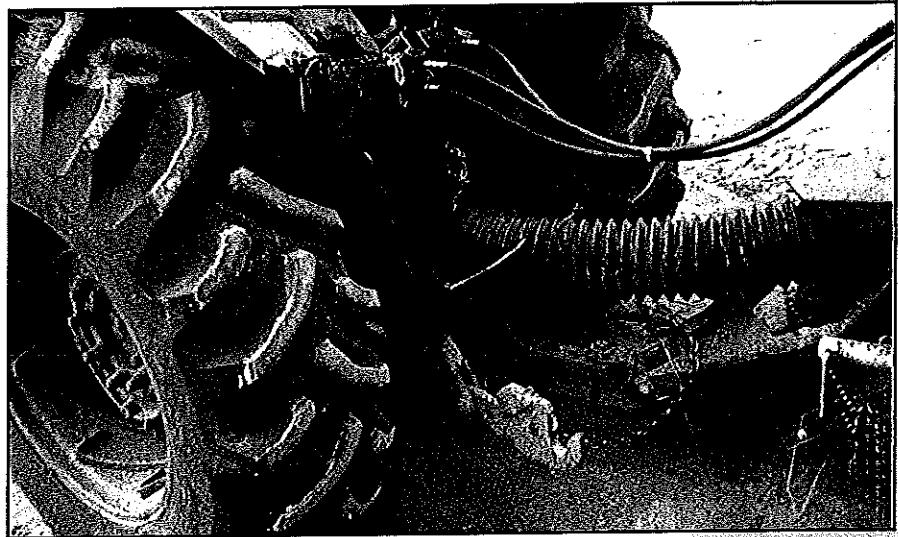
Frost Protection Software Monitors Real-Time Frost Conditions

Automata's FIELD VISION - COLDSPOT Frost Protection Software monitors real-time frost conditions in the fields. It sounds alarms, sends a message to a pager and can activate wind machines or pumps based on user-defined alarm levels. The alarms can be set using temperature, wet bulb temperature and/or dew point. The software includes all of the data acquisition and data analysis features of Automata's FIELD VISION Base Station Software. In conjunction with Automata's Field Stations and Telemetry System, the software continuously monitors fields in real-time around the clock. Automata, Inc., Grass Valley, California, (916) 273-0380.



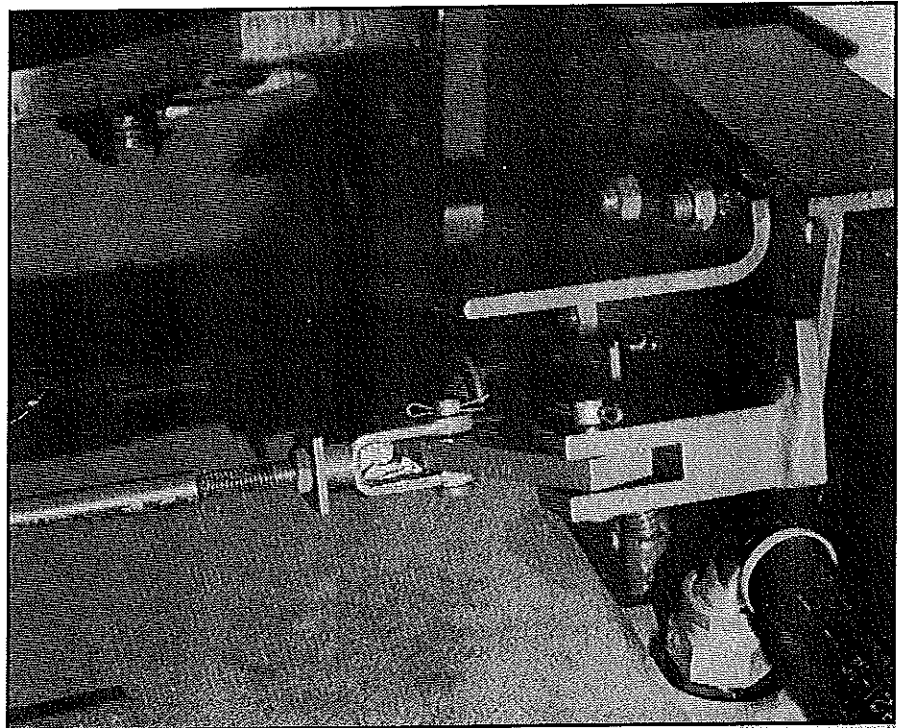
Driveline Shield Totally Encloses All Moving Parts

Spaldings Agricultural's PTO Total Guard virtually eliminates the hazards of driveline operations. The Total Guard system consists of a heavy duty neoprene convoluted tube with a male bayonet fitting at each end of the tube, which, in turn, connect to female couplings mounted on the tractor and implement. Easy to fit, it allows access to universal joint for lubrication and inspection. **Spaldings Agricultural USA, Atlanta, Georgia, (404) 696-0806.**



Draft Sensing Mechanism for Articulated Tractors

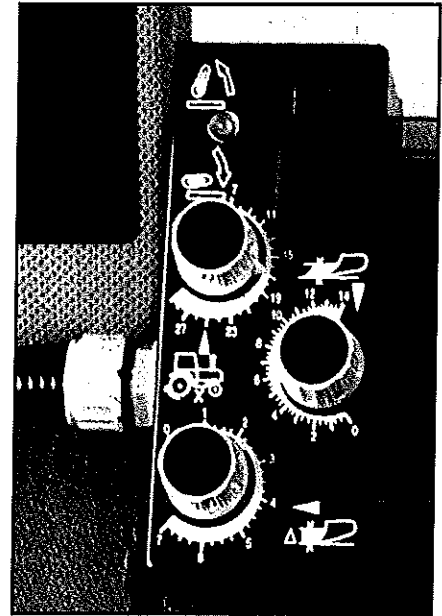
The Tractor Draft Force Sensor from John Deere is a transducer that monitors tractor component load deflections. This device can be used on various tractors to provide consistent load control on the tractor's 3-point hitch. The electronic system monitors the load and resets the depth to maintain constant engine load. This eliminates the need for the operator to shift the transmission, which increases the tractor's productivity. The draft link brackets bow at a micro-movement rate as the load changes and the electrical system regulates the depth. As the brackets bow, the linkage sums the micro-deflection into a pin movement directed into the displacement transducers. The multiplier lever coordinates the mechanical motion into the correct range for the displacement transducer to accept. **John Deere Product Engineering Center, Waterloo, Iowa, (319) 292-8922.**



Automatic Position and Traction Control Designed to Control Front 3-Point Systems

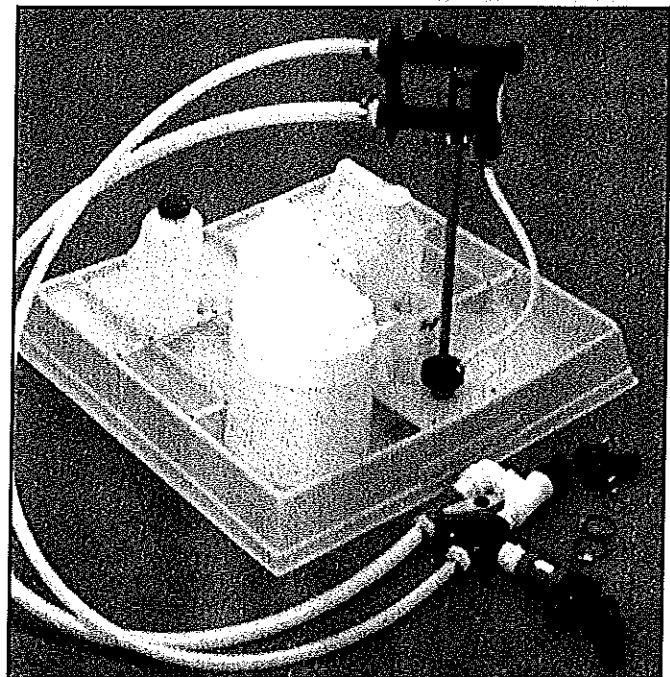
LAForge's Automatic Position and Traction Control is available for John Deere tractors 55-, 60- and 7000 series equipped with performance monitor and radar. An in-cab control box contains the rocker switch for raising and lowering of the hitch, a knob for setting the depth, a knob for setting the allowed maximum slippage percentage and a knob for adjusting the maximum deviance from the pre-set depth. An external

remote switch for raising and lowering the hitch is mounted up front to facilitate hook-up. Its unique feature is that it limits the tractor slippage by raising the front implement when it surpasses an operator selected maximum percentage. The maximum deviance from the pre-set depth can also be selected by the operator. **LAFORGE SYSTEMS INC.**, Concord, California, (510) 827-2010.



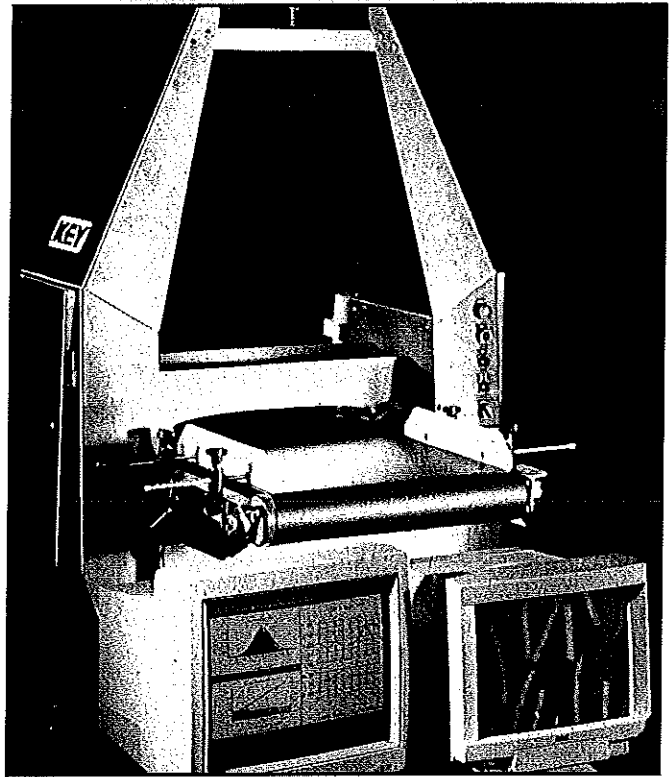
Hand-Held Cleaning Unit Provides Safety

Empty-Clean's EMPTY-CLEAN is a hand-held unit with suction probe that pulls pesticide from a container (most sizes through 55-gallon drum) and takes the pesticide to the operator's spray rig, then uses clean water from the operator's nurse tank to pressure rinse the container and remove the rinsate to the spray rig, all at the same time. Neither the operator, the operator's pump, nurse tank nor the environment is ever contaminated. The optional Portable Pesticide Spill Prevention and Containment Pad holds one through five gallon containers. The pad helps prevent pesticide waste, ground contamination and the bottom of the pad is sloped to a 100 mesh screened sump so any spills can be recovered with EMPTY-CLEAN. **Empty-Clean Corp.**, Cordele, Georgia, (912) 273-1272.



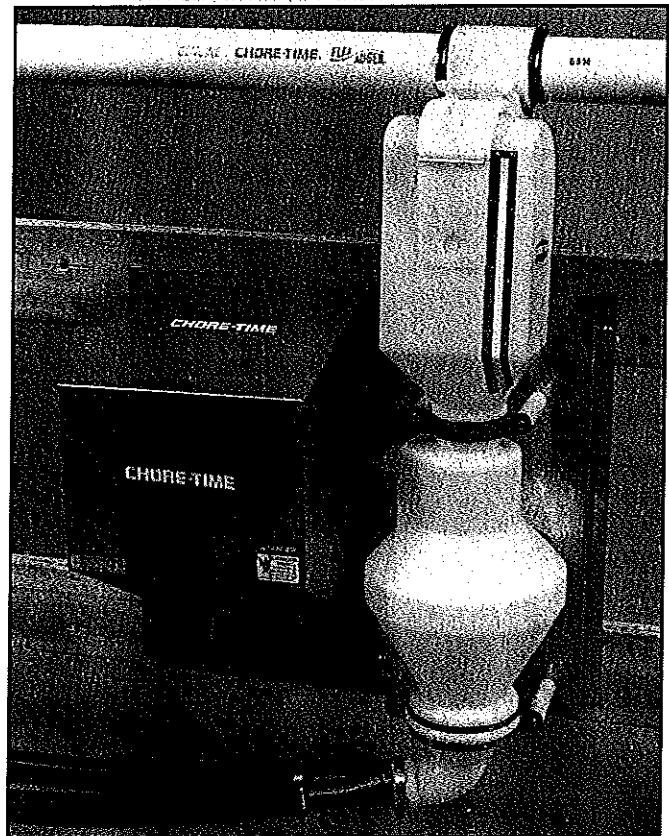
Quality Control Monitor for Food Processing Applications

Key Technology's AccuScan™ Quality Control Monitor is a machine vision system that sample inspects a continuous flow of product. Product is fed through a scanner/conveyor unit where precise digital images are produced with dimensional accuracy to ± 0.12 inches and some 16.7 million possible colors. The system sends these digital images over a fiber optic link to a high-speed computer located up to 1,000 feet away. Using comprehensive image-processing hardware and proprietary software, attributes are measured and a data base created. This data is then translated into graphical control charts using SPC/SQC techniques. The information allows the processor to produce more consistent product quality, allows for less rework, improves recovery and reduces labor. Key Technology, Inc., Walla Walla, Washington, (509) 529-2161.



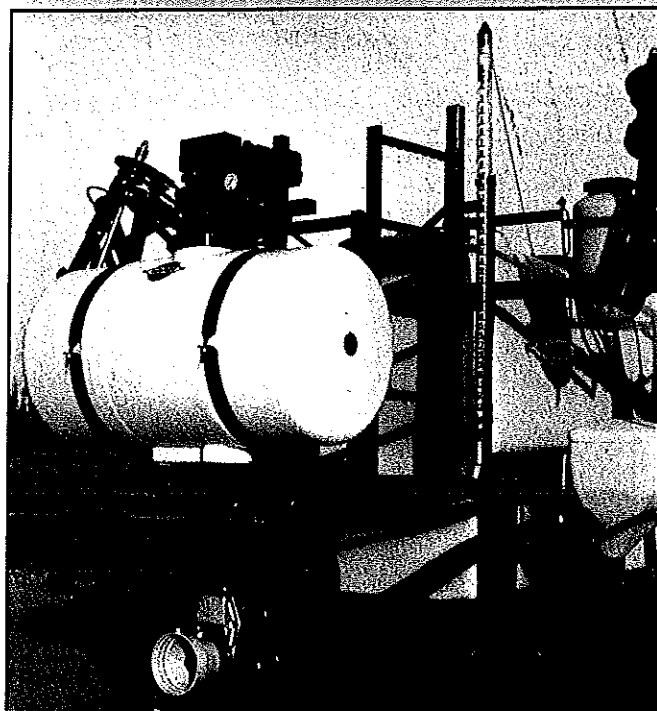
Blower Feeder Automates Food for Pond-Raised Fish

Chore-Time's Aquaculture Blower Feeder is a tool for automating the feeding of pond-raised fish. Designed for broadcast feeding, this system is a feeding management tool that incorporates bulk feed storage along with the feeding system and offers producers a total feed management program to deliver feed "right to the fish's mouth." The labor-saving system uses Chore-Time's FLEX-AUGER® coreless auger system to convey feed from the company's bulk feed storage bins to the feeder. Using a universal electrical power unit (220/230V, 50/60 Hz), the Blower Feeder can dispense feed to fish in ponds, raceways, nets or tanks up to 400 feet away. Chore-Time Equipment/CTB, Inc., Milford, Indiana, (219) 658-4101.



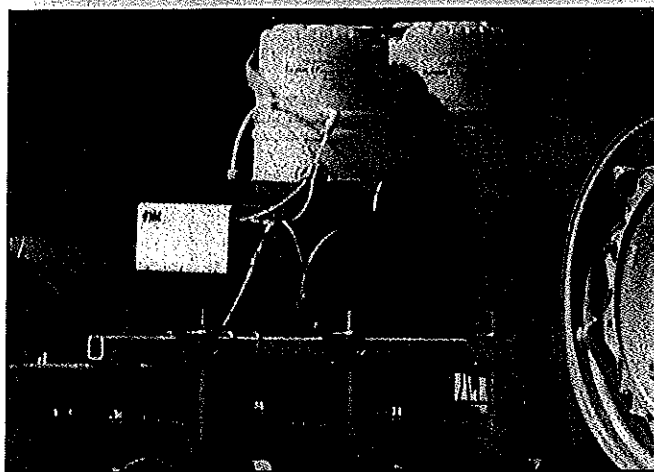
System Flushes and Rinses Sprayers

Hardi's "Flush & Rinse"™ System assists the sprayer operator to flush the spray lines should the spray task be interrupted and rinse the main tank between loads or spray operations. The system consists of a front-mounted tank (53 or 80 gal.) to carry the cleaning solution and a set of two 360-degree rotating rinse nozzles (or tank washing nozzles) inside the sprayer. Advantages include: reduction in time and labor needed to rinse the sprayer; reduction in amount of contaminated rinse water with greatly reduced disposal problems; reduction in crop damage and plugged nozzles; and rinse water can be sprayed over the crop rather than disposed of on a rinsing site. **Hardi, Inc.**, Davenport, Iowa, (319) 386-1730.



Application System for In-Furrow Delivery of Insecticide

The Custom Delivery System from FMC's Agricultural Chemical Group was developed for applying Furadan® 4F insecticide/nematicide in-furrow at planting time. A 15-gallon U-Turn® reusable drum sets in a specifically designed water tank that is mounted to a planter. A dry brake system, containing an air-tight seal that is intended to minimize exposure to farm workers, connects the Furadan 4F drum to the pumping system. The pump meters and sends Furadan 4F to the manifold and into individual microtubes, which apply the Furadan in-furrow as the seed is going in. The entire pumping system is governed by a control box mounted near the operator of the tractor. The turn of a knob adjusts the system for tractor speed. A second knob adjusts the application rate and a toggle switch supplies the system with power. Off/on is controlled by an actuator switch mounted on the planter that engages the system only when the planter is lowered and operational. **FMC Corporation**, Agricultural Chemical Group, Philadelphia, Pennsylvania, (215) 299-6087.



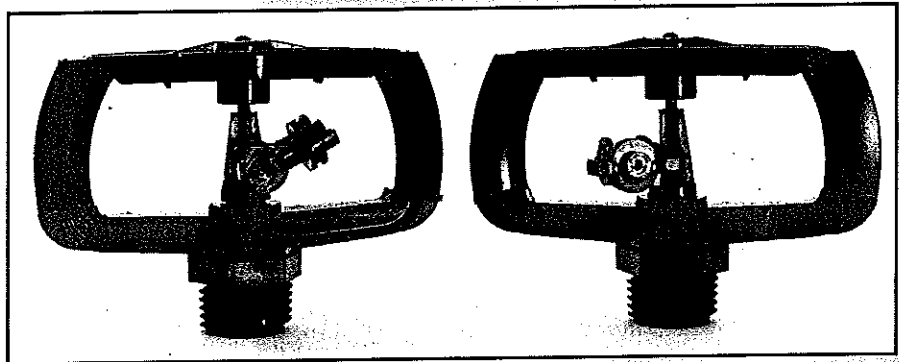
Round Baler Incorporates a Unique Baling Process

Ford New Holland's 640 Roll Belt™ Round Baler incorporates a baling process that makes tighter, denser and better looking bales. There are forming rolls in the front of the bale chamber and short, tough belts in the back. The front rolls are pivotable to provide a very small palatable core, with high density toward the bale surface. With this exclusive design, the floor roll carries the majority of the bale's weight, causing belts to last longer and overall maintenance costs to be lower. Bale density is controlled by an entirely self-contained hydraulic cylinder system. This system is easily adjustable allowing the operator to vary bale density while always maintaining a small, less dense core. This means the entire bale is edible and easier to shred without sacrificing bale weight. Ford New Holland, Inc., New Holland, Pennsylvania, (717) 355-3595.



Irrigation Sprinkler Uses a Viscous-Fluid Brake

Rainbird's Sidewinder™ is an irrigation sprinkler that uses a viscous-fluid brake to control the rotation speed of an unobstructed nozzle. Six nozzles enable it to cover an application range from 0.5 to 1.0 gallons per minute. This design provides a throw radius comparable to smaller impact sprinklers, while achieving efficient distribution. Sidewinder incorporates several innovations including an adjustable trajectory angle, quick-fit nozzles, a notched-orifice nozzle and support posts that employ the Coanda effect to achieve a high-uniform distribution. Intended primarily for fruit and nut orchards, it

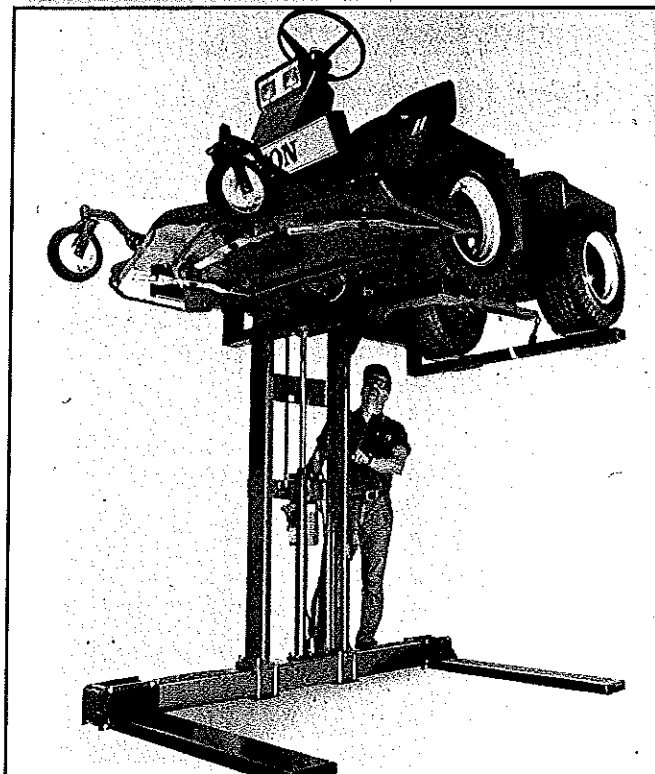


is also ideal for over-tree crop cooling. Its lower flow rates and reduced pressure requirements help growers reduce their water and energy costs.

Rain Bird, Agri-Products Division, Glendora, California, (818) 852-7401.

Repair Lift Adapted to Small Vehicles

The Heftee 1300 Service Lift from McCause Engineering provides easy (no tools required) fitting to a wide variety of small tractors and machines of all types for easy access and servicing at above head height with clear floor space underneath. Unequaled safety is provided with redundant safety systems including gravity operated safety locks and restricted hydraulic drop speed. It allows servicing axles and wheels, etc. while on the lift. The 1,750 lift capacity has been tested at a four times (7,000 lbs.) overload to assure safety and integrity. McCause Engineering, Inc., Oregon, Illinois, (815) 732-7540.

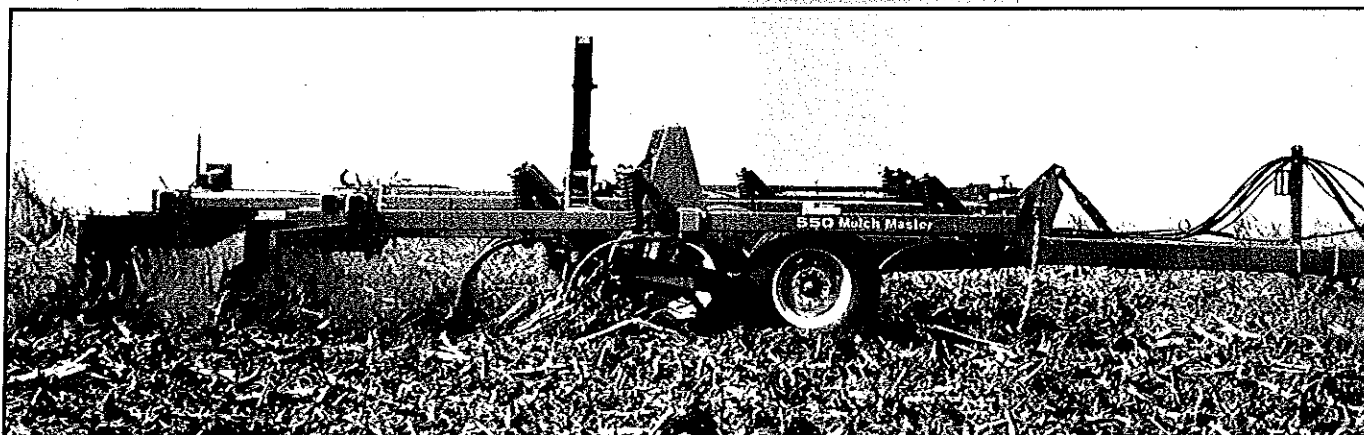


Secondary Tillage Tool Operates in High Levels of Crop Residue

The John Deere 550 Mulch Master is a secondary tillage tool designed to complete soil preparation prior to planting. Four major functions are performed: seedbed preparation, chemical incorporation (when applied), weed eradication and crop

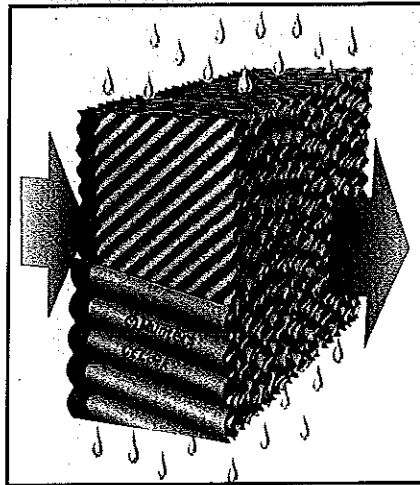
residue retention. These operations are completed at a shallower than normal operating depth and in one secondary tillage pass. The Mulch Master is not speed sensitive and can operate 2-4 mph faster than most other seedbed tools. Developed for

corn-belt use, Mulch Master is gaining acceptance in wheat and cotton markets. John Deere Des Moines Works, Des Moines, Iowa, (515) 289-3163.



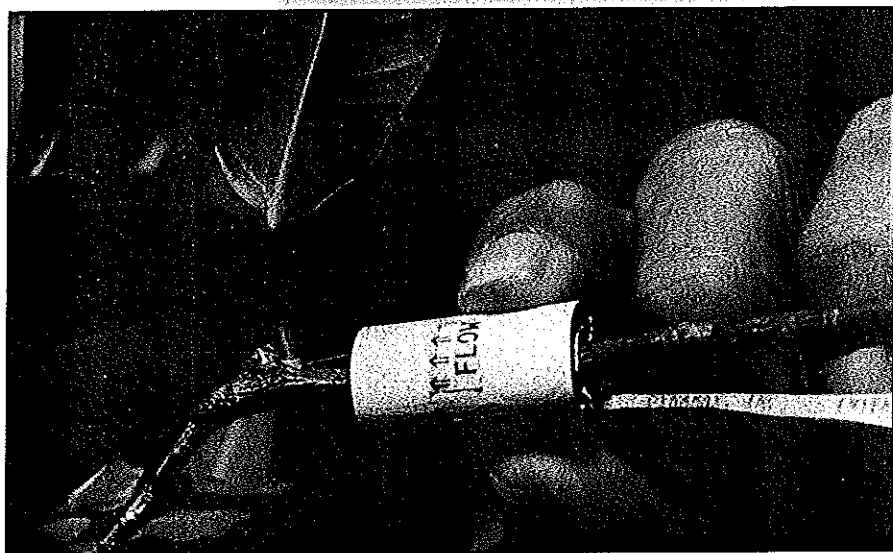
Evaporating Cooling Media for Poultry, Livestock and Greenhouses

Munters' MI-T-COOL™ pad is a new breed of MCELdek evaporative cooling pad used for cooling poultry, livestock and greenhouses. The patented design makes use of two different corrugation sizes and angles. Its design allows a greater amount of air to flow through the pad without over-humidification. The large airflow passages are also easier to clean and less likely to clog with dust and dirt. The small water flow channels direct unevaporated water to the air entering face of the pad which flushes the face in a self-cleaning action. **Munters Corporation**, Evaporative Cooling Division, Fort Myers, Florida, (813) 936-1555.



Sap Flow Sensor 'Listens In' on Small Crop Transpiration

Dynamax's SGA5 is an electronic device for monitoring water consumption in plant stems 0.2 in. (5 mm) in diameter. It is made specifically for grains such as rice, millet, beans and larger crops in the early growth stage. The SGA5 sensor, containing electronics based on the heat-energy balance principle, closes around the plant stem in clam-shell fashion and then is covered with a weather shield. A small amount of heat radiates from an inner heater strip, and the amount of heat carried by the sap flow is computed from temperature sensors. Using the heat absorption of water and measuring the temperature increase of the sap, the heat gain in the sap is readily translated to a mass flow rate of water. The SGA5 does not penetrate the plant, and does no harm by



installation. It is easily removable and can be reused. **DYNAMAX** Inc., Houston, Texas, (713) 771-4224.

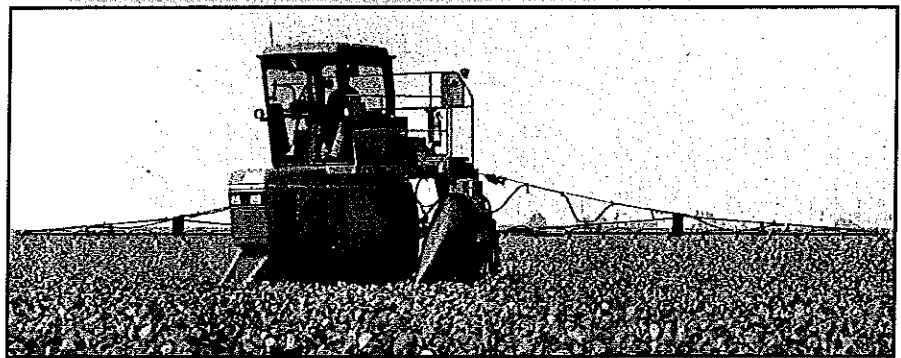
All-Terrain Mower Offers Automatic Leveling

The All Terrain Mower 72 from DewEze Manufacturing offers a 72-in. cutting width with diesel engine power. The ATM 72 offers constant automatic leveling for operator safety and comfort. In valleys, ditches and over-crowns, both decks simultaneously tilt for even mowing. A Mercury switch combination provides a signal to maintain the vertical position of the mower. This signal activates a hydraulic valve hooked to two hydraulic cylinders that provide stability up to a 30-degree slope. Mowing parallel to the slope eliminates the need for costly repairs due to erosion. DewEze Manufacturing, Inc., Harper, Kansas, (316) 896-7381.



Self-Propelled Sprayer Designed for Variety of Chemicals

The John Deere 6500 Self-Propelled Sprayer is designed to spray a variety of chemicals and fertilizers on virtually any type of crop. It features a two-speed, on-the-go hydrostatic transmission that provides smooth starts and an infinite range of ground speeds up to 15.2 mph. The 3.9 liter, turbo-charged John Deere diesel engine provides 94 hp. Two front axle choices are available. The wheel spacing is fully adjustable from 78 to 120 inches. The solution system contains a 420-gallon tank, 6.5 inch centrifugal pump, an optional quick-fill attachment, electronically actuated spray control valves, 47- and 60-ft. booms,

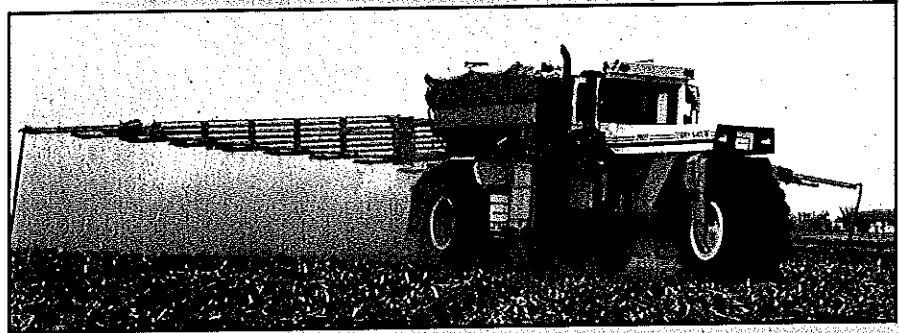


and an optional electronic chemical application rate control. Other features include a corner post monitor for all machine functions, nozzle tips in a variety of types and sizes, a 72-

inch under-axle ground clearance and electro-hydraulics for boom controls. John Deere Des Moines Works, Des Moines, Iowa, (515) 289-3062.

Blending System Able to Apply Eight Products Simultaneously

Ag-Chem's Soilection® Multi-Bin Dry Fertilizer Spreader is a full on-the-go blending system capable of applying eight products simultaneously to a field utilizing a soil recommendation map. The bin design allows ease of tending and maintenance, while the specially designed metering devices control precise application of products on an evenly distributed layer across the conveyor. Mixing is maximized prior to distribution through air-spread booms. Accuracy of metering, mixing of product on the belt, decrease of maintenance requirements, reduction



of required operator expertise in applying, increase of output capability and reduction of tending requirements are advantages of the system.

Ag-Chem Equipment Company, Inc., Minnetonka, Minnesota, (612) 933-9006.

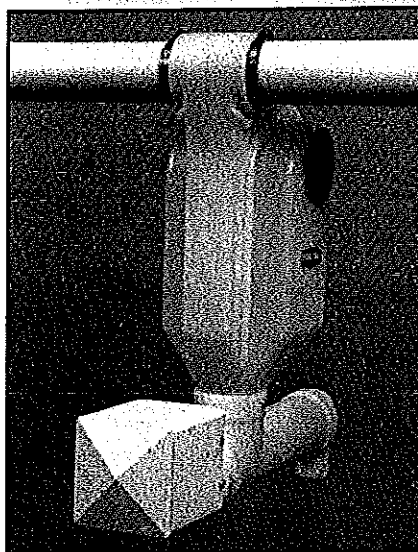
Side Marker for Implements Provides Safety

The Universal Implement Side Marker from Triple C Ventures Ltd. is permanently mounted to the implement and remains in place during field operations or in transit. This system is the only permanent method for safely marking the overwidth dimensions of wing-type implements with flags and flashing lights. The markers also function as turn signals when mounted on the implement at traffic eye level, thereby reducing the danger of left-hand turns. The Universal Implement Side Marker is built from 18-gauge steel and casting to withstand impacts and the rigors of fieldwork. It incorporates a suspension device to allow for flexing with the implement and rebounding if struck. The units come with a universal mounting bracket for ease of installation. **Triple C Ventures Ltd., Forestburg, Alberta, Canada, (403) 582-2125.**



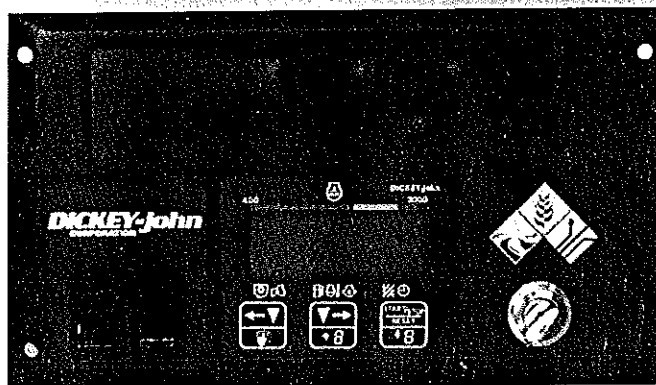
All-Weather Feeder for Fish

Chore-Time's Proportioner Drop Feeder for fish, activated by timeclock, releases a precise amount of feed to the water's surface as many times per day as desired. Choose between models dispensing two, four or six pounds of feed per minute. The all-weather polyethylene construction of both the volumetric feeder and the proportioning auger housing makes this durable for inside or outside installation. Each feeder comes with a low-voltage electric motor to power a small coreless auger in the feeder. **Chore-Time Equipment/CTB, Inc.**, Milford, Indiana, (219) 658-4101.



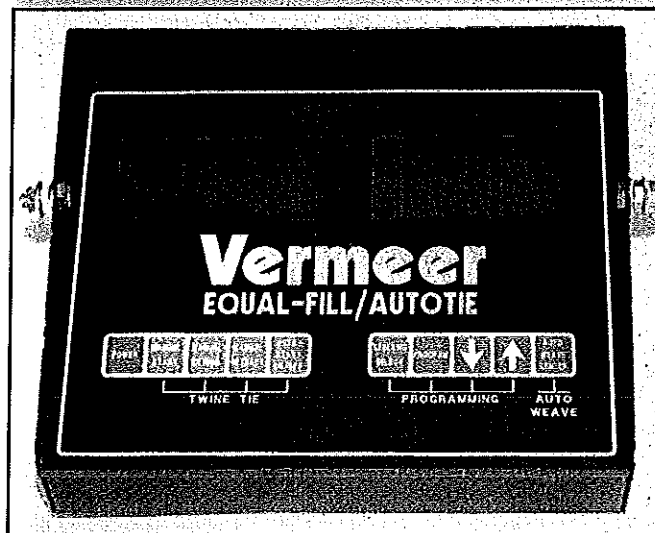
Monitoring Unit Based on Customer's Requirements

DICKEY-John's Enhanced Custom Instrumentation Package (CIP) is a monitoring unit that can be configured based on OEM customer requirements via programmable functions to accommodate various tachometer and monitoring tasks. The CIP is capable of monitoring up to 17 different inputs and simultaneously displaying four functions. Two basic configurations are available. One utilizes a three-bargraph display to convey gauge information such as oil temperature, fuel level, water temperature, etc. The other uses a 26-segment bargraph to display engine rpm or wheel slip. This gauge information is displayed at all times during normal operation regardless of the function selected by the touchswitches. Both configurations display other functions such as ground speed, wheel slip, PTO speed, and area/hr. **DICKEY-John Corporation**, Auburn, Illinois, (217) 438-2211.



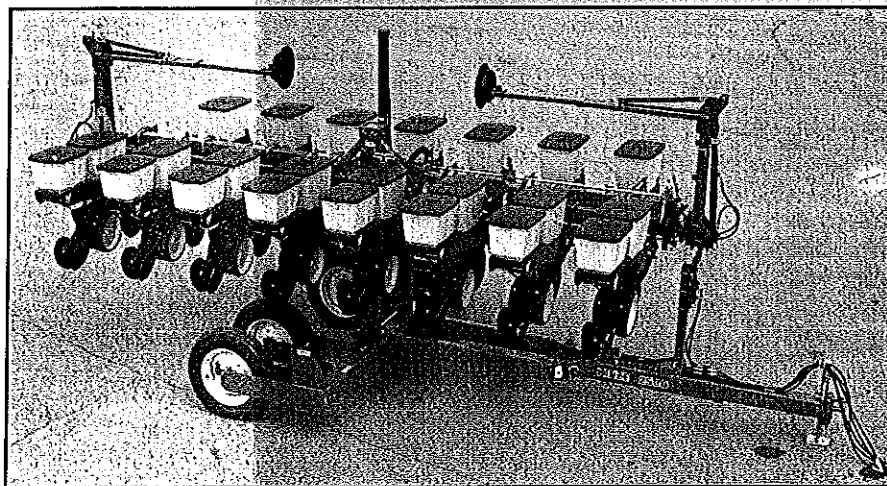
Baler Controller for Use on Round Hay Balers

Vermeer's Equal-Fill/AutoTie Bailer Controller, developed for operation with round hay balers, provides a maximum amount of programming choices and a maximum amount of display information. The unit includes two LCD display panels that operate in conjunction with eight switches to display information about the baler/bale status and to allow the operator to modify several operating characteristics. Containing a connector that allows hook-up to a reprogramming unit, the unit has the ability to easily modify the basic operational software, thus requiring no disassembly. Vermeer Manufacturing Company, Ag Division, Pella, Iowa, (515) 628-7373.



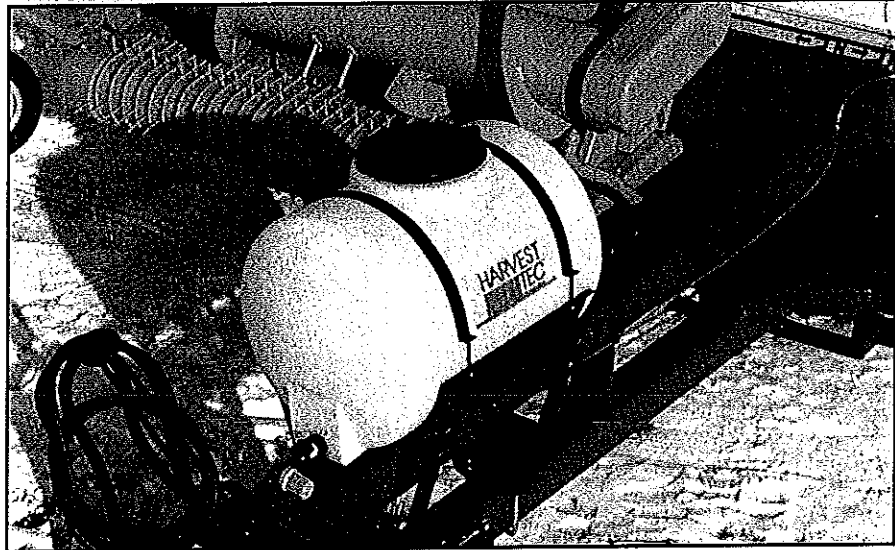
Planter Design Allows Narrow Road Transport

Kinze's 2500 Twin-Line® Planter is available in 6R30 or 8R30 sizes. Transport width on both machines is 11 ft. 2 in. The transition from field to transport is done by raising the machine to its full height and hydraulically rotating it 90 degrees. A single hydraulic cylinder raises the frame supported by UHMW bearing pads sliding on a stainless steel clad post. The double-frame design allows a variety of setup configurations including dry or liquid fertilizer or inter-plant push row units. The machine has been designed to accept a wide range of row unit-mounted and frame-mounted attachments with no additional brackets or adapters needed. KINZE Manufacturing, Inc., Williamsburg, Iowa, (319) 668-1300.



Forage Harvester Sprayer Is Tongue-Mounted

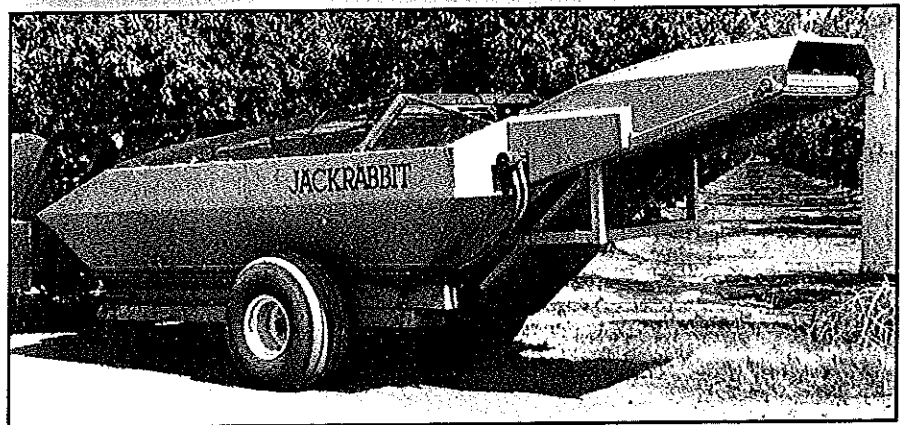
Harvest Tec's Forage Harvester Sprayer provides a low flow-rate water system for lubricating the forage harvester blower band. The unique nozzle location, which sprays water on the blower band directly before the feed inlet, effectively prevents gum accumulation from the crop and, therefore, reduces friction loss. A 15 gal./hr. water flow rate reduces forage harvester energy requirements by up to 14 percent when harvesting alfalfa between 40 and 55 percent moisture when gum accumulation normally would occur. The system, consisting of a tongue-mounted 55-gallon polyethylene tank, 12V by-pass diaphragm fixed rate pump, band lubrication flat fan nozzle and associated plumbing and wiring, can be used for application of a water soluble silage inoculant dissolved in the lubri-



cating water. Harvest Tec, Hudson, Wisconsin, (715) 386-9100.

Reservoir Cart Eliminates Hooking and Unhooking

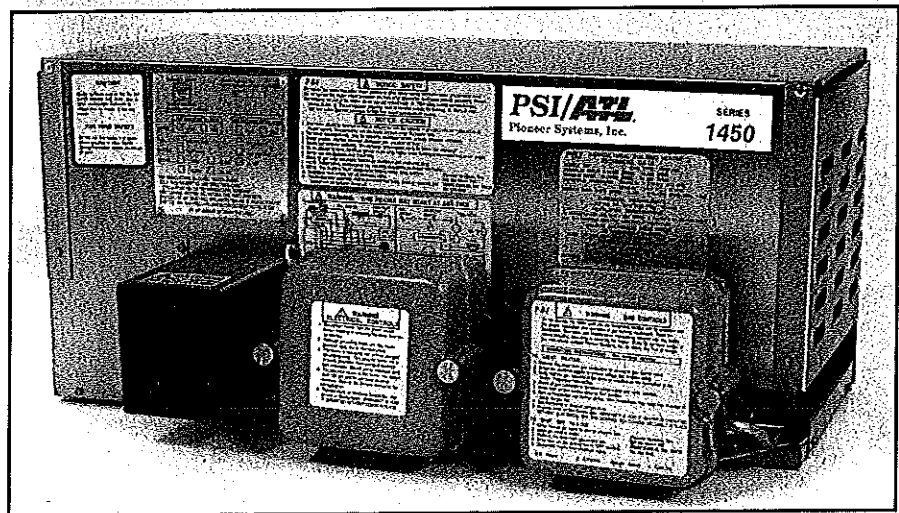
Jackrabbit's Jack Cart Harvest System consists of three separate components: a Reservoir Cart with 350 cubic feet of storage capacity, double-belted live floor conveyor and load distributing conveyor top; side-dumping Jack Cart, also with 350 cubic feet storage, 10,000 lb payload and tractor remote hydraulic hook-up; and an Adjustable Height Loader, road legal and easily transported, that raises and lowers for high or low trucks, has a 23-hp Duetz air-cooled diesel powered engine, double conveyor belts, and a 100-gal. diesel nurse tank. All three components are designed to make a 5,000 lb. load transition in 90 seconds or less. Each



unit can be purchased separately to enhance an existing system. Jackrabbit Inc., Ripon, California, (209) 599-6118.

Unvented Unit Heater Has Low-Profile Design

Pioneer's Series 1450 Heater is a line of "low profile" unvented unit heaters designed for use in animal confinement buildings with heaters that feature a burner and multi-port orifice that meet North American safety standards for animal confinement buildings. Minimum space is required for installation; a 60,000 btu heater is only 12 inches high. Propane and natural gas models are available in 20,000, 40,000, 60,000, 150,000 and 200,000 btu. Output on all heaters can be varied from 50 to 100 percent of nameplate ratings. Constructed of stainless steel, the heaters are available with pilot light or hot surface ignition. Pioneer Systems, Inc., West Fargo, North Dakota, (701) 282-6540.



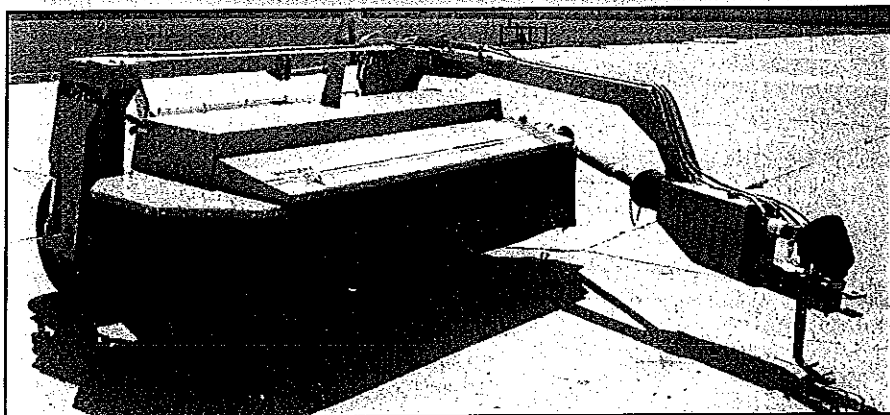
Tire Designed for Sprinkler Irrigation Service

The Goodyear TI3 is a new concept specialty farm tire designed for sprinkler irrigation service. Tire shape is a new generation CADAM/FEA design that defines a finely tuned bias natural shape carcass. The end result is a reduced stress construction with very good load carrying capability and long-term durability. The tread pattern is a long-short-short staggered bar sequence that provides improved lug distribution, yet has an open tread center to maintain cleaning. In addition, a wrap-around lug shape is used to provide full-tire-width gripping action. The Goodyear Tire and Rubber Company, Akron, Ohio, (216) 796-2858.



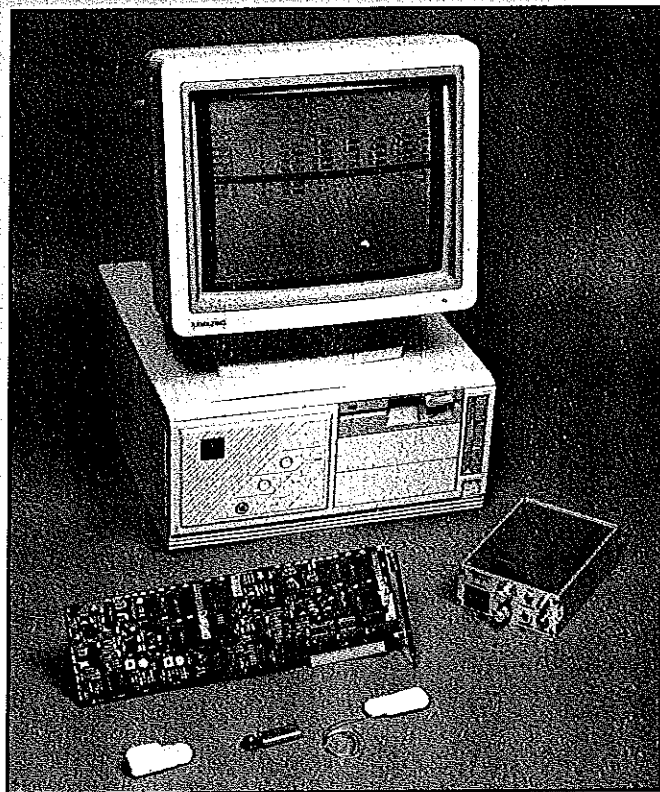
Mower Conditioner Utilizes Rotary Disc Cutting Unit

Vermeer's RC7120 Mower Conditioner utilizes a rotary disc cutting unit and conditioning rolls to harvest and condition a wide range of forage materials. A PTO drive system allows the operator to operate at full rpm and load in all positions from normal to transport. The application of a rubber torsional system to bias the conditioner rolls allows for easy operator adjustment and greater crop flow through the machine. A simple screw adjustment fine tunes roll spacing and crimping pressure for varying crops and conditions. The new style conditioner roll has a rubber roller with machined helical grooves. **Vermeer Manufacturing Company, Ag Division, Pella, Iowa, (515) 628-7715.**



Automated Data Acquisition System is PC-Based

The Datacol Version 6.7 System from Mini Mitter is a fully automated, PC-based telemetry monitoring system developed for use with Mini Mitter VHF-T-1 and VHF-C-1 remote temperature and heart rate transmitters placed on livestock species. It has applications for monitoring soil and plant canopy temperatures in "real time" from distances of more than 1 km. Monitoring of grain and produce storage facilities is also possible over similar ranges. Up to 50 subjects can be monitored per system. The user is provided with total control of the sampling protocol through the Datacol 6.7 software. Data is stored on the computer hard drive and can be copied onto diskettes for archival storage and analysis using various commercial packages. **Mini Mitter Company, Inc., Sunriver, Oregon, (503) 593-8639.**



Stripper Combine is Equipped with Rubber Tracks

The SP90T Green Pea and Lima Bean Stripper Combine is the first pea harvester equipped with rubber tracks. The unique track-wheel chassis allows timely harvest of highly perishable crops with unequalled flotation and mobility. Soil compaction damage is reduced over prior all-wheel models. The SP90T features a high-visibility cab with ergonomically sound operator controls and monitors. Air-conditioning, lighting and adjustable seat provide operator comfort day or night. "Built-in" electro-hydraulic governing system maintains a constant threshing beater speed for minimizing damage on or loss of tender products and controls ground speed and stripping reel speed based on total system loading to provide maximum harvest

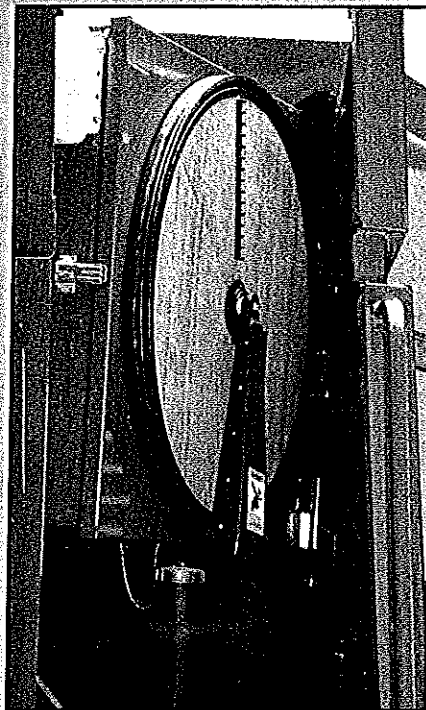
efficiency. Equipped with filtering and cooling for the diesel and hydraulic oil, the SP90T has more than 300 hp to handle the tough con-

ditions with a 24-hr. fuel supply and a road speed of 16 mph. **Klockner Hamachek**, Kewaunee, Wisconsin, (414) 388-2340.



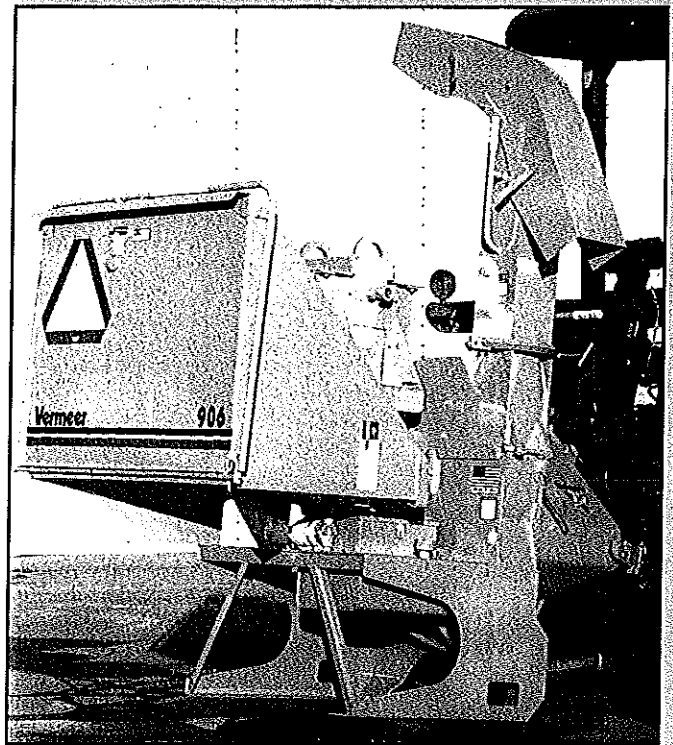
Rotary Screen System Corrects Trash Build-Up

John Deere's Rotary Screen Rake Bar System, used on the John Deere Maximizer, has two rake bars attached to the rotary screen. The bars pass through a sheet metal comb mounted on the leading edge of the vacuum duct. The rake bar and vacuum duct comb work together to shred and cut the larger pieces of material into smaller pieces that can then be removed by the vacuum duct, thus eliminating the build-up of material that could plug the leading edge of the duct. **John Deere Harvester Works**, East Moline, Illinois, (309) 765-2098.



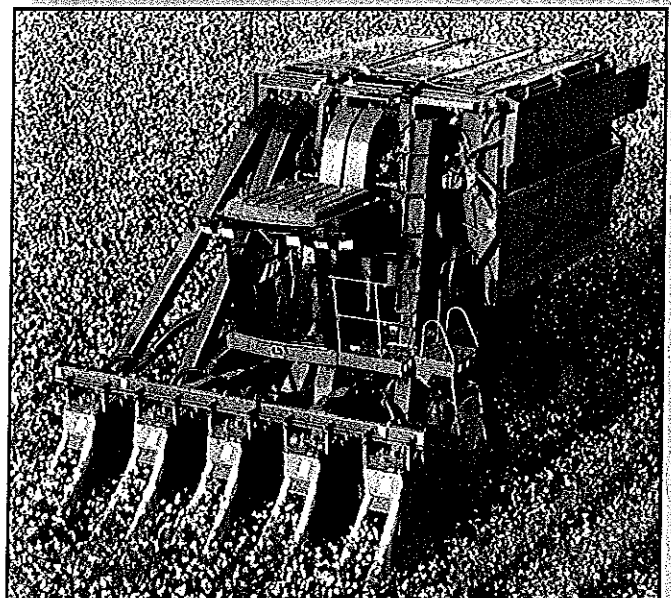
Brush Chippers Are Disc Style

Vermeer's 606 and 906 Brush Chippers reduce brush, small logs and lumber into marketable mulch or disposable chips. Both models have a 3-point hitch and a PTO drive for use with standard or utility tractors. The 606 has a 6-inch diameter input capacity and will fit Category I tractors up to 45 hp. The 906 has a 9-inch diameter capacity and will fit Category II tractors up to 80 hp. Both units have a heavy-duty gearbox drive designed for standard 540 rpm input. The gearbox also supports and drives the hydraulic pump that powers the feed wheel motor. The drive is coupled to a cutting-and-feed system to provide a cost-effective chipper for those who already own tractors. Vermeer Manufacturing Company, Pella, Iowa, (515) 628-7477.



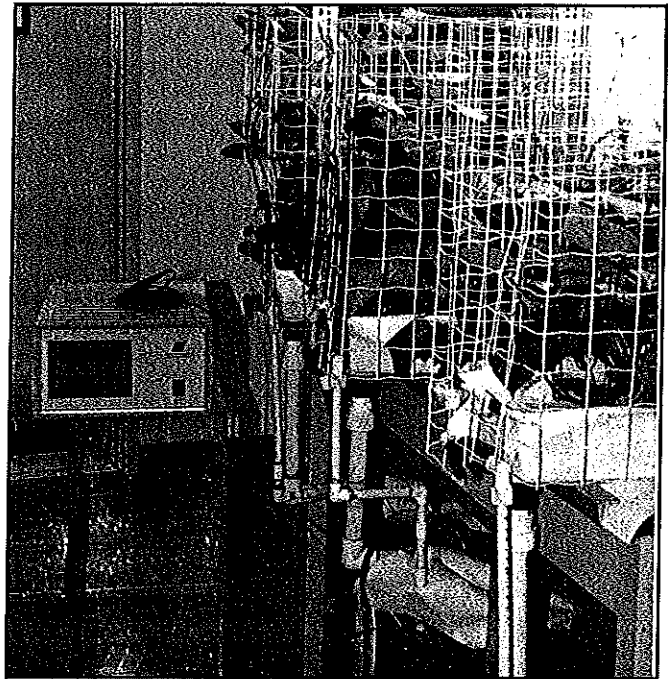
Cotton Picker Harvests Wide Rows

John Deere's 9965 Cotton Picker is the first picker in the industry to harvest five 34-, 36-, 38-, or 40-inch rows in one pass. The 9965 is equipped with in-line picking units that provide the flexibility to pick in up to 18 different row configurations and is also available with four conventional picking units for working in 38- and 40-inch row spacings and skip rows. In addition to row flexibility, features include simpler row-spacing conversions, non-contaminating doffers and moistener pads, a larger capacity water tank, electro-hydraulic controls, improved operation of the basket and metered unloading conveyor and serviceability improvements. An optional, factory-installed Mud-Hog® rear-wheel-drive axle provides added traction for muddy conditions. John Deere Des Moines Works, Des Moines, Iowa, (515) 289-3062.



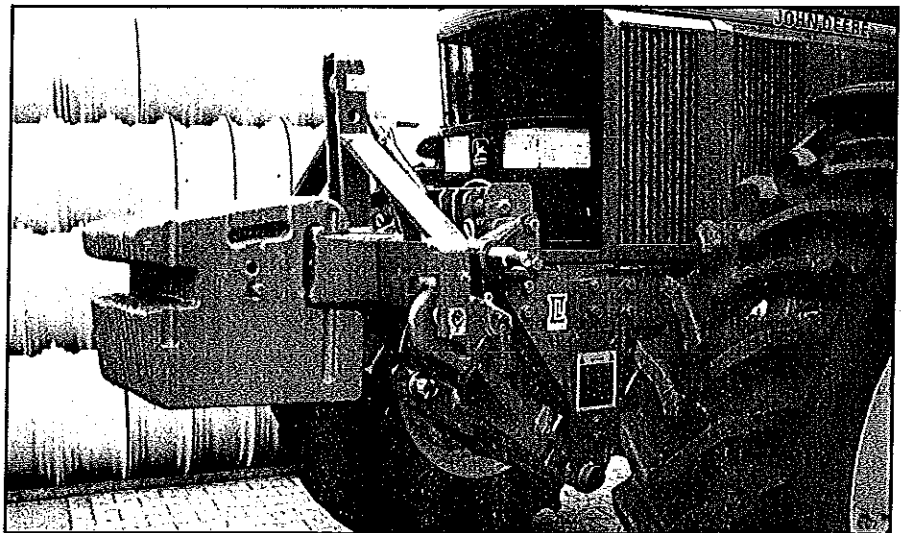
Proprietary Fiber Optic Sensor Monitors Fluids

The pH Optrode Measurement System from Geo-Centers has been developed for in situ optical monitoring of solution pH. The system uses a proprietary fiber optic sensor (optrode) to monitor the pH fluids in either standing or flowing conditions. The system consists of a pH optrode, an optrode interface board that plugs into standard PC/XT or PC/AT compatible computers, with software provided to test, operate and calibrate the measurement system. Features include stability in solutions of low conductivity such as natural waters and immunity from EMI and spurious electrical effects. NASA Kennedy Space Center has used the system for continuous on-line monitoring of hydroponic plant growth media and it has been used to monitor wastewater and process control water quality by commercial users. **GEO-CENTERS, Inc.**, Newton Centre, Massachusetts, (617) 964-7070.



Three-Point System Makes Possible Use of Two Mounted Pieces of Equipment Simultaneously

LAFORGE's "GREEN-LINK 75" front 3-point system, developed exclusively for John Deere 7600, 7700 and 7800 tractors, makes it possible to use two mounted pieces of equipment simultaneously. The folding, storing and locking feature allows the tractor to be operated without any interference by the hitch when it is not used. This position also allows for front-end loader compatibility. In working position, GREEN-LINK 75 is compatible with a factory installed front PTO according to ISO standards for Cat. IIIN front 3-point systems. An included "weight frame" makes the GREEN-LINK into a ballast management tool by allowing the front weights to be picked up and carried by the hitch. The system is designed to accept

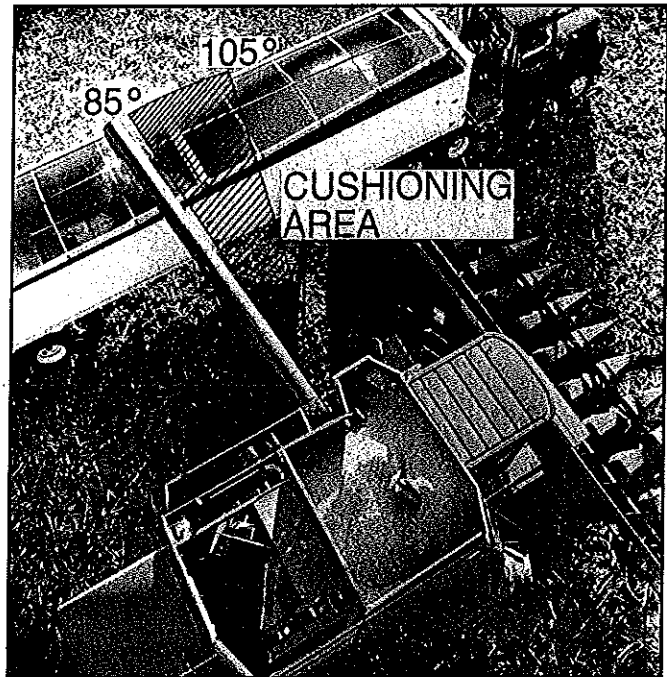


LAFORGE Depth and Traction Control and Weight Transfer System.

LAFORGE SYSTEMS INC., Concord, California, (510) 827-2010.

Unloading Auger Provides Cushioning Effect

John Deere's Cushioned Unloading Auger Swing Cylinder was introduced on all John Deere Maximizer combines. It provides for improved operator control and smoother operation. The cylinder is cushioned for the entire range that the end of the unloading auger is visible by the operator. The cushioning takes place both when the cylinder is extending and retracting and allows the operator to have smoother control over the start-and-stop motion of the unloading auger and reduces any harsh, jerky action that may splash or throw grain from the unloading auger spout. This is especially useful when topping off grain carts and trucks. The new cylinder has orifices that slow the (extend and retract) rate of travel of the unloading auger when it is between 85- to 105-degrees of its travel arc. **John Deere Harvester Works, East Moline, Illinois, (309) 765-2044.**



New Model Series for Maxxum Tractors

The Case IH 5200 Series Maxxum Tractors from J I Case range from 80 to 112 PTO hp. Increased comfort, convenience and visibility and features such as all-glass door, "A" post mounted mirrors, swivel seat, in-cab remote coupler flow controls, fender-mounted hitch controls and multiposition drawbar are provided in the new models. The fuel-delivery system on the highest horsepower 5250 features a fuel pump with "negative torque control" — an anti-smoke/emissions system. New engine side panels feature additional screens for enhanced cooling through better air flow. Additional features include larger radiator and air cleaner, slide-out oil cooler and transmission enhancements. **J I Case, Racine, Wisconsin, (414) 636-0392.**



- Ag-Chem Equipment Company, Inc.**
Sollection® Dry
Page 18
- Ag Leader Technology**
Yield Monitor 2000
Page 4
- AGRI-TECH Incorporated**
Merlin® Color Sorter
Page 5
- Automata, Inc.**
FIELD VISION - COLDSPOT
Frost Protection
Page 9
- Bou-Matic, the Dairy Equipment
Division of DEC International, Inc.**
Heat Seeker™ Electronic Pedometer
Page 7
- J I Case
Crop Harvesting Engineering**
Cross Flow™ Fan for Case IH Axial
Flow Combine
Page 9
- J I Case Company**
Case IH Maxxum 5200 Series
Page 27
- Chore-Time Equipment/GTB, Inc.**
Aquaculture Blower Feeder
Page 12
- Chore-Time Equipment/GTB, Inc.**
Proportioner Drop Feeder
Page 19
- John Deere Des Moines Works**
9965 Cotton Picker
Page 25
- John Deere Des Moines Works**
550 Mulch Master
Page 15
- John Deere Des Moines Works
Cotton Division**
6500 Self-Propelled Sprayer
Page 17
- John Deere Engine Group
Product Engineering Center**
6076AFN30 Natural Gas Engine
Page 7
- John Deere Harvester Works**
Cushioned Unloading Auger Swing
Cylinder
Page 27
- John Deere Harvester Works**
Rotary Screen With Rake Bar System
Page 24
- John Deere Horicon Works**
400 Series Lawn & Garden Tractors
Page 4
- John Deere Product Engineering
Center**
Agricultural Tractors — 60 to 145
PTO HP
Page 8
- John Deere Product Engineering
Center**
Agricultural Tractors
Tractor Draft Force Sensor
Page 10
- DewEze Manufacturing Inc.**
All Terrain Mower
Page 17
- DICKEY-John Corporation**
Enhanced Custom Instrumentation
Package
Page 19
- DYNAMAX Inc.**
SGA5 - Stem Flow Gauge
Page 16
- Empty-Clean Corporation**
EMPTY-CLEAN — portable device
for emptying and cleaning pesticide
containers at ground level
Page 11
- FMC Corporation
Agricultural Chemical Group**
Custom Delivery System
Page 13
- Ford New Holland, Inc.**
640 Roll Belt™ Round Baler
Page 14
- GEO-CENTERS, INC.**
pH Optrode Measurement System
Page 26
- The Goodyear Tire & Rubber
Company**
TI3 Irrigation Farm Service Tire
Page 22
- Hardi, Inc.**
"Flush & Rinse™" System
Page 13
- Harvest Tec**
Forage Harvester Sprayer
Page 21
- Jackrabbit Inc.**
Jack Cart Harvest System
Page 21
- Key Technology**
AccuScan™ Quality Control Monitor
Page 12
- KINZE Manufacturing, Inc.**
2500 Twin-Line® Planter
Page 20
- Klockner Hamachek**
SP90-T Green Pea and Lima Bean
Stripper Combine
Page 24
- LAFORGE SYSTEMS INC.**
GREEN-LINK 75 Front 3-Point
System
Page 26
- LAFORGE SYSTEMS INC.**
Automatic Position and Traction
Control
Page 11
- McCans Engineering, Inc.**
HF1300 Service Lift
Page 15
- Mini Mitter Co., Inc.**
Datacol Version With Mini Mitter
VHF-T-and VHF-C-1 Transmitters
Page 23
- Micro-Trak® Systems, Inc.**
TN11740 Injection Control System*
Page 6
- Motorola**
IRRInet™-Scorpio® System for
Irrigation
Page 8
- Munters Corporation
Evaporative Cooling Division**
MI-T-COOL™ Evaporative Cooling
Media
Page 16

*Joint development

New Holland Fiat S.p.A.

"Steering-O-Matic Full Drive" Single
Lever Steering System for Fiat 85
Series Agricultural Crawlers
Page 6

Pioneer Systems, Inc.

Series 1450 Heater
Page 22

**RHS Fertilizing/Spraying Systems
Inc.**

TNI1740 Injection Control System*
Page 6

Rain Bird Agri-Products Division

Sidewinder™ Irrigation Sprinkler
Page 14

Spaldings Agricultural USA

PTO Total Guard
Page 10

Triple C Ventures Ltd.

Universal Implement Side Marker
Page 18

**Vermeer Manufacturing Company
Agricultural Division**

606 and 906 Brush Chippers
Page 25

**Vermeer Manufacturing Company
Agricultural Division**

Equal-Fill/AutoTie Baler Controller
Page 20

**Vermeer Manufacturing Company
Agricultural Division**

RC 7120 Mower Conditioner
Page 23

**Wade Manufacturing Company
Micro-Irrigation Division**

WADE'RAIN PULSATOR™
Page 5

QUALITY PRODUCT. QUALITY PROMOTIONS.

*We can help you
promote your "AE 50" award.*

Agricultural Engineering wants to help you promote your award-winning product to your customers. And we can help you reward the employees who played a part in developing your product. Ask us about the following services:

- ☛ Complete copies of the September issue of *Agricultural Engineering* magazine that contains "The AE 50" section. Ten are provided free. Additional copies are \$3.50 each.
- ☛ Front cover of "The AE 50" section with your innovation described on the reverse side — 25 cents per copy, minimum order 300.
- ☛ Official gold imprinted "AE 50" recognition mug — \$10 each. Great gift for employees.
- ☛ Replica of plaque presented to company with description of honored product — \$24 each.



**AGRICULTURAL
ENGINEERING**
2950 Niles Road
St. Joseph, MI 49085-9659
(616) 429-0300
Fax (616) 429-3852

Contact: Dee Gunn