

# Salute to the AE 50

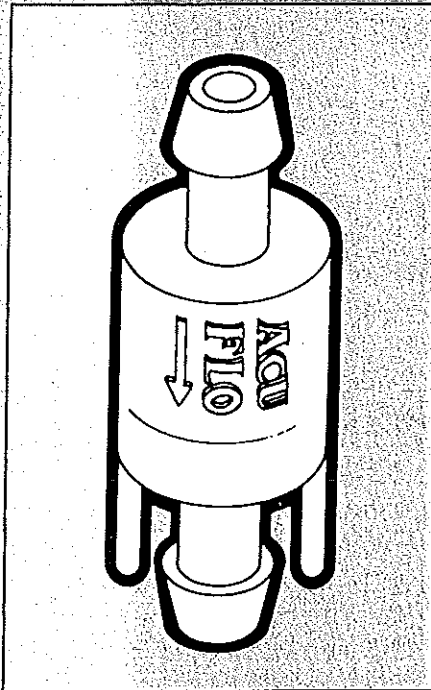
To be named among the winners of the annual **Agricultural Engineering 50** award is to be held in high esteem by one's peers — designers, developers, users, and others active in the diverse fields of engineering in agriculture. It is an honor bestowed in recognition of innovation of a high order.

Showcased within this section are the top engineering developments in agriculture introduced to the marketplace during 1989. Virtually all companies supplying components, making products, or developing systems for food and agriculture were eligible to submit for consideration "developments that embody the application of new technology or the innovative application of an older technology."

A distinguished panel of engineering experts from several well-known organizations reviewed entries to select those considered most likely to make a "worthwhile contribution to the advancement of engineering technology in food and agriculture."

**Agricultural Engineering** magazine is proud to play an important part in making known these significant developments in engineering technology. The products and processes showcased here feature many innovations that will help farmers, processors, and equipment makers to cut costs, enhance quality, boost nutrition, become competitive, and improve profitability. We salute all the researchers, innovators, designers, planners, managers, and supporters that make these new products possible. It takes teamwork to bring innovation to market! To all our honorees - here is our AE 50 Salute for 1990.





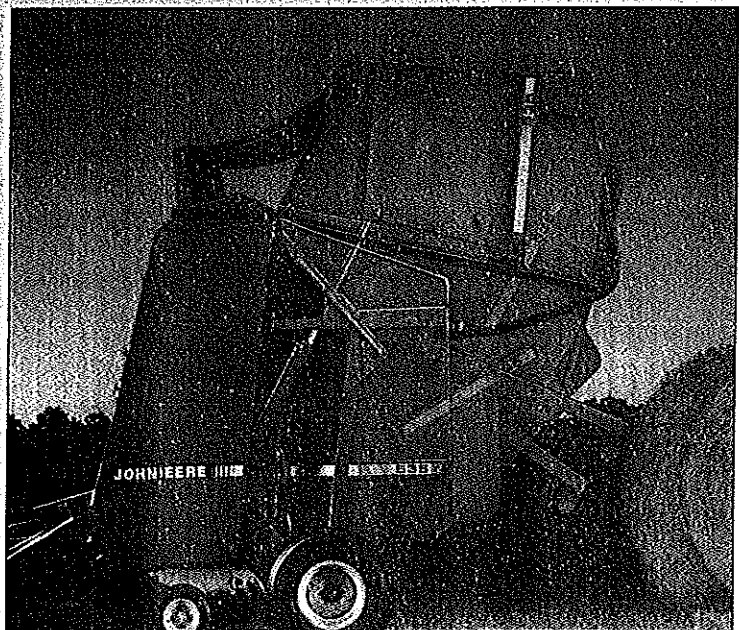
## Regulator Ensures Equal Discharge from Micro-Spray Emitters

The **WADE RAIN ACU-FLO™** Micro-Irrigation Flow Regulator provides a point of discharge flow control in micro-irrigation systems to ensure each spray along a lateral will discharge equally regardless of pressure change resulting from uneven topography, pump performance, diameter or length of laterals, filter load-up or other factors. Water flow is controlled by a one-piece, double-chamber, silicone diaphragm regulator. The silicone gives immediate and accurate regulation over a wide range of pressures and can be used with

chemicals normal to micro-irrigation. Because ACU-FLO is "stand-alone," it can be used in systems with micro-sprays of virtually any manufacturer. In new installations, the body configuration allows its use in place of a connector barb at the lateral. As a retrofit, it can be installed by cutting the connector tube and inserting the regulator. The regulation of individual micro-spray emitters allows the uniform application of soluble additives and greater flexibility in system designs. **Wade Mfg. Co.**, Tualatin, Oregon (503) 692-5353

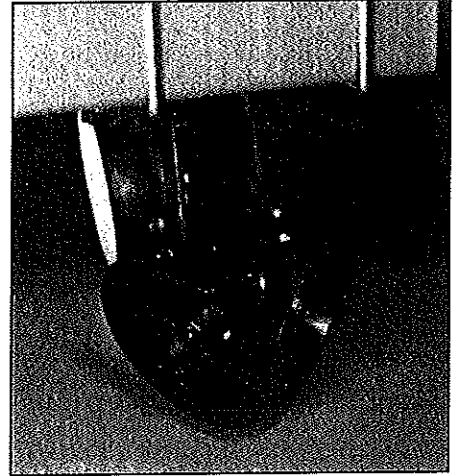
## Bale Push Bar for Round Balers

An optional **Push Bar Attachment**, available on John Deere 435 and 535 Round Balers, uses the movement of the baler gate to automatically roll the bale from beneath the gate and eliminates the need to move the tractor back to drop the bale, then forward to clear the bale. Two spring-loaded arms and a center bar gently push the completed bale out with a positive force. Shock absorber and compression springs cushion the load for a safe opening and closing. Push bars remain extended until the gate is closed to prevent the bale from rolling back into the baler on uneven ground. The bale push bar operates mechanically with the rear gate and requires no additional controls or mechanism to power it or to keep it in time with the gate or the bale positions. The push bar can be locked out when not needed. **John Deere Ottumwa Works**, Ottumwa, Iowa, (515) 683-2458.



## Frame-Mounted Coultter & Row Cleaner Attachment

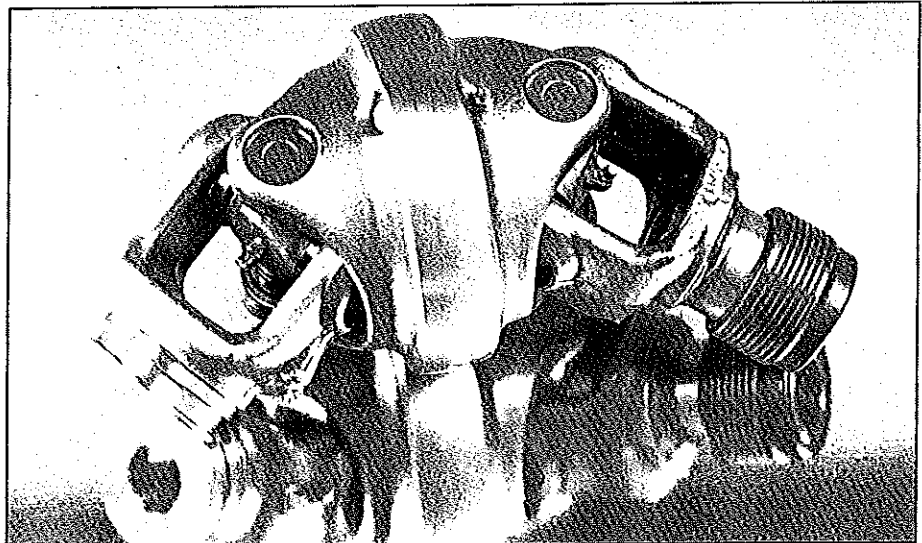
**K**inze's heavy duty **Frame-Mounted Coultter & Row Cleaner** attachment provides depth control without the use of additional gauge wheels. Designed for use in no-till, strip-till, and ridge-till planting, the coultter provides spring down-pressure without the use of heavy duty springs and exerts less load shock on the row unit. A depth control bar allows greater depth control in uneven terrain. The up and down movement of the row unit allows the coultter to move at a rate of approximately 1/2 that of the row unit, maintaining a more uniform operating depth. Depth is adjusted by the positioning of the coultter blade assembly in the fork mount. Down force is determined by the spring adjustment bolt. The coultter blade can be aligned with the row unit disc opener by moving spacer washers. The row cleaners are designed for use in front of the frame-mounted coultter. Slotted holes in the frame-mounted coultter fork mount and in the row cleaner arm allow for row cleaner blade adjustments. **Kinze Manufacturing, Inc.**, Williamsburg, Iowa, (319) 668-1300.



## 80° Constant Velocity Universal Joint

**W**easler's 80° **Constant Velocity (CV) Universal Joint** is the largest available in North America. The new CV will turn a square corner with very low driveline vibrations and gives the implement designer an alternative to double right angle gear boxes. The 80° CV is a double center Cardan universal joint with a floating center plate to divide the joint angle. A new ball and socket design provides efficient support and larger area

to resist the high loads during turns. The ball and socket encompasses a hidden snap ring in the ball retainer. The free floating wear plates also add support to the center plate for minimum wear and seal out dirt. The 80° CV can be operated at angles of 15 deg continuous or 15 - 70 deg during turns while transmitting high torques. **Weasler Engineering, Inc.**, Ag Components Division, West Bend, Wisconsin, (414) 338-2161.

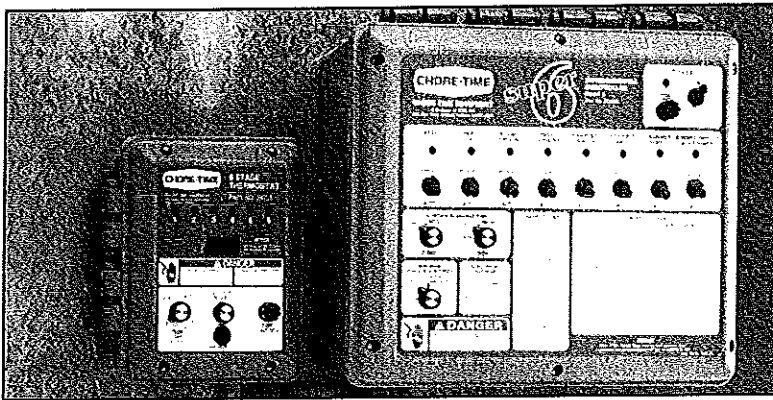


## Environmental Control System for Curtain-Sided Animal Housing

**Y**ear-round control of environmental conditions in curtain-sided livestock and poultry houses is provided by the **CHORE-TIME Super-6 Environmental Control System**. Easily installed in new or existing poultry houses, the system controls heaters, brooders, exhaust fans, sum-

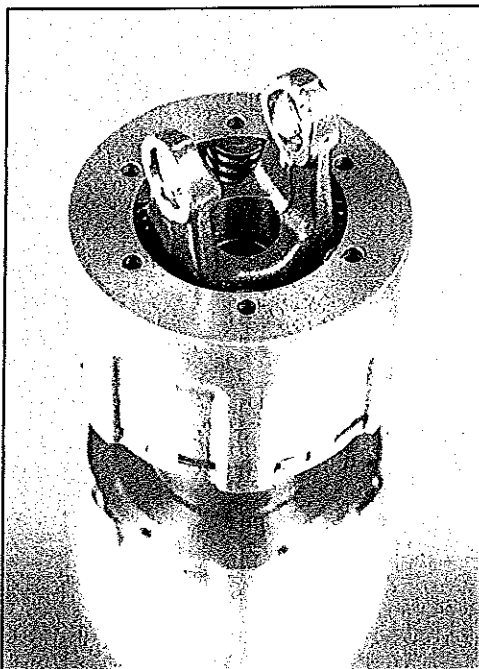
mer fans, fogger, and curtain operator. The Super-6 is available in two models: Model A controls conventional systems with summer circulation fans; Model T converts the building from natural ventilation to a power-ventilated "tunnel" system based on inside and outside temperature.

The system operation utilizes accepted building ventilation practices. Settings are based on animal or bird age and do not require adjustments for seasonal or daily weather changes. Automatic conversions between natural and mechanical ventilation are provided to avoid stale air conditions in cool weather. Super-6 eliminates a major problem of curtain ventilation by not allowing curtains to stop between fully closed and 12-inches open. The controller utilizes relay logic. Gasketed, moisture and dust-proof housing is manufactured from a tough, impact-resistant PVC plastic. **Chore-Time Equipment**, Milford, Indiana (219) 658-4101.



*Environmental Controller (right) works with 6-Stage Electronic Thermostat (left).*

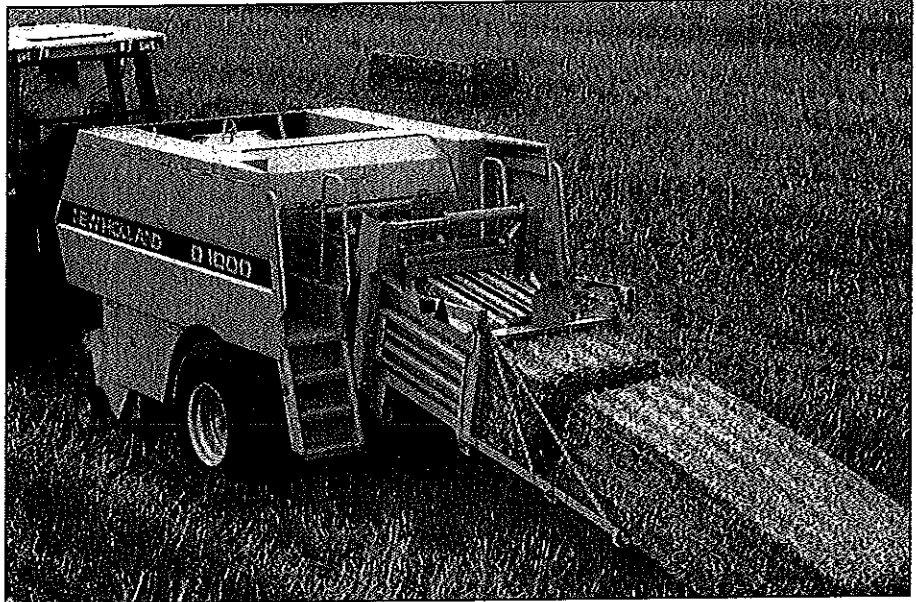
## Enclosed Clutch Provides Overload Protection



**T**he **Enclosed Clutch** from Weasler Engineering was designed for overload protection on agricultural implements. The multiple disc-type clutch has a slip torque of 10,000 to 18,000 in.-lb and is intended for high horsepower applications. The clutch provides protection for driven equipment by limiting torque under overload conditions. Excessive torque is prevented by slippable members. Six capscrews in the locking ring prevent tolerance stack-up through the plates and can be used to fine tune the clutch setting for the implement requirements or to compensate for lining wear. Components are enclosed in a steel housing and are protected from water and contaminants. The housing has a smooth 7-in. (18 cm) outer diameter and is made from plate material for minimum warpage. The clutch can be used on a driveline or separately as a through shaft with a chain or belt. The torque setting is adjustable within the full range up to the rated capacity. The clutch is also available with an optional overrun feature to handle high inertia implements. **Weasler Engineering, Inc.**, West Bend, Wisconsin, (414) 338-2161.

## Clear Bale Chamber from Cab

**F**ord New Holland's hydraulically driven **Bale-Eject™** system eliminates time-consuming manual clearance of bales. Controlled from the cab, the system enables the operator to clear the bale case whenever desired. Through a combination of two hydraulic cylinders and a flow restrictor, a series of teeth first enter the bottom of the bale and then move it rearward. The teeth retract when moved forward and remain retracted during baling. Bale-Eject is optional on the New Holland D1000 Big Baler. The bales measure 2 ft x 3 ft (0.60 m x 0.90 m) with adjustable lengths up to 8 ft 2 in. (2.50 m). Bale-Eject makes the big baler suitable for use with wilted silage (35-45% DM) and custom operations. **Ford New Holland**, New Holland, Pennsylvania, (717) 355-1323.



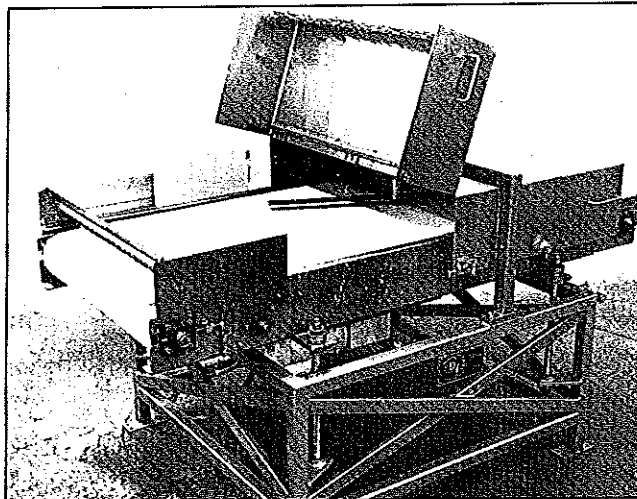
*Controlled from the cab, Bale-Eject™ quickly and easily ejects the last bale at the end of a field or at the day's end.*

## Cherry Destemmer Reduces Maintenance

**M**oving on a belt with an aggressive surface and orbital motion, mechanically harvested, tart cherries are rotated to a stem up position and passed under a dull, high speed blade which strikes and removes the stems. The Dunkley **Cherry Destemmer** features a new style of vibratory conveyor which is mounted on rubber isolation bushings and virtually eliminates transmission of unwanted vibratory forces to the support frame. By making the vibration generator

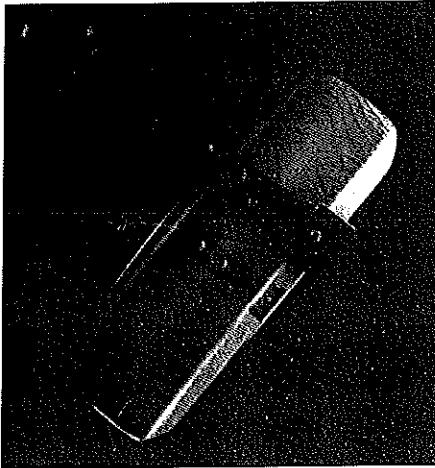
integral with the conveyor body, the motor reducer and direct coupled swing weight, along with the conveyor motor drive, become part

of a single vibrating mass with no mechanical connection to the frame. A four-point post and bushing arrangement with elastomeric bushing isolates the 800 lb (360 kg) of shaking force to an unmeasurable value at the frame. The rotating blade has been modified to reduce "lift" and is driven directly by a brake motor to eliminate drive belts. The destemming area is guarded by hinged access doors with automatic safety shut down switches. **Dunkley International, Inc.**, Kalamazoo, Michigan (616) 343-5583.



## Easier Access to Spare Tire

The Dutton-Lainson **EASY SPARE™** unit for full-size pickup trucks, retrieves the spare tire from underneath the vehicle and restores it to original position. Using a crank and gear mechanism, the unit swings the



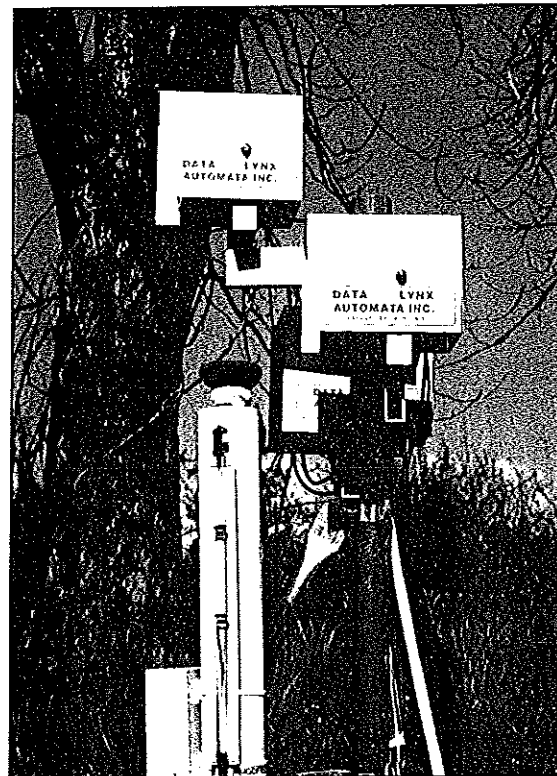
tire out behind the truck bumper where it can easily be accessed, removed, and subsequently replaced by reversing the operation. If needed, the tire cradle can also be tilted so the tire will slide out horizontally. A worm gear drive and sprocket gear mechanisms are used for ease of operation, high torque capabilities, and to hold the unit in any rotated position. The self-locking nature of the worm gear and a locking device

maintain a tight fit against the truck frame during storage and ensure the load will not move unless the handle and shaft are turned. The heavy-duty worm gear assembly cuts through potential build-up of mud or snow and is powder coated to withstand a 240 hr/5% salt spray test. The unit can be installed on most 1/2 and 3/4 ton pickup trucks. **Dutton-Lainson Company**, Hastings, Nebraska, (402) 462-4141.



## Direct Evapotranspiration Measurement System

Automata's electronic atmometer, **ET-NOW**, provides an affordable, continuous, real-time measure of crop evapotranspiration (ET). An electronic analog sensor measures the evaporation rate in the ET-NOW water reservoir to provide actual ET in a closed canopy crop. When combined with the **DATA ⇌ LYNX** telemetry unit, ET measurement can be transmitted directly to an office computer. Information from other monitoring systems such as weather stations, rain gauges, soil moisture sensors, or the crop water stress index can also be transmitted. The **DATA ⇌ LYNX** field station can be set up as self-reporting or interrogated by computer. Digital data is sent via infrared, radio, or telephone telemetry to a base station receiver and computer. Software packages are available for applications ranging from historical storage of data to automated irrigation. **Automata, Inc.**, Grass Valley, California, (916) 273-0380.



## Net Wrap for Round Bales



Ford New Holland's **Fastnet™** system with **Bale Command™** combines a microcomputer with a mechanically driven feeding mechanism to automatically wrap completed bales with plastic net. All functions of the wrapper are controlled from the tractor seat using a compact operator's panel. The operator programs the desired bale diameter and number of wraps prior to baling. When the specified bale size is obtained, the computer signals the operator to stop forward travel and the wrapping cycle begins automatically. The belt driven feedrolls feed net from a supply roll into the throat of the baler. The rotating bale catches the free end of the net and wraps the outer surface of the bale. Wrapping is completed in approximately 10 s. The net clings to particles on the bale surface, effectively locking itself in place so no additional tying is necessary. The net covers the bale from edge to edge and greatly reduces water penetration. **Ford New Holland, Inc.** New Holland, Pennsylvania, (717) 355-1323.

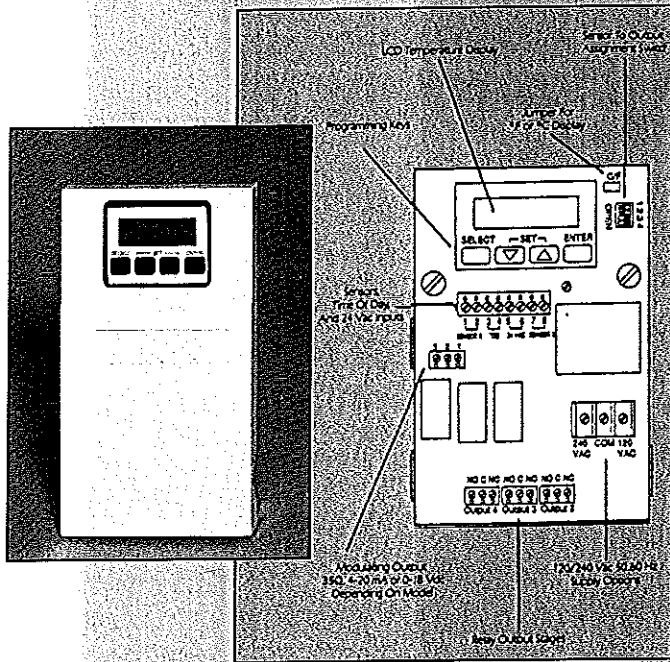
## Finger Reel and Air Flow Combined for Even Crop Feeding

Crary's **Finger Air Reel** attachment for combine headers rotates a finger reel around a stationary air manifold and tubes to push straight-cut crops in and over the cutter bar. The finger reel moves the heavy standing crop, weeds, or other obstructions off the cutter bar, and the air continuously pushes the crop back under the auger. The standard 4-bat finger reel is driven by pinion and ring gears off combine hydraulic motor and rotates smoothly on nylon rollers with steel roller bearing inserts. The stationary air manifold is built into the center of the rotating reel using an innovative drive and structural system. The 8 in. (20 cm) aluminum, high-pressure fan requires low rpm's. Air volume and angle of air can be adjusted from the cab of the combine. The pitch of fingers is manual-

ly adjustable. The reel can be raised and lowered hydraulically with existing reel arms and moved forward or backward. The Finger Air Reel is adaptable to most combines. **Crary Company**, West Fargo, North Dakota, (701) 282-5520.



## Four-Stage Temperature Control

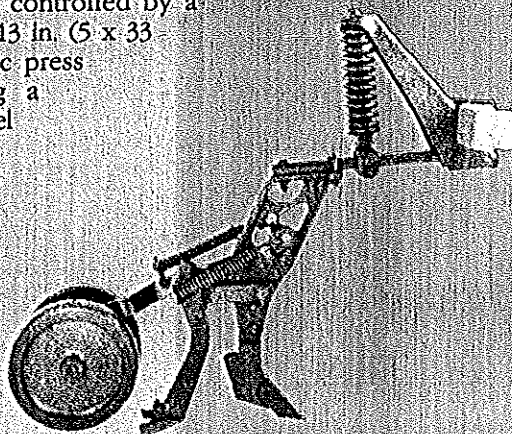
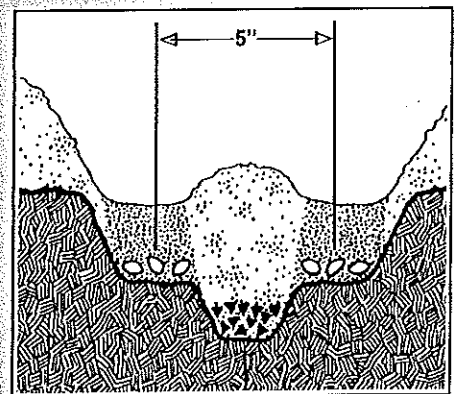


**H**oneywell's new **T775 Electronic Remote Temperature Controller** is designed for agricultural applications involving staged heating, cooling, and ventilation control in animal confinement buildings and greenhouses. The microprocessor-based controllers provide proportional and on-off control for up to 4 stages of heating or cooling or a combination of both. A model is available with dual sensor input to allow outside air temperature reset control. Setpoint, stage differential, and interstage differential are all customer selectable. A digital LCD allows precise temperature setting or monitoring and accepts time-of-day input. The positive coefficient platinum temperature sensor may be located up to 1000 ft (305 m) from the control. NEMA 4x enclosures are available for all models. Input voltage of 24/120/240 Vac, 50/60 Hz for all models; proportional + integral outputs of 135 ohms, 4-20 mA, or 0-18 Vdc available on some models. **Honeywell Building Controls Division**, Golden Valley, Minnesota, (612) 542-6668.

## Seed and Fertilizer Applied Simultaneously

**J**ohn Deere's **Furrow Opener** for air seeders is designed to be used for drilling cereal crops and provides no-till planting in many soil types. The opener places a narrow band of granular fertilizer between and below a split (paired) row of seeds. A rugged knife tills a deep trench for the granular fertilizer. A swept-back delta design cast carbide seed shoe shears the soil at an adjustable depth. Seed row depth is controlled by a pair of trailing 2 x 13 in. (5 x 33 cm) semi-pneumatic press wheels actuating a cam roller. The steel

cam roller attaches to the press wheel control arm engaging a cam track cast to the body of the seed tube to provide nearly constant seed depth within the useful range of motion of the seed tube/shoe. Two compression springs provide adjustable torque for setting the seed shoe and the press wheels. **John Deere Des Moines Works**, Des Moines, Iowa, (515) 289-3058.

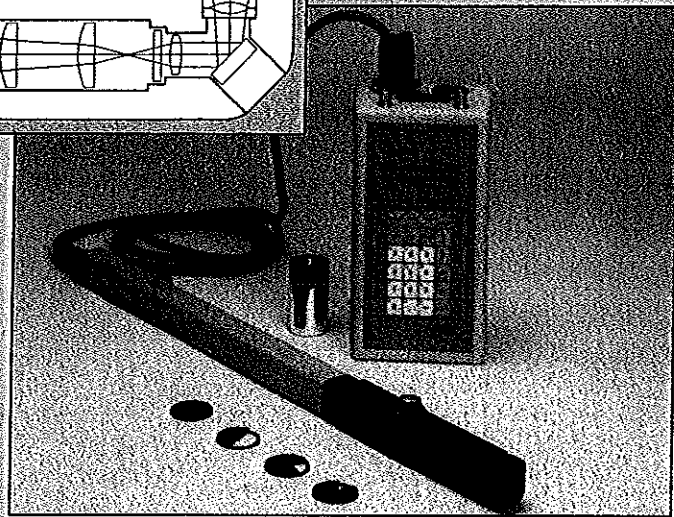
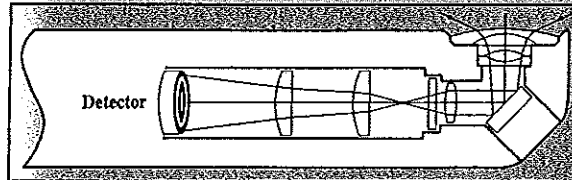




## Plant Canopy Analyzer

**T**he LI-COR LAI-2000 Plant Canopy Analyzer computes an estimate of Leaf Area Index (LAI) and Mean Tip Angle (MTA) for a vegetative canopy from simultaneous measurements of light interception at five angles.

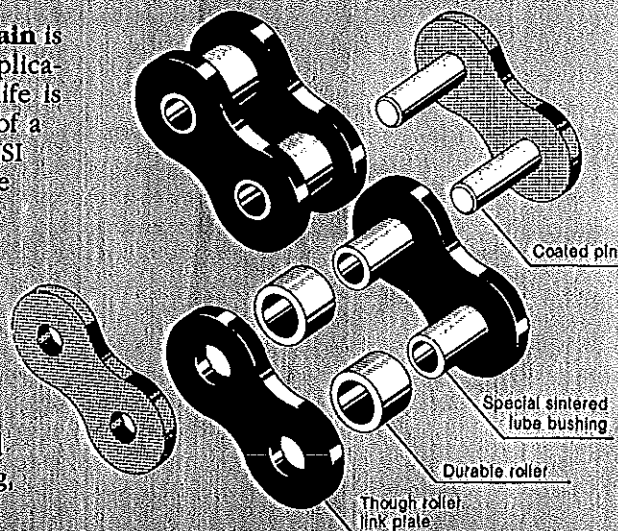
Using proprietary optics, the hemispherical image from the fisheye lens is projected on five concentric silicon photodiode detectors corresponding to five different angles in the sky. The sensor is filtered to see only blue light (radiation above 490 nm is rejected). The sky appears bright, foliage appears "black" and the contribution of radiation scattered by the foliage is minimized. Above-canopy and below-canopy readings can be obtained using the same sensor. 16K bytes RAM is available for working memory and 64K bytes RAM for file storage. Other features include: a 24-key tactile response keypad with audio feedback; 2 line by 16 character LCD display; internal clock; RS-232-C communications port. Operational range is 5° to 122°F (-15° to 50°C). **LI-COR, inc.**, Lincoln, Nebraska (402) 467-3576.



*The "fisheye" optical sensor projects a hemispheric image of the canopy onto five silicon detectors arranged in concentric rings.*

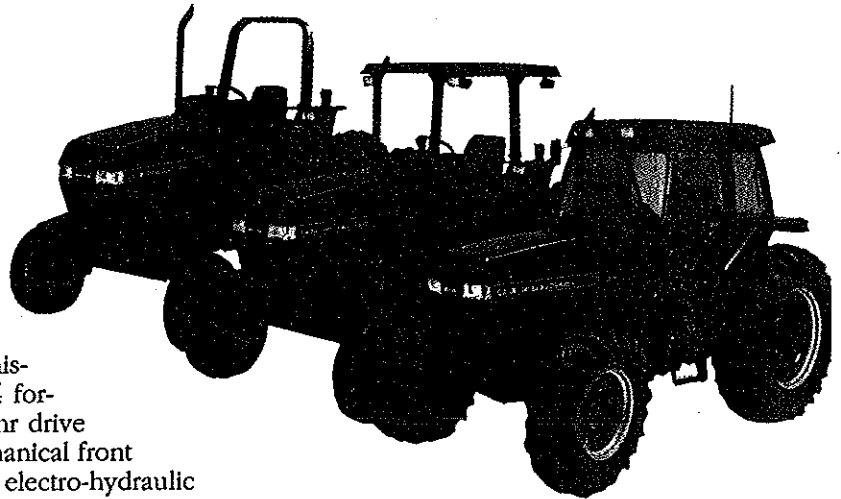
## Self-Lube Roller Chain Meets ANSI Specifications

**T**subaki's "Lambda Series" Self-Lube Roller Chain is designed for use in power transmission applications where lubrication is prohibitive and wear life is critical. The Lambda chain combines the benefits of a roller with a self-lubing bushing and maintains ANSI specifications. Lambda's major dimensions are the same as ANSI standard and it can directly replace ANSI roller chains and other lube free chains. Lambda chain features a special sintered bushing, coated pin, and durable roller. The durable rollers maintain smooth sprocket engagement and less wear on the sprocket teeth. The wear life of the chain can be up to 30 times that of conventional roller chain. Lambda chain is available from RS40 up to RS100 in both drive and attachment series. **U.S. Tsubaki Inc.**, Wheeling, Illinois, (708) 459-9500.



## New Mid-Size Tractors With Versatility

The J I Case MAXXUM 5100 Series mid-size agricultural tractors are designed for increased versatility to meet the widely varied requirements of a worldwide market. Three models rated at 77, 86, and 94 PTO hp (57, 64, and 70 kW) are available. The right-hand console contains most of the motion controls and the space and movement area of each control has been selected based on its frequency of use and precision need. A pressure flow compensating hydraulic system matches hydraulic power to the actual load. The PTO can be easily switched from 1000 rpm to 540 rpm. An optional creep transmission with speeds down to 0.18 MPH provides 24 forward and 20 reverse operating speeds. A 40 km/hr drive train is available for European road usage. A mechanical front drive is also optional and includes an on-the-go electro-hydraulic clutch and a limited slip differential. The engine is cantilever mounted directly on the transmission flange with no attachment to the tractor frame. **J I Case**, Agricultural Equipment Group, Racine, Wisconsin, (414) 636-6407.

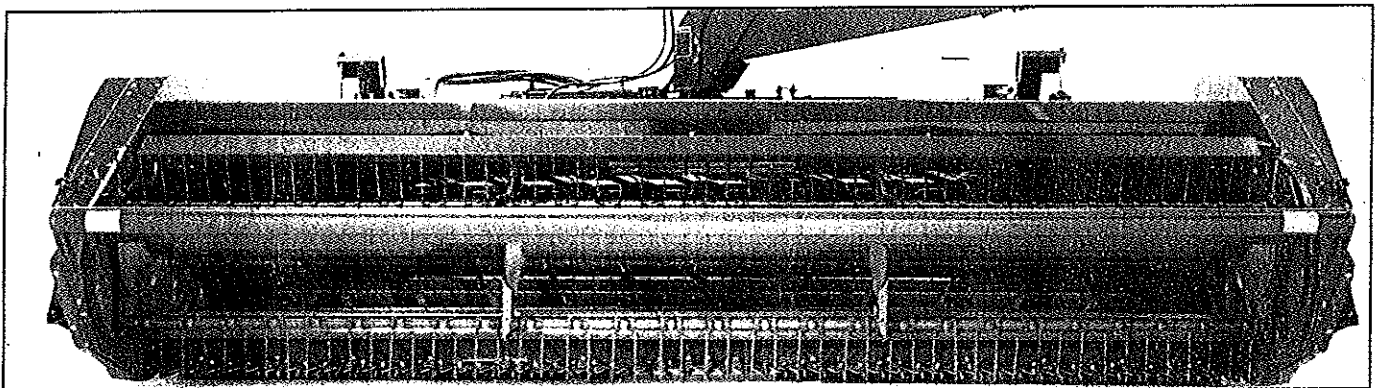


## New Longer Rollers for Conditioning

John Deere's 1600 Mower-Conditioner has new urethane rolls that are 110 in. (2794 mm) wide and 10 in. (254 mm) in diameter. The precision urethane rolls were developed and molded in a highly accurate process to control their runout. Clearance between rolls is optimized by a wrench adjustment while the machine is running. Intermeshing

cleats feature indentations that add more crimping edges, more pressure per square inch for thorough conditioning, and faster drydown. A mechanical linkage separates the conditioner rolls in the last part of the platform lift cycle. The rolls can be cleaned out by raising the platform with the PTO engaged. The mower can cut to either side or to

the rear of the tractor and can lay a very narrow windrow or a very wide swath for fast drying of heavy crops. The center pivot allows transport directly behind the tractor. Timed, twin knife drives, powered by a Kevlar reinforced belt, reduce vibration and give clean, high speed cutting. **John Deere Ottumwa Works**, Ottumwa, Iowa, (515) 683-2483.

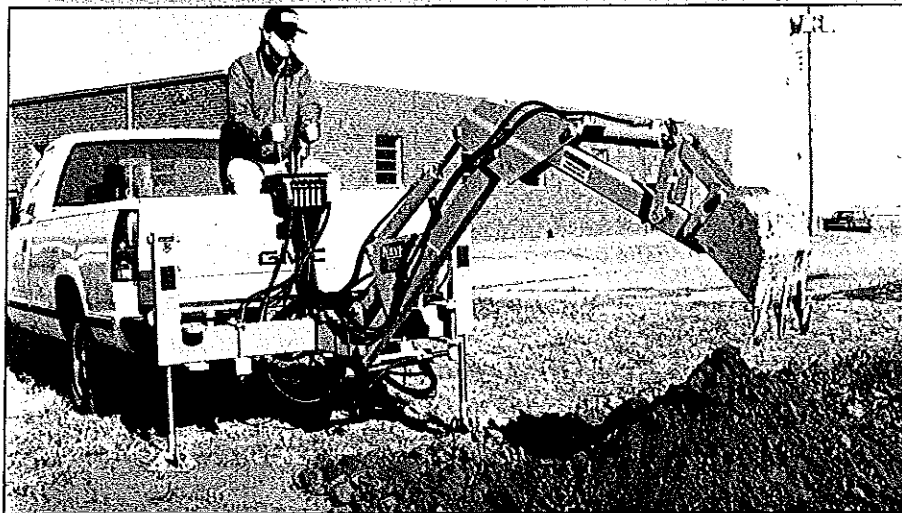


## Pickup Mounted Backhoe

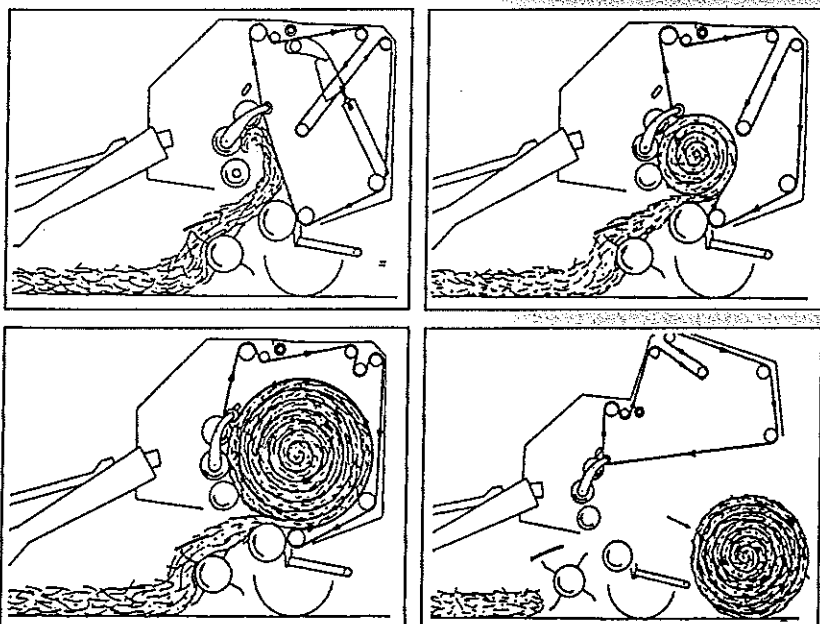
Full Vision's **NAVI-HOE Backhoe** attaches to the underneath frame on the back of a 1/2 ton or larger pickup truck using an easy-on/easy-off, two-point mounting system that needs no defacing holes or hardware. The boom arm can be mounted in three different locations on the frame and folds and locks for transportation. Digging can be accomplished from the center position or either side position for excavation next to walls or foundation and backfilling. The operator's seat and controls can be easily moved in either direction. Two-lever joystick controls use the SAE standard operating pattern. All power to operate the

unit is supplied by an underhood-mounted hydraulic pump with clutch that delivers digging force at the normal pickup engine idle speed. The reinforced tubular frame contains a

hydraulic reservoir with 10 micron filtration system. The boom arm has a 160-deg. swing rotation and digs to a 72-inch depth. **Full Vision, Inc.**, Newton, Kansas, (316) 283-3344.



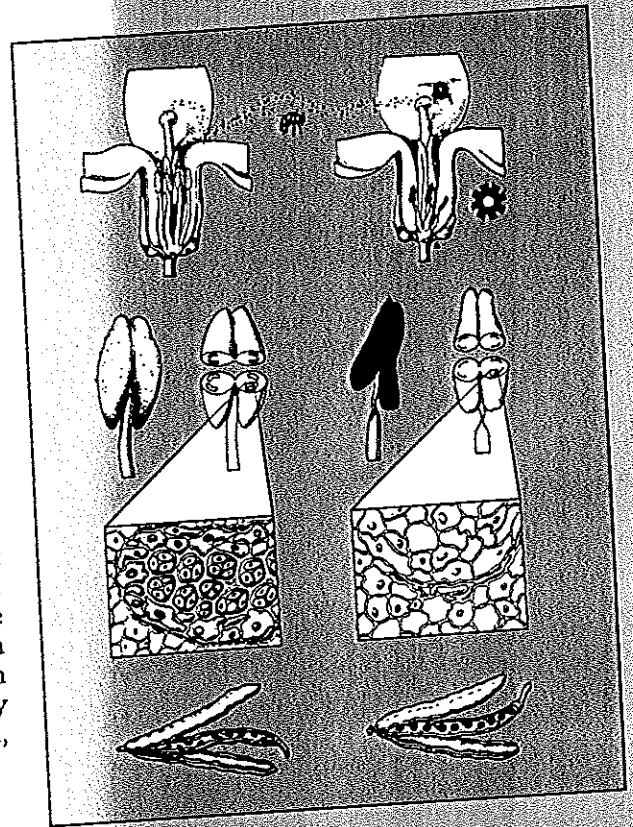
## Round Baler for Smaller Tractors



**F**ord New Holland's **Model 630 Round Baler's** low power requirements allow the use of a tractor with only 35 hp (25 kW) and single outlet hydraulics. Using a combination of rollers and belts, the unit forms a bale 4 ft (1.2 m) wide by 4 ft (1.2 m) in diameter that weighs up to 650 lb (295 kg). The bale forming chamber is made up of belts in the rear and cylindrical steel rolls in the front. One front roll pivots inward during core formation to provide a more rounded core chamber and a medium density core. Belt tension is low at core starting but increases rapidly near full bale to provide a high density outer surface for improved weatherability and handling. Only one drive roll is required due to powered steel rolls that lessen the load transmitted through the bale forming belts. Completed bales can be ejected without stopping baler rotation. **Ford New Holland, Inc.**, New Holland, Pennsylvania, (717) 355-1323.

## Genetic Technique to Make Hybrid Plants

**P**lant Genetic Systems (PGS) has isolated a promoter that regulates the expression of genes controlling pollen development in a plant's male reproductive organs (anthers). This anther-specific promoter has been used to introduce, and express in the plant, a gene conferring male sterility. The **PGS Gene** interrupts anther development only during the critical few days when pollen would normally develop on the flower. This results in stunted anthers which are devoid of pollen allowing for an efficient means of cross-pollination and the production of hybrid seed. The protein encoded by the gene disappears after rendering the plant male-sterile, allowing it to continue normal development. Biological materials obtained under an agreement from the University of California, Los Angeles (UCLA) were used in the development of the system. The hybrid system has been successfully applied in oilseed rape and trials are underway with other crops. **Plant Genetics Systems**, Ghent, Belgium, (011)(32)(91) 35 84 44.



## Hand-Held Computer Uses MS-DOS



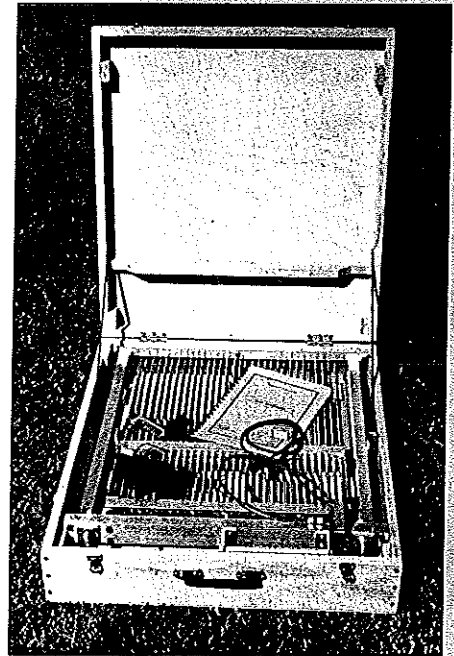
**O**mnidata International's **1600 Series Polycorder**, combines durability and portability with the MS-DOS operating system. The 2.9 lbs (1.32 kg) polycorder unit is immersible in water up to 3 in. (76 mm), can withstand a 4 ft (1.2 m) drop onto concrete, and will operate at temperatures ranging from -22° F to 158° F (-30° C to 70° C). The display is a backlit, 20 character x 8 line liquid crystal display. The keyboard is designed and balanced for handheld use and is constructed with an embossed polyester material over a metal snapdome for tactile feedback.

The 60 keys include alphanumeric, cursor arrows, and MS-DOS standard function keys. The system operates on MS-DOS version 2.25 using a 80C88 processor with 4 MHz real time clock and 0 wait state. The 256K to 2304K memory can be divided between system and RAM disks. Application programs using standard MS-DOS tools can be loaded directly from a desktop computer to the Polycorder. Two serial RS-232 ports and one parallel port are provided for communications. **Omnidata International, Inc.**, Logan, Utah (801) 753-7760.

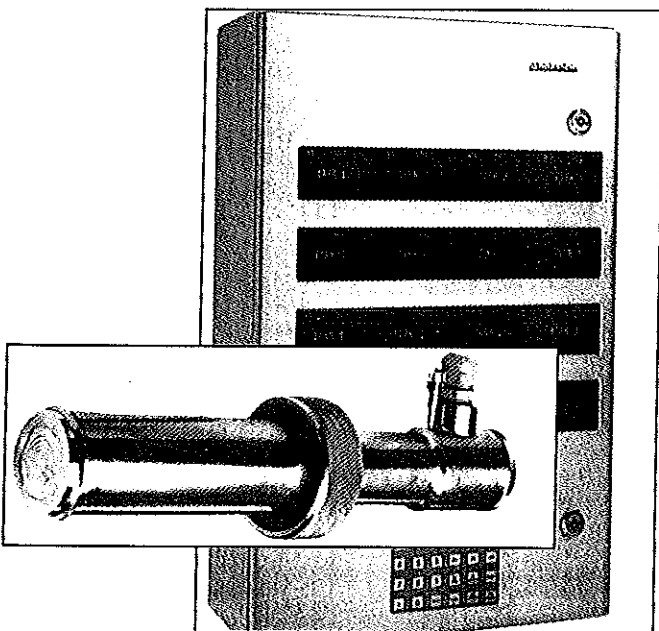
## Meter Measures and Records Soil Profile

**R**imik's **RPM3 Recording Profile Meter** measures and records profiles in a vertical plane 19 in. long x 12 in. high (480 mm x 300 mm). An array of 32 pins spaced at 0.6 in. (15 mm) is lowered toward the surface until all the pins have contacted the surface. The height at which each of the 32 pins contacts the surface is detected by a solid-state switch and recorded. The frame containing the pins moves in a slide assembly within an outer support frame. All major components are fabricated from aluminum for light weight and ease in field use. A removable module con-

tains the controls and all the electronics. A single chip microcomputer is used to control all functions of the instrument: depth, determining when a pin has reached the surface, controlling the storage and downloading of data, and controlling the alphanumeric display. Data is stored in a solid-state memory module that holds 250 sets of data. Built in software allows data to be sent to any computer with an RS-232 interface. The meter may be used on a wide range of surfaces including soft surface conditions such as after tillage. **Rimik Pty. Ltd.**, Toowoomba, Queensland, Australia 61-76-38 1586.



## System Monitors Liquid Level in 16 Tanks

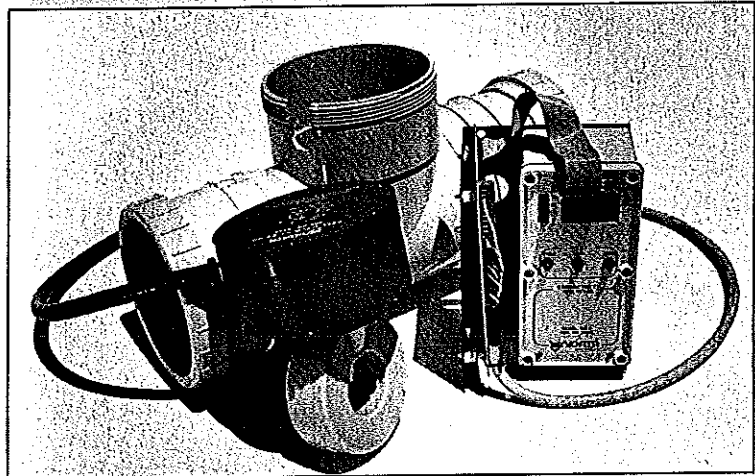


**T**he Anderson **PULSE 800** and **PULSE 1600 Liquid Level Monitoring Systems** will simultaneously measure and display the liquid level of up to 8 or 16 tanks respectively. Accuracy is  $\pm 0.5\%$  of full scale regardless of the shape of the vessel up to 100 ft (30.5 m) tall. A user-friendly interface allows the operator to display vessel contents by weight or by volume, and to compensate for specific gravity of the fluid. Four on/off relays are provided with each channel (tank), and these can be used to sound alarms or activate process equipment such as pumps, valves, agitators and refrigeration. The all-electronic operation uses a Motorola 68HG11 HCMOS 8-bit microprocessor. Electronic sensors use pressure transducers and proprietary circuitry to convert static head pressure to a proportional 4-20 mA signal. Sensors comply with sanitary standards, and are compensated to withstand 250°F (120°C) process temperature. Easily accessible zero and span adjustment permit fine tuning. **Anderson Instrument Company, Inc.**, Fultonville, New York, (518) 922-5315.

## Probe Provides Remote Water Conductivity Measurement

### S tarlog's Model 6518-1 Precision Water Conductivity Instrument by Unidata

America provides continuous measurement and recording of water conductivity and water temperature in streams and rivers, or other suitable locations. Three automatically selected conductivity ranges measure from pure water to saline water up to 10,000 milliSiemens per meter. The electronics have been designed for very low power consumption allowing the instrument to operate for many months from a battery. The instrument's conductivity sensor is a large diameter epoxy-coated toroid for minimal loss of accuracy when subjected to fouling and algae growth. A precision linear thermistor and a crystal clock based on a power cycling technique provide temperature and time. The probe is encased in an ultraviolet protected polycarbonate enclosure designed to protect the installation from floating logs and rubbish. Accuracy of 0.2% of fullscale can be achieved over long periods of field use. Factory calibration is provided for each probe and is continuously corrected by firmware in the display interface unit. **UNIDATA AMERICA**, Lake Oswego, Oregon (503) 697-3570.



## Surface Wrap Attachment for Round Balers



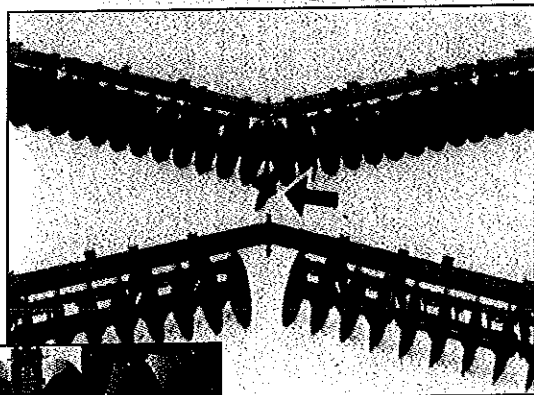
**T**he **Surface Wrap Attachment**, optional equipment for the John Deere 435 and 535 round balers, uses poly-filament woven mesh wrap instead of twine. It is automatically actuated and controlled by the self-contained hydraulic twine system on the baler, and is driven by a bale-forming belt roller. Operation of the system requires no action on the part of the operator other than stopping forward travel of the baler when the wrapping cycle begins. Wrap time is reduced to about two turns of the bale, so the bale is ready to eject in about 6 s. Rear mounting provides easy access for loading and allows the surface wrap to feed against the belts and around the bale without being covered by a layer of incoming crop. The surface wrap material is fed by the rubber drive rollers at a slightly slower speed than the bale surface is moving to provide controlled tension on the wrap. Breaking the rubber drive rollers increases tension in the fibers and allows a simple knife to cut the material off. **John Deere Ottumwa Works**, Ottumwa, Iowa, (515) 683-2458.

## New Tandem Disk Series

**J**ohn Deere's **600 Series Tandem Disks** are designed to perform primary and/or secondary tillage operations in a broad range of conditions. The 600 Series features tandem gangs with a unique cushioned disk middle breaker to cut completely across the working width and give the same soil profile as a double offset disk. The middle breaker blades are spherical and 6 in. (152 mm) smaller than basic blades. The blade attack and tilt angles are

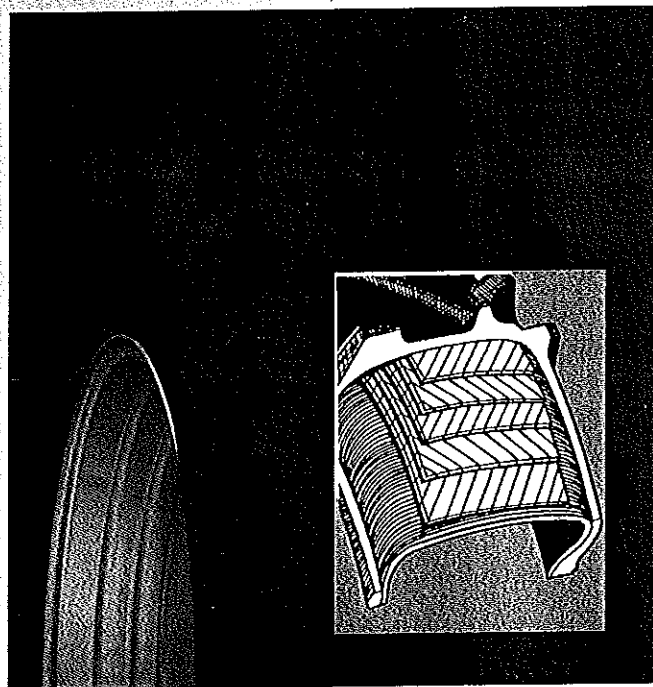
optimized for consistent penetration and cutout. Two sizes of C-springs optimize the stiffness of the gangs to

match the weight distribution of the disk frame and provide rock protection for the gangs. Sealed and lubricated urethane wheel arm pivot bearings eliminate wear associated with conventional rockshaft journal bearing designs. The welded frames use fewer and larger structural tube members for improved strength and reliability. A remotely adjustable disk leveling system for on-the-go adjustment from the tractor seat is available. **John Deere Des Moines Works**, Des Moines, Iowa, (515) 289-3070.

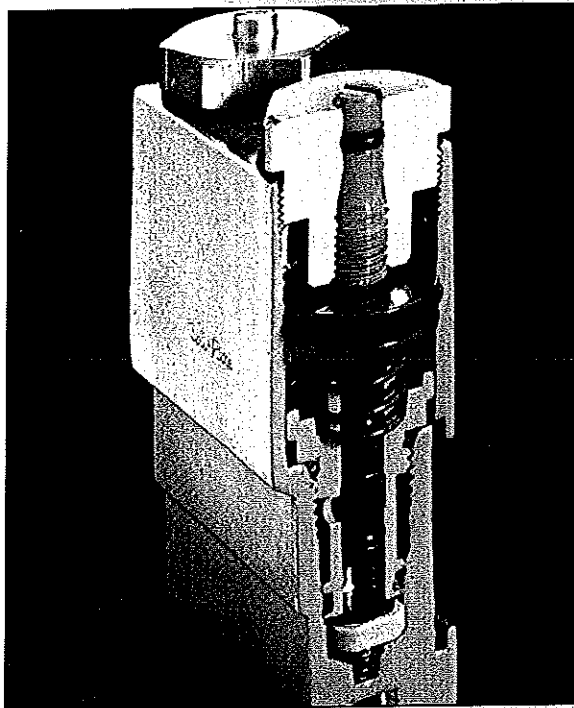


## Radial Tire With New Lug Pattern

**A**rmstrong's **Hi-Traction Lug Radial Drive Wheel R-1 Tire** provides a pneumatic tractor tire with improved traction, better wear characteristics, and reduced vibration. The new lug geometry, with alternating curved long bars and medium bars, allows nearly 50% more lugs to fit into the circumference to improve traction. The increased number of lugs means less space between the lugs and reduces vertical and lateral vibration both in the field and on pavement. The overall lug symmetry and the increased curvature of the lugs as they approach the centerline reduces the void space in that area. A smooth and relatively short transition from lug to lug reduces transitional thumping and associated vibration as the tire moves through the footprint. The curved portion of the medium and long lugs are of one radius which contributes to the improved wear pattern and eliminates the erratic road-wear normally developed by conventional lug design radial R-1 tires. The curved pattern also allows wet soil to be expelled as the tire rolls and flexes. **Pirelli Armstrong Tire Corp.**, New Haven, Connecticut, (203) 784-2691.

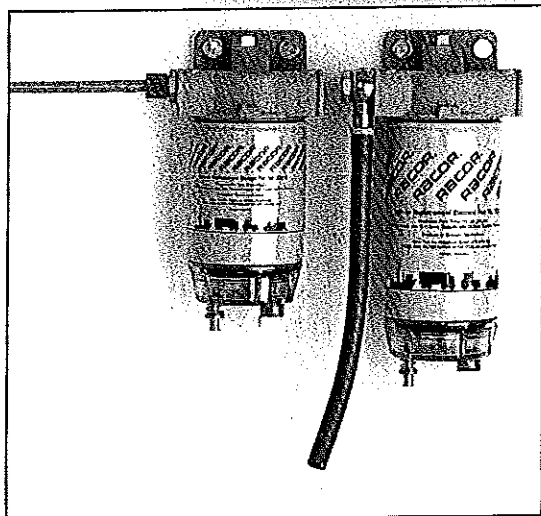


## Metering Pump With Precision Liquid Injection



The **Oil-Rite PurgeX** metering pumps or injectors are individually adjustable to dispense exact amounts of liquid in a spray, stream, drop, or fraction of a drop. Cavitation and irregular feed rates are prevented by purging the cylinder each cycle. Instead of stopping at end of the cylinder, the piston is pushed out of the cylinder to mechanically hold the evacuation valve open and allow any air entrapped in seal cavities and voids to expand and escape. The meters can be arranged in single or multiple units and operated by air, hydraulics, motor, solenoid, or manually. Components to operate the injectors can be purchased separately or a complete modular unit is available with a multiple injector pump, reservoir, and control box equipped with an air regulator, timer, low air pressure switch, and low liquid level switch to actuate a trouble light or warning alarm. High output pressures can be achieved using an air-operated meter due to a 9 to 1 difference in air piston and liquid piston size. **Oil-Rite Corporation**, Manitowoc, Wisconsin (414) 682-6173.

## Expanded Line of Spin-On Fuel Filter/Water Separators

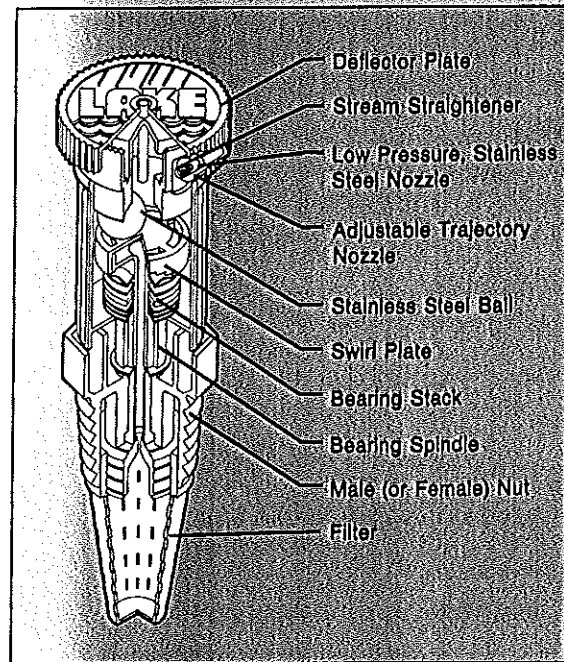


A new Racor diesel **Spin-on Fuel Filter/Water Separator** fits the same mounting location as existing four-port head fuel filters. The 130 Series single head is directly interchangeable with Lucas CAV bolt patterns, port locations and fuel line sizes. The spin-on design allows for quick, clean service at filter element change with no need to disassemble and realign a thru-bolt through the head, filter and bowl assembly as on other models. Flow rates from 15 gph to 90 gph can be handled. Racor Aquabloc™ filter media is a blend of high grade cellulose compounded with resins and a special water repellent chemical treatment. The reusable, see-thru polymer bowl withstands high impact, is UV resistant and makes water level monitoring easy. An optional water sensor kit is available. **Racor Division, Parker Hannifin Corp.**, Modesto, California, (209) 521-7860



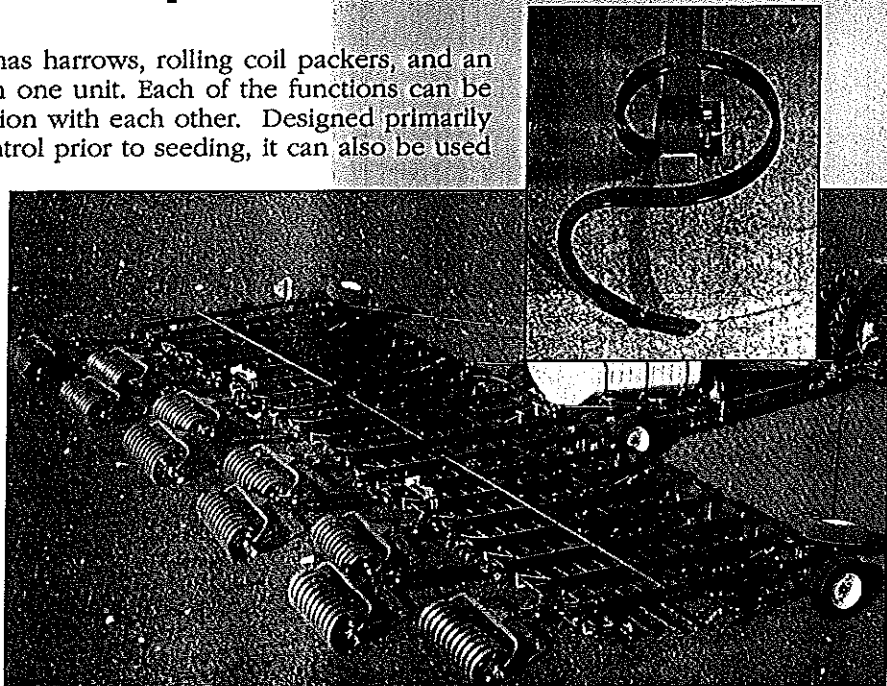
## Ball-Drive Sprinkler for Low Pressure Operation

**T**he Rattler, a Lake Co. Ball-Drive Sprinkler, provides a flexible design alternative in solid set sprinkler systems. The internal hydraulic design maintains uniform rotation speeds at operating pressures as low as 25 psi. Manufactured from injection molded Delrin plastic with a stainless steel nozzle, stainless steel ball drive, and spring-loaded, sealed bearing, the Rattler is less expensive than brass alternatives (and also more secure than brass since it has virtually no scrap value). Four sizes allow a delivery range of 0.5 gpm (1.9 L/min) to 3.0 gpm (11.3 L/min). The 0-30 adjustable trajectory provides a 20-70 ft (6-21 m) wetted diameter. Other features include a stream deflector cap, integral filter, and male or female base. **Lake Company**, Bakersfield, California, (805) 399-9131.



## S-Tine Multi-bar Has Multiple Uses

**F**lexi-Coil's new S-Tine Multi-Bar has harrows, rolling coil packers, and an optional chemical applicator all on one unit. Each of the functions can be operated independently or in conjunction with each other. Designed primarily for seedbed preparation and weed control prior to seeding, it can also be used for chemical application, incorporation, cultivation, harrowing, packing and seedbed finishing. Depth adjustment is independent of S-Tine bar rotation, allowing proper S-Tine vibrating action at any required operating depth. The S-Tine can be hydraulically rotated out of working position for transport or to use the harrows and/or packers separately. A unique valving arrangement allows the 5 x 30 in. (13 x 76 cm) transport cylinders to be single acting cylinders for part of the wing lift/wing lock cycle and to transform to double acting cylinders for the field position of the cylinders. **Flexi-Coil Ltd.**, Saskatoon, Saskatchewan, Canada (306) 934-3500.

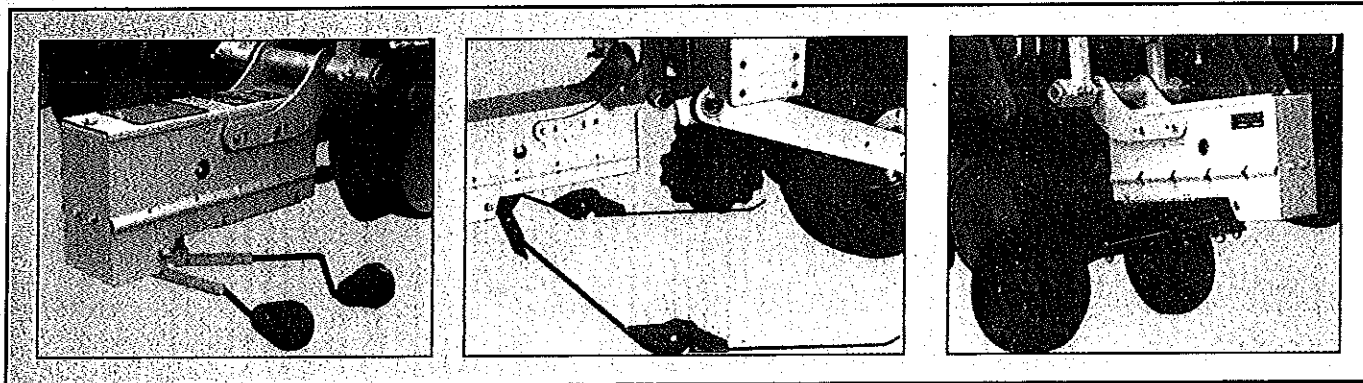


## Guidance System With Microprocessor Control and Proportional Steering

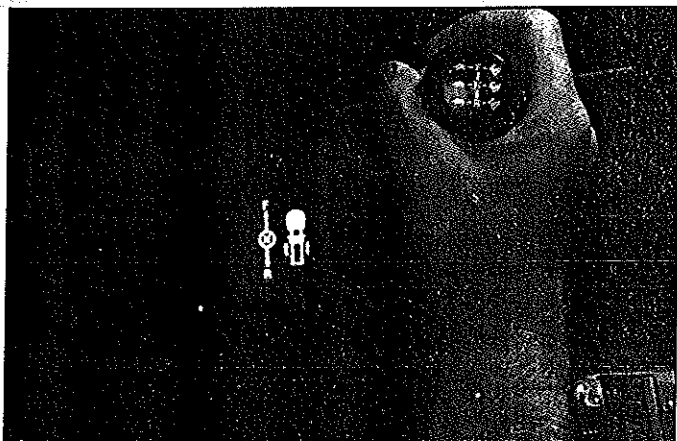
**O**rthman's Tracker MP 3 is an automatic guidance system for row crop equipment. With its programmable software package and new electro-hydraulic proportional solenoid valve, the Tracker can provide greater accuracy without oversteering. Using the MP 3.1 software, the microprocessor allows the operator's equipment type, probe type, and

field conditions to be programmed into the system. The steering ratio is programmed by "dip" switches located in the console. By changing the signal averaging setting, the Tracker MP 3 can be adjusted to ignore minor imperfections in the sensor's path or to react to every deflection of the probe. The system is self-centering and automatically adjusts itself at start-

up and throughout the day as changes in oil temperature and viscosity occur. A self-diagnostics test monitors front and rear sensors, power supply, and oil pressure every 10 s. The autoslope feature compensates for side draft caused by a slope or any unusual drag on one side of the implement. **Orthman Manufacturing, Inc.**, Lexington, Nebraska, (308) 324-4654.



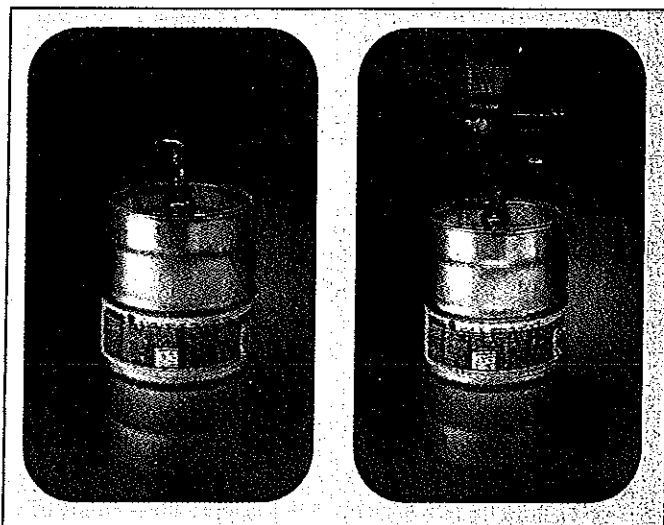
## Powershift Transmission Controlled by Single Lever



**F**ord New Holland's **Ultra Command Powershift Transmission**, available on Ford 8630, 8730 and 8830 agricultural tractors, provides optimum ergonomic control. A single lever controls the 18 forward and 9 reverse speeds in a combination of straight line (F-N-R) and left (down shifting) or right (up shifting) movements. During start-up, gear position from 1-12 may be pre-selected incrementing or decrementing from the N7 default position by moving the handle right or left. While driving in the forward or reverse gear position, changes are completed by moving the shift handle right or left. An operator programmable relationship between forward and reverse gears allows selection of up to three faster or slower relative to the forward gear selected or the slowest reverse gear. Shift strategies are controlled by a central microprocessor receiving signals from the shift control assembly containing sealed magnetic reed switches. Gear positions are presented to the operator by way of a liquid crystal display. Control algorithms are present in the microprocessor software as well as the programmable features, self diagnostics and, auto calibration capabilities. **Ford New Holland, Inc.**, New Holland, Pennsylvania, (717) 355-1323.

## 15-Gallon Pesticide Container is Returnable

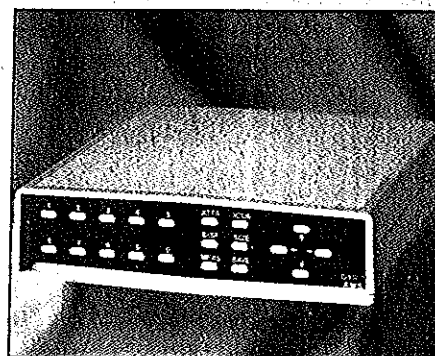
The **TRAVELER**<sup>®</sup>, a 15-gal (56.7 L) stainless steel container for liquid agricultural pesticide chemicals, can be returned to a manufacturing fill sight, washed and refilled. Each TRAVELER is equipped with a fail-safe, dry-disconnect fitting with a 1-in. NPT thread on the outlet, a check valve to prevent backfill, and is shipped with dust covers and tamper-evident seals. TRAVELER containers of LORSBAN 4E are currently available from distributors in central California. Users will be charged a fee for containers not returned within 30 days. Small Volume Returnable (SRV) fill lines are currently available in California and Michigan where automatic filling and washing rates of 400-600/hour are possible. The SVR system utilizes technology developed in the beverage industry for automatic filling and washing. It was developed in cooperation with Anheuser-Busch to ensure system containers, probes, and couplers are not compatible with any beverage handling, filling or dispensing system. A container tracking system has been developed. **DowElanco Ag Products**, Midland, Michigan. (517) 636-0967 technical, (317) 871-4622 marketing.



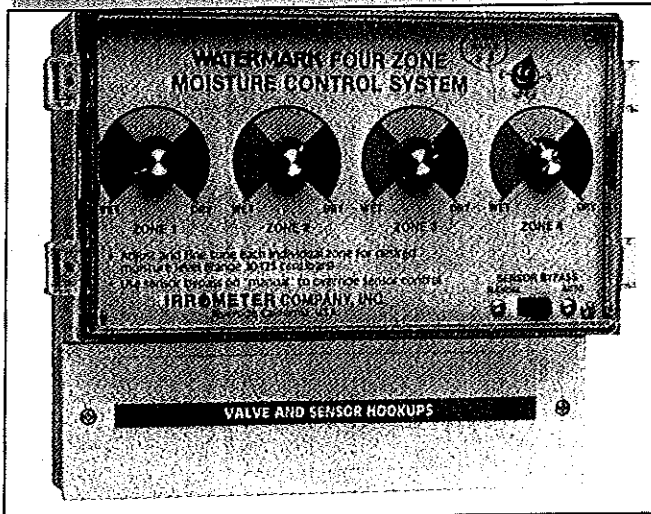
## Video Overlay Generator

The **AMS OVG-1** is a high resolution display generator capable of superimposing icons on standard composite video signals such as those generated by video cameras. The output composite video is identical to the input color or black and white source(s), but with superimposed graphics. A source selector switch allows one of three cameras of sources to be used for input. Video "windows" can be used to select defined areas of the image for detection of edges, or test marks such as ink dots. Users may create their own coordinates including circles. The OVG allows selection of several user

defined displays that are retained in the non-volatile image description memory. Two independent video overlay memories, each with a full resolution of 700 x 640 elements are standard. In normal operation only one is displayed at a time.. Where overlays cross each other, the modulation polarity is reversed. The Terminal Display Option (-T) adds the capability of displaying ASCII alphanumeric characters with 35 or 70 column resolution for display of menus or as the display terminal of an associated PC. **Advanced Micro Systems, Inc.**, Hudson, New Hampshire, (603) 882-1447.



## Four-Zone Irrigation Control Panel



Irrrometer's **WATERMARK** Four-Zone Moisture Control Panel is designed to manage an automated irrigation system based on soil moisture readings. Four separate moisture need zones/areas can be established based on similarity of water requirements, i.e., turfgrass separate from shrub and ground cover, full sun exposure separate from shade, top of the slope separate from toe of the slope. Each zone has two moisture sensors placed in the active root system of the turf or plant material to be controlled for that zone. The patented, low/no maintenance, **WATERMARK** soil moisture sensor is internally compensated for salinity, will not dissolve in soil and has a field life of 5+ years. Each zone moisture level is independently adjustable — from field capacity to 200 centibars of soil water tension. The control panel is designed for use with low voltage (24 Vac) irrigation controller/time clocks in automated irrigation systems. **Irrrometer Company, Inc.**, Riverside, California, (714) 689-1701.

## Small, Multi-Use, Electric Sprayer

Ficklin's **WEED-N-SPRAY** electric tank pump sprayer features a 12-gal (45 l) high density polyethylene tank and steel plate frame. The tank has a large, easy open fill and sloped bottom to insure complete emptying of contents. The spray unit has a lightweight, corrosion-proof handgun with filter, lock-on trigger, adjustable tip, and 7 ft (2.1 m) hose. A straight stream tip reaches up to 30 ft (9.1 m) for spraying long distances. The unit can be mounted on an ATV, lawn/garden tractor, or pickup bed. An optional wheel kit allows the unit to be towed behind a vehicle or by hand. The self-priming pump runs only on demand off a 12-V battery and can be powered from a vehicle battery or a rechargeable battery. Also optional is a 10 ft (3 m) boom with flexible extensions. The boom features seven 9 gal/acre (84 l/ha) fan-type spray tips on 20 in. (51 cm) centers and sprays a 12 ft (3.6 m) wide pattern. **Ficklin Machine Co., Inc.**, Onarga, Illinois, (815) 268-7826.



- Advanced Micro Systems, Inc.**  
AMS OVG-1  
*Video Overlay Generator*  
Page 21
- Anderson Instrument Co., Inc.**  
PULSE 80 AND PULSE 1600 LIQUID LEVEL MONITORING SYSTEMS  
*System Simultaneously Monitors Liquid Level in Up to 16 Tanks*  
Page 15
- Automata, Inc.**  
ET-NOW  
*Direct Evapotranspiration Measurement System*  
Page 8
- J I Case**  
MAXXUM 5100 SERIES TRACTORS  
*Mid-Size Tractors With Versatility*  
Page 12
- Chore-Time Equipment**  
SUPER-6 ENVIRONMENTAL CONTROL SYSTEM  
*Control System for Curtain-Sided Animal Housing*  
Page 6
- Crary Co.**  
FINGER AIR REEL  
*Reel and Air Flow Combined for Even Crop Feeding*  
Page 9
- John Deere Des Moines Works**  
600 SERIES TANDEM DISKS  
*Disks designed to Perform Primary and/or Secondary Tillage Operation*  
Page 17
- John Deere Des Moines Works**  
FURROW OPENER  
*Opener Provides Simultaneous Application of Seed and Fertilizer*  
Page 10
- John Deere Ottumwa Works**  
SURFACE WRAP ATTACHMENT  
*Surface Wrap Attachment for Round Balers*  
Page 16
- John Deere Ottumwa Works**  
PUSH BAR ATTACHMENT  
*Push Bar Uses Movement of Baler Gates*  
Page 4
- John Deere Ottumwa Works**  
1600 MOWER-CONDITIONER  
*New Longer Rollers for Conditioning*  
Page 12
- DowElanco Ag Products**  
TRAVELER  
*Returnable Pesticide Container*  
Page 21
- Dunkley International, Inc.**  
CHERRY DESTEMMER  
*Maintenance Reduced by New Style of Vibratory Conveyor*  
Page 7
- Dutton-Lainson Co.**  
EASY SPARE  
*Easier Access to Spare Tire*  
Page 8
- Ficklin Machine Co., Inc.**  
WEED-N-SPRAY  
*Multi-Use Electric Sprayer*  
Page 22
- Flexi-Coil Ltd.**  
S-TINE MULTI-BAR  
*Three Components - All on One Unit*  
Page 19
- Ford New Holland, Inc.**  
BALB-EJECT  
*Hydraulic Unit Clears Bale Chamber From Cab*  
Page 7
- Ford New Holland, Inc.**  
MODEL 630 ROUND BALER  
*Baler for Small Tractors*  
Page 13
- Ford New Holland, Inc.**  
FASTNET  
*New Wrap for Round Bales*  
Page 9
- Ford New Holland, Inc.**  
ULTRA COMMAND POWERSHIFT TRANSMISSION  
*Powershift Transmission Controlled by Single Lever*  
Page 20
- Full Vision, Inc.**  
NAVI-HOE  
*Pickup-Mounted Baler*  
Page 13
- Honeywell Building Controls Division**  
T775 ELECTRONIC REMOTE TEMPERATURE CONTROLLER  
*Four-Stage Temperature Control*  
Page 10
- Irrrometer Co., Inc.**  
WATERMARK  
*Four-Zone Moisture Control Panel*  
Page 22
- Kinze Manufacturing, Inc.**  
FRAME-MOUNTED COULTER & ROW CLEANER  
*Attachment Provides Depth Control Without Use of Additional Gauge Wheels*  
Page 5
- Lake Co.**  
THE RATTLER  
*Ball-Drive Sprinkler for Low Pressure Operation*  
Page 19
- LI-COR, Inc.**  
LAI-2000 PLANT CANOPY ANALYZER  
*Analyzer Uses Simultaneous Measurements of Light Interception From Five Angles*  
Page 11
- Oil-Rite Corp.**  
PURGE-X  
*Metering Pump Adjustable to Dispense Exact Amounts of Liquid*  
Page 18
- Omnidata International, Inc.**  
1600 SERIES POLYCODER  
*Hand-Held Computer Combines Durability and Portability*  
Page 14
- Orthman Manufacturing, Inc.**  
TRACKER MP 3  
*Automatic Guidance System for Row-Crop Equipment*  
Page 20
- Parker Hannifin Corp., Racor Division**  
SPIN-ON FUEL FILTER/WATER SEPARATOR  
*Spin-On Design Needs No Disassembling or Realigning*  
Page 18
- Pirelli Armstrong Tire Corp.**  
HI-TRACTION LUG RADIAL DRIVE WHEEL R-1 TIRE  
*New Lug Geometry and Increased Curvature Provide Improved Traction, Wear Characteristics, and Reduced Vibration*  
Page 17
- Plant Genetic Systems**  
PGS GENE  
*Genetic Technique to Make Hybrid Plants*  
Page 14
- Rimik Pty. Ltd.**  
RPM3 RECORDING PROFILE METER  
*Meter Measures and Records Soil Profile in a Vertical Plane*  
Page 15
- U.S. Tsubaki Inc.**  
SELF-LUBE ROLLER CHAIN  
*Chain Combines the Benefits of a Roller With a Self-Lubing Bushing*  
Page 11
- Unidata America**  
MODEL 6518-1 PRECISION WATER CONDUCTIVITY INSTRUMENT  
*Probe Provides Remote Water Conductivity Measurement*  
Page 16
- Wade Manufacturing Co.**  
WADE-RAIN ACU-FLO  
*Micro-Irrigation Flow Regulator*  
Page 4
- Weasler Engineering, Inc.**  
ENCLOSED CLUTCH  
*Clutch Provides Overload Protection on Agricultural Equipment*  
Page 6
- Weasler Engineering, Inc.**  
80° CONSTANT VELOCITY UNIVERSAL JOINT  
*Largest CV Universal Joint Available in North America*  
Page 5