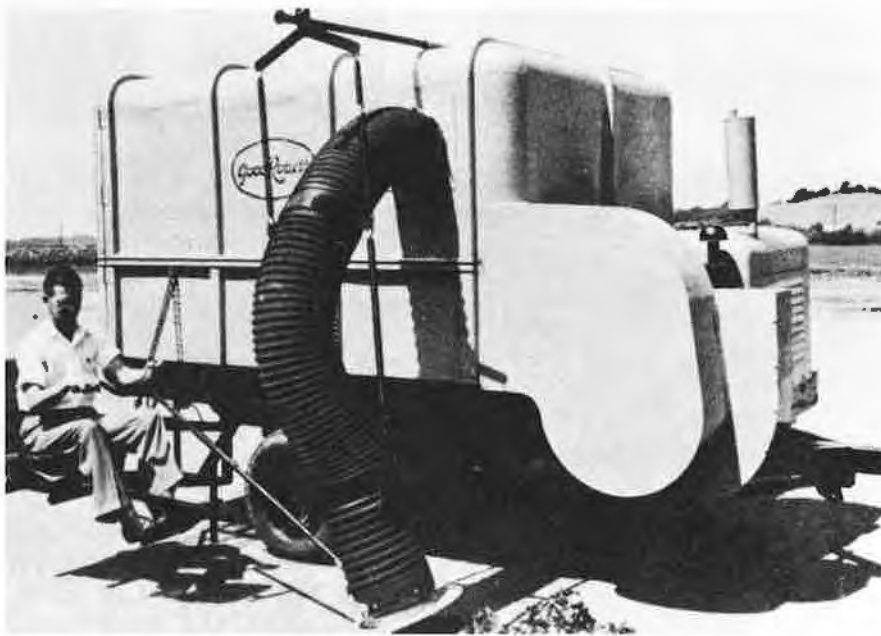


REPORT OF  
PROJECT COMMITTEE ON MECHANIZATION OF ROADSIDE OPERATIONS

Wilbur J. Garmhausen, Chairman  
Chief Landscape Architect  
Ohio Department of Highways

NEW uses for equipment with which you are already familiar, or new equipment for some particular work you want done—whichever the case may be—we are proud to present them to you, to help you cut your maintenance costs and hours of labor.

If you have developed or are acquainted with any equipment that has not been reported, will you kindly inform this Committee?



1. LARGE VACUUM SWEEPER: This motorized sweeper, powered by a 6-cylinder heavy-duty engine, has a 14-cubic-yard hopper. It is mounted on heavy-duty dual wheels and tires, and is complete with intake hose, adjustable steel-framed upholstered operator's seat, adjustable foot rest, stop and tail lights, warning signals, electric brakes, and safety chains.

Its straight-in-shoot from the ground through a 12-inch-diameter hose into an air-tight compartment pulls up everything within 6 to 7 feet either side of the unit. The air flows through upper inner filters into airways beneath the solid top and immediately to the rear of the front panel; then filtered free air is discharged through the exhaust by a blower rotor. When the body is filled, it is readily emptied by its own self-dumping mechanism.





2. CHIPPER: The chipper has been developed in various sizes and models which are powered either by a separate engine (as above) or by a power take-off (below).

The chipper consists of a cylindrical steel cutter head having four (or more) cutter blades held in place by steel wedges. The cutter head is inside a cast steel housing which supports the bearing cases and provides a wide-angled opening for feed on one

side and an opening for discharge of chips on the other. In the base of this housing is mounted the bed knife which can be adjusted with its edge parallel to the edges of the moving cutter blades and so close as to prevent sticks passing through



until reduced to chips. At the bottom of the feed opening is a spring-loaded feed plate mounted on a movable hinge pin near the outer end of the opening and supported by springs and a spring rod at the front, limited in its upward movement by spring rod adjusting screws with lock nuts. These screws are set so that the end of the feed plate will be about  $1/64$  inch closer to the moving edges of the blades than the edge of the bed knife. The action of this feed plate, together with the cutter head and bed knife, constitutes a very effective feed mechanism and works efficiently at from 4,500 to 6,500 feet of peripheral speed.

The machine will grind from 2,000 to 3,000 pounds of brush per hour. The maximum-size branch it will handle is 6-inch-diameter.



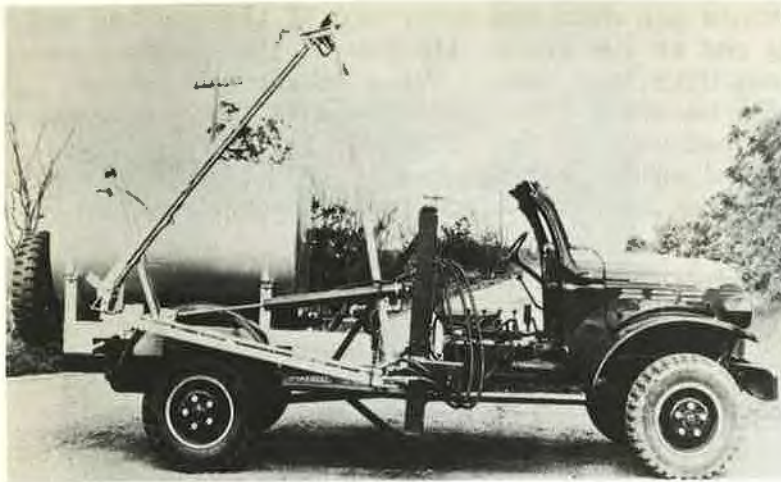
3. SEED SPRAYER: This machine is used to spray seed on prepared seedbed areas. It is mounted on a 2-ton truck and is attached to a Rockford Model PTA 5822 power take-off.

The pump is a Morris 75-gpm centrifugal, size 2R, powered by a Wisconsin 30-hp air-cooled Model VP4D engine. The agitators are mechanical, hooked to the power take-off of the truck transmission on direct control from the cab. There are six 5 x 10-inch fan blades. Additional agitation is secured from the use of a bypass from the pump.

The capacity of the tank is 750 gallons. It has an 18-inch opening in the top sealed with a rubber gasket and hinged bolts with wing nuts. The amount of water desired may be adjusted automatically when using the vacuum pump by means of spaced outlets connected with an automatic vacuum cut-off. The vacuum pump for filling the tank is connected with the engine at the same point where the truck brakes and windshield wiper are connected. The tank can be filled in 10 minutes.

The spray nozzle is made of  $1\frac{1}{2}$ -inch pipe flattened to have a rectilinear  $3/16$ -inch opening. The hose is stored in a gutter-shaped trough fastened under the bed of the truck.

A mounting ladder serving also as a safety gate when the truck is in motion, a priming tank for the pump, red safety light, and specially developed nozzle stand are other features.



4. **SPRAYER:** This sprayer is suitable for mounting on any type of truck, one-ton or larger, or on a Jeep. When mounted on the latter, it is attached and braced directly to the heaviest cross member of the frame in rigid position. It is quickly removable by removing nine bolts and one pipe connection.

One man, without leaving the driver's seat, can make the boom fit any contour (see below), spray shallow or deep ditches, high or low banks, and roadside brush (above right). He can control the supply of chemical to the boom section by a finger-tip selector valve while in continuous operation.

The boom extends 22 feet from the right of the vehicle, and provides double coverage of  $22\frac{1}{2}$  feet when in horizontal position. A 33-foot boom is also available. The boom is controlled by four hydraulic cylinders, three to operate each section of the boom vertically, and one to swing the boom back out of operating position and parallel with the line of travel of the vehicle. Airplane control cable from the cylinders to the outer boom sections are through specially designed cable pulleys.

A Jacuzzi multi-stage centrifugal pump with an adjustable capacity of from 30 to 300 pounds per square inch is capable of applying from 5 to 200 gallons per



mile. It can be installed for direct drive from a standard gasoline engine or by the power take-off of the vehicle.

There are 15 nozzles spaced 18 inches apart. Extra self-centering nozzles at each of the two outer hinges open automatically when the boom sections are raised vertically. The nozzles have removable tips and Monel metal screens to permit interchanging for different chemicals or any desired gallonage. Each nozzle screws into its own individual sediment trap.

Only the best-quality high-pressure chemical-resistant hose is used. Agitator hose is used for returning excess liquid to the tank and aids in mixing the chemical in the supply tank. The tank is made of heavily galvanized 12-gage steel, rust-proof, corrosion-proof, and chemical-resistant. A built-in jet-type agitator sweeps the bottom of the tank clean and keeps chemicals in suspension. A hand gun for spraying areas inaccessible to the spray unit or boom is provided. A swivel eliminates any kinking or twisting of the hose when reeled.

When folded for transport, the boom extends only 3 feet behind a Jeep,  $2\frac{1}{2}$  feet above the tank, and one foot from the side.



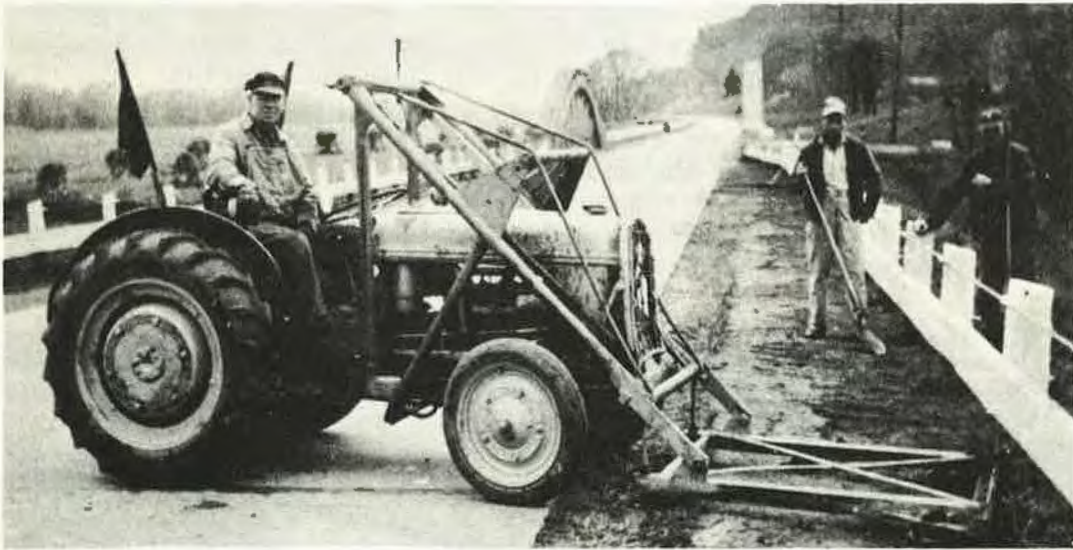
5. WEED BURNER: The weed burner can be mounted either on a trailer (left) or on a truck (right).

Pressure atomization of oil by a rotary pump and air for combustion by a steel pressure blower are the principle of operation. Pump and blower are driven by a 3-hp air-cooled engine having mechanical governor, oil pump, magneto ignition, and oil-bath air cleaner.

The component parts are mounted on an electrically welded frame made up of suitable steel shapes, the main horizontal ones being 2 x 2-inch steel angles 50 inches long and spaced  $10\frac{1}{2}$  inches. Cross members to carry the engine, blower, and pump are securely arc-welded to the longitudinal sills, making a one-piece frame. The overhead structure which is bolted to the main frame carries the burner head and provides means for adjusting it vertically through an arc of 80 degrees by a length of roller chain and hand wheel fitted with a steering wheel knob. The weight of the burner head is counter-balanced with a strong coil spring connected to the other end of the roller chain which carries the head. This makes it easy for the operator to raise or lower the burner head to suit the contour of the ground over which it is working. An automatic friction brake on the hand wheel holds the burner head wherever set for burning or dead-heading.

The air pipe on which the burner head is mounted is connected to a swing joint which is attached to the blower and main frame. The air-pipe connection to the swing joint is a wide draw band which permits the burner head to be rolled either to the right or left; this also facilitates adding an extension air pipe.

The machine is capable of burning a swath 5 feet wide at 6 mph and consumes 9 gallons of fuel oil per mile. Burning one acre at the same speed consumes 15 gallons. The burner unit is mounted on a circular track so that it can be set for straight-away burning or swung in an arc of 180 degrees or at right angles for ditch and ditch-bank burning.



6. TRACTOR DOZER BLADE: This blade attachment is used on a tractor equipped with a Da West hydraulically controlled front-end loader. The unit attaches to the push-lift frame of the loader without any alteration of the Da West parts, and is readily interchangeable with the bucket.

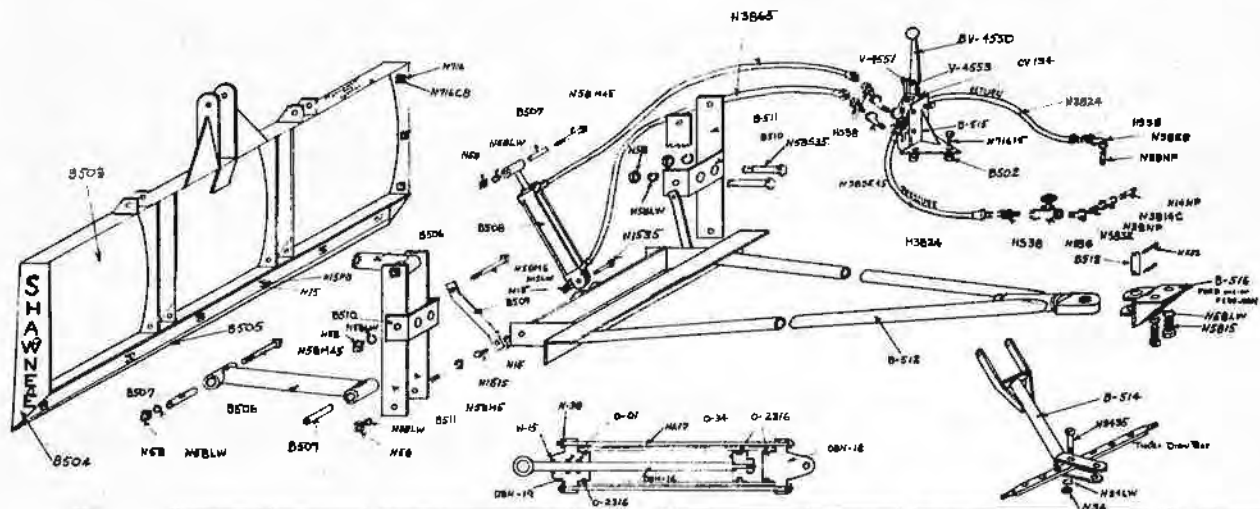
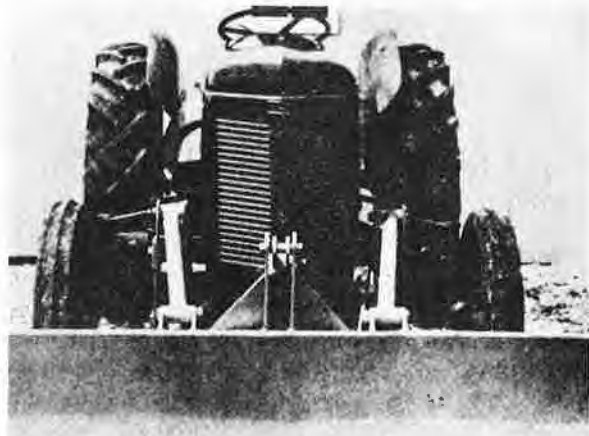
The frame of this attachment is rectangular in shape and built of  $\frac{3}{8}$  x 3 x 3-inch angle iron in all-welded construction. This frame is fitted with diagonal bracing to insure the necessary rigidity. Its width, determined by the width of the Da West construction, is  $42\frac{1}{2}$  inches. The length of the frame, overall, is 5 feet 10 inches, of which 5 feet is of low vertical clearance so that the unit can readily be used under the lower plank or cable of guard rail or similar obstructions. The combination cutting edge and moldboard is a section of standard  $\frac{1}{2}$  x 6-inch curved grader blade, and is bolt-fastened to the front cross angle of the dozer frame. This combination cutting-edge-moldboard is 43 inches long---just sufficient to clear the overall width of the frame itself. An adjustable shoe has been provided at each end, immediately back of the moldboard, to control the depth of cut made by the dozer.

Being attached directly to the hydraulically controlled element of the Da West loader, this attachment is readily adjustable vertically to meet all normal operating requirements.

The attachment has been used successfully for cutting down those sections of shoulders underneath guard rails and around other obstructions which could not otherwise be reached mechanically.

7. DOZER: This dozer (at right and below) can be installed on any tractor. It is equipped with a double-acting hydraulic system giving fast operation down as well as up. All thrust is from the underside of the differential, leaving no strain on the tractor front axle.

The width of the blade is 5 feet 6 inches; height, 22 inches; blade clearance, 15 inches; and weight, approximately 400 pounds.



FORD and FORD-FERGUSON PRESSURE FITTING

Ford-Ferguson Parts

SHAWNEE MFG. COMPANY  
1800 N. TULSA BLVD. BOX 12  
TULSA, OKLAHOMA

Ford-Ferguson SHAWNEE DOZER-DOLER  
ARMOR SUB BRACKET



DD-157

FORD VALVE ADAPTOR PLATE



Use Ford or Ford-Ferguson  
only adaptors with 3/8" and top 1/2" pin thread for return line

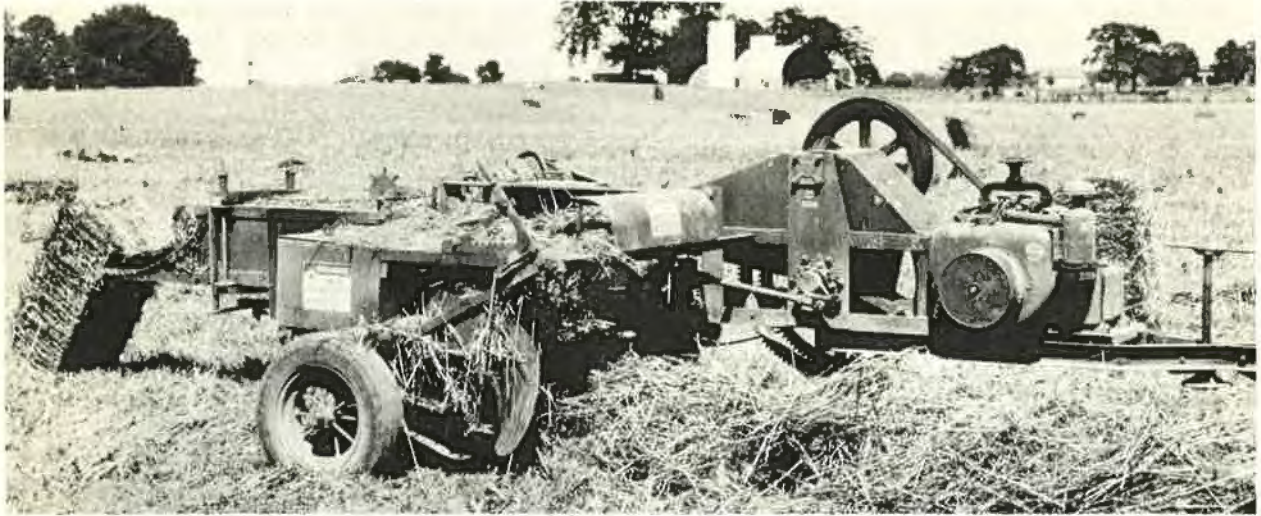
H3852 3/8" ST. B.L.L.

Ford-Ferguson SUB BRACKET



F-F VALVE ADAPTOR PLATE





8. **BALER:** This machine, which is pulled by a tractor, is used to bale straw or hay. It is 21 feet long, including the tractor hitch and tail-gate extension. The overall width is 8 feet 5 inches, and the height 59 inches. The bale chamber is 16 x 18 inches. The machine weighs 4,090 pounds and is provided with pneumatic tires.

A Wisconsin VEA engine is used to supply power for baling. The method of slicing is a knife on a plunger head and stationary baler knife. The plunger head is steel with special plastic slides on runners. Bales can be either 30-36 inches or 42 inches long. The weight per bale varies from 50 to 80 pounds.

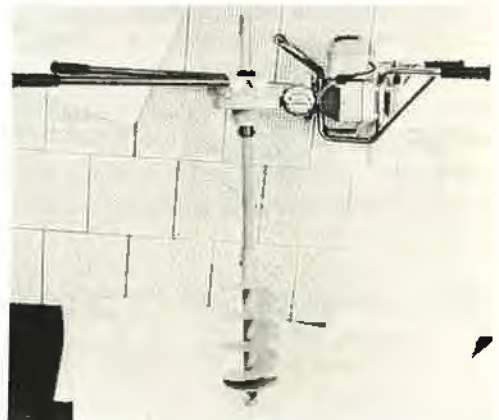
The machine is capable of baling up to 9 tons of material per hour, depending on field conditions.

9. **EARTH DRILL:** This machine can be operated by two men. It converts into a standard chain saw, as the earth-drill transmission is interchangeable with the chain-saw transmission.

The drill has a 5-hp engine for fast drilling through any earth, including hard clay, and will operate up to a 12-inch auger. A centrifugal clutch automatically disengages the auger for starting or for carrying when the engine is idling.

The drill operates at full power at any angle without adjustments, thus permitting vertical drilling regardless of the slope of the land. A full-swivel transmission permits this and also allows reversing the auger rotation when necessary.

The drill is easily carried to any location as it weighs only 80 pounds complete with 6-inch auger. The long supplementary handles are easily disengaged as are the auger bits, making a very compact unit for transporting.





10. **EARTH AUGER:** This piece of equipment (at right) is mounted on a tractor compressor but can also be mounted on a truck. It can be hung on an A-frame a considerable distance out in front of a truck so that it can be used satisfactorily on cut or fill slopes. It may also be used in a horizontal position for boring into a side slope or even under a roadway.

The drill, which is available in 4 to 16-inch diameters, comes in four sections and may be used in any reasonable length. A 70-pound motor is capable of handling up to a 12-inch drill; but the drill operates more efficiently on a pressure of between 100 and 125 pounds.



11. **LEAF SWEEPER:** This leaf sweeper is towed by a tractor, truck, or Jeep. It is of high-tensile-strength cast aluminum alloy and welded steel construction, with every major moving part mounted in either roller or ball bearings. Wheels are the separable rim type for easy removal of the low-pressure pneumatic tires. The wheels, each equipped with an agricultural ratchet pawl, drive the sweeping unit through heavy cut-steel drive and pinion gears.

The brush reel is equipped with a clutch, operated with a hand lever on the outside of the sweeper, to easily engage or disengage the sweeping unit, as desired. The sweeping height is easily adjusted for practically every type of sweeping by a screw knob on the front of the machine. The sweeping brush is a sectional type, steel-backed, filled with heavy bassine fiber, easily removed and replaced.

Baling canvases made of heavy waterproofing canvas have approximately 25-bushel capacity each. They are inserted in the sweeper with a baling lever operated on the outside of the sweeper. When the sweeper is full of leaves, the baling canvas is easily drawn into a cylindrical roll and removed. Draw ties on each side of the canvas prevent leaves from escaping. The canvases are interchangeable.

Approximately 500 bushels can be collected and put into bales per hour.



12. **LEAF SWEEPER:** Leaves are picked up in a 3-foot swath by vacuum suction only. The motor runs constantly at its most efficient speed, giving maximum power at all times. Forward speed of the machine is regulated by pressure on the grips. It is guided right or left by applying pressure on one or the other of the two handle grips. The machine can be turned completely around in its own length.

A blower is built in as a permanent part of the machine. This is used to blow into the open any leaves under hedges, fences, etc., so they can be picked up by the machine which does not pick up stones or heavy twigs. It thoroughly mulches the leaves, and the fine mulch is blown to one side or gathered in a collector.

Walking 2 miles an hour, one man with a Mulch-Vac-Leaf sweeper can clean up almost 6 acres in an 8-hour day.



13. **WEED CONTROL MACHINE:** This machine is pulled by a tractor and is used to shatter vegetation. It eliminates raking as the weeds are dispersed and no vegetation remains to be disposed of.

The machine is a commercial Roto-Beater, 80 inches in cutting width, equipped

with steel hammers with reversible replaceable manganese tips. It shatters any type of growth by mechanical impact, and is not damaged by contact with bottles, cans, or any other type of roadside litter.

14. **EXTENSION PLATFORM:** The extension platform shown at the right can be used for tree-trimming and other high-altitude work. It is a modification of the commercial Hi-Tender device mounted on a  $2\frac{1}{2}$ -ton truck. The platform extends to a height of 40 feet and may be swung through an arc of 300 degrees. Dual hydraulic controls at the platform and the base permit raising, lowering, and swinging the platform from either position.

Telescoping and folding outriggers may be extended from the truck bed to provide stability when the platform position is at one side or the other. Locking stabilizers prevent movement of the truck bed in any direction while the platform is in use.

A warning signal is provided to prevent damage which might be caused if the top portion of the collapsing arm interfered with the bottom segment during involved positioning operations.

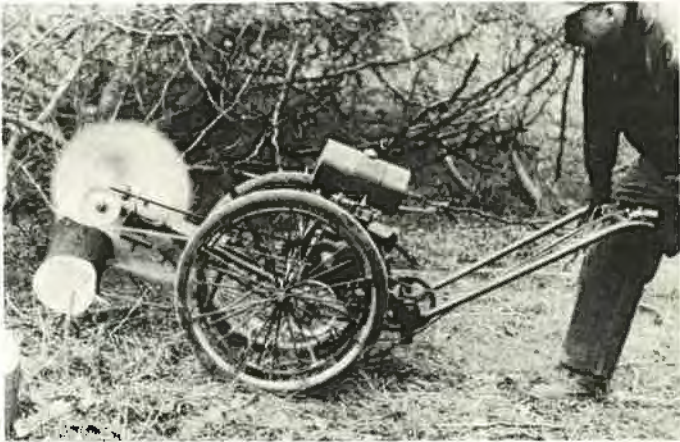


15. **SMALL TRACTOR:** The tractor at left has a two-speed transmission, final drive running in oil, fully shielded bogey carriage, and spring-loaded front idler wheels. Its small size and maneuverability ---pivoting within its own length---make it a valuable piece of equipment where larger machines cannot work. Special attachments such as mower, bulldozer blade, broom, tote wagon, rotary tiller, and agricultural tools are available.

The machine weighs 900 pounds. The width at tread is 36 inches, the length 60 inches, height of seat 26 inches, and width of treads, 7 inches. Bearing area on the ground is 532 square inches, and bearing pressure  $1\frac{1}{2}$  pounds per square inch. It has a

drawbar pull of 1,000 pounds, and a speed range of  $1\frac{1}{2}$  mph low to 6 mph high, with a high speed reverse.

Its turning radius is such that it pivots on either track within an 8-foot circle. It has an independent drive and brake lever for each track, a positive drive clutch and external shoe brakes. Gears for transmission and final drive are of case-hardened heavy-duty steel, running in oil. Other features include a hydraulic system pump with 5-gpm V-belt drive; a 4-way self-neutralizing control valve; a cylinder head,  $2\frac{1}{4}$ -inch bore,  $18\frac{3}{4}$  stroke, double-acting with automatic bypass at top and bottom of stroke; and a 4-cycle single-cylinder 6-hp air-cooled gasoline engine. The frame is of 3 x  $1\frac{1}{2}$ -inch all-welded steel channel box construction.

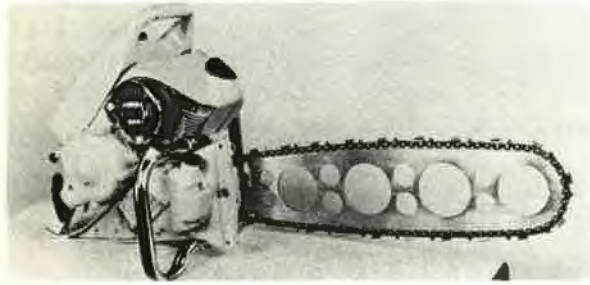


16. MOWER: This machine is available in push-type or self-propelled models. The self-propelled model has two forward speeds. It has all-steel all-welded frame construction, and a mower blade of tough chip-proof low-carbon steel with the cutting edge tempered to stay sharp. The saw blade attachment (above right) is made of the finest steel.

Heavy-duty wheels with semi-pneumatic tires are flat-proof. The blade spindle turns on two-grease-sealed ball bearings which require no lubrication at any time. The dependable V-belt drive is easy to adjust. Power is provided by a Clinton  $1\frac{1}{2}$  or 3-hp engine. It has a finger-tip-control clutch lever and throttle. A stone shield protects the operator.



17. CHAIN SAW: This saw comes in various sizes. The 5-hp type weighs 49 pounds, while the 7-hp type weighs 55 pounds. A small 3-hp model weighs 25 pounds.



The 5-hp is available in six models from a 20-inch to a 50-inch blade. The 7-hp has up to a 60-inch blade. Both include a 20-inch bow model. The 3-hp comes in 18, 24, and 30-inch models and a 15-inch bow saw model.

A feature is the special rotating balancers

which are geared and synchronized to the crankshaft to neutralize rotary vibration which is not counteracted by the conventional counterbalancing of the crankshaft. Exceptionally smooth operation results, which relieves fatigue and increases the life of the saw.



18. STUMP CUTTER: This stump cutter is mounted on a D2 Caterpillar tractor. It uses up to a 15-inch auger or cutter powered by the tractor through a rear power take-off and will cut to any required depth.

NOTE: A Special Report on "Mechanization of Roadside Operations" summarizing this and the preceding reports on equipment for roadside work will be published during 1953.

Members of the Project Committee on Mechanization of Roadside Operations are listed on the following page.

## PROJECT COMMITTEE ON MECHANIZATION OF ROADSIDE OPERATIONS

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