520 SERIES TRACTORS WITH GASOLINE OR ALL FUEL ENGINE (SERIAL NO. 5208100 - UP)

JOHN DEERE

OPERATORS MANUAL

520 SERIES TRACTORS WITH GASOLINE OR ALL FUEL ENGINE (SERIAL NO. 5208100 - UP)

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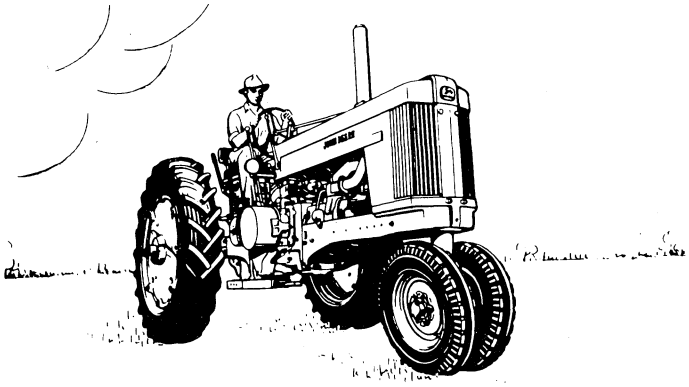

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To the Purchaser

We welcome you to our ever-growing family of John Deere tractor owners. We are confident that the dependable and economical performance of your John Deere tractor will prove that you made a wise choice.

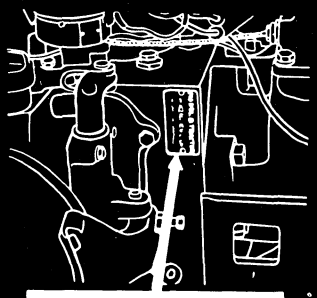
The purpose of this manual is to acquaint you with your new tractor. The manual explains how to operate and service your tractor, and how to maintain its high operating efficiency. Instructions are given clearly with the intention of making these operations as easy as possible.

Keep this manual in a convenient place for quick and easy reference. Use it as a guide whenever questions arise. You have purchased a dependable, sturdy tractor, but only by operating and caring for it properly can you expect to receive the service and long life for which it was designed.

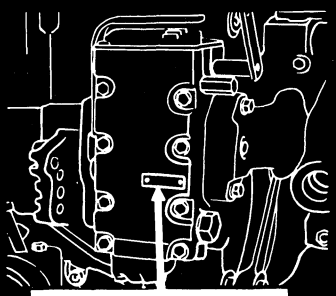
If in the future you need new parts to replace those that may be worn, insist on genuine John Deere parts. They are exact duplicates of the originals, made from the same patterns and of the same high-quality materials.

When in need of parts, give your John Deere dealer the serial number of your tractor or hydraulic system (Powr-Trol), depending on the parts you need. The illustration below shows you where to find these serial numbers. Obtain them from your tractor—NOW—and insert them in the spaces provided in the illustrations below.

TRACTOR



HYDRAULIC SYSTEM



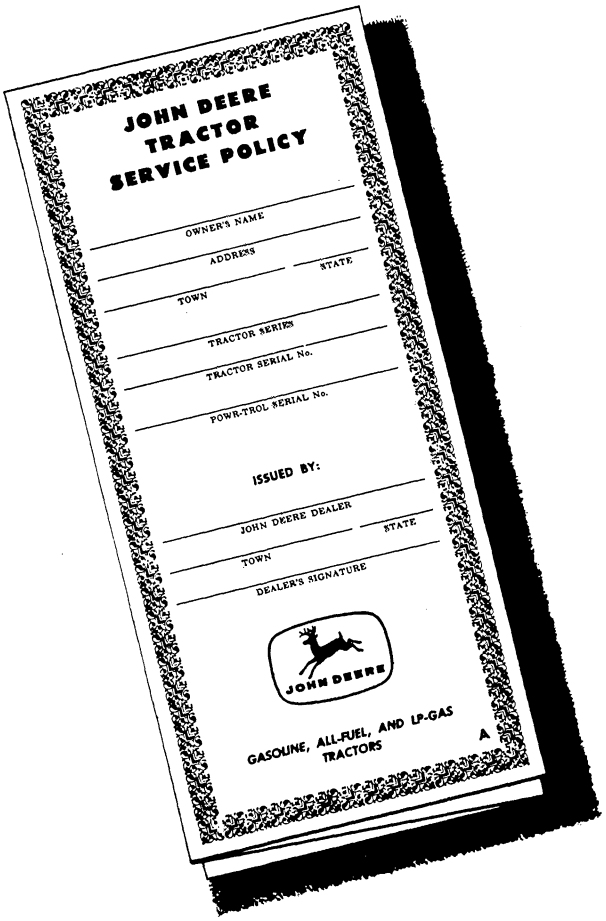
Owner

Date Purchased

• TABLE OF CONTENTS •

	Page
SPECIFICATIONS AND DATA	4
CONTROLS AND INSTRUMENTS	6
OPERATING INSTRUCTIONS	15
SAFETY SUGGESTIONS	50
LUBRICATION AND PERIODIC SERVICES	52
SERVICE THAT WILL KEEP YOUR TRACTOR IN TIP-TOP SHAPE	68
SERVICE REMINDERS	91
TRACTOR DIFFICULTIES	92
STORING THE TRACTOR	100
ATTACHMENTS	101
INDEX	106

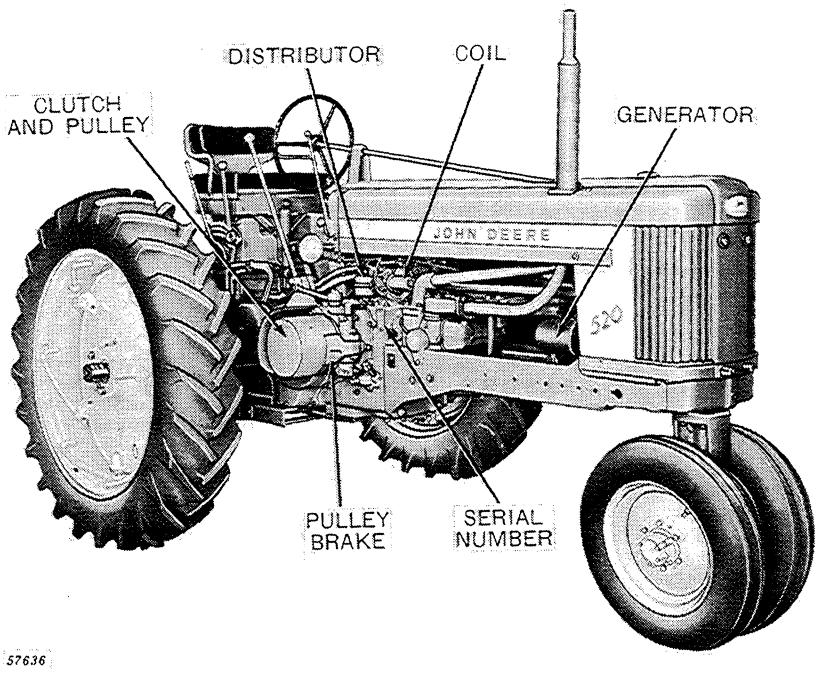
John Deere Tractor Service Policy



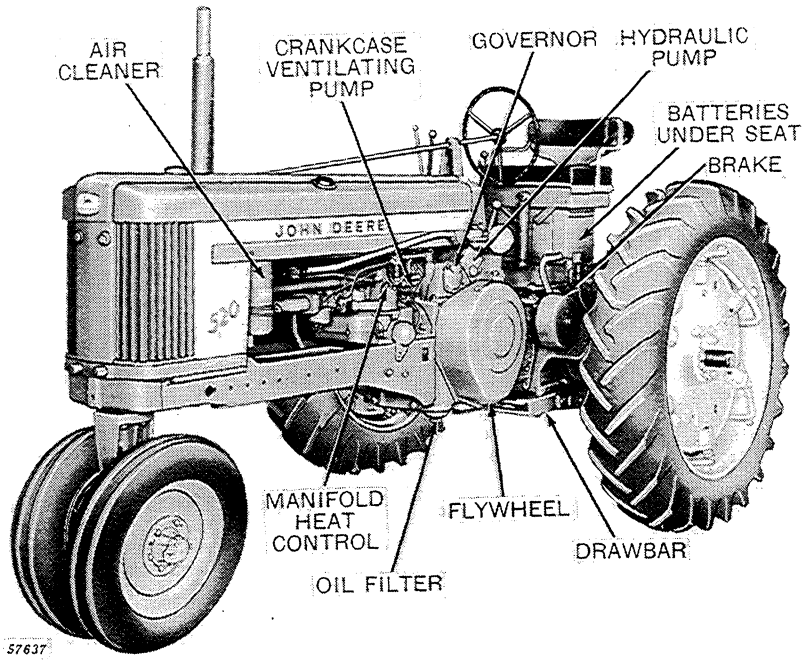
When your new tractor was delivered the John Deere dealer presented to you a copy of the Tractor Service Policy illustrated above. This policy certifies that your new John Deere Tractor was properly inspected and prepared for delivery by the dealer before he released it to you.

Present the policy to the dealer whenever any services which it authorizes are required. Keep the policy in a safe place for ready reference at all times.

This is Your New John Deere Tractor



John Deere "520" Series Tractor—Pulley Side
(Serial No. 5208100-)



John Deere "520" Series Tractor—Flywheel Side
(Serial No. 5208100-)

SPECIFICATIONS

PERFORMANCE:

Three 14-inch plow bottoms or the equivalent under most conditions.

Maximum Belt Horsepower:

*Gasoline	38.58
*All-Fuel	26.61

Maximum Drawbar Horsepower:

*Gasoline	34.31
*All-Fuel	24.77

CAPACITIES (U. S. MEASUREMENTS):

Gasoline Tank:

Gasoline Tractor	18 Gals.
All-Fuel Tractor	2 Gals.
Fuel Tank (All-Fuel)	15-1/2 Gals.
Crankcase	7 Qts.
Transmission	4 Gals.
Powr-Trol System	10 Qts.
Remote Cylinder	1 Qt.
Power Shaft Clutch	1 Gal.
Cooling System	4-1/2 Gals.
First Reduction Gear Cover	1 Qt.
Power Steering	5 Qts.

SPEEDS:

Gear	With 12.4-36 Tires
1	1-1/2 mph
2	2-1/2 mph
3	3-1/2 mph
4	4-1/2 mph
5	5-3/4 mph
6	10 mph
Reverse	2-1/2 mph

ENGINE:

Type ..... Two-cylinder, cast-in-block, valves-in-head.

Engine Speeds:

Load	1325 rpm
Fast Idle	1460 rpm
Slow Idle	600 rpm

Bore and Stroke	4-11/16″ x 5-1/2″
Displacement	189.8 cubic inches

Compression Ratio:

Gasoline	7.00 to 1
All-Fuel	4.9 to 1

**Maximum h.p. corrected to 60°F. and 29.92 in. hg. (Nebraska Tests Nos. 592 and 597).*

LUBRICATION SYSTEM:

Type ..... Full force-feed pressure system with full flow oil filter.

FUEL SYSTEM:

Type ..... Gravity feed.
Carburetor. Natural-draft duplex type.
Air Cleaner ..... Oil-wash type.

COOLING SYSTEM:

Type .... Pressure system—centrifugal pump with engine temperature controlled by heavy-duty thermostat.

IGNITION SYSTEM:

Type ..... Battery-Distributor
Distributor Point Gap (Delco-Remy) ..... .022″

Spark Plugs:

Size	18 mm.
Spark Plug Gap	.030″

ELECTRICAL SYSTEM:

Battery Voltage	12 Volts
Generator Regulation	Voltage Regulator.
Battery	Group I

CLUTCH:

Type ..... Hand-operated, four 7-inch dry disks.

BELT PULLEY:

Diameter	9-11/16″
Width	7-1/4″
Rpm (Load)	1325
Belt Speed	3360 fpm

TRANSMISSION:

Type ..... Six speeds forward and one in reverse.

Gears ..... Selective-type, straight spur-cut gears, forged and heat-treated.

Bearings ... Shafts operate on three roller bearings, four tapered roller bearings, and five ball bearings.

(Continued on next page)

SPECIFICATIONS

REAR AXLES:

Types Available.... Regular and long.
Diameter..... Regular..... 2-7/8″
Long..... 3-1/8″
Bearings..... Four tapered roller bearings.

REAR WHEELS AND TIRES:

Regular Rear Axle and Long Rear Axle. 12.4-36, 4-ply tires on cast disk wheels. 13.9-36, 4-ply and 11-38, 6-ply Cane and Rice tires also available.

REAR WHEEL BRAKES:

Type... Two automotive-type internal-expanding rear wheel brakes.

FRONT WHEELS AND TIRES:

Double and Adjustable Type:

Reversible for added clearance.
Bearings..... Four tapered roller bearings.
Tires..... 5.50 x 16″, 4-ply.

Single Type:

Bearings..... Two tapered roller bearings.
Tires..... 6.50 x 16″, 6- or 8-ply. 9.00 x 10″, 8-ply.

	Double Front Wheel	Single Front Wheel	Adjustable-Tread Front Axle
POWER TAKE-OFF:			
Shaft Diameter	1-3/8″	1-3/8″	1-3/8″
Shaft rpm	529	529	529
Splined End Ahead of Hitch	14″	14″	14″
Splined Shaft Above Ground	23.5″	23.5″	23.5″
DIMENSIONS:			
Wheel-Base	90″	90-1/4″	92-1/2″
Over-All Width	86-5/8″	86-5/8″	86-5/8″
Over-All Height	83-3/8″	83-1/8″	83-3/4″
Height to Top of Steering Wheel	75-11/16″	75-11/16″	75-11/16″
Width Over Axles	86-5/8″	95-15/16″	95-15/16″
Tread Adjustments:			
Regular Rear Wheels	56-88″*	56-88″*	56-88″*
Power-Adjusted Rear Wheels	56-94″**	56-94″**	56-94″**
Clearance	24-3/4″	24-3/4″	Front—22-9/16″ Rear—24-3/4″
Turning Radius	8′ 7-1/2″	8′ 7-1/2″	14′
SHIPPING WEIGHT	4960 lbs.	4870 lbs.	5230 lbs.

(Weights are for Tractor dry and with wheel equipment as shown under "*Front Wheels*" and "*Rear Wheels*")

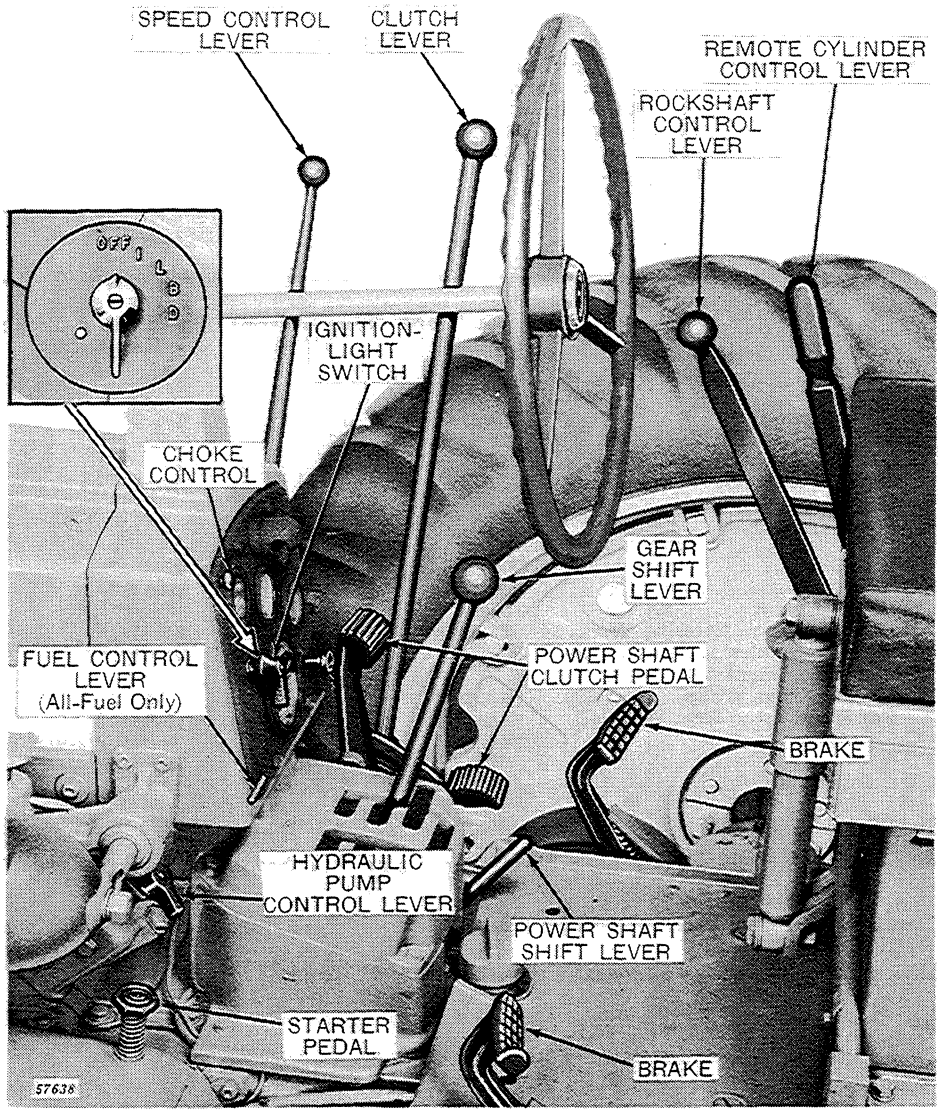
**Available with long axles providing tread of 62-1/2″ to 97-3/4″ and with offset wheels a tread of 56″ to 104″.*

***Power-Adjusted wheels on long axles provide tread of 59″ to 104″.*

(Specifications and design subject to change without notice.)

CONTROLS

Familiarize yourself with all the controls provided for safe and easy operation of your new tractor. Regardless of your previous tractor experience, study this section covering controls carefully before you operate your tractor.



Starting and Operating Controls

• STARTING CONTROLS •

IGNITION-LIGHT SWITCH.

A combination ignition-light switch is located in the center of the instrument panel. Turning the switch to any position except "OFF" turns on the ignition.

The lights on your tractor are designed to provide maximum use and convenience both for night work in the field and night travel on the highway. The combination rear lamp has a bright white light for illuminating drawn implements and a red light for highway travel.

All lights are controlled by the combination ignition-light switch. The switch has five positions as follows:

"OFF"—Both ignition and lights off.
"I" —Ignition only.
"L" —Bright front lights and white rear light.
"B" —Bright front lights and red rear light.
"D" —Dim front lights and red rear light.

FUEL-CONTROL LEVER (ALL-FUEL TRACTORS).

A three-way fuel control lever on All-Fuel tractors enables the operator to switch from gasoline for starting the engine to low-cost fuel for operation, or to shut off the fuel supply entirely without leaving his position at the wheel.

STARTER PEDAL.

The engine is started by the pedal located in convenient reach of the operator's left foot. The pedal engages the cranking motor pinion with the flywheel and also completes the electrical circuit to the cranking motor. For starting instructions see page 16.

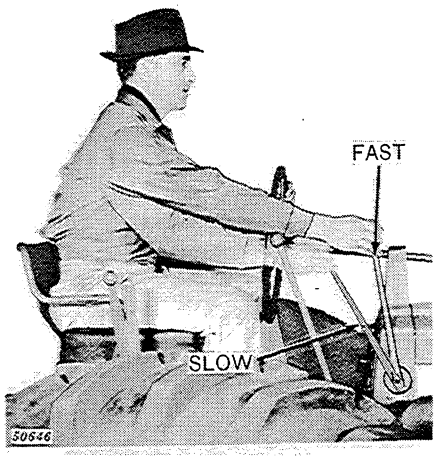
CHOKE CONTROL.

Pulling out the choke button provides a rich mixture for the engine when starting. When button is pushed in, the choke returns to its normal position.

• OPERATING CONTROLS •

SPEED CONTROL LEVER.

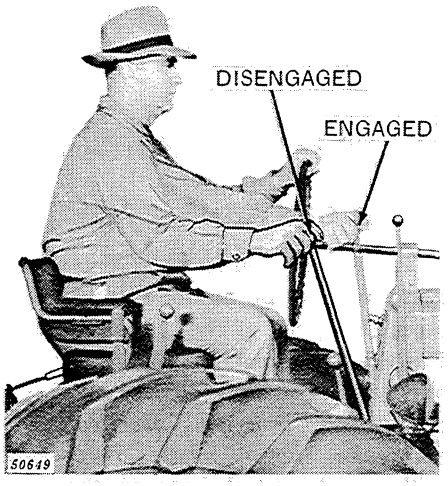
The lever mounted on the right-hand side of the hood support regulates the speed of the tractor engine. Pushing it forward opens the throttle and pulling it back closes the throttle. *NOTE: It is good practice to operate the engine whenever possible with speed control lever in the fully forward position.*



Speed Control Lever

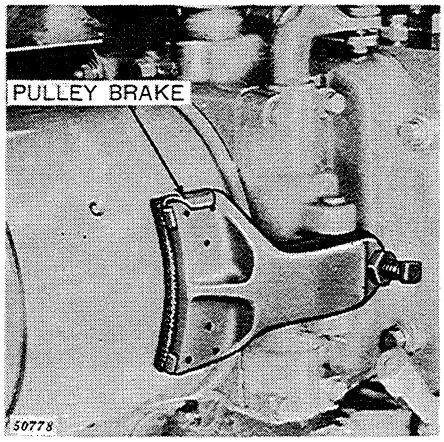
CLUTCH LEVER AND PULLEY BRAKE.

Power is applied gradually and smoothly to the drive system by slowly pushing the clutch lever forward. When the tractor picks up speed, a quick forward thrust on the lever snaps the clutch into engagement. Pull back on lever to disengage the clutch.



Clutch Lever

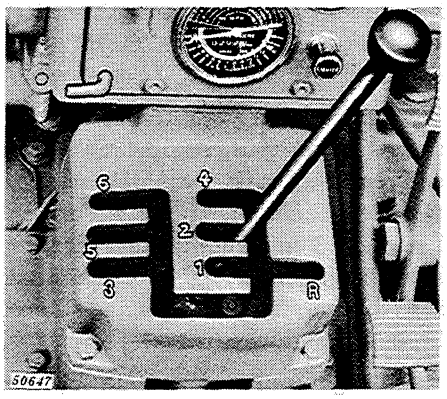
A pulley brake, which is applied when the clutch lever is pulled back, stops the pulley from rotating, permitting easy shifting of the transmission gears. *NOTE: Do not use pulley brake to stop the tractor.*



Pulley Brake

GEAR SHIFT LEVER.

The gear shift lever is used to select the proper gear depending upon the load and speed. Familiarize yourself with the shifting before attempting to operate the tractor.



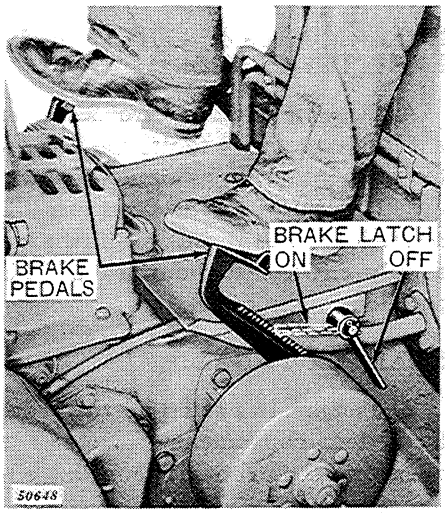
Gear Shift Lever

BRAKES.

Individual, foot-operated brakes make possible short turns.

For safe stopping at high transport speeds, apply the brakes **evenly** to avoid drawing the tractor to one side.

A brake latch is conveniently located for locking each brake when doing belt work or when holding the tractor on a hill or incline.



Brake Pedals and Latches

SEAT, BATTERY COMPARTMENT AND ELECTRICAL OUTLET SOCKET.

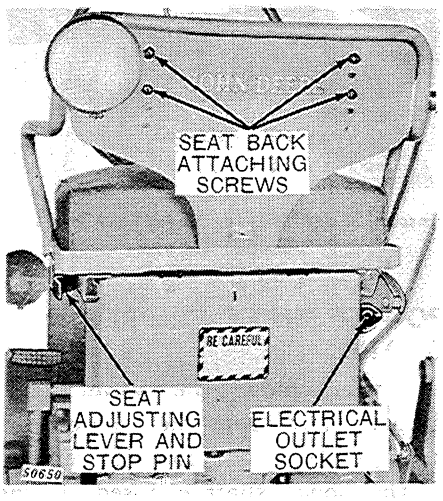
Standard Seat.

The roomy seat adds much to operator comfort and lessens fatigue. There is an adjustment on the left-hand side for moving the seat forward and backward to suit the convenience of the operator. The back of the seat can be adjusted up or down by means of the attaching screws.

The batteries are located in a compartment under the seat where they are readily accessible for periodic checking and service.

Electrical Outlet Socket.

A convenient electrical outlet socket is located on the right-hand side of the battery box.

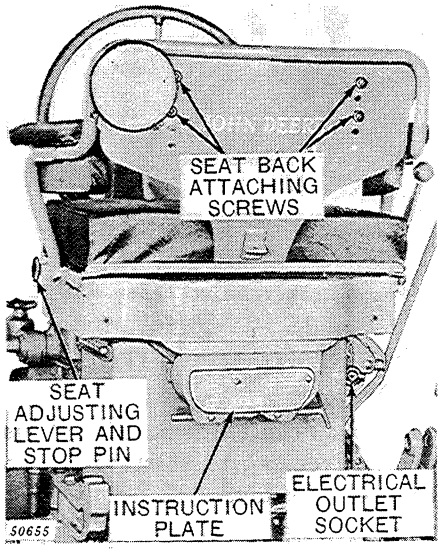


Standard Seat

Special Float Ride Seat.

A special float ride seat having rubber torsion springs and a shock absorber is available as optional equipment. This seat has the same forward and backward adjustment and seat back adjustment as the regular seat but, in addition, the tension on the rubber springs can be adjusted to suit each rider. Adjustment is made by turning the handle located at the back of the seat. An instruction plate above the handle tells how to make the adjustment.

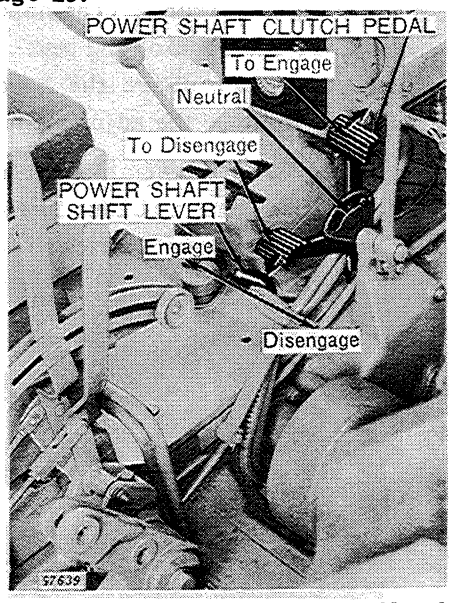
CAUTION: Do not adjust the rubber torsion springs while a rider is on the seat.



Float Ride Seat

POWER SHAFT SHIFT LEVER.

The power shaft is engaged by the power shaft shift lever located to the right of the gear shift lever. Move the lever to the left to engage the power shaft and to the right to disengage the shaft. **CAUTION: Do not engage the power shaft shift lever while the engine is running. Before engaging the lever, read the operating instructions on page 29.**



Power Shaft Shift Lever and Clutch Pedal

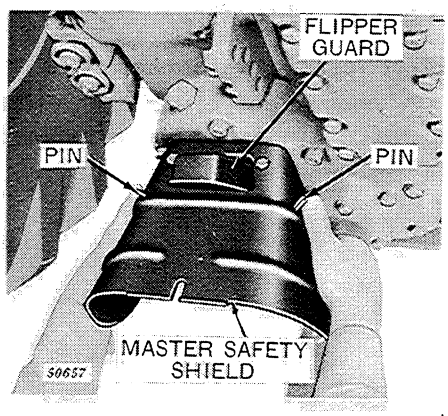
POWER SHAFT CLUTCH PEDAL.

A power shaft clutch makes it easy and convenient to start or to stop the power shaft.

The clutch is operated by a double pedal located to the right of the gear shift lever. Pushing forward on the upper pad of the double pedal engages the clutch. Pushing down on the lower pad disengages the clutch and applies a brake to keep the shaft from turning when not in use. For further information see page 29.

POWER SHAFT MASTER SAFETY SHIELD.

A master safety shield is mounted over the power shaft to protect the operator. This master shield should be removed only when it might interfere with operation of mounted integral equipment. To remove the shield, press up on the two pins protruding from the sides and lift the shield from the tractor. Replace the master shield immediately upon removal of the equipment. Install the master safety shield any time the power shaft is used.



Power Shaft Master Safety Shield and Flipper Guard

POWER SHAFT FLIPPER GUARD.

Never remove the power shaft flipper guard from the tractor. Do not operate the tractor with the end of the power shaft exposed, If the flipper guard is damaged, repair or replace it immediately.

CAUTION: Make it a rule never to dismount from the tractor without first disengaging the power shaft.

POWR-TROL PUMP CONTROL LEVER.

The Powr-Trol pump is engaged by rotating the control lever in a counter-clockwise direction and disengaged by turning the lever in a clockwise direction. **CAUTION: Do not engage the pump while the engine is running.** It may be necessary to turn the engine over by means of the cranking motor with the ignition switch **off** to engage the gears.

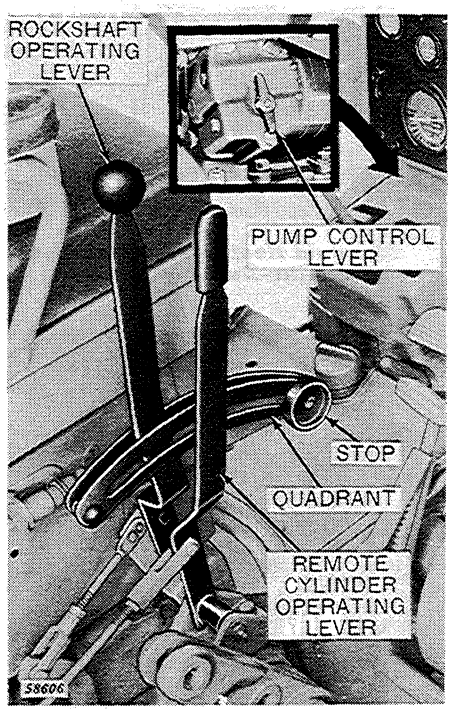
POWR-TROL OPERATING LEVERS.

Rockshaft Operating Lever.

The rockshaft is operated by a lever located to the right of the seat. Moving the control lever rearward raises the implement while moving the lever forward lowers the implement. A depth-control stop on the quadrant can be set so that the implement always returns to the same working depth after it has been raised. For further information see page 31.

Remote Cylinder Operating Levers.

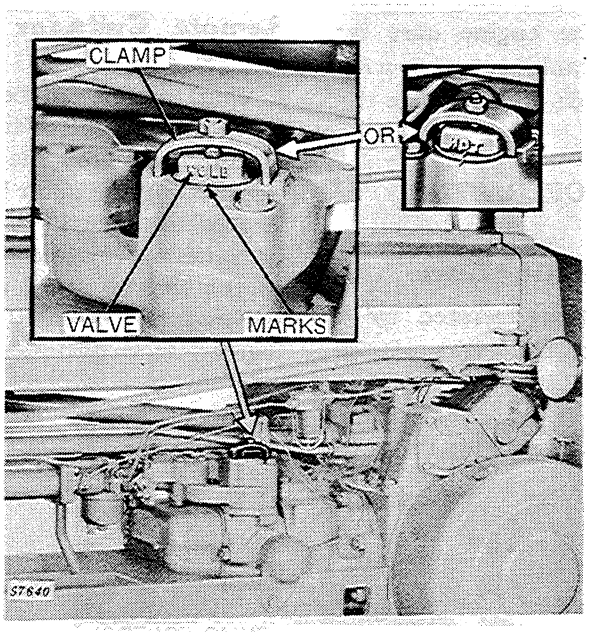
Your tractor can be equipped to operate either one or two remote hydraulic cylinders. The cylinders are operated by the outer lever or levers located to the right of the seat. Implements are lowered by moving the proper lever forward and raised by moving the lever to the rear. For further information see page 43.



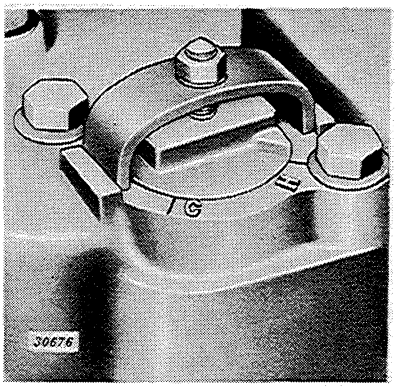
Powr-Trol Pump Control Lever and Powr-Trol Operating Levers

MANIFOLD HEAT CONTROL VALVE.

The purpose of this control, located in the engine manifold, is to improve engine performance and efficiency in hot or cold weather by controlling the path taken by hot exhaust gases. Use of the valve is described on page 71. Generally, the valve is set at "COLD" or "C" for air temperatures above 32° F. and at "HOT" or "H" for temperatures below 32° F. For instructions on changing the position of the valve, see page 71.

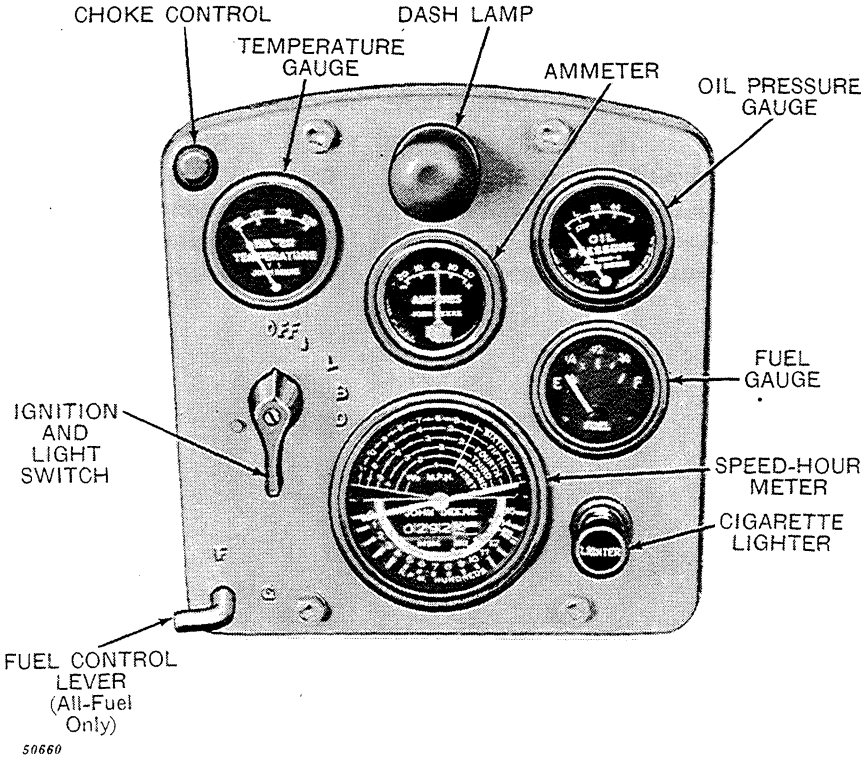


Manifold Heat Control Valve on Gasoline-Burning Tractors



Manifold Heat Control Valve on All-Fuel Tractors

• INSTRUMENT PANEL •



Instrument Panel

TEMPERATURE GAUGE.

The temperature gauge indicates the temperature of the coolant in the cooling system. Engine temperatures are controlled by a thermostat in the cylinder water outlet.

OIL PRESSURE GAUGE.

The oil pressure gauge indicates whether or not the oil pump is working. The gauge does not in any way tell the amount or condition of the oil in the crankcase. The indicator hand of the gauge should rest between the letters "M" and "H" when the engine is hot and operating at fast idle. **If the gauge does not register pressure when the engine is started, stop the engine immediately.**

AMMETER.

The ammeter indicates whether or not the generator is charging the batteries.

DASH LAMP.

A small lamp is provided to illuminate the dash at night. It is turned on by the ignition-light switch when the main lights are turned on.

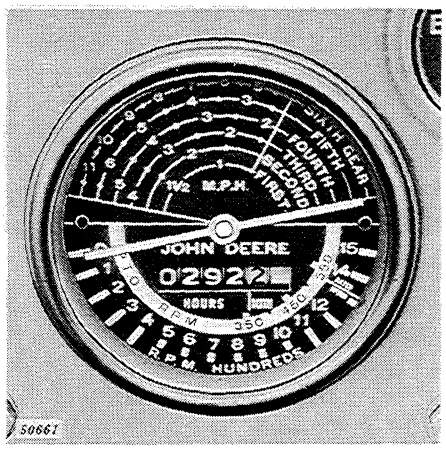
CIGARETTE LIGHTER.

A cigarette lighter (special attachment) is provided for your convenience on the instrument panel.

SPEED-HOUR METER.

The speed-hour meter (special attachment), located in the center of the instrument panel, can be used to determine the following:

	Shown on
(1) Ground Travel Speed in All Gears....	Top Half of Dial
(2) Power Take-Off Shaft Speed (rpm)....	White Section of Lower Dial
(3) Engine Speed (rpm).....	Bottom Portion of Lower Dial
(4) Accumulated Hours of Service.....	Center Portion of Lower Dial



Speed-Hour Meter Dial

OPERATING INSTRUCTIONS

The suggestions given on the following pages tell you how to take full advantage of the many features built into your new tractor and how to obtain long trouble-free service. By following the instructions, you will be able to perform your tractor work efficiently and avoid conditions likely to cause injury or damage.

• FUEL •

IMPORTANCE OF USING PROPER FUELS.

Now that you are familiar with the controls, your next consideration before starting your tractor is the type of fuel you are going to use.

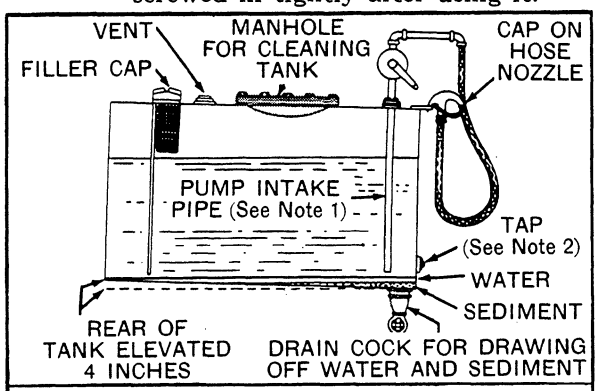
The gasoline tractor is designed to operate economically on regular grade gasoline as defined by ASTM Designation 439-55T. The gasoline should have a minimum octane number rating of 80 (Motor Method) or 86 (Research Method). The distillation range or volatility is adjusted by the petroleum producers for local climatic conditions and also for seasonal variations. Avoid carrying over gasoline purchased in one season for another season's work. For example, gasoline furnished for summer use is less volatile than that sold in the winter season and attempts to use the summer gasoline in cold weather can result in poor starting of the engine.

The All-Fuel Tractor is designed to operate on gasoline or "farm tractor fuel" as defined by ASTM Designation D-1215-54. This includes either the "Light Grade" or "Regular Grade" having ASTM distillation 10% point recovered of 401°F. maximum and a 95% point recovered of 518°F. maximum and a minimum octane number of 35 (Motor Method) or 38 (Research Method).

FUEL STORAGE.

Fuel should be stored in a convenient place outside of buildings. A fuel tank such as that illustrated below will provide good fuel storage. If fuel drums are used, they should be located in a shady spot to prevent undue evaporation. The fuel drums should be tilted slightly toward the rear so that any metal that might flake from the inside of the drum or any other sediment will settle to the rear and will not get out of the drum through the spigot. The hose nozzle should be capped when not in use so that no dust can enter.

Be sure that drum vent plug is screwed in tightly after using it.



NOTE 1—Intake pipe on pump should be 4 inches above tank bottom.
NOTE 2—Tap for filler hose on elevated tank should be 3 inches above tank bottom.
9450

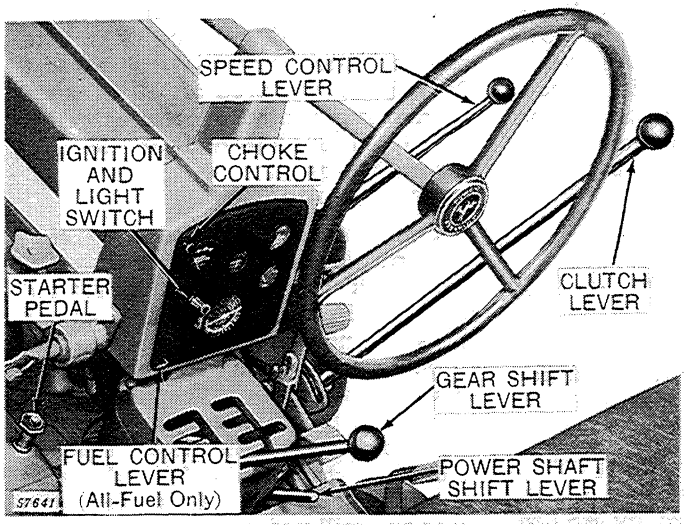
One Type of Fuel Storage Tank

• STARTING THE ENGINE •

All-Fuel Tractors Only.

(1) Close the carburetor drain cock.

(2) Turn on gasoline by setting the fuel control lever to the mark "G."



Starting Controls

All Tractors.

(3) Set gear shift lever in neutral and pull the clutch lever back into disengaged position.

(4) In cold weather disengage the Powr-Trol pump and the power shaft shift lever to relieve drag on cranking motor caused by cold oil.

(5) Pull speed control lever all the way to the rear. Engine will start easier if lever is not advanced.

(6) Turn ignition-light switch to "I" position.

(7) Pull out the choke button.

(8) Step on starter pedal.

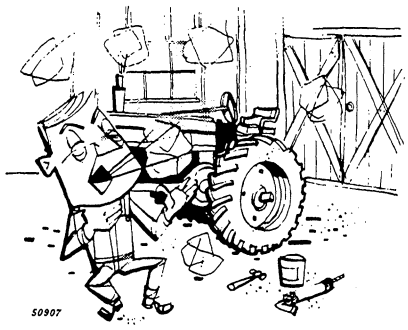
(9) As soon as engine starts, push the choke button in except during cold weather when it may be necessary to leave choke partially open for the first few minutes.

(10) Regulate engine speed by the speed control lever. The engine is set to run at the correct speed when the tractor leaves the factory: 1325 rpm for full load; 600 rpm for slow idle; and approximately 1460 rpm for fast idle. **CAUTION: Under no circumstances should the engine be operated at an idle speed over 1470 rpm.**

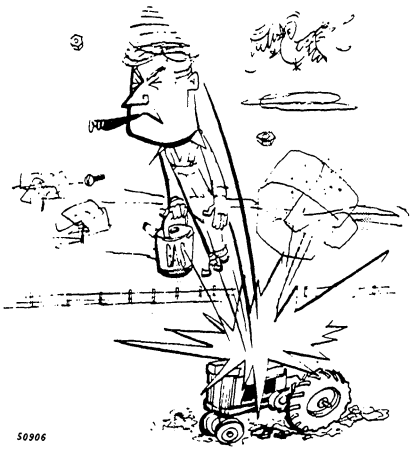
(11) Watch the oil pressure gauge when the engine starts. If the pointer is not between "M" and "H" when the speed control lever is pushed forward, stop the engine immediately and determine the cause of the low oil pressure.

All-Fuel Tractors Only.

(12) For satisfactory operation of the All-Fuel tractor on tractor fuel, warm up the engine before turning fuel control lever to mark "F" to switch from gasoline to tractor fuel.



Always Make Sure There Is Plenty of Ventilation Before Starting Tractor Engine



Never Smoke Around the Tractor When Filling the Fuel Tank

• WARM-UP PERIOD •

Before placing your tractor under full load, be sure it is warmed up to proper operating temperature. When starting to work with a cold tractor it is best to operate for about 30 minutes in a lower gear than is normally required for the load. This will give the oil a chance to circulate freely and will prevent undue wear on engine and transmission parts.

The warm-up period is particularly important when the tractor is operating in and out of dairy barns during extremely cold weather. Because of the high humidity in most dairy barns there is a tendency for moisture to collect in the crankcase. If the engine is not warm, the moisture may freeze resulting in lowered oil pressure. This condition will be reduced to a minimum during cold weather if the engine is allowed to idle for a few minutes to warm it up thoroughly before it is driven into the barn. It is also advisable to change the crankcase oil more frequently. (See page 59.)

• RUN-IN PERIOD FOR THE NEW TRACTOR •

Engine Run-In Period.

Your new tractor was shipped from the factory, with special "breaking-in" oil in the crankcase.

To be sure that all bearing surfaces will be properly lubricated, operate the tractor on a part load for the first 20 hours of operation with the "breaking-in" oil in the crankcase, then drain out the "breaking-in" oil and refill the crankcase with new oil as recommended on page 52.

Powr-Trol System and Power-Shaft Clutch Run-In Period.

The Powr-Trol system and powershaft clutch housing are also filled with "breaking-in" oil when the tractor is shipped from the factory. After 20 hours of Powr-Trol and Powershaft clutch operation, drain out the "breaking-in" oil and fill the system as instructed on pages 62 and 63.

The powershaft clutch should also be checked for proper adjustment after 20 hours of powershaft operation. For instructions on checking and adjusting the clutch see page 79.

• OPERATING THE TRACTOR •

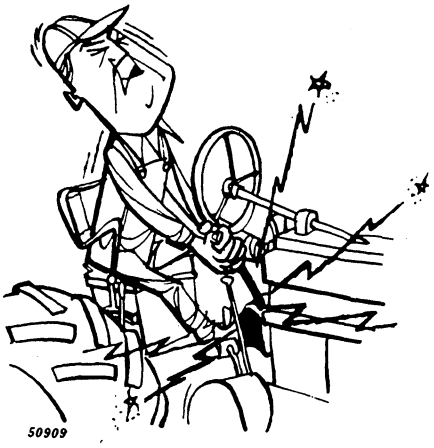
Your John Deere Tractor has six forward speeds and one reverse speed. These various speeds not only give you the flexibility and adaptability you want, but they also enable you to balance the load and the speed for maximum economy. However, if you are handling a light load and want to travel at slow speed, it is far better to put your tractor into the gear which gives you the speed you want than to use a higher gear and throttle down.

DRIVING THE TRACTOR.

(1) With the engine running, release the brake latches on both rear wheel brakes.

(2) If necessary, pull the clutch lever back until pulley brake stops the pulley from rotating.

(3) Shift the gear shift lever into the gear speed desired. If gears do not shift freely, move the clutch lever forward slightly, permitting the pulley to turn slowly. This allows gear teeth to line up for easy shifting. Shift gears carefully. Clashing gears cause unnecessary wear and breakage. Be sure the gear shift lever is moved far enough to place gears in full mesh.

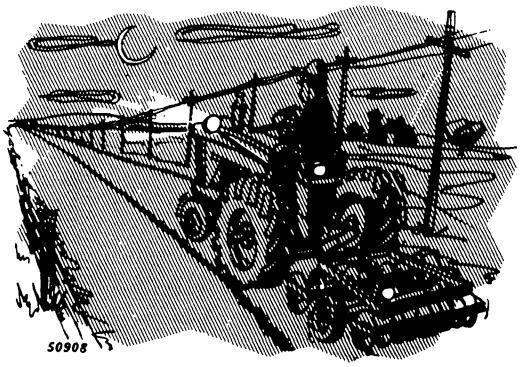


Clashing Gears Cause Unnecessary Wear

(4) When gears are shifted, push clutch lever forward slowly until the tractor picks up speed, then give the clutch lever a quick forward thrust until the clutch snaps into engagement.

DRIVING AT NIGHT.

When towing implements or driving on a public road at night or during other periods of poor visibility, use warning lamps to prevent a collision. Your John Deere dealer can supply you with a tractor-mounted warning lamp and a companion implement-mounted warning lamp which clearly mark the "passing side" of both the tractor and the implement.

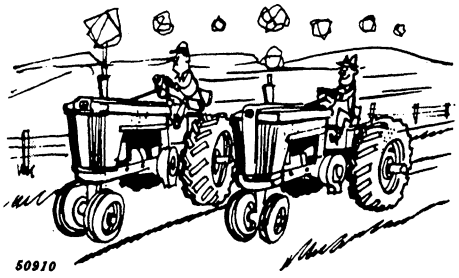


Use Warning Lamps When Driving at Night

The tractor warning lamp is mounted on the end of a mast. On hilly roads you can easily swing the lamp directly overhead to give other vehicles advance warning.

HIGH-SPEED DRIVING.

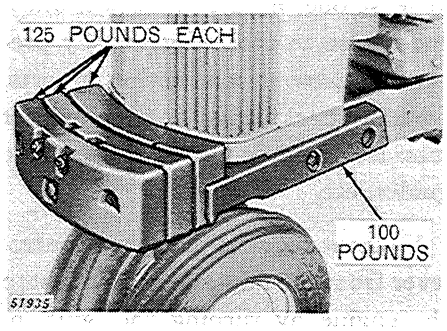
The purpose of the high-speed gear in your tractor is to save you time on highways or on smooth-surfaced secondary roads when going to and from your fields. Regardless of road or field conditions, use care when driving your tractor in high gear. Fast driving is the cause of many accidents. As a safety measure, shift to a lower gear, particularly over rough ground.



Do Not Race Along Highways. Observe All Traffic Rules

FRONT END BALLAST.

Under severe traction conditions requiring maximum rear wheel ballast, add ballast to the front end to maintain satisfactory stability. Also use front end ballast when using heavy rear-mounted integral implements, and when operating the tractor on hilly or steep terrain. Easily installed cast-iron front end weights, available from your John Deere dealer, will provide the desired stability. However, front end ballast **cannot** maintain desired stability if the tractor is driven too fast over rough ground with heavy rear-mounted tools in the raised position. When transporting these tools **play safe and drive slowly.**



Front End Weights

USING THE BRAKES.

Independent brakes on your John Deere Tractor enable you to use the brakes as steering aids when making sharp turns at row ends.

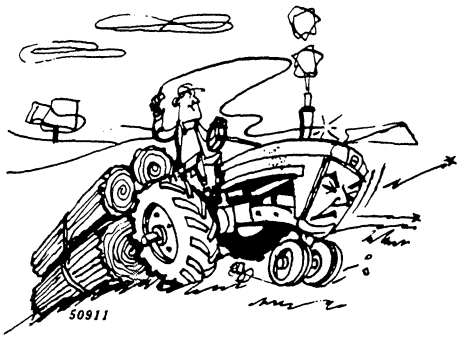
At high speed (5th and 6th speeds), apply the brakes evenly to avoid drawing the tractor to one side.

NOTE: Reduce engine speed first before applying brakes.

Do not apply brakes suddenly, especially when one wheel is spinning. To do so suddenly throws a tremendous load on the transmission and can cause breakage.

OVERLOADING.

Your tractor is designed and built to handle economically and efficiently all jobs within its range of power. To use your tractor on loads beyond its power range causes undue strain on all its parts and will eventually result in unnecessary repair expense and poor operation. An overloaded tractor usually can be detected by a gradual slowing down in speed and a slowing down and laboring of the engine.



Do Not Overload the Tractor

Your tractor was designed to pull its normal load with the carburetor near the three-quarter open position, but 20 to 25 per cent of its power beyond the normal load is available to pull you through tough spots in the field or to clean out a belt machine that has been fed unevenly.

As soon as the carburetor reaches the full-open position, you are using its full power. Beyond this, you are overloading your tractor.

HITCHING.

All drawn tools should be hitched to the drawbar. Do not draw or pull anything from any other place on the tractor. Do not attach a towed load

to the implement hitch bar if your tractor is equipped with Universal Three-Point Hitch (see page 32).

When hitching the tractor to a heavy load by means of a long chain take out any slack in the chain before the power is applied to eliminate jerking into the load.

Use an adequate pin with lock to connect towed implement to drawbar.

Never Drive Too Close to Ditches

STOPPING THE TRACTOR.

To stop the tractor, throttle engine down and disengage clutch by pulling the clutch lever all the way back. The rear wheel brakes can then be used to bring the tractor to a full stop.

Do not use the pulley brake to stop the tractor. This shortens the life of the pulley brake lining.

To reduce wear on clutch facings, always place gear shift lever in neutral after disengaging clutch, and then re-engage clutch if engine is idling. THIS IS IMPORTANT.

To maintain a satisfactory engine temperature when the All-Fuel engine is idling, place throttle lever in the half-open position.

STOPPING THE ENGINE.

Operate the engine at fast idle for at least one minute. This will allow the engine to cool off gradually preventing extreme contraction of parts, possible backfiring, and coking of lubricating oil on piston rings, valve guides, etc.

Without moving the speed control lever from the fast-idle position, stop the engine by turning the ignition-light switch to the "OFF" position.

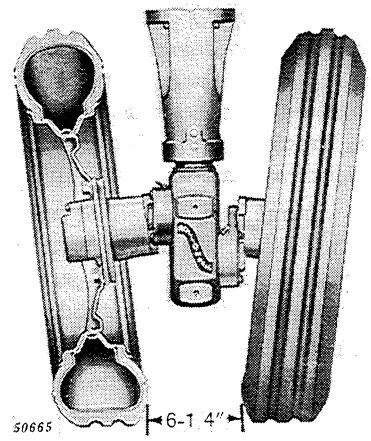
On an All-Fuel Tractor turn off the fuel supply at the three-way valve and drain the carburetor as soon as the engine has stopped.

Never drain the cooling system immediately after stopping the engine.

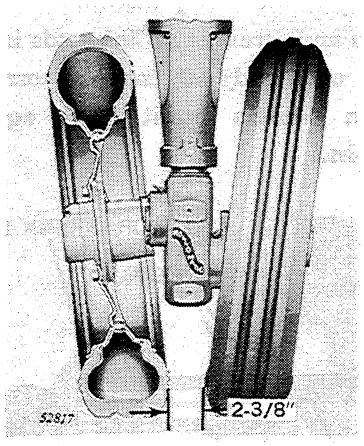
• FRONT WHEEL TREAD ADJUSTMENT •

DOUBLE FRONT WHEEL AND ROLL-O-MATIC SPACING.

The space between the front wheels can be set at 2-3/8 or 6-1/4 inches by reversing the wheels.



Front Wheels Set at Wide Spacing

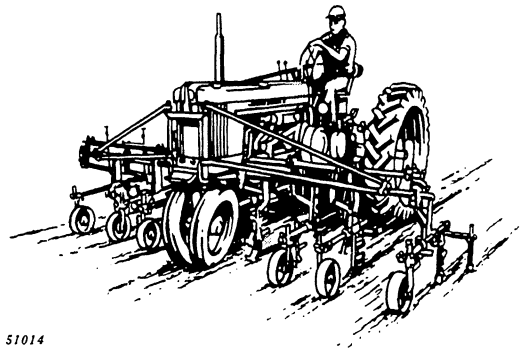


Front Wheels Set at Narrow Spacing

For easier steering during normal field operations, the wheels should be set to the narrow position.

Where listed crops are grown, it will be easier for the operator to keep the front wheels on the listed ridges if the spacing between the front tires is increased by removing the six hub bolts and reversing the wheels.

This extra clearance is also an advantage when the tractor is operated in muddy conditions. Mud will not accumulate under the frame or "ball up" between the wheels.



ADJUSTABLE-TREAD FRONT AXLE.

The telescoping adjustable-tread front axle provides tread widths of 48 to 80 inches. From 48 to 68 inches adjustment can be made in 2-inch steps. From 68 to 80 inches the adjustments are made in 4-inch steps.

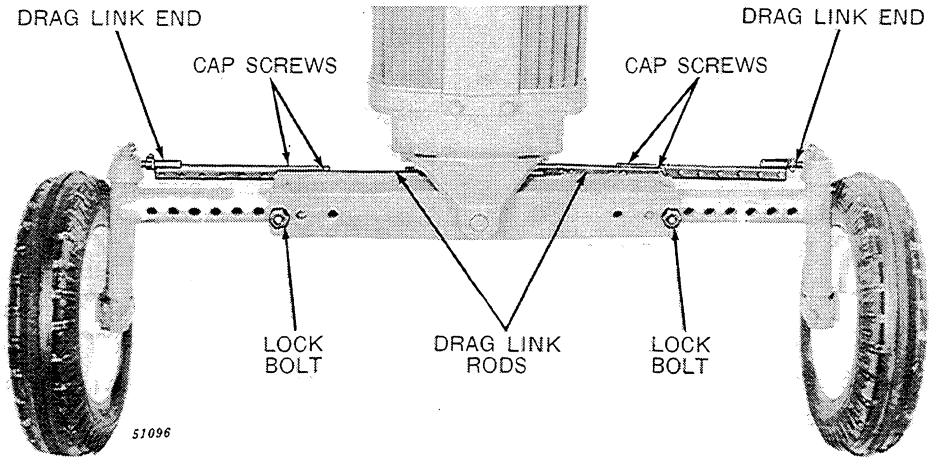
To change tread width, remove lock bolts which hold telescoping portions of axle together, and two cap screws on drag link rods.

Jack up the front of the tractor and move front axle knees to the desired tread width. Replace bolts and cap screws. Coat any unpainted surfaces with rust preventive or heavy grease.

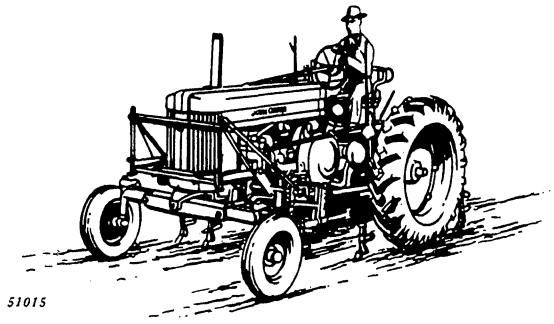
TOE-IN ADJUSTMENT.

Turn the steering wheel until the front wheels are pointing straight ahead, parallel to the centerline of the tractor.

Measure the distance from tire to tire at axle height, at front of tires and at rear of tires. The front measurement should be 1/8 to 3/16-inch less than the rear measurement. If toe-in is incorrect, disconnect drag links and screw drag link ends in or out until adjustment is correct. **Both wheels must have equal toe-in.**



Front Wheel Tread Adjustment and Toe-In Adjustment



MEMORANDA

• REAR WHEEL TREAD ADJUSTMENT •

RANGE OF ADJUSTMENT.

No matter what crops you grow, no matter what row spacings are required, you can obtain the exact wheel tread you need.

On a tractor equipped with regular axles and regular 36-inch wheels the tread can be adjusted from 56 to 88 inches.

On a tractor equipped with long axles and regular 36-inch wheels the tread can be adjusted from 62-1/2 to 97-3/4 inches.

Reversing the wheels on the axle is not necessary to obtain these tread ranges.

On tractors with long axles and off-set wheels with 36-inch tires the tread can be adjusted from 56 to 91-1/4 inches without reversing the wheels, and from 68-3/4 to 104 inches by reversing the wheels.

On tractors with power-adjusted rear wheels, the tread range is 56 to 94 inches on regular axles and 59 to 104 inches on long axles.

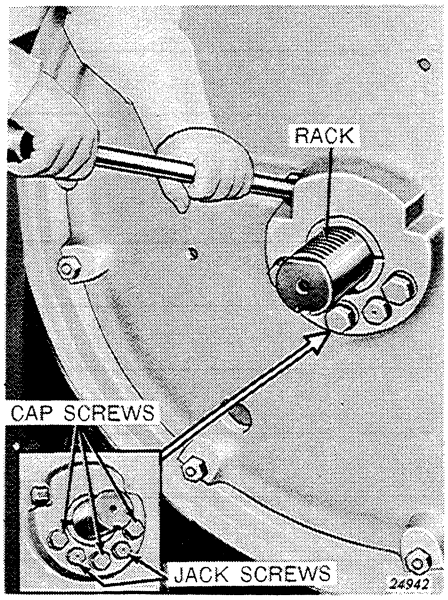
CHANGING REAR WHEEL TREAD.

Two means of adjusting wheel tread are provided. Intermediate adjustments are made by a pinion gear located in the wheel hub which engages a rack on the axle. Turning the pinion gear causes the wheel to slide in or out on the axle.

Extreme adjustments are obtained by changing the position of the tire and rim on the wheel.

Pinion and Rack Adjustment.

Rotate the wheel until the rack on the axle is up as illustrated. This position is important to provide proper action between the pinion gear and rack.



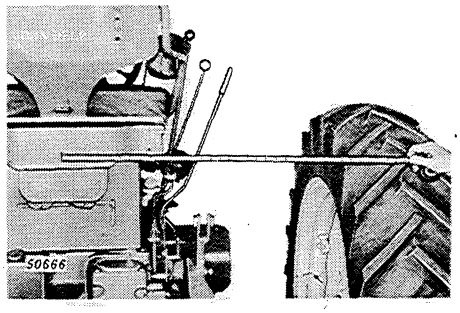
Adjusting Rear Wheel Tread

Loosen the three cap screws and screw them out 1/4 to 3/8-inch.

Turn the two jack screws clockwise with a wrench until the outer groove in each jack screw is flush with the outer surface of the wheel hub.

Jack up the rear end of the tractor and move the wheel in or out on the axle by turning the pinion shaft with the flywheel wrench furnished with the tractor or any other suitable wrench.

It is important that both wheels be set the same distance from the center of the tractor. A slotted hole on the back of the battery compartment is on the exact center line of



Measuring Distance from Center of Tractor to Tire

the tractor. When setting rear wheel tread, use this slot to get the wheels spaced just right.

When desired wheel setting has been obtained, back out the jack screws until inner groove of each jack screw is flush with face of hub. Tighten cap screws securely. Avoid adjusting wheel too close to the rear axle housing. It is possible to damage the adjusting pinion when the hub is tightened.

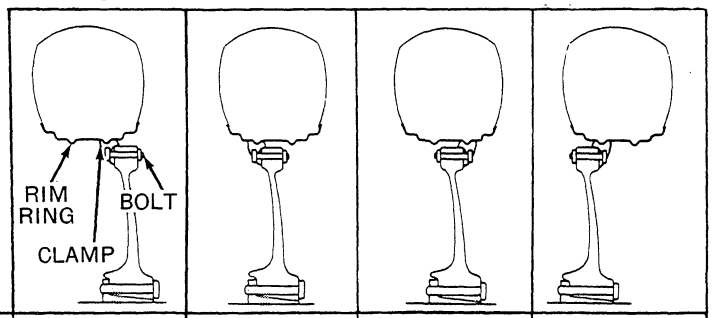
NOTE: The adjustment described above can be made with two wheel weights installed. If additional weights are attached they must be removed to obtain wrench clearance for turning the pinion.

Changing Position of Rim on Wheel.

To obtain the extreme tread adjustments which cannot be made with the rack and pinion, shift the position of the rim on the wheel. The rim is held to the wheel by eight clamps which engage one of two raised rings around the inside of the rim. The clamps bolt to either side of the lugs on the wheel and can engage either of the two rings in the rim. Thus, four combinations are available. The maximum and minimum tread widths that can be obtained in each of the four combinations are shown in the chart below.

To change position of rim, jack up the tractor until there is little or no weight on the tire. Remove the rim clamps and shift the wheel in or out by means of the rack and pinion until the proper side of the clamp lugs lines up with the proper rim ring to give the desired setting. Install clamps and tighten retaining cap screws securely.

NOTE: To obtain the maximum tread width of 104 inches on tractors with long axles, it will be necessary to reverse the wheels.

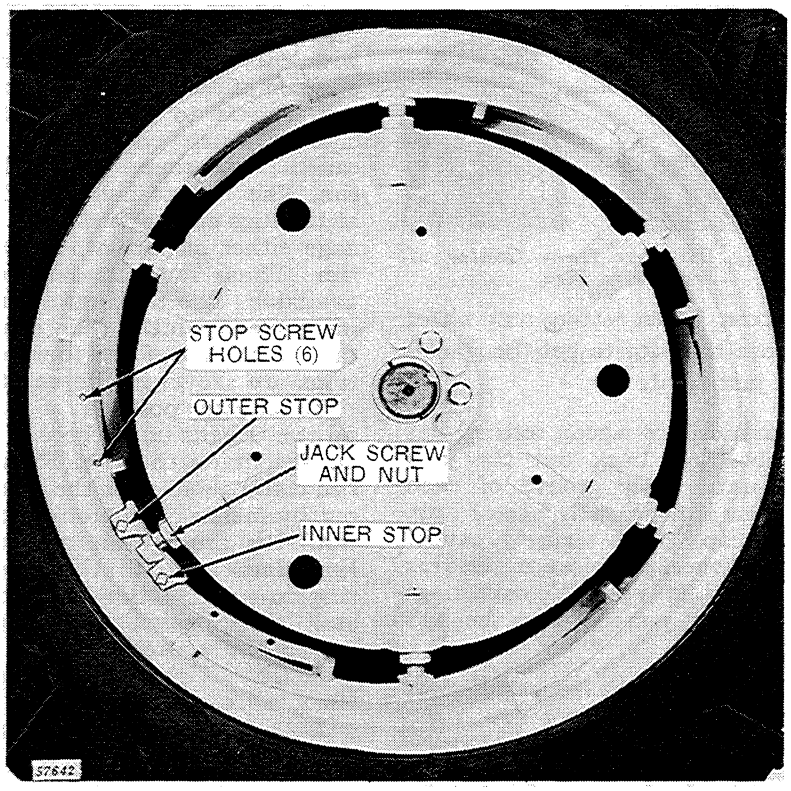


Regular Axles	56″–73″	64″–81″	63″–80″	71″–88″
Long Axles	62-1/2″–82-3/4″	70-1/2″—90-3/4″	69-1/2″—89-3/4″	77-1/2″—97-3/4″
Long Axles, Offset Wheels, "Dish" in	56″–76-1/4″	64″–84-1/4″	63″–83-1/4″	71″-91-1/4″
Long Axles, Offset Wheels, Wheels Reversed, "Dish" Out	72-3/4″-89″	79-3/4″–96″	80-3/4″–97″	87-3/4″–104″

61115

Rear Wheel and Rim Combination

• POWER-ADJUSTED REAR WHEELS •



Power-Adjusted Rear Wheel

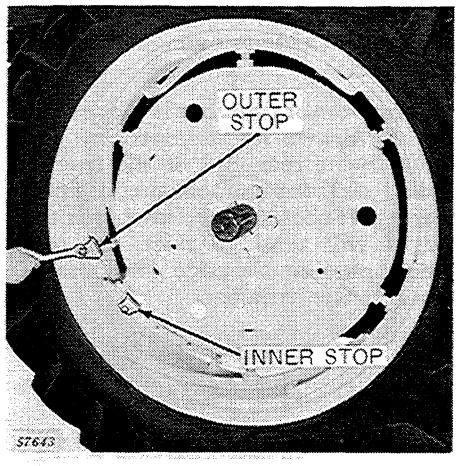
Power-adjusted rear wheels, optional equipment on your General-Purpose tractor, make it possible for you to change wheel tread by engine power without jacking up the tractor. In addition to this special feature, the power-adjusted wheels can be moved in or out on the axles by means of a pinion and rack just like regular wheels. (See page 24.)

The power-adjusted wheels give you seven different tread settings of 4 inches apart, or a total of 24 inches of adjustment without moving the wheels on the axles.

Notice that the power-adjusted wheels have six "jack screws" which clamp the wheel disks to spiral rails on the rims. One rail has six holes into which stops can be placed to "predetermine" the new wheel setting. **CAUTION: If tread is to be decreased to the minimum, position wheel far enough outward on axle to allow travel of power-adjusted rim inward without interference with either fenders or belt pulley shield.**

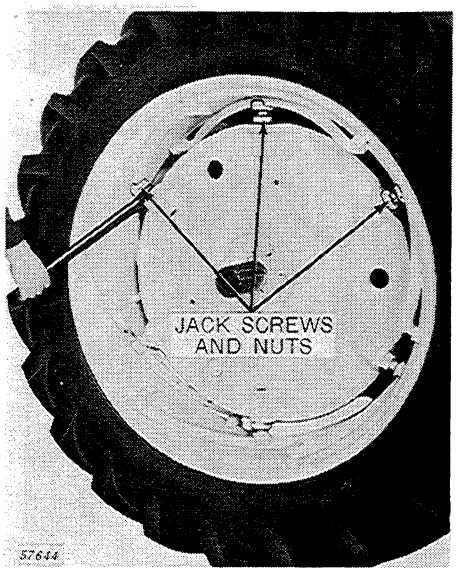
Adjust wheels one at a time.

To change tread adjustment, first remove the screw in the stop on the side of the rail toward which the wheel is to be rotated. Move the stop to the new tread position, then replace and tighten the set screw through the proper hole in the rail.



Setting Stops

Now loosen the nuts on the three uppermost adjacent jack screws, using the special wrench provided.



Loosening Jack Screws and Nuts

Start the tractor engine and shift into first or reverse gear.

To move the left wheel outward or the right wheel inward, use first gear.

To move the left wheel inward or the right wheel outward, use reverse gear.

Apply the brake on the side which is not being adjusted and slowly engage the clutch. The wheel disk will rotate until the jack screw contacts the preset stop. Disengage the clutch and shift to neutral. Move the second stop against the jack screw and tighten set screw securely.

Tighten the three loosened jack screw nuts an equal number of turns until each nut is tightened to the equivalent of 250 foot-pounds torque. This is approximately the same as 160 pounds pull on the wrench at the hole near the end of the handle.

Adjust jack screws until the distance from the heel of the jack screw to top of nut is equidistant on all jack screws.

Now adjust the second wheel in the same manner.

Recheck all jack screw nuts for proper tightness after the tractor has been operated a short time. *NOTE: It is very important that the nuts be tightened evenly to keep the rim centered around the wheel disk.*

Never lubricate the jack screw nut bearing surface or the mating surface on the cast disk drive wheel.

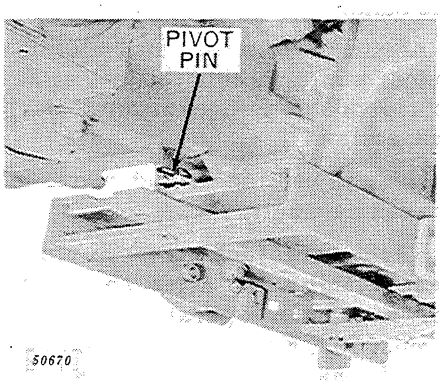
The complete range of tread widths can be obtained, both on tractors equipped with regular or long axles, without reversing the wheels.

• DRAWBAR ADJUSTMENTS •

Hitch all drawn equipment *only* to the drawbar. Do not attach a towed load to the implement hitch bar if your tractor is equipped with Universal Three-Point Hitch. Use an adequate pin with lock to connect towed implements to the drawbar.

The drawbar has three main adjustments which, together with adjustments provided on the plow or other drawn implement, enable the operator to obtain a correct line of draft. Correct line of draft is essential for greatest amount of drawbar pull, easy steering, and least amount of rear wheel slippage.

To make the various drawbar adjustments, line up handle on drawbar pivot pin with slot on drawbar front support. Lift up pin and move swinging drawbar to desired position. Drop pin in place and turn handle to lock.



Drawbar Pivot Pin

LENGTHWISE ADJUSTMENT.

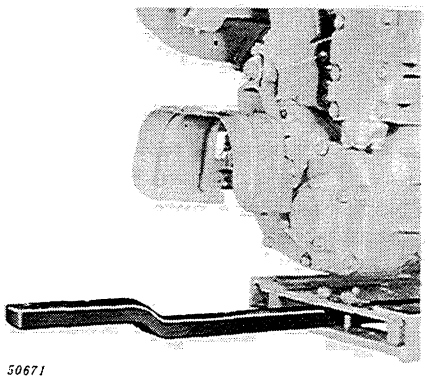
The swinging drawbar is provided with two lengthwise adjustments so that the drawn implement can be hitched closer to or farther from the tractor.

Tractors are shipped from the factory with the swinging drawbar in the short position. This position is recommended for general work.

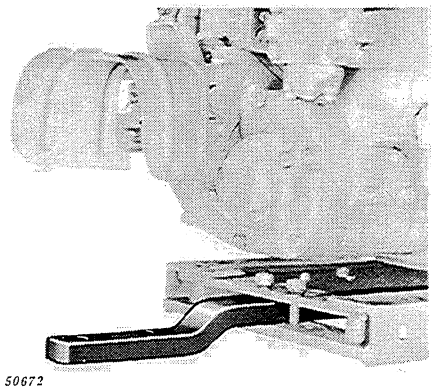
VERTICAL ADJUSTMENT.

Due to variable land conditions and variable heights of hitch points on tractor-drawn implements, the drawbar may have to be raised or lowered to obtain maximum traction and effective steering. Turn the swinging drawbar over to change its height.

If the tractor drawbar is placed too high the drawn implement may pull down on the rear end of the tractor raising the front end, causing difficult steering. If the tractor drawbar is too low, it will tend to raise the rear wheels causing slippage and loss of power at the drawbar.



Drawbar in Long High Position



Drawbar in Short Low Position

HORIZONTAL ADJUSTMENT.

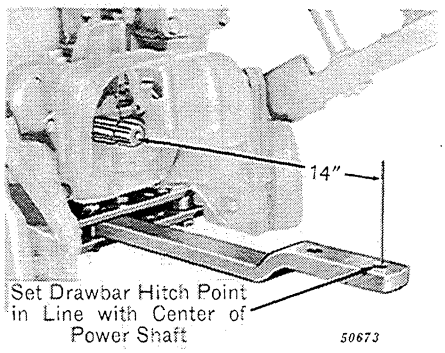
The crossbar, upon which the swinging drawbar swings, has a series of holes used for locking the swinging drawbar in any one of a number of fixed horizontal positions. Bolts or pins dropped in the holes on both sides of the swinging drawbar will hold it in place.

For disking, harrowing, and other similar work where it is necessary to turn corners under load, the drawbar should be free to swing.

RELATION BETWEEN DRAWBAR AND POWER SHAFT.

When power shaft is used, set swinging drawbar in line vertically with center of power shaft and lock it in position by tightening drawbar locking bolts.

The tractor drawbar should be set lengthwise so that the hole in the end of the drawbar is 14 inches behind the end of the power shaft.



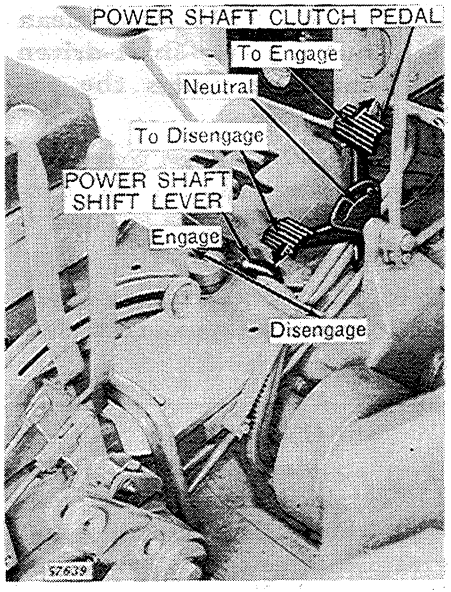
Drawbar Adjustment for Power Shaft Driven Implements

Possible damage to the universal joints on the drawn implement will be avoided if these simple adjustments are made before the implement is attached to the tractor.

• POWER SHAFT OPERATION •

The power shaft on your new tractor provides continuous power for operating PTO machines as long as the engine is running. Its operation is completely independent of the transmission or main clutch. The power shaft is 1-3/8 inches in diameter and rotates at 529 rpm when the engine is running at rated speed.

To engage the power shaft, stop the engine and push the power shaft shift lever to the left. It may be necessary to turn the engine over by means of the cranking motor with the ignition switch off to engage the gears.



Power Shaft Shift Lever and Clutch Pedal

The power shaft is started and stopped by a special clutch which makes it easy and convenient to operate the shaft independent of tractor motion. The clutch is operated by a double pedal located to the right of the gear shift lever. Pushing

forward on the upper pad of the double pedal engages the clutch. When engaging the clutch, push the upper pedal pad slowly forward to take up the load gradually. Pushing the lower pedal pad part way down disengages the power shaft and places the clutch in a "neutral" position, making it easy to turn the power shaft by hand to line up the splines when connecting to power shaft driven implements or when adjusting the clutch. **CAUTION: Never turn the power shaft by hand with the engine running.** Pushing the lower pedal pad all the way down until it latches, applies a brake to the power shaft to keep it from turning when not in use.

CAUTION: Never clean out a power-shaft-driven machine unless the engine is stopped.

NOTE: Whenever the power shaft is used for stationary work, the engine clutch should always be engaged to rotate the pulley.

It is good practice to disengage the shift lever when the power shaft is not in use.

CAUTION: Keep power take-off shield in place at all times except when using certain integral equipment which requires its removal. Never remove the flipper guard. Make it a rule never to dismount from the tractor without first disengaging the power shaft.

When using the power shaft, be sure the drawbar is set and locked in the correct position. (See page 29.)

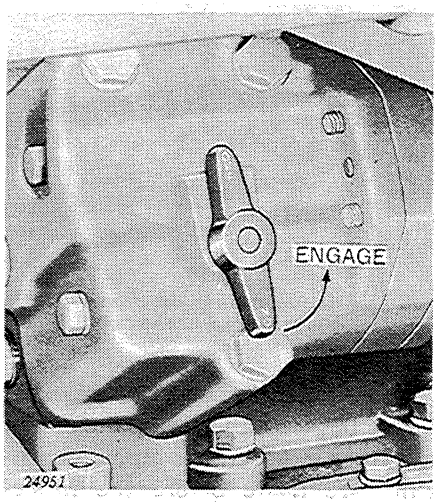
• CUSTOM POWR-TROL •

The hydraulic system on your tractor is completely independent of the clutch or power shaft. The system may consist of a "position-responsive" hydraulically-operated rockshaft or a combination of rockshaft with one or two remote cylinders, and also a choice of "solid" or "split" front-mounted rockshaft.

In addition, a tractor equipped with position-responsive rockshaft may have a Universal Three-Point Hitch and Load-and-Depth Control which are described in detail on page 32.

ENGAGING THE POWR-TROL PUMP.

To engage the pump, **stop the engine** and turn the control lever counter-clockwise. It may be necessary to turn the engine over with the cranking motor, with ignition switch off, to allow the gears to engage. The pump can be disengaged with the engine idling, simply by turning the control lever clockwise. *NOTE: When not using the Powr-Trol system it is good practice to disengage the pump.*

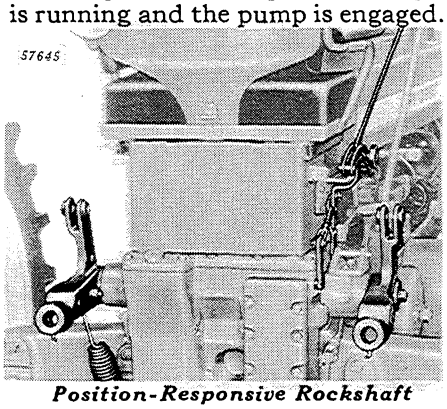


Powr-Trol Pump Control Lever

• POSITION-RESPONSIVE ROCKSHAFT •

The hydraulically-operated position-responsive rockshaft on your new tractor can be used to control a wide variety of integral and three-point-hitch tools.

"Position-responsive" means that the position of the rockshaft is always in direct relation to the position of the control lever in the quadrant. Any setting between maximum depth and maximum height can be obtained merely by moving the lever. Thus, the rockshaft can be quickly moved through its full range or "inched" to any position in-between. The rockshaft can be operated whether the tractor is moving or standing still as long as the engine is running and the pump is engaged.

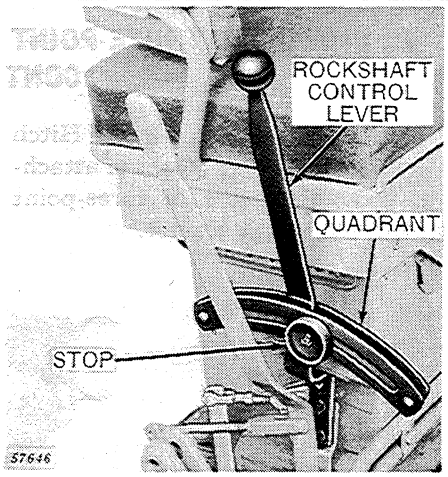


Position-Responsive Rockshaft

Control Lever.

Moving the control lever *to the rear raises* the implement, while moving the lever *to the front lowers* the implement. A depth control stop on the quadrant can be set (after a few minutes operation to determine the desired position) so that the implement always returns to the same working depth after it has been raised.

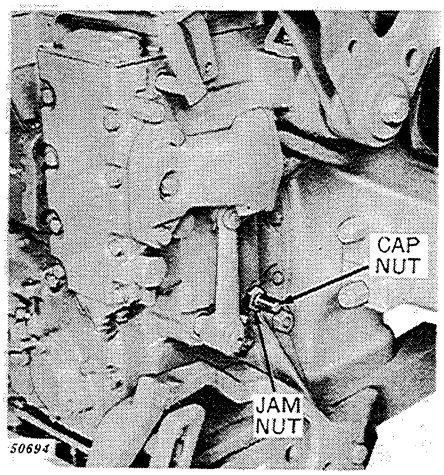
After the stop has been set, it occasionally may be necessary to vary the set depth of the implement. If you want to raise the implement slightly, move the control lever slightly to the rear. If you want to lower the implement beyond set depth, move control lever to inner side of quadrant and push it past the depth control stop.



Rockshaft Control Lever, Quadrant and Stop

Adjustment for Speed of Rockshaft Drop.

The speed at which the rockshaft (and implement) drops can be regulated by the throttle valve located on the lower right-hand side of the rockshaft housing. To adjust the valve, remove the cap nut, loosen the jam nut and turn the slotted screw "in" to decrease speed or "out" to increase speed. Retighten jam nut and install cap nut firmly on gasket seat. Adjust throttle valve to give a smooth drop of the implement or other load. Particularly when using a boom or planter, adjust for a slow drop.

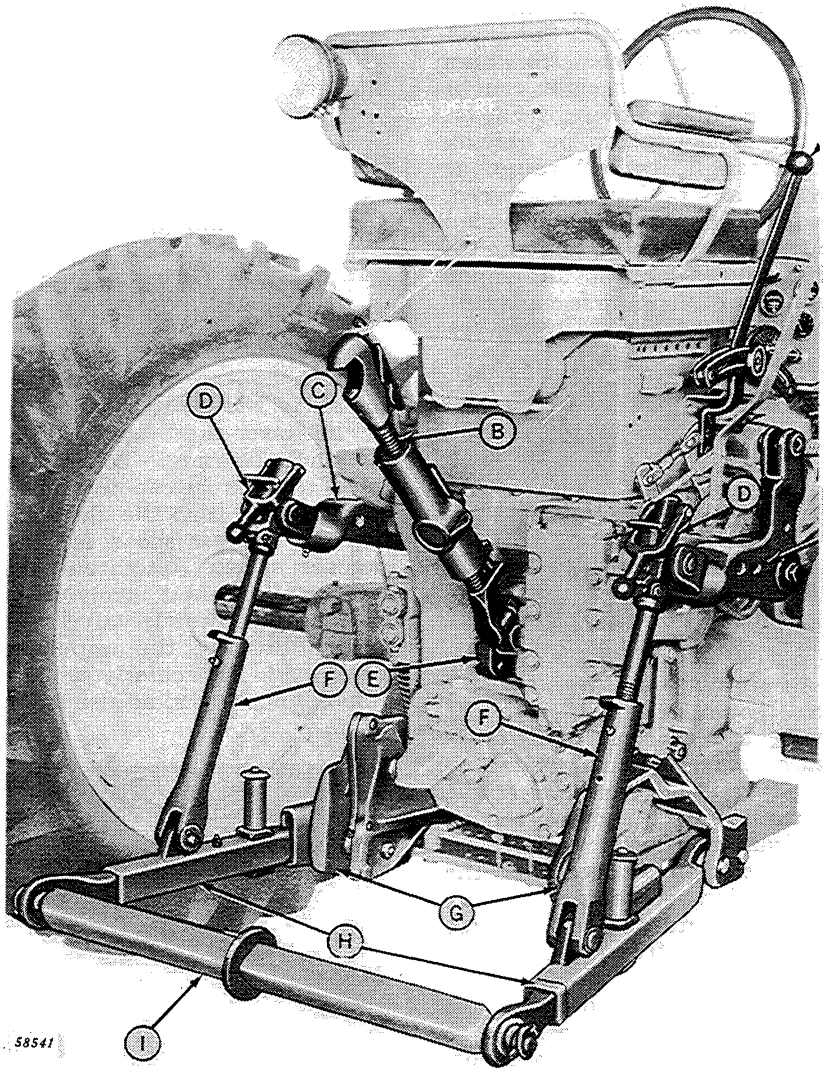


Throttle Valve Screw Cap Nut

• UNIVERSAL THREE-POINT HITCH WITH LOAD-AND-DEPTH CONTROL •

The Universal Three-Point Hitch provides a fast, easy means of attaching a complete line of three-point implements to the tractor.

The hitch consists of the position-responsive rockshaft and lift arms, the two draft links and draft link supports, the lift links which are the



A —Control Lever
B —Upper Link
C —Lift Arms
D —Leveling Cranks
E —Load Control Yoke
F —Lift Links
G —Sway Locks
H —Draft Links
I —Hitch Bar

Universal Three-Point Hitch

connection between the draft links and the rockshaft lift arms, and the easily-adjusted upper link which connects the mast of the implement to the exclusive John Deere Load-and-Depth Control System.

The rockshaft control lever, located at the right of the tractor seat, provides easy, positive control of the implement through the rockshaft hydraulic system. The position of the rockshaft (and the working position of the implement) is determined by the location of the control lever on the quadrant. Any movement of the control lever results in a corresponding movement of the rockshaft and of the implement attached to the Three-Point Hitch.

With Load-and-Depth Control the implement is able to follow variations in ground contour. Changes in the thrust placed on the upper (or center) link operate the tractor hydraulic system to keep the implement working at a very uniform depth. For instance, when tractor front wheels rise up on a ridge or drop into a depression the system responds to maintain the set working depth of the implement.

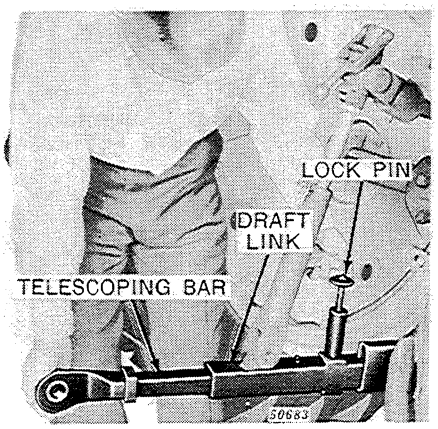
Of equal importance is the way John Deere Load-and-Depth Control boosts traction and takes full advantage of tractor power to do the best job in any soil conditions. Working depth will not vary for small changes in soil conditions or for tough spots that are small in area.

Only when there is a sustained increase in draft will there be a change in the implement working depth.

When Load-and-Depth Control is properly adjusted, only enough lifting of the implement occurs to prevent power stalls. The load on the rear wheels varies with soil conditions. Additional weight is transferred to the rear wheels when tough conditions are encountered to reduce or prevent wheel slippage.

Draft Links.

Both draft links are fastened to the drawbar frame by pivot pins and are raised and lowered hydraulically through the lift links and lift arms which are attached to the tractor rockshaft.



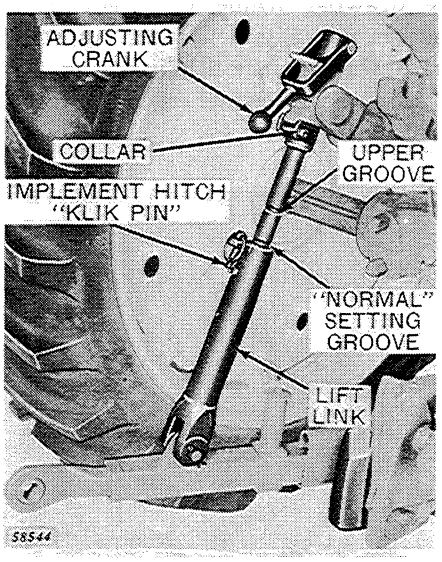
Draft Link and Lock Pin (Draft Link Extended)

The draft links have telescoping bars and swivel ball sockets which make it easy to hook up the implement crossbar even when it is not square to the tractor. The telescoping draft links may be extended to the rear after pulling up on the lock pin. After the implement is hitched to the tractor, the draft links are returned to and locked in normal operating position by backing up the tractor or lifting the links hydraulically.

Lift Links.

The lift links are attached to the rockshaft lift arms and to the draft links.

Both lift links are provided with leveling screws and cranks for lateral (or sidewise) leveling of the implement. The left lift link is usually set in the "normal" position which is indicated when the lower of two grooves cut around the lift link rod is lined up with top of lift link body.



Left Lift Link

If additional transport clearance is required for certain implements, the left lift link can be shortened, by means of the crank, to the upper groove cut around the lift link rod. This shortens the lift link 2 inches higher than the normal setting. A corresponding groove, located on the right-hand lift link rod, represents the short position. If additional working depth is required with certain implements, the left lift link may be lengthened 2 inches from the normal setting.

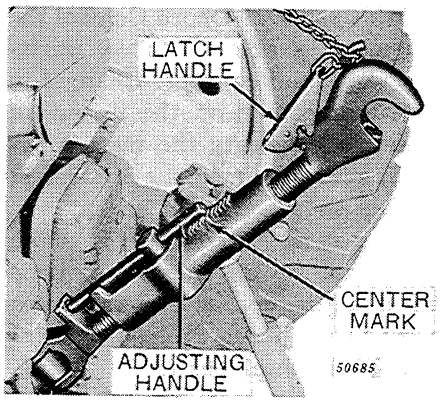
After the implement is attached, it is leveled laterally by means of the crank on the right-hand lift link.

When not in use, both lift link cranks are dropped to the rear where they lock in position and cannot turn.

Some implements are designed to "float"; that is, to follow the contour of the ground (such implements are usually equipped with gauge wheels). When using one of these implements, remove collars from top of lift links to permit up-and-down movement of the lift links. For safe keeping, install the collars below the shoulder on the lift links.

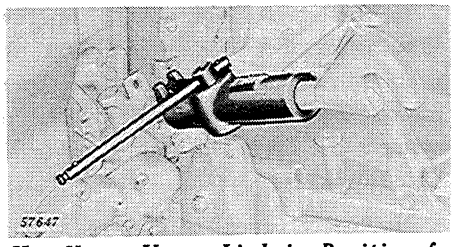
Upper Link.

The upper link provides the connection between the implement mast and the control yoke on the tractor. Thrust on the upper link actuates the Load-and-Depth Control System.



Upper Link

Fore-and-aft leveling of the implement is accomplished by changing the length of the upper link. The upper link body is equipped with a handle for this purpose. When in use, the handle is pulled back and turned until it is at right angles to the body. After proper adjustment is made, the handle is turned parallel with the body, then it is pushed forward and slipped into a hole to hold the upper link in adjustment.



Handle on Upper Link in Position for Making Fore-and-Aft Adjustment

As long as the threads projecting from both ends of the upper link body are equal in length, the center mark or projection on the body, when lined up with rear end of handle, indicates normal fore-and-aft adjustment with the link 24-1/4 inches long. Other settings will be necessary for various implements. Each projection on the body represents 1/2-inch change in length of the upper link. Some implements such as disk harrows, disk tillers and disk plows require a longer upper link as an aid in getting penetration of the rear of the implement.

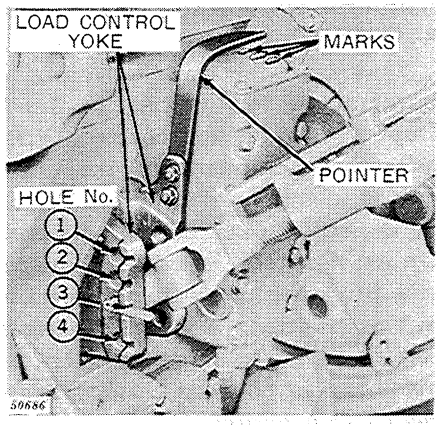
After upper link is attached to ball on implement mast, the latch handle must be pushed down to insure that it is in locked position. Snap the end of the support chain in the hole in right-hand side of body to prevent it from wedging between the implement mast and the upper link hook.

When upper link is detached from implement mast, **wrap the chain around hook on top of upper link hook and fasten the snap on end of chain to clip on rear of seat.**

Load Control Yoke and Pointer.

The load control yoke has four attaching holes for the upper link. These holes determine the sensitivity of the Load-and-Depth Control System. The bottom hole (No. 4) is the most sensitive and the top hole (No. 1) least sensitive.

The proper hole to use is specified



Load Control Yoke and Pointer

in most John Deere Implement Operator's Manuals. If you are using an implement for which this information is not available, refer to chart on page 41. In addition, markings underneath a pointer attached to the control yoke, enable you to check to see that the proper hole is being used.

When tractor and implement are in operation, the rear edge of the pointer should "float" over the center mark underneath the pointer. The position of the pointer indicates the amount of compression on the load control spring.

If pointer hovers over front marker, there is not enough compression and tractor may pull the implement out of the ground when it goes over a hump or when the front wheels drop into a hole.

If pointer hovers over rear mark, there is too much compression on the load control spring and the hydraulic system may not respond to an increase in draft. When this happens, there will be no load control and, in extreme conditions, the tractor may stall.

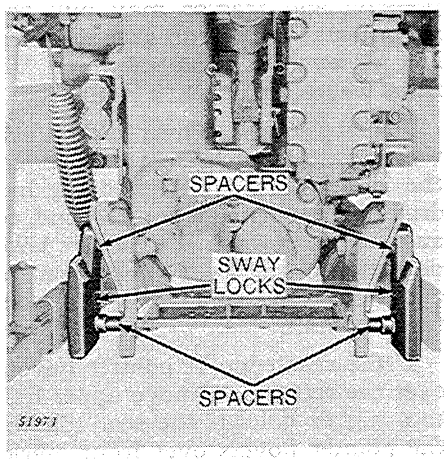
If the rear edge of pointer hovers over the rear mark, move upper link to a higher hole. If the rear edge of the pointer hovers over front mark, move upper link to a lower hole.

Implements Not Requiring Load-and-Depth Control.

There are certain self-gauging implements for which Load-and-Depth Control is not required. When using these implements, the upper link is installed in top (No. 1) hole in control yoke. The Load-and-Depth Control is essentially insensitive when upper link is installed in this position. *When using implements which are self-gauging, the control lever must be pushed to the forward end of the quadrant.*

Sway Locks.

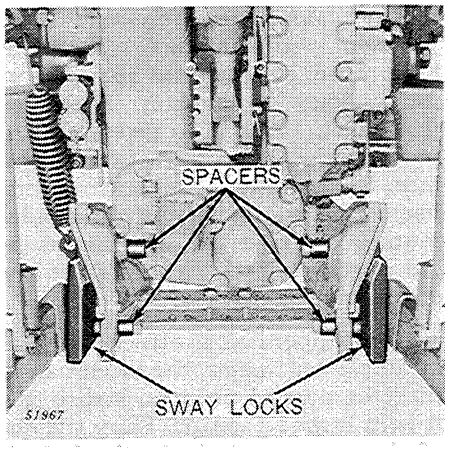
When using some implements such as bedders, tool bar cultivators, rear blades, etc., which require accurate trailing behind the tractor, it is necessary to eliminate implement side motion. In these cases, sway locks must be installed on the outside of the draft link supports. If the implement has a wide spacing between the draft link attaching points (*Category II implements with 1-1/8-inch hitch pins), spacers are used between the sway locks and the draft link supports.



Sway Locks Installed in Wide Position

If the implement has a narrow spacing between the draft link attaching points (*Category I implements with 7/8-inch hitch pins), the spacers are installed inside the draft link supports.

Normally, even with sway locks installed there is a small amount of implement side motion. If it is desirable to eliminate all side motion, washers can be used to shim the sway locks outward.



Sway Locks Installed in Narrow Position

Sway locks should not be used with such implements as plows, disk harrows, and tillers. The rear of these implements is a considerable distance behind the tractor and the implements should be free to trail.

When implement is in the transport position, sway is restricted by cam action on the draft link supports.

For recommended use of sway locks with various types of implements, see chart on page 41.

**For definition of Categories I and II, see next page.*

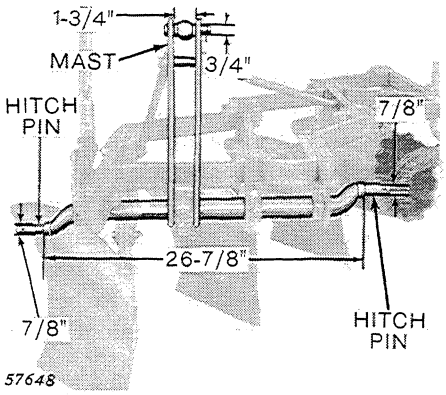
Implement Hitch Bar.

Some implements require a separate hitch bar which attaches between the two draft links. The hitch bar is illustrated on page 32. See page 39 for instructions on hitching implements to the hitch bar.

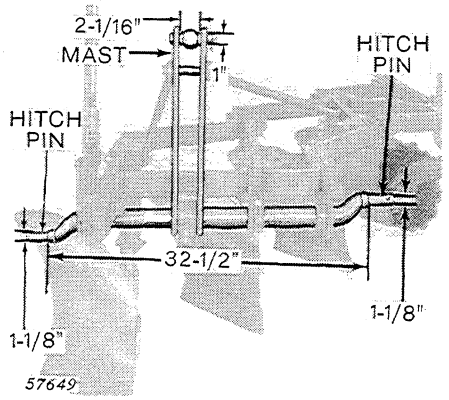
CATEGORIES I AND II IMPLEMENTS.

Two classes of implements are available for use with tractors having a three-point hitch. These implements are classed as Category I or Category II, depending on the dimensions of the attaching points.

Distinguishing dimensions of each category are shown in the illustrations below.



Distinguishing Dimensions of Category I Implements



Distinguishing Dimensions of Category II Implements

Category I implements have 26-7/8 inches between the shoulders of the hitch pins, which are 7/8-inch in diameter. They also have 1-3/4 inches between inside surfaces of mast, and a 3/4-inch diameter hole at mast attaching point.

Category II implements have 32-1/2 inches between the shoulders of the hitch pins, which are 1-1/8 inches in diameter. They also have 2-1/16 inches between inside surfaces of mast, and a 1-inch diameter hole at mast attaching point.

ATTACHING IMPLEMENTS TO HITCH.

(1) Before attempting to attach an implement to the tractor, make sure it has the correct mast ball and that the mast ball is free to turn on the pin. The mast ball for Category I implements has a 3/4-inch diameter hole for the mast pin. The mast ball for Category II implements has a 1-inch diameter hole. In addition, Category I implements require the use of bushings in the draft link swivel balls. See your John Deere dealer if your implement is not equipped with these adapting parts.

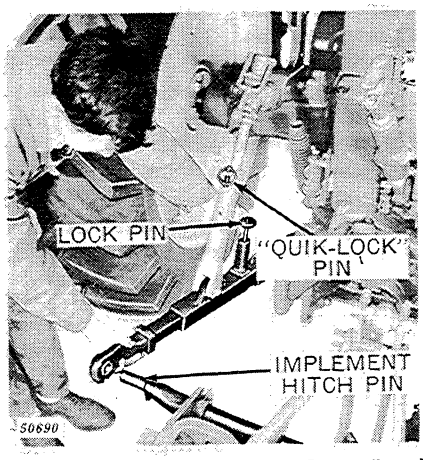
(2) To provide adequate tractor stability when the implement is being transported, install front end weights which can be obtained from your John Deere dealer. See page 19.

(3) Set tractor swinging drawbar in the short high position. For short-coupled implements such as a moldboard plow, bolt drawbar to the extreme left-hand side of the support. It is normally necessary to remove the power shaft master shield for clearance of short-coupled implements—the flipper guard will cover the power shaft.

(4) Back up the tractor until draft links are approximately in line with or slightly ahead of the attaching points of the implement cross-bar. Set brakes to prevent tractor from rolling.

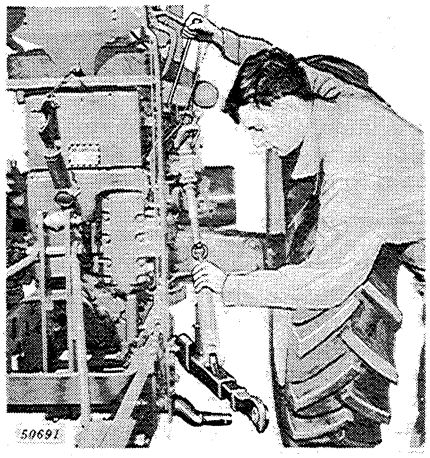
(5) Pull up on the draft link locking pins and extend the draft links rearward.

(6) Usually one draft link will be higher with respect to the implement hitch pins than the other. Align the higher draft link with the corresponding hitch pin by means of the hydraulic control lever. It is easier to raise the draft link end slightly higher than the implement pin and then allow the draft link to lower slowly until it is in line with the hitch pin. Now pull the telescoping draft link rearward and slip ball socket over the lowest implement hitch pin. Lock it in place with the "quik-lock" pin provided.



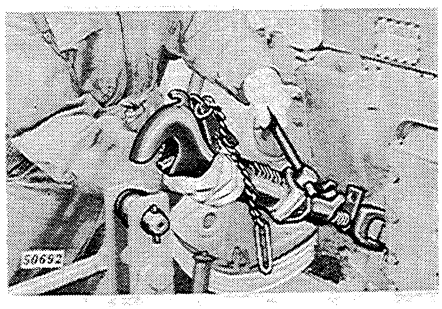
Attaching Left Draft Link to Implement Hitch Pin

(7) Raise implement slowly by means of the hydraulic control lever until the opposite draft link lines up with the implement hitch pin. Install draft link on hitch pin and lock it in place with the "quik-lock" pin.



Attaching Right Draft Link to Implement Hitch Pin

(8) Close the telescoping draft links either by raising and lowering the implement with the hydraulic control lever or by releasing the brakes and backing up the tractor. **Be sure lock pins snap into place.** Drop upper link hook on implement mast ball. It may be necessary to change length of the upper link by means of the adjusting handle before upper link hook and implement mast ball will engage.



Attaching Upper Link to Implement Mast

Lock socket firmly on mast ball by pushing down on the latch handle. Clip loose end of upper link chain to hole in right side of upper link body.

(9) Raise the implement slowly and watch for any points of interference. Be sure that the draft link locking pins are latched before operating in the field.

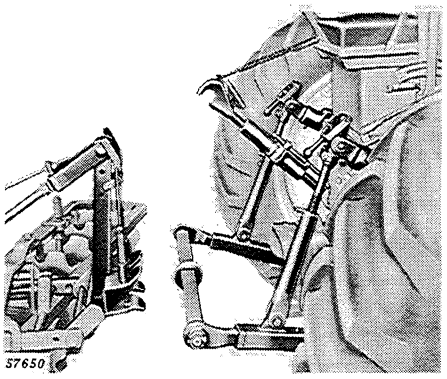
NOTE: Lower the implement to the ground when it is not in use.

CAUTION: If implement does not stand steady alone when disconnected from the hitch, use a block or stand to support it.

Hitching Implements to the Hitch Bar.

Back tractor into place, positioning the square bar vertically by means of the hydraulic control lever to engage the jaws on the implement. Sidewise adjustment of the bar may be made from the seat by using the right-hand lift link adjusting screw. Engage the upper link hook with the implement mast ball. The implement may be positioned by means of the hydraulic system to help engage the upper link hook. In some cases, it may be necessary to adjust the length of the upper link. Raise implement with the hydraulic system and fasten the hitch bar lock mechanism which is a part of the implement. Raise the implement slowly and watch for any points of interference.

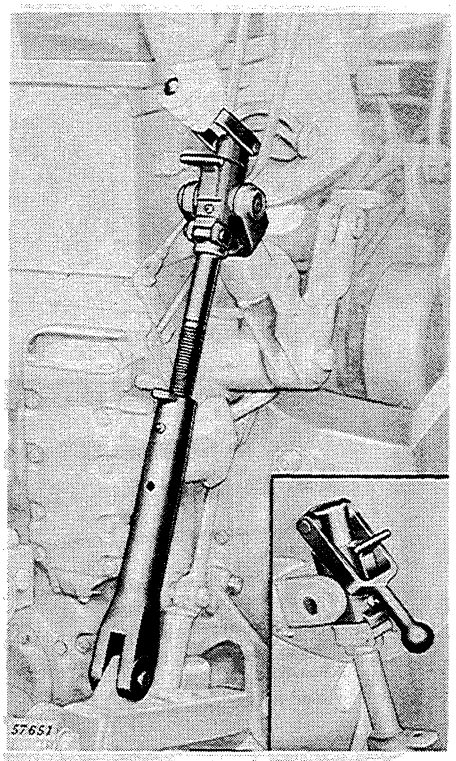
Do not attach a towed load to the hitch bar. A towed load must always be hitched to tractor drawbar.



Attaching Implement to Hitch Bar

LEVELING.

Use the adjusting crank on the right-hand lift link to level the implement laterally (side-to-side). **After implement is satisfactorily leveled, drop the adjusting crank to the rear, over the lock which holds it in place.**



Leveling Implement Laterally (Sideways)

Use the handle on the upper link to level the implement fore-and-aft. Be sure to lock the adjustment by turning the handle parallel to the upper link and slipping the end of the handle into the hole provided.

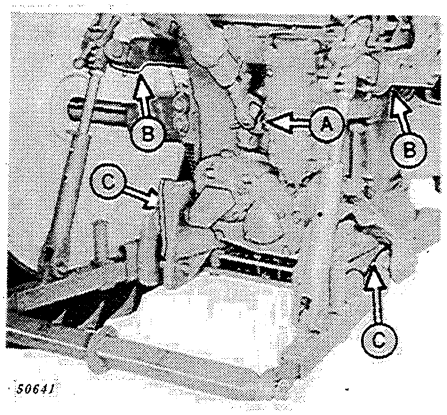
REMOVAL.

The hitch assembly can be easily removed by disconnecting the upper link support chain from the seat and removing five pins located as follows:

(A) One from the front end of the upper link.

(B) One from the front end of each lift link (these can be reached from underneath the rockshaft arms).

(C) One from the front end of each draft link.



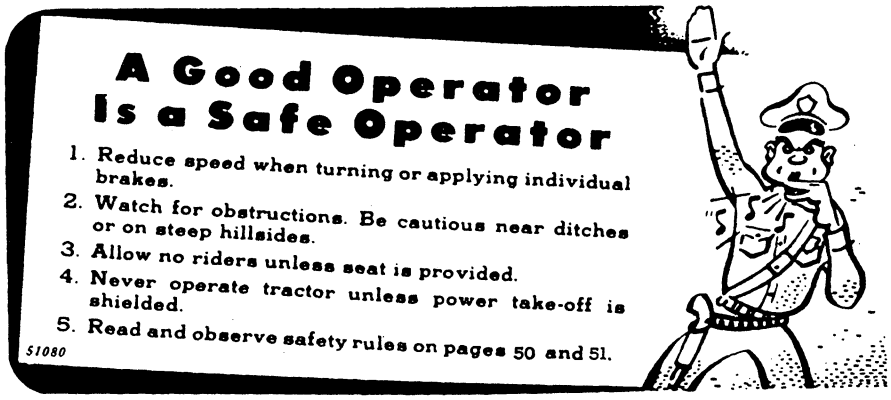
Hitch Attaching Points

WORKING WITH IMPLEMENTS OTHER THAN OF JOHN DEERE MANUFACTURE.

The Universal Three-Point Hitch can be used with many implements made by manufacturers other than John Deere. While it is obviously impractical to list in this manual the proper adjustments for every one of these implements, the tabulation on the next page is intended to provide you with general information regarding their use.

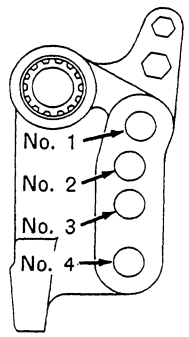
Opposite the names of the implements, the tabulation contains two columns. The first column, "*Load Control Yoke Setting,*" tells you which of the holes in the load control yoke should be used in attaching the upper link to an implement for the first time. After the tractor and implement are put to work it may be necessary to change holes to obtain proper operation as determined by the pointer described on page 35.

The second column, headed "*Sway Locks,*" tells you when the use of sway locks is recommended.



THREE-POINT-HITCH IMPLEMENTS NOT JOHN DEERE

(For John Deere, See Implements Operator's Manual)



Identification of Holes in Load Control Yoke

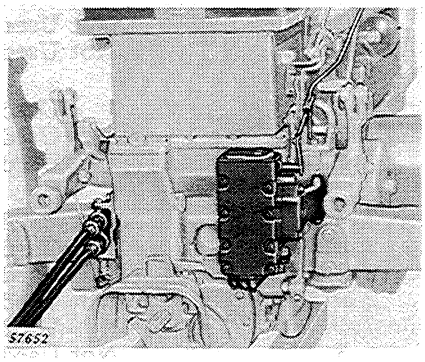
Implement	Approx. Load Control Yoke Setting (Hole No.)	Sway Locks
BLADE:		
Utility	2	Used
CULTIVATORS:		
Rigid Shank	3	Used
Spring Shank	3	Used
Field	1 or 2	Not Used
Listed Crop	3	Used
HARROWS:		
Spike-Tooth	1	Not Used
Tandem Disk	3	Not Used
Bush and Bog	1	Not Used
Spring-Tooth	1	Not Used
Offset Disk*	3	Not Used
PLANTERS:		
Lister	1	Used
Corn Checkrow	1	Used
Corn Drill	1	Used
PLOWS:		
Disk	2 or 3	Not Used
Two-Way*	2 or 3	Not Used
Two-Bottom Moldboard	2 or 3	Not Used
Three-Bottom Moldboard	2 or 3	Not Used
Middlebuster	1	Used
One-Bottom Moldboard	3	Not Used
TERRACERS:		
Disk*	2 or 3	Used
Terracing Blade	2 or 3	Used
TOOL BAR:		
Buck Scraper	2	Used
Stiff Shank Cultivator	1 or 2	Used
Spring Shank Cultivator	2 or 3	Used
Furrower	1	Used
Disk Ridger	1 or 2	Used
MISCELLANEOUS:		
Rear Mounted Mower*	1	Used
Side-Delivery Rake	1	Used
Subsoiler or Panbreaker	1 or 2	Used
Rear End Crane	1	Used
Disk Tiller	2 or 3	Not Used
Post Hole Digger	1	Used
Rear Mounted Scoop	2 or 3	Used
Cordwood Saw	1	Used
Grass Seed Attachment	1	Used

**May Require Modification.*

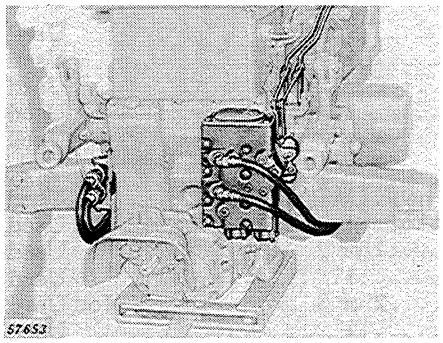
NOTE: All these implements require that proper pin and ball be installed in mast (see page 37). In addition, those with 7/8-inch diameter hitch pins (Category I) require adapter bushings. Implements with 1-1/8-inch diameter hitch pins (Category II) do not require adapter bushings.

• REMOTE CYLINDER OPERATION •

Your tractor may be equipped to operate one or two remote cylinders. On tractors equipped to operate only one remote cylinder, the cylinder can be used to control drawn equipment. It can also be used to control a front-mounted rockshaft (page 46) to raise, lower and provide down pressure on front-mounted tools. Delayed lift of front-mounted units is possible when used in conjunction with the rear rockshaft. The remote cylinder is controlled by a lever located to the right of the seat.



Single Valve Housing and Breakaway Coupling on Tractor Equipped to Operate One Remote Cylinder



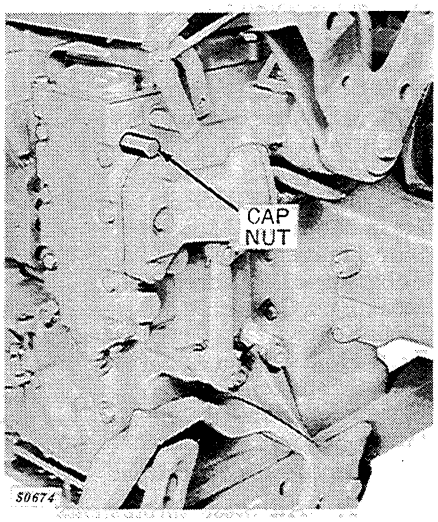
Dual Valve Housing and Breakaway Coupling on Tractor Equipped to Operate Two Remote Cylinders Attached to Front Mounted Rockshaft

If your tractor is equipped to operate two remote cylinders, it has individual control levers for each cylinder. Dual remote cylinders provide all the hydraulic functions obtained by the single remote cylinder, plus selective control of front-mounted units (by means of a "split" front-mounted rockshaft) and dual hook-ups on drawn machines.

If your tractor is equipped to operate one remote cylinder, it will accommodate either single-or double-acting remote cylinders. If your tractor is equipped to operate two remote cylinders, they may be operated independently or simultaneously. The No. 1 circuit will accommodate both single- and double-acting cylinders. The No. 2 circuit will accommodate only double-acting cylinders. The No. 1 circuit is connected to two breakaway couplings on the left-hand side of the tractor.

Adjustment for Single- or Double-Acting Cylinders.

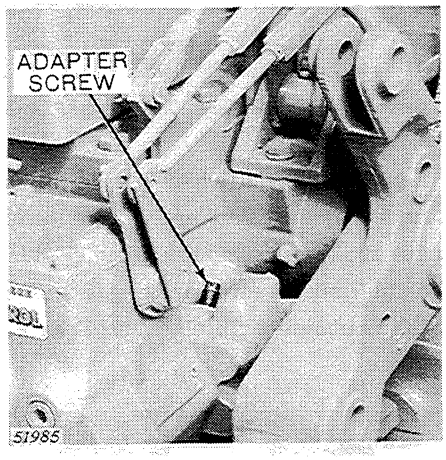
For operation with a single-acting cylinder on tractors equipped to operate one cylinder, remove the cap nut and slotted adapter screw located on the *upper side of the valve housing.*



Single- or Double-Acting Remote Cylinder Conversion Valve Cap Nut

Screw the adapter screw into the cap nut as far as it will go, then install the cap nut with adapter screw on the valve housing. For operation with a double-acting remote cylinder, remove cap nut, screw the slotted adapter screw into the valve housing until it seats, then install and tighten cap nut.

If your tractor is equipped to operate two remote cylinders, adjustment of the No. 1 circuit for use with single- or double-acting remote cylinders is made in the same manner, except that the cap nut and adapter screw are located on *top of the adapter* which attaches to the right-front of the dual valve housing.

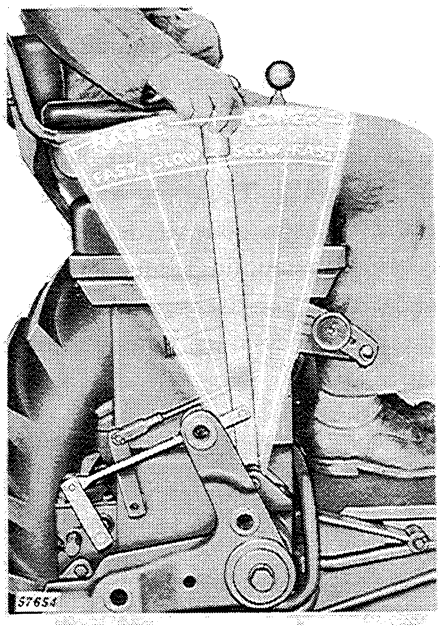


Single- or Double-Acting Remote Cylinder Adapter Screw on Dual Valve Housing

Using the Operating Levers.

Tractors equipped to operate one remote cylinder have one remote cylinder operating lever located to the right of the rockshaft operating lever, on the right-hand side of the seat. Tractors equipped to operate two remote cylinders have two remote cylinder operating levers, side by side. The inner remote cylinder operating lever operates the No. 1 circuit (which is connected to breakaway couplings on the left-hand side of the tractor) and the outer lever operates the No. 2 circuit. Each lever has five operating positions:

(1) neutral, (2) slow raise, (3) fast raise, (4) slow drop, (5) fast drop.



Remote Cylinder Operating Lever

(1) *Neutral Position.* Lever slightly rearward of the vertical position.

(2) *Slow Raise.* Approximately one-half of lever's travel to the rear. The lever must be held until the desired adjustment is reached.

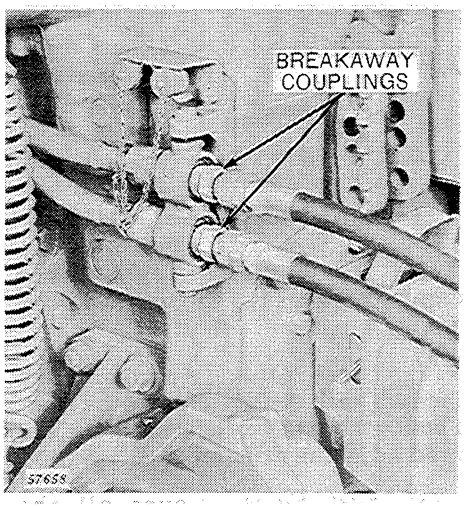
(3) *Fast Raise.* Lever all the way to the rear. The lever will remain in this position until the end of the stroke when it automatically returns to the neutral position.

(4) *Slow Drop.* Approximately one-half of lever's travel forward. The lever must be held until the desired adjustment is reached.

(5) *Fast Drop.* Lever all the way forward. The lever will remain in this position until the end of the lowering stroke when it automatically returns to the neutral position.

Attaching Remote Cylinder Hoses to Breakaway Coupling.

Breakaway couplings are provided on tractors equipped to operate one remote cylinder and for the No. 1 circuit on tractors equipped to operate two cylinders. On these tractors, the hoses for No. 2 circuit attach directly to the valve housing. A breakaway coupling can be installed at this point if desired. The breakaway couplings safeguard hoses and permit you to couple or uncouple the remote cylinder without loss of oil.



Breakaway Coupling

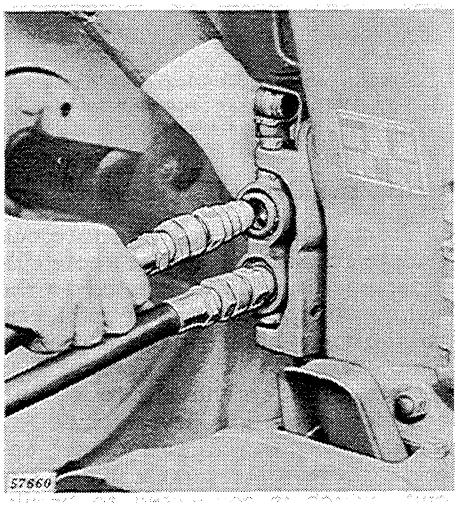
Always wipe hose ends free from dirt before they are inserted in the breakaway coupling.

With engine stopped, move remote cylinder operating lever back and forth to relieve pressure on couplings.

Remove coupling protector plugs by pulling rearward on oil lines leading from valve housing to coupling and lifting plugs from coupling.

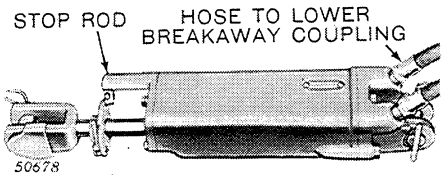
Removing Breakaway Coupling Plugs

Again pull rearward on oil lines from valve housing and insert hose ends into breakaway coupling. When the oil lines are released, the hoses will be automatically locked in place.



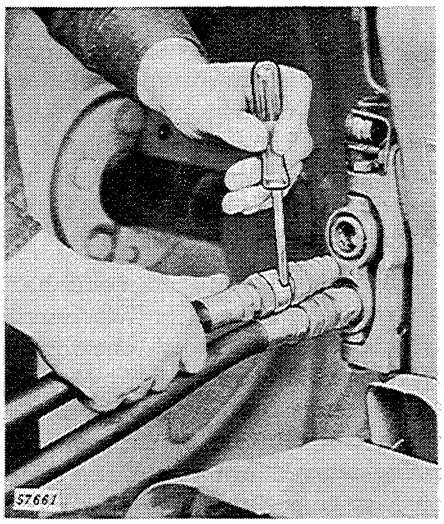
Connecting Remote Cylinder Hose

The hose from the stop rod side of a double-acting remote cylinder must be installed in the bottom breakaway coupling. When a single-acting cylinder is being used, the hose is installed in the bottom breakaway coupling.



Double-Acting Hydraulic-Stop-Type Remote Cylinder

If it is found difficult to insert the hoses, it may be due to oil pressure in the remote cylinder and hoses. This pressure can be relieved by prying outward on the tang in the thermal-relief valve at coupling end of hose with a screwdriver.



Relieving Pressure in Remote Cylinder Hose

If cylinder and hose assembly has been disassembled, all trapped air must be removed after hoses are connected to breakaway coupling. Place cylinder on transport arm with hose end up. Engage pump, start engine and operate the remote cylinder control lever back and forth seven or eight times.

Attaching Remote Cylinder to Implement.

To install remote cylinder on implement remove spring locking pins and pull out attaching pins.

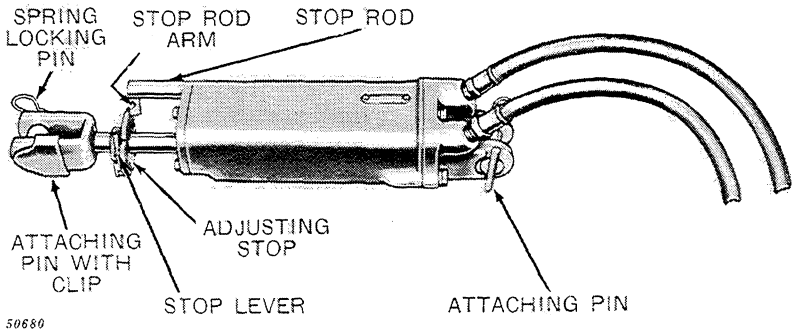
Set remote cylinder in place on implement. Install attaching pins and locking pins. *NOTE: Many implements have a locking device to hold it in transport position when the remote cylinder is removed. Be sure to disengage the locking device before operating the remote cylinder.*

After cylinder is removed from implement, replace attaching pins immediately.

Adjusting Remote Cylinder (Hydraulic-Stop Type).

The remote cylinder is equipped with an adjustable stop so that the working stroke may be adjusted to the requirements of the implement. The stroke may be varied from 0 inch minimum to 8 inches maximum.

To adjust working stroke, lift piston rod stop lever and slide adjustable stop assembly along piston rod to desired position. (There will be an

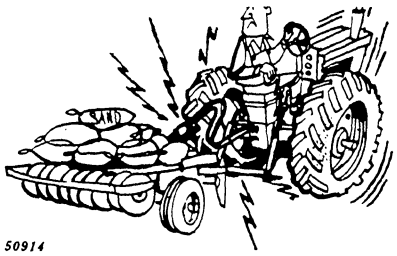


Remote Cylinder Attaching and Adjusting Parts

additional 1-1/2 inches of slow travel after adjustable stop contacts stop arm when the operating lever is moved to or held in the "slow drop" position). Press stop lever down. If clamp does not hold securely, lift adjustable stop lever, rotate it clockwise 1/2 turn and press in place.

CAUTION: Adjustable stop must be located on the piston rod so that stop arm contacts one of the flanges on stop. To prevent damage, be sure lever is clamped securely.

CAUTION: Never overload the hydraulic system. Although the mechanisms have relief valves to protect them from overloads, the operator should never impose on them a greater load than that for which they were designed. Many implements have auxiliary springs to help raise them. If the implement will not rise when the control lever is operated, adjust the auxiliary lifting spring. See the implement Operator's Manual.

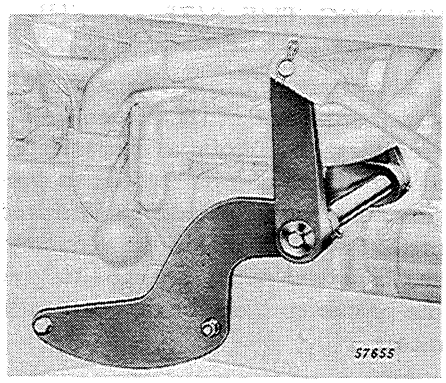


Never Overload the Hydraulic System

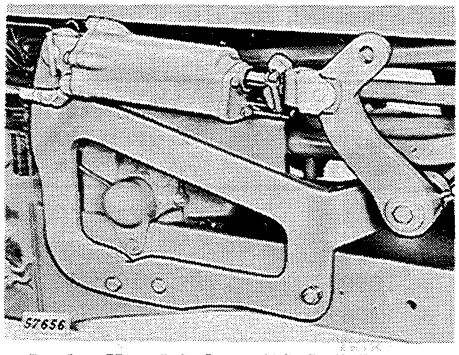
• FRONT-MOUNTED ROCKSHAFTS •

Your tractor may be equipped with a front-mounted rockshaft which permits you to raise and lower the front rigs of cultivators and similar equipment independent of the rear rigs which are controlled by the position-responsive rockshaft.

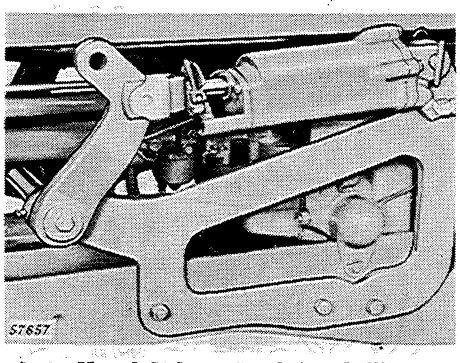
The front-mounted rockshaft is controlled by one or two remote cylinders. Tractors with one remote cylinder will have a "solid" rockshaft. At row ends both front rigs can be raised while lifting of the rear rigs can be delayed until the tractor clears the row. In addition, a double-acting remote cylinder provides down pressure on the front rigs, insuring positive and proper penetration.



Right-Hand Side of "Solid" Front-Mounted Rockshaft Operated by One Remote Cylinder



Right-Hand Side of "Split" Front-Mounted Rockshaft Operated by Two Remote Cylinders



Left-Hand Side of Both "Solid" and "Split" Front-Mounted Rockshafts

Tractors equipped with two remote cylinders may have a "split" front-mounted rockshaft. A remote cylinder is mounted on each side of the front-mounted rockshaft to raise or lower either front rig independently—a big advantage when finishing out point rows. Rear rigs are controlled through the position-responsive rockshaft.

Since the front-mounted rockshafts are operated by remote cylinders, they are controlled by means of the remote cylinder operating lever or levers.

• BELT WORK •

The belt pulley, mounted on the right-hand end of the crankshaft, revolves whenever the engine clutch is engaged. A pulley brake prevents the pulley from turning when the clutch is disengaged.

The belt pulley has a diameter of 9-11/16 inches and is 7-1/4 inches wide. When rotating at rated speed (1325 rpm) the belt travels at a speed of 3360 feet per minute.

To install or remove a belt, move the tractor forward to provide slack. Never use a stick to force a belt on or off a revolving pulley. Never put on or take off a belt while pulley is in motion.

After backing tractor into belt be sure tractor is well blocked and both rear wheel brakes are locked. Always start a belt load slowly.

After backing the tractor into the belt and setting each brake latch, the pull of the belt may cause the transmission gears to bind making it hard to shift into neutral. To relieve the bind, turn the belt pulley backwards by pulling on the belt, with clutch disengaged, after which the gears can be shifted easily into neutral.

Regardless of how familiar you are with the type of equipment used with your tractor, take the time to study the recommendations made by the manufacturer in the instruction book that comes with the equipment.

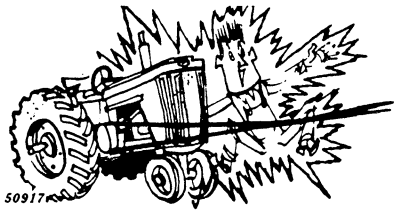
X

SAFETY PRECAUTION!

Never leave the tractor running unattended when adjustments are being made on the driven machine, even though the clutch is disengaged.

X

When using a rubber-tired tractor to operate various belt-driven equipment, static electricity is generated under certain conditions. This is stored in the tractor until the operator touches it or until the charge is dissipated into the ground by some other means. While the shock received is not dangerous, there is a certain amount of fire hazard from the spark produced at the time of discharge. A spark or shock may be prevented by hanging a chain from the drawbar, allowing it to contact the ground.



Ground Tractor to Dissipate Static Electricity

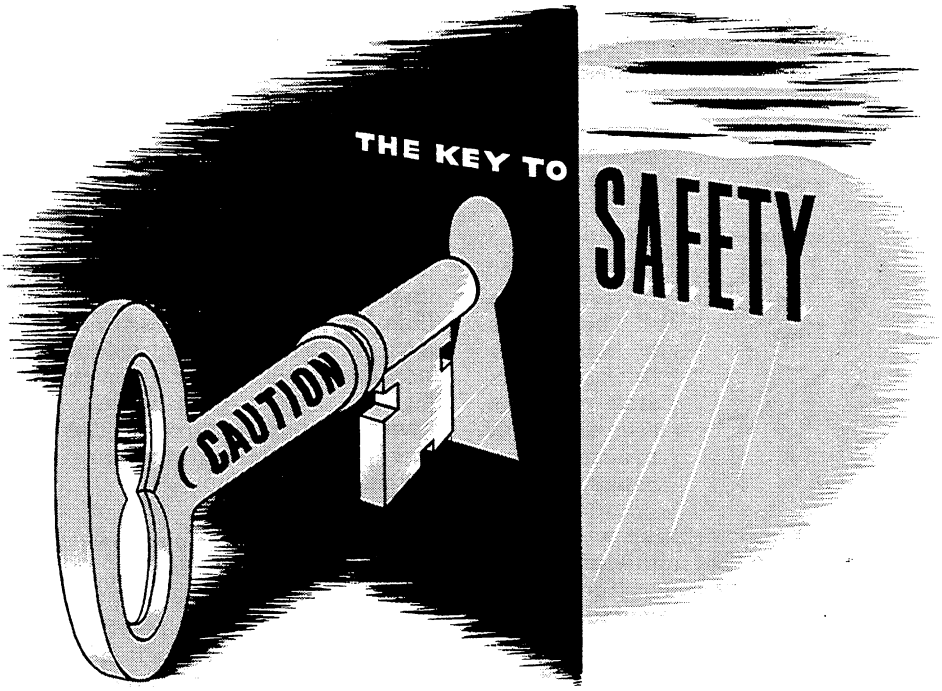
FINDING THE SIZE OF THE DRIVEN PULLEY.

The chart below will help you determine the size of the driven pulley necessary to obtain a desired rpm on the driven equipment. When possible, the engine should be operated at 1325 rpm for maximum economy, and a driven pulley selected to give the proper rpm on the driven equipment.

Tractor Pulley rpm	*—1325*
Tractor Pulley Diameter	*—9-11/16″*
Belt Speed (Ft. per Min.)	*—3360*

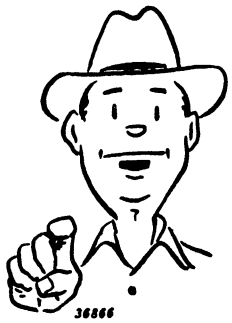
Desired rpm of Driven Pulley	Diameter of Driven Pulley to Use
600	21-1/4″
800	16″
1000	12-3/4″
1400	9-1/4″
1800	7″
2200	5-3/4″
2600	5″
3000	4-1/4″
3400	3-3/4″

Never Install or Remove a Belt While Pulley Is in Motion


THE KEY TO
SAFETY
CAUTION

SAFETY SUGGESTIONS

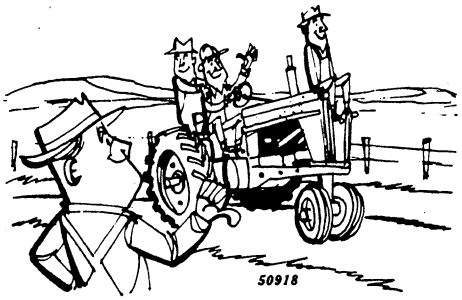
The safety of the operator was one of the prime considerations in the minds of John Deere engineers when this tractor was designed. Safety shields and other safety features were built into the tractor wherever possible.



However, investigation of thousands of farm accidents shows that careless use of farm machinery causes nearly 1/3 of all farm accidents. You can make your farm a safer place to live and work if you observe the safety suggestions given below. Study these suggestions carefully and insist that they be followed by those working with you and for you.

*

All machinery should be operated only by those who are responsible and delegated to do so.



Only one person—the operator—should be permitted on the tractor platform when tractor is in operation.

The rate of tractor travel on hillsides and curves should always be such that there is no danger from tipping.

*

Refuel your tractor only when the engine has been shut off. Do not smoke or use an oil lantern while refueling.

*

Refill the radiator only when the engine is stopped or slowly idling. This tractor has a pressure cooling system. To avoid being scalded when radiator cap is removed first turn cap slightly to the stop which allows steam to escape through the overflow pipe. After all pressure is relieved, remove cap.

*

When driving at night, use warning lamps to prevent accidents.

*

Be sure power take-off shields and guards are in place and in good order before starting field work.

*

Tractor brakes should be properly adjusted.

*

Do not oil, grease, or adjust a farm machine that is in motion.

*

Never drive a tractor too close to the edge of a ditch or creek.

*

Never operate your tractor in a closed garage or shed.

*

Be sure the gear shift lever of your tractor is in neutral before starting the engine.

*

When your tractor is hitched to a heavy load, always hitch to drawbar and never take up the slack in a chain with a jerk.

SAFETY SUGGESTIONS

Drive slowly when traveling with heavy integral tools mounted on the rear of the tractor.

*

Do not ride or permit others to ride on any machine unless the person is on the seat or platform provided for the operator.

*

Do not leave the engine running unattended, even though the clutch is disengaged, while anyone is adjusting or repairing the machine to which the tractor is belted.

*

Inspect the clutch and pulley brake mechanism frequently. See that it is in good condition.

*

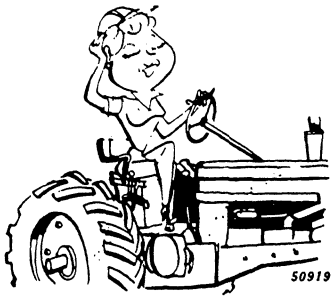
Never engage the clutch unless you are in a position to disengage it if necessary.

*

Clothing worn by tractor or machine operator should be fairly tight and belted. Loose jackets, skirts, shirts, or sleeves should not be permitted because of the danger of getting into moving parts.

*

All women operators should wear trousers or slacks.



Always keep tractor in gear when going down steep grades.

*

Never ride on drawbar of tractor or drawn implement.

*

Drive at speeds slow enough to insure your safety. Reduce speed before turning quickly or applying individual brakes. Drive slowly over rough ground.

*

Keep a firm grip on the steering wheel at all times when the speed is increased.

*

When hitching a drawn implement to the tractor, back the tractor past the clevis. Then move it slowly forward so that, in making the connection, the tractor will be moving away from you.

*

Provide a first-aid kit at the house for use in case of accident, and use the proper antiseptics on scratches, cuts, etc., without delay, to prevent the possibility of blood poisoning.

*

When driving out of a ditch, gully, or up a steep hillside, or when tractor is hitched to a heavy load, ENGAGE CLUTCH SLOWLY, and be prepared to disengage clutch promptly should the front wheels rise off the ground. These same precautions must also be taken if tractor rear wheels become mired in soft ground or drop into a hole. Back tractor out of these situations if at all possible.

*

Be careful, especially when operating on hillsides, because the tractor may tip sideways if it strikes a hole, ditch, or other irregularity.

Lubrication and Periodic Services

IMPORTANCE OF LUBRICATION.

Effective lubrication of your tractor is perhaps the most important step toward low upkeep cost, long life and satisfactory service, for without oil or grease you can ruin the important working parts of your tractor in a very few minutes.

STORAGE OF LUBRICANTS.

Your new tractor is equipped with various safeguards such as an air cleaner, oil filter, crankcase breather and ventilator—safeguards designed to keep dust, dirt and other abrasives from reaching operating parts. You can increase the efficiency of these safeguards by using clean containers for storing and for handling all the lubricants. See that only clean lubricants go into your tractor.

• ENGINE LUBRICATION •

TYPES OF CRANKCASE OIL.

The engine of this tractor with its full, force-feed pressure lubricating system has one of the finest oiling systems possible to design. Do not handicap it by using an oil of doubtful performance. It pays to buy only nationally-known brands of oil.

It is impossible to determine from the appearance of an oil whether it is best suited to your engine and service conditions. The petroleum industry markets several types of crankcase oils. These types have been defined by the American Petroleum Institute as follows:

Service ML—Oil suitable for service typical of gasoline and other spark ignition engines operating under light loads and favorable service conditions.

Service MM—Oil suitable for service typical of gasoline and other spark ignition engines operating under moderate to severe service conditions.

Service MS—Oil suitable for service typical of gasoline and other spark ignition engines operating under unfavorable or severe types of service conditions.

For average service conditions, oil specified **"For Service MM"** is recommended for use in your tractor engine.

For exceptionally severe service, combinations of heavy loads and high temperatures, or low temperature start and stop service, it may be possible to extend engine life by use of oils specified "For Service MS."

In some cases, where owners have had successful experience with certain brands of oils now specified **"For Service ML,"** it will be possible to continue use of these oils but, due to the wide variations likely to be encountered between various brands, their use cannot be generally recommended.

• WEIGHT OF OIL •

Your John Deere Tractor was made with the same precision as a fine automobile, with clearances between bearing surfaces as fine as a ten-thousandth part of an inch. If oil is expected to lubricate these surfaces, it first must get there. Therefore, weight or viscosity of the oil is very important.

Oil of the wrong weight can result in loss of power, excessive fuel consumption, and undue wear on moving parts.

In a new engine it is important to use the oil specified in the temperature-oil weight chart below.

The crankcase oil capacity is 7 U.S. quarts, including oil filter compartment.

TEMPERATURE—OIL WEIGHT CHART

Air Temperature	Weight of Oil to Use in Engine Crankcase and Air Cleaner	
	Viscosity No. for Single-Viscosity Oil	*Viscosity Range if Multi-Viscosity Oils Are Used*
Above 90°F.	SAE 20-20W	SAE 10W-30
0 to 90°F.	SAE 10W*	SAE 10W-30
Below 0°F.	SAE 5W	SAE 5W-20

**In areas where SAE 10W is not readily available, SAE 20-20W oil can be used above 32°F.*

CAUTION: Use of SAE 5W motor oil will likely result in some increase in oil consumption. Check oil level more frequently when using this oil. Do not use SAE 5W oil except during the extremely cold weather conditions specified above.

• BREAK-IN PERIOD •

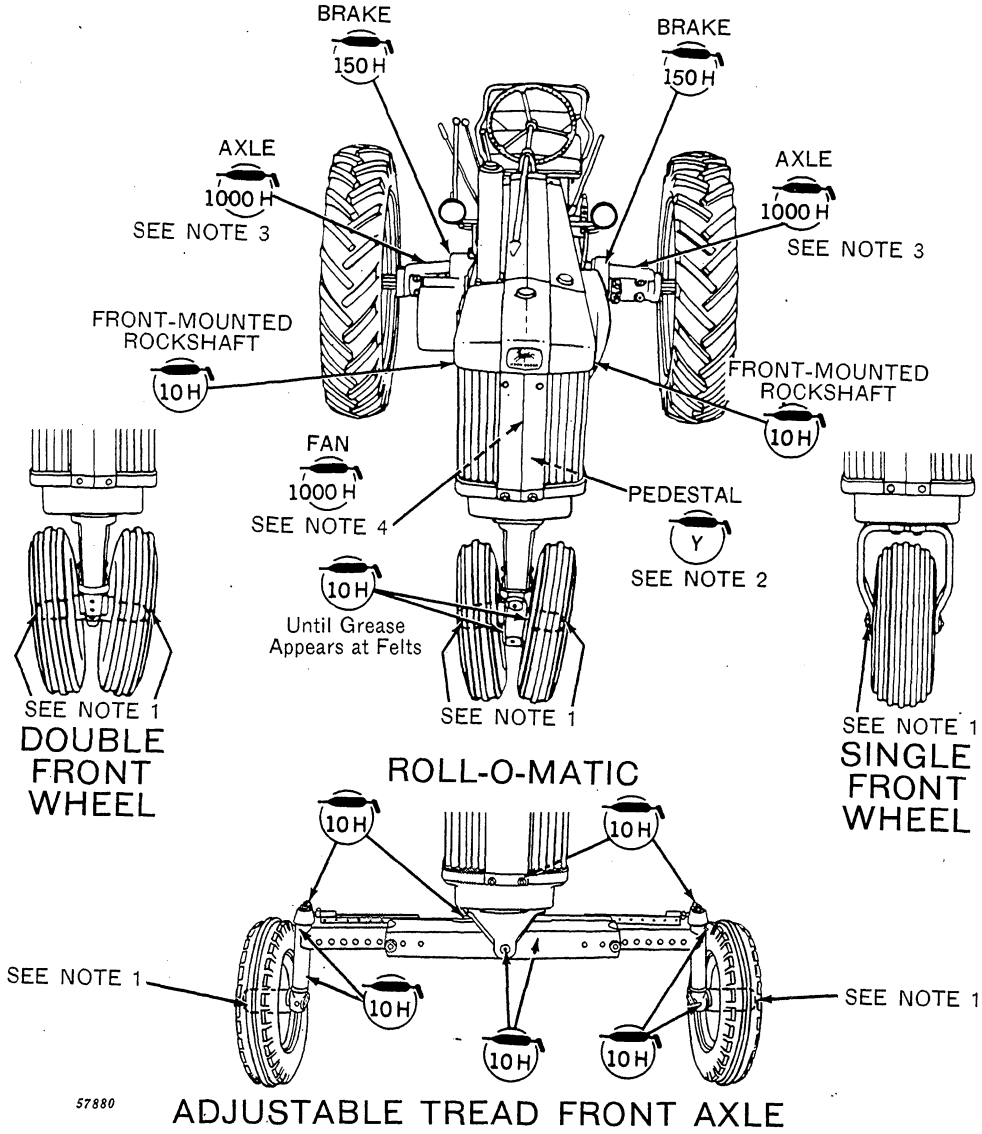
Regardless of whether you are using this new tractor in hot or cold weather, at the completion of the 20-hour breaking-in period, be sure to drain the oil from the crankcase and refill with new oil as specified in the chart above. This is important.

After 20-hour breaking-in period of the Powr-Trol system and power-shaft clutch, drain oil and refill with new oil as specified on pages 62 and 63. At the same time, check power-shaft clutch for proper adjustment. (See page 79.)

• LUBRICATION CHART •

(Grease Gun Points)

Service all fittings as indicated on the chart below and on the next page with pressure gun grease. Wipe off fittings beforehand.

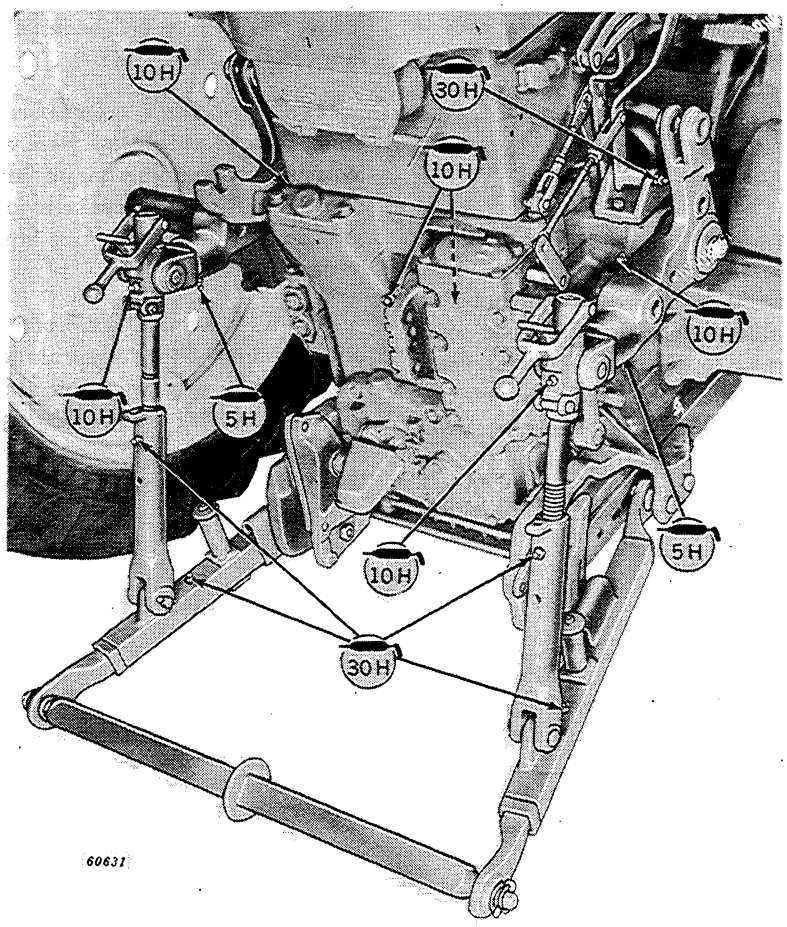


For "NOTES" see page 56.

CAUTION: Stop the engine before lubricating the tractor.

LUBRICATION CHART—Continued

(Grease Gun Points)



UNIVERSAL THREE-POINT HITCH

SYMBOLS			
5 H	Grease Every 5 Hours of Operation	150 H	Grease Every 150 Hours of Operation
10H	Grease every 10 Hours of Operation	Y	Grease Yearly
30 H	Grease Every 30 Hours of Operation	1000 H	Grease Every 1000 Hours of Operation

LUBRICATION CHART—Continued

• NOTES •

NOTE 1: Front wheels are packed with wheel bearing grease at the factory and, under normal conditions, need cleaning and repacking every 6 months or 500 hours of operation, whichever occurs first.

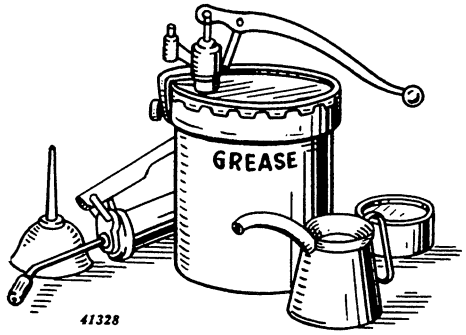
Where there is danger of mud and water getting into the front wheel bearings, due to operation in extremely wet and muddy conditions, grease front wheels **every 10 hours** with gun grease until the wheels can be removed and bearings cleaned and repacked with wheel bearing grease.

NOTE 2: See *"Yearly Service"* (page 65) for lower pedestal bearing lubrication.

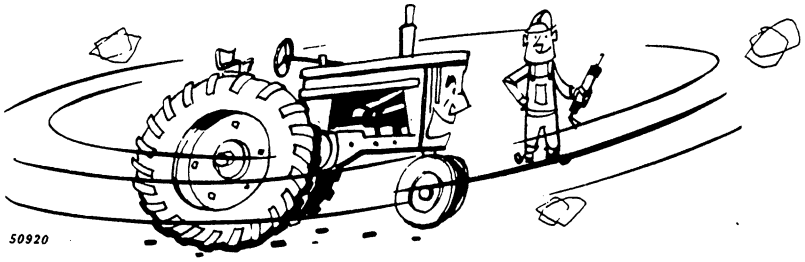
NOTE 3: Every 1000 hours of operation, remove pipe plugs from each rear axle housing, install a grease fitting, and pump 6 to 8 shots of pressure gun grease into both housings. Remove fittings and replace plugs.

NOTE 4: Every 1000 hours of operation, remove pipe plug from fan bearing housing, install a grease fitting, and fill housing with wheel bearing grease (this does not apply to tractor with power steering). Remove grease fitting and replace pipe plug.

KEEP LUBRICANTS CLEAN!



Use *only* high-grade lubricants which have been stored in clean containers. Wipe away all grease and dirt before removing filler caps or plugs.



The Tractor Will Respond to Frequent Lubrication

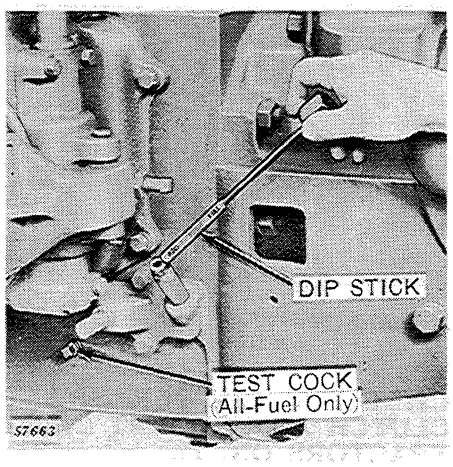
• PERIODIC LUBRICATION SERVICES •

» » » 10-HOUR SERVICE « « «

CHECKING CRANKCASE OIL LEVEL.

Check crankcase oil level on dip stick with filler cap resting on top of opening. If oil level is low, add a good quality of oil of correct weight until it is up to the full mark on the dip stick. See page 53 for proper weight of oil to use. For instructions on changing crankcase oil, see *"150-Hour Service,"* page 59.

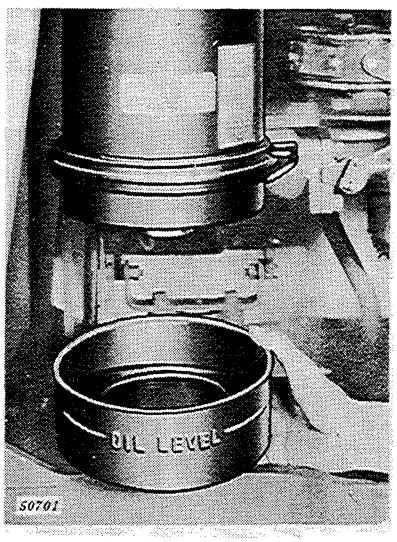
On an All-Fuel tractor open the oil drain cock below and to the left of the dip stick and drain to this level. Close drain cock. Add new oil to full mark on dip stick.



Checking Crankcase Oil Level on Dip Stick

CHECKING AIR CLEANER.

Under normal operating conditions the air cleaner requires servicing about every 30 hours of operation. However, it should be checked at least every 10 hours. *NOTE: If tractor is operated in extremely dirty conditions or is operating at maximum load, it may be necessary to check and service the air cleaner at the end of five hours' run.* To reduce service required, an auxiliary air stack is available. See your John Deere dealer.



Air Cleaner

» » » 30-HOUR SERVICE « « «

SERVICING THE AIR CLEANER.

Under normal conditions the air cleaner requires servicing about every 30 hours of operation. *Under severe dust conditions more frequent servicing may be necessary.* Never allow the oil to become too thick to flow freely; never allow more than 1/2-inch of dirt to collect in the cup.

To service the air cleaner, remove the oil cup, empty the oil, and scrape out dirt. Wash out the cup with distillate or kerosene. Refill both inner and outer cups to indicated level with

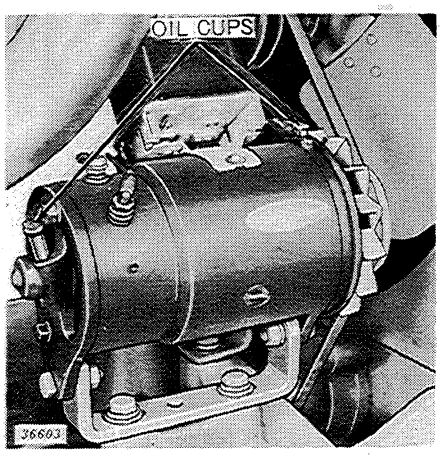
same grade oil as is used in engine crankcase for prevailing temperature conditions, page 53. Inspect bottom screen of cleaner body and remove any accumulation of chaff and dirt. Replace oil cup securely. **CAUTION: Do not service air cleaner with engine running.**

» » » 75-HOUR SERVICE « « «

LUBRICATING THE GENERATOR.

Place 8 to 10 drops of light engine oil in both oil cups every 75 hours of operation. **Do not over-lubricate.** More damage can be done by too much lubrication than by lack of lubrication.

While servicing the generator, test drive belt tension by checking for a total of one inch of up and down movement at the center of the belt midway between the pulleys. If belt is too tight or too loose, adjust as described on page 85.



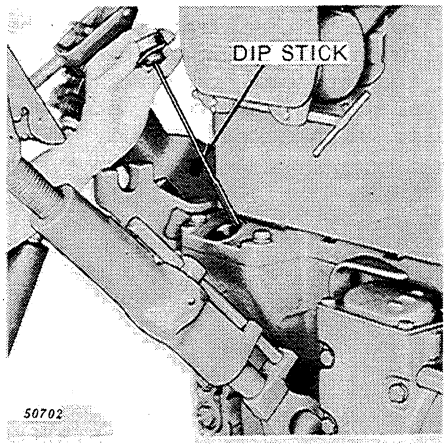
Generator Oil Cups

CRANKING MOTOR.

The cranking motor does not require lubrication.

CHECKING POWR-TROL OIL LEVEL.

Check Powr-Trol oil level on the dip stick with filler cap resting on top of housing. If oil level is low, add clean oil of the same weight as shown on chart on page 62, until it is up to the full mark on the dip stick. *To prevent freezing during cold weather, be sure the oil is completely free from water.*



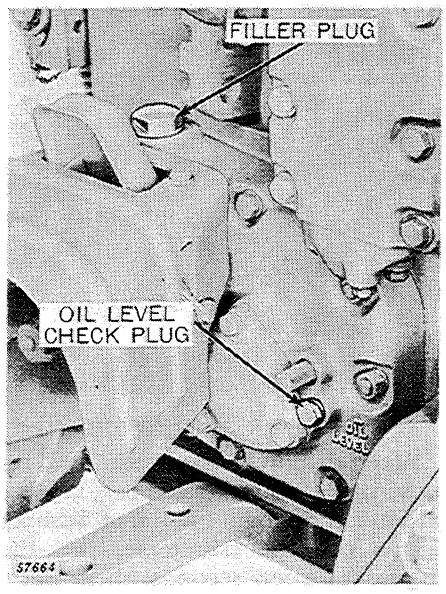
Checking Powr-Trol System Oil Level on Dip Stick

CHECKING POWER SHAFT CLUTCH ADJUSTMENT (NEW TRACTORS ONLY).

When the power shaft on a new tractor has operated 75 hours, check the clutch for proper adjustment (page 79). Thereafter clutch should be checked for adjustment every 150 hours of operation.

CHECKING POWER SHAFT CLUTCH OIL LEVEL.

Remove oil level check plug. Oil level should be up to bottom of hole from which plug was removed. If it is not, add clean SAE 10W oil at the filler plug until its level is correct. To prevent freezing during cold weather, be sure the oil is completely free from water.



Power Shaft Clutch Housing Oil Level Check Plug

» » » 150-HOUR SERVICE « « «

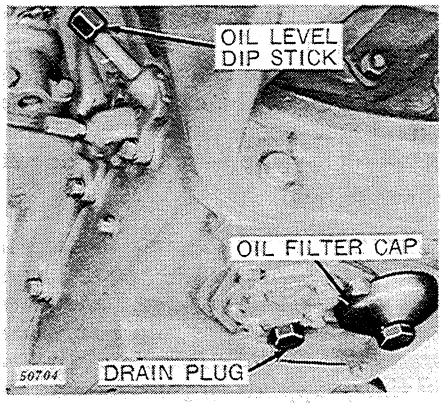
CHANGING THE ENGINE OIL AND FILTER.

Draining the Crankcase.

After completing 150 hours of tractor operation, the crankcase oil and the oil filter should be changed.

NOTE: During extremely cold weather when the tractor is operated daily in and out of dairy barns where high humidity usually exists, there is a tendency for moisture to collect in the crankcase where it may freeze and cause oil pressure failure. Under these conditions, the crankcase oil should be changed every two weeks. Crankcase should be warmed up above freezing temperature before oil is drained to insure that any ice is melted and the water will be drained out with the oil.

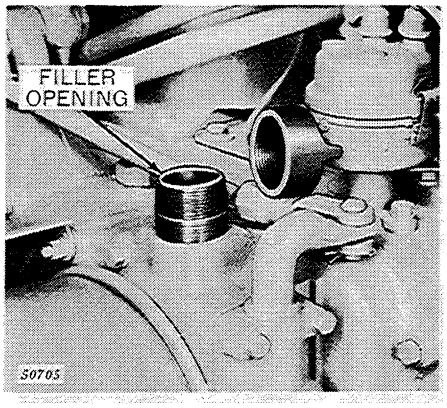
To drain the crankcase oil, simply remove the drain plug as shown in the illustration in the next column. While the oil is draining, remove the oil filter cap, pull out the old filter and discard. See "*Replacing Oil Filter*," next page.



Crankcase Drain Plug and Oil Filter Cap

Flushing the Crankcase.

During a period of several months of operation, sludge may form in the crankcase and other foreign matter may collect on the engine parts. Make it a practice to flush the crankcase thoroughly at regular periods. Distillate or kerosene serve as good flushing and cleaning agents.



Crankcase Filler Opening

After draining crankcase and removing old oil filter element, replace oil filter cap, pour 1 gallon of flushing agent into the crankcase, run the engine for a few seconds, then drain.

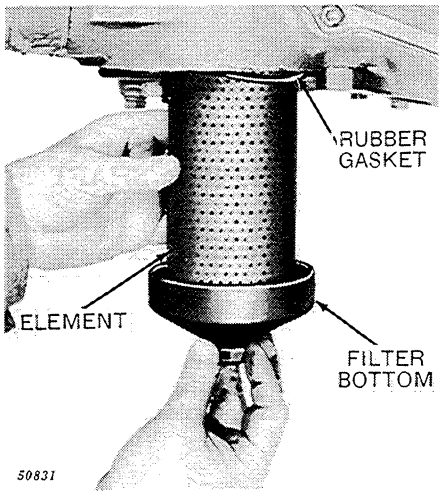
Replacing Oil Filter.

Each time you replace the crankcase oil, install a new filter element. The element fits over a long stud. If the stud is bent out of center position, straighten it by tapping with a soft hammer. If the rubber gasket that seals the filter cap is damaged, oil will leak at the cap. Remove the old gasket and install a new one. Draw filter cap up firmly, but do not over-tighten.

NOTE: Filter elements should not be used more than 150 hours. Always keep replacements on hand. Exhaustive tests by John Deere engineers have proved that the John Deere replacement oil filter, supplied by your John Deere dealer, will prevent contamination for the longest operating period.

Filling Crankcase with New Oil.

After flushing agent has drained out thoroughly and a new oil filter element has been installed, remove the filler cap and pour new oil of the proper weight in filler opening, until the oil is up to the full level on the dip stick with filler cap resting on



Oil Filter Element

top of opening. (See pages 53 and 57.) Add one extra quart of oil to replace oil drained out when filter element was removed. This extra quart of oil will not run into the filter compartment until the engine starts. Total approximate crankcase capacity is 7 U. S. quarts.

Keeping a Record of Oil and Filter Changes.

For your convenience, an "Oil and Filter Change" sticker comes with each box of Genuine John Deere Oil Filter Elements. Affix the sticker to the tractor air cleaner and keep a record of oil and filter changes on the sticker.

SERVICING POWER SHAFT CLUTCH HOUSING.

The power shaft clutch should be drained, flushed, and refilled every 150 hours of **power shaft** operation. Since this period normally occurs at about the same time as 500 hours of **tractor** operation, instructions for servicing the clutch are given under "*500-Hour Service,*" page 62.

CHECKING POWER SHAFT CLUTCH FOR PROPER ADJUSTMENT.

The power shaft clutch should be checked for proper adjustment (and

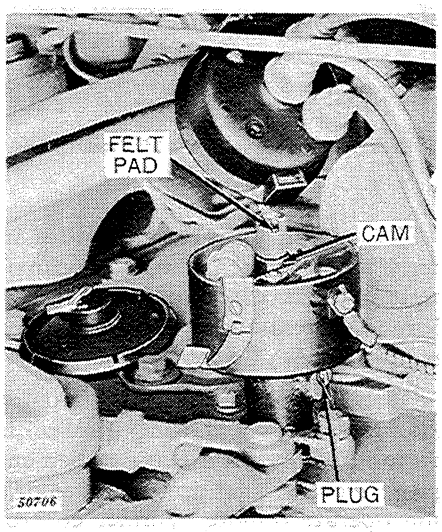
adjusted if necessary) at the end of each 150 hours of **power shaft** operation. For checking and adjusting instructions, see page 79.

SERVICING THE DISTRIBUTOR.

Remove distributor cover and put a trace of high-temperature grease on the breaker point cam.

At the same time, lubricate the felt pad in end of cam with two or three drops of light oil. **CAUTION: Do not over-lubricate.**

See *"1000-Hour Service"* (page 65) for lubrication of the distributor shaft.

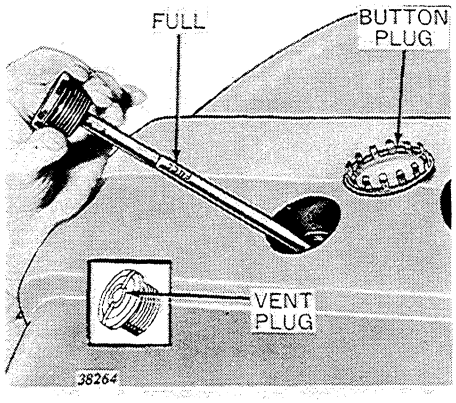


Points of Distributor Lubrication

CHECKING POWER STEERING OIL LEVEL.

If your tractor is equipped with power steering, every 150 hours of operation remove button plug located on top of grille, unscrew dip stick and note height of oil. If necessary, add new oil until its level comes up to the "FULL" mark on dip stick with filler cap resting on top of filler opening. See your John Deere dealer for correct type of oil to use.

Check vent plug in center of top of dip stick. If there is an accumula-

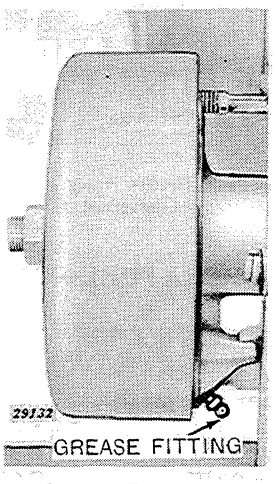


Power Steering Reservoir Dip Stick with Vent Plug

tion of dirt on plug, remove dirt with air hose or rinse in solvent. This porous plug allows breathing of power steering system.

LUBRICATING THE BRAKE PEDAL SHAFTS.

Service grease fitting on underside of each brake housing with pressure gun grease to prevent foot pedal from sticking.

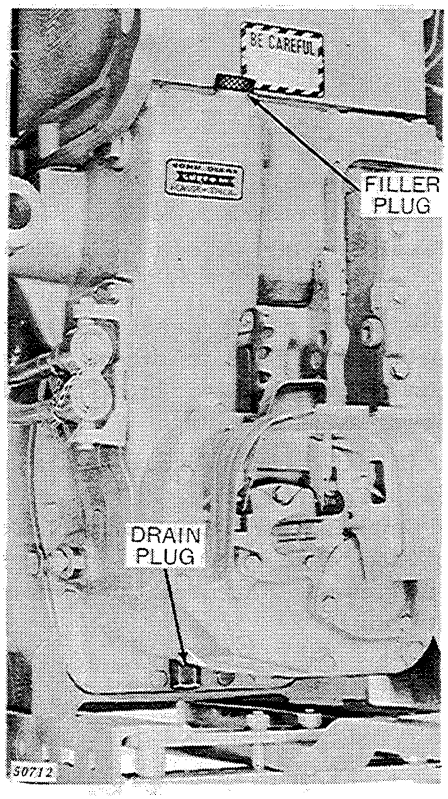


Grease Fitting in Brake Housing

» » » 500-HOUR SERVICE « « «

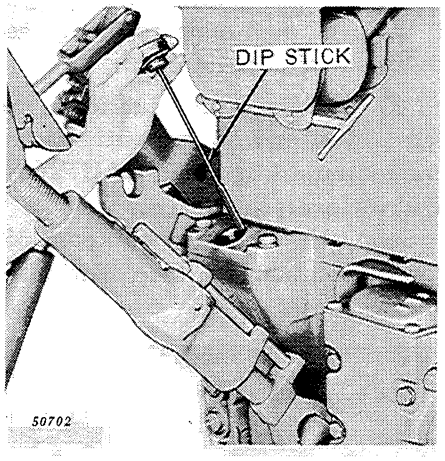
CHANGING POWR-TROL OIL.

Change oil in the Powr-Trol system twice a year, preferably before the spring and winter seasons. The drain plug is located on the underside of the main housing.



Powr-Trol Drain Plug and Filler Opening

After the housing is drained and flushed, fill it with good quality new oil to the full mark on the dip stick with filler cap resting on top of housing.



Checking Powr-Trol Oil Level on Dip Stick

Use weight of oil recommended in chart below. Oil capacity is approximately 10 U. S. quarts for the hydraulic system and 1 U. S. quart for each remote cylinder.

When remote cylinder is used for the first time, fill housing until oil is up to full mark on dip stick, then engage hydraulic pump, start engine and operate remote cylinder control lever several times to fill the remote cylinder with oil. Recheck oil level.

TEMPERATURE—OIL WEIGHT CHART FOR POWR-TROL SYSTEM

Air Temperatures	Weight of Oil to Use in Powr-Trol System	
	Viscosity No. for Single-Viscosity Oil	*Viscosity Range if Multi-Viscosity Oils Are Used*
Above 90°F.	SAE 30	SAE 10W-30
32° to 90°F.	SAE 20-20W	SAE 10W-30
Below 32°F.	SAE 10W	SAE 5W-20

CHECKING STEERING GEAR OIL LEVEL (MANUAL STEERING).

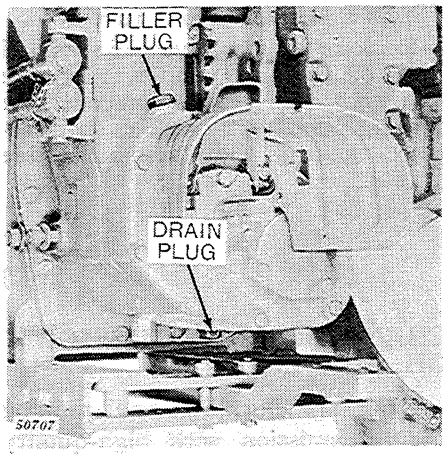
Remove the grille and gear housing cover. Add multi-purpose gear lubricant (hypoid) to the steering gear housing until the oil is even with the bottom of the worm gear. *NOTE: For power steering lubrication, see pages 60 and 66.*

Steering Gear Oil Level (Manual Steering)

DRAINING, FLUSHING, AND REFILLING POWER SHAFT CLUTCH HOUSING.

The power shaft clutch should be serviced at the end of 500 hours of tractor operation or approximately 150 hours of power shaft operation.

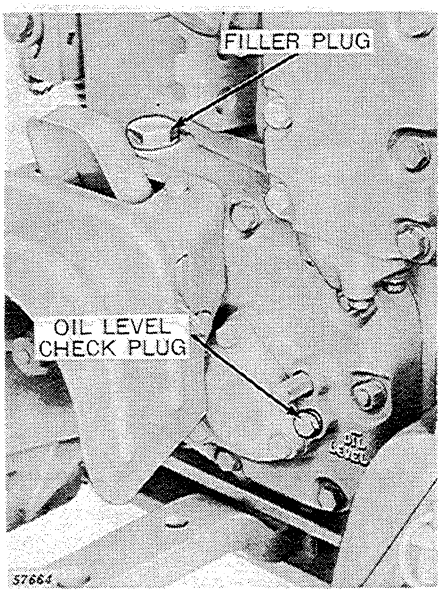
Remove the drain plug from bottom of clutch housing and drain out the oil. Replace the drain plug and pour about one quart of flushing agent into the housing through the filler plug. Engage power shaft shift lever, start tractor engine and operate clutch pedal a few times to agitate sediment. Stop engine and drain flushing agent from housing.



Power Shaft Clutch Housing Drain and Filler Plugs

Fill housing with new SAE 10W oil to bottom of check plug hole. Capacity of housing is approximately 4 U. S. quarts. To prevent freezing in winter, make sure oil is completely free from water.

At the same time clutch is serviced, check it for proper adjustment as described on page 79.



Power Shaft Clutch Housing Oil Level Check Plug

FRONT WHEEL BEARINGS.

Remove front wheels and wash all parts of hub and spindle to remove dirt and old grease. Examine the bearings and felt washers and replace them if they are worn. See page 82.

After bearings are removed, new felt retainers must be used when the wheel is reassembled.

Repack bearings with wheel-bearing grease.

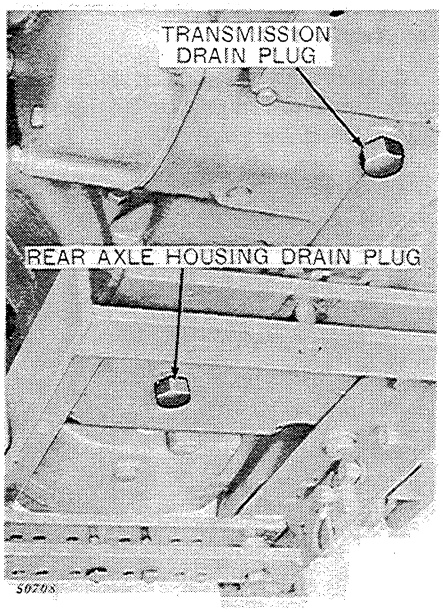
» » » YEARLY SERVICE « « «
(or 1000 Hours)

CHANGING TRANSMISSION OIL.

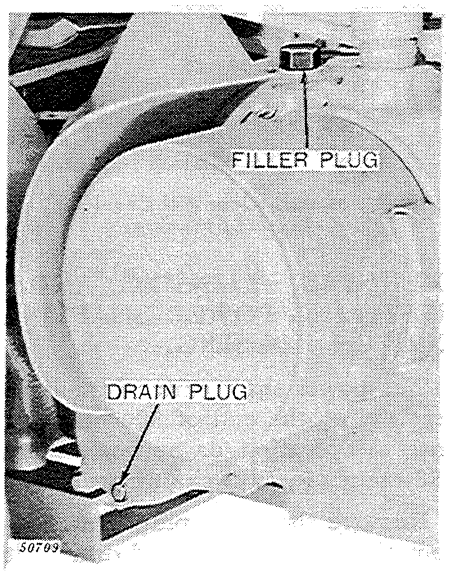
Draining, flushing, and refilling the transmission with high-quality transmission oil should be done at least once a year, or every 1000 hours of operation, whichever occurs first. To do a thorough job of draining, remove both transmission and rear axle housing drain plugs.

Drain the first reduction gear cover, also.

Replace drain plugs and add 3 gallons of flushing agent. Then jack up one rear wheel, start the engine, shift into low gear, and engage clutch. Run for a few minutes, then completely drain.

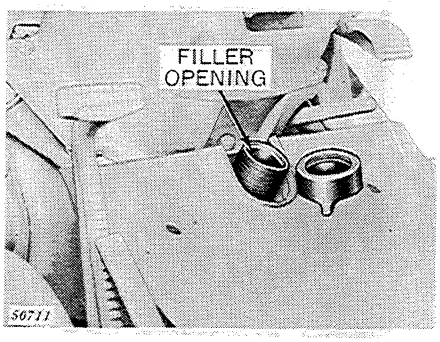


Transmission and Rear Axle Housing Drain Plugs

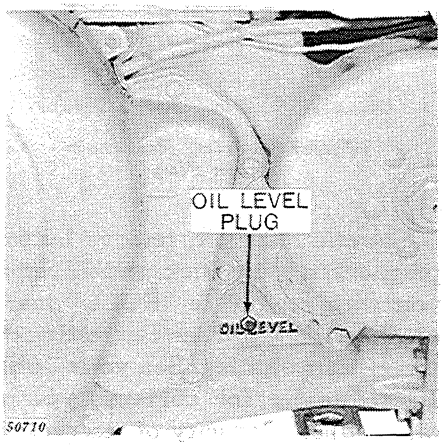


First Reduction Gear Cover Drain and Filler Plugs

Add transmission oil of the proper weight to the bottom of the oil level plug hole (approximately 4 U. S. gallons). For weight of oil to use, see table below.



Transmission Oil Filler Opening



Transmission Oil Level Plug

WEIGHT OF TRANSMISSION OIL

Air Temperature	SAE Viscosity Numbers
0°F. and Up	90
Below 0°F.	80

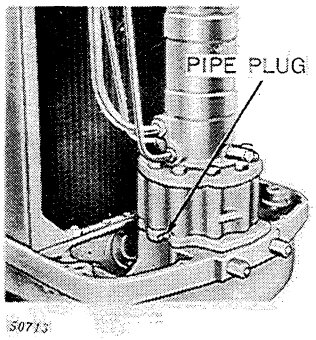
Be sure to refill the first reduction gear cover, also. Its capacity is 1 U. S. quart. For location of filler plug, see illustration on preceding page.

LUBRICATING THE DISTRIBUTOR SHAFT.

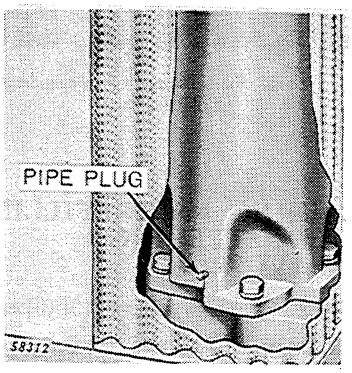
Remove distributor from tractor and place it in a horizontal position. Remove small plug from side of distributor body (see illustration on page 61). With hole from which plug was removed on top, oil level should cover bushing. If necessary, add a good grade of SAE 20 oil to reservoir until oil level is correct. Install distributor and retime engine (page 73).

LOWER PEDESTAL BEARING.

Once a year remove grille, take out pipe plug located on lower end of pedestal, install a grease fitting, and lubricate pedestal bearing with pressure gun grease. **Do not over-lubricate.**



Location of Pedestal Pipe Plug on Tractors with Power Steering



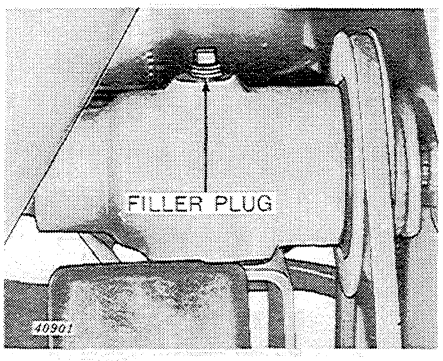
Location of Pedestal Pipe Plug on Tractors with Manual Steering

REAR AXLE BEARINGS.

After every 1000 hours of operation, remove pipe plugs from each rear axle housing, install a grease fitting, and pump 6 to 8 shots of pressure gun grease into both housings. Remove fittings and replace plugs.

FRONT FAN BEARINGS.

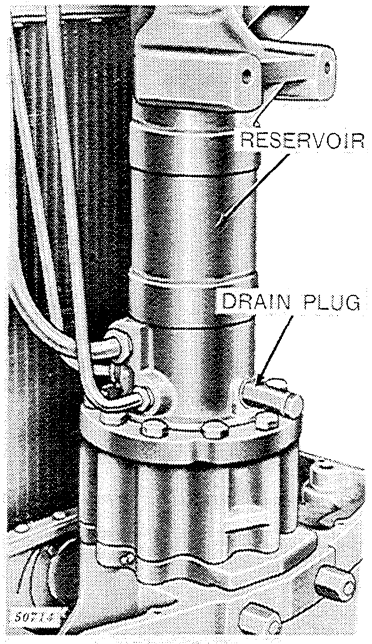
After every 1000 hours of operation, remove pipe plug from fan bearing housing, install a grease fitting, and fill housing with wheel bearing grease. This does not apply to tractors with power steering as they are automatically lubricated.



Front Fan Bearing Housing Filler Plug

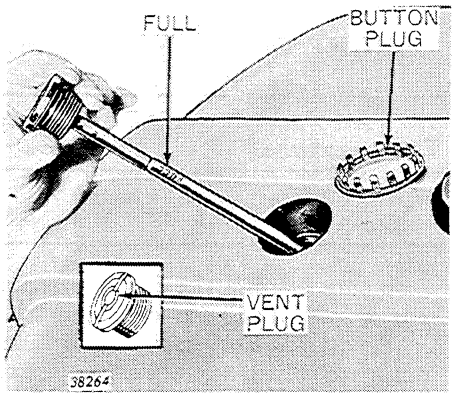
DRAINING AND REFILLING POWER STEERING RESERVOIR.

Once a year or every 1000 hours of operation, drain the power steering reservoir by removing drain plug at bottom of reservoir. Do not flush. Consult your dealer.



Power Steering Reservoir Drain Plug

To refill reservoir, remove button plug, unscrew dip stick, and fill reservoir with new oil to "FULL" mark on dip stick with filler cap resting on top of filler opening. **See your John Deere dealer for correct type of oil to use.** (Capacity of reservoir is approximately 5 U. S. quarts.)



Power Steering Reservoir Dip Stick

» » » SERVICE YOUR JOHN DEERE DEALER OFFERS « « «

Your John Deere dealer offers a complete tractor service at a nominal charge. Take advantage of this service once a year or after every 1000 hours of operation, whichever occurs first. This includes, among many other things, the following:

FRONT WHEEL BEARINGS.

Front wheels will be removed and all parts, including wheel hub, will be washed clean, removing the old grease. The bearings, felt washers, and felt retainers will be inspected for wear and replaced if worn. Wheel bearings will be packed with wheel bearing grease, assembled, and adjusted.

FRONT FAN BEARINGS (Except Tractors with Power Steering).

Front fan shaft assembly will be removed, disassembled, and all parts will be washed clean, removing the old grease. The bearings, felt retainers, washers, fan shaft, gears, spring, and fan will be inspected for wear and parts replaced if worn. This assembly will be repacked with high-temperature grease and assembled.

PULLEY AND CLUTCH BEARINGS.

The clutch and pulley will be removed; bearing and oil return holes in pulley hub will be washed clean. Bearing, bushing, and all clutch parts will be inspected for wear and parts will be replaced if worn. Bearing will be repacked with high-temperature grease, the pulley and clutch assembled and adjusted.

PULLEY BRAKE.

Pulley brake will be inspected, checked for proper operation, and adjusted, if necessary.

BRAKES.

The brakes will be inspected for lining wear and adjusted for proper operation.

STEERING MECHANISM.

The steering mechanism will be checked for proper operation and adjusted, if necessary.

HYDRAULIC POWR-TROL SYSTEM.

The Powr-Trol system will be inspected for leaks and proper operating characteristics.

CAP SCREWS AND NUTS.

All cap screws and nuts will be inspected and tightened.

REAR AXLE BEARINGS.

Rear axles will be inspected, adjusted, if necessary, and outer bearings repacked with proper lubricant.

POWER SHAFT CLUTCH.

The power shaft clutch will be inspected and adjusted, if necessary.

CLUTCH AND PULLEY (EVERY 2000 HOURS).

Every 2000 hours the clutch and pulley will be removed and clutch operating mechanism cleaned and repacked with high-temperature grease.

Services that will keep your tractor in tip-top shape

There are certain service jobs that should be performed before you operate your tractor, during its operation, and after your season's work has been finished. By making it a hard and fast rule to follow a servicing routine, your tractor will run better, last longer with less upkeep expense; you will eliminate field delays.

Many of the suggestions on the following pages may involve only inspection but, if necessary, the units involved should be adjusted or serviced, as described, by you or your John Deere dealer. Performing these adjustments or services will help to keep your tractor operating economically and efficiently. For additional service and genuine John Deere parts, see your John Deere dealer.

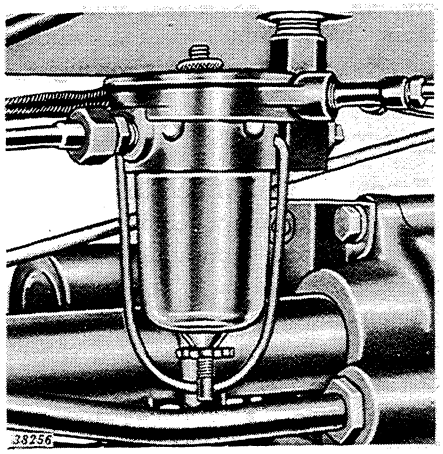
• FUEL SYSTEM •

Uniform efficiency of the fuel system will be assured by an occasional inspection and cleaning. The logical place to start is the source of fuel supply—the fuel tank and filter.

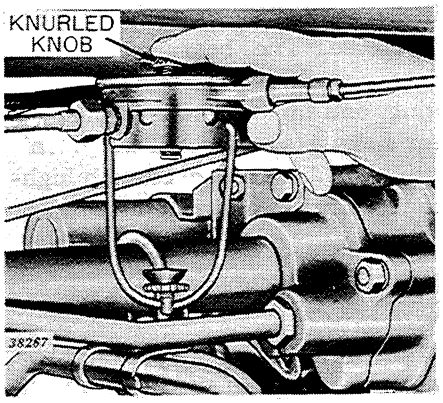
FUEL TANK AND FILTER.

Your new tractor is equipped with an automatic oil-pressure-operated fuel shut-off valve located on top of the fuel filter bowl. When the engine is stopped, the valve automatically shuts off flow of fuel to the filter. As soon as the engine is turned over by the cranking motor the valve is automatically opened by engine oil pressure.

Remove glass filter bowl and clean it thoroughly. With glass bowl removed release a small amount of fuel to see if it flows readily from the tank. This can be done by turning the knurled knob on top of the filter up to the top of the stud and pushing it down. If fuel does not flow, tank must be cleaned.



Fuel Filter



Releasing Fuel from Filter

When replacing the filter bowl be sure the cork gasket which fits between the bowl and the screen is in good condition; if not, replace it. Check fuel lines for leaks or restrictions.

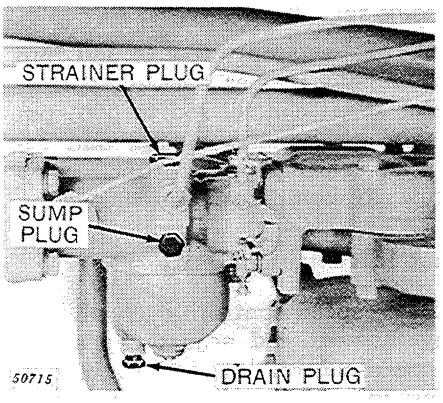
Priming Fuel Filter.

After the filter bowl has been removed it is not usually necessary to fill the bowl with fuel to start the engine. However, if the tractor has run out of fuel or if the carburetor has been drained, it is best to prime the fuel system. To do so, turn the knurled knob on top of the filter up to top of stud, push it down until the filter bowl is full of fuel, and hold it down a few additional seconds to fill the carburetor bowl.

CARBURETOR.

Cleaning the Carburetor.

To clean the screen, flush sump by removing drain plug and pushing down on the fuel filter priming stud as described above.



Carburetor Drain and Cleaning Plugs

Remove strainer plug with attached screen; clean screen. Replace screen and drain plug. Prime the fuel system to fill the carburetor bowl.

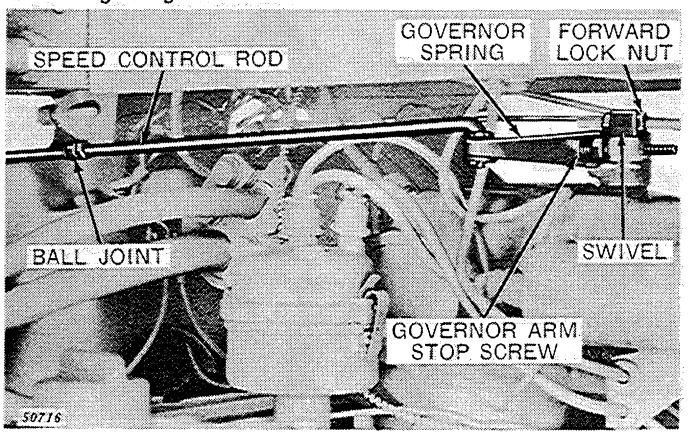
Adjusting Throttle Control Linkage.

(1) With throttle rod assembled and carburetor throttle lever and speed control lever in wide-open position, adjust throttle rod approximately 1/2 hole short. To accomplish this, turn swivel lock nuts until they clear swivel. Set forward lock nut 1/8-inch from swivel, then tighten rear lock nut. (See illustration below.)

(2) With speed control lever in closed position, hold throttle lever closed and adjust the throttle stop screw so engine runs at 300 rpm (see first illustration on next page).

(3) Adjust speed control rod at ball joint for 600 rpm slow idle. Governor spring must clear governor arm stop during this adjustment (see illustration below).

(4) With engine stopped and speed control lever in closed position, adjust governor arm stop screw so that the carburetor throttle stop screw clears stop pin by 1/8-inch.



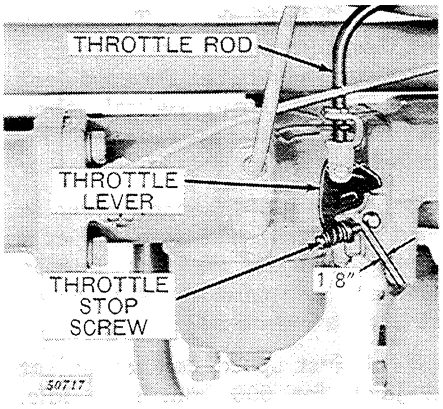
Throttle Control Linkage

Adjusting Carburetor.

Slow Idle Adjustment.

(1) Set speed control lever to slow idle position.

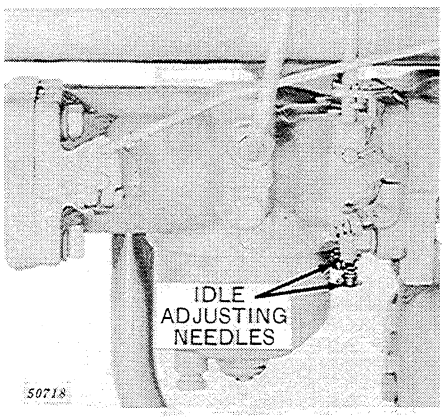
(2) Hook a spring or heavy rubber band over carburetor throttle lever to hold throttle closed on stop screw.



Throttle Lever, Rod and Stop Screw

(3) Reset slow idle speed by means of stop screw from 300 rpm to 600 rpm.

(4) Two idle-adjustment needles are provided, one for each carburetor venturi.



Idle-Adjusting Needles

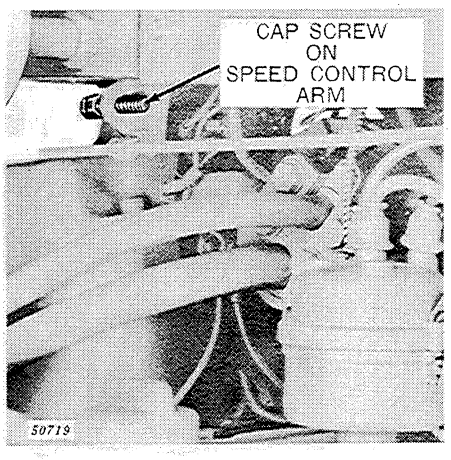
Short out the spark plug in No. 1 (left-hand) cylinder and adjust right-hand idle-adjustment needle on carburetor to give maximum rpm with engine operating on No. 2 (right-hand) cylinder only. Then short out spark plug in No. 2 (right-hand) cylinder and adjust left-hand idle-adjustment needle to give maximum rpm with engine operating on No. 1 (left-hand) cylinder only.

After maximum rpm is known, turn in the idle screw of the cylinder having the higher rpm until it is the same as that of the slower cylinder. Operate engine from slow to fast idle and back. If acceleration and deceleration are not even and smooth, it may be necessary to open the idle needles slightly.

(5) Reset stop screw to 300 rpm and remove rubber band or spring. Reset speed control rod to 600 rpm engine speed, stop engine and recheck clearance at throttle stop screw. It should be 1/8-inch.

Fast Idle Adjustment.

Push speed-control lever all the way forward and adjust cap screw on speed-control arm until engine has a fast idle speed of 1460 rpm.

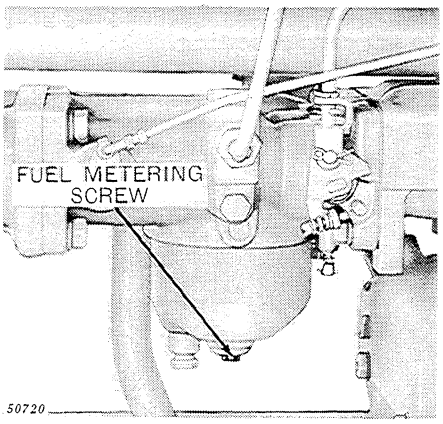


Fast-Idle Adjusting Cap Screw

CAUTION: Under no circumstances should the engine be permitted to idle faster than 1470 rpm.

Metering Screw Adjustment.

One metering screw adjustment is provided on the carburetor. Average setting for gasoline and All-Fuel is 2-1/4 turns open. However, the carburetor is equipped with limiting main jets and under some conditions it is possible to operate the engine at full load with the metering adjusting screw entirely closed. On the other hand, it may be open as much as five turns without abnormally high fuel consumption.



Fuel Metering Screw

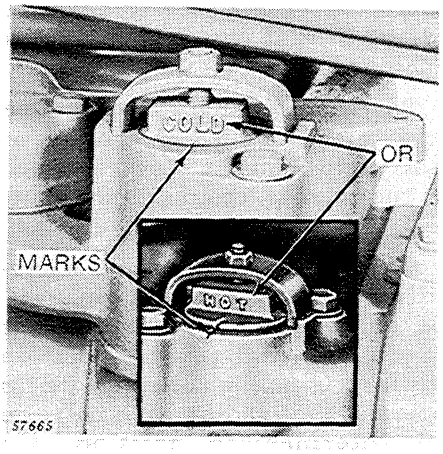
CAUTION: Never adjust the carburetor while tractor is moving.

MANIFOLD.

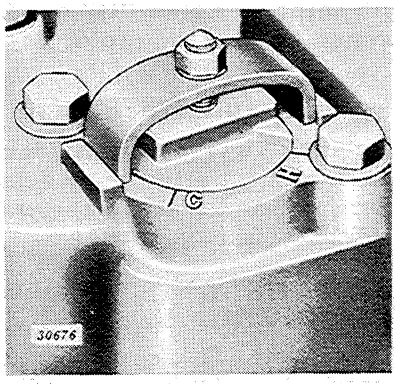
The flow of exhaust gases through the manifold of both gasoline-burning and All-Fuel tractors can be controlled to regulate the temperature of the incoming air-fuel mixture.

Adjustment is made by turning the two-position valve shown in the illustrations below.

On gasoline-burning tractors, the words "HOT" and "COLD" are stamped on opposite sides of the valve. On All-Fuel tractors the letters "H" (hot) and "C" (cold) are stamped on the manifold.



Manifold Heat Control Valve on Gasoline-Burning Tractor



Manifold Heat Control Valve on All-Fuel Tractor

On either gasoline-burning or All-Fuel tractors, set the heat control valve to "HOT" or "H" when temperatures are below 32° F.

If you have a gasoline-burning tractor, set the valve to "COLD" when temperatures are above 32° F. If you have an All-Fuel tractor, set the valve to "C" (cold) when temperatures are above 32° F. except when tractor is operating under continuous light loads or is burning heavy fuels. In either case, for continuous full-load operation under temperature conditions in which the engine has a tendency to detonate, set the heat control valve to "COLD" or "C."

To change position of the valve, remove the clamp and drive down (sharp blow with a heavy hammer) on the valve to loosen it in the manifold.

CAUTION: This is a two-position valve and the engine will be damaged if any attempt is made to change its position while engine is running, or to operate the tractor with valve in an intermediate position. On gasoline-burning tractors the marks on valve and manifold must be in line in either the hot or cold position. On an All-Fuel tractor, the indicator on valve must point to either "H" or "C" stamped on the manifold.

• IGNITION SYSTEM •

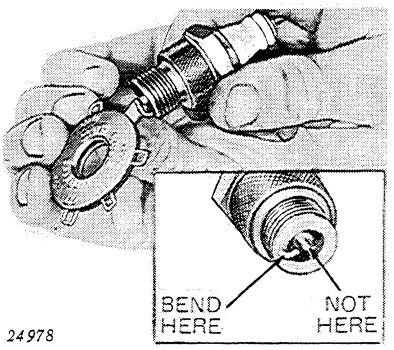
The entire ignition system must function efficiently to get first-class performance and maximum operating efficiency from your tractor.

CHECK THE IGNITION SYSTEM PERIODICALLY.

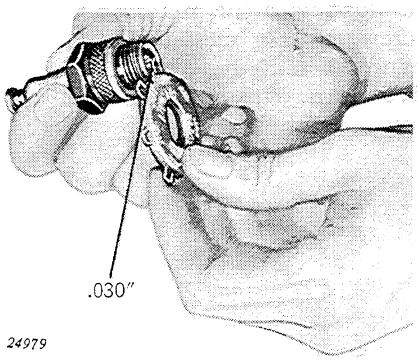
If necessary: (1) clean and adjust the spark plugs; (2) hone and adjust the distributor breaker points; (3) check ignition timing; (4) inspect the spark plug cables for breaks or shorts.

SPARK PLUGS.

If the plug is dirty, scrape or clean it. If the porcelain is cracked, the plug must be replaced. Check electrode gap and see that it is spaced to .030-inch. When adjusting the gap, bend only the outer electrode. Always use a spark plug gauge to get correct setting.



Setting Spark Plug Point Gap



Checking Spark Plug Point Gap

To prolong the life of the spark plugs, be sure they are properly installed and tightened.

See your John Deere dealer for correct plugs.

SPARK PLUG CABLES.

Keep cables clean to prevent shorting. Under certain weather conditions, cables may eventually become hard and cracked and require replacement. The cable terminals should fit snugly in the socket of the distributor cap. Be sure each cable is securely fastened to the spark plug terminal.

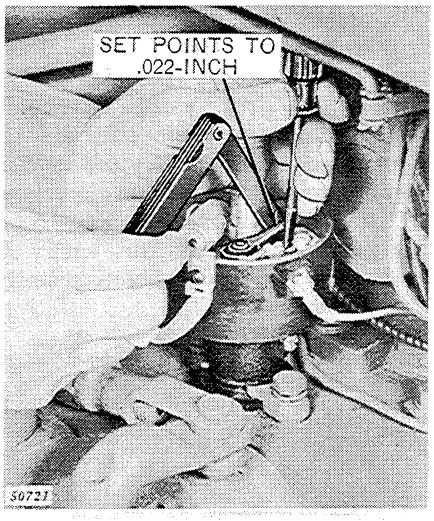
DISTRIBUTOR.

If you are experiencing ignition trouble, first turn on ignition. Remove wire from negative terminal on coil. Ground the wire. If no spark occurs, the trouble is in battery-to-distributor circuit. If spark does occur return wire to terminal and check spark plugs and spark plug cables. If these are in good condition, remove distributor cap. Wipe out the cap thoroughly with a clean rag, making sure ventilator holes are open. Inspect cap carefully; if cracks are found, replace cap with a new one.

Remove distributor arm from the shaft by pulling straight up. Wipe arm and cam clean. Relubricate cam with a trace of high-temperature wheel bearing grease. If breaker points are worn, pitted or dirty, carefully remove both points. After cleaning, dress each point to a smooth, flat surface, using a fine hone. (If points are badly pitted or worn, they should be replaced.) It is not necessary to remove pits. Just be sure points are clean and flat.

Distributor Point Adjustment.

After points have been installed, add a trace of high-temperature wheel bearing grease to cam. Turn flywheel until cam opens to widest position. Adjust points to 0.022-inch clearance. Examine the breaker bar for free movement.



Adjusting Distributor Breaker Point Gap

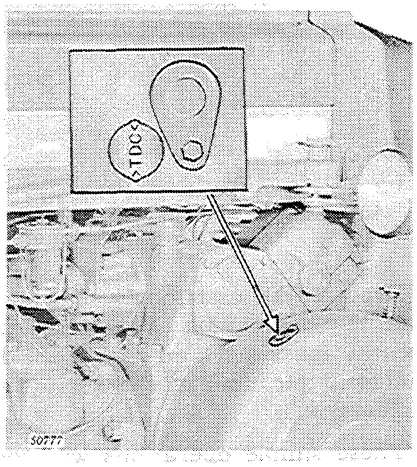
Replace the distributor arm and cap. Replace cables. Rear terminal goes to spark plug on flywheel side and front terminal to spark plug on pulley side.

These simple operations will correct all ordinary ignition troubles. If no spark is obtained after these operations are completed, the tractor should be taken to your John Deere dealer for checking and overhauling.

INSTALLING AND TIMING DISTRIBUTOR ON GASOLINE-BURNING AND ALL-FUEL TRACTORS.

If the distributor has been removed it must be timed after it is reinstalled. To do so follow the procedure given on the next page. *NOTE: This procedure is to be used for emergency timing only. For accurate timing see your John Deere dealer who has the proper equipment to time the engine for most efficient operation.* **CAUTION: Under no circumstances should the engine be run if it detonates continuously. When this occurs, retard the spark.**

Remove the spark plug from the flywheel side. (This is the No. 1 spark plug.) Place your finger over the hole and rotate the flywheel in the running direction until you feel a pressure of air in the cylinder. Continue turning the flywheel slowly until the "TDC" mark, stamped on the flywheel rim, lines up with the notches in the timing hole in the flywheel cover.

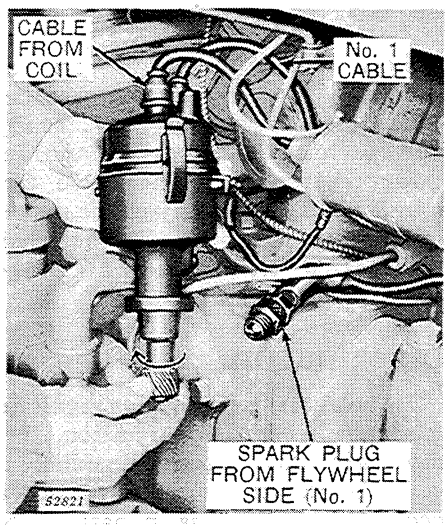


Flywheel Timing Marks

Assemble dust cover, arm and cap on distributor. Attach wire from coil to terminal on side of distributor body and cable from coil to center terminal on distributor cap.

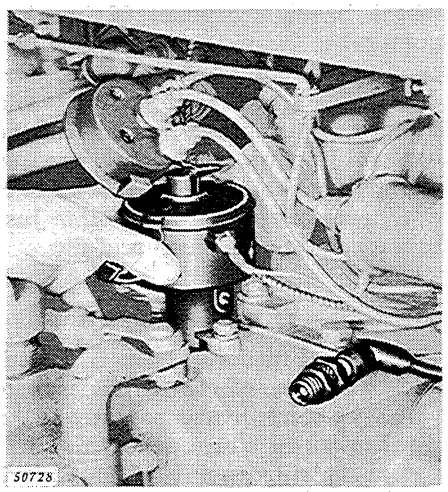
While holding distributor so spark plug cable terminals are toward center of tractor, install spark plug cable from flywheel side to rear (No. 1) terminal on distributor cap. Attach other end of cable to spark plug removed from flywheel side (No. 1). Ground body of plug on some metal part of the tractor and position plug so that the points can be observed.

Turn on ignition. Ground distributor body on some metal part of tractor and rotate distributor shaft slowly clockwise (as viewed from above) until a spark jumps across the points of the spark plug.



Rotating Distributor Shaft

Without turning distributor shaft, remove distributor cap and scribe a mark on distributor body to locate position of arm in relation to distributor body. Now lower distributor into position on tractor, carefully engaging gear on end of distributor shaft with gear on camshaft. Rotate distributor body until scribed mark on body again lines up with arm. Install distributor attaching cap screws and tighten them finger-tight.



Lining Up Distributor Arm with Mark on Body

To check for proper timing, reinstall distributor cap and rotate distributor body slightly in a clockwise direction. Rotate flywheel in the running direction until the "TDC" mark on flywheel is lined up with notches in timing hole. Now rotate distributor body counter-clockwise until a spark occurs at the spark plug removed from flywheel side. Tighten distributor body attaching screws securely.

Install spark plug in flywheel side. Attach cable from spark plug on pulley side to front terminal in distributor cap.

CAUTION: Whenever adjustments which do not require use of an electric current are made on the tractor engine, remove the coil-to-distributor wire from battery-ignition-type tractors. (If your tractor has a magneto instead of a distributor, remove the spark plug wires from the magneto.) Also remove the battery ground cable on all tractors to prevent accidental starting or dangerous sparks.

• COOLING SYSTEM •

Your tractor is equipped with a pressure cooling system. This system will not operate properly unless it is tight. The filler cap must be properly tightened. The gasket surface of the cap must be in good condition. The system must not have loose connections or leaks. Otherwise pressure will not be maintained, and loss of water and overheating will result.

Water is circulated in the cooling system by a water pump.

Proper operating temperature is maintained by a heavy-duty thermostat located in the cylinder water outlet pipe.

For safety, the pressure valve in the radiator filler cap is set to release when the pressure in the cooling system is between 3-1/2 to 4-1/2 pounds.

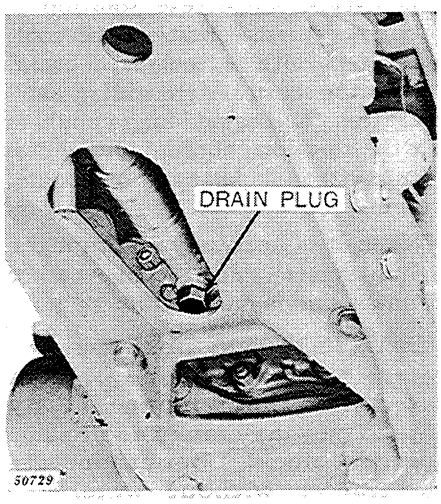
Never Remove Radiator Cap Until Temperature of Coolant Is Below Its Boiling Point

CAUTION: Do not remove radiator filler cap until the coolant temperature is down to its boiling point. Then loosen cap slightly to the stop to relieve any excess pressure before removing it completely.

CLEANING THE COOLING SYSTEM.

For efficient operation the cooling system should be cleaned once or twice a year.

Remove thermostat and run the engine for a few minutes to stir up any rust or sediment. Stop the engine and drain the cooling system completely before sediment settles again.



Cooling System Drain Plug

Replace drain plug and fill the cooling system with a solution composed of a good commercial radiator cleaner and water. (Cooling system capacity— 4-1/2 U. S. gallons.) Install the filler cap and run the engine. Then drain out the solution, add fresh water, start the engine and let the water circulate for a few minutes. Stop the engine and drain out this flushing water. Replace thermostat, and fill system with fresh water up to bottom edge of vertical baffle.

Remove the radiator grille and examine all air passages in radiator core; remove all chaff and dirt and straighten bent fins.

When filling the radiator, use soft water whenever available. Well water often contains lime and other minerals which eventually may clog the radiator core and reduce the cooling efficiency. It is recommended that a rust preventive be added when refilling.

COLD WEATHER SERVICE.

When using the tractor regularly in freezing weather, an anti-freeze solution will eliminate filling and draining the radiator daily. If permanent-type anti-freeze solution is to be used, first condition the cooling system with a recognized brand of radiator sealer. After adding anti-freeze run the engine long enough to mix the solution thoroughly and distribute it to all parts of the cooling system.

When it is necessary to drain the cooling system during cold weather see instructions on previous page.

CAUTION: Do not put hot water in a cold engine or cold water in a hot engine at any time. You may crack the head or cylinder block. Do not operate the tractor without water for even a few minutes.

Never Pour Cold Water in a Hot Engine or Hot Water in a Cold Engine

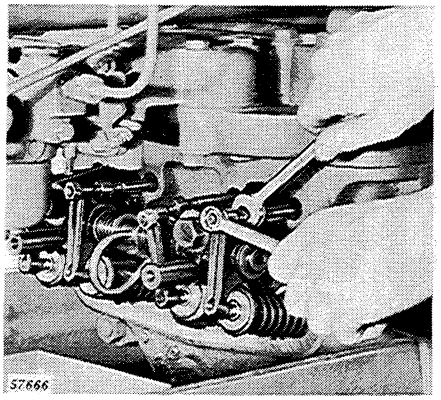
• TAPPET ADJUSTMENT •

Properly adjusted tappets insure longer valve life. Therefore, check tappet clearance every 500 hours and make adjustments if necessary. All adjustments should be made with a hot engine.

Start the engine and run it until operating temperature is reached. Remove the tappet cover from the front of the cylinder head and both spark plugs from the cylinders.

Turn the flywheel until the piston on the flywheel side is at the end of its compression stroke. To determine this position, place your finger over the spark plug hole on the flywheel side and turn the flywheel in the running direction until a pressure of air is felt in the cylinder. Then continue to turn the flywheel slowly until the "TDC" mark, stamped on the flywheel rim lines up with the notches in the timing hole in the flywheel cover. (See illustration on page 74.)

Now adjust the two left-hand tappets on the flywheel side. To do so, loosen the lock nuts and turn the adjusting screws in until there is no movement in the tappet levers. Then turn the adjusting screws out one-third turn or until there is 0.020-inch clearance between the end of the



Adjusting Tappets

tappet lever and valve stem. A feeler gauge may be used to measure this clearance but if the engine has operated for a long period of time, the wearing of the end of the valve stem into the tappet lever may cause a false reading.

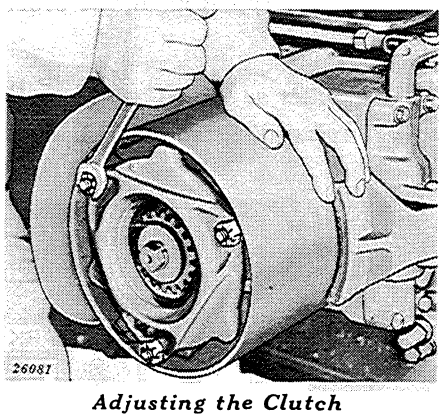
After tappet clearance is properly adjusted, lock the adjusting screws tightly in place with the lock nuts.

Now rotate the flywheel 180 degrees (one-half turn) in the running direction and adjust the tappets on the pulley side in the same manner. Replace the tappet cover using a good gasket.

• CLUTCH ADJUSTMENT •

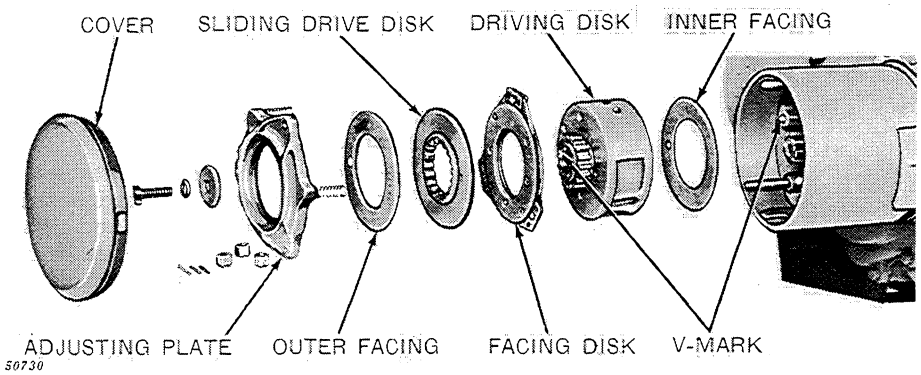
A loose clutch, one which requires little or no effort to engage, will slip, causing loss of power, overheating of the clutch and pulley, and will result in early replacement of clutch facings.

To adjust the clutch, first set the clutch lever in the engaged position, then remove pulley cover and tighten each of the three nuts equally until they are tight. Then back off each nut an equal amount a little at a time until the clutch can be disengaged. Now adjust the nuts equally until the clutch goes into the engaged or operating position with a snap requiring some pressure. Backing off the nuts an additional amount may be possible and yet provide a good snap when the clutch is engaged.



Adjusting the Clutch

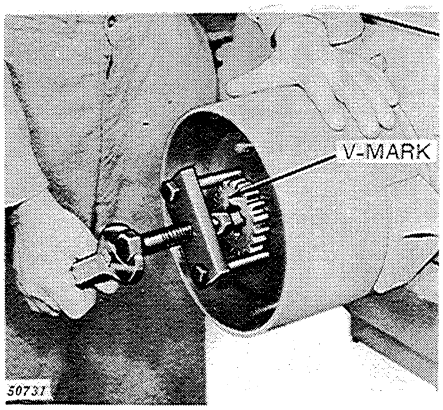
REPLACING CLUTCH FACINGS.



Clutch Facings and Related Parts

To replace the clutch facings, first study illustration above because it shows the arrangement of parts. Be sure they are replaced in the order as shown.

Use a puller as shown below to remove driving disk from crankshaft.



Removing Driving Disk from Crankshaft

When replacing parts, be sure "V" mark in the driving disk hub lines up with the flat spot at end of one of the crankshaft splines. The cap screw holding the fixed driving disk on the crankshaft must be tight.

After installing the new facings and all other parts, adjust the clutch as described previously. *NOTE: If at any time the clutch has been overheated, it is necessary to remove pulley and clutch, clean roller bearing, and repack it in high-temperature grease.*

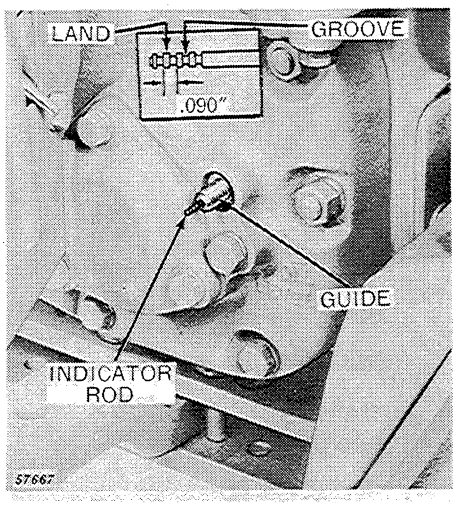
• POWER SHAFT CLUTCH •

The power shaft clutch is designed for long dependable service providing it is checked periodically for proper adjustment. Check and adjust the clutch after the first 20 hours and the first 75 hours of power shaft operation. Thereafter check it at the end of each 150 hours of power shaft operation (see "Periodic Check" below).

If at any time clutch slippage, which affects power shaft output is detected, the clutch must be adjusted immediately.

Periodic Check.

To check for correct adjustment, remove cap nut on rear of power shaft clutch housing to expose clutch adjustment indicator rod (see illustration below). Engage the clutch, then pull back on the clutch pedal to take up all slack in the linkage (do not disengage the clutch).



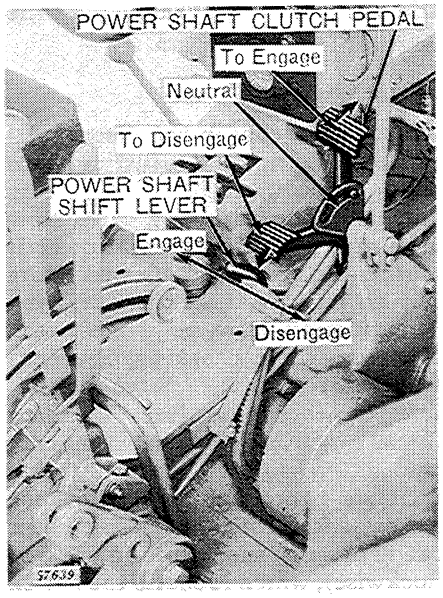
Checking Power Shaft Clutch Adjustment

Hold clutch adjustment indicator rod "in" and note position of rod in relation to end of guide. Disengage the clutch and see that pedal is latched. Again note position of indicator rod in relation to end of guide. When the clutch is correctly adjusted, the distance the rod has moved should be equal to the length of one land and one groove on the rod (0.090-inch).

Clutch Adjustment.

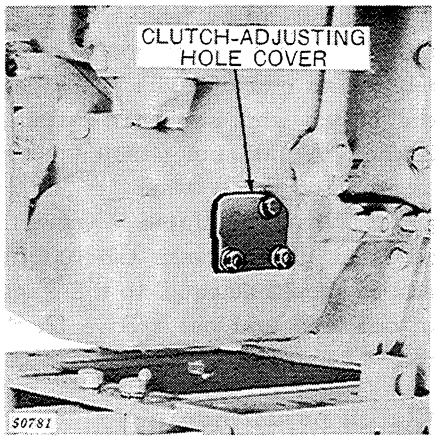
If your tractor is equipped with Universal Three-Point Hitch, adjustment can be made easier by removing the right-hand draft link and draft link support.

Locating Locking Screw.



Power Shaft Shift Lever and Clutch Pedal

Remove clutch adjusting hole cover from side of clutch housing. (See illustration on next page.)



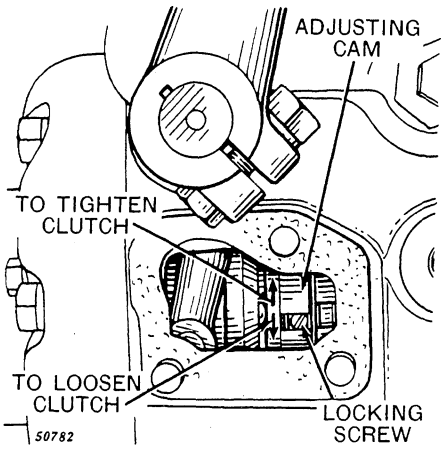
Clutch Adjusting Hole Cover

With power shaft clutch pedal in "neutral" position (that is, disengaged but not latched), see if you can locate the locking screw in one of the notches of the clutch adjusting cam. If the screw cannot be seen, turn the power shaft (and cam) a little at a time until you can see the screw.

Adjusting the Clutch.

Latch the pedal in the disengaged position. Turn the adjusting cam locking screw in until its head clears the slot in the adjusting cam. Now turn the adjusting cam upwards (counter-clockwise as viewed from rear) to tighten the clutch, moving the adjusting cam only one notch at a time while checking clearance as measured on the clutch adjustment indicator rod (see "Periodic Check", above). Turning the cam upwards (counter-clockwise), which **tightens** the clutch, will **increase** the measurement on the indicator rod. Turning the cam downward (clockwise), which **loosens** the clutch will **decrease** the measurement on the indicator rod.

After correct adjustment has been obtained, turn the locking screw outward, into one of the notches of the adjusting cam.

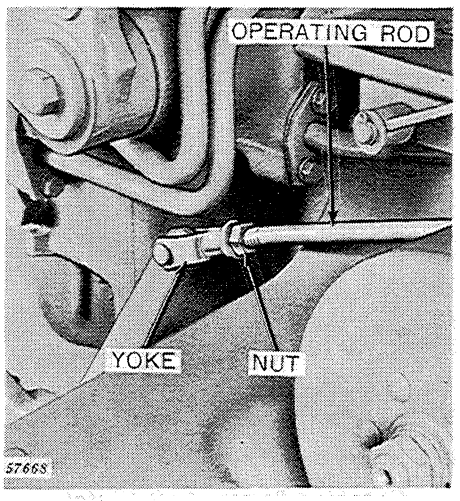


Cam Locking Screw

Replace clutch-adjusting hole cover and cap nut over indicator rod.

Power Shaft Brake Adjustment.

If the power shaft fails to stop when clutch is disengaged and pedal latched, it will be necessary to adjust the power shaft brake. To do so, disconnect yoke on rear end of operating rod from fork shaft arm, loosen jam nut and turn yoke 1/2



Clutch Operating Rod and Yoke

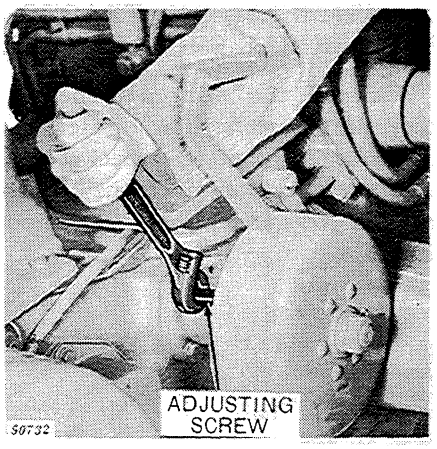
turn at a time to shorten operating rod, until power shaft stops when clutch is disengaged and pedal latched. After correct adjustment is made, tighten jam nut and connect yoke.

CAUTION: Always see that power shaft is disengaged and pedal latched before dismounting from tractor.

• BRAKE ADJUSTMENT •

Tighten the adjusting screw, then back it off five notches. This adjustment should permit about 2-3/4 to 3-1/4-inch pedal movement before you feel the brake shoe contacting the drum.

Whenever a brake adjustment will not correct or improve defective brake action, have the brakes relined.

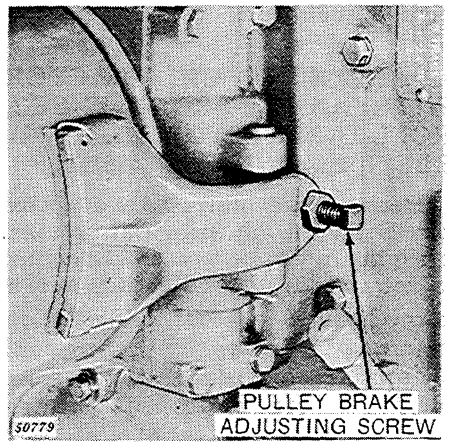


Adjusting Foot Brake

• PULLEY BRAKE ADJUSTMENT •

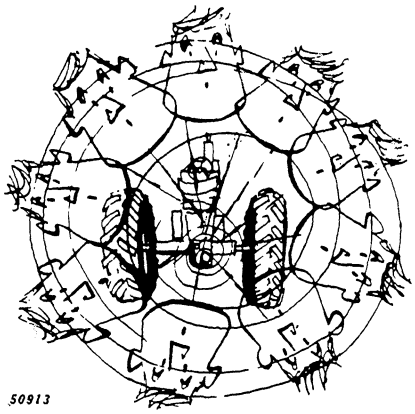
The pulley brake should be adjusted so that when the clutch operating lever is moved slightly forward from the rear (or released) position, the pulley is free to turn.

With engine running at slow-idle speed and gear shift in neutral, hold the clutch lever to the rear only far enough to take up the slack, then back off the pulley brake adjusting screw until pulley brake no longer stops pulley. Tighten the adjusting screw until there is just enough drag to stop the pulley. Then tighten the adjusting screw an additional one-eighth turn and lock the jam nut.



Pulley Brake Adjusting Screw

CAUTION: Do not use the pulley brake to stop the tractor as this shortens the life of the pulley brake lining.



Never Wear Loose Clothing Around Power Shaft

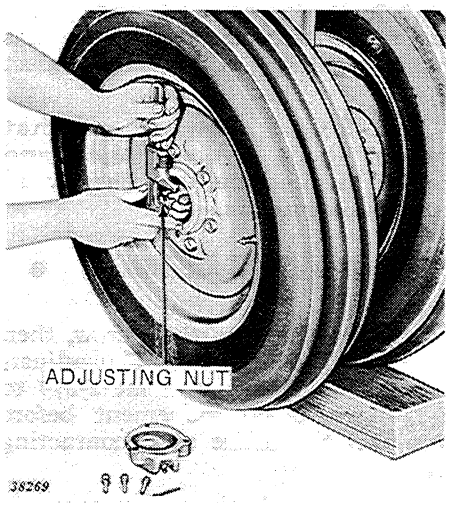
• FRONT WHEEL BEARINGS •

The front wheels on your tractor are carried on tapered roller bearings that must be kept in adjustment to assure long bearing life. Twice a year or after every 500 hours of operation check the front wheels for end play. Raise the wheels off the ground and if end play is evident, the bearings need adjustment.

ADJUSTMENT ON TRACTOR WITH DOUBLE FRONT WHEEL, ROLL-O-MATIC, OR ADJUSTABLE TREAD FRONT AXLE.

Remove the hub cap and cotter pin. Draw the adjusting nut up until a slight drag is felt when the wheel is rotated. If the adjusting nut is turned three to four castellations before it is drawn tight, the wheel should be disassembled, bearings inspected, and replaced if they are worn.

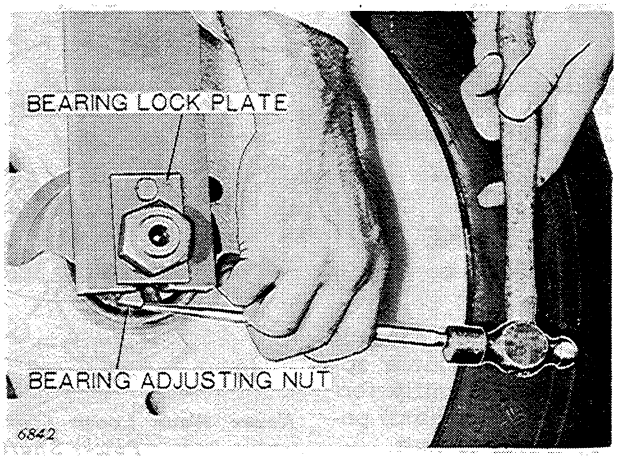
After adjusting nut is drawn tight, back it off one full castellation, plus any additional amount required for inserting the cotter pin. Install cotter pin, and replace hub cap. Both wheels must be adjusted alike.



Adjusting Double Front Wheel Bearings

ADJUSTMENT ON TRACTOR WITH SINGLE FRONT WHEEL.

Back off the front axle bearing lock plate screw; then tighten the adjusting nut until the wheel rotates with a slight drag. Lock the adjustment in the notch closest to this position.



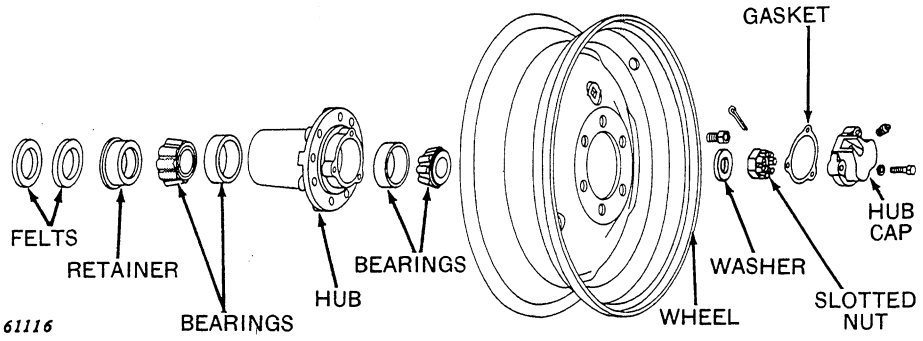
Adjusting Single Front Wheel Bearings

FRONT WHEEL BEARING SERVICE.

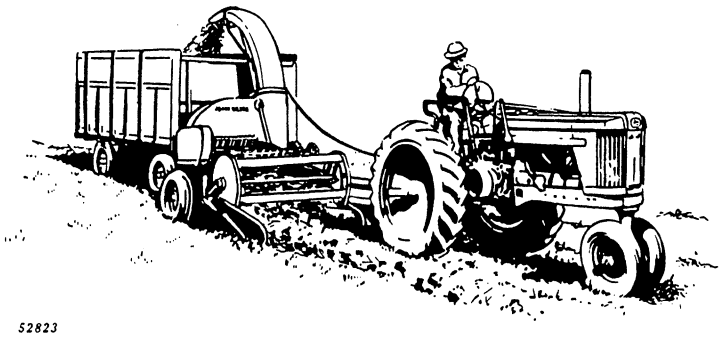
Twice a year the front wheels should be removed and all parts of hub and spindle washed clean to remove dirt and old grease. Examine the bearings and felt washers and replace if worn.

When bearings are removed, new felt retainers must be used when reassembling.

Repack bearings with wheel bearing grease.



Exploded View of Front Wheel Assembly



Nothing Like a Yearly Checkup by Your John Deere Dealer

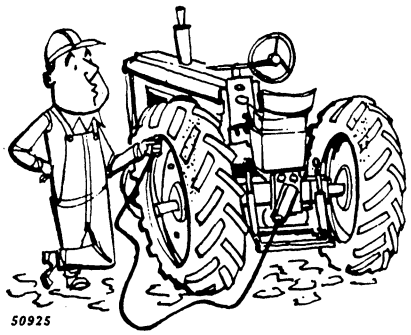
• TIRES •

CHECKING AIR PRESSURE.

Check air pressures every two or three weeks. Use special low-pressure gauge, with one pound graduations, to get accurate inflation. This gauge should be checked occasionally for accuracy. It may get out of order and require a correction in the reading.

Use a special air-water gauge for testing tires filled with water or calcium chloride solution.

Always replace the screw valve caps and be sure they are on tight to provide a positive air seal.



RUBBER TIRE INFLATION CHART

REAR TIRES

Tire Size	Ply	Inflation Pressure
12.4-36	4	12
13.9-36	4	14
11-38 (C and R)	6	12
12.4-38	6	12
9-42	6	18

When tractor is heavily loaded as with maximum added ballast or heavy rear-mounted implements, increase inflation pressure on:

12.4-36 Tire—2 Pounds
11-38 Tire—2 Pounds
12.4-38 Tire—2 Pounds
9-42 Tire—6 Pounds

Maximum ballast (liquid or cast-iron) per wheel—350 pounds.

FRONT TIRES

Tire Size	Ply	Inflation Pressure: With Towed or Rear-Mounted Implements	Inflation Pressure: With Front-Mounted Implements
5.50 x 16	4	32 Lbs.	32 Lbs.
6.50 x 16	6	36 Lbs.	40 Lbs.
6.50 x 16	8	36 Lbs.	56 Lbs.
9.00 x 10	8	44 Lbs.	44 Lbs.

Over- or under-inflation will shorten tire life.

If additional traction is required, add weight to the wheels. Lowering the air pressure will make little difference and may ruin the tires.

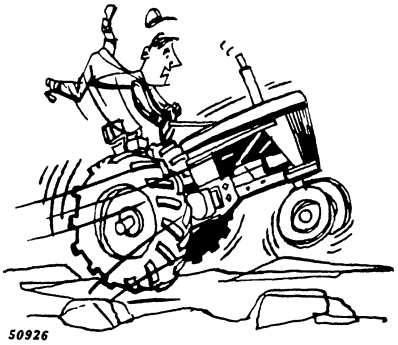
CARE OF RUBBER TIRES.

Grease and Oil Shorten Rubber Tire Life.

Tires should not stand on oil-soaked floors and should not come in contact with fuel or oil. Oil softens and deteriorates the rubber, shortening the life of the tires.

Careless Driving Shortens Rubber Tire Life.

Driving over rough ground at high speed puts an undue strain on fabric and very definitely shortens tire life. Driving over rocks, stones, tree stumps, etc., is hard on tires.



Careless Driving Shortens Tire Life

Sunlight Shortens Rubber Tire Life.

Bright sunlight causes the surface of the tires to check and harden. When not in use, keep tractor out of the sun if possible. When it is to be stored for any length of time, store it in a cool, dark place, with the tires relieved of their load by jacking up the tractor. If the tractor is stored in the open, it should be covered with canvas or some other suitable material.

Chemicals Shorten Rubber Tire Life.

When using a tractor in spraying and dusting operations, especially with Paris Green and Bordeaux mixtures which contain copper, the tires should be cleaned thoroughly with clean water after each spraying operation.

Inspecting Tires.

Inspect your tires at regular intervals for possible injuries. The sidewall or tread rubber may be cut through, exposing the fabric so that moisture and dirt can get in and cause rotting of the fabric. There are rubber compounds on the market for filling these cuts. If the break is more than 2 inches long, have it vulcanized for permanency. Your John Deere dealer may be able to do this for you.

• WEIGHTING REAR WHEELS •

WHEN TO USE WHEEL WEIGHTS.

Power can be lost and tire life cut drastically by wheel slippage. Wheel slippage can be largely corrected by weighting the rear wheels either by a liquid solution in the tires or by adding cast-iron wheel weights.

Extra weight is needed only for heavy pulling. It is not required for road operation and light work.

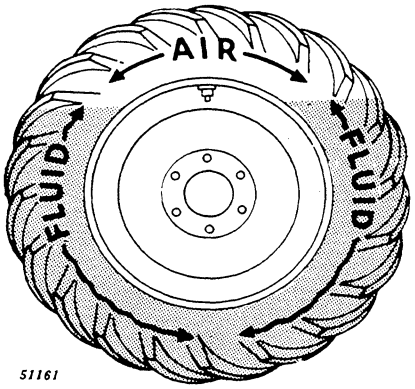
LIQUID WEIGHT.

Water and calcium chloride solution is an economical means of adding weight to rear wheels equipped with rubber tires. This solution will not damage the inner tube or tire if used in proper proportions. Its use has the full approval of the tire companies. Calcium chloride solution is recommended rather than water as it will not freeze. (See your John Deere dealer for this service.)

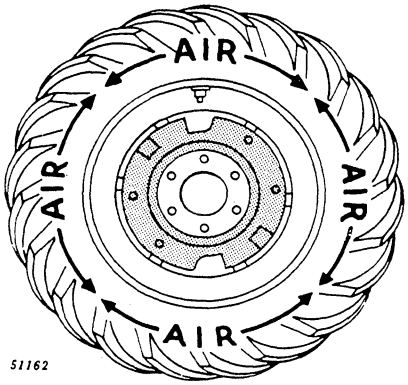
CAST-IRON WEIGHTS.

Where weight in addition to the liquid weight is required or where weight other than a liquid solution is desirable, cast-iron wheel weights, each weighing approximately 150 pounds, can be bolted to the rear wheels. This type of weight can be secured from your John Deere dealer.

When plowing, best results are generally obtained by taking one weight from the furrow wheel and adding it to the land wheel. The tilting of the tractor when plowing throws additional weight on the furrow wheel. Furthermore, the traction in the furrow is usually better than that on unplowed land. By adding weight to the land wheel, there is more uniform distribution of weight over the drive wheels, which is important.



Tractor Tire with Liquid in Tube as Wheel Weight



Rear Wheel Equipped with Removable Cast-Iron Wheel Weight

• STARTING AND LIGHTING EQUIPMENT •

Follow the simple precautions and service operations below for maximum satisfaction.

• CRANKING MOTOR •

The cranking motor used on your tractor is of the heavy-duty type, built to carry a big load for a short period of time.

Considerable amperage is required from the batteries whenever the cranking motor is used. This is a heavy drain on the batteries and creates considerable heat in the cranking motor, so limit the length of time the cranking motor is used to 1/2 minute. Wait about two minutes for the batteries to build up a more satisfactory charge. This rest period will also allow the heat to escape from the cranking motor.

IF CRANKING MOTOR FAILS.

If cranking motor fails to function make the following inspections:

See if the batteries have a sufficiently high charge.

Check for defective cables, loose or corroded connections. Any of these conditions will result in poor cranking motor performance.

If cranking motor still fails to operate, see your John Deere dealer.

The cranking motor does not require lubrication.

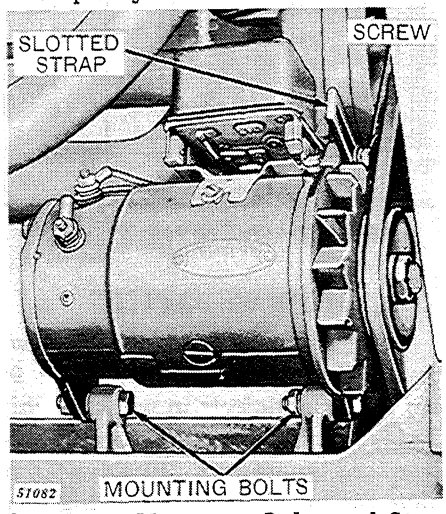
Do not lubricate drive parts as oil collects dust and grit which will cause sticking and rapid wear.

• GENERATOR •

The generator supplies current for lights and keeps the batteries in a charged condition by replacing the energy consumed by the cranking motor while starting the tractor. The charging rate is controlled by a voltage regulator.

ADJUSTING DRIVE BELT TENSION.

Rotate generator drive pulley until all slack in the belt is on top. Loosen the screw through slotted strap and the two mounting bolt nuts. Move generator out or in until there is a total of one inch up and down movement at the center of the belt between the fan and generator drive pulleys.



Generator Mounting Bolts and Strap Bolt for Belt Adjustment

After tension is adjusted, tighten screw and nuts.

To install a new generator belt, loosen generator and slip belt over fan blades, generator drive pulley and water pump pulley. Adjust belt as mentioned above.

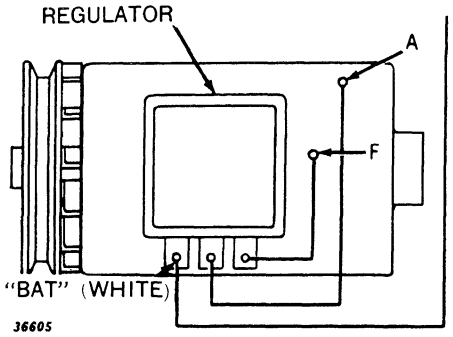
Make certain the generator pulley is properly aligned with the drive pulley.

CAUTION: Do not use the voltage regulator as a hand hold when adjusting belt. To do so may cause damage.

For generator lubrication, see page 58.

GENERATOR-VOLTAGE REGULATOR TERMINALS.

If for any reason either or both the generator or voltage regulator are removed from the tractor, connect wires according to this diagram when reinstalling.



Generator and Voltage-Regulator Terminals

• STORAGE BATTERY •

Your tractor is equipped with two tractor batteries guaranteed for 90 days against defects in workmanship and material. In addition to the standard guarantee (90 days), you have the privilege of registering your batteries and obtaining protection for an additional period of time. See your battery dealer.

When replacing a battery use a Group I, 6-volt, 85-ampere-hour battery having at least 15 plates. Insist on a heavy-duty type battery with a rubber case and "anti-leak" battery caps.

CLEANING THE BATTERIES.

At least once every 150 hours or 30 days wipe off the top of the batteries with a cloth dampened with water. If corrosion is present around the terminal connections, loosen it with a stiff bristle brush and then apply a solution consisting of 1/4 pound of baking soda added to one quart of water. Then flush the outside of the batteries, the battery box and the rear section of the tractor with clear water.

After cleaning the batteries, examine the vent holes in each cap, making sure they are open.

Battery connections must be clean as well as tight. A thorough coating of vaseline on each terminal connection will retard the accumulation of corrosion.

CHECKING ELECTROLYTE LEVEL.

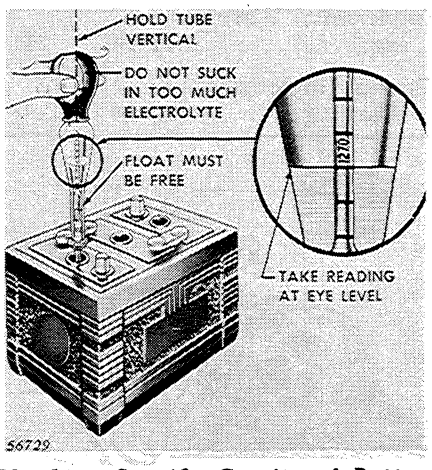
Check the electrolyte (acid and water solution) in the batteries every 150 hours or 30 days for proper level.

If the electrolyte level is low, add distilled water or any water that you would be willing to drink, until the recommended level is reached. Never permit the electrolyte level to go lower than the top of the cell plates.

In freezing weather, do not add water until after the engine has started, as water will not mix with the electrolyte until the generator passes a charging current into the battery.

CHECKING SPECIFIC GRAVITY.

The specific gravity of the electrolyte should be checked with an accurate hydrometer before adding water. If liquid level is too low to check, add water, run the engine for a few hours—permitting the water and electrolyte to mix; then check. Specific gravity should not go below 1.215. When fully charged, the reading will be 1.250 to 1.270.



Checking Specific Gravity of Battery with Hydrometer

COLD WEATHER BATTERY SERVICES.

It is difficult to maintain a fully charged battery during cold weather due, in part, to the heavy draw imposed on the battery while the cranking motor is cranking the engine, and because the average tractor is not run long enough for the generator to recharge the battery.

If this occurs, see your John Deere dealer and have him check the batteries, generator, and voltage regulator.

Keep the batteries well charged in freezing weather. A partially discharged battery freezes more quickly than one that is well charged. For example, a battery with a specific gravity reading of 1.150 will freeze at 0°F., and a fully charged battery will not freeze until temperature reaches −70°F. Freezing weather will not damage charged batteries.

STORING THE BATTERIES.

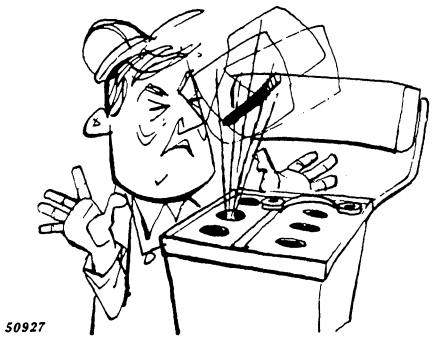
If the tractor is to be stored for the winter or is to be used only at infrequent intervals the batteries should be removed to a cool place (but above freezing). While the batteries are out of the tractor check them every 30 days and charge, if necessary, to prevent damage to the plates.

BATTERY INSTALLATION.

The batteries should not be permitted to bounce around in the battery compartment as this will jar active material off the cell plates, shortening the life of the batteries. Neither should the battery hold-down bracket be tightened too tightly as this will buckle the battery case causing the cell plates to crack. **CAUTION: When working with the battery, remember that all the exposed metal parts are "alive."**

DANGER CONNECTED WITH BATTERIES.

All sparks or open flames must be kept away from the batteries as the gas given off by the electrolyte is highly inflammable.



Keep Flame Away from Battery Filler Cap Openings

Avoid laying a tool or wire across the terminals as a spark or short circuit will result.

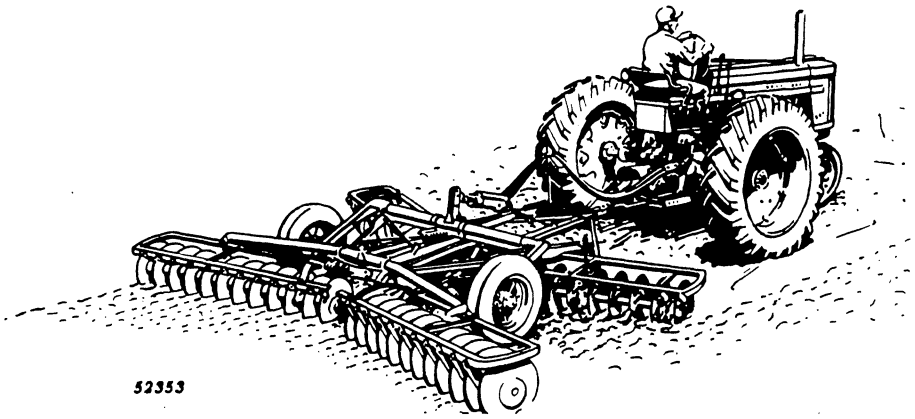
Spilled electrolyte will damage clothing unless diluted ammonia or some other counteracting agent is applied immediately.

CAUTION: Whenever adjustments are made on the tractor engine, remove the coil-to-distributor wire on battery-ignition-type tractors. (If your tractor has a magneto instead of a distributor, remove the spark plug wires from the magneto.) Also remove the battery ground cable on all tractors to prevent accidental starting or dangerous sparks.

• LIGHT BULBS •

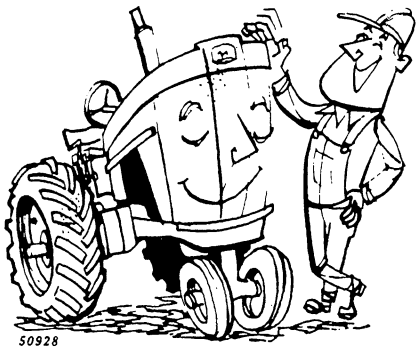
The front lights contain sealed-beam units. All other light bulbs are single-contact type, rated as follows:

Bulbs	Volts	Candle Power
Front	12-16	Sealed beam
Bright Rear	12-16	32
Red Rear	12-16	15
Dash	12-16	3
Implement Warning	12-14	21
Towed Implement Warning	12-14	21



SERVICE REMINDERS

Keep your tractor clean, well lubricated, and adjusted properly. Remember the old saying, "A farmer is judged by the appearance and condition of his farm machinery."



*

Use clean water in the cooling system. Don't start the engine unless the cooling system is full of water or anti-freeze solution.

*

When stopping the engine on an All-Fuel tractor, shut off the fuel-control valve and drain the carburetor.

*

Avoid over-choking when starting the engine.

*

Be sure all air intake connections to the carburetor are tight.

*

Be sure oil gauge registers immediately after engine starts.

*

Inspect batteries every 150 hours or 30 days. Check specific gravity and solution level according to instructions on page 89.

*

Be sure rear wheels are tight on rear axles before driving tractor.

*

Avoid clashing gears when shifting. Let pulley rotate very slowly for easy shifting.

*

Fix at once leaky fuel tanks, lines, or filter bowl bodies. Eliminate fire hazards.

*

Use a feeler gauge for setting such clearances as valve tappets, spark plug gap, and distributor breaker points.

*

Avoid racing and overloading the engine during the warm-up period, especially during cold weather. Save eventual trouble and expense.

*

Make it a practice to inspect your tractor periodically for loose nuts, bolts, cap screws, and cracked castings. Overlooking the little things can often be the cause of loss of time and added expense.

*

Whenever adjustments are made on the tractor engine, prevent accidental starting or dangerous sparks by disconnecting the battery ground cable and removing the coil-to-distributor wire. (If your tractor has a magneto instead of a distributor, remove the spark plug wires from the magneto.)

TRACTOR DIFFICULTIES

» » » » » ENGINE « « « « «

HARD TO START. WILL NOT START.

Possible Cause	*Possible Remedy*
No gasoline in tank.	Fill with fresh gasoline.
Old gasoline in tank.	Drain and fill with fresh gasoline.
Distillate or tractor fuel left in carburetor (All-Fuel).	Drain carburetor and fill with fresh gasoline.
No gasoline to carburetor.	Clean fuel filter and carburetor screen and fuel lines.
Water in fuel.	Drain and clean entire fuel system.
No spark.	See "*Ignition System,*" pages 72 to 75.
Poor compression.	Leaky valves. Worn or stuck rings. Call serviceman.
Water in cylinder.	Leaky head gasket. Have serviceman check.

ENGINE RUNS IRREGULARLY.

Improper carburetor setting.	See "*Adjusting the Carburetor,*" page 70.
Improper spark plug spacing.	Space spark plugs at .030″ gap.
Irregular spark.	Dirty points. See "*Distributor,*" page 72.
Irregular governor action.	Have serviceman check.
Improperly adjusted carburetor linkage.	See "*Throttle Control Linkage,*" page 69.
Worn throttle shaft bushing.	Have serviceman check and replace.
Governor to carburetor linkage binding.	Clean and relieve bind.

LACK OF POWER.

Throttle not wide open.	Open throttle.
Carburetor improperly adjusted.	See "*Adjusting the Carburetor,*" page 70.
Unsatisfactory fuel.	Change fuels.
Excessive carbon in manifold.	Have serviceman check.

LACK OF POWER (Continued).

Possible Cause	*Possible Remedy*
Engine not up to temperature.	See that thermostat is operating correctly.
Air cleaner and intake pipe dirty or obstructed.	Inspect and clean intake pipe and filter pack. Wash out with distillate or kerosene, if clogged. Service cup every 10 hours, page 57.
Obstruction in fuel system.	See "*Fuel System*," page 68.
Engine speed too low.	See "*Fast Idle Adjustment*," page 70.
Ignition timed too late.	See "*Installing and Timing Distributor on Tractor*," page 70.
Vent in fuel tank cap obstructed.	Clean vent. Wash in distillate or kerosene and blow out with air.
Too heavy an oil in air cleaner.	Use same weight of oil as in engine crankcase. See page 53.
Crankcase oil too heavy.	See "*Weight of Oil*," page 53.
Engine knocks excessively.	Using low-octane fuel. Change. Check manifold heat control valve, page 71.
Engine overheating.	See that thermostat is operating correctly. Clean trash from radiator core. Flush cooling system.
Poor compression.	Leaky valves. Worn or stuck rings. Call serviceman to check.
Improper hitching of equipment or belting to equipment.	See manual accompanying equipment for proper hitching or belting.
Operating in too fast gear.	Shift to a lower speed.

ENGINE KNOCKS.

Ignition timed too early.	See "*Installing and Timing Distributor on Tractor*," page 73.
Excessive carbon in engine.	Call serviceman to clean and reset valves.
Low octane fuel.	Change to fuel with higher octane.
Engine overheating.	Check water level. Clean core and remove chaff and trash. Check thermostat operation.
Worn bearings, bushings, etc.	Call serviceman.

ENGINE OVERHEATS.

Possible Cause	*Possible Remedy*
Temperature gauge defective.	Check water with thermometer. Have serviceman replace gauge if defective. (To overheat, a tractor must use water.)*
Chaff and trash in radiator core.	Clean core by flushing out chaff.
Thermostat not operating properly.	Replace thermostat.
Radiator system limed up.	Add radiator cleaner solution to dissolve lime deposits and flush out radiator. See page 75.
Use of fuel that causes knocking.	Change to a better fuel.

***A defective temperature gauge can indicate an overheated engine when actually this condition does not exist. Therefore, if the gauge consistently shows a higher than normal temperature, check level of water in radiator.**

ENGINE USES TOO MUCH OIL.

Engine speed too high.	See "*Fast Idle Adjustment*," page 70.
Oil pressure too high.	Have serviceman check and adjust.
External leaks.	Check gaskets and plugs. Replace if necessary.
Worn connecting rod bearings.	Have serviceman replace.
Piston rings worn or stuck.	Have serviceman replace.
Cylinders worn.	See your dealer for rebored or new block assembly.
Crankcase oil transferring to transmission.	Check level of transmission oil. If it is high have serviceman correct trouble.

ENGINE DILUTES OIL.

Using too heavy a fuel (All-Fuel).	Change fuel. See page 15.
Running engine too cold.	Check operation of thermostat.
Idling engine for long periods (All-Fuel).	Shut engine off or idle on gasoline.
Worn piston rings or cylinders.	Have serviceman check.

ENGINE OIL PRESSURE TOO HIGH OR TOO LOW.

Possible Cause	*Possible Remedy*
Defective gauge.	Have serviceman check with master gauge.
Loose or broken oil line.	Have serviceman check and repair at once.
Improper weight of oil.	See "*Weight of Oil,*" page 53.
Pressure regulating valve stuck.	Have serviceman check.
Bearings worn.	Have serviceman replace.

ENGINE USES TOO MUCH FUEL.

Improper carburetor adjustment.	See "*Adjusting the Carburetor,*" page 70.
Float level too high.	Have serviceman adjust.
Engine not operated up to proper temperature.	Check operation of radiator shutter and thermostat.
Engine overloaded.	Lighten load or shift to a slower speed.
Improper hitch of drawn implement.	See implement instruction book for proper hitch.
Engine speed too high.	See "*Fast Idle Adjustment,*" page 70.
Poor compression.	Have serviceman check valves and rings.

SPARK PLUG FOULING.

Low engine temperature.	Check operation of radiator shutter and thermostat.
Too heavy a fuel (All-Fuel).	Change to more suitable fuel.
Wrong heat range plug.	See your John Deere dealer for correct plugs.
Piston rings worn.	Have serviceman replace rings.

» » » » » BRAKES « « « « «

BRAKES NOT EFFECTIVE.

Improperly adjusted.	See "*Brake Adjustment,*" page 81.
Over-lubricated.	Have serviceman remove and clean out.
Brake lining worn.	Have serviceman replace.

BRAKES NOT EFFECTIVE (Continued).

Possible Cause	*Possible Remedy*
Brake squeak.	Have serviceman clean.
Brake pedal sticking.	Clean brake shaft with distillate and lubricate.

PULLEY BRAKE NOT EFFECTIVE

Out of adjustment.	See "*Pulley Brake Adjustment*," page 81.
Lining worn.	Have serviceman replace.

» » » » » THREE-POINT HITCH AND LOAD-AND-DEPTH CONTROL « « « « «

INSUFFICIENT LOAD RESPONSE

Upper link in too high a hole in load control yoke.	Drop upper link to lower hole.
Implement not level.	Level implement.
Implement not trailing correctly.	Adjust. See implement Operator's Manual.

EXCESSIVE LOAD RESPONSE

Upper link in too low a hole in load control yoke.	Raise upper link to higher hole.
Excessive "suck" in implement.	Adjust. See implement Operator's Manual.
Implement not trailing correctly.	Adjust. See implement Operator's Manual.

INSUFFICIENT TRANSPORT CLEARANCE.

Lift links too long.	Shorten lift links.
Upper link too long.	Shorten upper link.
Implement improperly adjusted.	See implement Operator's Manual.
Implement not level.	Level implement.

HITCH FAILS TO LIFT.

Hydraulic pump disengaged.	Engage pump. See page 30.
Excessive load on hitch.	Adjust auxiliary springs on implement.
Oil level in reservoir low.	Check oil level (page 58) and add oil, if necessary.

HITCH FAILS TO LIFT (Continued).

Possible Cause	*Possible Remedy*
Worn or damaged parts in system.	Have serviceman check and correct.

HITCH SETTLES UNDER LOAD OR "HUNTS" IN TRANSPORT POSITION

Worn or damaged oil seals, valves, or gaskets.	Have serviceman check and correct.
Improperly adjusted check valve.	Have serviceman check and correct.

LESS THAN FULL ROCKSHAFT ROTATION

Control lever link too short.	Have serviceman check and correct.

WORKING DEPTH CHANGES OR CONTROL LEVER MOVES DURING OPERATION.

Friction adjustment loose on control shaft.	Have serviceman check and correct.

HITCH FAILS TO LOWER OR LOWERS SLOWLY.

Rate-of-drop throttle valve closed.	Adjust valve, page 31.
Oil viscosity too high.	Drain and fill system with proper oil, page 62.
Worn or damaged linkage.	Have serviceman check and correct.

RELIEF VALVE OPERATES CONTINUOUSLY

Excessive load on hitch.	Adjust auxiliary springs on implement.
Remote cylinder control lever in raise or lower position.	Move lever to neutral.
Control lever linkage out of adjustment.	Have serviceman check and correct.

OIL OVERHEATS.

Relief valve operates continuously.	See "*Relief Valve Operates Continuously*," above.
Low oil supply.	Fill reservoir to proper level. See page 58.
Excessive load.	Adjust auxiliary springs on implement.

» » » » HYDRAULIC REMOTE CYLINDERS « « « «

REMOTE CYLINDER WILL NOT LIFT LOAD OR WILL NOT OPERATE WHEN NOT LOADED.

Possible Cause	*Possible Remedy*
Air in remote cylinder.	Bleed, page 45.
Powr-Trol pump disengaged.	Engage pump.
Low oil supply.	Fill reservoir to proper level. See page 62.
Excessive load.	Adjust auxiliary springs on implement.
Breakaway coupling not completely engaged.	Attach hoses to coupling correctly. See page 44.
Worn or damaged piston rings in cylinder.	Have serviceman check and correct.

REMOTE CYLINDER WILL NOT LOWER.

Air in cylinder.	Bleed, page 45.
Breakaway coupling not completely engaged.	Attach hoses to coupling correctly. See page 44.

REMOTE CYLINDER CONTROL LEVER DOES NOT RETURN TO NEUTRAL.

Worn, dirty or defective parts in valve housing.	Have serviceman check and correct.

REMOTE CYLINDER CONTROL LEVER WILL NOT LATCH IN FAST DROP OR FAST RAISE POSITION.

Cylinder loaded beyond capacity.	Adjust auxiliary springs on implement.
Relief valve setting low.	Have serviceman check and correct.
Oil line coupler defective.	Have serviceman check and correct.
Worn or dirty internal parts.	Have serviceman check and correct.

REMOTE CYLINDER SETTLES UNDER LOAD

Single- or double-acting conversion valve screw open with double-acting cylinder.	Place screw in proper position. See *"Adjustment for Single- or Double-Acting Cylinders,"* page 42.
Worn or dirty internal parts.	Have serviceman check and correct.
Piston rings leaking.	Have serviceman check and correct.
Thermal or mechanical relief valves leaking.	Have serviceman check and correct.

REMOTE CYLINDER SETTLES UNDER LOAD (Continued)

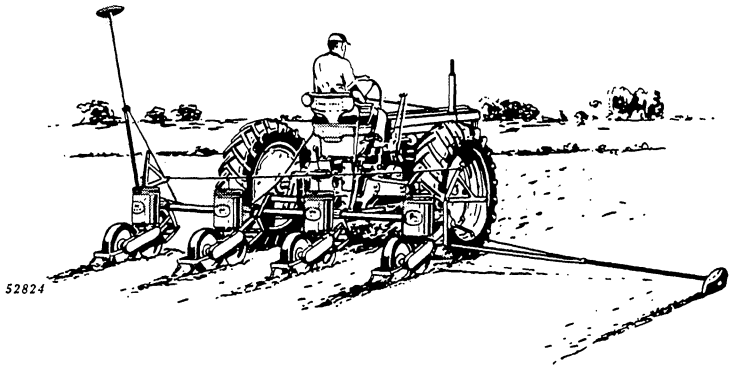
Possible Cause	*Possible Remedy*
Oil line not tightened in control housing or couplings.	Tighten oil line.
Breakaway coupling leaking.	Have serviceman check and correct.

POWR-TROL SYSTEM OVERHEATS WHEN USED WITH REMOTE CYLINDER.

Holding control lever in either the raising or lowering position after cylinder has reached end of travel.	Release lever after desired position is obtained.
Low oil supply.	Fill system with oil to correct level, page 62.
Relief valve setting too high.	Have serviceman check and correct.

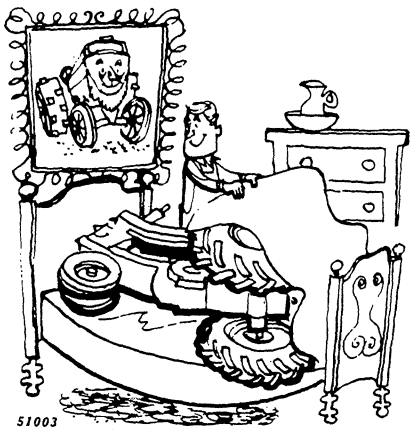
NOISY POWR-TROL PUMP.

Oil viscosity too high.	Drain and fill system with oil of proper viscosity, page 62.
Low oil supply.	Fill system with oil to correct level, page 62.
Air leak in suction line.	Have serviceman check and correct.



STORING THE TRACTOR

If your tractor is to be put in storage or laid up for the winter months, these suggestions, if followed, will prevent excessive deterioration.



*

Clean the tractor thoroughly and store it in a dry place.

*

Drain all oil from crankcase and oil filter, wash case with distillate or kerosene. Refill with proper amount of SAE 10W oil; run engine idle for 15 to 20 minutes.

*

Drain all water by removing the drain plug in bottom of cylinder head. Flush the cooling system to wash out any sediment which may have collected during the season's work. The water drain plug should be left out so that any water which might collect in the radiator or the water jacket by condensation will drain out.

*

Drain out all fuel and leave the drain valve open. **CAUTION: If fuel is allowed to stand in tanks, fuel lines, and carburetors, a gummy substance will form in the carburetor jets and passages where it will cause trouble.**

*

With the engine cold, put one-eighth pint (no more) of good engine oil in each cylinder through the spark plug holes. Replace plugs and turn engine over several times to work the oil in between the pistons and the cylinders.

*

Relieve all weight from the tires by blocking up tractor. Raise tractor high enough so tires do not touch ground. Protect tires from heat and light to prevent undue deterioration. Before putting tractor back in service, tires should be properly inflated.

*

Protect the batteries from freezing as described on page 89.

*

Inspect tractor for worn or damaged parts which may later cause expensive delays.

*

Between tractor working seasons is a good time to repair, clean, and paint the tractor. This can be done by your John Deere dealer at a nominal cost and will prove a profitable investment as paint prevents rust, corrosion, and deterioration.

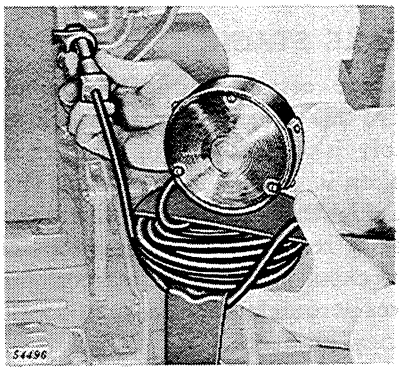
ATTACHMENTS

Your John Deere dealer has attachments specially designed for your tractor. These attachments will increase the comfort, convenience, and safety of your tractor.

A number of the attachments available are shown here. Your dealer can also furnish full foam rubber seats, pre-cleaners, umbrellas and other attachments that will help adapt the tractor to your special requirements and increase the convenience of operation.

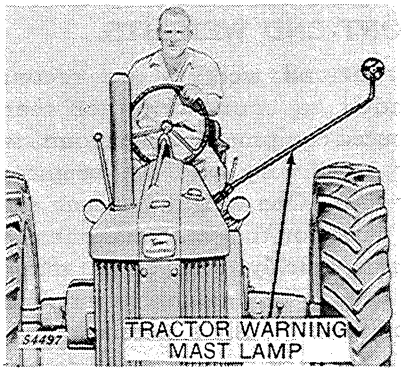
IMPLEMENT LIGHT.

To help prevent accidents on highways at night, John Deere makes available this implement warning lamp. The lamp projects beams of light visible for 500 feet; amber light in front, red to the rear. The lamp plugs into the tractor electrical outlet and is held securely in a socket mounted on the left side of the implement.



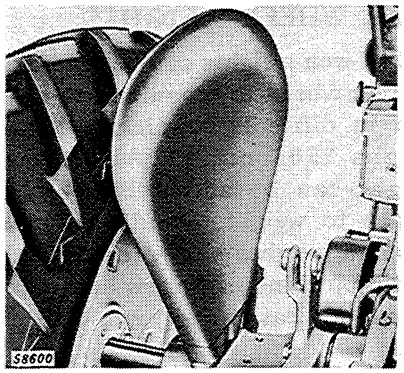
WARNING LAMP.

This tractor mast warning lamp clearly marks the passing side of your tractor and may help prevent a serious accident. On hilly roads the lamp can be swung directly overhead to give other vehicles advance warning of your presence. When not in use, the lamp is carried alongside the hood, where it does not interfere with your view or with mounted equipment.



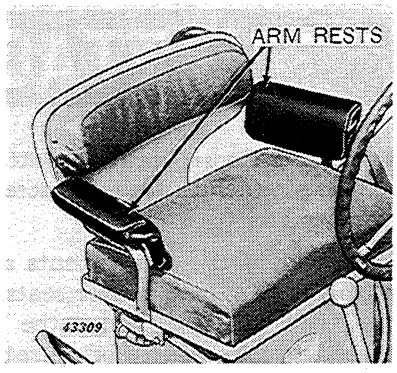
TWO-POSITION REAR FENDERS.

Neatly styled John Deere pressed steel fenders protect you from accidental contact with the rear wheels when working over rough ground or on hillsides. These fenders are sturdily built and feature a two-position adjustment for greater clearance between the fender and seat.



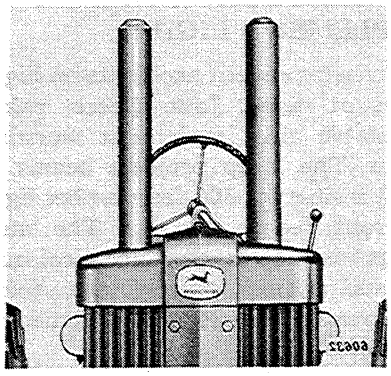
SNAP-ON ARM RESTS.

With a pair of John Deere arm rests, you'll relax more and ride in greater comfort. Foam rubber pads protect your hips and thighs when working on rough ground and hillsides. No bolting is necessary; the arm rests snap on quickly, easily, and securely. Available in black or yellow as preferred.



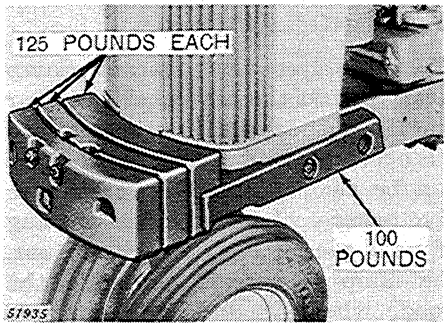
INTAKE STACK.

Where conditions are extremely dusty, this John Deere air stack assembly is recommended. Cleaner air is taken in from a higher level, thus reducing the amount of dust that must be removed by the air cleaner. A knockout plate on the tractor hood makes it quick and easy to install the new air stack.



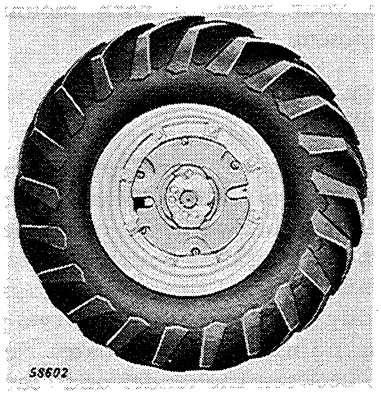
FRONT-END WEIGHTS.

Front-end weights are recommended to counterbalance rear-mounted equipment. The amount required will vary with the weight of rear tools. One weight for each side and three for the front make it possible to quickly, easily, and attractively add the amount required for stability and positive steering.



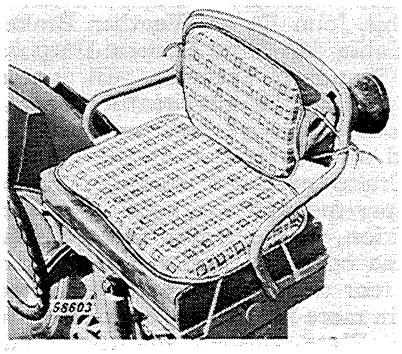
REAR WHEEL WEIGHTS.

Cast-iron weights can be bolted to the rear wheels to provide extra traction in difficult conditions. Each weighs 150 pounds. Additional weight can be added by bolting weight to weight. Handholds built into the weights help prevent accidental pinching of fingers and make installation easier and more convenient.



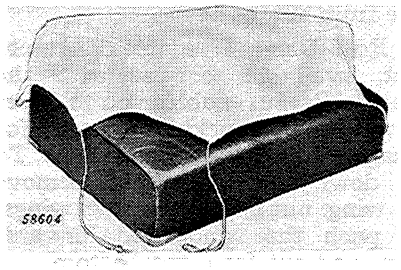
AIR-VENT CUSHION.

This brand-new John Deere air-vent cushion is a real comfort feature in warm weather. This cushion lifts you off the hot seat; provides ample ventilation to keep you cooler and more comfortable. The cushion is sturdy enough to hold you off the seat; yet is soft and springy for maximum comfort.



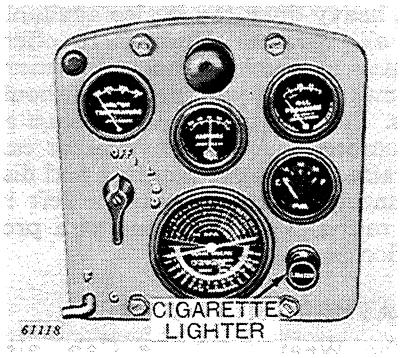
CANVAS SEAT COVER.

Protect your tractor seat cushion against sun, rain, grease, and dirt with this John Deere heavy-duty canvas seat cover. The cover fits snugly around the cushion; can be quickly removed for washing.



CIGARETTE LIGHTER.

This handy cigarette lighter saves time, matches, and tempers, especially on windy days. Just push it in, wait a second or two, and out it pops ready for use.



REAR EXHAUST MUFFLER.

A special rear exhaust and tail-pipe assembly (not illustrated) provides maximum clearance for working under low sheds and through doorways, for operating a manure loader or for working around a feed-lot. Exhaust fumes are discharged to the rear, away from the operator. This special muffler can be installed quickly and easily. A metal cap covers the regular exhaust port in the hood.

ADDITIONAL CUSTOM POWR-TROL FUNCTIONS.

You may find that you could use more of the Custom Powr-Trol hydraulic functions than were originally ordered on the tractor. Your dealer can add any or all of the hydraulic system features you do not have and give your tractor even greater versatility to handle more jobs easier and more conveniently.

WEATHER BRAKE.

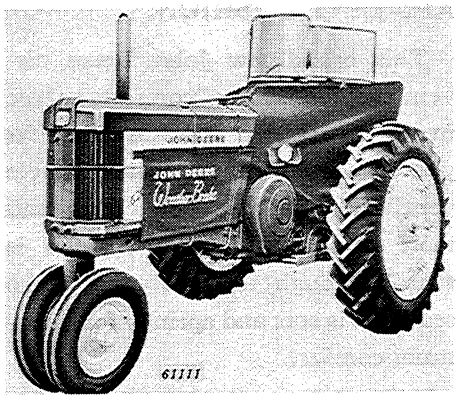
This John Deere Weather Brake, available for both General-Purpose and Standard Tractors, will enable you to handle cold-weather operations in much greater comfort. Tailored to fit your tractor, the Weather Brake creates a snug, protective compartment to keep cold air out. In addition, engine heat is directed back to the operator's compartment and the rear wings can be folded in to retain more heat to warm your whole body. Plate-polished, slightly tinted, vinyl windows permit a clear, undistorted view of your work without glare from sun or snow.

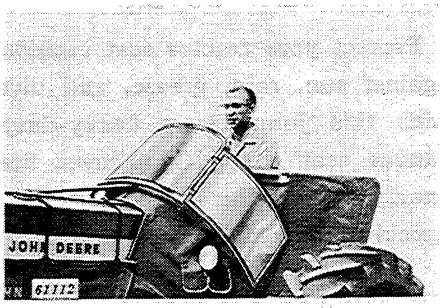
A Fold-Down Windshield Attachment, available for use with the Weather Brake, enables you to lower the windshield quickly and easily for passage through low doorways. To fold down the windshield, remove two wing nuts, lift the side wings, and push the windshield forward, down, and out from the bottom.

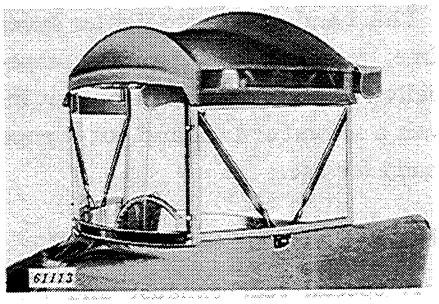
A heavy-duty top is also available for all Weather Brakes. It offers greater protection and holds more warmth around your head and shoulders. The top can be used alone as an umbrella. A flap at the rear can be raised to make mounting and dismounting easier and can be left in the raised position when extra protection is not required.

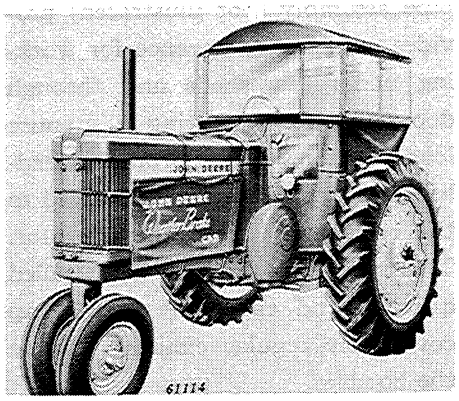
WEATHER BRAKE CAB.

The Weather Brake Cab, also available for both General-Purpose and Standard Tractors, provides full protection against cold, heat, rain, snow, sun, and glare. Engine heat is directed back and held in the cab. As the weather warms, the engine shields can be rolled back or removed, the windows opened or removed, and the rear curtain rolled up. In hot weather, the cab can be "stripped down" to the frame and roof and used as an umbrella. Plate-polished, tinted vinyl windows permit a clear, undistorted view of your work.









MEMORANDA

INDEX

A

Page

Adapting Parts, Implement. 37
Adjustable-Tread Front Axle Adjustment 22
Air Cleaner 57
Air Pressure, Tires 84
Ammeter 13
Attaching Implements to Three-Point Hitch 37
Attaching Remote Cylinder. 44
Attachments 101

B

Ballast, Front End 19
Batteries 9, 88
Bearing, Lower Pedestal 65
Belt, Generator 87
Belt Pulley 47
Brakes 8, 19, 61, 81
Brake Difficulties 95
Brake, Pulley 81
Breakaway Coupling 44
Break-In Period 17, 53
Bulbs, Light 90

C

Carburetor 69
Care of Rubber Tires 85
Catagory I and II Implements 37
Choke Control 7
Cigarette Lighter 14
Clutch, Main, Facings 78
Clutch Lever 8
Clutch, Main 8, 77
Clutch Pedal, Power Shaft. 10
Cold Weather Battery Service 89
Cold Weather Service 76
Controls 6
Cooling System 75
Crankcase, Lubrication 52, 57, 59
Cranking Motor 58, 87
Cylinder, Remote 42

D

Dash Lamp 13
Dealer Services 67
Distributor 61, 65, 73
Double-Acting Remote Cylinders 42
Draft Links 33
Drawbar Adjustments 28
Driven Pulley 48
Driving at Night 18
Driving the Tractor 18

E

Page

Engine Difficulties 92
Engine Lubrication 52, 57, 59
Engine Speeds 16, 64, 69, 70
Engine, Starting 19
Engine, Stopping 20

F

Fan Bearings 66
Fast Idle Adjustment 70
Filter, Fuel 68
Filter, Oil 60
First Reduction Gear Cover 64
Flipper Guard 10
Front End Weights 19
Front-Mounted Rockshaft. 46
Front Wheel Bearings 64, 82, 83
Front Wheel Tread Adjustment 21
Fuels 15
Fuel-Control Lever 7
Fuel Filter 68
Fuel Storage 15
Fuel System 68

G

Gear Shift Lever 8
Generator 58, 87
Generator Drive Belt 87
Generator Voltage Regulator 88
Grease Fittings 54, 55

H

Heat Control Valve, Manifold 12, 71
High-Speed Driving 18
Hitch Bar 37, 39
Hitch, Three-Point 32
Hitching Implements 19, 37
Hydraulic Powr-Trol Pump 11, 30
Hydraulic Powr-Trol Pump Control Lever 11, 30
Hydraulic Powr-Trol System 30, 58, 62
Hydraulic Powr-Trol System Difficulties 96–98

I

Ignition-Light Switch 7
Ignition System 72
Instrument Panel 13

L

Leveling the Implement 34, 35, 39
Lift Links 34
Lights 7, 90
Light Bulbs 90

(Continued on next page)

INDEX—Continued

	Page
Light Switch	7
Load-and-Depth Control	32
Load-and-Depth Control Difficulties	96
Load Control Yoke	35, 41
Lubrication	52
Lubrication Charts	54, 55, 56
Lubrication Services, Periodic:	
10-Hour	57
30-Hour	57
75-Hour	58
150-Hour	59
500-Hour	62
Yearly (1000 Hours)	64
2000-Hour	67
M	
Manifold Heat Control Valve	12, 71
Mast Balls	41
Master Safety Shield	10
O	
Oil Filter	60
Oil Pressure Gauge	13
Oil Weight, Engine	53
Oil Weight, Hydraulic System	62
Oil Weight, Transmission	65
Operation	15
Overloading	19
P	
Periodic Lubrication Services	57
Pointer, Load-and-Depth Control	35
Power Adjusted Rear Wheels	26
Power Shaft	10, 29
Power Shaft Clutch	56, 57, 58, 61, 77
Power Shaft Clutch Adjustment	79
Power Shaft Clutch Pedal	10
Power Shaft Shift Lever	10
Powr-Trol	11, 30, 58, 62, 96
Pulley, Belt	47
Pulley Brake	8, 81
Pump, Hydraulic	11, 30
R	
Radiator	74
Rear Axle Bearings	66
Rear Wheel Tread Adjustment	24
Regulator, Voltage	88
Remote Cylinder	42
Remote Cylinder Adjustment	45
Remote Cylinder Control Levers	11, 43
Remote Cylinder Difficulties	98
Rockshaft	31
Rockshaft Control Lever	11, 31
Run-In Period	17, 53
S	
Safety Shield, Power Shaft	10
Safety Suggestions	50, 51
Seat	9
Service Reminders	91
Single-Acting Remote Cylinders	42
Slow Idle Adjustment	70
Spark Plugs	72
Specifications	4
Specific Gravity, Battery	89
Speed Control Lever	7
Speed-Hour Meter	14
Starting and Lighting Equipment	87
Starter Pedal	7
Starting the Engine	16
Steering Gear Oil Level	63
Stopping the Engine	20
Stopping the Tractor	20
Storing the Tractor	100
Sway Locks	36, 41
T	
Tappet Adjustment	76
Temperature Gauge	13
Thermostat	75
Three-Point Hitch	32
Throttle Control Linkage	69
Timing Distributor	73
Tires	84
Toe-In Adjustment	22
Tractor Difficulties	92
Tractor Storage	100
Tread Adjustment, Front Wheel	21
Tread Adjustment, Rear Wheel	24
U	
Upper Link	34
V	
Valve Tappet Adjustment	76
Viscosity, Oil	53
Voltage Regulator	86
W	
Warm-Up Period	17
Wheel Weights	86

IMPORTANT

Make this manual your guide and adviser and do what it recommends, regardless of what may have been your practice with other makes of tractors, or the suggestions that may be made to you by well-meaning friends or neighbors.

When using this tractor with mounted or integral equipment, special servicing of the tractor may be required. This information will be given to you in the instruction book accompanying the integral or mounted equipment.

Always give your John Deere dealer the serial number of tractor, remote cylinder operating valve housing or remote cylinder, when ordering parts.

nobody can fill them like you can!

That's what the owner of this pair of work shoes is finding out—the hard way. Through a careless action, he has become the victim of an accident. It's a mighty tough way to find out that nobody else can wear your shoes or practice safety for you. And a needless, costly lesson to learn that safety is an everyday need.

Put safety into each of your workdays; read the operator's manual thoroughly; know how to operate each machine properly and safely; take the safety precautions specified; think before you act.

Make sure you wear your "shoes" everyday. Outfit yourself with a safety program now.