

Models AR-AO Tractors (Serial No. 272000-Up)



JOHN DEERE

OPERATORS MANUAL

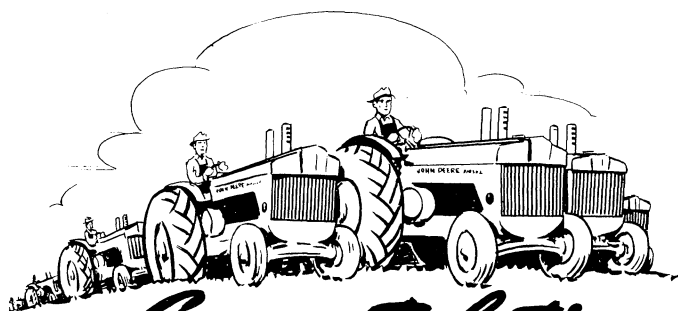
**Models AR-AO Tractors
(Serial No. 272000-Up)**

OMR2004 Issue H5 English

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Congratulations

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

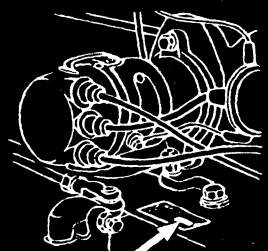
Back of your tractor is an organization that has been building farm equipment for more than one hundred years. The plant in which your tractor was built is the largest single tractor plant in the world. In this modern factory, equipped with the finest precision machinery, fine materials, high-grade workmanship, thorough inspection, and complete testing are combined to give you the best in dependable tractor performance and economical tractor operation.

The way you operate your tractor and the care you give it have much to do with the service and satisfaction you will get from it. This manual has been carefully prepared and profusely illustrated to show you what to do and when to do it. It has been written by the best engineers in the John Deere tractor factory. Make it your guide. Study it carefully. Refer to it often. Only by following the suggestions it contains can you hope to get the most from your investment.

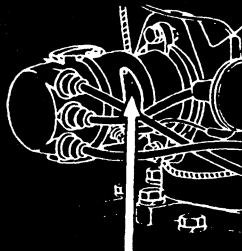
If you find that you need information not covered in this manual, or if your tractor requires special servicing, which it will periodically, take advantage of the facilities offered by your John Deere dealer. He has trained mechanics, who are kept informed on the best methods of John Deere tractor servicing and can give you prompt, "know-how" service in the field or in his shop.

When in need of parts, go to your John Deere dealer. Be sure to give him the serial number of your tractor. The illustrations, below, will show you where to find the serial numbers of your tractor, magneto, and Powr-Trol. Obtain these serial numbers from your tractor—NOW—and insert them in the spaces provided in the illustrations below. Also, be sure they are written on the special identification card which is included with the manual. Put it in your billfold for ready reference.

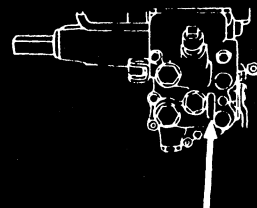
TRACTOR



DISTRIBUTOR



**POWR-TROL OR
POWER-LIFT**



Even though your dealer has carefully inspected this tractor before delivering it to you, it is always good business to recheck the items which are encircled on the reproduction below of the envelope which contains this manual.

TO THE NEW JOHN DEERE TRACTOR OWNER

Each John Deere Tractor is carefully designed, assembled, and given a complete test and final inspection at the factory before it is shipped. Our main ambition is to deliver tractors to new owners in the same mechanical condition as when shipped from the factory.

To enable us to fulfill this one ambition, this tractor was carefully inspected for irregularities that may have occurred in shipment. This inspection included a complete checking of the following:

- ☒ Wheel equipment; Tire pressure; Wheel weights; Install calcium chloride if requested by new owner.
- ☒ Radiator; Fill with water or anti-freeze; Inspect shutter control.
- ☒ Air cleaner; Oil level.
- ☒ Crankcase; Oil level.
- ☒ Transmission oil level.
- ☒ Powr-Trol oil level.
- ☒ Powr-Trol operation.
- ☒ Grease tractor.
- ☒ Brakes.
- ☒ Clutch operation.
- ☒ Spark plug gaps.
- ☒ Carburetor setting (may require adjusting later according to fuel burned.) (See Instructions in Manual.)

- ☒ Engine speed and oil pressure.
- ☒ Inspect rubber hose connections.
- ☒ Connect battery ground terminal; Check water level; Grease terminal posts.
- ☒ Check charging rate.
- ☒ Check lights.
- ☒ Check starting motor for operation.
- ☒ Serial numbers entered in owner's register.

The above inspection made by John Doe
Date 7/18/49 Dealer Good Business
Implement Co.



HANG THIS BOOK IN A
HANDY PLACE

We suggest this rechecking especially during freezing weather or when a period of time has elapsed between delivery and when you are ready to operate it. For complete starting information, see page 17.



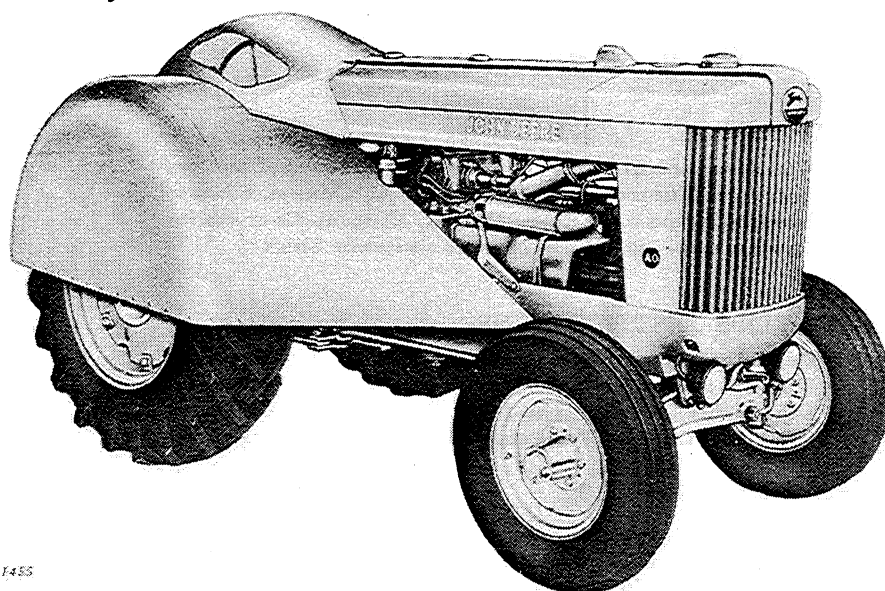
We, your John Deere dealer, are mighty proud to add your name to our list of John Deere Tractor owners. Because we are interested in having you obtain from this new tractor all the comfort and long life that are built into it, we are pleased to discuss the following important maintenance operations:

- ☐ Controls.
- ☐ Breaking-In Period—Part Load, Open Throttle, Changing Oil.
- ☐ Method of Starting and Stopping Engine.
- ☐ Lubrication—Engine, Transmission, Grease Fittings, Air Cleaner, and Oil Gauge.
- ☐ Cooling System—Adding Water, Shutter Control, Cleaning.
- ☐ Fuel System—Fuel, Fuel Control, Sediment Bowl and Trap, Carburetor Adjustment.
- ☐ Crankcase Ventilator.
- ☐ Tires—Inflation, Inspection, Wheel Weights.
- ☐ Drawbar—Adjustment; pull from no other place.
- ☐ Ignition System—Terminals Tight, Cleaning, Oiling, Adjusting Points.
- ☐ Brakes—Adjustment.
- ☐ Clutch—Adjustment, Pulley Brake.
- ☐ Front Wheels—Cleaning and Adjusting.
- ☐ Starter and Lights—Starting, Charging Rate, Battery Care.
- ☐ Tightening Bolts and Nuts—Caution on Governor Cover Cap Screws.
- ☐ Safety in Operation—Selecting Proper Speed, Power Shaft.
- ☐ Keeping the Tractor Clean.
- ☐ Have Farmer Operate the Tractor.
- ☐ Appointment for After-Sales Service—not later than two weeks after delivery.

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**John Deere
Model "AO" Tractor
—Pulley Side**



11455

SPECIFICATIONS

CAPACITY:

2—16" plow bottoms under normal soil conditions, or 3—14" plow bottoms under favorable conditions.

Maximum Belt Horsepower:*

Gasoline..... 39.10.

All-Fuel..... 30.94.

Maximum Drawbar Horsepower:*

Gasoline..... 34.88.

All-Fuel..... 27.13.

Maximum Pull:

Gasoline..... 4431 lbs. at

2.15 mph.

All-Fuel..... 4248 lbs. at

1.75 mph.

*Sea level (calculated): Maximum H. P. based on 60°F. and 29.92 in. Hg.

(Nebraska Test Nos. 378 All-Fuel and 429 Gasoline)

SPEEDS:

Forward with 13-26 Tires: 1-1/3, 2-1/2, 3-1/4, 4-1/2, 6-1/4, and 11 mph.

Reverse: 2-3/4 mph.

ENGINE:

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

Engine Speed..... 975 rpm (Load).

Bore and Stroke..... 5-1/2" x 6-3/4".

Displacement..... 321 cubic inches.

Compression Ratio:

Gasoline..... 5.60 to 1.

All-Fuel..... 4.50 to 1.

Carburetor..... Natural-draft type.

Ignition System..... High-Tension

Magneto or Distributor.

Spark Plugs:

Gasoline.... 18mm., AC88L Comm.

All-Fuel..... 18mm.,

Champion No. 8 Comm. C.

Lubrication... Full force-feed pressure system with Purolator oil filter element. Total oil capacity—8 U. S. quarts.

Cooling System..... Thermo-siphon with water capacity of 8-3/4 U. S. gallons.

Air Cleaner..... Oil-wash type.

Fuel System..... Gravity-feed.

Gasoline Tank Capacity:

Gasoline..... 20 U. S. gallons.

All-Fuel..... 1-3/4 U. S. gallons.

Fuel Tank Capacity:

(All-Fuel only)..... 20 U. S. gallons.

Clutch.... Hand-operated, dry disks.

Belt Pulley:

Diameter..... 12-13/16".

Width..... 7-3/8".

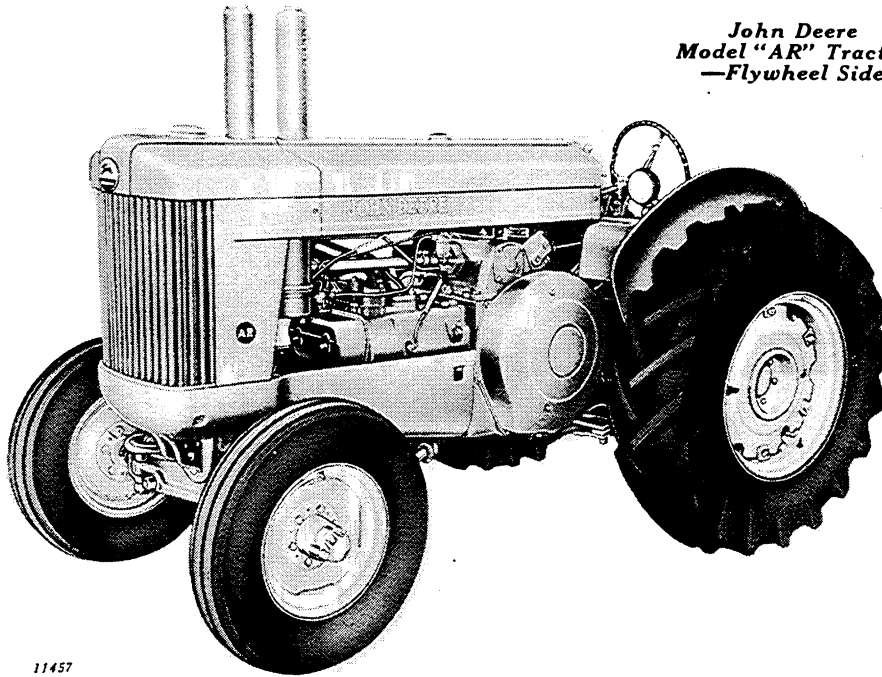
R.P.M..... (Load) 975.

Belt Speed..... 3270 fpm.

TRANSMISSION:

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

*John Deere
Model "AR" Tractor
—Flywheel Side*



11457

AND DATA...

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

Bearings..... Shafts operated on 2 straight roller bearings, 4 tapered-roller bearings, and 5 ball bearings.

Oil Capacity..... 8 U. S. gallons.

REAR AXLES:

2-3/4" diameter. Mounted on 4 tapered-roller bearings.

REAR WHEELS:

13-26, 6-ply tires, mounted on cast wheels, recommended for average field conditions. Steel spoke wheels with lugs available as special equipment. Diameter 42-3/4". Face 10".

BRAKES:

Foot-operated, individual, automotive-type, internal expanding.

FRONT WHEELS:

6.00 x 16", 4-ply tires. Mounted on 4 tapered-roller bearings. Steel spoke wheels with guide bands available as

special equipment. Diameter 28" Face 6".

DIMENSIONS:

On regular 13-26 pneumatic tires: Wheel base 75-3/4"; height to radiator cap 57"; maximum width "AR" 72-1/2"; "AO" 75-5/8"; over-all length 125-1/2"; rear wheel tread 54-7/16" narrow, 58-7/16" wide; turning radius 13' 8".

DRAWBAR:

Conforms with A.S.A.E. standards. Vertical adjustment 12-1/8" and 14-5/8".

POWER TAKE-OFF:

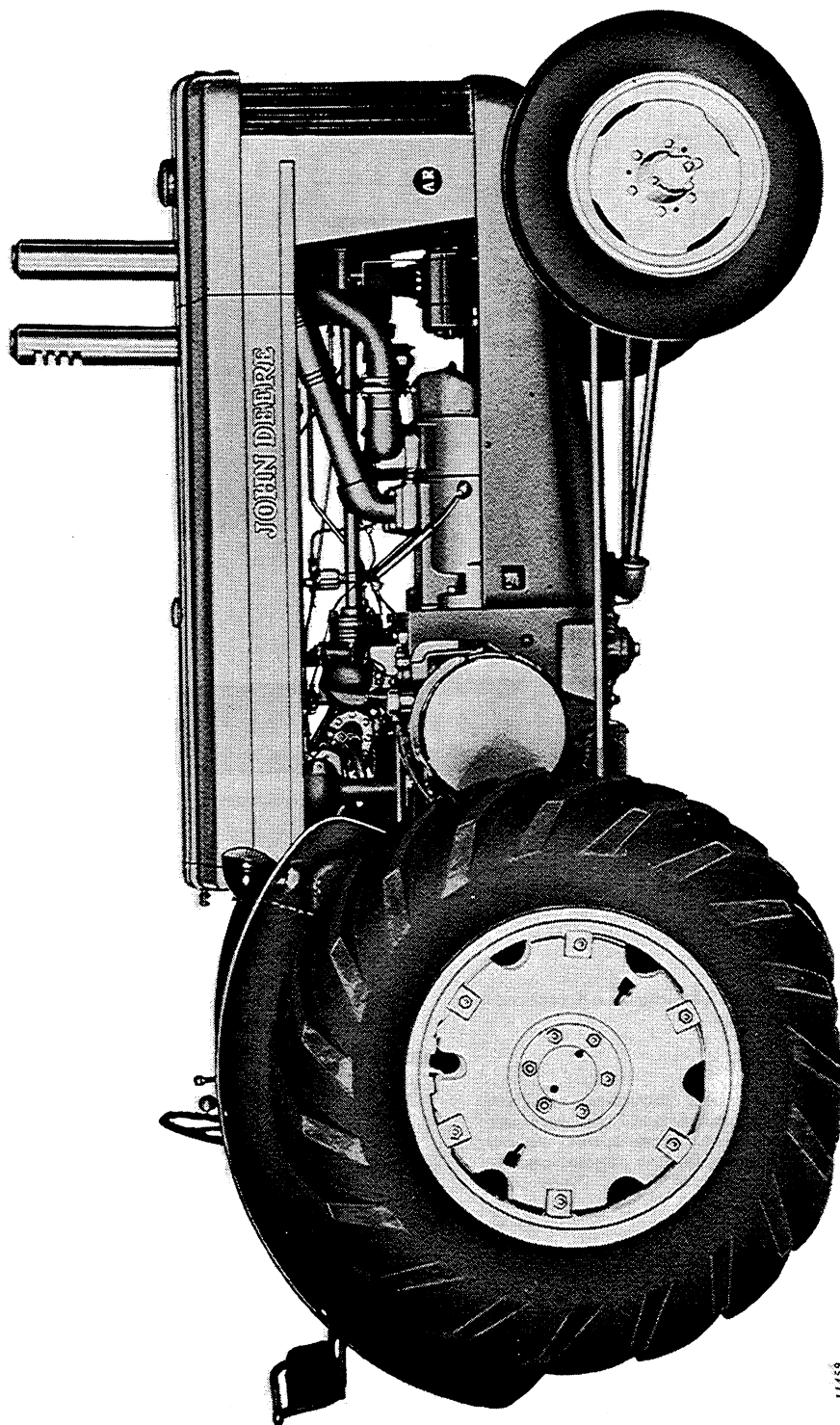
Shaft diameter 1-3/8"; R.P.M. 536; conforms with A.S.A.E. standards.

POWR-TROL:

Engine-driven pump.

SHIPPING WEIGHT:

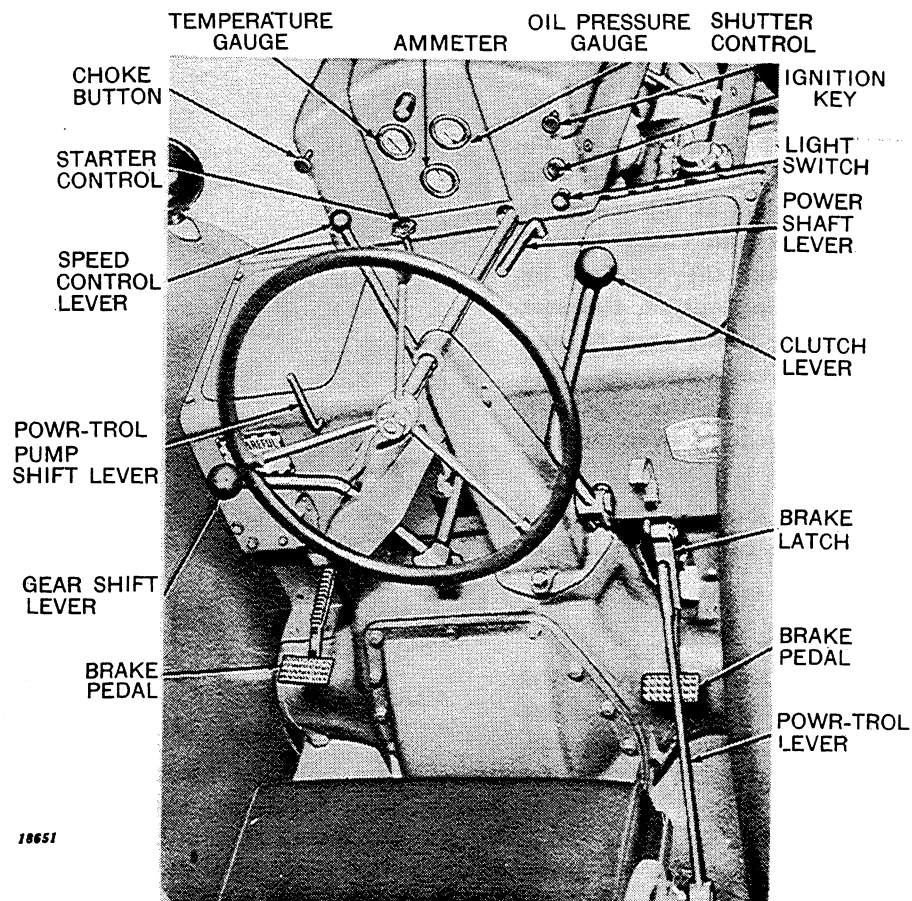
"AR"..... 5,244 lbs.
"AO"... with citrus fenders,
complete..... 5,502 lbs.



John Deere Model "AR" Tractor—Pulley Side

11459

CONTROLS



Operating Controls

The quality of work and the amount of work you do with your tractor not only depends upon the use of proper equipment, but also upon the ease and convenience of tractor operation. If you are in an uncomfortable position, if you have to fight the steering wheel, or if you can't see what you are doing, you are definitely handicapped.

Your John Deere Tractor is as convenient to handle as your automobile. All controls are readily accessible. Clutch lever, throttle, fuel control, and radiator shutter control are easily reached from the operator's seat. Under your feet are the convenient brakes and a comfortable platform on which you can stand if you so desire.

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.

SEAT

The deep-cushion seat increases operator comfort and reduces fatigue at the wheel. It can quickly and easily be adjusted to suit the operator by simply pulling out on the seat latch and pushing seat to any desired position. Arm and back rests safeguard the operator when traveling over rough ground.

The seat location affords the operator an unexcelled view of his work.

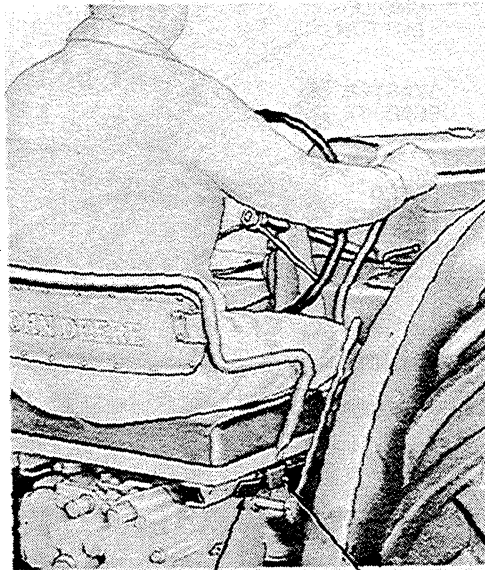
STEERING

The seat location and general design permit you to easily see what you are doing at either side.

This design, coupled with a steering mechanism built to eliminate objectionable wobble, backlash, or whipping of the steering wheel, even in the roughest going, permits you to work in freedom and comfort.

Smooth, responsive steering can be maintained throughout the life of your tractor by means of the adjustments provided for this purpose.

Adjustments can quickly and easily be made by your John Deere dealer's serviceman.



Seat

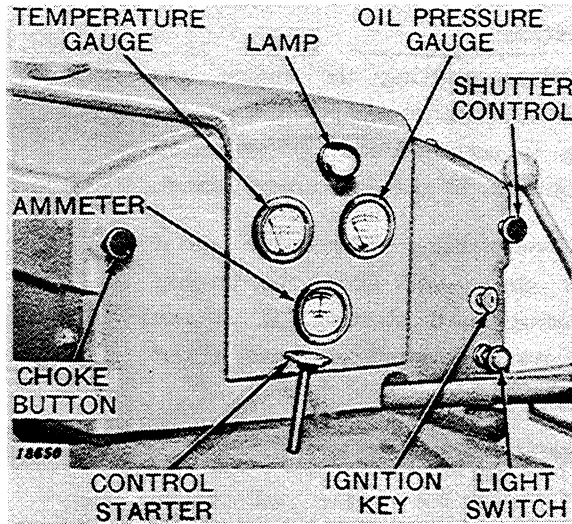


Steering

CONTROLS

RADIATOR SHUTTER, INSTRUMENT PANEL, AND CONTROLS

For greater all-around economy, better lubrication, and more power, All-Fuel engines should be operated at a temperature of 190°F. Engine temperature is effectively controlled from the driver's seat by means of a manually-operated radiator shutter. The engine temperature gauge on the instrument panel indicates when to adjust the shutter.

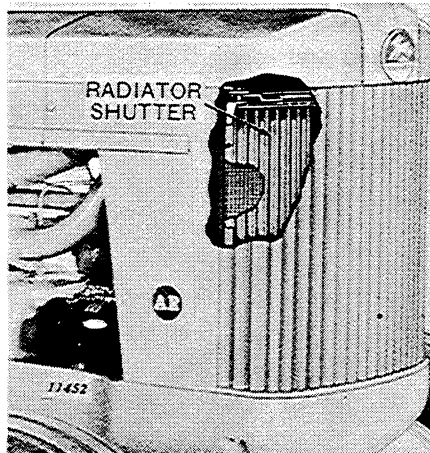


Instrument Panel

A convenient, three-way fuel control lever on the All-Fuel tractor is located on the instrument panel, enabling the operator to switch from gasoline to low-cost fuel or to shut off the fuel supply entirely without leaving his position at the wheel.

While engine temperature is not so important when burning gasoline, it is good practice to maintain an operating temperature of at least 180°F.

The oil pressure gauge is also located on the instrument panel. This gauge does not in any way tell the amount or condition of the oil in the crankcase. It only indicates whether the oil pump is working. The indicator hand of the gauge should rest between the letters "M" and "H" when the engine is running fast idle. If pressure is not registered on the oil gauge when the engine is started, stop the engine immediately.



Shutter

If your tractor is equipped with battery ignition, it is necessary to use the ignition key when starting or stopping the engine. Ignition is "on" when key is turned to the right.

The ammeter indicates whether or not the generator is charging.

CONTROLS

CHOKE

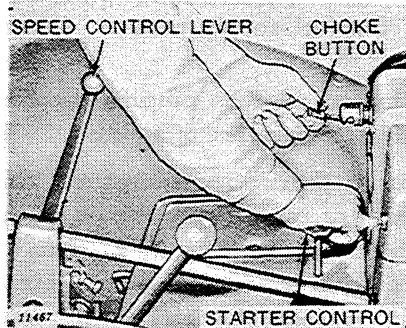
When starting the engine, set choke in full-choke position. Choking is accomplished by a button mounted on the instrument panel.

Over-choking or excessive use of the choke will flood the engine, causing hard starting. It is not always necessary to choke a hot engine.

ENGINE CRANKING

To start the engine, pull choke, put speed control lever in about half-speed position and push down on starter control. If your tractor is equipped with distributor, first turn key to the right ("on" position).

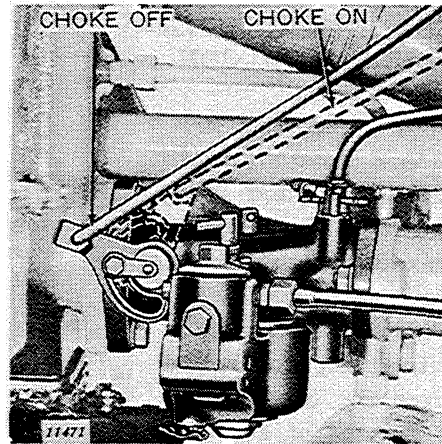
The starter motor is geared into the flywheel which is protected by a guard.



Starting

If brakes are pressed simultaneously with both feet, they assure you safer stopping at high transport speeds.

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

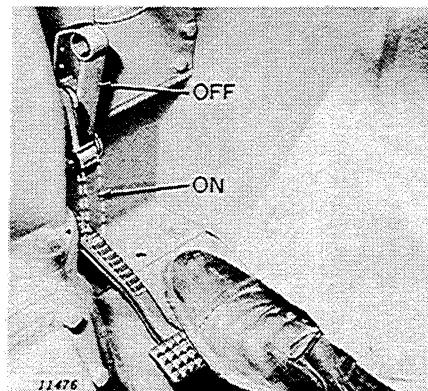


Choke

For additional information on starting, see section "Starting the New Tractor," page 14.

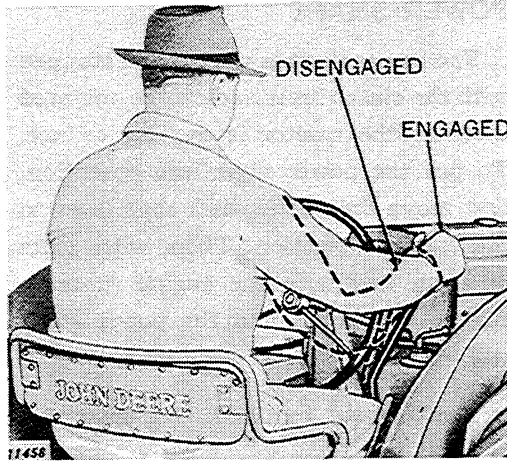
BRAKES

Individually foot-operated brakes make possible short turns to right or left when desired.



Brake Operation

CONTROLS



Clutch Lever

CLUTCH LEVER

The power required in putting the tractor in motion is gradually and smoothly applied to the drive system by slowly pushing the clutch lever forward. When the tractor picks up speed, give the lever a quick forward thrust until the clutch snaps into engagement.

By pulling back on the clutch lever, the clutch is released and the engine disconnected from the transmission. The pulley brake,

which is a part of the clutch lever, stops the pulley from rotating, permitting easy shifting of the transmission gears.

When the engine is running and the tractor is not moving, the life of the clutch parts and pulley bearings can be prolonged by shifting the gear shift lever into neutral and engaging the clutch. This allows the pulley and crankshaft to turn as one unit, reducing frictional wear, and lengthening the life of clutch parts.

GEAR SHIFT

Familiarize yourself with the shifting diagrams before you attempt to operate the tractor.

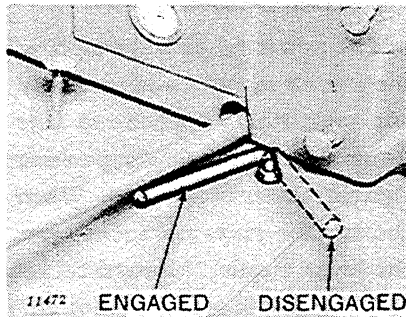
If gears do not shift freely, move clutch lever forward until pulley turns slowly. This allows gear teeth to line up for shifting.

Attempting to shift gears while tractor is in motion may cause clashing of gears, unnecessary wear, and possible breakage.



Gear Shift

CONTROLS



Power Shaft Shift Lever

POWER SHAFT

The power shaft is started and stopped with the clutch lever and can be operated whether the tractor is moving or not. To put the power shaft into operation, first move the power shaft shift lever to the engaged position. Then, with gears in mesh and with the engine running, engage the clutch and the power shaft will operate.

Whenever the use of the power shaft is not required, disengage the power shaft shift lever.

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

POWR-TROL

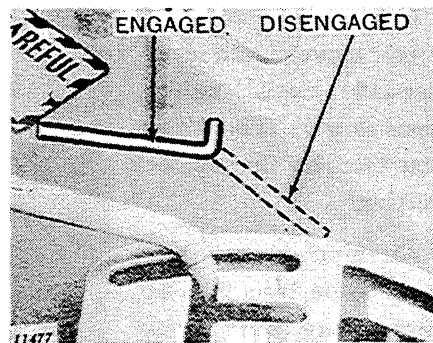
The Powr-Trol system is used with remote cylinder.

Oil pressure for the Powr-Trol is supplied by an independent pump mounted at the rear of the governor housing. To engage the pump, rotate the shift rod located on the tractor cowl in a counter-clockwise direction while turning the engine with the starter.

The pump drive gear is fully engaged when the lever is in the engaged position as shown in the illustration.

The pump is designed for continuous operation. However, it is good practice to disengage the pump drive gear when the remote cylinder is not being used.

To disengage pump, rotate shift rod clockwise at slow idle engine speed until drive gear is disengaged.



Powr-Trol Pump Shift Rod

CONTROLS

To operate the Powr-Trol move lever to one of five positions: 1—neutral, 2—slow raise, 3—fast raise, 4—slow drop, and 5—fast drop.

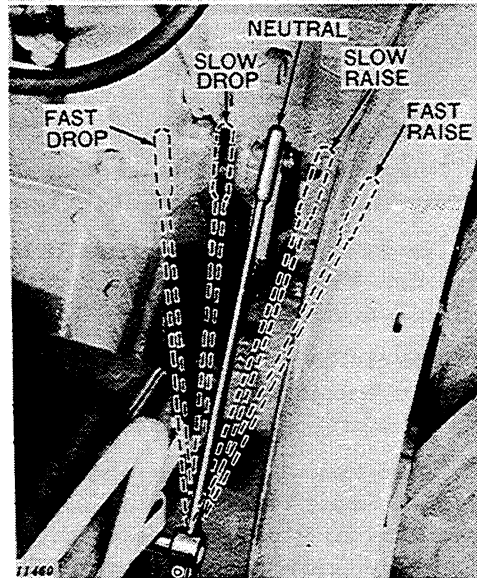
(1) The neutral position of the lever is approximately 30° forward of vertical.

(2) To decrease depth of the implement or to raise it slowly, move the lever forward approximately one-half of its travel. The lever must be held in this position until the desired adjustments are reached.

(3) To raise implement fast, move lever forward to its farthest position (not necessary to hold). The lever will return to neutral position automatically on completion of lifting stroke.

(4) To increase depth of the implement or to drop it slowly, move the lever to the rear approximately one-half of its travel. The lever must be held in this position until the desired adjustment is reached.

(5) To drop implement fast, move the lever to the rear as far as possible. The control lever returns automatically to neutral upon completion of the lowering stroke.



Powr-Trol Lever

Be Careful

THE LIFE YOU SAVE MAY BE YOUR OWN...

NATIONAL SAFETY COUNCIL

OPERATING INSTRUCTIONS

STARTING THE NEW TRACTOR

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 engine is designed to operate economically on regular-grade gasoline. Third-grade gasoline or power fuels are not satisfactory for use in this engine.

The All-Fuel engine is designed to operate on gasoline, power fuel, tractor fuel, or kerosene, and no difficulty will be experienced with these fuels if the simple operating directions are followed.

These low-octane, lower-cost fuels are manufactured to a variety of specifications; therefore, the All-Fuel tractor owner should investigate available fuels to determine which will give the most satisfactory results under the prevailing operating conditions, making sure that the directions are followed for adjusting carburetor and maintaining temperature.

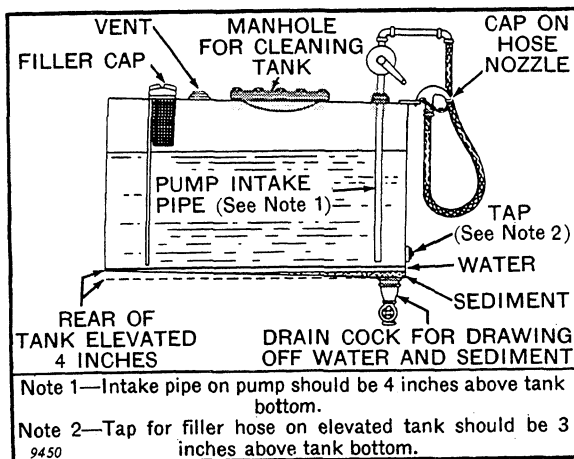
In all communities where these low-octane fuels are available, they are generally used in All-Fuel tractors because these tractors will burn them successfully without any detrimental effect to the working parts of the tractor and at a saving in fuel costs.

FUEL STORAGE

Many engine difficulties can be traced to dirty fuel.

The importance of proper fuel storage cannot be too highly stressed.

Fuel should be stored in a convenient place outside of buildings. If fuel drums are used they should be located in a shady spot to prevent undue evaporation.



One Type of Storage Tank

OPERATING INSTRUCTIONS

The storage tanks, drums, service tanks, or other containers must be free from foreign matter of any sort which might contaminate the fuel.

A storage tank provides the best means of storing fuel. Most storage tanks have a sump or other means of draining water, dirt, or other foreign matter from the bottom. After refilling storage tank, sufficient time should be allowed for any foreign matter which might be present to settle to the bottom before filling the tractor fuel tank.

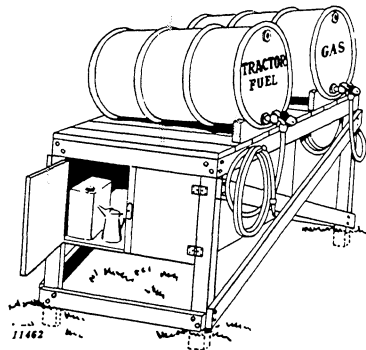
Some fuel companies supply adequate storage tanks on a purchase or rental basis.

Storage of fuel in barrels is not recommended because they are often a source of fuel contamination. However, in many instances, the fuel supply will necessarily be received in barrels. In such cases, some of the following precautions will help to insure clean fuel for the tractor.

Place barrel in such a position that it will not have to be moved to remove fuel, since moving barrel will stir up water and dirt in bottom of barrel.

When barrel is placed on side, keep rear end of barrel lower so water and dirt will tend to settle out at the back.

The fuel and gasoline drums should be tilted slightly towards the rear as shown in illustration so that any metal that might flake from inside 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 get in. Be sure the drum vent plug is screwed in tightly after using it. By cutting out the bottoms of two drums and welding them together, the capacity of each fuel storage tank will be doubled.



Fuel Storage Rack

RUN-IN PERIOD FOR THE NEW TRACTOR

Before your new tractor was shipped from the factory, all bearings and friction surfaces were correctly and tightly fitted, and the crankcase contained a special "breaking-in" oil.

OPERATING INSTRUCTIONS

To be sure that all bearing surfaces will be properly lubricated, operate it 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 with new oil in accordance with recommendations on page 23.

Keep engine temperature up to 190°F. because engine temperature is very important during the "breaking-in" period.

While engine temperature is not so important when burning gasoline, it is good practice to maintain an operating temperature of at least 180°F.

BEFORE STARTING THE ENGINE

SAFETY FIRST

Be sure gear shift lever is in neutral before starting engine.

Never refuel tractor while engine is running or extremely hot. Do not smoke or use an oil lantern when working around inflammable fuels, especially when refueling the tractor.

Before attempting to start or operate the tractor, familiarize yourself with the tractor and its various controls. Also check the following:

(1) Check radiator water level and, if necessary, add water up to bottom of baffle. (Use soft water or rain water if possible.) During freezing weather—where water has been drained to prevent freezing—**do not** start the engine before drain

plug has been installed in bottom of cylinder head and radiator filled with water. (Capacity of cooling system, 8-3/4 U. S. gallons.)

(2) Check amount of fuel in tanks. Always use clean fuel of the type recommended for your tractor. See "Fuels," page 14. (Capacity of fuel tank, 20 U. S. gallons.)

On All-Fuel tractors, gasoline in the small rear tank is used for starting and warming up the engine. Fill with clean gasoline. (Capacity, 1-3/4 U. S. gallons.)

(3) Check oil in the air cleaner for quality, weight, and amount. See recommendations, page 26.

(4) Check crankcase oil level. If necessary, add a good grade of 10-10W oil until oil runs out at the oil level cock. *NOTE: This oil must be drained after 20-hour "breaking-in" period and refilled with the weight of oil recommended in chart on page 23.*

OPERATING INSTRUCTIONS

(5) Check air pressure in pneumatic tires before moving the tractor. Inflate to correct pressure according to inflation chart, page 45. Tire inflation should be checked at least every two weeks.

TO START THE ENGINE

(1) Close the radiator shutter, set the gear shift lever in neutral, and pull the clutch lever back into the disengaged position.

(2) Advance speed control lever half-way.

(3) If the engine had been burning low-cost fuel when it was stopped, drain the carburetor.

(4) If the carburetor adjustments have been changed, adjust load and idle needle according to instructions on page 33.

(5) On All-Fuel engines turn on gasoline by turning the fuel control lever to the mark "G."

(6) Place choke in closed position. If your tractor is equipped with a distributor, turn ignition key to the right ("on" position).

(7) As soon as engine fires, open choke immediately to prevent flooding.

(8) With engine running, with speed control lever in forward position, the hand of the oil pressure gauge must be between "M" and "H."

(9) When heat indicator shows 180°F. on All-Fuel tractors, turn fuel control lever to mark "F." **Do not turn on fuel before heat indicator shows 180°F. Proper warming up of engine is essential for satisfactory operation of tractor on fuel.**

(10) Maintain an engine temperature of 190°F. by either opening or closing the radiator shutter; 180°F. on gasoline tractors.

(11) Regulate engine speed by the speed control lever.

(12) The engine is set to run at the correct speed when the tractor leaves the factory; 975 R.P.M. for full load and approximately 1080 R.P.M. for fast idle. **CAUTION: Under no circumstances should the engine be operated at an idle speed over 1080 R.P.M.**

OPERATING INSTRUCTIONS

WARM-UP PERIOD

Before you put your tractor on full load or into too high a gear, be sure it is warmed to proper temperature. This will give the oil a chance to circulate freely and will prevent undue wear on piston rings, cylinders, and bearings. Avoid racing the engine during the warm-up period.

OPERATING THE TRACTOR

Your John Deere Tractor has a range of speeds. These various speeds not only give you the flexibility and adaptability you want, but 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.
- (2) 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 causes unnecessary wear and breakage. Be sure the gear shift lever is moved far enough to place gears in full mesh.**
- (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.

A GOOD OPERATOR IS A SAFE OPERATOR

1. Reduce speed when turning or applying individual brakes.
2. Watch for obstructions. Be cautious near ditches or on steep hillsides.
3. Allow no riders unless seat is provided.
4. Never operate tractor unless power take-off is shielded.
5. Read and observe safety rules on pages 58 and 59.

OPERATING INSTRUCTIONS

HIGH-SPEED DRIVING

CAUTION: Your tractor is equipped with individual brakes which should be adjusted evenly to avoid drawing the tractor to one side. However, independent brakes on your John Deere Tractor enable you to correct or compensate for brakes that are not equally adjusted by merely changing the amount of foot pressure you apply.

Do not jam on brakes, especially when one wheel is spinning, because this suddenly throws a tremendous load on the transmission and can cause breakage.

NOTE: Reduce engine speed first before applying brakes.

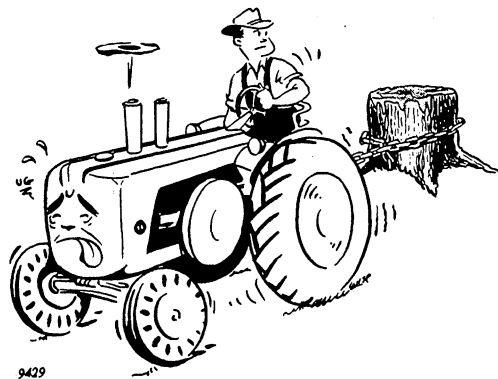
DRAWBAR LOAD

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

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

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 results in undue strain on all its parts and will eventually result in unnecessary repair expense and impaired efficiency of operation.



Your tractor was designed to pull its normal load with the carburetor near the three-quarter open position, with 20 to 25 per cent of its power beyond the normal load 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 full power. Beyond this, you are overloading your tractor. An overloaded tractor usually can be detected by a gradual slowing down in speed and a slowing down and laboring of the engine.

OPERATING INSTRUCTIONS

BELT WORK

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

Never use a stick to force a belt on or off a revolving pulley. To put on or take off belt, move tractor forward to provide slack. After backing tractor into belt, be sure the tractor is well blocked and both rear wheel brakes are locked. Always start a belt load slowly.

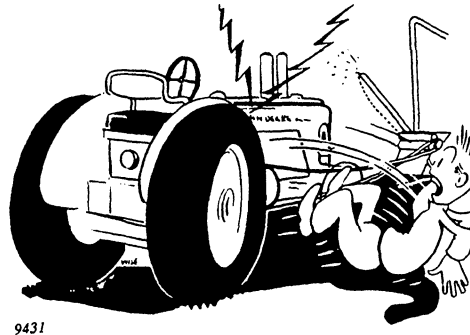
NOTE: After backing the tractor into the belt and setting brake latch, it may be difficult to get the gear shift lever into neutral. This is due to bind on the gear teeth caused by the pull of the belt. To relieve the bind, turn the belt pulley backward by pulling on the belt, after which the gears can easily be shifted into neutral.

SERVICE SUGGESTIONS

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 came with the equipment.

SAFETY SUGGESTIONS

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



In your everyday work around farm equipment remember this: An accident is usually caused by someone's carelessness, neglect, or oversight. On pages 58 and 59 are safety rules which, if practiced, will make your farm safer for you and for those who work with you.

STOPPING THE TRACTOR

To stop the tractor, throttle engine down, disengage the clutch by pulling the clutch lever clear back. As soon as the clutch is disengaged, the brakes can 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.

OPERATING INSTRUCTIONS

During the time the All-Fuel engine is idling, a more satisfactory engine temperature can be maintained by closing the radiator shutter and placing the throttle lever in the half-open position.

STOPPING THE ENGINE

If the tractor has been pulling a heavy load and is quite hot, idle the engine a few minutes before you stop it to cool it off gradually. Sudden cooling of a hot engine causes extreme contraction of the heated metal parts. In freezing weather, never drain the water immediately after stopping, for the same reason. You are assured of better performance year in and year out if you follow this practice.

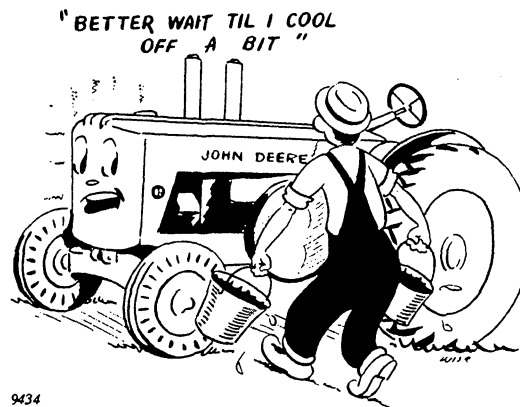
While there are several ways of stopping the engine, there is only one correct way. By following this you can be assured of easier starting.

To stop gasoline engine on tractor equipped with magneto, pull speed control lever all the way to the rear.

To stop the All-Fuel engine on tractor equipped with magneto, burning low-cost fuels, shut off the fuel at the fuel control lever and drain the carburetor bowl. This cuts off the fuel supply and, after a few revolutions, the engine will stop, leaving the combustion chambers dry—an important contribution to easy starting.

If your tractor is equipped with distributor, stop gasoline engine by turning ignition key to left. A few minutes before stopping All-Fuel engine, turn fuel control lever to "Gasoline." Allow engine to run long enough to burn low-cost fuel out of carburetor. Stop engine by turning ignition key to left.

CAUTION: Do not stop the All-Fuel engine by pulling back on the hand throttle or by shorting the magneto. This leaves several charges of unburnt fuel in the cylinders, which will reliquefy as the engine cools. This liquid fuel will lie on the electrode and porcelain of the spark plugs, providing a path for the spark to escape and resulting in hard starting. Liquid fuel left in the combustion chamber will also wash the lubricating oil off the pistons, rings, and cylinders, thus breaking the oil seal and causing poor compression—also a factor in hard starting.



LUBRICATION

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

PURPOSE OF LUBRICATION

You use oil and grease in your tractor to separate metal parts that otherwise would work against one another. If properly lubricated, these parts never touch. Oil of the right weight acts much the same as tiny ball bearings to keep the wearing parts separated.

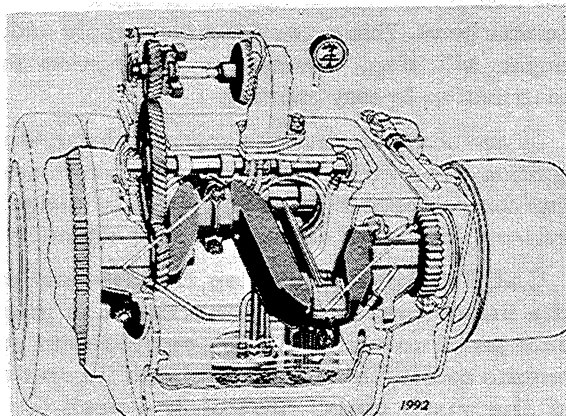
STORAGE OF LUBRICANTS

Your new tractor is equipped with various safeguards such as an air cleaner and oil filter—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 the working parts of your tractor.

ENGINE LUBRICATION

QUALITY OF OIL

The engine of this tractor, with its full force-feed pressure lubricating system, has one of the finest oiling systems it is possible to produce. Do not handicap it by trying to save money with cheap oil. High-grade oils withstand heat and wear for a longer time. Cheap oils soon become thin and lose their lubricating qualities.



Lubrication System

LUBRICATION

It is impossible to determine the quality of oil by its appearance. As a result, inferior oil often is sold as a quality product at a lower price. It pays to buy only nationally-known, high-quality brands of oil. Don't take chances.

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 must get there first. Therefore, weight or viscosity of the oil is very important.

As soon as oil of the correct weight and quality reaches bearing surfaces, it begins functioning immediately to relieve friction, carry off heat, to create an oil seal between rings and cylinders, thus preventing blow-by and loss of power, and last, to carry away elements such as carbon, dirt, and other abrasive materials that are harmful if left between metal working surfaces.

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

Remember this—the temperature in the crankcase correspondingly varies with the outside temperature. Therefore, it is important to use oil in the new engine according to the recommended temperature and weight chart below which has been scientifically worked out with leading oil companies.

Air Temperature	Engine Crankcase and Air Cleaners
Above 90°F.	S.A.E. 30
32°F. to 90°F.	S.A.E. 20-20W
Below 32°F.	S.A.E. 10W

NOTE: When temperatures remain below —10°F. for extended periods of time, improved engine performance will be obtained by using S.A.E. 5W motor oil. The engine will also be easier to crank which will result in less drain on the battery. S.A.E. 5W motor oil may also be used in the air cleaner under these conditions if desired.

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

Crankcase capacity: 11 U. S. quarts, including oil filter compartment.

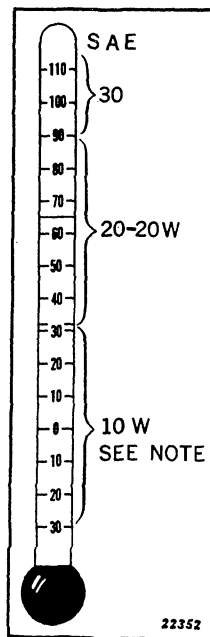


Chart Indicating Correct Weights of Oil to use at Various Outdoor Temperatures

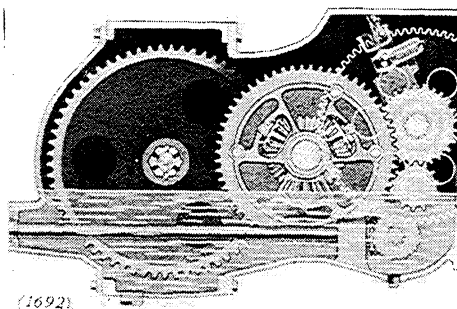
LUBRICATION

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 crankcase oil and refill with new oil as specified in the chart. This is important.

TRANSMISSION LUBRICATION

Lubrication of the transmission and differential is entirely automatic—it starts and stops with the engine. The differential and final drive gears are partially submerged in transmission oil and when they revolve, oil is carried up to all transmission parts, completely bathing gears, shafts, and bearings.



Transmission Lubrication

Changing seasons and temperatures, together with heating and cooling of the tractor, cause condensation and eventually an accumulation of water in the main transmission case. This water breaks down the lubricating quality of the oil and is one reason why transmission oil should be changed regularly.

Each spring the transmission should be drained and washed out.

WEIGHT OF OIL

Temperature	S.A.E. Viscosity Numbers	Oil Capacity— U. S. Measure
0°F and up	90	8 gals.
Below 0°F	80	
(See Yearly Service)		

PERIODIC LUBRICATION SERVICE

» » » » » 10-HOUR SERVICE « « « « «

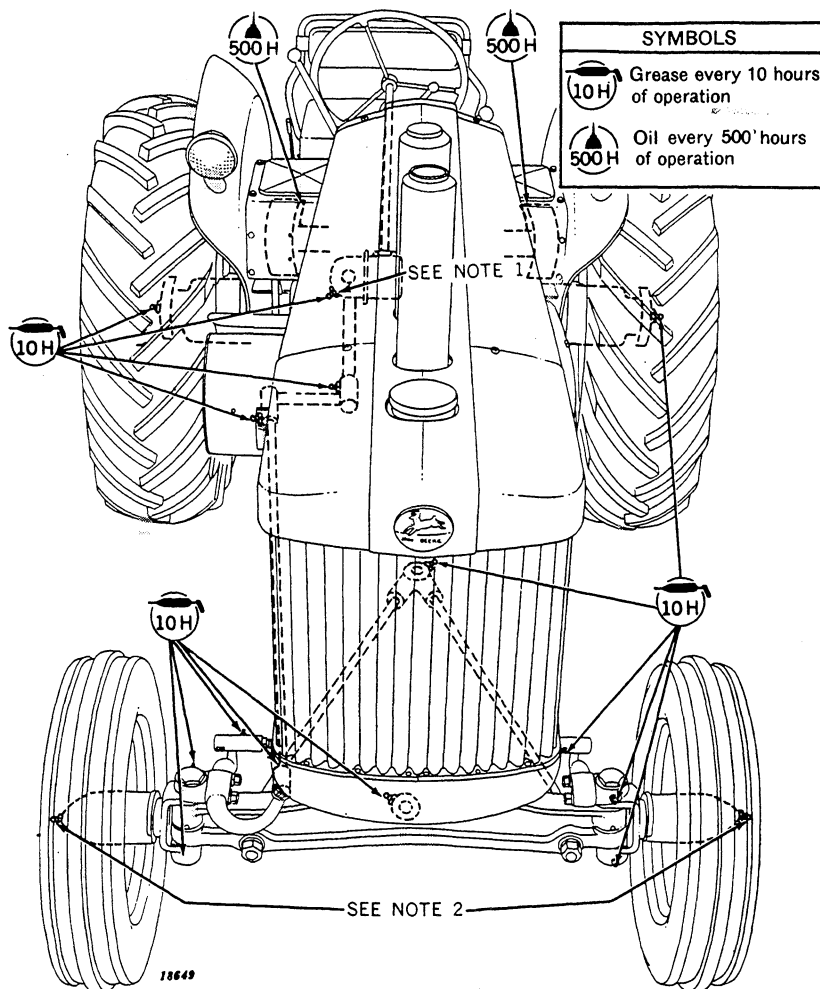
At the end of each ten-hour run: (1) service all grease fittings; (2) check the oil level in the crankcase and (3) check the oil in air cleaner cup.

NOTE: If tractor is operated in extremely dirty conditions or operating at maximum load, it may be necessary to check and service your tractor at the end of five hours' run.

LUBRICATION

SERVICING GREASE FITTINGS

Service all grease fittings with pressure-gun grease, wiping off fittings beforehand.



NOTE 1: If your tractor has a pipe plug at this location, remove the plug after every 500 hours of operation and add multi-purpose gear lubricant (hypoid) to the steering gear housing until oil runs out the filler hole.

NOTE 2: Front wheels are packed with wheel bearing grease at factory and need cleaning and repacking every six months under normal conditions.

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

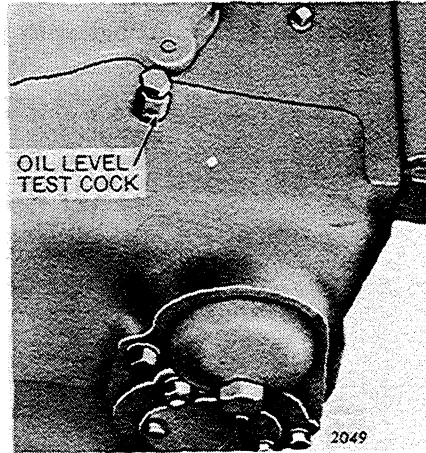
LUBRICATION

CHECKING CRANKCASE OIL LEVEL

If oil level in the crankcase is low, remove oil filler cap and add a good quality oil of the correct weight until it runs out the oil level cock. For instructions on changing crankcase oil, see "120-Hour Service," page 27.

CHECKING AIR CLEANER

If there is 1/2-inch of dirt in the bottom of inner or outer oil cup or if the oil is too thick with suspended dirt to flow freely, service the cleaner. See "30-Hour Service." If oil level is low and oil appears clean, add oil of correct weight to bring it up to the oil level mark.

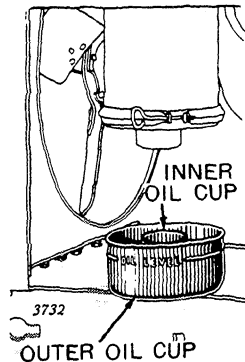


Location of Oil Level
Test Cock

» » » » » 30-HOUR SERVICE « « « « «

SERVICING AIR CLEANER

The air cleaner is built into the tractor to prolong its life and usefulness by preventing dirt, sand, and grit from going into the engine and causing wear on all moving parts. 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.



Air Cleaner
Cup Removed

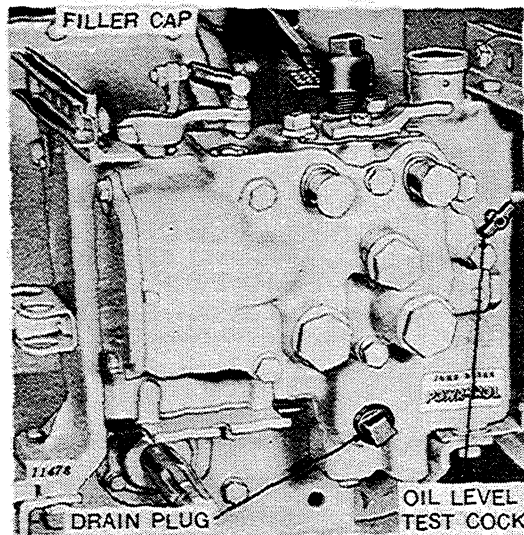
To Service—Remove oil cup, empty oil, and scrape out dirt. Wash out cup with fuel. Refill both inner and outer cups to indicated level with same grade oil as is used in engine crankcase for prevailing temperature conditions. Inspect bottom screen of cleaner body and remove any accumulation of chaff and dirt. Replace oil cup securely.

Safety Caution—Do not service air cleaner while engine is running.

LUBRICATION

» » » » » 60-HOUR SERVICE « « « « «

At the end of each 60-hour run: (1) check the Powr-Trol oil level and (2) lubricate the generator. Read instructions below.



*Powr-Trol Filler, Level,
and Drain Plug*

CHECKING POWR-TROL OIL LEVEL

Your tractor is equipped with a Powr-Trol. Check the oil level, if necessary, add S.A.E. 30 oil at the filler opening until it runs out at the oil level opening. For cold weather use lighter oil, same weight as used in engine.

Be sure oil used is free from water for satisfactory operation and to prevent water freezing in the pump.

GENERATOR LUBRICATION

Your tractor is equipped with electric starting and lighting equipment. The generator must be lubricated with 8 to 10 drops of light engine oil in both oil cups every 60 hours. Lubricate the generator when the tractor engine is stopped.

The starting motor does not require lubrication.

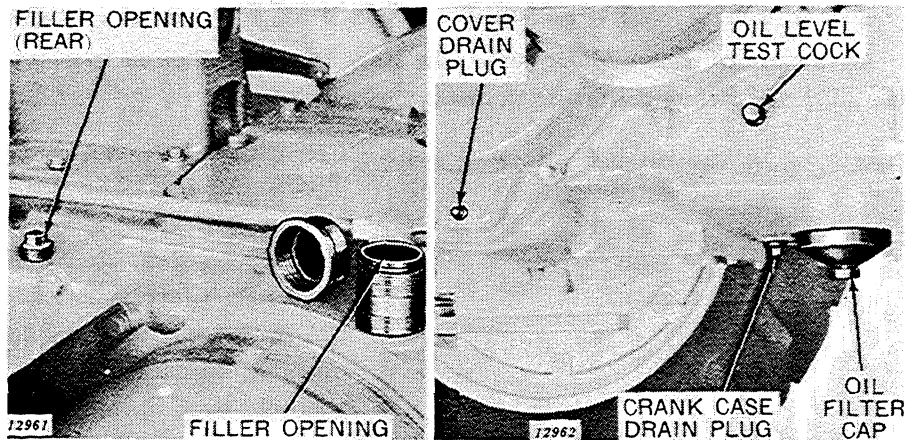
» » » » » 120-HOUR SERVICE « « « « «

CHANGING THE ENGINE OIL AND FILTER

After completing 120 hours of tractor operation, the crankcase oil and the oil filter should be changed.

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

LUBRICATION



Oil Filler Openings for Crankcase and First Reduction Gear Cover

Crankcase Test Oil Level Cock, Drain Plug and Oil Filter Cap

FLUSHING 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 serves as a good flushing and cleaning agent.

After draining out crankcase, pour in 1 gallon of flushing oil or distillate, run the engine a few seconds, then drain and change oil filter element. After the flushing oil has had a chance to drain out thoroughly, and filter element has been changed, remove filler cap and pour new oil of the proper weight in filler opening until the oil drips out at the oil test cock. Close test cock. Be sure to add one extra quart of oil, which is necessary to replace oil drained out when the oil filter element was removed. This extra quart of oil will not run into the filter compartment until the engine starts. Total approximate crankcase capacity: 8 U. S. quarts.

REPLACING OIL FILTER

When you replace the crankcase oil, replace the old filter element with a new one. Notice the long stud over which the filter element fits. If it is bent out of center position, straighten it by tapping with a soft hammer. If the rubber gasket that seals the filter cap becomes damaged, oil will leak at the cap. Remove the old gasket, using an ice pick or some similar tool, and replace gasket with a new one. Draw filter cap up snug. Damage may result from overtightening.

LUBRICATION

Always carry replacement filter elements on hand so that there will be no reason for using an element more than 120 hours.

NOTE: John Deere engineers have made exhaustive tests on all types, makes, and kinds of oil filters to find the filter which would keep the oil free from contamination for the longest operating period. These tests have proved that the replacement oil filter recommended and supplied by your John Deere dealer is the most effective.

DISTRIBUTOR

Wico—No lubrication required.

Delco-Remy—Check every other crankcase oil change, and if cam is dry, lubricate with small amount of high-temperature wheel bearing grease. At the same time lubricate felt pad in end of cam with two or three drops of oil. Do not overlubricate.

CHECKING FIRST REDUCTION GEAR COVER

When operating under conditions of high humidity or extreme temperature changes, condensation may form in the first reduction gear cover. A drain has been provided for such conditions. Check for water in the first reduction gear cover by removing the drain plug from cover. If there is water, drain the cover and add 1 pint of new engine oil through the rear filler opening in the first reduction gear cover.

INSPECTING BATTERIES

Clean batteries; check water level and specific gravity in accordance with instructions on pages 52 and 53.

» » » » » 500-HOUR SERVICE « « « « «

BRAKES

Brakes are lubricated with new engine oil of the same weight as that used in the crankcase. Fill each brake bearing oil cup to overflowing.

MAGNETO (WICO TYPE "X")

No lubrication required.

DISTRIBUTOR

Wico—No lubrication required.

Delco-Remy—Check oil reservoir and, if necessary, add a good grade of S.A.E. 20 oil. Oil level should be just above level of shaft.

FIRST REDUCTION GEAR COVER

Drain first reduction gear cover by removing the drain plug from the cover. Add 1 pint of new engine oil through the rear filler opening in the first reduction gear cover.

STEERING GEAR HOUSING

If your tractor is provided with a pipe plug in the steering gear housing instead of a grease fitting, remove the plug and add multi-purpose gear lubricant (hypoid) until oil runs out at the filler hole.

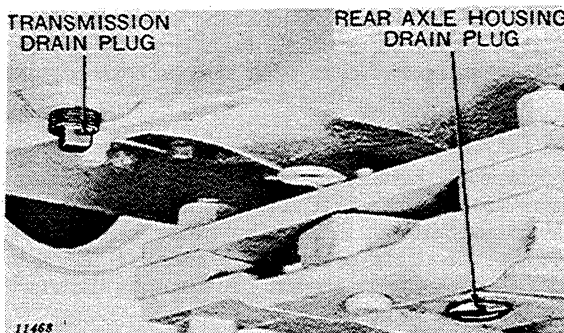
» » » » » » » **YEARLY SERVICE** « « « « « « «

CHANGING TRANSMISSION OIL

Draining, flushing, and refilling the transmission with high-quality transmission oil should be done at least once a year, preferably before the spring work begins. To do a thorough job of draining, remove both transmission and rear axle drain plugs.

FLUSHING TRANSMISSION CASE

To flush case, after draining out old oil, replace plugs, add 3 gallons of flushing oil or distillate. Then jack up one rear wheel, start the engine, shift into gear and engage clutch. Run for a few minutes, then drain. Add transmission oil of the proper weight. See table, page 24.



Rear Axle Housing and Transmission Drain Plugs

If your tractor will be used extensively during extremely cold weather, and it has S.A.E. 90 oil

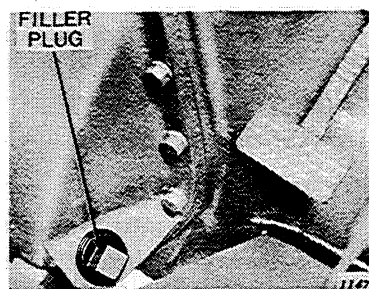
in the transmission, drain the transmission and put in a good quality S.A.E. 80 oil. Change to S.A.E. 90 oil again in the spring. (Oil capacity—8 U. S. gallons.)

CHANGING POWR-TROL OIL

Change oil in the Powr-Trol once a year, preferably each spring. The drain plug is located on the back of the Powr-Trol reservoir. It is good practice to run the Powr-Trol pump a minute or two when draining to remove the old oil from the pump and lines.

After draining and flushing the housing with fuel, add good-quality new S.A.E. 30 oil at the filler opening until it runs out at the oil level cock. Engage Powr-Trol pump, start engine, and run for a minute or two to fill pump and lines. Operate Powr-Trol lever several times to fill remote cylinder. Recheck oil level and refill until oil runs out level cock. If Powr-Trol is used in cold weather, use lighter oil, same weight as used in engine. (Oil capacity is approximately 8-1 2 U. S. quarts for Powr-Trol, and 1 U. S. quart for remote cylinder.

For illustration see page 27.



Transmission Filler Opening

YEARLY SERVICE YOUR JOHN DEERE DEALER OFFERS

YOUR JOHN DEERE DEALER OFFERS A YEARLY, COMPLETE TRACTOR SERVICE AT A NOMINAL CHARGE. TAKE ADVANTAGE OF THIS SERVICE AS IT INCLUDES, AMONG MANY OTHER THINGS, THE FOLLOWING LUBRICATION SERVICES WHICH SHOULD BE DONE EACH YEAR.

FRONT WHEEL BEARINGS

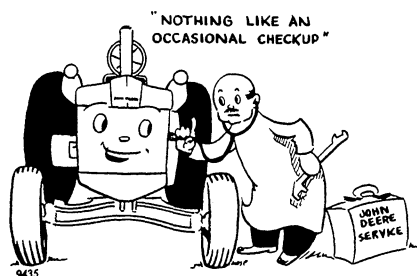
Front wheels will be removed and all parts, including wheel hub, will be washed clean, removing the old grease. The bearings, felt washers, and felt retainers will be inspected for wear and replaced if worn. Wheel hubs and bearings will be packed with wheel bearing grease, assembled and adjusted.

FRONT FAN BEARINGS

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 in 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 in high-temperature grease, the pulley and clutch assembled and adjusted.



SERVICE THAT WILL KEEP YOUR TRACTOR IN TIP-TOP SHAPE

Operating economy and long life have been characteristics of John Deere Tractors ever since the first one was built back in 1924. Fundamentally, these characteristics have been built into each tractor in the form of heavy, rugged parts, simplicity, and ability to burn a variety of fuels.

However, economy and long life are affected by almost all phases of tractor care and operation. The choice of speed, the load you pull, the selection of fuel, the temperature, lubrication, adjustments, and general conditions—all have bearing upon the economy and long life you can expect from your tractor.

There are certain service jobs that should be done 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, and will get your work done quicker and easier.

There may be rush seasons of the year when it is practically impossible to follow to the letter all the servicing suggestions made in this manual. However, at the first opportunity, do the servicing job that has been neglected temporarily so that your tractor will be in tiptop shape when you need it again.

The following suggestions cover adjustments and servicing which may involve merely inspection, but if necessary, adjusting or servicing of these various units should be made either by you or your John Deere dealer.

FUEL SYSTEM

INSPECTION OF FUEL SYSTEM

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

FUEL SYSTEM SERVICE

First, shut off the fuel at the fuel filter. Then remove glass bowl and clean thoroughly. With glass bowl removed, turn fuel on to see if it flows readily from the tank. If not, tank must be cleaned. When replacing the filter bowl, be sure the gasket which fits between the bowl and screen is in good condition; if not, renew it. All fuel lines should be checked.

To clean the carburetor strainer assembly, remove strainer retaining screw and drain plug and flush strainer housing by turning on fuel. Replace strainer screen assembly by screwing up tight with fingers and tightening it one-half turn with wrench.

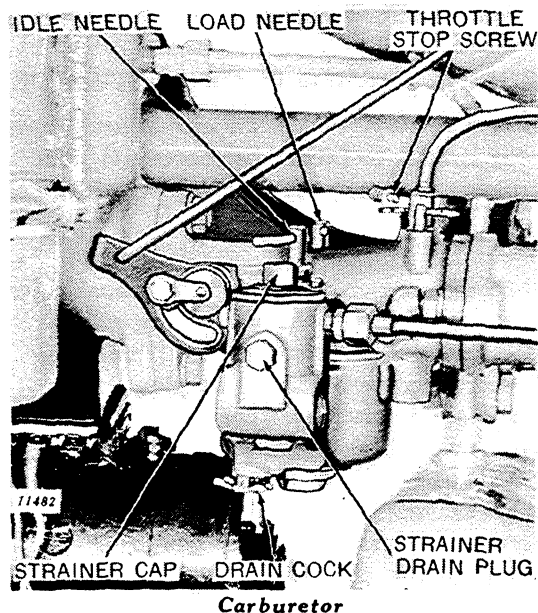
If fuel leaks at strainer assembly, install a new gasket.

ADJUSTING THE CARBURETOR

The carburetor mixes liquid fuel and air together to form a fuel vapor. The carburetor is provided with adjustments for smooth engine operation, fuel economy, and maximum power.

In making carburetor adjustments, the engine must be warmed up first. Then, with the speed control lever in the fast idle position, adjust the idle needle until the engine runs evenly. In warm weather, this varies from 1-1/2 to 1-3/4 turns on low-cost fuel and gasoline. This setting may vary on individual tractors, and when once made, should not be changed unless a different fuel is used.

For all-around maximum economy, apply a load (belt load preferred) to the engine which will operate the carburetor throttle lever in approximately the 3/4 open position. Adjust the load needle, turning it down until the engine loses power or backfires, then open one, two, or three notches—whichever gives desired performance. In warm weather, this should leave load needle open approximately 1 turn on low-cost fuel and gasoline. This adjustment will give best economy for all loads and should not be changed unless cold weather causes a lean mixture or a change has been made in the fuel used.



IGNITION SYSTEM SERVICE

If governor closes throttle entirely when load is released to cause uneven running, screw the throttle lever stop screw in against stop spring until tractor idles satisfactorily.

CAUTION: Carburetor should not be adjusted while tractor is moving.

For carburetor service, see your John Deere dealer.

IGNITION SYSTEM

The entire ignition system—which consists of a magneto or distributor, two spark plugs, and two spark plug cables—must function efficiently to get first-class performance and maximum operating efficiency from your tractor.

CHECK THE IGNITION SYSTEM PERIODICALLY

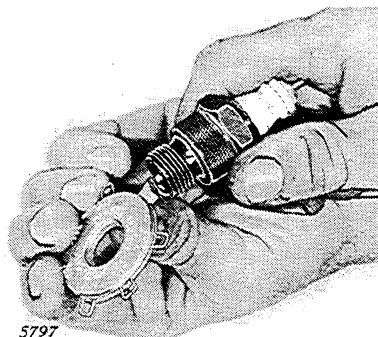
If necessary: (1) clean and adjust the spark plugs, (2) inspect the spark plug cables for breaks or shorts, (3) hone and adjust the magneto or distributor breaker points, and (4) check ignition timing.

SPARK PLUGS

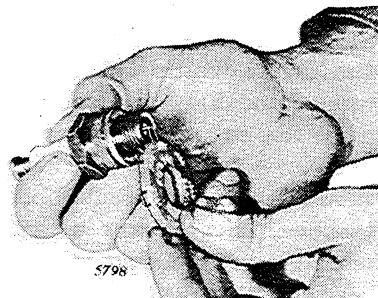
There are two things that will cause a grounded electric current through the spark plugs—a heavy coating of carbon and a cracked porcelain. If the plug is dirty, scrape or clean the plug. If the porcelain is cracked, the plug must be replaced. Check electrode gap and see that it is spaced to .030-inch. In adjusting the gap, bend only the outer electrode. Always use a feeler gauge to get correct setting.

To prolong the life of the spark plug, be sure to install the gasket which is provided with all new plugs. If the plug is tight against the gasket, the heat is permitted to escape from the plug through the gasket into the water jacket of the cylinder block, insuring longer life of the plug.

To obtain the best performance and to secure maximum efficiency from the All-Fuel engine, use only size 18mm. Champion No. 8 Commercial C spark plugs.



Setting Gap Clearance



Checking Gap Clearance

IGNITION SYSTEM SERVICE

For gasoline engine, use only size 18mm. AC88L Comm.

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.

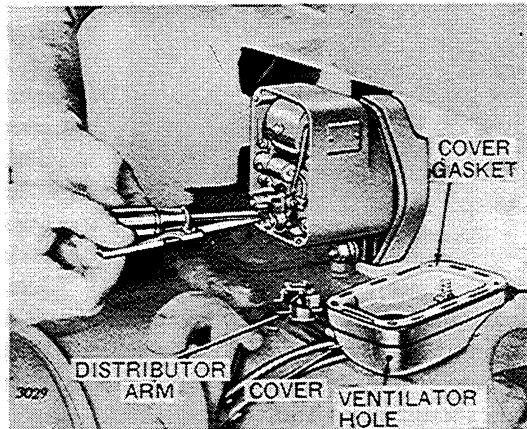
DISTRIBUTOR

If you are experiencing ignition trouble, first check spark plugs and spark plug cables. If these are in good condition, only then remove the distributor cap. Wipe it out thoroughly with a clean cloth and be sure that ventilator holes are open. Inspect the cap carefully and, if cracks are found, replace with a new one.

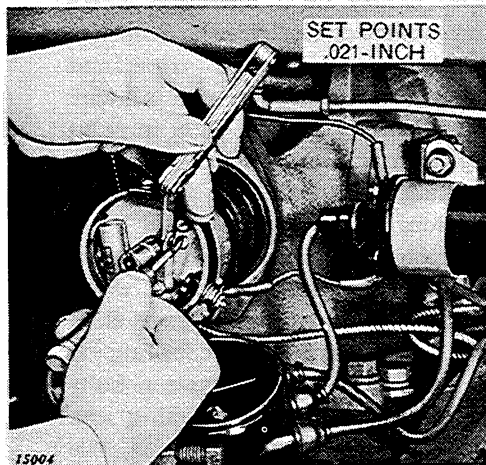
Remove the distributor arm from the shaft by pulling straight out, then wipe arm and cam clean. If on examination you find breaker points are worn, pitted, or dirty, carefully remove both points. After cleaning the points, hone each point to a smooth, flat surface, using a fine hone. (If points are badly pitted or worn, they should be replaced.)

After points have been installed, turn flywheel until the cam opens points to widest position. Adjust Wico points to a gap of .015-inch. Adjust Delco-Remy points to a gap of .021-inch. Examine the breaker bar for free movement.

Replace the distributor arm and distributor cap. Make sure the gasket is in place and in good condition. Replace cables, upper terminal to spark plug on fly-



Adjusting Magneto Point Gap



Adjusting Distributor Point Gap

wheel side, and lower terminal to spark plug on pulley side.

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

INSTALLING MAGNETO ON TRACTOR

Installing the magneto, after it has been removed from the tractor, can



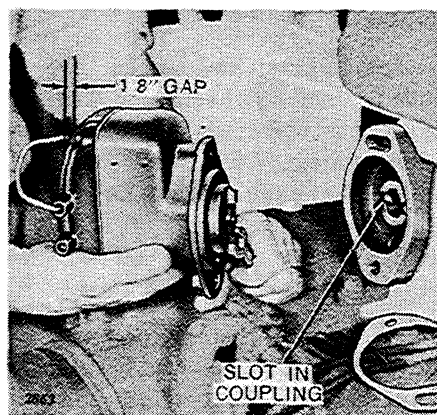
Timing Marks on Flywheel and Flywheel Guard

be done easily as follows: First, remove the spark plug on the flywheel side. 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 punch mark, stamped on the flywheel hub, lines up with "V" groove on flywheel guard or until the TDC mark, stamped on the flywheel rim, lines with the notches in the timing hole in the flywheel cover. In this position the slot in coupling on the governor shaft will be horizontal (See illustration below.)

Next, secure a short piece of wire and insert one end in the upper terminal of the distributor cap on the magneto; bend the other end around to within 1/8-inch of some metal part on the magneto frame. Hold the magneto solidly in the same upright position as when mounted on the tractor.

Grip the driving lug on the impulse coupling firmly and turn the impulse slowly in a left-hand direction (counter-clockwise). Stop instantly when impulse trips and spark occurs between end of wire and magneto frame. When impulse trips, driving lugs on the impulse coupling will be in a horizontal position.

Replace magneto and gasket on the governor case, making sure the impulse coupling lugs engage slots on the governor drive coupling. A gasket must be used between bolting flanges. After tightening the two cap screws firmly with the fingers, rotate the top of magneto



Magneto Timing Adjustment

IGNITION SYSTEM SERVICE

toward front of tractor as far as possible. Then rotate the flywheel one complete turn and line the punch mark on the flywheel hub exactly with the "V" groove on the flywheel guard, or line the TDC mark on flywheel rim exactly with the notches in the timing hole in the flywheel cover. Now tap the top of the magneto toward the rear of the tractor a little at a time until the impulse trips.

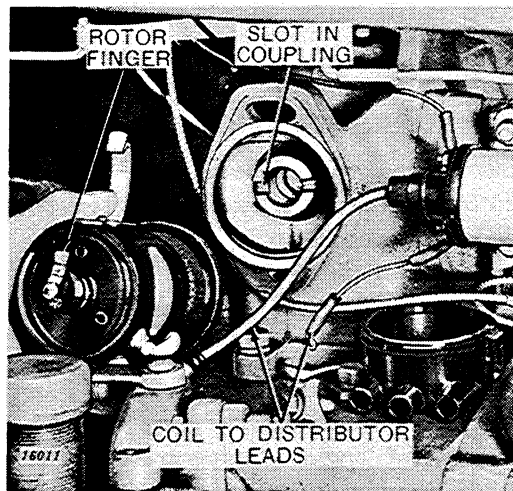
Tighten cap screws holding magneto to governor case and install spark plug cables. Left-hand spark plug cable must be installed in upper distributor cap terminal.

INSTALLING DISTRIBUTOR ON TRACTOR

Installing the distributor after it has been removed from the tractor can be done easily as follows: First, remove the spark plug on the flywheel side. 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 punch mark, stamped on the flywheel hub, lines up with "V" groove on flywheel guard or until the TDC mark, stamped on the flywheel rim, lines with the notches in the timing hole in the flywheel cover. In this position, the slot in the coupling on the governor shaft will be horizontal. (See illustration at right.)

On tractor with Delco-Remy distributor, turn the arm to a vertical position (see illustration at right). On tractor with Wico distributor, which has a forked arm, turn arm until right fork is at approximately one o'clock position; left fork will then be at approximately ten o'clock position and driving lug will be horizontal to distributor. This places the coupling lugs of the distributor in line with the slot on the governor shaft and in correct firing position for No. 1 cylinder.

Mount distributor and gasket on the governor case, making sure the driving lugs engage slots on the governor drive coupling. A gasket must be used between distributor and governor case. After tightening the two cap screws firmly with the fingers, connect battery ground strap, switch-to-distributor lead, and (on Delco-Remy) coil-to-distributor lead.



Distributor Timing Adjustment

IGNITION SYSTEM AND COOLING SYSTEM SERVICE

Rotate top of distributor approximately one inch toward front of tractor. Install cover on distributor and insert a suitable wire in the top terminal of the cover. Bend this wire to within 1/8-inch of some metallic part of the tractor.

After making sure the punch mark on the flywheel hub is still exactly lined up with the "V" groove on the flywheel guard or that the TDC mark on the flywheel rim is still lined up with the notches in the timing hole in the flywheel cover, turn on the ignition switch and slowly tap the top of the distributor toward the rear of the tractor until a spark is produced between the wire and a metallic part of the tractor.

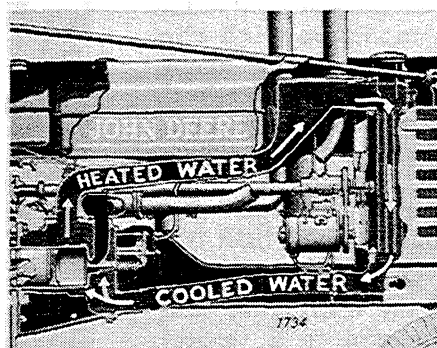
Tighten cap screws holding distributor to governor case and install spark plug cables. Left-hand spark plug cable must be installed in upper distributor cap terminal.

CAUTION: Whenever adjustments are made on the tractor engine, remove the spark plug cables from spark plugs and battery ground cable to prevent accidental starting.

COOLING SYSTEM

Your new tractor engine is water-cooled by the thermo-siphon cooling system—an automatic circulation system which eliminates the need for both a water pump and a thermostat.

The circulation is governed automatically by the requirements of the engine. This system not only gives a more uniform engine temperature but also eliminates delays in the field.

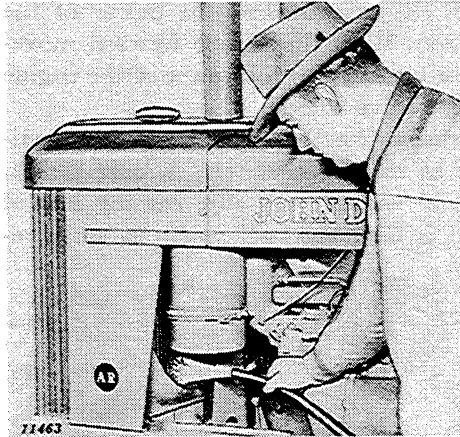


Cooling System

ENGINE TEMPERATURE

In order to compensate for varying loads and changing weather conditions, your tractor is equipped with a radiator shutter conveniently operated from the tractor seat. It is highly important to maintain an All-Fuel engine temperature of at least 190°F., as indicated on gauge, to insure complete burning of the fuel, greater economy, better lubrication, and steady power.

While engine temperature is not as important when burning gasoline, it is good practice to maintain an operating temperature of at least 180°F.



Cleaning Radiator

CLEANING THE COOLING SYSTEM

Efficient operation of the cooling system calls for an occasional cleaning just like the radiator of your car or truck. Clean the radiator as follows:

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. Replace drain plug and fill the cooling system with a solution composed of one pound

of washing soda per gallon of water. (Cooling system capacity—8-3/4 U. S. gallons.) Install the filler cap and run the engine for a half hour. 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. Fill with fresh water up to baffle. Following this procedure once or twice a year will keep the inside of the cooling system operating efficiently.

In order to do a thorough job of cleaning the cooling system, the radiator grille and shutter should be removed in order to examine all air passages in radiator core. Remove all chaff and dirt and straighten bent fins.

In filling the radiator, soft water should be used whenever available. Well water often contains lime and other minerals which eventually may clog the radiator cores and reduce the cooling efficiency.

COLD WEATHER OPERATION

In using the tractor regularly in freezing weather, an anti-freeze solution will eliminate filling and draining the radiator daily. *This mixture should have a boiling point of not less than 212°F.*

If you operate your tractor only occasionally in freezing weather, you can use water only and drain the radiator each time.

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.

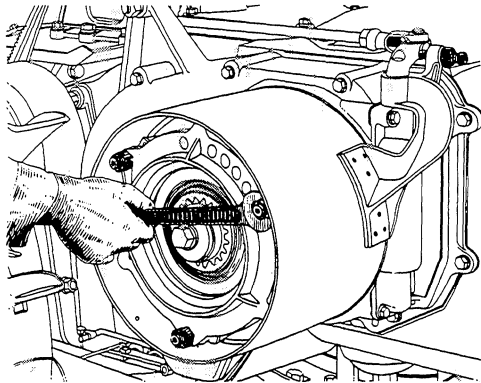
CLUTCH

Through the medium of the clutch on your tractor, the power of the engine is transferred to the transmission. With the simple forward movement of the clutch lever, you engage the clutch, and the power of the engine is transferred to the belt pulley or to the drive wheels.

The adjustment of the clutch determines whether or not you get maximum power developed by the engine to the drive wheels. 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.

ADJUSTING THE CLUTCH

To adjust the clutch, first set the clutch lever in the engaged position; then remove pulley cover; tighten each of the three nuts a little at a time to an equal tension. This you can determine by the effort required to turn the nuts. Now, try the clutch lever. It should go into engaged or operating position with a snap requiring some pressure.



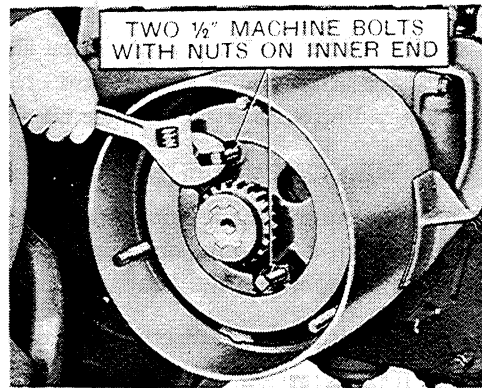
Adjusting Clutch

REPLACING CLUTCH FACINGS

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

Two 1/2-inch machine bolts and nuts can be used as a puller for removing the driving disk from the crankshaft. **CAUTION: Revolve pulley so that ends of bolts do not rest on swaged head of clutch cone drive pin when bolts are tightened.**

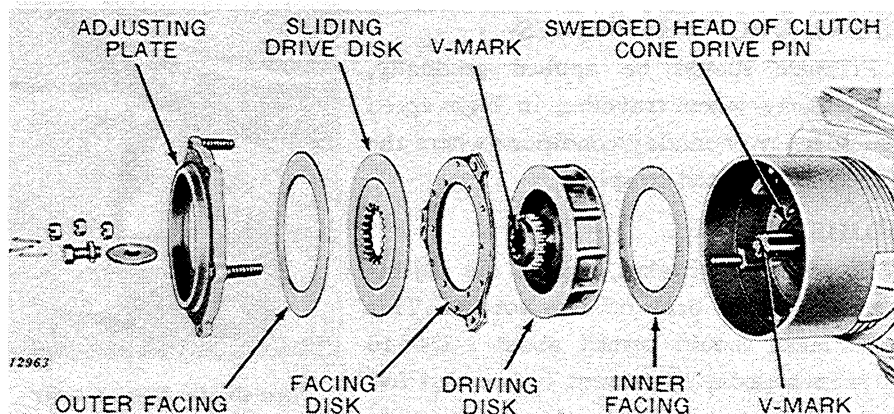
In replacing, be sure V-mark in the driving disk hub lines up with the V-mark on the end of one of the crankshaft splines. The cap screw holding the fixed driving disk on the crankshaft must be tight.



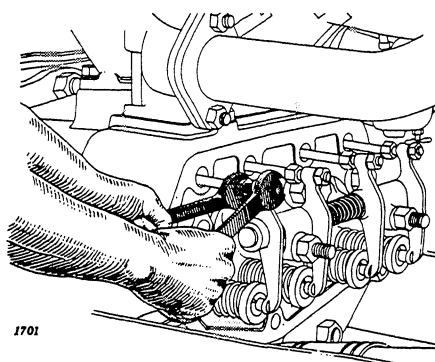
Removal of Driving Disk from Crankshaft

After installing the new facings and all other parts, adjust the clutch as described previously.

TAPPET SERVICE



Exploded View of Clutch Parts



Tappet Adjustment

TAPPET ADJUSTMENT

When properly adjusted, tappets will seldom need attention. However, an occasional checking is advisable. All adjustments should be made with a cold engine.

ADJUSTING THE TAPPETS

To adjust the tappets, 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 flywheel side is at the end of the compression stroke. Now adjust the two left-hand tappets. To adjust the two right-hand tappets, the flywheel must again be turned until the piston on pulley side is at the end of the compression stroke. Then adjust the two right-hand tappets.

Tappets are adjusted by turning the adjusting screws in until there is no movement in the tappet levers; then turn the adjusting screw out $\frac{1}{3}$ turn, or until there is .020-inch clearance between the end of the tappet lever and valve stem.

After each adjustment is made, lock tight the adjusting nut. In replacing the tappet cover, use a good gasket.

BRAKE SERVICE

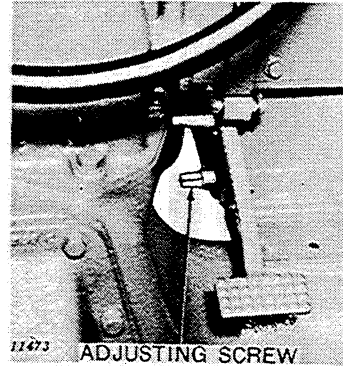
BRAKES

OPERATING THE BRAKES

Pressure should be applied gradually, particularly when traveling in high speed or under icy or muddy conditions where the wheels are inclined to spin.

ADJUSTMENT

To adjust the brakes, tighten the adjusting screw, then back 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.

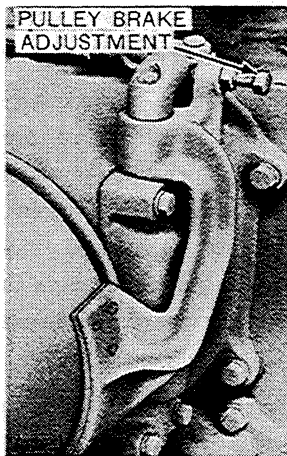


Foot Brake Adjustment

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

PULLEY BRAKE

The purpose of the pulley brake on the clutch lever assembly is to stop the pulley from rotating when lever is pulled back, thus making it easy to shift gears.



Pulley Brake Adjustment

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

ADJUSTMENT

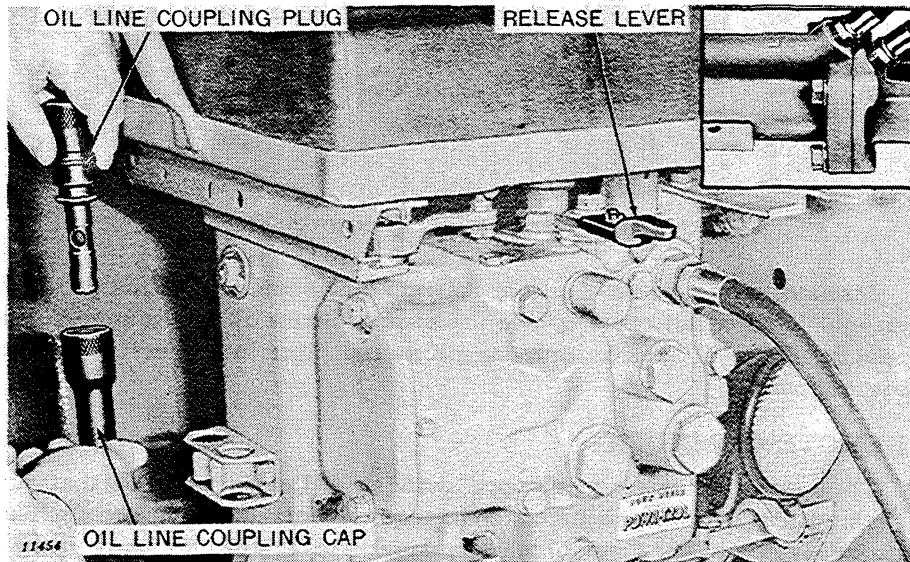
To adjust the pulley brake, loosen the brake adjusting screw lock nut and turn in the adjusting screw until the brake keeps the pulley from turning when the clutch is disengaged and clutch lever is held back. Then tighten the lock nut.

NOTE: After backing the tractor into the belt and setting each brake latch, it may be difficult to get the gear shift lever into neutral. This is due to binding on the gear teeth caused by the tightness of the belt. To relieve binding, turn the belt pulley backwards by pulling on the belt. The gears then can easily be shifted into neutral.

POWR-TROL

Ease of depth adjustment and of raising or lowering equipment—these are the practical advantages of the hydraulic Powr-Trol, pioneered and developed by John Deere.

It is practically trouble-free and requires very little attention.

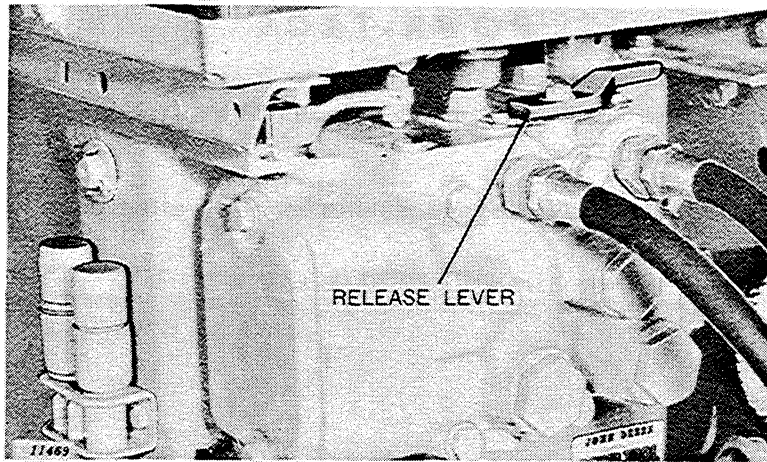


Installing Oil Lines to Housing and Coupling Plugs Into Caps

ATTACHING REMOTE CYLINDER TO POWR-TROL

Disengage Powr-Trol pump by rotating shift rod in counterclockwise direction while engine is idling slowly. Move the Powr-Trol lever to fast raise and fast lower positions. Hold in each position for a moment to allow oil at coupling plugs to drain into the reservoir. Remove the two coupling plugs from Powr-Trol valve housing by moving release lever to rear and pulling out the plugs. **Make certain parts are free from dirt.** Push the oil line couplings into the valve housing in the holes from which the plugs were removed and return release lever to latched position.

POWR-TROL SERVICE



Hoses and Coupling Plugs Installed

Insert coupling on oil line from the remote cylinder outlet marked "L" in right-hand outlet opening hole in housing. Screw oil line coupling caps removed from oil lines on coupling plugs and place in bracket on side of seat support.

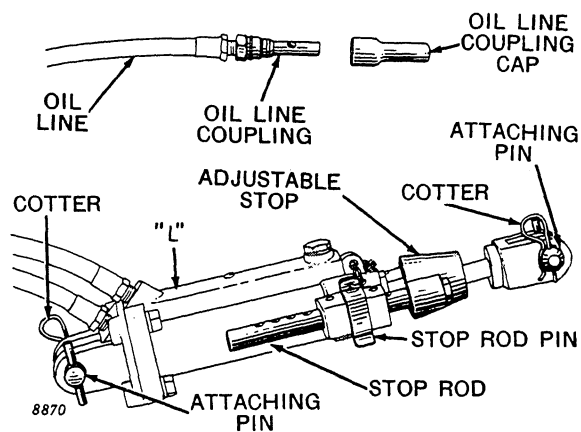
REMOTE CYLINDER

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 8 inches maximum to 3 inches minimum in 1/4-inch steps.

CAUTION: Do not operate the remote cylinder unless both stop rod pins are in place to lock both stop rods; failure to do this will result in damage to the assembly.

To attach or detach remote cylinder from implement, remove hairpin cotters and pull out attaching pins.

If cylinder is to be removed from implement, replace attaching pins immediately.



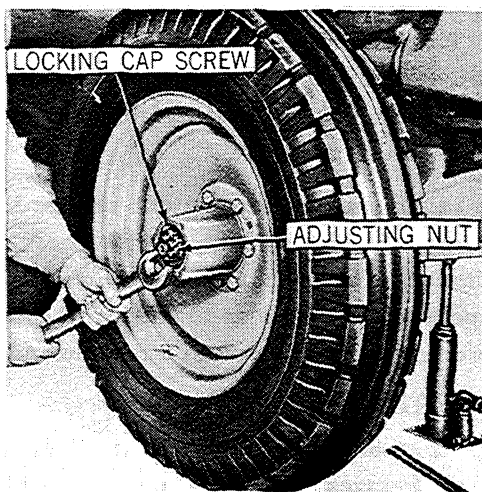
Remove Cylinder and Oil Lines

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 check the front wheels for end play. Raise the wheels off the ground and if end play is evident, the bearings need adjustment.

ADJUSTMENT

First, remove the hub cap and cotter key and loosen the lock screw. With a 12-inch wrench, draw adjusting nut up tight. If any other length wrench is used, draw the adjusting nut up until a slight drag is felt when the wheel is rotated. (If the adjusting nut is turned 3 to 4 castellations before it is drawn tight, the wheel should be disassembled and bearings inspected.) After adjusting nut is drawn tight, back it off one full castellation, plus any additional amount required for inserting the cotter key. Install cotter key, tighten lock screw, and replace hub cap. Both wheels should be adjusted equally.



Front Wheel Bearing Adjustment

CAUTION: Care must be taken that drag caused by the dust-excluding felts is not mistaken for drag caused by bearings.

WHEN SHOULD WHEELS BE REMOVED?

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

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

TOE-IN

Front wheel toe-in is 1/8-inch to 3/8-inch.

TIRE SERVICE

TIRE INFLATION

It is important to maintain the proper tire pressure under all conditions. The life of rubber tires can be affected materially by both under- and overinflation.

UNDERINFLATION

This condition may cause the tire to slip on the rim and tear out valve stems or buckling of the sidewalls, fabric breaks, and uneven tire wear.



UNDER INFLATION



OVER INFLATION



(199) PROPER INFLATION

In plowing, because of the change in weight distribution, the furrow wheel tire usually requires more air than the landwheel tire. Observe the tire from the tractor seat under actual operating conditions. If the tire buckles or wrinkles, increase the tire pressure. (See tire inflation recommendations.)

OVERINFLATION

Overinflation reduces traction, increases wheel slippage, and results in excessive tread wear and fuel consumption.

RUBBER TIRE INFLATION CHART

Rear Tires

Tire	Ply	Inflation Pressure Without Added Wheel Weight	Maximum Permissible Additional Weight per Wheel at Maximum Recommended Inflation Pressure
13-26	6	12 lbs.	
13-26	6	18 lbs.	1000 lbs.
14-26	6 Low Profile	12 lbs.	1000 lbs.
15-26	6 Cane and Rice	12 lbs.	1000 lbs.

When plowing, increase pressure in furrow rear tire 4 lbs.

Front Tires—All Sizes

6.00-16	4 Ply	28 lbs.
7.50-16	6 Ply	36 lbs.

TIRE SERVICE

CHECKING AIR PRESSURE

Air pressure should be checked every two or three weeks and should not be allowed to drop below the recommendations as shown in the chart on page 46. A special low-pressure gauge, with one pound graduations, is necessary in order to get accurate inflation. This gauge should be checked occasionally for accuracy. It may get out of order requiring a correction in the reading.

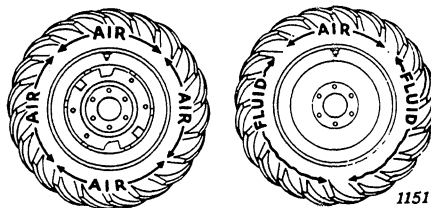
A special air-water gauge should be secured for testing tires filled with water or calcium chloride solution.

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

In the third column of the rubber tire inflation chart are shown minimum air pressures. If additional traction is required, add weight to the wheels. Lowering the air pressure will make little difference in the traction and may ruin the tires.

WEIGHTING REAR WHEELS

Rear wheel equipped with removable cast-iron wheel weight



Tractor tire with liquid in tube as wheel weight

WHY USE WHEEL WEIGHTS?

Power can be lost in the field 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 such as planting, harrowing, or cultivating, or when heavy equipment is mounted on the tractor.

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 and 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.)

TIRE 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.

In plowing, best results are generally obtained by taking one weight from the furrow wheel and adding it to the landwheel. The tilting of the tractor in 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 landwheel, there is more uniform distribution of weight over the drive wheels, which is important.

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.

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.

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.



IT MAY BE FUN FOR YOU-BUT
IT'S NOT FUN FOR YOUR TRACTOR
AND TIRES.

DRAWBAR SERVICE

If your tires frequently run over objects which would pierce them, such as citrus tree thorns, cactus, and certain kinds of stubble, a heavy inner liner should be used between the tire and the tube. This will prevent most punctures. Get inner liners from a tire dealer.

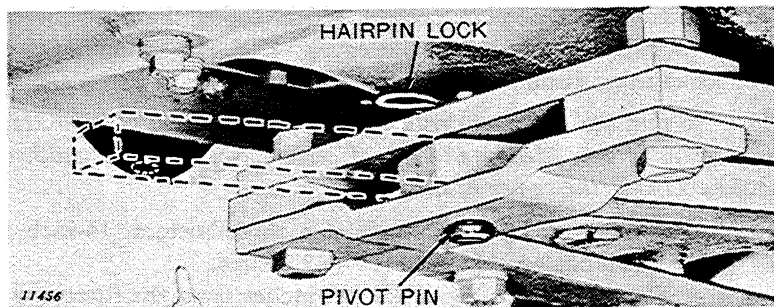
INSPECTING TIRES

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.

DRAWBAR

All drawn equipment should be hitched only to the drawbar.

The drawbar is provided with three main adjustments which, together with adjustments provided on the plow or other drawn implements, 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.



Drawbar Extension

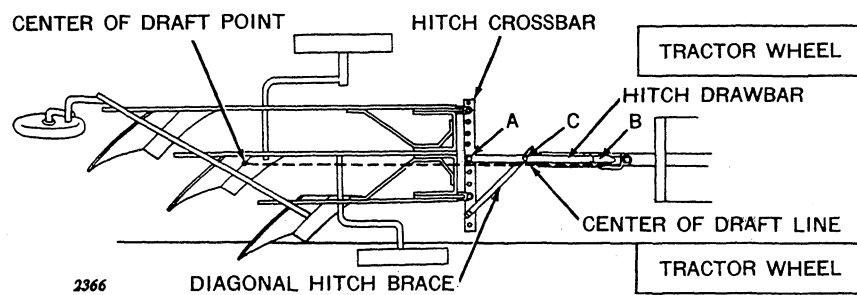
The swinging drawbar is provided with lengthwise adjustments so that the drawn implement can be hitched closer to or farther from the tractor.

To make this adjustment, remove hairpin lock. Remove pivot pin and move swinging drawbar to desired position. Replace pivot pin and hairpin lock.

Tractors are shipped from the factory with the swinging drawbar in the short position. This position is recommended for heavy vertical drawbar loads such as sprayers, fertilizer distributors, etc. For plowing the tractor drawbar should be in the short position.

For power shaft driven loads and general farm implements, the drawbar should be in the long position.

DRAWBAR SERVICE



Horizontal Drawbar Adjustment

HORIZONTAL ADJUSTMENT

The crossbar upon which the swinging drawbar swings has a series of holes which are used for locking the swinging drawbar in any one of a number of fixed horizontal positions. Bolts are provided in the holes on both sides of the swinging drawbar to hold it in place.

For plowing, locate the center of draft (see example below) and attach tractor to plow with a correct line of draft. (See above illustration.) The plow drawbar from "A" to "B" should be about parallel with the line of travel. If the front bottom does not cut correct width, swing the drawbar of the plow a little to right or left by adjusting at "C." The swinging drawbar should be locked in position for plowing.

NOTE: To find the center of draft: First, find total cut of plow. Half of total cut is center of cut. Measure to left of center of cut $1/4$ the width of cut of one bottom. This is the center of draft.

Example: To find the center of draft of a three-bottom, 14-inch plow:

Total cut of plow = $3 \times 14 = 42$ inches.

Center of cut = $1/2$ of $42 = 21$ inches from the furrow wall.

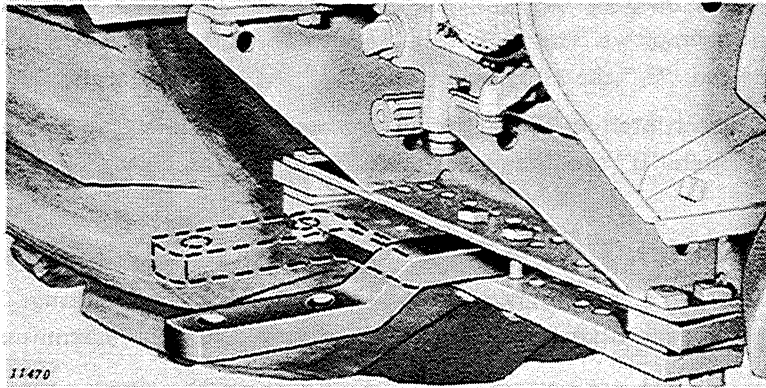
One-fourth of the cutting width of one bottom = $1/4$ of $14 = 3\frac{1}{2}$ inches.

Center of draft = $21 + 3\frac{1}{2} = 24\frac{1}{2}$ inches, measured to the left from the furrow wall to the junction of the share and moldboard. The measurement must be made at right angles to the furrow wall.

When power shaft is used, set swinging drawbar in line vertically with center of power shaft and lock in position by tightening drawbar locking bolts. The drawbar height should be adjusted so that the hitch hole is about 6 inches below the power shaft center.

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

DRAWBAR SERVICE

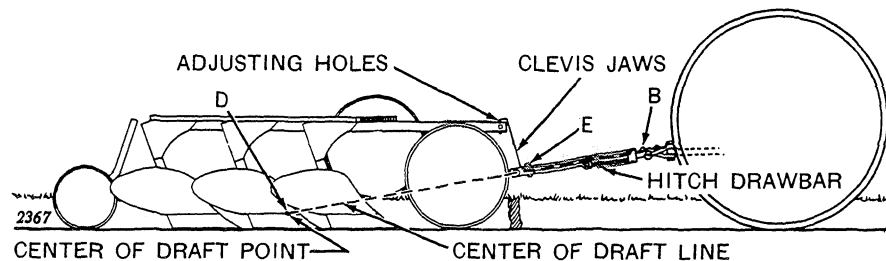


Vertical Drawbar Adjustment

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. If necessary, swinging drawbar can be turned over for adjustment.

If the tractor drawbar at "B" is placed too high, the pull of the drawn implement unbalances the tractor pulling down on rear end and up on front which causes difficult steering. *This frequently occurs when plowing uphill and, under these conditions, the tractor drawbar should be lowered.*



Vertical Drawbar Adjustment

If the tractor drawbar is too low, it tends to raise the rear wheels causing wheel slippage and loss of power at the drawbar. This frequently occurs when drawing equipment with higher hitch points than the tractor drawbar. The tractor drawbar should be raised to secure traction.

BATTERY SERVICE

The figure on page 51 illustrates the correct vertical hitch adjustment for tractor-drawn plows. The hitch is in line with line of draft as shown by dotted line between "B," the hitch point, and "D," the center of draft.

The correct hitch at "E" is the place where "E" is in a true line between point of hitch "B" and the center of draft "D" on the plow.

STARTING AND LIGHTING EQUIPMENT

Your tractor is equipped with electric starting and lighting. Follow the simple precautions and service operations below for maximum satisfaction.

THE STORAGE BATTERIES

The batteries are used for storing chemical energy which is converted into electrical energy whenever you demand the use of the starting motor or lights. For the batteries to continually perform these functions, it is necessary that current withdrawals be replaced by current from the generator.

When replacing the batteries, use two 6-volt batteries having not less than 15 plates, with the following over-all dimensions which are maximum, 9-1/16 inches long, 7-1/16 inches wide, 9-1/8 inches high over terminals.

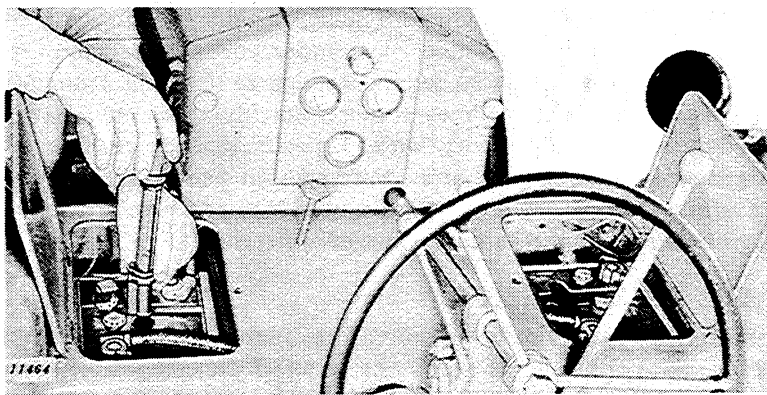
Insist on a heavy-duty type battery with a rubber case and "anti-leak" battery caps.

Battery life will depend upon how conscientiously you adhere to the following suggestions.

CLEANING BATTERIES

At least once every 120 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 up with a stiff brush and then apply a solution consisting of 1/4 pound of soda added to one quart of water. Then flush the outside of batteries with clear water. After cleaning, 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 greatly aid in retarding the accumulation of corrosion.

BATTERY SERVICE



Taking Hydrometer Reading of Battery

CHECKING WATER LEVEL

Check the electrolyte (acid and water solution) in the batteries every 120 hours or 30 days for proper level. If the electrolyte is low, add distilled water or any water that you would be willing to drink, until the level recommended is reached. The electrolyte, however, should never be permitted 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.

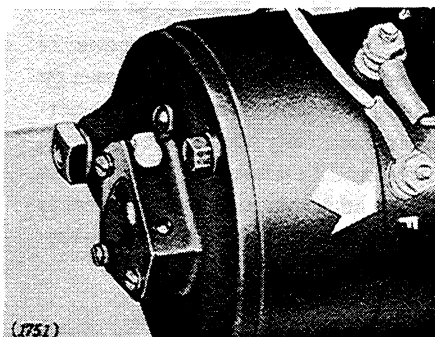
CHECKING SPECIFIC GRAVITY

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 minutes—permitting the water and electrolyte to mix—then check. Specific gravity should not go below 1.225 which is half-charge. When fully-charged, the reading will be 1.240 to 1.255.

COLD WEATHER OPERATION

If the tractor is not used enough in cold weather to maintain specific gravity of the electrolyte above half-charge, the batteries should be removed to a cool place (above freezing) and should be checked and recharged every thirty days to prevent damage to the plates.

CAUTION: If necessary to operate your magneto-equipped tractor without the batteries, remove the field wire from the generator terminal marked "F" on the generator frame; otherwise, the generator will be damaged.



Generator

BATTERY AND GENERATOR SERVICE

Do not place batteries on a concrete floor, as cold concrete tends to draw strength from the battery. Where the temperature drops below freezing, precautions should be taken to avoid damage to the cells from freezing. A badly discharged battery freezes more quickly than one that is well-charged. For example, a battery with a specific gravity reading of 1.175 (discharged) will freeze at 4°F., and a battery with a specific gravity reading of 1.255 (fully-charged) will not freeze until temperature reaches -65°F. Freezing weather will not damage charged batteries.

BATTERY INSTALLATION

The batteries should not be permitted to bounce around in the battery compartments as this will jar active material off the cell plates, shortening the life of the battery. Neither should the battery hold-down brackets be tightened too tight as this will buckle the battery case causing the cell plates to crack.

CAUTION: When working with batteries, remember that all the exposed metal parts are "alive."

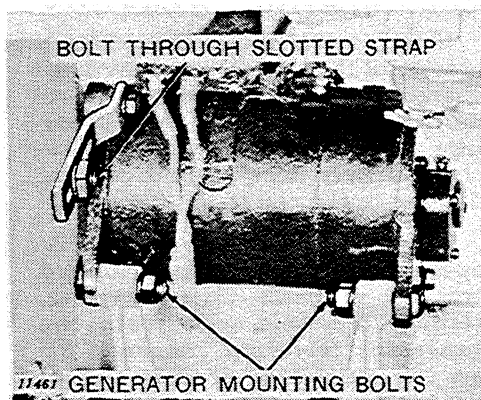
DANGER CONNECTED WITH BATTERY

Avoid laying a tool or wire across the terminals as a spark or short-circuit will result. All sparks or open flames must be kept away from the batteries as the gas given off by the electrolyte is highly inflammable. If electrolyte is spilled on clothing, damage will result if diluted ammonia or some other counteracting agent is not applied immediately to affected parts.

CAUTION: Whenever adjustments are made on the tractor engine, remove the spark plug cable from spark plugs and battery ground cables to prevent accidental starting.

THE ELECTRIC GENERATOR

The generator is a means of converting mechanical energy into electrical energy. The generator used on your tractor is belt-driven. The charging rate, set at maximum inside the generator, is controlled by a voltage regulator.



Generator Mounting Bolts and Strap for Belt Adjustment

GENERATOR SERVICE

The purpose of the generator is to supply current for lights and keep the battery in a charged condition by replacing in the battery the energy consumed by the starting motor in starting.

If at any time you find it necessary to operate your magneto-equipped tractor without the battery, remove the field wire from generator terminal marked "F" on generator frame or slip off the generator belt and wire it back against the fan shaft. If generator runs without the battery, excessive voltage will build up in the generator causing damage to the generator windings.

ADJUSTING DRIVE BELT TENSION

To adjust belt tension, rotate generator drive pulley until all slack in the belt is on top. Loosen nut on bolt through slotted strap and two mounting bolt nuts. Move generator out or in until belt is adjusted with 1-inch up and down movement at the center of the belt between the two pulleys. After tension is adjusted, tighten nuts. To install a new generator belt, loosen generator and slip belt over fan blades and onto generator and generator drive pulleys. Adjust belt as mentioned above.

Care must be taken that the generator pulley is properly aligned with the drive pulley.

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

For generator lubrication, see page 27.

VOLTAGE REGULATOR

A voltage regulator is used in conjunction with the generator to prevent overcharging the battery.

The rate of generator charge shown on the ammeter will depend upon the amount of charge in the battery. With a partially-discharged battery, the rate shown will be higher than it will be with a fully-charged battery.

If the generator fails to keep the battery charged see your John Deere serviceman for correction.

STARTING MOTOR SERVICE

THE ELECTRIC STARTING MOTOR

The starting 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 battery whenever the starting motor is used. As this drain is heavy on the battery and creates considerable heat in the cranking motor, it is advisable to limit the length of time the cranking motor is used to 1/2 minute. A two minute rest period is then recommended to permit time for the electrolyte to again work on the active material of each plate, restoring the battery to a more satisfactory charge. This rest period will also allow the heat to escape from the starting motor.

IF STARTING MOTOR FAILS

If starting motor fails to function when the starting switch is operated, a complete inspection should be made as follows:

See if the battery has a high enough charge.

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

The starting motor does not require lubrication.

SAFETY!!

**Tractor should not be started
for a few minutes after gasoline
has been spilled accidentally.**

LIGHT BULBS

Tractor lights require 12-16 volt, 32 candle power, single contact type bulbs.

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.

*

When stopping the engine, shut off the fuel control valve and then drain the carburetor.

*

Avoid over-choking in starting.

*

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

*

Be sure oil gauge registers immediately after engine starts.

*

Avoid clashing gears in 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 magneto breaker points.

*

Storage batteries should be inspected every 120 hours or 30 days. Check specific gravity and solution level according to instructions on pages 52 and 53.

*

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

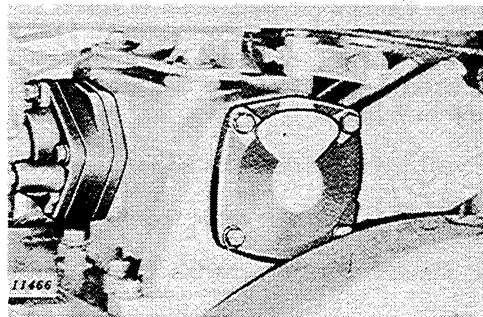
*

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, remove the spark plug cable from spark plugs and battery ground cable to prevent accidental starting.

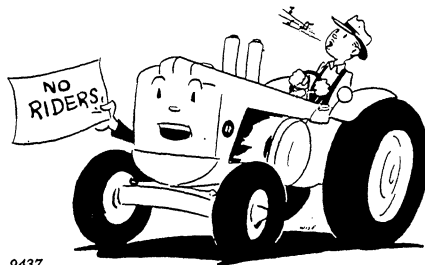
CAUTION: Do not tighten the cap screws or remove the two covers as shown in the figure at right because the position of these two covers controls gear adjustments inside the governor.



SAFETY SUGGESTIONS

According to safety authorities, agriculture is one of the most hazardous of all industries. More farmers were killed by accident during the last year on record than construction workers, miners, or factory workers. Careless use of the tractor and other farm machinery causes 29 out of every 100 farm accidents. The following rules are based on a study of thousands of farm accidents and, if followed, will make your farm a safer place on which to live and work. Study these rules carefully. Follow them yourself 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.



9437

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

*
The rate of tractor travel on hill-sides 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 idling. Be sure that there is no steam pressure back of the radiator cap to cause scalding when cap is removed.

*
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.

*
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.



(1683)

*
All women operators should wear trousers or slacks.

*
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.

SAFETY SUGGESTIONS

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

*

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 to low speed before turning quickly or apply individual brakes. Drive slowly over rough ground.

*

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.

*

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

*

In hitching a drawn implement to the tractor, back the tractor past the clevis. Then remove 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.

*

Finally, remember this: An accident is usually caused by someone's carelessness, neglect, or oversight.

TRACTOR DIFFICULTIES

HARD TO START. WILL NOT START.

Possible Cause

No gasoline in starting tank.
Stale gasoline in starting tank.
Distillate or tractor fuel left in carburetor.
No gasoline to carburetor.

Water in fuel.
No spark.

Poor compression.

Water in cylinder.

Possible Remedy

Fill with fresh gasoline.
Drain and fill with fresh gasoline.
Drain carburetor and fill with fresh gasoline.
Clean gasoline tank screen and fuel lines.
Drain fuel. Clean plugs.
See "Ignition System." Pages 34 to 38.
Leaky valves. Worn or stuck rings. Call serviceman.
Leaking head gasket. Have serviceman check.

ENGINE RUNS IRREGULARLY

Improper carburetor setting.

Improper spark plug spacing.
Irregular spark.

Irregular governor action.
Improper carburetor linkage.
Worn throttle shaft bushing.
Governor to carburetor linkage binding.

See "Adjusting the Carburetor." Page 33.
Space spark plugs at .030-inch.
Dirty points. See "Distributor." Page 35.
Have serviceman check.
Have serviceman check.
Have serviceman check and replace.
Clean and relieve bind.

LACK OF POWER

Throttle not wide open.
Carburetor adjusted too lean.

Unsatisfactory fuel.
Engine not up to temperature.

Open throttle.
Adjust. See "Adjusting the Carburetor." Page 33.
Change fuels.
Close shutter and operate on gasoline until engine temperature is 180°F.

TRACTOR DIFFICULTIES

LACK OF POWER (Continued)

<i>Possible Cause</i>	<i>Possible Remedy</i>
Air cleaner dirty or obstructed.	Clean cup and inspect filter pack. Wash out with distillate or kerosene if clogged.
Obstruction in fuel system.	See "Fuel System." Pages 32 and 33.
Engine speed too low.	Have serviceman check and set speed.
Ignition timed too late.	See "Installing Magneto or Distributor on Tractor." Pages 34 to 38.
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 recommended for engine crankcase.
Crankcase oil too heavy.	See "Weight of Oil." Page 23.
Engine knocks excessively.	Using fuel with too low an octane. Change fuel.
Engine overheating.	See that shutter 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 instruction book 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 Magneto or Distributor on Tractor." Pages 34 to 38.
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.
Worn bearings, bushings, etc.	Call serviceman.

TRACTOR DIFFICULTIES

ENGINE OIL PRESSURE TOO HIGH OR TOO LOW

<i>Possible Cause</i>	<i>Possible Remedy</i>
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 23.
Pressure regulating valve stuck.	Have serviceman check.
Bearings worn and loose.	Have serviceman adjust.

ENGINE USES TOO MUCH FUEL

Improper carburetor adjustment.	See "Adjusting the Carburetor." Page 33.
Float level too high.	Have serviceman adjust.
Engine not operated up to proper temperature.	Keep All-Fuel engines above 190°F. and gasoline engines 180°F.
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.	Have serviceman check and set.
Poor compression.	Have serviceman check valves and rings.

SPARK PLUG FOULING

Low engine temperature.	Keep All-Fuel engines above 190°F. and gasoline engines 180°F.
Too heavy a fuel.	Change to more suitable fuel.
Mixed fuel.	Keep All-Fuel engines above 190°F. and gasoline engines 180°F.
Wrong heat range plug.	See "Spark Plug." Page 34.
Piston rings worn.	Have serviceman replace rings.

BRAKES NOT EFFECTIVE

Improperly adjusted.	See "Brakes." Page 42.
Overlubricated.	Have service man remove and clean out.
Brake lining worn.	Have serviceman replace.

TRACTOR DIFFICULTIES

BRAKES NOT EFFECTIVE (Continued)

<i>Possible Cause</i>	<i>Possible Remedy</i>
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." Page 42.
Lining worn.	Have serviceman replace.

POWR-TROL WILL NOT OPERATE

Power shaft clutch not engaged.	Engage clutch.
Low oil level.	See "Powr-Trol" (60-Hour Service). Page 27.
Overloaded.	Adjust auxiliary springs on equipment.
Piston rings defective in cylinder.	Have serviceman check and correct.

POWR-TROL SLOW RAISE OR LOWER NOT OPERATING PROPERLY

Slow action of cylinder can be caused by the accumulation of dirt on the flat spot of inner check valve.	Have serviceman check and correct.
--	------------------------------------

POWR-TROL WILL NOT HOLD IMPLEMENT IN RAISED POSITION

Inner or outer check valves leaking.	Have serviceman check and correct.
Piston rings leaking.	Have serviceman check and correct.

TRACTOR DIFFICULTIES

POWR-TROL OVERHEATING

<i>Possible Cause</i>	<i>Possible Remedy</i>
Holding lever in either raising or lowering position after piston has reached limit of travel.	Release lever after reaching desired position.
Not enough oil.	See "Power-Trol" (60-Hour Service). Page 27.

POWR-TROL LOSING OIL

Leaky gaskets or oil seals.	Have serviceman replace.
-----------------------------	--------------------------

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.

If a parts list for this tractor is desired, your John Deere dealer can secure one for you.

Always give your John Deere dealer the serial number of tractor, Powr-Trol, and magneto or distributor when ordering parts.

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.

*

The tractor should be cleaned thoroughly and stored in a dry place.

*

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

*

All water should be drained 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.

*

All fuels should be thoroughly drained out and the drain valve left open. **Caution:** If fuel is allowed to stand in tanks, fuel lines, and carburetors, a gummy substance will form in the carburetor jets and passage and will cause plenty of trouble.

*

With the engine cold, put one-half pint of good engine oil in each cylinder through spark plug holes. Replace plugs and turn engine over several times to work the oil in between the piston and the cylinder.

*

Tractors with rubber tires should be relieved of all weight 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 53.

*

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.

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MEMORANDA

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



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.

