

COLD WEATHER STARTING**ADDITIONAL BATTERIES**

Starting the gasoline engine in cold weather can be made easier by connecting an additional 12-volt battery in parallel with the 12-volt battery on the tractor.

On diesel tractors, connect two additional 12-volt booster batteries in parallel with the two 12-volt batteries on the tractor.

Use jumper cables to connect the positive (+) terminal of the booster battery to the positive (+) terminal of the tractor battery, and the negative (-) terminal of the booster battery to the negative (-) terminal of the tractor battery.

CRANKCASE OIL HEATER

The tractor is designed to permit use of a 240-watt electrical crankcase oil heater. The heater warms the oil in the crankcase to facilitate engine starting.

To install the crankcase oil heater, remove the heater plug from the crankcase and drain the crankcase oil. Apply thread paste to the threads of the heater, insert the heater in the opening and refill the crankcase. When the heater is to be put into use, remove the protective cap, attach the cord, and plug the cord into any convenient 115-volt electrical source with suitable ground. The connector on the cord has a release lever to lock the connector and heater terminal connection. Press the release lever when connecting the heater cord.

BATTERY WARMER

This warmer is used to warm the battery, permitting it to furnish electrical current to the starter efficiently in cold weather.

Place the battery warmer in the battery compartment and plug the cord from the heater into any 115-volt electrical source. It may be necessary to disconnect and connect the battery before installation of the warmer. Be sure to connect the battery cables properly after installing the warmer.

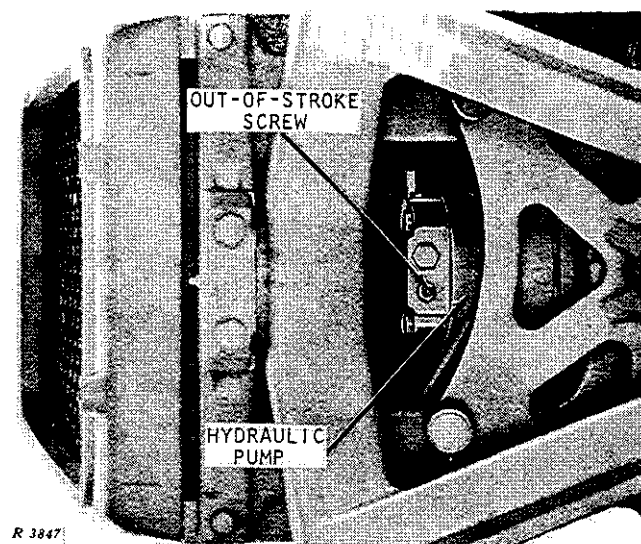
HYDRAULIC PUMP (OUT OF STROKE)

Fig. 10-10-2—Hydraulic Pump Out-of-stroke screw

As an additional aid to cold weather starting, the hydraulic pump can be adjusted out of stroke. Figure 10-10-2 shows the out-of-stroke screw for this operation. Turn the shut-off screw in (clockwise) a few turns with a screwdriver. Then turn the screw in by hand until resistance is felt. With a screwdriver, turn the screw in one more turn. The hydraulic pump is now out of stroke. After the engine has started, use a screwdriver to back the shut-off screw all the way out (counterclockwise). The pump will now build up pressure.

NOTE: Oil will leak past the shut-off screw if it is not backed all the way out against the internal stop.

COLD WEATHER STARTING FLUID ADAPTER (DIESEL TRACTOR)

The diesel tractor is equipped with an adapter (Fig. 10-10-3) which is used to inject atomized starting fluid into the engine air intake system. The starting fluid, which aids fuel combustion, is provided in pressurized cans.



Fig. 10-10-3—Cold Weather Starting Fluid Adapter

To install the can of starting fluid, remove the cap from the adapter, position the outlet tube of the can on the adapter pilot, and push up gently on the can until it snaps into place.

To inject starting fluid, push the can up 1/16-inch further while turning the key switch to start the engine. Relax pressure on the can between "shots" of starting fluid. Stop injecting the fluid after the engine starts. If the engine starts to die during the first 5 minutes of operation, inject starting fluid to smooth out engine operation. Remove the can from the adapter when the engine is operating satisfactorily.

NOTE: Install the cap on the adapter when it is not in use. This prevents dust from being drawn into the engine air intake system.

STOPPING THE ENGINE

ALL ENGINES

Operate the engine at 600 rpm for at least one or two minutes before stopping. This will allow the engine to cool off gradually, prevent-

ing extreme contraction of parts, possible back-firing, and coking of lubricating oil on piston rings, valve guides, etc.

NOTE: Never drain water immediately after the engine is stopped.

GASOLINE ENGINE

Set the hand throttle to run the engine at 450 rpm (pull out on the hand throttle knob and push the throttle all the way up) and allow the engine to run for at least 1/2 minute. Without moving the hand throttle, turn the key switch to the off position.

DIESEL ENGINE

Set the hand throttle lever in the slow idle position (600 rpm) and allow the engine to idle for one or two minutes. This permits it to cool gradually. Pull out on the engine stop knob. This causes the engine to stop after a few revolutions. Turn the key switch off to prevent battery discharge, shutting off electrical current to the fuel gauge, generator indicator light, and oil pressure indicator light.

ENGINE BREAK-IN

To be sure that all bearing surfaces will be properly lubricated during initial operation, break in the tractor engine as follows:

For the first 20 hours of service, the tractor engine should be operated at rated speed (pull hand throttle down to the first stop) with loads up to one-half of its capacity. A gasoline engine should operate between 2050 rpm and 2100 rpm, and a diesel engine should operate between 2000 and 2050 rpm at half load.

After the 20-hour break-in period, drain the oil from the crankcase, replace the crankcase oil filter, and fill the crankcase with new oil of the proper viscosity. The tractor is then ready for normal operation.

NOTE: Observe the engine coolant temperature carefully during the break-in period. If the temperature rises above the normal operating range, shift to a lower gear to reduce the load on the engine.

OPERATING CONTROLS

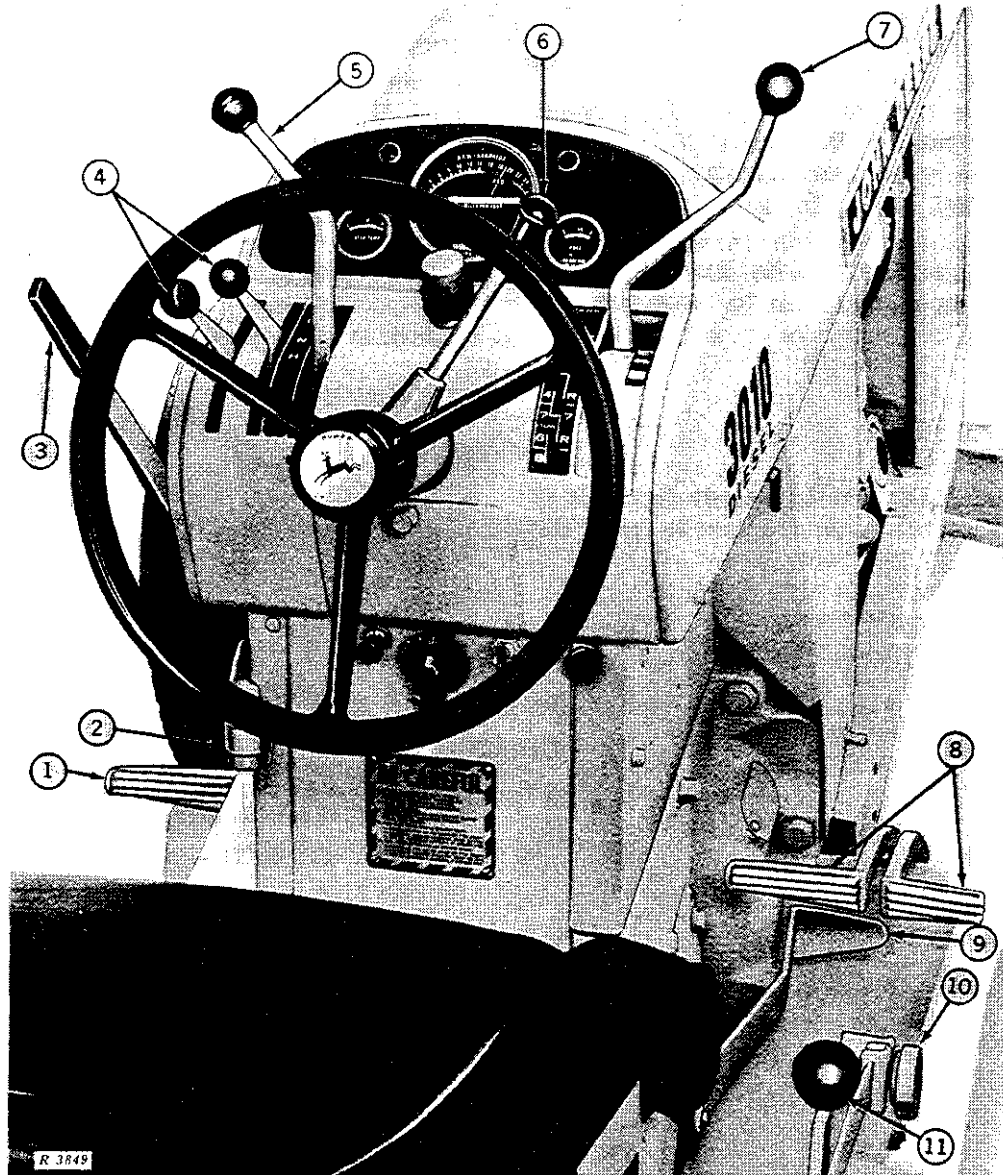
Operating controls on gasoline and diesel engine tractors are identical (Fig. 10-10-4). The clutch pedal, brake pedals, shift lever, PTO clutch lever, rockshaft control levers, remote hydraulic cylinder operating levers, hand throttle, and foot throttle are located in the same position on all tractors.

OPERATING THE TRACTOR

TRACTOR WARM-UP

Always be sure the tractor is warmed up properly before operating under a full load.

A good way to do this is first to idle the engine at about 1500 rpm for 5 minutes and then operate it at about 1900 rpm for another 5 minutes.



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|--|---|
| 1 - Clutch pedal | 7 - Right-hand shift lever |
| 2 - Ether starting fluid adapter | 8 - Brake pedals |
| 3 - Power take-off clutch lever | 9 - Foot throttle |
| 4 - Remote hydraulic cylinder operating levers | 10 - Rockshaft control lever depth stop |
| 5 - Left-hand shift lever | 11 - Rockshaft control lever |
| 6 - Hand throttle | |

Fig. 10-10-4—Operating Controls

In cold weather it is also good practice to operate the tractor for the first 30 minutes in a lower gear than is normally required for the load. This gives the oil a chance to circulate freely and prevents undue wear on engine or transmission parts.

ENGINE SPEEDS

The tractor engine is designed to operate at working speeds ranging from 1500 to 2200 rpm. These are variable governed speeds, and the engine can be operated at any speed between the two extremes to meet various working conditions.

The rated speed of the engine is 1900 rpm. Use this speed when operating the power take-off or belt pulley. Slow idle is 600 rpm.

In addition, engine speeds may be varied between 2200 and 2500 rpm to save you time when traveling on highways or on smooth-surfaced roads.

Using Hand Throttle

Use the hand throttle to select slow idle or any of the variable governed speeds from 1500 to 2200 rpm (Fig. 10-10-5).

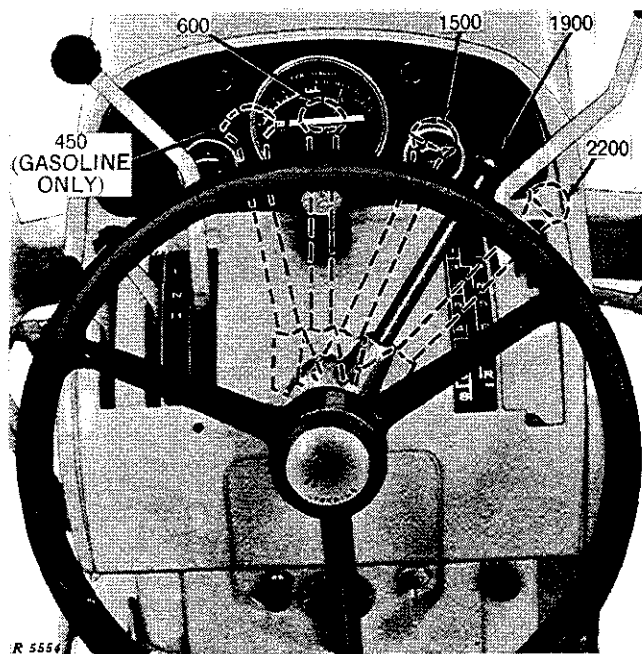


Fig. 10-10-5—Range of Hand Throttle Positions

Push the lever upward as far as it will go to obtain slow idle. To obtain the 1900 rpm rated engine speed, pull the lever downward to the first stop. Placing the lever halfway between slow idle and 1900 rpm gives the 1500 rpm speed. Engine speeds between 1500 and 1900 rpm may be selected by moving the lever between these two positions.

To obtain working speeds above 1900 rpm, pull out on the knob at the end of the hand throttle. With the knob pulled out, pull the throttle downward as far as it will go. This is the 2200 rpm position. Engine speeds between 1900 and 2200 rpm may be selected by moving the lever between these two positions.

Using Foot Throttle

The foot throttle is used to select engine transport speeds from 2200 to 2500 rpm or to change engine speed momentarily.

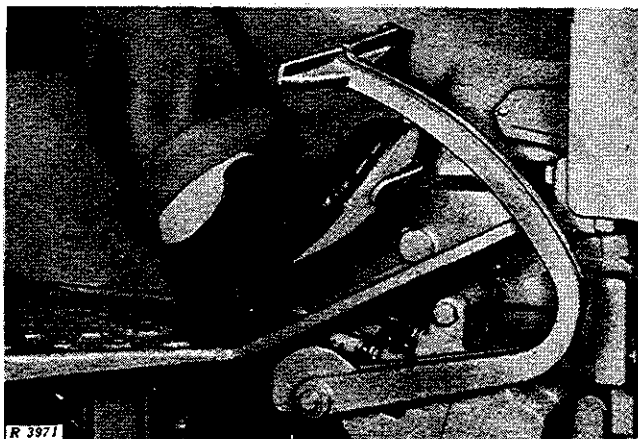


Fig. 10-10-6—Using the Foot Throttle

Press down on the foot throttle to speed up the engine (Fig. 10-10-6). When the pedal is pushed down as far as it will go, the engine operates at 2500 rpm.

The foot throttle operates independent of the hand throttle. When it is not in use, engine speed is determined by the setting of the hand throttle.

NOTE: The foot throttle is not intended as a means of increasing the normal working speed of the engine.

SELECTING GROUND SPEED

The tractor has 8 forward speeds and 3 reverse speeds for each of the throttle positions that may be used. These combinations enable the operator to balance speed and power for maximum economy and allow him flexibility to meet varying working conditions. For example, for a given ground speed the operator may choose to work in a low gear at high engine speed for maximum reserve power or in a higher gear at a lower engine speed for maximum fuel economy.

Examples of the ground speeds at which the tractor will travel are shown in Group 15 of this section. Engine working speeds may be varied between 1500 rpm and 2200 rpm, and engine transport speeds may be varied up to 2500 rpm.

NOTE: Avoid overloading the tractor. Overloading causes undue strain on parts, eventually resulting in poor operation.

SHIFTING FROM NEUTRAL

Having determined the proper speed, depress the clutch pedal to disengage the clutch and move the shift lever from neutral to the slot for the gear desired.

Gradually release the clutch pedal to take up the load smoothly.

SHIFTING FROM ONE SPEED TO ANOTHER

The shift quadrant has four shift stations. Stations No. 1, 2, and 3 have two forward speeds and one reverse speed. Station No. 4 has two forward speeds only.

With the clutch pedal depressed, the transmission can be shifted with *either* shift lever from one forward speed to the other forward speed within the same station. For instance, you can shift between 1st and 3rd gears, 2nd and 5th gears, 4th and 7th gears, and 6th and 8th gears.

Either shift lever can also be used to shift from the highest forward speed in any station to the reverse speed in the same station.

To shift from one station to another, depress the clutch pedal, stop the tractor, and move the *right-hand* shift lever to neutral. Then shift from neutral to the new gear in the new station and gradually release the clutch pedal to engage the clutch.

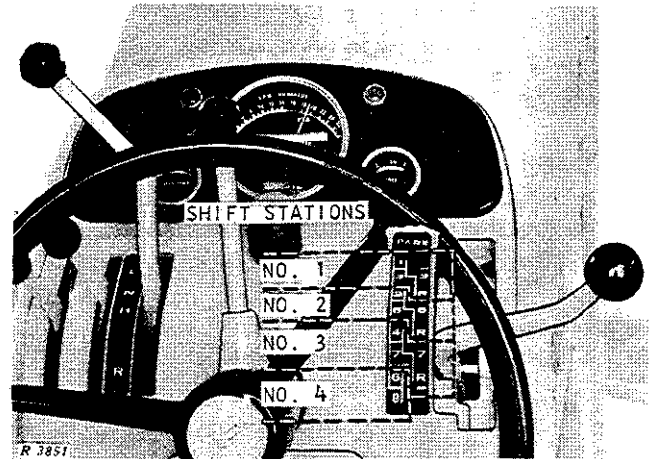


Fig. 10-10-7—Shift Lever in "TOW" Position in Quadrant

CAUTION: Stop the tractor before shifting from one gear to another within a station or when shifting from one station to another.

PARKING THE TRACTOR

When the tractor is stopped for parking, for holding it on an incline, or for holding it during PTO or belt work, move the shift lever as far as it will go forward from neutral to the "PARK" position.

CAUTION: Be sure the tractor is stopped before placing the shift lever in "PARK" position.

This automatically holds the tractor stationary. Shifting from "PARK" to neutral or to an operating gear releases the braking action.

TOWING THE TRACTOR

The shift quadrant on your tractor also has a "TOW" position. Whenever the tractor is to be towed, move the shift lever to this position. This will eliminate unnecessary wear of transmission parts when the tractor is being towed by another vehicle.

CAUTION: The tractor should never be towed at high speed. Always attach a tow bar or chain to the tractor frame.

HYDRAULIC SYSTEM

The John Deere hydraulic system is a constant pressure, closed center system.

Pressure and flow are maintained by a variable displacement, constant pressure pump driven by the engine crankshaft. Reservoir for the system is the transmission case and oil is carried through external steel pipes to each hydraulic function. All oil in the system is filtered through a full-flow filter.

POWER BRAKES

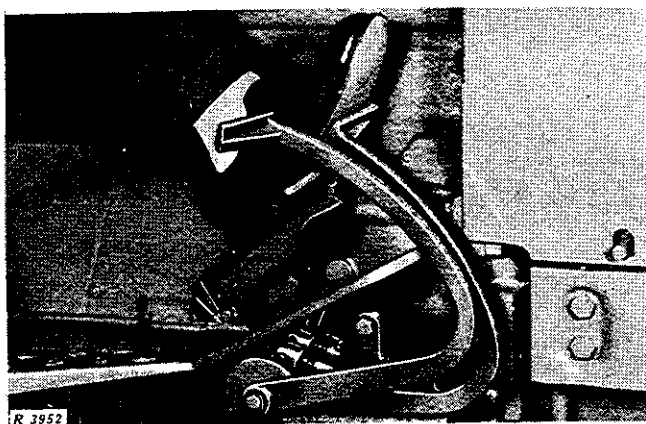


Fig. 10-10-8—Using Power Brakes to Help Make Sharp Left-Hand Turn

The tractor is equipped with fully hydraulic power brakes. The oil used in the transmission and hydraulic system operates the power brakes. A constant pressure of oil is maintained at all engine speeds. The two brake pedals may be applied individually to assist in making sharp turns (Fig. 10-10-8). They may also be applied together for slowing or stopping the tractor (Fig. 10-10-9).

POWER STEERING

The tractor is also equipped with fully hydraulic power steering and, like the power brakes, uses the same oil as the transmission and hydraulic system.

The power steering system consists of a valve, cylinders, and hydraulic pipes. The valve directs the flow of oil to and from the cylinders for either a right- or left-hand turn.

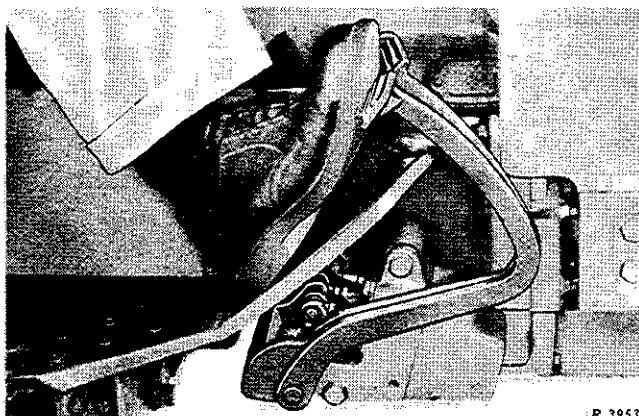


Fig. 10-10-9—Using Power Brakes to Stop Tractor

IMPLEMENT CONTROL SYSTEM

ROCKSHAFT

The tractor can be equipped with a rear rockshaft which can be used to raise, lower, and control a wide variety of integral implements and 3-point hitch tools.

The position of the rockshaft is in direct relation to the position of the rockshaft control lever (Fig. 10-10-10). Therefore, the rockshaft can be quickly moved through its full range of travel or "inched" to any position in between. The rockshaft can be operated whether the tractor is moving or standing still so long as the engine is running. Pushing the lever forward raises the rockshaft; pulling backward lowers it.

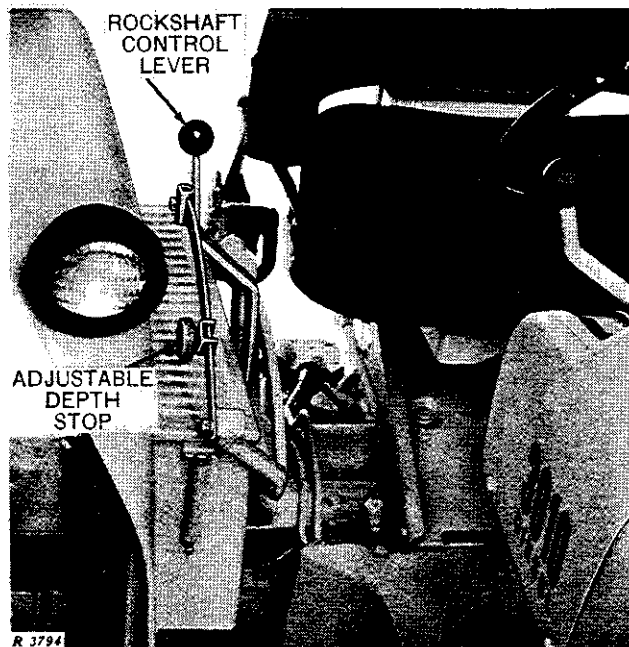


Fig. 10-10-10—Rockshaft Control Lever



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