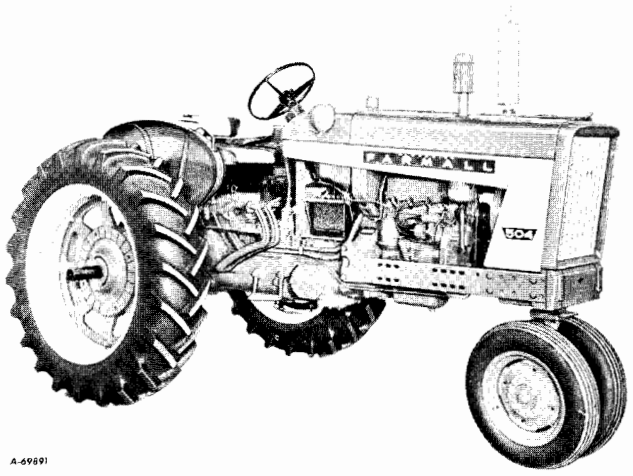
INTRODUCTION

Assembled in this manual are operation, lubrication, and maintenance instructions for the Farmall 504 Gasoline, LP Gas, and Diesel Tractors. This material has been prepared in detail in the hope that it will help you to better understand the correct care and efficient operation of your tractor.

Your International Harvester dealer has factory-trained servicemen, modern tools, and IH service parts to assure you of satisfactory tractor operation. To get the most out of your tractor, and to assure economical operation and top performance, your tractor should be inspected periodically by your International Harvester dealer's serviceman.

Depending upon your use of the tractor, these inspections should be performed as needed, or at least once a year, at which time a tune-up or other necessary service work should be performed. Proper pre-season maintenance will assure you of minimum lost time when your tractor is most needed.

Dealers are kept informed on the latest methods of servicing tractors. They carry stocks of IH parts, and are backed in every case by the full facilities of a nearby International Harvester district office and parts depot.



Illust. 3
Terms of location.

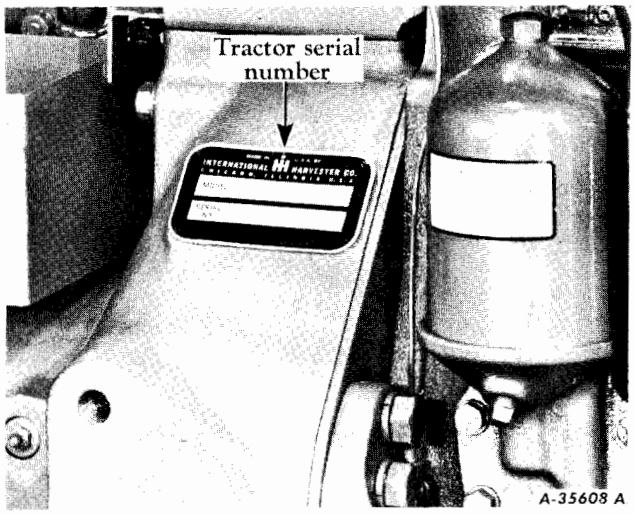
Throughout this manual the use of the terms LEFT, RIGHT, FRONT, and REAR must be understood to avoid confusion when following instructions. LEFT and RIGHT indicate the left and right sides of the tractor when facing forward in the driver's seat. Reference to FRONT indicates the radiator end of the tractor; to REAR the hitch end. **See Illust. 3.**

The illustrations in this manual are numbered to correspond with the pages on which they appear; for example, **Illusts. 3 and 3A are on page 3.**

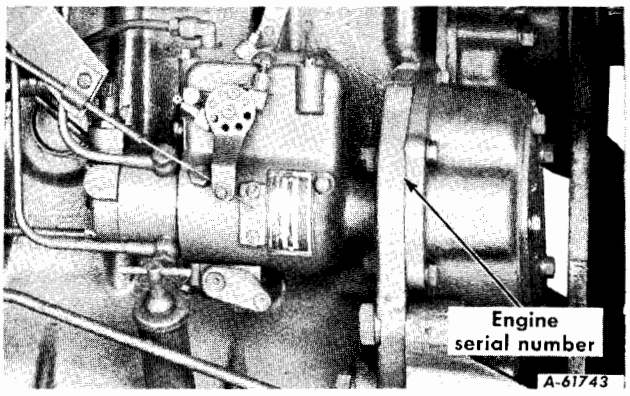
In order to provide a tractor equipped as nearly as possible to suit each customer's needs, a variety of extra equipment and accessories is available.

Where operating and maintaining instruction on these items is required, it is included in the instructions for operating or maintaining the tractor. Disregard the instructions for equipment not on your tractor.

On diesel engines, the engine serial number is stamped vertically on the right side of the engine mounting flange, approximately at the injection pump centerline. This serial number is preceded by the prefix D-188 which indicates it is a diesel engine with a 188-cubic-inch displacement. **See Illust. 3B.**



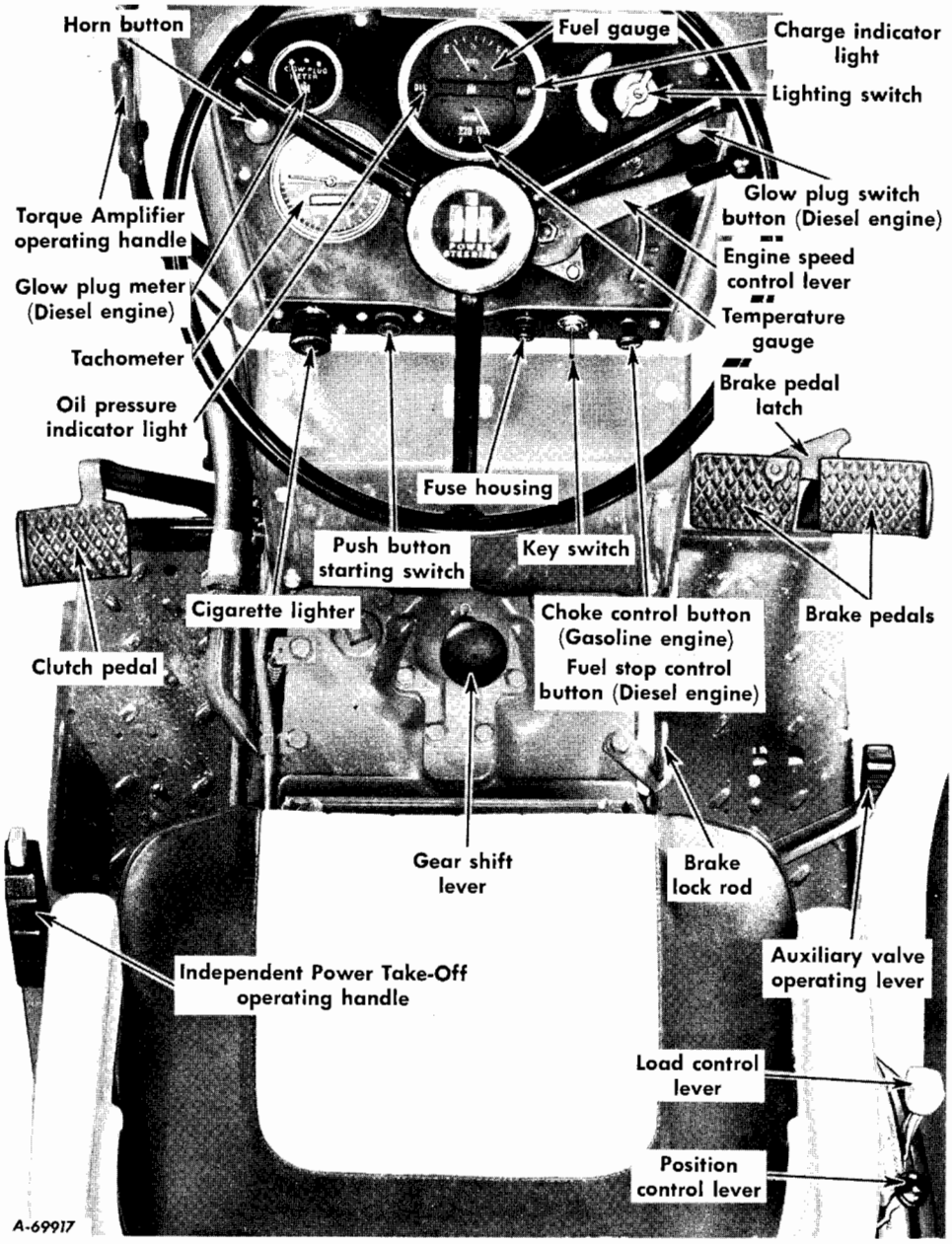
Illust. 3A
Location of the tractor serial number.



Illust. 3B
Location of diesel engine serial number.

DESCRIPTION

INSTRUMENTS AND CONTROLS



Illust. 6
Location of instruments and controls on the gasoline engine.
(For LP Gas Tractors, see Illust. 9).

BRAKE PEDALS

These pedals are used to stop the tractor to hold the tractor in a stationary position, or to assist in making sharp turns as outlined below.

To stop the tractor, depress both pedals at the same time. Before driving the tractor in high gear, always latch the pedals together.

To hold the tractor in a stationary position, latch the pedals together, depress them, and lock them in this depressed position by using the brake pedal lock.

BRAKE PEDALS - Continued

To assist in making a sharp turn, operate the pedals individually, depressing the pedal on the side toward which the turn is to be made.

The brake pedal latch (Illust. 6) is used to latch both brake pedals together, causing the brakes to operate simultaneously.

Caution! Always latch the brake pedals together when driving the tractor in high gear (fifth speed). To latch the pedals together, engage the latch in the back of the left pedal (Illust. 6) in the slot in the back of the right pedal. When the brake pedals are not latched together, the latch should rest in the slot in back of the left brake pedal.

The brake pedal lock rod (Illust. 6) is used to lock the brake pedals in the depressed position. This prevents the tractor from moving.

CLUTCH PEDAL

This pedal, when depressed all the way, disengages the engine from the transmission.

CHOKE CONTROL BUTTON (Gasoline Engine)

The choke control wire and button makes it possible to regulate the carburetor choke from the driver's seat. Pulling out on the choke control button closes the carburetor choke for starting the engine; pushing it in opens the choke.

FUEL STOP CONTROL BUTTON (Diesel Engine)

The fuel stop control button (Illust. 6) is used when starting or stopping the engine. Push the button in when starting the engine. Pull the button out when stopping the engine.

FUEL GAUGE (Gasoline and Diesel)

When the ignition switch is turned on, the fuel gauge indicates the level of the fuel in the fuel tank.

The fuel gauge will indicate fuel level in the fuel tank only when the key switch is in the "ON" position.

ENGINE SPEED CONTROL LEVER

This lever controls the speed of the engine and, when set in a given position, will maintain a uniform engine speed even though the engine load may vary.

When the lever is set at the top indicator point (LO) the engine speed is fully retarded. When the lever is at the lower indicator point the engine speed is fully advanced.

The minimum idle speed (hand throttle) for the gasoline engine is approximately 425 r.p.m. and for the diesel engine is approximately 700 r.p.m. with the engine speed control lever fully retarded. Never operate the engine at more than the regular governed speed. Excessive speeds are harmful. Refer to "Engine Speeds" on page 99.

GOVERNOR

The governor is set at the factory and should require no adjustment. Consult your International Harvester dealer if the governor does not function properly.

IGNITION SWITCH (Gasoline and LP Gas Engines)

A key-type ignition switch is located below the right side of the instrument panel and reservoir shroud. Turn the key clockwise to a horizontal position to turn on the ignition. The key cannot be removed when in this position.

Note: When the engine is not operating or the engine has stalled and the operator leaves the tractor, the key must be turned to the "off" position to prevent battery discharge.

KEY SWITCH (Diesel Engine)

A key-type switch is located below the right side of the instrument panel and reservoir shroud. Turn the key clockwise to a horizontal position to complete circuit between push button switch and battery. The key cannot be removed when in this position.

PUSH BUTTON SWITCH

Pushing the button in completes the electrical circuit between the battery and the cranking motor solenoid and causes the cranking motor pinion to engage the flywheel ring gear, thereby cranking the engine. Refer to page 14 for starting the gasoline engine; page 16 for the diesel engine.

CIGARETTE LIGHTER

Push the lighter to make electrical contact. When it pops back it is ready for use.

GLOW PLUG SWITCH BUTTON (Diesel Engine)

Pushing this button (Illust. 6) energizes the glow plugs to bring them up to igniting temperature. The glow plug meter indicates whether the glow plug system is working.

DESCRIPTION

LIGHTING SWITCH

The switch has four positions: "Off" position; "D" position for dim headlights, instrument lights, and a red taillight; "B" position for bright headlights, instrument lights, and a red taillight; and "R" position for bright headlights, instrument lights, and a white rear light. The red taillight should always be used when traveling on the highway at night or during times of poor visibility. The white rear light is for field use only and should not be used on the highway.

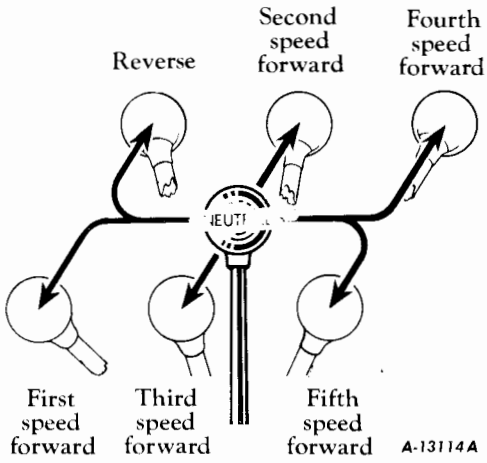
POSITION CONTROL AND LOAD CONTROL LEVERS

These levers are located on the quadrant (Illust. 6) and are used to operate the Three-Point Hitch. For instruction refer to pages 21 to 23.

AUXILIARY VALVE OPERATING LEVERS

The levers (Illust. 6) operate the auxiliary valves. They are used to raise (lever back), lower (lever forward), or provide float (with lever all the way forward).

GEARSHIFT LEVER



Illust. 8
Gearshift positions.

This lever is used to select the various gear ratios in the transmission. There are forward speeds and one reverse speed. See Illust. 8.

INDEPENDENT POWER TAKE-OFF AND BELT PULLEY OPERATING HANDLE

The same operating handle is used to engage or disengage the independent power take-off or belt pulley. See page 33 for independent power take-off or page 33 for belt pulley operating instructions.

TORQUE AMPLIFIER OPERATING HANDLE

The torque amplifier operating handle is used to engage or disengage the torque amplifier. See page 20 for operating instructions.

OIL PRESSURE INDICATOR LIGHT

This light (Illust. 6) indicates whether lubricating oil is circulating through the engine.

The oil pressure indicator light (Illust. 6) lights up as soon as the ignition key is turned on. If the light fails to come on, the bulb is burned out. Replace it with a new bulb before starting the engine. The light will go off a few seconds after starting (in cold weather the light may stay on a little longer until the lubricant starts to warm up.

If the light remains on after the engine is running, stop the engine at once and inspect the oil system to find the cause of failure. If unable to find the cause, consult your International Harvester dealer before operating the engine.

Always check the oil pressure light immediately after starting the engine.

Note: On tractors equipped with diesel engines the key switch must be left in the "ON" position while the engine is running so the light will function.

CHARGE INDICATOR LIGHT

This light (Illust. 6) indicates whether the generator is charging or the battery is discharging. The light will light up as soon as the ignition key is turned on. The light should go out a few seconds after the engine starts.

If the light fails to light up the bulb is burned out. Replace it with a new bulb before starting the engine.

If the light remains on after the engine is running a short time, investigate the cause to avoid completely discharging the battery and possible damage to the generator.

Note: On tractors equipped with diesel engines the key switch must be left in the "ON" position while the engine is running so the light will function.

TEMPERATURE GAUGE

This instrument (Illust. 6) indicates when the liquid in the cooling system is at the proper temperature for best engine operation. The indicator pointer should be a little past the 170 degree mark during normal operation depending on temperatures and tractor loads.

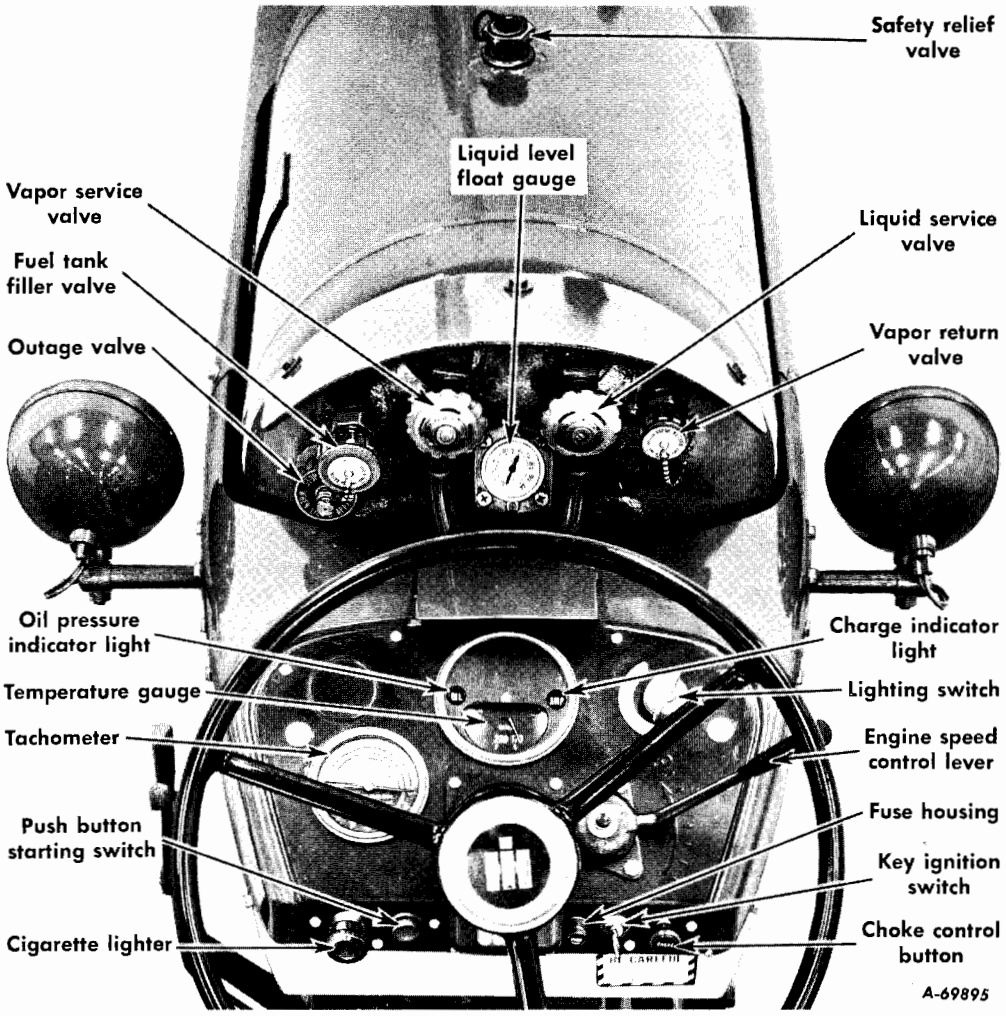
TACHOMETER

This instrument records engine operating hours at 2200 r.p.m. operation, shows normal tractor speeds in miles per hour in all forward gears, and indicates the engine r.p.m. which provides a means of setting the exact engine speed specified for power take-off operations.

A mark on the lower half of the dial indicates the recommended power take-off shaft speed.

Refer to the tables on page 99 for normal ground speeds according to tire sizes. Refer to "Power Take-Off Specifications" on page 100 for power take-off shaft speeds.

LP GAS TRACTORS



Illust. 9
Fuel system controls on Farmall 504 LP Gas Tractor.

DESCRIPTION

HOW THE LP GAS ENGINE DIFFERS FROMTHE GASOLINE ENGINE

The LP Gas engine develops approximately the same power as the gasoline engine.

Principal elements of this LP Gas fuel system include the fuel tank assembly with valves and gauges, pipes and connections, carburetor, fuel regulator, vaporizer unit, fuel filter, high compression pistons and cold manifold. These elements are specifically designed and installed to assure efficient, economical operation on LP Gas fuel as described below.

1. The Fuel tank is of heavy gauge welded steel construction complete with valves and gauges. This tank is hydrostatically tested to withstand a pressure of 500 pounds per square inch and has a working pressure of 312 pounds per square inch. A strong tank is necessary because the LP Gas fuel is stored in a liquid state under pressure, which varies with the temperature.

2. The regulator-vaporizer unit is supplied to change the liquid fuel at tank pressure to a dry gas at slightly below atmospheric pressure.

3. The carburetor is especially designed for LP Gas fuel and has an economizer for improved fuel economy under light loads.

In addition to the regular tractor instruments and controls, the Farmall 504 LP Gas Tractors are equipped with the following:

FUEL TANK FILLER VALVE

The filler valve serves as a connection for the transfer of liquid fuel from storage. The filler valve is spring-loaded and automatically closes when pressure from the transfer hose connection is released. The valve is equipped with a screw cap which keeps out dust and forms an additional seal against leakage after transfer of fuel is completed.

LIQUID LEVEL GAUGE

The liquid level gauge is a float type gauge which rotates a small bar magnet as the liquid level in the tank carries the float up or down. The motion of this magnet moves another bar magnet mounted on the external portion of the gauge. The external magnet forms the guage indicating needle. While these gauges are fairly accurate, some deviation will occur with various mixtures of butane-propane and because of the moving parts involved, the wear of certain parts affects the accuracy.

OUTAGE VALVE

The outage valve is used to determine when the fuel tank is filled to the maximum permitted level. It is also a positive check on the accuracy of the float type gauge. The outage valve is opened by turning the thumb screw counterclockwise, venting vapor from the tank through a small opening. The moment liquid is ejected from the valve, the maximum permitted filling level has been reached. The filling operation should be stopped and the outage valve closed. The thumb screw is retained with a keeper ring to prevent its complete removal in normal use.

VAPOR RETURN VALVE

The vapor return valve is used to connect the vapor space in the tractor-tank with the vapor space in the storage tank. This equalizes the pressure in the two tanks, permitting a more effortless transfer hose disconnection. A screw cap (with attached chain) is also provided to exclude dirt and as an added seal against leakage after fuel transfer is completed.

VAPOR AND LIQUID SERVICE VALVES

Internal tank piping delivers vapor from the top of the tank to the vapor service valve. Liquid from the bottom of the tank is delivered to the liquid service valve. External tubing connects both valves to the inlet port of the fuel filter.

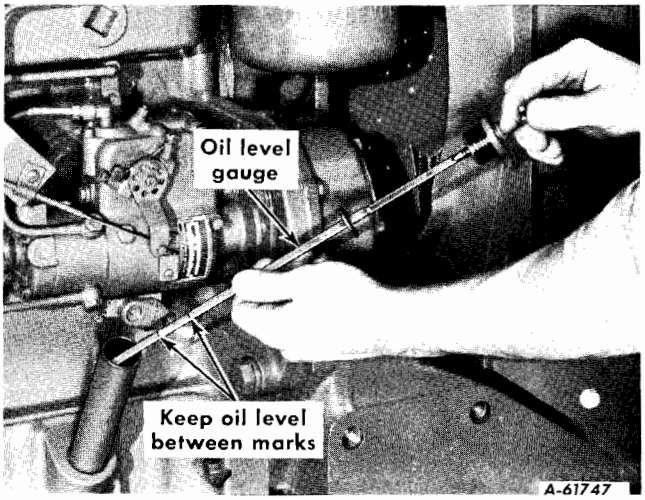
OPERATION

BEFORE STARTING YOUR TRACTOR

Lubricate the entire tractor, using the "Lubrication Guide".

Check the oil levels of the engine crankcase, air cleaner, transmission and differential case, belt pulley housing, and all gear cases to see that they are filled to the correct levels with oil of the proper viscosity for the prevailing temperature. See the "Lubrication Guide" and the "Lubrication Table".

Tractors packed for export have all oil drained from the engine crankcase, air cleaner, and all gear cases.



Illust. 11
Oil level gauge.

PNEUMATIC TIRES

Before moving the tractor, check the air pressure in the pneumatic tires and inflate or deflate the front tires to 28 pounds and the rear tires to 12 pounds. See the table on page 40 for more complete information.

ENGINE COOLING SYSTEM

Tractors shipped to destinations in the United States and Canada have the cooling system filled with antifreeze solution. Check the coolant level in the radiator. When cold, the coolant level should be approximately 4-inches below the top of the filler neck.

If water is added, use only clean water; soft or rain water is recommended, as it does not contain alkali, which forms scale and eventually clogs the passages.

Never start or operate the engine without water or antifreeze solution in the cooling system.

For further information, see "COOLING SYSTEM" on page 52. If the tractor is to be operated in freezing temperatures (32° F. or lower), see "COLD WEATHER PRECAUTIONS" on pages 51 and 52.

FUEL SYSTEM

Gasoline

International Harvester gasoline burning are specifically designed for use with regular grade gasoline having a 93 minimum octane rating (Research Method) (approximately 84 Motor Method).

Note: Unusual operating conditions, or fuel octanes below those recommended, may require modification of the specified ignition timing (shown in "Specifications" on page 100), to a retarded position. Retard from the specified setting as required to eliminate knock (not more than 6 degrees). It is recommended that this be done by an IH dealer.

To assure efficient operation of the engine, the ignition timing must be set with a timing light.

Use clean fuel and keep it clean. Store fuel in tanks equipped with hose and nozzle to prevent contamination of the fuel. The use of funnels, cans, and drums is not recommended because they are difficult to keep clean.

Diesel Engine

Carefully strain the diesel fuel to be sure it is free from foreign substances. Do not use dirty fuel.

Vent the fuel system before starting the engine for the first time. See "Venting the Fuel System" on page 16.

LP Gas

Liquefied pertrolem gas is not unduly hazardous, but its characteristics being somewhat different than more commonplace fuels such as gasoline or natural gas, require that a somewhat different method of handling and care be taken to insure against accidents. Under normal temperature range, the gas in the tank will be under pressures of from a few pounds up to 300 pounds per square inch. The pressure in the LP Gas tank is determined by the temperature of the liquid and

LP Gas - Continued

the type of liquid--propane, butane, or a mixture of the two. As an example, normal butane boils at +31° F. and propane boils at -44°F. Mixtures of the two gases have boiling points between these values. As the temperature of the tank and the contents are raised, the pressure in the tank also increases. Both propane and butane are heavier than air and will tend to settle in a low quiet spot if they should leak out of the tanks. Care should be taken to see that these spots are ventilated thoroughly before any spark or flame is produced, if the unit is used near such a location.

The safety relief valve protects the tank and starts to discharge at 312 pounds per square inch and allows excess vapor to escape.

If a tank is subjected to fire and the tank pressure rises above 312 pounds per square inch, the relief valve will open allowing the high pressure fuel to escape and burn. The fuel burns very fiercely, as a torch, but since no air can enter the tank there is no explosion. Nevertheless, you should not smoke or light a match around a butane-propane tank that is being filled, any more than you would do so while filling a gasoline tank. Safety precautions in the handling of any volatile fuel cannot be over-emphasized. Complete instructions for handling this type of fuel should be obtained from the dealer distrubuting the fuel in your community.

The liquid and vapor service valves on this tank are fitted with automatic excess flow check valves which close instantly whenever the flow exceeds the normal amount used to operate the tractor. If a fuel line accidentally should be broken or a valve torn off of the tank, the check valves which are located ahead of the pipe thread on the valve, will close and stop the flow of gas, except for a small amount which is bypassed for valve relief purposes.

Note: Never remove a valve assembly or gauge assembly from the fuel tank without first emptying the tank.

BATTERY-TO-GROUND STRAP

Tractors shipped from the factory with starting and lighting equipment have the battery-to-ground strap disconnected and taped. Therefore, before attempting to start the engine, be sure the battery-to-ground strap is connected to the ground.

INSTRUMENTS AND CONTROLS

Thoroughly acquaint yourself with all instruments and controls as described **on pages 6 to 9.**

PREPARING YOUR TRACTOR FOR EACH DAY'S WORK

After Every 10 Hours of Operation

Air cleaner pre-screener ... Remove dirt or chaff.
Air cleaner oil cup ..... Remove, clean, and refill. **See page 65.**
Cooling system ..... Check the level of the coolant in the radiator. **See pages 51 and 52.**
Lubrication points ..... See the "Lubrication Guide."
Tires .....Inspect for general condition. **See page 39.**

FILLING THE FUEL TANK

SAFETY FIRST! Never fill the fuel tank when the engine is running or when near an open flame. Do not smoke or use an oil lantern when working around inflammable fuels. When pouring fuel, keep the hose and nozzle or the funnel and container in contact with the metal of the fuel tank to avoid the possibility of an electric spark igniting the fuel. Do not light matches near inflammable fuels, as the air within a radius of several feet is mixed with a highly explosive vapor.

Gasoline

Fill the fuel tank, preferably at the end of each day's work. This will force out any moisture-laden air and prevent condensation.

The filler cap on the fuel tank has an air vent. This vent should be kept open at all times to assure proper flow of the fuel.

Diesel

Before starting the diesel tractor for each day's work, open the diesel fuel tank water drain cock **(Illust. 15)** to drain off water and sediment. Close the drain as soon as clean fuel appears.

OPERATION

LP Gas

Fill the fuel tank at a thoroughly ventilated location. Never fill the fuel tank when the tractor is inside a building.

Before filling the tractor fuel tank for the first time, open the outage valve (Illust. 9) by turning the stem counterclockwise to allow air under pressure in the tank to escape.

Be sure that the vapor service valve and the liquid service valve (Illust. 9) on the tractor-fuel tank are closed.

The recommended method for filling the fuel tank, is to use a fuel transfer pump connected from the main storage tank to the tractor tank filler valve. A vapor balancing hose may be used between the two tanks to equalize the pressure and eliminate the loss of vapor when filling the tractor fuel tank. The filler valve is spring loaded and automatically closes when the pump pressure is released. The vapor balancing connection has a valve which is pushed off its seat when the hose connection is made.

The tank can also be filled without a fuel transfer pump if the pressure in the tractor tank is considerably less than the pressure in the storage tank. When this method is used, filling can be expedited by running the engine on vapor before refueling. This reduces the vapor pressure in the tractor tank which increases the pressure differential between the two tanks and provides quicker filling. Both vapor service and liquid service valves must be closed before filling the tank.

The fuel tank is equipped with an outage valve. This valve is so located that when the tractor is level and the fuel tank is 80% full, fuel will be ejected from the outage valve when the fuel reaches this level and the valve is open. This is the maximum permitted volume using propane (.51 specific gravity at +60° F.) at a liquid temperature of +40° F. The outage valve should also be used to periodically check the liquid level gauge which should read approximately 80% at this point. This will vary somewhat due to manufacturing variations. As soon as liquid is ejected from the outage valve, the maximum permitted filling level has been reached; the filling operation should be stopped and the outage valve closed.

The maximum permitted filling volumes for propane, mixtures of propane and butane, and butane at various temperatures is shown on the liquid level gauge. For examples the maximum permitted volume using propane is 85% with fuel at +80° F. With butane it is 90% at +80° F.

Do not overfill the tank as vapor space is required for expansion. If the type fuel or fuel temperature is unknown, fill to the outage valve level (approximately 80% on the liquid level gauge).

Fuel transfer equipment and complete instructions for handling this fuel should be obtained from the dealer distributing the fuel in your community.

The tank is constructed to meet the regulations of the States having laws covering the design of tanks, their mounting, fittings, etc. In States not having safety codes, the National Board of Fire Underwriters' Regulations apply.

Caution! Due to various State laws and regulations your dealer should be consulted whenever any service on the fuel system is required.

The tank assembly incorporates the necessary fittings and valves for filling the tank, a gauge for checking fuel level, and a safety relief valve set at 312 pounds per square inch pressure. The fuel tank also includes a vapor service valve which is opened when starting the tractor, and a liquid service valve which is opened after the tractor is running.

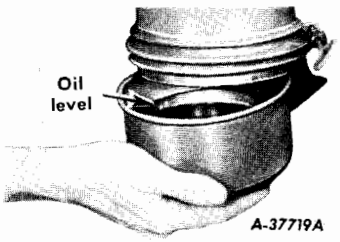
COOLING SYSTEM

Remove the radiator filler cap and check the water level. Fill to a level approximately 4 inches below the top of the filler neck.

AIR CLEANER OIL CUP

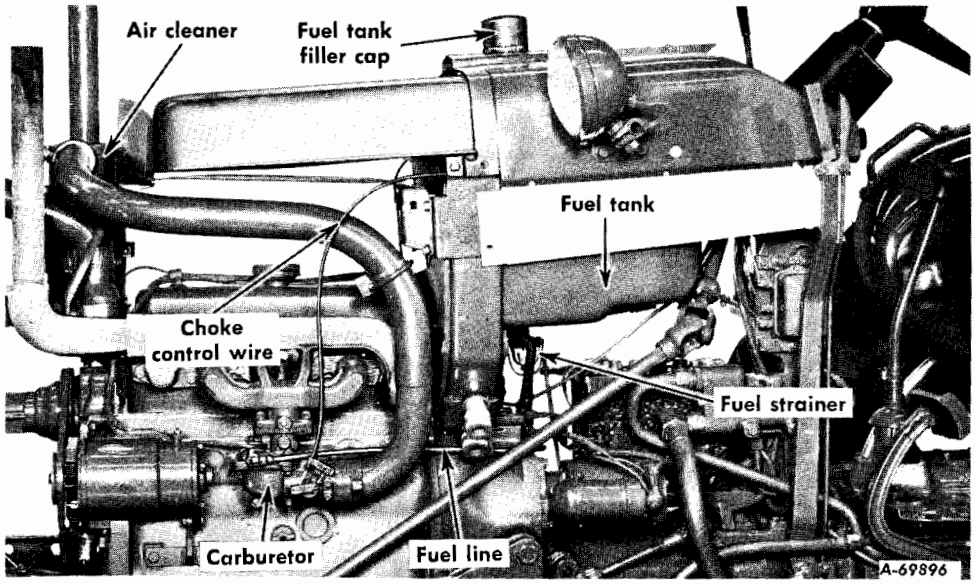
Change the oil in the air cleaner oil cup. Fill to the level mark with engine oil.

The air cleaner cap should be cleaned, and the oil in the air cleaner oil cup should be changed more frequently than every ten hours of operation if unusual dust and dirt conditions are encountered.



Illust. 14
Air cleaner oil cup.

OPERATING THE GASOLINE ENGINE



Illust. 14A
Fuel system - gasoline engine.

Before attempting to start or operate the tractor, be sure you review the instructions for the new tractor and thoroughly familiarize yourself with the instruments and controls.

FUEL SYSTEM

Be sure the shut-off valve on the fuel strainer under the gasoline tank is open.

To prevent leakage or seepage when the valve is in its full open position, screw the needle stem (shut-off valve) out until the seat on the stem is tight against the stop.

STARTING THE ENGINE

1. Put the gearshift lever in the neutral position. See Illust. 6.

2. Pull the choke control button all the way out.

When using the choke, avoid overchoking, as excessive use of the choke will flood the engine, making it hard to start. The use of the choke for starting will vary, depending on temperature and altitude.

3. Advance the engine speed control lever to the third indicator point down from "LO". See Illust. 6.

4. Disengage the engine clutch.

5. Turn the ignition key clockwise to a horizontal position. Press the push button starting switch (Illust. 6) and release it as soon as the engine starts: however, do not operate the cranking motor for more than 30 seconds at any one time. If the engine does not start within this time, release the push button starting switch and wait a minute or two; then try again.

STARTING THE ENGINE - Continued

Note: Never operate the cranking motor while the engine is rotating.

6. Slowly release the clutch after the engine starts.

Caution! When hand cranking the engine, be sure the gearshift lever is in neutral position and always stand in a position that will eliminate any possibility of being struck by the starting crank if there is a reversal of the direction of the engine. Crank the engine by using quick upstrokes; do not spin it.

AFTER THE ENGINE STARTS

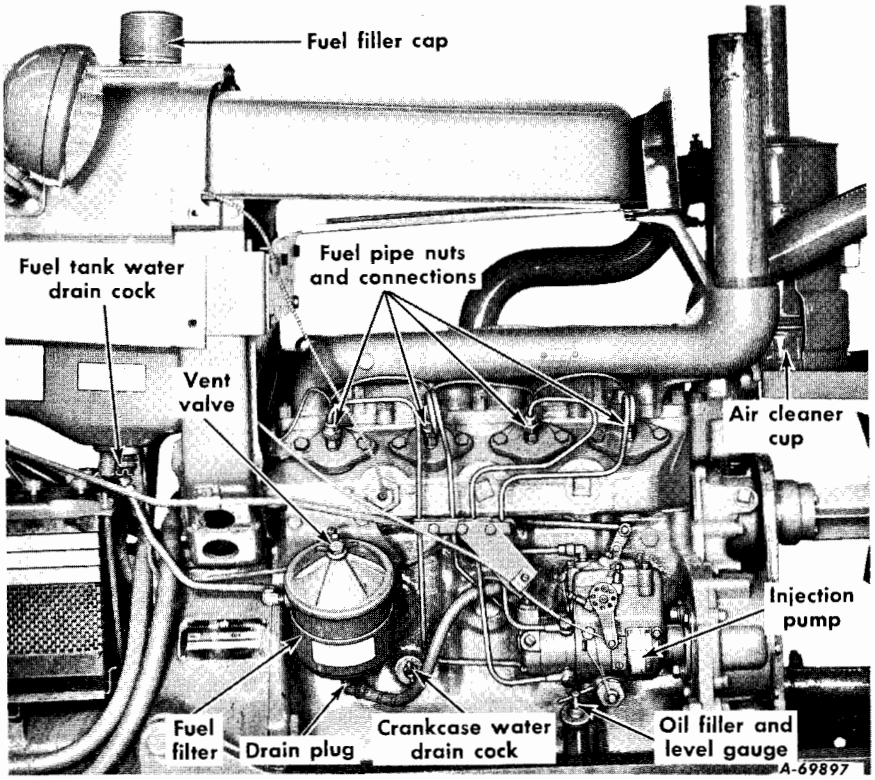
As soon as the engine starts, adjust the choke to a point where the engine operates without missing and, as the engine warms up, open the choke all the way by gradually pushing the choke control button all the way in. Do not use the choke to enrich the fuel mixture except when starting the engine.

Immediately after the engine starts, check the oil pressure light (Illust. 6) to make sure lubricating oil is circulating through the engine. Also check the charge indicator light, to be sure the generator is charging.

STOPPING THE ENGINE

Retard the engine speed control lever by pushing the control lever all the way up to "LO". Allow the engine to cool slowly from full-load operation by idling the engine for a short time. Then turn the ignition key counter-clockwise to the "OFF" position to stop the engine. It is advisable to close the gasoline shut-off valve if the engine is to be stopped for any length of time.

OPERATING A DIESEL ENGINE



Illust. 15
Fuel system on the right side of the diesel engine.

FUEL SYSTEM

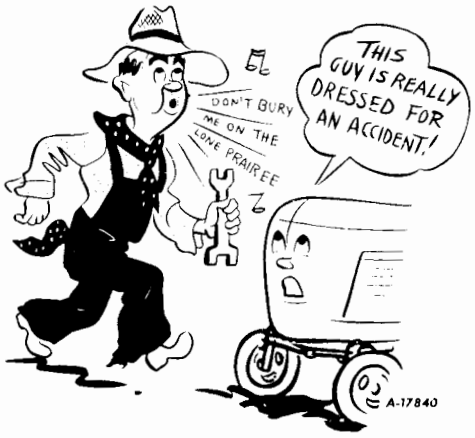
When filling the fuel tank, carefully strain the diesel fuel to be sure it is free from foreign substances. Do not use dirty fuel. Consult your International Harvester dealer or fuel supplier for the diesel fuels which will give the most satisfactory performance in your International engine.

FUEL SYSTEM - Continued

Be sure the shut-off valve on the left side of the tractor under the fuel tank is open. To assure against leakage or seepage when the valve is in its full open position, be sure to screw the needle stem (shut-off valve) out until the seat on the stem is tight against the stop.

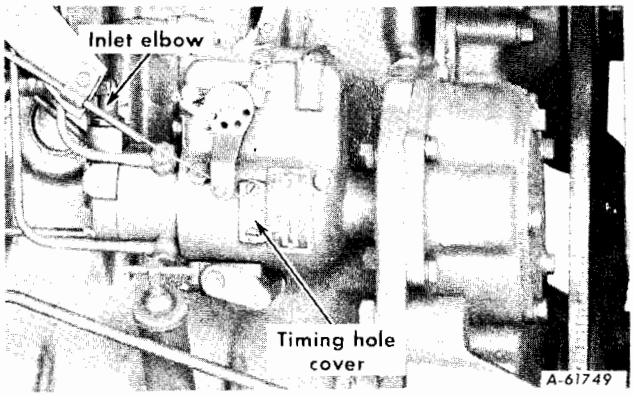
All air must be eliminated from the fuel lines before the engine will start and operate properly. All plugs are fuel line connections must be thoroughly tight to prevent leakage and to prevent air from entering the fuel system.

Note: To prevent possible damage to the fuel injection pump and to facilitate starting, before attempting to start the engine, vent the fuel system according to the following instructions.



Loose or "floppy" clothing should not be worn by the operator because of the danger of it wrapping on or getting into the moving parts.

VENTING THE FUEL SYSTEM



Illust. 16
Injection pump.

1. Loosen the bleeder stem on the vent valve at the top of the fuel filter (Illust. 15) and allow the fuel to run out until it becomes a solid stream without air bubbles. Then tighten the bleeder stem to close the vent valve.

2. Loosen the hose coupling nut under the fuel filter, then loosen the hose connection on the injection pump inlet elbow (Illust. 16) and allow the fuel to run out until it appears in a solid stream without air bubbles.

Tighten the hose connection at the inlet elbow and tighten the coupling nut under the fuel filter.

3. Loosen the coupling nut on the fuel return line on top of the injection pump and allow the fuel to run out. Crank the engine by pressing the push button starting switch for a few seconds until the fuel runs out in a solid stream, without air bubbles. Then tighten the coupling nut.

4. Try starting the engine as described elsewhere on this page. If the engine does not start, use two wrenches (one for holding the adapter and the other for loosening the fuel pipe nut) and loosen the two center fuel pipe nuts at the injection nozzles. Crank the engine by pressing the push button starting switch until fuel appears. Be sure the adapters are tight; use two wrenches (one on the adapter and the other on the nut) and tighten the fuel pipe nuts. Start the engine.

The system must also be vented under the following circumstances:

1. When an engine, in operation, runs out of fuel.

2. When the fuel filter has been serviced or replaced.

3. When any connections between the injection pump and fuel tank have been loosened or broken for any reason.

STARTING THE ENGINE

To start the engine, proceed as follows:

1. Be sure the shut-off valve under the fuel tank is open.

2. Put the gearshift lever in the neutral position.

3. Be sure the fuel stop control button is in all the way.

STARTING THE ENGINE - Continued

4. Set the engine speed control lever in the half advanced position (half throttle).

5. Disengage the engine clutch.

6. The characteristics of the glow plugs are such that they must be energized for 30 seconds before full heat is reached. Turn the key switch clockwise to the horizontal (starting) position.

7. **When temperatures are above freezing,** press the glow plug switch button (Illust. 15) for one minute to preheat the combustion chambers.

When temperatures are below freezing, press the glow plug switch button (Illust. 15) for 1-1/2 minutes to preheat the combustion chambers.

8. After preheating the combustion chamber for the specified time, press the push button starting switch (Illust. 15) while still energizing the glow plugs until the engine starts. Continue the glow plug heating until the smoke clears up.

As soon as the engine starts, the engine speed control lever must be set to give approximately 800 r.p.m. engine speed to keep the engine from racing during the warm-up period. Slowly release the clutch after the engine starts.

Note: Do not operate the cranking motor for more than 15 seconds at any time. If the engine does not start within this time, repeat steps 7 and 8.

If the engine fails to start after following the above procedure, see your International Harvester Dealer.

AFTER THE ENGINE STARTS

Immediately after the engine starts, check to see if the oil pressure indicator light is off, this indicates (Illust. 15) the lubricating oil is circulating through the engine. If the light is on, stop the engine and inspect the oil system to find the cause of failure. If you are unable to find the cause, consult your International Harvester dealer before operating the engine.

Inspect the engine to see that it is running evenly and note whether the exhaust smoke shows evidence of poor combustion. Uneven running is generally due to air in the lines or faulty nozzles. Black exhaust smoke can generally be traced to poor or excessive fuel, or wrong injection pump timing to the engine. Blue smoke indicates heavy oil consumption. White smoke indicates "misfiring" cylinders. For possible remedies, see "Trouble Shooting" in the tractor Maintenance Section.

STOPPING THE ENGINE

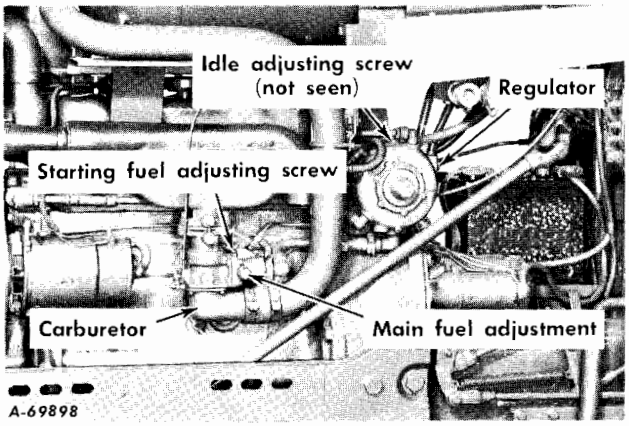
Retard the engine speed by pushing the control lever all the way up to "LO". Allow the engine to cool slowly from full-load operation by idling the engine for a short time. Then pull the fuel stop control button out all the way and turn the key switch counterclockwise to the "OFF" position.

EXHAUST SMOKE TABLE

	Smoke Number	Color	Explanation
Acceptable Range	0	Clear	No smoke visible, only heat distortion of objects seen through exhaust gas vapor.
	1	Trace	Very faint smoke.
	2	Light gray	Definite smoke visible without any doubt.
	3	Dark gray haze	Usual maximum considered desirable for continuous operation.
	4*	Black	Not desirable for continuous operation.
	5*	Heavy black	Soot color - possible flame or glow present, depending on the length of the exhaust line.

*If this smoke is encountered, stop the engine and investigate the cause.

OPERATING THE LP GAS ENGINE



Illust. 18
LP Gas fuel system.

STARTING THE ENGINE

1. Put the gearshift lever in the neutral position.

2. Advance the engine speed control lever one-half.

3. Slowly open the vapor valve (Illust. 9). It is important that the vapor valve or liquid valve be opened slowly, otherwise the excess flow valve may be "slugged" or automatically closed, requiring up to about 50 seconds for the excess flow valve to relieve itself.

4. Pull the choke control button (Illust. 9) all the way out. Never set the choke in an intermediate position. The choke must close completely, because the carburetor has a separate set of gas and air orifices for starting.

5. Disengage the engine clutch. Turn the ignition switch key clockwise to the horizontal position, press the starter button and release it as soon as the engine starts. However, do not operate the cranking motor for more than thirty seconds at any one time. If the engine does not start within a reasonable time, check the plugs for icing (in cold weather), gap setting, and correctness of carburetor starting adjustment. Then try starting again. Slowly release the clutch pedal after the engine starts.

6. After the engine is running and warmed up, push the choke control button all the way in, slowly open the liquid valve (Illust. 9), and close the vapor valve.

Check the oil pressure light (Illust. 9) to make sure lubricating oil is circulating through the engine. Check the charge indicator light to be sure the generator is charging.

STOPPING THE ENGINE

To stop the engine, close the liquid valve (Illust. 9) and allow the engine to consume the fuel in the lines, then turn the ignition switch key counterclockwise to off position. Never allow the liquid valve or vapor valve to remain open after the engine is stopped.

DRIVING THE TRACTOR

ADJUSTING THE DELUXE CUSHION SEAT

The seat is mounted on an adjustable base, that provides simultaneous height and longitudinal position adjustment.

Before starting the tractor, adjust the seat to one of the five positions available to provide the most comfortable position for the operator.

The seat is quickly and easily adjusted by means of the seat adjusting handle located at the left side of the seat.

Lift up on the handle and move the seat forward or backward to the most comfortable operating position.

FOOT RELEASE LEVER

The foot release lever provides means of moving the seat from a preset position, rearward out of the operator's way.

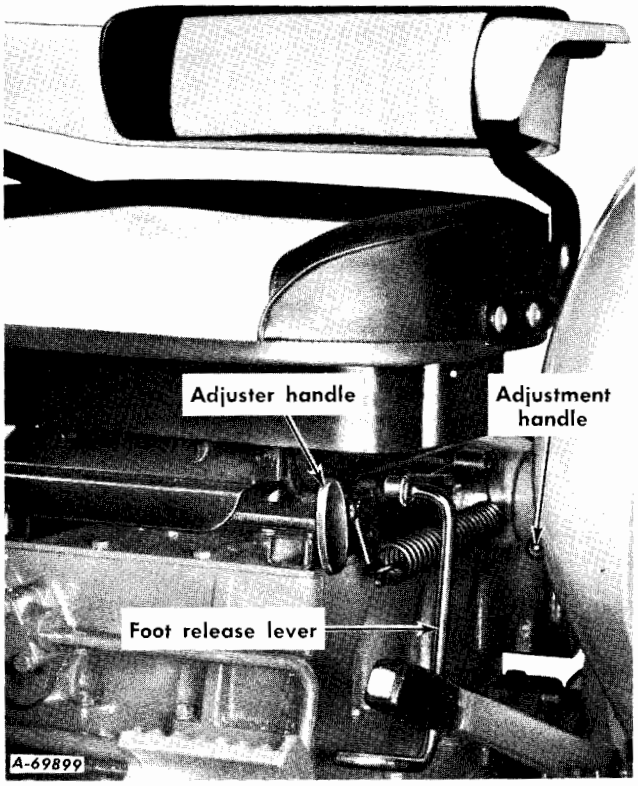
This allows easy access to the platform area, when getting on or off of the tractor. When the operator applies his weight to the seat and moves it forward the linkage returns to the preset position.

Note: The foot release lever should be used to place the seat in the furthest rear position when the operator is driving the tractor from a standing position.

ADJUSTING THE SEAT TO SUIT THE OPERATOR'S WEIGHT (Contour Seat with Vertical Action)

The seat suspension is adjustable to suit the weight of any operator from 100 to 250 pounds. To adjust the suspension, the operator turns an adjuster handle to slide a pointer along a scale until the proper mark is reached.

Turn the adjuster handle (Illust. 19) so the pointer at the rear of the seat is set at the number nearest the operator's weight. Place the handle in a near horizontal position after the proper adjustment is made.



Illust. 19
Adjusting the contour vertical acting seat.

STARTING THE TRACTOR

1. Advance the engine speed control lever slightly.

2. Disengage the clutch.

3. With the clutch pedal in the disengaged position, move the gearshift lever to the desired speed (Illust. 8).

4. Start the tractor in motion by slowly releasing the clutch pedal and advancing the engine speed control lever to a position where the engine operates best for the load to be handled. **Note:** Do not shift gears while the engine clutch is engaged or while the tractor is in motion.

5. Do not "ride" the clutch or brake pedals by resting the feet on the pedals while driving the tractor because this will result in excessive wear on the linings.

Always latch the brake pedals together before driving the tractor in high gear. To latch the pedals together, engage the latch into the slot in back of the right pedal. See Illust. 6. When the brake pedals are not latched together, the latch should rest in the slot in back of the left brake pedal.

STEERING THE TRACTOR

The tractor is steered in the conventional manner by means of the steering wheel; however, to make a sharp or pivot turn, press the right or left brake pedal, depending on the direction in which the turn is to be made. The brake pedals must be unlatched so they can be operated individually. Tractors equipped with power steering are identified by the words "Power Steering" under the IH monogram on the steering wheel hub cap.

TOWING THE TRACTOR

When towing is necessary, use a tow rope or cable and have an operator steer the tractor and operate the brakes.

Attach the tow rope, chain, or cable at the implement mounting bolt holes on the side of the front bolster. In no case should the attachment be made to the lower bolster.

When a tractor is "stuck" the power of both tractors should be used, and a steady, even pull maintained by the towing tractor.

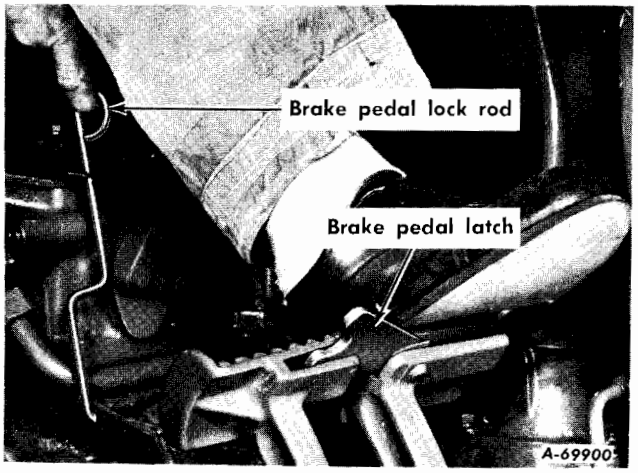
Note: When towing a tractor to get it started, put the torque amplifier handle in the direct drive (fully-forward) position. Do not exceed the normal ground speed attained in the gear selected for towing the tractor. Refer to the tables on page 99.

When towing a tractor to transport it from one place to another, the gearshift lever must be in the neutral position and the ground speed should not exceed twenty miles per hour.

STOPPING THE TRACTOR

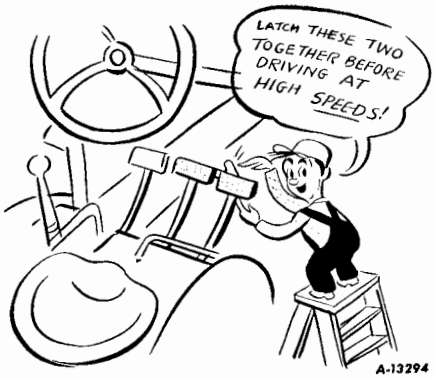
Disengage the clutch by pressing down firmly on the clutch pedal and move the gear-shift lever to the neutral position. Use the brakes if necessary.

LOCKING THE BRAKES



Illust. 20
Brake pedals in the locked position.

Always lock the brakes when the tractor is parked on a grade or when doing belt work. To lock the brakes, first latch the brake pedals together with the latch as previously described. Then press down on the brake pedals and lift up the brake pedal lock rod. See Illust. 20. The brake pedal lock will then engage with the ratchet on the left brake pedal. The brake pedals will lock in this position. To release the brakes, simply press the brake pedals further down and the lock will automatically fall back into the disengaged position.



Always latch the brake pedals together when driving on the highway or when driving in high gear. Be sure that the brakes are properly adjusted.

OPERATING THE TORQUE AMPLIFIER

The torque amplifier is a mechanical, supplemental, transmission unit. It is manually controlled to provide an optional lower gear speed in each respective transmission gear speed without interruption of engine power.

Tractors with torque amplifier have two ranges of traveling speeds. See "Speed Tables" on page 99 for speeds.

The torque amplifier can save much time and energy when the tractor is operated with either mounted or pull-behind implements. For example, if extra-hard ground is encountered when plowing, the speed of the tractor can be reduced to provide more pulling power without disengaging the engine clutch, shifting gears, or stopping the tractor.

The speed of the tractor can again be increased after the hard stretch of ground is passed without an unnecessary waste of time or energy.

The tractor also can be started in motion with the torque amplifier engaged, when pulling a heavy load. The tractor speed can be increased when under way by disengaging the torque amplifier.

ENGAGING OR DISENGAGING THE TORQUE AMPLIFIER

To engage the torque amplifier, pull the operating handle (Illust. 6) all the way back so that the pawl latches on the ratchet.

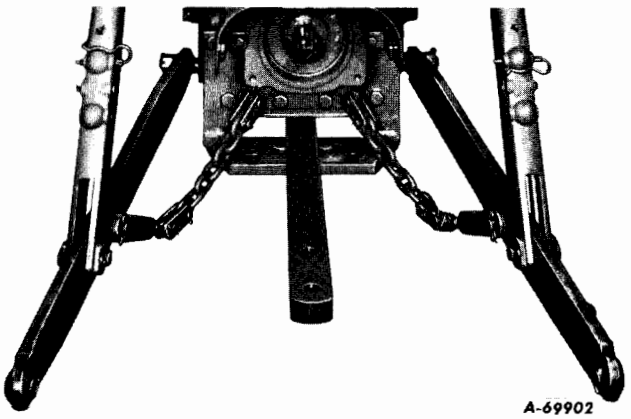
To disengage the torque amplifier, squeeze the pawl control grip to release the pawl; then move the operating handle forward.

Caution! To maintain safe control of tractor speed and to utilize the engine as a brake during downhill transport operation, the torque amplifier operating handle should be in the direct drive (fully-forward) position.

Note: The torque amplifier operating handle must be in the forward position when it is necessary to tow or push the tractor to start the engine.

OPERATING THE THREE-POINT HITCH AND HYDRAULIC SYSTEM

The three-point hitch with position control and load control provides a fast and convenient means of attaching rear-mounted equipment conforming to A.S.A.E. and S.A.E. specifications. You can mount International Harvester Company three-point equipment or most Category I (one) three-point equipment of other manufacturers.



Illust. 21
Three-Point Hitch with Swinging Drawbar.

The three-point hitch consists of two hitch lower links and a hitch upper link to connect the equipment to the tractor. The left and right hitch lower links, connected to the studs attached to the rear frame of the tractor, are suspended by lift links from a rockshaft, which is part of the load control unit. The hitch upper link is attached to the tractor rear frame by means of a bellcrank which is part of the load control unit, and is lengthened or shortened by means of the adjusting handle. A cross drawbar or swinging drawbar can be attached quickly and easily when trailing-type equipment is used.

The three-point hitch is activated by a hydraulic load control unit mounted on top of the rear frame, which incorporates a rockshaft, lift cylinder, main control valve with linkage, and drop control valve. Position control and load control levers operate in a quadrant mounted on the right side of the load control housing. See Illust. 22. Load control is obtained through a regulation of the load applied to the upper link of the hitch, which acts upon a torsion bar type spring through a bellcrank mounted on the rear of the load control housing.

One or two auxiliary valves with control levers may be mounted on the right side of the load control housing to provide independent control of either the external cylinders on mounted equipment, or the remote cylinders for trailing-type equipment.

The two gear-type pumps, which provide "live" hydraulic power to the three-point hitch and auxiliary valves, are tandem-mounted in the clutch housing from a cover plate on the left side of the tractor and are driven from the independent power take-off shaft drive gear. The 12 gallon per minute pump supplies the auxiliary valve circuits for controlling mounted or trailing-type equipment, and also the power steering system when so equipped. Mounted upon the 12 gallon per minute pump is a 4-1/2 gallon per minute pump which supplies the three-point hitch. Both pumps draw their supply from the transmission and final drive compartments through a fine mesh screen enclosing two partial flow replaceable type filter elements, which protects the hydraulic system from foreign matter. On tractors equipped with power steering, the return flow from the power steering valve passes through an oil cooler mounted in front of radiator before being returned to reservoir.

POSITION CONTROL

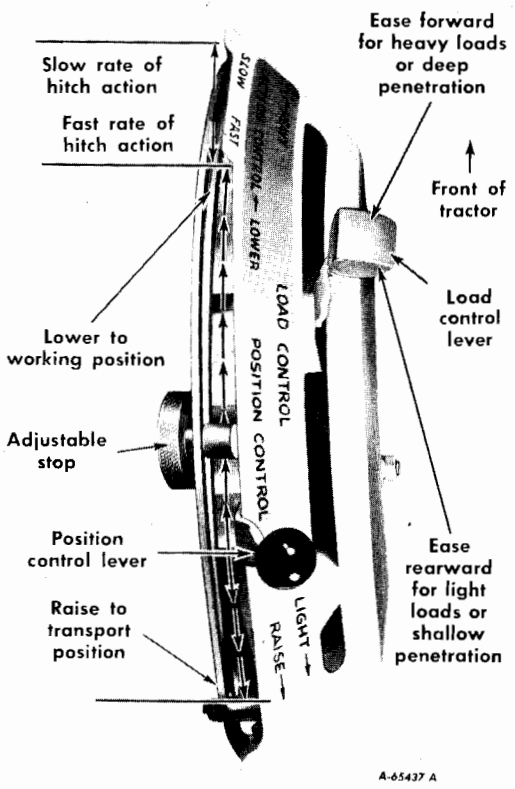
The position control lever, located at the right of the tractor seat, is used to raise or lower three-point hitch mounted equipment. When soil-engaging implements are used with load control, the position control lever must be used to raise the implement for transport and to lower it to the working position.

When operating soil-engaging implements where load control is not desirable or on three-point hitch mounted equipment which operates in an above-ground position, the position control lever is used to establish the depth or height of operation. In such instance the load control lever is moved to its full forward or "off" position, so that the load control is inoperative.

By means of an internal follow-up linkage, the lift arms automatically follow the movement of the position control lever or are positioned according to the position of the lever in its sector. By adjusting the stop on the sector to contact the position control lever when the

POSITION CONTROL - Continued

desired operating height or depth has been established, the equipment may be returned to this position after raising merely by moving the hand lever to its stop. Temporary lowering of the equipment without disturbing the stop setting is accomplished by bending the lever outward slightly to pass the stop, the lever may be similarly returning to the normal position to the rear of the stop.



Illust. 22
Operation of position control and load control levers.

Safety First! Never leave the equipment in the raised position. Moving the position control lever will lower the equipment even though the engine is not running.

LOAD CONTROL

Operating depth of tillage tools should be controlled by the load control lever, the outside lever at the right of seat. With the load control lever near the center of its quadrant, lower the implement from the raised or transport position to the ground by moving the position control lever forward to the action control range. The weight and suck of the implement will cause it to enter the ground and will find an operating depth according to the load control lever setting. If the implement is operating too deep, move the load control lever to the rear. If not deep enough, move it forward.

The implement is now operating under load control and will automatically raise or lower to maintain this draft load even though changes in soil texture and uneven terrain are encountered. When encountering extreme soil or terrain variations, it may be necessary to move the load control lever slightly from its normal setting. Move the lever forward to go deeper and rearward to shallow up.

The load control system functions by means of an interconnecting linkage between the load control lever, an implement reactive force in the upper link acting against a torsion bar spring, and the hydraulic control valve. For a given hand lever setting, an implement must encounter a specific draft load to twist the torsion bar enough to maintain the control valve in neutral position. If less than this amount of draft load is encountered, the control valve will move to allow the implement to lower until increased soil resistance exerts sufficient force on the upper link to move the control valve to neutral against increased spring resistance. Conversely, if greater than this amount of draft load is encountered, the control valve will be moved past its neutral position to cause fluid to be pumped into the cylinder to raise implement until equilibrium is again reached.

ACTION CONTROL

A drop control valve, built into the return line from the lift cylinder and control valve to the reservoir, regulates the maximum speed to drop as either light or heavy three-point mounted equipment is lowered from the transport position to the ground. When the position control lever is moved into the action control range at the forward end of its quadrant, the drop control valve is contacted, to reduce the return flow passage-way as the lever is moved forward.

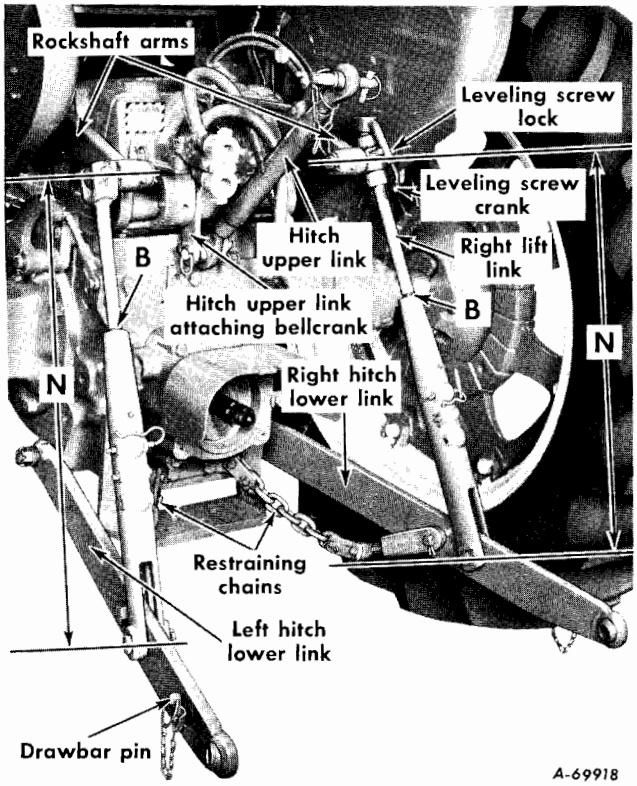
Within the range of this portion of the quadrant, movement of the position control lever permits the operator to change the action speed of the hitch and equipment, while operating in

ACTION CONTROL - Continued

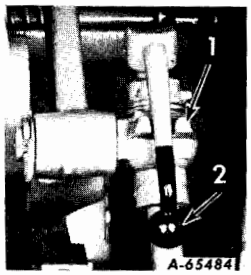
the ground, to suit a specific piece of equipment in particular soil or terrain conditions. The stop can be set on the position control quadrant in the action control range so each time the equipment is lowered, the lever can be returned to the same position.

The rate of speed of hitch action can be adjusted by starting with a fast rate, and reducing the rate (by moving the position control lever forward) until ideal operation is obtained. However, unless severe or extreme conditions are met, use the fast rate. The final step in obtaining the best control of the implement depends on the operator's "feel" of the tractor and equipment operation.

THREE-POINT HITCH



Illust. 23
Principal parts.



Illust. 23A
Leveling crank in locked position.

LIFT LINKS AND LEVELING CRANK

The lift links are used to raise or lower the hitch lower links. The right link incorporates the leveling screw which is adjusted by means of the leveling screw crank. The leveling screw crank is turned to obtain the desired position of the hitch lower links relative to one another. The left lift link body and rod are threaded and can be adjusted as required for some equipment.

The leveling crank is provided with a lock to hold the selected setting of the leveling screw. **See Illust. 23A.**

The right and left lift links are made rigid or free to float by positioning the quick-attachable cotter pins in the holes in the lift link housings. **See "A", Illusts. 26A and 27.**

HITCH LOWER LINKS

The hitch lower links are the connection between the equipment hitching pins, by means of the swivel sockets at the rear of the links, and the hitch point on the tractor. They are attached to the tractor at the two pivot pins attached to the rear frame.

HITCH UPPER LINK

The length of the hitch upper link can be shortened or lengthened by using the hitch upper link adjusting handle. **See Illust. 23.** Raise the adjusting handle to a vertical position, then turn the handle clockwise to shorten the link or counterclockwise to lengthen the link. The length of the hitch upper link can be adjusted from 19 inches to 28-1/2 inches.

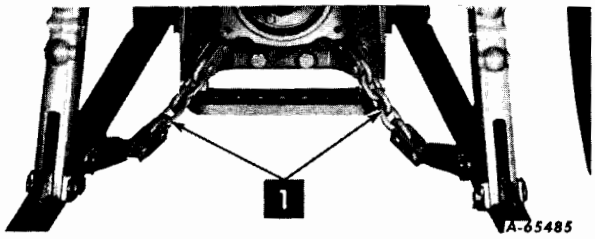
After adjusting, secure the upper link adjusting handle in the clip on the turnbuckle housing. **Note:** The lug on the handle must engage the slot in the threaded rod. When it is desirable to have the upper link raised out of the way, put the end of the adjusting handle in the clip on the draft control unit.

OPERATION

RESTRAINING CHAINS

Restraining chains are used to prevent excessive lateral movement of the hitch lower links. Consult the equipment operator's manual for any variations in the use of restraining chains. The restraining chain length is set at the factory in a proper relations with the nominal length of the lift links.

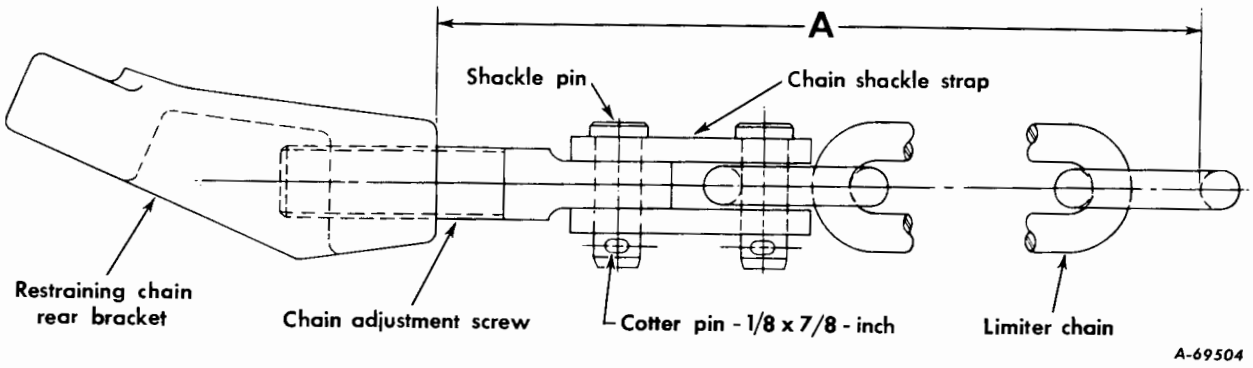
Note: The restraining chain front bracket must be assembled with the holes for the shackle pins in the upward position.



Illust. 24
Restraining chains.

	Nominal length of restraining chains	Nominal length of lift links
TRACTOR	Measured from edge of rear bracket to inside edge of front link. See "A" Illust. 24A. Rear bracket must rotate freely on lower link.	Set by aligning the groove on the link with the top edge of the housing. See "B" Illust. 24A.
Farmall 504	11-3/16 inches	27-1/8 inches

If for any reason the length of the restraining chains has been temporarily altered, restore to the length shown in the table.



Illust. 24A
Restraining chain adjustment for Farmall 504 Series Tractor (except Hi-Clear).

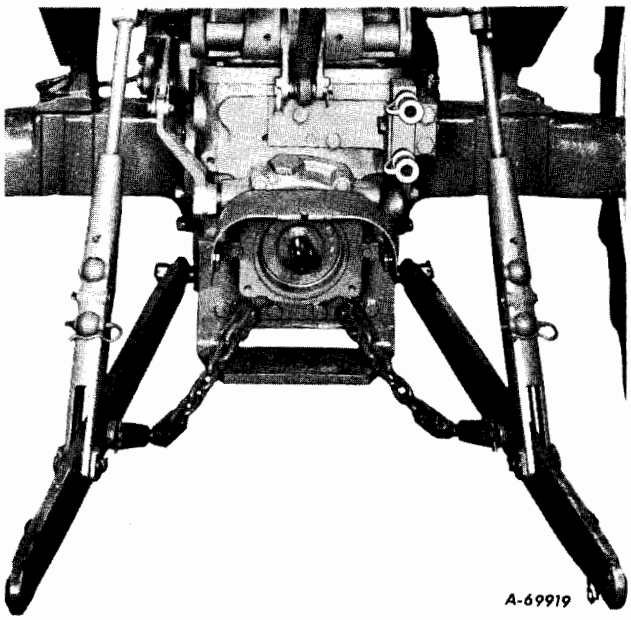
STABILIZERS

When lateral movement of the equipment is not desirable, stabilizers are available. Use the stabilizers when and as instructed in the equipment manual. The stabilizers are used with either the cross drawbar or with some direct-connected equipment.

Attach the front ends of the stabilizers to the stabilizer brackets, using a headed pin and a quick-attachable cotter pin.

The stabilizers can be lengthened by turning them counterclockwise, or shortened by turning them clockwise.

The rear ends of the stabilizers are attached to the hitching pins on direct connected equipment or to the ends of the drawbar. The stabilizers are put on after the hitch lower link swivel sockets are in place and both are made secure with the linchpins.



Illust. 25
Connecting the lift links to lockout brackets.

CROSS DRAWBAR

Disconnect the left and right lift links from the rockshaft arms by removing the quick-attachable cotter pins and connect the lift links to the left and right lower link lockout brackets. Assemble with the washer on the outside surface of the lockout bracket. Remove the pins from the lift link housings to help line up with the lockout brackets. Then reinstall the pins in the upper holes in the lift links.

Insert the ends of the cross drawbar into the hitch lower link swivel sockets. Remove the linchpins from the storage clips and insert them through the holes in the ends of the drawbar.

Caution! When the cross drawbar is used for trailing-type equipment, the lift links must be connected to the lockout brackets as shown in Illust. 25 and the quick-attachable pins must be in the upper holes in the left and right lift link housings. When side movement of the hitch is undesirable, or hazardous, stabilizers must be used.

To provide standard drawbar height for trailing-type equipment, adjust the left and right lift links to the nominal length of 27-1/8-inches for the Farmall 504 Tractor, measured from the center of the upper and lower pins. See "N", Illust. 23. This length can be obtained by aligning the groove "B" on the lift link with the top edge of the lift link housing. See Illust. 23.

Note: The cross drawbar is not to be used with power take-off driven equipment.

When using the cross drawbar for the first time, assemble the left and right lower link lockout brackets at the tapped holes in the left and right rear corners of the tractor rear frame with the four 5/8NC x 1-3/4-inch cap screws and lock washers and tighten to from 240 to 260 foot-pounds torque. If the tractor is equipped with independent power take-off, the operating handle hub must be mounted on the pin on the left lockout bracket.

RIGID HITCH POSITION

The right and left lift links are made rigid by placing the quick-attachable pins "A", (Illust. 26A) in the upper holes in the left and right lift link housings.

If side movement of direct-connected equipment is undesirable, stabilizers must be used.

Note: Vertical float to follow ground contcur is provided by the floating action of the rockshaft.

"FREE TO FLOAT" POSITION

Place the quick-attachable pins "A" (Illust. 27) in the lower holes on the left and right lift link housings. The links are then free to float both diagonally and vertically.

HIGHER LIFT FOR HAY TOOLS

When using fully-mounted power take-off driven equipment over rolling terrain, it may be desirable to obtain a high lift at the implement hitch point. This should be done only when so instructed in equipment manual. To obtain this, remove the pins securing the restraining chain rear brackets and move the lift links to these holes in the lower links.

Note: Stabilizers must be used to limit the lateral swing of the hitch.

POWER TAKE-OFF

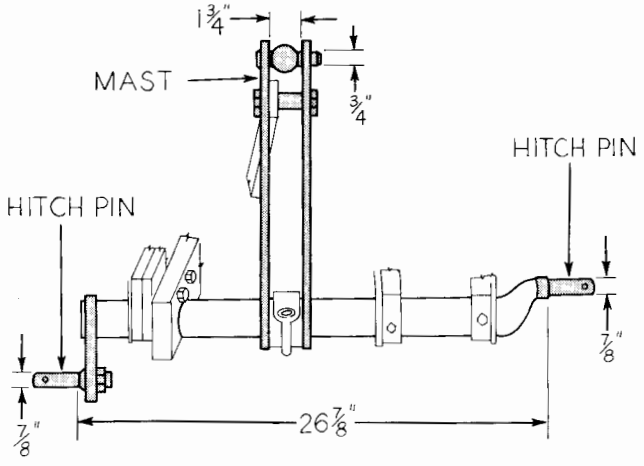
The left and right lift links must be set at the length specified in the equipment manual.

The swinging drawbar provides a standard hitch distance of 14 inches, from the end of the power take-off shaft to the center line of the rear hole, for power take-off operation of trailing-type implements.

When using power take-off driven equipment, lock the swinging drawbar in the center position on the drawbar support using the two 5/8 x 1-1/2-inch cap screws and nuts.

COUPLING THE EQUIPMENT

The Category I designation means that the hitch lower links are spaced to fit equipment hitching pins spaced 26-7/8 inches between the shoulders, the swivel sockets in the ends of the lower hitch links are the correct size to fit the 7/8-inch diameter equipment hitching pins, and the swivel socket on the hitch upper link is the correct size to fit the 3/4-inch hitching pin in the 1-3/4 inch space on the equipment mast.



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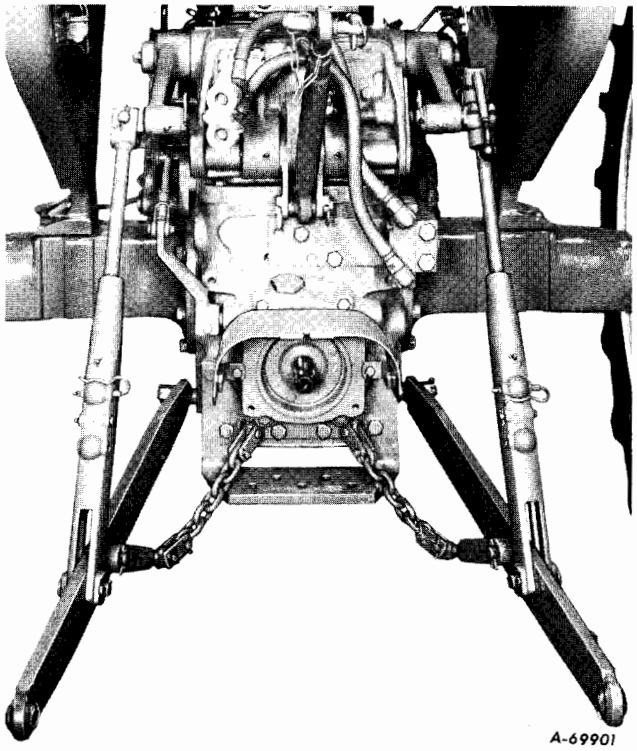
Illust. 26
Dimensions for Category I Equipment.

Coupling equipment to tractors with three-point hitch is relatively simple, but it requires a little thought and practice to do the job quickly and without lost motion. New hitches and equipment often need to be "broken in" to work best.

Be sure the uses of the position control and load control levers are understood. Spend a little time observing the action of the hitch when it is moved by these levers.

Set the position control lever **(Illust. 6)** as required to locate the hitch lower links at the same height as the equipment hitching pins.

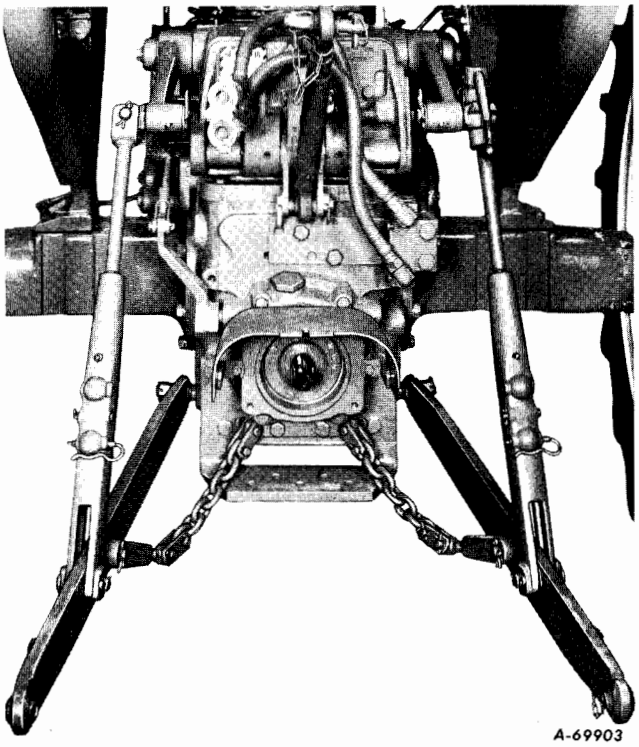
Hitching is easier if the equipment and the tractor are on reasonably level ground.



Illust. 26A
Lift links in "rigid" setting.

Back the tractor straight in until the swivel sockets in the ends of the hitch lower links are in line with the equipment hitching pins. Note: Pull the quick-attachable pins out of the holes in the lift link housings to assist in lining up the lower link sockets and equipment hitching pins. Put the swivel socket onto the left equipment pin. Then by adjusting the leveling crank, the right socket can be placed onto the equipment pin at the same height.

COUPLING THE EQUIPMENT - Continued



Illust. 27
Lift links in "free to float" setting.

Remove the hitching pin from the upper link. Adjust the hitch upper link so the swivel socket lines up between the hitching pin holes in the mast. Put the hitching pin through the mast holes and the swivel socket in the hitch upper link. Insert the linchpins. Raise the equipment, then replace the quick-attachable pins in the lift link housings. Remove the linchpins from their storage clips and insert them in the ends of the equipment hitching pins.

UNCOUPLING THE EQUIPMENT

Lower equipment to ground. Remove the linchpins from the three hitching points of the equipment. If the pins are difficult to remove, slightly raise or lower the hitch with the position control lever until the pins are free.

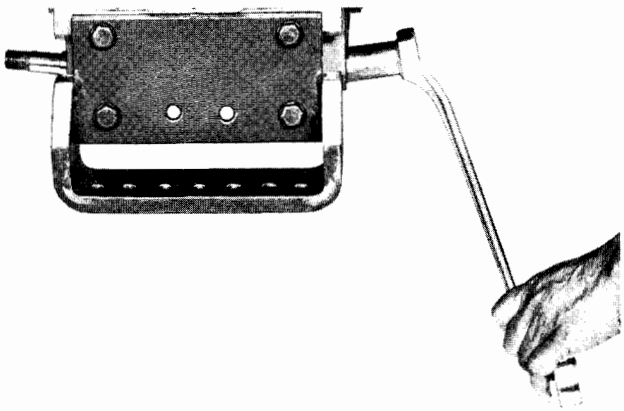
Caution! The load control lever must be fully-forward whenever the implement is disconnected.

REMOVAL

If for any reason the three-point hitch linkage is to be removed, proceed as follows:

If the stabilizers have been installed on the tractor, remove them by removing the cap screws, lock washers, and nuts from the brackets under the rear axle carriers.

Remove the pins from the upper rockshaft arm, ends, and the lower link ends of the left and right lift links. Disconnect the restraining chains from the brackets at the rear end of the tractor.

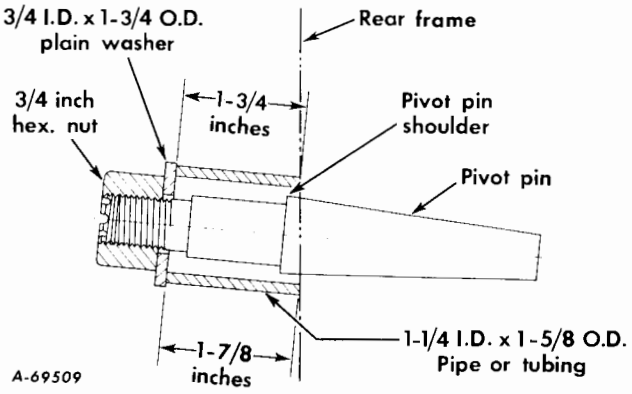


Illust. 27A
Removing the lower link pivot pins from the rear frame.

Now remove the nut, washer, and lower links from the pivots pins at the lower rear end of the rear frame.

If it is necessary to remove the pivot pins from the rear frame, first remove the nuts from the ends of the pivot pins under the rear frame. Use a piece of pipe or tubing, 1-1/4 inch ID x 1-3/4-inches long. **See Illust. 27A.** Place the pipe or tube over the stud, then the previously removed 3/4 ID x 1-3/4-inch OD washer and 3/4-inch hex. nut. Tightening the nut against the pipe will force the stud loose. Be sure the tube rests against the rear frame and not on the pivot pin shoulder.

If it is necessary to remove the upper link, remove the quick-attachable cotter pin and the locking pin from the bellcrank.



Illust. 28
Dimension diagram for pivot pin puller.

STEP BY STEP EXAMPLE OF OPERATING THE THREE-POINT HITCH WITH LOAD CONTROL

To provide a specific example showing the use of the three-point hitch with position control and load control, we have selected the moldboard and disk plows.

1. Place the quick-attachable pins in the upper holes in the left and right lift link housings. **See Illust. 27A.** The lift links are thereby made rigid, but vertical float, to follow ground contour, is provided by the floating action of the rockshaft. Set the upper link at the 24-inch length, when measured pin to pin.

2. Place the load control lever (**Illust. 6**) at the center of the quadrant.

3. Starting at the end of the field, move the position control lever (**Illust. 6**) forward to the "lower" position, lowering the plow into the ground, and drive ahead several feet.

4. Stop the tractor and adjust the upper link (**Illust. 27A**) either shorter or longer to level the plow in the fore and aft.

5. Adjust the right lift link with the leveling crank (**Illust. 23**) to level the implement horizontally.

6. After the implement has been leveled, adjust the load control lever either forward (to go deeper) or rearward (for shallower depth) until the desired depth is reached.

7. If the operator feels that the action of the implement is too fast, move the position control lever forward in the action control range slowly until the plow reacts at the desired rate of speed to suit the condition of the soil, weight of the implement, and type of terrain.

8. When the position control and load control levers are set for the field conditions described, set the stop on the quadrant so the position control lever can be returned to this position each time the plow is lowered into the ground.

9. When reaching the end of the field, move the position control lever rearward, raising the plow to transport.

10. Re-enter the field and lower the plow by moving the position control lever forward to the stop. The plow will reach and maintain the desired depth as previously set by the load control lever.

AUXILIARY VALVES AND REMOTE CYLINDERS

One or two auxiliary valves with integral control levers may be added to the right side of the load control housing to provide hydraulic control of various mounted and trailing-type equipment. Each valve provides independent lifting and lowering and may be set for float operation when equipment is to follow the ground contour. However when the levers are operated at the same time or with the three-point hitch, the cylinder with the lightest load will move before the more heavily loaded one moves.

AUXILIARY VALVES AND REMOTE CYLINDERS - Continued

At each junction block on the tractor, there are two female coupling halves. On each coupling hose there is a male coupling half. These couplings are self-sealing and close automatically when disconnecting the hoses.

The inner or single control lever operates the left side and rear hydraulic outlets simultaneously. The outer control lever operates the right side outlets. Rear remote control extension mounting is available for rear self-sealing couplings to provide break-away feature for trailing-type equipment.

The use of these levers will depend on the type of implement used with the tractor. Complete instructions for operating the control levers and use of the cylinders are included in the Operator's manual furnished with the implement. General instructions for operating the levers are given here.

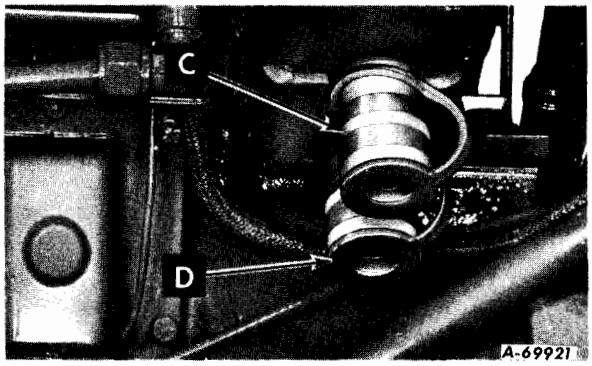
The proper junction port should be connected to the cylinder port with the arrow pointing to it. This will assure that the cylinder piston rod will extend when the auxiliary valve levers are moved rearward and retract when the auxiliary valve levers are moved forward. It will operate in the reverse manner if the hoses are reversed.

When connecting the coupling halves, take care to keep the couplings free from dirt and grit. Use the dust plugs furnished to help protect the female coupling from dirt and grit when the coupling is disconnected.

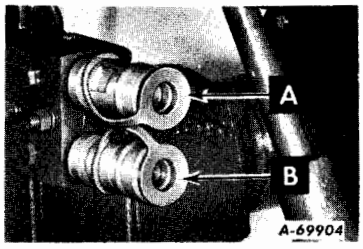
Connecting Hoses to Side Junction Blocks

A Farmall 504 Tractor with a single auxiliary valve system will have two junction ports, "C" and "D" (Illust. 29A) at the left side of the tractor for tractor mounted implements and two junction ports, "A" and "B" (Illust. 29) at the rear of the tractor for trailing-type implements.

When equipped with two auxiliary valves, there will be two additional junction ports "E" and "F" (Illust. 29B) at the right side of the tractor.

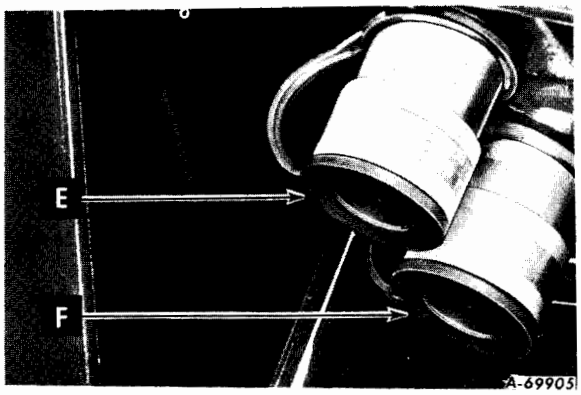


Illust. 29
Rear junction ports.



Illust. 29A
Left junction ports.

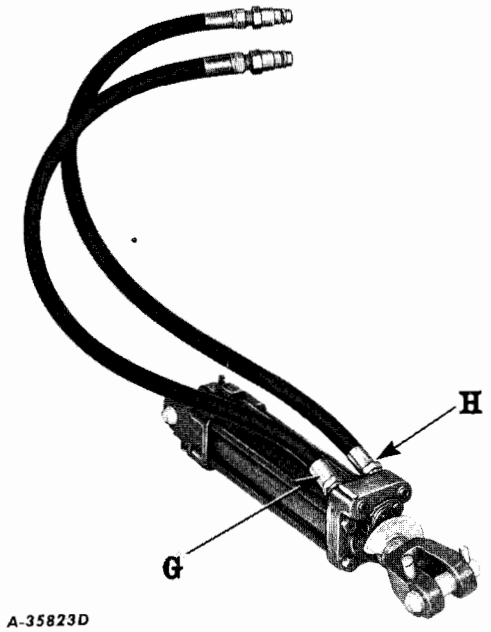
For left front tractor-mounted implements, connect one hose to upper junction port "C" on gasoline and diesel tractors (Illust. 29A) and to rear junction port on LP gas tractors and to cylinder port "G" (Illust. 30) with the arrow pointing to it. Connect one end of the other hose to lower junction port "D" on gasoline and diesel tractors (Illust. 29A) and front port on LP gas tractors and the other end of the hose to cylinder port "H" (Illust. 30).



Illust. 29B
Right junction ports.

Connecting Hoses to Side Junction Blocks - Continued

For right front tractor-mounted implements, connect one end of the hose to lower junction port "F" (Illust. 29B) on gasoline and diesel tractors and the other end to cylinder port "G" (Illust. 30) with the arrow pointing to it. Connect one end of the other hose to upper junction port "E" (Illust. 29B) on gasoline and diesel tractors and to rear port on LP gas tractors and the other end of the hose to cylinder port "H" (Illust. 30).



Illust. 30
Cylinder connections.

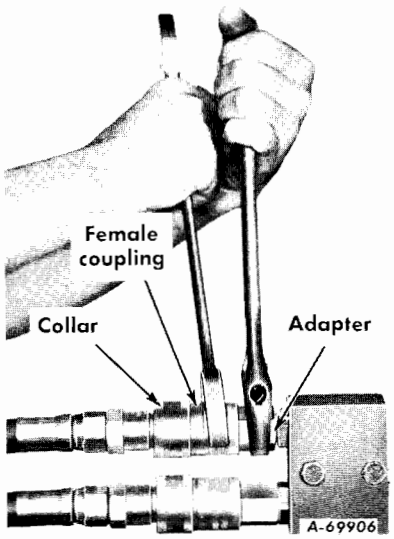
Illust. 30A
Connecting the self-sealing couplings on the side mounted junction blocks.

To connect the self-sealing couplings on side mounted junction blocks, push back the collar (lock ball retainer) on the female couplings as shown in Illust. 30A; insert the male half of the coupling all the way in; then release the collar to lock the two coupling halves together. To disconnect the couplings, push back the collar and pull the hose.

When connecting directly under the auxiliary valve, connect one end of the hose to the forward port and connect the other end to cylinder port "G" with the arrow pointing to it. Connect one end of the other hose to the rear port and the other end of the hose to cylinder port "H".

Connecting Hoses to Rear Junction Block

For rear tractor-mounted or trailing-implements, connect one hose to lower junction port "B",(Illust. 29) and cylinder port "G" (Illust. 30) with the arrow pointing to it. Connect the other hose to junction port "A", (Illust. 29) and cylinder port "H" (Illust. 30).

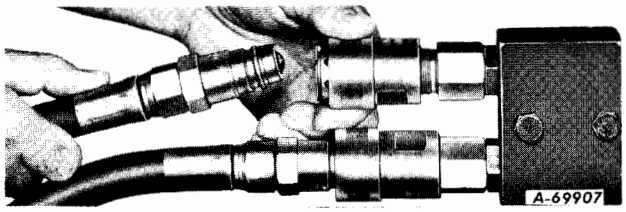


Illust. 30B
Unscrewing female coupling on rear junction block.

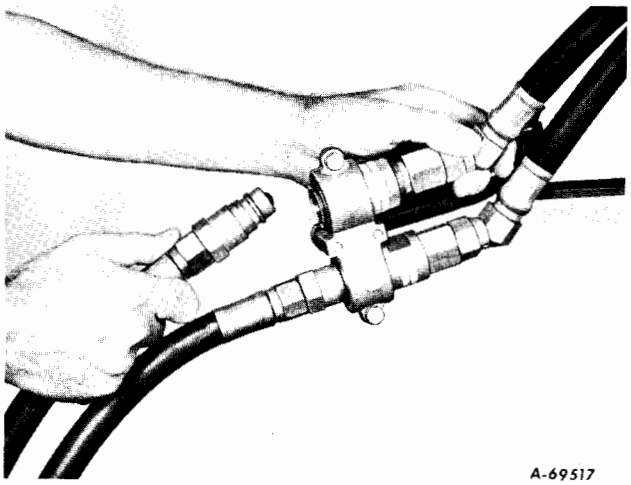
If it is difficult to connect the rear self-sealing couplings on the rear junction block in the manner above described, due to pressure in the lines, proceed as follows: First, use two wrenches, one to hold the adapter and the other to unscrew the female coupling (Illust. 30B). Then push back the collar (lock ball retainer) on the female coupling as shown in Illust. 30B, insert the male half of the coupling all the way

Connecting Hoses to Rear Junction Block - Continued

in; then, release the collar to lock the two coupling halves together and screw the female coupling tight to the adapter. To disconnect the coupling, push the collar and pull the hose.

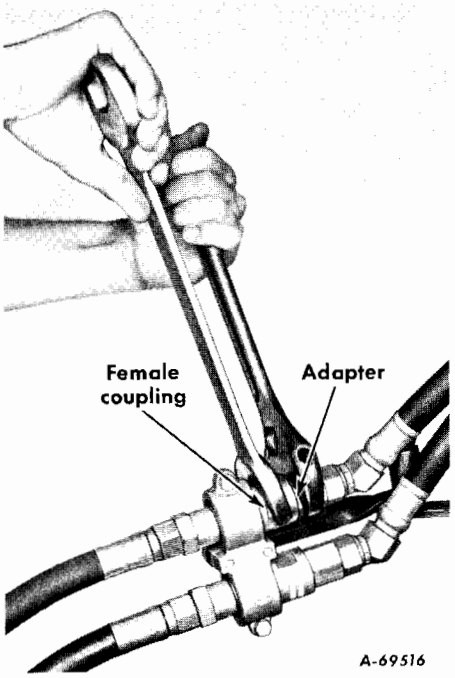


Illust. 31
Connecting the self-sealing couplings (rear junction block).



Illust. 31B
Connecting the self-sealing couplings (remote control).

Connecting Hoses to Remote Control Break-Away Couplings



Illust. 31A
Unscrewing the female coupling on remote control connection.

When self-sealing couplings are rear mounted to provide the break-away feature, the collar or lock ball retainer on the female coupling is rigidly held so that the coupling body must be pulled rearward to insert hose end.

If it is difficult to connect the rear self-sealing couplings on a break-away coupling frame due to pressure in the lines, proceed as follows: Hold the adapter with a wrench and unscrew the female coupling with another wrench (Illust. 31A). Now, pull the coupling body toward the operator as shown in Illust. 31B. Insert the male coupling all the way in. Then, ease back the coupling body to lock the two coupling halves together and screw the female coupling tight. To disconnect the coupling, pull the coupling body toward the operator and pull the hose.

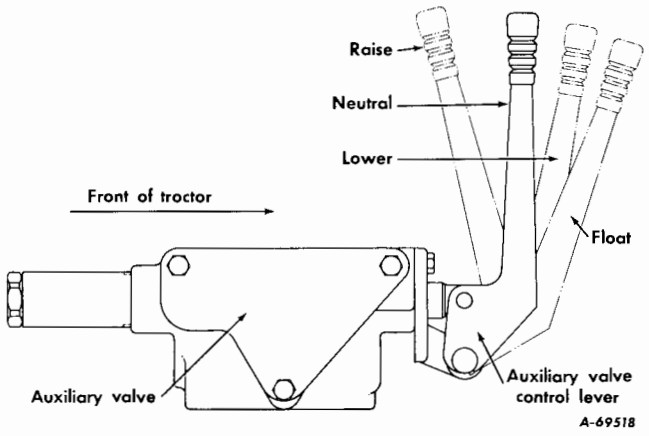
Connecting Hose of Single-Acting Cylinder

When connecting directly under the auxiliary valve, the hose must be connected to the forward port and the rear port must be plugged with the plug and O-ring supplied with the valve.

When connecting to the junction ports, connect the single hose to upper junction port "C" (Illust. 29A) on the left side of the gasoline and diesel tractors or the rear port on the left side of LP gas tractors, or to lower junction port "F" (Illust. 29B) on the right side for front tractor mounted implements on gasoline and diesel tractors or to the rear port on LP gas tractors. Connect the single hose to lower junction port "B" (Illust. 29) for rear tractor mounted implements.

OPERATION

Operating Double-Action Cylinders



Illust. 32
Setting the auxiliary valve in position with the control lever.

To raise the implement all the way up, move the control lever all the way back. See Illust. 6. To partially raise the implement, when it is desirable to ease the load as when hitching implements, move the auxiliary valve control lever backward slowly just enough to secure the proper lift. To lower implements, move the control lever forward to the lower position (Illust. 6). Push forward to lower, pull back to raise. Push the lever all the way forward to provide float required by some implements to follow ground contour.

If lever has been moved to detent positions during raising or lowering, it will automatically return to neutral when the piston stroke has been completed or an adjustable piston contacted. When lever has been moved fully forward to provide the implement with float, it will remain in the float position until manually returned to another position.

The length of the cylinder piston stroke gauges the working position of the implement. To set the implement for a six-inch depth, loosen the thumbscrew on the stoke limit collar and adjust the collar on the piston rod to permit the length of stroke that will correspond to a six-inch working depth. Tighten the thumbscrew. No tools are needed to adjust the position of the collar.

The implement will automatically stop at this depth when the collar comes against the limit stop valve. When the valve closes, fluid circulation to the cylinder is stopped, thus halting piston travel.

To transport the implement, set the stroke limit collar against the valve in the end of the cylinder. This prevents circulation of fluid and thus locks the implement rigidly in position.

Operating Single-Action Cylinders

Follow above instructions when raising. When lowering, if lever has been moved to the detent position it must be manually returned to neutral. If not moved to detent position, it will automatically return to neutral when released. Similarly, if lever has been moved fully forward to provide float operation it must be manually returned to neutral.

A Careful Operator

IS THE BEST INSURANCE

AGAINST AN ACCIDENT

—*National Safety Council.*

OPERATING THE POWER TAKE-OFF

The multiple-disc, clutch type independent power take-off is powered directly from the engine flywheel. It provides a separate control of the power take-off drive independent of the engine clutch. A multiple-disc clutch rear unit is provided which is engaged or disengaged by using the power take-off handle at the left of the tractor seat.

Advance the engine speed control lever to the position where the indicator needle on the tachometer is in line with the mark on the lower half of the dial, showing the proper speed for power take-off operation.

Note: Do not exceed the recommended power take-off speed for the driven machine.

The tractor motion can be started or stopped in any of the forward speeds or the reverse speed without affecting the speed of the power take-off shaft. Also, the power take-off shaft can be started or stopped without affecting the speed of the tractor.

Stop the power take-off before dismounting from the tractor.

When the tractor is pulling power equipment, be sure that all power line shielding is in place and in good order.

When the tractor is pulling power equipment, be sure that all power line shielding is in place and in good order.

SAFETY FIRST! When operating the power take-off, be sure that the master shield is always in place covering the power take-off exposed shaft.

OPERATING THE BELT PULLEY

Observe the following instructions when operating the belt pulley:

Securely anchor the machine which is to be driven by the belt, in the desired location.

Align the tractor belt pulley with the implement pulley. Keep the tractor level, if possible.

Observe the direction of the belt travel, indicated on the belt, and install the belt accordingly to prevent damage to it.

Tighten the belt enough to keep it from rubbing against itself during operation. Do this by driving the tractor into the belt, locking the brakes, and blocking the tractor rear wheels (when using a very long belt or a crossed belt, it will not be possible to eliminate all rubbing).

Gradually bring the tractor engine up to speed, making sure the belt is running true.

Note: Static electricity, generated by belt work, can be discharged harmlessly from tractors equipped with pneumatic tires by attaching a chain to the tractor and letting it touch the ground.

For belt and pulley speeds refer to the specifications on page 100.

When operating the belt pulley of the three-point hitch (Illust. 28) in the right rear position, the right lift link must be removed by removing the upper pin from the rockshaft arm and the lower pin from the right lower link. See Illust. 28.

If the belt pulley is to be in the left rear position, remove the left lift link.

Note: When lining up the belt, secure the lower link so it will not dig into the ground.

CHANGING THE BELT PULLEY TO RIGHT OR LEFT

Remove the belt pulley drive housing vent plug and install a 1/4-inch pipe plug in its place.

Remove the four bolts securing the belt pulley drive unit.

Rotate the belt pulley drive unit 180 degree and reassemble the bolts.

Remove the 1/4-inch pipe plug in the upper part of the belt pulley drive unit and replace it with the vent plug.

STARTING AND STOPPING THE BELT PULLEY

Because the belt pulley is driven by the power take-off shaft, it is started and stopped by the power take-off operating handle. For operating instructions, see "Operating the Power Take-Off".

SWINGING DRAWBAR

A swinging drawbar is available to tractors with or without the three-point hitch and must be used for all drawbar work on tractors not so equipped. This type of drawbar permits shorter turns when pulling trailing-type implements and makes tractor operation easier, especially when working a small or irregular field. The swinging drawbar is free to swing the entire width of the support bar or, when desired, can be locked in a stationary position.

The tractor when so equipped exerts its pulling power on trailing-type equipment by means of the swinging drawbar. Correct hitching will save both the tractor and the equipment it is pulling from undue strain and wear. Incorrect hitching tends to make the tractor difficult to steer and may result in unsatisfactory work by the implement being pulled.

SWINGING DRAWBAR (For use with power take-off driven equipment)

When using the swinging drawbar on tractors equipped with three-point fast hitch, pull the position control lever (on the quadrant) all the way back so the lower links are up as far as they can go. In this position the hitch will not interfere with the side movement of the swinging drawbar.

Caution! All hitches for trailing-type implements must be attached to the swinging drawbar or to the three-point hitch cross bar with lift links set as specified. Do not attach the swinging drawbar support or any other location on the rear of the tractor.

The tractor exerts its pulling power along a vertical line extending upward from a point on the ground midway between the drive wheel tracks and slightly ahead of the rear axle. This point is referred to as the center of pull. The height of load application depends upon the vertical location of the drawbar rear attaching point. Trailing-type equipment has what is called a center of resistance or a theoretical point, the location of which is determined by test, from which a pull must be applied to move it along. A line connecting the center of equipment resistance with the drawbar rear attaching point is known as the line of pull.

Whenever possible, the tractor tread should be adjusted and the tractor operated so the center of pull is straight ahead of the center of resistance, in the direction of travel. When this is not possible or advisable, the swinging drawbar should be pinned to one side just enough so an extension of the line of pull passes through the vertical line extending upward from the center of pull, or within a few inches of this line. This drawbar position is determined by trial and will result in the side force being exerted on the drive wheels, rather than being transferred through the tractor chassis to the front wheels where steering may become difficult.

When pulling trailing-type equipment which does not require close positioning, the drawbar tongue may be left free to swing, making steering under load easier both on the straight-away and when turning.

Caution! Lock the drawbar in the center position when towing loaded wagons or heavy equipment downhill or on the highway.

When using a long chain or cable to hitch the tractor to the load, drive the tractor forward slowly until all slack is taken out.

When using power take-off driven equipment, lock the swinging drawbar at the center two holes in the swinging drawbar support with the two 5/8 x 1-1/2-inch cap screws, and nuts.

The swinging drawbar is at a standard distance of 14 inches from the end of the power take-off shaft to the center line of the rear hole in the swing drawbar for power take-off operation.

FRONT WHEELS

FARMALL 504 TRACTOR

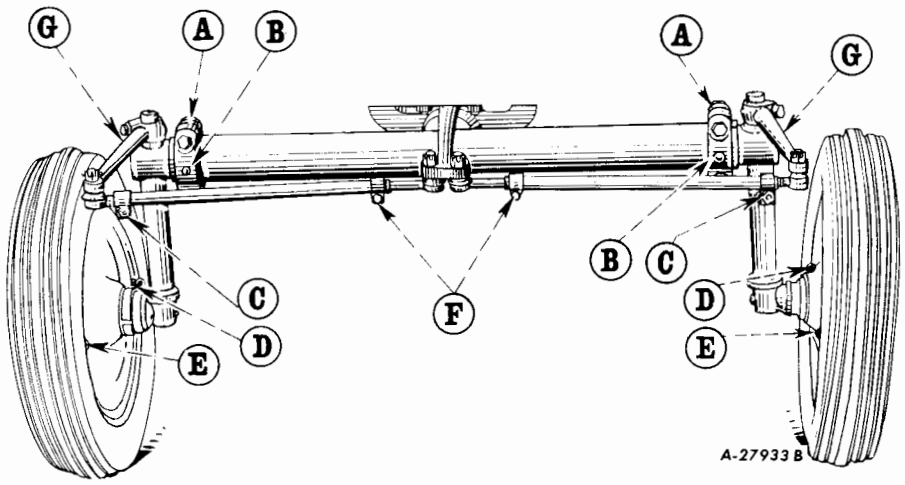
The front wheels are reversible disc wheels commonly equipped with 5.50-16 tires. Other tire sizes are available.

The wheels are provided with mounting holes for the addition of cast iron weights.

The front wheel tread is approximately 8 inches with the concave sides turned in.

An adjustable wide-tread front axle also is available.

ADJUSTABLE WIDE-TREAD FRONT AXLE



Illust. 35
Adjustable wide-tread front axle.

Your tractor may be equipped with one of two basic adjustable wide-tread front axle attachments as ordered: one provides a tread range of 50 to 74 inches with the wheel concaves turned in. The other adjustable wide-tread front axle attachment provides a tread range of 58 to 82 inches with the wheel concaves turned in.

The above figures apply when using 5.50-16 or 6.50-16 tires.

Many intermediate tread settings between these limits can be obtained by moving the axle extensions in or out.

ADJUSTING THE TREAD WIDTHS

1. Raise the front end of the tractor.

2. Loosen the bolts holding axle extension clamps "A" and remove bolt "B" on each side. See Illust. 35.

3. Pull out the cotter pins and remove axle extension clamp pins "B". Remove the bolts from tie rod clamps "C".

4. Pull the axle extensions out an equal distance on both sides to the desired tread position and move the tie rods to correspond.

5. Replace bolt "B" in the holes selected and tighten the clamps. Also replace and tighten the bolts in the tie rod clamps.

ADJUSTING THE TOE-IN

The front wheels should have 1/4-inch (±1/16-inch) toe-in (1/4-inch closer in front than in the rear). To check the toe-in, place chalk marks at point "D" on each rim at hub height, (Illust. 35) and measure the distance between them. Move the tractor forward a distance equal to one-half revolution of the front wheels. The chalk marks should now be at point "E". The measurement between point "E" should be 1/4-inch greater than at "D".

Adjustments can be made without disconnecting the tie rods from the steering knuckle arms "G" by removing bolts "F" from the tie rod clamps and loosening the bolts in tie rod clamps "C". Then turn the tie rod tubes clockwise or counterclockwise until the correct toe-in is obtained. Be sure to make the tie rod adjustments equal.

REAR WHEELS

Illust. 36
Cast iron rear wheel, concave turned out.

Farmall 504 Tractors are equipped with cast iron rear wheels with demountable double-bead type rims, or power adjusted wheels and rims, for 12.4-36 or 13.4-36 four-ply tractor-type, agricultural-tread tires as ordered with the tractor. See pages 37 to 39 for power adjusted wheels.

On the double-bead type rims, the rim is held to the wheel by eight clamps which engage a raised bead around the inside of the rim. The clamps may be bolted to either side of the wheel and will engage either of the two beads in the rim, as shown in Illust. 37.

The rear wheel tread can be varied from 52 to 80 inches with the wheel concave turned in or from 56 to 84 inches with the wheel concave turned out.

The desired tread width can be obtained by moving the wheels in or out on the axles, by mounting the rims in various positions on the wheels, and by reversing the wheels on the axles additional rear wheel tread widths up to 96 inches can be obtained by using wide tread rear axles. The various tread combinations available with different rim and wheel positions are tabulated in Illust. 37.

When reversing the wheels on the axles, make sure that the tires rotate in the direction shown by the arrow on the side of the tires. This will mean changing the wheels from one side of the tractor to the other unless the tires are removed from the rims.

The rear wheels are provided with mounting holes for the addition of cast iron wheel weights.

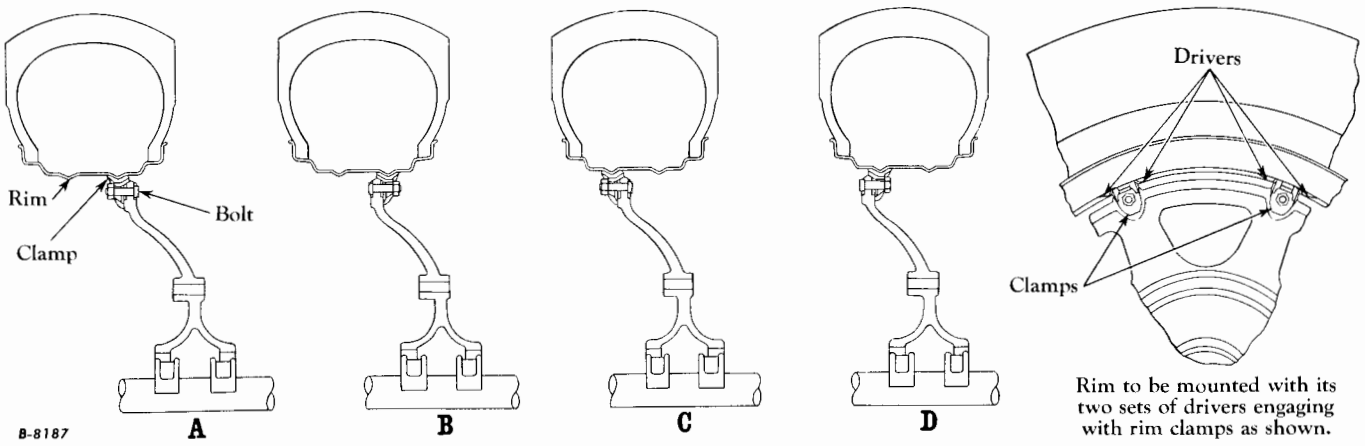
Note: Check the rear wheel hub clamp bolts after every 60 hours of operation to maintain a torque tightness of 240-280 foot-pounds. Tighten the rear wheel hub clamp bolts alternately a little at a time to prevent excessive tension at any location.

REVERSING THE REAR WHEELS

Raise the rear of the tractor so that one of the rear wheels is off the ground and the keyway in the axle is up.

Caution! Be sure the tractor is rigidly supported. Lock both brakes and block the front wheels and the other rear wheel.

Place the wheel in the desired position on the rear axle and tighten the clamp evenly and securely. Then lower the tractor, raise the opposite rear wheel, and proceed as described above.



Illust. 37
Rear wheel tread and rim mounting diagram - rear view of right rear wheel shown.

W-10-36 Double Beaded Rim	Wheel Concave	Rim and Clamp Position A	B	C	D
Standard Axle	In	52"-68"	56"-72"	60"-76"	64"-80"
	Out	56"-72"	60"-76"	64"-80"	68"-84"
Wide Tread Axle	In	52"-80"	56"-84"	60"-88"	64"-92"
	Out	56"-84"	60"-88"	64"-92"	68"-96"

POWER-ADJUSTED REAR WHEELS

The following instructions are for tractors with power-adjusted rear wheels having agricultural type 12.4-36 or 13.8-36 tires.

The power-adjusted rear wheels can be set at any position within the range of the holes in the rails on the rims by use of tractor power, to provide a variety of wheel tread positions. Wheel treads of 52 inches minimum to 88 inches maximum width may be obtained on tractors with standard rear axles by power-adjusting the wheels (concave sides out) and by moving the wheels in or out on the axles.

A range of 10 inches with 10-36 rims is available in two-inch increments at each position of the wheel on the axle by power-adjusting the wheels. **See Illusts. 38 and 39.**

Tread widths of 52 inches minimum to 100 inches maximum may be obtained when the tractor is equipped with wide tread rear axles.

Note: Since the minimum tread of 52 inches is determined by fender clearance and can be obtained on power-adjusted rear wheels with the wheel concave sides turned out, no advantage is gained by reversing the wheels to turn the wheel concaves inward.

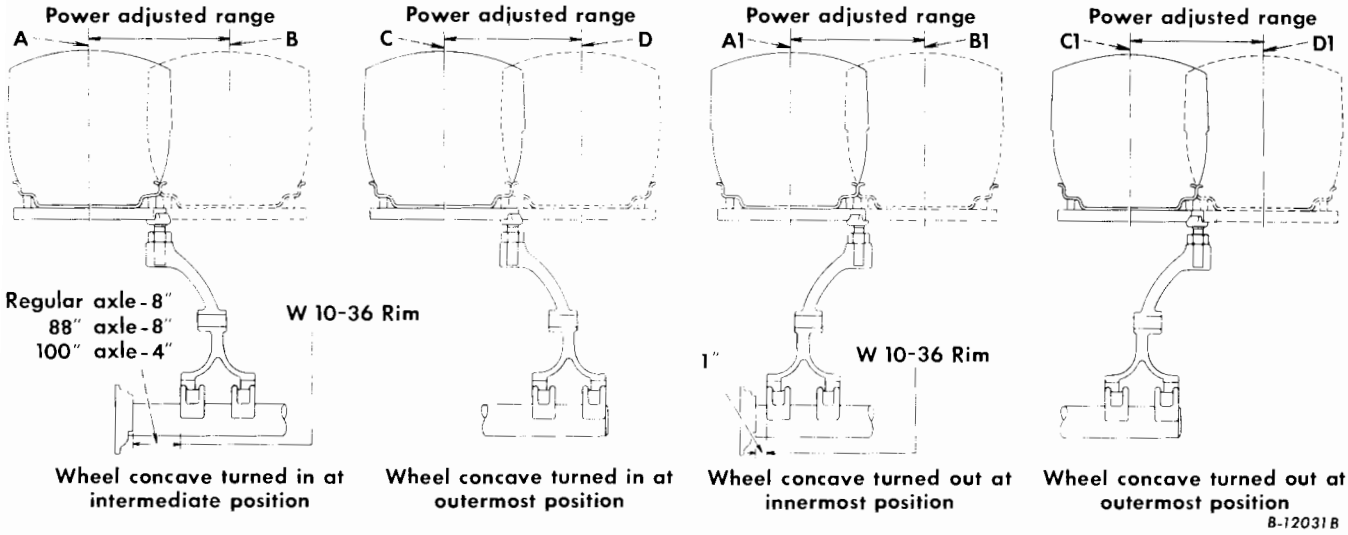
This would reduce the maximum tread adjustment by 4 inches.

ADJUSTING THE TREAD WIDTHS

Adjust the wheels one at a time as follows: Loosen the rim from the wheel by loosening the three upper-most adjacent jack screws as shown in **Illust. 39A.**

Loosen the screw in the stop at the side of the jack screw toward which the wheel is to be rotated. Move this stop to the new tread position. Then tighten the screw. **See Illusts. 39 and 39A.**

To move the right wheel inward or the left wheel outward, operate the tractor in low gear.



Illust. 38
Power-adjusted rear wheel tread diagram (right rear wheel shown).

	Wheel Concave Turned Out			
	Innermost Position		Outermost Position	
	A	B	C	D
Regular Axle W10-36 Rims	52"	72"	68"	88"
Wide Tread W10-36 Rims	52"	72"	80"	100"

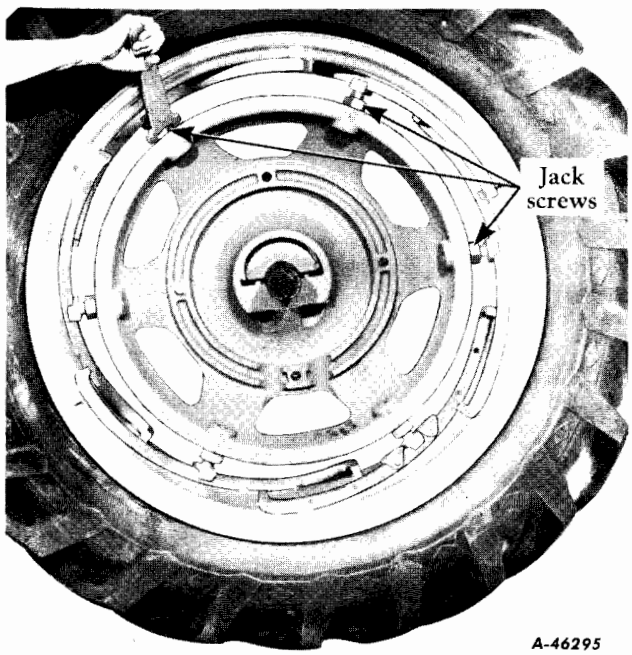
ADJUSTING THE TREAD WIDTHS - Continued

To move the right wheel outward or the left wheel inward, operate the tractor in reverse gear.

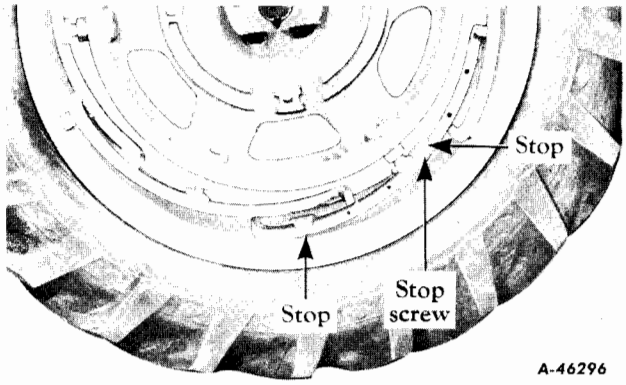
Apply the brake to the wheel which is not being adjusted. Engage the clutch until the jack screw reaches the stop, then disengage the clutch and shift to neutral.

Loosen the screw in the other stop, then slide the stop over against the newly positioned jack screw, and tighten the stop screw. **See Illust. 39A.**

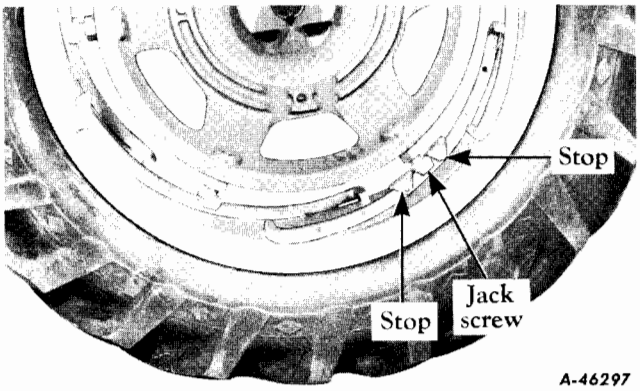
Tighten the nuts on the three previously loosened jack screws to 250 foot-pounds torque so the rim will be properly centered. Recheck all jack screw nuts for proper tightness after the tractor has been operated a short time.



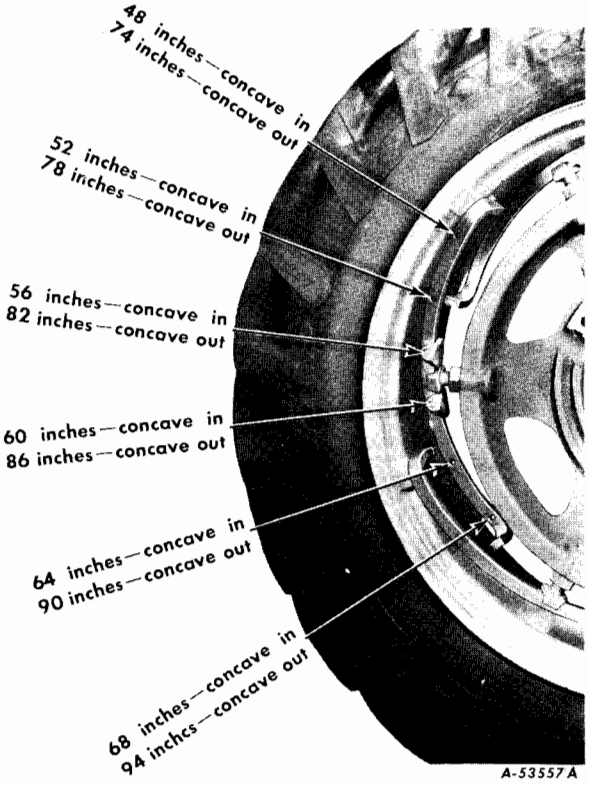
Illust. 38A
Loosening rim from wheel.



Illust. 39
Position of stop after power-adjusting rim.



Illust. 39A
Jack screw in locked position.



Illust. 39B

Jack screw locations for available power-adjusted rear wheel tread positions. Illustration shows INTERMEDIATE position of right rear wheel with 10-36 rim. Variations from this setting will result in other tread widths. Refer to Illust. 38.

PNEUMATIC TIRES

Observe the following instructions and recommendations in order to secure maximum life and efficient service from the pneumatic tires.

INFLATION

Keep the pneumatic tires properly inflated to the pressures shown in the tables on page 40. Underinflation will damage the tire cord body and may cause the tire to slip on the rim and tear out the tube valve stem. Overinflation results in excessive slippage, causing rapid tire wear.

Check the air pressure once a week with an accurate low-pressure gauge having one-pound graduations. Do not allow the air pressure to drop below the recommendations.

Always see that the tire valve caps are in place and are screwed tightly. The caps prevent the loss of air through the valve core, and also prevent loose soil, mud, gravel, snow, and ice from entering and damaging the valve core.

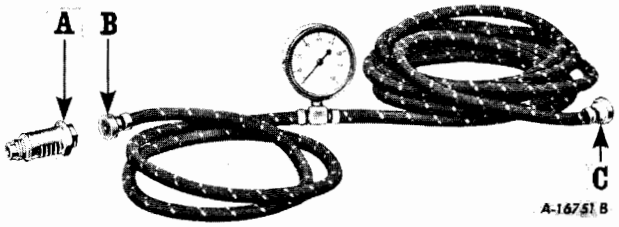
Tires can be inflated with a pressure pump, hand pump, or a spark plug pump. Spark plug pumps can be purchased from International Harvester dealers.

USING THE SPARK PLUG TIRE PUMP

Note: Do not use a diesel engine as the source of power.

Remove one of the spark plugs from the tractor engine, or any carbureted engine, and replace with pumping element "A" having the correct spark plug thread size. **See Illust. 40.** Attach one end "B" of the pump hose to the pumping element, and other end "C" to the valve stem of the tire to be inflated.

Start the engine and run it at low speed for maximum efficiency.



Illust. 40
Tire pump, hose, and air gauge.

OPERATING PRESSURE FOR LOW-PRESSURE TRACTOR TIRES

Caution! Upon receiving your tractor, immediately adjust the air pressure in the tires as indicated in the tables.

When equipment is mounted on the tractor, the rear wheel tire loads may be increased up to 20% with no increase in inflation (as indicated in the tables and speeds do not exceed 10 miles per hour). Tire loads should be calculated to include FULL bins or tanks.

SHIPPING TRACTORS EQUIPPED WITH PNEUMATIC TIRES

When tractors are transported on a carrier, such as a railroad car or trailer rear tires should be inflated up to 30 pounds. Front tires to the maximum pressures shown in the table. The higher pressure must be reduced to operating pressure before the tractor is removed from the carrier. Inflation pressure should be as follows to make possible rigid blocking and to prevent bouncing:

FRONT TIRE LOADS IN POUNDS AT VARIOUS INFLATION PRESSURE

Underscoring indicates maximum recommended load.

Tire Size	Ply Rating	Pounds per square inch: 20	24	28	32	36	40	44	48
		Kilograms per square centimeter: 1.40	1.68	1.97	2.25	2.53	2.81	3.09	3.38
F-2 Tread									
6.00-12	6	620	685	750	810	870	925	980	1030
5.50-16	4	655	725	795	860				
6.00-16	4	750	835	915					
6.00-16	6	750	835	915	990	1065	1130	1200	1260
6.50-16	4	860	960	1050					
7.50-10	6	825	915	1000	1080	1160			
I-1 Tread									
7.50-16	6	1500	1670	1820	1970				

REAR TIRE LOADS IN POUNDS AT VARIOUS INFLATION PRESSURES

Underscoring indicates maximum recommended load.

Tire Size	Ply Rating	Pounds per square inch: 12	14	16	18	20	22
		Kilograms per square centimeter: .84	.98	1.12	1.26	1.40	1.54
12.4-36	4	2120	2320				
13.9-36	4		2640				

Tire Code Marking	Tire Industry Type
F-2	Agricultural
I-1	Rib Implement
R-1	Agricultural

MOUNTING TIRES ON THE RIM

After mounting a new or old tire on the rim, inflate it to thirty pounds pressure to seat the tire bead on the rim flange and to prevent the tire from creeping and shearing off the valve. Then deflate or inflate the tire to the correct operating pressure.

TRACTION AND WEIGHTS

The tractor should not be operated with the tires improperly inflated. To insure the maximum hours of service, watch the tread lugs; if they wear down too fast, immediately add more weight to cut down slippage. Check for high air pressure. Consult your International Harvester dealer for information.

WHEEL WEIGHTS

The drawbar pull of a tractor can be increased by adding cast iron weights to the driving wheels, and by the use of liquid in the tire tubes.

The amount of the increase in drawbar pull by the addition of certain definite weights varies with the type of soil. When very heavy weight is required, both liquid and cast iron weights can be used.

After adding weight to the rear wheels, it may be necessary to readjust the height of the drawbar to obtain the correct alignment.

OVERLOADING

Do not overload the tractor tires by mounting implements on the tractor which exceed the load capacity of the size of the tires on the tractor.

CARE OF TIRES

Avoid stumps, stones, deep ruts, and other hazards. Cut in tires should be repaired immediately, as neglect decreases tire life. Keep the tires free from oil and grease, as both destroy rubber. After using the tractor for spraying (insect control work), use water to remove any chemicals that may be on the tires.

TIRE CHAINS

In wet grass or ground conditions, use lug-type chains. The flexing of the tire and the creeping of chains will break the mud loose as the wheel rotates. NOTE: There is a possibility of the tire slipping within the chain; to prevent this, the use of spring-type chain fasteners is recommended.

FRONT BOLSTER WEIGHTS

Due to the size and weight of some rear mounted implements, additional weight must be put on the front end of tractors when this equipment is used, this is particularly important when operating over rough terrain.

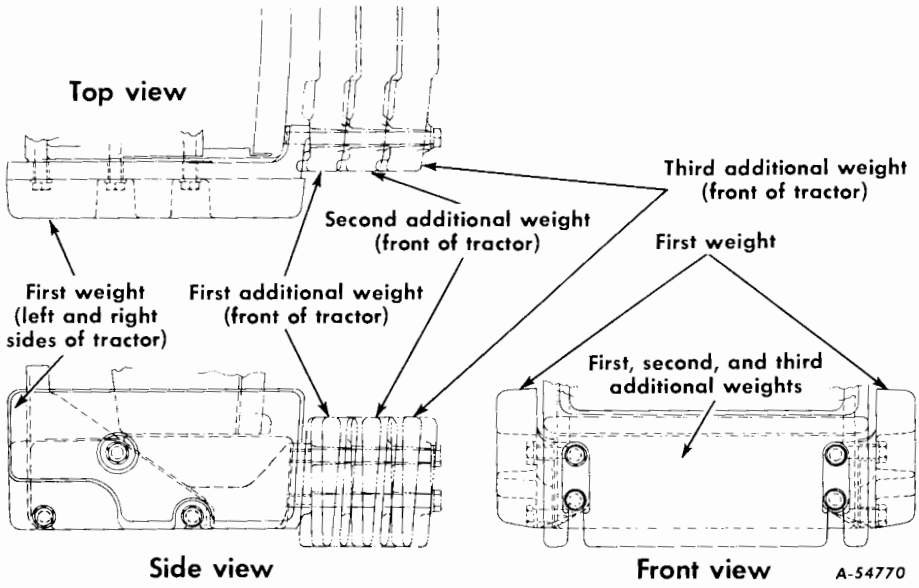
A set of two front bolster side weights, totaling approximately 160 pounds, can be used alone or in combination with one, two, or three front end weights totaling approximately 245, 330, or 415 pounds.

A first set of two front bolster side weights, weighing approximately 80 pounds each, can be installed on each side of the front bolster by using six 3/4NC x 2-3/4 inch hex. head cap screws, and six 3/4-inch plain washers.

One additional front end bolster weight, weighing approximately 85 pounds, can be installed on the front end of the first set of side weights by using four 3/4NC x 4-inch cap screws, and four 3/4-inch plain washers.

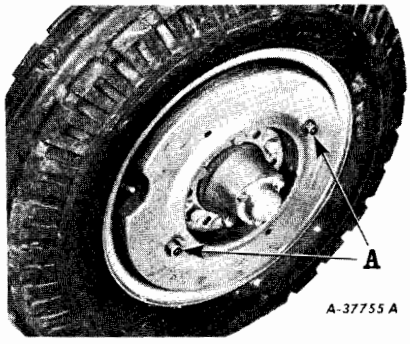
Two additional front end bolster weights, weighing approximately 85 pounds each, can be installed on the front end of the first set of side weights by using four 3/4NC x 6-1/2-inch cap screws, and four 3/4-inch plain washers.

Three additional front end bolster weights, weighing approximately 85 pounds each, can be installed on the front end of the first set of side weights by using four 3/4NC x 9-inch cap screws with four 3/4-inch plain washers.

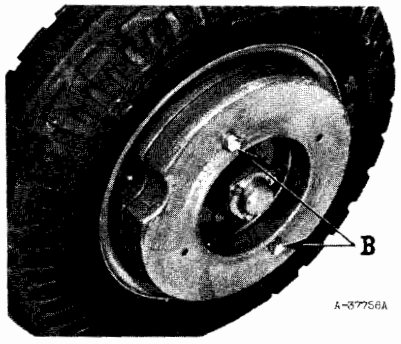


Illust. 42
Front bolster weights.

FRONT WHEEL WEIGHTS



Illust. 42A
First front wheel weight assembled
on the tractor.



Illust. 42B
First and second front wheel weights assembled
on the tractor.

The front wheel weights weigh approximately 54 pounds each, and either one or two can be attached to each front wheel. To increase steerability, front wheel weights are recommended for use as a front end counterbalance whenever heavy loads are superimposed on the drawbar, or when heavy equipment is to be mounted on the rear end of the tractor.

The first set of front wheel weights includes a set of two weights and four 1/2NC x 2-inch bolts, nuts, lockwashers and plain washers for attaching the weights to the front wheels at "A". See Illust. 42A.

If additional weight is desired, a second set of weights can be attached to the first weights by using four 1/2NC x 4-inch bolts, nuts, lockwashers and plain washers at "B". See Illust. 42B.

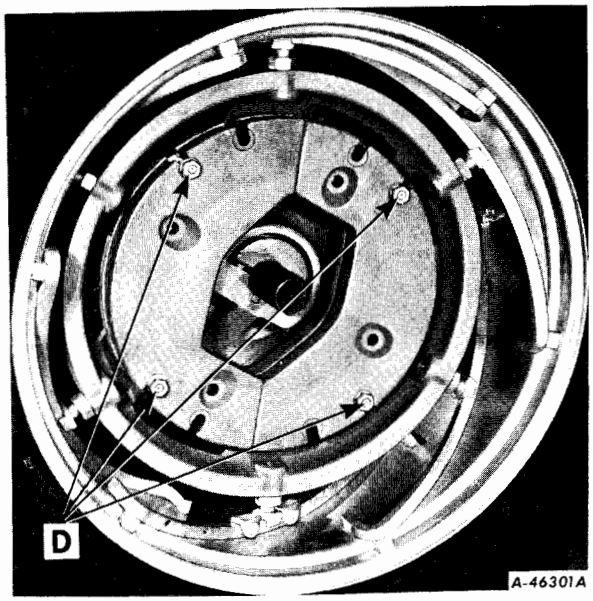
REAR WHEEL WEIGHTS (TWO-PIECE)

Two-piece weights are available to facilitate mounting weights on the inside of the wheel without having to remove the wheel. Easier mounting is possible to each half weights approximately 75 pounds.

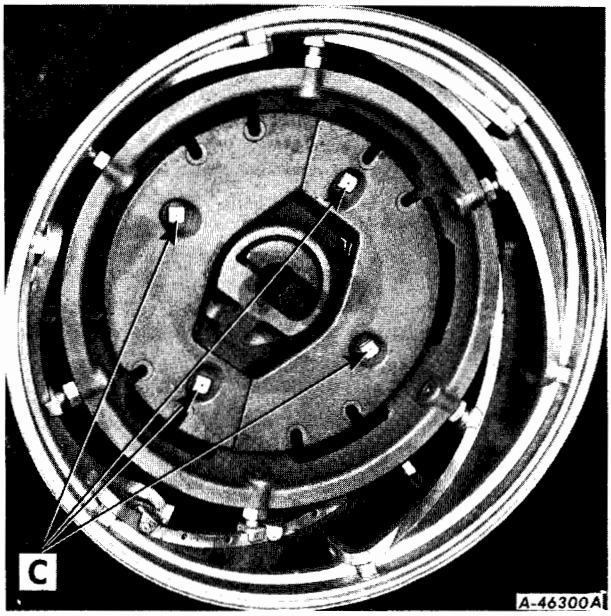
These weights can be attached to each drive wheel to reduce slippage and increase drawbar pull. The increase in drawbar pull, with the proportionate reduction in slippage varies with the type of soil.

The first set of rear wheel weights includes a set of four weight halves and eight 3/4NC x 4-3/4-inch bolts, lock washers, hex. nuts, and hex. jam nuts for attaching the weights to the wheels at "C". **See Illust. 43.**

The second set of rear wheel weights includes a set of four weight halves and eight 3/4NC x 3-1/4-inch bolts, hex. nuts, hex. jam nuts, and 16 plain washers for attaching the second set of weights to the first weights at "D". **See Illust. 43A.**



Illust. 43
First and second set of two-piece rear wheel weights assembled on power-adjusted wheels.



Illust. 43A
First set of two-piece rear wheel weights assembled on power-adjusted wheels.

LUBRICATION
GENERAL ENGINE LUBRICATION

The life of any tractor depends upon the care it is given. Proper lubrication is a very important part of that care.

Tractors shipped to destinations in United States of America, Canada, and Mexico have the crankcase and air cleaner filled with a light grade of oil for faster run-in. If the engine is to be operated at temperatures between +75°F. and +10°F., this oil can be used. If temperatures are not within the range specified, drain the oil from the crankcase, oil filter, and air cleaner, and replace it with the required amount of fresh oil having the physical properties and proper viscosity for the prevailing temperature and type of service. For the gasoline and LP Gas engines after the first 50 hours, and for the diesel engine after the first 25 hours of operation, the oil filter element and crankcase oil should be replaced. Refer to the "Lubrication Guide".

LUBRICATION

The engine has a pressure-feed lubrication system. A gear-type oil pump circulates the lubricating oil under pressure to the crankshaft bearings, connecting rod bearings, camshaft bearings, valve mechanism, timing gears, and governor, thereby assuring positive lubrication of all parts.

The engine is equipped with an oil filter which continually clears the oil while the engine is running. To obtain the full benefit from the filter on a gasoline or LP Gas engine, replace the used element with a new one, every time the oil in the crankcase is changed. (After every 250 hours of operation for gasoline engines or every 500 hours of operation for LP gas engines).

Replace the used element in the diesel engine, every second time the oil in the crankcase is changed (after every 200 hours of operation) cleaning the old element is not satisfactory.

The engine has a combination oil filler cap and bayonet-type oil level gauge on the right side of the engine.

Note: Stop the engine before removing the cap. Never check the oil level while the engine is running.

To add oil to the crankcase, remove the cap with the level gauge from the oil filler tube by turning the crosspiece counterclockwise to loosen it and then pulling out the gauge. The oil level should never be above the "Full" mark nor below the "Low" mark on the gauge.

When checking the oil level, the gauge must be withdrawn and wiped clean, then inserted all the way and withdrawn for a true reading.

OIL PRESSURE INDICATOR LIGHT

The oil pressure light (Illust. 6) shows whether lubricating oil is circulating through the engine.

The oil pressure warning light (Illust. 6) lights up as soon as the ignition key is turned on. If the light fails to come on the bulb is burned out. Replace it with a new bulb before starting the engine. The light will go off after starting the engine except in cold weather the light will stay on momentarily until lubricant starts to warm up).

If the light remains on after the engine is running a short time, stop the engine at once and inspect the oil system to find the cause of failure. If unable to find the cause consult your International Harvester dealer before operating the engine.

Always check the oil pressure light immediately after starting the engine.

OIL PUMP

A screen is attached to the oil intake of the gear-type oil pump in the crankcase. It stops large dirt particles from entering the lubricating system. This screen should be cleaned whenever the oil pan is removed. The oil intake floats on top of the oil in the crankcase and draws the oil from the surface, thereby eliminating the possibility of mixing water or sediment with the oil.

CRANKCASE BREATHER (Gas and LP Gas Engines)

The crankcase breather cap is located on the top of the valve housing. Remove the breather cap and clean it after every 50 hours of operation; under severe dust conditions, clean more frequently.

To clean, wash the breather cap in kerosene, dip it in engine lubricating oil, and replace it after wiping off the excess oil.

Replace the breather cap with the vent toward the rear of the tractor.

CRANKCASE BREATHER (Diesel Engine)

The crankcase breather pipe is on the left side of the engine. If the breather pipe has a crimped aluminum element in it, the element must be cleaned after every 150 hours. To clean it, remove the breather pipe and remove the element from the pipe. Wash it in kerosene or other solvent and reinstall it.

If there is no element in the breather pipe, the element is inside the push rod cover in the breather baffle at the breather pipe opening. Replace the element with a new one at the time of a major overhaul.

LUBRICATING OIL AND GREASE SPECIFICATIONS

ENGINE OIL (Gasoline and LP Gas Engines)

The three types of crankcase oils marketed have been classified by the American Petroleum Institute (API) as "For Service ML", "For Service MM", and "For Service MS".

Either single or multi-viscosity oils designated "For Service MS" are recommended for use in this engine.

ENGINE OIL (Diesel Engine)

Engine oil (for use in the crankcase and air cleaner) should be well-refined petroleum oil free from water and sediment.

Heavy-duty is the term used for engine oil possessing oxidation-stabilizing, anti-corrosive and antisludging properties neccessary to make it generally suitable for high-speed diesel engines. This is additive-type oil. The term "heavy-duty" as used here does not pertain to the viscosity rating or "weight" of the oil.

Heavy-duty engine crankcase oils provide the most satisfactory engine lubrication and should be used in diesel engines with present-day diesel fuels. The quality of the base oil and the amount and type of additives used in these oils determine their suitability for use in high-speed diesel engines under severe operating conditions, and also determine the degree of their suitability for use with diesel fuels containing sulphur or other injurious products.

No special procedure is required when heavy-duty engine crankcase oils are used other than to have the engine thoroughly run in.

It is not the policy of the International Harvester Company to publish approved lists of lubricants or to guarantee oil performance in service. The responsibility for the quality of the lubricant, its performance under the conditions of operation, and its compatibility with the diesel fuels used must remain with the supplier of the lubricant.

"Series 3" *lubricating oil is recommended for use in these engines.*

High-speed diesel fuels and lubricants should be procured from a reliable source. When in doubt, consult your International Harvester dealer.

TO AID STARTING

To facilitate starting, the selection of crankcase lubricating oils should be based on the lowest anticipated temperature for the day. It is not necessary to change the crankcase oil every time the temperature rises or falls into another temperature range during some part of the 24-hour day.

Also see "Cold Weather Precautions" on pages 51 to 54 for special instructions.

GEAR LUBRICANT

Tractors shipped from the factory to destinations in the United States of America, Canada, and Mexico are filled with lubricant in the transmission, differential and steering gear housing. Tractors shipped for export have all lubricant drained.

Torque Amplifier Transmission Lubricant Additive must be mixed with engine oil when it is used as gear lubricant, but must not be mixed with optional SAE-80 or 90 gear lubricant.

Use only high-quality lubricating oils and greases as specified in "Lubrication Table". For your own protection, select only oils and greases of recognized manufacture.

LUBRICATION FITTING GREASE

Use chassis lubricant (pressure-gun grease) for lubrication fittings on which the hand lubricator is applied.

Note: Keep your supply of lubricating oil and grease absolutely clean and free from dust. Always use clean containers. Keep the *lubricator clean and wipe dirt from the fittings* before applying the lubricator.

LUBRICATION TABLE

Point of Lubrication	Capacity	Anticipated Air Temperature				
		Above +90°F.	+90°F. to +30°F.	+32°F. to +10°F.	+10°F. to -10°F.	Below -10°F.
Gasoline engine						
Engine crankcase..	5 qt.	SAE-30 or SAE-20W-40	* SAE-20 or SAE-10W-30	SAE-10W or SAE5W-20	SAE5W-20 or 4-1/2 qt. SAE-10W w/1 pt. kerosene	4 qt. SAE-10W w/1 qt. kerosene
Air cleaner oil cup	1-1/2 pt.					
LP Gas engine†						
Engine crankcase..	5 qt.	SAE-20 or SAE-10W-30	SAE-20 or SAE-10W-30	SAE-10W or SAE5W-20	4-1/2 qt. SAE-10W 1 pt. kerosene or SAE 5W-20	4 qt. SAE-10W 1 qt. kerosene
Air cleaner oil cup	1-1/2 pt.				SAE-10W or SAE-5W-20	SAE-10W or SAE-5W-20

Point of Lubrication	Capacity	Anticipated Air Temperature			
Diesel Engine Farmall 504 Diesel Tractors.		Above +45°F.	+45°F. to +10°F.	+10°F. to -10°F.	Below -10°F.
Engine crankcase	7 qt.	SAE-30	SAE-10W	12-1/2 pts. SAE-10W with 1-1/2 pts. kerosene	11 pts. SAE-10W with 3 pts. kerosene
Air cleaner oil cup	1-1/2 pt.	SAE-30	SAE-10W	SAE-10W	SAE-10W
Oil pump support	xxx	Chassis Lubricant			
Generator	xxx	SAE-20 engine oil			

Point of Lubrication	Capacity	Lubricant
Distributor and drive housing	xxx	Chassis lubricant
Cam hole felt (in distributor).....	xxx	Light engine oil
Generator	xxx	SAE-20- engine oil
Cranking motor	xxx	SAE-20- engine oil
Transmission and differential case Tractors with Hydraulic system	Approx. 12 Gal.	1H Hy-Tran Fluid; or a mixture in the ratio of one quart 1H Torque Amplifier Transmission Lubricant Additive to each four gallons of SAE-10W engine oil (See Note I).
Transmission and differential case Tractors without Hydraulic system	Approx. 12 Gal.	Tractors operating in temperatures below +40°F., 1H Hy-Tran fluid; or a mixture in the ratio of one quart of IH Torque Amplifier Transmission Lubricant Additive to each four gallons of SAE-30 engine oil (see Note I); or SAE-80 gear lubricant may be used (see Note II). If temperatures are consistently above +40°F. 1H Hy-Tran fluid; or a mixture in the ratio of one quart of IH Torque Amplifier Transmission Lubricant Additive to each four gallons of SAE-50 engine oil (see Note I); or SAE-90 gear Lubricant may be used (see Note II).
Transmission and differential case Tractors without hydraulic system Torque Amplifier or Independent Power Take-off drive.	Approx. 6 Gal.	
Belt pulley housing (Rear mounted)	2 Qt.	
Steering gear housing Manual ..... Power steering....	1-1/2 pt. 1-1/2 pt.	Full strength IH Torque Amplifier Transmission Lubricant Additive or worm gear lubricant.
Lubrication fittings	xxx	Use chassis lubricant (pressure-gun grease) for fittings on which the hand lubricator is applied.

* SAE-5W-20 may be used if temperatures are not consistently above 65°F.

Note I - Any engine oil mixed with 1H Torque Amplifier Transmission Lubricant Additive must have an aniline point range of +170°F. to +220°F.

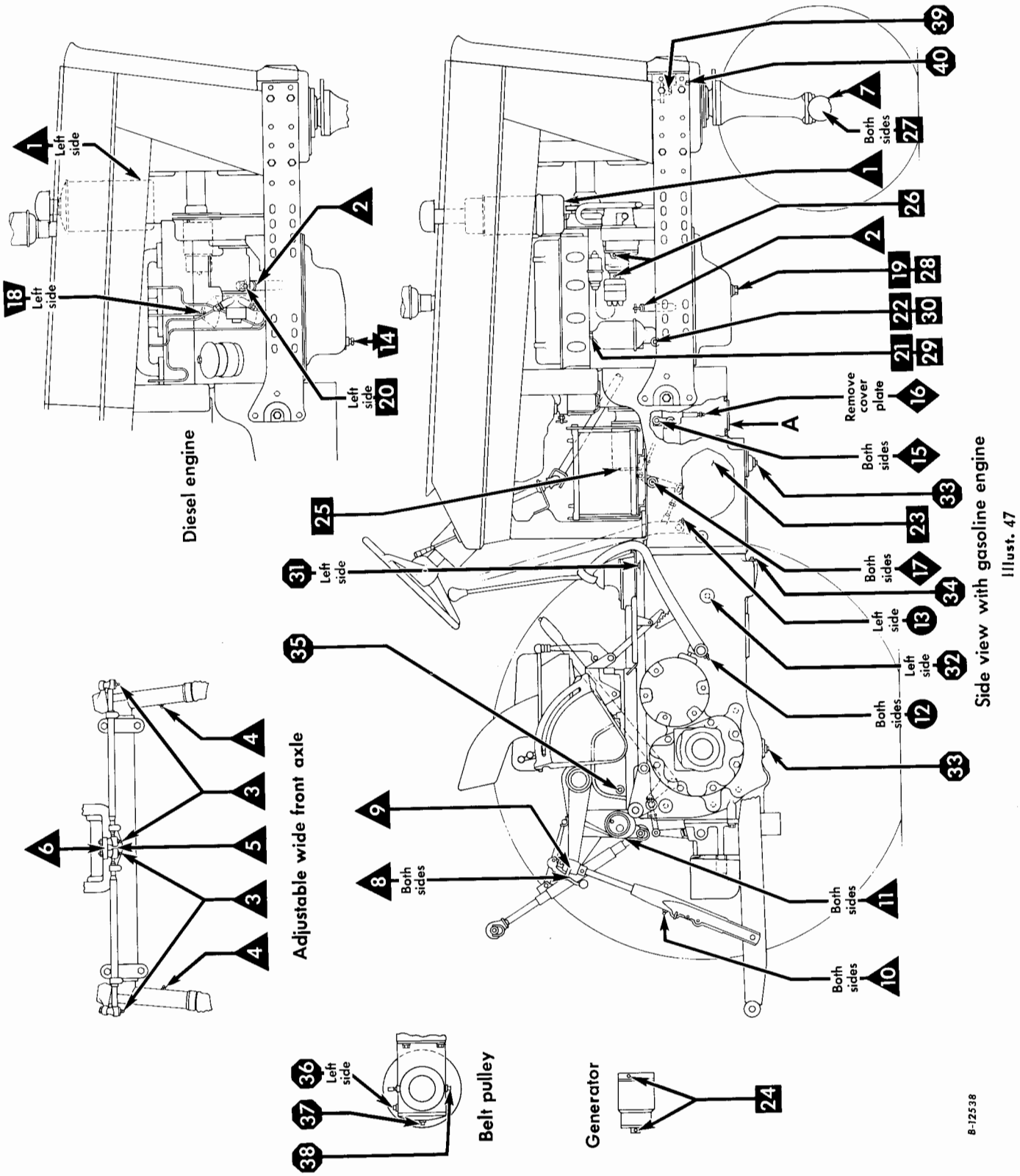
Note II - Torque Amplifier Transmission Lubricant Additive must be mixed with engine oil when it is used as gear lubricant, and must not be mixed with optional SAE-80 or 90 gear lubricants.

† - On LP gas engines when adding oil after crankcase change, use oil with one viscosity grade less.

LUBRICATION GUIDE

The symbols around the reference numbers indicate the intervals of lubrication.

-10 hours, -50 hours, -100 hours, -150 hours,
-200 hours, -250 hours, -500 hours, -Periodic



LUBRICATION

Key to Lubrication Guide

The symbols show around the reference numbers in Illusts. 46 and 47 indicate the intervals of lubrication. Paragraph numbers correspond to reference numbers in the illustrations.

▲ – Daily or After Every 10 Hours of Operation

1. Air Cleaner. — Clean and refill the oil cup to the oil level bead with the same new oil as used in the engine crankcase.

2. Oil level gauge (gasoline and LP Gas engines) Oil filler and bayonet-type oil level gauge (Diesel engine) — Check the oil (with the engine stopped) and add sufficient new oil to bring it to the "Full" mark on the bayonet gauge. Do not check the oil level while the engine is operating or operate the engine if the oil level is below the "Low" mark on the bayonet gauge. If the oil level is checked after the engine has been stopped for some time, the oil level may show slightly above the "Full" mark on the gauge. This is a normal condition as the result of oil draining back from the filter.

Note: The proper method of checking the oil level with the bayonet-type oil level gauge on the diesel engine (3) is: Turn the cross piece on the gauge counterclockwise to release it, remove the gauge from the oil filler tube and wipe it clean. Reinsert the gauge all the way without turning it, then remove the gauge and check the oil level. After checking, and adding oil if necessary, reinsert the gauge all the way, and turn the cross piece clockwise to tighten it.

3. Adjustable tie rod (4)

4. Steering knuckle post (2). (Adjustable wide front axle)

5. Front axle pivot shaft.

6. Power steering booster cylinder yoke (2) (Adjustable wide front axle) (not seen).

7. Single front wheel.

Use chassis lubricant (pressure-gun grease) and apply two or three strokes of lubricator, or sufficient grease to flush out the old grease and dirt.

THREE-POINT HITCH

8. Rockshaft arm (2).
9. Leveling screw collar (1).
10. Leveling screw housing (2).
11. Torsion bar bushing (2).

Use chassis lubricant (pressure-gun grease) and apply sufficient lubricant to flush out the old grease and dirt.

● – Weekly or After Every 50 Hours of Operation

12. Clutch pedal
    Brake pedal
13. Torque amplifier
    Operating handle

Use chassis lubricant (pressure-gun grease) and apply two or three strokes of lubricator, or sufficient grease to flush out the old grease and dirt.

Miscellaneous parts — Lubricate the clutch and brake pedal connections with a few drops of engine oil.

⬟ – After Every 100 Hours of Operation

14. Crankcase oil drain plug (diesel engine) — Remove the plug and drain all the oil from the crankcase while the engine is warm; then refill with new oil to the "Full" mark on the oil level gauge. Refer to the "Lubrication Table".

◆ – After Every 150 Hours of Operation

15. Clutch release shaft (2).
16. Clutch release bearing.
17. Torque amplifier clutch release shaft (2).

Use chassis lubricant (pressure-gun grease) and apply one or two strokes of the lubricator. To reach the clutch release bearing (15), remove the clutch compartment bottom cover "A".

▼ – After Every 200 Hours of Operation

18. Oil filter element (diesel engine)

Replace the oil filter element after every second oil change (200 hours of operation). Remove the oil filter retaining bolt and case and remove the used element. Install a new filter element as instructed in the Maintenance section.

■ – After Every 250 Hours of Operation

19. Crankcase oil pan drain plug (gasoline engine).

Remove the plug and drain all the oil from the crankcase while the engine is warm; then refill with new oil to the "Full" mark on the oil level gauge.

20. Oil pump shaft support (diesel engine).

Use chassis lubricant (pressure-gun grease) and apply two or three strokes of the lubricator or sufficient grease to flush out the old grease and dirt.

21. Oil filter element (gasoline engines).
22. Oil filter drain plug (gasoline engines).

Remove the oil filter drain plug and allow all the oil to drain out. Remove the oil filter retaining bolt and case, and remove the used filter element. Replace the drain plug and install a new filter element.

23. Hydraulic fluid filter.

Remove and clean the filter and replace the filter elements as instructed on page 53.

■ – Every Six Months or After Every 500 Hours of Operation

24. Generator oil cups (2).

Fill the generator oil cups with SAE-20 as follows:

Drive End: Fill the oil cup full once.

Commutator End: Fill the oil cup full approximately 2 or 3 times on a regular production generator having a bushing type bearing at the commutator end or fill the oil cup full only once on a heavy duty generator having a ball bearing at the commutator end.

Note: Overlubricating will "gum" the commutator, resulting in reduced output and increased wear. Never oil the commutator and do not lubricate the generator while it is in operation.

25. Cranking motor.

Put a few drops of SAE-20 oil in the cranking motor oil cup.

26. Distributor.

Remove the grease plugs and insert lubrication fittings. Apply chassis lubricant (pressure-gun grease) to the distributor fitting until a small quantity comes out of the relief hole opposite the plug. Apply several strokes of the lubricator to the drive housing fitting.

Remove the distributor cap and the distributor rotor, and apply one or two drops of light engine oil to the felt in the hole at the end of the breaker cam.

27. Front Wheels.

Remove, clean, and repack the front wheel bearings with fiber grease.

28. Crankcase oil pan drain plug (LP Gas engine)

Remove the plug and drain all the oil from the crankcase while the engine is warm; then refill with new oil to the "Full" mark on the oil level gauge.

■ – Every Six Months or After Every 500 Hours of Operation - Contd.

29. Oil filter element (LP Gas engine).
30. Oil filter drain plug (LP Gas engine).

Replace the oil filter element every time the crankcase oil is changed. Remove the oil filter drain plug and allow all the oil to drain out. Remove the oil filter retaining bolt and case and remove the used filter element. Replace the drain plug and install a new filter element as instructed in the tractor Preventive Maintenance Manual.

● – Periodic

Check the level of the lubricant periodically. Use approved lubricant according to the Lubrication Table.

Keep the lubricant up to the level of the cap screw opening in the hex. head plug (32) in the left side of the transmission case. Do not remove the large hex. head plug.

Note: Change the lubricant in the transmission case at least once a year preferably before freezing weather sets in. However do not drive the tractor more than 1,000 hours without changing the lubricant.

Transmission and Hydraulic System

31. Filler plug.
32. Level screw.
33. Drain plugs (2).
34. Drain plug.
35. Hydraulic housing drain plug.

Remove the two drain plugs (33) and drain plug (35) and allow all the lubricant to drain out. For tractors with Independent Power Take-Off and/or Torque Amplifier, also remove the drain plug (34). Replace the drain plugs and remove the filler plug (31) and level screw (32). Refill with approved lubricant up to the level opening. Start the tractor engine and operate it at a moderate idle speed. With the filler plug removed, move the position control lever and auxiliary valve control levers back and forth ten or twelve times, thereby drawing fluid from the rear frame, through the suction tube and into the hydraulic housing. If equipped with power steering, move the steering wheel first to one extreme, then to the other, and then back to center.

Then set the "Position Control Lever" and "Auxiliary Valve Levers" all the way forward.

Stop the engine and refill with approved lubricant up to the level opening and replace the filler plug and level screw.

Belt Pulley Housing

36. Filler plug.
37. Level plug.
38. Drain plug.

Check the oil level periodically. Use approved lubricant (see the Lubrication Table) and keep the lubricant up to the level plug (37). Drain and refill the housing each time the oil is changed in the transmission case. To change the oil, remove the drain plug (38) and allow all the oil to drain. Then replace the drain plug. Remove filler plug (36) and level plug (37). Fill to the level plug opening and replace the plugs.

Steering Gear Housing

39. Filler plug and level plug.
40. Drain plug.

Check the oil level periodically and add sufficient approved lubricant to bring it up to the level of plug. Keep the hole in the vent plug open at all times to relieve the pressure which may be built up due to temperature changes.

Change the oil at least once a year. However, do not operate the tractor more than 1,000 hours without changing the oil. Remove the drain plug and allow the oil to drain; replace the drain plug and remove the filler plug and level plug. Refill with approved lubricant up to the level plug opening and replace the plugs.

Miscellaneous

Occasionally lubricate the engine control linkage with a few drops of oil.

Occasionally coat the threads of the upper hitch link with chassis lubricant.

MAINTENANCE

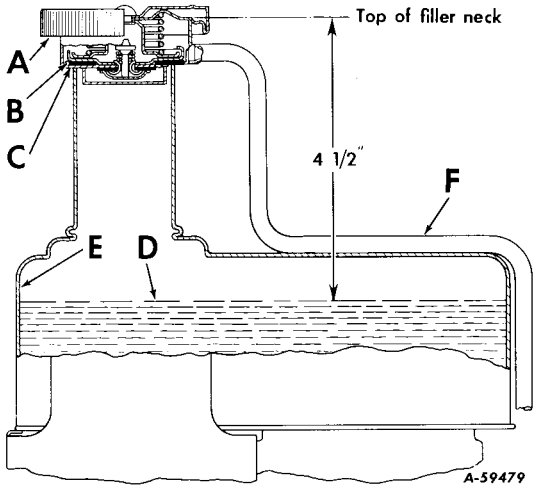
COOLING SYSTEM

The cooling system operates under pressure which is controlled by means of a regulating valve built into the radiator cap. Always use clean water (soft or rain water if possible).

ADDING WATER TO THE COOLING SYSTEM

Caution! If the water in the cooling system is hot and water is to be added, observe the following:

Turn the radiator cap "A" (Illust. 51) slowly counterclockwise to the safety stop to allow the pressure or any steam to escape; then press down on the cap and continue to turn until the cap is free to be removed.



"A" Radiator cap.
"B" Filler cap gasket.
"C" Filler neck.
"D" Water level.
"E" Upper water tank.
"F" Overflow pipe.

Illust. 51
Water level in pressure-cooled radiator.

Allow the engine to cool and fill the radiator slowly to approximately 4 inches below the top of filler neck "C". Due to expansion, when the system becomes hot, any excess water will be discharged through overflow pipe "F".

Note: Do not pour cold water into the radiator if the engine is very hot unless conditions make it absolutely necessary. In this case start the engine and let it idle; then slowly pour the water into the radiator.

Before replacing the filler cap, be sure to remove any chaff or dirt particles which may be on the gasket surface or cap, and tighten the cap clockwise to the stop.

Note: A pressure-cooled system will not operate properly unless the cooling system is tight.

The gasket surface must be in good condition. The cap must be properly tightened to the stop, and the system must not have loose connections or leaks. Unless these instructions are followed, pressure will not be maintained, and loss of water and consequent overheating will result. When draining the radiator, always remove the filler cap to permit complete drainage.

Do not attempt to repair or replace any of the regulating valve parts. If the valve is faulty, replace it with a new radiator cap of the same type.

FILLING THE COOLING SYSTEM

Be sure the radiator drain and the crankcase water drain are closed.

Fill the radiator to a level approximately 4 inches below the top of the filler neck. Filling the radiator to this level will allow for expansion of the coolant under normal operating conditions.

COLD WEATHER PRECAUTIONS

When operating the tractor in temperatures of +32° F. or lower, observe the following precautions:

FUEL SYSTEM (Gasoline)

Use only a high-test, winter-grade gasoline for starting, and keep your supply in a closed container so the more volatile portion does not evaporate.

Fill the fuel tank at the end of the day's run to prevent moisture from collecting in the tank.

LUBRICATION

Be sure to use lubricant of the correct viscosity in the engine crankcase and air cleaner, as specified in the "Lubrication Table".

COOLING SYSTEM

When the temperature is likely to be +32° F. or lower, there is danger of the water freezing in the cooling system.

To prevent this, drain the water from the cooling system (and regulating unit on LP Gas Tractors) at the end of each run or use IH permanent type antifreeze.

Draining and Refilling the Cooling System

If an antifreeze is not to be used:

1. Remove the radiator drain plug and open the crankcase water drain cock on the left side of the gasoline engine, or open the crankcase water drain cock on the right side of the diesel engine. See Illust. 15 and 56.

2. See that the drains are not clogged and that the water drains completely. Then replace the radiator drain plug and close the drain cock.

Note: Before filling the cooling system in freezing weather, cover the front of the radiator. Have sufficient water available at the tractor to fill the cooling system (warm water is preferable). Start the engine, then put the water in immediately. This keeps the water from freezing during warm-up. Maintain the operating temperature of the engine by uncovering as much as necessary of the front of the radiator.

If an antifreeze is to be used:

1. Inspect the hose connections. They must be in good condition both inside and out. Then tighten all water connections.

2. Inspect the water pump for leaks.

3. Inspect the fan belt and adjust it, if necessary, to the proper tension. If the belt is worn, or oil-soaked, install a new one.

4. Drain the cooling system as described above. Clean it as described on page 51.

5. Check to be sure that the radiator drain plug and the crankcase drain cock (on the left side of the gasoline engine or right side of the diesel engine) are tightly closed. Then fill the cooling system, using either of the following procedures:

a. Make a solution of the required amount of IH permanent type antifreeze with the necessary amount of clean water (use soft or rain water if possible) to fill the cooling system. Fill the cooling system to a level approximately 4 inches below the top of the filler neck. Because the thermostat is closed, only part of the solution can be put in. Put on the radiator cap, start the engine, and run it until the operating temperature is reached, to permit the thermostat to open. Then check the level of the solution and add solution as necessary to bring it up to the proper level.

b. Put the required amount of IH permanent type antifreeze into the cooling system as instructed on the container. Add sufficient clean water (use soft or rain water if possible) to a level approximately 4 inches below the filler neck. See "Specifications" on page 47 for the cooling system capacity. Start the engine and run it until operating temperature is reached to permit the thermostat to open and allow the antifreeze and water to mix thoroughly. After the engine is warm, check the coolant level in the radiator, and, if necessary, add water to bring it up to the proper level.

6. Check the cooling system for leaks, paying special attention to the hose connections.

Antifreeze Solutions

The use of alcohol as an antifreeze is not recommended because denatured alcohol boils at +173° F. However, if it is necessary to use alcohol, check the solution frequently to make certain you have adequate protection for the prevailing temperature.

Note: Use only one type of antifreeze solution. Do not mix solutions, as it will be difficult to determine the exact amount of protection.

Never use any of the following in the cooling water as an antifreeze - honey, salt, kerosene, fuel oil, glucose or sugar, calcium chloride, or any alkaline solution.

OIL FILTER (Gasoline and LP Gas Engines)

The life of your engine depends upon clean oil being circulated to all bearings.

OIL FILTER - Continued

The purpose of the oil filter is to separate and remove the dirt and other foreign substances from the oil to prevent these injurious materials from being circulated to the engine. This filter will keep the circulating oil free of harmful materials. Under normal operating conditions for the gasoline engine, replace the filter element every 250 hours of operation and after 500 hours for the LP Gas engine.

Note: To avoid delays, we recommend that you carry extra filter elements on hand so that replacement can be made at the proper time.

Changing the Filter Element (Gasoline and LP Gas Engines)

Illust. 53
Installing new oil filter element.

Do not change the element while the engine is running.

1. Remove the oil filter base drain plug or cap (Illust. 53) and allow the oil filter to drain completely.

2. Clean the filter case to prevent dirt from dropping into the base.

3. Unscrew and remove the retaining bolt.

4. Lift up and remove the case.

5. Remove the old element.

Note: If some special equipment on the tractor prevents lifting the case over the element, remove the case and the element together.

6. Wipe out the base and the case with a cloth dampened with kerosene.

7. Install the new filter element as follows:

   (a) Replace the drain plug in the filter base and install the new filter element.

   (b) Inspect the small metering hole at the threaded end of the oil filter retainer bolt, and make sure that it is not plugged. A plugged metering hole will impair or stop all oil flow through the oil filter element.

The life of your engine depends upon clean engine oil being circulated to all bearings. Every good tractor operator knows that dirt and other injurious materials eventually get into the crankcase of the engine and that in the normal course of engine operation the lubricating oil undergoes changes which produce sludge, acids, gums, varnish, and other harmful by-products.

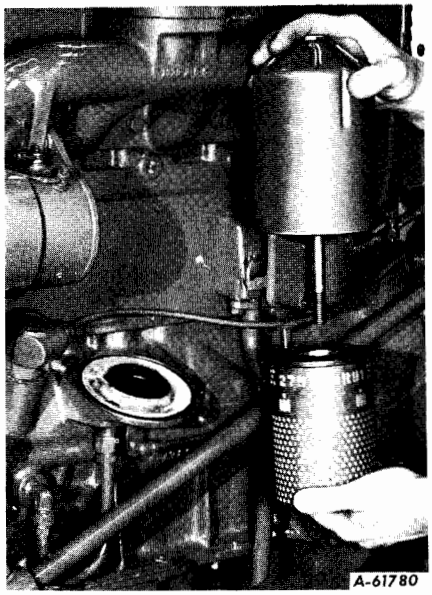
The purpose of the oil filter is to separate and remove the dirt and other foreign substances from the oil to prevent these injurious materials from being circulated to the engine. Under normal operating conditions the service life of the filter is 200 hours. By following the simple, common sense procedure for keeping dirt and oil impurities away from precision-made engine parts, you will safe-guard your tractor engine against undue wear and the operating troubles and upkeep expense which are a natural result of that condition.

Note: To avoid delays, we recommend that you carry extra filter elements on hand so replacement can be made at the proper time.

Changing the Filter Element (Diesel Engines)

1. Do not change the element while the engine is running. Stop the engine; remove the crankcase oil pan drain plug and drain all oil from the crankcase while it is still warm.

CHANGING THE FUEL FILTER
(Diesel Engine) - Continued



Illust. 54
Installing the new fuel filter element.

2. Clean the filter case to prevent dirt from dropping into the base.

3. Remove the 1/8-inch square head pipe plug under the filter base and allow the oil filter to drain completely.

4. Unscrew the filter case bolt.

5. Lift up and remove the bolt and case, **Illusts. 54 and 54A.**

6. Remove the old element.

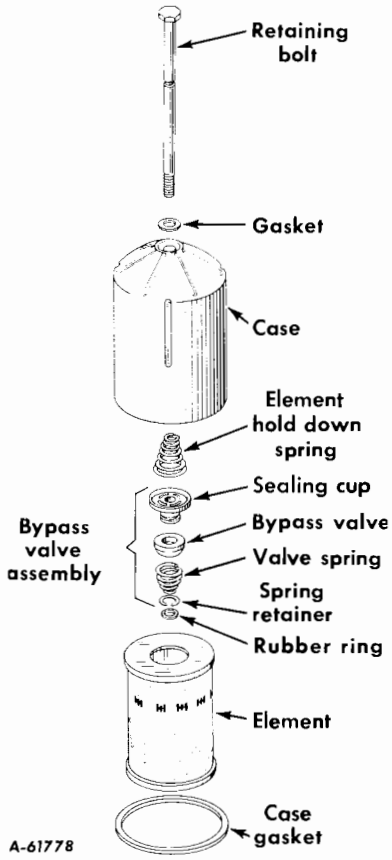
Note: If any equipment on the tractor interferes with lifting the case over the element, remove the case and element together.

7. Wipe out the base, filter case, and bypass valve assembly using a cloth dampened with a solvent. Then replace the filter base drain plug.

8. Install the new filter element as follows:

Make sure that the case gasket and the bolt gasket are in good condition. Replace them with new ones, if necessary.

To replace the bolt gasket, reach up inside the filter case and remove the rubber ring, bypass valve assembly, and element hold down spring from the filter case bolt. Then remove the bolt from the case and replace the gasket with a new one. Reassemble the bolt, filter case, hold down spring, bypass valve assembly, and rubber ring in the reverse order of removal. **See Illust. 54A.** Make sure the rubber ring is seated in the groove in the filter case bolt to prevent the valve assembly and spring falling out when changing elements.



Illust. 54A
Filter disassembled.

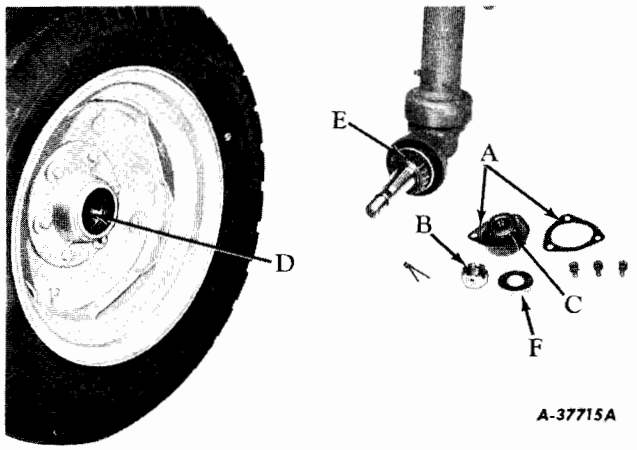
Install the new filter element, then install the case, retaining bolt, and bypass valve assembly. Carefully lower the retaining bolt into the filter base and tighten it securely.

9. Reinstall the crankcase oil pan drain plug and refill the crankcase oil pan with new oil.

10. Start the engine, check the oil pressure indicator light gauge to see whether lubricating oil is circulating through the engine; then inspect the filter for oil leaks.

GREASING THE FRONT WHEELS

Use pressure-gun grease (chassis lubricant) and apply two or three strokes of the lubricator, or a sufficient amount of grease to flush out the old grease and dirt. The lubrication fitting is located on the end of the front axle nut.



Illust. 55
Wheel removed for cleaning and greasing.

Be sure to keep all parts clean.

Every six months or after every 500 hours of operation, whichever occurs first, remove, clean and repack the front wheel bearings.

Raise the front end of the tractor until the wheels clear the ground. Remove hub cap and gasket "A", the cotter pin, nut "B" and washer "F". Remove bearing "C" and place it in hub cap "A" or in a clean container; then remove the wheel.

Clean the inside of hub "D", remove the old grease from the bearings, clean them with kerosene, and repack with fiber grease.

It is advisable to leave bearing "E" on the axle and clean it with a brush and kerosene. Repack the rollers with new grease before reassembling the bearings.

Inspect the oil seal felt washer and gasket and if they are not in satisfactory condition, replace them with new ones. A dirt deflector is also provided on the axle to prevent dirt from entering at the inner bearing.

REPLACING AND ADJUSTING

Reassemble the wheel and tighten nut "B" until the wheel binds slightly, rotating the wheel at the same time. Back the nut off one castellation from the cotter pin hole; replace the cotter pin and hub cap.

COOLING SYSTEM

A belt-driven water pump is used to circulate the water through the engine block, cylinder head, and radiator. Circulation is controlled by a thermostat which prevents the water from flowing through the radiator until the engine has reached operating temperature. With the thermostat closed, water circulates only through the engine block.

Cleaning the Cooling System

Twice a year or more often, depending upon the mineral content of the water used, the cooling system should be drained and thoroughly flushed. This is particularly important before using an antifreeze solution.

If the engine is to be operated in freezing temperatures, refer to "Cold Weather Precautions" on page 52. For filling the cooling system instructions and cooling system capacities, refer to page 47.

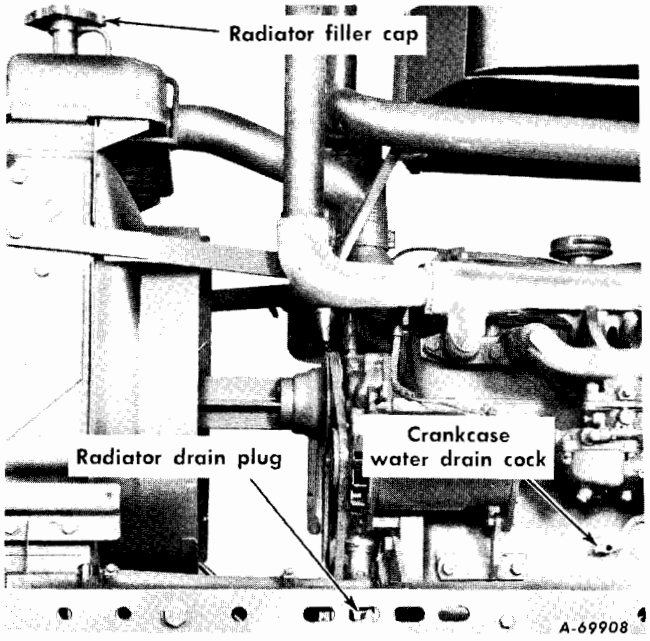
Drain the cooling system by opening the drain cock (on the left side of the gasoline and LP Gas engine) (on the right side of the diesel engine) and remove the radiator drain plug. Allow the system to drain; then replace the plug and close the drain cock.

Unless the cooling water is treated with a corrosion preventive, rust and scale will eventually clog the passages in the radiator and water jacket. This condition is aggravated in some localities by the formation of insoluble salts from the water used.

IH Cooling System Cleaner, dissolves rust, scale, and sludge and retards future corrosion when used according to the directions on the container.

Note: Do not use chemical mixtures to stop radiator leaks except as a temporary measure in an emergency. Instead, have the radiator repaired.

CLEANING THE COOLING SYSTEM - Continued



Illust. 56
Cooling system.

If the radiator is clogged with insoluble salt formations, take it to a reputable concern specializing in the removal of such formations. Reliable radiator service stations are familiar with local conditions and are equipped to apply the proper treatment.

The practice of flushing the system by forcing water from a hose in the radiator filler neck, without the use of cleaning solutions, may be only a waste of time. Iron corrosion is greater than that of any other cooling system metal, which accounts for the large quantities of rust found in neglected water jackets. Heavy rust deposits in the water jacket hold in heat and create local hot spots, especially around the exhaust valve seats. Under these conditions, the metal may get so hot that the valves will stick or burn, or the cylinder block or head may be damaged by heat cracking.

Engine Oil Cooler

When draining the cooling system on diesel engines, be sure to drain the engine oil cooler, located on the left side of the crankcase, by removing the water drain plug. See "Starting and Lighting" section. On LP Gas tractors, drain the water from the regulator. See LP Gas "Fuel System" section.

Rust Prevention

One of the most common causes of engine overheating is a rust-clogged cooling system. Rust interferes with circulation and cooling, which causes overheating.

In localities where alkaline, acid, or saline waters are the only kind available, the addition of IH Radiator Rust Preventive will tend to minimize the corrosive action of such water.

For rust prevention during winter use of the engine, a fresh filling of IH permanent-type antifreeze containing an effective corrosion preventive should be used. In the spring, drain and discard the old antifreeze solution, as the rust preventive or "inhibitor" may be exhausted from contamination and continued use.

After draining the antifreeze, IH Rust Preventive should be added to the cooling water to protect the cooling system during warm weather operation. This inhibitor solution should be drained and discarded in the fall when danger of freezing again makes necessary the use of an antifreeze.

Radiator Core

Overheating is often caused by bent or clogged radiator fins. If the spaces between the radiator fins become clogged, clean them with forced air or water. When straightening bent fins, be careful not to injure the tubes or break the bond between the fins and tubes.

Fan and Generator Belt Tension

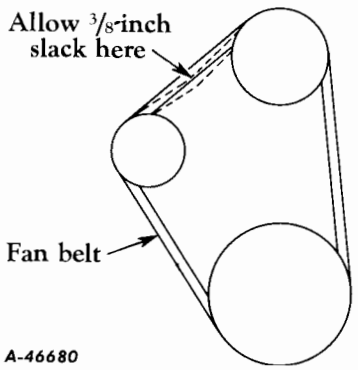
The slack of the fan belt should be checked after every fifty hours of operation to assure maintenance of the correct tension. The tension is correct when the belt can be depressed, without effort by your thumb, approximately 3/8-inch midway between the fan and generator pulleys. See Illust. 57. If the slack is more than 5/8-inch, adjust the belt as follows:

Adjusting the Fan and Generator Belt Tension

Loosen generator brace bolt "A" and generator mounting bolts "B" (Illust. 57).

Move the generator away from the engine until the tension on the belt is 3/8-inch (as explained above) measured between the fan pulley and generator pulley. See Illust. 57.

Adusting the Generator and Fan Belt Tension - Continued



Illust. 57
Correct belt tension.

Note: Under no circumstances should a pry bar be used on the generator to obtain fan belt tension as damage to the bearings will result.

Tighten mounting bolts "B" and brace bolt "A".

Removing and Replacing the Fan and Generator Belt.

Replace the fan belt when it becomes soaked with grease, or when it is so badly worn that it does not drive the fan at the proper speed.

To remove the old belt, loosen generator brace bolt "A" and generator mounting bolts "B". See Illust. 57. Move the generator in toward the engine and slip the old belt off the generator and crankshaft pulleys. Work the belt over the fan blades to remove it.

To install a new fan belt, work the belt over the fan blades and over the top of the fan pulley. Slide the belt over the crankshaft pulley. Hold the generator in toward the engine if necessary and slide the belt over the generator pulley. Adjust the belt as shown under "Adjusting the Fan Belt".

After a new belt has been in use approximately fifty hours, check the tension and adjust it again if necessary.

Water Pump

The water pump is in front of the crankcase and is driven by the fan belt from the crankshaft pulley. The inlet of the water pump is connected to the lower radiator connection and the outlet flow from the pump is through the integral passages cast in the crankcase.

No lubrication of the pump is required as the bearings are of the permanently sealed type and are packed with special lubricant for the life of the bearing.

The water pump requires no attention other than bearing replacement when they show excessive looseness or if a water leak developes which indicates that a damaged or badly worn seal needs replacement.

FUEL SYSTEM

(Gasoline and LP Gas Engines)

Cleaning the Fuel Strainer and Sediment Bowl

Clean the fuel strainer after every 250 hours of operation. To do this, proceed as follows:

1. Close the shut-off valve.

2. Take the strainer apart by loosening the nut under the sediment bowl.

3. Clean the sediment bowl and clean the screen if necessary.

4. When reassembling, be sure the cork gasket between the bowl and the main body is in good condition and does not leak. Use a new gasket if necessary.

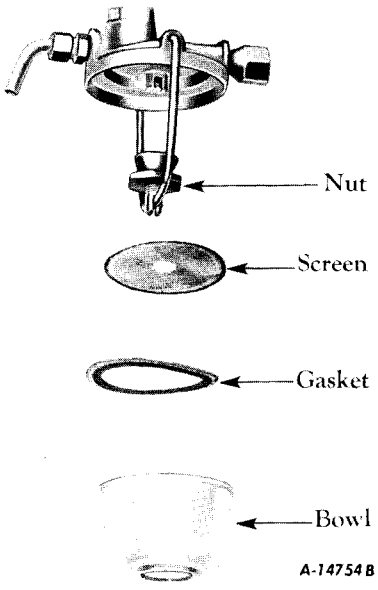
CARBURETOR (Gasoline Engines)

Use clean fuel; the presence of dirt and water will disturb the functioning of the carburetor. Clean the fuel screen after every 500 hours of operation.

The fuel screen can be removed for cleaning by unscrewing the fuel line fitting and removing the elbow; clean the screen and replace it.

The flange nuts which hold the carburetor to the manifold should be checked periodically for tightness. See "A", Illust. 58.

CARBURETOR (Gasoline Engine) - Continued



Illust. 58
Fuel strainer showing the glass bowl removed for cleaning.

Occasionally check cover screws which fasten the fuel bowl to the fuel bowl cover. See "B", **Illust. 58.** They should be kept tight to avoid any air leakage past the fuel bowl cover gasket.

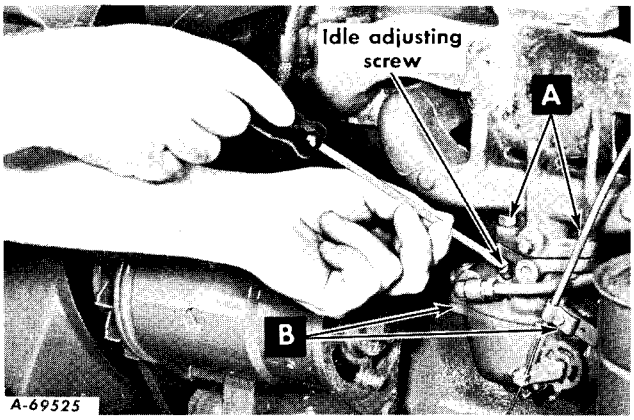
The engine and carburetor are correctly set when shipped from the factory. If this setting has been disturbed for any reason, proceed as follows.

Adjusting the Idle Adjusting Screw

Close the idle adjusting screw to its seat by turning it to the right (or in); then open it one turn. Start the engine and operate it at fast idle speed (without any load) until thoroughly warm. Cover the radiator if necessary or close the radiator shutter if the tractor is so equipped.

While the engine is running at fast idle speed, it is advisable to screw in the throttle stop screw a few turns to prevent the engine from stopping when the throttle is closed. Now close the throttle. The engine will then be idling at a fairly high speed and the throttle stop screw can be backed out a little at a time until the desired idle speed is obtained.

If the engine misses or rolls while backing out the throttle stop screw, the idle adjusting screw may be adjusted either in or out until



Illust. 58A
Carburetor adjustment.

the engine operates smoothly. Speed up the engine for a few seconds; then recheck the idle adjustment. A slight adjustment in or out will give the smoothest idle.

FUEL FILTER (LP Gas Engines)

The fuel filter is provided to stop the passage of scale, rust, or other foreign matter that may be carried by the liquid fuel as it flows from the tank. The filter is of cast bronze and designed for a working pressure of 375 pounds. Liquid fuel from the tank enters the filter and flows down through the treated paper filter cartridge to the outlet passage. By removing the nut and filter bowl, the filter cartridge may be removed for replacement.

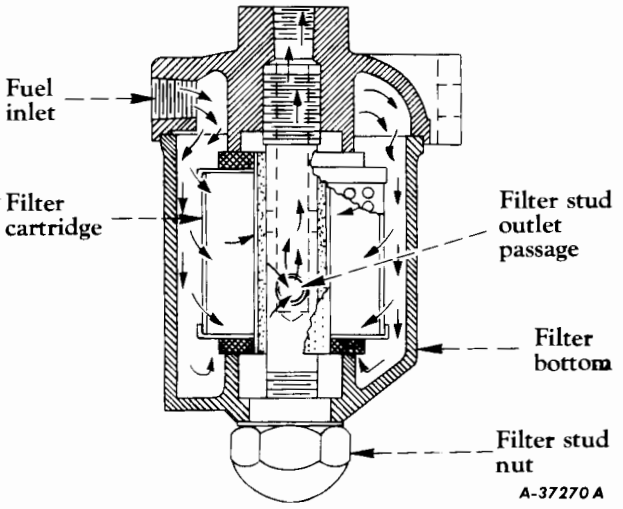
This filter operates until it becomes clogged sufficiently to restrict the flow of fuel.

A clogged element causes a pressure drop within the filter with consequent vaporisation of the fuel which may cause freezing at the filter and engine starvation for fuel due to liquid passages being required to pass gaseous fuel.

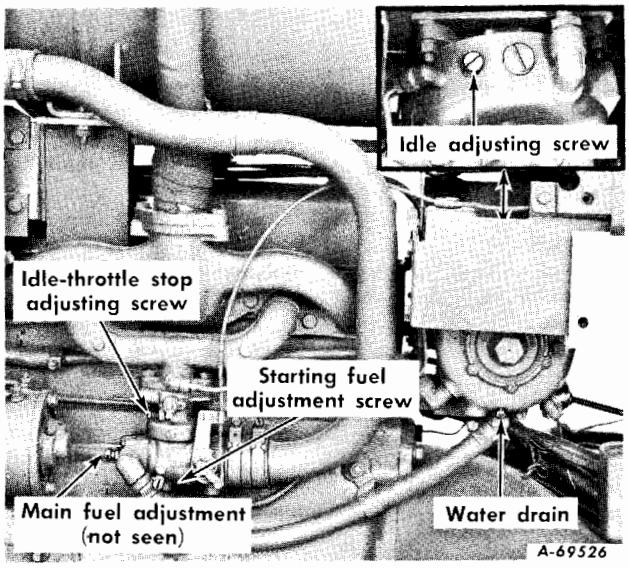
The filter element should be replaced when it is indicated that it is clogged sufficiently to restrict the flow of fuel. The filter element should be handled carefully so as not to crush or crack the sides of the element. When reassembling the filter, make certain the contact surfaces of the bowl gasket and the fiber washer on the filter and stud nut are clean. Replace the bowl gasket and fiber washer with new ones if necessary.

CARBURETOR (LP Gas Engines)

The carburetor, especially designed for LP Gas, mixes the correct proportions of LP Gas vapor with air and automatically provides this mixture in the right quantity to meet every engine demand. The carburetor also includes an economizer, a choke, and a metering system for starting purposes.



Illust. 59
Cutaway view of liquefied petroleum fuel filter showing the fuel passages inside and outside of the filter cartridge.



Illust. 59A
Carburetor and regulator adjustments.

Adjusting the Carburetor and Regulator

There are three fuel adjustments. These adjustments are correctly set at the factory and should require no alteration. If these adjustments have been disturbed in some manner, however, they can be correctly reset by following the instructions outlined below:

Starting adjustment and main fuel adjustment on the carburetor: Screw in (clockwise) for leaner mixture and out (counterclockwise) for richer mixture. **See Illust. 59A.**

Idle adjustment on the regulator: Screw out (counterclockwise) for leaner mixture and in (clockwise) for richer mixture.

To reset the fuel adjustments:

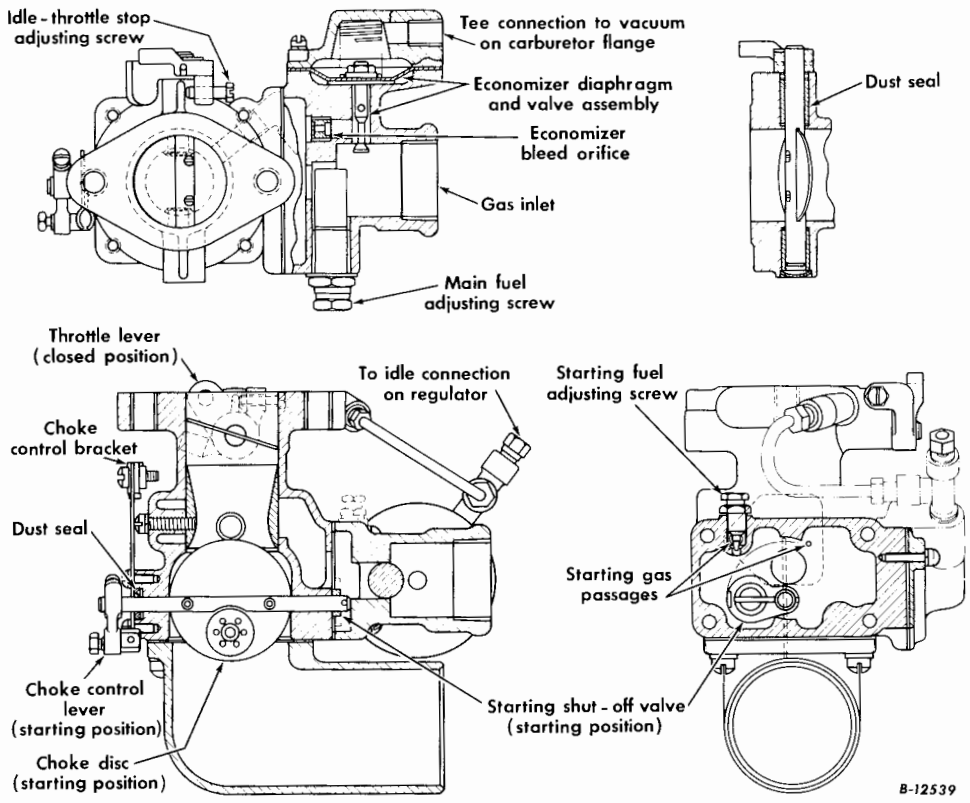
1. Loosen the lock nuts on the starting fuel adjustment and main fuel adjustment on the carburetor. Turn these adjusting screws, also the idle adjusting screw (on the regulator) all the way in.

2. Set the starting adjustment 1-1/4 turns open, the main fuel adjustment 1-1/2 turns open, and the idle adjustment (on the regulator) 1-1/2 turns open.

3. Start the engine and allow it to warm up. As soon as it is warm, retard the engine speed control lever until the control is taken by the throttle stop adjusting screw (on the carburetor) (**Illust. 59A**). Check the idle fuel adjustment (on the regulator) and turn it to a point where the engine speed is highest and operation smoothest.

To adjust the main fuel adjustment, move the engine speed control lever to the fully advanced position. Turn the main fuel adjustment either counterclockwise or clockwise to secure the smoothest operation. When the tractor is put under load, it may be necessary to vary this adjustment slightly to obtain the best engine performance.

The starting adjustment may be varied to obtain easiest starting if, "cold starts" with the suggested adjustment are not satisfactory.



Illust. 60 - Cutaway view of LP Gas carburetor

FUEL SYSTEM
(Diesel Engine)

The diesel fuel system consists of a fuel tank with a built-in stand pipe and a water drain plug, a fuel filter, an injection pump assembly complete with governor, a nozzle holder and nozzle assembly for each cylinder and high pressure steel tubings connecting the pump discharge outlets to the nozzles.

The fuel injection pump draws the fuel from the supply tank through the filters, places it under the high pressure required for mechanical atomization, meters it with great accuracy, distributes it in proper sequence to the various cylinders, makes the individual injections with fine precision in timing, and produces uniformly through the nozzles, the correct pattern of spray for the combustion chamber.

Careless removal of elements of the fuel injection system for "inspection" or "cleaning" is generally far more harmful than beneficial, because of the danger that dirt will enter the exposed connections and because of the possibility of mishandling the equipment through lack of knowledge of its design and construction. Various of its components are made with the utmost precision and are easily damaged when removed.

FUEL STORAGE

A storage tank is the best method of storing diesel fuel on the job. By the use of a storage tank, the sediment and water can be easily drained off through a trap provided for that purpose, and the fuel can be pumped into the tractor witha minimum of handling. When conditions require the use of drums for fuel storage, use a pump to draw the fuel from the drums, rather than from a faucet, as water and foreign material settle to the bottom of the drum. The suction pipe of the pump should be at least three inches from the bottom of the storage tank or drum.

If drums are used for storage of diesel fuel, place them under cover, or in a horizontal (laid-down) position if left exposed to rain. Do not disturb the drums after the fuel settles.

Do not use the last three inches of fuel in the supply tank or drum; collect it in a container and allow it to settle. In this manner the sediment and foreign material can be separated from the fuel and disposed of with no loss of fuel.

FUEL TANK AND WATER DRAIN COCK

The fuel tank is equipped with a built-in stand pipe and a water drain cock at the bottom of the tank at the right side of tractor. Water and foreign material which settles to the bottom of the tank should be drained off daily from the fuel before it enters the fuel filter and fuel injection pump. Open the drain cock before starting the tractor for each days work and allow water and sediment to drain from the tank until diesel fuel appears, then close the drain cock.

FUEL FILTER

The life of the filter element depends upon the amount of dirt, water and sediment that it must remove. It is important that clean fuel be used and that the fuel tank be drained of water at the recommended interval. This will lengthen the life of the filter element.

The fuel filter element cannot be cleaned and must not be disturbed except when it becomes necessary to replace it.

When to Replace Filter Element

Loss of power or misfiring of the engine may indicate that the fuel filter have become restricted.

1. Before replacing the filter element, drain the water from the diesel fuel tank as described above.

2. If the engine still shows loss of power replace the filter element as described below.

Precautions When Replacing Fuel Filter Element

Cleanliness cannot be overemphasized. Be careful not to allow dirt, water, and other foreign materials to get on the element. Keep new elements in the original package until ready for installation.

Before loosening the filter cover retaining bolt, clean the outside of the case and the cover thoroughly with kerosene or diesel fuel to prevent dirt or foreign material from entering the case when the cover is removed.

Replacing the Fuel Filter Element

1. Close the fuel tank shut-off valve on the left side of the tractor.

2. Open the air vent valve on the cover and remove the drain plug and allow the fuel to drain completely.

3. Unscrew the retaining bolt and remove the cover assembly from the case.

4. Remove the element and install a new element.

Note: Before installing the new element, clean the inside of the cover and case thoroughly with diesel fuel or kerosene.

5. Inspect the cover gasket and replace if necessary. Install the cover assembly with the cover gasket in place.

6. Close the vent valve, install the drain plug and open the fuel tank shut-off valve.

7. Be sure the retaining bolt has been drawn down tight then vent the system as described on page 64.

FUEL INJECTION PUMP

It should be borne in mind that minor problems can cause erratic engine behavior. It is unlikely that the injection pump itself will require overhaul before it has been in operation for several thousand hours.

Removing the Fuel Injection Pump

If it is necessary to remove the complete fuel injection pump from the engine, follow these instructions:

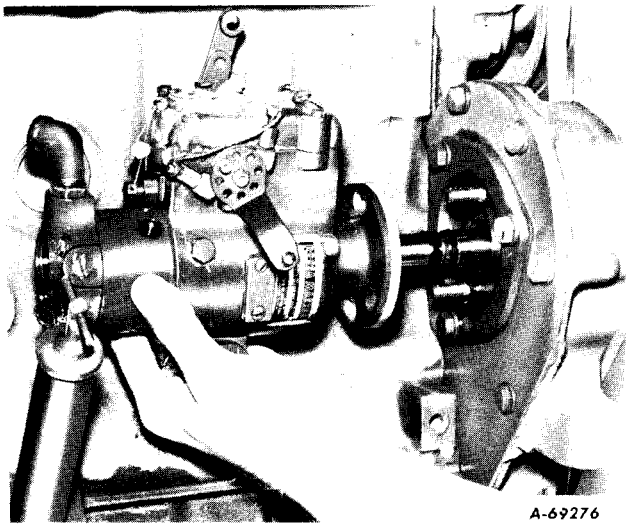
1. Close the fuel shut-off valve at the fuel tank.

2. Disconnect the governor control rod and fuel shut-off linkage.

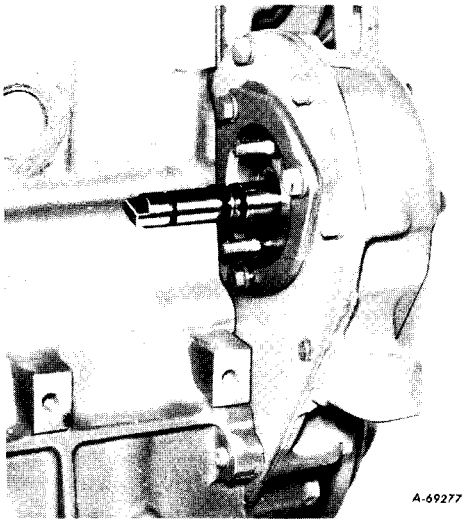
3. Thoroughly clean the injection pump, fuel lines and connectors with a brush and diesel fuel. Disconnect the fuel injection lines at the injection nozzles and leave them attached to the pump. Disconnect the main fuel supply and return lines at the pump. Cap all fittings and plug all line openings with clean caps and plugs.

4. Remove the timing hole cover (Illust. 64) and drain the diesel fuel from the injection pump.

FUEL INJECTION PUMP - Continued



Illust. 62
Removing and installing the injection pump.



Illust. 62A
Injection pump drive shaft.

5. Position the No. 1 piston 2 degrees after top dead center on the compression stroke by turning the engine in the normal direction of travel until the 2 degree mark after the notch marked DC on the fan drive pulley is in line with the timing pointer on the crankcase front cover. **See Illust. 62.**

Note: Rotate the pulley in a clockwise direction as viewed from in front of and facing the engine. Never rotate the engine in the counterclockwise direction as inaccurate timing will be the result. If you inadvertently pass the timing mark, make two complete revolutions of the pulley.

6. Check the position of the line on the governor weight retainer at the timing hole on the injection pump. **See Illust. 63.** The line on the governor weight retainer should be in line with the one on the cam ring. If it is not visible, turn the engine crankshaft one complete revolution.

7. Remove the two nuts and lock washers securing the pump to the adapter plate.

8. Slide the pump toward the rear of the engine leaving the drive shaft on the engine. **See Illust. 62.**

Note: Carefully slide the pump off the drive shaft so the tang of the shaft does not scratch or mark the pump housing bearing or oil seal. **See Illust. 62A.**

9. Unless the pump will be immediately reinstalled, cover the drive shaft to protect it from dirt or damage. Also tape or cover the drive shaft hole.

10. Remove the fuel injection lines from the pump and cap the pump fittings and plug the ends of the lines with **clean** caps and plugs.

Installing the Fuel Injection Pump

When the fuel injection pump is to be reinstalled on the engine, follow these instructions:

1. Check the timing mark on the fan drive pulley.

The timing pointer on the crankcase front cover must be in line with the 2 degree mark after the notch marked "DC" (top dead center). **See Illust. 64A.** The pulley rotates in a clockwise direction as viewed from in front of the engine.

Never rotate the pulley in the counterclockwise direction as inaccurate timing will be the result. If you inadvertently pass the timing mark, make two complete revolutions of the pulley.

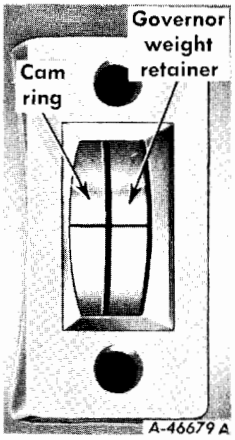
2. Remove the injection pump timing hole cover (**Illust. 63A**) and rotate the injection pump distributor rotor, by using a **clean** wide

Installing the Fuel Injection Pump - Continued

screw driver in the drive shaft tang slot, until the offset hole in the drive shaft tang slot is in line with the offset hole in the drive shaft tang. The line on the governor weight retainer should be visible in the timing hole. **See Illust. 63.** If it is not visible, the engine is on compression on No. 4 piston and must be rotated one revolution. To confirm being on compression on No. 1 piston, remove the injection pump drive gear cover. The hollowed out area with the line, in the gear hub, will be at approximately the 5 o'clock position. **See Illust. 63A.**

3. Lubricate the drive shaft and seals with clean chassis lubricant.

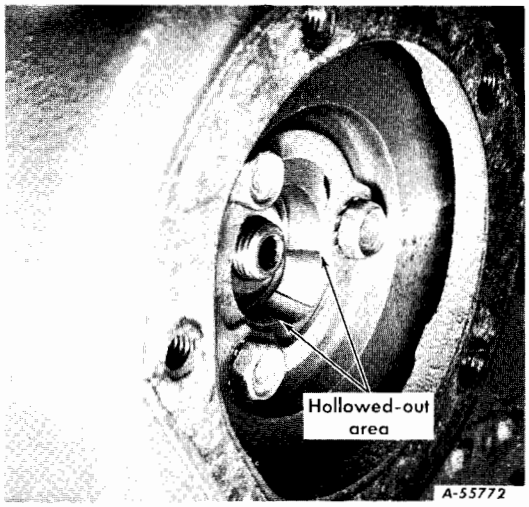
4. Again check the timing lines on the governor weight retainer and cam ring, and the offset holes in the drive shaft tang and tang slot. Taking extreme care that the drive shaft oil seals are not being lipped over in the process, slide the pump into position over the mounting studs. **See Illust. 62. Note:** The pump will slip over the seals easily if they have entered properly. If any resistance is felt, back the pump off the shaft and start over. A lipped over seal will permit diesel fuel to get into the engine crankcase.



Illust. 63
Injection pump timing marks.

Also, be sure the drive shaft tang enters the slot properly, as the mounting stud nuts can be started without the tang being in the slot. If any resistance is felt, rock the pump slowly from side to side. The slotted holes in the mounting flange will provide sufficient movement for the tang to enter the slot.

Tighten the mounting stud nuts finger tight.



Illust. 63A
Pump drive gear cover removed.

5. Install the fuel injection lines onto the pump using new copper washers and tighten the connector screws enough to insure proper sealing.

6. Check to see that the line on the governor weight retainer lines up with the line on the cam ring. **See Illust. 63.** If it does not, rotate the pump body on the mounting studs.

Tighten the mounting stud nuts.

7. Use a new gasket and replace the pump timing hole cover. Also, if it was removed, use a new gasket and replace the pump drive gear cover.

8. Connect the governor control rod and the fuel shut-off linkage.

9. Connect the return fuel line.

10. Open the fuel shut-off valve at the fuel tank. Purge the air from the fuel filters and fuel line to the inlet elbow, and connect the fuel line to the inlet elbow. Turn the engine over with the cranking motor and connect each fuel line to its injection nozzle as a full flow of fuel appears. See "Venting the Fuel System"

Note: All air must be eliminated from the fuel system before the engine will start and operate properly. All fittings and connections must be thoroughly tightened to prevent leakage of fuel and to prevent air from entering the fuel system.

VENTING THE FUEL SYSTEM

The system must be vented when --

— an engine, in operation, runs out of fuel.

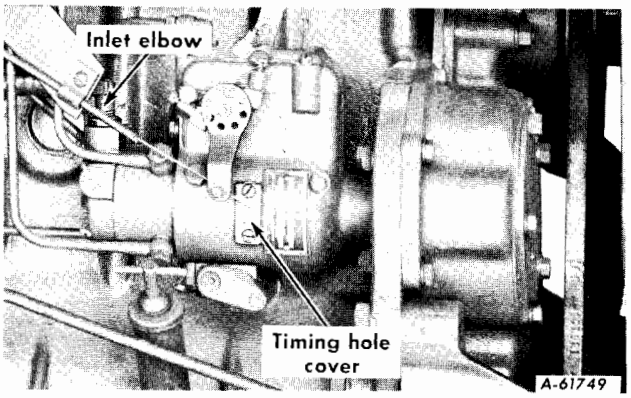
— the fuel filters have been serviced or replaced.

— any connections between the injection pump and the fuel tank have been loosened or broken for any reason.

— a new engine is being started for the first time.

If air has entered the diesel fuel system for any reason, vent the system according to the following procedure.

1. Loosen the bleeder stem on the vent valve at the top of the fuel filter and allow the fuel to run out until it becomes a solid stream without air bubbles. Then tighten the bleeder stem to close the vent valve.



Illust. 64
Injection pump.

2. Loosen the hose coupling nut under the final fuel filter, then loosen the hose connection on the injection pump inlet elbow (**Illust. 64**) and allow the fuel to run out until it flows in a solid stream without air bubbles.

Tighten the hose connection at the inlet elbow and tighten the coupling nut under the final fuel filter.

3. Loosen the coupling nut on the fuel return line on top of the injection pump and allow the fuel to run out. Crank the engine by pressing the push button starting switch for a few seconds until the fuel runs out in a solid stream, without air bubbles. Then tighten the coupling nut.

4. Try starting the engine. If the engine does not start use two wrenches (one for holding the adapter and the other for loosening the fuel pipe nut) and loosen the two center fuel pipe nuts at the injection nozzles. Crank the engine by pressing the push button starting switch until fuel appears. Be sure the adapters are tight; use two wrenches (one on the adapter and the other on the nut) and tighten the fuel pipe nuts. Start the engine.

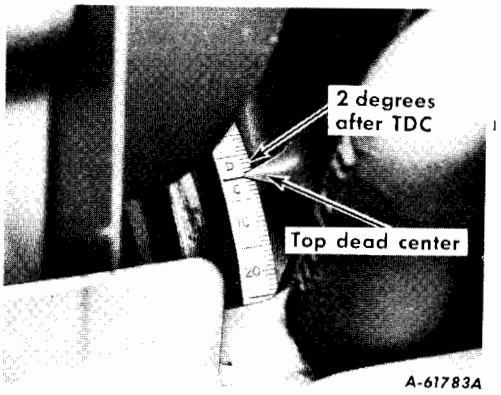
TIMING THE FUEL INJECTION PUMP

Warning! Never loosen the pump mounting nuts or attempt to make timing adjustments while the engine is running.

If the injection pump timing has been disturbed in any manner, retime the pump using the following procedure.

1. Turn the fan drive pulley in the clockwise direction until the timing pointer on the crankcase front cover is aligned with the two degree mark after the notch marked "DC" (top dead center). **See Illust. 64.**

2. Remove the injection pump timing hole cover (**Illust. 64**) to see whether the line on the governor weight retainer is visible. If it is not, rotate the pulley one complete revolution. This will put the engine on top dead center of the No. 1 cylinder compression stroke.



Illust. 64A
Timing pointer.

Never rotate the pulley in a counterclockwise direction as inaccurate timing will be the result. If you inadvertently pass the timing mark, make two complete revolutions of the pulley.

3. Check the fuel injection pump timing marks to be sure they are aligned. If they are not aligned, loosen the pump mounting nuts and rotate the pump by hand until the timing lines are aligned as shown in Illust. 64. Then tighten the mounting nuts. Reinstall the timing hole cover on the injection pump.

INJECTION PUMP GOVERNOR

The governor is an integral part of the fuel injection pump and is fully enclosed and sealed at the factory. It maintains the engine speed selected by the operator and automatically proportions the fuel to the load.

Do not attempt to adjust the pump or the governor. In case of serious trouble, it is best to replace the entire unit or see your International Harvester dealer.

AIR CLEANING SYSTEM

Clean air for combustion is assured by an oil-type air cleaner. A heavy screen in the air intake cap prevents large particles from entering the air cleaner. The air then passes to the oil cup where it goes through a bath of oil. As the air rises to the intake manifold, it passes through a series of oil-bathed screens and the fine dust is removed. As the oil from the screen works back down, it carries the dirt with it and settles in the oil cup. Never allow dirt to build up in the cup more than 1/2-inch deep.

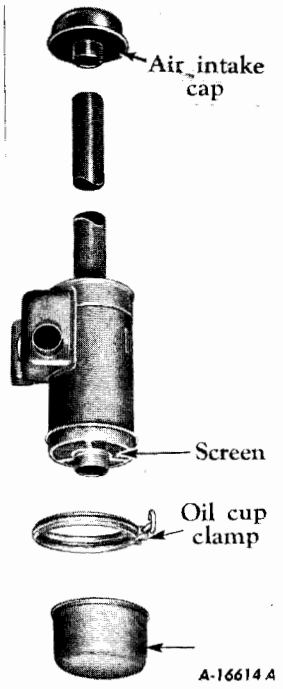
OIL CUP SERVICE

Clean and refill the oil cup every day, or every 10 hours of operation (more frequently when operating under dusty conditions). Refill the oil cup to the oil level bead with the same grade of oil used in the engine crankcase. For the oil cup capacity, refer to page 46.

Do not remove the oil cup while the engine is operating. Before replacing the oil cup, clean or wipe oil or grit from the top bead of the oil cup.

PRE-SCREENER

The Pre-Screener cap prevents chaff and other coarse dirt from getting into the air cleaner. Keep this screen clean and free from all chaff, oil, dust, or paint, as clogged holes in the screen will reduce the power of the engine by restricting the flow of air.



Illust. 65
Exploded view of the air cleaner.

WASHING THE CLEANER

After every 150 hours of operation, particularly if operating the tractor in an atmosphere heavily laden with dust, chaff, or lint; remove the entire air cleaner from the tractor, disassemble it (**Illust. 65**), and wash the parts thoroughly in kerosene. Be sure to clean out the air intake pipe.

After all parts have been thoroughly cleaned, replace the air cleaner body on the tractor. Make sure all joints are airtight. Replace the air intake Pre-Screener. Fill the oil cup to the proper level with the specified grade of oil and replace it on the air cleaner. Be sure it is held securely in place by the oil cup clamp.

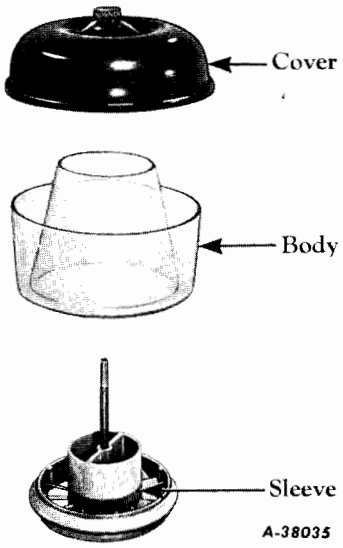
GENERAL PRECAUTIONS

As an added precaution against dirt entering the engine, frequently inspect the flexible rubber hose connections between the carburetor and the air cleaner. If they show any sign of deterioration, replace them. To eliminate strain on the rubber hose connections, be sure the pipes line up. All joints between the air cleaner, carburetor, manifold and cylinders of the engine should be tight. All gaskets must be in good condition and the bolts should be drawn up tight.

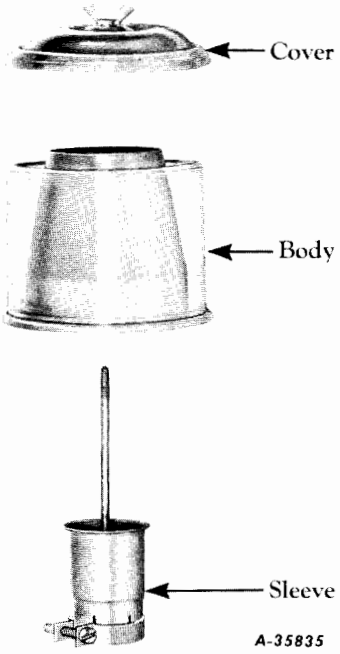
CLEANING THE PRE-CLEANER

Collector-Type and Detachable-Sleeve-Type Pre-Cleaners

Empty the Pre-Cleaner when the dust reaches the dust level mark. **To Clean:** Loosen the knurled nut or wing nut and remove the cover assembly. Then lift the plastic body from the sleeve, turn upside down and shake the dust from the dirt compartment. Reassemble the Pre-Cleaner on the tractor. **See Illust. 66.**



Illust. 66
Collector-type Pre-Cleaner disassembled for cleaning.



Illust. 66A
Detachable-sleeve-type Pre-Cleaner.

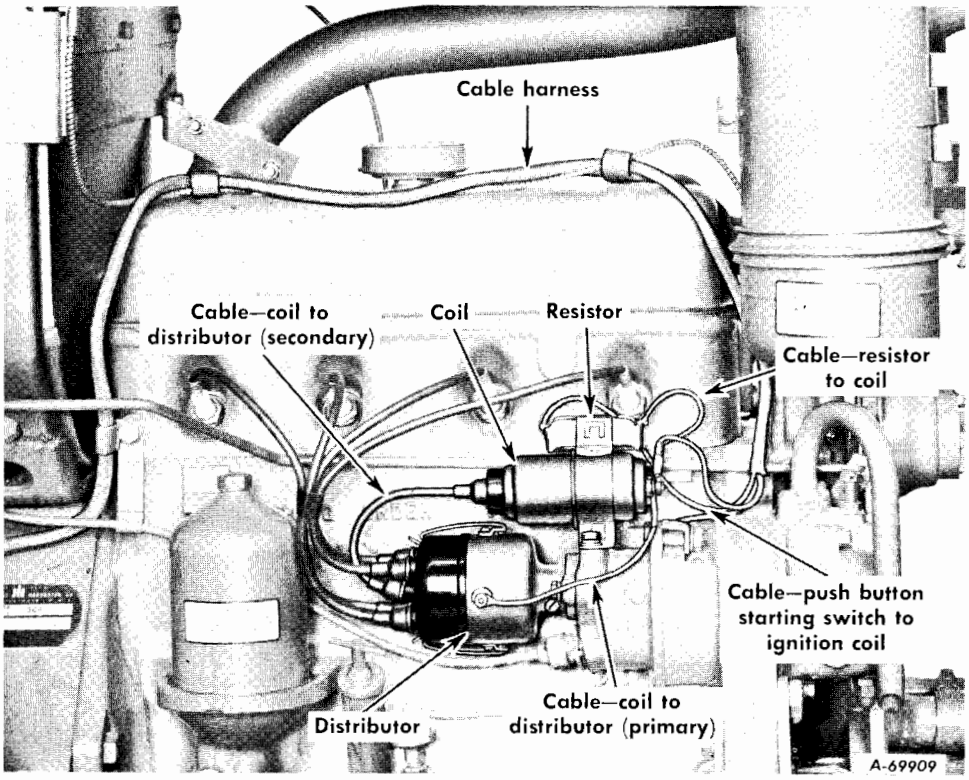
STARTING AND LIGHTING EQUIPMENT

GASOLINE OR LP GAS ENGINE TRACTORS

The electrical system of the tractor is a twelve-volt system and consists of a generator, voltage regulator, cranking motor, lights, lighting switch, twelve-volt battery, and a battery ignition unit. The colored plastic covered cables are contained in a harness of nonmetallic, oilproof, and waterproof woven braid.

Use the illustrations and wiring diagrams **on pages 72, 73, 76, and 77,** as a guide for identifying the various electrical units and for tracing the electrical cables and connections. Be sure all terminals are clean and securely fastened.

When the electrical equipment was installed at the factory, the battery-to-ground strap was left disconnected and taped. Before attempting to start the tractor, make certain that the ground strap is connected.



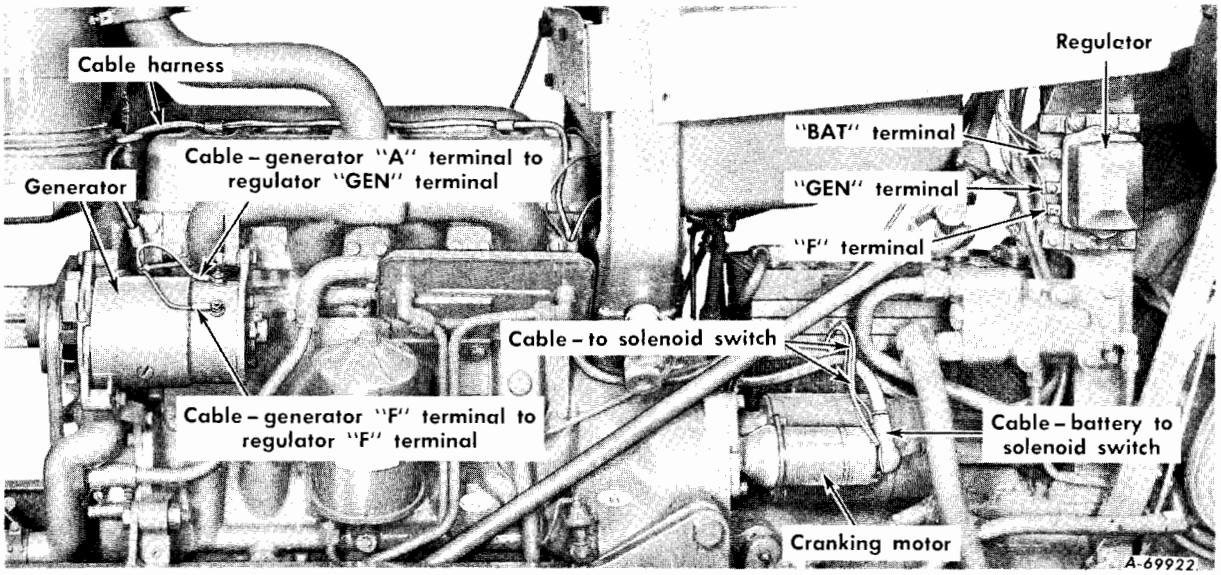
Illust. 67— Distributor, coil, and cable harness on the right side of the gasoline engine.

DIESEL ENGINE TRACTORS

The 12-volt electrical system of the tractor consists of a generator, voltage regulator, cranking motor, lights, lighting switch, electrical instruments, and either, one 12-volt battery or two six-volt batteries.

The colored plastic-covered cables are contained in a harness of nonmetallic oil-proof and waterproof woven braid.

Use the illustrations on page 67 and the wiring diagrams on pages 72, 73, 76, and 77 as a guide for identifying the various electrical units and for tracing the electrical cables and connections. Be sure all of the terminals are clean and securely fastened.



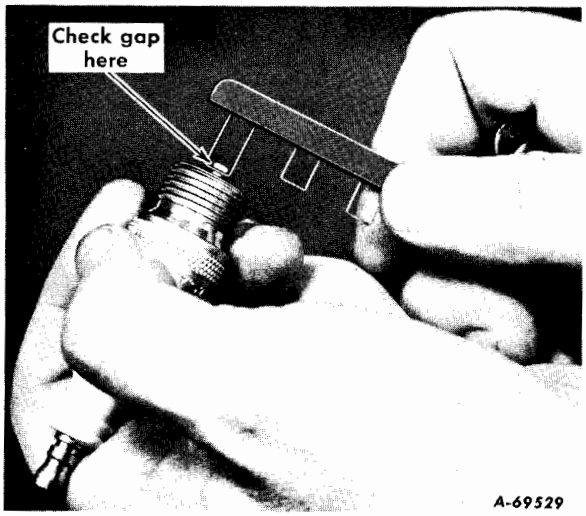
Illust. 67A — Generator, cranking motor, voltage regulator, cable harness, and cables on the left side of the diesel engine.

SPARK PLUGS AND CABLES

Gasoline or LP Gas Engine Tractors

Note: Remove all dirt from the base of the spark plug before removing the spark plug.

Remove the spark plugs after every 200 to 300 hours of operation for cleaning and checking the gaps between electrodes. A gap of .023 inch should be maintained for gasoline engines or .015 for LP Gas engines. When making this adjustment, always bend the outer electrode. Never bend the center electrode, as it may damage the insulator. If the gap between the electrodes is too great, due to improper setting or burning off of the ends, the engine will misfire and be hard to start.



Illust. 68
Checking the spark plug gap. Set gap at .023 inch. (Gasoline engines)

CLEANING SPARK PLUGS

Sandblasting is the recommended method of cleaning spark plugs. Never scrape or clean the insulator with anything which will scratch the porcelain. Scratched porcelain allows carbon and dirt to accumulate much faster.

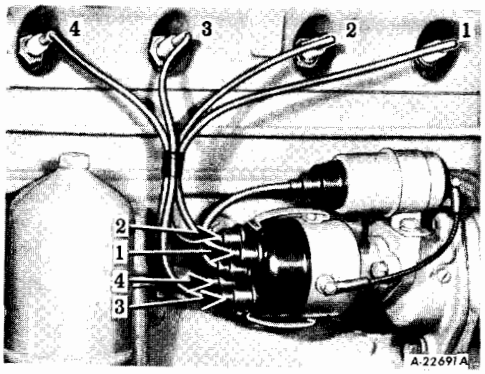
Always use a spark plug wrench when removing or replacing plugs. This helps to prevent cracking the porcelain.

When replacing spark plugs, be sure that the gaskets are in good condition, and screw the plugs in tight.

Replace defective plugs with new plugs.

See your International Harvester dealer for various makes of replacement plugs for normal or special service. These plugs have been tested and recommended as best suited for this engine.

If the spark plug cables are removed for any reason, note the position of each cable on the distributor cap as shown in **Illust. 68A.**



Illust. 68A
Spark plug wiring. Engine firing order is 1, 3, 4, 2.

GLOW PLUGS

Diesel Engine Tractors

If glow plug failure is suspected, check the glow plugs by removing all the spade lug connections at the glow plugs. Do not allow the cables to be grounded on the tractor.

Connect one glow plug at a time and push the glow plug switch button.

Note: If the glow plug meter pointer moves, the glow plug is functioning. Disconnect the spade lug connection.

Repeat this procedure for all of the glow plugs, one at a time.

If the glow plug meter pointer does not move during the test of any glow plug, the plug is defective and must be replaced.

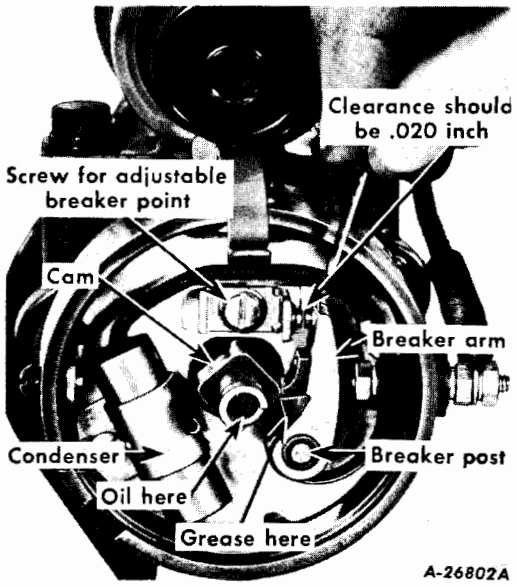
Cleaning the Glow Plugs

Remove the spade lug connections at the glow plugs and remove the glow plugs. Scrape all the carbon off the body. Clean the threads of the glow plugs with a wire hand brush. For easier removal, coat the threads with IH "Never Seez Compound" part number 999617R1. Replace the glow plugs, and tighten them to, from 5 to 7 foot-pounds torque. Replace the spade lug connections.

DISTRIBUTOR AND COIL UNIT

Gasoline or LP Gas Engine Tractors

GREASING THE BREAKER MECHANISM AND CHECKING THE POINTS



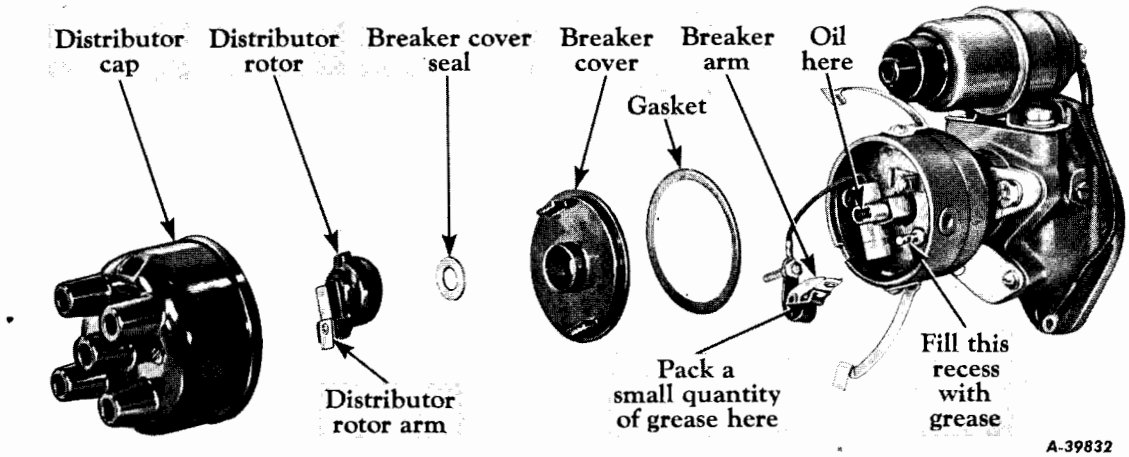
Illust. 69
Adjusting the breaker points.

It is important that the breaker chamber be kept clean because oil on the breaker points will cause rapid burning. Remove the distributor cap, distributor rotor, and the breaker cover for breaker chamber inspection. See Illust. 69. Care should be taken, when removing the breaker cover, to prevent dirt from entering the breaker chamber. Be sure the chamber is clean and that the breaker points are in good condition and have the proper opening.

Never use emery cloth or sandpaper to clean the points. To dress the points, use a sharp fine file. If the points are worn excessively, replace both points.

Fill the recess in the breaker post with IH High Temperature Grease (21372-D) and pack a small quantity of the same grease in back of the breaker arm rubbing block and apply a light coating of the same grease on the lobes and flats of the breaker cam. See Illusts. 69 and 69A. See your International Harvester dealer for the proper grease to use.

Check the condition of the breaker points for build-up or lip formation. If present, the points must be dressed before the point opening can be checked or set. Check the opening between the breaker points with a feeler gauge as shown in Illust. 69. The point opening should be .020 inch when the rubbing block is on the high part of the cam. If the opening is not correct, adjust it by loosening the screw holding the adjustable point. Then move the point toward or away from the point on the breaker arm until the gauge slips snugly into the opening. After the adjustment has been made, tighten the screw.



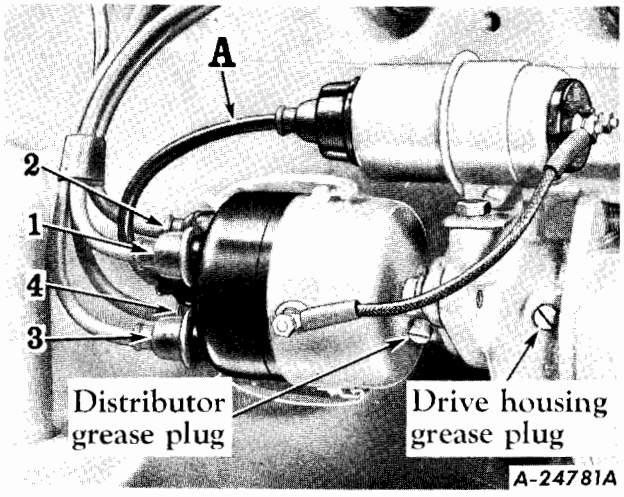
Illust. 69A
Distributor partially disassembled for servicing.

DISTRIBUTOR CAP

Every three or four months, remove the distributor cap and examine the inside. If any dust, moisture, or oil deposits are present, thoroughly clean and wipe dry. To assure long life of the distributor, care must be taken to keep the three small ventilator holes in the distributor cap open at all times. Also see that the distributor rotor is kept clean.

If the terminal nipples are removed, be sure the distributor cap terminals and coil terminal are clean and dry. The distributor is equipped with these nipples to prevent any external electrical leakage when the tractor is operating under adverse conditions.

If the spark plug cables have been removed for any reason, attach the cables to the spark plugs and to the terminal sockets of the distributor cap in the following order: The No. 1 cylinder spark plug cable to the socket marked "1" **in Illust. 70.** Then, going around the distributor cap in a clockwise direction, attach the cable from the No. 3 spark plug to the next or second socket, the cable from the No. 4 spark plug to the next or third socket, and the cable from the No. 2 spark plug to the fourth or last socket. Assemble the secondary cable "A" in the distributor cap. **See Illust. 70.**



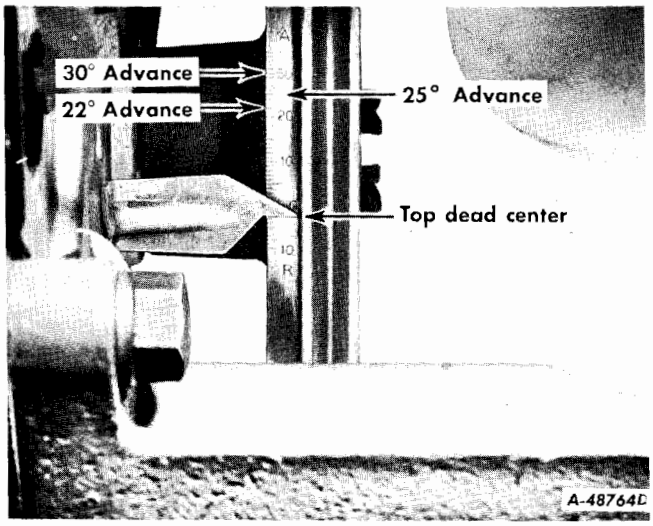
Illust. 70
Distributor wiring and lubrication.

IGNITION COIL

The ignition coil does not require special service other than to keep all terminals and connections clean and tight.

POWER TIMING LIGHT

A final check and adjustment of ignition timing should be made with a neon-type flashing timing light synchronized to the ignition system. See your International Harvester dealer.



Illust. 70A
Timing pointer and timing marks on the fan drive pulley.

GENERATOR AND REGULATOR

The generator supplies current to keep the battery in a charged condition, replacing the energy consumed by the cranking motor and lights. It is hinge-mounted on the left side of the engine crankcase and is driven by a combination fan and generator belt.

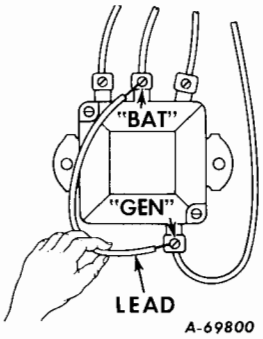
The generator charging rate is controlled by a voltage regulator which controls the generator output, thereby maintaining a satisfactory charging rate, and prevents the battery from overcharging under varying temperatures and operating conditions. It should not require adjustment or attention. If the regulator fails to operate correctly, see your International Harvester dealer.

POLARIZING THE GENERATOR

If the generator or the regulator has been removed or the leads disconnected, the generator should be repolarized. After the leads have been reconnected, but before the engine is started, proceed as follows:

After making certain that the grounded battery terminal is the negative (-) one, momentarily connect a jumper lead between the "BAT" and the "GEN" terminals of the regulator. **See Illust. 71.** This allows a momentary surge of current to flow through the generator which correctly polarizes it. Reversed polarity may result in vibration, arcing, and burning of the relay contact points.

Note: Never bridge, the "BAT" and the "F" terminals on the regulator, as this will damage the regulator.



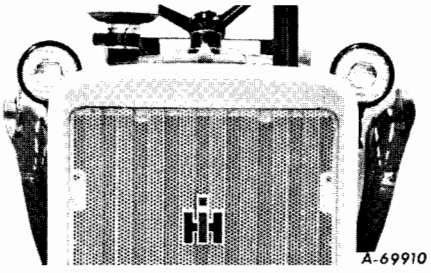
Illust. 71
Polarizing the generator.

GENERATOR BELT TENSION

Farmall 504 Series Tractors have a combination fan and generator belt. To check, adjust, or replace the belt.

HEADLIGHTS AND REAR LIGHT

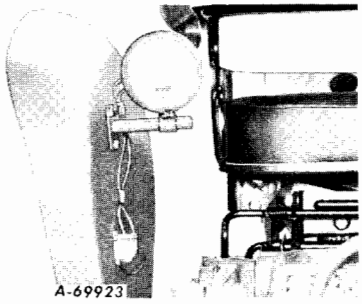
The headlights and rear light are sealed-beam lights especially developed for tractor operations. The parts are so constructed that the filament, reflector, lens and gasket are all assembled in a unit permanently sealed against dirt, moisture, and corrosion. If a filament burns out or a lens breaks, the complete unit must be replaced. See your International Harvester dealer.



Illust. 71A
Headlights on the Farmall 504 Series Tractors.

BREAK-AWAY CONNECTOR SOCKET

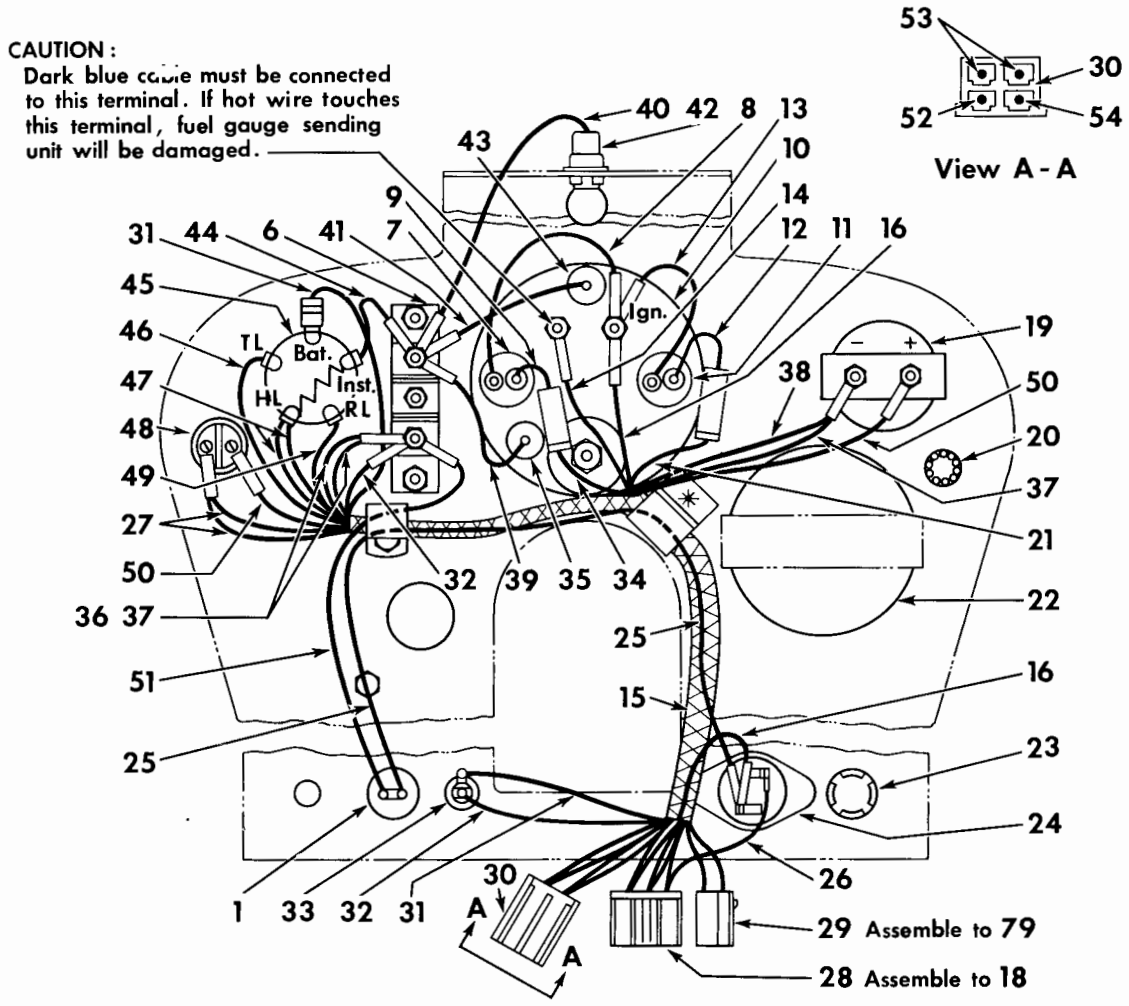
On tractors equipped with starting and lighting, a break-away connector socket on the left fender serves as a plug-in connection for lights on trailing implements. This socket can also be used to plug in a trouble light.



Illust. 71B
Rear light and break-away connector socket.

INSTRUMENT LAMP

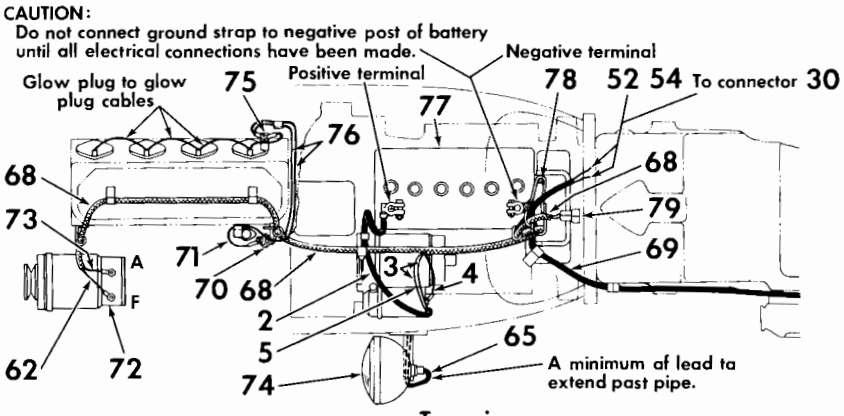
A 2-candlepower lamp (12-volt-No. 127 934) on the instrument panel and in the gauge cluster, is provided for illuminating the instruments at night and is lighted whenever the headlights are on.



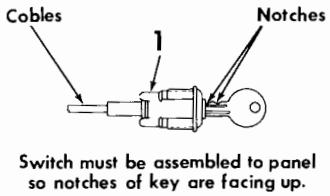
Terminal side of instrument panel

B-12532

Illust. 72
Wiring diagram for Farmall 504 Tractors
(Gasoline or LP Gas Engines)

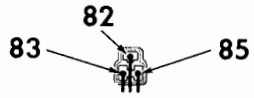


Top view



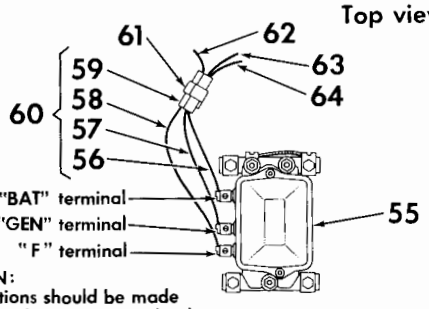
Switch must be assembled to panel so notches of key are facing up.

Key switch and key



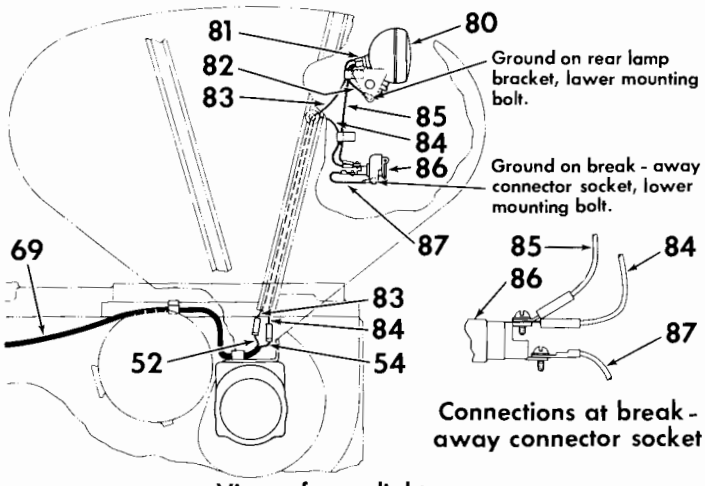
Item No. 81

Assembly of cables in combination rear lamp connector



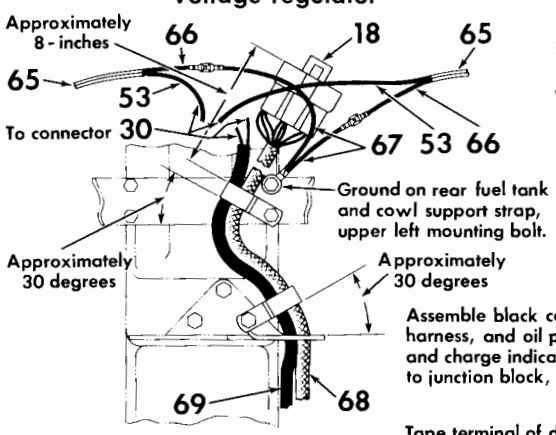
CAUTION:
Connections should be made so cables do not cross each other.

Voltage regulator

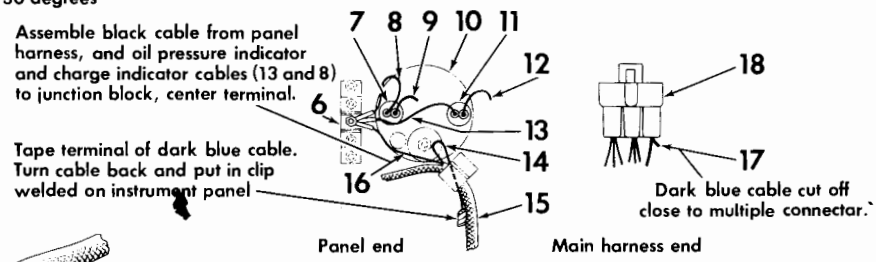


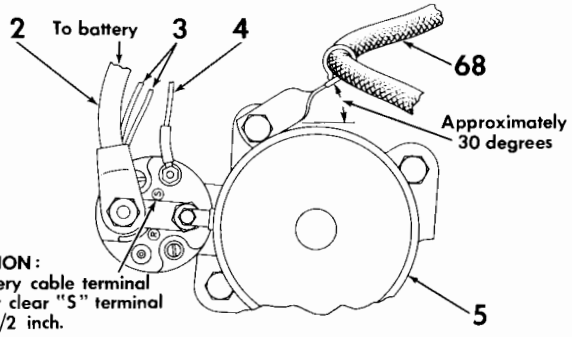
Connections at break - away connector socket

View of rear light and break - away connector socket connections



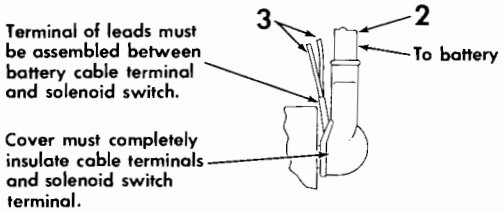
View of connections near steering shaft support





Battery cable and harness leads connected to solenoid switch, and assembly of harness clip

For tractors not equipped with fuel gauge sending and receiving units



Assembly of battery cable terminal cover

B-12533

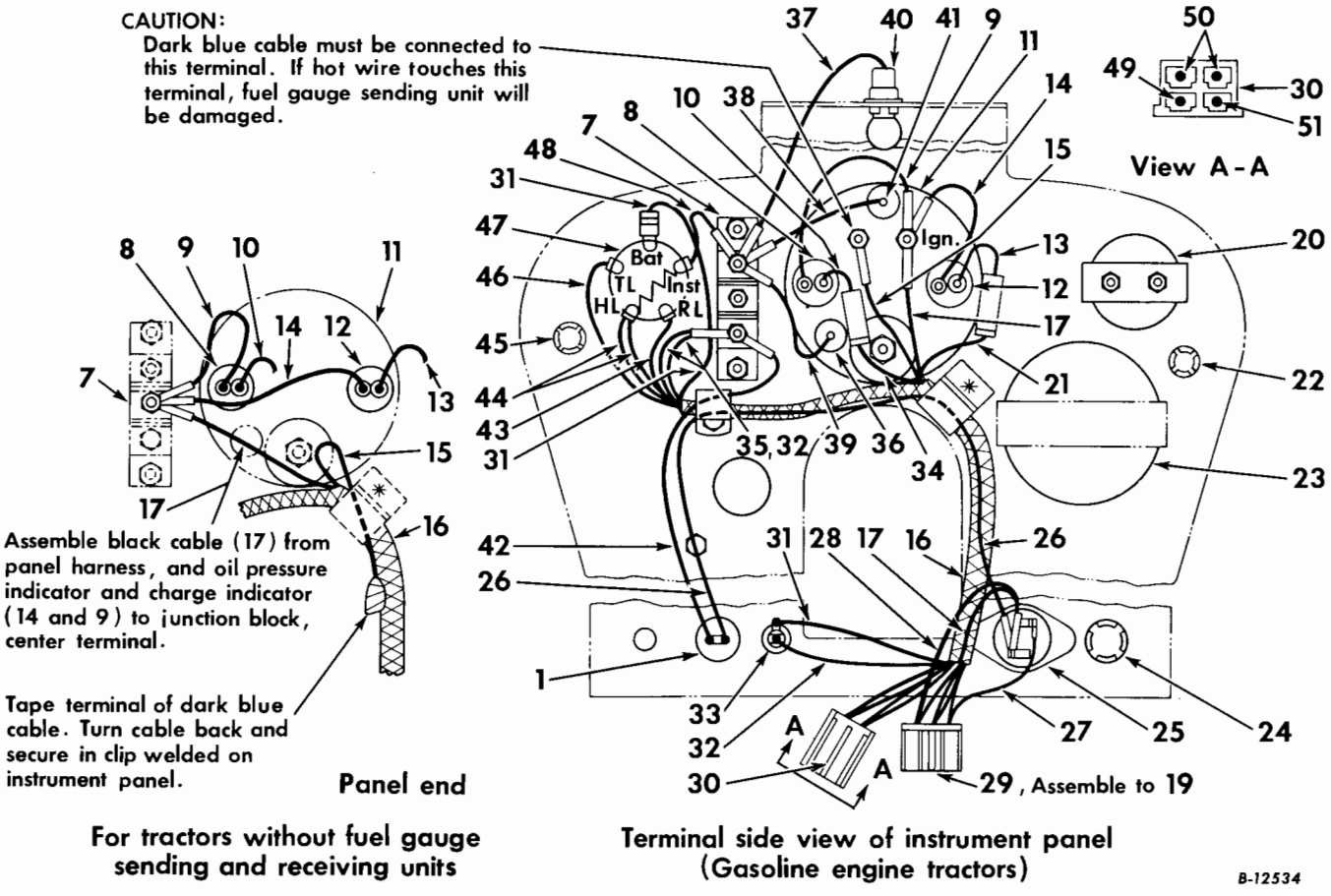
Illust. 73 — Wiring diagram for Farmall 504 Tractors (Gasoline or LP Gas Engines).

Index to reference numbers shown in Illusts. 72 and 73.

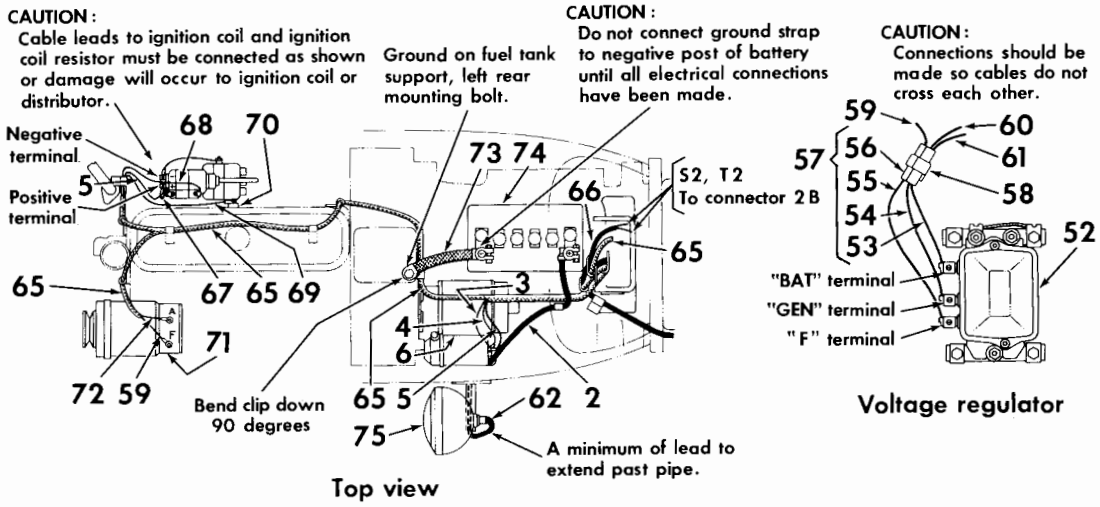
Ref. No.	Description
1	Key ignition switch.
2	Cable - battery to solenoid switch.
3	Cable - solenoid switch to multiple connector (19) 6 unit - red.
4	Cable - multiple connector (19) to solenoid switch "S" terminal - orange. (6 unit).
5	Cable - junction ignition coil + terminal to solenoid switch "R" terminal - natural.
6	Cranking motor.
7	Junction block.
8	Charge indicator light.
9	Cable - charge indicator light to fuel gauge receiving unit junction terminal.
10	Cable - charge indicator light to line connector.
11	Gauge - cluster.
12	Oil pressure light.
13	Cable - oil pressure light to line connector.
14	Cable - oil pressure light to junction block center terminal.
15	Cable - multiple connector (29) to fuel gauge receiving unit - dark blue.
16	Cable harness - panel.
17	Cable, push button switch junction terminal to fuel gauge receiving unit.
18	Cable - multiple connector (19) 6 unit to fuel gauge sending unit.
19	Multiple - connector - male.
20	Dust plug, glow plug, meter hole.
21	Cable - multiple connector (29) to line connector - grey.
22	Dust plug - horn switch hole.
23	Tachometer opening cover.
24	Dust plug - cigarette lighter hole.
25	Push button ignition switch.
26	Cable, long lead, key ignition switch to push button switch junction terminal.
27	Cable - multiple connector (29) to push button switch - orange.
28	Cable - multiple connector (29) to push button switch - black.
29	Multiple connector, 6 unit, female.
30	Single connector, 4 unit.
31	Cable - fuse housing to lighting switch "BAT" terminal - light green.
32	Cable - fuse housing to junction block lower terminal - dark green.
33	Fuse housing.
34	Cable - multiple connector (29) to line connector - light blue.
35	Cable - multiple connector (29) to junction block lower terminal - red.
36	Instrument light to gauge cluster.
37	Cable - instrument light to junction block upper terminal.
38	Cable - gauge cluster - instrument light to junction block - upper terminal.
39	Cable - gauge cluster instrument light to junction block upper terminal.
40	Instrument light - for panel.
41	Instrument light for gauge cluster.
42	Cable, short lead, key ignition switch to junction block lower terminal.
43	Cable - lighting switch "RL" terminal to connector (30) - natural (4 unit).
44	Cables - lighting switch "HL" terminal to connector (30) - violet (4 unit).
45	Dust plug - glow plug switch hole.
46	Cable - lighting switch "TL" terminal to connector (30) (4 unit) - black.
47	Lighting switch.
48	Cable - lighting switch to junction block.
49	Cable - connector (30) to line connector - natural.
50	Cables - headlight to connector (30).
51	Cable - connector (30) to line connector - black.
52	Voltage regulator.
53	Cable - multiple connector (58) (3 unit) to regulator "BAT" terminal - red.
54	Cable - multiple connector (56) to regulator "GEN" terminal - light blue.
55	Cable - multiple connector (56) to regulator "F" terminal - yellow.
56	Multiple connector 3 unit - female.
57	Cable - voltage regulator.
58	Multiple - connector, 3 unit, male.
59	Cable - generator "F" terminal to multiple connector (19) - yellow.
60	Cable - multiple connector (19) to multiple connector (19) (6 unit) - light blue.
61	Cable - multiple connector (19) (6 unit) to multiple connector (58) (3 unit).
62	Cable assembly - headlight.
63	Cables - headlight to ground line connector.
64	Cable - headlight ground junction.
65	Cable harness - main.
66	Cable - rear light.
67	Cable - junction ignition coil + terminal to ignition coil resistor - natural.
68	Cable - multiple connector (19) to ignition coil resistor - black (6 unit).
69	Cable - oil pressure switch to multiple connector (19) - grey (6 unit).
70	Oil pressure switch.
71	Generator.
72	Cable - generator "A" terminal to multiple connector (19) 3 unit - light blue.
73	Strap - battery to ground.
74	Battery.
75	Headlight.
76	Combination rear light.
77	Connector, combination rear light.
78	Cable, combination rear light connector to ground - pink.
79	Cable, line connector to combination rear light connector.
80	Cable - line connector to break-away connector - black.
81	Cable, break-away connector socket to combination rear light connector - black.
82	Socket - electrical break-away connector.
83	Cable - break-away connector socket to ground - pink.

Index to reference numbers shown in Illusts. 76 and 77.

Ref. No.	Description
1	Key switch.
2	Cable - battery to solenoid.
3	Cable - solenoid switch to multiple connector (18) 6 unit - red.
4	Cable - multiple connector (18) 6 unit to solenoid switch "S" terminal - orange.
5	Cranking motor.
6	Junction block.
7	Charge indicator light.
8	Cable - charge indicator light to fuel gauge receiving unit junction terminal.
9	Cable - charge indicator light to line connector.
10	Gauge - cluster.
11	Oil pressure light.
12	Cable - oil pressure light to line connector.
13	Cable - oil pressure light to junction block center terminal.
14	Cable - multiple connector (29) to fuel gauge receiving unit - dark blue.
15	Cable harness - panel.
16	Cable - push button switch junction terminal to fuel gauge receiving unit junction terminal - black.
17	Cable - multiple connector (18) 6 unit - to fuel gauge sending unit.
18	Multiple connector - male (6 unit).
19	Glow plug meter.
20	Dust plug - horn switch hole.
21	Cable - multiple connector (28) to line connector - gray.
22	Tachometer opening cover.
23	Dust plug - cigarette lighter hole.
24	Push button switch.
25	Cable - long lead, key switch to push button switch junction terminal.
26	Cable - multiple connector (28) 6 unit - to push button switch - black.
27	Cable - multiple connector (79) 2 unit - to glow plug switch.
28	Multiple connector - 6 unit - female.
29	Multiple connector - 2 unit - female.
30	Single connector - 4 unit.
31	Cable - fuse housing to lighting switch "BAT" terminal - light green.
32	Cable - fuse housing to junction block lower terminal - dark green.
33	Fuse housing.
34	Cable - multiple connector (28) 6 unit to line connector.
35	Instrument light for gauge cluster.
36	Cable - multiple connector (28) (6 unit) to junction block lower terminal - red.
37	Cable - junction block lower terminal to glow plug meter "-" terminal - red.
38	Cable - multiple connector (28) (6 unit) to glow plug meter "-" terminal - red.
39	Cable - gauge cluster instrument light to junction block upper terminal.
40	Cable - instrument light to junction block upper terminal.
41	Cable - gauge cluster instrument light to junction block upper terminal.
42	Instrument light - for panel.
43	Instrument light for gauge cluster.
44	Cable - lighting switch to junction block.
45	Lighting switch.
46	Cable - lighting switch "TL" terminal to connector (30) 4 unit - black.
47	Cables - lighting switch "HL" terminal to connector (30) 4 unit - violet.
48	Glow plug switch.
49	Cable - lighting switch "RL" terminal to connector (30) 4 unit - natural.
50	Cable - glow plug switch to glow plug meter "+" terminal.
51	Cable - short lead, key switch to junction block, lower terminal.
52	Cable - connector (30) 4 unit - to line connector - natural.
53	Cables - headlight to connector (30) 4 unit.
54	Cable - connector (30) 4 unit to line connector - black.
55	Voltage regulator.
56	Cable - multiple connector (59) 3 unit, to regulator "BAT" terminal - red.
57	Cable - multiple connector (59) 3 unit, to regulator "GEN" terminal - light blue.
58	Cable - multiple connector (59) 3 unit, to regulator "F" terminal - yellow.
59	Multiple connector, 3 unit, female.
60	Cable assembly, voltage regulator.
61	Multiple connector, 3 unit, male.
62	Cable - generator "F" terminal to multiple connector (61) 3 unit - yellow.
63	Cable - multiple connector (18) 6 unit to multiple connector (61) 3 unit - red.
64	Cable - multiple connector (18) 6 unit to multiple connector (61) 3 unit - light blue.
65	Cable assembly - headlight.
66	Cables - headlight to ground line connector.
67	Cable assembly - headlight to ground junction.
68	Cable harness (main).
69	Cable assembly - rear light.
70	Oil pressure switch.
71	Cable - multiple connector (18) 6 unit, to oil pressure switch - grey.
72	Generator.
73	Cable - generator "A" terminal to multiple connector (18) 6 unit - light blue.
74	Headlight.
75	Glow plug cable junction block and bracket.
76	Cable - multiple connector (79) 2 unit - male - to glow plug junction block - black.
77	Battery.
78	Strap - battery to ground.
79	Multiple connector (2 unit) male.
80	Combination rear light.
81	Connector - combination rear light.
82	Cable - combination rear light connector (81) to ground - pink.
83	Cable - line connector to combination rear lamp connector (81) - natural.
84	Cable - line connector to break-away connector socket - black.
85	Cable - break-away connector socket to combination rear light connector (81) - black.
86	Break-away connector socket.
87	Cable - break-away connector socket to ground - pink.

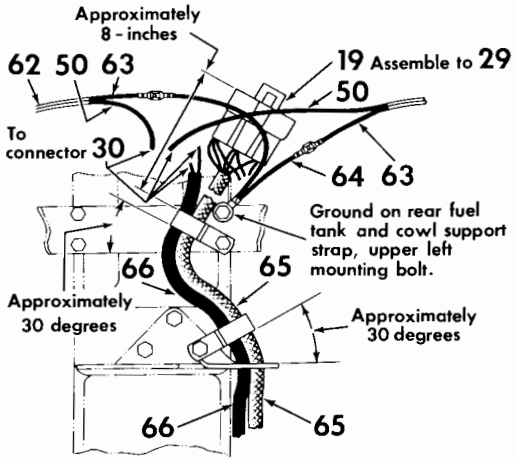


Illust. 76
Wiring diagram for Farmall 504 Tractors.
(Diesel engines.)

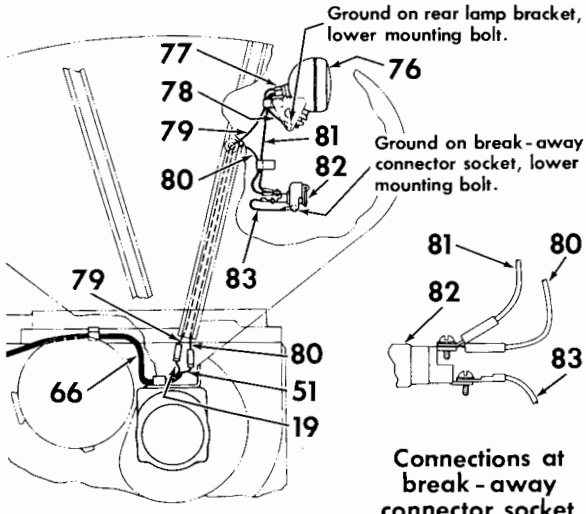


Top view

Voltage regulator

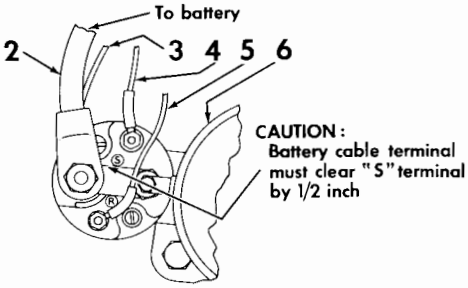


View of connections near steering shaft support

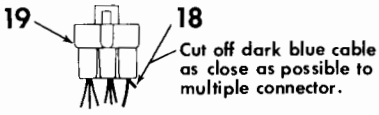


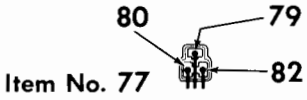
View of rear light and break - away connector socket connections

Connections at break - away connector socket

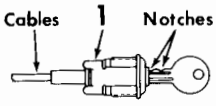


Battery cable and harness leads connected to solenoid switch



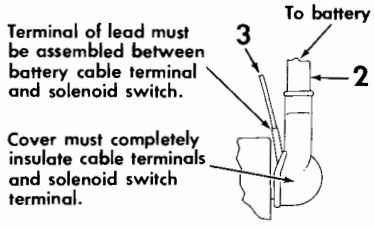


Assembly of cables in combination rear lamp connector



Switch must be assembled to panel so notches of key are facing up.

Key switch and key



Assembly of battery cable terminal cover

B-12535

Illust. 77 — Wiring diagram for Farmall 504 Tractor. (Diesel engine.)

COMBINATION REAR LIGHT AND TAIL LIGHT

The combination rear light and tail light is turned on by the lighting switch on the instrument panel. Should a lens break or a filament burn out the complete sealed beam unit must be replaced. See your International Harvester dealer. To replace the tail light lamp remove the sealed beam unit and replace the tail light lamp with a 15 candle power lamp (12-volt, No. 455490).

FUSE

A cartridge-type AGC-10 ampere fuse is located in the fuse housing. If a short circuit occurs in the lighting circuit, the fuse will burn out and break the circuit, preventing damage to the electrical system.

It is important to use the same capacity fuse for replacement. If the lights fail, check the fuse. If the fuse continually burns out, check the electrical wiring for short circuits.

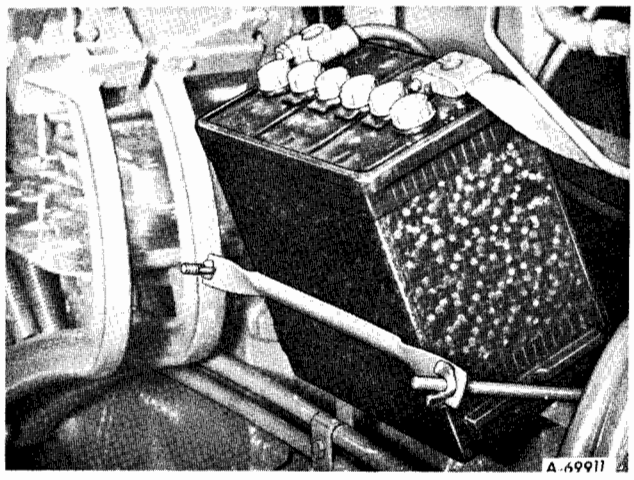
To install a new fuse, unscrew the fuse holder on the instrument panel, pull out the old fuse and replace it with a new one.

STORAGE BATTERY

CLEANING AND SERVICING THE BATTERY

To service the battery, loosen the wing nuts on the battery hold-down bolts, then tilt the battery on a slight angle so it is securely held in position by the battery hold-down bolts as shown in Illust. 78.

Occasionally remove the battery cable and ground strap, brighten the terminal contact surface with wire wool, and reassemble. Then apply a light coat of vaseline or chassis lubricant. Be sure the terminals are clamped tightly and that the battery is fastened securely to the battery support. Replace damaged cables. Keep the vent holes in the battery filler caps open.



Illust. 78
Servicing the battery.

LIQUID LEVEL

Check the battery at least once a month for water level. If the battery is in need of charging, it should be given immediate attention. Keeping the battery fully charged not only adds to its life but makes it available for instant use when needed.

The electrolyte (acid and water) in each cell should be at the proper level at all times to prevent battery failure. When the electrolyte is below this level, pure, distilled water should be added.

Acid or electrolyte should never be added except by a skilled battery man. Under no circumstances add any special battery "dopes", solutions, or powders.

Caution! Electric storage batteries give off highly inflammable hydrogen gas when charging and continue to do so for some time after receiving a steady charge.

Do not under any circumstances allow an electric spark or an open flame near the battery. Do not lay tools across battery terminals as this may result in a spark or short circuit which may cause an explosion. Be careful to avoid spilling any electrolyte on hands or clothing.

For dependable battery service see your International Harvester dealer.

SPECIFIC GRAVITY

The specific gravity of the electrolyte indicates the relative condition of the battery charge and warns when it may be necessary to recharge the battery.

Inspect the battery once every two weeks to maintain the correct specific gravity. The specific gravity of a fully charged battery is 1.255 to 1.270 (Gasoline or LP Gas engines) or 1.270 to 1.280 (Diesel engine) corrected to +80°F. (liquid temperature). A specific gravity reading of at least 1.230 corrected to +80°F. should be maintained. Never allow the battery to fall below 1.230.

The specific gravity reading will vary with the temperature of the electrolyte. For readings taken at any temperature other than +80° F., a temperature correction must be applied. This is done by adding .004 specific gravity for every 10° above +80°F., and by subtracting .004 specific gravity for every 10° below +80°F.

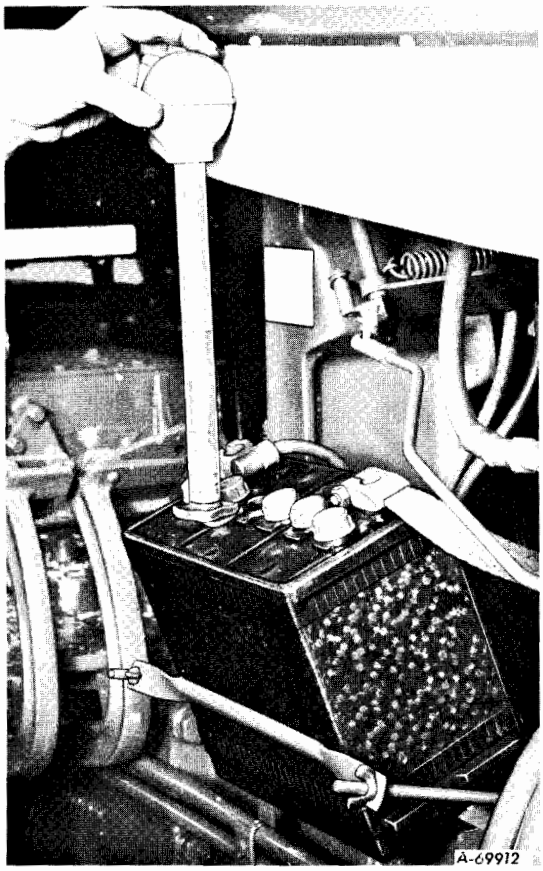
Example No. 1

Hydrometer reading	1.270
Electrolyte temperature	+20°F.
Subtract .024 Sp. Gr.	(.004x6)
Corrected Sp. Gr. is	1.246

Example No. 2

Hydrometer reading	1.255
Electrolyte temperature	+100°F.
Add .008 Sp. Gr.	(.004 x 2)
Corrected Sp. Gr. is	1.263

Use an accurate hydrometer when testing for specific gravity. Readings should not be taken immediately after adding water. All cells should show approximately the same specific gravity reading. Wide variations indicate something is wrong.



Illust. 79
Taking a hydrometer reading of electrolyte in the battery.

COLD WEATHER OPERATION

It is especially important to keep the battery close to full charge for cold weather operation. Add water to the battery in freezing temperatures only when the tractor is to operate for several hours, to thoroughly mix the water and electrolyte, or damage to the battery will result from the water freezing.

COLD WEATHER OPERATION - Continued

The electrolyte of a battery in various stages of charge will start to freeze at temperatures indicated below:

Battery used with Gasoline or LP Gas Engines

Specific Gravity (Corrected to +80° F.)	Freezing Temperature Degrees Fahrenheit
1.265	-80° F.
1.220	-30° F.
1.210	-20° F.
1.180	-10° F.
1.160	- 0° F.
1.140	+10° F.
1.100	+20° F.
1.000	+30° F.

Battery used with Diesel Engine

Specific Gravity (Corrected to +80° F.)	Freezing Temperature Degrees Fahrenheit
1.275	-90° F.
1.250	-62° F.
1.200	-16° F.
1.150	+50° F.
1.100	+19° F.

The temperatures shown indicate the approximate points at which the first ice crystals begin to appear in the solution. The solution does not freeze solid until a lower temperature is reached.

A battery three-fourths charged is in no danger of damage from freezing. Therefore keep the battery better than three-fourths charged, especially during winter weather.

If your tractor is not to be operated for some time during the winter months, it is advisable to remove the battery and store it in a cool, dry place above freezing (+32° F.). Place the battery on a rack or bench.

GROUND STRAP

When replacing a battery, make certain that the ground strap is connected to the negative (-) terminal on the battery.

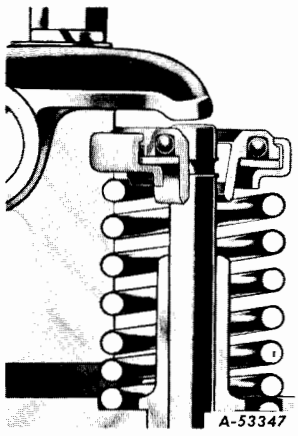
Note: Before working on any part of the electrical system, disconnect the battery ground strap from the battery terminal. Do not reconnect it until all electrical work has been completed. This will prevent shorting and causing damage to any of the electrical units.

VALVE CLEARANCE ADJUSTMENT

A clearance of .014 inch for the intake valves and .020 inch for the exhaust valves must be maintained for the gasoline and LP gas engines, and a clearance of .027 inch for both the intake and the exhaust valves on the diesel engine (measured when the valves are closed and the engine is warm) must be maintained between the end of the valve levers and the valve stems.

The exhaust valves on gasoline engines, and both intake and exhaust valves on the diesel engine are equipped with positive-action valve rotators (see Illust. 80). Check the valve clearance after every 50 hours of operation and after every 150 hours thereafter until the clearance remains the same between checks. Thereafter check the clearance every 500 hours.

The loss of valve lash is due to the valve seating in the head without the accompanying build-up of deposits as experienced with standard (non-rotating) valves.



Illust. 80
Cutaway view of exhaust valve rotator.

ADJUSTING THE CLEARANCE
(Gasoline or LP Gas Engines)

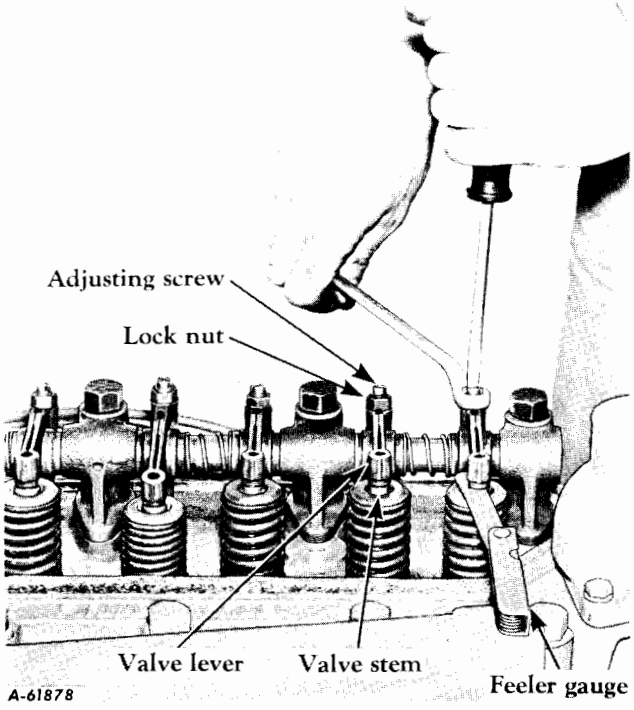
1. To safeguard against accidently starting the engine when checking the valve clearance, remove distributor-to-coil cable "A" from the socket on the coil. **See Illust. 70.**

2. Remove the valve cover.

3. Remove the spark plug from the No. 1 cylinder (the cylinder next to the radiator).

Place your thumb over the spark plug opening and slowly turn the engine until an outward pressure is felt. Pressure indicates the No. 1 piston is moving toward the top dead center of the compression stroke.

Continue turning slowly until the DC mark on the back flange of the fan drive pulley is in line with the pointer on the crankcase front cover. Both valves are now closed on the compression stroke of the No. 1 cylinder.



Illust. 81
Gauging the valve levers with a feeler gauge.

4. Loosen the lock nut and adjust the screw in the valve lever so the gauge slips snugly between the end of the valve lever and the valve stem. **See Illust. 81.**

5. Tighten the lock nut and recheck the clearance.

6. Crank the engine one-half revolution at a time and check the clearance of each cylinder's valves and adjust if necessary. Do this on each set of cylinder valves in succession according to the firing order of the engine, which is 1, 3, 4, 2.

7. Replace the valve housing. Check to see that the valve housing gasket makes an oil-tight seal with the cylinder head. Use a new gasket if necessary.

8. Replace distributor-to-coil cable "A" **(Illust. 70)** into the socket from which it was removed.

Note: Be accurate - use a feeler gauge for checking the valve clearance.

DIESEL ENGINE

1. Remove the valve housing.

2. Loosen the adjusting screw lock nut on both the No. 1 intake and exhaust valve levers. **See Illust. 80.** Insert the feeler gauge between the valve lever and valve stem. Turn the adjusting screw in or out as necessary to hold the feeler gauge snugly.

When the correct clearance is obtained, hold the adjusting screw in place with a screw driver, tighten the lock nut, and recheck the clearance. Adjust both the intake and exhaust levers in this manner.

3. Crank the engine one-half revolution at a time and check the clearance of each cylinder's valves and adjust them, if necessary. Do this on each set of cylinder valves in succession according to the firing order, which is 1, 3, 4, 2.

4. Replace the valve housing. Check to see that the valve housing gasket makes an oil-tight seal with the cylinder head. Use a new gasket if necessary.

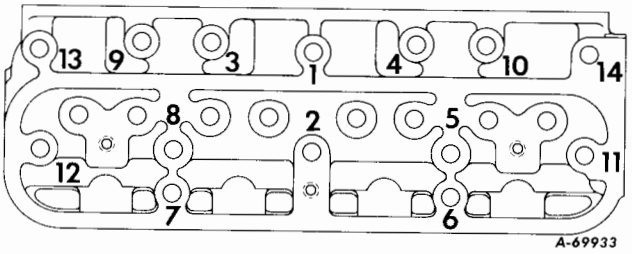
MAINTENANCE

Minor Engine Service Operations

CYLINDER HEAD GASKET

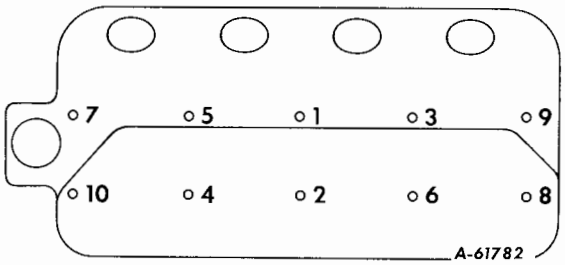
Check the tightness of the cylinder head bolts after the first 50 hours of engine operation for a new tractor and 50 hours after installing a new cylinder head gasket. The bolts should be tightened to, from 80 to 90 foot-pounds torque (gasoline engine), and from 110 to 120 foot-pounds torque (Diesel engine).

For most satisfactory results in tightening the cylinder head after installing the cylinder head gasket, tighten down all the cylinder head bolts fairly snug, starting with the row in the center, then going to the others. Retighten in the same order, giving each bolt a fraction of a turn at a time. Continue this until all nuts are tight. Do not screw one bolt down perfectly tight and then go on to the next as you will not obtain an even pressure on the gasket in this manner.



Illust. 82
Tightening sequence for cylinder head bolts.
(Gasoline or LP Gas Engines.)

After replacing the cylinder head, it is necessary to insure against leaks by retightening the bolts after the engine has been operating and the water jacket has become thoroughly heated. To properly tighten the bolts, the valve rocker shaft assembly must be raised.



Illust. 82A
Tightening sequence for cylinder head bolts.
(Diesel engine)

Note: Be sure to adjust the valve tappet clearance after the last tightening of the cylinder head stud nuts. See "Valve Clearanee Adjustment."

CRANKSHAFT BEARINGS, PISTONS, AND RINGS

We cannot impress too strongly the necessity of having your International Harvester dealer do the work of replacing the connecting-rod bearings, crankshaft bearings, pistons and rings, and reconditioning the valves.

BRAKES

The tractor is equipped with mechanical, disc-type brakes. The brakes are controlled by foot pedals which can be operated individually, or simultaneously when latched together.

Check the brakes for free movement and equal pressure after every 150 hours of operation until the proper interval is determined according to usage. Check the free movement thereafter, as required, to maintain equal pressure and efficient braking.

The brakes should not drag before they take hold. The pedals should have a free movement of 1-1/2 inches. The measurement to be taken between the points of contact of the brake pedals with the front of the platform or just enough movement so that when a slight pressure is applied on the brake pedals, the brake lock can be dropped into the first notch in the rack on the left brake pedal.

When the brakes wear, free travel increases and the brakes should be readjusted before the free travel reaches three inches.

BRAKE ADJUSTMENT

Adjust the free pedal travel of the right brake pedal first, as follows:

Loosen jam nut "B" (Illust. 83); then turn brake operating rod ball "A" until the correct free pedal travel is obtained. Then adjust the free pedal travel of the left brake pedal in the same manner by adjusting the brake operating rod at the left brake housing.

It is very important to have the brakes equalized. To have equalized brakes, both pedals must have the same amount of free movement.

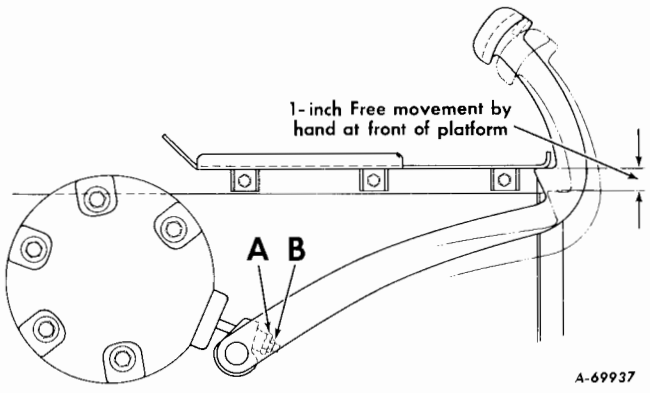
Test the brakes separately on left and right turns at slow speed.

Lock the brake pedals together and operate the tractor on level, hard ground at governed speed of fourth gear. Check for equal action of the brakes. Readjust if necessary. Lengthen the linkage on the side toward which the tractor "pulls" to correct the adjustment.

Note: Unequal braking action is indicated by the tractor pulling to one side when the brakes are applied. If there is no side pull in fourth gear, continue testing as follows.

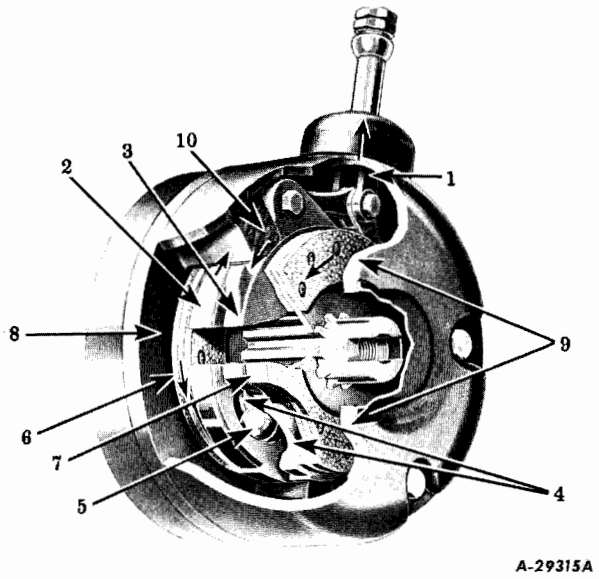
Operate the tractor in fifth gear and check for any tendency to pull to one side when the brakes are applied. Readjust the brake linkage as necessary.

When the correct adjustment has been made, lock ball "A" by tightening jam nut "B" on the right and left operating rods. See Illust. 83B.



Illust. 83
Brake pedal adjustment.

OPERATION



Illust. 83A
Cutaway view of the double-disc brake.

This cutaway view of one of the disc brakes shows why they give positive braking with very low pedal pressure. Here's how it works: When the foot pedal is depressed, the yoke (1) moves in direction of arrow and causes the actuating discs (2 and 3) to partially revolve in opposite directions and at the same time to spread apart. This latter action is due to four sets of elongated cups (4) in the actuating discs riding up on hardened steel balls (5). Only one set of cups and one ball are shown. As the actuating discs are spread apart, they force the two rotating double-lined friction discs (6 and 7) against the stationary braking surfaces (8 and 9). Both friction discs have splined hubs and are therefore positively driven. Direction of rotation (counterclockwise, tractor moving forward) and the braking action that has already started, causes one actuating disc (2) to rotate against a stop lug (10). Now the rotation of friction disc (7) will cause the actuating disc (3), which is still free to move, to ride up still higher on the balls, further expanding the actuating discs, creating more pressure against all braking surfaces.

CLUTCHES

The engine is equipped with a spring-loaded, 10-1/2-inch diameter, single-plate, dry-disc clutch. **Tractors with a Torque Amplifier** have an additional spring-loaded, 7-inch diameter, single-plate, dry-disc clutch.

As a result of normal clutch facing wear, the free travel between the clutch release levers and the release bearing is reduced. Lack of clearance causes overheating of the clutch, loss of power, and early replacement of clutch facing.

Check the clutch or clutches for free movement after every 150 hours of operation until the proper inspection interval is determined according to usage. Check the free movement thereafter, as required, to provide proper clearance between the clutch release bearing and the clutch release levers.

CARE OF THE ENGINE CLUTCH

The engine clutch is designed so that it requires a minimum of attention. It is important, however, that a clearance of approximately 1/8 inch be maintained between the engine clutch release bearing and the engine clutch release levers. Also, the clutch release shaft and release bearing should be lubricated at proper intervals as instructed in the "Lubrication Guide".

CARE OF TORQUE AMPLIFIER CLUTCH

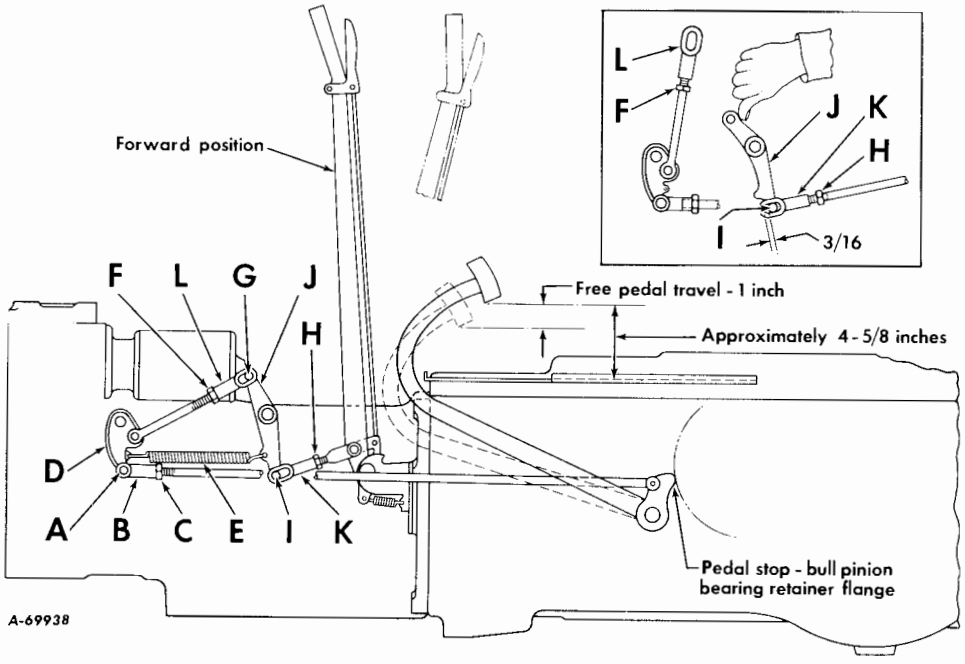
The torque amplifier clutch is designed so that it also requires a minimum of attention. It is important, however, that a clearance be maintained between the torque amplifier clutch release bearing and the torque amplifier clutch release levers. Also, the torque amplifier clutch release shaft should be lubricated at proper intervals as instructed in the "Lubrication Guide".

ADJUSTING THE ENGINE CLUTCH

To adjust the clutch pedal free travel, loosen nut "C" (**Illust. 84**). Remove clevis pin "A" and turn clevis "B" until pedal travel as indicated is obtained. Operating lever "D" must be moved clockwise to remove free travel.

Replace the clevis pin, cotter pin, and lock nut "C". This will provide 1/8-inch clearance between the clutch release levers and release bearing.

Note: Repeat the entire adjustment when the engine clutch pedal has a free movement of only 7/8-inch.



Illust. 84
Engine clutch and torque amplifier clutch adjustments.

ADJUSTING THE TORQUE AMPLIFIER CLUTCH

To adjust the torque amplifier clutch (Illust. 84), follow these instructions:

Remove spring "E", loosen lock nut "F", and remove clevis pin "G".

With the torque amplifier control handle in forward position follow these instructions:

1. Loosen lock nut "H" and remove pin "I". Move torque amplifier clutch release shaft lever "J" counterclockwise to remove the free travel.

2. In this position, the torque amplifier clutch release bearing just contacts the torque amplifier clutch release levers.

3. Adjust clevis "K" to provide a 3/16-inch space between the body of inserted pin "I" in lever "J" and the forward end of the slot in clevis "K". Reinstall pin "I", tighten lock nut "H", and reinstall spring "E".

4. Adjust clevis "L" and assembly pin "G" to the shortest free length without altering the position of torque amplifier clutch release shaft lever "J" previously established. Tighten lock nut "H".

Note: Repeat the entire adjustment when the engine clutch has a free movement of only 3/4-inch, or when the clearance provided in item 3 measures only 1/8-inch.

HYDRAULIC SYSTEM

Use IH Hy-Tran Fluid; or a mixture in the ratio of one quart IH Torque Amplifier Transmission Lubricant Additive to each four gallons of SAE-10W engine oil in the transmission and differential case which also functions as the hydraulic fluid reservoir. The engine oil must have an aniline point range of + 170° F. to + 220° F. The hydraulic system therefore, is drained and refilled with clean fluid each time the lubricant in the transmission case is changed.

POWER STEERING

The power steering system consists of a 12 gallon per minute hydraulic pump (which also supplies the auxiliary valves, when used), a flow divider valve with a relief valve, a torque generating unit forming a part of the steering column, an oil cooler mounted in front of the radiator (with a bypass check valve), and the necessary pressure and return tubes.

On Farmall 504 Tractors equipped with the adjustable wide tread front axle, a rotary servo valve forming a part of the steering column is used instead of a torque generating unit. A linkage booster cylinder mounted from the steering gear arm in the rear of the axle actuates the linkage.

The fluid in the transmission case and hydraulic system also supplies fluid for the power steering system. When draining the system, drain the cylinder and lines. To do this, turn the key switch clockwise and press the push button starting switch turning the engine over very briefly. When refilling the system, start the engine and slowly turn the steering wheel first to one extreme, and then the other, and back to center until the operation is smooth and steady, to remove air from the system. Air in the system will cause erratic operation.

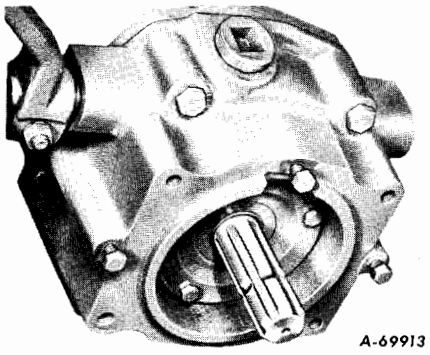
A thorough diagnosis should be made before condemning the power steering system as faulty. Low tire pressure, improper front end alignment, and improper steering gear adjustment can cause poor power steering without the power steering system being in fault.

The power steering system normally requires no adjustment or servicing, other than those specified for the conventional steering and hydraulic systems.

INDEPENDENT POWER TAKE-OFF CLUTCH ADJUSTMENT

The independent power take-off is equipped with a hand-operated overcenter clutch. The need for clutch adjustment is apparent when slippage occurs under load or when the power take-off does not pick up the load properly upon clutch engagement.

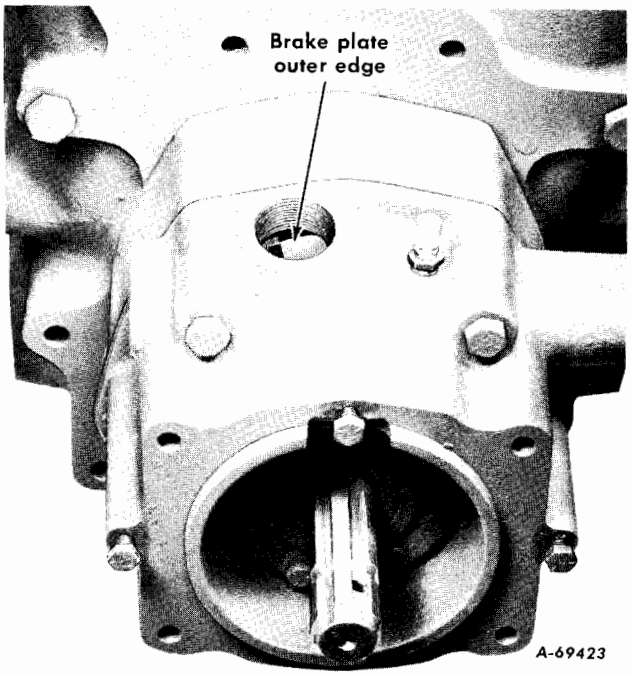
The clutch is externally adjusted without requiring removal of the unit from the tractor, by use of the special tool furnished. Be sure the engine is not operating, and place the independent power take-off handle in the neutral (middle) position.



Illust. 86
Rear unit housing cover.

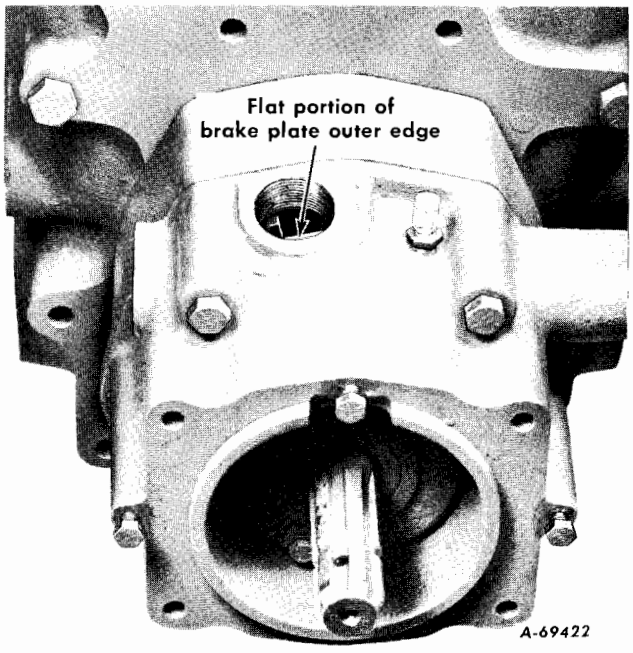
1. Remove plug from adjustment hole. **See Illust 86.**

2. Rotate output shaft by hand and note that the rotation of the outer edge of the brake plate (**Illust. 86A**) is visible through adjustment hole. Continue turning the output shaft until the flat portion of the brake plate outer edge is in line with the adjustment hole. Lock pin is now properly aligned with the adjustment hole so that it can be disengaged with tool. **See Illust. 86B.**



Illust. 86A
Outside edge of the brake plate.

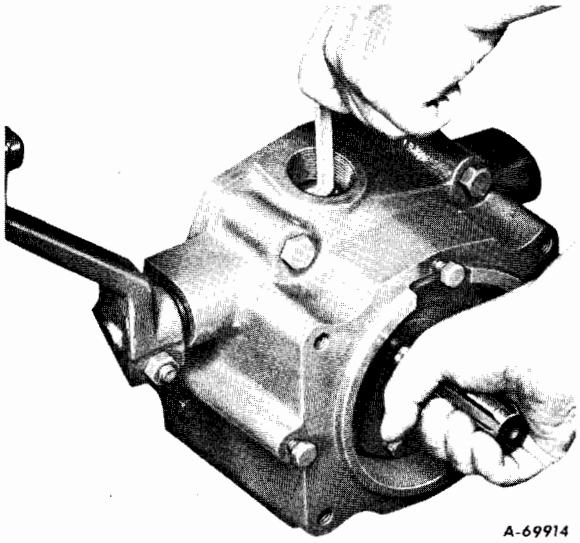
3. Insert tool through the adjustment hole, over flat portion of brake plate and into slot of adjusting spider, thus engaging the spring loaded lock pin. **See Illust. 87.**



Illust. 86B
Flat portion of the outer edge of the brake plate in line with adjustment hole.

INDEPENDENT POWER TAKE-OFF CLUTCH ADJUSTMENT - Continued

Note: Holding the forward end of the adjusting tool down as much as possible as it is inserted over the brake plate will bring the tool in contact with the lock pin. See Illust. 87.

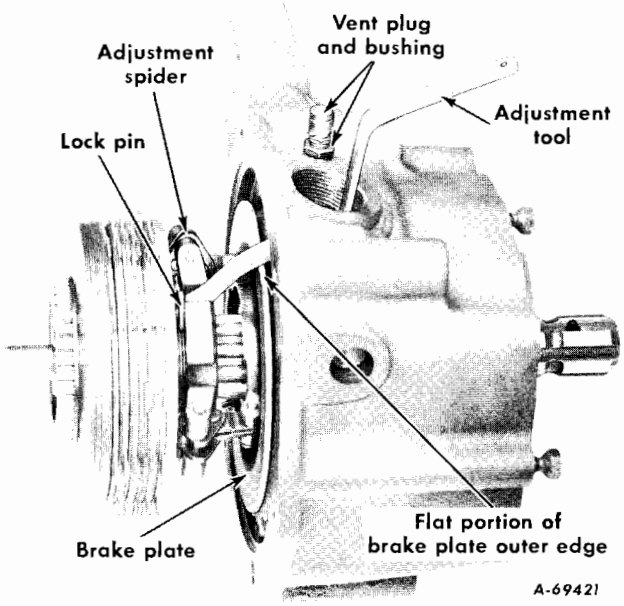


Illust. 87
Inserting the adjusting tool to disengage lock pin.

4. Push tool forward to disengage lock pin from spider (Illust. 87). While holding the lock pin disengaged, turn output shaft (counterclockwise to tighten or clockwise to loosen clutch adjustment) until its rotation is stopped by the locking pin locking in a new position. Each locking position required approximately 60 degrees output shaft rotation.

Note: While rotating the output shaft, the rear portion of the adjusting tool should be held upward as much as possible so that it allows the brake plate to turn beneath it.

5. Normal clutch adjustment is obtained when the lock pin engages in the first or second new locking position. Occasionally it may be necessary to engage the lock pin in the third new locking position, when operating equipment requiring a high power take-off output.

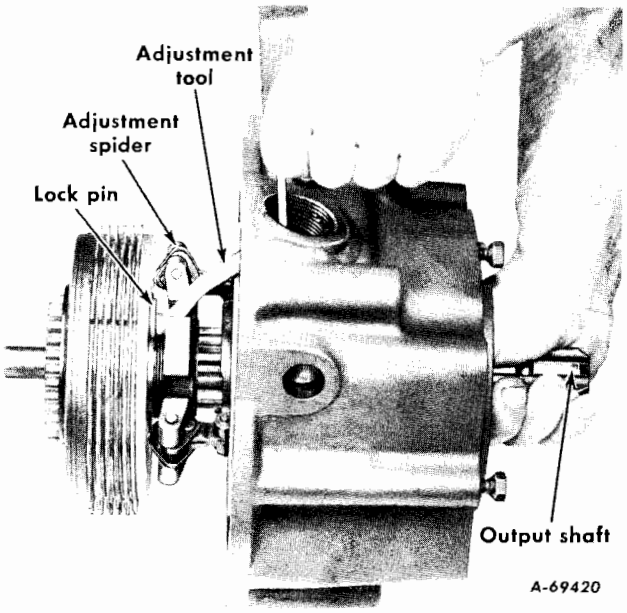


Illust. 87A
Internal parts and adjusting tool for outside adjustment.

Note: Over adjusting will prevent full clutch engagement.

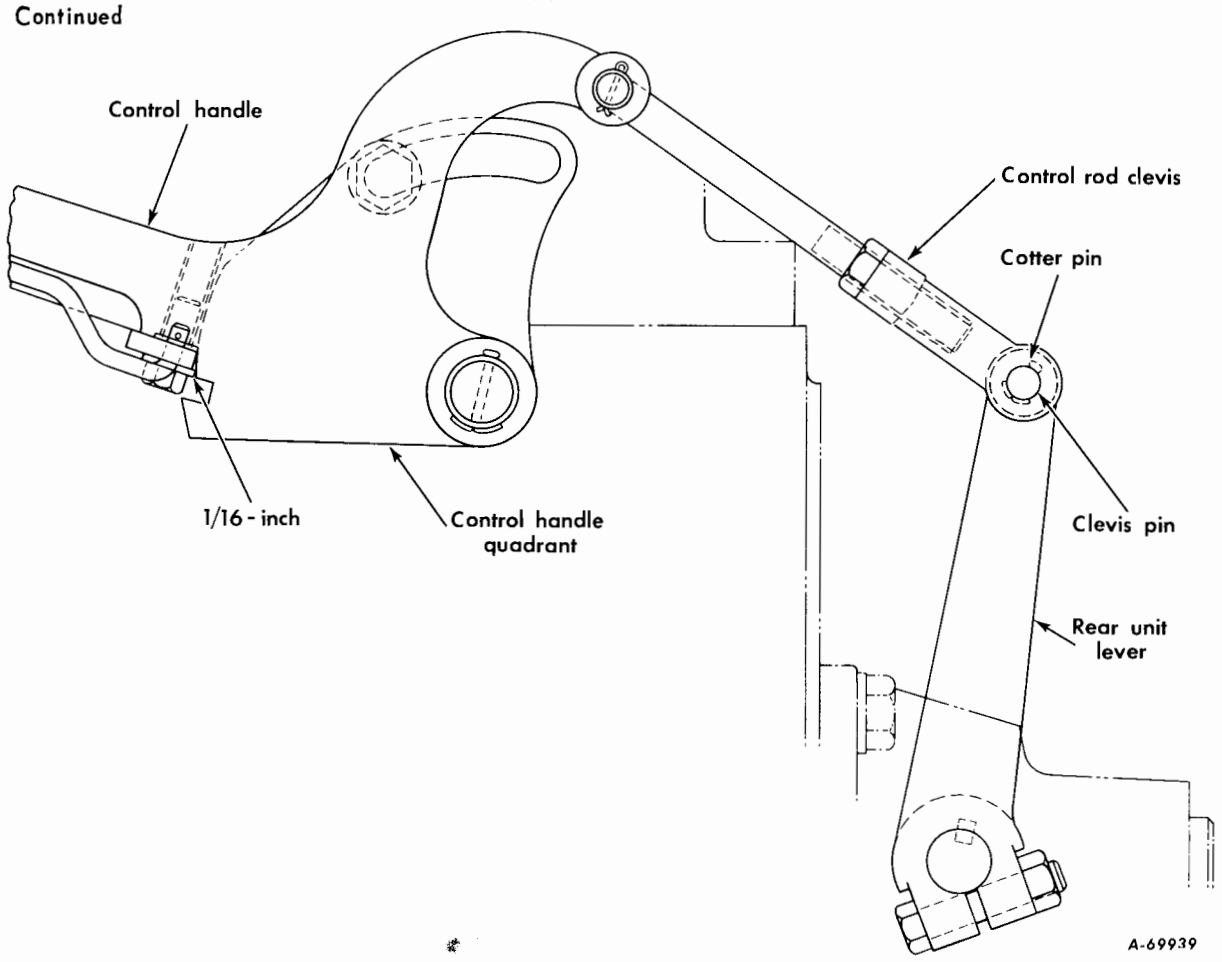
6. After each clutch adjustment, an anti-creep adjustment must be made as follows:

Continued on next page.



Illust. 87B
Disengaging the lock pin with the adjusting tool.

INDEPENDENT POWER TAKE-OFF CLUTCH ADJUSTMENT - Continued



Illust. 88
Anti-creep adjustment.

Whenever the independent power take-off is engaged, the pin through the control rod clevis should be free. If the lever is used to hold the load, premature failure of the over-center mechanism will result.

When making the anti-creep brake adjustment, the independent power take-off handle must be in the disengage position, as shown in Illust. 88.

Remove the cotter pin from the control rod clevis pin and remove the clevis pin. Then adjust the control rod clevis to obtain a 1/16-inch dimension as measured from the front edge of the pawl to the front edge of the quadrant.

This provides adequate brake spring compression in the unit when the control handle is pressed forward and the pawl drops just past the stop on the quadrant.

Remove the transmission filler plug and level plug and replace the previously drained lubricant or fill with new, clean, approved lubricant up to the level plug opening, as recommended in the "Lubrication Table" on pages 46, 47, and 48. Replace the plugs.

BELT PULLEY HOUSING VENT PLUG

Clean the vent plug after every 250 hours of operation or more often when operating under unusually dusty or dirty conditions. To clean, remove the vent plug, wash in kerosene, and replace.

STORING AND HOUSING YOUR TRACTOR

When your tractor is not to be used for some time, it should be stored in a dry and protected place. Leaving your tractor outdoors, exposed to the elements, materially shortens its life.

Follow the procedure outlined below when your tractor is placed in storage, and repeat steps 1, 7, and 8 every six months thereafter. We also recommend that caution is practiced when starting an engine that has been in storage.

1. Wash or clean and completely lubricate the tractor. See "Lubrication Guide" on page 47.

2. Store the tractor so the tires are protected from light. Before storing the tractor, clean the tires thoroughly. Jack up the tractor so the load is off the tires, when it is to be out of service for a long period. If not jacked up, inflate the tires at regular intervals.

3. Run the engine long enough to thoroughly warm the oil in the crankcase before draining the oil. Remove the oil filter element. (If any evidence of rust is found on the retaining bolt, clean thoroughly.) Replace the old filter element with a new one and flush out any sludge from the filter base.

4. **Gasoline or LP Gas engines:** Drain the fuel from the fuel tank and carburetor, and clean out the fuel strainer glass bowl.

Note: Gum will eventually form in the fuel tanks, lines and carburetor if the unit is not used. Gum in carburetor jets and passages affects engine starting. Gum can be dissolved with acetone or a 50-50 mixture of alcohol and benzol.

Diesel engines: Drain all fuel from the fuel tank. Partially fill the fuel tank with a mixture of one-half pure white kerosene and one-half SAE-10W oil, enough to run the engine 10 to 15 minutes.

5. Start the engine and run it at a speed of 1,000 to 1,200 r.p.m. until the engine stops from lack of fuel.

6. Drain the entire cooling system by removing the drain plug on the radiator drain pipe, the drain plug in the engine oil cooler, and opening the drain cock on the right side of the engine.

7. **Gasoline or LP Gas engines:** After the engine has been cooled off, remove the spark plugs and pour one tablespoonful of SAE-50 lubricating oil of good quality into each cylinder. Crank the engine two or three times to distribute the oil over the cylinder walls. Then replace the spark plugs.

Diesel engines: Remove the nozzle bodies. Spray about one ounce of SAE-50 oil through each precombustion chamber throat into each cylinder, then crank the engine two or three revolutions. Clean the gasket seats and install new gaskets, when reinstalling the bozzle bodies.

8. Clean and remove the valve cover, then slush the valves, rocker arms, and push rods with SAE-50 oil. (If any evidence of rust is found, remove it before lubricating.) Use a paint brush to coat the inside of the valve housing cover with SAE-50 lubricating oil. Replace the valve housing cover. The engine must not be run after the slushing operation.

9. Plug up the end of the breather pipe and exhaust pipe.

10. Remove the batteries and place them on a rack or bench in a cool, dry place above freezing (+32°F.). Check the batteries at least once a month for water level and specific gravity. See "Storage Battery".

11. Block the clutch pedal with a wood block so that the clutch is disengaged. This will prevent the clutch facing from sticking to the flywheel or clutch pressure plate.

STARTING ENGINES THAT HAVE BEEN IN STORAGE

1. Remove the valve cover and slush the valve and valve operating mechanism with a mixture of one-half kerosene and one-half SAE-10W engine oil.

2. Remove the spark plugs and pour a mixture of one-half gasoline and one-half light lubricating oil into each cylinder; one ounce (two tablespoonfuls) per cylinder is enough.

3. Crank the engine rapidly until excess oil has been blown out of the spark plug holes. This operation will loosen any tight piston rings and wash old, gummy oil from valves and pistons.

Omit steps 4, 5, and 6 if performed before tractor was stored.

4. Drain the crankcase and flush out with kerosene or flushing oil and fill with the specified lubricating oil. See the "Lubrication Guide" in the tractor Operator's Manual.

5. Be sure the lubricating oil filter has a new element before starting the engine.

6. Clean the air cleaner and refill the oil cup.

7. Remove the crankcase breaker pipe plug and the exhaust pipe plug.

8. **Gasoline engines:** Install the spark plugs after cleaning and setting the gaps.

9. Fill the water cooling system. Be sure the cooling system has a rust inhibitor added to the coolant.

10. Install fully charged batteries and be sure the proper connections are made.

11. Fill the fuel tank.

12. Vent all air from the fuel system as described **on page 16.**

Caution! Keep the doors wide open or move the machine outside the storage room immediately to avoid danger from exhaust gas. Do not accelerate the engine rapidly, or operate it at high speed immediately after starting.

13. Start the engine and let it run slowly; observe if any valves are sticking. If so, pour a small quantity of diesel fuel, dry cleaning solvent, or kerosene on the valve stems until loose.

14. Install the valve cover.

15. Remove the block from the clutch pedal.

16. Before driving the tractor, inflate the tires to the correct operating pressures.

INTERNATIONAL HARVESTER

MAINTENANCE

Trouble Shooting

Possible Cause	Possible Remedy
HARD TO START	
No fuel in starting tank or carburetor	Fill the tank with fuel; open the fuel shut-off valve. Check the fuel lines, fuel strainer, and carburetor.
Fuel strainer or fuel lines clogged	Clean the fuel strainer, check the fuel lines and carburetor.
Water in gasoline	Drain the fuel tank and carburetor. Use new fuel and dry the spark plugs.*
Water in cylinders	Check the cylinder head gasket or look for a clogged drain hole in the exhaust manifold or muffler.
Choked improperly. Flooded engine	Follow the starting instructions. See the operating section in this manual.
Defective ignition or loose wiring	Check the wiring, plugs, distributor and coil unit, etc. See pages 72 to 77.
Defective battery or cranking motor	Check and service; see pages 78 to 80 or replace.
Spark plugs dirty or improper gap	Clean, adjust the gaps to .023 for gasoline engines or .015 inch for LP Gas engines, or replace the plugs. See page 68.
Engine speed control not advanced	Advance the lever one-third for starting.
Lack of compression	*
Flywheel ring gear teeth broken	*
Lubricating oil of too high viscosity	Drain and refill with proper lubricant. See the "Lubrication Table" on pages 48 to 50.
Gears engaged	Put the gearshift in the neutral position.
Internal seizure	*
ENGINE OPERATES IRREGULARLY OR KNOCKS	
Engine incorrectly timed	Retime.*
Spark plugs dirty; wrong gap or wrong type	Clean, reset the gaps, or replace. See page 68.
Poor or weak spark	Check the distributor and coil unit to see if the spark is good from the coil. Check the breaker points and breaker point opening, spark plugs, and wiring; see pages 66 to 77.
Carburetor setting incorrect	Adjust; see "Carburetor" on pages 59 and 60.
Poor grade fuel or water in fuel	Drain and use a good grade of clean fuel.
Engine overheating	Check the cooling system and fan belt; adjust the radiator shutter if used; see "Engine Overheats" on page 92.
Engine valves at fault	Check the valve clearance.*
Air leaks around intake manifold	Check the gasket and tighten the nuts.
Engine smokes	Check the air cleaner oil level. Check the fuel delivery at the carburetor. Check for worn piston and rings.*
Excessive carbon in engine	*
Loose piston pin or bearings	*
Broken rings or loose pistons	*
Worn connecting rod and main bearings	*
Governor sticking or needs adjustment	*

*See your International Harvester dealer.

Possible Cause	Possible Remedy
LACK OF POWER	
Engine speed control lever not advanced.....	Advance the engine speed control lever.
Engine cold or overheated	Run the engine until it warms up before putting it under load. Adjust the radiator shutter if used. Check the cooling system. *
Engine overloaded	Reduce the load.
Engine knocks excessively.....	Use good fuel; also check the timing. *
Governor not working properly.....	*
Poor compression	Service the valves and piston rings. *
Poor fuel or too lean a mixture.....	See "Carburetor" on pages 59 and 60.
Fuel lines or strainer obstructed.....	Clean; see page 57 or page 58.
Fuel tank air vent closed	Open the vent in the cap.
Exhaust pipe clogged.....	Clean out.
Air cleaner clogged or air leakage between carburetor and engine.....	Clean the air cleaner as instructed on pages 65 and 66. Tighten the carburetor and manifold mounting nuts.
Oil of too high viscosity in crankcase or air cleaner.....	Drain and refill with proper lubricant. See the "Lubrication Table" on pages 48 to 50.
Incorrect timing or faulty ignition	Retime. *
Clutch slipping	Adjust the free travel of the pedal; see pages 84, 85, and 86.
Brakes drag.....	Adjust the brakes; see pages 82 and 83.
Carburetor intake manifold or cylinder head intake ports restricted by carbon (Gasoline engine)	Clean. *
ENGINE OVERHEATS	
Cooling system clogged or limed	Clean the system; see pages 51 and 52. *
Fan belt slipping	Adjust or replace the belt.
Insufficient water in cooling system	Fill the radiator to the proper level; see pages 51 and 52.
Radiator cores clogged.....	Remove all chaff or dirt from the radiator grille; clean with forced air or water.
Wrong kind of fuel	Change to a correct grade of fuel.
Carburetor improperly set.....	See "Carburetor" on pages 59 and 60.
Timing incorrect	Retime.
Breaker point opening incorrect.....	Adjust the opening per "Distributor and Coil Unit" (pages 69 and 70).
Excess load.....	Reduce the load.
Excess carbon in engine.....	*
Radiator shutter closed (if used).....	Open the shutter.
NO OIL PRESSURE, TOO HIGH OR TOO LOW	
Defective oil pressure indicator.....	Replace. *
Wrong viscosity, diluted or insufficient oil ..	See the "Lubrication Table" (pages 48 to 50). Check the oil level; if diluted, replace with fresh oil.
Broken, loose, or plugged oil lines.....	Clean and tighten. *
Low oil level in crankcase.....	Add oil; see "Lubrication Guide." Check for an oil leak.
Defective or dirty oil pressure regulating valve.....	*
Oil pump strainer clogged or pump not working	Clean. *
Worn bearings.....	*

* See your International Harvester dealer.

Possible Cause	Possible Remedy
OIL DILUTION OR USES TOO MUCH OIL	
Oil of incorrect viscosity	See the "Lubrication Table" on pages 48 to 50.
Leaks in oil lines or filter or in oil pan plug or gasket	Check and tighten.*
Worn piston or oil rings	*
Loose connecting rod bearings	*
Long engine idling	Stop the engine.
Engine overheating or too cold	See "Lack of Power" and "Engine Overheats" on page 92.
Engine speed too high	*
Crankcase breather clogged	Clean.
USING TOO MUCH FUEL	
Fuel mixture too rich. Carburetor out of adjustment	Check choke and see "Carburetor" on pages 59 and 60.
Fuel leaks	Tighten or replace the fuel lines or fuel strainer gasket.
Poor grade of fuel	Use a correct grade of fuel.
Choke closed	Investigate for the choke not operating.
Engine overloaded	Reduce the load or shift to a lower speed.
Poor compression	*
Faulty ignition	See pages 68 to 71.
Engine not operating at proper temperature	Check the cooling system. Check the lubricating oil.*
Air cleaner clogged	Service the air cleaner; see pages 65 and 66.
Wrong viscosity or amount of lubricating oil	See the "Lubrication Table" on pages 48 to 50, and keep the oil up to the proper level.
NO FUEL AT CARBURETOR	
Fuel low in tank	Fill the fuel tank and check the fuel lines.
Air vent hole in fuel tank cap plugged up	Clean out the vent hole.
Fuel valve closed or partly open	Open the valve; see the starting instructions on page 18.
Dirty or clogged fuel strainer screen or line	Clean as instructed on page 57 and 58.
IGNITION AND ELECTRICAL	
Wrong kind, old, cracked, dirty, or poorly set spark plugs	Clean and set the gaps as instructed on page 68 to .023 inch, for gasoline engines or .015 inch for LP Gas engines, or replace with new plugs.
Loose wiring or improper connections	Check the wiring to see that all connections are clean and tight; see pages 72 to 77.
Distributor and coil unit not timed correctly	Retime.*
Distributor cap or rotor or breaker chamber dirty	Clean as instructed on pages 69, 70, and 71.
Breaker points dirty, pitted, or improperly set	Clean and reset the opening or replace with new points; see pages 69 or 70.
Breaker arm stuck, weak, or broken spring	Check and replace; see pages 69 or 70.

*See your International Harvester dealer.

Possible Cause	Possible Remedy
IGNITION AND ELECTRICAL	
Battery defective, low charge or loose connections	Recharge, clean and tighten the cable lugs or replace with new; check the ground strap; see pages 78 to 80.
Cranking motor failure	Replace.*
Generator inoperative	*
Voltage regulator or generator relay	*
Charge indicator light inoperative	Replace the charge indicator bulb.
Charge indicator light remains on	Check the battery and generator; check the drive belts and wiring.
Lights will not burn	Check the battery ground strap. Turn on the switch, replace the sealed beam units, replace the fuse, recharge the battery, or check the wiring and generator.*
Lights burn dim	Turn the switch to bright. Recharge the battery, tighten the cable terminals, check the sealed beam units, clean the contacts.

(Diesel Engine)

HARD TO START	
Fuel stop control button	Not completely in starting position.
Engine speed control lever not advanced	Advance the lever one-third for starting.
Flooded engine	Follow the starting instructions in the tractor Operator's Manual.
Defective glow plugs	Check and replace. See page 68.
Defective battery or cranking motor	Check and service; see pages 78 to 80, or replace.
Water in the cylinders	Check the cylinder head gasket or look for a clogged drain hole in the exhaust manifold or muffler.
Lack of compression	Check the cylinder head gasket.*
Lubricating oil of too high viscosity	Drain and refill with proper lubricant. See "Lubrication Table" on pages 48 to 50.
Gears engaged	Put the gearshift in the neutral position.
Flywheel ring gear teeth broken	*
Internal seizure	*
ENGINE OPERATES IRREGULARLY OR KNOCKS	
Engine incorrectly timed	Retime.*
Injection pump out of time	Check the timing.*
Poor grade fuel or water in the fuel	Drain and use a good grade of clean fuel.
Injection nozzles dirty or stuck	Remove the defective nozzles.* Use clean fuel.
Air intake restricted	Service the air cleaner.
Air in fuel lines	Check connections - bleed fuel system.
Air leaks around the intake manifold	Check the gasket and tighten the nuts.
Engine valves at fault	Check the valve clearance.* See page 80.
Combustion knocks	Replace the nozzles or valves.
Engine overheating	Check the cooling system and fan belt; adjust the radiator shutter if used; see "Engine Overheats" on page 92.
Injection pump governor out of adjustment	*
Injection nozzles leaking	Replace.*
Excessive carbon in the engine	*
Loose piston pin or bearings	*
Broken rings or loose pistons	*
Worn connecting rod and main bearings	*
Engine smokes	Engine overloaded. Reduce the load. Check the fuel delivery and lubricant used. Check the injection pump governor adjustment. See smoke colors: on page 95. *

*See your International Harvester dealer.

(Diesel Engine)

Possible Cause	Possible Remedy
LACK OF POWER	
Engine speed control lever not advanced	Advance the engine speed control lever.
Engine cold or overheated	Run the engine until it warms up before putting it under load. Adjust the radiator shutter if used. Check the cooling system.*
Engine overloaded	Reduce the load.
Air cleaner clogged	Clean.
Poor fuel	Use correct fuel; see the specifications.
Fuel pipes obstructed	Clean.
Fuel strainer obstructed	Clean; see page 57.
Fuel tank air vent closed	Open the vent in the cap.
Air in fuel lines	Check connections and vent fuel system.
Fuel filter partly clogged	Replace.
Exhaust pipe clogged	Clean out.
Injection nozzle valves dirty or stuck	Remove the defective valves, clean them or replace.* Use clean fuel.
Oil of too high viscosity in the crankcase or air cleaner	Drain and refill with proper lubricant. See "Lubrication Table" on pages 48 to 50.
Incorrect timing of the injection pump	Retime.*
Engine knocks excessively	Use good fuel; also check the timing.*
Governor not working properly	*
Poor compression	Service the valves and piston rings.*
Clutch slipping or oil on the facings	Adjust the free travel, see page 84, replace the facings.*
Brakes drag	Adjust the brakes; see pages 82 and 83.
ENGINE STOPS	
Restriction in fuel flow	Clogged or dirty filters - check lines for obstruction or break.
No fuel being delivered	Check the fuel tank, open the fuel shut-off valve, vent the system or drain the fuel system, and fill it with new fuel. Vent the system again.
Injection nozzle inoperative	Remove the nozzle and clean.*
Faulty timing of the injection pump to the engine	Retime the pump.*
ENGINE OVERHEATS	
Cooling system clogged or limed	Clean the system; see pages 51 and 52. *
Thermostat left out or not functioning	Install a new thermostat of the correct range.
Radiator cap not pressure-tight	Screw the cap on tight, install a new gasket assembly, or replace with a new cap.
Fan belt slipping	Adjust or replace the belt.
Insufficient water in the cooling system	Fill the radiator to the proper level; see the tractor Operator's Manual.
Radiator cores clogged	Remove all chaff or dirt from the radiator grille; clean with forced air or water.
Wrong kind of fuel	Change to a good-quality fuel.
Incorrect timing of the fuel injection pump	Retime the pump.*
Excess load	Reduce the load.
Excess carbon in the engine	*
Heat indicator defective	Replace the heat indicator.
Radiator shutter closed (if used)	Open the shutter.

*See your International Harvester dealer.

MAINTENANCE

(Diesel Engine)

Possible Cause	Possible Remedy
NO OIL PRESSURE, TOO HIGH OR TOO LOW	
Defective oil pressure gauge	Replace.*
Wrong viscosity, diluted or insufficient oil	See "Lubrication Table" on pages 48 to 50. Check the oil level; if the oil is diluted, replace with fresh oil.
Broken, loose or plugged oil lines	Clean and tighten.*
Low oil level in the crankcase	Add oil; see "Lubricating Guide." Check for an oil leak.
Defective or dirty oil pressure regulating valve	*
Oil pump strainer clogged or pump not working	Clean.*
Worn bearings	*
Crankcase breather clogged	Clean the element.
OIL DILUTION OR USES TOO MUCH OIL	
Oil of wrong viscosity	See "Lubrication Table" on pages 48 to 50.
Leaks in the oil lines, filter, oil pan plug, or gasket	Check and tighten.*
Worn piston, oil rings or cylinders	*
Loose connecting-rod bearings.	*
Long engine idling	Stop the engine.
Engine overheating or too cold	See "Lack of Power" and "Engine Overheats".
Engine speed too high.	*
Crankcase breather clogged	Clean the element.
USING TOO MUCH FUEL	
Fuel leaks	Tighten or replace the fuel lines or fuel strainer gasket.
Engine overloaded	Reduce the load or shift to a lower speed.
Poor Compression	*
Engine not operating at the proper temperature	Check the cooling system. Check the lubricating oil.*
Air cleaner clogged.	Service the air cleaner; see pages 65 and 66.
Incorrect viscosity or amount of lubricating oil	See "Lubrication Table" on pages 48 to 50, and keep the oil up to the proper level.
Incorrect grade of fuel	Use correct fuel. See the specifications.
Fuel injection nozzle not operating properly.	Clean the nozzles or replace.*
Injection pump timing incorrect	Retime the injection pump.*

*See your International Harvester dealer.

Possible Cause	Possible Remedy
WHITE SMOKE (Indicates Misfiring)	
Low engine temperature	Check thermostat-increase engine temperature.
Faulty injectors	Clean and test faulty nozzle for pressure, leakage, and spray pattern.
Poor fuel	Use diesel fuel that meets specifications. See the tractor Operator's Manual.
Poor compression	See "Engine Operates Irregularly or Knocks".
BLUE SMOKE (Indicates High Oil Consumption)	
Worn or stuck rings	See "Oil Dilution or Uses Too Much Oil".
Low coolant temperatures	Check thermostat - increase engine temperature.
BLACK SMOKE	
Excessive fuel rate	*
Overloading engine	Reduce load.
Restriction in air supply	Clean air cleaner.
Low coolant temperature	Check thermostat - increase engine temperature.
ELECTRICAL	
Loose wiring or improper connections	Check the wiring to see that all connections are clean and tight. Also see "Wiring Diagrams" on pages 72 to 77. *
Battery defective, low charge, or loose connections	Recharge, clean, and tighten the cable lugs or replace with a new battery; check the ground straps.
Cranking motor failure	Replace. *
Generator inoperative	Clean the commutator, check the brushes. *
Voltage regulator	*
Charge indicator bulb inoperative	Replace the charge indicator bulb.
Charge indicator bulb remains on	Check the battery and generator; check the drive belts and wiring.
Lights will not burn	Check the battery ground strap. Turn on the switch; replace the headlight or rear light sealed beam units, combination rear light lamps, tail light lamp, instrument lamps, or fuse; recharge the battery; check the wiring, and the generator. *
Lights burn dim	Turn the switch to bright. Recharge the battery, tighten the cable terminals, check the headlight or rear light sealed beam units, combination rear light lamps, tail light lamp, instrument lamps, and clean the contacts.

* See your International Harvester dealer.

Possible Cause	Possible Remedy
BRAKES	
Do not hold	Adjust the brakes (pages 82 and 83) or new lining needed.*
Drag or uneven	Adjust the brakes.
Grease on lining	Replace the lining.*
Return spring broken	Replace.
Do not release	Release the brake lock. Be sure the left brake cross shaft is free to turn.
TRANSMISSION, BELT PULLEY, AND POWER TAKE-OFF	
Hard to shift gears	Use lubricant of the correct viscosity; see pages 48 to 50.
Engine clutch drags	See "Lack of Power."
Gears clashing	Stop the tractor and disengage the clutch before shifting the gears.
Gears slipping out of mesh	*
Noisy	Check the oil level; use lubricant of the proper viscosity.*
Damaged parts	*
REAR WHEELS	
Do not turn	Release the brake lock. Transmission, differential, or clutch faulty. See the transmission section above.*
FRONT WHEELS	
Too tight or too loose	Check the lubricant in the bearings, check the bearing adjustment see page 55.
Lubricant leakage	Check the oil seal.*
STEERING	
Faulty	Check the tire inflation.*
Defective front axle	Inspect the linkage, check and replace faulty parts.*
Tractor turns to one side	Check and adjust the brakes evenly; see pages 82 and 83. Check the pneumatic tire air pressures.
PNEUMATIC TIRES	
Excessive or uneven wear	Check for toe-in; page 36. Check the air pressure and load on the tires.
Slippage, rear tire	Add more weight, and check for high air pressure; see page 40. If the tread is badly worn, the tires slip more readily. Replace with new tires or use lug-type chains.
HYDRAULIC SYSTEM AND HYDRAULIC REMOTE CONTROL	
Noisy pump, pump laboring, unsteady pressure	Air in system.*
Fails to lift or lower properly	Strainer screen clogged.*

* See your International Harvester dealer.

EXTRA EQUIPMENT AND ACCESSORIES

The tractor is used for so many different types of work and is called on to operate under so many different conditions that a considerable variety of equipment is necessary to adapt it to the varied requirements of the user.

When you purchased your tractor, you probably had it completely equipped for your particular needs at the time. However, later you may wish to obtain some of the equipment or accessories shown below. These items can be purchased from, and installed by, your International Harvester dealer.

Adjustable Wide-Tread Front Axle
Auxiliary Hydraulic Valves
Belt Pulley and Power Take-Off
Break-Away Connector Socket
Cigarette Lighter
Combination Rear Light and Tail Light
Cross Drawbar (Three-Point Hitch)
Deluxe Cushion Seat
Deluxe Upholstered Seat
Drawbar
Exhaust Muffler
Exhaust Valve Rotators
Extension Cable
Front Power Take-Off Pulley
Front Power Take-Off Hydraulic Pump
Front End Weights
Heavy Duty Battery (Farmall 504 Diesel)
High Altitude Pistons (Gasoline Engine)
Hydraulic Manifold
Hydraulic Power Steering
Hydraulic Remote Control
Hydraulic System
Industrial Tractor Attachment
Pneumatic Tire Pumps
Independent Power Take-Off (Rear Unit-Clutch Type)
Pre-Cleaners
Pre-Screener
Radiator Shutter
Rear Axles
Safety Lamp Package
Safety Starting Switch
Seat, Contour W/Vertical Action
Single Front Wheel
Stabilizers
Swinging Drawbar (Three-Point Hitch)
Tachometer
Three-Point Hitch
Wheel Weights

SPECIFICATIONS

GROUND SPEED

Comparative Ground Speeds with Various Tires. No allowance for Tire Slippage.

Engine operating at rated speed of 2200 r.p.m. and at 2000 r.p.m. for 540 r.p.m. power take-off speed

FARMALL 504 TRACTORS

Gear	Miles Per Hour	
	•2,000 r.p.m. Engine Speed	2,000 r.p.m. Engine Speed
	12.4-36* and 13.9-36 R-1 Tire	12.4-36* and 13.9-36 R-1 Tire
1st Normal	1.3	1.7
T.A.	1.2	1.1
2nd Normal	3.9	3.6
T.A.	2.6	2.4
3rd Normal	5.3	4.8
T.A.	3.6	3.2
4th Normal	7.5	6.8
T.A.	5.1	4.6
5th Normal	16.6	15.0
T.A.	11.2	10.1
Rev. Normal	2.3	2.1
T.A.	1.5	1.4

* Standard Tire

SPECIFICATIONS

	Farmall 504 Tractor	Farmall 504 Diesel Tractor
Capacities (U. S. Measure - Approximate)		
Cooling system	15 qt.	18. 6 qt.
Fuel tank	22-1/2 gal.	22-1/2 gal.
(L. P. Gas)	23 gal.	
Crankcase pan	5 qt.	7 qt.
Transmission and differential case	Approx. 12 gal.	Approx. 12 gal.
Steering gear housing	1-1/2 pt.	1-1/2 pt.
Belt pulley housing	2 qt.	2 qt.
Air cleaner oil cup	1-1/2 pt.	2-1/2 pt.
Independent power take-off housing	1 pt.	1 pt.
Engine		
Cylinders	4	4
Bore	3-3/8 in.	3-11/16 in.
Stroke	4-1/4 in.	4-25/64
Displacement	152 cu. in.	188 cu. in.
Engine speeds:		
Maximum full load (governed speed)	2, 200 r. p. m.	2, 200 r. p. m.
Maximum idle (governed speed)	Approx. 2, 500 r. p. m.	Approx. 2, 400 r. p. m.
Minimum idle speed	Approx. 425 r. p. m.	Approx. 675 r. p. m.
Battery ignition unit:		
Distributor (21° advance (Gasoline)	IH	
(25° advance (L. P. Gas)		
Spark plug gap (Gasoline)	.023 in.	---------
(L. P. Gas)	.015 in.	
Valve clearance (engine hot)		
Intake	.014 in.	.027 in.
Exhaust	.020 in.	.027 in.
Carburetor	1-1/8 in.	---------
Injection pump, Roosa-Master	---------	Model "DB"
Injection nozzles	---------	IH Midget
Injection pump timing retard, end of injection, engine stopped	---------	2° after TDC
Maximum full load (governed speed) 2, 200 r. p. m.	603 r. p. m.	603 r. p. m.
Maximum idle (governed speed)	Approx. 685 r. p. m.	Approx. 658 r. p. m.
Minimum idle speed	Approx. 116 r. p. m.	Approx. 185 r. p. m.
Standard shaft speed (2, 000 engine r. p. m.)	548 r. p. m.	548 r. p. m.
Belt Pulley Speeds		
Maximum full load (governed speed) 2, 200 r. p. m.	1, 168 r. p. m.	1, 168 r. p. m.
Maximum idle (governed speed)	Approx. 1, 327 r. p. m.	Approx. 1, 274 r. p. m.
Minimum idle speed	Approx. 226 r. p. m.	Approx. 358 r. p. m.
Belt speed at 2, 200 r. p. m. engine speed	3, 363 ft. per min.	3, 363 ft. per min.
Pulley diameter	11 in.	11 in.
Pulley face	7-1/2 in.	7-1/2 in.

SPECIFICATIONS

	Farmall 504 Tractor	Farmall 504 Diesel Tractor
Electrical System		
System voltage	12 volt neg. ground	12 volt neg. ground
Battery size	10 HN	14 H 96
Generator, Delco-Remy	20 amp.	20 amp.
Generator regulator, Delco-Remy	3 unit	3 unit
Cranking motor, Delco-Remy	Positive engagement, push button controlled	Positive engagement, push button controlled
Light switch	4 position	4 position
Lamps - all glass, sealed beam units	12-16 volt	12-16 volt
Fuse (cartridge type)	AGC-10 amp.	AGC-10 amp.

Clutch	
Single-plate, dry-disc, spring-loaded	10-1/2 in.
Foot brakes	
Mechanical-disc type, operated either individually or interlocked.	
Wheels and Tread	
Front wheels, pneumatic tire size	*5.50-16
Rear wheels, pneumatic tire size	*12.4-36
Tread, front (Tricycle tractor)	8 and 14
Tread, adjustable wide front axle	50 to 74 or 58 to 82 in.
Tread, rear	
Power-adjusted wheels at inner position on axle	52 to 72 in.
Power-adjusted wheels at outer position on axle	68 to 88 in.
Concave turned in (not power adjusted wheels)	52 to 80 in.
Concave turned out (not power-adjusted wheels)	56 to 84 in.
Wheelbase (tricycle tractor)	89-3/4 in.
General Dimensions	
Length over-all	132-3/4 in.
Width over-all	
Minimum (to outside edge of rear axle)	83 in.
Maximum (to outside edge of rear tires)	96-1/2 in.
Height over-all (to top of steering wheel)	78 in.
Ground clearance for crops under front axle	23-1/4 in.
Ground clearance for crops under rear axle	24-1/4 in.
Ground clearance under drawbar	15-1/2 in.
Ground clearance under rear frame (drawbar removed)	17-1/2 in.
Drawbar height above ground	16 in.
Drawbar lateral swing	13-1/2 in.
Hitch hole to end of power take-off shaft	14 in.
Minimum turning radius (wheels in minimum tread)	
Without brake applied	8 ft. 4 in.
With brake applied	8 ft. 3 in.

* Other pneumatic tire sizes available