# McCormick Farmall 400 Tractors

## Operators Manual

**1004381R5**

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**FREE GASOLINE CAP — See your dealer today.**

International Harvester has developed a new gasoline cap designed to improve vapor venting and to inhibit the sudden eruption of liquid fuel if the safety precautions against cap removal are not observed.

New caps will be exchanged **free of charge** with owners of certain models of International Harvester farm tractors. To see whether your tractor already has the new cap or to arrange to obtain one, simply contact your local International Harvester dealer. Also ask him for a free International Harvester brochure "New Facts About Fuels" and for free "Warning" decals for all gasoline equipment.

**NOTE:** New cap **will not** fit on any of these tractors.

| | |
|---|---|
| B-275 | I-434 |
| B-276 | I-544 |
| I -284 | I-656 |
| I -354 | I-2656 |
| B-414 | |

*New cap **will not** fit on these tractors above serial numbers shown.

F-504 above serial No. 13400
I -504 above serial No. 14272
I -606 above serial No. 6879
I -2606 above serial No. 6879

| Gasoline Tractor Models Included in Cap Exchange Program (See Note) | | | |
|---|---|---|---|
| A | 100 | *504 | 2404 |
| AV | 130 | F-544 Only | 2424 |
| B | 140 | 560 | 2444 |
| BN | 200 | 600 | 2504 |
| C | 230 | *606 | 2544 |
| H | 240 | 650 | *2606 |
| HV | 300 | F-656 Only | 2706 |
| M | 330 | 660 | 2756 |
| MV | 340 | 666 | 2806 |
| O | 350 | 686 | 2826 |
| OS | 400 | 706 | 2856 |
| W | 404 | 756 | |
| WR | 424 | 766 | |
| 70 | 444 | 806 | |
| 86 | 450 | 826 | |
| | 460 | 856 | |

New cap **will not** fit on any lawn and garden tractor in the Cadet model series or on any tractor with the gasoline tank behind the operator's seat.

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## How the Engine for LP Gas Differs from the Gasoline Engine

The LP gas equipped engine will develop the same power as the gasoline engine. The engineering tests were made on 100 percent propane, which has a lower BTU value than butane.

Principal elements of this attachment include the fuel tank assembly with valves and gauges, pipes and connections, carburetor, fuel regulator and vaporizer unit, fuel filter, radiator outlet pipe, high compression cylinder head, cold manifold, and 12-volt electrical system. These elements are specifically designed and installed to assure efficient, economical operation on LP gas as described below.

1. The fuel tank is of heavy, welded steel construction complete with valves and gauges. This tank is built and hydrostatically tested to withstand a pressure of 500 pounds per square inch and has a working pressure of 250 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.

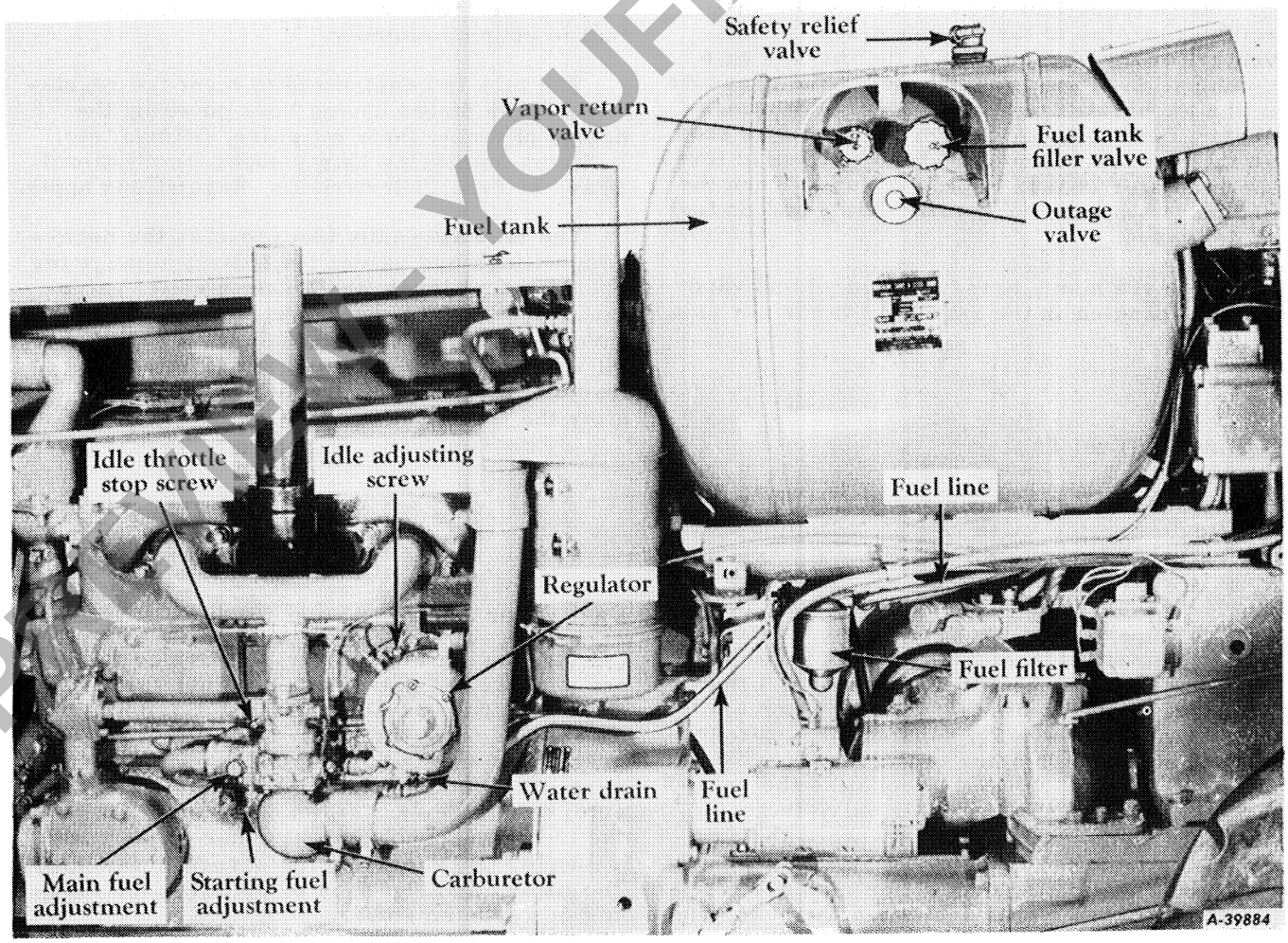
2. The regulator-vaporizer unit is supplied to change the liquid fuel at tank pressure to a dry gas at slightly below atmospheric pressure.

3. The carburetor is especially designed for LP gas fuel and has an economizer for improved fuel economy at part loads.

4. The 12-volt cranking motor furnishes powerful cranking action required for a high compression engine.

5. The compression ratio is increased to 8.35:1 compared with 6.3:1 in the gasoline engine.

6. The engine is fitted with stellite faced exhaust valves and stellite exhaust valve seat inserts.




**Illust. 2**
**LP gas fuel system.**



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| Point of lubrication | Capacity | Anticipated Air Temperature | | | |
|---|---|---|---|---|---|
| | | Above +45° F. | +45° F. to +15° F. | +15° F. to 0° F. | 0° F. to -20° F. |
| Engine crankcase | 8 qt. | SAE-20 | SAE-10W | 7 qt. SAE-10W<br>1 qt. Kerosene | 6 qt. SAE-10W<br>2 qt. Kerosene |
| Air cleaner | 2-1/4 pt. | SAE-20 | SAE-10W | 2 pt. SAE-10W<br>1/4 pt. Kerosene | 1-3/4 pt. SAE-10W<br>1/2 pt. Kerosene |

## Cold Weather Operation

When operating in temperatures below +15° F. dilute the SAE-10W oil in the crankcase and air cleaner with kerosene as specified in the chart *on page 8.*

When the temperature is likely to be +32° F. or lower, all water should be drained from the regulating unit as well as the engine cooling system at the end of each run, unless the system is filled with an antifreeze solution.

In order to assure starting in cold weather, the battery must be kept fully charged at all times.

Refer to the Tractor Operator's Manual for further "Cold Weather Precautions".

## Starting the LP Gas Engine

1. Put the gearshift lever in neutral position.

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

3. Slowly open the vapor valve *(Illust. 7)*. 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. 7)* 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 by pressing down on the clutch pedal. Turn the ignition and starting switch key clockwise all the way 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. *(See Illust. 7)*, and close the vapor valve.

## Stopping the Engine

To stop the engine close the liquid valve *(Illust. 7)* and allow the engine to consume the fuel in the lines, then turn the ignition and starting switch key counterclockwise to off position. Never allow the liquid valve or vapor valve to remain open after the engine is stopped.

Refer to the Tractor Operator's Manual for additional operating and maintenance instructions.

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

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## Pneumatic Tires

Before moving the tractor, check the air pressure in the pneumatic tires and inflate or deflate the front and rear tires to the correct operating pressures. See the table *on page 84.*

## Rear Wheels

Before operating the tractor, check the rear wheel hub clamp bolts to make certain that they are torqued to 390–440 ft. lbs.

## Steel Wheels

If your tractor is equipped with steel wheels, or has new wheel and lug installations, it is advisable to check and tighten the rear wheel bolts at intervals to be sure that the lugs seat properly.

## Engine Cooling System

The cooling system capacity is approximately 6½ U. S. gallons. Be sure the radiator drain and crankcase water drain (*Illust. 55*) are closed; then fill the radiator to a level approximately 2¼ 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. Use 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 in the cooling system except as instructed in "Cold Weather Precautions" *on page 53.*

For further information see "Cooling System" (*page 54*). If the tractor is to be operated in freezing temperatures (+32° F. or lower) see "Cold Weather Precautions" *on page 53.*

## Fuel System

Provision is made in the design of this tractor so that it may be equipped with either a gasoline, distillate, or kerosene-burning engine. Before attempting to use a fuel for which your tractor is not designed, see your International Harvester dealer or the nearest International Harvester Company District Office for full details.

International Harvester gasoline burning engines are specifically designed for use with regular grade gasoline having a 75 minimum octane rating (motor method).

Fuels having a lower than 75 octane rating can be used satisfactorily in distillate burning engines. These engines are designed for use with fuels having a 40 minimum octane rating.

Fuels having a less than 40 octane rating should be used in kerosene burning engines.

See the chart below for fuel octane ratings required to obtain the best engine performance and maximum engine life for your type of engine.

| Type of Engine | Fuel Octane |
|---|---|
| Gasoline burning | 75 and up |
| Distillate burning | 40 to 75 |
| Kerosene burning | Below 40 |

To obtain best results, use the fuel for which the tractor is designed, follow the operating instructions given for that fuel and observe the following precautions:

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.

Distillate fuels should conform to International Harvester Company specifications (see your International Harvester dealer).

On distillate or kerosene-burning tractors, do not open the shut-off valves under the auxiliary tank and under the main fuel tank, or even partially open them, at the same time, as this will permit the distillate or kerosene to mix with the gasoline, making the engine hard to start.

During the first 100 hours of operation, mix one pint of light engine oil with every five U.S. gallons of fuel.

## Battery-to-Ground Cable

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

## Instruments and Controls

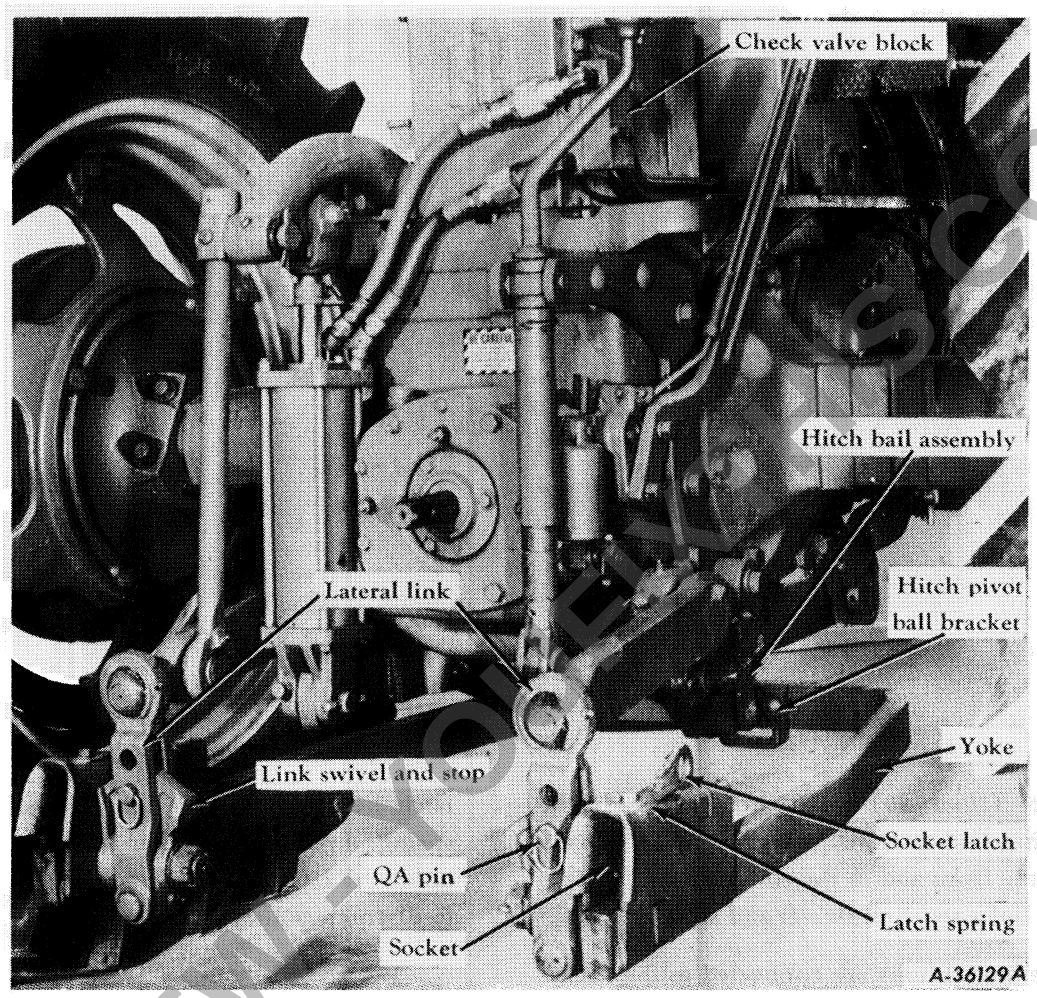
Thoroughly acquaint yourself with all instruments and controls as described *on pages 4 to 10.*



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## Fast-Hitch—Continued




**Illust. 10**
**Yoke, socket, and latch assembly.**

# Before Starting Your New Tractor

## Lubrication

**Tractors shipped to destinations in the United States of America, Canada, and Mexico** have the crankcase and air cleaner filled with SAE-10W oil from October 15 to April 15, and SAE-20 oil from April 15 to October 15. If the engine is to be operated at temperatures for which these oils are recommended (see the "Lubrication Table"), this oil can be used in the engine for 150 hours of operation. If temperatures are not within the range specified, drain the oil from the crankcase and air cleaner, and replace it with the required amount of fresh oil having the physical properties and proper viscosity suitable for the prevailing temperature and type of service.

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

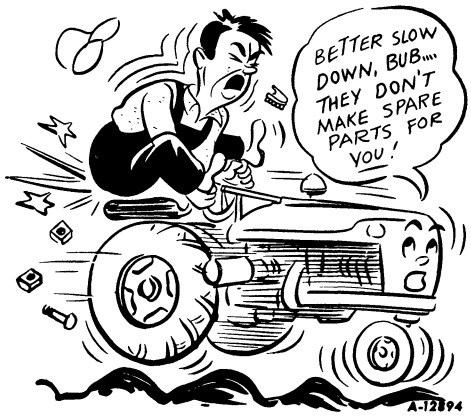
**Before starting the engine for the first time,** remove the spark plugs and put about one teaspoonful of crankcase oil into each cylinder; replace the spark plugs and crank the engine to distribute the oil over the cylinder walls. This assures positive lubrication of the cylinders and pistons immediately after starting and eliminates the possibility of scoring.

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

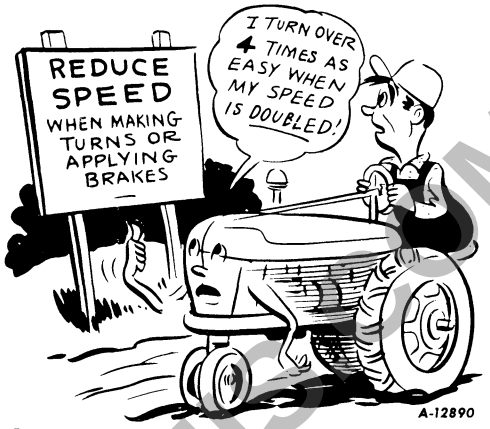
Check the oil levels of the engine crankcase, air cleaner, transmission, belt pulley housing, and all gear cases to see that they are filled to the correct levels with oil of the proper viscosity for the prevailing temperature. See the "Lubrication Guide" and the specifications of lubricants *on pages 41 and 42.*



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Always drive the tractor at speeds slow enough to insure safety, especially when driving over rough ground or near ditches.




Reduce speed before making a turn or when applying the brakes. Remember, the danger of the tractor overturning increases four times when the speed is doubled.

## Fifth Speed (Safety First)

On tractors equipped with steel rear wheels, the fifth (high) speed is locked out by a lockout screw located on top of the transmission case. Do not remove this screw unless the tractor is converted to pneumatic tires. Then remove the lockout screw and replace it with a $\frac{3}{8}$ x $\frac{3}{4}$-inch cap screw.

## Normal Ground Speeds According to Tire Size

**Note:** The tachometer used with the tractor is calibrated according to 12-38 rear tires. The tractor speed will vary according to other tire sizes as shown in the table.

Miles per Hour

| Gear | Engine R.P.M. | 11-38† 27.8§ | | 11-38* 28.3§ | | 12-36* 27.9§ | | 12-38† 28.6§ | | 12-38* 29.0§ | | 12-44* 31.0§ | | 13.36* 28.7§ | | 13-38† 29.4§ | | 13-38* 30.1§ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 400 | 400 Hi-Clear | 400 | 400 Hi-Clear | 400 | 400 Hi-Clear | 400 | 400 Hi-Clear | 400 | 400 Hi-Clear | 400 | 400 Hi-Clear | 400 | 400 Hi-Clear | 400 | 400 Hi-Clear | 400 | 400 Hi-Clear |
| 1st | 1,450 | 2.4 | – | 2.5 | – | – | 2.4 | 2.5 | – | 2.5 | 2.5 | 2.7 | 2.7 | – | 2.5 | 2.6 | – | 2.6 | 2.6 |
| 2nd | 1,450 | 3.7 | – | 3.8 | – | – | 3.8 | 3.8 | – | 3.9 | 3.9 | 4.2 | 4.2 | – | 3.9 | 4.0 | – | 4.0 | 4.1 |
| 3rd | 1,450 | 4.7 | – | 4.8 | – | – | 4.7 | 4.8 | – | 4.9 | 4.9 | 5.2 | 5.2 | – | 4.9 | 5.0 | – | 5.1 | 5.1 |
| 4th | 1,450 | 6.5 | – | 6.6 | – | – | 6.6 | 6.7 | – | 6.8 | 6.8 | 7.3 | 7.3 | – | 6.8 | 6.9 | – | 7.1 | 7.1 |
| 5th | 1,450 | 16.2 | – | 16.5 | – | – | 16.4 | 16.7 | – | 16.9 | 17.0 | 18.1 | 18.2 | – | 16.8 | 17.2 | – | 17.6 | 17.7 |

†—Agricultural Type Tire *—Rice and Canefield Type Tire §—Rolling Radii

## Operating the Torque Amplifier

The Torque Amplifier is a manually controlled, mechanical supplemental transmission unit which provides an optional lower gear speed in each respective transmission gear speed without interruption of engine power.

Tractors with a Torque Amplifier are provided with two ranges of traveling speeds as indicated in the table. The ranges are based on tractors with 12-38 rear tires on the Farmall 400 and 13-38 rear tires on the Farmall 400 Hi-Clear, and maximum, full-load governed engine speed.

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.



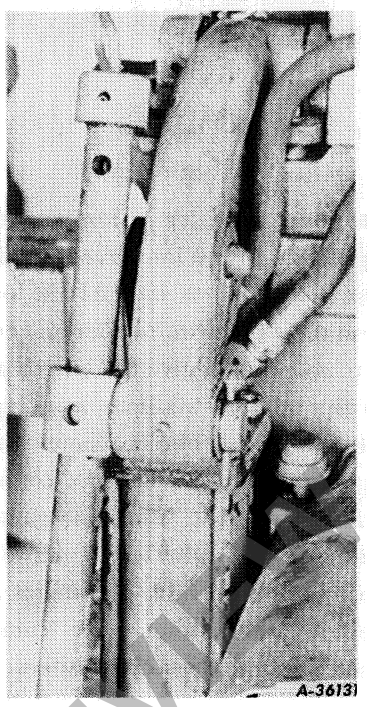
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## Operating the Fast-Hitch

The Fast-Hitch is operated with the Hydra-Touch control levers. *See Illust. 35.*

The hitch is raised and lowered by a hydraulic cylinder and lift link. This lift link should be free to float vertically except when using the drawbar. *See Illust. 32.*

When the drawbar is in use, the lift link should be pinned rigidly to the eyebolt in the rocker arm by means of a QA (quick-attachable) pin and cotter. This pin is stored in the drawbar when not in use. *See Illust. 32A.*

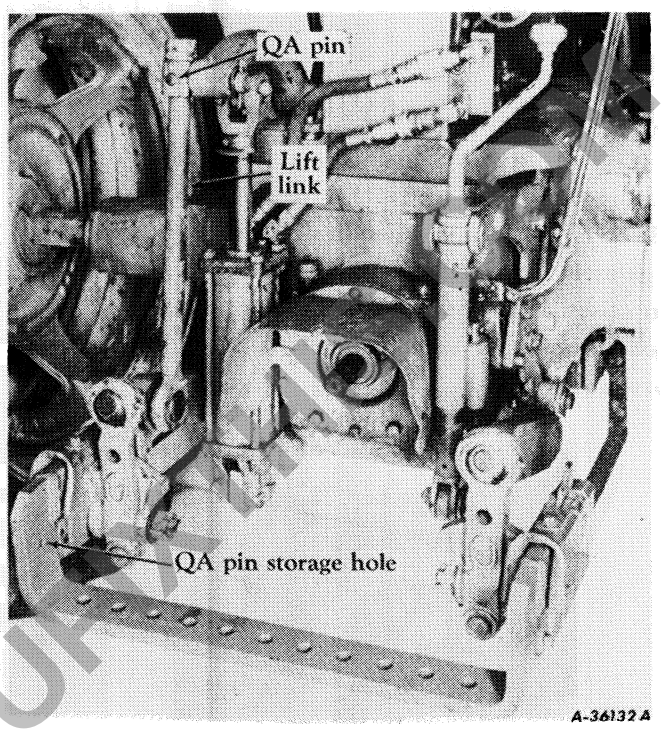



**Illust. 32**
**Lift link in float position.**

The stop collar on the rear lifting cylinder is used to limit the lowering range or control operating depth for mowers and cultivator rear sections without gauge wheels.

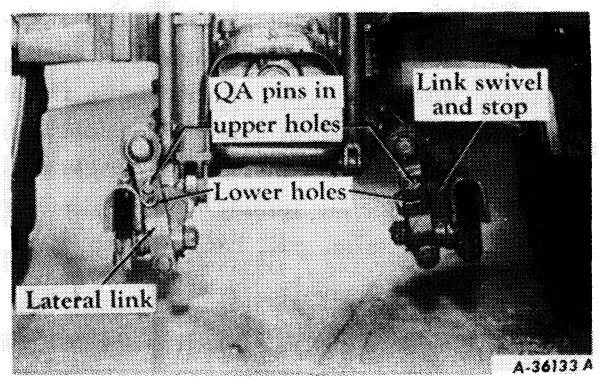
The lateral links should be in the float position except when it is desired to control the lateral movement of an implement with the tractor. *See Illust. 32B.*

Plows and harrows are examples of implements which should be free to float laterally. Mowers and middlebusters should be held rigid. *See Illust. 33.*




**Illust. 32A**
**Lift link pinned rigid.**

The leveling screw should be allowed to float when it is necessary to have the implement follow the contour of the ground independent of the tractor motion. To allow the leveling screw to float, align the hole in the leveling screw cover with the lower hole in the leveling screw and insert the QA (quick-attachable) cotter. *See Illust. 33A.*




**Illust. 32B**
**Pins in upper holes—lateral floating position.**



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# MAINTENANCE

## Storage Battery

Electrical energy, obtained through chemical action, is stored in the battery to be used for starting the engine and for furnishing electric lighting. It is not the source of electricity but only a storage reservoir for use when the generator is not running. In starting, for instance, the battery supplies the energy; but as soon as the engine starts, the generator output begins to replace the electricity taken from the battery.

You will receive maximum satisfactory service from your battery by closely following a few simple precautions and service operations.

A registration card is furnished with the battery. The purchaser of a new battery should take the card to the International Harvester dealer for registration.

Complete instructions for dry, charged batteries (used for export) are included with the battery.

### Cleaning and Servicing the Battery

To clean and service the battery, remove the two front cap screws from the battery box cover. Then tilt the seat unit and cover assembly all the way back. *See Illust. 64A.*

Battery cable terminals must be kept clean and tight. Use hot water for cleaning the top of the battery. Brighten the terminal contact surface with wire wool and reassemble. Be sure the terminals are clamped tightly and that the battery is fastened securely in the battery box. Replace unserviceable cables. Keep the vent holes in the battery filler caps open.

### Liquid Level

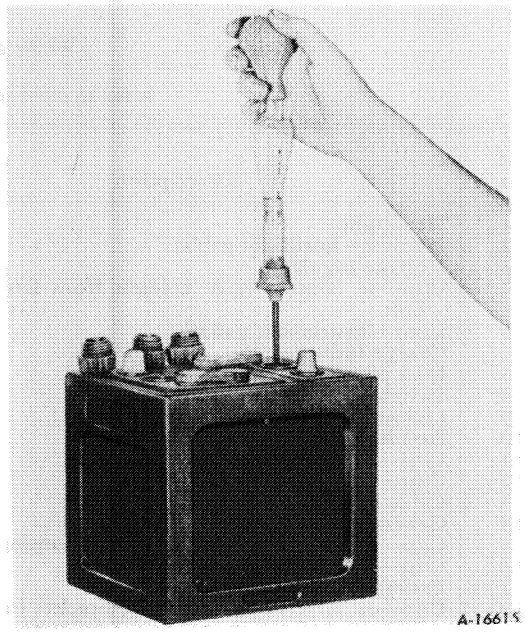
The electrolyte (acid and water) in each cell should be at star level at all times to prevent battery failure. When the electrolyte is below this level, pure, distilled water should be added. If your battery is equipped with automatic liquid leveling devices, follow the directions furnished with the battery or consult your International Harvester dealer. Never use hydrant water or any water which has been in a metal container. Keep pure, distilled water on hand in a glass jar for battery use only. Use a clean syringe when adding water and be careful not to allow dirt or corrosive salts to enter the cells.

Acid or electrolyte should never be added except by a skilled batteryman. 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.

### Specific Gravity




**Illust. 70**

**Taking a hydrometer reading of electrolyte in the battery.**

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.



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| Possible Cause | Possible Remedy |
|---|---|

## Using Too Much Fuel

| | |
|---|---|
| Fuel mixture too rich. Carburetor out of adjustment | Check the choke and see "Carburetor" *on page 52.* |
| Fuel leaks | Tighten or replace the fuel lines or fuel strainer gasket. |
| Poor grade of fuel | Use good-quality 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 59 to 63.* |
| Engine not operating at the proper temperature | Check the cooling system. Check the lubricating oil.* |
| Air cleaner clogged | Service the air cleaner; *see page 58.* |
| Incorrect viscosity or amount of lubricating oil | See "Lubrication Table" *on page 42,* and keep the oil up to the proper level. |

## No Fuel at Carburetor

| | |
|---|---|
| Fuel low in the tank | Fill the fuel tank and check the fuel lines. |
| Air vent hole in the 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 15 or 17.* |
| Dirty or clogged fuel strainer screen or line | Clean as instructed *on page 51.* |

## Ignition and Electrical

| | |
|---|---|
| Wrong kind, old, cracked, dirty, or poorly set spark plugs | Clean and set the gaps to .023 inch, or replace with new plugs. |
| Loose wiring or improper connections | Check the wiring to see that all connections are clean and tight; *see pages 59 to 71.* |
| Battery ignition unit not timed correctly | Retime as instructed *on pages 62 and 63.* |
| Distributor cap or rotor or breaker chamber dirty | Clean as instructed *on page 61.* |
| Breaker points dirty, pitted or improperly set | Clean and reset the opening or replace with new points; *see page 60.* |
| Breaker arm stuck; weak or broken spring | Check and replace; *see page 60.* |
| Battery defective, low charge, or loose connections | Recharge, clean and tighten the cable lugs or replace with a new battery; check the ground cable; *see page 70.* |
| Cranking motor failure | Replace.* |
| Generator inoperative | Clean the commutator, check the brushes; *see page 67.** |
| Voltage regulator | * |
| Charge indicator inoperative | Replace the charge indicator.* |
| Charge indicator shows excessive charge | * |
| Charge indicator shows discharge | Check the battery and generator; check the drive belts and wiring. |
| Lights will not burn | Check the battery ground cable. Turn on the switch, replace the headlight sealed beam units, combination rear light lamps, instrument lamp or fuse, recharge the battery, check the wiring, and generator.* |
| Lights burn dim | Turn the switch to bright. Recharge the battery, tighten the cable terminals, check the headlight sealed beam units, combination rear light lamps, instrument lamp, and clean the contacts. |

*See your International Harvester dealer.



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## 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 the lubrication precautions every six months thereafter. We also recommend that caution be practiced in starting an engine that has been in storage.

1. Wash or clean and completely lubricate the tractor. See "Lubrication Guide" *on pages 42 to 49.*

2. Drain and flush the cooling system.

3. After the engine has 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.

4. Remove the valve housing cover and flush 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.

5. Plug up the end of the breather pipe and exhaust pipe.

6. 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 as instructed *on page 40.*

7. Drain the fuel from the fuel tank and carburetor, and clean out the fuel strainer glass bowl.

**Caution!** 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.

8. Remove the battery and place it on a rack or bench in a cool, dry place above freezing (+32° F.). Check the battery at least once a month for water level and specific gravity. *See pages 70 and 71.*

9. 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 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.

2. Remove the valve housing cover and flush the valve and valve operating mechanism with the same mixture.

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.

4. Drain the crankcase and flush out with kerosene or flushing oil and fill with the specified lubricating oil. *See pages 42 to 47.*

5. Be sure the lubricating oil filter has a new element before starting the engine.

6. Remove the crankcase breather pipe plug and the exhaust pipe plug.

7. Install the spark plugs after cleaning and setting the gaps.

8. Fill the water cooling system.

9. Fill the fuel tanks.

10. Install a fully charged battery and be sure the proper connections are made. *See Illust. 68.*

11. Clean the air cleaner and refill the oil cup.

12. Start the engine and let it run slowly; observe if any valves are sticking. If so, pour a small quantity of kerosene on the valve stems until loose.

13. Assemble the valve housing cover.

14. After the engine has been run long enough to clean the excess oil out of the cylinders, the spark plugs should be removed and checked for oil fouling. If fouled, clean and reinstall them in the engine.

15. Remove the block from the clutch pedal.

**Caution!** Do not accelerate the engine rapidly, or operate it at high speed immediately after starting. Also, keep the doors wide open or move the machine outside the storage room immediately to avoid danger from exhaust gas.



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