


**McCormick Farmall
400 Tractors**

Operators Manual

1004381R5

CASE III

 ***This symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED. The message that follows the symbol contains important information about your safety. Carefully read the message. Make sure you fully understand the causes of possible injury or death.***

SB001

IF THIS MACHINE IS USED BY AN EMPLOYEE, IS LOANED, OR IS RENTED, MAKE SURE THAT THE OPERATOR UNDERSTANDS THE TWO INSTRUCTIONS BELOW.

BEFORE THE OPERATOR STARTS THE ENGINE:

1. GIVE INSTRUCTIONS TO THE OPERATOR ON SAFE AND CORRECT USE OF THE MACHINE.
2. MAKE SURE THE OPERATOR READS AND UNDERSTANDS THE OPERATOR'S MANUAL FOR THIS MACHINE.



IMPROPER OPERATION OF THIS MACHINE CAN CAUSE INJURY OR DEATH.

BEFORE STARTING THE ENGINE, DO THE FOLLOWING:

1. READ THE OPERATOR'S MANUAL.
2. READ ALL SAFETY DECALS ON THE MACHINE.
3. CLEAR THE AREA OF OTHER PERSONS.

LEARN AND PRACTICE SAFE USE OF MACHINE CONTROLS IN A SAFE, CLEAR AREA BEFORE YOU OPERATE THIS MACHINE ON A JOB SITE.

It is your responsibility to observe pertinent laws and regulations and to follow manufacturer's instructions on machine operation and maintenance.

See your Authorized Case dealer for additional operator's manuals, parts catalogs, and service manuals.

**IMPORTANT FUEL SYSTEM SAFETY WARNING
AND
ANNOUNCEMENT OF FREE, REPLACEMENT GASOLINE CAP**



CAUTION! The following information pertains to personal safety. Be sure to read and follow these instructions.

PROBLEM — Gasoline vapors can build up pressure in your gasoline tank.

All gasoline fuels are more volatile today than ever before. They vaporize and build up pressure in your gasoline tank more easily than in the past. Winter grade gasoline is especially subject to vaporization and pressure build-up when used on hot Spring or Fall days. If you have a tractor which is out of tune or not properly maintained, it can run hotter and increase vaporization.

DANGER — Fire and personal injury.

If the fuel cap is removed when the gasoline tank is hot and vapor pressure has, under certain circumstances, built up in the tank, this sudden release of pressure could force gasoline out of the tank. If the gas cap is not fully secured and tightened, it could come off the tank, and again, gasoline could escape. This sudden eruption of gasoline exposes the operator to, and may cover him with, liquid fuel and vapors and is a clear fire hazard if a source of ignition is present. A running engine is a source of ignition, as are cigarettes, open flames, sparks or a poorly maintained exhaust system. **An immediate fire could occur.** The operator or anyone in the area could be burned and suffer serious injury or even death.

PRECAUTIONS — Observe the following steps for safe operation:

- Always tighten gas caps securely.
- Never, under any circumstances, take the gas cap off a hot or running tractor.
- Never hold over Winter gasoline for use in the Spring. Remove any equipment unnecessary for warm weather operations, such as comfort covers, heat housers, or radiator covers.
- Maintain equipment properly and pay particular attention to electrical, exhaust, fuel, and cooling systems. Repair or replace frayed electrical wires; leaky exhaust manifolds, gaskets, pipes and mufflers; damaged carburetors, sediment bowls and fuel lines. Be sure radiators are clean inside and out. Clean off any accumulation of trash, oil or grease.
- Make sure that fuel cap vent holes are not plugged, gaskets are in good condition, and that cap tangs are firmly riveted. Repair worn, bent, or deformed filler necks and damaged heat shields or shield insulation. If your tractor is not equipped with a heat shield or insulation, install such equipment on applicable models.
- Be alert to any unusual sights and sounds during operation. If you suspect overheating or pressure build-up in the fuel system, do not touch the cap. Turn off the engine and allow the tractor to cool before you touch the cap.

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.

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	

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

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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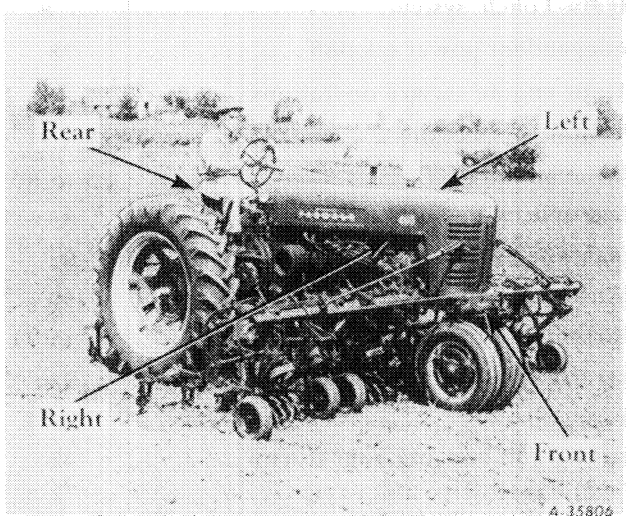
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INTRODUCTION

Assembled in this book are operating and maintenance instructions for the Farmall 400 and 400 Hi-Clear 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.

If you should need information not given in this manual, or require the services of a trained mechanic, get in touch with the International Harvester dealer in your locality. 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.

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 drawbar end. See *Illust. 2*.



Illust. 2
Terms of location.

The illustrations in this manual are numbered to correspond with the pages on which they appear; for example, *Illusts. 2, 2A, and 2B* are on page 2.

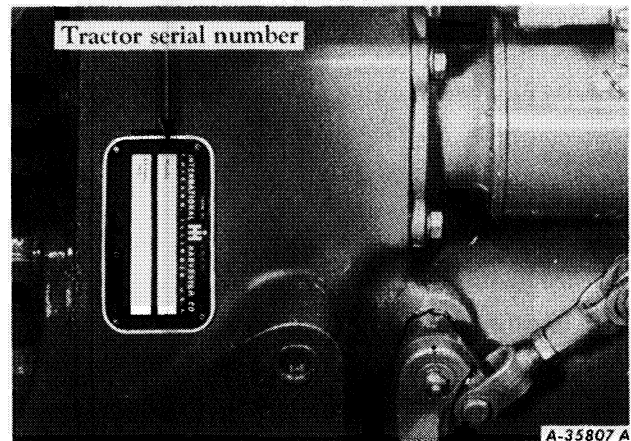
In order to provide a tractor equipped as nearly as possible to suit each customer's needs, a variety of extra equipment and accessories is available.

Many of these items are illustrated and described in the Extra Equipment and Accessories section of this manual.

Where operating and maintaining instruction on these items is required, it is included in the instruc-

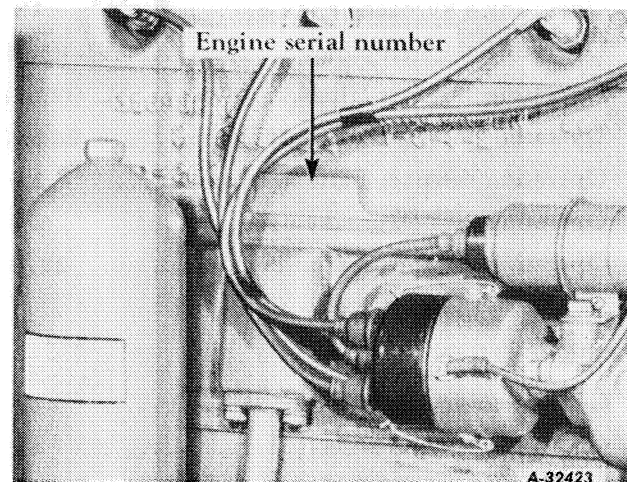
tions for operating and maintaining the tractor. Disregard the instructions for equipment not on your tractor.

When in need of parts, always specify the tractor and engine serial numbers. The tractor serial number is stamped on a name plate attached to the left side of the clutch housing. See *Illust. 2A*.



Illust. 2A
Location of the tractor serial number.

The engine serial number is stamped on the right side of the engine crankcase above the crankcase breather. See *Illust. 2B*. This serial number is preceded by the prefix C-264, which indicates that it is a carbureted engine with a 264-cubic-inch piston displacement.



Illust. 2B
Location of the engine serial number.

For ready reference, we suggest that you write these serial numbers in the spaces provided on the Delivery Report.

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.

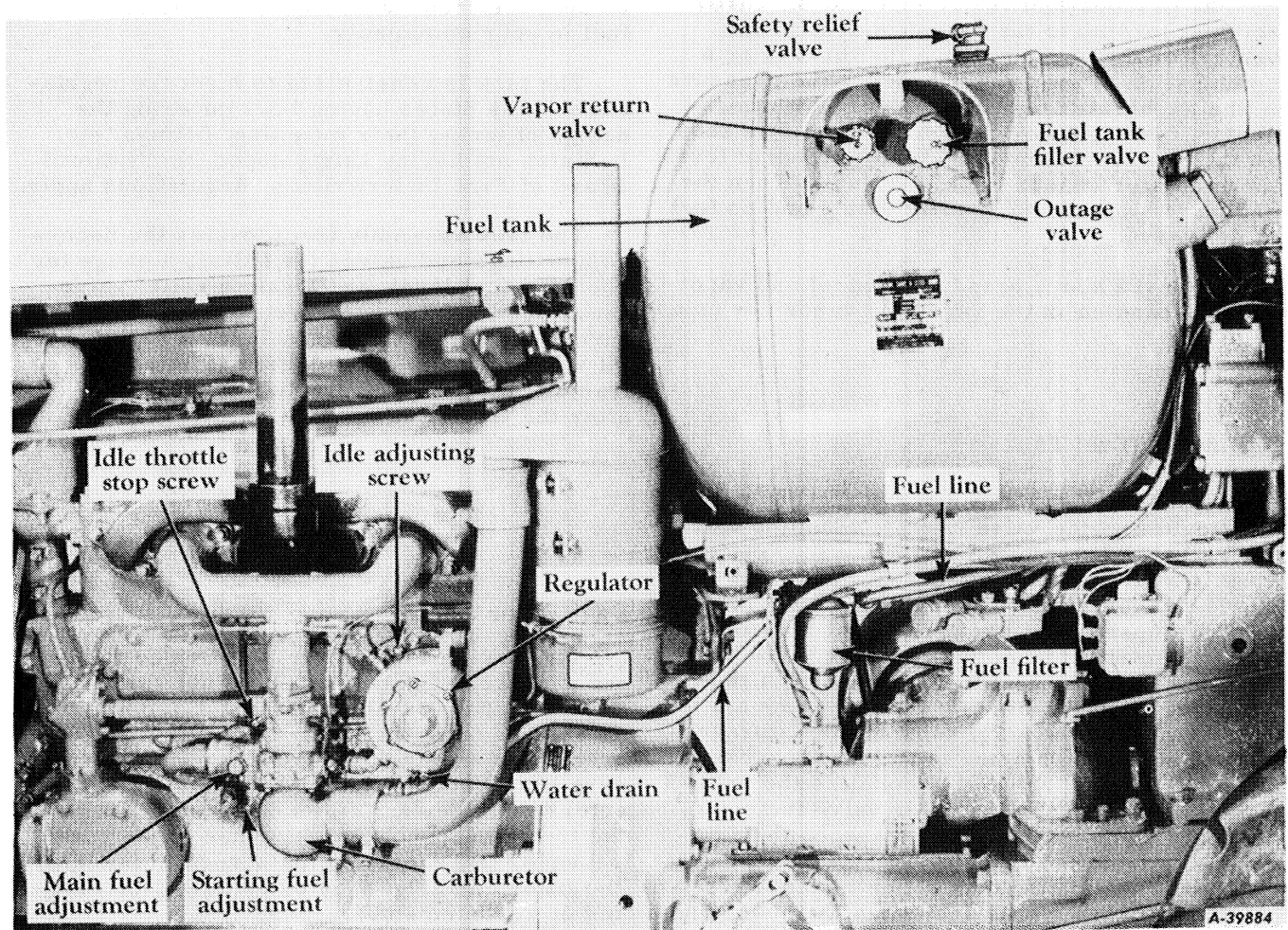
2. The regulator-vaporizer unit is supplied to change the liquid fuel at tank pressure to a dry gas at slightly below atmospheric pressure.

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.

How the LP Gas Fuel System Operates

A LP gas engine is essentially the same as a gasoline engine except that the fuel to the engine is metered in the gaseous stage and delivered to the cylinders mixed in the proper proportions with air. Since the fuel is in the gaseous stage there are no problems of distribution and since the fuel has a high octane rating the compression pressure may be increased over that possible with gasoline.

In order to properly meter the fuel to the engine load demands, the effect of this variation in pressure must be eliminated. This is done by dropping the pressure through a regulating valve to approximately four pounds, which is less than the tank pressure. The LP gas fuel used must always have a boiling point temperature below that of the surrounding atmosphere. Since it is difficult to meter a mixture of liquid fuel and gaseous fuel, heat is applied to the fuel after the pressure is reduced, to vaporize all the liquid fuel. With fuel in the gaseous state the fuel may be metered the same as natural gas, which has been successfully used for several years.

The gaseous fuel is delivered to the carburetor according to the pressure drop in the venturi or the vacuum above the throttle or a combination of the two. Whenever the pressure in the carburetor or manifold is below atmospheric, the regulator delivers gas, and as soon as this pressure comes up to atmospheric level the regulator ceases to deliver fuel. When the engine is stopped, no vacuum exists and no fuel is delivered.

All of the above pressure control and vaporizing is handled in the regulator vaporizer unit.

Filling the Fuel Tank

Be sure that the vapor service valve and the liquid service valve (*Illust. 7*) 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. The tank can also be filled by gravity, if the pressure in the tractor tank is the same as, or less than, in the storage tank and the storage tank is above the tractor tank. A vapor-balancing hose may be used to equalize the pressure in both tanks. The filler valve is spring-loaded. It automatically closes when the pressure from the transfer pump is released. The vapor-balancing connection also has a valve which is pushed off its seat when the hose connection is made. The dial gauge on the tank shows in percent the amount of fuel to which the tank should be filled. The tank has a 35

gallon water capacity but is never filled 100% full; 10 to 20 percent vapor space must be allowed for expansion. The gauge includes a chart which shows the level to which the tank should be filled with butane, propane, or a mixture of the two at different atmospheric temperatures.

The outage valve (*Illust. 7*) may be used to check the accuracy of the dial gauge and should be used to determine when the fuel tank is filled to the maximum permitted level.

When the dial gauge indicates that the tank is nearly full, the outage valve may be opened by turning it counterclockwise, venting the gas from the tank. 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.

One of the outstanding features of this tank is its large fuel capacity. This is important because a tractor usually has to be driven to a main storage tank for refilling.

Fuel transfer equipment and complete instructions for handling this type of 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.

The tank assembly incorporates the necessary fittings and valves for filling, a gauge for checking fuel level, and a safety relief valve set at 302 to 312 pounds per square inch pressure. The fuel tank also includes a vapor shut-off valve which is opened when starting the tractor, and a liquid valve which is opened after the tractor is running.

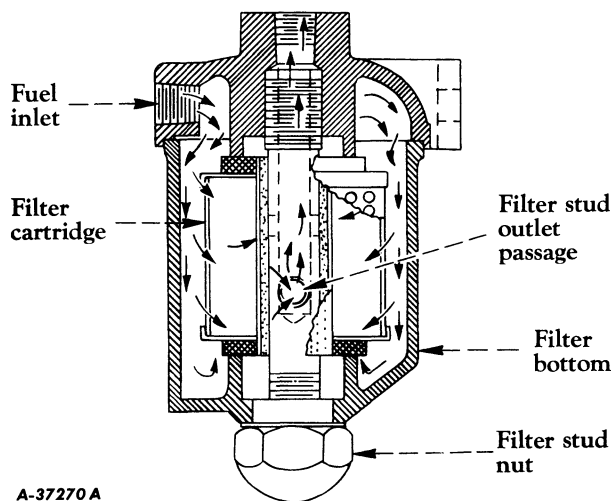
Fuel Filter

The Ensign 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 brass and designed for a working pressure of 250 pounds. Liquid fuel from the tank enters the filter and flows down and through the treated paper filter cartridge to the outlet passage. By removing the nut and filter bowl, the filter cartridge may be removed for cleaning or replacement.

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

A clogged element causes a pressure drop within the filter with consequent vaporization 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 filtering element is composed of treated paper with cork gaskets cemented to each end and should be cleaned or 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 element. In 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. The filter should be air tested at a pressure of 150-175 pounds per square inch to check for possible leaks at the gasket.



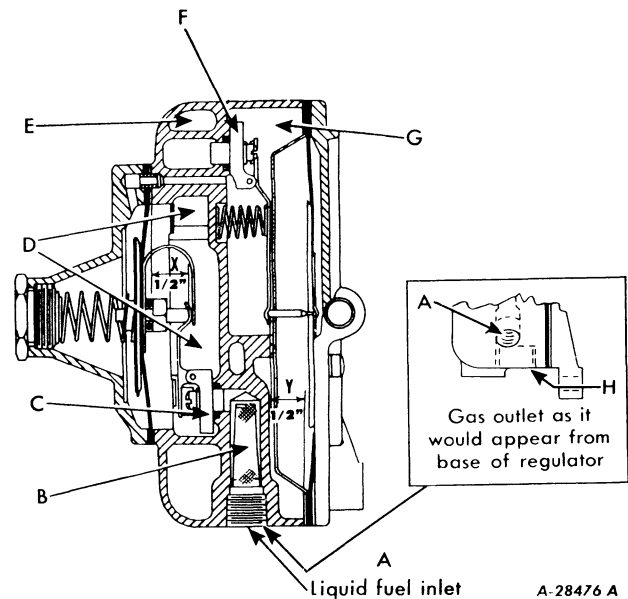
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Illust. 3
Cutaway view of liquefied petroleum fuel filter showing passage of fuel inside and outside of filter cartridge.

Regulating Unit

From the filter the liquid fuel is piped to the regulating unit. See *Illust. 4*. This unit's function is to reduce the pressure of the liquid LP gas in the tank to about four pounds, and to convert the liquid fuel into a gas. This gas pressure is then reduced through a second regulator within the unit to slightly below atmospheric pressure. The carburetor takes the gas from the regulator unit in whatever quantity is required to meet engine power demands, and thoroughly mixes it with air to create a combustible mixture. Heat must be applied to vaporize the butane-propane and to

prevent freezing of the regulator parts. The required heat is supplied by the hot water of the engine cooling system. Coolant is taken from the rear of the engine cylinder head where it is the hottest and passed through a core in the regulator. The outlet coolant is piped to the intake side of the water pump to assure good circulation. The engine is started from the vapor on top of the liquid fuel in the tank, so no initial heat is required. For starting purposes the regulator is used to control vapor pressure only so it does not require heat for vaporization.



A-28476 A

Illust. 4
Cross-section of regulator-vaporizer unit.

LP gas from the fuel tank enters the unit at "A" (*Illust. 4*), passes through the strainer "B" and is reduced from tank pressure to approximately four pounds per square inch at the high-pressure reducing valve "C". Fuel passing through the reducing valve expands very rapidly in the vaporizing chamber "D" when it is converted into a gas. In starting the engine, vapor is taken from the top of the tank. The heat for continuous vaporization is supplied from the engine's coolant system which is jacketed through passageway "E" around the vaporizing chamber "D". The vaporized gas then passes through the low-pressure reducing valve "F" and into the low-pressure chamber "G". It is then drawn off through the gas outlet "H" to the carburetor where the gas is mixed with air in correct proportion for ideal combustion.

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