Owner's Manual

INTERNATIONAL HARVESTER

FARMALL

M AND MV

INTERNATIONAL HARVESTER COMPANY
180 N. Michigan Ave. Chicago 1, Illinois

TO THE *FARMALL OWNER

Please accept our congratulations on your investment in an International Harvester tractor as your new power partner. We feel sure you will obtain from this machine the economical and superior performance it is designed to give. It is certain that you will derive a large measure of personal satisfaction from operating it.

Years of tractor manufacturing experience and actual contact with agricultural problems in the field have been combined with advancements in engineering and metallurgical science to produce all the features and refinements built into your Farmall. The liberal use of precision-type bearings, the Tocco-hardened crankshaft, force feed lubrication, valves in head, removable cylinder sleeves, extra large flywheel and the large air, oil and fuel cleaners are some of the features that give your tractor its eager power to do all your power jobs with thoroughness, speed and economy. Properly adjusted, operated, and maintained, this tractor will respond to every reasonable demand you make upon it and give you reliable service for years to come.

* Registered trade-mark. Only International Harvester builds Farmall Tractors.

A complete list of parts for this tractor will be supplied on request.

It is the policy of International Harvester Company to improve its products whenever it is possible and practical to do so. We reserve the right to make changes or add improvements at any time without incurring any obligation to make such changes on tractors sold previously.

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The instructions in this manual cover the operation of tractors on all types of fuel, except where otherwise specified.

INTRODUCTION

The purpose of this Owner's Manual is to explain maintenance requirements and routine adjustments which are necessary for the most efficient operation of your tractor. To protect your tractor investment, study your Manual before starting or operating your tractor.

If you should need information not given in this Manual, or require the services of a trained mechanic, we urge you to use the extensive facilities offered by the International Harvester dealer in your locality. Dealers are kept informed on the best methods of tractor servicing and are equipped to provide prompt, high-class service in the field or in an up-to-date service station.

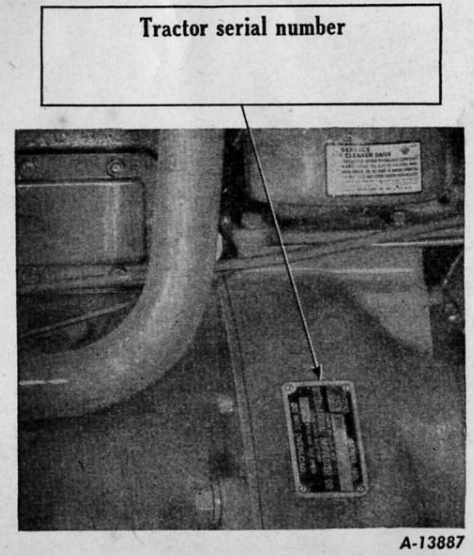
Dealers carry ample stocks of essential genuine IHC parts. These dealers are backed in every case by the full facilities of a conveniently located International Harvester branch.

When in need of parts, always give the International Harvester dealer your tractor and engine serial numbers. We suggest that you write these serial numbers in the spaces provided in the illustrations below, for ready reference when parts are required.

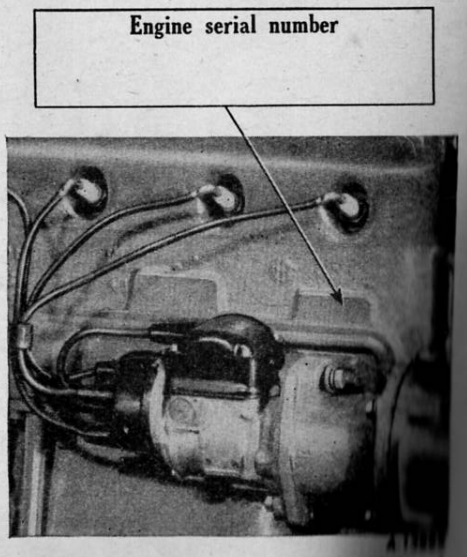
Throughout this manual the use of the terms LEFT, RIGHT, FRONT and REAR must be understood to avoid confusion when following instructions.

LEFT and RIGHT indicate the LEFT and RIGHT sides of the tractor when facing forward in the driver's seat.

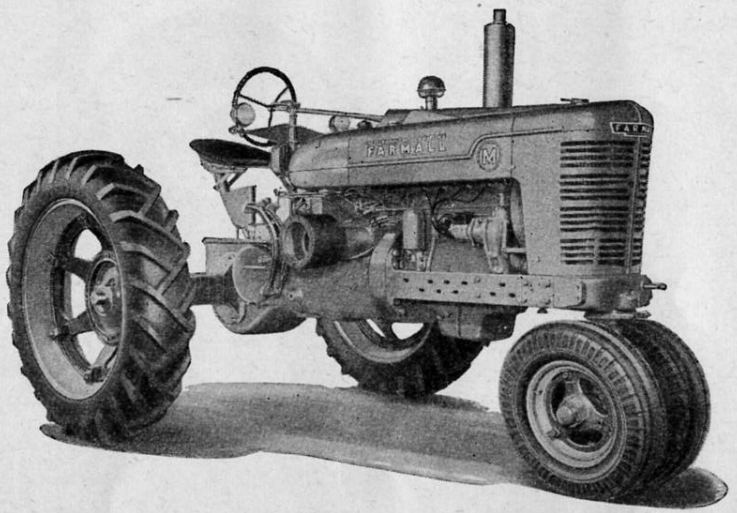
Reference to FRONT indicates the radiator end of the tractor, and REAR the drawbar.



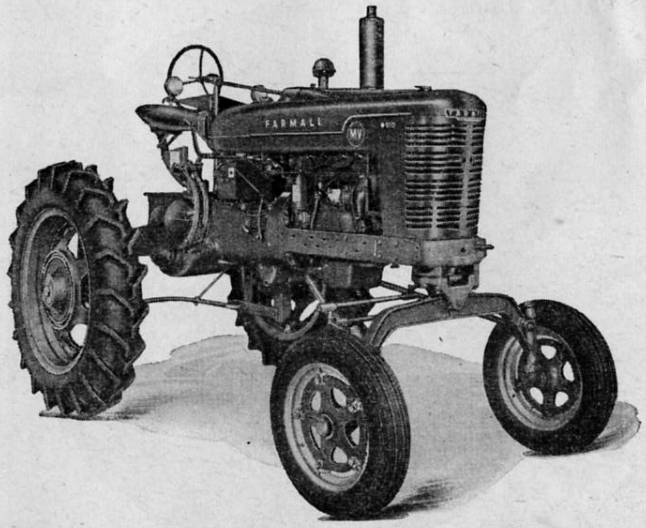
Illust. 1—Tractor Serial No. on Left Side of Clutch Housing.



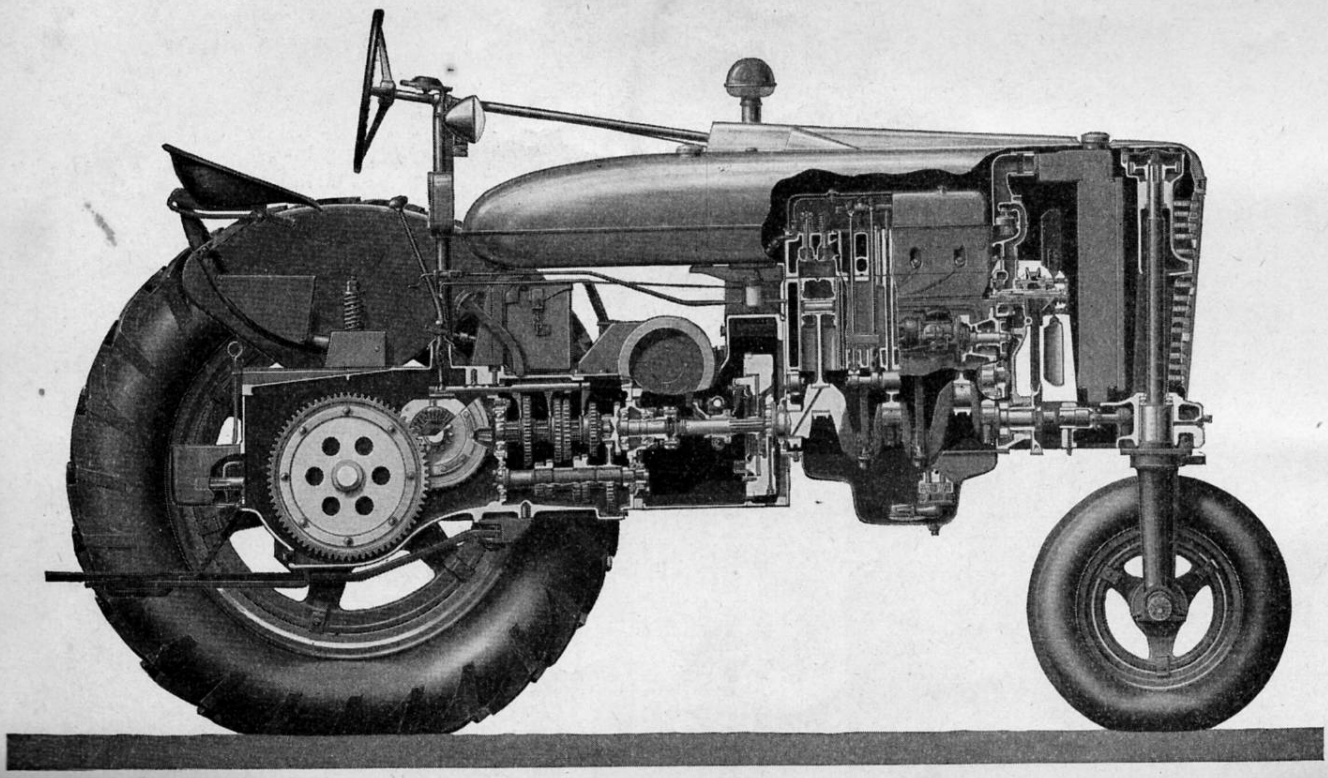
Illust. 2—Engine Serial No. on Right Side of Crankcase.



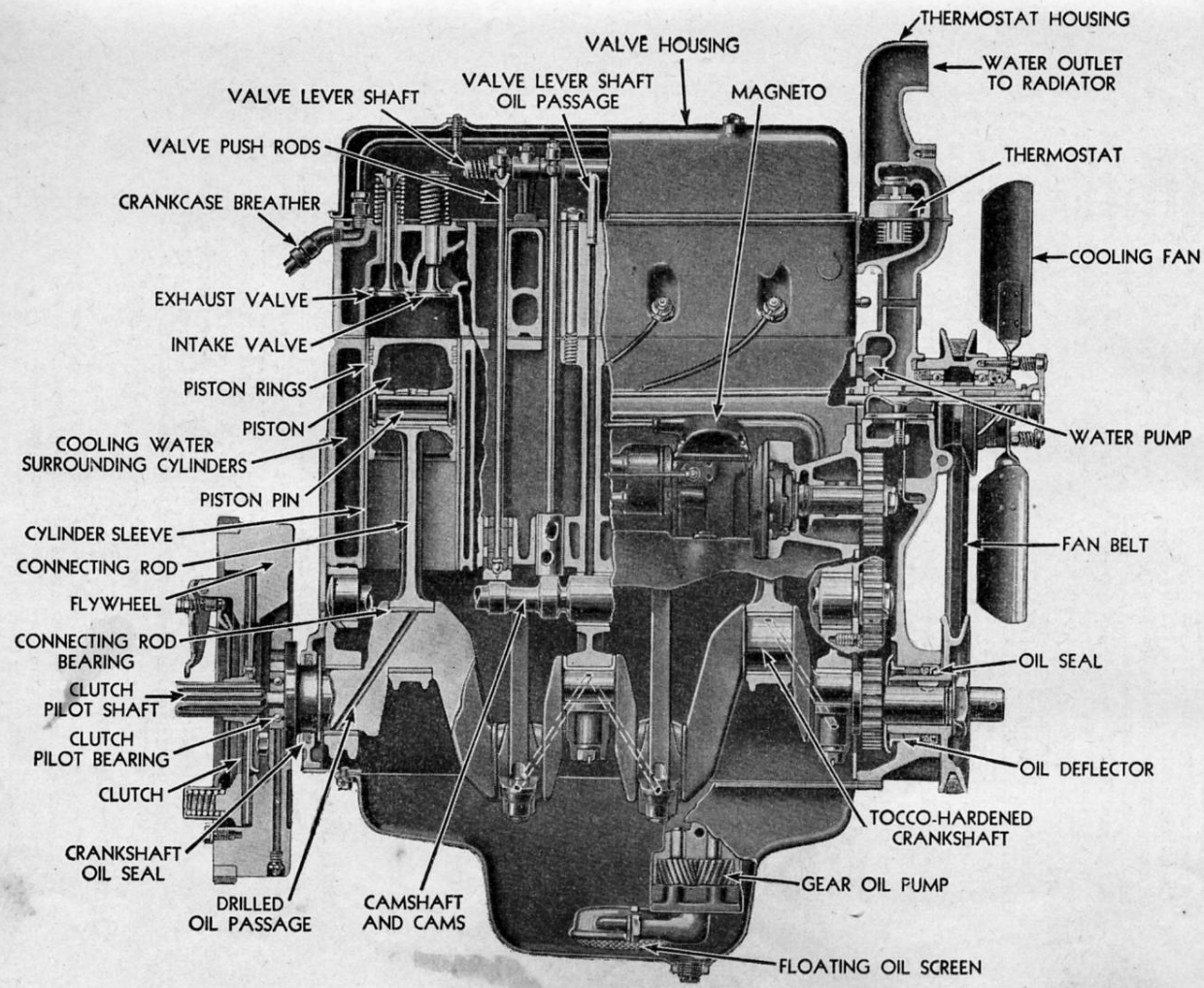
Right front view of the Farmall-M. The pneumatic tires, electric lighting, exhaust muffler and belt pulley shown in this illustration are special features.



Right front view of the Farmall-MV. The electric lighting and exhaust muffler shown in this illustration are special features.



Cut-away view of the Farmall-M showing the internal working parts. The pneumatic tires, belt pulley, power take-off, swinging drawbar and the electric starting and lighting shown in this illustration are special features. Details of the engine are shown in the illustration below.



Farmall-M Specifications

Capacities (U. S. Measure)

Fuel tank	Approx. 21 gal.
Gasoline tank	Approx. 7/8 gal.
Water cooling system	Approx. 6 gal.
Crankcase pan	Approx. 8 qt.
Transmission and differential case	Approx. 13 gal.
Steering gear compartment	Approx. 1 pt.
Air cleaner oil cup	Approx. 2¼ pt.

Engine

Cylinders	4
Bore	3⅞"
Stroke	5¼"
Engine speed (governed) (maximum full load)	1450 r.p.m.
*Power take-off shaft speed	537 r.p.m.
Magneto (fixed spark) (clockwise rotation)	IHC—H-4
Spark plug (Champion No. 15A or AC 87) gap	.028" to .032"
Valve clearance (engine hot)	.017"
Carburetor (with Donaldson air cleaner)	IHC 1¼" Updraft

Clutch and Belt Pulley

Single-plate, dry disk (spring-loaded)	11"
*Pulley speed	899 r.p.m.
*Belt speed (with 11" pulley)	2588 ft. per min.
*Pulley diameter	11"
*Pulley face	7½"

**Special—furnished when ordered.*

Foot Brakes

External contracting on drums.

Transmission (Five Speeds)

(Based on 11-38 pneumatic tires)

Speed (miles per hour)	1st	2⅝
	2nd	3½
	3rd	4¼
	4th	5⅛
*	5th	16¼
	Reverse	3⅛

**5th speed locked out when using steel wheels*

Wheels and Tread

Front wheels (basic pneumatic tire size)	*6.00-16
Rear wheels (basic pneumatic tire size)	*11-38
Tread—front (fixed)	8⅜"
Tread—rear (variable)	52" to 88"
Wheelbase	88¾"
Minimum turning radius (with 52" rear wheel tread) without applying brake	8'3"
Minimum turning radius (with 52" rear wheel tread) applying brake	8'2"

*Other pneumatic tire sizes available; also steel wheels.

General — Dimensions

Length, over all	133⅛"
Width, over all—maximum (to outside edge of rear tires)	100"
Width, over all—minimum (to outside edge of rear axle)	84⅛"
Height, over all (to top of steering wheel)	78¼"
Clearance under rear axle	26⅛"
Clearance under frame	17⅜"
Drawbar (quick-attachable type) vertical adjustment above ground	14⅜", 15⅞", 17⅜", 18⅞" and 20⅜"
Drawbar (quick-attachable type) lateral adjustment	13" on each side of center hole

Farmall-MV Specifications

Capacities (U. S. Measure)

Fuel tank	Approx. 21 gal.
Gasoline tank	Approx. 7/8 gal.
Water cooling system	Approx. 6 gal.
Crankcase pan	Approx. 8 qt.
Transmission and differential case	Approx. 13 gal.
Steering gear compartment	Approx. 1 pt.
Air cleaner oil cup	Approx. 2¼ pt.
Rear axle drive housing (each)	Approx. 3 qt.

Engine

Cylinders	4
Bore	3⅞"
Stroke	5¼"
Engine speed (governed) (maximum full load)	1450 r.p.m.
*Power take-off shaft speed	537 r.p.m.
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**Special—furnished when ordered.*

Foot Brakes

External contracting on drums.

Transmission (Five Speeds)

(Based on 10.00-36 pneumatic tires)

Speed (miles per hour)	1st	2½
	2nd	3⅜
	3rd	4⅛
	4th	5
*	5th (to be used only with pneumatic tires)	16
	Reverse	3⅛

**5th speed locked out when using steel wheels.*

Wheels and Tread

Front wheels (for pneumatic tires)	6.00-20
Rear wheels (for pneumatic tires)	10.00-36
Tread—front (adjustable)	60", 63", 66"
Tread—rear (adjustable)	60", 65¾", 72"
Wheelbase	91½"
Minimum turning radius (with wheels in minimum tread) without applying brake	16½'
Minimum turning radius (with wheels in minimum tread) with brake applied	12½'

General — Dimensions

Length, over all	146½"
Width, over all (to outside edge of rear axle)	85⅞"
Height, over all (to top of steering wheel)	90¼"
Clearance under rear axle (at main frame)	29⅞"
Clearance under front axle	30¼"
Drawbar vertical adjustment above ground	15⅜", 18½", and 21½"
Drawbar lateral adjustment	15" on each side of center hole

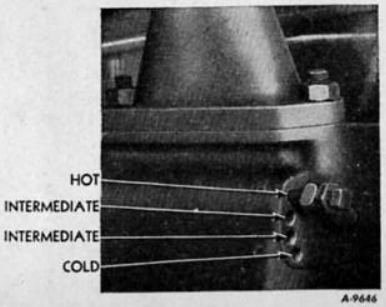
Instruments and Controls

Manifold Heat Control Lever

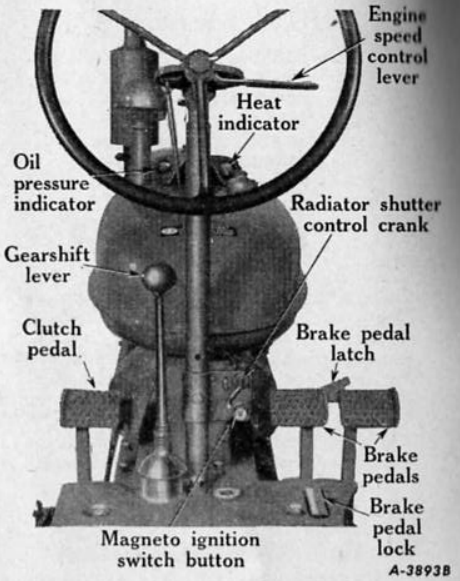
The manifold heat control is used only on distillate-gasoline and kerosene tractors. The manifold heat control valve has four adjustment positions: Top notch, "HOT" position; two center notches, "INTERMEDIATE" positions; and bottom notch, "COLD" position. To change positions, simply loosen the lock nut on the valve lever and move the lever to the desired position.

When operating on distillate or kerosene, set the valve in "HOT" position, except when operating in very hot weather, or when the engine will be handling a constant heavy load. In these instances set the valve in either of the two "INTERMEDIATE" positions or "COLD" position.

If a distillate or kerosene engine is to be operated on gasoline, set the valve lever in "COLD" position and remove the manifold shield.



Illust. 3—The Heat Control Valve Set in "HOT" Position.



Illust. 4—Instruments and Controls. The heat indicator and radiator shutter control crank are regular equipment on distillate-gasoline and kerosene tractors.

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.

Magneto Ignition Switch Button

This button, when pushed all the way in, will ground the magneto and stop the engine. Pull out this button when starting the engine.

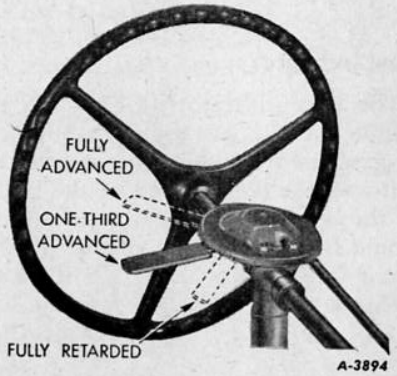
Gearshift Lever

The gearshift lever is used to select the various gear ratios provided in the transmission. There are five (5) forward speeds and one (1) reverse speed.

Note: The fifth speed is locked out when steel wheels are used; for further instructions refer to *page 21.*



Be sure that the gearshift lever of the tractor is in neutral before starting the engine.



Illust. 5—Various Positions of the Engine Speed Control Lever.

Engine Speed Control Lever

The engine speed control lever enables you to adjust the speed of the engine to the load that is to be handled. After you have selected the desired engine speed, the governor will automatically maintain this engine speed under variable loads. Retarding the engine speed control lever will decrease the load which the tractor can handle.

The rated or maximum full load governed speed is 1450 r.p.m.; maximum idle speed is approximately 1595 r.p.m.; minimum speed (hand throttle) is approximately 425 r.p.m.

Clutch Pedal

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

Electric Starter (Special Equipment)

The electric starter is a convenient means of cranking the engine. To start, adjust the choke rod and press the starter, as explained on *page 16.*



When starting the engine in a barn or garage, keep the doors wide open, as the exhaust gas contains deadly carbon monoxide, which is odorless, tasteless, and colorless.

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, latch the pedals together so that both brakes will operate simultaneously.

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

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

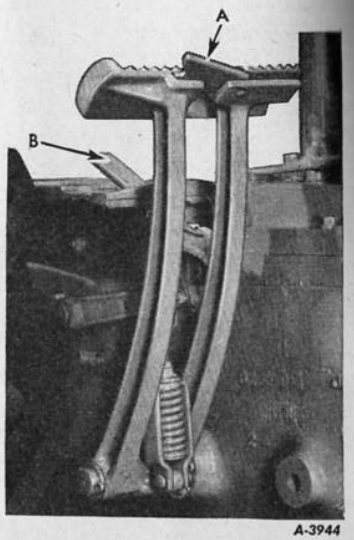
Brake Pedal Latch

This latch 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 (5th speed). To latch the pedals together, engage the latch "A" (located in back of left pedal, *Illust. 6*) in the slot in back of the right pedal. When brake pedals are not latched together, the latch should rest in the slot in back of the left brake pedal.

Locking Brakes

To lock the brakes, first latch the brake pedals together as described above. Then push both pedals all the way down and lift the brake pedal lock "B" with your finger, and the brake pedals will lock in this position. To release the brakes, simply push the brake pedals further in and the lock will automatically release.



A-3944

Illust. 6—Rear View of Brake Pedals Locked Together.
(A) Brake Pedal Latch.
(B) Brake Pedal Lock.

Heat Indicator

The heat indicator (located on the engine hood) is not regular equipment on gasoline tractors. This instrument indicates the temperature of the liquid in the cooling system. The needle should be in the center of the "RUN" range for engines using distillate or kerosene fuels, *Illust. 7,* or in the low side of the "RUN" range for gasoline fuel.



A-2341A

Illust. 7—Heat Indicator in Correct Operating Position when Operating on Distillate or Kerosene.

Radiator Shutter Control Crank

The radiator shutter is not regular equipment on gasoline tractors. The control crank (mounted on the steering post) opens and closes the radiator shutter, controlling the engine temperature. Turn the crank counterclockwise to close the shutter, and clockwise to open it.

Oil Pressure Indicator

This instrument (located on the engine hood) indicates whether sufficient oil is circulating through the engine. The indicator needle should be in the white area when the engine is operating, *Illust. 8.* If it is not in the white area, stop the engine immediately and investigate the cause of the oil pressure failure.

If you are unable to find cause, be sure to consult your International Harvester dealer before operating the engine.



A-3818

Illust. 8—Oil Pressure Indicator, Showing Needle in Correct Operating Position.

Carburetor Choke Lever

If your tractor is not equipped with an electric starter and choke rod, it will be necessary to use the carburetor choke lever when cranking the engine, *Illusts. 22 and 23.* This lever when moved toward the rear (closed position) cuts off the air supply, thereby enriching the fuel mixture for starting the engine. Always move the choke lever all the way forward (open position) as the engine warms up.

The use of the choke for starting will vary, depending on temperature and altitude. The following instructions offer approximate requirements which may be altered to suit local conditions.

During warm weather, or with engine warm. Set the carburetor choke lever in half-open position and crank engine, using quick upstrokes, until the engine starts.

During cold weather, or with engine cold. Close the choke completely by pulling the lever toward flywheel as far as it will go and crank engine with quick upstrokes as follows:

6 to 8 lifts of the crank at temperatures zero to ten degrees Fahrenheit.

4 to 5 lifts of the crank at temperatures ten to twenty degrees Fahrenheit.

2 to 3 lifts of the crank at temperatures twenty to thirty degrees Fahrenheit.

Now, open the choke halfway and crank the engine with quick upstrokes until it starts.

Caution! When 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.

Make a complete inspection of the tractor for any shortages or damage which may have occurred during shipment.

Before Starting Your New Tractor

Lubrication

1. Lubricate the entire tractor, using the "Lubrication Charts," *pages 30 to 37,* as a guide.

2. Check the oil levels of engine crankcase, air cleaner, transmission case and steering gear case to see that they are filled to the correct levels with the proper grades of oil for the prevailing temperature; *refer to specifications of lubricants on page 38.*

3. Tractors shipped to destinations in the United States of America, Canada, and Mexico are filled with oil in all parts before leaving the factory. Engines are filled with a light engine oil. Check the lubricant compartments to see that they contain the proper amount of lubricant. Refer to the "Lubrication Charts," *pages 30 to 37.*

Tractors packed for export. All oil is drained from the engine crankcase, air cleaner, and all gear cases on tractors packed for export.

4. 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.

Pneumatic Tires

Before moving the tractor, check the air pressure in the pneumatic tires and inflate or deflate them to the correct pressures as shown in the chart *on page 56.*

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 a couple of times at short intervals to be sure that the lugs seat properly.

Engine Cooling System

1. Be sure the radiator and crankcase drains are closed; then fill the radiator to a level approximately 2¼ inches below the top of the filler neck. Use clean water. Soft or rain water is recommended as it does not contain alkali which forms scale and eventually clogs the passages.

2. When filling the radiator, remove the pipe plug in left side of thermostat housing, *Illust. 26,* and replace the plug when water appears.

For further information, *see pages 43 to 45.* If the tractor is to be operated in freezing temperatures (32° F. or lower), *refer to "Cold Weather Operations," pages 26 and 27.*

Fuel System

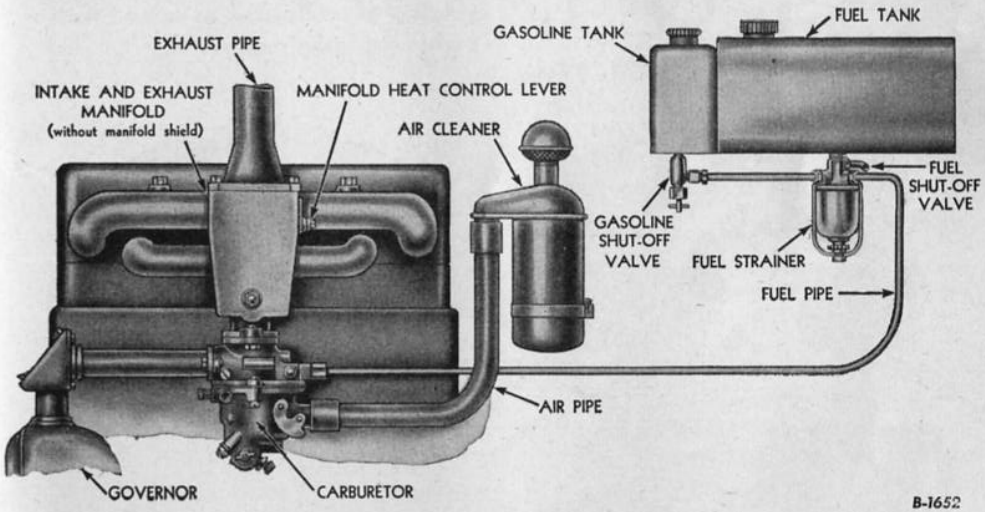
Provision is made in the design of this tractor so that it may be equipped with either a gasoline, distillate-gasoline or kerosene-burning engine. Before attempting to use a fuel for which your tractor is not designed, see your International Harvester dealer or the nearest International Harvester Company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

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:

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

2. Distillate-burning tractors should not have the shut-off valve under the auxiliary tank and the one under the main fuel tank open or even partially open at the same time, as this will permit the distillate to mix with the gasoline, making the engine hard to start.

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



Illust. 9—Schematic Diagram of Fuel System. (Gasoline-Distillate) with Air Cleaner.

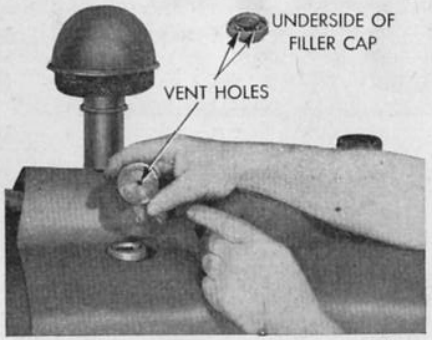
How to Prepare Your Tractor For Each Day's Work

Fuel System

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



Both fuel tanks have air vents in the filler caps. These vents should be kept open at all times to assure proper flow of the fuels, *Illust. 10.*



Illust. 10—Vent Holes in Filler Cap.

Tractors designed for distillate-gasoline operation have an auxiliary tank (capacity 7/8 U. S. gallon) for gasoline, which is used only for starting and warming up the engine. If a distillate-gasoline engine is to be operated on gasoline only, use the large fuel tank for gasoline and either shut off the small tank or use it as an auxiliary tank.

Safety First! Never fill the fuel tank when lamps are lighted, when near an open flame, or when the engine is operating. When pouring in fuel, keep the funnel and container in contact with the metal of the fuel tank, *Illust. 11,* to avoid the possibility of an electric spark igniting the gas. Do not light matches near gasoline as the air within a radius of several feet is mixed with a highly explosive vapor.



Illust. 11—Filling the Fuel Tank.

Lubrication

Air cleaner—Change the oil in the air cleaner oil cup.

Engine crankcase—When operating on distillate or kerosene: before starting your engine for the day's work, open the lower test cock in the crankcase pan and allow the oil to drain to this level. Close the lower test cock and open the upper cock in the crankcase pan. Add new oil (approximately one quart) until it appears at this level, and then close the cock.

When operating on gasoline, add sufficient oil to bring oil up to level of the upper test cock in the crankcase pan.

Grease fittings—Refer to "Lubrication Charts," *pages 30 to 37,* for complete daily lubrication requirements.

Cooling System

Remove the radiator cap and check to see that the water is approximately 2¼ inches below top of the filler neck. Be sure to replace the radiator cap and tighten to the stop after you have made the inspection.

Important! In freezing weather, if your tractor cooling system is not protected with an anti-freeze solution, drain out the water when the tractor is not being used. Before filling the radiator, close the radiator shutter (if tractor is so equipped) or cover entire radiator. Start the engine; then put in the water immediately. This prevents the water from freezing during the warming-up period. When the engine is operated on distillate, adjust the radiator shutter to maintain the operating temperature of the engine in the center of the "RUN" portion on the heat indicator, *Illust. 7.*



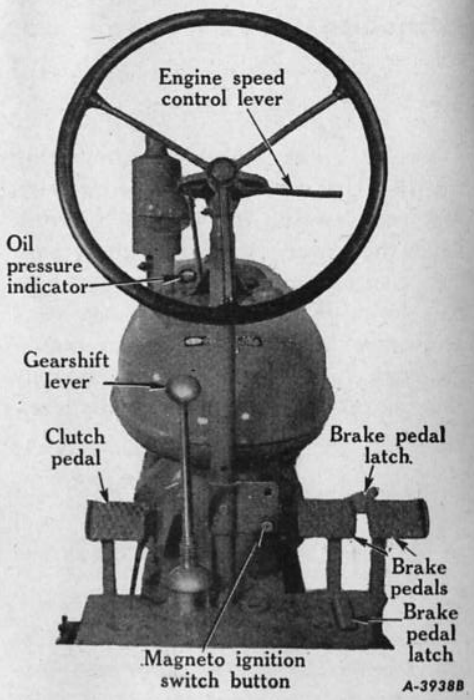
Loose or "floppy" clothing should not be worn by the operator because of the danger of it wrapping on or getting into the moving parts.

Careless use of the tractor and other farm machinery is the cause of most farm accidents. The safety rules shown throughout this manual are based on a careful study of thousands of farm accidents . . . Study them carefully and follow them, and insist that they be followed by persons working for you.

Remember, an accident is usually caused by someone's carelessness, neglect or oversight.

Operating a Gasoline Engine

This engine is designed to operate on gasoline with a minimum of 70-72 octane rating. Tractors designed for gasoline operation are not regularly equipped with a radiator shutter, but this feature can be supplied. If your tractor is so equipped, close the radiator shutter when starting the engine in cold weather; then regulate it as required to hold the needle of the heat indicator in the low side of the "RUN" range.



Illust. 12—Instruments and Controls.

Fuel System

Check the fuel tank to make sure it is full; also see that the shut-off valve on the fuel strainer under the gasoline tank is open.

Starting the Engine

1. Put the gearshift lever in neutral position, *Illusts. 12 and 17.*

2. Open the gasoline shut-off valve under the fuel tank.

3. Advance the engine speed control lever one-third, *Illust. 5.*

4. Pull out the magneto ignition switch button, *Illust. 12.*

5. If your tractor is equipped with an electric starter, *Illust. 83,* pull the choke rod all the way out. Disengage the engine clutch by pressing down on the clutch pedal. Press in on the starter button and release it as soon as the engine starts; however, do not press on the starter button for more than 30 seconds at any one time. Slowly release the clutch pedal after the engine starts.

5A. If you do not have an electric starter, close the choke by moving the carburetor choke lever all the way back (toward the flywheel), *Illusts. 13 and 23.* Crank the engine one or two strokes; then open the carburetor choke halfway. Crank the engine until it starts.

Avoid overchoking as excessive use of the choke will flood the engine, making it hard to start. For best results, follow the procedure outlined on *page 11.*

Caution! When cranking the engine, be sure that 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.

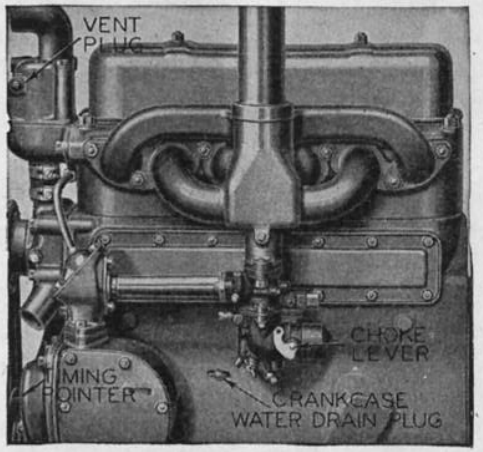
After Engine Starts

As soon as the engine starts, adjust the choke to a point where the engine operates without missing, and as the engine warms up, gradually open the choke completely by moving the carburetor choke lever forward all the way (toward radiator). If your tractor is equipped with an electric starter, gradually push the choke rod all the way in. Do not use the choke to enrich the fuel mixture, except when starting the engine. Never operate the engine with the choke partly closed.

Immediately after the engine starts, check the oil pressure indicator, *Illust. 8,* to see whether sufficient oil is circulating through the engine. If it is not, stop the engine 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.

Stopping the Engine

Retard the engine speed control lever by pushing it all the way forward, and short-circuit the magneto by pushing the magneto ignition switch button all the way in. It is advisable to close gasoline shut-off valve if the engine is to be stopped for any length of time.



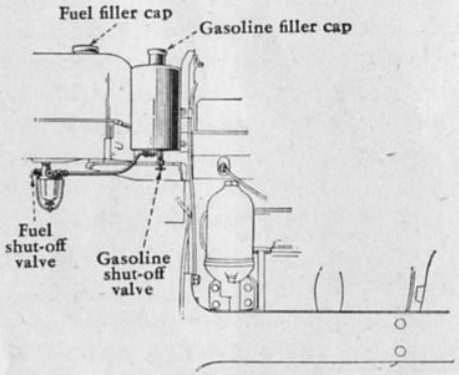
Illust. 13—Left Side of Gasoline Engine.

Operating the Distillate-Gasoline Engine on Distillate

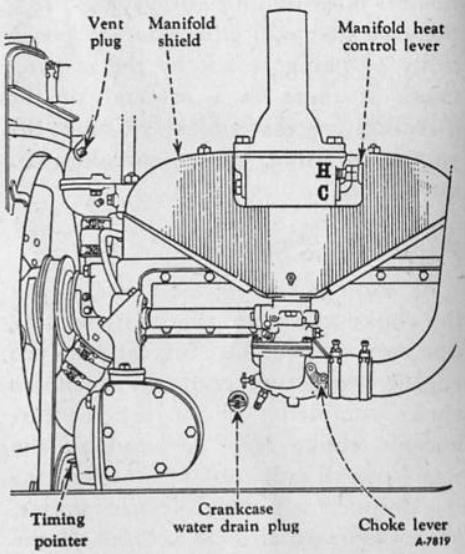
Fuel System

Check the fuel and auxiliary gasoline tanks to make sure they are full. Open the gasoline valve and be sure the shut-off valve for the main fuel tank is closed. Do not open this shut-off valve until the engine has been operating on gasoline long enough to be thoroughly warmed up.

Note: Do not have the shut-off valve under the auxiliary tank and the one under the main fuel tank open or partially open at the same time, as this will permit the distillate fuel to mix with the gasoline, making the engine hard to start.



Illust. 14—Fuel and Gasoline Tanks on Distillate-Gasoline Tractor.



Illust. 15—Left Side of Engine.

Radiator Shutter

Tractors designed for operation on distillate are regularly equipped with a radiator shutter to help warm up a cold engine quickly and to maintain the engine at the best operating temperature.

Before starting a distillate-gasoline engine, close the radiator shutter completely by turning the radiator shutter control crank, *Illust. 4* (counterclockwise). (After the engine has been started, allow it to operate with the radiator shutter closed until the pointer on the heat indicator is well into the "RUN" section; then regulate the shutter enough to keep the pointer on the heat indicator in the center of the "RUN" portion, *Illust. 7.*)

Four steps are necessary in operating the distillate-gasoline engine on distillate.

1. Setting the manifold heat control lever in the top notch "HOT" position (*see page 8*).
2. Starting the engine on gasoline.
3. Changing over to distillate fuel.
4. Changing back to gasoline before stopping the engine to insure having gasoline in the fuel bowl for the next starting.

The above steps are fully explained in this manual; please study them carefully.

Starting the Engine

1. Put the gearshift lever in neutral position, *Illusts. 4 and 17.*

2. Open the gasoline shut-off valve, *Illust. 14,* and be sure the shut-off valve for the main fuel tank is closed.

3. Advance the engine speed control lever one-third, *Illust. 5.*

4. Close the radiator shutter, *Illust. 4.*

5. Pull out the magneto ignition switch button, *Illust. 4.*

6. If your tractor is equipped with an electric starter, pull the choke rod, *Illust. 83,* all the way out. Disengage the engine clutch by pressing down on the clutch pedal. Press in on the starter button, *Illust. 83,* and release as soon as the engine starts; however, do not press on the starter button for more than 30 seconds at any one time. Slowly release the clutch pedal after the engine starts.

6A. If you do not have an electric starter, close the choke by moving the carburetor choke lever all the way back (toward the flywheel), *Illusts. 15 and 22.* Crank the engine one or two strokes; then open the carburetor choke halfway. Crank the engine until it starts.

Avoid overchoking as excessive use of the choke will flood the engine, making it hard to start. For best results follow the procedure outlined on *page 11.*

After Engine Starts

As soon as the engine starts, adjust the choke to a point where the engine runs without missing. As the engine warms up, gradually open the choke by moving the carburetor choke lever forward all the way (toward radiator). If your tractor is equipped with an electric starter, gradually push the choke rod 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 indicator, *Illust. 8,* to see whether sufficient oil is circulating through the engine. If it is not, stop the engine and inspect the oil system to find the cause of failure. If unable to find cause, be sure to consult your International Harvester dealer before operating the engine.

Changing Over to Distillate Fuel

When the engine has operated a while and the needle on the heat indicator is well into the "RUN" section, change over to operate on distillate by tightly closing the gasoline shut-off valve, *Illust. 14*, and quickly opening the shut-off valve under the main fuel tank.

Do not operate the engine under load until it is thoroughly warmed up (when heat indicator pointer is in the center of the "RUN" portion, *Illust. 7*).

Adjust the radiator shutter so as to maintain the needle in this position, *Illusts. 4 and 7.*

Stopping the Engine

Close the distillate shut-off valve and open the gasoline shut-off valve. Operate the engine two or three minutes with the engine speed control lever one-half advanced to empty the fuel lines and carburetor of distillate and fill them with gasoline. This will insure having gasoline in fuel bowl for starting again. Retard the engine speed control lever by pushing it all the way forward. Short-circuit the magneto by pushing the magneto ignition switch button all the way in.

After the engine has stopped, it is good practice to close the gasoline shut-off valve.

To start an engine that has been stopped while operating on distillate and has cooled off, close the main fuel shut-off valve, drain the distillate from the carburetor fuel bowl and fuel strainer bowl; then proceed in accordance with "Starting the Engine" instructions *shown on page 19.*

Operating a Kerosene Engine

If your tractor is equipped with a kerosene-burning engine, follow the same operating instructions as outlined for distillate operation.

If this kerosene engine is to be operated on gasoline, the same instructions as for operating a distillate engine on gasoline will apply.

Operating a Distillate-Gasoline Engine on Gasoline

Note: To operate a distillate-gasoline engine on gasoline, follow the same operating instructions as for distillate-gasoline operation, *pages 18 to 20,* except as outlined below:

Fuel System

The 21 U. S. gallon fuel tank is used for gasoline, and the small tank may be used as an auxiliary tank.

Radiator Shutter

Close the radiator shutter when starting the engine in cold weather, and as the engine warms up, regulate the shutter so that the heat indicator pointer maintains its position on the low side of the "RUN" portion.

Manifold Heat Control

Set the heat control valve in "COLD" position except when operating under light load, or in extremely cold weather; then valve should be set in the lower "INTERMEDIATE" position.

Manifold Shield

Remove the manifold shield, except when operating in extremely cold weather.

To Stop the Engine

Retard the engine speed control lever by pushing it all the way forward, and short-circuit the magneto by pushing the ignition switch button all the way in.

Close the fuel shut-off valve if the engine is to be stopped for any length of time.

Driving the Tractor

To Start Tractor

1. Advance the engine speed control lever to a position where the engine operates best for the load to be handled.

2. Disengage the clutch by pressing the clutch pedal all the way in.

3. Hold the clutch pedal in this position and move the gearshift lever to the desired speed.

4. Start the tractor in motion by slowly releasing the clutch pedal. (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 while driving the tractor, as this will result in excessive wear on the linings.

To Stop Tractor

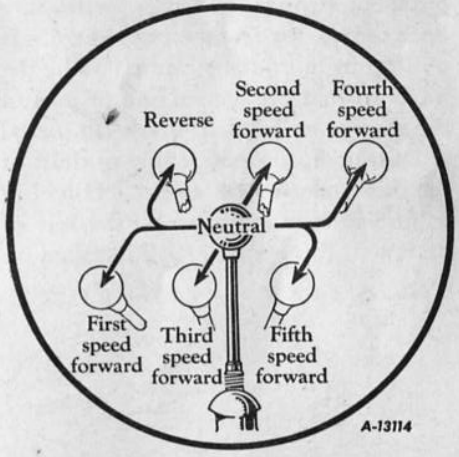
Disengage the clutch by pressing down firmly on clutch pedal, and move the gearshift lever into neutral position. Use brakes if necessary.



Illust. 16—Shifting Gears.



Always engage the clutch gently, especially when going up a hill or when pulling out of a ditch.



Illust. 17—Gear Shifting Positions.

Fifth Speed (Safety First)

On tractors equipped with steel rear wheels, the (High) 5th 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.

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 either 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.

Hitching the Tractor

The tractor exerts its pulling power on pull-behind implements by means of the drawbar which is adjustable up and down to accommodate different hitches. Proper hitching will save both the tractor and the implement it is pulling from undue strains. Make the hitch so that the center line of pull of the tractor will fall in line with, or be at least near, the center line of draft of the hitched-on implement. Hitching to one side or the other of the line of draft will cause stresses and strains on both the tractor and the implement being pulled, frequently great enough to do permanent damage. Incorrect hitching will also tend to make the tractor difficult to steer and will result in unsatisfactory work by the implement being pulled.

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

Warning! Do not attempt to pull when drawbar is removed. Drawbar bolts must be kept tight, and drawbar braces must be in place. All hitches for trailing implements must be attached to the drawbar.

Power Take-Off

If your tractor is equipped with a power take-off, be sure to stop the power take-off before dismounting from the tractor. Also, put the gear-shift lever in neutral position.



Always stop the power take-off before dismounting from the tractor.



Always hitch to the tractor drawbar, and when pulling a heavy load, pulling stumps, rocks, or fence posts, don't take up the slack of the chain with a jerk.



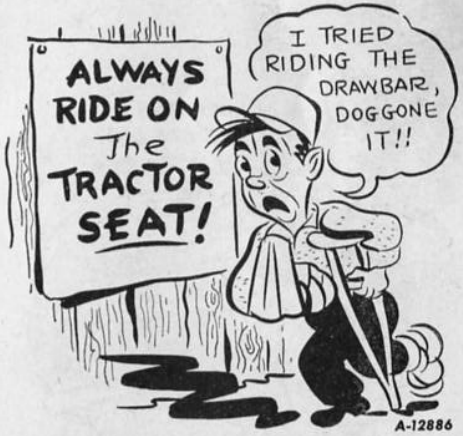
Never stand between the tractor and the drawn implement when hitching.



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



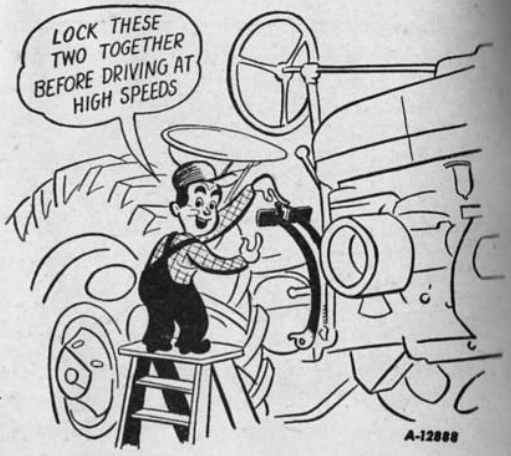
Be extra careful when working on hillsides. Watch out for holes or ditches into which a wheel might drop and overturn the tractor.



Always ride on the tractor seat when driving on the highway or to and from the fields. Never ride on the tractor drawbar or on the drawn implement.

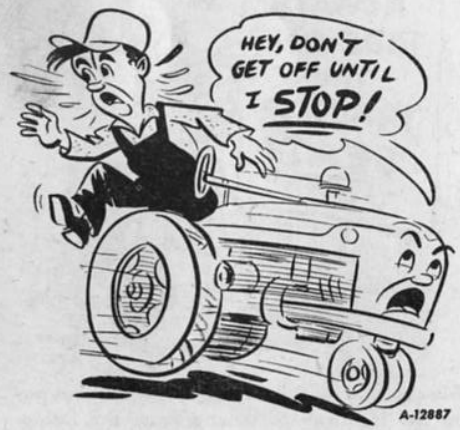


Reduce speed before making a turn or when applying the brakes. Remember, the danger of the tractor overturning increases four times when the speed is doubled.



Always lock the brake pedals together when driving on the highway or when driving in high gear.

Be sure that the brakes are properly adjusted.



Never dismount from the tractor while it is in motion. Wait until it stops.



Always keep the tractor in gear when going down steep hills.



Only one person, the operator, should be permitted to ride on the tractor when it is in operation.



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



If the tractor will not move because the rear wheels have dug in or sunk deeply into the ground, don't fasten logs, posts, or anything to the rear wheels that will prevent them from rotating. This would be certain to tip the tractor over backward. Instead .....



.....dig out or jack up the rear wheels and fill in under them. Or, if another tractor is available, hitch it with a chain to the front end of the "stuck" tractor. The power of both tractors can be used, if needed, provided a heavy pull is kept on the chain all the time.

COLD WEATHER OPERATION

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

Fuel System

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 the correct grade of lubricant in the engine crankcase, air cleaner, magneto impulse coupling, transmission, differential and steering gear case *as specified on the "Lubrication Charts."*

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, either drain the water from the cooling system at the end of each run, or use one of the recommended anti-freeze solutions.

To Drain the System

1. Remove the crankcase drain plug on the left side of engine, *Illusts. 13 and 15,* and remove the cap from the radiator drain pipe.

2. See that the drains are not plugged and that the water drains completely.

Important! Before filling the radiator in freezing weather, either close the radiator shutter (if tractor is so equipped) or cover the entire radiator and start the engine; then put in the water immediately. This prevents the water from freezing during the warming-up period. When the engine is operated on distillate, adjust the radiator shutter to maintain the operating temperature of the engine in the center of the "RUN" portion on heat indicator, *Illust. 7.*

Magneto Impulse Coupling

For satisfactory starting, keep the impulse coupling free of dirt and gummy rust formation.

When hand-cranked, the impulse coupling should trip (click) twice for each revolution of engine; failure to do so may indicate need for cleaning. Remove the magneto as described *on page 50* and flush the impulse coupling and magneto drive chamber with kerosene.

Anti-freeze Solutions

The following table shows the quantity of anti-freeze to be added to the cooling system for various temperatures.

Freezing Point (Fahrenheit)	Pints of anti-freeze required		
	Ethylene Glycol	Distilled Glycerine	Denatured Alcohol
10°	12	16	14½
0°	16	19	18
−10°	19	22½	20½
−20°	21½	25½	24
−30°	24	28½	27½
−40°	26	—	31
−50°	28	—	34½
−60°	30	—	37½
−70	31	—	—

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 that you have adequate protection for the prevailing temperature.

Note: Use only one type of anti-freeze solution. Do not mix solutions as it will be difficult to determine the exact amount of protection that you have.

Never use any of the following in the cooling water as an anti-freeze:

Honey, salt, kerosene, fuel oil, glucose or sugar, calcium chloride, or any alkaline solution.

If an anti-freeze solution is to be used, observe the following instructions:

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

2. Inspect the water pump for leaks.

3. Inspect the fan belt and adjust to proper tension as described on *page 44.* If the belt is worn or oil soaked it is best to install a new one.

4. Drain and clean out the cooling system as described on *page 44.*

5. Make sure that the crankcase water drain and radiator drain are tightly closed. Pour the required amount of anti-freeze into the cooling system. Fill the radiator with clean water (use soft or rain water if possible) to a level approximately 2¼ inches below top of filler neck, *Illust. 25.* Then inspect all hose connections for leaks.

LUBRICATION

General Engine Lubrication

The life of any tractor depends on the care it is given. Proper lubrication is very important.

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

The engine is equipped with an oil filter which continually cleans the oil while engine is operating. To secure the full benefit from the filter, the element should be replaced with a new one every time the oil is changed in the crankcase (*every 120 hours of operation*). *Cleaning the old element is not satisfactory.*

Do not operate the engine for any length of time if the oil level is below the lower test cock.

Never check the oil level while the engine is operating.

Oil Pressure Indicator

The oil pressure indicator shows whether sufficient oil is circulating through the engine. Under all operating conditions, the oil pressure of the engine should hold the indicator in the white section, *Illust. 8.* Should the indicator not register, stop the engine at once and inspect oil system to find the cause of failure. If unable to find the cause, consult your International Harvester dealer before operating the engine.

Always look at the oil pressure indicator immediately after starting the engine.



Don't oil or grease the tractor while the engine is running.

Oil Pump

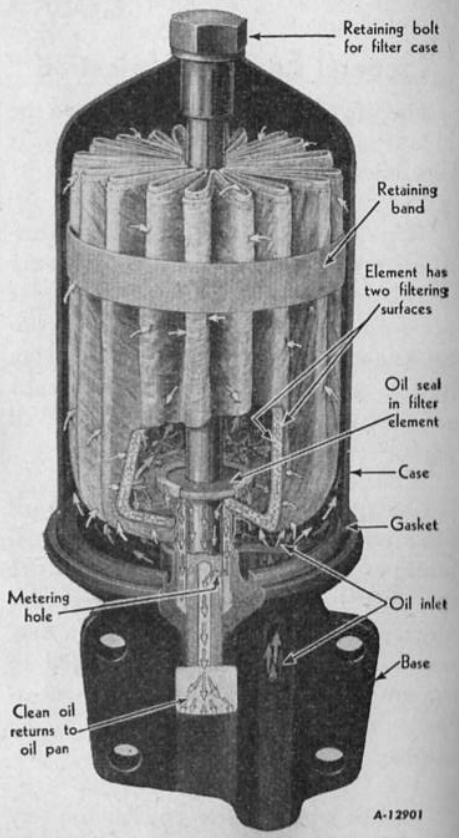
The gear-type oil pump in the crankcase has a screen attached to the oil intake to stop large dirt particles from entering the oiling system. This screen should be cleaned whenever the oil pan is removed. The oil intake floats on top of the oil in crankcase and draws the oil from the surface, thereby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

Oil Filter

The life of your engine depends upon clean 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. This filter is so efficient it will keep the circulating oil free of harmful materials for 120 hours of operation—at which time the oil should be changed and the inexpensive filter element replaced. *Refer to "Lubrication Chart"* for the recommended oil to use for the prevailing temperature. By following the simple, common-sense procedure for keeping dirt and oil impurities away from precision-made engine parts, you will safeguard 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 elements on hand so that replacement can be made at the proper time.



Illust. 18—Cutaway View of Oil Filter. Showing passage of oil through both inside and outside surfaces of the new accordion-pleated filter element.

To Change Filter Element

1. Stop the engine.

2. Remove the oil filter base drain plug and allow the oil filter to drain completely.

3. Clean off the filter case to prevent dirt dropping into the base.

4. Unscrew and remove the retaining bolt.

5. Lift up and remove the case.

6. Remove the old element.

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

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

8. Replace the drain plug in the filter base and install the new filter element. Leave the retaining band on the element. Make sure the case gasket is in position. Replace the case and retaining bolt, being careful not to jam the retaining bolt down into the filter seal located inside the filter element. Lower the retaining bolt carefully and screw it through the seal, into the filter base and tighten securely.

9. Check the oil level in the crankcase to see that the new oil is up to the proper level. *See "Lubrication Chart."* Now start up the engine, check the oil pressure indicator to see whether sufficient oil is circulating through the engine, and inspect the filter for oil leaks.

Greasing Front Wheels

Removing and Greasing

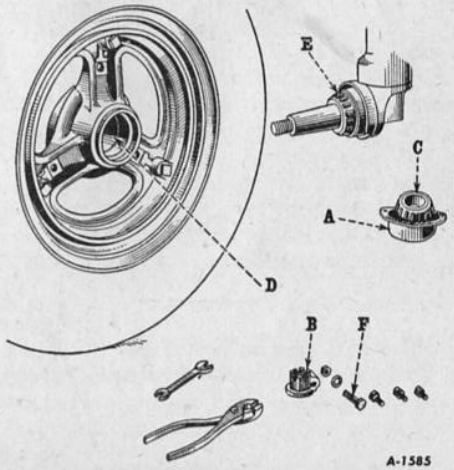
To grease the front wheels, raise the front end of tractor until the wheel clears the ground. Remove hub cap "A," remove cotter pin, loosen lock bolt "F" and remove nut "B." Remove bearing "C" and place in hub cap "A" or a clean container; then remove wheel. Clean inside of hub "D," remove the old grease from the bearings, clean the bearings with kerosene and repack them with pressure-gun grease (chassis lubricant).

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.

Replacing and Adjusting

Reassemble the wheel and tighten nut "B" until 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 tighten lock bolt "F."

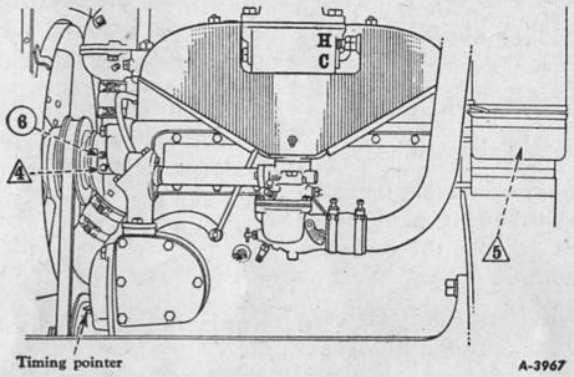
Be sure to keep all parts clean.



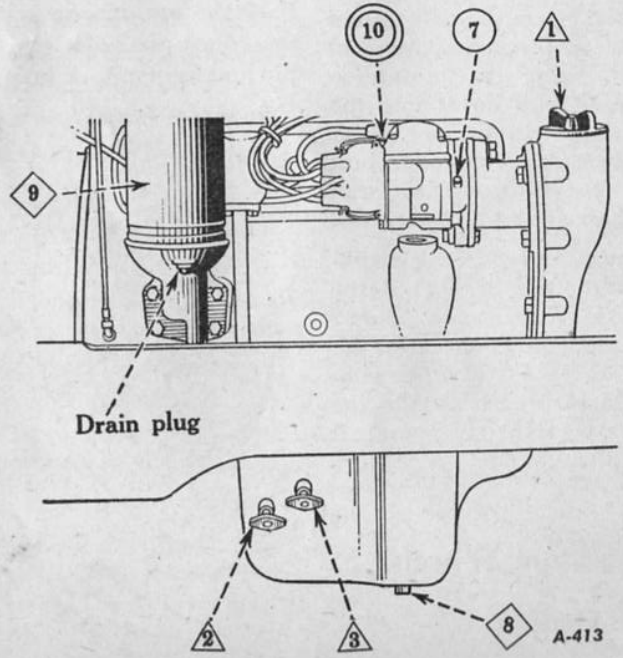
Illust. 19—Wheel Removed for Cleaning and Greasing.

Farmall-M Engine Lubrication Chart

The symbols shown around the reference numbers on the illustrations indicate the intervals of lubrication.



Left Side of Engine



Right Side of Engine

Key to Lubrication Chart

The specifications of the lubricants referred to are listed on *page 38.*
Paragraph numbers refer to corresponding numbers on illustrations.

△ — Daily or After Every 10 Hours of Operation

1. OIL FILLER.
2. LOWER OIL LEVEL TEST COCK.
3. UPPER OIL LEVEL TEST COCK.

When Operating on Gasoline:
Add sufficient new oil to bring oil up to level of upper test cock (3).
When Operating on Distillate:
Before starting engine for the day's work, drain the oil down to the lower test cock and add new oil as follows:
Open the lower test cock (2) in the crankcase pan and allow the oil to drain to this level.
Close the lower test cock and open the upper cock (3); then add new oil until oil appears at the upper cock. Close the cock.
Do not check the oil level while engine is operating, or operate the engine if the level of the oil is below the lower test cock.

4. WATER PUMP SHAFT... (Capped fitting)

Use pressure-gun grease (chassis lubricant). Apply not over two strokes of lubricator. Overlubrication will cause lubricant to be forced into the cooling system, resulting in possible clogging of system.

5. AIR CLEANER.....

Clean and refill oil cup to oil level bead with same new oil as used in engine crankcase. *Refer to page 46 for more information.*

○ — Weekly or After Every 60 Hours of Operation

6. WATER PUMP BEARING

Use pressure-gun grease (chassis lubricant) and apply two strokes of lubricator.

7. IMPULSE COUPLING....

Use a light oil such as sewing machine or cream separator oil and oil liberally. Use kerosene when temperature is below 10°F.

◇ — After Every 120 Hours of Operation

8. CRANKCASE OIL PAN DRAIN PLUG.

Remove plug (8) and drain all oil from crankcase while the engine is warm, and refill with new oil to level of upper test cock (3). Crankcase pan capacity is 8 U. S. quarts.

9. OIL FILTER ELEMENT...

Remove drain plug and allow the oil filter to drain completely. Replace oil filter element at the same time engine crankcase oil is changed, *page 29.* For the correct lubricating oil to use, refer to specifications listed on *page 38.*

◎ — Periodical

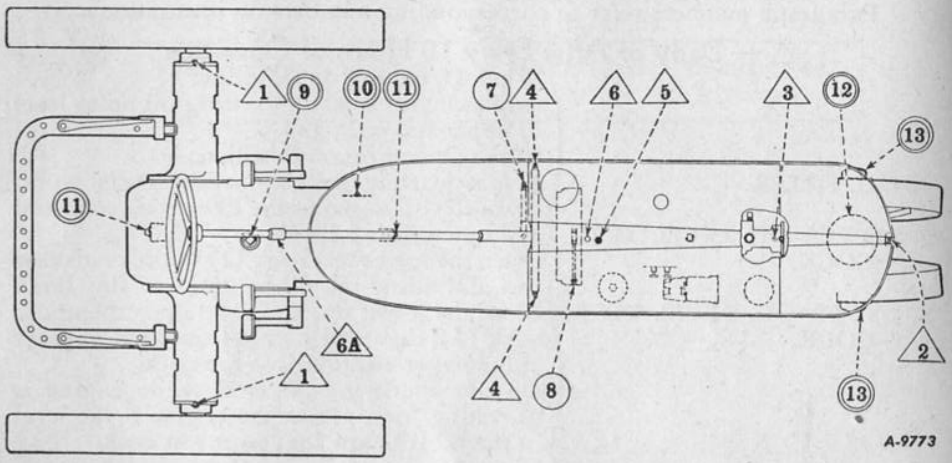
10. MAGNETO.....

After every 500 hours of operation, fill distributor bearing oil cup with very light oil such as cream separator or sewing machine oil. *Refer to page 48 for complete information on magneto lubrication.*

MISCELLANEOUS PARTS....

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

Farmall-M Chassis Lubrication Chart



Top View of Tractor.

Key to Chassis Lubrication Chart

Specifications of lubricants referred to below are listed on *page 38.* Paragraph numbers refer to corresponding numbers on illustration.

△ — Daily or After Every 10 Hours of Operation

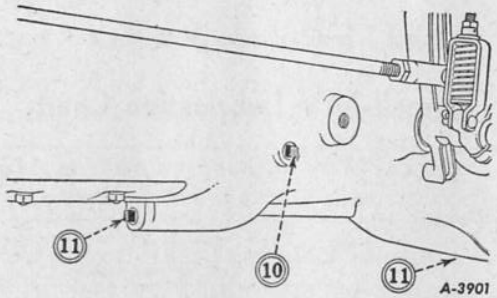
1. REAR AXLE BEARINGS (2).
2. UPPER BOLSTER PIVOT SHAFT (1).
3. STARTING CRANK BEARING (1).
4. CLUTCH RELEASE SHAFT (2).
5. STEERING SHAFT BEARING, CENTER (1).
6. STEERING SHAFT UNIVERSAL JOINT (1).

6A. STEERING SHAFT REAR BEARING (1).

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

○ — Weekly or After Every 60 Hours of Operation

7. CLUTCH RELEASE BEARING..... Use pressure-gun grease (chassis lubricant) and apply ten complete strokes of the lubricator. Fitting can be reached through hole in left side of clutch housing.



8. CLUTCH PILOT BEARING — Use pressure-gun grease (chassis lubricant) and apply not more than three or four strokes of lubricator. To get at grease fitting, turn crank until the single notch in fan drive pulley is in line with pointer on crankcase cover (see engine lubrication illustrations). Fitting is then in line with hole in bottom of flywheel housing.

◎ — Periodical

9. TRANSMISSION AND DIFFERENTIAL OIL FILLER PLUG.
10. TRANSMISSION AND DIFFERENTIAL OIL LEVEL PLUG.
11. TRANSMISSION AND DIFFERENTIAL OIL DRAIN PLUGS.

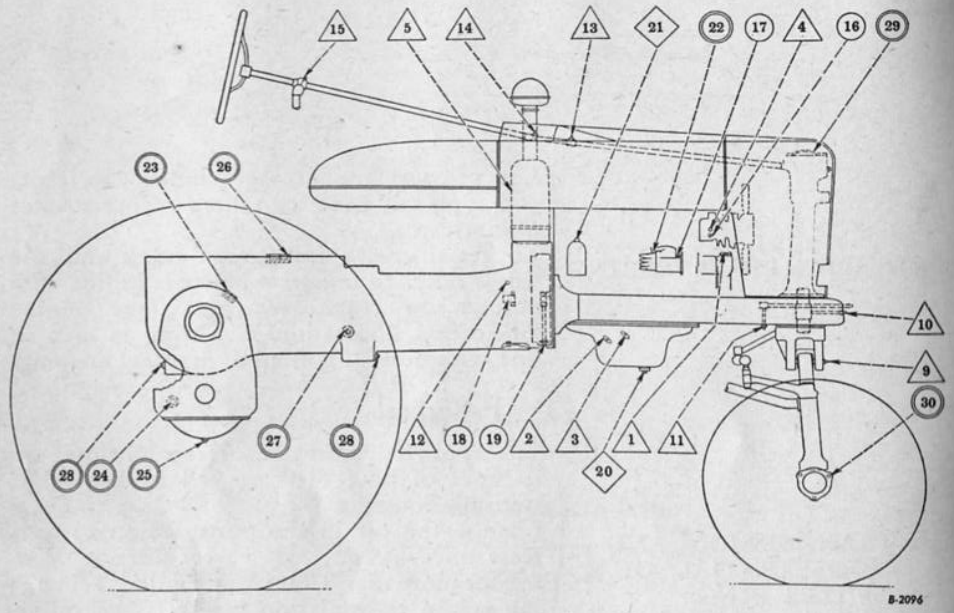
Use approved lubricant. Keep lubricant up to level of plug (10) on left front side of transmission case. Change the oil in the transmission case at least once a year. However, do not drive tractor more than 1,000 hours without changing oil in transmission case. If the oil in transmission case has been thinned with kerosene for operation in temperatures below zero, change the oil before operating in warm weather. Capacity 13 U. S. gallons when tractor is standing level. When operating tractors on belt work with front of tractor higher than rear, it is important that the correct oil level be maintained in the transmission. Keep the oil up to level plug. Check and add oil when necessary.

12. STEERING WORM GEAR. — Use approved lubricant. Lubricant should cover top of sector. To check and to add lubricant to steering gears in housing of upper bolster, remove grille and cover plate. Change the oil at least once a year. However, do not drive tractor more than 1,000 hours without changing the oil.

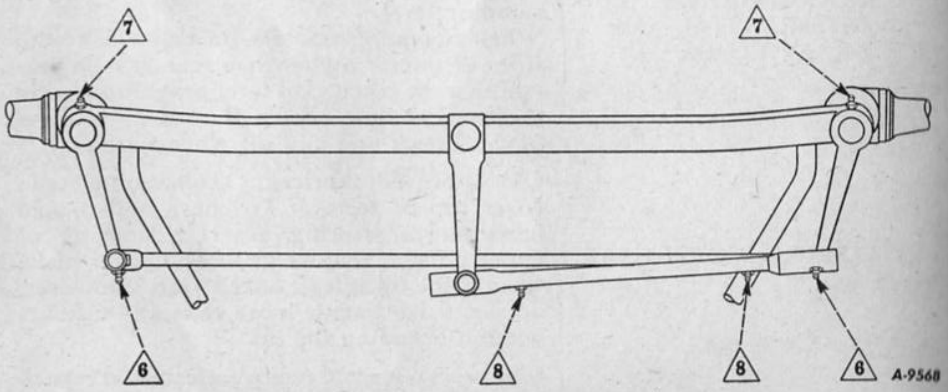
13. FRONT WHEELS..... *Once every 6 months,* remove, clean, and repack front wheel bearings with pressure-gun grease (chassis lubricant). *Refer to page 29 for further instructions.*

MISCELLANEOUS PARTS.... *Occasionally,* lubricate clutch and brake pedal connections with a few drops of engine oil.

Farmall-MV Lubrication Chart



Side view of Tractor



Top view of Front Axle Steering Linkage

Key to Lubrication Chart

The specifications of the lubricants referred to are listed on *page 38.* Paragraph numbers refer to corresponding numbers on the illustrations.

The symbols shown around the reference numbers on the illustrations indicate the intervals of lubrication.

△ — Daily or After Every 10 Hours of Operation

1. OIL FILLER.
2. LOWER OIL LEVEL TEST COCK.
3. UPPER OIL LEVEL TEST COCK.

When Operating on Gasoline:
Add sufficient new oil to bring oil up to level of upper test cock (3).
When Operating on Distillate:
Before starting engine for the day's work, drain the oil down to the lower test cock and add new oil as follows:
Open the lower test cock (2) in the crankcase pan and allow the oil to drain to this level. Close the lower test cock and open the upper cock (3); then add new oil until oil appears at the upper cock. Close the cock. Do not check the oil level while engine is operating or operate the engine if the level of the oil is below the lower test cock.

4. WATER PUMP SHAFT... (Capped fitting)

Use pressure-gun grease (chassis lubricant). Apply not over two strokes of lubricator. Overlubrication will cause lubricant to be forced into the cooling system, resulting in possible clogging of system.

5. AIR CLEANER.....

Clean and refill oil cup to oil level bead with same new oil as used in engine crankcase. *Refer to page 46 for more information.*

6. STEERING KNUCKLE ARM (2).
7. STEERING KNUCKLE PIVOT (2).
8. DRAG LINK (2).
9. FRONT AXLE PIVOT (1).
10. UPPER BOLSTER PIVOT SHAFT (1).
11. STARTING CRANK BEARING (1).
12. CLUTCH RELEASE SHAFT (2).
13. STEERING SHAFT BEARING, CENTER (1).
14. STEERING SHAFT UNIVERSAL JOINT (1).
15. STEERING SHAFT BEARING, REAR (1).

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

○ — Weekly or After Every 60 Hours of Operation

16. WATER PUMP BEARING — Use pressure-gun grease (chassis lubricant) and apply two strokes of lubricator.

17. IMPULSE COUPLING.... — Use a light oil such as sewing machine or cream separator oil and oil liberally. Use kerosene when temperature is below 10°F.

18. CLUTCH RELEASE BEARING..... — Use pressure-gun grease (chassis lubricant) and apply ten complete strokes of the lubricator. (Fitting can be reached through hole in left side of clutch housing.)

19. CLUTCH PILOT BEARING..... — Use pressure-gun grease (chassis lubricant) and apply not more than three or four strokes of lubricator.
To get at grease fitting, turn crank until the single notch in fan drive pulley is in line with pointer on crankcase cover (see engine lubrication illustrations). Fitting is then in line with hole in bottom of flywheel housing.

◇ — After Every 120 Hours of Operation

20. CRANKCASE OIL PAN DRAIN PLUG..... — Remove plug (20), drain all oil from crankcase while engine is warm, and refill with new oil to level of upper test cock (3). Crankcase pan capacity is 8 U. S. quarts.

21. OIL FILTER ELEMENT... — Remove the drain plug and allow the oil filter to drain completely. Replace oil filter element at the same time engine crankcase oil is changed, *page 29.* For the correct lubricating oil to use, refer to specifications listed on *page 38.*

◎ — Periodical

22. MAGNETO..... — *After every 500 hours of operation,* fill distributor bearing oil cup with very light oil such as cream separator or sewing machine oil. *Refer to page 48 for complete information on magneto lubrication.*

23. REAR AXLE HOUSING OIL FILLER PLUGS (2).
24. REAR AXLE HOUSING OIL LEVEL PLUGS (2).
25. REAR AXLE HOUSING OIL DRAIN PLUGS (2) — Check oil level periodically and keep lubricant up to level of level plug. Use approved lubricant. Change the oil at least once a year. However, do not drive tractor more than 1,000 hours without changing the oil. Drain and refill to level of plug (24). Capacity, 3 U.S. quarts on each side.

26. TRANSMISSION AND DIFFERENTIAL OIL FILLER PLUG.
27. TRANSMISSION AND DIFFERENTIAL OIL LEVEL PLUG.
28. TRANSMISSION AND DIFFERENTIAL OIL DRAIN PLUGS (2). — Use approved lubricant. Keep lubricant up to level of plug (27) on left front side of transmission case.

Change the oil in the transmission case at least once a year. However, do not run tractor more than 1,000 hours without changing oil in transmission case. If the oil in transmission case has been thinned with kerosene for operation in temperatures below zero, change the oil before operating in warm weather.

Capacity is 13 U. S. gallons when tractor is standing level.

Note: When operating tractors on belt work with front of tractor higher than rear, it is important that the correct oil level be maintained in the transmission. Keep the oil up to level plug. Check and add oil when necessary.

29. STEERING WORM GEAR. — Use approved lubricant. Lubricant should cover top of sector. To check and to add lubricant to steering gears in housing of upper bolster, remove grille and cover plate. Change the oil at least once a year. However, do not operate tractor more than 1,000 hours without changing the oil.

30. FRONT WHEELS..... — *Once every six months,* remove, clean, and repack front wheel bearings with pressure-gun grease (chassis lubricant). *Refer to page 29 for further instructions.*

MISCELLANEOUS PARTS..... — *Occasionally,* lubricate clutch and brake pedal connections with a few drops of engine oil.

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

Lubricating Oil and Grease Specifications — Engine Lubricating Oils

Note: Engine lubricating oil should be of well-refined petroleum oils, free from water and sediment, and without admixtures of fatty oils, acids, soaps, resins or any other substance not derived from petroleum. Oil should not corrode any metal used in engine construction. Engine lubricating oil containing additive products not necessarily derived from petroleum, but being of noncorrosive type, is satisfactory for use in this engine.

To aid easier 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. For example, SAE-30 may be used in temperatures below 32°F., if no starting trouble is experienced, and 20W oil can be used in temperatures around 50°F. 10W may be used up to 32°F., except when operating continuously on heavy loads. SAE-10 and SAE-20 oils may be substituted for 10W and 20W unless engine is difficult to crank.

Recommended Viscosity of Lubricating Oils

Air Temperature	Engine Crankcase	Air Cleaner	Magneto and Impulse Coupling
Above 32°F.	SAE-30	SAE-30	Very light oil such as cream separator or sewing machine oil
32°F. to 10°F.	20W	20W	Very light oil such as cream separator or sewing machine oil
Below 10°F.	10W	10W	Very light oil such as cream separator or sewing machine oil (*)

(*) Use kerosene in impulse coupling for temperatures below 10°F.
Refer to special instructions for Cold Weather Operations on page 26.

Approved Lubricants for Transmission, Differential, Steering Gear and Rear Axle Drive Housing

Tractors are shipped from the factory with SAE-90 oil in the transmission, differential and steering gear. (Also in the rear axle drive housings on the Farmall-MV.)

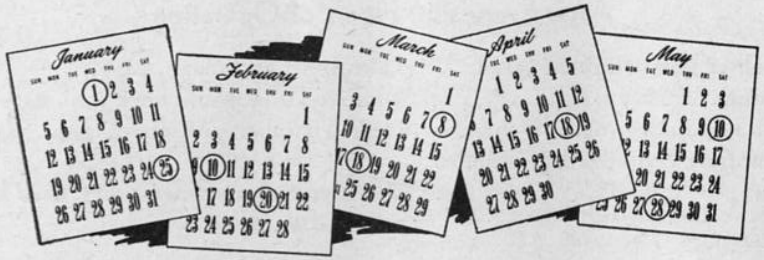
For all temperatures above zero, use SAE-90 transmission lubricant. For temperatures below zero, use the same transmission lubricant as for above zero, but also pour two gallons of kerosene into the transmission case (also 1 U. S. pint of kerosene into each rear axle drive housing on the Farmall-MV). After the kerosene has been added in these compartments, operate the tractor until the mixture is thoroughly warm. Then drain these compartments to the level plugs (refer to Farmall-M "Lubrication Chart," *page 33*, or Farmall-MV "Lubrication Chart," *page 37*, as described in the lubrication chart. Use a good grade of oil that is free from solid materials. Use only high-quality lubricating oils and grease. For your own protection, select only oils and grease of recognized manufacture.

Lubricator Fitting Grease

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

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

MAINTENANCE



Periodic Inspections

To keep your tractor performing efficiently, it is advisable to systematically inspect the following points at the intervals as outlined below.

After Every 10 Hours of Operation

Air cleaner cap.....Remove dirt or chaff, *page 46.* (*When unusual dust or dirt conditions are encountered during operation, it may be necessary to service this point more frequently.*)

Lubrication Points.....*See Lubrication Charts.*

After Every 60 Hours of Operation

Air cleaner, complete.....Remove and clean, *page 46.* (*When unusual dust or dirt conditions are encountered during operation, it may be necessary to service this point more frequently.*)

Flexible rubber connection between air cleaner and carburetor.....Inspect for loose fit or damage.

Fan belt.....Check tension; replace when necessary, *page 44.*

Radiator fins.....Clean spaces, *page 45.*

Lubrication Points.....*See Lubrication Charts.*

After Every 120 Hours of Operation

Lubricating oil filter.....Replace filter element, *page 29.*

Engine crankcase.....Drain and change oil.

Lubrication Points.....*See Lubrication Charts.*

After Every 250 Hours of Operation

Fuel strainer and sediment bowl.....Take apart and clean, *page 40.*
Spark plugs.....Remove and clean; check gap, *page 47.*
Magneto breaker points and chamber. Clean chamber and check gap, *page 48.*
Magneto drive chamber and impulse coupling.....Check and clean if necessary, *Cold Weather Operation, page 26.*

After Every 400 Hours of Operation

Fuel line screen (at carburetor).....Remove and clean, *page 41.*
Cooling system.....Clean, *page 44.*
Engine valves.....Check for clearance, *page 51.*
Clutch pedal.....Check for free movement, *page 53.*
Brake pedals.....Check for free movement and equalization, *page 52.*
Lubrication Points (500 hours).....*See Lubrication Chart.*

Fuel Strainer

Cleaning the Fuel Strainer and Sediment Bowl

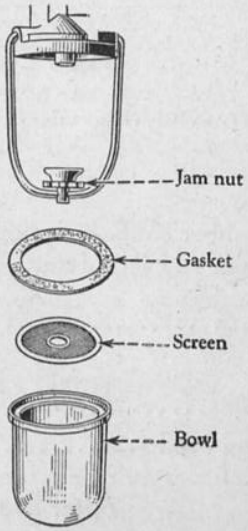
Clean the fuel strainer after every 250 hours of operation. To do this, proceed as follows:

1. Close all shut-off valves.

2. Take the strainer apart by loosening the lower jam nut.

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

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

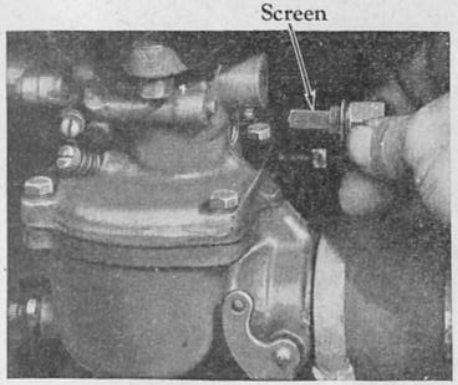


Illust. 20—Fuel Strainer Showing Glass Bowl Removed for Cleaning.

Carburetor

Care of Carburetor

After every 400 hours of operation remove the fuel line screen by unscrewing the fuel line fitting—clean the screen and replace it.



Illust. 21—Removing the Fuel Line Screen.

The flange nuts which hold the carburetor to manifold should be checked periodically for tightness.

Occasionally, check the screws that fasten the fuel bowl to the fuel bowl cover. These screws should be kept tight to prevent any leakage of air past the fuel bowl cover gasket.

Adjusting the Carburetor

This carburetor was correctly set at the factory, but if the settings have been disturbed the following procedure should be followed:

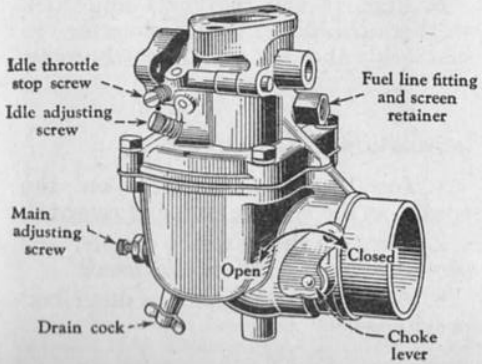
Before making any adjustments, close both fuel adjusting screws, then set the main fuel adjusting screw 2½ to 3 turns open and set the idle fuel adjusting screw 1 to 1½ turns open.

Main Fuel Adjustment

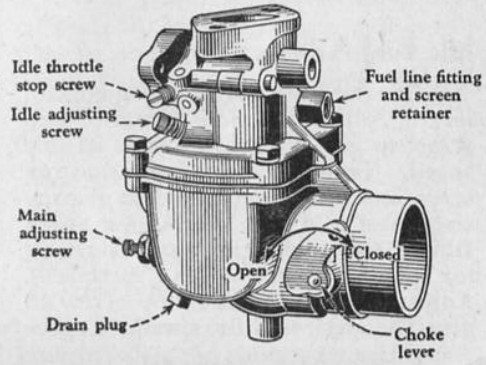
Start the engine, fully advance the engine speed control lever and allow the engine to operate until it is hot (about 20 minutes).

Distillate-gasoline only. If your tractor is equipped for distillate-gasoline operation, set the manifold heat control valve in "HOT" position, *Illust. 3.* When the heat indicator pointer moves into the "RUN" portion of the dial, *Illust. 7,* change over to operate on distillate. Operate the engine for a short time on distillate before making adjustments.

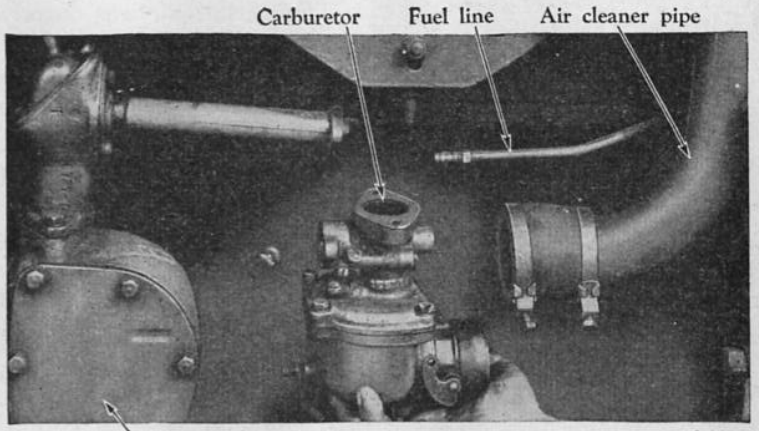
Turn the main fuel adjusting screw in until the engine starts to miss or operate unsteadily; then unscrew it to a point where the engine operates steadily. Check this adjustment with



Illust. 22—Distillate-Gasoline Engine Carburetor.



Illust. 23—High-Compression Engine Carburetor.



Illust. 24—Removal of Carburetor.

the engine under load to make certain you have secured the most satisfactory operation and maximum amount of power.

For the best operation and minimum dilution, keep adjustment as lean as possible. Screw the main fuel adjusting screw in for lean and out for rich load mixtures.

If, after adjusting, the engine still does not get the correct mixture of fuel, it may be caused by the main fuel adjusting screw becoming loose. This can be corrected by tightening the adjusting screw packing nut.

Idle Fuel Adjustment

Fully retard the engine speed control lever. Adjust the idle throttle stop screw to give a slight increase in idle speed. Turn the idle fuel adjusting screw in or out, as required, to give the smoothest idle with the highest speed (the idle fuel adjusting screw turns in for rich and out for lean mixtures). Adjust the idle throttle stop screw to give the desired idle speed. Engine should not be set to idle so slowly that impulse coupling will trip continually.

Removal of Carburetor (*Illust. 24*)

1. Shut off the fuel supply at the fuel tank.
2. Drain the carburetor by opening the drain cock.
3. Disconnect the choke and governor controls.
4. Disconnect the fuel line.
5. Remove the air cleaner connections to the carburetor.
6. Remove the two nuts and lock washers holding the carburetor to manifold, and lift off the carburetor.

Installation of Carburetor

1. Install the carburetor on the engine in the reverse order of removal.
2. Turn on the gasoline supply. *Be sure carburetor drain cock is closed.*
3. Adjust the carburetor as described previously.

Cooling System

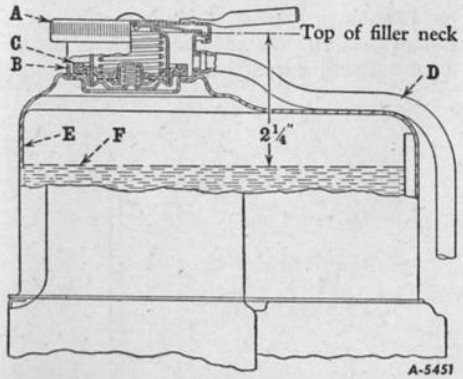
The cooling system operates under pressure which is controlled by means of a regulating valve built into the radiator cap. Always use clean water (soft or rain water if possible).

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

Turn the radiator cap (A) 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.

Allow the engine to cool and fill the radiator slowly to approximately 2¼ inches below top of filler neck (B). Due to expansion, when the system becomes hot, any excess water will be discharged through the overflow pipe (D).

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



Illust. 25—Water Level in Pressure-Cooled Radiators. (A) Radiator cap. (B) Filler neck. (C) Filler cap gasket. (D) Overflow pipe. (E) Upper water tank. (F) Water level.



Should the motor overheat, allow the engine to cool off before removing the cap to fill the radiator. When removing the cap, be extremely careful to avoid being scalded by steam which has built up pressure in the radiator.

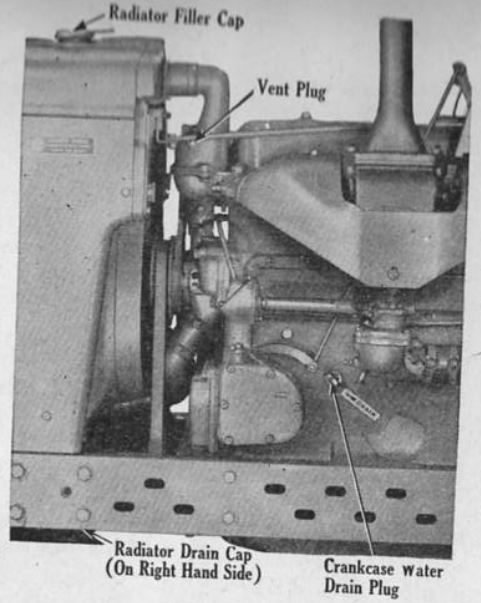
Before replacing the filler cap, be sure to remove any chaff or dirt particles which may be on the gasket surface or cap, and tighten the cap clockwise to the stop.

Note: A pressure-cooled system will not work 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 the regulating valve which is built into the radiator cap. If the valve is faulty, replace it with a new radiator cap of the same type.

If a heat indicator is to be installed, be sure it has the correct range for the pressure-type radiator.



Illust. 26—Left Side of Engine Showing Drain Plugs, Vent Plug and Filler Cap.

Thermostat

The water is circulated through the engine block, cylinder head and radiator by a centrifugal pump. Circulation is controlled by a thermostat that 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.

To Clean Out Dirt and Sludge

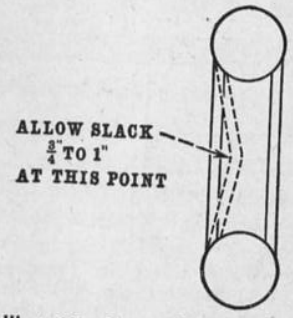
1. Drain the cooling system by removing the plug on the left side of the engine, *Illust. 26,* and remove the cap from the radiator drain pipe. Allow the system to drain, and replace the plug and cap.

2. Fill the cooling system with a solution of 3 pounds of ordinary washing soda mixed with 6 gallons (U. S.) of water (cooling system capacity).

3. Leave off the radiator filler cap and operate the engine until the water is hot; then drain and flush with clean water.

Fan Belt Tension

Check the slack of the fan belt frequently to assure maintenance of the correct tension. The tension is correct when the belt can be depressed without effort by the thumb, approximately $\frac{3}{4}$ to 1 inch, midway between the two pulleys, *Illust. 27.* If the slack is more than 1 inch, adjust belt as follows:



Illust. 27—Correct Belt Tension.

Adjusting the Belt

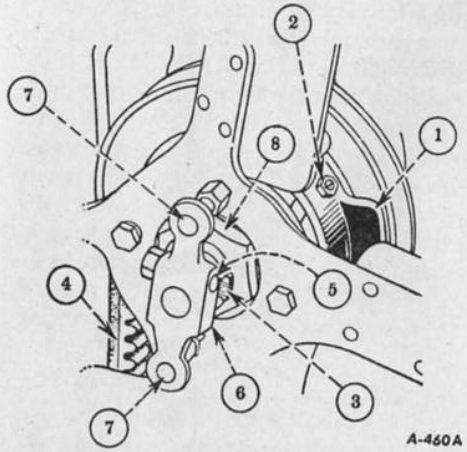
The tension of the fan belt is adjusted by changing the width of the groove in the fan pulley. To adjust, loosen set screw (2), *Illust. 28;* then screw pulley flange (1) in toward belt to tighten the belt, or out to loosen it. Retighten set screw (2) after the correct tension is obtained.

After a new belt has been in use approximately 50 hours, check the tension and adjust again if necessary.

The belt should at no time contact the bottom of the pulley groove because this will wear it out rapidly. Adjust the pulley for a narrower groove, if this is possible without increasing the tension more than allowable. Having V-belts tighter than the tension specified will result in rapid wear.

Removing the Fan Belt (*Illust. 28*)

To remove fan belt, loosen screw (2) in flange on fan pulley and unscrew flange as far as possible. Start belt over outer flange of lower pulley and pry it out with light bar or rod. Slowly crank the engine at the same time and belt will work off pulley. After the belt is off the pulley, move the starting crank ratchet forward and lift the belt out between the pulley and the front bolster. The belt can now be worked over the top of the fan blades.



Illust. 28—Fan Belt and Water Pump Packing Adjustment.

Replacing Fan 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.

When replacing the belt, reverse the procedure outlined under "Removing Fan Belt," except that belt can be started on lower pulley by hand, and by slowly cranking the engine, belt will find the correct position.

Radiator Core

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

Water Pump Packing

The pump may leak due to wear after considerable service. If this occurs, tighten up the packing nut (3), *Illust. 28,* just enough to stop the leaking.

To install new packing, remove driver pin (5) and driver (6). Unscrew and remove packing nut (3). Place water pump packing around shaft and reassemble packing nut, driver and driver pin.

(1) Fan pulley flange.
(2) Set screw in pulley flange.
(3) Water pump packing nut.
(4) Fan belt.
(5) Driver pin.
(6) Driver.
(7) Stud.
(8) Fan hub nut.

Air Cleaning System

Clean air for combustion is assured by a three-stage 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 screens works back down, it carries the dirt with it and settles in the oil cup. The oil cup must be cleaned and refilled regularly with new oil.

Oil Cup Service

Remove, clean and refill the oil cup every day, or after every ten hours of operation (more frequently when operating under dusty conditions). Refill the oil cup to oil level bead with the same grade of oil used in the engine crankcase. The capacity of the oil cup is 2¼ U. S. pints.

Do not remove the oil cup while engine is operating.

Before replacing the oil cup, clean or wipe oil or grit from top bead of oil cup, oil cup retaining clamp, and the surface under the clamp.

Air Intake Cap and Screen

The screen in the air intake 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.

Washing the Cleaner

After every 60 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. 29*, and wash the parts thoroughly in kerosene. Be sure to clean out the air intake pipe.

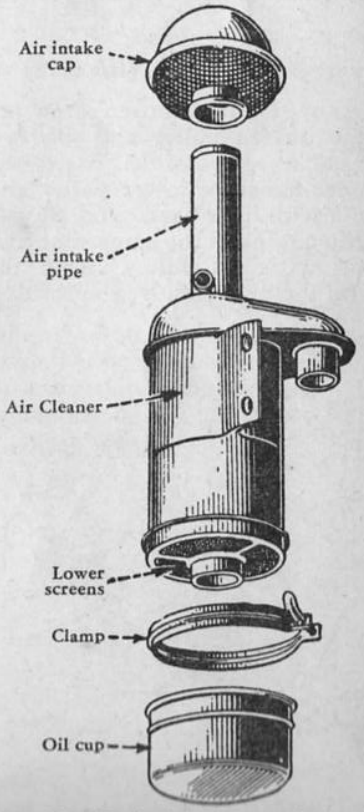
After all parts have been thoroughly cleaned, replace the air cleaner body airtight. Replace the air intake cap. Fill the oil cup to the proper level with the specified grade of oil and replace it on the air cleaner. Be sure it is held securely in place by the cup clamp.

General Precautions

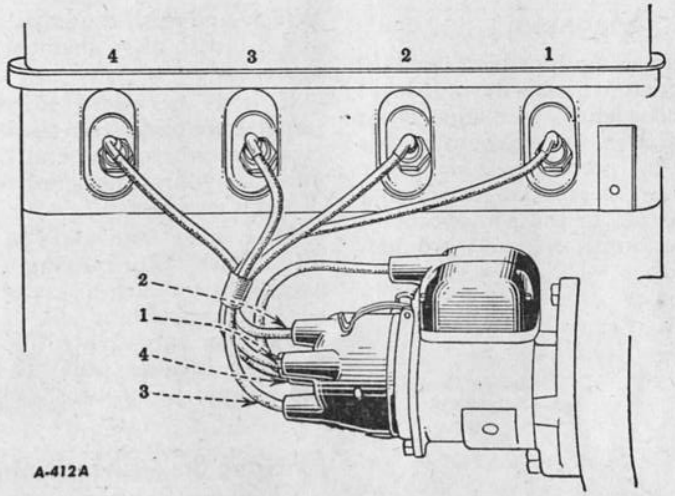
As an added precaution against dirt getting into the engine, frequently inspect the flexible rubber hose connections between the carburetor and the air cleaner. If they show any sign of deterioration, replace them.

To eliminate strain on the rubber hose connections, be sure pipes line up.

All joints between the air cleaner and carburetor, manifold and the cylinders of the engine should be tight. All gaskets must be good condition and the bolts should be drawn up tight.



Illust. 29—"Exploded" View of Air Cleaner



Illust. 30—H-4 Magneto—Wiring Chart. Engine firing order is 1, 3, 4, 2.

Spark Plugs and Cables

Spark Plugs

The spark plugs selected after careful tests as best suited for this engine are the Champion No. 15-A or AC-87 and should be used ordinarily. Use only a complete set of either type of spark plug.

Remove the spark plugs after every 200 to 300 hours of operation, or oftener if necessary, for cleaning and checking gaps between electrodes. A gap of .028 to .032 inch should be maintained (a gauge of this thickness is furnished). 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 the ends, engine will misfire and be hard to start.

Special Spark Plugs

To remedy fouling or sooting, use a hotter (light service) spark plug.

To remedy preignition and burning of electrodes, use a colder (severe service) spark plug.

For special spark plugs, see your International Harvester dealer.

Cleaning Spark Plugs

Sand blasting 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.

Spark Plug Cables

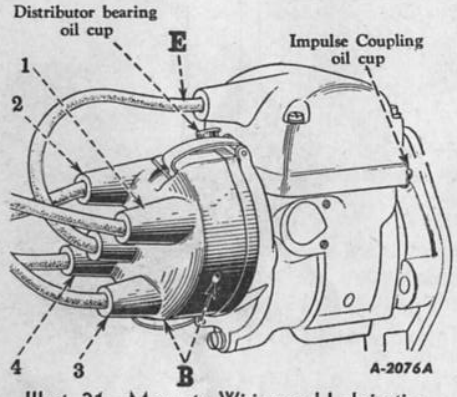
If spark plug cables are removed for any reason, note the position of each cable on the magneto. (*Wiring Chart, Illust. 30, shows correct wiring.*)

Keep a minimum clearance of ¼ inch between spark plug cables and cylinder head. By maintaining this clearance, shorting-out the spark plug will be prevented and the cable will be away from the extreme heat of the cylinder head. If the cable touches the cylinder head, the heat of the engine will soon cause the rubber to become soft, ruining the cable.

Magneto

Your tractor is equipped with a high-tension magneto which is designed and built in accordance with the latest ignition practices. A magneto of this type is used by International Harvester because our engineers have proved that it is superior from the standpoint of performance, long life, and trouble-free operation.

Lubrication



Illust. 31—Magneto Wiring and Lubrication.

Every week, or after every 60 hours of operation, oil the impulse coupling liberally with a light oil such as cream separator or sewing machine oil. Use kerosene when temperature is below 10°F.

Magneto Impulse Coupling and Magneto Drive Chamber

For satisfactory starting, it is important to keep the magneto impulse coupling oiled liberally, as specified in the "Lubrication Chart." The impulse coupling should be kept free of dirt and gummy rust formation.

When hand-cranked, the impulse coupling should trip (click) twice for each revolution of the engine. Failure to do so may indicate the need of cleaning.

After every 250 hours of operation, check magneto drive chamber and clean it if necessary.

Remove the magneto as described on *page 50* and flush the impulse coupling and magneto drive chamber with kerosene.

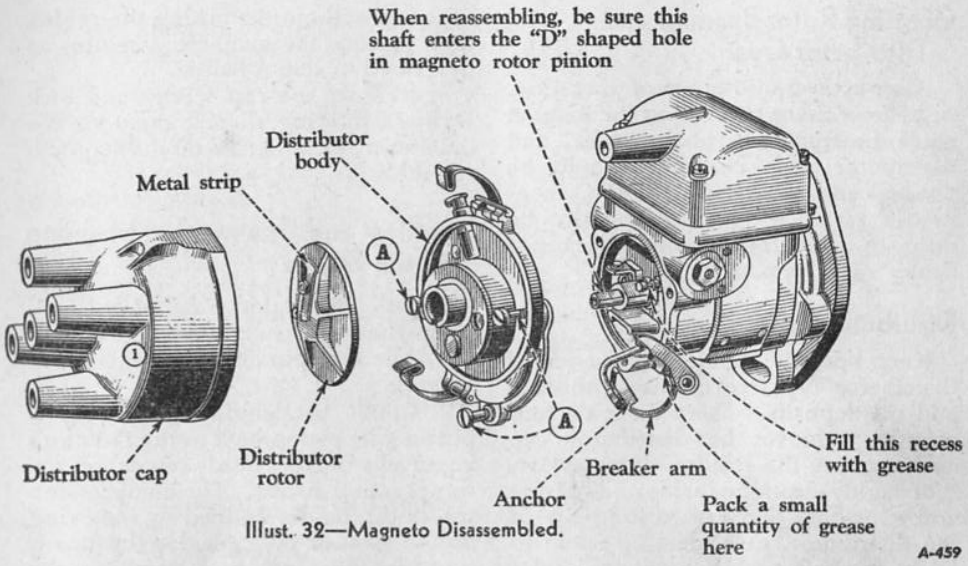
If it is necessary to remove the impulse coupling from the magneto for cleaning, we recommend that this be done by your International Harvester dealer's serviceman.

After every 500 hours of operation, fill the distributor bearing oil cup with very light oil such as cream separator or sewing machine oil. Do not oil oftener, as excessive oil might work into the breaker point chamber and cause rapid point wear.

Greasing Braker Mechanism and Checking Points

The magneto requires very little attention other than properly lubricating the oil cups as specified above. It is important, however, to keep the breaker arm chamber clean, as oil on the breaker points will cause rapid point wear. Overlubrication of the distributor bearing oil cup, *Illust. 31,* might cause a dirty breaker point chamber. After every 250 hours of operation, inspect the breaker point chamber to see that it is clean. See that the points are in good condition and have the proper clearance. If the chamber is clean, no attention is necessary other than checking the clearance of the points; but if the chamber is dirty, all parts must be thoroughly cleaned. After cleaning, the points should be dressed, the point clearance checked, and the breaker arm regreased as outlined below.

To reach the breaker mechanism, remove the distributor cap, and crank the engine slowly until metal strip on distributor rotor points toward the No. 1 terminal on distributor cap and impulse coupling just trips. Remove the distributor rotor. Take off the distributor body by removing the three screws "*A,*" *Illust. 32.* Do not crank the engine while distributor body is removed or it might be necessary to retime the magneto to the engine.



Illust. 32—Magneto Disassembled.

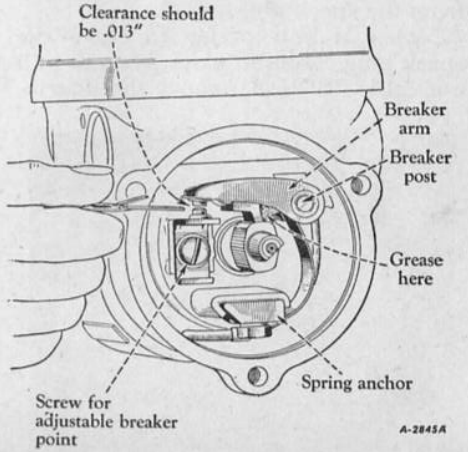
Remove the breaker arm and anchor from the chamber, and clean all parts. Inspect the breaker points and, if necessary, dress them with a sharp fine file. If the points are worn excessively, replace both points.

Fill the recess in breaker post with grease and pack a small quantity of magneto grease in back of the breaker arm rubbing block, *Illusts. 32 and 33.* See your International Harvester dealer for the proper grease to use.

Assemble the breaker arm, leaving the spring anchor projecting $\frac{1}{8}$ to $\frac{3}{16}$ inch above top of slot so that it is pushed into place by the distributor body. Be sure the points line up when breaker arm is pushed into place.

Check the gap between the breaker points with the gauge furnished with the tractor, *Illust. 33.* The point opening should be .013 inch when the rubbing block is on the high part of the cam. If gap is not correct, adjust it by loosening the screw holding the adjustable point, *Illust. 33,* and moving the point up or down until gauge slips snugly into opening. After the proper adjustment has been made, tighten the screw.

Line up the distributor rotor key with keyway in spindle, *Illust. 32,* and press rotor loosely on spindle. With the engine on top dead center of the No. 1 firing stroke, turn the distributor rotor until the metal strip on rotor points to the No. 1 terminal on the distributor cap. Place the distributor body on the magneto and be sure rotor shaft enters the "D" shaped hole in magnet rotor pinion. Remove the distributor rotor to tighten the three screws "*A,*" *Illust. 32.* Replace the distributor rotor and distributor cap.



Illust. 33—Adjusting the Breaker Points.

Greasing Rotor Bearings and Distributor Gear

After every 2,000 hours of operation, or at least every two years, the magnet rotor bearings, distributor gear, and distributor gear chamber should be cleaned and repacked with IHC magneto grease. We recommend this be done by your International Harvester dealer's serviceman.

Distributor Cap

Keep both the inside and outside of distributor cap free of dust, moisture and oil deposits. Every three or four months, remove the distributor cap and examine the inside. If necessary, thoroughly clean the inside and outside and wipe dry. To assure long life of the distributor, care must be taken to keep the two small ventilator holes "*B*," *Illust. 31,* open at all times. The distributor rotor should also be kept clean.

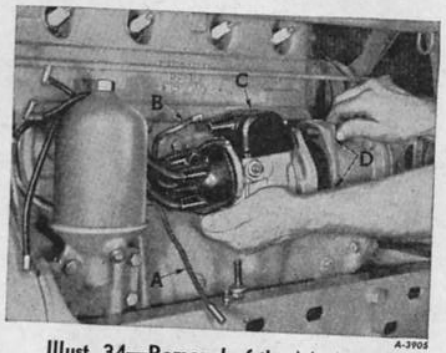
If it is necessary to remove the magneto, follow this procedure:

Removing the Magneto

1. Disconnect the switch cable "A" by removing the fillister head screw and lock washer attaching cable to the magneto terminal.

2. Pull out cable "B" from the coil cover "C" and disconnect all the cables from the spark plugs.

Note: If you prefer to leave the spark plug cables in place, you can pull out cable "B" and remove the distributor cap without disturbing the cables, then remove the magneto assembly as described in step 3 below.



Illust. 34—Removal of the Magneto.

3. Remove the cap screws and lock washers holding the magneto to the bracket at "D" and take off the magneto assembly.

Installing and Timing the Magneto to the Engine

1. Pull out cable "*E*," *Illust. 31,* from the coil cover end. This will eliminate any possibility of accidental starting.

2. Crank the engine until No. 1 piston (the piston next to the radiator) is on the upper dead center of the compression stroke. The compression stroke can be determined by removing the No. 1 spark plug, placing the thumb over the opening, and cranking the engine until an outward pressure is felt. Continue cranking slowly until first of the double notches on the fan drive pulley (on the crankshaft) is in line with pointer on front crankcase cover, *Illust. 15.* Both intake and exhaust valves would then be closed.

3. Remove the distributor cap and turn magneto coupling in a counter-clockwise direction (as viewed from the coupling end) until the metal strip on the distributor rotor points toward the No. 1 terminal on the distributor cap. Then replace the distributor cap.

4. Assemble the magneto on the engine, making sure that the lugs on the impulse coupling engage in the slots on magneto drive coupling. (Assemble magneto so that top is as close to crankcase as possible.)

5. Insert the magneto mounting bolts loosely in the magneto flange, just enough to hold the magneto in place. Then crank the engine one complete revolution to next top dead center. Now, pull the upper part of the magneto away from the engine until impulse coupling just trips.

6. Tighten mounting bolts securely. Attach spark plug cables to engine and magneto. Start by connecting No. 1 cylinder spark plug to socket marked

"1" on distributor block; connect No. 3 socket with No. 3 cylinder; next with No. 4 cylinder, and next with No. 2 cylinder. *See Wiring Chart, Illusts. 30 and 31.*

7. Connect the switch cable to the magneto terminal.

8. To check timing, crank the engine slowly until top dead center of No. 1 cylinder is reached, at which time impulse coupling should just trip.

9. The magneto is now correctly wired and timed.

10. Push cable "E" back into socket in coil cover, *Illust. '31.*

Valve Clearance Adjustment

Check the valve clearance after every 400 hours of operation and adjust the clearance, if necessary. A clearance of .017 inch, measured when valves are closed and engine is warm, is necessary between the end of valve levers and valve stems.

To Adjust Clearance

1. Before checking valve clearance, "cut out" the magneto by pulling cable "E," *Illust. 31,* out of socket. This will safeguard against accidentally starting the engine.

2. Remove the valve housing.

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

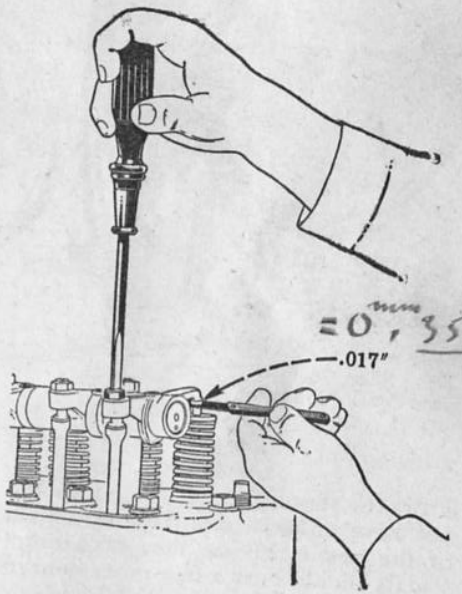
Place your thumb over the spark plug opening and slowly crank the engine until an outward pressure can be felt. (Pressure indicates No. 1 piston is moving toward upper dead center of the compression stroke.)

Continue cranking slowly until the first of the double notches on the fan drive pulley (on the crankshaft) is in line with the timing pointer in the front crankcase cover, *Illust. 15.* Both valves are now closed on compression stroke of No. 1 cylinder.

4. Loosen the lock nut and adjust the screw in the valve lever so that the gauge slips snugly between end of the valve lever and valve stem, *Illust. 35.*

5. Tighten lock nut and recheck the clearance.

6. Crank the engine one-half revolution at a time and check 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.



Illust. 35—Gauging Valve Levers with a Feeler Gauge.

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.

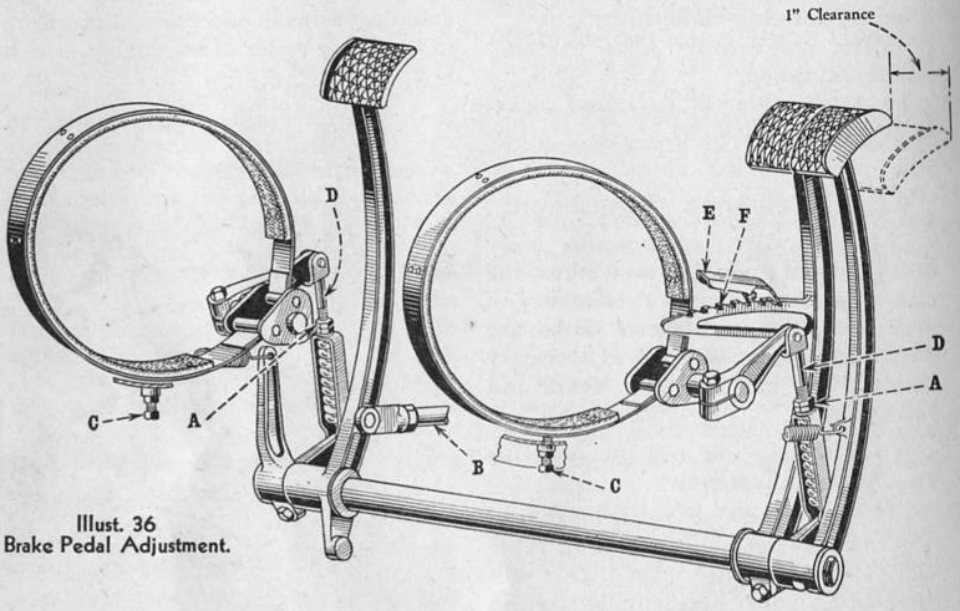
8. Replace the magneto cable "E," *Illust. 31,* into socket from which it was removed.

Important! Be accurate—use a feeler gauge for checking the valve clearance.

Brakes

The brakes consist of external bands that contract on the brake drums. The brakes are controlled by foot pedals which can be operated individually or simultaneously when locked together.

Caution: *Always lock brake pedals together when traveling in high gear.*



Illust. 36
Brake Pedal Adjustment.

Brakes should not drag and should not have an excessive free movement of the pedals before they take hold. Pedals should have a free movement of 1 inch, measured at the pedal pad, or just enough movement so that when a slight pressure is applied on the brake pedals, the brake lock "E" can be dropped into the first notch in the rack "F."

Adjustment

To adjust the brakes, screw in the set screw "C" in the bottom of the housing as far as it will go, then back off one-quarter to one-half turn and lock it.

Obtain the correct free pedal movement by changing the length of brake rod "D" by removing the pin from the clevis, loosening jam nut "A" and turning the clevis either to the right or to the left.

To obtain equalization of both brakes it is very important that both brake pedals have the same amount of free movement. A definite way to check the equalization of brakes is to jack up both rear wheels so they will turn freely, block tractor securely and latch the brake pedals together, then start the engine. Shift the gears to either third or fourth speed; engage the clutch; while the wheels are turning apply the brakes. Application of the brakes should slow down both wheels at the same time and also tend to reduce the speed of the engine. If one wheel stops and the other one continues to revolve, when brakes are applied, loosen the adjustment on the wheel that stops just enough so that both wheels stop simultaneously when the brakes are applied.

When correct adjustment has been made, tighten jam nut "A."

Minor Engine Service Operations

Cylinder Head Gasket

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

After replacing the cylinder head, it is necessary to insure against leaks by retightening the stud nuts after the engine has been run and water jacket has become thoroughly heated. To tighten nuts properly, the valve rocker shaft assembly must be raised.

Caution! Be sure to adjust the valve tappet clearance after the last tightening of cylinder head stud nuts; *see "Valve Clearance Adjustment" on page 51.*

Crankshaft Bearings, Pistons, and Rings

We cannot impress too strongly the necessity of having your International Harvester dealer's serviceman do the work on replacement of connecting-rod bearings, crankshaft bearings, pistons and rings, and grinding the valves.

Clutch

The engine is equipped with a spring-loaded, 11-inch diameter, single-plate dry disk clutch.

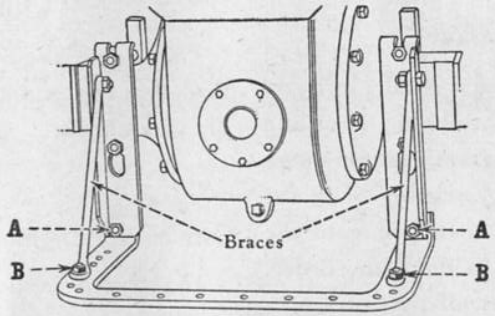
Care of the Engine Clutch

The clutch is designed so that it requires a minimum of attention. It is important, however, that the clutch release bearing be kept properly lubricated. This can easily be done by following the instructions *given in Lubrication Chart.*

Clutch Clearance

It is very important that a clearance of $\frac{3}{16}$ inch be maintained between the clutch release bearing and the clutch release levers. In order to maintain this clearance, the clutch pedal should have a free movement of $1\frac{1}{8}$ inches from the stop on transmission cover when the clutch is fully engaged. As the clutch wears, this free movement decreases and adjustment should be made before free movement has become less than $\frac{7}{8}$ inch. Clutch may be badly damaged unless a free movement of foot pedal is maintained. The clutch can easily be reset to the original position by adjusting the length of rod "B," *Illust. 36,* between clutch pedal and release shaft.

Adjusting the Drawbar



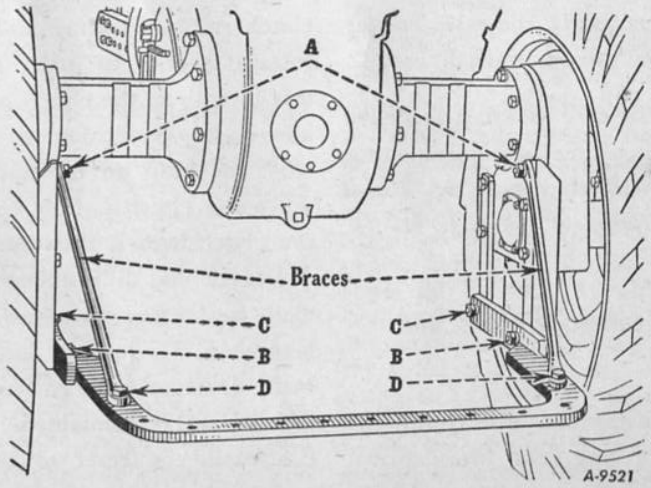
Illust. 37—Drawbar Adjustment on Farmall-M.

Adjustment of Farmall-M Drawbar

To raise or lower drawbar, loosen bolts "A," remove bolts "B," and put braces in desired position. Replace bolts "B" and tighten bolts "A" and "B."

Adjustment of Farmall-MV Drawbar

To raise or lower drawbar, loosen bolts "A" and "B," remove bolts "C" and "D," and put braces in desired position. Replace bolts "C" and "D," and tighten all bolts securely.



Illust. 38—Drawbar Adjustment on Farmall-MV.

Wheels

Front Wheels

Farmall-M tractors are equipped with either pneumatic tires or steel front wheels with skid rings. The wheels revolve on two tapered roller bearings. These wheels are equipped with felt and leather seals. A dirt deflector is also provided on the axle to prevent dirt from entering at the inner bearing.

Farmall-MV tractors are equipped with pneumatic tires. The rims can be set on the wheels to give treads of 60, 63 and 66 inches, *page 60.* The bearing design is the same as on the M.

To adjust and grease the front wheels refer to *page 29.*

Rear Wheels

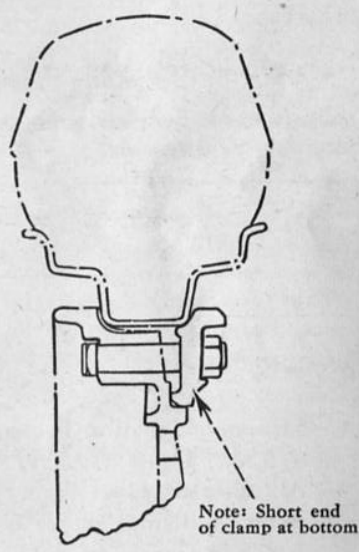
Farmall-M tractors are equipped with either pneumatic tires or steel rear wheels with spade lugs. The rear wheel tread can be varied from 52 to 88 inches by moving the wheels in or out on the axles and by reversing wheels on the axle.

Farmall-MV tractors are equipped with canefield type pneumatic tires. The wheels are not adjustable on the rear axle; however, if your Farmall-MV tractor is equipped with rear wheel rims with attached clamps, the rims can be reversed on the wheels to give rear wheel treads of 60, 65¾ and 72 inches, *page 59.*

Rear wheels having rims with loose clamps have a fixed tread of 69 inches and are not reversible.

Note: When reversing pneumatic tired rear wheels make sure that the tires will rotate in the direction as shown by the arrow on the side of the tires. It may sometimes be necessary to change them from one side of the tractor to the other.

Assembling Rim Clamp



Illust. 39—Method of Assembling Front Wheel Rim Clamps.

When assembling the front wheel rim, be sure to assemble the clamp in the correct position *as shown in Illust. 39.* Tighten clamp bolts securely and equally to prevent misalignment of rim on wheel.

Pneumatic Tires

Follow the instructions and recommendations shown below 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 chart below. Underinflation will damage the tire cord body and may cause 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.

Tires can be inflated with a pressure pump, hand pump, or a spark plug pump. Spark plug pumps, *page 82,* can be purchased from International Harvester dealers.

Always see that tire valve caps are in place and 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 and air chamber in the tires.

Operating Pressure for Low-Pressure Tractor Tires

Caution! Adjust air pressure in tires as indicated below immediately upon receiving your tractor.

FRONT AND REAR TIRES	Lbs. Per Sq. In.	KG CM^2
Front (All Sizes)		
A—4-Ply Tires	28	1.97
B—6-Ply Tires	36	2.53
Rear		
C—Minimum Inflation Pressure, 4 and 6-Ply Tires		
4, 5, 6, 7 Duals	20	1.40
All other sizes	12	.84
D—When plowing, increase pressure in tire on furrow wheel by	4	.28
E—When special heavy wheels are used, or heavy implements such as corn pickers, bedders, etc., are carried on the tractor, inflation pressure must be increased. See tire and rim association schedule or contact the tractor dealer or manufacturer.		
F—Maximum Inflation Pressure, 4-Ply Tires		
*—4, 5, 6, 7 Duals	24	1.68
All other sizes	16	1.12
G—Maximum Inflation Pressure, 6-Ply Tires		
All sizes	24	1.68
*—Made only in 4 plies.		

Shipping Tractors Equipped with Pneumatic Tires

When tractors are transported on a carrier, such as railroad cars or trailers, inflation pressures should be as follows to make possible rigid blocking and to prevent bouncing:

All 4-ply front tires.....30 lbs.

All 6-ply front tires.....36 lbs.

All rear tires.....30 lbs.

Important: Deflate the tires to correct operating pressure before the tractor is transported under its own power, towed, put into service, or placed in storage for any length of time; otherwise, the rubber will check or crack.

Maximum speed for highway use should not exceed 20 m.p.h. For farming operations a maximum speed of 10 m.p.h. is recommended.

When towing tractors, do not exceed a speed of 20 m.p.h.

Mounting Tires on the Rim

After mounting a new or old tire on the rim, inflate it to 30 lb. 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 correct operating pressure.

Traction and Weights

The recommended air pressures *are shown on page 56.* The tractor should not be operated with 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 the addition of weight to the driving wheels, either by adding cast iron weights to the wheels, or by the use of liquid in the tire tube.

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.

Overloading

Do not load these tires beyond their rated capacity. In adding weights, consideration must be given so as not to exceed the load capacity of the tire.

After adding weight to the rear wheel it may be necessary to readjust the height of drawbar to get the correct alignment.

Liquid Weight

Tractor tire tubes can be filled ¾-full with liquid, using clean water for temperatures above freezing (32°F.). A calcium chloride solution ($CaCl_2$) is recommended when operating in freezing temperatures.

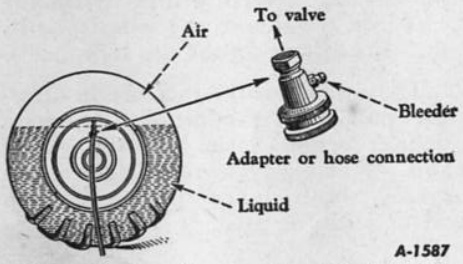
Methods of Putting Liquid into Tube

Purchase an adapter, *Illust. 40,* from an International Harvester dealer. The adapter is equipped with a bleeder for letting out the air displaced by the liquid.

Jack up the tractor and revolve the tire so that valve stem is on top. Remove valve core housing, and screw on the adapter, then attach water hose to adapter.

The liquid can be put into the tube from a tank placed at least five feet higher than the tire, by using a hand force pump or by using compressed air and a pressure tank filled with liquid.

Remove the hose and adapter; then replace valve core housing, and inflate tire to correct operating pressure.



Illust. 40—Tires Three-quarters Full of Liquid.

Liquid Weight for Freezing Temperatures

Calcium chloride solution, using a 25% mixture, which is approximately 20 lb. of flaked calcium chloride to 10 U.S. gallons of water, is recommended when freezing temperatures prevail.

The strength of the solution can be checked with a battery hydrometer. A 25% solution measures approximately 1.225 specific gravity and has a freezing point of 25° below zero.

Caution! Some calcium chloride flakes have an acid reaction. It is advisable to add one pound of lime to each 100 pounds of calcium chloride used.

When preparing calcium chloride solution, always pour the water into the container first; then add the correct amount of calcium chloride crystals, stirring the mixture thoroughly. Never pour the water on the calcium chloride flakes. After the solution is mixed, allow it to cool before using.

Valve Stem Mounting Cones

Valve stem mounting cones are furnished with all rear wheel tire tubes having valve stem for inserting liquids, and are mounted on the valve stem at the factory.

The purpose of the cone is to hold the valve stem in the valve hole when mounting tire, particularly when liquid is used in the tire. Without the cone when mounting the tire or inserting the liquid, the valve stem is very apt to be pulled into the rim and will entail much extra work in again getting it through the valve hole.

Care of Tires

Avoid stumps, stones, deep ruts and other hazards. Cuts in tires should be repaired immediately as neglect decreases the tire life.

Keep tires free from oil and grease as both destroy rubber.

After using the tractor for spraying—insect control work—wash off with water any chemicals that may be on the tires.

Tire Protection During Storage

When not in use, store the tractor so that the tires are protected from the light. Before storing tractor, clean the tires thoroughly. Jack up the tractor so that load is off tires when it is to be out of service for a long period. If it is not jacked up, inflate the tires at regular intervals. Before driving the tractor, inflate tires to correct operating pressures.

Tire Chains

For wet grass or ground conditions, use lug type chains. The flexing of the tire and creeping of chains will break the mud loose as wheel rotates.

There is a possibility of the tire slipping within the chain; to prevent this, the use of spring type chain fasteners is recommended.

Static Electricity in Tractors Equipped with Pneumatic Tires Doing Belt Work

Static electricity generated by belt work can be discharged harmlessly by attaching a chain to the tractor and letting it touch the ground.

Method of Adjusting Farmall-MV Rear Wheel Treads to 60, 65¾ and 72 Inches

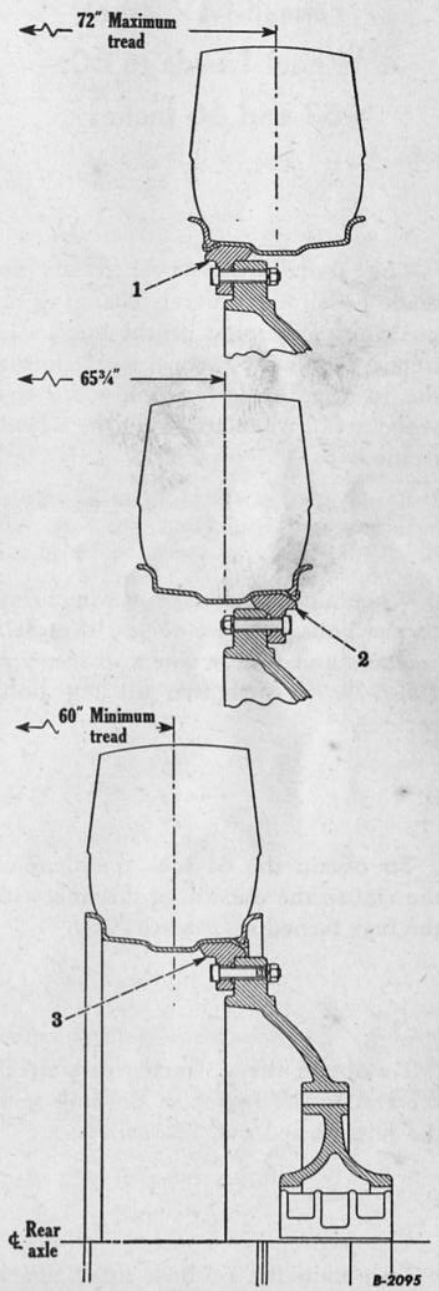
If your Farmall-MV is equipped with rear wheel rims having attached clamps, the rims can be fastened to the wheels as described below to obtain the desired tread.

When attaching the rear wheel rims to the hubs, be sure to use the lock washers and tighten all lug bolts securely.

To obtain the 72-inch tread, attach the rim to the inside of the hub with the lugs turned out, *position No. 1.*

To obtain the 65¾-inch tread, attach the rim to the outside of the hub with the lugs turned in, *position No. 2.*

To obtain the 60-inch tread, attach the rim to the inside of the hub with the lugs turned in, *position No. 3.*



Illust. 41—Method of Adjusting Rear Wheel Treads to 60, 65¾ and 72 inches on Farmall-MV.

Method of Adjusting Farmall-MV Front Wheel Treads to 60, 63 and 66 Inches

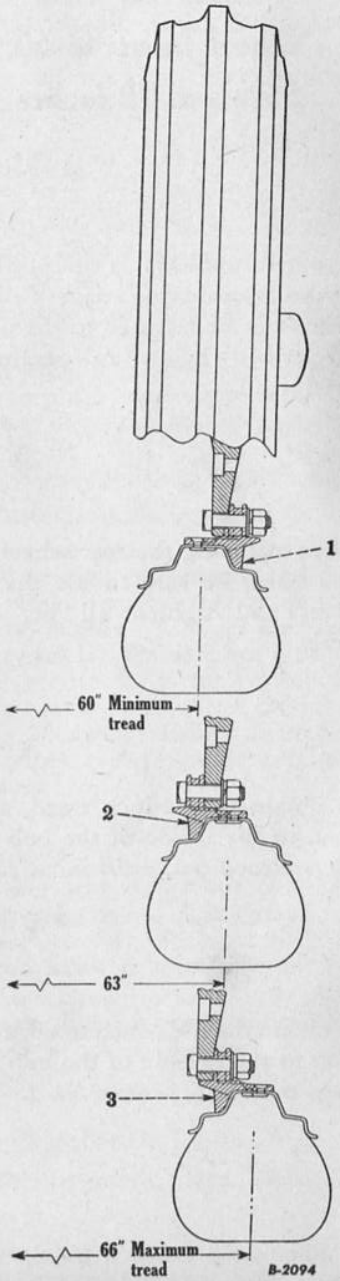
The above front-wheel treads are made possible by merely changing the position of the rims on the hubs. To obtain the desired wheel tread, follow the instructions given below for that wheel tread when attaching the wheels to the hubs.

When attaching the front wheel rims to the hubs, be sure to use the plain washers and lock washers *as shown in Illust. 42,* and tighten all lug bolts securely.

To obtain the 60-inch tread, attach the rim to the outside of the hub with the lugs turned in, *position No. 1.*

To obtain the 63-inch tread, attach the rim to the inside of the hub with the lugs turned out, *position No. 2.*

To obtain the 66-inch tread, attach the rim to the outside of the hub with the lugs turned out, *position No. 3.*



Illust. 42—Method of Adjusting Front Wheel Treads to 60, 63 and 66 inches on Farmall-MV.

Trouble Shooting

Hard to Start

Possible Cause	Possible Remedy
No gasoline in starting tank or carburetor	Fill with new gasoline, check fuel lines and carburetor.
Gasoline strainer or fuel lines clogged	Open fuel shut-off valve, check carburetor. Clean strainer, check fuel lines and carburetor fuel screen, *pages 40 and 41.*
Distillate in starting fuel or carburetor	Drain carburetor and use gasoline for starting, *page 41.*
Impulse coupling inoperative	Lubricate with light oil or kerosene, *page 48.*
Water in gasoline	Drain fuel tank and carburetor. Use new fuel, and dry spark plugs or see your dealer's serviceman.
Water in cylinders	Check cylinder head gasket or look for clogged drain hole in exhaust manifold.
Choked improperly. Flooded engine	Follow starting instructions, *pages 16 and 19.*
Defective ignition or loose wiring	Check wiring, plugs and magneto, etc., *pages 47 to 51.*
Defective battery or starting motor	Check or replace, *page 100.*
Spark plugs dirty or improper gap	Clean, adjust gap to .028″ to .032″ or replace plugs, *page 47.*
Magneto grounded	Pull out on ignition switch.
Engine speed control not advanced	Advance lever 1/3 for starting.
Lack of compression	Check cylinder head gasket, see your dealer's serviceman.
Flywheel ring gear teeth broken	See your dealer's serviceman.
Too-heavy-grade lubricating oil	Drain and fill as per "Lubrication Charts."
Gears engaged	Put gearshift in neutral.
Internal seizure	See your dealer's serviceman.

Engine Operates Irregular or Knocks

Possible Cause	Possible Remedy
Engine incorrectly timed	Retime. See "Magneto," *page 50.*
Spark plugs dirty, wrong gap or kind	Clean, reset gap or replace, *page 47.*
Poor or weak spark	Check distributor points and gap, spark plugs, ignition switch and wiring.
Carburetor setting incorrect	Reset, *page 41.*
Operating cold engine on distillate	Warm up engine before using distillate.
Poor grade fuel or water in fuel	Drain and use correct grade of clean fuel, see your dealer's serviceman.
Engine overheating	Check cooling system, fan belt and radiator shutter if used, *page 43.*
Excessive carbon in engine	See your dealer's serviceman.
Loose piston pin or bearings	See your dealer's serviceman.
Broken rings or loose pistons	See your dealer's serviceman.
Worn connecting rod and main bearings	See your dealer's serviceman.
Engine valves at fault	Check valve clearance, *page 51,* see your dealer's serviceman.
Governor sticking or needs adjustment	See your dealer's serviceman.
Air leaks around intake manifold	Check gasket and tighten nuts.
Engine smokes	Check air cleaner oil level. Check fuel delivery at carburetor. Check for worn pistons and rings. See your dealer's serviceman.

Lack of Power

Engine speed lever not advanced	Advance speed control lever.
Engine cold or overheated	Check fuel and cooling system, etc., open or close radiator shutter.
Engine overloaded	Reduce load.
Engine knocks excessively	Use good fuel, also check timing or see your dealer's serviceman.

Possible Cause	Possible Remedy
Governor not working properly	See your dealer's serviceman.
Poor compression	Check valves or rings, see your dealer's serviceman.
Poor fuel or too lean a mixture	See carburetor instructions, *page 41.*
Fuel pipes or strainer obstructed	Clean.
Fuel tank air vent closed	Open vent in cap.
Exhaust pipe clogged	Clean out.
Air cleaner clogged or air leakage between carburetor and engine	Clean air cleaner, *page 46.* Tighten carburetor and intake manifold mounting stud nuts.
Too heavy oil in crankcase or air cleaner	See "Lubrication Charts" for oil to use.
Incorrect timing or faulty ignition	See "Magneto," *page 50.*
Clutch slipping or oil on facings	Adjust pedal free travel, *page 53,* replace facings or see your dealer's serviceman.
Brakes drag	Adjust brakes, *page 52.*
Carburetor, intake manifold or cylinder head intake ports restricted by carbon	Clean or see your dealer's serviceman.

Engine Overheats

Cooling system clogged or limed	Clean system, *page 44,* or see your dealer's serviceman.
Water pump leaks	Tighten packing nut or repack, *page 45.*
Thermostat left out or not functioning	Install new thermostat of correct range.
Radiator cap not pressure-tight	Screw on tight or replace with new cap.
Temperature gauge defective	Replace gauge or see your dealer's serviceman.
Fan belt slipping	Tighten belt or replace, *page 45.*
Insufficient water in cooling system	Add coolant.
Radiator cores clogged	Clean thoroughly.
Radiator shutter closed (if used)	Open shutter.

Possible Cause	Possible Remedy
Wrong kind of fuel	Change to proper fuel.
Carburetor improperly set	Refer "Carburetor," *page 41.*
Excess carbon in cylinders	See your dealer's serviceman.
Timing incorrect	Check "Magneto," *page 50.*
Breaker point gap incorrect	Adjust gap per "Magneto" instructions, *page 48.*
Excess load	Reduce load.

No Oil Pressure, Too High or Too Low

Defective oil gauge	Replace or see your dealer's serviceman.
Defective or dirty oil pressure regulating valve	See your dealer's serviceman.
Wrong grade, diluted or insufficient oil	Refer to "Lubrication Chart." If diluted, replace with fresh oil, refer to operating instructions.
Broken, loose or plugged oil lines	Clean and tighten or see your dealer's serviceman.
Low oil level in crankcase	Add oil, refer to "Lubrication Chart." Check for oil leak.
Oil pump strainer clogged or pump not working	See your dealer's serviceman.
Worn bearings	See your dealer's serviceman.

Oil Dilution or Uses Too Much Oil

Incorrect grade of oil	Refer to "Lubrication Chart."
Leaks in oil lines or filter, or oil pan plug or gasket	Check and tighten or see your dealer's serviceman.
Worn piston oil rings or cylinders	See your dealer's serviceman.
Loose connecting rod bearings	See your dealer's serviceman.
Long engine idling	Stop engine.
Engine overheating or too cold	Refer to "Lack of Power and Engine Overheats," *pages 62 and 63.*

Possible Cause	Possible Remedy
Engine speed too high	See your dealer's serviceman.
Crankcase breather clogged	Clean pipe and screen.

Using Too Much Fuel

Fuel mixture too rich. Carburetor out of adjustment	Adjust carburetor, *page 41.*
Fuel leaks	Tighten or replace fuel lines and gaskets.
Poor grade of fuel	Use better fuel, see your dealer's serviceman.
Choke closed	Investigate for choke not operating.
Engine overloaded	Reduce load or shift to lower speed.
Poor compression	See your dealer's serviceman.
Faulty ignition	Refer to "Magneto," *page 50.*
Engine not operating at proper temperature	Adjust radiator shutter and check cooling system. Check thermostat.
Air cleaner clogged	Service air cleaner, *page 46.*
Incorrect grade or amount of lubricating oil	Use good grade and keep up to proper level.

No Fuel at Carburetor

Fuel low in main tank	Fill fuel tank.
Air vent hole in fuel tank cap plugged up	Clean out hole.
Fuel valve closed or partly open	Open valve, refer "Starting Instructions," *page 19.*
Dirty or clogged fuel strainer screen or lines	Clean, *page 41.*

Ignition and Electrical

Wrong kind, old, cracked, dirty or poorly set spark plugs	Clean, set gap to .028″ to .032″ or replace, *page 47.*
Loose wiring or improper connections	Check wiring, *page 47*, see that all connections are clean and tight.
Magneto not timed correctly	Retime. Refer to "Magneto," *page 50.*
Distributor cap or rotor or breaker chamber dirty	Clean, *page 50.*

Possible Cause	Possible Remedy
Distributor brush broken	Replace.
Breaker points dirty, pitted or improperly set	Clean and reset gap or replace with new. See "Magneto," *page 48.*
Breaker arm stuck, weak or broken spring	Check and replace, *page 48.*
Impulse coupling dirty	Clean and lubricate, *page 48.*
Battery defective, low charge or loose connections	Recharge, clean and tighten cable lugs or replace with new, check ground cable.
Starting motor failure	Replace or see your dealer's serviceman.
Generator inoperative	Clean commutator, *page 104,* check brushes, or see your dealer's serviceman.
Generator relay	See your dealer's serviceman.
Ammeter inoperative	Replace ammeter or see your dealer's serviceman.
Ammeter excessive charge	Adjust charging rate, *page 105.*
Ammeter shows discharge	Check battery and generator, check drive belts and wiring.
Lights will not burn	Turn on switch, replace bulbs, replace fuse, recharge battery, check wiring and generator or see your dealer's serviceman.
Lights burn dim	Turn switch to bright. Recharge battery, tighten cable terminals, check bulbs, adjust generator charging rate, clean contacts.

Brakes

Do not hold	Adjust brakes, *page 52.* New lining needed.
Drag or uneven	Adjust brakes, *page 52.*
Grease on lining	Replace lining, *page 52.*
Return spring broken	Install new.
Do not release	Release brake lock.
Drum out of round	See your dealer's serviceman.

Transmission

Possible Cause	Possible Remedy
Hard to shift gears	Use correct grade of lubricant.
Shifter fork or lever defective	Replace or see your dealer's serviceman.
Engine clutch drags	Refer under "Lack of Power."
Gears clashing	Stop tractor and disengage clutch before shifting gears.
Gears slipping out of mesh	See your dealer's serviceman.
Noisy	Check oil level, use proper grade lubricant or see your dealer's serviceman.
Damaged parts	See your dealer's serviceman.

Rear Wheels

Do not turn	Release brake lock. Transmission or differential or clutch faulty. Refer to "Transmission Section" or see your dealer's serviceman.

Front Wheels

Too tight or too loose	Check lubricant in bearings, check bearing adjustment, *page 29.*
Lubricant leakage	Check oil seal or see your dealer's serviceman.

Steering

Faulty	Check steering worm and sector. Check lubricant in front wheel. Check tire inflation or see your dealer's serviceman.
Defective front axle	Inspect linkage, check and replace faulty parts or see your dealer's serviceman.
Tractor turns to one side	Check and adjust brakes evenly, *page 52.* Check pneumatic tire air pressures, *page 56.*

Pneumatic Tires

Excessive or uneven wear	Check air pressure and check load on tires.
Slippage, rear tire	Add more weight.

Hydraulic Lift-All

Refer to the hydraulic lift-all, *pages 77 and 78,* or see your dealer's serviceman.

STORING AND HOUSING YOUR TRACTOR

When your tractor is not to be used for a period of time, store it in a dry and protected place. To leave equipment outdoors, exposed to the elements, will result in materially shortening 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 caution in starting an engine that has been in storage. (*See instructions on next page.*)

1. Wash or clean and completely lubricate the tractor (*refer to "Lubrication Chart."*).

2. Drain and flush the cooling system. Be sure all drains are open.

3. Oil magneto impulse coupling liberally with very light oil such as cream separator or sewing machine oil.

4. After the engine has cooled off, remove the spark plugs and pour one tablespoonful of SAE-50 lubricating oil of a good grade into each cylinder. Crank the engine two or three times to distribute the oil over the cylinder walls. Then replace spark plugs.

5. 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.) Replace the valve housing cover.

6. Plug up the ends of breather pipe and exhaust pipe.

7. Remove the oil filter element. (If any evidence of rust is found on the center stud, clean thoroughly.) Replace the old filter element with a new one and drain out any sludge from filter base.

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

Caution: Gum will eventually form in tanks, lines and carburetor, if 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.

9. If tractor is equipped with a storage battery, remove the battery and place it on a rack in a cool room. Check the electrolyte level and specific gravity of the battery at least once a month.

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 (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 spark plug holes. This operation will loosen any tight piston rings and wash old gummy oil from valves and pistons.

4. Flush out the impulse coupling with kerosene, and lubricate as specified. (*See "Lubrication Chart."*)

5. Drain the crankcase and flush it out with kerosene or flushing oil and fill with specified lubricating oil. (*See "Lubrication Chart."*)

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

7. Remove the crankcase breather pipe plug, and exhaust pipe plug.

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

9. Fill the water cooling system.

10. Fill the fuel tanks.

11. Install fully charged battery (if used) and be sure the proper connections are made.

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

13. Start the engine and let it operate slowly; observe if any valves are sticking. If so, pour small quantity of kerosene on valve stem until loose.

14. Assemble the valve housing cover.

Caution! Do not accelerate the engine rapidly or operate at high speed immediately after starting.

SPECIAL ATTACHMENTS FOR FARMALLS M AND MV

The following pages contain information on various attachments available for use with your tractor. You are urged to read and study this information on the care and operation of these attachments in order to be assured of satisfactory service. Special attachments must not be ordered from this manual. Consult your International Harvester dealer, giving the model of your tractor also the tractor and engine serial numbers.

TYPE OF ATTACHMENT	Attachment Number	Page No.
Air-Pipe Extension	62973 D	79
Belt Pulley	49265 DB	72, 73
Cultivator Shifter Lever	49194 DA	79
Electric Starting and Lighting Attachments		98 to 111
DELCO-REMY		
Electric Lighting	52038 DB	107
Starting and Lighting	54438 DB	108
Starting Only	54439 DB	109
Rear Lighting	61889 DA	110
BOSCH "NO-BATTERY TYPE"		
Electric Lighting	61521 D	111
Rear Lighting	61889 DA	110
Exhaust Muffler	45804 DA	81
Exhaust-Pipe Extension	53556 D	81
Front Axle, Adjustable, Wide (With Adjustable Wheelbase) (Farmall-M)	57067 DC	86 to 91
Front Wheel, Single, Steel (For Farmall-M with Dual Front Wheels)	67879 D	94
Front Wheel, Single, Steel (For Farmall-M with 9.00–10-inch Single Pneumatic Tire)	67880 D	94
Front Wheel, Single, Steel (For Farmall-M with 6.50–16-inch Single Pneumatic Tire)	67878 D	94
Front Wheels, Two, Pneumatic (Farmall-M) (For 6.00–16-inch Tire)	48981 D	92
Front Wheel, Single, Pneumatic (Farmall-M) (For 9.00–10-inch Tire)	49199 DA	92
Front Wheel, Single, Pneumatic (Farmall-M) (For 7.50–16-inch Tire)	49197 DA	92
Front Wheel Weights, First (Farmall-M)	48600 D	84
Front Wheel Weights, First (Farmall-MV)	60197 D	84
Front Wheel Weights, Second (Farmall-M)	48602 D	84
Front Wheel Weights, Second (Farmall-MV)	60198 D	84
Fuel Tank with Fuel Trap	58190 DX	97

TYPE OF ATTACHMENT	Attachment Number	Page No.
Heat Indicator for Pressure-Type Radiator	67135 D	80
Hydraulic Lift-All Attachment	15075 ECX	75 to 78
Overtire Attachment (For Farmall-M with 4 x 2½ or 3-inch Spade Lugs)	53017 DA	97
Overtire Attachment (For Farmall-M with 5 x 3-inch Spade Lugs)	57947 D	97
Overtire Attachment (For Farmall-M with 6 x 3-inch Spade Lugs)	66275 D	97
Overtire and Rim (For Farmall-M with 4 x 2½-inch Spade Lugs)	57945 DA	96
Overtire and Rim (For Farmall-M with 5 x 3-inch Spade Lugs)	57951 D	96
Overtire and Rim (For Farmall-M with 6 x 3-inch Spade Lugs)	66276 D	96
Pistons—5,000 ft. Altitude (Distillate-Gasoline Engine)	55425 D	97
Pistons—5,000 ft. Altitude (High-Compression Engine)	57320 D	97
Pistons—8,000 ft. Altitude (High-Compression Engine)	55425 D	97
Pistons—8,000 ft. Altitude (Distillate-Gasoline Engine)	55427 D	97
Power Take-Off (Farmall-M)	66413 D	73 to 75
Power Take-Off (Farmall-MV)	68671 D	73 to 75
Pre-Cleaner (Collector-Type)	59096 D	80
Radiator Shutter	57572 DB	80
Rear Axle, 100-inch Tread (Farmall-M)	52148 DA	83
Rear Wheel Extension Tire (Farmall-M) (51 x 6 inches)	49236 DB	96
Rear Wheel Fender	51499 DA	86
Rear Wheel Weights—First	49329 D	85
Rear Wheel Weights—Second	49330 D	85
Rear Wheel Weights—Third	49331 D	85
Rear Steel Wheel (Farmall-M) (51 x 10 inches)	66074 DB	96
Rear Steel Wheel (Farmall-M) (51 x 2 inches)	66297 DB	96
Reverse Flow Fan (Farmall-M)	68241 D	97
Skid Rings, High (Farmall-M) (2½ inches)	53015 D	95
Spade Lugs—single (Farmall-M) (51 x 2-inch Wheels)	66330 D	95
Spade Lugs—double (Farmall-M) (51 x 2-inch Wheels)	66331 D	95
Spade Lugs (Farmall-M) (5 x 3-inch—56 Lugs)	57460 D	95
Spade Lugs (Farmall-M) (5 x 3-inch—28 Lugs)	58039 D	95
Spade Lugs (Farmall-M) (4 x 3-inch—28 Lugs)	66247 D	95
Spade Lugs (Farmall-M) (6 x 3-inch—56 Lugs)	66112 D	95
Spade Lugs (Farmall-M) (6 x 3-inch—28 Lugs)	66248 D	95
Spark Arrester	51579 D	82
Speed Attachment—Low-Low (Farmall-M)	60216 D	97
Speed Attachment—7 m.p.h. Fourth Speed Forward	62400 D	83
Swinging Drawbar (Farmall-M)	49204 DB	85
Tire Pumps—For Pneumatic Tires (Enginair)	39604 DA	82
Tire Pumps—For Pneumatic Tires (Schrader)	39622 D	82
Variable-Tread Front Wheel (Farmall-M)	52697 D	92, 93

Belt Pulley

This attachment supplies ready and economical power for operating numerous types of equipment.

Lubrication

To assure immediate lubrication of the new parts, remove the filler plug, pour a small quantity of approved transmission lubricant in the reservoir in belt pulley housing (approximately 1 pint, U. S.), after which proper level is maintained from oil in transmission case. Replace the filler plug, *Illust. 43.* It is necessary to put in this additional lubricant only at time of assembly. *Refer to page 38 for approved lubricant.*

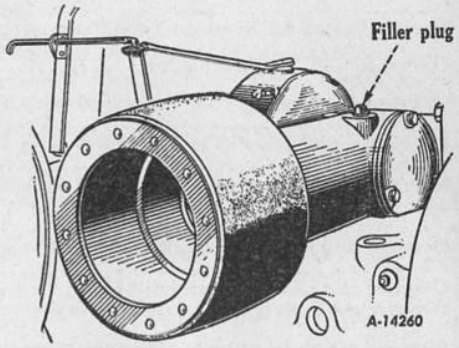
Note: When operating tractors on belt work with front of tractor higher than rear, it is important that the correct oil level be maintained in the transmission. Check and add oil when necessary.

Operating Belt Pulley

The gearshift lever must be in neutral position when operating the belt pulley.

Disengage the clutch and move the pulley control lever back until the gears are in mesh; then slowly engage the clutch. The belt pulley is started and stopped by the same clutch as the tractor; therefore, be sure to disengage the clutch before moving the pulley control lever.

Static electricity in tractors equipped with pneumatic tires doing belt work—

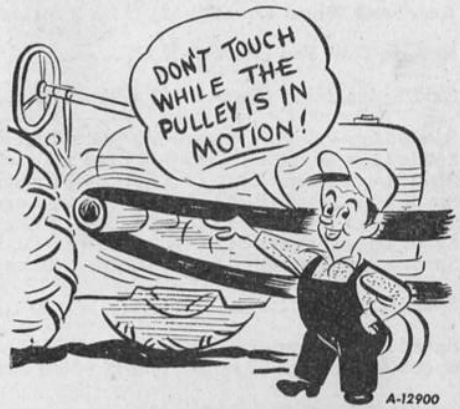


Illust. 43—Belt Pulley Assembled on Farmalls M and MV.

Static electricity generated by belt work can be discharged harmlessly by attaching a chain to the tractor and letting it touch the ground.

Belt and Pulley Speeds

Pulley speed is 899 r.p.m. Belt speed with the regular 11-inch diameter x 7½-inch face pulley is 2588 feet per minute. *See Pulleys on page 73.*



Don't put on or remove the belt from the belt pulley while the pulley is in motion.

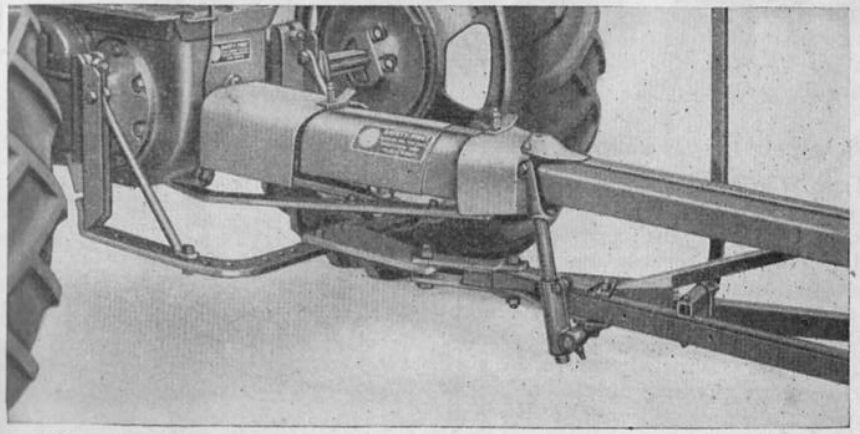
Belt Pulleys

The following belt pulleys are available on order:

Diameter (Inches)	Face Width (Inches)	Used On	Belt Speed —Feet Per Minute
		Farmalls M and MV	Farmalls M and MV
6½	8½	x	1529
7½	8½	x	1764
8½	8½	x	2000
9¾	7½	x	2294
*11	7½	x	2588
11	8½	x	2588
12	8½	x	2823
13	8½	x	3058
14	8½	x	3294
15	8½	x	3529

* *Regularly supplied with the attachment.*

Power Take-Off



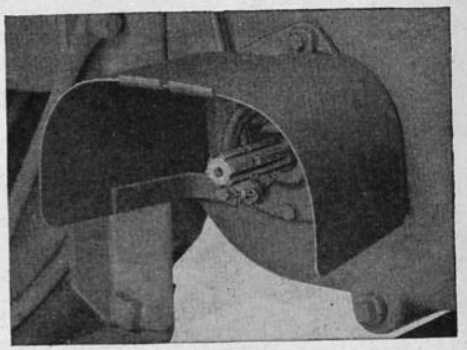
Illust. 44—Tractor hitch and power drive connections for the No. 52-R Harvester-Thresher attached to a Farmall-M with standardized power take-off.

The Farm Equipment Institute Advisory Committee of Engineers, in cooperation with the American Society of Agricultural Engineers, developed standard specifications for the power take-off, master safety shield, and drawbar hitch point to assure a safe and properly operating hitch. These standard specifications are known as the A.S.A.E. Standard Power Take-Off.

This standard was submitted to and has been adopted by practically all farm tractor and implement manufacturers. With tractors and pull-behind power-driven machines built to these standards or converted to them, it is possible to use any make and kind of power-driven machine with any make and model of tractor.

The power take-off for your tractor conforms to standard dimensions and will operate any implement built to these standards. Implements that do not conform to these standards may be adapted to your tractor by means of conversion packages. To secure conversion packages consult your local dealer handling your make of equipment.

Note: Farmall-MV tractors have standard power take-off shafts, but do not conform fully to A.S.A.E. standards due to their construction as high clearance tractors.



Illust. 45—Power Take-off Master Shield Assembled on Tractor.

To Operate Power Take-Off

Tractor in Motion. Press the clutch all the way in to disengage the engine clutch and pull the power take-off shifter rod all the way up. Shift the transmission to the speed desired; then slowly engage clutch. The power take-off is started and stopped by the same clutch as the tractor; therefore, be sure to disengage the engine clutch before moving the power take-off shifter rod.

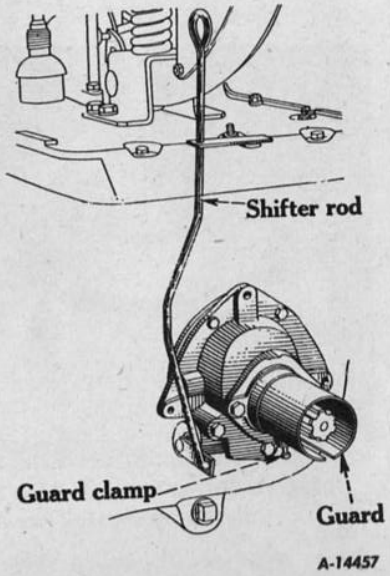
Tractor Standing Still. The gearshift lever must be in neutral position.

Disengage the engine clutch and pull the power take-off shifter rod all the way up; then slowly engage the engine clutch.

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

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

Caution! When the power take-off is not in use, assemble the guard, *Illust. 46,* to the power take-off housing by tightening the attached clamp.



Illust. 46—Guard Assembled to the Power Take-off Housing.

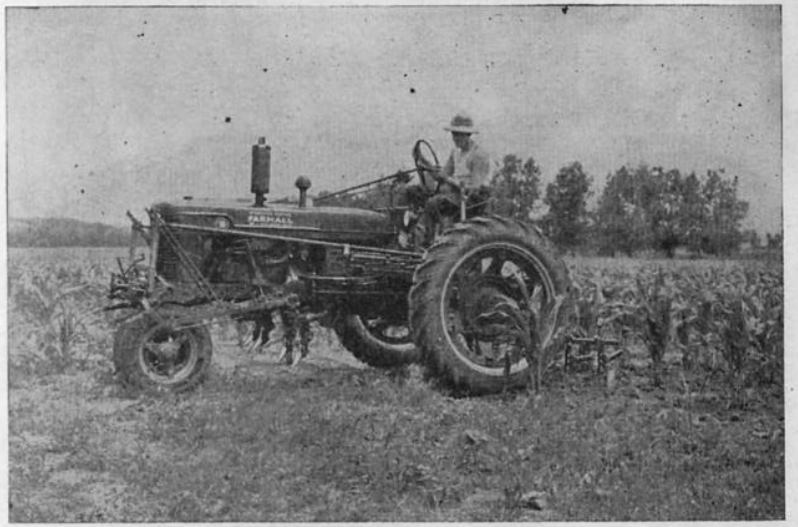
Dimensions

Power take-off shaft governed speed		537 r.p.m.
†Drawbar extension plate (top—above ground at hitch hole—normal) (with drawbar in next to lowest position)	M	16⅛"
†Height of shaft end above ground	M	26¾"
	MV	39⅛"
End of power take-off shaft ahead of drawbar hitch hole	M	14"*
	MV	16 7/16"

**When using drawbar extension plate.*

†*Based on* 11-38 *pneumatic tires—M*
10.00–36 *pneumatic tires—MV*

Hydraulic Lift-All



Illust. 47—Cultivating with Lift-All equipped for delayed action—the rear section stays down to finish the row. On entering a field the rear shovels are held up until they reach the point where the front shovels took to the ground.

LIFT-ALL saves time and backache by using the power of the engine to raise and lower plows, middlebusters, planters, cultivators and other direct-connected implements. Lift-All can be supplied in three ways: regular lift for raising the entire machine in one operation; delayed lift which controls the rear section independently of the front, *Illust. 47;* and selective lift which raises either side independently when working in "point" rows.

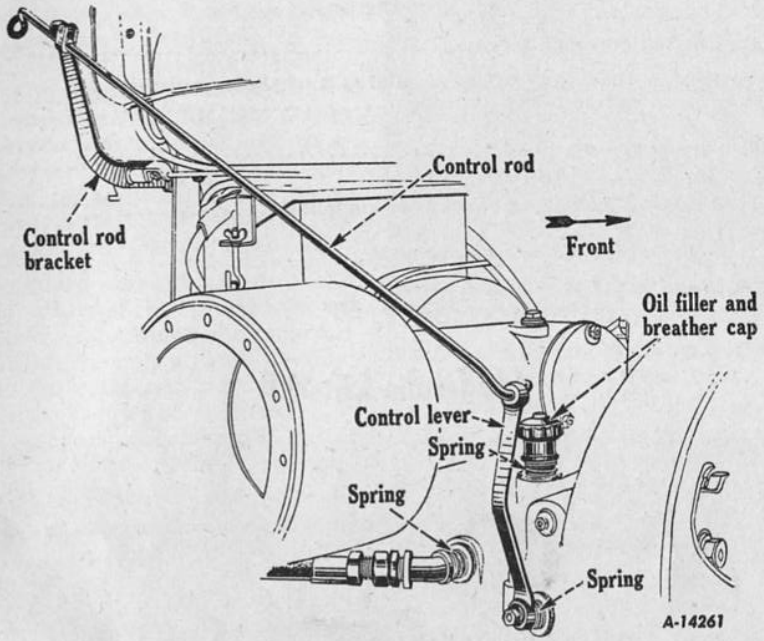
The following power cylinders and delayed lift valve are available on order for use with the hydraulic lift-all attachment.

1¾ x 8-inch cylinder.

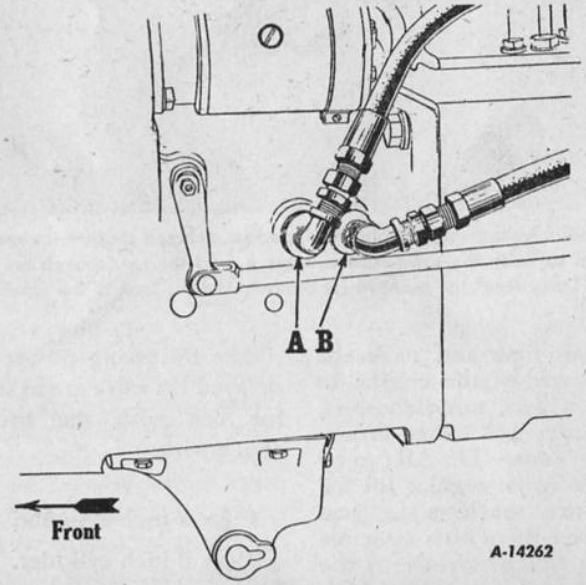
2¼ x 8-inch cylinder.

3 x 8-inch cylinder.

Delayed lift valve.



Illust. 48—Control Rod, Bracket and Oil Filler Cap.



Illust. 49—Left Side of Tractor Showing Front and Rear Outlets.

Care and Operation of Lift-All

The lift-all has the following features: By means of the lift-all an entire implement can be raised or lowered, or the front section raised or lowered first and the rear section later, automatically, with perfect timing.

It will lift or drop either the right or left sections of an implement independently of the other, as in the case of cultivators, two-way plows, etc. It will lift the implement partially, or all the way up, as desired by the operator.

There are three pressure outlet holes on the lift-all, two on the left side and one on the right. Pipes with elbows welded on are screwed into the pressure outlet holes through holes in the clutch housing. Plug the elbows to keep dust out and oil in when the cylinder hoses are not connected.

The front outlet "A," *Illust. 49,* on the left side and the one on the right side are to be connected to the cylinders for lifting all implements when the third, or delayed lift cylinder, is not used.

In cases where the third cylinder, or the delayed lift cylinder, is used for automatically lifting the rear of an implement after the front section has been raised, connect the front outlets to the cylinders lifting the front section of the implement, and connect the rear outlet "B," *Illust. 49,* on left side of the tractor to the cylinder which raises the rear section.

When connecting the hose to cylinders, always use two wrenches; one wrench to keep hose from twisting and the other wrench to tighten the union. Bending the hose will not hurt it, but twisting is very hard on it.

Lubrication

Check the oil to see that it is up to the "full" mark on the bayonet gauge (located inside of the filler cap), *Illust. 48.*

At least once a month when using the lift-all, remove plug from top of filler cap, insert wire and remove packing. Clean in kerosene and repack in filler cap. This packing, when clean, allows the lift-all to breathe and prevents dust from getting in. Do not carry oil in the lift-all above the full mark on the oil gauge. If reservoir is too full, oil will be forced out of the oil filler cap. Add only a very small amount of oil if the lift-all does not come all the way up and if the gauge does not register to the full mark.

The oil reservoir should be drained and filled with new oil once a season. About six (6) quarts are required. *Do not use oil drained from the engine crankcase for the lift-all. This oil may look all right, but it contains impurities that are injurious to the hose.*

Fill the lift-all to the full mark on the bayonet gauge with a good grade of clean engine oil, the same grade of oil as used in the engine of your tractor. It should be filled when the implements are in down position. *Never fill when implements are raised.*

Sand, dirt and grit of any kind is the worst enemy of the lift-all, and every care should be used in filling the oil reservoir and disconnecting and connecting hose to prevent dirt from getting into the hose or fittings. When the lift-all is not in use, keep the outlets plugged and the cylinder hose capped.

To raise the implement all the way up, lift the control rod, *Illust 48,* to top of slot in bracket and pull it all the way back toward the operator, hold for an instant, then let go. When the lift is completed, the rod will snap forward until the lug on the bottom comes to rest against the bracket.

To partially raise the implement when it is desirable to ease the load, as when hitching up implements, or in cultivating through wet places, lift control rod and pull toward operator slowly, just enough to secure the desired lift.

To lower implement, lift control rod and push forward.

If separate cylinder is used for lifting the rear section of any implement, push the rod forward enough to lower the front section and push it forward further to lower the rear section.

Note: Instructions for connecting the various implements are furnished with the individual implement.

Care and Operation of Lift-All Cylinders

When setting up a new implement that is built to operate with the lift-all, or when installing the lift-all on a tractor previously purchased, all that is necessary to put the cylinders into service is to connect them to the implement and to the pump unit, according to the directions furnished with the implement, using the high pressure hose and fittings furnished.

The cylinders are single acting. The oil pressure, acting on one side of the piston, pushes the piston rod out. The weight of the implement and the pressure springs, when used, pushes the piston rod in.

When doing drawbar work, belt work, or any work not requiring the cylinders, the cylinders and hose may be left on or removed from the tractor and hung up or laid in a clean, dry place, and the end of the hose capped with the cap furnished with the cylinders.

When the cylinders and hose are removed, the outlet elbows in the pump unit should be tightly plugged with the pipe plugs furnished with the lift-all to prevent losing the oil, and also to prevent dirt getting into the pump unit.

Beware of sand or grit in the lift-all. When disconnecting or connecting the hose, every care should be taken to prevent the end of the hose or any of the connecting parts from coming in contact with the ground or any object where dirt or sand is present. The oily surfaces will readily pick up any sand or grit which they contact. Sand or grit will destroy the working parts of the pump very rapidly.

Cultivator Shifter Lever

This attachment is for use with Farmall shifting gang cultivators. It enables the operator to shift the gangs sidewise quickly, in checkrowed crops, by merely turning the steering wheel to the right or left.

Lubrication

Lubricate the auxiliary lever daily, or after every ten hours of operation. Use pressure-gun grease (chassis lubricant) and apply two or three strokes with the hand lubricator, or sufficient grease to flush out the old grease and dirt.



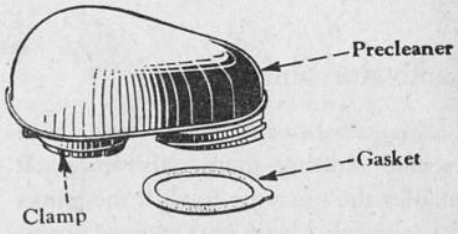
Illust. 50—Uneven rows do not fatigue the Farmall operator who has a shifting gang cultivator.

Air-Pipe Extension

The regular air intake pipe is located high enough above the ground for most operating conditions. But when heavy dust clouds continually envelop the breather pipe, it is best to add an air pipe extension. It gets the air screen above the dust, providing a fresher and cleaner supply of air for the engine, which means longer tractor life and better performance.

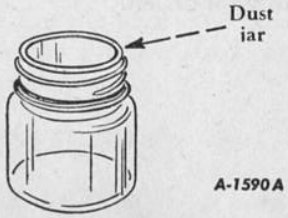
Collector Precleaner

The collector precleaner is recommended as added protection when working under excessively dusty conditions.



To Clean

Remove and clean out the dust jar frequently, at least before the jar becomes ¾ full. Remove the precleaner and inspect the fins regularly. When the fins become dirty or oily, wash the entire precleaner in kerosene. Replace the gasket and tighten the jar securely.



Illust. 51—Collector Precleaner Disassembled for Cleaning.

Heat Indicator

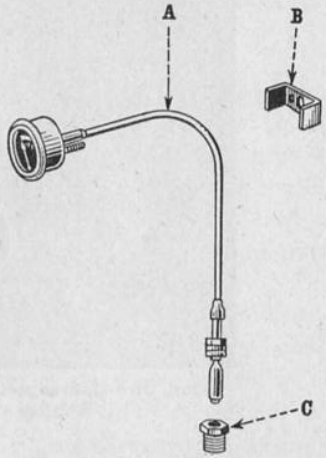
Be sure to use the correct heat indicator that is specified for the type of radiator with which your tractor may be equipped.

The pressure-type radiator can easily be identified by the radiator cap, which has a built-in regulating valve.

A—Heat indicator cable

B—Clamp

C—Adapter



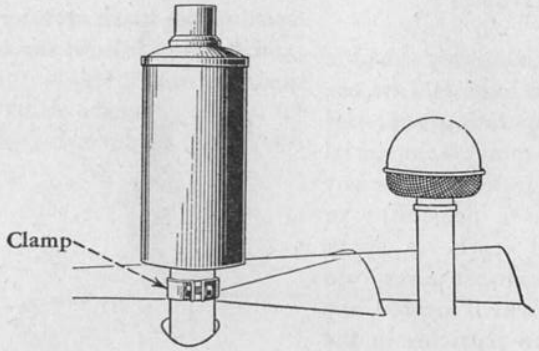
Illust. 52—Heat Indicator.

Radiator Shutter

A radiator shutter is highly advantageous for cold weather operation.

Note: This attachment consists of radiator shutter and controls. When this attachment is installed, the proper heat indicator must also be installed unless your tractor is already so equipped. *Heat Indicator Attachment is shown above.*

Exhaust Muffler

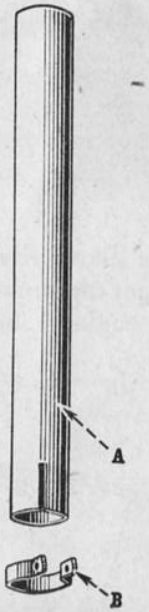


Illust. 53—Exhaust Muffler Assembled.

The laws of most cities prohibit the use of a tractor without an exhaust muffler in residential districts or near schools and hospitals because the roar of an open exhaust is disturbing and objectionable.

Exhaust Pipe Extension

The purpose of this attachment is to direct the exhaust fumes above the operator's head. It consists of a 30-inch steel tube "A," which is attached by slipping the slotted end over the regular exhaust pipe and fastening with clamp "B."

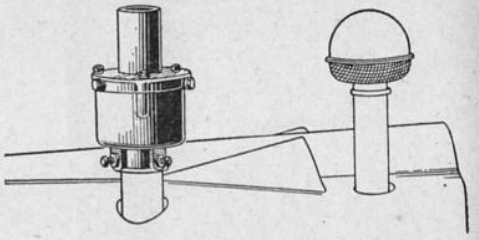


Illust. 54—Exhaust Pipe Extension.

Spark Arrester

The spark arrester is mighty valuable insurance against fire hazards. Its use is advisable when operating near dry underbrush and flammable material in forests, oil fields, grain fields, or any place where there is a possibility of fire from an exhaust spark. A spark arrester throws the exhaust gases into a cyclonic motion which causes any sparks or hot carbon particles in the exhaust to be smothered.

Remove and clean once a month by turning the spark arrester upside down and shaking it until the loose particles are removed.



Illust. 55—Spark Arrester Assembled.

Pneumatic Tire Pumps

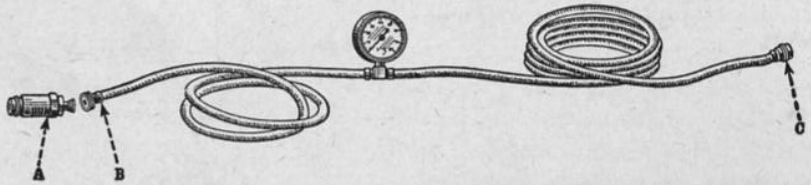
Enginair 18MM

Schrader 18MM

The tire pumps listed above are useful where air service is not easily obtained. They may be used for inflating tractor, truck, or automobile tires.

Note: The above tire pumps may be used with any carbureted-type engine (not Diesel engines) having 18mm. spark plug thread size. The tire pumps are also available for other spark plug thread sizes. Specify the size of spark plug thread when ordering other sizes.

To Use—Remove one of the spark plugs from the tractor engine, or any carbureted engine having the same spark plug thread size, and replace with the pumping element "A." Attach one end of the pump hose "B" to the pumping element and the other end "C" to the valve stem of the tire to be inflated. Start the engine and operate it at slow speed for maximum efficiency.



Illust. 56—Enginair Tire Pump with 16 ft. Hose and Air Gauge.

100-Inch Tread Rear Axle

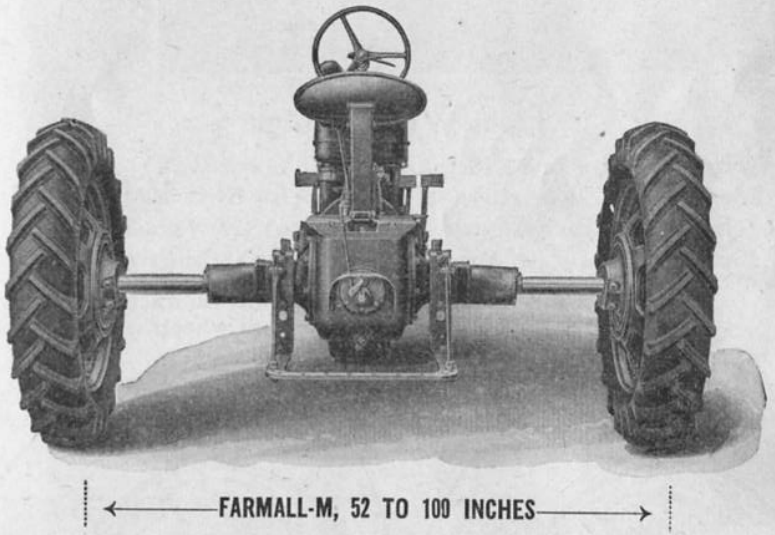
The wide-tread rear axle attachment is used on the Farmall-M only. This attachment consists of a set of two longer rear axles which, when applied on the tractor, increases the tread of the rear wheels from a maximum of 88 inches (regular) to a maximum of 100 inches.

To Increase Rear Wheel Tread

Raise the rear of the tractor so that one of the rear wheels is off the ground.

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

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



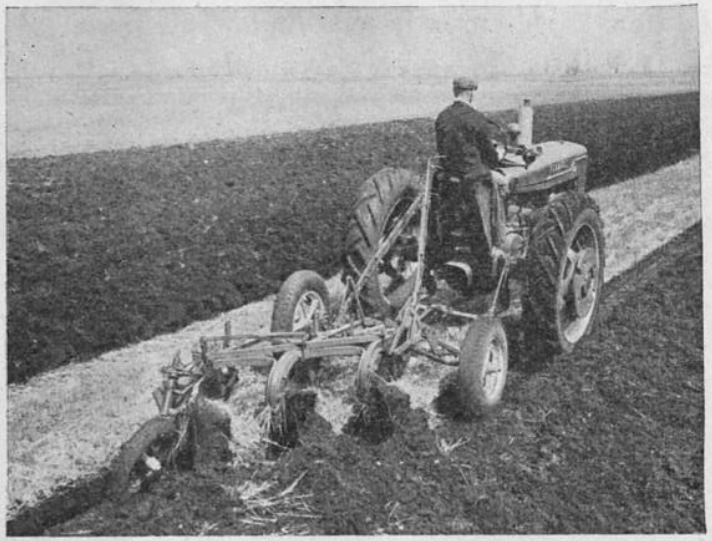
Illust. 57—Tractor with Wide-Tread Rear Axle.

7 M. P. H. 4th Speed Forward

This attachment is only for tractors equipped with pneumatic tires. It consists of a special 3rd and 4th speed driving gear and a special 4th and 5th speed sliding gear which replace the gears regularly supplied for the 5 m.p.h. fourth speed.

It utilizes the extra pulling power of the fourth speed and also increases the speed from 5 to 7 m.p.h. for highway hauling when the load is too heavy to be suitably handled with the high fifth speed. It is also very useful for high speed work with harrows, rotating hoes, etc.

We recommend that your International Harvester dealer's serviceman install this attachment.

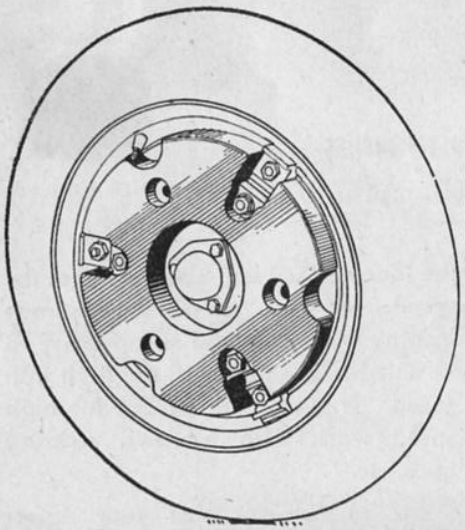


Illust. 58—A mighty speedy combination is this Farmall-M with wheel weights and 3-furrow No. 8 Genius on pneumatic tires.

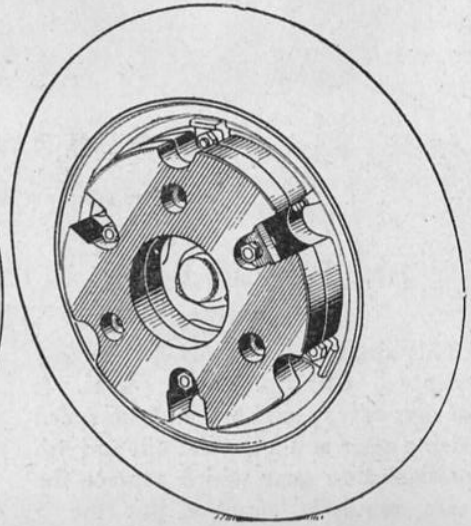
Front Wheel Weight

(First, 42½ lbs. Each) (Set of Two) (*For Farmall-M*)
(Second, 42½ lbs. Each) (Set of Two) (*For Farmall-M*)
(First, 73 lbs. Each Approx.) (Set of Two) (*For Farmall-MV*)
(Second, 73 lbs. Each Approx.) (Set of Two) (*For Farmall-MV*)

The above attachments can be used only on tractors equipped with pneumatic tire front wheels.



Illust. 59—First Front Wheel Weight Assembled.

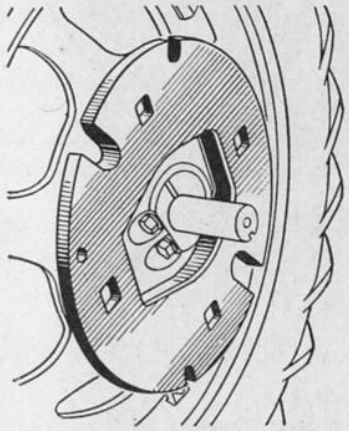


Illust. 60—First and Second Front Wheel Weights Assembled.

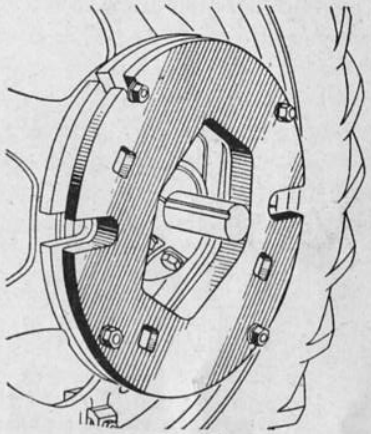
Rear Wheel Weight

(First, 145 lbs. Each) (Set of Two)
(Second, 145 lbs. Each) (Set of Two)
(Third, 145 lbs. Each) (Set of Two)

(*For Farmalls M and MV equipped with pneumatic tire rear wheels*)

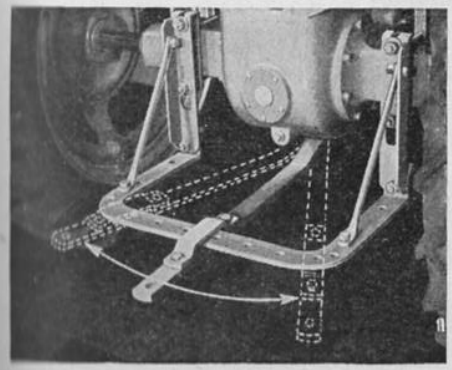


Illust. 61—First Rear Wheel Weight Assembled.



Illust. 62—First and Second Rear Wheel Weights Assembled.

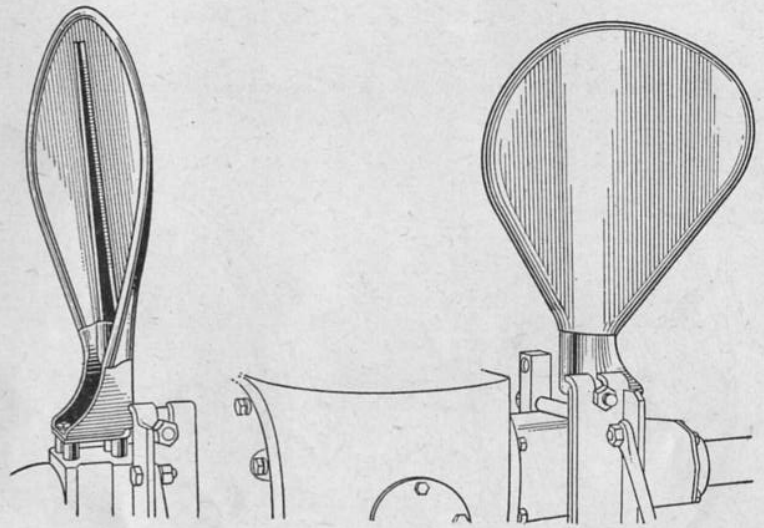
Swinging Drawbar



Illust. 63—This Swinging Drawbar is a desirable attachment when pulling trailing implements where shorter turns are required than can be obtained with the regular drawbar. For Farmall-M only.

Rear Wheel Fender

(Set of Two Fenders)



Illust. 64—Fender Assembled on Tractors Having Either Pneumatic or Steel Wheels.

Adjustable Wide Front Axle with Adjustable Wheelbase

For Farmall-M. This attachment adapts the tractor to work in potatoes and other vegetable crops where rows are spaced too close for regular wheels. The axle is adjustable for treads of 57 inches to 81 inches. With the attachment mounted in short wheelbase position, the wheelbase is 90 inches. Mounted in the long wheelbase position, the wheelbase is 100½ inches.

Note: When cultivator attachments are to be used on tractors with adjustable wide front axle, it is necessary to use the cultivator shifter lever attachment. *See page 79 for further information.*

To change from short wheelbase to long wheelbase or vice versa, proceed as instructed in the following paragraphs.

Caution: Be sure the tractor is rigidly supported. Lock the brakes and block the rear wheels.

Raise the front end of the tractor, preferably by means of a sling and hoist arrangement. If a hoist is not available, jacks may be used by placing them under each front frame channel, approximately at "X." *See Illust. 65 for long wheelbase position, or see Illust. 67 for short wheelbase position.* This location will afford proper clearance in assembling the attachment.

Long Wheelbase Position

The axle adapter plate and adapter brace spacers and unused bevel washers furnished with this attachment should be set aside for use when it is desired to use the tractor in the short wheelbase position.

For long wheelbase position, *Illust. 65,* move entire assembly of parts under the front end of tractor and attach to the tractor as follows:

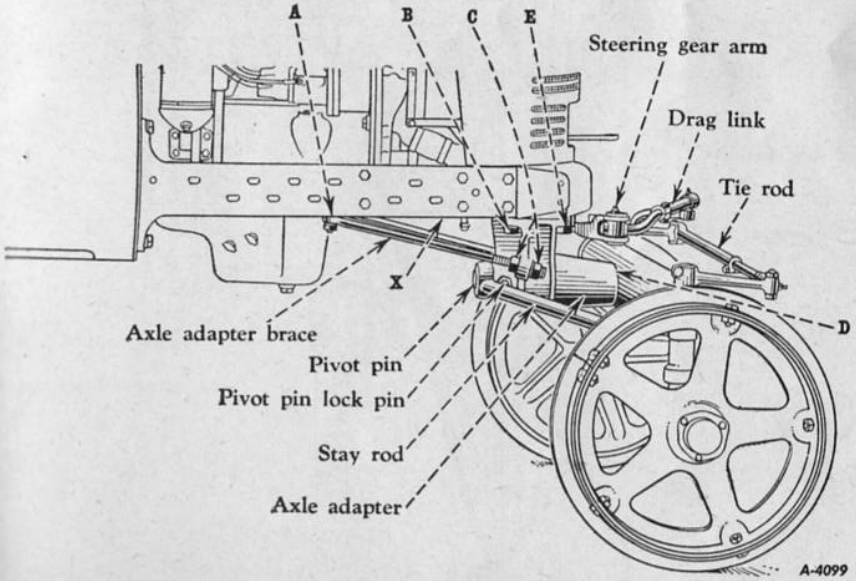
(a) Use two ¾ N.C. x 2-inch cap screws, with lock washers, at "E."

(b) Use two ¾ N.C. x 2¼-inch cap screws, with lock washers, at "B."

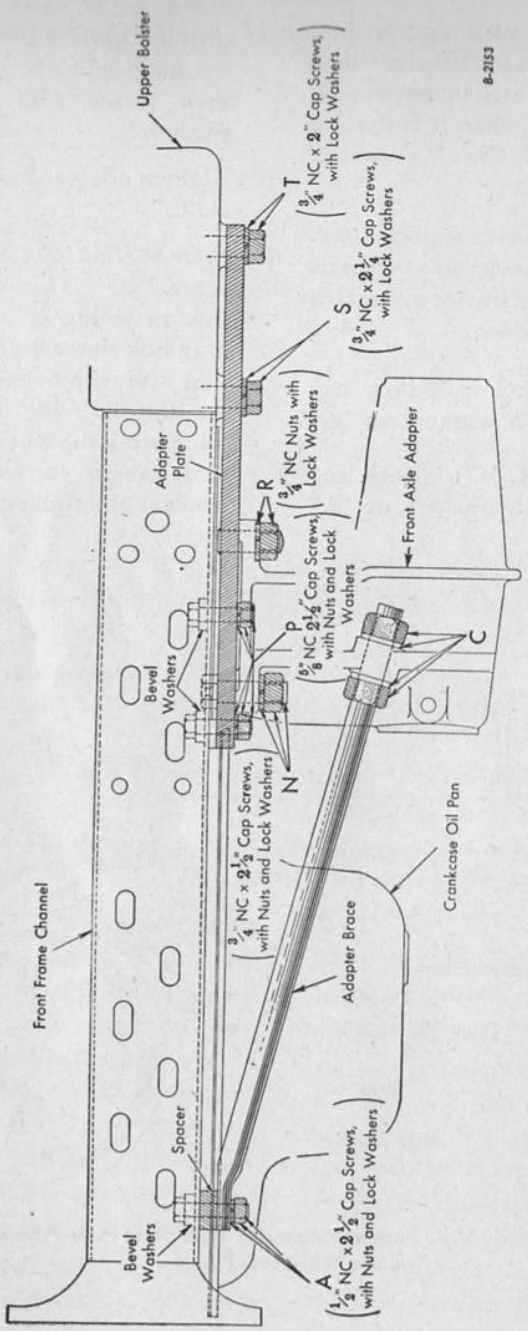
(c) Use two ½ N.C. x 2¼-inch cap screws at "A." Slip each cap screw through bevel washer, frame channel, and adapter brace, respectively; then secure with nut and lock washer.

(d) Tighten adapter brace nuts equally at "C."

(e) *Refer to Illust. 69.* Remove the cap screw "H." Then adjust the drag link by lining up the hole in the drag link sleeve nearest the steering gear arm with one of the notches in the drag link adjusting rod which will permit the wheels to turn at the same angle in either direction. Replace and tighten cap screw.



Illust. 65—Side View showing Adjustable Wide Front Axle Attachment in Long Wheelbase Position.



Illust. 66—Farmall-M with Adapter Plate, Adapter, and Adapter Braces Assembled to Tractor.

Short Wheelbase Position

Attach adapter plate to the adapter, *Illust. 66,* using two ¾ N.C. x 2½-inch cap screws, nuts and lock washers at "N," and two ¾-inch N.C. nuts, with lock washers, at "R."

For Short Wheelbase Position, *Illusts. 66 and 67,* move entire assembly of parts under the front end of the tractor, and attach to the tractor as follows:

(a) Use two ¾ N.C. x 2-inch cap screws, with nuts and lock washers, at "T."

(b) Use two ¾ N.C. x 2¼-inch cap screws, with nuts and lock washers, at "S."

(c) Use four ⅝ N.C. x 2½-inch cap screws at "P." Slip each cap screw through bevel washer, frame channel, and adapter plate, respectively; then secure with nut and lock washer.

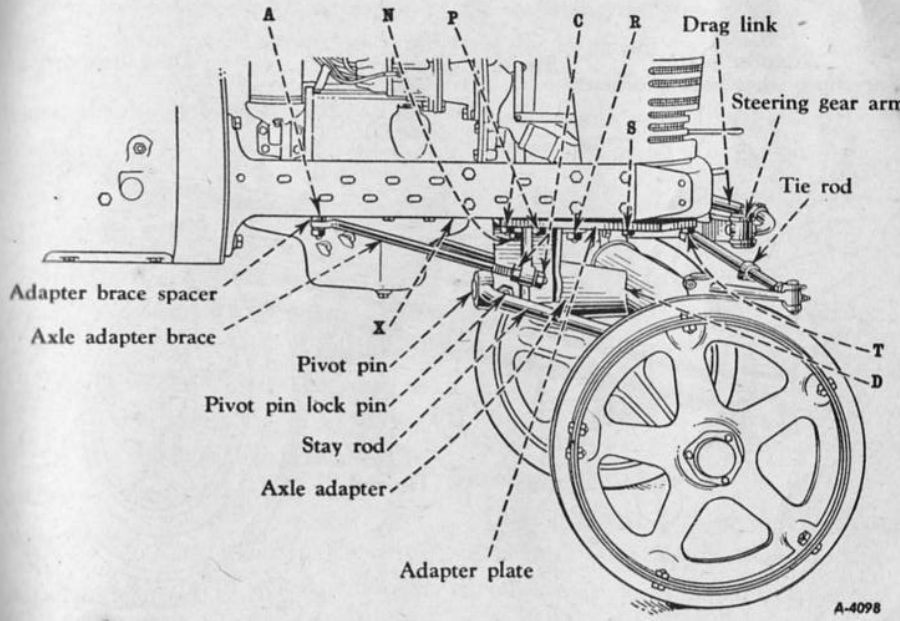
(d) Use two ½ N.C. x 2½-inch cap screws at "A." Slip each cap screw through bevel washer, frame channel spacer, and adapter brace, respectively; then secure with nut and lock washer.

(e) Tighten adapter brace nuts equally at "C."

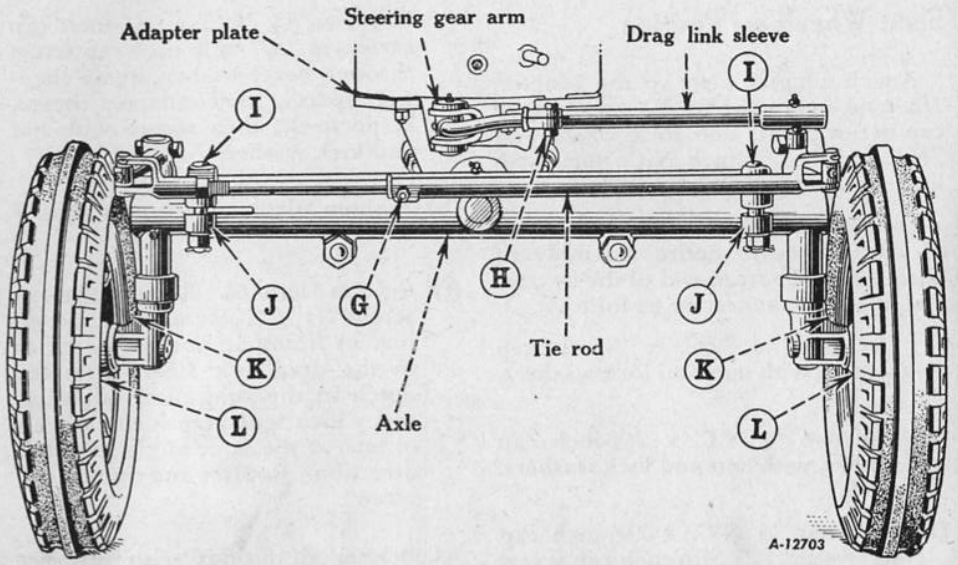
(f) *Refer to Illust. 68.* Remove the cap screw "H". Then adjust the drag link by lining up one of the holes in the drag link sleeve with the notch in the drag link adjusting rod which will permit the wheels to turn at the same angle in either direction. Replace and tighten cap screw.

Lubricate all fittings with pressure lubricant, *page 91.*

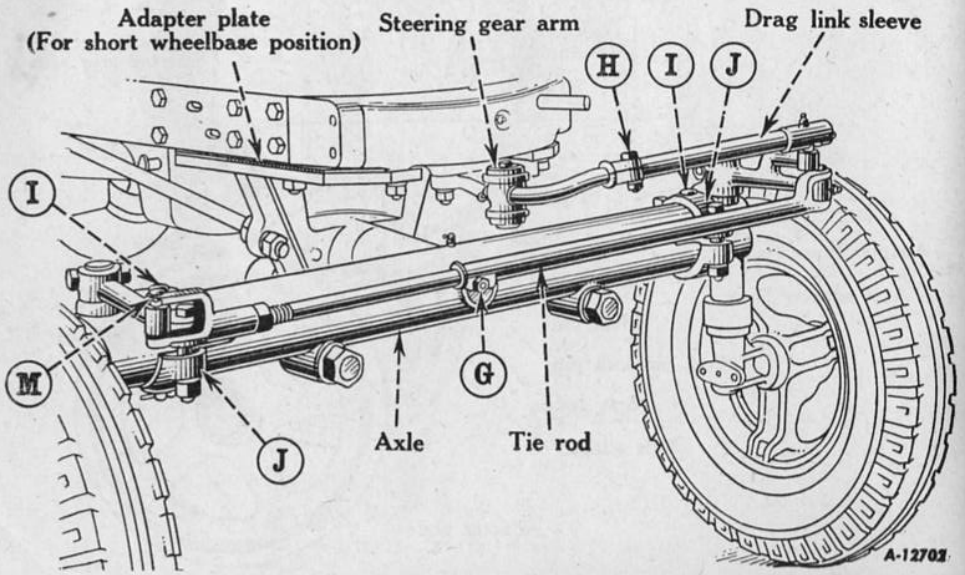
Adjust wheels for correct toe-in, *page 91.*



Illust. 67—Side View showing Adjustable Wide Front Axle Attachment in Short Wheelbase Position.



Illust. 68—Front View showing Adjustable Wide Front Axle Attachment in Short Wheelbase Position.



Illust. 69—Front View showing Adjustable Wide Front Axle Attachment in Short Wheelbase Position.

Adjusting Tread Widths

Illusts. 68 and 69.

1. Raise the front end of the tractor.

2. Remove drag link bolt "H" and tie rod bolt "G".

3. Pull out cotter pins and remove front axle clamp pins "I".

4. Loosen the nuts on the front axle clamps "J".

5. Move the front axle extension an equal distance on each side, to the desired tread position and reinsert the clamp pins "I" through the front axle clamps "J" and the holes selected in the front axle extension; secure with cotter pins and tighten the front axle clamp bolts.

6. Adjust the tie rod to correspond with the front axle extension and replace the tie rod bolt "G" to engage with the notch selected and tighten bolt.

7. Adjust the drag link sleeve to correspond with the front axle extension and select the notch in the drag link which will permit the front wheels to turn the same angle in either direction. Replace and tighten the drag link bolt "H" (use the hole in the drag link sleeve nearest to the steering gear arm when operating in long wheelbase position).

Note: With this attachment the front wheels can be set in seven different tread positions of 57, 61, 65, 69, 73, 77 or 81 inches. The rear wheels can be adjusted to track accurately with the front wheels.

Adjusting "Toe-In"

The correct "toe-in" of the front wheels should be maintained. To check the "toe-in," measure the distance between the two rims at their extreme outer edge at the same height as the hub caps, see "K" and "L" *Illust. 68.* The distance between the two points "L" should be ¼ inch to ⅜ inch shorter than the distance between the two points "K".

If your tractor is equipped with steel wheels, measure the "toe-in" from the extreme edges of the wheels at points "K and L".

To adjust "toe-in", disconnect the adjusting rod fork at "M", *Illust. 69,* by removing the cotter pin and pulling out the adjusting rod fork pin. Loosen the lock nut and turn the adjusting rod fork in or out as required.

When the proper "toe-in" (¼-inch to ⅜-inch) is reached, reconnect the adjusting rod fork and tighten the lock nut.

Lubrication

All points of lubrication are equipped with lubricator fittings and require lubrication daily, or after every ten hours of operation.

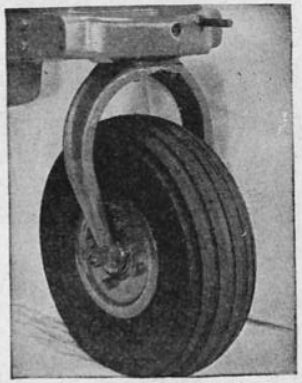
Use pressure-gun grease (chassis lubricant) and apply two or three strokes with hand lubricator, or sufficient grease to flush out old grease and dirt.

Single Front Wheel—Pneumatic Tire Equipment

(*Tires and tubes are not included*)

For Farmall-M—Two attachments are available; one is for 7.50-16-inch tires and the other for 9.00-10-inch tires.

Pneumatic-tired single front wheel attachments are used in crops in narrow row spacings.

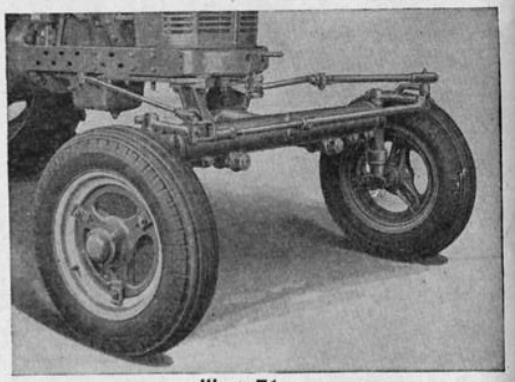


Illust. 70

Front Wheel—Pneumatic Tire Equipment

(*For 6.00-16-inch tires; tires and tubes are not included*)

For Farmall-M with adjustable wide front axle attachment (two required per tractor).



Illust. 71

Variable Tread Front Wheel —Pneumatic Tire Equipment

(*For 6.00-16 and 6.50-16-inch tires; tires and tubes are not included*)

For Farmall-M. This attachment includes one complete wheel. Two are required to equip a tractor.

The variable tread front wheels adapt the tractors to work on ridges. Approximate treads, 8, 11, 13½ and 16½ inches.



Illust. 72

How to Adjust Variable Tread Front Wheel

Rim bolts must be tightened securely.

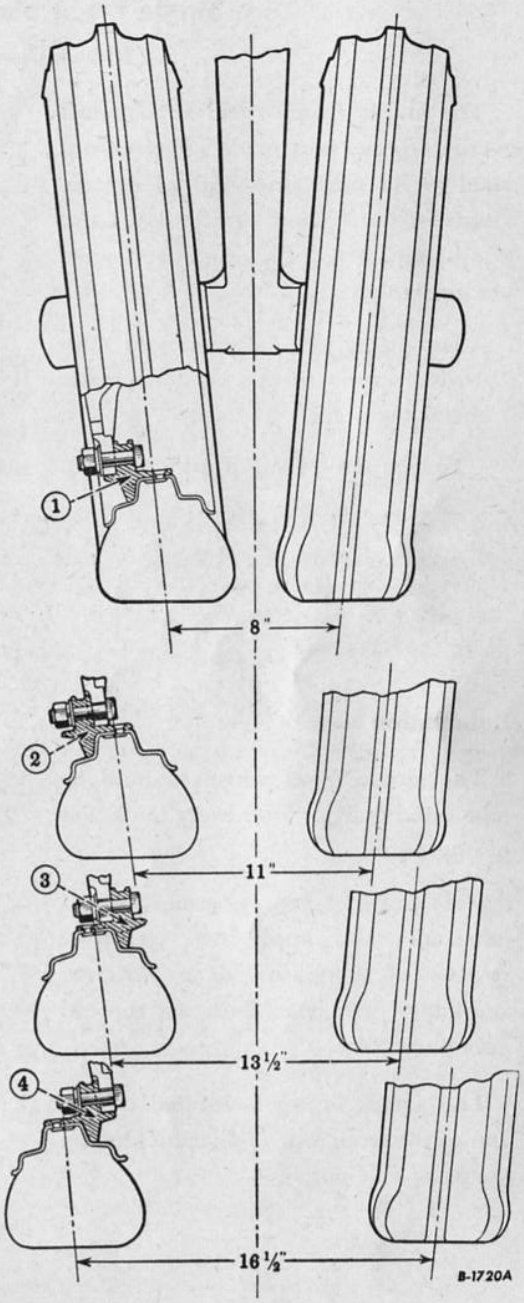
Four treads (8, 11, 13½ and 16½ inches) can be obtained with variable tread front wheels, *Illust. 73.*

To obtain the narrow tread or 8-inch position, assemble the rims to the inside of the hubs with the lugs turned in, *position No. 1.*

To obtain the 11-inch tread, assemble the rims to the outside of the hubs with the lugs turned in, *position No. 2.*

To obtain the 13½-inch tread, assemble the rims to the inside of the hubs with the lugs turned out, *position No. 3.*

To obtain the 16½-inch tread, assemble the rims to the outside of the hubs with lugs turned out, *position No. 4.*



Illust. 73—Front Wheel Tread Adjustments.

Single Front Steel Wheel

(26-Inch Diameter)

The single front wheel attachments were designed to provide a single front steel wheel, with skid ring, to replace single front wheel pneumatic tire equipment. The following attachments are available:

For Farmall-M equipped with 9.00-10-inch single front wheel pneumatic tire equipment.

For Farmall-M equipped with 6.50-16-inch single front wheel pneumatic tire equipment.

For Farmall-M equipped with the regular dual front steel wheels.

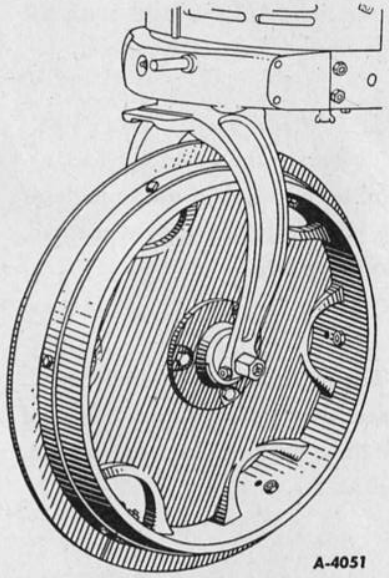
If your tractor is equipped with pneumatic tires and you desire to change to steel wheels, see your International Harvester dealer or the nearest IHC branch for full details.

Lubrication

The single front wheels should be lubricated daily or after every ten hours of operation.

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

The grease fitting is located on the end of the front axle and is shielded by the front axle nut.

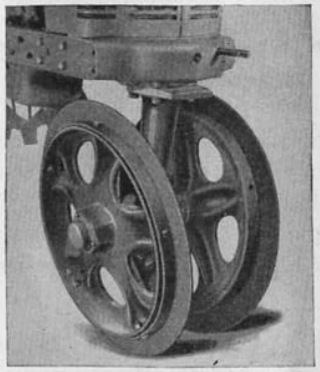


Illust. 74—Single Front Steel Wheel Attachment with Steel Skid Ring

Front Wheel Skid Ring (2½ inches high)

(For Farmall-M)

The high skid rings provide better control when operating in wet ground or when an extra heavy implement is mounted on the rear of the tractor. They bite into the soil and make steering easier.



Illust. 75—High Skid Rings Assembled on the Front Wheels.

Lug Attachments for Rear Wheels

Spade Lugs

(For Farmall-M)

Special Lugs for Regular (IHC) or Heavy-Duty (French and Hecht) Steel Rear Wheels
5 inches high x 3 inches wide (56 lugs)

Special Lugs for Heavy-Duty (French and Hecht) Steel Rear Wheels
6 inches high x 3 inches wide (56 lugs)

Spade Lugs for Extension Tire
5 inches high x 3 inches wide (28 lugs)
4 inches high x 3 inches wide (28 lugs)
6 inches high x 3 inches wide (28 lugs)—use with Heavy-Duty Rear Wheels

Double Spade Lugs (32 lugs) for 51 x 2-inch Channel-Rim Rear Wheels

Single Spade Lugs (64 lugs) for 51 x 2-inch Channel-Rim Rear Wheels

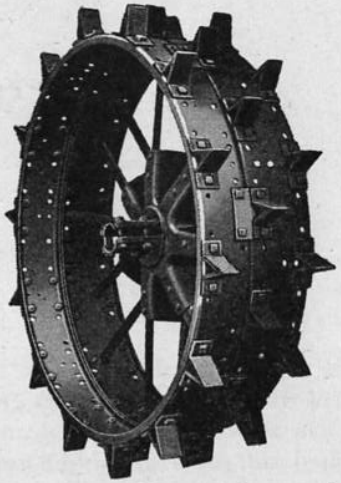
Rear Wheel Extension Tire

(51 x 6-inch)

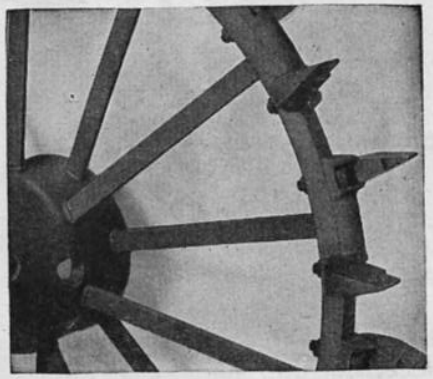
For Farmall-M equipped with regular (IHC) steel wheels.

This attachment improves the traction of the tractor when operating in soft or sandy soil.

Note: *See "Lug Attachments," page 95,* for lugs available for extension tire.



Illust. 76—Extension Rim, with Lugs, on Regular Farmall-M Steel Wheel.



Illust. 77—Channel-Rim Wheels with Double Lugs are for use in Sticky Soils—They are Practically Self-Cleaning.

Steel Rear Wheel

Farmall-M

(51 x 10-inch) heavy-duty rear wheel —less lugs.

(51 x 2-inch) channel rim rear wheel —less lugs (two required per tractor).

Note: *See "Lug Attachments," page 95,* for lugs available for the above steel wheels.

Overtire and Rim Attachments

(*For Farmall-M with 51-inch diameter rear wheels*)

For Farmall-M with spade lugs 4 inches high by 2½ inches wide.

For Farmall-M with spade lugs 5 inches high by 3 inches wide.

For Farmall-M with spade lugs 6 inches high by 3 inches wide.

The overtire attachments provide a 3½ or 4-inch smooth surface for tractors with lugs to prevent damage to road surfaces, etc.

The overtire and rim attachments provide a six-inch surface where this is required.

Overtire

(*3½-inch width for Farmall-M with 51-inch diameter rear wheels*)

For Farmall-M with spade lugs 4 inches high by 2½ or 3 inches wide.
For Farmall-M with spade lugs 5 inches high by 3 inches wide.

(*4-inch width for Farmall-M with 51-inch diameter rear wheels*)

For Farmall-M with spade lugs 6 inches high by 3 inches wide.

8,000-Ft. Altitude Piston

Distillate-Gasoline Engines

For Farmalls M and MV with Distillate-Gasoline Engine.

High-Compression Engines

For Farmalls M and MV with High-Compression Gasoline Engine.

5,000-Ft. Altitude Piston

Distillate-Gasoline Engines

For Farmalls M and MV with Distillate-Gasoline Engines.

High-Compression Engines

For Farmalls M and MV with High-Compression Gasoline Engines.

Note: These 8,000 and 5,000 ft. attachments consist of a complete set of cylinder sleeves and pistons.

(*For installation, see your International Harvester dealer.*)

Reverse Flow Fan

(*For Farmall-M*)

This attachment consists of a six-bladed fan which pushes the air through the radiator and aids in reducing the amount of chaff and trash accumulating on the radiator.

Low-Low Speed

(*For Farmall-M*)

Caution: A set of first and second front wheel weights must be used if the tractor is equipped with low-low speed attachment, to prevent the front wheels from lifting off the ground when the tractor is pulling a heavy load.

This attachment provides a special low gear for Farmall-M Tractors when used with Harvester-Threshers in heavy conditions.

Fuel Tank with Fuel Trap

This attachment is designed to permit the operation of tractors in hilly country with a minimum amount of fuel in the tank.

Starting and Lighting

A starting attachment, lighting attachment, or starting and lighting attachment added to your tractor gives you extra conveniences, extra savings and extra hours that your tractor can be used.

With a lighting attachment you can work after sundown, or 24 hours a day if necessary, to make up lost time due to bad weather—to finish a job ahead of schedule—or to utilize hours that may change a loss into a profit.

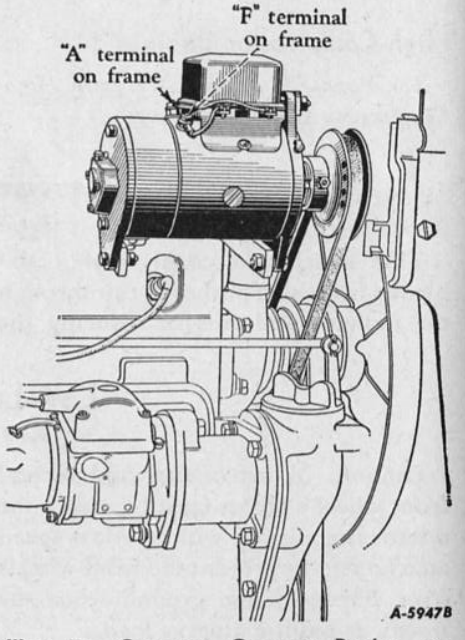
A starting attachment, besides being a convenience to you, will save many a gallon of fuel ordinarily wasted when the engine is idled during "times out."

The following pages give information on the care and operation of these attachments. You are urged to read and study this information and, when ordinary care is exercised, you should be assured of satisfactory service.

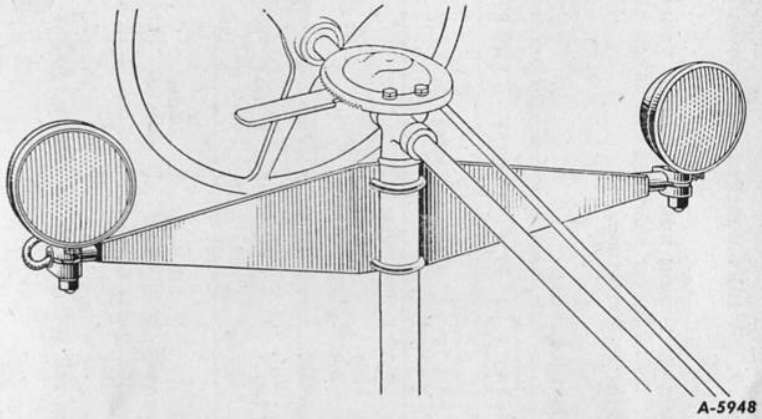
Delco-Remy Equipment

Important! Do not run generator unless the battery charging circuit is connected, and lead from "A" terminal on the generator frame is connected as shown in the wiring diagrams. If it is necessary to operate the generator without battery connections, remove connection from "F" terminal on the generator frame.

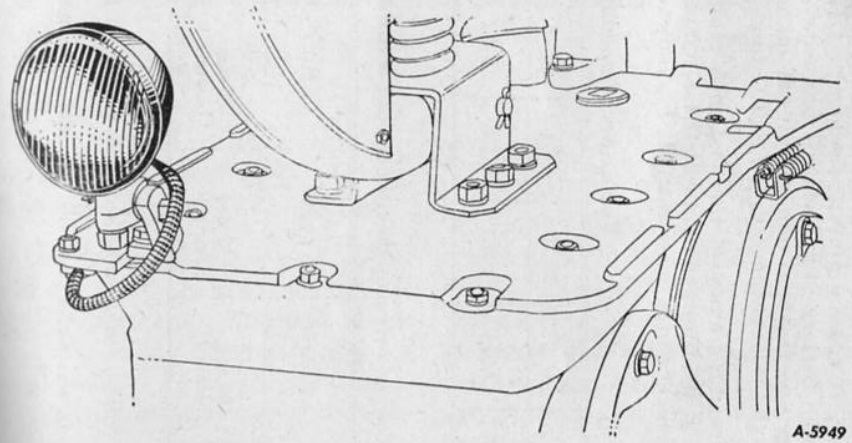
Before doing any electrical work, remove the cable from the battery to the ground. Do not reconnect this cable until all of the electrical work is completed.



Illust. 78—Generator, Generator Bracket, etc., on Farmalls M and MV.



Illust. 79—Head Lamps on Farmalls M and MV



Illust. 80—Rear Lamp Mounted on Tractor.

Test the specific gravity of the electrolyte in each cell with a hydrometer at least once a month, or more frequently in warm weather. A hydrometer reading of 1.270 to 1.285 indicates a full charge. A specific gravity reading of 1.250 corrected to 80°F. should be maintained. Never allow the battery to fall below 1.225, which indicates half discharged. A completely discharged battery will freeze at temperatures as high as 20°F. above zero. A fully charged battery will withstand temperatures as low as 45° to 50°F. below zero.

The specific gravity of the acid in a completely charged battery should not exceed the value specified by the manufacturer (base temperature 80°F.). If hydrometer readings are taken at acid temperatures other than 80°F., allowance must be made for temperature.

Variation of specific gravity with temperature

0° F.	10° F.	20° F.	30° F.	40° F.	50° F.	60° F.	70° F.	80° F.	90° F.	100° F.	110° F.	120° F.
1.281	1.277	1.273	1.269	1.266	1.262	1.258	1.254	1.250	1.246	1.243	1.239	1.235

The following chart gives the freezing point of battery electrolyte at given specific gravities:

Electrolyte Specific Gravity	1.280	1.220	1.210	1.180	1.160	1.140	1.100	1.000
Freezing Point (F.)	90 deg. below 0°	30 deg. below 0°	20 deg. below 0°	10 deg. below 0°	Zero Degrees	10 deg. above 0°	20 deg. above 0°	30 deg. above 0°

With battery fully charged and on charge at the normal rate, the cell voltage will be about as follows:

Average cell voltage at 80° usually falls between 2.5 and 2.7 volts.
Average cell voltage at 100° usually falls between 2.4 and 2.6 volts.

For accuracy, always take acid temperature when reading specific gravity.

Follow the instructions for the Delco-Remy generator given on tag which is attached to the generator, *Illust. 81.*

Note: On the generator tag, the instructions for increasing output of generator are to be used when you have the starting attachment only.

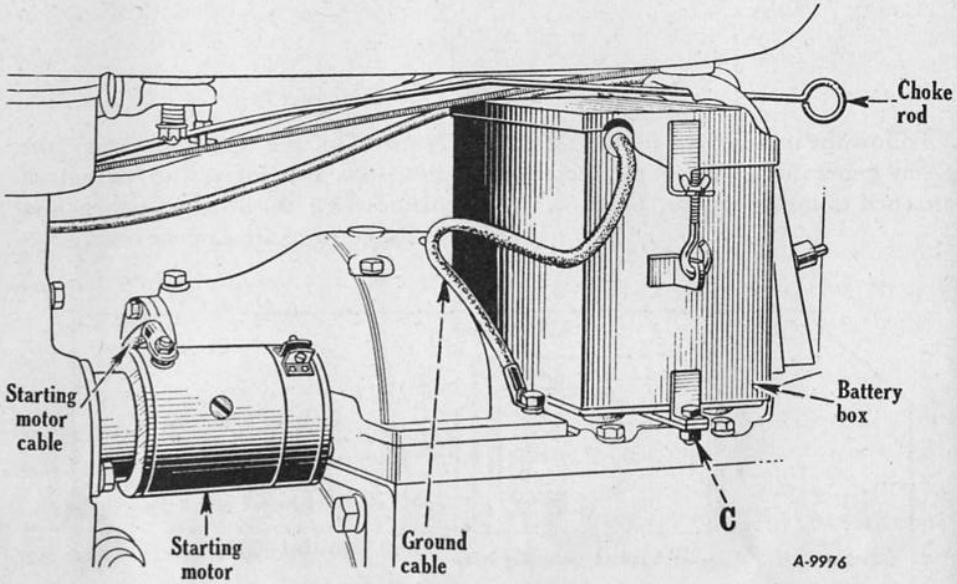
Illust. 81—Copy of Tag Attached to the Delco-Remy Generator.

Operation and Maintenance of Delco-Remy Electrical Equipment

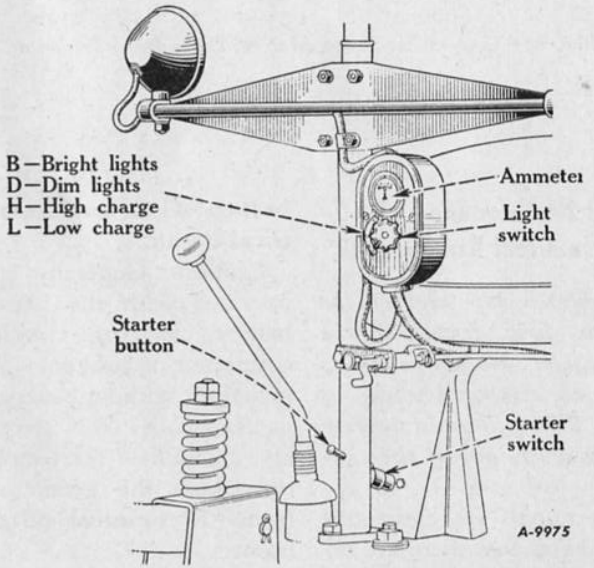
Before working on any part of the electrical system, first disconnect the battery ground cable. Do not reconnect this cable until all electrical work has been completed. This will avoid shorting and causing damage to any of the electrical units.

Be sure all terminals are clean and securely fastened and that there are no broken wires anywhere in the electrical circuit.

Caution: Generator will burn out if operated with the battery cables or battery charging circuit cables disconnected or broken. To operate the generator without battery, remove connection from "GEN" terminal on relay and ground on relay mounting screw, or remove the generator field cable from "F" terminal on the generator frame.



Illust. 82—Starting Motor and Battery Box Assembled on Farmalls M and MV.



Illust. 83—Starting and Lighting Switch on Farmalls M and MV.

Storage Batteries

A registration card is furnished with the battery. This card should be taken to the nearest authorized battery service station for registration.

To service the battery, remove two bolts at "C," *Illust. 82,* slide out the battery and remove cover. After servicing, reassemble and replace the bolts.

Inspect the battery once a week or oftener to keep the water at the correct level and to maintain the correct specific gravity. Specific gravity reading of about 1.250 corrected to 80° F. should be maintained. (*See Chart "VARIATION OF SPECIFIC GRAVITY WITH TEMPERATURE," page 100.*)

Keep vent holes in the battery filler caps open.

Caution! When adding water to the battery in temperature near freezing point (32° F.), always operate the engine long enough to mix the water and the electrolyte or damage to the battery from water freezing may result.

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

Keep the electrolyte in each cell three-eighths inch above the separators. When the electrolyte is below this level, add *pure distilled water* with a clean syringe. Never use hydrant water or any water which has been in a metal receptacle; keep pure distilled water in glass jar on hand for battery use only.

Keep the battery cable terminals clean and tight. Use hot water for removing terminal corrosion and for cleaning top of battery. Brighten the terminal contact surface with wire wool, apply a light coat of vaseline and reassemble. Be sure the terminals are clamped tightly and that battery is clamped securely in the battery box. If this is done two or three times a year no trouble from corroded terminals should be experienced.

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

Generator and Light Switch

The generator has an adjustable third brush for changing the charging rate. On the lighting, and starting and lighting attachment, a light switch with field resistance control is provided to regulate charging rate of generator from the instrument panel.

The generator field circuit is grounded through the light switch. Therefore, it is absolutely necessary at all times to make sure there is a good electrical connection between the switch and the mounting panel.

The light switch is used to control generator field resistance and has four positions: low charge, "L"; high charge, "H"; dim, "D"; and bright, "B."

When the lights are turned on either dim or bright, the field circuit is direct to the ground, giving high charge or increased generator output. This is also true when the switch is on position "H."

During the daytime, when lights are not used, set the switch in the "L" position. This adds a resistance coil to the field circuit and reduces the output of the generator to approximately one-half its original charge rate. If the battery is low, set the switch in the "H" position until the battery is fully charged.

The generators for starting and lighting attachment, and lighting attachment, as received from factory, have the third brush set in a position to give an output of approximately ten amperes when switch is in the "H" position. In the "L" position the generator output will be approximately four to five amperes.

On the starting attachment, the generator as shipped from the factory, has the short lead connected from the "F" terminal on the generator frame to the "F" terminal on the relay. This gives an output of approximately four to five amperes. To increase the charging rate, remove the connection at the "F" terminal on the relay and ground it under the relay mounting screw, *Illust. 81.*

If you desire to reduce the charging rates mentioned above, this may be accomplished by adjusting the third brush.

The charging rates specified above are for average conditions only. The generator output may have to be varied to meet abnormal operating conditions in order to maintain a fully charged battery. To obtain the maximum life and best performance of the battery, do not undercharge or overcharge the battery.

Generator Commutator

If the commutator is dirty, clean it with a strip of No. 00 sandpaper. *Never use emery cloth.*

All dust may be blown from the generator after the commutator has been cleaned. If the commutator is very rough or out of round, it is advisable to take generator to your International Harvester dealer or IHC Service Station and have commutator reconditioned.

Generator Lubrication (2 Cups)

After every 60 hours of operation, put in eight to ten drops of SAE-20 oil. Do not overlubricate as excessive oiling may cause oil and grease to gum on the commutator and cause a reduction of the generator output. *Never oil the commutator.*

Starting Motor Lubrication

Occasionally, put a few drops of SAE-20 oil in oil cup on starting motor.

To Adjust Charging Rate by Third Brush

1. Remove the cover band "C," *Illust. 84.*

2. Loosen round head screw "A" on the outside of the commutator end frame until lock washer tension is released. *DO NOT TRY TO REMOVE THIS SCREW.*

3. Change the charging rate by moving the third brush "B." (This brush is the one mounted on a movable carrier, whereas the other main brushes are mounted directly on the inside of the commutator end frame.)

The rate of charge is increased by moving the third brush in the direction of rotation of the armature and decreased by moving the brush in the opposite direction.

The maximum rate of charge for the six-volt generator is nine to eleven amperes when "HOT" and 13 to 16 amperes when "COLD," with switch in high charge position and no electrical load. *DO NOT SET BEYOND THESE LIMITS.*

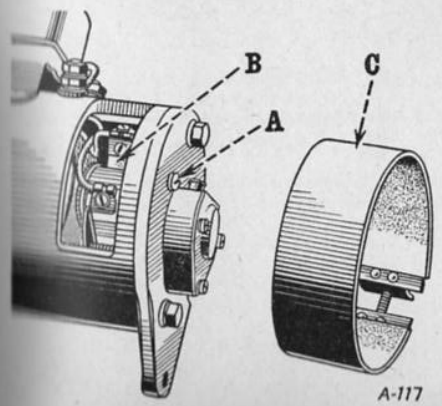
Always check the maximum generator output when operating with a fully charged battery.

Important! Never set the third brush closer than 3.2 commutator bars from main brush on six-volt generator, *Illust. 85.*

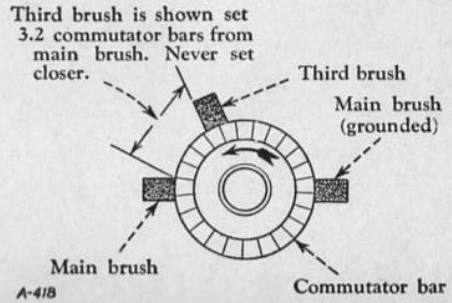
4. When the above adjustments are completed, be sure to tighten the round head screw "A", *Illust. 84,* which locks the third brush carrier in place.

5. Reassemble the cover band "C," making sure the joint is on the bottom of the generator so that the joint is not over any opening.

6. Unless you are familiar with this equipment and know how to adjust it, the above adjustment is best done by your International Harvester dealer or IHC Service Station. They have the correct equipment and capable men to make the adjustment.



Illust. 84—Generator showing Third Brush.



Illust. 85—Commutator End (Brush Setting).

Operation and Maintenance of Bosch No-Battery Type Electrical Attachments

Very little maintenance is required on these attachments. However, the cables should be inspected occasionally to see that they are in good condition and that all connections are tight.

Generator Lubrication

The generator has sealed-in lubrication and further lubrication is not required, unless the generator is disassembled for general overhaul.

Generator Commutator

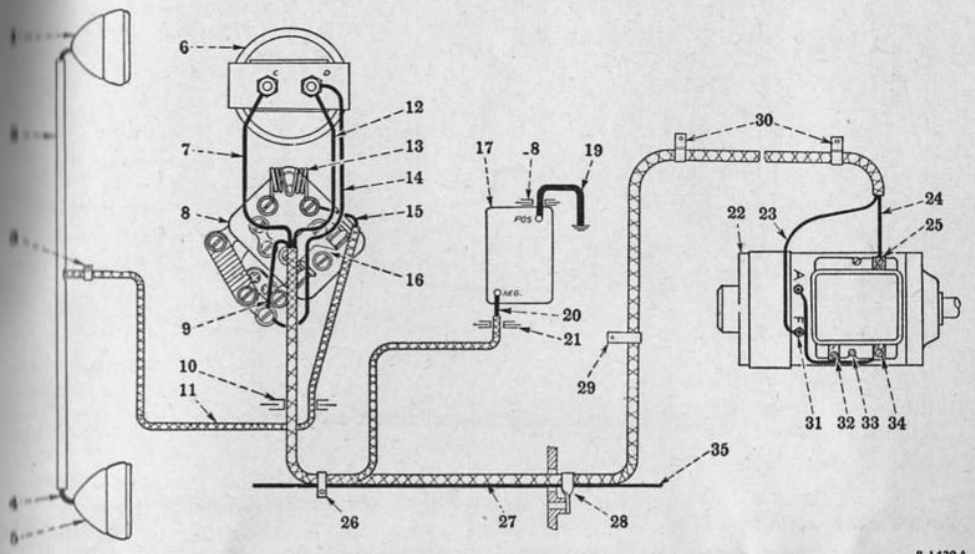
If the commutator is dirty, clean it with a strip of No. 00 sandpaper. *Never use emery cloth.*

All dust must be blown from the generator after the commutator has been cleaned. If the commutator is very rough or out of round, it is advisable to take generator to your International Harvester dealer or Service Station and have the commutator reconditioned.

Light Switch

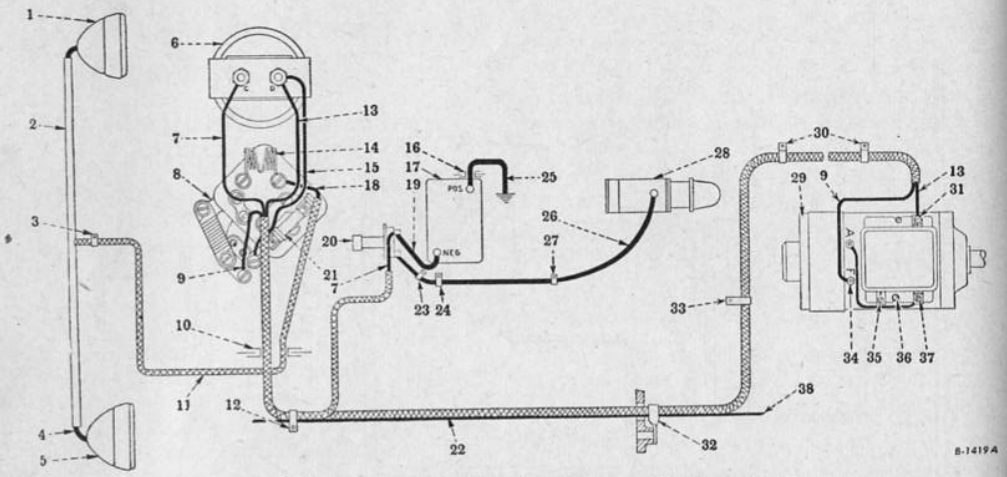
The light switch has four positions: "L," low position; "H," high position; "D," dim position; and "B," bright position.

Note: Be sure there is a good electrical connection between the switch and the switch mounting to complete the generator grounding circuit.



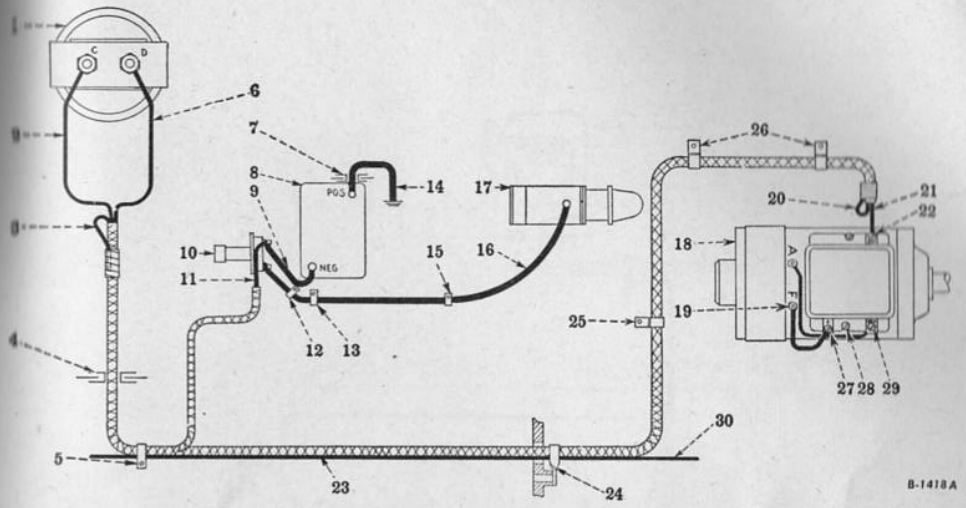
Illust. 86—Wiring Diagram for Electric Lighting Equipment.

Ref. No.	Description
1	Head lamp, left.
2	Head lamp support pipe.
3	Clip—on lower U-bolt of head lamp support.
4	Cable—head lamp to head lamp (seal brown with black and red cross tracers).
5	Head lamp, right.
6	Ammeter.
7	Cable—battery to ammeter (natural with red tracer).
8	Lighting switch.
9	Cable—generator field to switch (natural with black tracer).
10	Grommet—in instrument panel cover.
11	Head lamp cable harness.
12	Cable—generator to ammeter (natural with black and red cross tracers).
13	All wiring on instrument panel must be placed as far as possible from dimmer coil as shown.
14	Cable—ammeter to switch.
15	Cable—switch to head lamp (seal brown with black and red cross tracers).
16	Fuse.
17	Battery.
18	Grommet—in battery box.
19	Cable—battery to ground.
20	Cable—battery to ammeter (natural with red tracer).
21	Grommet—in battery box.
22	Generator.
23	Cable—generator field to switch (natural with black tracer).
24	Cable—generator to ammeter (natural with black and red cross tracers).
25	"BAT" terminal.
26	Clip—on side of rear fuel tank support.
27	Cable harness.
28	Clip—on control rod guide cap screw.
29	Clip—on gasoline tank bracket bolt.
30	Clip—on front and rear valve cover studs.
31	"F" terminal on frame.
32	"F" terminal on relay.
33	Mounting screw.
34	"GEN" terminal.
35	Cable—magneto ignition.



Illust. 87—Wiring Diagram for Electric Starting and Lighting Equipment.

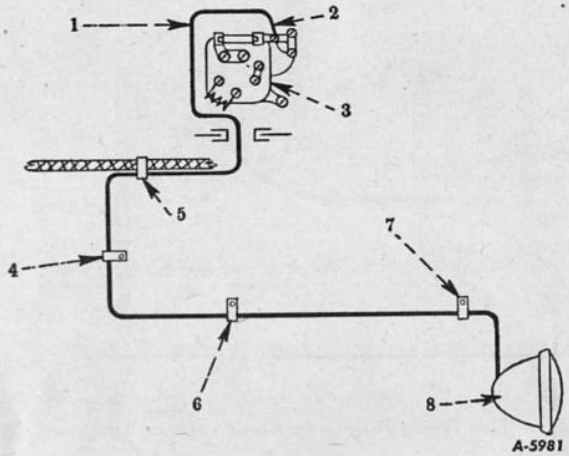
Ref. No.	Description
1	Head lamp.
2	Head lamp support pipe.
3	Clip—on lower U-bolt of head lamp support bracket.
4	Cable—head lamp to head lamp (seal brown with black and red cross tracers).
5	Head lamp, right.
6	Ammeter.
7	Cable—starting switch to ammeter (natural with red tracer).
8	Lighting switch.
9	Cable—generator field to switch (natural with black tracer).
10	Grommet—in instrument panel cover.
11	Head lamp cable harness.
12	Clip—on side of rear fuel tank support.
13	Cable—generator to ammeter (natural with black and red cross tracers).
14	Lighting switch.
15	Cable—ammeter to switch.
16	Grommet—in battery box.
17	Battery.
18	Cable—switch to head lamp (seal brown with black and red cross tracers).
19	Cable—battery to starting switch.
20	Starting switch.
21	Fuse.
22	Cable harness.
23	Clip—on dash sheet mounting bolt.
24	Clip—on main frame cover bolt.
25	Cable—battery to ground.
26	Cable—starting motor to starting switch.
27	Clip—on belt pulley housing bolt.
28	Starting motor.
29	Generator.
30	Clip—on front and rear valve cover studs.
31	"BAT" terminal.
32	Clip—on control rod guide cap screw.
33	Clip—on gasoline tank bracket bolt.
34	"F" terminal on frame.
35	"F" terminal on relay.
36	Mounting screw.
37	"GEN" terminal.
38	Cable—magneto ignition.



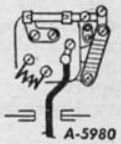
Illust. 88—Wiring Diagram for Electric Starting Equipment.

Ref. No.	Description
1	Ammeter.
2	Cable—starting switch to ammeter (natural with red tracer).
3	Cable—generator field to switch (natural with black tracer).
4	Grommet—in instrument panel cover.
5	Clip—on side of rear fuel tank support.
6	Cable—generator to ammeter (natural with black and red cross tracers).
7	Grommet—in battery box.
8	Battery.
9	Cable—battery to starting switch.
10	Starting switch.
11	Cable—starting switch to ammeter (natural with red tracer).
12	Clip—on dash sheet mounting bolt.
13	Clip—on main frame cover.
14	Cable—battery to ground.
15	Clip—on belt pulley housing bolt.
16	Cable—starting motor to starting switch.
17	Starting motor.
18	Generator.
19	"F" terminal on frame.
20	Cable—generator field to switch (natural with black tracer).
21	Cable—generator to ammeter (natural with black and red cross tracers).
22	"BAT" terminal.
23	Cable harness.
24	Clip—on control rod guide cap screw.
25	Clip—on gasoline tank bracket bolt.
26	Clip—on front and rear valve cover studs.
27	"F" terminal on relay.
28	Mounting screw.
29	"GEN" terminal.
30	Cable—magneto ignition.

(For Tractors already equipped with a Six-Volt Electric System)

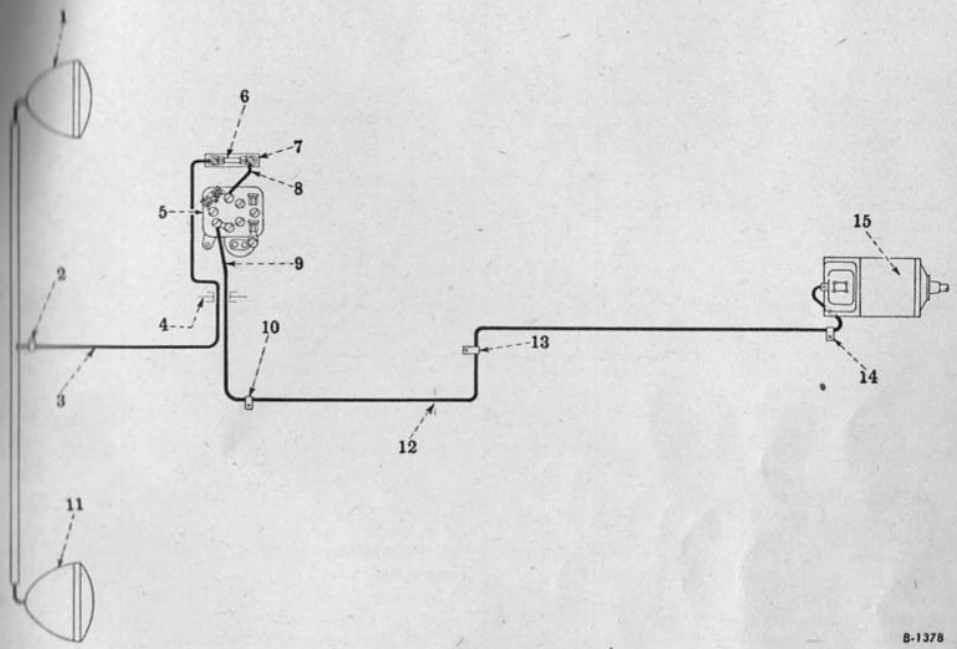


Illust. 89—Wiring Diagram for Rear Electric Lighting Equipment.



Illust. 90—Rear Lamp Cable Connection for Delco-Remy Attachments only.

Ref. No.	Description
1	Cable—switch to rear lamp.
2	Rear lamp cable. Connected as shown in Illust. 92 for Bosch Lighting Attachment only. (Illust. 93 shows cable connected for Delco-Remy Attachment.)
3	Lighting switch.
4	Clip—on lower right hand mounting bolt of rear fuel tank support.
5	Clamp.
6	Clip—on brake housing mounting bolt (upper bolt).
7	Clip—on rear frame cover.
8	Rear lamp (six-volt).



Illust. 91—Wiring Diagram for Bosch No-Battery Electric Lighting Equipment.

Ref. No.	Description
1	Head lamp.
2	Clip—on lower "U" bolt of head lamp support bracket.
3	Head lamp cable harness.
4	Grommet—in instrument panel cover.
5	Lighting switch.
6	Fuse.
7	Fuse block.
8	Cable—fuse block to switch.
9	Cable—generator to switch.
10	Clip—on fuel tank support rear.
11	Head lamp.
12	Cable—generator to switch.
13	Clip—under head of bolt holding air cleaner to support bracket (bottom bolt).
14	Clip—on generator mounting bracket rear bolt.
15	Generator.

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