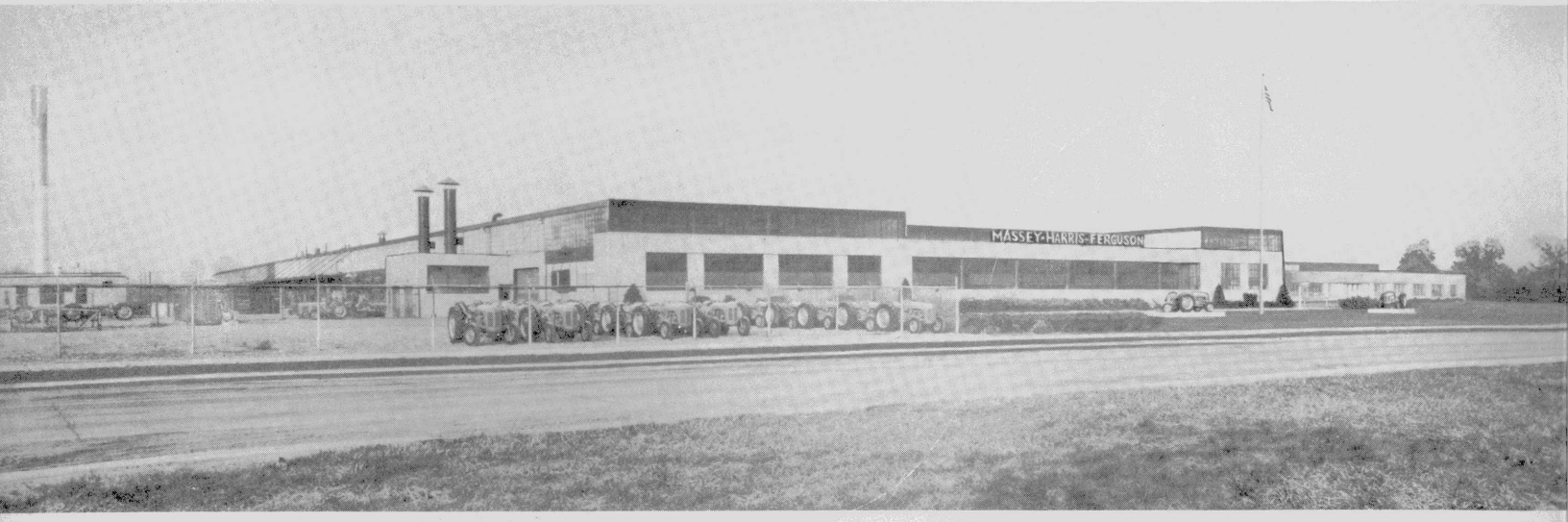
Ferguson 40

owner's manual

Ferguson DIVISION
MASSEY • HARRIS • FERGUSON INC.
RACINE, WISCONSIN
FORM No. 199 072 M91

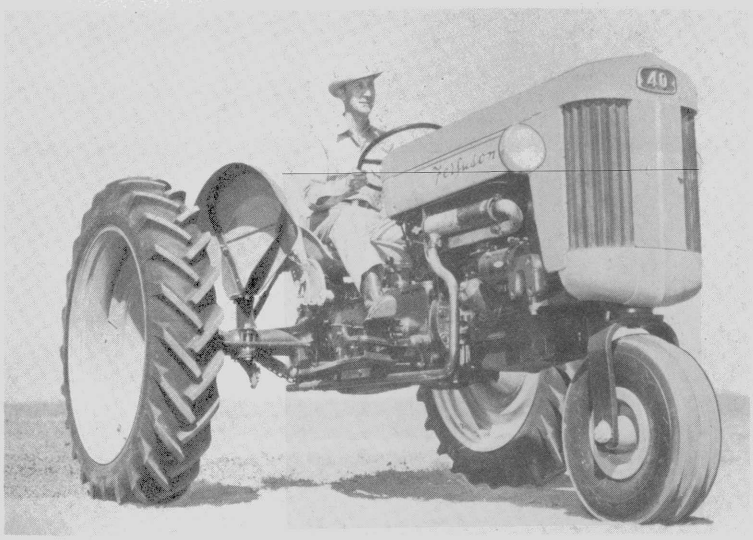
The FERGUSON TRACTOR and FERGUSON SYSTEM IMPLEMENTS

A Guide to



Ferguson Park, where you are always welcome, is a modern Massey-Harris-Ferguson installation on Southfield Road in Detroit. The site occupies an area of more than 72 acres. Here in the Engineering Building and Tractor Plant your Ferguson "40" was designed, tested, built and carefully inspected. Only the most modern methods and equipment have been used in the development and manufacture of the tractor, which means you have a precision well-built machine, designed for rugged operation and economy and capable of giving outstanding performance for many years to come.

Always synonymous with the world-famous Ferguson Tractor is the exclusive Ferguson Hydraulic System, which in itself has opened a new, more modern way of farming — and again Ferguson Engineering has ventured ahead offering you, as a "40" owner, still additional hydraulic features to make work easier and provide tractor performance not yet obtained in the agricultural field. Only after becoming familiar with your tractor will you fully realize that the "40" operating in conjunction with Ferguson System Implements provides the PERFECT FARMING COMBINATION.



Better Farming

To help you as an interested owner to become familiar with your tractor, we in the Service Department at Ferguson have prepared this manual. It outlines the necessary care your tractor needs in the Periodic Maintenance Section, suggests methods and procedures to follow while using your tractor in the Operating Section and discusses adjustments and service in the Servicing Section.

The life of your tractor will depend directly on the treatment to which you as an operator subject it. Long life and satisfactory performance can only be obtained by sensible servicing. Form the habit of performing scheduled maintenance as outlined on page 1, by using the accumulated hours recorded on the Tractormeter. Break-in and operate your tractor in accordance with the suggestions prepared, beginning on page 5. Always keep your tractor in "top-notch" condition by servicing as required; taking any major items to your Ferguson Dealer. He has the proper "know-how" and tools and is able to render the type of service necessary to keep your tractor in the best possible condition.

If at any time replacement parts are needed, only Genuine Ferguson Repair Parts should be installed. These parts are designed and built to fit correctly and give maximum service.

Have your dealer inspect your "40" periodically. Also ask him about the On-The-Farm Service Program that his dealership promotes. On-The-Farm Service brings scientific testing equipment directly to your farm. Remember Ferguson Dealer Service Personnel are factory trained.

We at Ferguson are sure that you, like many thousands of others, will find Ferguson Farming profitable as well as enjoyable. May we then wish you many years of satisfactory and trouble-free operation with your Ferguson "40" Tractor.

Table of Contents

Periodic Maintenance

Proper maintenance, including periodic inspection and regular lubrication with the correct lubricant, is essential to long life and trouble-free operation of your Ferguson Tractor. This section of your manual is devoted entirely to maintenance and should be referred to as a quick reference when minor servicing is performed.

LUBRICATION

Care should be taken when handling all lubricating oils. Open containers collect dirt which may damage the lubricated parts. Always wipe off a grease fitting before lubrication to prevent the entrance of dirt.

The points listed below should be lubricated periodically. The number in the boxes beside each point indicate the hours of operation after which these points should be serviced. The parts and time intervals are marked in the illustrations for your convenience.

△10 PRESSURE-TYPE GREASE FITTINGS

NOTE: Clean fittings, lubricate and remove excess grease.

Lubrication Point	*No. of Fittings*
Leveling Box	1
Lift Rod Leveling Fork	1
Front Axle Spindles (Four Wheel Hi "40" and standard "40")	1 each side
Front Axle Pivot Pins (Four Wheel Hi "40" and standard "40")	2
Single Wheel Tricycle Support Assembly	2
Upper Pedestal (Manual Steering)	2
Upper Pedestal (Power Steering)	3
Brake Pedal Assembly	1

△10 CRANKCASE DIPSTICK

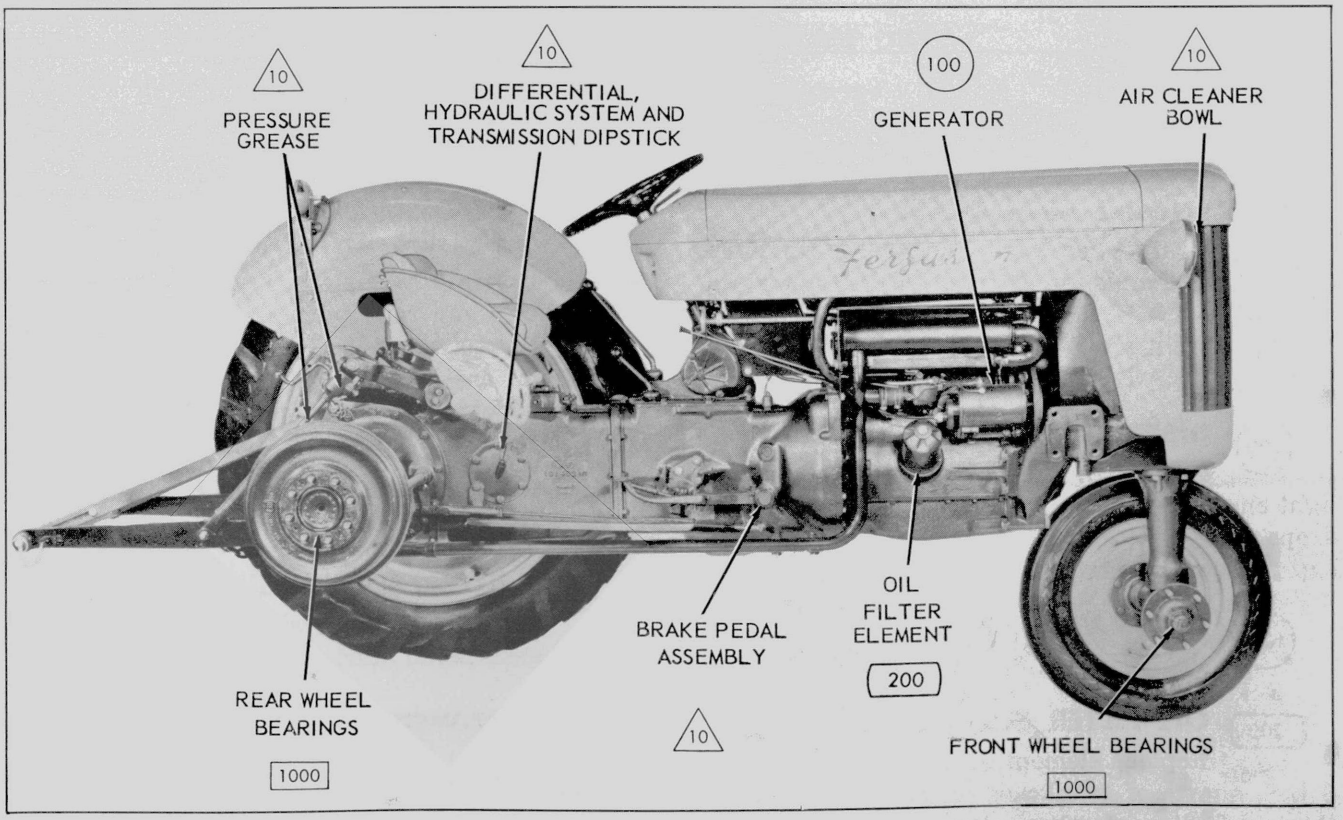
Check and maintain oil level at full mark.

△10 CENTER HOUSING DIPSTICK

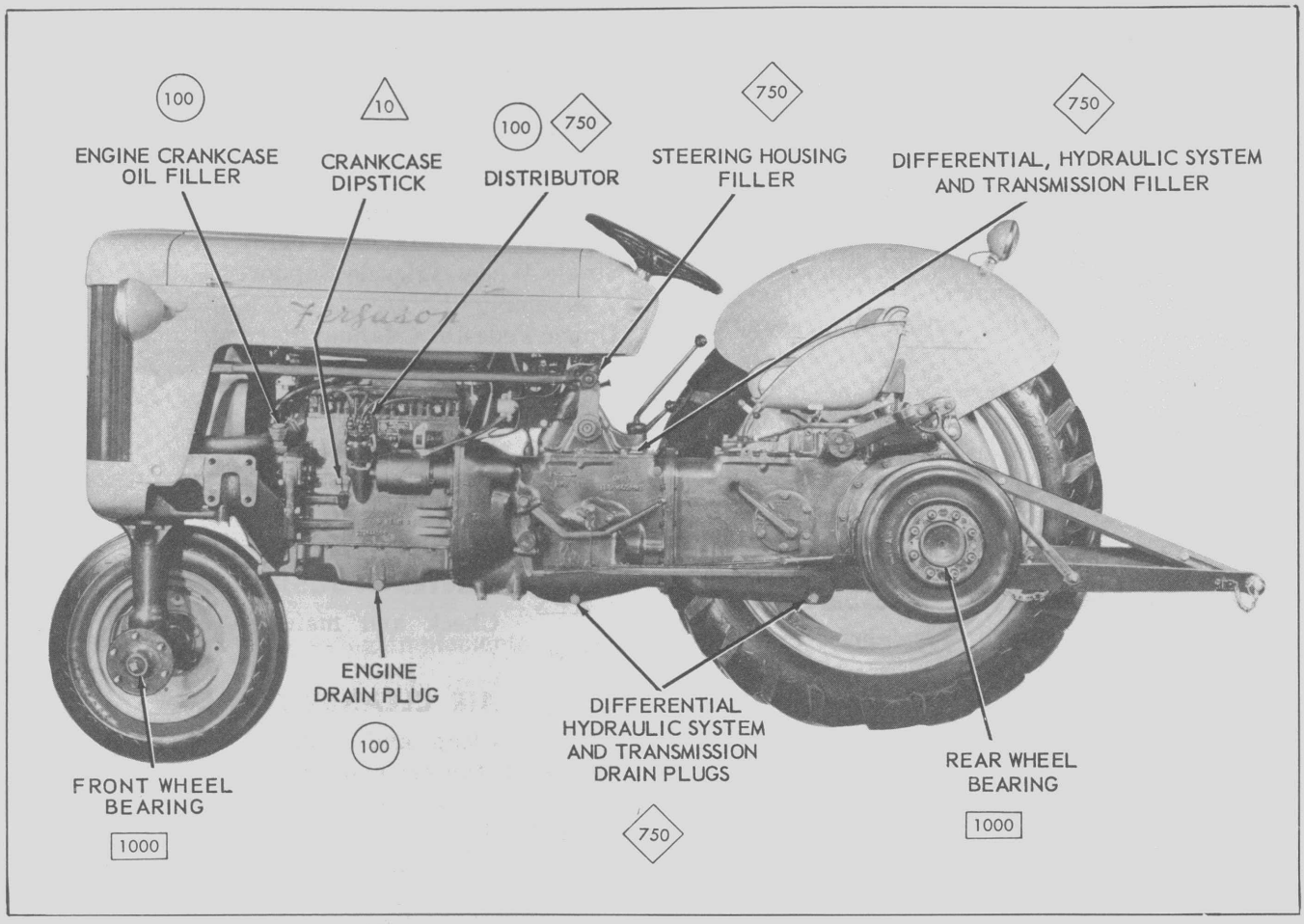
Check and maintain oil level within arrow.

△10 AIR CLEANER BOWL

Clean and refill to level indicated in bowl with the same weight oil as is used in the crankcase. Under very dusty conditions, service every five hours.



Lubrication Chart



Lubrication Chart

(100) ENGINE CRANKCASE

Drain when warm and refill to full mark on dipstick. Crankcase capacity—5 U.S. quarts.

S.A.E. 30 above 50° F.
S.A.E. 20 below 50° F.
S.A.E. 10W below 10° F.

(100) DISTRIBUTOR

Remove distributor cap, put one drop of light engine oil on breaker lever pivot and several drops on felt wick under rotor. Apply a trace of cup grease on distributor cam.

(100) GENERATOR

Put 10 drops of light oil in each oiler.

[200] OIL FILTER ELEMENT

Replace element every other oil change. 6 U.S. quarts of crankcase oil are required with the installation of a new element.

⟨750⟩ TRANSMISSION, HYDRAULIC SYSTEM AND DIFFERENTIAL

Drain when oil is warm through two drain holes and refill with straight mineral gear oil. The two magnetic drain plugs should be cleaned of any metal particles at this time. Quadramatic control levers must be in the lower position to drain ram cylinder. Capacity – 8 gallons.

S.A.E. 90 above 50° F.
S.A.E. 80 below 50° F.

[1000] STEERING HOUSING OIL LEVEL

Maintain oil level to filler plug opening with transmission lubricant.

⟨750⟩ POWER STEERING SYSTEM

Maintain oil level 1/4-1/2 inch above filter using only type "A" automatic transmission fluid.

DISTRIBUTOR RESERVOIR

750

Fill with S.A.E. 20.

WHEEL BEARINGS

750

Remove, wash out and repack bearings with a good grade wheel bearing lubricant. Refer to page 54 for front wheel bearing adjustment and page 50 for rear wheel disassembling procedure.

TRACTORMETER

1000

Put 2 or 3 drops of very light oil on felt wick located at shaft housing on rear of meter.

MAINTENANCE

Your tractor is rugged and durable; however, just like any other modern machine, it will give you much more satisfactory service if it is properly cared for. Experience has shown that periodic checks of certain parts are the best way to keep your tractor in "top-notch" condition. It is highly advisable that at least once a year, preferably in the early Spring before your tractor's busy season starts, you have your Ferguson Dealer give your tractor a complete "check-up". Having him make needed repairs at that time may save you costly breakdowns later in the season. In order to aid you in your periodic maintenance checks, the following table is provided. A more complete explanation of most items listed will be found elsewhere in this book.

Refer to lubrication details, page 1 and 2 for items which have an asterisk (*).

DAILY MAINTENANCE (10 HOURS)

CRANKCASE DIPSTICK*

CENTER HOUSING DIPSTICK*

AIR CLEANER*

Inlet hose. Inspect for dirt and clean if necessary.

PRESSURE FITTINGS*

RADIATOR

1. Coolant level should be approximately 1 in. above core.

2. Fins. Clean out foreign material.

GASOLINE TANK

Fill with good, clean gasoline through a screened funnel when the engine is stopped. Do not overfill. Be particularly careful not to spill fuel when engine is hot.

WEEKLY MAINTENANCE (50 HOURS)

BATTERY

1. Inspect cables and surface of battery. If wet, dirty or corroded, clean with a warm baking soda solution and apply grease to terminals to prevent further corrosion.

2. Keep water level to the bottom of the tubes. Add only distilled water.

TIRES

Inspect physical condition and check pressure. The tires should be inflated to the following pressures:

Front tires (all sizes)	24-28 lbs.
Rear tires (excluding 13-24 size)	12-16 lbs.
13-24 tires	14-18 lbs.

NUTS, BOLTS AND SCREWS

Check and tighten if necessary.

FUEL FILTER AND SEDIMENT BOWL

Shut off valve, empty bowl and wash filter in solvent. If filter becomes coated with gum or other deposits from the gasoline, soak in a varnish solvent to remove. Wash and blow clean.

SEMI-MONTHLY MAINTENANCE (100 HOURS)

CRANKCASE OIL*

DISTRIBUTOR*

GENERATOR*

MONTHLY MAINTENANCE (200 HOURS)

SPARK PLUGS

Inspect condition. Clean spark plugs and set gap at 0.025 in. Use new gaskets when reinstalling spark plugs.

OIL FILTER CARTRIDGE*

BEARING RETAINER NUTS

Tighten the six nuts on end of rear axle housings.

CYLINDER HEAD COVER BREATHER PIPE

Remove and clean.

CARBURETOR

Shut off fuel valve, remove drain plug and drain carburetor. Remove inlet elbow and clean screen.

SPRING AND FALL MAINTENANCE (750 HOURS)

TRANSMISSION OIL*

STEERING HOUSING OIL LEVEL*

POWER STEERING SYSTEM

Carefully clean top of power steering reservoir before removing reservoir cover. Maintain oil level 1/4 to 1/2 inch above the filter. Change filter only if damaged. Use only type "A" automatic transmission fluid.

RADIATOR

Clean and flush radiator and refill with proper coolant.

*For further information refer to pages 1, 2 or 3.

GASOLINE TANK

Clean and flush tank to remove rust, dirt and other foreign material.

AIR CLEANER

Internal filter. Remove filter assembly and wash in a solvent. Check all connections for tightness.

DISTRIBUTOR RESERVOIR*

YEARLY MAINTENANCE (1000 HOURS)

TRACTORMETER*

FRONT AND REAR WHEEL BEARINGS*

UPKEEP

Wash tractor thoroughly. Remove all rust spots and touch up all areas with Ferguson Enamel.

DON'T TAKE CHANCES!

HAVE YOUR FERGUSON TRACTOR SERVICED BY AN AUTHORIZED FERGUSON DEALER. YOUR FERGUSON DEALER HAS FERGUSON TRAINED MECHANICS AND GENUINE TOP QUALITY FERGUSON SERVICE PARTS.

Ask your Ferguson Dealer about his

ON-THE-FARM-SERVICE-PROGRAM

FERGUSON Full Value SERVICE

Operation

The "like new" performance of your Ferguson "40" Tractor can be perpetuated if you, the owner, observe a few basic rules and operating principles. A few reasonable precautions when you first receive your "40" will aid considerably in the over-all life of the machine. Periodic maintenance throughout the lifetime of the tractor will play an important part in the amount of trouble-free service you can expect to obtain. Also, as you become familiar with the controls in relation to situations encountered, you will determine to a large degree the flexibility of the tractor and implement. Thus the ultimate tractor life will be extended by eliminating unnecessary and uneconomical operations and procedures. Follow the suggestions in this section to help you obtain all the performance that was designed and built into your tractor.

INSTRUMENTS AND CONTROLS

IGNITION SWITCH

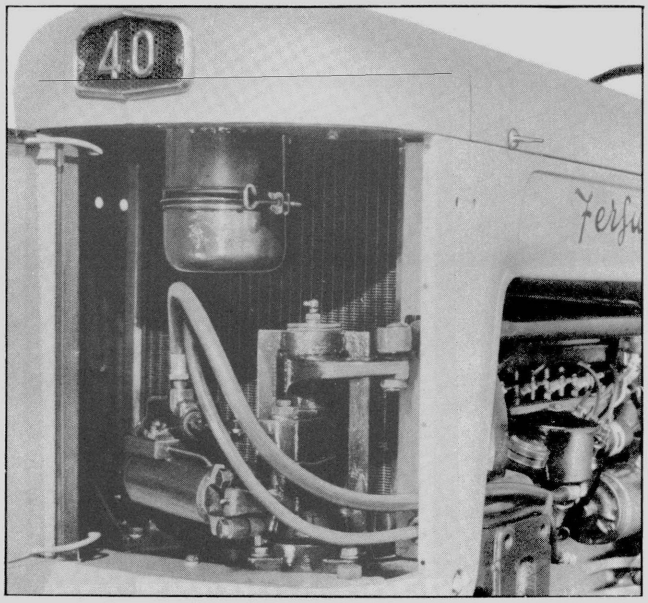
Key operated ignition, ignition and light, and light switch on the lower right side of the instrument panel. "I" position closes the ignition circuit. "IL" position closes both the ignition and light circuit and "L" position closes the light circuit only. The key can be removed from the switch only in the "off" position. When the key is removed, the switch is locked.

STARTER PUSH BUTTON SWITCH

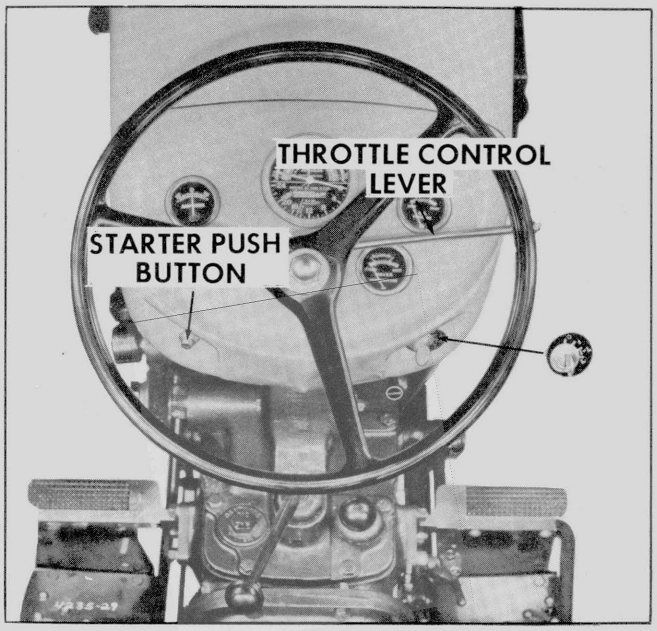
Located on the lower left portion of the instrument panel conveniently recessed out of the way. The switch closes the starting motor circuit only when the Dual Range lever is in neutral position and the ignition switch is "on".

CHOKE

Pull-type button located on the lower right of the instrument panel. Pulling the choke out provides a rich fuel mixture for faster and easier starting.



Power Steering Assembly (Optional)



Instruments and Controls Located on Dash Panel

THROTTLE LEVER

Located between the steering wheel and instrument panel at the upper right of the steering column. Pulling the throttle downward increases the engine speed.

AMMETER

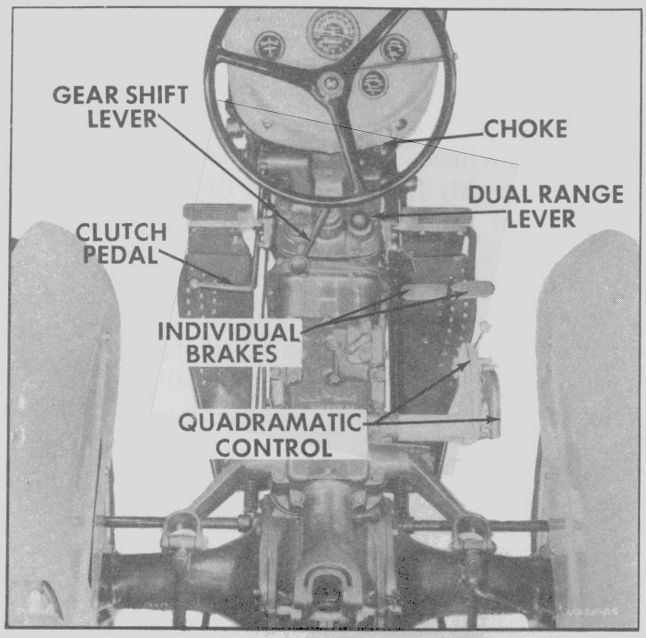
Induction type located on left side of instrument panel. The ammeter indicates the rate of battery charge or discharge and not the generator output.

OIL PRESSURE GAUGE

Located on upper right of instrument panel. The gauge indicates the amount of pressure and not the amount of oil in the system.

WATER TEMPERATURE GAUGE

Located on the lower right side of the instrument panel. The gauge indicates the engine temperature. When the engine has properly warmed-up, the needle should always remain in the "green" or normal operating position.



Tractor Controls

TRACTORMETER

Located in the center of the instrument panel. The instrument is a combination tachometer, speedometer and modified hour meter. The six scales on top of the dial indicate forward miles per hour corresponding to the gear engaged, the bottom scale indicates engine RPM, and the window at the center of the dial indicates the total accumulated hours of operation at an average speed of 1,580 RPM. It should be noted, however, that engine speeds lower than 1,580 RPM will accumulate hours slower than clock hours while engine speeds higher than 1,580 RPM will accumulate hours faster than clock hours. The normal pulley operating speed and engine PTO speeds are also shown on the dial face.

GEAR SHIFT LEVER

Located in front of the tractor seat on the top center of the transmission housing. The three forward and one reverse gears are indicated by raised characters on the tractor center housing. The gear shift lever is used in conjunction with the Dual Range shift lever.

DUAL RANGE SHIFT LEVER

Located in front of the tractor seat on the transmission housing to the right of the gear shift lever. The high and low ranges are indicated by a raised "H" and "L" on the tractor center housing. The raised "S" indicates the neutral or start position. For starting, the Dual Range shift lever must be in the "S" position in order to close the starting motor circuit. When operating, the lever must be in either the high or low range.

STEERING WHEEL

Hard rubber coated metal base wheel with evenly spaced finger bosses for gripping. The wheel is keyed to the steering shaft and provides easy turning and control of the tractor.

CLUTCH PEDAL

Located to the left of the transmission housing, above the step plate. To disengage clutch, depress pedal with foot. Initial movement of the pedal disengages the primary clutch (tractor motivation). Additional movement disengages the secondary clutch (hydraulic pump and PTO).

INDIVIDUAL BRAKE PEDALS

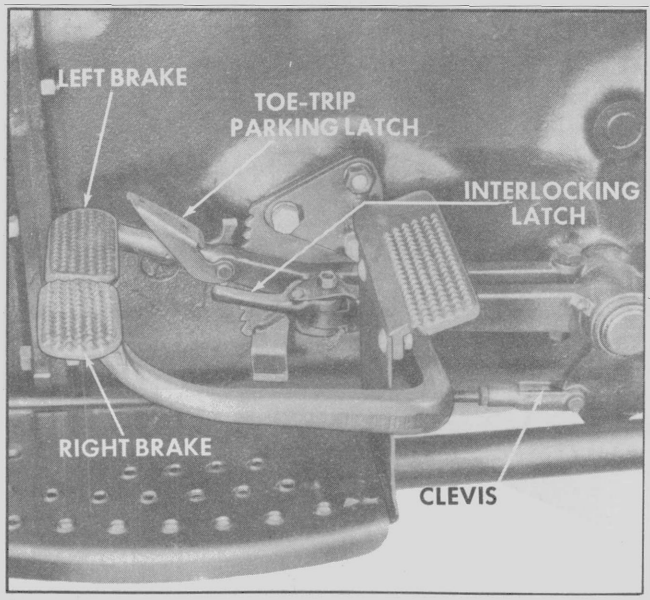
Located to the right of the transmission housing and adjacent to each other. Foot pressure on either the right or left pedal brakes the respective right or left wheel for turning.

MASTER BRAKE

The individual brake pedals are close enough together to enable the operator to depress them simultaneously to brake the tractor's forward travel. An interlocking latch locks the individual pedals together, thus providing a master pedal for highway use.

TOE-TRIP PARKING LATCH

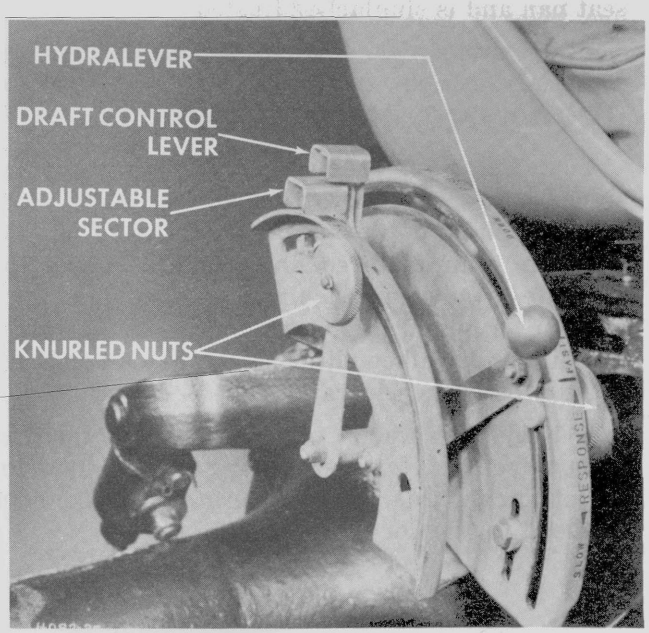
The left brake carries an over center spring type parking brake latch for convenient locking of both brakes when parking. This latch can be readily engaged by hand or foot. When set, it is released on the next application of the pedal.



Tractor Brake Assembly

QUADRAMATIC CONTROL

Located at the right of the tractor seat. The two levers provide the operator with manual control of the hydraulic system. The lever on the outer quadrant (draft control lever) is used for draft control adjustment, enabling the operator to establish a desired working depth for an implement. The lever on the inner quadrant (Hydralever) is used to control the position of the links as well as to select the desired response of the system. The upper range of the quadrant provides the system with position control, enabling the operator to select an infinite number of stopping points for the lower link. In the lower range the Hydralever provides a response selection by controlling the rate of implement fall.



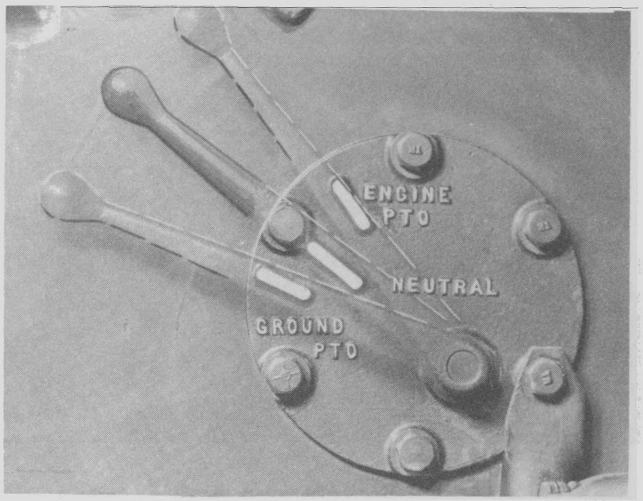
Quadramatic Control

POWER-TAKE-OFF LEVER

Located on the left side of the tractor center housing. The lever shifts to three positions: (1) proportional engine speed, (2) neutral and (3) proportional ground speed.

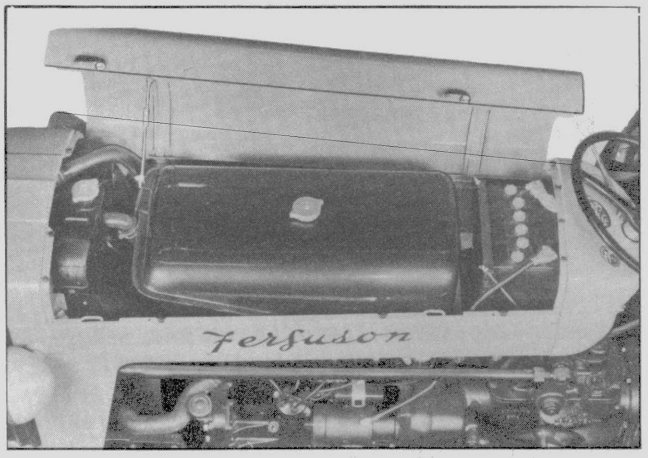
FUEL SHUT-OFF VALVE

Located on the bottom left rear of the fuel tank. The valve is turned to the right to shut off the fuel flow. The valve opened two full turns to the left will allow gasoline to flow from the main supply. Opening the valve completely permits the use of the reserve two gallons of fuel. Operate on reserve position one hour each day to keep reserve passage clean.



Power Take-Off Shift Lever Positions

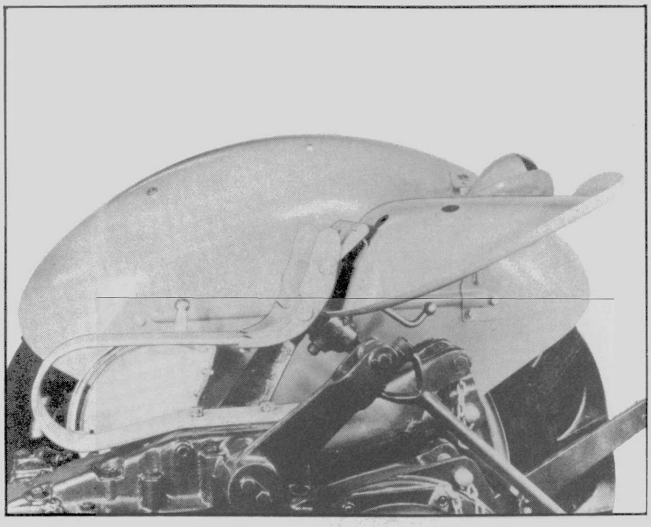
Fuel Valve and Sediment Bowl



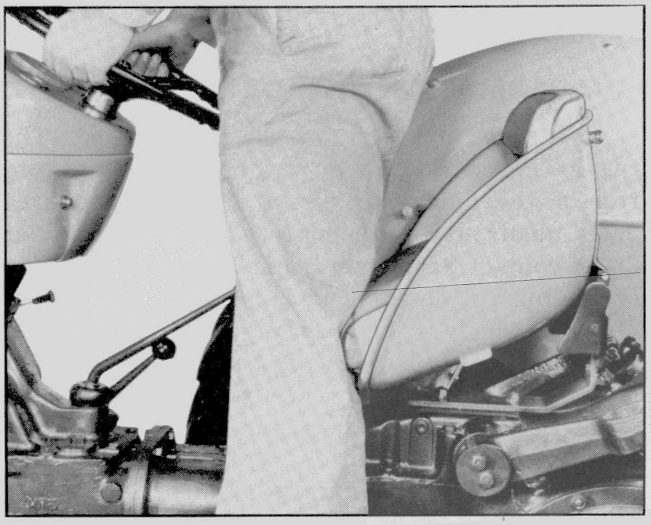
Hood Service Panel Opened

HOOD SERVICE PANEL

Located on the top of the tractor hood and released by means of two latches. The panel provides accessibility to the gas tank cap, radiator cap and battery filler caps from the left side of the hood without lifting the entire hood.



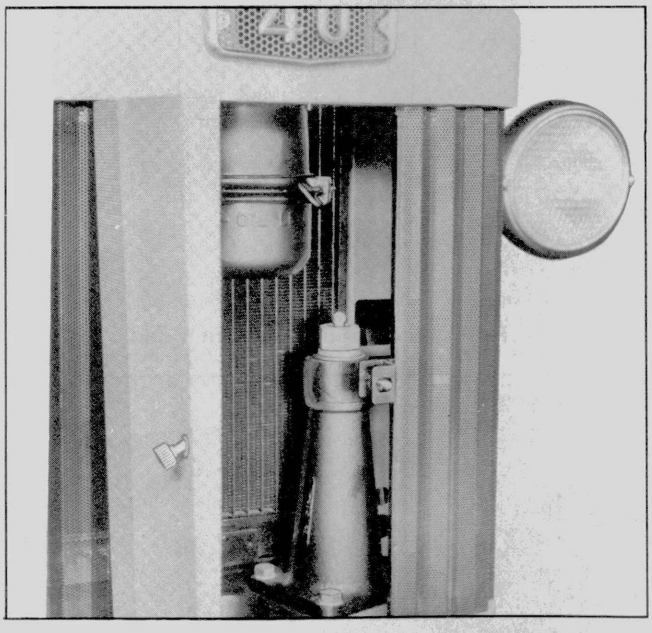
Steel Seat Thrown Back



"Foam Float" Seat Positioned for Standing

DOUBLE HINGE SEAT

The seat can be set back to enable the operator to stand and can be hinged upside down to keep it dry. The seat bracket can be adjusted forward or rearward.



Grill Center Section Open

GRILL CENTER SECTION

Located in the center of the grill and fastened shut by a knurled nut. The section swings to the left, giving ready access to the air cleaner, upper steering pedestal and power steering cylinder.

DOUBLE HINGE "FOAM FLOAT" SEAT (Accessory)

A foamed latex cushioned seat and back rest upholstered with a weather resistant, plasticized fabric. The seat is inserted in a steel bucket-type seat pan and is similarly adjusted as the standard seat.

BREAKING-IN PERIOD

Your Ferguson Tractor has been carefully designed and developed to furnish you many thousands of hours of working satisfaction. The "40" has been manufactured and produced using the ultimate in modern machining methods and production techniques for economical and trouble-free life under all conditions; yet, like all engines, it must be broken in carefully.

1. Keep your tractor on light work for the first 50-hour period. However, during each 10-hour interval during this period, operate tractor under full load for five or ten minutes.

Always Open Doors Before Starting Tractor Engine

2. Use low transmission speeds when pulling heavy loads while the engine is new.

3. Change crankcase break-in oil after first 50 hours of operation.

4. Change transmission break-in oil after first 50 hours of operation.

5. Tighten all nuts, bolts and screws frequently during break-in period.

6. Call your Ferguson Dealer for the first 180-day check up.

STARTING THE TRACTOR

Climb up on the tractor seat and get accustomed to the controls. Place your hands on the wheel and your feet on the clutch and brake pedals. Notice the location of all the instruments and controls. If necessary for comfort, the seat bracket can be easily adjusted forward or rearward on the tractor housing by positioning the studs in either of the three sets of holes. Now start the tractor engine.

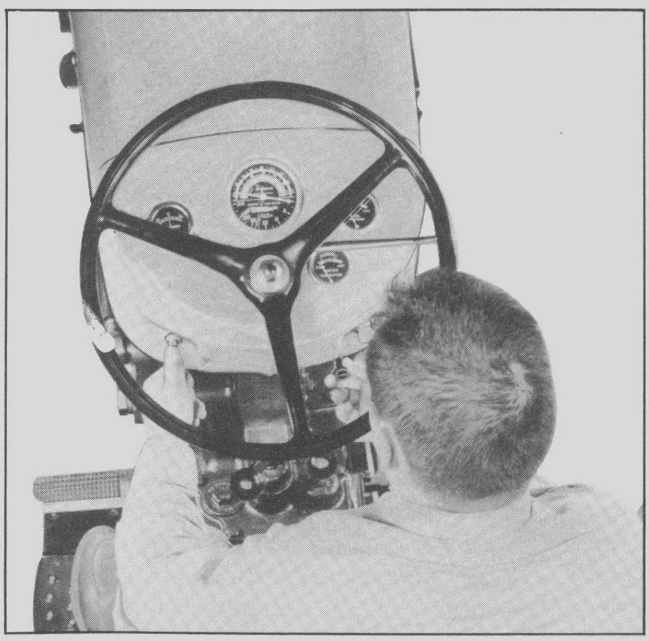
CAUTION: Carbon monoxide is a killer. Never operate your tractor engine in a closed building.

1. Open fuel shut-off valve by turning two full turns to the left from the closed position.

2. Turn ignition key to "I" position.

3. Move throttle 1/8 to 1/4 open position.

4. Disengage clutch by pushing pedal down fully.



Starting the Tractor

5. Place the Dual Range lever in the neutral position to close the transmission neutral safety switch.

6. Pull out choke and hold in position with the right hand.

7. Press the starter push button switch with the left thumb and release immediately when engine starts.

8. Release choke as soon as engine runs smoothly.

9. Do not "rev-up" or race the engine immediately after starting. Cold oil cannot circulate freely to all moving parts.

10. Allow the engine to reach its normal operating temperature before working the tractor. During cold weather, it will be noted that the oil pressure gauge will register a higher pressure. When this condition exists, the engine should be run at an idle speed until the pressure reaches its normal position.

NOTE: If the engine is hot and fails to start or if the carburetor becomes "flooded", pull the hand throttle down while starting. Do not use the choke.

OBSERVING THE INSTRUMENTS

Form the habit of observing the instruments after starting your tractor and occasionally while operating. The oil pressure gauge should register in the "green" or "white" area right after a cold engine is started. If it does not, stop the tractor immediately and determine the cause, as serious damage will result if the engine is operated without sufficient oil pressure even for a short time.

The ammeter needle has to be on the "plus" (+) or right side in order to charge the battery. When operating, the needle should always take this position unless the engine is running at an idle or unless the electrical load such as lights is consuming in excess of the output of the generator at low engine RPM's. Continuous operation of the tractor with the battery discharging will result in the battery running down. Also, operating with the ammeter indicating an excessive charging rate will cause the battery to overheat. When either of the above conditions exist, have your Ferguson Dealer check the electrical system.

The temperature gauge pointer will rest in the cold position after the engine is started and until the coolant warms up. After the engine warms up, the pointer should point in the "green" or normal range. If the pointer rises to the "red"

or hot range, the engine is overheated. Stop the engine and determine the cause. If you find the radiator is low of coolant, allow the engine to cool, then add water slowly to the radiator while idling the engine.

CAUTION: When removing the pressure-type radiator cap, slowly and carefully turn to the first notch. This will relieve the pressure, thus preventing possible injury from escaping steam.

DRIVING THE TRACTOR

To start the tractor in motion after the engine is operating, proceed as follows:

1. Make sure brakes are released.

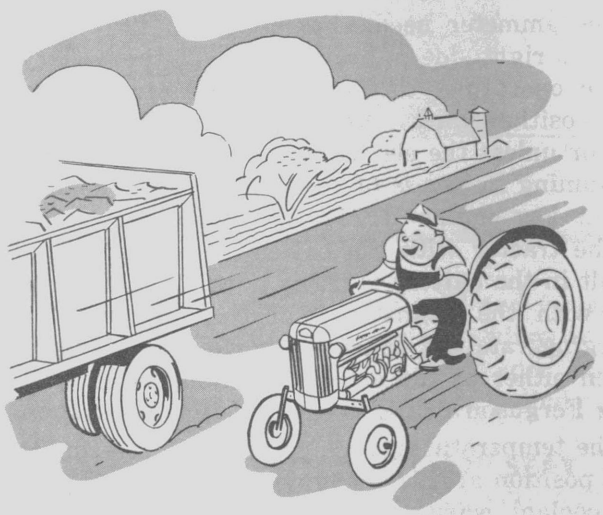
2. Depress clutch pedal through 1st stage and move the Dual Range lever to either high or low range and gear shift lever to desired gear.

3. Increase speed slightly and release clutch pedal slowly.

4. Remove foot from clutch pedal and slowly increase throttle setting until desired speed is obtained.

CAUTION: Do not permit foot to rest on or ride the clutch pedal. "Riding the clutch" over a period of time will cause the clutch to slip.

Notice how easily your "40" steers. This permits flexible maneuverability for both field and highway operation. Also, the independent wheel brakes can be used in conjunction with the steering wheel when making short turns.



Drive Carefully on the Highway, Observing all Traffic Rules

CAUTION: Sharply braking one wheel causes wasteful tire and brake wear, and therefore, should only be done when short turns are necessary. INDIVIDUAL WHEEL BRAKING SHOULD NOT BE ATTEMPTED WHILE TRAVELING AT HIGH SPEEDS. Before driving at high speeds, set the interlocking latch to provide master brake control.

SELECTING THE CORRECT GEAR

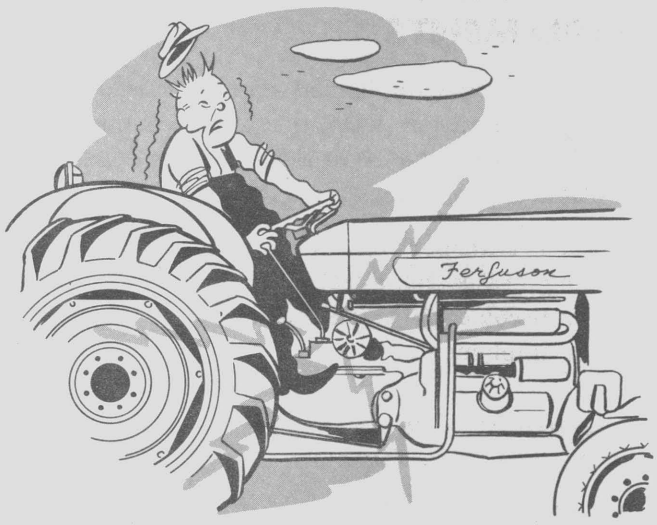
The correct working gear can only be obtained by an intelligent selection by the operator. The basic factors involved in this selection are: (1) type of implement used; (2) field conditions encountered; (3) load subjected to the tractor; and (4) the ground speed to effectively perform the operation.

Also, a factor to keep in mind while operating your "40" is the torque or "lugging" characteristic it possesses. This can be expressed as the ability the tractor has to work in varying soil and terrain conditions without changing the throttle setting or shifting gears. In other words, a good torque characteristic means you can work at a steady speed without throttle adjustment. Your Ferguson "40" incorporates a broad range of lugging power with the peak developing at the lower engine RPM's. Maximum torque occurs at 1,200 RPM. This does not mean, however, you should "lug" your tractor down at this speed. Instead, the throttle setting should be such that you can obtain maximum performance and yet "lug" through any tough spots that may be encountered. The low speed "lugging" characteristics your tractor develops should only be used to avoid a rough, fast ride in rough or rocky ground.

Don't Ride The Clutch Pedal

Always keep in mind that: (1) Operating the tractor under load in a high gear, or when an excessive load is involved for the selected gear and throttle setting, overloads the engine and can cause serious damage and wear. When this condition exists, the engine is turning with a low manifold vacuum and relatively higher compression pressure and is noticeable by a "lugging" sound of the engine. Excessive wear and overheating will result from this condition. (2) Operating the tractor in a low gear with a high engine speed and relatively light engine load is a waste of fuel and time. Any gasoline engine operating at a high speed, with a light load, is running with a high manifold vacuum and low compression which causes inefficient combustion. Noticeable racing of the engine is an indication of this condition.

CAUTION: When shifting, the tractor must be brought to a complete stop.



Bring the Tractor to a Complete Stop Before Shifting Gears

A TEST FOR OVERLOADING

With the tractor in motion, set the throttle half way open. Then quickly pull the throttle fully open. If the tractor speeds up rapidly, the engine is not overloaded. If the engine picks up speed slowly, the tractor is overloaded and should be stopped and then shifted to the next lower gear. When operating on hills, the above test might indicate overloading; however, this is not harmful as it is compensated for when coming down hill. It is the continuous overloading which must be avoided.

Always Stop Tractor Before Dismounting

STOPPING THE TRACTOR

When you desire to stop the forward motion of the tractor, depress the clutch pedal while at the same time reducing the engine speed. Apply pressure on both brake pedals as needed in order to stop the tractor. Move both the gear shift and Dual Range levers to their neutral position and turn the ignition switch to "off" position. Lock toe-trip parking latch.

NOTE: At the end of the working day, turn the fuel shut-off valve to the "off" position.

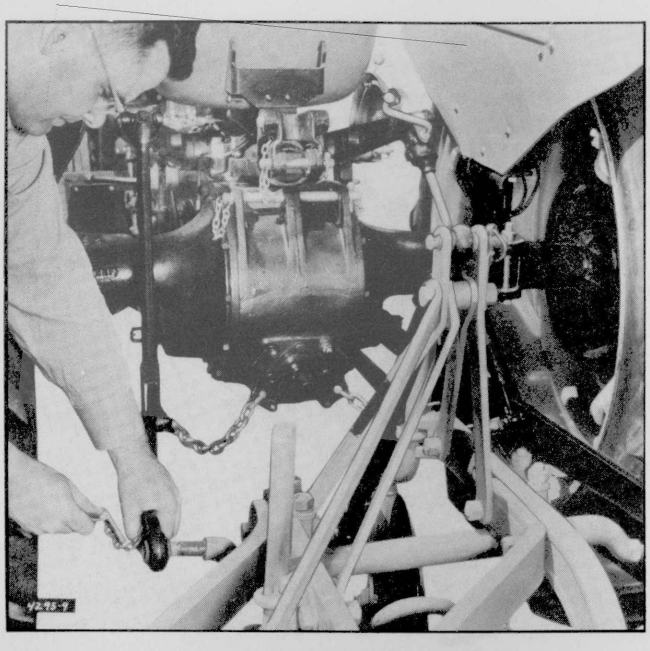
ATTACHING FERGUSON SYSTEM IMPLEMENTS

The outstanding feature of your Ferguson Tractor is the patented Ferguson System which combines both tractor and implement into one close-coupled hydraulically controlled working unit. Quadramatic control provides, at your fingertips, manual control over the entire system. Along with the ease of operating the system you'll also find it an easy matter to attach Ferguson Implements to the tractor linkage.

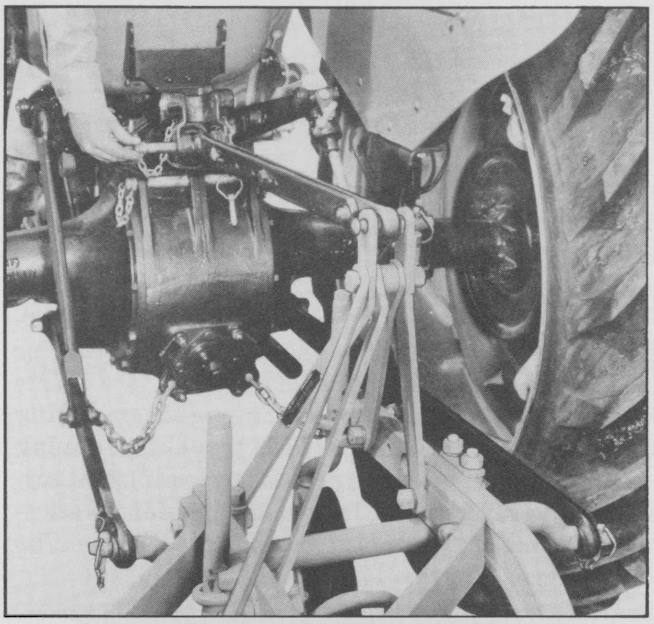
1. Back the tractor so that it is centered with the implement, having the lower links above the two lower attaching points.

2. Lower the links by pushing the Hydralever down as far as necessary.

3. Dismount tractor from left side.



Attaching Left Lower Link



Attaching Upper Link to Tractor

4. Attach left lower link by rocking the tractor slightly backward or forward to align the pin with the ball socket. Insert linch pin.

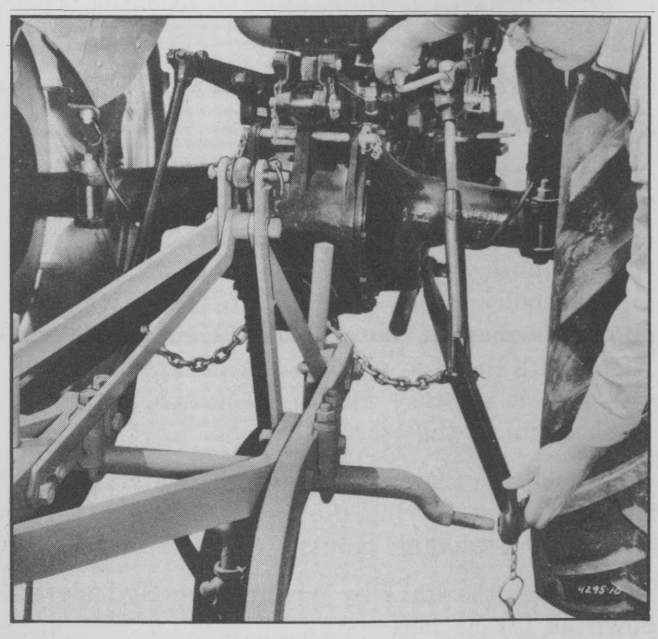
5. Attach right lower link using the leveling crank to bring the ball joint in line with the attaching pin. Insert linch pin.

6. Attach upper link to the implement and insert linch pin. Remount tractor and attach the free end of the upper link to the tractor by moving the tractor slightly backward or forward in low range. This will line up the connection, enabling the pin to be inserted. Insert linch pin.

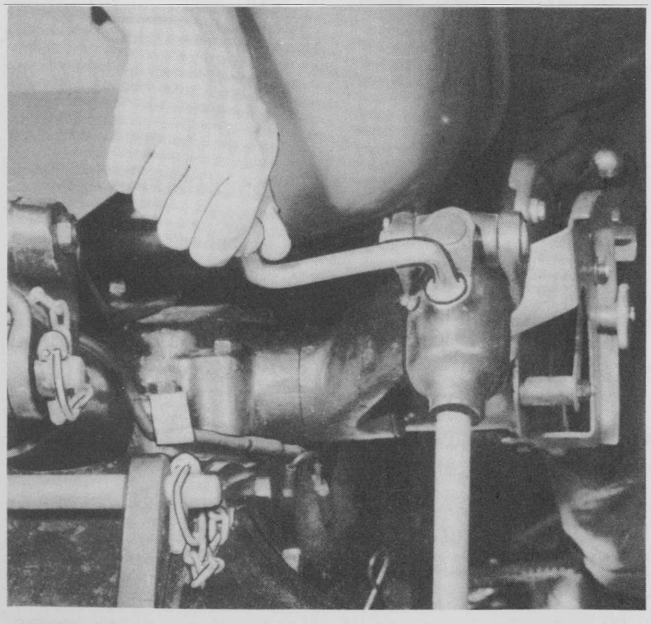
RAISING AND TRANSPORTING IMPLEMENTS

Any lift-type implement can be raised to the transport position with the engine running by simply raising the Hydralever to the top of the position control range.

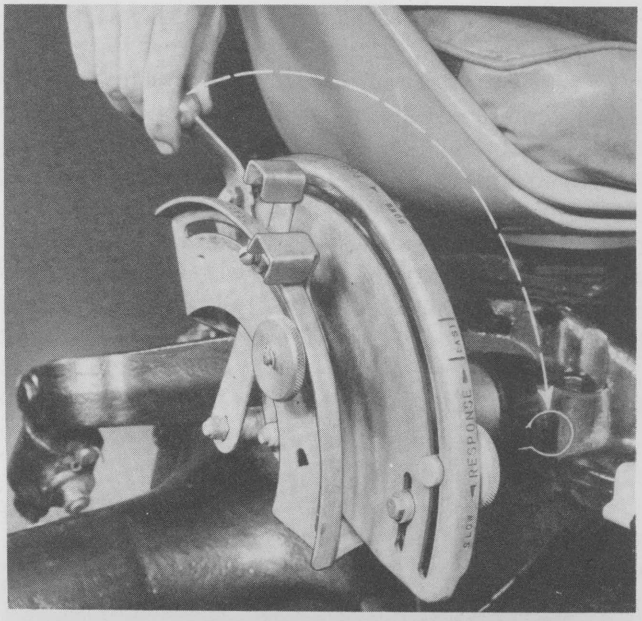
When transporting the implement, turn the leveling crank counterclockwise until the check chains become tight. This will prevent side sway of the implement.



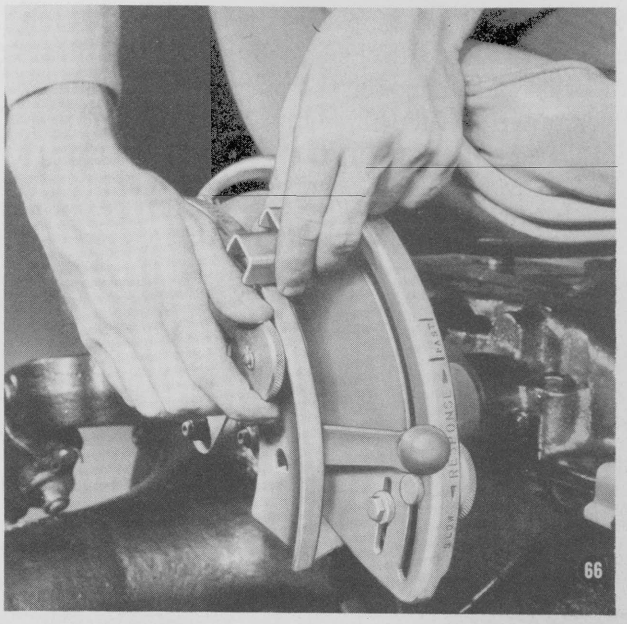
Attaching Right Lower Link



Turning the Link Leveling Crank



Raising the Hydralever to Transport Position



Positioning and Securing Small Adjustable Sector to Correspond to Draft Control Lever Setting

To level the implement, level the lower links by turning the hand crank on the right lift rod until the circular groove on the rod matches the top of the fork into which it threads.

NOTE: It is important that the ball joints be kept clean; however, they should never be lubricated.

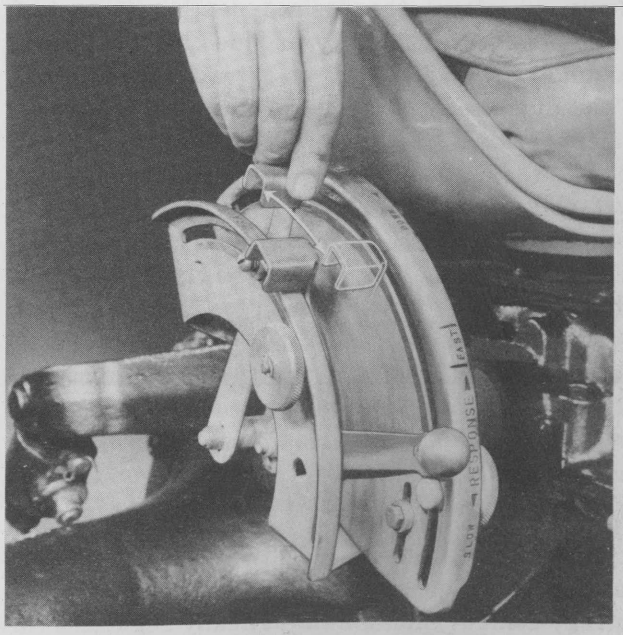
OPERATING WITH SOIL-ENGAGING IMPLEMENTS

The concept of implement control which is embodied in the Ferguson System of your "40" is based on many variable situations which you may encounter using the many Ferguson Implements.

DRAFT CONTROL

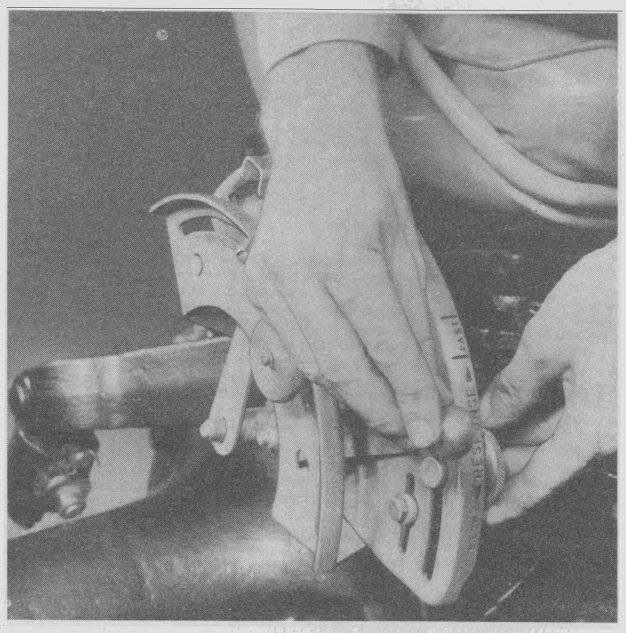
For draft implements (in general, most agricultural tillage implements are draft implements) the draft control lever is to be used to select the desired working depth of the tool in the soil.

With a soil-engaging implement in the raised or transport position, lower it to the working position by lowering the Hydralever through the position control range. This allows oil to flow from the hydraulic lift cylinder which in turn causes the implement to lower by its own weight. With most soil-engaging implements this would be done while initiating tractor forward motion. The weight of the implement and the "suck" designed into the soil-engaging parts will cause the implement to enter the ground. The depth the tool attains or the distance the implement lowers into the soil is dependent upon the setting of the draft control lever. As soon as the tool reaches the selected draft, the oil flow from the hydraulic lift cylinder is automatically stopped. If the soil texture changes, resulting in a variation in draft, the implement will raise or lower accordingly. This variation can be compensated for by moving the draft control lever slightly lower in heavier soils or slightly higher in lighter soils to maintain uniform depth. Sufficient range for field adjustments is provided within the adjustable sector.



Positioning Draft Control Lever Within Small Adjustable Sector to Compensate for Varying Draft Conditions

Initially the finger grip on this small adjustable sector is to be positioned in line with the draft control lever setting for the purpose of relocating the original setting following such field adjustment. The small, adjustable sector should be locked in the selected position by tightening the knurled nut.



Fixing Hydralever Travel to Obtain a Pre-Determined Response Selection

The draft control lever should not be used to raise the implement at the end of a furrow but should be left at the desired depth setting and the Hydralever used to over-ride this draft control and raise the implement to transport position. If the draft control lever is fully raised, and the tension load on the top link is less than 1,000 pounds, the implement will be lifted beyond transport shut-off position and the safety valve will blow so long as the draft control lever remains in this position. The small, adjustable sector, when tightened at the selected draft lever setting, permits a small amount of lever movement either way from the finger grip position for minor field adjustments, but in most operating conditions, prevents the operator from inadvertently using the draft control lever to bring the implement to transport position.

On uneven ground or undulating terrain, expansion and contraction of the master (double acting) control spring automatically regulates the flow of oil to and from the hydraulic lift cylinder. This tends to keep an implement at a uniform working depth.

The master control spring is double acting; that is, it may be compressed against its rearward seat by a tension load on the top link or it may be compressed against the forward seat by a compression load on the top link. This important feature means that full implement draft control can be maintained even though the top link is in tension. Implements with heavy overhung weight to the rear of the lower link ends, or implements having extremely light draft, receive the full benefits of draft control.

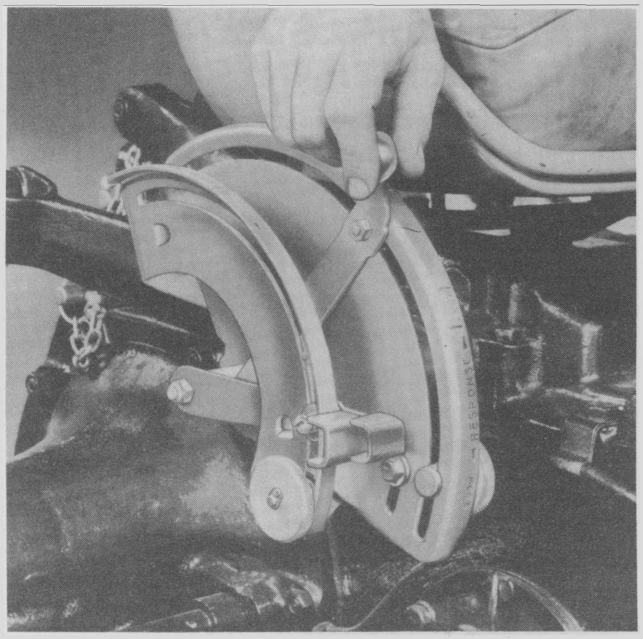
RESPONSE SELECTION

In conjunction with draft control, the lower range of the Hydralever quadrant provides the new Ferguson System with response control. In this range, movement of the Hydralever permits the operator to select the optimum discharge port area for the implement being used. This discharge area then modifies draft response to suit a given implement in a given soil condition by limiting the rate at which oil is released from the ram cylinder, consequently limiting the rate of implement fall. In draft control operations all implements, be they heavy or light, should be lowered at approximately the same rate. A nonadjustable discharge port, as used in some tractor hydraulic systems, must necessarily be a compromise. Hence the rate of response of heavy implements is often too fast, and light implements too slow for optimum control. This feature of the new Ferguson System, the adjustable discharge port, allows the operator to use such high volume discharge ports that even manure loaders can be operated by the single control valve, and by changing the response selection to restrict these ports, achieve proper response control of all soil-engaging implements.

In selecting the correct response setting, the draft control lever should be first set to give the desired depth, or draft, and then the Hydralever moved to the proper spot in the response sector to suit the particular implement and soil condition. The rate of response may be varied and can be adjusted to suit a heavy implement or light implement and in either case modified to suit the undulations of the soil being worked.

The final response selection is dependent upon the operator's "feel" of the tractor and implement and should be adjusted until a smooth operation is obtained. The Hydralever limit stop, which is provided with a knurled nut, should then be locked at this position. The same response selection can be maintained, after raising and lowering the implement, by returning the Hydralever to the limit stop.

As a general rule, a good place to start in making a response selection for a given soil-engaging implement is at or slightly below the halfway position on the response range of the quadrant. If at any time "bobbing or bouncing" of the implement occurs, the operator should reposition the Hydralever closer to the slow response range of the quadrant. If in undulating terrain, or in areas where there are rapid and varied soil texture changes, or extremely stony conditions, the implement may not respond fast enough to maintain a uniform working depth.



Selecting the Hydralever Setting to Obtain a Particular Fixed Implement Position

To compensate for the above, the Hydralever should be moved toward the fast response range until satisfactory operation is obtained. Such things as the L-UO manure loader, which requires a fast dump, are operated in the fast response position.

POSITION CONTROL

The new addition to the Ferguson System Controls, the Hydralever, has two distinct functions: (1) As previously discussed under "Response Selection", the Hydralever, at the lower end of its range, is able to modify draft control and provides response selection. (2) The Hydralever, at the upper end of its range, is able to overcome draft control, causing the links to raise, thus establishing an infinite number of shut-off points corresponding to lever positions up to full transport.

Thus, position control permits the operator to select and automatically maintain a fixed height or depth position for an implement, independent of forces applied at the control spring, with the following exceptions: Position control is subject to draft control and overload release when an implement working in the ground exerts a force on the master control spring which exceeds the selected draft setting. The maximum draft setting obtained by moving the draft control lever to the bottom of its quadrant is 3,000 pounds compression on the master control spring. An additional 2,000 pounds compression is needed to produce overload release.

Position control is useful when operating such earth-working implements as the Multi-Purpose Blade and Soil-Scoop to achieve a smooth surface and it is a decided help when connecting the tractor links to an implement. It is definitely advantageous when operating such non-soil engaging tools as the L-UO Manure Loaders or when positioning the Ferguson Power Jack.

The Hydralever is also used to lift an implement to transport position. The quadrant is provided with an adjustable stop so that the implement can be returned from transport to either its previously selected working position or response setting.

CAUTION: When lowering an implement from the transport position, the Hydralever should be moved slowly downward through the position control range.

Never Drive Too Close to Ditches or Gullies

The implement will lower at approximately the same rate at which the lever is lowered and a rapid drop may result in damage to the implement.

OVERLOAD RELEASE

Compensating overload release is a safety feature built into the Ferguson System of your "40" to assure protection when a soil-working implement strikes a hidden obstruction. If, when operating with an implement at any draft setting, an additional compression load in excess of 2,000 pounds occurs on the double acting control spring, the system will automatically go into overload release. This causes a rapid discharge of oil from the hydraulic lift cylinder and allows the lower links and attached implement to drop with respect to the tractor. As the transfer weight of the implement diminishes, a loss of traction occurs and the rear wheels spin. When this happens it is a simple matter for you to quickly disengage the clutch, reverse the tractor, lift the implement and drive forward until you are clear of the obstruction and again lower the implement to working position.

Overload release offers you protection in any draft control or position control setting, and is in no way affected by the response setting, thereby safeguarding you, your tractor and implement at all times.

CAUTION: When you are operating your "40" you must realize that the implement attached to the tractor has been designed and built to work best at a given ground speed. For instance, Ferguson Plows are built to operate in high range–first gear. A slow or faster speed will not provide the proper turning and pulverizing of the soil. Also, faster speeds increase the chances of damaging the tractor or implement. While the Ferguson System provides adequate, automatic protection at normal operating speeds, it should be kept in mind that the force at which an implement strikes an obstruction varies directly as the square of the velocity or speed. For example: assume that a Ferguson Hi-40 is operating in high range–second gear at 6.53 miles per hour (1500 engine RPM). The force at which an implement would strike an obstruction would be 2¼ times greater compared to operating in high range–first gear at 4.35 miles per hour (1500 engine RPM). It is therefore much better to use the increased power of your Ferguson "40" by pulling larger implements rather than by traveling at higher speeds. For example: use a 3 bottom 14 in. plow in high range—first gear instead of a 2 bottom 14 in. plow in high range–second gear.

High range–second gear is meant to be used with implements which operate above the ground such as mowers, wagons, spike tooth harrow, etc. High range–third gear is used for road transport, raking and rotary hoeing.

DETACHING FERGUSON SYSTEM IMPLEMENTS

1. Select level ground area, level the implement with the leveling crank and lower to the ground with the Hydralever.

2. While seated on the tractor seat, detach upper link from the tractor by removing the linch pin and clevis pin, moving the tractor slightly backward or forward if necessary.

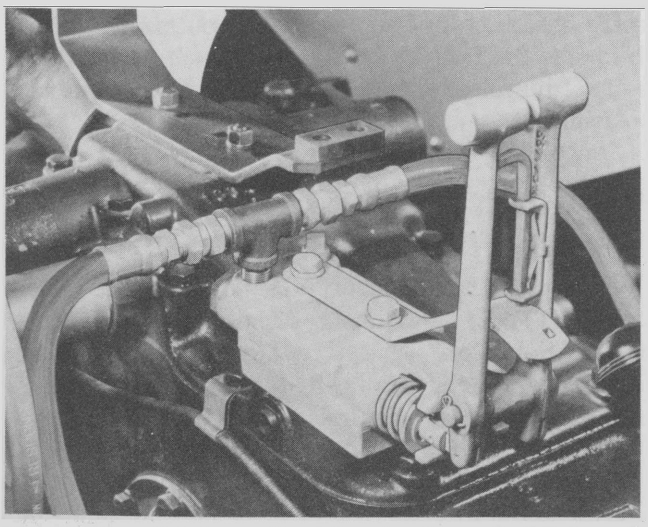
3. Detach right lower link by removing linch pin. Adjust the leveling crank if necessary, to relieve the strain on the ball socket joint.

4. Detach left lower link.

NOTE: Always place linch pins on their proper clips on lower links.

EXTERNAL HYDRAULIC EQUIPMENT

Outlets are provided in the hydraulic lift cover, below the tractor seat, so that external hydraulic



Double Spool Valve — Used for the Control of External, Single Acting, Hydraulic Cylinders

cylinders can be connected to the pump and operated either separately or in combination with the Ferguson Hydraulic Lift. The pump is connected to the master ram cylinder through an external transfer plate which may be removed and an external valve installed.

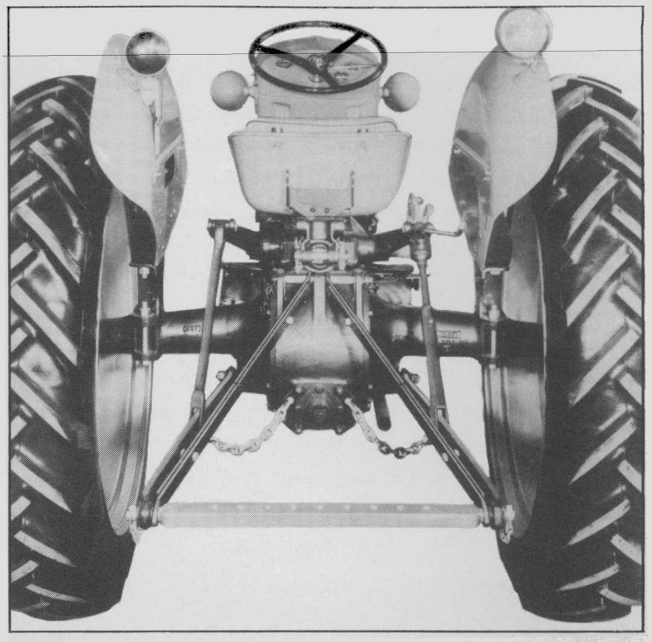
Two separate external valves are available: one a "single-spool" and the other a "double spool" valve. These provide direct return of the oil to the sump, thus permitting open center control operation of external cylinders or the tractor lift cylinder or both. The external valves are so designed that when the control levers are in the neutral position the oil is pumped through the valve and directly to the oil sump. In this type of operation, even though the pumping action is continuous, the only time the pump is delivering oil under pressure is while the valve control lever is held in the lifting position. The rest of the time oil is circulated through the valve and returned to the sump. This open center control results in a considerable savings in what would otherwise be wasted horsepower. During this type of operation both the draft control lever and Hydralever are moved fully up to provide constant pumping.

These valves are provided with a lock-out position which restores the conventional Ferguson System; thus, once installed, it is not necessary to remove the valves to operate draft and position control implements. It is now possible, by moving the draft control lever fully up into the tension range when there is no tension load on the control spring, to open the valve to intake position even though the links are in the fully raised or shut-off position. Thus, oil may be supplied to auxiliary cylinders without holding the links down.

When operating external cylinders, up to one and one-half gallons of oil can be withdrawn from the sump without seriously affecting the level of the lubricant in the tractor. More specific directions for the installation and use of external valves will be found in the manuals which accompany the Ferguson Implements that incorporate external cylinders.

STANDARD DRAWBAR

A universal-type drawbar is provided with your Ferguson Tractor to permit pulling implements in the conventional manner. Nine holes in the drawbar permit a lateral adjustment and the adjustable drawbar stay links furnished make it possible to adjust the height of the drawbar to adapt to the height of the implement.



Standard Draw Bar with Stay Links

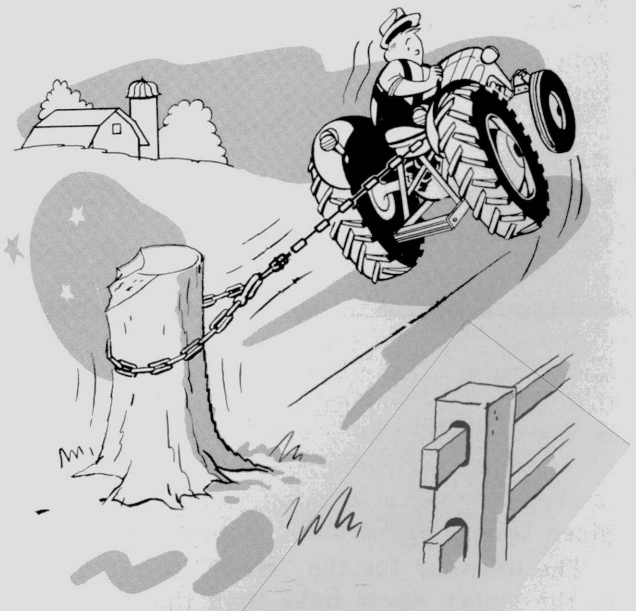
Attaching the drawbar:

1. Lower the lower links and level them.

2. Place the drawbar on the ground and attach the stay links to the drawbar ends. Lift and set the assembly on the tractor lower links.

3. Pin the top of the stay links to the tractor center housing by removing the rocker pin and reinstalling it, securing the stay links. Fasten with linch pin.

4. Place the ends of the drawbar, one at a time, in the ball joints of the lower links and fasten with linch pins.



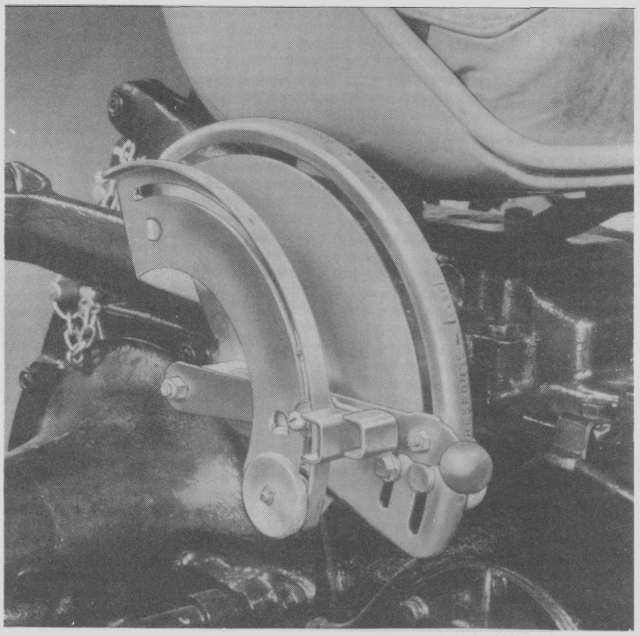
Never Pull from the Upper Link Connection

5. Adjust the drawbar to the desired height by loosening the bolts on the stay links and lengthening or shortening as required. The standard height is obtained when the notches on the stay links line up. Tighten bolts securely.

CAUTION: Always make sure the drawbar is adjusted low enough that sufficient weight remains on the front wheels for steering and safety.

The Hydralever and draft control must be in the lower position when the drawbar and stay links are used. If either lever is raised, the lift arms are restricted from raising and consequently the safety relief valve will continue to blow.

CAUTION: Never pull from the upper link connection or use the drawbar without stay links.

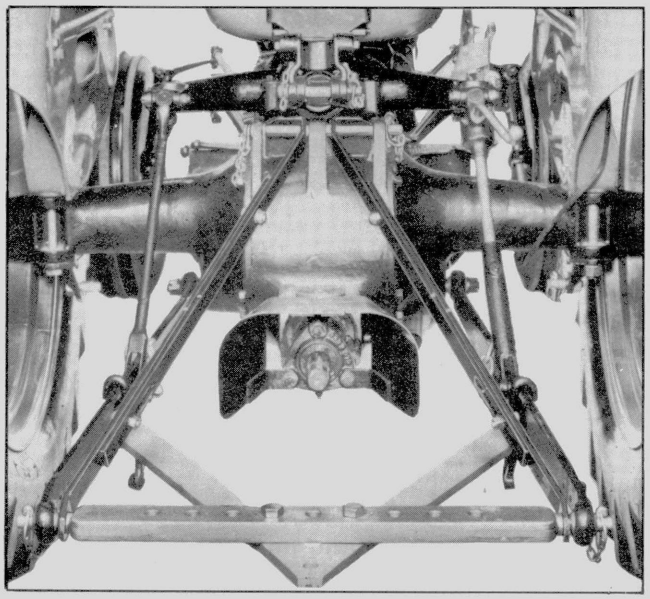


With the Standard Draw Bar Mounted, the Hydralever and Draft Control Lever are to be Lowered to the Extreme Position

EXTENSION DRAWBAR (Accessory)

An extension drawbar is available for providing a hitch point 4 in. to the rear of the standard drawbar. This accessory attaches directly to the lower links and standard drawbar and is desirable to be used with tongued implements incorporating a short clevis which would foul the standard drawbar while turning. The extended hitch point permits a shorter turning radius for the combined tractor and trailing implement.

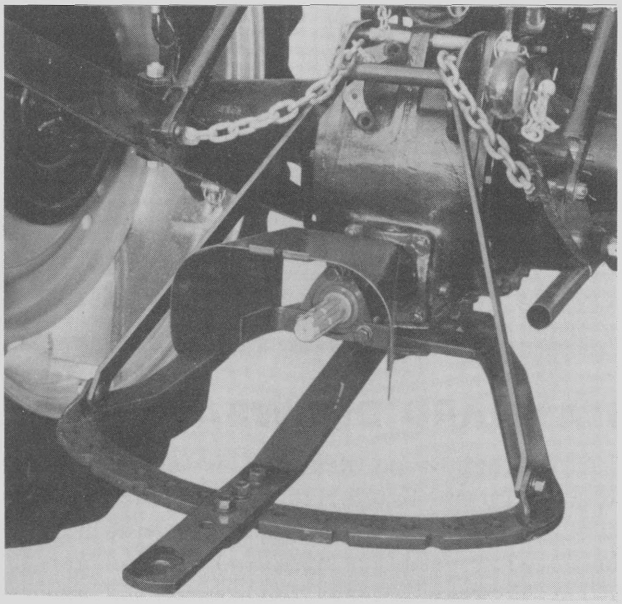
The drawbar for the "Hi-40" is different due to the longer lower links than the drawbar for the "40".



Extension Draw Bar (Accessory) with PTO Adapter (Accessory

SWINGING DRAWBAR (Accessory)

A swinging drawbar is also available for use on your Ferguson Tractor. This accessory replaces the standard drawbar for conventional pull-type hitching and is desirable to use under conditions where the load on the standard (fixed) drawbar would normally affect the steering of the tractor. It is easier to turn the tractor when the swinging drawbar is used as the angle of pull pivots closer to the tractor than with the fixed drawbar. The "Hi-40" requires a different drawbar than the "40" tractor.



Swinging Draw Bar (Accessory) with PTO Adapter (Accessory

POWER TAKE-OFF

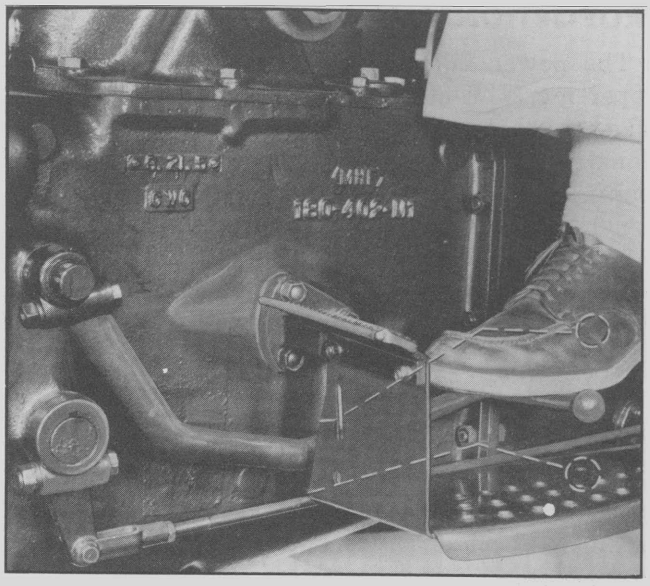
The power take-off of your Ferguson Tractor transfers engine power direct to mounted or drawn implements or, if equipped with a belt pulley assembly, to belt driven equipment.

The tractor engine power is made available at a 1-3/8 in. (A.S.A.E. Standard) splined shaft which projects from the rear of the tractor center housing. An annular groove is provided on the shaft for quick attaching. The shaft is readily accessible by removing a replaceable cap.

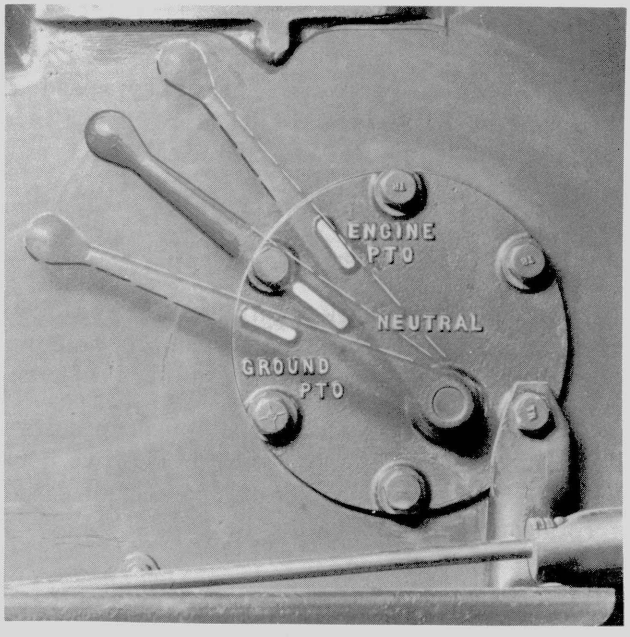
The power take-off shaft is controlled by a shift lever located on the left side of the tractor center housing. The shift lever contacts an internal coupling to engage the power take-off shaft in either proportional engine speed or proportional ground speed. The lever can also be shifted to neutral to disengage the shaft.

The Ferguson "40" features a dual clutch arrangement which allows the hydraulic pump and power take-off shaft to operate independently of tractor forward motion, i.e., when the primary clutch is disengaged to stop tractor motion, the power take-off (if engaged in Engine PTO) will continue to operate without interruption. For example, assume while using harvesting equipment such as a baler, forager harvester or mower, the crop becomes excessively heavy resulting in the machine becoming partially "clogged". With the ordinary single clutch tractor, the forward motion would have to be stopped, the tractor shifted to neutral and the clutch let out in order to clear the machine. This would result in the power take-off shaft stopping and consequently a loss of momentum while the tractor is shifted. With the dual clutch tractor the matter of clearing the machine is much easier and much more simplified. To stop the forward motion, the primary clutch is disengaged. This does not interrupt the continuous operation of the power take-off shaft or machine momentum. So, consequently the machine continues to operate, thus clearing itself. Tractor forward motion can now be resumed by merely completely re-engaging the clutch.

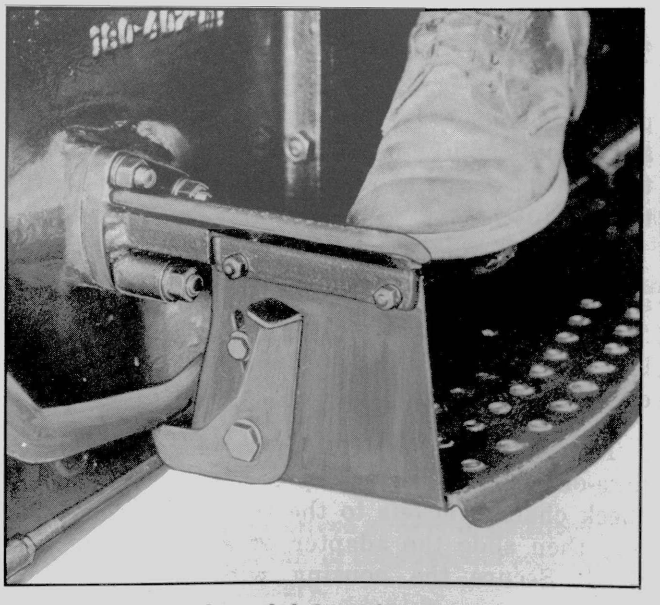
NOTE: A clutch pedal stop (accessory) is available for attaching to the front support panel of the step plate. When set, it limits the travel of the pedal to the 1st stage.



Clutch Pedal Depressed Through First Stage



Power Take-Off Shift Lever Positions



Clutch Pedal Stop (Accessory)

PROPORTIONAL ENGINE SPEED

The power take-off shift lever shifted to the upper mark "Engine PTO" will cause the power take-off shaft to operate in standard or proportional engine speed which is 18/50 of tractor engine speed. When the engine is operating at 1,500 RPM, the speed of the PTO shaft is 540 RPM. This conforms to the A.S.A.E. standard PTO speed recommendation and most power take-off driven equipment is designed to operate at this speed.

PROPORTIONAL GROUND SPEED

The power take-off shift lever shifted to the lower mark "Ground Speed PTO" will cause the power take-off shaft to operate in proportional ground speed which produces one revolution of the shaft for approximately each twenty inches of forward travel of the tractor regardless of the transmission gear the tractor is operated in. This is a feature which your Ferguson "40" incorporates and is very desirable when operating those implements which necessitate an operating speed always proportional to the tractor forward speed regardless of what gear the tractor is in. This is a decided advantage when operating the Side Delivery Rake, Lister Planter, etc.

CAUTION: When backing the tractor, the power take-off shift lever must be shifted from "Ground Speed PTO" to neutral. Failure to do this may result in serious damage as the implement mechanism will be reversed.

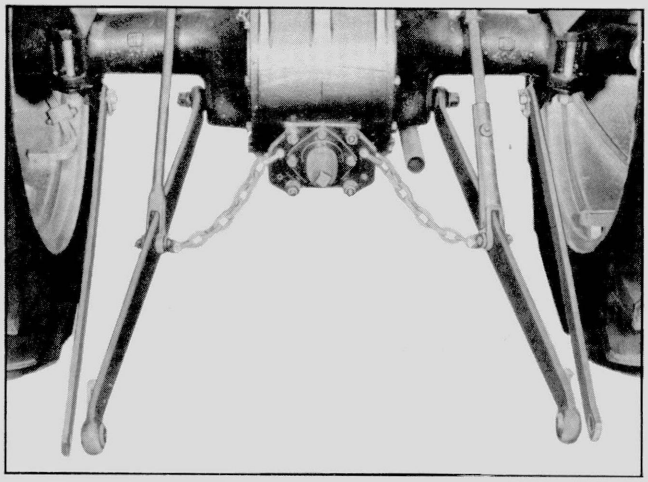
ADAPTERS (Accessories)

When using your Ferguson Tractor with most power take-off operated equipment, adapter kits and shields will be necessary to convert the tractor to meet A.S.A.E. requirements for a standard tractor hitch.

For your convenience, two adapter kits are available for the "40" tractor and two for the "Hi-40", one to be used with the extension drawbar (accessory) and the other with the swinging drawbar (accessory).

To install the adapters first remove the power take-off cap and four cap screws securing the check chain brackets to the tractor center housing, then slide the adapter over the end of the shaft. Secure the housing with the four cap screws.

NOTE: If the check chains are removed from the lower links, the brackets are to be installed as shown with the chains attached to the upper holes. Failure to do this will cause the lower links to be restricted in their full range of travel and consequently result in a continual blowing of the relief valve of the hydraulic system.



Stabilizer Kit (Accessory)—Mounted Under Fender Bolts to Give Lateral Stability to Attached Implements Such as Rake, Corn Planter, Etc.

BELT PULLEY (Accessory)

The belt pulley attachment for your Ferguson Tractor is a separate self-contained unit bolted to the tractor center housing. The unit is driven by the power take-off shaft and is controlled by the PTO shift lever. The ratio of speeds of the pulley to the PTO shaft and engine is 1.84 to 1 and 1 to 1.51 respectively. The pulley speed at 1,990 Engine RPM is 1,316 RPM resulting in a belt speed of 3,100 RPM (theoretical).

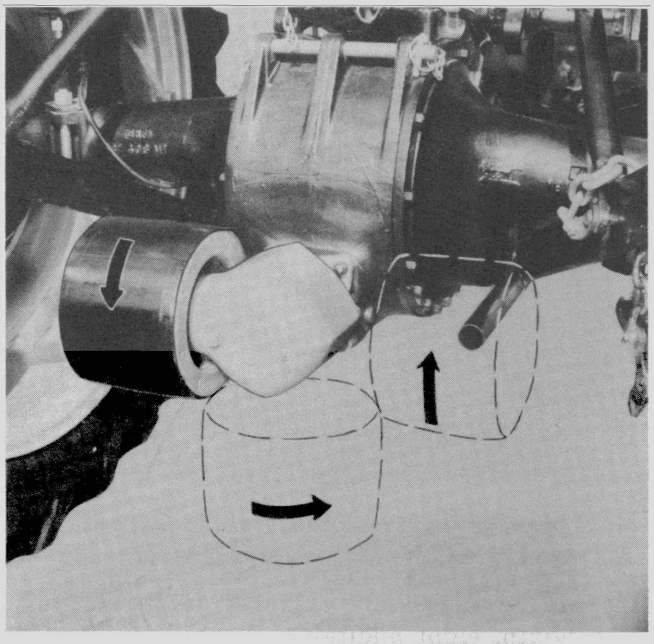
To attach the belt pulley:

1. Remove the power take-off cap.

2. Remove the check chain anchor brackets from the rear of the tractor center housing. (Refer to above note when re-installing brackets.)

3. Mount the pulley with the four cap screws in any of three positions as shown. The two horizontal positions will provide the correct direction of rotation without twisting the belt.

CAUTION: 1. Mount the pulley on the right side only when a vertical muffler (accessory) is installed.



Belt Pulley (Accessory) Illustrating Three Possible Mounting Positions

Never Wear Loose or Sloppy Clothing Around Tractor's Moving Parts

2. Do not force the pulley when mounting. If binding exists find out the cause. Forcing the pulley may cause breakage.

3. Never install the pulley in the "up" position as the top bearing will not receive proper lubrication.

To determine the diameter of the driven pulley, necessary to obtain a given RPM, refer to the right hand side of the table. Note that there is a choice of pulley sizes for any one pulley rate; however, each size is based on a specific engine RPM. In most cases the engine RPM required to operate the belt equipment will be determined to a large degree by the horsepower or load requirements of the equipment. In general, the greater the load involved, the more horsepower will be required, and consequently a higher engine RPM will be necessary.

IMPORTANT: To avoid static electricity when using the belt and pulley, ground the tractor by wrapping a chain around the front axle and drop one end on the ground.

Engine RPM	PTO RPM	Pulley RPM	Belt Speed (ft/min)	R. P. M. of Driven Pulley								
				600	800	1000	1400	1800	2200	2600	3000	3400
1000	360	662	1547	10	7½	6	4½	3½				
1200	432	795	1859	12	9	7½	5	4	3½			
1400	504	927	2165	14	10½	8½	6	4½	4	3½		
1600	576	1060	2478	16	12	9½	7	5½	4½	3½		
1700	611	1127	2632	17	13	10½	7½	5½	4½	4	3½	
1800	648	1192	2788	18	13½	11	8	6	5	4	3½	
1900	684	1250	2920	19	14½	11½	8	6½	5	4½	4	3½
2000	720	1325	3097	20	15	12	8½	6½	5½	4½	4	3½
2100	756	1391	3253	21	16	12½	9	7	6	5	4½	4

This table is based on an average slippage loss of 3% between the drive and driven pulleys at all speeds. However, it should be noted that as the diameter of a pulley decreases the per cent of slippage will increase; thus pulleys smaller than 3½ in. should not be used unless absolutely necessary.

Never Put on or Remove Belt When Pulley is in Motion

WHEEL TREAD WIDTHS

Your Ferguson Tractor incorporates the latest developments for tread width settings for both the front and rear wheels. You will find the "40" can be adapted to most field conditions as far as tread width is concerned without any unnecessary steps or major adjustments.

FRONT WHEEL WIDTHS

The front wheels of your Ferguson "40" are adjustable in 4 inch steps from 48 to 80 inches. For the "Hi-40", add 1 inch to the tread width. The settings between 48 and 72 inches are accomplished by positioning the right and left axle arms on the center axle.

To adjust the tread width:

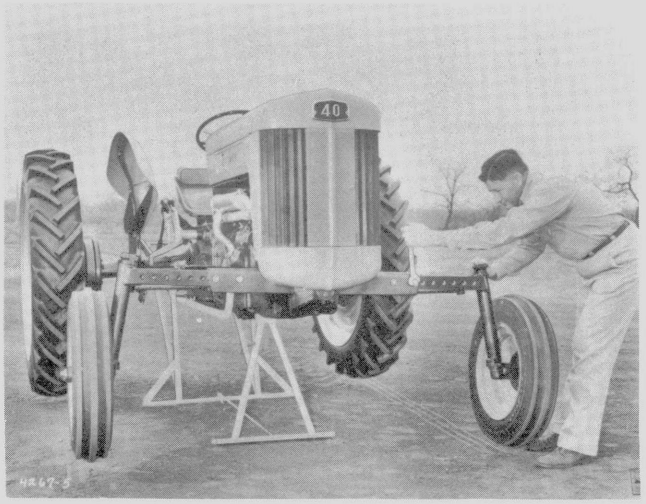
1. Place the Ferguson Power Jack (accessory) in position and lift the tractor off the ground by starting the engine and moving the Hydralever to the top of the quadrant to raise the lower links.

2. Remove the two bolts securing each front axle arm to the center axle. Loosen the tie rod set screw.

3. Move the axle arms with respect to the center axle to obtain the desired tread width.

4. Adjust the tie rod until the set screw can be turned into the proper notch of the rod with the wheels straight ahead.

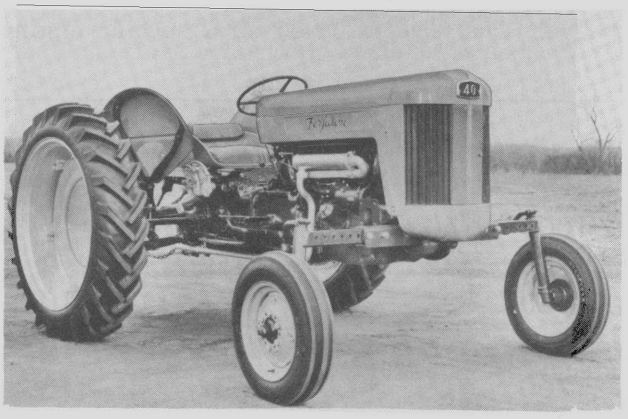
5. Replace the two bolts in each axle and tighten the set screw in the tie rod.



Adjusting Front Wheels to Desired Settings

When the wheels are extended to the 72 inch tread width, eight additional inches (or 80 inch tread width) can be obtained by reversing the wheel discs on the wheel hubs. This positions the wheel discs toward the inside. With the wheels at the 80 inch setting, 76 or 72 inch settings can be obtained by moving the axle arms toward the center.

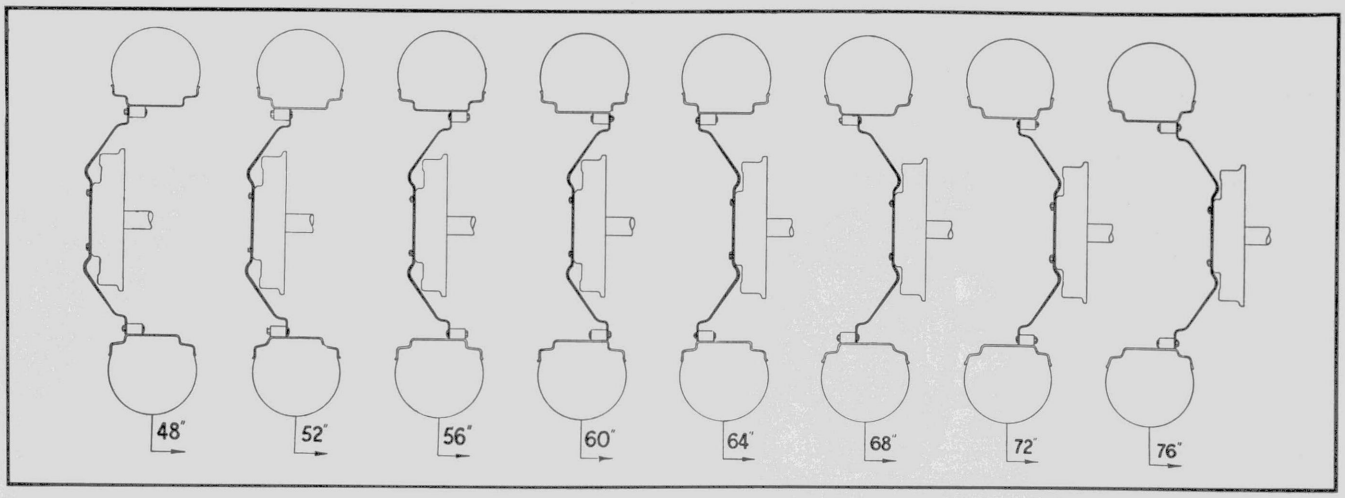
CAUTION: When the wheel discs are in the 80 inch or 76 inch settings, the front wheel bearings are subjected to greater strain and load. These tread widths should be used only when absolutely necessary and never used with front mounted equipment such as loaders.



76 Inch Wheel Spacing for Row Crop Work

REAR WHEEL WIDTHS (Standard Wheels)

To conform with the front wheel settings, the rear wheels on your Ferguson Tractor also can be adjusted in 4 inch steps from 48 to 76 inches. Tread width settings are accomplished by changing the relative position of the wheel discs and

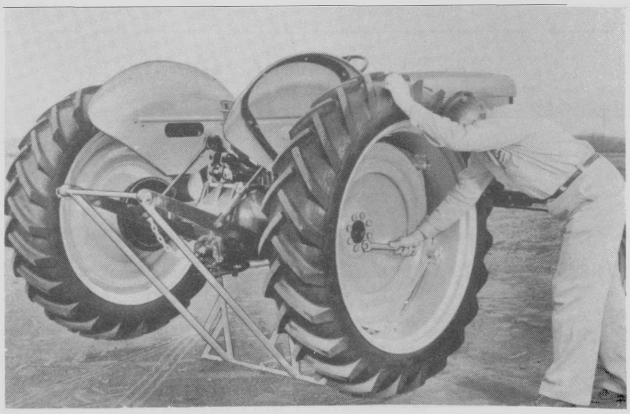


Rear Wheel Spacings (Standard Wheels)

rims. The assembling arrangement for obtaining the wheel settings are shown in the illustration. When you receive your "40", it will have a 52 inch wheel setting. To change the wheel settings, raise your tractor using the Ferguson Power Jack (accessory) and refer to the diagram. The 48 inch setting is obtained by moving the rims in and connecting the discs to the opposite side of the rim lug. The 56 and 60 inch settings are obtained by reversing the rims on the discs and interchanging the wheel assemblies to the opposite side of the tractor. The 64, 68, 72 and 76 inch settings are the reverse of the respective 60, 56, 52 and 48 inch settings, i.e., with the wheel assemblies turned around and mounted on the opposite side of the tractor. The arrow on the tire side wall should point in the direction of forward rotation.

REAR WHEEL WIDTHS (Power Adjusted Wheels—Accessory)

Power adjusted rear wheels are available for the 11-28 and 11-38 tires. This accessory consists of special wheel discs and rims that provide a range of tread adjustments from 52 to 72 inches in 4 inch increments or a total of 6 rear wheel settings.



Adjusting Rear Wheels to Desired Settings

To adjust the tread width:

1. Remove the two rim stop screws from the rim stops which position each wheel disc to the rim and remove the stops.

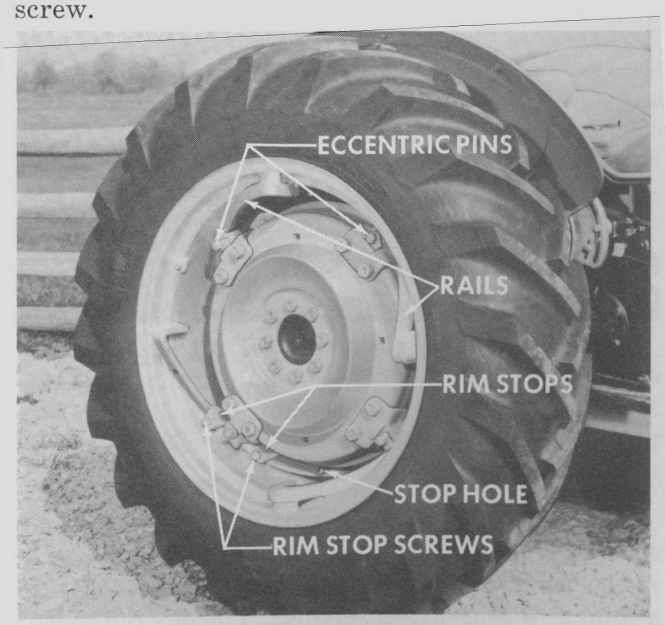
2. Replace one stop on each wheel at the position desired and secure with a rim stop screw.

NOTE: On the extreme settings the ends of the rail will provide the limiting stop.

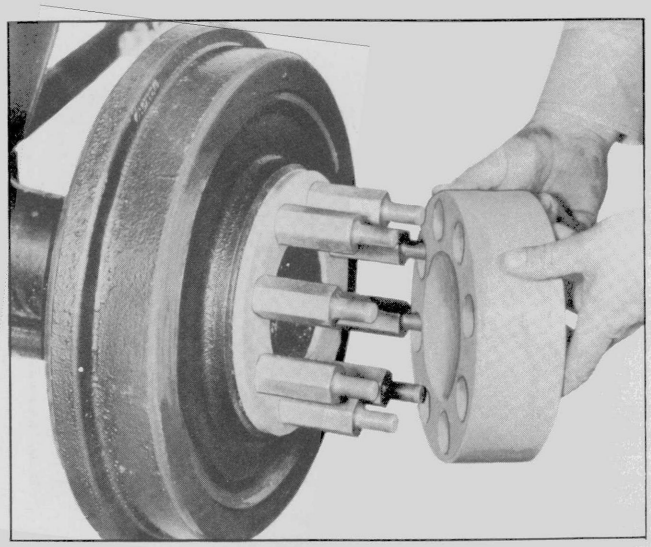
3. Loosen the four eccentric pins on the "40" or the six eccentric pins on the "Hi-40".

4. Drive the tractor forward or backward to rotate the disc in relation to the rails on the rims until the wheel discs engage the stop on the rail.

5. Secure the position of the discs in relation to the rims by placing the remaining stops on each wheel on the opposite side of the rail. Secure the rail between the stops with the remaining stop screw.



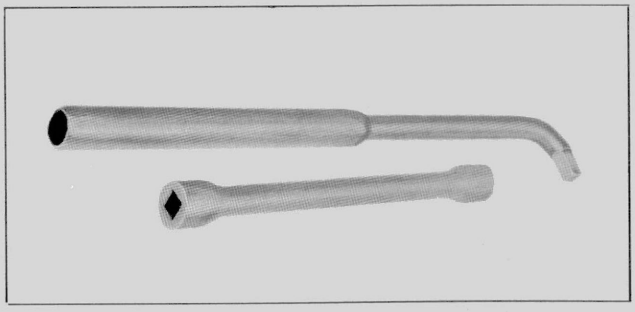
Power Adjusted Rear Wheels (Accessory)



P.A.V.T. Wheel Spacer Washer

6. Tighten the eccentric pins on each wheel until the indicators are 90 degrees to the right. The last eccentric pin on each wheel will require the most torque, between 110 and 300 foot pounds, to correctly position it.

A special power wheel kit is included with each tractor equipped with power adjusted wheels to assist the operator in making wheel tread adjustments. The kit is composed of a socket type wrench and an extension handle. The socket fits both the rim stop screws and the eccentric pins.



Power Wheel Tool Kit

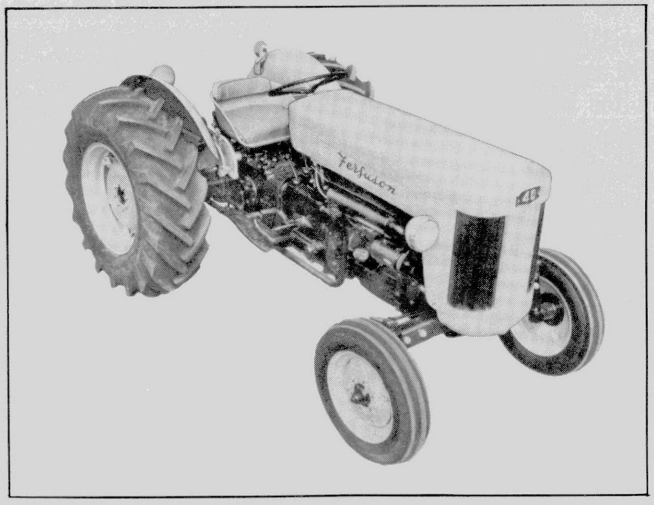
REAR WHEEL WIDTHS (13-24 Wheels—Accessory)

A 13-24 rear tire and wheel set is available either as factory installed equipment or as an accessory for your "40" tractor. This 13 inch tire provides a larger section tire for use in conditions where flotation is a problem.

This accessory consists of a 13-24 tire and special rim, disc and clamps, which provide a range of tread adjustment from 52 to 74 in. or a total of 8 rear wheel settings. The desired wheel width is obtained by changing the relative position of the wheel disc and rim. See illustration for various wheel settings possible. There are two locating grooves on the rim. At the 52 in. setting the disc is located on the outside of the outside groove. To obtain the 56 in. setting, the disc is moved to the inside of the outside groove. The 60 and 64 in settings are obtained by moving the disc to the inside locating groove. When the wheel disc is reversed the minimum wheel setting is 62 in. and then increases in 4 in. increments to 74 in.

As with the standard wheels and tires, the minimum tread width (52 in.) of the 13-24 tires becomes the maximum tread width (74 in.) when the wheel is turned around and mounted on the opposite side of the tractor. This can be accomplished without changing the disc to rim relationship and when doing so, the wheels should be switched to opposite sides of the tractor so that the tire is rotating in the correct direction for maximum traction. If the tractor is normally operated at the 56 in. setting and the wheels are reversed as above, the tread setting becomes 70 in., and so on through the various possible settings.

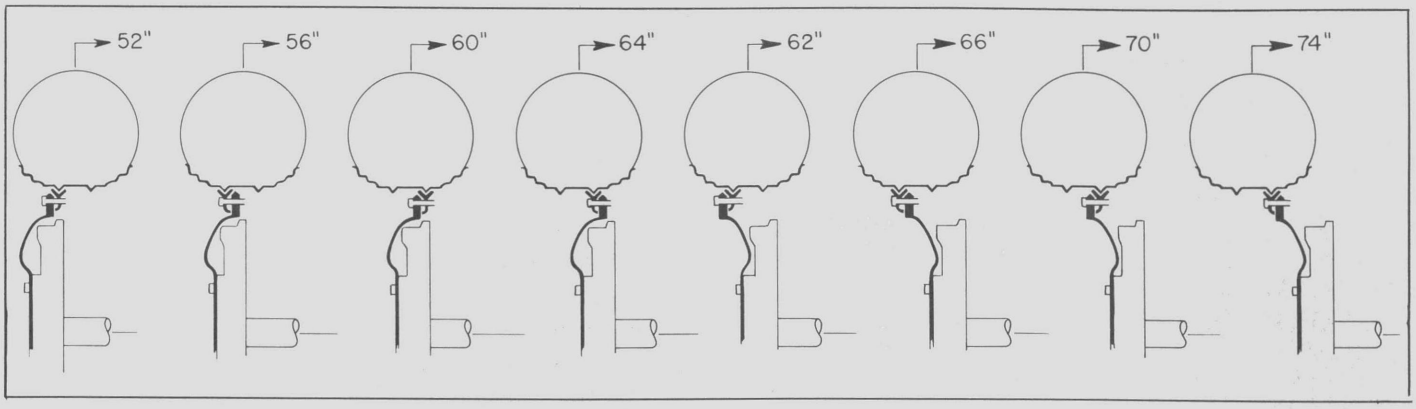
If it is desired to change the wheel disc to rim location, it is suggested that the procedure listed below be followed:



13-24 Rear Wheels (Accessory)

1. Place the Ferguson Power Jack (accessory) in position, lift the tractor rear wheels off the ground and remove the retaining nuts at the disc hub.

2. The 13-24 wheel and tire assembly is very heavy, particularly if loaded, and hard to maneuver and handle. Proper care should be exercised to prevent accidents or injuries.



Rear Wheel Spacings (13-24 Rear Wheels)

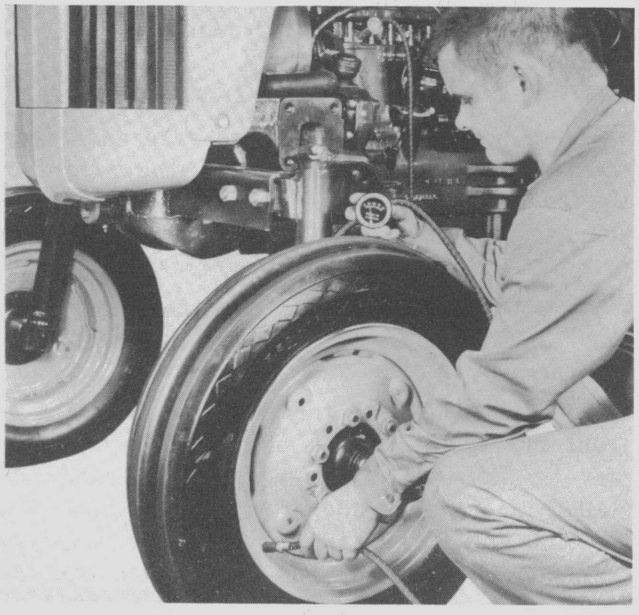
3. If an overhead hoist or chainfall is available, the wheel assembly should be supported in an upright position while the wheel disc is changed, otherwise the wheel assembly can best be changed by laying it flat on the ground or floor.

4. Loosen all the clamp bolts and remove a sufficient number of clamps to allow the wheel disc to be moved.

5. Position the wheel disc in the rim at the desired location and install the clamps and retaining bolts and nuts.

6. Tighten the retaining bolts and nuts in sequence around the rim making certain that the tapered portion of the wheel disc, which contacts the clamp, pulls up on the clamp the same distance on all six clamps. This will properly center the wheel disc on the rim.

7. Tighten the six retaining nuts to 90-100 foot pounds torque and install the wheel on the tractor.



Tire Pump Kit (Accessory) Available For Convenient Tire Care

TIRE INFLATION AND CARE

Correct tire inflation is the most important factor in long tire life. Both under and over inflation have detrimental effects on the casing. The tire pressures given below are recommended for your Ferguson Tractor.

RECOMMENDED TIRE PRESSURE		
FRONT		
4.00-19	24 lbs. min.	28 lbs. max.
5.50-16	24 lbs. min.	28 lbs. max.
6.00-16	24 lbs. min.	28 lbs. max.
7.50-10	24 lbs. min.	28 lbs. max.
REAR		
11-28	12 lbs. min.	16 lbs. max.
10-38	12 lbs. min.	16 lbs. max.
11-38	12 lbs. min.	16 lbs. max.
13-24	14 lbs. min.	18 lbs. max.

Without any additional weight on a wheel, the recommended pressure should be the minimum pressure as given in the above table. For each additional 100 lbs. added per wheel, add 1 lb. air pressure up to the maximum recommended pressure.

UNDER-INFLATION WILL CAUSE:

1. Damage to cord body resulting in breakage of cord fabric or side wall.

2. Difficult steering and poor braking control.

3. Tire slippage on rim which may tear off valve stem.

4. Irregular and uneven tire wear.

5. Unnatural tire distortion on hard roads; wiping off tread bar rubber on highly abrasive or unyielding road surfaces.

OVER-INFLATION WILL CAUSE

1. Excessive tread wear.

2. Loss of traction and increased slippage.

3. Increased packing of the soil; rut formations.

4. Casings more susceptible to bruises and impact breaks.

FOR LONGER TIRE LIFE THE FOLLOWING SUGGESTIONS ARE GIVEN FOR YOU TO FOLLOW:

1. Check tire pressure weekly.

2. Start and stop smoothly for both tire and fuel economy.

3. Avoid excessive slippage which grinds off tread rubber.

4. Remove harmful oil and grease promptly from tires.

5. Wash tires thoroughly with clear water after spraying and dusting operations (especially when using Paris Green and Bordeaux mixtures which contain injurious copper).

6. Keep valve caps tight to prevent air pressure escape. Tighten caps with fingers, not pliers.

7. Apply brakes slowly and evenly. Abrupt braking causes wasteful tire wear.

8. Allow sufficient clearance between implement edges and tires.

9. Don't speed or overload your tires as tractor tires are designed for slow speeds. Towing tractors at high speeds will develop high temperatures and weaken the rubber and cord structure.

10. Repair promptly side wall cuts made by sharp stones, glass or metal.

NOTE: Have your dealer permanently vulcanize casing cuts, bruises, etc.

OBTAINING ADDITIONAL TRACTION

Under certain conditions it is desirable to have increased weight on either the front or rear wheels or both in order to efficiently operate and control your tractor.

LIQUID FILL

For some operations, it is desirable to have additional weight to increase traction. The most practical and popular method of adding weight is to liquid-fill the tires. This procedure adds weight where it is most beneficial. A calcium solution is better adapted than water because it has a lower freezing point and a higher specific gravity.

It should be pointed out, however, that unnecessary weight causes extra load resulting in higher fuel consumption.

The following table is based on 100% fill in tires using 3-1/2 pounds of calcium chloride per gallon of water. This concentration will have a freezing point of 30 degrees below zero. Any other percentage of fill can be obtained by multiplying the percentage times the values given in the table.

Size of Tire	Pounds Calcium Chloride	Gallons of Water	Total Weight in Tire
	FRONT TIRES		
4.00-19	9.8	2.8	33
5.50-16	20.7	5.9	70
6.00-16	20.7	5.9	70
7.50-10	19.2	5.5	65
	REAR TIRES		
11-28	131.0	37.3	442
10-38	130.0	37.1	439
11-38	165.0	47.1	557
13-24	180.0	51.4	609

Example: If a 75% fill is desired in the 10-38 tire, the weight of calcium chloride would be 0.75 × 130 or 97.5 pounds, the volume of water 0.75 × 37.1 or 27.8 gallons resulting in a total weight of 0.75 × 439 or 330 pounds.

FRONT WHEEL WEIGHTS (Accessory)

When heavy implements are suspended from the rear of your Ferguson "40", the weight on the front wheels is reduced, resulting in decreased steering traction. This condition is especially prevalent when crossing headland furrows or ridges such as corn rows, etc., as the bouncing action reduces, even more, the downward action on the front wheels.

To compensate for this relative reduction in front end weight, the use of front wheel weights may be desirable. These weights are easily installed in the dish side of the wheel discs. For the 5.50 and 6.00-16 tires, the weight is in two segments as shown in the illustration. For the 4.00-19 tire, the weight is one piece; therefore, the wheel will have to be removed before the weight can be installed.

Front Wheel Weights (Accessory)

CAUTION: Inspect regularly to see if wheel weights are bolted tight to the wheel discs.

DUAL REAR WHEELS (Accessory)

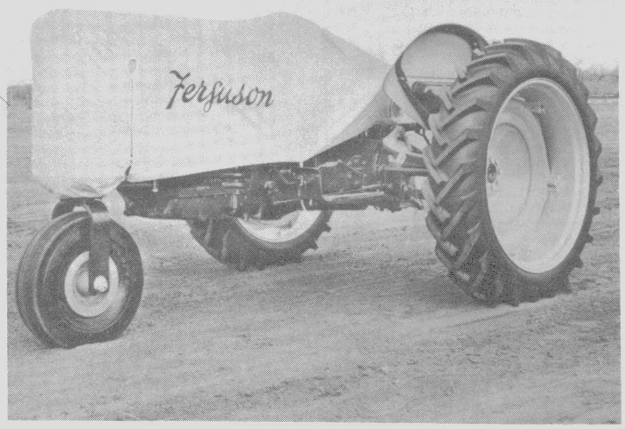
When operating in some areas where a loose textured soil is encountered, excessive rear wheel slippage may result. To help overcome this condition, a dual wheel kit for the standard 11 x 28 tire size is available. The kit makes it possible to mount two wheel assemblies on each side of the rear axle. This will double the surface area reacting against the soil and consequently result in increased traction.

The kit consists of two ring spacers to space the wheel assemblies apart and 16 spacer nuts.

Additional Wheels Installed Using the Dual Wheel Kit (Accessory)

FERGUSON TRACTOR STORAGE

If your tractor is to be idle for an extended period of time, it should be properly prepared for storage. Select a dry and protected place where it is neither exposed to the weather or livestock.



Storm Cover (Accessory) For Tractor Protection

The following procedure has been outlined for the purpose of keeping your Ferguson Tractor in working condition for many seasons:

1. Thoroughly wash and clean tractor.

2. Remove all rust spots with sandpaper and retouch with Ferguson paint.

3. Remove air cleaner. Wash filter and inside of cleaner thoroughly with a solvent. Refill cup with new oil and reinstall.

4. Lubricate all pressure fittings. Drain crankcase and remove oil filter element.

5. Install new oil filter element and refill crankcase with recommended grade of oil.

6. Drain transmission and refill with proper grade of new oil.

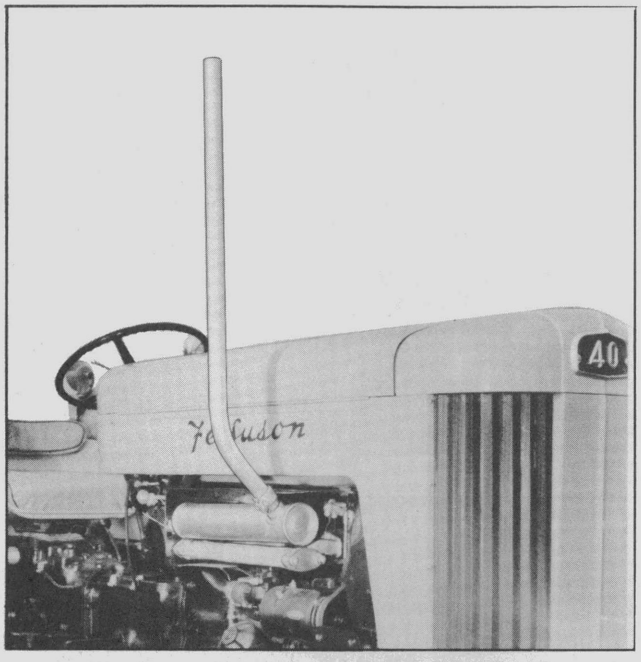
7. Clean and repack front wheel bearings.

8. Check oil level in steering gear housing and power steering pump reservoir (accessory).

9. Start engine and run to lubricate engine parts until temperature stabilizes.

10. Inspect tractor for worn or damaged parts which later may cause costly breakdowns. Order any needed items from your Ferguson Dealer promptly while the need is still in your mind.

11. Completely drain cooling system, thoroughly washing and flushing out with washing soda and water. Replace cap and close draincocks when dry to keep system clean.



Vertical Muffler (Accessory) Available For Use Under Hazardous Dry Conditions

Keep Straw and Other Inflammable Material Away From Exhaust Pipe to Prevent Fire

12. Drain fuel tank by removing filter assembly and let dry. Replace cap and filter to keep tank clean.

13. Remove, clean and reinstall sediment bulb, gas line and carburetor.

14. Remove spark plugs and pour two tablespoons of heavy lubricating oil into each cylinder top.

15. Clean and regap spark plugs at 0.025 in.

16. Turn engine over several revolutions before replacing spark plugs, using crank or starter.

17. Cover ends of exhaust pipe and breather pipe.

18. Remove, inspect and condition battery as required, then store in a cool place. Keep battery in a fully charged state. Inspect every two weeks to assure charge is correct.

19. Jack up the tractor and put on sturdy blocks to remove weight from all tires.

20. Remove water from tires to prevent freezing (calcium chloride solution need not be removed).

21. Cover tractor with tarpaulin for protection (a special storm cover for the tractor is available from your Ferguson Dealer).

STARTING ENGINES OUT OF STORAGE

1. Remove spark plugs and pour two tablespoons of a mixture of one-half gasoline and one-half light lubricating oil into each cylinder.

2. Reinstall spark plugs.

3. Install fully charged battery making sure the proper connections are made. The Ferguson Battery is negative grounded.

4. Fill the cooling system with proper coolant.

5. Fill the fuel tank.

6. Check oil level in crankcase, transmission and air cleaner.

7. Remove coverings from exhaust and breather pipes.

8. Inspect and tighten all nuts, bolts and screws.

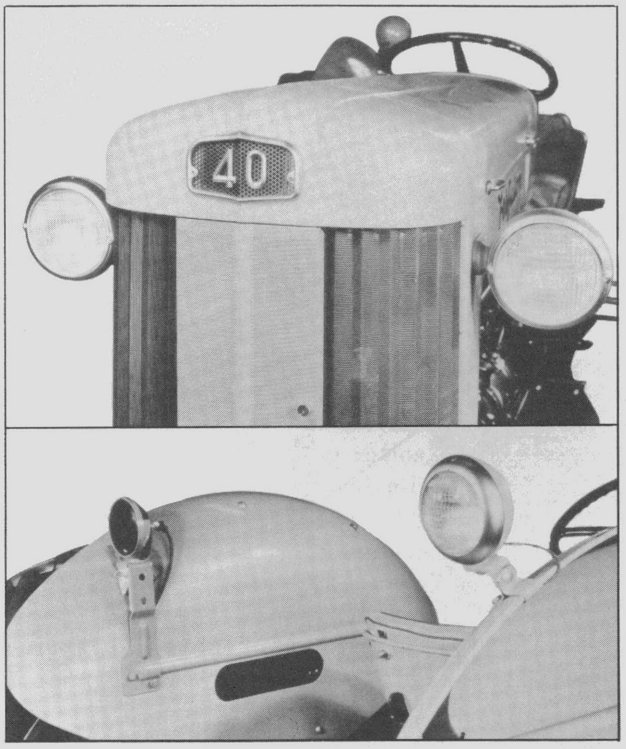
9. Lubricate all fittings if not lubricated prior to storage.

10. Start engine and allow it to run at an idle speed for 10 to 15 minutes. Note oil gauge to be sure the engine is receiving proper lubrication.

11. Drive the tractor without load and at slow speeds noting its operation.

LIGHTING EQUIPMENT

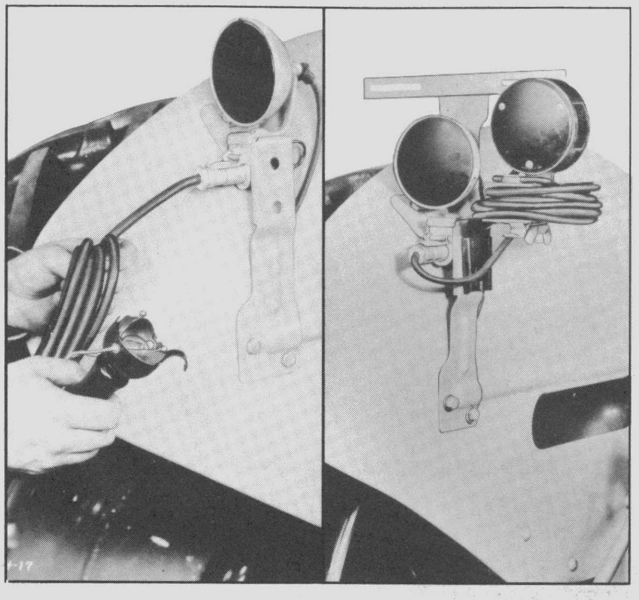
A complete line of lighting equipment is available as accessories for the Ferguson "40" Tractor. This equipment provides the operator with the greatest margin of safety both in the field and on the road.



Hood Lighting Kit (Accessory)

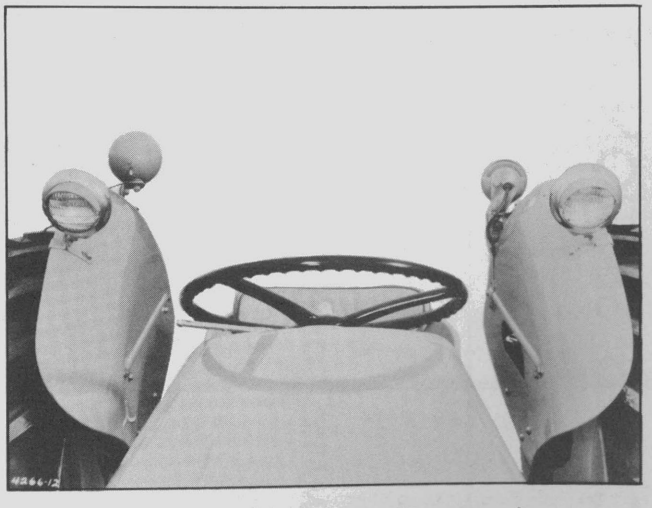
There are two lighting kits available for the Ferguson "40" and "Hi-40" tractors. The hood kit is recommended for use where front mounted tools will not be used. The two head lamps mount on the hood and the tail lamp and the rear work lamp are attached to the rear of the fenders. The fender kit should be utilized with front mounted implements such as the Utility Loader or to throw light on front mounted implements such as the front mounted cultivators. When mounting this kit, the two head lamps mount on the front of the fenders while the rear tail lamp and work lamp secure to the fender rear.

As additional aids, trouble lamps, license brackets and implement safety lamps may be purchased for particular needs. The trouble lamp



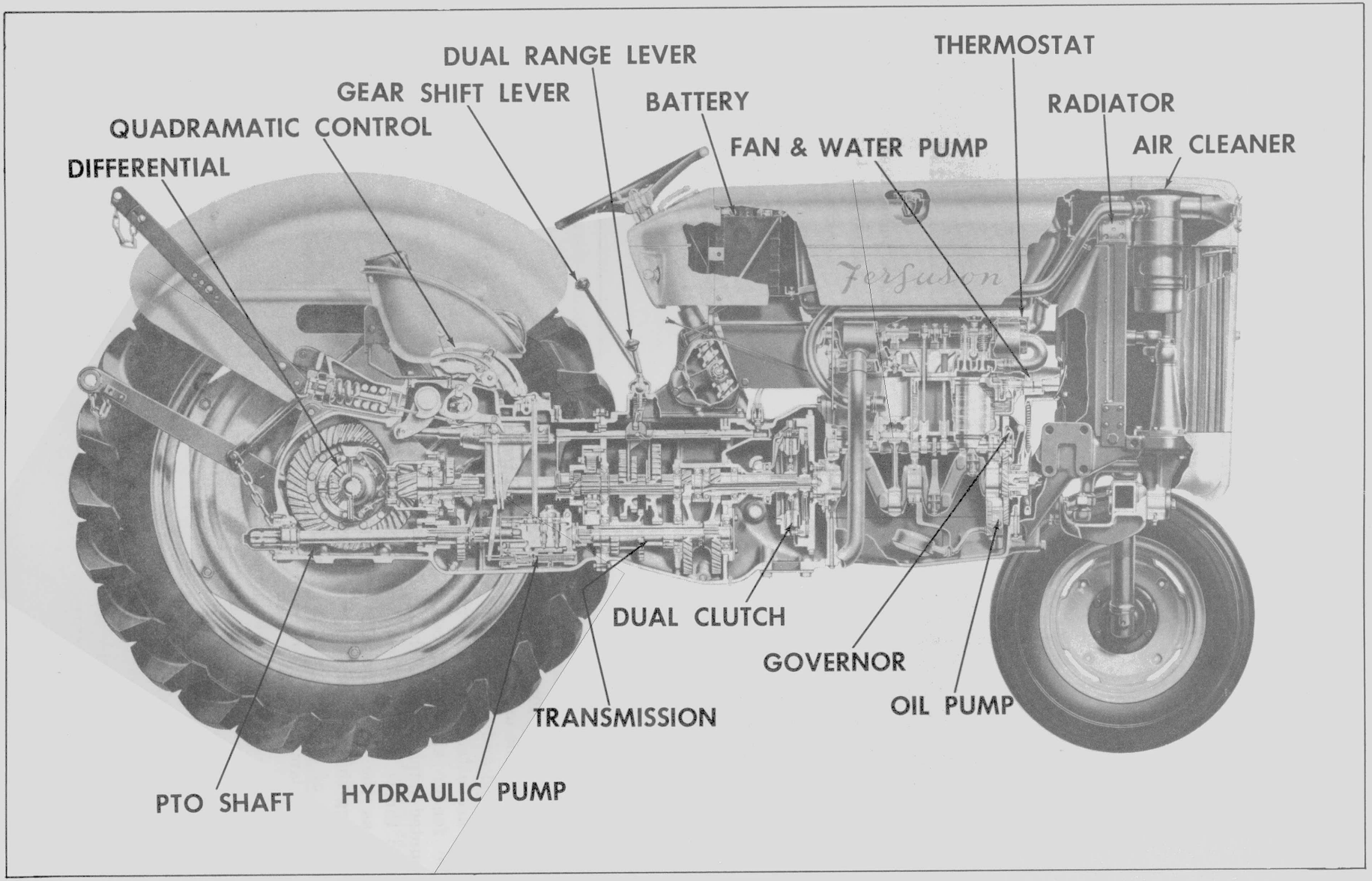
Trouble Lamp, License Bracket and Implement Safety Lamp (Accessories)

with its long cord is ideal for repairs or other work where direct illumination of an area is desired. The lamp plugs into a socket below the tail lamp. The license bracket and implement safety lamp should be used when the tractor and implement is driven over roads.



Fender Lighting Kit (Accessory)

CROSS SECTION OF THE FERGUSON "40" TRACTOR



Servicing

While we recommend that major overhauls, replacements and adjustments be done by the Ferguson Dealer whenever possible, occasions may warrant the owner making minor repairs and adjustments. For that reason, the following material has been compiled to give you a working knowledge of your Ferguson Tractor.

ENGINE

The engine of your Ferguson "40" Tractor has been developed especially for the type of tractor which integrates a hydraulic system to operate and control attached implements. The engine is a four cylinder, four stroke cycle, wet sleeve, valve-in-head unit with a cylinder bore of 3-5/16 in. and a piston stroke of 3-7/8 in. It has a total displacement of 134 cu. in. and is available in either of two compression ratios, the 6.60 to 1 or the 8.10 to 1 engine. The valve-in-head characteristics provide steady lugging power at lower engine RPM's with more economical operation, thus supplying the ideal features wanted for tractor work. Positive acting, rotating type exhaust valves are included as standard equipment insuring long valve life and more efficient performance.

6.60 to 1 ENGINE

Engines having the 6.60 to 1 compression ratio were designed for, and give their most efficient performance at, sea level elevation; however, their efficient performance and horsepower output is not seriously affected by altitudes up to a maximum of 5000 ft. The 6.60 to 1 engine was designed to operate at sea level and above on gasolines having a minimum octane rating of 78. Gasolines having an octane rating of less than 78 are not recommended for use in the Ferguson Tractor Engine. There may be some slight advantage to using a fuel with a higher octane rating; however, the additional cost of premium fuels should be carefully weighed against the advantages obtained by their use before making this decision.

8.10 to 1 ENGINE

At altitudes of 5000 ft. and above, the atmosphere is considerably lighter than at sea level; consequently, less fuel and air mixture is drawn into the combustion chamber during each intake stroke of the piston. This condition seriously affects the engine's ability to deliver its rated horsepower. To compensate for the lesser amount of fuel and air mixture it is necessary to compress the mixture to a greater degree in order to obtain the same efficiency and horsepower output from a given engine.

Recognizing the need for an engine that will perform with the maximum horsepower at higher altitudes, Ferguson now offers as factory installed, optional equipment, an 8.10 to 1 compression ratio engine.

The 8.10 to 1 engine was designed to deliver approximately the same horsepower at 5000 ft. elevation as the 6.60 to 1 engine delivers at sea level with both engines using 78 octane fuel. The 8.10 to 1 engine differs from the 6.60 to 1 engine only in the shape of the piston top, the engine timing and the carburetor setting, see pages 43 and 37.

The 8.10 to 1 compression ratio engine is identified by a warning plate attached to the engine name plate and three decals attached to the tractor.

Two of the decals are attached to the hood and the third decal containing instructions regarding the octane rating of the fuel to be used is attached to the underside of the hood service panel.

CAUTION: To obtain the most efficient performance and to insure the long service life of your Hi Altitude engine, the following recommendations should be strictly followed:

1. Never operate the 8.10 to 1 engine at an elevation of less than 4000 ft., regardless of the octane rating of the gasoline being used.

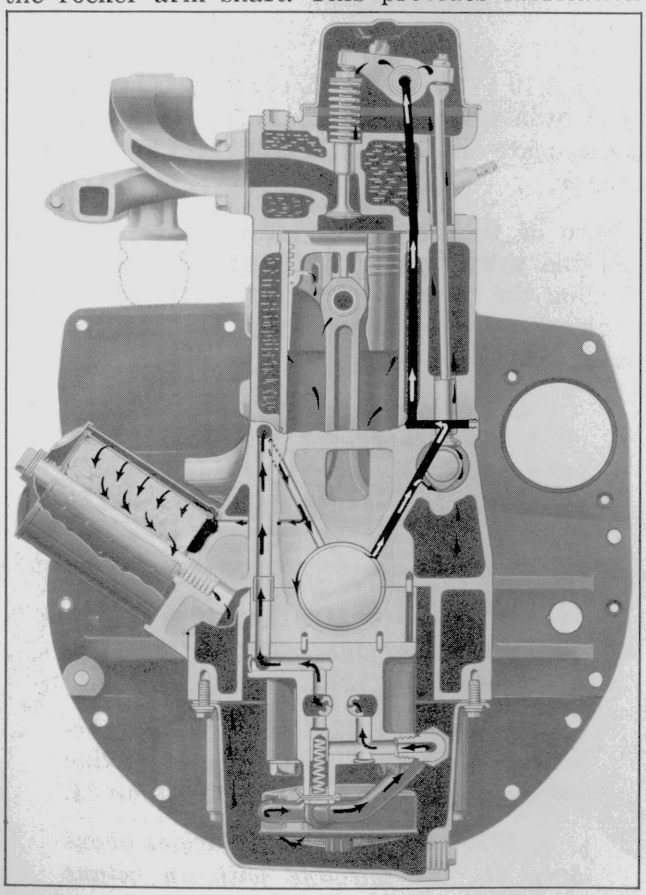
2. When operating at elevations between 4000 ft. and 5000 ft., use gasoline with an octane rating of not less than 84.

3. When operating at elevations above 5000 ft., use gasoline with an octane rating of not less than 78.

OILING SYSTEM

The crankcase capacity is 5 U.S. quarts with an additional 1 U.S. quart circulated through the oil filtering system. Oil is drawn from the oil sump through a floating screened oil intake by the oil pump. This allows only the cleaner upper-level oil to enter the oiling system rather than the sediment-laden oil from the bottom of the sump.

The oil pump forces the oil under pressure to the front main bearing and to the oil gallery which runs the length of the block. From the front main bearing, oil passes through the drilled crankshaft to the front connecting rod bearing and also to the front camshaft bearing which meters it through the camshaft retaining plate to the governor and timing gears. The main oil gallery supplies the center crankshaft bearing which in turn furnishes the center camshaft bearing and the second and third connecting rod bearings through the drilled crankshaft. The passage that supplies oil to the center crankshaft bearing also supplies oil to the filter element. The rear main bearing also receives its oil from the main oil gallery. It in turn supplies the rear camshaft bearing. Oil from the rear camshaft bearing is metered through a passage to the rear support of the rocker arm shaft. This provides lubrication for the rocker arm bushings and valves. The oil returns through the push rod tubes lubricating the tappets and cams.



Engine Oiling System (End View)

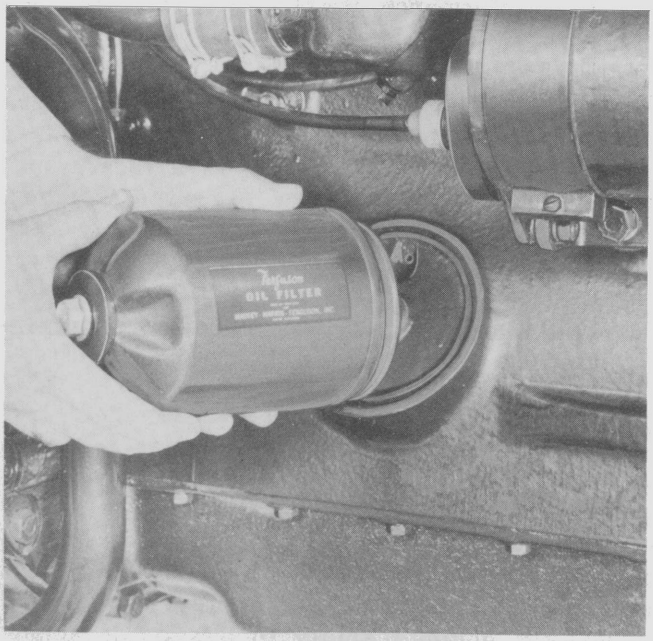
The engine is ventilated through a breather tube bolted to the left side of the valve cover. This tube should be removed and cleaned occasionally, removing any dirt and dust that may have collected.

OIL PUMP

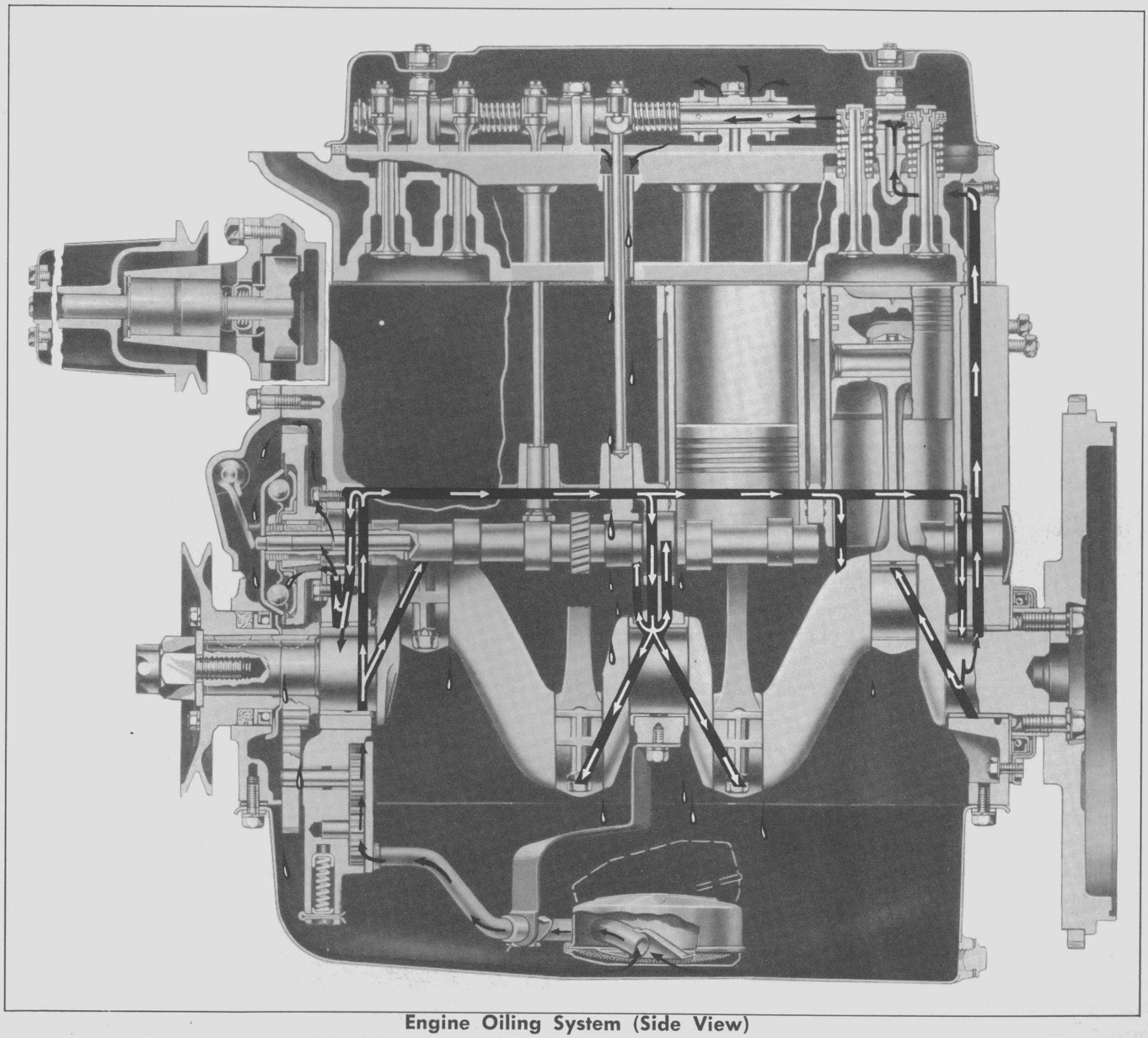
A single stage, gear-type oil pump located beneath the front main bearing, pumps oil from the oil sump to the oil passages. A pressure relief valve in the pump body limits the oil pressure to 30 pounds per square inch.

OIL FILTER

The oil filter located on the right side of the tractor engine is integrated with the block, that is, no external oil lines are used. This arrangement greatly increases the efficiency of the filtering as the operation is performed at engine oil temperature. The flow of oil is from the outside toward the center of the filter, thereby causing the external surface area of the element to first come in contact with the oil. The function of the oil filter is to remove sludge, grit, carbon, metal particles, etc., from the oil system. This is a continual process which is performed while the engine is operating. As the filter element becomes loaded or saturated with foreign material from the oil, it ceases to function and filter properly, therefore it should be removed and replaced at recommended intervals.



Removing Oil Filter From Engine



Engine Oiling System (Side View)

CHANGING ENGINE OIL AND FILTER ELEMENT

The oil in the crankcase as delivered is break-in oil and it should be drained and the crankcase refilled with proper lubricant after the first 50 hours of operation. Thereafter, the oil should be changed every 100 hours. Adverse working conditions such as severe dust or extremely cold weather may necessitate more frequent changes. Flushing the crankcase with oils or solutions, other than a good winter grade oil, is not recommended. If flushing is necessary, use 3 quarts of 10W oil and run at a fast idle for a few minutes. Drain immediately and fill with the correct seasonal grade of engine oil.

The use of detergent type lubricants is recommended as a cleaner engine results which will operate longer without service difficulties. Therefore, it is recommended that service MM oils be used in normal operating conditions. Service MS oils, while satisfactory for all conditions, are not specifically recommended except under unfavorable or severe operating conditions. See Lubrication Section on page 2 for viscosity recommendations.

NOTE: It is essential that the crankcase be drained when the engine is warm as much of the foreign material will be in suspension and will flow out with the oil.

Use Caution When Removing Radiator Pressure Cap

The filter element should be replaced with a new Ferguson Filter and the case wiped out at every other oil change. To change the filter element, remove the cover and element by turning out the center bolt. Pull the element from the cover using the attached ring.

NOTE: When a new filter element is installed, one quart extra oil should be added to allow for element absorption.

COOLING SYSTEM

The cooling system of your Ferguson Tractor consists of a radiator, pressure-type radiator cap, fan, water pump, thermostat, hoses and 10 quarts of coolant. The coolant conducts heat from around the wet sleeves and circulates through the radiator, where the heat is transferred by the copper fins to the air passing through the radiator. The cooling system incorporates a recirculating passage which allows faster and more even warm-ups by by-passing a metered amount of the coolant through the water pump back into the block before the thermostat opens.

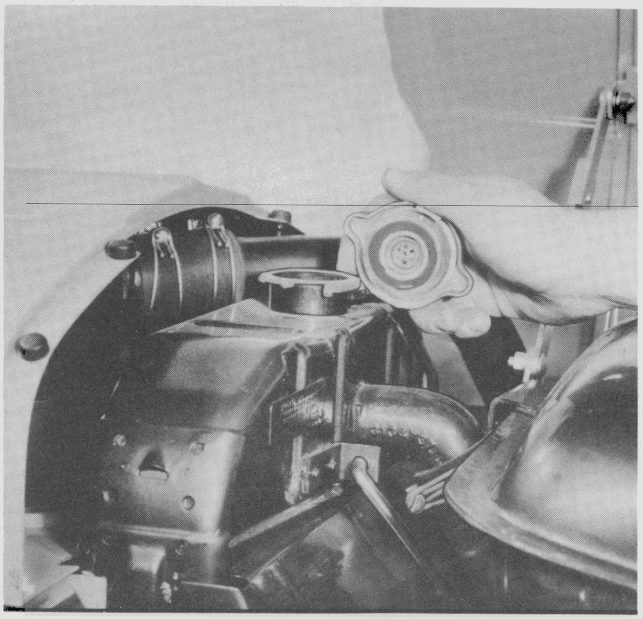
RADIATOR AND PRESSURE-TYPE CAP

The radiator is a copper tube and fin-type, with coolant entering the top and passing down through the tubes to the bottom and recirculating back through the engine. For efficient cooling, the fins must be kept clean of all lint, dust and other foreign material. A clogged condition is sometimes only apparent by looking through the fins and can be remedied by blowing out with water or air pressure.

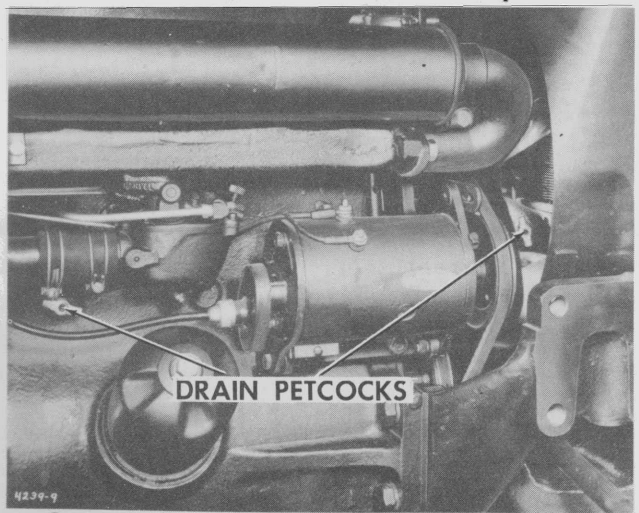
The radiator can be cleaned by swinging the center grill to the left. This is accomplished by loosening the knurled nut in the center grill.

Located on top of the radiator is a pressure-type cap which permits 6 to 8 pounds per square inch of pressure to build up within the cooling system. This raises the boiling point of the coolant 18° to 24°. It is essential that the pressure cap be used and installed tightly at all times.

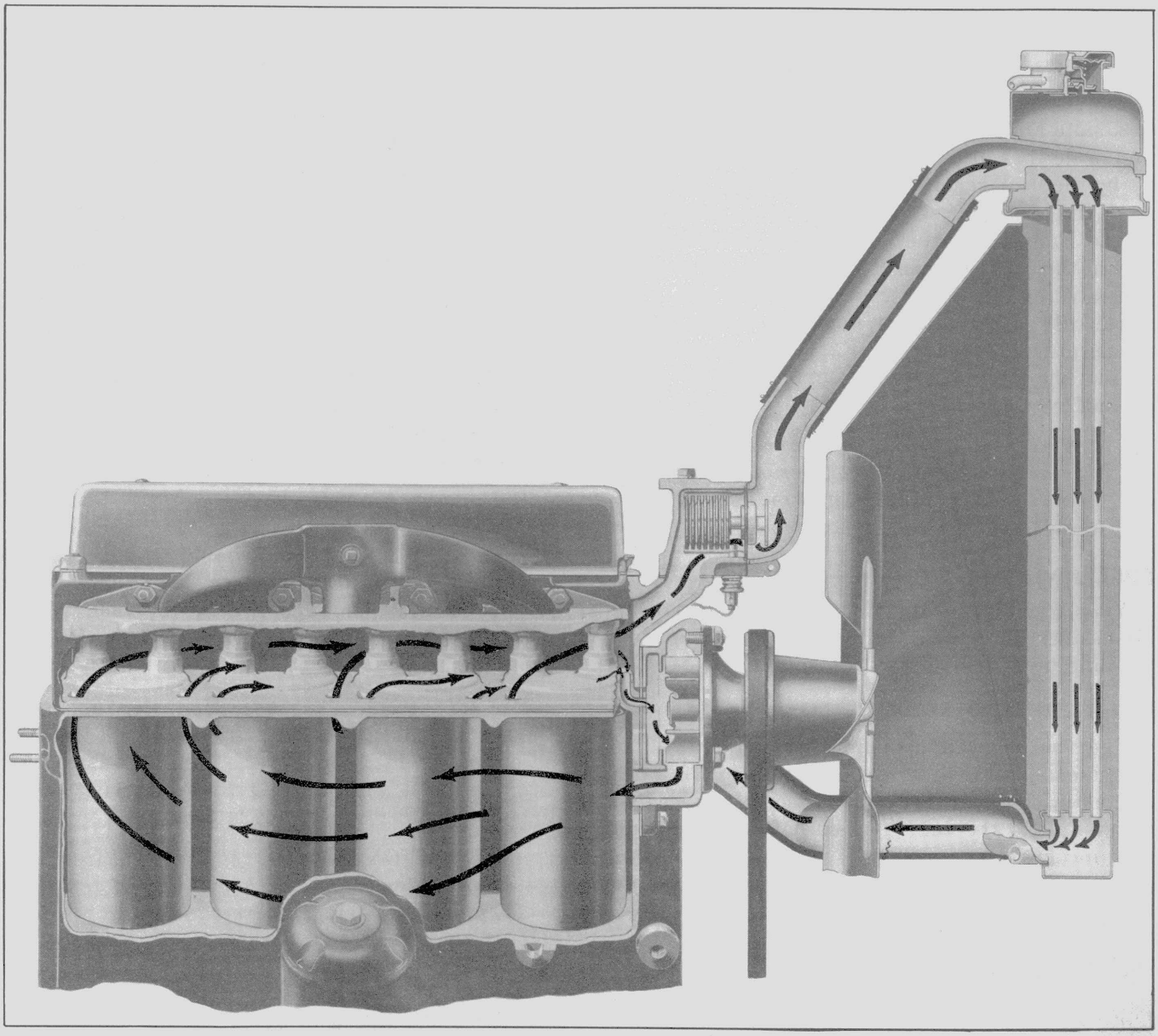
CAUTION: Remove radiator cap slowly and carefully by turning to the first notch. This relieves the pressure, preventing injury from escaping steam and scalding water. Always remove the pressure cap and open the 2 drain cocks when draining the cooling system; otherwise, all the coolant will not drain out.



Removing Radiator Pressure Cap



Open Radiator and Engine Block Drain Cocks When Draining Cooling System



Engine Cooling System

FAN AND WATER PUMP

A four blade pull-type fan, mounted on the water pump pulley, draws air through the radiator and blows it around the engine. The 6-vane impeller-type water pump circulates approximately 32 gallons per minute at 2,000 RPM. The fan belt drives the fan, water pump and generator. These are supported by a prelubricated sealed bearing which needs no additional lubrication. If the fan belt is removed and a new one installed, the generator pivoting bolts will have to be loosened and the generator pivoted toward the engine. When assembled, the generator should be positioned and secured so that the fan belt has sufficient tension (approximately 1/2 in. deflection) to properly turn the pulleys without slippage.

THERMOSTAT AND HOSES

The thermostat is located in a cast iron body between the cylinder head and the top radiator hose. It begins to open at 157°F. to 163°F. and is fully open at 175°F. to 185°F. An inoperative thermostat, or one removed from the system, will cause improper warm-up and operating temperatures, resulting in excessive condensation and crankcase dilution.

If a new thermostat is to be installed, it should be first checked by immersing in hot water. The upper radiator hose and cast elbow will have to be removed to install the replacement part. Use a new gasket when installing the cast elbow.

It is also important that the hoses be inspected occasionally and clamps tightened when necessary.

CARE OF COOLING SYSTEM

Soft water or rain water should always be used in the cooling system. Hard water contains alkalies, salts and other impurities which hasten rust and scale formation. This process is also speeded up by the heat generated in the engine. Clean and flush the cooling system twice a year, preferably in the Fall before the addition of an antifreeze and in the Spring when it is removed. To prevent corrosive action in the cooling system, use a reliable rust inhibitor after flushing. When the air temperature is below 32°F., it is necessary to protect the cooling system from freezing by using an antifreeze.

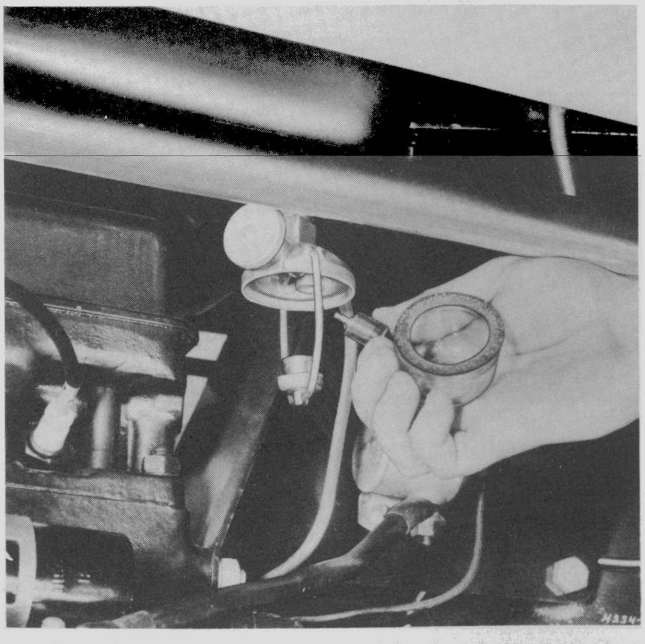
NOTE: If during cold weather, the tractor is used for long periods under heavy loads, a permanent type of ethylene-glycol antifreeze should be used.

FUEL AND AIR SYSTEM

Your tractor fuel and air system consists of an air cleaner, filter and sediment bowl, carburetor, gasoline tank and connecting tubing.

FUEL FILTER AND SEDIMENT BOWL

The fuel filter and sediment bowl filters the gasoline and provides a sediment basin for the fuel as it leaves the tank. The assembly is located below and to the rear left side of the fuel tank and incorporates a shut-off valve which stops gasoline flow and controls the main and reserve fuel supplies.



Removing Sediment Bowl and Disc Filter For Servicing

To select the closed, main or reserve fuel supply position, the shut-off or control knob is turned as follows: Turn the control knob fully to the right (clock-wise) to shut off fuel supply. Turn the knob left (counterclockwise) two turns from the closed position to open the main fuel supply. Turn the knob fully to the left to open the reserve supply. The main fuel supply flows through a standpipe which extends above the bottom of the tank. The inlet for the reserve 2 U.S. gallons is nearer to the bottom of the tank.

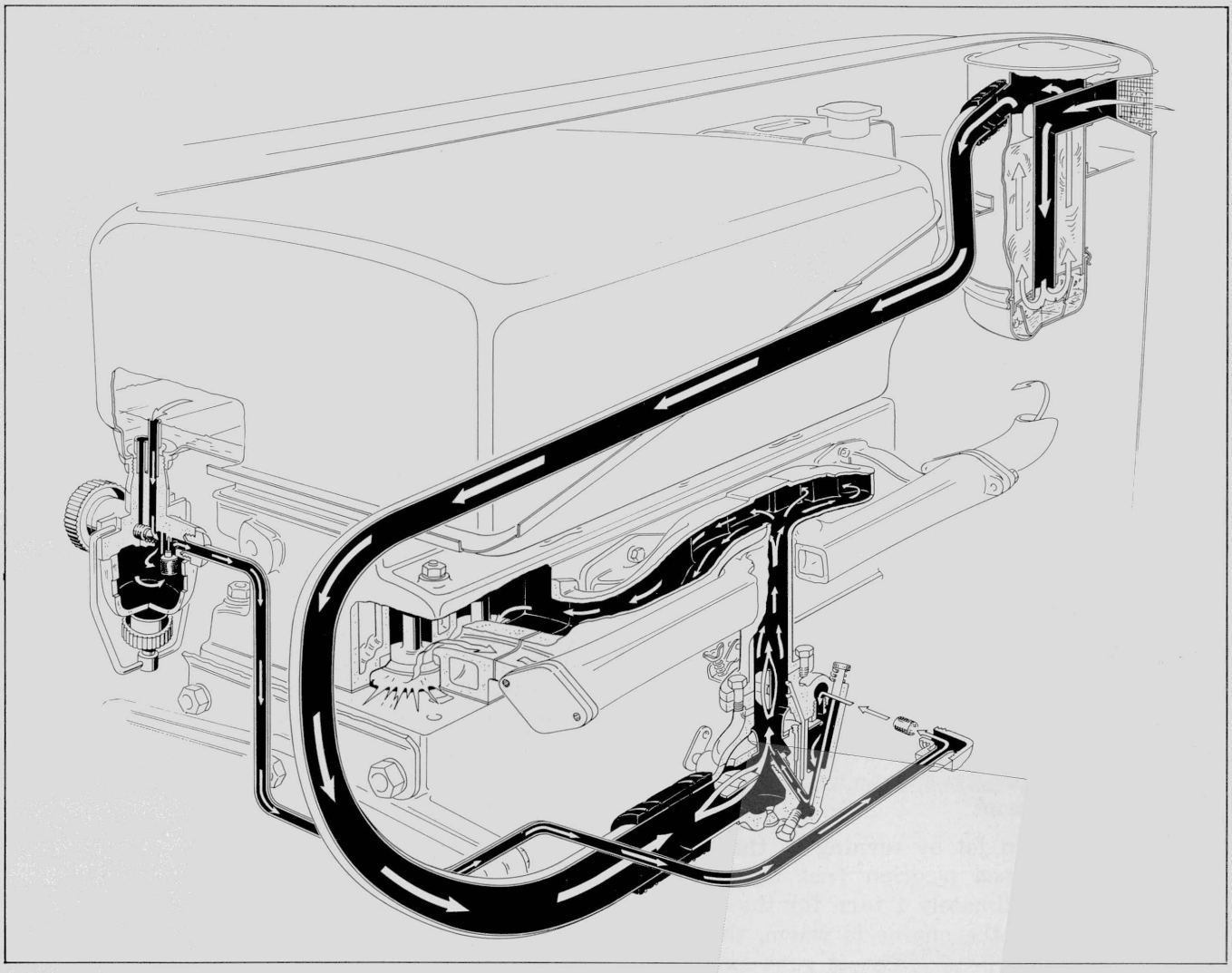
CAUTION: Do not allow the reserve supply to go unused for long periods, as condensation and rust may collect. It is desirable to operate the tractor an hour each day on reserve supply.

Each week the filter and the bowl should be removed, cleaned in a solvent and reinstalled. Periodically, the disc filter should be soaked and washed in a varnish solvent or paint remover to remove the varnish deposited by the fuel. When replacing, tighten disc filter finger tight. Do not use pliers.

For safe, trouble-free operation, the fuel tank should be flushed in the Spring and Fall. This is accomplished by removing the fuel filter assembly from the tank and flushing the tank with gasoline until all rust and water is removed.

CAUTION: Do not fill the gasoline tank if the engine is hot. Allow a few minutes for temperature to lower.

Don't Smoke When Refueling or Inspecting Gasoline Tank



Engine Fuel and Air System

CARBURETOR

The balanced, up-draft-type carburetor is fully sealed against the entrance of all dust and dirt. A porous plug is incorporated into the bottom of the carburetor to allow manifold condensation and excess fuel to escape but prevent the entry of dust and dirt. A screen in the fuel line inlet elbow strains all fuel entering the carburetor.

The carburetor incorporates both idle and main fuel passages with corresponding adjustments, which are sufficient to provide the correct fuel and air mixture from idling to top governed speed and from no load to full load.

Carburetor Adjustment for the 6.60 to 1 Engine

Idling Air Adjustment

The idling air adjustment regulates the flow of air while the engine is idling. Turn out idling adjustment screw approximately 1 turn from closed position or until the engine idles smoothly when warm.

Idling Speed Adjustment

An adjusting screw on the throttle shaft arm regulates the minimum idle speed. Turn the screw in to increase or out to reduce speed. Adjust to 450 RPM.

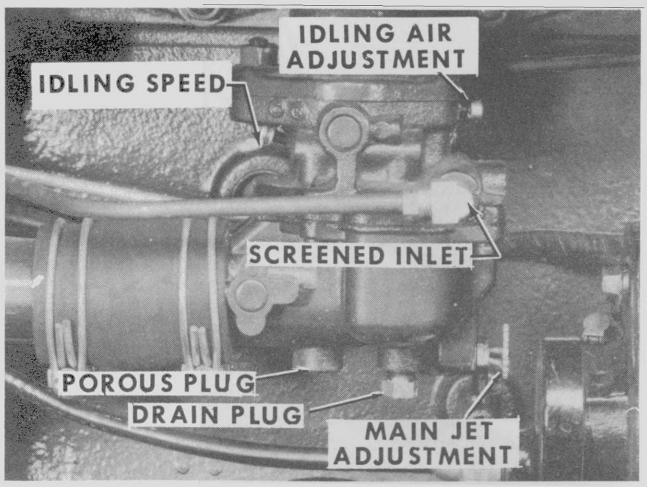
Main Jet Adjustment

Adjust main jet by turning in needle valve to fully closed position (not tight), then backing off 1 to 1-1/4 turns for the approximate operating setting. When the engine is warm the final adjustment should be made so it runs smoothly according to the load.

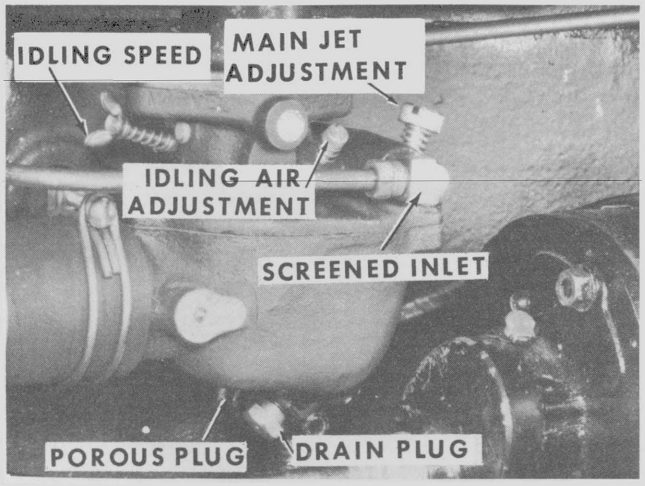
Carburetor Adjustment for the 8.10 to 1 Engine

Idling Air Adjustment

The idling air adjustment regulates the flow of air while the engine is idling. Turn out the idling adjustment screw until the engine idles smoothly when warm. This setting will vary as the altitude changes but the number of turns will be less than the setting for the 6.60 to 1 engine.



Carter Carburetor Nomenclature



Marvel-Schebler Carburetor Nomenclature

Idling Speed Adjustment

An adjusting screw on the throttle shaft arm regulates the minimum idle speed. Turn the screw in to increase or out to reduce speed. Adjust to 450 RPM.

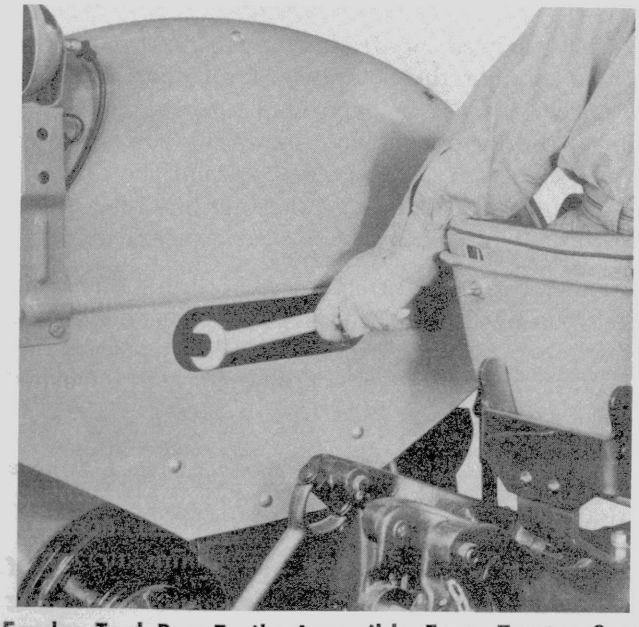
Main Jet Adjustment

Adjust the main jet by turning in the needle valve to fully closed position (not tight) then backing off approximately 1 turn for the operating setting. When the engine is warm, the final adjustment should be made so it runs smoothly according to the load.

IMPORTANT: An excessively lean mixture reduces power, overheats the engine and may cause burned valves. Therefore, the main jet should never be set less than 1 turn open. A mixture which is too rich wastes fuel and causes uneven operation. Field test the tractor under normal load by quickly moving the throttle from half open to fully open position. If engine coughs and stalls, open main jet 1/16 turn and repeat test. Repeat this procedure until the engine responds immediately to increased acceleration and runs smoothly and evenly.

The carburetor should be drained each week or according to the circumstances and conditions prevailing. Remove the drain plug located at the bottom of the carburetor to permit gasoline to flush the carburetor. This will remove dirt and water. Never attempt to blow out the carburetor through the gasoline inlet elbow and strainer screen as the screen may be ruptured and dirt blown into the carburetor. Remove and clean the inlet strainer twice a year as a restriction at this point may cause reduced fuel flow. When removing and replacing the elbow strainer, thread a fitting into the elbow to prevent the wrench from collapsing the elbow.

NOTE: The carburetor has been designed and calibrated scientifically for most efficient and economical operation of the engine. Therefore any changes or improper adjustments can result in unsatisfactory performance and possible damage to the engine.



Fender Tool Box Easily Accessible From Tractor Seat

The operator of any tractor must realize that the amount of fuel a tractor uses when working depends upon many factors, some of which are:

1. Proper adjustment of the tractor electrical system.

2. Care previously given the tractor.

3. Internal condition of tractor, such as valves, rings, pistons, bearings, etc.

4. Operator's method of handling tractor.

5. Type of implement being operated.

6. Adjustment of implement.

7. Type and condition of soil.

8. Depth of operation of implement.

However, it should be kept in mind that fuel consumption is proportional to the amount and rate of work done. Therefore, fuel consumption comparisons should be made on an acre per hour basis. The most efficient performance is obtained when the tractor and implement are operated under the most favorable conditions by an experienced operator.

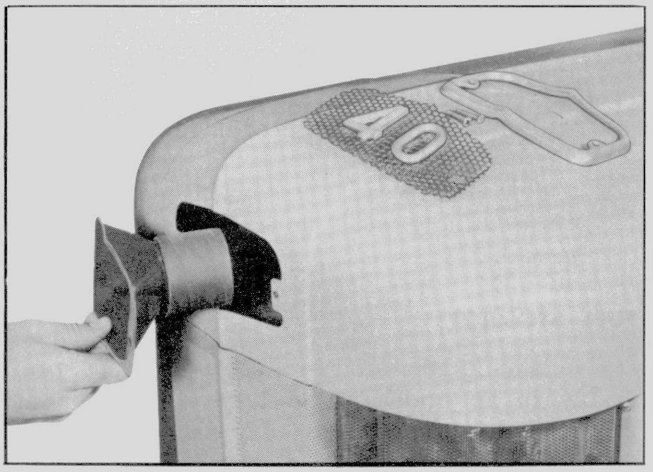
AIR CLEANER

The air cleaner is located ahead of the radiator and above the steering pedestal. Its purpose is to filter the air entering the carburetor. Foreign material such as dirt and other abrasives, if allowed access to the engine, will cause excessive wear of cylinder walls, pistons, rings and valves. Under normal operating conditions it is important to note that approximately 9,000 gallons of air must filter through the air cleaner in order to efficiently burn one gallon of gasoline. It is, therefore, essential that the air cleaner be kept clean and free from any type of restriction, as a partially plugged air cleaner will result in engine power loss and increased fuel consumption. Clean the oil cup and refill to the full mark each day using the same weight oil as is used in the crankcase. In extreme dirty and dusty conditions, it may be necessary to follow this procedure twice a day. Clean the intake screen above the radiator grill when dirty, but never oil this screen as dust will adhere and reduce the air flow.

Removing Air Cleaner Bowl For Servicing

The internal filter is cleaned by removing the air cleaner and rinsing the assembly in a suitable solvent. This procedure should be done once or twice a year. Under some operations, the filter becomes so plugged with dirt and lint that washing in a suitable solvent will not remove this clogged condition. If this occurs, the air cleaner will have to be replaced.

NOTE: Periodically, the entire air cleaner and hoses should be thoroughly inspected for cracks and other openings which would allow unfiltered air to enter the carburetor.

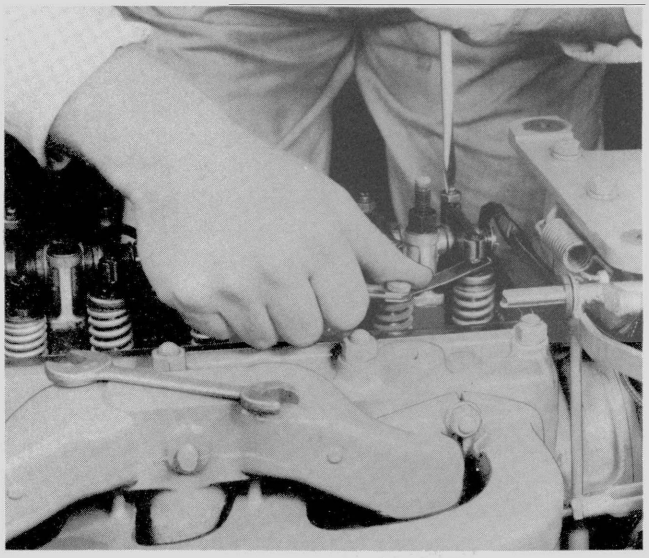


Servicing Air Cleaner Inlet Hose

VALVE ADJUSTMENT

Proper valve adjustment is essential for quiet, smooth operation and long valve life. However, it should be noted that quiet valves may mean tight valves. If this condition exists, short valve life will result due to the valves burning. The following procedure for adjusting valves is recommended:

1. Remove hood, gas tank and cylinder head cover.



Adjusting Valve Clearance

2. Crank engine with starter until one valve on No. 1 cylinder is open. (This valve spring will be completely compressed.) Set other (or closed) valve at 0.015 in.

3. Repeat this procedure with other three cylinders.

4. Set both exhaust and intake valves at 0.015 in.

NOTE: It is recommended that the valves be set "hot" at .013 in.; at normal operating temperature while running at a slow idle. In order to efficiently do this, an auxiliary gasoline tank should be used.

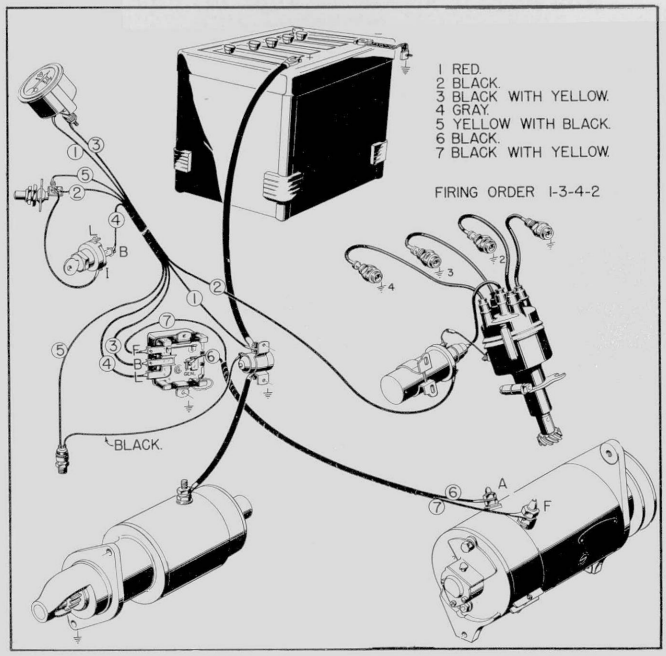
FUEL STORAGE

Fuel should be stored in a cool, dry place, preferably in an underground tank. If this is not practical, keep it in clean, dry drums, protected from the direct rays of the sun. The highly volatile parts of the fuel, which contribute to easy starting and high antiknock value, evaporate rapidly if exposed to heat.

Heat also hastens gum formation. Excessive gum in the gasoline may cause sticky intake valves or a clogged carburetor, fuel filter, or manifold.

ELECTRICAL SYSTEM

The electrical system of your Ferguson Tractor consists of a battery, starting motor, magnetic starter switch, safety switch, starter push button, ignition switch, regulator, ammeter, coil distributor, spark plugs and wiring. The purpose of the electrical system is to make available electric current for ignition, starting and other needs such as lights, etc. This battery-ignition type electrical system uses a storage battery to provide the primary or initial source of energy for ignition in the combustion chamber. This battery or low tension current is converted by the coil and distributor breaker points to a high voltage surge which jumps the spark plug gap in the combustion chamber. The generator, with related parts, generates an electrical current, controls it so that it will maintain the storage battery in a charged condition and supplies sufficient current for the normal electrical load of the tractor.



Engine Electrical System

BATTERY

The battery is a 9 plate, 12 volt, 50 ampere-hour capacity battery. The performance obtained from your battery depends on its amount of charge and the condition of the engine, starting motor and wiring. Cold weather reduces battery efficiency by retarding electro-chemical action. A fully charged battery with 100% cranking power at 80°F. will drop 2/5 of its original cranking power at 0°F. An engine also requires 2½ times more cranking effort at 0°F. than at 80°F. Therefore, during cold weather, the battery should be in the best possible condition.

The battery should be periodically inspected for the following:

1. Battery Surface Condition, Cable Corrosion and Frayed Cables. Clean by washing with warm baking soda solution. After connecting cable terminals to battery posts, coat with light grease to prevent corrosion.

NOTE: Care must be exercised not to get soda solution in vent holes as a neutralization of the electrolyte will result. Frayed cables should be replaced as excess resistance or shorts may develop.

2. Cracked or Broken Case.

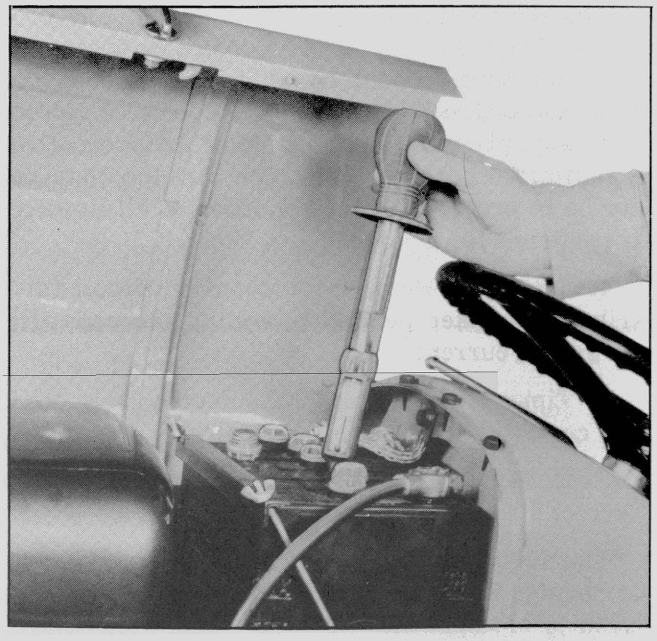
3. Soft Sealing Compound. This condition is usually caused by over-heating due to over-charging and will shorten battery life.

4. Battery Carrier. The wing nuts should be finger tight. Over-tightening will cause distortion when battery becomes hot. A loose battery will vibrate which may cause breakage.

5. Battery Caps. A broken or missing cap permits dust and dirt to enter the cell, shortening battery life. A plugged cap will not allow battery gases to escape, thereby damaging separators.

CAUTION: A battery, when being charged, produces and gives off very explosive hydrogen gas. It is important, then, that flames or sparks be kept away from the vent openings.

6. Electrolyte Solution Level. The level should be inspected once or twice a month to make sure it is approximately 3/8 in. above the plates. When adding distilled water fill each cell, using a syringe, to the bottom of the tube.



Checking Battery Specific Gravity

7. Specific Gravity. The specific gravity of a battery indicates the chemical condition of the battery. However, this is only true if the level is 3/8 in. above the plates. The specific gravity of a fully charged battery will be 1.260 or greater. A period of four hours should elapse before checking specific gravity after adding water to permit the solution to become uniform. If the battery has a low specific gravity reading, the battery should be recharged.

NOTE: Except in cases of emergency, a battery should always be slow charged to obtain long battery life.

IGNITION COIL

The coil is oil-filled to permit more rapid heat dissipation, provide greater insulation and is hermetically sealed against the entrance of air and moisture. A bakelite insulator, which resists surface leakage, protects the high tension terminal. Always make sure all leads have tight connections as excessive resistance will reduce the efficiency of the coil output.

GENERATOR

The generator is a 12-volt unit having an adjustable third brush to control its output. Moving the adjustable brush in the direction of rotation increases the output. Generator output must be set using external meters; it cannot be measured with the tractor ammeter.

The generator is capable of an output of 10 to 12 amps under normal conditions and is driven by the fan belt. The pulley end of the armature shaft is supported by a ball bearing and the commutator end by a bronze bushing.

Lubricate hinge-cap oilers every 100 hours of operation with medium weight engine oil.

Keep Flames Away From Battery Filler Cap Openings

CAUTION: Avoid excessive lubrication as over-oiling may force lubricant out on the commutator which will result in reduced generator output and increased commutator and brush wear. Never lubricate the commutator and do not lubricate the generator while it is in operation.

Occasionally observe the condition of the commutator and brushes by removing the cover band. If the commutator is dirty, it may be cleaned by holding a strip of No. 00 sandpaper (never use emery cloth) against it with a wood stick while the generator is operating. Move the stick across the length of the commutator to insure even cleaning. All dust should be blown from the generator after the commutator is cleaned.

NOTE: If the commutator is rough, out-of-round or has high mica, see your Ferguson Dealer. If the brushes are worn down to less than half their regular length they should be replaced. NEVER OPERATE TRACTOR WITH GENERATOR LEADS DISCONNECTED.

A hinge-type of mounting and slotted bracket at the front end allows for fan belt tension adjustment. To adjust, loosen the bracket and pivoting bolts, and pivot generator. There should be approximately 1/2 inch deflection in the belt. Tighten bolts securely.

GENERATOR REGULATOR

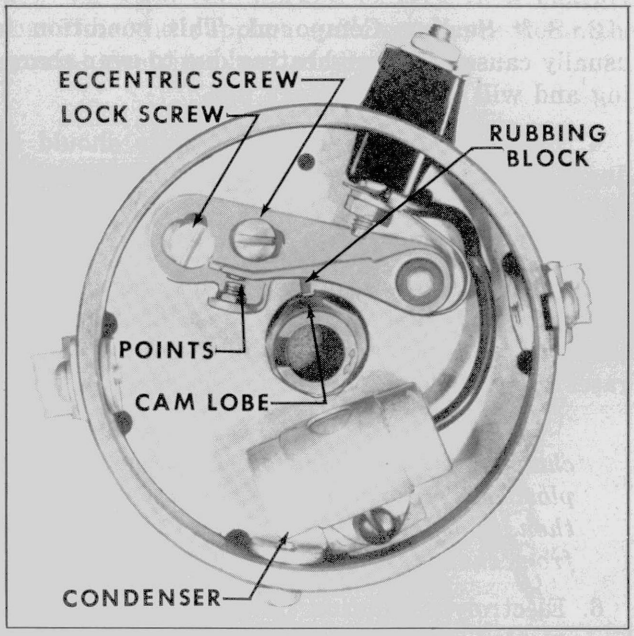
The generator regulator is a combination current voltage regulator and cutout relay to control the direction of current and generator output according to the battery conditions and electrical load. The regulator should be serviced and adjusted only by your Ferguson Dealer as maladjustment can mean a burned out regulator or generator.

STARTING MOTOR

The starting motor is a 12-volt, 4-pole, 4-brush, series-wound motor, mounted on the engine flange of the flywheel housing. The armature rotates in oilless bushings. The Bendix drive engages the pinion to the ring gear on the flywheel when the armature rotates. The over-running effect of the engine on the pinion disengages the pinion from the flywheel ring gear when the engine starts. In operation, a push button activates a solenoid which in turn closes the switch in the circuit from the battery to the starting motor.

Periodic cleaning of the commutator should be the only servicing needed. See this page under Generator Servicing for proper procedure. In case of functional difficulty, the starter should be removed and taken to your Ferguson Dealer.

CAUTION: Never operate the starting motor for periods longer than 30 seconds without pausing for a few minutes to allow the starting motor to cool; otherwise the commutator bars may become unsoldered.



Distributor Breaker Points Fully Opened

DISTRIBUTOR

The distributor is fully automatic and is protected from dust by a special seal between the cap and housing and by rubber caps over the entrance of the high tension wires. These rubber caps also prevent the entrance of moisture. It is essential for optimum operation that the distributor be in proper working condition at all times as it performs the following functions:

1. Opens and closes the low tension circuit (distributor breaker points) providing the coil with surges of current.

2. Times these surges to the engine speed with the centrifugal advance mechanism.

3. Directs the coil high voltage surge to the correct spark plug at the correct time.

The following inspection should be performed at regular intervals to make certain that the distributor mechanism is clean and functioning properly.

1. Remove distributor cap, rotor and dust cover. Note the condition of (a) contact points and (b) rotor and cap.

a. The contact points should meet squarely and have the proper gap (0.022 in.). With old worn points, it is difficult to obtain the correct gap setting by using a feeler gauge as the gauge only measures between the high points on the jagged surface. If a build-up is apparent on the points, the surface can be squared up by a few strokes of a fine cut file. To adjust points, crank engine until point wearing block is on a cam lobe (points are then fully open). Loosen lock screw and turn eccentric screw until correct opening is obtained. Tighten lock screw and recheck point opening.

b. A carbonized or chipped rotor and cap will cause high tension leakage to ground. If this condition exists, the parts should be replaced.

NOTE: If a feeler gauge is used to adjust the points, care should be taken to remove all foreign material from the gauge before use.

2. Check distributor cap and high tension wiring for frayed or damaged insulation. Check connections at the distributor cap and spark plugs. Excess resistance in the wires or frayed wiring may cause leaks to ground.

3. The distributor has a built-in oil reservoir filled with light engine oil and sealed at the factory. Under normal operating conditions, the reservoir should be refilled every 750 hours of operation (more frequent refilling is required when unusual heat or other abnormal operating conditions are encountered). To refill reservoir, remove oil plug and add 20W oil. A small trace of cup grease should be placed on the breaker cam every 100 hours of operation. Also place 1 or 2 drops of light (10W) engine oil on the breaker lever pivot and 3 to 4 drops on the felt wick under the rotor.

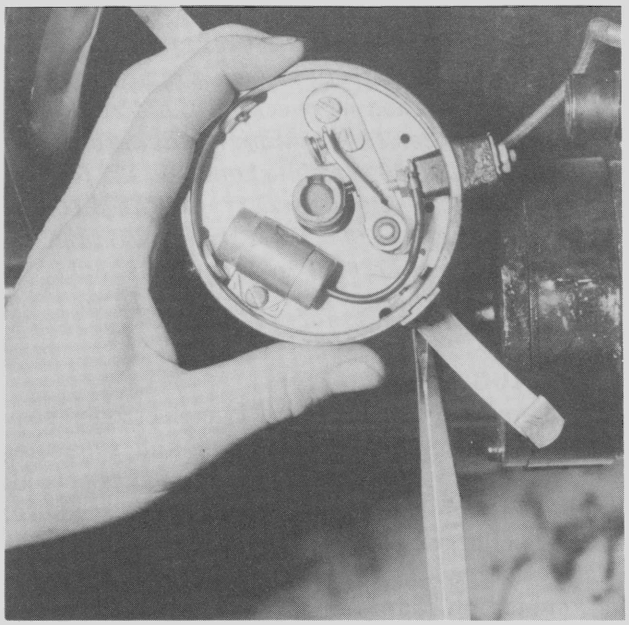
NOTE: Avoid excessive lubrication, as too much oil will get on the contact points and cause them to burn.

Engine Timing

A properly advancing distributor cannot provide correct ignition unless it is timed to the engine. For correct spark delivery, with engine not running, points should open as follows:

6.60 to 1 engine – 6 degrees before top dead center on compression stroke.

8.10 to 1 engine – 3 degrees before top dead center on compression stroke.

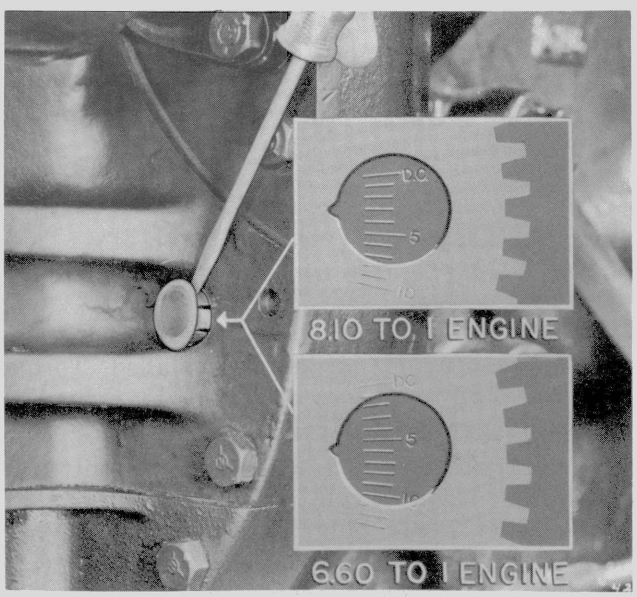


Rotating Distributor Until Points Just Begin to Move

The engine can be timed as follows:

1. Remove the No. 1 spark plug and crank the engine until the compression stroke creates pressure on finger held in the spark plug hole.

2. Remove the timing hole button plug and crank engine slowly until graduated lines on the front of the flywheel can be seen. When the line indicating 6 degrees before top dead center (6.60 to 1 engine) or 3 degrees before top dead center (8.10 to 1 engine) is aligned with the groove in the timing hole, the breaker points should be starting to open. If they are not, then loosen the distributor clamp screw and slowly rotate the complete distributor until the points just break contact.

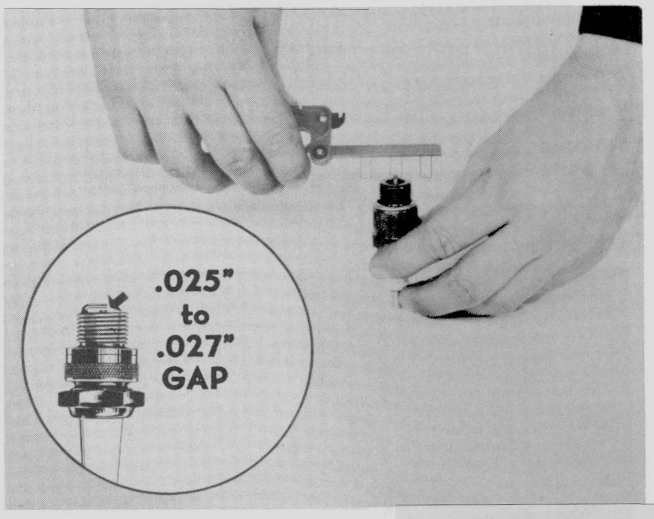


Removing Flywheel Timing Hole Plug

NOTE: It is recommended that the engine be timed with a timing light by your Ferguson Dealer. This provides an accurate method of checking the distributor advance. The maximum advance at idle speed (450 RPM) should be 6° for the 6.60 to 1 engine and 3° for the 8.10 to 1 engine. At 2000 RPM, the maximum advance for the 6.60 to 1 engine should be 30 ±2° and 27 ±2° for the 8.10 to 1 engine.

SPARK PLUGS

Each spark plug consists of two electrodes positioned in the combustion chamber and separated by an air gap. The center insulated electrode receives high voltage surges from the distributor which discharges to the side or ground electrode forming a spark to ignite the air-fuel mixture in the combustion chamber. Examine the spark plugs frequently for excessive carbon deposits, pitted or burned electrodes, broken porcelain and blow-by marks. Faulty spark plugs can be a major cause of poor engine performance. Therefore, when servicing, either clean and adjust, or replace if defective. For best engine performance clean and gap plugs every 100 hours of operation. Plugs should be cleaned with a sand blast machine and regapped at 0.025 in. with a wire feeler gauge.



Setting Spark Plug Gap Using a Wire Feeler Gauge

It is recommended that whenever spark plugs are replaced, a new gasket be installed. Torque the plug to 32 to 38 foot pounds or by threading the plug finger tight and tightening 3/4 of a turn.

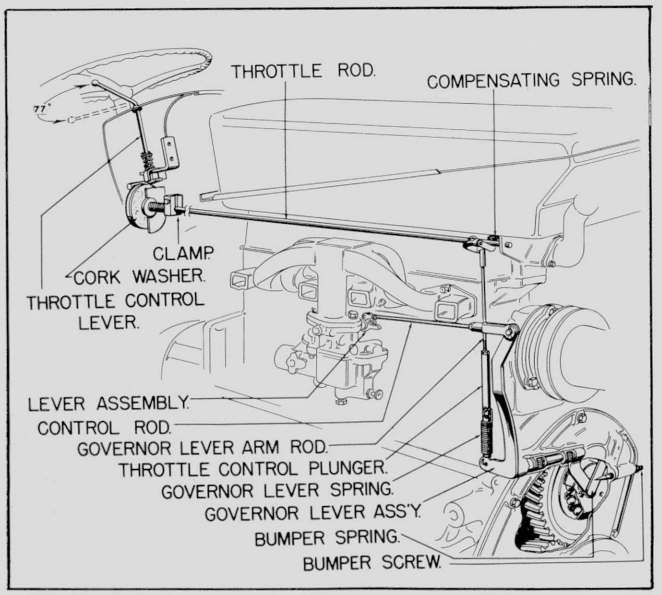
When the tractor is operated intermittently under light loads in cold weather, a hotter than normal heat range plug may be needed. When the tractor is operated under heavy loads during hot weather, a colder than normal heat range plug may be needed.

Recommended 18mm plugs for the Ferguson "40" Tractor are:

MAKE OF PLUG	HEAT RANGE		
	Standard	Hot	Cold
Champion	8 Com.	D-21	7
AC	85 S Com.	87 S Com.	83 S Com.
Auto-Lite	BT-8	BT-10	BT-4

GOVERNOR

An improved-type, variable-speed, centrifugal governor with ten evenly spaced ball weights, held in a metal retainer attached to the camshaft gear, regulates the engine speed as the load varies. The governor mechanism is completely enclosed by the timing gear housing except for the control linkage. By use of the throttle control lever, a selection of engine speeds from 400 to 2,200 RPM can be obtained. Also the governor action will maintain, within limits, selected engine speeds between 1,000 and 2,000 RPM at varying loads.



Governor Linkage

Opening the throttle control lever increases the governor lever spring tension. This causes the governor linkage to overcome the force of the ball weights, thereby opening the carburetor throttle butterfly and permitting a greater amount of fuel mixture to enter the combustion chamber which increases the engine speed. The increase in speed gives greater force to the governor ball weights which begin to overcome the spring tension and partially closes the throttle butterfly. A balance is reached between the action of the ball

weights and the spring tension, and is maintained until either the load or position of the throttle lever is changed.

When the throttle control lever is set for a certain speed and the load increases, there is a tendency to reduce the relative force of the governor ball weights, thereby permitting the governor lever spring tension to open the throttle butterfly, compensating for the increased load. Exactly the opposite condition occurs if the load is decreased.

The governor is lubricated by engine oil, which is forced through the bleeder holes from the front camshaft bearing. Proper governor action must be obtained to have steady and efficient lugging power as any binding or maladjustment will result in faulty or erratic operation.

To check governor action:

1. Start engine (must be at operating temperature).

2. Set throttle-control lever for 1,000 RPM. Engine should be "revved-up" then reduced to desired RPM.

3. Set master brake.

4. Shift to high range–third gear.

5. Engage clutch gradually.

6. Observe if governor lever assembly pulls control rod forward without delay. If it does not, note to see if bumper screw is backed away from bumper spring. This is accomplished by loosening lock nut and then backing screw out about one turn from the spring.

7. Recheck operation procedure 1 through 5. If insufficient action is still present, check external governor linkage for binding and proper geometry as described below.

GOVERNOR ADJUSTMENT

If governor action is responsive, note the top engine RPM on the tractormeter. Top Ferguson Engine speed should be 2100-2200 RPM. If this condition does not exist, loosen U-bolt and turn assembly on throttle rod until correct speed is obtained.

Governor action should be smooth and steady without surging. Surging is the result of either excessive wear or binding of the governor linkage. Therefore, to obtain efficient operation, the cause of surging should be determined and corrected. If the governor linkage operates freely and surging exists the bumper screw may be turned in until it touches the bumper spring.

CAUTION: Do not turn bumper screw in any farther than necessary to stop surging as it deadens governor action at slow speeds.

Improper external linkage operation may be caused by binding, interference due to misalignment or excessive dirt and paint accumulation.

Should the vertical arm of the governor lever assembly interfere with the fan belt, the control rod should be shortened at the clevis end and the governor lever arm rod lengthened to maintain idle position.

Before checking linkage for length, check engine idling speed as follows:

1. Disconnect control rod from governor lever assembly.

2. Start engine.

CAUTION: Care should be taken to hold control rod in an idle position when starting engine. If this precaution is not taken, the engine will run beyond its normal speed.

3. Hold control rod against idling stop and adjust idling speed screw until 400 to 450 engine RPM is obtained.

To adjust control rod length:

1. Open throttle control lever fully to create tension on governor lever spring.

2. Adjust control rod length until it is necessary to move the rod back slightly (approximately 1/32 in.) in order to insert the pin through the control rod clevis and governor lever assembly.

3. Lock clevis in position. Make sure pin fits freely and that clevis does not bind against governor lever assembly.

NOTE: If governor lever assembly interferes with the fan belt, shorten the control rod.

To adjust governor lever arm rod length:

1. Place throttle control lever at idling position, i.e., just short of the forward stop.

2. Observe if compensating spring link is touching the throttle rod. If not, loosen U-bolt assembly and rotate on throttle rod. Retighten U-bolt.

3. Observe if governor lever arm rod is long enough to contact horizontal arm of governor lever assembly and hold control rod against idle stop. If not, loosen locknut on governor lever arm rod, remove governor lever spring and adjust rod until it lightly touches the arm of the governor lever assembly and holds it at the idle position. Reconnect spring and retighten locknut.

4. Recheck top engine speed, if not 2100-2200 RPM, loosen U-bolt on throttle rod and adjust.

To remove throttle control lever "creep".

1. Increase spring compression on cork washer under instrument panel by relocating clamp. If this does not remove "creep", replace cork washer.

NOTE: Care must be taken not to position clamp where it will strike the battery.

2. Shorten compensating spring.

To correct throttle control lever arc:

1. Remove governor lever spring and shorten rounded end.

2. If step 1 did not correct, replace spring.

CLUTCH AND TRANSMISSION

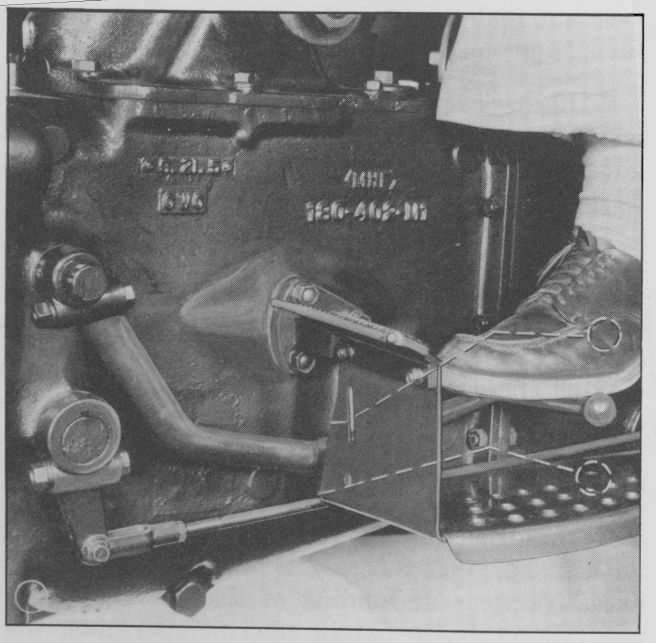
The Ferguson Clutch and Dual Range Transmission is that portion of the power train which mechanically regulates and controls the energy supplied by the engine. With the Dual Clutch, the clutch channels the power flow into (1) the transmission input shaft (primary clutch) and (2) the hydraulic pump and the power take-off input shaft (secondary clutch). This then provides an additional control of the latter when the power flow to the transmission is interrupted. The transmission receives the power that is transmitted by the primary clutch.

NOTE: The pump is constant running and operates whether or not the power take-off shaft is engaged. The pump may be stopped only when the secondary clutch is disengaged.

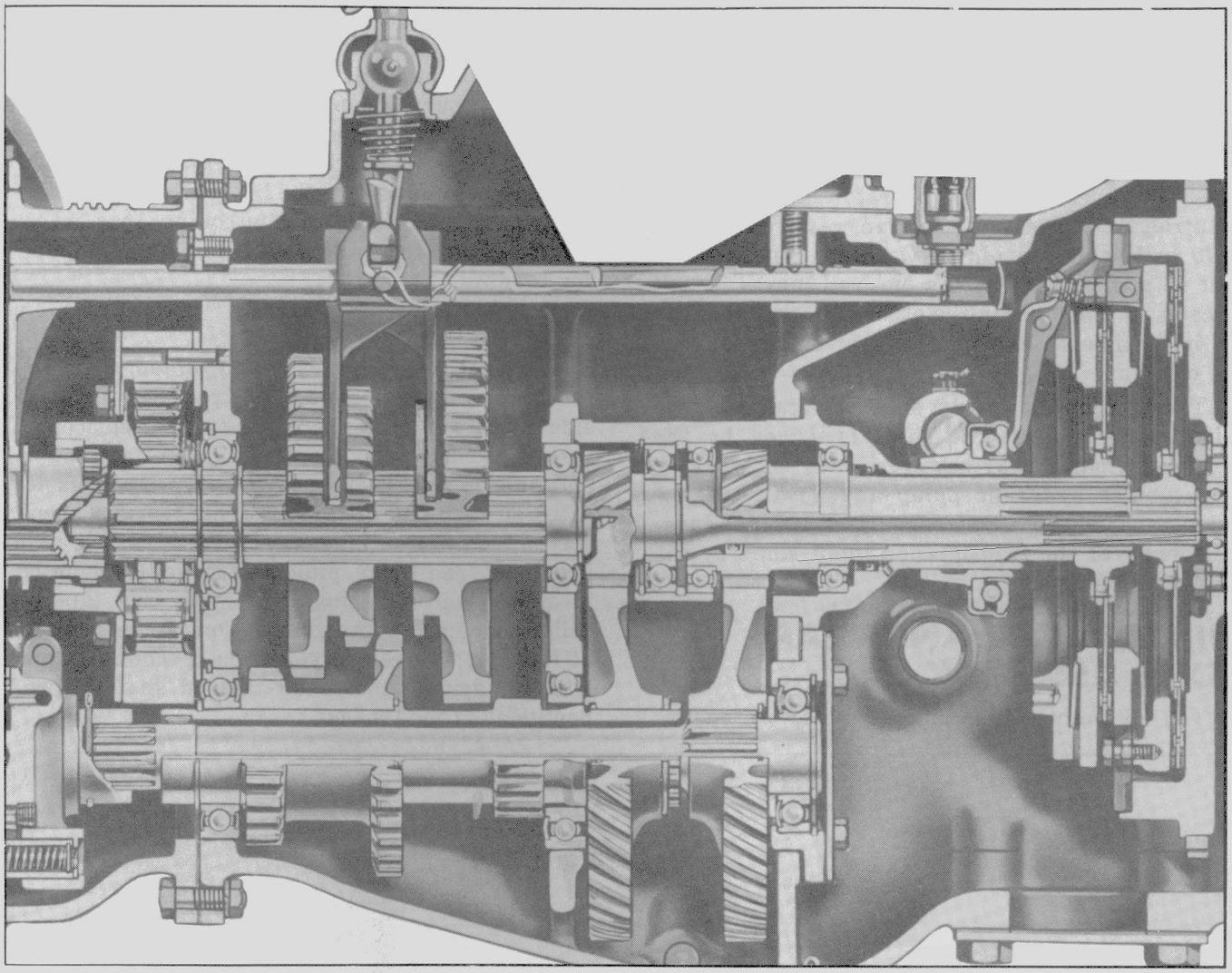
DUAL CLUTCH

The Ferguson Dual Clutch consists of a forward (primary) pressure plate and dry cushioned disc which is attached to the transmission input shaft, and a rearward (secondary) pressure plate and dry disc which is attached to the hydraulic pump and power take-off input shaft. Each pressure plate is spring-loaded by an annular Belleville-type spring which is located between the clutch cover and pressure plate for the secondary disc and the false flywheel ring and pressure plate for the primary disc. The false flywheel ring is interposed between and integrated with the primary and secondary clutch sub-assemblies, and is secured to the flywheel by the same cap screws that attach the clutch cover. In operation, the clutch springs exert pressure against the clutch pressure plates, this in turn transmits the pressure through the discs to the false flywheel ring for the secondary clutch and to the engine flywheel for the primary clutch, thus establishing a firm frictional contact between the respective discs and flywheel faces.

Depressing the clutch pedal through the 1st stage moves the clutch release fork, which in turn contacts the clutch release bearing, moving it forward on the retainer and bringing it in contact with the clutch release fingers. The fingers are assembled to the clutch cover. The bearing depresses the fingers which in turn causes the primary pressure plate to retract from the disc and release the pressure on it. This interrupts the power flow to the transmission. Depressing the clutch pedal further through the 2nd stage (noticeable by an increased resistance to overcome) causes the same release fingers to move the primary pressure plate to a point where it contacts and causes the secondary pressure plate to retract from its respective disc, thus releasing the frictional contact between the disc and the false flywheel ring face. This interrupts the power flow to the hydraulic pump and power take-off input shaft.



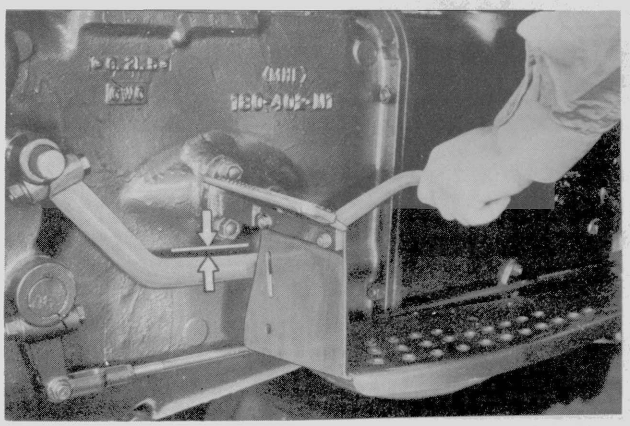
Clutch Pedal Depressed Through First Stage



Dual Range Transmission and Dual Clutch

CLUTCH PEDAL FREE PLAY

For efficient operation adequate clearance must exist between the clutch release finger and the clutch release bearing. This clearance is evident externally as clutch pedal free play and is adjustable as follows:



Clutch Pedal Free Play

1. Loosen clamp bolt and place a rod through the hole provided in the extended end of the clutch release shaft.

2. Turn the shaft clockwise until an engagement with the release bearing is felt.

3. Move the clutch pedal in relation to the shaft until a 3/8 in. free play is obtained. Tighten clamp securely.

DUAL RANGE TRANSMISSION

The Ferguson Transmission is a three-speed forward and one-speed reverse sliding spur gear-type compounded by a planetary reduction gear assembly located at the output end of the main shaft. This combination produces a total of six forward and two reverse speeds. The transmission drives direct to the differential when the Dual Range shift lever is positioned in "high–range". All gears are case-hardened, heat-treated alloy steel forgings. The gears in the first reduction train have helical-cut teeth for quietness and long

life. The spur teeth change-speed gears allow for ease of shifting.

Heavy forged shifter forks provide positive movement of the speed gears and planetary shift collar when the shifter rails are moved. Spring-loaded detent pins hold the shift rails in the positions selected by the operator, in gear or in neutral. At the rear of the transmission housing, two balls and one pin between the shifter rails act as a safety device. As one rail moves, a ball locates in the notch in the other rail, thus making it impossible to engage two transmission gears at one time.

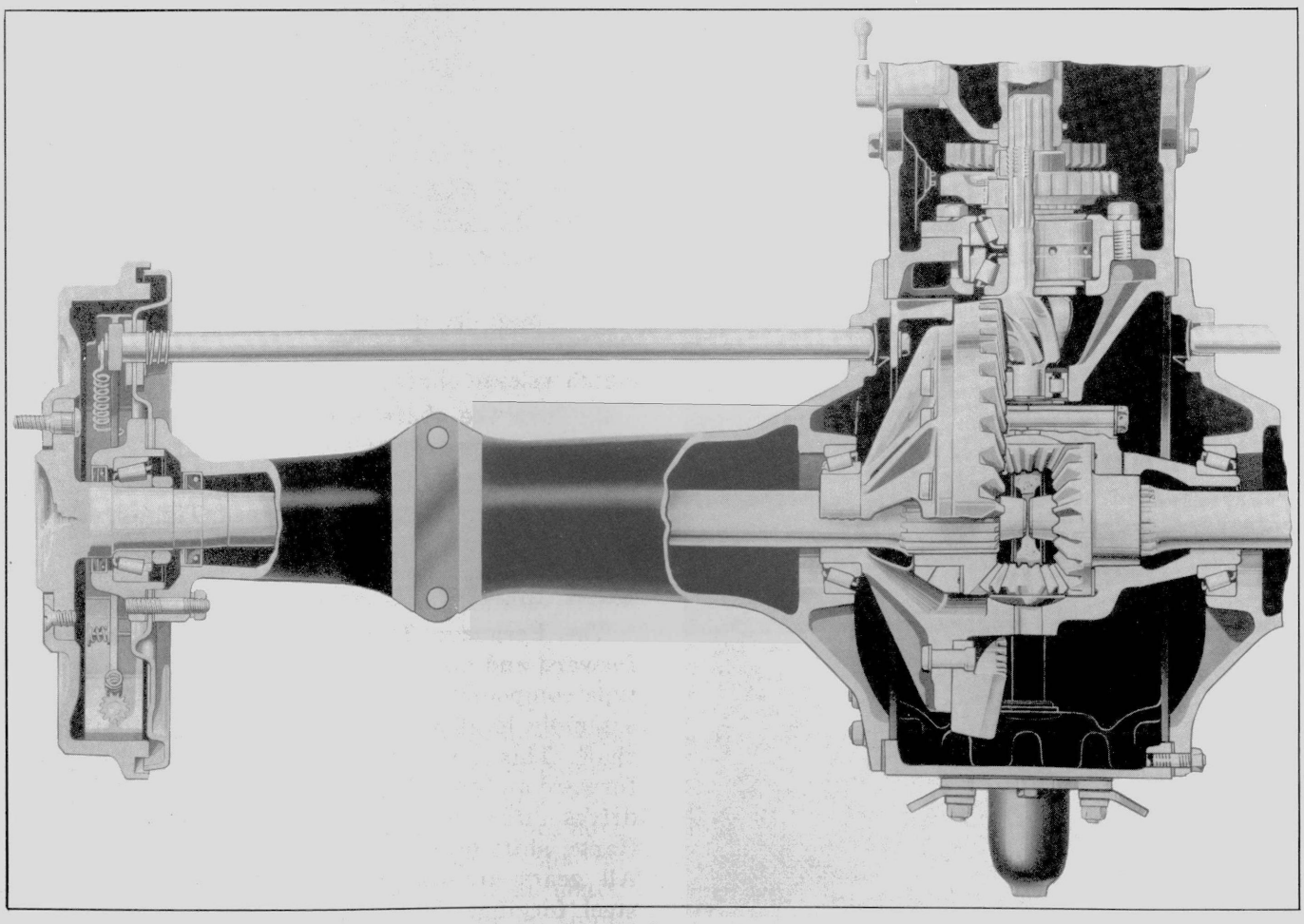
The transmission input shaft is rotated by the clutch driven disc. The shaft is driven by the clutch primary disc; however, it is enclosed by the tubular hydraulic pump and power take-off input shaft. The tubular shaft is rotated independently of the transmission input shaft by the clutch secondary disc.

DIFFERENTIAL AND REAR AXLE ASSEMBLY

The Differential Assembly receives the energy transmitted by the transmission output shaft and transfers it, at right angles, to the rear axle shafts, enabling the shafts to rotate together for motivation purposes or in a proportional relationship when the tractor turns. Assembled to the outer extremities of the housings which contain the rear axle shafts are the brake assemblies. The brakes offer a means of controlling rear wheel rotation both for tractor braking purposes and for turning.

DIFFERENTIAL

A special bevel ring gear and pinion, four differential pinions mounted on a spider and two side gears make up the differential. Replaceable thrust washers back up the differential pinions and side gears. Two tapered roller bearings located on each end of the differential case suspend the entire differential assembly between the axle housings. The drive pinion is straddle mounted in relation to the ring gear with two tapered roller bearings at its front and one roller bearing at its rear. The pinion shaft has a mounted spur gear for driving the power take-off shaft in proportional ground speed.



Differential and Rear Axle Assembly

GROUND SPEED IN MILES PER HOUR
Ferguson "40" Tractor

Range	Gear	11-28 TIRE 1000 RPM	11-28 TIRE 1500 RPM	11-28 TIRE 2000 RPM	13-24 TIRE 1000 RPM	13-24 TIRE 1500 RPM	13-24 TIRE 2000 RPM
Low	1	.66	.99	1.33	.65	.97	1.31
Low	2	.99	1.49	1.99	.98	1.46	1.96
Low	3	1.82	2.74	3.65	1.79	2.69	3.58
Low	R	.88	1.33	1.77	.87	1.31	1.74
High	1	2.65	3.98	5.30	2.60	3.91	5.21
High	2	3.98	5.97	7.96	3.91	5.86	7.82
High	3	7.29	10.95	14.59	7.16	10.76	14.32
High	R	3.54	5.31	7.09	3.48	5.22	6.96

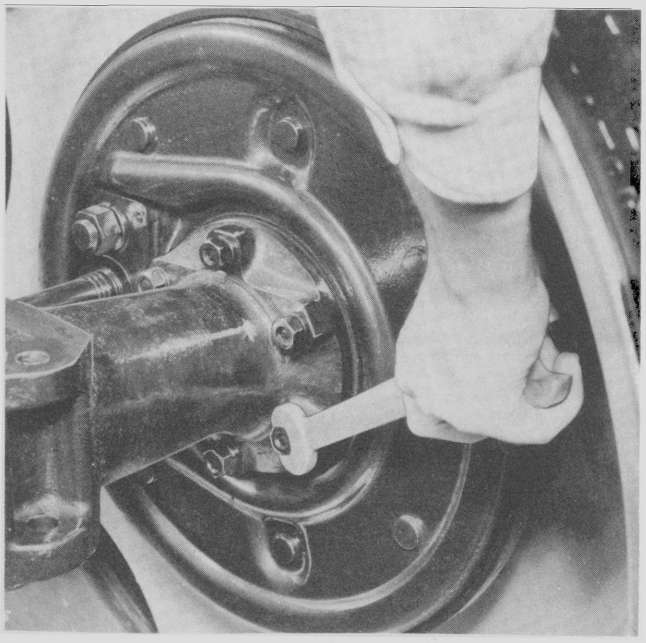
GROUND SPEED IN MILES PER HOUR
Ferguson Hi "40" Tractor

Range	Gear	10-38 TIRE 1000 RPM	10-38 TIRE 1500 RPM	10-38 TIRE 2000 RPM	11-38 TIRE 1000 RPM	11-38 TIRE 1500 RPM	11-38 TIRE 2000 RPM
Low	1	.72	1.08	1.45	.75	1.12	1.50
Low	2	1.09	1.63	2.18	1.12	1.68	2.25
Low	3	1.99	3.00	3.99	2.06	3.10	4.12
Low	R	.96	1.45	1.93	.99	1.50	1.99
High	1	2.90	4.35	5.80	2.99	4.50	5.99
High	2	4.35	6.53	8.71	4.50	6.75	9.00
High	3	7.99	11.98	15.98	8.25	12.38	16.50
High	R	3.87	5.81	7.75	4.00	6.00	8.01

REAR AXLE ASSEMBLY

The rear axle consists of a right and left hand axle housing, the axle shafts, bearing retainers, bearings, oil seals and brake assemblies. The malleable iron axle housings are attached to the tractor center section and contain the lower link studs which are the pull points of the tractor. The axle shafts are of a sturdy, forged-steel construction with the inner ends splined into the differential side gears. The outer ends of the shafts are supported by tapered roller bearings, located in bearing retainers which are bolted to the ends of the axle housing. The tapered bearings and retainer rings prevent the axle shafts from moving out of the housings, while the inward movement is controlled by the axles butting together in the differential. The tapered roller bearings must be repacked with wheel bearing lubricant every year (1,000 hours of operation.) Each rear wheel and brake is attached to the axle shaft flange.

NOTE: The bearing retainer nuts should be tightened frequently to guard against grease leakage.



Tightening Bearing Retainer Nuts

PACKING REAR WHEEL BEARINGS

Whenever possible, have your Ferguson Dealer perform this operation. The rear wheel bearings should be repacked annually.

NOTE: Before starting to pack rear wheel bearings, check for axle end movement by shaking one wheel at its top while both wheels are on the ground. If the inner ends are heard bumping against each other, shims will have to be removed as discussed in Step 5.

1. Jack up both rear wheels using the Ferguson Power Jack.

2. Remove both rear wheels and discs by removing the eight rear wheel disc nuts on each side.

3. Remove the six bearing retainer nuts on each side.

4. Disassemble brake rods by removing pins from clevises.

5. Pull rear axle assemblies partially out and repack with wheel bearing lubricant. (If axle end play exists, remove shims.)

6. Make sure gaskets and joining surfaces are in good condition before reassembling rear axles. It is essential that gaskets be assembled contacting the brake backing plates. Care must be exercised when pushing splines through grease seals to avoid damage to the seals.

7. Mount wheels and recheck for axle end play by lowering tractor to ground. If axle end play still exists, more shims will have to be removed.

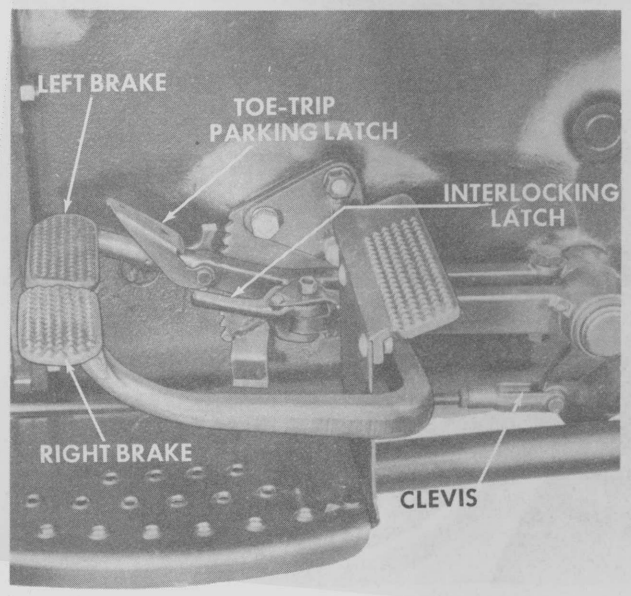
8. If noise is eliminated, jack both wheels up again, and turn one wheel noting the reaction on the other. If other wheel remains still or turns in opposite direction, proper axle clearance has been obtained. If other wheel turns in the same direction, the axle ends are binding on each other. This condition will necessitate shims being added. Failure to eliminate this condition will result in serious damage. In order to avoid duplication of work, it is suggested that these bearings be repacked whenever the wheels and brake drums are removed for replacement of brake shoes.

BRAKES

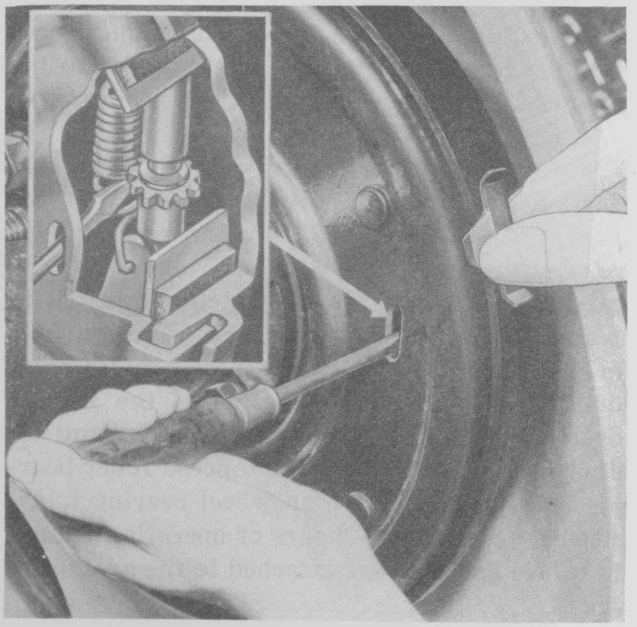
The mechanically operated brakes on the Ferguson Tractor are double internal expanding, self-energizing, two shoe-type Bendix Brakes with bonded linings. A braking surface of 118 square inches is provided on the brake linings. Each wheel can be braked independently by pedals mounted on the right side of the tractor center housing. Each pedal is coupled to the brake cross shaft. The shafts are connected by brake rods and lever linkages which incorporate equalizing springs. The right and left brake pedals brake the right and left wheels respectively or may be used simultaneously as a master brake. An interlocking latch locks the pedals together for a master brake. A spring-loaded pawl on the left pedal locks the left brake (or both brakes if the pedals are latched together) in an engaged position.

Brake Adjustment

When brakes do not function properly due to excessively damp or humid climatic conditions it may be necessary to "burn-in" brake linings prior



Tractor Brake Assembly



Adjusting Brakes

Always Set Brakes Before Dismounting, When Stopping on a Hill or Grade

to final adjustments. The proper procedure is as follows:

1. Use your Ferguson Power Jack to raise the rear wheels off the floor.

2. Start engine, shift tractor into high range–first gear and lock one wheel with turning brake. As opposite wheel rotates, partially apply its turning brake and operate tractor until brake drum is too warm to touch. Repeat this procedure to "burn-in" opposite brake.

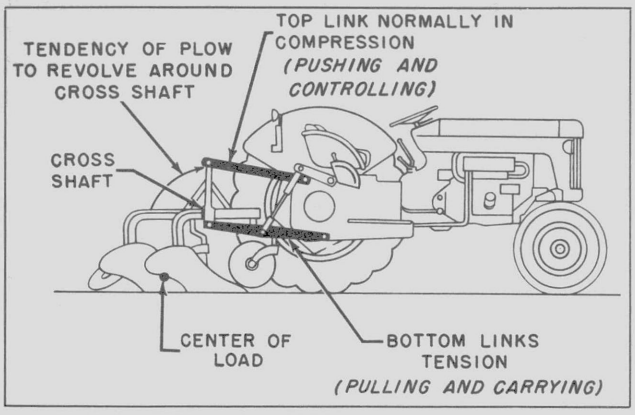
3. Permit brake drums to cool. Tighten adjusting screws (push screw driver handle toward axle housing) until drag is felt on wheel. Back off adjusting screws (pull screw driver handle away from axle housing) until wheel rotates freely. Check drag after each "click".

4. Check adjustment of the master brake setting (both brake pedals locked together) to see that both brakes react evenly. This should be done by driving the tractor on level ground and applying the master brake. If brake linkage is correct, the tractor will come to a stop on a straight line. If it is not, the tractor will pull to the side with the shorter brake linkage. Shorten the longer brake linkage by adjusting the clevis on the rod. Both brake linkages should have a small amount of free play before brakes are applied. Therefore, care must be taken not to get them too tight.

FERGUSON SYSTEM

The Ferguson System combines both tractor and implement into one close-coupled, hydraulically controlled working unit. In itself the system employs a combination of linkages and hydraulic mechanism for the control of farm implements. The Ferguson System provides automatic draft control of soil-engaging implements in conjunction with response control which now makes it possible to modify the rate of response of the system to compensate for different implement weights and varying soil conditions. The system also provides position control by means of which the height or depth of an implement relative to the tractor can be selected. The operator can manually control the Ferguson System from the tractor seat.

The Ferguson System utilizes three links instead of one to attach an implement to the tractor, thereby dividing the implement's force into three components. The two lower links normally act in tension and the upper link in compression. The system utilizes these links in tractor-implement relationship to obtain greater safety and efficiency.



Soil Reaction On Tractor Linkage

Only the Ferguson Hydraulic System performs all of the following:

1. Provides penetration without excess implement weight, since the geometry of the external linkage incorporates an implement entry angle as the implement enters the soil.

2. Provides double acting automatic draft control in conjunction with response control. These features are manually controlled from the tractor seat by selecting a draft (or depth setting) with the draft control lever and optimum response setting with the Hydralever.

3. Provides position control of an implement both above and below the ground. This feature is independent of draft control and is also controlled from the tractor seat by the Hydralever. The draft control lever is completely lowered when position control is used to select the working depth of an implement. The Hydralever is also used to raise or lower the links to and from the transport position.

4. Provides traction without excessive built-in weight, as a portion of the implement weight is carried on the tractor.

5. Insures against the tractor upsetting backward. This is provided by the geometry of the external linkage acting as a restraining support.

6. Automatically protects tractor, implement and operator by releasing the hydraulic transfer of implement weight from the rear wheels when the implement strikes an underground obstruction.

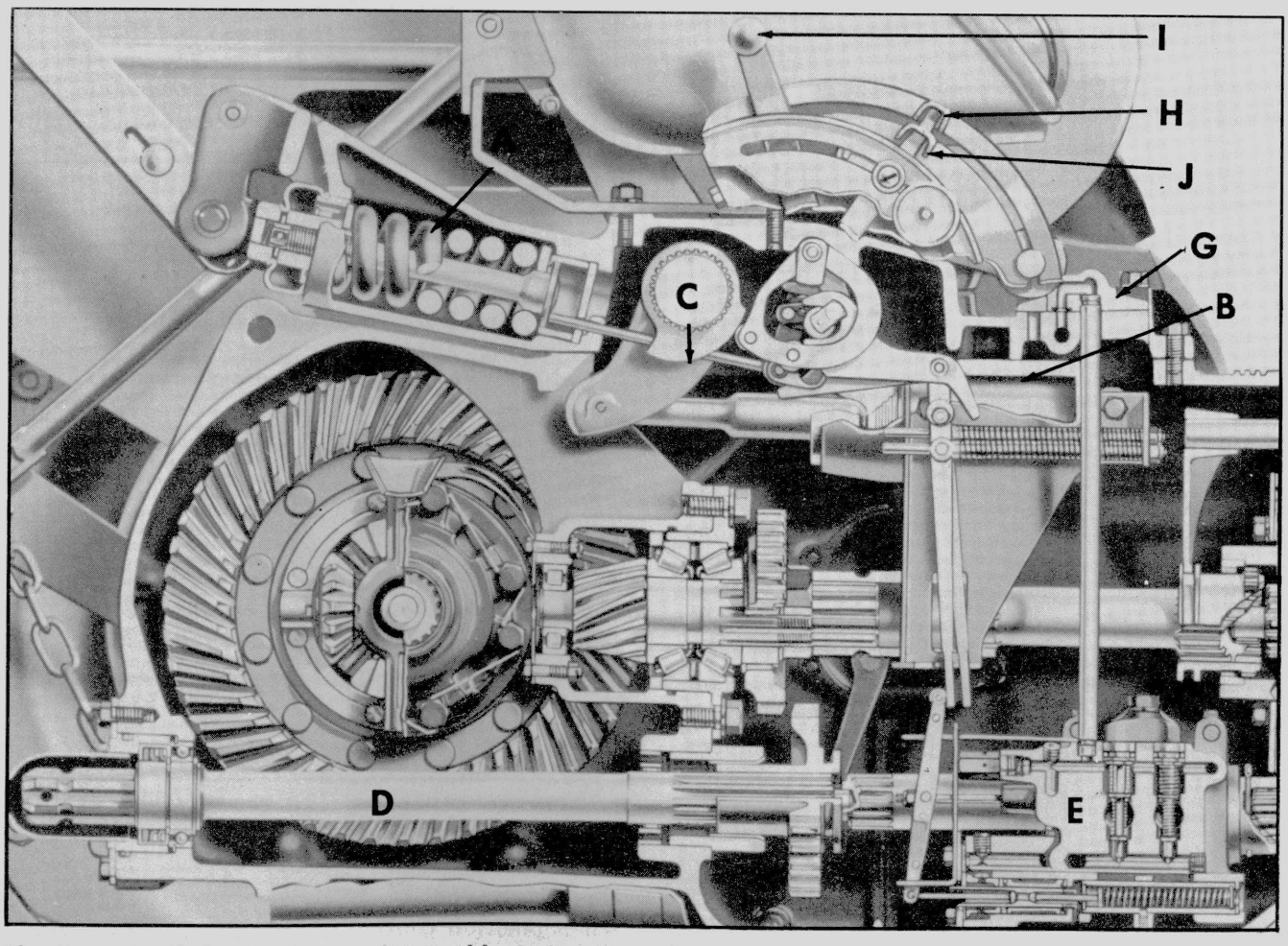
7. Insures against foaming and spongy oil and also wasted energy in the pump as the system incorporates the exclusive Suction Side Control; that is, the valve controls on the suction or intake side of the pump.

8. Double acting draft control. This feature allows the double acting control spring to be compressed against its rearward spring seat by a tension load in the top link or to be compressed against its forward seat by a compression load in the link, allowing full implement draft control to be obtained whether the top link is in compression or tension. The double acting control spring also allows an implement in transport to float its overhanging weight on the spring. This reduces shock loads which would normally tend to blow the safety valve.

9. High volume discharge. The new hydraulic pump control valve provides excessively large dump ports thus eliminating the need of an external dump valve when using such implements as the L-UO manure loader. High volume discharge is obtained by moving the Hydralever to the fast response setting.

10. A means to produce pumping even in the transport shut-off position. This feature allows oil to be supplied to external cylinders even though the lower links raise to the top position. This feature is obtained when there is no tension load on the control spring by moving the draft control lever to the top of the quadrant or tension range.

11. External transfer plate replacement with external cylinder control valves. This feature now



The Ferguson Hydraulic System. (A) Double Acting Control Spring (B) Ram Cylinder (C) Ram Arm Cam (D) Power Take Off Shaft (E) Hydraulic Pump (F) Control Valve (G) Transfer Plate (H) Draft Control Lever (I) Hydralever (J) Adjustable Sector (K) Ground Speed PTO Shift Gear

connects the hydraulic pump to the ram cylinder and is easily removed for incorporating external valves. These valves provide direct return of oil to the sump, thus permitting open center control of either the internal or external cylinders. For this operation both the draft control lever and Hydralever are to be fully raised.

The Ferguson linkage is raised by a full floating, constant-running, four cylinder scotch-yoke piston-type pump supported on and driven by a separable extension of the transmission countershaft. The pump is capable of delivering over three gallons of oil per minute at pressure up to 2500 PSI. The oil is pumped to the ram cylinder where the pressure is converted to a force which raises the linkage, in turn raising the attached implement.

NOTE: The pump is constant running and operates whether or not the power take-off shaft is engaged. The pump may be stopped only when the secondary clutch is disengaged.

The draft control lever and the Hydralever (in position control range) manually regulate the raising or lowering of the tractor lower links by controlling the flow of oil to and from the ram cylinder. TO RAISE AN IMPLEMENT FOR TRANSPORTING, THE HYDRALEVER IS TO BE USED. Raising the lever permits oil under pressure to fill the ram cylinder and consequently raise the lower links. Lowering the lever causes the implement to lower due to its own weight as the oil is released from the ram cylinder. During field operation when automatic draft control is used, the implement reaches the determined depth (as selected by the draft control lever) and at this point the oil flowing from the ram cylinder is automatically stopped as the control valve returns to neutral. The implement will, therefore, remain at this depth as long as the draft remains unchanged. On uneven ground, expansion and compression of the double acting control spring automatically regulates and controls the flow of oil to and from the ram cylinder. If the soil texture becomes heavier, the upper link will be subjected to a greater reaction, thereby compressing the double acting control spring. This in turn allows oil to flow into the pump and consequently into the cylinder, raising the implement until the original draft is re-established. In conjunction with draft control, a rate of system response can be selected to accommodate implements of varying weights or to adapt implements to varying soil surfaces or soil conditions by limiting the discharge opening of the control valve. This in turn limits the rate the oil is released from the ram cylinder and thus limits the rate of implement fall. When operating in position control each progressive setting of the Hydralever requires a corresponding rotation of the ram arm cam to return the control valve to neutral. Position control over-rides draft control in the lifting direction and consequently in itself is independent of the upper link and double acting control spring reactions. If while operating, the implement strikes a hidden object, the sudden impact will be carried through the upper link to the internal linkage which in turn subjects the system to overload release. This automatically relieves the oil pressure in the ram cylinder thereby removing from the tractor that portion of the implement's weight which was transferred hydraulically. This in turn reduces rear wheel traction which causes the wheels to spin and results in a decreased force on the implement which operates instantly upon striking an underground obstruction.

FRICTION WASHERS

The Quadramatic control levers are held in position by spring-loaded friction washers which after considerable usage may become worn and allow the levers to "creep". To compensate for wear, tighten the machine screw on each lever which secures the friction washer until the desired tension is obtained.

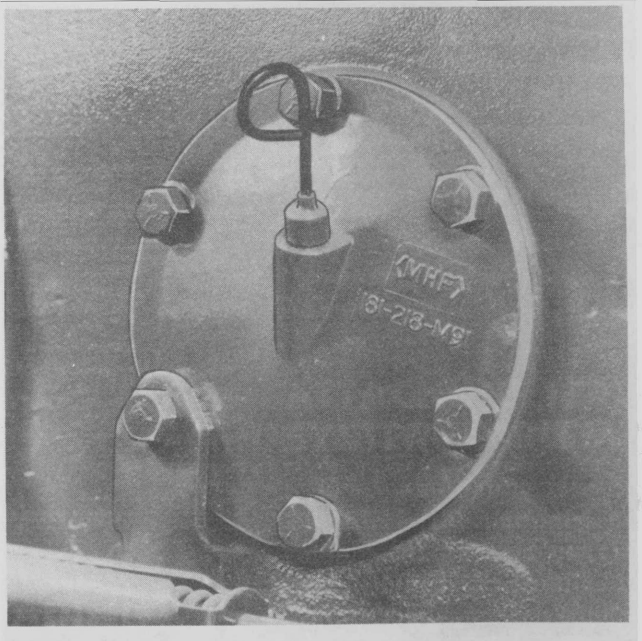
Quadrant Friction Washers

CHANGING HYDRAULIC SYSTEM, TRANSMISSION AND DIFFERENTIAL OIL

The mineral oil used in the hydraulic system also lubricates the transmission and differential gears and bearings. Two magnetic drain plugs have to be removed when changing oil. These plugs should be thoroughly cleaned before replacing.

As delivered to you, the system is filled with break-in oil which should be drained after the first 50 hours of operation; thereafter, the oil should be changed every 750 hours.

CAUTION: It is essential that only a straight S.A.E. mineral gear oil be used in your hydraulic system. Purchase this lubricant from your Ferguson Dealer as inferior or wrong types of oil can cause more serious damage and harm than many thousands of hours of use under normal operation. See Lubricant Section on Page 2.



Center Housing Dipstick to Determine Oil Level of Hydraulic System, Transmission and Differential Oil

FRONT ENDS AND STEERING

There are three interchangeable optional front ends for the Ferguson "Hi-40" and one standard front end for the standard 40. Either manual or power steering (optional) are available for the tractor models.

FRONT ENDS

The three interchangeable front ends on the "Hi-40" may be changed from one to another to meet the particular crop requirements greatly increasing the versatility of the tractor. Special tools are not necessary and the changeover time is only a matter of minutes.

FOUR WHEEL "HI-40" AND STANDARD "40"

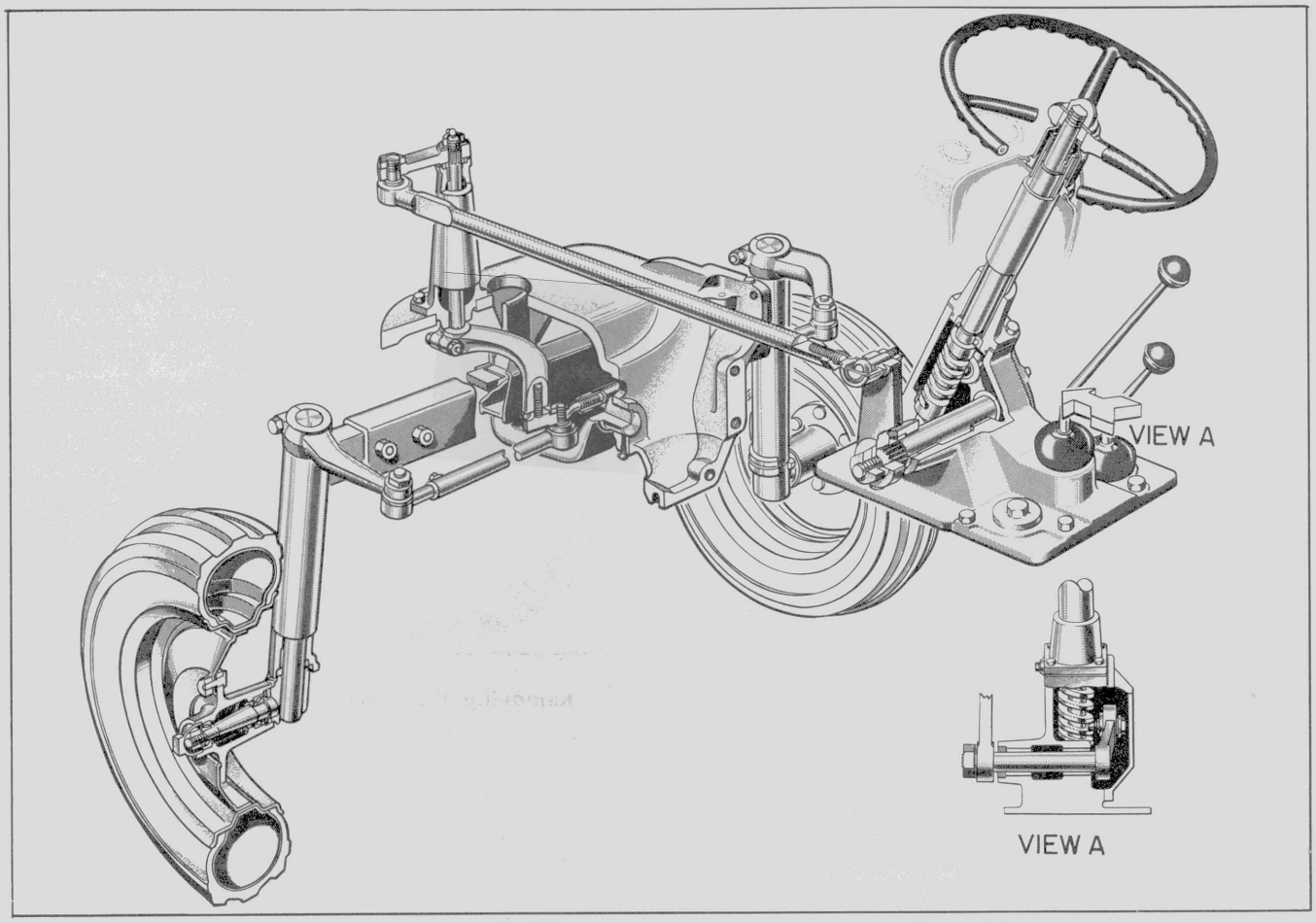
As the standard "40" (available in only a 4-wheel model) and the 4-wheel "Hi-40" differ only in the length of the axle extensions and spindles, the following describes both models.

The box center section pivots in and is supported by two pins, the front pin being carried in the axle support bracket assembly and the rear pin in the main support assembly. Both pins ride in bronze bushings allowing the axle to rock in relation to the contour of the ground. Shims on the forward pivot pin provide adjustment for end play of the axle. The axle extensions are bolted to the center section by two bolts which, if spaced in any of a series of holes, adjust the tread width. The wheel spindles housed in the axle extensions turn in bronze bushings located at the top and bottom of the extensions. Weight is transferred from axle to spindle through a thrust bearing at the lower end of the extension. Each wheel consists of a hub and wheel disc mounted on the spindle with two tapered roller bearings.

NOTE: Grease spindles and pivot pins daily during operation with a pressure-gun lubricant. Annually, the wheels should be removed and the bearings cleaned and repacked with a short fibre grease. When reassembling front wheels, adjust bearings by tightening castellated nut until a slight drag is noted when the wheel is turned, then backing off nut until cotter pin can be installed.

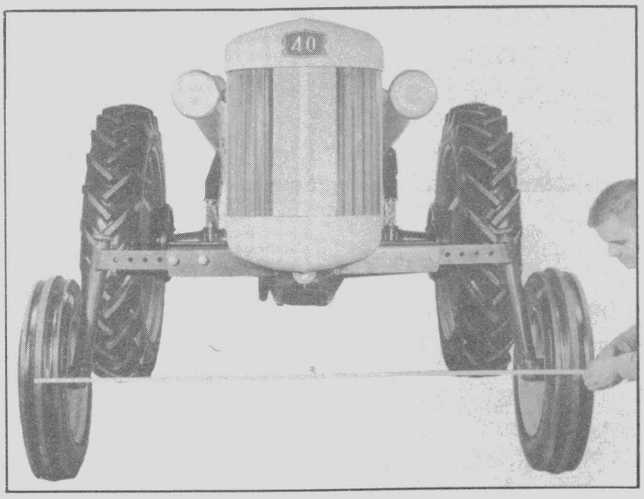
One end of a steering arm is keyed to the top of each spindle and the other end is bolted to the outer end of each tie rod. Each tie rod is in two pieces, one sliding in the other, and locked by a set screw. When the wheel tread is changed, the tie rod is adjusted accordingly. At their inner ends, the rods are connected together and in turn are secured to the steering crank arm.

The axle should be adjusted for end play of 0.002-0.008 in. between the front face of the axle bracket and the rear face of the front axle support. To do this, remove the front cover plate and add or remove shims as necessary.



Four Wheel Tractor Steering Mechanism

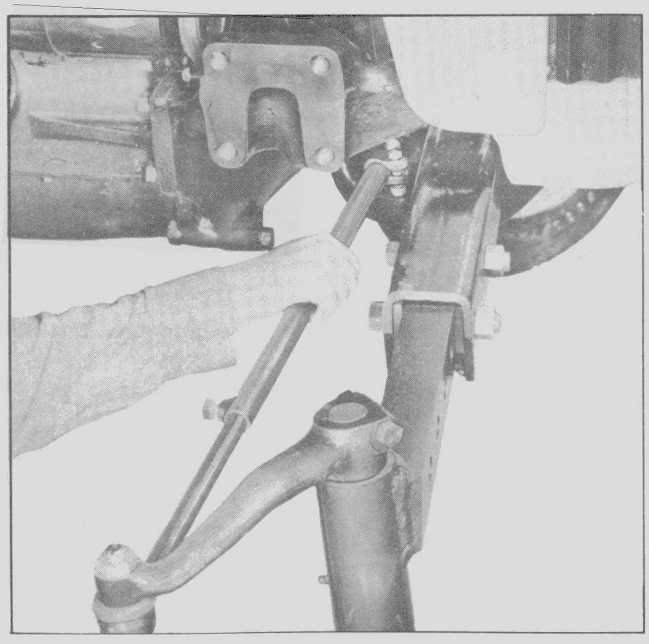
Periodically check the wheel alignment for the correct toe-in of 0 to 1/4 in. This is accomplished by measuring between the center tire ribs at hub height at both front and rear, noting the difference. To adjust, loosen the right tie rod set screw at the outer end and the clamp bolt at the inner end and turn in or out as required, making sure the set screw is in the forward position to engage the set screw hole.



Measuring "Toe-In"

To remove the 4-wheel front end, proceed as follows:

1. Remove the two cap screws securing the lower grille panel and pull out the panel.



Adjusting Drag Links

2. Loosen the bolt that attaches the steering arm crank to the splined lower end of the pedestal shaft.

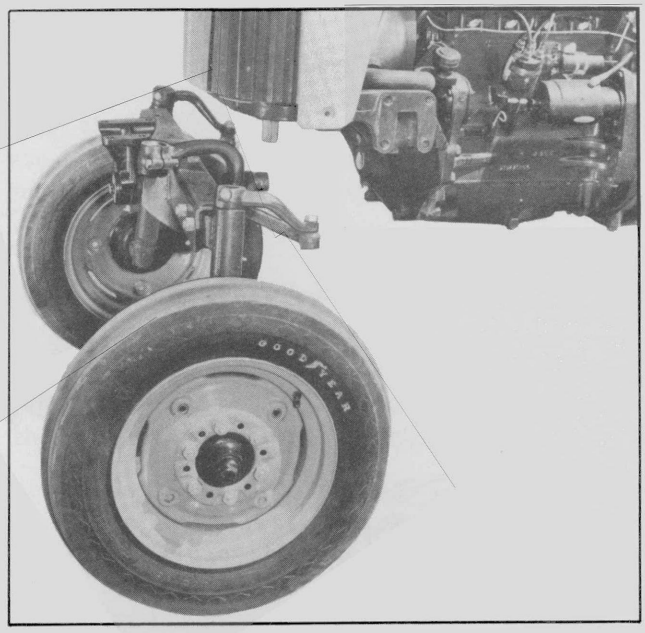
3. Remove the four cap screws attaching the front axle support to the main frame. The rear pin will hold the axle up.

4. Using the Ferguson Jack, raise the front of the tractor slightly. Pull the axle out of the rear hole, being careful to prevent the assembly from dropping.

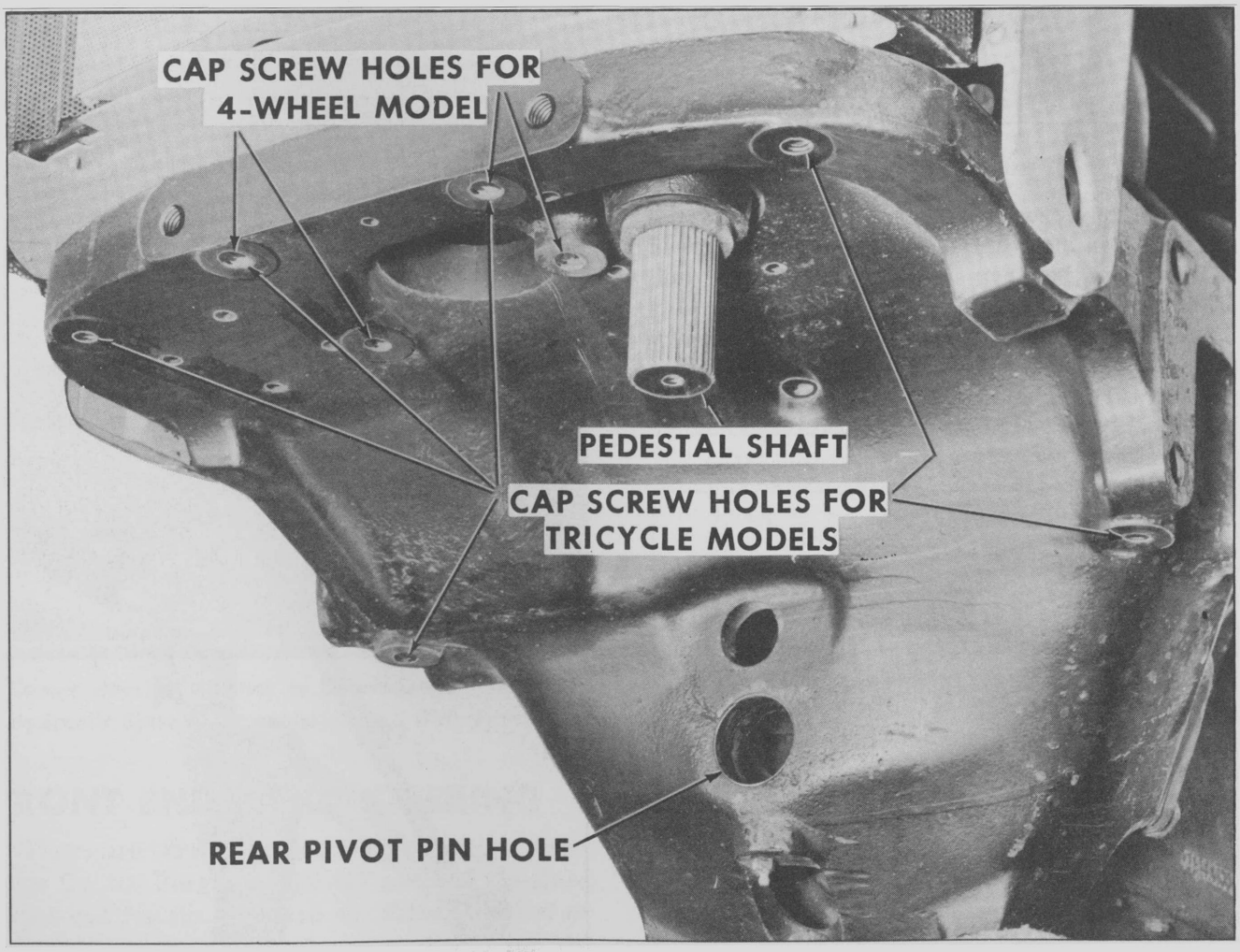
5. Continue raising the tractor and the steering arm will fall away from the pedestal shaft.

6. When storing the axle assembly cover the pivot pins and steering arm to keep off the dirt and moisture.

To replace this axle if a different front end is removed, reverse the above steps. To aid in the correct alignment there is a missing spline on both the steering crank arm and pedestal shaft. Be sure to adjust for end play as described above.



Removing Front Axle — Four Wheel Tractor



Main Front Support Casting

SINGLE WHEEL TRICYCLE

The wheel assembly of the single wheel tricycle rides on tapered roller bearings on the axle shaft. The bearings can be adjusted by castellated nuts on the axle shaft. The lower part of the yoke carries the wheel while the upper portion or spindle shaft is supported by needle bearings in the support assembly and a thrust bearing on the yoke shaft. Shims on top of the spindle provide adjustment for end play. The support bolts to the main support with six cap screws. One steering arm connects to the splined spindle shaft and the other to the splined pedestal shaft with a steering link connecting the two arms.

NOTE: Grease the spindle shaft daily during operation through the two grease fittings. Annually the front wheel should be removed and the bearings cleaned and repacked with short fibre grease. When reassembling the wheel, adjust the bearings by tightening the two castellated nuts equally until a slight drag is felt when the wheel is rotated, then backing off the nuts so that the cotter pins can be inserted.

The wheel assembly can be adjusted for end play by removing or adding shims on top of the yoke shaft. The correct end play is 0.002-0.008 in. Remove the dust cap and thrust washer and add or remove shims as necessary. Replace the cap and washer and secure.

To remove the single wheel unit:

1. Remove the two cap screws securing the lower grille panel and pull out the panel.

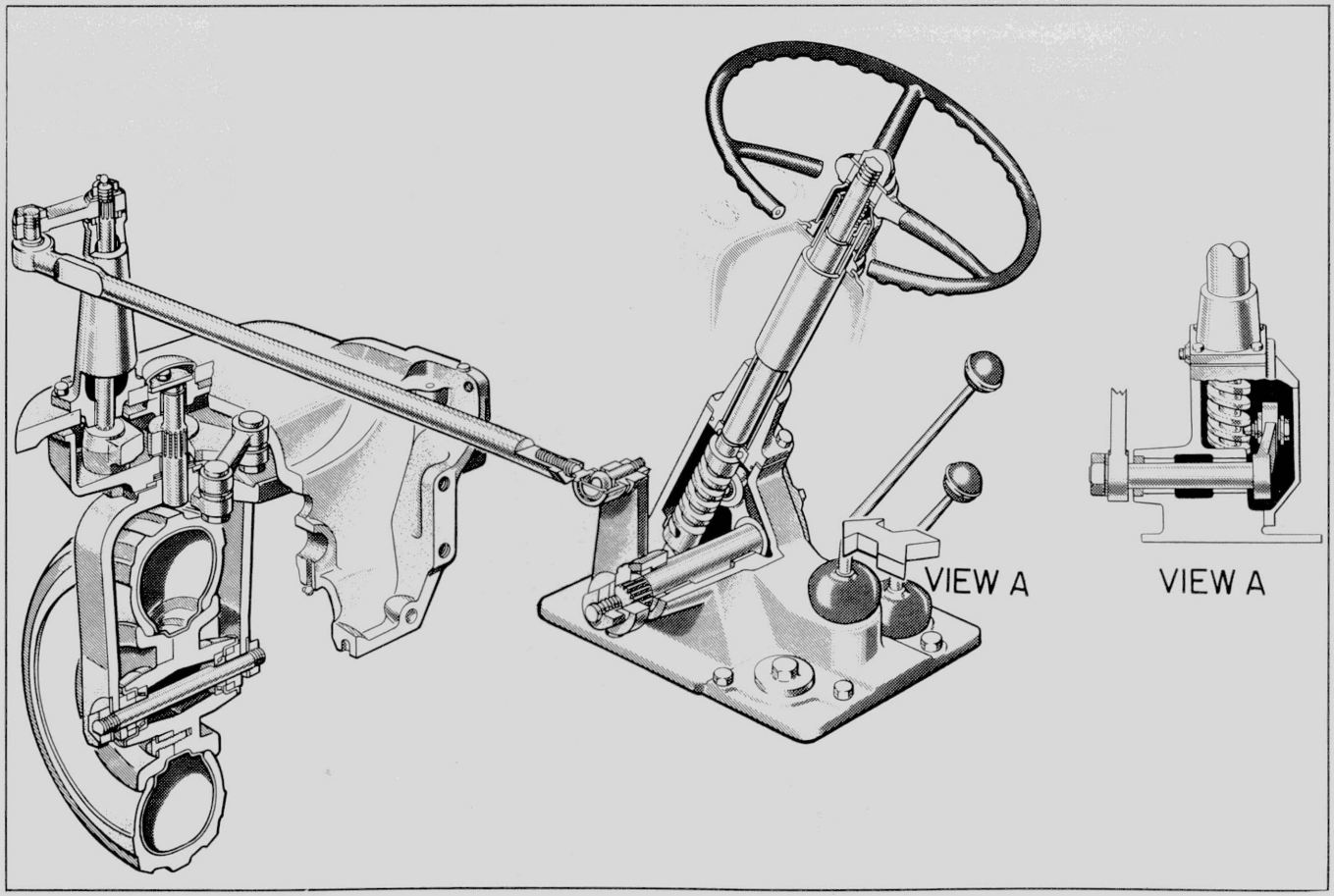
2. Loosen the cap screw attaching the main steering arm to the pedestal shaft.

3. Put blocks ahead of and behind the tire and brace the assembly so that it will remain upright when the tractor is raised.

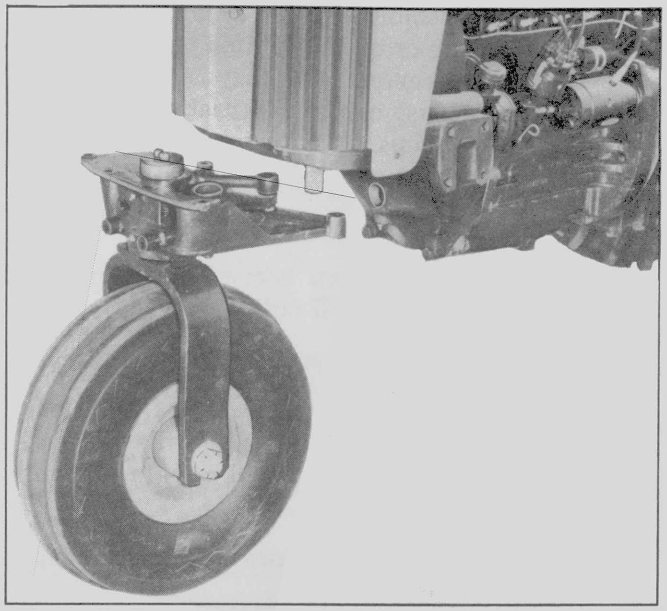
4. Remove the six cap screws holding the support to the tractor.

5. Using a suitable Jack, slowly raise the front of the tractor. The braces will hold the assembly upright while the arm slides off the pedestal shaft.

6. The unit is now free of the tractor and may be stored until further need. Cover the steering arm to prevent dirt from settling on the splines.



Single Wheel Tractor Steering Mechanism



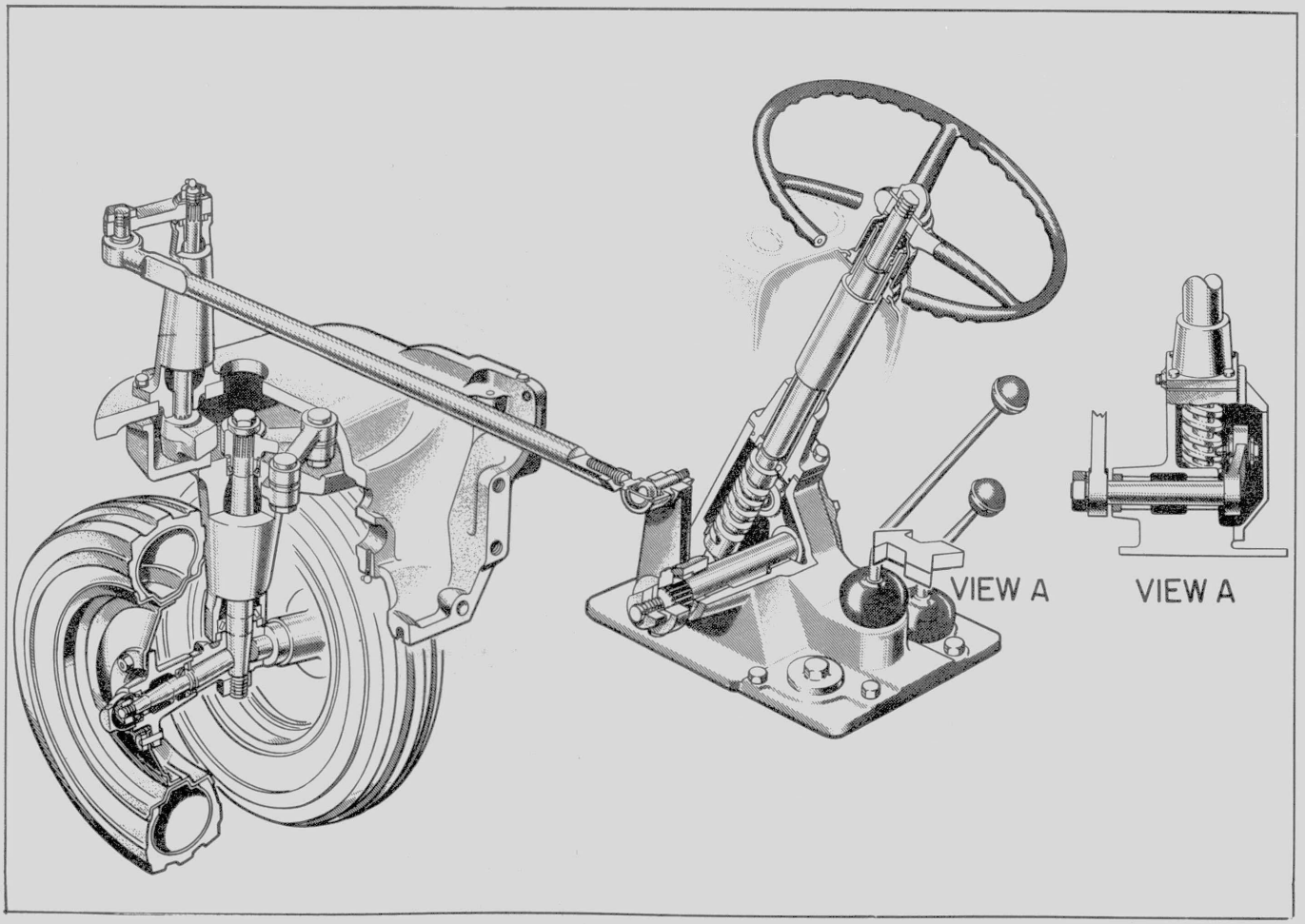
Removing Single Wheel Assembly

To replace this assembly, reverse the above steps. To aid in correct alignment, the main steering arm and the yoke steering arm have a missing spline. Be sure to adjust for the correct end play.

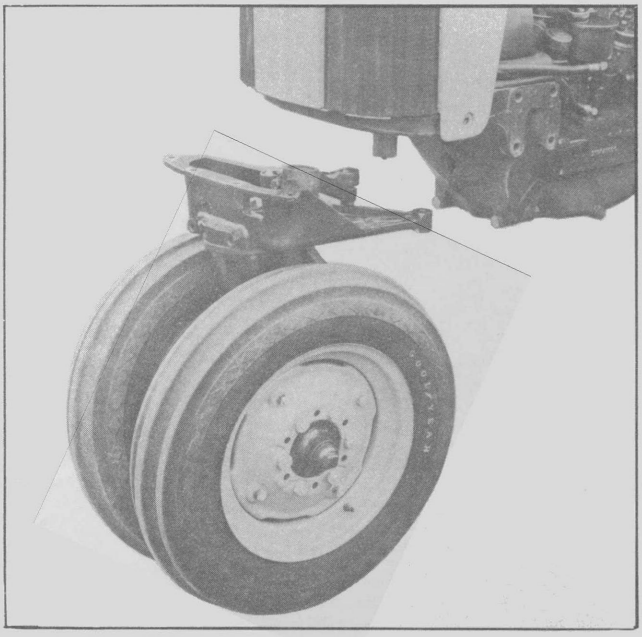
DUAL WHEEL TRICYCLE

Each wheel rides on two tapered roller bearings on the spindle arm. The two spindles are keyed to the spindle shaft which is supported by tapered roller bearings housed in the pedestal assembly. The pedestal housing is bolted to the base of the intermediate support which in turn is bolted to the main support. The two steering arms, one attached to the splined shaft and the other to the splined pedestal shaft, are connected by a steering link.

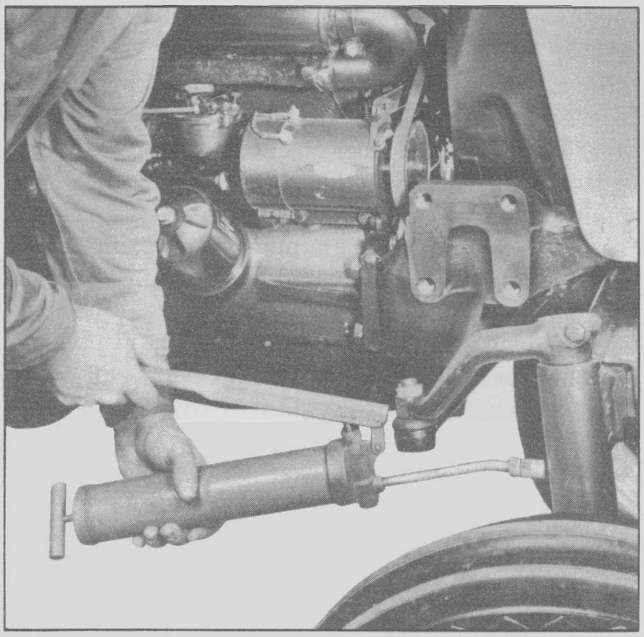
NOTE: Annually the front wheels should be removed and the bearings cleaned and replaced with a short fibre grease. When reassembling the wheel, adjust the bearings by tightening each castellated nut until a slight drag is felt, then backing off the nut so that the cotter pin can be inserted.



Dual Wheel Tractor Steering Mechanism



Removing Dual Wheel Assembly



Pressure-Type Grease Gun (Accessory) Available For Easy Tractor Servicing

The spindle shaft can be adjusted for end play by raising up the front of the tractor and tightening the castellated nut until a slight drag is felt when the steering wheel is rotated. Then back off the nut so the cotter pin may be inserted.

To remove the dual wheel unit, follow the directions below:

1. Remove the two cap screws attaching the lower grille panel and pull out the panel.

2. Loosen the cap screw attaching the main steering arm to the pedestal shaft.

3. Put blocks ahead of and behind the tires and brace the assembly to prevent it from falling when the tractor is raised.

4. Remove the six cap screws holding the support to the tractor.

5. Using a suitable Jack, raise the front up slowly. The braces hold the assembly up while the steering arm slides off the pedestal shaft.

6. The unit is now free and may be stored until further use. Cover the steering arm to keep off the dirt.

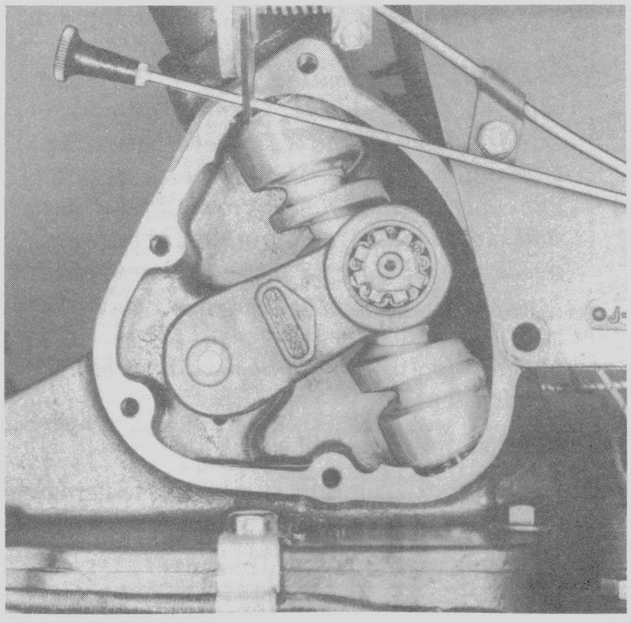
To replace the assembly, reverse the above steps. To aid in the correct alignment, the main steering arm and yoke steering arm have missing splines. Check the spindle for end play.

STEERING GEAR

Both the manual and power steering systems utilize many common parts; however, the power steering also has an hydraulic pump, control valve and power cylinder.

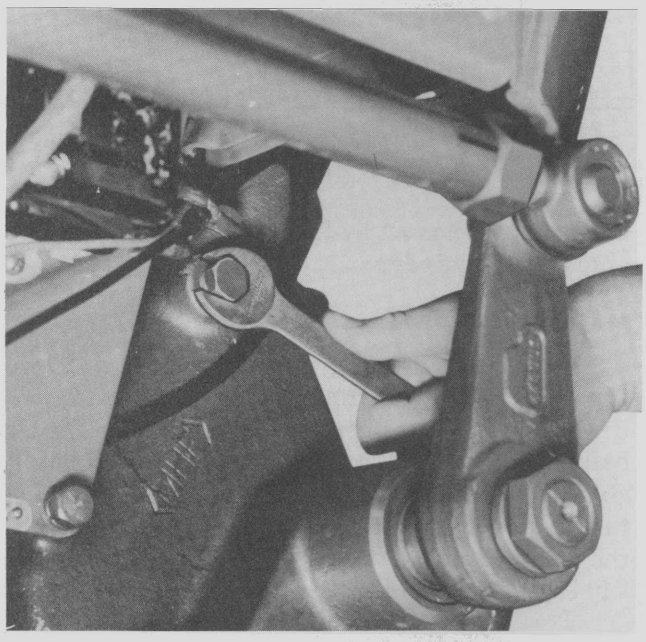
MANUAL STEERING

The manual steering gear is a cam and lever type with a single pitman arm. The cam secured to the camshaft (steering column) rides on two ball bearings which are adjustable for endplay by shims. The stud on the pitman lever shaft engages the groove in the cam and moves up or down as the camshaft is rotated. The "Hi-40" and standard "40" with a steering ratio requiring 3 turns from



Steering Gear Assembly

lock to lock is equipped with a roller type stud giving quicker steering and lower hand wheel effort. The Single and Dual Wheel Tricycle models are equipped with a plain fixed stud and require 4-1/4 turns from lock to lock. This ratio was selected to minimize the severe front wheel fight which normally occurs with this type of front end. The pitman shaft, supported by bronze bushings, is adjustable for backlash by a single adjusting screw on the right side of the gear cover. A single drag link is connected to the pitman arm at the rear and to an arm at the top of the pedestal casting at the front of the tractor. This pedestal houses a vertical shaft journalled in bronze bushings. The lower end of this shaft is splined to the main steering arm.



Checking Oil Level in Steering Gear Housing

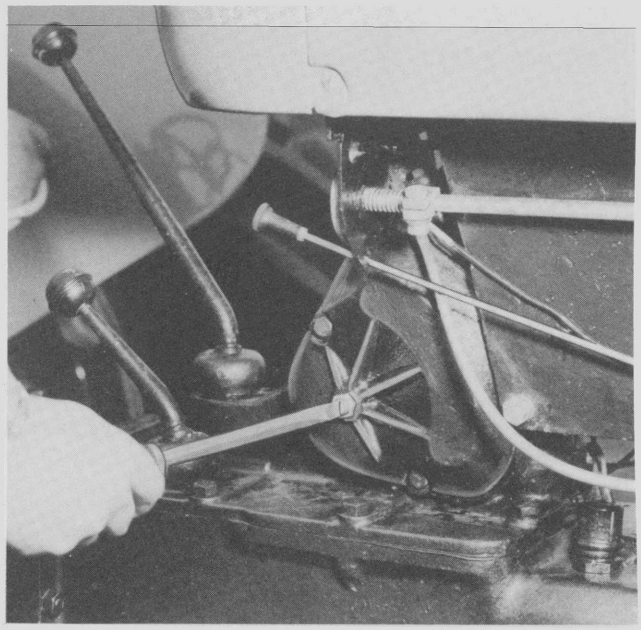
NOTE: Lubricate through the pipe plug hole in the side of the gear cover. If oil is low, fill the housing slowly with transmission oil until lubricant begins to run out of plug hole. Normally the oil will not require changing; however, if necessary, the gear cover will have to be removed. The steering column and camshaft bearings are lubricated at the time of manufacture and will need no further lubrication.

To adjust the steering gear:

1. Disconnect drag link at steering housing end.

2. Loosen adjusting screw lock nut and back off the adjusting screw two full turns.

3. Check steering cam for endplay. This can be determined by lifting on the steering wheel.



Adjusting Steering Assembly Backlash

If end play is present, remove the four cap screws which secure the steering column to the housing; then, remove sufficient shims to allow the steering wheel to turn with a barely perceptible drag. Tighten the four screws securely before checking.

4. With the pitman arm in the vertical or mid-position range, tighten the side cover adjusting screw until a very slight drag is felt when slowly turning the gear through mid-position. While holding the adjusting screw, tighten the lock nut. Recheck the drag at the wheel through full travel of gear.

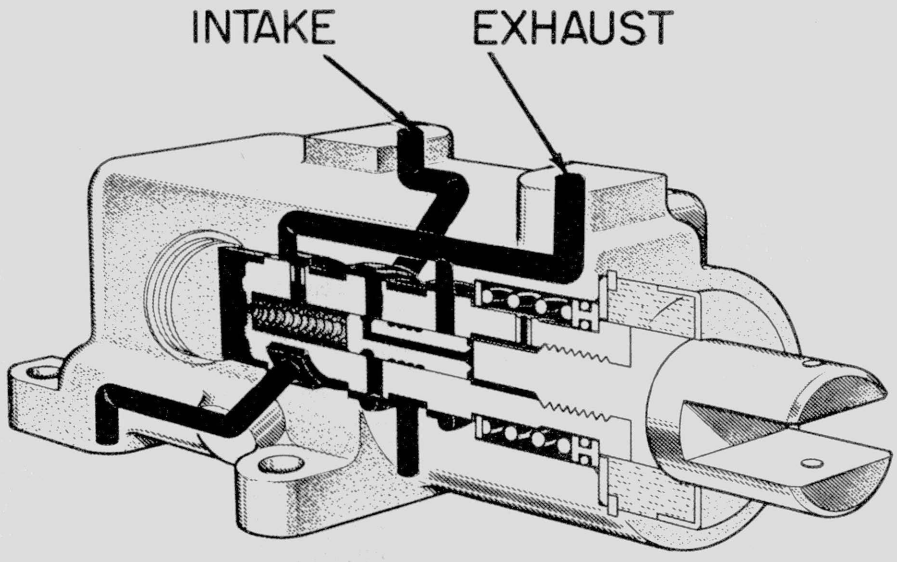
5. Replace the drag link and check for binding.

POWER STEERING

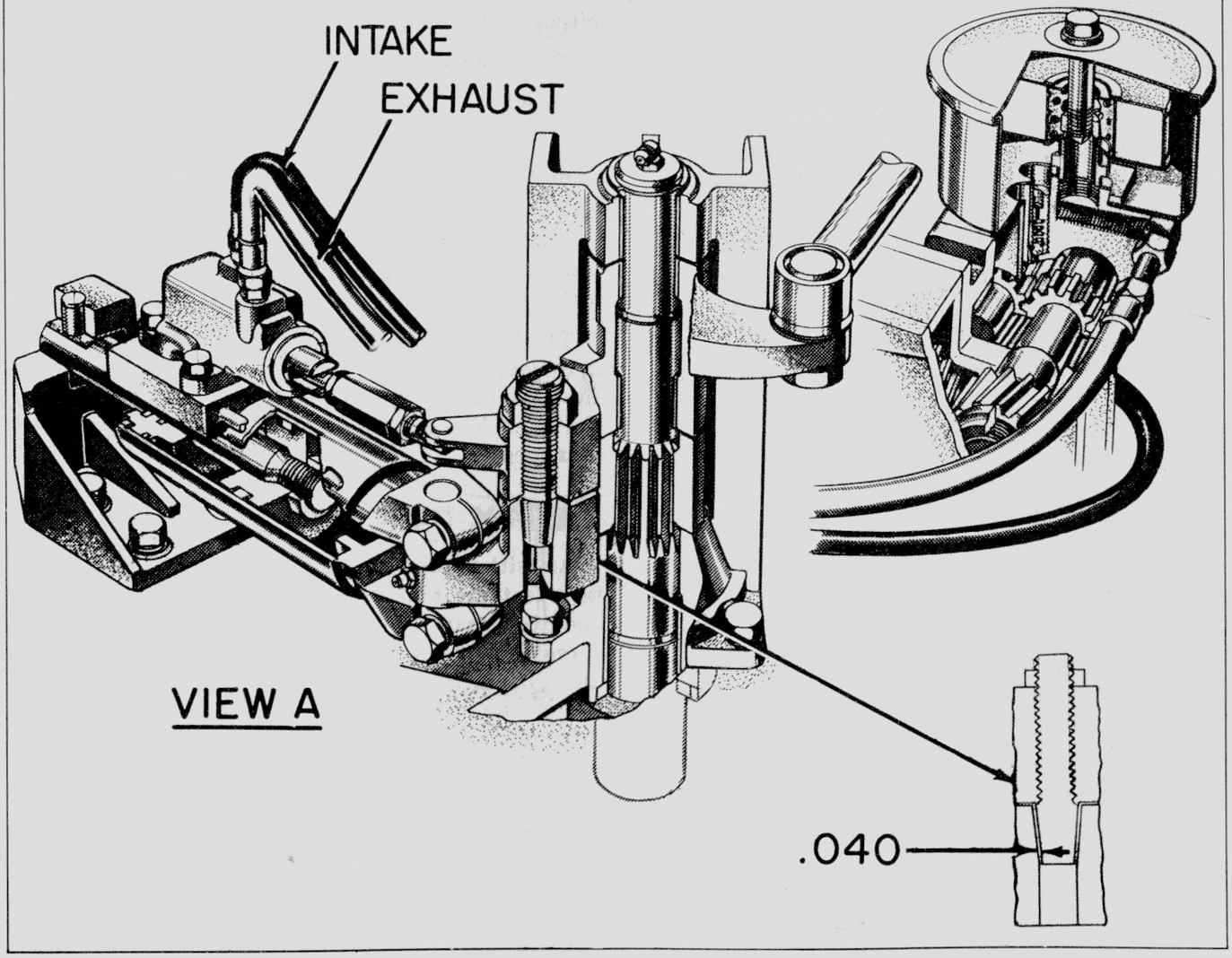
Power steering is now available as optional equipment for the Ferguson "40" line of tractors. This makes it easy to steer the tractor with only "finger-tip" effort and eliminates the usual steering wheel "fight" even in the roughest fields.

Both manual and power steering utilize many common parts such as the steering housing, gears, etc.; however, the power steering requires an altered pedestal assembly and upper arm and the addition of a hydraulic pump, power cylinder, control valve, connecting linkage and hoses.

The power cylinder and control valve mounted next to the pedestal are the external type; that is, they are not integral with the steering housing. By opening the center grille, the adjustments on the power steering mechanism may be readily made.



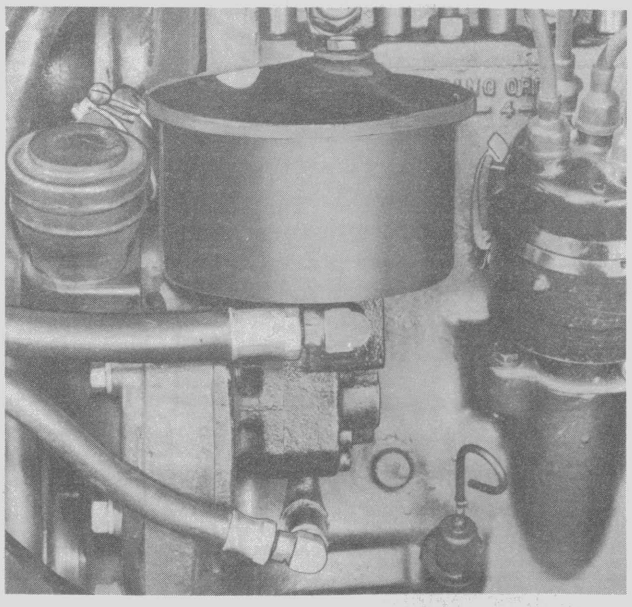
VIEW A



The control valve atop the power cylinder regulates the flow of oil to and from the cylinder while the power cylinder provides the force to rotate the front wheels. The piston end of the power cylinder is attached to a bracket on the top of the main front support casting and the barrel end of the cylinder is secured to the splined arm on the pedestal shaft. The control valve is connected to the same arm that the drag link is fastened to. This arm is not splined to the pedestal shaft and is free to turn. The only connection between the valve arm and the cylinder arm is a valve adjusting pin. This pin secured to the valve arm extends into the cylinder arm in a loose fitting socket.

When the steering wheel is rotated the following reaction takes place: The stud engaged in the camshaft (steering column) forces the pitman shaft and arm to rotate moving the drag link and the upper pedestal arm (control valve arm). The loose fit of the valve pin permits the control valve to be actuated before the pin contacts the cylinder arm. This slight movement shifts the valve spool causing a pressure rise in the end of the hydraulic piston which will rotate the pedestal shaft in the direction indicated by the steering wheel rotation. When the wheels are in the correct direction, the pin centers in the cylinder arm socket and the control valve returns to neutral.

The hydraulic pump which supplies oil for the power steering unit is flange mounted to the engine block and driven by a helical gear meshing with the camshaft timing gear. The pump is the spur gear type which will deliver a maximum of 4 gallons per minute at an engine speed of 2000 RPM. The integral relief valve is preset at the factory for a pressure of 1100 p.s.i. The fluid by-passed by the relief valve, when the operating pressure exceeds 1100 p.s.i., is returned directly to the reservoir and to the inlet side of the pump.



Power Steering Pump

The oil reservoir is mounted integrally with the pump and contains a paper-type filter element located in the return line from the control valve. The reservoir has a capacity of approximately 2/3 quart of type "A" automatic transmission fluid.

In the event of a power steering failure, the tractor can still be manually steered. Two features permit this. First, the valve adjusting pin after the slack in the socket is taken up (.040 in.) will force the power cylinder arm to move turning the front wheels. The only noticeable difference between operating manually the power steering and the manual systems is the increased backlash in the steering wheel. Secondly, when the steering wheel is turned, the valve spool releases oil from either end of the power cylinder piston.

To adjust the power steering system:

1. With the engine running at 1500 RPM tighten the valve adjusting pin until it bottoms.

2. Adjust control valve linkage so that pin can be inserted freely.

3. Back off adjusting pin 7 turns and lock securely with lock nut. This provides a pin clearance of .040 in.

The hydraulic pump reservoir has a capacity of 2/3 quart of type "A" automatic transmission fluid. Maintain the oil level in the reservoir above the filter. The oil filter need not be replaced unless damaged.

SAFETY PRECAUTIONS

As with every piece of modern machinery, certain features must be incorporated to insure the operator's safety. In many cases when these features are embodied, other desirable characteristics must be sacrificed. Ferguson, however, with the use of the Ferguson Hydraulic System has used to advantage both the external linkage and the internal mechanism to provide (1) protection against the tractor rotating about the rear wheels through the compressive forces in the top link and (2) protection for the tractor, implement and operator through the automatic overload release feature when an underground obstruction is hit. The physical construction of the Ferguson Tractor with its low silhouette also assures the operator of perpetual stability as well as rigidity and

rugged durability all of which are necessary for safe operation. Yet with all of these features, we at Ferguson cannot design or manufacture a tractor to compensate for a careless operator. For this reason the following safety measures are given. Read and become familiar with them. Remember, your safety is involved.

1. Never operate tractor engine in a closed building. Carbon Monoxide is extremely poisonous and cannot be detected as it is both odorless and colorless.

2. Never fill gasoline tank if engine is running or excessively hot. Always avoid spilling gasoline.

3. Never smoke when refueling or inspecting gasoline tank. Refill tank only in well ventilated areas.

4. Keep sparks or flames away from battery filler cap openings.

5. Always remove radiator pressure cap slowly.

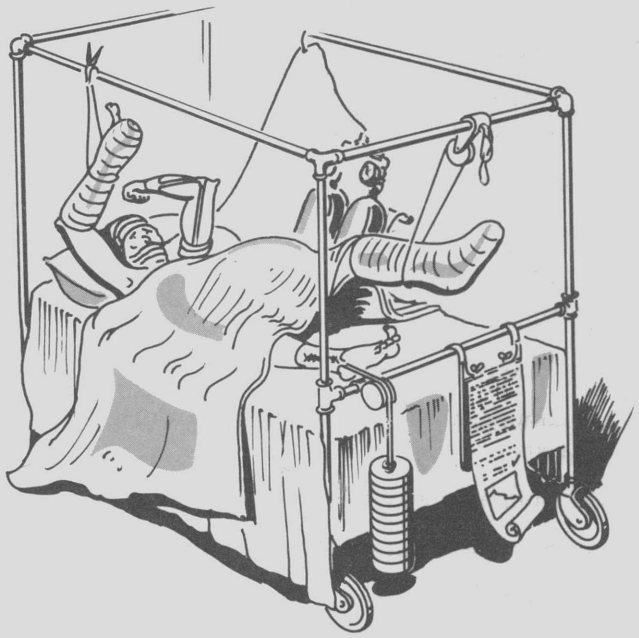
6. Keep straw or other inflammable material away from exhaust pipe to prevent fire.

7. Always engage tractor clutch slowly.

8. Back tractor if rear wheels are frozen to ground. Forward motion may cause the tractor to upset. It may, however, be necessary to physically remove the ice.

9. Keep tractor in gear when going down hill. Always reduce tractor speed when operating on hills, rough ground and around turns.

10. Never operate too close to ditches or gulleys.



Avoid Accidents By Being A Careful Operator

11. Always use stay links with standard drawbar. Keep drawbar adjusted to maintain sufficient weight on front wheels to insure steering traction.

12. Use PTO shields when required with PTO driven equipment. Never wear loose or sloppy clothing around tractor moving parts.

13. When operating an implement in ground speed PTO, disengage the shift lever before attempting to back the tractor.

14. Never install or remove belt while pulley is in motion. When using tractor in a stationary position, ground the tractor to avoid static electricity build-up.

15. Never pull from the upper link connection or rear axle. Use only factory engineered hitchpoints.

16. Always set parking brake before dismounting from the tractor.

17. Never use individual wheel brakes to make sharp turns at high speeds.

18. Always drive carefully on the highway and observe all traffic rules, especially if traveling after dark.

19. Never allow additional riders on farm machinery.

TROUBLE SHOOTING

ENGINE CRANKING FAILURE

1. Planetary gear shift lever not in "S" position.

2. Ignition switch key in "Off" position.

3. Loose, grounded, shorted, or broken wiring. Check connections on all switches, solenoid, starting motor, and battery.

4. Discharged battery.

5. Inoperative starting motor.

ENGINE CRANKS BUT WILL NOT START (Ignition Spark Failure)

1. Loose, grounded, shorted, or broken ignition wiring. Check connections on ignition key switch, ammeter, coil, distributor, and spark plugs.

2. Mechanical failure of spark plugs–cracked or broken porcelain, incorrect gap setting, electrodes fouled.

3. Distributor failure. Inspect cap for cracks, carbon traces, and condition of wire terminals. Wipe cap clean of dirt and moisture. Inspect rotor, breaker points, and wiring connections. Use of clean cloth to wipe distributor units free of dirt, oil, and moisture.

4. Faulty coil. Remove high tension wire from distributor and hold end of wire approximately 1/4 in. from suitable ground. With ignition switch on, crank engine and note if coil produces spark. If no spark occurs, check all primary wiring again before condemning coil.

ENGINE CRANKS BUT WILL NOT START (Carburetion Failure)

1. Choke not pulled out when engine is cold.
2. Throttle closed.
3. Fuel shut-off valve not open.
4. Fuel tank empty.
5. Clogged fuel tank cap vent.
6. Clogged fuel filter.
7. Restricted fuel line.
8. Restricted carburetor passages.
9. Maladjustment of needle valves.
10. Water deposited in carburetor. In cold temperatures, water freezing would prevent gasoline flow thru fuel valve and line.
11. Air cleaner inlet tube restricted.
12. Clogged air cleaner.
13. Throttle and/or governor linkage inoperative or maladjusted.
14. Air leak in fuel line, carburetor, or intake manifold gasket.
15. Cracked or broken intake manifold.
16. Valves sticking.

ENGINE CRANKS SLOWLY

1. Weak battery.
2. Use of heavy crankcase oil in zero weather.

EXCESSIVE FUEL CONSUMPTION

1. Fuel leak.
2. Fouled air cleaner.
3. Metering jet adjustment.
4. Idle adjustment.
5. Main adjustment.
6. Timing
7. Automatic spark advance.
8. Distributor points.
9. Spark plugs.
10. Wiring.
11. Improper valve timing.
12. Burned, worn or sticking valves.
13. Worn pistons, rings or sleeves.
14. Improper valve adjustment, worn or bent push rods.
15. Engine overheating.
16. Clutch slippage.
17. Excessive power train drag due to binding or wear.
18. Brakes dragging.
19. Excessive exhaust back pressure.

EXCESSIVE OIL CONSUMPTION

1. Oil leak.
2. Plugged breather pipe.
3. Worn valve guides.
4. Worn or ill fitted rings.
5. Worn, scored or out-of-round cylinders or pistons.
6. Worn ring grooves.
7. Inverted rings.
8. Stuck piston rings.
9. Loose hubbard plugs.
10. Worn neoprene oil guard gaskets on the intake valves.

LOSS OF POWER

1. Dirty or improperly adjusted carburetor.
2. Faulty ignition.
3. Worn rings, pistons or sleeves, burned or sticking valves.
4. Faulty governor operation.
5. Faulty throttle, governor, or choke linkage.
6. Crack in intake manifold or leaking gasket.
7. Blown head gasket.
8. Brakes dragging.
9. Improper valve adjustment, worn or bent push rods.
10. Connecting rod or main bearings too tight.
11. Excessive exhaust back pressures.
12. Overloaded tires.
13. Clogged air cleaner.

ERRATIC MISFIRE

1. Dirt in carburetor.
2. Weak or broken valve springs.
3. Sticky valves.
4. Faulty ignition.

PRE-IGNITION

1. Low anti-knock fuel.
2. Ignition timing too far advanced.
3. Engine overheating.
4. Heavy carbon deposits in the combustion chamber.
5. Spark plugs not of proper heat range.
6. Insufficient tappet clearance.
7. Burned or worn valves.
8. Distributor advance.

CONTINUOUS MISFIRE

1. Stuck or burned valves.
2. Blown head gasket.
3. Faulty ignition.

ENGINE OVERHEATING

1. Thermostat stuck shut.
2. External leakage. Check all hoses and hose connections. Inspect radiator and radiator cap gasket. Observe cylinder gasket for evidence of leaking.
3. Fan belt slipping. Clean belt and pulleys. Adjust or replace if necessary.
4. Clogged radiator care.
5. Carburetor mixture too lean.
6. Improper ignition timing.
7. Fouled cooling system. Flush thoroughly using a good grade cleaner.
8. Engine excessively tight.
9. Improper valve timing.

FAILURE OF ENGINE TO REACH NORMAL OPERATING TEMPERATURE

1. Thermostat stuck open. Remove the thermostat and test it for proper opening (160°F.).

Specifications

CAPACITIES

Gasoline Tank.....17.0 U.S. gallons
(includes 2 gallons reserve)
Cooling System.....10 U.S. quarts
Crankcase ..... 5 U.S. quarts
(If new filter is installed, one additional quart must be added)
Power Steering
Pump reservoir .....2/3 U.S. quart
Steering Housing .....2 U.S. pints
Transmission, Differential and
Hydraulic System .....8 U.S. gallons
If auxiliary hydraulic equipment is used requiring more than 1-1/2 gallons, the amount in excess must be added for satisfactory operation. After implement is removed, excess oil must be drained from the system.
Manual Steering Gear
Housing .....Approximately 2 U.S. pints
Air Cleaner Oil Bath .....Fill to mark

DIMENSIONS

WHEEL BASE

Standard "40" .....81.26 inches
4-wheel "Hi-40" .....81.80 inches
Dual Wheel Tricycle "Hi-40" ..84.55 inches
Single Wheel Tricycle "Hi-40"..85.56 inches

OVERALL LENGTH

Standard "40" .....120.01 inches
4-wheel "Hi-40" .....124.55 inches
Dual Wheel Tricycle "Hi-40"..127.30 inches
Single Wheel Tricycle "Hi-40".127.06 inches

NORMAL TREAD (FRONT)

Standard "40" .....48 inches
"Hi-40" .....50 inches

NORMAL TREAD (REAR)

Overal Width (52 in. rear tread)
Standard "40" .....65.25 inches
"Hi-40" .....63.84 inches

OVERALL HEIGHT

Standard "40" .....56.75 inches
"Hi-40" .....63.25 inches

GROUND CLEARANCE (UNDER FRONT AXLE)

Standard "40" .....20.3 inches
"Hi-40" .....26.7 inches

GROUND CLEARANCE (UNDER CENTER)

Standard "40" .....12.60 inches
"Hi-40" .....18.84 inches

TURNING CIRCLE (USING BRAKES)

Approximately 16 feet

WEIGHT (GAS, OIL AND WATER)

Standard "40" .....3100 pounds
4-wheel "Hi-40" .....3280 pounds
Dual Wheel Tricycle "Hi-40" ..3165 pounds
Single Wheel Tricycle "Hi-40"..3175 pounds

ENGINE

Cylinder Bore .....3-5/16 inches
Stroke .....3-7/8 inches
Piston Displacement .....134 cubic inches
Compression Rations .....{6.60 to 1 / 8.10 to 1
Idle Speed .....400 RPM
Top Speed .....2,200 RPM
Governor .....Variable speed, centrifugal fly-ball type.
Valves .....Overhead high lift, Rotocap on exhaust.
Tappet Clearance .....{.013 inches hot— / .015 inches cold.

Lubrication — Pressure by gear pump to crankshaft, camshaft, connecting rod, and rocker arms. Float intake type.

Oil Filter — Replaceable cartridge type. Filter from outward inward.

Cooling – Circulation by centrifugal type pump with recirculating passage. Flow controlled thermostatically through tube and fin-type radiator.

Fuel – Gravity-flow. Designed to maintain 2 gallons reserve. Up-draft, dustproof carburetor.

Air Cleaner — Oil bath type.

ELECTRICAL SYSTEM

Battery – 12-volt, 50-ampere hour capacity, 9 plates per cell.

Starting – Dual push button, solenoid, safety switch operated by Dual Range lever. 12-volt, 4-pole starting motor.

Charging – 12-volt, 3-brush generator. Output 10-12 amps. Combination voltage-current control and cutout relay type regulator.

Ignition – Automotive type distributor with automatic spark advance. Contact point opening .022 inch. Spark plug gap .025 inch.

POWER TRAIN

Clutch – Dual Dry Disc Type. Dual Range Transmission – Constant mesh helical primary reduction gears with change-speed gears, spur-type. Transmission operates in conjunction with planetary reduction gear assembly which provides 6 speeds forward, 2 reverse.

Differential and Pinion — Spiral bevel gear final drive with straddle mounted pinion. 6.17 to 1 ratio.

HYDRAULIC SYSTEM

Pump – 4 cylinder piston type, developing up to 1900 PSI.

Control – Oscillating-type control valve located on inlet side of pump.

POWER TAKE-OFF

Shaft — A.S.A.E. standard 1-3/8 inch diameter spline shaft with quick attaching snap ring groove.

Control – 3 position shift lever (1) Engine Speed PTO; (2) Ground Speed PTO; and (3) Neutral.

POWER STEERING (Optional)

Pump – Spur gear-type delivering 4 gals. per minute.

Control – Spool-type valve located above power cylinder.

BRAKES

Double internal expanding shoe – 14 inch diameter, 118 square inch area, mechanically operated together or independently to facilitate short turning.

THE FERGUSON TRACTOR WARRANTY

For a period of six (6) months from the date of delivery of a new Ferguson Tractor to the original purchaser thereof from a Ferguson Dealer, Massey-Harris-Ferguson Inc., warrants all such parts thereof (except tires) which, under normal use and service, shall appear to Massey-Harris-Ferguson Inc., to have been defective in workmanship or material.

This warranty is limited to shipment to the purchaser, without charge except for transportation costs, of the part or parts intended to replace those acknowledged by Massey-Harris-Ferguson Inc., to be defective.

If the purchaser uses or allows to be used on the Ferguson Tractor, parts not made or supplied by Massey-Harris-Ferguson Inc., or if any Ferguson Tractor has been altered outside of its own factories or sources of supply, or if implements have been used which were unsuited and harmful to the Ferguson Tractor, then this warranty shall immediately become void. Massey-Harris-Ferguson Inc., does not undertake responsibility to any purchaser of a Ferguson Tractor for any undertaking, representation or warranty beyond those herein expressed.

Massey-Harris-Ferguson Inc., reserves the right to make changes in design or changes or improvements upon the Ferguson Tractor without any obligation upon it to install the same upon its tractors heretofore manufactured.

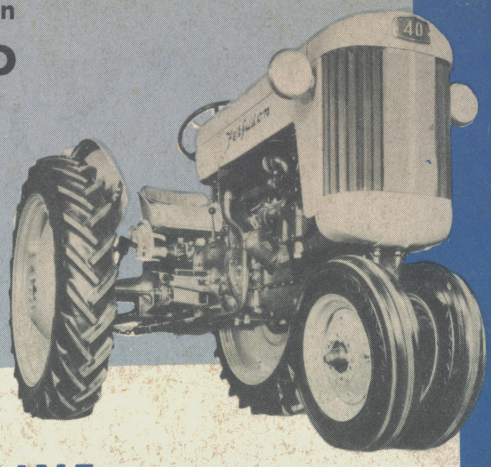
FERGUSON DIVISION

MASSEY-HARRIS-FERGUSON INC.

RACINE, WISCONSIN

See your Ferguson dealer for information on

THE FERGUSON TRACTOR AND FERGUSON SYSTEM IMPLEMENTS



THE FERGUSON LINE OF IMPLEMENTS INCLUDES

- Moldboard Plows
- Disc Plows
- Two-Way Plows
- Spike Tooth Harrows
- Spring Tooth Harrows
- Lift Type Disc Harrows
- Tandem Disc Harrows
- Heavy Duty Harrows
- Offset Disc Harrows
- Spring-Tine Cultivators
- Rigid-Tine Cultivators
- Lister Cultivators
- Agricultural Mowers
- Industrial Mowers
- Balers
- Forage Harvesters
- Multi-Purpose Blades
- Sub Soilers
- Manure Spreaders
- Manure Loaders
- Corn Pickers
- Corn Planters
- Lister Planters
- Side Delivery Rakes
- Rotary Hoes
- Cordwood Saws
- Rear Cranes
- Disc Tillers
- Field Tillers
- Tool Carriers
- Middlebusters
- Four-Row Weeders
- Four-Wheel Wagons
- Soil Scoops

Ferguson

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