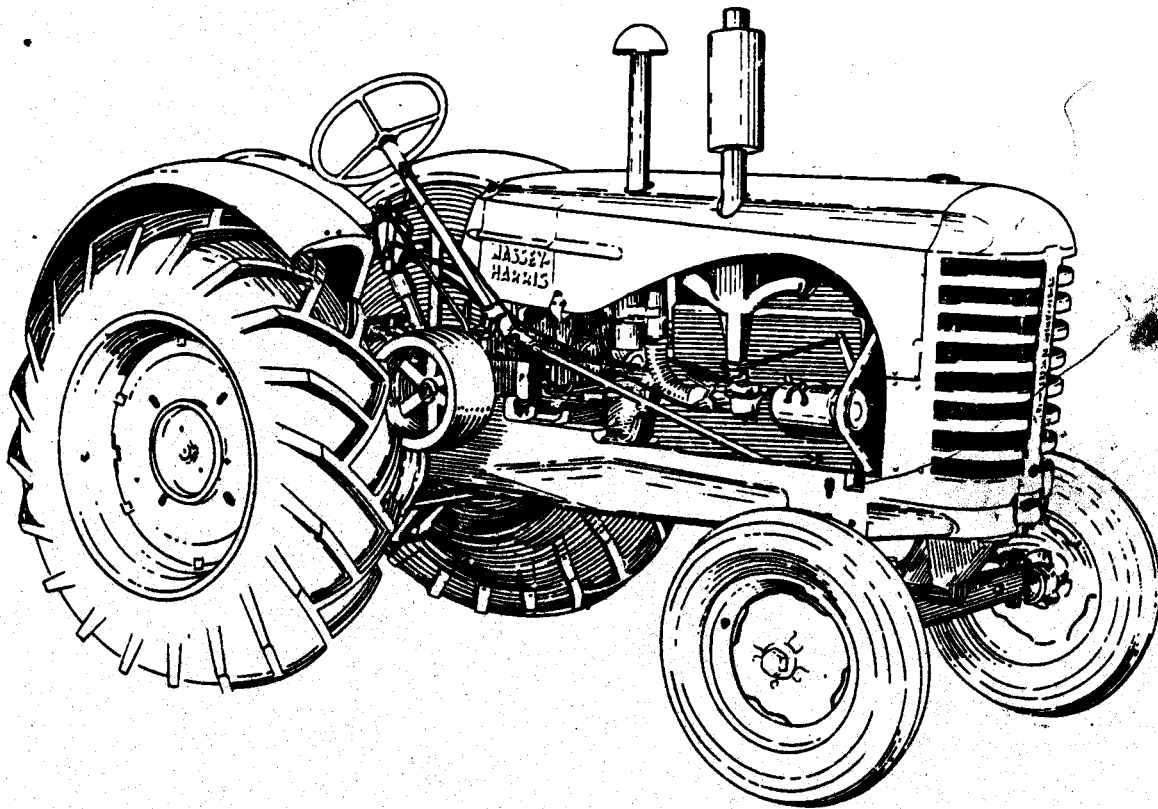


PROPERTY OF
SPRINGFIELD
FLYING
CLUB

Form Nos. 694 056 M94

Operating Instructions
and Service Manual for
"44" MASSEY-HARRIS
TRACTORS "44K"



Manufactured by

THE MASSEY-HARRIS COMPANY
INCORPORATED

General Offices:
Racine, Wis.

Factories:
Racine, Wis.
Batavia, N. Y.
Fowler, Cal.

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DATA

Tractor serial number located on plate mounted at rear of left frame member.
Also stamped on top center of transmission housing.

Models:

44GS	Gasoline Standard Model Tractor
44KS	Low Grade Fuel Standard Model Tractor
44GR	Gasoline Row Crop Model Tractor
44KR	Low Grade Fuel Row Crop Model Tractor

ENGINE:

Cylinders	4
Bore	3-7/8
Stroke	5-1/2
R.P.M. -- Full Load 1350 -- No Load 1510 to 1520	
Displacement (Cubic Inches)	260

Ignition	Battery
Spark Plug Champion "8 Comm." . .	18MM Thread
Spark Plug Cap.	.025"
Valve Clearance Intake Hot Setting. .	.014"
Valve Clearance Exhaust Hot Setting .	.014"

LBS. COMPRESSION, CRANKING SPEED:

Gasoline	.115 lbs. min., 120 lbs. max.
Low Grade	.80 lbs. min., 85 lbs. max.

CLUTCH:

Foot operated. Single plate dry disc.

BELT PULLEY:

Diameter	13-1/2"
Face	6-1/4"
Speed No Load	.965 to 970
Full Load	863
Belt feet per minute.	.3050 Under Full Load

POWER TAKE-OFF:

Spline Size	1-3/8"
Speed No Load	597 to 602
Full Load	534
Height from Ground Std. 33"	R.C. 34"
Left of Center	3/8"
Ahead of drawbar pin.	14"

FOOT BRAKES:

Expanding shoe. Individual action, or pedals interlocked.

TRANSMISSION SPEEDS: (M.P.H. at 1350 R.P.M. engine speed)

	Std.	R.C.		
Tire Size	13x30	14x30	12x38	13x38
1st	2.21	2.25	2.48	2.65
2nd	3.33	3.38	3.75	4.02
3rd	4.43	4.5	4.98	5.33
4th	5.75	5.84	6.47	6.92
5th	12.28	12.48	13.80	14.77
Reverse	2.89	2.93	3.26	3.49

WHEELS AND TREAD: (Rubber Tires)

Front Wheel	Std.	R.C.
Tire Size	6.00 x 16	5.50 x 16
Rear Wheel		
Tire Size	13 x 30	12 x 38
	14 x 30	13 x 38

GENERAL DIMENSIONS:

Wheel Base	Std. 79 1/2"	R.C. 87 1/2"
Length Overall	129"	137"
Height Overall	76 1/2"	82"

WEIGHT:

	Std.	R.C.
w/Water, Fuel and Oil	4565	4206

DRAWBAR:

	Std.	R.C.
Height from Ground	9 3/4" to 17 3/8"	13 1/2" to 21 1/2"
Lateral Adjustment	11 1/2"	11 1/2"

TURNING RADIUS Std. 26 ft. R.C. 17 1/2 ft.

CAPACITIES: STANDARD

	U.S. Measure	Imperial Measure	Litres
Main Fuel Tank.	19 Gals.	15-5/6 Gals.	72
Auxiliary Tank (44K)	1-1/2 Gals.	1-1/4 Gals.	5.68
Cooling System, Gas Std.	22 Qts.	18-1/2 Qts.	20.82
Cooling System, Dist. Std.	23 Qts.	18-2/3 Qts.	21.76
Engine Oil Pan.	2 Gals.	1-2/3 Gals.	7.57
Incl. Oil Filter.			
Transmission.	13 Gals.	11 Gals.	49

CAPACITIES: ROW CROP

	U.S. Measure	Imperial Measure	Litres
Main Fuel Tank.	23 Gals.	19 Gals.	87
Auxiliary Tank (44K)	1-1/2 Gals.	1-1/4 Gals.	5.68
Cooling System, Gas R.C.	22 Qts.	18-1/2 Qts.	20.82
Cooling System, Dist. R.C.	23 Qts.	18-2/3 Qts.	21.76
Engine Oil Pan.	2 Gals.	1-2/3 Gals.	7.57
Incl. Filter.			
Transmission.	13 Gals.	11 Gals.	49

SAFETY FIRST

Most farm accidents, like industrial, home and highway accidents, are caused by the failure of some individual to observe simple and fundamental safe rules or precautions. For this reason farm accidents, just as other types of accidents, can be prevented by recognizing the cause of accidents and doing something about it before the accident occurs.

Regardless of the care used in the design and construction of farm equipment, there are many points that cannot be completely safeguarded without interfering with accessibility and efficient operation.

A careful operator is the best insurance against an accident.

The complete observance of one simple rule would prevent many thousand serious injuries each year. That rule is: "NEVER ATTEMPT TO CLEAN, OIL OR ADJUST A MACHINE WHILE IN MOTION".

-- NATIONAL SAFETY COUNCIL --

RULES FOR SAFE TRACTOR OPERATION

1. Modern tractors travel fast and when operating tractors at high speed the same care must be exercised as is used in operating an automobile in order to avoid accident and injury.
2. Be sure gear shift lever is in neutral before starting engine.
3. Always engage clutch gently, especially when going up a hill or pulling out of a ditch.
4. When driving on highways, or to and from the fields, be sure that both wheels are braked simultaneously when making an emergency stop.
5. When tractor is hitched to a stump or heavy loads, always hitch to drawbar and never take up slack of chain with a jerk.
6. Be careful when working on hillsides. Watch for holes or ditches into which a wheel may drop and cause tractor to overturn.
7. Always keep tractor in gear when going down hills or steep grades.
8. Always drive tractor at speeds slow enough to insure safety, especially over rough ground or near ditches.
9. Reduce speed before making a turn or applying brakes. The hazard of overturning the tractor increases four times when speed is doubled.
10. Always stop power-take-off before dismounting from tractor.
11. Never dismount from a tractor when it is in motion. Wait until it stops.
12. Never permit persons other than the driver to ride on tractor when it is in operation.
13. Never stand between tractor and drawn implement when hitching. Use an iron hook, jack or blocks to hold drawbar on drawn implement.
14. Do not put on or remove belt from belt pulley while the pulley is in motion.
15. NEVER remove cap from radiator while the water in the cooling system is boiling or when the engine is overheated. NEVER fill radiator if engine is hot.
16. Never refuel tractor while engine is running or extremely hot.
17. Do not stop engine immediately after it has been working hard. It may backfire and cause conflagration. Let the engine idle at a moderate speed for a few minutes before stopping.
18. Do not use clutch pedal as a foot rest.
19. Do not run engine if oil pressure gauge does not register.
20. When tractor is attached to a power take-off driven implement, be sure that all power line shielding is in place.
21. Never leave transmission in gear after engine has stopped.

PREVIEW

It is not possible to have this Service Manual complete in every detail and yet have it brief enough so that one can commit to memory all the instructions enclosed herein; hence, this preview is written as a guide and reminder of the important and constant points on tractor care and operation. For detailed information on any part of the tractor, refer to that section.

NEW TRACTOR:

Do not work the tractor under heavy load for the first fifty hours.

CAUTION: Crankcase is filled with rust-proofing oil for the protection of the engine while shipping.

ENGINE MUST NOT BE RUN MORE THAN 10 HOURS on this oil before draining and re-filling.

Recommended oil viscosity for engine break-in period.

The first filling should be SAE No. 10 and be drained after 20 hours of operation.

The second filling should be SAE No. 10 and should be drained after 30 hours of operation.

If a new tractor is put into service in the Summer, the third oil change should be SAE No. 20 otherwise follow seasonal recommendation.

Use low gear while the engine is new.

The life of the tractor is affected by the manner in which it is handled during the break-in period.

RADIATOR:

Fill the radiator with clean, pure water (preferably rain water). Drain, flush, and refill with fresh water at least every 90 days.

In sections where mineral water prevails care must be exercised. If rainwater or distilled water can not be obtained drain radiator and allow sediment to settle and refill with the same water. Each new supply of mineral water adds to the deposit in the engine cooling system.

STORAGE BATTERY:

Add distilled water to all three cells weekly. DO NOT LET SOLUTION GET BELOW TOP OF PLATES.

AIR CLEANER:

The air cleaner is put on this engine to prolong its life by preventing dirt and grit from getting into the engine.

Service the air cleaner DAILY, oftener in extremely dusty conditions.

See instructions on side of air cleaner.

OIL FILTER:

The oil filter contains a replaceable cartridge which must be removed and replaced with a new cartridge at necessary intervals. If this is not done, the engine oil will become contaminated with grit and sludge and premature wear of the pistons, rings, and bearings will be the result.

Under ordinary circumstances the cartridge should be changed every 180 hours for gasoline. For low grade fuels every 120 hours. Remove the bayonet gauge and inspect the oil on it. If the oil shows signs of dirt and sludge, it is time to change the cartridge. For changing cartridges, see "Lubrication" section.

OIL AND GREASE:

The outstanding feature of tractor care and operation is PROPER LUBRICATION. Keep all lubricants and their containers perfectly clean. Do not attempt to experiment or economize by using inferior quality or incorrect weight of oil. Any attempt to do so is like stopping the clock to save time. Refer to page 8 for oil specifications and to Lubrication Chart on page 11. See that the oil pressure gauge on instrument panel indicates 10 to 20 pounds at all times when the engine is running at full speed. Check this every time the engine is started, particularly in cold weather. If the pressure gauge fails to register when the engine is started or if the pressure drops below 10 pounds when the engine is running full speed, stop the engine immediately. See page 9.

FUELS:

The gasoline engine is adjusted at the factory to use gasoline of 68 to 70 octane rating. Gasoline of a lower rating may be used by retarding the ignition timing sufficiently to prevent pre-ignition, "Pinging". It may also be necessary to readjust the carburetor.

For detailed information on carburetor setting, see carburetor section.

Clean the fuel strainer screen and tank outlets frequently to assure a constant, full flow of fuel to the carburetor.

"44" MASSEY-HARRIS TRACTORS "44K"**GEAR CASES:**

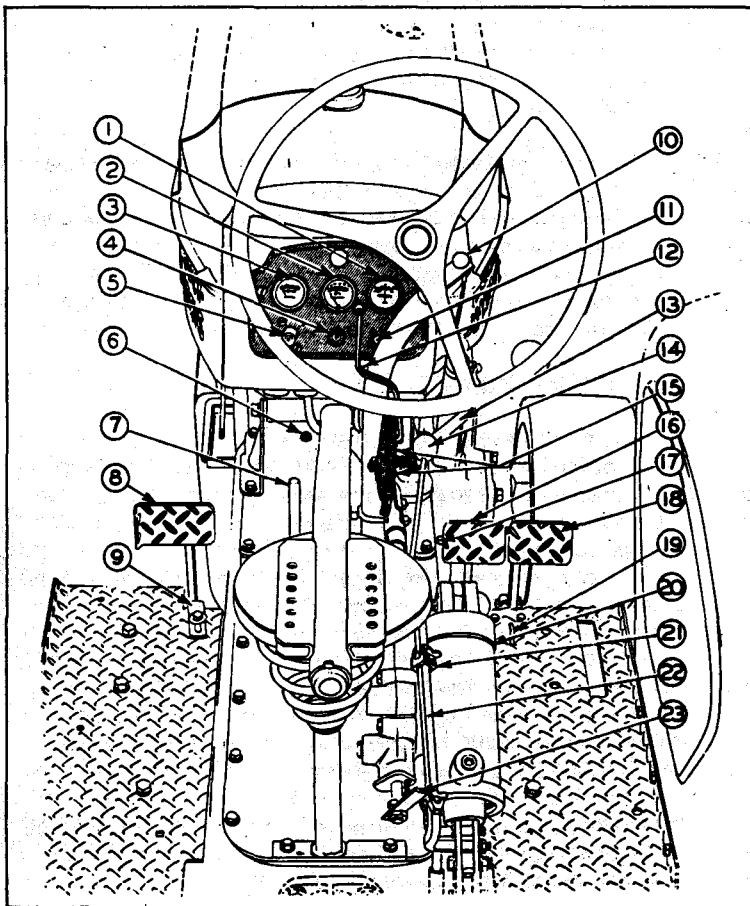
Check the level of lubricant in the gear cases and maintain proper oil levels by adding if necessary.

Change the oil in the gear cases at least once each year. See page 10 for winter operation.

TIRES:

The use of pneumatic tires on tractors has greatly improved power, fuel economy,

operator's comfort, and tractor life; also, has increased the range of tractor use. However, tractor tires must be given attention. Maintain proper air pressure and guard against tire injury. It is necessary to use some type of wheel weights for varying conditions. There can be either too much or too little wheel weight used. Refer to rubber tires and wheels section for wheel weight analysis.

CONTROLS AND OPERATING

1. Ammeter.
2. Oil pressure gauge.
3. Heat indicator gauge.
4. Ignition switch.
5. Starter switch.
6. Transmission and differential filler plug.
7. PTO and belt pulley shifter lever.
8. Clutch pedal
9. Clutch pedal stop.
10. Choke button.
11. Hole for light switch.
12. Throttle lever.
13. Gear shift lever.
14. Depth-O-Matic control lever.
15. Throttle quadrant.
16. Left brake pedal.
17. Brake pedal interlocking pin.
18. Right brake pedal.
19. Brake pedal locking ratchet.
20. Hydraulic cylinder.
21. Stops.
22. Follower arm.
23. Stop lever.

PLATE NO. 1

TO START ENGINE, PROCEED AS FOLLOWS:

1. Check fuel shut-off valve to gas tank to be sure that it is open.

On low grade fuel models there is a small auxiliary tank for gasoline which is used for starting and warming up the engine only. The main fuel tank is used for the heavier fuel.

Do not leave both shut-off valves open at the same time or the fuels will mix.

2. Be sure the gear shift lever is in neutral position. (Hand lever should be free to rock crosswise of tractor.)
3. Partially open throttle.
4. Choke engine if necessary. (Be careful in using the choke not to flood engine.)
5. Turn ignition switch to the "ON" position.
6. Push in on starter button and hold it in until engine starts.

"44" MASSEY-HARRIS TRACTORS "44K"

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- Let engine warm up at one-fourth speed until the engine temperature gauge registers 155° F. Be sure oil pressure gauge is registering 10 to 20 pounds pressure at normal operating speed.

In cold weather it may be necessary to leave choke partially on until engine is warmed up. Never operate tractor with choke partially on.

- Operate the tractor under a light load for the first 50 hours.

TO MOVE TRACTOR, PROCEED AS FOLLOWS:

- With engine running, place throttle control lever in idling position and disengage clutch by pressing clutch foot pedal forward as far as it will go.
- Move shifting lever in position for desired speed. Numbers on the top of the transmission case show the position of the shifting lever for various speeds. If the gears do not shift into mesh, engage clutch just enough to move the gears and then shift again. Do not clash or try to force gears into mesh.
- Set throttle lever to run at half speed.
- Gradually engage the clutch until the slack is taken up between the tractor and the load, then let the clutch back in as far as it will come, and pull throttle lever wide open.
- When starting light load, either on drawbar or belt, open throttle about half open and engage clutch. Then bring load to full speed by opening throttle. This will add life to the clutch facing.

WARNING: DO NOT USE THE CLUTCH PEDAL AS A FOOT REST. USE IT ONLY TO START AND STOP THE TRACTOR AND WHEN SHIFTING GEARS.

TO STOP TRACTOR, PROCEED AS FOLLOWS:

- Disengage clutch and move throttle into idling position.
- Shift gear shift lever into neutral position.
- Re-engage clutch.

WARNING: DO NOT LEAVE TRACTOR SEAT WITHOUT SHIFTING GEAR SHIFT LEVER INTO NEUTRAL POSITION.

TO OPERATE BELT PULLEY, PROCEED AS FOLLOWS:

- With the engine running, place throttle control lever in idling position and disengage clutch by pressing clutch foot pedal as far forward as it will go.
- Push shifter lever for belt pulley and power take-off, No. 7, Plate No. 1, forward as far as it will go.
- Pull throttle a few notches open.
- Gradually engage clutch by letting clutch pedal come back until pedal is as far back as it will go.
- Bring engine up to operating speed by opening throttle control lever.

When doing belt work with a rubber tired tractor, the tractor should be "grounded" to discharge any static electricity that may be generated in the tractor. This can be easily done by attaching a chain or wire from the tractor frame to the ground. If a wire is used, the lower end should be embedded in the ground slightly.

LUBRICATION

The purpose of lubricants is to establish a friction reducing film between all rubbing surfaces, and in so doing performs several functions:

- Reduces friction.
- Prevents wear.
- Keeps working parts cool by flushing.
- Cushions power impulses on piston pins, bearings, and gear thrust loads.
- Forms a seal between piston rings and cylinder wall.

The molecules of oil might be compared to hard rubber balls, thus a film of oil between rubbing parts is comparable to a smooth running ball bearing. In a smooth running ball bearing, the balls must all be exactly the same size. In good quality oil, the molecules are all the same size and therefore spread in a perfectly smooth film surface.

To prevent wear, there must not be any grit, corrosive acid, or glue-like substances in the oil.

The oil must be light enough in viscosity to penetrate the close fitting parts quickly or

"44" MASSEY-HARRIS TRACTORS "44K"

it will neither prevent wear nor serve as a cooling agent.

It must not contain any non-heat-resisting "filler" that will break down under heated working parts or there cannot be a "film seal" between the piston and cylinder, loaded gears, or bearings.

When supplying lubricants for this tractor, be guided by these three prime factors:

First, select the grade or viscosity of oil that this book recommends and do not deviate from it. The SAE rating of oils that are recommended for use by this book have been determined by exhaustive research engineering.

Second, use a quality of oil that is known to be good. Do not use an oil unless you know it is good. Good oil maintains a constant viscosity at a fixed temperature, is uniformly refined, and contains no foreign substance.

Third, **KEEP IT CLEAN.** No matter how good the oil is, if it contains dirt or grit, premature wear and expensive repair bills will be the result. Keep the containers clean and protected from dust and dirt while not in use. Wipe the dirt away from the filler cap or plug before removing them. Service the air cleaner and oil filter as prescribed and keep the tractor clean.

The lubrication of the various units of the tractor are individually dealt with in the following paragraphs:

ENGINE LUBRICATION:

The lubricating system is one of the most important features of the present day engine. Upon its proper functioning depends the successful operation of the engine which means continued operation of the machine.

OILING SYSTEM is full pressure through drilled passages in the cylinder block and crankcase to all main and connecting rod bearings as well as to the governor, timing gears and overhead valve rocker arms, the overflow from which lubricates the tappets. This pressure is automatically regulated by an adjustable spring in the pump body so that a pressure of 10 to 20 lbs. at governed speed can be maintained. The capacity of the gear type oil pump, driven off the crankshaft gear, is several times engine requirements. The excess, however, is by-passed from the line and returns to the crankcase. To the hand hole cover in the bottom and center of the oil pan is attached a generous size pump inlet screen. This can be quickly removed to facilitate cleaning.

To prevent scuffing of the pistons and the cylinder walls, particularly during the warm-up period in the cold weather, and also to lubricate the piston pins satisfactorily, spurt holes are drilled in the large end of the connecting rods pointing to the thrust side of the pistons. They register with the oil passages and pressure in the crankshaft so that at the right time and for a sufficient interval the proper amount of oil is ejected onto the parts which need it most. Oil for the Rocker Arms on the cylinder head is also regulated in the same manner by the spurt system which prevents too much oil getting on the valve stems, an excessive amount of oil at this point sometimes causes sticking of valves or excessive oil consumption. Very little wear takes place in the oil pump during normal engine life and failures are rare. If a pump should require service, it is recommended that the entire oil pump assembly be replaced.

The engine oil pan holds 2 U.S. gallons, 1-2/3 Imperial Gallons or 7.570 Litres. This includes the oil filter body capacity because it should also be drained at the time the crankcase oil is being changed.

Change oil every 40 hours on low grade fuel models, or every 60 hours on gasoline models. If working in extremely dusty conditions, change the oil more often.

Check the oil level in the oil pan at least once daily with the bayonet oil gauge. This should be done when the engine is cold or several minutes after stopping. If the oil pan is half full or less, oil should be added to bring it to the full mark, but not above it. Wipe the dust away from the cap of the bayonet gauge before removing it for measuring the oil level, also the filler cap before removing it for adding oil or refilling.

Seasonal oil recommendations:

SAE #10 or 20 for winter or temperatures below 32° F. as required for satisfactory starting.

SAE #30 for spring and fall or temperatures between 60° F. and 30° F.

SAE #40 for summer or temperatures above 60° F.

DRAINING THE OIL

It is best to drain the oil when the engine is at normal operating temperature. The oil will drain more completely and flush out the oil pan better.

"44" MASSEY-HARRIS TRACTORS "44K"

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DRAIN THE OIL FILTER BODY EACH TIME THE CRANKCASE IS DRAINED BY REMOVING THE DRAIN PLUG SHOWN AT NO. 9, PLATE NO. 3.

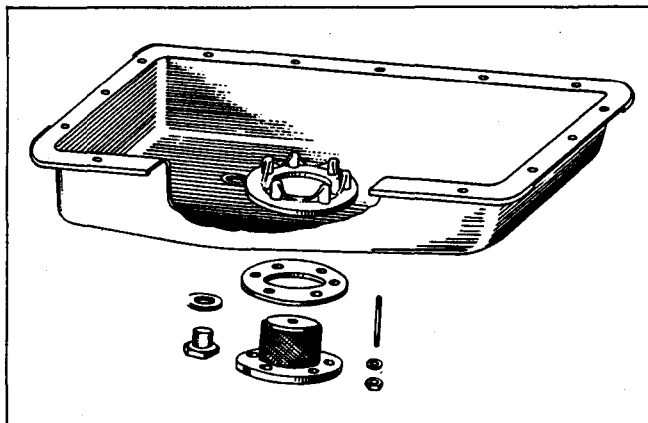


PLATE NO. 2 - OIL PAN

IMPORTANT:

Clean the screen on the bottom of the oil pump every 250 hours. On these models there is a hand hole plate on the underneath side of the engine oil pan.

To the hand hole cover in the bottom and center of the oil pan is attached a generous size pump inlet screen. This can be quickly removed to facilitate cleaning.

If this screen is not cleaned regularly, the oil will be shut off from the inlet or "suction" tube of the oil pump and consequently the pump cannot supply oil to the working parts of the engine. If the oil pressure gauge on the instrument panel does not show 10 to 20 pounds, while the engine is running at operating speed and operating temperature, or if the pressure fluctuates or runs below normal, it indicates that the screen on the oil pump is quite dirty. Clean it at once or the main and connecting rod bearings as well as pistons and rings are liable to be injured from lack of sufficient oil.

The oil pressure is regulated by an adjustable spring in the pump body so that a pressure of 10 to 20 pounds at governed speed is maintained.

The following are some of the causes of improper oil pressure:

1. Lack of oil.
2. Broken oil lines or tubes.
3. Leaky connections in oil lines or tubes.
4. Defective oil gauge.
5. Clogged oil pump or screen.
6. Loose main or connecting rod bearings.
7. Relief valve stuck.
8. Improper viscosity of oil.
9. Worn oil pump gears.
10. Oil lines on base of filter plugged.

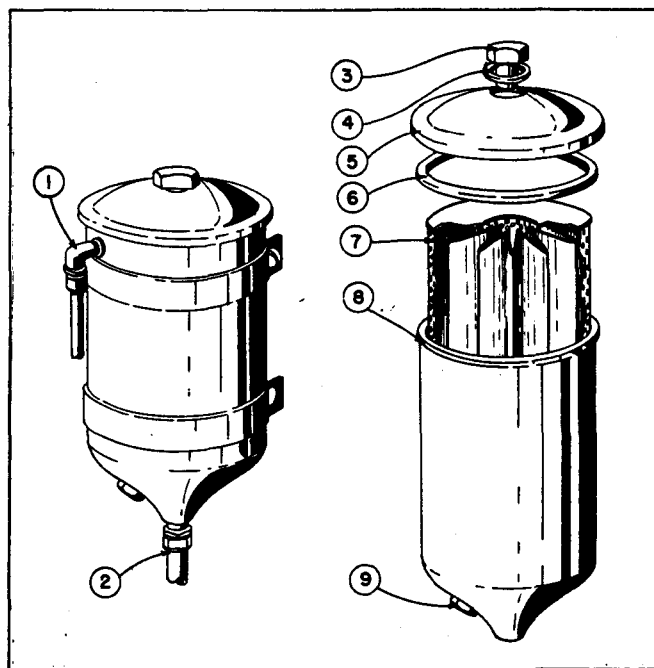


PLATE NO. 3 - OIL FILTER

- | | |
|--------------------------|-----------------------------|
| 1. Oil inlet tube. | 6. Oil filter cover gasket. |
| 2. Oil outlet tube. | 7. Oil filter cartridge. |
| 3. Filter cover nut. | 8. Oil filter body. |
| 4. Gasket for cover nut. | 9. Oil filter drain plug. |
| 5. Oil filter cover. | |

OIL FILTER:

The sole purpose of the oil filter is to keep the engine oil clean. Practically all the oil in the engine passes through the filter every half hour of engine operation. The effectiveness of the filter depends on how regularly the filter cartridge is changed. The cartridge "strains" the grit, sludge, and foreign particles from the oil as it passes through the filter. Since the filter is continually collecting this substance, the minute passages in the cartridge become clogged and the oil ceases to pass through the filter, and by-passes around it. The result is that the oil is not strained and these abrasive or grinding qualities remain in the oil and are fed to the bearings. The remedy is to change the filter cartridge frequently. Under average conditions, the cartridge should be changed every 180 hours on gasoline models and every 120 hours on low grade fuel models.

To replace the Cartridge: Unscrew the nut holding the top on the filter, lift out old cartridge; drain out bottom of filter (No. 9) and clean thoroughly, place new cartridge in filter and replace cover. Do not attempt to change the cartridge while engine is running. After cover is replaced, start the engine and

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check cover of filter for oil leaks. The filter cartridge should be changed at a time when the engine oil is being changed. An extra quart must be added when refilling to replenish the oil taken from the filter.

GEAR CASE LUBRICANT:

There are two gear cases in the tractor viz.: Main Transmission Case, and Steering Gear Housing.

TRANSMISSION LUBRICANT:

The capacity of the transmission and differential is 13 U.S. gallons, 11 Imperial gallons or 49 Litres metric measure. The two compartments have a common level and the oil may be poured in to either front or rear compartment.

The oil level should be checked after every 60 hours operation and oil should be added if necessary. To check the oil level refer to page 50 and follow instructions as outlined.

Change the oil in the transmission case twice each year. It is just as necessary to change the oil in the gear cases as it is to change oil in the engine and for the same reason. Change oil both in Fall and in Spring. Drain out the old oil, fill the gear cases with kerosene, and drive the tractor for a few minutes to thoroughly flush the inside of the case. Drain out the kerosene and refill with new SAE #140 transmission oil for Summer and SAE #90 for Winter.

Transmission oil and chassis lubricant constitute only 3% of total tractor operating cost; Therefore, the expense of changing transmission oil is not burdensome. In fact, exhaustive tests show that transmission maintenance amounts to as much as 6½% of total operating cost in tractors where the transmission oil is not drained seasonally, and was reduced to 1½% in tractors drained; hence, a saving of 5% in operating cost by changing the oil in the gear cases yearly.

This text has no interest whatever in the sale of lubricants, but is vitally interested in reducing tractor operating costs and prolonging tractor life.

STEERING GEAR HOUSING LUBRICANT:

The steering gear housing is located directly below the tractor radiator and is filled to the level of the filling plug located on the top side of the housing. This should be filled so that lubricant covers worm gear with good steering gear lubricant not heavier than a SAE #140. Do not use ordinary grease or any lubricant that will tend to channel in cold weather. Change to a lighter weight oil for continuous cold weather use.

As this housing is tightly sealed and not subjected to any amount of heat and load, very little attention to its lubricant is necessary. It is, however, suggested that as a precautionary measure, the oil level should be checked every 300 hours.

CHASSIS LUBRICANT:

For Chassis, Generator, Starting Motor, and Distributor lubrication, see accompanying Lubrication Chart. Use a good grade of pressure gun grease in all fittings.

ENGINE:

The engine is a 2 Gear, vertical, 4 cylinder in-line, 4 cycle model of over-head valve design, water cooled and pressure lubricated. The cylinder block, designed to take replaceable wet cylinder liners, is case in one piece with the crankcase and rear end plate on which tractor clutch assembly is mounted. Provision is made for the installation of air cleaner, oil filter, etc., to make the power plant function satisfactorily.

"44" MASSEY-HARRIS TRACTORS "44K"

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LEFT TRACTOR SIDE

KEY

- "GL" = SAE 140 GEAR LUBRICANT
- "CL" = CHASSIS LUBRICANT
- "WB" = WHEEL BEARING LUBRICANT
- "MO" = MOTOR OIL

STEERING UNIVERSAL JOINT
"CL" EVERY 10 HOURS

TIE ROD "C.L."
LUBRICATE EVERY 10 HOURS

STEERING KNUCKLE "C.L."
LUBRICATE EVERY 10 HOURS
(2 FITTINGS)

STEERING DRAG LINK "C.L."
LUBRICATE EVERY 10 HOURS

GENERATOR
"MO" TWO OIL CUPS
FEW DROPS EVERY 80 HOURS

DISTRIBUTOR
"MO" OIL CUP—THREE DROPS OF ENGINE OIL
WIPE DISTRIBUTOR CAM WITH OILY FINGER
ALSO FELT UNDER ROTOR

AIR CLEANER
"MO" DRAIN, CLEAN & REFILL
SEE INSTRUCTIONS ON AIR CLEANER

STARTING MOTOR
NO LUBRICATION NECESSARY

STEERING UNIVERSAL JOINT
"CL" LUBRICATE EVERY 10 HRS.

TRANSMISSION & DIFFERENTIAL
FILLER PLUG

CLUTCH FOOT PEDAL
"CL" LUBRICATE EVERY 10 HOURS

BRAKE PEDAL SHAFT
"CL" ONE FITTING
LUBRICATE EVERY 10 HOURS

STEERING SHAFT SUPPORT
"CL" ONE FITTING
LUBRICATE EVERY 10 HOURS

REAR AXLE BEARING
"CL" ONE FITTING
LUBRICATE EVERY 10 HOURS

RIGHT TRACTOR SIDE

BEARING IN FRONT END
SUPPORT
"CL" LUBRICATE EVERY 80 HOURS

FRONT WHEEL BEARINGS
REMOVE WHEELS: WASH OUT OLD
GREASE. REPACK WITH WHEEL
BEARING GREASE. EVERY 300 HOURS.

STEERING GEAR HOUSING
"GL" FILL TO TOP OF WORM
CHECK EVERY 300 HOURS

STEERING KNUCKLE C.L.
LUBRICATE EVERY 10 HOURS
(2 FITTINGS)

STEERING DRAG LINK C.L.
LUBRICATE EVERY 10 HOURS

WATER PUMP
NO LUBRICATION NECESSARY

FRONT AXLE PIVOT PIN "C.L."
LUBRICATE EVERY 10 HOURS

CRANKCASE OIL FILLER CAP
"MO" SEE ENGINE LUBRICATION

BAYONET OIL GAUGE
"MO" CHECK CRANKCASE OIL
LEVEL EVERY 10 HOURS

OIL FILTER
CHANGE FILTER CARTRIDGE
EVERY 180 HRS. - GASOLINE
EVERY 120 HRS. DISTILLATE

BEARING ON CLUTCH SHAFT
"CL" ONE FITTING. LUBRICATE
SPARINGLY. ONE STROKE OF OIL
EVERY 300 HOURS

TRANSMISSION AND DIFFERENTIAL
OIL LEVEL PLUG
"GL" FILL TO PLUG LEVEL
CHECK EVERY 60 HOURS

BRAKE PEDAL & SHAFT
"CL" TWO FITTINGS
LUBRICATE EVERY 10 HOURS

TRANSMISSION DRAINING PLUG

REAR AXLE BEARING
"CL" ONE FITTING
LUBRICATE EVERY 10 HOURS

DIFFERENTIAL
DRAIN PLUG

ENGINE

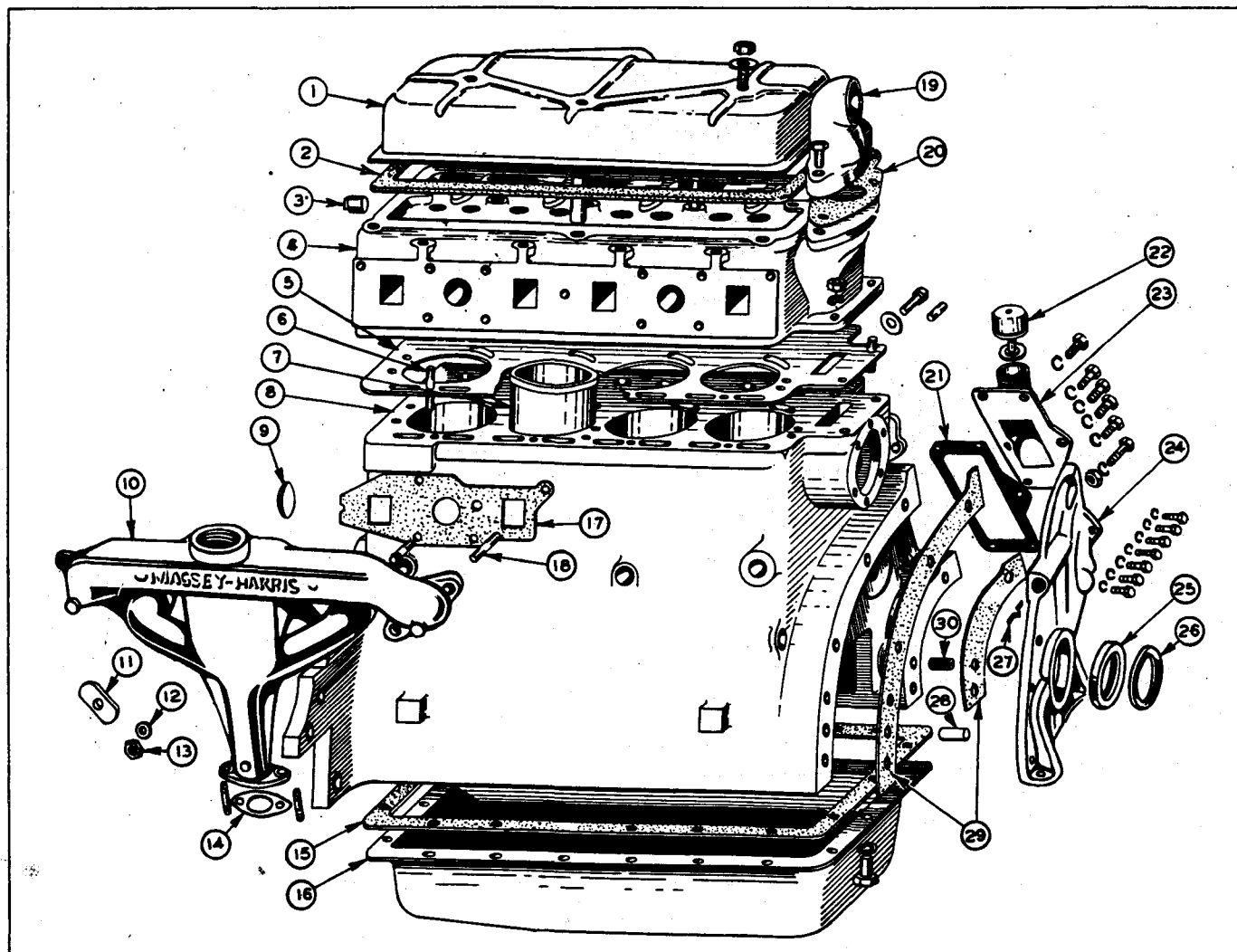


PLATE NO. 5

- | | |
|--|---|
| 1. Cover assembly. | 16. Oil pan. |
| 2. Gasket cover to cylinder head. | 17. Manifold gasket. |
| 3. Plug, cylinder head oil hole. | 18. Manifold to block stud. |
| 4. Cylinder head. | 19. Water outlet elbow. |
| 5. Cylinder head gasket. | 20. Gasket, elbow to cylinder head. |
| 6. Stud, head to block. | 21. Gasket for oil filler cover assembly. |
| 7. Cylinder sleeve. | 22. Oil filler cap. |
| 8. Cylinder block. | 23. Oil filler assembly. |
| 9. Plug, rear crankshaft bearing hole. | 24. Timing gear cover. |
| 10. Manifold. | 25. Oil seal (leather). |
| 11. Manifold clamp. | 26. Oil seal (felt). |
| 12. Washer. | 27. Governor bumper spring. |
| 13. Nut, 3/8" NC Hex. | 28. Timing gear cover dowel pin. |
| 14. Gasket, manifold to carburetor. | 29. Timing gear cover gaskets. |
| 15. Oil pan gasket. | 30. Oil plug. |

"44" MASSEY-HARRIS TRACTORS "44K"

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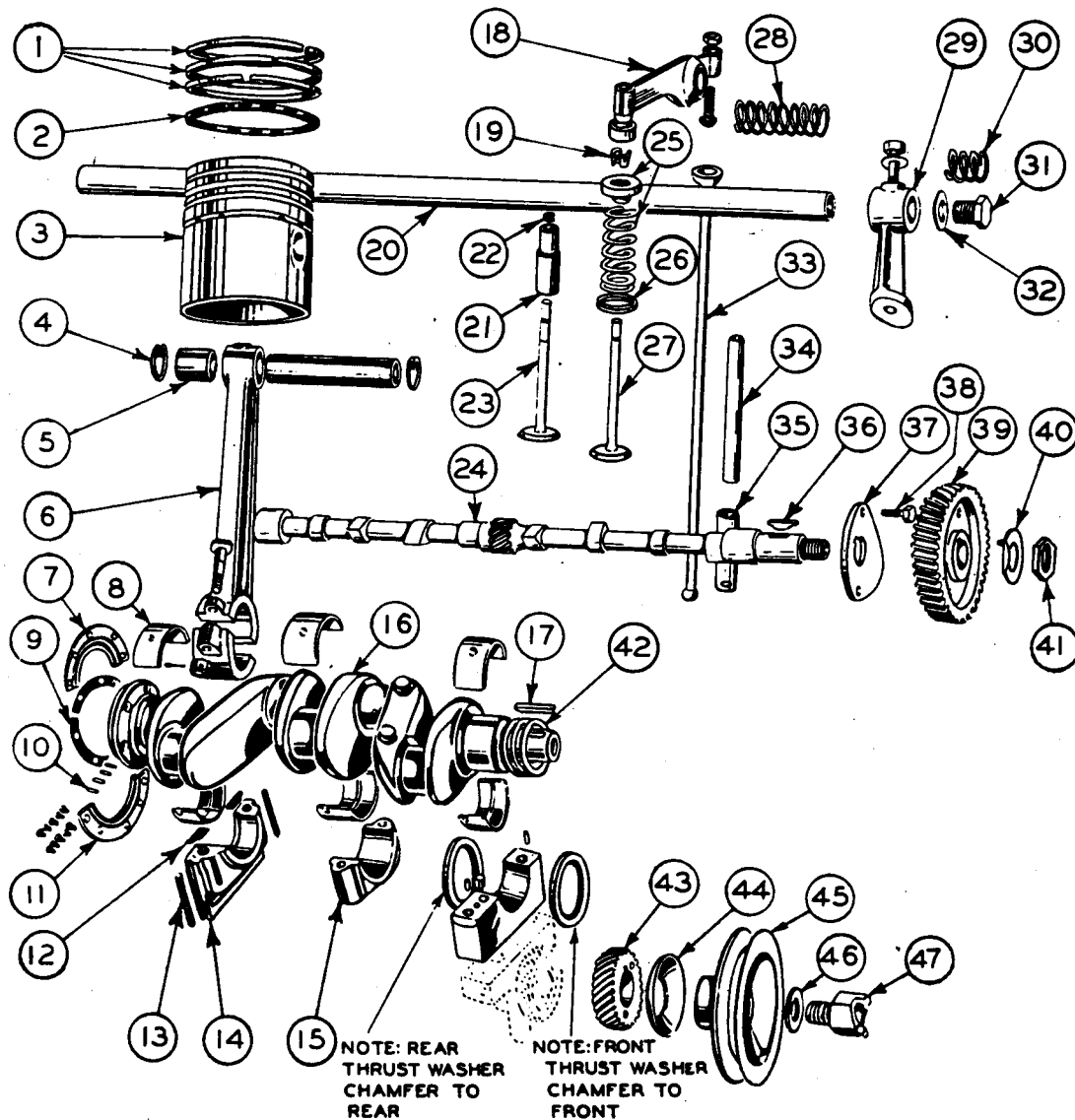


PLATE NO. 6

- | | |
|--|--|
| 1. Compression rings. | 25. Valve spring and retainer. |
| 2. Oil ring. | 26. Insert for exhaust valve. |
| 3. Piston. | 27. Exhaust valve. |
| 4. Retaining ring for piston pin. | 28. Spring on rocker arm shaft. |
| 5. Bushing for piston pin. | 29. Support for rocker arm shaft. |
| 6. Connecting rod assembly. | 30. Spring on end of rocker arm shaft. |
| 7. Oil seal crankshaft rear (upper half). | 31. Plug in end of rocker arm shaft. |
| 8. Bearing shell. | 32. Gasket, washer copper. |
| 9. Gasket for oil seal. | 33. Valve push rod. |
| 10. Dowel pin for oil seal. | 34. Spacer for valve cover. |
| 11. Oil seal crankshaft rear (lower half). | 35. Tappet. |
| 12. Gasket, rear main bearing cap to block (rubber). | 36. Woodruff key. |
| 13. Packing, rear main bearing cap to block. | 37. Thrust plate for camshaft. |
| 14. Main bearing cap rear. | 38. Capscrew for thrust plate. |
| 15. Main bearing cap center. | 39. Camshaft timing gear. |
| 16. Crankshaft. | 40. Washer (special lock). |
| 17. Key-gear to crankshaft. | 41. Nut - 1" - 16 special hex. |
| 18. Rocker arm assembly. | 42. Shims .002 - .008. |
| 19. Lock for spring retainer. | 43. Timing gear, crankshaft. |
| 20. Rocker arm shaft. | 44. Oil throw-off washer. |
| 21. Valve guide exhaust or intake. | 45. Pulley, fan drive. |
| 22. Snap ring for valve stem. | 46. Washer for starting jaw. |
| 23. Intake valve. | 47. Starting jaw and crankshaft nut. |
| 24. Camshaft. | |

"44" MASSEY-HARRIS TRACTORS "44K"

Particular consideration is given in the overall design to accessibility so quick and efficient service can be easily rendered.

Description of some of the more important details follows:

CYLINDER block is cast integral with the crankcase which is heavily ribbed to prevent distortion and reduce vibration. The bores consist of easily replaceable wet liners sealed in by 2 composition rings at the bottom and the cylinder head gasket at the top. These liners are made of alloy cast iron, centrifugally cast, treated so the brinell hardness ranges between 210 and 242 and honed to a smoothness of 15 to 25 micro-inches.

The rear of the cylinder block forms an end plate to which the clutch and flywheel housing is attached.

CYLINDER HEAD is of the overhead valve design and is securely held in place by heat-treated, alloy steel studs 9/16" in diameter so placed as to prevent distortion of the cylinder bores and failure of the cylinder head gasket. The combustion chamber is of improved design, being particularly adapted for use with fuel oil. The same head is used for all fuels or altitudes. To change compression ratio, select pistons of proper length and design to handle the fuel in question or the altitude to be encountered.

FLYWHEEL is made of special alloy cast iron and X-Rayed for flaws which might cause serious damage in service. All wheels are balanced dynamically within 1/2 inch ounce which contributes largely to smooth operation. Provision, of course, is made for attaching the clutch.

CRANKSHAFT is drop-forged, heavy duty design and carefully proportioned to give adequate rigidity. Improved heat-treatment perfects the granular structure of the shaft and relieves all strains which might lead to failure. Proper bearing dimensions have been carefully worked out based on long and severe service experience so that a minimum of trouble will develop. These crankshafts are both statically as well as dynamically balanced within 1/2 inch ounce which largely minimizes vibration.

The crankcase is sealed at both ends of the crankshaft from dust -- at the front end by a spring backed, leather seal back of a felt washer and, at the rear, by a specially designed Neoprene Seal.

BEARINGS The 3 large replaceable, precision type main bearings, steel-backed semi-micro, tin-base babbitt lined, are doweled and securely held in place by rugged caps with 1/2" diameter heat-treated alloy steel cap screws all positively locked.

For checking bearing clearance, use 1/2 inch feeler gauge, .0025" thick, approximately the length of the bearing.

Place the feeler gauge between the bearing and crankshaft, parallel with the shaft, and tighten the cap screws on the bearing cap.

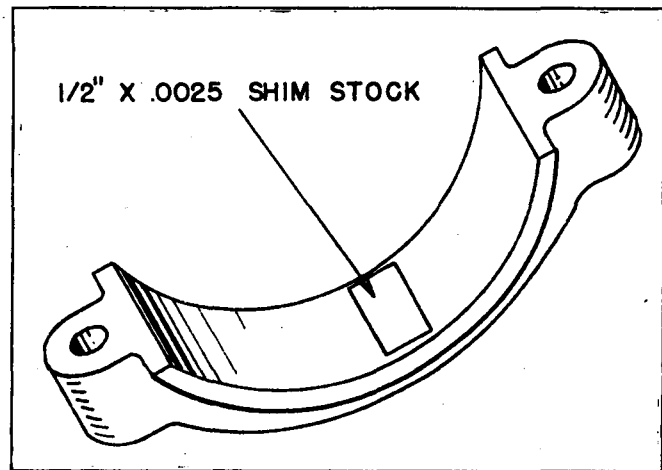


PLATE NO. 7 - FEELER GAUGE IN BEARING

A very light drag should be noticed when turning the shaft.

Bearing Size:	LENGTH	DIAMETER
FRONT	1-17/32	2-7/8
CENTER	2-3/8	2-7/8
REAR	2-1/16	2-7/8

Desired clearance .002 to .003".

Desired crankshaft end play. Clearance .006 to .010. Adjustment can be made by removing or adding shims at the front end of crankshaft. See Plate No. 6.

CAMSHAFT is a one-piece highly alloyed iron casting especially heat-treated with an integral distributor shaft gear and runs on 3 large well lubricated bearings machined in the block and uses no separate bushings.

Bearing:	LENGTH	DIAMETER	BEARING CLEARANCE
FRONT	1-7/16	2	.0035 to .004
CENTER	1-1/16	1-3/4	.0035 to .004
REAR	1-1/8	1-11/16	.0035 to .004

End clearance is from .006 to .010.

CONNECTING RODS are drop-forgings of heavy duty, "I" section design having an ample margin of safety under full load with carefully engineered caps. The hole for the piston pin is diamond bored to ensure proper fit and carefully gauged for alignment.

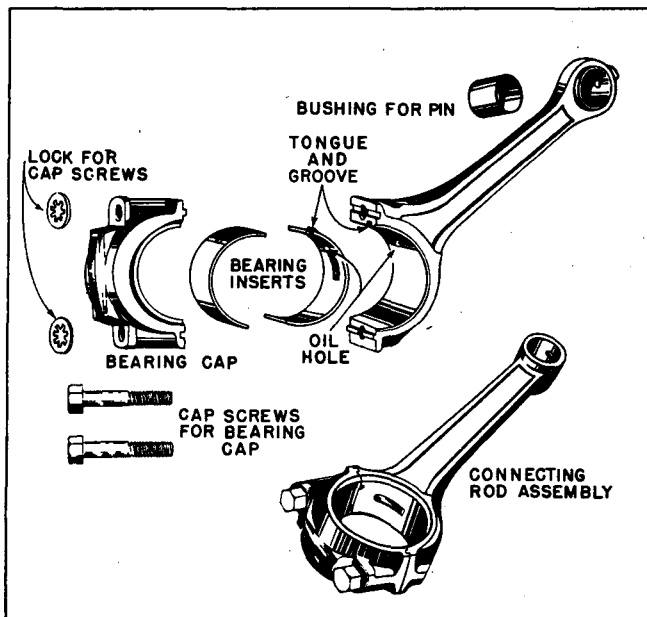


PLATE NO. 8 - CONNECTING ROD ASSEMBLY

CONNECTING ROD BEARINGS are of the replaceable precision ready-to-run type "steel backed Semi-Micro, tin-base babbitt lined," doweled and securely held in place by rugged caps with 1/2" diameter heat-treated alloy steel bolts.

Bearing Size: LENGTH DIAMETER
 1-11/16" 2-1/2"
 CLEARANCE .002 to .0035"
 SIDE CLEARANCE .006 to .010"

PISTON PIN BUSHING in the top end of the connecting rod is of "Phosphor Bronze" and are held to proper dimensions within very close limits. The finished hole size is 1.2504 to 1.2502 inches.

The piston pin diameter is 1.2500 to 1.2498 inches.

The desired pin fit in bushing .0004".

The desired pin fit in piston, light push fit.

PISTONS of aluminum are a heavy duty design and anodized to prevent the absorption of dirt or dust which later may be ejected into the oil of the crankcase; otherwise light weight and high thermal conductivity are maintained. They are held within very close limits for size and weight which ensures smooth operation. .0035 of an inch is the correct clearance

between the piston and the cylinder wall. This measure can be taken by placing a feeler gauge .0035 thick by 1/2" wide between the piston and the cylinder wall the full length of the piston. The clearance is correct if this gauge can be pulled out with the gauge held between the thumb and two fingers (5 to 10 lbs. pull). This measure must be made on the thrust face of the piston skirt, that is, on the face of the piston that goes toward left side of the engine. (The piston pins are to be removed when fitting new pistons.) This measure should be made at two or three places along the length of the cylinder with the piston pin holes parallel to the crankshaft. Mark each piston for the cylinder in which it is measured and assemble them in that order.

If for any reason, a new piston, or piston rings are installed in this engine using the old sleeve, the glaze must be removed from the wall of the 'sleeve with a fine hone, or if a hone is not available, a piece of emery cloth or fine sandpaper may be used by hand for burnishing the wall.

Neglecting to burnish the walls in some manner is quite often the difference between a satisfactory and an unsatisfactory re-ring job.

Burnishing the glaze off the cylinder walls aids greatly in the seating of the new rings.

PISTON RINGS:

There are four rings on each piston. The four rings are above the pin. The combination of rings used was selected with extreme care to provide the maximum in long-life, power and economy.

GROOVE POSITION	RING SIZE	TYPE RING	GAP CLEAR-ANCE	SIDE CLEAR-ANCE
1st. . .	3-7/8 x $\frac{.124}{.123}$	Tin Plated Comp.	.011	$\frac{.006}{.004}$
2nd. . .	3-7/8 x $\frac{.124}{.123}$	Taper Face Comp.	.011	$\frac{.005}{.003}$
3rd. . .	3-7/8 x $\frac{.124}{.123}$	Taper Face Comp.	.011	$\frac{.005}{.003}$
4th. . .	3-7/8 x $\frac{.2490}{.2485}$	Single Slot Oil Ring	.013	$\frac{.005}{.003}$

To check the gap clearance push the ring down in the cylinder with a piston to be sure it is straight and measure the gap with a feeler gauge.

To check the ring side clearance install the ring in the groove and insert a feeler gauge between the side of the ring and the land of the groove.

"44" MASSEY-HARRIS TRACTORS "44K"

When installing new rings, do not use a ring that is over .010" too large, for when it is filed to get proper gap and compressed to go into the cylinder, it bends into an egg shape and consequently does not fit the cylinder.

It is usually better to use standard size rings unless the cylinder is reconditioned to some definite oversize.

Keep the ends filed square so that the ends fit together evenly when the ring is compressed until the ends touch.

When fitting new rings in a worn wall, always take the measure at the bottom of the ring travel in the cylinder.

Always remove ridge at top of cylinder bore with a ridge remover.

If new rings are to be installed in an engine that is "broken in" or in cylinders worn to a perfectly smooth surface, the cylinder walls must be burnished with fine emery cloth or a fine hone to remove the "glassy surface". If this is not done, satisfactory results will not be obtained from installing the new rings.

Always install the rings in the cylinder for which they are measured and the compression rings with the side marked "top" up.

Remove all carbon from the ring grooves, and drain holes in bottom groove, carefully when installing new rings.

It is a known fact that when a piston is removed from a cylinder after the rings have worn to a fit, they will not fit properly when the piston is replaced no matter how much caution is used to replace the rings in the same position. It is therefore necessary to clean the grooves and install new rings and burnish the cylinder wall whenever a piston is removed from the cylinder.

High oil consumption is usually due to:

1. Worn piston rings.
2. Pistons and cylinders worn excessively (failure to service the air cleaner as directed will cause excessive wear).
3. Loose main and connecting rod bearings or cracked and damaged bearing shells.

The obvious remedy is to replace the worn parts. However, worn engine parts are by no means the sole cause of high oil consumption. Poor quality of oil, improper grade or weight of oil, dilution of oil with fuel, and incorrect motor temperature have as much bearing on this subject as engine parts.

Inferior oil will quickly build up a carbon deposit in the ring grooves and prevent free action of the rings to seal the cylinder

walls against leak. Also the slots in the oil control ring and the oil drain holes in the piston groove become filled and can no longer carry the oil wiped from the cylinder wall back into the crankcase. In this case it will be necessary to clean the pistons and replace the rings. It is advisable to burnish the cylinder walls very lightly to aid in fitting the rings to the cylinder wall.

Oil of improper grade will not create a perfect seal between the cylinder walls and the pistons nor does it protect bearing clearance.

Dilution of the oil with fuel reduces the body of the oil until an excessive amount flows out the bearing ends, also breaks down the oil seal at the piston rings.

Good oil, kept clean and regularly changed, is the best assurance of long engine life.

Refer to lubrication section for correct seasonal oil grade and interval change.

PISTON PINS:

The piston pins are 1.5000 in diameter. A 1.4998 bronze bushing provides the bearing in the upper end of the connecting rod and they are held in the piston by snap rings.

Desired Piston Pin Fit:

In Piston. Light Push Fit
In connecting rod. 0004

Before placing a serviced piston back in the cylinder bore, make sure the snap rings are in place on the piston pin ends.

CYLINDER HEAD:

The cylinder head is of the conventional cast iron type.

The recommended method for removing the head in order that the head, cylinder block and cylinder head gasket will not be damaged is as follows:

1. Remove all cylinder head stud nuts.
2. Screw an eyebolt or cap screw with the proper thread size in the front and rear rocker shaft stud holes and use a short length of chain between them to lift up on the head while tapping lightly around the edges of the cylinder head with a lead or rawhide mallet or hammer.

Never use a screw driver or chisel to pry the cylinder head loose from the cylinder block.

IMPORTANT:

When installing the cylinder head, tighten the cylinder head stud nuts in sequence as shown in Plate No. 9. Tighten nuts down evenly and repeat the operation until the nuts are tight. After the engine has been warmed up to the normal operating temperature, give the bolts a final tightening. Torque wrench tension for bolts 130 to 140 foot lbs.

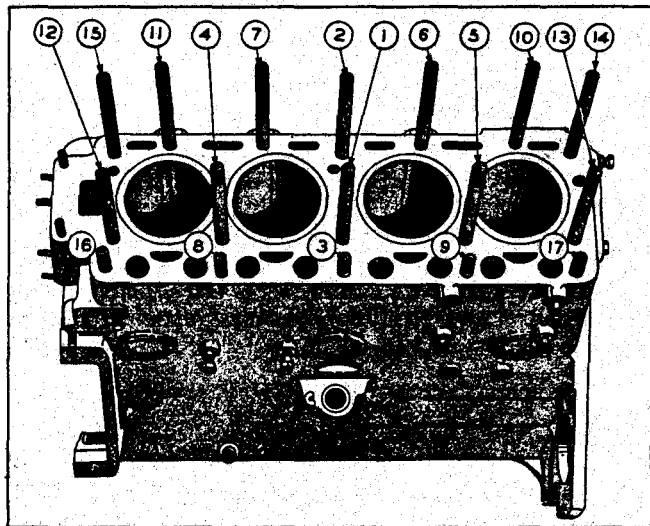


PLATE NO. 9 - SLEEVE PULLER

INSTALLING SLEEVES:

After a long period of use, natural wear enlarges the cylinders which widens the clearance between the cylinder and piston. When the clearance between the cylinder and piston is worn to .010 of an inch, the worn cylinder sleeves should be replaced with new sets of sleeves, pistons, rings and pins.

Wash and clean the tractor thoroughly removing all dirt and grease from whole tractor. You will enjoy working on a clean machine and will be able to do a much more satisfactory and longer lasting overhaul job if no dirt and grit is allowed to get into the engine. One of the most common causes of engine failure can be directly traced to dirt getting into the moving parts.

"KEEP IT CLEAN" should be the slogan of every repair man overhauling a tractor.

Remove the hood from the tractor and drain the cooling system. Drain the oil from the crankcase. Disconnect the water outlet hose to the radiator. Remove heat indicator and spark plug wires. Disconnect choke wire, governor linkage rod and air hose from the carburetor. Remove air cleaner.

The manifold and carburetor can be removed as a unit. Remove the valve cover, rocker arms and push rods. Be sure to keep the push rods in order so they may be put back in the same sockets from which they were removed. Remove the cylinder head and set it on a solid flat surface. Remove the oil pan. Take off the connecting rod caps and push the pistons and rods out through the top of the cylinders.

When removing the sleeves from this engine, a puller will be required similar to the one illustrated below. The puller should be centered over the top of the barrel before proceeding to pull it.

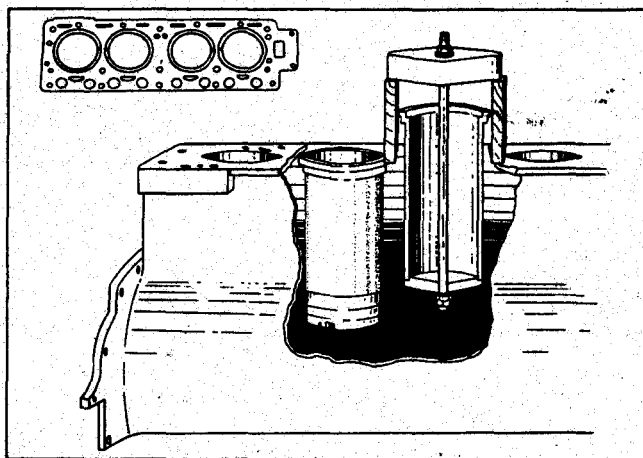


PLATE NO. 10 - CYLINDER HEAD STUDS

When installing the new sleeves, be sure to clean the two grooves at the bottom so the seals can seat properly to prevent distortion. It is very important to have the composition rings properly seated in the recess in the sleeve to prevent water leaking into the crankcase.

Be sure the two slots at bottom of sleeves are properly aligned for clearance of connecting rod. The slots must be at right angles to the crankshaft so the connecting rod will clear the bottom end of the cylinder sleeve. This can be determined by checking the mark on the top flange of the sleeve as shown in the illustration in the upper left corner of Plate No. 10.

The top flange of the sleeve (where it sets into the recess in the block) should be cleaned thoroughly and coated with light oil before being tapped down in place.

VALVES:

The valves are one piece forgings. Intakes are chrome nickel steel and exhausts are XCR steel.

VALVE SPECIFICATIONS:**Intake:**

Head Diameter 1-41/64
 Stem Diameter 4344 to .4352
 Length Overall 5-15/16
 Seat Angle 30°

Exhaust:

Head Diameter 1-29/64
 Stem Diameter 4315 to .4325
 Length Overall 6"
 Seat Angle 44°

Valve Seats:

Intake Seat Angle 30°
 Intake Seat Width 3/32

Exhaust Inserts Wausau Alloy:

Insert O.D. 1.5775 to 1.5785
 Seat O.D. 1.401 to 1.411
 Insert I.D. 1.301 to 1.318
 Depth 245 to .250
 Seat Angle 45°

Valve Guide Reamed in Place:

Exhaust and Intake O.D. 751 to .752
 Exhaust and Intake I.D. 4360 to .4365
 Overall Length 2-7/8

The necessity for valve grinding is usually quickly detected by loss of power due to loss of compression. Before grinding valves, the valves should be removed and their heads and stems as well as the block parts cleaned of all carbon, and the holes in the guides cleaned out and oiled. It is important that each valve be replaced in the hole from which it was taken. No more metal should be removed from the valve than is necessary for a good seat.

VALVE SEATS:

The inlet valve seats are cut in the cylinder head and may be refaced in the usual manner.

The exhaust valve seats are hardened inserts, and if truing up is necessary, they must be reground with a special grinding stone in a high speed tool. Oversize inserts are available for repairs and are furnished only in .010 oversize. When installing new inserts, it will be necessary to bore the head to the proper size to accommodate the oversize inserts.

VALVE STEM GUIDES:

The valve stem guides are removable. Guides are a press or drive fit into the cylinder head. Distance from valve spring seat to top of guide 5/8".

The new guides must be reamed to provide correct clearance for the valve stem after

being installed in the head. Both intake and exhaust guides are reamed to the same size .4360" to .4365". The valve stems are different in size to provide the clearance as shown.

Intake valve stem clearance limits .0008" to .0021". The desired clearance with new parts is .002".

Exhaust valve stem clearance limits .0035" to .005". The desired clearance with new parts is .004".

VALVE SPRINGS:

The valve spring pressure: 53-59 lbs. to compress the length of the spring to 1-7/8". The exhaust and intake springs are interchangeable. When reassembling the spring, make sure the upper end of the spring fits around the lower end of the valve guide and in the counter bore in the head.

VALVE TAPPETS:

The barrel type tappets operate in a bath of oil delivered from the engine oiling system and require little or no servicing. Tappet clearance is adjusted by turning the adjusting screw on the rocker arm in or out until the desired clearance is obtained.

Inlet valve tappet clearance hot setting 014"
 Exhaust valve tappet clearance hot setting 014"

It is important that the proper tappet clearance be maintained at all times to insure good engine performance.

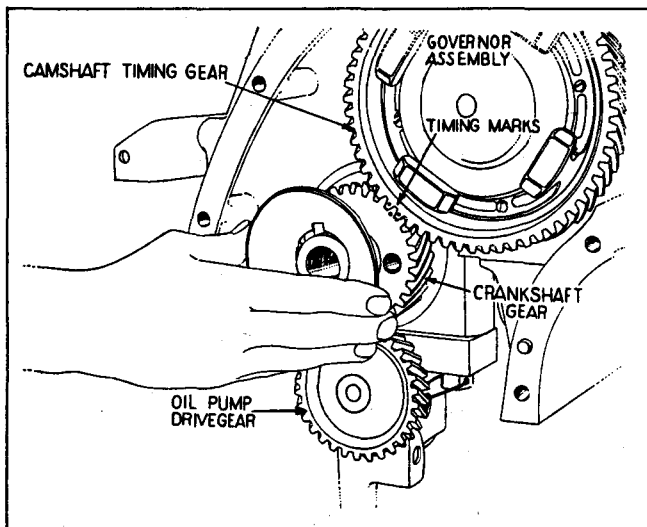


PLATE NO. 11 - TIMING GEARS

VALVE TIMING:

The valves are timed correctly at the factory and the timing gears marked. The relation of these gears must not be altered.

If new timing gears, or a new camshaft are installed, check the valve timing as follows:

Set the exhaust valve tappet clearance at .025" and the intake valve tappet clearance at .020".

Insert a .005" feeler gauge under each of the tappets on No. 1 or No. 4 cylinder, and turn the engine very slowly, checking the feeler gauges. When both feeler gauges pull free, the pointer in the flywheel housing should be directly over the dead center mark on the flywheel. This is the proper setting for the valve timing. If the pointer is not in this position the timing gear should be advanced or retarded sufficiently to bring it to this

setting and the timing gears should be marked at the proper position.

THE ABOVE SETTINGS ARE NOT TO BE CONSIDERED AS VALVE OPERATING CLEARANCES, BUT USED ONLY FOR CHECKING VALVE TIMING.

The intake valve closes 215° after T.D.C. The exhaust valve opens 140° after T.D.C. on the power stroke and closed on T.D.C. after the scavenging stroke.

WARNING:

When timing the valves, never retard the camshaft to make the timing gears mesh with the marks on the teeth.

If the timing marks on the gears are not correct when the valves are timed as outlined in the previous paragraphs, the gears are evidently in error, or the keyway in the camshaft is incorrect.

OIL PUMP

OIL PUMP:

The oil pump is of the gear type, and has ample capacity to supply the requirements of the engine.

The pump is attached to the lower side of the front main bearing and is driven by the timing gear on the crankshaft.

Very little trouble is ever experienced with the pump, and if it fails to function after an extended period of use, it is usually better to replace the entire unit rather than attempt to repair it.

The pressure is regulated by a pressure regulating spring.

The normal pressure at operating speed is 10 to 20 lbs.

If the pressure fluctuates, or falls below the rated normal pressures, stop the engine immediately and find the cause of the trouble and correct it.

PROBABLE CAUSES:

No oil in crankcase.

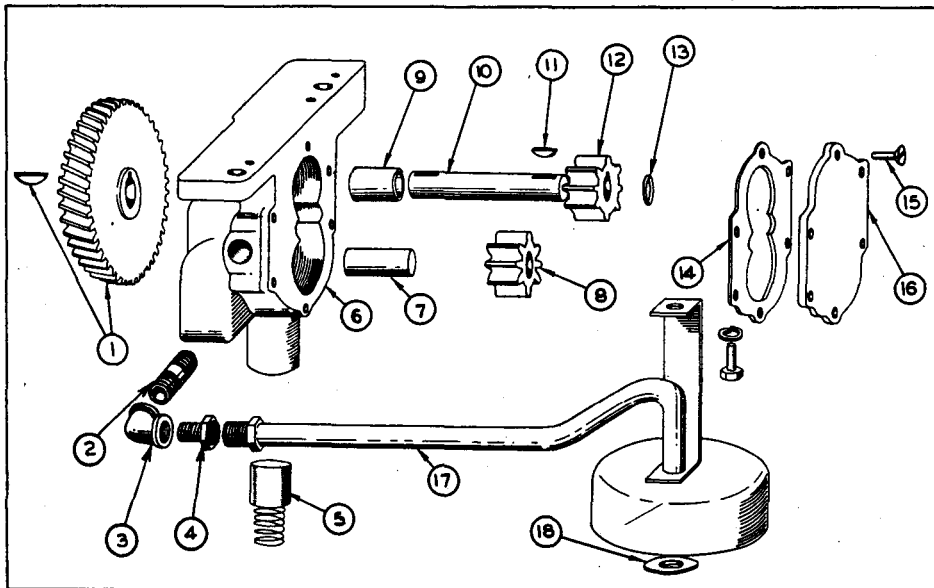
Oil strainer screen clogged.

Oil lines from pump to screen broken or loose.

Oil lines to filter broken or loose.

Oil in crankcase diluted or improper grade.

Loose or chipped bearings.



1. Oil pump drive gear and Woodruff key.
2. Nipple.
3. Elbow.
4. Fitting.
5. Bypass valve.
6. Oil pump body.
7. Shaft for driving gears.
8. Driven gear.
9. Oil pump shaft bushing.
10. Shaft for driving gears.
11. Woodruff key for driving gear.
12. Driving gear.
13. Snap ring.
14. Gasket.
15. Screw.
16. Cover plate.
17. Oil tube (pump to strainer).
18. Washer for strainer cover.

PLATE NO. 12 - OIL PUMP

GOVERNOR

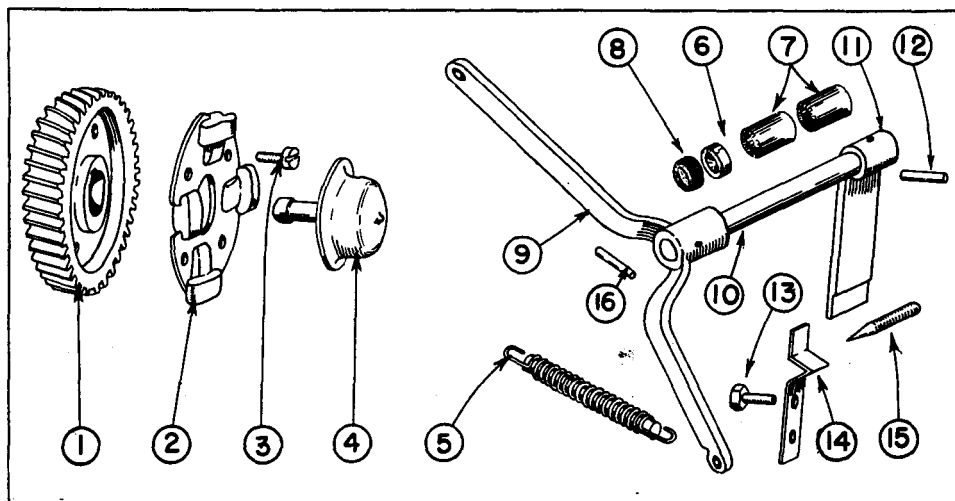


PLATE NO. 13 - GOVERNOR. Exploded View.

The governor is a variable speed type using accurately balanced die cast weights to control the speed of the engine. It is a "built-in" type and is attached to the front side of the camshaft gear, being entirely enclosed in the timing gear housing. It is lubricated by a bath of oil furnished by the engine oil pump and requires no attention in normal service.

The engine speed is controlled by the governor automatically after the desired speed is selected by moving the hand throttle lever on the steering post. For almost all operations, except when running under light loads at slow speeds, as may be necessary in some of the exacting planting operations the throttle lever should be advanced to its extreme position. Moving the hand throttle lever to the rear on its quadrant increases engine speed. Placing hand throttle lever in its farthest advanced position for field and belt work, will allow the engine to run at its rated speed, and prevent damage to the engine from running under-speed for any length of time.

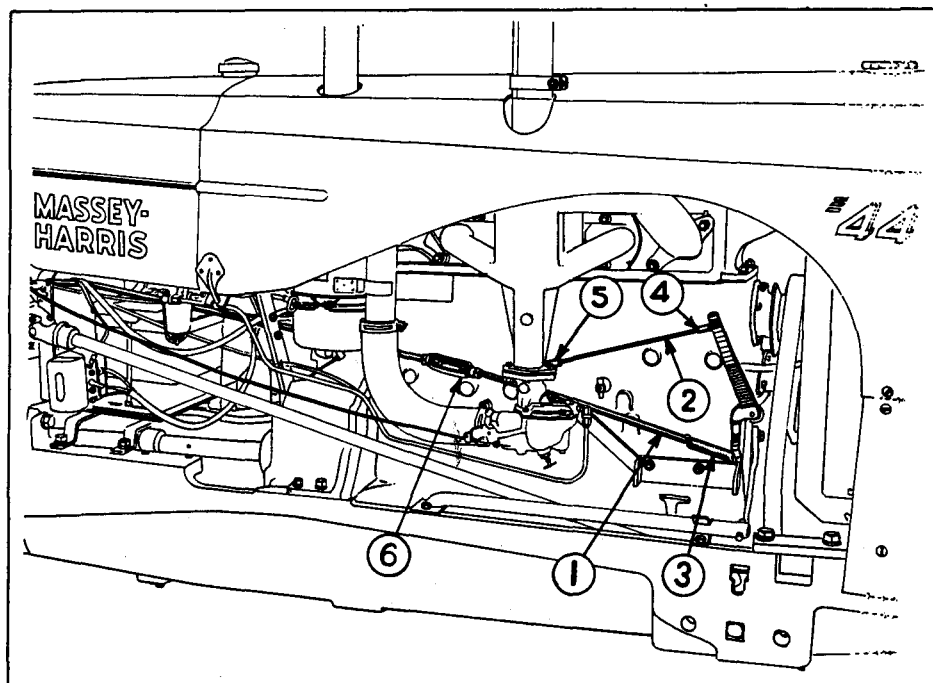
THE GOVERNOR IS PROPERLY ADJUSTED WHEN THE TRACTOR LEAVES THE FACTORY, AND SHOULD REQUIRE NO ADJUSTING UNLESS IT BECOMES NECESSARY TO REPLACE SOME PARTS. The positive "stop" speed adjusting screws are properly set when the tractor leaves the factory, and any change in this setting will limit the manufacturer's warranty. The adjusting instructions given below must be carefully followed, in order to insure good engine performance, should it become necessary to replace any of the governor assembly parts.

Adjustment: Plates Nos. 14 and 15.

1. The governor control rod (No. 1, Plate No. 14) is attached at the front end as shown, and has a turnbuckle shown at No. 6, Plate No. 14 to adjust the length of this rod. After the control rod is in place, with the governor control spring hooked in the lower end of the bellcrank, set the hand throttle lever in the second or third notch from the front of its quadrant.

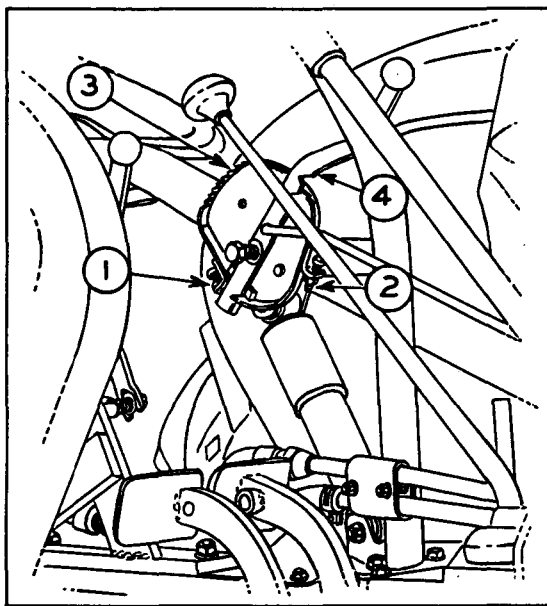
Disconnect the rod from governor arm shown at No. 4, Plate No. 14 and pull the top end of the governor bellcrank back as far as it will go.

2. Install the carburetor to governor linkage rod (No. 2, Plate No. 14) with the clevis end to the rear or on the butterfly arm of the carburetor. Before installing the ball and socket joint (No. 4, Plate No. 14) to the top end of the bellcrank on the governor, it will be necessary to adjust the rod to the proper length as follows: Set the hand throttle lever back two thirds of the way on the throttle lever quadrant. This will pull the governor bellcrank to its wide open position. Pull the governor to carburetor linkage rod (No. 2, Plate No. 14) forward to its wide open position and adjust the length of the rod by screwing it in or out of the clevis (No. 5, Plate No. 14) until the ball joint bolt (No. 4, Plate No. 14) will go through the hole in the top end of the bellcrank arm freely and bolt it in place. Tighten the lock nut (No. 5,



1. Governor control rod.
2. Governor to carburetor linkage rod.
3. Control rod to bell crank spring.
4. Ball and socket joint.
5. Lock nut on clevis.
6. Turnbuckle for adjusting throttle control rod.

PLATE NO. 14 - GOVERNOR LINKAGE



1. Low idle stop screw.
2. High idle stop screw.
3. Throttle quadrant.
4. Throttle lever.

PLATE NO. 15 - THROTTLE LINKAGE AND STOP

Plate No. 14) at the clevis and be sure that the rod is not binding after the nut is tightened. IT MUST WORK FREELY. Never attempt to adjust the engine speed by either lengthening or shortening this rod. This does not adjust the engine speed, and it will impair governor action if this adjustment is not properly made. After this adjustment is properly made it will not be necessary to change it until either the governor or carburetor is removed.

3. Start the engine and let it warm up to operating temperature at about 1/3 to 1/2 throttle.

After the engine is thoroughly warmed up, open the throttle wide open and check the engine speed. With no load, the crankshaft speed should be 1510 to 1520 RPM. The belt pulley speed will be 965 to 970 RPM.

If the engine is running UNDER normal speed, loosen the lock nut No. 2, Plate No. 15, and turn the screw out until the engine speed is correct and tighten the lock nut to hold it. If the engine is running OVER normal speed loosen the lock nut and turn the adjusting screw in until the engine is running at the proper speed.

"44" MASSEY-HARRIS TRACTORS "44K"

Re-check the engine speed several times by closing and opening the throttle to see that it is correct.

When it is properly adjusted the lock nut on the quadrant stop screws should be tightened securely.

NOTE: THE LIFE, PERFORMANCE, AND EFFICIENCY OF YOUR TRACTOR ENGINE DEPENDS A GOOD DEAL ON CORRECT GOVERNOR SPEED ADJUSTMENTS. MAKE SUCH ADJUSTMENTS WITH CARE, AS A GOOD ENGINE CAN BE RUINED BY RUNNING EITHER "OVER-SPEED" OR UNDER SPEED. The best rule to follow is that a governor, once correctly adjusted, should need no "tampering".

As an added assurance of good governor operation, the governor is constructed with a "built-in" bumper spring, its adjustment screw is located on the timing case just left of the crankshaft pulley, and directly forward of the cam shaft gear. This should require no adjustment, as it is correctly set when the tractor leaves the factory.

If, however, conditions are such that the engine is unstable, and the governor too sensitive, which will be evidenced by a tendency of the speed to vary, when running with "no load" at 1510 to 1520 R.P.M., this may be corrected by turning the bumper spring screw "in" one to two turns and then checking the engine performance. A "too heavy" adjustment of the bumper spring will impair good governor action.

WATER PUMP

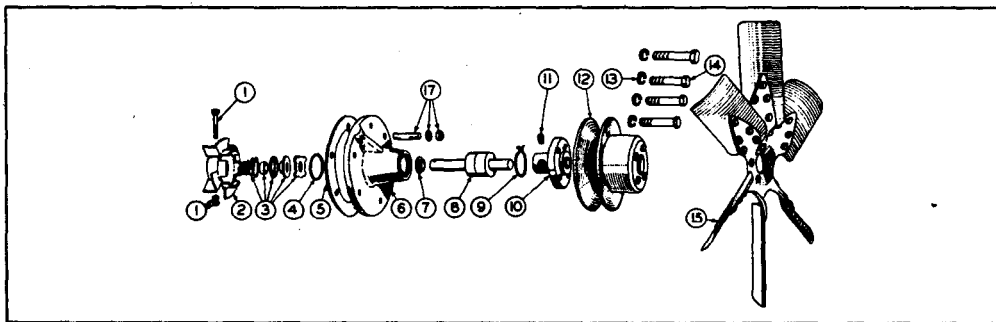


PLATE NO. 16 - WATER PUMP

1. Impeller bolt, nut and washer.
2. Impeller.
3. Seal assembly.
4. Snap ring for seal assembly.
5. Gasket for housing.
6. Water pump flange.
7. Slinger ring.
8. Shaft and bearing assembly.
9. Snap ring.
10. Hub for fan pulley.
11. Allen set screw.
12. Pulley.
13. Lockwasher.
14. Capscrew.
15. Fan

WATER PUMP:

To disassemble the pump, the following procedure should be followed:

1. Remove the radiator and fan belt.
2. Remove the nuts holding the pump body to the front end of the motor block, and the pump can be removed as an assembly.
3. Remove the bolt from the impeller hub and pull the impeller off the shaft. Do not pound or drive on the pump shaft when removing any of the parts or you will damage the carbon disc seal. Always use a puller.
4. Remove the snap ring (No. 4) and the seal assembly can be removed from the impeller hub.
5. If it is necessary to remove the shaft, remove the "Allen" set screw, No. 11, and pull the fan pulley off the shaft. Always use a puller.

6. Remove the snap ring (No. 9) and the shaft and bearing assembly can be pressed out of the pump body toward the front end.

To re-assemble, reverse the foregoing procedure.

If a water leak develops, it is more than likely that the seal has become worn or damaged and should be replaced.

To replace the seal only, follow instructions 1 to 4 inclusive. It will not be necessary to remove the fan or fan pulley.

When installing the seal on the shaft, use thick soap suds on the rubber seal and on the shaft to lubricate the parts while assembling. This will help to prevent damage to the rubber seal.

The pump requires no lubrication. The bearings are of the permanently sealed type and are packed with special lubricant at the factory for the life of the bearing. When the bearings show signs of looseness they must be replaced.

FAN BELT:

Loosen generator adjusting bolts and pull out on the generator with hand until fan belt is snug. Tighten adjusting bolt to hold generator in new position. Under no circumstances should the fan belt be tightened by moving the generator with a pry bar.

The Fan Belt is to be adjusted just tight enough so that it can be deflected about three-quarters to one inch as shown in Plate No. 17.

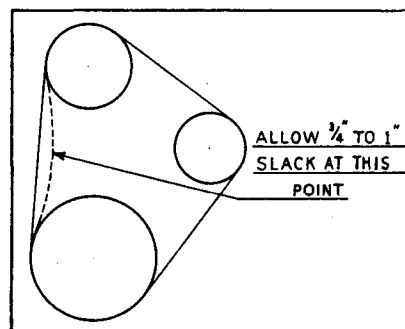


PLATE NO. 17 - CORRECT FAN BELT TENSION

ENGINE TUNE UP

ENGINE TUNE-UP:

For best performance and dependability, the engine should have a periodic tune-up every 200 hours of operation.

The following procedure is recommended when performing this operation.

1. Remove the spark plugs and clean. Adjust the electrodes to .025 gap. This adjustment should be made preferably with a round gauge instead of a flat type thickness gauge. The round type will, in most instances, give a more accurate setting.
2. Check battery terminals on battery posts and ground cable where it is attached to the tractor. Clean all of these thoroughly and keep them tight.
3. Remove distributor cap and inspect breaker points. Set gap to .020".
4. Check ignition timing. Be sure it is properly set after making any adjustment to the breaker points.

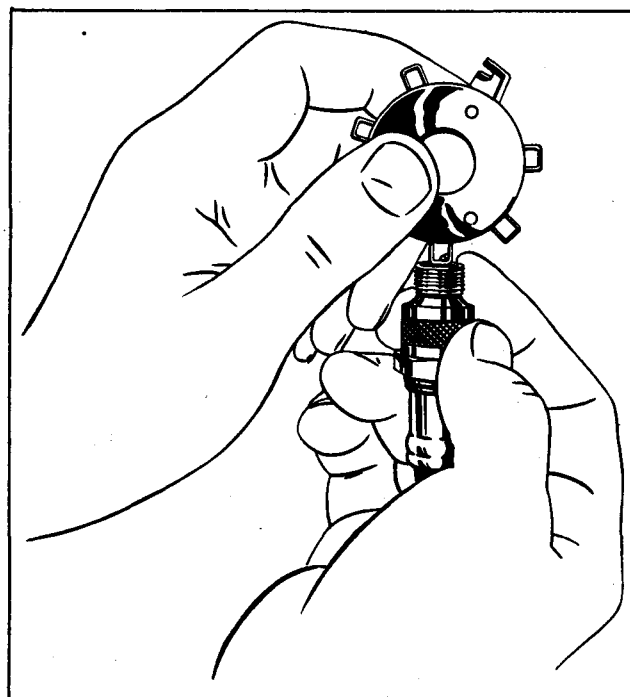


PLATE NO. 18 - SPARK PLUG GAP

5. Check valve tappets. Adjust clearance on intake to .014 and exhaust to .014. Hot setting.
6. Set carburetor float level as outlined in carburetor instructions.
7. Start engine and let it warm up thoroughly and adjust idling screw so that engine will idle smoothly.

ENGINE TROUBLES AND CAUSES

Poor Fuel Economy:

Ignition Timing Slow or Spark Advance Stuck.
Carburetor Float High.
Gasoline Leakage.
Low Compression.
Valves Sticking.
Spark Plugs Bad.
Weak Coil or Condenser.
Improper Valve Tappet Clearance.
Carburetor Air Cleaner Dirty.
Clogged Muffler or Bent Exhaust Pipe.

Lack of Power:

Low Compression.
Ignition System (Timing Late).
Improper Functioning Carburetor.
Gasoline Lines Clogged.
Air Cleaner Restricted.
Engine Temperature High.
Improper Tappet Clearance.
Sticking Valves.
Valve Timing Late.
Leaky Gaskets.
Muffler Clogged.
Bent Exhaust Pipe.
Old Gasoline.

Low Compression:

Leaky Valves.
Poor Piston Ring Seal.
Sticking Valves.
Valve Spring Weak or Broken.
Cylinder Scored or Worn.
Tappet Clearance Incorrect.
Piston Clearance Too Large.
Leaky Cylinder Head Gasket.

Burned Valves and Seats:

Sticking Valves or Too Loose in Guides.
Improper Timing.
Excessive Carbon Around Valve Head and Seat.
Overheating.
Valve Spring Weak or Broken.
Valve Tappet Sticking.
Valve Tappet Screw Clearance Incorrect.
Clogged Exhaust System.

Valves Sticking:

Warped Valve.
Improper Tappet Clearance.
Carbonized or Scored Valve Stems.
Insufficient Clearance Valve Stem to Guide.
Weak or Broken Valve Spring.
Valve Spring Cocked.
Contaminated Oil.

Overheating:

Defective Cooling.
Thermostat Inoperative.
Improper Ignition Timing.
Improper Valve Timing.
Excessive Carbon Accumulation.
Fan Belt Too Loose.
Clogged Muffler.
Oil System Failure.
Scored or Leaky Piston Rings.

Popping-Spitting-Detonation:

Improper Ignition.
Improper Carburetion.
Excessive Carbon Deposit in Combustion Chambers.
Poor Valve Seating.
Sticking Valves.
Broken Valve Spring.
Tappets Adjusted Too Close.
Spark Plug Electrodes Burnt.
Water or Dirt in Fuel.
Clogged Lines.
Improper Valve Timing.

Excessive Oil Consumption:

Piston Rings Stuck in Grooves, Worn or Broken.
Piston Rings Improperly Fitted or Weak.
Piston Ring Oil Return Holes Clogged.
Excessive Clearance, Main and Connecting Rod Bearings.
Oil Leaks at Gaskets or Oil Seals.
Excessive Clearance, Valve Stem to Valve Guide (Intake).
Cylinder Bores Scored, Out-of-Round or Tapered.
Too much Clearance, Piston to Cylinder Bore.
Misaligned Connecting Rods.
High Speeds or Temperature.

Bearing Failure:

Crankshaft Bearing Journal Out-of-Round.
Crankshaft Bearing Journal Rough.
Lack of Oil.
Oil Leakage.
Dirty Oil.
Low Oil Pressure or Oil Pump Failure.
Drilled Passages in Crankcase or Crankshaft Clogged.
Oil Screen Dirty.
Connecting Rod Bent.

ELECTRICAL SYSTEM

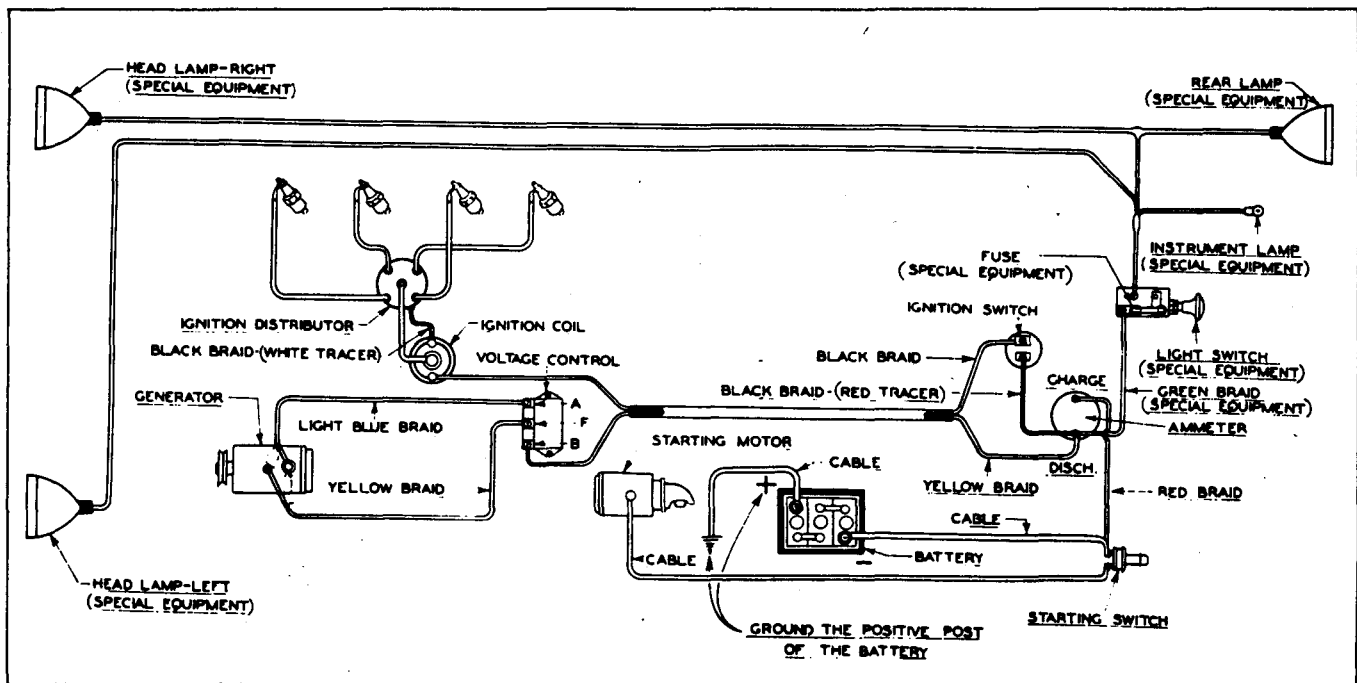


PLATE NO. 19 - WIRING DIAGRAM

The electrical system on this tractor consists of the distributor assembly, induction coil, spark plugs, cables, generator, regulator unit, starter, two switches, ammeter and battery.

Lights can be furnished as extra equipment.

DISTRIBUTOR: AUTO-LITE.

The distributor is driven by a spiral gear on the camshaft. It requires lubrication each 60 hours. Adding a few drops of light engine oil in the oiling cup will be sufficient. Wipe the distributor cam with a very small portion of vaseline or engine oil. The rotation of the rotor (No. 12) is counter-clockwise or toward the left.

BREAKER POINTS

The breaker point gap is to be adjusted to .020". Make this adjustment accurately. The tension of the breaker arm spring should be adjusted to require 14 ounces pull to open the points. The hole in the end of the breaker arm spring is slotted to make this adjustment. Keep the points free from oil or grease and clean or polish the points every 200 hours. When points become pitted or rough, they must be ground or honed smooth. After points have been ground once, they should be replaced when becoming

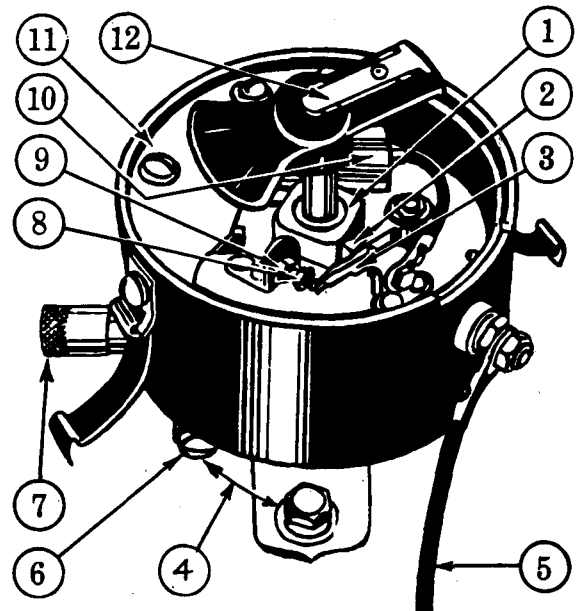


PLATE NO. 20 - DISTRIBUTOR

1. Cam.
2. Breaker rubbing lock.
3. Breaker arm.
4. Timing adjustments.
5. Cable distributor to coil.
6. Clamp or adjusting bolt.
7. Oil cup.
8. Stationary breaker point.
9. Point adjusting screw.
10. Condenser.
11. Dust Proof Cover.
12. Rotor.

"44" MASSEY-HARRIS TRACTORS "44K"

rough again. If the points get rough or pit quickly, it indicates that the condenser (No. 10) is defective or is not making good contact at its ground, or wire connection. As the electric current through the condenser is very low, the ground connection and wire connection must be very clean in order to carry this low current.

DISTRIBUTOR CAP:

The distributor cap should be inspected for cracks, carbon runners, evidence of arcing, and corroded high-tension terminals. If any of the above conditions exist, the cap should be replaced.

ROTOR:

Inspect the rotor for cracks. Inspect the end of the metal strip for excessive burning.

After considerable use the end of the metal strip will become burned. If burning is found on top of the metal strip, it indicates that the rotor is too short and should be replaced.

Usually when this condition is found, the distributor cap segment will be burned on the horizontal face, and the cap should also be replaced.

SPARK PLUGS:

The spark plug size is 18 M.M. The setting of the spark plug point gap is .025, check with a gauge and adjust accurately. Check and clean the plugs frequently, especially if the engine is hard to start.

The heat range of the plugs is of comparatively medium range. When replacing the plugs, they should have a heat range comparable to Champion No. 8 Com. plugs. If the points of the plugs deteriorate rapidly, or the tip of the porcelain chips or cracks, it indicates that the plug is too "hot". If the plug fouls frequently or the points are black or sooty, it indicates that the plug is too "cold". However, a carburetor mixture that is too lean will make a plug that is correct appear too "hot" and a mixture that is too rich will make a correct plug appear too "cold".

When installing spark plugs, be sure there is a round copper gasket between the base of the plug and the cylinder head and that the plug is tight on the gasket, as this gasket carries the heat from the plug. If the gasket is pressed quite thin, use a new gasket. Replace the spark plugs every 250 hours, and the engine will use less fuel and have more power.

Proper torque wrench tension 40 foot pounds.

CABLES:

Occasionally check the spark plug cables and the cable from the distributor to the coil. See that the cable terminals set snugly in the distributor cap sockets, and that there are no cracks in the insulation, also keep the top of the distributor cap and cables clean. When the insulation on the cables becomes hard and cracked, the cables should be replaced. The size of the cable is 7 M.M. or #1 Brown and Sharpe Gauge.

IGNITION TIMING:

Firing order, 1 - 3 - 4 - 2.

BE SURE BREAKER POINTS ARE CAREFULLY AND ACCURATELY ADJUSTED AND IN GOOD CONDITION.

TIMING PROCEDURE:

1. Remove distributor cap.
2. Remove the inspection hole cover from flywheel housing opening located below the air cleaner body on front face of flywheel housing. Bring No. 1 piston up on compression stroke until "Dead Center" mark is even with the pointer in the flywheel housing.

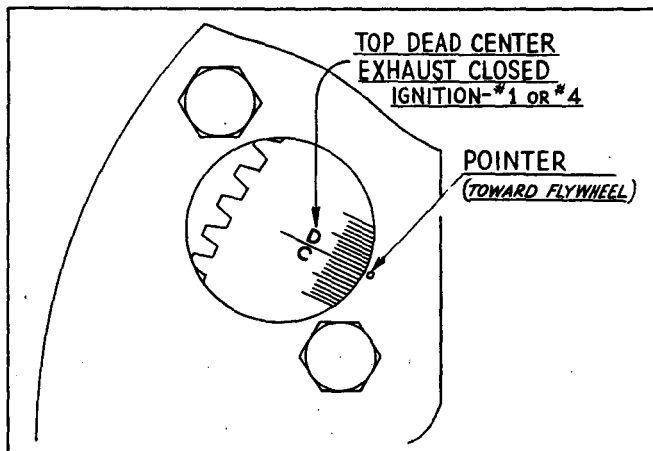


PLATE NO. 21 - FLYWHEEL MARKING

3. Loosen clamp or adjusting bolt (6) and turn the distributor body to the left counter-clockwise as you look down on it. Turn the distributor body far enough to make sure that the points are closed. Turn the rotor (12) to the right (or clockwise) so that all back-lash is taken up.
4. Turn the ignition switch (No. 4, Plate 1) to the "ON" position.

5. Disconnect the ignition cable that leads from the center of the distributor cover to the spark coil. (Disconnect it at the distributor). Hold the end of the cable very close to some metal part of the engine and at the same time turn the distributor clockwise until a spark occurs at the end of the cable just disconnected. Set the distributor at the exact point where the spark occurs by tightening the clamp screw (6).
6. Replace distributor cover and reconnect ignition cable.
7. Check the accuracy of the above setting by removing cables from No. 1 spark plug and hold it very close to some metal part of the engine. With the ignition switch still "ON" turn the flywheel backward about 1/8

of a turn, or until ammeter on instrument panel shows "discharge". Then turn very slowly forward until a spark occurs at the end of the disconnected cable, or until the exact instant that the hand on the ammeter returns to "Zero" or "0". If the "DC" mark is even with the pointer when the spark occurs, the timing is correct.

A "glow lamp" provides an accurate method of checking the ignition timing while the engine is running at governed speed or at cranking speed. When the "glow lamp" is properly connected, it will light up when the spark occurs. Then by holding the "glow lamp" close to the inspection hole, the pointer in the inspection hole for the flywheel will show the firing time in relation to the timing marks on the flywheel.

GENERATOR

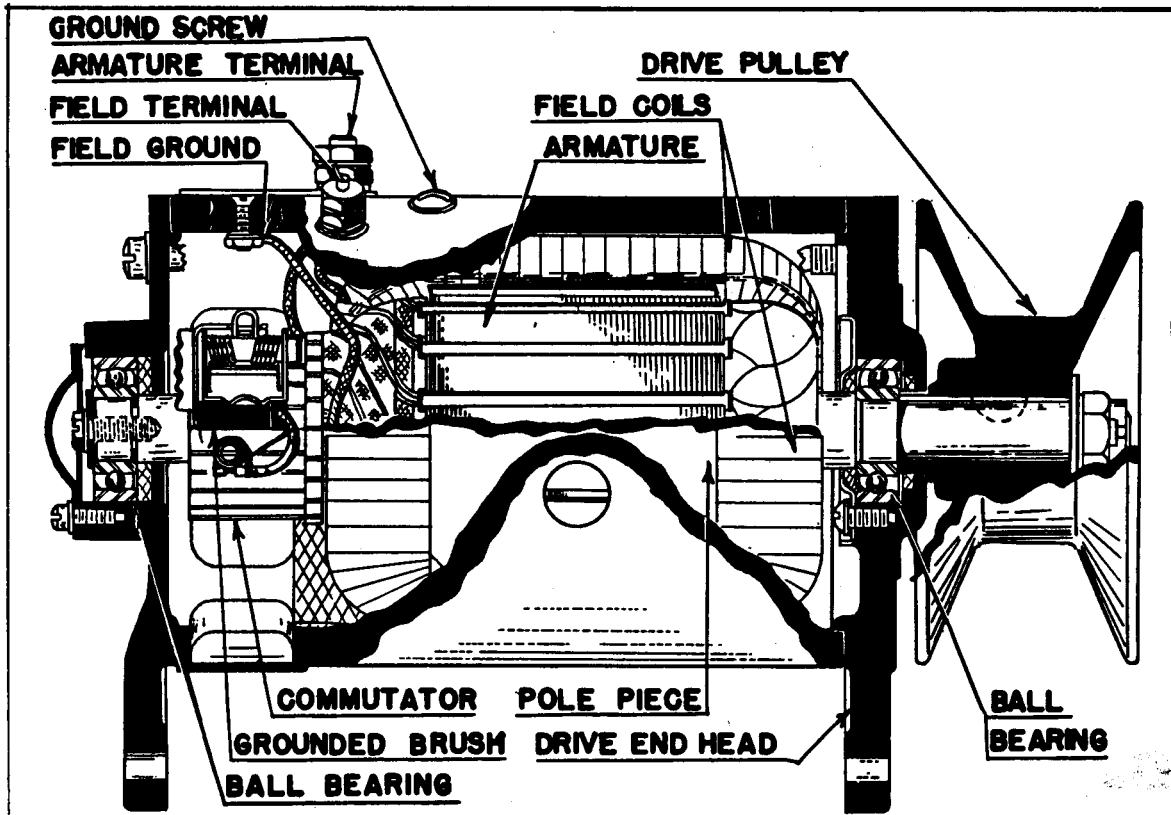


PLATE NO. 22 - GENERATOR

GENERATOR: Auto-Lite.

A periodic inspection should be made of the charging circuit. Inspection should be made once every 500 hours of operation. In extremely dusty conditions every 250 hours.

Operating in dusty conditions has a greater tendency to wear out the brushes, commutator, and also the bearings.

If the commutator is dirty or discolored, it can be cleaned by holding a narrow strip of

No. 00 sand paper on it with the finger while running the generator slowly.

Carefully blow the sand out of the generator after cleaning the commutator.

BEARINGS:

If the bearings are loose they must be replaced to keep the armature from striking the pole shoes in the generator.

"44" MASSEY-HARRIS TRACTORS "44K"**BRUSHES:**

If the brushes are worn down to 1/2 their original length, they should be replaced. The proper brush tension is 35 to 53 ozs. with new brushes.

When replacing brushes, they must slide freely in the brush holders. If they are tight in the holders, they must be sanded off so they slide freely.

A good surface contact on the commutator is also necessary. This can be done by placing a strip of No. 00 sandpaper around the commutator with sanded side toward the brush and drawing it back and forth under the brush. The spring tension on the brush will hold it down so the brush will be sanded to the proper fit. Blow the sand and carbon dust out of the generator when finished.

ARMATURE:

If the armature is rough or worn down, it must be turned down in a lathe. After turning a commutator to true it up, it is also necessary to undercut the mica insulation 1/32" below the surface of the commutator segments.

For general overhauling of the generator, it is usually best to take it to an authorized Auto-Lite repair shop or your Massey-Harris dealer.

REGULATOR UNIT: Auto-Lite.

The regulator unit is mounted on the tractor in the compartment under the fuel tank near the steering gear shaft.

This unit consists of a circuit breaker, a voltage regulator, and a current limit regulator.

The circuit breaker automatically closes the circuit between the generator and battery when the generator voltage rises above that of the battery, and automatically opens the circuit when the generator voltage falls below that of the battery.

The regulator unit terminals are marked and care should be used when making the connections, or serious damage may result.

The voltage regulator controls the generator voltage and will not allow it to rise above a value determined by the regulator setting. This will prevent overcharging the battery.

The current limiting regulator controls the maximum generator output and does not allow the output to exceed the value determined by the current regulator setting. This prevents damage to the generator due to an overload.

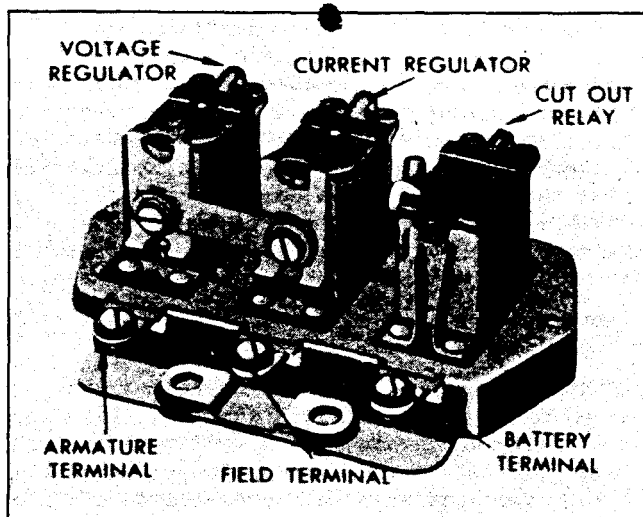


PLATE NO. 23 - VOLTAGE REGULATOR

The regulator unit requires no attention in the field and if trouble develops the best thing to do is to remove the unit and take it to an authorized Auto-Lite repair shop or your Massey-Harris dealer for repairs or adjustment. To properly adjust these units requires special test equipment.

TO CHECK REGULATOR:

1. A fully charged battery and a low charging rate indicate normal operation of the regulator unit. Check the battery with a hydrometer to see if it is fully charged.
2. To check the regulator the following procedure should be followed to find out whether the generator, or regulator is at fault.
3. Push in on the starter switch and roll the engine for 30 seconds with the ignition switch off. Then start the engine and note carefully the charging rate on the ammeter when the engine is running at about half throttle. This will indicate approximately the charging rate for which the regulator is set. As soon as the generator has replaced the current in the battery which was consumed in the cranking process, the voltage regulator, if operating properly, will taper the output down to 4 or 5 amperes in a reasonably short time.

A fully charged battery and a high charging rate:

Disconnect the field wire from the field terminal of the regulator. This opens the generator field circuit and the generator current should immediately drop off. If it does not drop off, the generator wire and the field wire are shorted together in the wiring harness between the regulator unit and the generator.

if the output drops off to zero on the ammeter. the trouble has been traced to the current regulator.

Remove the regulator and have it repaired or replace it with a new unit.

A low battery and a low or no charging rate:

Check the entire generator wiring circuit for loose connections, corroded battery terminals, loose or corroded ground straps.

High resistance resulting from the above conditions will prevent a normal generator charge from reaching the battery and will quite often cause burned distributor points and burned out light bulbs when in use.

With the engine running at 1/3 speed, connect the two wire terminals on the generator together with a jumper wire, then increase the engine speed and note carefully if the generator output increases. If the output increases the regulator requires attention. If the current does not increase, the trouble is in the generator.

If the generator does not show any output at all, either with or without jumper wire on the generator terminals, take a screw driver and short the generator terminal to the generator case with the engine running about 1/2 throttle. If a spark is seen when the ground is first made it indicates that the circuit breaker in the regulator unit is not making contact and the unit should be removed and repaired or replaced with a new unit. If there is no spark when terminal is first grounded, the generator is not working and should be removed and repaired.

STARTING MOTOR: Auto-Lite.

The starting motor is very similar in construction to the generator. The design of the parts are different because of the larger volume of current handled for short intervals.

The starting motor requires very little attention except for periodic inspection of the brushes and commutator. Keep the terminal connections clean and tight.

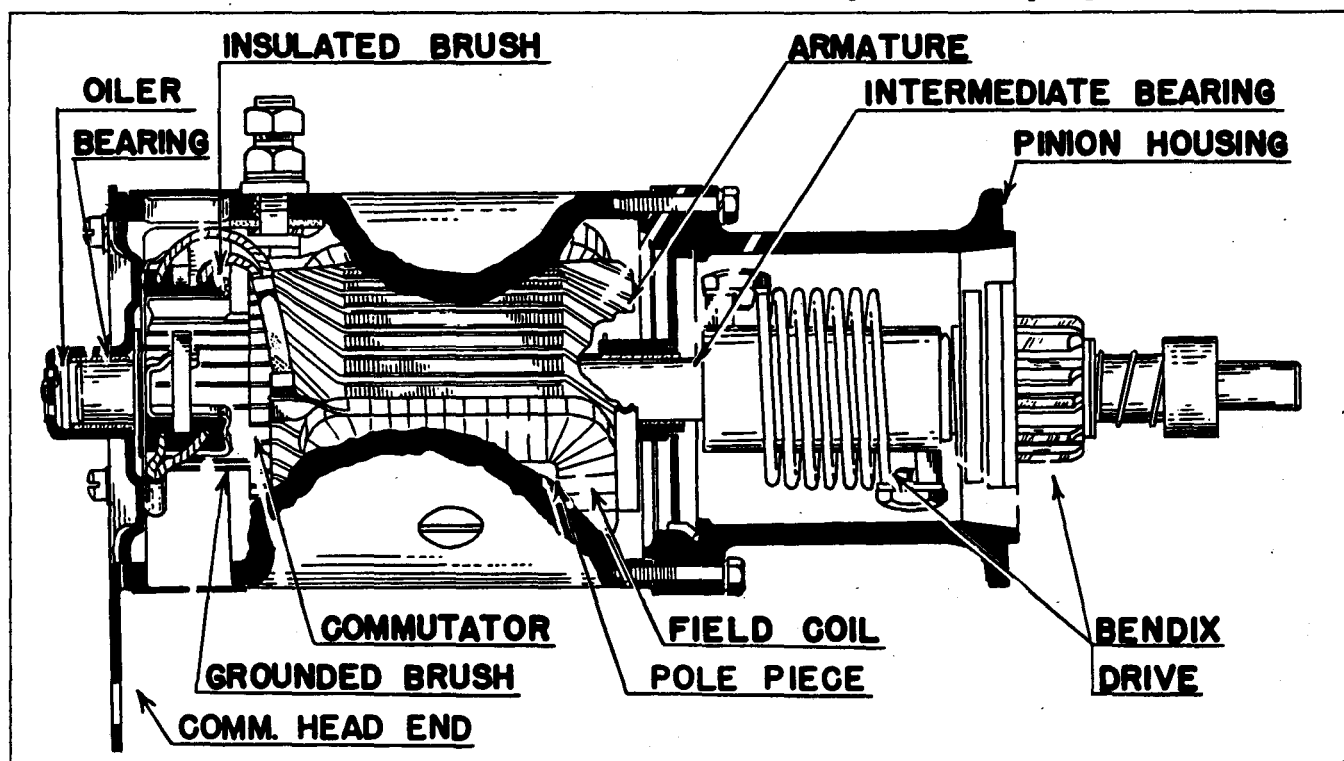
The torque wrench tensions on the mounting screws is from 20 to 25 ft. lbs.

Check the commutator for wear or discoloration. If it is dirty or slightly burned, it can be cleaned with No. 00 sand paper. Blow out the sand after cleaning the commutator. If the commutator is rough or worn, remove the armature and have it turned down in a lathe. Do not undercut the mica insulation between the segments on the commutator.

BRUSHES:

Brushes should slide freely in the holders and must make full contact on the commutator. This contact can be obtained by placing a strip of No. 00 sand paper around the commutator with the sanded side toward the carbon brush and rocking the armature back and forth several times until the brush will fit properly. Blow out the sand and carbon particles when finished.

The brush spring tension on new brushes should be from 35 to 53 ozs. To take this reading, hook a scale under the end of the brush spring and pull straight away from the brush and read the scale just as the spring leaves the brush.



ELECTRICAL TROUBLES AND REMEDIES

SYMPTOMS

PROBABLE REMEDY

Battery Discharged:

Short in Battery Cell	Replace Battery
Short in Wiring	Check Wiring Circuit
Generator Not Charging.	Inspect Generator and Fan Belt
Loose or Dirty Terminals.	Clean and Tighten
Excessive Use of Starter.	Tune Engine
Excessive Use of Lights	Charge Battery

Generator:

Low Charging Rate--

Dirty Commutator.	Clean Commutator
Poor Brush Contact.	Repair or Install New Brushes
Voltage Regulator Improperly Adjusted	Have it Adjusted
High Resistance in Charging Circuit	Clean and Tighten Terminals
Loose or Dirty Terminals.	Clean and Tighten

Too High Charging Rate--

Current Regulator Improperly Adjusted	Have it Adjusted
Short in Armature	Replace

Starting Motor:

Slow Starter Speed--

Discharged Battery or Shorted Cell.	Recharge or Repair
Ground Strap to Frame	Clean Terminals and Tighten
Loose or Dirty Terminals.	Clean and Tighten
Dirty Commutator.	Clean with No. 00 Sandpaper
Poor Brush Contact.	Repair or Install New Brushes
Worn Bearings	Replace
Burned Starter Switch Contacts.	Replace Switch

Distributor:

Hard Starting--

Distributor Points Burned or Pitted	Clean Points or Replace
Breaker Arm Stuck on Pivot Pin.	Clean and Lubricate
Breaker Arm Spring Weak	Replace
Points Improperly Adjusted.	Adjust .020"
Spark Plug Points Improperly Set.	Adjust .025"
Spark Plug Wire Terminals in Distributor Cap Corroded	Clean
Loose Terminals	Check Circuit
Loose or Dirty Terminals -- Ground Strap to Frame	Clean and Tighten
Condenser Defective	Replace
Improper Ignition Timing.	Set Timing

CLUTCH ASSEMBLY

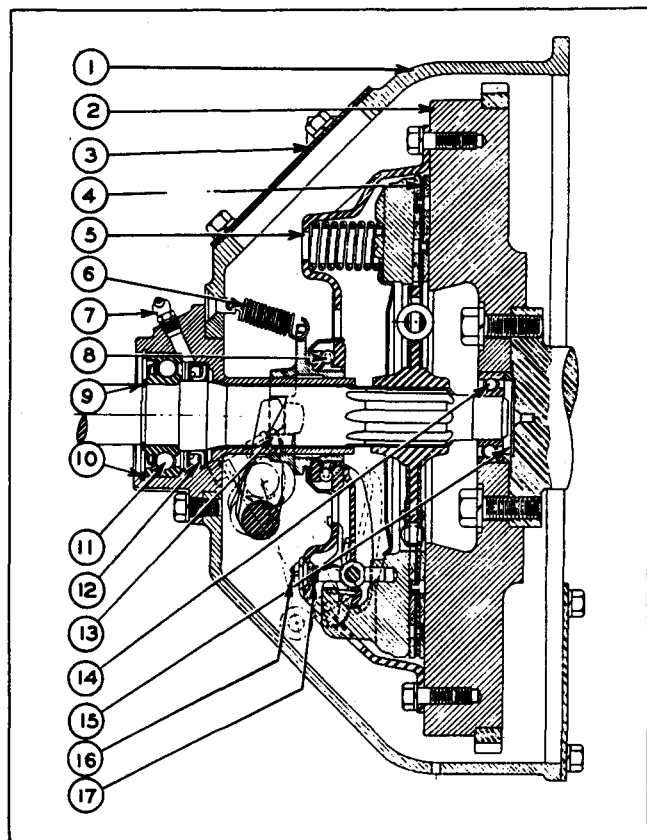


PLATE NO. 25 - CLUTCH ASSEMBLY

- | | |
|---|---|
| 1. Clutch housing. | 10. Snap ring - bearing to housing. |
| 2. Flywheel. | 11. Bearing for clutch shaft. |
| 3. Inspection cover. | 12. Oil seal. |
| 4. Clutch disc facings. | 13. Clutch release fork. |
| 5. Clutch pressure plate. | 14. Bearing - pilot (in flywheel) |
| 6. Spring - release bearing return. | 15. Spacer for bearing in flywheel |
| 7. Grease fitting for clutch shaft bearing. | 16. Pressure plate adjusting bolt. |
| 8. Bearing - clutch release. | 17. Pressure lever adjusting bolt lock nut. |
| 9. Snap ring - bearing to shaft. | |

The clutch in this tractor is a single plate dry disc type with ample capacity for transmitting the full power of the engine.

As the clutch facings wear, the release levers move outward toward the release bearing. In time the clearance would disappear and the clutch would not fully engage. To prevent this, adjust the clutch pedal linkage by removing the pin at the lower end of the clutch pedal, loosen lock nut No. 2, Plate No. 26, and screw the clevis No. 3, Plate No. 26, out on the rod until the proper clearance is obtained. The proper clearance is present when the pedal pad can be moved not less than one inch (1") before resistance (other than the pull-back spring) is felt. To prevent the clutch pedal from going

forward far enough to cause the clutch to drag, adjust stop screw No. 19, Plate No. 26, so that there is approximately 1/2" clearance between the head of the screw and the transmission housing when the clutch reaches the point of release.

The clutch release bearing is a permanently lubricated bearing, packed in special lubricant when assembled and needs no further lubrication.

Never use the clutch pedal as a foot rest. Use it only for starting and stopping and for shifting gears.

If it becomes necessary to remove the clutch facings, the clutch disc can be removed and a new disc and facings installed or new facings replaced on the original disc. If the facings are replaced on the original disc, drill out the rivets. Do not punch them out as that will damage the disc and the cushion springs. Care must be taken when installing new facings to see that the clutch cushion springs and disc are not bent from their original position.

DO NOT ALLOW ANY GREASE OR OIL TO COME IN CONTACT WITH THE FRICTION SURFACES OF THE CLUTCH.

Even greasy hands touching the surface can transfer enough grease to the friction surfaces to create a glazed surface on the clutch facing.

TO DISASSEMBLE THE CLUTCH:

1. Disconnect clutch pedal.
2. Uncouple flexible coupling on shafts between clutch housing and transmission.
3. Remove radiator, hood and fuel tank. Disconnect throttle rod, starter and generator cables, oil pressure line and temperature gauge line. Move engine forward.
4. Remove the three cap screws holding the bearing retainer plate on the rear end of the clutch housing.
5. Slide clutch drive shaft backward out of clutch housing.
6. Remove clutch housing.
7. Mark clutch assembly and flywheel so it can be installed in the same position. Remove the eight cap screws holding the clutch cover to the flywheel. Loosen these screws in sequence, a little at a time, and the clutch pressure plate assembly can be taken off.

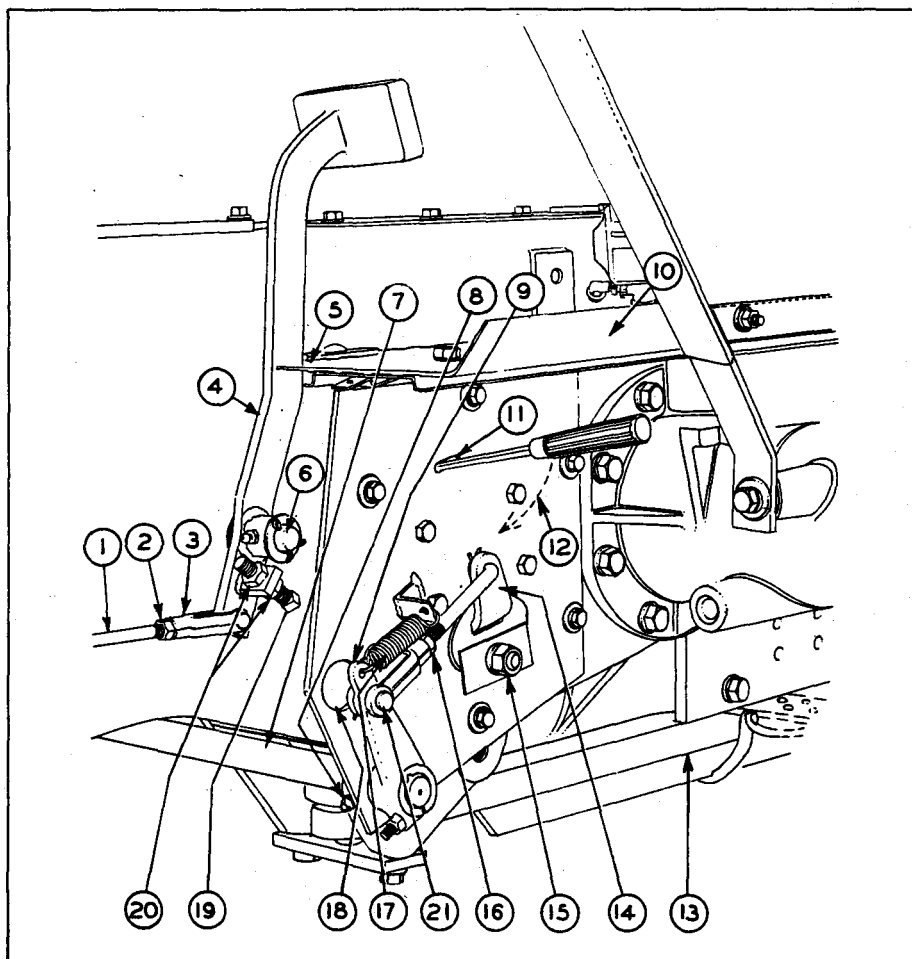
"44" MASSEY-HARRIS TRACTORS "44K"

PLATE NO. 26 - CLUTCH AND BRAKE PEDAL ASSEMBLY

1. Clutch shifting rod.
2. Clutch shifting rod end nut.
3. Clutch shifting rod clevis.
4. Clutch pedal.
5. Clutch pedal stop.
6. Clutch pedal pivot shaft.
7. Brake pedal cross shaft.
8. Brake cross shaft grease fitting.
9. Brake pedal shaft arm.
10. Foot board.
11. Slotted hole for adjusting.
12. Engage screw driver in star wheel and move downward toward center of brake drum to tighten.
13. Drawbar.
14. Cam lever.
15. Anchor pin.
16. Brake linkage (do not use to adjust brake shoes).
17. Return spring.
18. Hole for bearing (Model 55 brake mounting).
19. Clutch pedal stop screw.
20. Lock nuts-clutch pedal stop screw.
21. Brake linkage pin.

TO ASSEMBLE THE CLUTCH:

1. BE SURE NO GREASE, OIL, OR DIRT is on the face of the flywheel, pressure plate, or disc facings.
2. Place clutch disc and clutch cover assembly against the face of the flywheel with the offset or reinforcing plate on the clutch disc away from the flywheel or to the rear. (Note your cover and flywheel marks).
3. Clean the clutch drive shaft and push it back in place being sure that the release bearing and sleeve are in place. It may take a little patience to get the splines on the shaft lined up with the splines on the disc hub.
4. Replace the eight cap screws holding the cover assembly to the flywheel. Tighten the screws a little at a time so that the cover will pull up evenly without distortion.
5. Replace the clutch housing and bearing retainer plate on the rear of the housing. Tighten the cap screws.
6. Make sure that all screws are secure and set the engine in place.

7. Hook up linkage and make necessary pedal adjustments. Be sure all pins and keys are in place.
8. Connect flexible joining coupling.

CAUTION: Do not disturb setting of pressure lever adjusting bolts or lock nuts Nos. 16 and 17, Plate No. 25. This is a fixed setting and requires special fixtures to adjust them.

Clutch chatter, grabbing or slippage in most cases is caused by one or more of the following:

1. Incorrect adjustment of rod to clutch pedal.
2. Clutch may have been installed with oil on disc facings or pressure plate.
3. Oil leaking from rear main bearing.
4. Broken clutch disc facings or pressure plate.
5. Weak pressure plate springs.
6. Incorrect adjustment of the release levers.
7. Clutch plate hub sticking on clutch shaft.

DO NOT OPERATE A TRACTOR WITH A FAULTY CLUTCH. It is dangerous and destructive.

STEERING GEAR

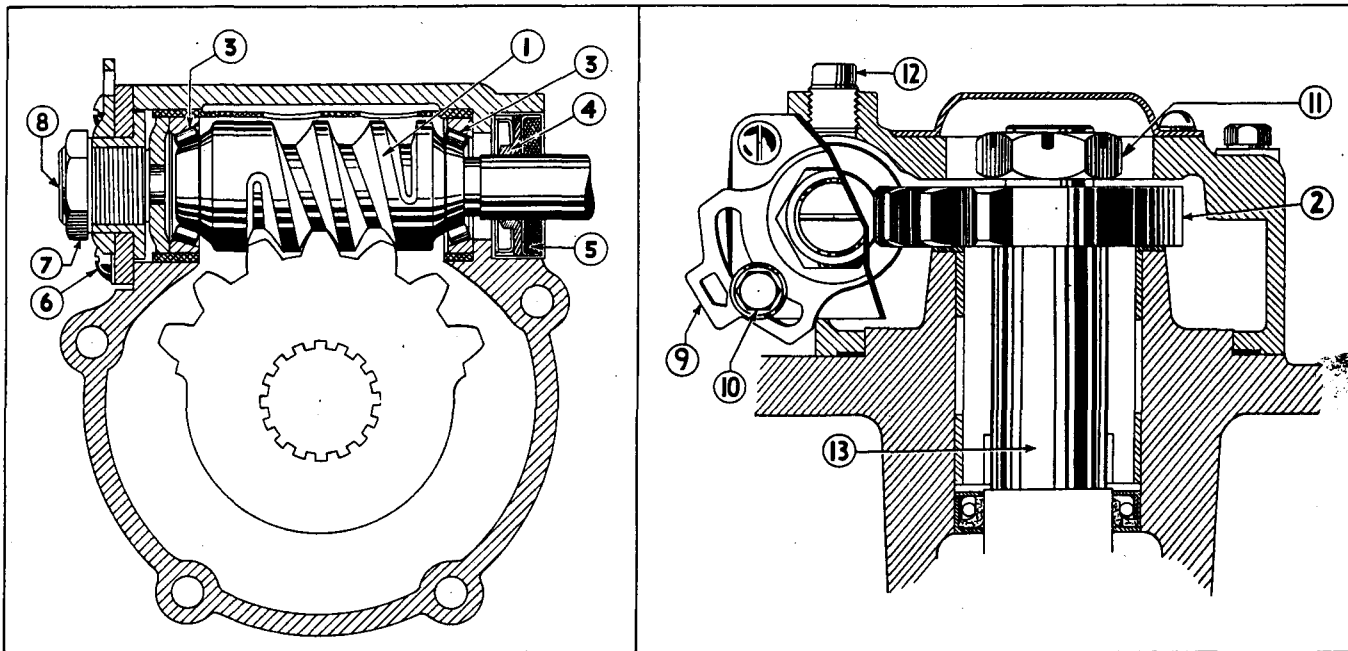


PLATE NO. 27 - TOP AND FRONT VIEWS OF THE STEERING GEAR

- | | |
|----------------------------------|-----------------------------------|
| 1. Steering worm gear and shaft. | 8. Worm gear, adjusting screw. |
| 2. Steering sector gear. | 9. Lash adjuster. |
| 3. Worm gear bearings. | 10. Lash adjuster lock nut. |
| 4. Worm gear leather seal. | 11. Sector gear retaining nut |
| 5. Worm gear felt seal. | (row crop model only). |
| 6. End cover bolts. | 12. Lubricant filler plug. |
| 7. Adjusting screw locknut. | 13. Steering gear pedestal shaft. |

STEERING GEAR:

A worm and sector type steering gear is used. All working parts are enclosed and operate in a bath of oil. Oil level may be checked by removing the plug (No. 12, Plate No. 27), on the top of the worm gear housing. This should be filled so that the worm gear is covered with a good steering gear lubricant not heavier than a SAE 140. Do not use ordinary grease or any lubricant that will tend to "channel" or harden in cold weather. If the tractor steers too hard in winter, change to a lighter weight lubricant, or thin the lubricant by adding 1/4 pint of kerosene. At least a seasonal check should be made as to the amount of lubricant in the housing and its quality. If, in any event, dirt or other foreign matter has gotten into and mixed with the lubricant, remove all old lubricant, wash out housing and refill with new lubricant.

SERVICE ADJUSTMENTS:

Before making any final adjustments on the steering gear assembly, be sure that all parts that might bind or cause a drag have been lubricated properly. The front end of the tractor

should be raised off of the ground, so as not to have any steering load on the steering gear. In the "Standard" model tractor, the steering draglinks may be disconnected while adjusting the steering gear.

TO REMOVE EXCESSIVE PLAY DUE TO A WEAR-ING OF THE SECTOR GEAR (NO. 2) AND THE WORM (NO. 1):

1. Place front wheels in a "straight forward" steering position.

NOTE: THIS IS VERY IMPORTANT, AS IT IS ONLY IN THIS ONE POSITION THAT THERE SHOULD BE NO BACK-LASH BETWEEN THE SECTOR GEAR AND THE WORM.

2. Loosen lash adjuster lock nut (No. 10, Plate No. 27) ABOUT 1/2 turn.
3. With a soft hammer tap lightly on lash adjuster (No. 9, Plate No. 27) to turn it in the direction of the arrow. Adjuster should not be moved more than 1/16" at a time with relation to bolt 10. This adjustment must not be too tight or damage to gear will result. Preferably 1-1/2 to 2-1/2 lbs. of pull should turn steering gears when measured on the rim of the steering wheel.

"44" MASSEY-HARRIS TRACTORS "44K"**CAUTION:**

Remove back-lash with wheels in the straight forward position only. There will be back-lash when wheels are turned in any other direction.

REMOVAL AND INSTALLATION OF THE STEERING GEAR ASSEMBLY:

The steering gear assembly can be removed from both the Standard and the Row Crop model as a unit.

1. Raise and support front end of tractor securely.
2. Drive pins out of lower universal joint on steering rod and drive towards the steering wheel end as far as it will go.
3. On the "Standard" model tractor, loosen drag links and drop axle by removing pivot pin. This will allow for sufficient room to take unit out downward. On the "Row Crop" model the entire pedestal can be removed.
4. Remove the six bolts holding steering gear housing to frame.
5. Remove steering gear by tilting it and removing it downward.

ASSEMBLING AND DISASSEMBLY OF THE STEERING GEAR MECHANISM:

1. The worm gear and housing can be removed from the assembly by loosening the four cap screws on the top of the assembly.
2. The sector gear is removed by loosening the retaining nut (No. 11, Plate No. 27) in the "Row Crop" model. In the "Standard" model tractor, this gear can be removed after removing the worm gear housing as outlined in step one above. After the steering arm is removed.
3. If, upon removal of the worm gear, or upon replacing any parts in the worm gear assembly, there is too much end play in the worm gear and shaft, remove it as follows:

- A. Tighten end cover bolts (No. 6, Plate No. 27).
- B. Loosen lock nut (No. 7, Plate No. 27).
- C. Turn adjusting screw (No. 8, Plate No. 27), clockwise as far as possible without stiffening the action of the worm while turning through its entire range.
- D. Tighten lock nut securely (No. 7, Plate No. 27).

4. In assembling the steering gear it is necessary to match the slightly heavier tooth on the sector gear with the worm, when the worm is in its central position. To do this follow the steps outlined below:

- A. Place sector gear in its center position as shown in Plate No. 28. This can be checked by installing the two housing bolts near the worm end. Then place a straight edge ruler so that it touches the worm gear side of the bolts. Then line up the sector gear as shown in Plate No. 28.

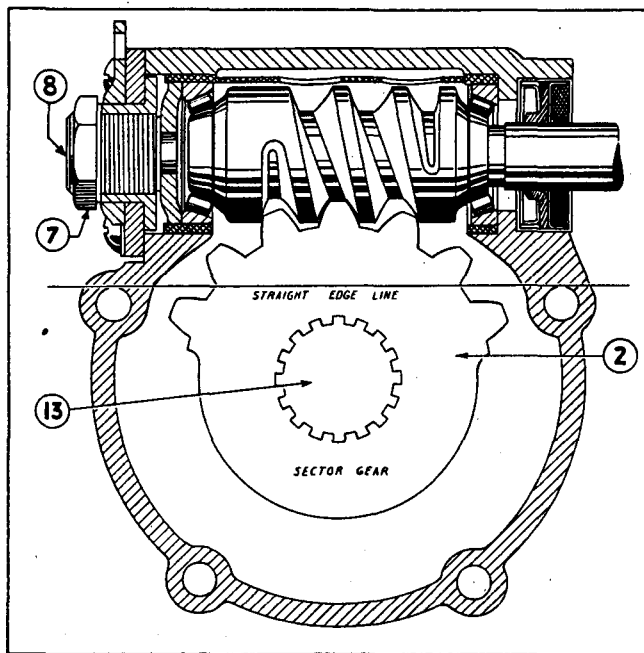


PLATE NO. 28

5. Without changing the sector gear position, mesh the center of the worm with the sector gear.
6. Bolt worm gear housing to the assembly and check steering range. When correctly installed there should be approximately 90° of travel from the center position in either direction.
7. Adjust back-lash as outlined under "Service Adjustments".

CARBURETOR AND MANIFOLD

CARBURETOR:

Plate No. 29 shows the construction of the Zenith Carburetor. The removable venturi No. 1 Plate No. 29, measures the volume of air which passes through the carburetor and has been carefully selected to give full economy and still conform to power requirements.

MAIN JET SYSTEM:

The main jet (2) often referred to as the "high speed jet", exerts its principal influence at the higher engine speeds. Fuel from the bowl is metered through the main jet (2) and discharged into the air stream at the point of greatest suction, in the secondary venturi (3) through the main discharge jet (4).

The main jet (2) determines the maximum amount of fuel which may be obtained for high speed operations. The main jet adjustment (8) reduces this amount if it is turned toward its seat. Ordinarily the main jet adjustment has no effect after it is three turns open.

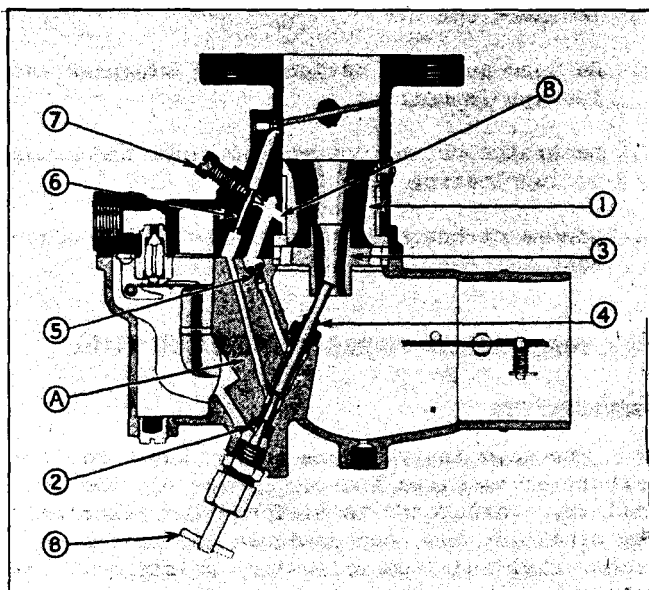


PLATE NO. 29 - CROSS SECTION OF CARBURETOR

- | | |
|------------------------|---------------------------|
| 1. Main venturi. | 6. Idling jet. |
| 2. Main jet. | 7. Idle adjusting needle. |
| 3. Secondary venturi. | 8. Main jet adjustment. |
| 4. Main discharge jet. | A. Fuel channel. |
| 5. Well vent. | B. Air channel. |

To set this adjustment, close the main needle valve by turning it to the right until the needle is seated (never force it against seat), and then open by turning it to the left for an approximate setting of 2 to 2-1/2 turns. Start the engine and put tractor to work under

a maximum load with the approximated needle valve setting. After the engine is thoroughly warmed up, turn the needle valve gradually to the right until the engine starts to lose power due to the lack of fuel. Then gradually turn in the opposite direction until the position is found where the engine speed will not increase with further increase in fuel. This adjustment should be carefully made to insure the best fuel economy.

IDLING SYSTEM:

The idling system consists of the idling jet (6) and the idle adjusting needle (7). The idling jet (6) receives its fuel from the main jet (2) through channel (A). The fuel is metered through the idling jet (6) and is mixed with air which is admitted, from behind the venturi (1), through channel (B). The idle adjusting needle (7) controls the amount of air which is admitted to the idling system. The idling system functions only at idling and low speeds. At these speeds, the throttle plate (10) is almost closed and there is a very strong suction past the edge of the throttle plate. This suction draws the mixture of fuel and air from the idling jet (6) which discharges into the air stream through the priming plug.

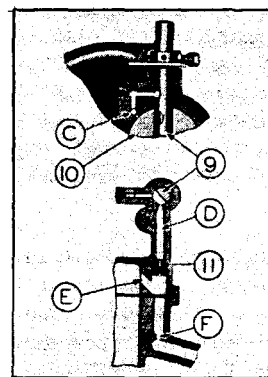


PLATE NO. 30 - THROTTLE SHAFT

ECONOMIZER SYSTEM:

To develop full power, a certain mixture of fuel and air is required. Under part load, a leaner mixture may be used and operating costs reduced. In the Zenith 62-Series carburetor, this is regulated automatically by the position of the throttle shaft.

Plate No. 30 shows the position of the throttle shaft (9) at closed throttle. At this point no suction is transmitted to the bowl, because the channel (C) is below the throttle plate (10), thus permitting a full flow of fuel through the idling system.

"44" MASSEY-HARRIS TRACTORS "44K"

When the throttle is opened sufficiently to bring the throttle plate (10) just below the channel (C), approximately 1/4 open, a strong suction acts through channels (D), (E) thus holding back the fuel in the bowl and causing a lean mixture through the part throttle operation. The suction is controlled by the economizer jet (11). The bowl ventilation from the intake of the carburetor is restricted at (F) thus preventing bowl ventilation from over-coming the suction from channels (C and D).

For full power operation, at wide open throttle, this suction is cut off, due to the position of the slot in the throttle shaft, and permits the full flow of fuel necessary for full power.

The air and fuel passages of the carburetor must be kept clean. The minutest particle of dirt or other foreign object lodged in a jet will retard if not stop the flow of fuel. For this reason, the carburetor must be kept perfectly clean at all times; also the greatest of care exercised in keeping the fuel clean.

Do not attempt to clean the jets with a wire or any kind of metal object. The jets are made of brass to prevent rust and corrosion and a wire would cut or ream the hole in the jet and ruin it for further use.

Another important item is the fuel level in the carburetor bowl. The amount of fuel flowing through the jets is naturally effected by the amount of fuel in the bowl. The float arm is to be adjusted (bent) so that the bottom edge of the float is 1-5/8" (+ or - 3/64") below the machined surface of the carburetor body when the fuel valve is closed. Bend arm midway between float valve and float. The proper fuel level is 29/32" from top edge of bowl.

After a considerable amount of use the holes in the jets, also the float valve and seat, become worn from the constant flow of fuel and the carburetor will not operate economically. When this occurs the carburetor should be overhauled by a competent carburetor service station.

If the carburetor is dismantled for cleaning or repairs, be sure the bowl gasket is tight and free from leaks.

Whenever it is necessary to replace any part of the float or fuel valve assembly it is advisable to replace the entire assembly.

Do not experiment with different sized jets other than regular equipment.

Adjust carburetor throttle stop screw to obtain proper idling speed with hand throttle control in idling position. Idling speed should be 450 R.P.M. Always make the idle adjustment

after the main jet valve adjustment and while engine is warm.

Approximate setting for the main jet adjustment is (2-5/8) rounds for gasoline and (3-1/4) rounds for low grade fuels. Approximate setting for the idle screw adjustment is (3/4) turn for gasoline and (1) turn for low grade fuels. Do not force the valves against the seats. Turn them in gently until the valves are seated and back out to the proper setting.

If the carburetor can not be adjusted to make the engine idle properly, it indicates that auxiliary fuel passage or jet is fouled, or that the fuel level in the bowl is not correct.

Excessive fuel consumption is not always the fault of the carburetor, therefore, as well as attempting to correct the carburetor, check the following:

1. Be sure the timing is correct.
2. Clean and inspect the distributor.
3. Check the spark plugs. Replace them if they have been in use 500 hours or more.
4. Check tire pressure and weights.
5. Be sure fuel strainer and lines are perfectly clean.
6. Be sure governor action is not sluggish and linkage is correct.
7. Determine octane content of fuel and grade of lubricating oils.
8. Remove carbon and grind valves if compression is poor.

MANIFOLD FOR LOW GRADE FUEL**Carburetor:**

The same instructions would apply to the carburetor as given above. However, the distillate, carburetor is differently calibrated. The manifold has been designed to handle low grade fuel and the following points must be noted when using low grade fuels and starting with a cold engine.

Manifold:

1. Make sure the manifold cover is in place. See Plate No. 31.
2. Close both fuel tank valves Plate No. 32.
3. Fill main tank with kerosene or distillate and auxiliary tank with gasoline.

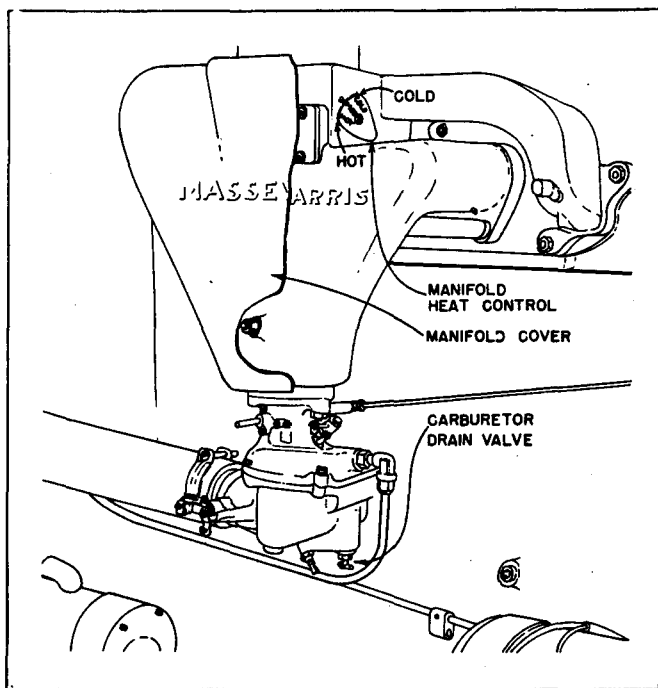


PLATE NO. 31 - MANIFOLD

4. Drain carburetor by opening drain cock under carburetor bowl. Close drain cock after carburetor is drained.
5. Open gasoline tank valve (Plate No. 32) and allow carburetor to fill with gasoline.
6. Start engine and allow temperature to rise to 180 degrees or more before attempting to burn kerosene or distillate. Then close gasoline tank valve and open fuel tank valve.

NEVER PERMIT BOTH VALVES TO BE OPEN AT THE SAME TIME. TO DO THIS WILL MIX THE FUELS.

7. While working or running the engine make sure that the water temperature indicator is between 180 and 200 degrees. 185 is ideal. The temperature is controlled by a thermostat, and if any reduction in temperature is noted HAVE THE THERMOSTAT CHECKED AND POSSIBLY REPLACED.

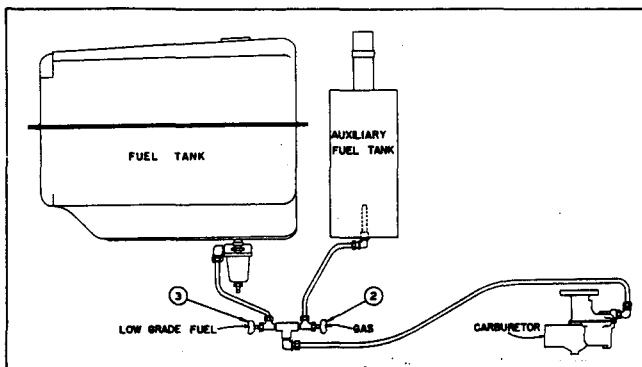


PLATE NO. 32 - FUEL TANK VALVES

Do not run your engine with a continual low water temperature. The engine may be ruined just as quickly by running with a too cold water temperature, as it can with a too high water temperature. The thermostat should keep the water at its correct temperature automatically, although in cold weather the use of the radiator shutter is recommended. Replace the thermostat with the same rated thermostat. In the 44 Model tractor, a 160 degree thermostat is used, while in the 44K a 185 degree thermostat is used.

8. There are three positions marked on the heat control valve - "Gas", "Kero", and "Dist". Normally the valve should be kept toward the hot side for low grade fuels, depending on weather temperatures and loads encountered. Naturally, a hotter setting will be necessary in cold weather.

For average loads with temperatures below 50° the hottest heat valve setting will generally be required. With light loads the hottest setting must be used at all times.

NOTE: THE CORRECT MANIFOLD HEAT SETTING IS IMPORTANT. THE TENDENCY WILL BE FOR THE OPERATOR TO SET IT ONCE AND THEN NEVER TO CHANGE IT. THIS IS WRONG! FOR BEST FUEL ECONOMY AND FOR BEST TRACTOR PERFORMANCE FOLLOW THE ABOVE INSTRUCTIONS CAREFULLY.

If an operator chooses to burn gasoline in a low grade fuel burning tractor (Model 44K) the heat valve should be in the "off" or "cold" position and the manifold shield should be removed.

AIR CLEANER

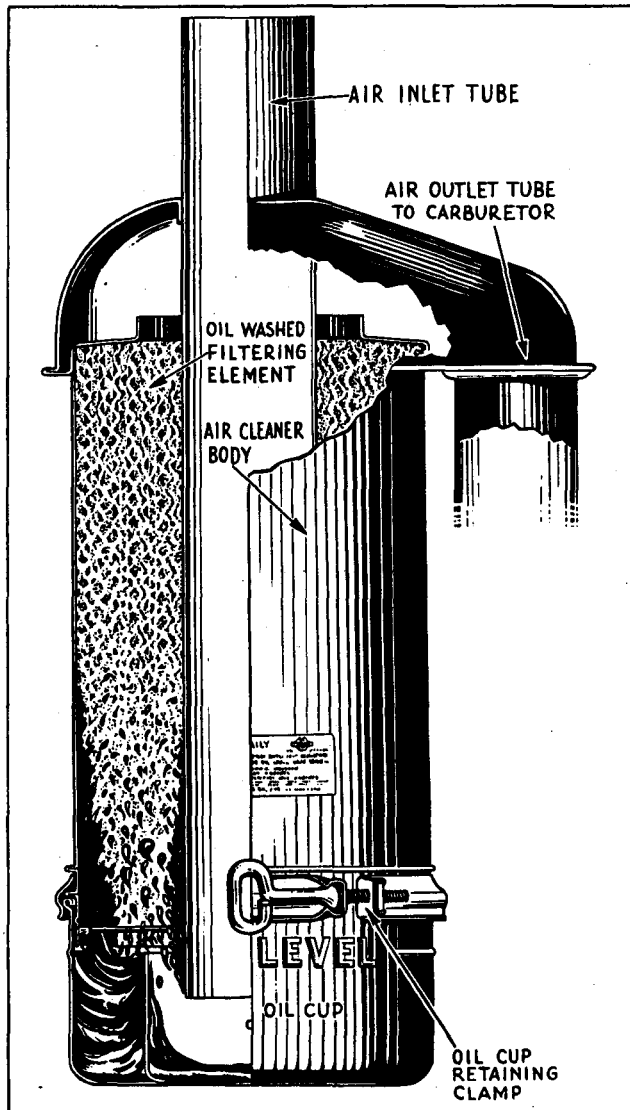


PLATE NO. 33 - AIR CLEANER

Follow instructions printed on side air cleaner body.

The air cleaner is put on the tractor engine to prolong its life and performance by preventing dirt and grit from getting into the engine, causing excessive wear on all operating parts. **HOWEVER, THE TRACTOR OPERATOR IS OF NECESSITY CHARGED WITH THE RESPONSIBILITY OF**

GIVING THE AIR CLEANER EQUIPMENT REGULAR AND CONSTANT ATTENTION IN ACCORDANCE WITH THE INSTRUCTIONS PRINTED ON SIDE OF AIR CLEANER.

IMPORTANT:

SERVICE AIR CLEANER DAILY. Remove oil cup, empty oil, scrape out dirt. Do not fail to remove the oil daily whether it looks dirty or not. The dirt that is suspended in the oil is not visible but yet if drawn into the engine will cause damage. Dirt suspended in the oil is of more danger to the engine than that which has settled to the bottom of the cup. Fill to oil level mark with engine oil. Replace oil cup securely. **NEVER REMOVE OIL CUP WHILE ENGINE IS RUNNING.**

The oil cup should be kept filled to the level indicated by the level mark with **FRESH OIL** the same as is used in the crankcase. Never use oil heavier than that used in the engine crankcase.

The best performance of the air cleaner is obtained by keeping the oil level up to the level mark on the cup. Raising the oil level above this point **DOES NOT** increase the efficiency and this practice should be avoided.

Ordinarily, if the correct oil level is maintained with the proper grade of oil, the filtering element will need very little attention. However, the bottom of the element should be inspected whenever the cup is removed and any accumulation of heavy lint, chaff, leaves, or straw removed.

All connections between the air cleaner and carburetor should be inspected at frequent intervals and must be kept tight. **SEE INSTRUCTION PLATE STAMPED ON SIDE OF AIR CLEANER.**

Remove the cap from the top of the air cleaner stack occasionally and clean out the tube that goes down through the center of the air cleaner body.

Wash out the cap thoroughly by immersing it in either gasoline or fuel oil to remove all of the accumulated oil and dust.

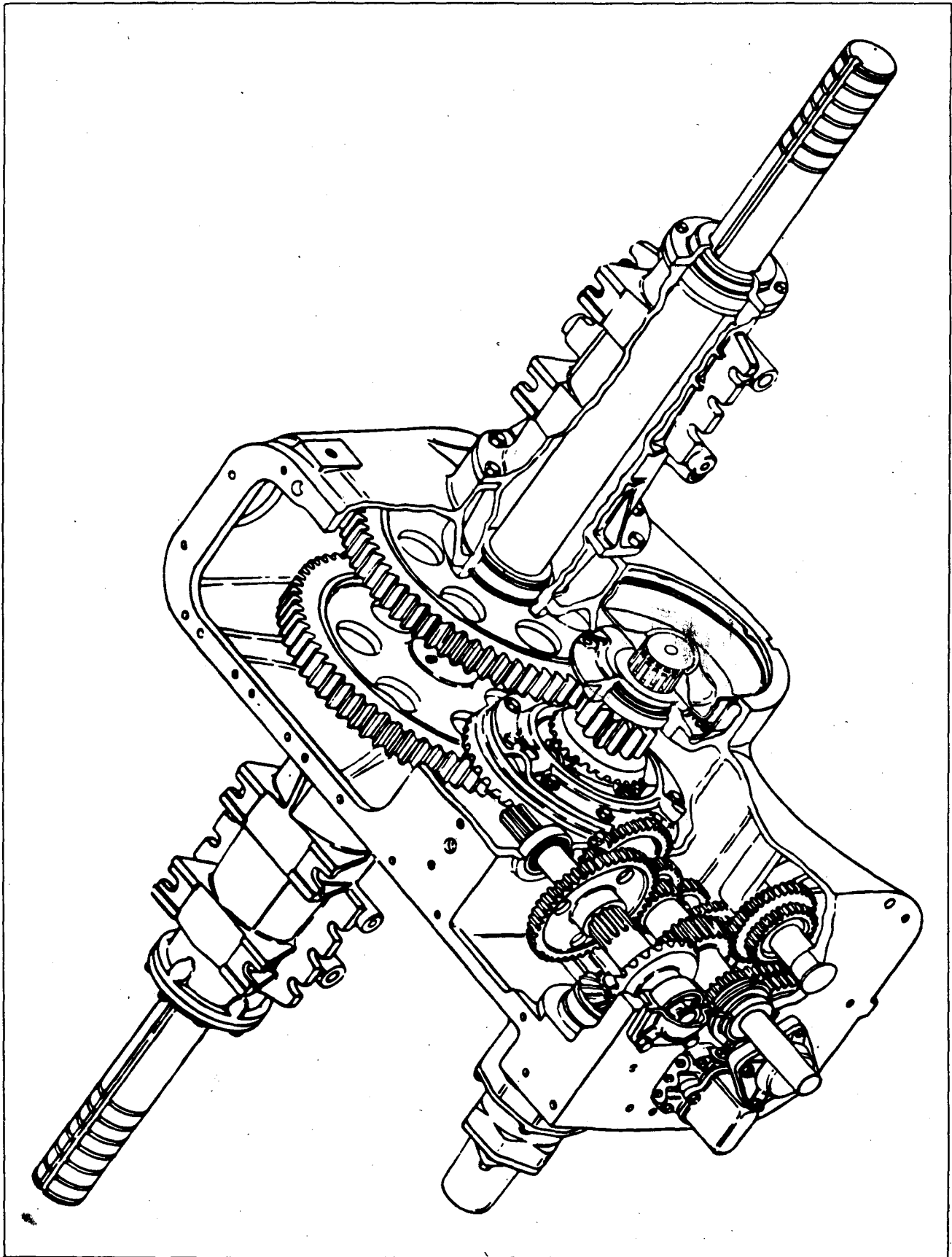


PLATE NO. 34

TRANSMISSION

This transmission in this tractor is of the selective sliding gear type with five forward speeds and one reverse. It is splash lubricated by the transmission gears being partly submerged in oil which is thrown over the gears in the upper part of the housing. In conjunction with the splash system, some of the oil is carried to the bearings by "CAST IN" oil trough inside the housing. The "CONSTANT MESH" idler gear in the front end of transmission insures constant and adequate lubrication when doing belt work. It is only necessary to maintain the proper oil level in the housing. The oil level should be checked every sixty hours of operation and if the level is lower than plug level as shown on Plate No. 4,

sufficient oil should be added to bring it up to the proper level.

The oil capacity for the entire housing (both transmission and differential compartments) is 13 U.S. gallons, 11 Imperial gallons or 49 Litres Metric. Use a good grade of transmission oil of the correct weight. S.A.E. 90 for winter, and S.A.E. 140 for summer.

When adding oil to bring it up to proper level, it is advisable when possible to add the same brand and weight oil that is already in the housing. This is especially true if the oil you use is classed as "Extreme Pressure" lubricant. The oil in the transmission when shipped is a mineral oil.

DISASSEMBLING AND REASSEMBLING

The following paragraphs in this section are devoted to the procedure for dis-assembling and re-assembling the complete transmission and final drive, belt pulley assembly, shifter mechanism and power take-off.

Our aim, in compiling this text, is to follow the actual sequence of operations from removing the entire transmission case from the engine main frame, to the removal of the last shaft from the case by illustrations and copy, and if carefully followed, you, the

operator or owner of this tractor, should be able to make the necessary repairs and adjustments to this unit without any great difficulty.

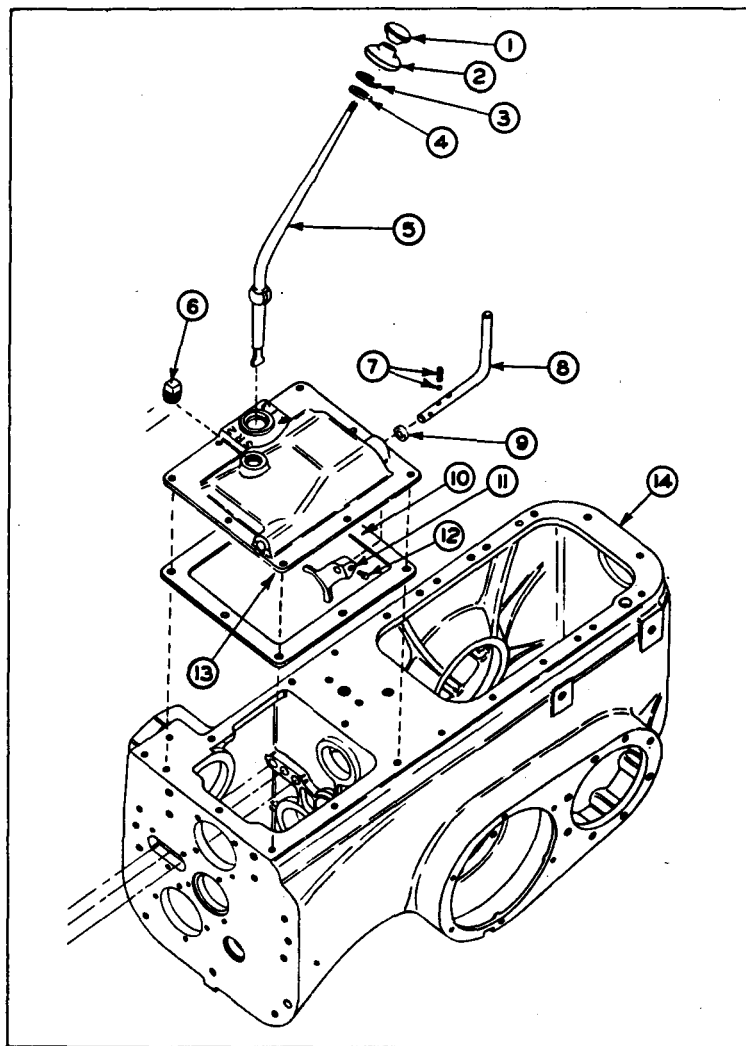
We wish, however, at this point, to stress the following things when any repair or adjustment is to be made. Be sure to have all parts clean and in their proper place and check accurately all clearances where specified. In the transmission, as in the engine, dirt and grit are its greatest enemies. **KEEP IT CLEAN.**

REMOVING TRANSMISSION FROM MAIN FRAME

STEP NO. 1:

1. Remove the battery.
2. Remove the battery platform assembly.
3. Remove the capscrews and stud nut in rear fuel tank support to transmission.
4. Disconnect the steering shaft universal joint at the lower end of the joint.
5. Disconnect the governor linkage at the turnbuckle at right side of engine.
6. Loosen the steering shaft support on the transmission case, and take out the cap screws at the base of the steering shaft.
7. Remove the top wire on the voltage regulator marked B and lay the regulator along side of the engine.
8. Remove the six bolts from the coupling on the clutch and main shaft.
9. Disconnect the clutch control rod at the pedal. Remove the clevis and lock nut.
10. Block up under the frame and also the transmission case. This will take two sets of blocking.
11. Remove the six cap screws and nut from stud through the frame into the transmission case, the transmission is now ready to separate from the frame. It will be necessary to blockup the transmission sufficient to remove the wheels and axles. If a chain hoist is available the work can be done easier and safer.
12. Drain the grease from the transmission and differential case by removing the pipe plug in the bottom of differential case.

TRANSMISSION COVER AND SHIFT LEVER ASSEMBLY



1. Gear shift lever ball.
2. Rubber dust seal.
3. Snap ring.
4. Retaining washer.
5. Gear shift lever.
6. Oil filler plug.
7. Locking ball and spring.
8. Belt pulley and P.T.O. shift lever.
9. Oil seal on shift lever.
10. Cover plate gasket.
11. Belt pulley and P.T.O. gear shifter fork.
12. Pointed set screw for shifter fork.
13. Transmission cover plate.
14. Transmission housing.

PLATE NO. 35

STEP NO. 2—To Remove the Transmission Control Mechanism:

Remove the seat assembly. The entire transmission cover and control mechanism can then be removed as a unit including parts 1 to 13. By taking out 4 cap screws.

When re-assembling be sure that the bottom end of shifting lever (No. 5) is in place in the

shifting fork sockets on the shifter rails and also that shifting fork No. 11, is in the shifter collar on the belt pulley and P.T.O. sliding gear.

If it is necessary to remove any of the parts from this assembly they must be assembled in the order shown in the illustration.

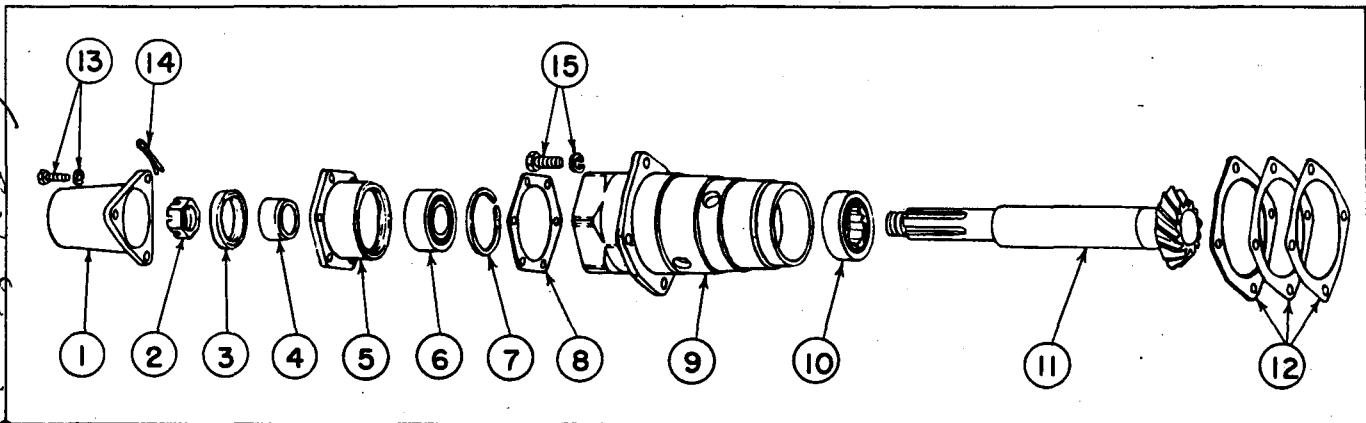


PLATE NO. 36 - BELT PULLEY ASSEMBLY

- | | | |
|--|---------------------------------|---|
| 1. Cover for end of shaft when pulley is not used. | 6. Outer bearing. | 12. Gear adjusting shims. |
| 2. Nut for holding pulley. | 7. Snap ring for bearing. | 13. Cap screw (cap to housing). |
| 3. Oil seal. | 8. Bearing adjusting shims. | 14. Cotter pin (nut to shaft). |
| 4. Spacer sleeve. | 9. Belt pulley shaft housing. | 15. Cap screw (pulley housing to case). |
| 5. Bearing housing. | 10. Inner bearing. | |
| | 11. Belt pulley shaft and gear. | |

STEP NO. 3—Belt Pulley:**Assembly and Adjustment:**

1. To remove the Belt Pulley assembly from the transmission case, remove 4 cap screws. The belt pulley assembly may then be pulled out of the transmission case.
2. Dismantle the Belt Pulley assembly, remove nut No. 2 Plate No. 36. The belt pulley shaft may now be pressed out through the rear end of the belt pulley housing.

To assemble this unit start with shaft (No. 11) and assemble through to oil seal (No. 3) in sequence shown in illustration above.

There are only two adjustments to be made to this unit. The first one is made when assembling the unit itself. This is the end play adjustment on the bearings made by the shims (No. 8) between the sleeve (No. 9) and the bearing housing (No. 5). Place sufficient

shims between the housing and sleeve to relieve any end thrust on the bearings but not enough so as to have any end play or drift on the shaft. If the shaft can drift it will be impossible to hold the proper clearance between the belt pulley drive gear and the driven gear on the belt pulley shaft (No. 11).

The second adjustment is made when installing the assembly in the transmission housing. This is done by means of the shims (No. 12) on the flange of the sleeve (No. 9). This is the in and out adjustment of the belt pulley driven gear. The correct depth of mesh for these gears is obtained by the shims (No. 8, Plate No. 37) on the belt pulley and power take-off drive shaft bearing at the front of the transmission housing (Shaft "A", Plate No. 39). The gears should be adjusted so the heel or outer edge of the gears run flush and the tooth play or back lash is .006" to .010" when all cap screws are tightened.

POWER TAKE-OFF AND BELT PULLEY DRIVE SHAFT—PLATE No. 37

STEP NO. 4—Removal and Installation:

In order to remove the power take-off and belt pulley drive shaft, first follow procedures outlined in Step Nos. 1, 2 and Paragraph 1 Step No. 3.

1. Remove the front bearing cap (4 cap screws).
2. Remove cotter pin and nut from end of shaft.
3. Pull the front bearing, bearing housing and adjusting shims.
4. Push the shaft and rear bearing through the rear bearing bore far enough into the master

gear section of the housing so you can remove the bearing snap ring and pull the bearing off the shaft.

5. After the rear bearing is removed, raise the front end of the shaft and remove the rest of the assembly through the top and toward the front of the transmission housing.

To re-assemble, reverse the foregoing procedure.

When re-assembling, it will be necessary to adjust the spiral bevel gear and pinion as outlined in the previous chapter.

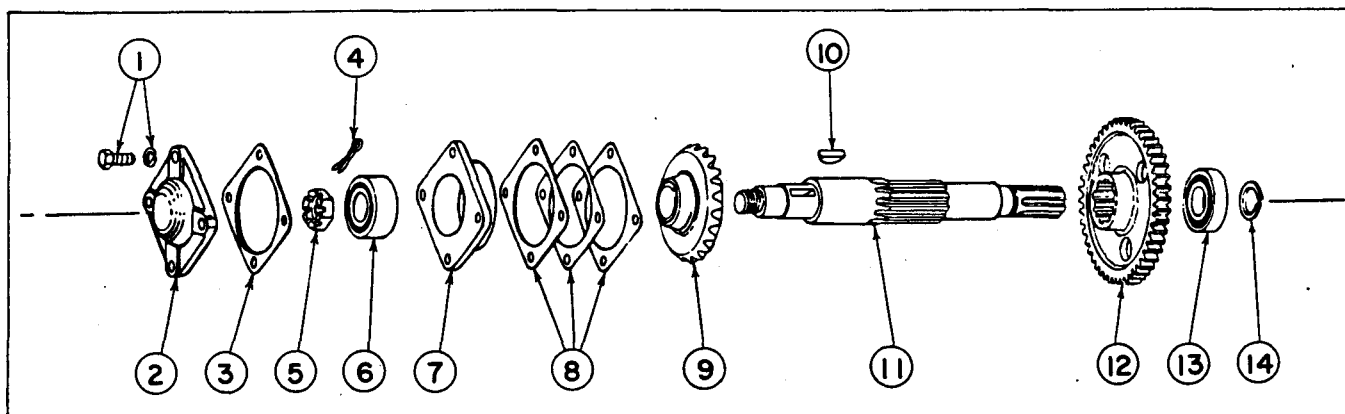


PLATE NO. 37 - POWER TAKE-OFF AND BELT PULLEY DRIVE SHAFT

- | | | |
|-------------------------------|--------------------------------|---|
| 1. Cap screws (4). | 6. Bearing (front). | 11. Belt pulley and P.T.O. shaft. |
| 2. Bearing cap (front). | 7. Bearing housing (front). | 12. Sliding gear for belt pulley and P.T.O. |
| 3. Gasket for cap. | 8. Adjusting shims. | 13. Bearing (rear). |
| 4. Cotter pin (nut to shaft). | 9. Belt pulley drive gear. | 14. Snap ring for bearing. |
| 5. Nut (castellated). | 10. Key for pulley drive gear. | |

TRANSMISSION MAIN SHAFT

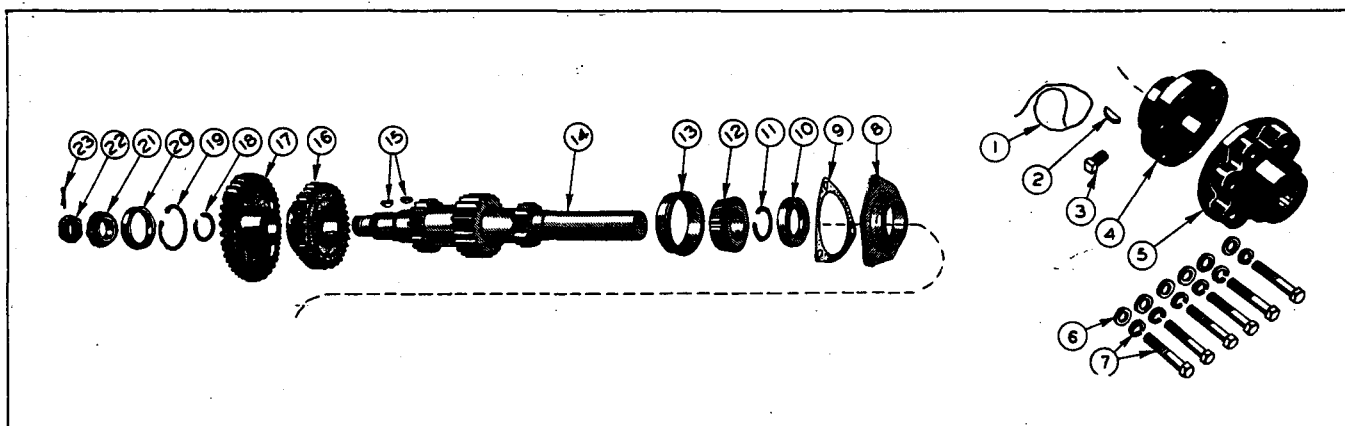
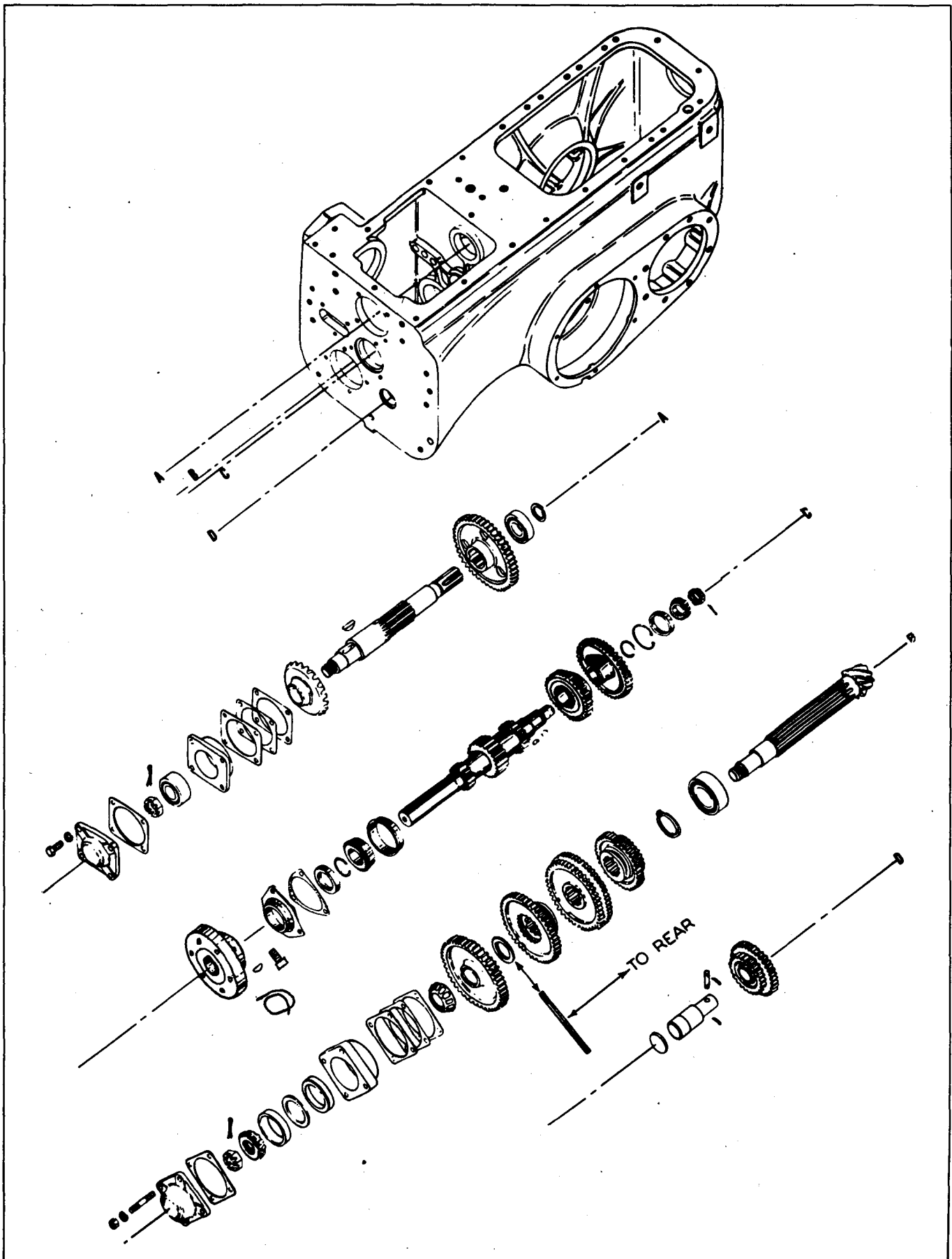


PLATE NO. 38 - TRANSMISSION MAIN SHAFT

- | | | |
|------------------------------|---------------------------|--|
| 1. Lockwire. | 9. Gasket. | 17. Gear - fifth speed. |
| 2. Woodruff key. | 10. Oil seal. | 18. Snap ring - gear to shaft. |
| 3. Set screw. | 11. Snap ring. | 19. Snap ring in transmission housing. |
| 4. Rear half of coupling. | 12. Bearing cone - front. | 20. Bearing cup - rear. |
| 5. Front half of coupling. | 13. Bearing cup - front. | 21. Bearing cone - rear. |
| 6. Flat washer. | 14. Main shaft. | 22. Nut. |
| 7. Capscrew and lock washer. | 15. Woodruff keys. | 23. Cotter pin. |
| 8. Bearing cap. | 16. Gear - fourth speed. | |

STEP NO. 5—Removal and Installation of Main Shaft:

- To remove the Main shaft, first follow procedures outlined in Step Nos. 1, 2, Paragraph 1, Step No. 3, and Step No. 4.
- Remove the coupling on the front end of the main shaft.
- Remove the cotter pin from the rear end of the main shaft.
- Remove the nut on the rear end of the main shaft.
- Remove the key from the front end of the main shaft.
- Remove the main shaft bearing cap from the front of the main shaft. The 1/4" pipe plug on the inside edge of the shifter rail cage must be removed to do this. Extreme care must be taken not to damage the oil seal when removing this cap.
- Remove three nuts on the shifter rail cage. Move the shifter rail assembly out approximately 3/4".
- Place a bar on the rear end of the main shaft. With a rawhide or lead mallet, tap the main shaft ahead until the rear bearing comes off of the main shaft.
- Remove the snap ring from the front end of the main shaft.



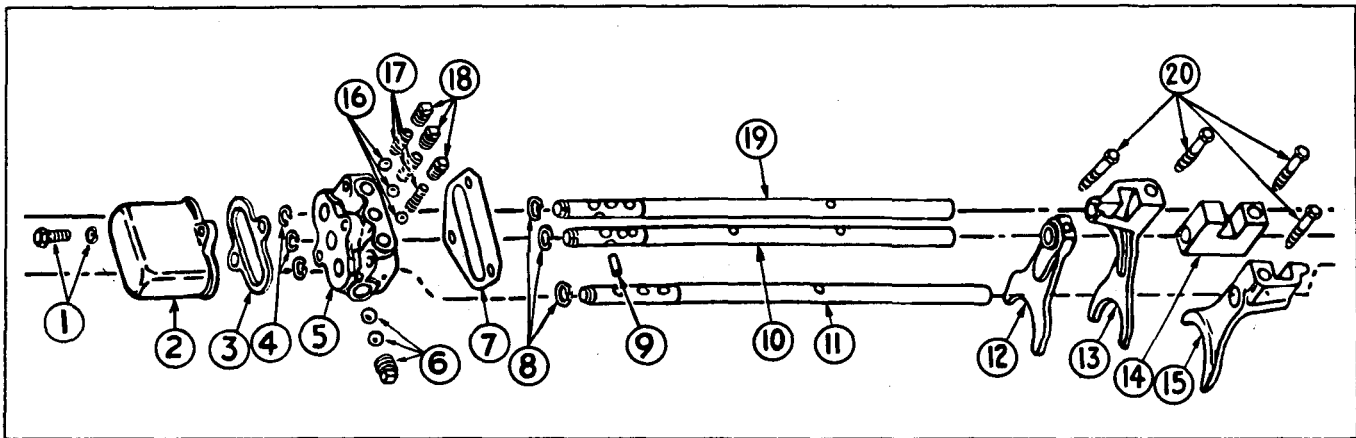


PLATE NO. 40 - GEAR SHIFT BLOCKS AND FORKS

- | | | |
|--|--|--------------------------------------|
| 1. Cap screw and washer. | 7. Gasket-housing to case. | 14. Shifter block (low & reverse). |
| 2. Cover cap for rails. | 8. Snap rings for rail stop (rear). | 15. Shifter fork (2nd & 3rd). |
| 3. Gasket for cap. | 9. Interlocking pin through center rail. | 16. Locating balls on shifter rails. |
| 4. Snap rings for rail stop (Front). | 10. Shifter rail (low & reverse). | 17. Springs for locating balls. |
| 5. Housing for shifter rails, interlocking balls, springs and pin. | 11. Shifter rail (2nd & 3rd). | 18. Pipe plugs for springs. |
| 6. Interlocking balls and plug. | 12. Shifter fork (low & reverse). | 19. Shifter rail (4th & 5th). |
| | 13. Shifter fork (4th & 5th). | 20. Lock screw for shifter forks. |

10. Force the front bearing cup from the transmission case far enough ahead to attach a puller to the lip on the front bearing cup. Remove the front cup and bearing from the main shaft.
11. Pull the main shaft ahead, then lift the rear end up and remove the shaft from the transmission case. The shifter rail assembly may have to be pulled out some to complete this operation.

RE-ASSEMBLY:

1. Put the main shaft in the case and install the front bearing cup, bearing and snap ring. Tap lightly on the front end of the main shaft with a rawhide or lead mallet to make sure the snap ring is tight against the bearing.
2. Install the front bearing cap. Care must be taken not to damage the seal in this cap due to sharp edges or burrs on the main shaft.
3. Install the bearing and nut on the rear end of the main shaft.
4. Install the key on the front end of the main shaft.
5. Push the shifter rail assembly back into position and replace the three mounting nuts.
6. Tighten up the nut on rear end of the main shaft until the shaft is snug and a drag can be felt on the bearings. Tap the rear end of the main shaft lightly to reposition the bearings.

7. Install the cotter pin in the rear of the main shaft.
8. Install the coupling at the front of the main shaft.

STEP NO. 6—Removal of Gear Shift Blocks and Forks:

In order to remove the Gear Shift Blocks and Forks, first follow the procedure outlined in Step Nos. 1, 2, Paragraph No. 1 Step No. 3, and Step No. 4.

This assembly need not be removed to take out the belt pulley and P.T.O. shaft and the transmission main shaft.

If the sliding gear shaft is to be removed it is necessary to remove the shifter forks and rails as follows:

1. Remove the four set screws (No. 20) from the shifter forks and shifter block.
2. Remove the nuts and lock washers from the three studs that hold the housing (No. 5) to the front end of the transmission case, and slide the complete assembly forward. Take off the shifter forks and blocks toward the rear of the shifter rails. It is not necessary to remove the cap (No. 2) to get this assembly out of the case. The assembly may be left intact with the exception of the forks and block unless it is necessary to disassemble it for some other reason. If it is taken apart for any reason it must be reassembled as shown in the illustration. Be sure that one of the interlocking balls (No. 6) is on each side of the center shifting rail (No. 10) and the interlocking pin (No. 9) is in place through the hole in the center rail.

"44" MASSEY-HARRIS TRACTORS "44K"

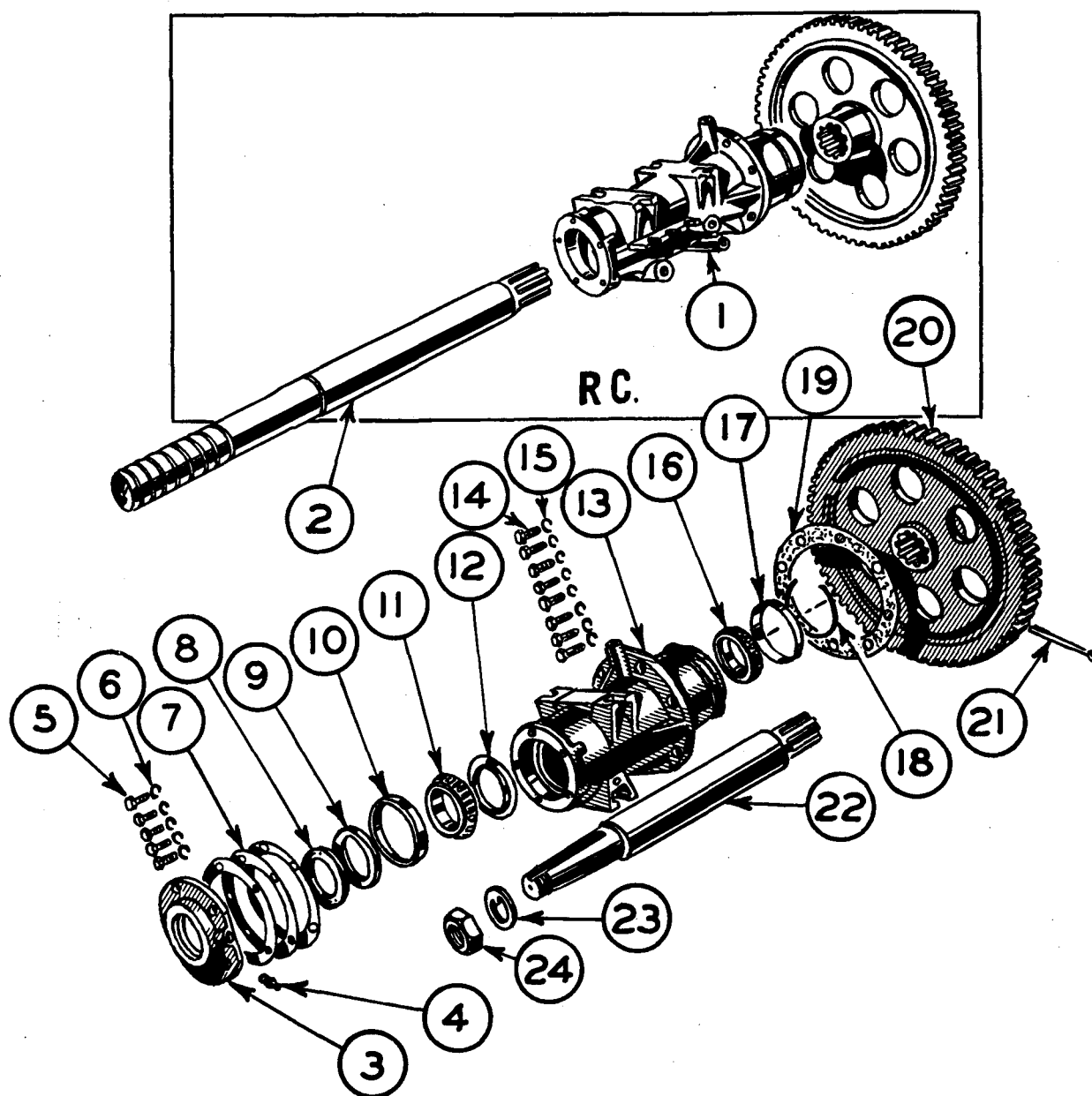


PLATE NO. 41 - REAR AXLES AND MASTER GEARS

1. Axle sleeve (row crop).
2. Axle (row crop).
3. Cap (axle bearing).
4. Grease fitting.
5. Capscrew.
6. Lockwasher.
7. Shims-Vellum.
8. Washer (felt).
9. Oil seal.
10. Bearing cup.
11. Bearing cone (outer).
12. Cup washer (grease retaining).

13. Axle sleeve (standard).
14. Capscrew.
15. Lockwasher.
16. Bearing cone (inner).
17. Bearing cup.
18. Snap ring.
19. Gasket.
20. Master gear.
21. Cotter pin master gear retaining.
22. Axle standard.
23. Lock.
24. Nut.

REAR AXLES AND MASTER GEARS

STEP NO. 7—Removal and Installation:

To remove the Rear Axles and Master Gears, first follow the procedure outlined in Step No. 1 Paragraph Nos. 6, 10 and 12.

1. Remove the Fenders and platforms.
2. Remove the wheel from the axle. On the Row Crop type this can be done by removing the wheel disk bolts and remove the hub separately or with the rest of the assembly. The wheel on the "Standard" model has the hub cast in the wheel so it must be taken off the axle by straightening up the lip washer, remove the nut and pull the wheel with a heavy puller. The inside of the hub is tapered to fit the taper on the outer end of the axle.
3. Remove the cotter pin (No. 21) from the hub of the master gear (No. 20), then take out the eight cap screws that hold the axle housing (No. 14) to the master gear case. The axle assembly can now be pulled out of the master gear case as an assembly.
4. The master gear (No. 20) can be lifted out through the opening in the top of the master gear case.

ADJUSTING AXLE BEARINGS:

The bearings should be adjusted tight enough to eliminate any end play or up and down movement of the axle. To make this adjustment, remove the cap (No. 3). One or more shims

(No. 7) can be removed as necessary to get correct bearing adjustment. Care must be taken not to get the bearings too tight as it is possible to set up a terrific thrust load on the bearings when the cap screws are tightened in the end cap (No. 3) if too many shims are removed. Be very careful also when removing the cap not to damage the oil seal (No. 9). If there are any rough spots or sharp edges on the axle they should be smoothed down with a file or sandpaper before removing or installing the oil seal.

If the axle bearings become loose it will damage the oil seal and cause oil to leak out at the cap.

It is not necessary to remove the axle and sleeve assembly from the tractor just to make the bearing adjustment as it can be done by jacking up one side of the tractor and removing the wheel and proceeding as outlined above.

INSTALLATION:

When installing the assembly, slide the axle and sleeve assembly into the opening about half way to the flange or just so the inner end of the axle will clear the hub of the master gear. Put the master gear in place in the housing noting the position of the hole in both the hub and axle shaft. Start the hub on the proper spline so the holes will line up. Finish sliding the axle and sleeve assembly into place. Put in the cap screws. Key the master gear to the axle and spread the key.

BRAKE ASSEMBLY

STEP NO. 8—Removal of Brake Shoes:

1. Remove the pin out of clevis on left tractor side.
2. Take off the arm and Woodruff key out of cross shaft.
3. Remove right brake pedal also ratchet or lock and remove bolt out of platform to brake plate.
4. Remove the six bolts from the outside diameter of brake plate and pull out complete assembly. Do not remove the four bolts in center of brake plate.

5. Remove snap ring and pull brake drum off the shaft. Note if the brake drum is tight on the splines, insert two long 1/2" standard thread bolts in center of drum and screw them in to pull the drum off the shaft. NOTE: It will only be necessary to remove the drums if they are rough or scored from long service.
6. Remove the springs from anchor pin and brake shoes.
7. Take hold of shoes at the anchor end or ends from which springs were just removed and spread the shoes apart until they can be removed from the spider. Lap the two shoes over each other at the anchor ends to remove upper spring, adjusting wheel and nut.

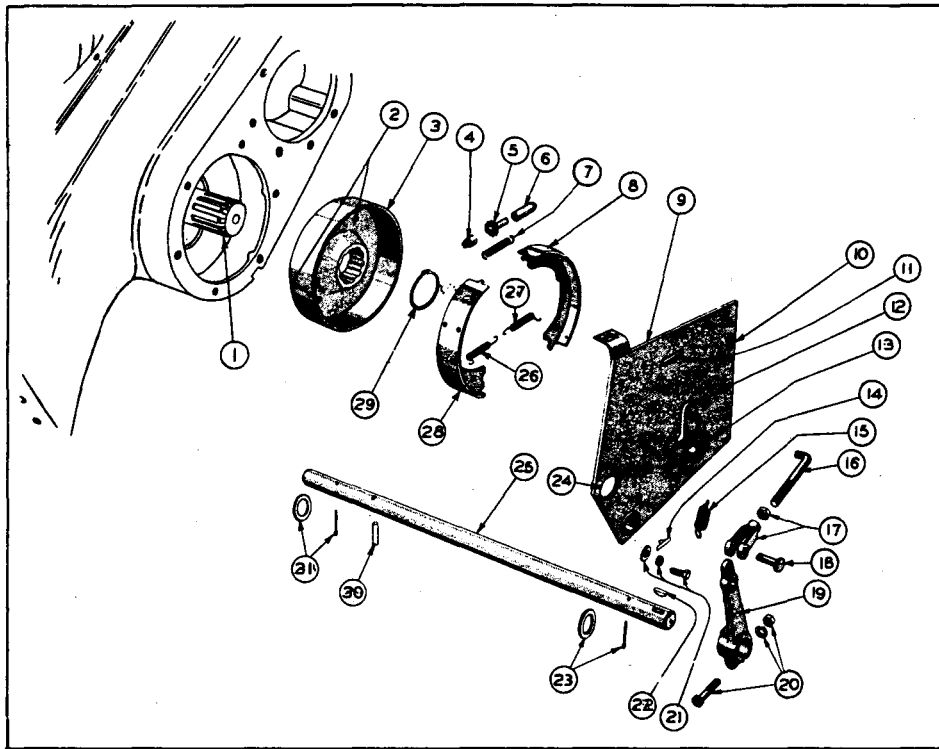
"44" MASSEY-HARRIS TRACTORS "44K"

PLATE NO. 42 - BRAKE ASSEMBLY

- | | | |
|---|---|--|
| 1. Master brake pinion shaft. | 11. Slotted hole for brake adjustment. | 22. Woodruff key-arm to cross shaft. |
| 2. 1/2" NC threaded holes for puller bolts. | 12. Brake arm or cam lever. | 23. Flat washer and cotter key. |
| 3. Brake drum. | 13. Anchor pin nut. | 24. Hole for bearing model 55 tractor cross shaft. |
| 4. Socket for adjusting screw. | 14. Seal clip for adjusting hole. | 25. Cross shaft. |
| 5. Adjusting screw. | 15. Pedal return spring. | 26. Spring (primary) (weak spring). |
| 6. Adjusting screw nut (right hand thread) both left and right). | 16. Brake rod. | 27. Spring (secondary) rear shoe (heavy). |
| 7. Spring for adjusting screw, also primary to secondary shoes (top). | 17. Clevis and lock nut. | 28. Primary shoe-front shoe (edge painted red). |
| 8. Rear shoe secondary. | 18. Pin clevis to cross shaft arm. | 29. Snap ring (drum retaining). |
| 9. Left brake plate assembly. | 19. Arm brake pedal shaft. | 30. Pin-left brake pedal to cross shaft retaining. |
| 10. Slotted holes for synchronizing brake shoes. | 20. Clamp bolt lockwasher and nut. | 31. Flat washer and cotter pin. |
| | 21. Flat washer, lockwasher and capscrew for brake plate. | |

INSTALLATION:

The primary shoe is the front shoe shown at No. 4, Plate No. 43 (edge painted red). The secondary shoe is the rear shoe edge painted yellow.

The primary or front spring shown at No. 6, Plate No. 43 is the weaker spring (Blue Spring).

The secondary or rear spring shown at No. 8, Plate No. 43 is the heavy spring (Black Spring).

Caution: That the long adjusting nut No. 6, Plate No. 42 for adjusting screw on the left tractor side is installed to the rear as shown at No. 11, Plate No. 43 so as to bring the adjusting screw in center of slot. The long adjusting nut No. 11 must be installed to the front on right tractor side to bring the adjusting screw in center of slot.

INSTALLATION OF BRAKE PLATE ASSEMBLIES:**INSTALLATION:**

1. Install the left brake plate first. Loosen the large nut on anchor pin shown at No. 13, Plate No. 42 (not more than one complete turn).
2. Start the six capscrews in brake plate to transmission housing finger tight only. **CAUTION:** that platform does not bind down on brake plate assembly. The brake plate assembly must be free to shift in slotted bolt holes in any direction to properly equalize brake shoes in drum. In some cases it may be necessary to prop up front edge of platform on both left and right tractor sides to overcome this interference while the brake shoes are being centered.

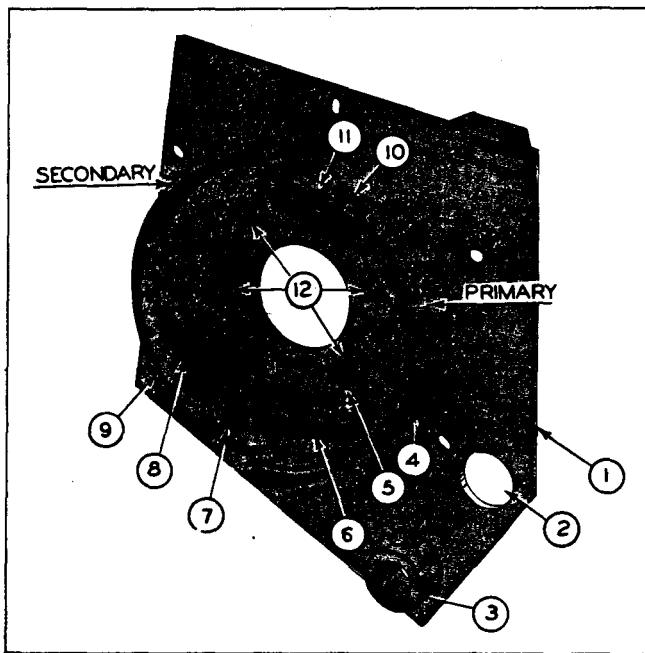


PLATE NO. 43

1. Left brake plate.
2. Bearing hole for model 55 tractor mounting.
3. Bearing for cross shaft.
4. Primary shoe.
5. Spider for brake shoes.
6. Primary spring (light).
7. Anchor pin for brake shoes.
8. Secondary spring (heavy).
9. Secondary brake shoe.
10. Star wheel-brake adjustment.
11. Adjusting screw nut.
12. Bolts for spider to brake plate.

Follow same procedure for right tractor side. Slide the cross shaft in place with left pedal on inside of right brake plate.

3. Jack up the rear of tractor and expand the brake shoes in drum with adjusting screw shown at No. 12, Plate No. 26 enough so that tractor wheel can't be turned by hand.
4. Tighten the six capscrews in brake plate. Then tighten the large nut on anchor pin or cam lever as shown at No. 13, Plate No. 42.
5. Pull the brake pedals up against the platform and hold brake cam lever No. 12 forward and adjust linkage No. 16, Plate No. 42 to arm on cross shaft No. 19, Plate No. 42 so that pin in cross shaft arm will slide in freely. NOTE: the brake rod linkage need

never be readjusted as all of the adjusting must be done with the adjusting screw No. 10, Plate No. 43. Follow the same procedure for right tractor side.

6. After complete installation has been made loosen the adjusting screw No. 10, Plate No. 43. fifteen notches. NOTE: each time the adjusting screw is moved downward with a screw driver shown at No. 12, Plate No. 26 a click can be heard so that an equal adjustment can be made for both pedals.
7. **IMPORTANT:** Make sure that equal pedal travel is present after adjustment is made so that both left and right brake will function simultaneously. There will only be about 1/2" to 3/4" free brake pedal travel, after the adjustment is backed off fifteen notches. CAUTION: When brake pedals are up against the platform, remove the hold back spring No. 17, Plate No. 26 and check that pin No. 21, Plate No. 26 is free in the clevis.
8. As a double check that brakes are properly adjusted, jack up the rear end of the tractor and apply brakes to the point where the brake shoes contact the drums. Turn each wheel and check that brake shoes contact drums equally on both left and right sides.

For Safety sake apply brakes in low speed before attempting to use brakes at high speed.

LUBRICATION:

When the brakes are assembled at the factory the cam lever, anchor pin, brake housing plate, adjusting screw threads, socket and nut are lubricated with lubriplate No. 110B.

The above parts will need no further lubrication until replacement of brake shoe lining is made.

CAUTION: Do not use any type of lubricant other than the above mentioned as some lubricants will run in hot weather and ruin the brake lining.

DIFFERENTIAL AND MASTER PINIONS

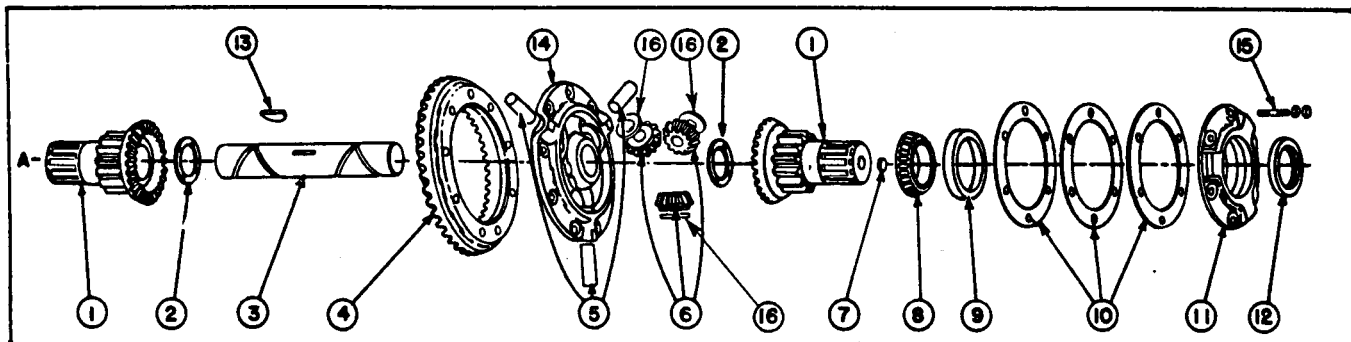


PLATE NO. 44 - DIFFERENTIAL AND MASTER PINIONS

- | | | |
|--|--|---|
| 1. Differential side gear and master pinion. | 6. Equalizing pinions. | 11. Bearing retainer. |
| 2. Thrust washer. | 7. Welsh plug in side gear and pinion. | 12. Oil seal. |
| 3. Differential through shaft. | 8. Bearing cone and roller assembly. | 13. Woodruff key (through shaft to spider hub). |
| 4. Ring gear. | 9. Bearing cup. | 14. Differential spider. |
| 5. Pin for equalizing pinion. | 10. Adjusting shims. | 15. Stud bolt nut and washer. |
| | | 16. Thrust washers. |

STEP NO. 9—Removal and Installation:

To remove the Differential and Master Pinion, first follow the procedure outlined in Step No. 1 Paragraph Nos. 6, 10 and 12, Step Nos. 7 and 8.

The differential and master pinions can be removed only after the rear axles, master gears and brakes have been removed. This is done in the following manner:

1. Remove the nuts from the six studs (No. 15) holding the bearing retainer (No. 11) in place and remove the retainer, oil seal, and shims. Note the number of shims behind the retainer.
2. Repeat this operation on the opposite side of tractor.
3. Drift the entire assembly to the left far enough to push the bearing cup (No. 9) clear of the bore in the case and remove the master pinion and bearing cone assembly through the bearing bore on the left side of the case.
4. Drift the right master pinion assembly to the right far enough to push the bearing cup out of the bore in the housing and remove the master pinion assembly through the bearing bore in the case.
5. The ring gear, spider assembly and differential through shaft (Nos. 3, 4, 5, 6, 13 and 14) can be lifted out through the large opening in the top of the housing.

INSTALLATION:

To install this assembly reverse the foregoing operations, being very careful to have all of the parts in their proper place in the order shown in the illustration.

Careful adjustment of the bearings must be made as well as the proper ring gear to pinion adjustment. These adjustments are both made with the shims under the bearing retainer caps.

Removing a shim from either side of the assembly will tighten the bearings. Sufficient shims should be removed to eliminate all end play in the bearings and still allow the differential side gears to turn freely. Check this by turning the master pinions in opposite direction by hand. A slight drag should be noticed. The ring gear to pinion adjustment is made by removing the shims from the bearing retainer on one side and putting them in the other side. This does not change the bearing adjustment because the same total number of shims are used and the assembly is simply drifted toward the side where the shims are added. In other words, if you want to move the ring gear assembly to the right, (closer to the pinion) remove the desired number of shims from under the left retainer cap and put them under the right retainer cap and vice-versa. The proper adjustment for the bevel ring gear and pinion is when the small end of the pinion is flush with the inside diameter of the ring gear, and there is between .008" and .010" back lash or tooth play between the teeth.

See instructions for installing sliding gear shaft for depth adjustment of spiral bevel pinion.

SLIDING GEAR SHAFT AND PINION

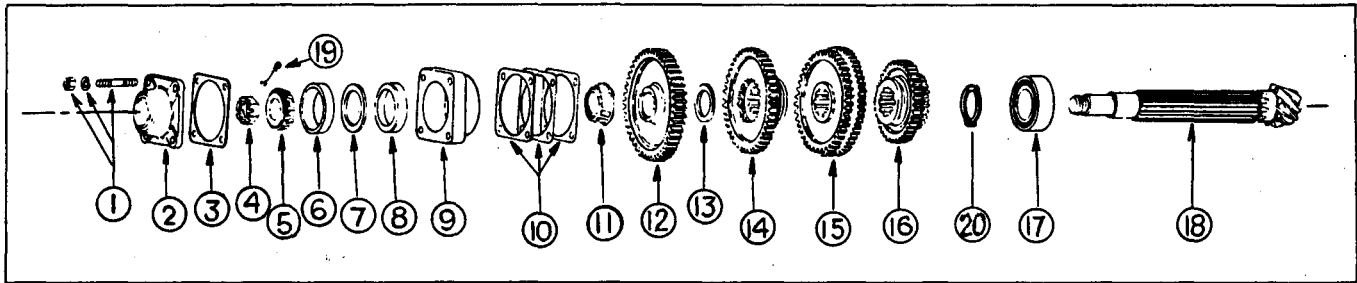


PLATE NO. 45 - SLIDING GEAR SHAFT AND PINION

- | | | |
|--------------------------------------|---|------------------------------------|
| 1. Stud, lock washer, nut. | 8. Bearing cup second brg. | 14. Low and reverse sliding gear. |
| 2. Bearing cap. | 9. Bearing retainer. | 15. Second and third sliding gear. |
| 3. Bearing cap gasket. | 10. Adjusting shims. | 16. Fourth and fifth sliding gear. |
| 4. Adjusting nut for Timken bearing. | 11. Second bearing. | 17. Bearing rear. |
| 5. Bearing front. | 12. Low speed gear idler on sliding gear shaft. | 18. Sliding gear shaft and pinion. |
| 6. Bearing cup front. | 13. Thrust washer. | 19. Cotter pin. |
| 7. Spacer washer. | | |

STEP NO. 10—Sliding Gear Shaft and Pinion:

In order to remove the Sliding Gear Shaft and pinion, first follow the procedure outlined in Step Nos. 1, 2, Paragraph No. 1, Step Nos. 3, 4, 5, 6, 7, 8 and 9.

1. Take off bearing cap.
2. Remove the nut from the shaft.
3. Drive the shaft back until the first Timken bearing comes off.
4. Take off the bearing retainer.
5. Put a piece of brass shaft between the low idler gear and back end of transmission case, and drive the second Timken bearing off.
6. Pull the sliding gear shaft out through the rear and up through master gear cover opening. The sliding gears can be taken out through the opening above the transmission. To reassemble, reverse disassembling procedure.

NOTE: Care must be taken to see that the thrust washer (No. 13) is in place on the sliding gear shaft before the low idler gear is put on. Drive one of the Timken bearings on the shaft and put the bearing carrier in place. Put the cap on, tighten the cap. By doing this it is easier to adjust the spiral bevel pinion to the spiral ring gear. The carrier can be removed to add or take out shims to adjust the pinion for in and out depth to the ring gear. When adjustments are made, take off cap (No. 2) and put bearing (No. 5) on

front end of shaft and adjust with adjusting nut (No. 4) until drag can be felt on bearing. Install cotter pin (No. 19).

CAUTION:

Always check the end clearance between the low idler gear and the thrust washer. This clearance is .004 to .008 and the low idler gear must run free on the shaft. It is always a good practice to put some transmission oil in the bushing of the idler gear before putting the gear on the shaft. To reassemble the remainder of the transmission, reverse the disassembling procedure.

NOTE: Care must be taken in adjusting the ring gear and pinion. The end of the bevel pinion must come flush with the inside of the ring gear and the backlash is .008 to .010. With a dial gauge, however, this is soon acquired by experience with hand and eye setting.

STEP NO. 11—Removal and Installation of Reverse Idler Gear and Shaft:

To remove the reverse Idler Gear and Shaft, first follow the procedure outlined in Step Nos. 1, 2, Paragraph No. 1 Step Nos. 4 and 5.

1. Remove cotter pins from pin in reverse idler shaft and remove pin.
2. Slide shaft forward out of gear hub and transmission.

NOTE: It will be necessary to push out expansion plug in the front end of transmission housing.

TRANSMISSION LUBRICATION

The transmission is splash lubricated throughout by the gears throwing oil up in the upper part of the housing, and being sprayed over all exposed parts. Some of the bearings which cannot be reached by direct splash or spray have "CAST IN" oil ducts leading to the housing around them thus assuring proper lubrication at all times.

The lubrication of the belt pulley gears in the front compartment is cared for by the "CONSTANT MESH" idler gear in the front end of the transmission housing when doing belt work. This gear turns at all times with the transmission main shaft.

Check the oil level in the transmission and differential housing every 60 hours of operation. The oil level plug is located on the right side of the transmission housing. This plug level determines the oil level in both the differential and transmission.

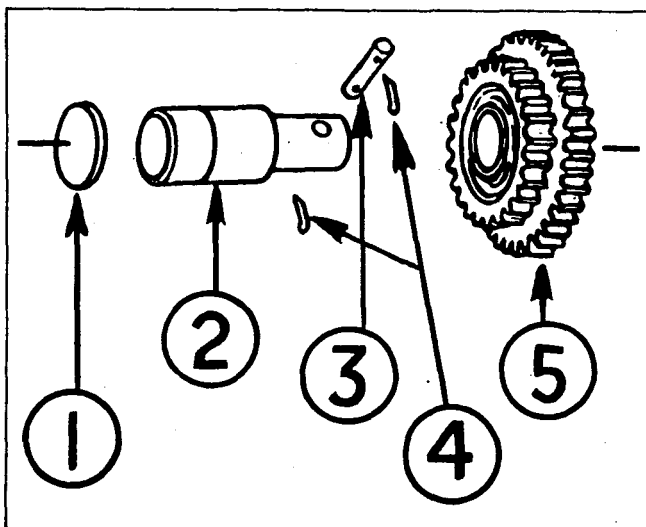


PLATE NO. 46 - REVERSE IDLER GEAR AND SHAFT

1. Expansion plug in transmission case.
2. Reverse idler gear shaft.
3. Reverse idler gear shaft pin.
4. Cotter pins.
5. Reverse idler gear.

WHEELS AND TIRES**REAR WHEELS (R. C. MODEL):**

The rear wheels of the R.C. Model tractors are adjustable to accommodate various row widths. When the rear wheels are placed on the axle with the clamp end of the hub to the outside, the wheels are adjustable from 52 to 64 inch tread. (Tread is the distance from center to center of wheel rims).

When the wheels are reversed, the wheels are adjustable from 68 to 88 inch tread.

The maximum tread without reversing the wheels is 64 inches. With the wheels reversed, it is 88 inches.

To change rear wheel tread, jack up one side of tractor and loosen the clamp bolts in hub of wheel. Slide wheel to desired position and tighten clamp bolts. Repeat operation on other side.

When reversing wheels on which chevron style tread pneumatic tires are mounted, place the left wheel on the right axle and vice versa.

After tractor is operated a few minutes when a tread change has been made, retighten hub clamp bolts.

NOTE: See inside of back cover for wheel spacing chart.

REAR WHEELS (Std. Models):

Rear wheels are fitted to axles by means of a taper fit and key. Wheels are held in place by axle nut.

1. Removing: A heavy duty puller is necessary to loosen the wheels from axle. If wheels are exceptionally tight, draw up on puller screw tightly and then tap the wheel with a hammer on the inner side of hub, or apply heat to the hub until the expansion loosens it.
2. Replacing: Slide the wheel onto axle as far as it will go and then line up keyways. Replace the key by driving it into the hub until outer end is flush with tapered end of axle. Replace the lip washer and axle nut. Draw up tightly on the axle nut and then drive on the end of hub by means of a sledge hammer and block of wood. Continue this operation until the wheel is securely tight on axle.

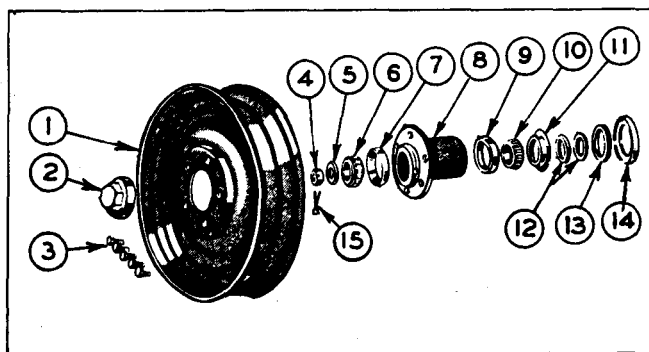
FRONT WHEELS:

PLATE NO. 47 - FRONT WHEEL SPINDLE

- | | |
|--------------------------|--------------------------------|
| 1. Front wheel assembly. | 10. Bearing cone - inner. |
| 2. Hub cap. | 11. Retainer for felt washers. |
| 3. Bolt wheel to hub. | 12. Felt washers (2) small. |
| 4. Nut for spindle. | 13. Felt washer (1) large. |
| 5. Tongued washer. | 14. Dust deflector. |
| 6. Bearing cone - outer. | 15. Cotter pin. |
| 7. Bearing cup - outer. | |
| 8. Hub. | |
| 9. Bearing cup - inner. | |

REPLACING FELT SEALS: PLATE No. 47.

To install the various parts that are used in the front wheel mounting, proceed as follows:

1. Place deflector, No. 1, and large felt washers (No. 2) on inner end of spindle.
2. Pack inner bearing, cone and roller assembly (No. 4) with grease and lay it in place in the wheel hub and press retainer (No. 3) into recess in hub.
3. Place the two small felt washers (No. 2) in the retainer.
4. Start the wheel on the spindle and by using a piece of pipe drive the inner bearing on to the spindle as far as it will go, at the same time pressing in against the wheel to be sure that the retainer (No. 3) is not driven out of place while the bearing is being driven on the spindle.
5. Pack outer bearing (No. 5) and inside of hub with grease and install bearing. Place tongue washer (No. 6) and nut (No. 7) on the spindle and adjust bearings with the nut as described on the preceding page. Secure nut with cotter pin.

ADJUSTMENT (RC and Std. Models):

Front wheels should be jacked up occasionally and checked for bearing adjustment. Remove hub cap. Remove cotter pin. Turn nut until wheel drags slightly while being turned by hand. Loosen nut until wheel turns freely and then replace cotter pin.

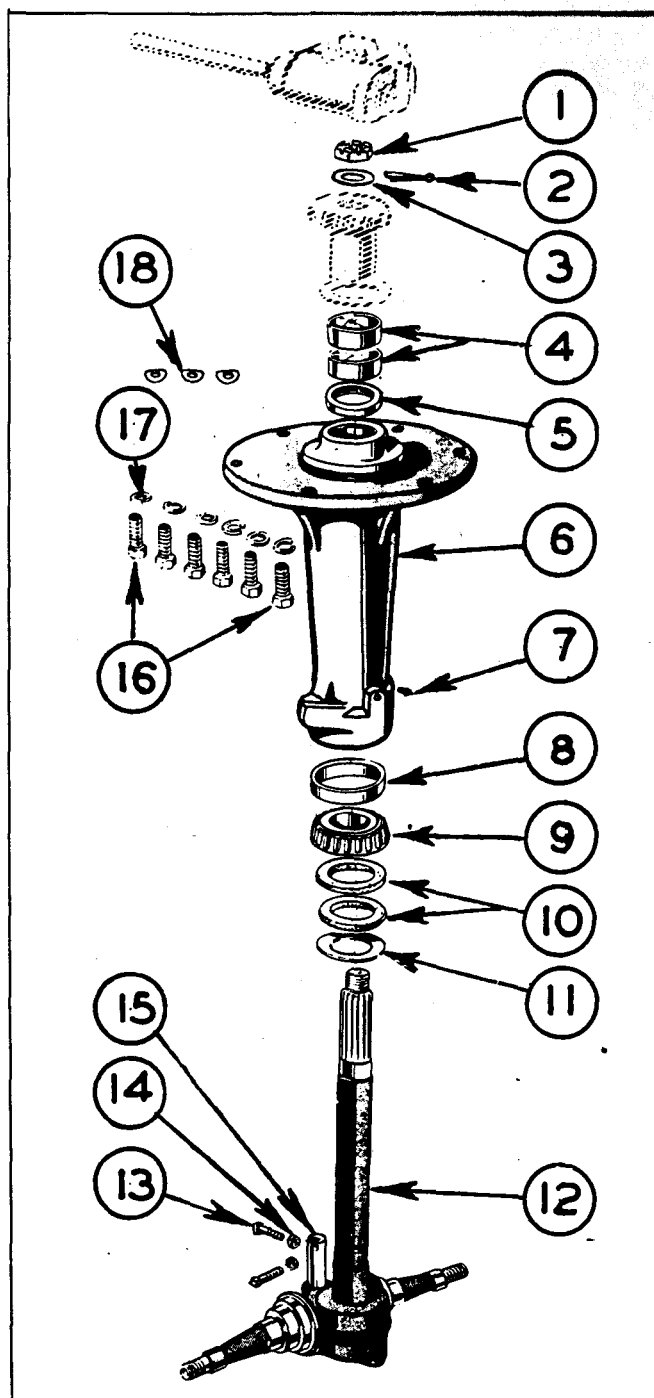


PLATE NO. 48 - FRONT AXLE AND SUPPORT ASSEMBLY.

1. Nut.
2. Cotter pin.
3. Washer.
4. Bushings (2).
5. Oil seal.
6. Front axle support assembly.
7. Grease fitting.
8. Bearing cup.
9. Bearing cone.
10. Felt washers (2).
11. Retainer for felt washers.
12. Pivot shaft and spindle assembly.
13. Stop screw.
14. Nut.
15. Stop pin.
16. Cap screws.
17. Lock washers.
18. Washers support to frame.

"44" MASSEY-HARRIS TRACTORS "44K"

The "toe-in" of front wheels should be about 3/8"; that is, the distance between the front wheels when measured at the rear should be 3/8" greater than at front. To make this adjustment, shorten or lengthen the tie-rod by means of turnbuckle.

REMOVAL AND ASSEMBLY OF FRONT WHEEL SUPPORT AND AXLE PIVOT SHAFT:

1. Place wheels in straight forward position and remove radiator grill and screen.
2. Remove the cover off top of steering gear housing and clean out all lubricant.
3. Remove cotter pin, nut and washer, Nos. 1, 2 and 3 Plate No. 48.
4. Raise the front of tractor high enough to remove the front wheels and to slide spindle out of support. NOTE: If for any reason the front axle support assembly No. 6 Plate No. 48 is removed from frame, make sure spacer washers No. 18 are replaced in their original position between support and frame.
5. Replace felt seals and worn parts.
6. To reassemble, reverse foregoing procedure and refer to service adjustments listed under steering gear.

LUBRICATION:

Once each season -- or every 300 hours -- take the wheels off and wash all the old grease out of hub and bearings and then repack with fresh grease. At the same time install new seal rings (2 and 3, Plate No. 47).

SKID BANDS:

If the tractor is equipped with steel front wheels, install the skid bands with the vertical flange towards center of wheel.

RUBBER TIRES:

Tires should be inflated to recommended pressures at all times. The pressure should be checked and the tires inflated once each week.

Keep Caps on the Valve Stems. They prevent air leak from the valve stem as the valve core is not supposed to be "leakproof". The caps also prevent dirt and moisture from

entering the valve stem which will damage the valve core. Tighten the caps with the fingers only.

When the tractor is not in use for long periods of time, the tractor should be blocked up so that the tires do not support the weight of the machine. If it is not practical to block up the tractor, the tires should be inflated regularly once each month during the storage period.

Tires should be kept free from contact with oil and gasoline. They should not stand on oily floors nor be stored in sunlight or near electrical discharges.

The tires on tractors used on spraying and dusting operations, especially when Paris Green and Bordeaux mixtures which contain copper are used, should be thoroughly cleaned after the dusting and spraying season is over. A thorough cleaning with clear water will remove the harmful chemicals from the tires.

The paint and metal parts of tractors used in alkaline soils deteriorate rapidly due to oxidation. Although the salts and acids in the soil do not have any harmful effects upon the tires, it is suggested that the wheels and tires be washed with clear water to prevent the wheels and rims from becoming rusted.

AIR PRESSURE IN TIRES:

WHEN TRACTORS ARE IN TRANSIT THE AIR PRESSURE IN THE TIRES IS VERY HIGH TO PREVENT EXCESSIVE BOUNCING, AND MUST BE REDUCED TO THE RATES GIVEN BELOW BEFORE THE TRACTOR IS PUT IN FIELD WORK.

Front Tires—All Sizes:

1. 4 PLY TIRES 28 LBS.
2. 6 PLY TIRES 36 LBS.

Rear Tires—All Sizes:

1. MINIMUM AIR PRESSURE. 12 LBS.
2. WHEN PLOWING, INCREASE AIR PRESSURE IN FURROW WHEEL TIRE. 4 LBS.
3. WHEN SPECIAL HEAVY WHEELS ARE USED OR HEAVY LOADS ARE CARRIED ON THE TRACTORS, THE AIR PRESSURE MUST BE INCREASED IN A RATIO OF ONE LB. OF AIR TO EACH 100 LBS. OF WEIGHT ADDED PER WHEEL.

Rear—4 Ply—All Sizes:**1. MAXIMUM INFLATION PRESSURE. 16 LBS.**

Excessive inflation pressures may cause so called "weather checking" of the rubber, imperfect cleaning of the tread, undue slippage, and hard riding.

Insufficient inflation pressures may cause rim bruising, sidewall snagging, breaks in sidewall on shoulder area, difficult steering on front wheels, and fast tread wear when operating on hard surfaces.

Tread Wear:

The tread lugs or bars on tractor tires wear evenly at proper air pressure and with a correct amount of wheel weight.

Generally speaking, there are two distinct types of irregular tread wear, which are described as follows:

1. **Excessive Slippage** brings about an irregular angular wear on the front or leading edge of the traction bars as shown in Plate No. 49. This type of wear is caused by one or more of these causes:
 - (a) Insufficient wheel weight.
 - (b) Over-inflation.
 - (c) A too heavy draft load.
 - (d) Quick starting by running motor at top speed as the clutch is engaged.



PLATE NO. 49

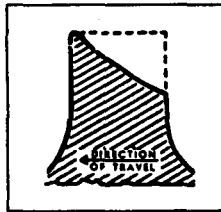


PLATE NO. 50

2. **Excessive Deformation** of the rubber due to excessive bulge or flattening out of the tire will cause irregular and angular wear on the rear edge of the traction bars as shown on Plate No. 50.

This type of excessive wear is caused by one or more of these causes:

- (a) Excessive wheel weight or lead.
- (b) Under-inflation.
- (c) Highway or other hard surface, operations, especially in conjunction with excessive weight, load and under-inflation.

Wheel Weights:

It is impossible to give any set rule as to the correct wheel weight necessary for all soils and operating conditions. The greater the weight on the tires, the more pulling power it can exert without slippage. Extra wheel weights do not increase ground pressure per square inch, but do give added traction by increasing the number of square inches of ground contact.

The following table may be of assistance in estimating the amount of wheel weight to use.

150 Lb. Weights on Rear Wheels	Pounds Drawbar Pull on Plowed Ground On Sod.	
None	1600	3000
1 Weight per wheel . . .	1725	3200
2 Weights per wheel. . .	1850	3400
3 Weights per wheel. . .	1975	3600

Needed weight may be added by filling the tires with water and, since this method is inexpensive and does not add to the over-all rear axle width, it is very popular, in many conditions.

When water is used for wheel weight on tractors operating in cold weather, the solution must be protected against freezing. Calcium chloride is the most commonly used anti-freeze agent for solution in tractor tires.

CAUTION: When mixing the solution, do NOT pour the water onto the calcium chloride but add the calcium chloride to the water. THIS IS IMPORTANT.

When mixing calcium chloride solution follow recommendations of supplier.

Generally the proportions given below will be satisfactory.

Use 1/2 lb. of Calcium Chloride per gallon of water for temperatures down to 20° F. above zero.

Use 3-1/2 lbs. of Calcium Chloride per gallon of water for temperatures down to 40° F. below zero.

The solution may be pumped into the tire with a hand water pump; forced in from a pressure tank or line; or run in by gravity from a container held at least five feet above the top side of the tire.

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Employing any one of these 3 methods, proceed as follows:

1. Jack the wheel off the ground and turn the tire valve to the top of the wheel.
2. Remove the valve core and allow all the air to escape.
3. Obtain a water adapter and screw the small end on the tire valve and attach the water line to the other.
4. Turn on water and allow pressure to build up in tire, occasionally allowing air to escape by pressing on small deflator.
5. When water begins to flow continuously from the deflator, the tire has been filled.

6. Turn off water. Remove adapter from tire valve. Let excess water run out of valve.
7. Replace valve core and inflate tire to 12 to 16 pounds.
8. Metal containers in which calcium chloride has been mixed should be cleaned immediately after using.

Anti-freeze must be added to the water that remains in tires after draining if it was not treated when put in as all the water in the tube cannot be drained out, and sharp-cornered pieces of ice will form in the tube and will damage the tire and tube.

Do not use a calcium chloride solution for anti-freeze in the radiator as calcium chloride will erode the metal parts of the radiator and engine.

LEATHER OIL SEALS

Assembling the Oil Seal:

Dip the oil seal in oil and let it soak a minute or two before installing.

The oil seal is pressed into position in every installation.

In cases where the oil seal is pressed to the bottom of a recess, it is important that an arbor be used that is not more than 1/32 inch smaller than the outside diameter of the oil seal. If the arbor is smaller than recommended, there is danger of collapsing the metal case and pinching the leather and, consequently, the seal will not function.

Before passing the shaft thru an oil seal, examine it for sharp edges or corners or burrs. Bevel the sharp edges and remove the burrs before making the assembly. These instructions also apply when assembling the seal over the shaft.

Care should be taken when assembling seals over splines or keyways to prevent cutting into the leather.

When assembling an oil seal over a shaft that is undercut or grooved, shim stock should be wrapped around the shaft to completely cover the grooves. Then the seal should be rotated, in the direction of the overlapping shim stock, as it is moved along the shaft. This will eliminate the possibility of the shim stock cutting into the leather.

Make sure that the seal is assembled with the raw edge of leather facing the right way. Refer to the text or illustration for correct assembling instructions before pressing the seal in.

If a press is not available, seals may be tapped in with a hammer. When the seal is flush with the outer surface of recess, a block of wood or steel plate should be used to protect the seal from hammer blows.

Oil Leakage: If an oil leak occurs shortly after putting the seal into service, it is an indication that the seal was not treated properly before assembling or else the leather was cut or damaged when installing. In either case the oil seal should be replaced immediately.

COLD WEATHER OPERATION

Cooling System:

In cold weather, completely drain the cooling system when the tractor is not in actual use or else employ a good anti-freeze solution.

When draining the cooling system, drain both the radiator and engine block and do not leave the tractor until the system has been completely drained. Loosen the radiator cap to break any vacuum in the cooling system. Leave the drain cocks open until tractor is to be used again.

The engine block drain cock is located on right side of block. The radiator drain cock is located on the radiator outlet tube.

ANTI-FREEZE SOLUTIONS:

For protection against freezing, alcohol or ethylene glycol type compounds may be used. Solutions containing salt, calcium chloride, soda, sugar or mineral oils should never be used in the cooling system. The following table supplies the amount of alcohol with water to make one U.S. gallon of anti-freeze proof against freezing at Fahrenheit temperature listed. When using Ethylene Glycol or any permanent anti-freeze, follow manufacturer's recommendations.

Because of its low boiling point, alcohol is not recommended in the distillate model tractors.

The capacity of the cooling system is 5-1/2 U.S. gallons for gasoline models and 5-3/4 U.S. gallons for the distillate models.

WATER PINTS	ETHYLENE GLYCOL PINTS	ALCOHOL PINTS	FOR ONE GAL. ANTI-FREEZE TO PROTECT TO
6	2		30° F.
5½	2½		0° F.
5	3		-10° F.
4½	3½		-20° F.
4	4		-30° F.
5½		2½	30° F.
5		3	0° F.
4½		3½	-10° F.
4		4	-20° F.
3		5	-30° F.

With all anti-freeze solutions make sure that there are no leaky hose connections. Check the cooling system for leaks after the first few hours operation. Leaks of anti-freeze do not appear at once when system is filled but generally after the engine is at normal operating temperature. Refer to page 55 for anti-freeze solution for rubber tires.

DO NOT USE ANTI-FREEZE SOLUTIONS PREPARED FOR RADIATORS WHEN TREATING SOLUTION IN TIRES AND DO NOT USE ANTI-FREEZE SOLUTIONS PREPARED FOR TIRES WHEN TREATING SOLUTION IN RADIATORS.

Anti-freeze solutions prepared for radiators are VERY INJURIOUS to rubber and anti-freeze solutions prepared for tires are very injurious to radiators.

OILING SYSTEM:

Engine:

Water has a tendency to condense in the crankcase of any engine and this tendency is greatly increased by cold weather. In the summer the engine runs hot enough to vaporize the water and expel it through the crankcase breather system; while in the winter, due to relative short operating periods and cold outside temperature, the engine does not get hot enough to vaporize the moisture sufficiently to expel it from the crankcase.

Consequently, this moisture, which is mainly a by-product of fuel combustion (water and carbon dioxide), condenses soon after the engine is stopped and collects in the lowest parts of the oiling system, namely, the oil filter base and in the bottom of the crankcase.

This water in combination with the oil forms a sludge which may freeze and plug the screen on the oil pump and the oil ducts in the filter base resulting in broken pump parts and burned out bearings.

When the tractor is used in freezing weather, the following safe rules should be observed to prevent the engine from becoming damaged by condensed moisture freezing in the crankcase and oil filter.

1. Watch the oil pressure gauge for the first 15 to 20 minutes after the tractor is started. IF OIL PRESSURE DOESN'T REGISTER, STOP TRACTOR AND INVESTIGATE IMMEDIATELY.
2. Use light engine oil (S.A.E. #20).
3. Change engine oil oftener than in the summer.
4. Always drain engine when oil is hot. The oil will drain more completely and carry more dirt and sludge with it.
5. In extremely cold climates the oil should be drained from the engine when it is not being used, kept in a warm place, and poured back into the engine before tractor is started.

TRANSMISSION:

If a high quality transmission oil is used, S.A.E. #110 is suitable for both summer and winter use.

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PERIODIC INSPECTION:

Keep tractor clean. Anyone can judge an operator by one look at his machine.

Use every precaution to prevent dirt reaching working parts. Practically all wear is directly traceable to abrasives in the lubricant.

Rather than experiment with doubtful adjustments, call a competent repair man, the same as you would for your automobile.

Never overload the tractor. Any load which slows the engine below its normal operating speed is considered an overload.

Cold weather operation -- let the tractor run slowly without load until cold lubricants have warmed sufficiently. Use high grade lubricants of correct viscosity for cold weather operations.

Always use genuine Massey-Harris repair parts. Have a few gaskets and parts that are subject to damage on hand at all times.

Engine: Check all bearings for looseness. Do not wait for a bearing to pound.

Grind valves and clean carbon from combustion chamber. Do not wait until the valves leak badly.

Keep tappets properly adjusted for clearance.

Clean and adjust spark plugs.

Give air cleaner proper attention.

Install a new oil filter element after each 180 hours operation on gasoline models and 120 hours on distillate models.

Take the generator and starting motor to an authorized service station for a complete check, in accordance with instructions.

Thoroughly clean out the entire fuel system of water and settlements, especially before freezing weather.

Check all bolts and nuts for tightness and examine cotter pins.

TRANSMISSION AND REAR END: Once each season drain out the transmission oil and flush out the case to thoroughly clean, and then refill with a good quality transmission lubricant of correct viscosity.

FRONT WHEELS: Once each season -- or every 300 hours -- jack up the front wheels, take the wheels off, and wash all the old grease out of wheel hub and off the bearings. Install new felt rings and gaskets in the dust seals. Repack with fresh wheel lubricant.

REAR AXLE: Once each season check the bearings at the outer end of the axle sleeves. Wash bearings and repack with fresh cup grease. Renew the felt seal located in each axle sleeve bearing cap.

WINTER STORAGE:

In storing the machine for winter, the following points should be noted:

Put the tractor on blocks to take the weight off the tires.

Drain water from the radiator and fill with anti-freeze solution.

Lubricate all bearings.

ENGINE CARE DURING WINTER STORAGE:

FUEL SYSTEM:

Drain the fuel tank completely; run the engine until it stops, thus making sure that all fuel is exhausted from the system; clean the sediment bowl and the carburetor. Then disconnect and blow out the fuel lines.

ENGINE CONDITIONING:

It is recommended that the motor be rust-proofed before laying up for a long period. For this purpose, use a good make of rust-proof oil. Use these oils according to maker's directions.

COOLING SYSTEM:

If freezing temperatures are to be encountered in unheated storage, the cooling system should be either completely drained or protected by sufficient anti-freeze for the lowest temperature that will be experienced.

A "Full" cooling system is less subject to rust and corrosion than an empty one, but the availability of anti-freeze may of necessity determine your procedure. If the anti-freeze solution remains in the stored machine, the condition of all hose connections should be carefully checked at the end of the storage period.

ANTI-FREEZE:

Protect the cooling system with a suitable anti-freeze solution for temperatures below +32° F. Alcohol or ethylene glycol type compounds may be used. Do not use solutions containing salt, calcium chloride, soda, sugar or mineral oils. Before adding anti-freeze compound, replace deteriorated hose connections and see that system does not leak. Fill system with water to about 1/3 capacity and add anti-freeze compound in the proportions shown on page 57.

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After adding anti-freeze, fill system with water, start and warm the engine. Then stop the engine and check the solution with a hydrometer, adding anti-freeze if required. Check carefully for leaks.

If the cooling system is drained, DO NOT FORGET THE CYLINDER BLOCK DRAIN COCK LOCATED ON THE SIDE OF THE ENGINE.

STORAGE BATTERY:

Remove storage battery and store where it will be protected against freezing temperature. Also battery should be charged once every 30 days.

PREPARING THE ENGINE FOR SERVICE AFTER WINTER STORAGE:

Cooling System:

Fill radiator with water (use soft water if you have it). See that core and intake are clear of obstructions.

LUBRICATION:

See that oil level in engine is up to full mark on bayonet gauge.

Oil all points of lubrication, such as Starter, Generator, Distributor, etc.

The oil in the engine should be replaced with new oil, particularly if rust proof oil has been used during storage.

AIR CLEANER:

Clean and refill with oil.

OIL FILTER:

Check oil filter; replace element, if necessary, as a further precaution to assure satisfactory engine performance in your Tractor.

TUNE-UP:

It is advisable that before the unit is placed in service, the engine be started and run for a period of 30 to 45 minutes, after which the engine should receive the minor tune-up operations.

TROUBLE CHART

Failure of Engine to Start:

- Ignition switch in off position.
- Lack of fuel.
- Water in fuel, or fuel lines to carburetor clogged.
- Weak spark.
- Spark Plugs improperly adjusted or dirty.
- Excessive choking of the carburetor.

ENGINE STOPS:

- Lack of fuel.
- Failure of ignition system.

OVERHEATING:

- Spark too late, or very weak.
- Mixture too lean.
- Lack of proper lubrication.
- Insufficient cooling water.
- Radiator water passages clogged.
- Chaff or dirt in radiator fins.
- Water pump not working properly.
- Loose fan belt.
- Heavy carbon deposits in cylinder.

ENGINE USES TOO MUCH FUEL:

- Spark too late.
- Leaky valves.
- Improper carburetor adjustment.

LOSS OF POWER:

- Spark occurring too late.
- Dirty spark plugs.
- Poor connections; also dirty connections.
- Breaker points worn, oily, or out of adjustment.
- Mixture too lean or too rich.
- Flow of fuel to carburetor restricted.
- Water in fuel.
- Leaks around intake manifold.
- Overheating in cylinder or bearings.
- Gummy, inferior, or insufficient oil.
- Governor out of adjustment.
- Sticky carburetor butterfly stem.
- Lack of compression, which may be due to leaky valves or piston rings.
- Leaky cylinder head gasket.

MISFIRING:

- Poor connections.
- Distributor dirty or broken, or loose connections.
- Breaker points pitted, dirty, or poorly adjusted.
- Dirty or cracked spark plugs; points of plugs not properly spaced.
- Mixture too lean or too rich.
- Fuel passage partly clogged.
- Water in fuel.
- Valves sticky or insufficient tappet clearance.

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TO FIND SPEED OF DRIVEN SHAFT:

To determine speed of drive shaft when size of driven pulley is known:

Multiply diameter of driving pulley by number of revolutions per minute and divide by diameter of driven pulley.

TO FIND SIZE OF PULLEY TO USE ON DRIVEN SHAFT:

To determine size of driven pulley, to obtain a required speed of a driven shaft:

Multiply diameter of driving pulley by number of revolutions per minute and divide by desired speed of driven shaft.

OPERATION AND CARE OF THE DEPTH-O-MATIC LIFT

The lift itself consists of 3 major units:

1. The cylinder and control unit mounted on top of the transmission case. It is double acting, that is, it both lowers and lifts the implement hydraulically.
2. The pump, mounted on the timing gear case and driven by the cam shaft gear.
3. The oil tank, mounted on the front of the radiator on the radiator support.

The cylinder and the control valve are built together as a unit and so mounted that the control lever is located between the operator's legs just below the tractor seat. The lift is double acting, that is it provides power to both lift the implement and force it down. The control can be adjusted to stop automatically at any point on the up or down stroke by moving the adjustable stops which are secured with thumb screws. The operating handle has two working positions. In its normal position, the lift works at "high speed". It will lift or lower the load in approximately $1\frac{1}{2}$ seconds. By holding the lever over to the left, the lift works in "low speed" and is set at the factory to complete each cycle in seven seconds.

The pump is gear type and continuously circulates oil through the hydraulic system whenever the engine is running. The delivery is approximately 8 gallons per minute at operating speed. In operation, oil is drawn from the reservoir mounted in front of the radiator into one side of the pump and then is forced from the other side through the oil line into the inlet port of the selector valve, through the internal open center passages to the valve return port and then back to the reservoir, thru the return line.

When the hand lever is moved forward the sliding piston of the selector valve will open and close the necessary internal passages to extend the cylinder piston. When the lever is pulled back the cylinder piston will retract.

When the cylinder piston has completed its travel the sliding selector valve will be returned to its neutral position by the springs in each end of the selector valve housing, thus holding the drawn tool in the desired position. At the same time the open center passages are opened to allow the fluid to circulate at low pressure.

The integral relief valve in the selector valve housing is connected to the system pressure line and is set to open at 900-1000 psi. This valve is a unit safety feature and will relieve excessive internal pressure, thus preventing damage to equipment.

MAINTENANCE:

Every precaution should be taken to prevent entry of dirt into the fluid or any part of the system.

Be sure hydraulic system is kept filled with oil.

NOTE: If the following adjustments are not made correctly lift will not function properly, however, no damage will likely occur.

Depth Control:

Depth stops are provided on the follower rod, the purpose of these stops is to permit limiting the stroke or travel of the cylinder, and in turn determining the raised and lowered positions of the implements.

The function of the depth stops is to contact the valve lever and return the control valve to neutral and thus stopping motion of the cylinder and implements.

To change the controlled position of the tools, slide stops along rod till desired travel of cylinder and implement is obtained.

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High Speed:

The valve is provided with a high speed adjusting screw, the purpose of this screw is to limit the maximum speed that an implement can drop from a raised position.

The reason for limiting the speed of dropping of an implement is to insure that the full desired travel of the cylinder and implement is obtained before the valve automatically returns to neutral and stops further motion.

The high speed adjusting screw is the hexagon headed cap screw located in the end plate in the valve.

The high speed screw should be adjusted so that with your heaviest implement attached, and with the tractor engine running at governed speed, there should be no lag in the operation of the lift. i.e. - The motion of the piston in or out of the cylinder should be uniform with no tendency to slow down.

NOTE: To get best performance from the hydraulic system the lift should operate with minimum restriction. Care should be taken when adjusting the high speed screw to insure that the valve is as nearly full open as possible and still meet the above uniform motion requirement.

CAUTION: If the high speed screw is adjusted wrong so that the valve does not open sufficiently the pump will operate under unnecessary load. This will possibly reduce pump life.

Slow Speed:

A slow speed valve position is provided to give a convenient method of selecting intermediate implement positions without readjusting depth stops.

Adjusting screws are provided to permit the tractor operator to select a slow speed to his liking. To change the slow speed, adjust the round head set screws in the end plate and stop lever till the speed of operation of the lift is satisfactory.

NOTE: The slow speed stops are only effective when the handle is pushed to the left and then operated.

CAUTION: The slow speed control position causes the engine pump to operate at full pressure all the time, and hence continued use

of the lift in slow speed instead of high speed will cause unnecessary wear in the pump and hydraulic system.

If the unit has been removed for servicing the following adjustments should be checked, when the lift is reinstalled in the tractor.

Adjust stop lever to give 1/16" clearance with follower rod - be sure jam nuts are securely tightened after making adjustment.

CAUTION: Be careful that valve piston is not twisted when tightening nuts.

Adjust end plate so there is 1/8" clearance between projection on end plate and the head of the slow speed adjusting screw. (The holes in the end plate are slotted and by loosening the screws the end plate can be turned to make this adjustment.

Maintain a full supply of oil in the supply tank. Use every precaution to keep the oil clean and to keep dirt from getting into the tank or lines.

For servicing use any S.A.E. No.10 premium grade motor oil.

WINTER OPERATION:

For cold weather operation the hydraulic system should be serviced as outlined below:

For temperature down to 10° F. no dilution of the SAE #10 oil is necessary. For operation down to 0° F. one quart of oil should be drained from the supply tank and one quart of kerosene added. For operation down to -10° F. two quarts of oil should be drained out and two quarts of kerosene added. Of course, it is recommended that if the oil is diluted for winter use that it be replaced completely with 7 quarts of new SAE #10 oil for warm weather use.

Drain the system once a year to remove any accumulation of dirt or water in the bottom of supply tank. This should be done immediately after the days run or while the oil is still warm.

If the pump or lines have been opened, work the pump a few full strokes with no load to bleed out any possible air bubbles.

If oil spurts out of the filler cap on the tank it indicates that too much oil is in the tank.

Oil the rear hinge pin on the pump daily with an oil can.

Watch all lines for leaks either at line connections, hose clamps or plugs. Correct all leaks immediately.

When the lift cylinder is not attached to a lift shaft it is to be supported on the rear guide rod with a cotter key inserted through the matching holes in the guide rod and sleeve.

UNIT OVERHAUL:**Actuating cylinder:**

- a. Normal overhaul of this unit will require only the replacement of packings, and should be done when leakage occurs.
- b. To replace cylinder packings remove the snap ring that secures the bearing in the cylinder end, and withdraw piston and bearing from the cylinder.
- c. Replace "O" ring synthetic rubber packing and two backup rings on piston; also packing and one back-up ring on outer side of bearing. Remove bearing over end of piston rod and replace packing and back-up ring in groove on inside of bearing.
- d. Remove and replace the oil retainer in end of bearing that surrounds the piston rod.
- e. Insert piston and bearing in cylinder and secure bearing with snap ring.

CAUTION: Be sure snap ring is securely seated in groove.

Selector Valve:

To replace packings in selector valve remove the valve and handle from cylinder.

Loosen the locking nut on both sides of the stop lever and unscrew the lever from the piston rod.

From each end of the valve, remove the two screws that secure the end plate to the valve.

From each end of valve, remove the bearing, spring and retainer. Replace the packing ring in each of the inner and outer grooves in the bearing. Replace oil retainer in end plates.

NOTE: Clean all metal parts when disassembling the unit. Keep all parts clean during reassembly.

Insert piston in valve body.

Insert a bronze retainer in each end of valve.

Insert springs, then the bearings and secure in place with end plate on each end of valve.

Replace seals in each of five packing counterboxes and attach valve to cylinder with four attaching bolts.

Screw stop nut on piston till it bottoms and backoff 1/2 turn then screw on stop bar and other stop nut on threaded end of valve piston.

Attach the handle to the valve by inserting pin in hole in end of piston and install sufficient washers to give a snug fit between handle and piston and then insert the cotter pin.

Install and tighten spring and bolt on bottom of lever.

Adjustments:

After replacing packing the following adjustments must be made:

Adjust bolt at bottom of handle, to give 3/32" clearance with round head slow speed adj. screw and handle.

NOTE: It may be necessary to shift end plate to get 3/32" clearance. If this is required loosen screws and rotate plate.

CAUTION: Be sure oil retainer in end plate contacts evenly all around circumference of valve piston. Tighten screws and lock jam nut on handle pivot bolt securely.

Adjust stop bar so it is 2-1/8 inches from edge of piston rod.

Adjust end plate so there is 1/8" clear between projection on end plate and round head slow speed adj. screw

Adjustments #2 and #3 are approximate only and will have to be checked when lift is installed on tractor.

Test Complete Unit:

After repacking hydraulic lift it should be tested as follows:

Connect lift to hydraulic system so oil pressure of 1000 psi can be obtained.

NOTE: Use test stand or tractor.

Connect pressure gage in drawn tool cylinder port on valve.

Hold handle toward valve till cylinder piston bottoms and then pressure should go to 850 min. to 1100 max. with 7-1/2 gallons per minute flowing from pump (Governed engine speed on tractor).

Look for any external leaks.

Hold handle in opposite position and after cylinder piston bottoms look for external leaks.

DEPTH-O-MATIC LIFT

SYMPTOMS	POSSIBLE CAUSE	REPAIR TO CORRECT TROUBLE
Handle does not return to neutral.	Foreign matter in valve. Bent spool.	Remove spool very carefully (do not force). Clean spool and body thoroughly. Check valve bore for possible burrs. Polish bore to remove rough surface. Note: Small hair line scratches do not cause trouble. Check bronze retainers for burrs. Remove spool from body. Check straightness of spool. Straighten if possible with soft object. Do not hit with hammer.
Lift will not raise implement.	No oil in reservoir. Pump failed. Piston seal failed. Relief valve failed.	Fill to proper level. Replace pump. Replace seal. Replace seat and ball.
Lift will not stay in position.	Valve worn out. Piston seal leaks.	Replace valve body and spool. Replace seal.
Short seal life.	Piston worn out. Rod bearing worn out.	Replace with new piston. Note: Difference in diameter of piston and cylinder should not exceed .025 inches. Replace with new bearing. Note: Difference in diameter of rod and bearing should not exceed .015 inches.
Lift will not raise load fast enough.	Same troubles as in failure to lift. Also. Valve worn out.	Replace valve body and spool.

IMPORTANT: Do not leave an implement of any kind suspended in mid-air over night or any length of time when the implement is not in use. When tractor is not in operation and the control lever is moved, the tool will drop rapidly which might cause serious injury to anyone under the implement.

ADJUSTMENT INSTRUCTIONS FOR DEPTH-O-MATIC CONTROL

When connecting the ram to the arm on both the high and low lift shaft the following adjustments must be checked and made.

It is very important that these adjustments be made correctly for two reasons; (1) So that the unit will function as it is supposed to with regard to slow speed stops, over-ride of Depth-stops and return of the handle to neutral at the end of the cylinder stroke. (2) To prevent serious damage to the lift unit because of the lack of proper adjustment.

The necessary adjustments are shown in Plate Nos. 51, 52 and 53 and are supplemented with the following information.

(1) Handle (See Plate No. 51).

Always start by setting the control handle in a vertical position by adjusting the pivot bolt. Check the 3/32" clearance dimension between the handle and slow speed stop. If necessary, loosen the screws which hold stop plate and rotate to obtain the correct dimension.

"44" MASSEY-HARRIS TRACTORS "44K"**(2) Follower Arm (See Plate No. 52).**

With follower arm bolted in place, check alignment of Follower Arm and cylinder. If necessary, bend follower arm so that it remains parallel with the cylinder through out its entire travel.

(3) Stop Lever (See Plate No. 53).

Adjust Stop Lever to obtain $1/16$ " between it and the follower arm. Check the distance between the Slow Speed Stop and the Stop Lever and the stop plate. If necessary, loosen screws holding stop plate and rotate stop plate to obtain $1/8$ " dimension.

(4) High Speed Stop (See Plate No. 52).

Adjust high speed stop so that it does not contact the handle. NOTE: High Speed Stop Adjustment screw is assembled for use with the low lift shaft. When using the high lift shaft the adjustment screw must be removed and used at the control handle end of the cylinder, in hole provided in stop plate.

(5) Slow Speed Stop (See Plate No. 52).

Adjust Slow Speed Stop to limit the travel of the handle on one end and the stop lever on the other, so that the cylinder extends or retracts in three to four seconds.

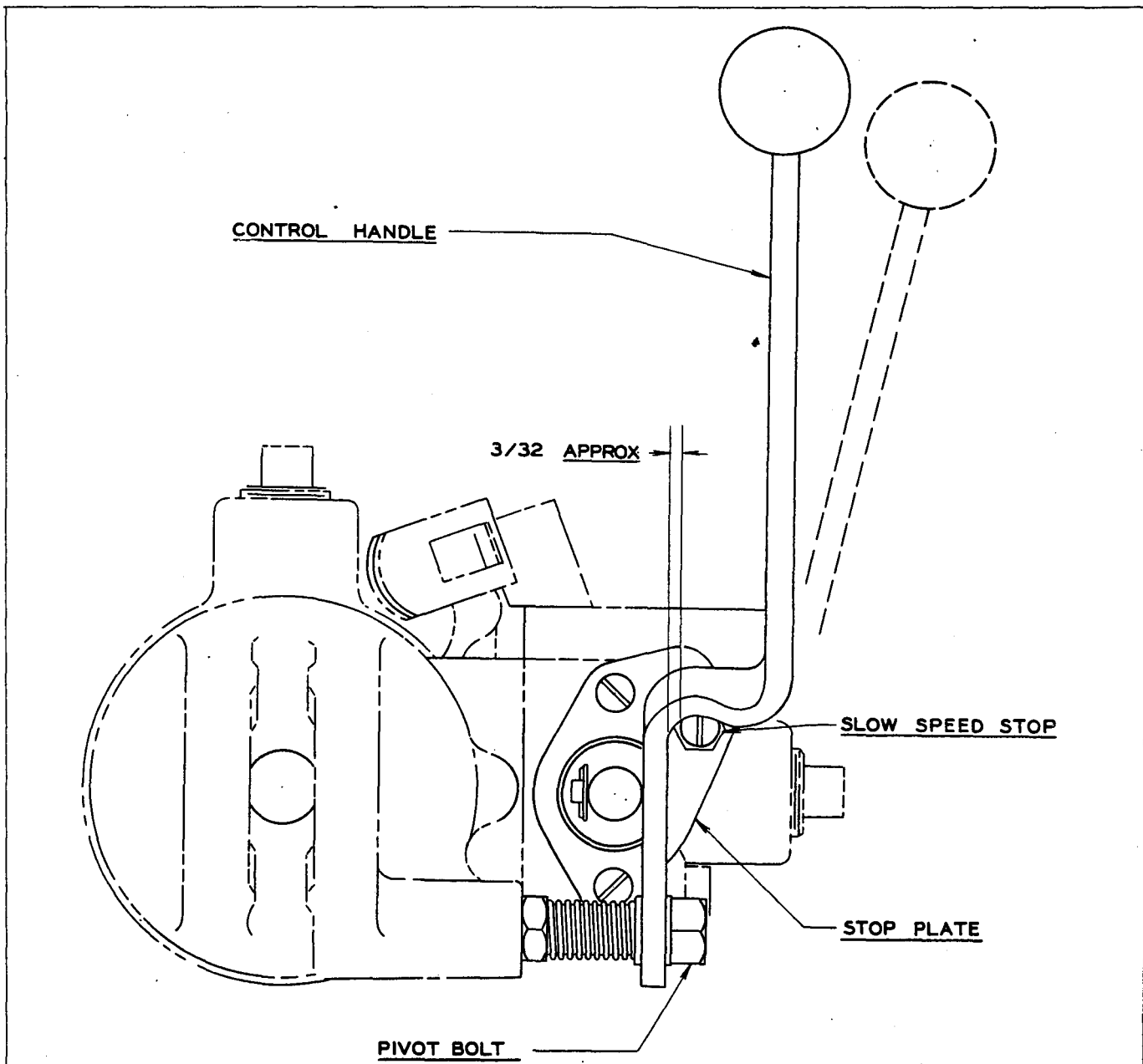


PLATE NO. 51

"44" MASSEY-HARRIS TRACTORS "44K"

65

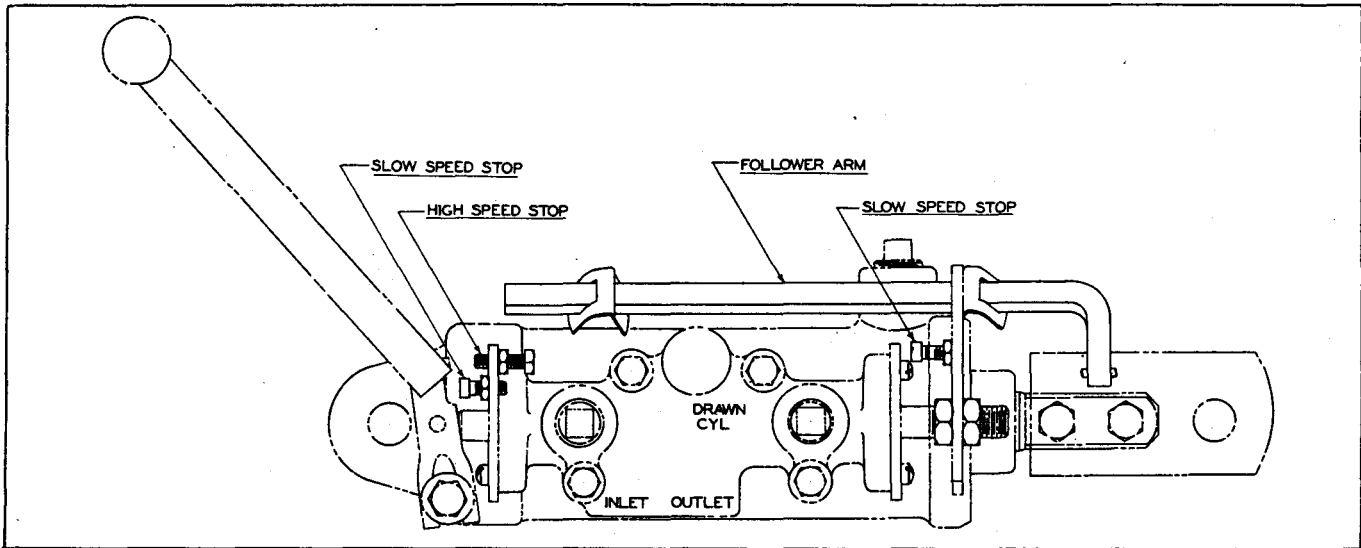


PLATE NO. 52

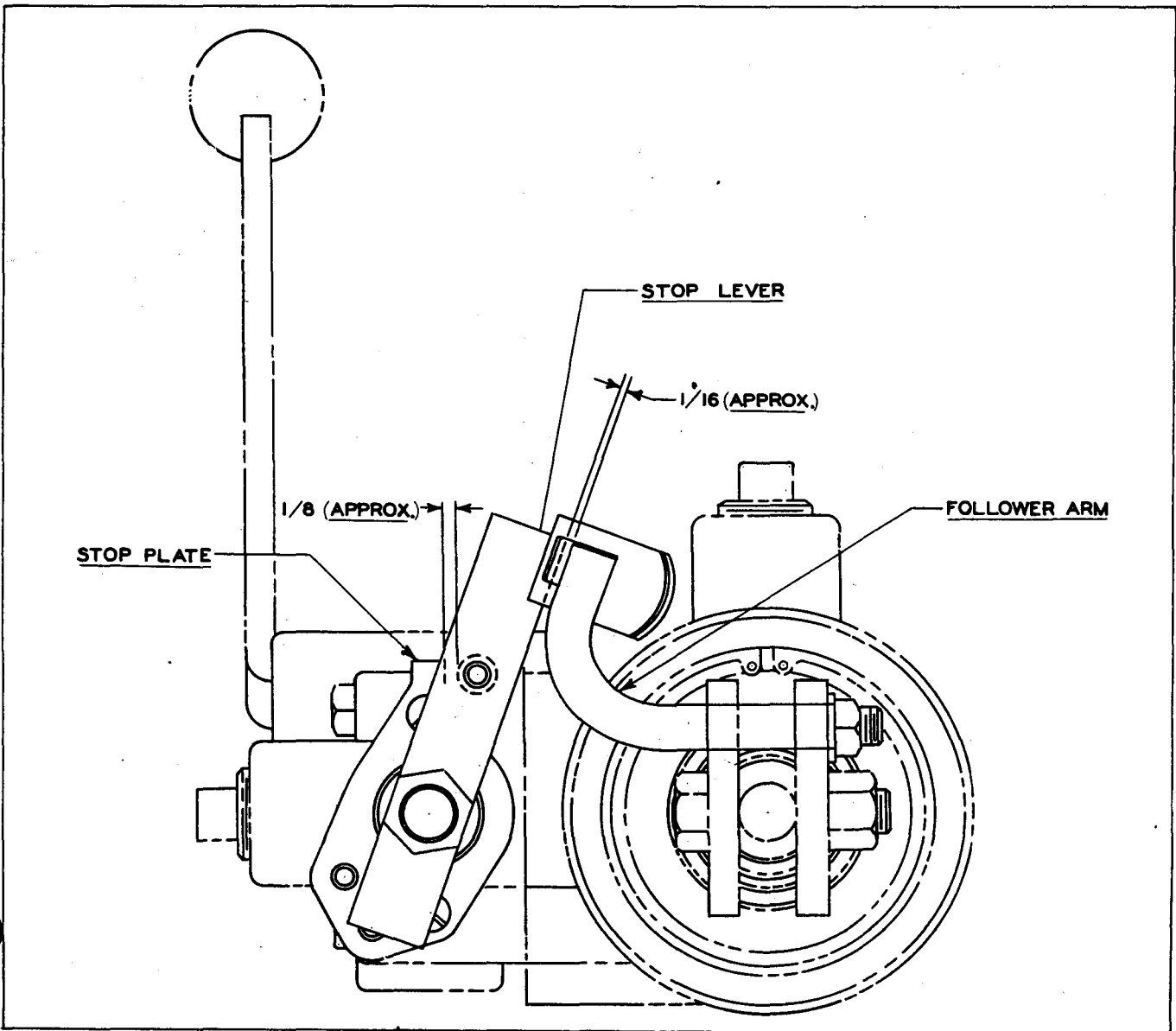
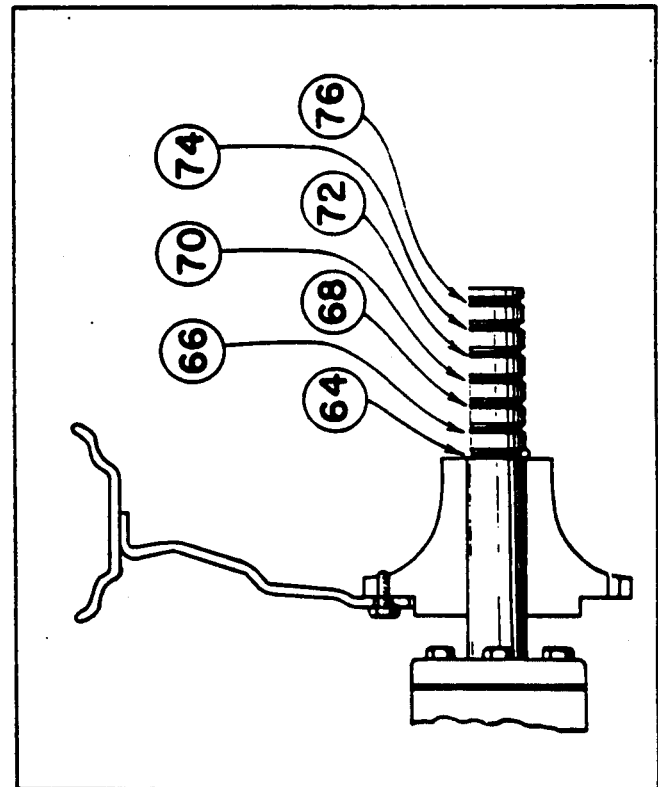
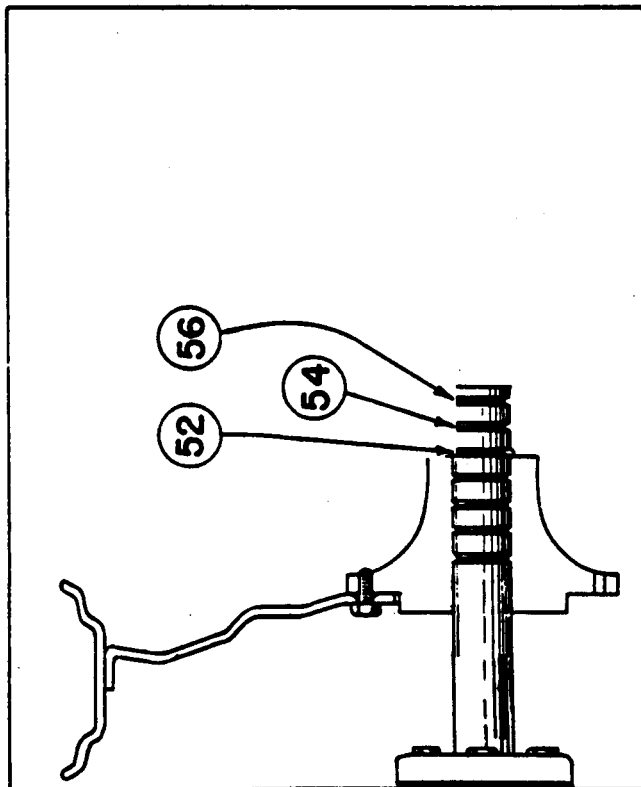
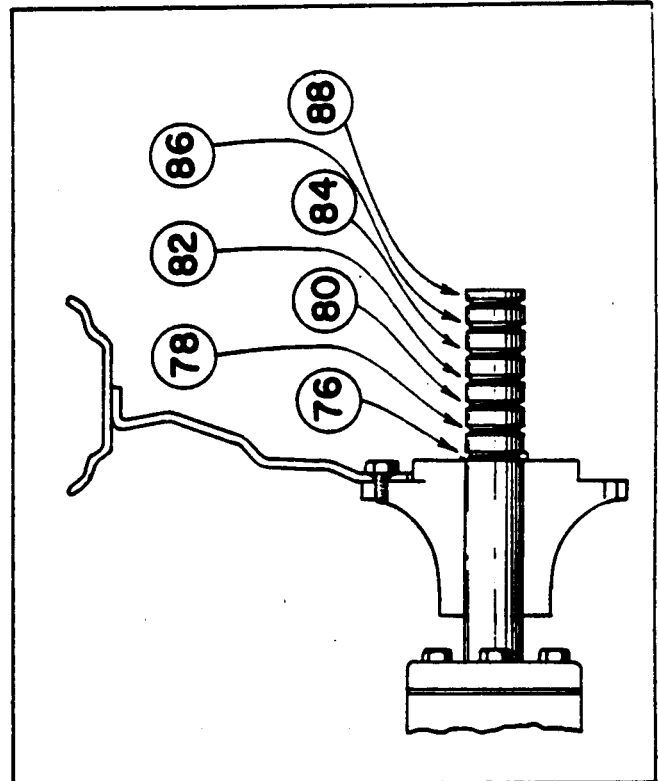
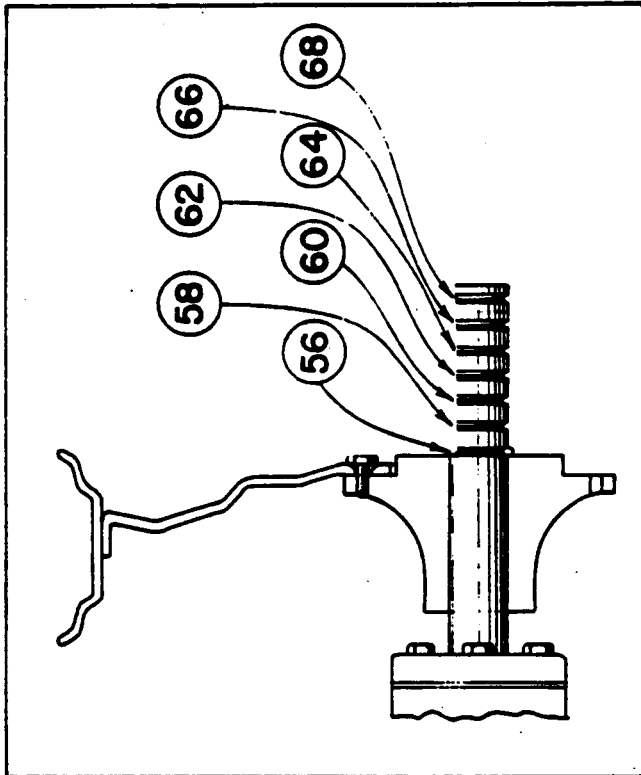


PLATE NO. 53

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

"44" MASSEY-HARRIS TRACTORS "44K"



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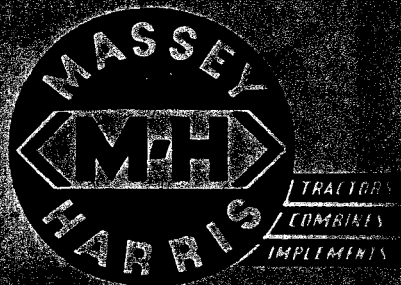
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INSIST UPON THE GENUINE

GENERAL DESCRIPTION

The basic charging system is the SI integral regulator charging system (Fig. 6D-1C). The internal components are connected electrically as shown in Fig. 6D-2C. The generator is connected to the car electrically as shown in Fig. 6D-3C.

The 15-SI generator is similar to the 10-SI except that:

1. It is slightly larger physically.
2. It produces 70 amps output at full speed.
3. It uses different drive end and slip ring and bearings.
4. The stator uses delta windings, which cannot be checked for opens.

The brown field wire to the generator is used to initially activate the generator. The 10 ohm resistance, provided by either the generator warning lamp or the resistance wire with optional gages, is needed to protect the diode trio.

Although several models of generators are available with different outputs at idle and different maximum outputs, their basic operating principles are the same.

The generator features a solid state regulator that is mounted inside the generator slip ring end frame. All regulator components are enclosed into a solid mold, and this unit along with the brush holder assembly is attached to the slip ring end frame. The regulator voltage setting never needs adjusting, and no means for adjustment is

provided.

The generator rotor bearings contain a supply of lubricant sufficiently adequate to eliminate the need for periodic lubrication. Two brushes carry current through two slip rings to the field coil mounted on the rotor. Under normal conditions will provide long period of attention-free service.

The stator windings are assembled on the inside of the laminated core that forms part of the generator frame. A rectifier bridge connected to the stator windings consists of six diodes, and electrically changes the stator a.c. voltage to a d.c. voltage which appears at the generator output terminal. Generator field current is supplied through a diode trio which also is connected to the stator winding. A capacitor or condenser, mounted in the end frame, protects the rectifier bridge and diode trio from voltage spikes, and suppresses radio noise.

No periodic adjustments or maintenance of the generator are required on the entire generator assembly.

NOISY GENERATOR

Noise from a generator may be caused by a loose pulley, loose mounting bolts, worn or dirty brushes, a defective diode, or defective stator.

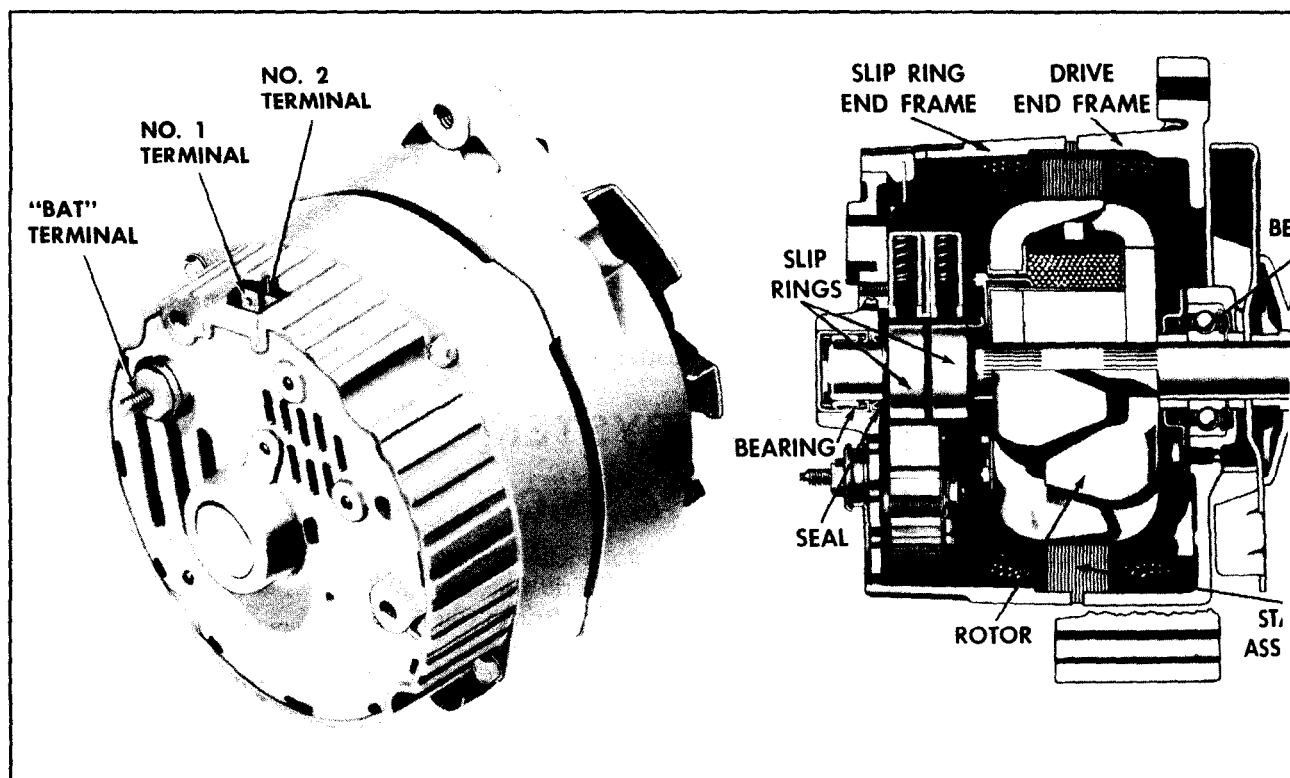


Fig. 6D-1C--10SI Generator

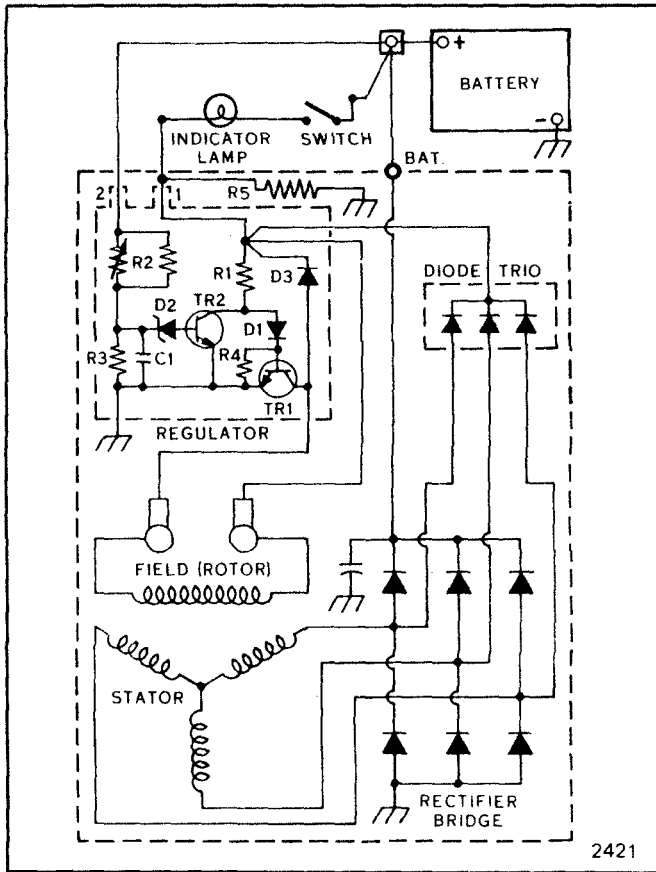


Fig. 6D-2C--Regulator in Charging Circuit

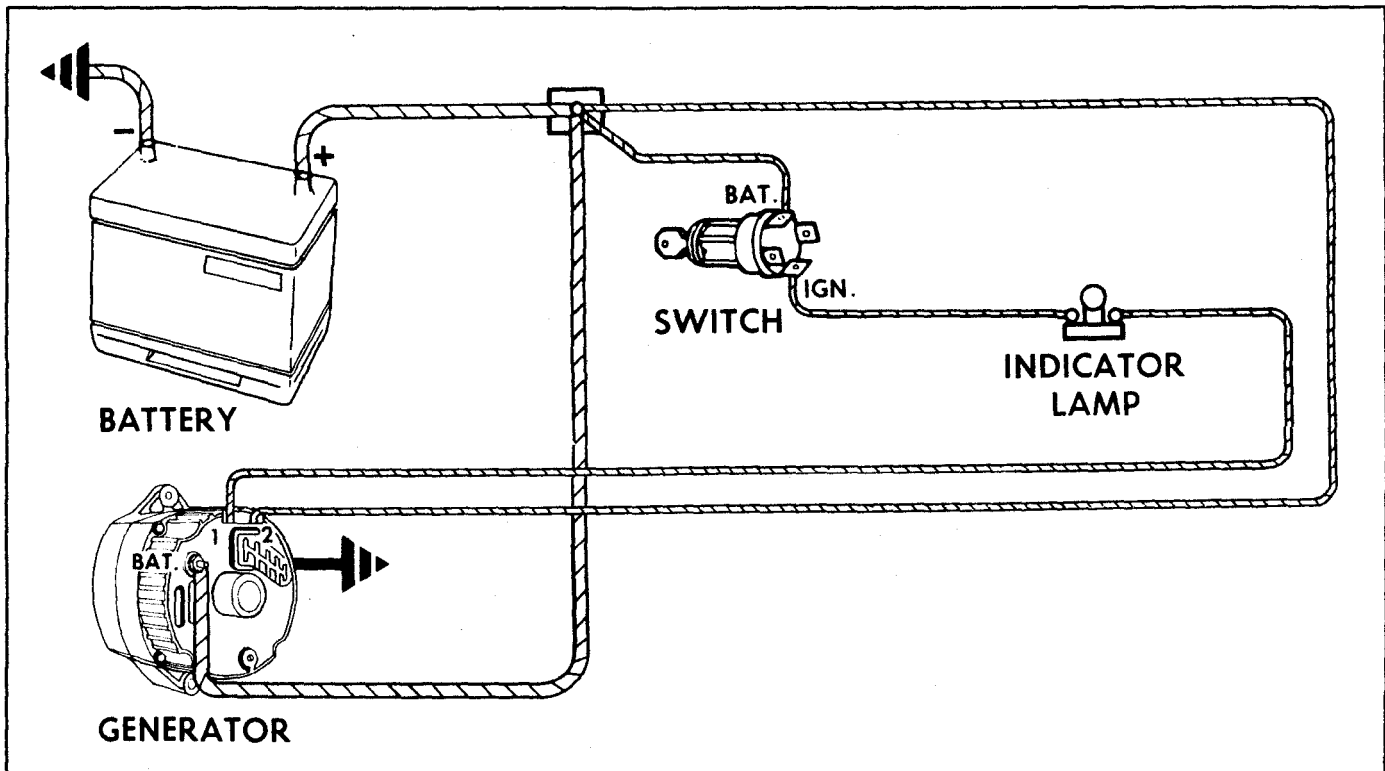
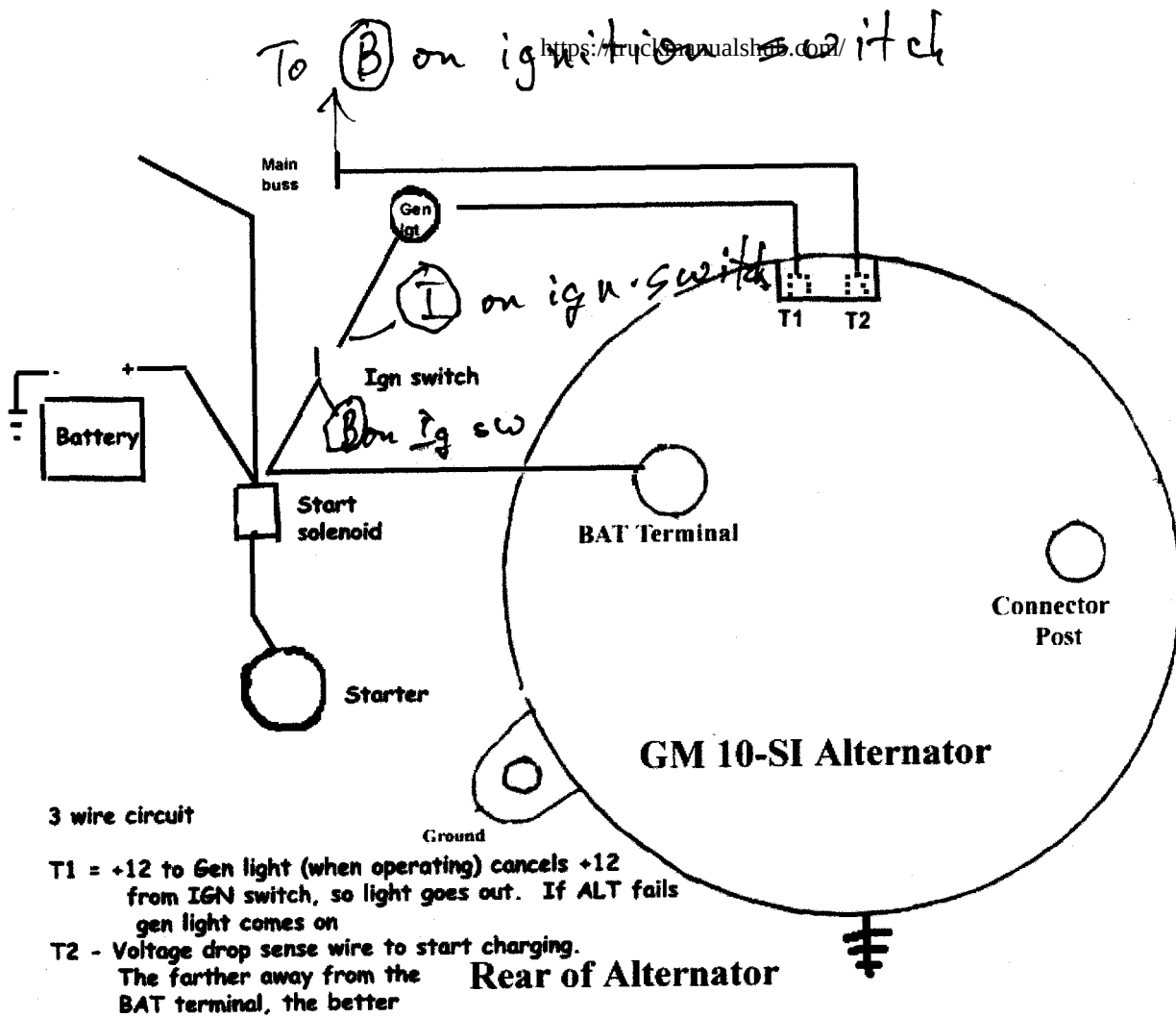


Fig. 6D-3C--Charging Circuit - SI System



MASSEN ALTERNATOR WIRING DIAG.