REMOVING ENGINE FROM TRACTOR

1. Drain crankcase oil.

2. Remove tractor hood by spreading hood only far enough to remove one pin at a time. *NOTE: Too much deflection could cause the hood to crack.*

3. Remove front grille.

4. Shut off gas at sediment bowl and remove gas tank.

5. Disconnect ground wire on engine and coil wire. *NOTE: Coil and condenser come off with the engine.*

6. Disconnect choke and throttle control cables at the engine.

7. Remove hydraulic system above cylinder head if tractor is so equipped. *NOTE: Do not disconnect hydraulic lines unless hydraulic system is to be repaired also.*

8. Remove shielding from right-hand side of tractor and remove four engine base bolts. Lift out engine.

DISASSEMBLING ENGINE

Remove engine shrouding, motor-generator, coil and carburetor.

Remove cylinder head, breather assembly and valves. See Group 10 of this section.

Break flywheel nut loose with a shock tool or use a long handle nut spiner and a strap wrench. The flywheel is mounted on a tapered shaft and should be removed with a puller, Figure 3.

Remove oil pan and dipstick. Turn engine upside down and remove connecting rod, cap screws, lock and rod cap.

CAUTION: Use proper type tools to prevent oil slinger damage when removing rod cap screws.

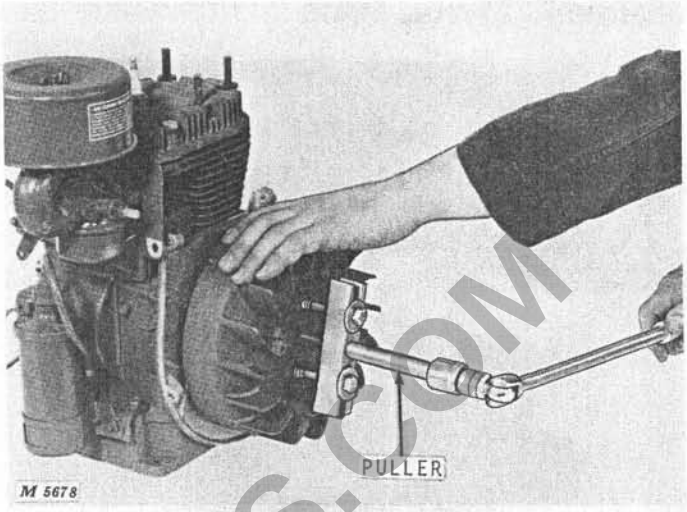


Fig. 3–Removing Flywheel

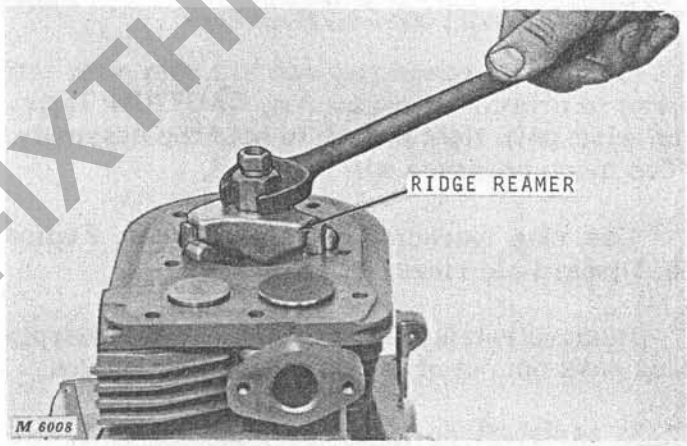


Fig. 4–Removing Ridge with Ridge Reamer

Before removing piston, check for carbon or ridge at top of cylinder bore. Remove carbon and ridge with ridge reamer, Figure 4. Push piston and rod out top of block.

Remove bearing plate (13, Figure 2). Be sure key is removed from end of crankshaft before removing plate. **Be careful not to cut oil seal.**

Leave bearing and seal in the bearing plate unless bearing or seal service is required.

Lift out crankshaft.

NOTE: It may be necessary to press crankshaft out.

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Group 10
SPECIFICATIONS

ENGINE SPECIFICATIONS

Engines	110 Tractors		112 Tractors
	(-3550)	(3551-)	(-100 000)
Engine Model No.	K161S	K181S	HH100
Manufacturer	Kohler	Kohler	Tecumseh
Cylinders	One	One	One
Cycle	Four	Four	Four
Bore & Stroke	2.875 x 2.50 in.	2.94 x 2.75 in.	3.31 x 2.75 in.
Displacement	16.22 cu. in.	18.63 cu. in.	23.70 cu. in.
Speeds (fast) No Load	1800-3800 rpm	1800-3800 rpm	1800-3800 rpm
Speeds (idle)	1200-1700 rpm	1200-1700 rpm	1200-1700 rpm
Horsepower (Engine Manufacturers Rating)*	7 @ 3600 rpm*	8 @ 3600 rpm*	10 @ 3600 rpm*
Normal Compression	110-120 psi	110-120 psi	110-120 psi
Valve Clearance	---	---	---
(Intake) Cold	0.007 in.	0.007 in.	0.010 in.
Valve Clearance	---	---	---
(Exhaust) Cold	0.016 in.	0.016 in.	0.010 in.

**The horsepower ratings shown are established by the engine manufacturer in accordance with Standard Internal Combustion Engine Institute procedure. They are corrected to 60°F. and 29.92 in. Hg. Barometer and are developed from laboratory test engines equipped with standard air cleaner and muffler less motor-generator equipment.*

CAPACITIES

Cavities	110 Tractors			112 Tractors
	(-15000)	(15001-40000)	(40001-100,000)	(-100,000)
Fuel Tank - U.S. Gallons	1.9	1.9	1.9	1.9
Crankcase - U.S. Pints	2.5	2.5	2.5	2.5
Transaxle - U.S. Pints	2.0	3.0	3.0	3.0
Hydraulic Lift System - U.S. Pints	--	--	2.5	2.5

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DIAGNOSING MALFUNCTIONS

ENGINE

Engine Will Not Crank

Transaxle not in neutral.
Place shift lever in neutral position.

Battery discharged or defective.
Check battery condition.
Replace battery if necessary.

Neutral-start switch and bracket loose or not properly adjusted.
Tighten and/or adjust bracket and switch.

PTO drive engaged.
Disengage clutch.

Defective safety switch(es).
Replace switch(es).

Loose motor-generator belt.
Adjust belt tension.

Broken motor-generator sheave.
Replace motor-generator sheave.

Defective solenoid.
Replace solenoid.

Loose electrical connections.
Tighten connections firmly.

Motor-generator malfunction.
Check condition of motor-generator.
Repair or replace if necessary.

Engine seized.
Check engine condition.

Engine Cranks But Will Not Start

Empty fuel tank.
Fill fuel tank.

Restricted fuel tank vent.
Replace cap or cap gauge assembly.

Fuel shut-off valve closed (valve below fuel tank).
Open shut-off.

Clogged, restricted or air lock in fuel line.
Clean and bleed line.
Replace line if necessary.

Breaker points worn or pitted.
Check condition.
Replace if necessary.

Spark plug fouled or pitted.
Check condition of plug.
Clean and regap.
Replace if necessary.

Incorrect spark plug.
Install proper spark plug.

Battery not fully charged.
Charge battery and check condition.
Replace battery if necessary.

Loose electrical connections.
Tighten connections firmly.

Wire leads not properly connected.
Connect wire leads to their respective terminal.

High speed and idle mixture needles not properly adjusted.
Adjust carburetor.

Faulty condenser.
Replace condenser.

Defective ignition coil.
Replace coil.

Dirt in fuel system.
Remove fuel system and clean dirt and water from system.
Install new gaskets.
Install carburetor kit if necessary.

Frayed wire(s) causing ground(s).
Repair wire(s), replace if necessary.

Engine Starts Hard

Spark plug pitted or fouled.
Check condition of plug.
Clean and regap.
Replace if necessary.

Breaker points worn, pitted or out of adjustment.
Check breaker point condition.
Clean and regap.
Replace breaker points if necessary.

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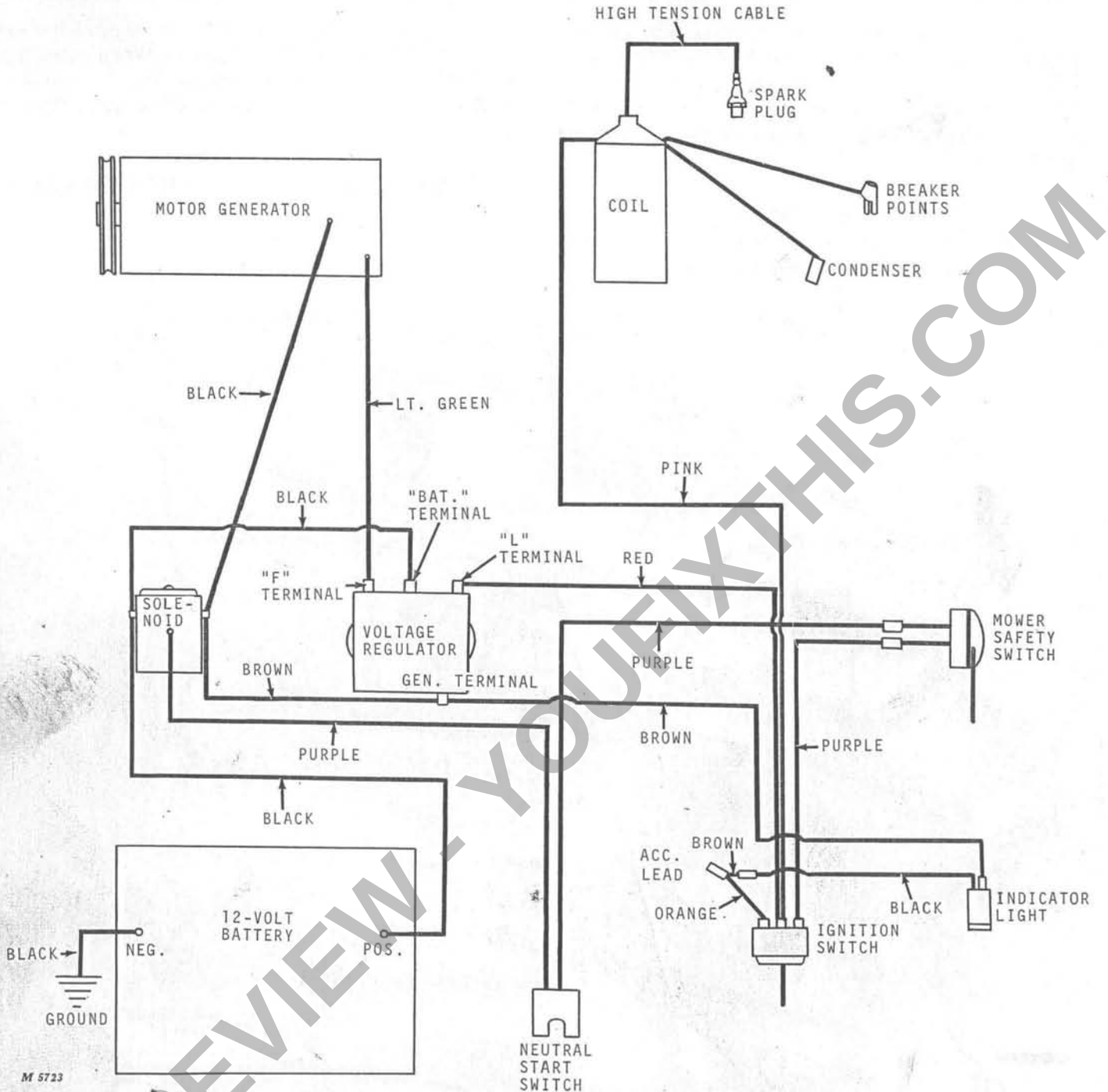


Fig. 4–Electrical System Wiring Diagram (15001-)

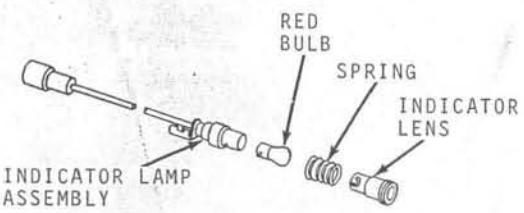


Fig. 5–Schematic View of Generator Indicator Lamp

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INSPECTING AND REPAIRING BLOCK

After thoroughly cleaning the block, check it for cracks. Cracks not visible to the naked eye may be detected by coating the suspected area with a mixture of 25 per cent kerosene and 75 per cent light engine oil.

Wipe the part dry and immediately apply a coating of zinc oxide dissolved in wood alcohol. If a crack is present, the coating will become discolored at the defective area. Replace the block if cracked. *NOTE: A short block is available for service.*

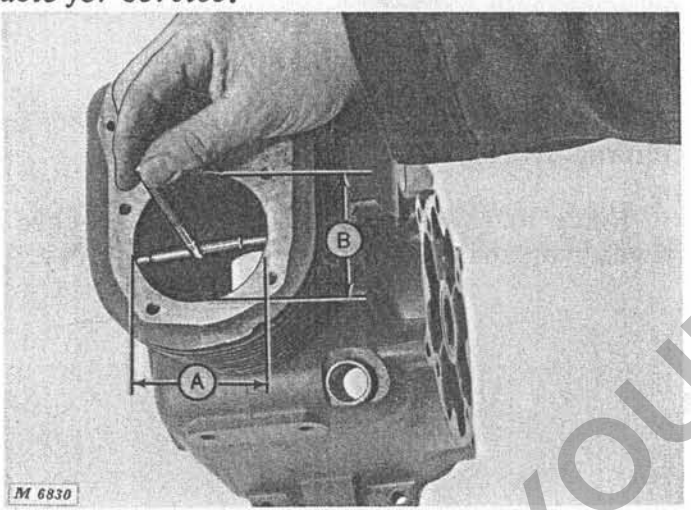


Fig. 24–Measuring Cylinder Bore

Use a telescoping gauge and micrometer to measure bore in two places, at top and bottom of ring travel area. Out-of-round dimension is the difference between dimensions A and B. Cylinder wall taper is the difference between dimension A at the top and dimension A at the bottom of cylinder bore. See "Specifications," page 35-18, for wear tolerance.

DEGLAZING CYLINDER BORE

Deglazing is not intended to remove any appreciable amount of metal from the bore, but rather to clean up and provide the proper surface. A proper bore surface feels smooth, but has a cross-hatch pattern of micro-scratches which can be seen. This finish will allow the new rings to conform to the cylinder bore. This finish also retains a small film of oil to provide ring lubrication for the ring surface and prevents scoring.

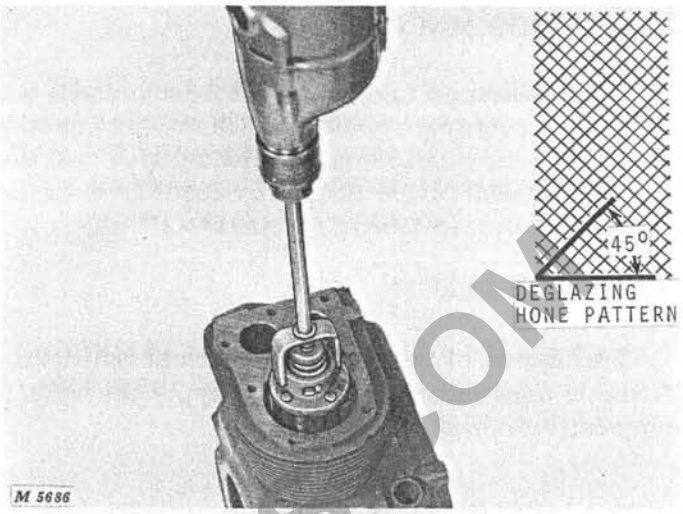


Fig. 25–Deglazing Cylinder Bore

Use a deglazing tool to break glaze, Figure 25. Follow manufacturer's recommendations.

A 200-280 grit tool is generally preferred for deglazing. A cross-hatch pattern of approximately 45° should be obtained while operating the tool vertically during deglazing.

BORING CYLINDER BLOCK

If block is to be bored as determined on page 35-7, clean and dry block thoroughly. Boring can be done by machining at a reliable automotive repair shop or by electric drill and boring tool. See "Special Tools," page 35-19.

Reboring to 0.010-inch oversize to accommodate oversize piston and rings can also be done with a course stone in the deglazing tool, Figure 25, and refinishing with finer grit stones. *IMPORTANT: If block is jigged in a drill press for reboring, be sure boring tool and block are in true alignment.*

INSPECTING CAMSHAFT

Check camshaft for broken or cracked gear teeth. Check operation of EZEE-start assembly making sure all parts are intact and operate freely. Check condition of flyweight spring. If camshaft needs attention, see Group 40 for camshaft and governor service.

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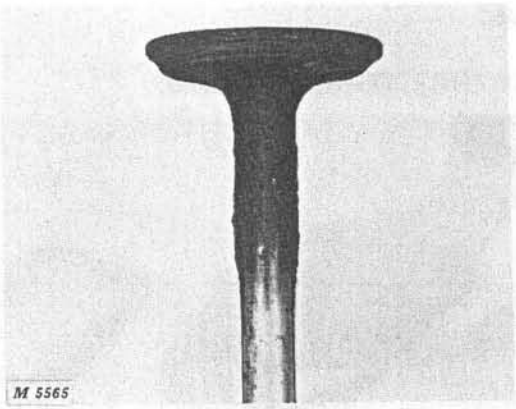


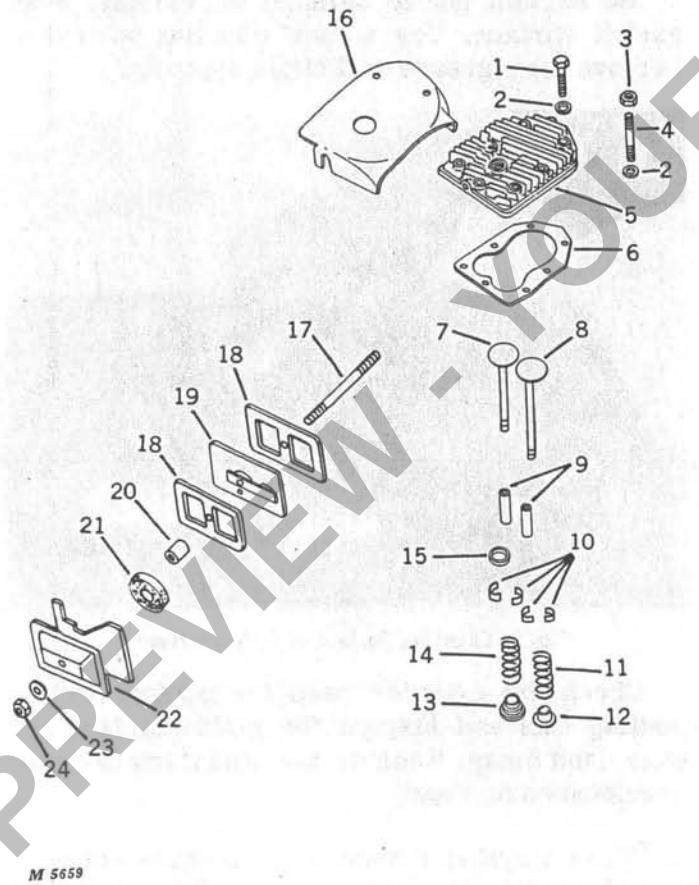
Fig. 5–Gummy Valve Causing Valve to Stick

Using gasoline which has been left in the tank a long time is a common cause of sticking valves.

Sometimes this gummy substance can be seen on the valve. When this condition is found, it is also likely that the carburetor also contains gum deposits and will require a complete cleaning.

Advise customer always to use fresh gasoline and always to drain gas from all fuel lines and carburetor before storing tractor.

REPAIR



1 – Cap Screw (5 used)
2 – Washer (9 used 30198D–10 used 30270D)
3 – Hex. Nut (9 used 30198D–10 used 30270D)
4 – Stud (2 used 30198D–3 used 30270D)
5 – Cylinder Head
6 – Head Gasket
7 – Exhaust Valve
8 – Intake Valve
9 – Valve Guides (2 used)
10 – Spring Keeper (4 used)
11 – Intake Valve Spring
12 – Spring Retainer (Intake and Exhaust, 30198D–Intake, 30270D)
13 – Exhaust Valve Rotator (30270D)
14 – Exhaust Valve Spring
15 – Exhaust Valve Insert
16 – Head Baffle
17 – Stud
18 – Gasket (2 used)
19 – Breather
20 – Seal
21 – Filter
22 – Cover
23 – Lock Washer
24 – Hex. Nut

Fig. 6–Exploded View of Cylinder Head, Valves and Breather

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BOLT TORQUE CHART

Grade of Bolt	SAE-2	SAE-5	SAE-8		
Min. Tensile Strength	64,000 PSI	105,000 PSI	150,000 PSI		
Grade Marking on Bolt				Socket or Wrench Size	
U.S. Standard				U.S. Regular	
Bolt Dia.	U.S. Dec. Equiv.	TORQUE IN FOOT POUNDS		Bolt Head	Nut
1/4	.250	6	10	14	7/16	7/16
5/16	.3125	13	20	30	1/2	1/2
3/8	.375	23	35	50	9/16	9/16
7/16	.4375	35	55	80	5/8	11/16
1/2	.500	55	85	120	3/4	3/4
9/16	.5625	75	130	175	13/16	7/8
5/8	.625	105	170	240	15/16	15/16
3/4	.750	185	300	425	1-1/8	1-1/8
7/8	.875	*160	445	685	1-5/16	1-5/16
1.	1.000	250	670	1030	1-1/2	1-1/2

Multiply Readings by 12 for inch pound values.

**"B" Grade bolts larger than 3/4-inch are sometimes formed hot rather than cold which accounts for the lower recommended torque.*

NOTE: Allow a tolerance of plus or minus 10% on all torques given in this chart.

SET SCREW SEATING TORQUE CHART

Screw Size	Cup Point	Square Head
	Torque in Inch Pounds	
#5	9	--
#6	9	--
#8	20	--
#10	33	--
1/4	87	212
5/16	165	420
3/8	290	830
7/16	430	--
1/2	620	2100
9/16	620	--
5/8	1225	4250
3/4	2125	7700

Divide Readings by 12 for foot pound values
NOTE: Allow a tolerance of plus or minus 10% on all torques given in this chart.

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Section 10
GENERAL

Group 5
TRACTOR IDENTIFICATION

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SERIAL NUMBERS

Each lawn and garden tractor is assigned an individual serial number. Serial numbers are written in parentheses throughout this manual for the reasons shown below. Only the last four digits of the serial number are shown for earlier tractors and the last six digits for later tractors. All serial number references are tractor serial numbers and not engine specification numbers.

(3551-) When a serial number appears before the dash, the design change was introduced beginning with that serial number and is still current.

(-40000) When a serial number appears after the dash, the design change was effective up to and including that serial number and is no longer effective.

(40001-65000) When a serial number appears both before and after the dash, the design change was effective with the first serial number, but is no longer effective after the second serial number.

VINTAGE INFORMATION

	110 Tractor					*112 Tractor*
	(-3550)	*(3551-15000)*	*(15001-40000)*	*(40001-65000)*	*(65001-100,000)*	*(-100,000)*
Year Manufactured	1963	1964	1965	1966	1967	1966-1967
Model - Manual Lift	110	110	110	110	110	112
Model - Hydraulic Lift	---	---	---	110H	110H	112H
Engine Model Number	Kohler K161S	Kohler K181S	Kohler K181S	Kohler K181S	Kohler K181S	Tecumseh HH100
Engine Horsepower	7	8	8	8	8	10
Transaxle Speeds (Forward)	3	3	4	4	4	4
Transaxle Speeds (Reverse)	1	1	1	1	1	1

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REPAIR—Continued

It is not necessary to remove the engine from the tractor when servicing the cylinder head, head gasket, muffler, breather assembly, valves and valve seats.

IMPORTANT: On tractors equipped with hydraulic lift, do not disconnect the hydraulic lines. Remove the pump, valve and reservoir unit from the top of the engine and lower it to the ground with the hydraulic lines still attached. This procedure avoids the possibility of dirt entering the system.

Disconnect choke conduit and cable at carburetor. Remove carburetor, breather assembly, hydraulic lift system on engine, motor-generator bracket, head baffle, cylinder head and head gasket.

REMOVING VALVES

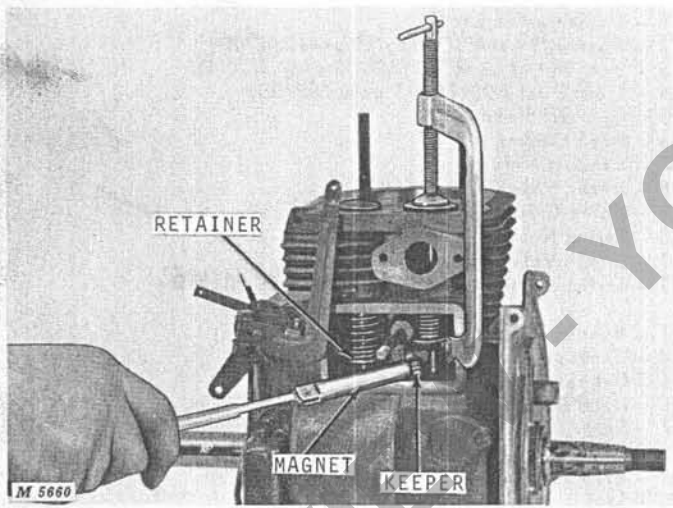


Fig. 7–Removing Valves

Use a valve spring compressor to compress valve springs, Figure 7. Remove keepers from valve stem and lift valves from engine block.

Remove valve spring retainers and valve springs from valve chamber. Note that 110H Tractors have a rotator type retainer and the exhaust valve spring is shorter than the intake valve spring.

INSPECTING CYLINDER HEAD

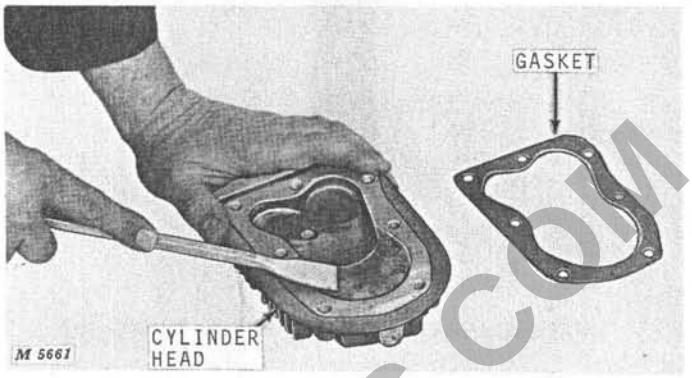


Fig. 8–Cleaning Cylinder Head

Remove all deposits from combustion chamber and gasket surface of head with a scraper and a wire brush.

Be careful not to damage the cylinder head gasket surface. Use a safe cleaning solvent to remove dirt, grease and other deposits.

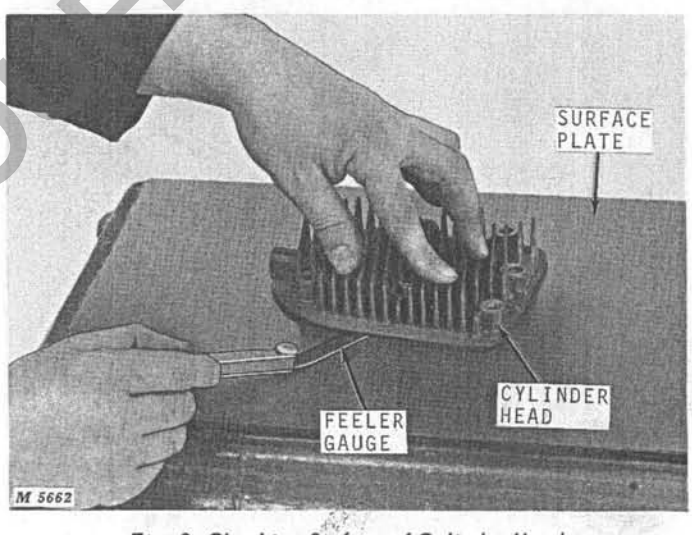


Fig. 9–Checking Surface of Cylinder Head

Check the cylinder head for cracks, broken cooling fins and inspect the gasket surface for burrs and nicks. Replace the head if any of these conditions are found.

When a cylinder head is removed because of gasket leaks, check the flatness of the cylinder head by placing it on a face plate, Figure 9. Check to see that gasket surfaces make contact at all points. Replace the cylinder head if it is warped.

NOTE: Always use new head gasket after removing cylinder head.

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SPARK ADVANCE CAMSHAFT

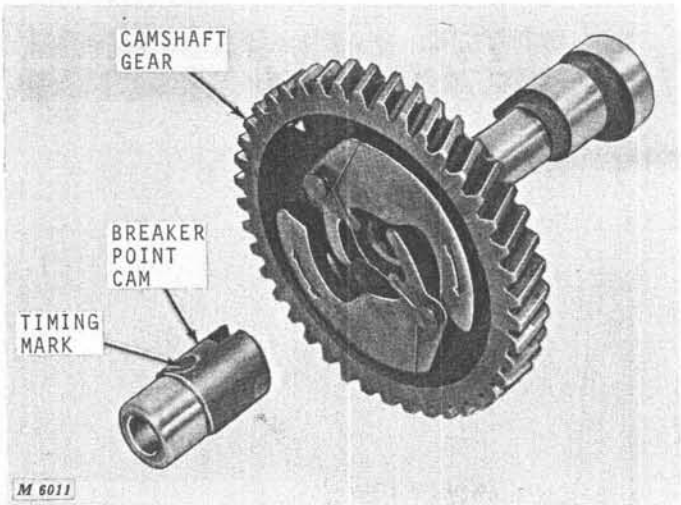


Fig. 2–Spark Advance Camshaft

The K161 Engine used in 110 Tractors (-3550) and K181 Engine used in Tractors (3551-40000) have spark advance camshaft, Figure 2.

Weights on the camshaft gear actuate the breaker point cam, which in turn retards the ignition timing during the cranking cycle. As engine reaches 500-600 rpm, timing is advanced and engine operates in the standard manner at all higher speeds.

AUTOMATIC COMPRESSION RELEASE CAMSHAFT

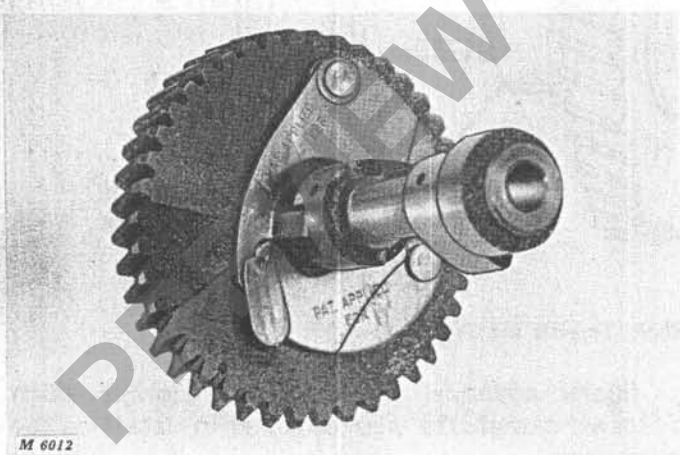


Fig. 3–Automatic Compression Release Camshaft (ACR)

K181 Engines in 110 Tractors (40001-100,000) have the automatic compression release camshaft, Figure 3.

The ACR camshaft can be installed in engines on 110 Tractors (-40000). The necessary parts are provided in kit form including new camshaft assembly and exhaust tappet. After installation, check valve clearance, page 10-11.

All short blocks are equipped with ACR camshafts.

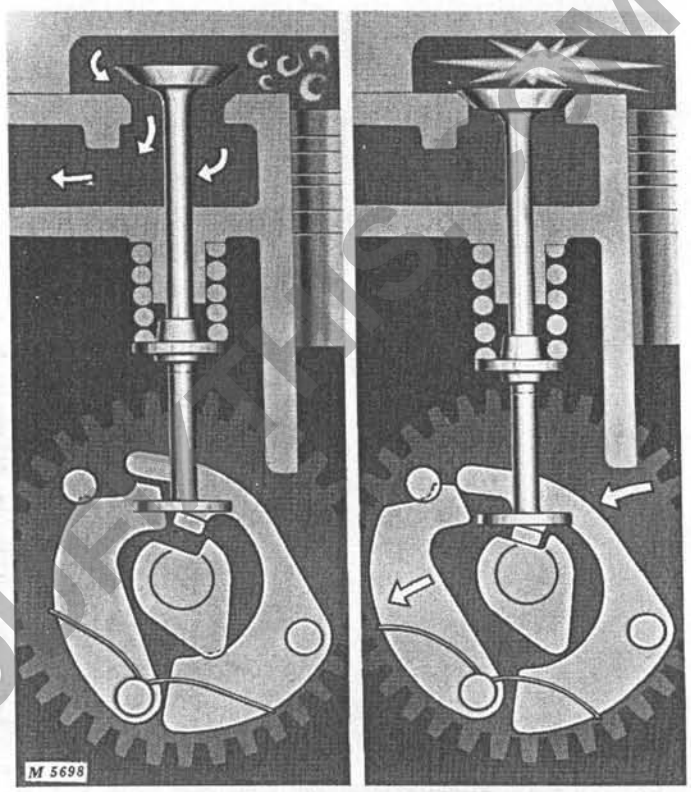


Fig. 4–ACR Operation

Automatic compression release provides a reduction in cranking effort by holding the exhaust valve open slightly during the first part of the compression stroke. This allows part of the fuel-air mixture to escape, lowering the compression pressure, Figure 4. This feature is especially valuable during cold weather starting.

By releasing compression, the pressure of the burning mixture is reduced sufficiently for the flywheel to carry the engine over top dead center. This prevents "kick-back" and eliminates the need for the spark retard mechanism.

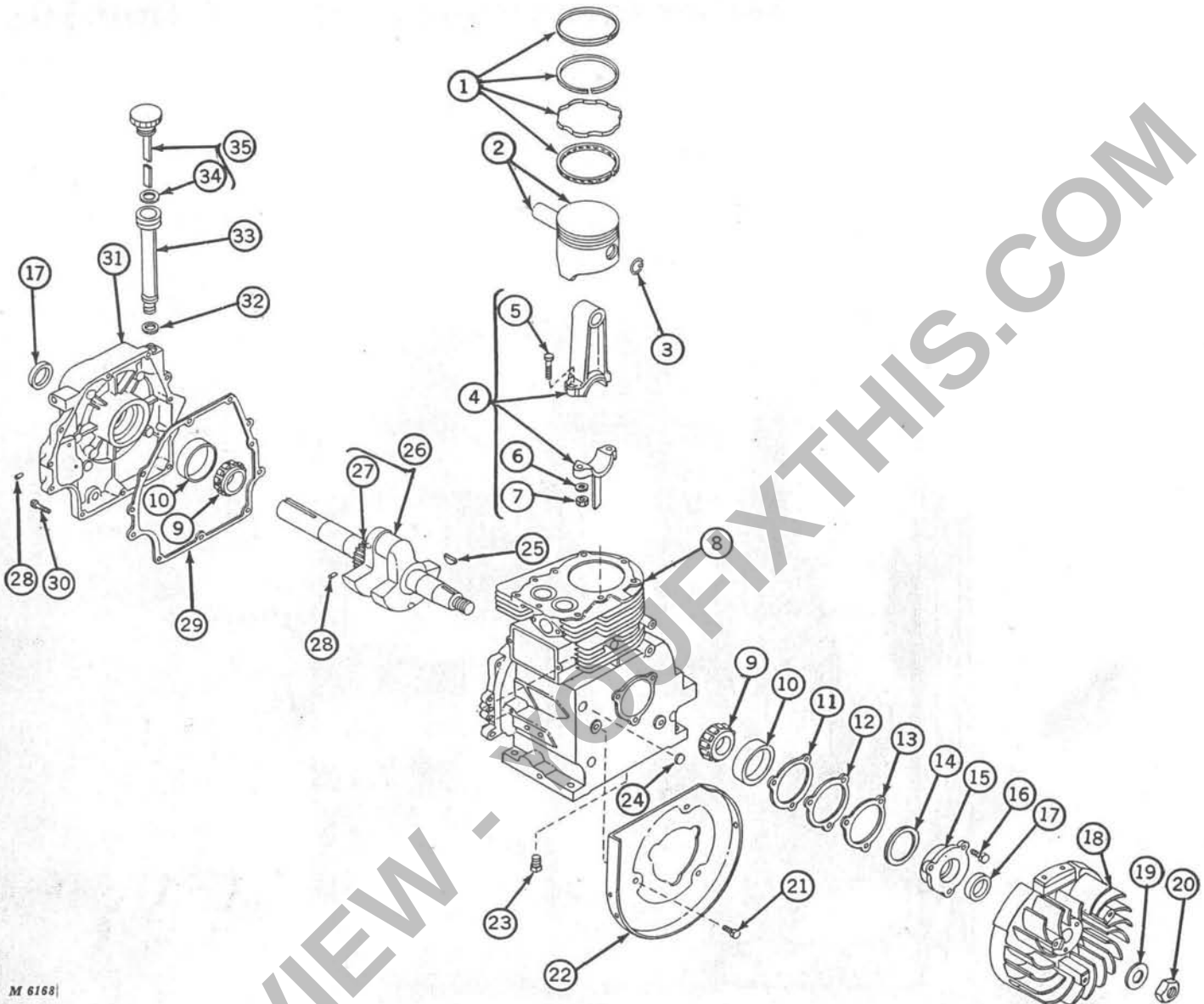
When the engine speed reaches approximately 650 rpm, centrifugal force disengages the ACR allowing the engine to operate in the usual manner at all higher speeds, with no loss of power.

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REPAIR



1 – Ring Set
2 – Piston Assembly
3 – Retaining Ring (2 used)
4 – Rod Assembly
5 – Bolt (2 used)
6 – Washer (2 used)
7 – Lock Nut (2 used)
8 – Cylinder Block
9 – Roller Bearing (2 used)
10 – Bearing Cup (2 used)
11 – Shim Gasket (0.003''/0.004'' thick) (Use as req'd)
12 – Shim Gasket (0.004''/0.005'' thick) (Use as req'd)
13 – Shim Gasket (0.005''/0.007'' thick) (Use as req'd)
14 – Steel Spacer (0.010'' thick) (Use as req'd)
15 – Cylinder Cover
16 – Cap Screw (3 used)
17 – Oil Seal (2 used)
18 – Flywheel
19 – Washer
20 – Nut
21 – Cap Screw (3 used)
22 – Baffle
23 – Drain Plug
24 – Expansion Plug
25 – Woodruff Key
26 – Crankshaft Assembly
27 – Crankshaft Gear
28 – Pin (2 used)
29 – Gasket
30 – Cap Screw (8 used)
31 – Cylinder Cover
32 – Gasket
33 – Oil Tube
34 – O-Ring
35 – Dipstick

Fig. 2–Exploded View Showing Piston, Connecting Rod, Crankshaft, Flywheel, Main Bearings and Oil Seals

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CARBURETOR—Continued

Poor Acceleration

High speed and idle mixture needles not properly adjusted.
Adjust needles properly, page 10-5 or 10-11.

Restricted air filter element.
Clean element.
Check condition.
Replace element if necessary.

110 Tractors: Arm loose on governor cross shaft.
Replace cross shaft assembly.

112 Tractors: Check condition of governor spool.
Clean hole in each end of spool.
Replace spool if necessary.

Throttle cable slipping in control swivel.
Adjust linkage and tighten cable in swivel.

Sticky fuel inlet needle.
Replace needle and seat assembly.

Dirty or damaged high speed mixture needle.
Replace damaged needle.

112 Tractors: Dirt or paint on throttle return spring.
Clean spring.

Also see "Diagnosing Malfunctions," page 5-11 of Section 20, "Engines," for other solutions to poor engine acceleration.

Engine Surging

High speed and idle mixture needles not properly adjusted.
Adjust needles properly, page 10-5 or 10-11.

112 Tractors: Dirt or paint on throttle return spring.
Clean spring.

Too low on fuel.
Refill fuel tank.

Flooding or Leaking Carburetor

Sticky fuel inlet needle.
Replace needle and seat assembly.

Incorrect float setting.
Adjust float to proper level, page 10-4 or 10-9.

Leaking float.
Replace float and adjust to proper level, page 10-4 or 10-9.

Gas Drips from Carburetor

Loose fuel fitting.
Tighten fitting. Install a new fitting if necessary.
Replace fuel line if necessary.

Fuel line loose on fuel fitting.
Relocate hose clamp on fuel line.
Install new fuel line if necessary.

112 Tractors: Bowl drain leaking.
Push up and release bowl drain several times.
Replace bowl drain assembly if necessary.

SEDIMENT BOWL

Gas Drips at Sediment Bowl

Loose shut-off valve.
Tighten needle valve retaining nut.

Loose bowl nut.
Replace gasket and secure bowl nut.

No Fuel in Sediment Bowl

Shut-off valve closed.
Open valve.

Empty fuel tank.
Fill tank.

Filter screen clogged.
Clean screen.
Replace screen if necessary.

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TESTING COIL—Continued

Follow manufacturer's recommendations to test the following:

1. Coil power test
2. Coil high speed test
3. Coil surface insulation test
4. Coil continuity test
5. Coil ground test.

TESTING CONDENSER

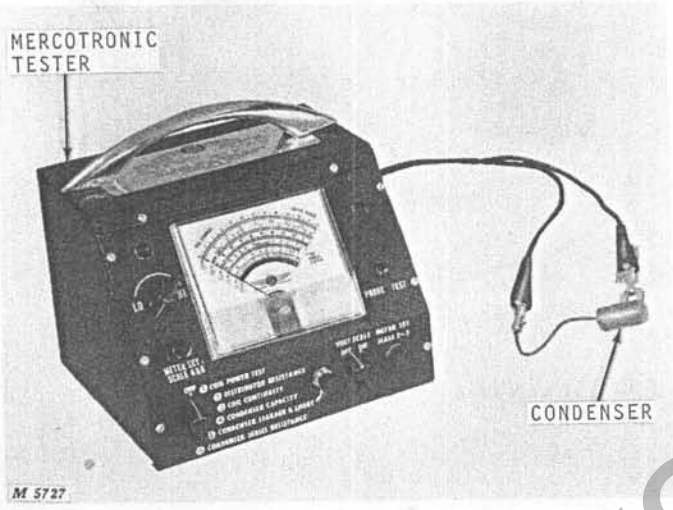


Fig. 13–Testing Condenser Capacity

The test unit, Figure 13 can also be used to test the condenser. Follow manufacturer's recommendations to make the following condenser tests:

1. Capacity test
2. Leakage
3. Short
4. Series resistance test

TESTING SOLENOID

The solenoid (magnetic switch) used on 110 and 112 Tractors is a sealed unit and cannot be repaired. A simple test for proper operation can be made by using a battery as shown in Figure 14.

With a continuity tester and a battery of correct voltage, connected as shown in Figure 14, momentarily touch jumper lead to solenoid terminal. If switch is in good condition, the plunger will snap in and close the main contacts. Continuity tester light should also light if tester is so equipped.

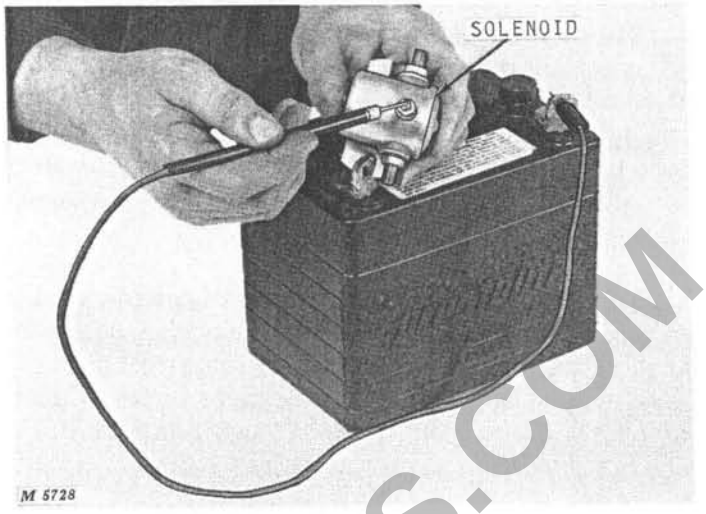


Fig. 14–Solenoid Test

Test unit, Figure 14 can also be used for testing solenoid continuity.

TESTING SAFETY SWITCHES

Neutral-start switch failure is sometimes the wrong diagnosis for a switch which needs only a simple adjustment to fix it.

When the engine fails to crank when the shift lever is in neutral and the tractor clutch throwout is disengaged, it is likely that the neutral-start switch needs adjusting, especially on tractors (Serial No. -15000).

CAUTION: Be Sure Spark Plug Cable is Disconnected from Plug to Prevent Accidental Starting of the Engine While Making the Following Test.

Test first by holding the ignition switch in the start position with one hand while moving the shift lever from side to side in the neutral position or into one of the gear positions with the other hand.

If contact is made and the engine begins to crank, the neutral-start switch needs adjusting. Refer to page 10-15 for repair and adjustment.

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POLARIZING GENERATOR

After reconnecting leads, momentarily connect a jumper lead between the "BATTERY" terminal of regulator and "ARMATURE" terminal of generator. This allows a momentary surge of current to flow through the generator which correctly polarizes it. Reversed polarity may result in vibration, arcing and burning of the relay contact points.

EMERGENCY WINTER OPERATION

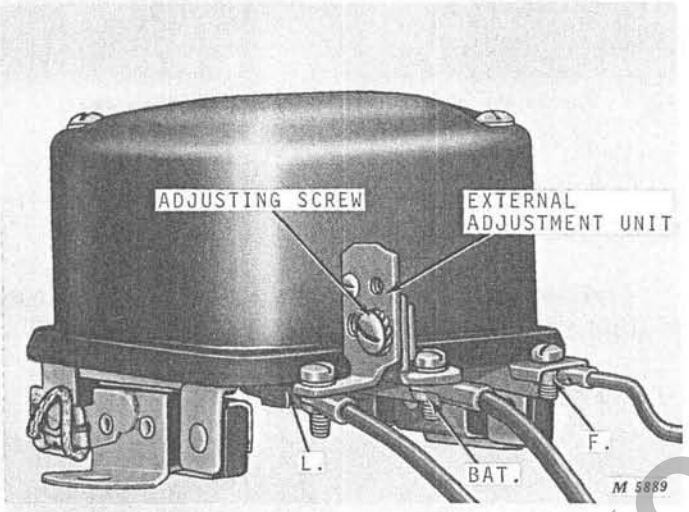


Fig. 35 – Increasing Regulator Voltage

During winter operation, if rundown batteries are repeatedly experienced and the condition is found to be due to short or infrequent engine operation, it is advisable to increase temporarily the operating voltage of the regulator.

A simple method of increasing voltage is to disconnect the lead to regulator "BAT" terminal and reconnect this lead to the regulator "L" terminal. The reconnection bypasses the current-voltage feature of the regulator, automatically allowing an increase in the operating voltage and increasing the amount of charge to the battery.

CAUTION: Operate the regulator with these connections only during cold weather and when operating periods are short or infrequent. Reestablish the original lead connections as soon as mild weather returns, or operation time becomes normal, otherwise the battery will be damaged by overcharge.

For ease in bypassing the current-voltage feature of the regulator, an external adjustment can be installed as shown in Figure 35.

The external adjustment unit shown in Figure 35 can be purchased from any United Delco-Remy service station under package No. 1951938.

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GEAR SHIFT PATTERN

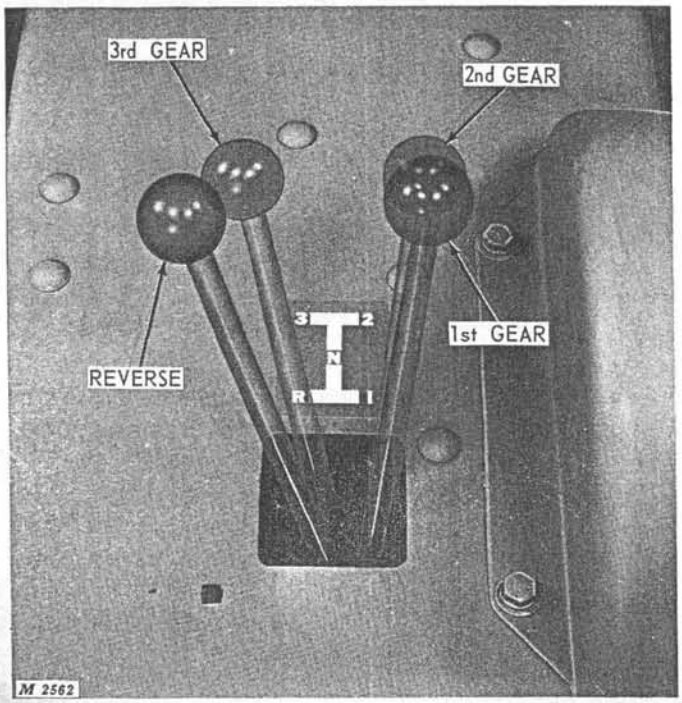


Fig. 2–Gear Shift Pattern - 110 Tractors (-15000)

Gear shifting for all speeds of the 3 forward speeds and 1 reverse is accomplished with a shift lever, Figure 2, mounted on the transaxle and two separate shifter forks and gear assemblies. One fork controls the reverse and first gear positions and the other fork controls the second and third positions.

Study the illustrations below and at left to determine power transmission from the input shaft to the axles in each gear position. Note the slight gear movement between 1st and 2nd gear positions.

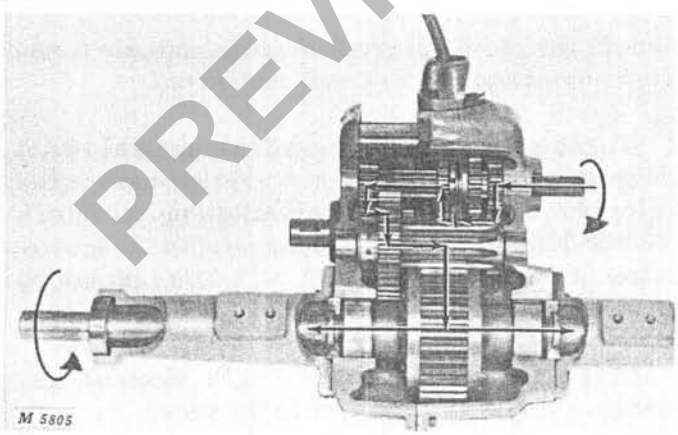


Fig. 3–Reverse Gear

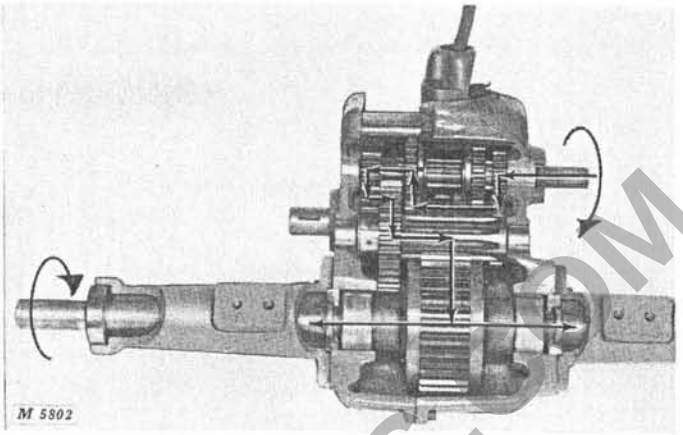


Fig. 4–1st Gear

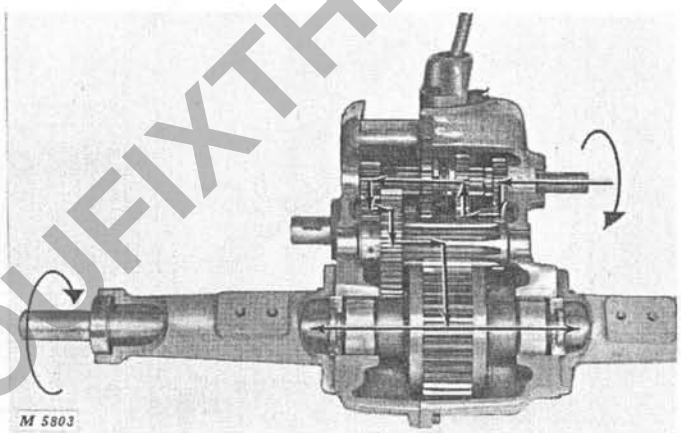


Fig. 5–2nd Gear

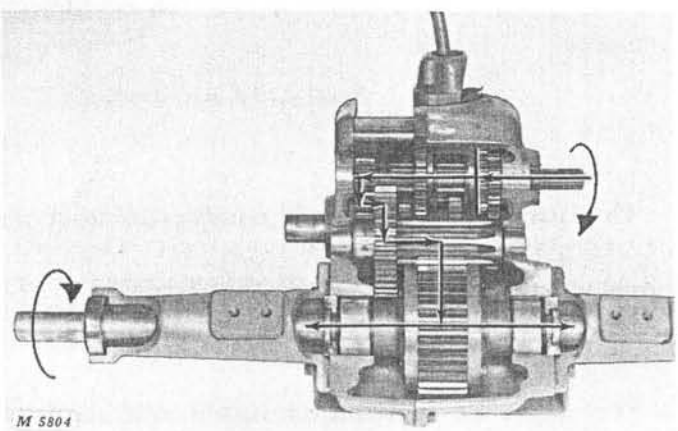


Fig. 6–3rd Gear

DIAGNOSING MALFUNCTIONS

Refer to pages 20-3 and 20-4 of this section for diagnosing transaxle malfunctions.

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OUTPUT SHAFT AND GEAR

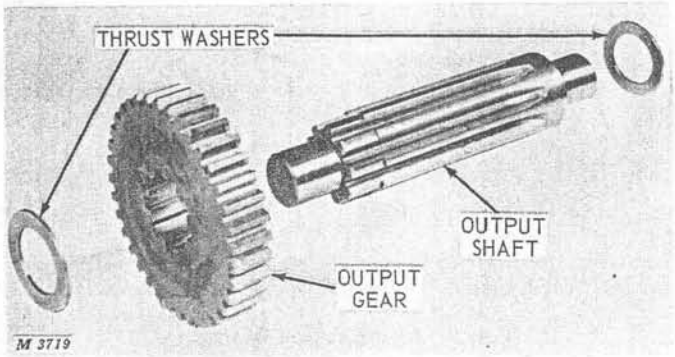


Fig. 31–Output Shaft and Gear Assembly

The output gear is assembled to the output pinion shaft with a press fit. A thrust washer is used on both ends of output shaft, Figure 31.

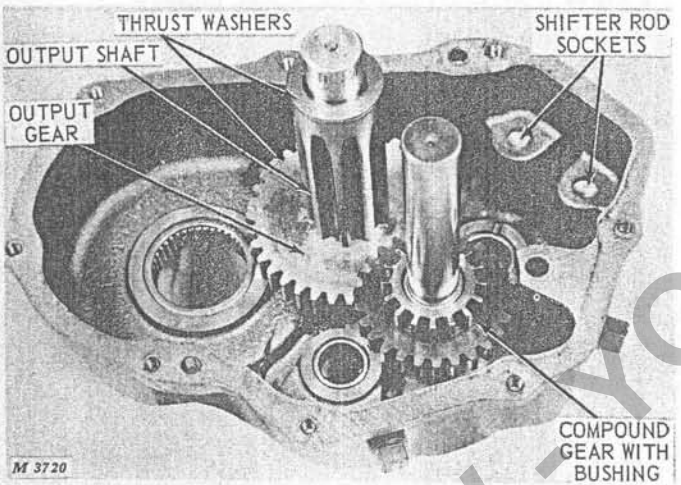


Fig. 32–Output Shaft and Gear Installed

Install output gear, pinion shaft and thrust washers into left-hand case, Figure 32.

Install compound gear with bushing into left-hand case, Figure 32.

SHIFTER SHAFT

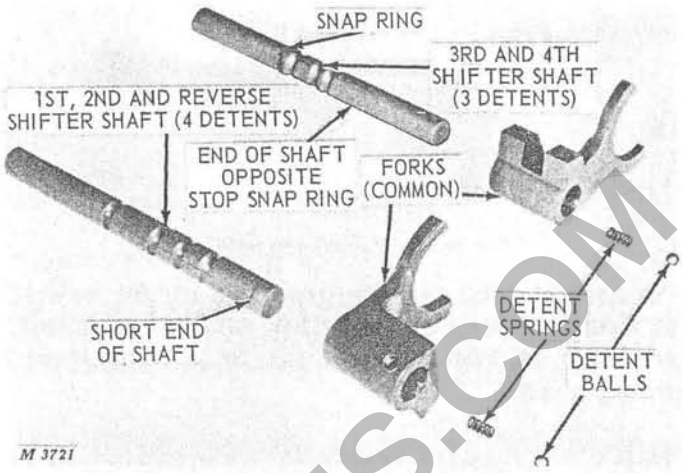


Fig. 33–Shifter Components

Because of heavy detent pressure, the assembly of these shafts can be difficult. Assemble forks as shown in Figure 33. 1st, 2nd and reverse fork will face to the left and 3rd and 4th fork will face to the right or away from shaft. The 1st, 2nd and reverse shaft must have the short end of shifter shaft toward fork. The 3rd and 4th shifter fork must have end opposite stop snap ring toward fork as shown in Figure 33. Start the shaft into the fork. Depress detents and complete the assembly. Slide forks along shaft. A good snap should be felt in each detent. Place forks in neutral positions at this time.

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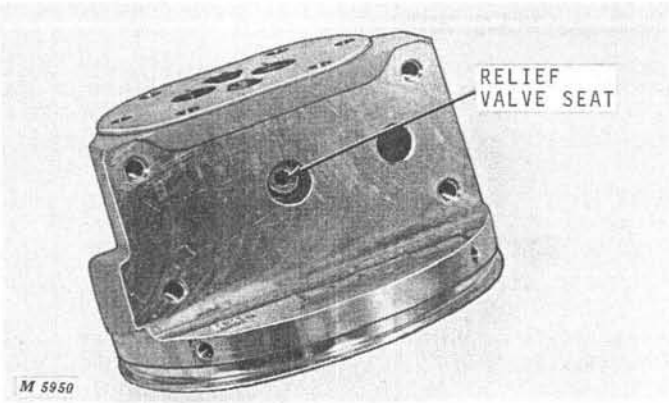


Fig. 7–Removing Relief Valve Seat

The relief valve seat is locked in place. Do not attempt to remove seat unless repair is necessary. Apply heat to back plate and use screwdriver to remove seat.

When replacing seat, apply Loctite or equivalent and turn in to specified depth. See "Specifications," page 15-10.

INSPECTION

Wash all parts in a clean safe cleaning solvent and dry them with compressed air.

Inspect all parts for wear, and remove all scratches, nicks, burrs and rough spots with emery cloth. Check condition of springs.

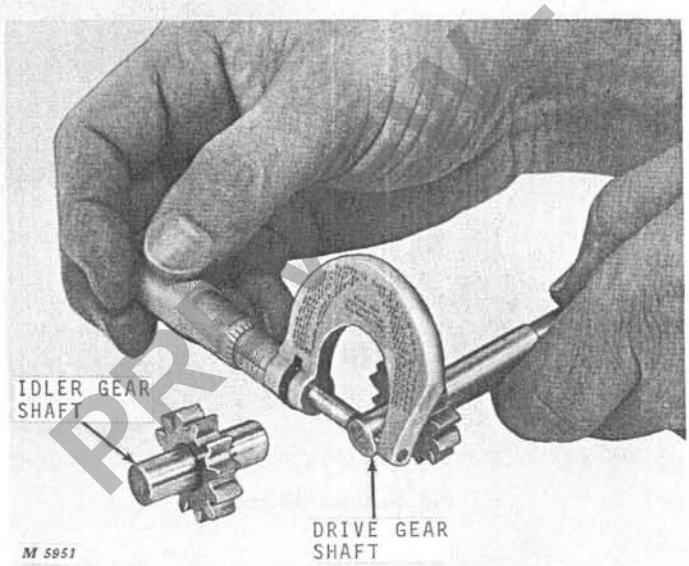


Fig. 8–Measuring Gear Shafts

Inspect the drive gear and idler gear shafts at bearing points and seal areas for rough surfaces and excessive wear. Use a micrometer to measure the shafts, Figure 8. Refer to "Specifications," page 15-10, for shaft tolerance. Inspect drive shaft for broken keyway. Shafts and gears are available as assemblies only.

Inspect the face of the gear for scoring and excessive wear. Use a micrometer to measure gear width. Snap rings should be in groove in drive and idler shaft gears. If gears require replacing, replace gear and shaft as an assembly. If edges of teeth are sharp, break edges with emery cloth.

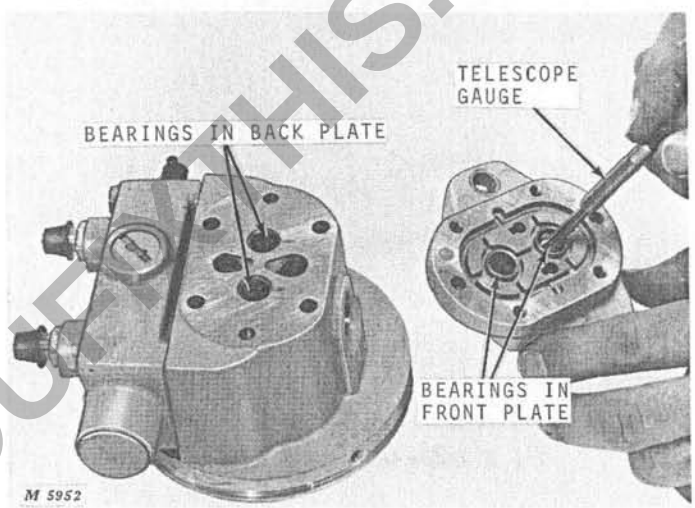


Fig. 9–Measuring Inside Diameter of Bearings

Use a telescope gauge to measure bearing wear in the front and back plate, Figure 9. Refer to "Specifications," page 15-10, for bearing tolerance. Bearings in front plate should be flush with islands in groove pattern. Bearings are available for service only as a plate and bearing assembly. Replace front or back plate if scored or if bearings are worn beyond specifications.

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