FORD

CONSUMER PRODUCTS

Repair Manual

Volume 1

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CONSUMER PRODUCTS REPAIR MANUAL

SECTION CONTENTS

VOL. 1

VOL. 2

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LAWN & GARDEN TRACTORS 1

SECTION CONTENTS

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Eaton Model II Hydrostatic Transmission Repair Information (Reference end of this section)

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12 & 17 H.P. GEAR AND HYDRO DRIVEN LGT'S
(Models 09GN-2201/2202/2203/2204/2205/2206)

IMPORTANT: The replacement of any part on this product by other than the manufacturers' authorized replacement part may adversely affect the performance, durability or safety of this product.

The manufacturer reserves the right to make changes on and to add improvements upon its products at any time without notice or obligation. The manufacturer also reserves the right to discontinue manufacture of any product at its discretion at any time.

Notice to Serviceman in the State of California — The engine on this unit is NOT equipped with a spark arresting muffler.

IMPORTANT: USE OR OPERATION OF THIS ENGINE ON ANY FOREST COVERED, BRUSH COVERED, OR GRASS COVERED LAND WITHOUT A STATE APPROVED SPARK ARRESTOR IN EFFECTIVE WORKING ORDER CONSTITUTES A VIOLATION OF THE LAW OF THE STATE OF CALIFORNIA.

LGT TRACTORS

INTRODUCTION

This manual contains service and maintenance instructions for Lawn and Garden Tractor (LGT). It has been prepared to provide the information the serviceman needs to correctly service and maintain a LGT Tractor. All sections of this manual should be carefully studied by the serviceman before beginning work on the tractor.

ALL WARNINGS used throughout this manual should be heeded and followed very closely. Failure to obey these rules could result in personal injury or death to yourself or others.

All references made to the left side, right side, front and rear are given from the operator's position.

SAFETY

Safety is No Accident . . . . . Be Alert!

This symbol is used to attract your attention to the safety precautions that should be understood by the serviceman to avoid accidents.

Please read and follow these instructions on safety procedures before servicing the tractor.

PERSONAL CONSIDERATIONS:

1. Never let shop rags, used for cleaning, lay around to become fire hazards.
2. Always use safety glasses when servicing or inspecting the tractor.
3. Do not wear loose fitting clothing that might get caught in moving parts. Also, keep hands and feet away from moving parts.
4. Be certain that the work bench or support being used is strong enough. The weight of the part plus the force applied to it during assembly or disassembly may put a great strain on the bench or support.
5. Use jack stands or blocks to hold up the unit in any potentially dangerous positions required for access. Do not rely only on jack for support.

EQUIPMENT CONSIDERATIONS:

1. Always disconnect spark plug wire and secure away from spark plug. This **must** be performed every time any servicing is done and will prevent accidental starting of engine.
2. Always store gasoline or flammable solvents used for cleaning in closed containers specifically designed for that purpose.
3. Before cleaning, servicing or inspecting tractor, make certain all moving parts have stopped and engine and exhaust assemblies have cooled down.
4. Never operate tractor without proper guards, plates or other safety protective devices in place.
5. Never store tractor with gasoline in the tank, inside a building where fumes may reach an open flame or spark. Allow engine to cool before storing in any enclosure.
6. Disengage power to attachment(s) and stop engine before servicing, repairing or making any adjustments.
7. Disengage power to attachment(s) when transporting or not in use.
8. Take all possible precautions when leaving the vehicle unattended, such as disengaging the power-take-off, lowering the attachment, shifting into neutral, setting the parking brake, stopping the engine and removing the key.
9. Do not change governor setting or over speed the engine.
10. Be certain that any part being removed is properly supported or held to prevent injury or damage.

OPERATIONAL CONSIDERATIONS:

1. Do not start or run the engine indoors. Fumes from engine exhaust can kill.
2. Disengage all clutches and place gear shift lever in neutral before attempting to start engine.
3. Be sure that all parts are securely fastened before starting tractor.
4. Be sure all tools and cleaning materials are removed before starting tractor.
5. If the equipment should start to vibrate abnormally, stop engine and check immediately for the cause. Vibration is generally a warning of trouble.
6. If test running is required, make sure you are thoroughly familiar with the complete operation of the tractor. Know how to stop the tractor.
7. Never operate machine at high transport speeds on slippery surfaces. Use care when backing.
8. Never operate without good visibility or light.

Whenever you see this symbol  **it means:**
ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

IDENTIFICATION PLATE LOCATION

The tractor model and serial number identification plate is located on the left side of engine base assembly below the engine. (Fig. 1)

Refer to engine manufacturer's engine literature for location of engine model and serial number.

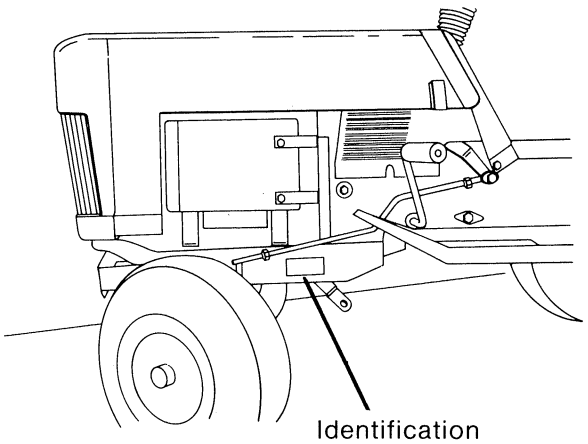


FIG. 1

MAINTENANCE

1. GENERAL - Make a visual inspection for loose or damaged parts. Check nuts and bolts periodically to insure against looseness caused by vibration or rough handling. Damaged parts should be repaired or replaced.
2. BATTERY - Terminals should be tight and free of corrosion. Battery hold down bracket should be snug over battery. Top of battery should be clean and dry. Check level of electrolyte. Add clean distilled water as needed.
3. TIRE PRESSURES - Recommended tire pressure for both front and rear tires is 10 p.s.i.
4. P.T.O. WARNING LIGHT - Periodically check the operation of this light. Check as follows:
    a. Turn ignition switch to "RUN" position. (DO NOT start engine)
    b. Move P.T.O. switch to "ON" position. NOTE: Warning light should come on.
    c. Move P.T.O. switch to "OFF" position. NOTE: Warning light should turn off.
    d. Turn ignition switch to "OFF" position.

WARNING: Proper operation of this light is mandatory. Personal bodily injury may occur if light is not operating properly. Reference "ELECTRICAL SYSTEM - P.T.O. WARNING LIGHT" for servicing.

5. BELT (Gear Drive Units **Only**) - Inspect traction drive belt for cracking, excessive wear and for proper tension. Refer to "ADJUSTMENT AND SERVICING - TRACTION DRIVE BELT" section to check belt tension.

BOLT TORQUE SPECIFICATIONS

The following chart lists the standard torque specifications for all capscrews and thread forming screws used in this unit. Unless **special** torques are called for, all torque values must meet these specifications.

	TYPE OF CAPSCREW	SAE GRADE 2 		SAE GRADE 5 		SAE GRADE 5 		SAE GRADE 2 OR 5 ALSO THREAD FORMING SCREWS	
	TYPE OF FASTENER USED	STANDARD HEX NUT		STANDARD HEX NUT		CONE LOCKNUT		INTO TAPPED HOLE	
	TORQUE FACTOR	FT./LBS. MIN.	MAX.	FT./LBS. MIN.	MAX.	FT./LBS. MIN.	MAX.	FT./LBS. MIN.	MAX.
SCREW SIZE	1/4	5	7	9	11	5	7	5	7
	5/16	9	14	18	22	9	14	9	14
	3/8	16	24	30	40	16	24	16	24
	7/16	25	37	50	60	25	37	25	37
	1/2	38	57	75	95	38	57	38	57
	5/8	73	110	150	185	73	110	73	110

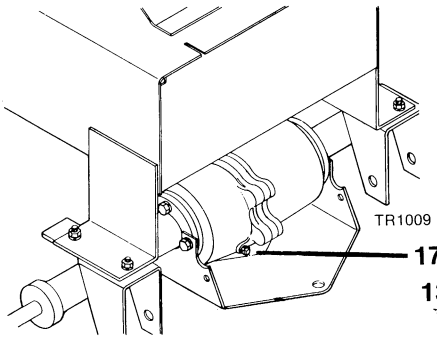
LUBRICATION CHARTS

WARNING: To avoid accidental starting, disengage power to attachments(s) and stop the engine and remove the ignition key before lubricating tractor.

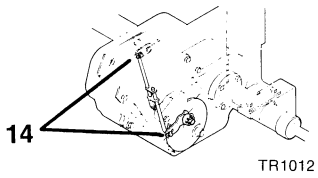
LGT and LGT 17 (Gear Drive Tractors)

LUBE POINT	LOCATION	LUBRICATION	INTERVAL			REMARKS
			DAILY	25 HRS.	100 HRS.	
1	Engine oil level	Per Eng. Mfg.	●			Check before each use of tractor.
2	Engine air filter		●			Check daily if operating under dusty conditions. Normally inspect every 50 hrs.
3	Engine oil change	Per Eng. Mfg.		●		Break-in, change after first 5 hrs. thereafter every 25 hrs. (more often under dusty conditions).
4	Axle pivot	Grease*		●		Pump slowly until grease seeps out.
5	Tie rod	Grease*		●		Pump slowly until grease seeps out.
6	Front wheel spindles	Grease*		●		Pump slowly until grease seeps out.
7	Front wheels	Grease*		●		Pump slowly until grease seeps out.
8	Steering sector gear & pinion	Grease*		●		Apply liberally to gear teeth.
9	Steering assembly bushing	SAE 30 Oil		●		Few drops of oil in each bushing.
10	Front (Mule drive) idler pulleys	SAE 30 Oil		●		Few drops of oil in each bearing. DO NOT get oil in pulley groove or on belt.
10A	Drive Shaft	SAE 30 Oil			●	Few drops of oil on square shaft that slides in front universal joint.
11	Clutch/Brake pedal shaft	SAE 30 Oil		●		Both end of clutch/brake shaft. Both ends of parking brake link and clutch rod.
12	Traction drive pulleys	SAE 30 Oil		●		Few drops of oil in bearings of flat and v-idler pulleys. DO NOT get oil in pulley groove or on belt.
13	Clutch/Brake arm shaft	SAE 30 Oil		●		Both ends of shaft.
14	Brake adjustment rods	SAE 30 Oil		●		Linkage pivot points.
15	Attachment lift lever shaft	SAE 30 Oil		●		Both ends of shaft.
16	90° Traction drive gear box	Moly EP Lithium Grease			●	Periodic visual inspection for leaks. Fill with 4 oz. of grease after rebuilding.
17	Transaxle	EP 140 wt. SAE Oil			●	Periodic visual inspection for leaks. Capacity 4 pints.

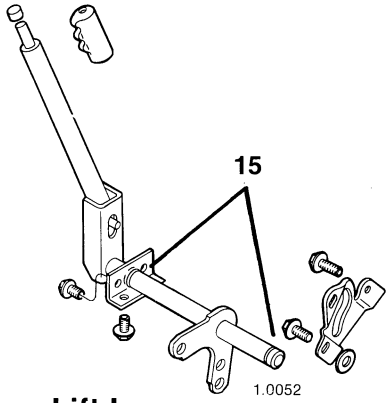
*Grease—NLGI Grade 2 Lithium base EP grease (Ford 1T-M1C137-B). Grease with hand pump grease gun when required.



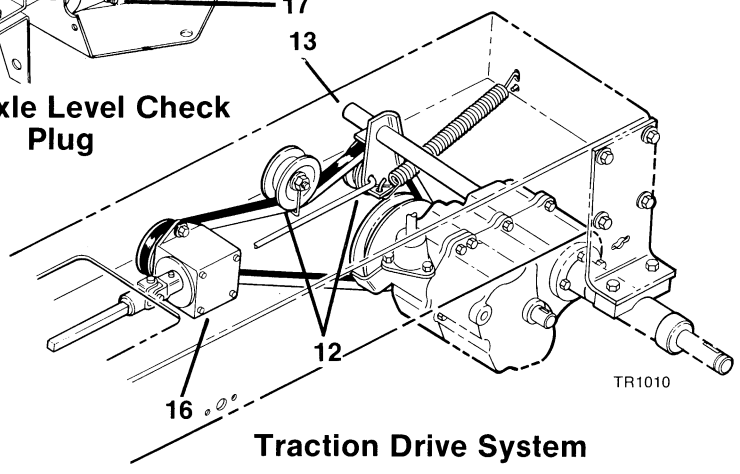
Transaxle Level Check Plug



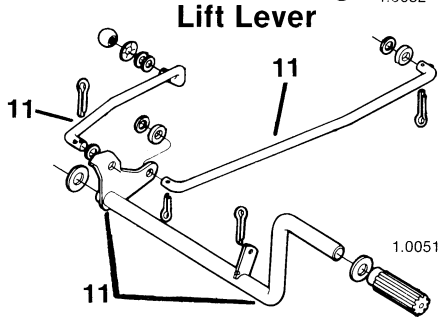
Brake Adjustment Rods



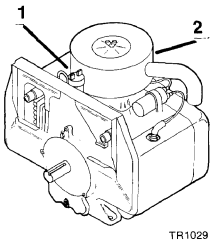
Lift Lever



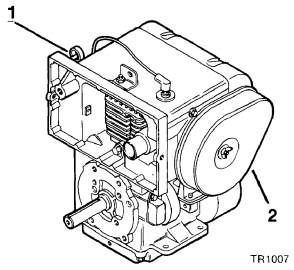
Traction Drive System



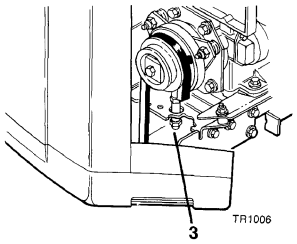
Clutch/Brake Pedal Linkages



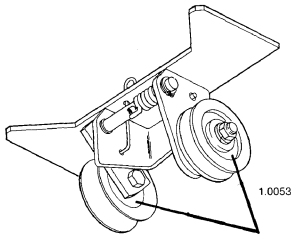
17 H.P. Kohler Engine



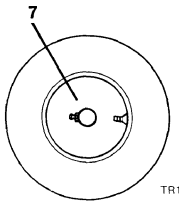
12 H.P.Kohler Engine



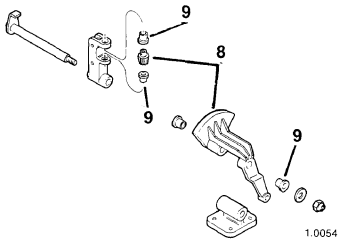
Engine Oil Change



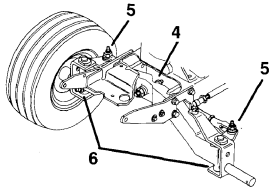
Front (Mule Drive) Idler Pulleys



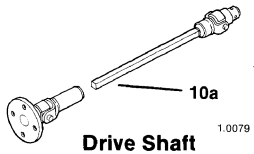
Front Wheels



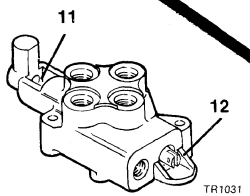
Steering Sector Gear And Pinion



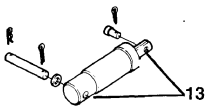
Front Axle



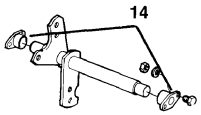
Drive Shaft



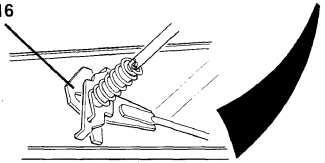
Lift Valve



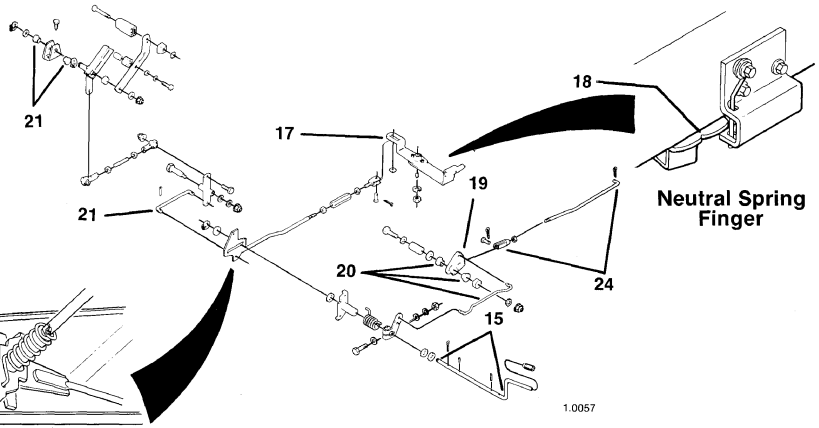
Lift Cylinder



Lift Arm Shaft



Neutral Rod Assembly



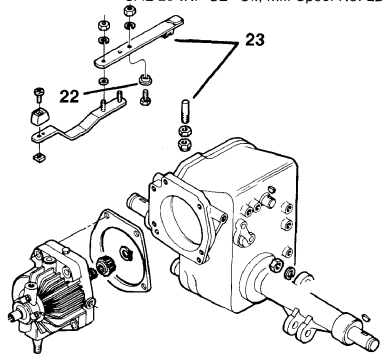
Clutch/Brake Pedal And Drive Lever Linkages

Neutral Spring Finger

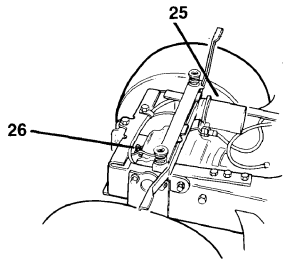
LGT 12H and LGT 17H (Hydro Drive Tractors Models 09GN2202 & 2204 Only)

LUBE POINT	LOCATION	LUBRICATION	INTERVAL DAILY	INTERVAL 25 HRS.	INTERVAL 100 HRS.	REMARKS
1	Engine oil level	Per Eng. Mfg.	●			Check before each use of tractor.
2	Engine air filter		●			Check daily if operating under dusty conditions. Normally inspect every 50 hrs.
3	Engine oil change	Per Eng. Mfg.		●		Break-in, change after first 5 hrs. thereafter every 25 hrs. (more often under dusty conditions).
4	Axle pivot	Grease*		●		Pump slowly until grease seeps out.
5	Tie rod	Grease*		●		Pump slowly until grease seeps out.
6	Front wheel spindles	Grease*		●		Pump slowly until grease seeps out.
7	Front wheels	Grease*		●		Pump slowly until grease seeps out.
8	Steering sector gear & pinion	Grease*		●		Apply liberally to gear teeth.
9	Steering assembly bushings	SAE 30 Oil		●		Few drops of oil in each bushing.
10	Front (Mule drive) idler pulleys	SAE 30 Oil		●		Few drops of oil in each bearing. DO NOT get oil in pulley groove or on belt.
10a	Drive Shaft	SAE 30 Oil			●	Few drops of oil on square shaft that slides in front universal joint.
11	Lift valve cavity	Grease*		●		Pack cavity, level with grease.
12	Lift valve clevis	SAE 30 Oil		●		Few drops of oil on clevis pin.
13	Lift cylinder pivot ends	SAE 30 Oil		●		Few drops of oil on each pivot pin.
14	Lift arm shaft	SAE 30 Oil		●		Few drops of oil on each end of shaft.
15	Clutch/Brake pedal shaft	SAE 30 Oil		●		Few drops of oil on each end of shaft.
16	Neutral rod assembly	Grease*		●		Apply grease around entire slot.
17	Neutral rod at speed control lever, square slot.	Grease*		●		Apply grease around entire slot.
18	Speed control lever at neutral spring finger notch	Grease*		●		Spread grease over entire curved surface of speed control lever.
19	Parking brake ratchet	Grease*		●		Spread grease on all ratchet teeth.
20	Parking brake link & bushing	SAE 30 Oil		●		Few drops of oil in bushings and on both ends of linkage.
21	Drive lever bushings & linkage	SAE 30 Oil		●		Few drops of oil in bushings and on both ends of linkage.
22	HI/LO speed range pivot bushing	SAE 30 Oil		●		Few drops of oil in bushing.
23	HI/LO speed range lever shifting end	Grease*		●		Spread grease around slot and on shift pin.
24	Brake adjustment rod	SAE 30 oil		●		Few drops of oil at both ends of rod.
25	Oil filter			● (20 hrs)	●	Break-in, change after first 20 hrs, thereafter every 100 hrs.
26	Transmission & Transaxle	SAE 20 wt. detergent oil			●	Periodic visual inspection for leaks. Check oil level at "plug and dipstick". Capacity 6 quarts.

*Grease—NLGI Grade 2 Lithium base EP grease (Ford 1T-M1C137-B).
Grease with hand pump grease gun when required.
**SAE 20 wt. "SE" Oil, Mil. Spec. No. L2104B.



Transmission And Transaxle

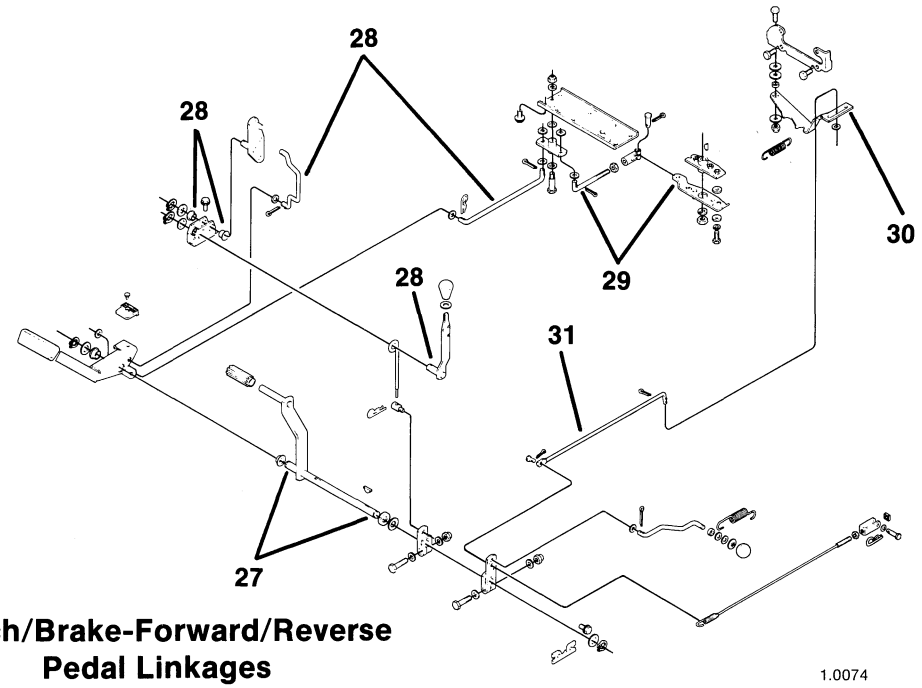


Transaxle Fill Plug And Oil Filter

LGT 12H and LGT 17H (Hydro Drive Tractors Models 09GN2205 & 2206 Only)

LUBE POINT	LOCATION	LUBRICATION	INTERVAL			REMARKS
			DAILY	25 HRS.	100 HRS.	
1	Engine oil level	Per Eng. Mfg.	●			Check before each use of tractor.
2	Engine air filter		●			Check daily if operating under dusty conditions. Normally inspect every 50 hrs.
3	Engine oil change	Per Eng. Mfg.		●		Break-in, change after first 5 hrs. thereafter every 25 hrs. (more often under dusty conditions).
4	Axle pivot	Grease*		●		Pump slowly until grease seeps out.
5	Tie rod	Grease*		●		Pump slowly until grease seeps out.
6	Front wheel spindles	Grease*		●		Pump slowly until grease seeps out.
7	Front wheels	Grease*		●		Pump slowly until grease seeps out.
8	Steering sector gear & pinion	Grease*		●		Apply liberally to gear teeth.
9	Steering assembly bushings	SAE 30 Oil		●		Few drops of oil in each bushing.
10	Front (Mule drive) idler pulleys	SAE 30 Oil		●		Few drops of oil in each bearing. DO NOT get oil in pulley groove or on belt.
10a	Drive Shaft	SAE 30 Oil			●	Few drops of oil on square shaft that slides in front universal joint.
11	Lift valve cavity	Grease*		●		Pack cavity, level with grease.
12	Lift valve clevis	SAE 30 Oil		●		Few drops of oil on clevis pin.
13	Lift cylinder pivot ends	SAE 30 Oil		●		Few drops of oil on each pivot pin.
14	Lift arm shaft	SAE 30 Oil		●		Few drops of oil on each end of shaft.
22	HI/LO speed range pivot bushing	SAE 30 Oil		●		Few drops of oil in bushing.
23	HI/LO speed range lever shifting end	Grease*		●		Spread grease around slot and on shift pin.
25	Oil filter			● (20 hrs)	●	Break-in, change after first 20 hrs, thereafter every 100 hrs.
26	Transmission & Transaxle	SAE 20 wt. detergent oil			●	Periodic visual inspection for leaks. Check oil level at "plug and dipstick". Capacity 6 quarts.
27	Clutch/Brake pedal shaft	SAE 30 Oil		●		Few drops on each end of shaft.
28	Speed control lever bushings & linkage	SAE 30 Oil		●		Few drops of oil in bushings and on both ends of linkage.
29	Transmission shift linkage	SAE 30 Oil		●		Few drops of oil at both ends of rod.
30	Neutral return lever	Grease*		●		Apply grease around entire slot.
31	Neutral release rod	SAE 30 Oil		●		Few drops of oil at both ends of rod.

*Grease—NLGI Grade 2 Lithium base EP grease (Ford 1T-M1C137-B).
Grease with hand pump grease gun when required.
**SAE 20 wt. "SE" Oil, Mil. Spec. No. L2104B.



Clutch/Brake-Forward/Reverse Pedal Linkages

1.0074

ADJUSTMENTS AND SERVICING

ATTENTION: All procedures listed in this section for adjustments and servicing of the tractor are described with the **attachment removed**. Reference "ATTACHMENTS" section of this service manual for all information specific to the attachment mounted on this tractor.

ENGINE:

1. Refer to Engine Manufacturer's Service Manual for all adjustments and servicing information.
2. Maximum engine RPM high speed, no load, range is 3300 RPM to 3500 RPM.
3. **12 H.P. Engine Removal —**

WARNING: To avoid accidental starting, remove spark plug wire and secure away from spark plug. Turn ignition switch "OFF".

WARNING: To avoid severe burns, DO NOT attempt this procedure when engine is hot. Wait for engine and muffler to cool down before proceeding.

A. Before this procedure is performed, the attachment should be removed from this tractor as outlined in "ATTACHMENT"section of this service manual.

B. Unclip hood latches and raise hood. Disconnect green wire at connector located at left bottom corner of hood. (Fig. 2)

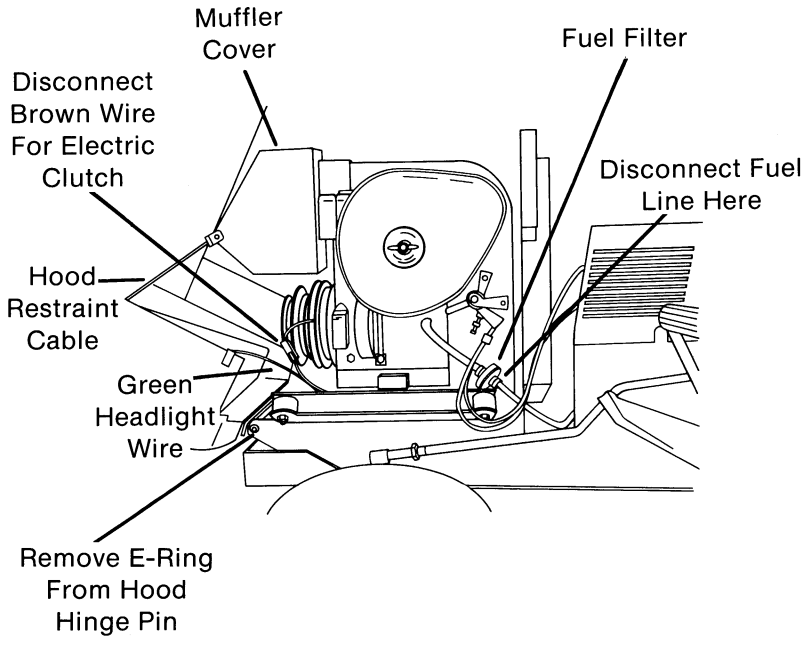
C. Disconnect hood restraint cable connected to left front corner of muffler cover. (Fig. 2) Lower hood back onto tractor.

D. Remove one E-ring from end of hood hinge pin. (Fig. 2) Remove hinge pin completely from hood hinge. Remove hood.

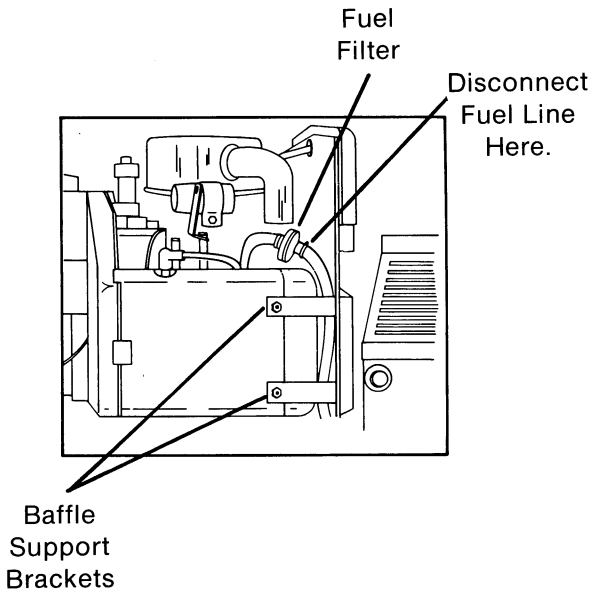
E. Disconnect black battery cable at negative (-) battery terminal. Secure cable away from battery.

F. Disconnect the following lead wires at engine:

   a. Brown wire connected to electric clutch at lower left front corner of engine. (Fig. 2)



12 H.P. ENGINE



17 H.P. ENGINE

FIG. 2

b. Orange and white wires at engine plug at upper rear corner of engine. (Fig. 3)

c. Remove cap on solenoid and disconnect red starter wire at solenoid. (Fig. 3)

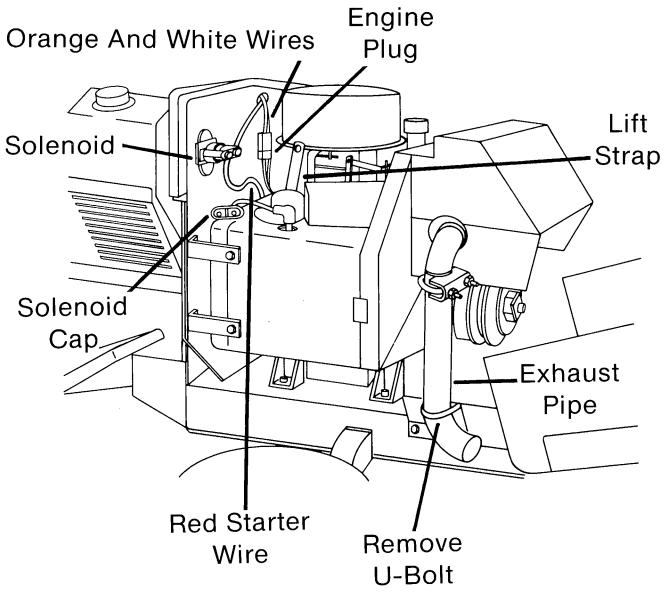


FIG. 3

G. Remove two nuts and lockwashers on U-bolt securing exhaust pipe to engine mounting bracket. (Fig. 3)

H. Disconnect fuel line at fuel filter. (Fig. 2) Cap line to prevent leakage. Remove fuel filter from fuel line and inspect or replace filter per engine manufacturer's specifications.

I. Loosen cable clamp screws, securing throttle and choke cables to left side of engine, far enough so both cables can be removed. (Fig. 4) Unhook throttle cable end (inner cable) from throttle speed control lever. Unhook choke cable end (outer cable) from choke lever.

J. (Gear Drive Tractors Only) Loosen two setscrews on rear of drive shaft. (Fig. 5)

(Hydro Drive Tractors Only) Remove one long setscrew thru notch in fan hub on rear of drive shaft. Rotate fan to expose second short setscrew, loosen setscrew. (Fig. 5)

Push or pry drive shaft forward until rear universal joint comes off of gear box or transmission shaft.

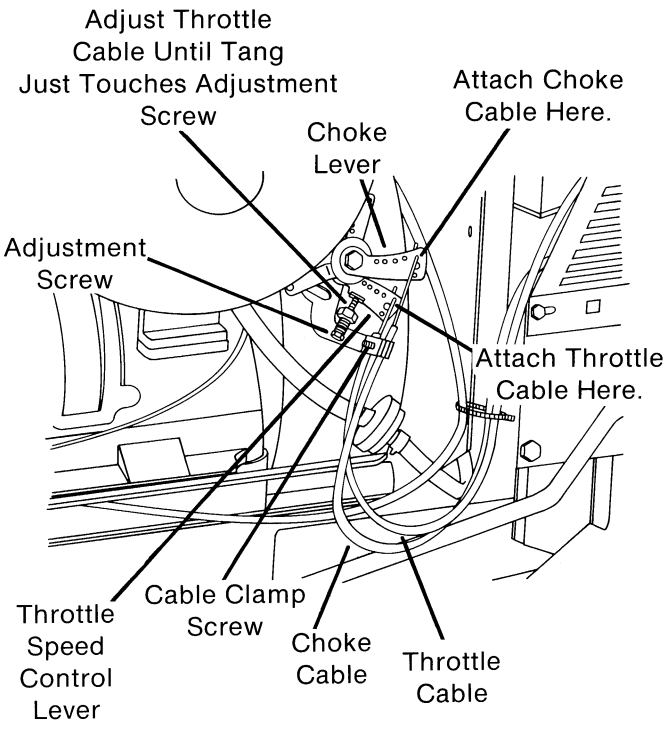


FIG. 4

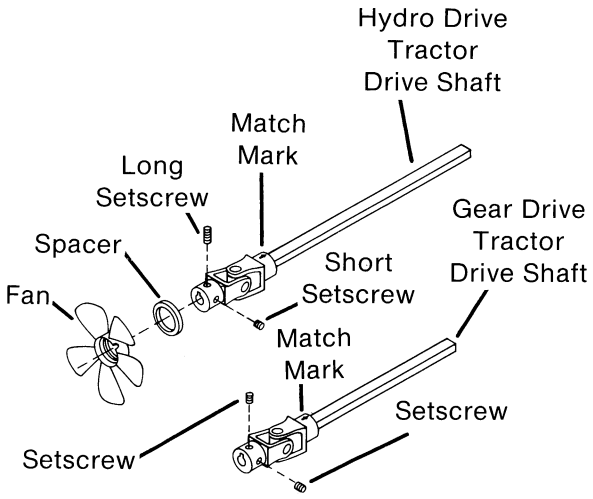


FIG. 5

K. Make a chalk mark on front universal joint and a matching mark on rectangular drive shaft so these parts can be mated together the same way during reassembly.

NOTE: Lubricate drive shaft with 30 wt. oil during reassembly.

NOTE: Drive shaft is a balanced assembly and **must** be reassembled the same way it was removed. Match marks (arrows) are stamped into both front and rear universal joints, if chalk marks are not made, to insure proper reassembly. (Fig. 5)

L. Pull drive shaft out of front universal joint and remove drive shaft.

M. Remove four capscrews and flange nuts securing engine to engine isolator mounting brackets. (Fig. 6)

NOTE: Attached to front left mounting capscrew is a ground strap cable. This must be reattached to the same capscrew when reassembled.

NOTE: Spacing washers should be replaced between engine mounting base and engine isolator mounting brackets during reassembly.

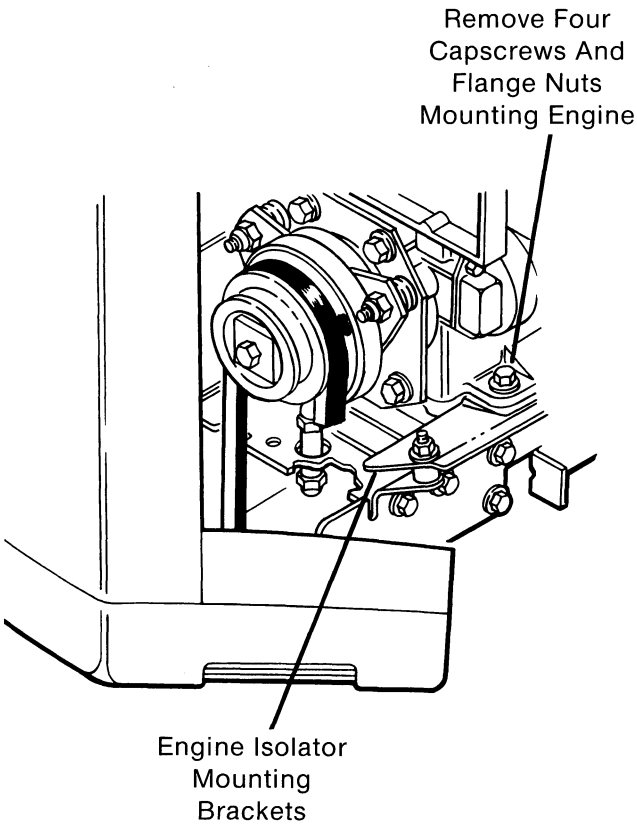


FIG. 6

N. Using lift strap at top of engine, lift engine up and off of tractor. (Fig. 3) Guide universal joint out of screen while engine is being removed.

O. Reverse above procedures to install engine until you reach the point of connecting the throttle and choke cables. Then follow these adjustment procedures:

a. Throttle Cable - Move throttle control lever up to the "FULL FAST" position. (Fig. 7) Attach end of throttle cable to top rear hole on inside control lever. Position cable under cable clamp and move throttle cable until tang on speed control lever just touches throttle adjustment screw. (Fig. 4) Tighten cable clamp screw after choke cable has been adjusted.

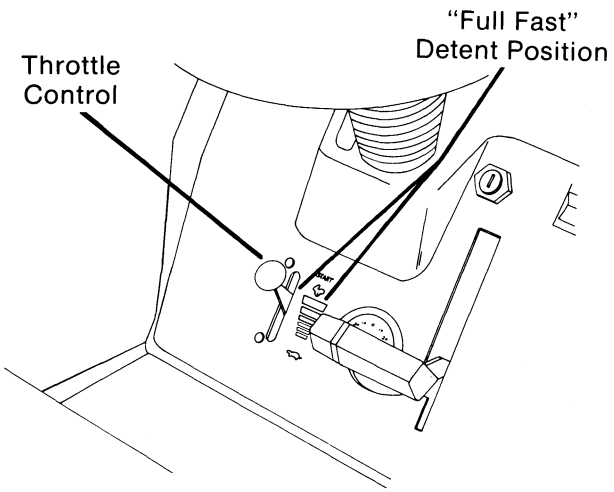


FIG. 7

b. Choke Cable - Remove air cleaner. Attach end of choke cable to top rear hole on outside control lever. (Fig. 4) Position cable under cable clamp and push knob on choke control in all the way against instrument panel. Adjust cable until butterfly in carburetor throat is full open. Tighten cable clamp screw, making sure throttle cable adjustment has not changed. Pull knob on choke control out (minimum 1⅛") butterfly in carburetor throat must close all the way. Adjust cable until proper choke is achieved. Replace air cleaner.

NOTE: After engine is completely assembled onto main frame, check for space between rear of engine shroud and foam gasket attached to baffle plate. If foam gasket is not tight against engine shroud adjust baffle forward until foam gasket is compressed against rear of engine.

4. 17 H.P. ENGINE REMOVAL —

WARNING: To avoid accidental starting, remove spark plug wire(s) and secure away from spark plug(s). Turn ignition switch "OFF".

WARNING: To avoid severe burns, DO NOT attempt this procedure when engine is hot. Wait for engine and muffler to cool down before proceeding.

A. Before this procedure is performed, the attachment should be removed from this tractor as outlined in "ATTACHMENT" section of this service manual.

B. Unclip hood latches and raise hood. Disconnect green wire at connector located at left bottom corner of hood (Fig. 2)

C. Disconnect hood restraint cable connected to left front corner of muffler cover. (Fig. 2) Lower hood back onto tractor.

D. Remove one E-ring from end of hood hinge pin. (Fig. 2) Remove hinge pin completely from hood hinge. Remove hood.

E. Disconnect black battery cable at negative (-) battery terminal. Secure away from battery.

F. Disconnect the following lead wires at engine:

a. Brown wire connected to electric clutch at lower left front corner of engine. (Fig. 2)

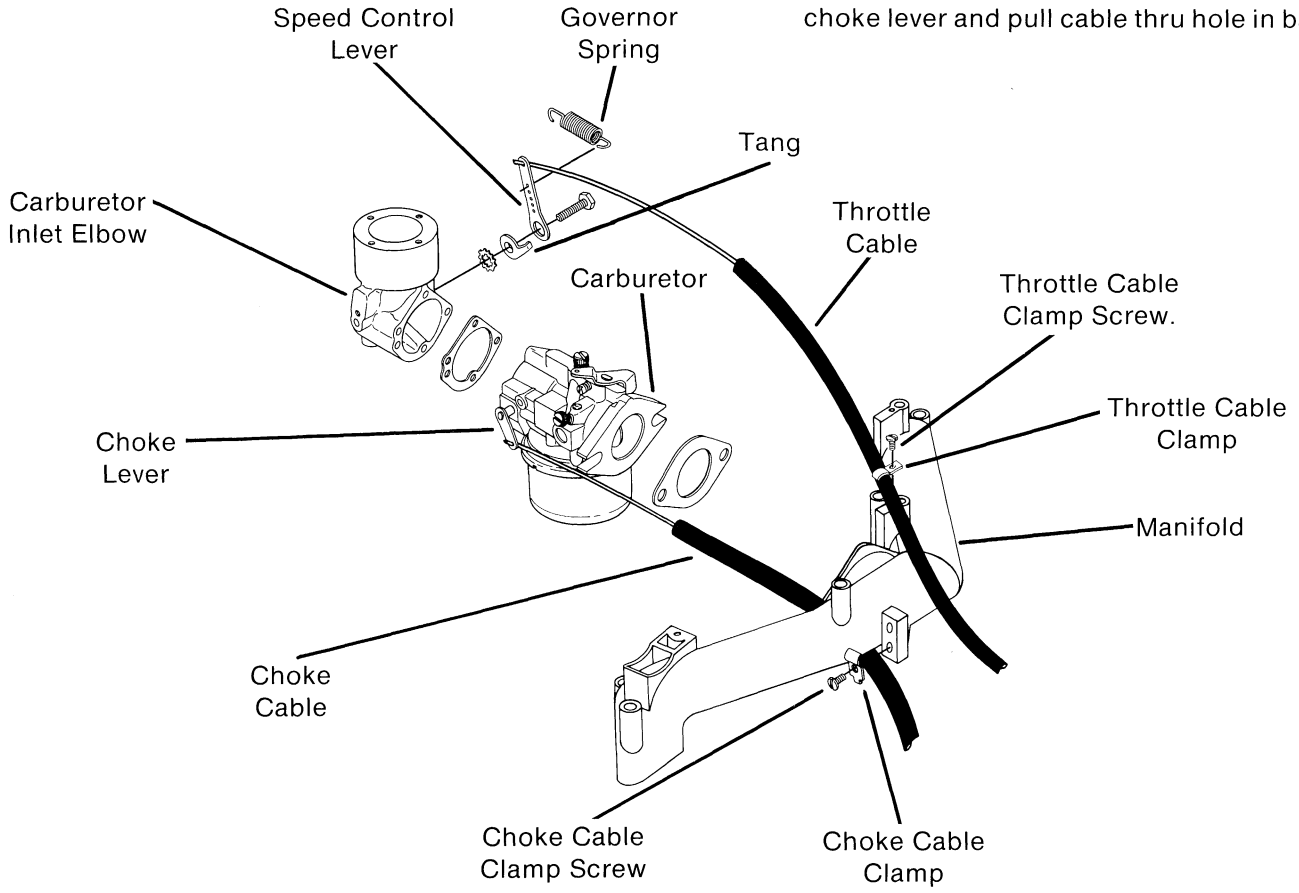
b. Orange and white wires at engine plug at upper rear corner of engine. (Fig. 3)

c. Remove cap on solenoid and disconnect red starter wire at solenoid. (Fig. 3)

G. Remove two nuts and lockwashers on U-bolt securing exhaust pipe to engine mounting bracket. (Fig. 3)

H. Disconnect fuel line at fuel filter. (Fig. 2) Cap line to prevent leakage. Remove fuel filter from fuel line and inspect or replace filter per engine manufacturer's specifications.

I. Disconnect throttle cable just below right side of air cleaner, (Fig. 8) by loosening throttle cable clamp screw far enough so that cable can be removed. Unhook cable end from throttle speed control lever and pull cable thru hole in baffle. Remove choke cable clamp screw and cable clamp, attached to left manifold pipe, (Fig. 9) so choke cable can be removed. Unhook end of choke cable from choke lever and pull cable thru hole in baffle.



FIGS. 8 & 9

J. Remove four thread forming screws securing baffle support brackets to engine shrouding. (Fig. 2)

K. (Gear Drive Tractors Only) Loosen two setscrews on rear of drive shaft. (Fig. 5)

(Hydro Drive Tractors Only) Remove one long setscrew thru notch in fan hub on rear of drive shaft. Rotate fan to expose second short setscrew, loosen setscrew. (Fig.5)

L. Make a chalk mark on front universal joint and a matching mark on rectangular drive shaft so these parts can be mated the same way during reassembly.

NOTE: Lubricate drive shaft with 30 wt. oil during reassembly.

NOTE: Drive shaft is a balanced assembly and **must** be reassembled the same way it was removed. Match marks (arrows) are stamped into both front and rear universal joints, if chalk marks are not made, to insure proper reassembly. (Fig. 5)

M. Pull drive shaft out of front universal joint and remove drive shaft.

N. Remove two rear allen head capscrews securing rear engine mounts to main frame. Remove two hex head capscrews securing front engine mounts to main frame. (Fig. 10)

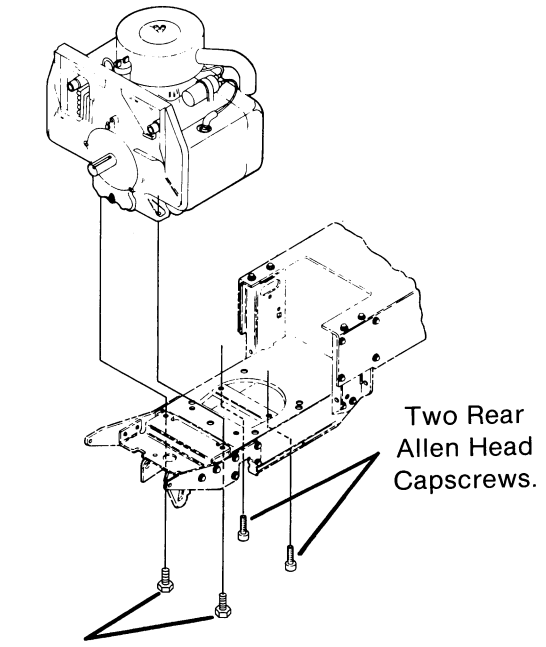


FIG. 10

O. Using two lift straps on top of engine, lift engine up and off of tractor. Guide universal joint out of screen while engine is being removed.

P. Reverse above procedures to install engine until you reach the point of connecting the throttle and choke cables. Then follow these adjustment procedures.

a. Throttle Cable - Move throttle control lever up to the "FULL FAST" position. (Fig. 7) Push throttle cable thru hole in screen and baffle plate and attach end of throttle cable to end hole on speed control lever (under air cleaner on right side). Position cable under cable clamp and move throttle cable towards the rear until speed control lever just touches tang. (Fig. 8) Tighten cable clamp.

b. Choke Cable - Remove air cleaner. Push choke cable thru hole in screen and baffle plate and attach end of choke cable to hole in choke lever. (Fig. 9) Place choke cable in position to be clamped. Replace cable clamp and screw over cable and start screw. Push knob on choke control in all the way against instrument panel. Adjust cable until butterfly in carburetor throat is full open. Tighten cable clamp screw. Pull knob on choke control out (minimum 1⅛") butterfly in carburetor throat must close all the way. Adjust cable until proper choke is achieved. Replace air cleaner.

NOTE: After engine is completely assembled onto main frame, check for space between rear of engine shroud and foam gasket attached to baffle plate. If foam gasket is not tight against engine shroud, adjust baffle forward until foam gasket is compressed against rear of engine.

5. ELECTRIC (P.T.O.) CLUTCH/BRAKE —

Adjustment —

A. To check adjustment, use a .012" feeler gauge.

WARNING: To avoid accidental starting, move PTO switch to "OFF" position and turn ignition switch "OFF" and remove key.

B. To gain access to electric clutch/brake, remove front grill by turning four ¼ turn fasteners.

NOTE: (17 H.P. engines only) Unclip hood latches and tilt hood forward. Remove hood

restraint cable at front left corner of bottom exhaust defector. Remove remaining hardware attaching bottom exhaust deflector to top muffler cover. Lower hood back onto tractor.

C. Insert feeler gauge through access slot and into air gap between armature and rotor. (Fig. 12) There should be some resistance felt when clutch/brake is properly adjusted. Repeat this step in at least three locations on clutch/brake. If feeler gauge cannot be inserted into air gap or gap is too large, follow procedure below to adjust.

D. IF P.T.O. switch is turned "ON" and attachment does not drive, turn all three locknuts equally ¼ turn **clockwise**. (Fig. 11) This will decrease air gap and allow clutch surfaces to engage. Recheck gaps with feeler gauge, if more adjustment is required, continue turning locknuts equally ¼ turn until correct adjustment is achieved.

E. If P.T.O. switch is turned "OFF and attachment does not stop, turn all three locknuts equally ¼ turn **counterclockwise**. This will increase air gap and allow clutch surfaces to disengage. Recheck gap with feeler gauge, if more adjustment is required, continue turning locknuts equally ¼ turn until correct adjustment is achieved.

F. Reassemble tractor by reversing step "B".

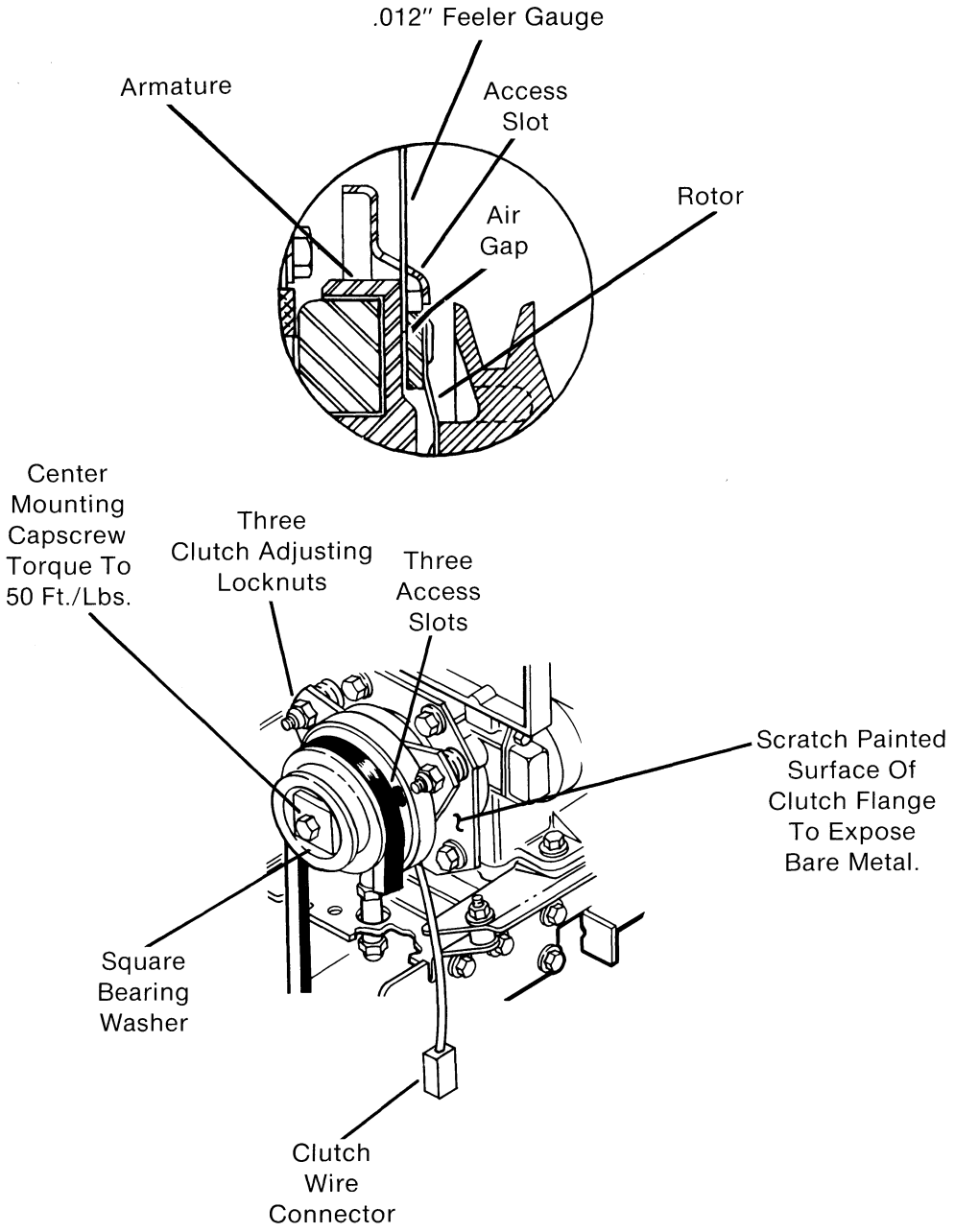


FIG. 11

Clutch Coil Check —

If electric (P.T.O) clutch is not engaging properly to bring deck up to speed or does not drive at all, preform the following test to check the clutches field coil.

WARNING: To avoid accidental starting, remove spark plug wire(s) and secure away from spark plugs(s).

A. Remove front grill by turning four ¼ turn fasteners.

B. Using a voltmeter, check voltage at clutch wire, out left side of clutch. (Fig. 11) Connect positive (+) probe to clutch wire connector. Connect negative (-) probe to ground (engine mounting bolt). Turn ignition switch to the RUN position and engage the P.T.O. switch. Voltmeter should register more than 10 volts. If voltmeter does not register a reading, look for broken wires or connections. If voltmeter registers less that 10 volts, check battery charge and/or fluid level. If battery does not hold a charge of at least 10 volts, replace battery. If voltmeter reads over 10 volts, disengage P.T.O. switch and turn ignition switch OFF. Disconnect clutch wire at clutch wire connector and check resistance of clutch field coil as follows:

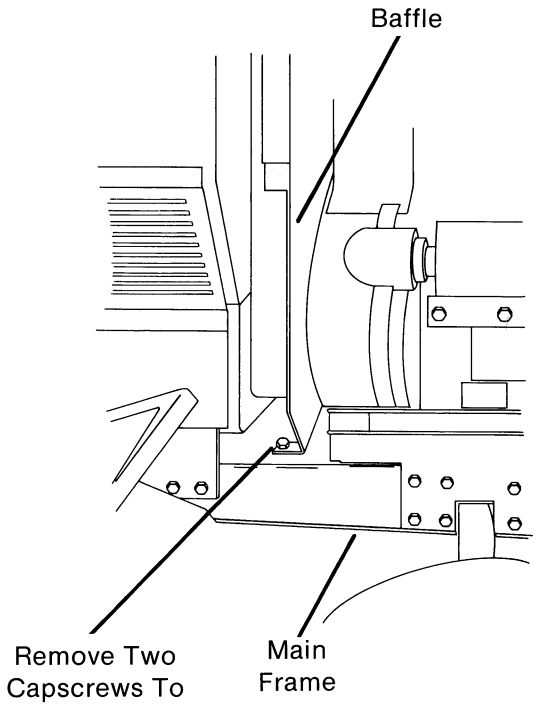


FIG. 12

C. Using an ohmmeter, connect one probe to clutch coil connector and with a knife, scratch the painted surface of the clutch flange to expose bare metal. (Fig. 11) Make other probe connection there. With ohmmeter set to low ohm scale, a normal resistance reading should be between 2.05 and 2.77 ohms. A reading outside these values indicates a faulty coil and P.T.O. clutch should be replaced as a complete unit when under warranty and field assembly should be repaired or replaced when out of warranty.

D. If P.T.O. clutch still does not engage properly, reset "ELECTRIC (P.T.O.) CLUTCH/BRAKE - "ADJUSTMENT".

E. Reconnect clutch wire connector and replace front grill.

Removal —

WARNING: To avoid accidental starting, remove spark plug wire(s) and secure away from spark plugs(s). Turn ignition switch to the "OFF" position.

A. Remove front grill by turning four ¼ turn fasteners.

NOTE: (17 H.P. engines only) Unclip hood latches and tilt hood forward. Remove hood restraint cable at front left corner of bottom exhaust deflector. (Fig. 2) Remove remaining hardware attaching bottom exhaust deflector to top muffler cover. Lower hood back onto tractor.

B. Disconnect brown wire at connector on lead wire to electric clutch. (Fig. 2)

C. Remove four capscrews and lockwashers attaching electric clutch to front of engine. (Fig. 11)

D. Remove center bolt, square bearing washer and bearing spacer. (Fig. 11)

E. Pull clutch assembly off crankshaft.

NOTE: **Do Not** use wheel puller to remove clutch assembly.

F. Electric (P.T.O.) clutch/brake assembly should be replaced as a complete unit under warranty and repaired or replaced when out of warranty. Reverse above procedures to reassemble.

NOTE: When reassembling clutch onto crankshaft, lightly oil crankshaft and torque center capscrew to a torque of 50 ft./lbs. Also, orient

wire so it comes out right side of clutch housing when facing front of machine. (Fig. 11)

NOTE: Check armature/rotor air gap by following procedures for ELECTRIC (P.T.O.) CLUTCH/BRAKE - ADJUSTMENT.

IMPORTANT: After attachment has been reassembled onto tractor, **new** clutch/brake must be burnished to extend life of clutch/-brake. Proceed as follows:

a. Position gearshift lever in NEUTRAL.

b. Start engine and put throttle in "FULL FAST" position.

c. Turn P.T.O. switch ON and OFF **six** times, engaging and disengaging attachment.

NOTE: Allow attachment to come to a complete stop between ON-OFF cycles.

d. Recheck armature/rotor air gap by following procedures for ELECTRIC (P.T.O.) CLUTCH/BRAKE - ADJUSTMENT.

6. FUEL TANK REMOVAL —

WARNING: To avoid accidental starting, remove spark plug wire(s) and secure away from spark plugs(s).

WARNING: To avoid severe burns, DO NOT attempt this procedure when engine is hot. Wait for engine and muffler to cool down before proceeding.

A. Before this procedure is performed, the attachment should be removed from this tractor as outlined in "ATTACHMENT" section of this service manual.

B. Unclip hood latches and raise hood and set in upright position.

C. Disconnect both battery cables from battery. Disconnect negative (-) terminal **first**. Loosen (do not remove) hex nuts on battery hold down clamp and remove battery from tractor.

D. Disconnect fuel line at fuel filter and drain fuel tank (Fig.2) Remove fuel filter from fuel line and inspect or replace filter per engine manufacturer's specifications.

E. (Gear Drive Tractors Only) Loosen two setscrews on rear of drive shaft. (Fig. 5)

(Hydro Drive Tractors Only) Remove one long setscrew thru notch in fan hub on rear of drive shaft. Rotate fan to expose second short setscrew, loosen setscrew. (Fig. 5)

Push or pry drive shaft forward until rear universal joint comes off of gear box or transmission shaft.

F. Make a chalk mark on front universal joint and a matching mark on rectangular drive shaft so these parts can be mated together the same way during reassembly.

NOTE: Drive shaft is a balanced assembly and **must** be reassembled the same way it was removed. Match marks (arrows) are stamped into both front and rear universal joints, if chalk marks are not made, to insure proper reassembly. (Fig. 5)

G. Pull drive shaft out of front universal joint and remove drive shaft.

H. Remove attaching hardware holding baffle and screen assembly against rear of engine.

12 H.P. Engines - Two capscrews at bottom of baffle, holding baffle to main frame. (Fig. 12)

17 H.P. Engines - Four thread forming screws holding baffle support brackets to both sides of engine shroud. (Fig. 2)

I. Remove seven (7) thread forming screws at bottom of instrument panel holding panel to both sides of main frame. (Fig. 14)

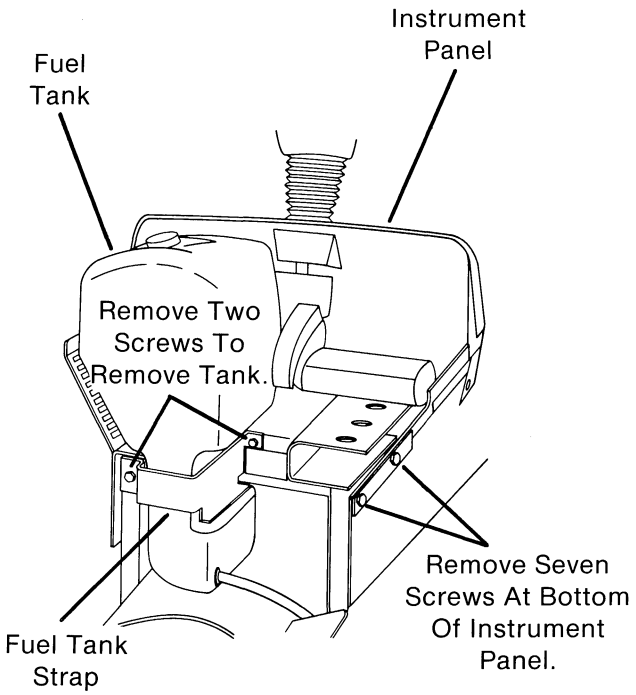


FIG. 14

J. Remove two thread forming screws through tank strap securing fuel tank to main frame. (Fig. 14)

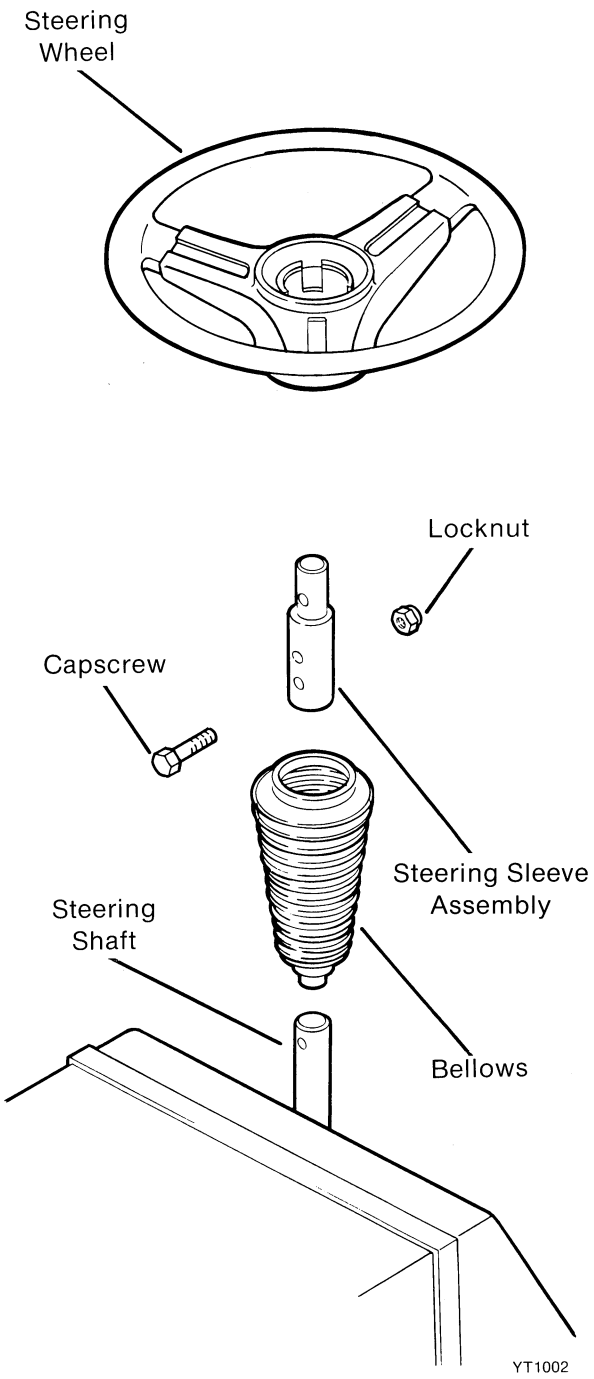


FIG. 15

K. **17 H.P. Engines Only** - follow next five (5) steps, "a" through "e".

a. Compress steering shaft bellows to expose capscrew through steering sleeve assembly. (Fig. 15) Remove capscrew and locknut. Lift steering wheel assembly and bellows off steering shaft.

b. Unbolt two capscrews holding upper steering shaft bearing to instrument panel.

c. (Hydro Drive Tractors **only**) Remove "T" handle knobs on traction drive lever by removing slotted machine screw.

d. Remove choke cable clamp screw and cable clamp, attached to left manifold pipe, (Fig. 17) so choke cable can be removed. Detach end of choke cable from choke lever, under left side of air cleaner, and pull cable thru hole in baffle.

NOTE: Choke cable adjustment procedure should be followed to reset choke cable adjustment.

e. Carefully lift instrument panel up and over steering shaft towards rear of tractor.

L. Carefully work fuel tank out from its mounting. Service fuel tank as required.

NOTE: Tank strap must be wrapped around fuel tank during reassembly.

M. Reverse above procedures to reinstall fuel tank.

7. THROTTLE CONTROL LEVER REMOVAL AND ADJUSTMENT —

WARNING: To avoid accidental starting, remove spark plug wire(s) and secure away from spark plugs(s).

A. Unclip hood latches and raise hood and set in upright position.

B. Disconnect both battery cables from battery. Disconnect negative (-) terminal **first**. Loosen (do not remove) hex nuts on battery hold down clamp and remove battery from tractor.

C. Detach throttle cable at engine.

a. **(12 H.P. Engines Only)** Loosen cable clamp screw, securing throttle and choke cables to left side of engine, (Fig. 16) far enough so throttle cable (inner cable) can be removed from throttle speed control lever.

b. **(17 H.P. Engines Only)** Loosen throttle cable clamp screw, under right side of air cleaner, (Fig. 17) far enough so cable can be removed. Disconnect cable end from throttle speed control lever and pull cable thru hole in baffle.

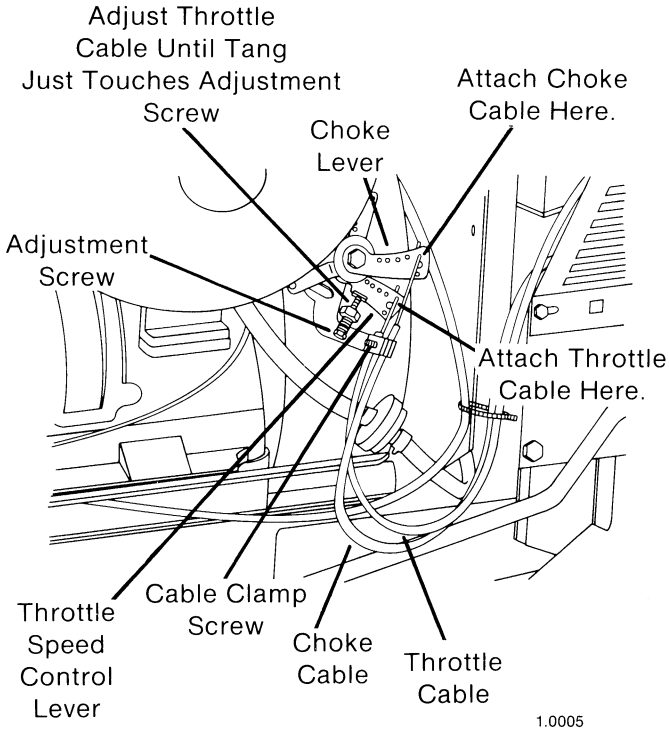
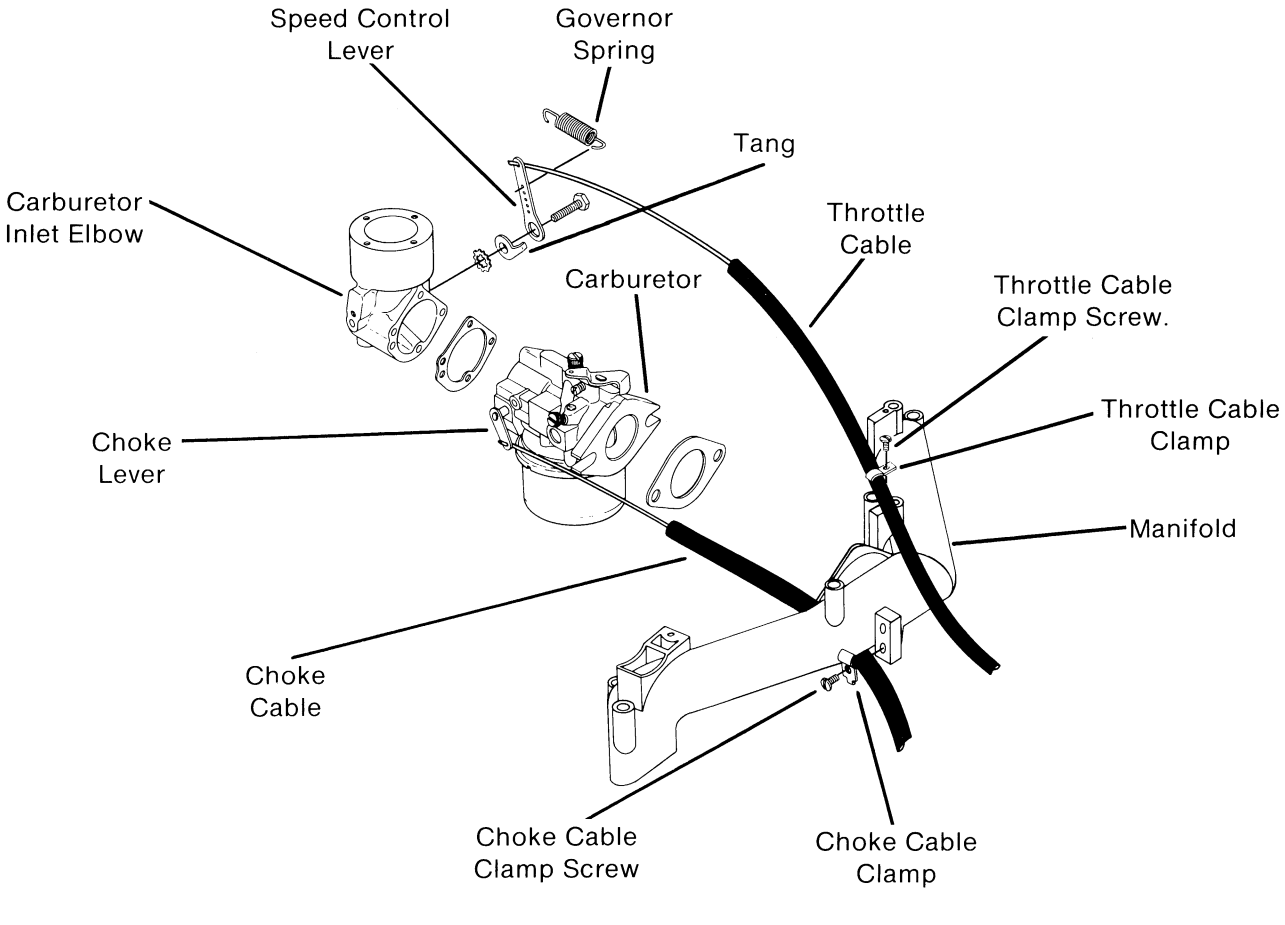


FIG. 16



FIGS. 17 & 19

D. Remove throttle control knob by prying off of control lever.

E. Remove two screws attaching throttle control assembly to instrument panel.

F. Push throttle control lever through slotted hole in instrument panel. Work throttle control assembly out and remove from tractor.

G. Service or replace throttle control assembly as required by reversing above procedures, then set throttle adjustment at engine as follows:

   a. **(12 H.P. Engines Only)** Move throttle control lever up to the "FULL FAST" position. (Fig. 18) Attach end of throttle cable to top rear hole on inside control lever. Position cable under cable clamp and move throttle cable until tang on speed control lever just touches throttle adjustment screw. (Fig. 16) Tighten cable clamp screw after choke cable has been adjusted. See CHOKE CABLE - ADJUSTMENT.

   b. **(17 H.P. Engines Only)** Move throttle control lever up to the "FULL FAST" position. (Fig. 18) Push throttle cable thru hole in screen and baffle plate and attach end of throttle cable to end hole on speed control lever (under air cleaner on right side). Position cable under cable clamp towards the rear until speed control lever just touches tang. (Fig. 17) Tighten cable clamp.

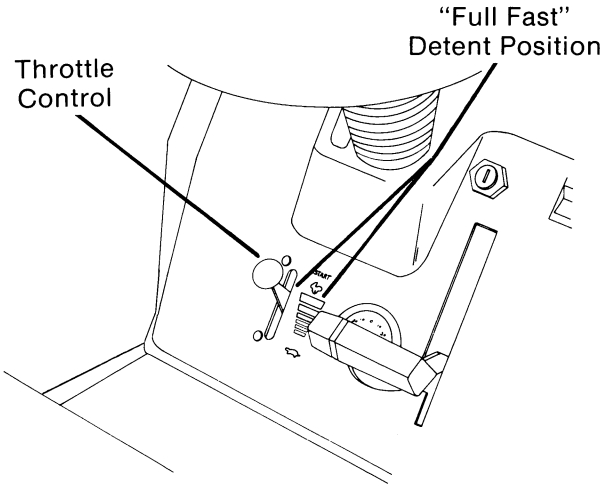


FIG. 18

8. CHOKE CABLE REMOVAL AND ADJUSTMENT —

WARNING: To avoid accidental starting, remove spark plug wire(s) and secure away from spark plugs(s).

A. Unclip hood latches and raise hood and set in upright position.

B. Disconnect both battery cables from battery. Disconnect negative (-) terminal **first**. Loosen (do not remove) hex nuts on battery hold down clamp and remove battery from tractor.

C. Detach choke cable at engine.

   a. **(12 H.P. Engine Only)** Loosen cable clamp screw, securing throttle and choke cables to left side of engine, (Fig. 16) far enough so that choke cable (outer cable) can be removed from choke lever.

   b. **(17 H.P. Engine Only)** Remove choke cable clamp screw and cable clamp, attached to left manifold pipe, (Fig. 19) so choke cable can be removed. Remove end of choke cable from choke lever and pull cable thru hole in baffle.

D. Remove nut on inside of instrument panel securing choke cable assembly in place.

E. Pull choke cable assembly out through hole in instrument panel and service or replace choke assembly as required.

   NOTE: Routing of cable goes under steering mechanism when choke cable is reassembled.

F. Reverse above procedures to reinstall choke cable assembly and set choke adjustment at engine as follows:

   a. **(12 H.P. Engines Only)** Remove air cleaner. Attach end of choke cable to top rear hole on outside control lever. (Fig. 16) Position cable under cable clamp and push knob on choke control in all the way against instrument panel. Adjust cable until butterfly in carburetor throat is full open. Tighten cable clamp screw, making sure throttle cable adjustment has not changed. See THROTTLE CONTROL LEVER - ADJUSTMENT. Pull knob on choke control out (minimum 1⅛") butterfly in carburetor throat must close all the way. Adjust cable until proper choke is achieved. Replace air cleaner.

b. **(17 H.P. Engine Only)** Remove air cleaner. Push choke cable thru hole in screen and baffle plate and attach end of choke cable to hole in choke lever. (Fig. 17) Place choke cable in position to be clamped. Replace cable clamp and screw over cable and start screw. Push knob on choke control in all the way against instrument panel. Adjust cable until butterfly in carburetor throat is full open. Tighten cable clamp screw. Pull knob on choke control out (minimum 1⅛") butterfly in carburetor throat must close all the way. Adjust cable until proper choke is achieved. Replace air cleaner.

FRONT (MULE DRIVE) IDLER PULLEY REMOVAL AND ADJUSTMENT:

WARNING: To avoid accidental starting, remove spark plug wire(s) and secure away from spark plugs(s).

A. Before this procedure is performed, the attachment should be removed from this tractor as outlined in "ATTACHMENT" section of this service manual.

B. Unlock spring loaded idler pulley (if lock-out pin in locked position) (Fig. 20) by pushing pulley back and removing lock-out pin. Release idler pulley.

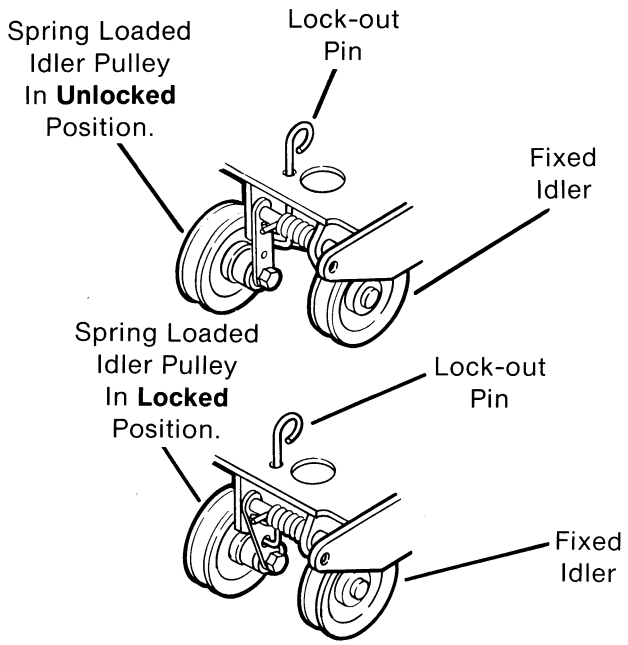


FIG. 20

C. Remove nut on outside of spring loaded idler capscrew. Remove lockwasher, short spacer, idler pulley and long spacer from capscrew. (Fig. 21) Inspect idler pulley bearing for wear. If bearing is worn, replace idler pulley and bearing as a complete assembly. Bearing cannot be replaced separately.

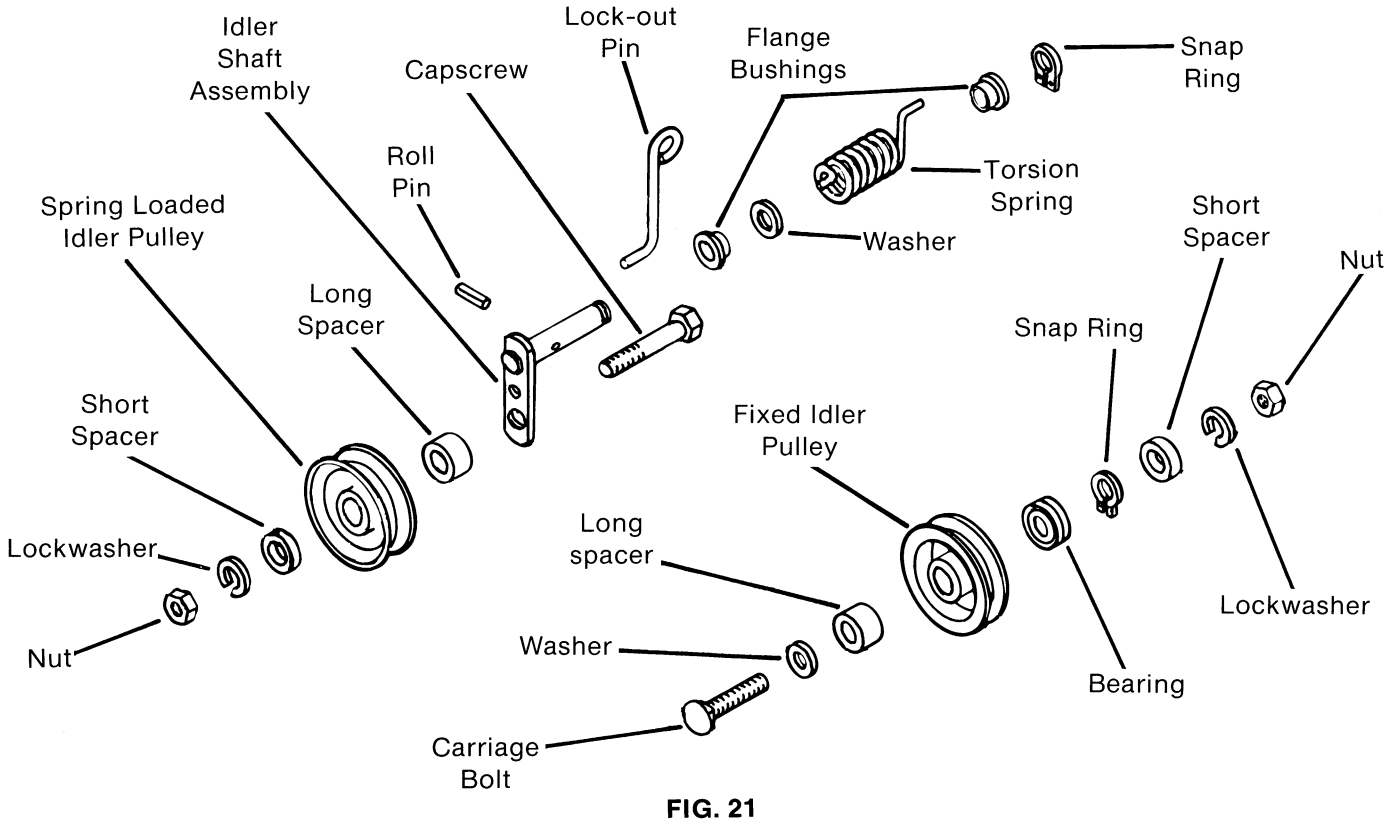


FIG. 21

D. Remove spring loader idler capscrew from idler shaft assembly.

WARNING: To avoid injury from parts under tension, care should be taken when capscrew is removed from idler shaft. Shaft should be held and released slowly and carefully.

E. Remove snap ring from left end of idler shaft assembly. (Fig. 21)

WARNING: To avoid injury from parts STILL under tension, care should be taken when snap ring is removed from idler shaft. Shaft should be held and released slowly and carefully.

Remove spacing washers under snap ring.

F. Punch roll pin thru idler shaft with a pin punch. Push idler shaft through idler shaft mounting brackets and remove idler shaft. Torsion spring will fall off shaft at this time.

G. Idler shaft flange bushings can now be removed and inspected for excessive wear. Replace bushings if worn.

H. Remove nut and lockwasher from carriage bolt through fixed idler pulley. Remove short spacer, fixed idler pulley, long spacer, flat washer and carriage bolt. Inspect fixed idler bearing for wear. If bearing is worn, bearing can be pressed out of fixed idler pulley and replaced separately.

I. Reverse above procedures to reassemble idler pulleys to idler shaft mounting brackets.

NOTE: When installing fixed idler pulley onto idler shaft mounting bracket, fixed idler pulley should be in the highest position in the slot. Adjustment of fixed idler pulley should be made after attachment is mounted to the tractor, follow adjustment procedures below.

NOTE: Fixed idler pulley is adjustable to take up any excessive slack in the attachment drive belt. Follow procedures below to adjust fixed idler pulley:

a. Push spring loaded idler pulley back and lock in this position using the lock-out pin. (Fig. 20) This will take tension off the drive belt.

b. Loosen (do not remove) nut securing fixed idler pulley. (Fig. 21)

c. Slide fixed idler pulley down towards bottom of slot until all slack is removed or until spring loaded idler pulley is directly opposite the fixed idler pulley when spring loaded idler is in the unlocked position. (Fig. 20)

d. Retighten nut securing fixed idler pulley.

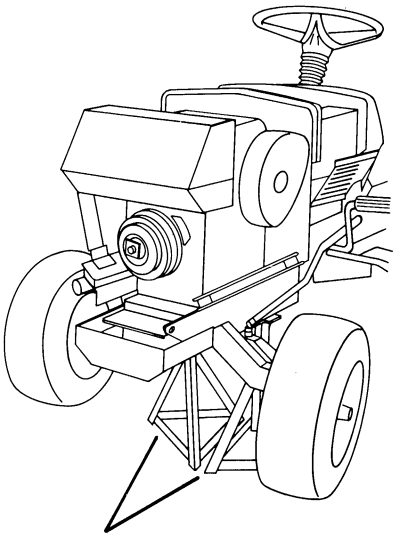
e. Release spring loaded idler pulley by removing lock-out pin from pulley arm. Replace lock-out pin in hole in idler shaft mounting bracket. (Fig. 20)

FRONT AXLE REMOVAL:

WARNING: To avoid accidental starting, remove spark plug wire(s) and secure away from spark plugs(s).

A. Before this procedure is performed, the attachment should be removed from this tractor as outlined in "ATTACHMENT" section of this service manual.

B. Jack front of tractor up and support with jack stands on frame as shown in (Fig. 22)



Jack Front Of Tractor Up And Support On Jack Stands.

FIG. 22

C. Remove jam nut on front drag link ball joint under left spindle assembly steering arm. (Fig. 23)

D. Remove ball joint from left spindle assembly steering arm by threading ball joint out of steering arm. Ball joint spacer between ball joint and steering arm should be removed also at this time. (Fig. 23)

E. Loosen (do not remove) two rear capscrews holding rear axle pivot bracket to main frame. Remove two front capscrews completely. (Fig. 23)

F. Holding locknut on front of axle, remove front axle pivot bolt and pull bolt out towards rear of machine. (Fig. 23)

WARNING: To avoid injury from falling parts, care should be taken to secure assembly when removing the pivot bolt.

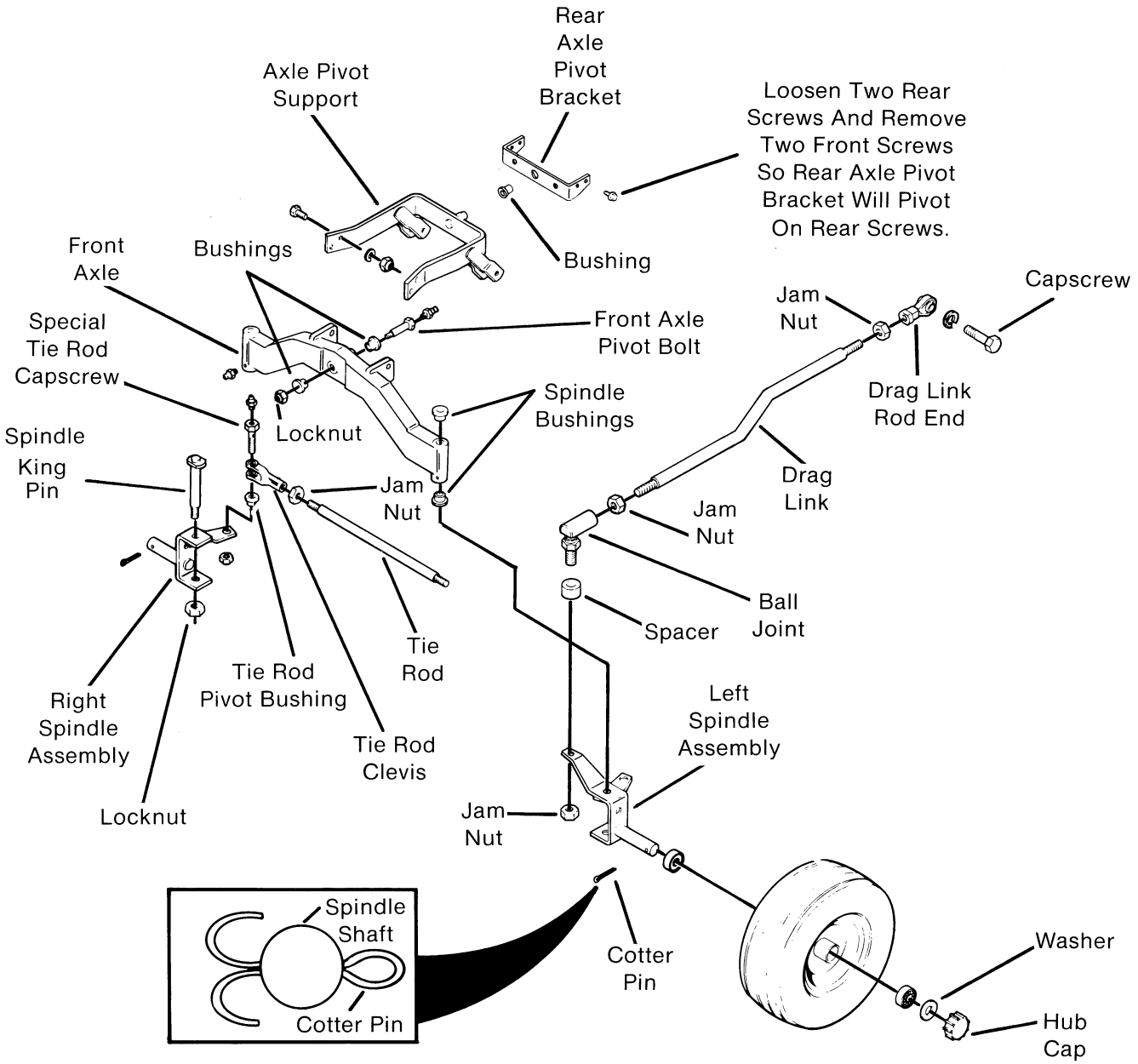


FIG. 23

G. Pull entire axle assembly down and forward to remove. The rear axle pivot bracket will pivot on the two remaining capscrews and allow the front axle pivot bracket to separate from the rear bracket.

H. Service front axle as required. Check front spindles and tie rod for excessive wear. Follow individual procedures to service spindles and tie rod. Replace any worn parts and regrease all lube fittings with NLGI Grade 2 Lithium base EP grease (Ford 1T-M1C137-B), after axle is reassembled.

I. Reverse above procedures to install front axle until you reach the point of connecting the drag link then follow procedures under "DRAG LINK/TOE—IN ADJUSTMENT", to set drag link properly.

TIE ROD REMOVAL:

WARNING: To avoid accidental starting, remove spark plug wire(s) and secure away from spark plugs(s).

A. Remove locknuts on bottom of special capscrews (with grease fittings) that attach tie rod clevis to both right and left spindle assemblies. (Fig. 24)

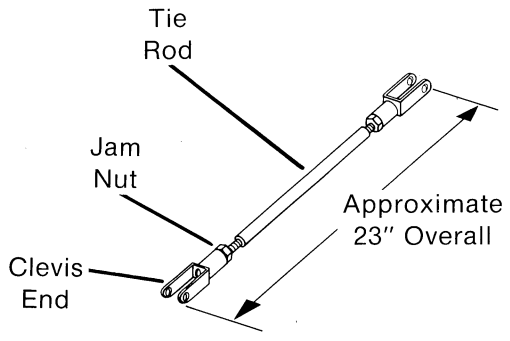


FIG. 24

B. Remove special capscrews and remove tie rod assembly.

C. Service tie rod assembly as required. Also, check condition of pivot bushings in spindle assembly. Replace bushings if worn. (Fig. 23)

D. Reverse above procedures to reassemble tie rod between spindles, but first, set tie rod assembly to an approximate 23" overall length with clevis ends threaded equally onto tie rod. (Fig. 24) Then follow the **complete** procedure under "DRAG LINK/TOE-IN ADJUSTMENT" to set the tie rod properly.

FRONT SPINDLE REPLACEMENT:

WARNING: To avoid accidental starting, remove spark plug wire(s) and secure away from spark plugs(s).

A. Raise front of tractor off the ground and support main frame on jack stands. (Fig. 22)

B. Remove hub cap, cotter pin and washer from end of spindle shaft. (Fig. 23)

NOTE: When replacing cotter pin into spindle shaft, cotter pin should be spread properly around spindle shaft. See detail (Fig. 23). This will prevent cotter pin from destroying hub cap.

C. Pull wheel and tire assembly off spindle. Check spindle shaft and inner and outer wheel bearing for excessive wear. Replace wheel bearings if necessary.

D. Remove locknut and special capscrew attaching tie rod clevis to spindle assembly. Remove pivot bushing from spindle assembly. (Fig. 23)

E. Remove locknut on bottom of spindle king pin. Remove king pin. (Fig. 23)

F. **On left spindle only!** Remove jam nut on front drag link ball joint under left spindle assembly steering arm. Remove ball joint from left spindle assembly steering arm by threading ball joint out of steering arm. Ball joint spacer between ball joint and steering arm should be removed also at this time. (Fig. 23)

G. Spindle assembly can now be removed and service spindle as required.

H. Check also the condition of upper and lower spindle bushings. Replace bushings if excessive wear is present.

I. Reverse above procedure to replace spindle and grease all pivot points with NLGI Grade 2 Lithium base EP grease (Ford 1T-M1C137-B).

IMPORTANT: It is good practice to service both spindle assemblies at the same time. Repeat above procedure to service other side.

J. Follow the **complete** procedures under "DRAG LINK/TOE-IN ADJUSTMENT" to reset drag link and tie rod properly.

DRAG LINK REMOVAL:

WARNING: To avoid accidental starting, remove spark plug wire(s) and secure away from spark plugs(s).

A. Remove capscrew and lockwasher attaching rear draglink rod end to pitman arm (Fig. 23)

B. Remove jam nut on front drag link ball joint under left spindle assembly steering arm. (Fig. 23)

C. Remove ball joint from left spindle assembly steering arm by threading ball joint out of steering arm. Ball joint spacer between ball joint and steering arm should be removed at this time. (Fig. 23) Remove drag link assembly.

D. Reverse above procedures to reassemble drag link between pitman arm and left spindle, but first, set drag link assembly to an approximate 24¼" overall length with front ball joint and rear rod end threaded equally onto drag link. (Fig. 25) Then follow the **complete** procedure under "DRAG LINK/TOE-IN ADJUSTMENT" to set the drag link properly.

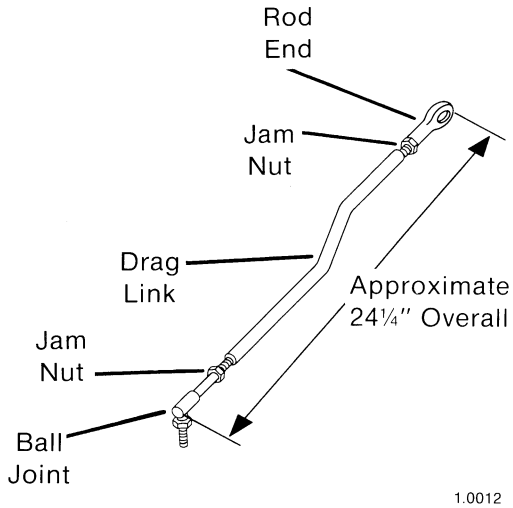


FIG. 25

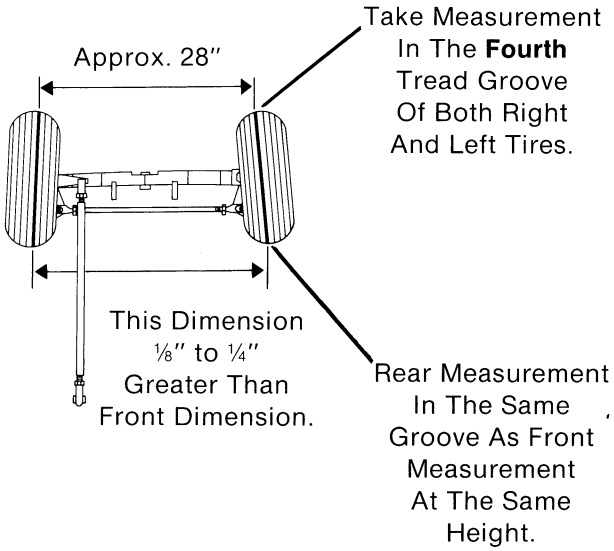
DRAG LINK/TOE-IN ADJUSTMENT:

If front axle, tie rod or drag link are serviced or replaced, this procedure should be followed **completely** to set proper adjustments.

If excessive or uneven tire wear or if improper steering characteristics develop (hard steering), following this procedure **completely** should remedy these problems.

WARNING: To avoid accidental starting, remove spark plug wire(s) and secure away from spark plugs(s).

A. Measure between front of front tires in the fourth tread groove from the inside of each tire. (Fig. 26) This dimension should be approximately 28".



TOP VIEW

FIG. 26

B. Measure between rear of front tires in the same tread grooves in Step "A". (Fig. 26) This dimension should be ⅛" to ¼" greater than dimension in Step "A". If dimension is anything else, adjust proper toe-in as follows:

a. Loosen jam nut on left end of tie rod securing tie rod clevis to tie rod. (Fig. 23)

b. Remove special capscrew (w/grease fitting) at left end of tie rod by removing the locknut. (Fig. 23)