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

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# 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.

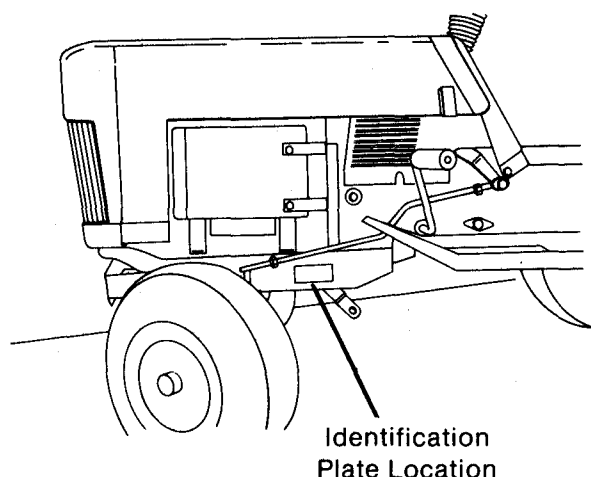


FIG. 1

1.0001

## 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.

SCREW SIZE	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.	
	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

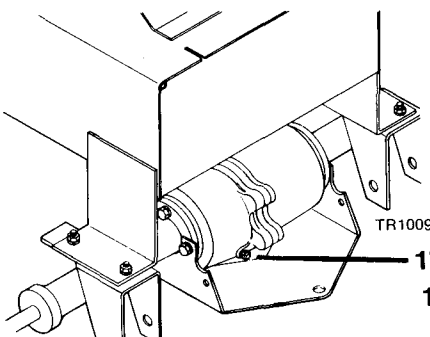
# LUBRICATION CHARTS

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

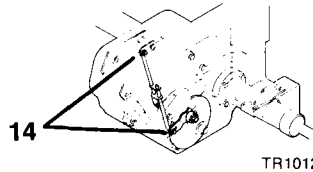
## LGT and LGT 17 (Gear Drive Tractors)

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.

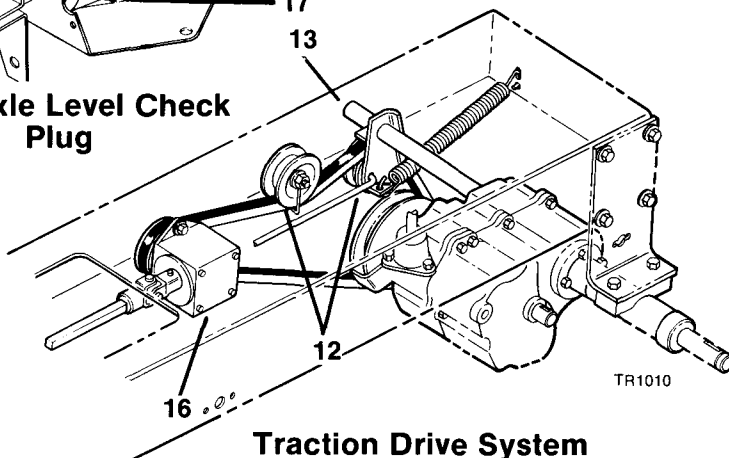
\*Grease—NLGI Grade 2 Lithium base EP grease (Ford 1T-M1C137-B). Grease with hand pump grease gun when required.



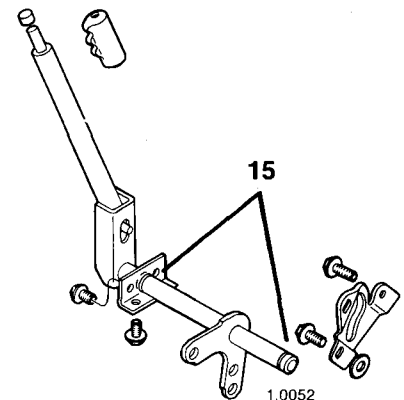
**Transaxle Level Check Plug**



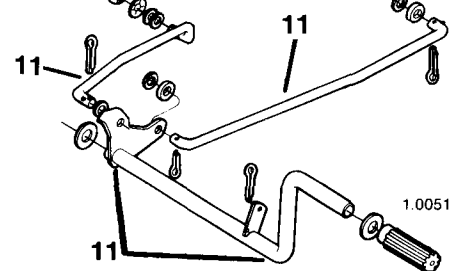
**Brake Adjustment Rods**



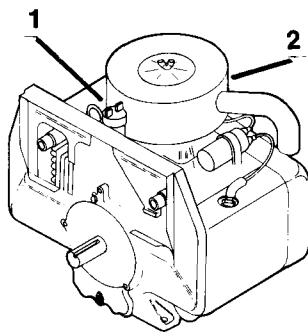
**Traction Drive System**



**Lift Lever**

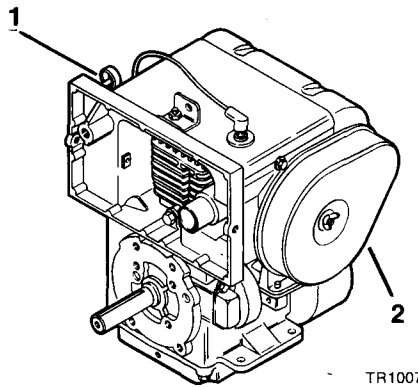


**Clutch/Brake Pedal Linkages**



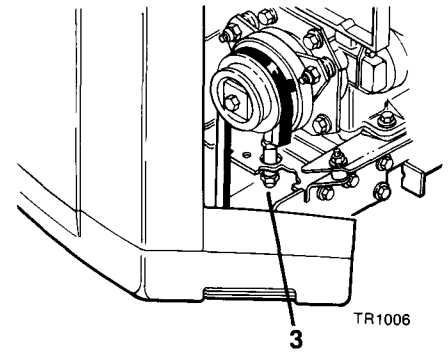
TR1029

**17 H.P. Kohler Engine**



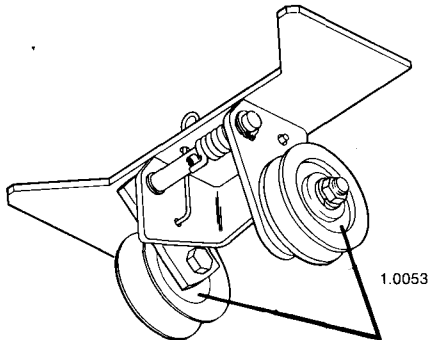
TR1007

**12 H.P. Kohler Engine**

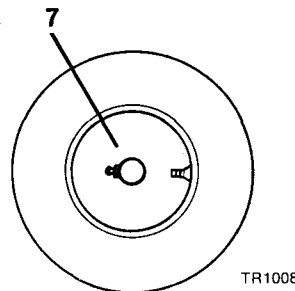


TR1006

**Engine Oil Change**

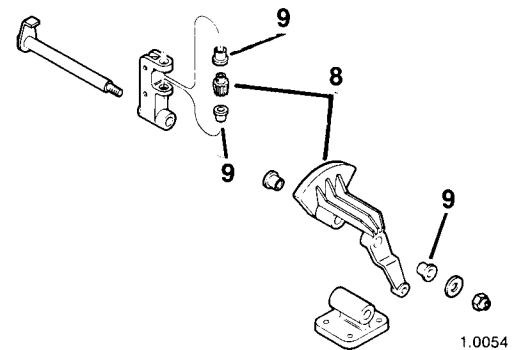


**Front (Mule Drive)  
Idler Pulleys**

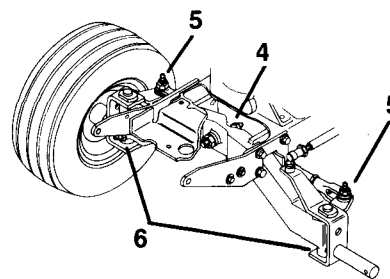


TR1008

**Front Wheels**

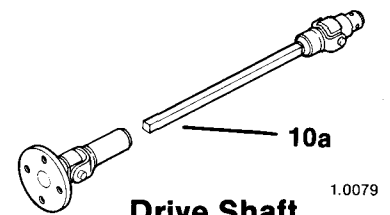


**Steering Sector Gear  
And Pinion**



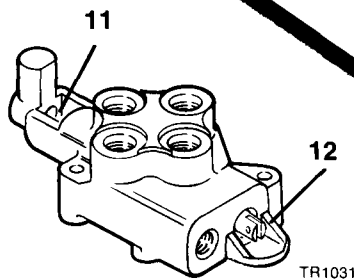
TR1030

**Front Axle**



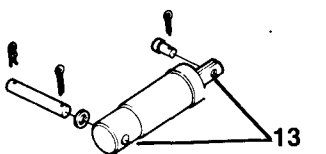
1.0079

**Drive Shaft**



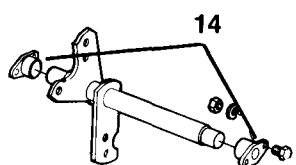
TR1031

**Lift Valve**



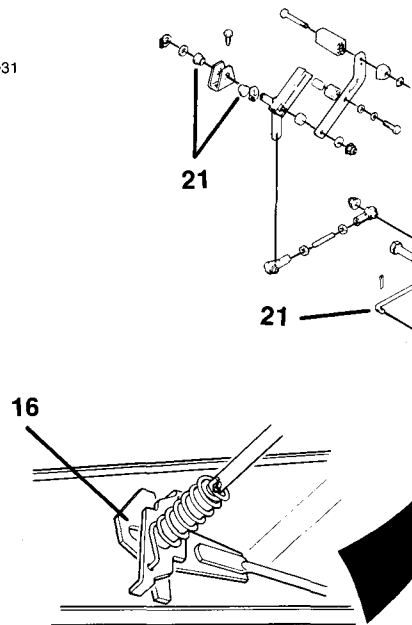
1.0055

**Lift Cylinder**



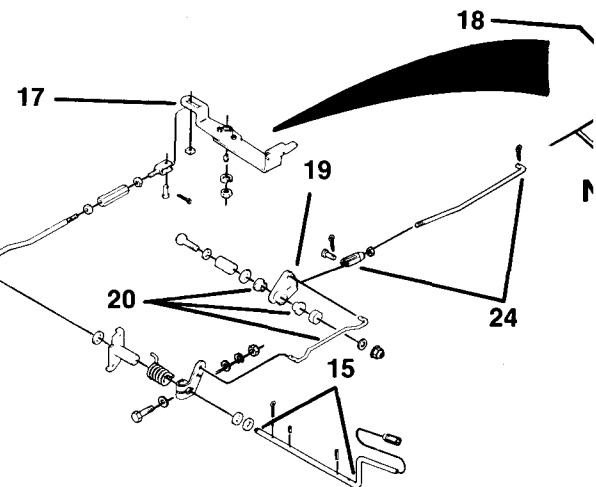
1.0056

**Lift Arm  
Shaft**



1.0058

**Neutral Rod  
Assembly**



1.0057

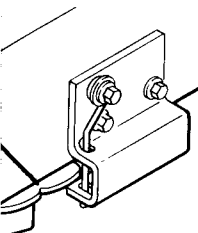
**Clutch/Brake Pedal And  
Drive Lever Linkages**

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

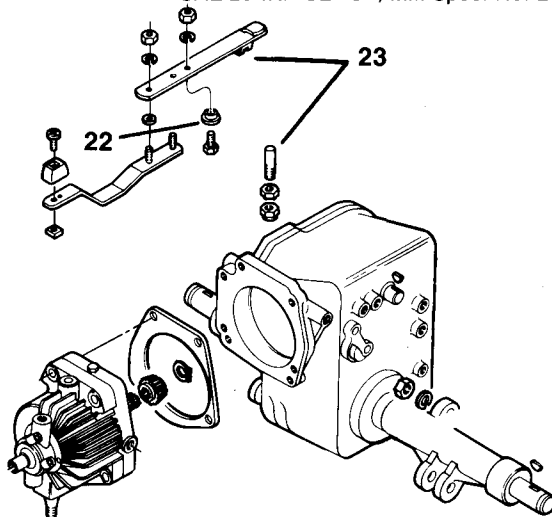
LUBE POINT	LOCATION	LUBRICATION	INTERVAL			REMARKS
			DAILY	25 HRS.	100 HRS.	
1	Engine oil level	Per Eng. Mfg.	●			Check before each use of tractor.
2	Engine air filter		●			Check daily if operating under dusty conditions. Normally inspect every 50 hrs.
3	Engine oil change	Per Eng. Mfg.		●		Break-in, 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.
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.

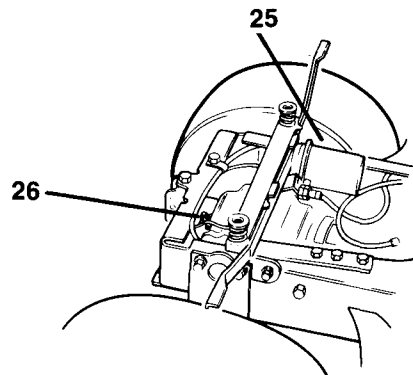
\*\*SAE 20 wt. "SE" Oil, Mil. Spec. No. L2104B.



Neutral Spring Finger



Transmission And Transaxle



Transaxle Fill Plug And Oil Filter

TR1023

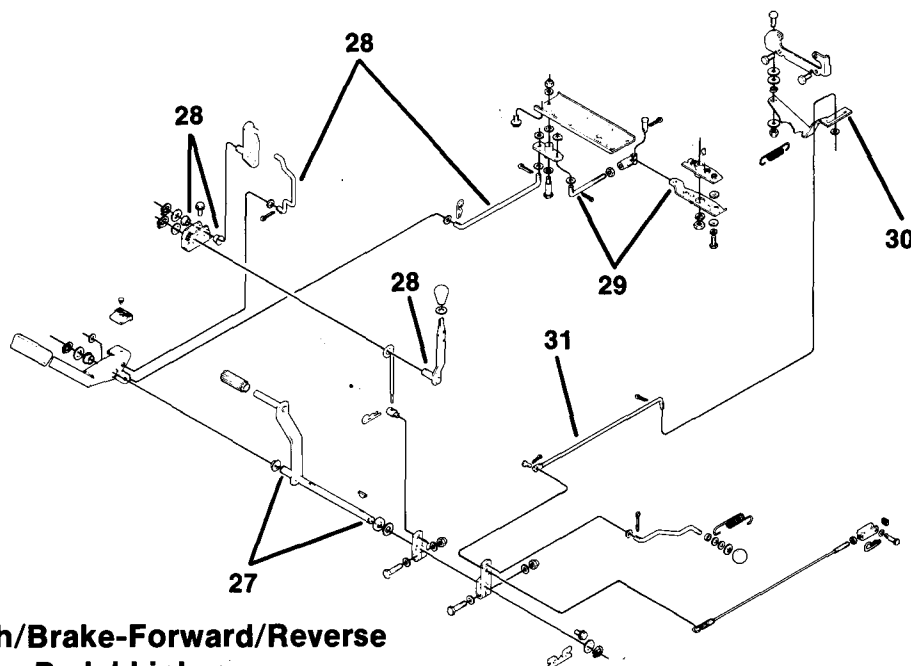
1.0060

# 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:

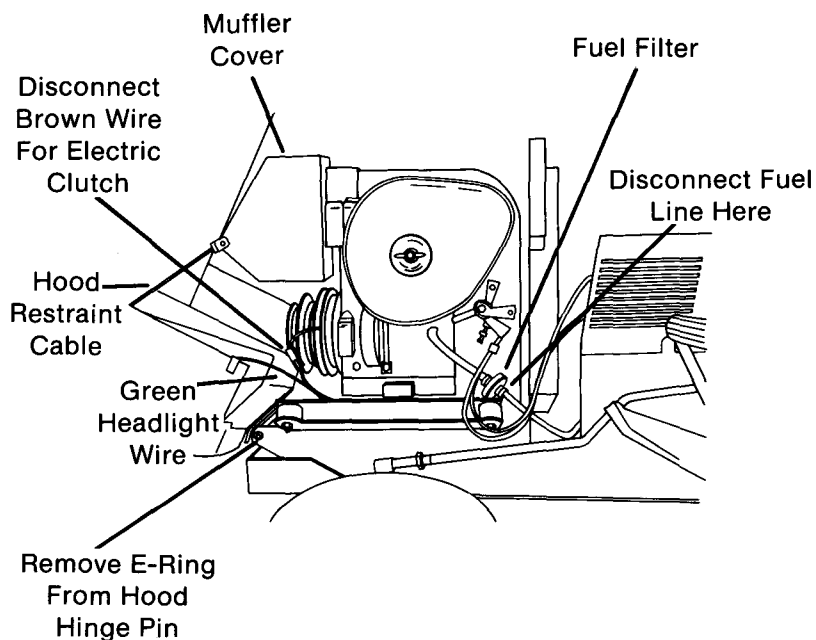
1. Refer to Engine Manufacturer's Service Manual for all adjustments and servicing information.
2. Maximum engine RPM high speed, no load, range is 3300 RPM to 3500 RPM.
3. **12 H.P. Engine Removal —**



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

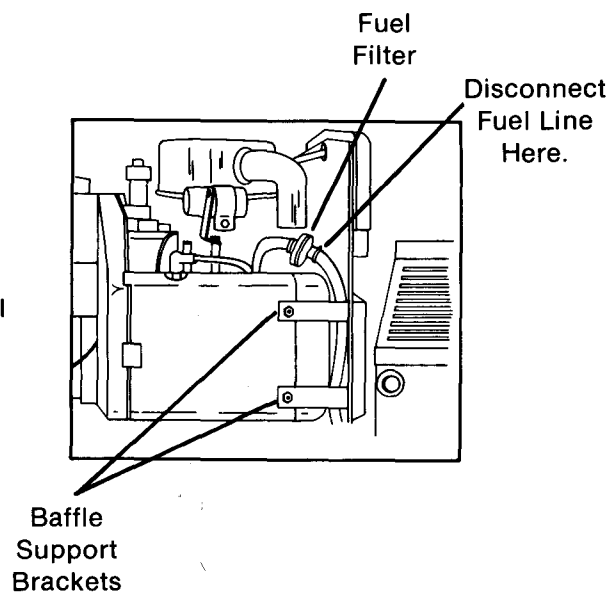


**WARNING:** To avoid severe burns, **DO NOT** attempt this procedure when engine is hot. Wait for engine and muffler to cool down before proceeding.



**12 H.P. ENGINE**

- 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)



**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)

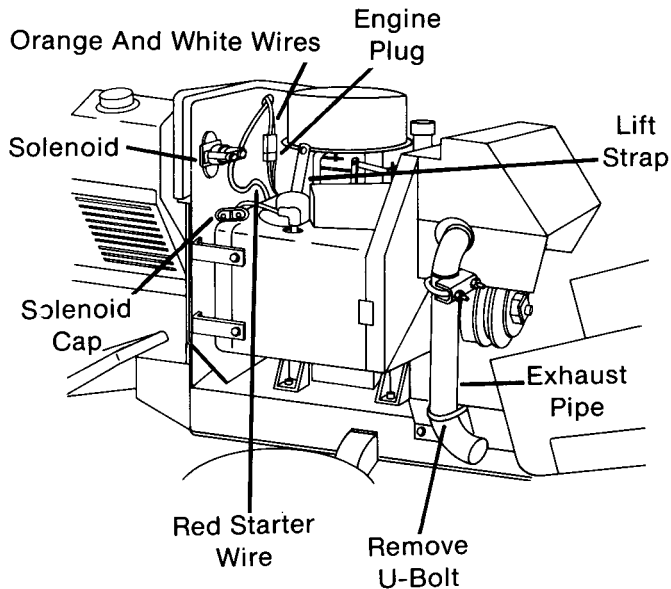


FIG. 3

- 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.

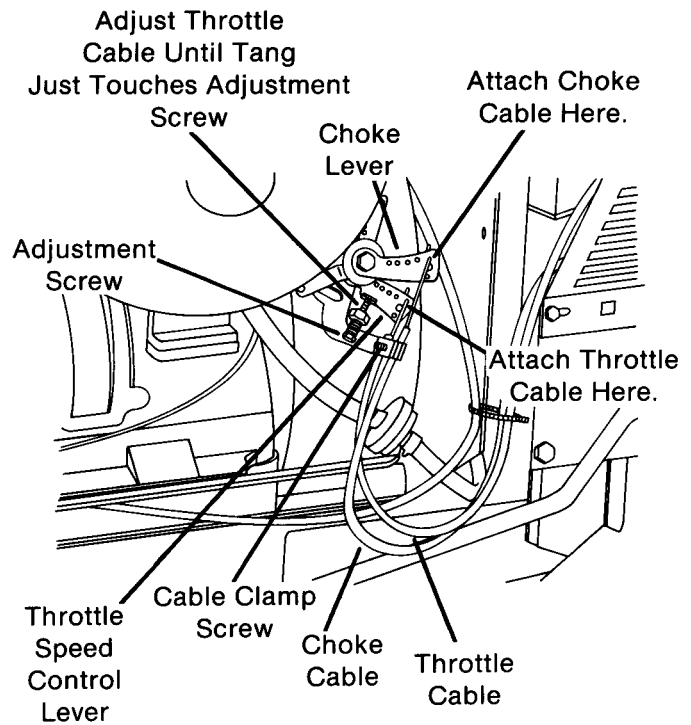


FIG. 4

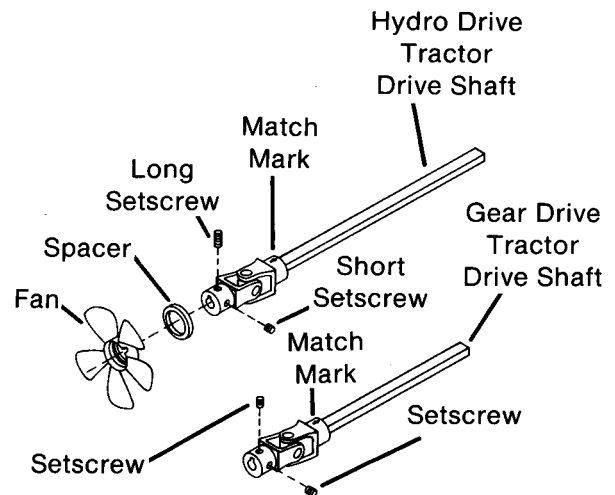


FIG. 5

- 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.

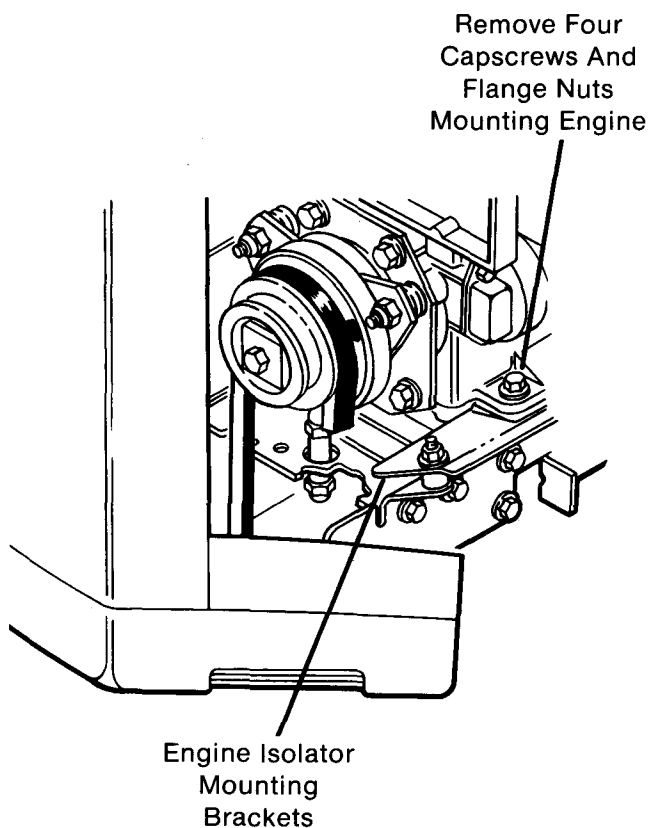
NOTE: Lubricate drive shaft with 30 wt. oil during reassembly.

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 cap-screw is a ground strap cable. This must be reattached to the same capscrew when reassembled.

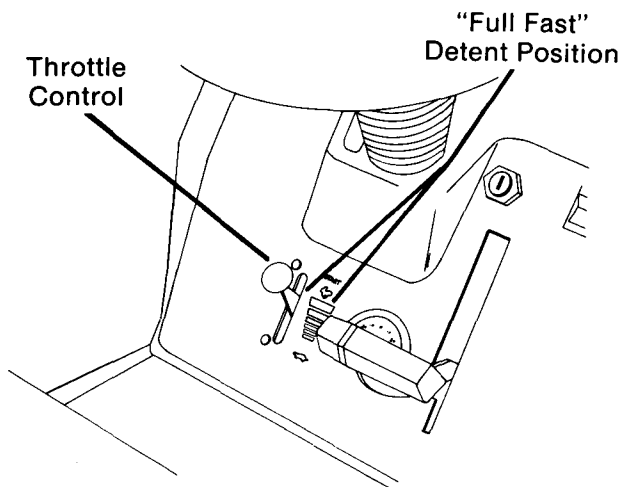
NOTE: Spacing washers should be replaced between engine mounting base and engine isolator mounting brackets during reassembly.



**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 1½") 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.

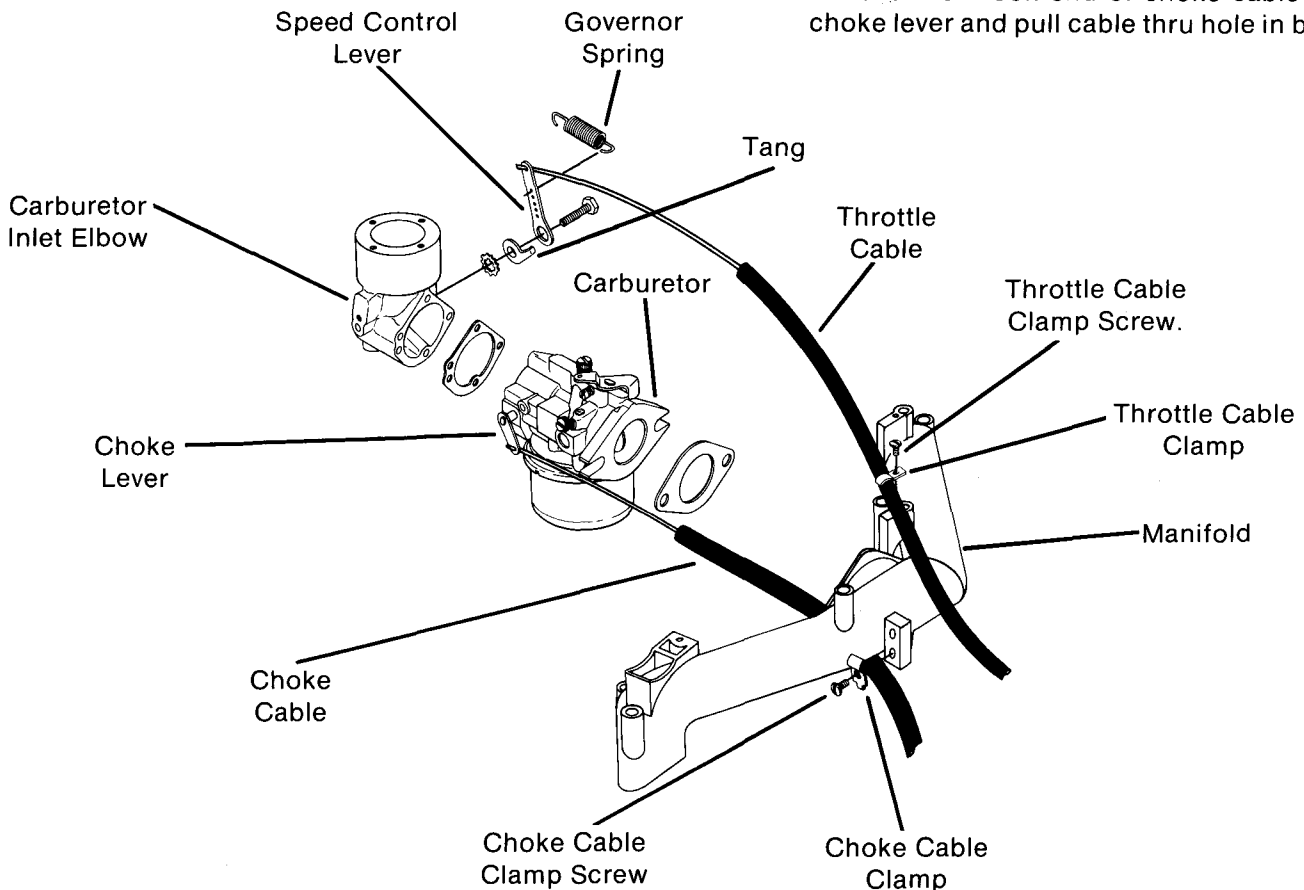
F. Disconnect the following lead wires at engine:

- 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)

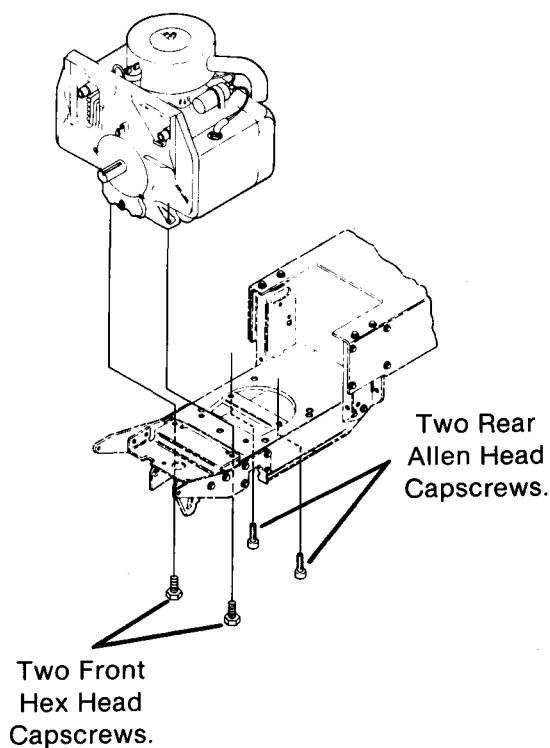


FIG. 10

- 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 1 1/8") 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 1/4 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. 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  $\frac{1}{4}$  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  $\frac{1}{4}$  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  $\frac{1}{4}$  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  $\frac{1}{4}$  turn until correct adjustment is achieved.

- F. Reassemble tractor by reversing step "B".

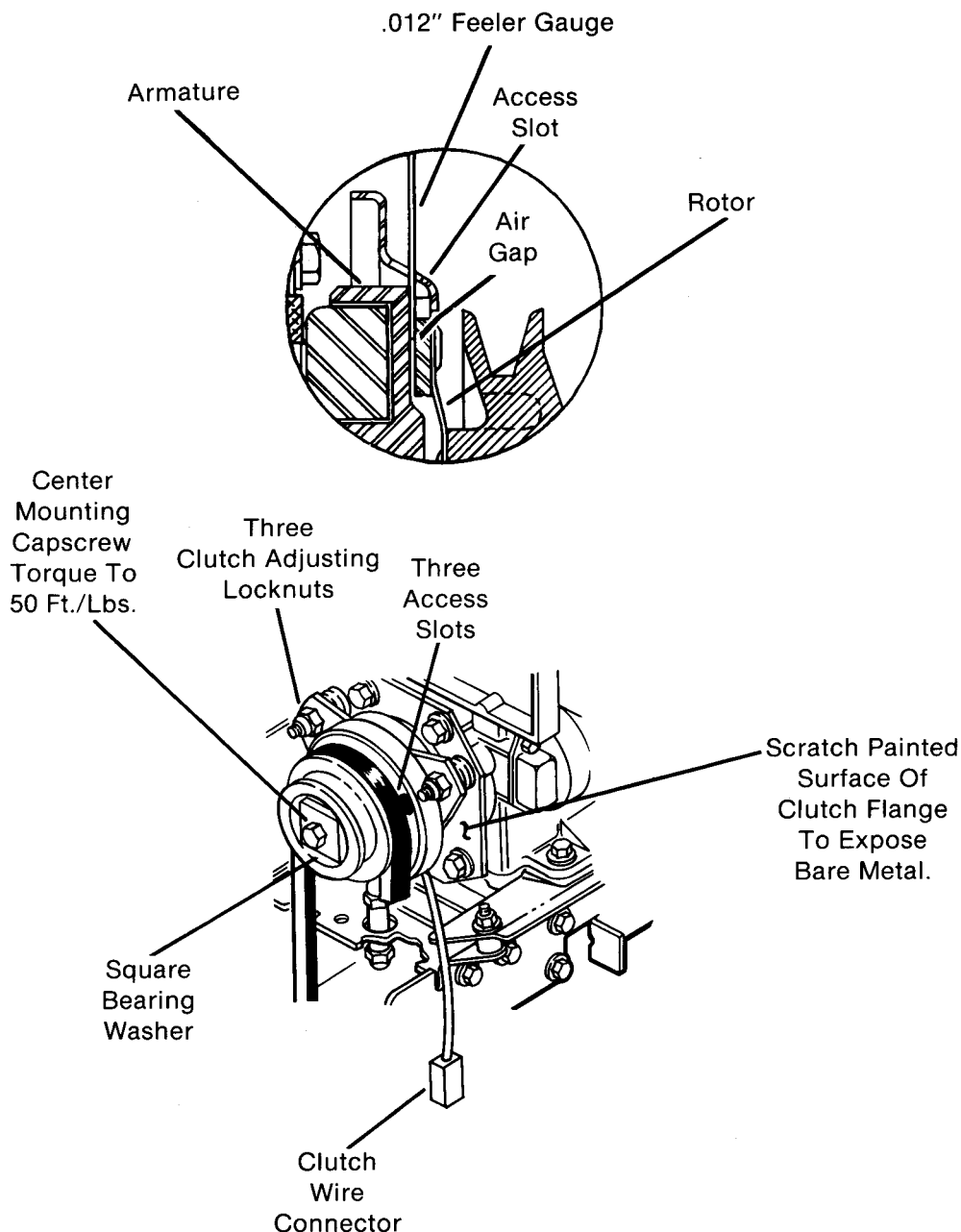


FIG. 11

## 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, perform 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 than 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:

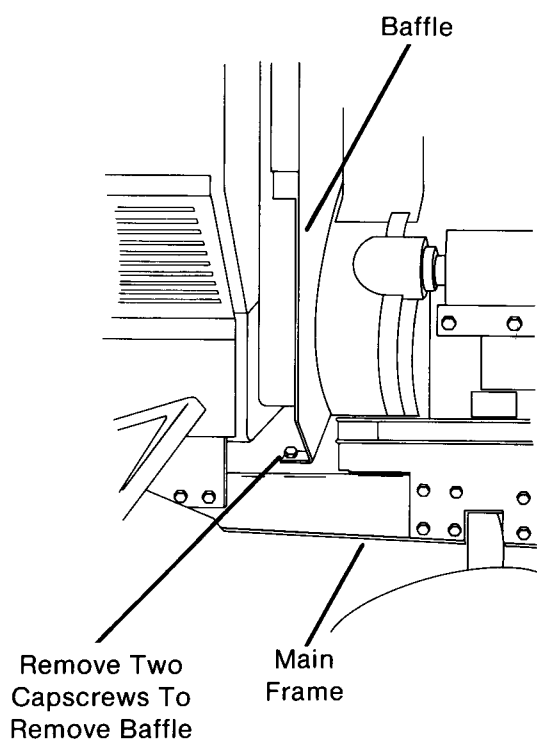


FIG. 12

- 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 re-assembled 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)

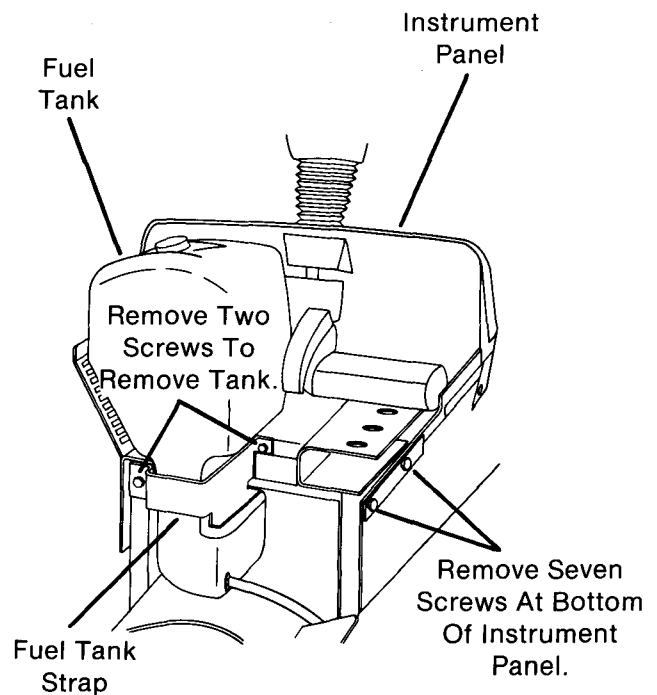


FIG. 14



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

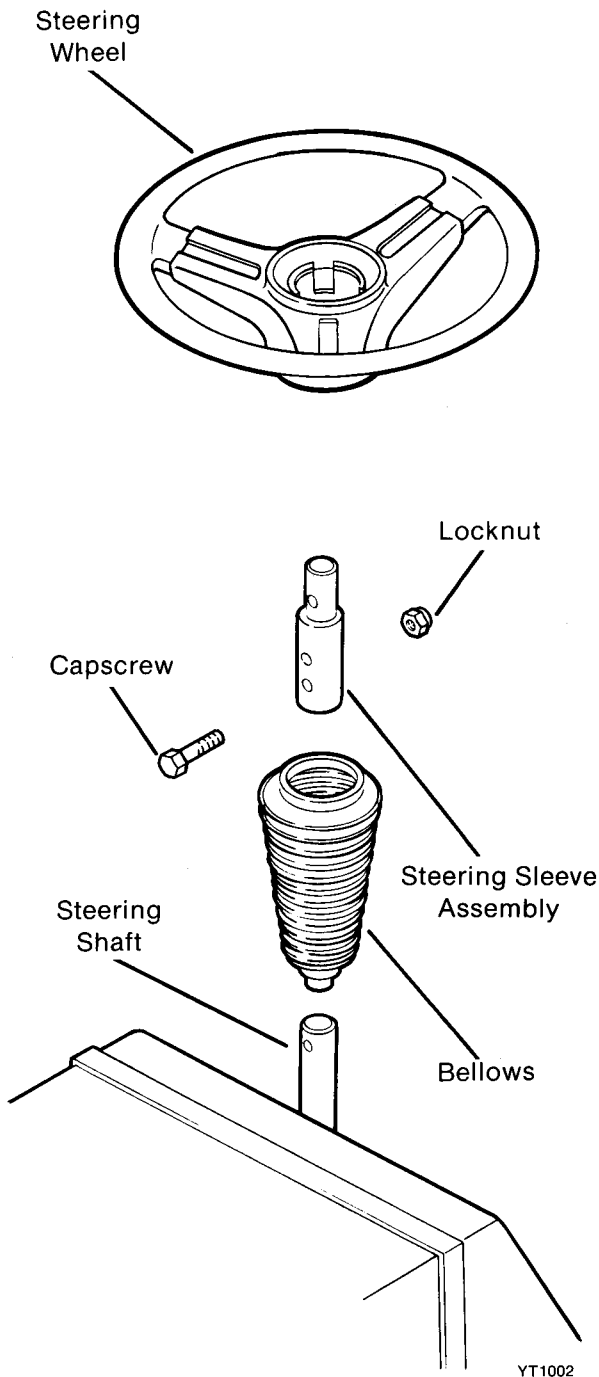


FIG. 15

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

- 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.
  - Unbolt two capscrews holding upper steering shaft bearing to instrument panel.
  - (Hydro Drive Tractors **only**) Remove "T" handle knobs on traction drive lever by removing slotted machine screw.
  - 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.
- 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).**

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

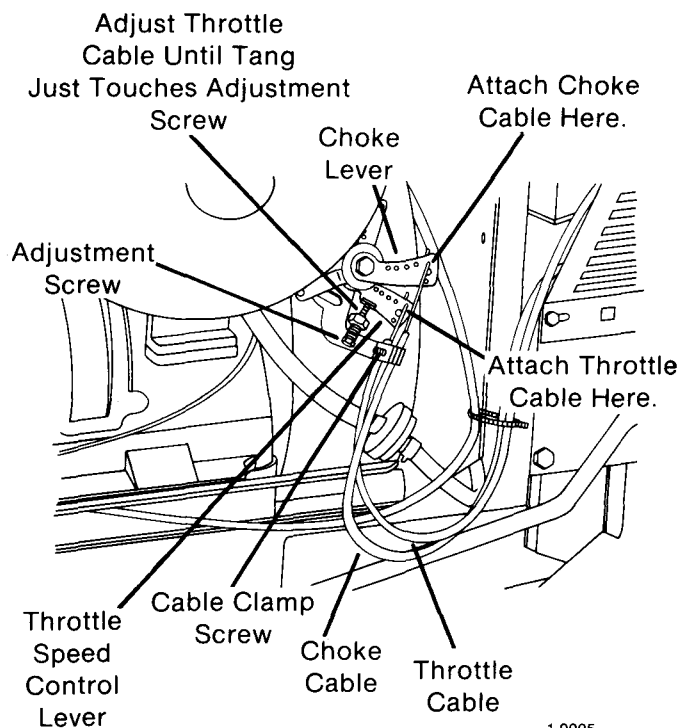
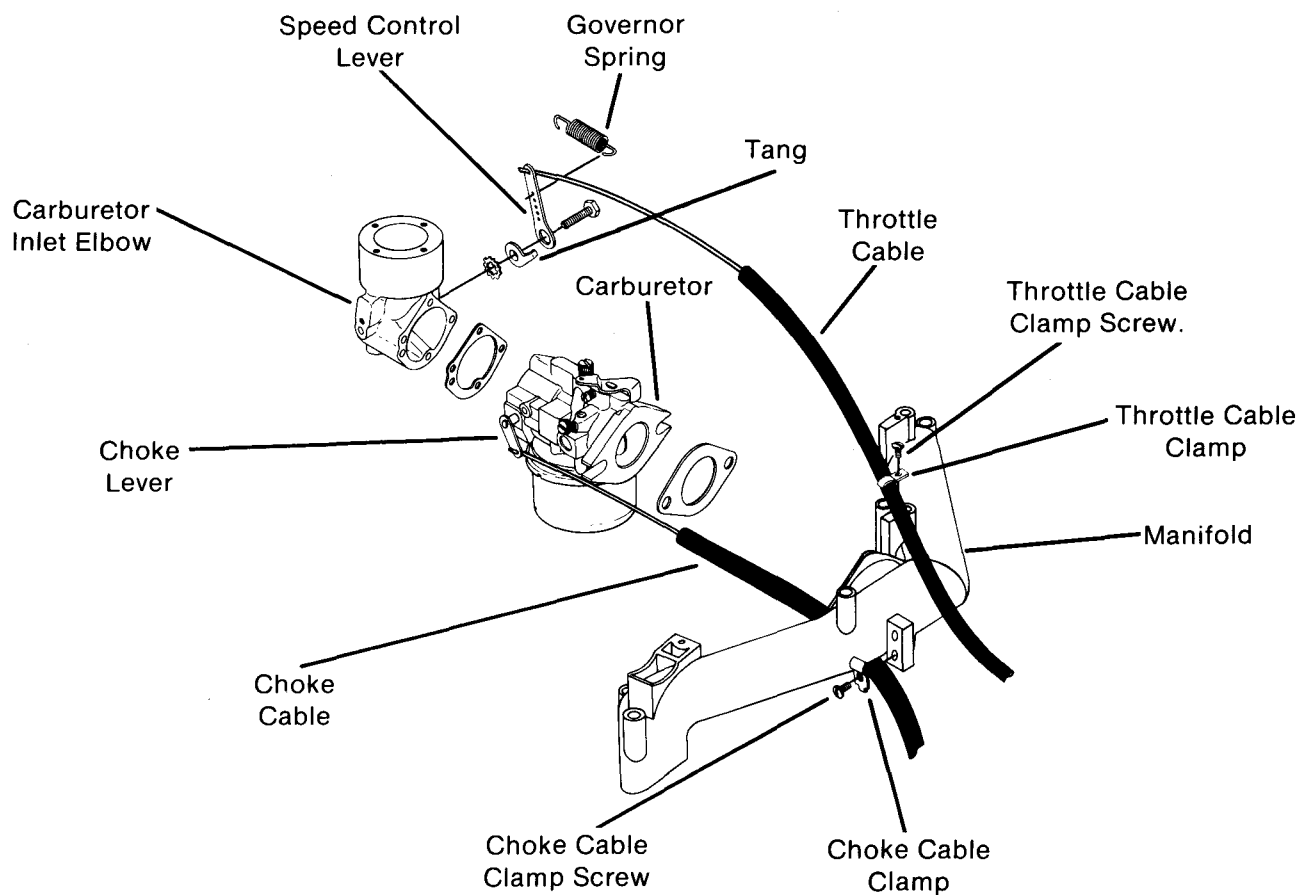


FIG. 16



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 CHOKES - 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.

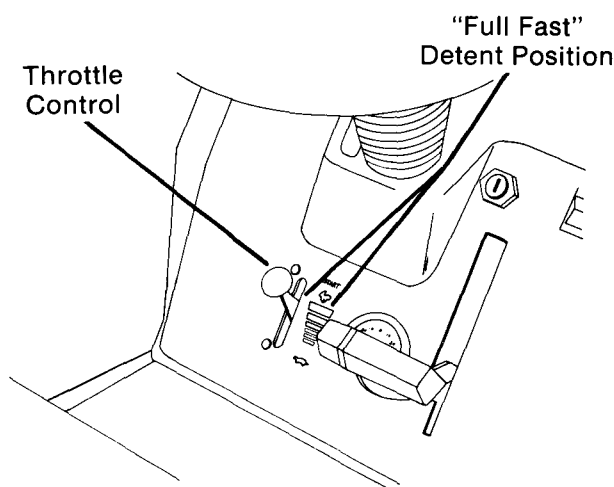


FIG. 18

## 8. CHOKES - 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 1 1/8") 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 1½") 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.

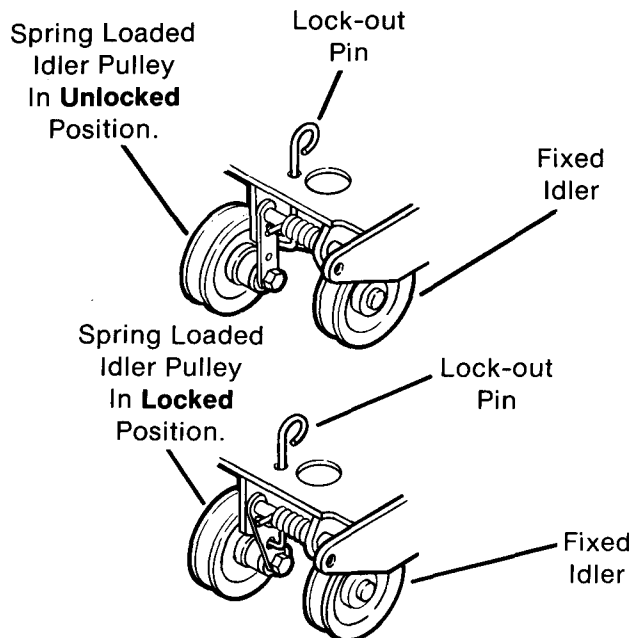


FIG. 20

- 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.

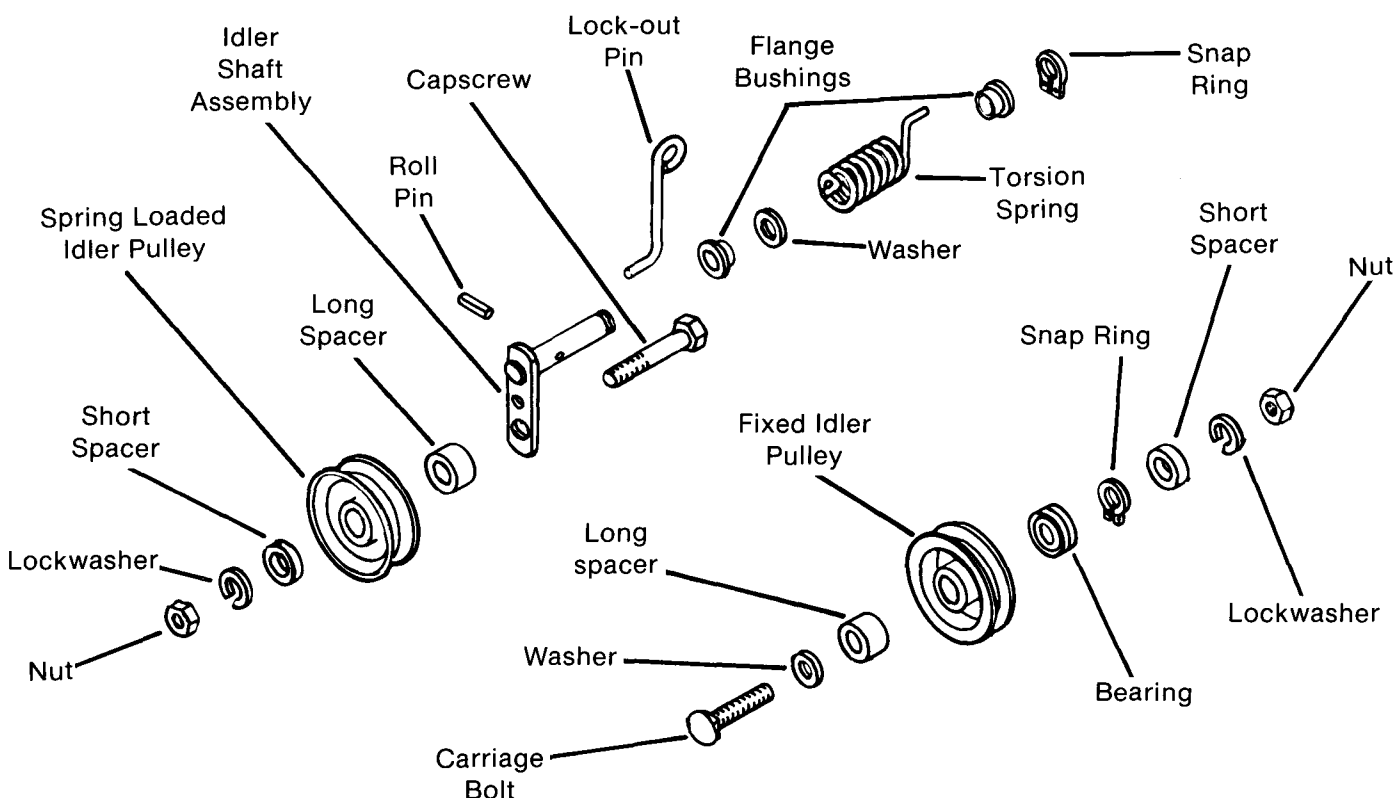


FIG. 21

- 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:

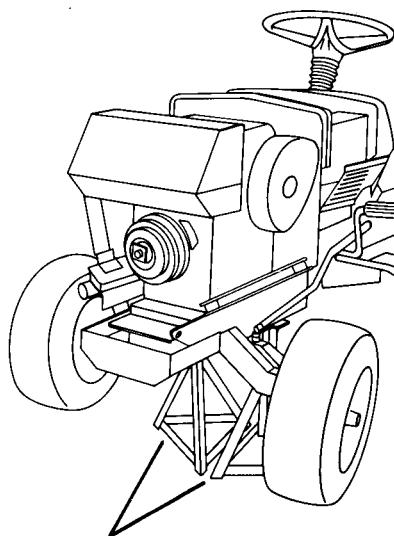
- a. Push spring loaded idler pulley back and lock in this position using the lock-out pin. (Fig. 20) This will take tension off the drive belt.
- b. Loosen (do not remove) nut securing fixed idler pulley. (Fig. 21)

- 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.

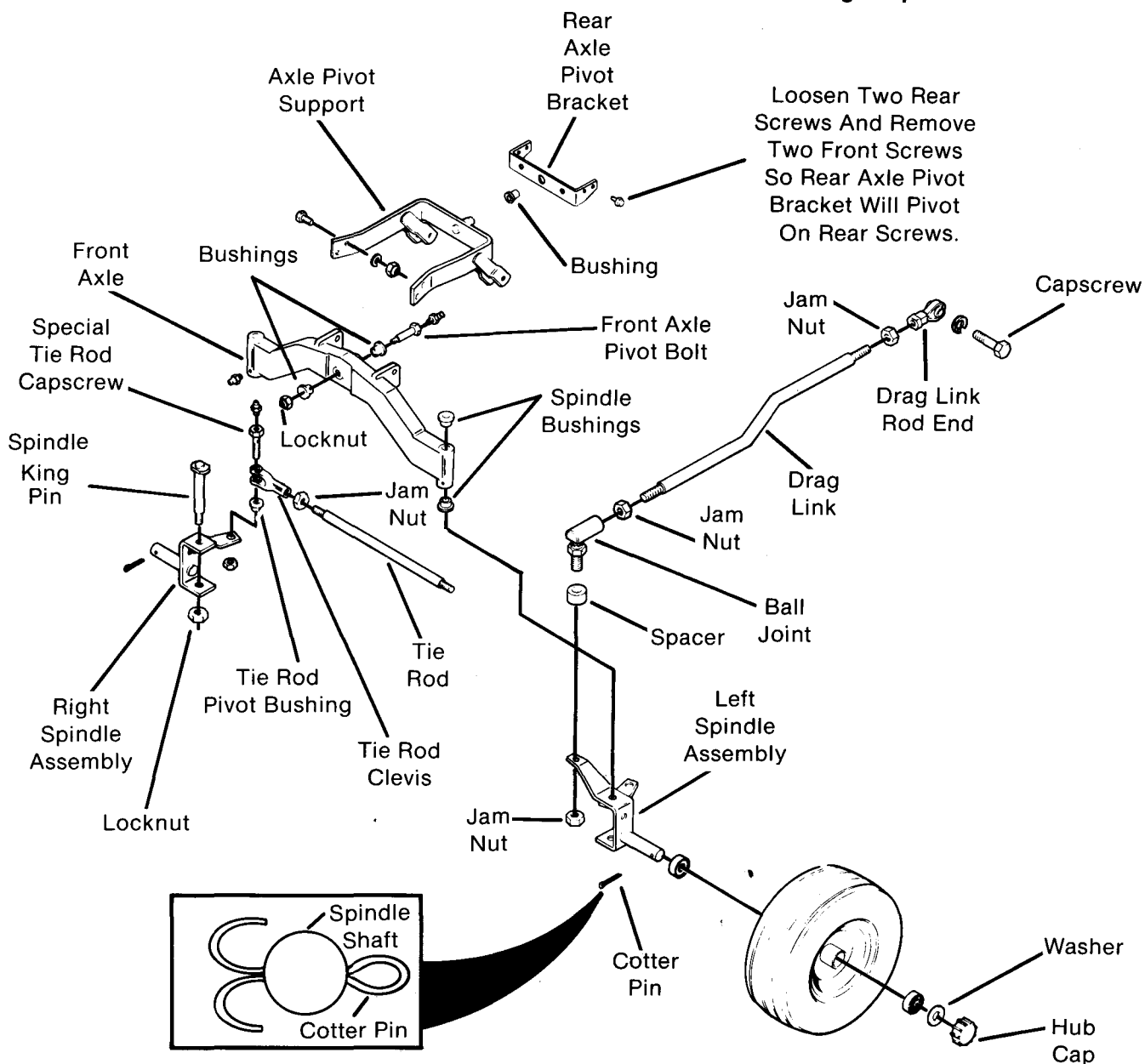
FIG. 22

- 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**

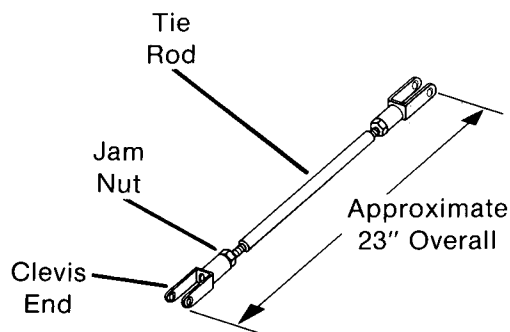
- G. Pull entire axle assembly down and forward to remove. The rear axle pivot bracket will pivot on the two remaining capscrews and allow the front axle pivot bracket to separate from the rear bracket.
- H. Service front axle as required. Check front spindles and tie rod for excessive wear. Follow individual 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)



1.0011

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 24 $\frac{1}{4}$ " 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.

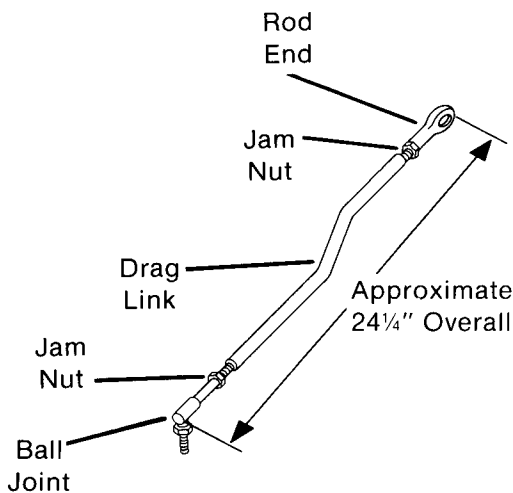


FIG. 25

1.0012

## DRAG LINK/TOE-IN ADJUSTMENT:

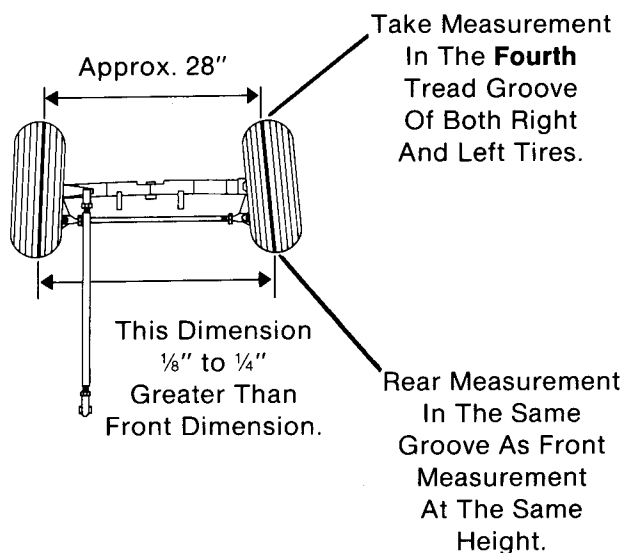
If front axle, tie rod or drag link are serviced or replaced, this procedure should be followed **completely** to set proper adjustments.

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

1.0013

- B. Measure between rear of front tires in the same tread grooves in Step "A". (Fig. 26) This dimension should be  $\frac{1}{8}$ " to  $\frac{1}{4}$ " 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)



- c. Detach tie rod clevis from left spindle assembly.
- d. Check condition of tie rod pivot bushing at spindle assembly. Replace pivot bushing if worn. If left pivot bushing is worn, remove tie rod completely and check condition of right pivot bushing. Replace worn pivot bushing and reconnect right tie rod end.
- e. Manually set front wheels to proper toe-in dimension, described in Steps "A" and "B" above. (Fig. 26)
- f. Turn clevis on end of tie rod until special capscrew can be slipped easily through clevis and pivot bushing.
- g. Replace locknut on bottom of special capscrew and tighten locknut. Turn steering wheel full left then full right then back to forward direction. Recheck toe-in setting described in Steps "A" and "B". If proper toe-in is still not achieved, repeat above steps until proper  $\frac{1}{8}$ " to  $\frac{1}{4}$ " toe-in is achieved.
- h. Retighten jam nut against left tie rod clevis and continue with drag link adjustment below.

- C. Turn steering wheel to a full left turn. Left spindle assembly **must** hit axle stop before steering wheel reaches its full left stop tab in the steering mechanism. (Fig. 27)

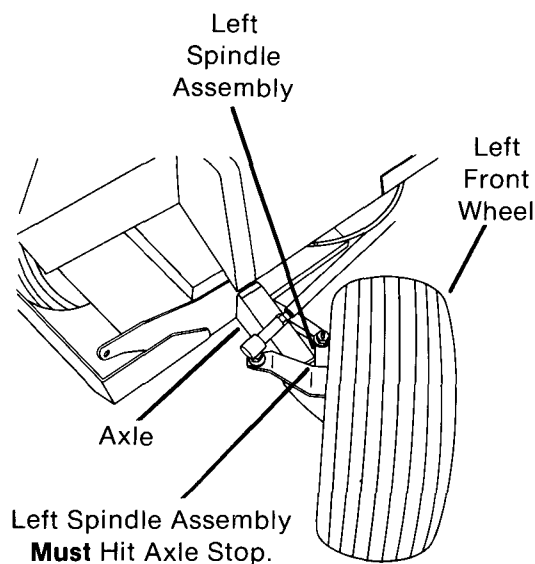
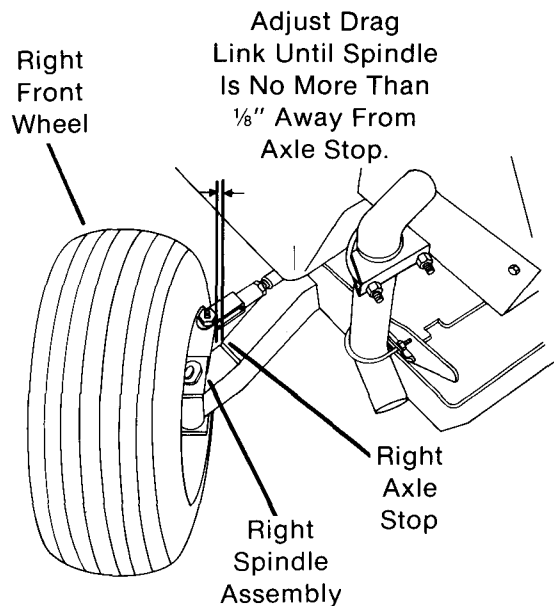


FIG. 27

1.0014

- D. Turn steering wheel to a full right turn. Right spindle assembly may hit axle stop before steering wheel reaches its full right stop tab in the steering mechanism. (Fig. 28)



1.0015

FIG. 28

- E. The most critical condition is the one described in Step "D". The right axle stop condition is not as critical and may never be able to be achieved. In this case, adjust drag link until spindle is no more than  $\frac{1}{8}$ " away from right axle stop.
- F. If any other condition exists other than what is described in Steps "C", "D" and "E", adjust drag link as follows:
  - a. Loosen jam nut against rear drag link rod end.
  - b. Remove capscrew and lockwasher that attach rod end to pitman arm assembly. Detach rod end. (Fig. 23)
  - c. Manually set left front wheel until left spindle assembly stops against left axle stop. (Fig. 27)
  - d. Turn steering wheel to a full left turn (counterclockwise).
  - e. Turn steering wheel approximately 1" clockwise. This sets steering mechanism approximately  $\frac{1}{8}$ " away from its full left turn stop tab. DO NOT move steering wheel from this position.

- f. Adjust rear rod end on drag link until rod end capscrew will thread easily into pitman arm assembly. Tighten capscrew completely.
  - g. Check for conditions described in Steps "C" "D" and "E" again.
  - h. Repeat rod end adjustment (turning rod end ½ turn at a time) until proper drag link adjustment (Step "E") is achieved. Then retighten jam nut against rear drag link rod end.
- G. Adjustment is complete! Replace attachment and spark plug wires.

- E. Remove capscrew and lockwasher that attach drag link rod end to pitman arm assembly. Detach rod end. (Fig. 23)
- F. Compress steering shaft bellows to expose capscrew through steering sleeve assembly. (Fig. 30) Remove capscrew and locknut. Lift steering wheel assembly and bellows off steering shaft.

## STEERING MECHANISM REMOVAL:

**WARNING:** To avoid accidental starting, remove spark plug wire(s) and secure away from spark plug(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. Disconnect both throttle and choke cables at their connections at the engine.
- D. Remove seven (7) thread forming screws at bottom of instrument panel holding panel to both sides of main frame. (Fig. 29)

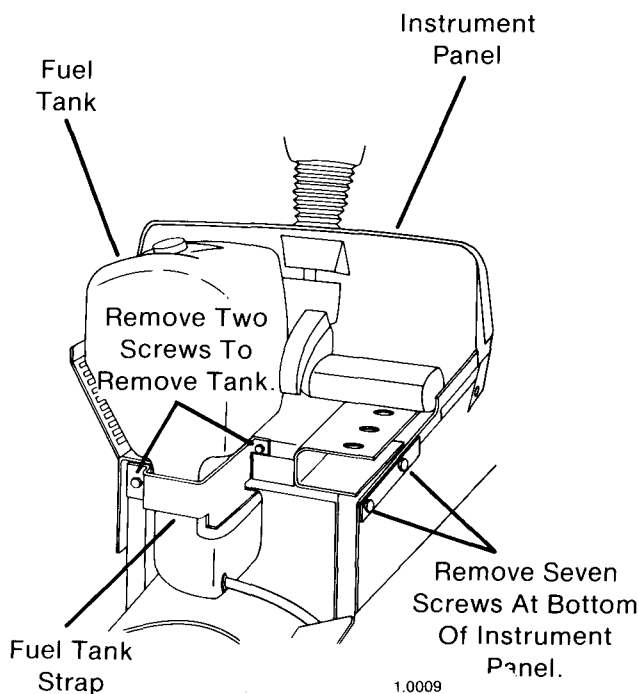


FIG. 29

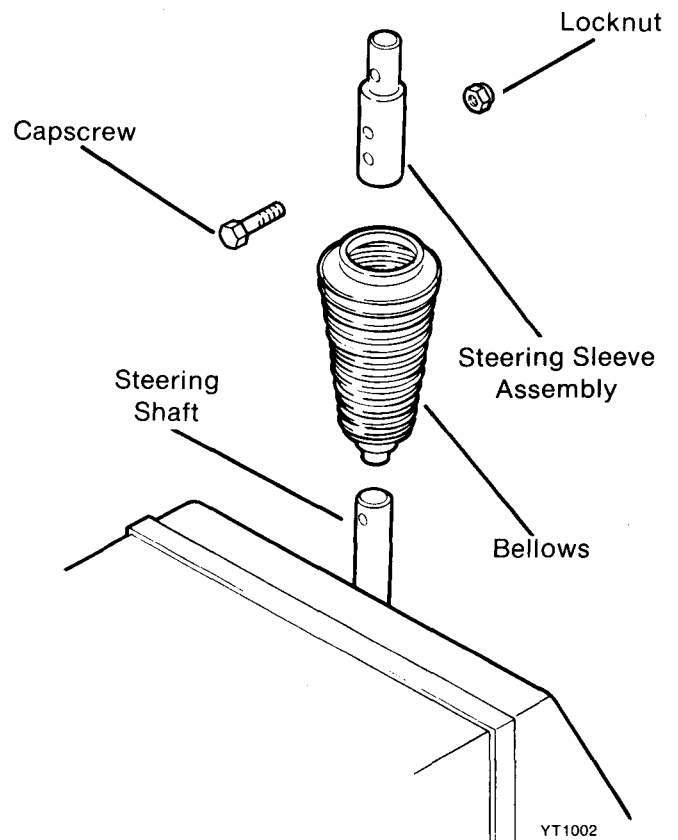


FIG. 30

- G. Unbolt two capscrews holding upper steering shaft bearing to instrument panel.
- H. (Hydro Drive Tractors **only**) Remove "T" handle knobs on traction drive lever by removing slotted machine screw.
- I. Pull choke cable out from underneath steering mechanism while working instrument panel back and over steering shaft. NOTE: Some wires and wire harness will have to be lifted over steering shaft also to move instrument panel back far enough to gain full access to steering mechanism.
- J. Remove four thread forming screws holding steering mechanism to steering support channel. (Fig. 31)
- K. Remove one thread forming screw thru pinion support brace (Fig. 31) and lift steering mechanism assembly out of tractor.
- L. Steering mechanism can now be disassembled and serviced as required. Check condition of sector gear and pinion gear teeth. Check condition of bushings in sector gear and pinion support assemblies. (Fig. 31) Replace any worn or damaged parts.

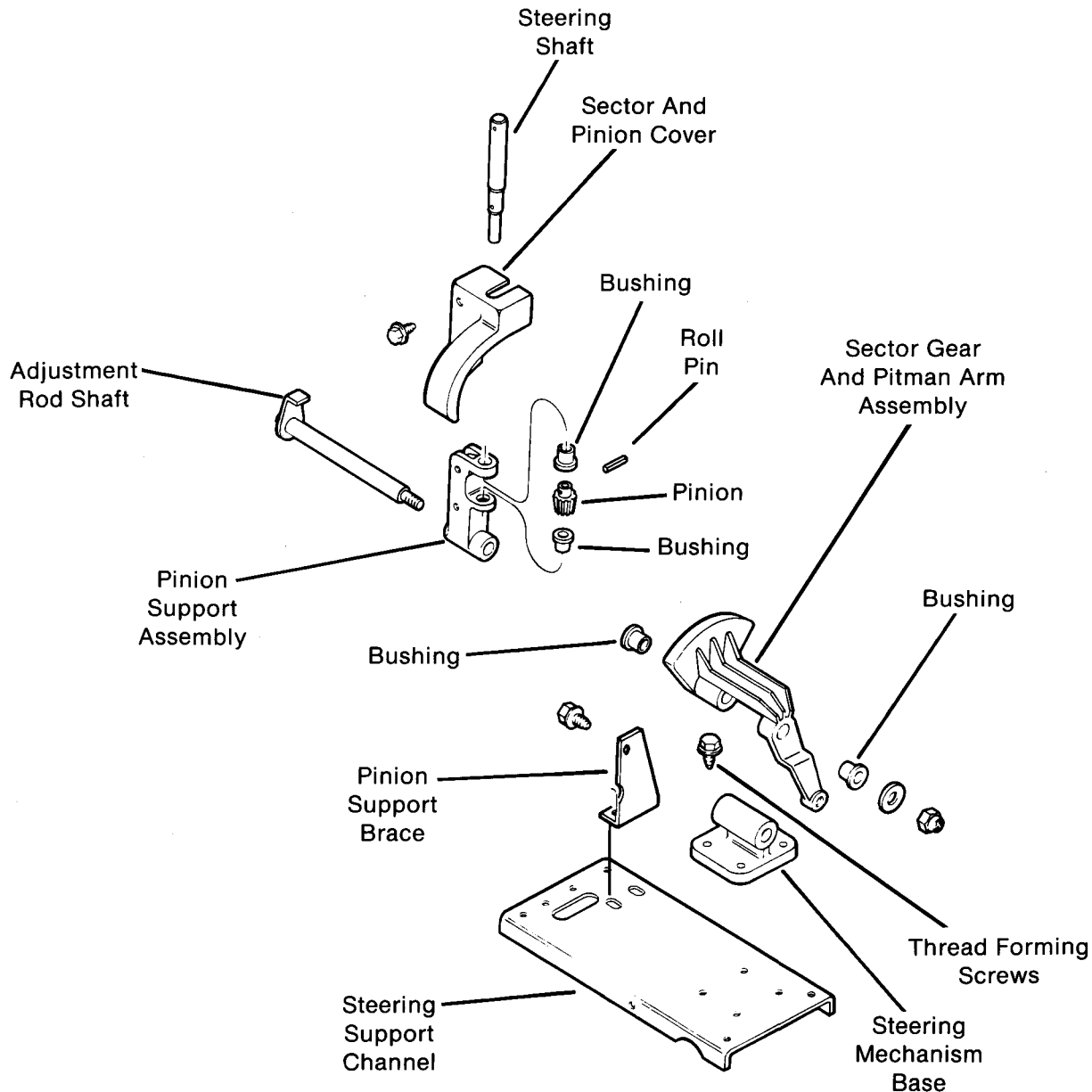


FIG. 31

- M. Reverse above procedures to reassemble steering mechanism onto tractor. Liberally grease sector gear and pinion gear teeth with No. 2 wheel bearing grease or Ford 1T-M1C137-A grease. Oil all bushings and pivot points with 30 wt. oil.

**IMPORTANT:** Choke cable must be routed under steering mechanism when reassembled.

**NOTE:** When instrument panel was lifted over steering shaft some wire connections may have disconnected from instruments connected to the panel. Check for any loose connections and reference "WIRING DIAGRAM" to reattach terminals.

- N. Reset throttle and choke cables adjustment at engine by following procedures under "THROTTLE CONTROL LEVER REMOVAL AND ADJUSTMENT" and "CHOKE CABLE REMOVAL AND ADJUSTMENT".

**NOTE:** If steering mechanism was disassembled for servicing, steering wheel free play must be readjusted. Follow procedures below to reset free play adjustment.

## STEERING WHEEL FREE PLAY ADJUSTMENT:

If any noticeably excessive free play exists in the steering wheel (more than  $1\frac{1}{2}$ " , measured at outside diameter of steering wheel) adjust steering mechanism by following procedures below:

- A. Adjust locknut on end of steering adjustment rod through hole in left side of instrument panel. (Fig. 32)

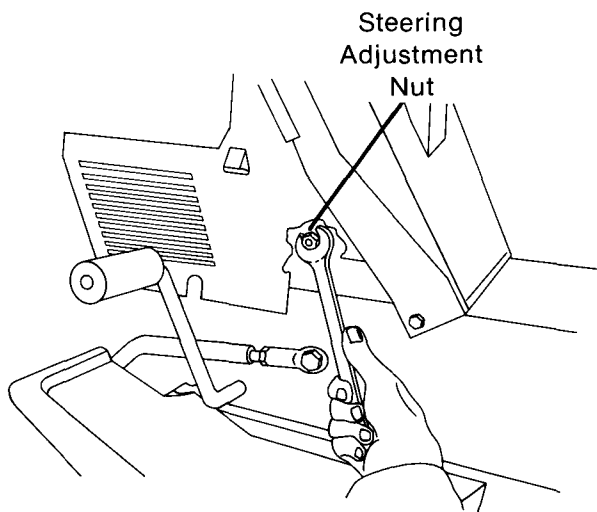


FIG. 32

- B. Tighten locknut clockwise, to decrease steering wheel free play. Loosen locknut, counter-clockwise, to increase steering wheel free play or to correct tight steering.
- C. Adjust locknut until there is approximately 1" free play (measured at outside diameter of steering wheel). Maximum free play allowed is  $1\frac{1}{2}$ ".

**NOTE:** Steering shaft end play can also be adjusted by tightening the steering adjustment nut. (Fig. 32) First, pull up on steering wheel until end play is removed. Hold in this position, then tighten adjustment nut until no end play is present.

## STEERING WHEEL HEIGHT ADJUSTMENT:

Steering wheel can be adjusted in two heights, HIGH and LOW positions.

- A. Compress bellows on steering shaft to expose capscrew through sleeve assembly. (Fig. 30)
- B. Remove capscrew and locknut.
- C. Slide sleeve assembly up or down to achieve desired position.
- D. Replace capscrew through **lowest** hole in sleeve assembly for HIGH steering wheel position or through upper hole for LOW steering wheel position, and secure with locknut.
- E. Stretch bellows up and center into bottom of steering wheel.

## DRIVE SHAFT 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. (Gear Drive Tractors Only) Loosen two setscrews on rear of drive shaft. (Fig. 33)

(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. 33)

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

NOTE: Remove fan spacer, on Hydro drive units only, off rear drive shaft universal joint.

- C. 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 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. 33) If drive shaft is damaged or out of balance and requires replacement, it **must** be replaced as a complete assembly. A complete replacement would include the front universal joint attached to the engine.

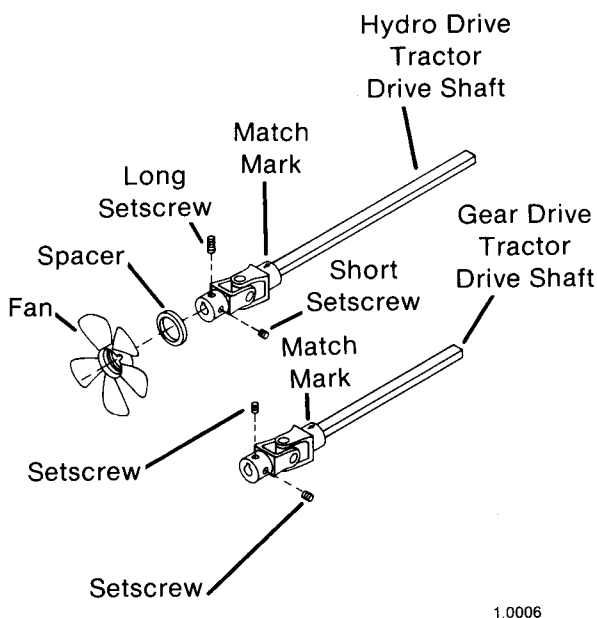


FIG. 33

- D. Pull drive shaft out of front universal joint and remove out bottom of tractor.
- E. To remove front universal joint, engine must be removed. Follow procedures under "ENGINE REMOVAL 12 H.P. or 17 H.P." then remove four capscrews and lockwashers holding front universal to engine.
- F. Pull universal joint off engine crankshaft and service as required. Reverse above procedures to reassemble drive shaft into tractor.

## ELECTRICAL SYSTEM:

### 1. System Functions —

- A. To start the tractor the operator should be seated, the clutch/brake pedal **must** be depressed and the P.T.O. switch must be in the OFF position. Ignition switch can now be turned and the engine will start.

The Safety Interlock System is made up of three separate switches, clutch/brake pedal switch, seat switch and P.T.O. switch. This interlock system is provided for the safety of the operator and should not be tampered with.

- B. The safety functions of the interlock system are as follows:
- If either the clutch/brake pedal is up (ENGAGED position) or P.T.O. switch is engaged or both levers are in their operating positions. The ignition switch can be turned to the START position and the engine will not crank to start.
  - The seat switch is also an integral part of the safety interlock system. Should the operator leave the seat with engine running while either the clutch/brake pedal is up or P.T.O. switch engaged, the engine will stop.

**IMPORTANT:** In some instances, it may be necessary for the serviceman to be off of the operator's seat with engine running to make certain engine adjustments. This can be achieved by depressing the clutch/brake pedal and setting the parking brake and setting the P.T.O. switch in the OFF position. Special precautions should be taken by the serviceman when operating tractor in this mode, as this is **NOT** a recommended method of operating for this tractor.

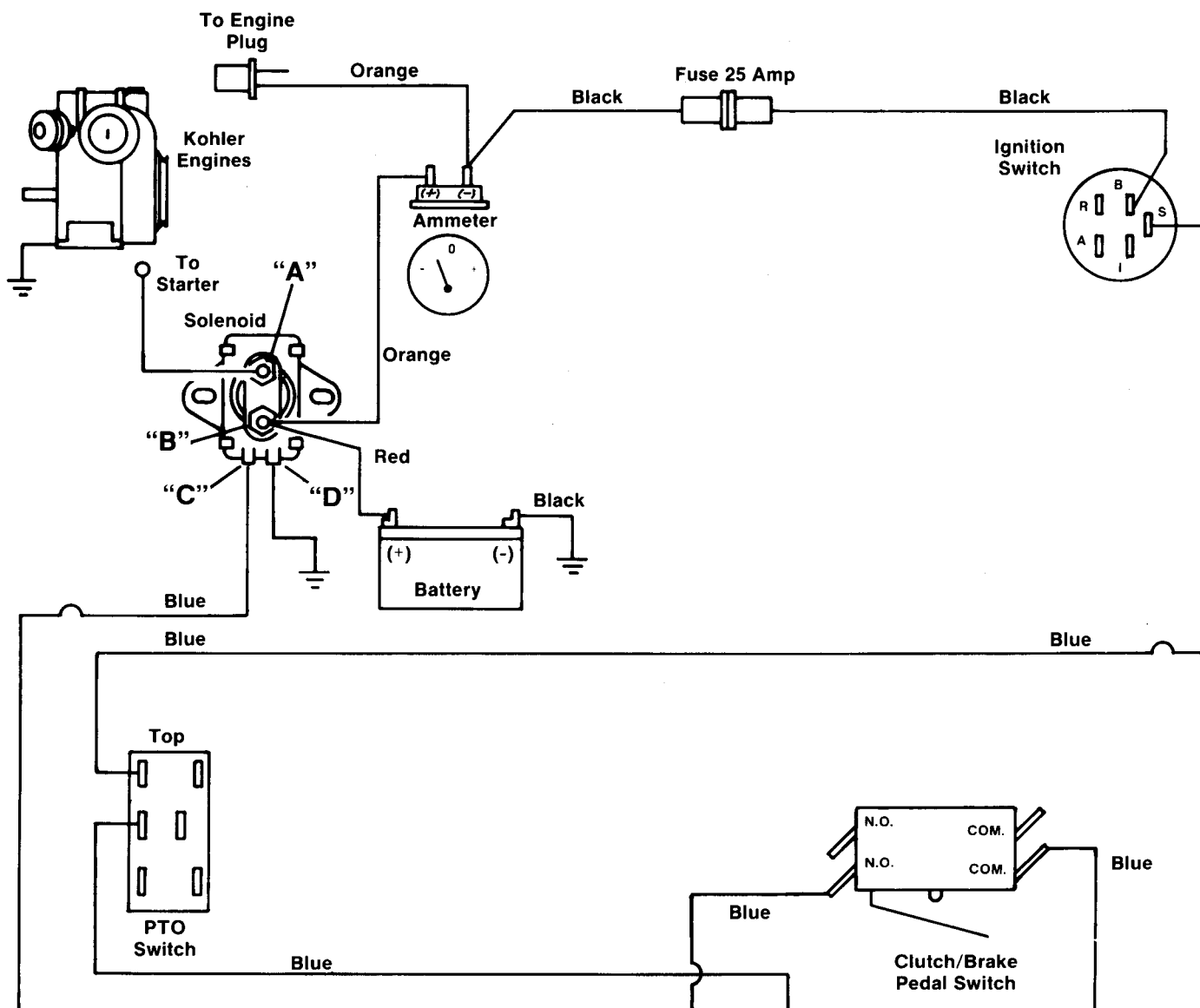


**WARNING: To avoid serious injury do not run engine without an operator in the seat, except for necessary engine adjustments. KNOW HOW TO STOP THE ENGINE!**

- C. To aid in trouble-shooting the starting, ignition and P.T.O. electrical systems, we have isolated each system in the following wiring diagrams to make servicing each system easier. The function of each system is described as follows:

a. Starting System - (Fig. 34)

Power from the battery flows to the solenoid, through the ammeter and to the ignition switch terminal "B". When ignition switch is turned to the START position, current flows from terminal "S" to P.T.O. switch. The P.T.O. switch **must** be in the OFF position allowing the current to flow to the common terminal of the clutch/brake pedal micro switch. The clutch/brake pedal **must** be fully depressed to actuate the micro switch allowing the current to flow to and thru the solenoid to ground. This energizes the solenoid and current can flow to the starter.



**STARTING SYSTEM**

1.0017

FIG. 34

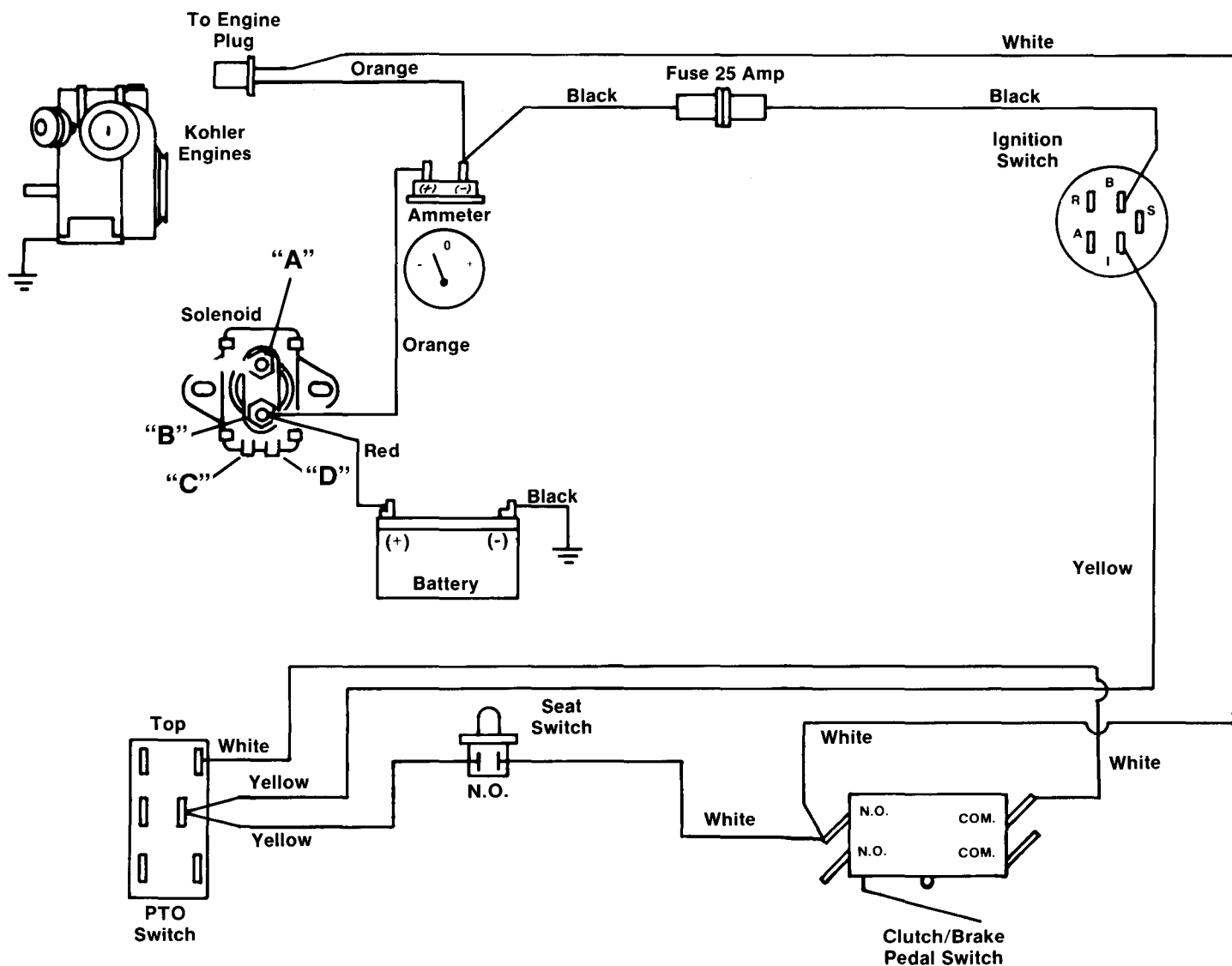
b. Ignition System - (Fig. 35)

The ignition system for LGT tractors is a battery ignition **not** a magneto ignition type. In the ignition system, electrical energy from the battery is supplied to the coil to produce the voltage necessary for ignition.

Power from the battery flows to the solenoid through the ammeter and fuse to the ignition switch terminal "B". When ignition switch is turned to the ON position current flows thru the switch to the "I" terminal and on to the P.T.O. switch. From here current can be supplied to the coil one of two ways. First, if the operator is on the seat (which actuates a normally open terminal of the clutch/brake pedal micro switch and on to the coil for ignition. OR if the operator is off the seat, the

P.T.O. switch must be in the OFF position and the current will flow thru the P.T.O. switch to the common terminal of the clutch/brake pedal micro switch. The clutch/brake pedal **must** be fully depressed to actuate the micro switch allowing current to flow thru to the normally open terminal and on to the coil for ignition.

Once the engine is started and running the engines flywheel alternator provides rectified D.C. current back through orange wire, at the engine plug, thru the ammeter and back to the battery to charge the battery. This rectified D.C. current will also flow back into the ignition system to keep the coil energized.



IGNITION SYSTEM  
FIG. 35

1.0018

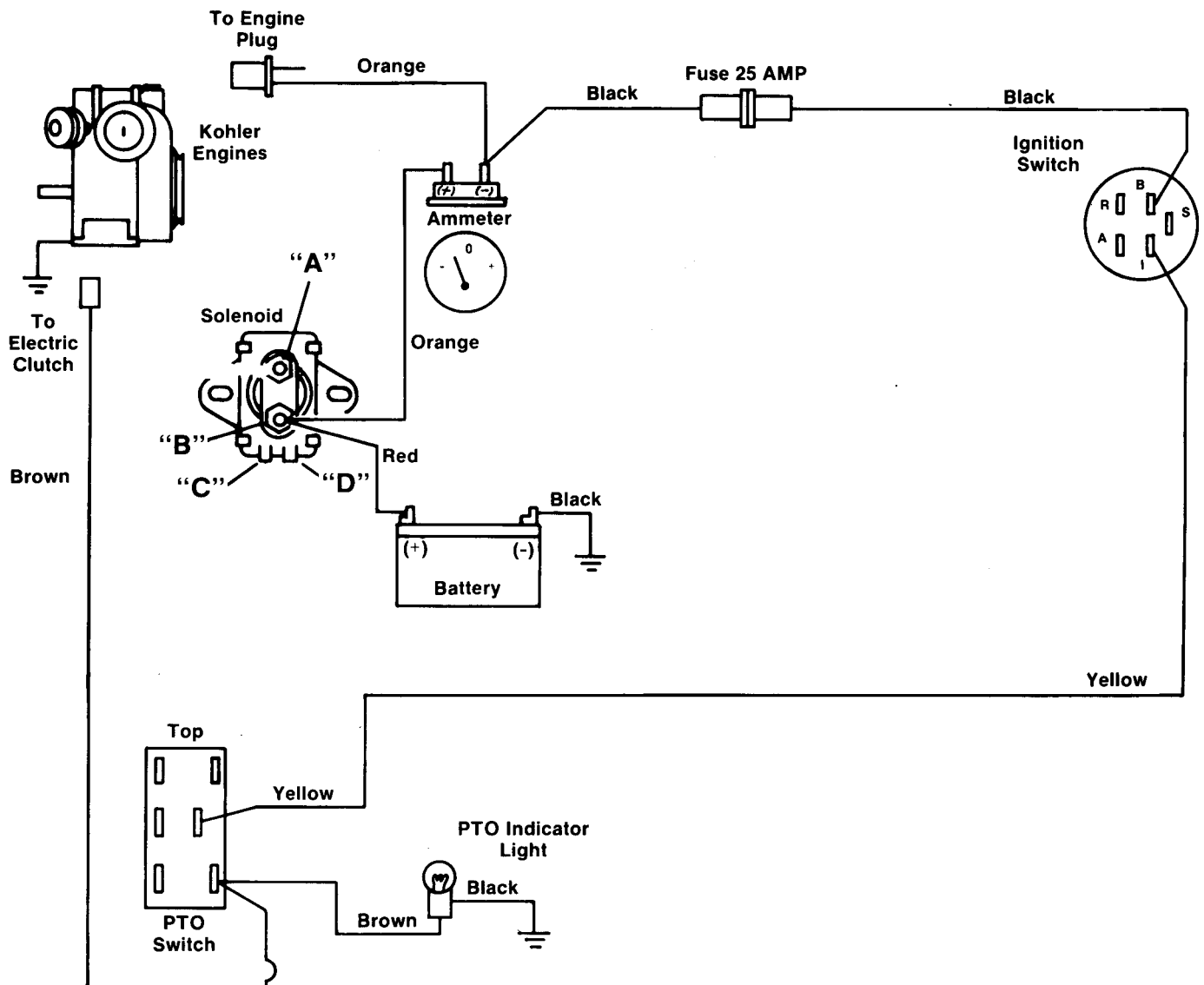
c. P.T.O. System - (Fig. 36)

The P.T.O. system again picks up its power from the battery at the ignition switch terminal "B". With ignition switch in the ON position current flows thru the switch to the "I" terminal and on to the P.T.O. switch. When the P.T.O. switch is in the ON position current flows thru the switch to both the P.T.O. indicator light and to the electric (P.T.O.) clutch/brake field coil.

d. If any of these systems require servicing, all wire connections and components should be checked to see if they are connected and functioning properly. Reference individual test procedures for testing each component in these systems!

D. To stop engine:

- Move gear shift (drive lever) to neutral "N".
- Move P.T.O. switch to OFF.
- Set parking brake.
- Turn ignition key to OFF. Remove key.



P.T.O. SYSTEM

FIG 36

1.0019



## 2. Battery —

The battery used is a 12 volt wet cell type.



**WARNING:** When the alternator is charging, an explosive gas is produced inside the battery; therefore, always check the electrolyte level with the engine stopped. Do not use an exposed flame and do not smoke when checking the battery.



**WARNING:** The battery contains sulfuric acid which can cause severe burns. Avoid contact with skin, eyes or clothing.

### FIRST AID:

**External Contact** - Flush with water.

**Internal Contact** - Drink large quantities of water. Follow with Milk of Magnesia, beaten egg or vegetable oil. Call physician immediately! IMPORTANT: In case of internal contact, **DO NOT** give fluids that would induce vomiting.

**Eyes** - Flush with water for at least 15 minutes and get medical attention immediately!

**Battery Charging** - If battery is dead, engine may be started with jumper cables and operated with out damage to electrical system, with battery connected. IMPORTANT: Be certain jumper cables are connected positive to positive and negative from booster battery to the engine block not to negative terminal of battery.

### Battery Removal —



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

- Unclip hood latches and raise hood and set in upright position.
- Loosen (do not remove) two hex nuts on battery hold down clamp. (Fig. 37)
- Lift rubber battery cover and disconnect negative (-) battery cable from negative terminal.
- Disconnect positive (+) battery cable (with protective cap) from positive battery terminal. Remove battery from its mounting.
- Service battery as required and reverse above procedures to replace.

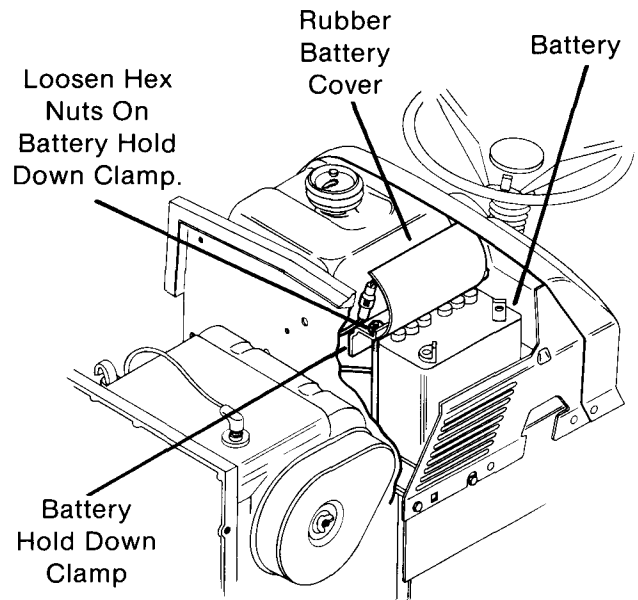


FIG. 37

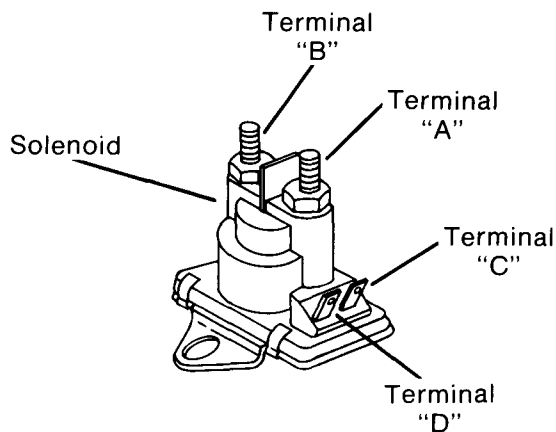
## 3. Solenoid Check —

The starter solenoid is a sealed unit and serviced only as a complete assembly. To check for defective solenoid, follow procedures below to remove and test solenoid.



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

- Unclip hood latches and raise hood and set in upright position.
- Disconnect all leads attached to solenoid. IMPORTANT - Tag all leads to insure proper reinstallation. For further aid in reassembly, refer to "Wiring Diagram".
- Remove two flange nuts securing solenoid to baffle assembly. Remove solenoid. Test solenoid as follows in steps "D" and "E" and reverse above procedures to replace solenoid.
- Connect leads of continuity tester or ohmmeter to the "A" and "B" terminals (Fig. 38) of solenoid. If continuity exists or ohmmeter reads zero, replace solenoid. If no continuity exists, go to step "E". Repeat this procedure two or three times to insure a positive test.



**FIG. 38**

- E. Using two 14 gauge jumper wires and 12 volt battery, connect one jumper wire to positive (+) battery terminal then to terminal "C" on solenoid. Connect other jumper wire to negative (-) battery terminal then to terminal "D" on solenoid. An audible click should be heard and continuity tester (still attached to solenoid terminals "A" and "B") should be brightly lit or ohmmeter should register zero ohms.



**WARNING - Be sure to make the last jumper wire connection at the solenoid NOT at the battery. This will prevent a spark from igniting explosive gases at battery.**

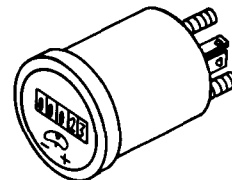
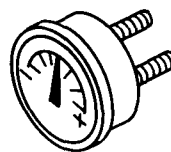
If poor or no continuity exists, replace solenoid. Repeat this procedure two or three times to insure a positive test.

#### **4. Ammeter, Hour/Amp Meter Check —**

The major difference between the electrical systems of the 17 H.P. Hydro Drive LGT and the other three LGT's is that the 17 H.P. Hydro Drive LGT has an Hour/Amp Meter and the other three LGT's have only an ammeter. (Fig. 39)

The ammeter indicates whether battery is charging or discharging. Movement of ammeter needle to the right of center indicates battery is charging; movement to the left indicates battery is discharging.

Ammeter For  
All Other LGT's.



Hour/Amp Meter  
For 17 H.P. Hydro Drive  
LGT's **Only**.

**FIG. 39**

The hourmeter (17 H.P. Hydro Only) portion of the Hour/Amp Meter registers the actual number of hours that the engine has been run. The hourmeter feature provides the operator with the capability to set up maintenance intervals for lubrication, oil changes and other servicing of the tractor.

Normal operation of the tractor will keep the battery fully charged. NOTE: If ammeter does not move, or indicates constant discharging, remove ammeter from instrument panel and follow TEST #1 below to check for defective ammeter. If hourmeter is not functioning along with the ammeter follow TEST #2 below to check for defective hourmeter.

#### **Ammeter, Hour/Amp Meter Removal —**



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

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

- B. Compress steering shaft bellows to expose capscrew through steering sleeve assembly. (Fig. 40) Remove capscrew and lock nut. Lift steering wheel assembly and bellows off steering shaft.

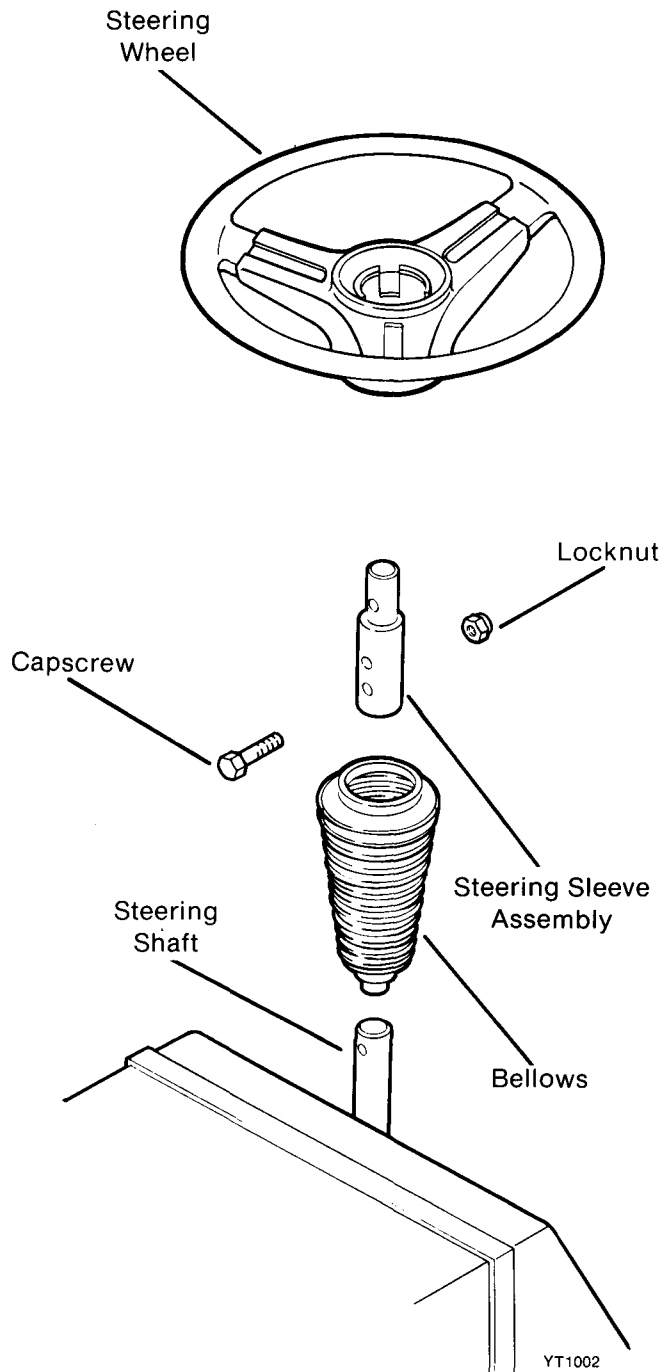


FIG. 40

- C. Unbolt two capscrews holding upper steering shaft bearing to instrument panel.
- D. (Hydro Drive Tractors **only**) Remove "T" handle knobs on traction drive lever by removing slotted machine screw.

- E. Disconnect both throttle and choke cables at their connections at the engine.

NOTE: When reconnecting throttle and choke cables to engine, follow procedures to readjust both cables under "THROTTLE AND CHOKE CABLE - ADJUSTMENTS".

- F. Remove seven (7) thread forming screws at bottom of instrument panel holding panel to both sides of main frame. (Fig. 41)

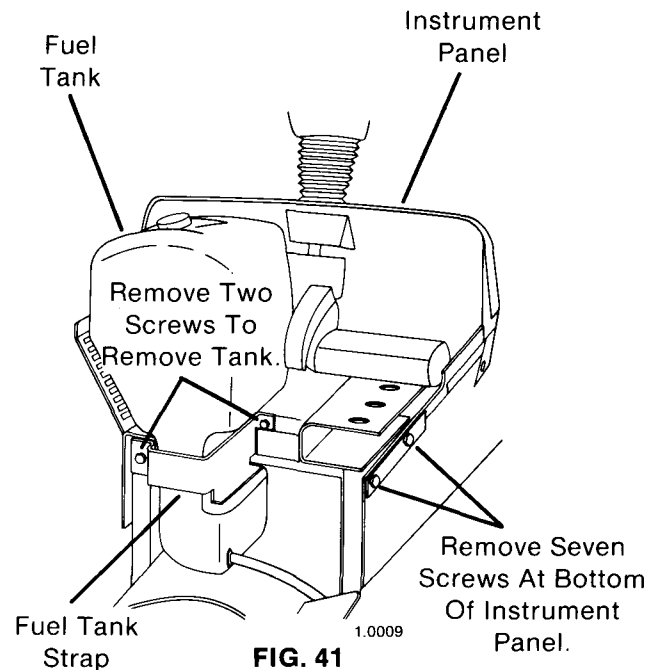
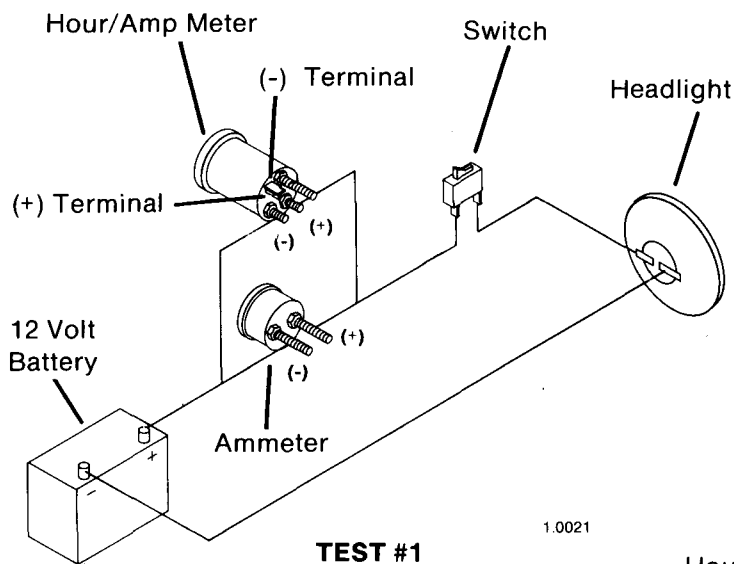


FIG. 41

- G. Pull choke cable out from underneath steering mechanism while working instrument panel back and over steering shaft. NOTE: Some wires and wire harness will have to be lifted over steering shaft also to move instrument panel back far enough to gain full access to ammeter.
- H. Remove nut or nuts on back of ammeter at terminal connections. Remove and tag all wire connections from terminals.
- I. Remove fastener brackets off back of ammeter and remove ammeter out front to instrument panel. Connect ammeter or hour/amp meter into TEST #1 circuit below to test ammeter function. Connect hour/amp meter into TEST #2 circuit below to test hourmeter function. Reverse above procedures to reassemble tractor.

### TEST #1 (Fig. 42)

- A. Use a 12 volt battery that is fully charged and a headlight and switch that work.
- B. With ammeter connected into circuit as shown, close switch, ammeter should show a charge condition.
- C. Reverse the connections at the ammeter and close switch again, ammeter should register a discharge.
- D. If ammeter does not perform above tests, ammeter is defective. Replace ammeter.
- E. When connecting lead wires to ammeter—the orange/black wire should be connected to the negative terminal.



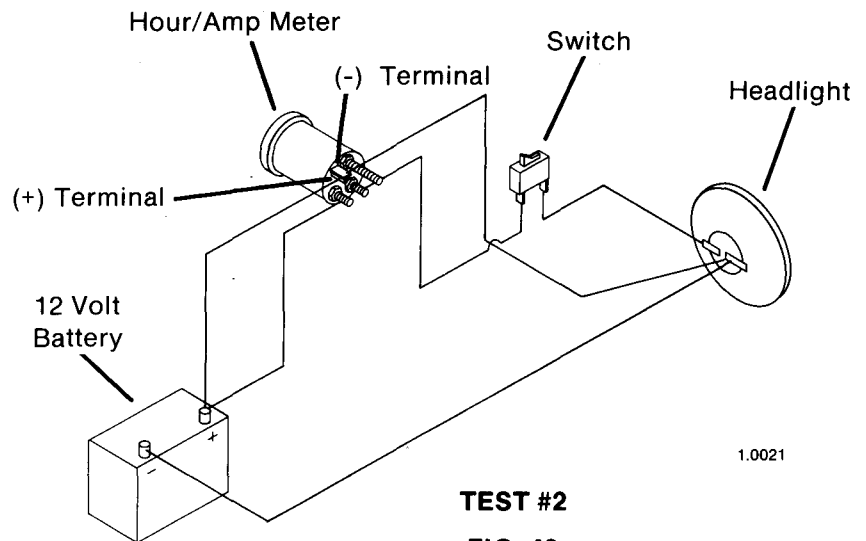
**TEST #1**  
**FIG. 42**

### TEST #2 (Fig. 43)

- A. Connect hour/amp meter into circuit as shown, close switch, ammeter should show a charge condition. Leave circuit on for approximately 5 min., hourmeter should have advanced  $\frac{1}{10}$  of an hour.

**NOTE:** Ammeter **must** be connected into the circuit in order for the hourmeter to operate.

- B. If hourmeter does not perform above test, hourmeter is defective. Replace hour/amp meter assembly.



**TEST #2**  
**FIG. 43**

## 5. Ignition Switch Check —

For safety, the tractor is equipped with an automotive type ignition switch that controls all the electrical circuits. To check for defective ignition switch, follow procedures below to remove and test switch.



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

- A. Unclip hood latches and raise hood and set in upright position.
- B. Compress steering shaft bellows to expose capscrew through steering wheel adaptor. Remove capscrew and locknut. Lift steering wheel assembly off of shaft. Compress bellows further to expose capscrew through height adaptor sleeve. Remove capscrew and locknut. Slide height adaptor sleeve and bellows off of steering shaft. (Fig. 40)
- C. Unbolt two capscrews holding upper steering shaft bearing to instrument panel.
- D. (Hydro Drive Tractors **only**) Remove "T" handle knobs on traction drive lever by removing slotted machine screw.
- E. Disconnect both throttle and choke cables at their connections at the engine.

NOTE: When reconnecting throttle and choke cables to engine, follow procedures to readjust both cables under "THROTTLE AND CHOKE CABLE - ADJUSTMENT".

- F. Remove seven (7) thread forming screws at bottom of instrument panel to both sides of main frame. (Fig. 41)
- G. Pull choke cable out from underneath steering mechanism while working instrument panel back and over steering shaft. NOTE: Some wires and wire harness will have to be lifted over steering shaft also to move instrument panel back far enough to gain full access to ignition switch.
- H. Disconnect lead wire connector from rear of ignition switch.
- I. Remove keys from ignition switch and remove jam nut securing ignition switch to instrument panel. Switch may now be removed from instrument panel.
- J. Replace key into ignition switch and begin continuity test with switch in "OFF" position.

- K. Using continuity tester or ohmmeter, attach one probe to terminal "B" on ignition switch (Fig. 44) and touch all other terminals with other probe. Continuity should not exist between any terminal. If continuity exists between any terminal, switch is defective, replace switch.

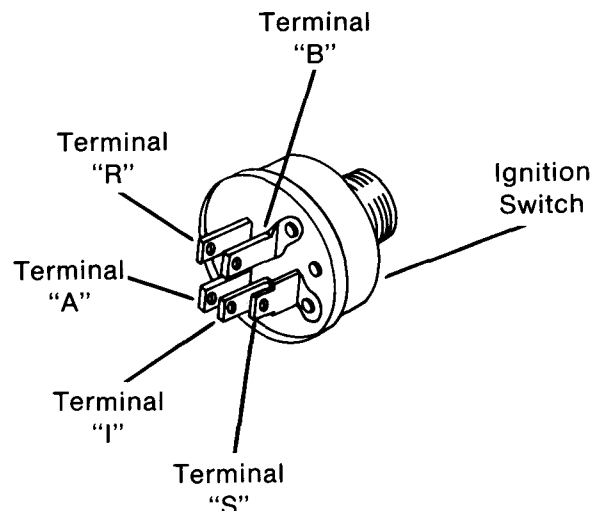


FIG. 44

- L. Switch key to "ON" position and attach one probe to terminal "B" and touch all other terminals with other probe. Continuity should **only** exist between terminals "B" and "I", "B" and "A" and also "B" and "R". If continuity appears between any other terminals, switch is defective, replace switch.
- M. Switch key to "START" position and hold in this position. Attach one probe to terminal "B" and touch all other terminals with other probe. Continuity should **only** exist between terminals "B" and "S", "B" and "I" and also "B" and "R". If continuity appears between any other terminals, switch is defective, replace switch.
- N. To reassemble switch back onto tractor, reverse procedures steps "A" thru "I" above.

## 6. Interlock Switch System —



**WARNING:** To avoid accidental starting of engine and to avoid serious bodily injury, **DO NOT** disconnect, by-pass or remove any of the interlock safety switches. Proper operation of this system is mandatory for the safety of the operator.

The seat switch, P.T.O. switch and clutch/brake pedal switch control the starting and stopping functions of the tractors. Tests of the individual switches should be made if any of the following conditions are present:

- Engine will not crank to start.
- Engine starts when either clutch/brake foot pedal or P.T.O. switch is engaged with or without operator on the seat.
- Engine fails to stop when either clutch/brake foot pedal or P.T.O. switch is engaged with operator off the seat.

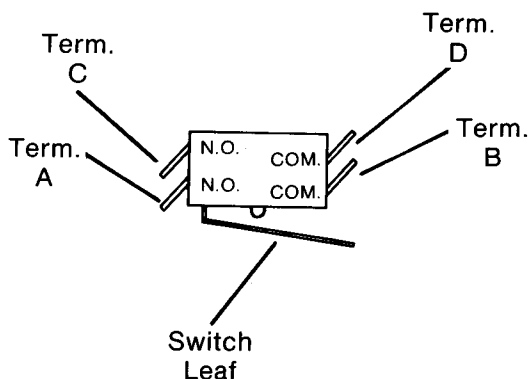
Before starting individual switch tests, first check battery electrolyte level, battery charge, battery terminal connections for corrosion, blown fuse and loose or broken wires at solenoid. If all of these conditions are good, proceed with individual switch tests as follows:



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

### A. Clutch/Brake Switch Check —

Switch is located attached to the left inside wall of main frame. Detach switch by removing two machine screws and nuts securing switch to main frame. Remove and tag all lead wires at switch terminals. Test switch for continuity as follows: (Fig. 45)



**CLUTCH/BRAKE SWITCH**

**FIG. 45**

- Without leaf depressed.

Terminal Connections	Functions
A to B	Continuity does <b>not</b> exist.
C to D	Continuity does <b>not</b> exist.

- With leaf depressed until one click is heard.

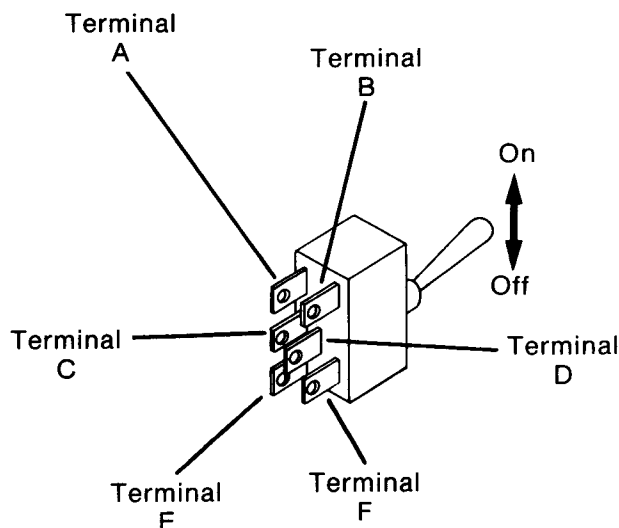
Terminal Connections	Functions
A to B	Continuity does <b>not</b> exist.
C to D	Continuity exists.

- With leaf depressed until two clicks are heard.

Terminal Connections	Functions
A to B	Continuity exists.
C to D	Continuity exists.

### B. P.T.O. Switch Check —

To remove switch, unclip hood latches and raise hood and secure in upright position. 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. Remove hex nut on outside of instrument panel and push switch inward to remove. Remove and tag all lead wires at switch terminals. Test switch for continuity as follows: (Fig. 46)



**FIG. 46**

- a. Using continuity tester or ohmmeter, position P.T.O. switch in the OFF position. Attach one lead to terminal "C", touch all other terminals with the other lead. Continuity should only exist between terminals "A" and "C". Repeat above procedure starting with terminal "D". Continuity should only exist between terminals "B" and "D".
- b. Position switch in the ON position. Attach one lead to terminal "C", touch all other terminals with the other lead. Continuity should only exist between terminals "C" and "E". Repeat above procedure starting with terminal "D". Continuity should only exist between terminals "D" and "F".

### C. Seat Switch Check —

Check gap between the end of plunger and seat support bracket. (Fig. 47) There should be  $\frac{1}{32}$ " to  $\frac{1}{16}$ " gap between end of plunger and bracket, **without** operator on the seat. If gap is anything else shim accordingly on top of seat support bracket or bend bracket down if plunger is touching.

Test seat switch located under seat pan assembly. Raise rear of seat pan and squeeze locking tabs on switch and pull switch out hole in seat pan. Remove and tag lead wires at switch terminals. With switch plunger up, continuity should **not** exist. With switch plunger depressed, continuity should exist. (Fig. 47)

NOTE: If switch is replaced, the switch **must** be a N.O. (normally open) type **only**. For easy identification of a N.O. type switch, the switch bottom is black in color.

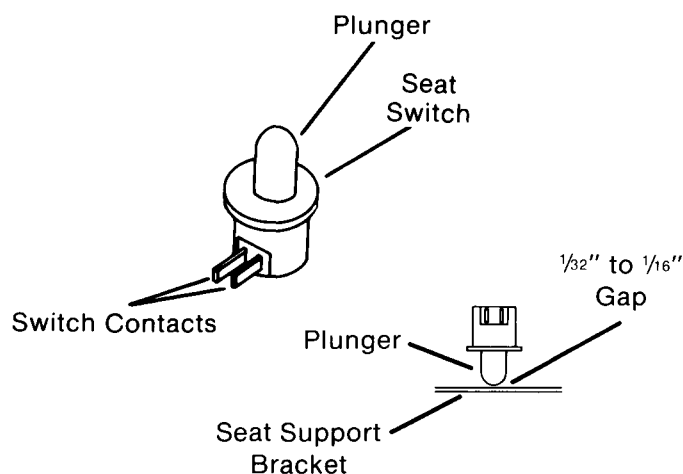


FIG. 47

- D. If any of the above interlock switches fail to perform their specific tests, the switch is defective and should be replaced.

- E. If all switches check-out to be operating properly and the engine still does not crank to start, **check**:
  - a. Ignition switch for continuity.
  - b. Engine coil and or complete engine ignition system per engine manufacturer's specifications.

### 7. Headlight Switch Check —

This switch is a rocker type switch and headlights should only work with engine running.

Follow procedures below to remove and test switch:



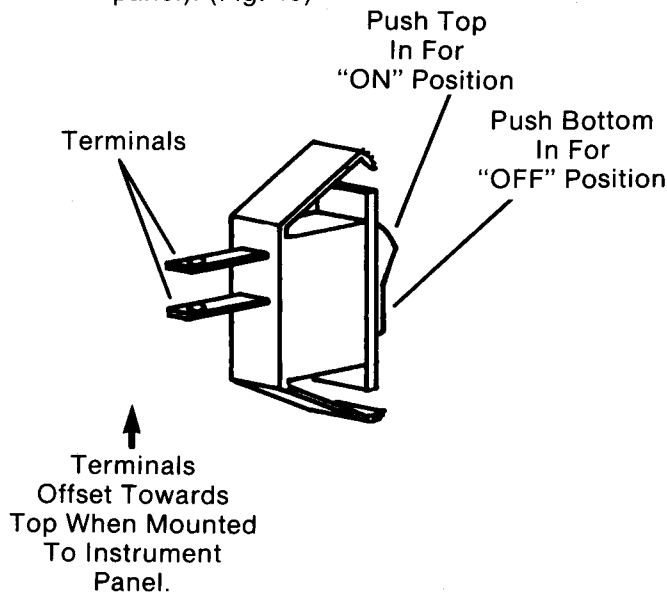
**WARNING: To avoid accidental starting, remove spark plug wire(s) and secure away from spark plug(s).**

- A. Unclip hood latches and raise hood and set in upright position.
- B. Compress steering shaft bellows to expose capscrew through steering wheel adaptor. Remove capscrew and locknut. Lift steering assembly off of shaft. Compress bellows further to expose capscrew through height adaptor sleeve. Remove capscrew and locknut. Slide height adaptor sleeve and bellows off of steering shaft. (Fig. 40)
- C. Unbolt two capscrews holding upper steering shaft bearing to instrument panel.
- D. (Hydro Drive Tractors **only**) Remove "T" handle knobs on traction drive lever by removing slotted machine screw.
- E. Disconnect both throttle and choke cables at their connections at the engine.

NOTE: When reconnecting throttle and choke cables to engine, follow procedures to readjust both cables under "THROTTLE AND CHOKE CABLE - ADJUSTMENT."

- F. Remove seven (7) thread forming screws at bottom of instrument panel holding panel to both sides of main frame. (Fig. 41)
- G. Pull choke cable out from underneath steering mechanism while working instrument panel back and over steering shaft. NOTE: Some wires and wire harness will have to be lifted over steering shaft also to move instrument panel back far enough to gain full access to headlight switch.
- H. Reach behind instrument panel and pinch switch locking tabs together and push switch tabs together and push switch through hole in panel.

- I. Remove and tag both lead wires at switch terminals. Note also the orientation of switch when mounted to instrument panel (Terminal offset should be toward top of instrument panel). (Fig. 48)



**HEADLIGHT SWITCH**  
**FIG. 48**

- J. Connect a continuity tester or ohmmeter across terminals. (Fig. 48)
- K. With switch in "ON" position, continuity should exist.
- L. With switch in "OFF" position, continuity should **not** exist. Repeat this procedure two or three times to insure a positive test.
- M. If switch fails to perform above test, switch is defective and should be replaced.

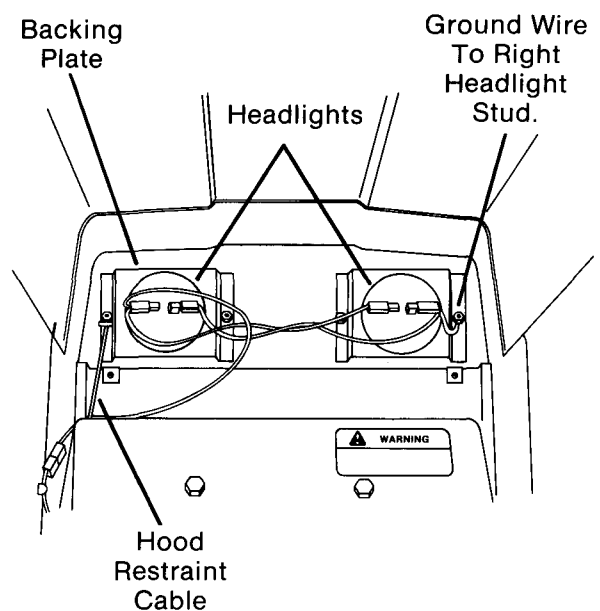
#### 8. Headlight Replacement —

To replace headlights, follow procedure below:

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

- A. Unclip hood latches and raise hood and set in upright position.
- B. Remove and tag wires attached to headlight terminals.
- C. Remove two nuts holding headlight backing plate and headlight to hood assembly.

NOTE: Hood restraint cable is attached to left mounting stud on left headlight. (Fig. 49) When nut is removed, hood should be held from falling forward and damaging hood.



**FIG. 49**

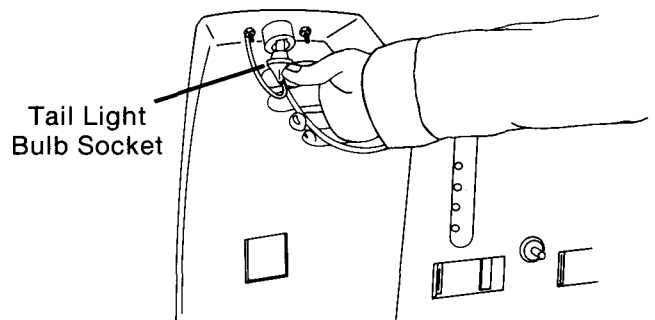
- D. Remove backing plate and headlight. Replace headlight (No. 4411-1) and reassemble to hood.

NOTE: If right headlight is replaced, be sure to connect ground wire to right mounting stud when reassembling. (Fig. 49)

#### 9. Tail Light Replacement —

To replace tail lights, follow procedures below:

- A. Lift rear of seat pan up.
- B. Rotate rubber bulb socket ¼ turn clockwise until socket can be removed from tail light. (Fig. 50)



**FIG. 50**



- C. Pull light bulb out of rubber bulb socket and replace bulb (No. 194).
- D. Replace socket into tail light and rotate socket ¼ turn counterclockwise.

#### **10. Fuse Replacement—**

The fuse protects all electrical circuits except the starter. The fuse holder is located between the battery and the fuel tank. The fuse may be one of the following three types: an automotive plug type Bussman ATC 25, Little Fuse 3AG 25, or a Bussman AGC 25. All fuses are rated at 25 amp capacity, and replacements are available at most service stations.

NOTE: To open fuse holder, push in on both ends of holder and turn ends in opposite directions, then pull apart.

IMPORTANT: For electrical safety, always disconnect negative (-) battery cable before removing fuse. Replace fuse, then battery cable.

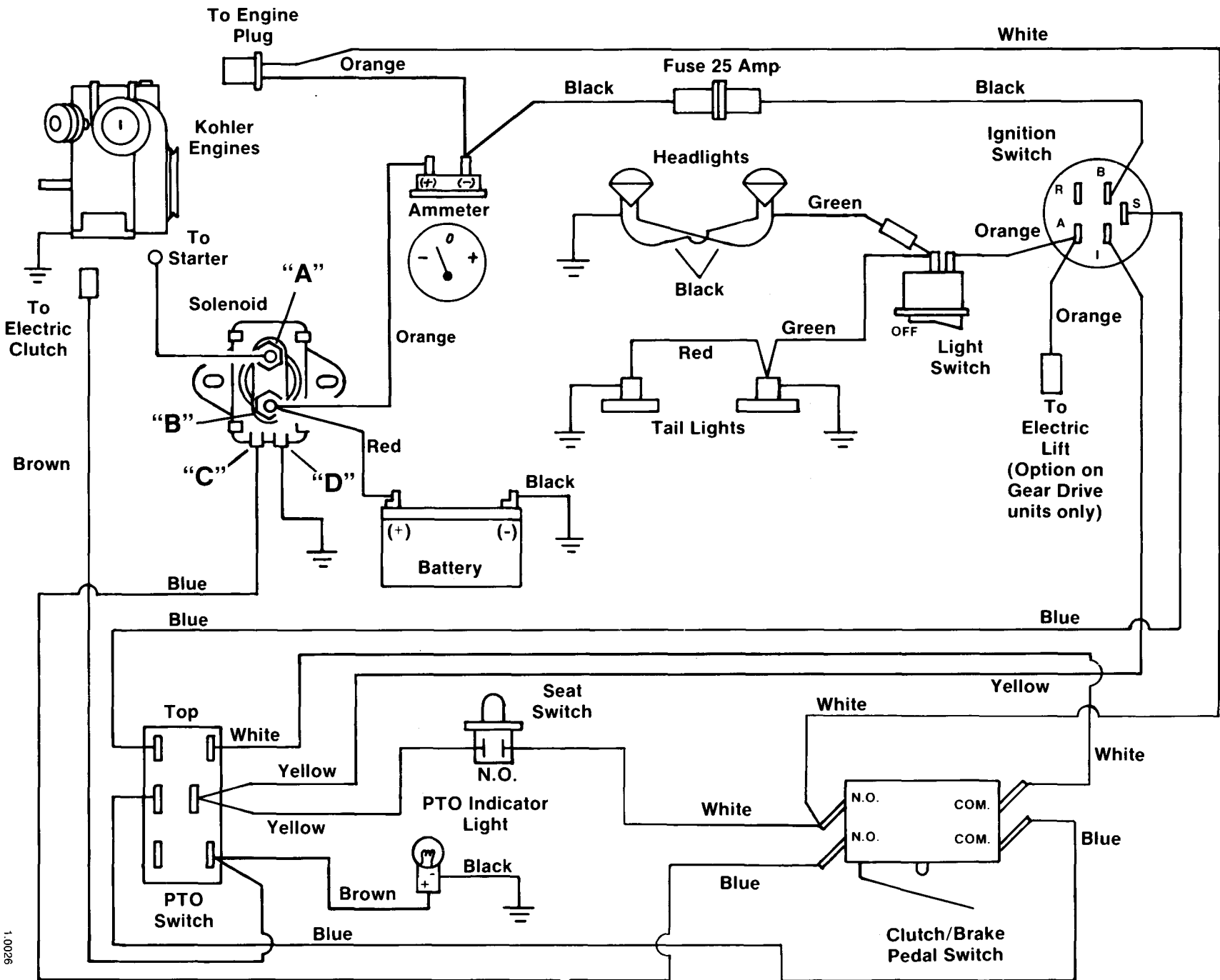
#### **11. P.T.O. Warning Light Check —**

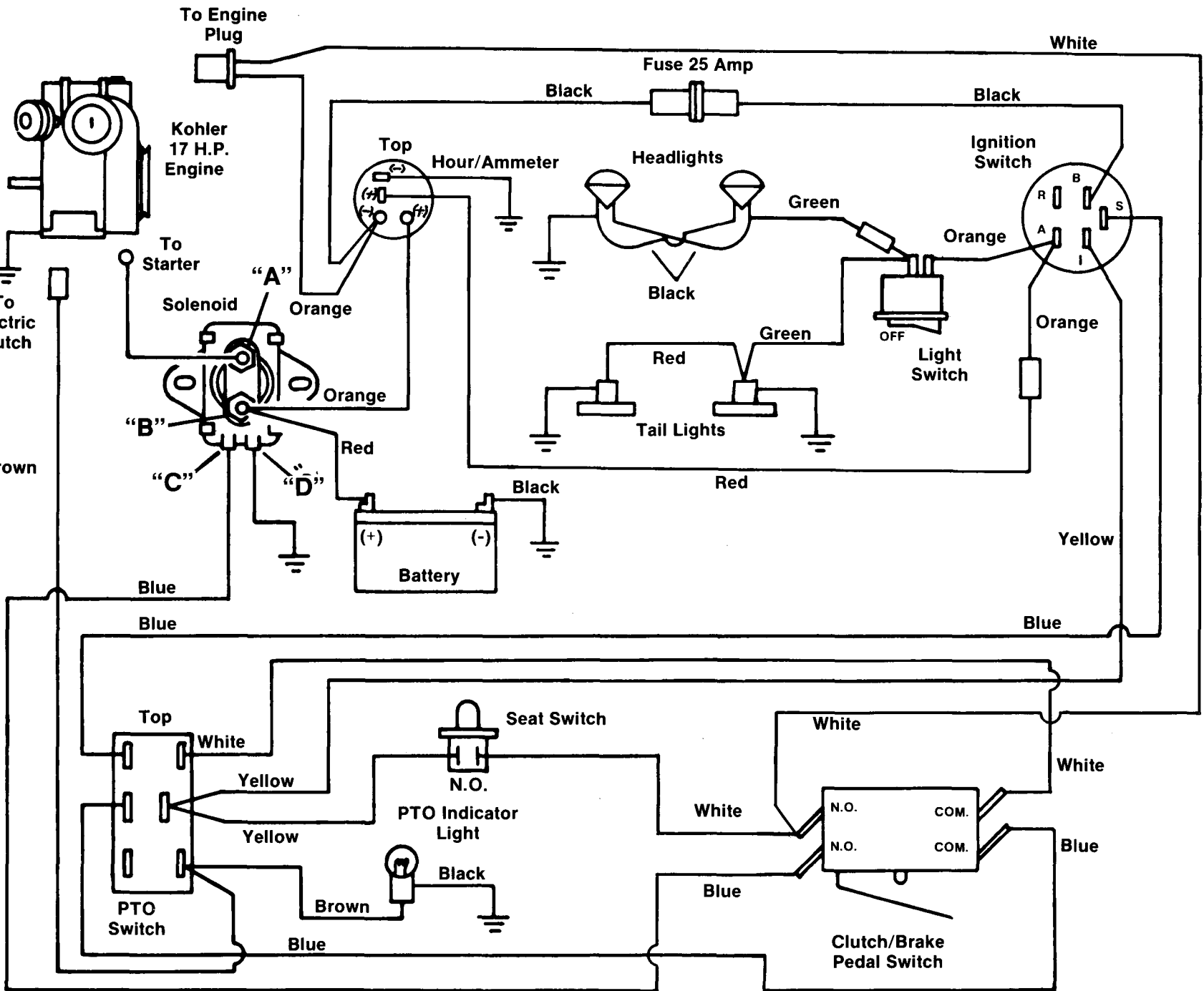
If warning light fails to operate properly, check:

- A. Wire connections at terminals on rear of light.
- B. Burnt out light. Light can only be replaced as a complete unit. Pry light out front of instrument panel and disconnect wires at terminal connections on rear of light. Reconnect wires to new light assembly terminals and snap light into place in instrument panel.

NOTE: When wires are reconnected to light, the polarity must be correct for the light to work. Brown wire should connect to the positive terminal (indicated by a dot on the light case). Black wire connects to the other terminal.

**WIRING DIAGRAM**  
(LGT 12, LGT 12H, and LGT 17)





WIRING DIAGRAM  
(LGT 17H only)

# ADJUSTMENTS AND SERVICING FOR GEAR DRIVE TRACTORS ONLY

## 90° TRACTION DRIVE GEAR BOX REMOVAL:



**WARNING:** To avoid accidental starting, remove spark plug wire(s) and secure away from spark plug(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. Loosen two setscrews through rear drive shaft universal joint. (Fig. 51)

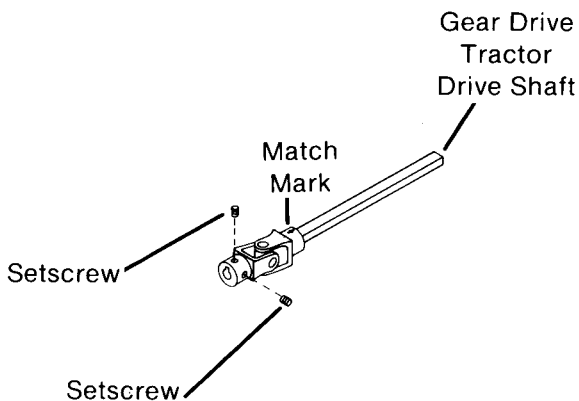


FIG. 51

1.0006

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

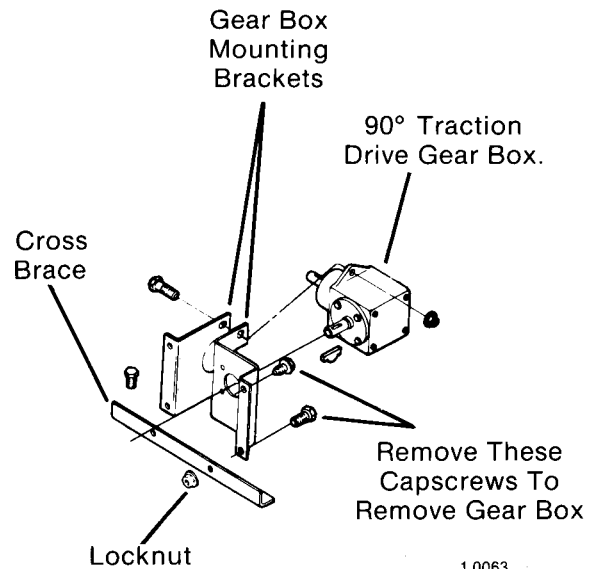
- C. Make chalk mark on front universal joint and a matching mark on rectangular drive shaft so these parts can be mated together the same way during reassembly.

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 onto both front and rear universal joints, if chalk marks are not made, to insure proper reassembly. (Fig. 51)

- D. Pull drive shaft out of front universal joint and remove drive shaft.
- E. Depress clutch/brake pedal and set parking brake. Remove traction drive belt from trans-axle pulley then from gear box pulley.

- F. Remove four capscrews and locknuts holding gear box mounting bracket to gear box support cross braces. (Fig. 52)



1.0063

FIG. 52

- G. Rotate gear box counterclockwise until gear box pulley points to the rear of the tractor. Work gear box back, down and out of the tractor.
- H. Service gear box per manufacturer's specifications found in this service manual. Reverse above procedures to install gear box.

## TRACTION DRIVE BELT:

### Belt Adjustment —

No adjustment is necessary. This belt is self adjusted by a spring loaded idler pulley. Periodically check idler arm to be sure it is pivoting freely and providing tension.

### Belt Replacement —

This belt was designed and engineered to provide long, trouble-free service. If replacement is necessary, use **only** the belt recommended by manufacturer to be sure you have a belt that will provide the life and service required.



**WARNING:** To avoid accidental starting, remove spark plug wire(s) and secure away from spark plug(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. Remove flange nut holding V-idler pulley on the moveable idler arm. (Fig. 53)
- C. Depress clutch/brake pedal and set parking brake.
- D. Slide V-idler pulley to the right until belt is clear of V-idler belt guide. (Fig. 53)
- E. Carefully remove flat idler pulley and belt finger, keeping all parts and mounting hardware in order. (Fig. 53)
- F. Remove old belt from pulleys and replace with a new belt. Be sure belt is routed as shown in (Fig. 54) NOTE: Belt must be to the **inside** of all belt guides. V-shape of belt must be in grooves of V-shaped pulleys. Reassemble flat idler pulley and belt finger but do not fully tighten the mounting hardware at this time. Flat side of belt should run **under** flat idler pulley and through belt finger as shown.
- G. Reassemble flange nut to secure V-idler pulley. Be sure bent bottom edge of V-idler belt guide fits under bottom edge of moveable idler arm, and belt is inside belt guide, before tightening nut. (Fig. 53)
- H. Release parking brake and center belt finger on the arc of the belt under flat idler pulley, tighten the belt finger and pulley hardware in this position. (Fig. 54)

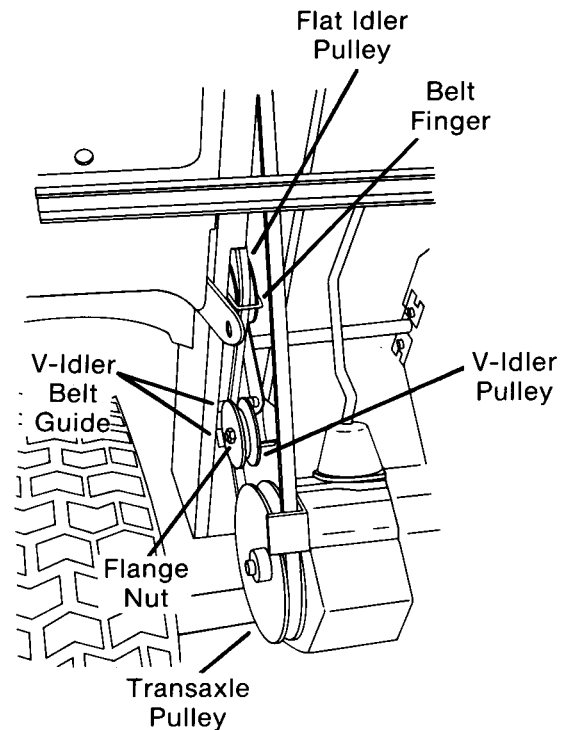


FIG. 53

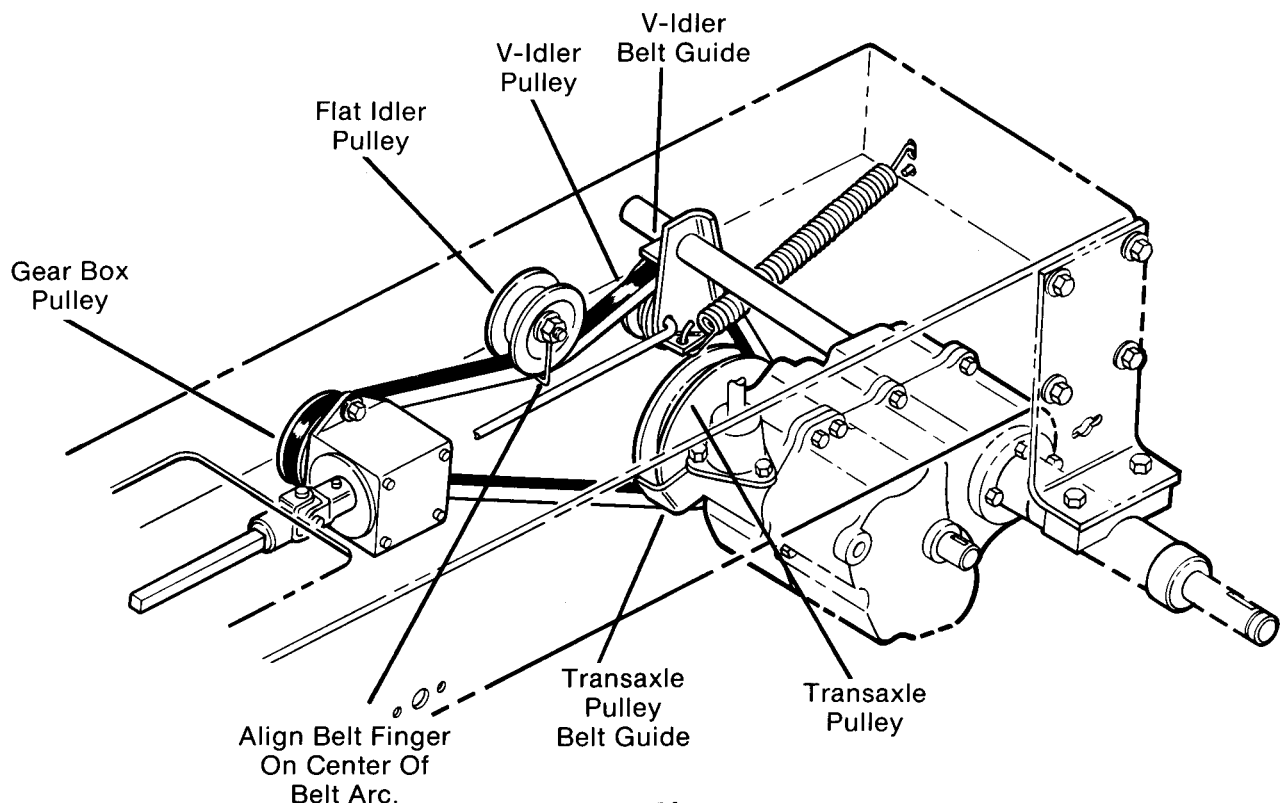


FIG. 54

## CLUTCH/BRAKE PEDAL REMOVAL:



**WARNING:** To avoid accidental starting, remove spark plug wire(s) and secure away from spark plug(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. Detach clutch/brake pedal interlock spring from clutch/brake pedal shaft. (Fig. 55)

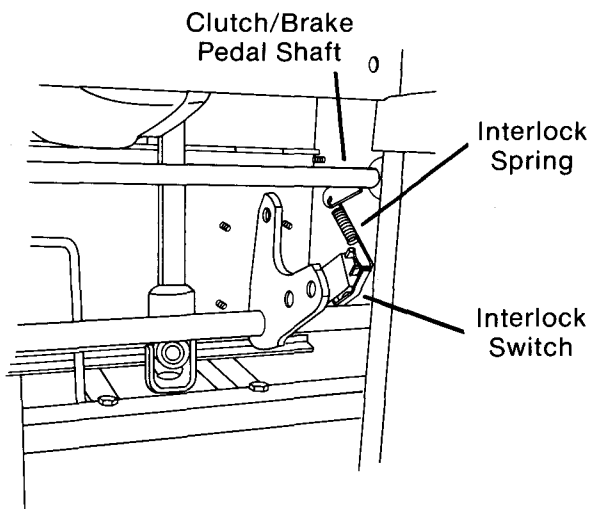


FIG. 55

- C. Remove rubber foot pedal grip from clutch/brake pedal shaft.
- D. Remove cotter pin thru clutch/brake pedal shaft along left inside of main frame. (Fig. 56)
- E. Slide shaft to the left and remove flat washer on right end of shaft. Detach cotter pins and washers from parking brake and clutch rods and remove rods from shaft. (Fig. 56)

NOTE: Rubber washer on clutch rod may have to be compressed to remove cotter pin.

- F. Remove two thread forming screws holding clutch/brake support plate to left inside of main frame along with one capscrew and flange nut on lip of left main frame. Remove support plate. (Fig. 56)
- G. Work clutch/brake pedal shaft to the right and down and out hole in left main frame.
- H. Service shaft as required and reverse above procedures to reassemble shaft into tractor.

NOTE: Replace rubber washer onto clutch rod then flat washer. Rubber washer may have to be compressed to replace cotter pin in clutch rod.

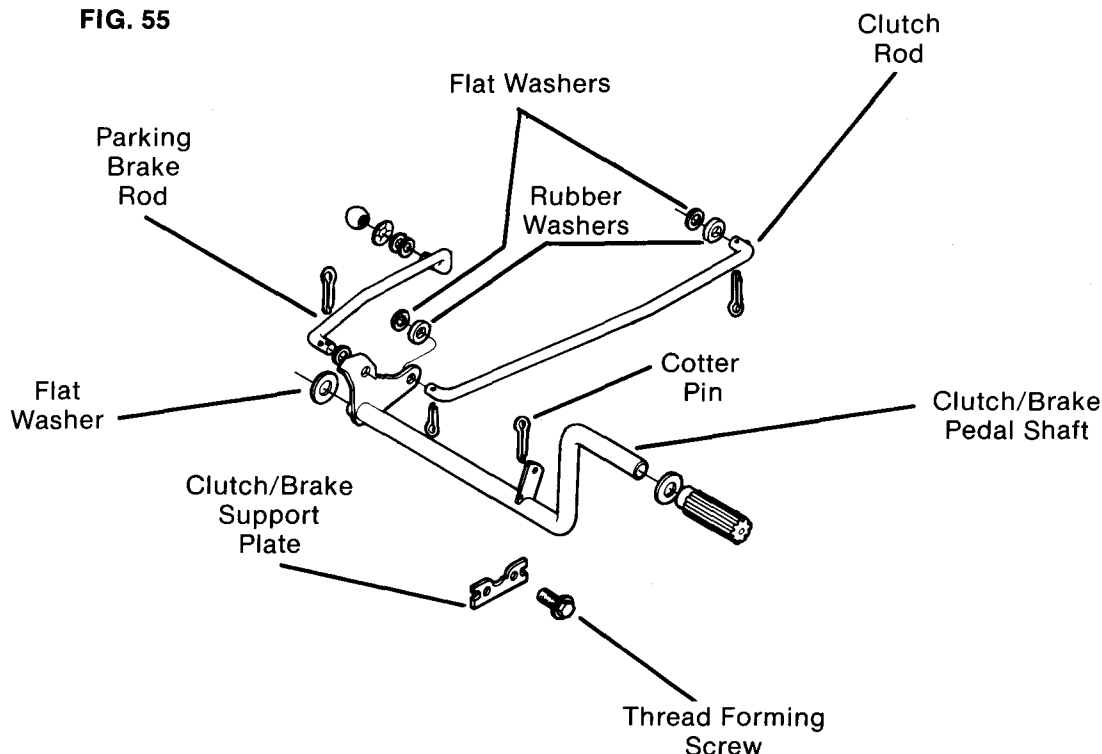


FIG. 56

## CLUTCH/BRAKE ARM ASSEMBLY REMOVAL:

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

- Before this procedure is performed, the attachment should be removed from this tractor as outlined in "ATTACHMENT" section of this service manual.
- Depress clutch/brake pedal and set parking brake.
- Remove flange nut holding V-idler pulley clutch/brake arm. (Fig. 53)
- Depress clutch/brake pedal and release parking brake. Detach clutch/brake arm spring at rear of main frame.

NOTE: When reassembling into place, short hooked end of spring must be attached to clutch/brake arm with spring coils away from arm (Fig. 57). Long hooked end of spring attaches to rear of main frame.

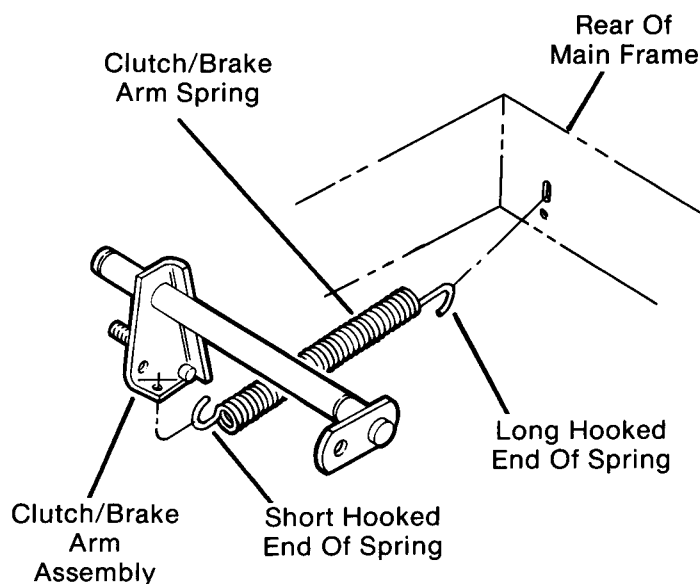


FIG. 57

- Remove E-ring clip on left end of clutch/brake arm assembly against transaxle and brake support plate. (Fig. 58)

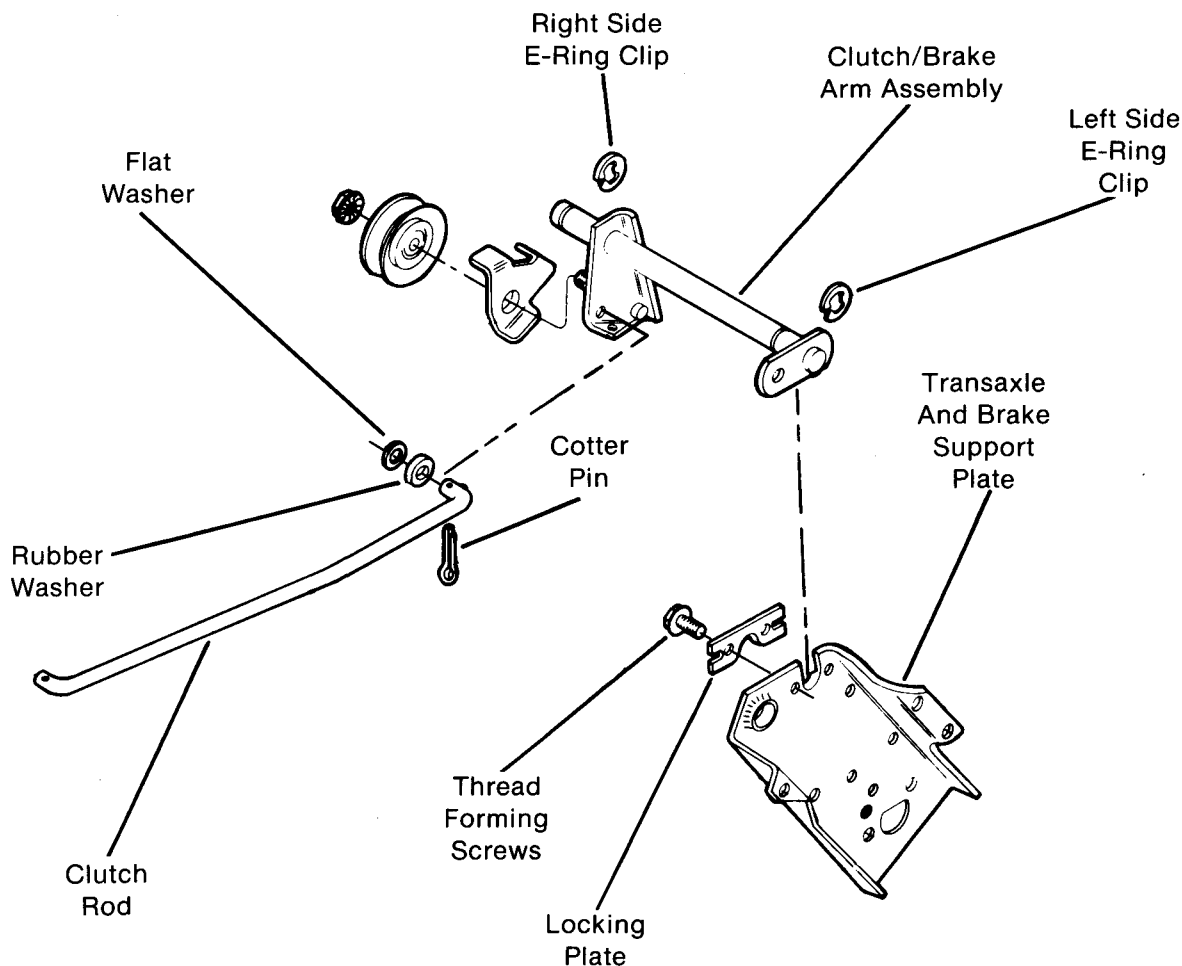


FIG. 58

- F. Remove two thread forming screws attaching locking plate to transaxle and brake support plate. (Fig. 58)
- G. Remove cotter pin from brake adjustment rod attached to transaxle brake lever arm at disc brake. Detach adjustment rod from brake lever arm. (Fig.59)
- H. Push clutch/brake arm assembly to the left so right end of clutch/brake arm assembly pulls out of hole in main frame. Let right end of clutch/brake arm assembly drop down.
- I. Compress rubber washer and flat washer on rear end of clutch rod and remove cotter pin from clutch/brake arm assembly. (Fig. 58)
- J. Work left end of clutch/brake arm assembly (with brake adjustment assembly still attached) out from behind transaxle and brake support plate. (Fig. 59)
- K. Remove and service clutch/brake arm assembly as required. Reverse above procedures to reinstall clutch/brake arm assembly into tractor.

NOTE: Replace rubber washer onto clutch rod then flat washer. Rubber washer may have to be compressed to replace cotter pin in clutch rod.

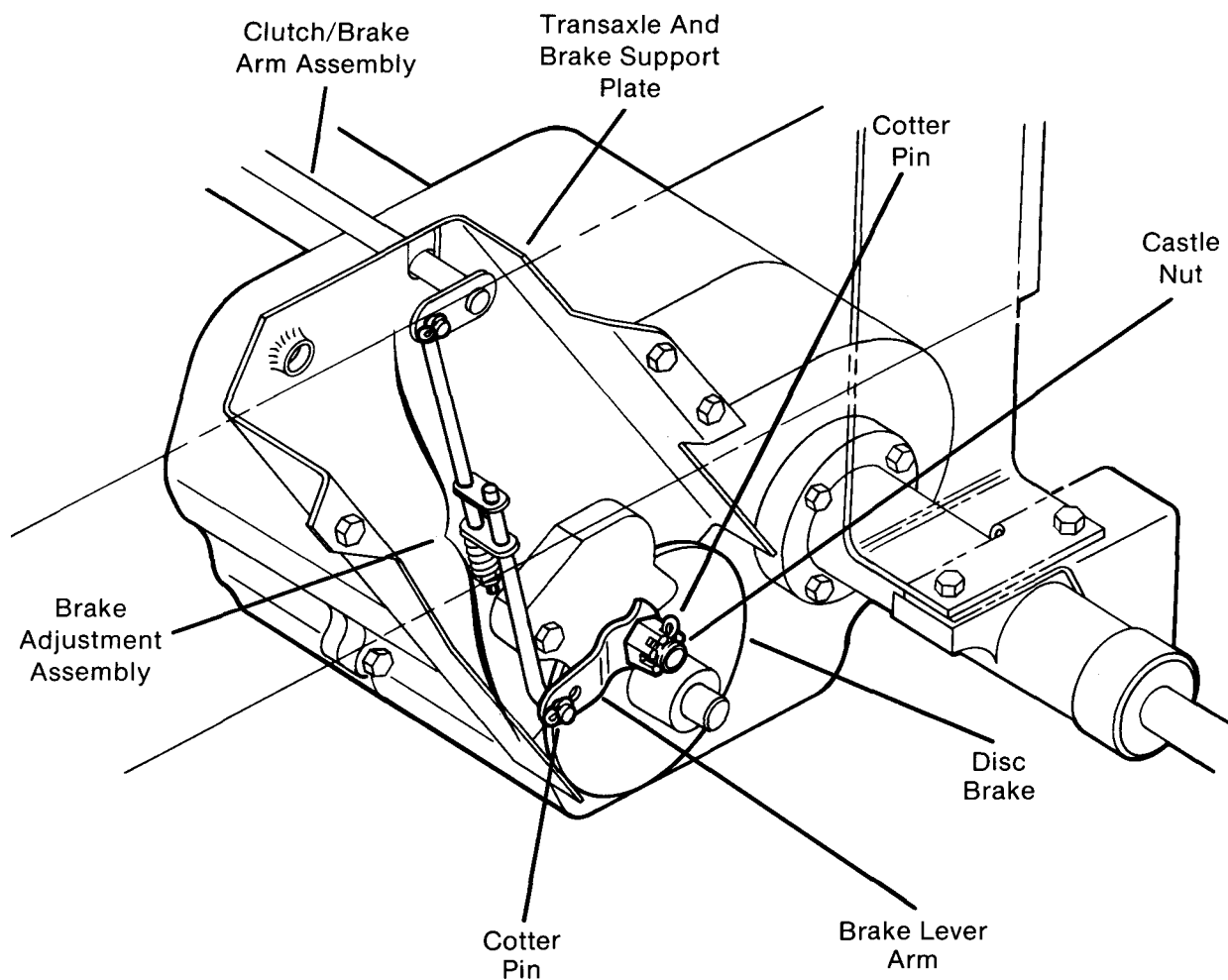


FIG. 59



## TRANSAXLE:

### 1. Transaxle Removal and Replacement —



**WARNING:** To avoid accidental starting, remove spark plug wires(s) and secure away from spark plug(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. Remove shift lever knob from shift lever.
- C. Jack rear of tractor up and place jack stands just behind right and left foot resets. Lower tractor onto jack stands so tractor's main frame rests on jack stands.
- D. Remove five lug nuts and wheel hub bolts on both right and left wheel assemblies. Remove both wheel assemblies from wheel hub.
- E. Remove cotter pin from brake adjustment rod at disc brake lever arm. Remove adjustment rod from brake lever arm. (Fig. 59)
- F. Remove two capscrews securing disc brake to transaxle. Pay special attention to the order of parts (spacers, outer brake pad and back-up plate) when removing disc brake. Remove disc brake. (Fig. 60)

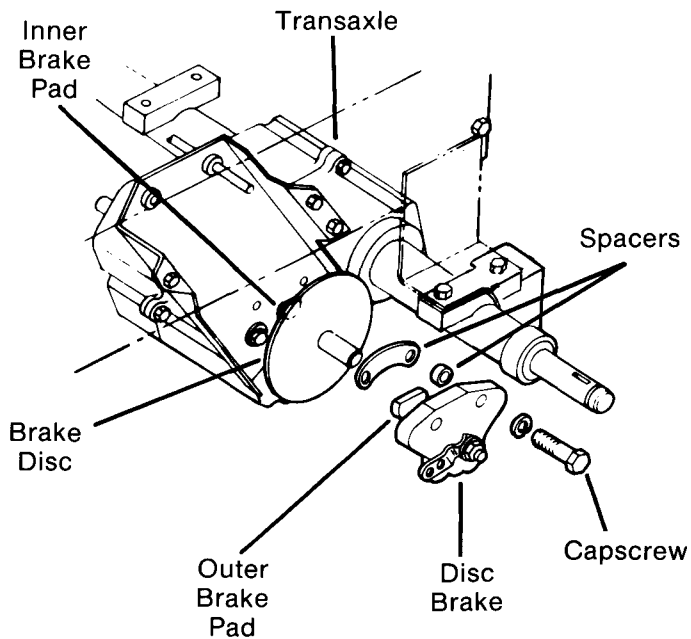


FIG. 60

- G. Slide brake disc off transaxle output shaft, inner brake pad can be removed at this time. (Fig. 60)
- H. Raise rear of tractor up again and remove jack stands. Lower rear of tractor all the way to the ground until transaxle rests on the floor.
- I. Remove two capscrews, lockwashers and nuts on both right and left transaxle mounting brackets. (Fig. 61)

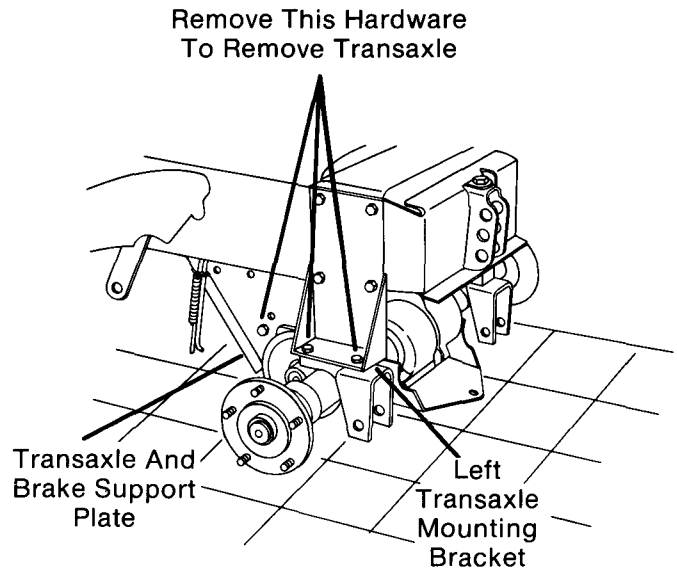
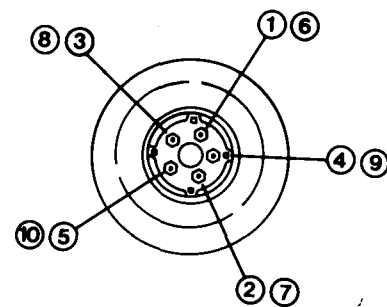


FIG. 61

- J. Finally remove one capscrew and lockwasher thru transaxle and brake support plate at left front corner of transaxle. (Fig. 61)



REAR WHEEL LUGS  
TIGHTENING SEQUENCE

FIG. 62

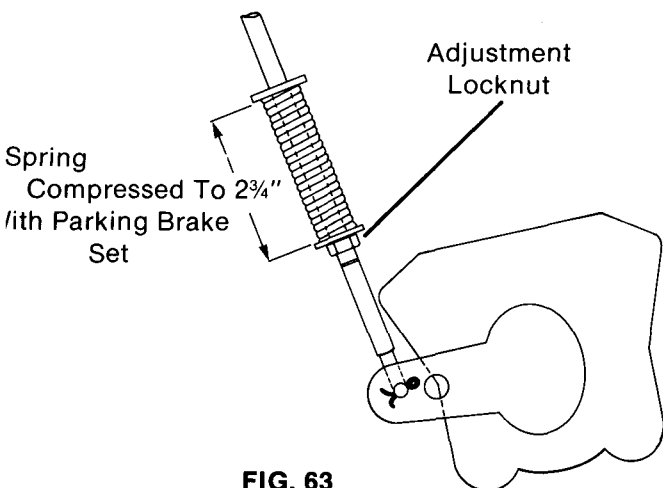
- K. Lift rear of tractor up and over transaxle.  
**IMPORTANT:** Lift rear of tractor high enough to clear transaxle shift lever.
- L. Service transaxle per manufacturer's specifications (reference literature included for Peerless at the end of this service manual).
- M. Reverse above procedures to reassemble transaxle to tractor.

**NOTE:** When reassembling rear wheels onto wheel hubs, follow tightening sequence shown in (Fig. 62) to tighten lug nuts. Repeat sequence until all lug nuts are secured tightly.

## 2. Traction Drive Brake Adjustment —

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

- A. Depress clutch/brake pedal and set parking brake. Spring on brake adjustment rod should be compressed to the dimension shown in (Fig. 63) Turn locknut on end of adjustment rod until dimension is achieved.



- B. Test brake adjustment by pushing tractor forward while holding clutch/brake pedal down. If brake does not stop rear wheels, continue adjustment with step "C".
- C. Depress clutch/brake pedal and release parking brake. Remove cotter pin thru castle nut. (Fig. 59)
- D. Turn castle nut clockwise to tighten brake pad against brake disc to compensate for brake pad wear. Set adjustment between outer brake pad and brake disc with a .015" feeler gauge.

- E. Depress clutch/brake pedal and push tractor forward. Brake should engage.
- F. Reinstall cotter pin into castle nut.  
**NOTE:** Castle nut may have to be turned slightly to enable cotter pin to be installed.  
**NOTE:** If brake still does not perform properly, follow procedures below for "BRAKE PAD REPLACEMENT".

## 3. Brake Pad Replacement —

Replace **both** brake pads when the brake can no longer be adjusted to hold the tractor or when the thickness of either pad is less than the thickness of ignition key. Follow procedures below for brake pad replacement.

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

- A. Remove two capscrews securing disc brake to transaxle. (Fig. 60) Disc Brake will pivot on brake adjustment rod.

**NOTE:** Location and position of both flat and tube type spacers on inside of disc brake for reassembly. (Fig. 60)

- B. Remove worn brake pad from disc brake.

**NOTE:** Back-up plate may fall out at this time. Replace back-up plate before new brake pad is installed.

- C. Pull brake disc off of transaxle output shaft, inner brake pad can now be removed. (Fig. 60)

- D. Replace both inner and outer brake pads with new parts and reassemble by reversing above procedures.

**NOTE:** It may be necessary to readjust brake engagement. Refer to procedures under "TRACTION DRIVE BRAKE ADJUSTMENT".

## ATTACHMENT LIFT LEVER SHAFT REMOVAL AND REPLACEMENT:

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

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

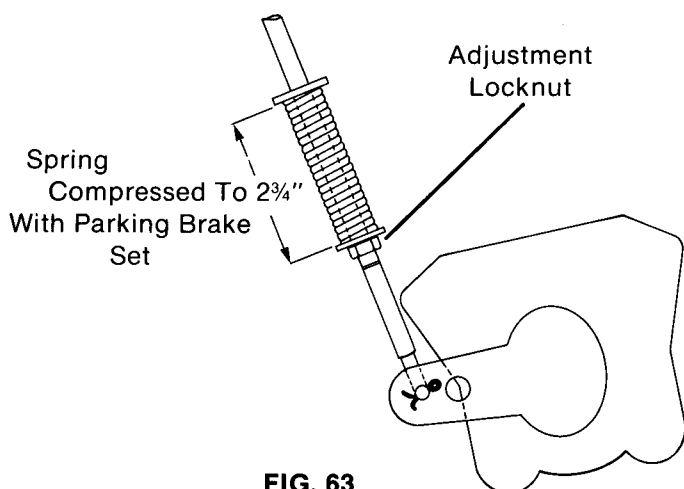
- K. Lift rear of tractor up and over transaxle.  
**IMPORTANT:** Lift rear of tractor high enough to clear transaxle shift lever.
- L. Service transaxle per manufacturer's specifications (reference literature included for Peerless at the end of this service manual).
- M. Reverse above procedures to reassemble transaxle to tractor.

**NOTE:** When reassembling rear wheels onto wheel hubs, follow tightening sequence shown in (Fig. 62) to tighten lug nuts. Repeat sequence until all lug nuts are secured tightly.

## 2. Traction Drive Brake Adjustment —

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

- A. Depress clutch/brake pedal and set parking brake. Spring on brake adjustment rod should be compressed to the dimension shown in (Fig. 63) Turn locknut on end of adjustment rod until dimension is achieved.



**FIG. 63**

- B. Test brake adjustment by pushing tractor forward while holding clutch/brake pedal down. If brake does not stop rear wheels, continue adjustment with step "C".
- C. Depress clutch/brake pedal and release parking brake. Remove cotter pin thru castle nut. (Fig. 59)
- D. Turn castle nut clockwise to tighten brake pad against brake disc to compensate for brake pad wear. Set adjustment between outer brake pad and brake disc with a .015" feeler gauge.

- E. Depress clutch/brake pedal and push tractor forward. Brake should engage.

- F. Reinstall cotter pin into castle nut.

**NOTE:** Castle nut may have to be turned slightly to enable cotter pin to be installed.

**NOTE:** If brake still does not perform properly, follow procedures below for "BRAKE PAD REPLACEMENT".

## 3. Brake Pad Replacement —

Replace **both** brake pads when the brake can no longer be adjusted to hold the tractor or when the thickness of either pad is less than the thickness of ignition key. Follow procedures below for brake pad replacement.

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

- A. Remove two capscrews securing disc brake to transaxle. (Fig. 60) Disc Brake will pivot on brake adjustment rod.

**NOTE:** Location and position of both flat and tube type spacers on inside of disc brake for reassembly. (Fig. 60)

- B. Remove worn brake pad from disc brake.

**NOTE:** Back-up plate may fall out at this time. Replace back-up plate before new brake pad is installed.

- C. Pull brake disc off of transaxle output shaft, inner brake pad can now be removed. (Fig. 60)

- D. Replace both inner and outer brake pads with new parts and reassemble by reversing above procedures.

**NOTE:** It may be necessary to readjust brake engagement. Refer to procedures under "TRACTION DRIVE BRAKE ADJUSTMENT".

## ATTACHMENT LIFT LEVER SHAFT REMOVAL AND REPLACEMENT:

**WARNING:** To avoid accidental starting, remove spark plug wires(s) and secure away from spark plug(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. Remove right side running board by removing two capscrews securing inner front corner of running board to main frame along with two rear carriage bolts. (Fig. 64)
- C. Remove snap ring and all thrust (shim) washers from left end of lift lever shaft. (Fig. 65)
- D. Remove four thread forming screws securing inner retainer bracket to right frame rail. (Fig. 65) Slide bracket away from frame until it clears frame lip. Pull lift lever handle down and away from right side of tractor until left side of shaft comes out of frame. Work lift lever assembly out bottom of tractor.
- E. Service lift lever assembly as required and reverse above procedures to replace.

NOTE: Lubricate all pivot points, with NLGI Grade 2 Lithium base EP grease (Ford 1T-M1C137-B), during installation.

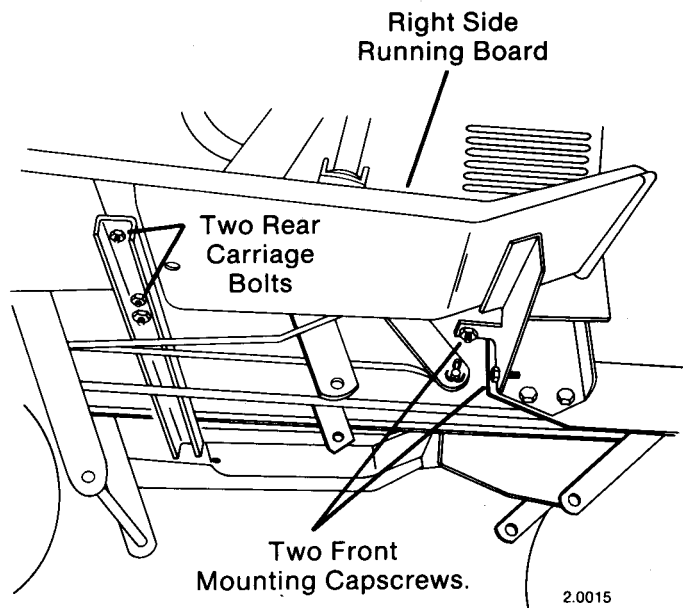


FIG. 64

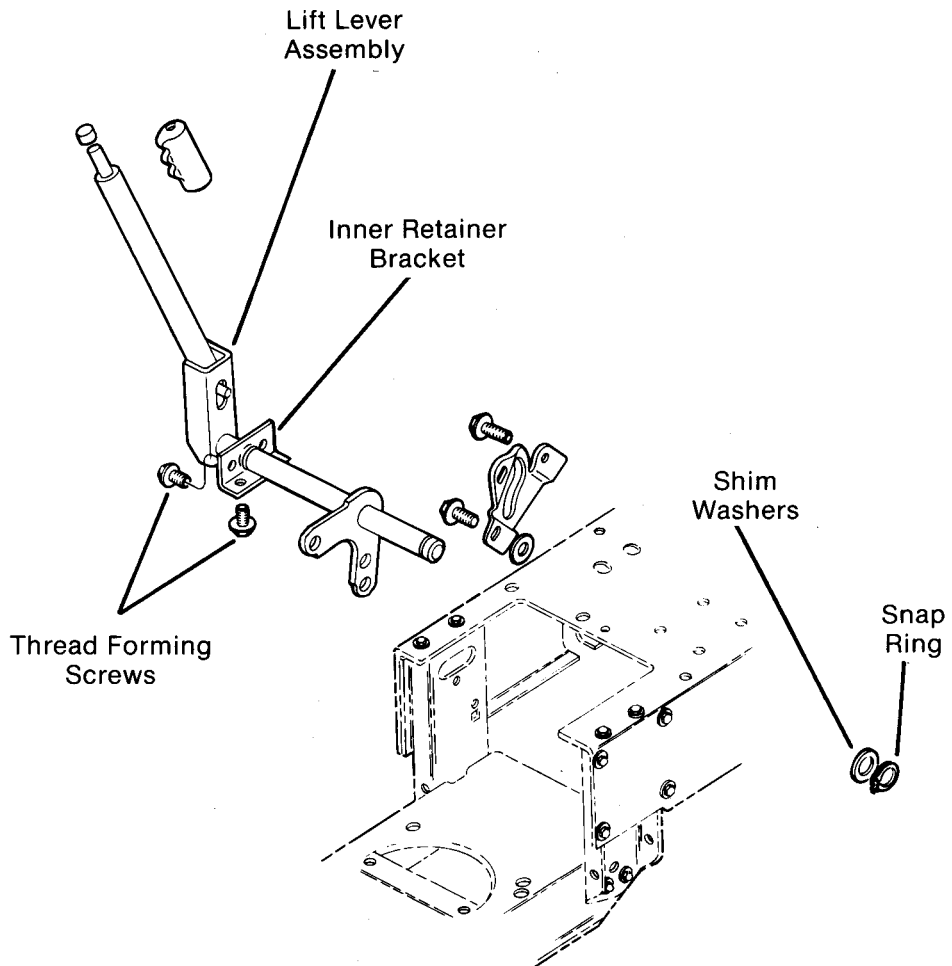


FIG. 65

# ADJUSTMENTS AND SERVICING FOR HYDRO DRIVE TRACTORS ONLY

## CLUTCH/BRAKE PEDAL SHAFT REMOVAL:

(Models 09GN 2202 & 2204 only)

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

- Before this procedure is performed, the attachment should be removed from this tractor as outlined in "ATTACHMENT" section of this service manual.
- Remove cotter pin from parking brake link at brake arm lever and detach link from lever. Disconnect clutch/brake pedal micro switch spring from brake arm lever also. (Fig. 66).
- Remove two thread forming screws holding clutch/brake support plate to left inside of main frame along with one capscrew and flange nut on lip of left main frame. Remove support plate. (Fig. 66)

D. Remove snap ring and spacing washers on right outer end of clutch/brake pedal shaft. (Fig. 67)

E. Unbolt capscrew, washers and nut from brake arm lever and pry brake arm lever to the right on shaft. (Fig. 67)

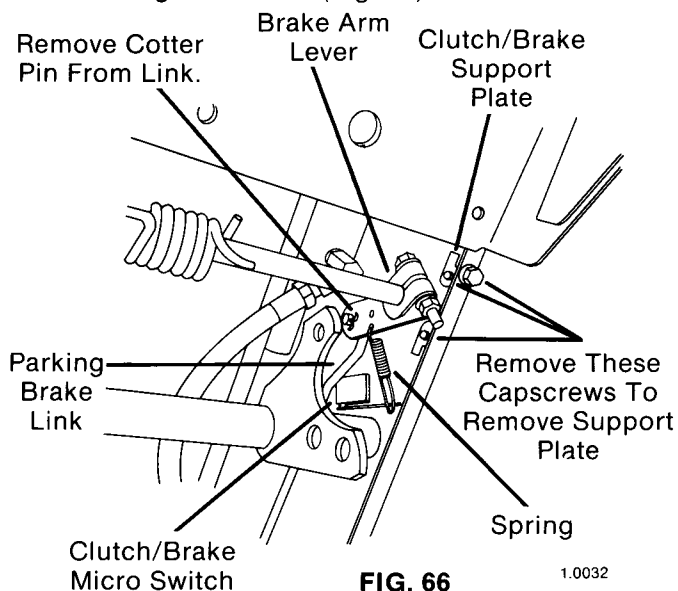


FIG. 66

1.0032

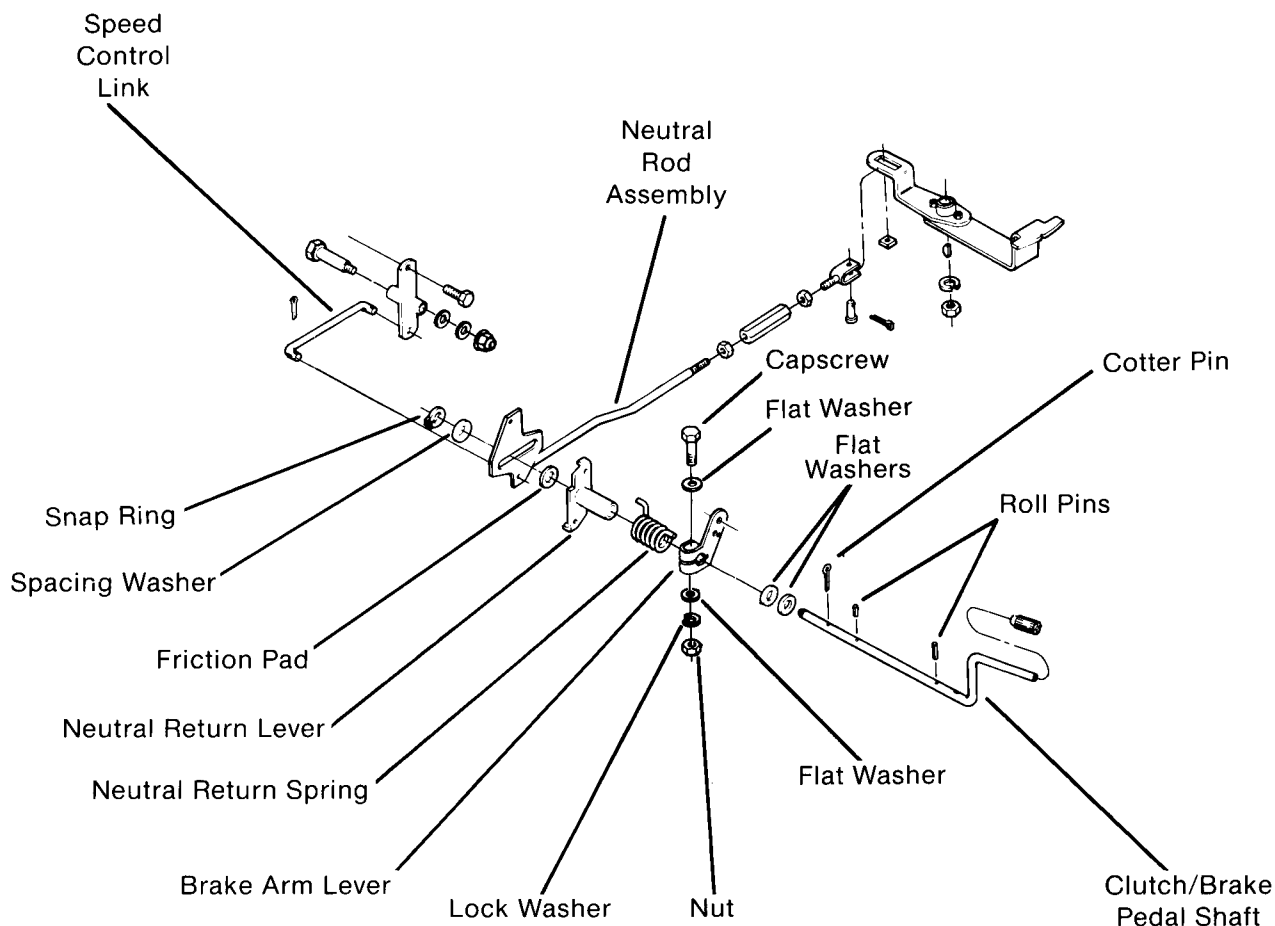


FIG. 67

1.0067

NOTE: When relocating brake arm lever onto clutch/brake pedal shaft, roll pin **must** fit into slot on brake arm lever. (Fig. 68) Note also that the offset of brake arm lever must be towards the rear of the tractor when properly installed on shaft (Fig. 68). Remove cotter pin from speed control link attached to the bottom hole in the neutral return assembly. (Fig. 67)

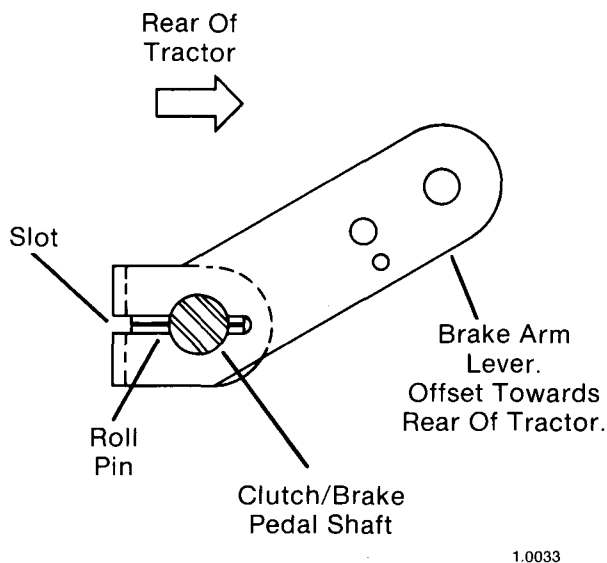


FIG. 68

- F. Push clutch/brake pedal shaft to the left and remove cotter pin thru right inside end of shaft. (Fig. 67)
- G. Punch out both roll pins thru clutch/brake pedal shaft. (Fig. 67)
- H. Shaft is now loose and can be removed out hole in left main frame. Service shaft as required.

NOTE: Position and location of all parts on shaft. Reference (Fig. 67) for proper location of parts during reassembly.

- I. Reverse above procedures to reassemble clutch/brake pedal shaft into tractor.

## CLUTCH/BRAKE — FORWARD/REVERSE PEDAL SHAFT REMOVAL:

(Models 09GN 2205 & 2206 only)

**WARNING:** To avoid accidental starting, remove spark plug wire (s) and secure away from spark plug (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. On left end of shaft remove a snap ring and flat washer (Fig. 68A)
- C. Remove two thread forming screws holding support plate to left inside of main frame. Remove support plate (Fig. 68A).

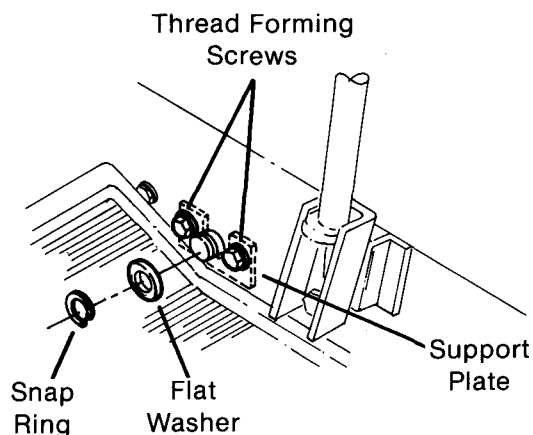


FIG. 68A

- D. Remove snap ring and spacing washers on right outer end of shaft (Fig. 68B)
- E. Remove cotter pin and flat washer from speed control link and speed control rod under the reverse foot pedal (Fig. 68B). Slide forward/reverse control pedal assembly off of shaft.

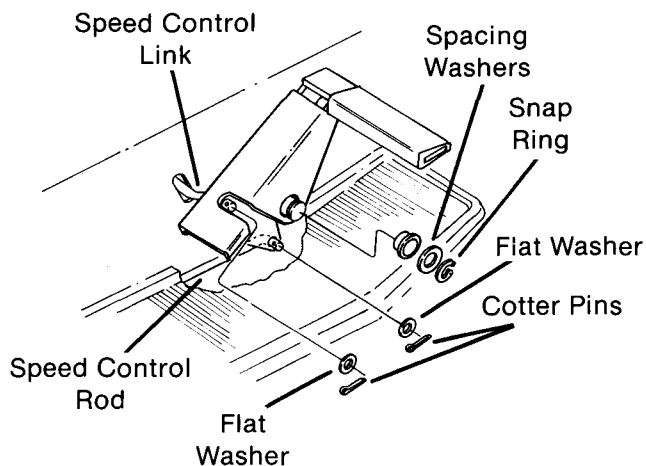


FIG. 68B

F. Loosen (do not remove) locknut on both the brake arm lever and speed control release lever (Fig. 68C)

G. Pull shaft to the right while sliding both the brake arm lever and speed control release lever on the shaft until both hypro keys are exposed (Fig. 68C). Remove both hypro keys from shaft.

H. Continue pulling shaft to the right until both levers are detached from shaft. Pull shaft out hole in right side of main frame. Service shaft as required.

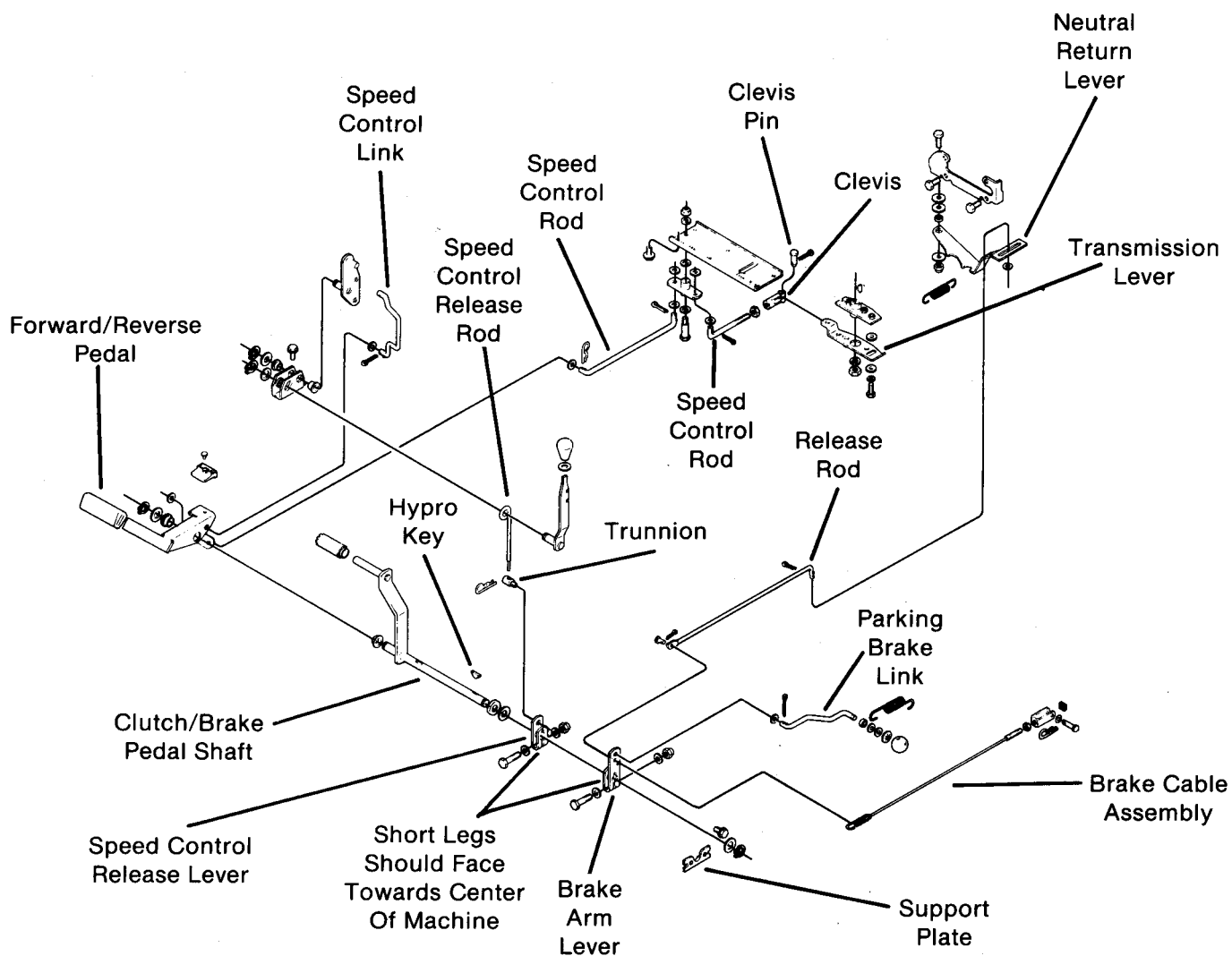


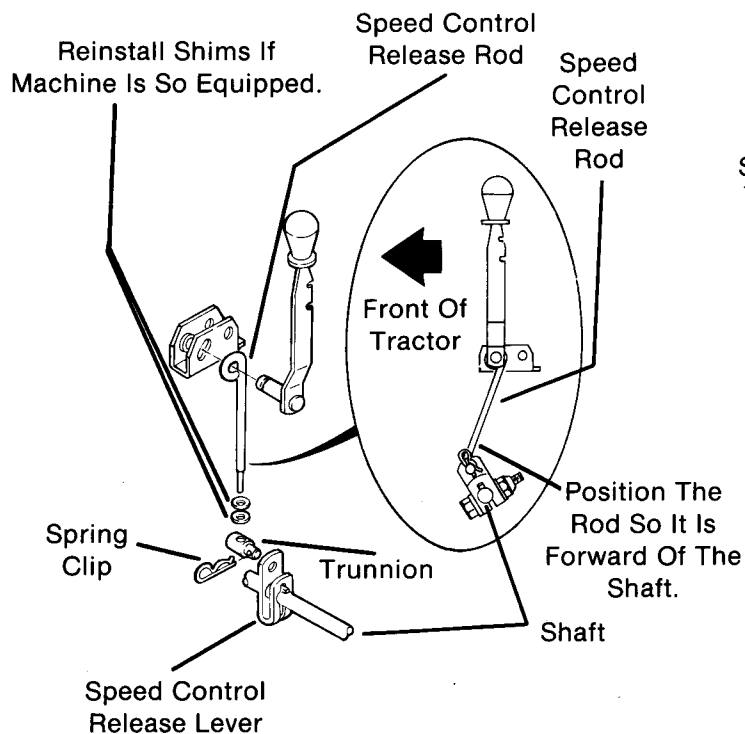
FIG. 68C

1.0074

- I. Reverse above procedures to reassemble shaft into tractor.

NOTE: During reassembly of shaft, the speed control release rod should be positioned forward of the shaft (Fig. 68D). Also, if machine is so equipped; replace shim washers onto end of speed control release rod before inserting into hole in trunnion.

NOTE: The short leg of both the brake arm lever and speed control release lever should be positioned so they are toward the center of the machine, once mounted onto the shaft. (Fig. 68C)

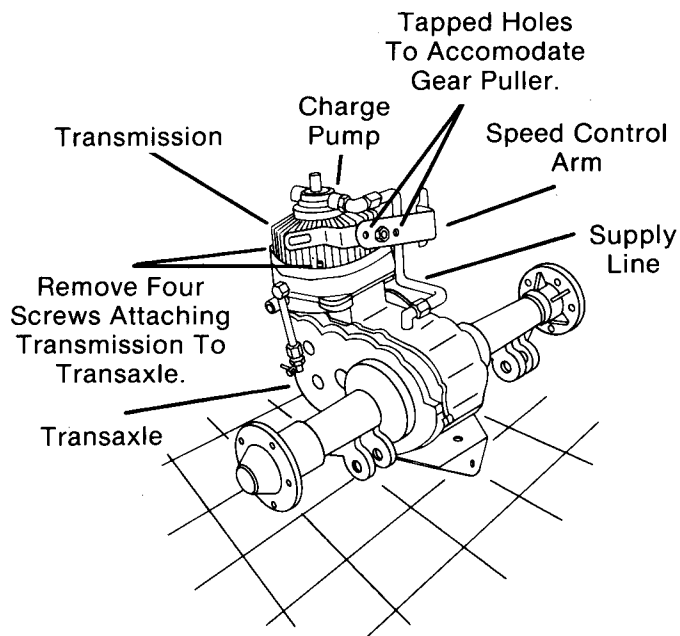


**FIG. 68D**

## HYDROSTATIC TRANSMISSION:

### 1. Removal and Replacement —

- A. Remove transaxle from tractor by following procedures under "HYDROSTATIC TRANSDAXLE REMOVAL".
- B. Rotate transaxle until transmission faces up off transaxle. (Fig. 69)



**FIG. 69**

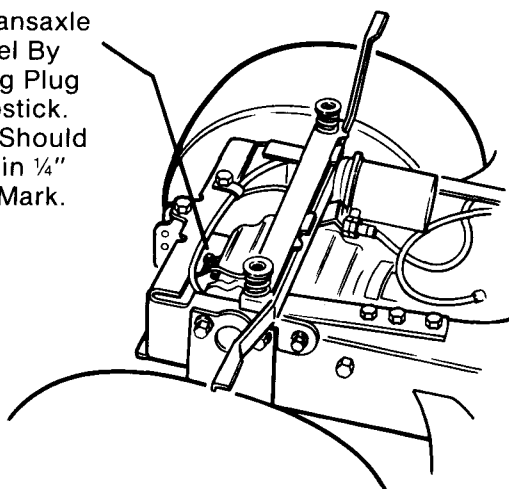
- C. Disconnect supply (inlet) line (steel tubing) at charge pump and at transaxle. Remove tube assembly. (Fig. 69)
- D. Remove four capscrews and lockwashers holding transmission to transaxle and carefully remove transmission. (Fig. 69)

**IMPORTANT:** If only servicing hydrostatic transmission, cover opening in transaxle with a clean shop rag. This will keep any dirt from falling into transaxle and contaminating the oil.



- E. If speed control arm is to be removed to service transmission, speed control arm is drilled and tapped to accommodate a gear puller. (Fig. 69) **DO NOT** hammer on transmission control shaft to remove speed control arm as damage to internal transmission components may occur and also VOID the warranty.

Check Transaxle Oil Level By Removing Plug And Dipstick. Oil Level Should Be Within  $\frac{1}{4}$ " Of Full Mark.



TR1023

FIG. 70

- F. Service hydrostatic transmission as required following transmission manufacturer's procedures and specifications found at the end of this section for LGT's.
- G. After servicing transmission, reverse above procedures to install. Pay special attention to "NOTES" below:

NOTE: After transmission and transaxle have been completely remounted on to the tractor, recheck oil level in transaxle. With engine OFF, lift up seat support and clean area around "plug and dipstick". Unscrew plug

and dipstick and check oil level. (Fig. 70) Oil should be within  $\frac{1}{4}$ " of full mark. If oil is low, add **only** SAE #20 wt. detergent motor oil to bring fluid up to correct level.

NOTE: When reassembling transmission to transaxle, use a **new** gasket and change the lift system oil filter.

NOTE: When transmission is filled with new oil after rebuilding, there may be the possibility that air may get trapped inside the transmission. The transmission can be purged of air by running tractor for a few minutes in gear. Stop tractor, turn engine OFF and check oil level again. Add additional oil if necessary.

IMPORTANT: Low or inadequate oil level can result in permanent damage to hydrostatic system.

NOTE: Readjust **neutral** by following procedures under "HYDRO DRIVE LEVER ADJUSTMENT".

## 2. Hydrostatic Drive Lever Adjustment — Dash Mounted

(Models 09GN 2202 & 2204 only)

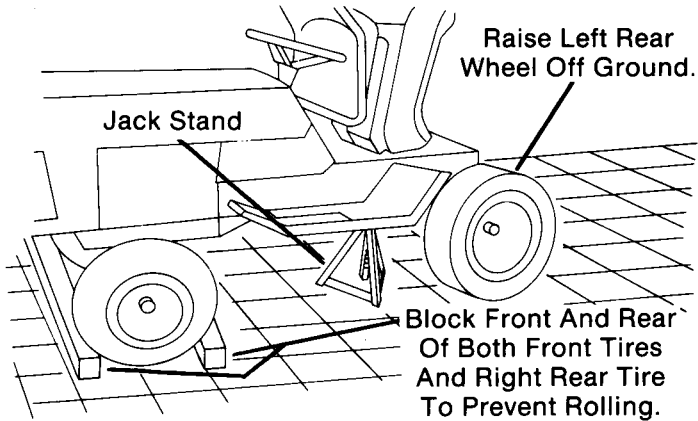
Check as follows: Drive tractor FORWARD with throttle control set in FULL FAST position. Depress clutch/brake pedal all the way down, then release pedal. Repeat with tractor moving in REVERSE.

If tractor has a noticeable creep in either FORWARD or REVERSE, after clutch/brake pedal is released, adjust as follows:



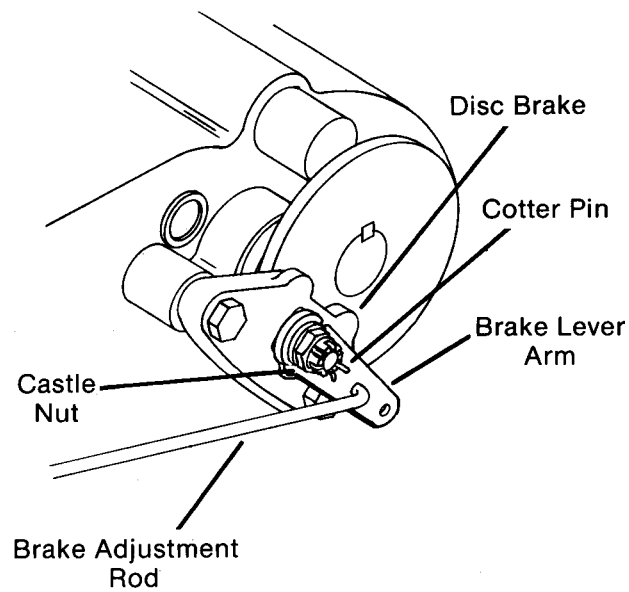
**WARNING:** The following procedure requires the engine to be running to make the proper adjustments. **EXTREME** caution should be taken to keep hands and feet away from all moving parts. **DO NOT** wear loose fitting clothing. **DO NOT** start or run engine indoors. Use safety glasses when performing this adjustment. Use jack stands and blocks as outlined in following procedures. Be sure all tools are removed from tractor before starting.

- A. Before this procedure is performed, the attachment should be removed from this tractor as outlined in "ATTACHMENT" section of this service manual.
- B. Move tractor to a level surface outdoors.
- C. Point front wheels straight ahead. Block both sides of each front wheel and right rear wheel, to prevent rolling. (Fig. 71)

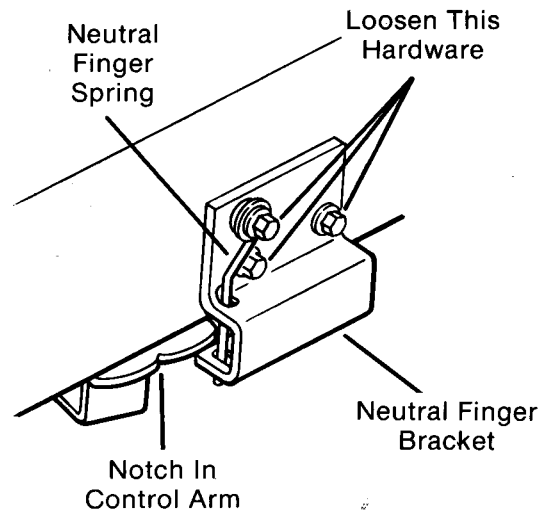


**FIG. 71**

- D. With clutch/brake foot pedal released, remove cotter pin from adjustment rod at disc brake lever arm. Remove adjustment rod from brake lever arm. (Fig. 72)
- E. Raise and block left rear wheel off ground just far enough to let wheel turn freely. (Fig. 71)
- F. Loosen (do not remove) hardware holding neutral finger spring and neutral finger bracket on left side of tractor main frame. (Fig. 73)



**FIG. 72**



**FIG. 73**

- G. Place drive lever in any forward drive gear and depress clutch/brake pedal fully and set parking brake latch. (Doing this will set drive lever in its normal NEUTRAL position. (Fig. 74) DO NOT move this lever for the remainder of the procedures.
- H. Loosen jam nuts on both ends of turnbuckle (Fig. 74) NOTE: Turnbuckle is located under right side of frame just ahead of rear wheel.
- I. Check that HI/LOW speed range selector is **not** in neutral (N) position. Move P.T.O. switch to OFF position and **start the engine**. **Be sure** parking brake latch is set.
- J. Turn turnbuckle slowly (clockwise or counterclockwise) until left rear wheel stops turning. IMPORTANT: Be sure drive lever has not moved and is still in the normal NEUTRAL position on instrument panel. (Fig. 74)
- K. Retighten jam nuts against turnbuckle. IMPORTANT: DO NOT ALLOW TURNBUCKLE TO TURN WHILE TIGHTENING JAM NUTS. **Turn engine "OFF"**.
- L. Slide neutral finger bracket forward or backward until neutral finger spring is centered in the control arm notch. (Fig. 73 & 75) Tighten bracket and spring capscrews in this position.
- M. Start engine. Check that left rear wheel does not turn, even at full engine speed. Lift seat support and tape seat switch in the depressed position (this will allow the engine to remain running when releasing the clutch/brake pedal). Release parking brake, move drive lever into a forward drive gear then fully depress and release clutch/brake foot pedal. Left rear wheel must stop completely. If it is necessary to readjust, **stop engine**, then repeat steps "F" thru "M".
- N. When adjustment is correct - STOP ENGINE, then reconnect brake adjustment rod and unblock tractor. Lift seat support and **remove tape from seat switch**.

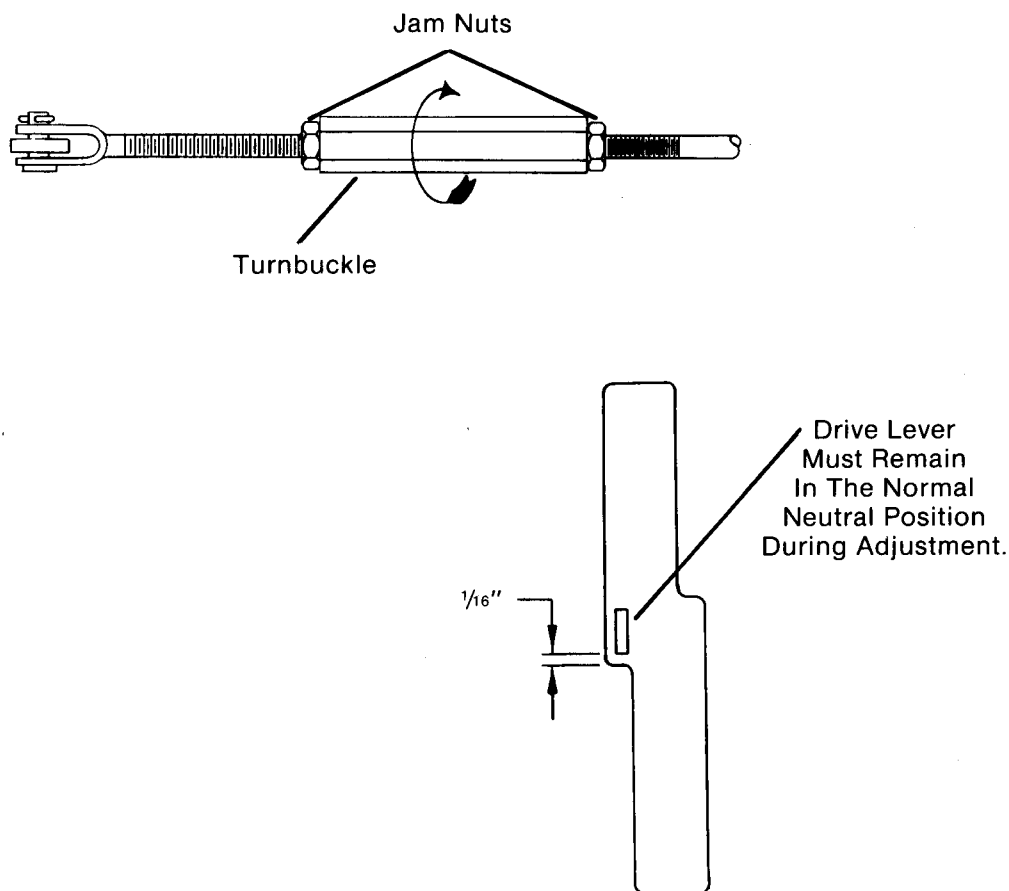


FIG. 74

1.0069

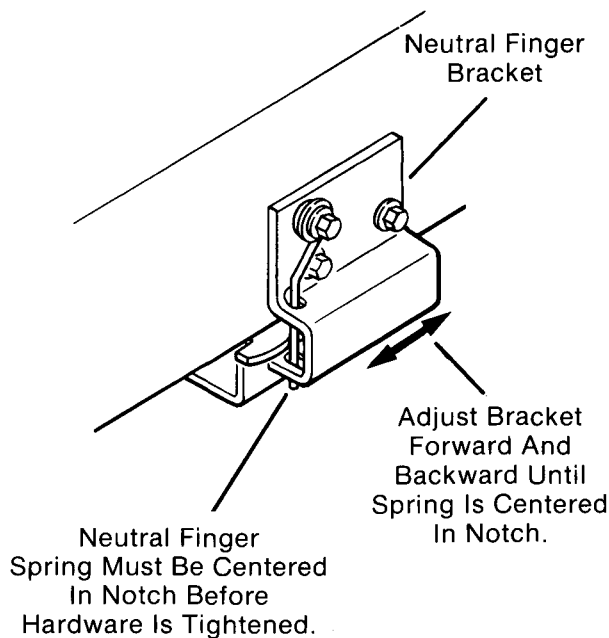


FIG. 75

1.0070

### 3. Hydrostatic Drive Lever Adjustment — Foot Pedal Type

(Models 09GN-2205 & 2206 only)

Check as follows: Drive tractor FORWARD with the throttle control set in FULL FAST position. Depress clutch/brake pedal all the way down, then release pedal. Repeat with tractor moving in REVERSE.

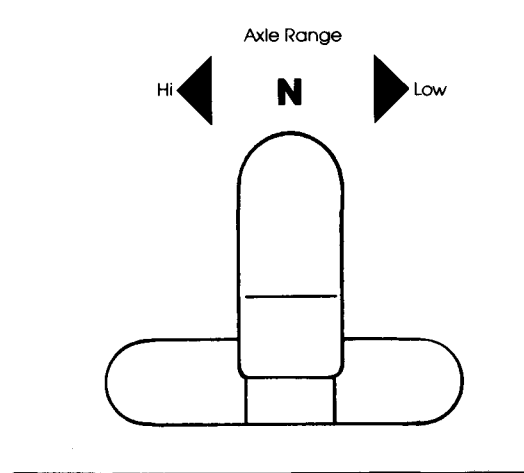
If tractor has a noticeable creep in either FORWARD or REVERSE, after clutch/brake pedal is released, adjust as follows:

**WARNING:** The following procedure requires the engine to be running to make the proper adjustments. To avoid personal injury, **EXTREME** caution should be taken to keep hands and feet away from all moving parts. **DO NOT** wear loose fitting clothing. **DO NOT** start or run engine indoors. Use safety glasses when performing this adjustment. Use jack stands and blocks as outlined in following procedures. Be sure all tools are removed from tractor before starting.

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

B. Move tractor to a level surface outdoors.

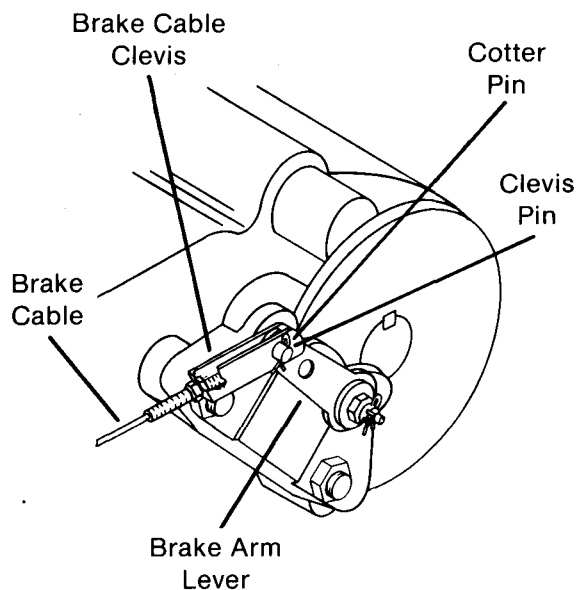
- C. Point front wheels straight ahead. Block both sides of each front wheel and right rear wheel, to prevent rolling (Fig. 71).
- D. Raise and block left rear wheel off the ground just far enough to let wheel turn freely.
- E. Make certain that axle range control lever is in the "HI" position (Fig. 75A).



TR1028

FIG. 75A

- F. With clutch/brake foot pedal released, disconnect brake cable clevis at brake lever arm (Fig. 75B). Retain clevis pin and cotter pin for reassembly.



TR1033

FIG. 75B

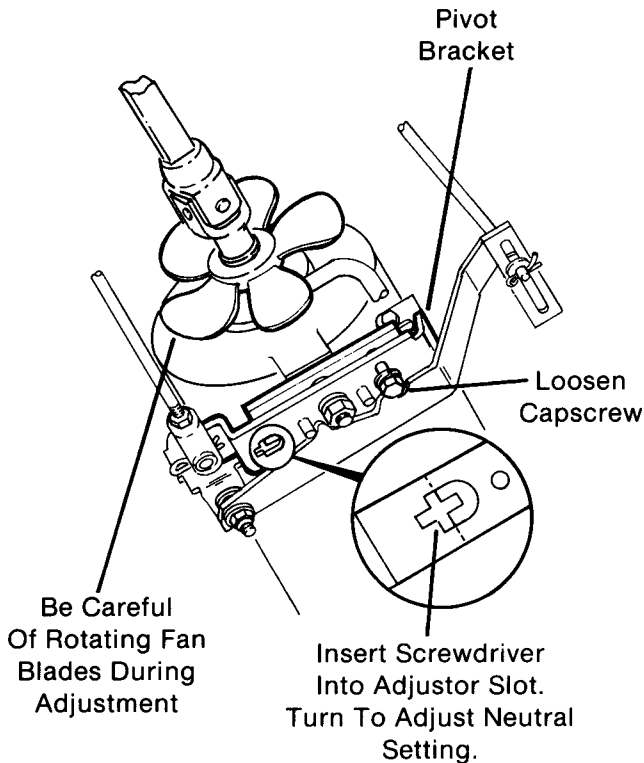
- G. Depress clutch/brake pedal fully and set parking brake latch.
- H. Working at the right rear underside of tractor, loosen, but do not remove capscrew on pivot bracket (Fig. 75C).

- L. Tighten capscrew on pivot bracket to secure correct adjustment (Fig. 75C).



**WARNING: To avoid personal injury, never attempt to tighten this capscrew with engine running.**

- M. Restart engine. Check that left rear wheel does not turn, even at full engine speed. Depress forward drive pedal fully; then release pedal. Left rear wheel must come to a complete stop. Repeat procedure by depressing the reverse drive pedal; wheel should again come to a complete stop. If it is necessary to readjust, **stop engine**, then repeat steps "F" thru "M".
- N. When adjustment is complete, **turn off engine**.
- O. Depress clutch/brake pedal to release parking brake.
- P. Reattach brake cable clevis to brake lever arm (Fig. 75B).
- Q. Unblock tractor and lower tractor to the ground.



**FIG. 75C**

1.0078

- I. Be sure the P.T.O. switch is in the OFF position and **start the engine**. Be sure parking brake latch is set or engine will not start.



**WARNING: To avoid personal injury, exercise EXTREME caution to keep hands and feet away from moving parts. (Fan blades).**

- J. Insert a wide blade screwdriver into adjustor notch of pivot brackets (Fig. 75C). Observe the rotation of the left rear wheel. If wheel rotates forward; turn screwdriver slowly clockwise until wheel is stationary. If wheel rotation is backward; turn screwdriver counter-clockwise until wheel stops rotating.
- K. **Turn engine "OFF"!**

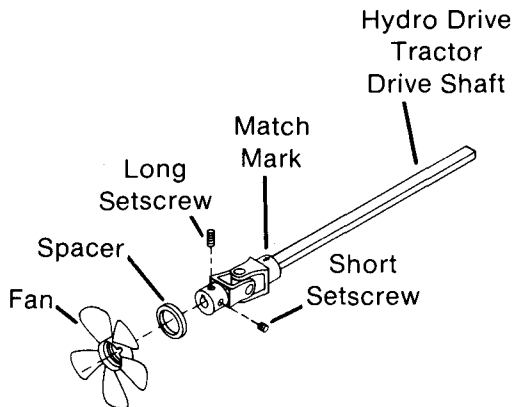
## HYDROSTATIC TRANSAXLE:

### 1. Removal —



**WARNING:** To avoid accidental starting, remove spark plug wires(s) and secure away from spark plug(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. Remove one long setscrew thru notch in fan hub on rear of drive shaft. Rotate fan to expose second short setscrew, loosen setscrew. (Fig. 76)



1.0006

**FIG. 76**

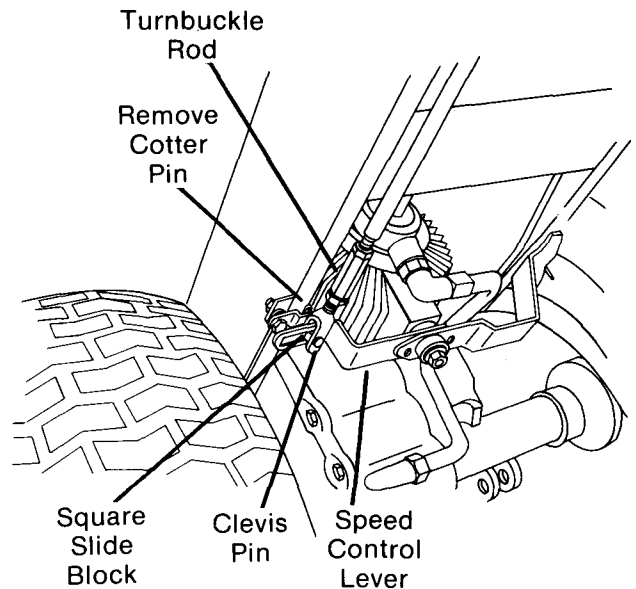
Push or pry drive shaft forward until rear universal joint comes off of gear box or transmission shaft.

- C. 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. 76)

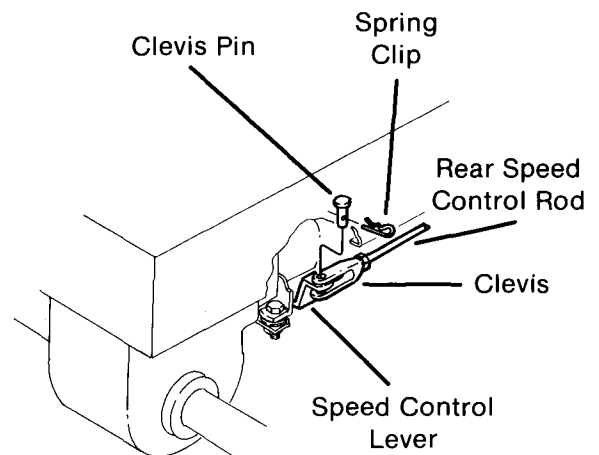
- D. Pull drive shaft out of front universal joint and remove drive shaft.
- E. Following procedures apply to Models 09GN-2202 and 2204 only.
  - a. Remove cotter pin thru clevis pin, where turnbuckle rod attaches to speed control lever. Remove clevis pin. Remove square slide block from rectangular slotted hole in speed control lever. (Fig. 77)



1.0036

**FIG. 77**

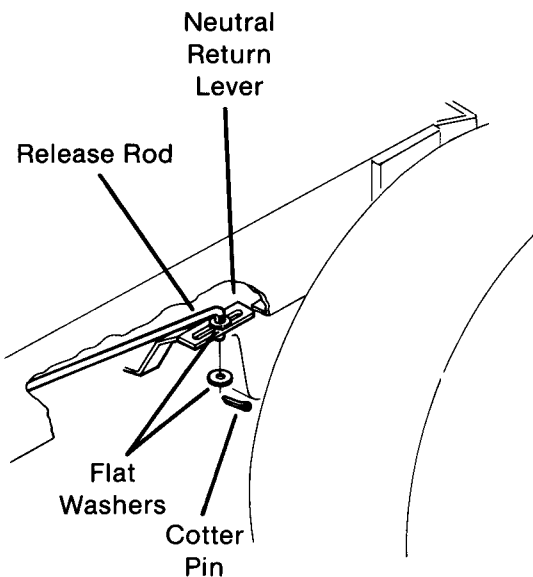
- b. With clutch/brake pedal released, remove cotter pin from adjustment rod at disc brake lever arm. (Fig. 72) Remove adjustment rod from brake lever arm. Loosen jam nut at other end of adjustment rod and screw rod out of clevis at that end. Remove adjustment rod completely.
- F. Following procedures apply to Models 09GN-2205 and 2206 only.
- a. With clutch/brake foot pedal released, disconnect brake cable clevis at brake lever arm (Fig. 75B). Retain clevis pin and cotter pin for reassembly.
  - b. Detach clevis on end of rear speed control rod from speed control lever at transmission (Fig. 77A) by removing spring clip and clevis pin.



1.0080

**FIG. 77A**

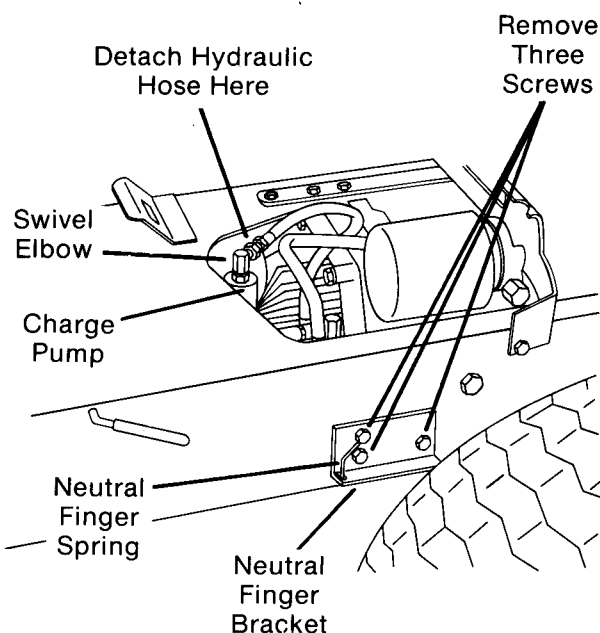
- c. Remove cotter pin and flat washer from release rod at neutral return lever (Fig. 77B). Left rod out of slot in lever and remove other flat washer.



**FIG. 77B**

1.0081

- G. Jack rear of tractor up and remove five lug bolts on both rear wheel assemblies and remove rear wheels. Carefully lower the tractor until transaxle rests on the floor.
- H. Raise seat pan assembly and disconnect seat restraint cable. Secure seat pan assembly in upright position.
- I. Detach hydraulic hose, between charge pump and lift valve, at swivel elbow attached to top of charge pump. (Fig. 78)



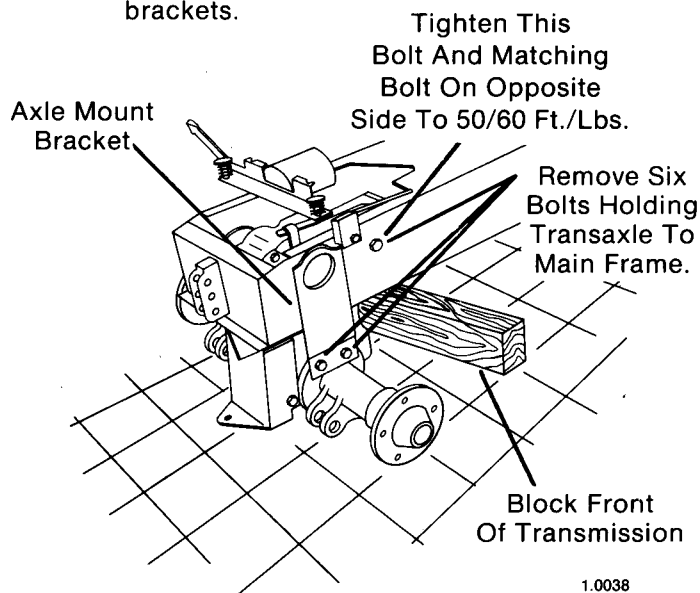
**FIG. 78**

1.0037

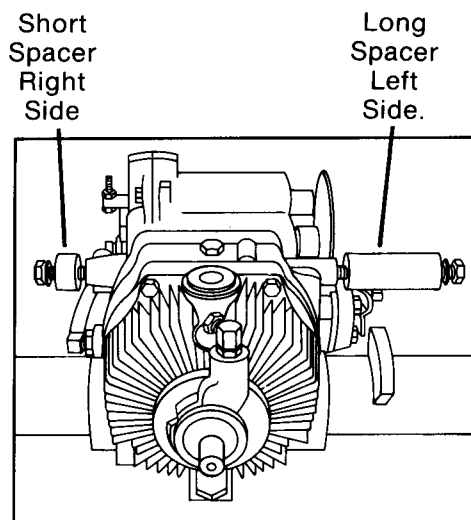
- J. Remove capscrew, nut and lockwasher thru hose clamp attached under rear lip of main frame.
- K. (Following procedure applies to Models 09GN 2202 & 2204 only). Remove three thread forming screws attaching neutral finger spring and neutral finger spring bracket to left side of main frame. (Fig. 78) "L" shaped mounting bracket will fall out at this time.
- L. Block or support front of transmission and remove the six bolts holding transaxle to main frame. (Fig. 79)

Two bolts thru main frame into transaxle housing. NOTE: These two bolts pass thru two spacers that center transaxle between main frame. When reassembling, short spacer is mounted on right side of transaxle and long spacer on left side.

The other four bolts attach axle to axle mount brackets.



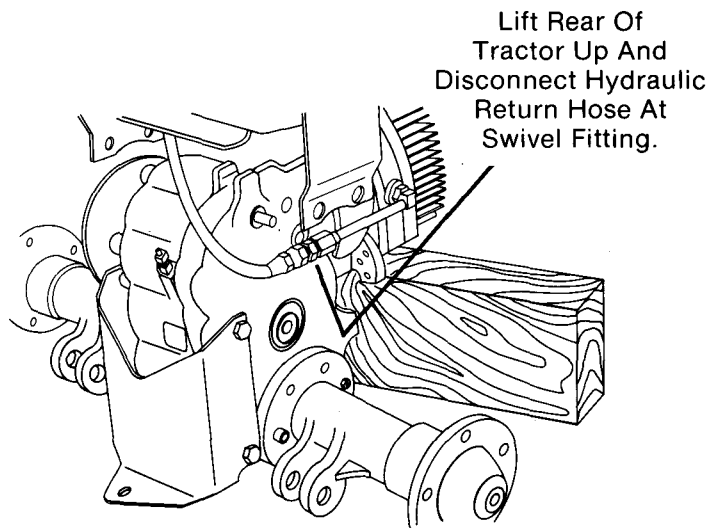
1.0038



**FIG. 79**

1.0039

- M. Carefully lift rear of tractor main frame up just far enough to disconnect hydraulic return hose, from filter at swivel fitting on right side of transaxle. (Fig. 80) NOTE: Some oil may drain out filter. Raise hydraulic hose above filter level to stop draining.
- N. Lift rear of tractor up completely and over transaxle. Lower tractor to the floor.



1.0040

FIG. 80

- O. Service transaxle per manufacturer's specifications (reference literature included for Peerless at the end of this service manual).

NOTE: Refer to HYDROSTATIC TRANSMISSION — REMOVAL AND REPLACEMENT if transmission must be removed to service the transaxle.

## 2. Replacement —

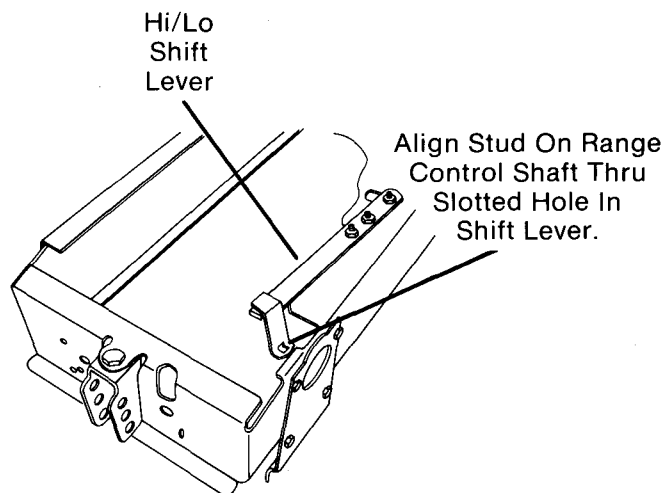
- A. Reconnect hydraulic return hose at swivel fitting. (Fig. 80)
- B. Lower rear of tractor main frame over transaxle assembly.
- C. Align axle mount brackets with holes in axle mounting tabs. Install axle mounting bolts and secure those bolts lightly. (Fig. 79) DO NOT tighten at this time.
- D. Raise rear of tractor up and support transmission housing on a jack stand. Lower transmission onto jack stand and align holes in transaxle housing with holes in right and left side of main frame so spacers can be installed easily.

- E. Install long left spacer first, then install capscrew and lockwasher thru spacer and into transaxle housing. Tighten capscrew.

NOTE: This will pull transaxle to the left slightly and make installation to right spacer easier.

- F. Inserting short right spacer from top rear of tractor. Position short spacer near transaxle mounting hole and pry between transaxle and main frame moving transaxle to the left until short spacer can be slipped into place. Install capscrew and lockwasher and tighten capscrew.
- G. Reverse remaining procedures above, starting with step "L", to complete reassembly. Pay special attention to NOTES below:

NOTE: While lowering tractor main frame over transaxle, align stud thru HI/LO range control shaft on right side of transaxle housing into slotted hole at rear of HI/LO shift lever assembly. (Fig. 81)



1.0041

FIG. 81

NOTE: After transaxle has been completely remounted, readjust **neutral** by following procedure under "HYDRO DRIVE LEVER ADJUSTMENT".

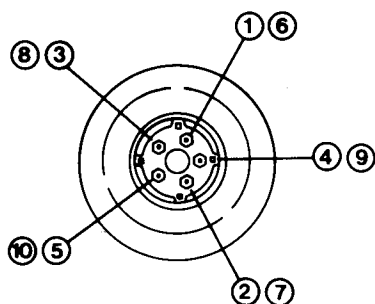
NOTE: After transaxle has been completely remounted, recheck oil level in transaxle. With engine OFF, lift up seat support and clean area around "plug and dipstick". Unscrew plug and dipstick and check oil level. Oil should be within 1/4" of full mark. If oil is low, add only SAE#20 wt. detergent motor oil to bring fluid up to correct level.



**IMPORTANT:** Low or inadequate oil level can result in permanent damage to hydrostatic system.

**NOTE:** When transaxle has been filled with new oil after rebuilding there may be the possibility that air may get trapped in the hydraulic system. The system can be purged of air by running tractor for a few minutes in gear. Stop tractor, turn engine OFF and check oil level again. Add additional oil if necessary.

**NOTE:** When reassembling rear wheel onto wheel hubs, follow tightening sequence shown in (Fig. 82) to tighten lug studs. Repeat sequence until all lug studs are secured tightly.



**REAR WHEEL LUGS  
TIGHTENING SEQUENCE**

**FIG. 82**

1.0030

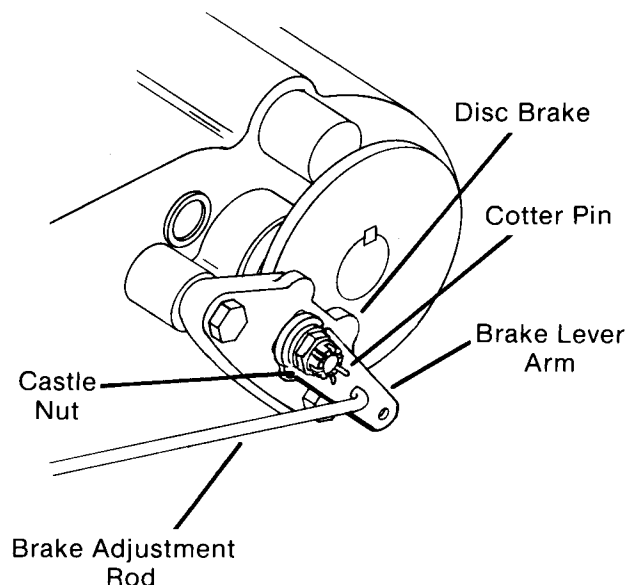
### 3. Traction Drive Brake Adjustment —



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

- A. Remove cotter pin from castle nut at disc brake (Fig. 83)
- B. Turn castle nut clockwise to tighten brake and counterclockwise to loosen brake.

**IMPORTANT:** Brake should be adjusted so that when clutch/brake pedal is depressed, speed control lever must return to neutral before brake is engaged. This can be a very fine adjustment and sometimes hard to distinguish. Follow procedures below very carefully.



1.0068

**FIG. 83**

- a. Move speed control lever into the fastest forward drive gear.
- b. Depress clutch/brake pedal **slowly** while rolling tractor forward. Speed control lever **must** reach neutral (N) position before brake is engaged.
- c. If brake engages before speed control lever reaches neutral position, loosen castle nut  $\frac{1}{4}$  turn counterclockwise at a time. (Fig. 83) Recheck speed control lever neutral position described in step "b".
- d. Repeat steps "b" and "c" until proper adjustment is achieved.
- C. Replace cotter pin into castle nut. **NOTE:** To replace cotter pin, turn nut until groove in nut lines up with hole.

**NOTE:** If brake still does not perform properly, follow procedures below for "BRAKE PAD REPLACEMENT".

### 3a. Traction Drive Brake Cable Adjustment —

(Models 09GN-2205 & 2206 only).

The brake cable must not be under tension until the clutch/brake pedal is actuated. When the pedal is fully released (up position), the cable should be almost straight with just a slight amount of slack or “sag” at its midpoint.

To provide either more or less cable slack, proceed as follows:

- A. Raise seat pan assembly and disconnect seat restraint cable. Secure seat pan in upright position.
- B. With clutch/brake foot pedal released, disconnect brake cable clevis at brake lever arm (Fig. 75B). Retain clevis pin and cotter pin for reassembly.
- C. Back the cable locknut away from the clevis (Fig. 75B).
- D. Pull the clevis tight against the square nut, and turn the clevis clockwise to take up cable slack. Turn clevis counterclockwise to slacken cable.
- E. Reattach clevis to brake lever arm and recheck cable slack or sag.
- F. Secure cable adjustment by tightening cable locknut against cable clevis (Fig. 75B).
- G. Reconnect seat restraint cable.

### 4. Brake Pad Replacement —

Replace **both** brake pads when the brake can no longer be adjusted to hold the tractor or when the thickness of either pad is less than the thickness of the ignition key. Follow procedures below for brake pad replacement.



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

- A. Remove two capscrews securing disc brake to transaxle. (Fig. 84) Disc brake will pivot on brake adjustment rod.

NOTE: Location and position of flat spacer on inside of disc brake for reassembly. (Fig. 84)

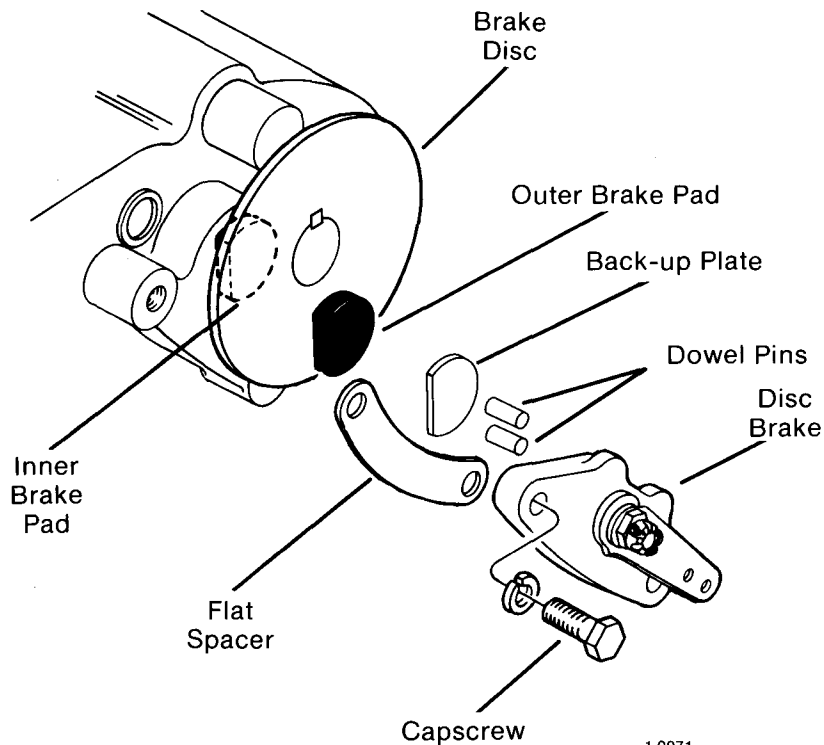
- B. Remove worn outer brake pad from disc brake.

NOTE: Back-up plate may fall out at this time. Replace back-up plate before new brake pad is installed. (Fig. 84)

- C. Pull brake disc off of transaxle output shaft, inner brake pad can now be removed.

- D. Replace both inner and outer brake pads with new parts and reassemble by reversing above procedures.

NOTE: It may be necessary to readjust brake engagement. Refer to procedures under “TRACTION DRIVE BRAKE ADJUSTMENT”.



1.0071

FIG. 84

## 5. HI/LO Speed Range Selector Adjustment —

Speed range selector is a hand operated control used to select a high or low operating speed range for the rear axle. When set to the neutral (N) position, this allows the tractor to be towed or moved manually (free wheeled) without starting the engine.

To operate: Shift speed range selector when engine is not running or depress the clutch/brake pedal fully to stop tractor then shift range selector to desired setting. **NEVER SHIFT IN MOTION!** It may be necessary to release the clutch/brake pedal to complete the shifting.

If speed range selector is difficult to shift:

- A. Lift seat pan assembly check condition of speed range selector pivot bushing. Remove nut, lockwasher and capscrew to remove pivot bushing. Replace bushing if worn. See (Fig. 85)
- B. If speed range selector is still difficult to shift, adjust transaxle shift rod per manufacturer's specifications and/or contact transaxle manufacturer's service personnel for further troubleshooting.

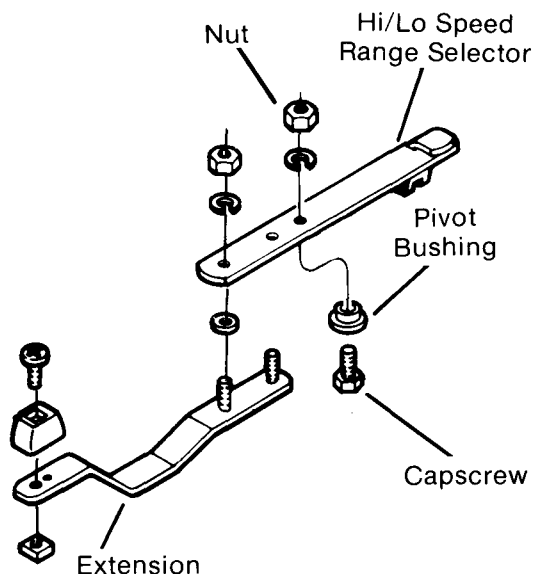
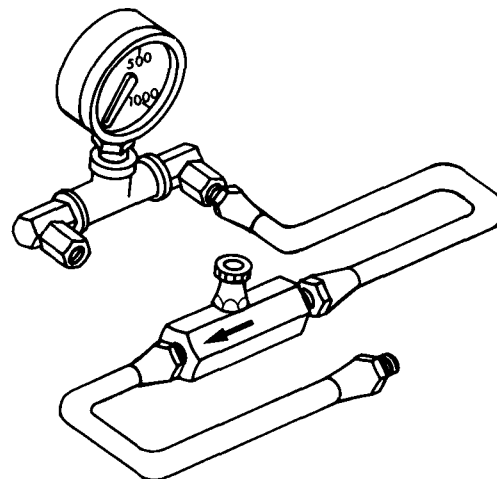


FIG. 85

1.0060



1.0042

HYDRAULIC TEST KIT  
(#G.B. 28386)

FIG. 86



**WARNING:** The following procedures require the engine to be running to perform TEST #1, TEST #2 and TEST #3. **EXTREME** caution should be taken to keep hands and feet away from all moving parts. **DO NOT** wear loose fitting clothing. **DO NOT** start or run engine indoors. Use safety glasses when performing these tests. Be sure all tools are removed from tractor before starting.



**WARNING -** Escaping hydraulic fluid under pressure can penetrate the skin causing serious injury.

- **DO NOT** use your hand to check for leaks. Use a piece of cardboard or paper to search for leaks.
- Hydraulic fluid can cause permanent eye injury. Wear appropriate eye protection and stop engine and relieve pressure before connecting or disconnecting lines.
- **HOT HYDRAULIC FLUID CAN CAUSE SEVERE BURNS.** Wait for fluid to cool down before disconnecting lines.
- Tighten all connections before starting engine or pressurizing lines.

If anyone is injured by or if any hydraulic fluid is injected into the skin, obtain medical attention immediately or gangrene may result.

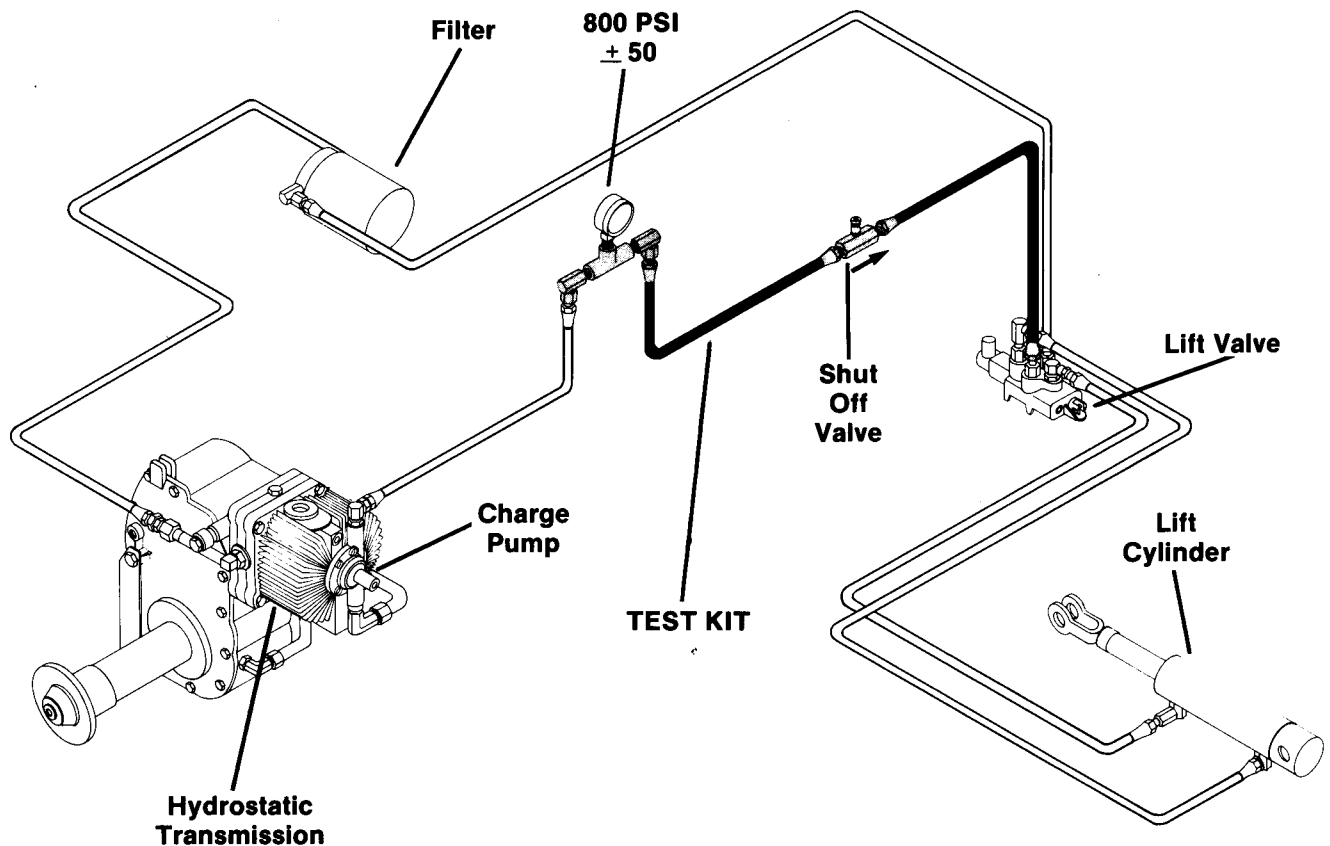
## LIFT SYSTEM TESTS:

If a problem exists in the hydraulic lift circuit, the following procedures should be used to pin point the location of the malfunction. Test kit #G.B. 28386 is required to properly perform the following tests (Fig. 86). Tests should be performed with HI/LO speed range selector in the neutral (N) position and parking brake set.

## TEST #1 —

The external lift or auxilliary circuit is charged by the external pump. This test is designed to determine if the charge pump is putting out, at least, the required amount of pressure to efficiently operate the lift. Connect the test kit between the hydrostatic transmission and tractor lift valve as shown in (Fig. 87). With test kit shut off valve in the open position, start and run engine at full RPM. Actuate lift lever back and forth several times to purge air from the system. Begin to close kit shut off valve. As the valve closes, the gauge reading should increase. Continue to close the shut off valve until the needle in the gauge

reaches 800 PSI. DO NOT CLOSE VALVE ANY FURTHER. The pump is capable of producing more than what is required, therefore, we are only interested in knowing that we have at least 800 PSI  $\pm$  50. If 800 PSI  $\pm$  50 is not attained, even by closing the shut off valve completely, the pump is bad and requires repair. Repair charge pump per transmission manufacturer's procedures and specifications found at the end of this section for LGT's. If 800 PSI  $\pm$  50 is attained, the pump is operating properly and you can go to TEST #2 and #3. Turn engine OFF, remove test kit and reconnect original hose.



**TEST #1**

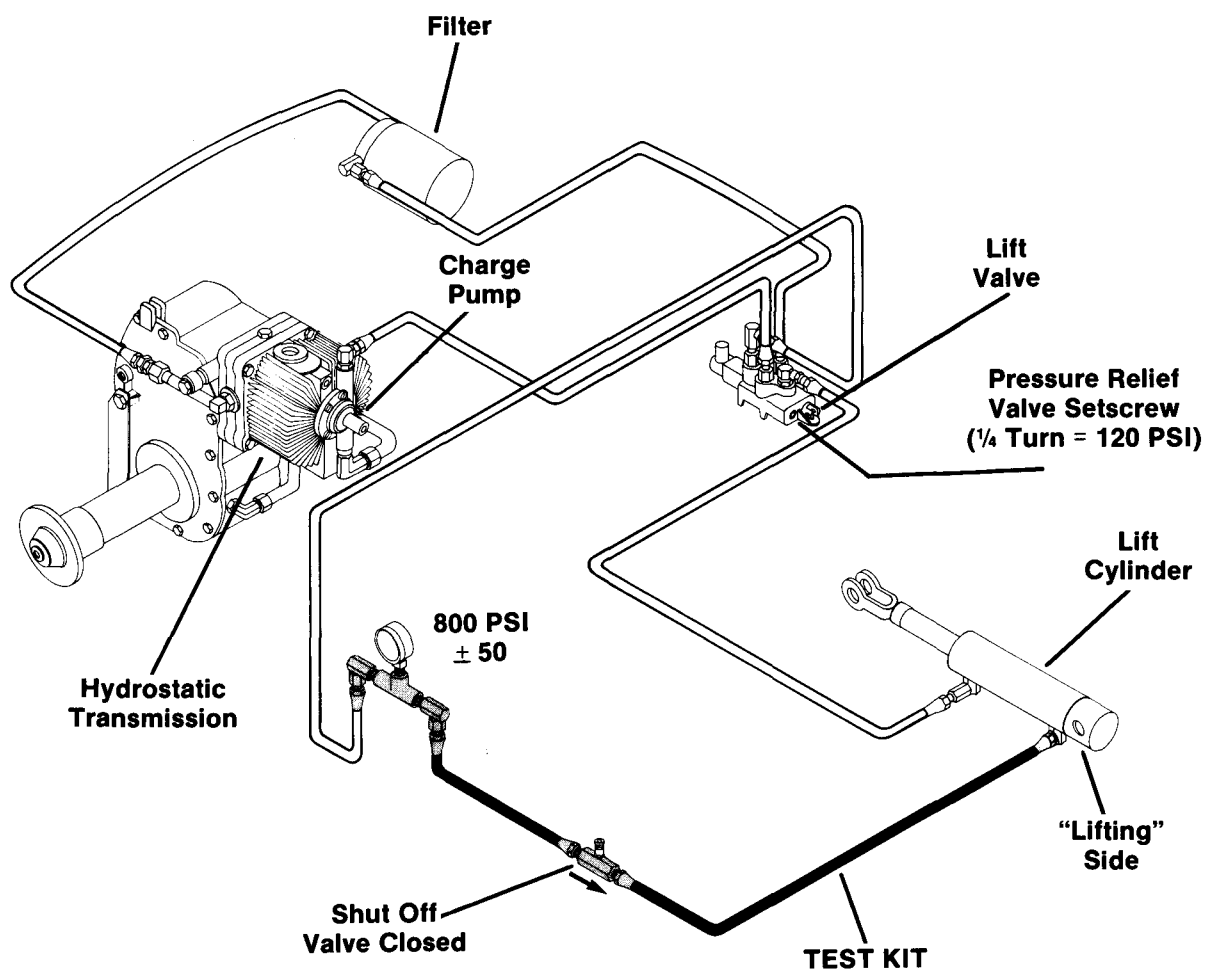
**FIG. 87**

## TEST #2 —

With engine in OFF position, install test kit between the valve and the "lifting" side of the lift cylinder as shown in (Fig. 88). Depress clutch/brake pedal, set parking brake and start engine. With test kit shut off valve open, move tractor lift lever back and forth several times to purge air from the system. With engine at full RPM, close shut off valve and hold lift lever in the UP position. Pressure gauge should read 800 PSI  $\pm$  50. If this

pressure is not attained, follow procedures below:

- A. Reset relief check ball in lift valve to 800 PSI by adjusting the pressure relief valve setscrew. ( $\frac{1}{4}$  turn equals approximately 120 PSI.) Reference (Fig. 88)
- B. If resetting the setscrew does not bring the pressure up to 800 PSI, there is an internal leak in the lift valve. Remove lift valve following procedures under "LIFT VALVE REMOVAL AND SERVICING" and service as required.



**TEST #2**

**FIG. 88**

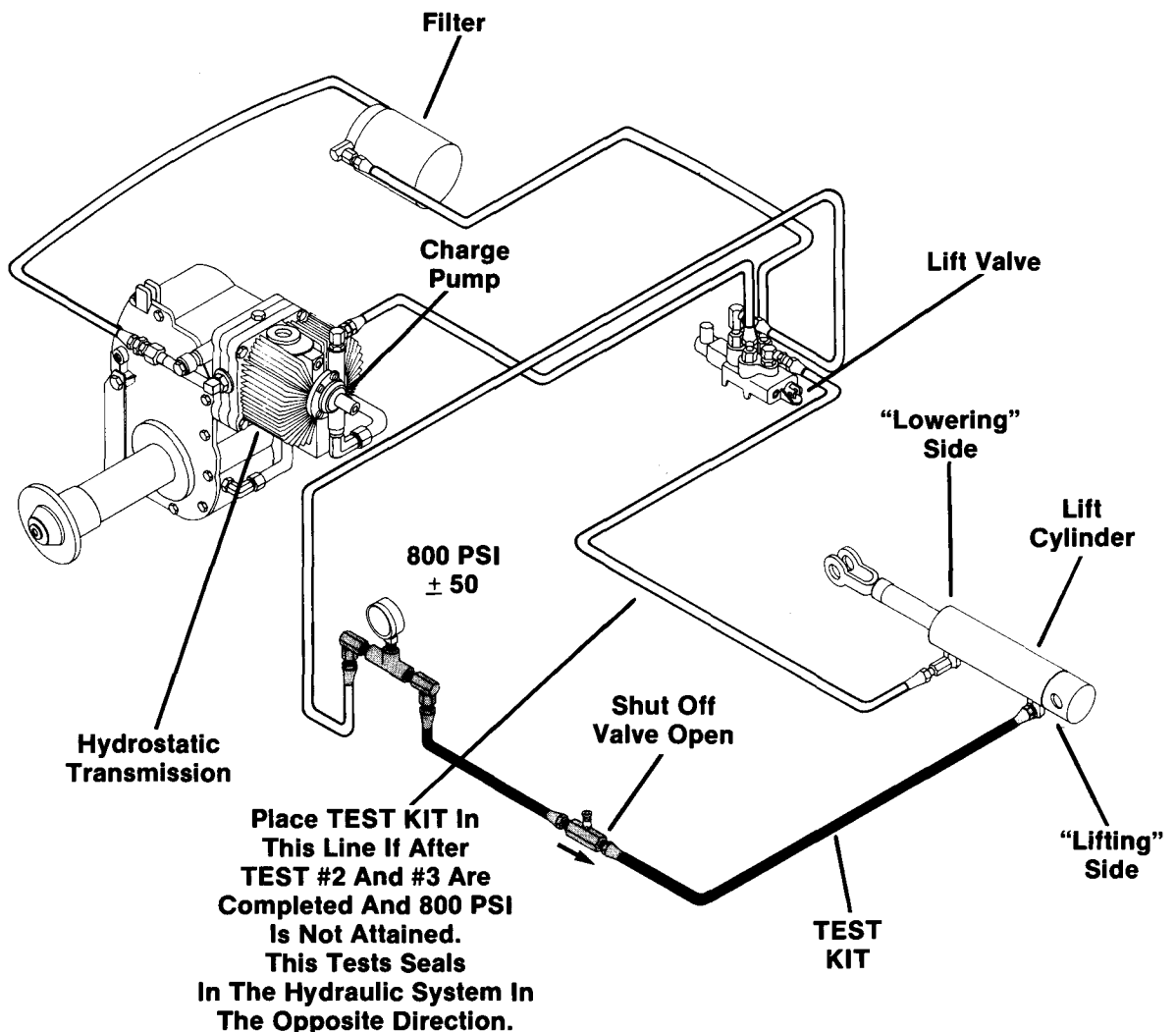
### TEST #3 —

After TEST #2 has been completed and the lift valve has been adjusted and/or proven to be operating properly, open the test kit shut off valve. Again hold the lift lever in the UP position (Fig. 89) The pressure gauge should read 800 PSI  $\pm$  50. If it does not, the O-rings in the cylinder are probably defective and should be replaced per procedures under "LIFT CYLINDER REMOVAL AND SERVICING".

If, after TEST #2 and TEST #3 are completed and problem still remains, connect the test kit between the valve and the "lowering" side of lift cylinder (Fig. 89) and repeat TEST #2 and #3. This

time hold the lift lever in the DOWN position. By doing this, the seals and O-rings can be rechecked in the opposite direction, in the hydraulic system.

If the problem of an attachment lowering itself exists but the hydraulic system checks out to be functioning properly per the above tests, the possibility of a very small leak in the cylinder may exist. Remove and service lift cylinder by following procedures under "LIFT CYLINDER REMOVAL AND SERVICING", and carefully inspect all component parts of cylinder. Repair or replace parts as necessary, however, it is not uncommon for a cylinder to "leak down" after tractor has not been used over a prolonged period.

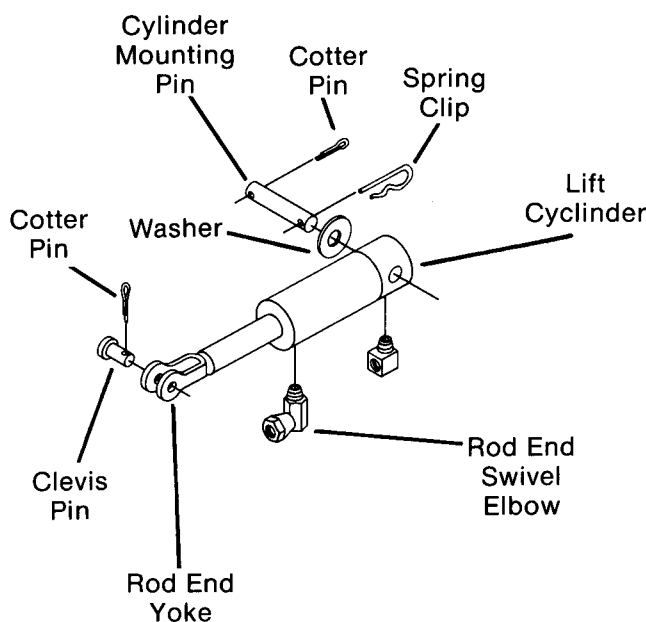


**TEST #3**

**FIG. 89**

## LIFT CYLINDER REMOVAL AND SERVICING:

- A. Turn ignition switch OFF and remove key.
- B. Before this procedure is performed, the attachment should be removed from this tractor as outlined in "ATTACHMENT" section of this service manual.
- C. Disconnect both hydraulic hoses at fittings at lift cylinder.
- D. Remove cotter pin thru yoke end clevis pin and remove clevis pin. (Fig. 90)

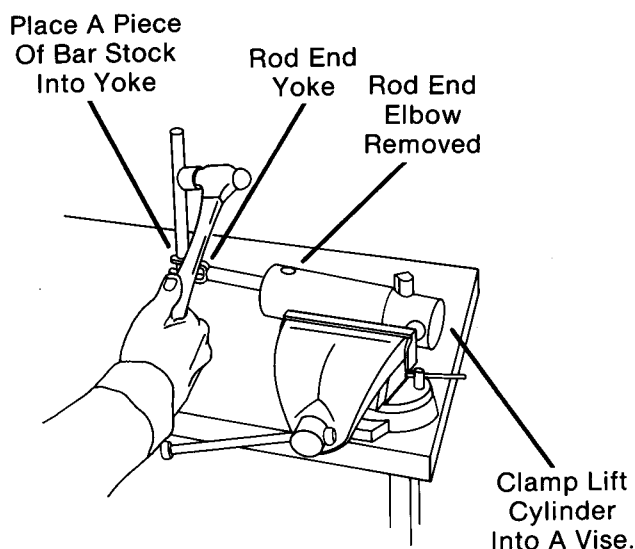


**FIG. 90**

- E. Remove spring clip at trunnion end of lift cylinder thru cylinder mounting pin. Push mounting pin to the left just far enough to remove cylinder.
- F. Lift cylinder is now loose and can be removed.
- G. Clean off lift cylinder prior to disassembly.
- H. Remove rod end elbow swivel fitting from cylinder, which secures rod guide in cylinder. (Fig. 90)

- I. Clamp cylinder in a vise and put a piece of bar stock into yoke on rod end. Drive rod, piston and rod end out of cylinder. (Fig. 91)

**IMPORTANT:** Be careful not to bend piston rod using this procedure.



**FIG. 91**

- J. Remove and replace **all** O-rings and back-up rings and clean all parts.

**NOTE:** It is good practice when servicing the lift cylinder that **all** seals are replaced.

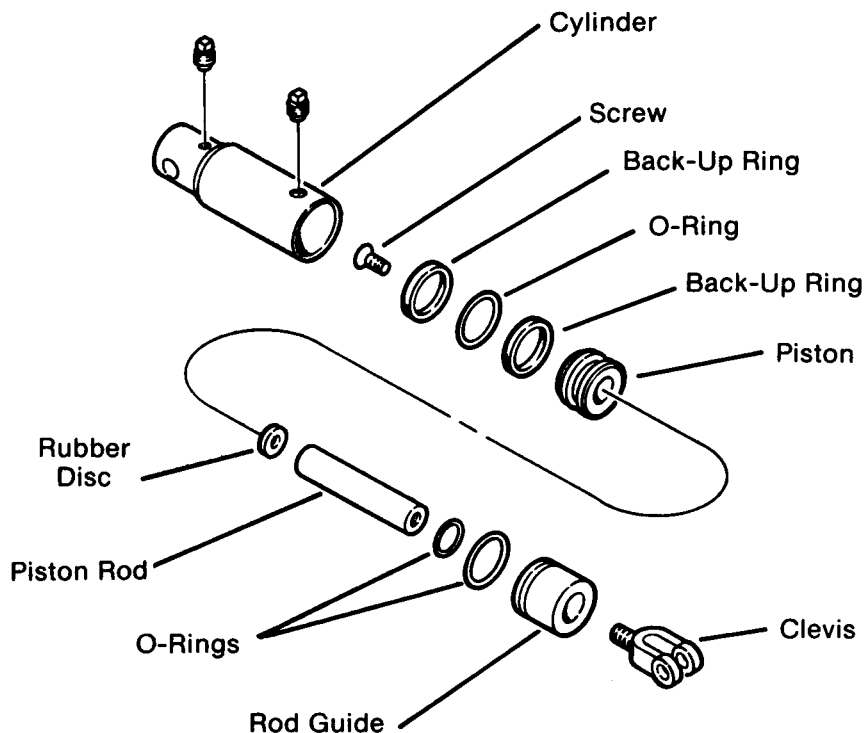
Check cylinder walls for burrs, lightly oil all O-rings and reassemble cylinder. (Fig. 92)

**NOTE:** When reassembling cylinder be sure to align hole in rod end guide with hole in cylinder tube.

- K. Reassemble lift cylinder into tractor by reversing above procedures "A" thru "H".
- L. Run tractor and move lift lever back and forth several times to purge air from the system.

**NOTE:** With engine off, check oil level in transaxle, add SAE 20 wt. detergent oil only if necessary.

**IMPORTANT:** Low or inadequate oil level can result in permanent damage to hydrostatic system.



**FIG. 92**

## **LIFT VALVE REMOVAL AND SERVICING:**

- A. Turn ignition switch OFF and remove key.
- B. Before this procedure is performed, the attachment should be removed from this tractor as outlined in "ATTACHMENT" section of this service manual.

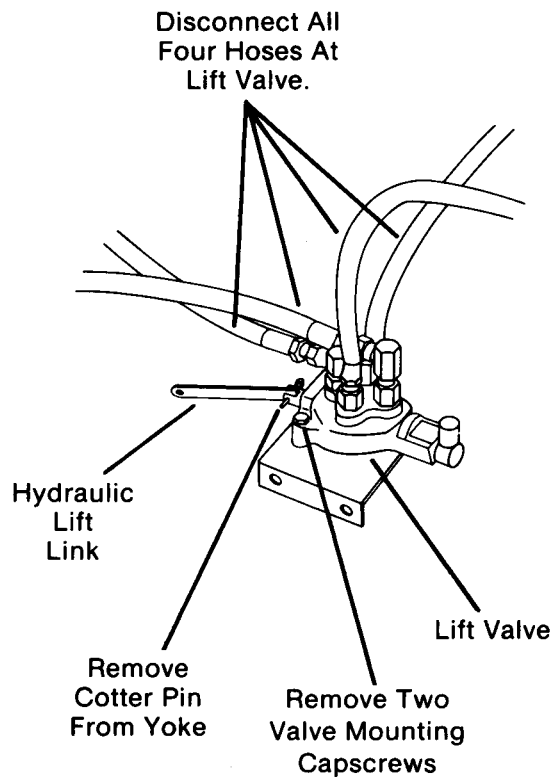
- C. Raise seat pan and disconnect seat restraint cable and secure seat pan assembly in up-right position.

- D. Disconnect all four hoses connected to lift valve. (Fig. 93)

**NOTE:** Mark or tag all hoses for proper reassembly and cap all ends.

- E. Remove cotter pin thru lift valve yoke and disconnect hydraulic lift link from valve. See (Fig. 93)

- F. Remove two nuts and lockwashers from bottom of valve mounting bracket and remove capscrews thru valve body out the top. See (Fig. 93)



**FIG. 93**



- G. Valve is now loose and can be removed out top of tractor main frame, under seat pan.
- H. Service lift valve as required. Clean off lift valve prior to disassembly. (Fig. 94)
- I. If valve requires disassembly, replace **all** seals. If spool or valve body require replacement, lift valve can **only** be replaced as a complete assembly. Spool and valve body are mated parts and cannot be interchanged with other spools or bodies.

NOTES: After valve is serviced and reassembled, pack cavity at rear of lift valve, level, with No. 2 wheel bearing grease or Ford 1T-M1C137-A grease.

- J. Reassemble lift valve into tractor by reversing above procedure "A" thru "F".
- K. Run tractor and move lift lever back and forth several times to purge air from the system.

NOTE: With engine off, check level in transaxle add SAE 20 wt. detergent oil only if necessary.

IMPORTANT: Low or inadequate oil level can result in permanent damage to hydrostatic system.

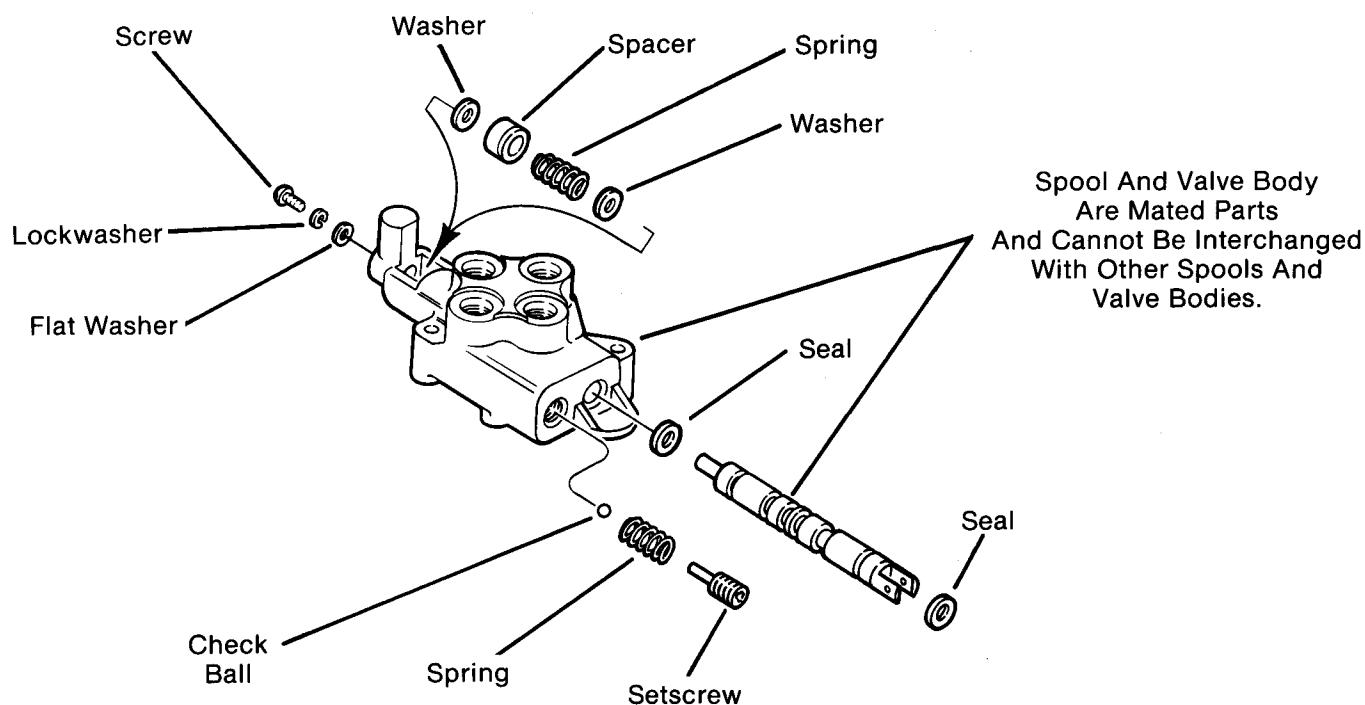


FIG. 94

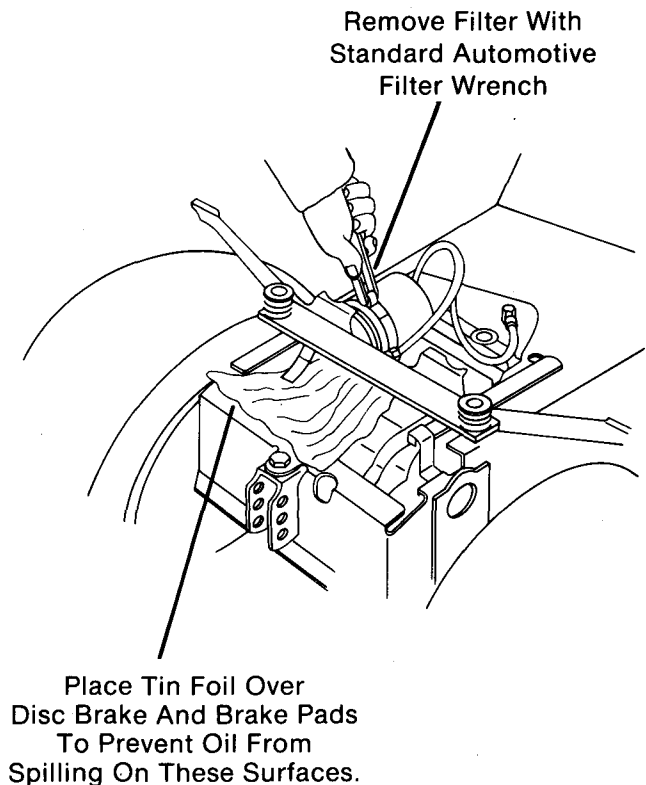
## LIFT SYSTEM FILTER REPLACEMENT:

- A. Turn ignition switch OFF and remove key.
- B. Raise seat pan and disconnect seat restraint cable and secure seat pan assembly in up-right position.
- C. Place tin foil or some suitable cover over disc brake and brake pads, so when filter is removed oil does not spill on these surfaces. (Fig. 95)
- D. Remove filter with a standard automotive filter wrench. (Fig. 95)

NOTE: Filter should be changed after the first 20 hrs. of operation then every 100 hrs. thereafter.

- E. Lightly oil filter gasket and screw new filter into filter adaptor. Hand tighten filter onto filter adaptor  $\frac{3}{4}$  turn once filter gasket touches adaptor.
- F. Lower seat pan and reconnect seat restraint cable.
- G. Start engine and **run** tractor for approximately 5 minutes and check oil level in transaxle, with engine OFF. Add SAE 20 wt. detergent oil only if necessary.

IMPORTANT: Low or inadequate oil level can result in permanent damage to hydrostatic system.



1.0048

FIG. 95

# TROUBLE-SHOOTING

PROBLEM	REMEDY	REFERENCE
Engine will not crank to start.	<ol style="list-style-type: none"> <li>1. Check starting procedure.</li> <li>2. Check or recharge battery.</li> <li>3. Check wiring connections.</li> <li>4. Replace blown fuse.</li> <li>5. Check ignition switch.</li> <li>6. Check interlock switches.</li> <li>7. Check solenoid.</li> </ol>	<ol style="list-style-type: none"> <li>1. ELECTRICAL SYSTEM — SYSTEM FUNCTIONS</li> <li>2. ELECTRICAL SYSTEM — BATTERY</li> <li>3. ELECTRICAL SYSTEM — WIRING DIAGRAM</li> <li>4. ELECTRICAL SYSTEM — FUSE</li> <li>5. ELECTRICAL SYSTEM — IGNITION SWITCH</li> <li>6. ELECTRICAL SYSTEM — INTERLOCKING SWITCHES</li> <li>7. ELECTRICAL SYSTEM — SOLENOID</li> </ol>
Engine turns over but fails to start.	<ol style="list-style-type: none"> <li>1. Fill fuel tank.</li> <li>2. Contact authorized engine dealer.</li> </ol>	
Engine starts with foot pedal up or PTO switch engaged.	<ol style="list-style-type: none"> <li>1. Check interlock switches.</li> <li>2. Check for grounded wire.</li> <li>3. Check for improper wiring.</li> </ol>	<ol style="list-style-type: none"> <li>1. ELECTRICAL SYSTEM — INTERLOCK SWITCHES</li> <li>2. ELECTRICAL SYSTEM — WIRING DIAGRAM</li> <li>3. ELECTRICAL SYSTEM — WIRING DIAGRAM</li> </ol>
Engine fails to stop.	<ol style="list-style-type: none"> <li>1. Check for loose wiring.</li> <li>2. Check ignition switch.</li> </ol>	<ol style="list-style-type: none"> <li>1. ELECTRICAL SYSTEM — WIRING DIAGRAM</li> <li>2. ELECTRICAL SYSTEM — IGNITION SWITCH</li> </ol>
Engine fails to stop with foot pedal up or PTO switch engaged with operator off seat.	<ol style="list-style-type: none"> <li>1. Check for bad ground.</li> <li>2. Check interlock switches.</li> </ol>	<ol style="list-style-type: none"> <li>1. ELECTRICAL SYSTEM — WIRING DIAGRAM</li> <li>2. ELECTRICAL SYSTEM — INTERLOCK SWITCHES</li> </ol>
No traction drive.	<ol style="list-style-type: none"> <li>1. Release parking brake.</li> <li>2. Check rear axle drive keys.</li> <li>3. Check for broken drive shaft or drive shaft keys.</li> <li>4. (Gear Drive tractors <b>only</b>) <ol style="list-style-type: none"> <li>a. Check or replace traction belt.</li> <li>b. Wrong belt being used.</li> <li>c. Check belt routing.</li> <li>d. 90° Gear box need repair or replacement.</li> </ol> </li> <li>5. (Hydro Drive tractors <b>only</b>) <ol style="list-style-type: none"> <li>a. HI/LO speed range selector not in gear.</li> <li>b. Transmission needs repair or replacement.</li> </ol> </li> <li>6. Transaxle needs repair or replacement.</li> </ol>	<ol style="list-style-type: none"> <li>3. DRIVE SHAFT REMOVAL</li> <li>4a. TRACTION DRIVE BELT REPLACEMENT</li> <li>4b. TRACTION DRIVE BELT REPLACEMENT</li> <li>4c. TRACTION DRIVE BELT REPLACEMENT</li> <li>4d. 90° TRACTION DRIVE GEAR BOX</li> <li>5b. HYDROSTATIC TRANSMISSION</li> <li>6. TRANSAXLE OR HYDROSTATIC TRANSAXLE</li> </ol>
Traction drive brake fails to engage.	<ol style="list-style-type: none"> <li>1. Brake pads need adjustment or replacement.</li> <li>2. Check engagement linkage.</li> <li>3. (Gear Drive tractors <b>only</b>) <ol style="list-style-type: none"> <li>a. Adjust brake control rod spring.</li> <li>b. Wrong belt being used.</li> </ol> </li> <li>4. (Models 09GN2205 &amp; 2206 <b>only</b>) Check adjustment of traction drive brake cable.</li> </ol>	<ol style="list-style-type: none"> <li>1. TRACTION DRIVE BRAKE-ADJUSTMENT PAD REPLACEMENT</li> <li>3a. TRACTION DRIVE BRAKE-ADJUSTMENT</li> <li>3b. TRACTION DRIVE BELT REPLACEMENT</li> <li>4. TRACTION DRIVE BRAKE CABLE —ADJUSTMENT</li> </ol>

PROBLEM	REMEDY	REFERENCE
Traction drive brake engaged all the time.	<ol style="list-style-type: none"> <li>1. Brake pads need replacement.</li> <li>2. (Gear Drive tractors <b>only</b>) <ol style="list-style-type: none"> <li>a. Adjust brake control rod spring.</li> <li>b. Adjust brake pads.</li> </ol> </li> <li>3. (Models 09GN2205 &amp; 2206 <b>only</b>) Check adjustment of traction drive brake cable.</li> </ol>	<ol style="list-style-type: none"> <li>1. TRACTION DRIVE BRAKE-PAD REPLACEMENT</li> <li>2a. TRACTION DRIVE BRAKE-ADJUSTMENT</li> <li>2b. TRACTION DRIVE BRAKE-ADJUSTMENT</li> <li>3. TRACTION DRIVE BRAKE CABLE-ADJUSTMENT</li> </ol>
Traction drive brake engages before drive lever reaches neutral when clutch/brake pedal is depressed.	<ol style="list-style-type: none"> <li>1. Readjust traction drive brake.</li> </ol>	<ol style="list-style-type: none"> <li>1. TRACTION DRIVE BRAKE-ADJUSTMENT</li> </ol>
Tractor creeps forward or backward when drive lever or foot pedal is in neutral. (Hydro Drive tractors <b>only</b> )	<ol style="list-style-type: none"> <li>1. Adjust drive lever for proper neutral setting.</li> </ol>	<ol style="list-style-type: none"> <li>1. HYDRO TRANSMISSION-DRIVE LEVER ADJUSTMENT</li> </ol>
HI/LO speed range selector difficult to shift. (Hydro Drive tractors <b>only</b> )	<ol style="list-style-type: none"> <li>1. Lubricate pivot bushing.</li> <li>2. Check tie rod and steering linkage for wear.</li> </ol>	<ol style="list-style-type: none"> <li>1. LUBRICATION CHARTS</li> <li>2. TIE ROD REMOVAL</li> </ol>
Excessive play in steering wheel.	<ol style="list-style-type: none"> <li>1. Readjust steering gears.</li> </ol>	<ol style="list-style-type: none"> <li>1. STEERING WHEEL FREE PLAY ADJUSTMENT</li> </ol>
Excessive or uneven tire wear or hard steering.	<ol style="list-style-type: none"> <li>1. Reset drag link and front wheel toe-in.</li> <li>2. Check tire air pressure.</li> </ol>	<ol style="list-style-type: none"> <li>1. DRAG LINK/TOE-IN ADJUSTMENT</li> <li>2. MAINTENANCE</li> </ol>
P.T.O. clutch does not properly engage or disengage.	<ol style="list-style-type: none"> <li>1. Readjust clutch air gap.</li> <li>2. Check coil windings of clutch.</li> <li>3. Check for bad ground.</li> <li>4. Test P.T.O. switch.</li> </ol>	<ol style="list-style-type: none"> <li>1. ELECTRICAL CLUTCH/BRAKE-ADJUSTMENT</li> <li>2. ELECTRICAL CLUTCH/BRAKE-CLUTCH COIL CHECK</li> <li>3. ELECTRICAL CLUTCH/BRAKE-CLUTCH COIL CHECK</li> <li>4. P.T.O. SWITCH CHECK</li> </ol>
P.T.O. warning light does not operate.	<ol style="list-style-type: none"> <li>1. Check wire connections.</li> <li>2. Replace light.</li> <li>3. Test P.T.O. switch.</li> </ol>	<ol style="list-style-type: none"> <li>1. P.T.O. WARNING LIGHT</li> <li>2. P.T.O. WARNING LIGHT</li> <li>3. P.T.O. SWITCH CHECK</li> </ol>
Attachment lift lever does not lift, lower or hold the attachment.	<ol style="list-style-type: none"> <li>1. Recheck attachment mounting.</li> <li>2. Perform lift system tests.</li> </ol>	<ol style="list-style-type: none"> <li>1. "ATTACHMENT" SECTION OF THIS MANUAL.</li> <li>2. LIFT SYSTEM TESTS</li> </ol>