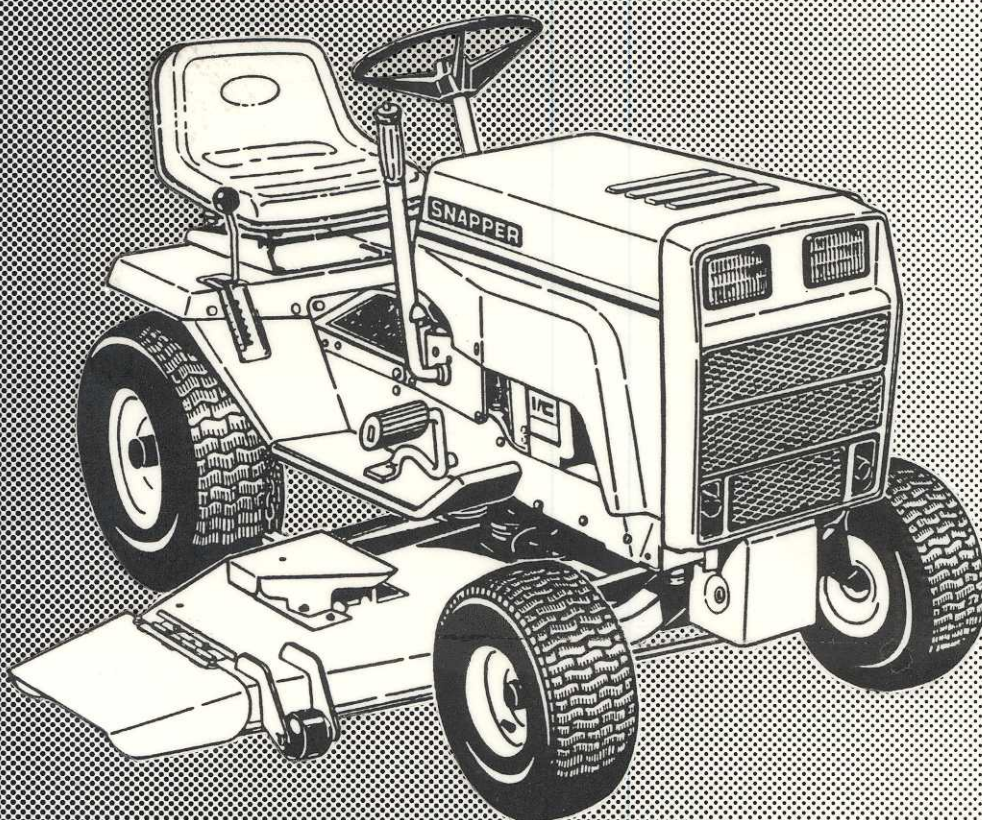


SNAPPER[®]

YT/GT SERIES TRACTORS



SERVICE MANUAL

SNAPPER YT/GT SERIES TRACTORS---

SERVICE MANUAL

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SECTION 1 GENERAL INFORMATION

HOW TO USE THIS MANUAL.....

This manual contains the Service and Maintenance information required to properly inspect, service and repair the SNAPPER YT/GT Series Yard & Garden Tractors equipped with 33", 41", or 48" Mower Attachments. The manual is divided into sections for quick, easy reference. Carefully read all procedures described for servicing a particular component **BEFORE** repairs are started, to avoid needless disassembly.

NOTE: References to the RIGHT and LEFT sides are determined by facing forward while sitting on the operator's seat.

WARNINGS & CAUTIONS

Details of standard workshop safety procedures are not included in this manual. **WARNINGS & CAUTIONS** occur where procedures, if improperly performed, could cause personal injury, and/or damage to the tractor or its components. These **WARNINGS & CAUTIONS** do not cover all conceivable ways hazardous consequences could be created by improperly following the instructions or by the incorrect use of service tools.

SERIAL NUMBER LOCATION

The tractor serial number is located on the left side below the dash panel.

TOOL REQUIREMENTS

The normal complement of U.S. Standard tools found in most repair shops are all that will normally be needed to repair SNAPPER Yard & Garden Tractors. Special tools and meters are mentioned where needed in the manual. Refer to the Parts Manuals for special tools available through SNAPPER Dealers.

SPECIFICATIONS - GENERAL

ENGINE SPECIFICATIONS

Refer to the engine Manufacturer's manuals.

TRACTOR SPECIFICATIONS

Tractors covered in this manual will have either Disc (YTD designation) or Hydrostatic (YTH designation) drive trains. Some general specs on these are:

DISC DRIVE: This friction drive system provides 6 forward speeds and 1 reverse speed in both HI and LO shift ranges. The transmission can be shifted on-the-go. This dual-axle shift range drive employs a drum and band on the transmission for braking. The maximum ground speed of a YTD tractor when shifted into HI range is about 6.12 miles per hour in top forward speed and RPM.

HYDROSTATIC DRIVE: The YTH hydro drive system provides a continuous range in both forward and reverse speeds. Forward speed is increased by additional toe pressure on the FORWARD/REVERSE control pedal's rubber pad while reverse speed is controlled by the amount of pressure exerted on the "heel" pad. Braking is provided by an internal disc type brake inside the transmission. Maximum ground speed with hydrostatic drive is about 7 miles per hour.

TIRE SPECIFICATIONS

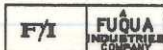
FRONT TIRES (all models): 15 x 6.00 - 6 (12 psi)

REAR TIRES (YTD models): 18 x 6.50 - 8 (10 psi)

REAR TIRES (YTH models): 23 x 10.5 - 12 (10 psi)

SNAPPER POWER EQUIPMENT

McDONOUGH, GA., U.S.A.



SER

MOD

09991




COVERED BY ONE OR MORE OF THE FOLLOWING PATENTS:
U.S.: 3154903, 3269100, 3716977, 4158279, 4164112,
4300332, 4498552, D212702, D213125, D213328, D250027,
D250892, D251089.
CANADA: 733714, 844284, 848134, 968963, 1137764.

SERIAL NUMBER LOCATION

The tractor serial number is located on the frame.

SPECIFICATIONS - TORQUE VALUES

Standard Torque specifications and capscrew markings chart. The values given here are based on the use of clean and dry threads. Reduce torque by 10 percent when threads are lubricated with engine oil and by 20 percent if new plated capscrews are used.

CAPSCREW HEAD MARKINGS	CAPSCREW BODY SIZE Inches—Thread	SAE GRADE 1 or 2 SAE GRADE 5 SAE GRADE 6 or 7 SAE GRADE 8			
		Torque	Torque	Torque	Torque
		Ft-Lb	Ft-Lb	Ft-Lb	Ft-Lb
Manufacturer's marks may vary. Three-line markings on heads shown below, for example, indi- cate SAE Grade 5.   SAE 1 or 2 SAE 5  SAE 6 or 7 SAE 8	1/4-20	5	8	10	12
	-28	6	10		14
	5/16-18	11	17	19	24
	-24	13	19		27
	3/8-16	18	31	34	44
	-24	20	35		49
	7/16-14	28	49	55	70
	-20	30	55		78
	1/2-13	39	75	85	105
	-20	41	85		120
	9/16-12	51	110	120	155
	-18	55	120		170
	5/8-11	83	150	167	210
	-18	95	170		240
	3/4-10	105	270	280	375
	-16	115	295		420

WORKSHOP SAFETY HINTS

DO NOT run engine in an enclosed area -- exhaust fumes are hazardous to your health and could be a potential fire hazard.

DO NOT smoke, light a fire or create any sparks near gasoline - it is extremely flammable.

DO NOT use gasoline as a solvent. Fumes are dangerous. Always use non-flammable solvents.

DO NOT store gasoline in an area where sparks or flames are present such as near water heaters or furnaces -- gasoline fumes are extremely explosive.

ALWAYS disconnect the spark plug wires and secure the ends away from the plugs BEFORE inspecting, servicing or repairing the tractor or attachments. Precautions prevent accidents such as unintentional start-ups!

ALWAYS make adjustments and do repairs in a well lit and well ventilated area.

ALWAYS wear protective safety goggles when using pressurized air to clean the machine or parts.

DO NOT use a jack to support the tractor in a raised position. Use "jack stands" or other stable supports that will hold up BOTH sides of the frame at the same time. This approach is especially important when raising and supporting the rear end of the tractor. With the front axle pivotal, both sides of the frame must be securely supported. Be sure to chock (block) the wheels that remain on the surface.

NOTE: Thoroughly read the tractor operator's and engine owner's manual and instructions furnished with attachments BEFORE test operating equipment after making repairs and adjustments.

SECTION 2 TROUBLE SHOOTING

DRIVE TRAIN -- DISC DRIVE

PROBLEM	POSSIBLE CAUSE
No Pedal Return	1.Broken or disconnected return spring 2.Pedal binding in pivot bracket
Brake Slips	1.Adjustment too loose 2.Lining worn beyond limit 3.Oil on brake lining
No Clutch or Brake Action	1.Broken or disconnected cable 2.Cable adjusted too long
Weak Brake	1.Adjustment too loose 2.Brake link disconnected 3.Lining worn beyond limit 4.Oil on brake lining
Brake grabs before clutch disengages	1.Brake adjustment too tight 2.Clutch adjustment too loose
No Drive	1.Hi-Lo in Neutral 2.Linkage binding 3.Yoke spring broken 4.Clutch worn or yoke stop pin out of adjustment 5.Axle bolt sheared 6.Key sheared in flex coupling hub 7.Broken flex coupling disc 8.Grease on driven disc 9.Broken chain or gear in transmission or in primary chain case
Transmission Leaking	1.Over filled 2.Faulty check or fill plug 3.Case screws loose 4.Oil seal at axle failure or improperly installed 5.Case gasket not sealing properly 6.Bearing loose in case or cover
Leaking Primary Chain Case	1.Overlubricated * Maximum 2 table spoons 2.Faulty fill plug 3.Case screws loose 4.Case gasket not sealing properly
Drives in Reverse Only	1.Broken yoke spring
Grinding Noise (With foot off Clutch/Brake Pedal)	1.Clutch adjustment too loose and/or brake adjustment too tight 2.Brake band too small (i.e. too tight) 3.Operator riding Clutch/Brake pedal excessively 4.Operator depressing or releasing Clutch/Brake pedal too slowly

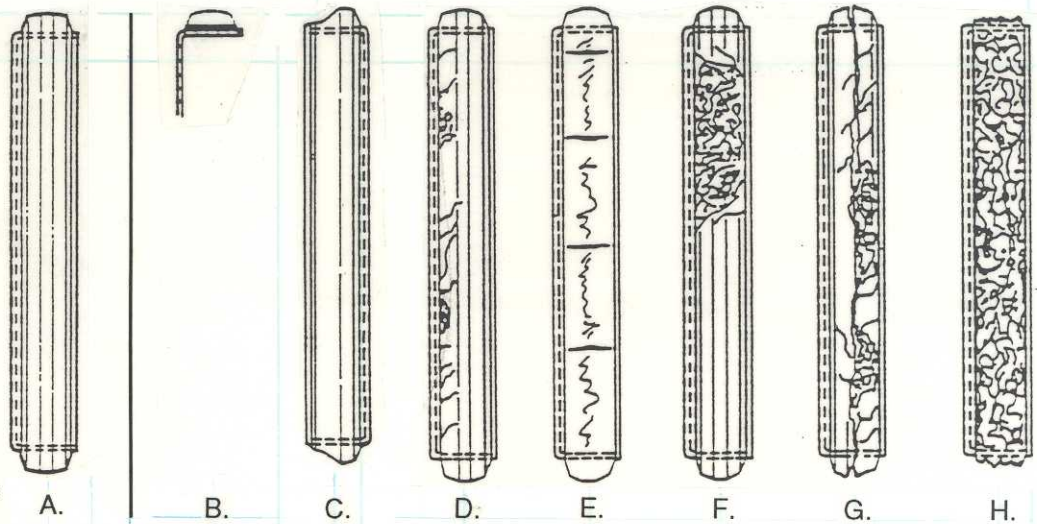
ENGINE

For troubleshooting information on the engine, refer to the engine manufacturer's service manual.

DRIVE TRAIN --HYDRO

PROBLEM	POSSIBLE CAUSE
No Pedal Return	1.Broken or disconnected return spring 2.Pedal binding in pivot bracket
Brake Slips	1.Adjustment too loose 2.P B assembly worn
No Brake Action	1.Broken or disconnected rod 2.Rod adjusted too long
Weak Brake	1.Adjustment too loose
Brake grabs before transmission disengages	1.Brake adjustment too tight
No Drive	1.Loose or broken belt 2.Linkage disconnected 3.Idler spring adjusted too loose, broken, or disconnected 4.Cold start kit engaged 5.Axle bolt sheared, key sheared, hub split 6.Key sheared in flex coupling hub 7.Low transmission fluid 8.Broken transmission 9.Broken flex coupling disc 10.Roll release rod engaged 11.Transmission pulley loose on shaft or key sheared
Hydraulic Fluid Leak	1.Overfilled reservoir 2.Hose improperly installed on fittings, loose clamp, loose fitting, or cracked hose 3.Transmission housing screws loose 4.Oil seal at axle failing or improperly installed 5.Transmission gasket(s) not sealing properly 6.Cracked fluid reservoir (oil tank)
Vibration	1.Loose belt, damaged belt, or improper spring tension 2.Bent drive shaft 3.Bent pulley 4.Drive shaft bearing failure, flex coupling hub or flex coupling disc failure

DRIVEN DISC WEAR ANALYSIS



A. NEW CONDITION

1. A new disc is shown for comparison

B. PARALLEL WEAR

1. NORMAL wear pattern - after many hours of use
2. Extreme slippage
3. Rough or grooved drive disc
4. Yoke contacting rubber
5. REPLACE disc when the rubber is worn to about .015

C. IRREGULAR WEAR PATTERN

1. Failed chain case or fender bearing

D. CRACKS and/or CHUNKING ON LEFT SIDE

1. Drive disc set too low
2. Drive disc alignment set greater than 1/16"

E. SMOOTH WITH CRACKS ACROSS RUBBER

1. Old disc - lots of use
2. Insufficient contact pressure against drive disc (may also have a shiny bluish tint).
3. Yoke stop improperly set on some earlier models

F. GOUGED SPOT

1. Center button on drive disc missing, or it's bearing is frozen-replace button
2. Excessive clutch spring pressure

G. CRACKS and/or CHUNKING ON RIGHT SIDE

1. Drive disc set too high
2. Shift detent not set properly
3. Tire running off edge in 6th speed
4. Excessive clutch spring pressure

H. ENTIRE RUBBER SURFACE DAMAGED

1. Yoke contacting rubber surface
2. Final stages of C, D, E, F, G, & H

The driven disc should be replaced when inspection reveals one of the conditions shown above. For conditions other than "normal wear", investigate and correct the cause **BEFORE** continuing operation.

* ELECTRICAL

PROBLEM

Engine
WILL NOT
Crank:

POSSIBLE CAUSE

1. Check Clutch Switch with a continuity light. With Clutch/Brake Pedal depressed, the light should be on.
2. Check Mower Blade Switch with a continuity light. With the switch in OFF position, the light should be on when connected to terminals #4 and #5.
3. Check Seat Switch for continuity. With operator seated, the light should be on.
4. Check for weak or dead Battery.
5. Check continuity of Circuit Breaker.
6. Check Key Switch.
7. Check Solenoid.
8. Check Interlock Module starting circuit. With the red and yellow module wires connected to the Wiring Harness, ground the brown wire to the frame. If the engine cranks, the module is good.
9. Check for bad connections or broken wires in the Wiring Harness with a continuity light.

**Engine cranks,
but spark plug(s)
DOES NOT fire:**

1. Disconnect the red wire at engine and check condition of spark plug(s).
2. If the spark plug(s) does not fire, the problem is in the engine ignition system.
3. If the spark plug(s) does not fire, check for grounded red wire.
4. Check Key Switch. Disconnect Wiring Harness from switch and connect continuity light from M terminal to frame. With switch in the RUN position, the light should be OFF.
5. If all switches and wiring are good, but the spark plug(s) does not fire, replace the module.

**Engine runs but
dies when the
Clutch/Bake Pedal
is released or the
Mower Blade
Switch is turned
on—with the
operator seated:**

1. Check Seat Switch for continuity.
2. Check for broken seat switch wires or poor connections.
3. Check Module Interlock System. With the red wire connected to Wiring Harness, connect yellow and brown module wires together.
4. If engine runs properly, the module is good. Check for break or poor connections in yellow wire to Solenoid.
5. If the engine does not run properly, replace module.

**Engine starts
with interlock
switch(s) open:**

1. Check for a broken or disconnected red module wire.
2. Check for ground between module case and frame, with a continuity light.
3. If all switches and wiring are good, and the engine continues to start with switch(s) open, replace module.

**Engine runs, but
DOES NOT
charge Battery:**

1. Check for a bad Diode.
2. Check for broken wires or bad connections in the Wiring Harness.
3. Check Alternator output per engine manufacturer's specifications.
4. Check Battery.

**Engine runs
but lights fail
to operate:**

1. Check Light Bulbs.
2. Check for broken wires or bad connections in wiring harness. Make sure light wire is grounded to grill.
3. Check continuity of Light Switch.
4. Check for bad Diode.
5. Check Alternator output per engine manufacturer's specifications.

**Engine runs but
Mower Clutch
fails to engage
at 3/4 to FULL
throttle:**

1. Check clearance between clutch plates.
2. Check for broken wires or bad connections in Wiring Harness.
3. Check Mower Blade Switch with a continuity light. With the switch in the ON position, the light should be on when connected to terminals #1 and #3.
4. Check clutch and replace if bad.

**Engine fails to
shut off when
Key Switch is
shut off:**

1. Red wire to engine disconnected or broken.
2. Check module case for ground.
3. Check Key Switch for ground.
4. If all switches and wiring are good and engine fails to stop when Key Switch is turned off, replace module.



Refer to SECTION 4 ELECTRICAL SYSTEM (pages 12 through 18)

SECTION 3 PREVENTIVE MAINTENANCE



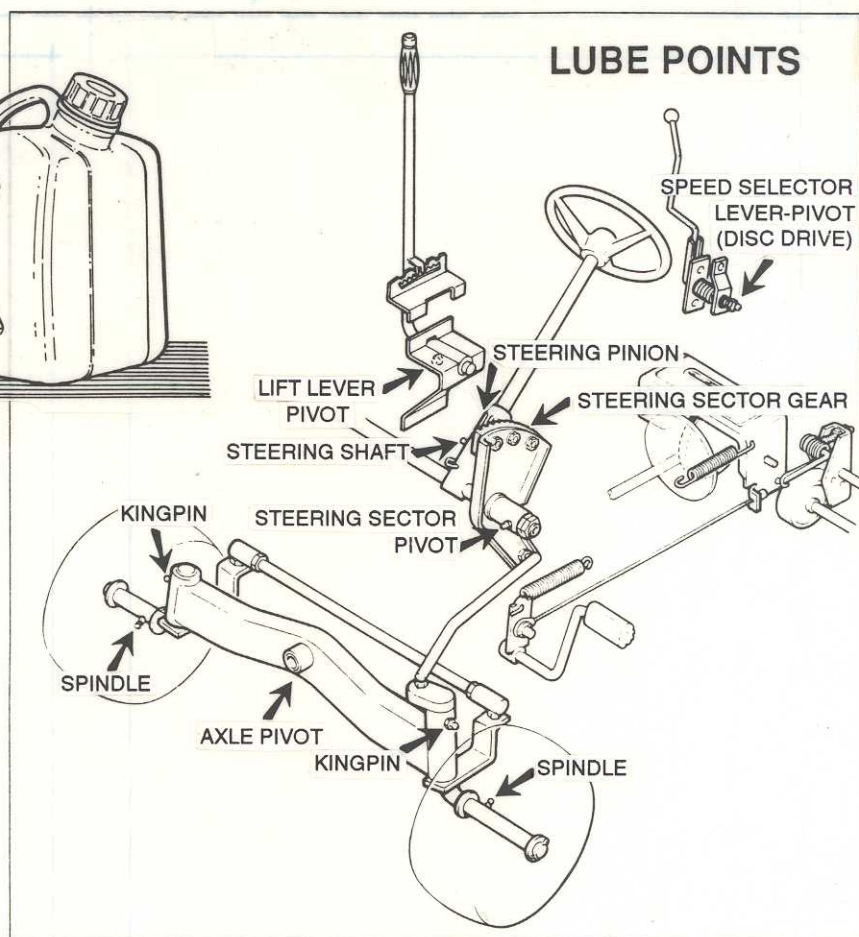
ENGINE OIL. Use proper grade of oil for the lowest temperature expected before next oil change. See your engine owner's manual.

PRIMARY CHAIN CASE LUBRICANT. Use SNAPPER 00 grease.

TRANSMISSION LUBRICANT-DISC DRIVE. Use SNAPPER 00 grease.

TRANSMISSION LUBRICANT-HYDRO. Use hydraulic fluid, 20W 20, or 30W engine oil.

FUEL SELECTION. See your engine owner's manual.



SERVICE CHART

INTERVAL	PART NAME	SERVICE	LUB. OR FLUID
Before Use	Engine Crankcase (oil)	Inspect	Engine Oil
	Tire Pressure	Inspect	12 p.s.i. Front 10 p.s.i. Rear
	Battery	Inspect	Distilled Water
Every 25 Operating Hours	Foam Pre-Cleaner (air cleaner)	Inspect & clean if dirty	Wash & Re-Oil
	Idler Arm Pivot (41" & 48" mowers)	Lube	Multipurpose Grease
	Front Wheel Spindle Bearings	Lube	Multipurpose Grease
	Front Axle Pivot & Kingpins	Lube	Multipurpose Grease
	Engine Crankcase (oil)	Change Oil	Recommended Engine Oil
Twice Yearly, or Every 50 Operating Hours	Foam Pre-Cleaner (air cleaner)	Inspect & clean if dirty	Wash & Re-Oil

Twice Yearly, or Every 50 Operating Hours	Paper Element	Clean - Replace When Necessary	Tap on Flat Surface to Clean
	Transmission - Disc Drive	Inspect- Lube If Necessary	Use only SNAPPER OO Grease
	Transmission - Hydro	Inspect- Lube If Necessary	Hydraulic Fluid, 20W 20, or 30W Engine Oil
	Ground Speed Selector Lever - Pivot	Lube	Multipurpose Grease
	Implement Lift Lever - Pivot	Lube	Multipurpose Grease
	Steering Shaft	Lube	Multipurpose Grease
	Steering Sector Gear - Pivot	Lube	Multipurpose Grease
End of Season, or Every 100 Hours	Chain Case - Disc Drive	Inspect- Lube as Needed	Use SNAPPER OO Grease
	Spark Plugs	Remove & Inspect	Clean or Replace
	Fuel Filter	Remove	Replace
	Battery - Caps	Inspect Liquid Level	Add Distilled Water - If low
	Battery - Connections	Inspect all Connections	Clean/Tighten Cable Terminals & Posts - If needed
	Front End Alignment	Inspect	Adjust - If needed
	Mower Spindle(s)	Lube	Multipurpose Grease
	Foam Pre-Cleaner (air cleaner)	Inspect & Clean If dirty	Wash & Re-oil
	Paper Element (air cleaner)	Clean- Replace when necessary	Tap on flat surface to clean
	Air Intake/Cooling Areas	Inspect & Clean when necessary	Remove all debris- Remove shrouding If needed, to clean cooling fins, etc.

ENGINE CRANKCASE

Use the following procedure for inspecting, adding and changing engine crankcase oil:

1: Park the tractor on a flat, level surface. Wipe away dirt from around the dipstick and filler areas. **NOTE:** Kohler engines have dipsticks which are separate from the oil fill tubes while Briggs & Stratton engines have combined dipstick - fill caps. Check oil level.

2: When adding oil, use the proper weight and grade as specified by the engine manufacturer.

3: Always maintain the oil level at the **FULL** mark on the dipstick -- never overfill ! Pour the oil slowly into the tube and check frequently while adding, until full.

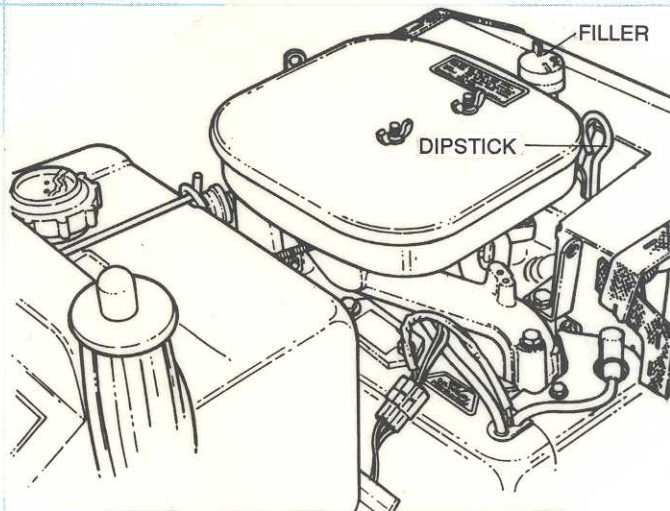


FIG. 1 - KOHLER-FILLER & DIPSTICK

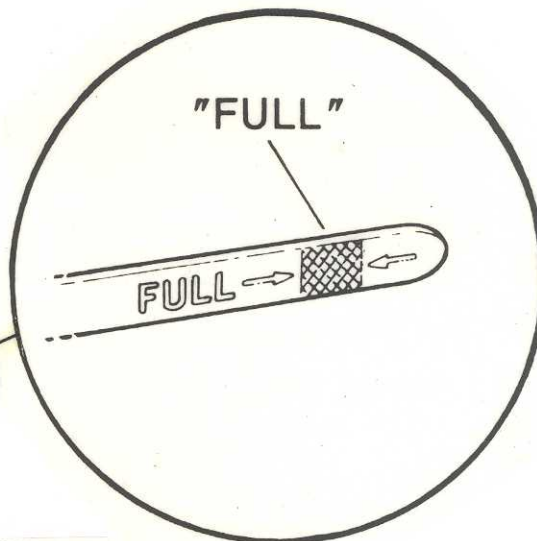
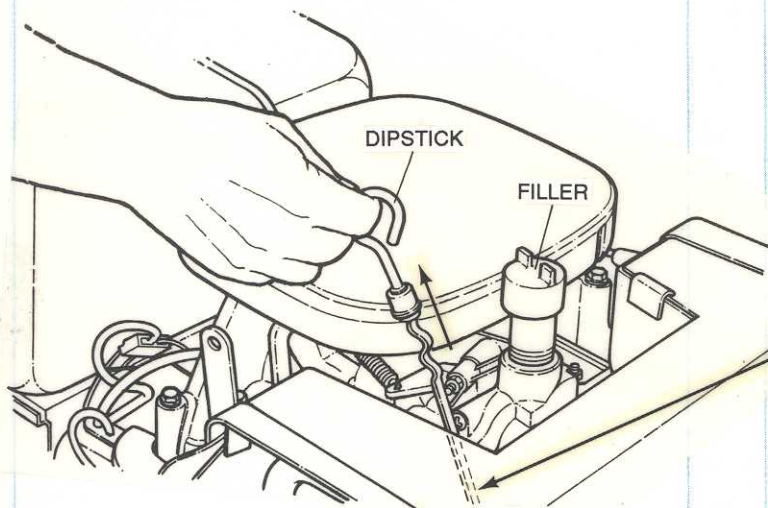


FIG. 2 - DIPSTICK "FULL" MARK

4: When changing oil, always have the dirty oil at operating temperature -- when hot, oil drains faster and removes more dirt and other foreign material held in suspension.

5: Remove the oil drain plug which is located on the underside of the engine behind the tie rod and near the center of the oil pan. Use a 1/4" allen head wrench on Briggs & Stratton engines or a 5/16" allen head on Kohler engines. After all oil has been drained into a suitable container, reinstall and securely tighten the drain plug.

6: When filling the crankcase, follow the engine manufacturer's specifications regarding the weight, grade, and quantity of oil. Check the level frequently while filling crankcase -- **DO NOT OVERFILL !**

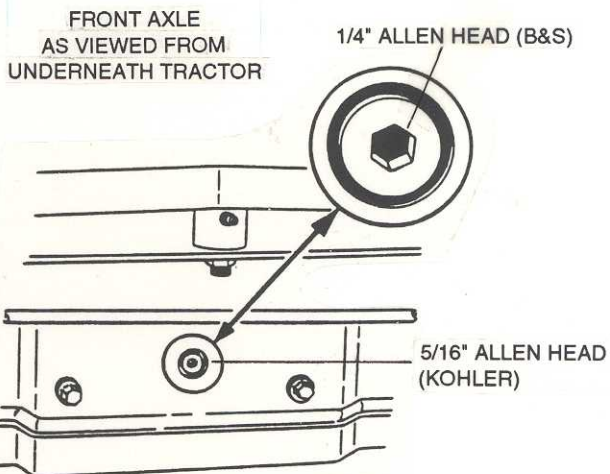


FIG. 3 - ENGINE OIL DRAIN LOCATION

PRIMARY CHAIN CASE (DISC DRIVE)

1: The primary chain case requires no regularly scheduled maintenance, however, a periodic lubricant inspection is recommended.

2: Remove the check plug. Extend your little finger into the hole and touch the chain. If the tip of your finger has grease on it, reinstall the plug. But if not, add some SNAPPER O grease. **DO NOT overfill!** The total capacity must not exceed 2 ounces - overfilling could cause leakage.

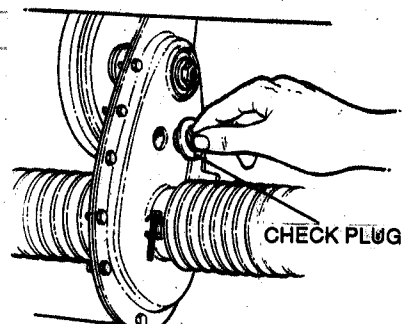


FIG. 1 - CHECK PLUG LOCATION

TRANSMISSION (DISC DRIVE)

1: The transmission requires no regularly scheduled maintenance, however, a periodic lubricant inspection is recommended.

2: Remove the check plug (2) to inspect the lube level.

3: Add SNAPPER O grease (as needed) through the fill hole (1) to bring the level up to the lower edge of the check hole. Note: allow sufficient time for the grease to flow from the fill hole to the check hole - to prevent overfilling. Reinstall both plugs.

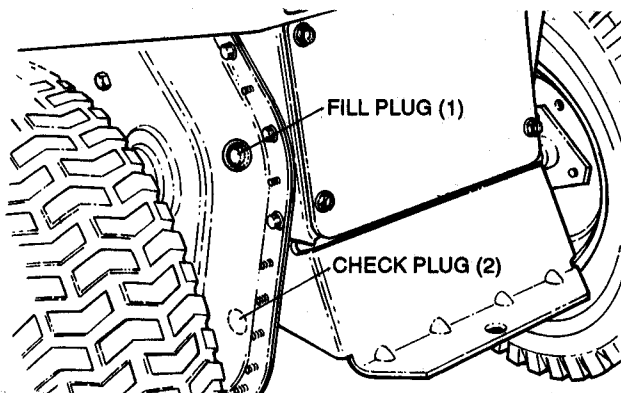


FIG. 2 - CHECK PLUG LOCATION

TRANSMISSION (HYDRO)

The hydrostatic drive transmission is equipped with a cooling fan and the cover has cooling fins cast into the exterior surface. Inspect both periodically and remove any accumulation of debris to prevent build-up of destructive heat.

1: This transmission requires no regularly scheduled maintenance, however, it is recommended that the hydraulic fluid (20W20 or 30W engine oil) be checked periodically. Check as follows:

2: Remove the console cover. After unscrewing the two retaining knobs, slide the cover to the rear and lift it out. **CAUTION: Operate tractor ONLY with this cover in place!**

3: Clean all dirt and debris from around the reservoir cap **BEFORE** removing the cap - the fluid must be kept free of contaminants at all times.

4: Fill the reservoir as needed to bring the fluid up to 1-1/2" to 2" below the top of the filler neck. Be sure to use only clean funnels or pouring spouts. Reinstall the filler cap after the proper level is reached, then reinstall the console cover.

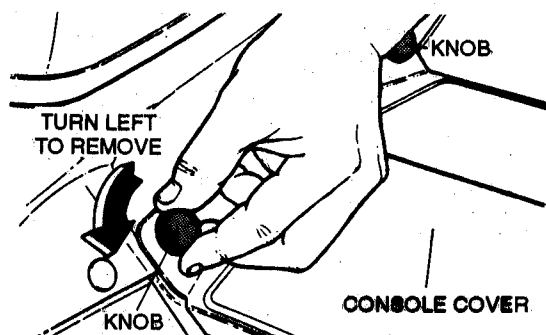


FIG. 1 - REMOVING CONSOLE COVER

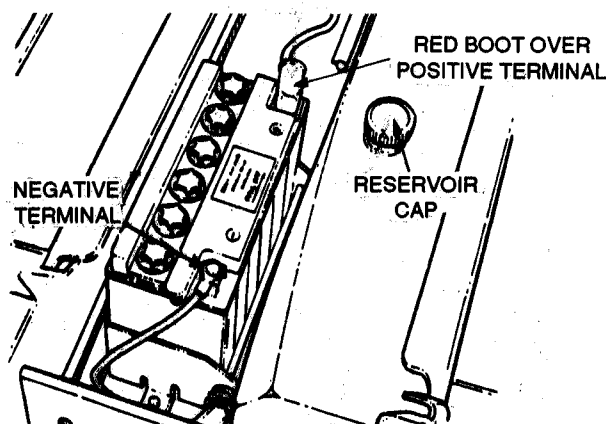


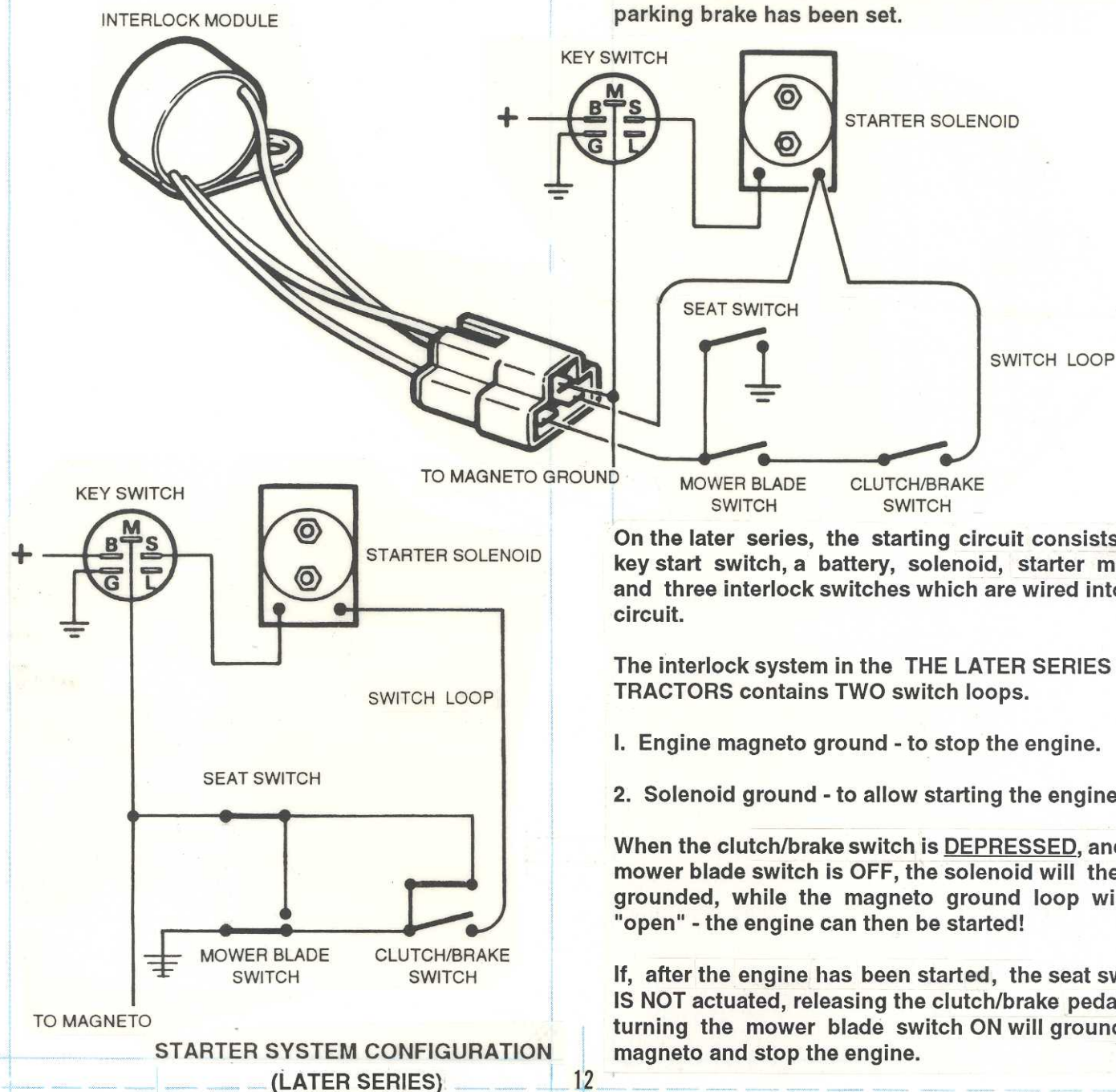
FIG. 2 - RESERVOIR LOCATION

SECTION 4: ELECTRICAL SYSTEM

SYSTEM DESCRIPTION

The YT series tractor electrical system consists of three circuits which are the Ignition, Charging and Starting circuits. This section covers the Starting Circuit only. Refer to the engine manuals for information concerning the Ignition and Charging Circuits – these are internal engine circuits.

STARTER SYSTEM CONFIGURATION (EARLY SERIES)



STARTING CIRCUIT

PRINCIPLE OF OPERATION: The safety interlock module is a solid--state device containing a loop consisting of three interlock switches; Seat, Clutch and Mower Blade switch. The three switches **MUST** be closed at the same time before the engine can be started. If any of the three is open, the circuit will not be grounded and the starting solenoid can not be actuated.

After the engine has been started, the clutch switch and mower blade switch can be opened. The key switch must remain closed (in run position) and the operator must remain in the seat to keep the seat switch closed. The interlock module will "kill" the engine if the operator vacates the seat UNLESS the mower blade switch has been turned off first and the parking brake has been set.

On the later series, the starting circuit consists of a key start switch, a battery, solenoid, starter motor, and three interlock switches which are wired into the circuit.

The interlock system in the THE LATER SERIES YT TRACTORS contains TWO switch loops.

1. Engine magneto ground - to stop the engine.
2. Solenoid ground - to allow starting the engine.

When the clutch/brake switch is DEPRESSED, and the mower blade switch is OFF, the solenoid will then be grounded, while the magneto ground loop will be "open" - the engine can then be started!

If, after the engine has been started, the seat switch IS NOT actuated, releasing the clutch/brake pedal OR turning the mower blade switch ON will ground the magneto and stop the engine.

BATTERY SERVICE

Most dry charge type battery problems result from improper activation practices and/or the lack of proper battery maintenance. Activate as follows:

1: Before activating the battery, remove it from the tractor. Never attempt to pour electrolyte into a new battery when it is mounted on the equipment.

2: Place the battery on a level surface and make sure the cap vent holes are open to permit gas to escape during battery charging.

CAUTION: Battery acid (electrolyte) is corrosive in nature -- exercise care when handling it!

3: Remove the caps and fill each cell with 1.265 (.05) specific gravity battery grade electrolyte to a level that is no more than 3/16" above the top of the plates. Note: The battery and electrolyte should be at least 70 degrees Fahrenheit prior to filling. Allow 30 minutes to set, then add electrolyte as needed to bring the level back up to 3/16" above plate level. Reinstall caps.

4: The recommended rate of charge is 1 Amp for ten hours. If time will not allow this, charge at three Amps for four hours. Due to the length of time required, it is not practical to attempt charging a new battery with the tractor engine. **NEVER USE BOOST CHARGERS!**

WARNING: When charging, batteries emit Hydrogen gas which is explosive if exposed to sparks or flames.

5: After the battery has been properly activated, inspect it for leaks and electrolyte on surfaces and clean/dry all surfaces before installing in tractor.

6: **ALWAYS** connect the Positive (+) cable to the Positive battery terminal **BEFORE** attaching the Negative (-) cable to the Negative terminal. This procedure will prevent accidental arcing should a wrench or pliers touch the tractor frame during removal or installation. **ALWAYS** disconnect the Negative (-) ground terminal first.

7: Proper care of the battery before off-season storage will lengthen its useful life and assure starting at the beginning of the new season. To prepare, clean the top to remove all dirt and grease. Bring the electrolyte up to 3/16" above plates in each cell then fully charge the battery before storing it in a cool, dry area. Check the charge status every 30 days while in storage.

8: A small, inexpensive, 3 Amp capacity charger would be a good investment for the owner to occasionally charge the battery to extend its life.

NOTE: Never overfill the battery cells. Maintain the level at **NO MORE** than 3/16" above the plates. Use distilled water to restore correct level. If overfilled, the liquid can overflow and reach the battery terminals creating a path for electrical discharge and, also cause corrosion and deterioration of metal parts. Should corrosion occur, clean terminals with a wire brush, then coat them with petroleum jelly.

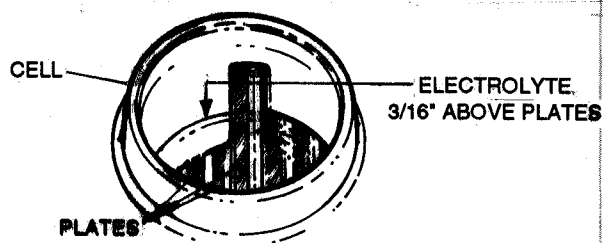


FIG. 1 - BATTERY CELL

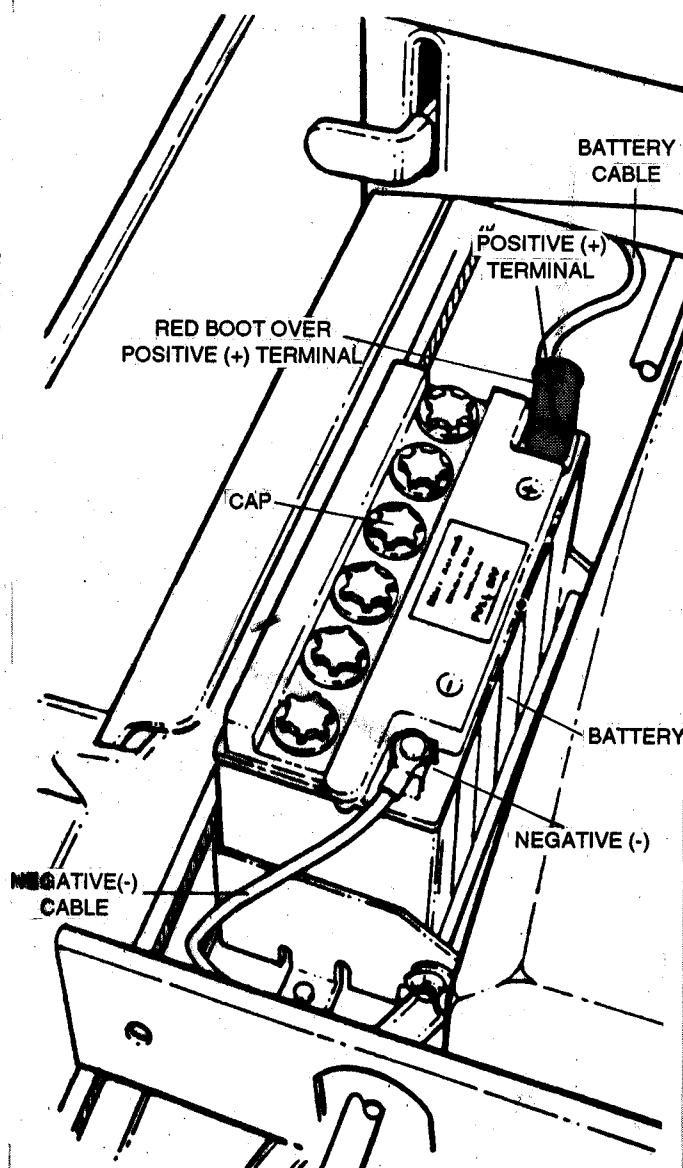


FIG. 2 - BATTERY LOCATION

A battery which does not perform properly is not necessarily worn out or defective. It may only need to be removed from the tractor and be brought up to full charge with a battery charger. If battery trouble is still suspected after being fully charged, tests should be performed.

If the battery is producing 12 volts and the cables have continuity, the remainder of the starting system can be systematically tested. A complete check includes cleaning and testing the charge with a hydrometer. The battery must be properly serviced as described earlier before testing.

TESTING WITH VOLTMETER

Test battery voltage with a Voltmeter (VOM). Set meter on DC Volts. Place the red probe on the positive (+) terminal and the black probe on the Negative (-) terminal. Refer to the chart for test indications.

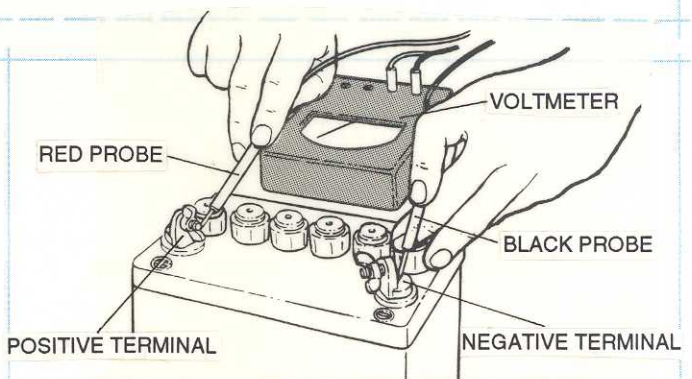


FIG. 3 - TESTING TYPICAL BATTERY

12 V Recorded	Less Than 12 V Recorded
Battery OK for Cranking System Tests	Battery Discharged or Defective
Test Battery Cables	Perform Battery Maintenance

TESTING WITH HYDROMETER

Test the specific gravity of the battery's electrolyte with a hydrometer. If the reading is less than 1.225, the battery should be recharged before further testing can be done. If the battery fails to accept a charge, it is not serviceable and should be replaced. Cease testing if this is the case.

NOTE: Hydrometers are generally calibrated to give a correct reading at only one temperature which is 80 degrees Fahrenheit. When taking a reading at other temperatures, a correction factor must be applied. This factor is approximately 0.004 specific gravity which is referred to as 4 points of gravity. For each 10 degrees above 80 F, ADD 4 points, and for each 10 degrees below 80 F, subtract 4 points. Always correct the readings for temperature variations. Test the specific gravity of the electrolyte in each cell.

1: Perform the hydrometer specific gravity test as follows: Carefully insert tip of the hydrometer into the cell to avoid damaging the separators. Broken separators could result in premature failure of the battery. squeeze bulb and draw in only enough electrolyte to keep the float from touching the bottom of the hydrometer barrel when the bulb is released. Keep hydrometer in a vertical position while drawing in liquid and while taking the reading. Test each cell. Refer to the BATTERY TESTING CHART for analysis of test readings.

To read the hydrometer correctly, position the top surface of the electrolyte in the hydrometer at eye level. Disregard the curvature of the liquid where the surface rises against the float.

EXAMPLE

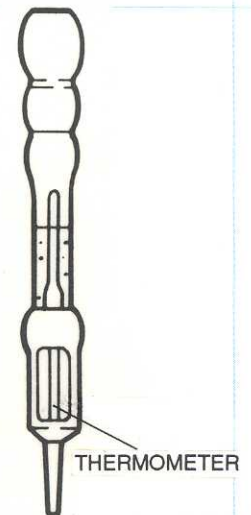
Hydrometer reading is.....	1.240
Temperature is.....	50°F
Degrees different than 80°.....	30
Number of 10° intervals.....	3
Times Correction factor.....	3 x 0.004
Correction =.....	0.012

(Correction is subtracted when temperature is lower than 80°)

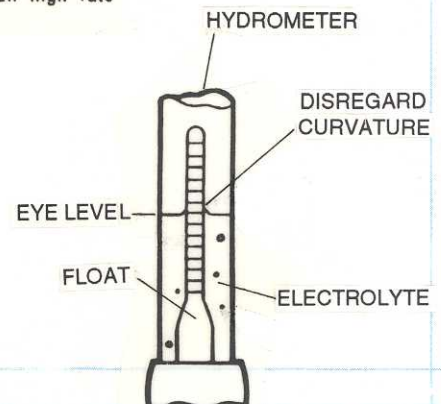
-0.012

Corrected Hydrometer
Reading 1.228

A fully charged battery should have a specific gravity reading above 1.225 in all cells before performing full high rate discharge test.



HYDROMETER

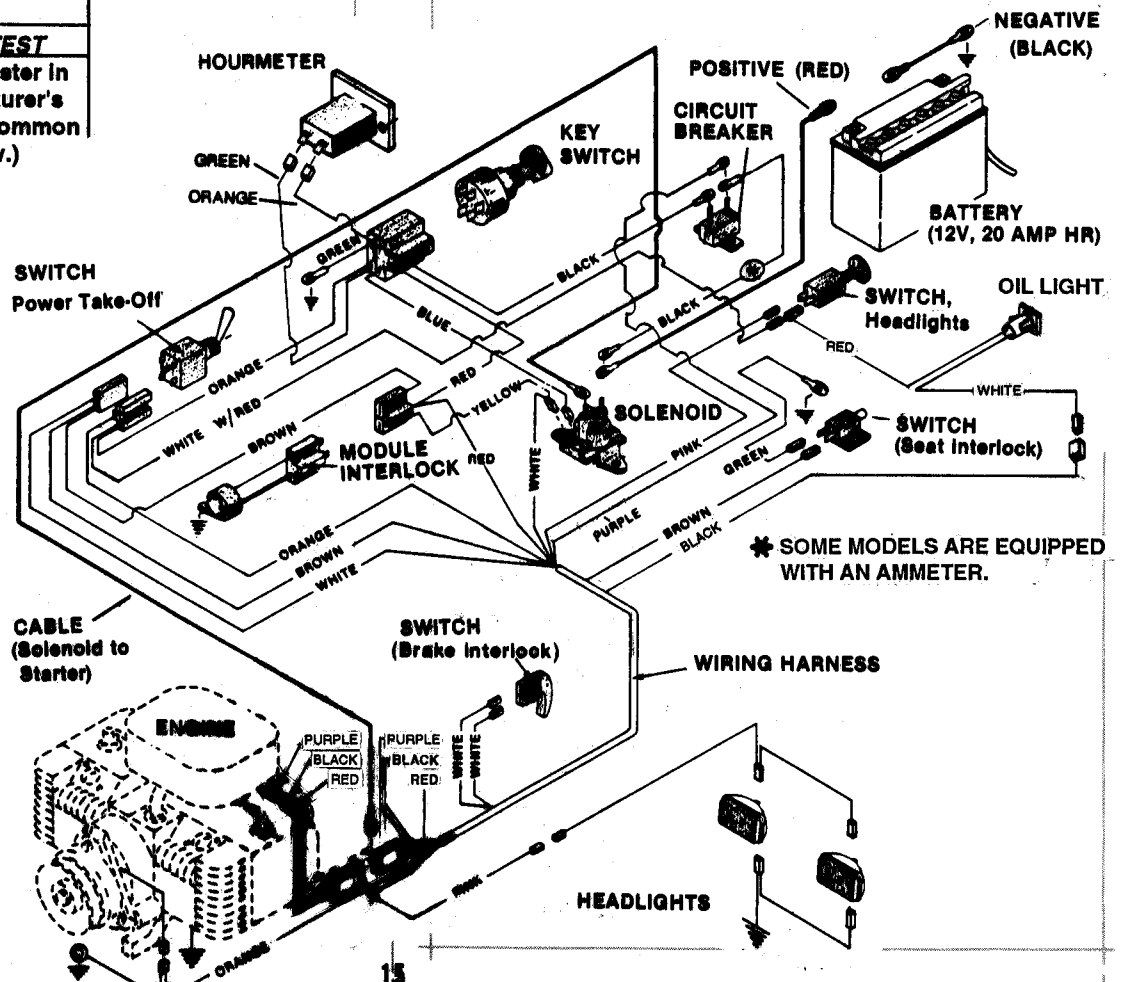


BATTERY TESTING CHART

<u>HYDROMETER TEST</u> <u>@ 80° F (26.7°C)</u>	<u>STATE of CHARGE or</u> <u>BATTERY CONDITION</u>	<u>CORRECTION or REMEDY</u>
(1) 1.215 Sp. Gr.	(1) Probably Good	(1) No correction required if variation among cells not over .050 Sp. Gr. Give high rate discharge capacity test. If test O.K., check operation and setting of voltage regulator. Make a thorough check of the electrical system for short circuits, loose connections, corroded terminals, etc.
(2) Less than 1.215 Sp. Gr.	(2) Questionable.	(2) Battery should be recharged. After recharge, repeat step #1.
(3) Cells showing more than 50 points (.050) Sp. Gr.) variation in gravity.	(3) A. Short circuit in low cell. B. Loss of electrolyte by leakage or excessive overcharge. C. Improper addition of acid or contaminants. D. Natural or premature failure. E. Cracked box partition.	(3) Try to recharge battery. If .050 Sp. Gr. variation persists, battery should be replaced. If battery accepts recharge and variation does not persist, repeat step #1.

<u>OPEN CIRCUIT VOLTAGE TEST</u>	<u>STATE of CHARGE or</u> <u>BATTERY CONDITION</u>	<u>CORRECTION or REMEDY</u>
(4) Battery or cells showing more than 1/2 charge.	(4) Probably good.	(4) Apply remedy given for #1 above.
(5) Battery showing less than 1/2 charge or cells showing less than 1/2 charge but not more than .05 volts variation.	(5) Questionable	(5) Apply remedy given for #2 above.
(6) If cell connectors are accessible, cells showing more than .05 variation.	(6) See #3 above.	(6) Apply remedy given for #3 above.

HIGH RATE DISCHARGE TEST
(7) Use high rate discharge tester in accordance with manufacturer's recommendations. (See common electrical difficulties below.)



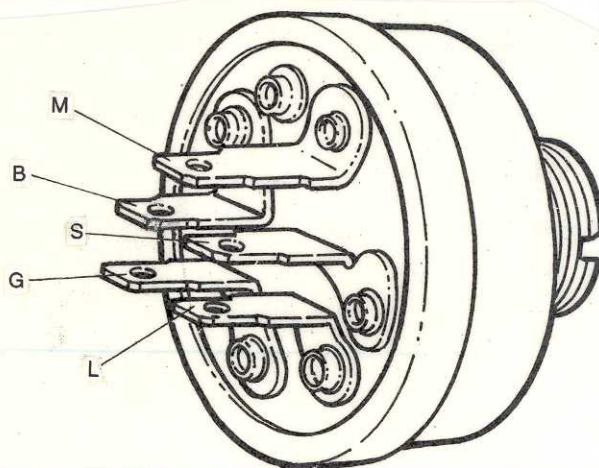
**ELECTRICAL
DIAGRAM**

INTERLOCK SYSTEM ANALYSIS

KEY SWITCH

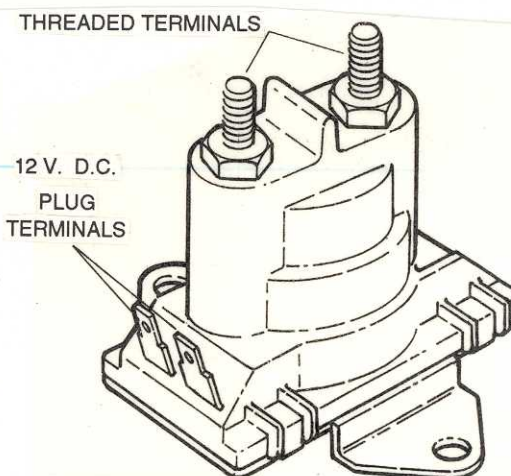
- 1: Disconnect wires from the switch terminals.
- 2: Place the switch in the OFF position. Connect continuity light to "M" and "G" terminals only -- there should be contact.
- 3: Place the switch in ON position and connect the light to the "B" and "L" terminals only -- there should be contact.
- 4: Hold the switch in the START position after connecting the light to terminals "B" and "S" -- there should be contact.

5: Reconnect harness wires to switch terminals after completing test.



SOLENOID TESTS

- 1: Disconnect all wires from the solenoid.
- 2: Connect the continuity light to both threaded terminals.
- 3: Now apply 12 Volts to the two plug terminals. The solenoid should click and the continuity light should come on.
- 4: Reconnect wires to proper terminals.

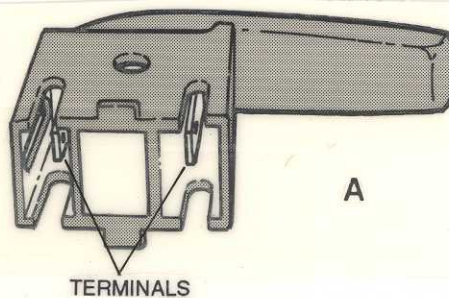


CLUTCH PEDAL SWITCH

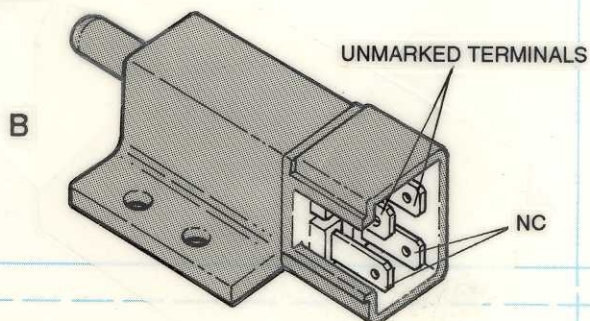
- 1: Disconnect wires from switch terminals.
- 2: Attach Continuity light to terminals and turn light on.
- 3: Press and release clutch pedal -- the light should come on only when the pedal is depressed.

The clutch pedal switch B is used on later series YT TRACTORS. It must be tested differently than the style A switch which is used on the earlier YT TRACTORS.

- 1: Disconnect The wires from the four switch terminals.
- 2: Attach a continuity light to the two terminals marked NC. Turn the light switch on - the bulb should light. Depress the clutch pedal and the bulb should go out.

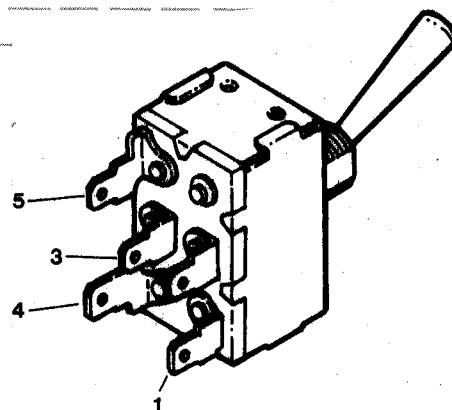


3: Next, attach the light to the two UNMARKED terminals. Turn the light switch on and depress the pedal - the bulb should light ONLY when the pedal is depressed.



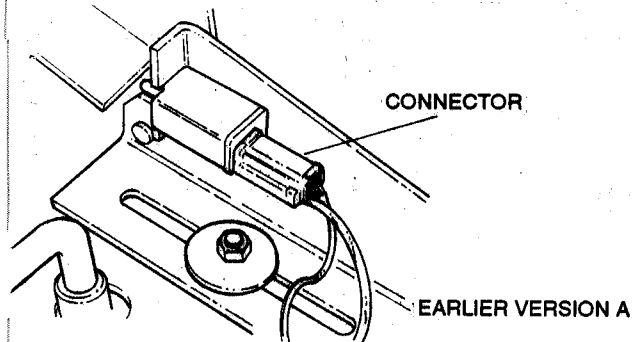
PTO SWITCH TESTS

- 1: Disconnect wires from the switch terminals.
- 2: Place switch in OFF position and connect tester wires to the #4 and #5 terminals only -- the light should come on.
- 3: Place switch in ON position and connect the tester wires to the #1 and #3 terminals only -- the light should come on.
- 4: Reconnect wires to the proper terminals.

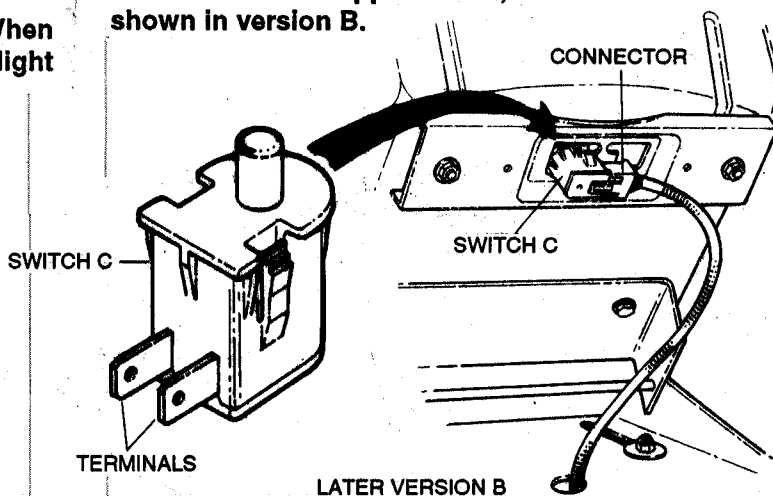


SEAT SWITCH TEST

- 1: Disconnect wire connectors from terminals.
- 2: Attach continuity light wires to the terminals. When the switch is depressed (making the circuit) the light should come on.
- 3: Reconnect wires to the seat switch.



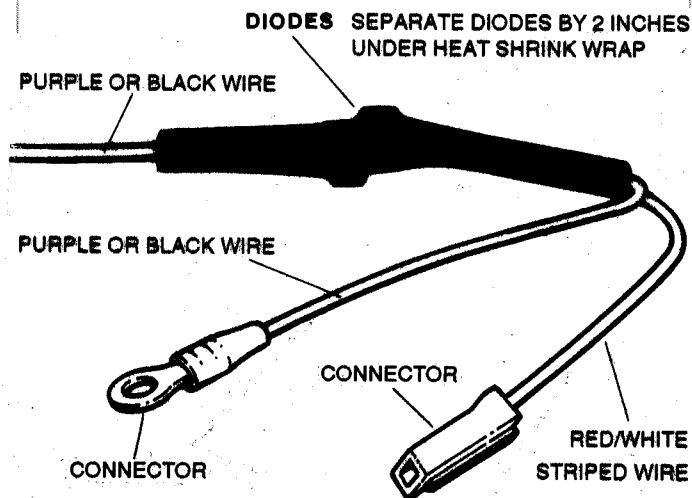
Later YT tractors are equipped with a spring loaded channel attached to the underside of the operator's seat, with switch C snapped into it, as shown in version B.



DIODE HARNESS

- 1: Disconnect diode harness terminals from the engine and the light switch.
- 2: Connect BLACK continuity wire to the light switch (red & white wire) connector and the RED continuity wire to the engine (purple or black wire) connector - there should be contact. Reverse the continuity light wires and there should be an open circuit.
- 3: Connect the BLACK continuity wire to the engine (purple or black wire) connector and the RED continuity wire to the solenoid terminal (purple or black) and you should have continuity. Reverse the wires and there should be no continuity through the charging diode - an open circuit.

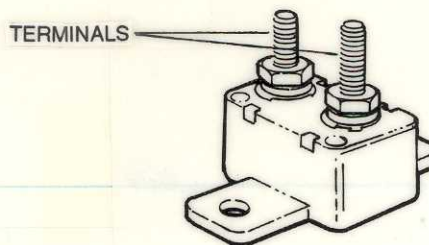
NOTE: The Continuity Tester used to make the above tests has the BLACK wire attached to the negative (-) terminal of the battery.



NOTE: The Diode Harness is part of the INTERLOCK SYSTEM on earlier tractors. Later model tractors DO NOT have the harness.

CIRCUIT BREAKER TEST

- 1: Disconnect wires from circuit breaker.
- 2: Attach Continuity light to both terminals -- there should be contact.



ELECTRIC CLUTCH TESTS

A: MEASURE CLUTCH FIELD COIL

- 1: Turn engine switch and PTO switch off.
- 2: Disconnect clutch wire connectors.
- 3: Connect OHM meter leads to the two wires in the clutch connector (Figure 1).
- 4: If the meter reading is BELOW 2.40 OHMs or ABOVE 3.40 OHMs resistance, the clutch has failed and must be replaced.
- 5: If the meter reads between 2.40 and 3.40 OHMs resistance, proceed with the CLUTCH CURRENT DRAW test B.

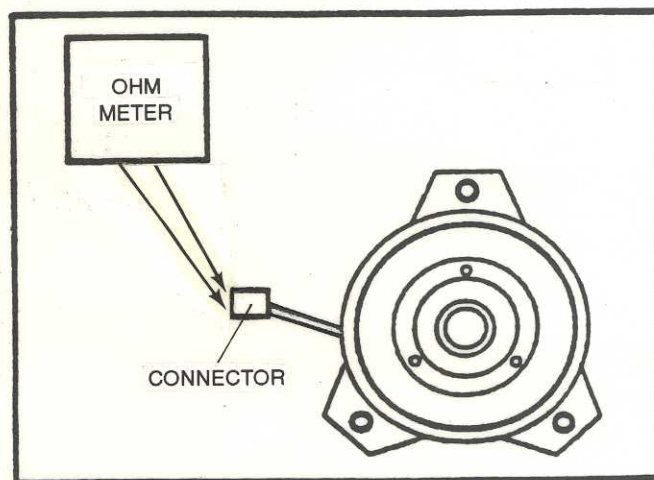


FIG. 1 - CLUTCH FIELD COIL RESISTANCE

B: MEASURE CLUTCH CURRENT DRAW

- 1: With the engine switch and PTO switch OFF, disconnect the clutch wire connector.
- 2: Refer to Figure 2. Use an AMP meter with a 10 AMP scale. Connect one meter lead to clutch connector wire "A" and connect the other meter lead to wire "C" in the harness connector.
- 3: Connect a short jumper wire to wire "B" in the clutch connector and to wire "D" in the harness connector.
- 4: Turn PTO switch ON.
- 5: If the meter reads BELOW 3.5 AMPS, the electrical system has a problem (battery, relay, switches, etc). Check the electrical system.
- 6: If the meter reads 3.5 AMPS to 4.5 AMPS, proceed to the AIR GAP SETTING instructions.

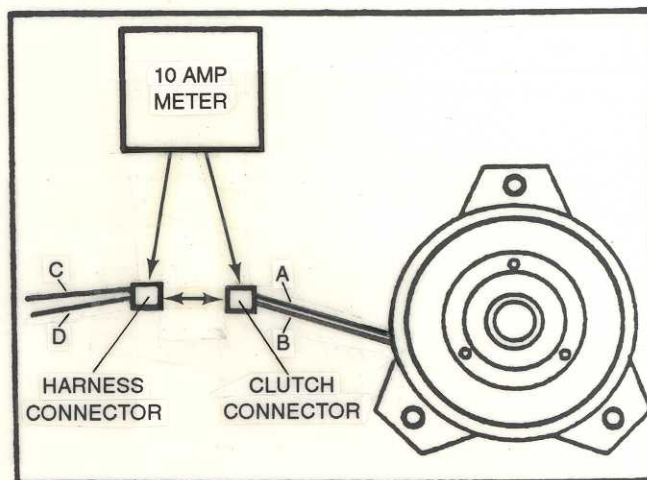


FIG. 2 - CLUTCH CURRENT DRAW

CHECK AIR GAP SETTING

1: With the engine switch and PTO switch OFF, locate the three air gap check "slots" as shown.

2: Insert a .017" feeler gauge into each of the 3 slots.

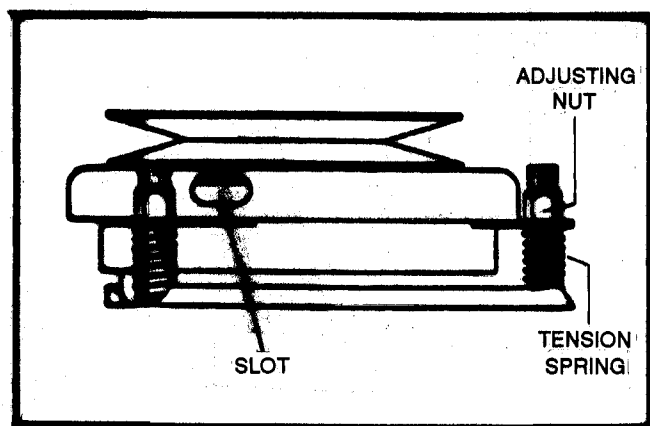
3: If the gaps do not fall between .010" and .025" reset the spring loaded adjustment nuts until the gaps are measured at .017" on the feeler gauge.

THEREFORE, IF.....

A: The resistance falls between 2.40 and 3.40 OHMS ..

B: The amperage draw is 3.50 AMPS to 4.5 AMPS.

C: The air gaps are between .010" and .025" (or have been reset to .017"), the electric clutch is within factory specifications and is not the source of a problem -- check the remainder of the electrical system.



NEW CLUTCH NOTE

BURNISH NEW CLUTCH: To insure optimum clutch operation on a new tractor or on one with a new clutch, burnish the clutch as follows;

1: With the mower operational, run the engine at 1/2 throttle then engage and disengage the clutch 5 times (10 seconds on and 10 seconds off).

2: Increase engine speed to 3/4 throttle and again engage and disengage clutch 5 times at intervals of 10 seconds on and 10 seconds off to complete the job of burnishing the clutch.

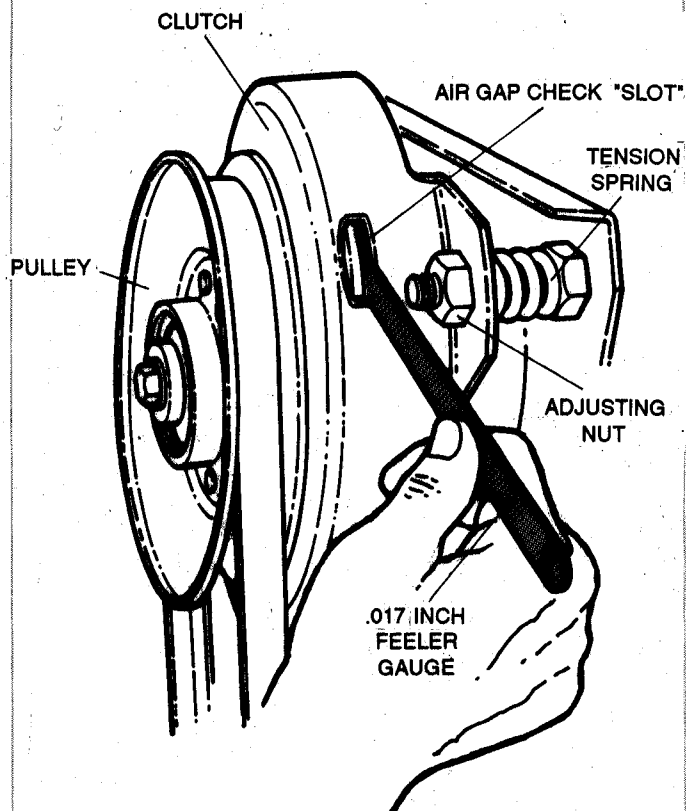


FIG. 2 - USING FEELER GAUGE

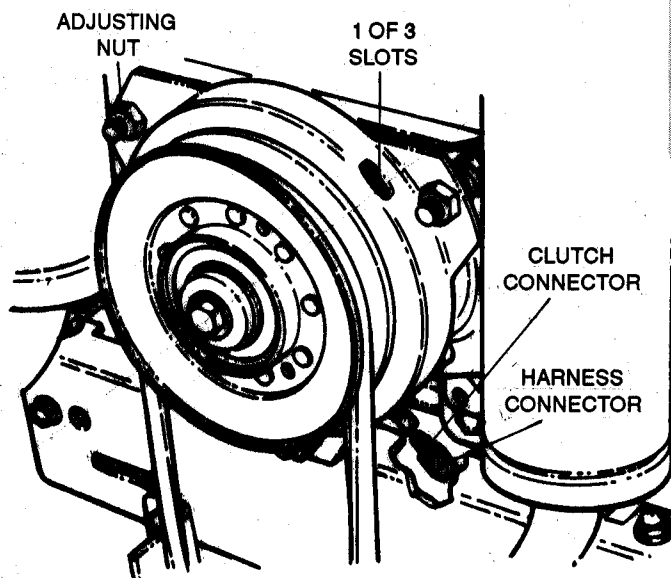


FIG. 3 - CLUTCH ELECTRICAL CONNECTOR

SECTION 5: BRAKE/CLUTCH SYSTEMS

DISC DRIVE SYSTEM (YTDs)

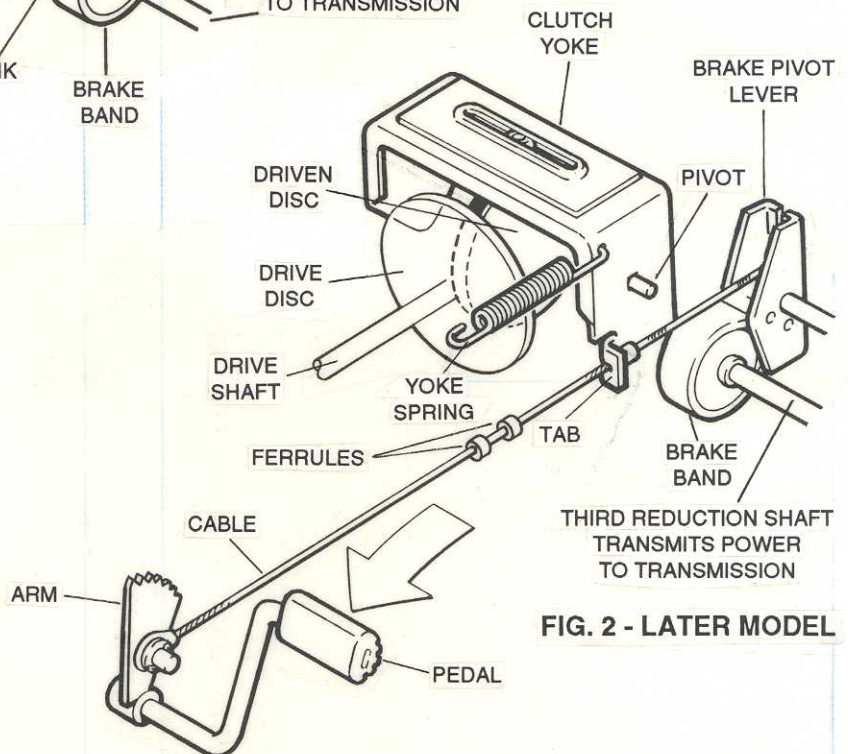
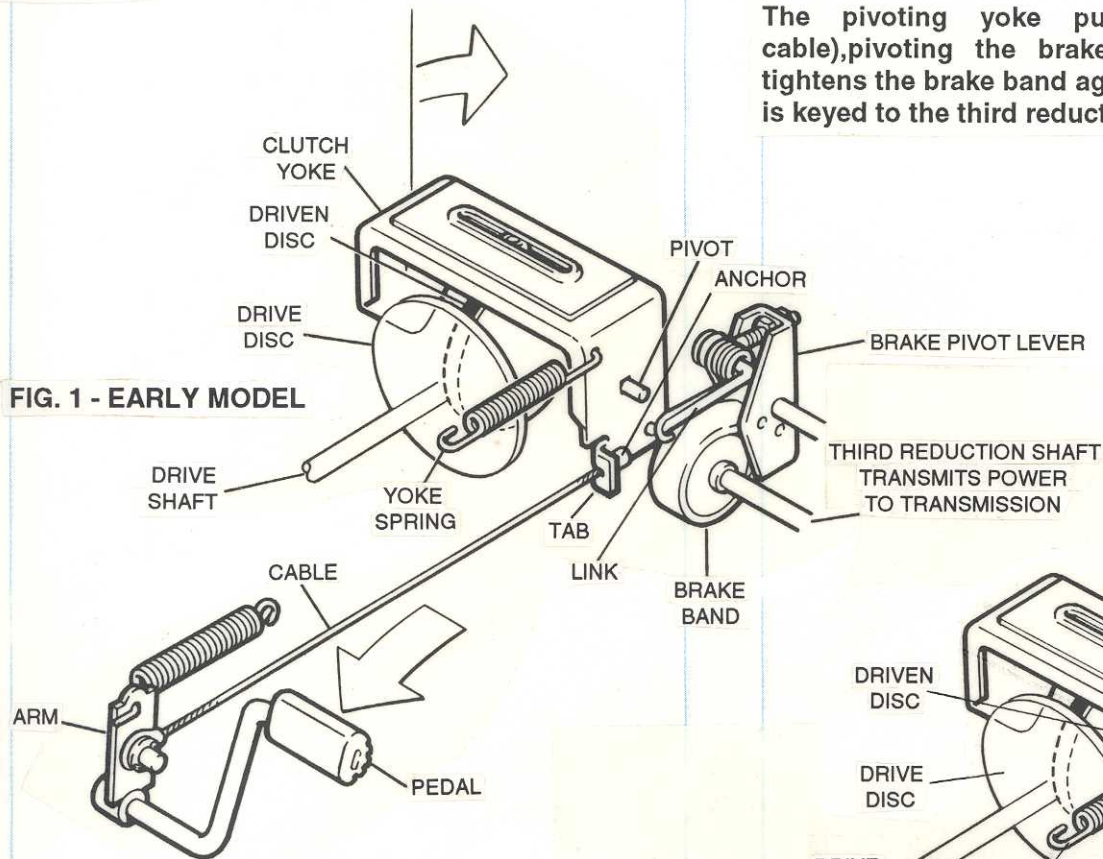
DESCRIPTION

The brake and clutch mechanisms are combined to be operated from one pedal. The operator depresses the pedal halfway down to disengage the clutch. The pedal must be completely depressed to apply the brakes. The clutch engages and disengages the driven disc.

PRINCIPLE OF OPERATION

Depressing the clutch/brake pedal pulls a steel cable which is connected to the clutch yoke. The yoke pivots and pulls the driven disc away from the drive disc. This action interrupts the transfer of power from the engine to the rear wheels.

The pivoting yoke pulls the brake link (or cable), pivoting the brake pivot lever which then tightens the brake band against the brake drum which is keyed to the third reduction transmission shaft.



HYDROSTATIC DRIVE (YTHs)

DESCRIPTION

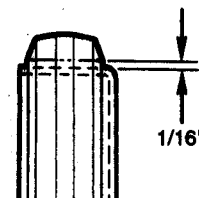
The brake and forward/reverse control mechanisms are interactive. When the operator depresses the neutral return/brake pedal, the tractor will come to a stop and the forward/reverse control pedal will be automatically placed in the neutral mode.

PRINCIPLE OF OPERATION

Depressing the brake pedal pulls a steel cable which is attached to the disc brake assembly located in the bottom of the hydrostatic transmission. At the same time the brake is being applied, the forward/reverse control mechanism is deactivated, placing the transmission in the neutral mode.

CLUTCH SYSTEM (DISC DRIVE SYSTEM)

CHECK DRIVEN DISC: If the rubber on the driven disc is worn down to 1/16" or less, replace it. **Note:** Review the **DRIVEN DISC WEAR ANALYSIS** in section 2 and follow recommendations.



REPLACING DRIVEN DISC: Replace the driven disc as follows if it is excessively or unevenly worn.

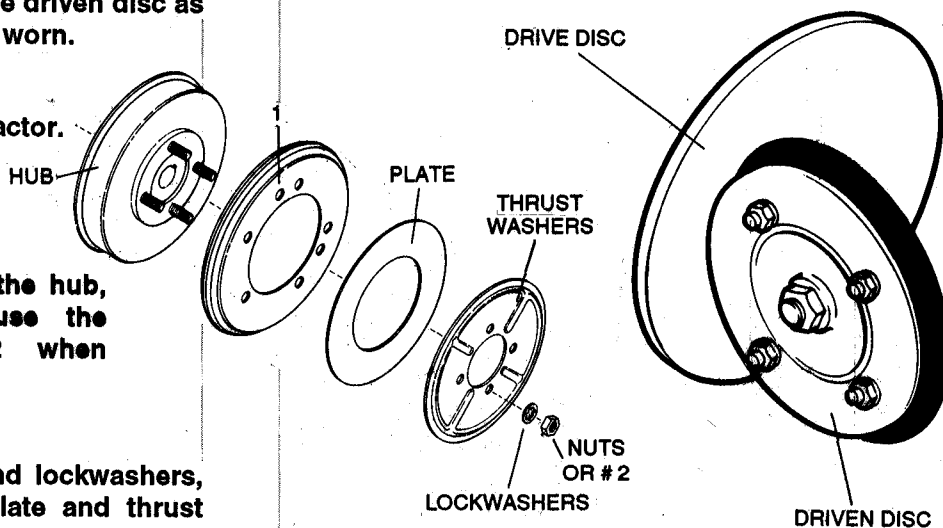
1: Remove the rear cover plate from tractor.

2: Shift the drive into neutral.

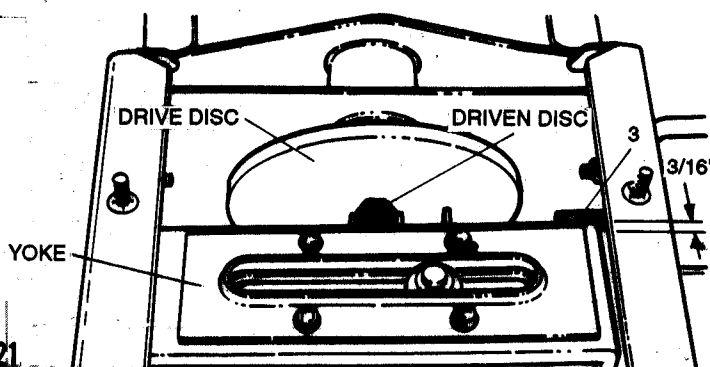
NOTE: DO NOT use pliers to hold the hub, damage could result. Always use the **SMOOTH CLUTCH TOOL #32392** when disassembling the driven disc.

3: Remove the four retaining nuts and lockwashers, or locknuts (2), and remove the plate and thrust washer.

4: Remove the old disc (1) and replace it with a new one. Reassemble in reverse order.



NOTE: Some earlier models have a stop pin (3). If your tractor is equipped with this pin, remove and discard it!



DISC ALIGNMENT: This consists of both the vertical position of the drive disc and the horizontal position of the driven disc. Both must be properly aligned for maximum efficiency. Check as follows:

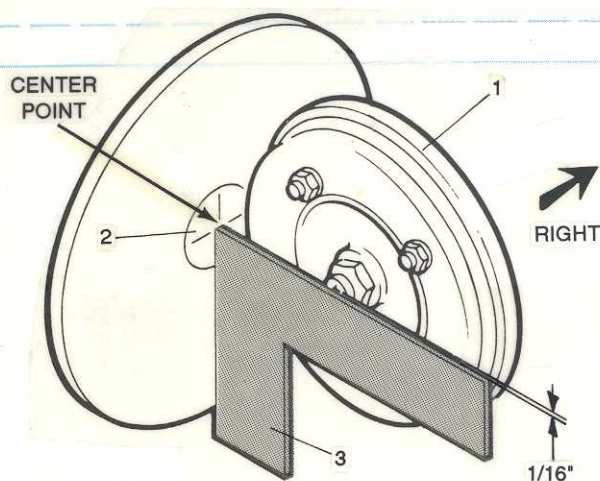
1: Remove the fenders and rear cover plate.

2: Shift into reverse to move driven disc (1) to the right side of the drive disc.

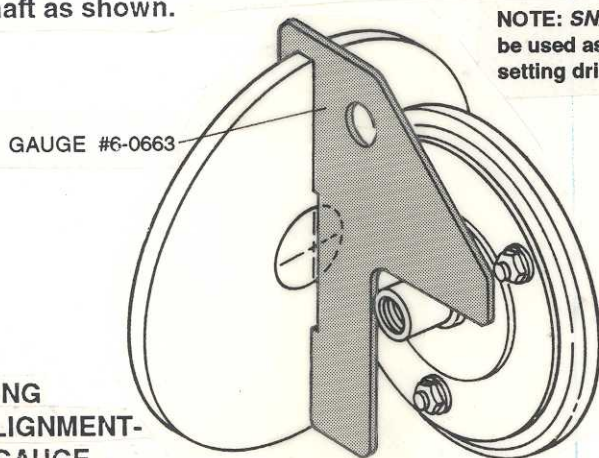
3: Draw center marks on the drive disc center button (2) using a legible marker.

NOTE: Be sure to find the **EXACT** center of the button and then draw the marks on this point!

4: Position a square (3) against the center of the drive disc. The upper (straight) edge of the square should be 1/16" BELOW the center point of the driven disc input shaft as shown.



**FIG. 1 - CHECKING DISC ALIGNMENT-
USING SQUARE**



**FIG. 2 -
CHECKING
DISC ALIGNMENT-
USING GAUGE**

5: To **ADJUST ALIGNMENT**, loosen the six screws which project through the slots in the tractor frame securing the bearing support to the frame.

6: Tap gently **WITH A MALLET** to move the bearing support assembly up or down as required to obtain correct alignment, then tighten the six screws. Recheck alignment after retightening.

NOTE: **SNAPPER** gauge #6-0663 shown here can be used as an alternate method of checking and setting drive disc alignment.

NOTE: Only 1983 thru 1986 models have the "adjustment" frame slots.

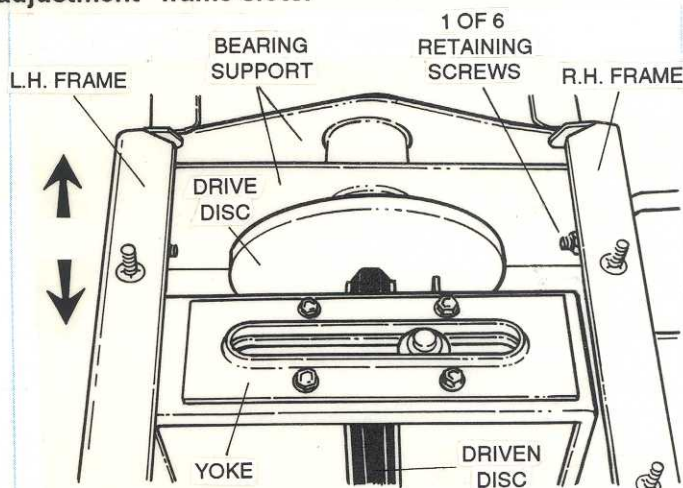
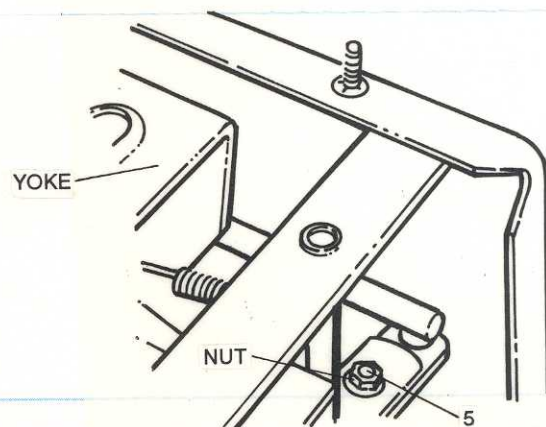


FIG. 3 - ADJUSTING DISC ALIGNMENT

SHIFT DETENT ADJUSTMENT

1: Position the driven disc at the center of the drive disc, then check the position of the shift lever. If the lever is **NOT** in the **NEUTRAL** slot of the shift detent, loosen the nut on the adjusting screw (5) and move the lever into the **NEUTRAL** slot. Then retighten the adjusting screw nut.

2: Check adjustment by shifting to *first* speed, then by shifting to *reverse*. The driven disc should clear the drive disc button in **BOTH** *first* and *reverse*, and **MUST NOT** run off the drive disc in the sixth speed.



DRIVE DISC

INSPECTION: The drive disc should be replaced if warped, damaged or excessively worn. Warpage can be checked by using a dial indicator. If the surface varies more than .020", replace the disc. When replacing the disc, it is recommended that the ball bearings and tube bore be inspected for damage and/or excessive wear.

REMOVAL: Remove the drive shaft **BEFORE** removing the drive disc assembly. Refer to the **DRIVE SHAFT REMOVAL** Instructions in SECTION 6 for disassembly procedures. Note: There are two different style drive disc assemblies - they are described as style "A" and style "B". Follow the appropriate instruction for the type involved.

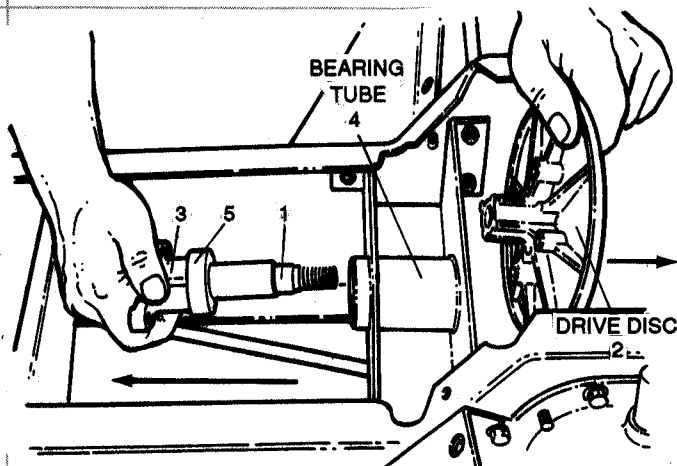


FIG. 1 - REMOVING STYLE "A" DISC

TO DISASSEMBLE (Early) STYLE "A":

1: Hold hub (3) and carefully tap drive disc (2) "flanges" clockwise (NOTE: The drive disc has Left Hand thread) with a mallet to break the disc loose from spindle (1) threads.

2: Hold the hub and unscrew the drive disc from the spindle. Pull hub, front ball bearing (5) and spindle FORWARD from the bearing tube which is in bearing support (4), to remove the driven disc.

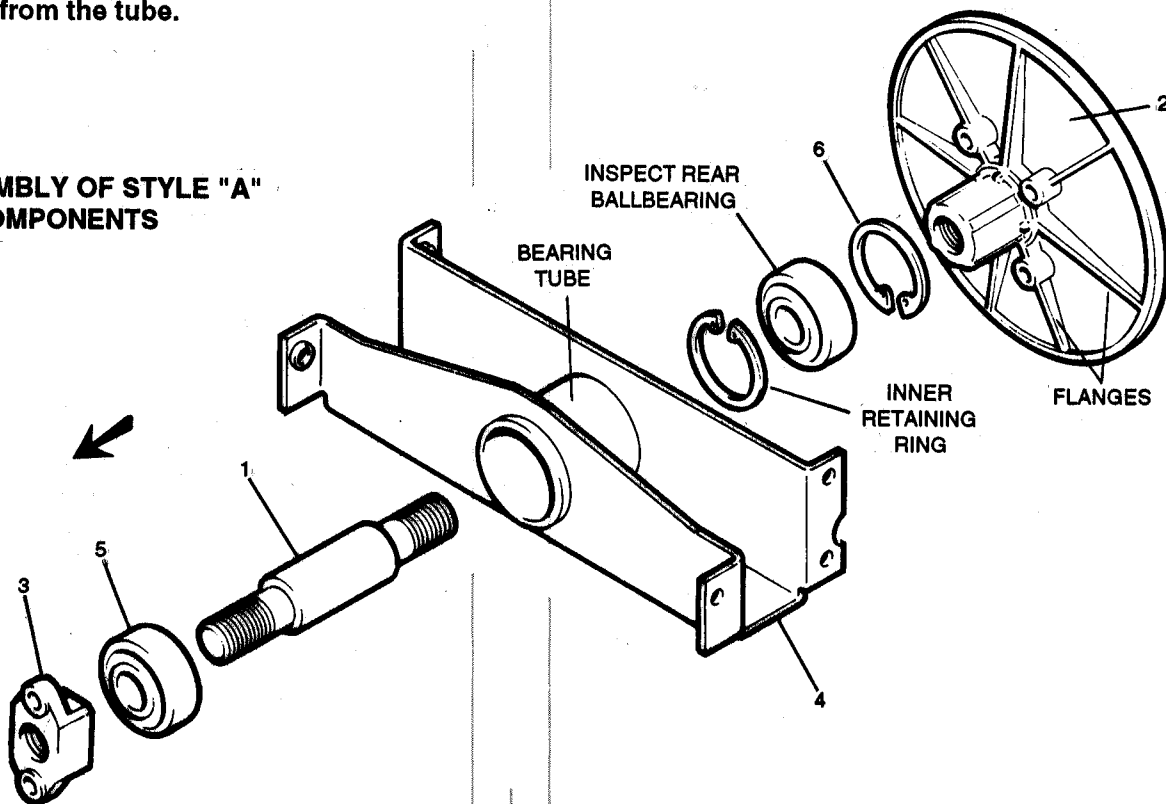
3: Use internal snap ring pliers and remove the outer retaining ring (6) from the tube.

4: Clamp spindle in vise and tap the hub clockwise (it has Left Hand thread) with a mallet. Then unscrew hub from the spindle. Remove front ball bearing from the spindle.

5: Inspect all components and replace any which are damaged or are excessively worn.

6: Reverse this procedure to reassemble the drive disc assembly.

FIG. 2 - DISASSEMBLY OF STYLE "A" DISC & COMPONENTS



TO DISASSEMBLE (Later) STYLE "B":

1: Hold hub (3) and carefully tap drive disc (2) flanges clockwise (it has Left Hand thread) with a mallet to break the disc loose from the spindle (1) threads.

2: Hold the hub and unscrew the disc from the spindle. Remove the 5/16" locknuts (9) and the 5/16 x 3" capscrews (8).

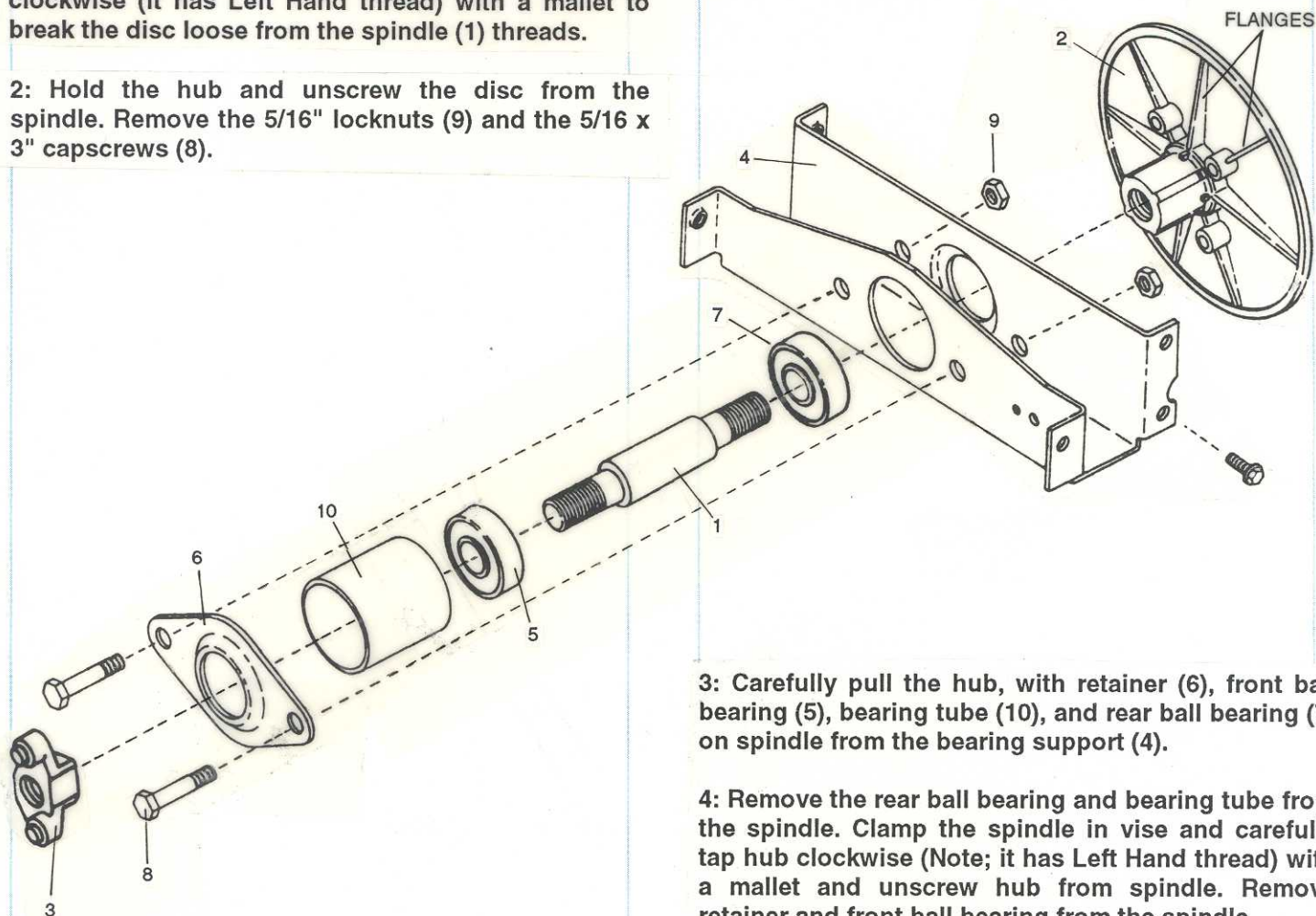


FIG. 3 - DISASSEMBLY OF STYLE "B" DISC & COMPONENTS

3: Carefully pull the hub, with retainer (6), front ball bearing (5), bearing tube (10), and rear ball bearing (7) on spindle from the bearing support (4).

4: Remove the rear ball bearing and bearing tube from the spindle. Clamp the spindle in vise and carefully tap hub clockwise (Note; it has Left Hand thread) with a mallet and unscrew hub from spindle. Remove retainer and front ball bearing from the spindle.

5: Inspect all parts and replace any part which is damaged or excessively worn.

6: Reverse this procedure to reassemble the drive disc assembly.

DRIVE DISC ADJUSTMENT

NOTE: After completing the reassembly of the style "A" or "B" disc drive assembly, measure the distance between the drive disc face and the rear surface of the mounting bracket as shown. This distance must be set at 2--3/16".

If the distance is LESS than 2--3/16", interference between the top of the yoke and the rubber disc might occur. If the distance is greater than 2--1/4", improper declutching can result.

TO CORRECT if the distance is less than 2--3/16", remove the drive disc and add washers #1-0935 to bring the distance up to 2--3/16".

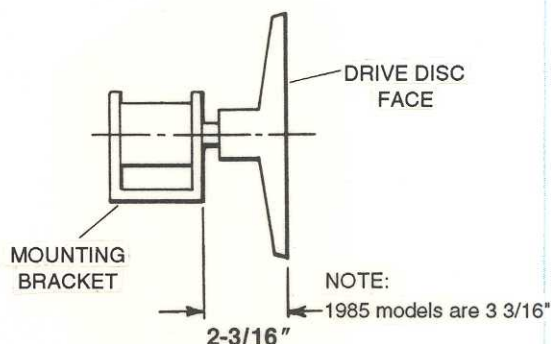


FIG. 4 - DRIVE DISC ADJUSTMENT

BRAKE SYSTEM-DISC DRIVE

The clutch/brake pedal controls the clutch and brake functions on a disc drive (YTD) tractor. The clutch is disengaged after the pedal has been pushed about half way down. After being depressed about 3/4" even further (pedal free travel) the brake will begin to function.

PEDAL TRAVEL INSPECTION

1: With the engine off, place the axle range selector in either HI or LO and attempt to roll the tractor while slowly depressing the clutch/brake pedal.

2: If the pedal "free travel" distance is NOT about 3/4" (starting after the disengaging of the clutch and ending before activation of the brake) brake cable adjustment is required. The area where "free travel" should occur is the FIRST HALF of the total distance the pedal travels. Braking should NOT start near the end of the travel distance -- see the illustration.

BRAKE ADJUSTMENT (EARLY MODELS)

1: Loosen the brake link jam nut located at the FRONT of the brake pivot lever, then turn the jam nut at the REAR of the lever clockwise to tighten the brake band until proper braking is obtained. Retighten the front jam nut. Refer to the illustration

NOTE: On these earlier models, if clutching occurs too late in pedal travel, it will be necessary to move one or more ferrules from in FRONT of the clutch yoke tab to the rear of the tab next to the cable anchor. When properly adjusted, there should be approximately 1" of slack cable (a total of 1" up and down movement) measured midway between the yoke tab and the clutch pedal.

BRAKE ADJUSTMENT (LATER MODELS)

1: To adjust brake, tighten the brake cable by moving one (or more) ferrules from the FRONT of the brake pivot lever to the REAR of the lever (next to the anchor).

NOTE: If the brake cable is adjusted too tight, the clutch switch may not engage (to close the interlock circuit) when the pedal is depressed.

FIG. 1 - PEDAL TRAVEL

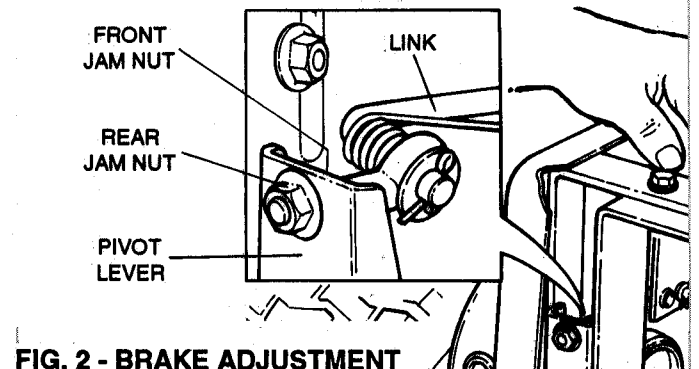
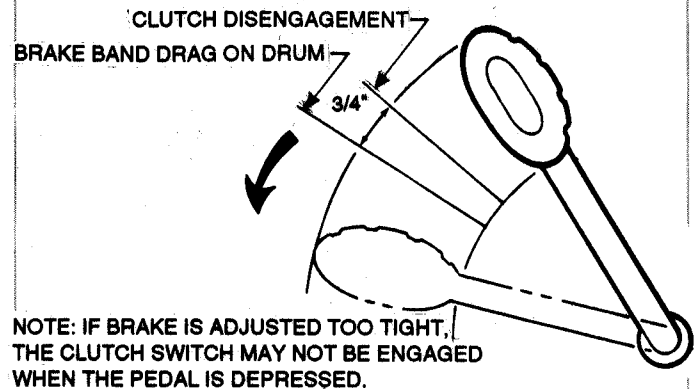


FIG. 2 - BRAKE ADJUSTMENT

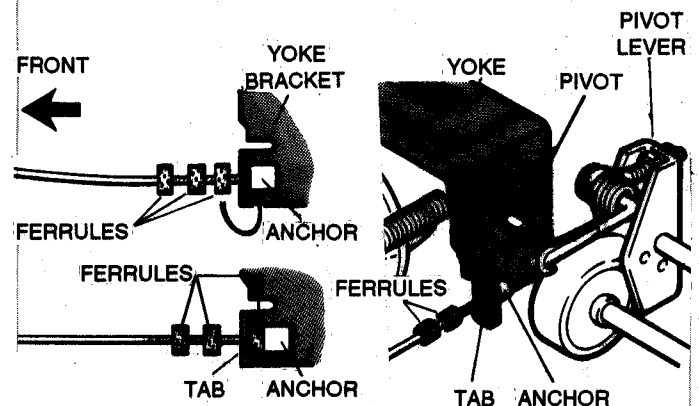


FIG. 3 - FERRULE RELOCATION (EARLY MODELS)

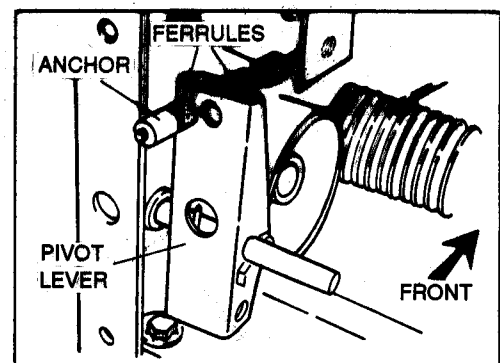


FIG. 1 - FERRULE RELOCATION (LATER MODELS)

BRAKE OVERHAUL (EARLY MODELS)

1: To remove the brake drum (5), remove the 5/8" retaining jam nut (6) from the end of the third reduction transmission shaft and slip the brake drum off shaft.

NOTE: When replacing a worn brake band (10), it IS NOT necessary to remove the brake drum (5).

2: To remove a worn brake band (10), unlatch torsion spring (1) from the brake link (2). Remove the cotter pin (3) and flat washer (4) from the end of the brake link.

3: Remove the three 5/16" x 3/4" lock bolts (7) and locknuts; remove the brake pivot support (8) from between the upper and lower cross straps. Slide the brake assembly off the 3/8" x 2-9/16" clevis pin (9).

4: Check the amount of brake band lining (10) wear. The brake band should be replaced when the lining is worn to 1/16" or less, or if it is oil soaked or damaged.

5: Remove the 1/4" x 1-13/16" clevis pin (11) from the assembly and remove the band. Install a new brake band in the channel of the brake pivot lever, then reassemble brake components in reverse order.

NOTE: Check the alignment of the band lining to the drum surface. There should be full contact. Operate the brake pivot lever to make sure that there is no binding.

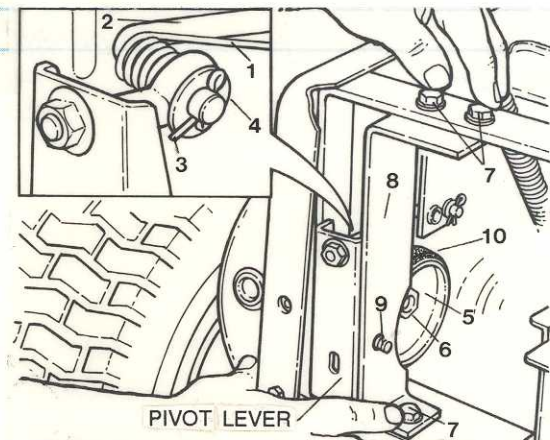


FIG. 1 - BRAKE DRUM REMOVAL

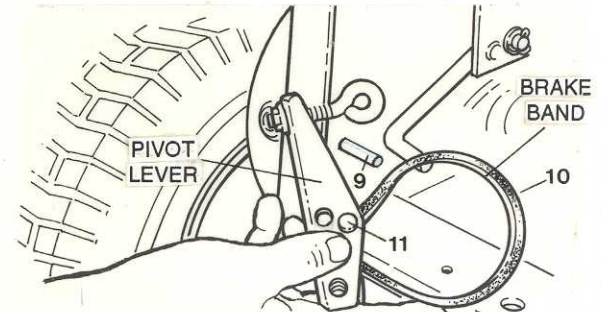


FIG. 2 - BRAKE PIVOT LEVER & BAND REMOVAL

BRAKE OVERHAUL (LATER MODELS)

1: On later models, the brake link was replaced by a brake cable/ferrule arrangement. On these, raise and remove the cable from it's position in the brake pivot lever slot and proceed with the disassembly steps described for the early models.

2: After reassembly is completed, place ferrules (1 or more) in front of or behind the pivot lever until the proper amount of braking is achieved. DO NOT adjust the brake cable too tight - clutch switch and proper clutching could be affected.

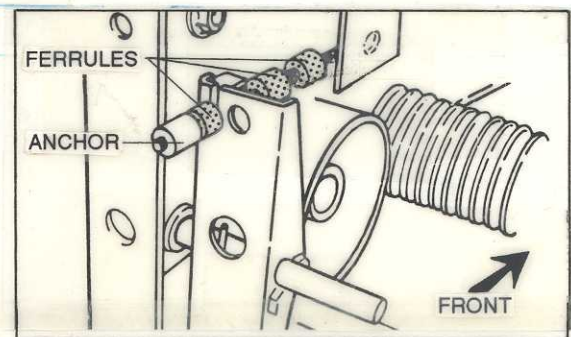


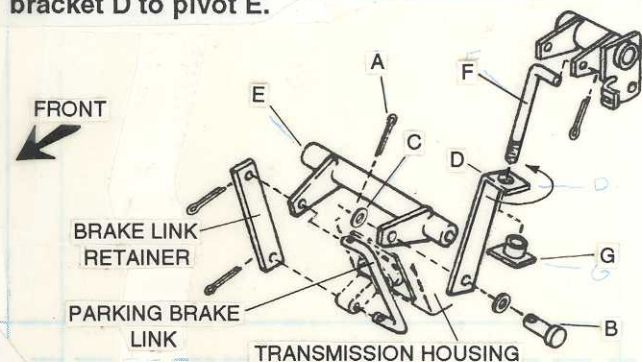
FIG. 3 - FERRULE RELOCATION (LATER MODELS)

BRAKE SYSTEM - HYDROSTATIC MODELS

The Hydro (YTH) Models have a disc brake rather than the brake band/drum system. The disc mechanism is "built - in" and is located in the lower portion of the Eaton transmission. Servicing of the YTH disc brake system if needed should be done only by trained technicians of the transmission manufacturer.

The hydro braking system is designed with a secondary brake/parking brake adjusting method. This method is to be used AFTER the primary adjusting method can no longer effect vehicle braking (all ferrules have been placed behind the pivot lever).

Remove cotter pin A and clevis pin B (with flat washer C) from parking brake bracket D and parking brake pivot E. Turn bracket D clockwise to SHORTEN adjusting link F in teenut G - as needed. Reattach bracket D to pivot E.



SECTION 6: DRIVE TRAINS

DESCRIPTION -- DISC DRIVE SYSTEM

YTD Tractors with disc drives have 12 forward and 2 reverse speeds. A dual range axle (HI-fast & LO- slow) permits the operator a selection of 6 forward and 1 reverse speed in each range. Changing the FORWARD speed from 1 to 6 in either axle range can be done "on - the - go" without clutching or stopping the machine. To shift into reverse, depress the clutch/brake pedal, bringing the tractor to a stop. Select the axle range, and then shift into REVERSE.

NOTE: The tractor must not be shifted from one axle range to the other while the tractor is in motion – gear damage can result! Shifting of the axle selector must be done only when the tractor is completely stopped.

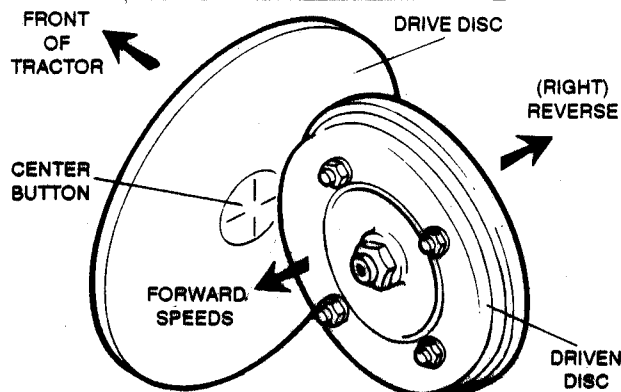
PRINCIPLE OF DISC DRIVE OPERATION

Power from the engine goes through the drive shaft to the drive disc. The drive disc contacts the driven disc, and through friction, delivers power to the primary chain case. The hexagonal drive tube transfers power from the chain case to the transmission. The multiple speed selection capabilities of the friction drive system is accomplished by the movement of the primary chain case across the hex tube. Shifting the ground speed selector moves the driven disc across the face of the drive disc, altering the ground speed.

First speed places the driven disc slightly to the left of the drive disc's center button. In this setting, the driven disc makes its slowest rotation. As the driven disc is shifted further to the left into higher settings (contacting increasingly larger circumferences on the drive disc), it's R.P.M.s will increase while the engine R.P.M.s remain the same.

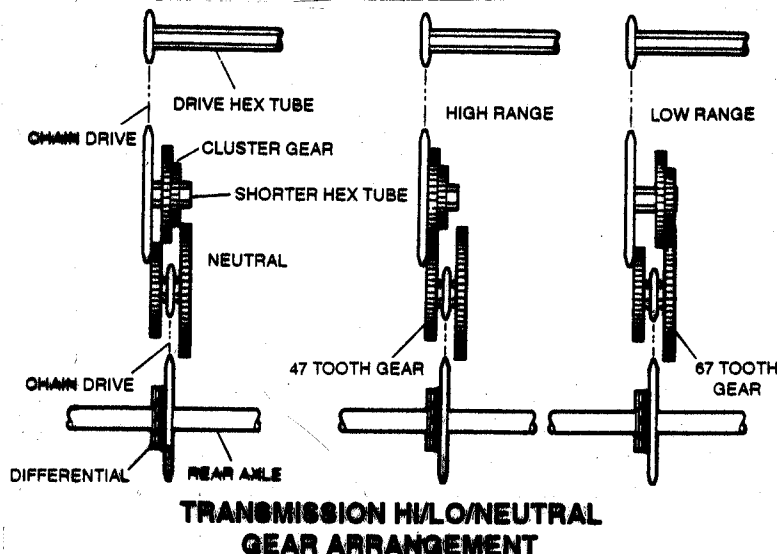
When in the neutral position, the driven disc makes contact with the ball bearing mounted center button. The center button does not rotate while the driven disc is in contact with it.

When in reverse, the driven disc will be to the right of the center button and the direction of rotation will be opposite that of the forward speeds. The drive disc rotation will remain the same.



Power is delivered to the transmission through the drive hex tube from the primary chain case. Inside the transmission, the hex tube drives a chain sprocket which is mounted on a shorter hex tube. Also mounted on this hex tube is a cluster gear which is slid back and forth on the tube to shift into either the high or low range. One of the two gears on the cluster meshes with one of the two larger gears (67 tooth and 47 tooth) when slid into position and then transmits power from the chain drive to the rear axle.

The rear axle is equipped with a differential which, while the tractor is turning, allows the outer rear wheel to travel a longer distance (larger arc) than the inner rear wheel and thus eliminate lawn damage which would otherwise occur if the inner wheel were allowed to skid across the turf.



SMOOTH START CLUTCH OPERATION

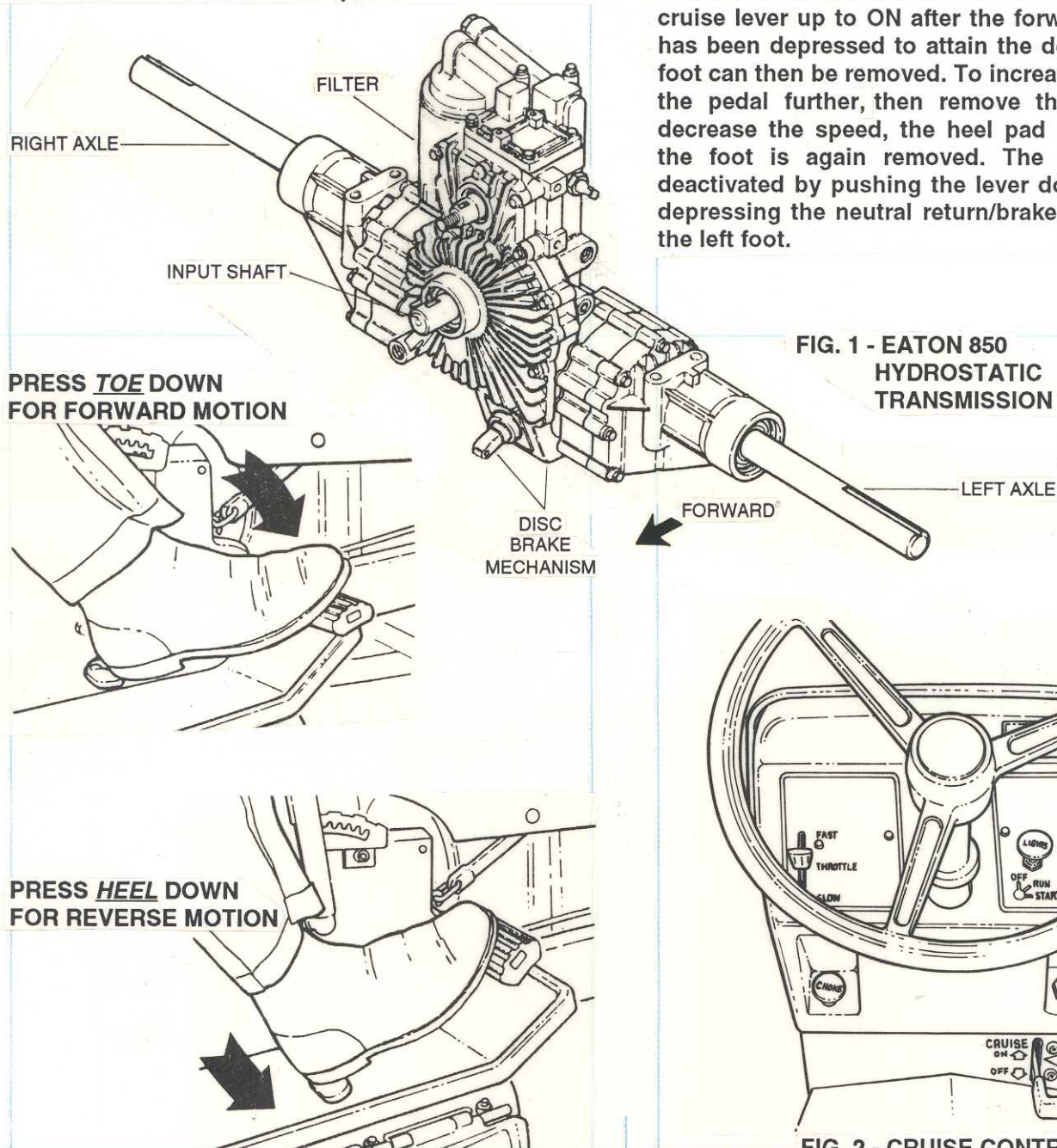
AFTER the ground speed selector has been engaged, releasing foot pressure on the clutch pedal brings the rubber surface of the driven disc into contact with the rotating metal surface of the drive disc, and begins the driven disc's rotation mode. As more foot pressure is released, the brake lining on the inside of the rubber disc will continue to smoothly exert MORE pressure (additional friction) against the surface of the driven disc hub. The driven disc then transfers the rotational movement (energy) to the chain case, which in turn, drives the transmission. The more pressure applied, the better the pulling power!

NOTE: If the operator "rides the clutch" excessively (keeps the clutch pedal partially depressed during operation), or when starting motion, exerts and/or releases foot pressure on the pedal TOO SLOWLY (especially in the higher gear speeds), the machine may have a tendency to lope or make jerky movements and also emit annoying grinding sounds. These reactions are the results of inadequate contact (lack of friction) between the brake lining on the inside of the rubber disc and the surface of the driven disc hub. Although unpleasant, these symptoms of the lack of smooth engagement will not harm the machine.

DESCRIPTION -- HYDROSTATIC DRIVE

The Model YTH Tractors, which are equipped with hydrostatic transmissions, have variable forward and reverse speeds. By pressing the forward/reverse control pedal's rubber pad with the toes, the tractor will go forward. By pressing the heel pad, the tractor will start reverse movement. The more pressure exerted, the faster the tractor will travel in forward or reverse direction. Speed is reduced by reducing pressure on the pedal. When the foot is completely removed from the pedal, the transmission goes into the neutral mode - the tractor will be in NEUTRAL.

Later model YTH tractors are equipped with cruise control. This allows the operator to set the forward movement at a desired speed and then remove the foot from the forward/reverse pedal.



PRINCIPLE OF OPERATION: HYDRO DRIVE

Power from the engine goes through the drive shaft to the traction drive belt into the hydrostatic drive transmission. The hydro is "automatic" and requires no manual shifting. Its operation is controlled by the forward/reverse pedal. Gradually increasing the "toe" pressure increases forward speed while releasing pressure causes the tractor to slow down. Removing the foot places the transmission in neutral mode. "Heel" pressure controls reverse speeds.

The hydrostatic transmission has a built-in differential which eliminates the inside rear wheel from dragging or sliding across the turf and cause lawn damage when turning the tractor.

The cruise control feature is activated by pulling the cruise lever up to ON after the forward control pedal has been depressed to attain the desired speed. The foot can then be removed. To increase speed, depress the pedal further, then remove the foot again. To decrease the speed, the heel pad is depressed and the foot is again removed. The cruise feature is deactivated by pushing the lever down to OFF or by depressing the neutral return/brake pedal firmly with the left foot.

ENGINE REMOVAL & INSTALLATION

The following procedures are for the removal and the reinstallation of the tractor engine. Refer to the engine manufacturer's service/repair manual for information concerning engine repairs.

REMOVAL PROCEDURE

1: Disconnect the hood stop cables and the headlight wiring harness before removing the hood.

1-A: Roll the drive belt off a deck pulley, then pull the belt slack up to the engine clutch pulley and remove the belt from the clutch pulley groove.

DO NOT attempt to roll the belt over the side of the engine clutch pulley **BEFORE** removing it from a deck pulley - the clutch pulley has a deep groove with sharp edges which can damage the belt!

2: Disconnect the **NEGATIVE (-)** cable first and then the **POSITIVE (+)** cable from the battery terminals. Remove battery from the tractor if it will interfere with the repairs.

WARNING: Always disconnect the negative battery cable first and reconnect it last to prevent sparks from occurring should the positive terminal accidentally be grounded to the frame by a tool or metal component.

3: Disconnect the engine to driveshaft coupling (1). Refer to "DRIVESHAFT REMOVAL" instructions in the following section.

4: On Kohler engines, remove the air breather cover, and the element. Then remove retaining screw (A), and remove the air breather base. The air breathers on Briggs & Stratton engines are removed in a similar fashion.

5: On Kohler engines, separate the engine harness from the tractor harness at the connectors, as shown.

On Briggs & Stratton engines, disconnect the ground to coil red wire. Disconnect the purple alternator wire and then the orange electric clutch wire. Disconnect the starter cable at the starter motor terminal.

6: Disconnect the throttle control cable (2) and choke cable (3) at the carburetor.

7: Remove the fuel line at the fuel filter.

8: Remove the engine mounting bolts from the tractor engine base.

9: Using a suitable lift, connect the hooks on the lift to the lifting brackets and remove the engine.

INSTALLING ENGINE

Reverse the foregoing removal instructions to reinstall the engine

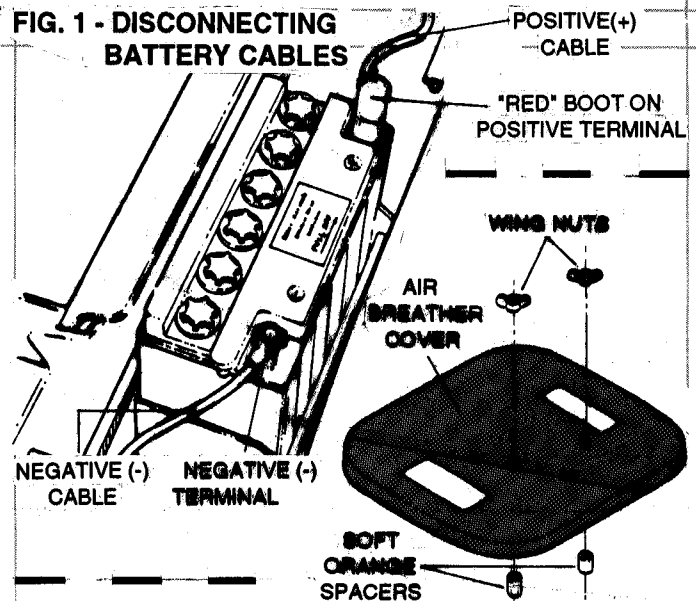
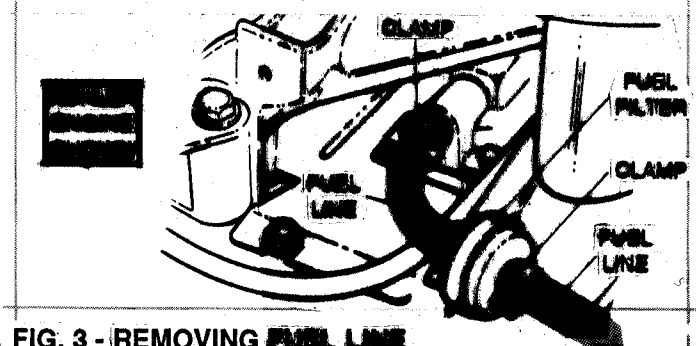
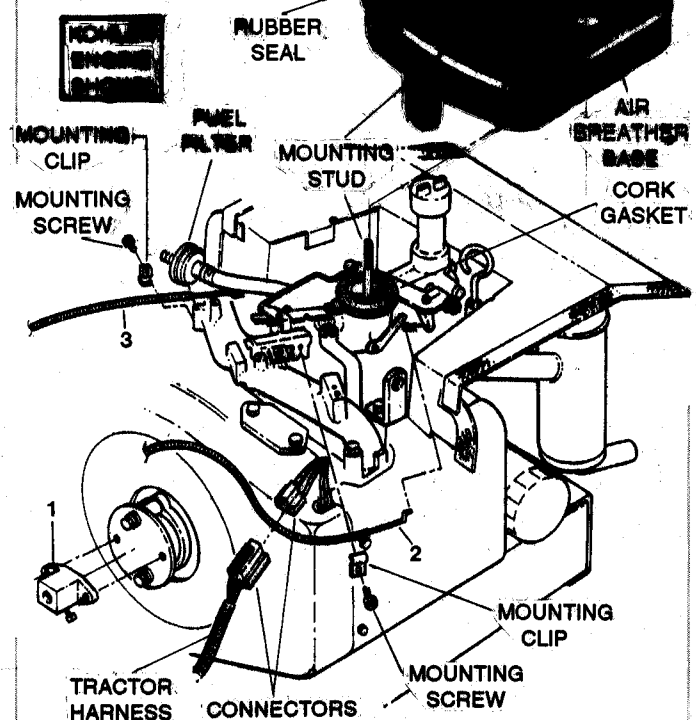


FIG. 2 - DISCONNECTING ELECTRICAL CONNECTIONS & DISCONNECTING ENGINE CONTROLS

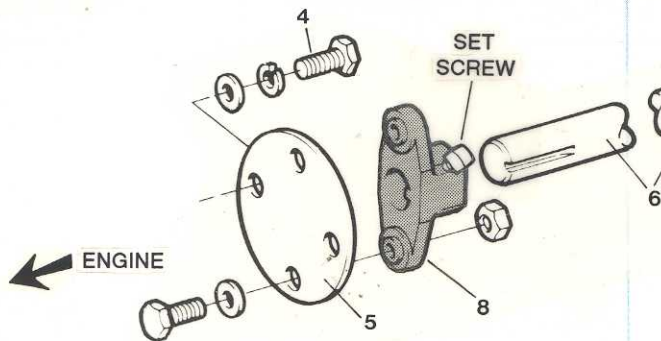


DRIVE SHAFT REMOVAL (DISC DRIVE)

- 1: Remove the console cover to gain access to the rear end of the drive shaft.
- 2: Remove both of the 3/8" x 1" hex head capscrews (1) which secure the flex coupling disc (2) to the drive disc spindle hub (3).
- 3: Remove both of the 3/8" x 1-1/4" hex head capscrews (4) which secure the flex coupling disc (5) to the engine output shaft hub.
- 4: Lift the drive shaft (6) [with hub (7)-disc (2) and hub (8)-disc (5) attached] from between the engine output shaft hub and the drive disc spindle hub (3).
- 5: Remove the flex coupling discs (2 & 5) from the drive shaft hubs (7 & 8). Loosen the 5/16" square head setscrew in each hub and slide both hubs off the drive shaft.

INSPECTION OF DRIVE COMPONENTS

- 1: Examine the drive shaft for straightness and check condition of both keyways.
- 2: Check each hub for cracks. Examine the key and setscrew threads in each hub. Replace if damaged.
- 3: Examine both flex coupling discs for wear or damage. Replace if there are any cracks or if the holes in the disc have become elongated.



REASSEMBLY OF DRIVE SHAFT

- 1: Apply a light coat of grease to the drive shaft ends and to both keyways before installing the hubs.
- 2: Slide one hub on each end of the drive shaft with keys aligned in keyways. Reattach one flex coupling disc to each hub with the fasteners previously removed.

NOTE: Make sure that the "shoulder" around each capscrew hole (there are two holes per hub) is properly seated in its corresponding disc hole. Then carefully place the flat washers under the screw heads and against the "shoulders" and the flex coupling disc for proper coupling installation.

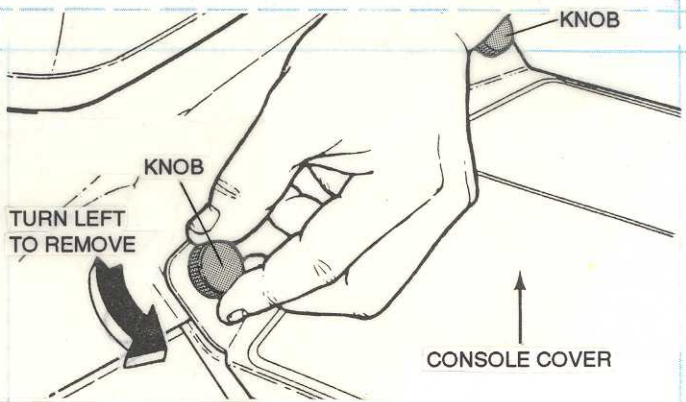


FIG. 1 - CONSOLE COVER REMOVAL

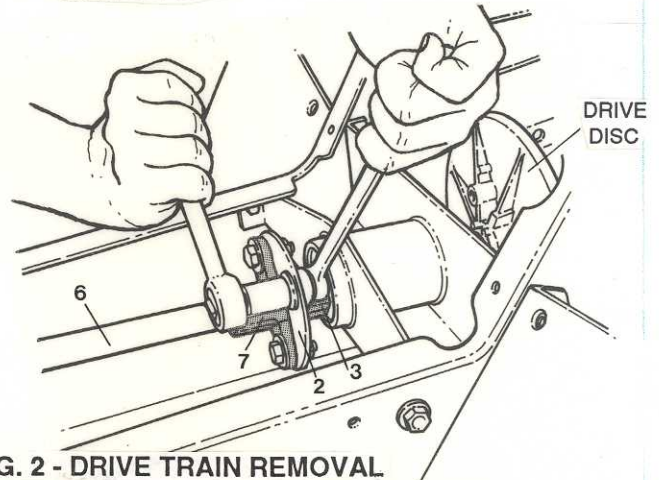


FIG. 2 - DRIVE TRAIN REMOVAL

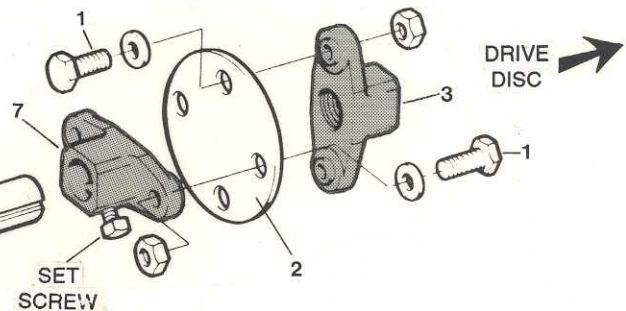


FIG. 3 - DRIVE SHAFT COMPONENTS

NOTE: The flat washers must be under the screw heads and against the flex coupling disc for proper coupling installation.

3: Position the drive shaft between the engine output shaft hub and the drive disc spindle hub. Slide the drive shaft hubs as needed on the shaft to align holes in the discs with those in the engine and drive disc hubs. Secure assembly with the fasteners previously removed.

4: Tighten both setscrews to 15 foot pounds torque and then check the tightness of all fasteners in the drive shaft assembly.

DRIVE SHAFT REMOVAL (HYDROSTATIC)

NOTE: Illustration "A" shows the **EARLY** hydro drive shaft assembly. If bearing, threaded rod, or traction drive belt problems occur, install upgrade kit #6-1061 YTH to eliminate any further recurrences - several parts will be replaced with this kit. *

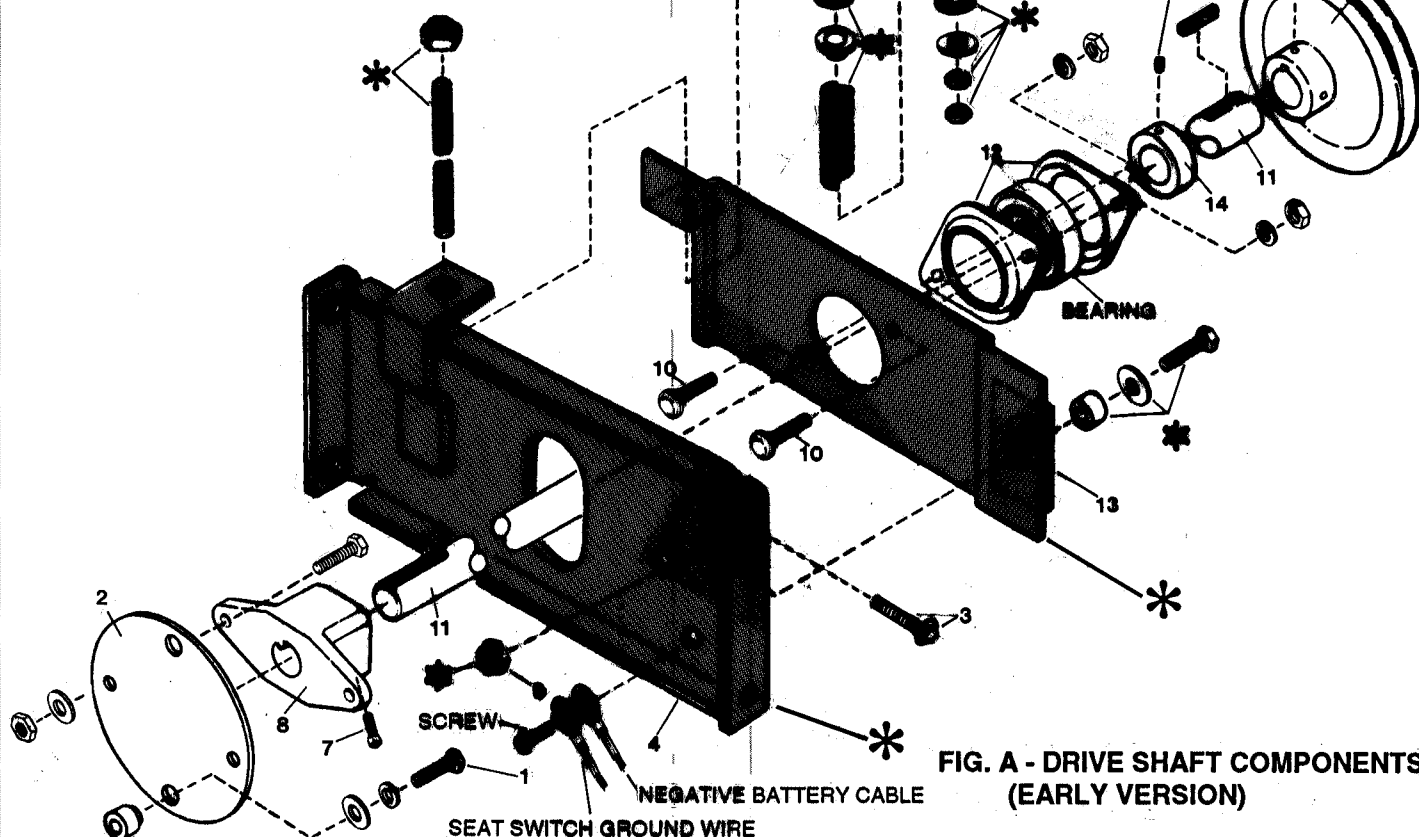


FIG. A - DRIVE SHAFT COMPONENTS (EARLY VERSION)

1: Remove the console cover to gain access to the rear end of the drive shaft. Also remove the seat and the fender. Disconnect the battery cables (negative first) and remove the battery. Disconnect the negative battery cable and seat switch ground wire from the cross brace.

2: Remove the 5/16" hex locknut (9) for access to the two 5/16 x 3/4" carriage bolts (10) which secure the drive shaft (11) bearing/flangettes (12) to the bearing mount (13).

3: Remove both 3/8 x 1-1/4" hex head cap screws (1) which secure the flex coupling disc (2) to the engine output shaft hub.

4: The rear cross brace (4) is held in position between the right and left frame channels by four 5/16 x 5/8" self tapping hex head flange screws (3). Remove and save these screws.

5: Remove the existing traction drive belt (5) from the drive pulley (6) and transmission input pulley. Carefully tap one end of the rear cross brace (4) with a mallet to loosen and separate it from the frame channels. Remove the brace and drive shaft assembly from the tractor.

6: Loosen the square head setscrew (7) in the hub (8) and slide the hub off the drive shaft keyway.

7: Loosen the setscrew in the drive pulley (6) and slide the pulley off the key and keyway. Loosen the socket head screw in the locking collar (14) and slide the collar off the shaft.

8: Remove the rear cross brace (4) and bearing mount (13). They will not be re-used.

INSPECTION OF COMPONENTS

1: Examine the drive shaft. It must be straight and the keyways in good shape.

2: Check the condition of the bearing and flangettes and inspect the hub (8). Replace if damaged.

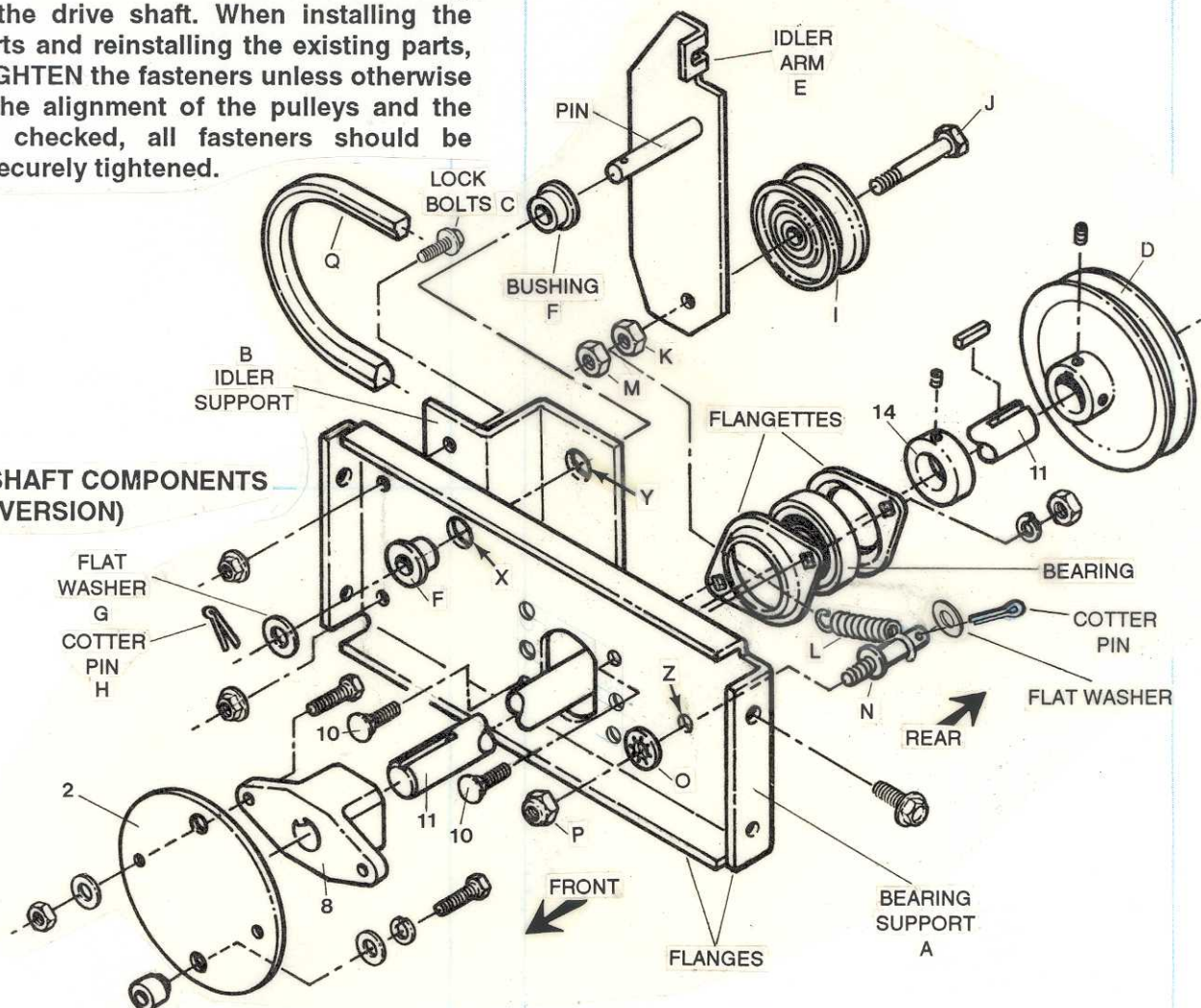
3: Examine the flex coupling (2) for wear or damage. Replace coupling if there are any cracks or if the holes are elongated.

REASSEMBLY OF DRIVE SHAFT

NOTE: Refer to illustrations "A" & "B" before starting to reassemble the drive shaft. When installing the replacement parts and reinstalling the existing parts, only **FINGER TIGHTEN** the fasteners unless otherwise noted. **AFTER** the alignment of the pulleys and the belt has been checked, all fasteners should be inspected and securely tightened.

FIG. B - DRIVE SHAFT COMPONENTS (LATER VERSION)

FORWARD



1: Secure the replacement bearing support (A) between the frame channels with the four previously removed flange screws (3) – the bearing support flanges must face toward the front of the tractor. Tighten these screws now !

2: Apply a light film of grease to the ends of the drive shaft (11) and both keyways. Install bearing/flangettes on the shaft. Install lock collar (14) and drive pulley (6) (with key) on shaft end. Insert other end of shaft through the large center hole in the bearing support facing toward the front of the tractor.

3: Attach drive shaft bearing/flangette to the backside of the bearing support with both previously removed carriage bolts (10).

NOTE: Use the highest set of holes possible to achieve maximum belt tension without permitting the shaft to hit or rub against the console cover.

4: Attach the idler support (B) to the backside of the bearing support with two 5/16" x 3/4" flange lock bolts (C) and 5/16" locknuts. Finger tighten these now and, after final assembly is completed, securely tighten both bolts.

5: Insert one bushing (F) into bearing support hole "X" and the other into idler support hole "Y" as shown. Insert the idler arm (E) pin through bushings (from the back side) and secure with a 3/8" flat washer (G) and 3/32 x 3/4" cotter pin (H) – bend legs over.

6: Install idler (I) on idler arm (E) with a 3/8 x 2" hex head capscrew (J) and secure with a 3/8" hex nut (K). Securely tighten hex nut. Slip spring (L) "hook" on screw stud (J) and secure with a 3/8" locknut (M). **DO NOT** over tighten locknut against spring "hook" – it must be free to move on stud without restriction.

7: Insert threaded end of idler stud (N) through hole "Z" from the backside of the bearing support. Secure with a 3/8" internal tooth lockwasher (O) and 3/8" hex nut (P). Securely tighten this nut.

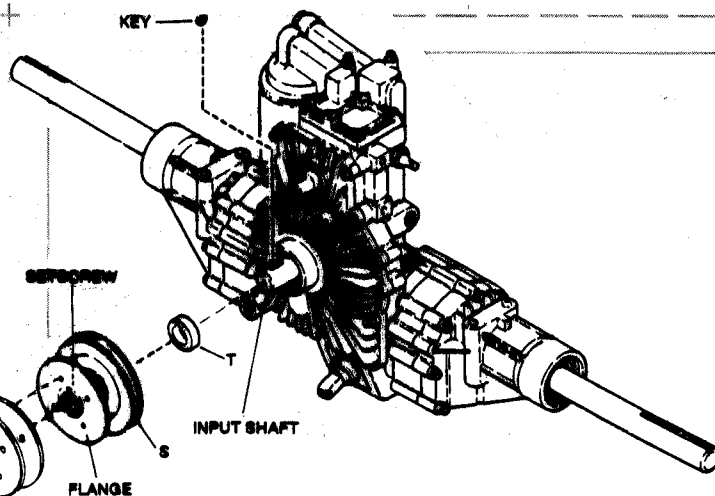
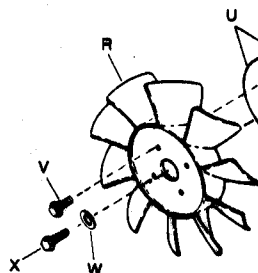
8: Reinstall the flex coupling hub (8) on the end of the drive shaft and secure the flex coupling disc (2) to the hub and to the engine output shaft hub with the existing, previously removed, fasteners. Securely tighten these fasteners at this time.

BELT & PULLEY ALIGNMENT - HYDRO

Refer to illustration "C" and make the modifications described in the following to insure proper alignment of the pulleys and belt.

1: Remove the four screws which secure the fan (R) to the transmission input pulley (S) and remove the fan. Remove the hex head bolt which secures the pulley on the shaft, loosen the pulley setscrew, then remove the pulley and key from the input shaft. Then remove the three washers from the shaft.

FIG. C - BELT & PULLEY ALIGNMENT



2: Lubricate shaft end and keyway with a light coating of grease. Slip the fan pulley spacer (T) and key into place on the input shaft.

3: Align the input pulley with the key, then carefully slide the pulley onto the shaft. NOTE: The pulley does not fully cover the key.

4: Place one or both fan spacers (U) (as needed for clearance) against the face of the pulley's flange, then position the fan (R) against the spacer(s). Align the holes before inserting the four 1/4" x 3/4" hex washer head tap screws (V) into the holes. Tighten these screws.

5: Slip the 11/32" I.D. flat washer (W) onto 1/4" x 1-1/2" hex head bolt (X) and screw this bolt into the end of the input shaft. Securely tighten this bolt and tighten the pulley setscrew.

Refer to Figure "B" and continue with step 6:

6: Align the drive pulley (6) with the input pulley (S) then work the replacement drive belt (Q) down into the groove in each pulley.

7: Swing idler (I) against the outer surface of belt and slip the loose or "hooked" end of spring (L) onto the idler stud (N), and secure with flat washer and cotter pin (bend legs over).

8: Check the alignment of the pulleys and belt. Be sure the idler arm does not bind - there must be tension against the belt. Inspect and securely tighten all fasteners at this time *EXCEPT* the bearing flangette bolts (10) and the lock collar (14) setscrew.

Start the engine and run for 10 seconds to align the drive shaft/bearing with the flangettes. Then securely tighten both flangette bolts (10) and nuts. Last, slip the locking collar (14) onto the rear of bearing's race, and then tighten the collar by gently rotating the collar with a punch and hammer in the direction of shaft rotation (clockwise). Tighten the collar setscrew to 60 inch pounds maximum.

Then reattach the seat switch ground wire and negative battery cable to the cross brace. Install the battery (connect the negative cable last), and reinstall the fender, seat, rear cover plate, and console cover.

NOTE: Later model YTH hydro tractors are equipped with an idler pulley which maintains pressure against the drive belt. This mechanism is very similar to the upgrade kit #8-1061 YTH (Illustration "B") which improves the operation of the earlier models. Follow kit installation instructions on later model YTHs,

TRANSMISSION REMOVAL (DISC DRIVE)

1: Remove the rear console panel and fenders.

2: The brake drum on 1984 and 1985 models must be removed (refer to BRAKE SYSTEM Instructions in Section 5).

3: After carefully positioning the rear of the tractor frame on jackstands, remove both rear wheels.

4: Remove the tapered bolt (1) from the hub on the right end of the rear axle.

5: Loosen the setscrew in the lock collar (2). Punch the collar in reverse rotation to remove.

6: If the transmission is to be disassembled, also remove the hub on the left end of the axle. Remove the boot clamp (3), then remove the dust seal cap, oil seal, and lock collar (punch off in reverse rotation).

7: Remove the screw (4) from the end of the drive hex tube.

FIG. 1 - RIGHT HUB REMOVAL

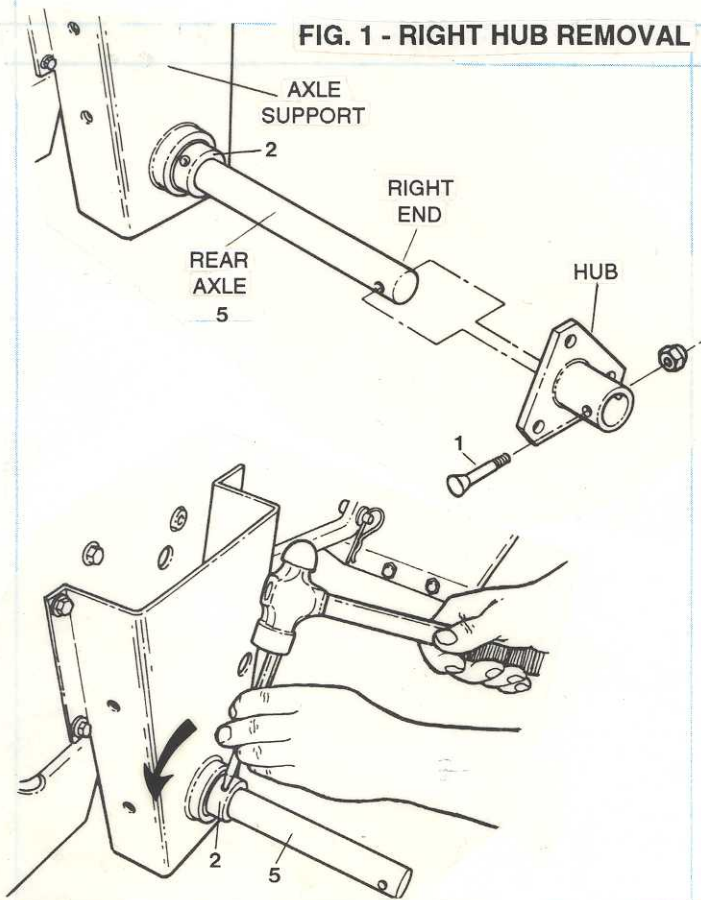


FIG. 2 - RIGHT COLLAR REMOVAL

8: To ease removal of the axle (5) when it is pulled through the ball bearing, remove all debris and any burrs from the shaft surface.

9: Loosen the boot clamp (6) at each end of the hex tube boot.

10: Remove the left rear lift hanger bracket (7) from the underside of the tractor to prevent it from interfering with the transmission flange during removal of the transmission.

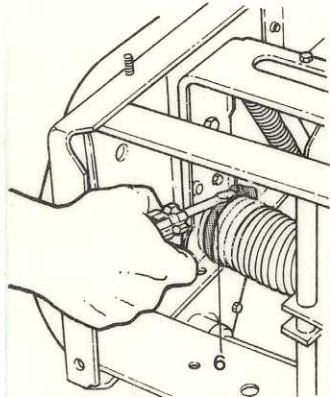


FIG. 5 - LOOSENING BOOT CLAMPS

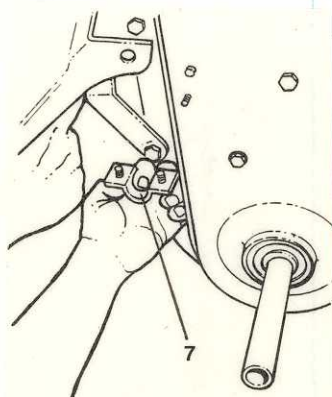


FIG. 6 - HANGER BRACKET REMOVAL

FIG. 3 - LEFT COLLAR REMOVAL

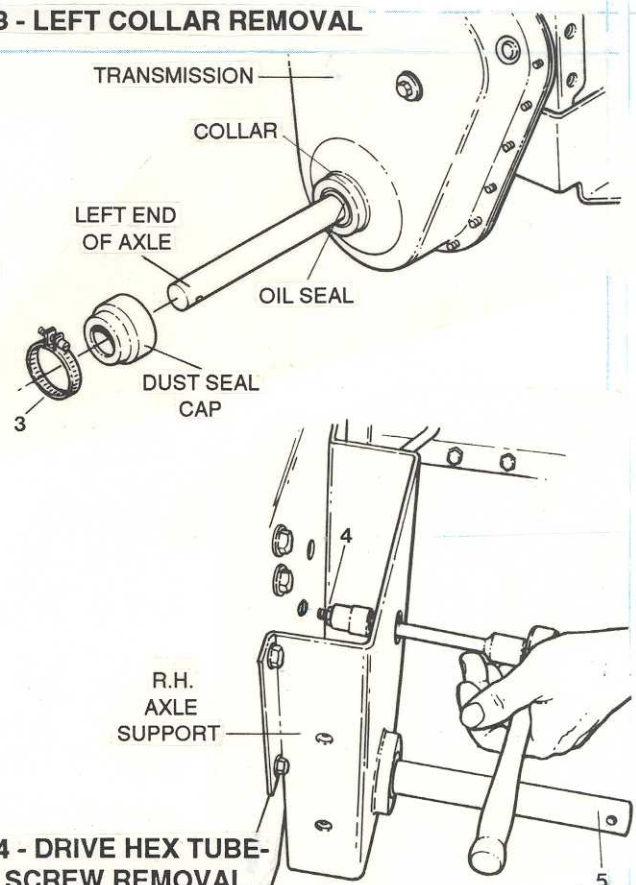


FIG. 4 - DRIVE HEX TUBE-SCREW REMOVAL

11: Remove the 5/16" x 5/8" hex washer flange self-tap screws which secure the transmission to the tractor. To ease removal of the transmission, partially clutch and lock pedal, to reduce chaincase binding on the hex tube.

12: Grasp the left axle end and the HI-LO shifter lever and pull the transmission away from the tractor. Note that the hex tube spacer and thrust washer may fall into the right hand boot when the transmission is pulled from the tractor.

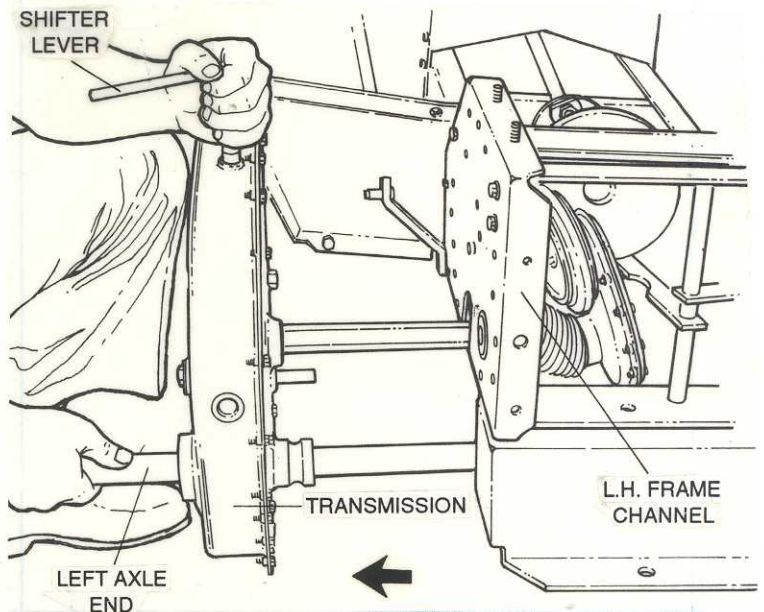
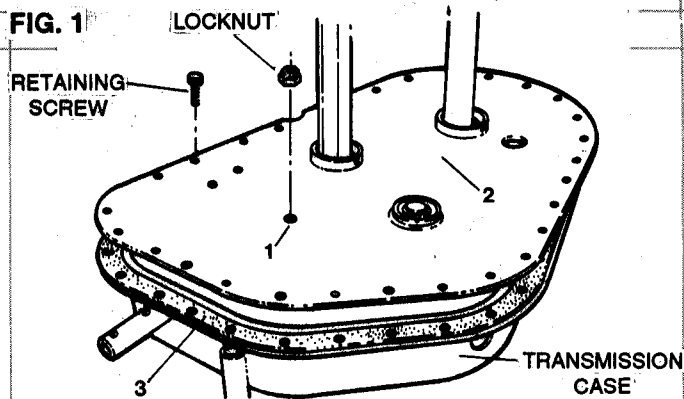


FIG. 7 - TRANSMISSION REMOVAL

TRANSMISSION DISASSEMBLY (DISC DRIVE)

NOTE: It is recommended that the transmission be laid flat with the cover facing up. In this position, a 2" hole is required in the work surface to accommodate the axle.

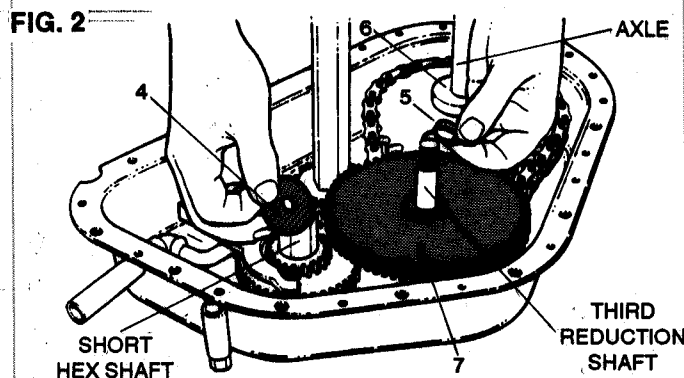
1: Remove the 3/8" hex locknut at the short hex shaft location (1). Remove the remaining cover to case retaining screws. Remove cover (2) and cover gasket (3).



2. Remove the hardened steel thrust washer (4) which is laying on the end of the short hex shaft, and slip the shim washer (5) off the third reduction shaft.

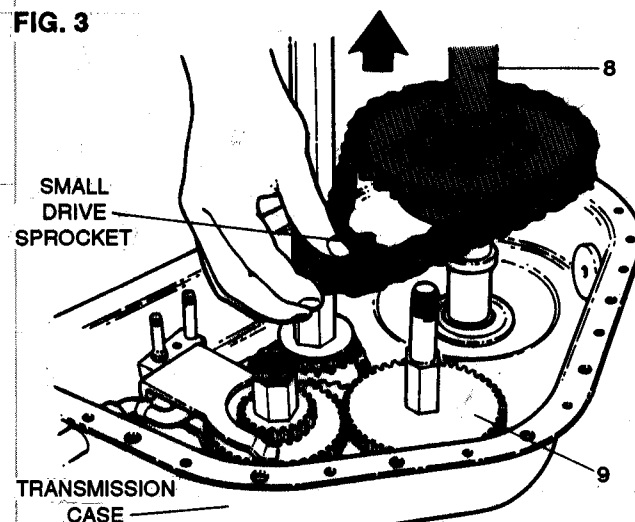
3: Slip the special (white nylon) washer (6) off axle.

4: Lift the low range gear (7) off third reduction gear.

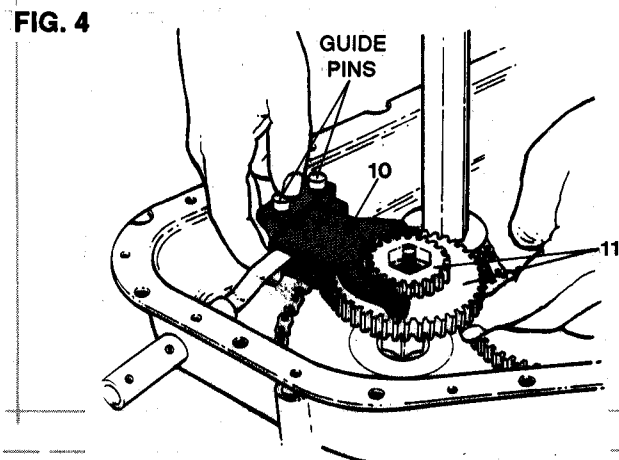


5: Lift the axle (8), small drive sprocket, and chain out of the transmission as an assembly. Refer to the "Differential" illustration.

6: Lift the high range gear (9) off third reduction shaft.

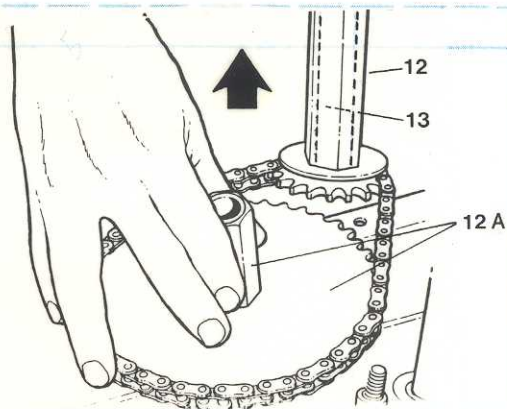


7: Lift out the HI-LO shifter fork (10) along with the cluster gear (11). The fork runs on two guide pins which must be lifted out of locating holes in the case. Remove this assembly and separate the cluster gear from the fork. Refer to the HI-LO shifter fork sub-assembly instructions.



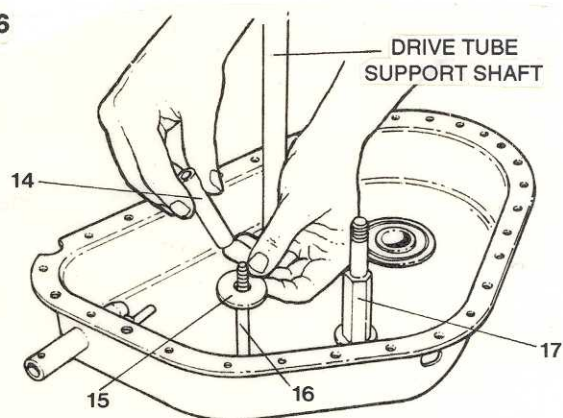
8: Lift the drive hex tube (12), short hex tube with sprocket (12A) and chain out of case as an assembly. Raise this assembly until the drive hex tube clears its support shaft (13). Remove the chain from both sprockets.

FIG. 5



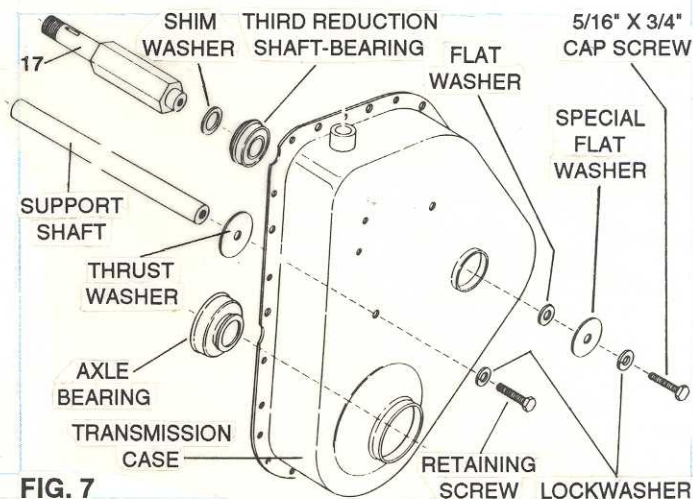
9: Remove the bearing race (14) and bottom hardened steel thrust washer (15) from the idler bolt (16).

FIG. 6



10: The third reduction shaft (17) is secured to case by a flat washer, special flat washer, lockwasher, and a 5/16" x 3/4" cap screw. Remove this screw and pull the shaft and shim washer from the bearing in the case. NOTE: If the bearing will not permit the third reduction shaft to be pulled from the case, use the following procedure: Screw the 5/16" x 3/4" cap screw back into the end of the shaft (about 1/2") and carefully tap the head until the shaft is driven from the bearing.

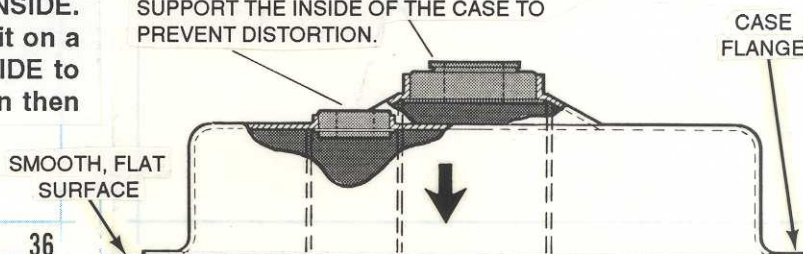
11: Remove the drive hex tube's support shaft from the case by removing the retaining screw and the lockwasher.



12: Use the following procedure to remove the transmission case bearings. The bearings are pressed out of the case from the OUTSIDE toward the INSIDE. To remove the bearings, the case flange must sit on a smooth flat surface with adequate support INSIDE to prevent distortion of the case. The bearings can then be removed. Refer to illustration "A".

ILLUSTRATION "A"

BEFORE PRESSING BEARINGS FROM CASE, SUPPORT THE INSIDE OF THE CASE TO PREVENT DISTORTION.



CLEANING & INSPECTION (DISASSEMBLED TRANSMISSION PARTS)

1: Sealed bearings and nylon parts should be wiped clean with shop rags -- DO NOT clean these with solvents. Wash all other transmission parts in clean solvent to remove old lubricant, metallic particles and dirt from surfaces. Dry parts afterward to remove cleaning solvent residue.

2: Inspect all gear teeth for signs of excessive wear and/or damage. Inspect all thrust washers, special washers and shim washers for evidence of excessive wear, distortion or damage. Replace as necessary.

3: Inspect case and cover for damaged or distorted mating surfaces. Replace case or cover if cracked, distorted or otherwise damaged beyond repair. Check for burrs, deep scratches or nicks on gasket and oil seal surfaces.

4: Inspect hex tubes for burrs and nicks. The gear and sprocket hubs must slide freely on these tubes. Replace any part which cannot be repaired or exhibits excessive wear.

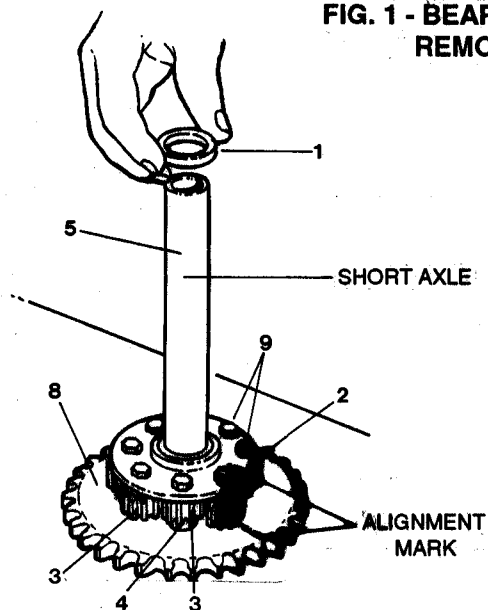
5: Inspect drive chains. If links are excessively loose and/or show signs of excessive wear or damage, replace them.

DIFFERENTIAL OVERHAUL

To ease disassembly, the large sprocket should be laid flat on a work surface with the long end of the axle going through a hole in that surface and pointing downward. The work surface illustrated shows a jig used to hold the transmission for disassembly.

1: Remove the bearing spacer (1) if it has not already slipped off the axle when the differential was removed from the case.

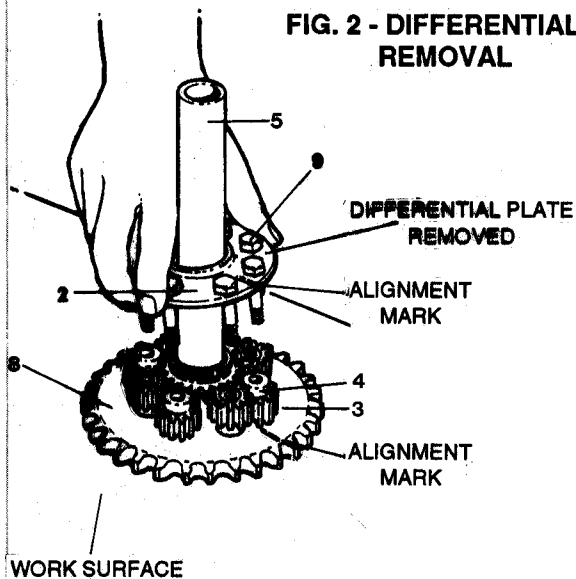
FIG. 1 - BEARING SPACER REMOVAL



2: Note the position of the alignment mark on the differential plate (2) and the matching mark on the large sprocket (8) -- they must be realigned during reassembly! Loosen and remove all eight special lock screws (9) and discard these - they will not be reused.

3: Note the position of each pinion gear (3) and its spacer (4) on the surface of the sprocket (8) BEFORE removing them.

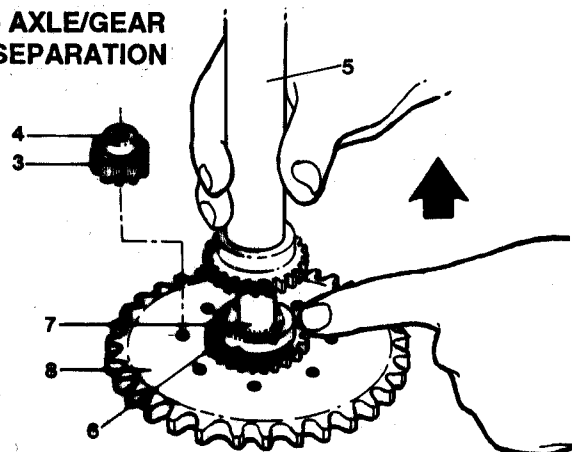
FIG. 2 - DIFFERENTIAL PLATE REMOVAL



4: Lift the short axle (5) off the long axle (7), then remove axle spacer (6).

5: Pull the long axle (with small gear attached) from the bore of the large sprocket (8).

FIG. 3 - AXLE/GEAR SEPARATION

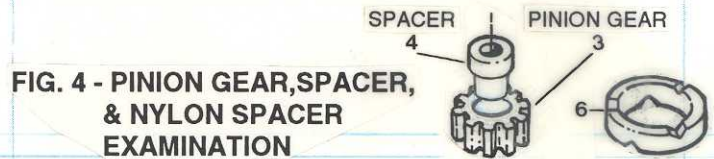


CLEANING & INSPECTION OF PARTS

1: Wash all metal differential parts thoroughly in clean solvent to remove old lubricant, metallic particles, or dirt from all surfaces. Wipe the nylon axle spacer clean with a CLEAN cloth.

2: Separate the eight pinion gears from the spacers and examine for worn or broken teeth. Also examine teeth on the short axle gear and those on the long axle gear for wear or damage.

3: Check the eight pinion spacers for wear. Compare a new pinion spacer (#2-1126) to the used one to determine condition. Examine the nylon axle spacer (6) for wear or damage. It establishes the proper distance between the long and short axle. Replace any part which shows signs of wear or damage.



REASSEMBLY OF DIFFERENTIAL

1: Reassemble the differential in reverse order. Slip the long end of the long axle through the bore of the large sprocket. Slip the axle spacer down on the short end, then prelubricate the short end of the shaft and slip the short axle down on it.

2: Prelubricate the pinion spacers and slip the pinion gears on them. Locate the alignment mark on the surface of the large sprocket. Sit the first spacer/gear unit over a screw hole near the mark with the spacer AGAINST the sprocket surface. The next unit must have the gear AGAINST the sprocket surface. Alternate the remaining units as illustrated.

3: Slip the differential plate (2) down the short axle (5) and position it against the pinion spacers with its alignment mark in line with the one on the sprocket. Use NEW special "lock" capscrews (#1-2333) to secure the plate and pinion gears/pinion spacers to the sprocket. NOTE: Capscrews #1-2333 are special mis-aligning thread type locking screws which are intended to be used only one time. Torque these bolts to 25 foot pounds.

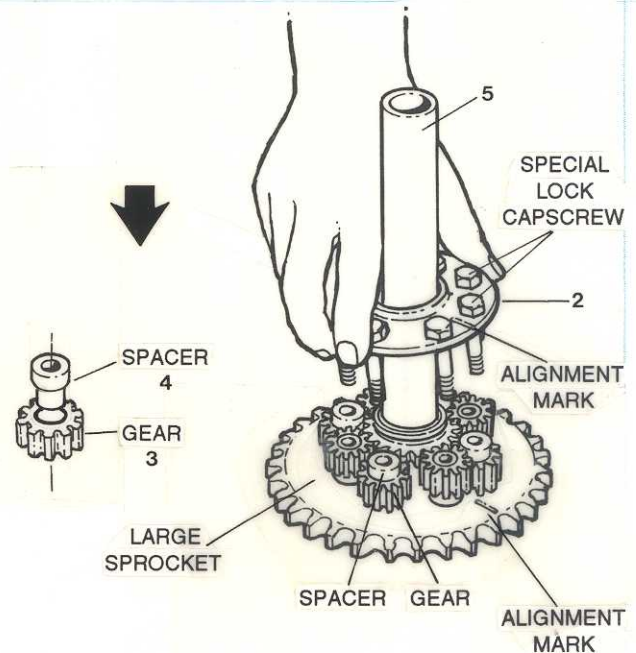
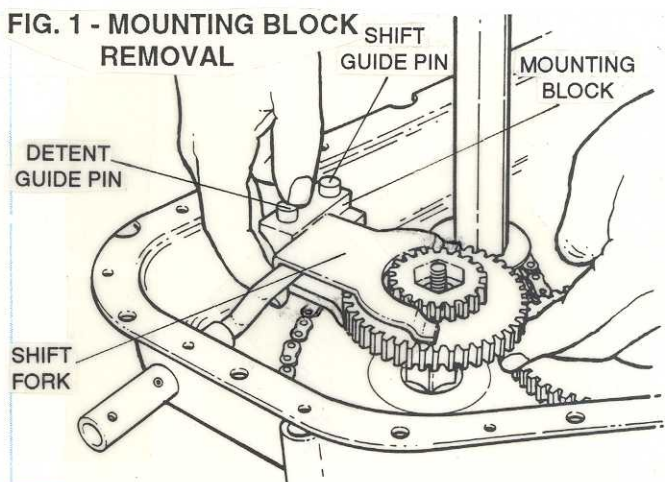


FIG. 5 - DIFFERENTIAL REASSEMBLY

HI-LO SHIFTER OVERHAUL

The shift fork moves across a shift guide--pin and a detent guide--pin. The detent mechanism (located inside the shift fork mounting block) consists of the detent guide--pin and ball & spring. These parts can be replaced if the mechanism does not function properly.



1: Carefully pull the detent guide-pin (1) from the assembly, allowing the ball and spring to be released into a rag which should be held at opening (A)

2: Remove the shift guide-pin from the fork mounting block then carefully clean all parts in solvent. Use compressed air to dry all the mounting block bores. Dry all parts with clean rags.

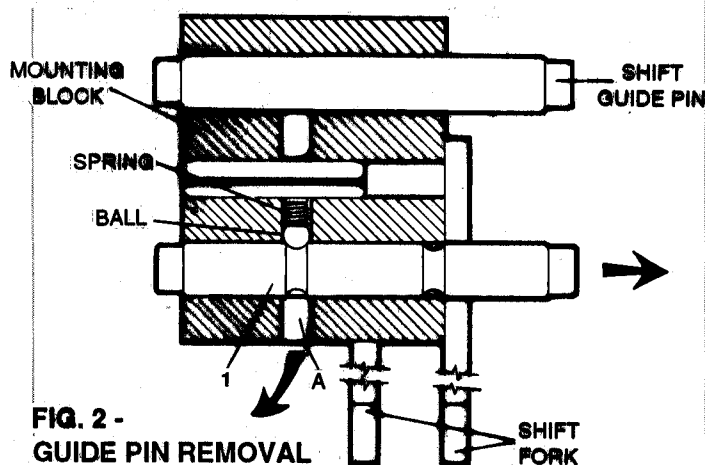
3: Examine both guide-pins for scratches, nicks or excessive wear which could cause poor shifting. Replace pins if worn or damaged.

4: Inspect the shift fork. If the forks are spread too wide for proper gear retention, the fork should be replaced.

5: Prelubricate both pins and insert them into the proper mounting block bores. Move them back and forth to check for smooth operation. If the movement is not smooth, replace the defective part(s).

6: Position the detent guide-pin in the shift fork (mounting block) just short of the spring/ball bore. Carefully insert the spring, then the ball into the bore.

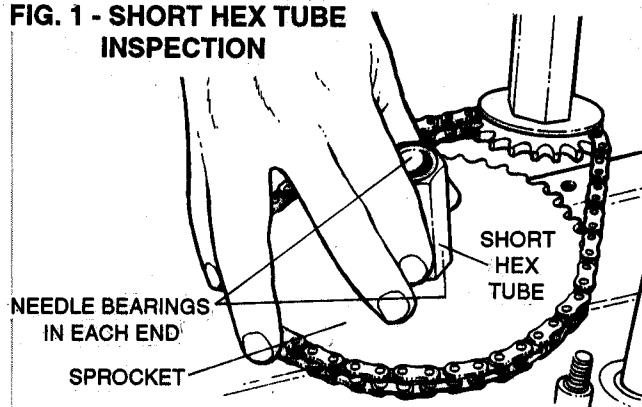
7: While pushing the ball down with a small punch (to compress the spring), slide the detent guide-pin inward over the TOP of the ball. Remove the punch as the pin moves past the ball.



SHORT HEX TUBE OVERHAUL

1: The short hex tube subassembly has two needle bearings (one located in each end of the tube) which should be carefully examined for excessive wear and/or damage. Always examine bearings in a clean area with clean hands and wipe away excessive bearing grease with clean shop rags.

FIG. 1 - SHORT HEX TUBE INSPECTION



2: To replace a bearing, place the subassembly (the hex tube with 46 tooth sprocket) in a vise equipped with BRASS jaw inserts. Using a BRASS drift and a hammer, drive the bearing from the hex tube, taking care not to damage the tube bore or external surfaces. If the other bearing is not going to be removed and replaced, protect it from damage.

3: To install a new bearing, spread a light film of bearing grease on the inside of the hex tube, then carefully press fit the bearing FLUSH with the end of the hex tube. Always press against the end of the bearing which has writing on it. Refer to illustration.

NOTE: NEVER squeeze the hex tube in a vice - such treatment can cause distortion and consequently result in hard shifting.

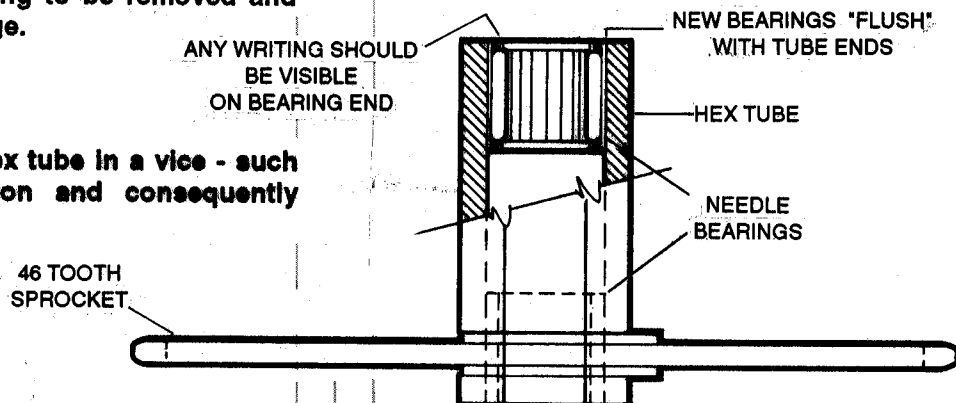


FIG. 2 - BEARING REPLACEMENT

TRANSMISSION REASSEMBLY

Begin reassembly of the transmission by reinstalling the subassembly removed from the case. Continue in reverse order and always lubricate bearings, shafts and other points of contact as the reassembly procedure progresses. After all components have been reinstalled in the transmission case and the new cover to case gasket and cover have been properly positioned on the case, reinsert the 1/4" x 5/8" self tapping screws in their proper holes. Reinstall, then torque the 3/8" hex idler locknut at (1) to 18 – 20 foot pounds. Reinstall all other external fasteners and secure the transmission to the tractor. Retighten the boot clamp at each end of the hex tube, then reinstall all other components at the appropriate time. Securely tighten all fasteners. Install new oil fill and check plugs after the transmission case has been filled to the proper level with SNAPPER "O" grease.

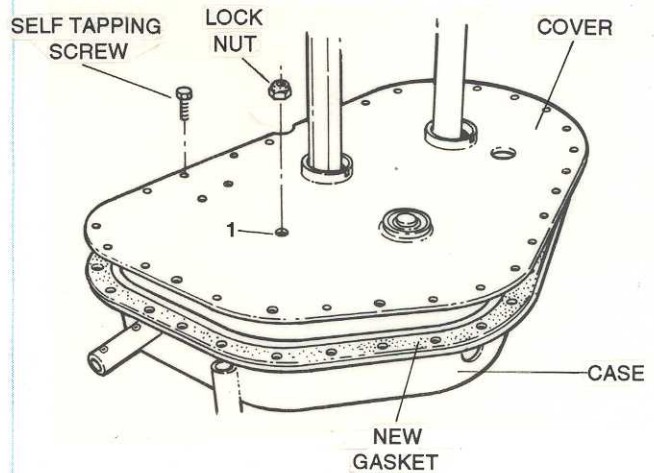


FIG. 1 - TRANSMISSION REASSEMBLY

PRIMARY CHAIN CASE REMOVAL

1: Remove the primary chain case (with the two dust seal boots attached) from the tractor.

2: Remove the dust seal boot from the boot flange on the inside of the case and the other boot from the cover by loosening the boot clamp (1) on each.

3: Remove the locknut (2) and Belleville washer (3), then slide the driven disc hub off the input shaft. Remove woodruff key (4) and remaining Belleville washer (5).

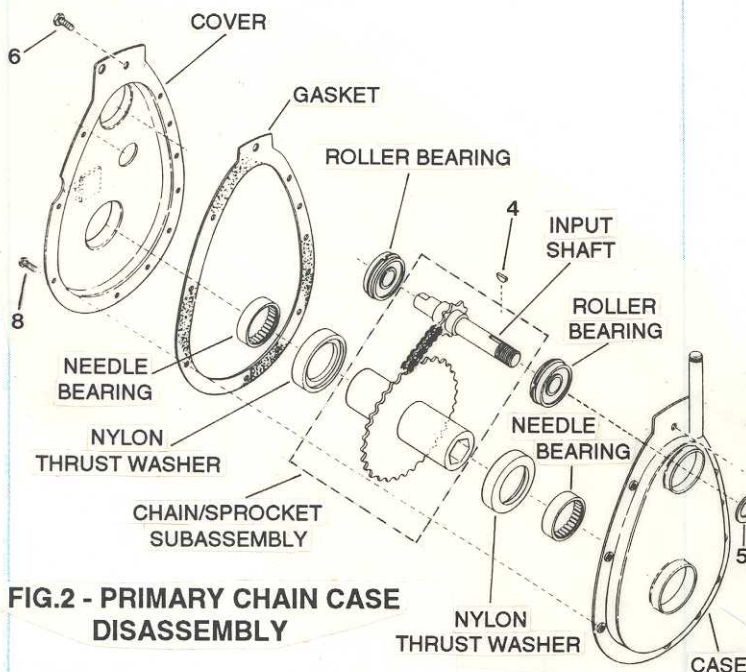
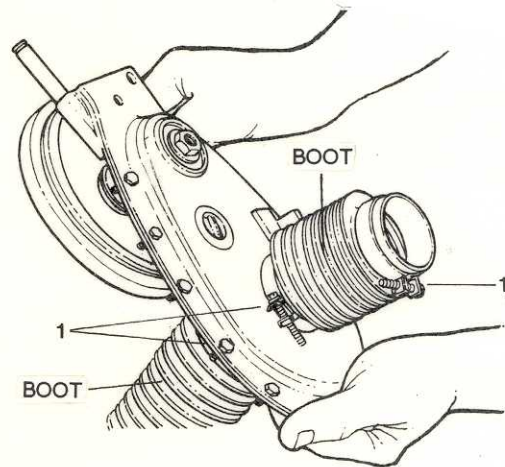


FIG.2 - PRIMARY CHAIN CASE DISASSEMBLY

4: Remove the one 1/4" x 20 screw (6) and nut (7) then the ten self tapping screws (8) which hold the case and cover together.

FIG. 1 - PRIMARY CHAIN CASE REMOVAL



5: Separate the cover from the case and discard the gasket.

6: Lift the chain on the sprockets out of the case as a subassembly.

7: To remove the ball bearings and needle bearings from the cover and case, place a round support under each bearing seat area and press each bearing out TOWARD the INSIDE of the case.

CLEANING & INSPECTION OF COMPONENTS

1: Wash all parts EXCEPT the nylon thrust washers and the bearings, thoroughly in clean solvent. Be sure all old lubricant, metallic particles, or foreign materials are removed from all surfaces of every part. Dry all parts to remove the residue of the cleaning solvent.

2: Examine chain and sprockets for excessive wear or damage. Check the threaded end of the shaft and the keyway for nicks, burrs or any damage and correct if possible. Inspect the hub of the large sprocket. Install the hub on the hex tube to be sure it slides freely. Replace any excessively worn or damaged parts.

3:Inspect the case and cover for cracks, damaged mating surfaces. stripped bolt threads, distortion or oversized bearing bores. Also make sure the paint drain tab is closed.

4: Examine the gasket and bearing seating surfaces on the case and cover and remove any nicks, burrs or sharp edges which could interfere with and/or damage replacement bearings or new case gasket during reassembly.

5: Examine the needle and ball bearings. Replace if worn or damaged. Examine the thrust washers for excessive wear or damage and replace as necessary.

6: Inspect the dust seal boots for cracks or wear and replace if excessively worn or damaged in any way.

3: Support the outer surfaces of the case (and cover) while pressing needle bearings into the lower openings of the case (and cover). Always press against the lettered end of the bearings.

4: Reinstall one nylon thrust washer on each end of the sprocket hub with the cupped end of each placed against the sprocket.

5: Place the chain on the two sprockets and carefully slip the input shaft and hub (as one unit) through their respective bearing bores in the case.

6: Position a new case/cover gasket on the case flange and align the holes.

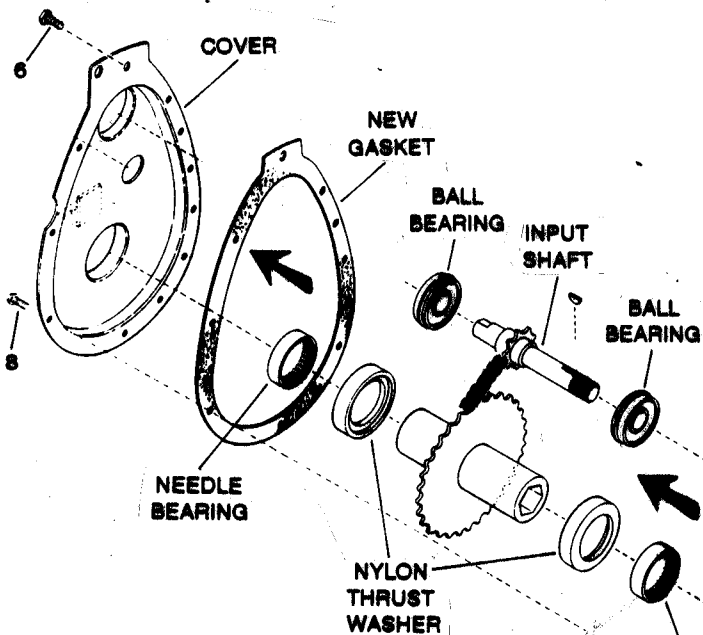
7: Align the cover flange holes with those in the gasket and flange case, then reinsert the ten self tapping screws (8) and the one 1/4"x 20 screw (6) secured with nut (7), then tighten all fasteners. Install Belleville washer (A) (cupped outward) on the input shaft, then install key and hub.

8: Reassemble the driven disc on the input shaft. Reverse the order used to disassemble these components. NOTE: Belleville washer (B) should be cupped toward hub. Securely tighten all fasteners including locknut (2). Torque locknut (2) to 75 foot pounds.

9: Reinstall one dust seal boot on the case boot flange and the other on the cover boot flange, then tighten the boot clamps.

10: Reverse the removal procedures described earlier to reinstall the primary chain case in the tractor. Recheck the assembly and make sure all fasteners are securely tightened.

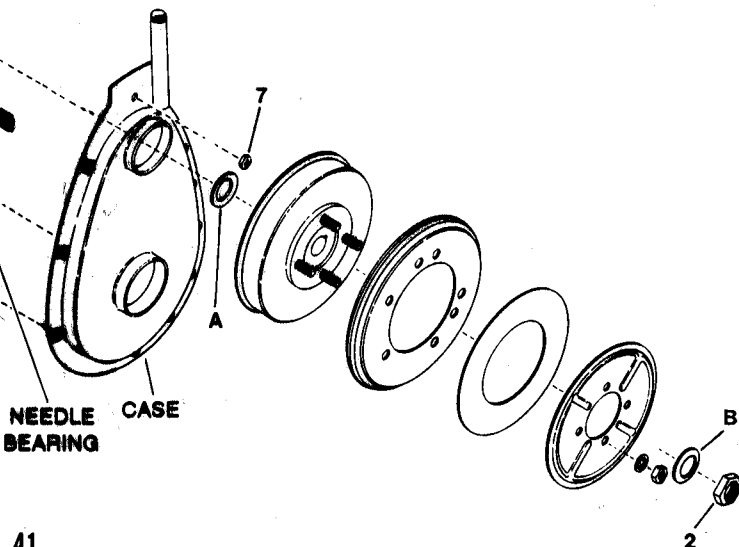
11: Before operating the tractor, the primary chain case must be lubricated. Fill the case with 2 ounces of SNAPPER "O" grease - DO NOT overfill. Install a new check/fill plug. NOTE: Over lubrication will cause grease leaks at the #10756 bearing.



REASSEMBLY OF PRIMARY CHAIN CASE

1: Bearings must be pressed from the inside outward. Support the outer surface of the case (and cover) while pressing the bearings into place.

2: Press one ball bearing into the upper opening in the case, then the other bearing in the corresponding opening in the cover. The snap rings should touch the case (and cover) when finished pressing.



RIGHT REAR AXLE BEARING: REPLACEMENT

1: Securely position the rear frame of the tractor on jackstands, then remove the right rear wheel bearing as follows.

2: Remove the hub cap. Remove the three lug bolts which secure the wheel to the hub - then remove the wheel. Remove the tapered bolt (1) from the hub and slide the hub off the axle.

NOTE: To ease hub removal, rotate the hub on axle, to misalign holes. Remove burrs from holes, lubricate axle with penetrating oil, and continue rotating hub while pulling off axle. Use wheel puller #6-0327 if necessary.

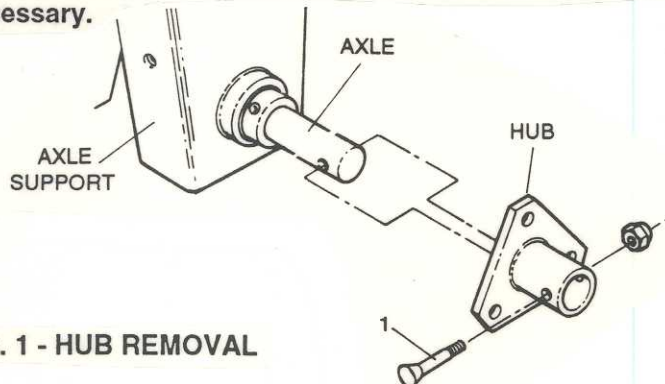


FIG. 1 - HUB REMOVAL

3: Loosen the setscrew in the lock collar (2). Punch collar in reverse rotation to remove. Clean any excess paint, burrs or debris from the axle to ease removal of the collar and bearing.

TRANSMISSION REMOVAL - HYDRO

NOTE: If the hydrostatic transmission is still under warranty, it should be removed from the tractor and returned to SNAPPER, who will forward it to the manufacturer for repair. A replacement transmission should be installed in its place to get the tractor back into operation. Those out of warranty should be removed and carefully repaired by following Eaton's Repair Manual covering their Hydrostatic Transaxle Series 850. Remove the Hydrostatic transmission as follows:

1: Remove the console panel, rear cover and rear fender.

2: After carefully positioning the rear of the tractor frame on jackstands, remove the rear wheels and hubs.

3: Disconnect the tension spring from the idler stud. Remove the two carriage bolts securing the two flangettes and drive shaft bearing to the bearing mount. This permits the drive shaft to drop, facilitating removal of the traction drive belt. Refer to DRIVE SHAFT REMOVAL (HYDRO) earlier in section 6.

NOTE: The hoses from the hydraulic fluid reservoir (or tank) must be disconnected at the transmission.

4: Remove the four screws securing the axle support to the right hand frame channel then slide the support with bearing off the axle.

5: Before pressing the bearing out, support the INSIDE surface of axle support around the bearing bore to prevent distortion. Press the bearing inward to remove.

6: Turn the axle support over and support the OUTSIDE surface - around the bearing bore (to prevent surface distortion around the bore).

7: Reverse the procedures to reassemble components to tractor. Securely tighten all fasteners. NOTE: Tighten lock collar in direction of wheel rotation.

FIG. 2 - AXLE SUPPORT
REMOVAL

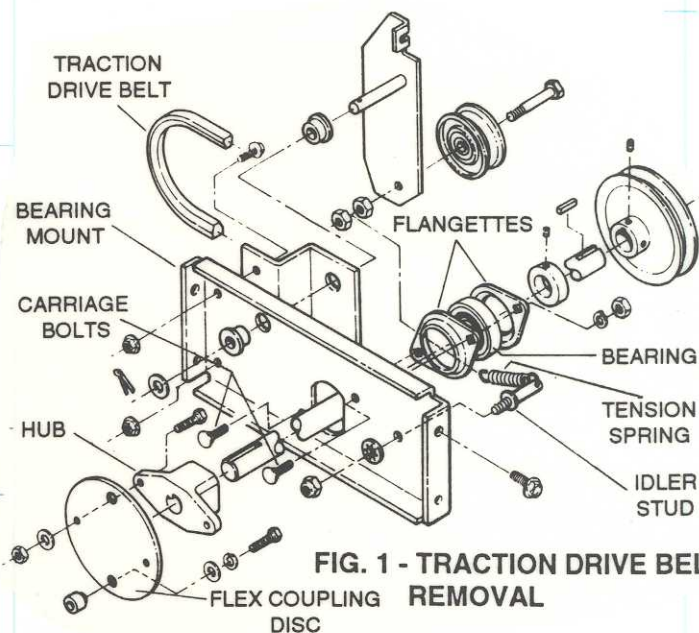
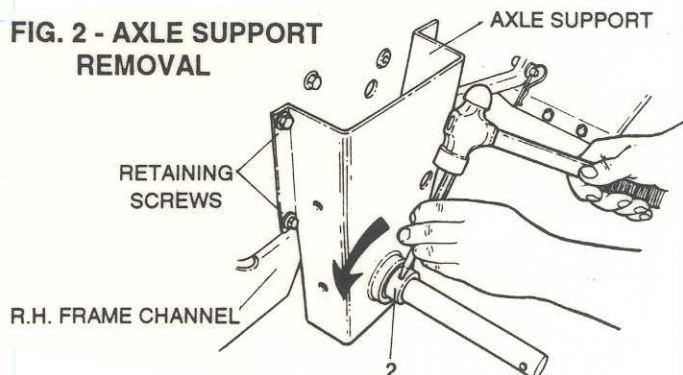


FIG. 1 - TRACTION DRIVE BELT
REMOVAL

4: To eliminate possible fluid loss, clamp the short RETURN hose *before* loosening the hose clamp and disconnecting the hose from fitting (1). This fitting is located on the lower front of the transmission as shown in FIG. 2.

5: Again to avoid fluid loss, clamp the long SUPPLY hose before loosening the clamp and disconnecting the hose from fitting (2). This fitting screws into the transmission housing near the rear on the left side of the transmission.

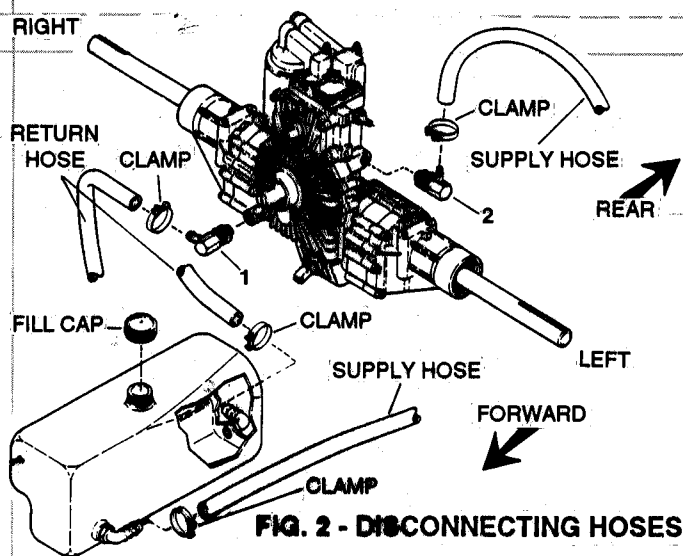


FIG. 2 - DISCONNECTING HOSES

6: Disconnect the neutral brake cable at the pedal by removing the cotter pin and washer.

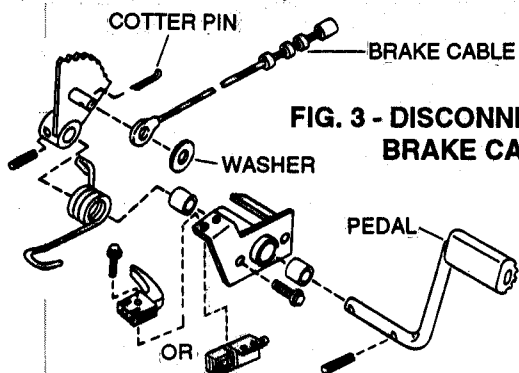


FIG. 3 - DISCONNECTING BRAKE CABLE

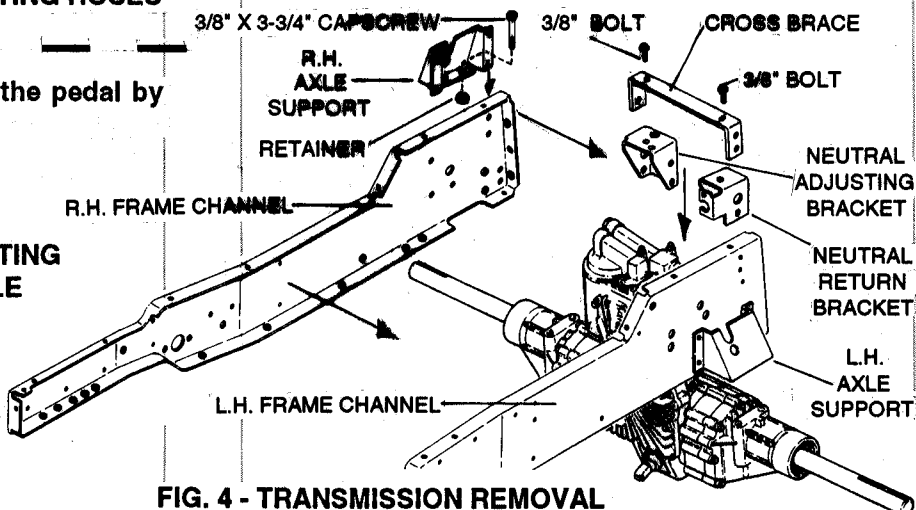


FIG. 4 - TRANSMISSION REMOVAL

HYDRO TRANSMISSION ADJUSTMENT

Transmission adjustment will be required if the transmission has been re-installed after being overhauled or replaced. It will also be necessary if the tractor continues to creep in drive when the FORWARD/REVERSE pedal is released. Adjust as follows.

1: Raise and securely position the rear of the tractor on two jackstands to permit the rear wheels to rotate.

2: Pull the two wire connectors from the seat switch terminals. Remove the seat assembly (on the seat support) from the fender.

3: Remove the access cover on top of the fender. The hex washer head adjusting bolt and hex flange lock bolt are in the front right corner of the access area.

4: **TEMPORARILY** close the seat interlock circuit by jump wiring the two connectors, permitting the engine to be started with the seat removed. **WARNING:** This is necessary for adjusting but the circuit must be restored to normal immediately after this procedure has been completed !!

7: One self tapping 3/8" bolt secures the neutral return bracket to the underside of the tractor cross brace and another secures the neutral adjusting bracket to the underside of the cross brace. Remove these bolts.

8: Finally, four 3/8" x 3-3/4" hex head capscrews secure the transmission to the underside of the right and left hand axle supports. Be careful while removing these, as the transmission can easily drop from position when the last one (the four capscrews) is removed.

9: After the transmission has been repaired or has been replaced, install it by reversing the foregoing. Check tightness of all fasteners and also check the hoses at fittings to make sure they do not leak.

5: Depress the NEUTRAL RETURN/BRAKE pedal (on the *left* side), start the engine, and then release the pedal. Then completely depress the FORWARD/REVERSE pedal (on the *right* side) to start wheel rotation; then release that pedal and observe the rear wheels - they should stop rotating immediately!

6: If the wheels continue turning after conducting this test, the transmission must be adjusted to re-establish neutral.

7: To adjust, loosen the lock bolt just enough to move the adjusting bolt slightly to the right or left until the wheels cease to rotate when repeating step 5. Tighten the lock bolt against the adjusting bolt to lock in neutral position.

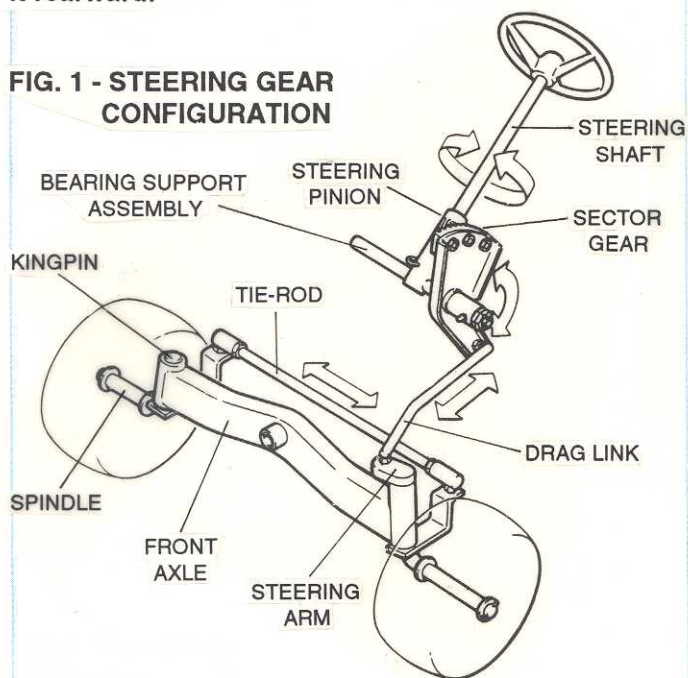
8: Reassemble seat components in reverse order and remove tractor from the jackstands. **WARNING:** Make sure that the jump wire is removed and the seat interlock wires are properly reconnected to restore the seat safety switch feature before operating the tractor !!

SECTION 7 : STEERING & FRONT AXLE

DESCRIPTION OF STEERING SYSTEM

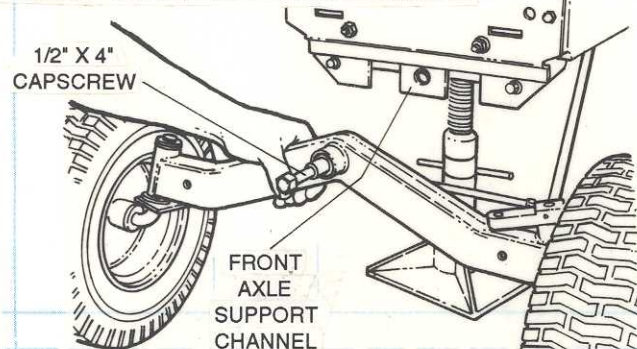
The steering linkage provides a direct connection between the steering gear and the front wheels. The linkage consists of a tie rod which is adjustable at either end and which is connected to the left and right wheel kingpins. A drag link and steering arm connect the left kingpin to the sector/steering gear.

The steering gear is mounted on the sector which rides on the bearing support. This support also carries the end of the steering shaft and can be pivoted to allow the operator multiple steering wheel positions. Adjusting the wheel is done by depressing the adjusting sleeve, then turning the wheel to the left to tilt it forward or to the right and pulling back to tilt it rearward.



The front axle is suspended from the underside of the tractor by one 1/2" x 4" hex head capscrew. It pivots on the front axle support channel to provide floating front suspension, independent from the other wheels.

FIG. 2 - FRONT AXLE SUSPENSION



PRINCIPLE OF OPERATION

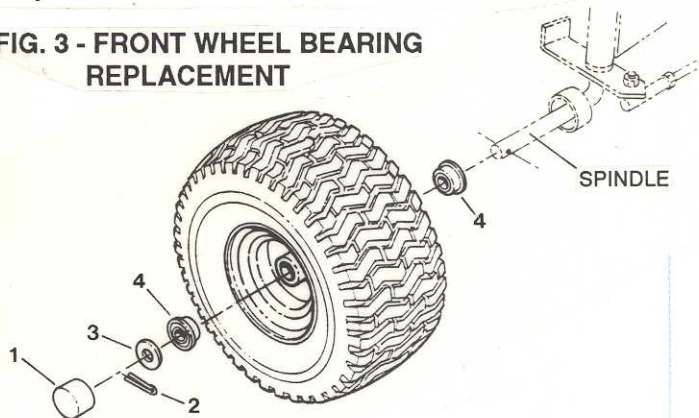
When the steering wheel is turned, the rotating motion of the shaft/pinion causes the sector to travel in a curvilinear fashion. The drag link, which is connected to the sector, is pulled rearward for right turns and pushed forward for left turns.

FRONT WHEEL (SPINDLE) BEARINGS: REPLACEMENT PROCEDURE

REMOVAL

- 1: Raise and support the front end of the tractor with jackstands or a sturdy jack.
- 2: Refer to the illustration and remove the dust cover (1), cotter pin (2), and washer (3) from the spindle.
- 3: Slide the tire/rim assembly off the spindle.
- 4: Remove the wheel bearings (4). Tight bearings can be punched out from inside of the wheel hub.

FIG. 3 - FRONT WHEEL BEARING REPLACEMENT



CLEANING & INSPECTION

- 1: Wipe out old grease from the bearing bore in rim.
- 2: Inspect the bore for damage. Replace rim if there is any damage which cannot be repaired.
- 3: Examine the spindle and replace it if damaged or excessively worn.

REASSEMBLY

- 1: Press the replacement bearings into the wheel hub.

NOTE: Look for the special "HEAT TREATED" stamp on the bearings. A bearing lacking this stamp may be soft, and consequently *will not* have a long service life.

- 2: Reinstall on spindle in reverse order. Be sure to bend cotterpin legs over.

- 3: Lubricate the assembly through the lube fitting with bearing grease until the grease becomes visible around the edges of the bearings.

LEFT KINGPIN BEARING: REPLACEMENT

REMOVAL PROCEDURE

- 1: Raise and support the front end of the tractor with jackstands or a sturdy jack.
- 2: Disconnect the drag link (1) and the 1/2" split lockwasher from the steering arm.
- 3: Drive out the roll pin (3) which secures the steering arm to the left kingpin.
- 4: Disconnect tie-rod end (5). Remove the nut and 3/8" split lockwasher from the ball joint.
- 5: Using a large punch, drive out the kingpin (6) from the steering arm and axle assembly.
- 6: Drive out both bearings (8) from the axle assembly and discard the bearings.

CLEANING & INSPECTION

- 1: Wipe out old grease from the bearing bore in the axle assembly and clean the kingpin.
- 2: Inspect bore for damage. Replace axle assembly if it is damaged beyond repair.
- 3: Examine the kingpin and replace it if damaged or if excessively worn.

REASSEMBLY PROCEDURE

- 1: Press replacement bearings in and reassemble components in reverse order.
- 2: Lubricate the bearings through the lube fittings with bearing grease until grease appears around the edges of the bearings. Wipe away excess grease.

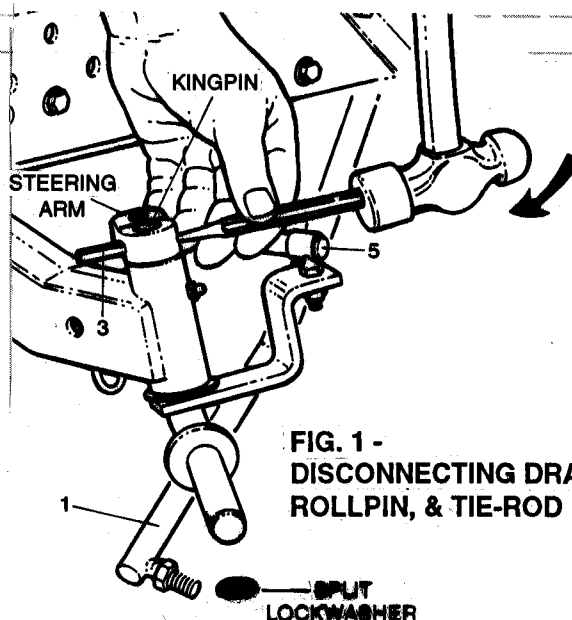


FIG. 1 - DISCONNECTING DRAG LINK, ROLLPIN, & TIE-ROD

FIG. 2 - REMOVING KINGPIN

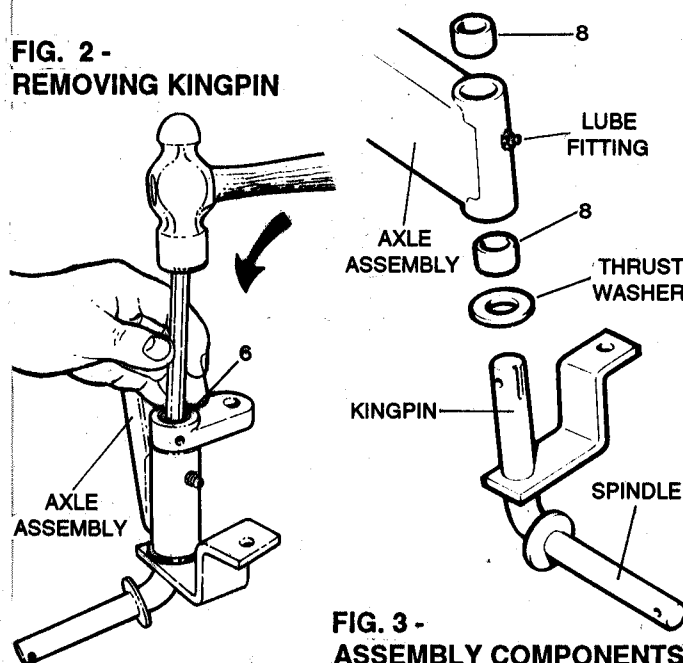


FIG. 3 - ASSEMBLY COMPONENTS

RIGHT KINGPIN BEARING: REPLACEMENT

REMOVAL PROCEDURE

- 1: Raise and support the front end of the tractor with a sturdy jack or jackstands.
- 2: Disconnect tie-rod end (2), the 3/8" lockwasher and nut.
- 3: Remove the retaining ring (1) from the top of the kingpin.
- 4: Remove the kingpin from the axle assembly. Remove thrust washer (3) from the kingpin assembly.
- 5: Drive out both bearings (4) from the axle assembly and discard the bearings.

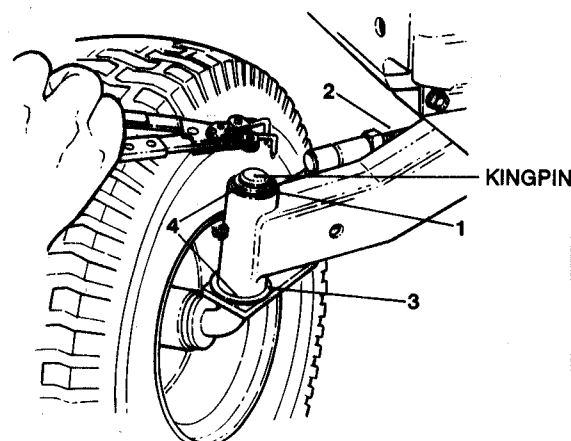


FIG. 1 - KINGPIN REMOVAL

CLEANING & INSPECTION

1: Wipe out old grease from the bearing bore and clean the kingpin.

2: Inspect the bore for damage. Replace the axle assembly if it is damaged beyond repair.

3: Examine the kingpin; replace if excessively worn or damaged.

REASSEMBLY PROCEDURE

1: Press replacement bearings in and reassemble in reverse order.

2: Lubricate the bearings through the lube fittings with bearing grease until grease appears around the edges of the bearings. Wipe away excess grease.

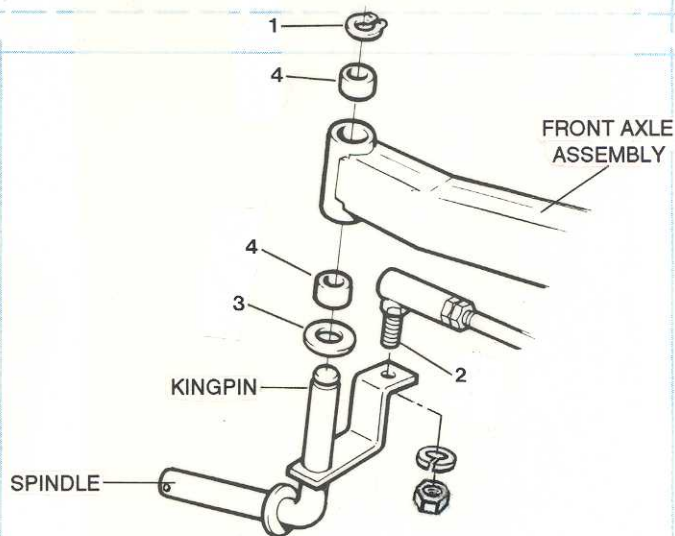


FIG. 2 - COMPONENT REASSEMBLY

FRONT AXLE PIVOT BEARING: REPLACEMENT REMOVAL PROCEDURE

1: Raise and support the front end of the tractor with jackstands or a sturdy jack. Disconnect the drag link and lockwasher from the steering arm.

2: Remove the 1/2" hex locknut (1) from the 1/2" x 4" hex head capscrew (2) -- this capscrew suspends the front axle assembly from the front axle support channel. Carefully remove the capscrew and lower the axle and wheel assembly to the surface.

3: Remove the axle journal (3) from the axle assembly.

4: Drive both pivot bearings (4) from the axle bore and discard them.

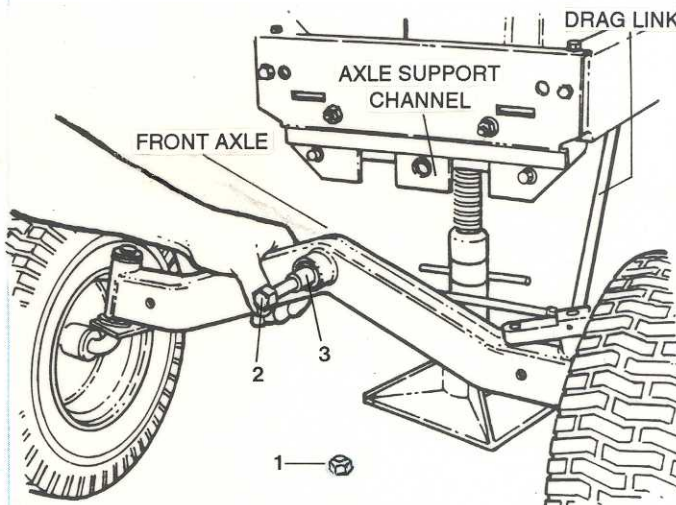


FIG. 1 - REMOVAL OF
FRONT AXLE ASSEMBLY

CLEANING & INSPECTION

1: Wipe out old grease from the bearing bore. Clean the journal and the capscrew.

2: Examine the bore, journal and the capscrew for excessive wear or damage. Replace any substandard part.

REASSEMBLY PROCEDURE

1: Press in the replacement bearings and reassemble components in reverse order.

2: Lubricate the bearings through the lube fitting with bearing grease until grease appears around the edges of the bearings. Wipe away excess grease.

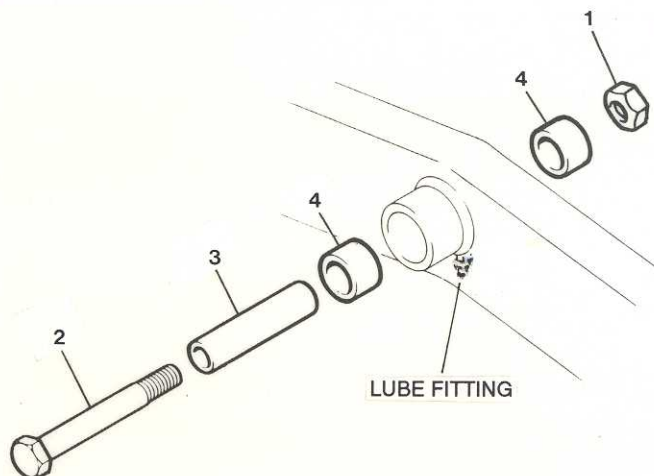
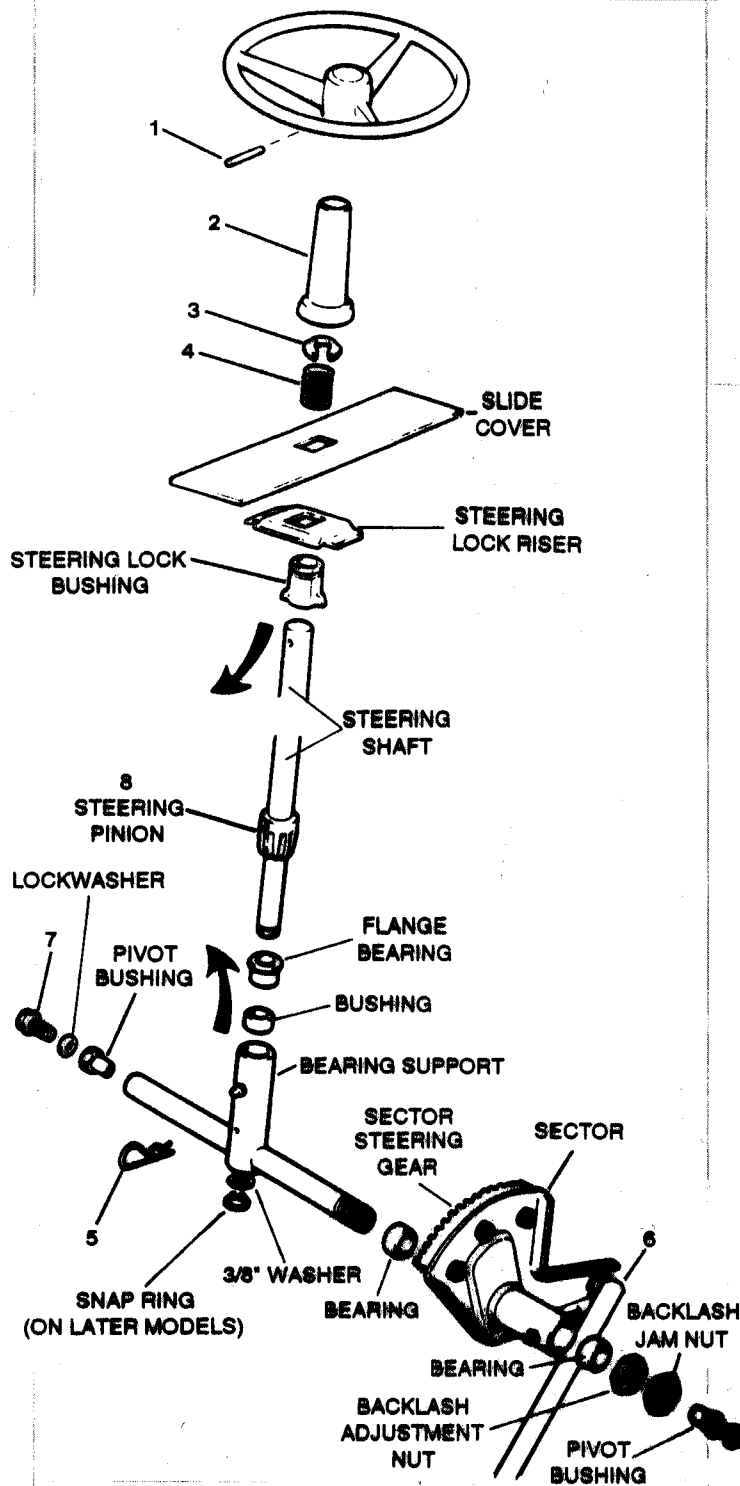


FIG. 2 - PIVOT BEARING REMOVAL

FIG. 1 - STEERING GEAR COMPONENTS



STEERING GEAR OVERHAUL

DISASSEMBLY PROCEDURE

1: First, drive rollpin (1) out of the steering wheel hub and from the steering shaft. Using a punch and hammer, carefully drive the pin out from the *SIDE* (across tractor) while supporting the steering wheel.

NOTE: Driving the rollpin out toward the front or toward the rear of tractor could break the "ears" off steering lock bushing.

2: Slide actuator (2) off the shaft. Compress spring (4) and remove retaining ring (3) from the steering lock bushing. Slide the spring off the shaft.

3: On **EARLIER** model tractors, pull out hair pin (5) securing the lower end of the steering shaft in the bearing support assembly. The shaft can then be removed from the support as shown. On **LATER** models, a retaining ring with a 3/8" washer secure the lower end of the bearing in the support. Remove this ring and washer to free the shaft from the bearing support.

NOTE: Before working on the underside of tractor, it may be more convenient to raise it off the shop floor. While elevated, the tractor must be securely positioned on jackstands to prevent personal injury or property damage from occurring.

4: Raise the steering shaft up and out of the bearing support (at the lower end), then direct the shaft down and out of the dash (at the upper end). The steering lock bushing will be on the shaft during removal from tractor.

5: Disconnect the drag link (6) from the sector by removing the 1/2" split washer and hex nut. While holding the pivot bushings with a wrench, the two 5/16" x 3/4" thread cutting screws (7) and 5/16" lockwashers securing the bearing support assembly to the frame channels can now be removed. Remove the complete bearing support assembly from the underside of the tractor.

CLEANING & INSPECTION

1: Wash all parts thoroughly in clean solvent to remove old lubricant, metallic particles and dirt from all surfaces. Dry the parts after cleaning to remove residue of the solvent.

2: Replace worn bushings and bearings. Apply a light coating of grease to bushing and surfaces prior to installation.

3: Inspect the steering sector gear and pinion (8) for damage and/or excessive wear.

4: Inspect retaining ring (or hairpin on earlier models), spring and steering wheel roll pin for wear, damage or weakness. Replace any part which exhibits any of these conditions.

REASSEMBLY PROCEDURE

1: Reverse procedures to reassemble the steering gear mechanism.

2: Apply a coat of grease to the pivot bushings prior to inserting them into the ends of bearing support.

3: The bearing support assembly should then be positioned between the frame channels. Align the hole in each pivot bushing with the corresponding hole in the right or left hand frame channel. Loosely install the two thread cutting screws into the pivot bushings.

4: After securing the steering shaft in the bearing support, and before installing the spring on the steering lock bushing, center the lock bushing (in slide cover) in the top of the dash by adjusting the steering lock riser above the slots provided in the pedestal so the steering lock bushing moves freely through all tilt steering adjustment positions. Make sure that the steering lock bushing is "CENTERED" in the slots *before* tightening both pivot bushing screws.

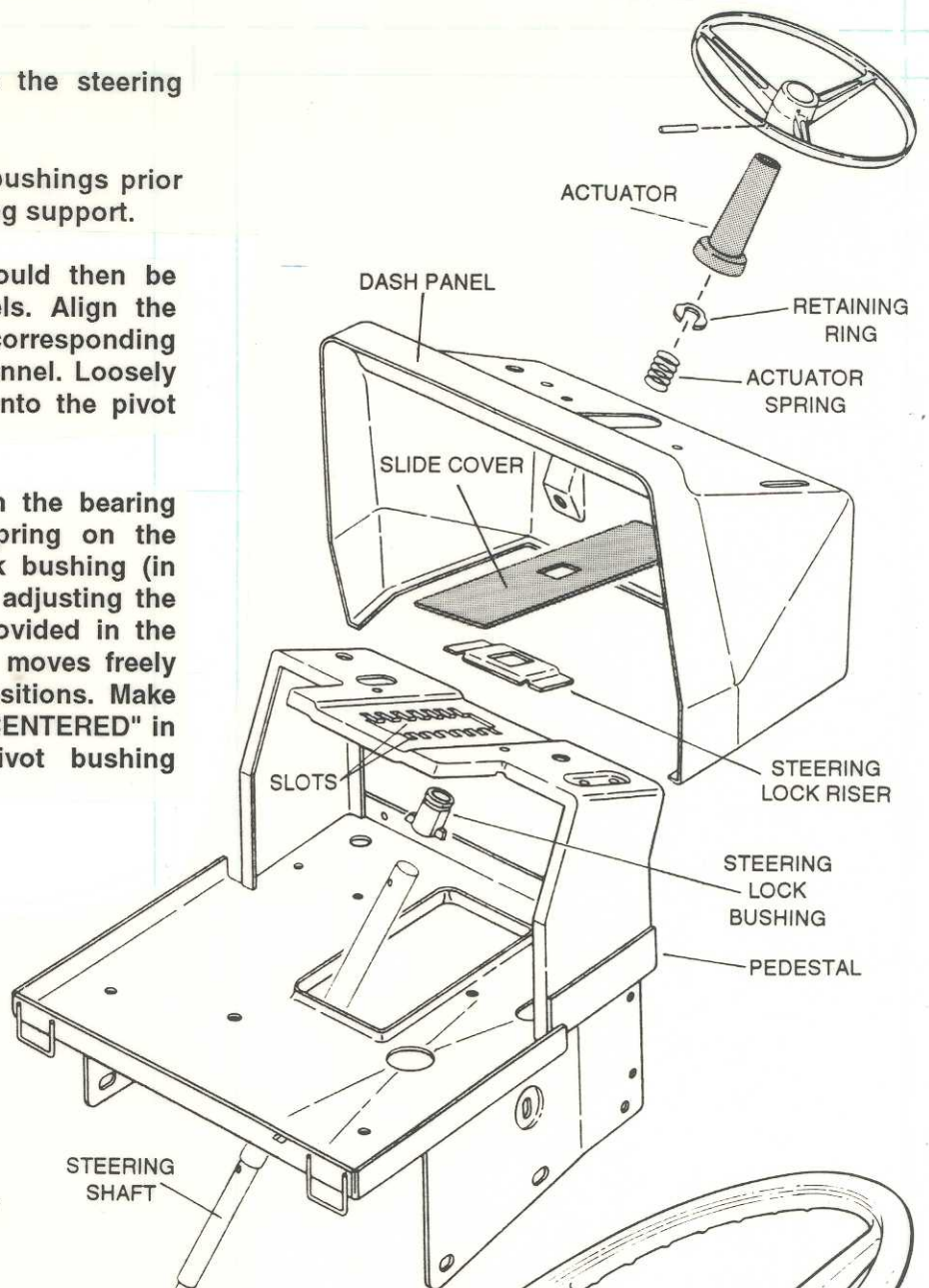
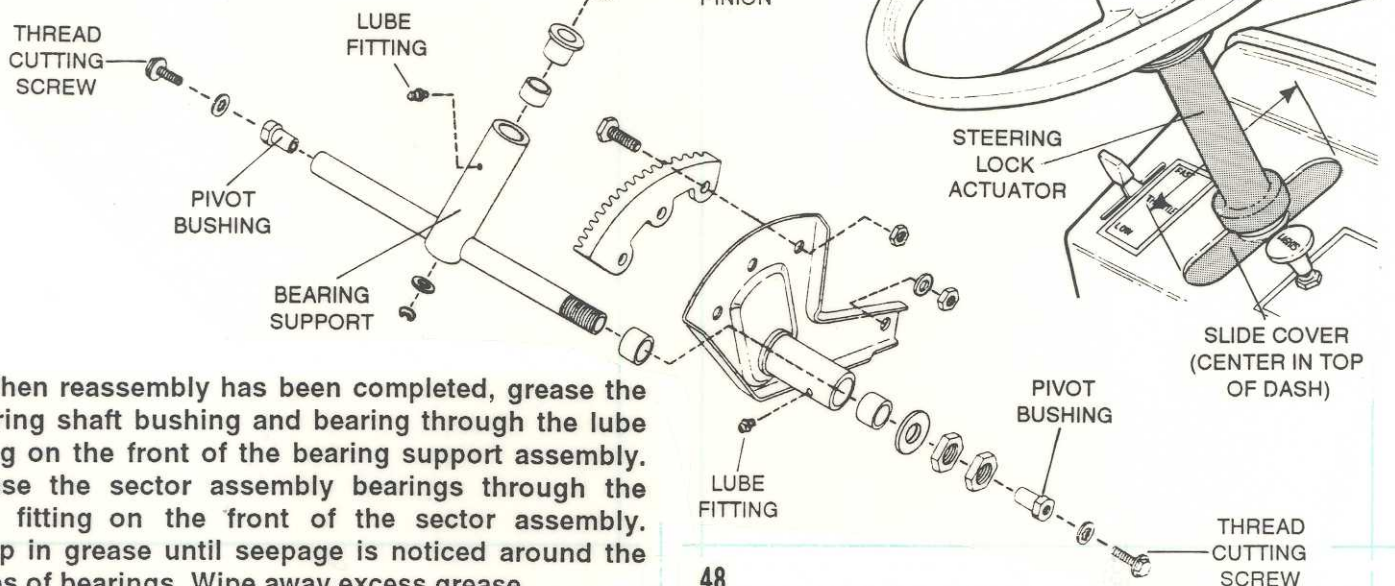


FIG. 2 - STEERING GEAR REASSEMBLY



5: When reassembly has been completed, grease the steering shaft bushing and bearing through the lube fitting on the front of the bearing support assembly. Grease the sector assembly bearings through the lube fitting on the front of the sector assembly. Pump in grease until seepage is noticed around the edges of bearings. Wipe away excess grease.

ADJUSTMENTS

STEERING GEAR BACKLASH ADJUSTMENT

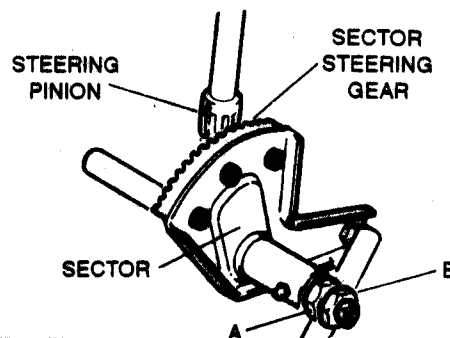
1: Jack the front of tractor up and securely position it on jackstands. Both front wheels must be suspended. Loosen the 3/4" backlash adjusting hex nut (A) and the 3/4" hex jam nut (B).

2: Adjust the 3/4" hex nut (A) *INWARD* against the sector assembly until backlash between the steering sector gear and the steering pinion is eliminated with minimal drag when the steering wheel is rotated.

3: After backlash has been eliminated, securely tighten the 3/4" hex jam nut (B) against nut (A) so the correct adjustment will be maintained.

NOTE: Nuts (A) and (B) *must* be securely tightened; if not, they might work loose and cause loss of steering (excessive play), or cause the steering to be extremely tight (binding).

4: Remove jackstands and lower the front wheels back down to the ground.



TOE-IN ADJUSTMENT

Toe-in is an intentionally created condition (part of the steering geometry) that exists when the measured distance between two selected points on the front of the tires is *LESS* than the distance between two corresponding points on the rear of the tires. Toe-in helps compensate for normal steering play and causes the tires to tend to roll in a straight ahead manner. Adjust as follows:

1: Park the tractor on a hard level surface and check the tires for proper inflation -- 12 p.s.i. front, 10 p.s.i. rear required.

2: Turn the steering wheel until the tires are positioned straight ahead (*DO NOT* use the steering wheel "spokes" as reference when pointing the wheels forward).

3: Measure the distance between designated points "A" & "B" on the front of the tires and compare this to the distance between corresponding points "C" & "D" on the rear of the tires. The distance between "C" & "D" should be up to 3/16" greater than the distance between "A" & "B".

4: To adjust the toe-in, remove the nut and lockwasher which secure the tie-rod's RIGHT ball-joint to the right hand kingpin assembly. Using two wrenches to prevent ball-joint damage from occurring, loosen and back the jam nut away from the RIGHT ball-joint.

5: One complete revolution of the ball-joint changes it's distance on the tie-rod approximately 1/16". If a large adjustment is needed, also loosen the LEFT ball-joint and split the difference between the two ball-joints.

6: Turn the ball-joint clockwise to *DECREASE* toe-in thus lengthening the distance between "A" & "B".

7: Turn the ball-joint counter-clockwise to *INCREASE* toe-in thus shortening the distance between "A" & "B".

8: Reinstall the ball-joint on the right kingpin assembly and be sure the desired amount of toe-in has been achieved before retightening the ball-joint jam nut(s). Check all fasteners and securely tighten any which are loose.

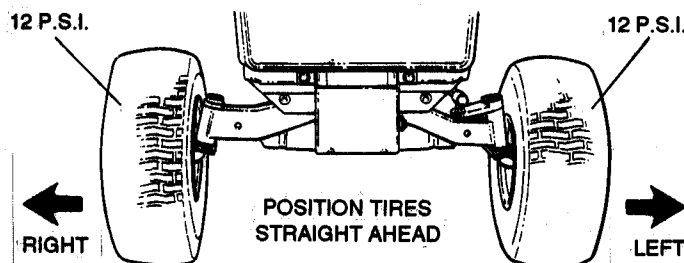


FIG. 1 - POSITIONING FRONT TIRES

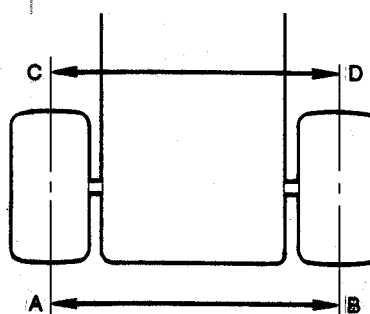


FIG. 2 - MEASURING TOE-IN

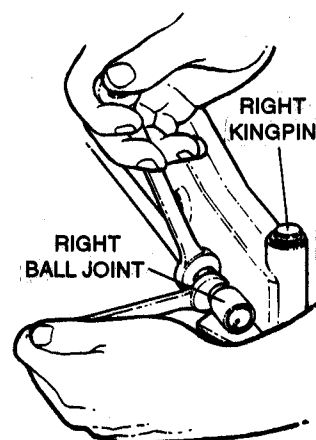


FIG. 3 - BALL JOINT REMOVAL

SECTION 8: MOWERS COMPONENTS & INSTALLATION

INSPECTION OF BLADES

The mower blade(s) should be inspected whenever the mower deck is removed for servicing. This inspection should be visual -- the blade(s) does not have to be removed for this.

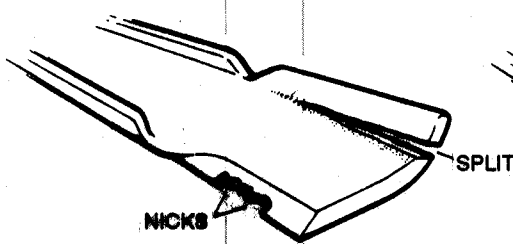
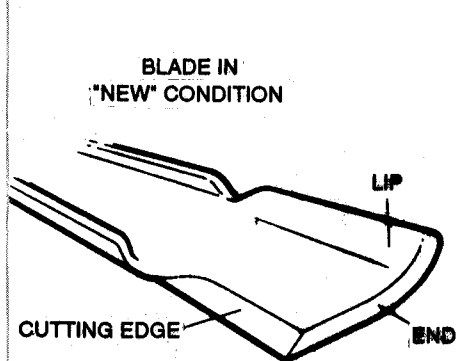
NOTE: ALWAYS WEAR GLOVES WHEN HANDLING BLADES -- THEY MAY HAVE SHARP EDGES !

1: Check the blade(s) for obvious damage such as bends, large nicks or chunks resulting from hitting solid objects. **DO NOT** attempt to repair a damaged blade. Replace it with a new genuine SNAPPER blade.

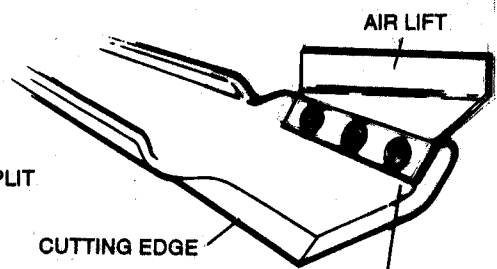
2: Always check condition of the blade retaining hardware. This is very important to assure that they will not loosen during operation. Replace any blade retaining fasteners which appear damaged or worn, with genuine SNAPPER parts only - **DO NOT** use any substitutes or unauthorized replacements and double check to make sure the correct part number is used.

3: Air lifts (or blades with lifter lips) warrant additional attention. Be sure air lifts are securely attached and that the correct "hardened screws" are used. Air lifts and blade lips sustain most wear, especially when subjected to dry and/or sandy conditions. If wear is noticed, the blade and air lifts should be replaced along with new fasteners for the lifts.

4: Examine cutting edges of blade(s) for sharpness. Dull blades produce ragged cuts and make the engine work harder, thus increasing fuel consumption and requiring lower ground speeds to do the job. Keep the blades sharp !



WARNING: IF MOWER IS USED IN DRY AND SANDY AREAS, INSPECT THE LIPS MORE FREQUENTLY TO AVOID SEPARATION FROM THE BLADE.



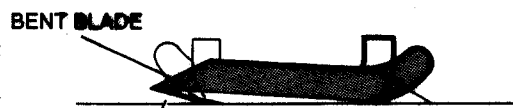
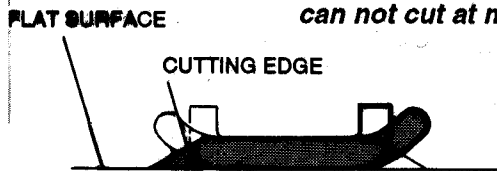
THIS IS A CRITICAL AREA SINCE EXCESSIVE WEAR CAN SEPARATE THE LIP OR AIR LIFT FROM THE BLADE.

BLADE SHARPENING PROCEDURE

WARNING: Always wear safety glasses and protective gloves when grinding or sharpening mower blades.

1: After removing the blade from the mower, lay it on a smooth, flat surface to check for straightness. Both cutting edges should be flat or angled downward, **NEVER** upward! Most SNAPPER blades are bowed and angled downward at the tips and at the cutting edges.

Note: Bent blades, especially those twisted upward, can not cut at maximum efficiency.



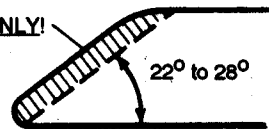
IF THE CUTTING EDGE OF THE BLADE ANGLES UPWARD, REPLACE THE BLADE WITH A NEW SNAPPER BLADE

2: When sharpening a blade, maintain the original 22 to 28 degree cutting edge angle. Sharpen only the **TOP SIDE** of each cutting edge. To maintain balance, grind each cutting edge an equal amount.

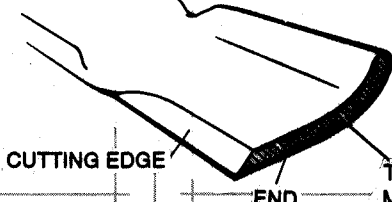
3: Use a commercial balancer to check blade balance. Follow balancer manufacturer's instructions. If out of balance, grind metal from the **HEAVY END** of the blade -- never from the cutting edge. Recheck balance until correct.

MAINTAIN THE ORIGINAL ANGLE ON CUTTING EDGE.

SHARPEN BLADE ON "TOP SIDE" ONLY!



DO NOT GRIND THE **BOTTOM** SURFACE OF BLADE WHEN SHARPENING CUTTING EDGE.



TO BALANCE A BLADE, REMOVE METAL FROM THE **END**, **NOT** THE CUTTING EDGE.

BLADE ALIGNMENT -- 33" MOWERS

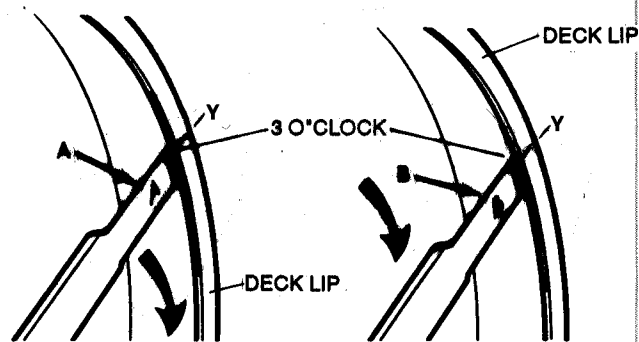
PROPER BLADE ALIGNMENT requires a straight blade and a cutting plane parallel with the mower deck. If the blade is not straight, one cutting edge will do most of the work, reducing the maximum efficiency for which the mower was designed. If the cutting plane is not parallel with the deck, the grass within a cut path may not be the same height on the right side as it is on the left side of the path. Such a condition will result in a lawn with an unlevel appearance.

To correct, first check the straightness of the blade and adjust or replace as necessary. Next check the blade/deck parallelism and make corrections in alignment as needed.

NOTE: Detach the mower from the tractor and review Reference Service Bulletin # 1979-4 *before* starting the following procedures:

- 1: Mark one blade tip "A" and the other tip "B" as shown.
- 2: Mark "Y" on the deck lip at the 3 O'CLOCK position and then rotate the blade until tip "A" lines up with the "Y" mark. Measure the distance from the lip to the blade tip. Rotate the blade again (180 degrees) until tip "B" lines up with the "Y" mark and measure the distance between this tip and the deck lip.
- 3: If the two measurements are the same or within $1/16"$ of the other, the blade is considered straight and adjustment is not needed. If the difference noted is, however, more than $1/16"$, adjust blade for straightness as follows.

WARNING: DO NOT attempt to straighten a blade that was bent as a result of hitting a solid object. Replace it with a genuine SNAPPER blade and check the new blade for straightness and adjust as needed.



MEASURE FROM BLADE'S TIP A AND FROM TIP B TO THE SAME POINT (Y) ON THE DECK LIP.

THE DISTANCE FROM TIP A TO POINT (Y) SHOULD BE THE SAME AS, OR WITHIN $1/16"$ OF THE DISTANCE FOR BLADE TIP B TO (Y).

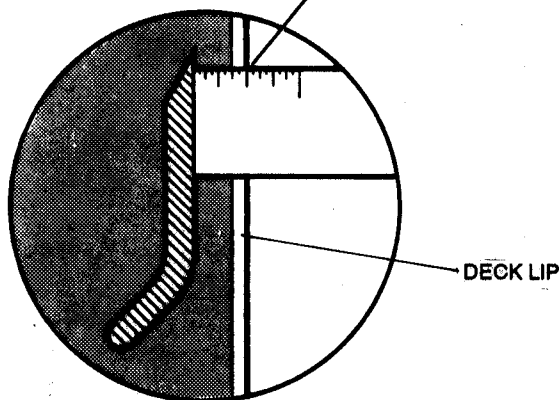


FIG. 1 - BLADE ALIGNMENT

STRAIGHTENING BLADE

- 1: Mark the blade tip having the larger dimension then loosen the jam nut (1) closest to this tip.
- 2: Turn blade adjusting screw (2) clockwise against the blade until this tip is the same distance from the lip at mark "Y" as the other tip. Make small adjustments and measure each time until both are the same within $1/16"$.
- 3: When both blade tips are the same distance from mark "Y", tighten the jam nut (1) against the blade holder to secure the adjusting screw setting. Proceed with the blade/deck parallelism check as follows.

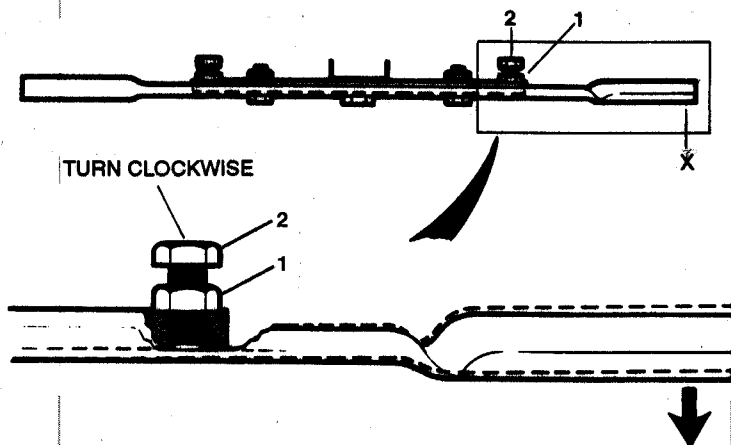


FIG. 2 - STRAIGHTENING BLADE

BLADE/DECK PARALLELISM – CHECK

1: Rotate blade tip "A" to mark "Y" (3 O'CLOCK) and measure the distance from deck lip to blade tip.

2: Make 3 other marks (equally spaced) on the lip of the deck - as shown. Rotate tip "A" and measure the distance from tip "A" to each of these 3 additional marks. If all 4 measurements are within $\frac{1}{8}$ " of each other, the blade is considered to be parallel to the deck. If any two dimensions are *not* within the $\frac{1}{8}$ " limit, the blade is not parallel and will have to be adjusted as described in the following section.

3: Rotate blade tip marked "A" to the spot where the smallest dimension (shortest distance) was found and mark an "X" on the deck lip at this spot. The longest distance should then be found between tip "B" and its corresponding spot on the deck lip. Proceed to the **BLADE/DECK PARALLELISM ADJUSTMENT** instructions to correct this problem.

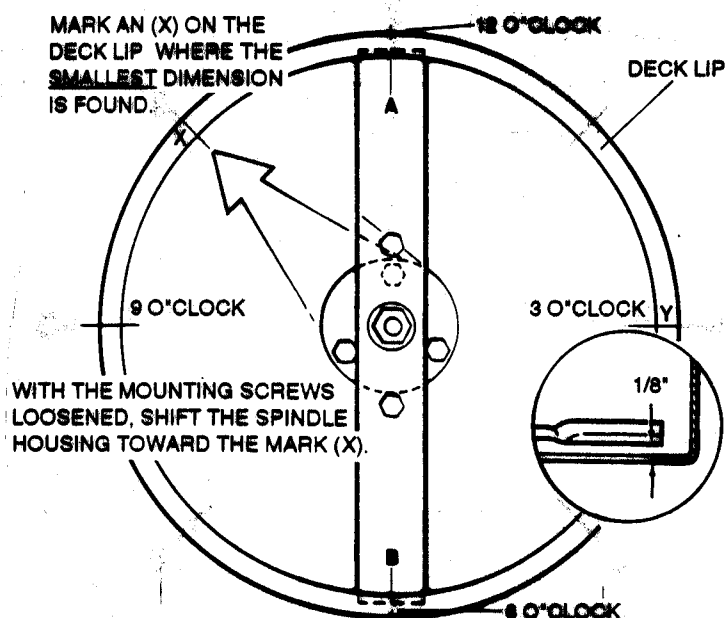


FIG. 3 - CHECKING PARALLELISM

BLADE/DECK PARALLELISM - ADJUSTMENT

To establish parallelism, the spindle assembly must be shifted within the enlarged mounting holes in the mower deck surface.

The upper end of the spindle housing is enclosed in a spindle brace at the tolerance ring to limit lateral movement of the upper end of the housing (it is the pivot point). Movement of the lower end is controlled by the three $\frac{3}{8}$ " x $\frac{3}{4}$ " spindle mounting hex flange lock bolts and $\frac{3}{8}$ " locknuts.

To achieve parallelism, the spindle (with blade) must be shifted toward blade tip "A". This is the tip closest to the deck lip mark "X" established in step 3 in the foregoing parallelism check procedures. To adjust, refer to the illustrations and use the following steps.

1: Loosen the three mounting bolts *just enough* to shift the lower end of the spindle housing on the deck.

2: Shift the spindle housing toward blade tip "A" to increase the distance from mark "X". Compare the distance from tip "A" and Tip "B" to the deck and shift the housing until both are the same distance.

3: Retighten the mounting bolts to secure the spindle housing in the proper location, then recheck the parallelism by measuring the distance from blade tip "A" to the other 4 marks on the deck lip. If they are **ALL** equal or within $\frac{1}{8}$ " of each other, the blade is parallel to the deck.

4: After adjusting the spindle housing to get the straight blade parallel with the deck lip, it must be checked/adjusted so *both* blade tips are $\frac{1}{2}$ " from the lip. If closer, the blade tips may hit the lip. If higher, a ragged, poor quality cut will result.

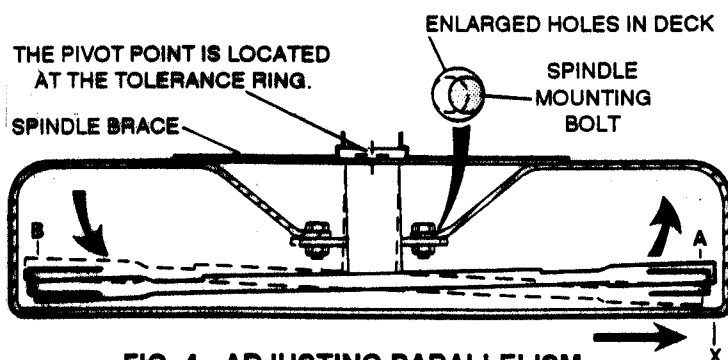


FIG. 4 - ADJUSTING PARALLELISM

BLADE ALIGNMENT -- 41" & 48" MOWERS

Proper blade alignment requires straight blades with cutting planes which are parallel with the mower deck from side to side. If a blade is not straight, the lowest cutting edge will do most of the work, reducing the efficiency of the mower. If the cutting planes are not parallel to each other (or to the deck), the grass within a cut path will not be the same height on the right side, middle, or left side. Such a condition results in a lawn with an unlevel appearance.

To correct, first check the straightness of the blades and adjust or replace as necessary. Next check the blade/deck parallelism and make corrections in alignment as needed.

CHECKING BLADE STRAIGHTNESS

NOTE: Detach mower from the tractor before starting the following procedures.

1: Mark one tip on each blade "A" and mark the other tip on each blade "B".

2: Select one blade and rotate the tip marked "A" until it is perpendicular to the *closest* point on the mower deck's REAR lip. Mark this spot on the deck with a "Y". Then measure the distance between tip "A" and the "Y" mark as shown. Rotate the blade and position tip "B" at "Y" and measure this distance.

3: If the two measurements are the same, or within $3/32$ " of each other, the blade is considered to be straight. If the difference is more than $3/32$ ", replace the blade and remeasure the distances from the new blade's tips to the "Y" to insure that the new blade is straight. Repeat the procedure for each blade.

CHECKING BLADE PARALLELISM

1: Place adjacent blades in line (end to end). Position the two tips which have the largest dimension from the deck lip end to end and check the alignment of one tip to the other. The two blades are considered to be parallel if the two tips are level or have a distance of $1/8$ " or less between them as shown.

2: If there is more than $1/8$ " difference between the two tips, they are misaligned and the spindle with the blade having the most misalignment must be shifted to tilt the blade back to parallel.

"HIGH ENDS" ON ADJACENT BLADES MUST BE AT THE SAME LEVEL, OR HAVE NO MORE THAN $1/8$ " DIFFERENCE BETWEEN THEM.

FIG. 2 - CHECKING PARALLELISM

3: The blades MUST be parallel to the UNDERSIDE of the deck from side to side. With the adjacent blades' tips end to end (across the deck), measure *straight up* from EACH blade tip to the underside of the deck - there should be no more than $1/8$ " difference in the measurements, otherwise an unlevel cut will occur. Adjust spindle(s) if needed. Refer to Figure 3.

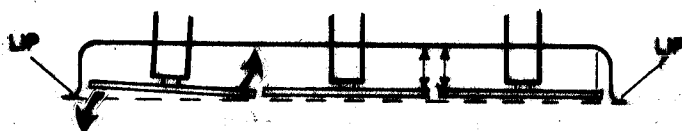
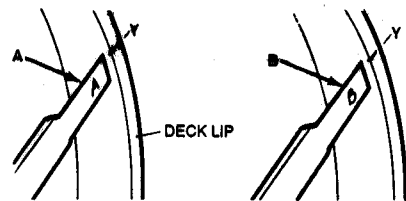


FIG. 3 - BLADE TO DECK PARALLELISM



MEASURE THE DISTANCE FROM TIP A TO (Y) AND FROM TIP B TO (Y).

THE DISTANCE FROM TIP A TO (Y) SHOULD BE THE SAME AS, OR WITHIN $3/32$ " OF THE DISTANCE FOR TIP B TO (Y).

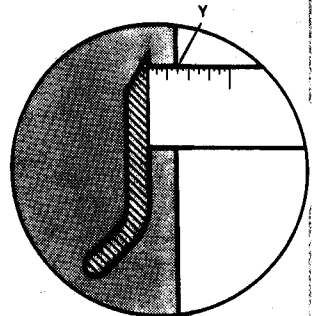


FIG. 1 - BLADE STRAIGHTNESS

NOTE: More than one spindle may require shifting before parallelism can be re-established.

4: Finally, rotate ALL blades until one tip on each is perpendicular to the FRONT of the deck at the *upper*, "off-set" portion of the lip.

Measure from each blade tip to the lip:

Place a straightedge against the bottom of the blade's cutting edge and let it project slightly past the deck lip. While holding the straightedge in place, measure from its top edge to the underside of the lip.

The distance from the straightedge to the lip should be $1/8$ " FOR EACH BLADE. Refer to Figure 4.

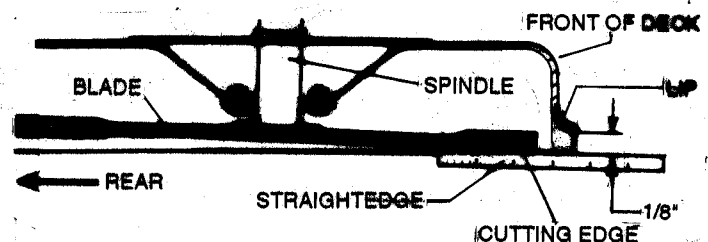


FIG. 4 - BLADE TO FRONT LIP MEASUREMENT

ADJUSTING BLADE PARALLELISM

To adjust blade parallelism, the spindle assembly must be shifted within the enlarged mounting holes in the deck surface. The upper end of the spindle housing is enclosed in a spindle brace at the tolerance ring and limits lateral movement of the upper end of the housing (it is the pivot point). Movement of the lower end of this housing is controlled by the three spindle mounting $3/8$ " x $3/4$ " hex flange lock bolts and $3/8$ " locknuts. To re-gain parallelism, the misaligned spindle (with blade) has to be adjusted until the high tip on one blade is parallel with the corresponding tip on the other blade.

1: Loosen the three mounting bolts *JUST ENOUGH* to shift the lower end of the spindle in the mounting holes in the deck.

2: Shift the spindle housing toward the LOW blade tip. This will lower the higher tip into alignment (levelness) with the corresponding tip of the other blade.

3: Retighten the mounting bolts to secure the spindle housing in position and recheck parallelism.

SHIFTING THE SPINDLE HOUSING
WILL ADJUST THE CUTTING PLANE ANGLE.

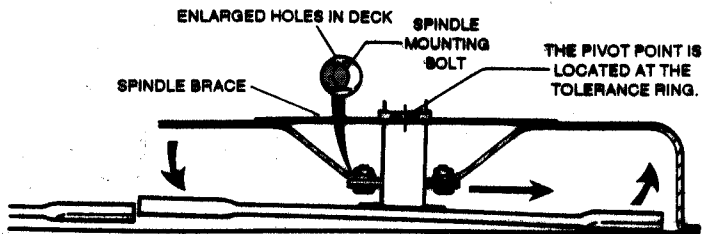


FIG. 5 - ADJUSTING PARALLELISM

SPINDLE ASSEMBLY - 33" MOWER

The spindle can be rebuilt using genuine SNAPPER replacement parts or it can be replaced as an assembly. Both approaches require the mower to be removed from the tractor. They are described separately in the following.

WARNING: DO NOT handle cutting blades with bare hands or unprotected wrists and arms - always wear gloves! When removing blade, use a piece of wood to block it and prevent rotation.

REBUILDING SPINDLE ASSEMBLY

When rebuilding a spindle assembly, it is not necessary to remove the idler arm from the spindle housing nor does the spindle housing have to be removed from the deck.

Rebuilding an assembly rather than replacing it reduces time and cost since fewer parts are replaced and spindle housing realignment is not necessary.

Note: The rebuilding procedure does not require the removal of the spindle housing.

1: To remove the blade, remove the two 1/2" x 1" capscrews (7), 1/2" internal tooth lockwashers (8) and 1/2" jam nuts (9).

2: Remove the spindle pulley nut (10). Note: the blade holder must be held while loosening the nut.

3: Remove the spindle pulley (11) and the two shim washers (12) from the spindle shaft.

4: Reinstall the spindle pulley nut *flush* with the top of the spindle. Use a soft face mallet and carefully drive the spindle with lower bearing, and blade bar, out the bottom of the spindle housing. Hold the spindle at the large diameter center portion in a vise while removing the bottom nut, then tap the blade bar with a mallet *counter-clockwise* to loosen and remove it from the spindle shaft. Then the spindle washer (2) and the lower bearing (4) can be removed.

5: Remove the top retaining ring (5) from the spindle housing, then remove the upper bearing (6).

6: Carefully clean all parts - removing any metallic particles, dirt, and debris. When replacing bearings, be sure the work area is free from dirt.

7: Be sure to use only genuine SNAPPER replacement parts. Reverse procedures to reassemble.

8: After installing the blade holder and securing with hex locknut (1), tighten locknut to 70 foot pounds torque.

9: After the spindle assembly components have been reassembled and all fasteners are securely tightened, lubricate the housing with several shots of bearing grease through the lube fitting.

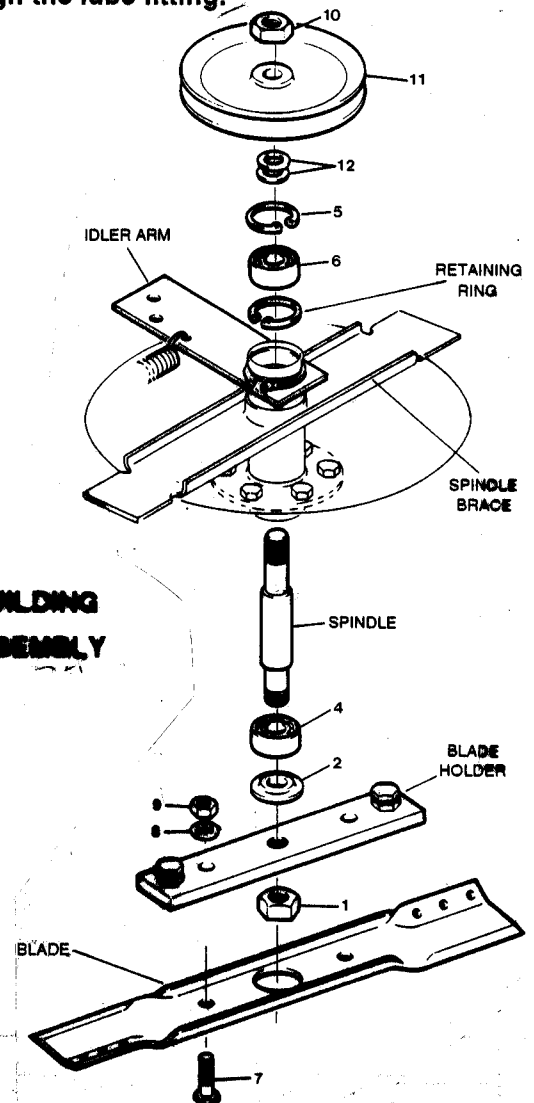


FIG. 1 - REBUILDING
SPINDLE ASSEMBLY

REPLACING SPINDLE ASSEMBLY

Use the following procedure when replacing, rather than rebuilding, a 33" deck spindle assembly.

- 1: To remove blade, remove two 1/2" x 1" capscrews (1), 1/2" internal tooth lockwashers (2) and 1/2" hex jam nuts (3).
- 2: Remove spindle pulley nut (4). The blade holder must be held while loosening this nut.
- 3: Remove the spindle pulley (5) and the two shim washers (6) from the spindle shaft.
- 4: Remove retaining ring (7) and lift the idler arm (8) off the spindle housing.
- 5: Remove retaining ring (9) from the spindle housing.
- 6: Remove the three lockbolts (10) and nuts (11) which secure the spindle housing to the deck. Pull the spindle assembly from deck and remove the tolerance ring (12) - it will be reinstalled.
- 7: Reverse the procedures to install the replacement spindle assembly. Be sure to reinstall the tolerance ring on the new assembly first.
- 8: Be sure the new spindle assembly is adequately lubricated. Pump a few shots of bearing grease into the assembly through the lube fitting if in doubt.
- 9: After all components are in place and all fasteners have been securely tightened, check blade alignment and blade/deck parallelism as described earlier under adjustments.

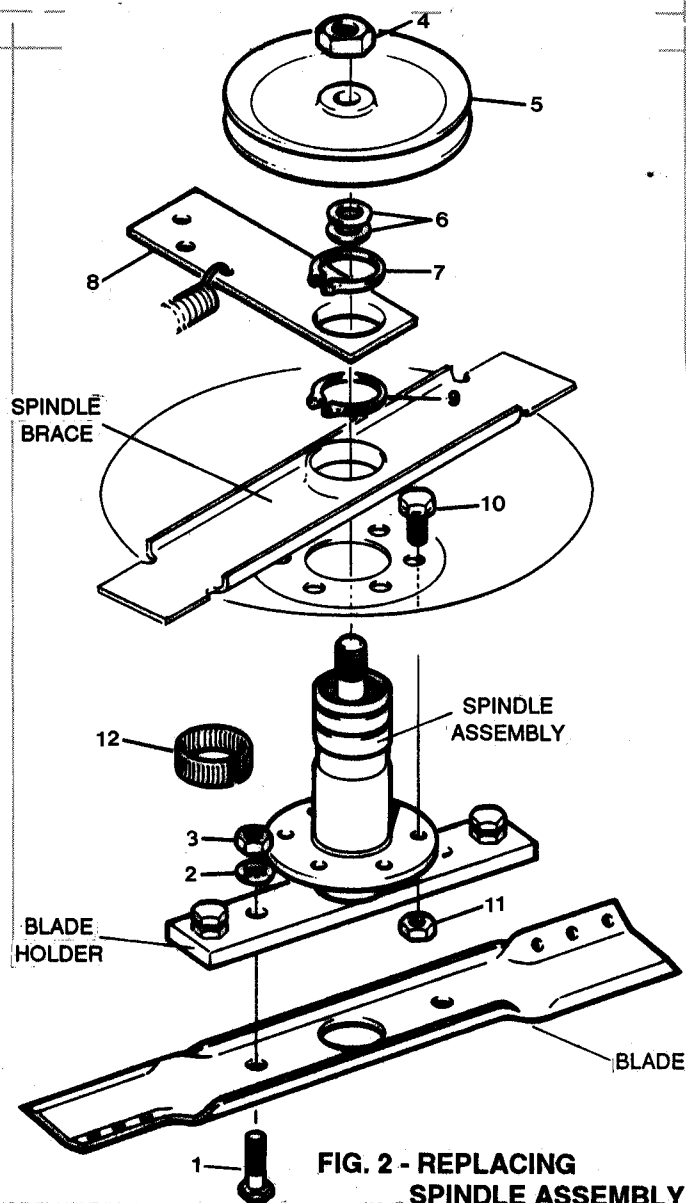


FIG. 2 - REPLACING SPINDLE ASSEMBLY

SPINDLE ASSEMBLY-- 41" & 48" MOWERS

Spindles can be rebuilt using SNAPPER replacement parts or they can be replaced as assemblies. Both approaches require that the mower be removed from the tractor. The procedures are described separately in the following.

WARNING : DO NOT handle cutting blades with bare hands -- always wear gloves. When removing a blade, use a piece of wood as a block to prevent the blade from rotating.

REBUILDING SPINDLE ASSEMBLY

Note: The rebuilding procedure does not require the removal of the spindle housing. Rebuilding reduces time and cost.

1: Prevent the blade from turning while loosening the spindle pulley nut (7). Remove the nut and lift the pulley (8) off the spindle shaft.

2: Tap the edge of blade holder (1) counterclockwise with a soft faced mallet to break it loose from the spindle threads. Spin the holder off the spindle.

3: Temporarily screw the spindle pulley nut (7) back on the upper threads of the spindle (3) until it is *flush* with the top of the spindle. Carefully tap the top of the spindle with a soft face mallet until the spindle and lower bearing (4) are free from the housing. Remove the nut, and then remove the spindle. Clamp the spindle at the shoulder in a vise and remove the blade cap screw (9), both cone washers (10), blade, blade holder, and the spindle washer (2).

4: Remove the top retaining ring (5) from the spindle housing and then remove the upper bearing (6).

5: Use only genuine SNAPPER replacement parts and reverse the foregoing procedures to reassemble the spindle components. After the blade has been installed, be sure to torque the retaining capscrow (with cone washers in position) to 30 foot pounds.

6: After reassembly has been completed and all fasteners have been securely tightened, lubricate the bearings with several shots of bearing grease through the lube fitting.

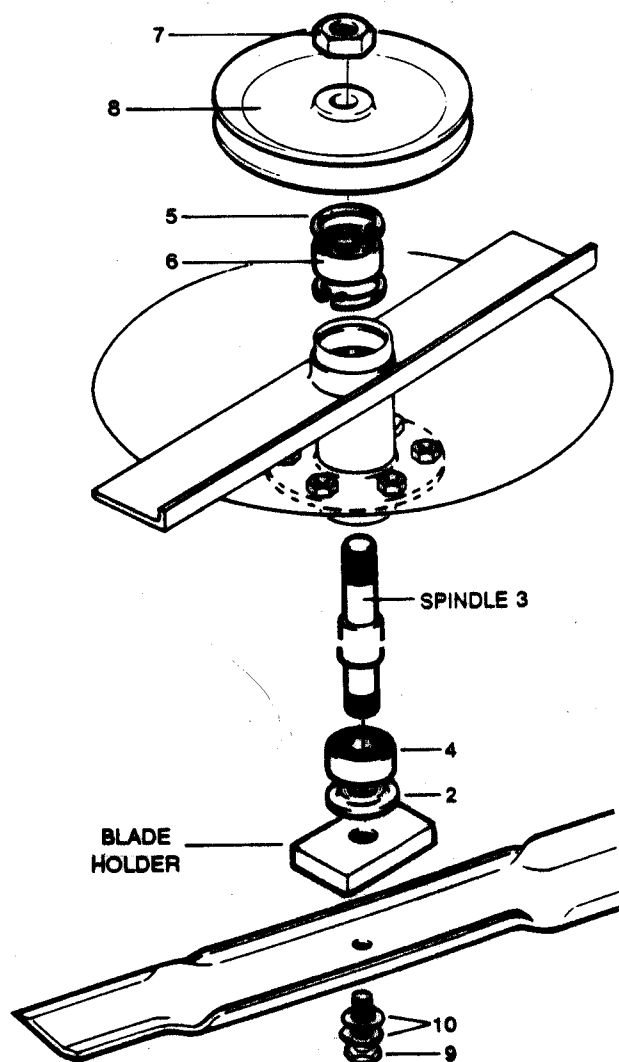


FIG. 1 - REBUILDING SPINDLE ASSEMBLY

REPLACING SPINDLE ASSEMBLY

Use the following steps to replace a complete spindle assembly on a 41" or 48" mower deck.

1: Prevent the blade from turning while loosening the spindle pulley nut (1). Remove the nut and lift pulley (4) from the spindle shaft.

2: Restrain the blade while removing capscrow (2) and cone washers (3). Remove blade from blade holder.

3: Remove the three lockbolts (5) and nuts (6) which secure the spindle housing to the deck. Pull the spindle assembly from the deck and remove the tolerance ring (7) -- it will be reinstalled.

4: Reverse the foregoing procedure to install the new replacement spindle assembly. Be sure to install the tolerance ring on the new housing before installing on the deck.

5: Be sure the new spindle assembly is adequately lubricated. Pump a few shots of grease into the lube fitting if in doubt.

6: After all components are in place and the fasteners have been securely tightened, check blade alignment and blade/deck parallelism as described earlier. Follow the appropriate procedure if adjustments are needed.

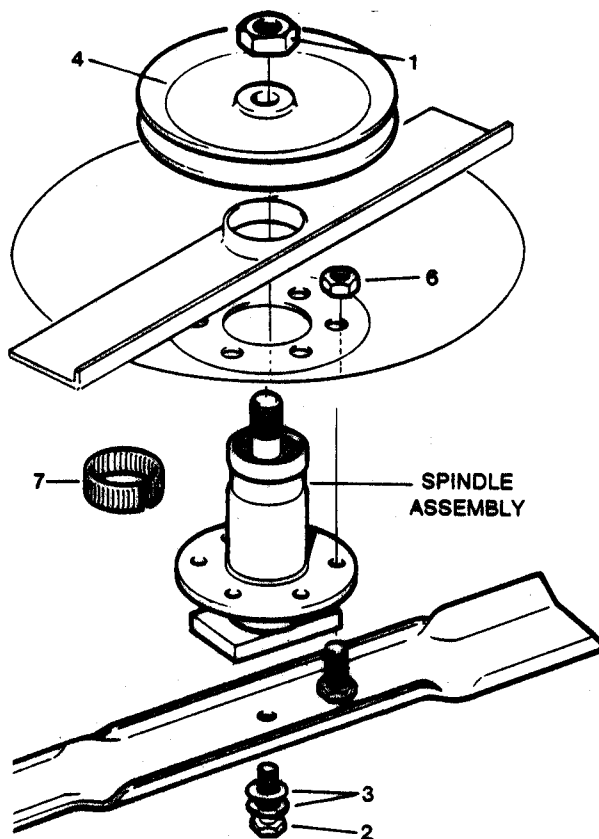


FIG. 2 - REPLACING SPINDLE ASSEMBLY

INSTALLATION: 33", 41", & 48" (ECCENTRIC with CHAINS or CABLES)

NOTE: Blades should always be thoroughly inspected for excessive wear, damage, and for misalignment **BEFORE** installing the mower assembly on a tractor. Refer to the "BLADE INSPECTION" and "BLADE ALIGNMENT" instructions in this section.

After insuring that the mower, including blade(s) and deck belt, is in proper condition, install it on the tractor as follows:

1: Inspect the drive belt and replace it if there are any signs of excessive wear, fraying or cracking. Always use the correct SNAPPER replacement belt.

2: Turn the front wheels of the tractor to the LEFT and slide the mower under the tractor from the RIGHT side.

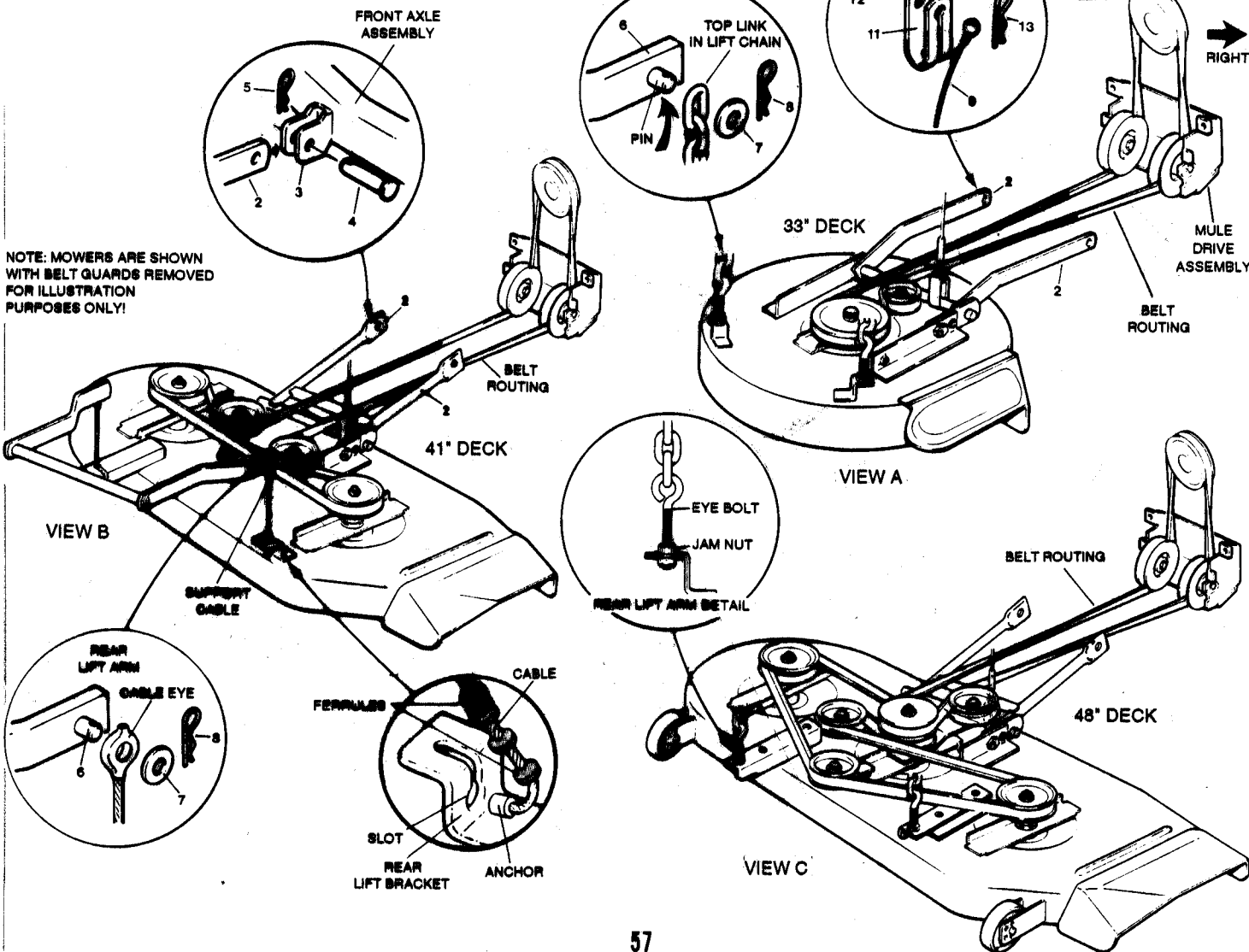
3: Raise the front lift arms (2) up into position between the implement attaching brackets (3) which are located on the back of the front axle assembly (1). Secure at each side with a large clevis pin (4) and large hairpin (5). **NOTE:** Always push a hairpin all the way to the "big" loop!

4: Place the implement lift lever in the LOWEST (full forward) position. **Chain equipped:** Raise the deck lift chains and slip the top link of each on the corresponding rear lift arm (6) pin. Secure with flat washers (7) and small hairpins (8). **Cable equipped:** Raise the two rear support cables (taking care not to dislodge ferrule placement) and position each cable eye on corresponding rear lift arm (6) pin. Secure with flat washers (7) and small hairpins (8).

5: Slip the ball end of the front lift cable (9) into lift cable clevis (11) slot. Attach the clevis to the front lift bracket (10) with a small clevis pin (12) and secure with a small hairpin (13).

6: **Install the drive belt as described & illustrated:** On 33" decks, refer to view A. On 41" decks, follow view B; and on 48" decks, see view C.

Position the drive belt in the engine pulley groove FIRST, then route it *down* into the groove in each mule drive pulley; then *back* to the idler pulley(s) and use force to roll it over the lip of the spindle pulley(s).



DECK LEVELING: 33", 41", & 48" (ECCENTRIC with CHAINS or CABLES)

During reinstallation of the mower on the tractor, it must be leveled - before mowing is undertaken. With the blade(s) sharpened and properly aligned, and with the deck properly leveled, the mower can be expected to produce clean, even cuts when properly used!

1: Check air pressure in tires before leveling. Front tire pressure should be 12 p.s.i. with the rear at 10 p.s.i. NOTE: Higher p.s.i. reduces scalping during turns.

5: Loosen the jam nut on the front lift cable and adjust the cable until the front lip rests on the wood block with the cable still tight. Tighten the cable jam nut and remove the wood block.

6: Pull the two small hairpins (and remove the flat washers) from the rear lift arm support pins; then remove the chains or cables from the support pins.

7: Turn blade(s) perpendicular to the tractor frame so that one blade *outer* "tip" is close to the RIGHT side of deck and the other *outer* "tip" is close to the LEFT side - the blades are then positioned "side to side".

8: Measure the distance from the floor to one *outer* "tip" and then measure the distance from the floor to the other *outer* "tip". The blades are considered "side to side" level IF the two dimensions are the same or are 1/8" or less in difference. To level the blades, slightly loosen the eccentric adjusting bolt nut and the pivot bolt nut. Level the blade(s) "side to side" by turning the eccentric adjusting bolt up or down as required. Retighten the nuts on these two bolts.

2: Move the tractor to an area where the surface is smooth and level.

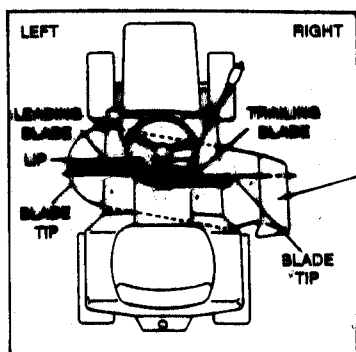
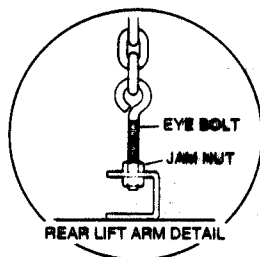
3: To level a 33" deck, center a 2-3/4" wood block on edge under the front lip (between the lift arms). Place another 2-3/4" wood block on edge under the EXACT center of the rear lip.

To level a 41" or 48" deck, center a 3-1/2" wood block on edge under the front lip (center it between the lift arms). Place a 3" high wood block under the EXACT center of the rear lip.

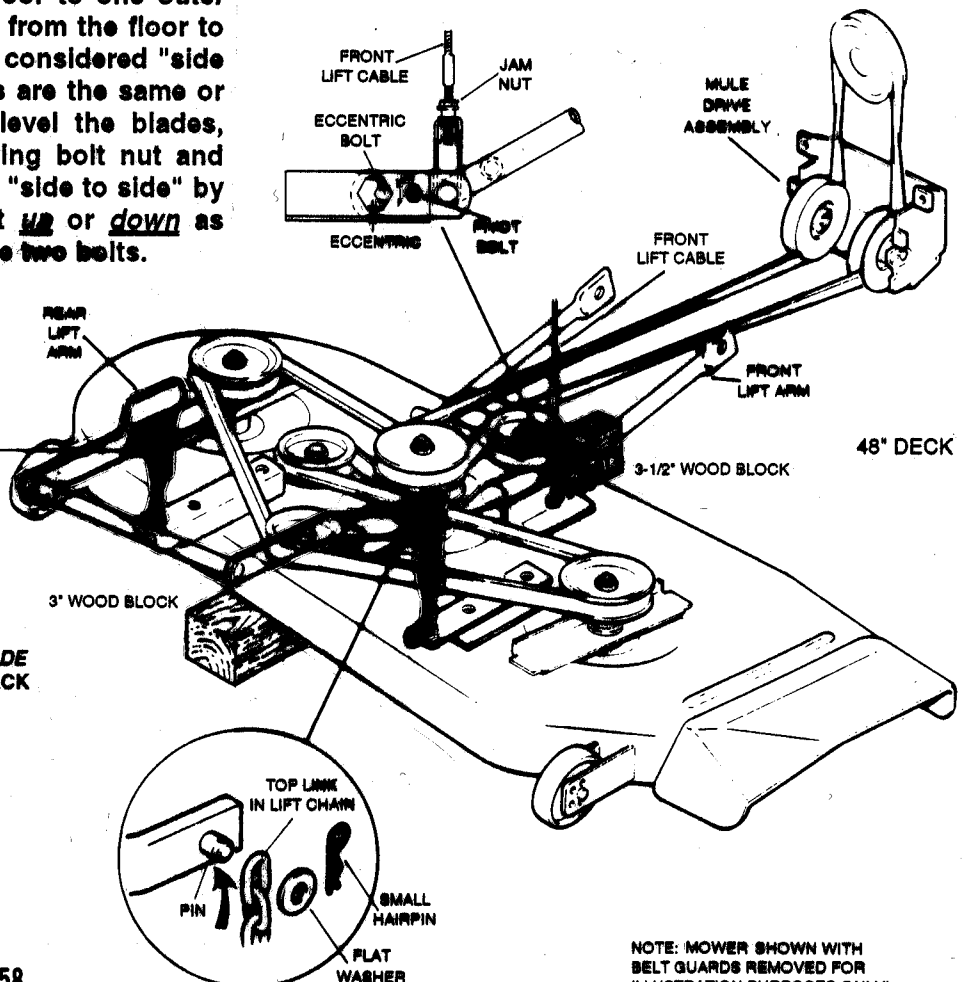
4: Move the lift lever to notch #5.

9-A: Chain equipped decks: Loosen both rear lift chain eyebolt jam nuts. Then adjust each eyebolt so that the "top link" in it's chain just slides over the corresponding pin on the rear lift arm. Reinstall the flat washers and hairpins, then tighten the jam nuts. Remove the wood block and recheck the levelness of the blade(s). Be sure the hairpins have been pushed in to the big loop so they will not be knocked out.

NOTE: If chains kink during operation over uneven terrain, a piece of plastic hose 3" long by 1" I.D. can be slipped over each chain to reduce kinking. Also, an eye bolt loop should be "closed" and not have a gap - such a condition could cause kinking!



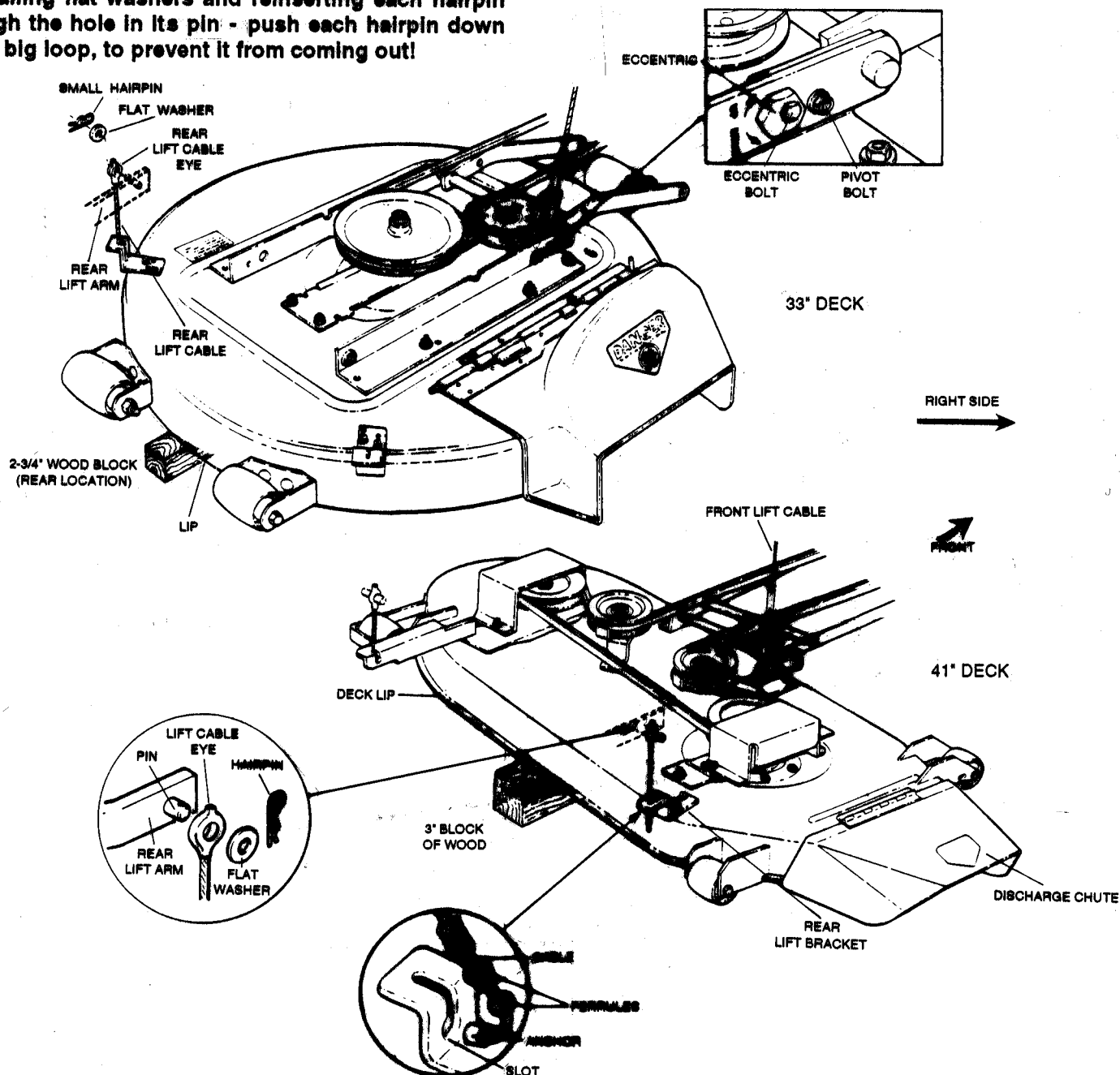
MULTI-BLADE
LEVEL CHECK



NOTE: MOWER SHOWN WITH
BELT GUARDS REMOVED FOR
ILLUSTRATION PURPOSES ONLY!

9-B: Cable equipped decks: Each cable eye should align with its corresponding rear lift arm pin when its cable is the *correct* length. To tighten a cable, move loose ferrules down along the lift bracket "slot" until they can be slipped through the "keyhole" to the *underside* of the bracket; to loosen a cable, move one or more ferrules from the *underside* of bracket to *above* it. After making ferrule adjustments, slip both cable eyes onto pins. Remove the wood block, and check cable tension and blade levelness before reinstalling flat washers and reinserting each hairpin through the hole in its pin - push each hairpin down to the big loop, to prevent it from coming out!

NOTE: MOWER SHOWN WITH BELT GUARD REMOVED FOR ILLUSTRATION PURPOSES ONLY!



33" DECK - FRONT TO REAR LEVELING

1: Measure the distance from the floor to the bottom (LIP) of the deck at the FRONT and at the REAR. The two dimensions should be the same or within 1/8" of each other.

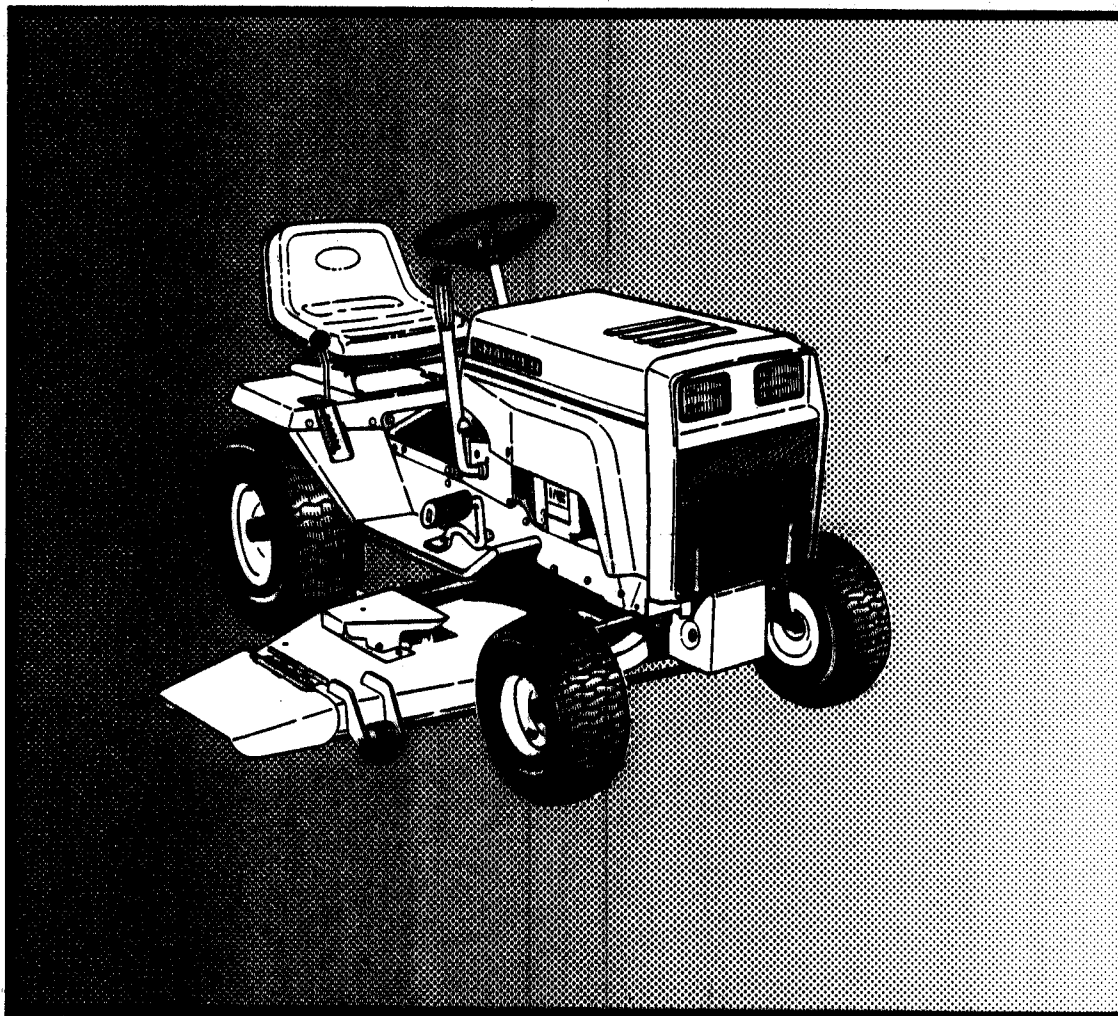
2: If adjustment is needed, adjust the REAR of a chain equipped deck by following the techniques in 9-A. For cable equipped decks, use the information in 9-B.

NOTE: If the unit creates a streaked or ragged cut, lower the REAR of the deck as much as 3/8" lower than the front.

COVER - READ

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