LANDSCAPER WPM SERVICE MANUAL

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TORO®

Landscaper Rear Bagging Mower

SERVICE MANUAL

ABOUT THIS MANUAL

This service manual was written expressly for the Toro Landscaper™ Mower. The Toro Company has made every effort to make the information in this manual complete and correct.

This manual was written with the service technician in mind. It is organized so that information used most often is up front. As a result, you will find reference information on safety, identification, specifications, troubleshooting and maintenance, all in the front third of the manual.

Disassembly, inspection and reassembly procedures are covered in the last two-thirds of the manual and are grouped by component. We tried to cover each common repair with its own section or sub-section. For example, you will find that wheel pinion clutch service and transmission service are addressed separately.

Most sections will include some component theory. This information can be found at the front of each service procedure section.

We are hopeful that you will find this manual a valuable addition to your shop. If you have any questions or comments regarding this manual, please contact us at the following address:

The Toro Company
Consumer Service Department
8111 Lyndale Avenue South
Minneapolis, MN 55420

The Toro Company reserves the right to change product specifications or this manual without notice.

SAFETY INSTRUCTIONS


Safety alert

Servicing of any outdoor power equipment requires care and common sense to prevent injury. "CAUTION" statements have been placed throughout this manual to enhance safety. Whenever you encounter the word CAUTION - read the instruction because it has to do with safety. Failure to comply with the instruction may result in personal injury or death.

This manual is intended as a service and repair manual only. The safety instructions provided in this manual are for the troubleshooting and service of the product only. The individual Operator's Manuals will contain safety and instructional information on the operation of Vacu-Power mowers.

Operator's Manuals are available through:

The Toro Company
Publications Department
8111 Lyndale Avenue South
Minneapolis, MN 55420 U.S.A.

SAFETY TIPS...

Avoid lacerations and amputations...
Stay clear of all moving parts whenever the engine is running. Treat all normally moving parts as if they were moving whenever the engine is running or has the potential to start.

Avoid burns...
Do not touch engine while running or shortly after running.

Avoid falls...
Do not operate the mower on slippery surfaces or if footing is questionable.

Avoid fires and falls...
Wipe up any spilled fuel or oil.

Avoid asphyxiation...
Never operate an engine in a confined area without proper ventilation.

Avoid possible eye injuries...
Wear eye protection when working with springs or cables and when running engine.

Avoid unexpected starting of engine...
Always turn off key and disconnect spark plug wire before attempting any cleaning, adjustment or repair.

Avoid possible fires and explosions...
Use a container designed for gasoline. Avoid spilling gasoline and never smoke while working around gasoline.

Avoid accidental misuse of fuel...
Always store fuel in a container designed for gasoline that is properly labeled.

Avoid possible injury due to inferior parts...
Use only Toro original parts to insure that important safety criteria are met.

Avoid injury to bystanders...
Always clear the area of bystanders before starting or testing a lawn mower.

Avoid injury due to projectiles...
Always clear the area to be mowed of sticks, rocks and other debris that could be picked up and thrown by the mower.

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PRODUCT IDENTIFICATION

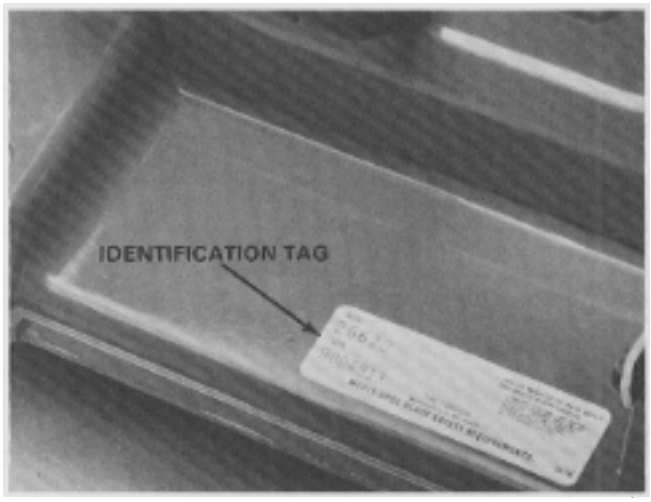

Figure 1

Each Toro Walk Power Mower is assigned a model and serial number. The model number has five digits and reflects the engine, deck style and features of the mower. In addition to the model number, each product also has a unique serial number which serves to differentiate it from other products with the same model number. The serial number has seven digits, the first of which identifies the year of manufacture (ie. 0022576 indicates that the product was built in the 1990 model year).

These numbers are printed on a decal that is about 1" high and 3" wide. The decal can be found on the top side of the cutting deck between the rear wheels on some models. See Figure 1. On others, it can be found under the control panel. Always refer to these numbers when ordering parts or requesting information on the mower.

Engine model and serial numbers differ from the chassis model and serial numbers. Engine numbers can generally be found on the blower housing of the engine. Use this information when ordering parts or requesting information regarding the engine.

SPECIFICATIONS

General Specifications

Item	Specification
Engine	Toro 2-Cycle
Housing	Die Cast Aluminum
Blade	53.3 cm (21.00") heat treated alloy steel
Wheels	Steel with double sealed ball bearing
Tires	20.3 X 5.1 cm (8.0 X 2.0") wide semi-pneumatic radial style
Handle Construction	2.5 cm (1") diameter gauge plated steel tubing.
Handle Adjustments	Adjustable to three different positions.
Height-of-Cut	Wheels individually adjustable from 25 to 75 mm in 13 mm increments (1" to 3" in 1/2" increments)
Width-of-Cut	53.3 cm (21")
Overall Width	55.2 cm (21.75")
Overall Length	85.7 cm (33.75")
Overall Height (handle down)	55 cm (21.50"), wheels in hightest height-of-cut
Weight	40 kg (89 lbs)
Blade Attachment	Single bolt
Brake Material	Non-asbestos
Brake Type	Spring loaded brake contacting bottom of flywheel

Self-Propelled Model Specifications

Item	Specification
Ground Speed #1	2.9 kph (1.8 mph @ 3000 rpm) 1.9 kph (1.2 mph @ 2000 rpm)
Ground Speed #2	4.3 kph (2.7 mph @ 3000 rpm) 2.9 kph (1.8 mph @ 2000 rpm)
Ground Speed #3	6.1 kph (3.8 mph @ 3000 rpm) 4.0 kph (2.5 mph @ 2000 rpm)
Gearbox	Die cast aluminum with stamped steel cover
Gearbox Lubricant	177 cc (6 oz) lithium-base grease
Clutch	Gearbox pivots on output shaft to tighten or loosen belt
Wheel Pinions	15 tooth gear with wheel pinion clutches
Wheel Gears	42 tooth permanently fastened to wheel hub with rivets

SPECIFICATIONS (cont'd)

Service Specifications

Item	Specification
Traction Cable (beginning of engagement)	Control bar 3.8 cm (1.50") from handle
BBC Cable Adjustment	BBC bellcrank spring to be 2.59 ± .127 cm (1.02 ± .05") long when engaged
Blade to Housing (and Ramp) Clearance	.432 ± .203 cm (.170 ± .080)"
Blade Position @ Front	Flush with bottom of housing
Blade Position @ Rear	.635 ± .152 mm (.250 ± .060") from bottom of housing
Blade Tip to Ground Clearance @ 1" HOC	Front 2.77 ± .152 cm (1.09 ± .060") Rear 4.32 ± .15 cm (1.70 ± .060")
Blade Tip to Ground Clearance @ 1.5" HOC	Front 4.07 ± .15 cm (1.60 ± .060") Rear 5.49 ± .15 cm (2.16 ± .060")
Blade Tip to Ground Clearance @ 2" HOC	Front 5.33 ± .15 cm (2.10 ± 0.60") Rear 6.60 ± .15 cm (2.60 ± 0.60")
Blade Tip to Ground Clearance @ 2.5" HOC	Front 6.60 ± .15 cm (2.60 ± 0.60") Rear 7.70 ± .15 cm (3.03 ± 0.60")
Blade Tip to Ground Clearance @ 3" HOC	Front 7.85 ± .15 cm (3.09 ± .060") Rear 8.74 ± .15 cm (3.44 ± .060")
Wheel Toe In/Out	.318 cm (.125") max
Wheel Camber	.318 cm (.125") max
Transmission Lubricant	No. 2 lithium-base grease
Transmission Capacity	177 cc (6 oz)

SPECIFICATIONS (cont'd)

Torque Specifications

Fastener	Torque
Engine Mounting Screws	36.8 N•m (325 in. lbs.)
Engine Belt Guide Screws (SP only)	25.5 N•m (225 in. lbs.)
Crankshaft Bolt (Zone Start)	72 N•m (53.0 ft. lbs.)
Cable Support Bracket	28.3 N•m (250 in. lbs.)
Transmission Cover Screws	13.4 N•m (118 in. lbs.)
Transmission Belt Guide Screws	14.7 N•m (130 in. lbs.)
Transmission End Cap Screws	25.5 N•m (225 in. lbs.)
Transmission Cable Clamp Screws	17.0 N•m (150 in. lbs.)
Handle Studs	40.0 N•m (350 in. lbs.)
Handle Latch Screws	24.4 N•m (215 in. lbs.)
Handle Rope Guide Nut	7.4 N•m (65 in. lbs.)
Control Bar Locknuts	9.1 N•m (80 in. lbs.)
Spring Arm Screws	8.5 N•m (75 in. lbs.)
Pivot Arm Nuts	36.8 N•m (325 in. lbs.)
Wheel Bolt Nuts	29.5 N•m (260 in. lbs.)
Screen Panel Screws	25.5 N•m (225 in. lbs.)
Outer Discharge Ramp Screw	25.5 N•m (225 in. lbs.)
Inside Discharge Ramp Screw	14.2 N•m (125 in. lbs.)
Under Deck Cover Screws	25.5 N•m (225 in. lbs.)
Door Handle Screws	7.1 N•m (63 in. lbs.)

TROUBLESHOOTING

The Troubleshooting Section has been divided into three sections. Use the guide below to locate information on the symptom you are observing, then turn to the proper page for possible causes and remedies.

Quality of Cut

Transmission

Miscellaneous

TROUBLESHOOTING (cont'd)

Quality of Cut

Symptom: Scalping

Possible Cause	Remedy
Height-of-cut too low	Raise height-of-cut
All wheels not in same height-of-cut	Move height-of-cut adjusters to uniform height
Lawn has ruts	Repair lawn

Symptom: Stragglers (some grass blades left uncut)

Possible Cause	Remedy
Blade dull	Sharpen blade
Blade sail worn away	Replace blade
Incorrect blade	Check part number
Blade on upside down	Install blade correctly
Grass mowed to soon after watering	Wait 1 to 2 days after watering to mow
Some stragglers are normal	Adjust operator's expectations

Symptom: Clumping

Possible Cause	Remedy
Excessive blade to ramp clearance	Adjust engine and grass ramp
Grass too long	Use bag or optional side discharge chute
Grass too wet	Allow grass to dry before mowing

Symptom: Unlevel height-of-cut

Possible Cause	Remedy
Wheels in different height-of-cut	Adjust wheels to uniform height
Blade not level	Check blade levelness
Spongy turf	Allow turf to dry

Symptom: Bag will not fill completely

Possible Cause	Remedy
Grass too wet	Allow grass to dry before mowing
Excessive blade to ramp clearance	Adjust engine and grass ramp positioning
Back of bag frame too high	Use part number 71-2970

Symptom: Mower picks up too much dust

Possible Cause	Remedy
Lawn too dry	Water the day before cutting
Height-of-cut too low	Raise height-of-cut
Vacuum too aggressive for conditions	Use standard blade, P/N 42-1000

TROUBLESHOOTING (cont'd)

Transmission

Symptom: Drive slips

Possible Cause	Remedy
Transmission belt slightly loose	Adjust belt per Operator's Manual
Transmission belt worn or damaged	Replaced transmission belt
Output shaft roll pin sheared	Replace roll pin
Intermediate shaft key pin sheared	Replace intermediate shaft key
Pinion and wheel gears misaligned	Replace defective gears
Wheel pinion clutch malfunctioning	Repair wheel pinion clutch

Symptom: Intermittent drive

Possible Cause	Remedy
Transmission belt slightly loose	Adjust belt per Operator's Manual
Shift keys sticking down in slots	Clean key slots, then lightly grease slot area
Shift keys in between gears	Adjust gear selector cable, if difficulty persists, see Service Bulletin 43
Sheared output shaft roll pin	Replace roll pin

Symptom: Transmission slow going into gear

Possible Cause	Remedy
Shift keys sticking down in slots	Clean key slots, then lightly grease slot area
Shift keys in between gears	Adjust gear selector cable, if difficulty persists, see Service Bulletin 43
Sheared output shaft roll pin	Replace roll pin

Symptom: Inaccurate gear selection

Possible Cause	Remedy
Flexing of gear selection cable	Install new shift lever and cable per Service Bulletin 43

Symptom: First gear too fast

Possible Cause	Remedy
Normal gearing not to operator's liking	Adjust engine speed to 2850 rpm, recommend customer slip belt by feathering control bar

Symptom: Difficult to pull backwards

Possible Cause	Remedy
Operator not moving forward 25 mm (1") after releasing control bar	Inform operator of proper operating technique
Transmission belt turning input pulley when control bar is disengaged	Adjust or replace traction belt
Contact between wheel and wheel cover	Repair or replace wheel cover
Wheel pinion clutch malfunctioning	Inspect wheel pinion clutch and repair as necessary

TROUBLESHOOTING (cont'd)

Transmission (cont'd)

Symptom: Only one wheel drives

Possible Cause	Remedy
Wheel/pinion gears not mating properly	Replace defective gears
One wheel pinion clutch malfunctioning	Inspect and repair wheel pinion clutch

Miscellaneous

Symptom: Thatcher does not fit correctly

Possible Cause	Remedy
Incorrect components	See Service Bulletins 45 and 46

Symptom: All four tires do not touch the ground

Possible Cause	Remedy
Surface not level	Insure that surface is absolutely level
Pivot arm bent	Replace defective pivot arm
Deck warped, less than 6 mm (1/4")	Elongate low pivot arm bolt hole upward
Deck warped, more than 6 mm (1/4")	Replace the deck

MAINTENANCE

CAUTION: Pull the wire off the spark plug before performing adjustments or maintenance.

Maintenance - Servicing Air Cleaner

Normally, clean the air cleaner after every 25 operating hours. More frequent cleaning is required when the mower is operated in dusty or dirty conditions.

1. Stop the engine and pull the wire off the spark plug. See Figure 2.
2. Lift tabs at the top of the air cleaner cover and pivot cover down as shown in Figure 2. Clean the cover thoroughly.
3. If the outside of the foam element is dirty, remove it from the air cleaner body. See Figure 2. Clean thoroughly.

   WASH the foam element in a solution of liquid soap and warm water. Squeeze to remove the dirt, but no not twist because the foam may tear. Rinse thoroughly in clear water.

   DRY by wrapping it in a clean rag and squeezing.

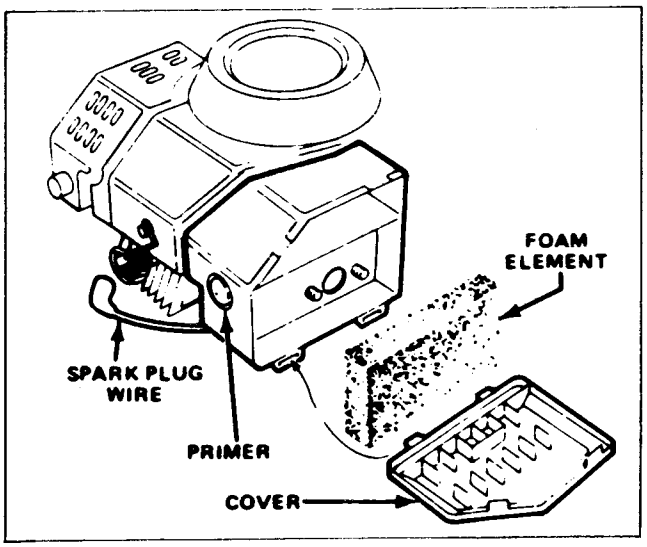

Figure 2

Saturate the element with 25 ml (5 teaspoons) of SAE 30 or 10W30 engine oil. Squeeze the element to remove excess oil and to distribute the oil thoroughly. A damp element is desirable.

4. Reinstall the foam element and the air cleaner cover.

Maintenance - Replacing Spark Plug

Use an NGK BPMR4A spark plug or equivalent. Correct air gap is 0.81 mm (0.032"). Remove the plug after every 25 operating hours and check its condition.

1. Stop the engine and pull the wire off the spark plug. See Figure 2.
2. Clean around the spark plug and remove the plug from the cylinder head.

   IMPORTANT: Replace a cracked, fouled, or dirty spark plug. Do not sand blast, scrape, or clean electrodes because engine damage could result from grit entering the cylinder.
3. Set the air gap at 0.81 mm (0.032") as shown in Figure 3. Install correctly gapped spark plug and gasket seal. Tighten the plug firmly.

Spark Plug Torque: 13.6 N•m (10 ft lbs)

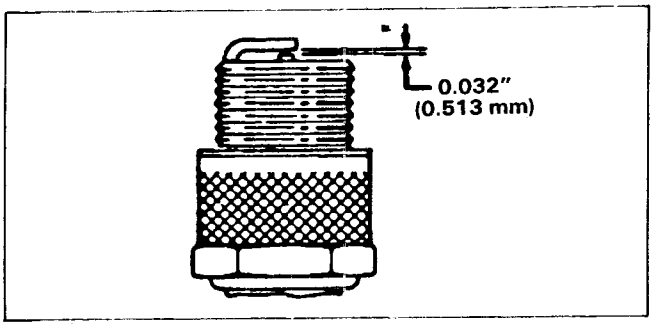

Figure 3

Maintenance - Draining Gasoline

1. Stop the engine and pull the wire off the spark plug. See Figure 2.
2. Turn the fuel shut-off valve to the OFF position. See Figure 4.

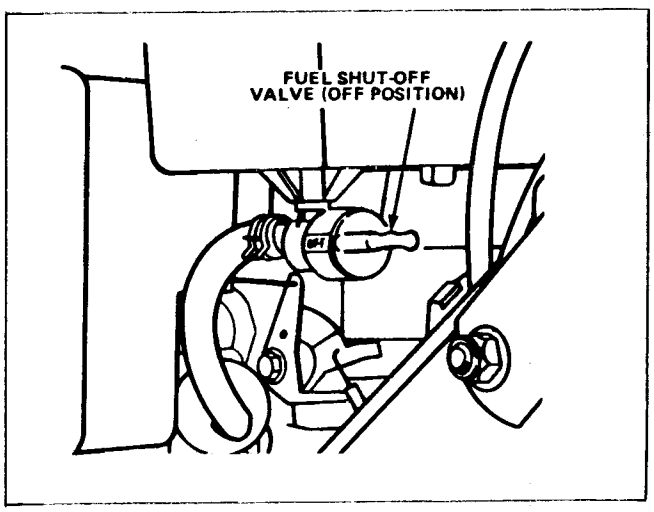

Figure 4

Maintenance - Draining Gasoline (cont'd)

3. Remove the cap from the fuel tank and use a pump-type siphon to drain the fuel into a clean gas can.

   NOTE: This is the only procedure recommended for draining fuel.

Maintenance - Adjusting Wheel Traction Drive

If the mower does not self-propel or has a tendency to creep forward when drive is not engaged, an adjustment to the wheel traction control cable is necessary.

1. Stop the engine and pull the wire off the spark plug. See Figure 2.
2. Lift the control bar until some resistance is felt. The control bar should be 4 cm (1-1/2") from the handle when properly adjusted. See Figure 5.

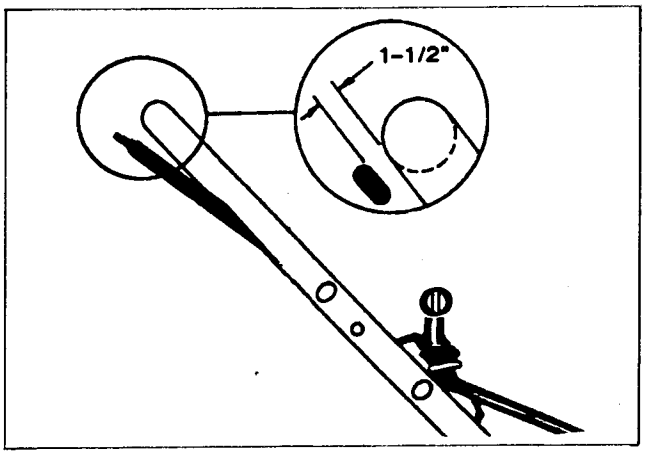

Figure 5

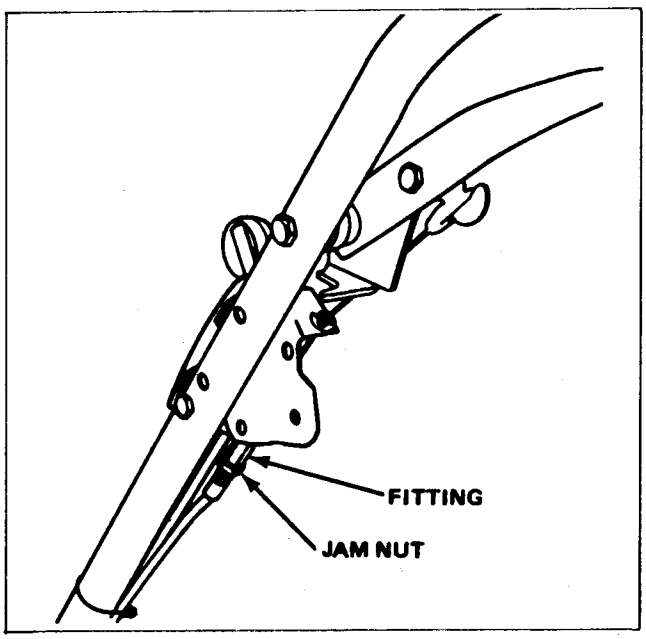

Figure 6

3. Loosen the jam nut on the cable adjuster and rotate the fitting up or down to achieve the correct distance between the control bar and the handle. See Figure 6.
4. Repeat steps 2 and 3 until properly adjusted.
5. Tighten the jam nut to lock the adjustment.

Maintenance - Cleaning the Cooling System

After every 75 operating hours, clean dirt and chaff from the cylinder, cylinder head fins and from around the carburetor and linkage. Also remove debris from air intake slots on recoil housing. This will assure proper cooling and optimum engine performance.

Maintenance - Cleaning Muffler and Exhaust Port

Check and, if necessary, clean the end of muffler pipe and exhaust port after every 75 hours of operation.

CAUTION! Clean the muffler and exhaust port only after engine and muffler are cool. A hot engine and muffler can cause burns.

1. Use a hard wood scraper to remove the carbon from the end of the muffler pipe.
2. Remove the screw, two nuts, and lock washers. See Figure 7. Slide the muffler off mounting pins.
3. Pull the wire off the spark plug. Slowly pull the recoil starter so the piston covers exhaust port. See Figure 8.
4. Clean the carbon from the exhaust port with a flat hardwood scraper.

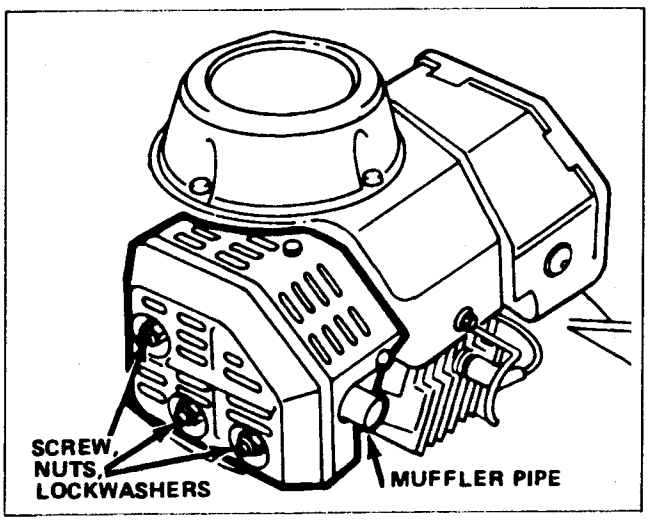

Figure 7

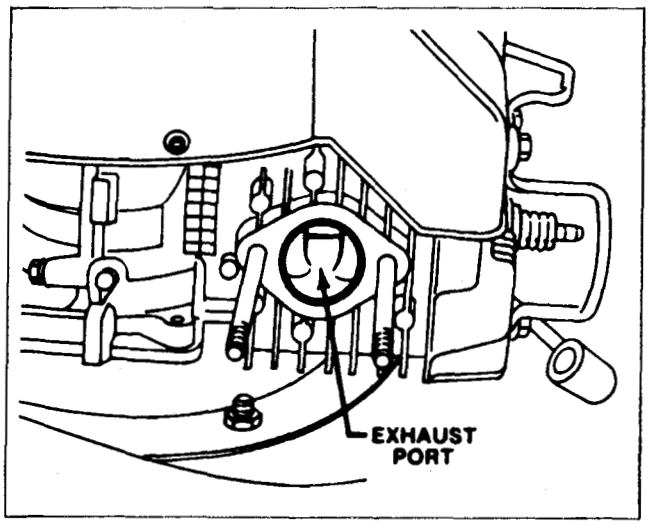

Figure 8

Maintenance - Adjusting Throttle

See Figure 9.

Throttle control adjustment may be required if the engine does not start or stop. Whenever a new throttle control cable is installed, the throttle must be adjusted.

1. Stop the engine and pull the wire off the spark plug. See Figure 2.
2. Move the throttle control to STOP.
3. Loosen the cable clamp screw until the throttle cable slides. Hold the carburetor control arm down against the throttle control bracket. Pull the throttle cable slightly to remove any slack and tighten the cable clamp screw to lock the adjustment in place.

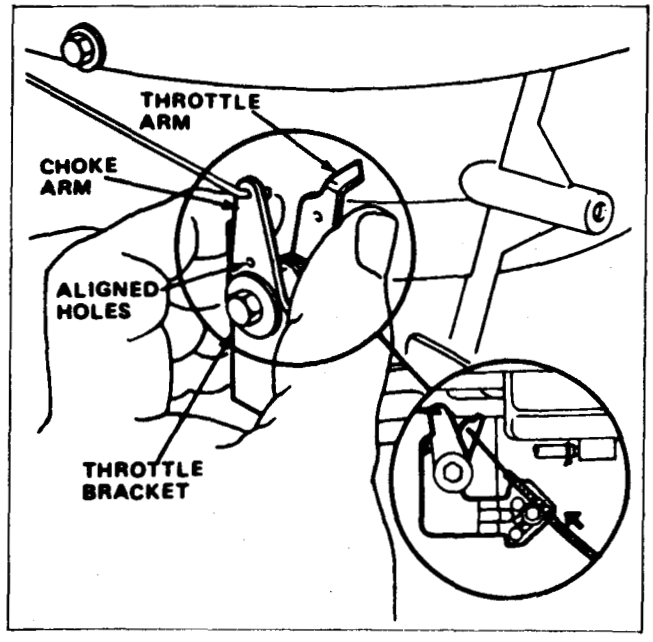

Figure 9

Maintenance - Servicing Blade

1. Stop the engine and pull the wire off the spark plug. See figure 2.

   CAUTION! Do not attempt to inspect, remove or replace the blade without first removing the spark plug wire from spark plug. Fasten the wire so that it does not accidentally touch the plug.
2. Drain the gasoline from the fuel tank; refer to Maintenance - Draining Gasoline, page 13.
3. Tip the mower on its right side. See Figure 10.

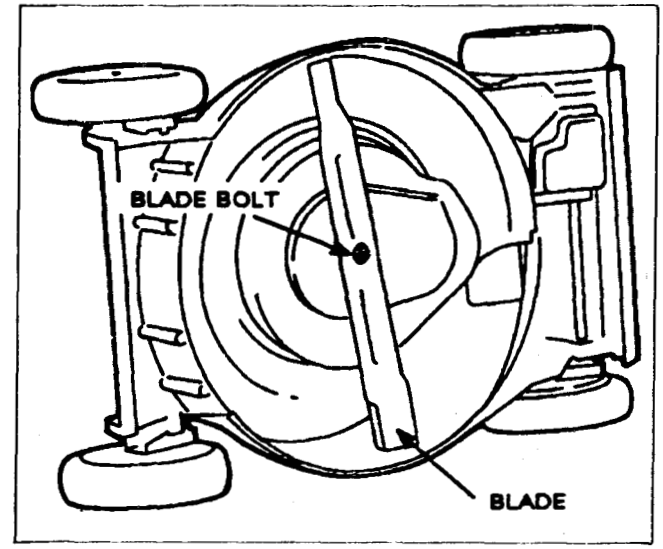

Figure 10

4. *INSPECTING THE BLADE* - carefully examine the blade for sharpness and wear, especially where the flat and curved part meet. See Figure 11A. Since sand and abrasive material can wear away the metal that connects the flat and curved parts of the blade, check the blade before using the mower. If a slot or wear is noticed, replace the blade. See Figure 11B and 11C. Refer to step 5.

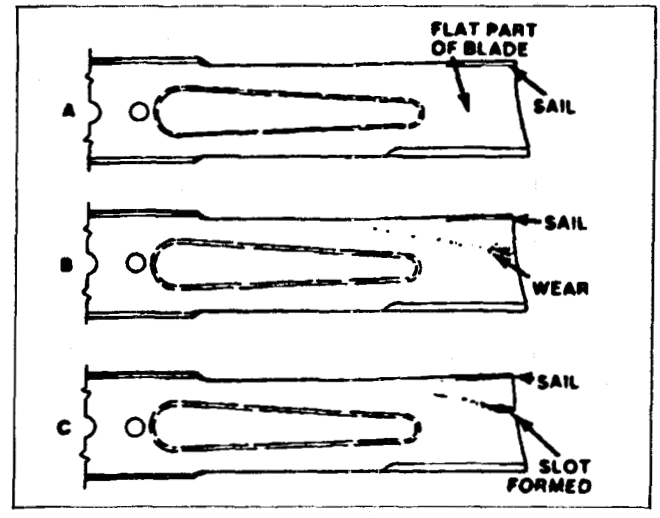

Figure 11

Maintenance - Servicing Blade (cont'd)

5. *REMOVING THE BLADE* - Grasp the end of the blade using a rag or thickly padded glove. Remove the blade bolt, washer, blade, and blade retainer. See Figures 10 and 12.

   NOTE: For optimum performance, install a new blade before cutting season begins. During the year, file down small nicks to maintain the cutting edge.

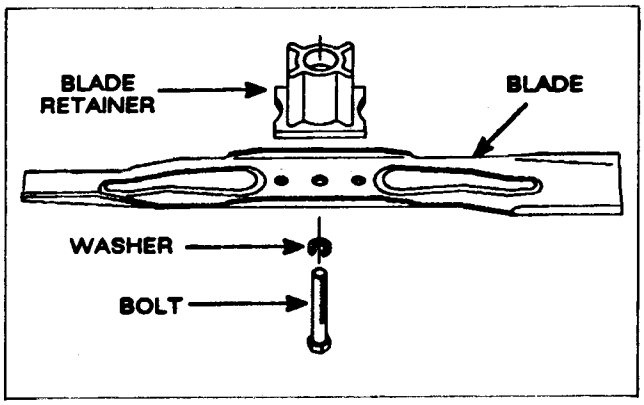

Figure 12

CAUTION! If the blade is allowed to wear, a slot may form near the end. Eventually a piece of the blade may break off resulting in serious injury to yourself or a bystander.

6. *SHARPENING THE BLADE* - Using a file, sharpen the top side of the blade (side facing mower housing) and maintain original cutting angle. Do not over-sharpen or the blade will dull very quickly. See Figure 13. The blade will remain balanced if the same amount of material is removed from both cutting edges.

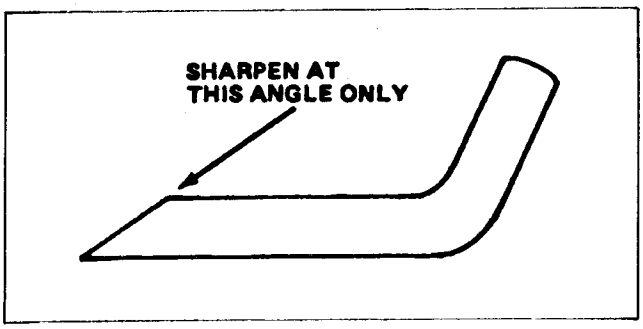

Figure 13

IMPORTANT: Check balance of the blade by putting it on a blade balancer. An inexpensive balancer can be purchased at a hardware store. A balanced blade will stay in a horizontal position while an unbalanced blade will settle to the heavy side. If the blade is not balanced, file more metal off the cutting edge on the heavy end of the blade.

7. Install the blade spacer, sharp, balanced blade, and washer with blade bolt. The sail part of the blade must point toward the top of the mower housing to assure correct installation. Tighten the blade nuts.

Blade Bolt Torque:
72 N•m (53.0 ft lbs)

Maintenance - Lubrication

1. Lubricate the rear suspension after every 25 hours of use.

2. Move the rear wheel height-of-cut levers to "2" setting. Wipe grease fittings with a clean rag. See Figure 14. Install a grease gun into the fitting and gently apply 2 or 3 pumps of No. 2 lithium-base grease.

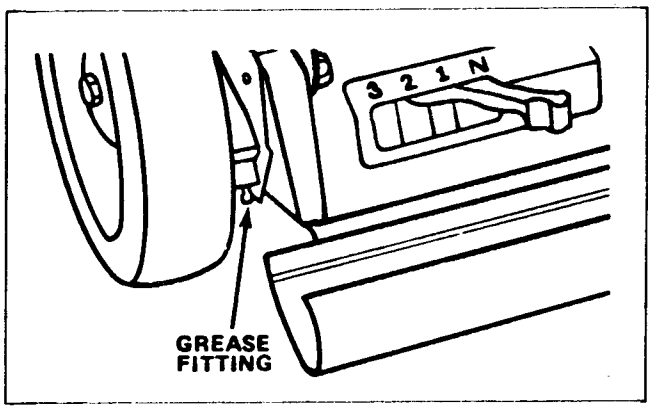

Figure 14

Maintenance - Adjusting Blade Brake

Whenever a new blade brake cable assembly is installed, an adjustment is required.

1. Stop the engine and pull the wire off the spark plug. See Figure 2.

2. *CHECK ADJUSTMENT* - See Figure 15. Move the control bar toward the handle until slack in the wire is removed. Gap between the brake lever and the handle must be 3-5 mm (1/8" - 3/16"). See step 3 for adjustment.

3. *ADJUST CABLE CONDUIT* - Loosen the locknut on cable support. See Figure 16. Insert a 3-5 mm (1/8" - 3/16") object between the brake lever and the handle. Adjust the cable conduit until the slack is removed, then tighten the locknut.

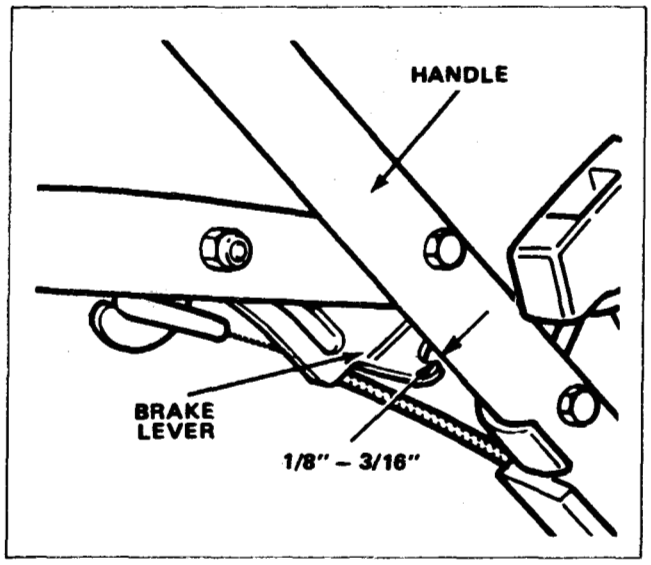

Figure 15

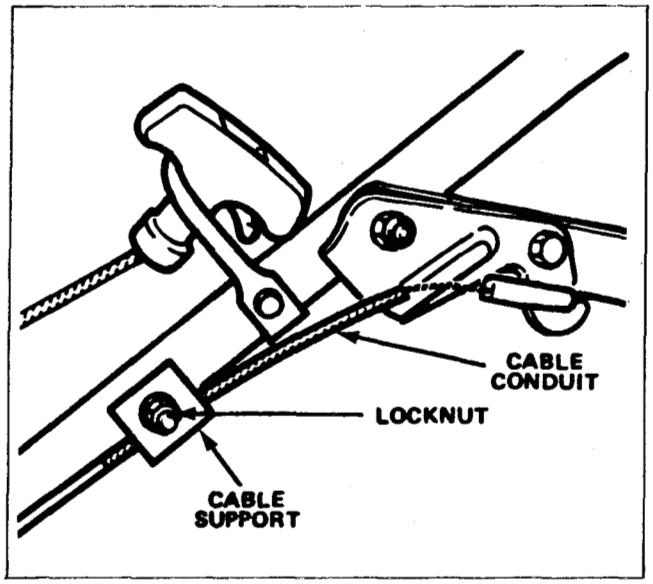

Figure 16

Maintenance - Servicing Wheels

Removal

1. Stop the engine and remove the capscrew, wheel spacer, the locknut securing the wheel to the pivot arm. See Figure 17.

2. Separate the wheel halves from the tire by removing the flange capscrews and locknuts. See Figure 17.

   NOTE: If the bearings are to be removed from the bearing support hub, remove them by pressing on the bearing spacer.

Assembly

1. Position the tire on the wheel half, aligning lugs on each. See Figure 17.

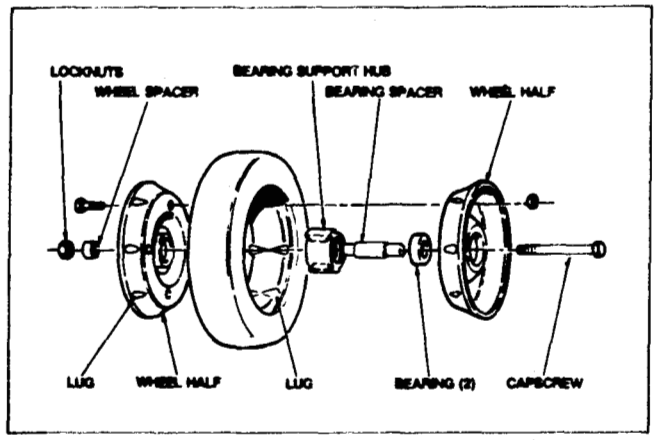

Figure 17

2. Place the bearing support hub into the center hole of wheel half. Make sure the legs of the hub are positioned over the flange of the hole.

3. Place the other wheel half onto the bearing support hub aligning the wheel and the tire lugs and mounting holes.

4. To facilitate assembly, use two 1/2-20 X 1.50" long fully threaded screws or bolts and non-locking nuts, loosely secure the wheel halves together. Mount the screws or bolts in opposite holes.

5. Check the alignment of all parts and tighten the screws, alternating from side to side for a uniform fit, until the wheel halves are drawn together.

6. Install two flange capscrews and locknuts, previously removed, in remaining holes in wheel halves and tighten. Remove the two temporary long screws or bolts and replace with two flange capscrews and locknuts.

7. Reinstall the wheel to the pivot arm with a capscrew, spacer, and locknut. Make sure the spacer is positioned between the wheel hub and the pivot arm.

Maintenance - Cleaning the Mower Housing

To assure optimum performance, keep the underside of the mower housing and inside of the discharge area clean.

1. Stop the engine and pull the wire off the spark plug. See Figure 2.

2. Drain the gasoline from the fuel tank; refer to Maintenance - Draining Gasoline, page 13.

Maintenance - Cleaning the Mower Housing (cont'd)

3. Tip the mower on its right side. See Figure 18.

4. Remove dirt and grass clippings that stick to the housing by spraying it with a garden hose. Scrape out remaining debris with hardwood scraper. Avoid burrs and sharp edges.

5. Clean the discharge door and hinge of grass or debris that may impair operation of the door. Use caution when cleaning the door so you do not damage the foam seal.

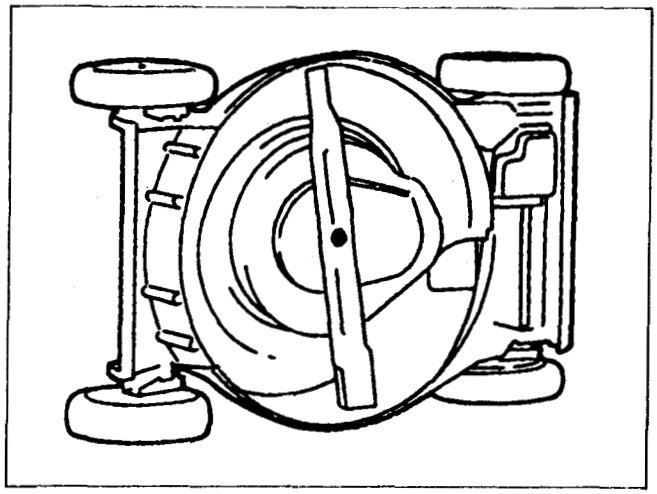

Figure 18

Maintenance - Preparing Mower for Storage

1. For long term storage, either drain the gasoline from the fuel tank or add a fuel stabilizer to the gasoline. To drain the gasoline, refer to Maintenance Draining Gasoline, page 13. After the fuel is drained, start the engine and let it idle until all fuel is consumed and the engine stops. If the gasoline is not drained, gum-like varnish deposits will form and cause poor engine operation, even starting problems.

   Fuel can be left in the gas tank only if a fuel additive, such as Toro Preservit, is added to the gasoline before storing. Toro Preservit is a petroleum distillate based conditioner/stabilizer.

   Toro does not recommend stabilizers with an alcohol base, such as ethanol, methanol or isopropyl. Use fuel stabilizer in recommended quantities as specified on the container.

   Under normal conditions, all fuel additives remain effective in fuel for 6-8 months.

2. Remove the spark plug and pour 10 ml (2 teaspoons) of SAE 30 or 10W30 oil into the hole in the cylinder. Pull the starter rope slowly to coat the inside of the cylinder. Install the spark plug and tighten. DO NOT INSTALL THE WIRE ON THE SPARK PLUG.

Spark Plug Torque: 1.36 N•m (10 ft lbs)

3. Clean the mower housing; refer to Maintenance - Cleaning the Mower Housing, page 17.

4. Check the condition of the blade; refer to Maintenance - Servicing Blade, page 15.

5. Tighten all nuts, bolts, and screws

6. Clean dirt and chaff from the crankcase, cylinder head fins, and blower housing. Also remove grass clippings, dirt and grime from external parts of the engine, shrouding, and top of the mower housing.

7. Clean the air cleaner; refer to Maintenance - Servicing Air Cleaner, page 13.

8. Lubricate the wheels; refer to Maintenance - Lubrication, page 16.

9. Touch up all rusted or chipped paint surfaces. Toro Re-Kote paint is available from an Authorized TORO Service Dealer.

10. Store the mower in a clean, dry place. Cover the mower to keep it clean and protected.

SECTION 1 FRONT SUSPENSION

Front Suspension - Operation

The front wheels are not affixed directly to the cutter housing. Rather, they are affixed through *pivot arms* which allow changes in height of cut. As the pivot arm is rotated, the distance from the ground to the blade will increase or decrease accordingly. Once in the desired position, the *spring arm* prevents the pivot arm from further rotation by means of a pin or rivet which falls into a slot on the front quadrant. See Figure 19.

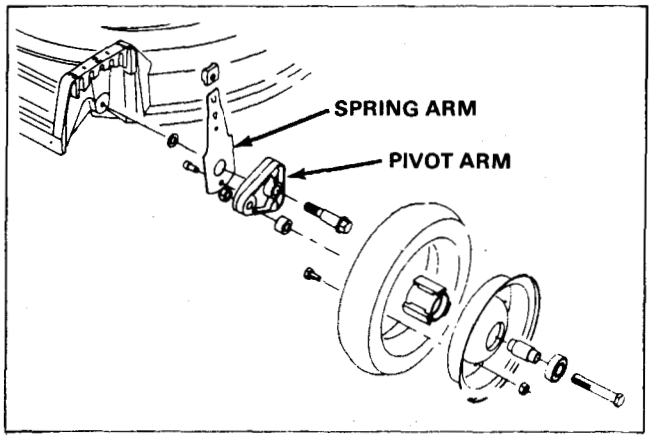

Figure 19

Changes in height-of-cut are accomplished by flexing the spring arm toward the wheel, then rotating to the desired height.

Front Suspension - Disassembly

1. Remove the carriage bolt securing the wheel to the pivot arm. Remove the wheel and tire assembly along with the shoulder bolt, the spacer, and the nylon locknut.
2. Remove the shoulder bolts securing the pivot arm to the housing and remove the pivot and spring arm assembly complete with washers and fasteners.
3. Remove the spring arm from the pivot arm by removing the socket head machine screw.
4. The knob can be removed from the spring arm by pressing on the detent through the hole in the knob. It is not glued on.

Front Suspension - Assembly

See Figure 20.

1. Assemble the spring arm and knob so that the detent on the spring arm falls in the hole on the knob.

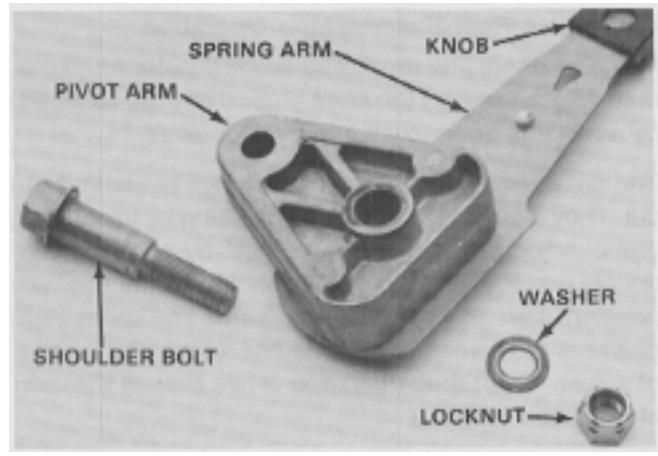

Figure 20

2. Assemble the pivot arm and spring arm so that the concave portion of the knob faces the deck. See Figure 19 above for pivot arm orientation. Secure the spring arm with the socket head machine screw.
3. Install the spring arm and pivot arm assembly onto the deck using the carriage bolt and nylon locknut. Don't forget the spacer that fits between the deck and the spring arm. Torque the pivot arm bolt. See Figure 21.

Pivot Arm Bolt Torque:
17-28 N•m (150-250 in lbs)

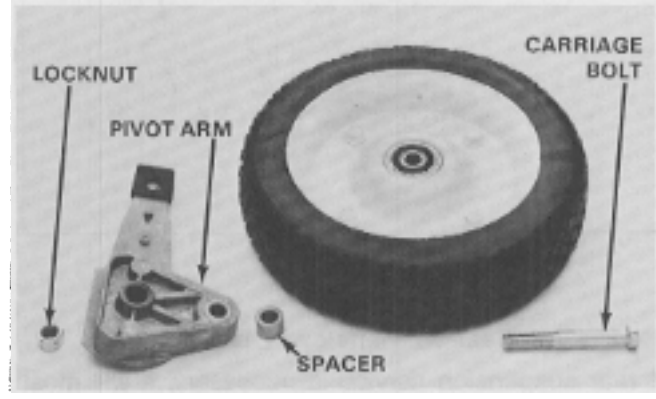

Figure 21

NOTE: Lubricate the pivot arm bolt to prevent corrosion.

4. Move the pivot arm to the highest height-of-cut and slip the locknut, nylon side toward the housing, into the recess provided in the pivot arm. Then, secure the wheel and tire assembly with the carriage bolt and locknut. Be sure to lubricate the wheel bolt with a No. 2 lithium- base, general purpose grease.

SECTION 2 REAR SUSPENSION (HP Models Only)

Hand Push Rear Suspension - Operation

The rear wheel and tire asemblies are fastened to the cutter deck through the pivot arms. They are retained by a hex head capscrew and nylon locknut.

The pivot arms pivot in order to change the height-of-cut. They are held in the desired position by the spring arms. Adjustment is accomplished by bending the spring arm toward the wheel, rotating to the desired position, then releasing the spring arm. The spring arm prevents the pivot arm from further rotation by means of a rivet, which drops into one of five slots at the rear of the cutter housing.

The rear pivot arms are fastened to the cutter deck by means of a solid rear axle that passes through both wheel assemblies. The axle is retained by two end caps which prevent the pivot arms from wearing into the aluminum cutter housing. An E-clip on each end of the axle prevents the pivot arm from falling off. A solid axle is used to maximize commonality between hand push and self-propelled models. See Figure 22.

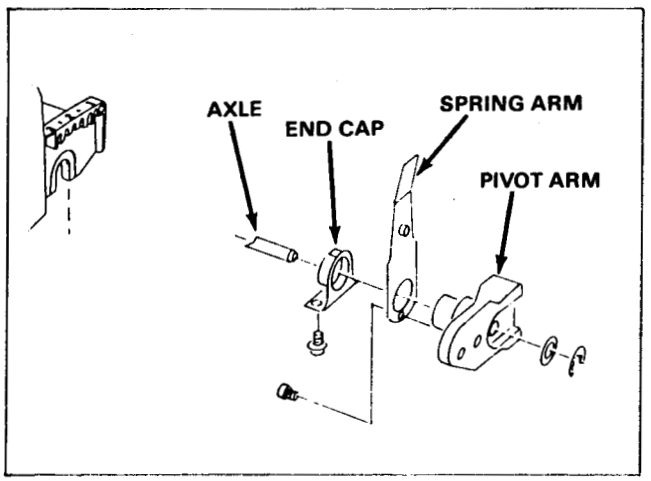

Figure 22

Hand Push Rear Suspension - Disassembly

If rear suspension service is necessary, it will most often be easiest to remove the whole assembly and then perform the service.

1. Remove the spark plug wire to prevent accidental starting.
2. Drain the gasoline from the unit.
3. Remove the 4 flanged head capscrews securing the end caps and safety sheild to the deck. Remove the safety sheild assembly and the hand push rear suspension assembly.
4. Remove the carriage bolt that secures the wheel and tire assembly to the pivot arm and remove the wheel,spacer and nylon locknut.
5. Remove the E-clips from each end of the axle.
6. Pull the pivot arms, spring arm assembly and the end caps from the axle.
7. Remove the spring arms from the pivot arms by removing the socket head capscrews.

   If required, the spring arm can be further disassembled by removing the knob. Press on the tab inside the hole in the knob and pull off vertically.

   NOTE: The spring arm uses a rivet to retain it in a desired height-of-cut. These rivets are not replaceable separately.
8. Inspect all parts for wear and/or damage and replace as necessary.

Hand Push Rear Suspension - Assembly

1. If necessary, reassemble the spring arms by installing a knob on top of the spring arm. Make sure that the tab on the top of the spring arm rises at least 1.5 mm (.060") above the spring arm. Install the knob so that the concave part of the knob and the concave part of the rivet are on opposite sides. See Figure 23.

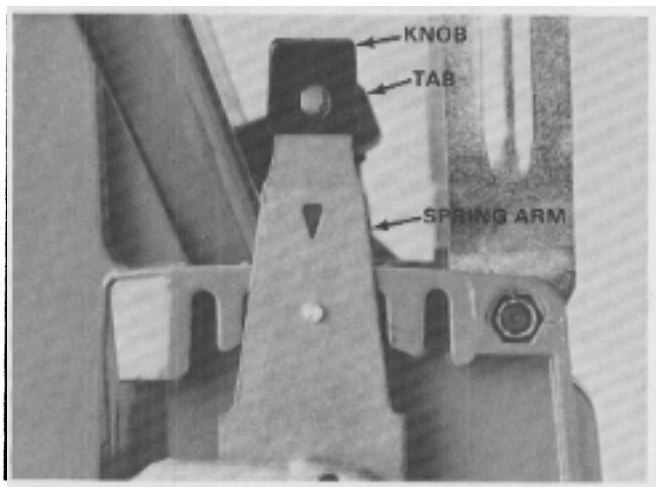

Figure 23

2. Secure the spring arm to the pivot arm with a socket head capscrew.
3. Slide an end cap onto each end of the axle, flange last. Slide the spring arm and pivot arm

assembly onto each side of the axle, spring arm first.

Slide a flat washer onto each end of the output shaft then secure the assembly with an E-clip on each end.

4. Install the assembly into the mower housing using only the 2 front flanged head capscrews.

5. Position the safety shield components as shown in Figure 24, and secure the safety shield and endcaps with the two flanged head capscrews. Tighten all endcap capscrews.

Endcap Capscrew Torque: 25 N•m (225 in lbs)

6. Install the wheel and tire assembly onto the pivot arm using a carriage bolt and nylon locknut. Don't forget the spacer that goes between the wheel and the pivot arm.

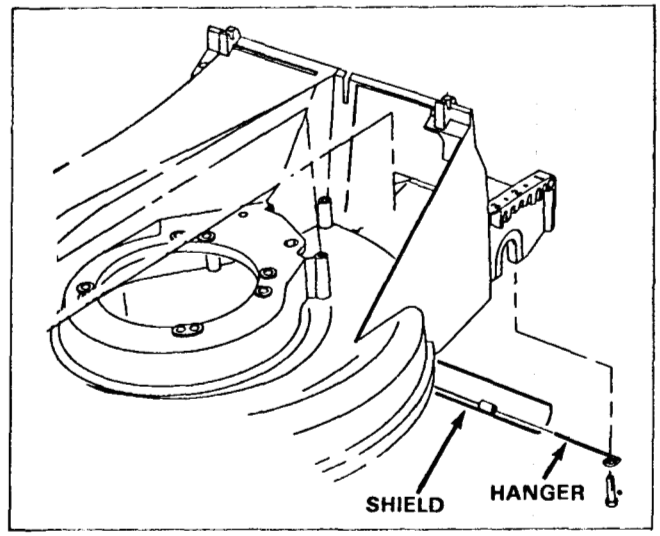

Figure 24

7. Check for free operation of the pivot arm.

SECTION 3 SELF-PROPEL SYSTEM

GEAR SELECTION CONTROL

Gear Selection Control - Operation

The self-propelled Toro Landscaper Mower is equipped with a three speed transmission. The gear selection control allows the operator to select one of the three speeds or neutral by moving a lever near the transmission

The transmission uses a sliding key arrangement for gear selection.

Gear Selection Control - Removal

1. Place the gear selection control in neutral
2. Raise and support the rear of the mower approximately 30 cm (12") off the ground. Remove the transmission access cover by pressing from underneath. See Figure 25.

Figure 25

3. Remove the two flanged head self-tapping screws holding the left endcap to the housing. This allows the rear axle to be pulled out slightly, thereby providing clearance for removal of the gear selection control. See Figure 26.

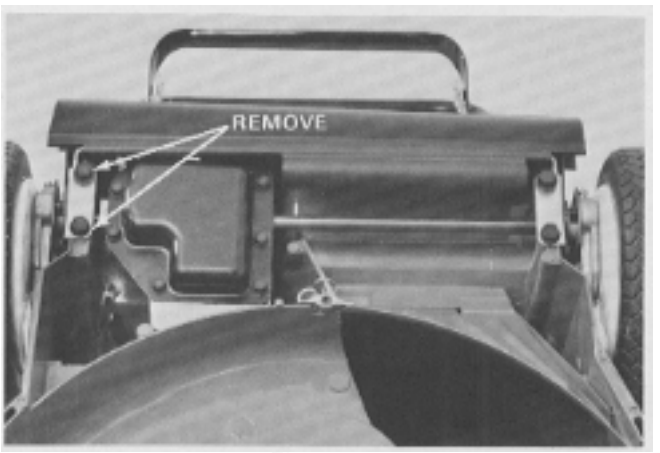

Figure 26

Pull the left side of the transmission out slightly and remove the cotter pin securing the gear selection control lever to the transmission. Remove the gear selection control lever.

Gear Selection Control - Installation

1. Remove the two self-tapping screws securing the endcap to the cutter deck if they are not already removed.
2. Pull the left side of the transmission out slightly from the deck to provide clearance for gear selection control installation.
3. Slip the gear selection control onto the shift fork.

   NOTE: There is no adjustment. It fits on only one way.
4. Secure the gear selection control lever to the shift fork with a cotter pin.
5. Fasten the endcap to the cutter housing with the two self-tapping screws.

TRACTION CONTROL

Traction Control - Operation

A belt transfers power from the engine to the transmission. Tension on this belt determines whether the unit will drive or not. Tensioning is accomplished by tilting the transmission rearward. The operator controls this by means of the black control bar at the top of the handle. When the operator brings the control up to the handle, a cable is tightened which causes the transmission to rock backwards. When the operator releases the control bar, the transmission is allowed to tilt forward which loosens the belt. The belt guide at the engine and another on top of the transmission insure that the belt adequately releases the pulleys. This provides positive control. Adjustment of the traction control cable is accomplished by means of an adjuster near the control bar.

Traction Control - Removal

1. Disconnect the spark plug lead from the spark plug to prevent accidental starting.
2. Drain the fuel tank and close the stop - cock at the base of the tank.
3. Remove the self-tapping screws securing the gas tank bracket to the recoil housing.

4. Remove the two self-tapping screws securing the lower tank bracket and the screen panel to the cutter housing. See Figure 27.

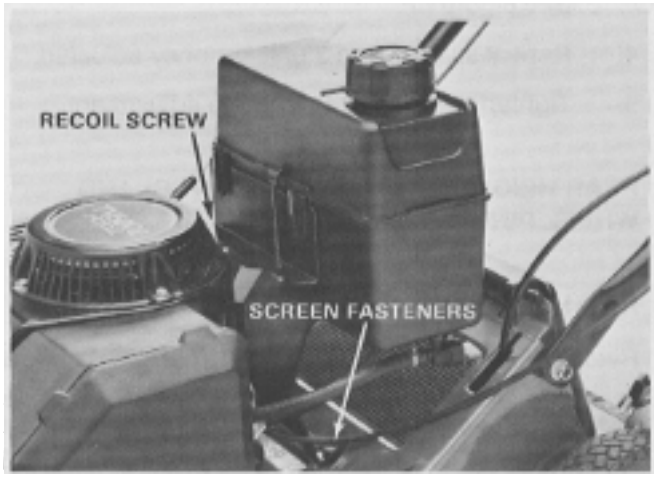

Figure 27

5. Move the fuel tank and bracket assembly out of the way and remove the screen panel.

6. Remove the black plastic transmission cover from the transmission area by pulling straight up and out.

7. Squeeze the ears at the end of the cable sheath and pull the cable out vertically. See Figure 28.

Figure 28

8. Snip and remove the cable tie straps securing the cable to the handle.

9. Remove the E-clips retaining the traction control cable sheath and the grommet to the control assembly.

10. Remove the traction control cable.

Traction Control - Installation

1. Slip the new traction control cable onto the control bar bracket and secure to the control assembly as shown in Figure 29.

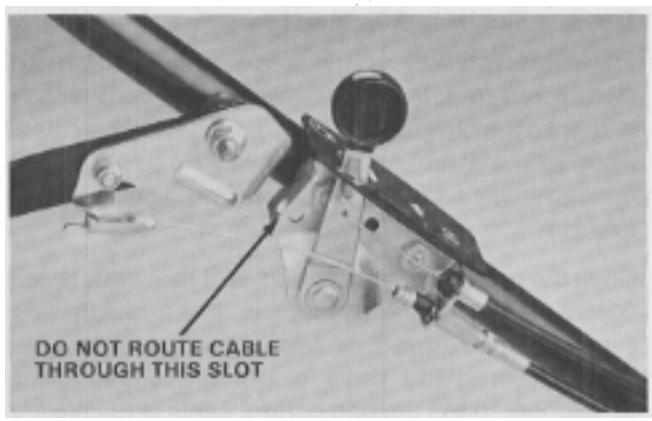

Figure 29

NOTE: Use only 1 E-clip to secure the traction control cable to the control assembly. Do not use the grommet, as this may cause fraying and premature failure of the cable.

2. Slip the Z end of the traction control cable into the belt guide bracket on top of the transmission, then slide the cable through the slot provided in the cable support bracket. Finally, push the lower end of the traction control cable into the hole. The ears will lock it into place.

3. Secure the cable to the handle with two tie straps.

4. Verify that the cable works freely when the control bar is lifted and released.

5. Install the black plastic transmission cover. See Figure 30.

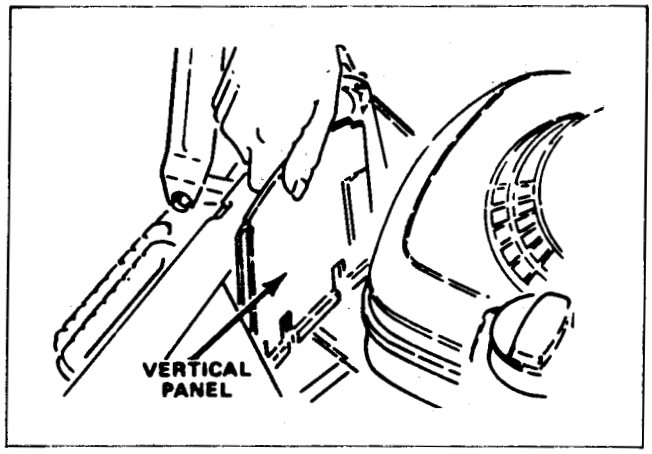

Figure 30

6. Place the screen panel and tank assembly into position. Secure with two self-tapping screws.

7. Fasten the upper tank bracket at the rear of the recoil with the self-tapping screw.

8. Check adjustment of the traction control cable and adjust if necessary, as described below.

Traction Control - Adjustment

The traction control cable is properly adjusted when all slack is removed from the cable and the control bar is at a point 3.8 cm (1-1/2") from the handle. (You can tell when all the slack is removed from the traction cable by feeling for a slight resistance as the control bar is raised.)

Once the preliminary adjustment is made, verify proper operation by starting the mower. If the transmission slips when engaged or has a tendency to creep forward when the drive is not engaged, further adjustment to the traction control cable is necessary.

1. Stop the engine and pull the wire off the spark plug.
2. Lift the control bar until some resistance is felt. Insure that the distance between the handle and the control bar is 3.8 cm (1-1/2"). See Figure 31.

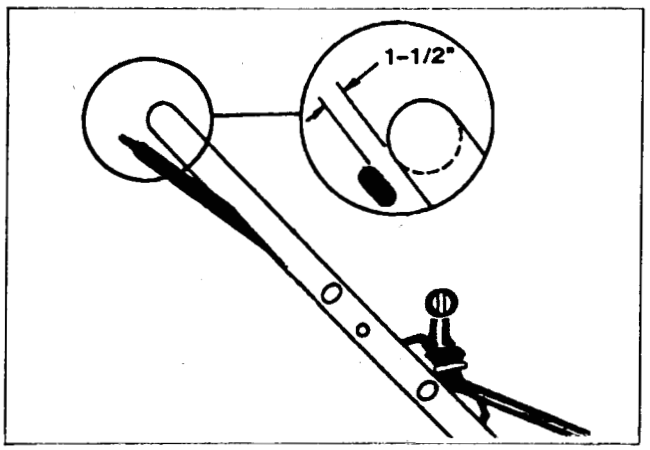

Figure 31

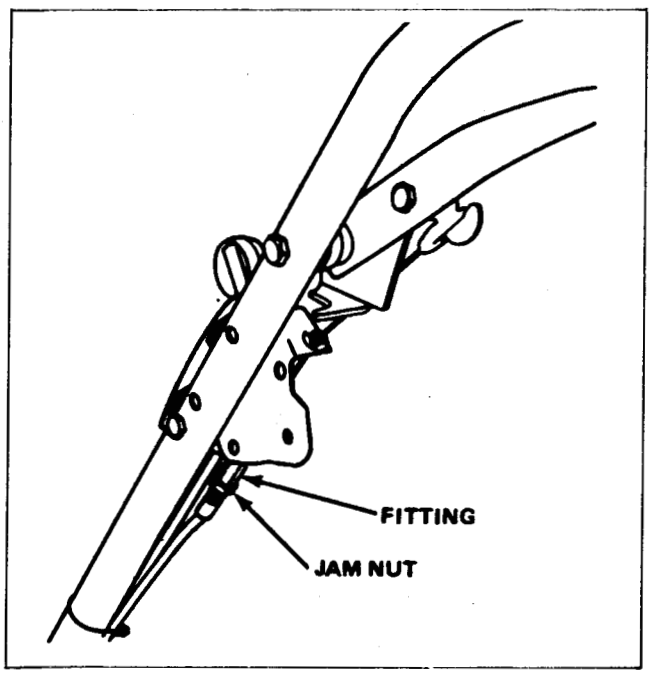

Figure 32

3. Loosen the jam nut on the cable adjuster and rotate the fitting up or down to achieve the correct distance between the control bar and the handle. See Figure 32.
4. Repeat steps 2 and 3 until properly adjusted.
5. Tighten the jam nut to lock the adjustment.

REAR HEIGHT OF CUT SYSTEM (HOC) AND WHEEL PINION CLUTCH (WPC)

Rear HOC and WPC - Operation

Rear Height Of Cut System: The rear height-of-cut system is similar to the front height-of-cut system. By fastening the wheel to pivoting brackets called pivot arms, the height-of-cut can be changed from 25 to 75 mm in 13 mm increments (1 to 3" in 1/2" increments). The spring arms hold the pivot arms in their desired position through the use of a small rivet which drops into recesses in the housing.

The rear height-of-cut system is a bit more complex in that not only must the wheels pivot, but they must also drive. This is accomplished by running the output shaft from the transmission through the pivot point on the pivot arms. The pinion at the end of the output shaft drives the wheel gear which is permanently affixed to the wheel. Because the output shaft passes through the pivot point on the pivot arm, mating of the two gears is not affected by changing the height-of-cut. See Figure 33.

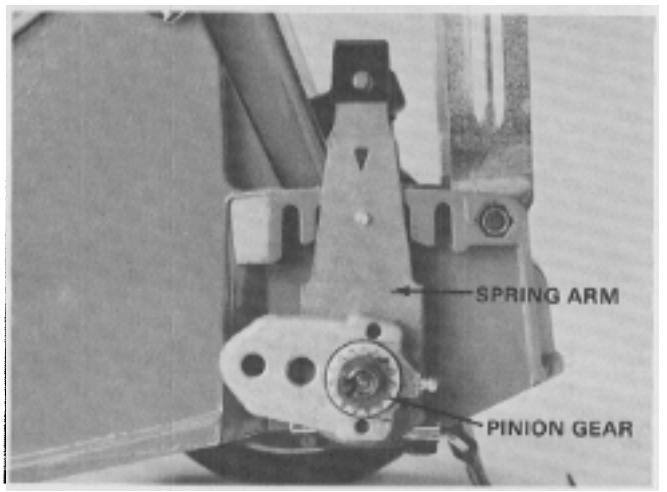

Figure 33

Wheel Pinion Clutch: The wheel pinion clutch has a three fold purpose. One, when the transmission is engaged, it causes the pinions to move with the output shaft and drives the wheels. Two, it provides differential action to allow easy turning and excellent maneuverability. Three, it disengages the wheel

pinions from the output shaft when the operator is not squeezing the handle. This allows the wheels to turn backwards without turning the gears inside the transmission and provides pullback forces similar to those found on a hand-push version.

Figure 34 shows a breakdown of the wheel pinion clutch system. The letters in the illustration refer to the explanations of each component function below.

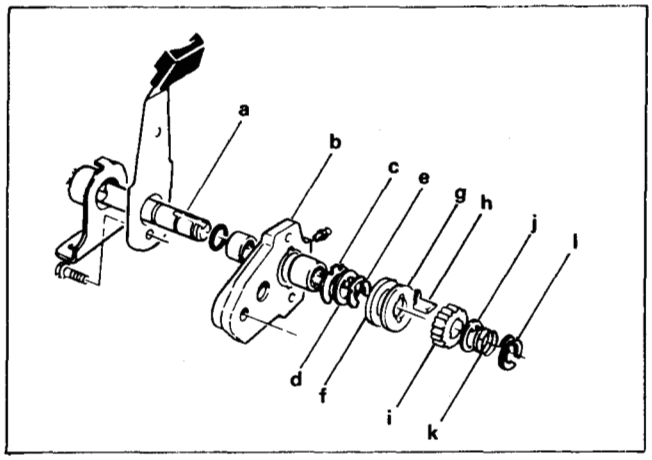

Figure 34

a. Output Shaft - turns when the operator squeezes the handle to provide power to the wheels.

b. Pivot Arm - provides support for the output shaft with a bushing and a needle bearing. It can be rotated in the end cap to change height-of-cut.

c. Externally Tabbed Thrust Washer - fits in corresponding recesses on the pivot arm to protect pivot arm from premature wear.

d. Internally Tabbed Thrust Washer - internal tab fits in the keyway on the output shaft. This washer rotates with the output shaft and protects outboard clutch components from wear.

e. Special Retaining Clip - fits in a groove on the output shaft to retain the pivot arm and spring arm. (This is not an E-clip!) The tab at the center of the clip is extended and fits in the keyway of the output shaft to prevent rotation. If an E-clip is substituted, premature failure of the wheel pinion clutch system will result.

f. Friction Ring - fits in a circular groove in the pivot arm and works with the clutch washer to actuate the key. It does not rotate.

g. Clutch Washer - is affixed to the output shaft by means of the key so it turns with the output shaft. It is also allowed to rotate slightly with respect to the output shaft. This slight back and forth rotation actuates the wheel pinion key. Friction between the clutch washer and friction ring causes the clutch washer to lag the output shaft slightly once it is engaged. That slight rotation is all that is necessary to raise the wheel pinion key and engage the pinion.

h. Wheel Pinion Key - causes wheel pinion to turn with output shaft when up. Allows the wheel pinion to "free-wheel" when down. Clutch washer brings key up. Wheel pinion turning forward "wipes" key down.

i. Wheel Pinion - positively engages the wheel gear at all times. Engagement with the output shaft is controlled by the wheel pinion key. The wheel pinion is a powered metal part and is symmetrical so that it can be put on either way and still function properly.

j. Internally Tabbed Thrust Washer - turns with the output shaft to prevent wear problems between the spring and the wheel pinion.

k. Compression Spring - provides the light, constant, inward force necessary for proper clutch washer and friction ring engagement.

l. Special Retaining Clip - fits in the outer groove on the output shaft to retain the outer wheel pinion clutch components (note that this is not an E-clip!). The extended tab at the center of the clip fits into the keyway to prevent rotation with respect to the output shaft. Substituting an E-clip will result in reduced wheel pinion clutch life.

The wheel pinion clutch is a durable system, however it is extremely important that it be maintained as per the instructions in the operator's manual, which is greasing every 25 hours with one or two pumps of grease. Greasing regularly will prevent contaminents from damaging or wearing the system.

Rear HOC and WPC - Disassembly

The rear height-of-cut system and the wheel pinion clutch can be serviced with the transmission in or out of the unit. For information on removing the transmission from the unit, see Transmission - Removal, page 29.

1. Disconnect the spark plug lead from the spark plug to prevent accidental starting.

2. Remove the shoulder bolt securing the wheel and tire assembly to the pivot arm and remove the wheel and tire assembly complete with carriage bolt, spacers, wheel cover and nylon locknut.

Rear HOC and WPC - Disassembly (cont'd)

3. Remove the special retaining clip at the end of the output shaft and pull off the following six wheel pinion clutch components:
   - Spring
   - Internally Tabbed Thrust Washer
   - Wheel Pinion
   - Wheel Pinion Key
   - Clutch Washer
   - Friction Ring
4. Remove the inner special retaining clip from the output shaft and remove the following components:
   - Internally Tabbed Thrust Washer
   - Externally Tabbed Thrust Washer
   - Pivot Arm and Spring Arm Assembly
   - Endcap (if desired)
5. Check all components at this time for damage and wear. Pay particular attention to the grooves at the end of the output shaft, the bearing surfaces on the output shaft and the wheel pinion clutch components. Replace parts as necessary.
6. Check the innermost groove on the output shaft (located 5.7 cm (2-1/4") in from the end of the shaft) making sure that the O-ring seal is present and in tact. This seal is important to keep grease in and contaminents out. Replace if necessary. See Figure 35.

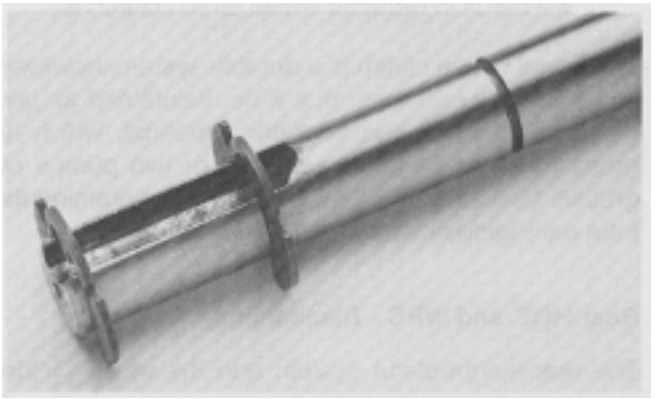

Figure 35

7. If further disassembly of the pivot arm is required, remove the spring arm.
8. Press the needle bearing and the oil impregnated bushing from the pivot arm using an arbor press.
9. Removal of the grease fitting is not recommended because it is pressed in. However, if damaged or lost, we suggest tapping and installing a threaded grease fitting.
10. If the spring arm knob requires replacement, push in on the detent tab, then pull the knob straight off.

    NOTE: The detent rivet is not replaceable separately.

Rear HOC and WPC - Assembly

1. If the grease fitting in the pivot arm has been damaged or lost, tap and replace with a threaded fitting.
2. Pack the caged needle bearing with grease then press into the outside of the pivot arm until it is flush with the groove that houses the externally tabbed thrust washer.
3. Press the oil impregnated bushing into the boss on the pivot arm until it is flush with the face of the boss. See Figure 36.

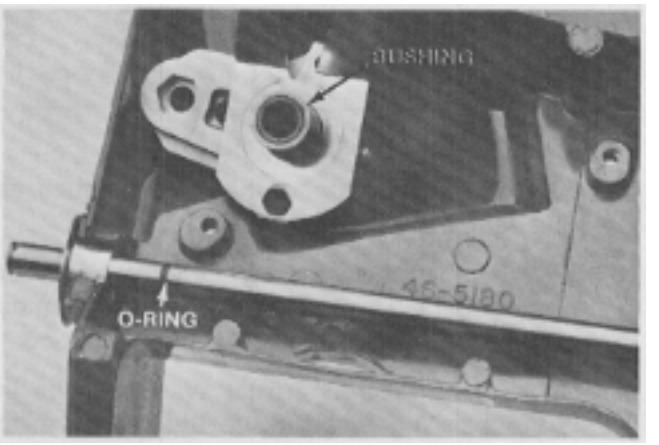

Figure 36

4. If spring arm disassembly was required, install the knob making sure that the detent is pressed out about .060". Install the spring arm knob so that the concave side of the knob and the convex side of the rivet align.
5. Assemble the spring arm and pivot arm as shown in Figure 58.
6. To increase service life, make sure all parts are clean prior to assembly and coated with new grease.
7. If removed, install new O-rings in the innermost groove 5.7 cm (2-1/4") in from end on each end making sure that it is fully seated in the groove. See Figure 36.
8. Slip the end cap onto the output shaft but do not fasten at this time.
9. Slide the pivot arm and spring arm assembly onto the output shaft, boss first.

NOTE: The convex side of the spring arm rivet and the concave side of the knob on the spring arm should both be facing the housing.

10. Slide the externally tabbed thrust washer and the internally tabbed thrust washer onto the output shaft. (Make sure that the tab on the internally tabbed thrust washer follows the contour of the keyway.) Secure with the special retaining clip, making sure that the center tab fits properly into the keyway. This will prevent rotation of the clip on the output shaft.

11. Place the friction ring into the groove on the pivot arm, flat side out.

12. Slide the clutch washer onto the shaft so that the recesses for the key are facing out.

13. Place the wheel pinion key in the groove on the output shaft with the leg toward the clutch washer.

    NOTE: There is a left and a right wheel pinion key. You are using the correct key if when placed in the groove, the top of the key is flat and the straight portion of the leg is perpendicular to the shaft.

Before assembling further, rotate the clutch washer back and forth slightly, making sure that the key actuates properly. See Figure 37.

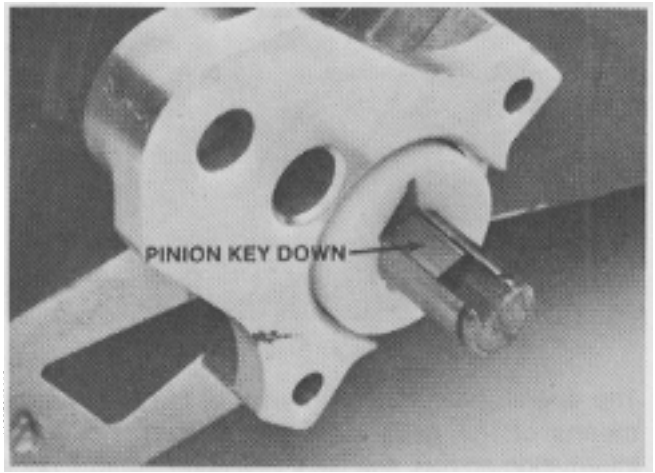

Figure 37

14. Place the wheel pinion onto the output shaft. It is symmetrical and can be put on either way.

15. Install the internally tabbed thrust washer onto the output shaft making sure that the contours of the tab follow the contours of the keyway.

16. Slip the spring onto the end of the output shaft and secure with the special retaining clip. Again, make sure that the center tab fits properly into the keyway to prevent rotation of the clip. See Figure 38.

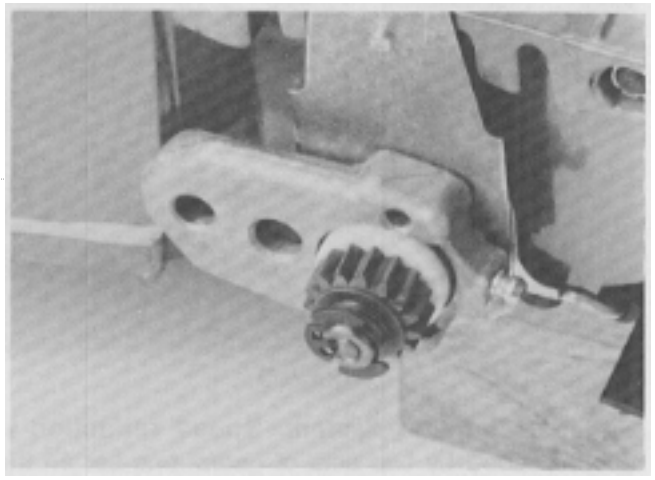

Figure 38

17. Slip the wheel, the original number of spacers, and the wheel cover onto the shoulder bolt and secure to the pivot arm using the nylon locknut.

18. Grease with a No. 2 lithium-base grease. As a rule, use two pumps to insure that you do not over grease. Be sure to grease after every 25 hours of use to insure maximum service life.

TRANSMISSION

Transmission - Operation

Power from the engine is transferred to the wheels by means of a belt and a three speed transmission. The belt and transmission are easiest to understand when broken down into smaller systems.

Input System: Power is transferred from the engine to the transmission via a belt. The self-propel pulley at the engine is keyed to the crankshaft. The self-propel pulley on top of the transmission is supported by a ball bearing and drives a pinion gear inside the transmission. Tensioning of the belt is accomplished by rocking the transmission. When the operator squeezes the control bar toward the handle, a cable is tightened which tilts the transmission backward and tensions the belt. When the control bar is released, gravity rocks the transmission forward to loosen the belt.

Belt guides at the engine pulley and atop the transmission insure disengagement by forcing the belt to loop around the pulleys. See Figure 39.

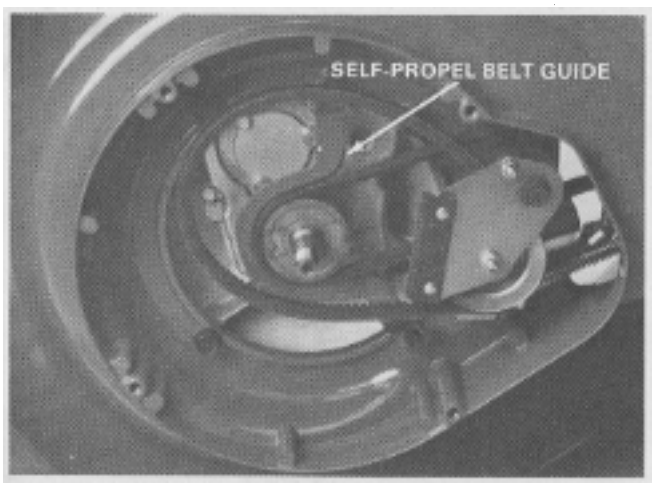

Figure 39

Speed Reduction System: Speed reduction is accomplished by two sets of gears--one set on the intermediate shaft and the other set on the output shaft. The gears on the intermediate shaft are powdered metal and ride on a hexagonal shaft supported on each end by oil impregnated bushings. These gears are driven by the pinion at the bottom of the input shaft. The driven bevel gear turns the shaft so that all three gears on the intermediate shaft have the same rotational velocity. See Figure 40.

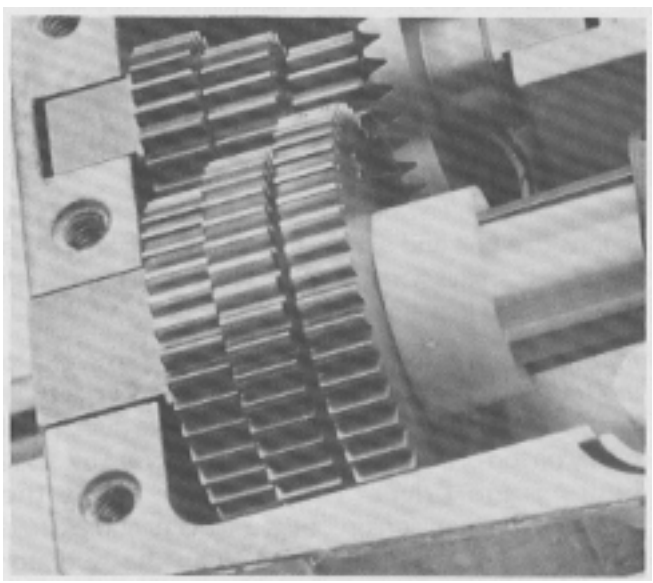

Figure 40

There are also three gears on the output shaft, however, these three gears rotate freely on the gear sleeve. The gear sleeve is coupled to the output shaft with a roll pin so the gear sleeve always rotates with the output shaft. The gear selection system determines which one of these three gears will be coupled with the gear sleeve and the output shaft. This determines the final drive ratio. For more information on final speeds at various throttle settings, see Figure 41.

Gear	Ground Speed @ 3000 RPM	Ground Speed @ 2000 RPM
1	1.8 mph	1.2 mph
2	2.7 mph	1.8 mph
3	3.8 mph	2.5 mph

Figure 41

Gear Selection System: Gear selection is determined by moving sliding shift keys in a sleeve that is fixed to the output shaft. These keys engage one of the three gears that rotate on the gear sleeve. Once the key engages one of the gears, that gear will rotate at the same speed as the output shaft. This determines the final drive ratio, shown in Figure 41 above.

The shift keys are trapped on one end by the shift collar. Movement of the shift fork positions the shift collar and shift key. The shift fork is supported, both top and bottom, by nylon bushings for smooth operation and long wear. See Figure 42.

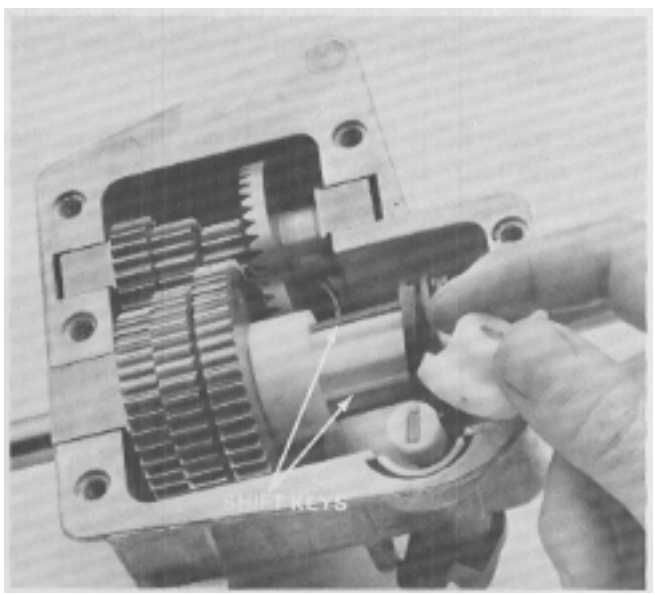

Figure 42

The operator controls movement of the shift fork by means of the gear selection control. For more information on this, see Gear Selection Control, page 22.

General Information: The upper gear case half is cast aluminum. The lower transmission cover is made of stamped steel and the gears are powered metal.

The output shaft is supported by needle bearings with seals. The intermediate shaft is supported by oil impregnated bushings.

Lubrication is provided by 177 cc (6 oz) of No. 2 lithium-base grease.

Transmission - Removal

Complete transmission removal on the Landscaper mower is quite easy and is recommended for most self-propel system repairs.

1. Remove the spark plug lead from the engine to prevent accidental starting.

2. Drain the fuel from the tank and shut off the valve under the tank.

3. Remove the three flanged head self-tapping screws securing the tank to the engine and cutter housing. Remove the tank and screen panel. See Figure 43.

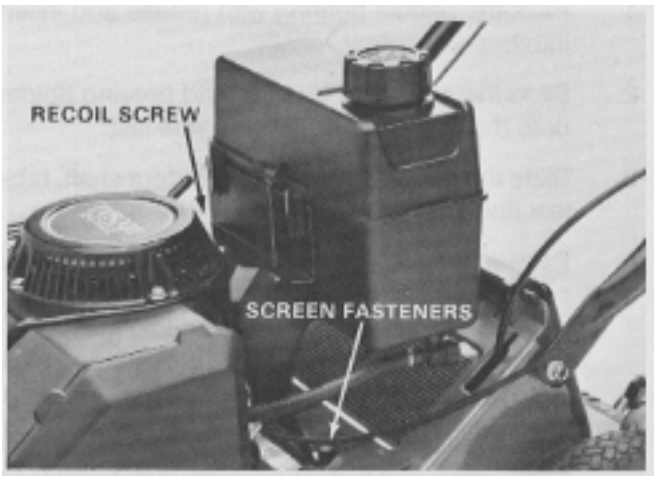

Figure 43

4. Remove the black plastic transmission cover from the top rear of the housing.

5. Remove the two flanged head self-tapping screws securing the belt cover to the top of the transmission. Pull the cable from belt guide and remove the belt guide.

6. Remove the transmission access cover from the rear of the housing by pressing from underneath.

7. Turn the mower onto its right side and remove the four flanged head self-tapping screws securing the end caps to the housing. See Figure 44.

8. Slowly pull the transmission from the housing being very careful not to damage the speed selection control lever.

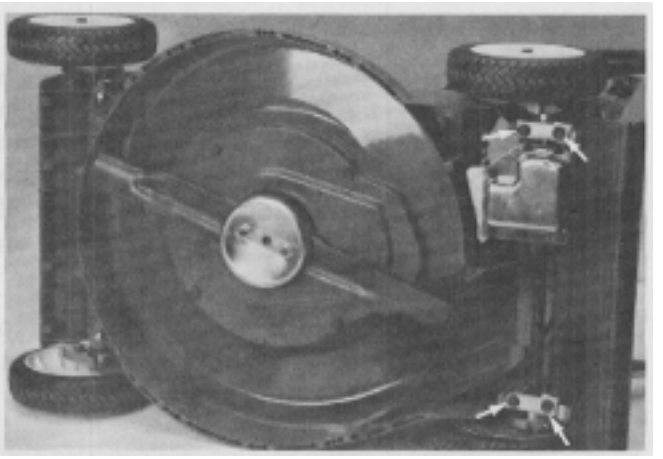

Figure 44

Transmission - Disassembly

Many repairs to this "Series 2" (used in all Landscaper self-propelled rear baggers) transmission can be accomplished without removing the pivot arm assembly from the output shaft. Only if components on the output shaft require replacement will pivot arm removal be necessary.

1. Remove the six flanged head self-tapping screws securing the transmission cover to the transmission case and remove the cover. See Figure 45.

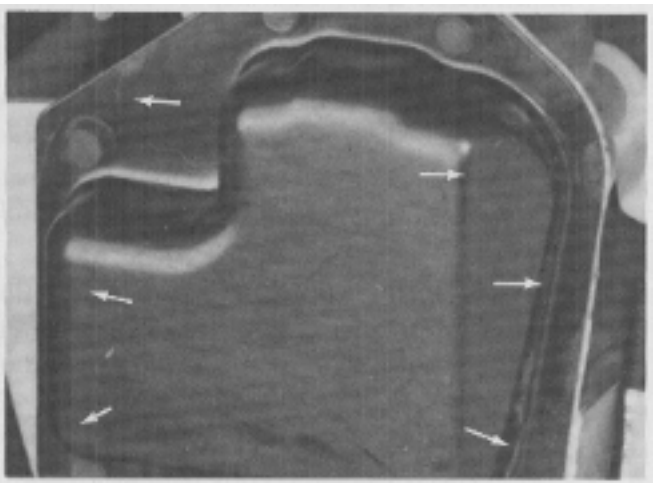

Figure 45

2. Before disassembling further, check for proper operation of the input system, the gear reduction system and gear selection system. For more information on this, see Transmission - Operation, page 27.

3. Removal of the input shaft and pulley assembly can be difficult because the input pinion will have a tendency to turn as the pulley nut is loosened.

Address this situation by using an impact wrench or by removing the 20 and 25 tooth gears from the intermediate shaft and then putting the intermediate shaft assembly back onto the transmission. The hexagonal intermediate shaft can then be held with a 7/16" end wrench while the pulley nut is loosened.

NOTE: Using a cut-away transmission cover to hold the intermediate shaft in place may facilitate pulley nut removal. See Figure 46.

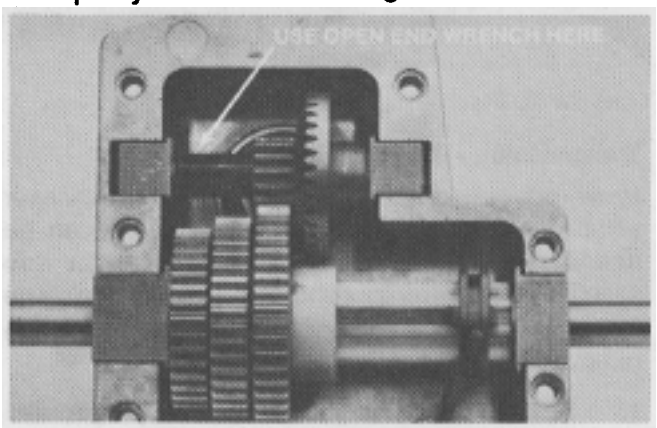

Figure 46

4. Remove the intermediate shaft from the transmission and clean. Inspect all gears for cracks and/or broken teeth. Inspect the bushings for excessive wear. Replace any parts necessary. Be careful not to lose the two spacers that fit between the bevel gear and the bushing.

6. Remove the cotter pin from the top of the shift fork and remove the speed selection control lever.

7. Carefully pull the output shaft from the transmission case, clean, and inspect all components for wear or damage. Check the input shaft ball bearing for roughness or excessive drag and replace any parts necessary. If ball bearing replacement is required, press the ball bearing out using an arbor press.

8. If service of any of the output shaft gears or the gear selection system is required, remove the left pivot arm as described under Rear Height-of-Cut System and Wheel Pinion Clutch - Disassembly, page 25.

   NOTE: It is possible to replace the shift keys and spring clip without removing the pivot arm if the roll pin securing the gear sleeve to the output shaft is first driven out. However, it is not recommended since inspection of the inside of the output gears is not possible.

9. Pull the seal, bearing, bearing holder, spacer, shift collar, shift keys with spring clip, and shift key sleeve from the output shaft.

10. Remove the three output shaft gears from the output shaft.

11. Drive out the roll pin securing the gear sleeve to the output shaft and remove the gear sleeve and remaining bearing, bearing holder and seal. Inspect all parts for wear and damage and replace if necessary.

Transmission - Assembly

The Series 2 transmission uses all No. 2 lithium-base grease as lubricant. When assembling, be sure to coat all moving components with such to insure proper lubrication.

Output Shaft Assembly:

1. Pack the needle bearing with grease and insert into bearing holder.

2. Slide the right seal, bearing and bearing holder onto the output shaft, flanged side last.

3. Slide the gear sleeve onto the output shaft, tabs last and secure with a new roll pin.

4. Paint a light coat of lithium-base grease on the output shaft under the output bushing, on the gear sleeve, and on the three output shaft gears. Slide the three output shaft gears onto the gear sleeve, notched sides last.

5. Slide the nylon shift key sleeve onto the output shaft, large end first. Make sure that it engages the tabs on the gear sleeve.

6. Coat the shift key sleeve with grease and prepare the shift keys, shift collar, and spring clip for assembly as shown in Figure 47.

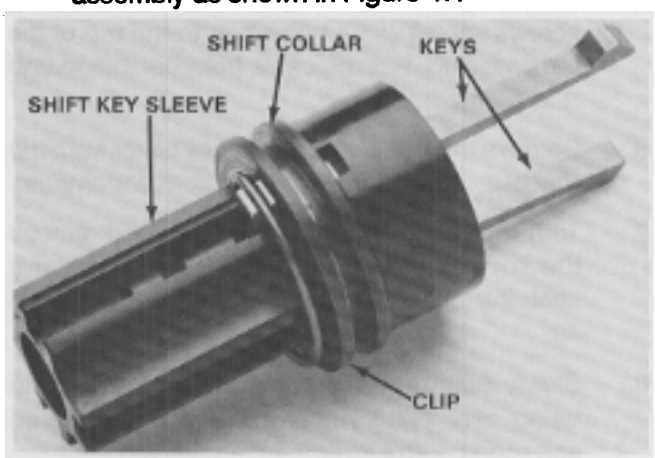

Figure 47

7. Slide the shift key assembly into the shift key sleeve until the shift collar bottoms out.

8. Complete the output shaft assembly by sliding a spacer washer and the other output bearing assembly onto the output shaft. See Figure 48.

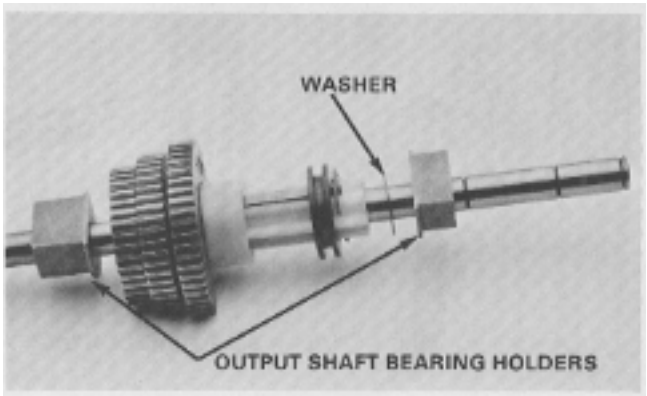

Figure 48

9. If the left pivot arm was removed for servicing, reassemble now as described under Height-of-Cut System and Wheel Pinion Clutch - Assembly, page 26.

10. Input Shaft Assembly: If the input bearing had been removed, press a new one into the gearcase using an arbor press. Press only on the outer race or bearing damage may result.

11. Slide the input shaft and pinion through the ball bearing and top with the spacer and two pulley halves as shown in Figure 49. Secure with a flat washer and a nylon locknut.

12. Tighten the input pulley nut by using an impact wrench or by using the cutaway gearcase half and end wrench method described in step 3, under Transmission - Disassembly, page 29.

13. Slip the shift fork into the slot on the shift collar and place the shift fork and output shaft assembly into the transmission.

    NOTE: The long end of the shift fork shaft should go through the hole in the gearcase. Make sure that the output bearing holders are trapped in the proper locations. Note that the larger holder goes on the longer end of the shaft and the shorter holder goes on the shorter end of shaft.

14. Slide the yoke bushing onto the lower end of the shift fork then secure the shift fork with the white nylon shift fork retainer. See Figure 50.

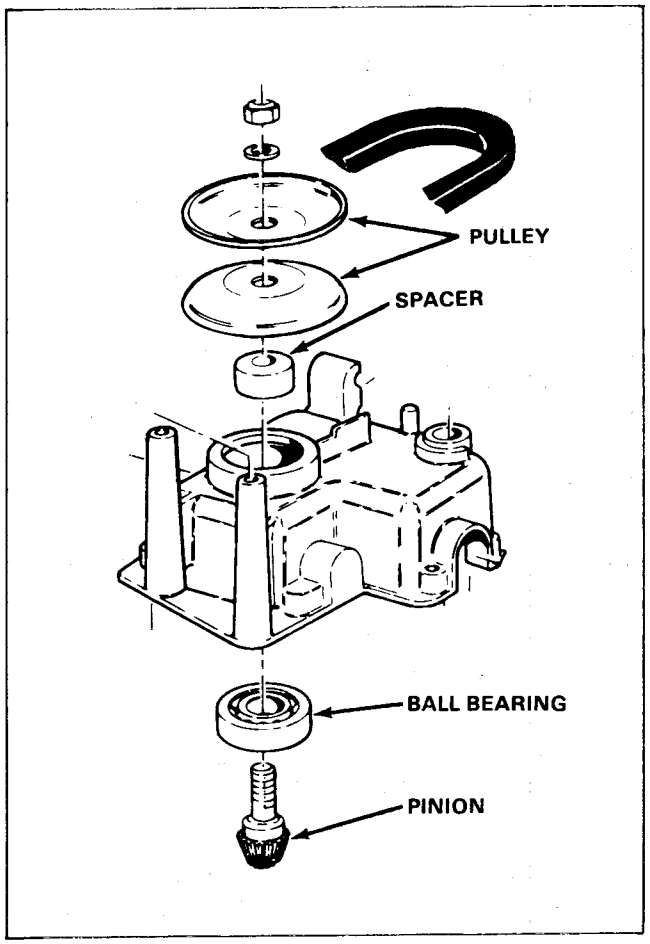

Figure 49

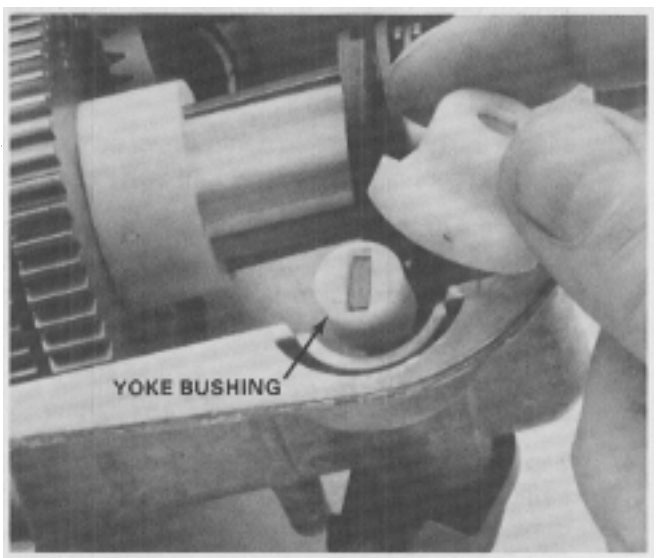

Figure 50

Intermediate Shaft Assembly:

NOTE: Before assembling, be sure that you have coated the intermediate shaft with a No. 2 lithium-base grease.

Transmission - Assembly (cont'd)

15. Slip an intermediate shaft bushing onto the left end of the intermediate shaft, flanged end first. See Figure 51.

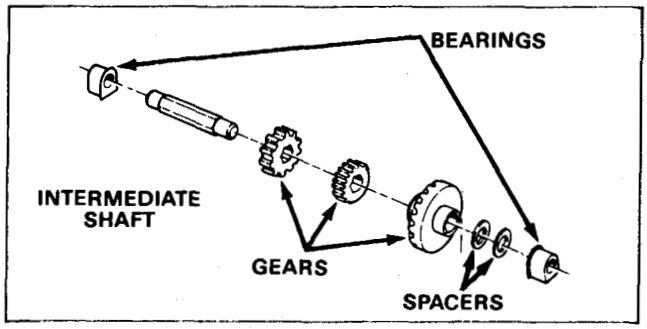

Figure 51

16. Slide the intermediate shaft gears onto the intermediate shaft in this order:
    - 25-tooth gear
    - 20-tooth gear
    - 15-tooth gear
17. Slide a spacer washer onto the intermediate shaft next to the bevel gear and follow with an intermediate shaft bushing, flanged side first.
18. Drop the intermediate shaft into the gearcase, making sure that all gears engage properly.
19. Fill the gear case with 177 cc (6 oz) of No. 2 lithium-base grease, then install the cover with the six flanged head self-tapping capscrews.

Transmission - Installation

1. Mount the gear selection control lever on the shift fork and secure with a cotter pin. See Figure 52.
2. Bring the transmission assembly into position underneath the deck, making sure that the end caps are on the outside of the housing. Place the transmission and pivot arm assembly into the deck.
3. Loosely install the two front endcap fasteners.
4. Slip the two rear end cap fasteners through the safety shield guide wires and install the end caps. Tighten the right two end cap fasteners. See Figure 53.

Endcap Fastener Torque:
26 N•m (225 in lbs)

5. Slip the traction belt into position on the transmission pulley. Make sure that it does not bind on any of the bosses.

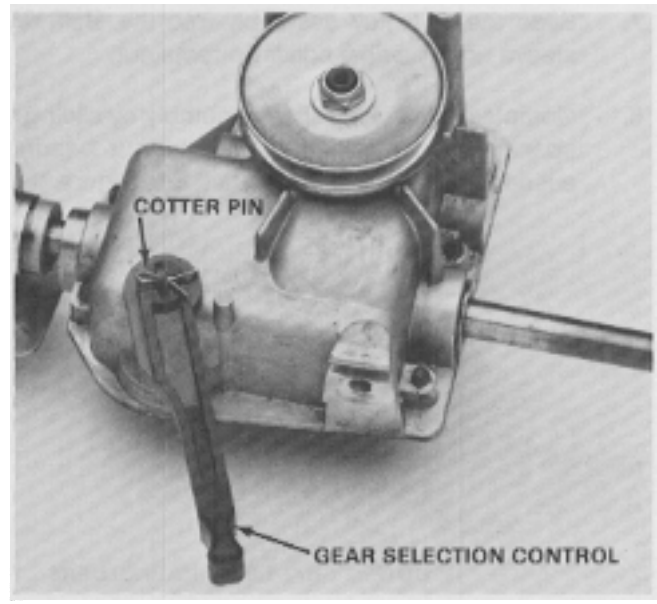

Figure 52

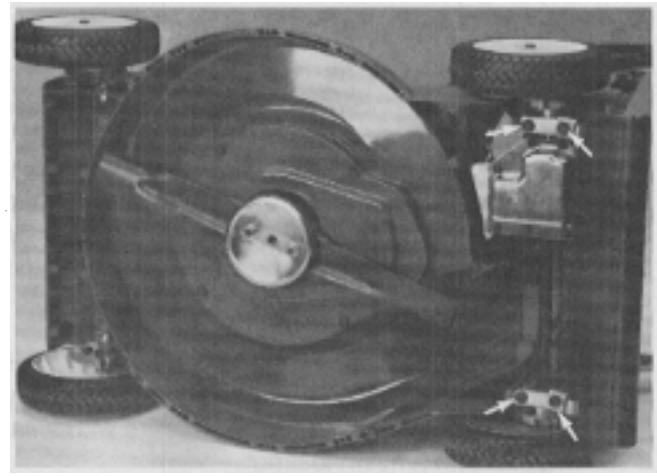

Figure 53

6. Slip the end of the traction cable into the belt guide bracket from the outside then install the belt guide bracket onto the top of the transmission, making sure that the traction belt is inside the guide. Torque the fasteners.

Fastener Torque:
15 N•m (130 in lbs)

7. Slip the black plastic transmission cover into place making sure that the belt falls in the appropriate grooves. Install the screen panel with the two flanged head self-tapping capscrews. Make sure that the top edge is trapped underneath the lip of the housing.
8. Install the gear selection cable as described under Gear Selection Control - Installation, page 22.

SECTION 4 ZONE START BRAKE

Zone Start Brake - Introduction

In 1982 the federal government mandated that all consumer walk behind mowers with a cut of 63.5 cm (25") or less be equipped with safety devices. Because Landscaper mowers are intended for both light and commercial use and heavy *consumer* use, safety controls are incorporated.

There are two primary criteria which these devices must meet:

1. A two step operation must be performed in order to get the blade turning.
2. The blade must come to a stop within three seconds of the operator leaving the operator's position.

One of the ways The Toro Company met these requirements was with the "zone start system". This system utilizes a kill switch and brake which stops the engine when the operator releases the control bar. The two step blade engagement criteria is met by requiring the operator to first raise the control bar, and second, pull the recoil rope from the operator's position. See Figure 54. Notice that the end of the recoil rope is up near the operator's position just ahead of the control bar. This allows the operator to start and operate the unit without leaving the operator's position.

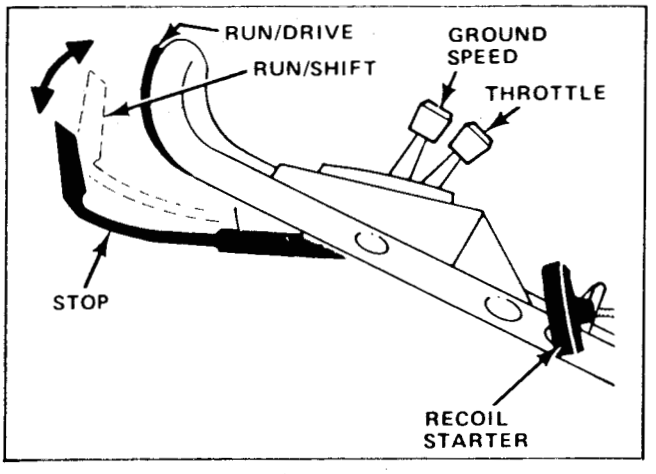

Figure 54

Zone Start Brake System - Operation

The pivoting style zone start brake system consists of two parts. The first system stops spark production and the other stops the engine and blade.

Spark is stopped by means of a switch. The switch is closed when the control bar is in the "at rest" position. Raising the control bar opens the switch.

The switch leads are connected to the primary side of the coil and to ground. When the switch is closed, the electronic ignition module is bypassed so that it cannot interupt primary coil current flow. This prevents the coil from producing the high voltage necessary for spark. When the switch is open, the ignition coil produces spark.

Stopping of the engine and blade is accomplished by means of a brake that is applied to the bottom of the ignition flywheel. The brake is spring loaded in the "braked" position when the control bar is in the "at rest" position. When the control bar is lifted, the brake is pulled away from the flywheel to allow the engine to run.

Zone Start Brake System - Disassembly

See Figure 55.

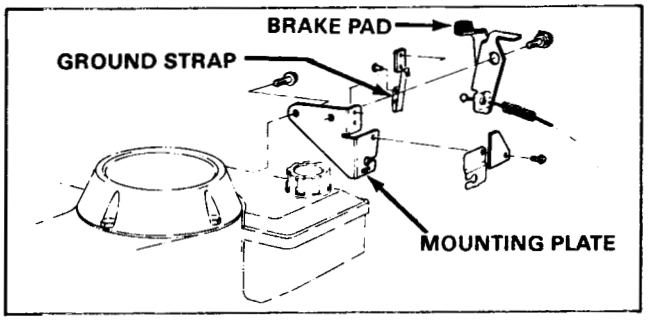

Figure 55

1. Inspect the brake pad for excessive wear and replace if necessary.

   NOTE: The brake pad is not replaceable separately from the brake plate.

2. Remove the self-tapping screw securing the cable clamp to the mounting plate. Remove the cable clamp, the ground strap stop and the brake cable with spring.
3. Remove the two screws securing the mounting plate to the engine and remove the brake assembly.
4. If removal of the ground strap is required, drill out the two rivets securing it to the mounting plate and remove the strap and insulator.

Zone Start Brake System - Assembly

1. If the ground strap has been removed, fasten it to the mounting plate as shown in Figure 56.

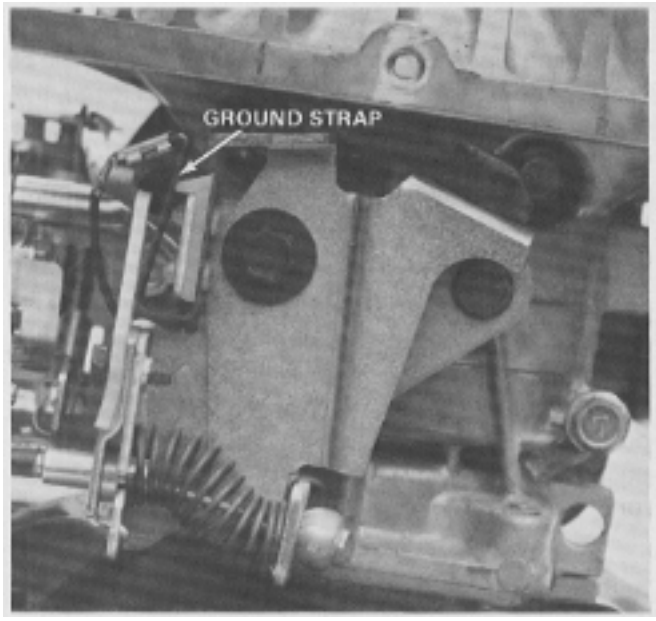

Figure 56

2. Secure the mounting plate with one self-tapping screw. Tighten to the proper torque.

Mounting Plate Screw Torque: 10.4 N•m (90 in lbs)

3. Fasten the brake plate to the mounting plate and block with the shoulder screw. Make sure that the brake plate pivots freely once the screws are tightened. Tighten to the proper torque.

Brake Plate Pivot Screw Torque: 10.4 N•m (90 in lbs)

4. Slip the compression spring over the cable, then slip the lugged end of the cable into the slot in the brake plate. Slip the spring between the brake plate and mounting plate, then secure with the cable clamp and ground strap stop as shown in Figure 57.

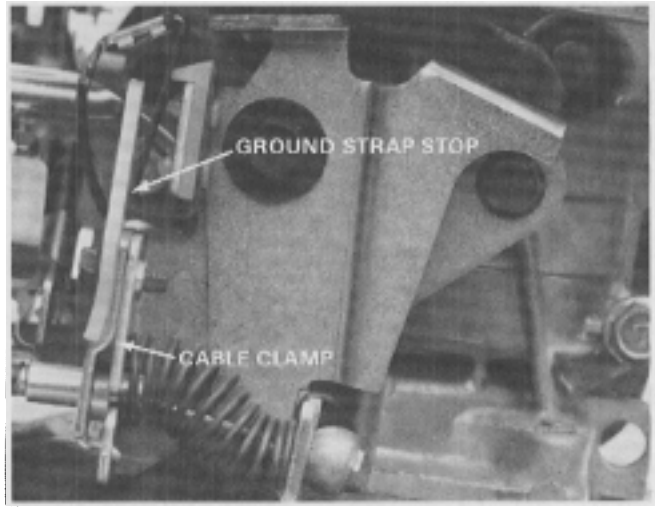

Figure 57

5. Adjust the cable as described below.

Zone Start Brake System - Adjustment

The cable is not adjustable at the brake end. See Maintenance - Adjusting the Blade Brake, page 16 for cable adjustment information.

SECTION 5 ELECTRICAL SYSTEM

Electrical System - Operation

While the ignition circuit is described in each of the applicable engine manuals, the subject will also be briefly described here since the wire harness is part of the chassis. See Figure 58.

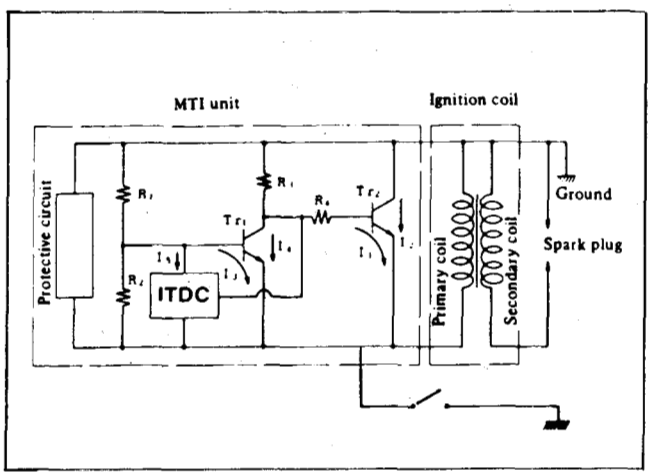

Figure 58

A *magneto* style ignition as shown in the figure above is based on the principle that a magnet passing by a coil of wire produces an electrical current flow in the wire. (Note: the coil of wire must form a complete circuit.)

The flywheel on the Toro 2-Cycle engine houses a magnet on one side. Because the coil is mounted close to the flywheel, current flows through the primary side of the coil and through the electronic ignition module when the magnet passes by. However, the amount of current present in the primary is very small, so something must be done to "step it up".

To increase voltage, a second coil is used. This coil is called the secondary. It is different from the primary in that it is constructed of finer wire and has many more windings. The magnetic field produced by the primary tries to force current to flow in the secondary, but cannot because of the open circuit at the spark plug electrodes. While current will not flow, something important does happen. A voltage difference is produced across the electrodes. When the voltage gets high enough, an arc occurs, thereby producing spark at the plug.

Unfortunately, the components we have described so far cannot produce a voltage high enough at the plug to produce spark. To create an arc we must add one more component: the electronic ignition module.

The electronic ignition module opens the primary circuit while the magnet is passing by, thereby causing a rapid decrease in primary current flow. Opening the primary circuit is important because any change in primary current (whether an increase or a decrease) boosts the voltage in the secondary. The faster the change in primary current, the greater the increase in secondary voltage. When the electronic ignition module is functioning properly, the voltage at the spark plug electrodes becomes high enough to overcome the resistance of air, thus producing spark.

While producing spark may be somewhat difficult to understand, stopping spark is not. The Toro 2-Cycle engine use a "kill wire" that runs to the zone start brake switch. When the switch is closed, the primary coil is grounded.

Grounding does not prevent current flow in the primary. Current still flows each time the magnet passes by the coil. However, as you can see in Figure 59, the current flow bypasses the electronic ignition module which eliminates the "momentary open" in the primary circuit. With no "momentary open", high voltage cannot be produced and spark cannot occur.

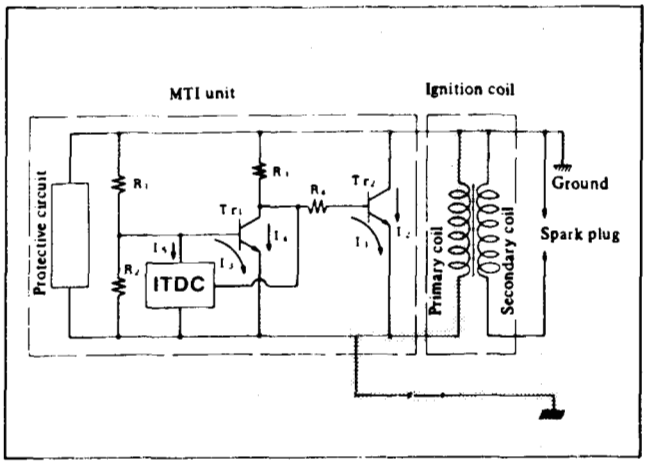

Figure 59

Electrical - Troubleshooting

For ignition system troubleshooting information, see the appropriate engine service manual for your engine.

SECTION 6 HANDLE ASSEMBLY

Handle Assembly - Introduction

The handle assembly on the Landscaper rear bagger is constructed of 25mm (1") diameter 16 gauge steel. It is painted black with a dry powdered paint. The handle latches are bolted to the handle and the handle is of single piece design. Both these features are for added durability and rigidity to stand up to the rigors of commercial use. See Figure 60.

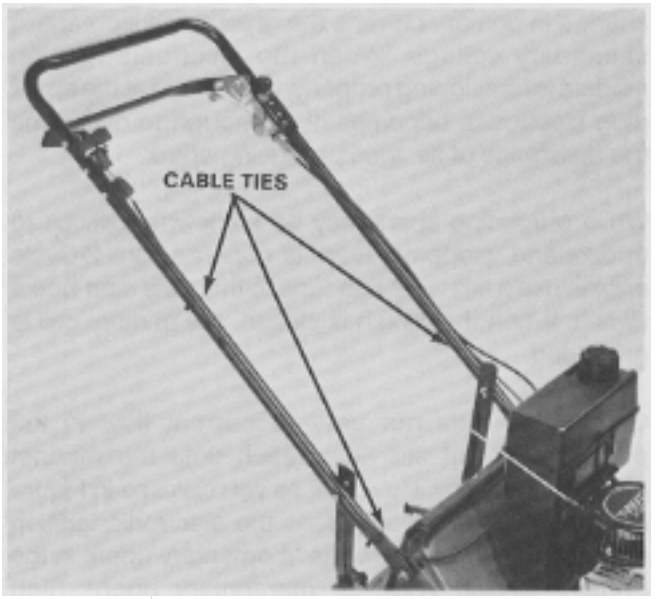

Figure 60

Handle Assembly - Removal

1. Remove the two hex head capscrews securing the throttle control to the handle and remove the throttle control. Remove the traction cable clevis from the traction control bar. See Figure 61.

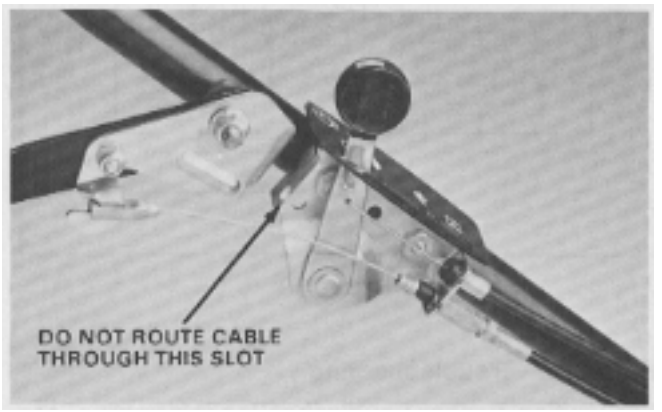

Figure 61

2. Remove the hex head capscrew and nylon locknut securing the recoil rope bracket to the handle and remove the recoil rope bracket.
3. Remove the hex head capscrew and nylon locknut securing the zone start brake cable on the right side of the handle and remove the bracket. Disconnect the zone start brake cable from the control bar.
4. Remove the hex head capscrews and nylon locknut from each end of the control bar and remove the control bar complete with spacers.
5. Snip any cable ties securing the cables to the handle.
6. Make note of the handle adjustment. Remove the two hex head capscrews and nylon locknuts securing the handle latches to the handle.
7. Remove the two nylon locknuts and washers securing the handle to the cutter housing and remove the handle.
8. If necessary, remove the studs from the cutter housing.

Handle Assembly - Installation

See Figure 62.

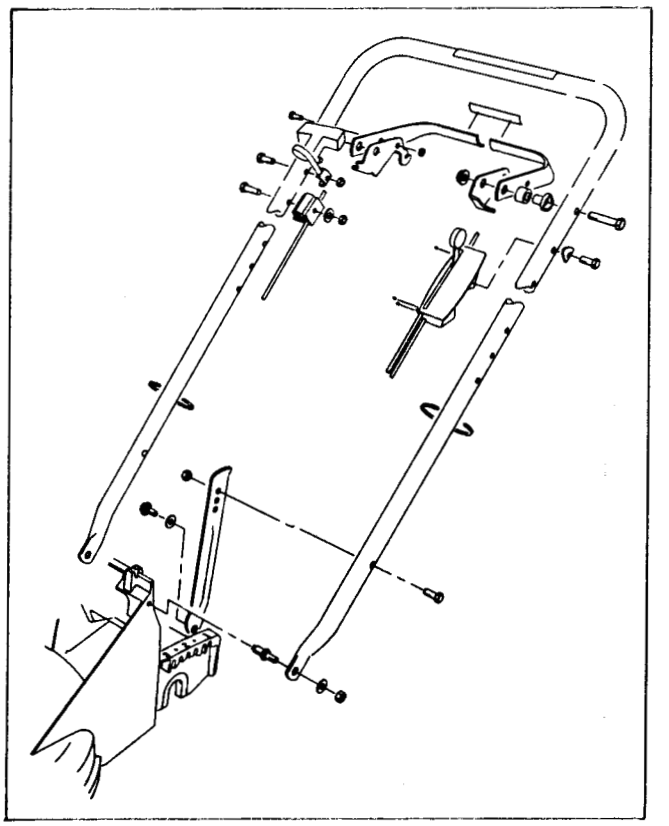

Figure 62

1. If the handle studs were removed from the cutter housing, apply Loctite to prevent the studs from turning out. Then install the studs into the cutter housing.

Handle Stud Torque:
40.3 N•m (350 in lbs)

2. Slip the lowest hole on the handle over the stud and secure with a washer and nylon locknut.

3. Bring the handle up to the desired height and secure with a hex head capscrew and nylon locknut on each side. If in doubt of adjustment, use the center hole.

4. Install the control bar so that the decal can be read from the operator's position. Secure it with a hex head capscrew and flanged nylon locknut on each side.

   NOTE: The control bar should be mounted on the top hole on the handle. Check for free operation.

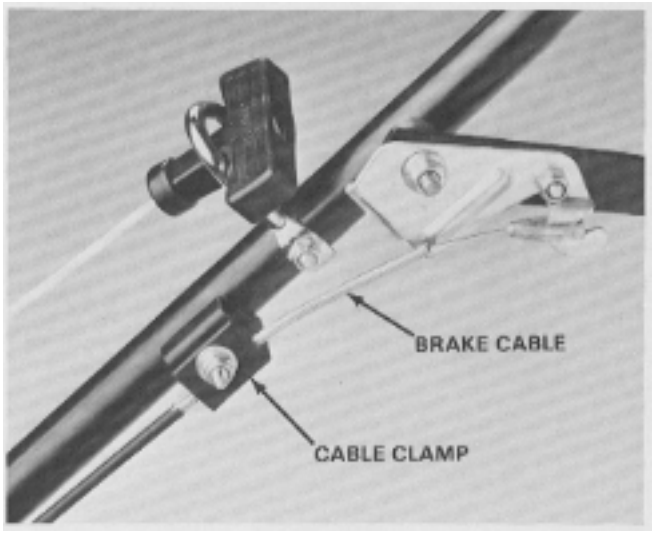

Figure 63

5. Hook the brake cable onto the control bar. Secure the cable clamp to the right side of the handle, third hole from the top with a hex head capscrew, washer and nylon locknut. However, do not tighten completely since adjustment will be required later. See Figure 63.

6. Mount the recoil rope bracket in the second hole from the top on the inside of the handle. Secure it to the handle with a hex head capscrew and nylon locknut.

7. Slip the traction cable onto the hook on the left side of the control bar then secure the throttle control in the second and third hole from the top of the handle with hex head capscrews. See Figure 61.

8. Secure the zone start cable to the handle with a cable tie. See Figure 64.

9. Secure the throttle and traction cables to the left side of the handle with a cable tie. See Figure 60.

10. Adjust the traction control as described under Maintenance - Adjusting Wheel Traction Drive, page 14.

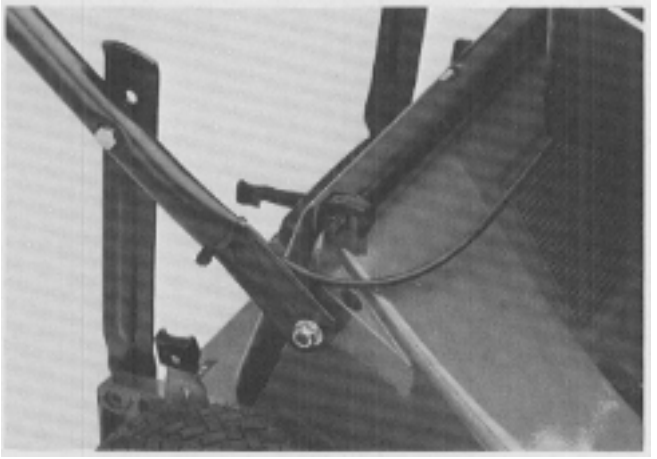

Figure 64

11. Adjust the zone start brake cable as described under Maintenance - Adjusting Blade Brake, page 16.

12. As a precautionary measure, check to insure that high and low speed idle are at the prescribed rpm. If necessary, adjust the governor.

SECTION 7 ENGINE

The Landscaper Rear Bagging Mowers are powered by the Toro 2-Cycle engine. The manual covering maintenance and service of this engine is available from The Toro Company at the following address:

The Toro Company
Consumer Service Department
8111 Lyndale Avenue So.
Bloomington, MN USA 55420
Phone: 612-887-8255

SECTION 8 CUTTING DECK

Cutting Deck - Operation

The Landscaper Deck is designed to provide the ultimate in quality of cut and bagging. It relies on air movement to carry the grass into the bag.

Not all of the air is drawn from the sides; a considerable amount of air enters through the center of the deck. The perforated screen panel just behind the engine is the entry point. From there, the air passes through the belt opening in the deck, and finally down to the cutting chamber area. On self propelled models, there is a plate that covers the transmission to help prevent grass from packing around it. See Figure 65.

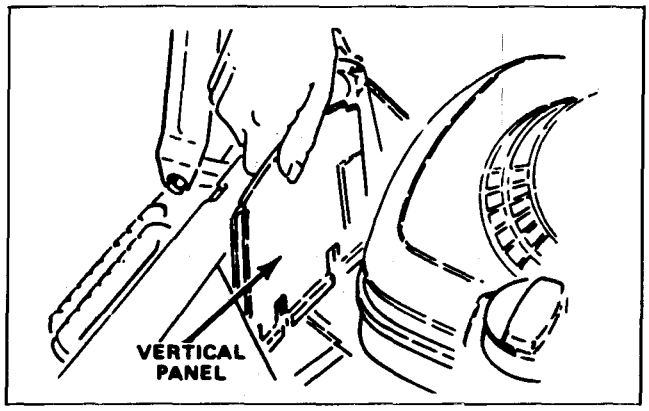

Figure 65

It is important to keep the screens and air passages clear of debris to allow free air flow. If the screens are obstructed, the quality of cut will degrade.

Cutting Deck - Adjustments

IMPORTANT: The following adjustments can be time consuming and should only be performed if blade position affects safety or quality of cut. If you have questions about these adjustments, please call The Toro Company Consumer Service Department at 612-887-8256.

There are two critical dimensions that also affect quality of cut: blade position and blade tip to housing clearance. A description of each is provided below.

Blade Position refers to the vertical position of the blade at the tip with respect to the bottom lip of the deck. See Figure 66.

If the blade is too high, quality of cut will degrade. If the blade is too low, operator safety may become a concern.

The specification for blade height with respect to the bottom lip of the deck follows.

Blade Position	Should be
@ Front	Flush with housing bottom
@ Rear	6.4 ± 1.5 mm (.250 ± .060")
@ Sides	Even with opposite side within 1.5 mm (.060")

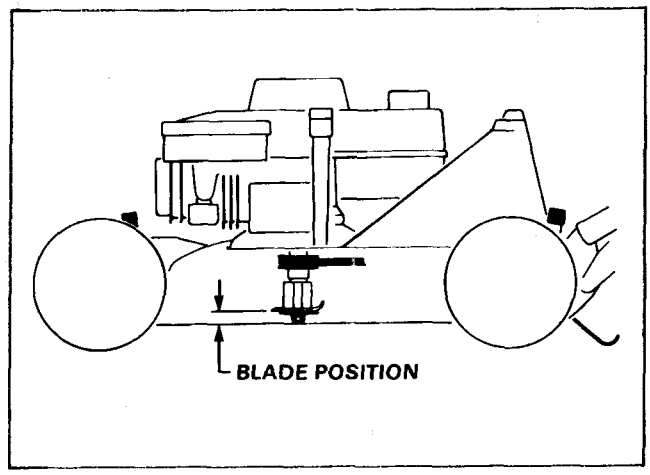

Figure 66

If the blade is too low at any point within the housing, the engine can be shimmed to bring it within the specification. Shim the engine using shim washers between the engine and the deck as shown in Figure 67. Always use Loctite® on engine fasteners being re-installed. Recheck blade position after engine mounting screws are tightened to the proper torque.

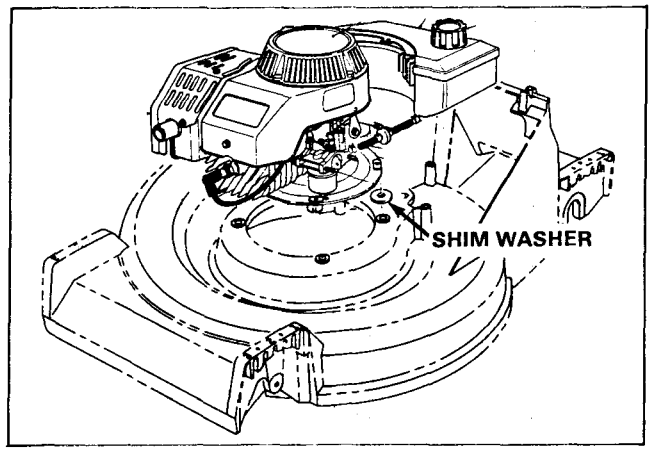

Figure 67

CAUTION! Do not shim the engine more than 1.5 mm (.060"). If the dimension is still out of specification after shimming, deck replacement may be required.

Cutting Deck - Adjustments (cont'd)

If the height of the blade is too high within the housing, the engine mounting pads on the cutting deck can be lowered slightly. Using a caliper, measure the original height of the mounting pad. Using a mill or file, remove an amount of material equivalent to 20% of the movement required at the blade tip. Check the mounting pad height occasionally to make certain you are not removing too much material. Make sure the mounting pad is flat when complete. Always use Loctite® on engine fasteners when re-installing. Recheck blade position after engine mounting screws are tightened. See Figure 68.

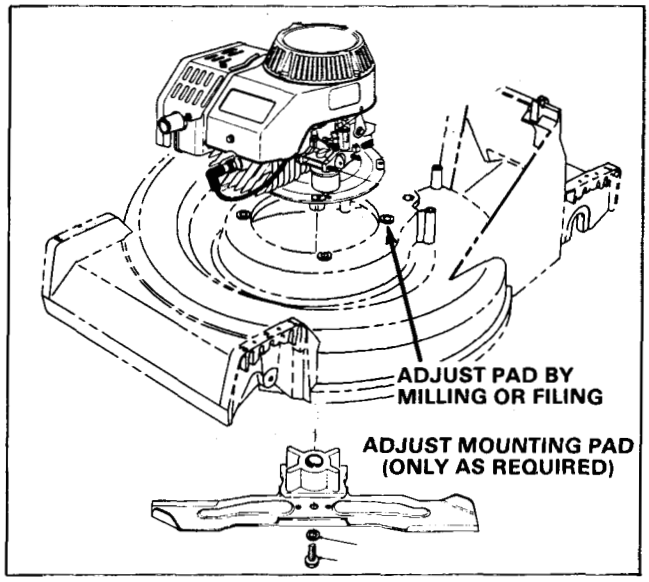

Figure 68

CAUTION! Do not adjust the pads more than 1.5 mm (.060"). If the dimension is still out of specification after adjusting the pads, deck replacement may be necessary.

Blade Tip to Housing Clearance is the distance between the end of the blade and the side of the deck (and the discharge ramp). See Figure 69. If this distance is too close, the blade tip may contact the side of the deck. If the clearance is too great, clumps or streaks of grass clippings may result. It is also possible that the bag will not fill completely since the deck will lose some of its vacuum around the circumference of the deck.

The specification for blade to tip housing clearance is given below.

Blade Tip Clearance
4.3 ± 2 mm (.170 ± .080")

If the clearance is uneven around the circumference of the deck, loosen the engine bolts, center the engine, then retighten the bolts. Recheck to be sure that the blade to tip clearance is now within the specification.

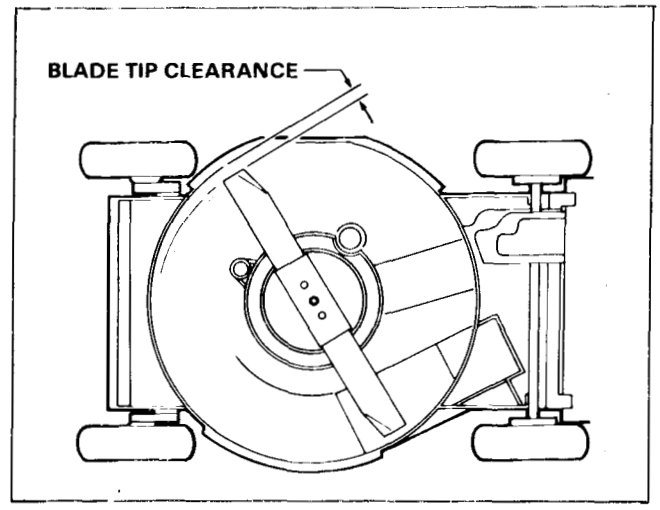

Figure 69

If after centering the engine the clearance is still not consistent around the cicumference, the deck may be warped due to manufacture, "squeeze" type forklifts, or operator abuse. Check with the Toro Consumer Service Department at 612-887-8256 if blade tip to housing clearance is still less than .090"

NOTE: The distance from the blade to the discharge ramp can have a significant effect on the quality of cut. For best performance, adjust the ramp as close as possible to the blade tip but not closer then 2.3 mm (.090").

Cutting Deck - Repair

If a foreign object is picked up by the blade, the deck may be damaged. Small cracks may be repaired by welding. If cracks are large, or if pieces are missing, the deck should be replaced.

CAUTION! Because the deck is aluminum, it is imperative that only a welder experienced in aluminum welding be used. If not, damage to the deck or compromised structural integrity may result.

A #380 aluminum welding rod used in conjuction with an inert gas type welder is recommended.

SECTION 9 GRASS BAG AND DISCHARGE DOOR

GRASS BAG

Grass Bag - Construction

The bag used on Toro Landscaper units consists of two pieces, the bag frame and the bag. See Figure 70.

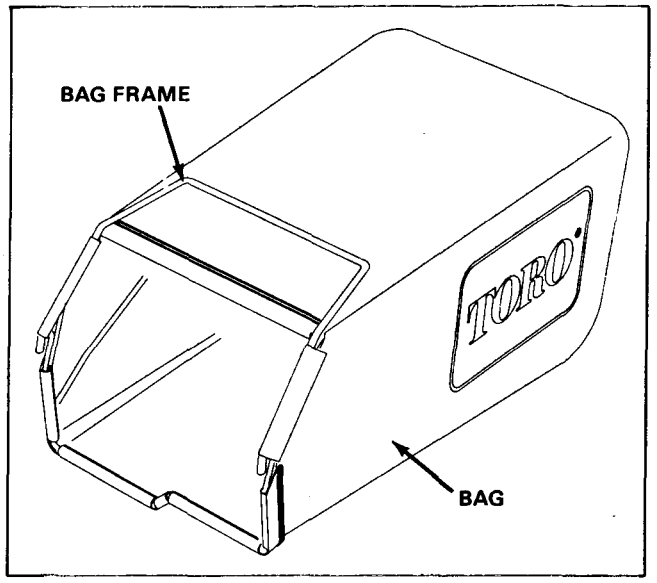

Figure 70

The bag frame is one piece. It is important that the bag frame fits properly in the area of the deck to prevent objects from flying out. If deformed, replacement is recommended. However, if broken, welding is an acceptable fix provided it does not compromise the integrity of the fit between the bag and the bag door.

The bag material is polyester with an open type weave that allows it to "breathe". Washing the bag periodically is recommended to help maintain good airflow through the bag. The left side and back of the bag (where most objects are thrown) are doubled material. The bag is fastened to the bag frame by means of plastic molding that is sewn to the bag. These plastic pieces are not available separately.

CAUTION: The bags that Toro uses meet stringent requirements by ANSI, the American National Standards Institute. To insure quality and safety, do not use substitutes.

Grass Bag - Disassembly

1. Remove the bag by prying the plastic molding off the frame.
2. Carefully inspect the bag inside and out to insure its integrity.

Grass Bag - Assembly

1. Slip the bag frame into the bag. Make sure that the Toro logos are up and that the plastic molding aligns properly with the front of the frame. Make sure that the handle is on the outside of the bag.
2. Gradually work the molding over the bag frame until it is fully seated.
3. Place the bag assembly onto the mower and check for leaks around the bag front. Correct as necessary.

DISCHARGE DOOR

Discharge Door - Operation

See Figure 71.

Figure 71

CAUTION! The bag door is an important component as it helps protect the operator from thrown objects. Always make sure that the door is closed or the chute is installed before mowing. Never operate the mower if the door is damaged or malfunctioning.

CAUTION! *Never* open the door while the engine is running.

The bag door has a number of purposes. When used in the mulching mode, it acts as a sheild to help protect the operator from flying debris. In the bagging mode, it serves as the upper top half of the bag and seals off the bag. In the side discharge mode, its spring action retains the side discharge chute in place.

The door pivots on hinge pins which support plastic bushings for long life. It is spring loaded in the closed position to enhance operator safety and the door is

Discharge Door - Operation (cont'd)

sealed along the sides and bottom by foam adhesive "weather stripping". It is important that this "weather stripping" be intact because otherwise dust and fine particles will exit the bag area during mowing. Along the hinge line is a special plastic seal which conforms to the shape of the top of the door. This seal is also important in preventing the escape of fine particles.

The bag door is also the location of a safety decal which tells the operator not to mow with the door open unless the bag or side discharge chute is in place. If installing a new bag door, make sure that the decal is in its proper location.

Discharge Door - Disassembly

1. Remove the spark plug lead to prevent accidental starting.
2. Drain the gas from the unit.
3. Tip the mower on its right side and detension the spring using a piece of thin rope or insulated electrical wire. See Figure 72.

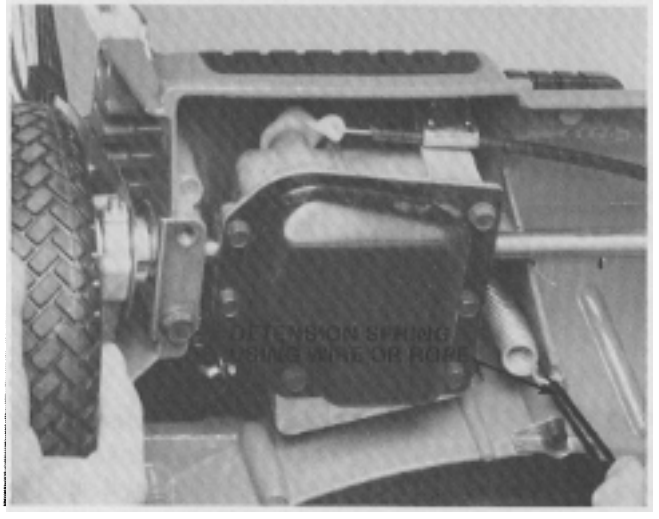

Figure 72

4. Remove the rearmost recoil fastener to prepare for tank removal.
5. Remove the two flanged head self-tapping screws securing the fuel tank bracket and screen panel to the housing. Remove the fuel tank and screen panel.
6. Remove the plastic transmission cover.
7. Slip the spring from the door cable and pull the door cable out through the top of the door.
8. Remove the 2 socket head capscrews securing the hinge clamps to the deck and remove the hinge clamps.
9. Remove the door assembly complete with hinge pins and bushings and also the plastic door seal.
10. Pull the hinge pins and plastic bushings from the door.
11. If necessary, remove the door handle and door brace from the door by removing the two flanged head screws.
12. Inspect all parts for damage and/or wear and replace as necessary.

Discharge Door - Assembly

See Figure 73.

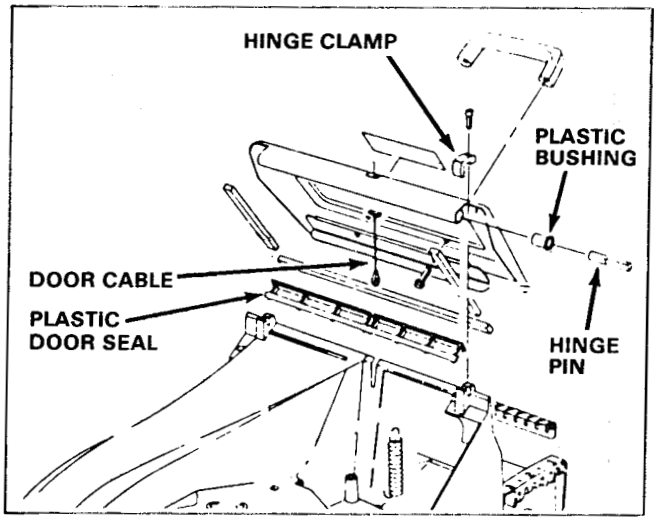

Figure 73

1. If necessary, install new seals along the side and bottom of the bag door. See Figure 74.

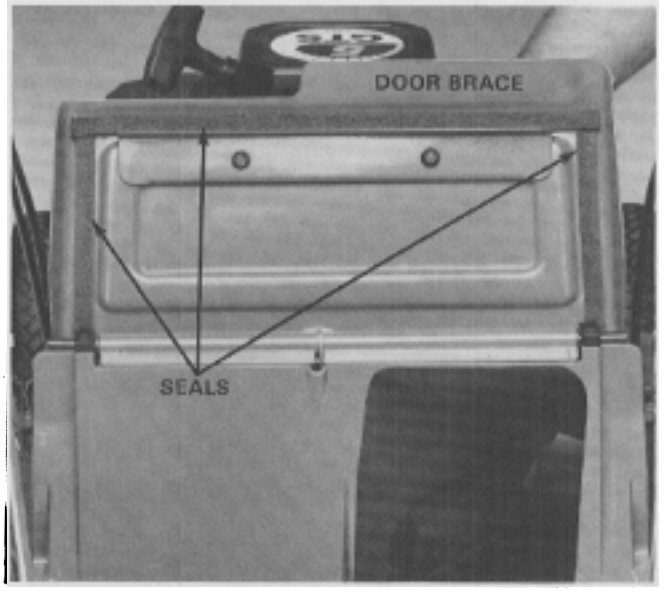

Figure 74

2. Place the door brace into position, flanged side down or away from the hinge, and secure to the handle using the two flanged head screws as shown in Figure 131.

3. Slide a plastic bushing, flanged end last, into the hinge area on the door.

4. Insert a hinge pin into each hinge bushing, flat side out.

5. Place the plastic door seal into position on the deck making sure that the groove for the door cable faces the back of the door.

6. Place the door assembly into position on top of the door seal and the housing. Secure with the hinge clamps and socket head capscrews, one set per side. Check to make sure that the door operates freely.

7. Slip the door cable through the hole in the top of the door and slip the spring on, making sure that the J hook on the bottom faces the right side of the mower.

8. Tip the mower on its side and pull the bottom of the spring into position using a thin rope or insulated electrical wire. See Figure 72.

9. Check for proper operation of the spring by watching from the bottom of the unit while opening and closing the door.

10. Install the black plastic plate cover.

    NOTE: It may be necessary to rotate the transmission back slightly to provide clearance. Make sure that the belt slips into the grooves on the plate cover.

11. Fasten the screen panel and fuel tank to the housing using the two flanged head self-tapping screws. Make sure that the top edge of the screen panel fits underneath the lip at the top of the housing.

12. Install the recoil housing fastener, being sure to trap the top fuel tank bracket between the recoil and the shroud.

13. Check to insure all fuel line and clamps are secure and free of leaks.

SECTION 10 SIDE DISCHARGE CHUTE (Optional)

Side Discharge Chute - Operation

The side discharge chute when attached, takes clippings, propelled rearward by the blade, and redirects them off to the left side of the mower. It allows the operator to mow without bagging grass.

While the Landscaper mower will do a very good job at mulching in light cutting conditions, the side discharge chute is recommended for heavier cutting conditions. It disperses the clippings over a 3/4 to 1 meter (2-3 foot) area on the left side of the mower. Best results are obtained when the mower is operated at full throttle.

Construction of the side discharge chute is simple. The chute itself is of molded plastic. Affixed to it is a bracket that allows it to be clamped at each end of the door hinge, the same place that the bag attaches.

Side Discharge Chute - Disassembly

1. Remove the machine screws and nylon locknuts securing the chute hanger bracket and the stress plate to the chute. Remove the hanger bracket and the stress plate.

2. Repair or replace any damaged parts.

Side Discharge Chute - Assembly

1. Place the chute hanger bracket and stress plate into position as shown in Figure 75. Secure with two washer head capscrews and nylon locknuts. See Figure 75.

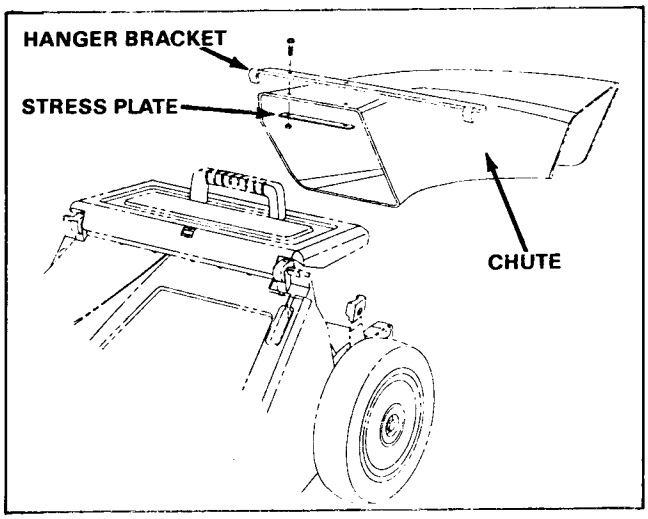

Figure 75

2. Place the side discharge chute onto the mower and check for correct fit around the perimeter of the chute. Loosen the machine screws and reposition the hanger bracket if necessary to ease removal and installation of the chute.

SECTION 11 - DETHATCHER (Optional)

Dethatcher - Safety Information

1. Operate your dethatcher only when there is adequate light.
2. Remove all debris such as wire, bottles, cans, sticks, and stones from the area to be dethatched.
3. Always remove the spark plug wire and disconnect the battery on electric start mowers before servicing your mower dethatcher.
4. Before each use, check to make sure all fasteners are tight, tines are functioning properly, and safety wires are in place.
5. Reduce speed and cautiously dethatch any area (rough ground) of the turf that may have hidden hazards.
6. Do not leave your mower running while unattended - stop the engine and remove the ignition key if so equipped.
7. Make a visual check of the dethatcher stop bracket - it must be in the proper location and tight!
8. Store dethatcher on the floor to prevent any injuries from occurring.

Dethatcher - Operation

When dethatching, an overlap or cross-hatch pattern is recommended. While all lawns are different, the ideal amount of thatch left on the lawn would be about 3 mm (1/8") thick. Very dense lawns generally require more frequent dethatching than do less dense lawns.

Grass should be less than 7.5 cm (3") tall for proper tine action. The tines should deflect back and then independently "flip" the thatch up and forward. If the tines tend to drag, raise the dethatcher a little and recheck the "flipping" action. Adjust the tine tray up or down as necessary for proper action.

Dethatcher - Introduction

NOTE: References to RIGHT SIDE and LEFT SIDE are made while standing in the operator's position - behind the dethatcher (or the mower).

CAUTION! Carefully read and follow safety information (Cautions) in this manual and the Operator's Manual which came with your mower to prevent injury or damage.

When correctly assembled and adjusted, and with proper care, your dethatcher will provide years of trouble-free lawn maintenance.

Arrange each kind of hardware into a group to ease assembly.

NOTE: Locknuts must be used where specified. They have a slightly oblong hole or a fiber insert and are domed on one end.

Tools required for assembly:

- 1-screwdriver (flat)
- 1-pair of pliers (slip-joint recommended)
- 1-hammer
- 1-7/16" wrench
- 1-1/2" socket
- 1-9/16" socket
- 1-3/4" socket
- 1-socket wrench handle
- 1-medium side adjustable wrench (optional)

Dethatcher - Assembly

1. Install the six tines to the tine tray by laying the tray on a flat surface with the flanges facing up. See Figure 76.

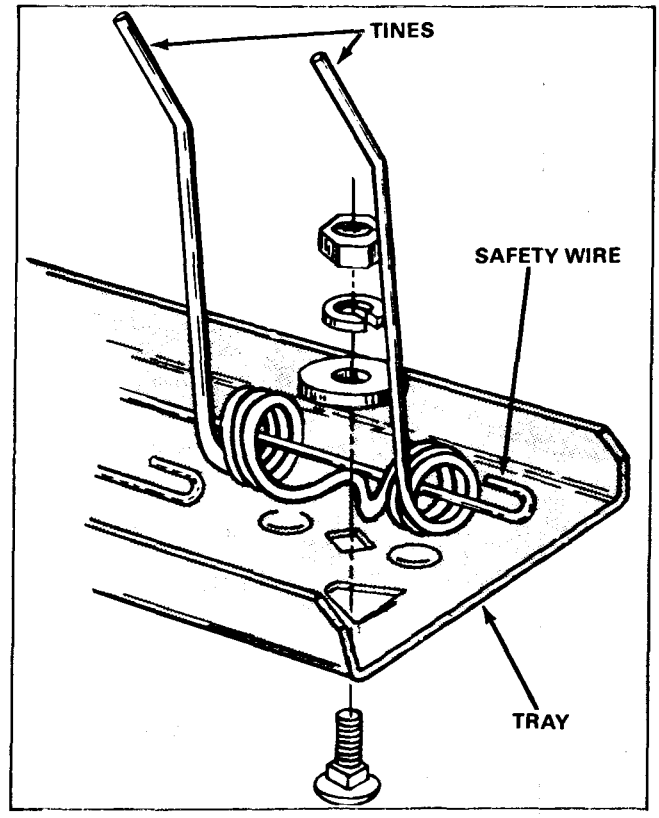

Figure 76

2. Nest each tine loop between the embossed "dimples" with bent tips facing forward - toward tab cutouts "A" and secure with one 5/16" X 3/4" carriage bolt, a special washer, one 5/16" lock washer and a 5/16" hex nut . Tighten securely.

3. Install both safety wires through the tine coils and bend the ends over to secure (use pliers).

   CAUTION! Failure to install safety wires can result in personal injury if a tine should disengage from the tine tray.

4. See Figure 77 to identify the type of front pivot arms which mount the wheels to your mower.

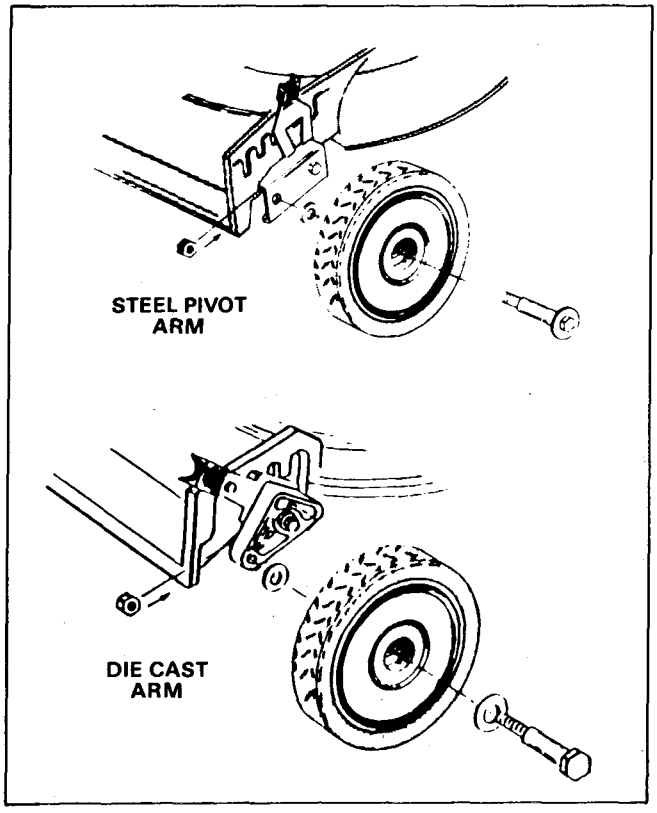

Figure 77

Once you've identified the pivot arm used on your mower, refer to the following table to determine which stop bracket to use.

Pivot Arm	Stop Bracket
Steel	R1417-01
Die Cast	B4055-01

5. Turn the tine tray right side up and install the frame bar, right hand mount bar, and left hand mount bar to the inside of tabs "A" with offsets toward the center of the tray. See Figures 78 and 79.

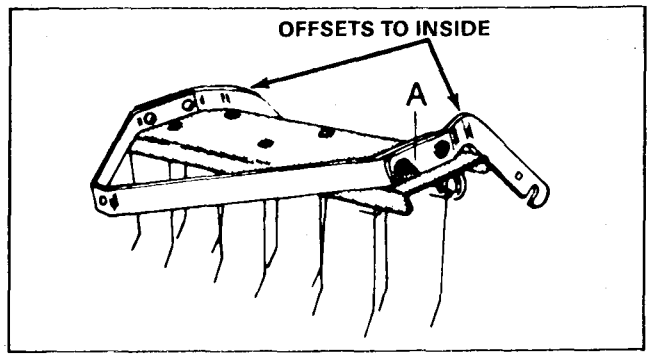

Figure 78

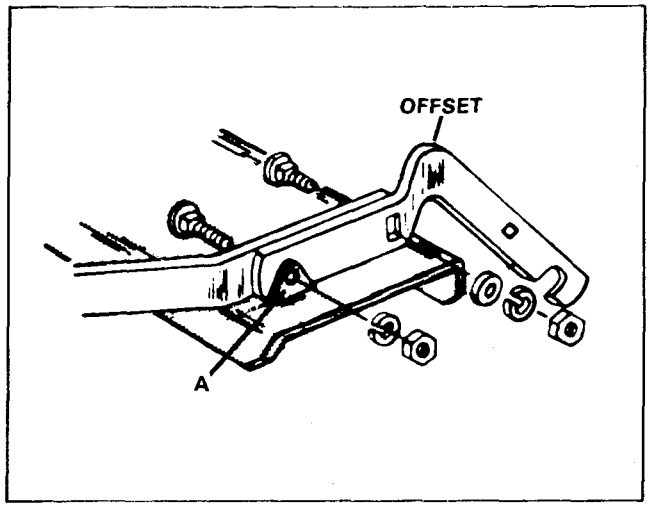

Figure 79

6. Insert one 5/16" X 1" carriage bolt, threads FACING OUTWARD, through the FRONT square hole in the left side of the frame bar, the FRONT square hole in the left-hand bar and through the round hole in the left-hand tab "A" on the tine tray. Secure with one 5/16" lock washer and a 5/16" hex nut.

7. Follow the same procedure for the right side.

8. Install a 5/16" X 1" carriage bolt, threads FACING OUTWARD, through the rear square hole in the right-hand and the left-hand side of the frame bar and secure with two 5/16" flat washers, 5/16" lock washers and 5/16" hex nuts. Tighten these fasteners securely.

9. See Figure 80. Assemble the wheel mount bracket to the frame bar and one 5/16" X 3/4" carriage bolt inserted through the square hole and secured with one 5/16" lock washer, and one 5/16" hex nut - on the inside of the frame bar. Tighten securely.

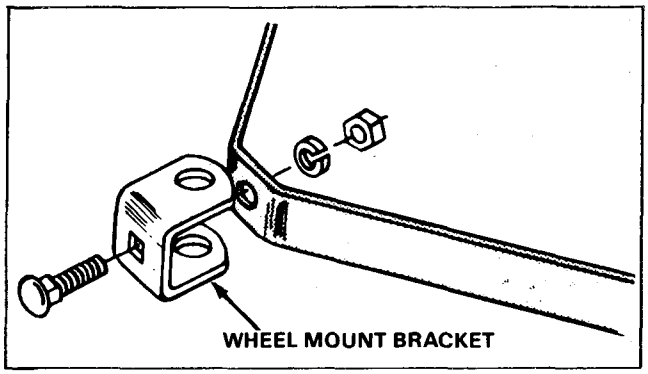

Figure 80

10. See Figure 81. Place one latch against the outside of both mount bars with the tab up (and facing outward) and the long slot located in front of the square hole near the mounting slot. Secure each latch with one 1/4" X 3/4" carriage bolt - threads facing inward, a special washer, O-ring, special washer and 1/4" hex locknut.

CAUTION! Tighten both locknuts until there is SOME friction when sliding the latches against the mount bars. Do not over-tighten!

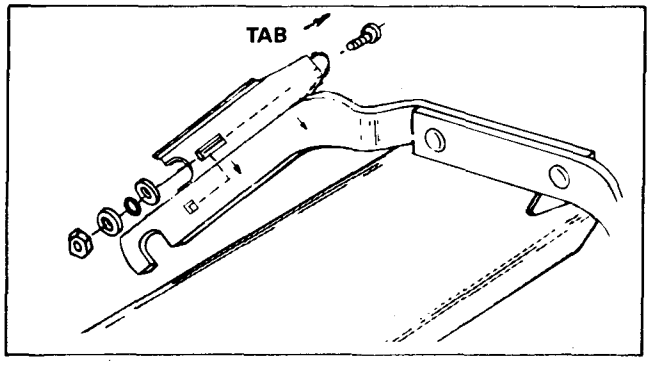

Figure 81

11. See Figure 82. Assemble the gauge wheel and axle to the wheel mount bracket as follows: slide one 1/2" ID flat washer on to the short end of axle, followed by the gauge wheel, with hub facing out, and another 1/2" flat washer, and then "tap" the push nut on the shaft with a hammer.

12. Next, insert the two 1/2" ID nylon bearings in the round holes (from inside) in wheel mount bracket with the flange surface on each bearing facing inward. Position the axle bushing between the flange surfaces of bearings and slide the long end of wheel axle up through the bracket, bearings, and the bushing, then secure with 5/16" X 1/4" set screw.

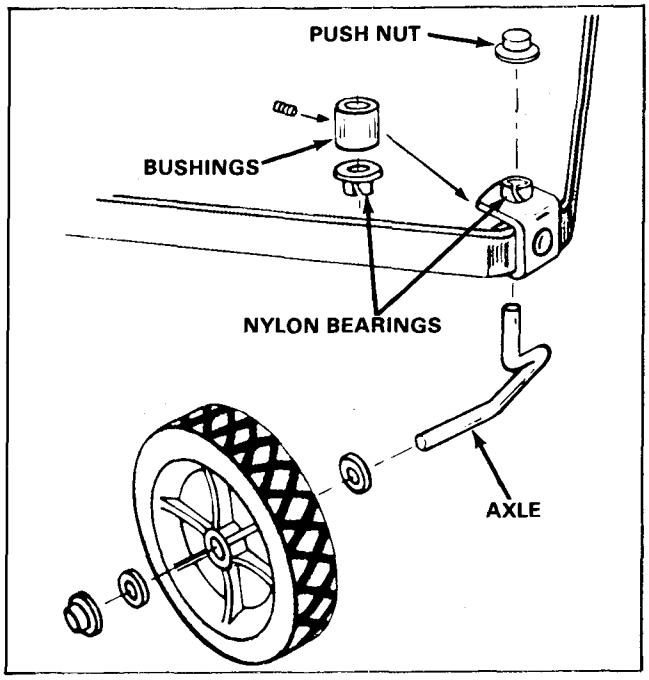

Figure 82

13. Finally, "tap" the remaining push nut down on the end of the axle with a hammer.

14. See Figure 83. Remove the large shoulder bolt, thin washer and locknut from the left FRONT wheel of mower. (They will not be reused as long as you use the dethatcher. Save these parts for future use.)

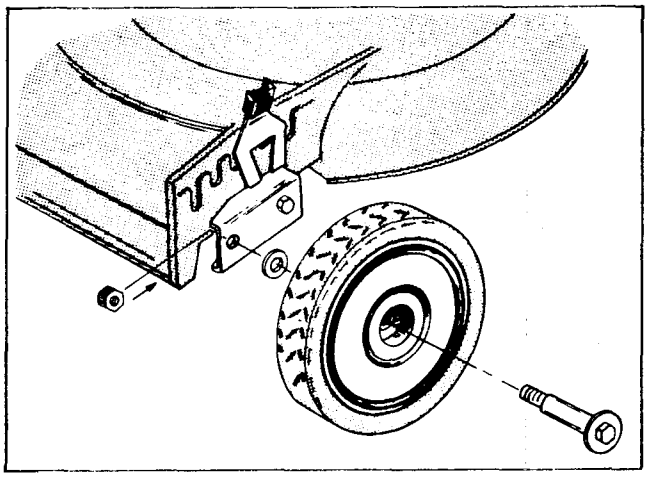

Figure 83

15. Repeat this procedure on the right side. Next, determine which type front pivot arms (for wheels) your mower is equipped with and proceed as follows. (Refer to Figure 136.)

16. Reinstall the LEFT mower wheel as follows (see Figures 84 and 85).

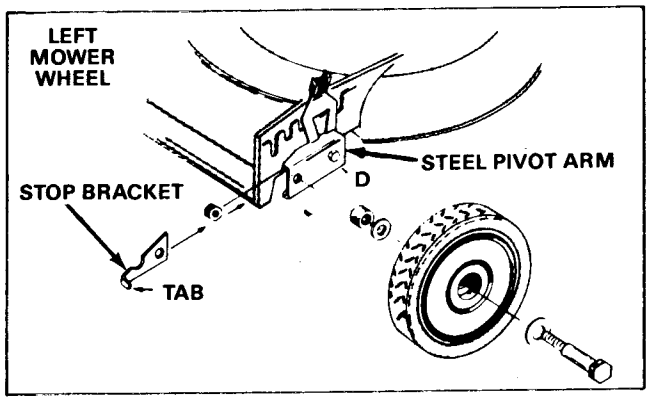

Figure 84

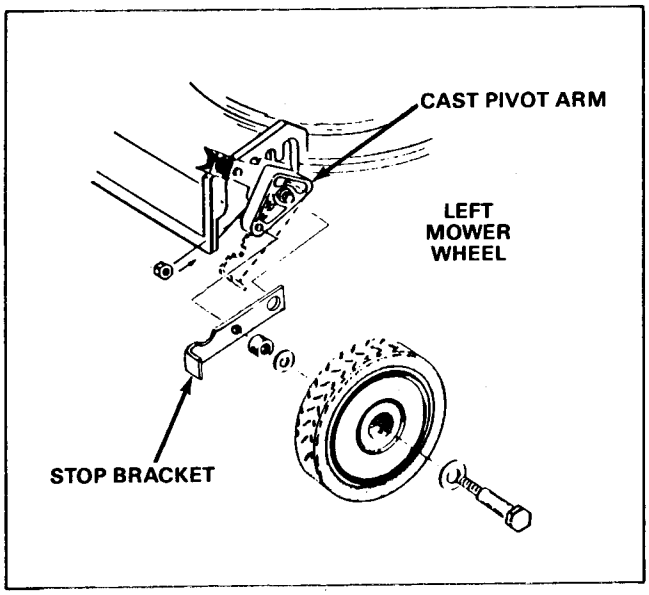

Figure 85

First, slip one 1/2" flat washer on one new shoulder bolt and insert the bolt through the hole in mower wheel (from "outside" surface of wheel). Next, slip on a 3/8" flat washer, frame spacer, and stop bracket.

17. Reinstall the right side wheel with new shoulder bolt, 1/2" flat washer, 3/8" flat washer, frame spacer, and 3/8" locknut but not using a stop bracket.

    Now, insert this completed assembly through the hole in the wheel mount casting. Secure with a new 3/8" hex locknut supplied and tighten securely.

18. See Figures 86 and 87. Reinstall the right side wheel with new shoulder bolt, 1/2" flat washer, 3/8" flat washer, and frame spacer, and locknut, but not using a stop bracket.

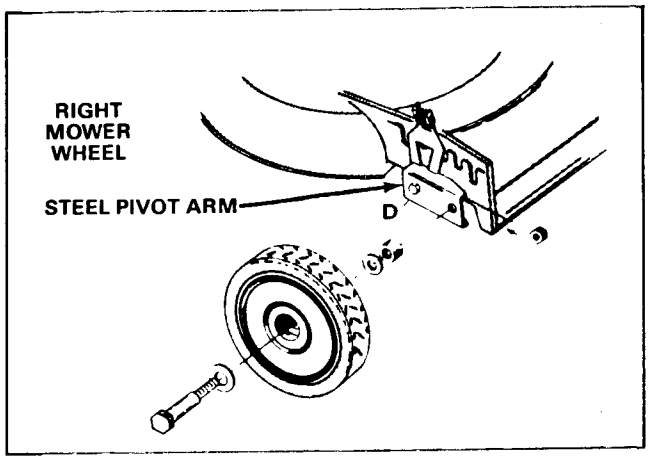

Figure 86

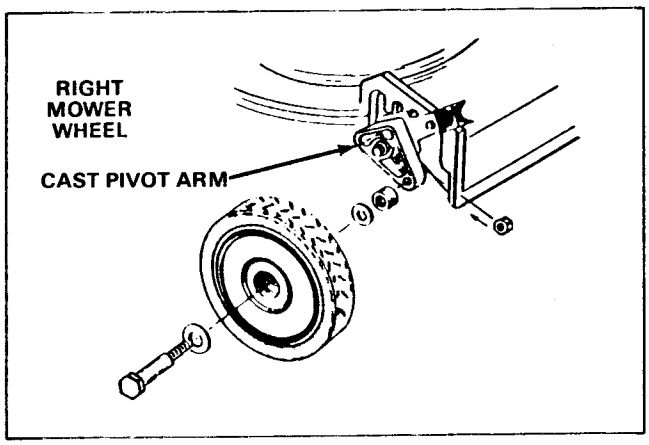

Figure 87

Dethatcher - Disassembly

Disassembly is simply the reverse of the above steps.

Dethatcher - Installation

See Figure 88. Install your dethatcher by sliding both latches up to clear the mounting slots on the mount bars. Position the front wheel adjustments on your mower to the lowest cutting height and place the mounting slots over the frame spacers. Then slide the latches downward locking the thatcher to the mower. Check all fasteners for tightness.

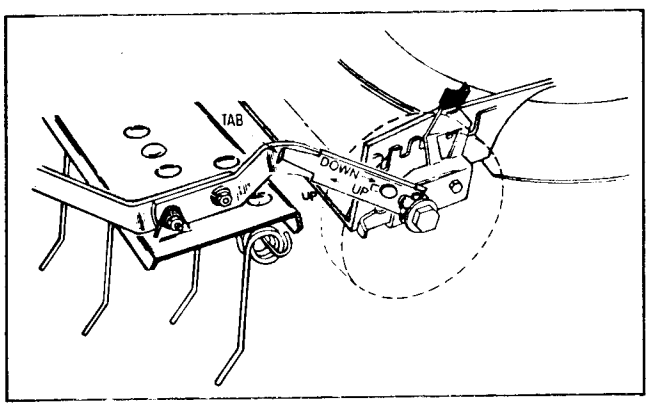

Figure 88

Dethatcher - Adjustment

See Figures 89 and 90. With the dethatcher mounted to your mower, position both units over a smooth flat surface such as a sidewalk, driveway or garage floor. Adjust the mower height (check your Operator's Manual for correct procedures) to the desired height-of-cut. With the gauge wheel directly under the wheel mount brackets, loosen the set screw in axle bushing and adjust the frame bar until the tine tips are approximately 1/2" above the flat surface in the "free" position, and touch the surface when deflected rearward. Tighten the set screw .

NOTE: The dethatcher and mower heights can be adjusted independently of each other.

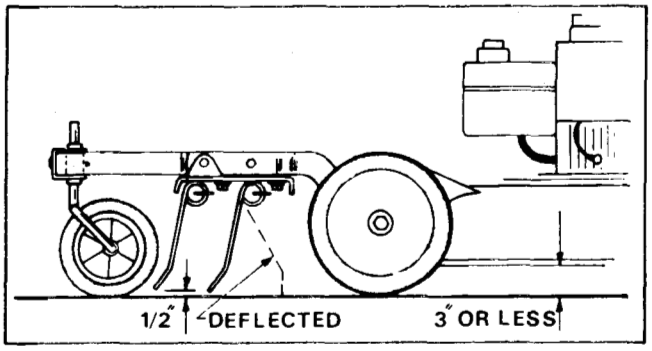

Figure 89

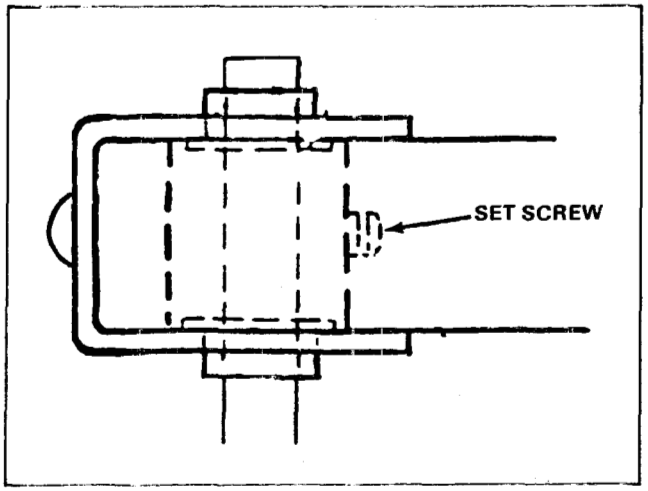

Figure 90

Dethatcher - Maintenance

Before each use, check all fasteners for tightness. Replace any missing fasteners before using.

Replace any worn or broken parts (including tines). Lubricate all pivot points and keep the dethatcher stored in a dry location with the tines resting on the ground. Although the dethatcher is generally a maintenance free steel product, it can rust. To eliminate rust on the tray, mount bars, or frame bar, sand the area lightly and apply a coat of enamel paint.