

**TROY-BILT®**

## Owner/Operator Manual

### PTO Chipper/Shredder

- Safety
- Assembly
- Operation
- Maintenance

Model

47026



Thank you for purchasing the unit. It was carefully designed and manufactured to provide excellent performance if properly operated and maintained.

Read this manual. This is a safety, operation and general maintenance manual which does not attempt to cover major repairs. This manual is considered a permanent part of the unit and it must stay with the unit if it is resold. A replacement manual can be obtained from the factory. To order, call or write to the address on the following page.

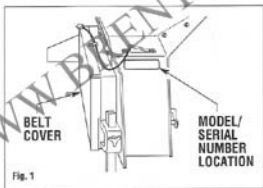
All information in this manual is based on the latest product information available at the time of printing. Review this manual frequently to familiarize yourself with the unit, its features and operation.

The unit has met the rigid safety standards of the Outdoor Power Equipment Institute and an independent testing laboratory.



The warranty statement is included on the back cover of this manual. Read it carefully. Also, please complete and return the owner registration card included with this manual.

If you have any problems or questions concerning the unit, contact your local authorized dealer or the factory (our customer service telephone numbers and mailing addresses are listed on the next page).



#### Owner Registration Card

Please fill out and mail the enclosed postpaid owner registration card. This card will register you as the owner of the unit.

#### Model/Serial Numbers

This model/serial number is located on the model/serial number decal (Fig. 1). For quick reference, record these numbers in the spaces below.

Date of Purchase: \_\_\_\_\_

Model/Serial Number: \_\_\_\_\_

#### SPARK ARRESTER WARNING TO RESIDENTS OF CALIFORNIA AND OTHER STATES

Under California law, and under the laws of several other states, you are not permitted to operate an internal combustion engine using hydrocarbon fuels on any forest, brush, hay, grain, or grass covered land; or land covered by any flammable agricultural crop, without an engine spark arrester in continuous effective working order.

The engine on the unit is an internal combustion engine which burns gasoline, a hydrocarbon fuel, and must be equipped with a spark arrester muffler in continuous effective working order. The spark arrester must be attached to the engine exhaust system in such a manner that flames or heat from the exhaust system will not ignite flammable material. Failure of the owner/operator of the unit to comply with this regulation is a misdemeanor under California law (and other states) and may also be a violation of state and/or federal regulations, laws, ordinances or codes. Contact your local fire marshal or forest service for specific information about which regulations apply in your area. Contact your local engine dealer for information about obtaining a spark arrester.

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### Service and Repair

For factory authorized service, contact your authorized dealer. Do not return parts directly to the factory. When ordering parts, provide your dealer with the model/serial numbers of the unit and a description of the parts required.

### Replacement Parts

Factory specified replacement parts are available from your authorized dealer or directly from the factory. For parts ordering information, refer to the parts catalog.

### Left and Right Sides

Left and right sides of the unit are determined from the operator's position, facing the hopper inlet.

### Customer Service

If you have questions or problems with the unit, contact your local dealer – or call or write to the factory at the addresses listed below. When calling or writing the factory, provide the model/serial number of the unit.

#### IN THE U.S.:

**Garden Way Incorporated**  
102nd St. and 9th Ave.  
Troy, New York 12180  
For Service: (800) 433-5990  
For Parts: (800) 648-6776

#### IN CANADA:

**Garden Way Incorporated**  
320 Van Sickle Rd., Unit 12  
Saint Catharines, Ontario L2R 6P7  
For Technical Service or Parts:  
(800) 225-3585

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## Section

# 1 Safety

### Important!

#### Safe Operating Practices for the Unit



This is a safety alert symbol. It is used in this manual and on decals on the unit to alert you to potential hazards. Whenever you see this symbol, read and obey the safety message that follows it. Failure to obey the safety message could result in personal injury or property damage.

#### TRAINING



1. Read this manual, your PTO Horse Tiller Owner/Operator Manual, and any other literature which came with the machine carefully before operating this equipment. Be thoroughly familiar with the controls and the proper use of the equipment.

2. Never allow children or untrained adults to operate this equipment.

3. Keep the area of operation clear of all persons, particularly small children, and pets. Keep bystanders at least 25 feet away from the area of operation.



4. Familiarize yourself with all of the safety and operating decals on this equipment.

5. Do not run the engine in an enclosed area. Engine exhaust contains carbon monoxide gas, a deadly poison that is colorless, odorless, and tasteless. Do not operate this equipment near buildings, windows, or air conditioners.

6. Do not put hands, feet, face, or any other part of your body or clothing inside the chipper chute, shredder hopper, or discharge area. Cutting blades begin to rotate when the Power Unit engine starts and the Wheels/Tines/PTO Drive Lever is put into FORWARD. Rotating cutting blades slow down gradually after the Power Unit engine is shut off. Serious personal injury will occur if contact with blades is made while cutting blades are rotating and when winding down after the Power Unit engine is shut off.

7. Before inspecting or servicing any part of the equipment, shut off the Power Unit engine, disconnect the spark plug wire, move it away from the spark plug, and make sure that all moving parts have come to a complete stop. Be aware that rotating blades slow down gradually after the Power Unit engine is shut off.

8. Do not operate this equipment if you are under the influence of alcohol, medication, or when tired or ill.

#### PREPARATION



1. Know where the Power Unit engine shut-off control is and know how to use it (refer to Section 3 in this Manual).

2. Always wear approved safety glasses when using the PTO Chipper/ Shredder. The operation of any powered machine can result in foreign objects being thrown by high speed rotating parts.

3. Always wear appropriate work gloves, sturdy footwear, and hearing protection while using your PTO Chipper/Shredder.



4. Do not wear loose-fitting clothing, jewelry, scarves, ties, etc. that can get caught in moving parts.

5. All operators shall use extra care when handling gasoline and other fuels. Gasoline and its vapors are highly flammable and explosive. To help prevent a fire or explosion:

- Use an approved fuel container.
- Never remove the gas cap or add fuel while the engine is running. Allow the engine to cool before refueling.
- Keep matches, smoking materials, open flames, and sparks away from the fuel tank and fuel container.
- Fill the fuel tank outdoors and with extreme care.
- Replace caps on the fuel tank and fuel container and clean up spilled fuel before starting the engine. Gas cap shall never be removed or fuel added while engine is running.
- Leave 1/2-inch air space at the top of the fuel tank to allow for expansion of fuel.

- g. The Power Unit shall not be stored inside where there is an open flame or spark, or where ignition sources are present such as hot water and space heaters, furnaces, clothes dryers, stoves, electric motors, etc.

6. Before starting the Power Unit engine, make a visual check to see that all screws, nuts, bolts, and other fasteners are properly secured. Replace any damaged or unreadable warning and operating decals.

7. The discharge screen (or the optional bar grate), chipper chute, and all safety covers must be correctly and securely installed. Disconnect the spark plug wire and move it away from the spark plug before performing this check. This check is recommended before each use.



8. Before starting the Power Unit engine, be sure that the chipper chute, shredder hopper, and internal cutting chamber are empty. The engine must be off, all parts completely stopped, and the spark plug wire disconnected and moved away from the spark plug before you check or remove any material.

9. Make sure the PTO Chipper/Shredder is level and stable before starting the Power Unit engine.

10. Before operating the chipper/shredder, shift the Wheels/Tines/PTO Drive Lever into NEUTRAL. Put the Wheel Speed Lever into FREE WHEEL. Then check all wheels to prevent rolling. Do not allow the chocks to extend past the wheels where they would result in a "tripping" hazard.

## OPERATION

1. To avoid personal injury, keep hands, feet, face, and clothing out of shredder hopper inlet, chipper chute inlet, and discharge area when machine is running.

Rotating cutting blades inside discharge opening will cause serious personal injury.



2. Before clearing jams, clogs, or removing discharged materials, STOP the engine, disconnect the spark plug wire, prevent it from touching the spark plug, and wait for all moving parts to come to a complete stop. Use only a long stick to clear jams or clogs. Use only a long-handled shovel to clear away any material from beneath the machine. Do not use hands or feet to clear material from the discharge area, or discharge opening.

3. Do not run the engine in an enclosed area. Engine exhaust contains carbon monoxide gas, a deadly poison that is colorless, odorless, and tasteless. Do not operate this equipment near buildings, windows, or air conditioners.

4. Do not operate the PTO Chipper/Shredder on a paved, hard, or gravel surface. Discharged material may bounce from a hard surface and cause personal injury. Always operate the PTO Chipper/Shredder on a level, earthen surface.

5. Do not stand in front of the discharge area when operating the PTO Chipper/Shredder. Material exits at high speed from the discharge screen and discharge opening and can cause serious personal injury.

6. Do not tip the PTO Chipper/Shredder while the unit is running.

7. When feeding appropriate material into the chipper chute or shredder hopper, be extremely careful that pieces of metal, rocks, bottles, nails, cans, or other foreign objects are not included. Use organic materials only!

8. Do not allow Power Unit engine surfaces, especially around the cooling fins and muffler, to become clogged with leaves, grass, oil, grease, or other

combustible material. Keep these areas clean and free of debris to avoid a potential fire hazard.

9. Do not allow chipped or shredded material to build up in, or clog the discharge area — clogging prevents proper discharge of materials and can result in kickback of material up through the shredder hopper or chipper chute. To remove material from the discharge area, shut off the engine, allow all moving parts to come to a complete stop, disconnect the spark plug wire and keep it from touching the spark plug. Use only a long stick to clear jams or clogs. Use only a long-handled shovel to clear away any material from beneath the machine.

**ROTATING BLADES CUT 1/4-INCH FROM THE DISCHARGE SCREEN (OR BAR GRATE). KEEP AWAY! NEVER PUT YOUR HANDS OR FEET IN THE DISCHARGE AREA OR THE DISCHARGE OPENING WHILE THE UNIT IS RUNNING.**

10. If the equipment strikes any foreign object or starts making an unusual noise or vibration, immediately shut off the engine, disconnect spark plug wire from the spark plug, and wait for all moving parts to come to a complete stop. Then take the following steps: a.) Inspect for damage; b.) Replace or repair any damaged parts; c.) Check for and tighten any loose parts.

11. Keep all safety shields, guards, screens, and deflectors securely in place, properly secured, and in good condition. Do not operate the PTO Chipper/Shredder unless the Chipper Chute is securely bolted in place and a Discharge Screen (or optional Bar Grate) is correctly installed in the PTO Chipper/Shredder.

12. Do not overreach when feeding material into the Shredder Hopper or Chipper Chute. Always keep arms parallel to the ground while feeding material into Shredder Hopper. Use the plastic leaf tamper (provided with machine) to push material down into the Shredder Hopper. When chipping,

# Safety

keep arms perpendicular (at a 90° angle) to the chipper chula. Keep proper footing and good balance at all times.

13. Do not leave the equipment unattended with the engine running. Shut off the engine and disconnect the spark plug wire from the spark plug before leaving the equipment.



14. Do not operate the machine on an incline where the Power Unit engine is higher than the PTO Chipper/Shredder. Damage to the equipment caused by oil starvation (in Power Unit transmission) could result.

15. Operate the equipment only in daylight or in good artificial light.

16. Keep the swing-bolts which connect the Power Unit to the PTO Chipper/Shredder very tight at all times. Check the bolts after every 2-1/2 hours of operation.

17. Do not tamper with the governor settings on the engine. The governor controls the maximum safe operating speed and protects the engine and other moving parts from damage that can be caused by excessive speed. Authorized service shall be sought if a problem exists.

18. Rotating cutting blades do not stop for six seconds after the engine has been shut off using the Throttle Control Lever. The blades do not stop for 45 seconds after the PTO Chipper/Shredder is stopped by putting the Wheels/Tines/PTO Drive Lever in NEUTRAL.

You can tell when the rotating cylinder stops by watching the white line on the bearing collar. When this white line is stationary, the cylinder has stopped rotating.



## TRANSPORTATION

1. Never transport the equipment on slippery surfaces.
2. Remove loading protection and watch for traffic when operating near or when crossing roadways.
3. Always disengage the Tine/PTO Clutch Lever before transporting the equipment. With the lever disengaged, no power is delivered to the Chipper/Shredder. **Never shift into REVERSE while the Tines/PTO Clutch Lever is in ENGAGE. Serious damage to the reverse disc will result. Always install the reverse lockout before operating the unit.**
4. Reduce speed before turning the equipment, particularly on rough or uneven ground. Avoid sharp turns.
5. Avoid going up or down slopes that are too steep for safety. Reduce speed on slopes and make sure that you have secure footing. To prevent tipping or loss of control, travel up and down the face of the slope; never across the face. Do not attempt to change direction when traveling uphill or downhill.
6. Never shift the Wheel Speed Lever out of gear when heading up or down a slope. If the lever should go into FREE WHEEL, the equipment could roll out of control.
7. Never use the PTO Chipper/Shredder to transport cargo.
8. Never allow people to ride on the PTO Chipper/Shredder.

## MAINTENANCE AND STORAGE

1. When the equipment is stopped for servicing, maintenance, cleaning, inspection, changing shredder discharge screens (or the optional bar grate), or work of any other kind, make sure the spark plug wire is disconnected and moved away from the spark plug. Wait for all moving parts to come to a complete stop. Allow the engine to cool before making any inspections, adjustments, etc.
2. Maintain the equipment in clean and safe working condition.
3. Never perform any maintenance while the engine is running or when the spark plug wire is connected to the spark plug, except when specifically instructed to do so.
4. Store the PTO Chipper/Shredder where children will not have access to it. Always disconnect the spark plug wire and prevent it from touching the spark plug before storing the Chipper/Shredder.
5. Never store the equipment with fuel in the fuel tank inside a building where fumes may reach an open flame or spark, or where ignition sources are present such as hot water and space heaters, furnaces, clothes dryers, stoves, electric motors, etc.
6. Allow the engine to cool before storing in any enclosure.



7. Store gasoline in a cool, well-ventilated area, safely away from any spark or flame producing equipment. Store gasoline in an approved container, safely out of the reach of children.

8. Use only original equipment replacement parts. Parts manufactured by others could present a safety hazard even though they may fit on this equipment.

9. Refer to the TROY-BILT PTO Horse Owner/Operator Manual for additional seasonal maintenance and storage information. If you do not have an Owner/Operator Manual, please call us before operating this equipment.

## SAFETY DECALS

Make certain that all safety decals on this equipment are kept clean and in good condition. The decals are shown (at reduced sizes) below and on the next page. If you need a replacement decal, please refer to the Parts Catalog that accompanied this Manual.



A



C



F



G



B



D



E



H

Ref. Letter	Part No.	Description and Location	Qty.
A	1764862	Operating Instructions Decal — Located on forward portion of Shredder Chipper	1
B	1763130	Danger Decal — Located on front wall of mainframe, above discharge area	2
C	1769797	Fire Hazard Decal — Located on the handlebars	1
D	1763132	Danger Decal — Located on right-hand side of mainframe	2
E	1810039	Danger Decal — Located on right-hand side of mainframe, to the rear of the chute	1
F	1816037	Danger Decal — Located on the inside of the chipper chute	1
G	1816172	Warning Decal — Located on top of belt cover	1
H	1765544	Danger Decal — Located on chipper chute side	1

## Section

# 2 Assembly

### READ ME FIRST!

Please carefully follow the steps in this Section to properly assemble your new machine. These steps will not take very long and they will assure you of having assembled your machine correctly.

### WARNING

To prevent personal injury or property damage, do not attempt to start the engine until all assembly steps are complete and you have read and understand the safety and operating instructions in this Manual.

### Tools Needed:

One 7/16" Open End or Adjustable Wrench

One 3/8" Open End or Adjustable Wrench

One 1/2" Open End or Adjustable Wrench

One 3/4" Open End or Adjustable Wrench

### Subjects covered in this Section:

- Inspecting Machine After Delivery
- Operator Presence Controls
- Unpacking and Checking Contents
- Installing Wheel
- Adjusting Storage Stand
- Attaching Chipper Chute
- Attaching Handlebar
- Moving Chipper/Shredder Without Power Unit
- Checking PTO Power Unit Belt Speed
- Checking Power Unit Transmission Gear Oil Level
- Attaching Chipper/Shredder to PTO Power Unit

### INSPECTING MACHINE AFTER DELIVERY

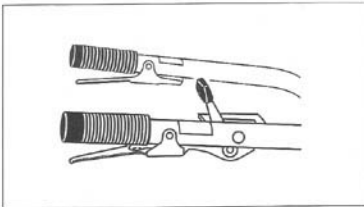
Inspect your machine immediately after delivery for shipping damage. If you find any damage, contact the carrier (trucking company) right away. Inform them of the specific damage and notify them that you want to file a claim. To protect your rights, be sure to put this in writing to the carrier within 15 days of the delivery. The carrier will let you know how to proceed with a claim. Please let us know if you need any assistance with this matter.

### OPERATOR PRESENCE CONTROLS

This PTO Chipper/Shredder is not designed for use with Power Units which were not originally equipped with Operator Presence Controls (Forward Interlock Levers with wire harness - see Figure below). Power Units produced before June 1987 may not have the necessary Operator Presence Controls. If your Power Unit does not have these controls, contact the Factory for further information before proceeding with these assembly instructions. The PTO Chipper/Shredder Warranty is valid only when the unit is operated with a Power Unit which is equipped with Operator Presence Controls.

### STEP 1: Unpacking and Checking Contents

- In addition to the PTO Chipper/Shredder Unit, the shipping carton contains the parts listed below.
- If any parts are missing or damaged, contact an authorized Dealer or call the Factory for assistance.
- Do not remove the PTO Chipper/Shredder from the shipping pallet until the wheel is installed. See Step 2 in this section.
- Assemble on a clean, level surface.





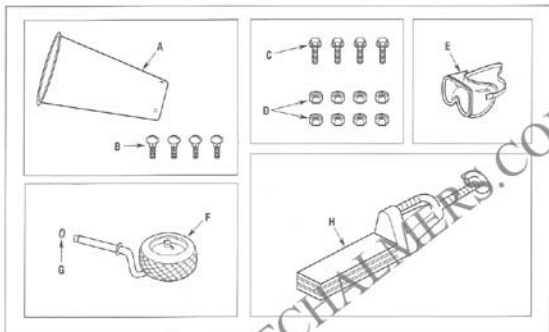


Figure 2-1: PTO Chipper/Shredder parts.

Table 1 – Carton Contents Parts List

KEY	QTY	DESCRIPTION
A	1	Chipper Chute (top section)
B	4	Bolts, Carrage, Round Hd., Sq. Neck, 1/4"-20 x 5/8" long (to attach chipper chute)
C	4	Screws, Flange Head, 1/4"-20 x 1-1/4" long (to attach handlebar)
D	8	Nuts, Toplock, 1/4"-20 (to attach chipper chute & to attach handlebar)
E	1	Safety Goggles
F	1	Wheel Assembly
G	1	Retaining Ring
H	1	Lead Tamper
--	2	Dust Caps - One for Power Unit Coupling and One for PTO Chipper/Shredder Coupling (Not illustrated)

# Assembly

## STEP 2: INSTALLING WHEEL

- Before removing the machine from the pallet, install the wheel assembly. See Figure 2-2.
- Install the retaining ring into the groove at the end of the caster. See Figure 2-2.
- Slide the caster firmly into the hole in the frame. The caster shaft slides in until the retaining ring seats into a groove inside the frame. Make certain that the caster is securely seated.

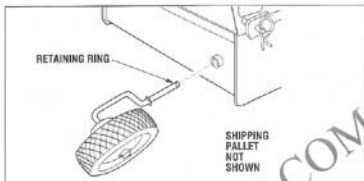


Figure 2-2: Install wheel.

## STEP 3: ADJUSTING STORAGE STAND

- Before removing the machine from the pallet, lower the storage stand by turning the adjustment knob.
- Pull out the stand until the bottom of the stand is even with the bottom of the wheel.
- Tighten the adjustment knob. See Figure 2-3. Remove the machine from the pallet.

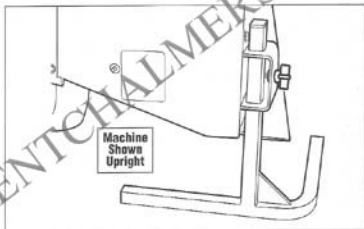


Figure 2-3: Storage stand lowered.

## STEP 4: ATTACHING CHIPPER CHUTE

- Remove the screws that secure a cardboard sleeve over the opening in the chipper chute base ("A" Figure 2-4). Discard the screws and the cardboard sleeve.

### 4. DANGER

- The chipper blade which is attached to the cylinder assembly disk (inside the chute opening) is extremely sharp. Do not touch the blade while installing the chipper chute.
- The chipper chute must be securely attached before operating the PTO Chipper/Shredder.

**IMPORTANT:** The chute must be installed so that the safety message decal can be read when the operator looks down into the chute!

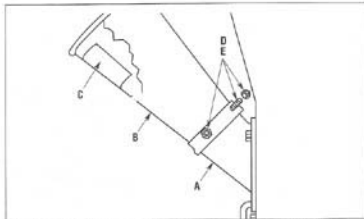


Figure 2-4: Install chipper chute with four carriage bolts and toplock nuts. Make certain safety message decal ("A") is positioned as shown.

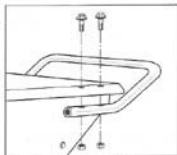


Figure 2-5: Install handlebar.

B. Insert the small end of the chipper chute ("B", Figure 2-4) into the chipper chute base ("A"). Align the four square holes in the chipper chute with the four round holes in the chipper chute base. Make certain that the safety message decal ("C") is positioned as shown in Figure 2-4.

C. From inside the chipper chute, insert four 1/4"-20 x 5/8" round head carriage bolts ("D", Figure 2-4) through the four holes. Add 1/4"-20 topleck nuts ("E") and tighten all four bolts and nuts very securely.

## STEP 5: ATTACHING HANDLEBAR

A. For shipment, the handlebar was installed upside down and was secured by two shipping bolts and nuts. Using two 7/16" wrenches, remove the handlebar and discard the shipping bolts and nuts.

B. Position the handlebar with the bend upward (see Figure 2-5).

C. Insert the four flange head screws (1/4"-20 x 1-1/4") from the hardware package down through the holes in the left and right sides of the lip on the shredder hopper and then through the holes in the handlebar. Add the four topleck nuts (1/4"-20).

D. Tighten the four screws securely using 7/16" and 3/8" wrenches.

## MOVING PTO CHIPPER/SHREDDER WITHOUT POWER UNIT

You can move the unattached PTO Chipper/Shredder into or out of a storage area by following these instructions:

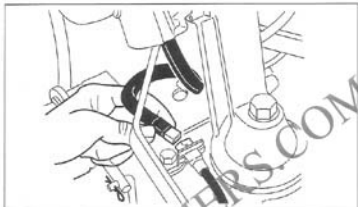


Figure 2-6: Forward interlock wire connection and handlebar adjustment bolt.

1. Move the tiller as close as possible to the PTO Chipper/Shredder storage area.
2. With the storage stand down, place both hands on the PTO Chipper/Shredder handle. Tip the PTO Chipper/Shredder forward until its weight is balanced on the wheel.
3. Slowly pull the PTO Chipper/Shredder back toward you until the machine is close to the Power Unit.

## CHECKING PTO POWER UNIT BELT SPEED RANGE

**IMPORTANT:** The belt on the PTO Power Unit should be in HIGH Range for operating the PTO Chipper/Shredder.

### ⚠ CAUTION

Before checking the Power Unit belt speed, shut off the engine, disconnect the spark plug wires, and make sure that all moving parts have come to a complete stop.

Failure to follow these instructions can result in personal injury or property damage.

Ensure that the PTO Power Unit belt is in HIGH range. With the Wheels/Tines/PTO Drive Lever in NEUTRAL, move the belt to the FORWARD position on both the

engine and transmission pulleys. If necessary, see the PTO Horse Owner/Operator Manual for information on moving the belt.

## CHECKING PTO POWER UNIT TRANSMISSION GEAR OIL LEVEL

Before operating the machine, check that the gear oil inside the PTO Power Unit transmission is at the proper level. See the PTO Horse Owner/Operator Manual for instructions.

## ATTACHING PTO CHIPPER/SHREDDER TO POWER UNIT

With the engine off, check the following:

- ✓ Tines/PTO Clutch Lever in DISENGAGE.
- ✓ Wheel Speed Lever in FREE WHEEL.
- ✓ Wheels/Tines/PTO Drive Lever in NEUTRAL.
- ✓ Engine propped by the kickstand (recommended) or a sturdy block.
- ✓ Chipper/Shredder resting on its storage stand.
- ✓ Dust caps on PTO couplings removed.

1. Unplug the forward interlock wire (see Figure 2-6) at the connection on the Power Unit transmission.

# Assembly

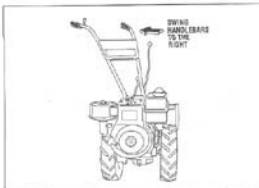


Figure 2-7: Handlebars positioned toward right side.



Figure 2-8: Location of swing-bolts.



Figure 2-9: Alignment Pin on Power Unit.



Figure 2-10: Alignment hole on PTO/Chipper Shredder.

2. Using a 3/4" wrench, loosen the handlebar bolt on the Power Unit as shown in Figure 2-6. Also see the PTO Horse Drive Operator Manual if additional information is needed on moving the handlebars. (Owners of older model Power Units use the T-bar to move the handlebars.)

3. Swing the handlebars all the way to the right to allow attachment of the PTO Chipper/Shredder. (The handlebars on older models may swing further to the right than is necessary for attachment of the Chipper/Shredder. On these machines, move the handlebars two notches to the right.) See Figure 2-7 for correct position of the handlebars. Tighten the handlebar mounting bolt or T-bar.

4. Using a 3/4" wrench, loosen the two swing-bolts (see Figure 2-8) which secure the Tine Attachment to the PTO Power Unit and swing the bolts outward.

5. Remove the Tine Attachment from the PTO Power Unit. (Refer to the PTO Horse Owner/Operator Manual if additional information on tine removal is needed.)

**IMPORTANT:** Always store the Tine Attachment in a level position to avoid losing oil from the breather vent located on top of the oil fill plug. Place the larger of the two dust caps on the coupling of the Tine Attachment to prevent the accumulation of dust or dirt. A tine cradle is also available for storing the Tine Attachment. See the PTO Horse Owner/Operator Manual for further information.

6. With storage stand down and machine level, roll the Power Unit back and carefully align the alignment pin on the Power Unit (see Figure 2-9) with the alignment hole on the PTO Chipper/Shredder (see Figure 2-10).

7. Make sure that washers on swing-bolts are next to bolt heads. Place swing-bolts on the PTO Power Unit in slots on the PTO Chipper/Shredder.

8. Using a 3/4-inch wrench, alternately tighten both swing-bolts until the concave washers are flat. The bolts must be very tight. If using a torque wrench, torque to 70-80 ft-lbs.

**IMPORTANT:** Swing-bolts must be kept very tight to prevent undue wear on the dog clutch coupling or on alignment pin and hole. Check bolts for tightness after every 2-1/2 hours of PTO Chipper/Shredder operation.

9. Connect the Forward Interlock Wires as shown in Figure 2-6 on Page 13.

## INSTALLING/REMOVING REVERSE LOCKOUT

To install:

Install **Reverse Lockout** (which prevents shifting the Wheels/Tines/PTO Drive Lever into REVERSE) *each* time you use the PTO Chipper/Shredder.

### ⚠ WARNING

Securely install Reverse Lockout before operating PTO Chipper/Shredder.

• Failure to install Reverse Lockout (which could result in shifting into REVERSE while operating the chipper/shredder) could result in serious personal injury from material being thrown at high speed from chipper chute or shredder hopper. Damage to tiller reverse disk will also occur.

• Shut off the engine, wait for all moving parts to come to a complete stop, disconnect the spark plug wire, and move it away from the spark plug wire before installing/removing the Reverse Lockout. Failure to do so could result in serious personal injury.

A. Place Reverse Lockout on belt adjustment block as shown in Figure 2-11.

B. Move Wheels/Tines/PTO Drive Lever up and down while holding Reverse Lockout in position on block to align hole in block with holes in the lockout.

C. Place clevis pin through holes in block and lockout. Install hair pin cotter. Use only *original equipment hardware* when installing lockout.

D. Remove the Reverse Lockout when you have detached the PTO Chipper/Shredder. *If the Reverse Lockout is not removed, the tiller cannot be operated in REVERSE. Also, the Interlock Switch (located on the neutral plunger tab of the motor mount) may not open so that the tiller engine may not start.*

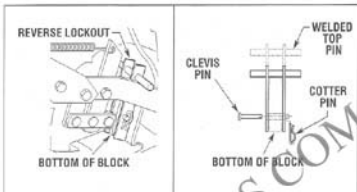


Figure 2-11: Install Reverse Lockout.

To Remove:

A. Remove the Reverse Lockout and attachment hardware from the tiller.

B. Install the hardware on the Reverse Lockout and store the assembly in an easily remembered location for future use. Remember to install the Reverse Lockout every time you use the PTO Chipper/Shredder.

### ⚠ CAUTION

Before checking the Power Unit belt speed, shut off the engine, disconnect the spark plug wire, and make sure that all moving parts have come to a complete stop.

Failure to follow these instructions can result in personal injury or property damage.

## Section

# 3 Features and Controls

### READ ME FIRST!

Learn the location of the features and controls on your machine before starting the engine. For detailed step-by-step operating instructions, please refer to "Section 4: Operation."

### DANGER

ROTATING CUTTING BLADES WILL CAUSE SERIOUS INJURY!

Do not allow hands or any other part of the body or clothing inside the shredder hopper, chipper chute, or discharge area when engine is running.

Before inspecting or servicing any part of the machine, shut off engine, disconnect spark plug wire from spark plug, and make sure that all moving parts have come to a complete stop.

NOTE: All references to left, right, front and rear of the Power Unit are determined by standing behind the Power Unit handlebars.

### LOCATION OF FEATURES AND CONTROLS

The figure below identifies the location of key features and controls on the PTO Chipper/Shredder. The operation of these controls is completely described in the Operation Section of this Manual.



Figure 3-1: PTO Chipper/Shredder features and controls.

#### Shredder Hopper (Inlet)

The shredder hopper inlet (see Figures 3-1 and 3-2) is the opening at the top of the PTO Chipper/Shredder for material to be shredded. Material up to 1/2" in diameter can be processed through the shredder hopper inlet. In the shredder chamber, rotating cutting blades shred the material.

#### Shredder Hopper Retainer Flap

A retainer flap (see Figures 3-1 and 3-2) is installed at the shredder hopper opening. Material is pushed past this retainer flap (using only the leaf tamper provided with the machine) and enters the shredder chamber. The retainer flap is an important feature – it prevents kickback of materials! Do not use the

PTO Chipper/Shredder unless the rubber retainer flap is securely fastened. Immediately replace the rubber retainer flap if it is torn or damaged.

### **▲ DANGER**

- Shredded particles can kick back up through the shredder hopper inlet. The rubber retainer flap is designed to reduce the kickback of shredder material and must be in place and securely fastened whenever the machine is operated.

Failure to do so can result in serious personal injury.

- Rotating cutting blades inside the Chipper/Shredder chamber when the engine is started and the Wheels/Tines/PTO Drive Lever is put into FORWARD. Contact with the rotating cutting blades will cause severe personal injury.

- Keep hands, face, feet, and clothing away from chipper chute inlet, shredder hopper inlet, discharge opening and discharge area at all times.

### Chipper Chute (Inlet)

Thick material (such as tree limbs, branches, scrap lumber, and vines) up to 3 inches in diameter is processed through the side-mounted chipper chute. Material fed through the chipper chute is processed into chips by a rotating chipper blade mounted on the cylinder disk (see Figure 3-2).

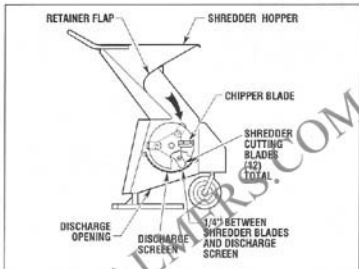


Figure 3-2: Blades are 1/4" from discharge screen or bar grate.

### **▲ CAUTION**

Do not operate the chipper/shredder unless the chipper chute is properly secured to the unit. Serious personal injury can result if the chipper chute is not securely attached.

### Chipper/Shredder Chamber

The cylinder assembly, located inside the steel shredder chamber (see Figure 3-2), is powered through a system of belt-driven pulleys. The round cylinder assembly disk has a chipper blade (see Figure 3-2) attached. Three cylinder assembly pins each hold four shredder cutting blades. When the Power Unit engine is running, the Wheel Speed Lever is in FREEWHEEL, the Wheels/Tines/PTO Drive Lever is in FORWARD, and the Tines/PTO Clutch Lever is in ENGAGE, the chipper and shredder blades rotate — allowing you to either chip or shred.

### Discharge Opening and Discharge Screen

A perforated discharge screen (see Figure 3-3) is installed at the bottom of the PTO Chipper/Shredder (under the shredder chamber). Processed material passes through the screen and exits through the discharge opening. The diameter of the holes in the screen determines how finely the material is shredded. The PTO Chipper/Shredder comes equipped with a standard screen with 3/4-inch holes.

Optional screens are available with 3/8 inch, 1 inch and 1-3/4 inch holes. Screens with small holes produce finely shredded particles. Screens with large holes produce coarsely processed

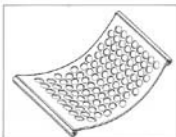


Figure 3-3: Standard discharge screen has 3/4 inch holes.

# Features and Controls

material and may not clog as readily as screens with small holes when wet, soggy or green material is processed. A bar grate for processing very wet, heavy materials is also available. The procedure for removing and installing the discharge screens and bar grate is described in Section 4.

## Bar Grate (Optional)

The optional bar grate (see Figure 3-4) allows you to replace the discharge screen with a "grate" with openings wide enough to efficiently process wet and damp materials such as matted leaves, spoiled or leftover vegetables, manure, etc. If necessary, the coarsely shredded material processed through the bar grate can then be dried and later reprocessed through the shredder with a discharge screen installed. The procedure for installing the optional bar grate is described in Section 4.

## Leaf Tamper

The leaf tamper is designed to push light, loose, bulky material (such as dry leaves, straw, and twigs) past the rubber retainer flap down into the shredder hopper inlet.

The leaf tamper has a "stop" which prevents the end of the tamper from being struck by the rotating blades. See Figure 3-5. When using the tamper, do not force the tamper beyond the "stop." Always hold the tamper by the handles with the "stop" facing up.

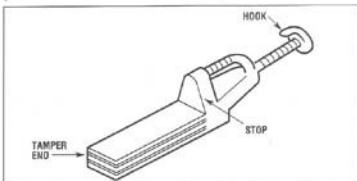


Figure 3-5: Leaf Tamper.

To tamp material into the shredder hopper, position either one hand or both hands on the built-in handle grips. Always position your arms so that they do not point down toward the shredder hopper opening.

The hook on the handle end of the tamper is used to hang the tamper on the side of the shredder hopper.

## PTO POWER UNIT CONTROLS Wheels/Tines/PTO Drive Lever

This lever (shown in Figure 3-6) transfers power from the engine to the PTO Chipper/Shredder. Put the lever in NEUTRAL before shifting the Tines/PTO Clutch Lever (see "Tines/PTO Clutch Lever" below). When the Wheels/Tines/PTO Drive Lever is in FORWARD, power is transferred from the PTO Power Unit to the PTO Chipper/Shredder.

**IMPORTANT:** Never put the Wheels/Tines/PTO Drive Lever in REVERSE when the Tines/PTO Clutch Lever is in ENGAGE. Damage to the reverse disc on the PTO Power Unit will result.

## Wheel Speed Lever

To prevent the PTO Power Unit wheels from rotating during operation of the PTO Chipper/Shredder, the Wheel Speed Lever (shown in Figure 3-6) must be in FREE WHEEL. When moving the PTO Chipper/Shredder, the Wheel Speed Lever is put in either SLOW or FAST for

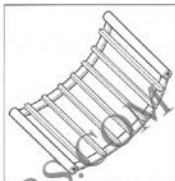


Figure 3-4: Optional bar grate.

forward motion and put in slow for reverse.

## Forward Interlock Wire

This wire (see Figure 2-7) must be hooked up to the wire harness connection on the PTO Power Unit before the PTO Chipper/Shredder is operated. Once this wire is connected, the PTO Chipper/Shredder can be operated without squeezing and holding one of the Forward Interlock Levers on the PTO Power Unit handlebars.

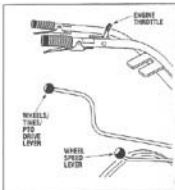


Figure 3-6: PTO Power Unit controls.



## Features and Controls

### Engine Throttle Control Lever

This lever is used to run and stop the PTO Chipper/ Shredder. Put the lever in FAST when operating the Chipper/Shredder. Put the lever in STOP to stop the PTO Chipper/Shredder. Chipper/Shredder blade rotation stops after six seconds when the machine is stopped by putting the Throttle Control Lever in STOP. See Figure 3-6.

### Tines/PTO Clutch Lever (Not Illustrated)

When the Tines/PTO Clutch Lever (located on the left side of the Power Unit transmission - see inset in Figure 4-5) is in the ENGAGE position, the operator can use the PTO Chipper/Shredder while the wheels on the PTO Power Unit are not moving. Always put the Wheels/Tines/ PTO Drive Lever in NEUTRAL before shifting the Tines/PTO Clutch Lever to ENGAGE or DISENGAGE. The Tines/PTO Clutch Lever should not be used to stop the PTO Chipper/Shredder.

**IMPORTANT:** Never engage the Tines/PTO Clutch Lever while the Wheels/Tines/PTO Drive Lever is in FORWARD or damage will result to transmission parts.

### ENGINE CONTROLS

See the PTO Horse Tiller Owner/Operator Manual for complete instructions on operating your PTO Power Unit engine controls.

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## Section

# 4 Operation

### READ ME FIRST!

As with any other piece of outdoor powered equipment, getting the "feel" for how your machine operates and getting to know the best techniques for particular jobs are very important to overall good performance.

Read this Section thoroughly before you start the engine. The instructions given here will help you become familiar with your machine and have you operating it efficiently in a short time.



### WARNING

Before operating your machine, be sure you read and understand all safety, controls, and operating instructions in this Owner/Operator Manual and on the decals on your machine.

Failure to follow these instructions can result in serious injury or property damage.

**NOTE:** All references to left, right, front and rear of the Power Unit are determined by standing behind the Power Unit handlebars.

#### *This Section explains:*

- Pre-Starting Checklist
- Overview of PTO Chipper/Shredder Operation
- Selecting a Work Site
- Moving the PTO Chipper/Shredder
- Chocking Wheels
- Starting/Stopping the PTO Chipper/Shredder
- Materials to Avoid
- Using the Shredder
- Shredding Wet, Soggy, or Green Material
- Using the Chipper
- Removing/Installing Discharge Screen or Bar Grate
- Ordering Optional Discharge Screens

### PRE-STARTING CHECKLIST



### DANGER

Contact with rotating cutting blades will cause serious personal injury. Do not put hands, face, feet, or clothing into the shredder hopper inlet, chipper chute inlet, discharge opening, or near the discharge area at any time.

Removing discharged material from beneath the Chipper/Shredder should be performed only after the engine is off, the spark plug wire is disconnected and moved away from the spark plug, and all moving parts have come to a complete stop. Then, use only a long wooden stick or a long-handled shovel to clear away material.

- Read the complete Owner/ Operator Manual, including these operating instructions and Section 1, "Safety," before transporting or operating the machine.
- Disconnect the spark plug wire and move the wire away from the spark plug.

- Check the engine oil level and fill the fuel tank as described in the PTO Horse Owner/Operator Manual.
- Check the gear oil level in the Power Unit transmission. (See the PTO Horse Owner/Operator Manual for instructions.)
- Put on safety goggles, hearing protection, and sturdy footwear.
- Visually check that the chipper chute and shredder hopper are empty.
- Do not wear loose fitting clothing or jewelry that can get caught in moving parts.
- When operating the machine at temperatures below 40° F., use lighter weight motor oil and lighter weight transmission gear oil. See the PTO Horse Tiller Owner/ Operator Manual for cold weather operating tips.

- The Power Unit Drive Belt must be in HIGH RANGE before the Chipper/Shredder is operated.**
- All bystanders and pets must be at least 25 feet away from the operating area.
- The chipper chute must be correctly and securely installed.
- The discharge screen (or optional bar grate) must be correctly and securely installed.
- Check the discharge screen holes for clogging. If clogged, clear the holes with a stick.
- All hardware must be securely fastened.
- Reconnect the spark plug wire to the spark plug.

## **⚠ DANGER**

Do not run engine in an enclosed area. Engine exhaust contains carbon monoxide gas, a deadly poison that is odorless, colorless, and tasteless. Do not operate this equipment near buildings, windows, or air conditioners.

## **OVERVIEW OF CHIPPER/SHREDDER OPERATION**

## **⚠ DANGER**

Contact with rotating cutting blades will cause serious personal injury. Do not put hands, face, feet, or clothing into the shredder hopper inlet, chipper chute inlet, discharge opening, or near the discharge area at any time.

Maintenance and service should be performed only after the engine is off, the spark plug wire is disconnected and moved away from the spark plug, and all moving parts have come to a complete stop. Then, use only a long wooden stick or a long-handled shovel to clear away the discharged material.

The chipper cutting blade and the shredder blade cylinder assembly rotate at the same speed, powered by the PTO Power Unit engine. (See Figure 4-1. Material that is fed into the shredder hopper is shredded and ground when the shredder cutting blades force the material against the discharge screen. The finely shredded material is then forced out through perforations in the discharge screen (or between the bars of the bar grate).

The rotating chipper blade is separated from a stationary anvil by a gap of 1/16 to 1/8 inch. Tree limbs and branches are fed through the chipper chute which directs the branches between the blade and the anvil, thereby shearing off chips. The chips are then discharged through the same screen as in shredder operation.

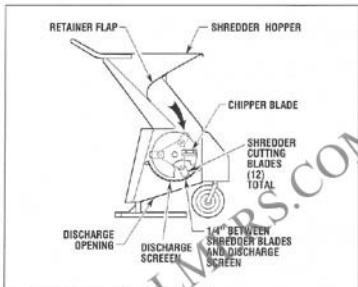


Figure 4-1: PTO Chipper/Shredder cutaway view.

## **SELECTING A WORK SITE**

Operate the PTO Chipper/Shredder only on an even, level surface, not on a hard surface such as concrete, asphalt, brick, sand, or rocks. On a hard surface, discharged material can rebound off the surface and cause serious personal injury or property damage.

## **MOVING THE PTO CHIPPER/SHREDDER**

1. With the engine shut off, check the following control settings:

- ✓ Wheels/Tines/PTO Drive Lever in NEUTRAL.
- ✓ Tines/PTO Clutch Lever in DISENGAGE.
- ✓ Forward Interlock Wire from handlebar CONNECTED.

## **⚠ CAUTION**

Do not operate the chipper/shredder unless the chipper chute is properly secured to the unit. Serious personal injury can result if the chipper chute is not securely attached.

2. Before moving the PTO Chipper/Shredder under engine power, the storage stand must be raised.

3. Loosen the stand adjustment knob, raise the stand, and reighten the adjustment knob. See Figure 4-2.

4. Put the Wheel Speed Lever in either SLOW or FAST.

**IMPORTANT:** Refer to the PTO Horse Owner/Operator Manual and the Engine Owner's Manual for complete engine starting instructions and starting tips.

5. Start the Power Unit engine. To go forward, squeeze and hold one Forward Interlock Lever.

# Operation

6. Shift the Wheels/Tines/ PTO Drive Lever into FORWARD. To stop moving forward return the lever to NEUTRAL, and release both Forward Interlock Levers.

**NOTE:** Practice moving the PTO Chipper/Shredder in a large open area to become familiar with the feel of the equipment.

7. Walk behind the unit with your hands on the the handlebars of the Power Unit.

8. Do not walk too close to the pivoting wheel on the PTO Chipper/Shredder.

9. Use caution when making turns while moving the PTO Chipper/Shredder, particularly on rough or uneven ground.

10. Avoid going up or down slopes that are too steep for safety. Reduce speed on slopes and make sure that you have secure footing. To prevent tipping or loss of control, travel up and down the face of the slope; never across the face. Do not change directions when going up or down hill.

11. Never shift the Wheel Speed Lever out of gear when traveling on a slope. Accidentally placing the lever in FREE WHEEL could allow the unit to roll out of control.

## CAUTION

Do not use the PTO Chipper/Shredder for chipping or shredding when the Wheels/Tines/PTO Drive Lever is in REVERSE. REVERSE should only be used for moving the machine. To chip or shred, set the Wheels/Tines/PTO Drive Lever in FORWARD.

12. Put the Wheel Speed Lever in SLOW before putting the Wheels/ Tines/ PTO Drive Lever in REVERSE. Be sure to check for any obstructions behind you before moving the unit in REVERSE. To stop moving in REVERSE, release the Wheels/Tines/PTO Drive Lever.

**IMPORTANT:** Use REVERSE when necessary for moving the machine, but not for extended periods of time. Extended use of REVERSE could result in undue wear on the reverse disc.



Figure 4-2: Moving the PTO Chipper/Shredder with the Power Unit.

## Transporting the Chipper/Shredder by Truck or Trailer

If transporting the PTO Chipper/Shredder (without the Power Unit attached) in a truck or trailer, be sure to block up the base of the machine at the left, front. The stand is meant only for storage. The unit could tip during transit if not blocked. Also tie the unit down securely.

## CHOCKING WHEELS

After reaching the work site, place the Wheel Speed Lever in FREE WHEEL, chock the wheels of this Power Unit (see Figure 4-3) and then follow the Chipper/Shredder starting procedure later in this section.

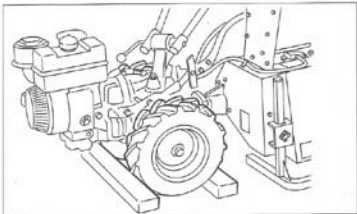


Figure 4-3: Chock wheels on Power Unit before operating Chipper/Shredder.

## INSTALLING REVERSE LOCKOUT

Install **Reverse Lockout** (which prevents shifting the Wheels/Tines/PTO Drive Lever into REVERSE) each time you use the PTO Chipper/Shredder.

### ⚠ WARNING

Securely install Reverse Lockout before operating PTO Chipper/Shredder.

• Failure to install Reverse Lockout (which could result in shifting into REVERSE while operating the chipper/shredder) could result in serious personal injury from material being thrown at high speed from chipper chute or shredder hopper. Damage to tiller reverse disk will also occur.

• Shut off the engine, wait for all moving parts to come to a complete stop, disconnect the spark plug wire, and move it away from the spark plug wire before installing/removing the Reverse Lockout. Failure to do so could result in serious personal injury.

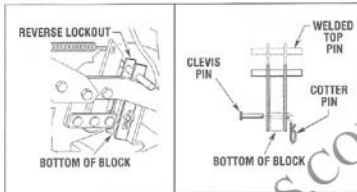


Figure 4-4: Install Reverse Lockout.

### To Remove:

- Remove the Reverse Lockout and attachment hardware from the tiller.
- Install the hardware on the Reverse Lockout and store the assembly in an easily remembered location for future use. Remember to install the Reverse Lockout every time you use the PTO Chipper/Shredder.

### ⚠ CAUTION

Before checking the Power Unit belt speed, shut off the engine, disconnect the spark plug wire, and make sure that all moving parts have come to a complete stop.

Failure to follow these instructions can result in personal injury or property damage.

A. Place Reverse Lockout on belt adjustment block as shown in Figure 4-4.

B. Move Wheels/Tines/PTO Drive Lever up and down while holding Reverse Lockout in position on block. Align hole in block with holes in the lockout.

C. Place clevis pin through holes in block and lockout. Install hair pin cotter. Use only original equipment hardware when installing lockout.

D. Remove the Reverse Lockout when you have detached the PTO Chipper/Shredder. *If the Reverse Lockout is not removed, the tiller cannot be operated in REVERSE. Also, the Interlock Switch (located on the neutral plunger tab of the motor mount) may not open so that the tiller engine may not start.*

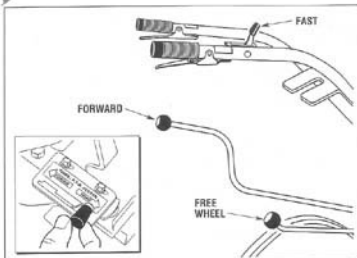


Figure 4-5: Put Wheels/Tines/PTO Drive Lever in FORWARD and engine Throttle Control Lever in FAST.

# Operation

## OPERATING THE PTO CHIPPER/SHREDDER

When ready to begin shredding or chipping follow these procedures:

**IMPORTANT:** Make sure you are wearing safety glasses, hearing protection, and sturdy footwear. Review and follow the Safety Rules in Section 1 and elsewhere in this manual.

### Starting

1. Check that these controls are set:
  - ✓ Wheel Speed Lever in FREE WHEEL.
  - ✓ Tines/PTO Clutch Lever in ENGAGE.

**IMPORTANT:** Never put the Wheels/Tines/PTO Drive Lever in REVERSE while using the PTO Chipper/Shredder. Serious damage to the equipment will result.

2. After starting the engine, move the Wheels/Tines/PTO Lever to FORWARD to transfer power to the Chipper/Shredder (see Figure 4-5).
3. Move the Throttle Control Lever to FAST. When operating the PTO Chipper/Shredder, always use the FAST throttle setting. See Figure 4-6.

### ▲ DANGER

• Contact with rotating cutting blades will cause serious personal injury. The PTO Chipper/Shredder cutting blades are rotating when the engine is running. Keep hands and any part of the body or clothing away from the shredder hopper, chipper chute, and discharge area at all times. Before servicing the machine or removing jams or clogs, stop the engine, disconnect the spark plug wire, move the wire away from the spark plug and let all moving parts come to a complete stop.

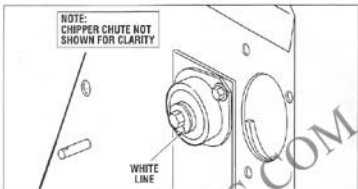


Figure 4-6: Check white line on bearing collar.

### ▲ DANGER

- Rotating cutting blades slow down gradually after the engine is shut off. Blades normally require 6 seconds to stop. Rotating cutting blades cause serious personal injury.
- Cutting blades begin to rotate when the engine is started and the Tines/PTO Clutch Lever is engaged, and slow down gradually when the engine is shut off. Do not allow hands or any other part of the body or clothing inside the shredder hopper, chipper chute, discharge opening, or near any moving part.

### Stopping

1. To stop the PTO Chipper Shredder, move the throttle control lever to STOP (see Figure 4-5).
2. Remove any hearing protection. Listen to the sound of the PTO Chipper/Shredder as it slows down. There is an audible tone that changes as the cylinder assembly slows down. The shredder blades "clatter" as they slow, and then become silent. Wait for all parts to come to a complete stop. Allow 6 seconds after the engine is shut off.
3. Put the Wheels/Tines/PTO Drive Lever in NEUTRAL.

**IMPORTANT:** The bearing collar on the chipper/chute side of the PTO Chipper/Shredder has a white line painted on it. When this white line is stationary, the cylinder assembly has stopped rotating. See Figure 4-6.

### MATERIALS TO AVOID

Do not feed the following materials into the shredder hopper or chipper chute:

- Metal
- Glass
- Bottles
- Plastic
- Cans
- Rocks
- Other Non-organic Foreign Objects

### Materials Suitable for Shredding

The Table to the right lists materials suitable for shredding and conditions under which each material should be processed.

**NOTE:** If the material is wet or green, see special processing instructions, "Shredding Wet, Soggy, or Green Material" later in this section.

## USING THE SHREDDER

**IMPORTANT:** Make sure you are wearing safety glasses, hearing protection, and sturdy footwear. Review and follow the Safety Rules in Section 1 and elsewhere in this Manual.

1. Always operate the shredder with the Power Unit engine speed at FAST.
2. When feeding the shredder, stand a foot or two away from the shredder hopper and keep your hands parallel to and several inches above the hopper. Never point your hands downward into the hopper opening.
3. A steady flow of material into the shredder hopper usually provides the most efficient results. You will learn by experience how fast the shredder can handle different material. Let the machine work at its own speed. Do not overload the machine.
4. The rate of feed for small branches, vines, and brush can be controlled by lightly pushing and guiding the free end of the material until it extends above the top of the hopper. At this point, let go of the material. See Figure 4-7.

**IMPORTANT:** Always hold material loosely and be ready to quickly let go.

### **▲ DANGER**

- Retaining shredder cutting blades can tug suddenly on material being fed into the shredder hopper. Contact with cutting wheel cutting blades will cause serious personal injury.
- Do not hold on too tightly to branches and vines.
- Do not feed material straight down into the shredder hopper with your arm pointing downward toward the opening. Instead, keep your arm parallel to the ground and several inches above the top edge of the hopper.
- Do not operate the PTO Chipper/Shredder unless a discharge screen or bar grate is securely installed.

### MATERIALS SUITABLE FOR SHREDDING

Material	Conditions
Branches	Up to 1 1/2" in diameter. Several may be shredded at once if diameter of bundle is less than 1/2". Cut to 3-5 foot lengths.
Brush	No special conditions.
Cardboard (corrugated)	No special conditions.
Grass Clippings	No special conditions.
Hay	No special conditions.
Leaves	No special conditions.
Manure	Use bar grate.
Newspaper	Process one or two sections at a time.
Organic Waste Materials	Use bar grate.
Straw	No special conditions.
Twigs	Up to 1/2" in diameter.
Vines/Stalks	Up to 1 1/2" in diameter and 2-3 feet long.



Figure 4-7: Using the shredder to shred small branches.

5. Cut long branches into 3-5 foot lengths and vines into 2-3 foot lengths before feeding them into the shredder hopper.
6. When feeding loose material, such as leaves, straw, or grass, drop the material into the shredder opening and push it into the shredder hopper using the leaf tamper (supplied). See Figure 4-8.

### **▲ DANGER**

• To avoid a fire hazard, keep leaves, grass and other combustible materials away from the engine and muffler.

7. All shredded material exits through the discharge opening. Always stay clear of this area because material exits at high speed. The standard discharge screen supplied with the PTO

# Operation

Chipper/Shredder has 3/4" holes. This screen is suitable for shredding dry materials such as brush and dry leaves. To install a different screen or the bar grate, see "Removing/Installing Discharge Screen or Bar Grate" later in this section.

## **⚠ DANGER**

- Rotating cutting blade cut within 1/4" of the discharge screen. Never put hands or feet near discharge opening or discharge area while machine is being operated. Contact with cutting blades will cause serious personal injury.

- To avoid serious personal injury, keep hands, feet, and clothing out of the discharge area. Follow all safety rules.

- Do not allow processed material to build up beneath the Chipper/Shredder and contact the discharge screen. Material which cannot freely exit the discharge screen may circulate inside the processing chamber causing clogs. Some of the material may also "blow" back up through the shredder hopper or chipper chute.

- Do not tip the Chipper/Shredder or Power Unit (while the unit is running) to remove discharged material.

- Do not remove discharged material from beneath the machine unless the engine is stopped, the spark plug wire is disconnected and moved away from the spark plug, and all moving parts have come to a complete stop. Then, use a long stick or long-handled shovel to remove the material. Never use your hands or feet to remove material!

8. To obtain optimum performance, shred only material listed in the Table on Page 23. Feed limited amounts of material. Bulk and/or length can be increased if material is processed without difficulty. Do not overload the shredder. Overloading will cause the engine speed to decrease significantly or the belt to slip.



Figure 4-8: Using the leaf tamper.

9. Material can build up beneath the Chipper/Shredder. Do not tip the Chipper/Shredder or Power Unit (while the machine is running) to remove discharged material from the discharge area. Use a long stick or long-handled shovel to clear away processed material. See Figure 4-9 and the DANGER statement in the left column.

## Shredding Tips

- Cut long branches into 3-5 foot lengths and vines to 2-3 foot lengths before feeding.

- When shredding wet or green material, mix in dry material. Alternating wet and dry material helps prevent material from sticking inside the shredder chamber.

- Process very wet, soggy material using the optional Bar Grate.

- Always use the Leaf Tamper to push bulky material into the Shredder Hopper.

- If the engine slows down while you are feeding material, stop and allow the engine to come back to full speed.

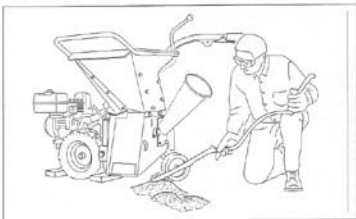


Figure 4-9: Using long-handled shovel or long stick to clear away discharged material. (Stop the engine, disconnect the spark plug wire and move it away from the spark plug, and wait for all moving parts to come to a complete stop before removing discharged material.)



## SHREDDING WET, SOGGY, OR GREEN MATERIAL

### ▲ DANGER

Never shred brush, branches, or other dry material when the bar grate is installed. Material will exit the discharge opening at high speed and will not be properly processed.

Wet or "green" materials (such as wet, matted leaves, vegetables, "green" vegetation such as squash vines, etc.) will most likely clog the 3/4" holes of the standard discharge screen. Instead, shred these materials with the optional 1-3/4" discharge screen or bar grate, depending on the moisture content of the material.

1. Remove the FTO Chipper/Shredder standard discharge screen and install the optional 1-3/4" screen (see "Removing/Installing Discharge Screen or Bar Grate") later in this section.
2. If clogging persists, use the optional bar grate for best results (see "Removing/Installing Discharge Screen or Bar Grate"). The bar grate will shred wet, soggy, or "green" materials to a medium consistency. To shred these materials to an even finer consistency, process them a second time using a screen.
3. If you do not have the optional bar grate, try the following sequence to help prevent clogging of the discharge screen:
  - a. Process a small batch of wet, soggy, or green material through the shredder.
  - b. Then, process a small batch of completely *dry* material through the shredder.
  - c. Continue alternating wet and dry material.

MATERIALS SUITABLE FOR CHIPPING	
Material	Conditions
Branches	Up to 3" in diameter depending on hardness. Wood with extremely hard knots will not process well.
Branches (short, thick)	Short, thick branches left over when a long branch is processed can be chipped by being pushed into the chute using another long branch.
Lumber	Up to 3" in diameter. Remove nails and any metal parts from the lumber before processing.
Stalks & Vines	From 1/2" to 3" in diameter. Cut to 2-3 foot lengths before chipping.

## USING THE CHIPPER

The material listed in the left column of the Table below is suitable for chipping. The right column lists conditions under which the material should be processed.

**IMPORTANT: Make sure you are wearing safety glasses, hearing protection, and sharp (see your before using the chipper. Review and follow the Safety Rules in Section 1 and elsewhere in this Manual.**

1. Stand at either side of the chipper chutes as shown in Figures 4-10 and 4-11.
  2. Always operate the chipper with the FTO Power Unit engine speed at FAST.
  3. With both hands, grasp one end of a branch (up to 3" diameter) and feed the other end into the chipper chute. Do not feed the branch into the chute with your arms pointing into the chipper chute opening. Keep your arms perpendicular (at a 90° angle) to the chipper chute. Keep the branch away from your body to avoid any kick-back and don't over-reach. Always hold the branch firmly to control the rate of feed.
  4. Evenly rotate the branch to prevent bark from stripping into long strips which could become tangled in the cylinder assembly. Rotating the branch also improves the cutting action of the chipper blade.
  5. Continue to guide the branch until you begin to come near the top of the chute and then let go! Never put your hands inside the chipper chute.
  6. Short stubs of branches may be pushed through the chipper with another branch.
- IMPORTANT: If the chipper is not cutting branches efficiently, the chipper blade could be dull or the wood could be particularly hard. Check the sharpness of the chipper blade. See "Chipper Blade Replacement" in Section 5 of this Manual.**
7. All chipped material exits through the discharge opening. Always stay clear of this area because material exits at high speed.
  8. To obtain optimum performance, process only organic material through the Chipper Chute. Feed limited amounts of material. Avoid overloading the chipper. Overloading will cause the engine speed to decrease significantly or cause the belt to slip, and could result in damage to the Power Unit engine.
  9. Do not tip the Chipper/Shredder or Power Unit (when the unit is running) to remove discharged material. Use a long stick or long-handled shovel to clear away processed material. See the DANGER statement on the next page.

# Operation



Photo 4-10: Using the chipper for small branches.



Photo 4-11: Using the chipper for a large branch.

## **⚠ DANGER**

Rotating cutting blades cut within 1/4" of the discharge screen. Never put hands or feet near discharge opening or discharge area while machine is being operated. Contact with cutting blades will cause serious personal injury.

To avoid serious personal injury, keep hands, feet, and clothing out of the discharge area. Follow all safety rules.

Do not allow processed material to build up beneath the Chipper/Shredder and contact the discharge screen. Material which cannot freely exit the discharge screen may circulate within the processing chamber causing clogs. Some of the material may also "blow" back up through the shredder hopper or chipper chute.

Do not remove discharge material from beneath the machine until the engine is stopped, the spark plug wire is disconnected and moved away.

## **⚠ DANGER**

To avoid a fire hazard, keep leaves, grass, and other combustible materials away from the engine and muffler.

### **REMOVING/INSTALLING DISCHARGE SCREEN OR BAR GRATE**

Remove the standard (supplied) discharge screen for any of these reasons:

To clean the screen. The holes in the discharge screen may be clogged.

To process wet or green materials. Remove the discharge screen and install the optional bar grate for best results.

To change the size of the discharged material. Remove the standard discharge screen and replace with one of the optional screens.

## **⚠ DANGER**

Rotating cutting blades inside the discharge opening will cause serious personal injury. Blades cut 1/4" from the discharge screen or bar grate. Before removing or installing the discharge screen or bar grate, make sure the engine is off, the spark plug wire is disconnected and moving parts have come to a complete stop.

### **Removing the Discharge Screen**

1. Make sure that the engine is shut off, all moving parts have stopped completely, and the spark plug wire is disconnected and moved away from the spark plug.

2. Clear away any discharged material from the screen area using only a long stick or long-handled shovel.

3. On the chipper chute side, remove the hair pin cotters (see A in Figure 4-12) from the studs securing the ends of the two discharge screen rods (B).

4. Pull out the two discharge screen rods. Watch that the screen does not fall on you. See Figure 4-12.
5. If the screen is tight and does not drop, hook an end of a discharge screen rod into a hole in the screen (see Figure 4-13). Pry the screen down. Because the holes in the 3/8" screen are too small for use of a screen rod to remove the screen, use a screwdriver to pry the screen loose.
6. Install either a discharge screen or the optional bar grate before using your PTO Chipper/ Shredder.

## **▲ DANGER**

Do not operate the PTO Chipper/Shredder unless a discharge screen or bar grate is securely installed.

### Installing the Discharge Screen or Bar Grate

1. Make sure that the engine is shut off, all moving parts have stopped completely, and the spark plug wire is disconnected and moved away from the spark plug.
2. Clear away any discharged material from the discharge area using only a long stick or long handed shovel.
3. Note the two welded tubes at the ends of the screen. When the screen rods are inserted through these tubes, the screen is held securely in place. See Figure 4-14.
4. Position the screen or bar grate (shown in Figure 4-15) up into the discharge opening (curve of screen or grate faces down). Make sure that the tubes at each end of the screen (or grate) align with the holes in the wall of the PTO Chipper/Shredder.
5. Hold the screen (grate) in place. Slide the two rods through the tubes and out through the holes in the wall on the other side of the Chipper/Shredder.

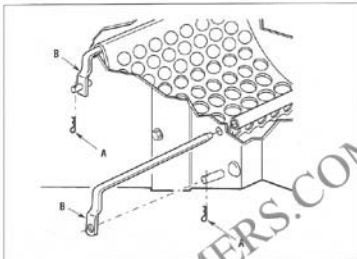


Figure 4-12: Remove hair pin cutters and pull out screen rods.



Figure 4-13: Use screen rod to remove screen.

The small holes in the ends of the screen rods must go over the two stud pins on the machine wall. See Figures 4-14 and 4-15. Make sure that the rods go through the holes in both tubes.

6. Replace the two hair pin cutters through the stud pins. The discharge screen (or grate) is now securely installed. If the pins become lost, call for replacements immediately. DO NOT OPERATE MACHINE UNLESS FACTORY-DESIGNED PINS ARE PROPERLY INSTALLED.

### ORDERING OPTIONAL DISCHARGE SCREENS

In addition to the standard discharge screen with 3/4" diameter holes and the bar grate, screens with 3/8", 1", and 1-3/4" diameter holes are also available. The smaller the holes in the screen, the more finely shredded is the processed materials. Consider ordering one of the screens with the large holes to process coarse material or to minimize clogging. See the Parts Catalog for ordering information.

## Operation

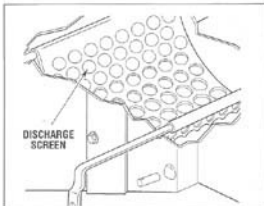


Figure 4-14: Install screen.

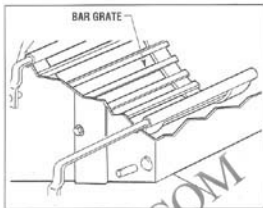


Figure 4-15: Install bar grate.

### AFTER OPERATING THE PTO CHIPPER SHREDDER

Reinstall the tine attachment by reversing the instructions given. Be sure to block the engine or use the kickstand before removing the PTO Chipper/Shredder.

Also be sure to remove the Reverse Lockout (shown in Figure 4-16) before operating your machine for tilling.

### CAUTION

Remove the Reverse Lockout after using the PTO Chipper/Shredder.

Failure to do so will result in loss of the use of REVERSE and could also result in inability to start the tiller.

### REMOVE BEFORE USING TILLER

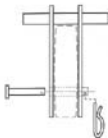


Figure 4-16: Reverse Lockout.

## Section

# 5 Maintenance/Repairs

### READ ME FIRST!

Carefully read this Section on PTO Chipper/Shredder maintenance and service. Performing the required maintenance according to schedule will ensure the proper performance and long life of your machine.



### CAUTION

Before inspecting, cleaning or servicing the machine, shut off Power Unit engine, disconnect spark plug wire, and make sure that all moving parts have come to a complete stop.

Failure to follow these instructions can result in personal injury or property damage.

NOTE: All references to left, right, front and rear of the Power Unit are determined by standing behind the Power Unit handlebars.

*Subjects covered in this Section include:*

- Belt Inspection
- Belt Adjustment
- Belt Removal/Installation
- Cylinder Assembly
- Removal/Disassembly
- Cutting Blade Rotation/Replacement
- Cylinder Reassembly
- Chipper Blade Removal/Installation
- Hopper Flap Replacement
- Off-Season Storage
- Troubleshooting



### WARNING

- Moving parts on the Chipper/Shredder can cause serious personal injury. Shut off the engine, let all moving parts come to a complete stop, disconnect the spark plug wire and prevent it from touching the spark plug before performing any Chipper/Shredder maintenance or service.
- Do not operate the Chipper/Shredder without the belt cover securely attached. Rotating belt and pulleys can cause serious personal injury.

Follow the service recommendations in the chart below to correctly maintain your equipment.

### BELT INSPECTION

*The following belt inspection, adjustment, and removal/installation procedures apply only to the PTO Chipper/Shredder drive belt. See the PTO Horse Owner/Operator Manual for Power Unit belt replacement instructions.*

**Tools Needed:** One 1/2-inch Wrench  
Every 10 operating hours, examine the drive belt for cracks, cuts, fraying or other evidence of belt damage. Also check for proper belt adjustment.

1. Shut off the engine, let the engine cool, disconnect the spark plug wire and prevent it from touching the spark plug.

**PTO CHIPPER/SHREDDER MAINTENANCE SCHEDULE**

REQUIRED MAINTENANCE*	Before Each Use	Every 10 Hours	Yearly	End of Season
Check Bolts and Nuts	○			
Clean Machine			○	○
Inspect Drive Belt for Wear				○
Inspect Drive Belt Tension		○		
Inspect Hopper Flap			○	

\* Perform Power Unit and Engine Maintenance according to the schedule in the Maintenance Section of the PTO Horse Owner/Operator Manual.

# Maintenance

2. Using a 1/2" wrench, remove the flange locking screw (on side of belt cover), the flange nut with spacer (on the front of the belt cover), and the flange nut (on the top edge of the belt cover). See Figure 5-1. Remove the interlock wire clamp. Lift off the belt cover.

3. After inspecting the belt closely (see Figure 5-2), replace interlock wire clamp, the belt cover, the belt cover hardware, and reconnect the spark plug wire if the belt does not need replacement.

## BELT ADJUSTMENT

Tools Needed: One 1/2" Wrench; One 9/16" Wrench; One 7/16" Wrench

Check the belt tension between the left stationary idler pulley and the driven pulley. Push down on the belt. If the belt moves **more** than one belt width it should be adjusted using the instructions below:

1. Remove the belt cover as described above in "Belt Inspection."
2. Loosen the bolt (A) behind the adjustment idler pulley using a 9/16" wrench. See Figure 5-2.
3. Back off the jam nut (B) on the adjustment screw (C) using a 7/16" wrench. Turn down the adjustment screw to tighten the belt until the movement of the belt at the position shown in Figure 5-2 is one belt width. If the adjustment screw protrudes out and the belt is still too loose, replace the belt.
4. Tighten the jam nut (B). Securely tighten the nut (A) behind the adjustment idler pulley.
5. Replace the belt cover, interlock wire clamp, belt cover hardware, and reconnect the spark plug wire.

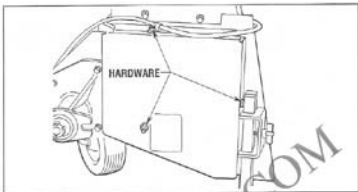


Photo 5-1: Drive belt cover.

### ⚠ WARNING

Do not operate the unit without the belt cover installed. Failure to follow these instructions could result in serious personal injury.

## BELT REMOVAL/INSTALLATION

Tools Needed: 9/16" Wrench; 7/16" Wrench; 1/2" Wrench

If the belt breaks, is damaged, or is excessively worn or stretched, remove it following these instructions:

1. Remove the belt cover following the instructions in "Belt Inspection".
2. Loosen the bolt (A) behind the

adjustment idler pulley using a 9/16" wrench.

3. Back off the jam nut (B) on the adjustment screw (C) using a 7/16" wrench.

4. Loosen the adjustment screw (C) as much as possible to allow the belt to be removed from the adjustment idler pulley.

5. Using a 9/16" wrench, remove the bolt (D) securing the left idler pulley and remove that pulley. This allows the belt to be removed.

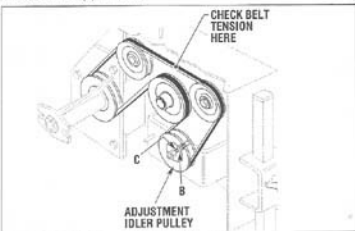


Figure 5-2: Drive belt inspection and adjustment.

- Remove the belt and install the new belt in the grooves in the pulleys in the pattern shown in Figure 5-3.
- Reinstall the left idler pulley.
- Follow the belt adjustment procedure on Page 32.
- Replace the belt cover, interlock wire clamp, belt cover hardware, and reconnect the spark plug wire.

### ▲ WARNING

Do not operate the unit without the belt cover installed. Failure to follow these instructions could result in serious personal injury.

## SHREDDER CUTTING BLADES (ROTATION OR REPLACEMENT)

### Cylinder Assembly Removal

### ▲ WARNING

Before performing any maintenance, stop the engine, wait for all moving parts to stop, disconnect the spark plug wire and prevent it from touching the spark plug.

Wear gloves when working with the cylinder assembly to prevent personal injury from sharp shredder cutting blades and chipper blade.

Tools Needed: 9/16-inch Wrench; Flat-Blade Screwdriver; 5/32-inch Hex Wrench; Hammer; Punch

**IMPORTANT:** Before removing the cylinder assembly, place a long wooden stick down the shredder hopper to block rotation of the cylinder shaft.

#### 1. Remove Discharge Screen and Belt Cover.

Remove the discharge screen as described in the "Maintenance" section of this manual. Remove the belt cover as described in "Belt Inspection", earlier in this section.

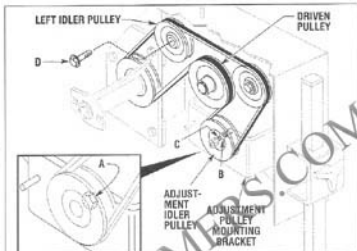


Figure 5-3: Drive belt removal.

#### 2. Remove Adjustment Idler Pulley.

Remove the adjustment idler pulley by removing the nut (A) shown in Figure 5-3 above.

#### 3. Remove Driven Pulley.

Use snap ring pliers to remove the snap ring (Figure 5-4) which secures the driven pulley (see Figures 5-3 and 5-4). Remove the washer (E) and the driven pulley as shown in Figure 5-4 to access the locking collar (C).

#### 4. Unlock Locking Collar.

Use a hex wrench to remove the setscrew (D) in the locking collar (C). Use a hammer and punch to unlock the locking collar. Position the punch in the punch hole (the non-threaded hole, *not* the setscrew hole) and use the hammer to turn the collar counterclockwise (the opposite direction from shaft rotation). See Figure 5-4. Do not lose the key (F) in the cylinder shaft.

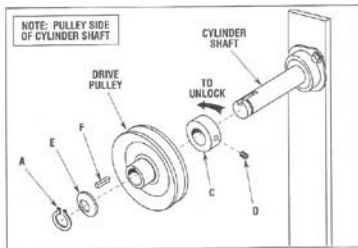


Figure 5-4: Cylinder shaft removal (pulley side).

# Maintenance

## 5. Remove Cap Screw (Chipper Chute Side).

On the other end (chute end) of the cylinder shaft, use a 9/16-inch wrench to remove the capscrew (A) which secures the shaft. Remove the two washers (B). See Figure 5-5.

## 6. Remove Cylinder Assembly.

- Wear heavy work gloves when working with the cylinder assembly to prevent personal injury from sharp shredder cutting blades and the chipper blade.
- Hold the shaft by reaching down inside the shredder hopper. Use a 9/16" wrench to remove the six screws (G) securing the bearings and closure plates on both sides of the machine. (Figure 5-5 shows two of the three screws which secure the closure plate on the chipper chute side).
- On the pulley side, push the cylinder assembly inward and then down past the adjustment pulley mounting bracket (shown in Figure 5-3), so that the assembly can be lowered through the clearance area and out of the machine.
- Note the location of all hardware to ensure correct replacement.

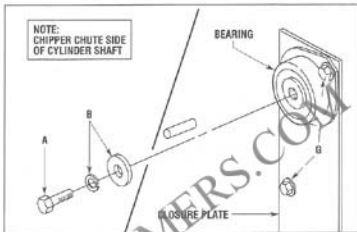


Figure 5-5: Cylinder shaft removal (chipper chute side).

all parts of the cylinder assembly so that it can be reassembled correctly. Mark each cylinder pin and other components before disassembly (see Figure 5-6).

Disassemble the cylinder assembly to rotate or replace the shredder cutting blades. See Figure 5-6 which illustrates the direction of blade rotation. Only one edge of the cutting blade cuts at any one time.

- Wear safety glasses when performing this procedure.
- Securely clamp the cylinder assembly in a vise.
- Position the assembly so that one of the roll pins (Ref.# 16 in Figure 5-6) can be driven out using the punch and hammer. (Each of the three sleeve/spacer assemblies at the end of each cylinder pin contains a roll pin.)

## Disassembling the Cylinder Assembly

Tools Needed: 5/32-inch Punch; Hammer; Vise

**IMPORTANT:** Note the exact location of

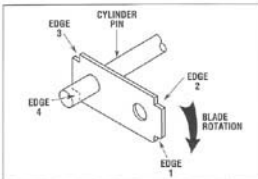


Figure 5-6: Individual cutting blade on cylinder pin.

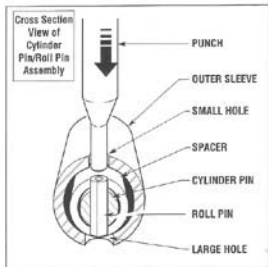


Figure 5-7: Sleeve/spacer with roll pin installed.



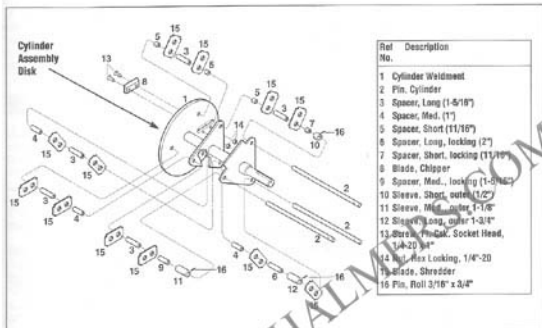


Figure 5-8: Cylinder assembly components.

- Rotate the outer sleeve on the cylinder pin (see Figure 5-7) until the holes line up to allow access to the roll pin. Use penetrating oil to loosen the sleeve if necessary.
- Carefully inspect the holes in the sleeve. One hole is larger than the other. Position the sleeve so that the roll pin will be pushed out through the large hole. See Figure 5-7.
- Drive the roll pin out of the cylinder pin and spacer through the large hole in the sleeve using the punch and hammer.
- Work toward the roll pin. The cylinder pin, spacers, and cutting blades can now be disassembled.
- Rotate the cylinder assembly to gain access to the other two roll pins and disassemble the remaining two cylinder pins following the steps presented above.

### ⚠ WARNING

Before performing any maintenance, stop the engine, wait for all moving parts to stop, disconnect the spark plug wire and prevent it from touching the spark plug.

Wear gloves when working with the cylinder assembly to prevent personal injury from sharp shredder cutting blades and chipper blade.

### Cylinder Blade Replacements

Tools Needed: Metal File (Optional)

**NOTE:** See the Parts List when ordering replacement cylinder assembly components.

- Flip or rotate the cutting blades to expose a sharp cutting surface or replace cutting blades if all cutting surfaces are dull.

- Replace spacers or sleeves if worn or damaged. Be sure to use correct replacement parts.
- Thoroughly clean and inspect all parts. Using the metal file, remove any burrs which would prevent the parts from fitting correctly.

### Cylinder Blade Replacements

Tools Needed: Hammer, 5/32" Punch, Vise:

- Wear safety glasses when performing the following procedure.
- Securely clamp the cylinder assembly disk in a vise, with the disk positioned to allow reinsertion of a cylinder pin.
- To reassemble the cylinder assembly, see Figure 5-8 for the position of the components.
- To assemble a sleeve/spacer, slide a locking spacer inside the sleeve (see Figure 5-9). (Line up the roll pin holes in the sleeve and spacer so that the larger hole is facing upward).

# Maintenance

5. Use pliers to hold the **new** roll pin (never reuse a roll pin). Tap the roll pin into the **large** hole in the sleeve with the hammer and punch. See Figure 5-10. The bottom of the pin should be flush with the bottom surface of the **top** hole in the spacer. See Step 1 in Figure 5-10. Assemble the other two sleeve/spacer/roll pin assemblies.

6. To assemble one cylinder pin through the spacers, sleeves, cutting blades, and triangular plates and into the corresponding hole in the cylinder assembly disk.

7. Place a sleeve/spacer assembly on the cylinder pin last.

8. Rotate the cylinder pin until the hole in the pin is aligned with the holes in the sleeve/spacer assembly.

9. Position the cylinder assembly in the vise so that the roll pin in hole in the sleeve/spacer assembly faces upward. Coat the remaining exposed surface of the roll pin with Loctite 242 (or equivalent) removable thread sealant.

10. Use a hammer and punch to tap the roll pin down so that it seats inside the spacer and cylinder pin. The sleeve should spin freely. See Step 2 in Figure 5-10.

11. Check to see that the roll pin does not protrude beyond the outside edges of the spacer. See Figure 5-10.

12. Rotate the cylinder assembly as necessary in the vise to reassemble the remaining cylinder pins and component parts using Steps 2 through 11 above.

## ⚠ WARNING

Failure to reassemble the cylinder assembly correctly could result in serious personal injury.

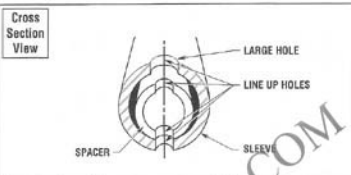


Figure 5-9: Sleeve with spacer.

## Cylinder Assembly Installation

### ⚠ WARNING

Wear heavy work gloves when handling the cylinder assembly. The edges of the cutting blades can cause severe personal injury.

1. Position the closure plates and bearings on each end of the cylinder shaft.
2. Raise the entire assembly, with closure plates and bearings, up into place. Push the shaft toward the chipper side far enough to allow the other end of the shaft and closure plate to clear the adjustment idler pulley mounting bracket (see Figure 5-3).

3. Secure the bearings and closure plates to the frame on both sides using the six flange screws.

4. On the pulley side, tighten the locking collar and lock the collar (C in Figure 5-4) by turning it against the bearing flange using the hammer and punch. Turn the collar clockwise. Secure the collar in place with the setscrew (D). See Figure 5-4.

5. Install the driven pulley on the cylinder shaft. Replace the washer (E), and secure the pulley with the snap ring (A). See Figure 5-4.

6. Replace the left idler pulley as shown in Figure 5-3.

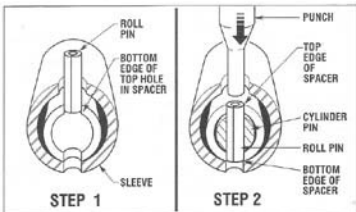


Figure 5-10: Insert roll pin and install pin using punch and hammer.

7. Replace and adjust the drive belt, and reinstall the belt cover, the interlock wire clamp, and the belt cover hardware. Install the discharge screen, and reconnect the spark plug wire.

## **⚠ WARNING**

Do not operate the unit without the belt cover installed. Failure to follow these instructions could result in serious personal injury.

## **CHIPPER BLADE REMOVAL/INSTALLATION**

Over time, the chipper blade will become dull. Replace or sharpen the chipper blade when the blade no longer cuts efficiently.

Tools Needed: 1/2" Wrench; 7/16" Wrench; 5/32" Hex Wrench

### **Removal**

1. Shut off the engine, allow it to cool, disconnect the spark plug wire and prevent it from touching the spark plug.
2. Lower the front end of the discharge screen (or remove the screen). See "Discharge Screen Removal" in the "Operation" section of this manual.
3. Using a 1/2-inch wrench, remove the three bolts which secure the chipper chute to the side of the machine. Remove the chipper chute.
4. The chipper blade is extremely sharp, wear heavy work gloves when working near the chipper blade.



Figure 5-12: Sharpen edge of chipper blade at 45° angle.

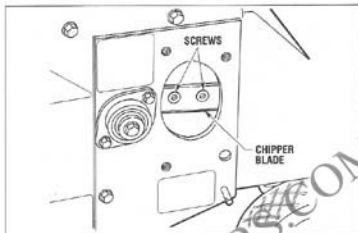


Figure 5-11: Location of chipper blade with chute removed.

## **⚠ WARNING**

The chipper blade is extremely sharp. To avoid personal injury, handle the blade with extreme care during service or maintenance.

5. Rotate the cylinder assembly disk carefully (with your gloved hand) so that the chipper blade is exposed through the chipper chute opening. See Figure 5-11.
6. Keep the cylinder assembly disk from turning by wedging the cylinder against the internal wall of the machine using a sturdy block of wood.

7. The chipper blade is attached to the disk by two socket head (Allen) screws (see Figure 5-11) and two locknuts. Use a 7/16-inch wrench and reach up inside the chamber to remove these two nuts. Hold each screw steady with a 5/32" hex wrench while removing the nuts.

8. Inspect the cutting edge of the blade. See Figure 5-12. If it is dull or nicked, sharpen at a 45° angle as shown. (The blade can also be taken to a professional sharpening service.)
9. Discard and replace a cracked blade. Never use a cracked blade because pieces of the blade could break off and cause serious injury.

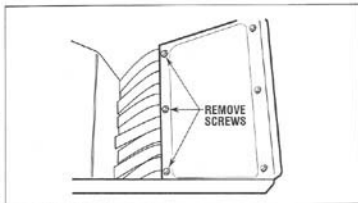


Figure 5-13: Shredder hopper flap.

# Maintenance

## Installation

1. Clean the blade seat and adjacent area on the cylinder assembly disk.
2. Place the chipper blade in the seat on the disk with the countersunk holes in the blade facing outward (toward you). Insert two **new** socket head (Allen) screws into the holes. See Figure 5-11.
3. Secure the blade using two **new** 1/4"-20 locknuts. **Do not reuse old hardware.** Tighten the nuts very securely. (After two operating hours, recheck these nuts for tightness.)
4. Remove the block of wood, reinstall the chipper chute, reattach the discharge screen, and reconnect the spark plug wire.

## HOPPER FLAP REPLACEMENT

**Tools Needed:** One 7/16" and one 3/8" wrench

If any of the "fingers" on the flap are torn or missing, or the flap does not prevent "blowback" of discharged material, inspect the flaps for damage. See Figure 5-13.

1. **Shut off the engine, allow it to cool, disconnect the spark plug wire, and prevent it from touching the spark plug.**
2. Remove the screws and nuts (underneath) which secure the flap and remove the flap.
3. Place the new flap in the same position and reinstall the attachment screws and nuts. Tighten the hardware securely.

## ▲ DANGER

**Never operate the Chipper/Shredder unless the rubber retainer flap is securely installed.**

## OFF-SEASON STORAGE

1. Thoroughly clean the PTO Chipper/Shredder.
2. Be sure that all nuts, bolts, and screws are securely fastened. Inspect the PTO Chipper/Shredder for damaged, broken, or worn parts.
3. Touch up all rusted or chipped paint surfaces — and lightly before repainting.
4. If possible, store your PTO Chipper/Shredder indoors.
5. Cover the PTO Chipper/Shredder with a suitable protective cover (not plastic) that does not retain moisture.

**IMPORTANT:** Install the dust cap on the PTO Chipper/Shredder coupling during storage.

## TROUBLESHOOTING

*This chart applies only to problems with the PTO Chipper/Shredder. Tiller and/or engine problems may also prevent the Chipper/Shredder from operating efficiently. See the PTO Horse Owner/Operator Manual for Tiller Troubleshooting instructions and the Engine Owner's Manual for engine troubleshooting. If further help is needed, contact your local authorized Engine Service Dealer for engine service, or contact your local authorized TROY-BILT® PTO Chipper/Shredder dealer or the Factory. Before performing any of the corrections in this Troubleshooting Chart, refer to the appropriate information contained in this Manual for the correct safety precautions and operating or maintenance procedures.*

PROBLEM	POSSIBLE CAUSE	CORRECTION
Chipper/shredder does not chip or shred.	<ol style="list-style-type: none"> <li>1. Belt on Power Unit or chipper/shredder is out of adjustment, broken, or excessively worn.</li> <li>2. Broken or missing chipper blade or shredder cutting blades.</li> <li>3. Broken or missing key in cylinder shaft.</li> <li>4. Locked cylinder shaft bearing.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust belt tension or replace belt(s).</li> <li>2. Replace blade(s).</li> <li>3. Replace key.</li> <li>4. Have authorized Dealer repair unit.</li> </ol>
Poor chipping/shredding performance.	<ol style="list-style-type: none"> <li>1. Dull chipper blade or shredder cutting blades.</li> <li>2. Power Unit engine not in FAST setting.</li> <li>3. Power Unit belt not in HIGH range.</li> <li>4. Excessively worn engine/cylinder shaft bearing(s).</li> <li>5. Loose locking collar(s) on cylinder shaft.</li> <li>6. Screen or bar grate not installed.</li> <li>7. Installation mesh has holes too large/small for task.</li> <li>8. Material tangled in cutting blades.</li> <li>9. Clogged chipper chute.</li> <li>10. Chipper blade clearance incorrect.</li> </ol>	<ol style="list-style-type: none"> <li>1. Sharpen or replace blade.</li> <li>2. Move Throttle Control Lever to FAST.</li> <li>3. Move belt to HIGH range.</li> <li>4. See Engine Service Dealer (engine shaft). See authorized PTO Chipper/Shredder Dealer (cylinder shaft).</li> <li>5. Tighten collar(s).</li> <li>6. Install screen or bar grate.</li> <li>7. Remove screen and install optional screen with smaller holes.</li> <li>8. Remove tangled material.</li> <li>9. Clear chipper chute.</li> <li>10. See authorized Dealer for adjustment.</li> </ol>
Heavy vibration or unusual noise	<ol style="list-style-type: none"> <li>1. Solid object jammed in chipper chute.</li> <li>2. Blades damaged and cylinder out of balance.</li> <li>3. Chipper cylinder assembly disk damaged.</li> <li>4. Chipper cutting blades fit inside unit.</li> <li>5. Cylinder shaft bearing(s) damaged.</li> <li>6. Blades hit bent discharge screen.</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove obstruction.</li> <li>2. See authorized Dealer for repair.</li> <li>3. See authorized Dealer for repair.</li> <li>4. See authorized Dealer for repair.</li> <li>5. See authorized Dealer for repair.</li> <li>6. Replace with new discharge screen. If necessary, replace damaged cutting blades.</li> </ol>
PTO Power Unit or Chipper/Shredder belt slips.	<ol style="list-style-type: none"> <li>1. Belt tension incorrect.</li> <li>2. Stretched or worn belt.</li> <li>3. Oil or grease on belt.</li> <li>4. Cylinder shaft bearings are binding.</li> <li>5. Object jammed in chipper chute or shredder hopper.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust belt tension.</li> <li>2. Adjust or replace belt.</li> <li>3. Clean pulleys and belt and replace belt.</li> <li>4. Check cylinder shaft for smooth rotation. If binding occurs, have authorized Dealer replace bearings.</li> <li>5. Remove object.</li> </ol>

# 6 Product Specifications

Dimensions:	30' long x 29-1/2' wide x 40" high
Weight:	Approximately 173 lbs.
Drive:	PTO-driven by PTO Horse Model Power Unit
Standard Screen:	3/4"
Optional Screens:	3/8", 1", 1-3/4" and bar grate
Shredder Cutting Blades:	12, hardened steel, removable and replaceable blades
Chipper Blade:	Hardened alloy steel blade on 12 lb. cylinder assembly disk
Chipper Capacity:	3" diameter branches
Shredder Capacity:	1/2" diameter materials
Accessories:	Leaf Tamper, Goggles, Dust Caps (supplied)

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## LIMITED WARRANTY

**Products Covered** This warranty is for the following TROY-BILT® branded products and their attachments or accessories: chipper/shredders, chipper/vacs, walk-behind mowers, riding mowers, tractors, snow throwers, brushcutters, sprayers, carts, composters and the Mini-Tiller.

**Date Warranty Begins** The warranty begins on the date of purchase.

**What is Covered** This product (except for the engine, as explained below) is warranted by Garden Way Incorporated to the original purchaser only, to be free of defects in material and workmanship under normal use and service for the following time periods:

NON-COMMERCIAL RESIDENTIAL USE ..... 7 Years  
COMMERCIAL OR OTHER NON-RESIDENTIAL USE ..... 90 Days

**ENGINES:** Engines used for non-commercial residential purposes are covered by the engine manufacturer's separate Limited Warranty. Garden Way Incorporated does, however, extend the length of the engine manufacturer's limited warranty, providing you with coverage for a total of 3 years. Please refer to the separate engine owner's manual for details concerning the engine manufacturer's Limited Warranty.

*Engines used for commercial or other non-residential purposes are warranted by their respective manufacturer for the time periods indicated in the Limited Warranty printed in the separate engine manufacturer's owner's manual.*

**What is Not Covered**

1. This warranty does not cover the periodic, normal replacement of parts that wear out such as belts, seals, blades, batteries, etc.
2. This warranty does not cover damage, malfunctions or failures due to:
  - a) Use of unauthorized accessories or attachments.
  - b) Misuse, accidents, or a lack of reasonable and necessary maintenance as specified in your product's Owner/Operator Manual (you may wish to keep records of maintenance and service).

**What We Will Do For You** We will, at our option, repair or replace any part found to be defective in material or workmanship, without charge for parts and labor. However, charges for pick-up, delivery, and service calls are not covered by this warranty.

**How to Obtain Non-Engine Related Warranty Service**

- You may be required to provide proof of the date of purchase (your sales receipt, for example).
- Contact any TROY-BILT® Authorized Service Dealer (if purchased from a dealer, we recommend that you contact the same dealer you purchased this product from in order to give the dealer the opportunity to service you to your satisfaction). Refer to your local telephone directory for the name of your nearest dealer or call the TROY-BILT® Technical Service Department (see Toll-Free number below) for assistance.

-OR-

- Contact the TROY-BILT® Technical Service Department in Troy, N.Y. at this Toll-Free number:  
**1-800-833-6990.**

**How to Obtain Engine Warranty Service** Contact any service dealer that is authorized by the manufacturer of your engine. Please refer to the engine manufacturer's Limited Warranty for exact details on how to obtain warranty service. If you have any questions or concerns regarding engine warranty service, please call the TROY-BILT® Technical Service Department for assistance.

**Disclaimer of Consequential Damages** Garden Way Incorporated shall not be liable under any circumstances for any incidental or consequential damages or expense of any kind, including but not limited to cost of equipment rental, loss of profits, or cost of hiring services to perform tasks normally performed by the equipment.

**Limitation of Implied Warranties** Any implied warranties, including without limitation any implied warranty of merchantability or fitness for a particular purpose, shall be limited in duration to a period of seven years (90 days if product is purchased for commercial or other non-residential use) from the date of sale.

**SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, OR LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS. THEREFORE, THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU.**

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

**Garden Way Incorporated, 102nd St. & 9th Avenue, Troy, New York 12180**

*For customer assistance, contact your nearest authorized dealer or:*

In the United States: Garden Way Incorporated • 102nd St. and 9th Ave. • Troy, New York 12180  
For Technical Service: (800) 833-6990 • For Parts: (800) 648-6778

In Canada: Garden Way Incorporated • 320 Van Sicke Rd., Unit 12 • Saint Catharines, Ontario L2R 6P7  
For Technical Service or Parts: (800) 225-3555