




PATRIOT

The New Performance Standard.

OWNER'S & OPERATOR'S
MANUAL

—  —
FOR MODELS WITH
ELECTRIC MOTORS

THIS AIN'T EXACTLY A NEW YORK TIMES BESTSELLER, BUT...

Rest assured. You've purchased the most efficient, most durable chipper-shredder-vac of its kind. However, before you get started, you must read all the instructions in this manual to work efficiently and safely.

For your own satisfaction and well-being, please take time now to study this publication. Then, drop your warranty card in the mail so we can send you news and updates. Anyone else who will operate this powerful recycling machine must read this, too. Work safely and enjoy!

—PATRIOT PRODUCTS, INC.

CUSTOMER SERVICE

8:00 a.m. - 4:00 p.m. CST

Monday - Friday (except holidays)

800-798-CHIP(2447)

FAX 262-523-1011

The Patriot Warranty

Run your PATRIOT in the safe, efficient manner that we set down in this manual. If the equipment fails during the warranty period due to defects in materials or workmanship, we will make things right:

Home Use

Any PATRIOT product or part found to be defective within two (2) years from the date of purchase is to be returned to our factory by way of your dealer or place of purchase for evaluation. Transportation charges on parts and whole units submitted for replacement under this warranty must initially be borne by you.

This warranty shall not be effective for parts which do not function properly due to:

- **normal wear and tear;**
- **negligence, misapplication or accident;**
- **alteration, abuse, misuse or improper maintenance.**

Patriot Product, Inc. shall not be liable for any damages or injuries arising from our products, defective or otherwise.

Commercial Use

A PATRIOT employed in any commercial endeavor (rental stores, landscaping businesses, farming, etc.) is warranted for ninety (90) days from the date of purchase under the terms and conditions described above.

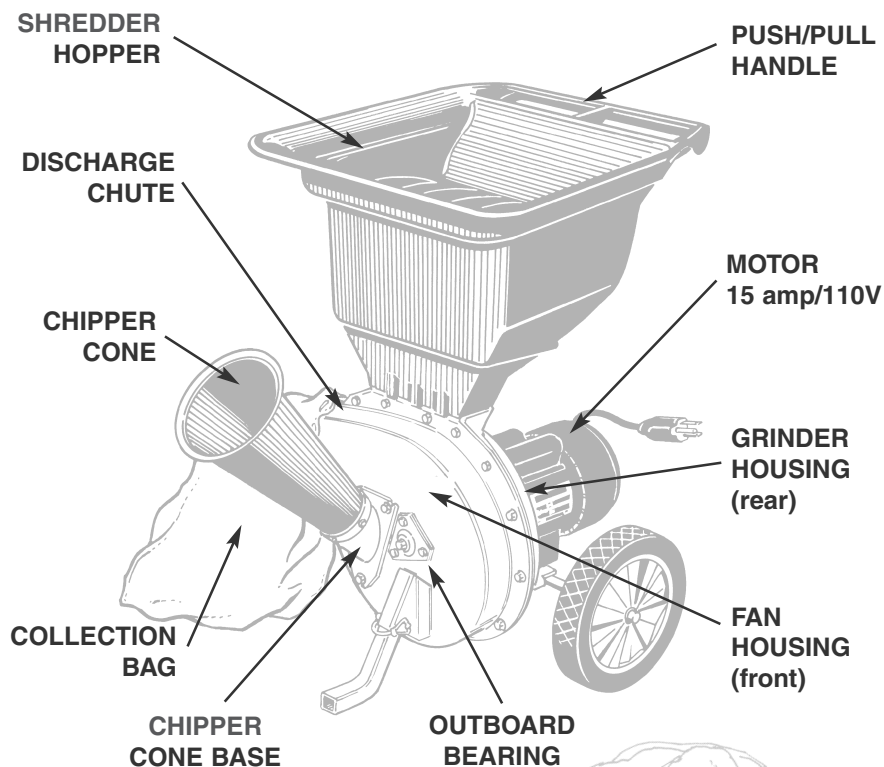
All Owners

This warranty shall be effective only if the instructions in this manual have been followed *and* the warranty card is filled out, signed and returned within ten (10) days of receipt of merchandise. The Patriot Warranty gives you specific legal rights, and you may also have other rights which vary from state to state. This warranty is not transferable.



**THE BLACK TRIANGLE
CALLS YOUR ATTENTION TO
IMPORTANT SAFETY AND
OPERATING INSTRUCTIONS.
PROPERTY DAMAGE AND
PERSONAL INJURY MAY
RESULT IF THESE INSTRU-
CTIONS ARE NOT HEEDED BY
ALL OPERATORS.**

PATRIOT'S ELECTRIC CHIPPER-SHREDDER-VAC



WARNING: DO NOT OPERATE THIS EQUIPMENT UNTIL (1) IT IS COMPLETELY ASSEMBLED AND SERVICED, (2) YOU HAVE READ AND UNDERSTAND THIS MANUAL, AND (3) YOU HAVE FILLED OUT, SIGNED AND RETURNED YOUR WARRANTY REGISTRATION CARD.



CAUTION: PLUG YOUR ELECTRIC UNIT INTO A SOCKET HAVING A GROUND FAULT INTERRUPTER (GFI). AVOID RAINY OR MOIST CONDITIONS. KEEP CHILDREN AND PETS AWAY FROM ANY OPERATING POWER EQUIPMENT.



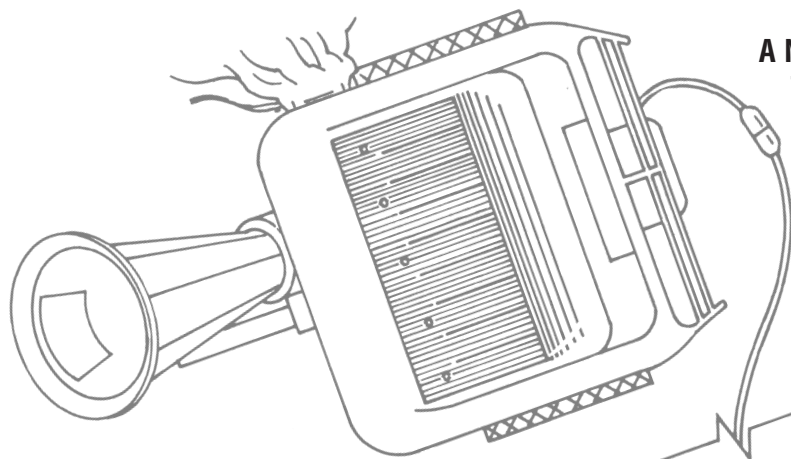
WARNING: NEVER PUT YOUR HANDS, FACE OR CLOTHING INTO ANY HOPPER, CONE OR CHUTE WHEN THE ROTOR IS TURNING. NEVER PUT YOUR FINGERS OR FACE INTO THE CHUTE OR BEYOND THE HOPPER GUARDS WHEN THE ROTOR IS TURNING. SERIOUS PERSONAL INJURY MAY RESULT.



The area marked by the dotted line is a **SAFE OPERATING AREA.**

Discharge area. Stay clear during operation.





**A NOTE TO
THE HAPPY, EXCITED,
TO-HECK-WITH-THE-MANUAL
KIND OF CUSTOMER...**

We've put
this information on this page because it has come
to our attention that *some* people don't read these
manuals. (Can you believe IT!)

POINT #1

You need a 12 gauge, outdoor-rated extension
cord, not to exceed 100 feet in length. Use only one
cord, not two joined together.

POINT #2

Dedicate a 15 amp (minimum) house-
hold circuit to this machine. Having multiple
appliances drawing from a circuit will reduce the
chipper-shredder-vac's performance. The unit may stall or
trip the circuit more often, without a line to itself.

POINT #3

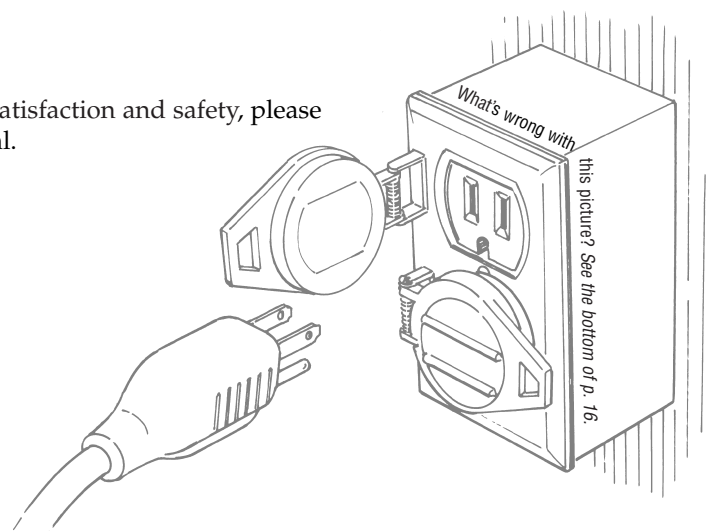
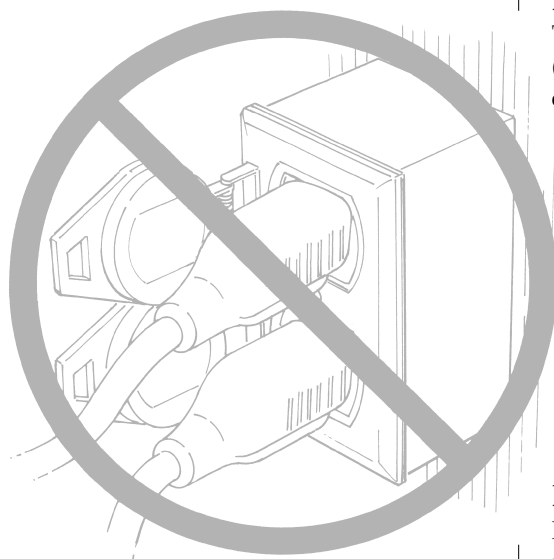
This dedicated circuit must have sockets with Ground Fault Interrupters
(GFI)—look for small rectangular red buttons built into the socket. The
electric motor's switch is insulated with silicon and the motor is UL listed.
But a GFI is further insurance.

POINT #4

Blowing a fuse or tripping a circuit breaker is a warning that the operator
is over-loading the machine or has too many devices taking power from
the circuit—or both. Determine the cause (i.e., overloaded circuit, feeding
chipper too fast with thicker branches, old circuitry, etc.) and correct it. A
higher capacity fuse shall NOT be installed.

POINT #5

For your own satisfaction and safety, please
read the manual.



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Common

(and Expensive) Mistakes

Sure-fire ways to *shorten* the life of your chipper-shredder-vac while incurring costly repairs along the way:

- Chipping dead wood and not sharpening the knife often. (Dead wood dulls the edge faster than greener limbs.)
- Forcing branches down the chipper cone when the knives are dull.
- Dropping stuff down the shredder that's bigger than the decal says it can safely handle.
- The occasional, if accidental, railroad spike, brick, 2 x 4, barbed wire, and/or gardening tool "down the hatch" routine.
- Disrespecting the SHUT DOWN PROCEDURE (see page 4).



Safety & Maintenance

This chipper-shredder-vac is engineered to meet or beat the very latest safety standards established by the Outdoor Power Equipment Institute (OPEI) and the American National Standards Institute (ANSI).

OPEI/ANSI standards require safety decals in special places on the machine. These decals must be replaced should they become worn or unreadable. It is your responsibility to replace the decals when they become hard to read.

Safety also requires that all guards and deflectors be kept in place and in good condition. Again, it is the operator's responsibility to repair or replace the guards and the deflector whenever necessary.

Other Maintenance

It's hard to say exactly when you should sharpen the chipping knife or reverse (or replace) the hammers. Chip branches and prunings while they are still green and fresh to keep the knife wet and cool. It will stay sharp longer. Dead, dry wood—or dirty, gravelly garden waste, for that matter—dulls the chipping knife and weathers the shredding hammers much more quickly.

Generally speaking, when the knife ceases to pull branches down the chipper, it needs sharpening. The hammers can be checked visually by just looking down the shredder hopper.

① SAFETY

It is your responsibility to make sure that no person is injured operating the chipper-shredder-vac. You and all others who will operate this equipment must read and follow all the safety and operating instructions in this manual!

The Shut Down Procedure

Before assembling, using, servicing or otherwise operating your chipper-shredder-vac, please protect everyone's safety by knowing how and when to use the Shut Down Procedure...

HOW TO SHUT DOWN

1. Turn off the motor.
2. Wait until the rotor inside has stopped turning.
3. Disconnect the plug from the extension cord.

WHEN TO SHUT DOWN

- ⇨ Before moving the chipper-shredder-vac.
- ⇨ Before attaching or detaching the collection bag.
- ⇨ Before attaching or detaching the vacuum.
- ⇨ Before clearing debris from the rotor.
- ⇨ Before removing waste from inside the shredder or chipper hoppers.
- ⇨ Before resetting the breaker in the event of a broken circuit.
- ⇨ Before cleaning, servicing or otherwise inspecting the machine.
- ⇨ Before putting hands, face, fingers, probing tools, etc. near any moving part.
- ⇨ Before children, pets or bystanders come near.

Some Do's

- ✓ Wear safety goggles while operating this equipment. Hearing protection is advised.
- ✓ Avoid wearing loose-fitting clothing or hanging jewelry.
- ✓ Prevent shock hazard. Use a 12 gauge extension cord rated for outdoor use. The correct cord is important to personal safety and property.
- ✓ Blowing a fuse or tripping a circuit breaker is a warning that the operator is over-loading the machine or has too many devices taking power from the circuit—or both. Determine the cause and correct it. A higher capacity fuse shall NOT be installed.
- ✓ Unplug the cord from its ends, not by yanking the cord. Keep the cord away from excessive heat, oil and sharp edges.
- ✓ Know when and how to use the SHUT DOWN PROCEDURE.
- ✓ If the cord is damaged, SHUT DOWN and replace it with a new one before using the machine again.
- ✓ Check all fasteners for tightness before each use.
- ✓ Avoid damp locations.
- ✓ Keep the cooling fan in back of the motor clean of debris and other accumulations.
- ✓ Operate your chipper-shredder-vac on dirt or grass and on level ground.
- ✓ Make sure the chipping and shredding chambers are clear before starting the motor.
- ✓ Remain alert while operating this equipment.
- ✓ Inspect waste before processing it. Make sure it is free of rocks, glass, metal, and other non-organic objects.
- ✓ Keep your face, hands, body, and clothing out of the hoppers, discharge chute and any other inlets when operating this equipment. Stay clear from all moving parts.

- ✓ Keep your balance. Don't overreach. Watch your step around the cord.
- ✓ Disconnect the machine when it is not in use. Make sure the switch is moved to OFF before plugging the unit back in.

Some Don'ts

- ▲ Do not attempt even a *minor* clean-out of the hoppers or discharge chute while the rotor is turning!
- ▲ Do not continue operating the chipper-shredder-vac if unusual vibration or noise occurs. Shut down, inspect for damage, replace or repair parts as needed and check fasteners for tightness before resuming work. If there are still problems, take it to a PATRIOT Service Center.
- ▲ Do not allow children to operate this equipment.
- ▲ Do not operate this equipment around children, pets or bystanders.
- ▲ Don't operate in slick, wet or congested areas.
- ▲ Don't operate on paved or gravelled surfaces.
- ▲ Don't permit materials to build up in the collection bag. The chips and shreds may clog the discharge chute, resulting in stalling or even a kick back of material out of the hoppers.
- ▲ Do not put your hands or any other part of your body or clothing inside the hoppers or discharge chute—or near any opening to moving parts!
- ▲ Don't transport the machine with the motor running.
- ▲ Don't dump waste in the shredder using a trash or nylon bag. It may get caught by the vacuum or the grinder, causing damage or injury.

② ASSEMBLY

First & Foremost

The parts you must assemble are packed in the cardboard base beneath your chipper-shredder-vac. These parts *must be assembled* before any attempt is made to start the motor!

The collection bag—which is to be used at all times—must be put on before each operation.

Step by Step

If anything is dented, bent or badly scratched, now is the time to notify your place of purchase. The box should include:

- the *chipper-shredder-vac*, with factory-installed motor, wheels and shredder hopper;
- *collection bag*;
- the *chipper cone* with *chipper cone base*.
- the *front leg* (it's supposed to be bent!); and,
- a *bag of hardware*, containing:
 - (5) serrated flange nuts, 5/16-18
 - (1) hex-headed cap screw, 5/16-18 x 3.25"
 - (1) Allen wrench, 5/32" (for hopper maintenance only)
 - (1) Allen wrench, 3/16" (for chipper knife maintenance only)

The lynch pin for the leg is already on the unit. The vacuum kit is not included with your unit. It is packaged and sold separately.

You will need one 1/2" box end wrench for assembly.

Long-Term Care & Storage

Store the chipper-shredder-vac out of reach of children. Do not leave it plugged in.

The steel parts are finished with a baked-on powder coating. This type of paint process is more durable and more environmentally friendly than sprayed-on paints.

Wash your machine—unplugged, please—with a garden hose. Soap won't hurt it either.

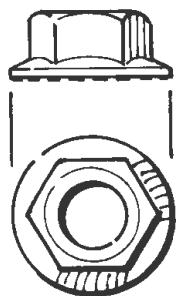


WARNING: DO NOT OPERATE THIS EQUIPMENT UNTIL (1) IT IS COMPLETELY ASSEMBLED AND SERVICED, AND (2) YOU READ AND UNDERSTAND THIS MANUAL. (3) SIGN AND RETURN YOUR WARRANTY REGISTRATION CARD WITHIN 10 DAYS AND TELL US WHAT YOU THINK OF THE PATRIOT.



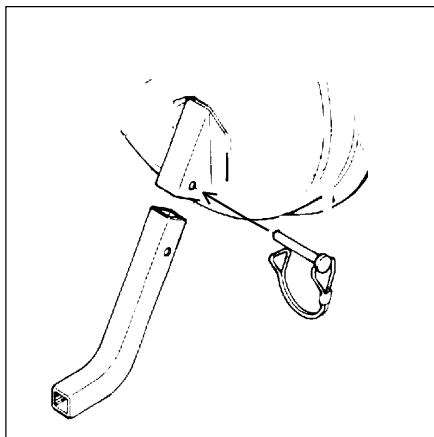
HEX HEAD CAP SCREW,
5/16-18 x 3.25"

The bag retaining bolt
used in Step 3.



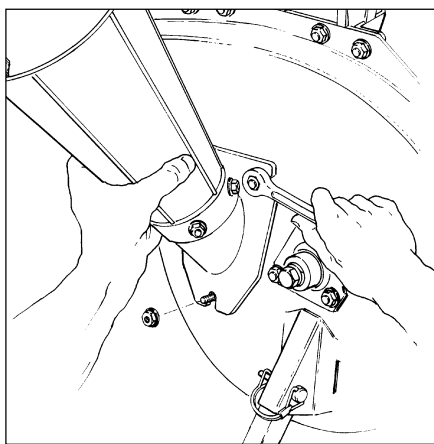
SERRATED
FLANGE NUT

Side and top views.
The serrations on
the bottom bite into
the steel for better
staying power.



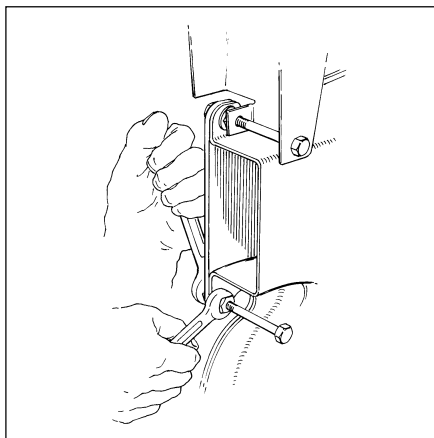
STEP 1

Put the leg into its holder. Insert the lynch pin and clip the U-shaped clasp around the front of the leg, onto the end of the pin.



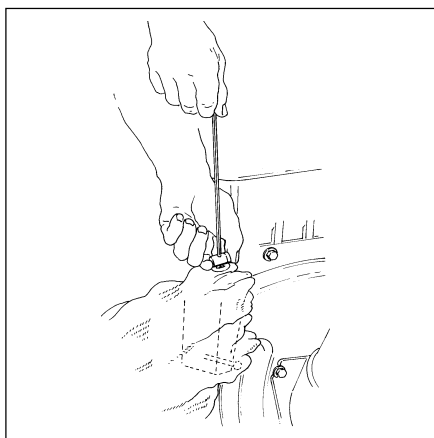
STEP 2

Insert the base of the chipper casting, bottom first, into the oval hole. Use your 1/2" wrench to tighten the three serrated flange nuts (5/16-18) on the exposed studs. *Do not over-tighten these nuts. Do not file or grind any part of the chipper cone base.*



STEP 3

Thread one flange nut onto the 3-1/4" long bolt, with its serrated side facing away from the head of the bolt. Insert the end of the screw through the hole under the discharge chute. Screw on the remaining nut, serrated side facing in, onto the end of the bolt. Tighten with a 1/2" wrench.

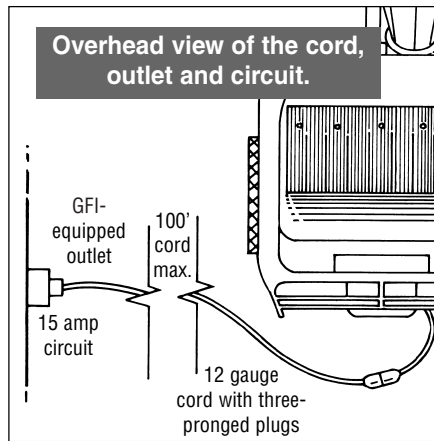


STEP 4

Attach the bag over the entire deflector shield assembly and the retaining bolt you installed in STEP 3. Pinch the plastic barrel clamp and pull it down until the bag is tightly attached. The bag must be secured like this before each use of your chipper-shredder-vac.

STEP 5

Before plugging in, always be sure the switch on the motor is in the OFF position. Use up to 100 feet of 12 gauge, outdoor-approved extension cord. Plug into a 15 amp, ground-fault-equipped outlet.



WARNING: BE SURE THE SWITCH IS OFF BEFORE PLUGGING IN THE CORD.

Now check all the fasteners. They may have loosened during shipping. Tighten anything that's loose. It's a good idea to check the fasteners for tightness before every use.

Cords & Circuits

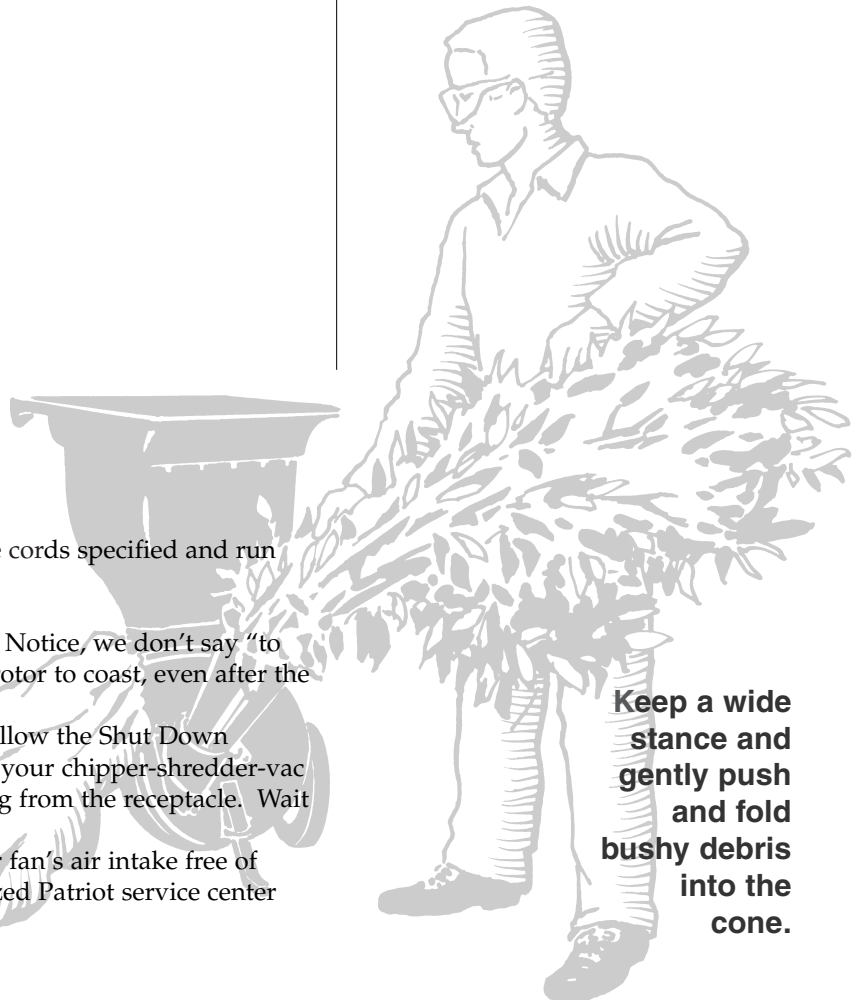
For safety and maximum performance, use only the cords specified and run the machine on circuits as we have described.

A word about the ON/OFF switch:

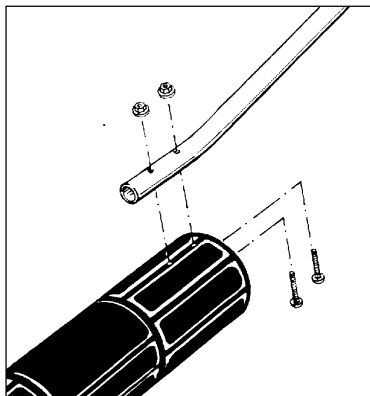
To turn the power off, move the switch to OFF. Notice, we don't say "to stop the chipper-shredder-vac." Inertia causes the rotor to coast, even after the power is shut off. Don't mess with a moving rotor!

For your personal safety, please remember to follow the Shut Down Procedure before attempting to service or clean out your chipper-shredder-vac in any way. Turn off the motor. Disconnect the plug from the receptacle. Wait until all moving parts have stopped.

For your safety and satisfaction, keep the motor fan's air intake free of accumulations of dust, dirt and leaves. An authorized Patriot service center can help you should problems arise.



Keep a wide stance and gently push and fold bushy debris into the cone.



Vacuum Kit Assembly (optional equipment)

The vacuum kit, 15 feet long and 4" in diameter, is used to vacuum and grind leaves, pine straw and other loose organic waste. The kit is sold separately; instructions are provided here and with the kit for your convenience.

FIRST

Insert two 1.25"-20 carriage bolts from inside the nozzle and through the holes in the handle. Fasten with the two 1/4"-20 serrated flange nuts provided using a 7/16" wrench.

SECOND

Push one end of the hose firmly into the nozzle. The nozzle has what is called a "regressive" fit. Turn the nozzle to adjust the angle of the handle in your hand.

THIRD*

Thread the other end of the hose into the adaptor about 3 inches. You may need to tug it through from the other side.

FOURTH*

When you want to use the vac, snap the adaptor into the hopper *before you turn on the power*. The adaptor only fits with the DANGER decal on your right as you stand behind the machine.

FIFTH & LAST*

Snap the cone cover over the chipper cone. This seals off all air flow for maximum vacuuming power.

*Patent pending design featured in this step.

③ WORK AREA & WASTE PROCESSING GUIDE

Safe Operating Area

Work on even ground—either dirt or grass—close to the waste you plan to process, or where you plan to put the chips and shreds. Allow enough room to work around your chipper-shredder-vac, without obstacles standing in the way. Allow enough overhead clearance to pick up the longer, bushier branches. Avoid wet, slippery or congested areas which might trip you up. Avoid driveways, sidewalks, gravel and other hard areas. Discharge might bounce up and hit you or bystanders.

Waste Processing Guide

SHREDDER	CAPACITY	TYPE OF DISCHARGE
Leaves, pine straw, small plants, flowers, bulbs, light prunings.	1/2" dia. x 36"	Fine mulch (greens), longer shreds (branches).

SHREDDING TIPS

- Aim the waste butt-first down the right side of the shredder hopper (as you stand behind it)
- Use an open-handed technique, loosely grasping the waste to throw it in. Do not hold onto it.
- Pour—rather than dump—loose waste into the shredder hopper at an even rate.
- Chase waste stuck in the throat with a shreddable pruning. Or, use the end of 3" thick branch to stir clumps until the rotor pulls them in.
- Vines are best fed down the chipper, followed by a thick branch.
- Green debris exceeding the length limitations may wrap around the rotor and seriously plug up the machine! Chip them.
- Materials that are too thick may stall the machine and possibly damage the hammers, rotor, housings or hopper. Use the chipper.
- Shut down and empty the bag often.

CHIPPER	CAPACITY	TYPE OF DISCHARGE
Hard or soft woods, bundles of smaller prunings, corn stalks, palm fronds (split down center), vines.	2.5" dia. x ?	Dime-sized chips, some bigger chips.

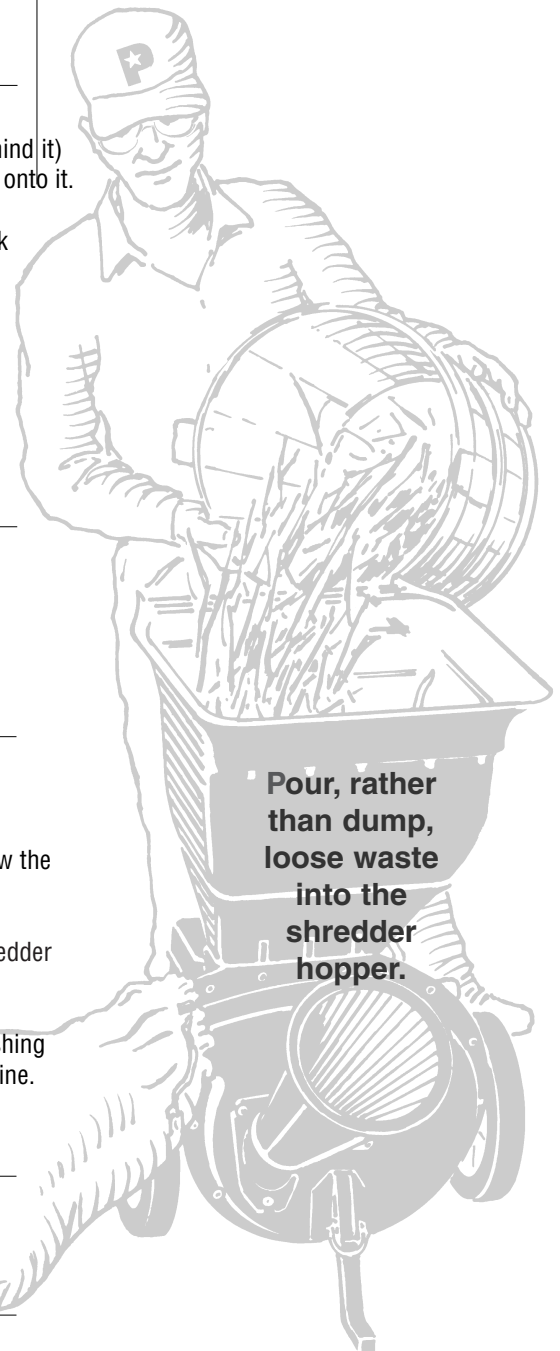
CHIPPING TIPS

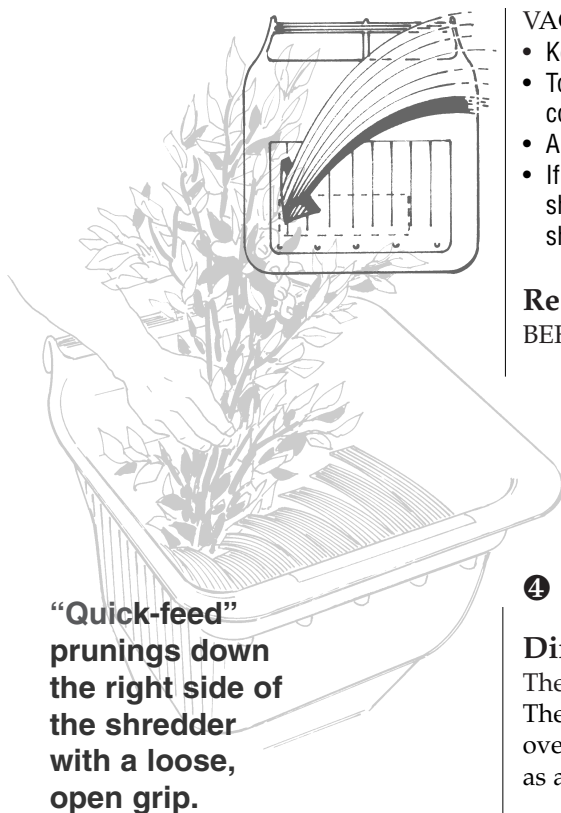
- Chipping is more efficient than shredding.
- Small branches on a thick limb may fold easily into the cone as it is fed.
- Rotate, insert and retract thick branches so that the motor runs at a steady rate. Allow the rotor to recover and discharge the chips.
- Several smaller branches may be bundled and inserted together.
- *When the debris is the length of the chipper cone:* put thinner prunings down the shredder or chase the debris down the cone with another branch.
- Green materials are easier to chip and the knives will keep their edges longer.
- Resharpen the chipper knives when you notice that they don't self-feed very well. Pushing debris into dull knives causes horrible vibration and can seriously damage your machine.
- Shut down and empty the bag often.

VACUUM	CAPACITY	TYPE OF DISCHARGE
Dry to moist leaves, pine straw, sawdust, grass clippings.	Loose waste.	Powdery mulch, some shreds.



CAUTION: KEEP CHILDREN AND PETS AWAY FROM ANY OPERATING POWER EQUIPMENT.





VACUUMING TIPS

- Keep the hose straight or slightly curved along the ground.
- To vacuum around sensitive plants, decrease the suction power by taking the cone cover off the chipper cone.
- Allow the nozzle to hover over the waste, rather than sticking it into the pile.
- If the vacuum loses power, there may be a clog in the nozzle or in the throat of the shredder hopper. You may need to shut down, unplug the adaptor and unclog the shredder's throat.

Ready to Go?

BEFORE YOU START

1. Power OFF, plug detached?
2. Fasteners tight, adequate cord and circuit?
3. Work site prepared, collection bag attached (and vacuum, if needed)?
4. Shredder and chipper chambers clear of debris?
5. Plugged in, operating instructions understood?

4 HOW (& WHY) IT WORKS

Direct-Bagging

The chipper-shredder-vac must be operated with the bag securely in place. The bag holds over two bushels, but emptying it often is a good habit. If it overfills, debris may back up into the discharge chute and stall the motor, just as a lawn mower does when it's bag gets too full.

Great will be the temptation...but do not begin to remove the bag until you have thoroughly executed the Shut Down Procedure.

Chipping

Waste fed down the chipper cone produces fairly uniform, dime-sized chips. One sharp knife, mounted on the rotor, passes the cone's cast iron base at 3450 RPM, cutting the end of the branch into little chips. The chips pass through a slot behind the knife and are conveyed by the fan into the bag.

The knife is angled to draw limbs in as it cuts them. Eventually, the knife will become dull. It must be removed and sharpened (see page 13). The knife must be replaced when its cutting surface nears one quarter inch from the knife's mounting holes. (See page 15, bottom right.)

Shredding

The shredder hopper uses six Y-shaped hammers and the built-in vacuum to pull waste into the grinder housing. The vacuum created by fan blades mounted on the rotor pulls in loose debris. The shredding hammers attached to the rotor grab onto thicker debris. They shred, cut or grind the material until it is small enough to be pulled into the fan chamber by the vacuum and discharged into the bag.

The rotor spins clockwise (as you stand behind the machine). The hammers swing freely on their shafts, a full 360°. If the Y-shaped hammers hit material too heavy to shred or grind on the first strike, they swing out of the way.

The forks at the working ends of the hammers do the shredding and grinding. (Technically speaking, green debris is said to be “shredded”; drier, leafier debris is “ground”.) These hammers eventually wear down and can be reversed. After both sides are used, replacement hammers are required.

Vacuumping

The rotor has four fan blades fixed to it, creating a vacuum inside the scroll-shaped housings. The vacuum draws air into the housings through the shredder hopper and chipper cone inlets.



CAUTION: DO NOT LET GO OF BULKY WASTE AND LET IT BOUNCE AROUND IN THE HOPPERS. IT MAY DAMAGE THE UNIT OR BE EJECTED TOWARD THE OPERATOR OR BYSTANDERS AND CAUSE INJURY.

To take full advantage of this air flow system, the optional vacuum kit hose attaches with an adaptor, which snaps inside the shredder hopper. Snap the cone cover over the chipper cone and you've sealed off all sources of air except one. Since a vacuum needs air to stay alive, it draws air from the working end of the hose.

And If It Doesn't Work...

Most stalls, jams and plug-ups can be attributed to overloading the hoppers, an overloaded circuit, or some other power problem. However, sometimes any chipper-shredder can get caught up on something. Here's what we suggest you do:

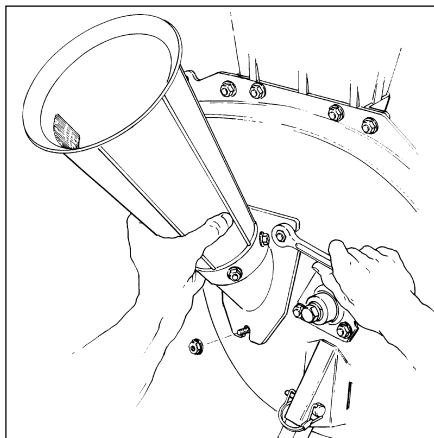
1. Turn the switch to OFF and unplug the unit.
2. Clear the hoppers of all debris. Plug the unit in. Restart.
3. If it still won't start, check the circuit breaker. *Make sure the switch is OFF before leaving the unit unattended.* Restart.
4. If the rotor is still jammed, shut the unit down again. Take off the bag. Use a long, sturdy probing tool to reach into the discharge chute. Push on the fan blades to move the rotor backwards. Repeat 2, 3 and 4 until all's clear.
5. If the rotor is wrapped up and the housings are full of debris, open the housings to empty them. See the next section for disassembly instructions.

⑤ MAINTENANCE GUIDE

Servicing the Hammers & Sharpening the Knives

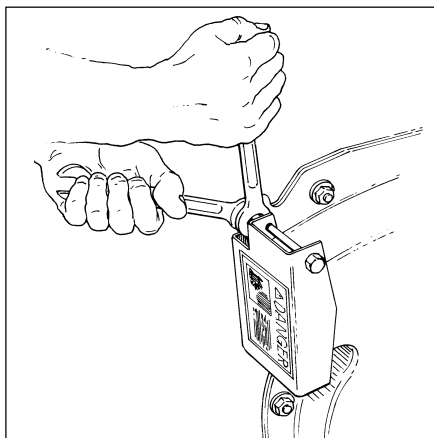
1

Shut off the motor, let the rotor stop, disconnect the plug. Remove the chipper cone from the fan housing with a 1/2" box-end wrench. (If you only wish to service the knives, go directly to #8 on page 15.)



2

Disassemble the discharge deflector and the bag retaining bolt underneath the discharge chute using two 1/2" wrenches.



WARNING: THE POWER MUST BE OFF, THE ROTOR FULLY STOPPED AND THE PLUG DISCONNECTED FROM THE OUTLET BEFORE ANY SERVICE OR MAINTENANCE IS PERFORMED. OTHERWISE, PERSONAL INJURY MAY RESULT.

Batten Down the Hardware

All the serrated fasteners, roll pins, lock nuts and lockwashers have special locking qualities when they're new.

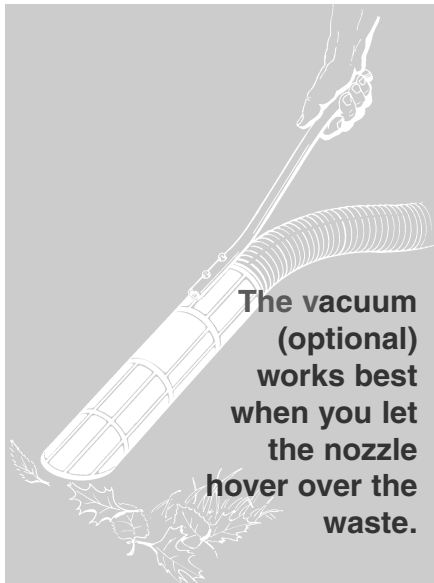
After removing one for any reason, use a new one in its place. Inspect and tighten loose fasteners before each use.

Deflector Shields, Hopper Guards & You

The deflector shield covering the discharge chute and the flexible hopper guard inside the shredder hopper are designed to last a long, long time. However, should either the guard or the deflector somehow become damaged, you must shut down the unit and fix or replace them before continuing any further.



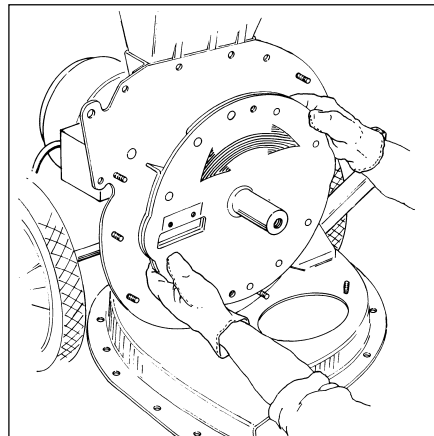
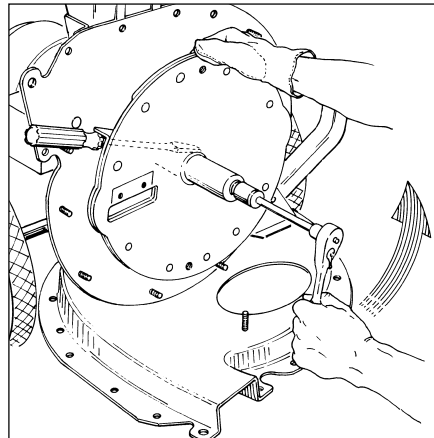
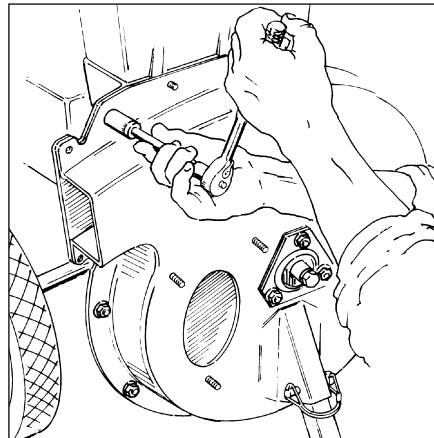
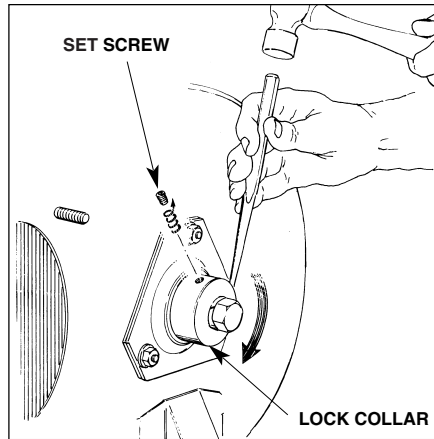
CAUTION: TURN OFF THE MOTOR, WAIT FOR THE ROTOR TO STOP TURNING AND DISCONNECT THE CORD BEFORE ATTEMPTING TO SERVICE THE HAMMERS OR KNIVES. FAILURE TO SHUT DOWN PROPERLY CONSTITUTES NEGLIGENT BEHAVIOR AND MAY RESULT IN PERSONAL INJURY.



CAUTION: FOR YOUR SAFETY AND TO MEET NATIONAL SAFETY STANDARDS, THE DISCHARGE DEFLECTOR AND HOPPER GUARD MUST BE MAINTAINED IN GOOD CONDITION. SERIOUS PERSONAL INJURY MAY OCCUR IF THE SHIELD OR DEFLECTOR ARE NOT INTACT. IT IS THE OPERATOR'S RESPONSIBILITY TO MAINTAIN THESE SAFETY DEVICES.



CAUTION: THE ROTOR WILL COAST EVEN AFTER THE MOTOR IS OFF. MAKE SURE THIS ASSEMBLY IS FULLY STOPPED AND DISCONNECT THE MOTOR'S PLUG BEFORE ATTEMPTING MAINTENANCE OR SERVICE. IF THE ROTOR IS STILL TURNING, IT MAY CAUSE SERIOUS PERSONAL INJURY.



3

Lock the rotor by inserting a long probe into the shredder hopper, between rotor's hammer shafts. Loosen the lock collar by removing the set screw with an 1/8" Allen wrench. Insert a pin punch at an angle into the *other* hole in the collar. Tap clockwise with a ball peen hammer, turning the collar clockwise, and remove. (When reassembling, sand the burr where the set screw enters. Tap the collar 3-6 times counter-clockwise with the punch. Unlock the rotor.)

4

Remove the flange nuts from around the perimeter of the fan housing. Next, loosen but do not remove the three flange nuts holding the triangular flangettes over the bearing. Pull apart the housings. Then take off the flangettes and remove the entire fan housing. Position it underneath the unit, as seen in the next drawing...

5

Note how the fan housing has been placed underneath. This supports the unit while you remove the rotor. Wedge a screw driver behind the rotor, under a fan blade and above a stud. Use a 1/2" wrench to remove the 5/16" bolt and two lockwashers from the center of the rotor shaft. (When reassembling, replace both lockwashers, and use a torque wrench to tighten this bolt to 27 ft.-lbs.)

6

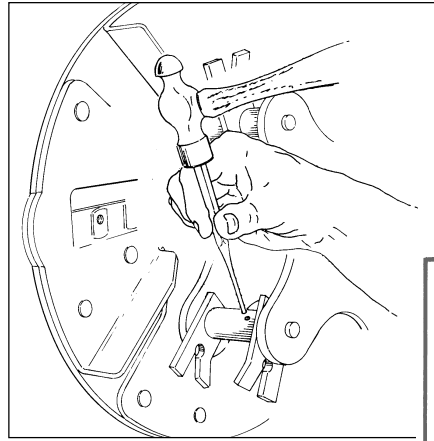
Pull the rotor from the crankshaft by pulling and steering the rotor. There may be some resistance. Pull it off steadily, making sure that the hammers clear the inner wall of the center plate. (Before reassembling, coat the motor's drive shaft and the key with liquid graphite. Do not use anti-seize.)

7

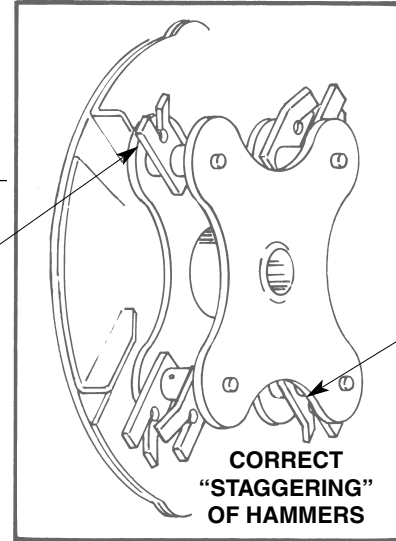
Secure the rotor in a vice. Service one hammer assembly at a time. Use a ball peen hammer and pin punch to remove the roll pins from each spacer and shaft as shown. (**Discard the roll pins. Use new pins during reassembly.**) Pull out the shaft, catching the spacers and hammers with your free hand. Inspect the shafts and spacers for unusual wear. Replace them, if necessary.

Reverse each worn hammer, or replace them as need be. Note how the Y-hammers are positioned in relation to one another. Shafts with two hammers must be reassembled so that the bent prongs face inward; the single hammers face their prongs in opposite, outward directions. Secure the spacers with new roll pins using your ball peen hammer and punch pin.

If not servicing the knives, reassemble your unit by following 1 through 6 in reverse order.



One hammer, fork facing outwards.



One hammer, fork facing in.

8

With the chipper cone and base removed, slowly turn the rotor clockwise with a probe until the chipper knife appears in the hole. Scrape out any pulp embedded in the heads of the screws. Loosen the screws using the 3/16" Allen wrench provided with your unit. Unscrew them by hand and remove the knife.

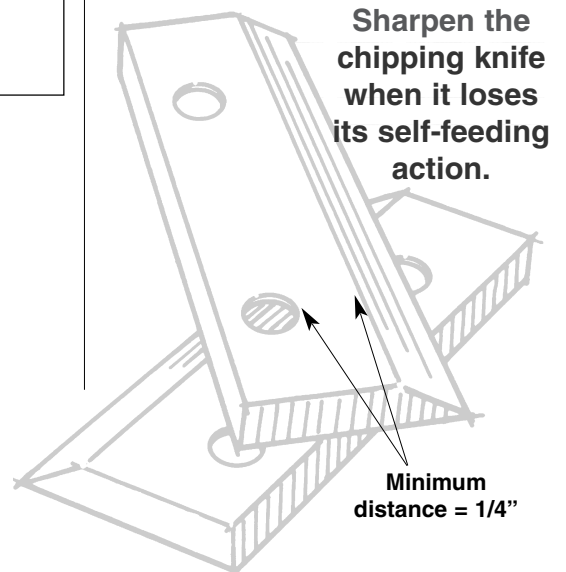
Sharpen the knife evenly at a 30° angle. A homeowner's bench grinder with a fine grit stone will do. But because the knife is specially heat-treated, too much heat will make brittle. So, grind only a little bit at a time and allow them to cool.

Slow-speed, water-cooled grinding is preferred. For best results, see your local machine shop specialist.

The knife must be replaced once the base of its cutting edge is ground within 1/4" of the mounting holes.



SHOWN HERE:
Removing the
knife without
disassembling
the housings.



Reassemble your chipper-shredder-vac by following these instructions in reverse.

⑥ TROUBLE-SHOOTING



CAUTION: BEFORE ATTEMPTING TO REMEDY PROBLEMS WITH YOUR CHIPPER-SHREDDER-VAC, TURN THE MOTOR OFF, DISCONNECT THE UNIT AND WAIT FOR THE ROTOR TO COME TO A COMPLETE STOP. FAILURE TO DO SO CONSTITUTES NEGLIGENT BEHAVIOR AND MAY RESULT IN PROPERTY DAMAGE AND SERIOUS PERSONAL INJURY.

PROBLEM	CAUSE	REMEDY
Motor won't start.	1 Not plugged in or wrong gauge cord. 2 Circuit is broken. 3 Hoppers, housings or bag are full of debris. 4 Malfunctioning internal switches or leads.	1 Review page 4. 2 Turn off unit. Reset circuit breaker. 3 Shut down, clean out, reset breaker, and re-start. 4 See an authorized service center.
Unusual vibration, rubbing noises, low RPMs.	1 Sticky debris lodged on rotor. 2 Dull, damaged knife. 3 Bearing is cracked or misaligned and/or the rotor and knife are hitting chipper base. 4 Hammers broken or aren't swinging freely. 5 Bent metal, broken plastic, internal damage.	1 Shut down. Clean out rotor. 2 Sharpen or replace <i>immediately</i> . 3 Inspect bearing and knife for damage. Re-secure or replace. If rotor or bearing are damaged, see a service center <i>immediately</i> . 4 Check hammers for debris or bent or damaged parts. 5 See a service center for repairs.
Clogging or debris does not chip easily.	1 Feeding rate too fast for discharge rate. 2 Dull, damaged knife.	1 Feed thicker waste at a slower rate. 2 Sharpen or replace <i>immediately</i> .
Clogging or debris does not shred easily.	1 Debris exceeds shredder's size limits. 2 Debris is either too wet or too dry. 3 Hammers worn, broken.	1 <u>Chip</u> thicker, longer debris. 2 Alternate between dry and green debris to keep housings clean. 3 Service <i>immediately</i> .
Vacuum not vacuuming.	1 Adaptor or hose not secure. 2 Cone cover not on cone. 3 Nozzle or shredder are plugged up.	1 Snap adaptor into hopper. Check hose connections, cone cover. 2 Snap on cone cover. 3 Check nozzle by hand for plugs. If hose or shredder are plugged, shut down, shake out hose and clean out the shredder.
Chronic clogging, vibration, rattling.	1 Dull knives, hammers. 2 Internal damage to rotor or components. Rotor or motor shaft problem.	1 Service <i>immediately</i> . 2 Disassemble. Inspect for bent parts, unusual wear. See an authorized service center for help.

NOTES/SERVICE HISTORY

Regarding page 4, there's no GFI on the outlet.

7 WHAT TO DO WITH THE STUFF NOW THAT IT'S ALL CHIPPED & SHREDDED

The chips, shreds and mulch you make are valuable organic materials for your lawn and garden. You can put them to good and immediate use, even if you are not an avid green thumb-er.

Landscape & Garden

Use the reduced materials to make a garden path and to edge saplings or shrubs. An inch or so holds in moisture, moderates temperatures and erosion, and reduces weed and turf growth. It also protects exposed root systems and tender bulbs from unpredictable elements.

Composting

Whole books have been written on the subject. A good compost pile will not—contrary to popular opinion—smell like a landfill and attract critters. The rule of thumb for a proper pile is, “Equal weights of green and brown help to break the microbes down.” (Note well the word “weights”, as opposed to ‘parts’!)

Your basic compost pile is a three layer salad, measuring 4' x 4' x 4'. You can use a pile, a pit or a trench, just as well as any fancy container—though some containers speed things along and look nicer. A couple of things you *can't* use? Animal wastes, bones and meat scraps.

LAYER #1

Brown, 3" - 5". Some old leaves or twiggy brush on the bottom helps air to enter the pile.

LAYER #2

Green, 3" - 5". Leafy, non-woody stuff, including grass clippings, kitchen scraps (but *not* meat, fat or dairy products).

LAYER #3

Soil or compost starter, 1". This layer of micro-organisms does the dirty work. If you're so inclined, a handful of granular fertilizer jumpstarts it, feeding the organisms.

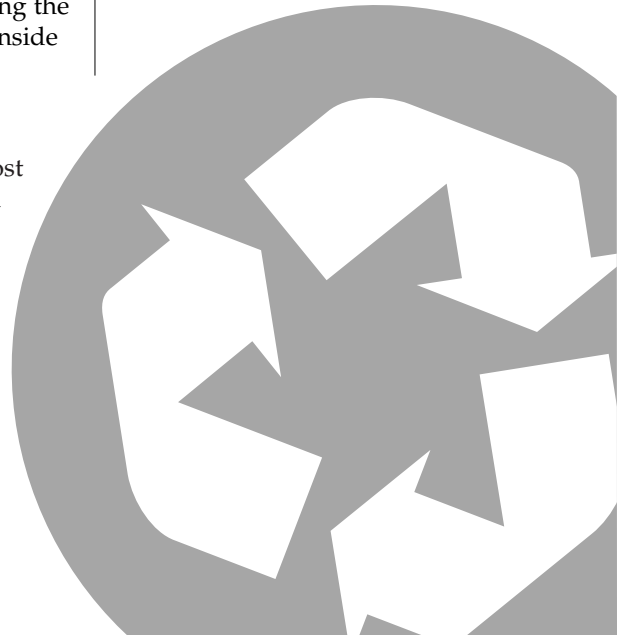
Wet the pile as needed to keep the center the consistency of a damp sponge. Continue to add layers until it is up to four feet high and deep. Turn the pile once a week or so with a shovel or pitch fork. Turning and wetting the pile is what the pros call “fast” or “hot” composting, with temperatures inside the pile reaching 160° F!

How Long Until Soup's On?

Depending on how well it is tended, in six to eighteen months the compost is ready for use in your garden...or virtually disappeared. Better yet, you can't “spoil” the recipe. If offending odors emerge, too much moisture, green material or animal wastes have muddled the brew. Mix in more brown, turn the pile more often, and cover it with plastic to keep it dry.

Bitten by the Organic Bug?

- “The Rodale Book of Composting,” by the editors of Rodale Press.
- “The Mulch Book,” by Stu Campbell (Storey Publishing).
- “Worms Eat My Garbage,” by Mary Apelhof (Flower).
- “Yardening,” by Jeff and Liz Ball (MacMillan).

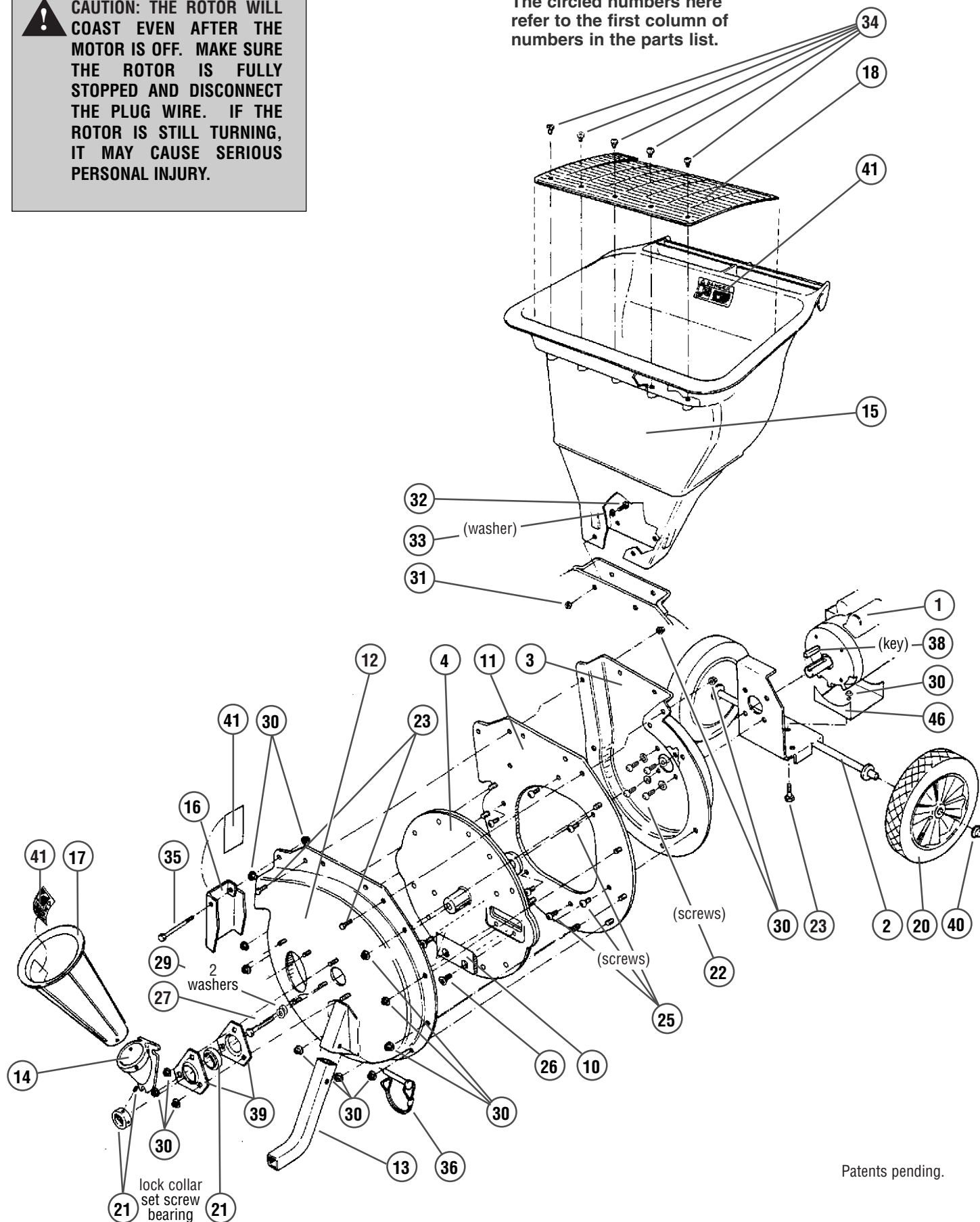




CAUTION: THE ROTOR WILL COAST EVEN AFTER THE MOTOR IS OFF. MAKE SURE THE ROTOR IS FULLY STOPPED AND DISCONNECT THE PLUG WIRE. IF THE ROTOR IS STILL TURNING, IT MAY CAUSE SERIOUS PERSONAL INJURY.

FRONT VIEW

The circled numbers here refer to the first column of numbers in the parts list.



⑧ ILLUSTRATED PARTS LIST: '95 PATRIOT ELECTRIC 2HP

The "Illus. #" refers to the numbered parts in the illustrations. Use the "Order #" and the "Description" when ordering. "Qty." refers to the total number of each part the machine is built with. Items without an "Illustration #" are available but not shown in the drawings.

Illus. #	Order #	Description	Qty.
1	82515-000-2	1.5 HP ELECTRIC MOTOR w/ KEY	1
2	30101-019-5	ENGINE MOUNT/AXLE, IRON GRAY	1
3	30201-021-2A	GRINDER HOUSING (CALL FACTORY)	1
4	30800-079-2	ROTOR w/ 3/4" BORE, 3/16" KEY WAY	1
5	10300-903-5	Y HAMMERS	6
6	20400-904-5	ELECTRIC MODEL HAMMER SHAFT	4
7	21100-907-5	SPACER A (short, plain)	2
8	21100-905-5	SPACER B (short w/ hole)	2
9	21100-935-5	SPACER C (long w/ hole)	2
10	81000-901-2	ELECTRIC CHIPPER KNIFE	1
11	30301-023-2	CENTER PLATE, COMPACT, IRON GRAY	1
12	30201-025-2	FAN HOUSING, COMPACT, IRON GRAY	1
13	61201-027-2	LEG, COMPACT FRAME, IRON GRAY	1
14	40001-055-5	CHIPPER CONE CASTING, IRON GRAY	1
15	50003-051-5A	SHREDDER HOPPER, BLUE	1
16	11301-039-5A	DISCHARGE DEFLECTOR, IRON GRAY	1
17	50003-037-5A	CHIPPER CONE, BLUE	1
18	11405-034-5	HOPPER GUARD	1
19	70006-040-5	COLLECTION BAG, 24" x 36"	1
20	70904-000-5	12" WHEEL, SILVER	2
21	70800-000-5	BEARING, 1" BORE & LOCK COLLAR	1
22	73070-000-2	BTN. HD. SOCK. CAP SCRW. 3/8-16x3/4"	4
23	70552-000-5	HEX HEAD CAP SCREW, 5/16-18 x 3/4"	3
25	70572-000-5	BUTTON HEAD SOCKET CAP SCREW, 5/16-18 x 1/2"	7
26	70685-000-5	FLAT HEAD SOCKET CAP SCREW, 5/16-24 x 5/8"	2
27	73150-000-2	HEX HEAD CAP SCREW, 5/16-24 x 5-1/2"	1
29	70562-000-5	LOCK WASHER, 5/16 SPLIT RING	2
30	70532-000-5	SERRATED FLANGE NUT, 5/16-18	22
31	70732-005-L	HEX HEAD REVERSIBLE LOCK NUT, 1/4"-20	8
32	70772-000-5	BUTTON HEAD SOCKET CAP SCREW, 1/4-20 x 3/4"	8
33	71062-000-5	1/4" SAE FLATWASHER	8
34	70002-000-5	TRUSS HEAD SELF-TAPPING SCREW, #14 x 5/8	5
35	71752-000-5	HEX HEAD CAP SCREW, 5/16-18 x 3-1/4"	2
36	71022-000-5	LYNCH PIN	1
37	70320-000-5	ROLL PIN, 3/16 x 3/4"	4
38	70310-000-2	KEY, 3/16" SQUARE	1
39	70202-000-5	FLANGETTE, TRIANGULAR	2
40	70992-000-5	PUSH NUT, 5/8"	2
41	80007-043-5	DANGER DECAL	3

Illus. #	Order #	Description	Qty.
42	80007-044-5	CAUTION DECAL	1
44	80007-045-5	SERIAL NUMBER TAG (CALL FACTORY)	1
45	80007-083-2	1/2" SIZE LIMIT DECAL	1
46	11101-080-2	MOTOR SUPRT. BRACKET, IRON GRAY	1

Convenient kits and accessories also available...

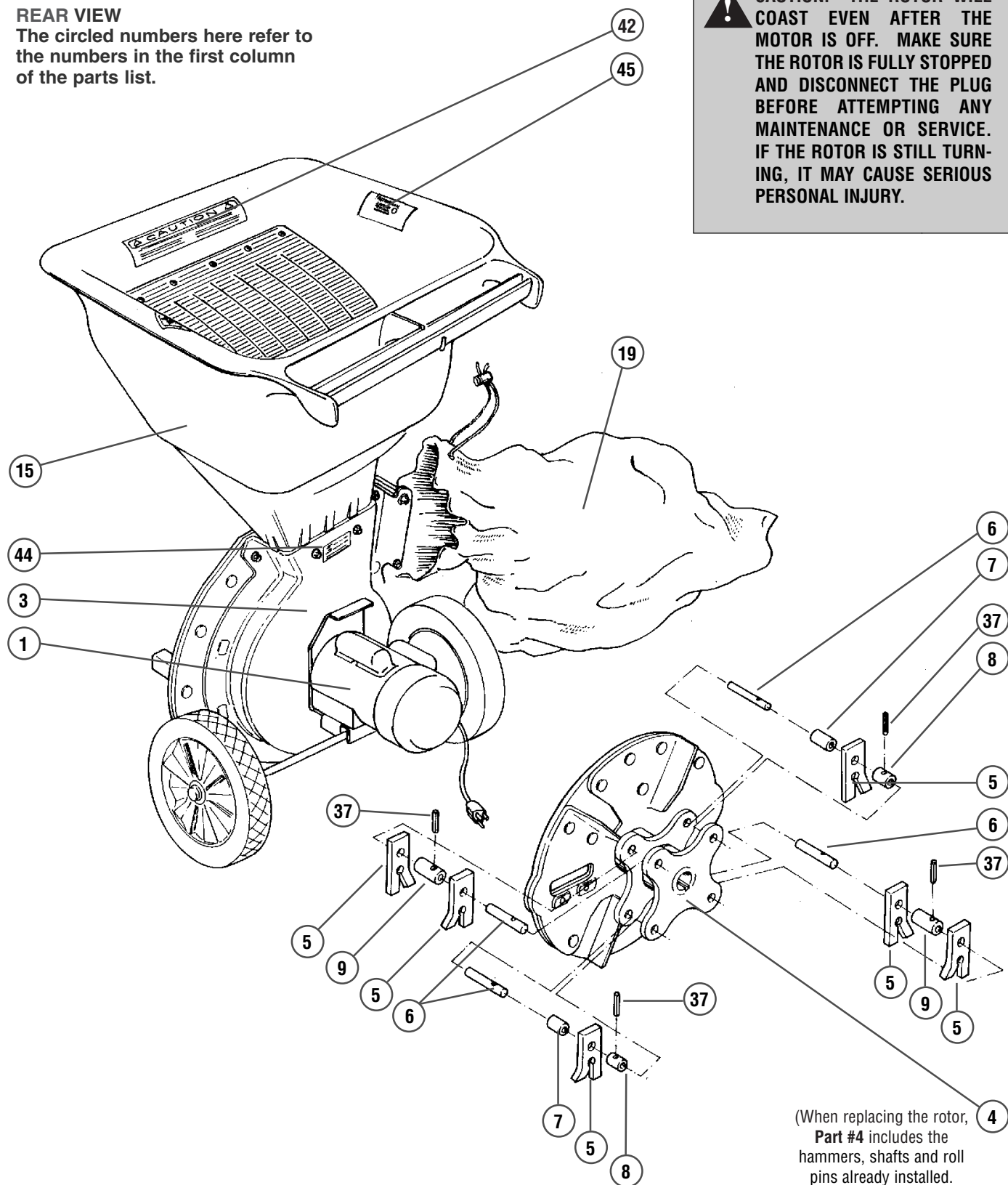
99005-004-5	VACUUM KIT (see page 8)	1
30800-079-2A	ROTOR, ASSEMBLED w/ HAMMERS & KNIFE, compact frame	1
99309-003-5	Y-HAMMER KIT w/ shafts, hardware	1
99000-001-2	ELEC. CHIPPER KNIFE KIT w/ hardware	1
99001-039-5	DEFLECTOR KIT, IRON GRAY	1
99000-045-5	HOPPERS HARDWARE KIT	1
99000-000-5	HARDWARE KIT, complete unit	1
99004-000-5	WHEELS KIT w/ PUSH NUTS	1
70305-000-5	ALLEN WRENCH, 3/16"	1
92000-000-5C	ASSEMBLY HARDWARE BAG, for assembly out of the box	1
70000-000-5	SAFETY GOGGLES	1
99007-000-5	WARNING/CAUTION DECALS KIT	1
80007-042-5	PATRIOT BRAND DECAL	1
80007-000-2	PATRIOT OPERATOR'S MANUAL, ELECTRIC MODELS	1
80007-059-5	PATRIOT WARRANTY CARD (CALL FACTORY)	1

REAR VIEW

The circled numbers here refer to the numbers in the first column of the parts list.



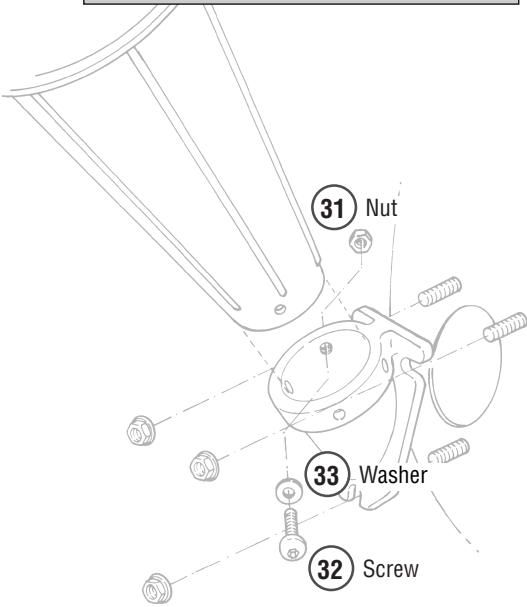
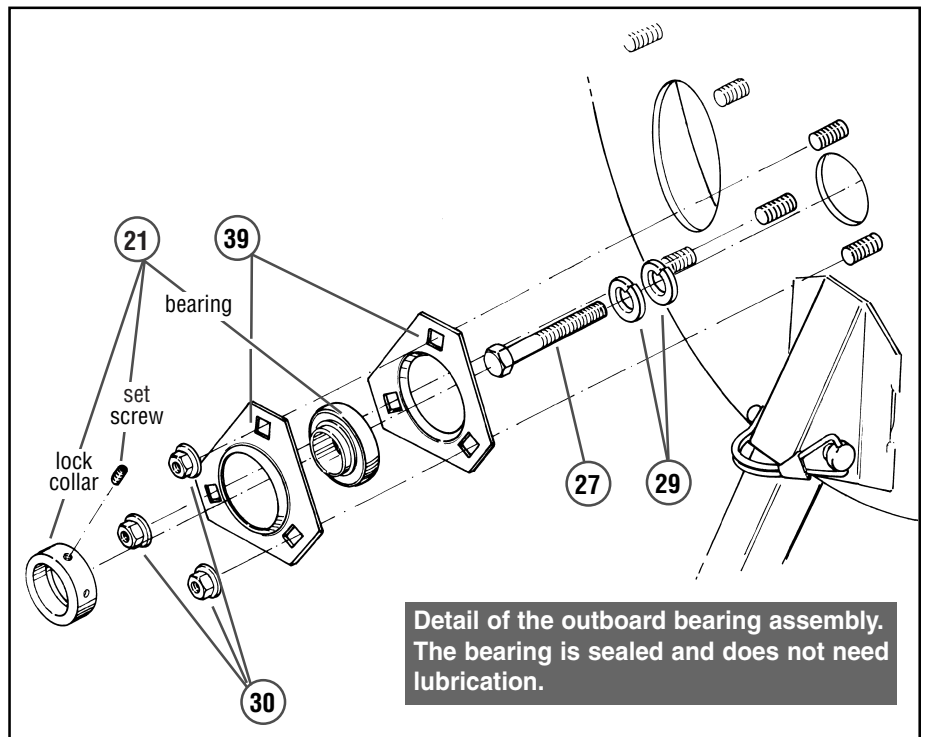
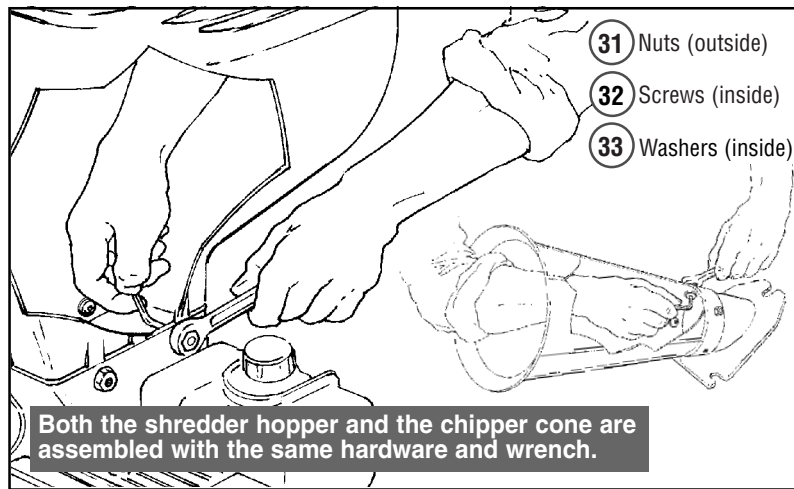
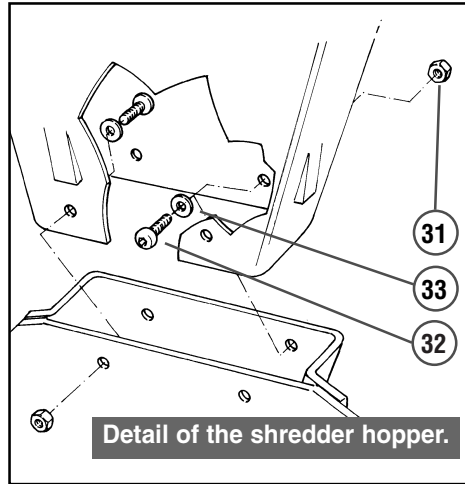
CAUTION: THE ROTOR WILL COAST EVEN AFTER THE MOTOR IS OFF. MAKE SURE THE ROTOR IS FULLY STOPPED AND DISCONNECT THE PLUG BEFORE ATTEMPTING ANY MAINTENANCE OR SERVICE. IF THE ROTOR IS STILL TURNING, IT MAY CAUSE SERIOUS PERSONAL INJURY.



(When replacing the rotor, **Part #4** includes the hammers, shafts and roll pins already installed. It is packaged as the "Rotor Assembly.")



CAUTION: THE ROTOR WILL COAST EVEN AFTER THE MOTOR IS OFF. MAKE SURE THE ROTOR STOPS TURNING, THEN DISCONNECT THE PLUG FROM THE MOTOR BEFORE ATTEMPTING ANY MAINTENANCE OR CLEAN-OUT PROCEDURE. IF THE ROTOR IS STILL TURNING, IT MAY CAUSE SERIOUS PERSONAL INJURY.





PATRIOT MANUAL,
ELECTRIC MODELS #80007-000-2
Illustrations by Robert F. Schwengel.

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