

# 1 INTRODUCTION

Congratulations on your choice of an AgriMetal RotoRake to complement your operation. This equipment has been designed and manufactured to meet the needs of a discerning turf care industry.

Safe, efficient and trouble free operation of your AgriMetal RotoRake requires that you and anyone else who will be operating or maintaining the machine, read and understand the Safety, Operation, Maintenance and Trouble Shooting information contained within the Operator's Manual.



This manual covers the AgriMetal RotoRake. Use the Table of Contents or Index as a guide to locate required information.

Keep this manual handy for frequent reference and to pass on to new operators or owners. Call your AgriMetal Dealer or Distributor if you need assistance, information or additional copies of the manuals.

**OPERATOR ORIENTATION** - The directions left, right, front and rear, as mentioned throughout this manual, are as seen from behind the handle and facing in the direction of travel.

## 2 SAFETY

### SAFETY ALERT SYMBOL

This Safety Alert symbol means **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**



The Safety Alert symbol identifies important safety messages on the AgriMetal RotoRake and in the manual. When you see this symbol, be alert to the possibility of personal injury or death. Follow the instructions in the safety message.

Why is SAFETY important to you?

#### 3 Big Reasons

**Accidents Disable and Kill**  
**Accidents Cost**  
**Accidents Can Be Avoided**

#### SIGNAL WORDS:

Note the use of the signal words **DANGER**, **WARNING** and **CAUTION** with the safety messages. The appropriate signal word for each message has been selected using the following guide-lines:

**SI NO LEE INGLES, PIDA AYUDA A AIGUIEN QUE SI LO LEA PARA QUE LE TRADUZCA LAS MIDIDAS DE SEGURIDAD.**

**DANGER** - Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations typically for machine components which, for functional purposes, cannot be guarded.

**WARNING** - Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

**CAUTION** - Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

If you have any questions not answered in this manual or require additional copies or the manual is damaged, please contact your dealer or AgriMetal Inc., 1006 Rue Principale, Wickham, Quebec, Canada, J0C 1S0. Phone (819) 398-6883 or fax (819) 398-5311.

# SAFETY

**YOU** are responsible for the SAFE operation and maintenance of your AgriMetal RotoRake. **YOU** must ensure that you and anyone else who is going to operate, maintain or work around the RotoRake be familiar with the operating and maintenance procedures and related **SAFETY** information contained in this manual. This manual will take you step-by-step through your working day and alerts you to all good safety practices that should be adhered to while operating the RotoRake.

Remember, **YOU** are the key to safety. Good safety practices not only protect you but also the people around you. Make these practices a working part of your safety program. Be certain that **EVERYONE** operating this equipment is familiar with the recommended operating and maintenance procedures and follows all the safety precautions. Most accidents can be prevented. Do not risk injury or death by ignoring good safety practices.

- RotoRake owners must give operating instructions to operators or employees before allowing them to operate the machine, and at least annually thereafter per OSHA (Occupational Safety and Health Administration) regulation 1928.57.
- The most important safety device on this equipment is a SAFE operator. It is the operator's responsibility to read and understand ALL Safety and Operating instructions in the manual and to follow these. Most accidents can be avoided.
- A person who has not read and understood all operating and safety instructions is not qualified to operate the machine. An untrained operator exposes himself and bystanders to possible serious injury or death.
- Do not modify the equipment in any way. Unauthorized modification may impair the function and/or safety and could affect the life of the equipment.
- Think SAFETY! Work SAFELY!

## 2.1 GENERAL SAFETY

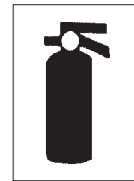
1. Read and understand the Operator's Manual and all safety signs before operating, maintaining, adjusting or unplugging the RotoRake.



2. Have a first-aid kit available for use should the need arise and know how to use it.



3. Have a fire extinguisher available for use should the need arise and know how to use it.



4. Do not allow riders.

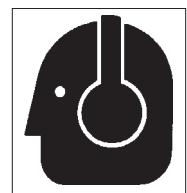
5. Wear appropriate protective gear. This list includes but is not limited to:

- A hard hat
- Protective shoes with slip resistant soles
- Protective glasses or goggles
- Heavy gloves
- Wet weather gear
- Hearing protection
- Respirator or filter mask



6. Install and secure all guards before starting.

7. Wear suitable ear protection for prolonged exposure to excessive noise.



8. Stop engine, remove spark plug wire and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.

9. Clear the area of people, especially small children, before starting the unit.

10. Review safety related items annually with all personnel who will be operating or maintaining the RotoRake.

## 2.2 EQUIPMENT SAFETY GUIDELINES

1. Safety of the operator and bystanders is one of the main concerns in designing and developing a machine. However, every year many accidents occur which could have been avoided by a few seconds of thought and a more careful approach to handling equipment. You, the operator, can avoid many accidents by observing the following precautions in this section. To avoid personal injury or death, study the following precautions and insist those working with you, or for you, follow them.
2. In order to provide a better view, certain photographs or illustrations in this manual may show an assembly with a safety shield removed. However, equipment should never be operated in this condition. Keep all shields in place. If shield removal becomes necessary for repairs, replace the shield prior to use.
3. Replace any safety sign or instruction sign that is not readable or is missing. Location of such safety signs is indicated in this manual.
4. Never use alcoholic beverages or drugs which can hinder alertness or coordination while operating this equipment. Consult your doctor about operating this machine while taking prescription medications.
5. **Under no circumstances should young children be allowed to work with this equipment. Do not allow persons to operate or assemble this unit until they have read this manual and have developed a thorough understanding of the safety precautions and of how it works.** Review the safety instructions with all users annually.
6. This equipment is dangerous to children and persons unfamiliar with its operation. The operator should be a responsible, properly trained and physically able person familiar with machinery and trained in this equipment's operations. If the elderly are assisting with work, their physical limitations need to be recognized and accommodated.
7. Never exceed the limits of a piece of machinery. If its ability to do a job, or to do so safely, is in question - **DON'T TRY IT.**
8. Do not modify the equipment in any way. Unauthorized modification result in serious injury or death and may impair the function and life of the equipment.
9. In addition to the design and configuration of this implement, including Safety Signs and Safety Equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence, and proper training of personnel involved in the operation, transport, maintenance, and storage of the machine. Refer also to Safety Messages and operation instruction in each of the appropriate sections of the tow vehicle, engine and machine Manuals. Pay close attention to the Safety Signs affixed to the tow vehicle and the machine.

## 2.3 SAFETY TRAINING

1. Safety is a primary concern in the design and manufacture of our products. Unfortunately, our efforts to provide safe equipment can be wiped out by a single careless act of an operator or bystander.
2. In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence and proper training of personnel involved in the operation, transport, maintenance and storage of this equipment.
3. It has been said, "The best safety feature is an informed, careful operator." We ask you to be that kind of an operator. It is the operator's responsibility to read and understand ALL Safety and Operating instructions in the manual and to follow these. Accidents can be avoided.
4. Working with unfamiliar equipment can lead to careless injuries. Read this manual before assembly or operating, to acquaint yourself with the machines. If this machine is used by any person other than yourself, or is loaned or rented, it is the machine owner's responsibility to make certain that the operator, prior to operating:
  - a. Reads and understands the operator's manuals.
  - b. Is instructed in safe and proper use.
5. Know your controls and how to stop engine and machine quickly in an emergency. Read this manual and follow the instructions.
6. Train all new personnel and review instructions frequently with existing workers. Be certain only a properly trained and physically able person will operate the machinery. A person who has not read and understood all operating and safety instructions is not qualified to operate the machine. An untrained operator exposes himself and bystanders to possible serious injury or death. If the elderly are assisting with work, their physical limitations need to be recognized and accommodated.



## 2.4 SAFETY SIGNS

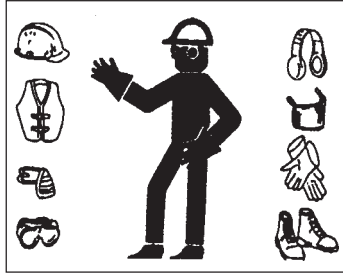
1. Keep safety signs clean and legible at all times.
2. Replace safety signs that are missing or have become illegible.
3. Replaced parts that displayed a safety sign should also display the current sign.
4. Safety signs displayed in Section 3 each have a part number in the lower right hand corner. Use this part number when ordering replacement parts.
5. Safety signs are available from your authorized Distributor or Dealer Parts Department or the factory.

### How to Install Safety Signs:

- Be sure that the installation area is clean and dry.
- Be sure temperature is above 50°F (10°C).
- Determine exact position before you remove the backing paper.
- Remove the smallest portion of the split backing paper.
- Align the sign over the specified area and carefully press the small portion with the exposed sticky backing in place.
- Slowly peel back the remaining paper and carefully smooth the remaining portion of the sign in place.
- Small air pockets can be pierced with a pin and smoothed out using the piece of sign backing paper.

## 2.5 PREPARATION

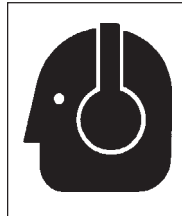
1. Never operate the machine until you have read and completely understand this manual and each of the Safety Messages found on the safety signs on the machine.
2. Personal protection equipment including hard hat, safety glasses, safety shoes, and gloves are recommended during assembly, installation, operation, adjustment, maintaining, repairing, removal, or moving the implement. Do not allow long hair, loose fitting clothing or jewelry to be around equipment.



3. **PROLONGED EXPOSURE TO LOUD NOISE MAY CAUSE PERMANENT HEARING LOSS**

### **LOSS!**

Tow Vehicles with or without equipment attached can often be noisy enough to cause permanent, partial hearing loss. We recommend that you wear hearing protection on a full-time basis if the noise in the Operator's position exceeds 80db. Noise over 85db on a long-term basis can cause severe hearing loss. Noise over 90db adjacent to the Operator over a long-term basis may cause permanent, total hearing loss. **NOTE:** Hearing loss from loud noise (from tractors, chain saws, radios, and other such sources close to the ear) is cumulative over a lifetime without hope of natural recovery.



4. Clear working area of hidden obstacles that might be hooked or snagged, causing injury

or damage.

5. Operate only in daylight or good artificial light.
6. Be sure machine is properly mounted, adjusted and in good operating condition.
7. Ensure that all safety shielding and safety signs are properly installed and in good condition.

## 2.6 OPERATING SAFETY

1. Please remember it is important that you read and heed the safety signs on the RotoRake. Clean or replace all safety signs if they cannot be clearly read and understood. They are there for your safety, as well as the safety of others. The safe use of this machine is strictly up to you, the operator.
2. All things with moving parts are potentially hazardous. There is no substitute for a cautious, safe-minded operator who recognizes potential hazards and follows reasonable safety practices. The manufacturer has designed this RotoRake to be used with all its safety equipment properly attached, to minimize the chance of accidents. Study this manual to make sure you have all safety equipment attached.
3. If a safety shield or guard is removed for any reason, it must be replaced before the machine is again operated.
4. When the use of hand tools is required to perform any part of assembly, installation, adjustment, maintaining, repairing, removal, or moving, be sure the tools used are designed and recommended by the tool manufacturer for that specific task.
5. Personal protection equipment including hearing protection, hard hat, safety glasses, safety shoes, and gloves are recommended during assembly, installation, operation, adjustment, maintaining, repairing, removal, or moving. Do not allow long hair, loose fitting clothing, or jewelry to be around moving parts.
6. Always use two people to handle heavy, unwieldy components during assembly, installation, removal or moving.
7. Never place any part of your body where it would be in danger if movement should occur during assembly, installation, operation, maintaining, repairing, removal or moving.
8. Stop engine, remove spark plug wire and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.
9. Never use alcoholic beverages or drugs which can hinder alertness or coordination while operating this equipment. Consult your doctor about operating this machine while taking prescription medications.
10. Do not allow riders on the machine at any time. There is no safe place for any riders.
11. Before you operate the machine, check over all pins, bolts, and connections to be sure all are securely in place. Replace any damaged or worn parts immediately.
12. Do not allow anyone who is not familiar with the safety rules and operation instructions to use this machine.
13. Never allow children to operate or be around this machine.
14. Do not reach into Rotor or under deck when the engine is running. Keep others away also.
15. Clear the work area of objects which might be picked up and snagged or entangled in the machine.
16. Keep hands, feet, hair, jewelry, and clothing away from all moving and/or rotating parts.
17. Do not direct the debris stream toward people, animals or buildings to prevent injury or damage. Always stop the engine or tilt frame back when unauthorized people enter the working area.
18. Do not place hands, feet or other body parts into debris stream or under the deck.

## 2.7 STORAGE SAFETY

1. Store the unit in an area away from human activity.
2. Do not permit children to play on or around the stored machine.
3. Store the unit in a dry, level area. Support the frame with planks if required.

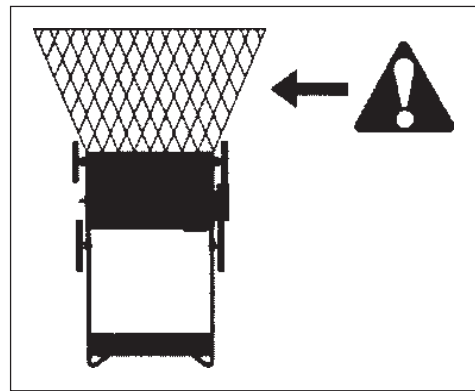
## 2.8 REFUELLING SAFETY

1. Handle fuel with care. It is highly flammable.
2. Allow engine to cool for 5 minutes before refuelling. Clean up spilled fuel before restarting engine.
3. Do not refuel the machine while smoking or when near open flame or sparks.
4. Fill fuel tank outdoors.
5. Prevent fires by keeping machine clean of accumulated trash, grease and debris.



## 2.9 OPERATING HAZARD AREA

1. Objects can be thrown out from under the machine with sufficient force to injure people. Stay away from machine when it is running. Keep others away.
2. Stay out of shaded hazard area.
3. Always know where all additional personnel are located when operating the RotoRake. Never allow anyone within the hazard area.
4. Tilt the deck up to stop the raking action when anyone comes within the hazard area. Do not resume working until the people have left.



**MACHINE HAZARD AREA**



## 2.10 MAINTENANCE SAFETY

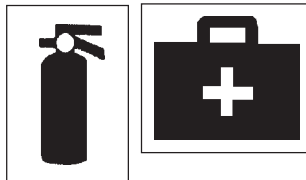
1. Good maintenance is your responsibility.  
Poor maintenance is an invitation to trouble.
2. Follow good shop practices.

- Keep service area clean and dry.
- Be sure electrical outlets and tools are properly grounded.
- Use adequate light for the job at hand.



3. Make sure there is plenty of ventilation.  
Never operate an engine in a closed building.  
The exhaust fumes may cause asphyxiation.
4. Before working on this machine, shut off the engine and disconnect spark plug wire.
5. Always use personal protection devices such as eye, hand and hearing protectors, when performing any service or maintenance work.
6. Where replacement parts are necessary for periodic maintenance and servicing, genuine factory replacement parts must be used to restore your equipment to original specifications. The manufacturer will not be responsible for injuries or damages caused by use of unapproved parts and/or accessories.

7. A fire extinguisher and first aid kit should be kept readily accessible while performing maintenance on this equipment.



8. Periodically tighten all bolts, nuts and screws and check that all cotter pins are properly installed to ensure unit is in a safe condition.
9. When completing a maintenance or service function, make sure all safety shields and devices are installed before placing unit in service.

## 2.11 GAS MOTOR SAFETY

**BEFORE STARTING ENGINE, READ AND UNDERSTAND THE OPERATING AND MAINTENANCE INSTRUCTIONS THAT CAME WITH YOUR ENGINE.**

### **WARNING: DO NOT**

1. DO NOT run engine in an enclosed area. Exhaust gases contain carbon monoxide, an odorless and deadly poison.
2. DO NOT place hands or feet near moving or rotating parts.
3. DO NOT store, spill, or use gasoline near an open flame, or devices such as a stove, furnace, or water heater which use a pilot light or devices which can create a spark.
4. DO NOT refuel indoors where area is not well ventilated. Outdoor refuelling is preferred.
5. DO NOT fill fuel tank while engine is running. Allow engine to cool for 5 minutes before refuelling. Store fuel in approved safety containers.
6. DO NOT remove fuel tank cap while engine is running.
7. DO NOT operate engine if gasoline is spilled. Move machine away from the spill and avoid creating any ignition until the gasoline has evaporated.
8. DO NOT smoke when filling fuel tank.
9. DO NOT choke carburetor to stop engine. Whenever possible, gradually reduce engine speed before stopping.
10. DO NOT run engine above rated speeds. This may result in injury.
11. DO NOT tamper with governor springs, governor links or other parts which may increase the governed engine speed.
12. DO NOT tamper with the engine speed selected by the original equipment manufacturer.
13. DO NOT check for spark with spark plug or spark plug wire removed. Use an approved tester.
14. DO NOT crank engine with spark plug removed. If engine is flooded, place throttle in "FAST" position and crank until engine starts.
15. DO NOT strike flywheel with a hard object or metal tool as this may cause flywheel to shatter in operation. Use proper tools to service engine.
16. DO NOT operate engine without a muffler. Inspect periodically and replace, if necessary. If engine is equipped with muffler deflector, inspect periodically and replace, if necessary with correct deflector.
17. DO NOT operate engine with an accumulation of grass, leaves, dirt or other combustible materials in the muffler area.
18. DO NOT use this engine on any forest covered, brush covered, or grass covered unimproved land unless a spark arrester is installed on the muffler. The arrester must be maintained in effective working order by the operator. In the State of California the above is required by law (Section 4442 of the California Public Resources Code). Other states may have similar laws. Federal laws apply on federal lands.
19. DO NOT touch hot muffler, cylinder or fins because contact may cause burns.
20. DO NOT run engine with air cleaner or air cleaner cover removed.

### **WARNING: DO**

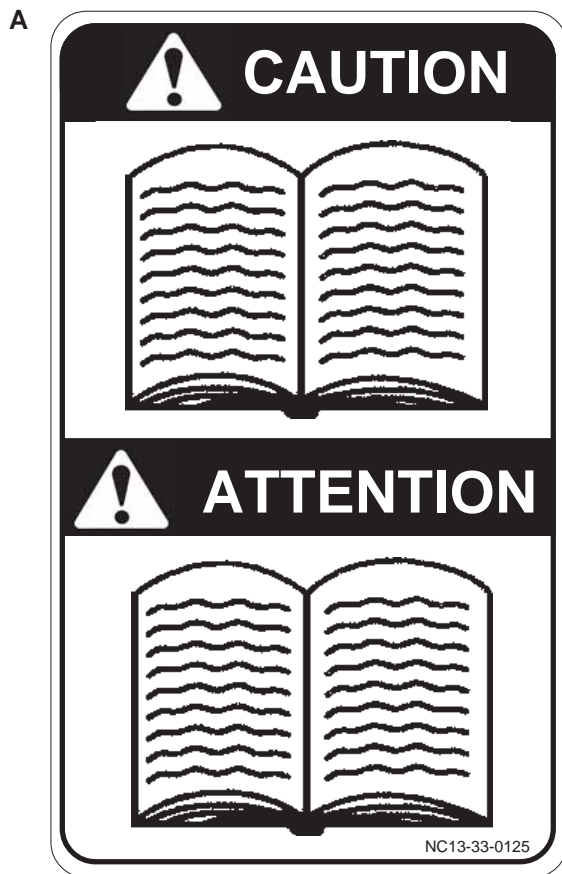
1. ALWAYS DO remove the wire from the spark plug when servicing the engine or equipment TO PREVENT ACCIDENTAL STARTING or disconnect the negative wire from the battery terminal.
2. DO keep cylinder fins and governor parts free of grass and other debris which can affect engine speed.
3. DO examine muffler periodically to be sure it is functioning effectively. A worn or leaking muffler should be repaired or replaced as necessary.
4. DO use fresh gasoline. Stale fuel can gum carburetor and cause leakage.
5. DO check fuel lines and fittings frequently for cracks or leaks. Replace if necessary.



### 3 SAFETY SIGN LOCATIONS

The types of safety signs and locations on the equipment are shown in the illustrations that follow. Good safety requires that you familiarize yourself with the various safety signs, the type of warning and the area, or particular function related to that area, that requires your SAFETY AWARENESS.

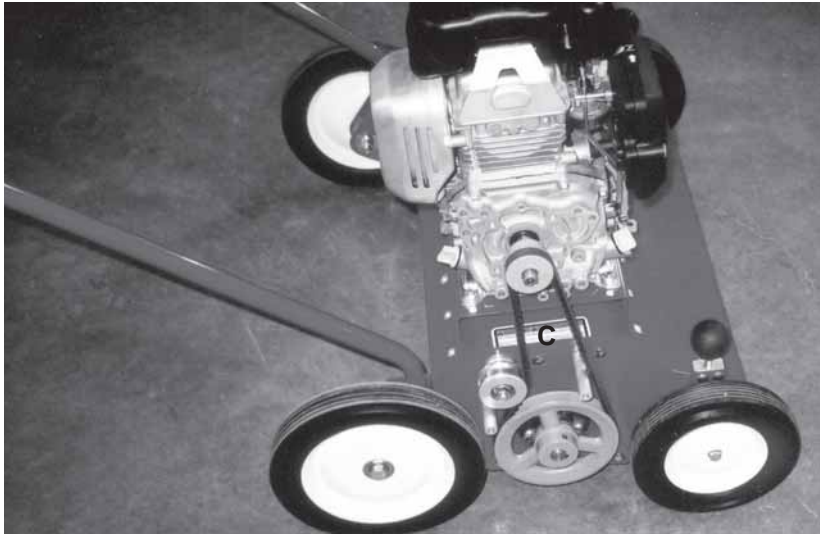
- Think SAFETY! Work SAFELY!



REMEMBER - If safety signs have been damaged, removed, become illegible or parts replaced without safety signs, new signs must be applied. New safety signs are available from your authorized dealer.

The types of safety signs and locations on the equipment are shown in the illustrations that follow. Good safety requires that you familiarize yourself with the various safety signs, the type of warning and the area, or particular function related to that area, that requires your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!



	<b>WARNING</b>
<p>Machine is shown with guard removed for illustrative purposes only. Do not operate machine with guard removed.</p>	

**B**

	<b>WARNING</b>		<b>AVERTISSEMENT</b>
	<b>ROTATING PART HAZARD</b>		
<p>To prevent serious injury or death from part hazard:</p> <ol style="list-style-type: none"> <li>1. Keep all guards and shields in place.</li> <li>2. Keep hands, feet, hair and clothing away from moving parts.</li> <li>3. Keep others away.</li> </ol>		<p>À défaut de suivre ces instructions, cela pourrait entraîner de sérieuses blessures ou même la mort.</p> <ol style="list-style-type: none"> <li>1. Garder tous les écrans protecteurs en place.</li> <li>2. Garder les mains, pieds, cheveux et vêtements éloignés des éléments mobiles et rotatifs.</li> <li>3. Garder les gens et les animaux à une distance sécuritaire de la machine.</li> </ol>	
		<small>01-60-0110</small>	

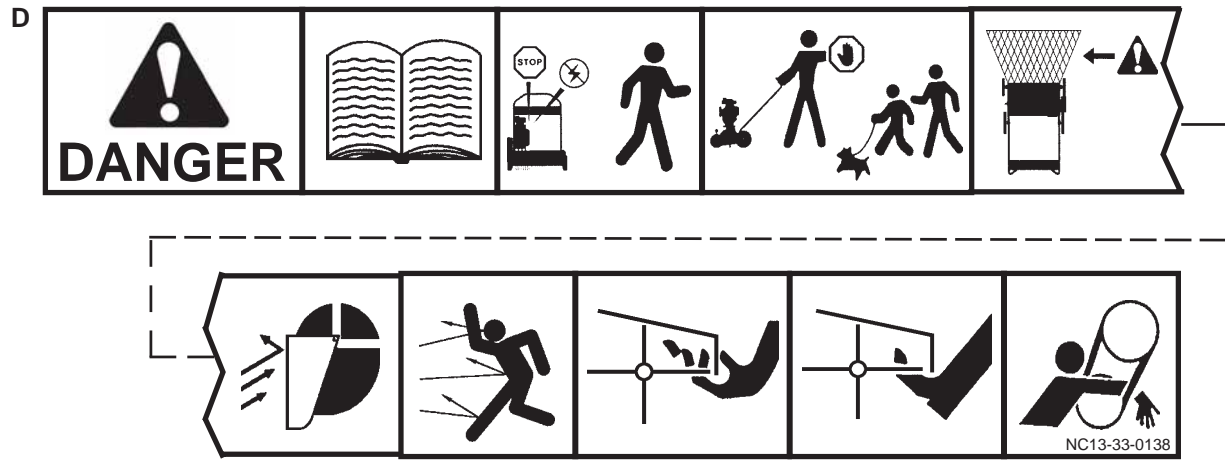
**C**

	<b>WARNING</b>		<b>AVERTISSEMENT</b>
<p><b>Install and secure guard before operating.</b></p>		<p><b>Installer les gardes de façon sécuritaire avant la mise en marche de la machine.</b></p>	
		<small>NC13-33-0139</small>	

REMEMBER - If safety signs have been damaged, removed, become illegible or parts replaced without safety signs, new signs must be applied. New safety signs are available from your authorized dealer.

The types of safety signs and locations on the equipment are shown in the illustrations that follow. Good safety requires that you familiarize yourself with the various safety signs, the type of warning and the area, or particular function related to that area, that requires your SAFETY AWARENESS.

- Think SAFETY! Work SAFELY!



REMEMBER - If safety signs have been damaged, removed, become illegible or parts replaced without safety signs, new signs must be applied. New safety signs are available from your authorized dealer.

## 4 ASSEMBLING

### 4.1 MACHINE ASSEMBLY

The machine is shipped from the factory in a partially disassembled configuration in a pallet box that provides for easy moving and handling. Always use tools, equipment and forklifts of appropriate size and capacity for the job. Always use 2 men when lifting, moving and assembling the machine.

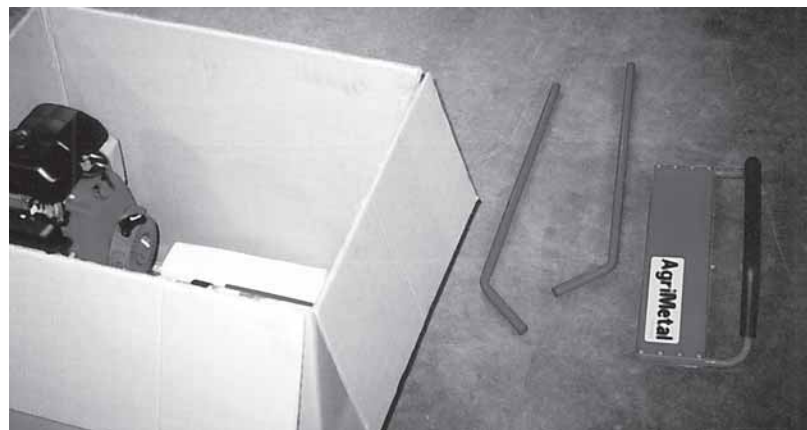
**When the machine is shipped, follow this procedure when preparing for the customer:**

1. Clear the area of bystanders especially small children before starting.



**Fig. 1 PALLET BOX**

2. Use a forklift to lift the pallet box from the truck. Carry the load close to the ground as it is moved to the assembly area and positioned.
3. Open the pallet box.
4. Remove machine, handles and lay-out. Be sure to use 2 men to lift the machine out of the box.



**Handles**



**Machine**

**Fig. 2 LAYOUT**

6. Slide the handles into the frame pockets and snug up fasteners. Do not tighten.
7. **Attach Handle Cross Frame:**
  - a. Slide cross frame into handle tubes.

**NOTE**

Move the lower handles as required to align the tubes.



**Fasteners**



**Installed**

**Fig. 3 CROSS FRAME**



- b. Attach the lower clamping brackets.
- c. Install the fasteners and snug up only.



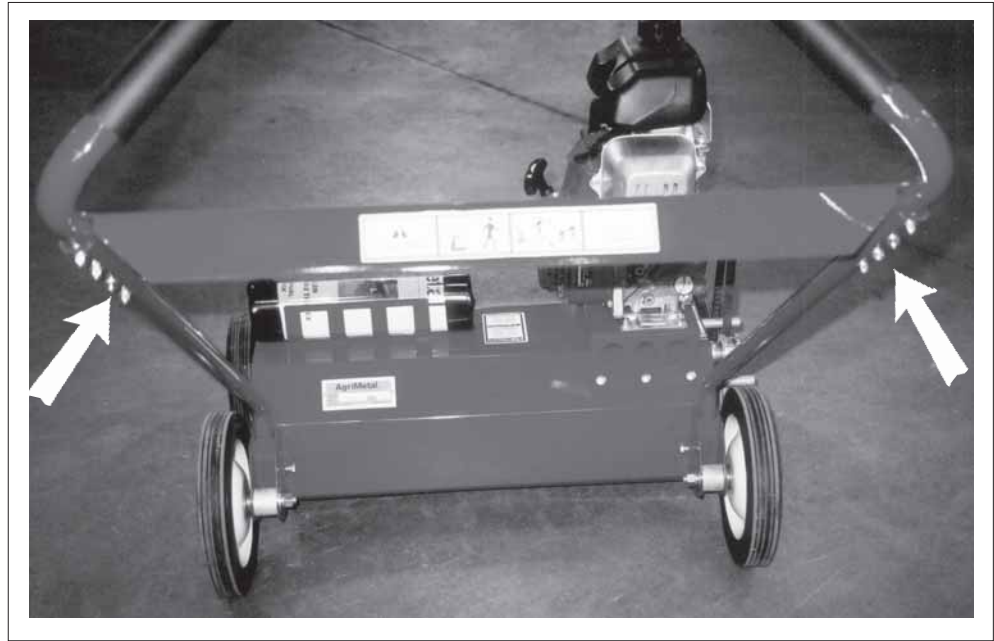
**Bracket**



**Fasteners**

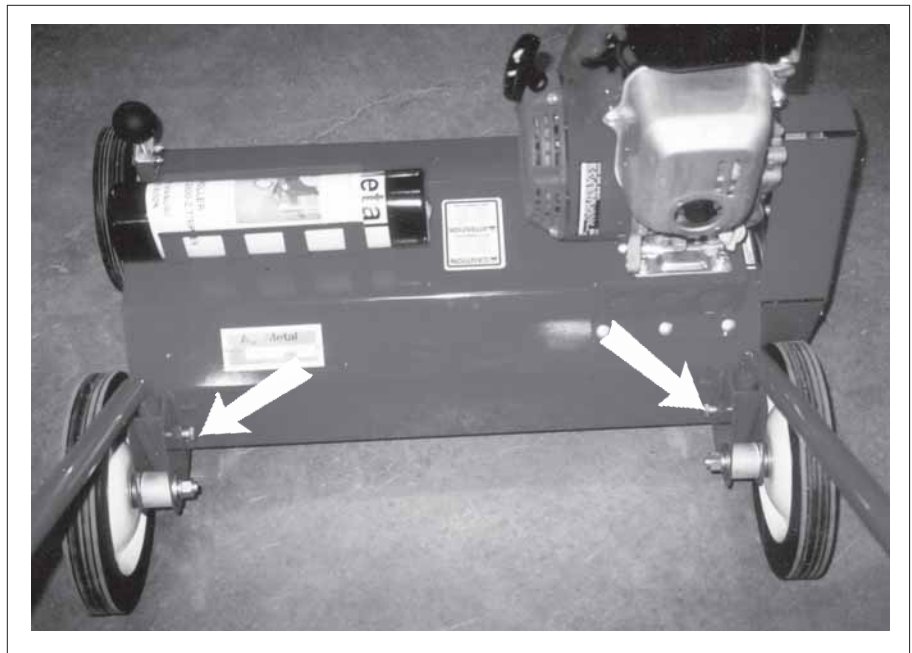
**Fig. 4 HOLDERS**

- d. Attach the other side.
- e. Tighten cross handle fasteners to their specified torque.



**Fig. 5 ANCHOR BOLTS CROSS FRAME**

- 8. Tighten handle frame anchor bolts to their specified torque.



**Fig. 6 HANDLE FRAME ANCHOR BOLTS**

## 5 OPERATION



### OPERATING SAFETY

- Please remember it is important that you read and heed the safety signs on the RotoRake. Clean or replace all safety signs if they cannot be clearly read and understood. They are there for your safety, as well as the safety of others. The safe use of this machine is strictly up to you, the operator.
- All things with moving parts are potentially hazardous. There is no substitute for a cautious, safe-minded operator who recognizes potential hazards and follows reasonable safety practices. The manufacturer has designed this RotoRake to be used with all its safety equipment properly attached, to minimize the chance of accidents. Study this manual to make sure you have all safety equipment attached.
- If a safety shield or guard is removed for any reason, it must be replaced before the machine is again operated.
- Personal protection equipment including hearing protection, hard hat, safety glasses, safety shoes, and gloves are recommended during assembly, installation, operation, adjustment, maintaining, repairing, removal, or moving. Do not allow long hair, loose fitting clothing, or jewelry to be around moving parts.
- Always use two people to handle heavy, unwieldy components during assembly, installation, removal or moving.
- Stop engine, remove spark plug wire and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.
- Before you operate the machine, check over all pins, bolts, and connections to be sure all are securely in place. Replace any damaged or worn parts immediately.
- Do not allow anyone who is not familiar with the safety rules and operation instructions to use this machine.
- Never allow children to operate or be around this machine.
- Do not reach into Rotor or under deck when the engine is running. Keep others away also.
- Clear the work area of objects which might be picked up and snagged or entangled in the machine.
- Keep hands, feet, hair, jewelry, and clothing away from all moving and/or rotating parts.
- Do not direct the debris stream toward people, animals or buildings to prevent injury or damage. Always stop the engine or tilt frame back when unauthorized people enter the working area.
- Do not place hands, feet or other body parts into debris stream or under the deck.

### 5.1 TO THE NEW OPERATOR OR OWNER

AgriMetal RotoRakes are designed to quickly and efficiently rake away cuttings, sand, small stones and other debris. The material is picked up by swinging nylon flails on the rotor and removed from the area of concern. When the material is removed, it gives a neat, professional look to the working area. Working backward well pulverise aeration core.

Works equally as well in reverse as a machine that breaks up aeration cores.

**In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence and proper training of personnel involved in the operation, transport, maintenance and storage of equipment. It is the responsibility of the owner or operator to**

**read this manual and to train all other operators before they start working with the machine.**

**Follow all safety instructions exactly. Safety is everyone's business. By following recommended procedures, a safe working environment is provided for the operator, bystanders and the area around the worksite. Untrained operators are not qualified to operate the machine.**

Many features incorporated into this machine are the result of suggestions made by customers like you. Read this manual carefully to learn how to operate the machine safely and how to set it to provide maximum field efficiency. By following the operating instructions in conjunction with a good maintenance program, your RotoRake will provide many years of trouble-free service.

## 5.2 MACHINE COMPONENTS

The AgriMetal RotoRake is a rotor mounted in a deck that moves across the ground for picking up grass, leaves, sand, small stones and other debris. Swinging nylon flails contact the material and expel it out the front of the deck.

Power to turn the rotor is provided by a small gas engine mounted on the deck. A belt drive on the right end of the deck transmits power to the rotor.

Four wheels on the deck carry the rotor over the working area. Use the 2 front wheels to set the working height.

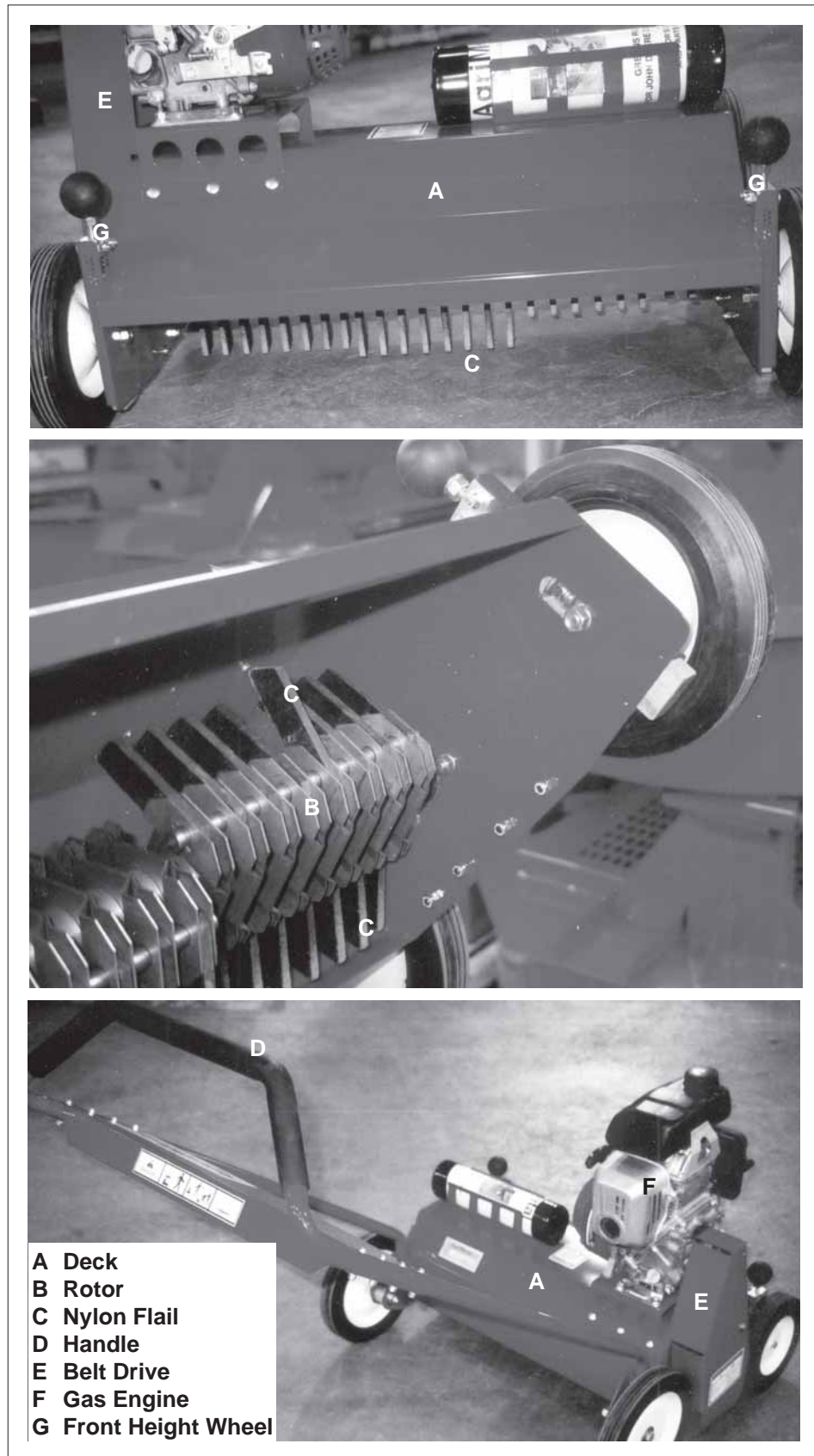


Fig. 7 PRINCIPLE COMPONENTS

## 5.3 BREAK-IN

Although there are no operational restrictions on the RotoRake when it is used for the first time, it is recommended that the following mechanical items be checked:

### A. After operating for 1 hour:

1. Torque all fasteners and hardware.
2. Check the rotor for entangled material. Remove material.
3. Check condition of Rotor bearings.
4. Check condition of flails. Be sure all can swing freely and all are in good condition.
5. Check drive belt tension. Adjust as required.
6. Check engine fluid levels. Top up as required.

### B. After operating for 10 hours:

1. Repeat steps 1 through 6 listed above. (Section A).
2. Change engine oil.
3. Go to the normal servicing and maintenance schedule as defined in the Maintenance Section.

## 5.4 PRE-OPERATION CHECKLIST

Efficient and safe operation of the AgriMetal RotoRake requires that each operator reads and understands the operating procedures and all related safety precautions outlined in this section. A pre-operation checklist is provided for the operator. It is important for both personal safety and for maintaining the machine in good mechanical condition that this checklist be followed.

Before operating the RotoRake and each time thereafter, the following areas should be checked off:

1. Check that all bearings turn freely. Replace any that are rough or seized.
2. Check the rotor for entangled material. Remove anything that is tangled in rotor.
3. Make sure that all guards and shields are in place, secured and functioning as designed.
4. Check engine oil and fuel level. Top up as required.

## 5.5 CONTROLS

Before starting to work, all operators should familiarize themselves with the location and function of the control.

### 1. Gas Engine:

A 3.0 hp Honda engine is used with the unit. Always read the engine Operator's manual supplied with the machine for the detailed operating procedures.

#### a. Ignition Switch:

This rotary switch controls the electrical power to the engine electrical system. Turn the switch clockwise to turn the electrical system ON and the engine will run. Turn counter-clockwise to stop the engine.

#### b. Fuel Shut-Off Valves:

Each engine is equipped with a valve between the fuel tank and the carburetor. Slide the fuel valve toward the block to turn ON and away for OFF. Turn the fuel OFF when not in use or before transporting.

#### c. Throttle:

This lever controls the engine RPM. Move the lever vertically to increase or decrease the RPM. Always run at maximum throttle while operating.

#### d. Choke:

The choke controls the fuel/air mixture to the engine. Close the choke when starting if the engine is cold. Open the choke as the engine warms. Always open the choke fully during operation.

#### e. Starting Rope:

This retracting rope and T bar is used to turn the engine over for starting. Grasp the T bar firmly and pull the rope sharply to start the engine.



Fig. 8 ENGINE CONTROLS

## 5.7 FIELD OPERATION



# OPERATING SAFETY

- Please remember it is important that you read and heed the safety signs on the RotoRake. Clean or replace all safety signs if they cannot be clearly read and understood. They are there for your safety, as well as the safety of others. The safe use of this machine is strictly up to you, the operator.
- All things with moving parts are potentially hazardous. There is no substitute for a cautious, safe-minded operator who recognizes potential hazards and follows reasonable safety practices. The manufacturer has designed this RotoRake to be used with all its safety equipment properly attached, to minimize the chance of accidents. Study this manual to make sure you have all safety equipment attached.
- If a safety shield or guard is removed for any reason, it must be replaced before the machine is again operated.
- Personal protection equipment including hearing protection, hard hat, safety glasses, safety shoes, and gloves are recommended during assembly, installation, operation, adjustment, maintaining, repairing, removal, or moving. Do not allow long hair, loose fitting clothing, or jewelry to be around moving parts.
- Always use two people to handle heavy, unwieldy components during assembly, installation, removal or moving.
- Stop engine, remove spark plug wire and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.
- Before you operate the machine, check over all pins, bolts, and connections to be sure all are securely in place. Replace any damaged or worn parts immediately.
- Do not allow anyone who is not familiar with the safety rules and operation instructions to use this machine.
- Never allow children to operate or be around this machine.
- Do not reach into Rotor or under deck when the engine is running. Keep others away also.
- Clear the work area of objects which might be picked up and snagged or entangled in the machine.
- Keep hands, feet, hair, jewelry, and clothing away from all moving and/or rotating parts.
- Do not direct the debris stream toward people, animals or buildings to prevent injury or damage. Always stop the engine or tilt frame back when unauthorized people enter the working area.
- Do not place hands, feet or other body parts into debris stream or under the deck.

Although the RotoRake is easy to use, each operator should review this section to familiarize himself with the detailed safety and operating procedures. When using the machine, follow this procedure:

1. Clear the area of bystanders, especially small children.
2. Review and follow the Pre-Operation Checklist (see Section 5.4).
3. Transport or move to the working area.

4. **Starting Machine:**

- a. Close the choke if the engine is cold.
- b. Move the throttle to its 1/4 throttle position.
- c. Turn the ignition switch on the front frame to start the engine.
- d. Pull sharply on the starting rope.
- e. Run the engine for a few minutes to allow it to warm.
- f. Gradually open the choke.
- g. Increase throttle setting to maximum speed for operation.

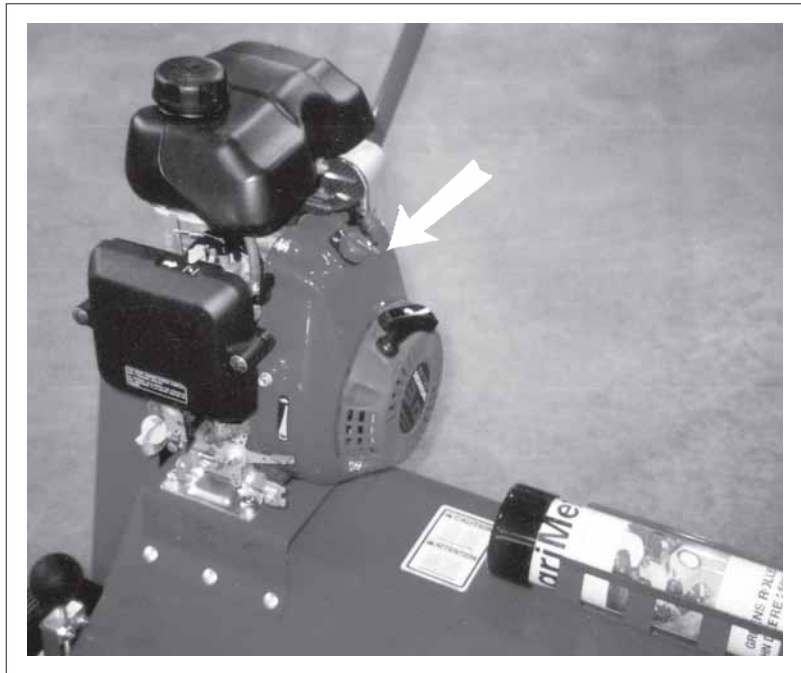


Fig. 9 IGNITION SWITCH

- h. Move the machine into the working area start cleaning.

5. **Working Speed:**

Set the travel speed appropriate for the job being done. Travel faster if all the debris is being cleaned away. Slow down if some debris is not being removed. Make 2 passes if some material is not being picked up.

5-b **Breake up aeration cores:**

Operatethe machine back word over aeration cores will pulverize them in one pass.



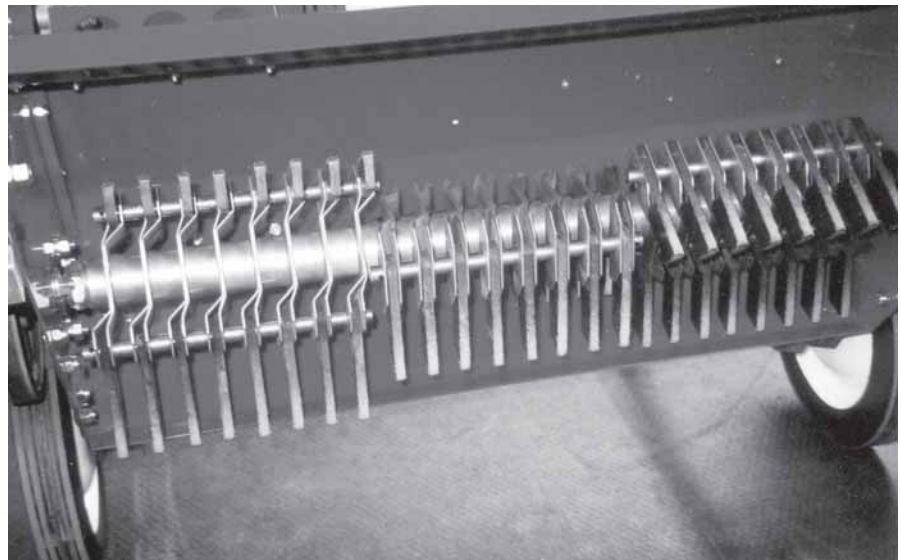
Fig. 10 WORKING



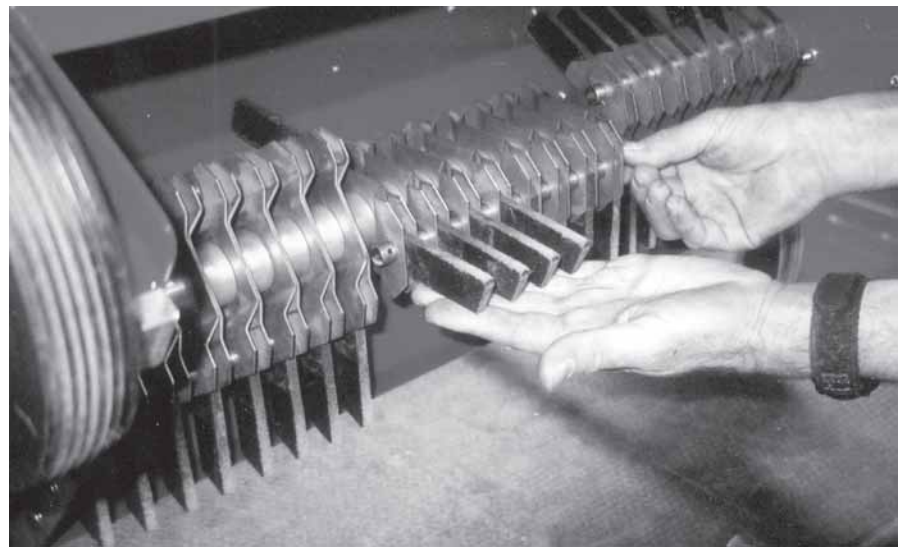
6. **Rotor:**  
The rotor consists of 3 sets of flail hangers offset by 60° to each other for mounting swinging flails. This offset allows for the removal of the flail shaft when servicing is required.

Use a small punch to remove the spring pin on the end when removing the flail shaft.

Always install the replacement flail with the long side on the leading edge.



**Hanger Sets**



**Leading Edge**

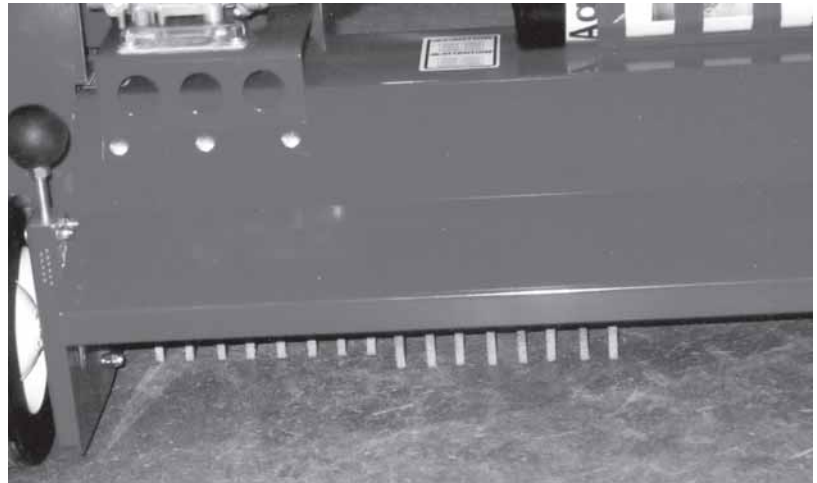
**Fig. 11 ROTOR**

7. **Flail Height:**

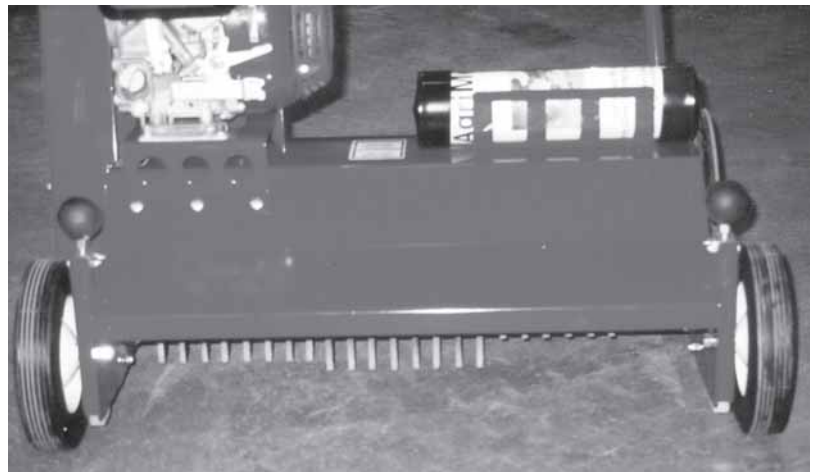
The flails can be set to operate at any height by setting the position of the front wheels.

Use the quality of job done as an indicator for the flail height. If some debris is being left, lower the flail, travel slower or make 2 passes.

Always set each front wheel at the same position to obtain maximum performance. Use the holes as reference in the front wheel frame to position the wheels.



**High**



**Low**



**Front Wheel Frame**

**Fig. 12 HEIGHT**

8. **Engine Operating RPM:**  
Run the engine at wide open throttle to get the best results. The speed is required to pick up and remove debris such as gravel, stones and screening.
9. Place the unit into a truck box or on a trailer when moving from one work site to another. The handle can be removed for moving it is more convenient.



Fig. 13 RAKING

10. **Hazard Area:**

- a. Objects can be thrown out from under the machine with sufficient force to injure people. Stay away from machine when it is running. Keep others away.
- b. Stay out of shaded hazard area.
- c. Always know where all additional personnel are located when operating the RotoRake. Never allow anyone within the hazard area.
- d. Tilt the deck up to stop the raking action when anyone comes within the hazard area. Do not resume working until the people have left.

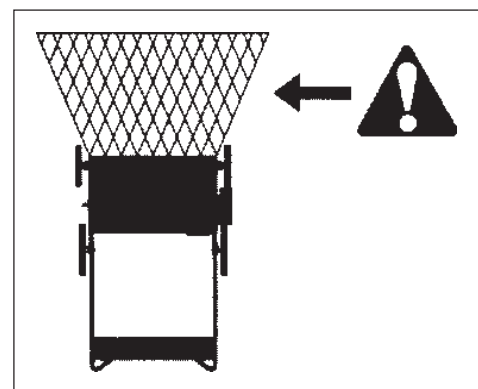
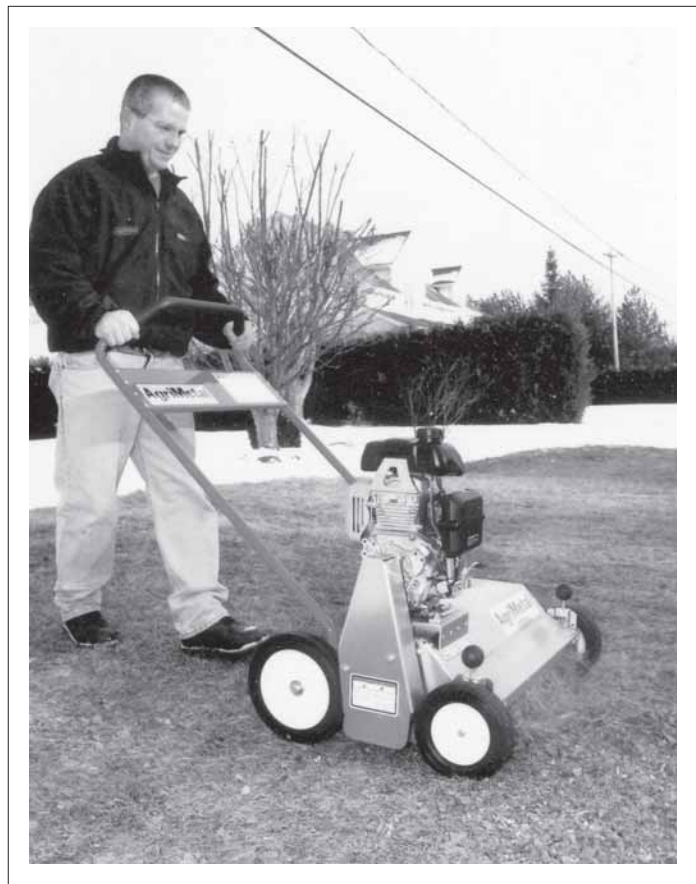


Fig. 14 MACHINE HAZARD AREA

## 12. Cleaning Grass or Sod:

- Always inspect and clean the working area prior to starting. Remove any debris that could interfere with machine function including wire, rope, twine, cans, bottles, scrap metal, plastic bags, etc.
- Move the machine across the area to be cleaned.
- Pull back and move to the adjacent area.
- Continue over the entire area to be cleaned.

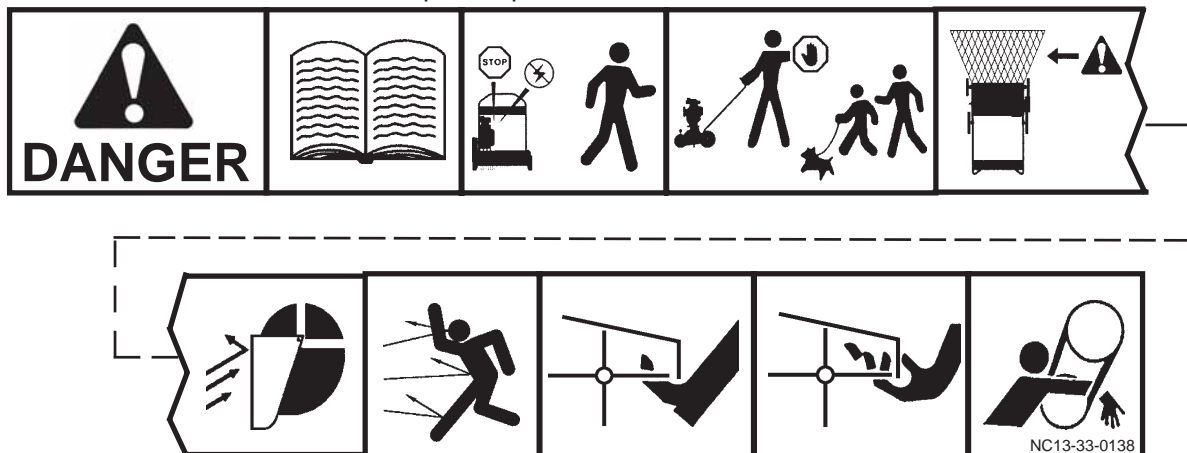


**Fig. 15 WORKING**

## 13. Application Hints:

- Rake the area that needs cleaning.
- Set the wheel position so the flails just clear the surface.
- Run only at maximum engine speed to move the debris.
- Direct the debris stream with care. The rake can produce a debris flow speed in excess of 30 kph (15 mph). At this speed, it can pick up small solid objects and move them over 5 m (16 feet). People, pets, animals, buildings, vehicles or other objects can be hit by these objects. Dust or sand can be blown in peoples eyes.
- It is best to stop raking for a short time to allow people to pass before running machine again.
- Tilt the handle down and deck up to stop

the raking action.



## 5.7 STORAGE



### STORAGE SAFETY

- Store the unit in an area away from human activity.
- Do not permit children to play on or around the stored machine.
- Store the unit in a dry, level area. Support the frame with planks if required.

At the end of the season, the machine should be thoroughly inspected and prepared for storage. Repair or replace any worn or damaged components to prevent any unnecessary down time at the beginning of the next season. Follow this procedure:

1. Thoroughly wash the machine with a pressure washer or water hose to remove all dirt, mud, debris or residue.
2. Lubricate all grease points to remove any water residue from washing.
3. Remove any material that has become entangled around any moving part.
4. Touch up all paint nicks and scratches to prevent rusting.



**Fig. 16 STORED**

5. Move the machine to its storage area.
6. Store in a dry, level spot.
7. Store in an enclosed building if possible. If space is not available, cover with a waterproof tarpaulin and tie down securely.
8. Store in an area away from human activity.
9. Do not allow children to play around the stored unit.

## 6 SERVICE AND MAINTENANCE



### MAINTENANCE SAFETY

- Good maintenance is your responsibility. Poor maintenance is an invitation to trouble.
- Follow good shop practices.
  - Keep service area clean and dry.
  - Be sure electrical outlets and tools are properly grounded.
  - Use adequate light for the job at hand.
- Make sure there is plenty of ventilation. Never operate an engine in a closed building. The exhaust fumes may cause asphyxiation.
- Before working on this machine, shut off the engine, set the brakes, and remove the ignition keys.
- Never work under equipment unless it is blocked securely.
- Always use personal protection devices such as eye, hand and hearing protectors, when performing any service or maintenance work.
- Where replacement parts are necessary for periodic maintenance and servicing, genuine factory replacement parts must be used to restore your equipment to original specifications. The manufacturer will not be responsible for injuries or damages caused by use of unapproved parts and/or accessories.
- A fire extinguisher and first aid kit should be kept readily accessible while performing maintenance on this equipment.
- Periodically tighten all bolts, nuts and screws and check that all cotter pins are properly installed to ensure unit is in a safe condition.
- When completing a maintenance or service function, make sure all safety shields and devices are installed before placing unit in service.

## 6.1 SERVICE

### 6.1.1 FLUIDS AND LUBRICANTS

#### 1. Gasoline:

Use a super unleaded gasoline for all operating conditions. Do not use gasoline with an ethanol blend.

Capacity: 1.2 litres (0.32 gal).

#### 2. Engine Oil:

Use an SAE 10W30 multi-viscosity oil meeting the American Petroleum Institute (API) classification of SF or SG for normal operating temperatures. Consult the engine manual for unusual operating conditions. Do not mix oil types or viscosities.

#### Crankcase Capacity:

0.4 litres (0.42 US qt).

#### 3. Storing Lubricants:

Your machine can operate at top efficiency only if clean lubricants are used. Use clean containers to handle all lubricants. Store them in an area protected from dust, moisture and other contaminants.

### 6.1.3 SERVICING INTERVALS

The period recommended is based on normal operating conditions. Severe or unusual conditions may require more frequent lubrication or oil changes.

#### 8 Hours or Daily

1. Check engine oil level.
2. Check fuel level.



Fig. 17 ENGINE

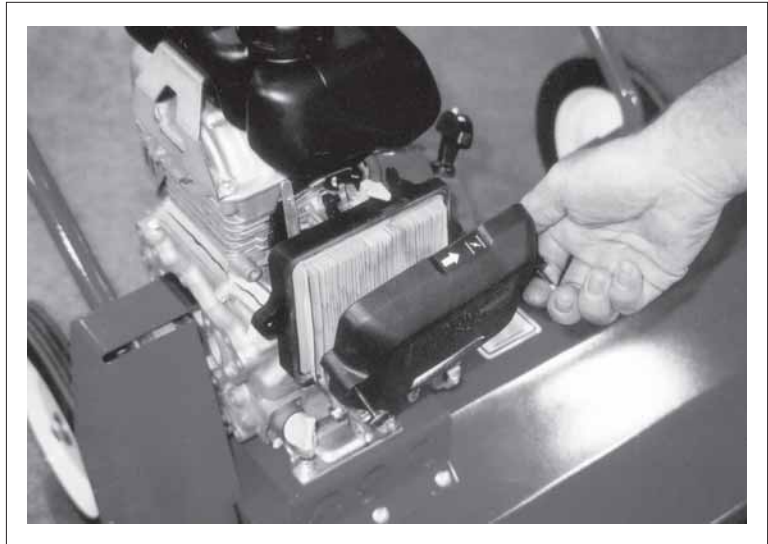
#### 100 Hours

1. Change engine oil.



Fig. 18 ENGINE DRAIN PLUG

2. Clean air cleaner.



**Fig. 19 AIR CLEANER**

### **Annually**

1. Clean machine.



**Fig. 20 MACHINE**





## 6.2 MAINTENANCE

By following a careful service and maintenance program for your machine, you will enjoy many years of trouble-free operation.

### 6.2.1 CLEANING AIR CLEANER

1. Review the Operator's Manual for the engine.
2. Place all controls in neutral, stop engine and turn off ignition key before maintaining.
3. Remove the cover over the air cleaner.
4. Remove the foam from the engine.
5. Use an air hose to blow the dust and debris out of the foam.
6. Install foam.
7. Install and secure the cover.

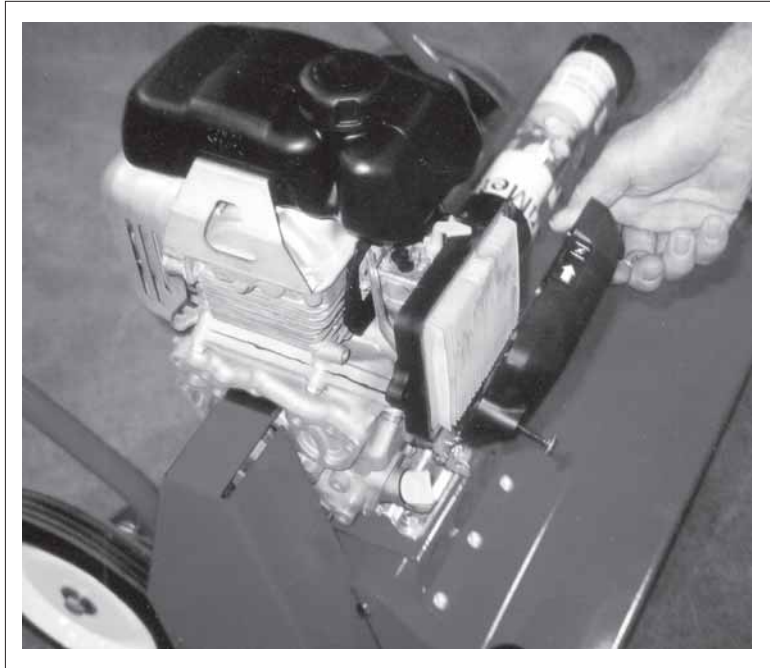
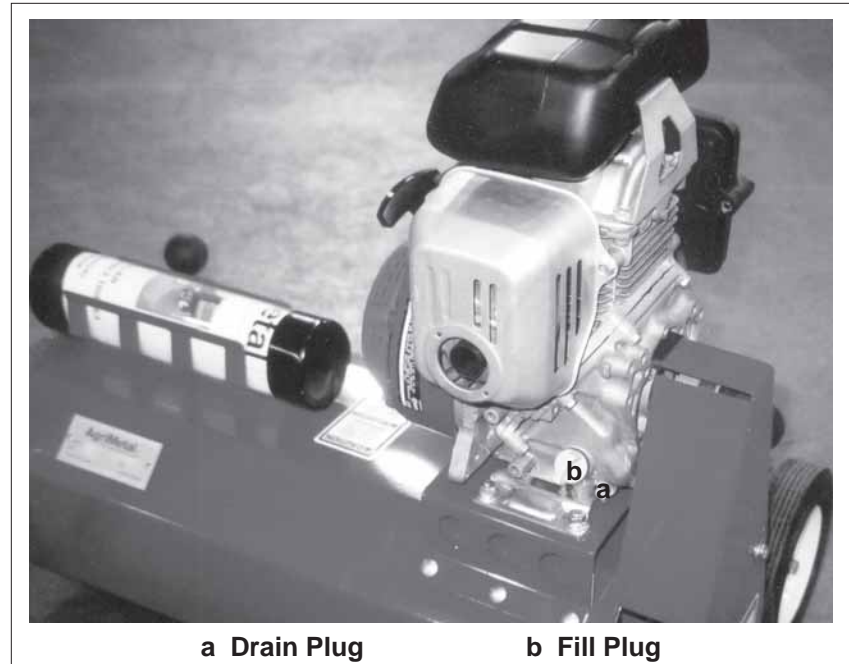


Fig. 21 AIR CLEANER

## 6.2.2 CHANGING ENGINE OIL AND FILTER

1. Review the Operator's Manual for the engine.
2. Place all controls in neutral, stop engine and turn off ignition key before maintaining.
3. Allow the engine to cool before changing the oil. Hot oil can cause burns if it contacts exposed skin. It is best to change oil while the engine is warm to keep the contaminants in suspension.
4. Place a pan under the drain plug.
5. Remove the drain and allow the oil to drain for 10 minutes.



**Fig. 22 ENGINE**

6. Install and tighten the drain plug.
7. Dispose of the used oil in an approved container.
8. Fill the crankcase with specified oil.
9. Run the engine for 1-2 minutes and check for oil leaks.
10. If leaks are found around the drain plug, tighten slightly.
11. Check engine oil level. Top up as required.

## 6.2.3 FLAIL REPLACEMENT

The rotor is designed with swinging flails that loosen and propel leaves, sand, small stones and any other debris ahead of it as it moves across an area. The flails are made of a light plastic with good wear resistance. Each flail is free-swinging and can fold back if it hits a solid object.

After operating for a time in abrasive conditions, the flails can wear and it will be necessary to lower the deck to allow the flails to reach the material to be moved. And eventually the flails will have to be replaced. Or if a flail breaks or is damaged, it will have to be replaced.

When replacing, follow this procedure:

1. Run the unit until the engine is almost out of gas.
2. Stop engine and remove spark plug wire to disable engine.
3. Place the unit on a table or workbench to provide easy and convenient access.
4. Tilt the deck back to expose the rotor.

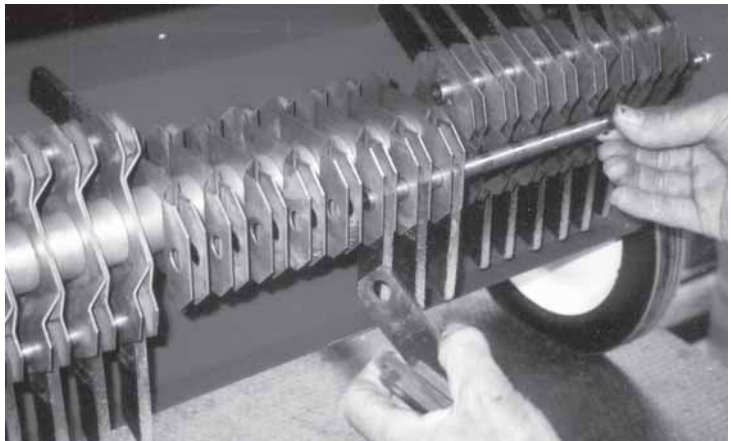


### WARNING

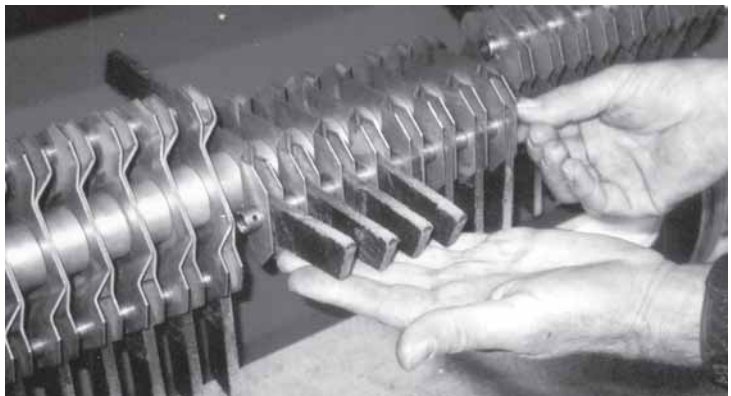
Be sure there is only a small amount of gas in the gas tank to minimize the chance of spillage when the deck is tilted. Clean up any spills before continuing with the work.



Vise Grips



Flail Removal



Flail Position

Fig. 23 FLAIL REPAIR

5. Use a small punch to drive the end roll pin out of the shaft. Do not enlarge the hole.
6. Slide the shaft out and catch the flails.
7. Replace the flail(s) as required.
8. Slide the shaft back into the assembly.

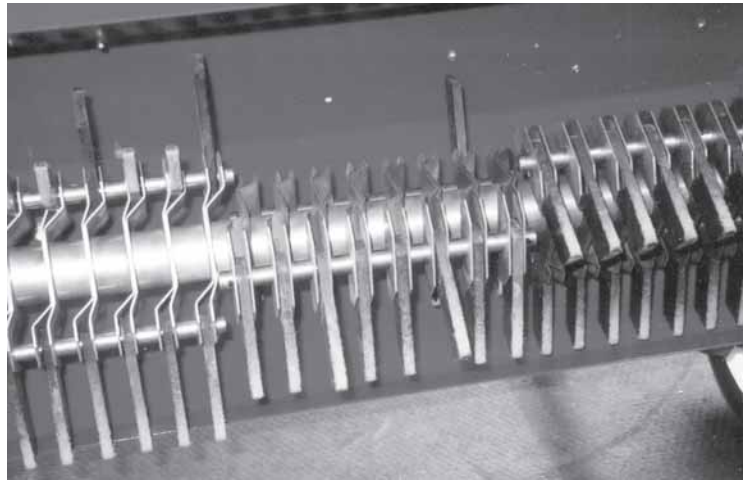
### IMPORTANT

Install flail with the long portion forward.

9. Push the shaft through until the roll pin hole is in the open.
10. Install the roll pin and center through the shaft. Use a hammer if required.
11. Check that all flails swing freely on the shaft.
12. Repeat with the other shafts as required.



**Roll Pin**



**Assembled**

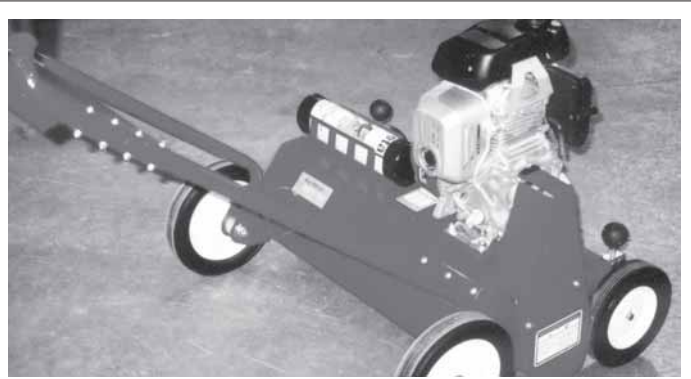
**Fig. 24 ROTOR**

## 6.2.4 ROTOR DRIVE BELT

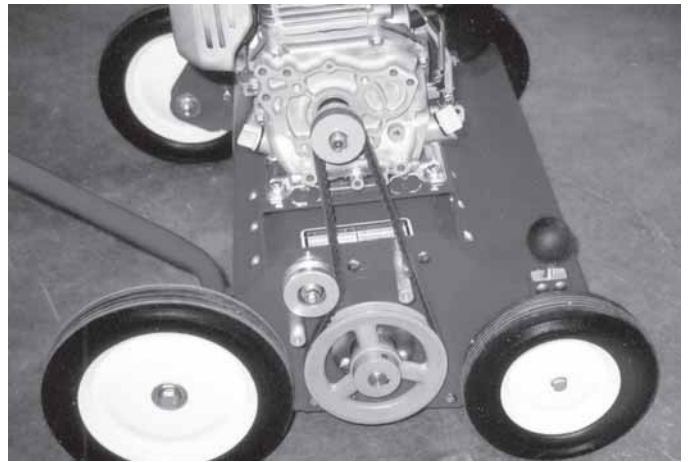
The rotor is driven by a V belt on the right end of the deck. The belt must be kept at the correct tension to obtain the required performance and life.

When maintaining the belt drive system, follow this procedure:

1. Clear the area of bystanders, especially small children.
2. Stop engine and remove spark plug wire to disable engine.
3. Remove guard over belt drive.
4. Check the belt tension by pushing on the long span with a 10 lb<sub>f</sub> pressure. The belt should deflect up to 6 mm (1/4 inch).
5. Loosen the idler pulley anchor bolt.
6. Slide or tap the idler pulley to the required position to tension the belt.
7. Tighten anchor bolts to its specified torque.
8. Move engine or idler pulley as required to align pulleys.
9. Install guard. Tighten fasteners to their specified torque.

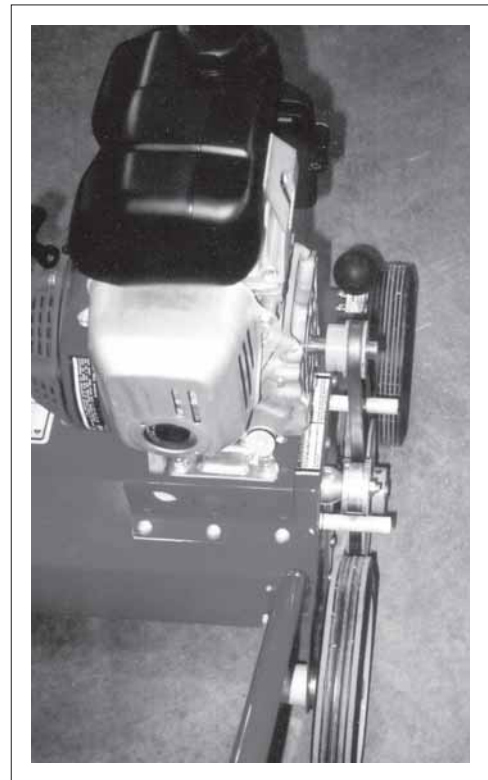


**Guard**



**Idler Pulley**

**Fig. 25 BELT DRIVE**



**Fig. 26 ALIGNMENT**

## 7 TROUBLE SHOOTING

The AgriMetal RotoRake is a portable rake that can be used to rake leaves, gravels, sand, small stones, trash and debris. It is a simple system that requires minimal maintenance.

In the following Trouble Shooting section, we have listed many of the problems, causes and solutions that can help you to solve the problems that you might encounter.

If you encounter a problem that is difficult to solve, even after having read through this trouble shooting section, please call your local distributor or dealer. Before you call, please have this Operator's Manual and the serial number of your machine at hand.

<b>PROBLEM</b>	<b>CAUSE</b>	<b>SOLUTION</b>
Engine won't start	No fuel.	Check fuel level, add as required.
	Ignition switch off.	Turn ignition switch on.
<hr/>		
Doesn't move debris/leaves.	Flails too high.	Lower frame and flails.
	Flails wore out.	Replace flails.
	Loose belt.	Tighten drive belt tension.
<hr/>		

## 8 SPECIFICATIONS

### 8.1 MECHANICAL

<b>ROTORAKE</b>	
Working width	24" (60cm)
Height	40" (102cm)
Width	31" (79cm)
Length	46" (117cm)
Engine	3 HP HONDA
Machine weight	100 lbs (45 kg)
Shipping weight	105 lbs (47 kg)
Shipping dimensions	32" X 26" X 32" HEIGHT (81 X 66 X 81 cm HEIGHT)

**SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE**



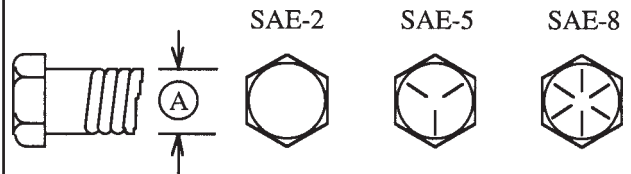
## 8.2 BOLT TORQUE

### CHECKING BOLT TORQUE

The tables shown below give correct torque values for various bolts and capscrews. Tighten all bolts to the torques specified in chart unless otherwise noted. Check tightness of bolts periodically, using bolt torque chart as a guide. Replace hardware with the same strength bolt.

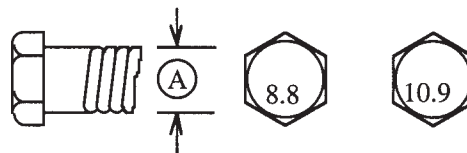
### ENGLISH TORQUE SPECIFICATIONS

Bolt Diameter "A"	Bolt Torque *					
	SAE 2		SAE 5		SAE 8	
	N.m	(lb-ft)	N.m	(lb-ft)	N.m	(lb-ft)
1/4"	8	(6)	12	(9)	17	(12)
5/16"	13	(10)	25	(19)	36	(27)
3/8"	27	(20)	45	(33)	63	(45)
7/16"	41	(30)	72	(53)	100	(75)
1/2"	61	(45)	110	(80)	155	(115)
9/16"	95	(70)	155	(115)	220	(165)
5/8"	128	(95)	215	(160)	305	(220)
3/4"	225	(165)	390	(290)	540	(400)
7/8"	230	(170)	570	(420)	880	(650)
1"	345	(225)	850	(630)	1320	(970)



### METRIC TORQUE SPECIFICATIONS

Bolt Diameter "A"	Bolt Torque*			
	8.8		10.9	
	(N.m)	(lb-ft)	(N.m)	(lb-ft)
M3	.5	.4	1.8	1.3
M4	3	2.2	4.5	3.3
M5	6	4	9	7
M6	10	7	15	11
M8	25	18	35	26
M10	50	37	70	52
M12	90	66	125	92
M14	140	103	200	148
M16	225	166	310	229
M20	435	321	610	450
M24	750	553	1050	774
M30	1495	1103	2100	1550
M36	2600	1917	3675	2710



Torque figures indicated above are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or capscrews unless otherwise specified in this manual. When using locking elements, increase torque values by 5%.

\* Torque value for bolts and capscrews are identified by their head markings.

# 10 INDEX

A	PAGE
Assembling .....	15
Machine Assembly .....	15
I	
Introduction .....	1
O	
Operation .....	19
Break-In .....	21
Controls .....	22
Field Operation .....	23
Machine Components .....	20
Pre-Operation Checklist .....	21
Storage .....	29
To the New Operator or Owner .....	19
P	
Parts List .....	42

S	PAGE
Safety .....	2
Equipment Safety .....	4
Gas Motor Safety .....	10
General Safety .....	3
Maintenance Safety .....	9
Operating Hazard Area .....	8
Operating Safety .....	7
Preparation .....	6
Refuelling Safety .....	8
Safety Signs .....	5
Safety Training .....	5
Sign-Off Form .....	11
Storage Safety .....	8
Safety Sign Locations .....	12
Service and Maintenance .....	30
Maintenance .....	34
Changing Engine Oil and Filter .....	35
Cleaning Air Cleaner .....	34
Flail Replacement .....	36
Rotor Drive Belt .....	38
Service .....	30
Fluids and Lubricants .....	30
Service Record .....	33
Servicing Intervals .....	31
Specifications .....	40
Bolt Torque .....	41
Mechanical .....	40
T	
Trouble Shooting .....	39