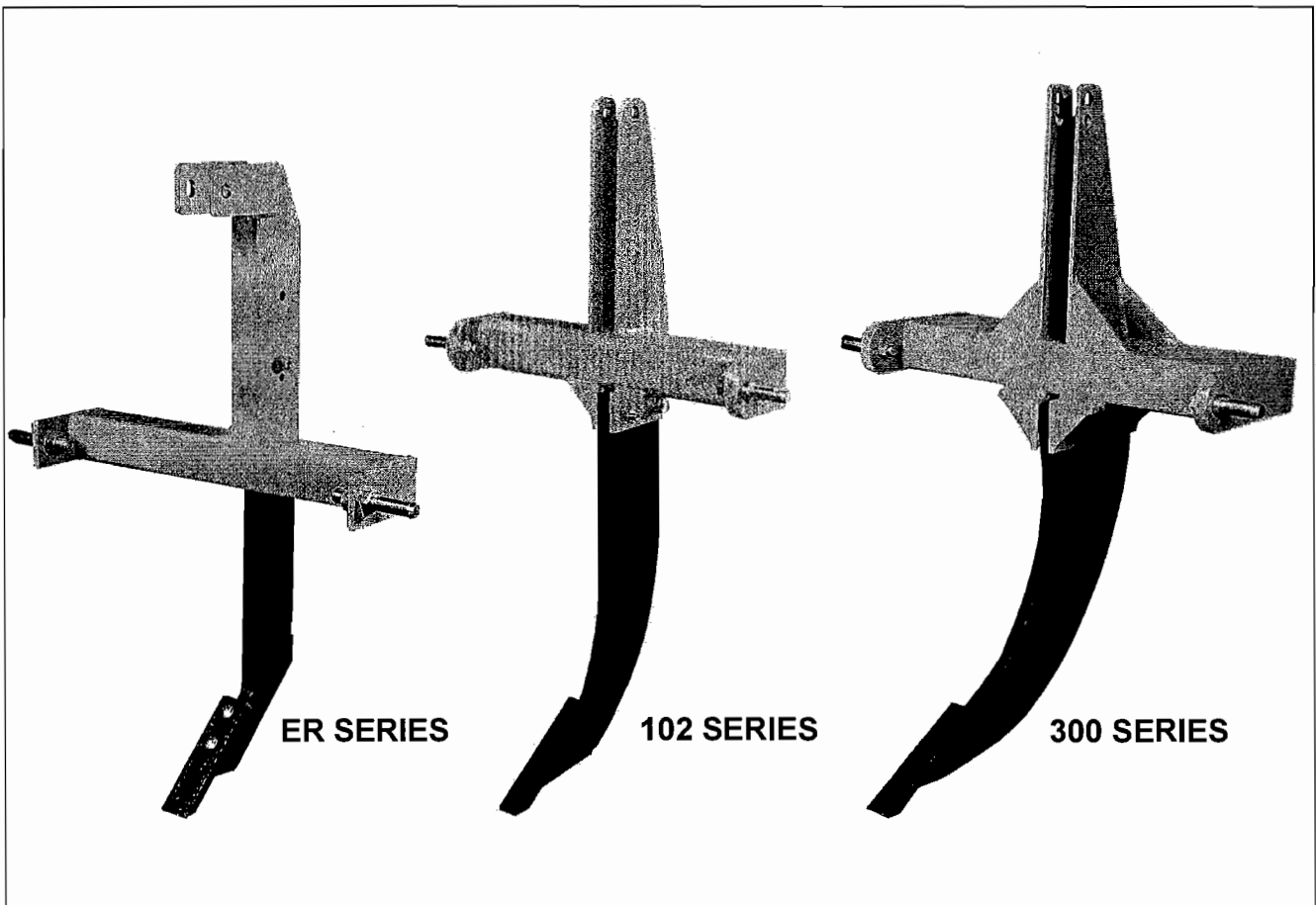


FRONTLINE

SINGLE SHANK RIPPERS



OPERATOR'S MANUAL

ER-25, 102L, 102 & 300 SERIES

MANUFACTURER'S

LIMITED WARRANTY

Manufacturer warrants to original Purchaser that its product is free from major defects in material under normal use and service for a period of 180 days from the date the product is shown to have been placed into operation by original distributor customers or for one year from date of shipment from Manufacturer's plant, whichever shall first occur.

Manufacturer's obligation under this warranty is expressly limited to the repair or replacement, at its option, of the parts which are returned F.O.B. Manufacturer's factory, Yakima, WA, and which are determined by Manufacturer to be defective. Provided further that such parts shall be returned within thirty (30) days from date of failure to Manufacturer through the dealer or distributor from whom the purchase was made. Transportation charges prepaid by customer. Manufacturer assumes no responsibility for outside labor.

THIS IS THE SOLE AND ONLY WARRANTY OF MANUFACTURER AND NO OTHER WARRANTY IS APPLICABLE, EITHER EXPRESSED OR IMPLIED, IN FACT OR BY LAW, INCLUDING ANY WARRANTY AS TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE.

This warranty shall not be interpreted to render us liable for injury or damages of any kind or nature, direct, consequential, or contingent, to person or property. This warranty does not extend to loss of crops, loss because of delay in harvesting or any expense or loss incurred for labor, supplies, substitute machinery, rental or any other reason.

The sole and only remedy in regard to any defective products shall be the repair or replacement thereof herein provided, and Manufacturer shall not be liable for any consequential, special, incidental, or punitive damages resulting from or caused by any such defects.

Manufacturer reserves the right to make improvements in design or changes in specifications at any time, without incurring any obligations to owners of units previously sold.

No one is authorized to alter, modify, or enlarge this warranty nor the exclusions, limitations, and reservation.

The price of goods sold is determined using this warranty as a cost factor.

**WARRANTY VOID IF NOT REGISTERED
WITHIN 30 DAYS OF PURCHASE DATE**

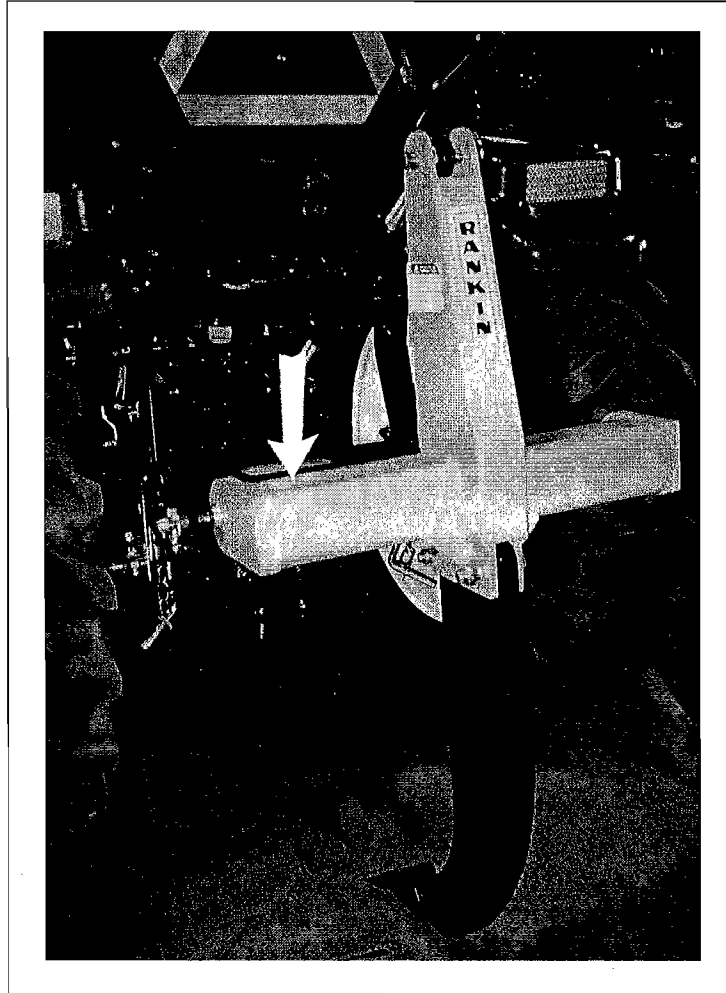
TABLE OF CONTENTS

SECTION PAGE	DESCRIPTION	
1	Introduction	1
2	Safety	2
2.1	General Safety	3
2.2	Equipment Safety Guidelines	4
2.3	Safety Training	5
2.4	Safety Signs	5
2.5	Preparation	6
2.6	Operating Safety	7
2.7	Transport Safety	8
2.8	Storage Safety	8
2.9	Maintenance Safety	8
2.10	Sign-Off Form	9
3	Safety Sign Locations	10
4	Operation	11
4.1	To the New Operator or Owner	11
4.2	Machine Components	12
4.3	Machine Break-In	12
4.4	Pre-Operation Checklist	12
4.5	Field Operation	13
4.6	Transporting	18
4.7	Storage	18
5	Trouble Shooting	19
6	Assembly	20
7	Specifications	21
7.1	Mechanical	21
7.2	Bolt Torque	21
8	Index	22

SERIAL NUMBER LOCATION

Always give your dealer the serial number of your Single Shank Ripper when ordering parts or requesting service or other information.

The serial number plate is located where indicated. Please mark the number in the space provided for easy reference.



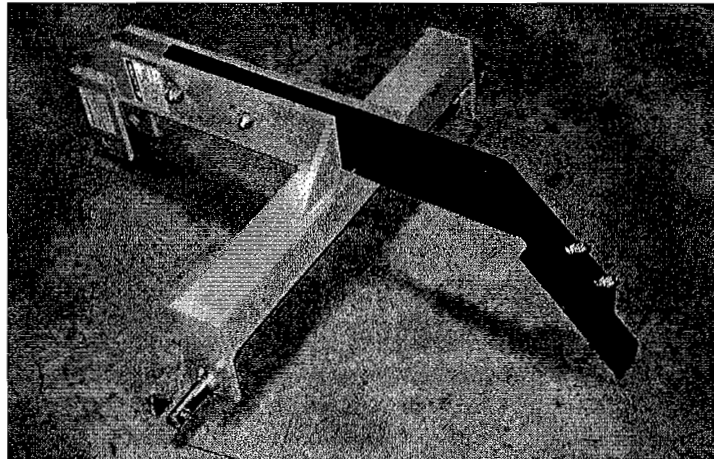
Model Number _____

Serial Number _____

1 INTRODUCTION

Congratulations on your choice of a Single Shank Ripper to complement your farming operation. This equipment has been designed and manufactured to meet the needs of a discriminating buyer for the breaking up of hardpan or aerating soil.

Safe, efficient and trouble free operation of your Ripper 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.



ER Series



102 Series

This manual covers the Model ER-25, 102L, 102 and 300 Series Single Shank Rippers. Differences are explained where appropriate. Use the Table of Contents or Index as a guide to locate required information.

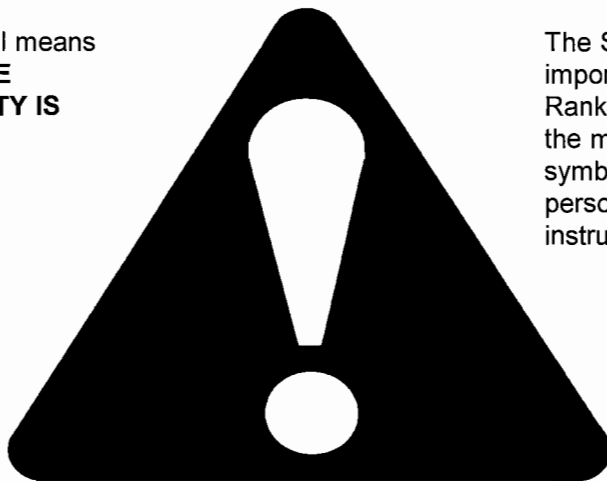
Keep this manual handy for frequent reference and to pass on to new operators or owners. Call your dealer or distributor if you need assistance, information or additional copies of the manuals.

OPERATOR ORIENTATION - The directions left, right, front and rear, as mentioned throughout this manual, are as seen from the driver's seat 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 Rankin Single Shank Ripper 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.

SAFETY

YOU are responsible for the **SAFE** operation and maintenance of your Single Shank Ripper. **YOU** must ensure that you and anyone else who is going to operate, maintain or work around the Single Shank Ripper 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 Ripper.

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.

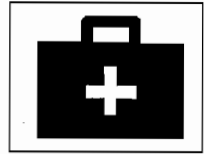
- Ripper owners must give operating instructions to operators or employees before allowing them to operate the machine, and at least annually thereafter per OSHA (Occupational Safety and Health Administration) regulation 1928.57.
- The most important safety feature on this equipment is a **SAFE** operator. 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

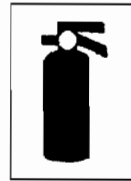
1. Read and understand the Operator's Manual and all safety signs before operating, maintaining, adjusting or unplugging the Ripper.



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.

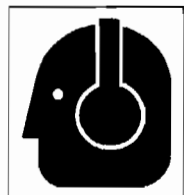


4. Wear appropriate protective gear. This list includes but is not limited to:



- A hard hat
- Protective shoes with slip resistant soles
- Protective goggles, glasses or face shield
- Heavy gloves
- Protective clothing

5. Install and secure all guards before starting.
6. Do not allow riders.
7. Wear suitable ear protection for prolonged exposure to excessive noise.



8. Place all controls in neutral, stop tractor engine, set park brake, remove ignition key 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.
10. Review safety related items annually with all personnel who will operating or maintaining the Ripper.

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 farm machinery and trained in this equipment's operations. If the elderly are assisting with farm work, their physical limitations need to be recognized and accommodated.
7. Use a tractor equipped with a Roll Over Protective Structure (ROPS) and seat belt.
8. 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.**
9. 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.
10. 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 Tractor and machine Manuals. Pay close attention to the Safety Signs affixed to the Tractor 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, and the manual for your tractor, 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 tractor, engine, and machine quickly in an emergency. Read this manual and the one provided with your tractor.
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 farm 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 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

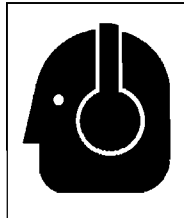
1. Never operate the tractor and machine until you have read and completely understand this manual, the Tractor Operator's Manual, and each of the Safety Messages found on the safety signs on the tractor and machine.

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.

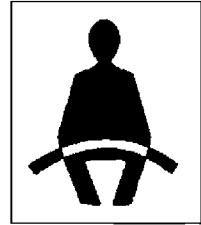


3. **PROLONGED EXPOSURE TO LOUD NOISE MAY CAUSE PERMANENT HEARING LOSS!**

Tractors 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. Operate the machine only with a tractor equipped with an approved Roll-Over-Protective Structure (ROPS). Always wear your seat belt. Serious injury or even death could result from falling off the tractor ---particularly during a turnover when the operator could be pinned under the ROPS or the tractor.
5. Clear working area of stones, branches or hidden obstacles that might be hooked or snagged, causing injury or damage.
6. Operate only in daylight or good artificial light.
7. Be sure machine is properly mounted, adjusted and in good operating condition.
8. 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 Single Shank Ripper. 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 Single Shank Ripper 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 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. Never place yourself between the tractor and machine while implement is in operation.
9. Do not walk or work under a raised machine or attachment unless it is securely blocked or held in position. Do not depend on the tractor hydraulic system to hold the machine or attachment in place.
10. A heavy load can cause instability of the tractor. Use extreme care during travel. Slow down on turns and watch out for bumps. The tractor may need front counterweights to counterbalance the weight of the machine.
11. 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.
12. Do not allow riders on the machine or tractor at any time. There is no safe place for any riders.
13. 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.
14. Do not allow anyone who is not familiar with the safety rules and operation instructions to use this machine.
15. Never allow children to operate or be around this machine.
16. Use stabilizer bars, adjustable sway chains, or sway blocks on the tractor lift arms to keep the machine from swinging side to side. Adjust as tightly as practical for best performance.
17. Clear the work area of objects which might be picked up and snagged or entangled in the machine.
18. Keep hands, feet, hair, jewelry, and clothing away from all moving and/or rotating parts.

2.7 TRANSPORT SAFETY

1. Comply with state and local laws governing highway safety and movement of farm machinery on public roads.
2. The use of flashing amber lights is acceptable in most localities. However, some localities prohibit their use. Local laws should be checked for all highway lighting and marking requirements.
3. At all times, when driving the tractor and equipment on the road or highway under 20 mph (32 kph) use flashing amber warning lights and a slow moving vehicle (SMV) identification emblem. Do not exceed 20 mph (32 kph). Reduce speed on rough roads and surfaces.
4. Plan your route to avoid heavy traffic.
5. Always install transport locks, pins or brackets before transporting.
6. Do not drink and drive.
7. Be a safe and courteous driver. Always yield to oncoming traffic in all situations, including narrow bridges, intersections, etc. Watch for traffic when operating near or crossing roadways.
8. Turn into curves or go up or down hills only at a low speed and at a gradual steering angle. Make certain that at least 20% of the tractor's weight is on the front wheels to maintain safe steering. Slow down on rough or uneven surfaces.
9. Never allow riders on either tractor or machine.

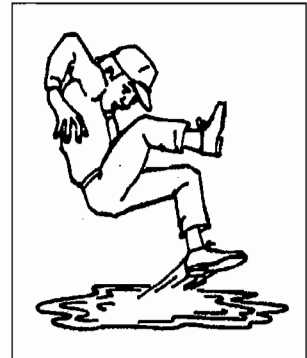
2.8 STORAGE SAFETY

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.

2.9 MAINTENANCE SAFETY

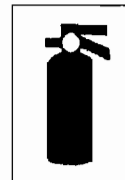
1. Good maintenance is your responsibility. Poor maintenance is an invitation to trouble.
2. Follow good shop practices.

- 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 the engine of the towing vehicle in a closed building. The exhaust fumes may cause asphyxiation.
4. Before working on this machine, shut off the engine, set the brakes, and remove the ignition keys.
6. Never work under equipment unless it is blocked securely.
7. Always use personal protection devices such as eye, hand and hearing protectors, when performing any service or maintenance.
8. 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.

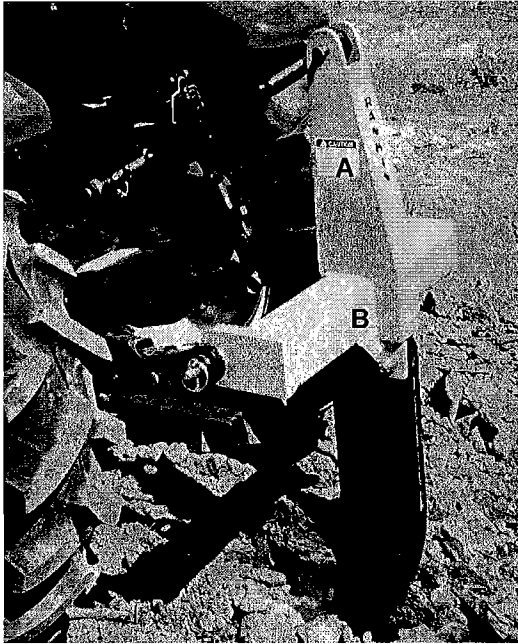


9. A fire extinguisher and first aid kit should be kept readily accessible while performing maintenance on this equipment.
10. Periodically tighten all bolts, nuts and screws and check that all cotter pins are properly installed to ensure unit is in a safe condition.
11. When completing a maintenance or service function, make sure all safety shields and

3 SAFETY SIGN LOCATIONS

The types of safety signs and locations on the equipment are shown in the illustration below. 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!



A

CAUTION

Read and understand Operator's Manual before starting.

Place all controls in neutral, stop engine, set park brake, remove ignition key and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.

Place jack stands under frame before working under machine.

Review safety instructions annually.

CAUT001

B

IMPORTANT

TIGHTEN WITH NYLOCK ONLY.
DO NOT COMPRESS SHANK
MOUNTING PLATES.

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

4 OPERATION



OPERATING SAFETY

- Read and understand the Operator's Manual and all safety signs before operating, servicing, adjusting, repairing or unplugging.
- Do not allow riders.
- Install and secure all guards and shields before starting or operating.
- Keep hands, feet, hair and clothing away from moving parts.
- Place all controls in neutral, stop tractor engine, set park brake, remove ignition key and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.
- Place all tractor and machine controls in neutral before starting.
- Never start or operate machine unless sitting on tractor seat.
- Clear the area of bystanders, especially small children, before starting.
- Clean reflectors, SMV and lights before transporting.
- Use hazard flashers on tractor when transporting.
- Do not put hands or feet under machine while tractor engine is running.
- Review safety instructions with all operators annually.

4.1 TO THE NEW OPERATOR OR OWNER

The Single Shank Ripper is designed to break up hardpan and aerate the soil.

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 Single Shank Ripper unit will provide many years of trouble-free service.

4.2 MACHINE COMPONENTS

Single Shank Rippers consist of a 3 point hitch mounting frame attached to a vertical shank. The shank is bolted to the frame and extends down for soil engagement. Shovels or tips are attached to the shank.

- A Mounting Frame**
- B Shank**
- C Shovel/Tip**
- D Shear Pin**
- E Mounting Pin**

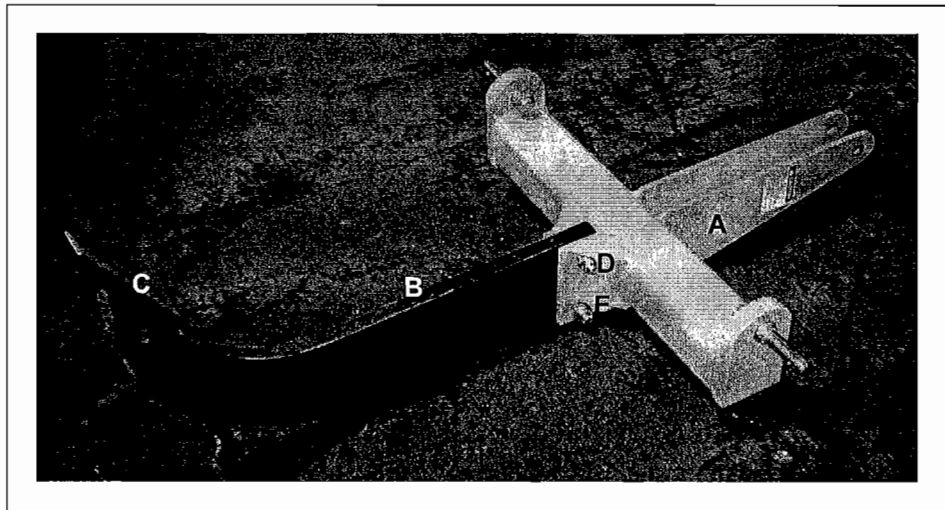


Fig. 1 MACHINE COMPONENTS

4.3 MACHINE BREAK-IN

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

A. After Operating For 1 and 5 Hours:

1. Check all nuts, bolts and other fasteners. Tighten to their specified torque level.
2. Check that the shovels/tips are in good condition.

4.4 PRE-OPERATION CHECKLIST

Efficient and safe operation of the Single Shank Ripper 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 the personal safety and maintaining the good mechanical condition of the Ripper that this checklist is followed.

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

1. Use only a Agricultural tractor of the recommended horsepower on the Ripper.
2. Check that the machine is properly attached to the tractor. Be sure retainers are used on the mounting pins.
3. Check the shovels/tips. Be sure they are not damaged or broken and not badly worn. Repair or replace as required.
4. Be sure extra weights are mounted on the front of the tractor if required.
5. Check for entangled material. Remove this material.

4.5 FIELD OPERATION



OPERATING SAFETY

- Read and understand the Operator's Manual and all safety signs before operating, servicing, adjusting, repairing or unplugging.
- Do not allow riders.
- Install and secure all guards and shields before starting or operating.
- Keep hands, feet, hair and clothing away from moving parts.
- Place all controls in neutral, stop tractor engine, set park brake, remove ignition key and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.
- Place all tractor and machine controls in neutral before starting.
- Never start or operate machine unless sitting on tractor seat.
- Clear the area of bystanders, especially small children, before starting.
- Clean reflectors, SMV and lights before transporting.
- Use hazard flashers on tractor when transporting.
- Do not put hands or feet under machine while tractor engine is running.
- Review safety instructions with all operators annually.

Single Shank Rippers are designed as a light duty machine for breaking up hardpan or aerating the soil. However the operator has the responsibility of being familiar with all operating and safety procedures and following them.

Each operator should review this section of the manual at the start of the season and as often as required to be familiar with the machine. When using, follow this procedure:

1. Review and follow the Pre-Operation Checklist.
2. Attach the tractor to the machine.
 - a. Lift the machine and slide the balls over the mounting pins. Install the retainers.
 - b. Attach the top link to the mast. Install the retainer.
 - c. Always engage the anti-sway components on each lift arm to keep the unit from moving from side-to-side during operation.

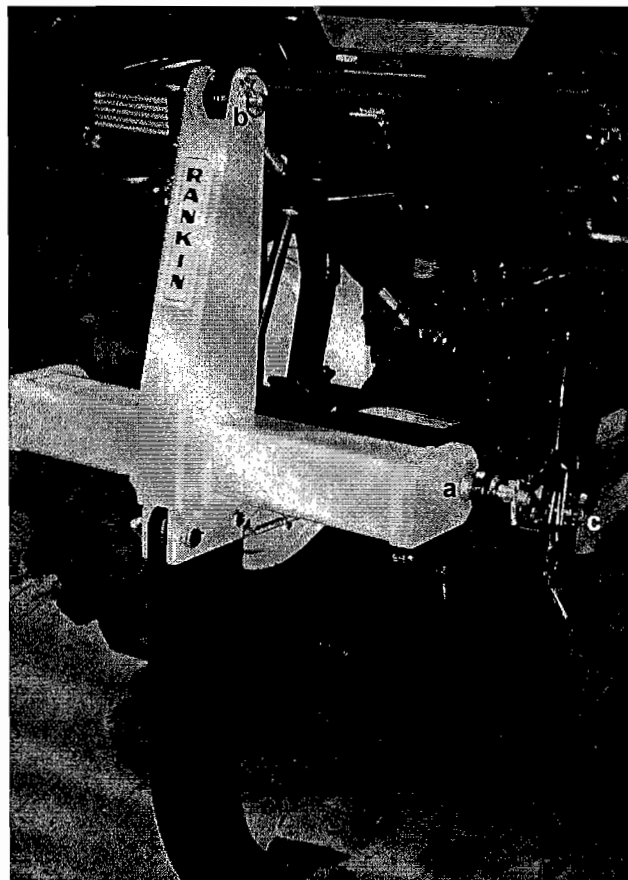


Fig. 2 ATTACHED (TYPICAL)

3. The Ripper is designed for a tractor of a certain horsepower range as specified in Table 1. Controlling the operating depth will also determine the horsepower required in the field. Do not exceed the recommended power range.
4. Before going to the work area review Section 4.6 Transporting.
5. Stop in a level area next to the work site.
6. Lower to the ground.
7. **Set the Machine:**

TABLE 1 HORSEPOWER VS MODEL

MODEL	HORSEPOWER RANGE
ER-25	Up to 25
102L	Up to 50
102	Up to 50
300	Up to 75

a. **Level the Frame:**

Use the screw jack on the right lift arm to level the frame from side-to-side.

b. **Frame Angle:**

Use the turnbuckle on the top link to set the mast and frame angle. Normally the mast should be angled forward slightly when the machine is set at operating depth. This will help draw the tip into the ground during operation.

c. **3 Point Hitch:**

Place the 3 point hitch into its "draft" or "position" mode.

In "position", the operator will have to watch the frame and raise or lower the hitch as required when driving the tractor if it becomes overloaded.

In "draft", the hitch will automatically be raised should the tractor be overloaded.

d. **Category:**

The Ripper is designed with a Category 1, 3 point hitch. Always use the appropriate pins and retainers when hooking to the tractor.



Fig. 3 FRAME POSITION

8. Align the shank with the working area, drive forward and lower the 3 point hitch.

9. **Speed:**

The Ripper can be operated at any speed from 1 to 5 mph depending on the soil conditions and operating depth. A slower speed generally works better as it allows the operator to keep better control of the tractor.

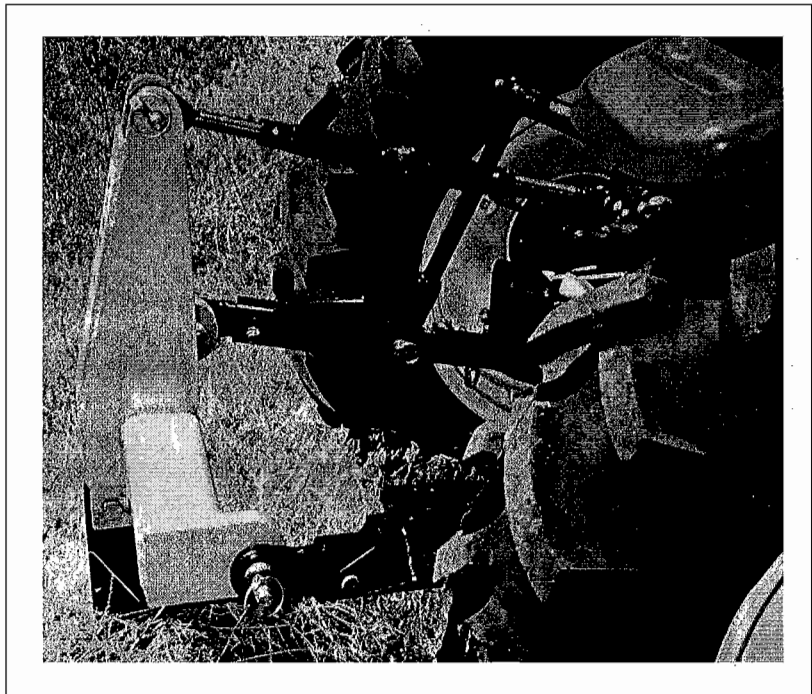


Fig. 4 FIELD

10. **Depth:**

Although these units can be positioned for almost any depth, a practical depth appears to be about 6 to 10 inches. In most cases, ground hardness and horsepower available will limit the depth. Do not increase tractor size as it leads to shank bending and failure.

11. **Turning:**

Raise the unit out of the ground when making turns. This will prevent bending or twisting of the shank.



Fig. 5 TURNING

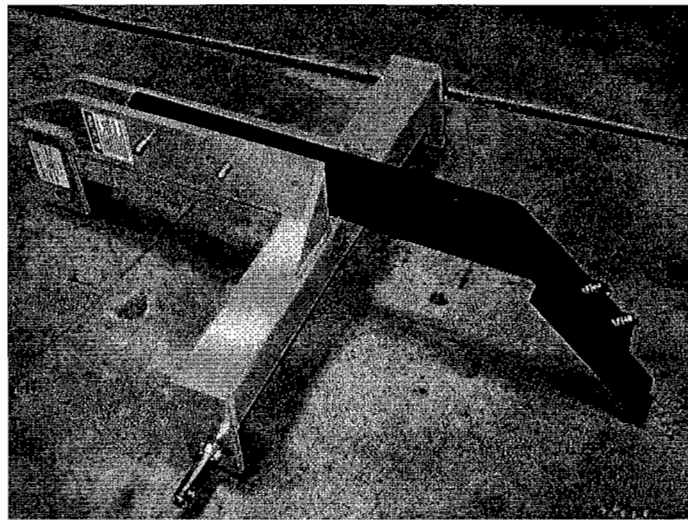
12. Tips:

A tip is attached to the bottom of each shank and engages the soil. The ER-25 is designed with a plow bolt to hold on the tip and all other models have a pin through the side. Raise the machine above the ground and support on a safety stand when changing tip. Replace plow bolts if the heads are worn when changing the tip. Do not allow the tip to wear so much that the shank wears.

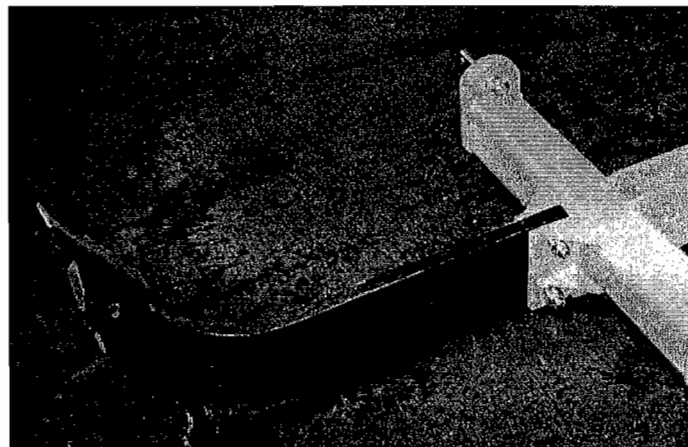
13. Furrower (Optional):

An optional furrower is available for the ER-25.

Remove the existing shovel and install the furrower. Always use plow bolts when mounting the furrower.



ER-25



102L

Fig. 6 TIPS

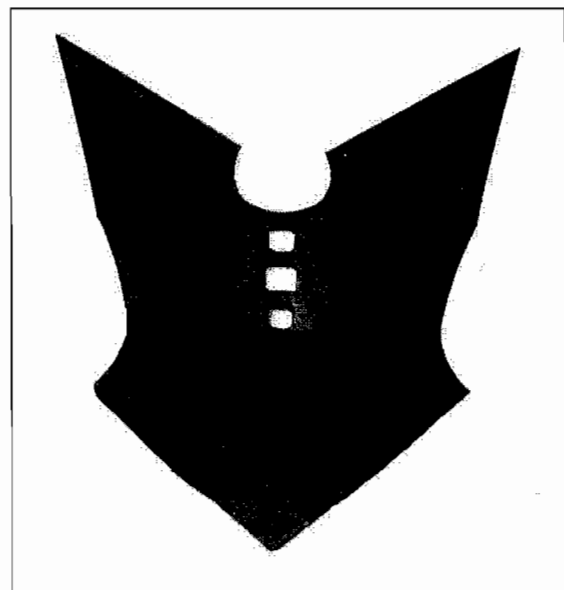


Fig. 7 OPTIONAL FURROWER FOR ER-25

14. Operating Hints:

- a. Know the working area before starting. Do not work where there are shallow underground objects such as wires, water lines, rocks, roots or other objects. Damage can be done to the machine or tractor from an underground object.
- b. When contacting something under the ground, it may be necessary to back up a few inches while lifting to release the tip/shank from the object.
- c. Always angle the mast forward slightly to help draw the tip into the ground. Do not angle too far forward that it pulls itself too far into the ground.



Fig. 8 FIELD

- d. In very hard soil conditions, it may be necessary to add some weight to the frame to help the tip penetrate the surface. Add only as much weight as required. Do not use more than 200 lbs.

- e. Use only Nylock nuts on shank mounting bolts to be sure hardware stays tight whenever changing a shear bolt. Do not compress the shank mounting plates.

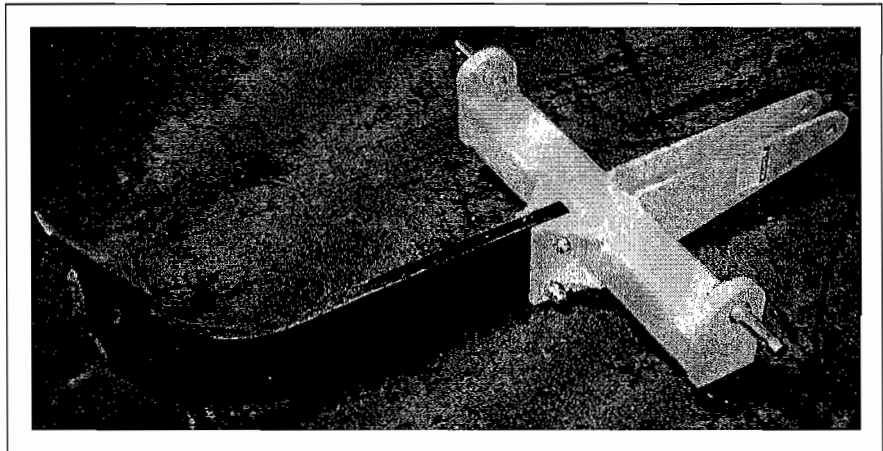


Fig. 9 SHANK HARDWARE

- f. Use the "position" mode on the 3 point hitch to operate at a pre-determined depth. Watch the soil on the shank to know the depth.

- g. Keep the tip in good condition. A badly worn tip will require extra power to pull and may allow the shank to wear.
- h. Be sure the shank is out of the ground when starting to move. It is best to be moving and then lower the machine into the ground to prevent overloading the tractor drivetrain.

- i. In abrasive soils, it may be desirable to hard surface the tip and shank to improve the wear characteristics. Most local welding shops can hard face these surfaces.

4.6 TRANSPORTING



TRANSPORT SAFETY

- Make sure you are in compliance with all local regulations regarding transporting equipment on public roads and highways.
- Make sure the SMV (Slow Moving Vehicle) emblem and all the lights and reflectors that are required by the local highway and transport authorities are in place, are clean and can be seen clearly by all overtaking and oncoming traffic.
- Do not allow anyone to ride on the Ripper or tractor during transport.
- Do not exceed 20 mph (32 kph). Reduce speed on rough roads and surfaces.
- Use retainers on the mounting pins when attaching.
- Always use hazard flashers on the tractor when transporting unless prohibited by law.

When transporting the machine, review and follow these instructions:

1. Be sure all bystanders are clear of the machine.
2. Be sure that the machine is securely attached to the tractor and all retainer pins are installed.
3. Be sure you have installed extra weights on the front of the tractor if required.
4. Clean the SMV emblem, lights and reflectors and be sure they are working.
5. Be sure you are in compliance with all applicable lighting and marking regulations when transporting. Check with your local authorities.
6. Be sure your machine can clearly be seen by overtaking and oncoming traffic.
7. Keep to the right and yield the right-of-way to allow faster traffic to pass. Drive on the road shoulder if permitted by law.
8. Do not allow riders.
9. Always use hazard flashers on the tractor when transporting unless prohibited by law.

4.7 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.

After the season's use, 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 start of next season. To insure a long, trouble free life, this procedure should be followed when preparing the unit for storage:

1. Clear the area of bystanders, especially small children.
2. Thoroughly wash the machine using a pressure washer to remove all dirt, mud, debris and residue.
3. Inspect the shank and tip for damage or entangled material. Repair or replace damaged parts. Remove all entangled material.
4. Touch up all paint nicks and scratches to prevent rusting.
5. Move to storage area.
6. Select an area that is dry, level and free of debris.
7. If the machine cannot be placed inside, cover with a waterproof tarpaulin and tie securely in place.
8. Store the machine in an area away from human activity.
9. Do not allow children to play on or around the stored machine.

5 TROUBLE SHOOTING

Single Shank Rippers are a 3 point hitch frame that is used to mount a shank for breaking up hardpan. It is a simple and reliable system that requires minimal maintenance.

In the following section, we have listed many of the problems, causes and solutions to the problems that you may encounter.

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

PROBLEM	CAUSE	SOLUTION
Tip won't penetrate soil.	Hard ground conditions.	Replace tip if badly worn. Be sure 3 point hitch is set in "float" or "draft" mode. Add weight to frame. Tilt frame forward slightly to help pull tip into the ground.
High power required.	Wrong tip.	Install smaller tip.
Tip worn.	Going too deep.	Replace tip. Raise the unit a little. Tilt frame back slightly to reduce pull into the ground.
Front of tractor is light.	Wrong mast angle.	Tilt mast angle back slightly to reduce load transfer.

6 ASSEMBLY

The machine is shipped from the factory in a partially disassembled form that allows for easy and convenient shipping.

When preparing for the customer, follow this procedure:

1. Clear the area of bystanders, especially small children.
2. Use 2 men to guide or direct and handle the heavy and bulky components.

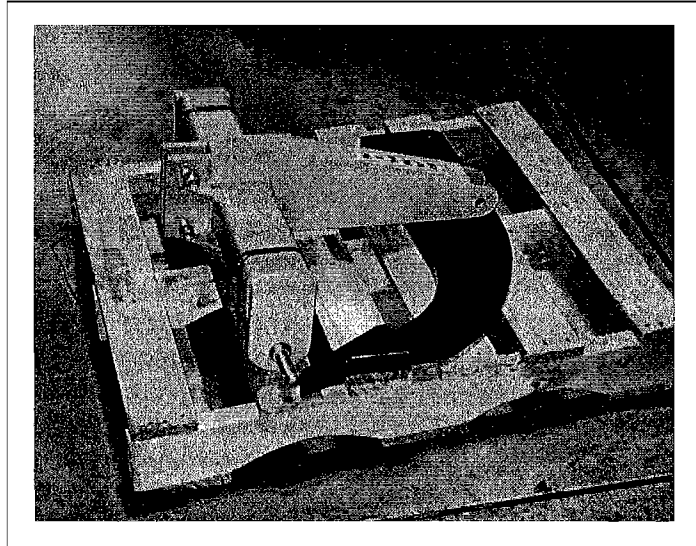


Fig. 10 SHIPPING CONFIGURATION

3. Use a crane, hoist or forklift of sufficient capacity and stability to handle the components.
4. Attach to the lifting device, remove tie-downs, lift from the truck and move to the assembly area. Drive slow and keep the machine close to the ground.
5. Remove all the shank mounting hardware from the frame.
6. Mount the shank into the frame.

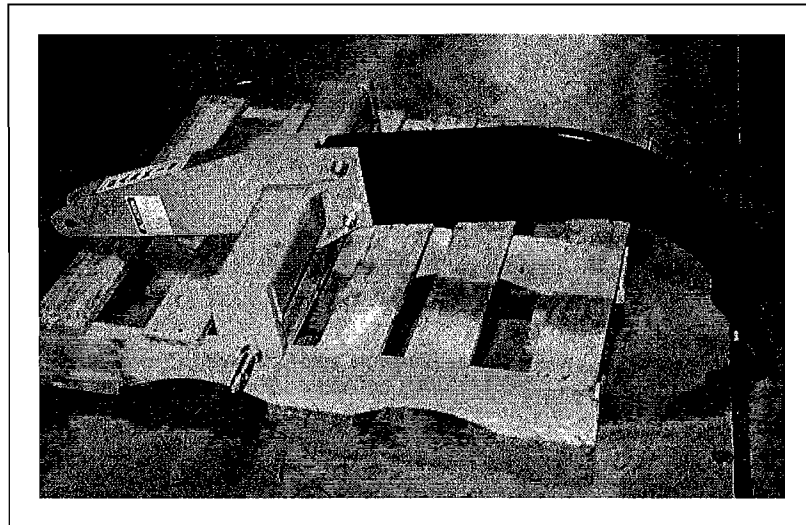


Fig. 11 MOUNTED

IMPORTANT

Be sure to install the 5/8" bolt (Grade 5) in the rear position and the 1/2" Grade 2 bolt in the front.

7. Tighten fasteners to their specified torque.

IMPORTANT

Tighten only with the Nylock nuts provided. Do not compress the shank mounting plates.

7 SPECIFICATIONS

7.1 MECHANICAL

MODELS	ER-25	102L	102	300
NUMBER OF SHANKS	1	1	1	1
TOOL BAR WIDTH	NA	NA	NA	NA
FRAME TUBE SIZE	3" X 3"	4" X 4"	4" X 4"	4" X 8"
SHANK LENGTH	15 & 19"	23"	28"	27"
SHANK SIZE	1" X 4"	1" X 6"	1" X 6"	1" PARABOLIC
HITCH	CAT. 1	CAT. 1	CAT. 1	CAT. 2
HP RATING	UP TO 25	UP TO 50	UP TO 50	UP TO 75
SHEAR-BOLT PROTECTION	YES	YES	YES	YES
WEIGHT	85	130	135	240
OPTIONAL 12" FURROWER	YES	NO	NO	NO
PARKING STANDS	NO	NO	NO	OPTIONAL

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE

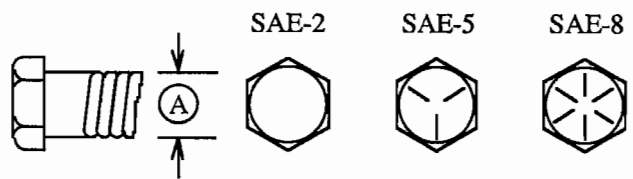
7.2 BOLT TORQUE

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)



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.

8 INDEX

A	PAGE
Assembly	20
I	
Introduction	1
O	
Operation	11
Field Operation	13
Machine Break-In	12
Machine Components	12
Pre-Operation Checklist	12
Storage	18
To the New Operator or Owner	11
Transporting	18

S	PAGE
Safety	2
Equipment Safety Guidelines	4
General Safety	3
Maintenance Safety	8
Operating Safety	7
Preparation	6
Safety Training	5
Safety Signs	5
Sign-Off Form	9
Storage Safety	8
Transport Safety	8
Safety Sign Locations	10
Specifications	21
Bolt Torque	21
Mechanical	21
T	
Trouble Shooting	19



DISTRIBUTING

10784 Industrial Parkway

Marysville, OH 43040

Tel: 614-873-4620

Fax: 614-873-8584