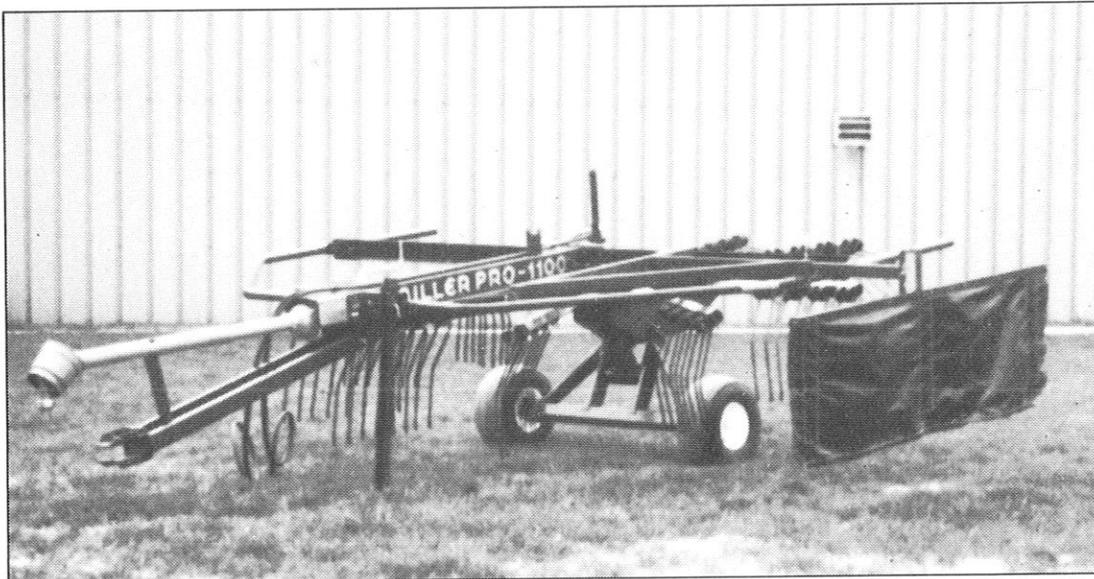


MILLER PRO

MODEL: 1100

ROTARY RAKE OPERATOR'S MANUAL



DO NOT OPERATE THIS EQUIPMENT UNTIL THIS
MANUAL HAS BEEN READ AND UNDERSTOOD.

Part Number: 17.00176
March 15, 1993

**MILLER
ST. NAZIANZ**

MILLER-ST.NAZIANZ, INC.
P.O. BOX 127
ST. NAZIANZ, WI 54232
414/773-2121
FAX:414/773-2649

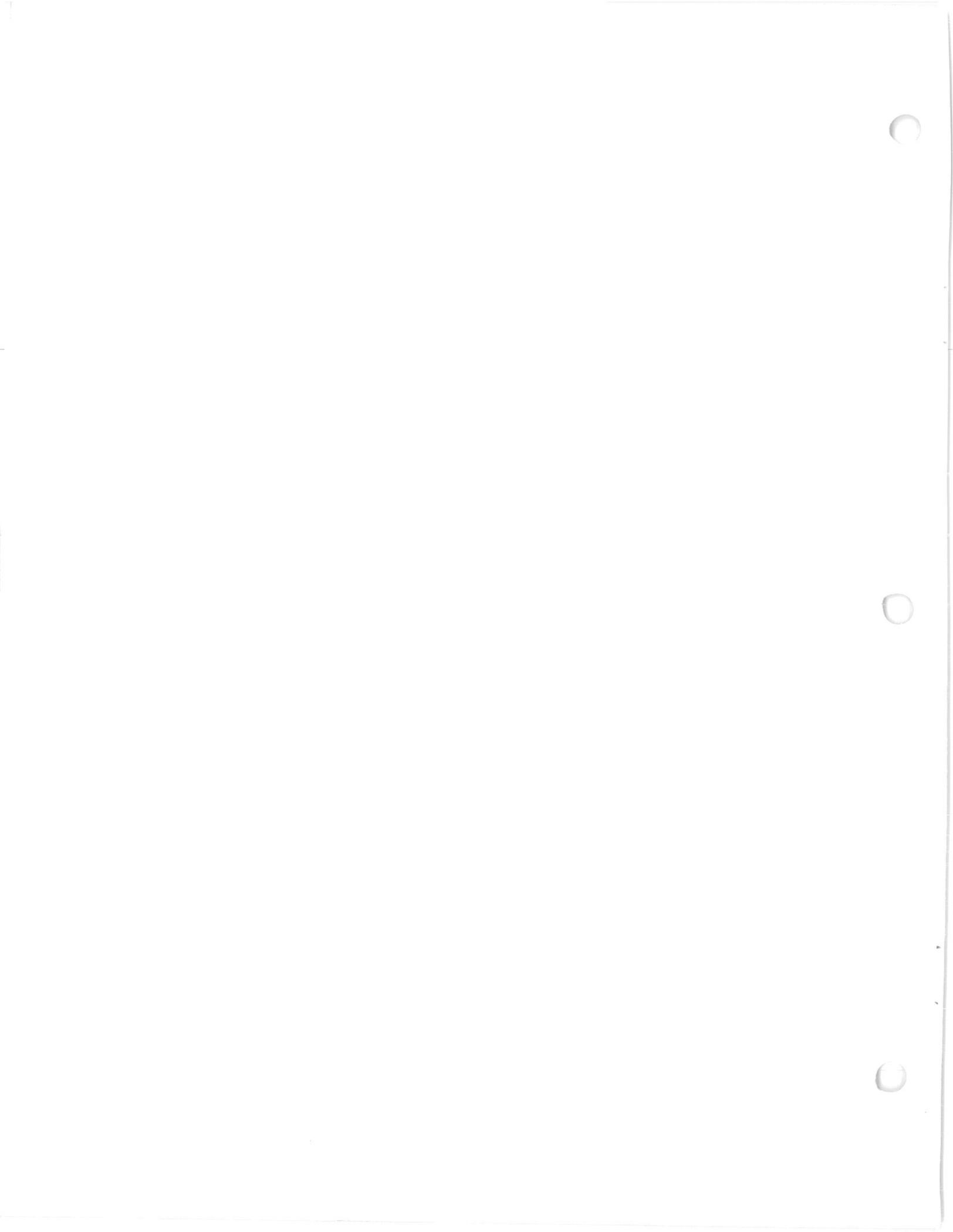


TABLE OF CONTENTS

MILLER PRO ROTARY RAKE	
Pre-Delivery Check List , Dealer Copy	3
Delivery Check List, Dealer Copy.	3
Pre-Delivery Check List, Customer Copy	5
Delivery Check List, Customer Copy	5
INTRODUCTION	
Machine Serial Number	6
General Information	7
SAFETY	7-8
POWER SOURCE SAFETY	8
SAFETY DECALS	9
RAKE ASSEMBLY	10-12
HITCHING/UNHITCHING	
Tractor Requirements	13
Hitching	13-14
Unhitching	15
TRANSPORTING	16
OPERATION	
General	17
Height Adjustments	18
Swath Screen Adjustments	18,19
Operating	19
LUBRICATION	20,21,22
MAINTENANCE	
Fasteners	22
Tires	22
General	22
Storage	23
SPECIFICATIONS	23
WARRANTY	24

MILLER PRO ROTARY RAKE

PRE-DELIVERY CHECK LIST

After the Miller Pro Rotary Rake has been completely set up, check to be certain that it is in correct working order before delivering it to the customer. The following is a list of points to inspect. Check off each item to verify the proper adjustments have been made and the item is operating satisfactorily. Any adjustment must be made according to specifications defined in this manual.

- The gearbox is properly filled with the appropriate lubricant.
- All grease fittings have been properly lubricated.
- All safety decals are in place and legible.
- All mechanisms including lift mechanism, leveler, and swath screen are operating trouble free.
- All bolts and other fasteners are tight or adjusted properly.

Dealer's Name

Signature of Pre-Delivery Inspector

Date of Inspection

DELIVERY CHECK LIST

The following check list is an important reminder of valuable information that **MUST** be passed on to the customer at the time the unit is delivered. Check off each item as you explain it to the customer. (Dealer to retain this copy for your records.)

- Give the customer their Operator's Manual. Instruct them to be sure to read and completely understand its contents **BEFORE** attempting to operate the unit.
- Explain the warranty.
- Explain and review with them the Safety section of the manual.
- Explain that regular lubrication and proper adjustments are required for continued proper operation and long life. Review with them the Maintenance section of this manual.
- Complete the Dealer and Warranty Registration Card and have the customer sign and return it to Miller-St. Nazianz.

I acknowledge that the above points were reviewed with me at the time of delivery.

Customer's Signature

Date Delivered

(Dealer Copy)

MILLER PRO

MODEL: 1100

ROTARY RAKE OPERATOR'S MANUAL



Date Sold _____ Serial # _____
Customer _____

MILLER
ST. NAZIANZ

MILLER-ST. NAZIANZ, INC.
P.O. BOX 127
ST. NAZIANZ, WI 54232
414/773-2121
FAX: 414/773-2649

MILLER PRO ROTARY RAKE

PRE-DELIVERY CHECK LIST

After the Miller Pro Rotary Rake has been completely set up, check to be certain that it is in correct working order before delivering it to the customer. The following is a list of points to inspect. Check off each item to verify the proper adjustments have been made and the item is operating satisfactorily. Any adjustment must be made according to specifications defined in this manual.

- The gearbox is properly filled with the appropriate lubricant.
- All grease fittings have been properly lubricated.
- All safety decals are in place and legible.
- All mechanisms including lift mechanism, leveler, and swath screen are operating trouble free.
- All bolts and other fasteners are tight or adjusted properly.

Dealer's Name

Signature of Pre-Delivery Inspector

Date of Inspection

DELIVERY CHECK LIST

The following check list is an important reminder of valuable information that **MUST** be passed on to the customer at the time the unit is delivered. Check off each item as you explain it to the customer. (Dealer to retain this copy for your records.)

- Give the customer their Operator's Manual. Instruct them to be sure to read and completely understand its contents **BEFORE** attempting to operate the unit.
- Explain the warranty.
- Explain and review with them the Safety section of the manual.
- Explain that regular lubrication and proper adjustments are required for continued proper operation and long life. Review with them the Maintenance section of this manual.
- Complete the Dealer and Warranty Registration Card and have the customer sign and return it to Miller-St. Nazianz.

I acknowledge that the above points were reviewed with me at the time of delivery.

Customer's Signature

Date Delivered

(Customer Copy)

INTRODUCTION

This Assembly/Operator's Manual is provided to acquaint the operator with the safety and operation of the Miller Pro Rotary Rake. Complete Assembly, Operation, Lubrication and Maintenance procedures are provided. Following the recommended procedures will assure many years of trouble-free service from your Miller Pro Rake.

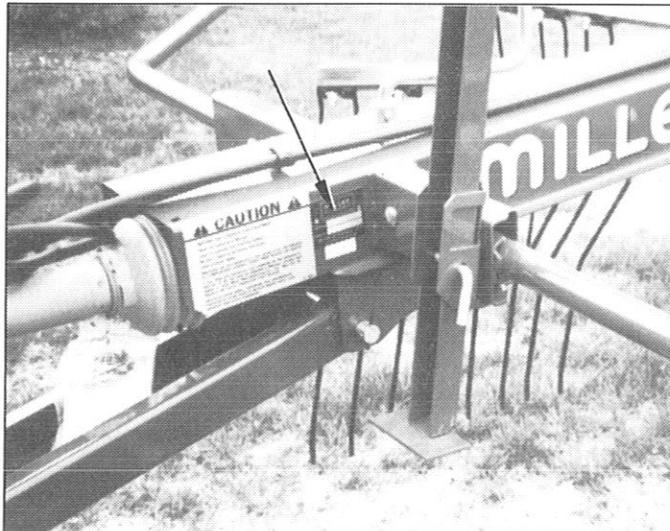
Make sure the operator reads and understands the manual before placing the rake into operation.

Failure to follow the recommended procedures may result in injury and equipment damage, and could void the warranty.

MACHINE SERIAL NUMBER

The machine serial number is located on the left side of the front frame near the hitch. For your convenience refer to this number and your product model number when requiring service or parts information. Record the machine serial number, model number, date of purchase and dealership name in the space provided below.

Date Purchased _____	Serial _____
Dealership _____	



Note: Pages 3 & 4 have been removed.

GENERAL INFORMATION

The Miller Pro Rotary Rake is designed to create fluffy windrows rapidly and with minimum crop loss.

The rake is available with single or tandem axles.

Right and left side of the rake are relative to someone standing behind the rake facing forward.

With proper maintenance your Miller Pro Rotary Rake will provide years of trouble-free operation.

Tine saver clips are available to prevent broken tines from remaining in the field or windrow.

SAFETY

This manual contains information and procedures that you must know before operating the machine.



This symbol is used to call your attention to specific instructions relating to safety. It is recommended that you read the entire manual. Pay particular attention to items preceded by this symbol.



WARNING FAILURE TO HEED THESE INSTRUCTIONS CAN RESULT IN PERSONAL INJURY OR DEATH!



WARNING Keep hands, feet and clothing away from the implement input driveline and other moving parts until you shutdown and lock out the power source. Refer to Power Source Safety section of this manual.



WARNING Do not unclog, adjust, lubricate or service the rake until you shut down and lock out the power source. Refer to Power Source Safety section of this manual.



WARNING Do not make adjustments or lubricate the machine while it is in motion.



WARNING Do not allow anyone to ride on implement or tractor.



CAUTION Support implement securely when working under it.



CAUTION Do not stand between the tractor and implement when attaching or detaching implement unless tractor engine is stopped and parking brake is applied.



CAUTION Make sure that everyone is at a safe distance before raising or lowering the rake.

SAFETY, continued



CAUTION When transporting avoid sudden turns which may reduce operator control of tractor.



CAUTION Always be aware of the location of the ends of the implement in order to avoid collision with stationary or moving objects.



CAUTION Do not transport at speeds in excess of 20 mph.



CAUTION Use reflectors, lights and slow moving vehicle signs which are approved for use by your local government agencies when moving equipment on public roads.

POWER SOURCE SAFETY



WARNING Do not un-clog, adjust, lubricate or service the rake until you shut down and lock out the power source.

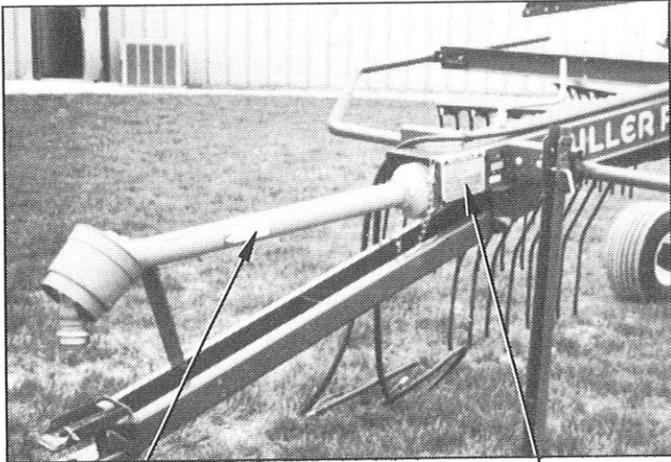
1. Never use an implement input driveline without a rotating shield in good working order. Also see that the power drive system safety shields are in place on the equipment and the power source.
2. Be certain that the implement input driveline is securely attached to the input shaft and the power source.
3. Do not misalign or over extend the implement input driveline; refer to Operation Section for proper alignment.
4. Before starting the power source, be certain the PTO is disengaged.
5. Stay out of the hazard area of an operating implement input driveline.

To Lock Out:

Disengage the PTO and remove the ignition key or coil wire from power source or remove the implement input driveline from the work area.

SAFETY DECALS

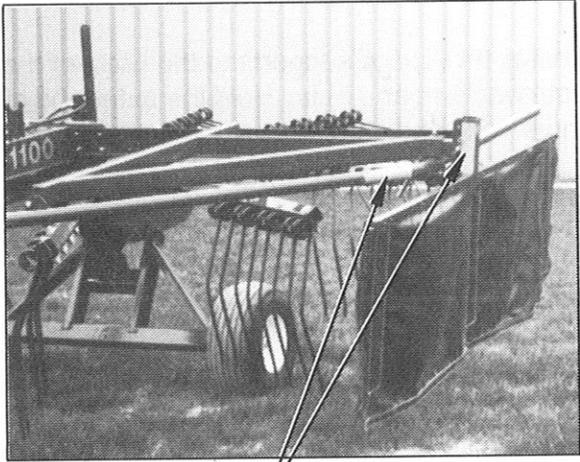
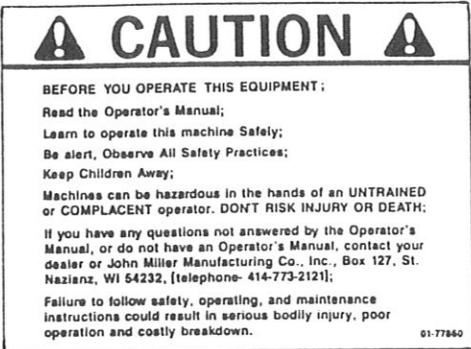
THE DECALS SHOWN ON THIS PAGE ARE FOR YOUR PROTECTION. IF YOUR SAFETY DECALS ARE NOT READABLE OR ARE MISSING REPLACEMENTS ARE AVAILABLE FROM YOUR DEALER.



17.00164 Danger, Rotating Drive



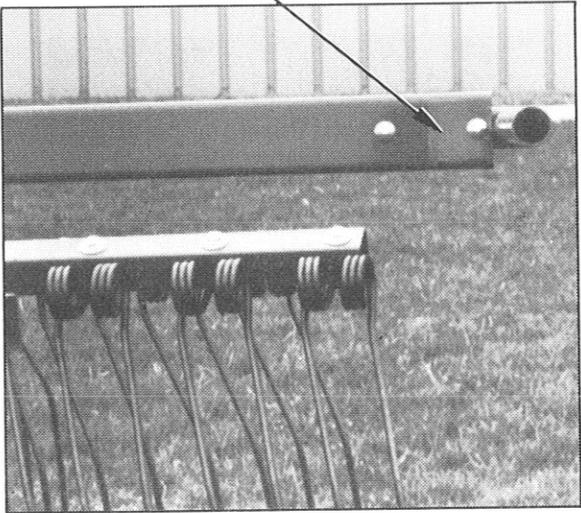
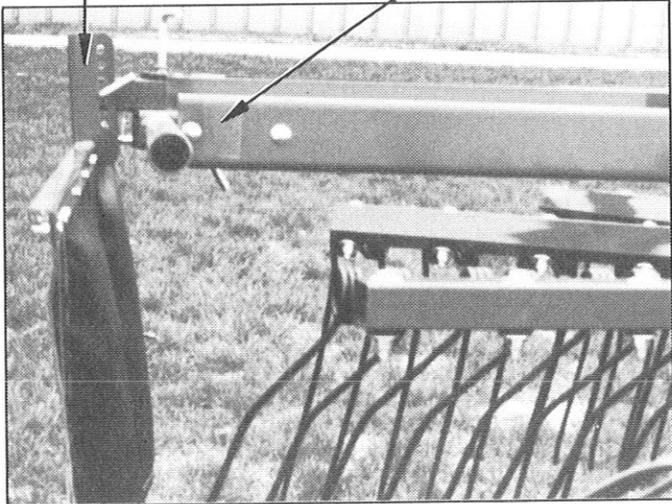
01.77860 Before Operating



01.77890 Amber Reflector Left Front Only

01.77900 Red Reflector

01.77900 Red Reflector: 1/2 Decal on each side

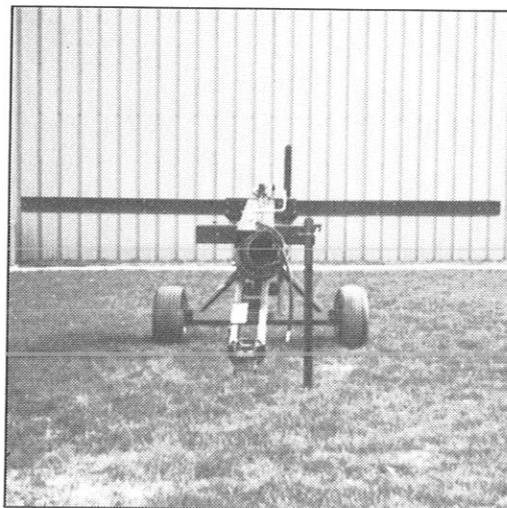
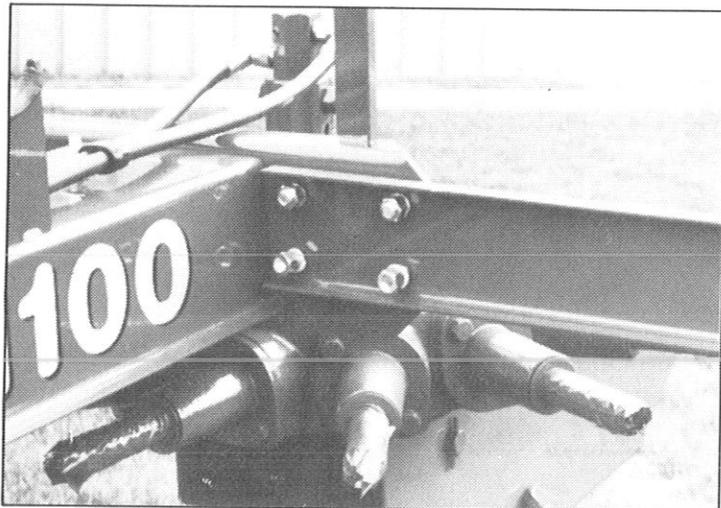


RAKE ASSEMBLY

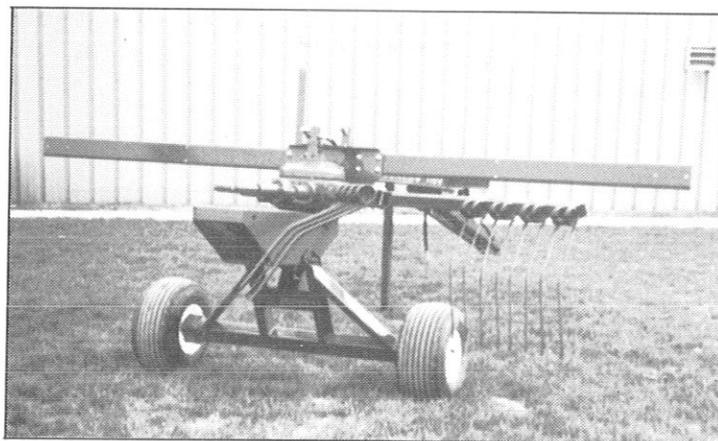
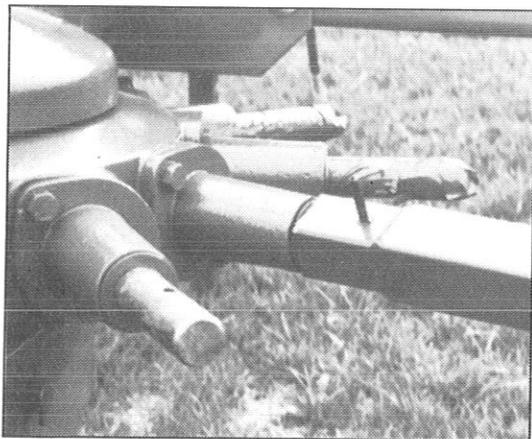


CAUTION Support the implement securely when working under it.

Install the Guard supports to the base of the front frame at the gearbox using 1/2 x 1 1/4 carriage bolts, lockwashers and nuts. Hold the outer end of the guard supports up so that they are level and tighten the nuts. If six holes provided, do not use the middle two.

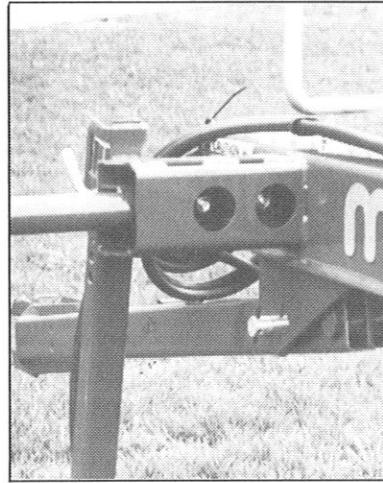


Install the tine arm assemblies onto the gearbox. The end of each tine arm opposite the tines slides onto one of the eleven shafts protruding from the gearbox. Align the hole in the tine arm with the hole in the gearbox shaft so that the tines are oriented as shown. Install the 10mm x 45mm slotted spring pin through the tine arm and gearbox shaft. Install the 6mm x 45mm slotted spring pin through the center of the 10mm x 45mm slotted spring pin making sure the slots in the two spring pins are not aligned. The pins should be approximately flush with the tine arm after installation.

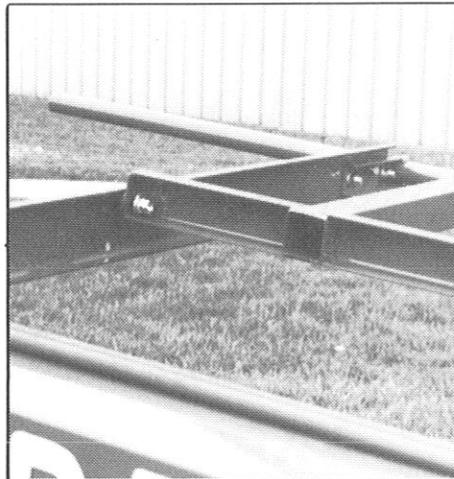


RAKE ASSEMBLY, continued

Install the left and right guards to the bracket on the sides of the front frame near the hitch and to the ends of the Guard Supports. The left guard may be identified by the circular plate welded to the center section. Fasten using 1/2 x 1 1/4 carriage bolts, lockwashers and nuts. Tighten the nuts.

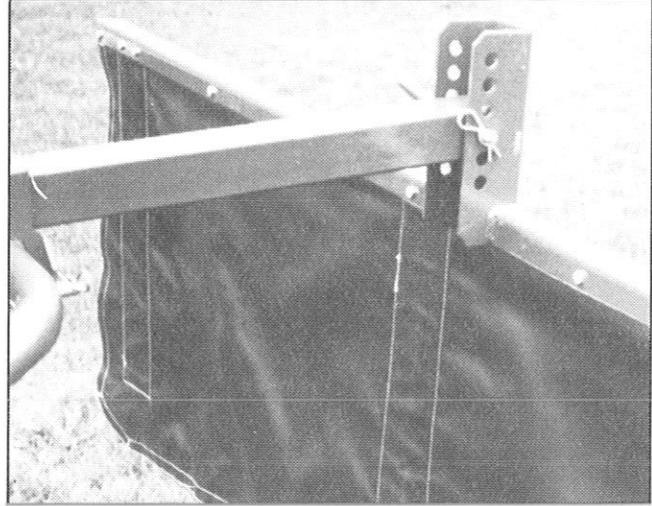


Install the swath screen adjuster base to the circular plate on the left guard and the left guard support. One bushing is to be inserted in each end. Fasten using the 1/2 x 2 1/2 hex head bolts, flatwashers, lockwashers, and nuts. Tighten the nuts. Lock the adjuster to the guard using the longer pin and clip provided.

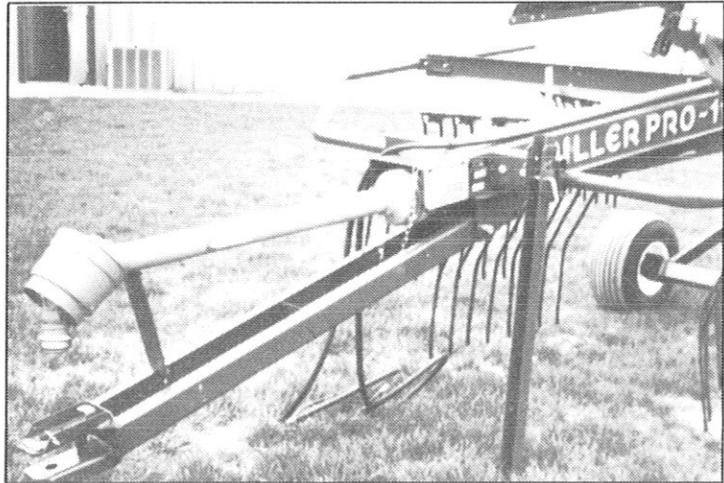


RAKE ASSEMBLY, continued

Slide the swath screen adjuster into the adjuster base. Lock in place with the bent threaded pin. Fasten the swath screen to the adjuster using the pin and clip provided.



Attach the implement input driveline (IID) to the input shaft. Align the implement end of the IID (the end with the chain fastened to it) with the splines on the input shaft. Pull the collar on the implement end of the IID forward and slide the IID onto the input shaft as far as possible. Release the collar, pull the IID forward until the collar snaps into the locked position and the IID will not move forward or rearward relative to the input shaft. Clip the chain into the hole in the top of the front frame. Rotate the storage bracket upward. Rest the IID on the storage bracket.



Install the reflective decals as shown in the Safety Decals section of this manual.

HITCHING /UNHITCHING

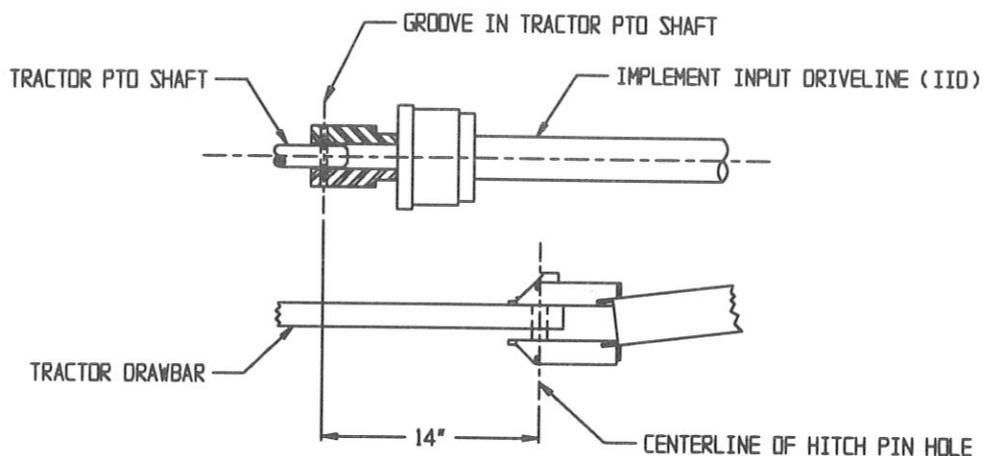


CAUTION Do not stand between the tractor and implement when attaching or detaching implement unless the tractor engine is stopped and parking brake is applied.

TRACTOR REQUIREMENTS

The Miller Pro 1100 Rotary Rake is designed to be used with a tractor having a 540 RPM PTO. The hitch pin hole on the tractor should be 14 inches to the rear of the groove in the PTO output shaft.

NOTE: If the hitch pin hole is located well behind the tractor tires there is the potential of making a sharp enough turn to damage the implement input driveline. See the Operation Section of this manual.



HITCHING

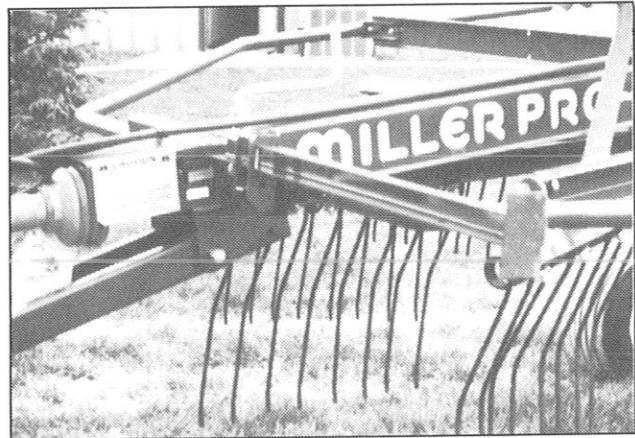
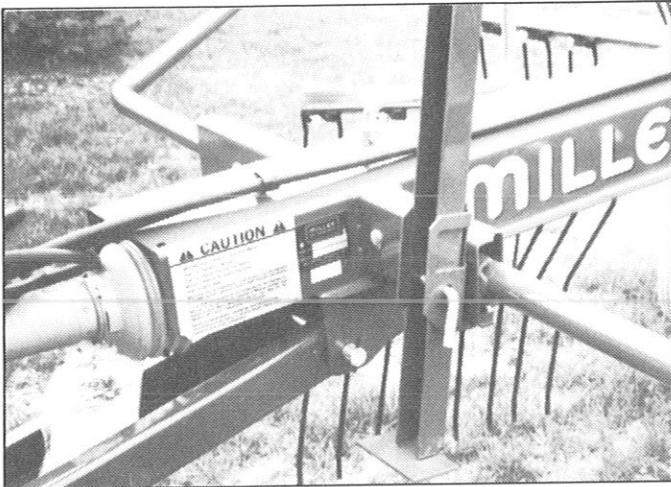
Align the tractor drawbar with the rake hitch. Shut down and lock out the power source. Refer to the Power Source Section of this manual. Remove the hitch pin and clip from their storage positions. Install the hitch pin. Lock the hitch pin in place by inserting the clip through the side of the hitch and the hitch pin.



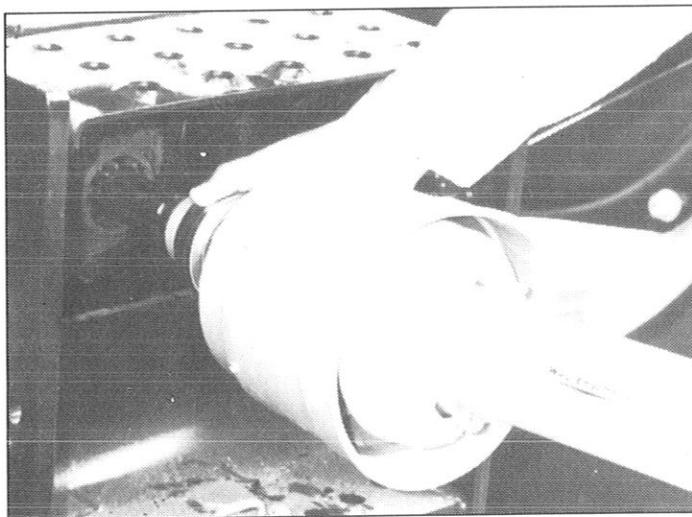
HITCHING, continued

Turn the leveling crank clockwise until the parking stand is no longer touching the ground. Remove the pin and clip from the parking stand. There are two storage positions for the parking stand.

1. Align the lower hole in the parking stand with the parking stand bracket and install the pin and clip.
2. Slide the top of the parking stand through the sides of the parking stand bracket and install the pin and clip through the parking stand in the center of the bracket.



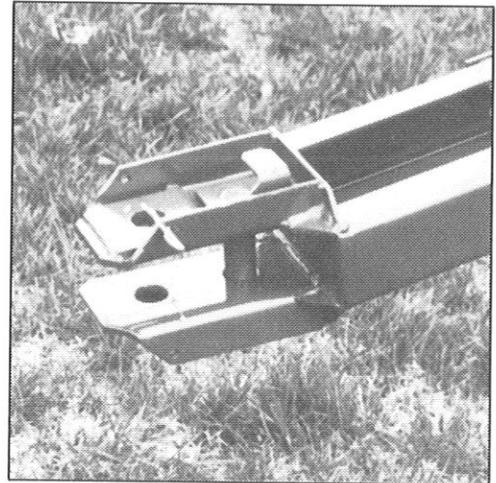
Lift the implement input driveline (IID) and rotate the storage bracket down. Pull the collar on the Tractor end of the IID rearward and slide the IID onto the PTO output shaft of the tractor as far as possible. Release the collar. Pull the IID rearward until the collar snaps into the locked position and the IID cannot be moved forward or rearward.



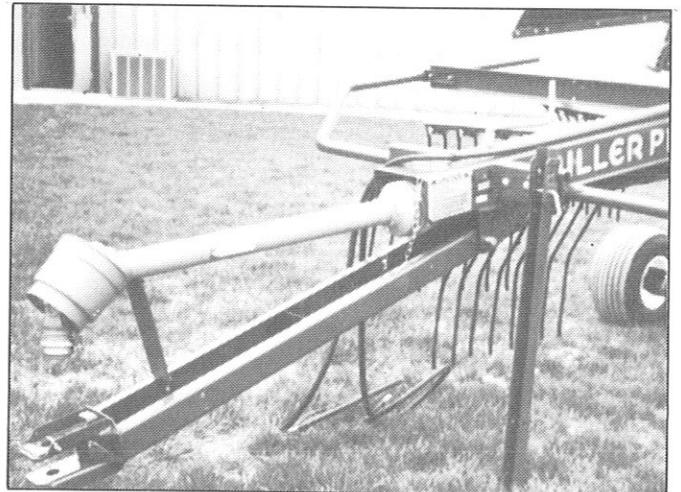
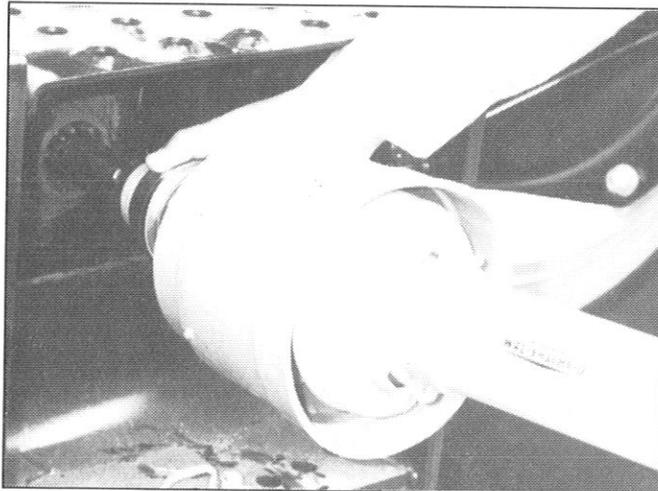
Couple both hoses to the tractor hydraulic remotes. If this is the first time the rake has been hitched to a tractor, charge the hydraulic system with oil and then remove the channel that locks the cylinder in the extended position for shipping purposes.

UNHITCHING

Verify that the rake is in the storage position - the lift cylinder should be fully extended. Shut down and lock out the power source. Refer to the Power Source Safety section of this manual. Remove the pin and clip from the parking stand. Align the hole in the parking stand bracket with the uppermost hole in the parking stand that is easily accessible. Reinstall the pin and clip. Turn the leveling crank counter-clockwise until the hitch begins to raise up off of the tractor drawbar. Remove the hitch pin and clip. Reinstall the clip and place the hitch pin in the storage position (the rear hole of the hitch).



Pull the collar on the tractor end of the implement input driveline (IID) rearward. Slide the IID off the tractor PTO output shaft. Rotate the storage bracket upward. Rest the IID on the storage bracket.



Relieve the pressure in the hydraulic system. Uncouple the hoses from the tractor remotes.

TRANSPORTING



WARNING Do not allow anyone to ride on implement or tractor.



CAUTION When transporting avoid sudden turns which may reduce operator control of tractor.



CAUTION Always be aware of the location of the ends of the implement in order to avoid collision with stationary or moving objects.



CAUTION Do not transport at speeds in excess of 20 mph



CAUTION Use reflectors, lights and slow moving vehicle signs which are approved for use by your local government agencies when moving equipment on public roads.

A bracket is provided at the rear of the front frame above the gearbox so that you may affix a slow moving vehicle sign.

Before leaving the field raise the rake to the transport position by using the tractor hydraulics to fully extend the cylinder. Note: As the lift mechanism moves from the working position through the over center feature to the transport position it will lower the rake slightly after the rake reaches the peak height. This is what locks the rake in the transport position.

OPERATION



WARNING Keep hands, feet and clothing away from the implement input driveline and other moving parts until you shut down and lock out the power source. Refer to Power Source Safety section of this manual.



WARNING Do not unclog, adjust, lubricate or service the rake until you shut down and lock out the power source. Refer to Power Source Safety section of this manual.



WARNING Do not allow anyone to ride on implement or tractor.



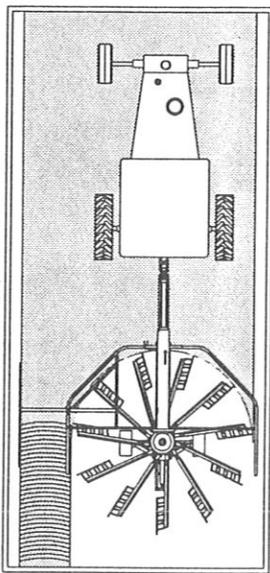
CAUTION Make sure that everyone is at a safe distance before raising or lowering the rake.



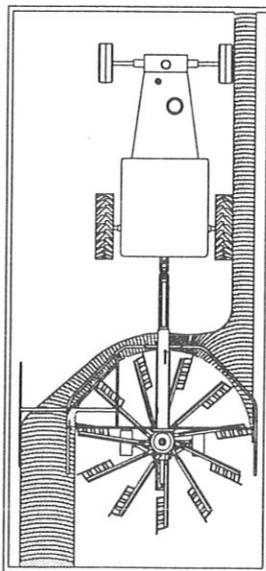
CAUTION Always be aware of the location of the ends of the implement in order to avoid collision with stationary or moving objects.

GENERAL

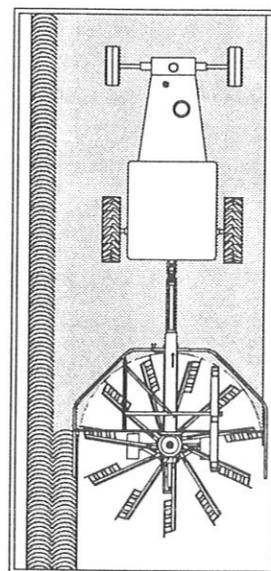
The Miller Pro rotary rake is designed to create fluffy windrows from the crop as it lays behind your cutting implement or a previously formed windrow. It can also be used to combine two or more windrows. The size and shape of the windrow is controlled by the ground speed, the PTO speed and the swath screen setting.



Raking A Single Windrow



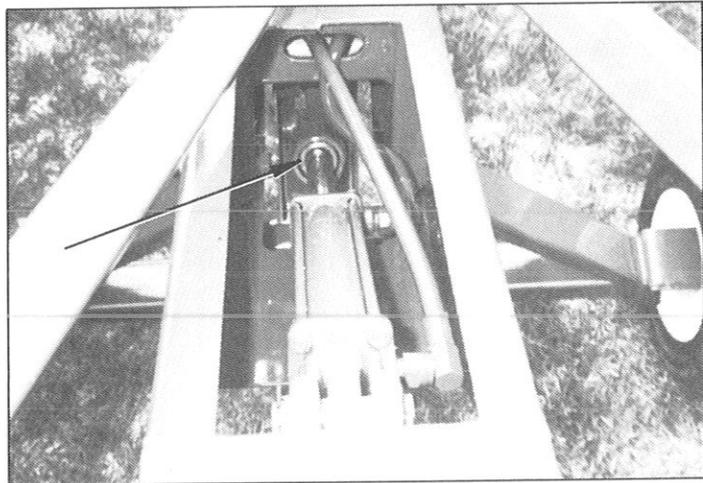
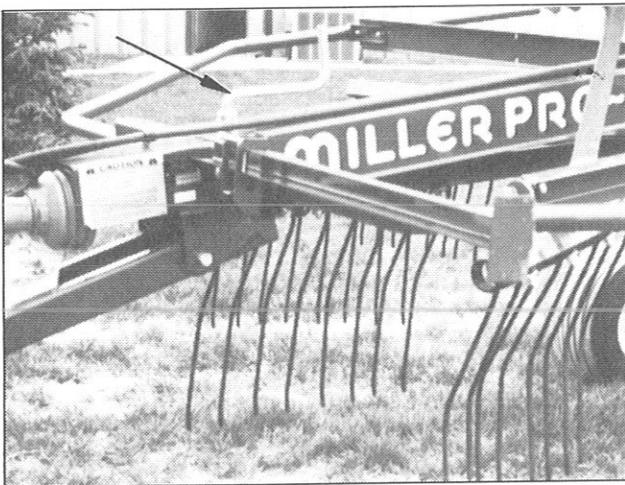
Turning A Windrow



Raking A Double Windrow With The Swath Screen Up

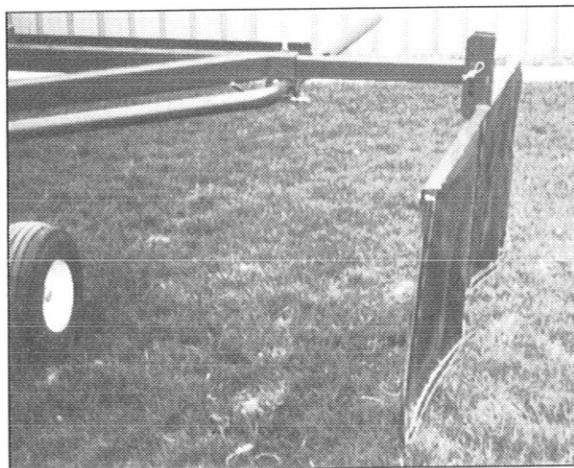
HEIGHT ADJUSTMENTS

Upon reaching the field, use the tractor hydraulics to lower the rake to the working height. Note: As the lift mechanism moves from the transport position through the over center feature to the working position it will raise the rake slightly before lowering it. The correct working height of the rake is achieved when the rake tine tips on the left and right sides are just touching the top of the crop stubble. If necessary, adjust the leveling crank so that the rake tine tips in front are also just touching the top of the crop stubble. Set the adjustable stop on the cylinder by rotating the large nut on the cylinder counterclockwise until it tightens against the cylinder body. This prevents the hydraulic system from having to hold the entire load and allows you to easily return to the working height after raising the rake.



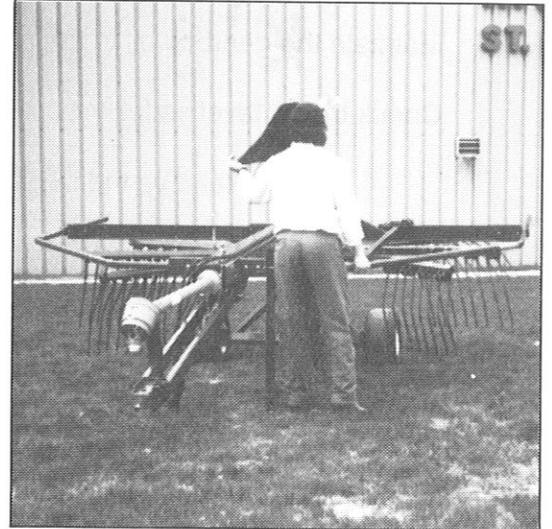
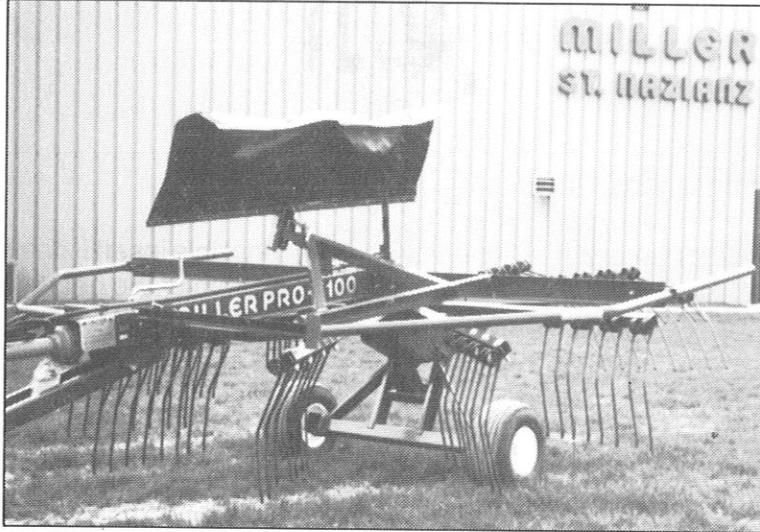
SWATH SCREEN ADJUSTMENTS

If necessary, adjust the swath screen. The width that the swath screen is set at helps to control the width of the windrow. To change the width, unlock the adjuster by turning the bent threaded pin counterclockwise. Slide the swath screen assembly inward or outward as desired. Lock the adjuster by turning the bent threaded pin clockwise until snug. The height of the swath screen is adjusted by removing the pin at the swath screen, aligning a different hole and reinstalling the pin. The swath screen should be located so that the bottom of the swath screen just touches the top of the crop stubble.



SWATH SCREEN ADJUSTMENTS, continued

When combining windrows the swath screen may be rotated up after removing the locking pin. Note: Slide the swath screen inward before rotating it up or it may be difficult to rotate it down. When rotating the swath screen down, lift on the end of the swath screen.



OPERATING

NOTE: The IID of the rake is equipped with an overload clutch to protect the drive components should the rake become clogged or obstructed, or if the PTO is engaged or disengaged at too high a RPM. Clutch slippage can be identified by a clicking sound.

Engage the PTO at a low RPM to avoid slipping the overload clutch. Adjust to the desired PTO speed before proceeding forward. When making turns be careful not to create an angle of 80 degrees or more in the front joint of the implement input driveline (IID) as this will damage the IID. When finished, reduce the PTO speed before disengaging the PTO.

Ground speed and PTO speed should be selected so that the crop is moved with minimum losses and the overload clutch does not slip during normal operation. Ground speed may need to be reduced significantly in areas where the crop is denser or of higher moisture content.

If the rake becomes clogged or obstructed, immediately disengage the PTO and halt the forward motion. Shut down and lock out the power source before removing the blockage - refer to the Power Source Safety section of this manual. Do not resume operation until the blockage is completely removed and the rake is checked for damage.

WARRANTY

Miller-St. Nazianz, Inc. ("Miller") warrants each new Miller Pro Rotary Rake to be free from defects in material and workmanship under recommended use and service, as stated in the Operator's Manual, as follows:

Miller will replace, F.O.B. St. Nazianz, Wisconsin, or repair, as Miller elects, any part on a new Miller Pro Rake which is defective in material or workmanship without charge for either parts or labor during the first year following delivery to the original retail customer and without charge for parts only (not labor) during the second year.

Notwithstanding the above, Miller does not warrant teeth against wear and breakage as this item is expected to wear and extent of wear or breakage depends on field conditions and operating practices.

All warranties on the new Miller Pro Rake shall apply only to the original retail purchaser from an authorized Miller Pro dealer.

Miller warrants that it will replace, F.O.B. St. Nazianz, Wisconsin, or repair, as Miller elects, without charge, any genuine Miller spare part purchased after the expiration of the new harrow warranty that are defective in material or workmanship within ninety (90) days of the installation date.

The provisions of this warranty shall not apply to any Miller Pro Rake which has been subject to misuse, negligence, alteration or accident, or which shall have been repaired with parts other than those obtainable through Miller.

Repairs eligible for labor warranty must be made by an authorized Miller Pro dealer. The purchaser is responsible for transportation of the equipment to the dealership for warranty service or for any service call expense.

Except as set forth above, Miller shall not be liable for injuries or damages of any kind or nature, direct or consequential, to person or property. This warranty does not extend to loss of crops, loss because of machinery rental or for any other reasons. No person is authorized to give any other warranties or, to assume any other obligation on Miller's behalf unless made or, assumed in writing by Miller.

THERE ARE NO WARRANTIES, EITHER EXPRESSED OR IMPLIED, OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

MILLER
ST. NAZIANZ

© 1993 by Miller-St. Nazianz, Inc.