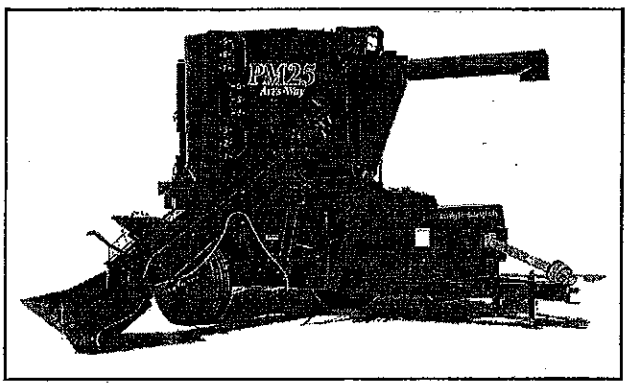
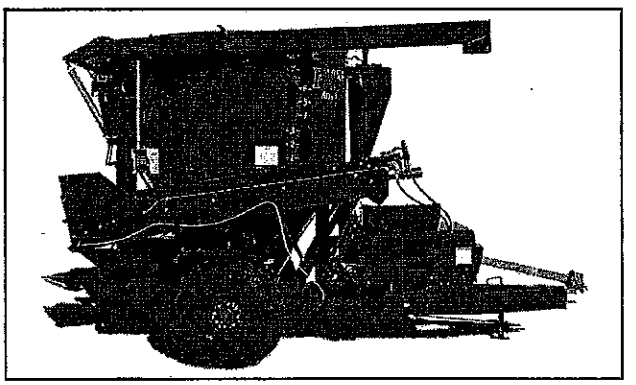
Building on a
Art's-Way
Tradition of Quality

PM25 & PM35 Grinder Mixer





Operator's Manual

485150 (-)
1199

Art's-Way Manufacturing Co., Inc.

TO THE OWNER

Congratulations on the purchase of your new Art's-Way grinder mixer. You have selected a top quality machine that is designed and built with pride to ensure you many years of efficient, reliable service.

Many people have worked on the design, production, and delivery of this grinder mixer. The information in this Manual is based on the knowledge, study and experience of these people through years of manufacturing specialized farming machinery. This Manual is designed to provide you with important information regarding safety, maintenance and machine operation so you can get the best possible performance from your Art's-Way grinder mixer.

Even if you are an experienced operator of this or similar equipment, we ask you to ***read this Manual before running this grinder mixer.*** The way you operate, adjust and maintain this unit will have much to do with its successful performance. Any further questions you may have about this piece of Art's-Way equipment should be directed to your local Art's-Way dealer or to Art's-Way Manufacturing Co., Inc., Armstrong, Iowa 50514. (712) 864-3131.

Specifications And Design Are Subject To Change Without Notice

Art's-Way Manufacturing Co., Inc. is continually making product improvements. In doing so, we reserve the right to make changes or add improvements to our products without obligation for equipment previously sold.

Because modifications to this grinder mixer may effect the performance, function and safety of its operation, no modifications are to be made without the written permission of Art's-Way Manufacturing Co., Inc. Any modifications made without the written permission of Art's-Way Mfg. Co. shall void the warranty of this product.

In the interest of continued safe operation of this grinder mixer, pay particular attention to the safety alert symbol throughout this Manual.

Art's-Way Manufacturing Co., Inc. Statement Of Product Liability

Art's-Way Manufacturing Co., Inc. recognizes its responsibility to provide its customers with a safe and efficient product. Art's-Way attempts to design and manufacture its products in accordance with accepted engineering practices in effect at date of design. This statement should not be interpreted to mean that our products will protect against the user's own carelessness or failure to follow common safety practices, as set forth in this Manual, nor will Art's-Way be liable for any such act. In addition, Art's-Way assumes no liability for product altered or modified in any way by users or anyone other than an authorized dealer.

Important Warranty Information

The warranty for this grinder mixer appears on page 1 of this manual. In order to establish a proper warranty, the Warranty Registration and Dealer Pre-Delivery Checklist must be completed and returned to the factory. Failure to comply with this requirement will result in reduced warranty allowances.

Limitations Of This Manual

This manual contains operating instructions for your grinder mixer only. It does not replace the manual(s) for any machine that it may be attached to or used with.

PARTS & SERVICE

As the new purchaser of your grinder mixer, it is very important to consider the following factors:

A. Original Quality

B. Availability of Service Parts

C. Availability of Adequate Service Facilities

Art's-Way Manufacturing Co., Inc. has an excellent dealership network ready to answer any questions you may have about your grinder mixer. Parts for your machine may be ordered through our dealers. When placing a parts order, please have the ***model*** and ***serial number*** ready. This will allow the dealer to fill your order as quickly as possible.

For your convenience, we have provided this space for you to record your model number, serial number and the date of purchase, as well as your dealer's name and address.

Owner's Name: _____

Owner's Address: _____

Purchase Date: _____

Dealership Name: _____

Dealership Address: _____

Dealership Phone No.: _____

Machine Serial Number Location

(The serial number is located behind ladder left hand side.)

Enter the serial number and model number of your grinder mixer in the space provided above.

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NOTES

LIMITED WARRANTY

Art's-Way Manufacturing Co., Inc. warrants the products it sells to be free from defects in material and workmanship for a period of one (1) year after the date of delivery to the first purchaser, subject to the following conditions:

- **Art's-Way Manufacturing Co., Inc.** obligation and liability under this warranty is to repair or replace (at the company's option) any parts which upon manufacture were defective in material or workmanship.
- All parts and repairs under this warranty shall be supplied at an authorized **Art's-Way Manufacturing Co., Inc.** dealer or at the factory, at the option of **Art's-Way Manufacturing Co., Inc.**
- **Art's-Way Manufacturing Co., Inc.** warranty does not extend to parts and elements not manufactured by **Art's-Way Manufacturing Co., Inc.** and which carry the warranty of the other manufacturer.
- Transportation or shipping to an authorized dealer for necessary repairs is at the expense of the purchaser.
- **Art's-Way Manufacturing Co., Inc.** makes no other warranty expressed or implied and makes no warranty of merchantability or fitness for any particular purpose beyond that expressly stated in this warranty. **Art's-Way Manufacturing Co., Inc.** liability is limited to the terms set forth in this warranty and does not include any liability for direct, indirect, incidental or consequential damages or expenses of delay and the Company's liability is limited to repair or replacement of defective parts as set forth herein.
- Any improper use, and maintenance, including operation after discovery of defective or worn parts, operation beyond the rated capacity, substitution of parts not approved by **Art's-Way Manufacturing Co., Inc.** or any alteration or repair by other than authorized **Art's-Way Manufacturing Co., Inc.** dealer which affects the product materially and adversely, shall void this warranty.
- No dealer, employee or representative is authorized to change this warranty in any way or grant any other warranty unless such change is made in writing and signed by an officer of **Art's-Way Manufacturing Co., Inc.** at it's home office.
- Some states do not allow limitations on how long an implied warranty lasts or exclusions of, or limitations on relief such as incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you the specific legal rights and you may have other rights which vary from state to state.

SAFETY FIRST

"A careful operator is the best insurance against an accident."

(National Safety Council)

Most accidents can be prevented if the operator:

- fully understands how the machine functions
- can anticipate situations which may produce problems
- can make necessary corrections before problems develop.

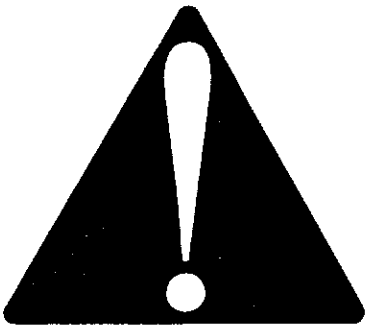


Figure 1: The Universal Safety Alert Symbol

The American Society of Agricultural Engineers has adopted the ***Universal Safety Alert Symbol*** (Figure 1) as a way to identify areas of potential danger if the equipment is not operated correctly. ***Please be alert whenever you see this symbol in the manuals or on your grinder mixer.***

Art's-Way Manufacturing Co., Inc. strives to make our equipment as safe as it can possibly be. The grinder mixer conforms to applicable safety standards at the time of manufacturing. A safety conscious equipment operator makes an effective accident-prevention program complete.

Safety features and instructions for the grinder mixer are detailed elsewhere in the Operator's Manual. It is the responsibility of the owner to ensure that ***all*** operators read and understand the manual before they are allowed to operate the grinder mixer. ***(Occupational Safety and Health Administration (OSHA) regulation 1928.57.)***

Notices of Danger, Warning and Caution

Watch for these words on the grinder mixer and in this manual to alert you to important safety messages:

DANGER: Immediate and specific hazard which *will* result in severe personal injury or death if proper precautions are not taken.

WARNING: Specific hazard or unsafe practice *could* result in severe personal injury or death if proper precautions are not taken.

CAUTION: A reminder of good safety practices. Personal injury *could* result if proper procedures are not followed.

SAFETY GUIDELINES

CAUTION: Remember, a careful operator is the best insurance against an accident.

CAUTION: *READ* and *UNDERSTAND* the Operator's Manual and all the safety decals before operating the grinder mixer. Review safety instructions with all operators annually.

Before Operating

- ***Do not*** wear loose fitting clothing as it may catch in moving parts.
- Make sure to install and/or secure all guards and shields, including the tractor power take-off master shield, before starting or operating the machine.
- Be sure that the correct implement driveline parts are used and that they are properly secured.
- Install the tractor safety chain when attaching the mixer to the tractor.
- ***Do not*** allow riders while transporting.
- Put all tractor and machine controls in "neutral" and disengage the PTO before starting. Follow the starting instructions according to your tractor manual.
- Operate the mixer only while seated on the tractor seat.

During Operation

- Shut off the tractor engine, put key in pocket, and be sure to wait until all rotation has come to a complete stop before opening any covers/shields, adjusting, cleaning or lubricating.
- Keep hands, feet, hair and clothing away from moving parts.
- Keep all shields and guards in place and in good repair.
- Keep all children and bystanders away from the machine while in operation.
- Always disengage the auger feeder before transporting.
- ***Do Not*** allow riders while the mixer is in operation.
- ***Do Not*** attempt to unclog, clean or adjust the mixer while it is running.
- Stay away from overhead power lines and obstructions. Check for clearances when positioning discharge auger. Electrocution can occur without direct contact.
- Keep all hydraulic lines, fittings, and couplers tight and free of leaks. (See the **"Hydraulic Safety"** section below.)
- Be careful when ascending or descending on the mixer ladder, wet shoes or boots are slippery.

Maintenance Safety

- Follow all operating, maintenance and safety instructions found in this manual.
- Before servicing, adjusting, repairing or unplugging the machine, stop the tractor engine, place all controls in neutral, set parking brake, remove ignition key and wait for all moving parts to stop.
- Use only the tools, jacks and hoists that are of sufficient capacity for the job.
- Use support blocks or safety stands when changing tires or working under the machine.
- Before applying pressure to the hydraulic system, make sure all lines, fittings and couplers are tight and in good condition (see "Hydraulic Safety" below).
- Relieve pressure from hydraulic circuit before servicing or disconnecting from tractor.
- Follow the good shop practices of keeping the service area clean and dry and use adequate light for the job at hand.
- Make sure all shields/guards are in place and properly secured when maintenance work is complete.

Hydraulic Safety

- Make sure all components in the hydraulic system are kept clean and in good condition.
- Replace any worn, cut, abraded, flattened or crimped hoses.
- ***Do not*** make any temporary repairs to the hydraulic lines, fittings or hoses by using tape, clamps or cements. The hydraulic system operates under extremely high pressure and temporary repairs may fail suddenly and create a hazardous situation.

SAFETY GUIDELINES

- Wear proper hand and eye protection when searching for a high-pressure hydraulic leak. Use a piece of wood or cardboard as a backstop instead of hands to identify and isolate a leak. If injured by a concentrated high-pressure stream of hydraulic fluid, seek medical attention immediately. Serious infection or toxic reaction can develop if hydraulic fluid penetrates the surface of the skin.
- Before applying pressure to the system, make sure all components are tight and that lines, hoses and couplings are not damaged.

Transportation Safety

- Be sure to comply with all local regulations regarding transporting equipment on public roads and highways.
- Make sure the Slow Moving Vehicle (SMV) emblem and all lights and reflectors required by local highway and transportation authorities are in place, clean and clearly visible to all oncoming or following traffic.
- ***Do not*** allow riders while transporting.
- Make sure the grinder mixer is securely attached to the tractor and install a safety chain to the machine. Install a retainer through the drawbar pin and attach the safety chain (see Figure 10; page 11 in the ***"Preparing for Operation"*** section).
- ***Do not*** fail to latch the tractor brake pedals together.
- ***Do not*** exceed 20 mph (32 km/h) when transporting the grinder mixer. Always reduce speed to a maximum of 10 mph on rough roads and surfaces, or when going down inclines.

CAUTION: Always transport a loaded grinder mixer at slow speed (10 mph or less).

- Drive slow when turning and always use turn signals on the tractor to indicate your turning intentions to other traffic.
- A dealer installed Road Light Kit is available. It includes warning lights that plug into you tractors light connector. The red tail lights will illuminate whenever the tractor road lights are turned on.
- The weight of the trailed machine should ***NEVER*** exceed the weight of the towing vehicle.
- Stay away from overhead obstructions and power lines during transport. Electrocution can occur even without direct contact.
- Check for clearances carefully wherever the machine is towed.

Storage Safety

- Store the mixer in an area away from human activity.
- ***Do Not*** permit children to play on or around the stored machine.

Tire Safety

- Have a qualified tire dealer or repair service perform tire repairs.
- ***Do not*** attempt to install a tire on a wheel or rim unless you have the proper equipment and experience to do the job.
- Follow proper procedures when installing a tire on a wheel or rim to prevent an explosion which could result in serious injury or death.
- ***Do not*** substitute tires of lesser road rating and capacity for the original equipment tires.

CAUTION: Failure to follow proper procedures when installing a tire on a wheel or rim can produce an explosion which may result in serious injury or death. Do not attempt to install a tire unless you have the proper equipment and experience to perform the job. Have it done by your dealer or a qualified tire repair service.

Assembly Safety

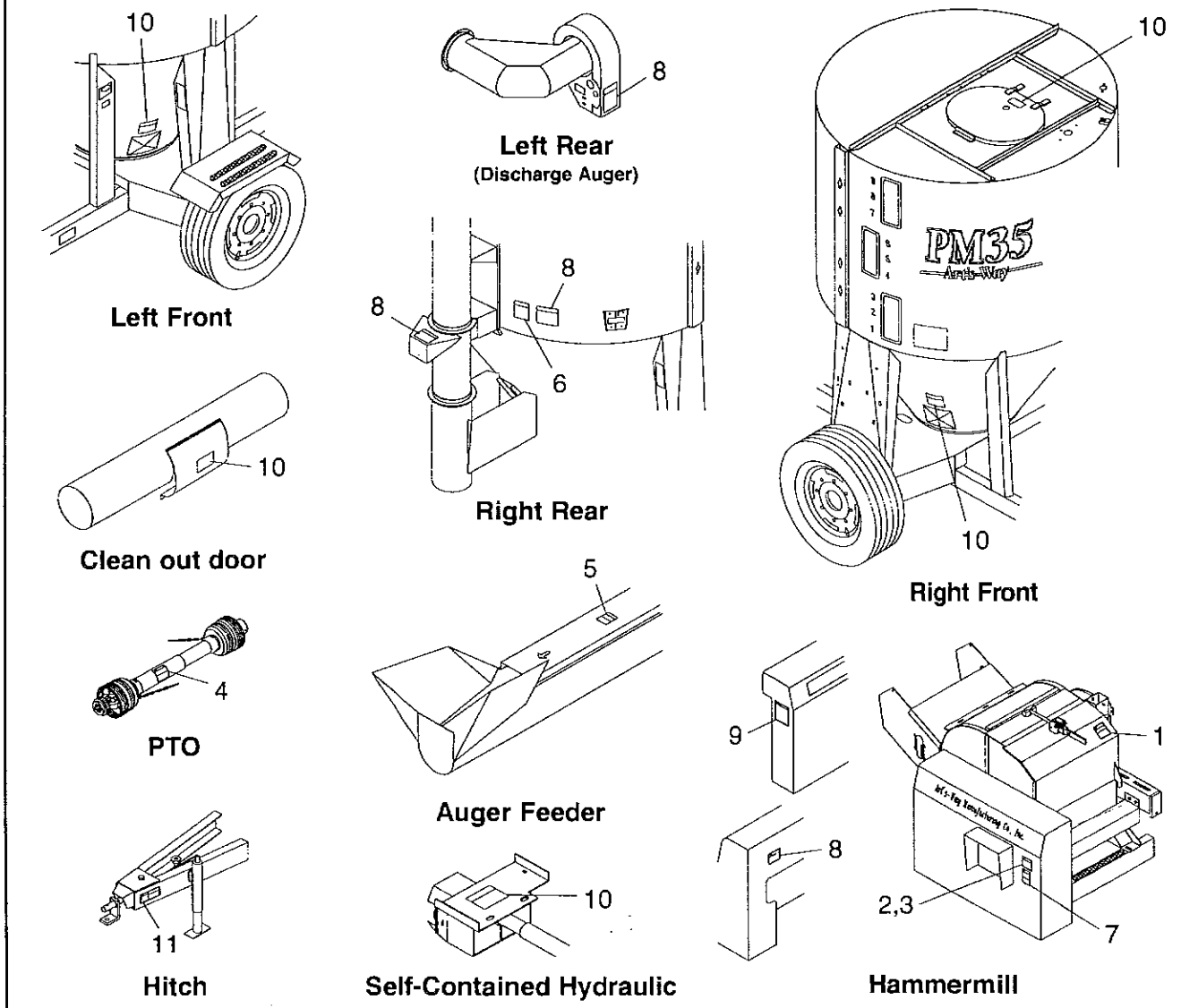
- Use adequate manpower to perform assembly procedures safely.
- Use only forklifts, lift cranes, jacks and tools with sufficient capacity for the loads.
- ***Do not*** allow spectators in the working area.

Remember:
"The Best Operator is a Safe Operator"

SAFETY DECALS

The different types of safety decals for your grinder mixer are illustrated on the following pages. Please familiarize yourself with the appearance of each decal, the warning it describes and the area where it is located on the grinder mixer. Refer to Figure 2 below for decal locations. The number preceding the description is the part number of that decal. (This part number also appears in the lower right corner of the decal.)

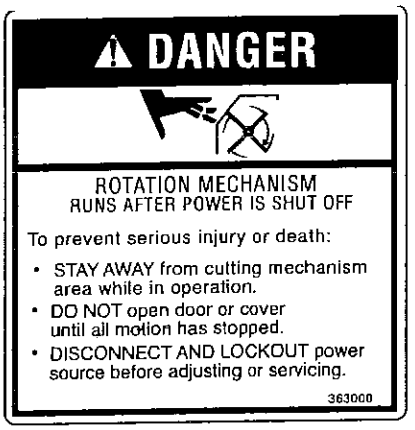
Safety awareness is the responsibility of each operator of the grinder mixer. Keep safety decals and signs clean and legible and be sure replacement parts display the current safety decals and signs as well. ***Remember:*** *Always replace missing, damaged or illegible safety decals. New decals and signs are available from your dealer.*



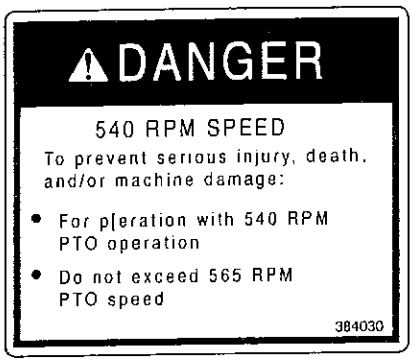
Item	Qty.	Part No.	Description	Item	Qty.	Part No.	Description
1	1	363000	Decal, Danger Rotating Mechanism	7	1	368350	Decal, Warning Moving Flywheel Hazard
2	1	384030	Decal, Danger 540 rpm PTO	8	5	467450	Decal, Warning Moving Parts
3	1	384020	Decal, Danger, 1000 rpm PTO	9	1	368040	Decal, Caution, Safety Instructions
4	1	268860	Decal, Danger Rotating Drive Line	10	4	377280	Decal, Caution Do Not Open
5	1	383990	Decal, Danger Auger Feeder Injury	11	1	383970	Decal, Caution Hitch Instructions
6	1	384000	Decal, Danger Electrocution Hazard				

Figure 2. Grinder Mixer Safety Decal Locations

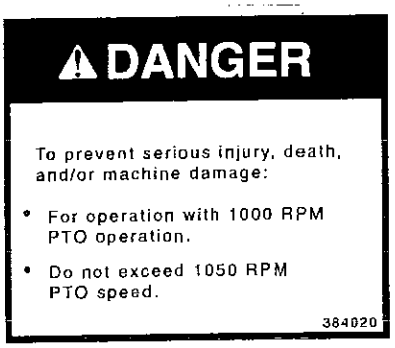
SAFETY DECALS



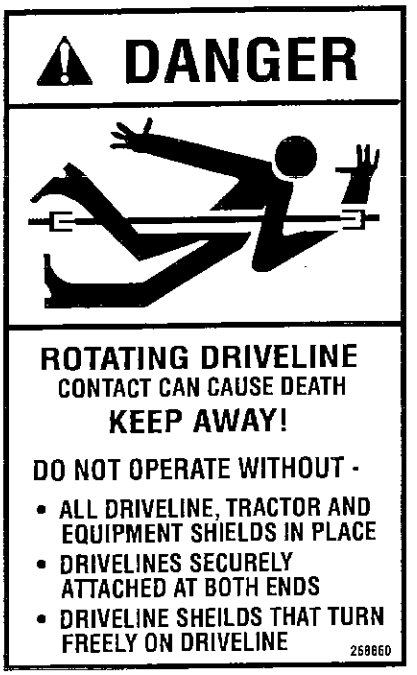
No. 1 - "Danger" - Rotating mechanism. Part No. 363000.



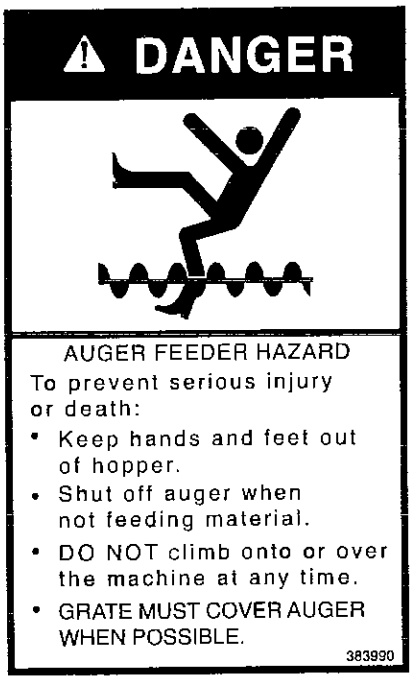
No. 2 - "Danger" - For standard 540 rpm PTO operation. Part No. 384030.



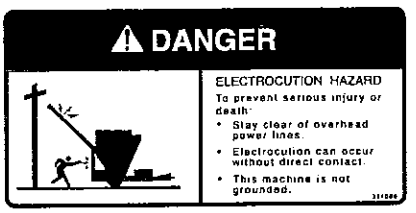
No. 3 - "Danger" - For standard 1000 rpm PTO operation. Part No. 384020.



No. 4 - "Danger" - Rotating drive line (located on PTO). Part No. 268860.



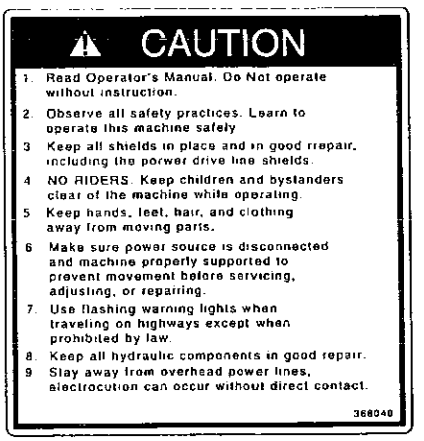
No. 5 - "Danger" - Auger feeder hazard. Part No.383990.



No. 6 - "Danger" - Electrocution hazard. Part No. 384000.

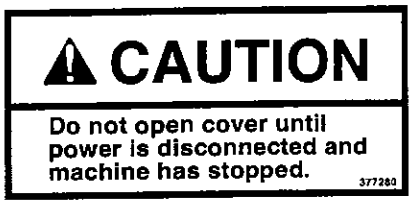
No. 7 - "Warning" - Moving flywheel hazard. Part No. 368350.

No. 8 - "Warning" - Moving part hazard. Part No. 467450.

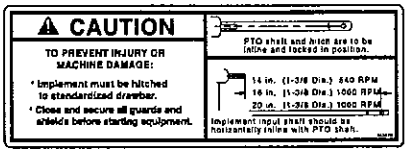


No. 9 - "Caution" - Safety instructions. Part No. 368040.

SAFETY DECALS



No. 10 - "Caution" - Do not open cover until power is disconnected. Part No. 377280.



No. 11 - "Caution" - Hitch instructions. Part No. 383970.

Note: Keep all decals clean and free of dirt for maximum visibility. Replace any and all decals that are no longer legible. ***Read and obey all***

INTRODUCTION

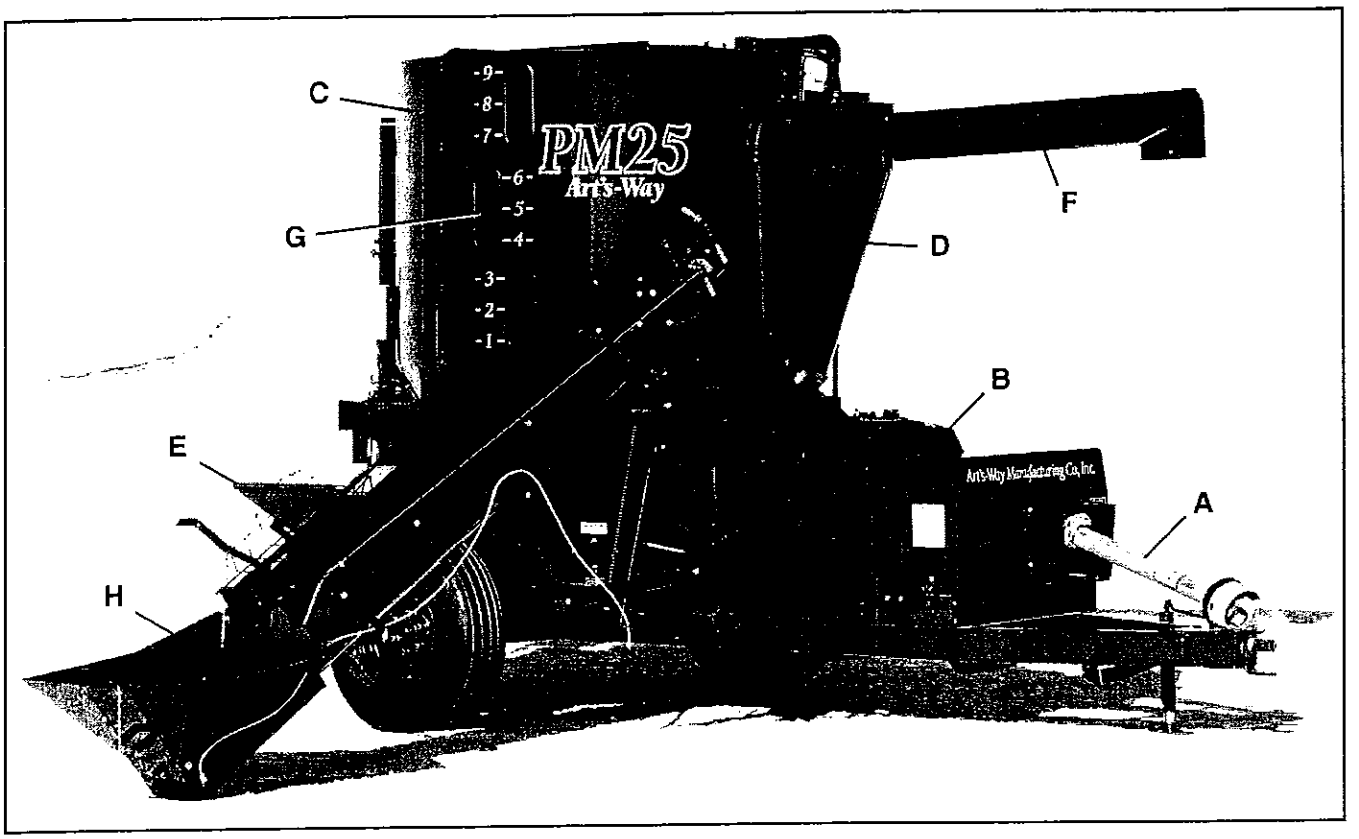


Figure 3: Model PM25 with auger feeder (Model PM35 on page 9). (A - PTO driveline; B - hammermill; C - mixing tank; D - dust collector; E - supplement hopper; F - unloading auger; G - viewing windows; H - auger feeder).

This manual has been prepared to acquaint you with the proper operation, adjustment, lubrication and service of your grinder mixer. Take the time to be careful and better understand the efficient operation and care of your machine.

Whenever the terms "Left" and "Right" are used, it should be understood to mean standing behind the machine and facing the direction of forward travel.

Some pictorials used show guards and shields removed for easy identification. Be sure that all shields and guards are in place before operating. These are for your protection.

The Art's-Way grinder mixer is PTO (A - PTO driveline) driven by 40 hp to 150 hp tractors and is factory available with either a 540 or 1000 RPM (PM35 only) drive.

Hammermill (B) respective speed should be maintained as the hammermill cylinder operates best at 2800 to 3000 RPM. Hammermill cylinders do not exceed 3000 RPM.

CAUTION: Never operate 540 RPM processor with 1000 RPM tractor.

Before operating your grinder mixer, select and install the screen size desired. Sizes are available from 1/8" to 2" openings. See page 14 for screen selection guidelines.

All types of grain can be ground with the hammermill. Hay can be ground with a minimum of 1/3 mixer of grain. Material is fed into the hammermill where it is ground until it can pass through the screen size selected. From the hammermill, the material is augered into the mixing tank (C). A suction fan takes air pressure out of the hammermill housing and delivers feed fines into the dust collector (D). The fines are separated and then dropped into the mill to mixer auger.

If supplement is to be added to the ration, a hopper (E - supplement hopper) with a sack cutter is located at the right rear of the mixing tank. Best mixing will result if supplement is added before grinding.

The ground feed is mixed continuously until the tractor PTO is disengaged.

The unloading auger (F) pivots at the rear center of the mixing tank and can swing 324° on the PM25 or 316° on the PM35 in a horizontal arc and in a vertical arc to

the limit of the lift assist spring. The unloading auger tube can be positioned either to the right or left side tank for transport. Unloading rates up to 28 bushels per minute can be obtained depending on the type of material processed.

Three viewing windows (G) are located at the front right corner on the mixing tank to observe the feed level while grinding and mixing.

A ladder is located at the front left corner of the mixing tank to obtain access to the spring-loaded mixing tank lid.

CAUTION: Do NOT open spring-loaded mixing tank lid while PTO is engaged and tractor is running.

Many convenient features are standard equipment on the Art's-Way grinder mixers including:

105 bu. - PM25

1. 540 RPM.
2. 10.00 x 15 tires.
3. Magnet in hammermill throat.
4. Lift assist.
5. Positioner to enable the hopper on the auger feeder (H) to be moved in or out 6 inches to properly position in front of augers.
6. Fenders.
7. Screen rack.
8. Tongue jack.
9. Discharge auger hood with spring loaded relief door.

150 bu. - PM35

1. 13.5 x 16.1 tires.
2. Magnet in hammermill throat.
3. Lift assist.
4. Positioner to enable the hopper on the auger feeder (H) to be moved in or out 6 inches to properly position in front of augers
5. Fenders.
6. Screen rack.
7. Tongue jack.
8. Discharge auger hood with spring loaded relief door.

A number of optional attachments are available:

1. 540 or 1000 PTO. (Model PM35 only).
2. Auger feeder, hydraulic.
3. Electronic scale with digital readout. Micro-processor model is also available.
4. Horn, light or horn and light for electronic scale.
5. Unloading auger extensions; 3' to 6' folding or bolt-ons.
6. Hydraulic roll feed in mill throat of hammermills.
7. Self-contained hydraulic system. (Model PM35).
8. Highway light kit.

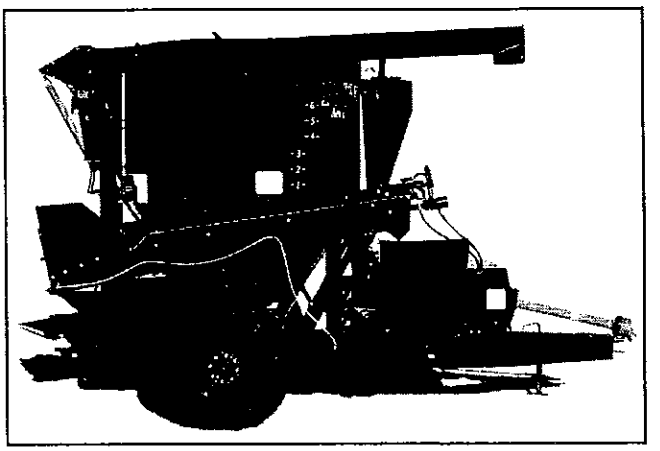


Figure 4: Model PM35 with auger feeder.

PREPARING GRINDER-MIXER FOR OPERATION

Remove the shipping banding or wire from the auger feeder (if so equipped), rear discharge cover and unloading tube to saddle at the side of the tank.

Remove the bag from supplement hopper. Place the screen hook in the hammermill door pin (see Figure 5). If equipped with mechanical lift and swing, the crank for the unloading auger is in the bag. Place it in the hanger near the crank position for lift and swing. Install the PTO driveline storage bracket under front hitch with 1/2" x 1-1/2" bolt and lock nut (see Figure 6). Maintain tension with lock nut to allow movement with 15 lbs. pull.

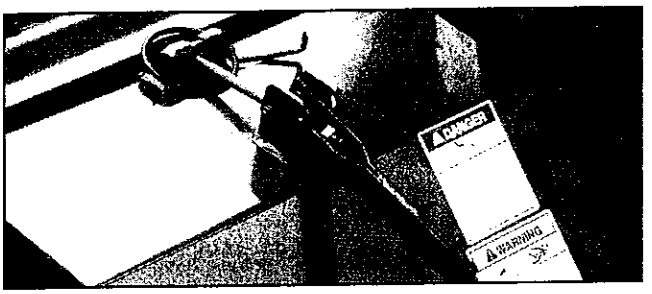


Figure 5: Screen hook storage (20" hammermill shown).

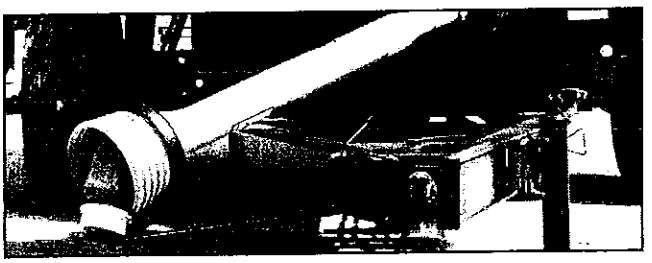


Figure 6: PTO driveline storage bracket.

Install any option that was ordered with the machine and shipped loose. See instructions packaged with options for installation.

Install the implement end of the PTO driveline by fastening it to the input jackshaft with the 5/16" x 3-1/2" clevis pin and cotter pin provided:

Spread cotter pin. Make sure the proper PTO is used.

CAUTION: Never operate 540 rpm grinder mixer with a 1000 rpm tractor.

The hydraulic drive ring and worm gear reservoir, for controlling back auger, should be filled with SAE 90 weight gear oil up to the worm shaft (see Figure 7).

NOTE: Height of the unloading auger tube needs to be checked. Move the saddle on the side of the mixing tank so tube properly clears tractor and cab.

If equipped with tractor hydraulic auger feeder or roll feed see pages 18 - 20 and 38 - 39 for additional instructions.

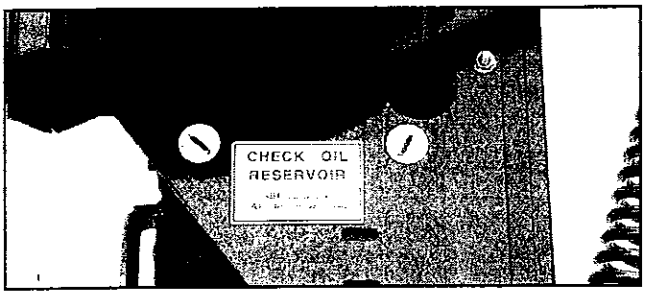


Figure 7: Ring and worm gear hydraulic reservoir.

Tires

Keep tires properly inflated. Lack of pressure can result in torn valve stems, fabric breaks and uneven tread wear. Too much pressure causes undue strain on fabric, excessive tread wear and allows the tire to cut in more on wet surfaces. Equal tire pressure reduces mixer sway when towing.

Recommended tire inflation pressure is:

10:00-15	8-PR tires - 40 psi
13.5 x 16.1	8-PR tires - 28psi.

Shields

Make sure that all shields are in place and functioning.

Bolts and Nuts

Before starting to operate the grinder mixer, check all nuts and bolts for tightness. Also check that all cotter pins are spread. After operating the grinder mixer for several hours, check all the bolts for proper torque. See Torque Guide Figure 8.

SIZE	CLAMP LOAD	PLAIN	PLATED
1/4 - 20(.250)	2,025	8 ft. lbs.	76 in. lbs.
5/16 - 18(.3125)	3,338	17 ft. lbs.	13 ft. lbs.
3/8 - 16(.375)	4,950	31 ft. lbs.	23 ft. lbs.
7/16 - 14(.4375)	6,788	50 ft. lbs.	37 ft. lbs.
1/2 - 13(.500)	9,075	76 ft. lbs.	57 ft. lbs.
9/16 - 12(.5625)	11,625	109 ft. lbs.	82 ft. lbs
5/8 - 11(.625)	14,400	150 ft. lbs.	112 ft. lbs.
3/4 - 10(.750)	21,300	266 ft. lbs.	200 ft. lbs.
7/8 - 9(.875)	29,475	430 ft. lbs.	322 ft. lbs.
1 - 8(1.00)	38,625	644 ft. lbs.	483 ft. lbs.
1-1/8 - 7(1.125)	42,375	794 ft. lbs.	596 ft. lbs.

Figure 8: Torque specification guide.

Cap screws, except for shear bolts, used in the grinder mixer are Grade 5 and if replaced, cap screws of equal

or higher strength should be used. Grade 5 cap screws are identified by three radial dashes on the hex head (see SAE Bolt Identification Figure 9).

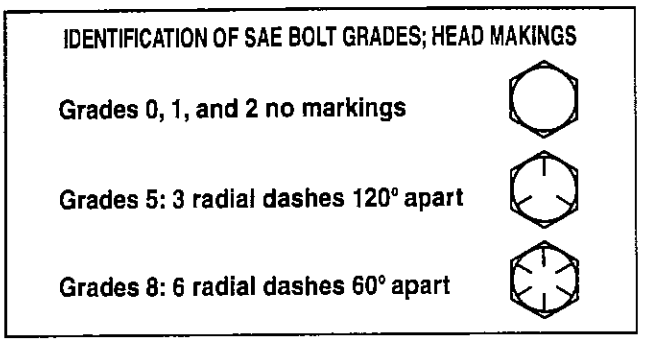


Figure 9: SAE bolt identification.

IMPORTANT: Shear bolts must be replaced with bolts of same grade.

Lubricate grinder mixer at regular intervals as instructed in lubrication sections. See "Lubrication" section beginning on page 25.

Preparing The Tractor

The tractor must be equipped with a 540 or 1000 rpm PTO to match the grinder mixer as described in the previous section. Make sure the grinder mixer and tractor are set up for the proper rpm.

CAUTION: Never operate 540 rpm grinder mixer with a 1000 rpm tractor PTO.

Tractor Hitch

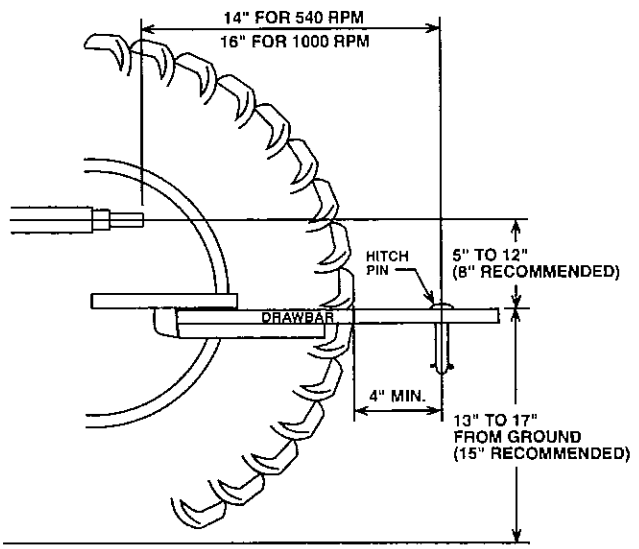


Figure 10: Hitch point locations.

The hitch for the grinder mixer is designed to attach to any SAE-ASAE standardized tractor drawbar. Adjust the drawbar so that it is 13" to 17" above the ground (see Figure 10). Extend or shorten the tractor drawbar so that the horizontal distance from the end of the tractor power take-off shaft (PTO) to the center of the hitch pin hole is 14" for 540 rpm and 16" for 1000 rpm drives. Lock the drawbar in its crossbar, parallel with the centerline of the PTO. Place locking pins on each side of the drawbar. If the tractor has an offset drawbar, the offset should be down for PTO work.

IMPORTANT: An improperly located hitch point may cause damage to the universal joints of the PTO driveline.

Attaching To The Tractor

NOTE: Height of the unloading auger needs to be checked. Move the saddle on the side of the mixing tank so the tube properly clears tractor and cab.

Back the tractor up to the hitch. Use the crank of the jack to raise or lower the grinder mixer hitch into position to engage the tractor drawbar. Fasten the grinder mixer hitch to the drawbar with a hitch pin that can not bounce out. Raise the jack and lock into transport position (see Figure 11). Install safety chain (see Figure 12).

CAUTION: Always follow state and local regulations regarding a safety chain when towing farm equipment on public highways.

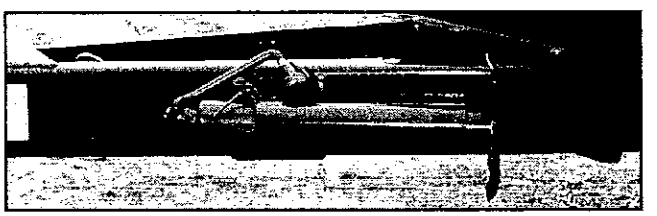


Figure 11: Jack in transport position.

Figure 12: Grinder attached to tractor with safety chain.

PREPARING GRINDER-MIXER FOR OPERATION

If the grinder mixer is equipped with an electronic scale, plug the scale power supply cord into the electrical outlet on the tractor or to battery on the mixer frame.

IMPORTANT: On electronic scale applications, if a bolt and nut are used in place of a hitch pin, the nut must not be tightened such that it hits against the underside of the weigh bar clevis.

If the grinder mixer is equipped with a tractor hydraulic function, install the proper male ends on the hoses and plug the hydraulic hoses into the tractor outlets. See page 23 for open and closed center instructions.

Connect the PTO driveline to the tractor PTO shaft. The PTO operating speed of the tractor and grinder mixer must be the same. The tractor half of the PTO is equipped with 6 splines for 540 rpm operation and 21 splines for 1000 rpm operation.

Hammermill

Be sure the grinder mixer is equipped with 1000 rpm drive when operating with a tractor equipped with 1000 rpm PTO drive. The diameter of the pulley on the jackshaft must be 12-5/16" for 1000 rpm operation in a hammermill application. The diameter of the pulley on the jackshaft must be 22-5/8" for 540 rpm operation in a hammermill application (see Figure 13).

CAUTION: Never operate 540 rpm grinder mixer with a 1000 rpm tractor.

After connecting PTO driveline to tractor, anchor driveline implement shield chain in main shield base slot and the tractor shield chain to the tractor drawbar.

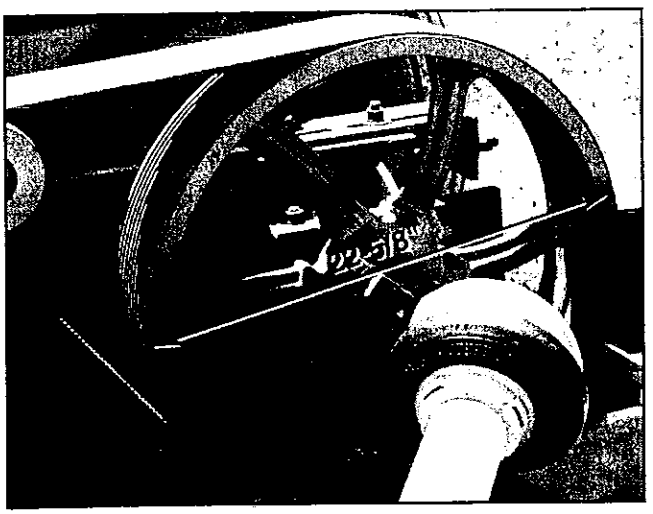


Figure 13: Large pulley - 540 RPM (shields removed for clarity).

Before Grinding

New machines should be operated before preparing feed. A few hundred pounds of coarse material, such as shelled corn or ground corn cobs, should be run through the grinder and mixer. This will remove the protective oil coating from the mixer cone and any metal particles that may be in the machine. This helps polish the cone and prevent bridging. After several minutes of running, unload the mixture and discard. ***Do not feed this material to livestock.***

Detaching From Tractor

CAUTION: Be sure the tractor engine is shut off and remove key from tractor and place in pocket.

Disconnect the PTO driveline and front shield anchor chain from the tractor and place it on the PTO driveline support bracket (see Figure 13). PTO driveline support should be tight enough to remain in position when rotated from storage against frame to use position.

Disconnect the electronic scale power cord from the tractor if so equipped.

Disconnect the hydraulic hoses from the tractor outlets if equipped with tractor hydraulic functions.

Make sure the discharge auger and auger feeder are in their saddles before disconnecting.

Block the tires. Lower the jack stand to the ground. Turn the handle of the jack stand to raise the grinder mixer tongue off the tractor hitch. Remove the hitch pin and safety chain.

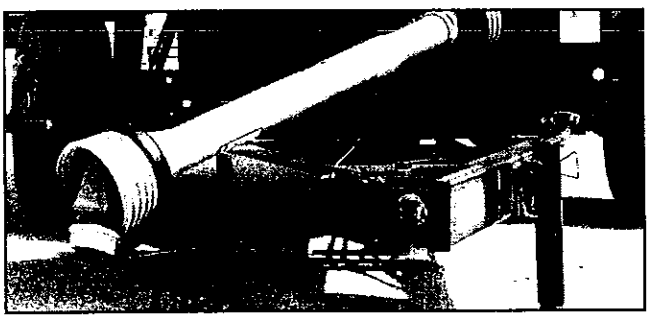


Figure 14: PTO support.

OPERATION OF GRINDER MIXER

Tractor PTO Engagement

The mixer may be operated by engaging the PTO. Always engage the tractor PTO with the tractor engine at an idle speed. After it is engaged, increase the engine speed gradually until operating speed is obtained. Reverse the engagement procedure to disengage.

Before grinding, position the tractor straight with the frame of grinder mixer. This will allow smoother PTO operation and prolong PTO driveline life.

IMPORTANT: *If mixing during transport, avoid sharp turns which may damage the PTO driveline.*

Hammermill Clutch Pin

CAUTION: Before changing positions of clutch pin, make sure tractor is shut off and place key in pocket.

The hammermill clutch pin, (see Figure 15) is located on the front of the fly-wheel. ***Make sure the machine has come to a complete stop and shut off the tractor engine before proceeding with this step.*** To engage the hammermill, turn the fly-wheel by hand to align one of the six slots in the fly-wheel with the pin then push the pin in and turn 1/4 turn in either direction to lock in place. To disengage the hammermill, push the pin in, turn 1/4 turn and release.

CAUTION: Always operate PTO at the speed for which the machine is equipped; 540 or 1000 RPM. Note the speed decal on the front shield.

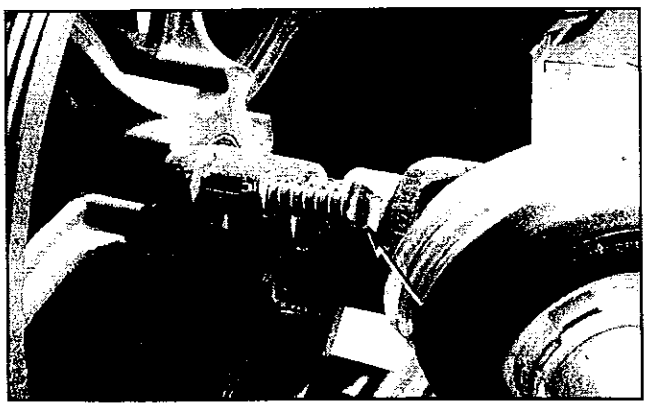


Figure 15: Hammermill clutch pin. Pin is disengaged in photo (shields removed for clarity).

Feed Gate

A feed gate, (see Figure 16), is provided in the mill throat with a rubber baffle (removed for roll feed installation) behind it. The feed gate should be set to the lowest position to allow material to flow into the hammermill evenly.

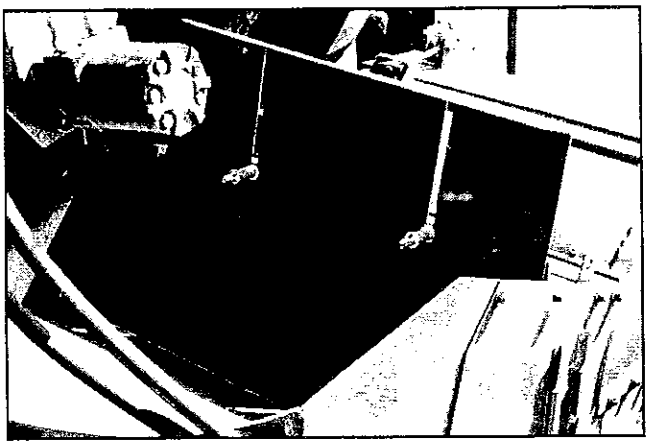


Figure 16: Feed gate at the throat of hammermill.

Hay Retard Bolts

The hay retard bolts (see Figure 17) will help maintain uniform feeding while grinding hay. The degree of retard is adjusted by loosening the lock nuts on each of the retard bolt and turning the bolts in or out to the desired position. Retarding action is increased by turning the bolts in and lessened by turning the bolts out. Secure the bolts by tightening the lock nuts.

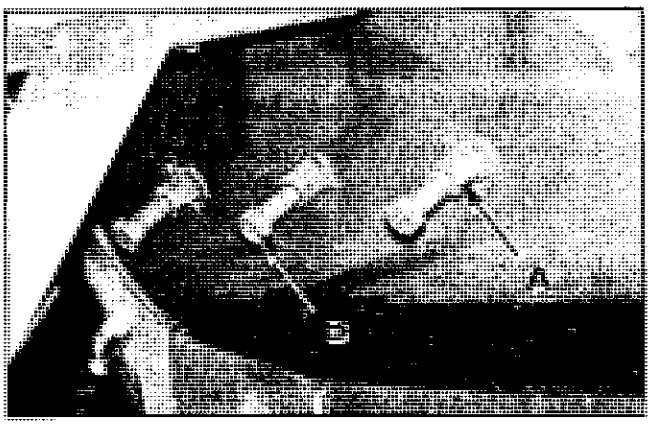


Figure 17: Hay retard bolts. (A - Lock Nut; B - Adjustable Retard Bolt. 26" hammermill shown, 20" hammermill has two bolts.)

Hammermill Screens

Screens are available in sizes ranging from 1/8" to 2" openings. The screen size will be determined by the type of material and the degree of fineness desired.

OPERATION OF GRINDER MIXER

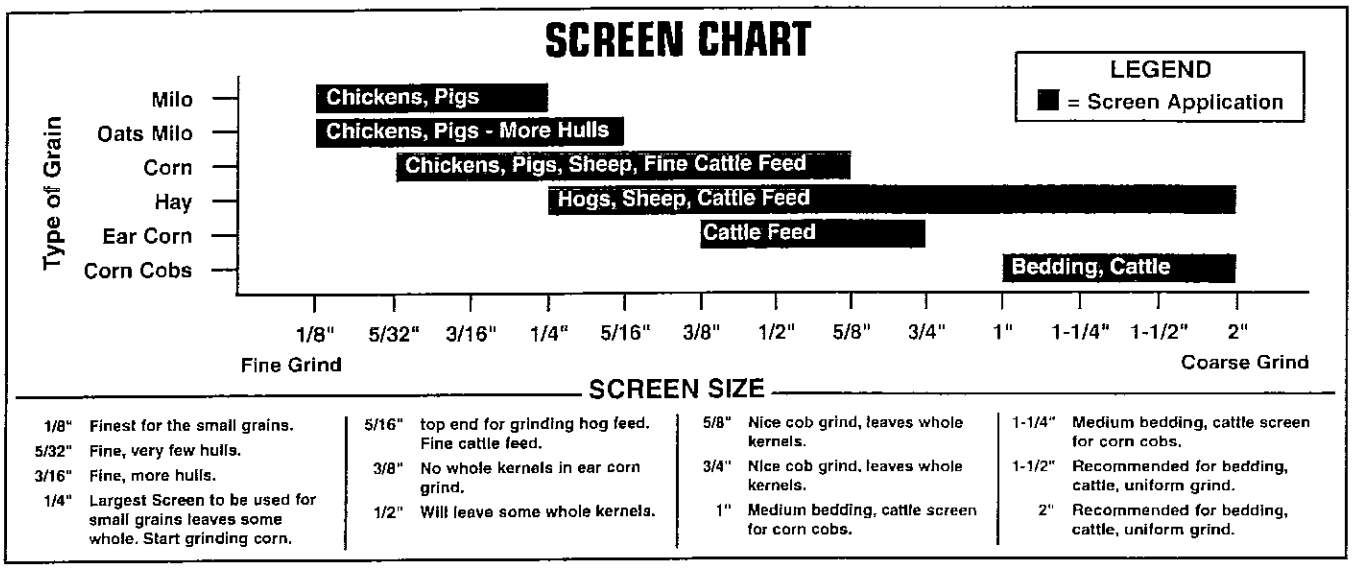


Figure 18. Screen Chart.

The chart (Figure 18) showing screen sizes may be used as a guide for grinding different types of feed.

Do not use finer screens than needed since they require more power and will reduce mill capacity. Never grind wet corn or hay. This can cause auger problems in loading and unloading.

Changing Screens

CAUTION: Disengage all drives, shut off tractor engine and place key in pocket before installing or changing hammermill screens. Never open the hammermill cover until the hammermill has come to a complete stop.

Extra screens are carried in the screen rack located over the left fender.

To install or change the screen, open the hammermill door and remove the screen with hook provided (see Figure 19). The screen support rack will drop down to allow easier screen removal. Install the new screen, close and latch the hammermill door, replace the screen hook and locking pins (see Figure 20).

Processing Hay

If hay is to be ground, grind grain first. Do not grind more than five bales of hay per tank until familiar with the results. Large amounts of hay, or coarse ground hay, can cause "bridging" in the tank and difficulty in unloading. If large quantities of hay are to be ground, run straight through the machine without filling the tank.

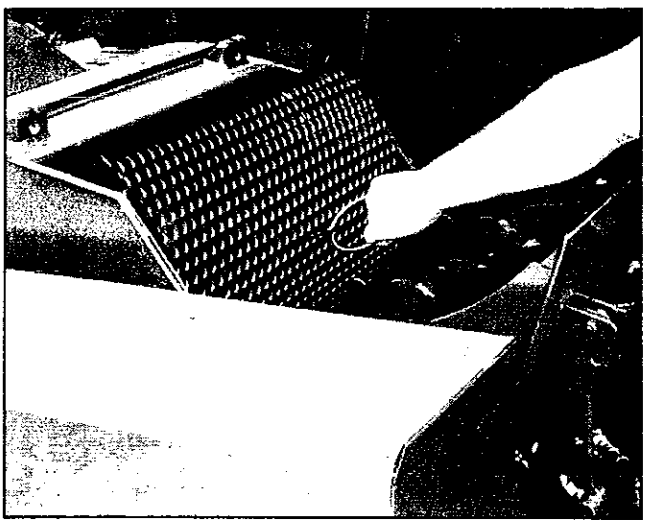


Figure 19: Changing screens.

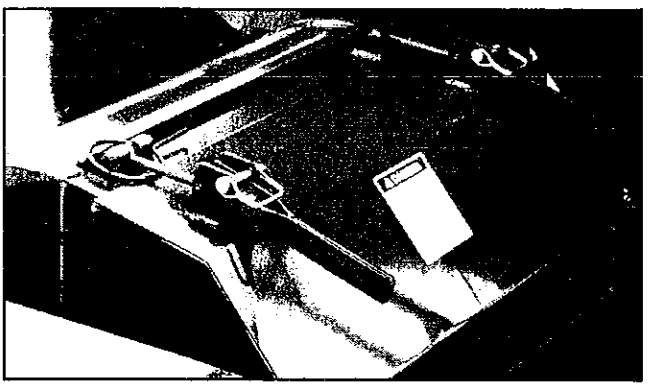


Figure 20: Locking pin and latch on hammermill door (26" hammermill shown, 20" hammermill has only one latch).

Processing Without Mixing

To grind any material without mixing, engage the unloading auger lever, open the tank unloading door

OPERATION OF GRINDER MIXER

and start the grinding operation. The feed will be augered into the mixing tank cone and then out through the unloading augers without mixing. Position the unloading auger tube as needed to direct the feed.

Adding Concentrate Or Supplement

Concentrate or supplement should be added to the ground feed through the supplement hopper located at the right rear corner of the grinder mixer. A serrated sack cutter is located in the hopper opening. A grate is positioned below the sack cutter to keep the bag from dropping into the auger.

CAUTION: Keep hands and feet clear of auger. Make sure grate is always in place.

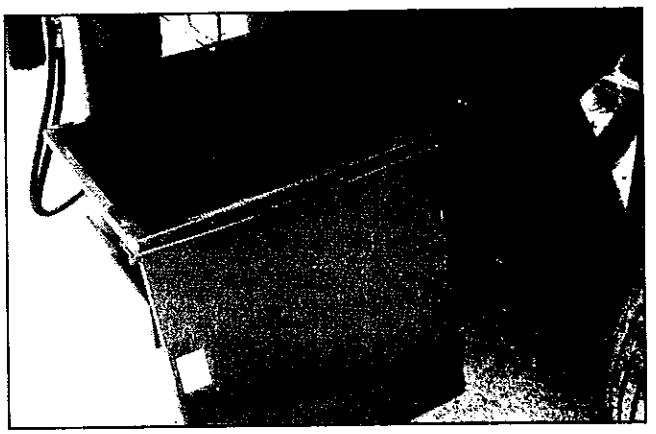


Figure 21. Supplement hopper located on right hand side of machine.

For best results, add the concentrate or supplement prior to the grinding operation or within a minute or two after grinding has begun. If micro-ingredients are to be added to the feed, the best results are obtained with a premix, or by adding the supplements and micro-ingredients simultaneously. If the micro-ingredients are desired without a premix or other supplement, open the mixing tank lid and put the ingredients directly into the mixer. This should be done at the beginning of the operation. Be sure to close the lid before starting. The supplement hopper lid should be closed when not in use. If strong additives are not wanted in the next batch, clean out the tank cone and unloading augers through clean-out doors (see Figure 22).

CAUTION: Make sure PTO is disengaged, tractor is shut off and key is in your pocket before opening or closing clean-out door.

Located under the right side of frame and tank assembly is a hinged door on the bottom of the auger trough. Release two spring clamps and drop door. Keep away from opening. Run mixer slowly until trough and mixing tank are cleaned out. Keep all persons away from under and around the machine.

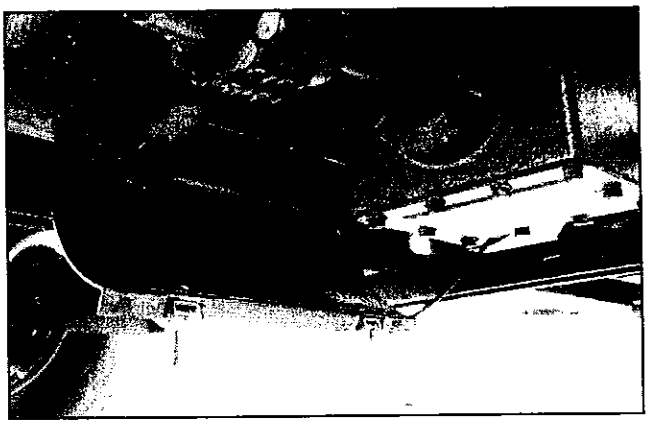


Figure 22. Clean-out door located under right side of tank assembly.

Filling Mixer Tank

Be sure the mixing tank unloading door is closed. As the mixing tank is filling, watch the ground feed through the mixing tank windows. When the top window first becomes covered, the tank is not full since the mixing auger throws material away from the center of the tank. Continue loading until the top window clears (feed drops), then becomes covered again about half-way (see Figure 23). Stop feeding material into the processor at this point, but continue operating until the processor has had time to clear. Do not overload the mixer: overloading can cause damage to the machine. To estimate how many bushels are in the tank see Figure 24 page 16.

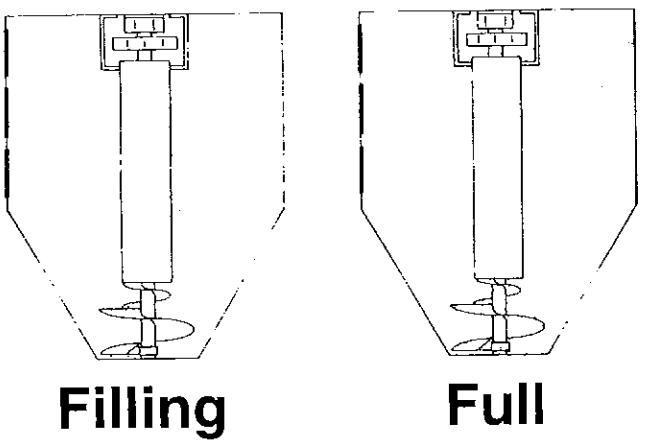


Figure 23: Filling pattern.

For best mixing results, always add lightweight bulky materials first. Always add high moisture corn or grain last. Excessive amounts of wet material or bulky material may cause bridging in the mixing tank.

OPERATION OF GRINDER MIXER

105 BU. - APPROXIMATE CAPACITY CALIBRATION - IN POUNDS*

(Actual Weights Vary with Material, Moisture, Screen Size; ration weight is not included and is highly variable.)

Window Number	Ground Oats 22.5 lbs./bu.	Ground Barley 36 lbs./bu.	Ground Milo 56 lbs./bu.	Ground Shelled Corn 50 lbs./bu.	Ground Ear Corn 38 lbs./bu.	Un-ground Shelled Corn 50 lbs./bu.
Full	2346	3754	5839	5213	3962	5839
9	2219	3549	5521	4930	3747	5521
8	2046	3274	5092	4547	3456	5092
7	1874	2998	4664	4164	3165	4664
6	1659	3654	4129	3687	2802	4129
5	1487	2379	3701	3304	2511	3701
4	1315	2103	3272	2921	2220	3272
3	1100	1760	2737	2444	1857	2737
2	928	1484	2038	2061	1566	2038
1	756	1208	1880	1678	1276	1880

150 BU. - APPROXIMATE CAPACITY CALIBRATION - IN POUNDS*

(Actual Weights Vary with Material, Moisture, Screen Size; ration weight is not included and is highly variable.)

Window Number	Ground Oats 22.5 lbs./bu.	Ground Barley 36 lbs./bu.	Ground Milo 56 lbs./bu.	Ground Shelled Corn 50 lbs./bu.	Ground Ear Corn 38 lbs./bu.	Un-ground Shelled Corn 50 lbs./bu.
Full	3427	5483	8529	7615	5787	8529
9	3254	5206	8098	7230	5495	8098
8	3002	4802	7470	6670	5069	7470
7	2747	4396	6838	6105	4640	6838
6	2468	3949	6143	5485	4169	6143
5	2228	3564	5544	4950	3762	5544
4	1987	3179	4945	4415	3355	4945
3	1685	2696	4194	3745	2846	4194
2	1444	2311	3595	3210	2440	3595
1	1204	1926	2996	2675	2033	2996

*Above weights are approximate: to be used as a guide only. Large variations may occur due to test weight of grain, slope that machine may be on, moisture content, or screen size. For best ration control, use an electronic scale.

Figure 21. Tank Capacity For 105 Bu. And 150 Bu.

Spring Loaded Tank Lid

CAUTION: Disengage all drives and shut off tractor engine and place key in pocket before opening mixing tank lid.

If the tank is accidentally over filled, it is equipped with a spring loaded tank lid (see Figure 25). This lid also allows access to the inside of the mixing tank. Keep the lid latched down at all times.

CAUTION: If entering tank, make sure tractor engine is shut off and place key in your pocket and disconnect PTO driveline.

After the processing is completed and the desired ration is in the mixing tank, allow the mixer to operate until ready to unload. Run the mixer 2 to 3 minutes to insure a thorough mixing of feed and supplements.

IMPORTANT: Do not make sharp turns with PTO running while transporting.

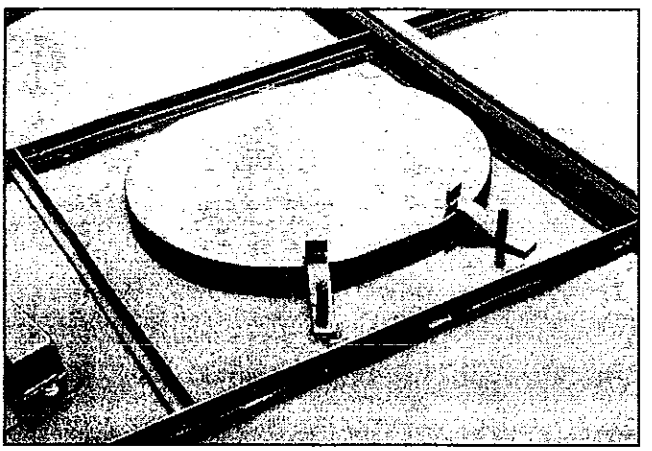


Figure 25: Spring Loaded Tank Lid

Unloading Auger Positioning

After mixing, the finished feed may be unloaded into storage bins, wagons or feeders. Positioning (Lift and Swing) of the unloading auger and drive for the unloading auger may be controlled in two ways.

1. MANUAL CRANK: (See Figure 26 and 27, page 17) Insert crank on the shaft next to channel to lift and on the shaft at the rear of lower auger housing to swing the unloading auger. A brake is provided

to prevent movement after positioned (see Figure 28).

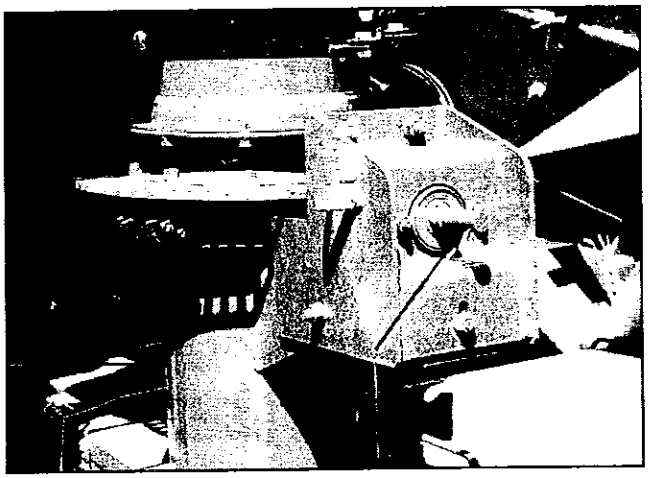


Figure 26: Manual swing.

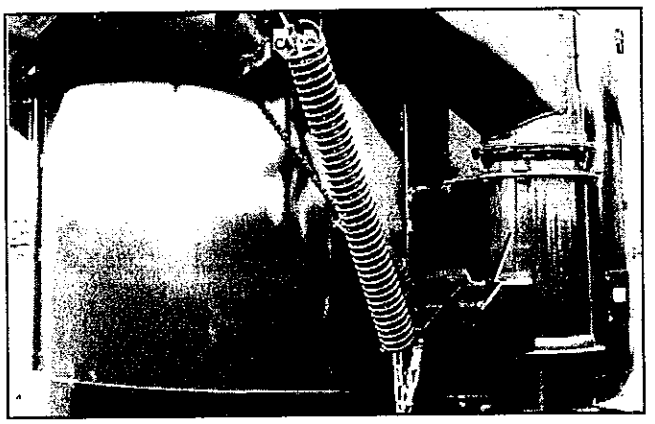


Figure 27: Manual lift.

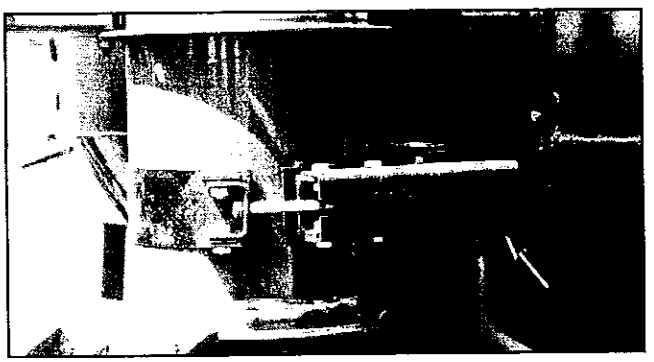


Figure 28: Manual brake.

2. **TRACTOR HYDRAULIC LIFT & SWING:** Hydraulic lift and swing using tractor hydraulic system valves. If a hydraulic auger feeder is present, a double selector valve is required to direct the flow of hydraulic oil. Either the swing motor or the auger feeder may be operated independently, but not at the same time (see Figure 29). Position the selector valve control "in" to direct oil to discharge swing function.

   Connect four hydraulic hoses with appropriate male connectors to the tractor. Make sure the proper hoses are paired to same tractor hydraulic circuit. Activate the appropriate tractor valve to lift the unloading auger then using the other valve to swing the unloading auger to the desired position.

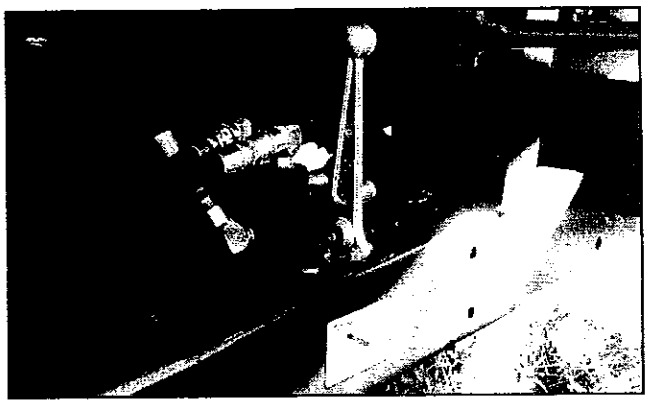


Figure 29: Hydraulic Selector Valve (lever in the in position - hydraulic swing).

Unloading Auger Engagement

Operate tractor at a minimum of 2/3 throttle for unloading.

UNLOADING CLUTCH DRIVE: (See Figures 30). Move the clutch handle ahead and down to engage the augers. Open the unloading door, the eccentric may be used to hold open. (See Figure 31, page 18). When tank is unloaded, reverse procedure.

If unloading in more than one location, close discharge door and empty auger before moving machine.

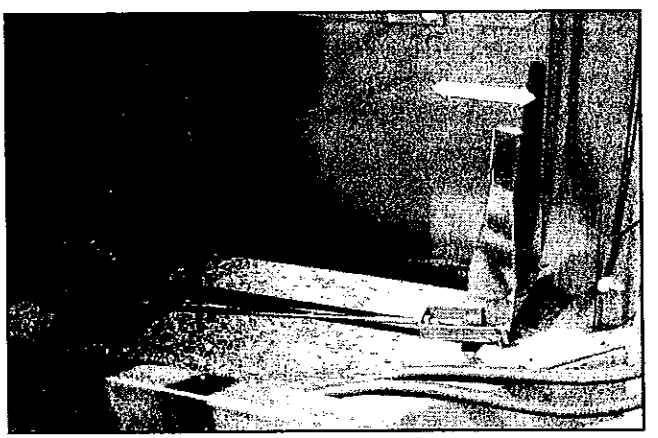


Figure 30: Unloading clutch operation.

OPERATION OF GRINDER MIXER

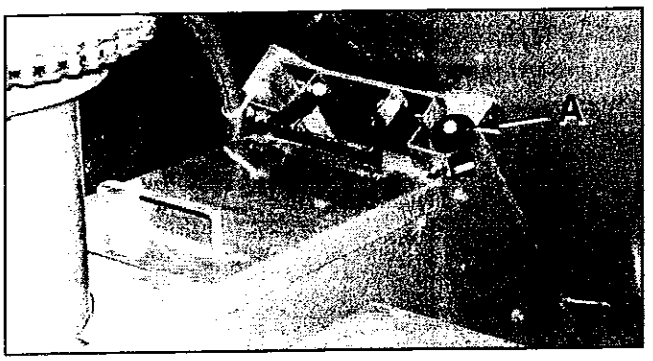


Figure 31: Unloading door (A - eccentric lock).

Folding Auger Extension:

Optional extensions for the unloading auger include a 3' to 6' folding or bolt-on extensions. See Figures 33 and 34 for discharge heights with these extensions.

If equipped with a folding auger extension, be sure the outer auger drive cog is properly engaged and extension tube is locked before engaging unloading clutch.

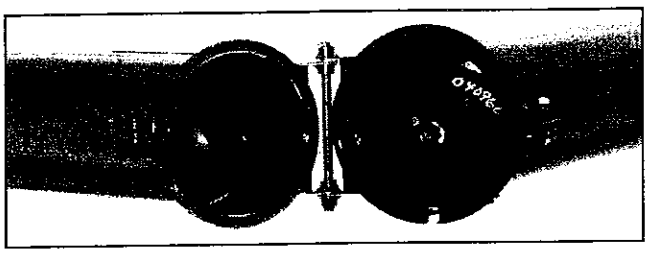


Figure 32: Folding auger extension.

Unloading Auger Hood

When the unloading auger tube becomes overloaded, a spring-loaded door opens on the end to prevent damage to the drive (see Figure 35).

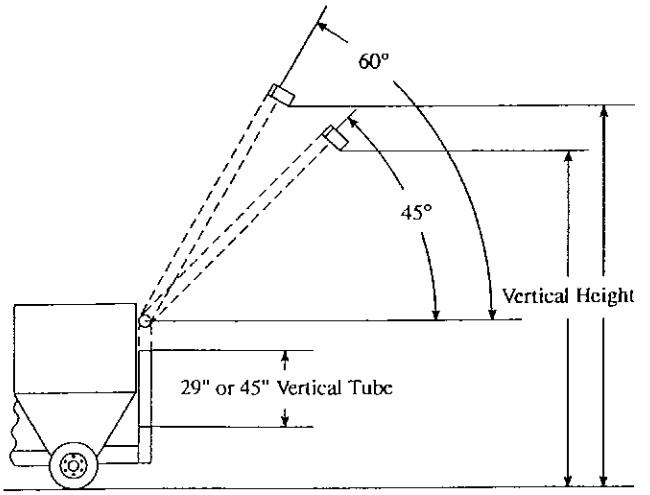


Figure 34: Unloading auger heights (see figure 33).

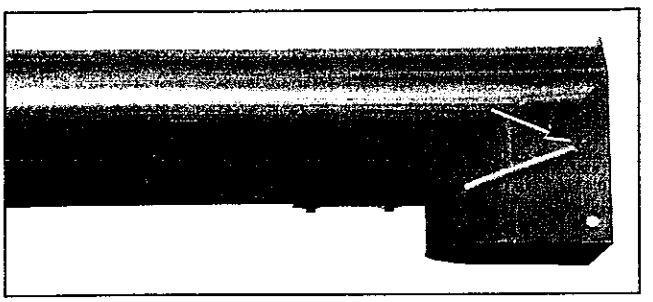


Figure 35: Unloading auger hood.

Auger Feeder Operation

The grinder mixer may be equipped with a hydraulic auger feeder:

To position the auger feeder, remove the clip pin from the fender bracket, lift the bottom of the auger feeder slightly so that the brackets clear at the fender. Swing the auger feeder out away from tank so it will clear the fender when it is lowered. Lift slightly on the auger feeder and pull the rope on the right hand side to

UNLOADING HEIGHTS OBTAINED ON LEVEL SURFACE
(See Figure 34)

Unloading Auger Configuration	Tube & Elbow Combined Length	Discharge 45° 29" Tube	Discharge 45° 45" Tube	Discharge 60° 29" Tube	Discharge 60° 45" Tube
105 Bu.					
Standard - No Extensions	125"	14'-9"	N/A	16'-8"	N/A
3' Fold Around Auger Extension	161"	17'-0"	N/A	19'-3"	N/A
6' Fold Around Auger Extension	197"	19'-3"	N/A	22'-0"	N/A
150 Bu.					
Standard - No Extensions	125"	N/A	15'-9"	N/A	17'-8"
3' Fold Around Auger Extension	161"	N/A	18'-0"	N/A	20'-3"
6' Fold Around Auger Extension	197"	N/A	20'-3"	N/A	23'-0"

Figure 33: Unloading Auger Heights.

disengage the height adjustment ratchet bar. Raise or lower to the desired height and release the rope. Remove the clip pin holding the auger feeder folding hopper up and swing the hopper down. When processing material such as ear corn, the grate must be left in the up position. If you must grind with the grate up, use extreme care to stay clear of the auger.

DANGER: To prevent personal injury:

1. **Use grate over auger at all times possible.**
2. **Keep hands and feet out of the hopper area and do not climb onto or over the hopper at any time.**
3. **Keep children and bystanders away from machine while in operation.**

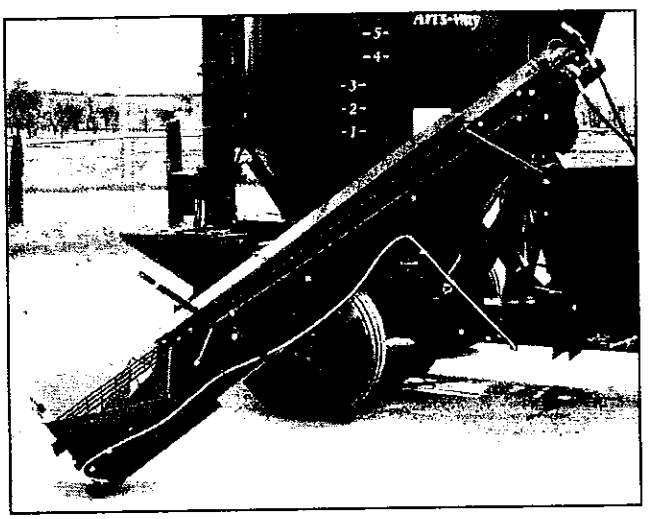


Figure 36: Auger feeder operation.

Make sure the auger feeder clutch handle will stop the auger feeder. Loosen cable clamps to readjust.

The auger feeder swing brake prevents the auger from swinging. Tighten or loosen as desired (see Figure 37).

NOTE: *If machine is equipped with an electric scale, to obtain a more accurate reading DO NOT rest auger feeder on the ground. Place in position and set swing brake (see Figure 37).*

The auger feeder is counter balanced by a spring (see Figure 38). Adjust the spring by loosening the nut on the lower bolt, turn the bolt in to increase the spring tension, relock the nut.

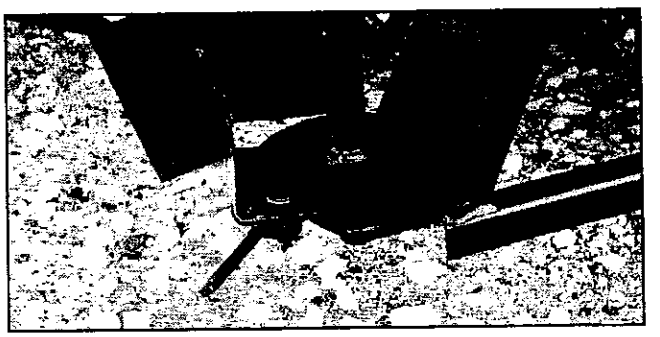


Figure 37: Auger feeder swing brake.

The auger feeder is equipped with a unique patented feature called a positioner (see Figure 38). This enables the hopper to be repositioned approximately 6" in or out without moving the tractor. To operate the positioner, hold the long handle securely; release the short handle; reposition the auger feeder hopper more directly under a spout or against a building; then release handles.

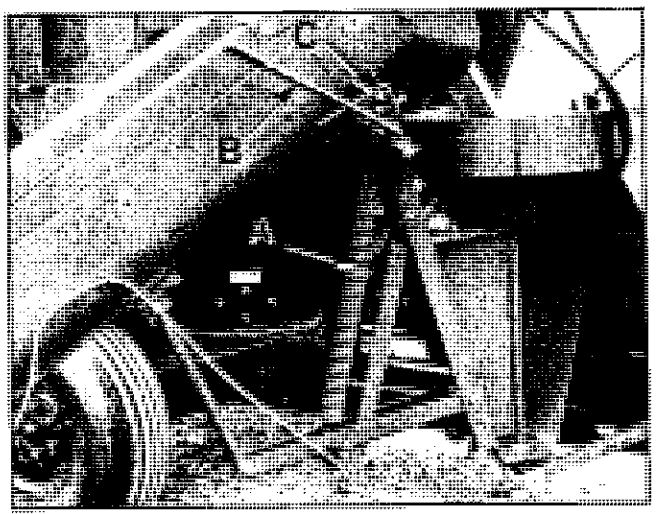


Figure 38: Auger feeder positioner and spring adjustment (A - spring; B - positioner handle; C - positioner lock).

Shut off handles are provided at the auger feeder hopper and at the flow control valve at the top of the auger feeder housing. To shut off the auger feeder pull the handle at hopper area or move flow control lever to off (see Figure 39 and 40, page 20).

For the tractor hydraulic auger feeder, when the machine is also equipped with a hydraulic lift and swing unloading auger, a selector valve will be located to the left, rear side of the processor. The handle on this valve must be out to divert the oil to the auger feeder.

If the handle for the selector valve is in, oil flows to the lift and swing function of the unloading auger (see Figure 41, page 20).

OPERATION OF GRINDER MIXER

To start the auger feeder, the flow control handle is moved forward (clockwise) until the desired speed is reached.

If the hydraulic auger feeder is operated by tractor hydraulics, there must be a minimum of 8 GPM flow and 1500 psi pressure available.

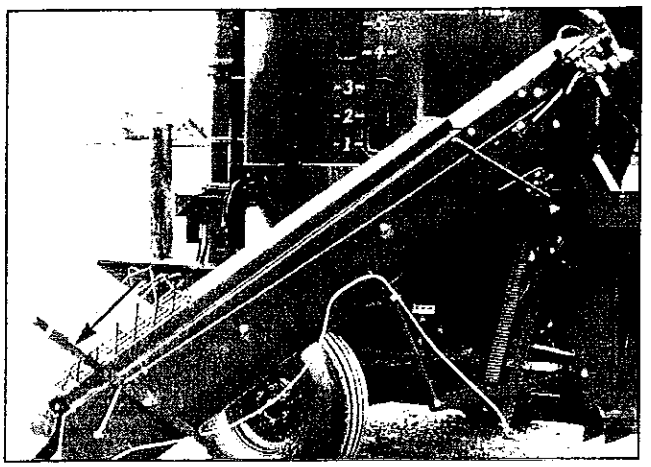


Figure 39: Hydraulic auger feeder controls - see arrows.

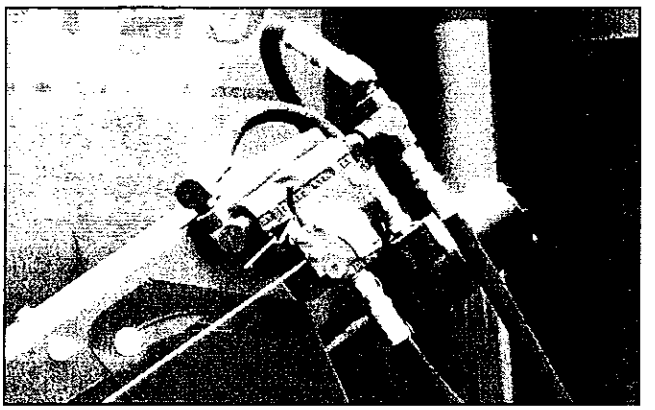


Figure 40: Hydraulic auger feeder control - see arrow.

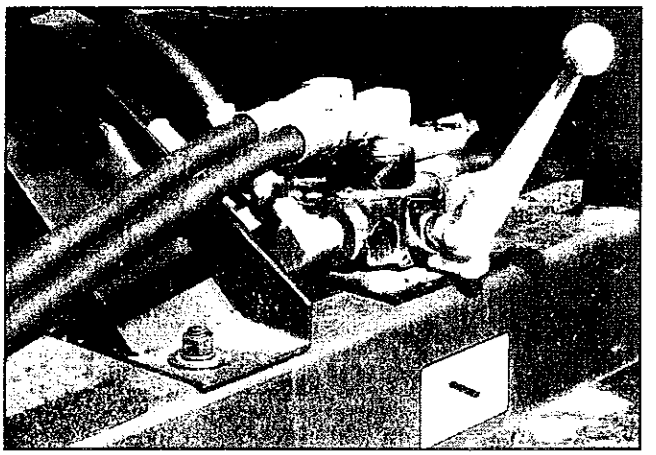


Figure 41: Hydraulic auger feeder selector valve (lever in the out position - auger feeder).

GRINDER MIXER ADJUSTMENTS

CAUTION: Do NOT make any adjustments while the machine is in operation.

Auger/Supplement Drive Chain Adjustments

The mill to mixer auger and supplement hopper drive chain and discharge auger drive chain (see Figures 42 and 43), are tensioned with a wood block idler. Adjust the chain tension to 1/2" total deflection by positioning the wood block idler.

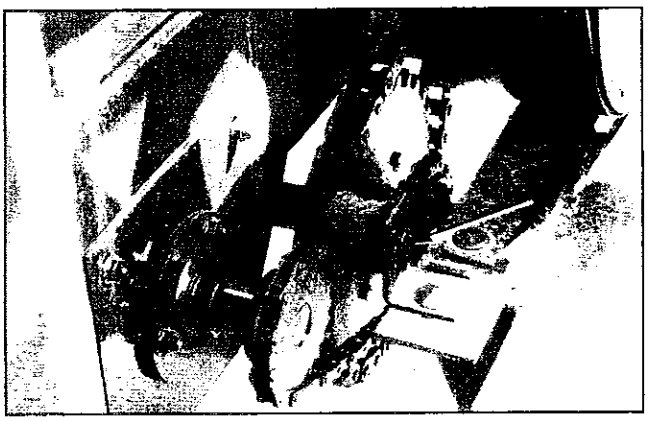


Figure 42: Mill to mixer auger drive chain.

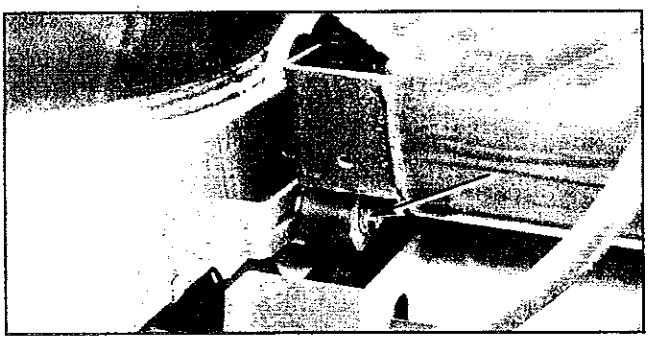


Figure 43: Discharge auger drive chain.

Main Drive Chain

Adjust the tension of the main drive chain (see Figure 44), by loosening the idler sprocket and bolt and sliding the idler sprocket towards the chain. Retighten idler sprocket bolt. Chain deflection should be 1/2" total at longest span. This chain should be checked and oiled daily.

Main Drive Belts

Belts on new machines have been properly tensioned at the factory. To re-tension belts on a machine which has been in operation, the following procedure should be followed:

Figure 44: Drive chain adjustment (shields removed for clarity).

Loosen bolts B and C (see Figure 45), place a scale at the midway point of the double V-belts on the pulleys, adjust bolt A (see Figure 45), until 15 pounds of pull on the scale raises the top of one double V-belt approximately 1/4" above the top of the remaining belts (see Figure 46). All six pairs of belts should have the average of 1/4" deflection at 15 pounds.

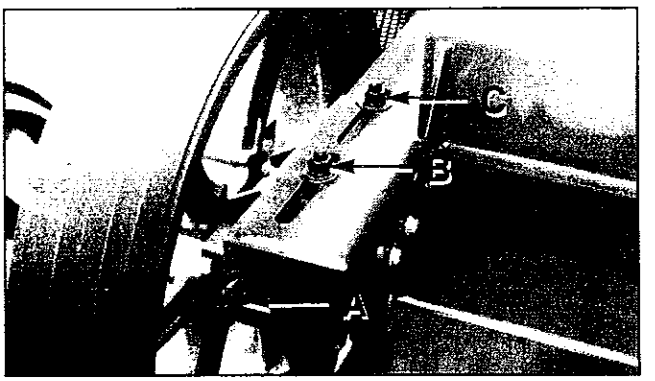


Figure 45: Belt tension adjustment (shields removed for clarity).

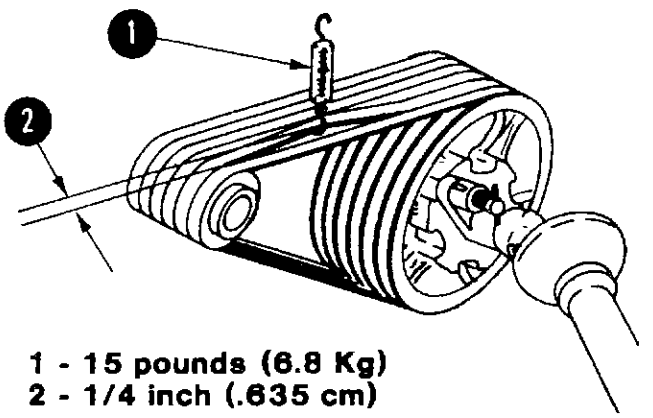


Figure 46: Checking belt tension.

IMPORTANT: Proper alignment of pulleys must be maintained when adjusting belt tension.

Belts should be checked periodically for proper tension and alignment, especially when the machine is new or a new set of belts is installed. When operating, if the

drive belts are very hot or smoking due to loose belts, do not shut off the machine, but stop grinding and let the mill continue to run for several minutes until the belts have cooled. Then stop the machine to re-tension the belts.

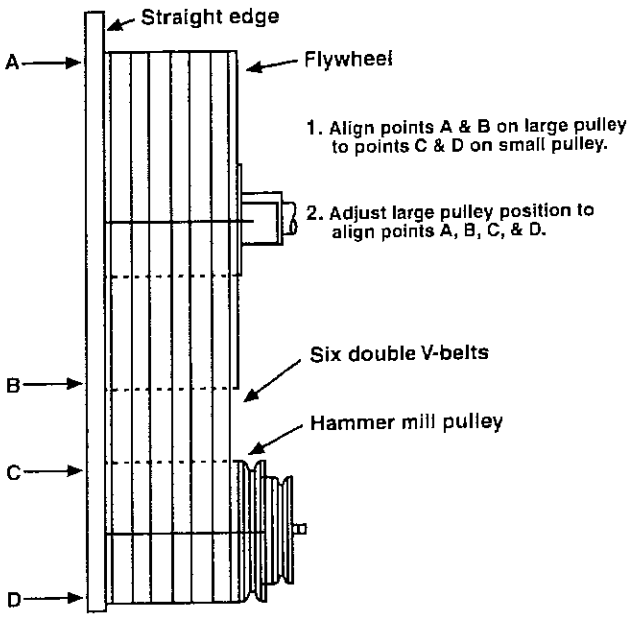


Figure 47: Belt Pulley Alignment.

Hammermill Door

To increase the Hammermill door pressure on the screen, adjust the length of the T-handle threaded end. Check adjustment and tighten locking nuts in place against the pivot block (see Figure 48).

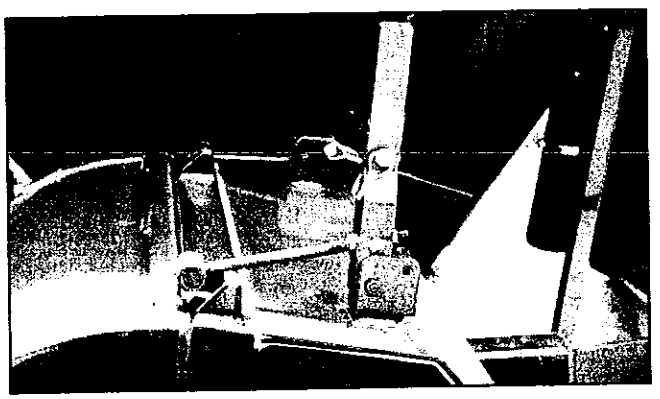


Figure 48: Hammermill door pressure.

Manual Unloading Auger Swing Crank Adjustment For Sprocket Engagement:

Adjust by loosening the three bolts shown in Figure 49 and moving the assembly up to engage the teeth of the sprocket with the disk.

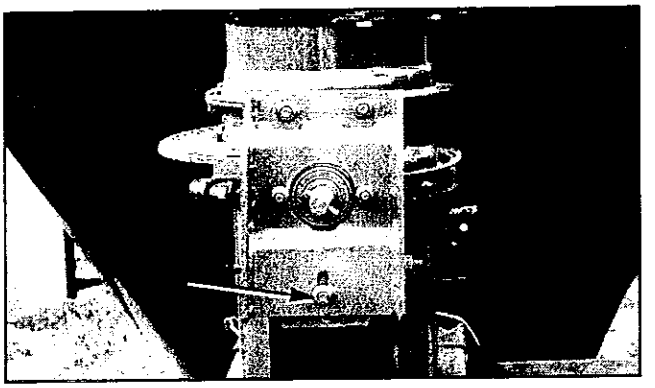


Figure 49: Manual unloading auger swing crank adjustment.

Manual Unloading Auger Swing Brake adjustment

Tighten or loosen nut and bolt, to maintain tension to hold unloading auger (see Figure 50).

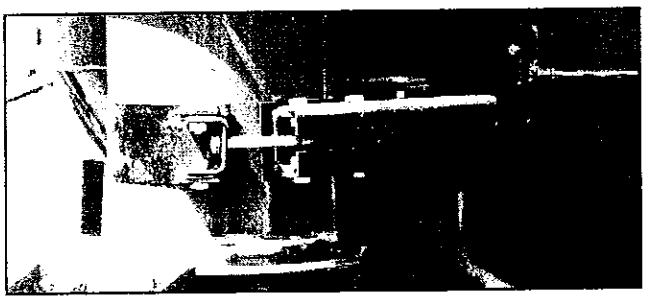


Figure 50: Manual brake adjustment.

Manual Lift Adjustment:

If the chain becomes loose, loosen bolts on the crank shaft and position chain to the proper tension (see Figure 51).

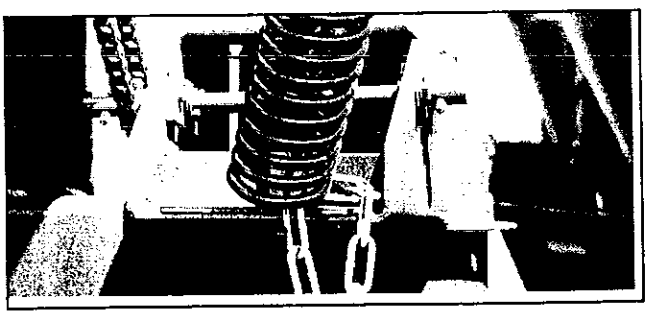


Figure 51: Manual Lift adjustment.

Hydraulic Swing Adjustment:

If any problem is encountered with this drive, adjust and/or check as follows: (see Figure 52, page 23).

GRINDER MIXER ADJUSTMENTS

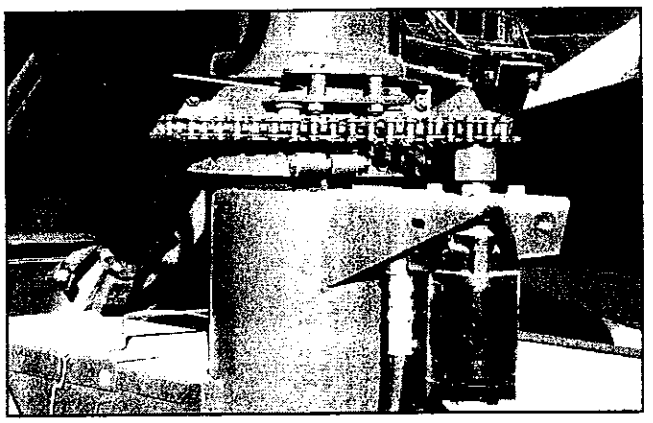


Figure 52: Hydraulic swing adjustment (shield removed for clarity).

1. Loosen the four hydraulic motor bolts and remove the #60 chain.
2. Wrap #60 chain completely around 55 tooth split sprocket. Inspect the chain matching sprocket teeth in the two areas where the sprocket is split. If the rollers on the chain do not seat into the root of the sprocket teeth, loosen 10 bolts holding sprocket to upper ring; holding the chain across split areas retighten holts so the chain properly seats into sprocket teeth.
3. Retighten the hydraulic motor bolts, check alignment of sprocket. If out of linc, loosen set screws on the 10 tooth sprocket and realign.
4. Reinstall #60 chain and tension. Reinstall shield.
5. Adjust spring tension (see arrow in Figure 52) to be sure auger will slip if it hits something solid. If it doesn't slip, damage to discharge could occur.

Lift Assist Spring Adjustment

The lift assist spring may loose tension after excessive usage. It is important to keep proper tension on the spring, this spring helps ease raising and lowering the discharge auger. Adust the spring tension by removing bolt in hole and moving to the hole shown in Figure 53.

Positioning The Unloading Auger To Opposite Side Of Machine

To change to the opposite side, lift the unloading auger until it is straight up and comes down the opposite side. Rotate the hood downward. Move the saddle to the opposite side of the mixing tank.

An unloading auger swivel stop (see Figure 54) prevents the unloading auger from contacting the mixing tank when moved 180° from the storage position. Relocate the swivel stop so it contacts the bracket before unloading auger contacts the tank.

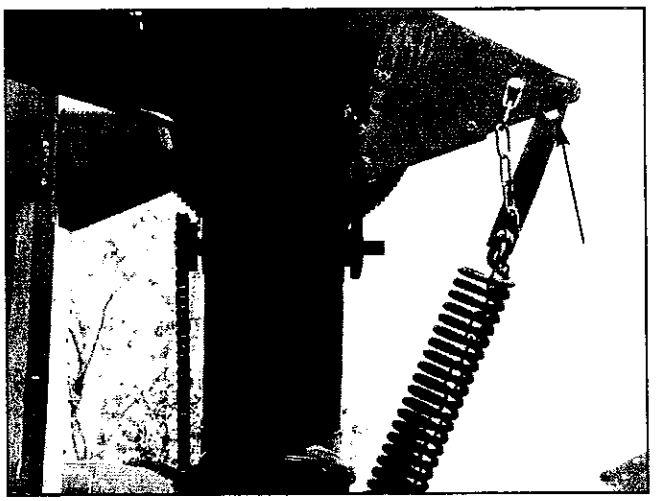


Figure 53: Lift assist spring.

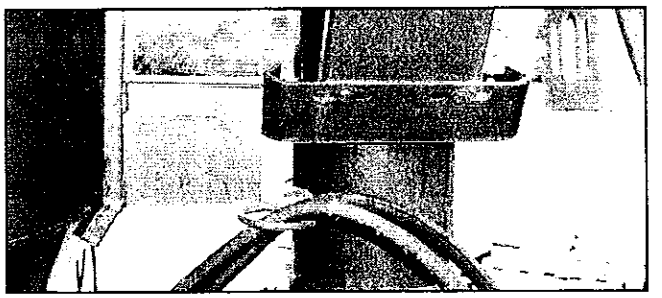


Figure 54: Swivel Stop.

Swivel Stop Adjustment

Adjust bracket so it contacts before unloading auger contacts the tank.

Open & Closed Hydraulics

As standard, this machine is equipped for tractor "Open Center" hydraulic operation.

If operation of the auger feeder is to be with a tractor that is equipped with a closed center hydraulic system, revision to the plumbing at the control valve bypass should be made. Refer to the tractor operators manual or consult the dealer to make sure which system the tractor has (see Figure 55, page 24).

To convert to "Closed Center" hydraulic system revise as shown in Figure 55, page 24. If the system has two control valves for auger feeder and roll feed, change only at roll feed flow control valve (see as shown). When revised for "Closed Center" operation, do not use on tractor with "Open Center".

GRINDER MIXER ADJUSTMENTS

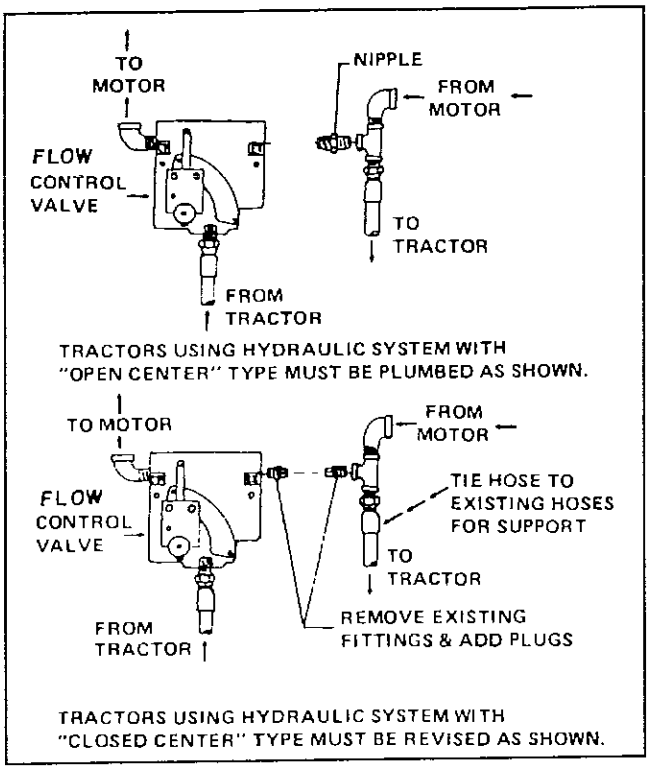


Figure 55: Open and closed hydraulic systems.

For converting to "Closed Center" do the following:

At the control valve upper right corner, disconnect hoses from the motor and tractor from the tee and elbow: remove the nipple. Install plugs in the valve and tee where the nipple was removed. Reconnect the hoses to the tee and elbow. Tie the hoses together for support. If equipped with hydraulic roll feed, do not change control valve for auger feed, but control valve for roll feed (see Figure 55).

Wheel Bearings

Raise and securely block the frame so that the wheel turns freely. Be sure to block wheel on opposite side. To tighten wheel bearing, remove the hub cap. Then remove the cotter pin from the slotted nut and tighten the slotted nut while turning the wheel. Then loosen or back off the nut to the nearest slot and insert and spread cotter pin.

There should be a slight drag on the bearing. following the adjustment. Replace hub cap (see Figure 56).

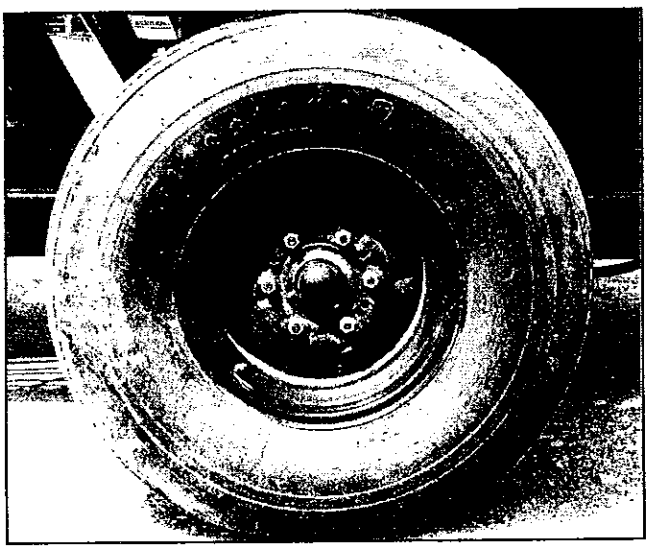


Figure 56: Wheel bearing adjustment.

LUBRICATION

For other lubrication see the section that may apply to your grinder mixer "Service and Lubrication: Self-Contained" page 36.

CAUTION: Before lubricating, make sure tractor engine is shut off, place key in your pocket and disconnect implement input driveline.

The grinder mixer is designed to require a minimum amount of lubrication, however, the points that are to be lubricated should be serviced regularly at the intervals listed.

Keep your supply of lubricating oil and grease stored in clean containers and covered to protect from dust and dirt.

Keep the lubricating gun nozzle clean and wipe dirt from grease fittings before lubricating.

PTO Driveline

Grease the bearing crosses, zerk on the sliding shaft (see Figure 57 and 58) every 20 hours.

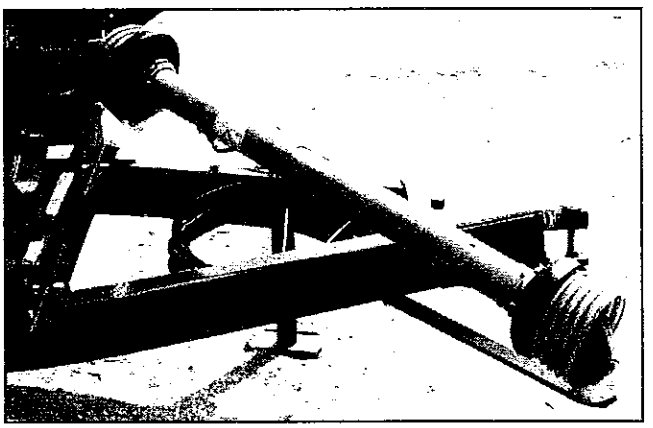


Figure 57: PTO driveline (shield removed for clarity).

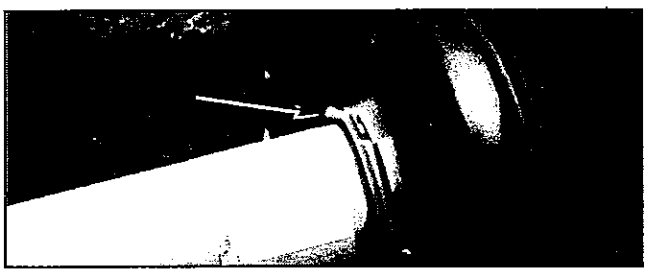


Figure 58: Plastic Shaft Bearings.

Hammermill Shaft Bearings

Grease front and rear pillow block bearings on the Hammermill cylinder shaft (see Figure 59 and 60) weekly or every 10 hours of operation with SAE multi-purpose type grease.

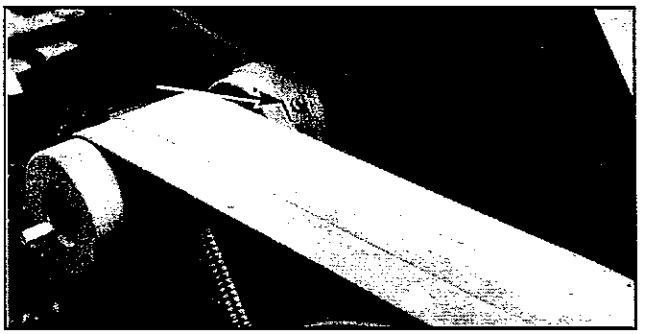


Figure 59: Cylinder shaft bearings (first bearing) (shields removed for clarity).

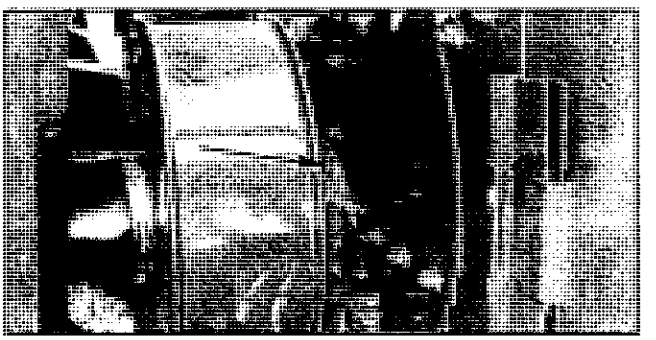


Figure 60: Cylinder shaft (shields removed for clarity).

Hammermill Engaging Pin

Periodically oil the sliding pin which engages the large Hammermill drive pulley. Use a light engine oil for lubrication (see Figure 61).

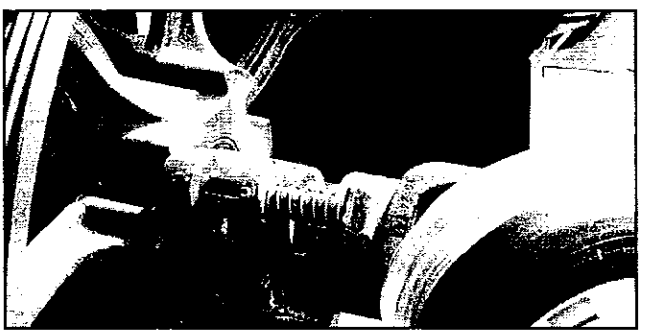


Figure 61: Hammermill Engaging pin (shields removed for clarity).

Drive Shaft Bearings

Grease the pillow block hearings, front and rear bearings, (see Figure 62, page 26) on the hammermill jack shaft and one pillow block bearing, (see Figure 63, page 26) on lower line shaft monthly or every 25 hours of operation with SAE multi-purpose type grease.

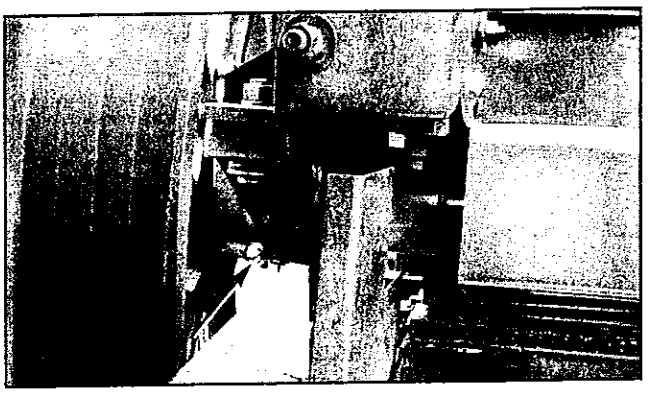


Figure 62A: Jack shaft front bearing (front) (shields removed for clarity).

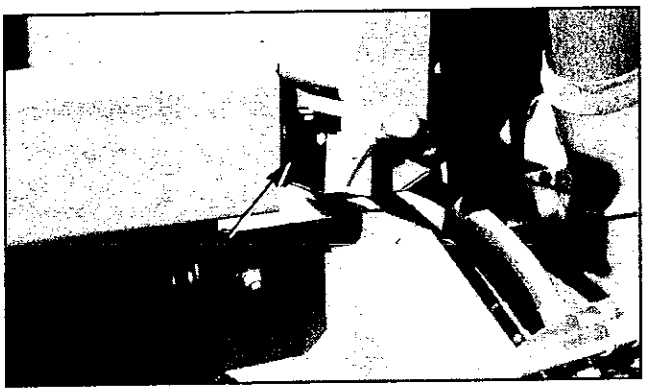


Figure 62B: Jack shaft front bearing (rear) (shields removed for clarity).

Figure 63A: Mixer drive shaft bearing (front).

Figure 63B: Mixer drive shaft bearing (rear).

Chains

Chains should be lubricated at frequent intervals. Apply a light engine oil to the chain. Oil the chain on the inside (upper side of lower strand) (see Figure 64).

Chains should be cleaned regularly. Take the chains off and clean them well by soaking and dipping them in kerosene. Dry well and oil thoroughly.

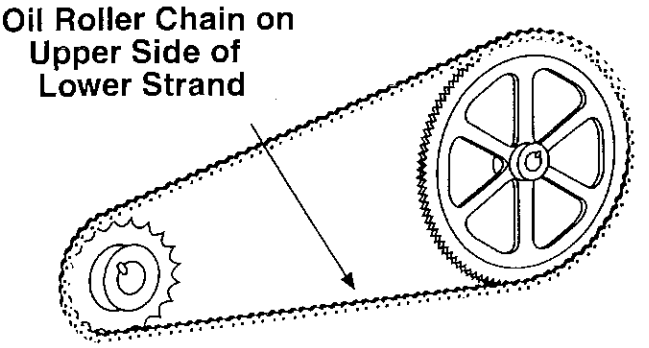


Figure 61: Oiling roller chains.

The split end of the chain clip must face the direction opposite the chain travel. Be sure the clip is properly seated in the groove on the ends of the pin (see Figure 65).

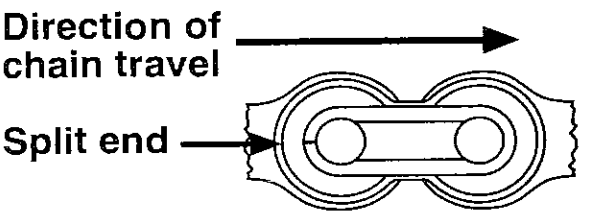


Figure 65: Chain spring clip.

Gearbox

Check the oil level in the gearbox at the base of the mixing tank every 6 months by removing check plug at front of the gearbox. Add SAE 90 weight gear oil if necessary, until oil runs out of check hole (see Figure 66). *DO NOT OVERFILL.*

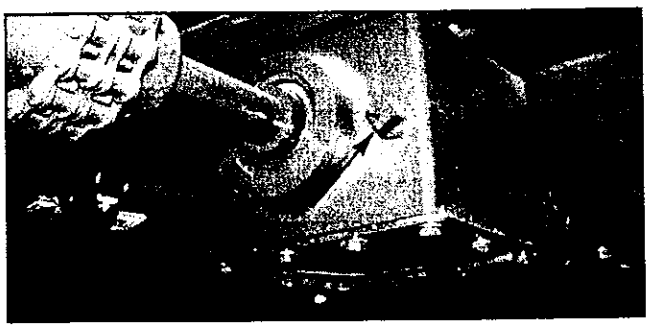


Figure 66: Gearbox lubrication.

LUBRICATION

Lower Vertical Mixing Auger

Refill the grease seal at the bottom of the vertical mixing auger every six months with SAE multi-purpose type grease. Access to this fitting is through the clean-out door in the mixing tank cone, under the large bottom flight of the mixing auger (see Figure 67).

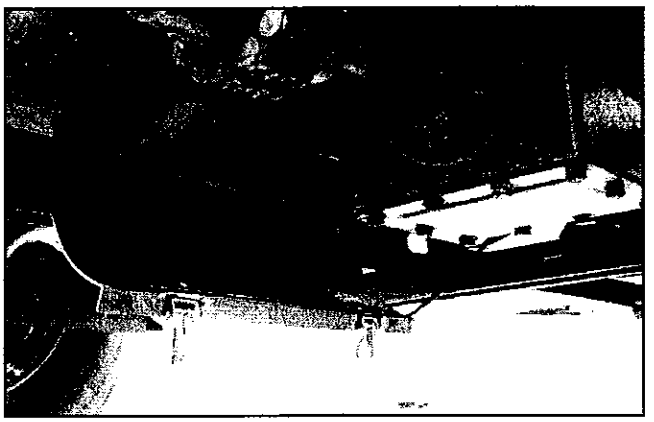


Figure 67. Clean-out door located under right side of tank assembly.

Upper Vertical Mixing Auger

Grease the upper vertical mixing auger brass bearing weekly or every 10 hours of operation with SAE multi-purpose type grease. Access to this bearing is through the top of the mixing tank (see Figure 68).

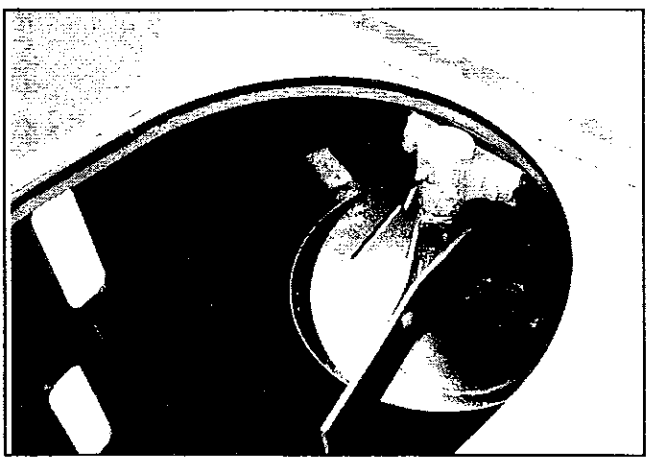


Figure 68: Vertical mixing auger brass bearing.

Unloading Auger Clutch

Apply SAE multi-purpose type grease to the shaft and groove in the under sliding (driven) unloading auger clutch half periodically (see Figure 69).

Figure 69: Unloading clutch operation.

Swivel Clamp

Grease lower swivel clamp weekly (see Figure 70).

Elbow

Periodically lubricate gear sets at each unloading auger transfer point. Use SAE multi-purpose type grease (see Figures 71 and 72, page 28) every 20 hours.

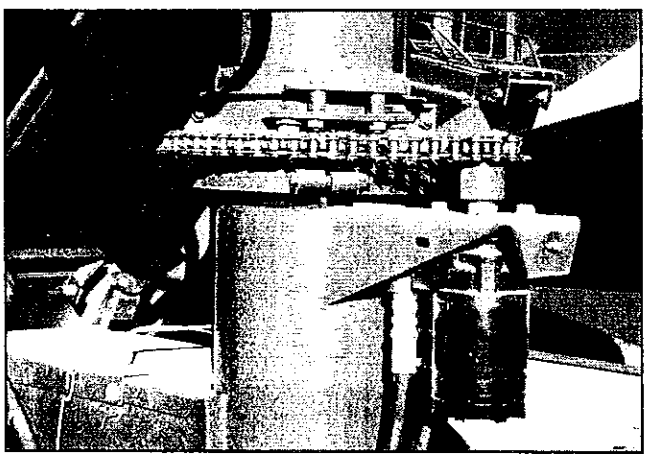


Figure 70: Swivel clamp area, discharge auger (shield removed for clarity).

Figure 71: Discharge auger bevel gears (inner elbow) (shields removed for clarity).

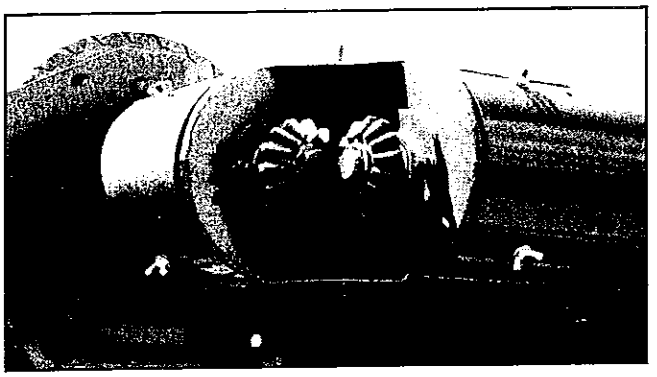


Figure 72: Discharge auger bevel gears (outer elbow) (shields removed for clarity).

Ring And Worm Gear

Grease at two locations on large ring gear on unloading auger and apply grease at ring gear and worm gear periodically. Use SAE multi-purpose type grease. Also every 6 months repack 3/4" dia. bearings on worm shaft (see Figure 73, page 28).

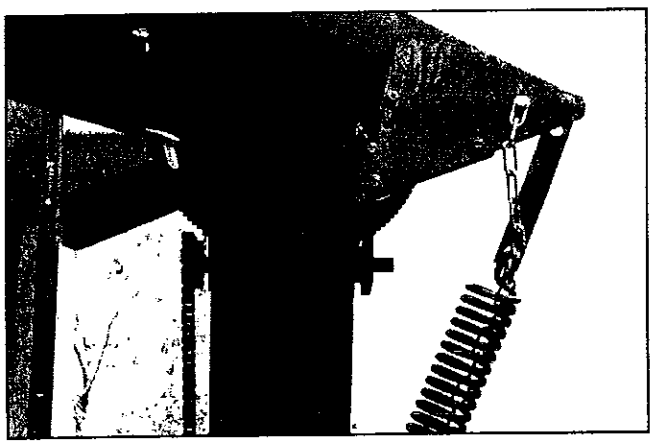


Figure 73: Ring and worm gear - mechanical

On units with hydraulic controlled back auger, keep the worm gear reservoir filled with oil up to the worm shaft (units shipped dry). Use SAE 90 weight gear oil. Check periodically for leaks which could run reservoir dry (see Figure 74). Grease lubrication fittings and outside diameter of ring gear with multi-purpose grease every 10 hours of operation (see Figure 75).

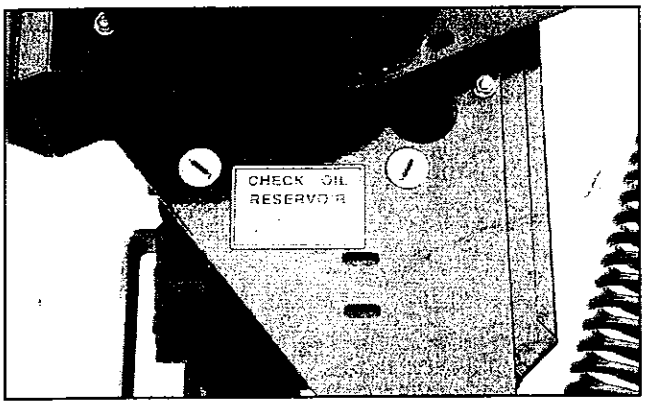


Figure 74: Ring and worm gear hydraulic.

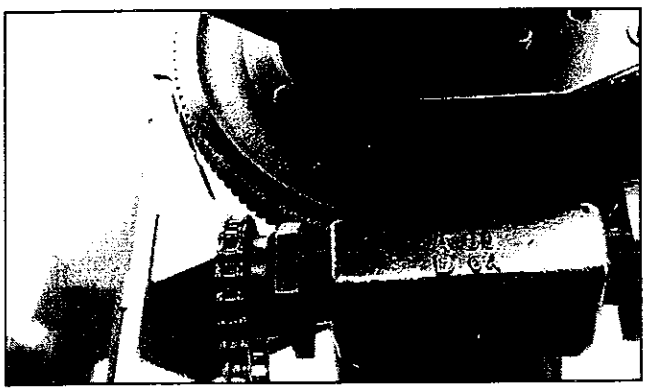


Figure 75: Outside diameter of ring gear.

Wheels

Repack the wheel bearings once a year or every 100 hours of operation with SAE multi-purpose type grease.

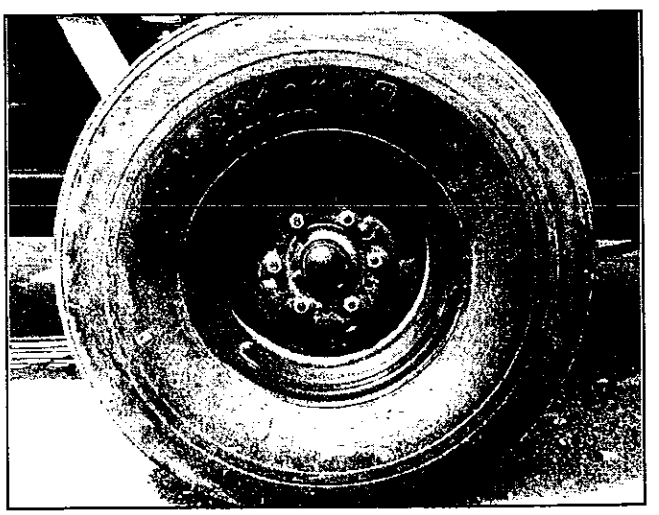


Figure 76: Wheel bearing lubrication.

SERVICE

CAUTION: Disengage all drives, shut off tractor engine and place key in pocket and disconnect PTO driveline before servicing grinder mixer.

SIZE	CLAMP LOAD	PLAIN	PLATED
1/4 - 20(.250)	2,025	8 ft. lbs.	76 in. lbs.
5/16 - 18(.3125)	3,338	17 ft. lbs.	13 ft. lbs.
3/8 - 16(.375)	4,950	31 ft. lbs.	23 ft. lbs.
7/16 - 14(.4375)	6,788	50 ft. lbs.	37 ft. lbs.
1/2 - 13(.500)	9,075	76 ft. lbs.	57 ft. lbs.
9/16 - 12(.5625)	11,625	109 ft. lbs.	82 ft. lbs
5/8 - 11(.625)	14,400	150 ft. lbs.	112 ft. lbs.
3/4 - 10(.750)	21,300	266 ft. lbs.	200 ft. lbs.
7/8 - 9(.875)	29,475	430 ft. lbs.	322 ft. lbs.
1 - 8(1.00)	38,625	644 ft. lbs.	483 ft. lbs.
1-1/8 - 7(1.125)	42,375	794 ft. lbs.	596 ft. lbs.

Figure 77: Torque specification guide.

Shear Plates

The shear bolts make a loud noise when they shear. This is your warning to turn off the tractor ignition immediately and determine the cause of the shearing.

When replacing the shear bolts, always tighten them securely, using lock nuts. The shear bolts must be of the correct hardness: Grade 5 (3 radial dashes) or Grade 2 (plain head) (see Figure 78).

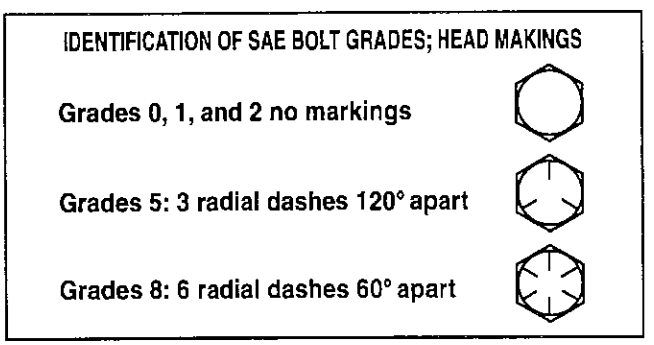


Figure 78: SAE bolt identification.

Sprocket & Chain Alignment

Be sure the sprockets are in line of the shafts. If the sprockets are not aligned, a side pull develops which concentrates the load on the sides of the sprocket teeth and on the side of the chain. This faulty alignment results in excessive wear on both chain and sprockets (see Figure 80 for alignment).

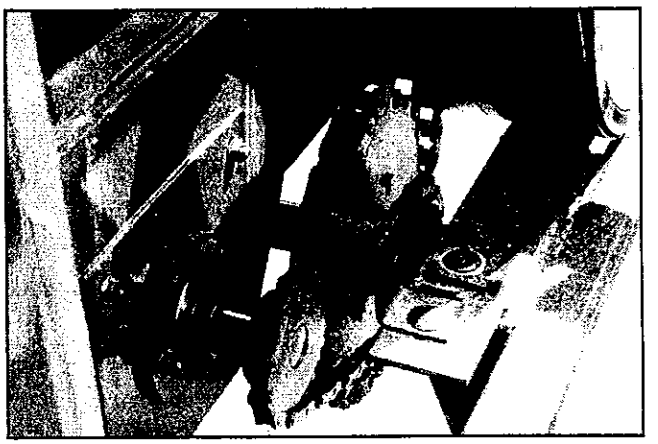


Figure 79: Mixer/supplement hopper drive shear sprockets (shields removed for clarity).

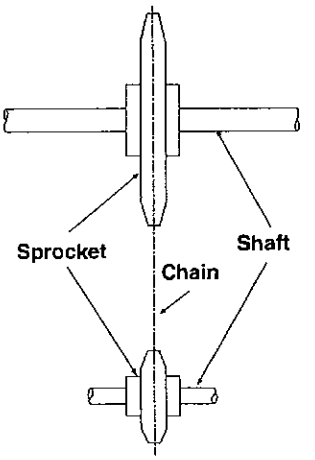


Figure 80: Sprocket alignment.

Replacement Of Worn Or Damaged Hammers

Hammers must be replaced in pairs to maintain balance. This is done by replacing the hammers opposite each other (180° apart) with a matched pair.

Reversing The Hammers

CAUTION: Be sure hammermill has stopped rotating before opening hammermill door. Shut off tractor engine, disengage all drives and place key in your pocket.

There are four rows of hammers in the rotor assembly with a total of 36 hammers on the 20" hammermill (see Figure 81, page 30). There are also four rows of hammers in the rotor assembly with a total of 48 hammers on a 26" hammermill. (See Figure 82, page 30). The hammers are reversible, but always replace hammers and spacers in the exact sequence that they

are removed to preserve the balance of these specially matched units. All four corners can be used on each hammer.

To remove the hammers, remove the bolts from the side of the mill and round plate (see Figures 83 and 84). Remove the pins from each end of the rod and pull rods out, making sure that the hammers are put back in the same place from which they were removed (see Figures 81 and 82).

Do not pull more than one rod at a time to avoid mix-up. Serious vibrations will occur if hammers are replaced in wrong positions. (See Figures 81 and 82 for proper hammer spacing on each of the four shafts.)

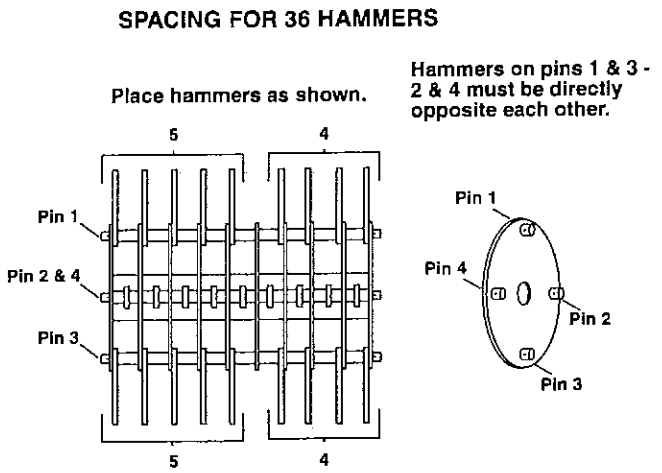


Figure 81: Proper hammer spacing (20" hammermill).

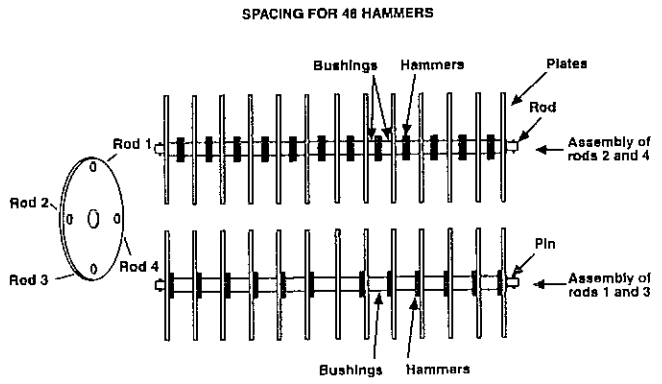


Figure 82: Proper hammer spacing (26" hammermill).

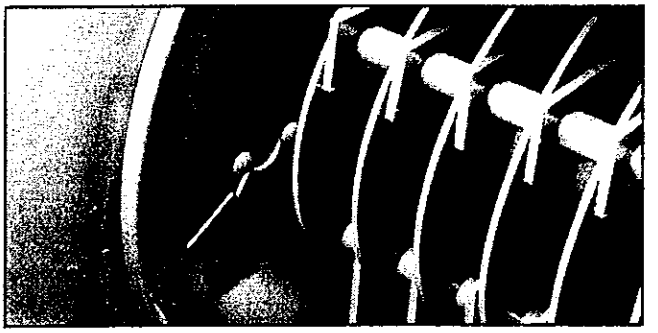


Figure 83: Hammer removal (inside hammermill, hole to remove hammermill rods)(shields removed for clarity).

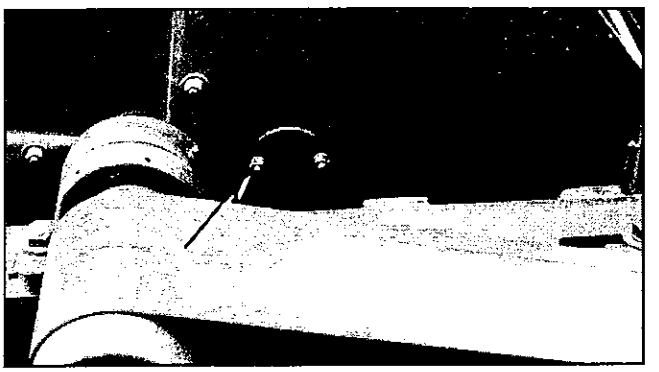


Figure 84: Hammermill removal hole (plate to be removed) (shields removed for clarity).

Main Drive Belt Replacement

To remove the drive belts, loosen bolts at location B & C (see Figure 85). Relieve the belt tension by loosening bolts at location A.

After the tension is off the belts, remove belts and replace with the new set and proceed as described in adjustments section. Be sure to align pulley and sheave.

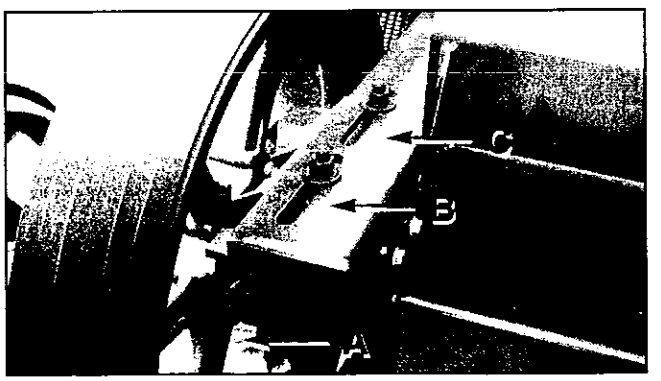


Figure 85: Belt removal (shields removed for clarity).

TROUBLESHOOTING

Most difficulties are caused by improper adjustments. When you encounter trouble, make a systematic check of all adjustments, using the following chart as a guide. If the difficulties cannot be corrected by making the adjustments given in this manual, consult your dealer.

Trouble	Possible Cause	Possible Remedy
PTO driveline hard to telescope and hook-up.	Shafts twisted due to overloading of mill.	Replace PTO driveline. if necessary. Load as uniformly as possible and adjust belts to prevent slipping. 1000 rpm recommended over 100 hp.
	Lack of grease on sliding halves.	Lubricate.
Mill vibrates excessively while operating.	PTO driveline not aligned.	Front of grinder mixer main shield must be parallel to tractor axle.
	PTO driveline bent.	Replace PTO driveline.
	Missing or broken hammers.	Replace hammers (in pairs).
	Tractor drawbar improperly adjusted.	Adjust tractor drawbar as shown on page 11.
Excessive noise when turning with mixer in operation.	Turning too sharply.	Avoid sharp turns.
Low volume from hammermill	Hammermill not operating at optimum speed.	Before grinding, set tractor throttle to obtain rated PTO speed (540 or 1000 rpm).
	Hammermill screen may be worn.	Turn screen around or replace if necessary.
	Hammers worn. Hammermill not level.	Reverse or replace. Operate mill as near level as possible.
	Mill drive belts slipping.	Adjust drive belts.
Tractor engine rpm falls below rated PTO speed while grinding.	Overfeeding. Screen size too small. Feed gate too high. Drive belts too loose.	Reduce flow of material to mill. Increase screen size. Lower gate. Tighten belts.
Drive belt squeals when mill is engaged.	Drive belts too loose.	Tighten belts.
Drive belts wear excessively.	Belts out of alignment. Belts slipping.	Align pulleys. Adjust belts.
Material bridges in tank.	High-moisture content ear corn or hay being ground.	Grind high-moisture ear corn last or run straight through tank. Use smaller screen or add more grain with hay.
Feed roll will not draw hay slice into mill.	Feed roll too low.	Raise feed roll. Adjust hay retard bolts.

TROUBLESHOOTING

Trouble	Possible Cause	Possible Remedy
Mill runs but unloading auger and mixing auger do not run.	Pin(s) sheared in drive.	Correct cause of sheared pin and replace.
Unloading auger runs but feed is not unloading.	Mixer tank door closed.	Open door.
Unloading auger does not engage.	Unloading auger clutch linkage out of adjustment.	Adjust clutch linkage.
	Clutch sticking.	Engage clutch.
Auger feeder stops when mill is engaged.	Hydraulic flow control valve disengaged.	Engage flow control valve.
	Selector valve position.	Change position of selector valve (out for auger feeder).

SELF-CONTAINED: INTRODUCTION

This section of the manual has been prepared to acquaint you with the proper operation, adjustment, lubrication and service of the Art's-Way Self-Contained Hydraulic Option. Take time to read and understand both this manual and efficient operation of your portable unit. The best insurance from an accident is a careful and knowledgeable operator.

Some pictorials used show guards and shields removed for easy identification. Be sure that all shields and guards are in place before operating. These are for your protection.

The Self-Contained Hydraulic system features a hydraulically driven discharge positioning lift and swing, and an auger feeder with or without roll feed. Also available are electric linear actuators used to operate the discharge door and clutch. All controls, except for the auger feeder control valve, are within easy access to the operator.

This system can be used with any tractor that can maintain a rated PTO speed when grinding. There is no hydraulic connection between the mixer and the tractor. The tractor must also provide a minimum of 12-15 volts DC and 20 amperes to operate the electrical activated flow control valve and linear actuator.

WARNING: Because the operator is allowed to operate the system without leaving the tractor, special care is needed to avoid injury or damage. When locating the discharge tube into position, stay clear of overhead power lines, farm buildings and anyone in the area.

SELF-CONTAINED: PREPARING FOR OPERATION

Prepare the grinder mixer and tractor as instructed in the grinder mixer sections of this manual. Additional preparation is needed to operate the self-contained option.

WARNING: When preparing tractor and grinder mixer for operation, make sure PTO is disengaged, tractor engine is shut off and place key in your pocket.

Preparing The Tractor

The tractor must be equipped with a 1000 rpm PTO to match the grinder mixer. Make sure the proper PTO is used. The pulley 12-5/6" diameter for 1000 rpm drive on hammermill applications. Self-contained is only available on 1000 rpm machines.

Install control box in cab of tractor using mounting bracket provided. Connect the power cord to a suitable 12 VDC power supply. The tractor must be able to provide 12 - 15 volts DC and 20 ampere to operate the electrical activated control valve. See Figure 86 for direct connection to battery.

NOTE: *The electrical system of the tractor must be in good working order. If a voltage of less than 12.0 volts DC is provided to the actuator or solenoids on hydraulic control valves, the system will not operate properly. There is a 20 amp fuse mounted on the tractor control box to provide overload protection.*

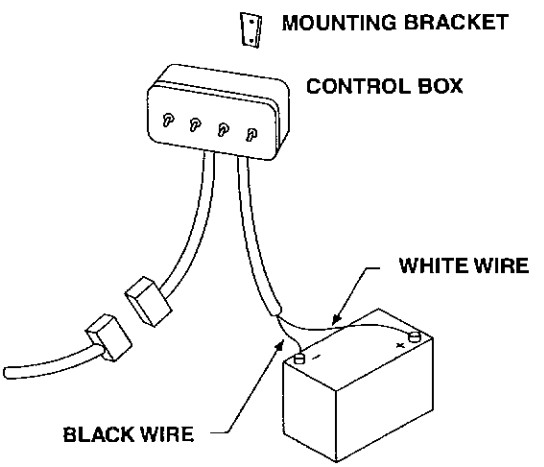


Figure 86: Control Box Installation.

Preparing The Grinder Mixer

Electrical Components

Connect tractor control box to machine with plug provided.

Activate electric linear actuator to engage clutch. It will ratchet when actuator is fully retracted and at this point the clutch should be fully engaged. Clutch arm should be loosely riding in the groove of the clutch.

Adjustment can be made in rear mounting bracket by loosening bolts and sliding actuator assembly to the desired setting.

Hydraulic Components

Check all connections and fittings for oil leaks.

Check oil level in reservoir. Oil level should be maintained 2 - 3 inches below top reservoir.

Adjustable valves to control the rate of swing are located near hydraulic motor. For a faster swing, turn valves to a higher number. Set both valves at approximately the same setting.

Run grinder mixer at low rpm for 5 - 10 minutes. During this time, activate all hydraulic motors (auger feed, lift & swing, roll feed) to insure that air is removed from the system.

Recheck all hydraulic connections and fittings for leaks.

Recheck oil level reservoir.

SELF-CONTAINED: OPERATION

CAUTION: Always operate PTO at speed for which the machine is equipped; 1000 rpm. Note the speed decal on the front shield.

The grinder mixer should be run at a slow idle for a few minutes when the temperature drops below 0° F to allow the hydraulic oil to warm up.

For information on operating the auger feeder and roll feed, if your machine is so equipped, see the "Operation of Grinder Mixer" section - pages 13 - 20, and "Attachments" section, page 38 - 39.

Lift and Swing operations are functions of the hydraulic control valve. The control valve is electrically actuated from the control boxes either in the tractor or at the rear of the grinder mixer.

Manual overrides are provided on the hydraulic control valves. This allows the operator to still operate the lift and swing in case of an electrical failure. To override the control valve, press the center of the rubber cap on the solenoid (see Figure 87).

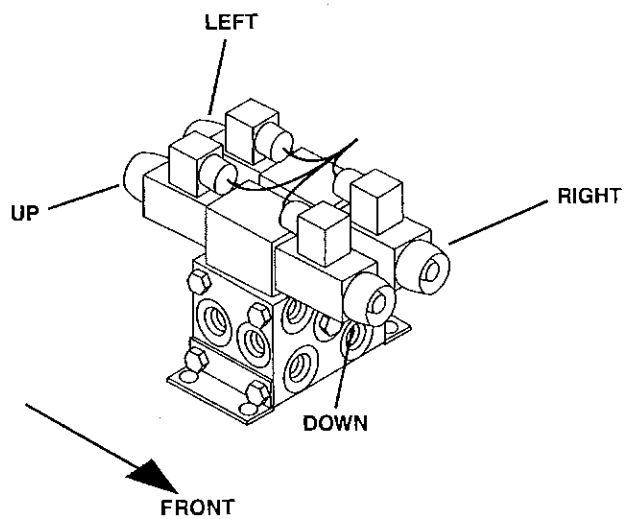


Figure 84: Valve override.

If auger feeder becomes clogged with material or foreign objects, the hydraulic motor will stall. When this occurs, the operator must disengage the tractor immediately so the pump and motor will not be damaged from excessive heat. The overloaded material and/or the obstruction must be removed before the operation can be continued.

WARNING: Before attempting to clear a blocked auger, disengage PTO, shut off tractor engine and place key in pocket. Failure to heed this warning may result in injury.

To engage the discharge auger, activate the electrical linear actuator until a "ratchet" sound is heard. This will indicate that the clutch is fully engaged. Excessive wear of the clutch teeth will result if the clutch is not fully engaged (see figure 88).

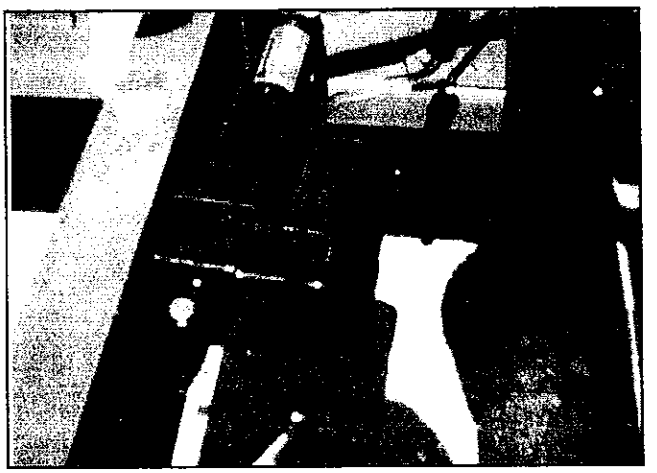


Figure 88: Discharge clutch actuator.

To operate the discharge door, activate the electrical linear actuator. The actuator will "ratchet" when the door is fully opened or closed (see figure 89).

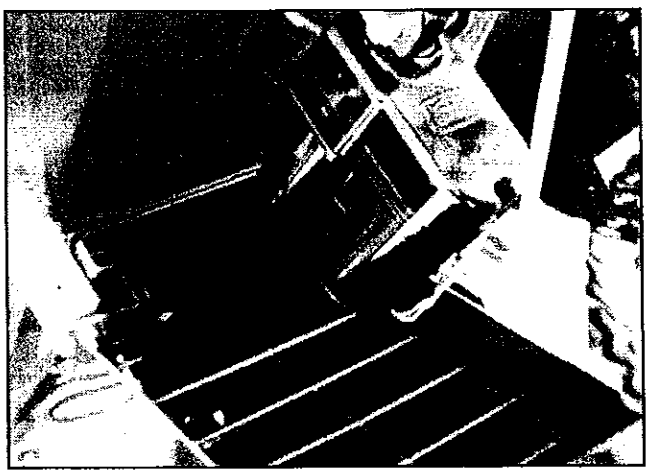


Figure 89: Discharge door actuator.

SELF-CONTAINED: ADJUSTMENT/SERVICE & LUBRICATION

CAUTION: Do not clean, lubricate or adjust your grinder mixer while it is running. Disengage PTO, shut tractor engine off and place key in your pocket before making adjustments.

Main Drive Belts

Remove coupler shield for hydraulic pump. Adjust main drive belts as shown in the Adjustment section of this manual. Adjust mounting bracket of hydraulic pump so that the sprocket on the hammermill jackshaft and sprocket on hydraulic pump are running on center. Tighten bearing and mounting bracket bolts and replace shield. Run grinder mixer slowly and observe hydraulic pump. If pump is in need of further adjustment to better align sprockets; for position of the sprockets see Figure 90. Excessive wear of chain, sprockets, and hydraulic pump will result if sprockets are not centered properly.

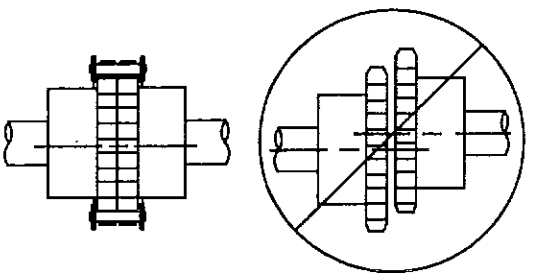


Figure 90: Sprocket Alignment.

Hydraulic Valves

All valves are preset, except for adjustable valves to control the rate of swing of the discharge auger. For a faster swing, turn valves to a higher number. One valve controls only one direction, so both may need adjustment for desired swing rate (see Figure 91).

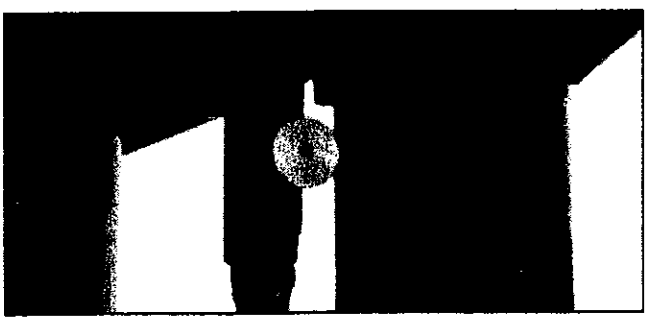


Figure 91: Hydraulic valves.

Lubrication

The chain on the pump coupling should be lubricated periodically with a light engine oil.

For other lubrication see the section of this manual beginning on page 25.

Hydraulic Filtration

The return line filter, mounted on the side of the hydraulic reservoir, traps contaminants before the oil returns to the tank. It is recommended that the element be replaced after the first 100 hours of operation and each 1000 hours or yearly (which ever occurs first) thereafter (see Figure 92).

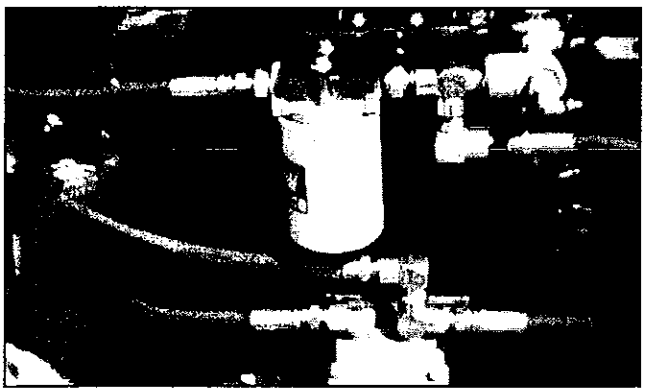


Figure 92: Reservoir filter.

A suction strainer is located in the suction port of the hydraulic tank. Periodically remove and clean it with compressed air, blowing from the inside out. If it is damaged or does not clean up well, replace it with a new strainer (see Figure 93).

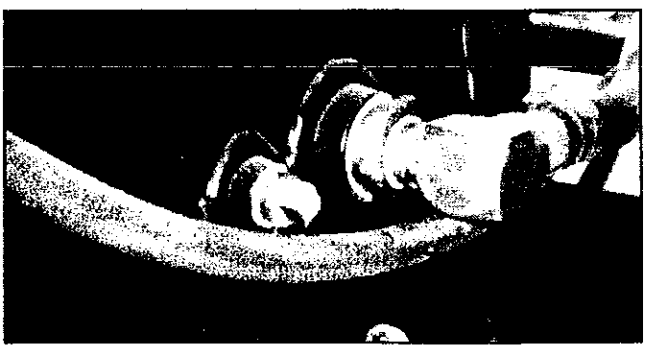


Figure 93: Strainer/Drain

Installed in the drain port of the hydraulic reservoir is a magnetic pipe plug. When hydraulic oil is changed, this plug should be removed and any metal particles removed from it (see Figure 93).

SELF-CONTAINED: ADJUSTMENT/SERVICE & LUBRICATION

Filler/Breather Filter

When adding hydraulic oil, back blow through the filler cap with low pressure air. If the filler screen is dirty, remove the ten (10) - 5/16" whiz nuts on the access cover and flush screen with solvent and allow to dry before installing. Prior to replacing the access cover, remove the old gasket material from the cover and tank, then replace gasket material using silicone blue (see Figure 94).

If lack of pressure or flow is experienced, check strainer and/or replace filter. Regular servicing of the filter and preventing contaminants from entering the hydraulic oil is the best assurance of reliable and economic operation.

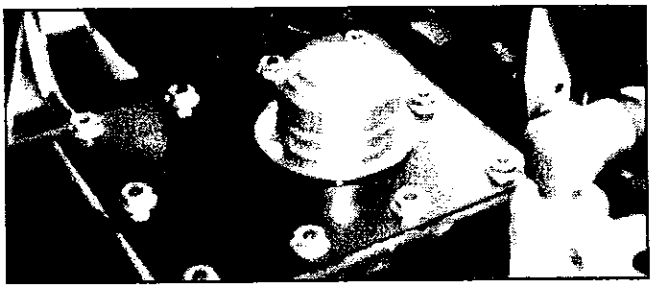


Figure 94: Hydraulic reservoir cap.

SELF-CONTAINED: TROUBLESHOOTING

Most difficulties are caused by improper adjustments. When you encounter trouble, make a systematic check of all adjustments, using the following chart as a guide. If the difficulties cannot be corrected by making the adjustments given in this manual, consult your dealer.

Trouble	Possible Cause	Possible Remedy
Discharge auger will not lift and/or swing.	Improper voltage or amperes.	Use tractor that will provide 12 - 15 volts DC and 20 amperes.
	Loose electrical connections.	Check connections to battery. Check connections from tractor to grinder. Check connections on control valve. Check for severed wires. Use manual override of complete electrical failure.
	Low hydraulic fluid level.	Fill to proper level.
	Hydraulic fluid leak.	Check all fittings for leaks.
	Faulty relief valve (Lift only).	Replace relief valve.
	Adjustable valves closed (Swing only).	Open valves.
Discharge auger will not run.	Actuator not operating.	Check electrical connections as above Tractor not providing proper voltage or current.
	Actuator out of adjustment.	Adjust actuator mount bracket.
Discharge door will not open.	Actuator not operating.	Check electrical connections as above. Tractor not providing proper voltage or current.
Hydraulic motors run slow.	Clogged filter or strainer.	Replace filter. Clean strainer.
	Low hydraulic fluid level.	Fill reservoir.
Hydraulic system runs hot.	Low fluid level.	Fill reservoir.

ATTACHMENTS

Electronic Scale Attachment

A solid state electronic scale attachment, digital type, is available for your grinder mixer. The scale attachment consist of weigh bar sensors mounted on grinder mixer's axle spindles and hitch. They are electronically connected to the indicator box. The indicator alarm system is available with the electronic scale attachment. Scale accuracies of one percent or less are obtained. Complete installation and operating instructions are included with the attachment.

Discharge Unloading Auger Extensions

3' and 6' folding and 3' to 6' bolt on discharge auger extensions are available. See chart on page 18 for unloading height obtainable with various extensions added to the unloading auger system. Refer to the Operation Section, page 18, of this manual for unloading auger instructions

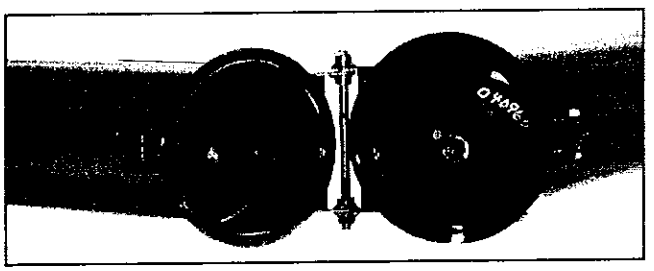


Figure 95: Folding auger extension

Screens

Screens for hammermills are available in 12 sizes ranging from 1/8" to 2" Refer to Operation Section, page 14, of this manual for screen size selection.

Hydraulic Roll Feed

The roll feed provides easier feeding of exceptionally coarse material such as ear corn, corncobs or hay. Additional protection is provided for the operator and more even particle size will be obtained (see Figure 96).

To maintain even feeding, the roll feed may be set at a desired height by using the roll feed crank. Roll feed settings will vary with the material being fed. Brief experience will indicate the best settings. Set the roll feed just high enough so that the material is being pulled smoothly.

CAUTION: Never force material into the roll feed with a stick or with hands. Be especially careful when feeding slices of hay, always allowing the roll feed to pull the hay into the mill.

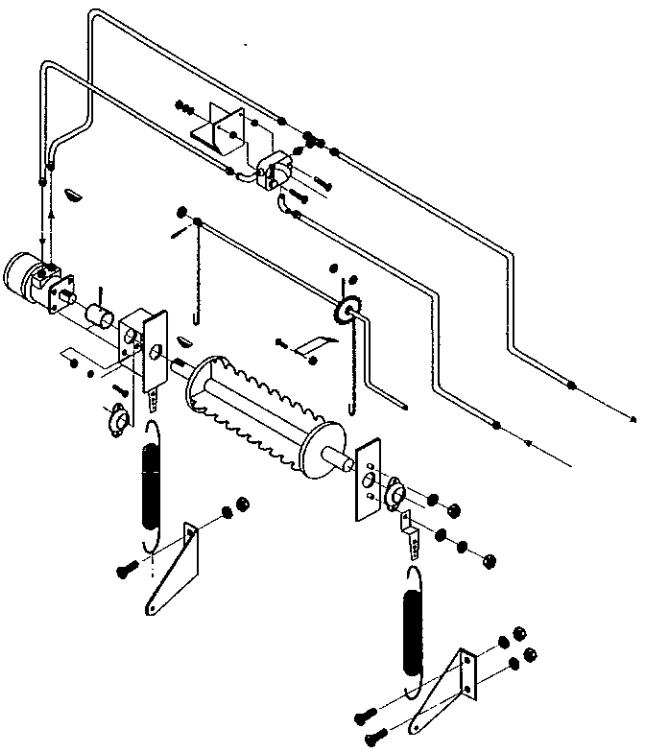


Figure 96: Roll feed (with auger feeder shown).

The hydraulic roll feed is connected in series with the hydraulic auger feeder, a separate flow control valve allows separate speed control for the roll feed. If equipped with hydraulic roll feed only, the flow control is on top of Hammermill.The crank for lowering the roll feed is to the front of the hammermill housing (see Figure 97).

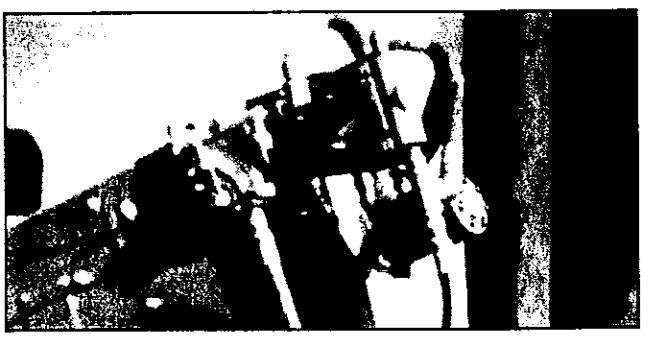


Figure 97: Roll feed and auger feeder flow control valves.

Figure 98: Hydraulic roll feed motor.

Figure 99: Roll feed crank.

Roll Feed Adjustment:

Five holes are provided at the upper end of the roll feed spring. Roll feed tension can be changed as desired. Generally, the top hole is used for hay (see Figure 99).

If the roll feed does not crank up straight, check the cables at each side of the roll feed to see if they are both uniform on the roll feed crank shaft.

Cable lengths can be adjusted by loosening the nut with special cable washer and retighten after cables have been equalized.

SPECIFICATIONS

Grinder Mixers

Tank and Frame	PM25	PM35
Capacity of mixing tank:	105 bu. (129 cu. ft.)	150 bu. (187 cu. ft.)
Height (variable with tire size):	106"	119"
Width without auger feeder:	95"	111"
Overall length:	170"	175"
Weight	3,540 lbs.	4,400 lbs.
Discharge Auger		
Auger diameter:	7"	7"
Auger tube diameter:	8"	8"
Horizontal operating arc:	324°	316°
Vertical operating arc:	Infinite	Infinite
Auger Feeder		
Auger length:	100"	100"
Auger diameter:	10"	10"
Hopper width open:	43"	43"
Height of hopper from ground in down position:	16-1/2"	16-1/2"
Height of hopper from ground in up position:	51"	60"
Mixing Auger		
Auger width:	12"	12"
Mixing base:	24"	24"
Supplement Hopper:		
Auger diameter	7"	7"
Hopper size:	21" x 24"	21" x 24"
Height from ground:	34"	39"
Hammermills		
Tank and Frame	20"	26"
Width of mill:	Full 20"	Full 26"
Screen area:	600 sq. in.	780 sq. in.
Operating speed:	540rpm	540 or 1000 rpm
Operating speed of mill:	2800 - 3000 rpm	2800 - 3000 rpm
Screen sizes available:	1/8", 5/32", 3/16", 1/4", 3/8", 1/2", 5/8", 3/4", 1", 1-1/4", 1-1/2" & 2"	1/8", 5/32", 3/16", 1/4" 3/8", 1/2", 5/8", 3/4", 1", 1-1/4", 1-1/2" & 2"
Type drive:	Six double banded 3V belts for 540 rpm	Six double banded 3V belts for 540 or 1000 rpm
Power required:	40 to 100 hp	80 to 150 hp

SPECIFICATIONS

Self-Contained

PUMP (1000 RPM)

Type: Gear Driven - Positive Displacement
Displacement: 2.00 cu. in. per revolution
Flow (GPM): 8.65 gallons per minute at 1000 RPM
Input hp Required: 11.9 hp at 2000 psi
Pressure: 3000 psi

HYDRAULIC RESERVOIR

Type: Fabricated pickled and oiled steel
Capacity: 12.5 gallons
Ports: Suction: 1-1/2" NPT
Return: 3/4" NPT
Drain 3/4" NPT

FILTERS/STRAINERS/BREATHERS

Tank Mounted Suction Strainer

Flow Capacity: 15 GPM
Style: Suction Type
Screen Size: 100 Mesh
Thread Size: 1-1/2" NPT Male
1" NPT

Tank Mounted Filler Breather

Breather Filler: 40 Micron
Strainer Basket: 30 Mesh

Return Line Filter

Filtration: 10 Micron
Flow: 20 GPM
Internal Bypass: Relieves at 15 psi differention
Ports: 3/4" NPT

HYDRAULIC MOTORS

Auger Feeder and Lift

Type: Gear, low speed high torque
Displacemeut: 12.0 cu. in. per revolution
Flow: 9 gpm maximum
Pressure Rating: 1500 psi continuous, 2000 psi intermittent
Ports: 1/2" NPT

Swing

Type: Gear. low speed high torque
Displacement: 20.0 cu. in. per revolution
Flow: 12 gpm continuous, 15 gpm maximum
Pressure Rating: 1000 pos continuous, 1400 psi intermittent
Ports: 1/2" NPT

VALVES

Directional Valve Assembly: Consisting of (2) DO3 Solenoid operated 4 way 3-Opposition valves mounted on a common manifold.

Valves

Type: DO3 4-way 3 position
Solenoids: 12V Electric
Flow: System design 4 gpm, maximum 20 gpm
Pressure Drop: 20 psi @ 4 gpm, 150 psi @ 20 gpm
Misc.: Manual overrides on each solenoid

Manifold

Type: Series
Material: Aluminum
Porting: P & T 7/8"-14 SAE "O" Ring
A & B 3.4"-16 SAE "O" Ring
Gauge 7/16"-20 SAE "O" Ring

Flow Control

Construction: Brass
Maximum Working Pressure: 2000 psi
Flow (maximum): 8 gpm
Porting: 3/8" NPT

Flow Divider

Flow: 2-14 gpm
Controlled Flow: Preset at 4 gpm
Pressure: 3000 psi maximum
Ports: 1/2" NPT

System Relief

Relief Setting: 2000 psi
Flow: 30 gpm
Ports: 1/2" NPT

Dual Relief (Lift)

Maximum Pressure 3000 psi
Preset Pressure: 800 psi
Ports: 1/2" NPT

Adjustable Flow Control

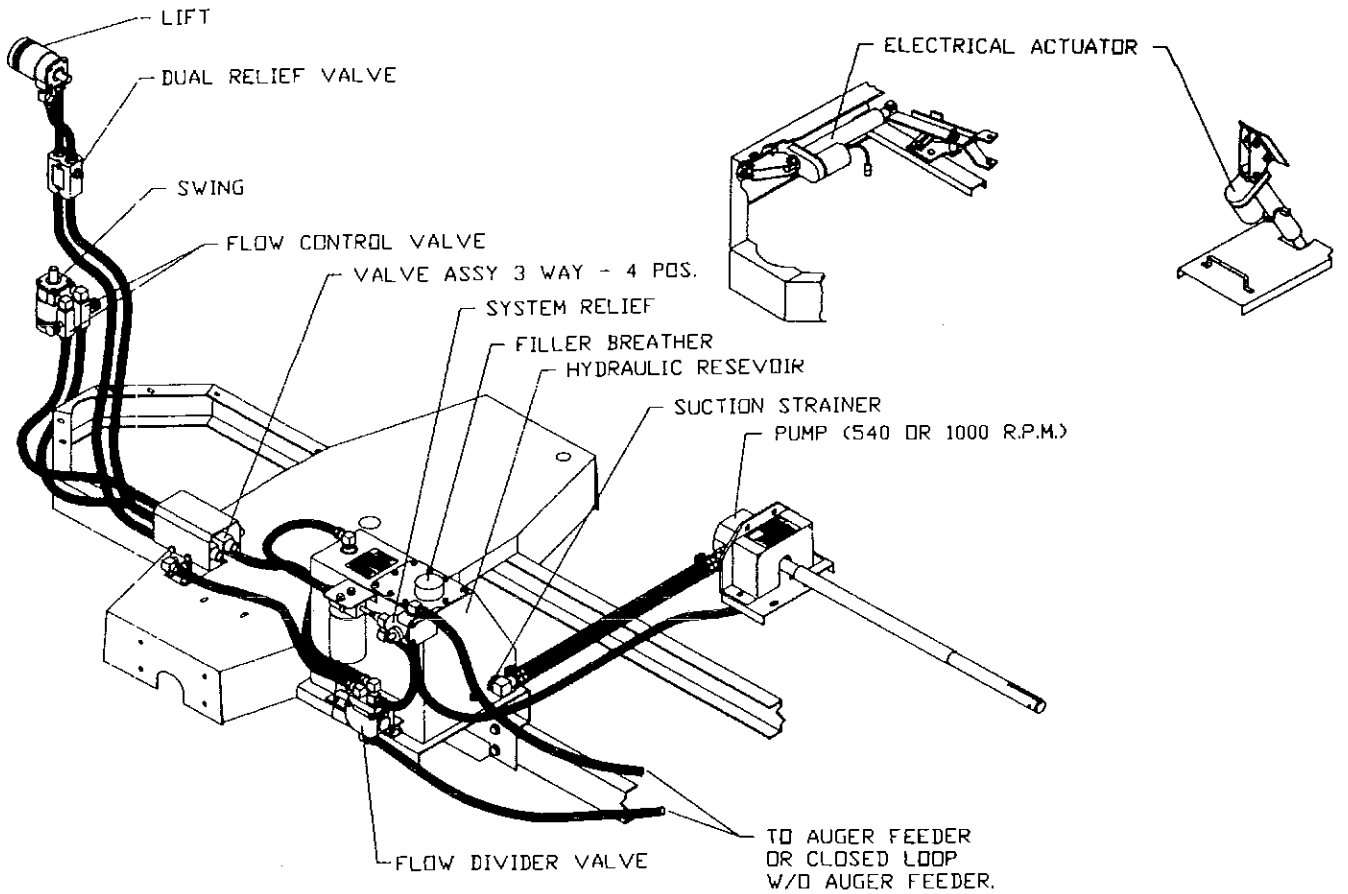
Flow Range: 0-16
Maximum Pressure: 3000 psi
Ports: 1/2" NPT

ELECTRICAL ACTUATORS

Type: 12 Volt DC
Load Rating: 250 lbs.
Stroke: 8"
Overload Protection: Ball detent overload clutch
Drive: Acme screw thread

SPECIFICATIONS

Self-Contained



Torque specification guide.

SIZE	CLAMP LOAD	PLAIN	PLATED
1/4 - 20(.250)	2,025	8 ft. lbs.	76 in. lbs.
5/16 - 18(.3125)	3,338	17 ft. lbs.	13 ft. lbs.
3/8 - 16(.375)	4,950	31 ft. lbs.	23 ft. lbs.
7/16 - 14(.4375)	6,788	50 ft. lbs.	37 ft. lbs.
1/2 - 13(.500)	9,075	76 ft. lbs.	57 ft. lbs.
9/16 - 12(.5625)	11,625	109 ft. lbs.	82 ft. lbs
5/8 - 11(.625)	14,400	150 ft. lbs.	112 ft. lbs.
3/4 - 10(.750)	21,300	266 ft. lbs.	200 ft. lbs.
7/8 - 9(.875)	29,475	430 ft. lbs.	322 ft. lbs.
1 - 8(1.00)	38,625	644 ft. lbs.	483 ft. lbs.
1-1/8 - 7(1.125)	42,375	794 ft. lbs.	596 ft. lbs.

SAE bolt identification.

IDENTIFICATION OF SAE BOLT GRADES; HEAD MAKINGS

Grades 0, 1, and 2 no markings

Grades 5: 3 radial dashes 120° apart

Grades 8: 6 radial dashes 60° apart

NOTES

NOTES