

Shivers

CIRCU-LATOR JR.

INSTALLATION MANUAL

Shivers

614 W. ENGLISH • P.O. BOX 467
CORYDON, IA 50060
515-872-1005

P-10415

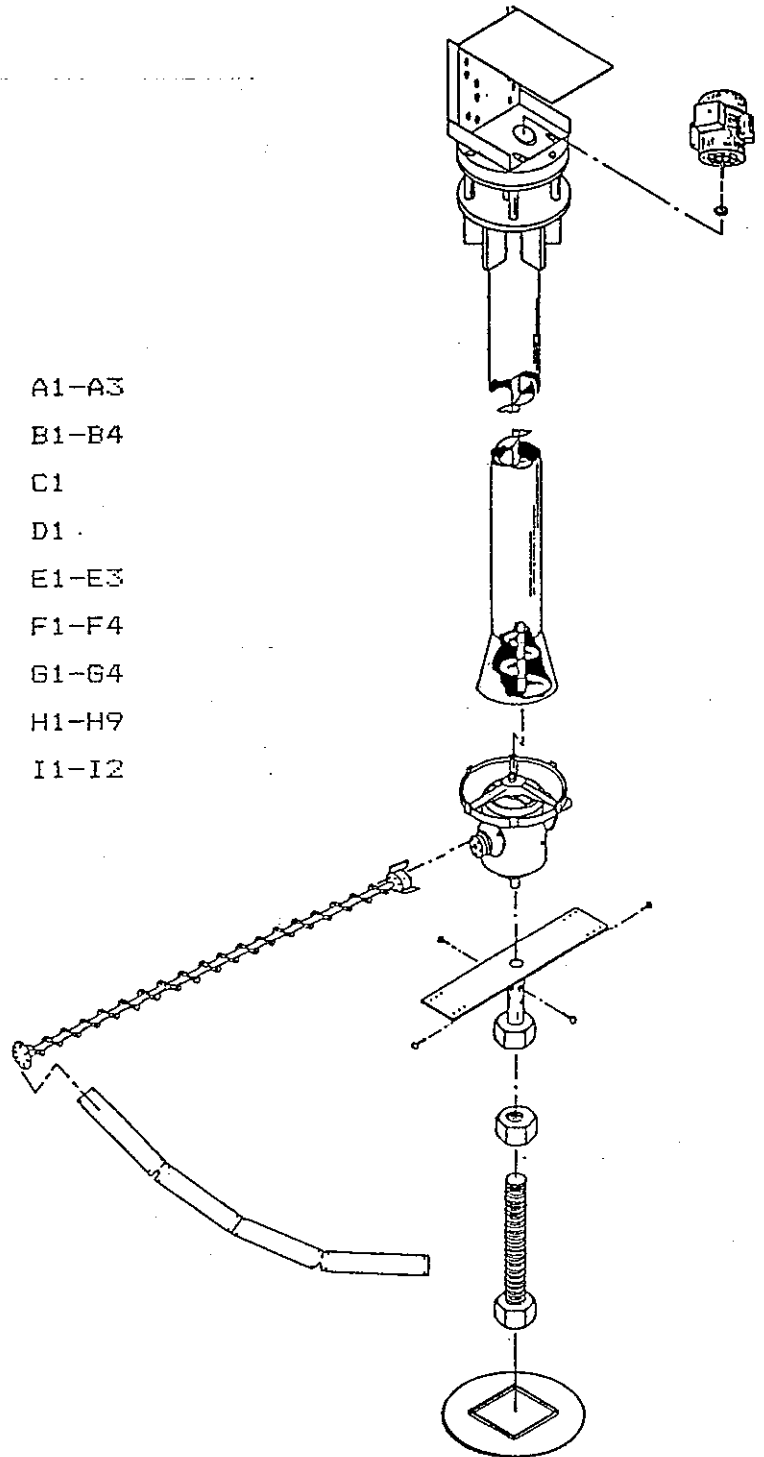
THIS EQUIPMENT IS MANUFACTURED UNDER 1 OR MORE OF THE
FOLLOWING U.S. & CANADIAN PATENTS: D246388; 3,563,399;
3,765,547; 3,765,548; 905108

SHIVVERS INCORPORATED
614 W. ENGLISH, P.O. BOX 467
CORYDON, IOWA 50060
515/872-1005
TWX: 910-520-1970

APRIL 1, 1988

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GENERAL INFORMATION

The Circu-Lator Junior employs the counterflow method of drying. Heated air is pushed upward through the grain from below the drying floor. Grain moves downward as the sweep removes an even layer of grain from the drying floor. The grain moves counter to the direction of air flow. This is the most efficient form of grain drying in common use to date.

The drying rate of your system is determined by the fan and heater used. Grain drying occurs in the lower areas of your bin referred to as the "drying zone". It is therefore important that the wet upper areas of grain be moved downward to enter this zone. In hot weather, wet grain spoils very rapidly. It may be better to dry all the grain down some points of moisture, employing recirculation, rather than risk spoilage in the wettest grain. Your Circu-Lator Junior will continually move your grain through the drying zone in this manner. Your machine can be equipped with optional "add-on" control equipment to monitor your grain drying process.

EQUIPMENT RECOMMENDATIONS

UNLOADER

An unloading system is recommended for below the drying bin floor. This speeds bin unloading and provides for future access to the machine. Machine access is necessary for general maintenance and service.

FLOOR SUPPORTS

Drying floors require extra support legs in the center half diameter of the grain bin. As a general rule, these extra legs must be spaced half as far apart as in the outer area. The extra support is required due to grain movement pressure created by the tapered sweep auger. Your support-leg manufacturer should be consulted regarding the exact quantity and placement of the additional legs.

Drying floors using individual plank floors without a center rib, should be reinforced to prevent "sagging". Sagging is created because of the grain pressure induced by the tapered sweep auger moving the grain. These "U-shaped" floor supports are available from Shivers to fit most floor types.

BIN STIFFENERS

Bin stiffeners are required. They add rigidity to the bin sidewall. Unless the bin sidewall is of extra strength, or reinforced by bin stiffeners, the forces of flowing grain could cause the bin to collapse.

Certain bin manufacturers may warrant their bins for use with recirculation devices. This should be verified prior to using the Circu-Lator Junior without bin stiffeners in place.

FAN AND HEATER

The fan and heater must be capable of maintaining an even temperature throughout the entire plenum. We recommend that the fan and heater be located straight across from where the unloader tube exits from the bin. Proper fan and heater location helps eliminate hot and cold spots caused by air deflection due to obstructions. Air and/or heat deflection will lead to uneven drying.

ELECTRIC POWER

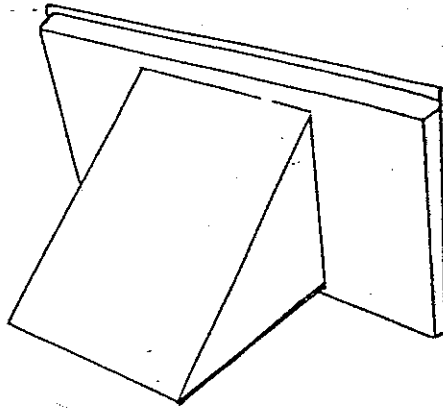
The electric power supply must be of sufficient capacity to start, and operate, all motors simultaneously. You may also want to consider the capacity of transfer equipment if your site has more than one bin.

DOORS

All doors must be of sound construction. All original equipment door braces must be fastened in place during Circu-Lator Junior operation.

BIN PROTRUSIONS

Remove the withdrawal auger cover panel which may be fastened to one of the door panels and extend into the bin.



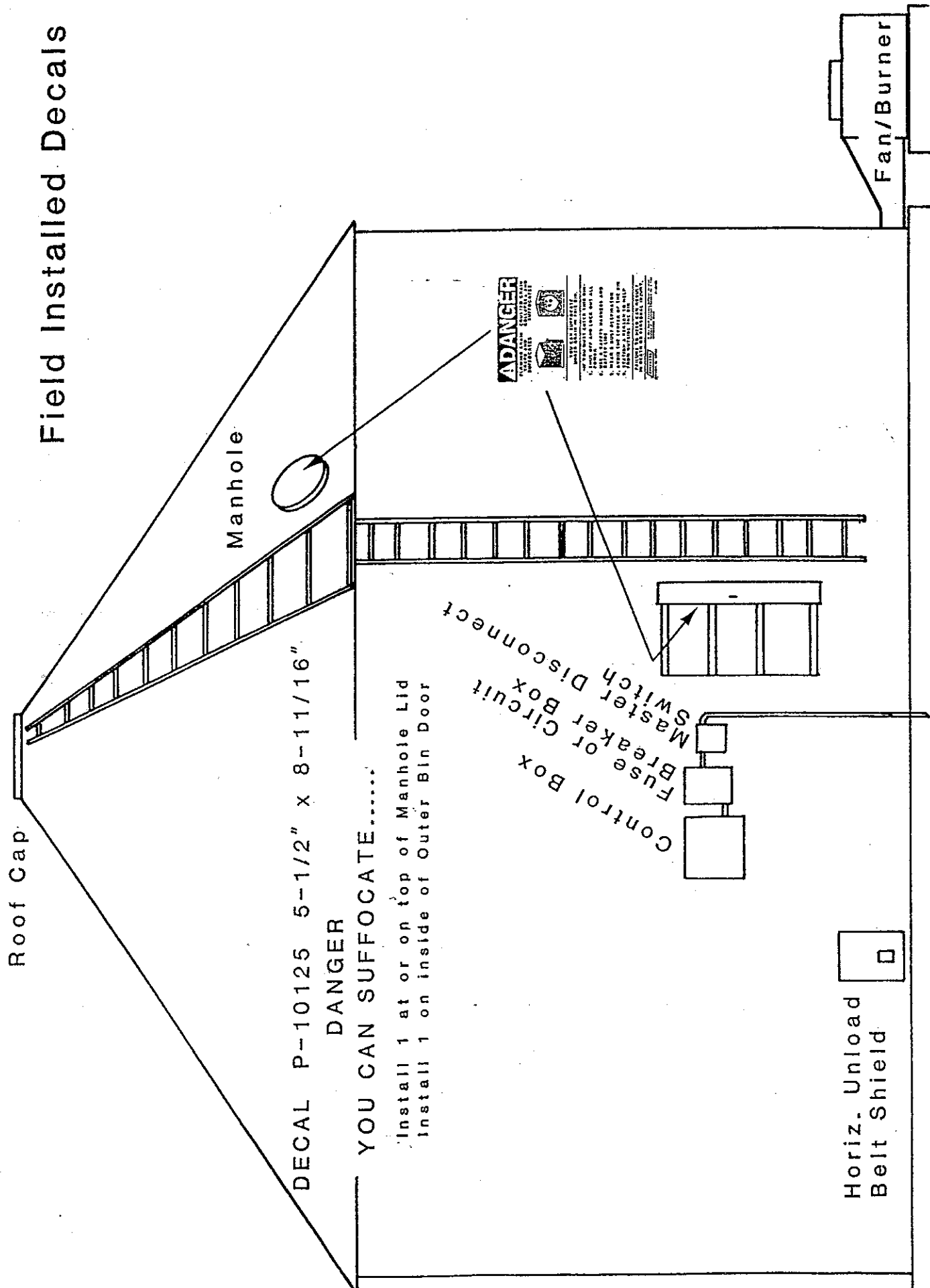
This and any other internal protrusions of substantial size (such as ladders extending more than 3" (8 cm) from the bin wall, etc.) should be removed as they may be pulled down by the flowing grain during Circu-Lator Junior operation.



WARNING

Be sure all safety, caution and warning decals and/or signs are installed, maintained and replaced as necessary. These safety decals may cause people to think, thus preventing serious or fatal accidents.

Field Installed Decals



DECAL P-10125 5-1/2" x 8-11/16"
DANGER
YOU CAN SUFFOCATE.....
 Install 1 at or on top of Manhole Lid
 Install 1 on inside of Outer Bin Door

DANGER
 YOU CAN SUFFOCATE
 SKULL AND CROSSBONES SYMBOL
 1. READ AND UNDERSTAND ALL INSTRUCTIONS.
 2. ALWAYS WEAR YOUR SAFETY BELT.
 3. NEVER REMOVE ANY GUARDS OR SAFETY DEVICES.
 4. NEVER OPERATE THE MACHINE WITH GUARDS OR SAFETY DEVICES REMOVED.
 5. NEVER REPAIR OR MAINTAIN THE MACHINE WHILE IT IS RUNNING.
 6. ALWAYS LOCK OUT AND TAG OUT ALL ENERGY SOURCES BEFORE ATTEMPTING REPAIR OR MAINTENANCE.
 7. NEVER REPAIR OR MAINTAIN THE MACHINE WHILE IT IS RUNNING.
 8. NEVER OPERATE THE MACHINE WITH GUARDS OR SAFETY DEVICES REMOVED.
 9. NEVER REPAIR OR MAINTAIN THE MACHINE WHILE IT IS RUNNING.
 10. ALWAYS WEAR YOUR SAFETY BELT.
 11. NEVER REMOVE ANY GUARDS OR SAFETY DEVICES.
 12. NEVER OPERATE THE MACHINE WITH GUARDS OR SAFETY DEVICES REMOVED.
 13. NEVER REPAIR OR MAINTAIN THE MACHINE WHILE IT IS RUNNING.
 14. ALWAYS WEAR YOUR SAFETY BELT.
 15. NEVER REMOVE ANY GUARDS OR SAFETY DEVICES.
 16. NEVER OPERATE THE MACHINE WITH GUARDS OR SAFETY DEVICES REMOVED.
 17. NEVER REPAIR OR MAINTAIN THE MACHINE WHILE IT IS RUNNING.
 18. ALWAYS WEAR YOUR SAFETY BELT.
 19. NEVER REMOVE ANY GUARDS OR SAFETY DEVICES.
 20. NEVER OPERATE THE MACHINE WITH GUARDS OR SAFETY DEVICES REMOVED.

Control Box
 Fuse of Circuit Breaker
 Master Switch
 Disconnect

Horiz. Unload Belt Shield

Roof Cap

Factory Installed Decals

DECALS: P-10224 5-1/16" x 4-1/8"
P-10225 4" x 3-1/4"

DANGER
THE ROTATING AUGER.....
Install 1 on front of
Machine Control Box

DANGER
THE ROTATING AUGER IN THIS BIN
CAN KILL OR DISMEMBER

NEVER ENTER THE BIN FOR ANY
REASON UNTIL ALL POWER IS
DISCONNECTED AND LOCKED OFF


FAILURE TO HEED CAN RESULT IN
DEATH OR PERSONAL INJURY

SAFETY

DECAL P-10223
5-3/4" x 8-9/16"
WARNING
ROTATING EQUIPMENT.....

Install 1 on front of
Horz. Belt Shield

AWARNING



ROTATING EQUIPMENT
DO NOT OPERATE WITHOUT READING
THE OPERATING MANUAL
IF MANUALS OR DECALS ARE MISSING
OR ARE DIFFICULT TO READ,
REPLACE THEM,
CONTACT LOWY BROS.
FOR FREE MANUALS OR DECALS

Horz. Unload
Belt Shield


Manhole

DECAL P-10126 4-11/16" x 5"

WARNING
DO NOT OPERATE
WITHOUT READING.....

Install 1 decal where appropriate:
a) on front cover
b) on inside of front cover
of Machine Control Box

AWARNING



DO NOT OPERATE WITHOUT READING
THE OPERATING MANUAL
IF MANUALS OR DECALS ARE MISSING
OR ARE DIFFICULT TO READ,
REPLACE THEM,
CONTACT LOWY BROS.
FOR FREE MANUALS OR DECALS

Control Box
Fuse or Circuit
Breaker Box
Master Disconnect
Switch

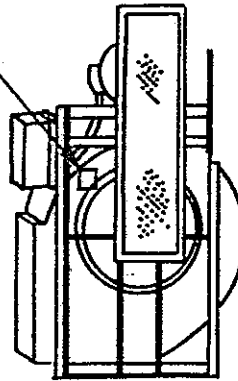
Fan/Burnor

Factory Installed Decals

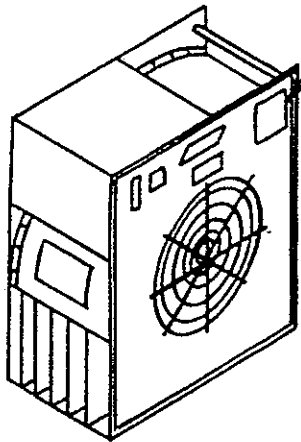
DECAL P-10221 5-3/4" x 5-3/8"

WARNING
ROTATING BLADES AND SUCTION.....

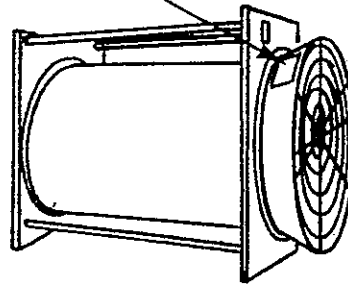
1 decal on Fan near guard



BIG BLUE FAN



CENTRIFUGAL FAN



BLUE FLAME DRYER

Roof Cap

Factory Installed Decals

Manhole

DECAL: P-9198 5-3/4" x 6-3/16"

P-10226 3-7/8" x 4-3/16"

WARNING
DANGEROUS VOLTAGE.....

Install 1 decal where appropriate:

- a) on front cover
- b) on inside cover of Machine Control Box.

Install 1 on top of Heater Control Box.

Control Box
 Fuse or Circuit Breaker
 Master Switch
 Disconnect

WARNING



DANGEROUS VOLTAGE

DO NOT OPEN THIS COVER UNTIL ALL ELECTRICAL POWER HAS BEEN DISCONNECTED AND LOCKED OUT.

FAILURE TO HEED CAN RESULT IN FATAL ELECTRICAL SHOCK.

SAFETY
SAFETY SYMBOLS AND LABELS TO USE

Horiz. Unload Belt Shield



WARNING



DANGEROUS VOLTAGE

DO NOT OPEN THIS COVER UNTIL ALL ELECTRICAL POWER HAS BEEN DISCONNECTED AND LOCKED OUT.

FAILURE TO HEED CAN RESULT IN FATAL ELECTRICAL SHOCK.

SAFETY
SAFETY SYMBOLS AND LABELS TO USE

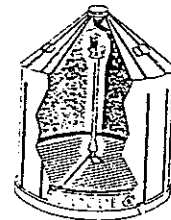
Heater Control Box

Fan/Burner

ATTENTION !!

Circu-Lator Junior sets up flow patterns of grain which exert extra stress on the walls of your bin. Bin sidewall stiffeners are required. You may wish to consult your bin manufacturer for his recommendation before installing a Circu-Lator Junior. SHIVVERS will not be responsible for structural failure of your bin; for any loss or damage to its contents; nor any injuries relating thereof, by installing this system in a bin.

WARRANTY



SHIVVERS' Circu-Lator Junior is guaranteed for the first season of harvest operation, regardless, of purchase date, when installed and operated as instructed in the installation manual. Under this Warranty, SHIVVERS will repair or replace such parts that are returned to us freight prepaid, and found defective.

Electric motors are not covered under this warranty. Check the specific manufacturer of this equipment for warranties.

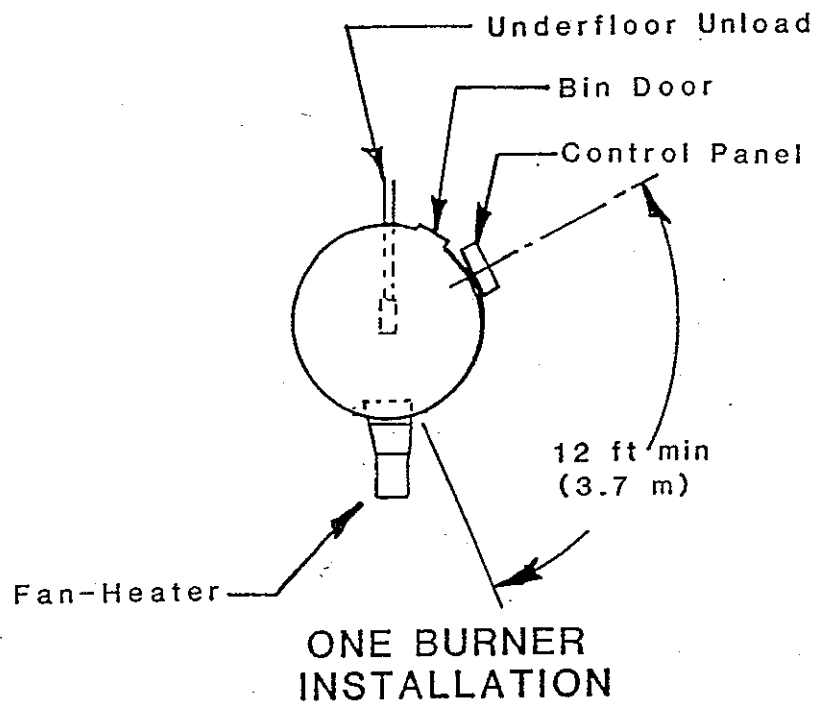
SHIVVERS makes no Warranty of any kind, expressed or implied, except as stated herein and buyer assumes all risk and liability resulting from the use of products manufactured by SHIVVERS, whether used singly or in combination with other products.

For purpose of this Warranty, "Season of Harvest" is defined as the period of time between May 1st and December 1st of a calendar year.

SITE PREPARATION

Determine the placement of the fan-heater, underfloor unload and control panel, all in relationship to the bin entrance door.

Suggested site layout--



This is a suggested site layout only. Your specific use and facilities may dictate other layouts.

BIN STIFFENERS

All bins equipped with a SHIVVERS DRYING UNIT must have bin stiffeners. Certain bin manufacturers may warrant their bin for use without stiffeners. This should be verified prior to operating the machine without stiffeners installed on the bin. Shivers units require stiffeners for all drying bins.

Step 1: Determine which set of stiffeners your bins uses.

8-8-12 gauge combination -- all aluminum bins and those with grain heights greater than 17'4"

8-12 gauge combination -- most bins with maximum grain height of 17'4"
(1 set of stiffeners per wall sheet)

12 gauge x 10' -- Circu-Lator Junior only (1 bin stiffener per wall sheet)

Check to insure that you have the proper stiffeners.

Step 2: Mount stiffeners as per drawing to fit your application. NOTE:

- a) Stiffeners MUST rest firmly upon the concrete slab.
- b) The heavier gauge stiffener is always installed to the bottom.
- c) Bolt the 1st corrugation above the concrete slab and then every 8 - 12" (20.3 - 30.5 cm) thereafter. Stiffeners are not symmetric and turning them end for end may help alignment with corrugations of bin wall.
- d) Stiffeners always mount at the middle of the bin sheet and not on the vertical seams.
- e) Install bolts with the heads mounted on the inside of the bin to facilitate sealing the bin sidewall.
- f) Stiffener sets must have the top stiffener resting securely and tightly against the one that rests upon the concrete slab.
- g) Stiffener connectors must be bolted with 4 bolts through each stiffener connector.
- h) When finished, each stiffener should have a bolt through every slot in every stiffener.

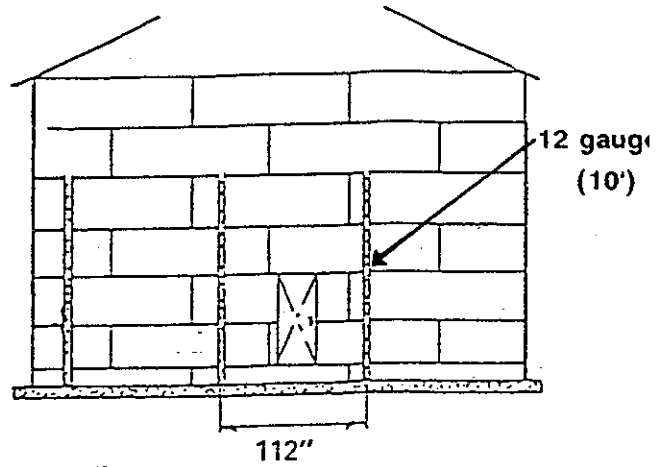


WARNING

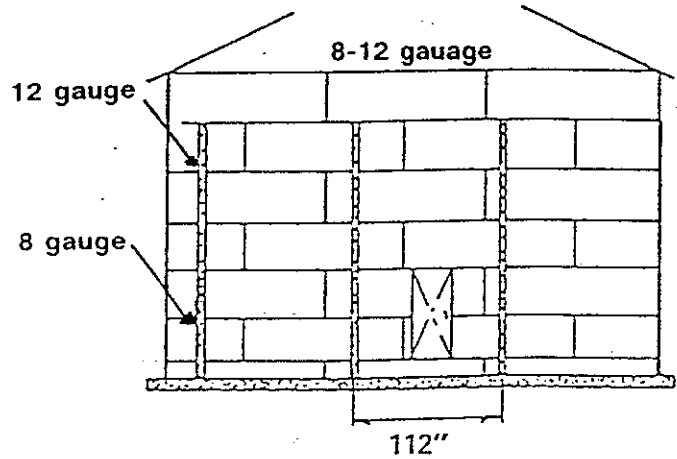
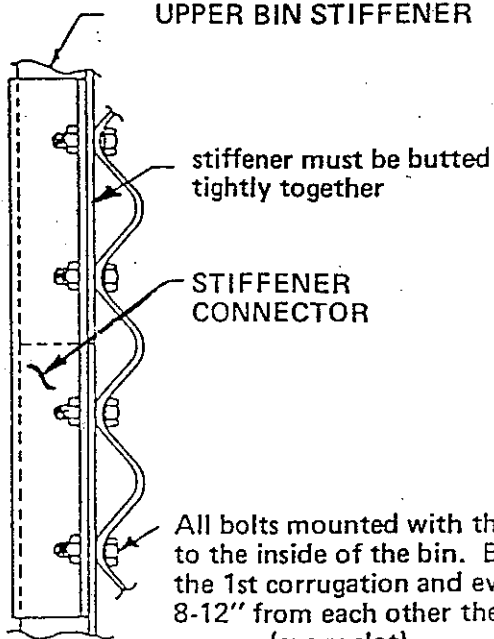
When installing bin stiffeners, as with any item involving elevated heights, always be sure to use the proper equipment, and in the manner that the equipment was intended. Proper installation equipment, along with its proper use can prevent serious or fatal accidents.

USE THIS LAYOUT FOR ANY OF THE 3 POSSIBLE SHIVERS STIFFENERS

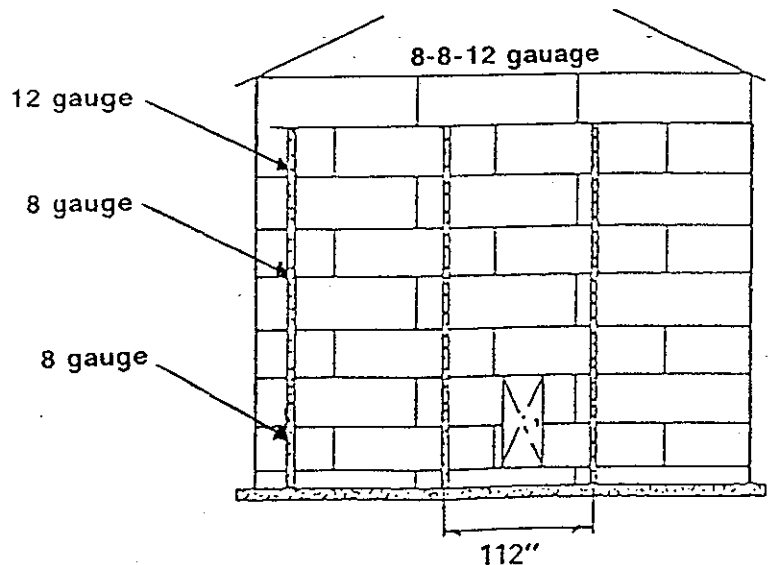
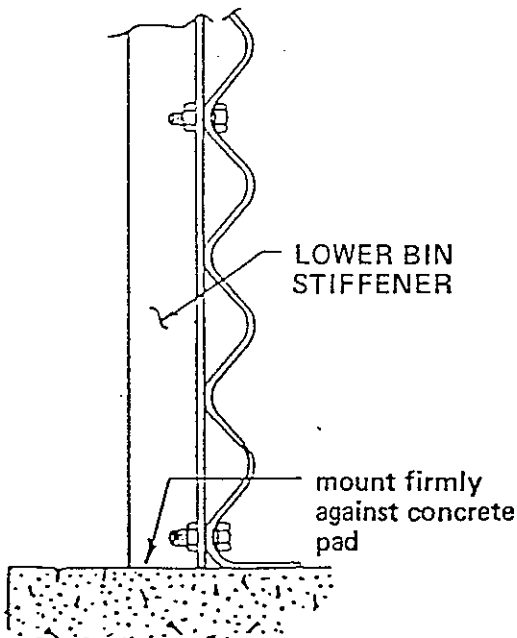
- 1) 8-12 GAUGE COMBINATION STIFFENER FOR BINS HAVING A MAXIMUM GRAIN DEPTH OF 17'4"
- 2) 8-8-12 GAUGE COMBINATION STIFFENER FOR 8 OR 9 RING BINS.
- 3) 12 GAUGE STIFFENER FOR A BIN USING A CIRCU-LATOR JUNIOR.



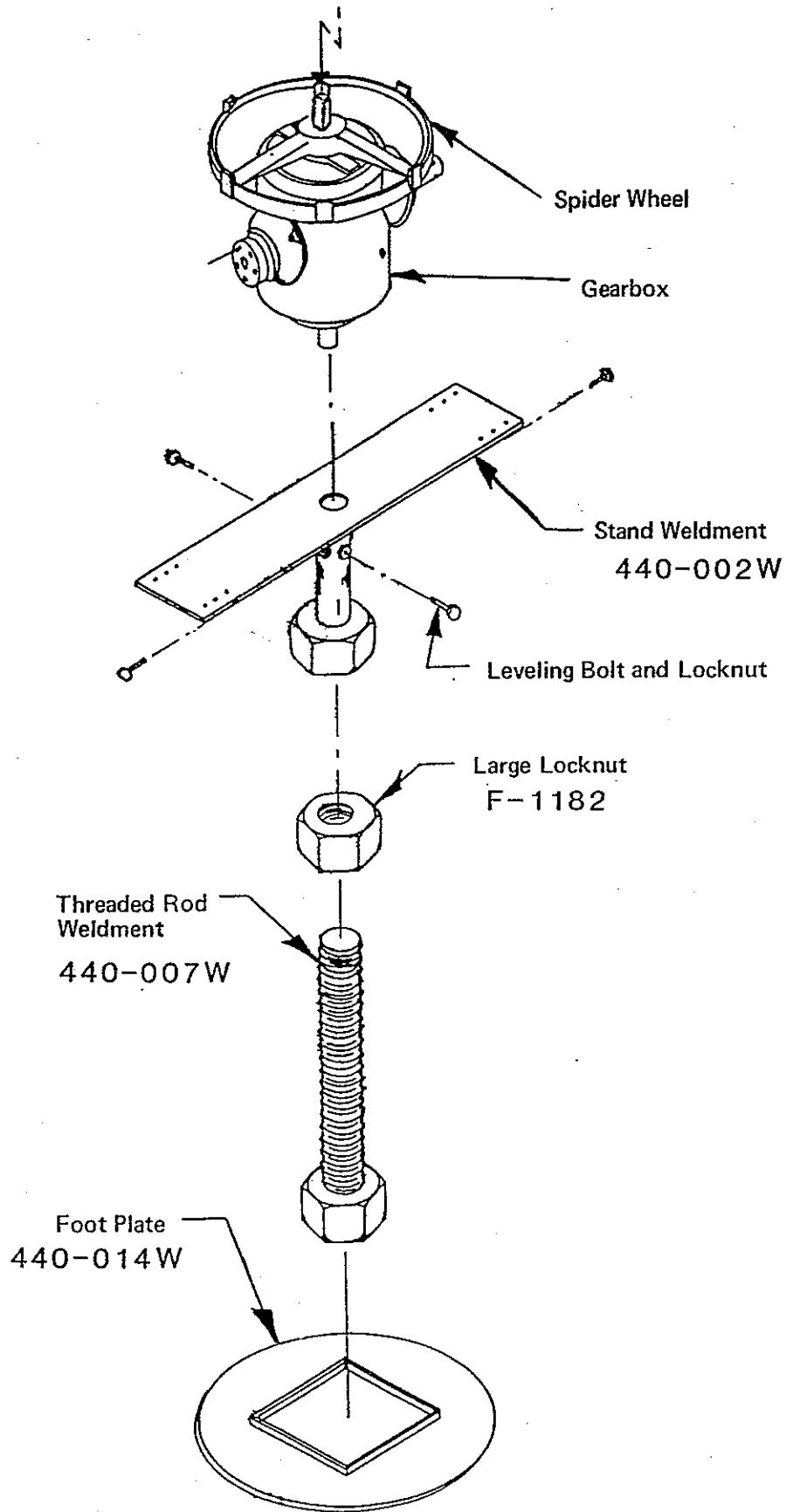
UPPER BIN STIFFENER



Install the 1st 2 sets of stiffeners equidistant from the door, then proceed around the bin installing all stiffeners 112 inches on center (1 per bin sheet)



STAND ASSEMBLY COMPONENTS



STAND ASSEMBLY

STAND ASSEMBLY INSTALLATION

If this machine is being installed in a currently operating grain bin, the floor may need to be removed to install additional floor supports. If so, be sure to mark each floor plank for ease in reassembly.

Clean the entire plenum area of fines and add additional underfloor supports as required.

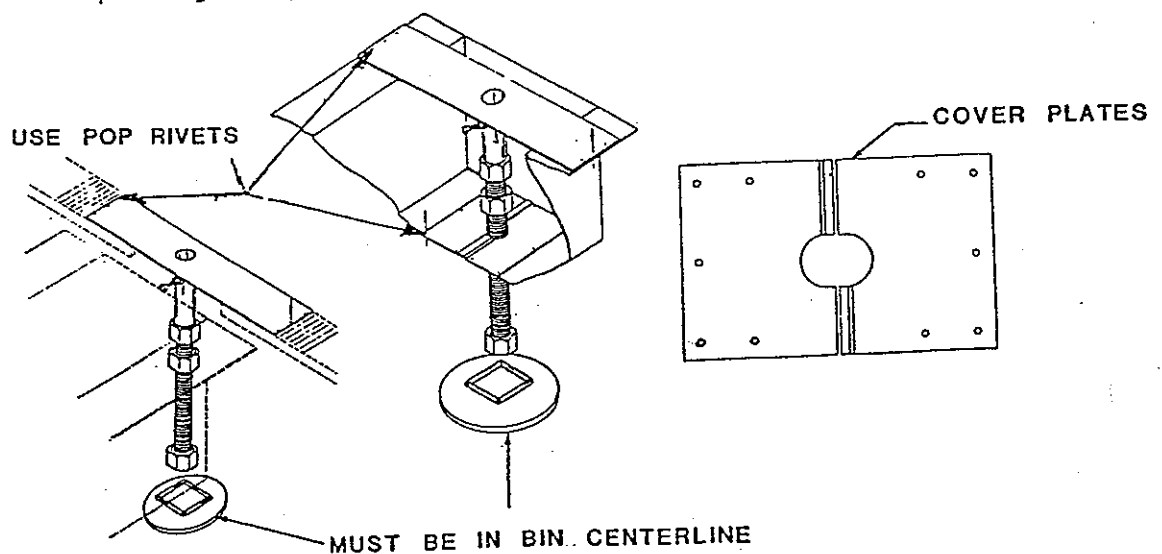
Step 1: Locate the exact center of the grain bin. This should be done from at least 3 different directions. Mark this point on the concrete floor.

Step 2: Screw the large locking nut onto the threaded rod weldment and cut to the required length for your installation. To determine this length:

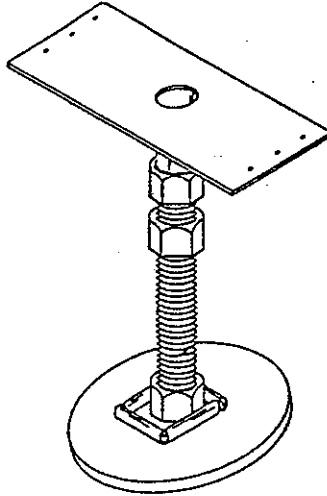
- A: Measure the distance from the concrete to the top of the floor.
- B: Subtract 3 1/2" (8.9 cm) from that dimension.
- C: Cut the threaded rod weldment to this length.

Step 3: Insert the 4 leveling bolts with locknuts into the stand weldment and assemble the weldment to the threaded rod.

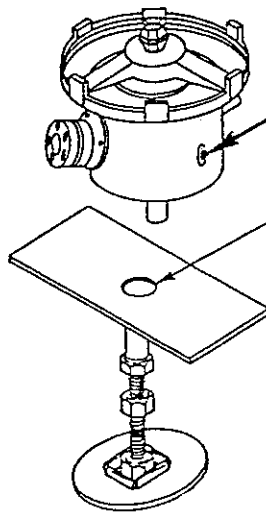
NOTE: If installing a center unload well, we recommend that it be placed directly in front of the stand weldment. If a center well is placed in the center of the bin, it will be necessary to cut a hole through this well to mount the stand weldment to the concrete floor. The stand weldment MUST rest upon the concrete. DO NOT have it rest on the well. Cover plates are provided to seal around the well opening if you install your unit through the well.



Step 4: Place the foot plate on the concrete at the bin center point. Insert the stand assembly in the foot plate.



Step 5: Check the gearbox for lubrication. Lubricate with Moly-Lithium No. EP-2 grease as required.



CHECK GEARBOX LUBRICATION !

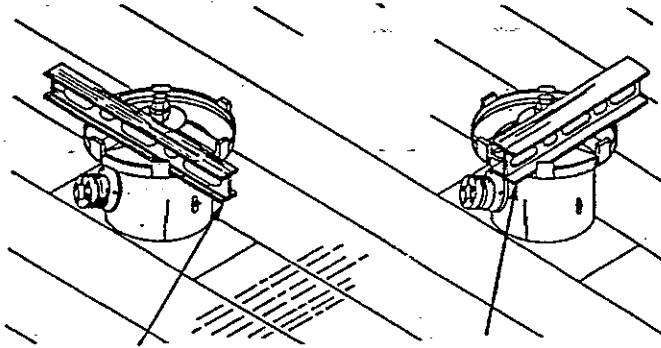
GEARBOX MUST BE SEATED COMPLETELY IN STAND

Step 6: Insert the gearbox into the stand assembly. Make certain the gearbox seats completely in the stand. The gearbox must rest on the top plate. Make certain the gearbox shaft passes beyond the leveling bolts.

Step 7: Replace the floor planks around the stand weldment. leave a 4" square opening in the floor. This allows for the stand assembly removal. Pop rivet the stand weldment to the floor planks at 3 places on each end with the pop rivets provided. We recommend pop rivets, not sheet metal screws. Screws have a tendency to vibrate loose when the machine operates. DO NOT install the complete floor yet. Leveling adjustments are still required.

Step 8: Recheck the bin center to be sure that the stand is properly located. It must be centered. Make any slight adjustments that may be required.

Step 9: If your assembly does not come with the spider wheel assembled to the gearbox, install the spider wheel at this time. Level the spider wheel in all directions.



LEVEL IN AT LEAST 3 DIFFERENT DIRECTIONS

Tighten the 4 leveling bolts securely. These keep the gearbox level and in place. Lock into place with the locknut.

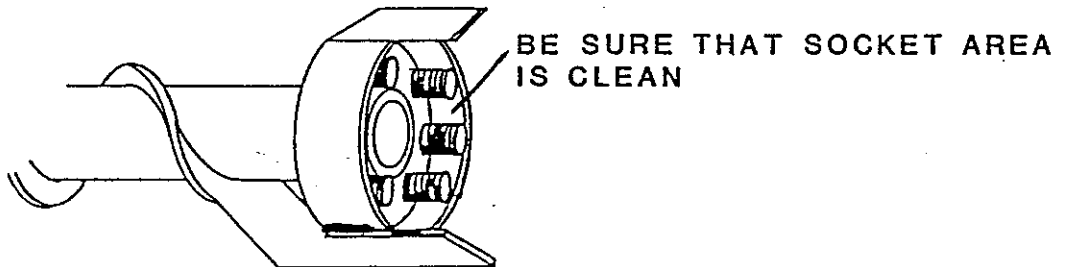
- Step 10: Recheck the assembly for proper height. It must rest firmly upon the concrete. When the proper height is reached, lock the large locking nuts together. This prevents movement due to vibrations. Recheck the spider wheel for level.
- Step 11: Finish installing the remaining floor planks.
- Step 12: Install the floor flashing at the jointure of the bin wall and floor. The flashing should be installed in a clockwise direction. All flashing must overlap so the right hand piece, when looking at the flashing, is on top of the preceding piece of flashing.

SWEEP & TRACK

SWEEP AND TRACK INSTALLATION

SWEEP INSTALLATION

- Step 1: Remove the protective cover and small pieces of tubing from the sweep auger coupler end. Discard these parts but retain the nuts.
- Step 2: Clean the sweep auger socket of any paint, dirt, rust, weld spatter, etc. It is very important that this area be free of any foreign contaminants. DO NOT grease or oil this area.

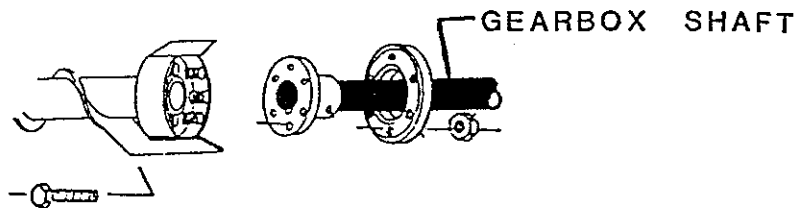


- Step 3: Bolt the tapered sweep auger to the gearbox in these steps:

Note: These bolts are high strength, SAE grade 8 capscrews and must be at least this grade. DO NOT substitute other bolts. These may be identified by this marking on the bolt head.

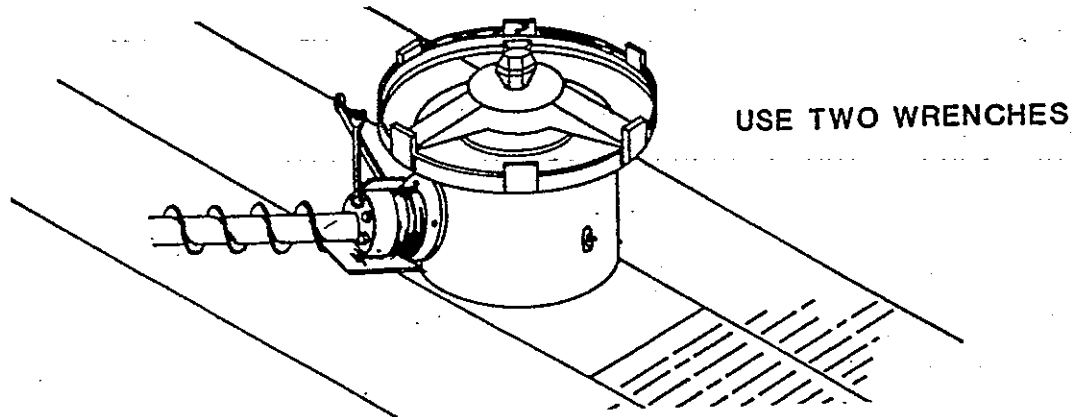


- 1) Start all capscrews into the threaded coupler ring mounted on the gearbox shaft until 1 or 2 full threads are exposed through the coupler.



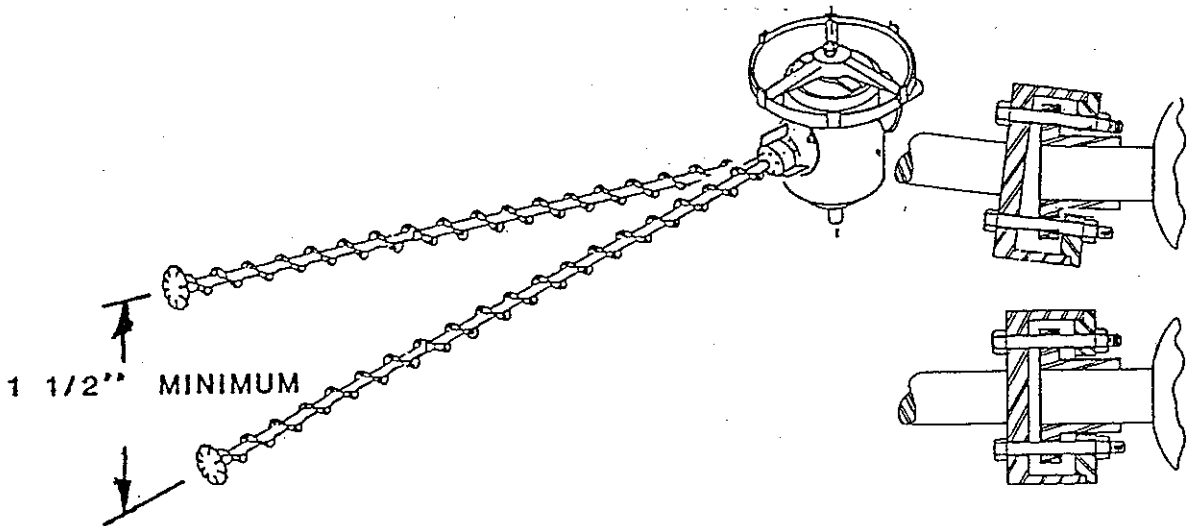
- 2) Start each locknut on the capscrew.

- 3) Holding the nut with one wrench, turn the capscrew with another wrench until it is tight and secure. You cannot overtighten these bolts. Repeat this operation until each one is tightened securely.



- 4) Recheck each capscrew. Each one must be fastened tightly. These capscrews CAN NOT be overtightened. They WILL NOT easily snap.

Step 4: Check the tapered sweep "flex". At the bin sidewall end of the tapered sweep, the sweep must be able to raise a minimum of 1 1/2" (4 cm) without causing the sweep to bow or the gearbox to tilt.



If this "flex" is not present, contact Shivers immediately. (515/872-1005) DO NOT operate your machine under this condition. Stresses and torques could cause your sweep to break.

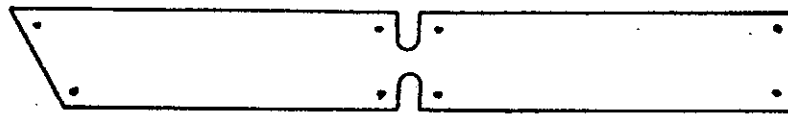
WEAR TRACK INSTALLATION

This track must mount so the sweep auger wheel rides on it. The sweep must not hit any pop rivets. The track must also be mounted smooth and flat without having space gaps at the part connection joints.

Step 5: The narrow wear track comes bundled in straight sections. One end of each track piece is square and the other is trimmed to an angle. Each section must be bent before installation.

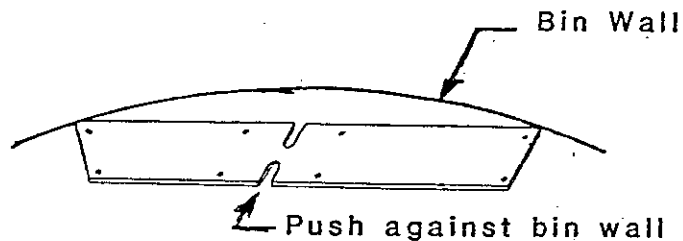
Angled end

Square end

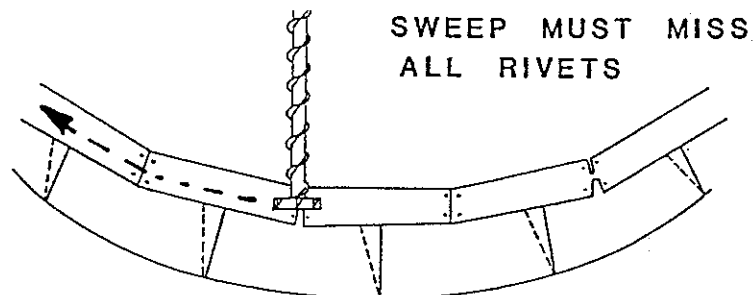


205-003P

To bend the track, hold the edge of each section of track against the inside bin wall. The "point" of the angled end must be against the bin wall. Push the notched center to the bin wall until the track is the same curvature as the bin. Be sure to bend the track with the angled side in the same direction for each piece.



Step 6: Use the sweep auger to locate the track the proper distance from the bin sidewall. The sweep auger wheel should ride in the center of each bend, and at the center where the track sections meet.



If you are using a 2.66" corrugated floor in your bin, wear track mounting plates must be used. Shivers has these in stock if you need them. These are pop riveted to your floor across each corrugation valley where a wear track splice joint occurs.

- Step 7: Fasten 1 end of the track to the floor with 1 pop rivet while the wheel is located in the center. Move the sweep auger to the center of the track section and center the wheel on it. Fasten the track into position with 1 pop rivet. Again, move the sweep auger to the center of the track section and center the wheel on it. Fasten the track into position with 1 pop rivet. Again, move the sweep auger to the unfastened end and center the wheel. Fasten this end with 1 pop rivet. The sweep auger wheel MUST NOT hit the rivets. The track must be bent to the final adjustment while it is being fastened down.
- Step 8: Take the next track section and butt it tightly against the previous section. DO NOT overlap the sections. DO NOT allow space separation between them. Repeat this track installation process around the bin until all track is laid. The last track section usually has to be trimmed to size. If the final track length is less than 1/2 the length of the total track length, trim the ends of the last 2 track sections.
- Step 9: Install the pop rivets in all remaining track pop rivet holes. Drill additional holes and pop rivet if necessary to insure a firm, smooth track. We recommend pop rivets rather than sheet metal screws as screws will vibrate loose. Loose track will prevent the sweep from rotating.

NOTE: The sweep must miss ALL pop rivets.

CENTER VERTICAL

CENTER VERTICAL INSTALLATION

Requires a high torque, farm duty, totally enclosed, electric motor with a 1 1/8" diameter shaft and one of the following frame sizes: 182T, 184T, 213, or 215 NEMA.) Motor must be designed for vertical shaft operation.

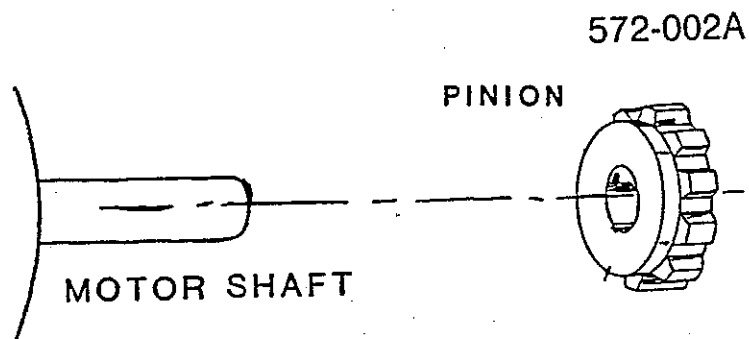
Due to the vertical operating position and environment of the motor on the Circu-Lator Jr., there is a potential for more motor problems than may be expected in more normal motor installations.

Shivvers has had the most success with Century motors over the past several years. When a motor is ordered for a Circu-Lator Jr. from Shivvers, a heavy farm duty Century motor of the recommended horsepower will be supplied. No other brand of motor has shown a good degree of success on the Circu-Lator Jr., in our experience.

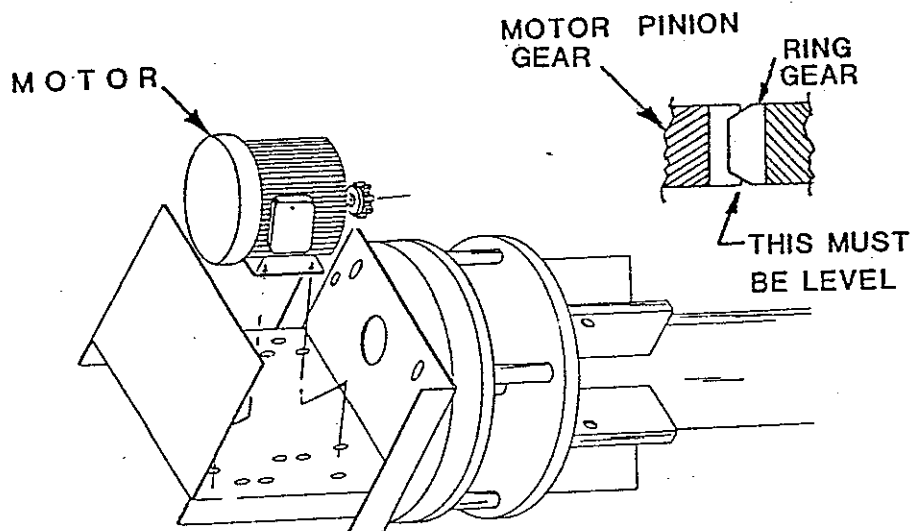
Any motor problems encountered on the Circu-Lator Jr. should be taken to the motor manufacturer's authorized warranty repair shop before contacting Shivvers. Shivvers can offer warranty assistance only on motors which are purchased from Shivvers.

BIN DIAMETER	MOTOR HORSEPOWER
18'	3
21'	5
24'	7.5
27'	7.5
30'	7.5

Step 1: Mount the pinion gear in place on the motor shaft with the 1/4" square key. The gear is mounted with the teeth away from the motor body. The gear must be flush with the end of the shaft. Fasten the gear to the shaft with the setscrew.



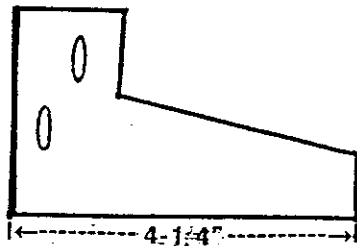
Step 2: Bolt the motor to the motor mount. Mounting bolts, lock and flat washers, and nuts are supplied. Adjust the motor so the pinion gear is fully engaged with the ring gear. The tooth to tooth alignment must be level with each other. Tighten all motor mounting bolts to securely fasten the motor in place.



CENTER VERTICAL FLIPPERS

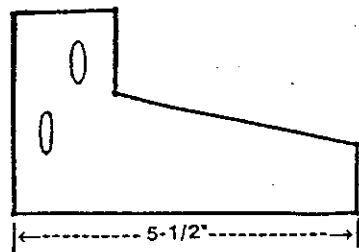
Step 3: Your unit comes with 3 different flippers. Determine which one to install for your unit from the information below.

Save the other flippers. These may be needed to achieve a proper spread pattern for grain.



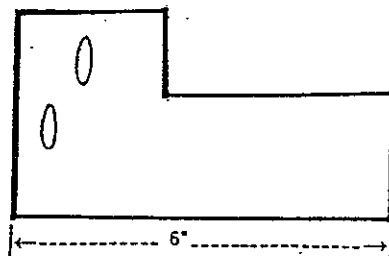
572-014P

install on bins 18'-0" and under



572-010P

install on bins over 18'-0" to 24'-0"

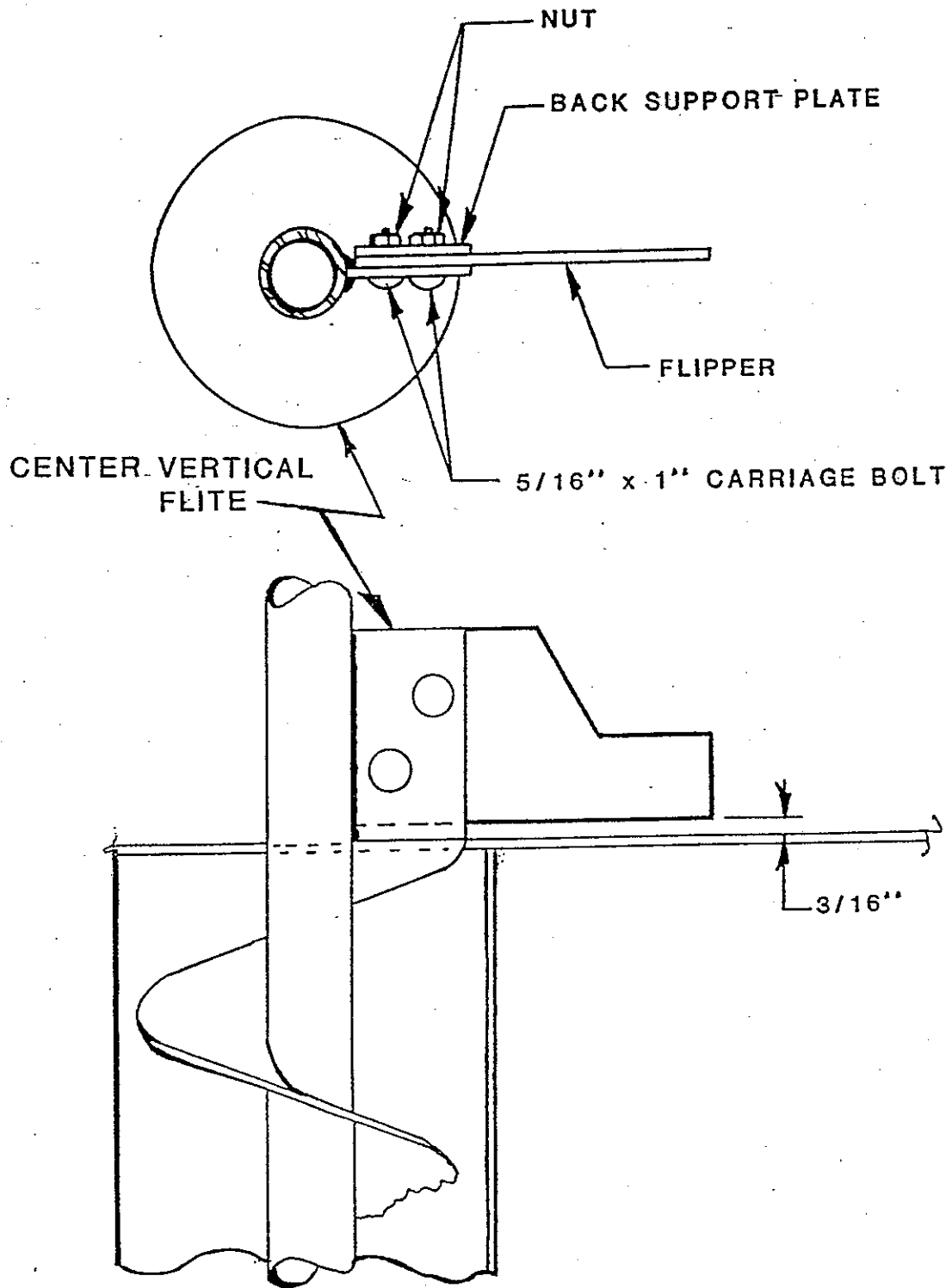


572-011P

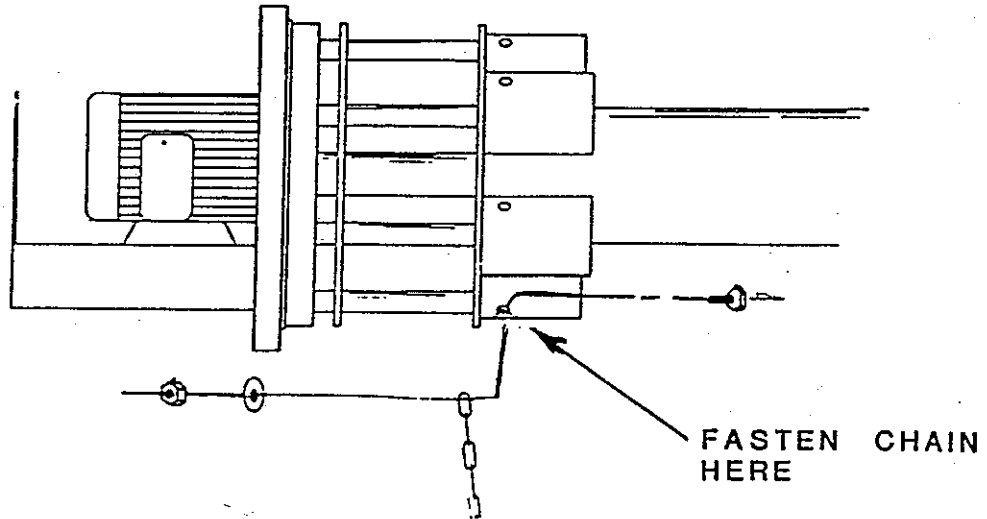
install on bins over 24'-0"

Save the UNUSED FLIPPERS. The flipper may have to be changed as the circumstances vary.

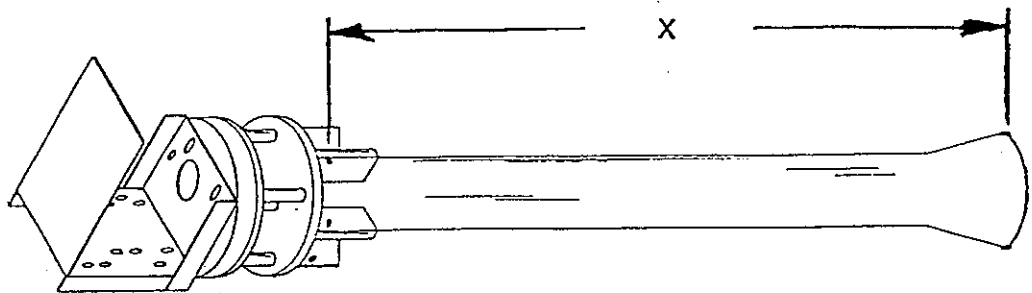
Step 4: Install the flipper on the top of the center vertical in the manner prescribed below.



Step 5: Fasten each of the 6 long chains to the center vertical gussets located under the bottom plate at the top of the center vertical.



Step 6: Measure the distance of your center vertical height from the cone to the gusset mounting hole (dimension "x"). Add 6" (15 cm) to this dimension.



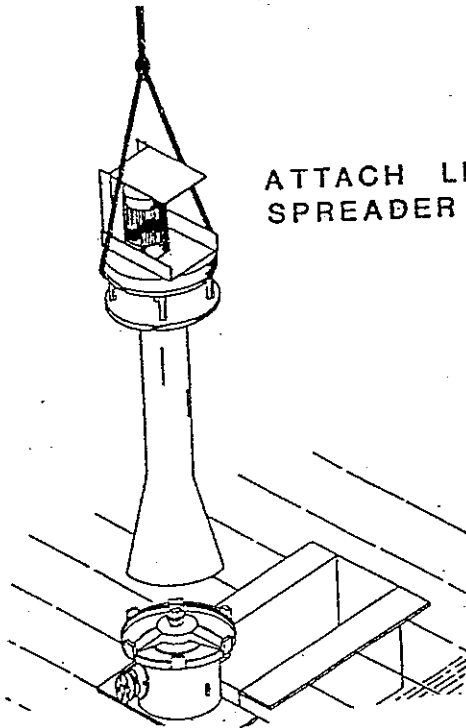
Locate the 6 short chains equidistance apart at this dimension on the bin sidewall. Mounting these chains too high will have a tendency to lift your center vertical from the gearbox. These chains should be level with, or slightly lower than, the center vertical gusset.



WARNING

Floors with fines, light oil, or moisture may be extremely slippery. Always take proper precaution when working under these conditions. When working at elevated heights use equipment not susceptible to slippage. Proper equipment can prevent serious or fatal injuries.

- Step 7: Raise the center vertical into the upright position using a rope and pulley, a block and tackle, or a winch. Be sure the lift is securely fastened to both the center vertical and the bin roof cap. Attach the lift through the spreader plates to prevent damaging parts. Care should be taken to prevent damaging the bottom cone.



ATTACH LIFT THROUGH
SPREADER PLATES

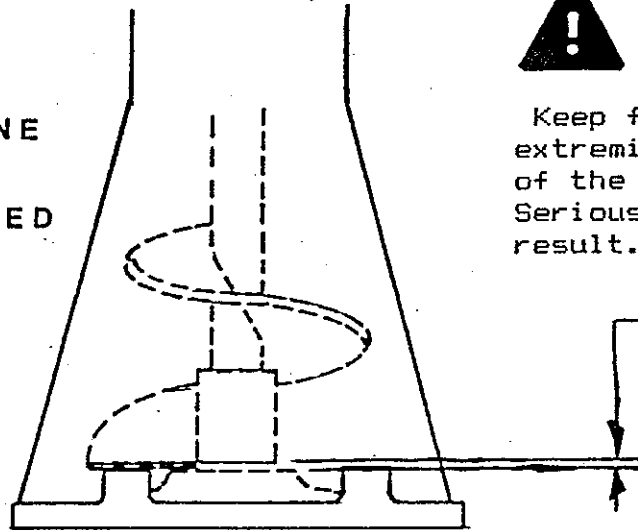


DANGER

Only necessary properly trained and equipped manpower should be allowed in the bin during installation of this unit. Proper precaution could save life or limb.

Step 8: Carefully lower the center vertical onto the spider wheel gearbox assembly. The center vertical must rest completely on the spider wheel. The gearbox shaft and enter vertical tube must be fully engaged, (1/4" min., 5/8" max. space). The center vertical cone must be completely contained within the spider wheel. DO NOT unhook the lift.

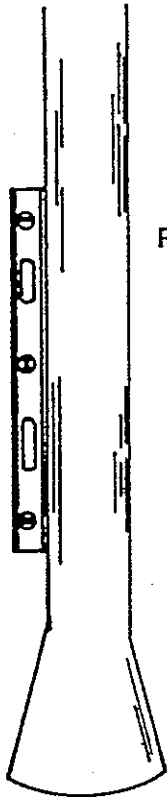
BE SURE CONE
IS SEATED &
DRIVE ALIGNED



CAUTION

Keep fingers and other extremities from the area of the spider wheel. Serious injuries could result.

1/4" Min.
5/8" Max.



PLUMB CENTER
VERTICAL
IN ALL
DIRECTIONS!

Step 9: Connect each long chain to each corresponding short chain with a turnbuckle. Tighten each turnbuckle until the chain is tight and the center vertical is plumb in all directions. This may require loosening some turnbuckles and retightening others.

NOTE: ALL chains must be tight after the final plumbing of the center vertical. The chains MUST NOT raise the center vertical from its spider wheel. RECHECK STEP 7 to be sure the spider wheel clearance is correct.

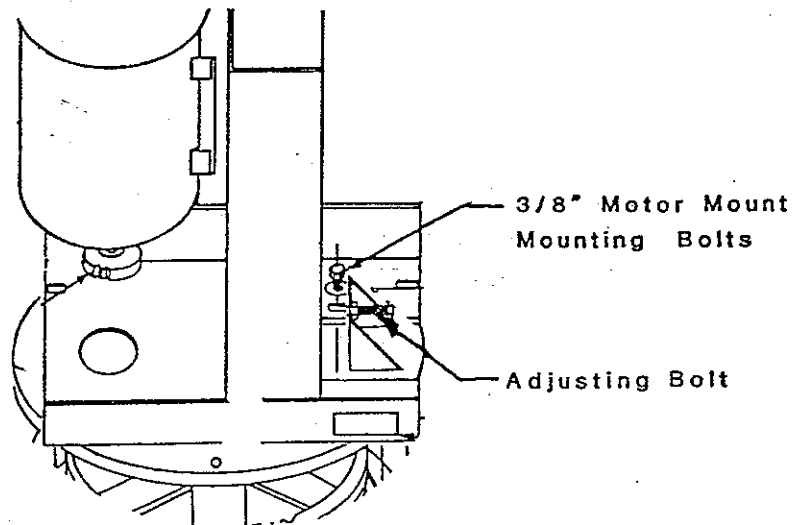
Step 10: Wire each turnbuckle in place to prevent movement and slippage caused by machine vibration.



WIRE THROUGH TURNBUCKLES!

FINAL BACKLASH ADJUSTMENTS

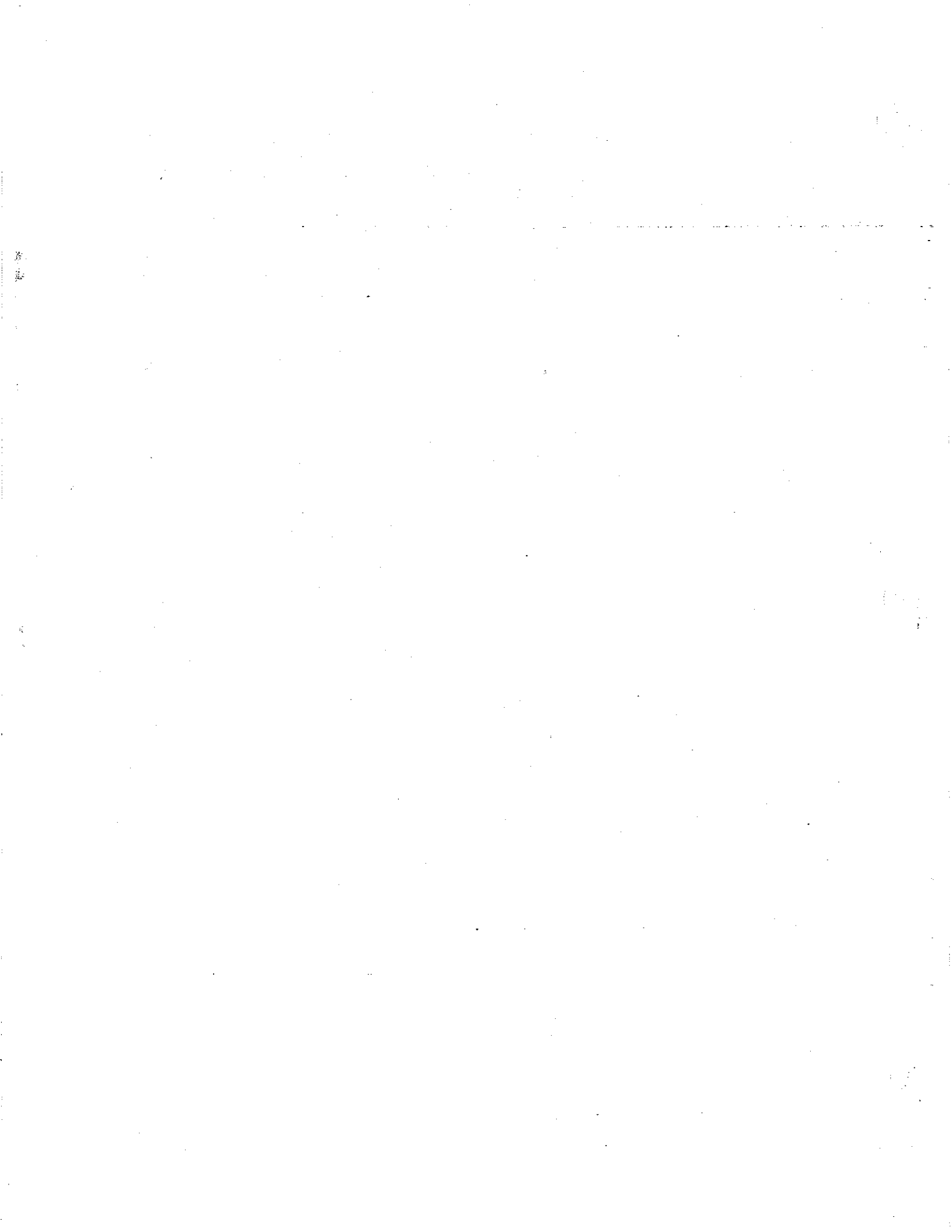
Step 11: Remove the lift attachment from the center vertical. Loosen the 3/8" bolts that hold the motor mount bracket to the center vertical. Also loosen the adjusting bolt lock nut. You are now ready to make the backlash adjustments.



- 1) Turn the adjusting bolt to move the pinion gear towards the ring gear teeth. The slack between the meshing gears should be such that only a slight movement (3 to 7 thousandths of an inch) can be felt. Stop turning the adjusting bolt at this point. Mark this point on the ring gear with a grease pencil, etc.
- 2) Rotate the ring gear in 1/4" increments and check for gear mesh at each location. Turn the adjusting bolt as required to maintain proper gear mesh. (3 to 7 thousandths of an inch)

IMPORTANT: Gear mesh that is too loose will cause the ring gear teeth to wear down quickly. Gear mesh that is too tight will cause "climbing" action between teeth. This will cause rapid wear as well as excessive vibration.

- 3) After proper alignment has been completed, retighten the 3/8" motor mount bracket bolts. Also lock the nut to the adjusting bolt.
- 4) Completely recheck gear mesh alignment. The backlash should be from 3 to 7 thousandths of an inch.



ELECTRICAL

MOTOR WIRING

Your system requires that the motor be wired so the shaft, when viewed from the shaft end, rotates clockwise. This causes your center vertical to rotate clockwise.

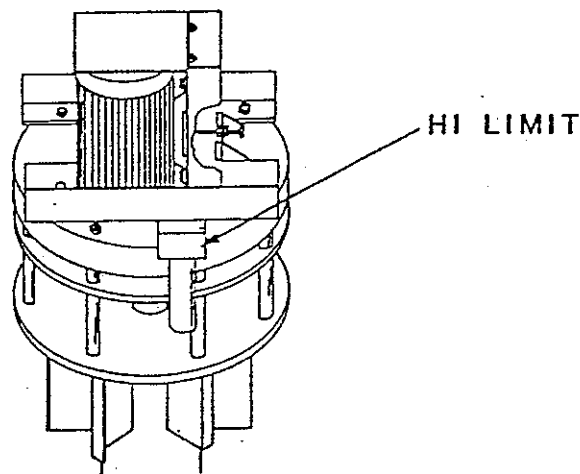
The wire size should be of sufficient capacity to safely carry the amount of amps required to run your motor. The wire should be enclosed by a conduit to protect it from damage. The conduit should be mounted to the grain bin in such a manner that it is never covered by grain.

Your machine operates from a control panel. This is mounted outside the bin and must be weatherproof. Shivers has various control panels available to fit your exact needs.

HI-LIMIT WIRING

Your unit comes supplied with a hi-limit safety switch. It will shut down your fan if temperatures in the gearbox area become dangerously hot. Too hot temperatures may cause fires. Fan shut-down prevents air from being blown into this potential situation.

This hi-limit safety switch is located at the top of the center vertical and has a tube extending down from it. It senses the air exiting the center vertical.



To wire the hi-limit, two wires need to be connected between this unit and your fan-burner unit. The wires should be protected by a conduit. Fasten the conduit in such a manner that it never becomes covered by grain.

Connect these two wires to your fan so they operate in series with the fan motor starter coil. Extreme high temperature air exhausted from the center vertical will then open the safety switch. This switch will turn the fan off.

