MODEL DF
DOUBLE FRAME PLANTER
OPERATOR & PARTS MANUAL

M0107 Reprint 10/95

This manual is applicable to: Model: DF
Serial Number: 3980 and on

Record the model number and serial number of your planter with date purchased:

Model Number DF _____

Serial Number _____

Date Purchased _____

ATTENTION: Effective 12/1/87 amendments were made to the KINZE New Machine Warranty. Refer to insert W12187.

NEW MACHINE WARRANTY

No warranties express or implied are made or will be deemed to have been made by KINZE of the products sold under this Agreement except as follows:

KINZE warrants to the original purchaser for use, on products sold and located within the boundaries of the U.S. and Canada, that if any part of the product proves to be defective in material or workmanship within one year from date of original purchase, and is reported to KINZE within 10 days after such defect is discovered, KINZE will (at our option) either replace or repair said part. Return of the defective part to KINZE and submission of a completed warranty request must be accomplished within 30 days of the date that the replacement is made available.

This warranty does not apply to damage resulting from the alteration, misuse, neglect, accident or improper installation or maintenance. A part will not be considered defective if it substantially fulfills performance specifications. Labor, shipping, field service, travel or administrative expenses incurred in connection with warranty replacements are not covered. Tires are not warranted by KINZE Manufacturing, Inc. and such claims must be pursued through the tire manufacturer's warranty.

KINZE warrants all replacement parts for a period of 90 days from date of purchase by the customer. Parts warranty is subject to the same provisions, restriction and exclusions as new machine warranty and carries the same return and reporting requirements.

The foregoing warranty is exclusive and in lieu of all other warranties of merchantability, fitness for purpose and of any other type, whether express or implied. KINZE neither assumes nor authorizes anyone to assume for it any other obligation or liability other than stated above, and will not be liable for consequential damages. Purchaser accepts these terms and warranty limitations unless the product is returned within the fifteen days for full refund of purchase price.

KINZE reserves the right to make changes or to add improvements at any time without notice or obligation.

W12187

TO THE OWNER

We at Kinze Manufacturing wish to thank you for your patronage and appreciate your confidence in Kinze farm machinery. Your Kinze Planter Bar has been carefully designed and sturdily built to provide years of dependable operation in return for your investment.

This manual has been prepared to aid you in the assembly, operation, and maintenance of the planter bar. Refer to it when necessary to maintain the machine in efficient operating condition.

Throughout this manual the symbol ⚠ and the words **Caution** and **Warning** are used to call your attention to important safety information. The definition of each of these terms used, follows:

NOTE: Indicates a special point of information.

CAUTION: Indicates that a failure to observe can cause damage to the machine or equipment.

⚠ **WARNING:** Indicates that a failure to observe can cause damage to equipment and/or personal injury.

This manual is applicable to:

Double Frame Pull Type Planter Bar-Model Number DF, Serial Number 3980 and on.

Record the model number and serial number of your planter with date purchased below:

Date Purchased _____

Serial Number _____

Model Number _____

DANGER

THIS PLANTER IS DESIGNED TO BE **DRIVEN BY GROUND TIRES ONLY.** THE USE OF HYDRAULIC, ELECTRIC OR PTO DRIVES MAY CREATE SERIOUS SAFETY HAZARDS TO YOU AND THE PEOPLE NEAR BY. IF YOU INSTALL SUCH DRIVES YOU MUST FOLLOW ALL APPROPRIATE SAFETY STANDARDS AND PRACTICES TO PROTECT YOU AND OTHERS NEAR THIS PLANTER FROM INJURY.

WARNING

THIS MACHINE HAS BEEN DESIGNED AND BUILT WITH YOUR SAFETY IN MIND. ANY ALTERATION TO THE DESIGN OR CONSTRUCTION MAY CREATE SAFETY HAZARDS. DO NOT MAKE ANY ALTERATIONS OR CHANGES TO THE EQUIPMENT, BUT IF ANY ALTERATIONS OR CHANGES ARE MADE YOU MUST FOLLOW ALL APPROPRIATE SAFETY STANDARDS AND PRACTICES TO PROTECT YOU AND OTHERS NEAR THIS MACHINE FROM INJURY.

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INTRODUCTION

The double frame planter is available in various row configurations with a choice of 30" or wide row spacing. The double frame planter bar also allows installation of interplant row units for 15", 19", or 20" spacing.

The double frame units permit installation of liquid or dry fertilizer application equipment, trash coulter, field cultivator shanks, rolling incorporators, etc., on the front bar for full no-till planting. The weight of the double frame unit also contributes to effective operation of coulters and other minimum till equipment that the operator may choose to add. For further information on installation and use optional equipment on all models, refer to the assembly and operation sections of this manual.

General Information

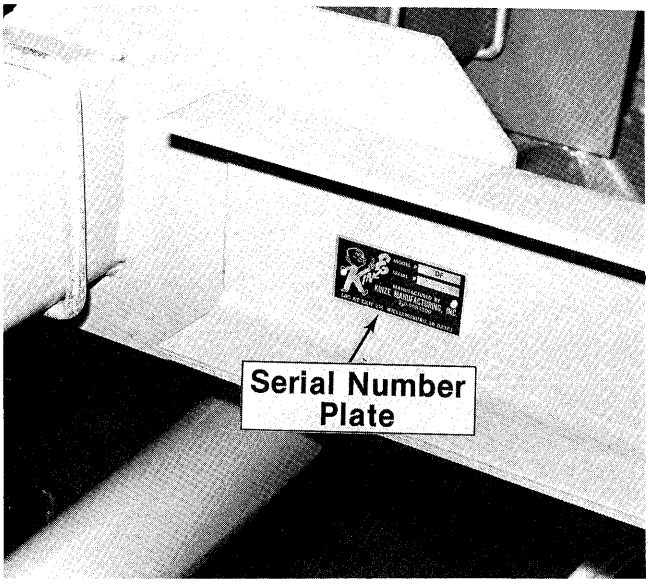
The information and photos used in this manual were current at the time of printing. However, due to Kinze's continual attempt to improve its product, possible in-line production changes may cause your machine to appear slightly different in detail. Kinze Manufacturing reserves the right to change specifications or design without notice and without incurring obligation to install the same on machines previously manufactured.

Right hand or left hand as used throughout this manual is determined by facing in the direction the machine will travel when in use.

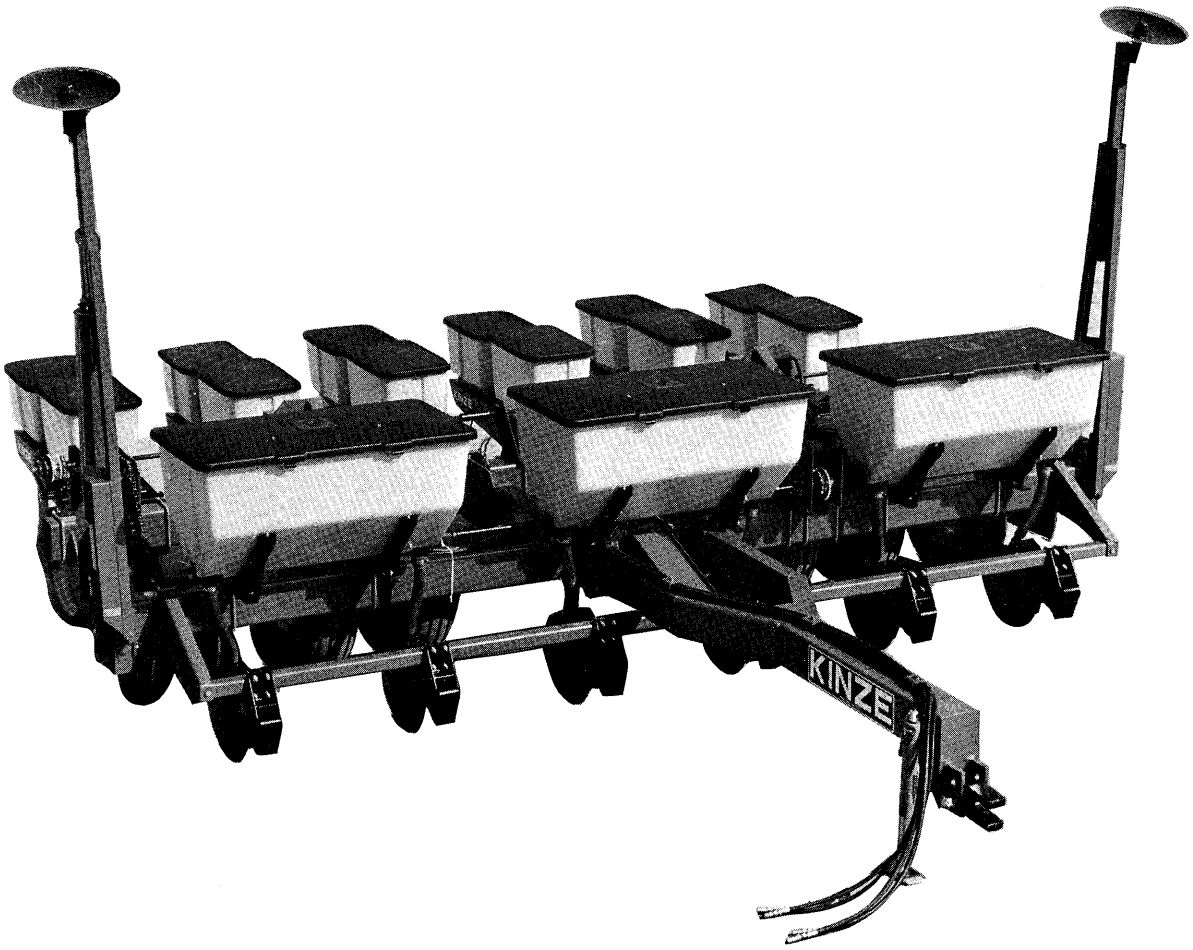
Serial Number

The serial number provides important information about your planter bar and may be required to obtain the correct replacement part.

The serial number plate is located on the planter bar frame to be readily available. It is suggested that the serial number and purchased date also be recorded in the space provided on the inside front cover of this manual. Always provide the serial number and model number to your Kinze dealer when ordering parts or anytime correspondence is made with Kinze Manufacturing.



Double Frame Planter



Available Models	Bar Length	Marker Assembly
4 Row-30"	122"	Conventional
4 Row-Wide	148"	Conventional
6 Row-30"	182"	Conventional
6 Row-Wide	226"	Low Profile - Double Folding
8 Row-30"	242"	Low Profile - Double Folding
8 Row-Wide	298"	Low Profile - Double Folding

Options Available

Interplant Rows
Liquid Fertilizer Attachment
Dry Fertilizer Attachment
Ripple or Fluted Coulters
Down Pressure Springs

SAFETY PRECAUTIONS

Safe and careful operation of the tractor and planter bar at all times will contribute significantly to the prevention of accidents.

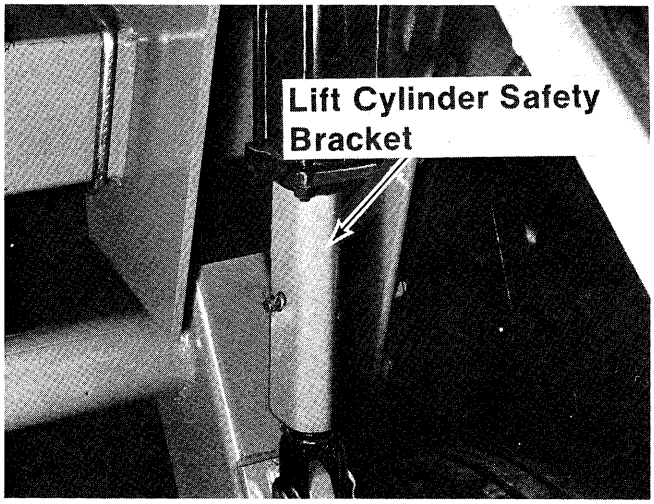
Since a large portion of farm accidents occur as a result of fatigue or carelessness, safety practices should be of utmost concern. Read and understand the instructions provided in this manual as well as those provided in your row unit operator's manual. Listed below are a few other safety suggestions that should become common practice.

- Never permit any persons other than the operator to ride on the tractor.
- Never ride on the planter bar frame or allow others to do so.
- Limit towing speeds to 15 MPH.
- Always make sure there are no persons near the planter bar when gauge marker assemblies are in operation.
- Always lower the planter bar when not in use and cycle the hydraulic control lever to relieve pressure in cylinders and hoses.
- Always make necessary safety preparations prior to transporting the machine on public roads. This includes installing Slow Moving Vehicle (SMV) emblem and use of adequate lights or safety warnings after dark.
- Watch for obstructions such as wires, tree limbs, etc., when folding marker assemblies.
- Always install marker lock up/safety pins before transporting or parking any planter bar equipped with conventional marker assemblies.
- Alway install lift cyclinder lock up bracket before towing planter bar or working under the unit.

SAFETY PIN ("Safety" Position Shown)

Marker Assembly

Lift Cylinder Safety Bracket



Double Frame Planter Bar

ASSEMBLY

The following instructions are provided for assembly of the Kinze double frame planter bar. Please read through the instructions prior to assembly. Becoming familiar with the procedures before actual set up will facilitate smoother assembly and possibly save time by eliminating backtracking. Although there may be procedures for assembly other than those shown, caution should be taken to avoid unnecessary risk to compensate for the extra time it takes to safely perform each step.

Prior to starting, inspect all components for possible damage incurred during shipment. Notify the freight or carrier agent immediately of any damage found. Any parts shortages should be noted and reported to Kinze Manufacturing, Inc. immediately.

Since the assembly instructions which follow are written for several sizes and configurations of units, they are divided into major components which are interchangeable. The interchangeability designed into each Kinze planter bar simplifies assembly as well as operation, service, and parts availability for any size and model unit.

Hardware

All bolts furnished with the planter bar unless otherwise noted are SAE Grade 5. These high strength bolts are distinguished by these radial lines on the head. If bolts must be replaced, be sure to replace them with bolts of equal size and strength.

In many cases bolts have been pre-installed in the holes in which they go during assembly. It is suggested that bolts be left somewhat loose until parts have been assembled. This especially applies to bearing flanges, idler sprockets, etc. Then tighten all bolts to the torque value specified below unless otherwise noted.

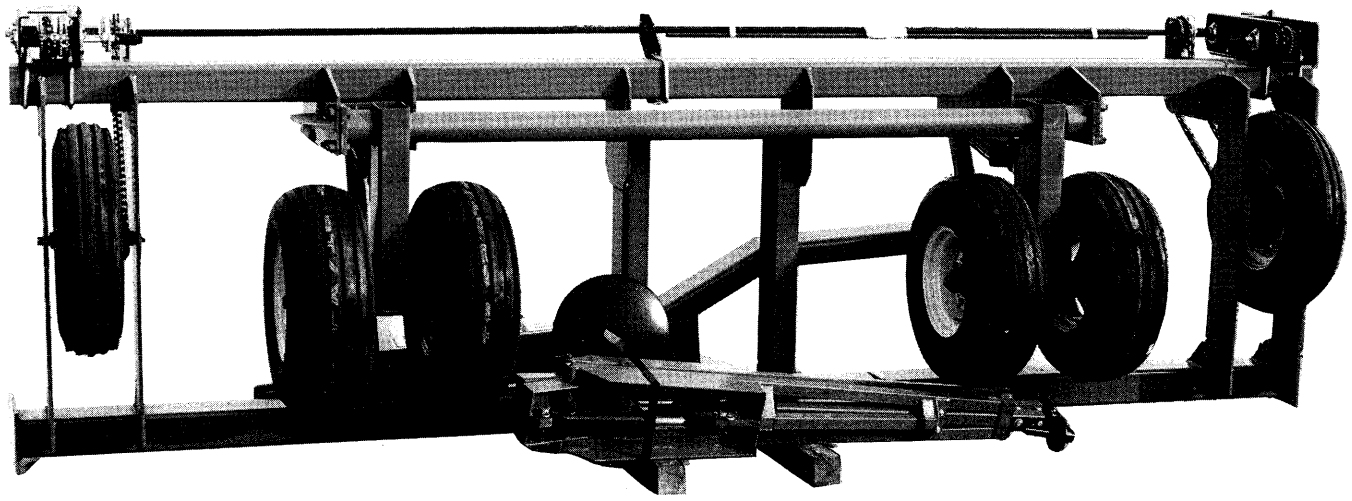
TORQUE VALUES		
Bolt Diameter	Grade 5 Three Radial Dashes	Grade 8 Six Radial Dashes
	Foot Pounds	Foot Pounds
3/8"	30	— —
1/2"	75	— —
5/8"	150	— —
3/4"	270	— —
1"	— —	910

FRAME ASSEMBLY

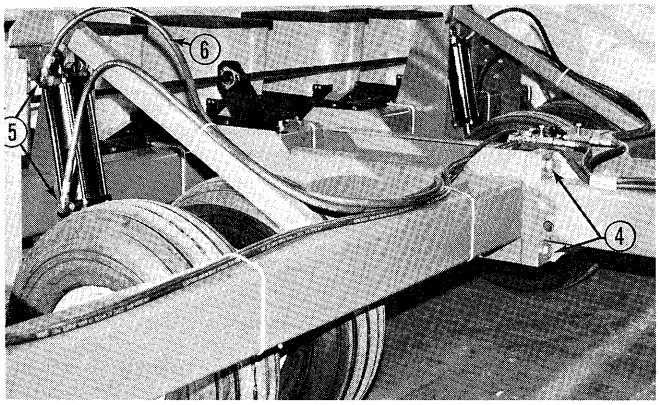
1. Place the pre-assembled planter bar frame in an area which provides sufficient space for complete assembly. Keep in mind the access necessary in both height and width to remove the complete machine.

2. Unband the shipping bundle and inspect for damage.

3. While supporting the frame with an overhead hoist or front end loader, remove the bolts which fasten the frame to the skid. Carefully lower the planter frame to a level position. Then block up the front and rear of the bar and block the wheels.



4. Bolt hitch assembly to the planter frame with four 1"x3" cap screws, lock washers and hex nuts. Tighten bolts securely (Refer to torque chart on previous page.)



5. Remove plugs from ports in each 3½" x 10" lift cylinders and install two ½"x¾" - 16 JIC 90° elbow fittings so that fittings are pointed toward the center of the cylinder tube and slightly forward.

   CAUTION: Do not over tighten fittings. Damage to the cylinder casting may occur.

6. Attach hydraulic hoses to each cylinder. Hoses for each planter bar size are 90" long except 8 row units which are 125".

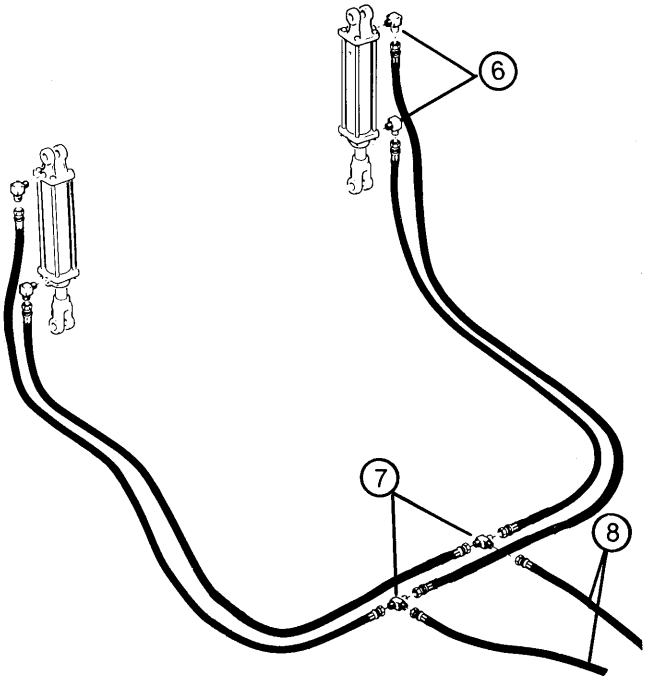
   If the planter is to be operated with dual tractor hydraulics, proceed with step 7, If a single valve system is to be installed, refer to the marker assembly and marker hydraulics sections of this manual on page 16.

7. Connect hoses from base of each cylinder together with one ¾" — 16JIC male tee provided. Do the same with the hoses from the shaft end of each cylinder.

8. Attach 3/8" x 135" hydraulic hose to each tee. Install customer supplied coupler on tractor end of each hose. The couplers installed must be the SAE type to match the tractor being used.

9. Disconnect lower cylinder clevis from transport axle assembly. Connect hoses to a tractor or "power pack" and cycle cylinders through at least one full stroke each way. Then use hydraulic power to extend lift cylinders until shaft clevis can be reattached to the transport axle. Secure all cylinder pins with lock clips.

CAUTIONS
Make sure all air has been purged from the cylinder and hoses before connecting the cylinder to the axle mounting bracket.



ROW UNIT ASSEMBLY AND INSTALLATION

The frame is constructed of 5"x7" rectangular tubing to accept most popular types of row units.

NOTE: If planter units other than Kinze Precision Placement units are being installed, it is suggested that the manual for the particular brand and model be consulted.

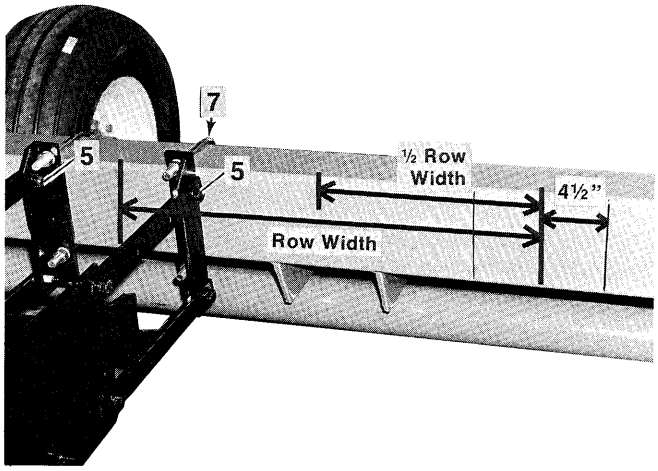
1. Measure the full length of the planter bar and locate center.

2. Mark center of each row by measuring to each side of bar center. The two middle units will be located half the row width from the center. For example, when units are being installed for 30" rows, measure 15" to each side from the center of the bar and every 30" thereafter to the ends of the bar.

ASSEMBLY

3. Mark a squared vertical line 4½" to each side of the row center. This will allow correct positioning and vertical alignment of each row unit as it is being installed.

4. Remove 5/8" x 1¼" hex head cap screw, with bushing and lock nut from shipping position on each support bracket.



5. Swing right and left upper parallel arms to a position parallel with lower arms and attach to support brackets with bolts and bushings provided.

6. Position row unit on planter bar, aligning inside edge of support brackets with marks made earlier.

7. Attach row units using 5/8" U-bolts, lock washers, and hex nuts.

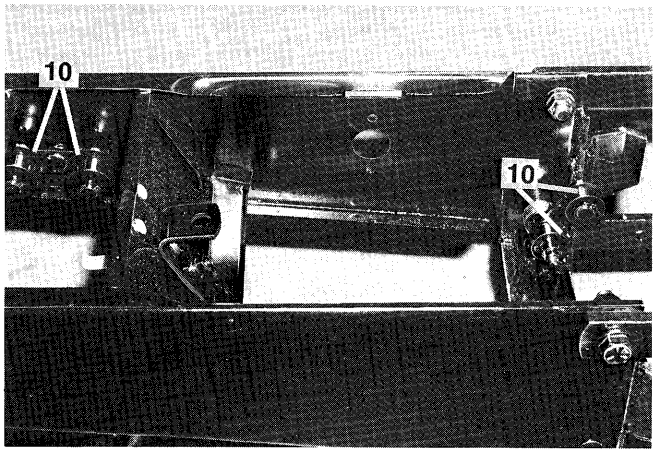
IMPORTANT: If heavy duty down pressure springs are to be installed, the front support plate must be installed on the U-bolts directly behind the row unit support angles prior to installing lock washers and nuts.

8. Remove plateless drive clutch and drive bearing and sprocket assembly from shipping position on rear of row unit. Both parts are wired to the row unit frame.

IMPORTANT: Do not install drive bearing sprocket assemblies on row units as part of row unit assembly.

9. Remove bolts which extend into bearing support on plateless drive and reuse to attach drive to left side panel of hopper support.

10. Turn all chain idler spools to break loose any paint that may restrict movement.



11. Remove drill shafts (taped to drive shaft) and slide drive bearing/sprocket assemblies onto the shaft for each side. Ensure that the shaft end with the hole is toward the outboard side of the planter and that the longer of the two shafts is on the left side. Refer to the chart which follows for proper drill shaft for right and left hand side on each size unit.

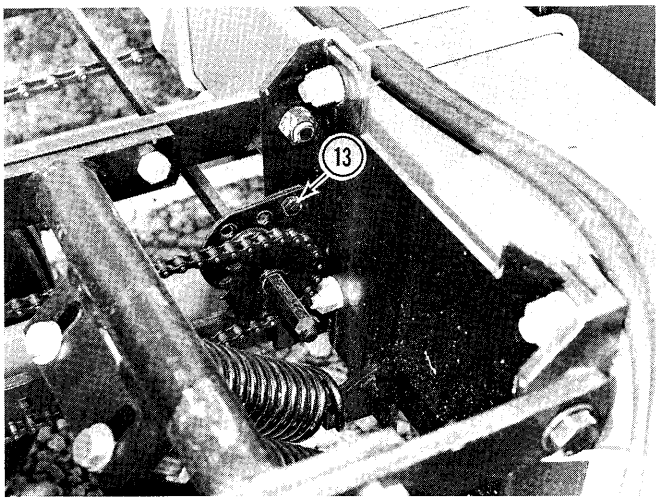
NOTE: It is not necessary to install a drive bearing/sprocket assembly on the drill shaft for the extreme left row unit on all double frame planters. This row unit is driven directly off a sprocket preinstalled on the left transmission.

9/16" Hex Drill Shaft		
Planter Size	Left	Right
4-30"	44"	44"
4-Wide	58"	58"
6-30"	74"	74"
6-Wide	96"	96"
8-30"	104"	104"
8-Wide	134"	134"

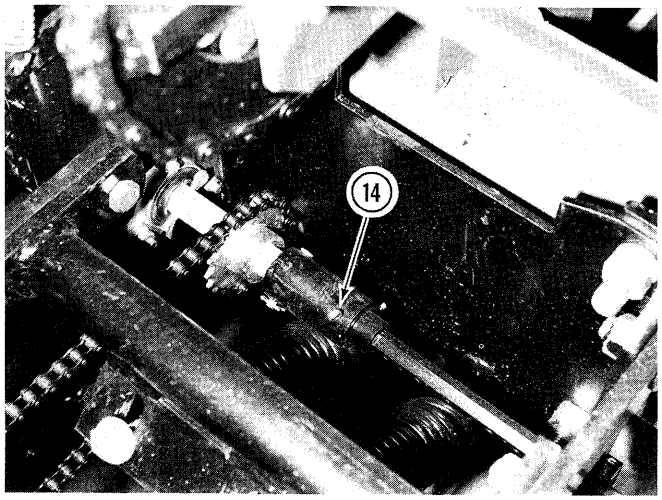
12. Insert each drill shaft, with drive sprockets, between the parallel arms on each row unit and then move the shaft and brackets forward into position.

NOTE: Since the transmission and drive shafts are pre-installed at the factory this procedure will allow installation of the drill shafts without removing either transmission.

13. Attach bearing/sprocket assemblies to the left mounting angle of each row unit with hardware supplied. Do not tighten mounting bolts at this time.

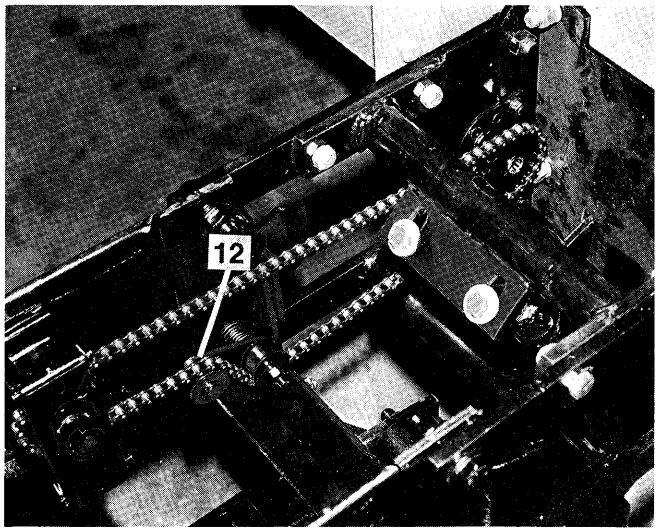


14. Remove cotter pin from drill shaft driver and remove driver from transmission coupler. Install driver onto end of drill shaft and slide driver and drill shaft into transmission coupler. Align the hole in all three components and install cotter pin.



15 Tighten the attachment bolts on all row units bearing/sprocket assemblies after making sure they are in alignment.

16. Install drive chains around row unit drive sprocket and plateless drive sprocket; then join with connecting link. Position drive chain over and under chain idlers as shown.

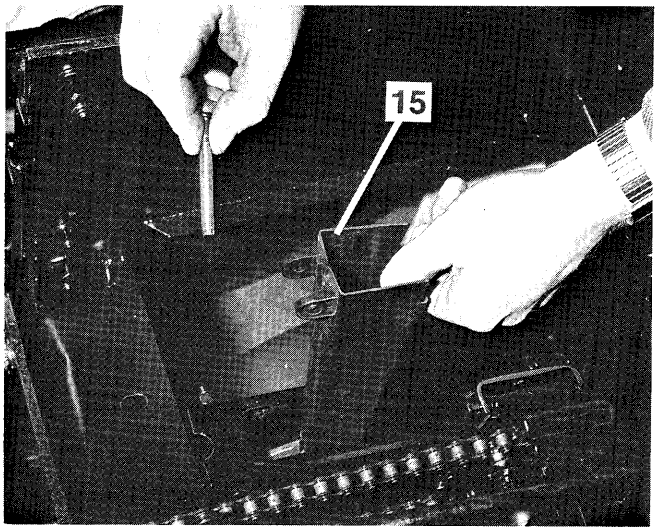


17. Remove hold down latch clip from shipping position on inside of seed hopper and reattach to outside of hopper with 3/8"x3/4" socket head cap screw, flat washer, lock washer, hex nut...and ¼"x¾" carriage bolt, rubber washer, flat washer and self-locking flange nut.

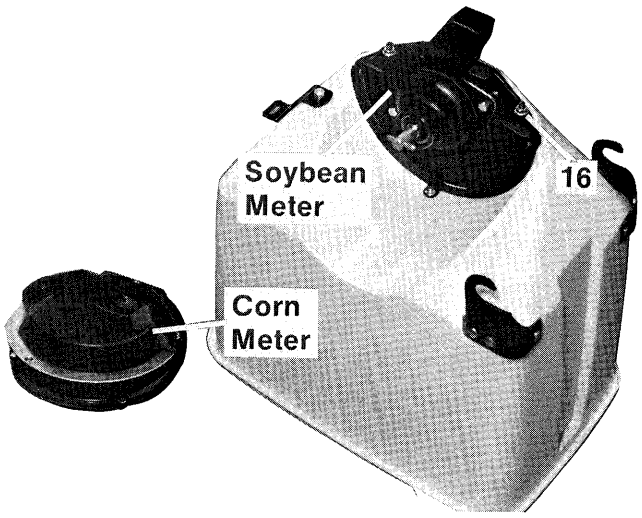
18. Install seed tube in shank as shown. Position hook on the front of the tube over alignment pin in shank. Then pivot top of tube forward and secure with retainer pin and locking clip. Once the tube has been secured in position, tighten 3/8" nut on bolt at front of shank cover.

If electronic seed monitor tubes are being installed, refer to the accompanying instructions.

ASSEMBLY



19. Install seed metering unit on hopper bottom with two 5/16" hex flange nuts.



20. Install seed hopper and latch in position. Adjust latch up or down as necessary for a secure fit.

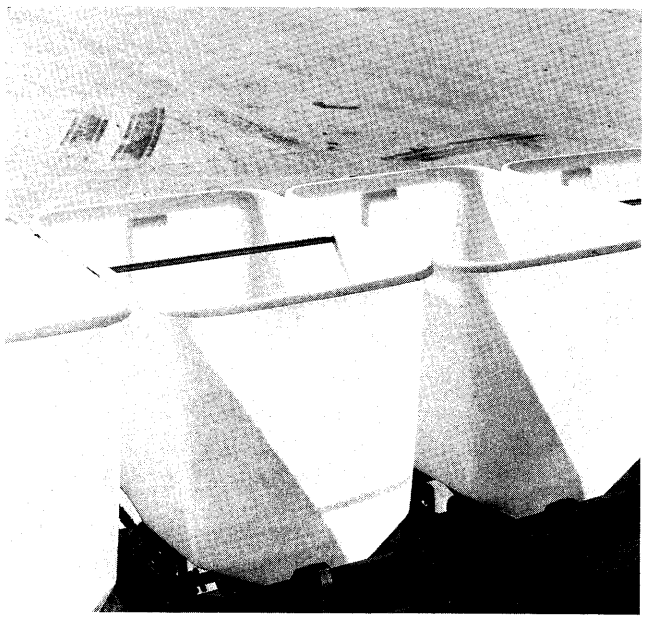
21. Install red reflector on rear corner of hopper support on outside row unit of each side.

SPECIAL INSTRUCTIONS FOR INTERPLANT ROWS

When mounting extra row units between the regular 30" or wide row units, the following special steps must be taken.

1. When assembling the parallel arms and mounting brackets, the 5/8"x1¾" assembly bolts must be installed with the head to the inside. The lower arm mounting bolts must also be removed and turned around. This procedure will allow the operator to simply remove the nut from each of the four bolts and pull the bolts out from the inside. Then after removing the drive chain the extra row unit can be removed, leaving the support brackets. With drive sprocket attached to the planter bar.

2. In some instances, the space between row units may not permit the installation of all hopper lids. This is particulary true when all seed hoppers are filled. Therefore, it may be necessary to install a piece of threaded rod through each side of the hopper and install a large diameter flat washer and hex nut on each side. This will permit the side of the hopper to be pulled in as required and eliminate the possibility of the hoppers rubbing against each other and causing fiberglass damage.

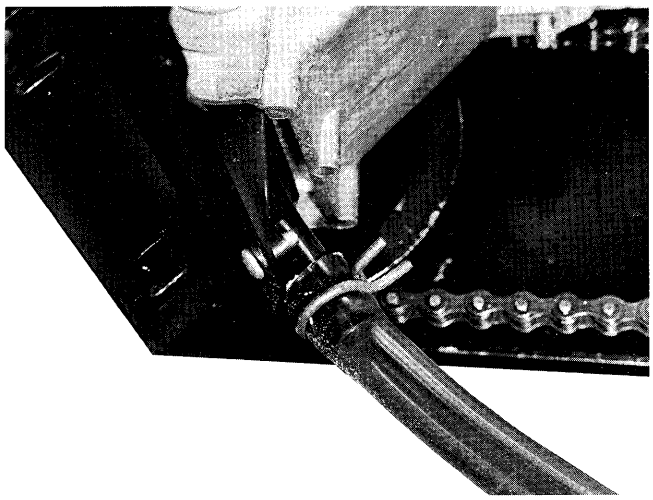


ASSEMBLY

INSECTICIDE AND HERBICIDE ATTACHMENT

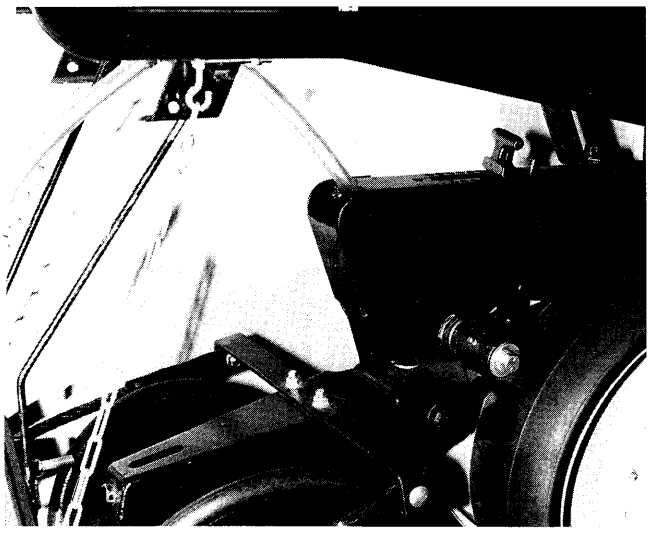
1. Attach insecticide and/or herbicide funnel to hopper support with two No. 10x3/8" self tapping screws. Install insecticide funnel facing forward and herbicide funnel facing rearward.

2. Attach plastic hose(s) to funnel(s) with spring clamp. Hose may be cut if necessary to eliminate bends and provide straight line granule delivery.

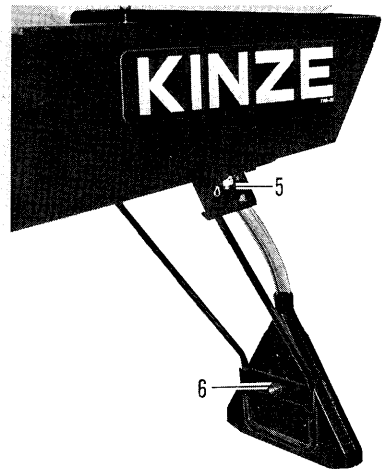


3. Insert adapter tube into insecticide bander and secure bander to shank as illustrated with spring locking clip.

4. Insert insecticide hose into tube and bander assembly. Shorten hose if necessary to eliminate all bends.



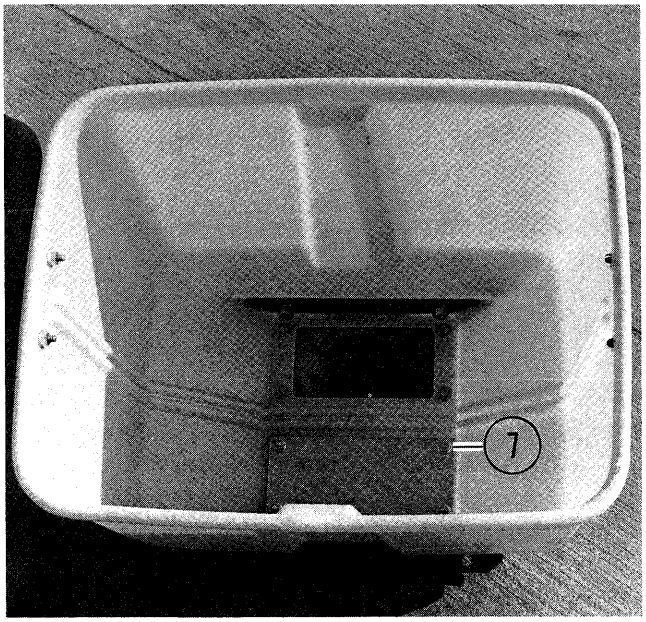
5. Attach herbicide bander hanger brackets to hopper support with four ¼"x¾" carriage bolts, lock washers and hex nuts.



6. Install/herbicide bander hanger in brackets and secure in place with cotter pins. Attach bander to hanger with strap, 3/8"x2" carriage bolt, lock washer and hex nut. The bander may be adjusted for height on the hanger.

   The insecticide/herbicide hopper is shipped for use as a single granular spreader. If the hopper is to be used with both insecticide and herbicide a second granular spreader and a hopper divider must be installed as follows:

7. Remove ¼" cap screws, flange nuts and cover plate from inside of hopper.



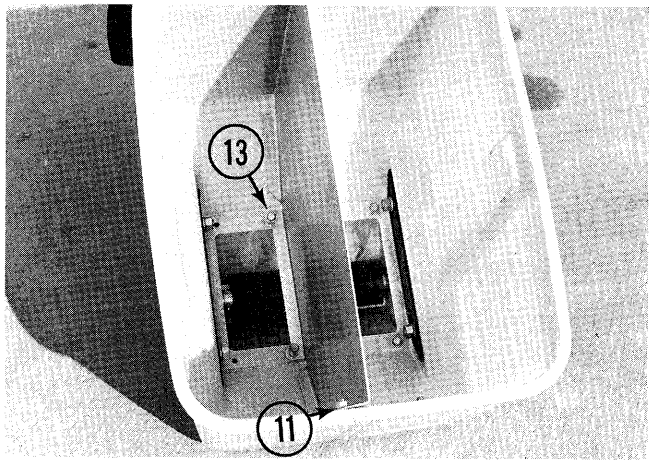
8. Remove cotter pin and washer(s) from roller shaft on existing granualr housing.

9. Attach drive coupler to both granular housings with 5/32"x 1½" cotter pins.

10. Attach second granular housing to hopper with four ¼"x¾" self tapping screws. Do not install the two inboard screws at this time.

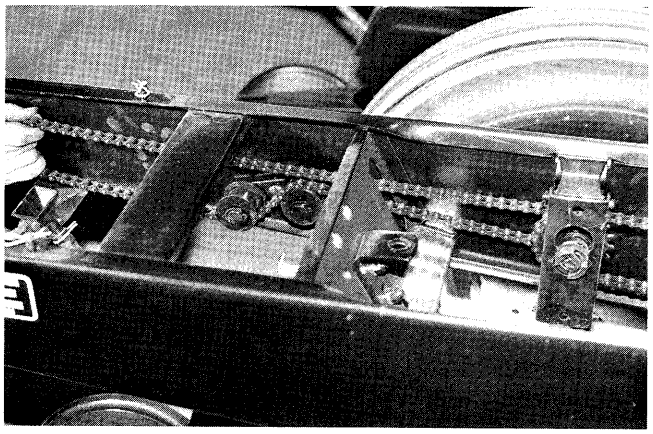
11. Remove right plug from front of hopper and remove ¼" nut and washer from right hinge screws.

12. Install hopper divider. Secure divider to front of hopper with ½"x¾" cap screw, washer and nut. Rear of hopper is secured with existing hinge screw and hardware.



13. Install two remaining housing attachment screws through divider tabs and granular housing. Be certain roller shafts are in alignment and turn freely before tightening screws.

14. Route insecticide and/or herbicide drive chain around 11 tooth part of double sprocket seed hopper drive. Run both upper and lower halves of chain through slot in hopper support and around idlers as shown.



15. Position hopper on rear of support panel and install drive chain around sprocket. Then lower hopper until side brackets seat on support pins. Secure in place with spring locking pins.

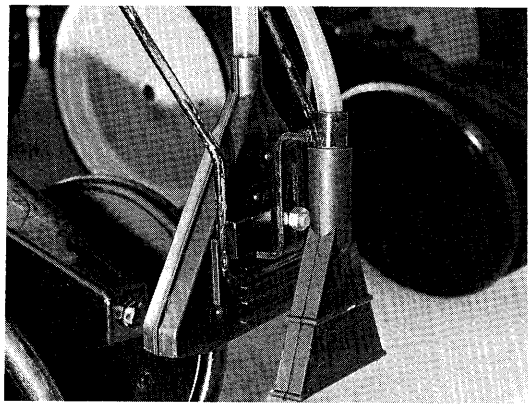
16. If necessary, reposition spouts so they are directly beneath and snub against the granular housing openings.

Rear Mount Insecticide Spreader

To attach the insecticide spreader to an existing herbicide diffuser, proceed as follows:

1. Attach welded bracket to herbicide diffuser with 3/8"x2½" carriage bolt provided.

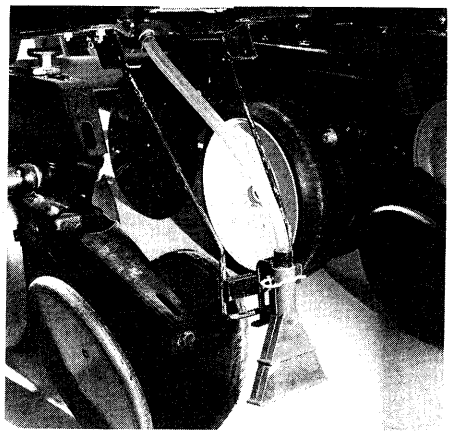
2. Attach insecticide spreader to welded bracket as shown.



3. Removing tapping screw from hopper funnel and turn funnel 180 degrees so that insecticide exits out the rear of the planter unit.

4. Insert hose into welded bracket. Then attach other end of hose to funnel with hose clamp.

The insecticide spreader may also be rear mounted on units not equipped with the herbicide diffuser. Simply install the diffuser hanger as instructed for the herbicide package and attach welded bracket to hanger with clamp and 3/8" x 1½" carriage bolt provided. Make sure funnel projects to the rear of the row unit.



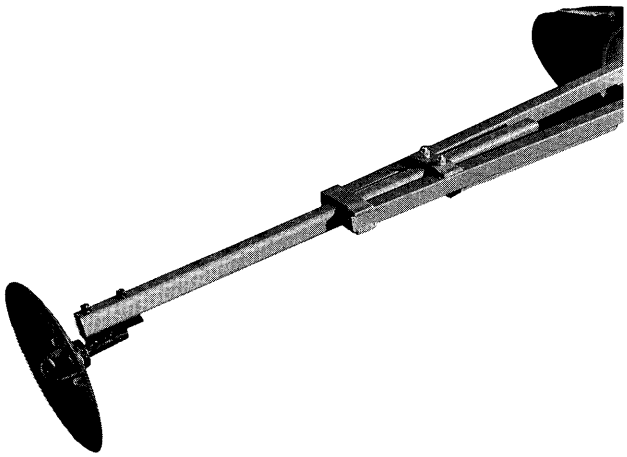
ASSEMBLY

MARKER ASSEMBLY INSTALLATION

Depending upon the size of the planter bar, the marker assemblies will be either a conventional or double folding low profile design. Refer to model configurations following "Introduction" for the type of marker used on each model.

Conventional Marker Assembly

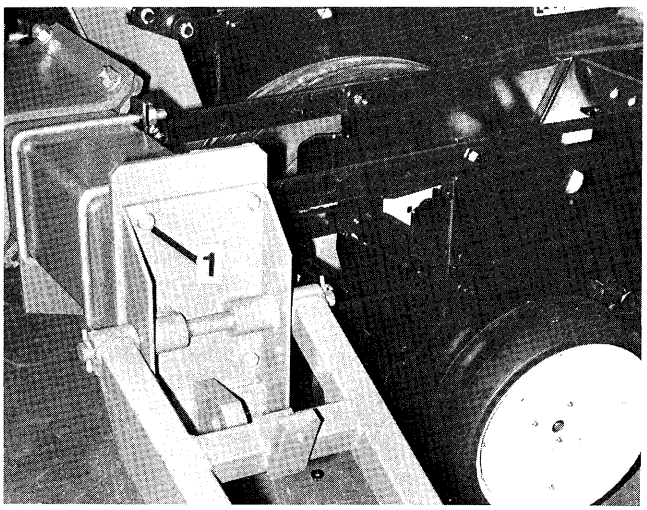
1. The conventional marker assemblies are pre-assembled with the exception of installing the marker disk and hydraulic components. The hub on each marker assembly is designed for either right or left hand installation. Make sure the marker is mounted on the correct side that the spindle and blade project forward. Attach bracket to mounting pad on end of planter bar with four ½"x1½" cap screws, lock washers and hex nuts.



2. Using the bolts pre-installed in the hub, attach the 16" disk to throw dirt out away from the hub and grease seals. Be sure to alternate bolts while tightening to avoid distorting the disk's shape or breaking the marker hub. The spindle bracket has slotted mounting holes which allow the angle of the blade to be increased or decreased.

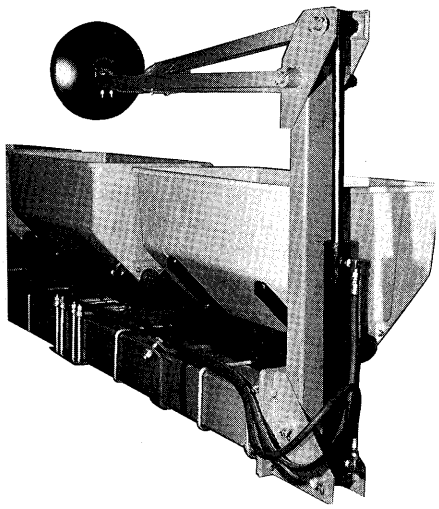
3. Final position of the extension must be set by the operator and is discussed in the operation section of this manual.

4. Refer to the "Marker Hydraulics section which follows for connection of the marker cylinders, hoses and additional hydraulic components.



Double Folding -Low Profile Marker Assembly

1. Install mounting bracket/first stage to mounting pad on end of planter bar with four ½"x1½" cap screws, lock washers and hex nuts. This assembly is interchangeable between the right and left sides.

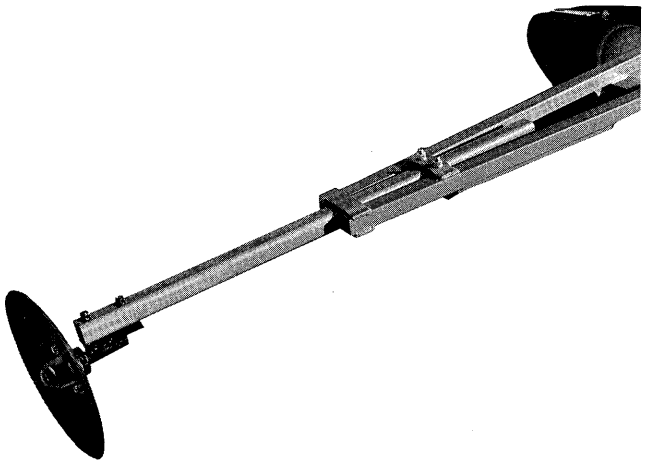


2. Attach pre-assembled second stage of marker with extension and hub to first stage with pivot pin and cotter pins.

IMPORTANT: The hub on each second stage is designed for either right or left hand installation. Make sure this stage is mounted on the correct side so that the spindle and blade project forward. The spindle bracket has slotted mounting holes which allow the angle of the blade to be increased or decreased.

3. Using the bolts pre-installed in the hub attach the 16" disk to throw dirt out away from the hub and grease seals. Be sure to alternate bolts while tightening to avoid distorting the disk's shape or breaking the marker hub.

4. Final position of the extension must be set by the operator and is discussed in the operation section of this manual.



5. Refer to the "Marker Hydraulics" section which follows for connection of the marker cylinders, hoses and additional hydraulic components.

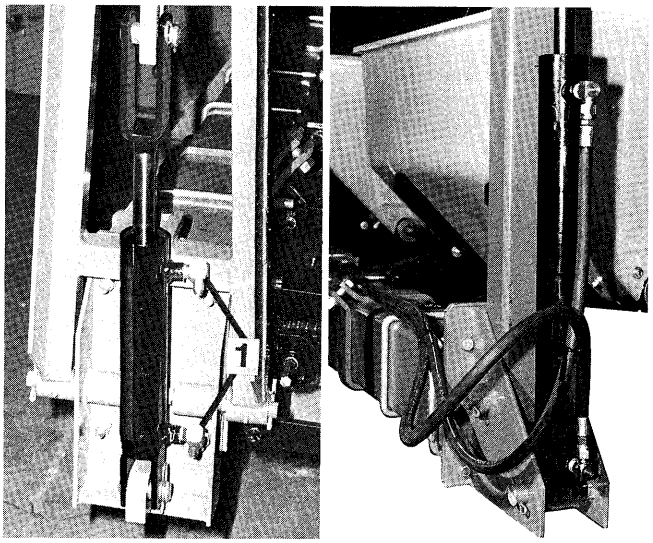
6. Install amber reflector to front lower portion of marker arm on each side.

MARKER HYDRAULICS

Both the single and double folding marker assemblies are hydraulically operated. All double frame planters are also available with a single or double valve hydraulic system. The double valve system requires dual hydraulic outlets on the tractor. One pair of outlets is used to power the planter lift system, while the second outlet is used entirely for the marker system. The single valve system ties the marker cylinders in with the planter bar lift system. As the planter bar is raised, one of the marker assemblies is also lifted. Marker assemblies then alternate raising and lower each time the planter bar is raised and lowered.

Proceed with installation of the marker cylinders and hydraulic system as follows:

Warning: Always leave the marker assembly laying horizontally or secured with safety pin when installing hydraulics. Never rely on the hydraulic cyclinder to hold the marker in the raised or folded position while working on or around planter.



1. Install 90° 3/8" male pipe x 9/16"-18JIC elbow in each port of 2"x 8" conventional hydraulic cylinder ...or 90°½" NPT x ¾"-16JIC elbow in each port of 2½" x 20" low profile hydraulic cylinder.

2. Attach base end of cylinder to marker mounting bracket. Then turn elbow fittings, if necessary, to project rearward and down.

3. Attach hoses to each elbow, routing them around the back of the marker and along the frame bar. When securing hoses to the frame, allow for flexing at marker arm.

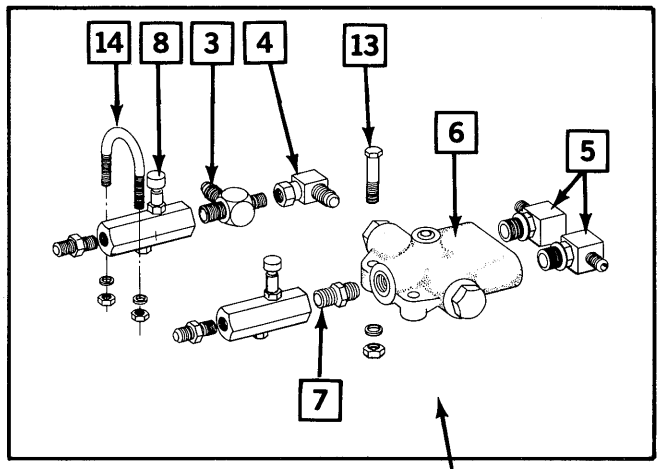
4. Assemble sequencing valve, flow control valves, and fittings as shown for your particular unit. Due to the variations between pull type and mounted planter bars and between single and dual valve systems, refer to the appropriate illustration for correct assembly of all hydraulic hardware.

5. Secure all hydraulic hoses to planter bar frame with nylon tie straps. Route hoses to tractor under clamps on planter tongue and tighten clamp bolts.

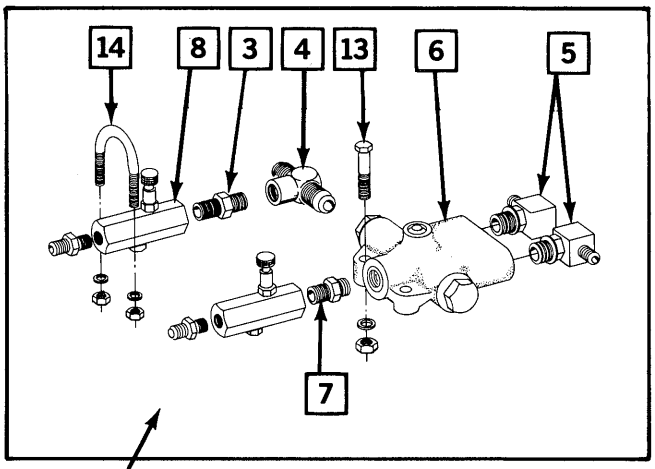
⚠ **WARNING: Always stand clear of marker assembly and blade when in operation.**

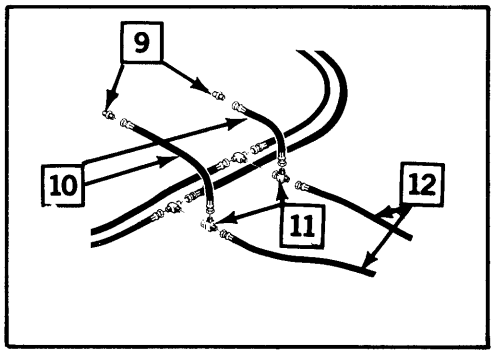
ASSEMBLY

Fittings Used With
Conventional Markers

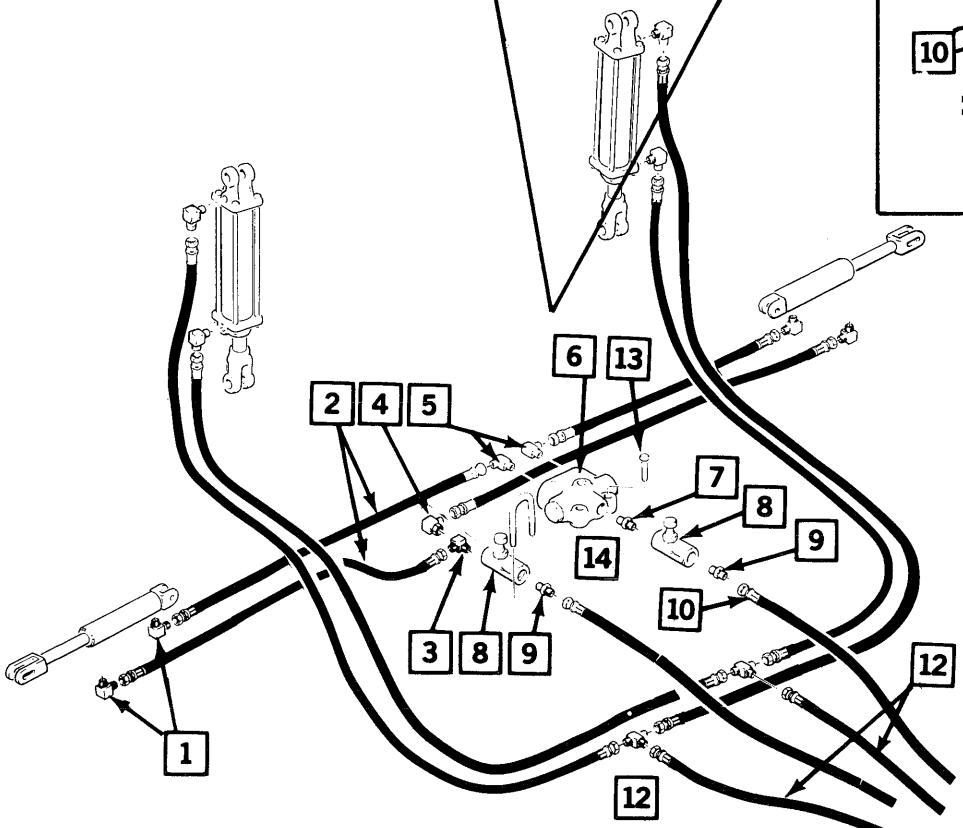


Fittings Used With Low Profile Markers





Single Valve System



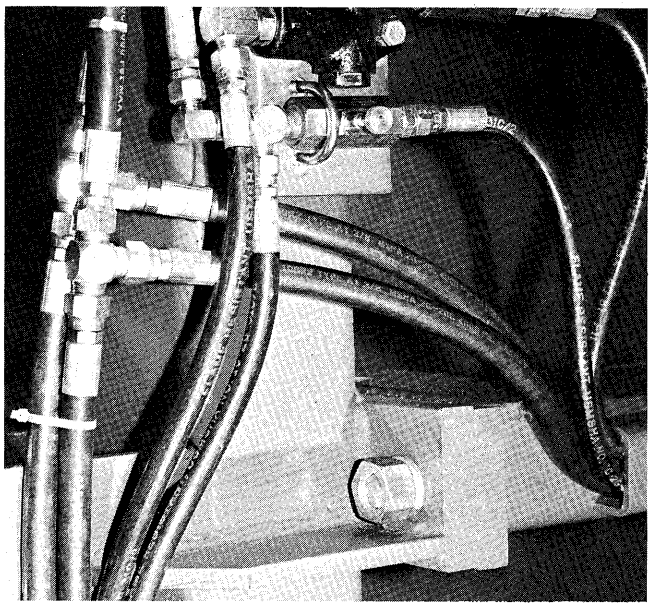
Dual Valve System
(Conventional Marker System Illustrated

ASSEMBLY

Legend

1. ½" NPT x 9/16"-18JIC Elbow
   (Low Profile Marker**)
   3/8"NPT x 9/16"-18JIC Elbow
   (Conventional Marker*)
2. ¼" Hydraulic Hose w/9/16"-18JIC Swivel
   Both Ends (Used with Conventional Marker*)
   4 Row 30" - 6 Row 30" - 125"
   4 Row Wide - 110"
   3/8" Hydraulic Hose w/3/4"-16 JIC Swivel
   Both Ends (Used with Low Profile Marker**)
   6 Row Wide - 150" (4) 8 Row Wide - 150" (4)
   8 Row 30" 160" (2) 8 Row Wide - 36" (4)
   8 Row 30" - 150" (2)
3. 90° 3/8" NPT x 9/16" - 18 JIC Male Tee
   (Conventional Marker System)
   3/8" NPT Male Pipe Fitting
   (Low Profile Marker System**)
4. 90° 9/16"-18 JIC Swivel x 9/16" JIC Male Elbow
   (Used on Conventional Marker System*)
   3/8" NPT Female Side Tee
   (Low Profile Marker System**)
5. 90°3/4"-16 O-Ring x 9/16"-18 JIC Elbow
   Conventional Marker*)
   90° 3/4" - 16 O-Ring x 3/4"-16 JIC Elbow
   (Low Profile Marker**)
6. Sequencing Valve
7. 3/4"-16 O-Ring x 3/8" NPT Straight Adapter
8. Flow Control Valve, 3/8" NPT
9. 3/8" NPT x 3/4"-16 JIC Straight Adapter
   (Used on all models except those with
   Dual Valve Conventional Marker System)
   3/8" NPT x 9/16"-18 JIC Straight Adapter
   (Used on Dual Valve, Conventional Marker
   System* only)
10. 1/4" x 140" Hydraulic Hose, 1/2" NPT x
    9/16"-18 JIC Swivel (Used on Dual Valve,
    Conventional Marker System*)
11. 3/8" x 140 Hydraulic Hose, 3/4"-18 JIC Swivel x
    1/2" NPT (Used on Dual Valve, Low
    Profile Marker Systems**)
    3/8" x 15" Hydraulic Hose, 3/4"-18 JIC Swivel
    Both Ends (Used on all Single Valve System)
12. 3/4"-16 JIC Swivel Tee
13. 3/8" x 140" Hydraulic Hose, 1/2" NPT x
    3/4-16 JIC Swivel
14. 3/8" x 2" Hex Head Cap Screw, Lock Washer
    and Hex Nut
15. 5/16" U-Bolt, Flat Washer, Lock Washers and
    Hex Nuts.

* 4 row 30", 4 row wide and 6 row 30" and equipped with Conventional Markers and 9/16" fittings.
**6 row wide, 8 row 30" and 8 row wide are equipped with Low Profile Markers and ¾" fittings.



IMPORTANT: The flow control valves must be installed with the arrows pointed toward the tractor.

CAUTION: Before the marker assembly is first put into use, the flow control valves must be adjusted to prevent damage to the marker assembly. Loosen the lock nut on each knurled adjustment knob and screw the adjustment all the way closed. Then open each valve approximately ½ turn. After the marker has been cycled several times final adjustments can be made.

Before operating the marker assemblies, first connect all hydraulic hoses and cycle the cylinder several times with the ram end disconnected to purge air from the system. After the cylinders are operating smoothly, attach the ram end clevis to the marker arm.

OPTIONAL EQUIPMENT ASSEMBLY

Regular Duty Down Pressure Springs

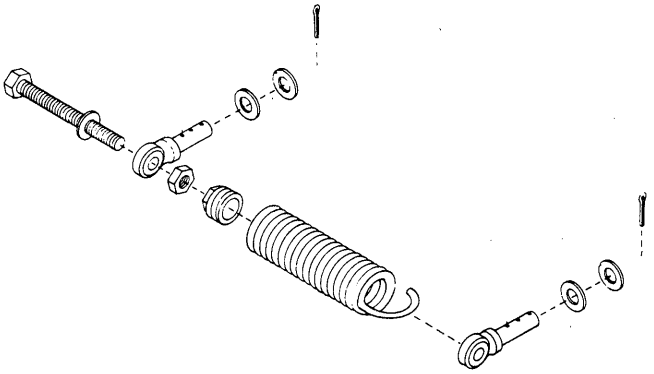
If extra row units are to be installed between the regularly spaced planter units, the springs should be installed on the inside of the row unit frame. Otherwise, they should be installed on the outside of the frame as instructed below:

1. Install eyebolt in top and bottom support arms with a flat washer on each side of support and secure in place with cotter pin.

2. Hook down pressure spring in lower eyebolt.

2. Place flat washer on 7/16" x 4" full thread capscrew and install through top eyebolt, 7/16" jam nut and spring plug. Tighten bolt until sufficient down pressure is obtained.

Important: Make sure length of stretched spring is equal on each side of row unit. Spring tension must be further adjusted by the operator to match ground conditions.



Heavy Duty Down Pressure Springs

1. Install support plate on U-bolts directly behind support angles as part of row unit installation procedure. (The support plate is held in place with the same hardware that is used to attach row unit.)

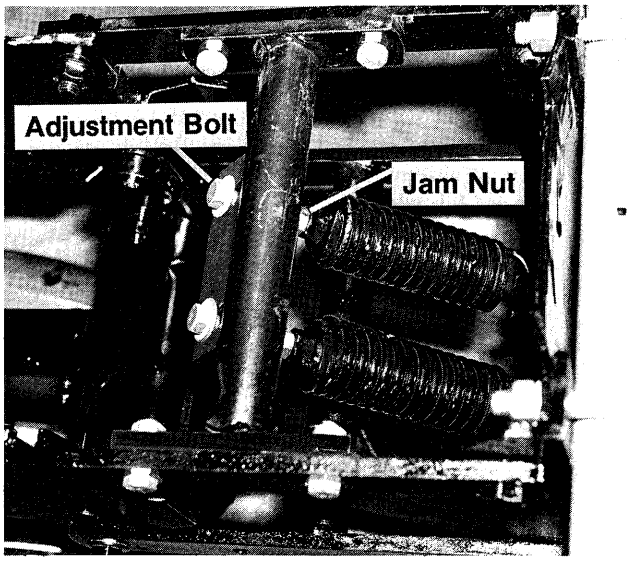
2. Attach spring tube to upper row unit support arms with four-½" x 1½" cap screws and locknuts.

3. Hook tension springs to support plates. Then install ½" x3" cap screws, flat washers, and jam nuts as shown; threading cap screw into spring plug.

Note: It may be necessary to lift planter bar to start the bolts into the spring plugs.

4. Equally tighten both adjustment bolts to obtain the desired amount of down pressure tension.

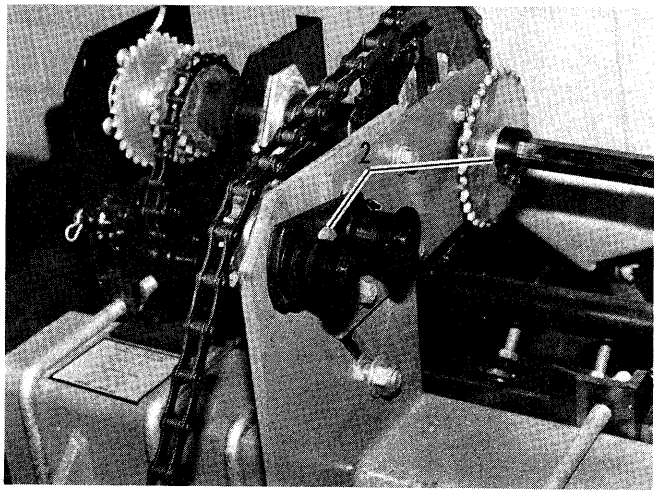
IMPORTANT: It is necessary for the operator to adjust springs for ground conditions. If springs are overtightened, it is possible in some cases that the row units actually lift the planter bar to the point that the drive wheel do not contact the ground sufficently for proper operation.



OPTIONAL PUSHER ROW UNITS (Double Frame Planter Only)

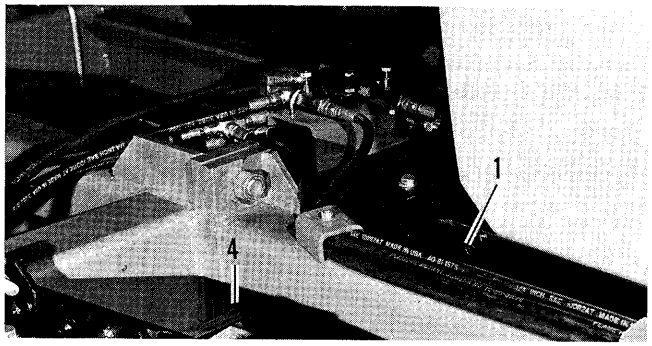
1. Assemble and install pusher row units on front tool bar in the same manner as the conventional row units described on page 12. The units must be positioned on the front bar so that the row spacing is between the rear units. The center row unit is positioned between the "Y" in the tongue.

2. Disconnect hex drive shaft for seed drive transmissions and install lock collar and drive sprocket on the inboard side of the bearing support bracket as shown. Install chain idler (in hole provided) near the front of the bearing support with carriage bolt and hardware.

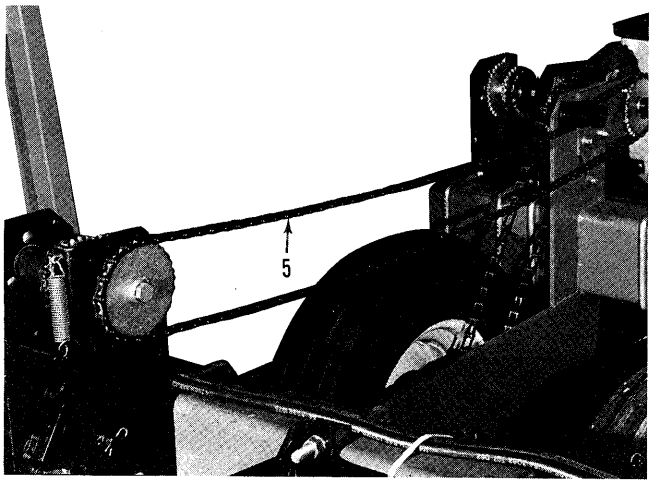


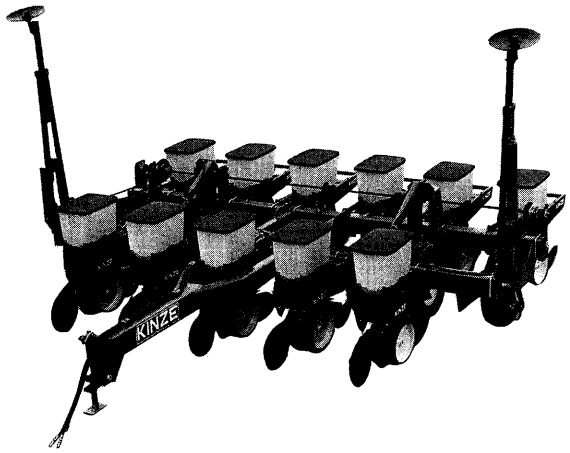
3. Install front seed drive transmission with 5/8" U-bolts so that driven sprocket is in alignment with the drive sprocket installed in step 2.

4. Install hex drill shaft through bearing/drive sprocket assemblies on each row unit beginning with the unit on the far left. Holes provided in the tongue assembly allow the shaft to run the full width of the planter. Connect the drill shaft to the transmission with the driver and cotter pin pre-installed in the coupler.



5. Connect drive chain between the drive sprocket and transmission. Pivot the idler assembly against the chain to provide sufficient tension and tighten mounting bolt.



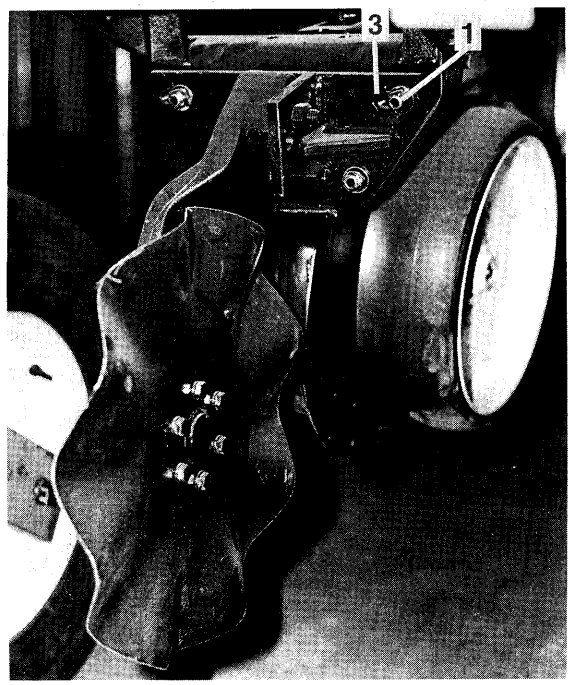


ASSEMBLY

Coulters

The heavy duty coulter attachment is available with either a 16" fluted blade or rippled blade for no till or minimum till planting.

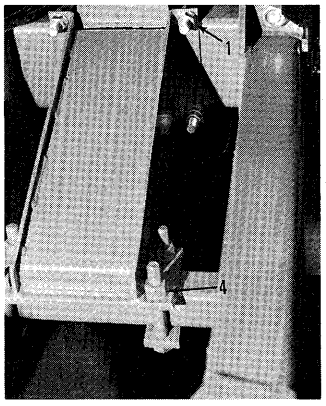
1. Attach coulter bracket to row unit frame with four ½" x 1¼" cap screws and locknuts, but do not tighten completely at this time.
2. Install coulter blade with six-3/8" x 1" cap screws. Tighten bolts alternately to avoid distorting the blade.
3. Shift mounting bracket within the limits of the adjustment slots until coulter is aligned with row opener disks. Then finish tightening mounting bolts.
4. Three positions are provided for adjustment of coulter operating depth. To change depth position, loosen the locknut that secures the ¾" x 3½" cap screw. Then loosen and remove 5/8"x4" cap screw and reposition coulter as desired. Reinstall 5/8" cap screw and tighten both locknuts securely.

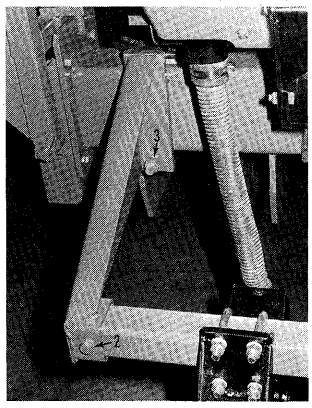


DRY AND LIQUID FERTILIZER ATTACHMENT

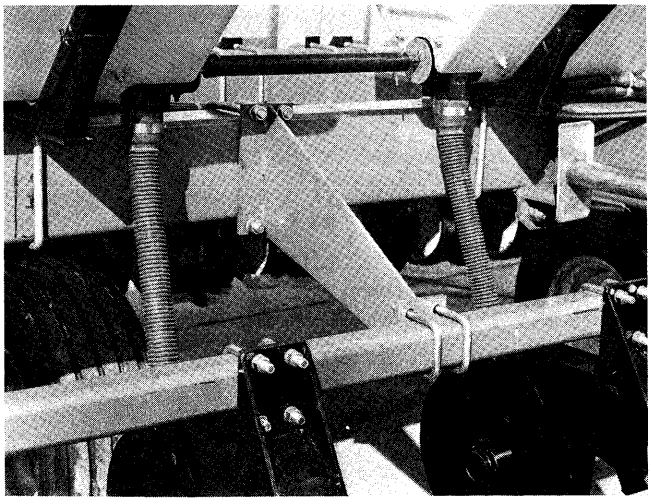
Fertilizer Bar Installation-Double Frame Planter

1. Install fertilizer bar center support between the "Y" section of the tongue with two 5"x7"x5/8" U-bolts, lock washers and hex nuts.
2. Attach bar end brackets to the fertilizer bar with ½x3¾" cap screws, lock washers and hex nuts.
3. Lift bar into position and attach end mounting brackets to toolbar with 5"x7"x¾" U-bolt, lock washer and hex nuts.
4. Secure center of fertilizer bar to center support bracket with mounting straps, and four ¾"x4½" cap screws, lock washers and hex nuts.





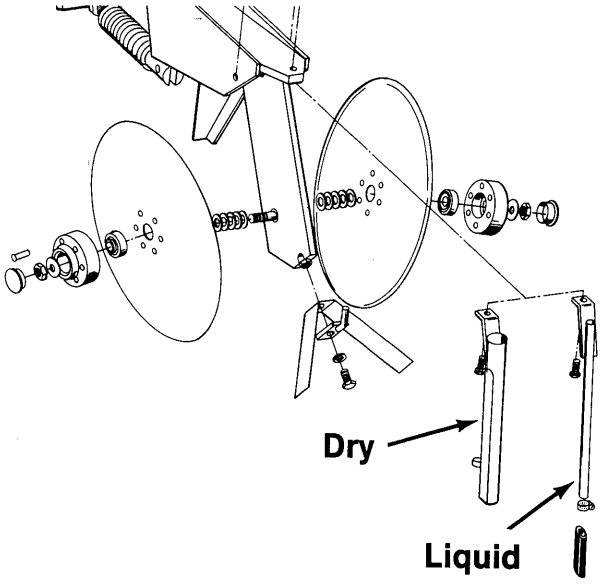
On 6 row wide and all 8 row units, a fertilizer bar stabilizer is installed midway between the tongue and the end of the planter of each side. Each stabilizer bar is attached to the tool bar with two 5"x7"x5/8" U-bolts, lock washers and hex nuts. Attach the opener bar end with two 2½"x2½" U-bolts.



ASSEMBLY

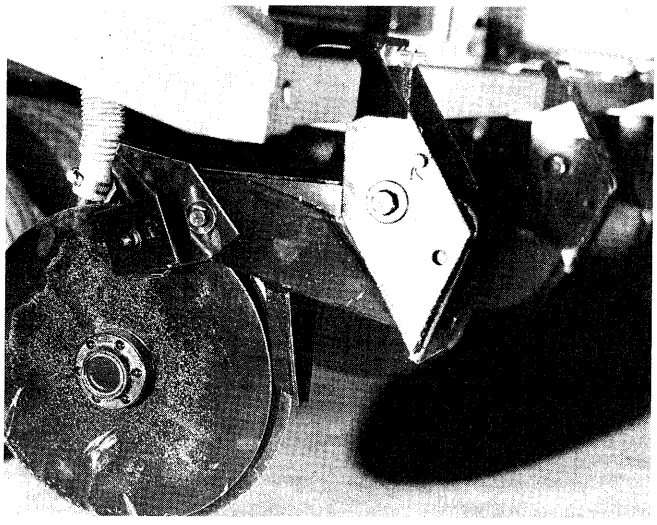
Double Disk Openers

Both the liquid and dry fertilizer attachments use the same 15" double disk openers. Attach drop tubes to each opener by positioning the bottom of the tube on the drop tube retainer and attaching the top of the tube with one 5/16"x1½" cap screw and locknut.



Attach disk openers to the fertilizer bar so that disks are positioned two inches to the side of the row unit openers. When installing openers for dry fertilizer, position the opener on the side nearest the hopper outlet.

The down pressure springs on the double disk openers are factory preset at 250 pounds, but may be further adjusted for various soil conditions. To adjust spring tension, loosen the jam nut with a 15/16" wrench and adjust the tension adjustment bolt with a 1" wrench. Turning the adjustment bolt clockwise increases down preassure. Retighten the jam nut upon completion of tension adjustment.

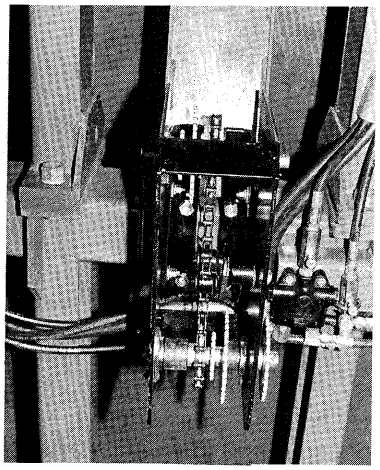


WARNING: Do not operate the double disk openers at full down pressure tension when planting in rocky ground. Chipping of the disk blades may occur.

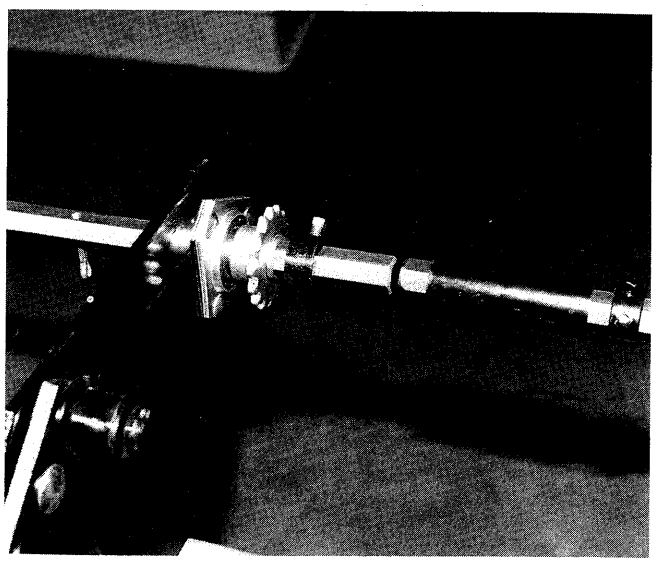
DRY FERTILIZER ATTACHMENT

Transmission and Drive Installation

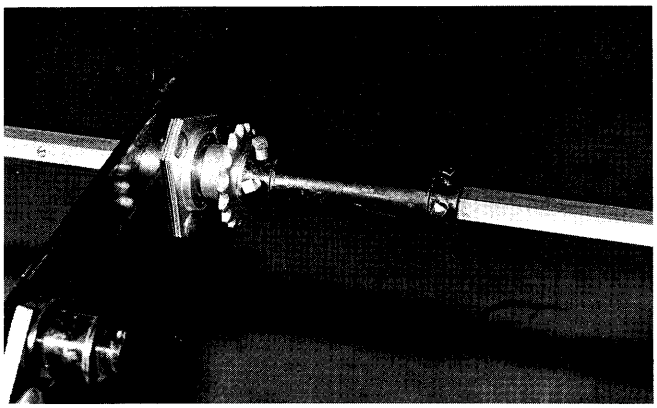
1. Attach fertilizer transmission to front toolbar with two 7"x5"x5/8" U-bolts. Lock washers and hex nuts. The tramsmission is positioned on the planter center line on 4 and 8 row models and to the left of center as illustrated on page 22 thru 23 on 6 row models.



2. Locate the point on the hex drive shaft in direct alignment with the transmission sprocket. Then cut the shaft approximately 3" to the right of this mark.



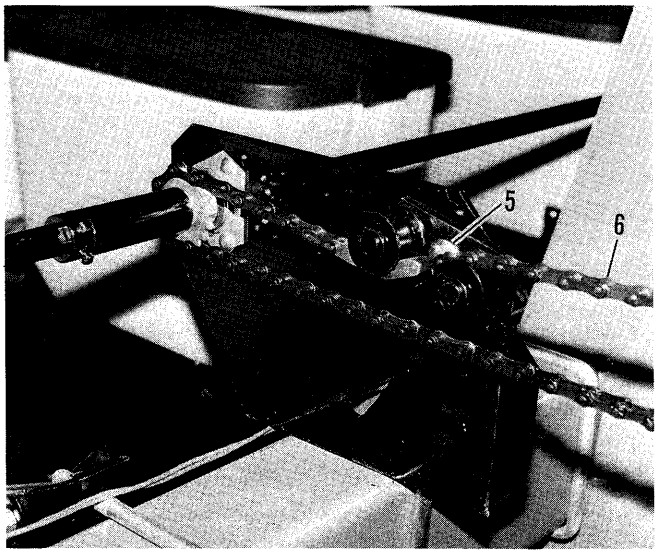
3. Assemble 7/8" hex bore bearing and flangettes on drive shaft support bracket supplied. Slide bearing and bracket onto the left shaft portion followed by the 16 tooth drive sprocket and lock collar. Slide sprocket against bearing and position bracket on the rear tool bar so that drive sprocket and transmission driven sprocket are in alignment. Secure bracket with 5/8" U-bolt.



4. Join portions of hex shaft that were cut with 7/8" hex bore coupler and secure in place with lock collars.

5. Install idler bracket on drive shaft support bracket with ½"x1½" cap screw. Position internal-external washer, flat washer and second internal-external washer between idler and support bracket.

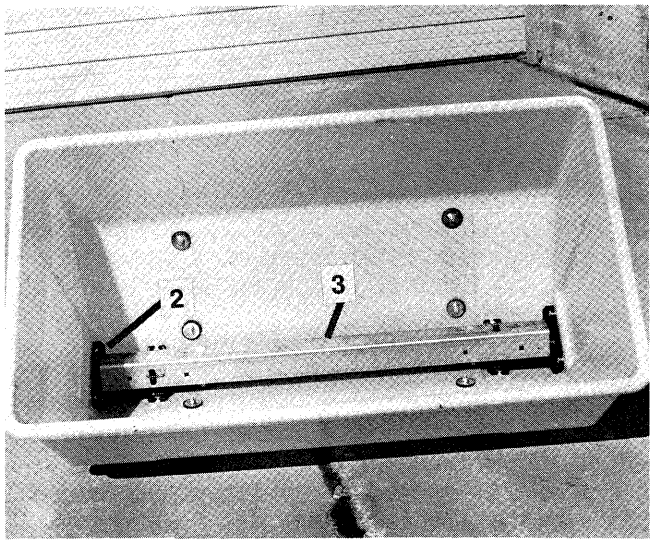
6. Install 105 link drive chain between drive shaft and transmission as shown. Pivot double spool idler to provide sufficient tension and tighten mounting bolt.



HOPPER INSTALLATION - ALL MODELS

1. Install the hopper mounting brackets on the planter bar in the locations illustrated on the following pages. Do not tighten attachment bolts at this time.

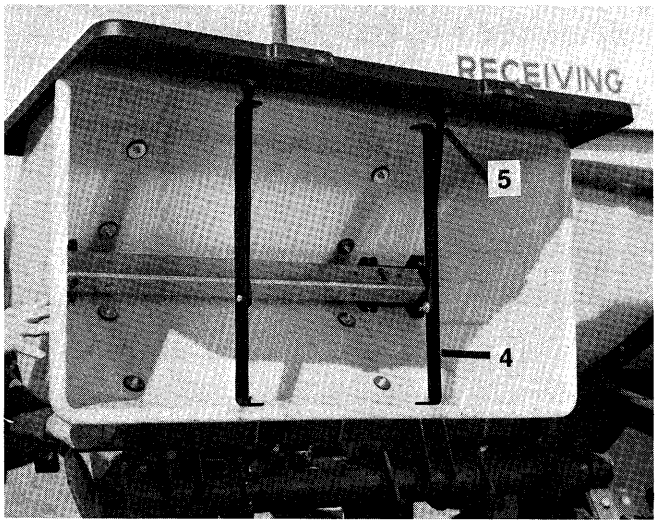
2. Remove the cotter pin and flat washer from one end of the fertilizer shaft and slide the entire assembly through the outlet housing into the hopper. Secure in place by reinstalling the washer and cotter pin. Check rotation to make sure the auger springs will carry fertilizer to the outer ends of the hopper when in operation. If rotation is wrong, remove the auger assembly, turn it 180° and reinstall.

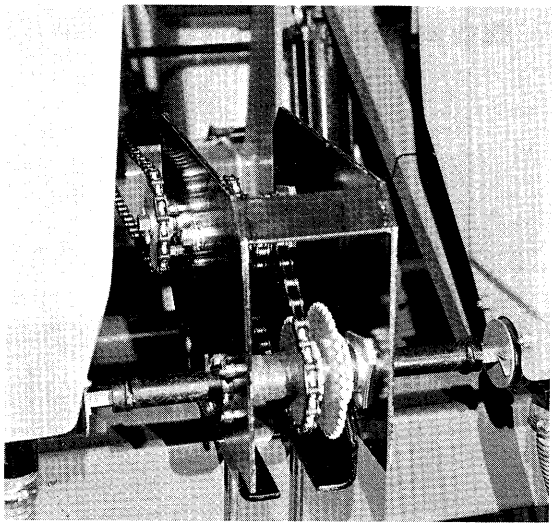


3. Install auger shields over augers and secure in place with two hair pins on each.

4. Install two hopper braces in hopper with bolts provided. Each brace is drilled for installation of a rubber lid strap. Make sure this hole is closest to the front of the hopper. Place one of the rubber washers between each end of the brace and the inside surface of the hopper. Attaching bolts should be installed with the head to the outside of the hopper and a flat washer between the head and the outside hopper surface.

ASSEMBLY





5. Position the hopper lid so the latches will be to the front of the hopper and install two rubber straps between hopper braces and underside of lid. Install a rubber washer between the bolt head and the rubber strap...and a lock washer and nut on the outside of the braces. The bolt holding the strap to the lid should have a flat washer under the bolt head on the lid top...and a flat washer, lock washer and hex nut next to the strap on the bottom side of the lid.

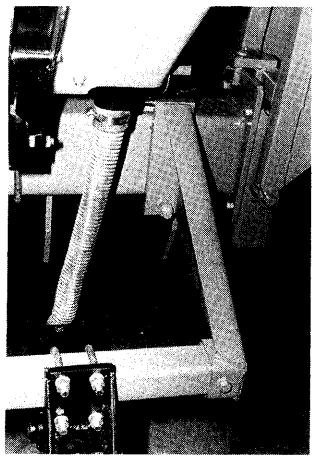
6. Install the hoppers on the hopper mounts with the round hole in the saddle toward the front. Attach the front side of the hopper to the mount with two 7/16"x3" clevis pins and cotter pins.

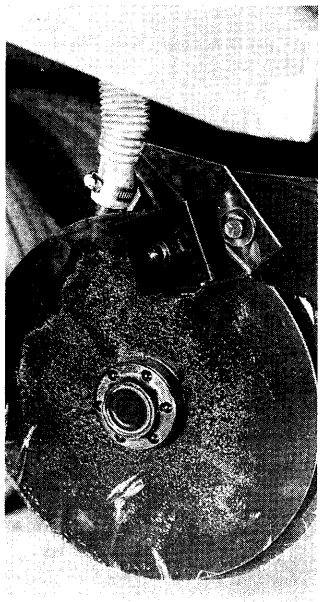
7. Install coupler/drive shafts beginning at the transmission and working outward toward each end. Slide the square end of the coupler over the auger shaft so that at least ¾" or more of the shaft extends into the coupler. Attach opposite end of the coupler/drive shaft with 3/16" cotter pin. Four holes in the auger shaft allows for 1½"or 3" to extend beyond the end of the hopper. In most installations the short end is toward the transmission. Make sure all coupler/drive shafts are installed with the cotter pin toward the transmission.

8. Once the coupler/drive shafts have been connected, bolt the rear of the hopper saddle to the hopper support with two ½"x1¼" cap screws.

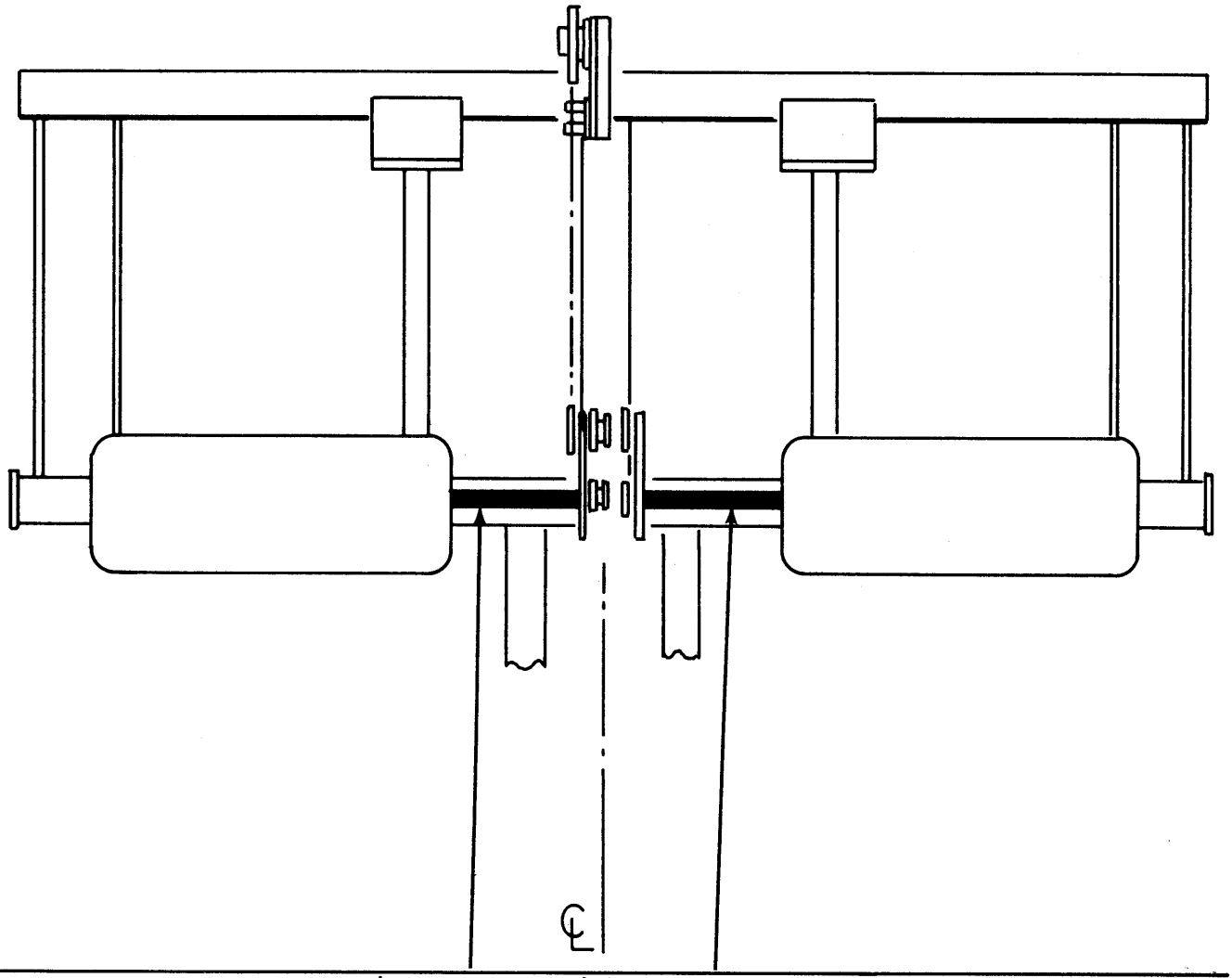
9. Align all hoppers and the transmission both horizontally and vertically and tighten all mounting bolts. Slots in the transmission and mounting bracket allow for up and down and forward and backward adjustment.

10. Connect all fertilizer drop tubes between hopper outlets and double disk opener drop tubes. Make sure tubes are straight; and secure with hose clamps.



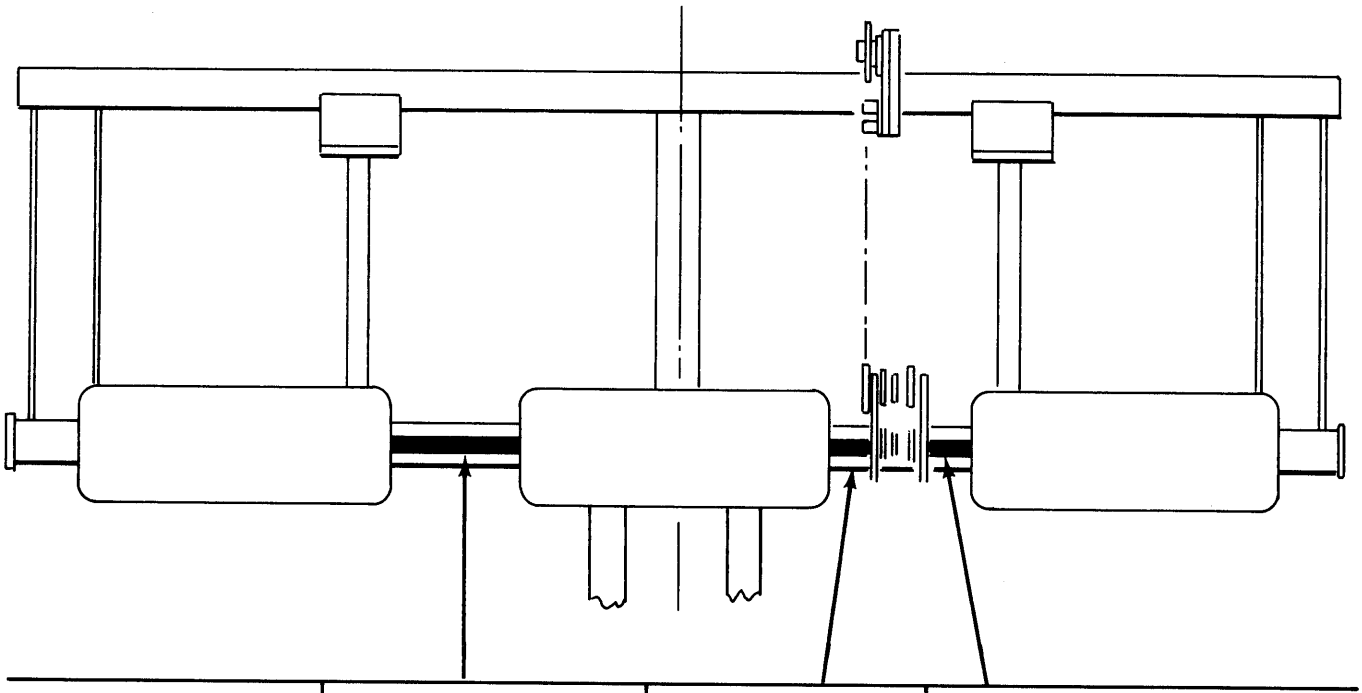


4 Row 30", 4 Row Wide Dry Fertilizer Couplers



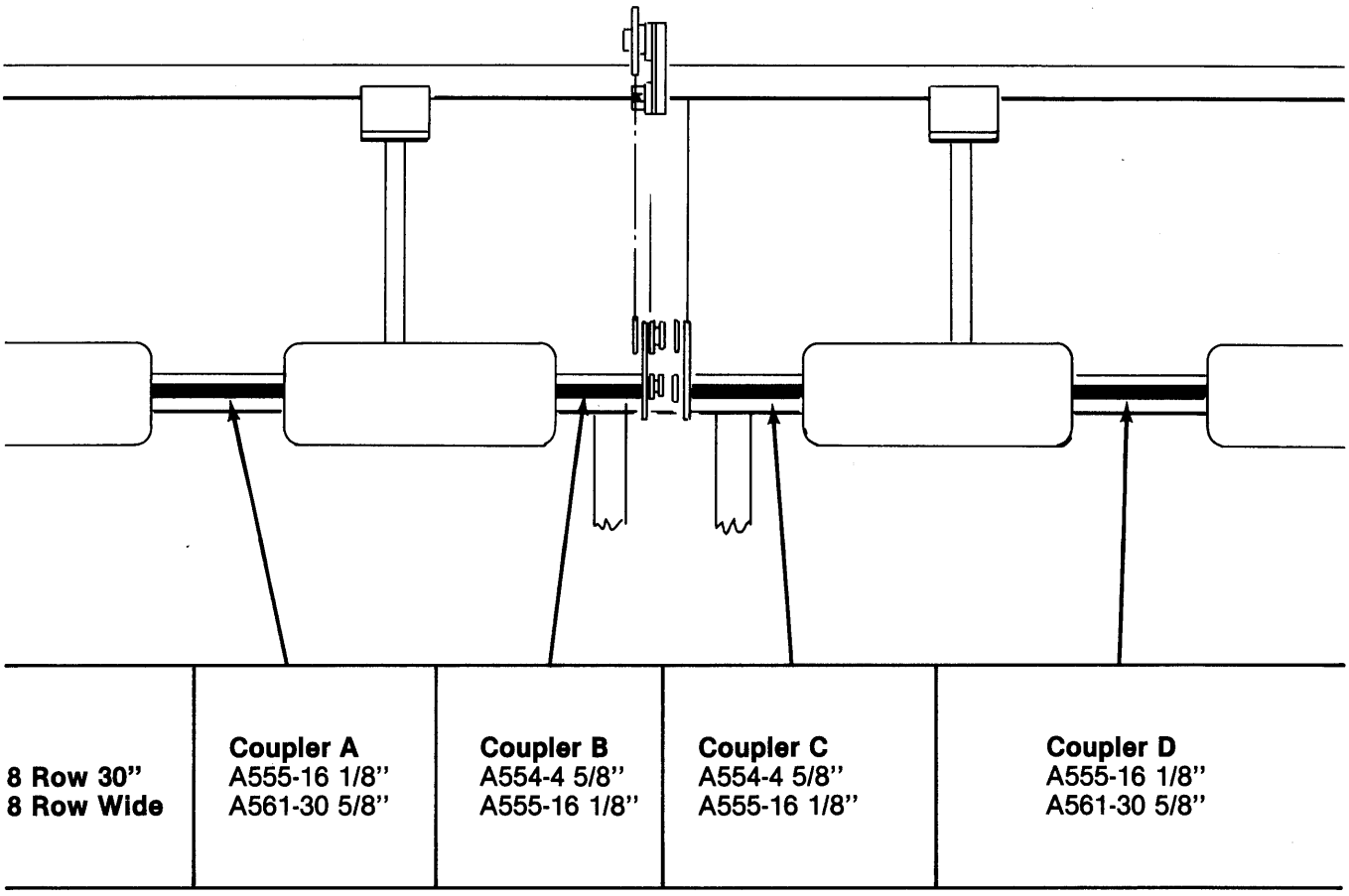
	Coupler A	Coupler B
4 Row 30"	A554-4 5/8"	A555-16 1/8"
4 Row Wide	A554-4 5/8"	A555-16 1/8"

6 Row 30", 6 Row Wide Dry Fertilizer Couplers



6 Row 30" **6 Row Wide**	**Coupler A** A555-16 1/8" A561-30 5/8"	**Coupler B** A554-4 5/8" A554-4 5/8"	**Coupler C** A554-4 5/8" A560-18 5/8"

8 Row 30", 8" Row Wide Dry Fertilizer Couplers



8 Row 30" **8 Row Wide**	**Coupler A** A555-16 1/8" A561-30 5/8"	**Coupler B** A554-4 5/8" A555-16 1/8"	**Coupler C** A554-4 5/8" A555-16 1/8"	**Coupler D** A555-16 1/8" A561-30 5/8"

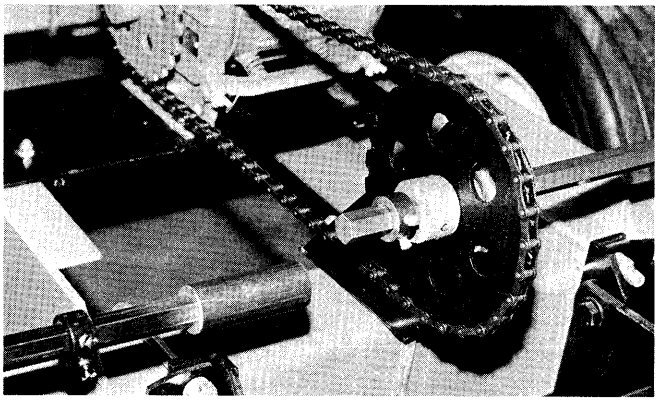
LIQUID FERTILIZER ATTACHMENT

Squeeze Pump and Drive Installation

1. Attach squeeze pump to base plate of mounting bracket with four 3/8" x 1 ¾" cap screws, lock washers and hex nuts. The bolts on the left side join the base plate, squeeze pump and lower mounting bracket plate.

2. Position base and pump between frame braces as shown and install right hand lower plate. Do not tighten bracket clamp bolts at this time.

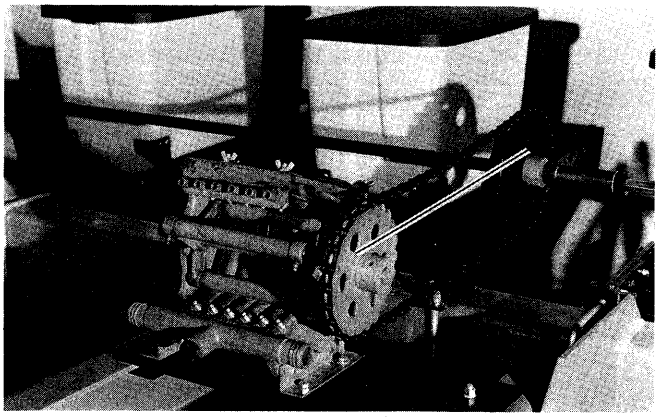
3. Install sprocket adapter, selected driver sprocket and sprocket retainer on left side of squeeze pump.

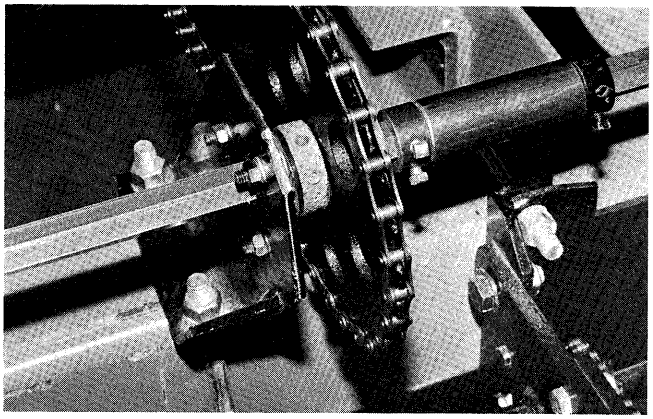


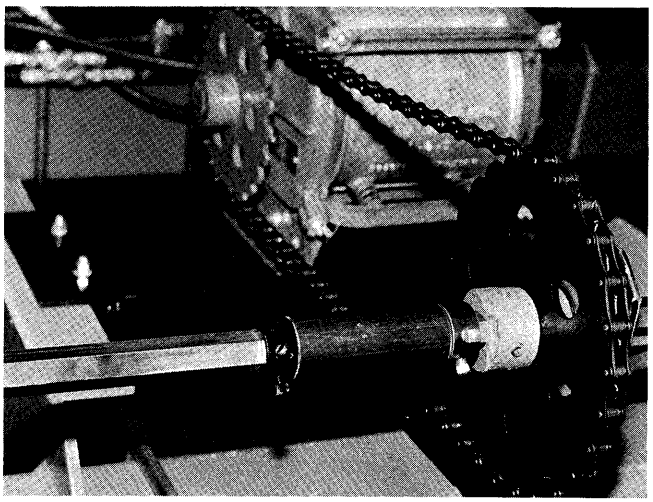
4. Placing a straight edge ruler along the side of the driven sprocket, mark a point on the hex drive sprocket in direct alignment with the squeeze pump sprocket.

5. Cut a 1½" section out of the hex drive sprocket approximately 3" to the right of this mark.

6. Install sprocket adapter, selected drive sprocket and sprocket retainer on the hex shaft. It may be necessary to loosen and slide the center shaft support bracket to the left to attain sprocket alignment.







7. Install one lock collar on each portion of the cut drive shaft and slide the shaft coupler onto either side. Align the shaft ends and slide the coupler to reconnect the drive. Slide lock collars against each side of the coupler and secure in place.

8. Install drive chain between squeeze pump drive and driven sprockets. Slide squeeze pump and mounting bracket forward to obtain approximately ½" deflection of the drive chain.

Tank and Hose Installation

1. Attach two tank saddle brackets for each tank on tool bar and fertilizer bar with ½" U-bolts around fertilizer bar and 5/8" U-bolts around tool bar.

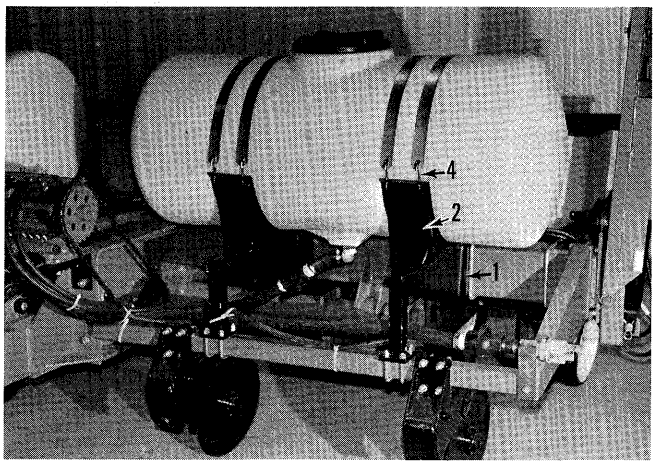
2. Attach tank saddle to tank saddle bracket with four ½" x 1½" cap screws.

NOTE: Two sets of front mounting holes are provided for installation of 100 or 150 gallon tank saddles.

ASSEMBLY

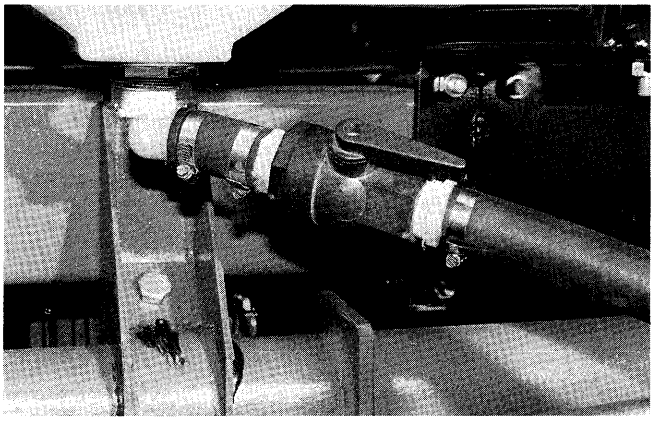
3. Install outlet elbow in bottom of each tank.

4. Install tanks on tank saddles with straps and J-bolts, lock washers and hex nuts as shown.



5. Attach a short piece of 1¼" hose to each outlet elbow and then install adapter fittings and shut-off ball valve.

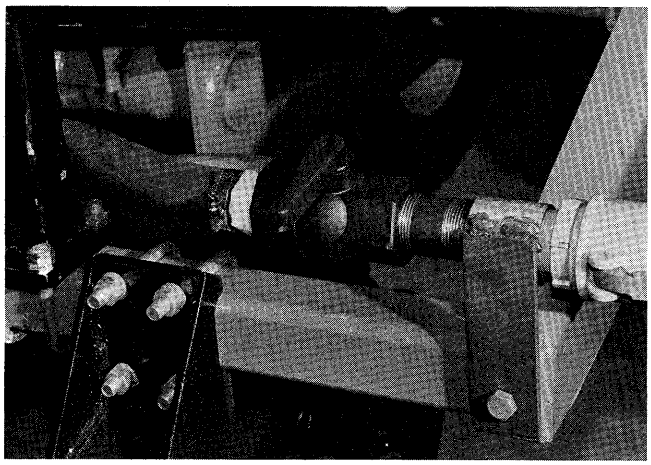
NOTE: The 1¼" hose for connecting tanks to squeeze pumps is provided in a roll and must be cut to length. Attach hose to each fitting or connection with hose clamps provided.



6. Attach additional 1¼" hose to each ball valve to extend to center of planter bar. Then join hoses from each tank with 1¼" hose barb tee.

NOTE: Make sure hoses between tanks and front of squeeze pump are long enough to allow forward movement of the squeeze pump. This is important to allow for chain tension adjustment.

7. Cut approximately 2" out of left hose and install second 1¼" hose barb tee. Then attach sufficient length of hose to extend to outer end of tank for quick fill attachment.



8. Attach quick fill bracket with threaded pipe fitting to fertilizer bar end bracket as shown.

9. Assemble male adapter, 1¼" ball valve, pipe nipple and quick fill fitting to bracket as shown.

10. Connect 1¼" hose between squeeze pump intake manifold and barb tee which connects tanks. Install rubber plugs in unused manifold inlets.

CAUTION: Avoid excessive pressure when using the quick fill attachment. The rubber plugs installed in the manifold may be forced out under pressure.

11. Connect fertilizer hoses between squeeze pump outlet manifold and double disk openers. The plastic hose comes in a roll and must be cut to length for each row. Begin with the two outside first, allowing enough hose for up and down movement of disk openers.

12. Secure all hoses to the planter frame with nylon tie straps.

LUBRICATION

The following pages show the location of all lubrication points. Proper lubrication of all moving parts will help insure efficient operation of your Kinze unit and prolong the life of friction producing parts. Those parts equipped with grease fittings should be lubricated at the frequency indicated with an SAE multipurpose type grease. Be sure to clean the fitting thoroughly before using grease gun. The frequency of lubrication recommended is based on normal operating conditions. Severe or unusual conditions may require more frequent attention.

Sealed Bearings

A number of sealed bearings are used on your Kinze Planter Bar to provide trouble free operation. These are located in such areas as the drive shaft, row units, and transmission bearings. Sealed bearings are lubricated for life, and due to the seals, relubrication is not practical.

Corn Meter Lubrication

To provide efficient operation of the finger type plateless corn meters and extend the life of com ponents, sprinkle a teasopoon of powdered graphite over the top of the seed each day. The graphite will filter down into the seed pickup mechinism and insure lubrication.

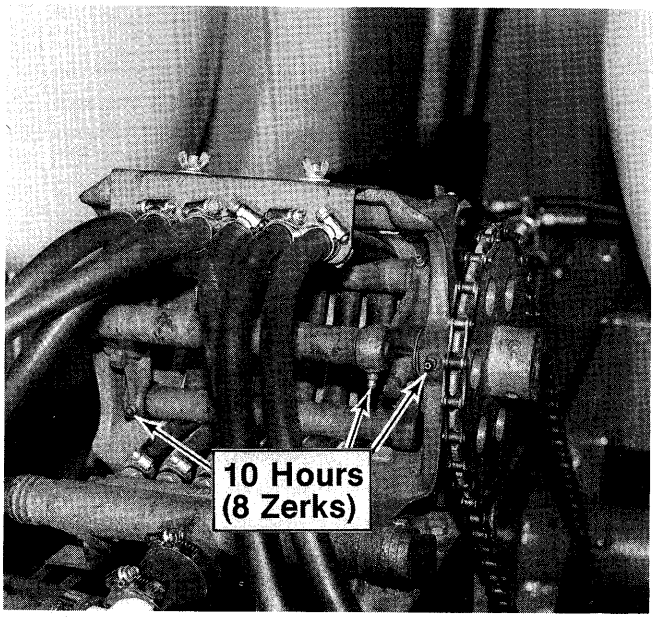
Drive Chains

The transmission and row unit drive chains should be lubricated approximately every 8-10 hours with a quality engine oil or equivalent SAE 10 weight oil. A good quality spray lubricant may also be used for periodic chain lubrication. Extreme operating conditions such as dirt, temperature, or speed may require more frequent lubricaiton. If any of the chains become stiff, it should be removed and soaked and washed in solvent to loosen and remove dirt from the joints. Then soak the chain in oil so the lubricant can penetrate between the rollers and bushings.

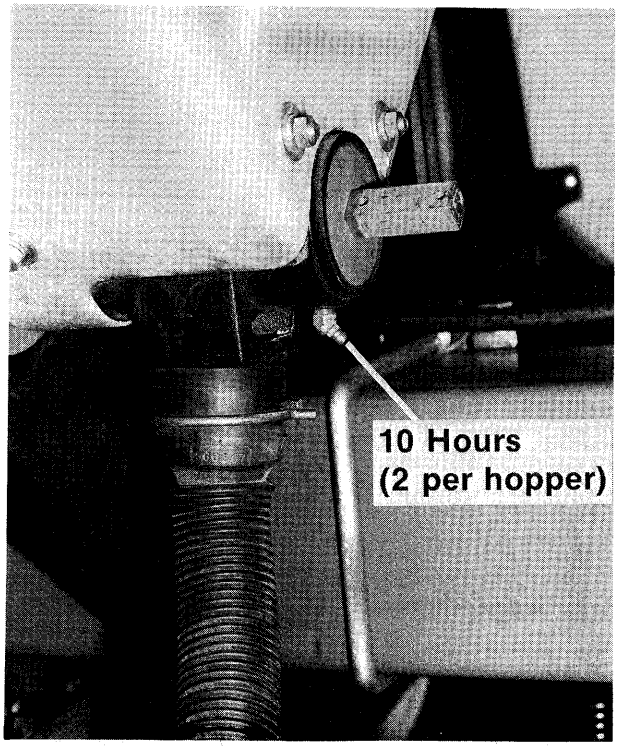
Wheel Bearings

Wheel bearings should be repacked with clean heavy duty axle grease approximately once a year or at the beginning of each planting season. This applies to all drive wheels, transport wheels and marker hubs. Transport wheels on the double frame planter bar may require less frequent service depending upon amount of road travel. Follow the procedure outlined for wheel bearing replacement with the exception that bearings and bearing caps are reused.

Fertilizer Options

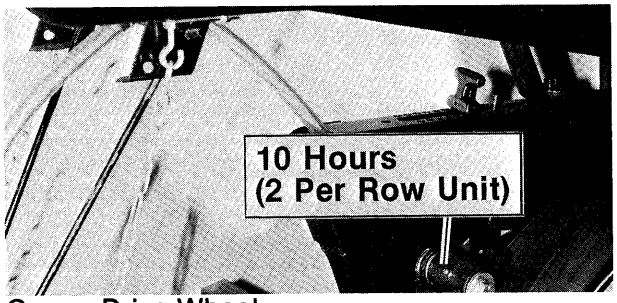


Liquid Fertilizer Pump

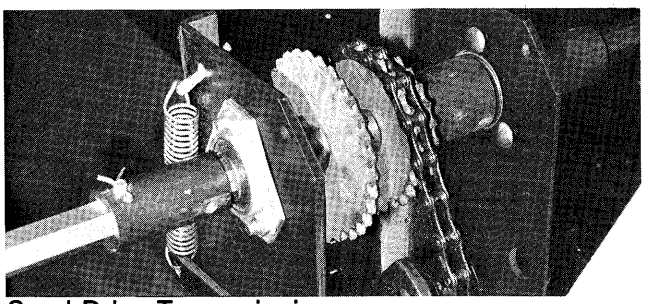


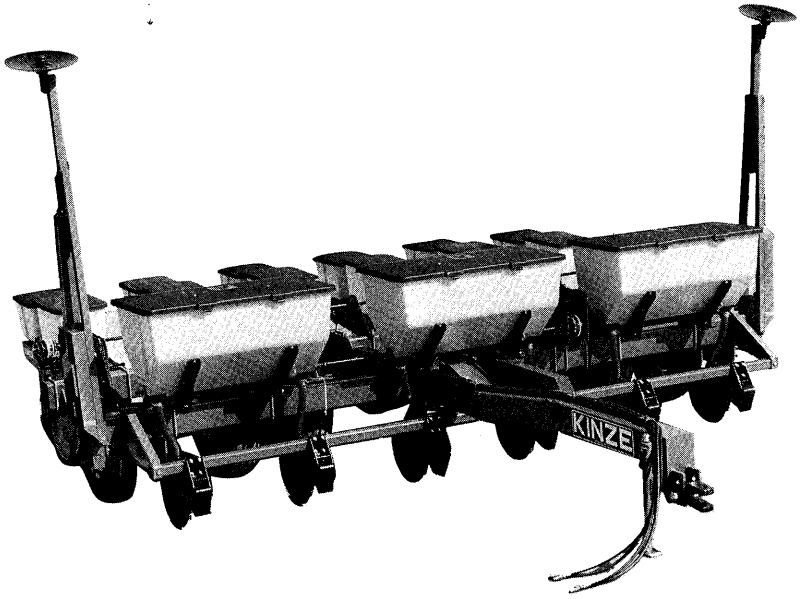
Dry Fertilizer Hopper

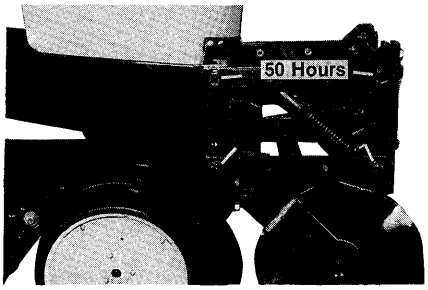
LUBRICATION

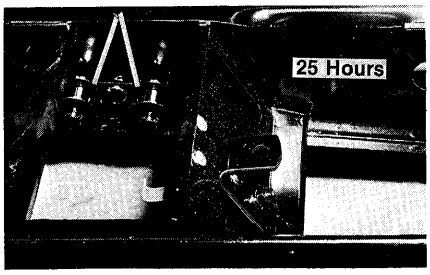


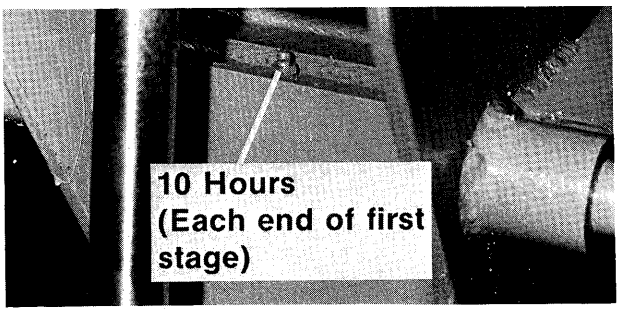
Gauge Drive Wheel


Seed Drive Transmission



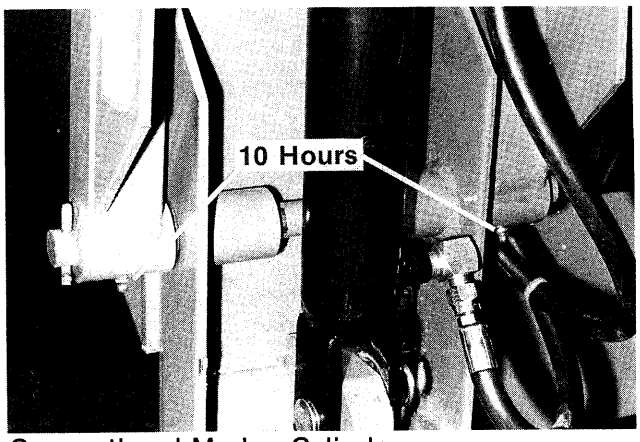




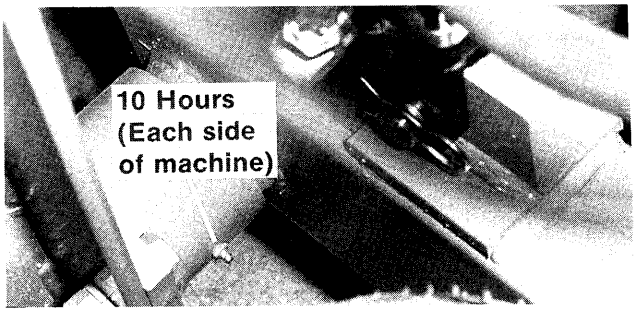


Low Profile Marker Assembly

The parallel arm (8) bushings should be lubricated every 50 hours and the idler spools every 25 hours with a quality engine oil or equivalent SAE 10 weight oil.



Conventional Marker Cylinder



Transport Wheel

OPERATION

The following information is general in nature and was written to aid the operator in preparation of the tractor and planter bar for use, and to provide general operating procedures. The operator's experience, familiarity with the machine and the following information should combine for efficient planter operation and good working habits. The operator's manual for the row units used with your Kinze Planter Bar should also be readily available and consulted for planter operation.

Initial Preparation of the Planter Bar

Lubricate the Planter Bar and row units per the lubrication information in this manual and the row unit operator's manual. Make sure all tires have been properly inflated. Check all drive chains for proper tension and lubrication.

Tractor Preparation and Hookup

1. Adjust tractor drawbar so that it is 13 to 17 inches above the ground. Then adjust the drawbar so that the hitch pin hole is directly below the center line of the PTO shaft. Make sure the drawbar is in a stationary position.

2. Back tractor up to planter bar and connect with hitch pin. Make sure hitch pin is secured with locking pin or cotter pin.

3. Connect hydraulic hoses to tractor ports in a sequence which is both familiar and comfortable to the operator.

⚠ Before applying pressure to the hydraulic system, make sure all connections are tight and that hoses and fittings have not been damaged. Hydraulic fluid escaping under pressure can have sufficient force to penetrate skin, causing injury or infection.

IMPORTANT: Always wipe hose ends to remove any dirt before connecting couplers to tractor ports.

4. Raise jack stand and remount horizontally on storage bracket.

5. Lower planter bar to the planting position and check tongue for levelness. If tongue slopes up or down, disconnect planter bar and adjust hitch clevis up or down as necessary.

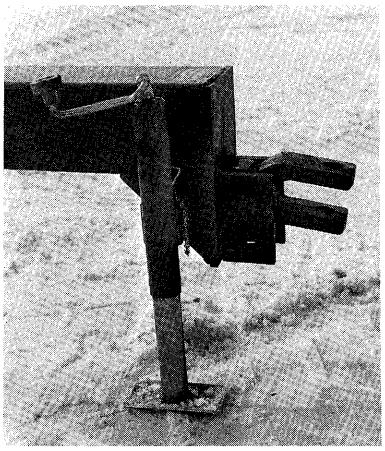
Transporting The Planter Bar

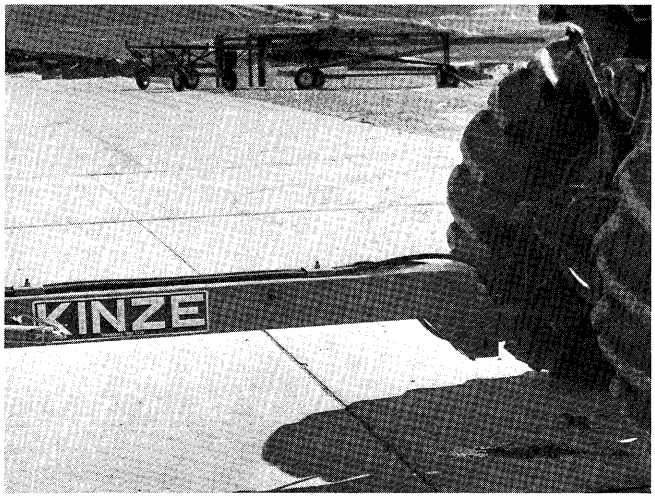
⚠ Always make necessary safety preparations prior to transporting the planter bar on public roads. This includes installing Slow Moving Vehicle (SMV) emblem and use of adequate lights or safety warning after dark.

Leveling The Planter Bar

For proper operation of the planter bar and row units, it is important that the unit operate level.

Two holes in the double frame tongue hitch bracket allow the clevis to be raised or lowered. In addition, the clevis may be turned over for a finer adjustment between mounting holes. When installing clevis mounting bolt, make sure lock washer is in place and tighten hex nut to proper torque setting.





Always check fore and aft levelness with the planter bar lowered to proper operating depth. Then sight across tongue or place a bubble level on the tongue and frame itself.

In order to maintain lateral levelness, it is important that tire pressure be maintained at pressures specified.

Tire Pressure

Tire pressure should be checked regularly and maintained as follows:

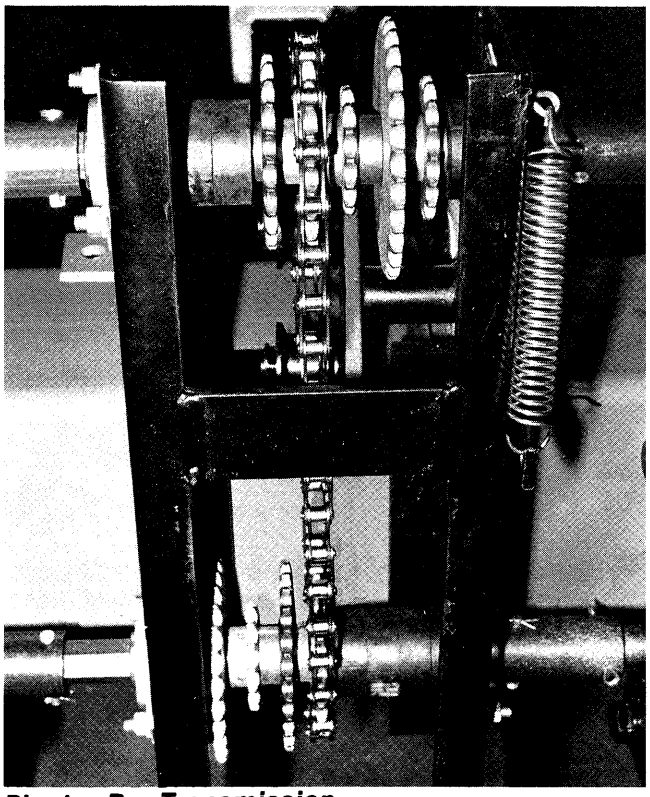
Transport-11L x 14" 6-Ply-35 lbs. PSI
Drive Gauge-7:60 x 15" 4-Ply-40 lbs. PSI

IMPORTANT: Tire pressure must be correctly maintained in all drive wheel tires to insure levelness of planter bar and proper operation of planter. Also, all rate charts are based on rolling radius of 7:60 x 15 tires inflated to 40 PSI.

Transmission Adjustment

The transmission is designed to allow simple and rapid changes in sprocket combination to obtain the desired planting population. Since both the transmission drive shaft and the row unit drive shaft are hexagonal in shape, the sprockets need only be slid into alignment with the idlers after first removing the rubber spacers and loosening the drive chain. The combination of small sprockets may require shortening the drive chain.

A decal positioned next to the transmission and the information provided in your row unit operator's manual or planting rate chart in this manual will aid you in the selection of the correct sprocket combinations. After positioning both sprockets, replace rubber spacers between sprockets or on the ends as necessary. Then restore tension on the drive chain.



Planter Bar Transmission

Hydraulic Marker Operation

The double frame planter bars are equipped with either a single or double valve hydraulic system. The double valve system allows the markers to be operated independently of the planter lift cylinders. Each time a marker is completely raised, the sequencing valve will direct flow to lower the opposite marker.

Planter bars equipped with a single valve system will require that the planter be raised in order to lift the marker. Each time the unit is raised, the markers will alternately be raised. Then, as the planter bar is lowered, the opposite marker will lower. It is possible to experience an inconvenience with this system if the unit must be raised at points other than at the end of the field. For example, if the planter bar is raised to cross a waterway, the opposite marker will be lowered when the unit is dropped back into the ground. Therefore, it will be necessary to stop, and again raise and lower the bar to restore correct marker operation.

⚠ WARNING: Always stand clear of the gauge marker assembly and blade when it is in operation.

Both the left and right marker assemblies on all planter bars, whether single or dual valve systems, have two flow control valves built into the hydraulic system. This permits the operator to manually adjust the proper speed of "lift" and "lower" for each marker as there is a valve for each direction on both cylinders.

CAUTION: The flow controls should be properly adjusted before the marker assembly is first put into use to prevent equipment damage.

To properly match the marker cylinder speed to your tractor's hydraulic system, loosen the lock nut which secures the knurled adjustment knob in place. The raise or lower time is increased by closing the valve (clockwise). This restricts oil flow and slows the speed of the marker cylinder. To increase the cylinder speed and decrease raise or lower time turn the valve counterclockwise to open the valve. This action has no effect on the transport wheel cylinders on single valve systems.

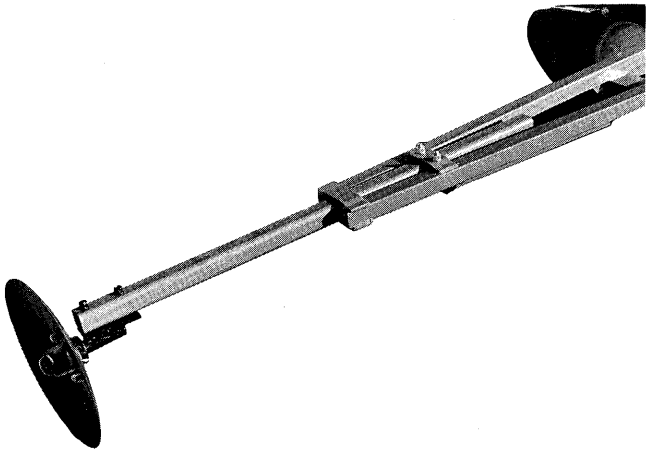
NOTE: After the flow controls have been adjusted, the marker speed will decrease with cold oil supply. Make sure that all adjustments are made with warm oil.

⚠ WARNING: Always position marker lock-up pin in "safety" position when transporting or storing planter bar. See Safety Precaution.

Marker Adjustment

To determine the correct length at which to set the marker assemblies, multiply the number of rows by the row spacing in inches. This provides the total planting width. Then adjust the marker extension so that the distance from the marker disk to the center line of the planter bar is equal to the total planting width previously obtained. Both the planter and marker assembly should be lowered to the ground when measurements are being taken. Also, the measurement should be taken from the point where the disk contacts the ground. Adjust right and left marker assemblies equally and securely tighten clamping bolts. An example of marker length adjustment follows:

Number of Rows	x	Row Spacing (inches) =	Dimension between planter bar center line and marker blade
6 x 30"	=	180" marker dimension	



The marker disk is installed so the concave side of the disk is outward to throw dirt away from the grease seals. To provide further variation in the size of the mark, the spindle bracket is slotted so the hub and blade can be angled forward or rearward to throw more or less dirt. To adjust the hub and spindle, loosen the ½" x 3½" capscrews and move the bracket as required. Then tighten bolts to the specified torque.

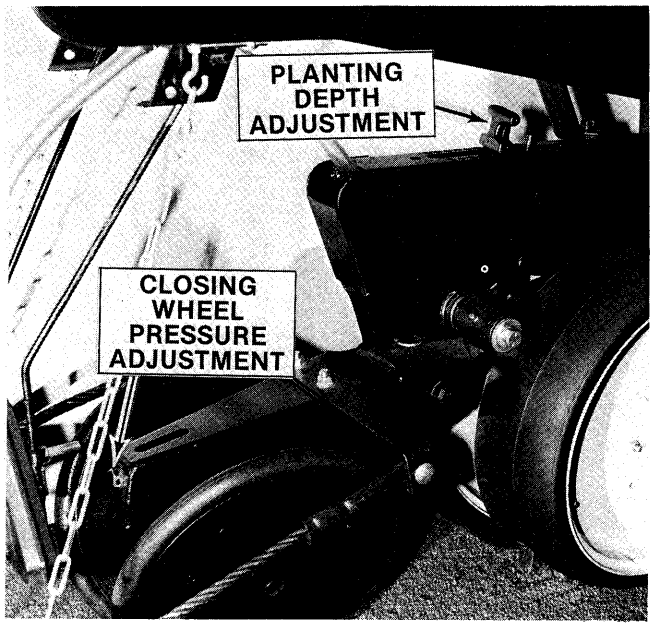
Tractor Speed

Depending upon seed population being planted and sprocket combinations, ground speeds may range from 2 to 7 miles per hour. However, optimum speed for most conditions is 5 to 5.5 MPH. Seed population may increase at higher planting speeds, particularly at higher population rate settings.

Consult the operator's manual and planting rate charts for your row units for further tractor speed information. Planting rate charts for Kinze row units equipped with plateless corn or soybean meters can be found at the end of the operation section of this manual.

Planting Depth

Planting depth is maintained by the row unit gauge wheels. To increase or decrease the planting depth, first raise the planter bar to remove weight from the wheels. Then lift the depth adjustment handle and reposition it forward to decrease depth or rearward to increase planting depth. Adjust all units to the same depth initially. Then lower the planter bar and check operation and planting depth of all row units. It may be necessary to readjust certain rows to obtain consistant operation.



Closing Wheel Pressure

After adjusting for planting depth, check the operation of the closing wheels. The closing wheels should gently close the row without sinking in or compacting the soil. To increase spring pressure on the closing wheels, turn the adjustment bolt, located at the rear of the closing wheel arm in a clockwise direction. Turning the bolt in the counterclockwise direction decreases spring tension.

Adjust all row units to a similar setting. Tension setting can be determined by checking the position of the tension spring through the viewing slot on top of the closing wheel arm.

When planting in light soil at average depth (approximately 2") start by setting the dimension between the bolt head and the rear edge of the spring plug at 2 inches. For medium soil at average depth, increase spring tension to obtain 1½" between the bolt head and spring plug.

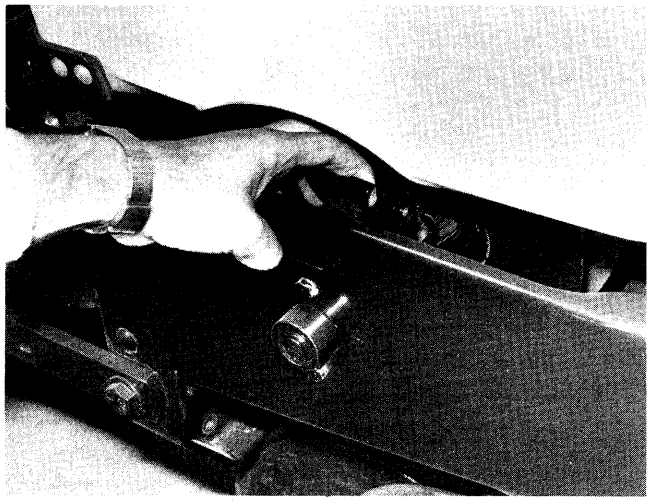
For heavy soil and average planting depths of 2 to 3 inches, set the bolt dimension at approximately 1".

IMPORTANT: In field conditions that require a light soil setting of more than 2", it is recommended that a jam nut be placed on the bolt and tightened against the spring plug. This will prevent bolt loss when operating with minimum spring tension.

Plateless Drive Release

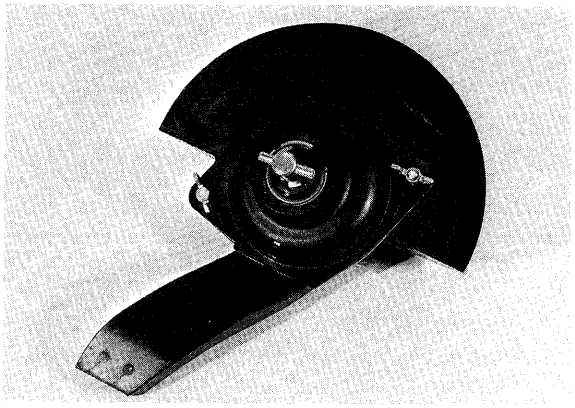
The plateless drive clutch is equipped with a release mechanism that allows the drive to be disconnected from the seed metering unit. Disconnecting the drive allows the operator to check insecticide and/or herbicide application rates without dropping seed. It also allows one or more of the rows to be disconnected when finishing fields.

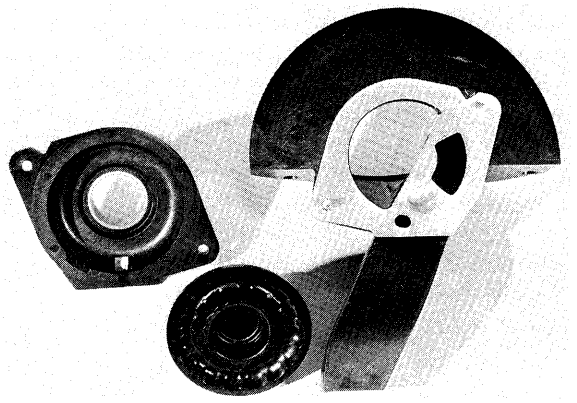
To disengage the drive, lift the release handle and pull outward until the handle locks in the slot in the side of the hopper side panel. To engage the row unit, simply lift and unlatch the handle. Spring tension will return the mechanism to the drive position.



Feed Cup Meters

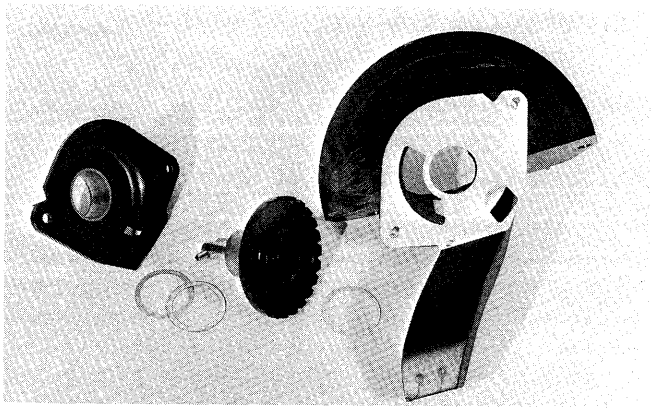
The feed cup meter consists of the feed cup beans, sorghum-regular rate or sorghum-low rate. The seed guide and seed cup housing are both notched to insure correct installation by aligning with a projection on the feed cup adapter. Make sure all parts are seated when assembling the meter.





When planting low rate sorghum or milo, it may be necessary to adjust the seed clearance to obtain the desired planting rates. Three washer shims have been supplied with each seed meter, and must be used on either side of the feed cup.

For precision planting of small seeds (9/64" in diameter or smaller) place all three shims between the feed cup and the housing. When seeds are approximately 10/64" in diameter, place one washer between the feed cup and the housing and two washers between the feed cup and seed guide. Progressively large seeds (11/64" or larger) will require one washer shim between the feed cup and housing and two between the feed cup and seed guide; or all three shims between the feed cup and seed guide.



Low Rate Sorghum Cup and Guide

Assemble the feed housing, shims, feed cup and seed guide insuring that notches in parts are aligned. Make sure seed cup housing and seed guide are seated and secure seed meters together with wing nuts.

Refer to planting rate chart for recommended seed drive transmission sprocket combinations.

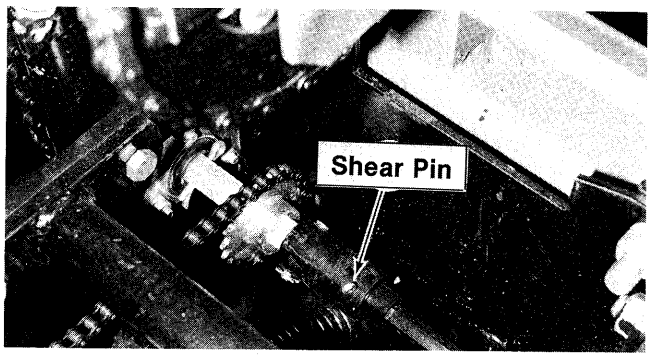
Shear Pin Protection

The transmission and row unit components are protected from damage by the cotter shear pin which connects each drill shaft to the transmission.

If excessive load on the drill shaft should cause the pin to shear, it is important to determine where binding has occurred before replacing the pin. Turn the drill shaft by hand, checking for misalignment of the shaft and for the possibility of seized parts. If necessary, loosen the mounting bolts on each bearing drive sprocket assembly; then align sprockets and retighten mounting bolts.

When the drill shaft can be turned by hand (with the aid of a wrench) replace the cotter pin with one of identical 3/16" x 2" size.

To prevent future binding or breakage of components, follow prescribed lubrication schedules.

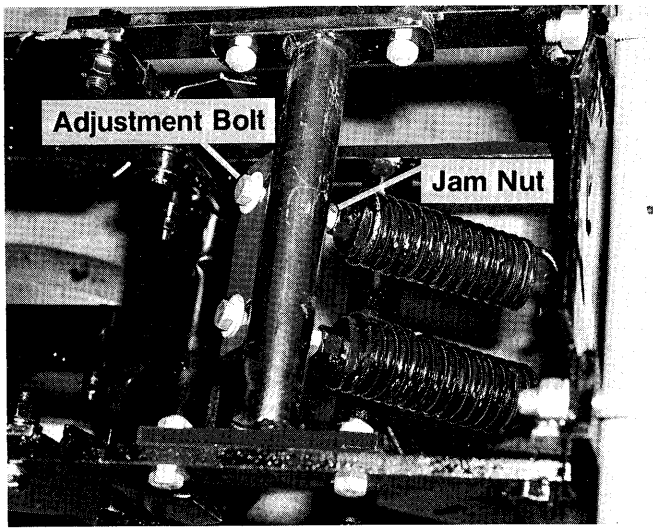


Down Pressure Spring Adjustment

The optional conventional or heavy duty down pressure springs are designed to increase penetration in hard soil and keep the row unit from bouncing in rough field conditions.

To increase down pressure with either type of system, loosen the jam nuts and turn the adjusting bolts clockwise. Tighten lock nuts as soon as desired down pressure is obtained to maintain setting.

IMPORTANT: Do not attempt to set down pressure at maximum pressure in hard soil conditions. This can cause the row units to carry the planter and raise the drive wheels to the point that excessive slippage may occur.



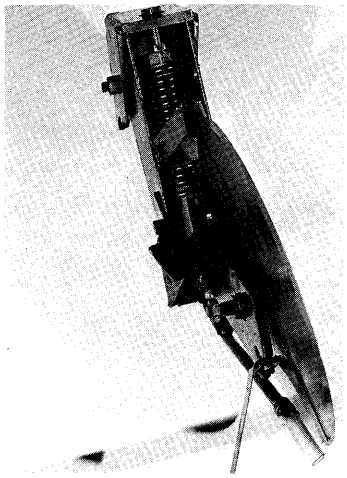
Double Disk Opener

The double disk openers should be positioned during assembly to place the fertilizer approximately 2" to either side of the row and from 4 to 6 inches deep depending upon soil conditions and down pressure.

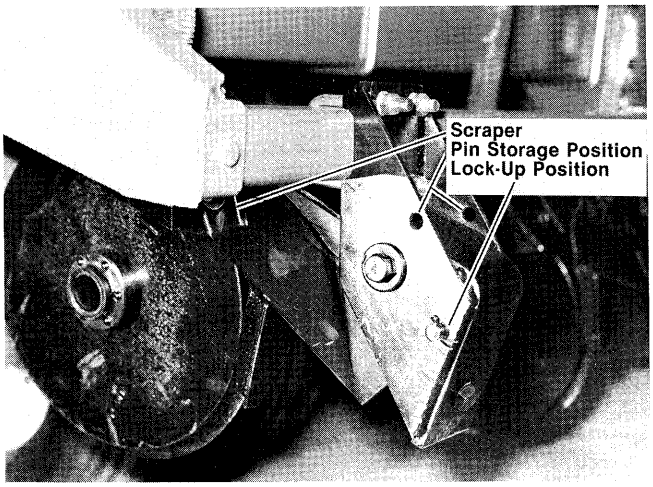
The down pressure springs are factory preset at 250 pounds down pressure but may be adjusted for various soil conditions. To adjust spring tension, loosen the jam nut with a 15/16" wrench and use a l" wrench to turn the adjustment bolt -clockwise to increase tension or counterclockwise to decrease tension. Securely tighten the jam nut upon completion of tension adjustment.

WARNING: Do not operate the double disk openers at full down pressure tension when planting in rocky ground. Chipping of the disk blades may occur.

The scrapers on each blade may also be adjusted to make up for wear that may occur. Make sure the scraper is adjusted as close as possible to the blade without touching.

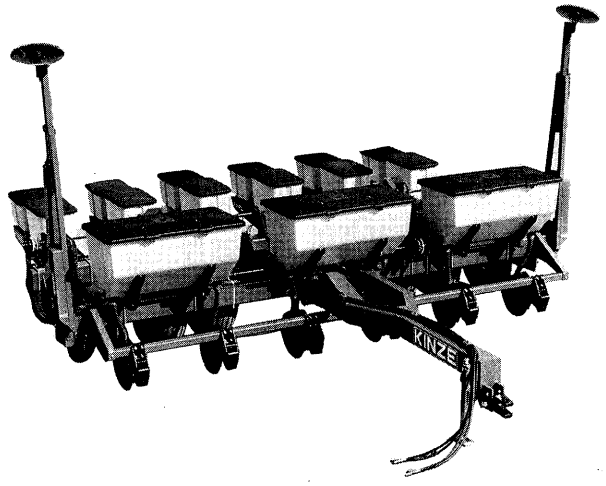


The opener assembly is designed to be locked in a raised position when the fertilizer attachment is not in use or during storage. To lock the opener, first raise the planter and place blocks under the openers. Then lower the planter until the hole in the pivot section aligns with the hole in the mounting bracket. Remove the lockup pin from the storage position in the mounting bracket and install it through the lockup hole and secure with cotter pins.



Dry Fertilizer Attachment

The rate of dry fertilizer application is determined by the drive and driven sprocket combinations on the fertilizer transmission. Sprocket combinations are changed in the same manner as the row unit transmission. After removing the rubber spacers and loosening the drive chain, slide the selected sprockets into alignment with the idlers. Then, restore proper chain tension and replace spacers between sprockets. Refer to the application charts at the end of "Operation" for selection of sprocket combinations.



The dry fertilizer attachment meters granules by volume rather than weight. For this reason, and given the variances in brands and fertilizer analysis, the weight metered during actual application may vary considerably. Use the chart for reference only. It is suggested that a container be used to catch and measure application (as explained following the application chart) to obtain a closer estimate.

Since most fertilizers easily accumulate moisture, it is important that fertilizer be kept dry during use and storage. In addition to waste, deposits of fertilizer left in the hopper can cause metal corrosion.

The dry fertilizer attachment uses two fiberglass hoppers on the 4 row models, three hoppers on the 6 row models and four hoppers on the 8 row models. Each hopper is designed to hold approximately 550 pounds depending upon the type of fertilizer being used.

⚠ WARNING: Agricultural chemicals can be dangerous if not selected and handled with care. Always read and follow directions supplied by the chemical manufacturer.

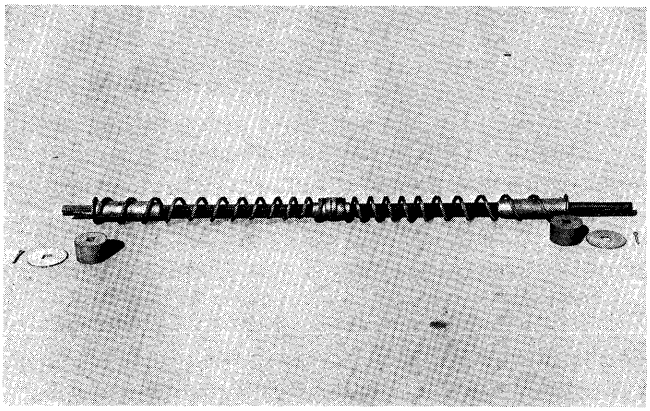
Cleaning

The dry fertilizer hoppers are designed to tip forward for dumping and ease of cleaning. To dump hoppers, first disconnect the drive shaft from the transmission or adjacent hopper. Loosen hose clamps and remove hoses from each hopper.

Finally, remove the two cap screws from the hopper bracket at the rear of each hopper. Rotate hopper lids to the back side of the hopper and carefully tip hopper forward. After dumping contents, flush all loose fertilizer from the hopper and hoses.

At the end of the planting season, or when fertilizer attachment is not going to be used for a period of time, the hoppers should be disassembled, cleaned and coated with a rust preventative.

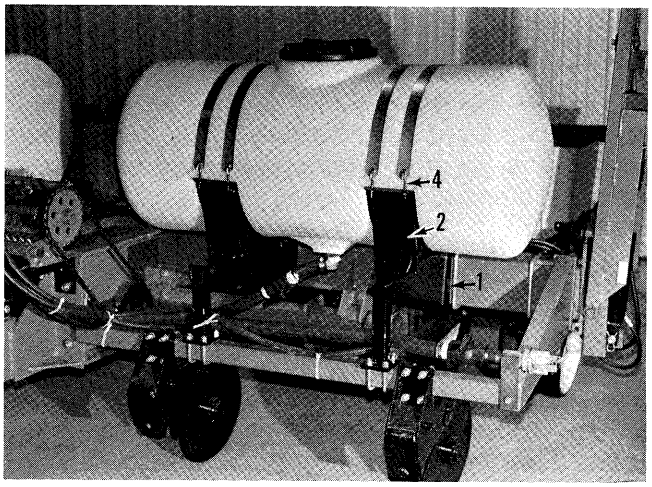
To disassemble spreader assemblies, remove the hairpins and baffle from the top of the auger. Then remove the cotter pin from the auger shaft adjacent to the large flat washer and pull auger assembly from the hopper. The bearings pass through the outer castings and need not be removed. Remove the cotter pin and washer from outer end of the auger shaft and remove all auger components for cleaning. Coat all parts with rust preventative before reassembly.



NOTE: Left hand and right hand springs are used on each auger shaft. Make sure springs auger fertilizer to the outer ends of the hopper when rotated in the direction of rotation they turn on the planter.

Liquid Fertilizer Attachment

The rate of liquid fertilizer application is determined by the combination of sprockets on the squeeze pump driven and drive shaft. When changing sprocket combinations, make sure sprockets and idler are in alignment, sprocket retaining collars are tight and chain tension is sufficiently restored.



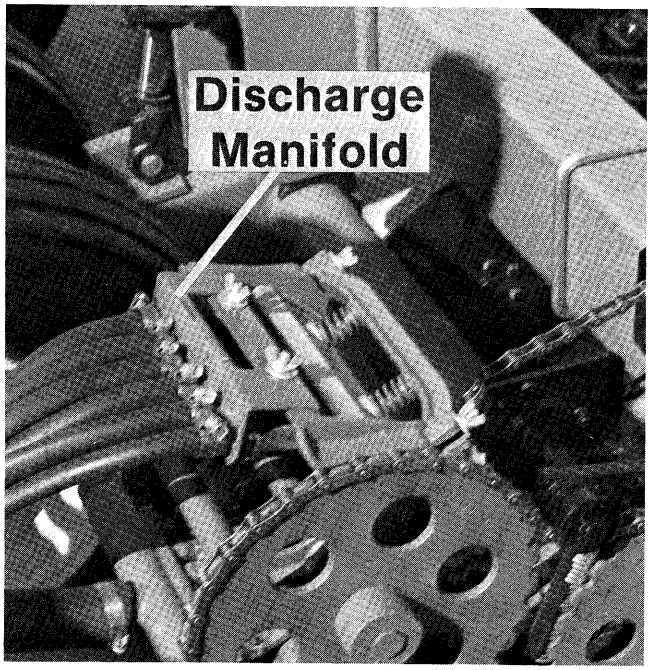
The delivery rate chart found at the end of the "Operation" section provides an approximate application rate only. Actual delivery will vary with temperature and the particular fertilizer being used.

⚠ WARNING: Agricultural chemicals can be dangerous if not selected and handled with care. Always read and follow directions supplied by the chemical manufacturer.

Shut off valves provided under each tank, should be closed to shut off flow when the planter sets overnight or for extended periods of time. It is also important to close the tank valves whenever service on the pump or hoses is being performed. To prolong the life of the hoses in the squeeze pump, the discharge manifold must be repositioned to the rearward position to prevent hose distortion.

The discharge manifold must be in the forward position when the pump is in operation. To reposition the manifold, loosen the wing nuts and slide the manifold forward and sideways or rearward as required and retighten nuts.

CAUTION: Avoid excessive pressure when using the quick fill attachment. The rubber plugs installed in the manifold may be forced out under pressure.



If either of the end pump hoses should run off the back plate, loosen the hose clamp on the intake manifold and rotate the hose as follows.

For *the right hand hose* (facing the pump from front of planter) twist the hose ¼ turn in the clockwise direction.

For the left hand hose (facing front of pump) twist the hose ¼ turn in the counter-clockwise direction.

Retighten hose clamp.

Cleaning

The tanks and all hoses are made of sturdy plastic and rubber to resist corrosion. However, the tank should be rinsed with water after each season or extended period of non-use. Do not allow sludge to build up in the bottom of the tank or allow fertilizer to crystallize because of cold temperature or evaporation.

At the end of the planting season, thoroughly clean all parts with clean water and flush the tanks hoses and metering pump prior to storage.

Planting Rate for Plateless Corn Meter

Seed Populations Per Acre			Average Seed Placement In Inches	Sprocket Combinaitons		Recommended Speed Range In MPH
30 Inch Rows	36 Inch Rows	38 Inch Rows		Drive Sprocket	Driven Sprocket	
56,200	46,800	44,300	3-3/4	30	14	2 to 3
48,700	40,600	38,510	4-¼	26	14	2 to 3½
43,700	36,400	34,500	4 ¾	30	18	3 to 4
41,300	34,400	32,600	5 1/8	22	14	3 to 4½
37,800	31,600	29,900	5 ½	26	18	3 to 4½
35,700	29,800	28,200	5 7/8	30	22	3 to 5
32,100	26,800	25,400	6 ½	22	18	3 to 5½
30,700	25,800	24,400	6 ¾	26	22	3 to 6
30,100	25,200	23,900	7	30	26	3 to 6
29,950	24,950	23,700	7 1/8	16	14	3 to 6
27,800	23,200	21,950	7 ½	30	28	4 to 6½
26,200	21,900	20,600	8	22	22	4 to 7
24,300	20,300	19,200	8 5/8	26	28	4 to 7
23,300	19,400	18,400	9	16	18	4 to 7
22,200	18,500	17,600	9½	22	26	4 to 7
20,700	17,200	16,300	10 1/8	22	28	4 to 7
20,400	16,900	16,100	10 ¼	14	18	4 to 7
19,100	15,900	15,100	11	16	22	4 to 70
16,700	13,950	13,200	12 5/8	14	22	4 to 7
16,200	13,500	12,800	13	16	26	4 to 7
14,950	12,500	11,900	14	16	28	4 to 7
14,200	11,800	11,200	14 7/8	14	26	4 to 7
13,200	10,950	10,400	16	14	28	4 to 7

Above chart for planters equipped with 7.60-15 inch drive tires and 1:1 drive sprocket ratios. Recommended tire pressure 40 PSI.

IMPORTANT: The above sprocket combinations are best for average conditions. Changes in sprocket combinations may be required to obtain desired planting population.

The size and shape of seeds will effect the planting rate. Medium round corn is generally the most preferred while small flat is the least desirable. Higher than optimum speeds may result in population rate increases or higher incedents of doubles and triples, particulary with small flat seeds.

Planting Rate For Plateless Soybean Meters

Approximate Pounds Per Acre		Sprocket Combinations		Recommended Speed Range In MPH
30 Inch Rows	36 Inch To 40 Inch Rows	Drive Sprocket	Driven Sprocket	
125	98	30	14	3 to 5
110	88	26	14	3 to 5
100	80	30	18	3 to 5
96	76	22	14	3 to 5
92	73	26	18	3 to 5
86	68	30	22	3 to 5
78	61	22	18	3 to 5½
75	59	26	22	3 to 6
72	58	30	26	3 to 6
71	57	16	14	3 to 6
67	53	30	28	4 to 6½
63	50	22	22	4 to 7
58	46	26	28	4 to 7
55	44	16	18	4 to 7
54	43	22	26	4 to 7
50	40	22	28	4 to 7
49	39	14	18	4 to 7
48	38	16	22	4 to 7
43	34	14	22	4 to 7
41	33	16	26	4 to 7
40	32	16	28	4 to 7
37	30	14	26	4 to 7
35	28	14	28	4 to 7

Above chart for planters equipped with 7.60-15 inch drive tires and 1:1 drive sprocket ratios. Recommended tire pressure 40 PSI.

IMPORTANT: Soybean rates may vary widely depending upon size of the seed.

Approximate rates for row spacings, other than those shown above, may be calculated using the rate setting that is one half the desired setting. Refer to the following example:

15-inch rows at a desired planting rate of 80 lbs. per acre. Use the 30" chart since 15" spacing is ½ of 30". Then follow the column down to the 40 lbs. per acre setting, which is ½ of the desired 80 lbs. per acre rate. This indicates that the 16 tooth drive sprocket/28 tooth driven sprocket will provide the desired planting rate.

If lower rates are desired, special drive sprockets are available on a special order basis.

Planting Rate For Plateless Regular Rate Sorghum Meters

Approximate Pounds Per Acre		Sprocket Cominiations		Recommended Speed Range In MPH
30 Inch Rows	36 Inch To 40 Inch Rows	Drive Sprocket	Driven Sprocket	
21	16.7	30	14	2 to 3
17.5	13.9	26	14	2 to 3½
16.2	12.9	30	18	3 to 4
15.1	12.0	22	14	3 to 4½
13.8	10.9	26	18	3 to 4½
12.9	10.2	30	22	3 to 5
11.8	9.4	22	18	3 to 5½
11.2	8.9	26	22	3 to 6
11.1	8.8	30	26	3 to 6
10.9	8.6	16	14	3 to 6
10.0	7.9	30	28	4 to 6½
9.6	7.6	22	22	4 to 7
9.1	7.2	26	28	4 to 7½
8.8	7.0	16	18	4 to 8
8.5	6.7	22	26	4 to 8
8.0	6.3	22	28	4 to 8
7.9	6.3	14	18	4 to 8
7.6	6.0	16	22	4 to 8
6.8	5.4	16	26	4 to 8
6.3	5.0	16	28	4 to 8
6.2	4.9	14	26	4 to 8
5.9	4.7	14	28	4 to 8

Above chart for planters equipped with 7:60-15 inch drive tires and 1:1 drive sprocket ratio. Recommended tire pressure 40 PSI.

Planting Rate For Plateless Low Rate Sorghum Meters

Approximate Pounds Per Acre		Sprocket Combinations		Recommended Speed Range In MPH
30 Inch Rows	36 Inch to 40 Inch Rows	Drive Sprocket	Driven Sprocket	
6.2	4.9	30	14	2 to 3
5.4	4.3	26	14	2 to 3½
4.8	3.8	30	18	3 to 4
4.6	3.6	22	14	3 to 4½
4.2	3.3	26	18	3 to 4½
4.0	3.1	30	22	3 to 5
3.6	2.8	22	18	3 to 5½
3.4	2.7	26	22	3 to 6
3.4	2.7	30	26	3 to 6
3.3	2.6	16	14	3 to 6
3.1	2.4	30	28	4 to 6½
2.9	2.3	22	22	4 to 7
2.7	2.1	26	28	4 to 7
2.6	2.1	16	18	4 to 7
2.5	2.0	22	26	4 to 7
2.3	1.8	22	28	4 to 7
2.3	1.8	14	18	4 to 7
2.1	1.7	16	22	4 to 7
1.9	1.5	14	22	4 to 7
1.8	1.4	16	26	4 to 7
1.7	1.3	16	28	4 to 7
1.6	1.2	14	26	4 to 7
1.5	1.2	14	28	4 to 7

Above chart for planters equipped with 7:60-15 inch drive tires and 1:1 drive sprocket ratios. Recommended tire pressure 40 PSI.

DRY INSECTICIDE APPLICATION RATES

Clay Granules Approximate Rate In Pounds Per Acre At 5 MPH			
Meter Setting	30 Inch Rows	36 Inch Rows	38 Inch Rows
10	4.1	3.4	3.3
12	5.4	4.5	4.3
14	6.8	5.7	5.4
16	8.1	6.8	6.5
18	9.4	7.9	7.5
20	10.7	9.0	8.5
22	12.1	10.1	9.6
24	13.4	11.2	10.6
26	14.7	12.3	11.6
28	16.1	13.4	12.7
30	18.1	15.1	14.3
32	20.1	16.8	15.8
34	22.7	19.0	18.0
36	25.4	21.2	20.1

Sand Granules Approximate Rate In Pounds Per Acre At 5 MPH			
Meter Setting	30 Inch Rows	36 Inch Rows	38 Inch Rows
6	4.8	4.0	3.8
8	6.8	5.7	5.4
10	8.6	7.2	6.8
12	10.5	8.7	8.3
14	12.1	10.1	9.6
16	13.7	11.4	10.8
18	16.1	13.4	12.7
20	18.5	15.4	14.6
22	21.4	17.9	16.9
24	24.1	20.1	19.1
26	28.1	23.4	22.2

Variations in pounds per acre may occur with changes in seed planting rates.

Rate is affected by changes in temperature and climatic conditions. Changes in speed or field conditions may also affect metering rates.

DRY HERBICIDE APPLICATION RATES

Clay Granules Approximate Rate In Pounds Per Acre At 5 MPH			
Meter Setting	30 Inch Rows	36 Inch Rows	38 Inch Rows
6	4.1	3.4	3.3
8	5.4	4.5	4.3
10	6.7	5.6	5.3
12	8.1	6.7	6.4
14	9.4	7.9	7.5
16	10.7	8.1	8.6
18	12.1	10.1	9.6
20	13.4	11.2	10.6
22	14.4	12.3	11.7
24	16.1	14.5	12.7
26	18.7	15.6	14.8
28	20.4	17.1	16.2
30	23.4	19.5	18.5

Variations in pounds per acre may occur with changes in seed planting rates.

Rate is affected by changes in temperature and climatic conditions. Changes in speed or field conditions may also affect metering rates.

DRY FERTILIZER APPLICATION RATES

Approximate Rate in Pounds Per Acre					
Drive Sprocket	Driven Sprocket	30 Inch Rows	36 Inch Rows	38 Inch Rows	40 Inch Rows
18	36	87	73	68	65
18	30	101	85	79	76
24	36	127	107	99	95
24	30	151	129	118	113
18	18	181	152	141	136
18	16	208	175	162	156
36	30	215	180	168	161
24	18	242	203	189	181
24	16	269	225	210	201
36	18	357	300	278	267
36	16	390	327	304	293

NOTE: Calculated using 7:60 x 15 drive tire with 40 PSI.

This chart was calculated with a bulk density of 65 pounds per cubic foot.

To check the exact number of pounds your fertilizer attachment will actually deliver on a 40 inch row spacing, proceed as follows:

Remove one spout from one of the fertilizer hoppers and attach a container under the opening. Engage the fertilizer attachment and drive forward for 130 feet. Weigh the amount of fertilizer caught in the container and multiply that amount by 100. The result will be the pounds of fertilizer delivered per acre when planting in 40-inch row. To convert this delivery rate for narrow rows, multiply by the following conversion factors:

30" Multiply by 1.33 36" Multiply by 1.11 38" Multiply by 1.05

LIQUID FERTILIZER APPLICATION RATES

Driver	Driven	ROW SPACE Gal. Per Acre				Driver	Driven	ROW SPACE Gal. Per Acre			
		40	38	36	30			40	38	36	30
8	9	19.1	20.4	21.0	25.3	22	23	20.6	22.0	22.7	27.2
8	10	17.2	18.3	18.9	22.7	22	26	18.3	19.4	20.1	24.1
8	15	11.4	12.1	12.5	15.0	22	30	15.1	16.7	17.3	20.7
8	22	7.7	8.2	8.5	10.2	22	31	15.0	16.0	16.6	19.9
8	23	7.5	8.0	8.3	5.6	23	8	61.9	65.9	68.1	81.7
8	26	6.7	7.1	7.3	8.8	23	9	55.0	58.6	60.5	72.6
8	30	5.8	6.2	6.4	7.7	23	10	49.4	52.6	54.4	65.3
8	31	9.9	5.9	6.1	7.4	23	15	32.8	35.0	36.2	43.4
9	8	24.1	25.6	26.5	31.8	23	22	22.6	24.0	24.8	29.8
9	10	19.3	20.6	21.3	25.5	23	26	18.9	20.1	20.8	25.0
9	15	12.9	13.7	14.2	17.0	23	30	16.5	17.6	18.2	21.8
9	22	8.8	9.4	9.7	11.6	23	31	15.9	16.9	17.5	21.0
9	23	8.4	8.9	9.2	11.1	26	8	69.8	74.3	76.8	92.2
9	26	7.5	8.0	8.3	9.9	26	9	62.1	66.1	68.3	81.7
9	30	6.4	6.9	7.1	8.5	26	10	55.9	59.5	61.5	73.8
9	31	6.2	6.6	6.9	8.2	26	15	37.2	39.6	40.9	49.1
10	8	26.9	28.6	29.6	35.5	26	22	25.4	27.0	27.9	33.5
10	9	23.9	25.4	26.2	31.5	26	23	24.3	25.8	26.7	32.1
10	15	14.4	15.3	15.8	19.0	26	30	19.3	19.7	20.3	24.4
10	22	9.7	10.3	10.6	12.8	26	31	18.1	19.0	19.6	23.5
10	23	9.2	9.8	10.2	12.2	30	8	80.1	85.8	88.7	106.4
10	26	8.2	8.7	9.0	10.8	30	9	71.6	76.2	78.7	94.5
10	30	7.1	7.5	7.8	9.4	30	10	64.5	68.6	70.9	85.1
10	31	6.9	7.3	7.6	9.1	30	15	43.0	45.7	47.3	56.7
15	8	40.4	43.0	44.5	53.3	30	22	29.2	31.1	32.2	38.6
15	9	35.9	38.2	39.5	47.4	30	23	27.9	29.7	30.7	36.9
15	10	32.2	34.3	35.5	42.6	30	26	24.7	26.3	27.2	32.6
15	22	14.6	15.6	16.1	19.3	30	31	20.8	22.0	22.7	27.2
15	23	14.0	14.9	15.4	18.4	31	8	83.2	88.5	91.5	109.8
15	26	12.5	13.3	13.7	16.5	31	9	73.9	78.7	81.3	97.6
15	30	10.7	11.4	11.8	14.2	31	10	66.6	70.9	73.3	88.0
15	31	10.3	11.0	11.3	13.6	31	15	44.5	47.1	48.7	58.4
22	8	59.1	62.9	65.0	78.0	31	22	30.3	32.0	33.1	39.7
22	9	52.4	55.8	57.7	69.2	31	23	29.0	30.6	31.7	38.0
22	10	47.3	50.3	52.0	62.4	31	26	25.6	27.2	28.1	33.8
22	15	31.4	33.4	34.5	41.4	31	30	22.1	23.6	24.5	29.2

Approximate application rates using 7.60 x 15 drive tire at 40 PSI and based on a solution weighing 10 pounds per gallon.

SEED METER TROUBLESHOOTING

Finger Pick-Up Meter

Problem	Possible Cause	Probable Remedy
One row not planting seed	Drive release not engaged	Engage drive release mechanism
	Foreign material in hopper	Clean hopper and finger pick-up mechanism
	Pin sheared in drive release sprocket	Replace pin—inspect meter for obstructions or defective parts
Drive release does not engage properly	Drive release shaft is not aligned properly with finger pick-up drive shaft	Align drive mechanism by shifting hopper support
Unit is skipping	Foreign material or obstruction in meter	Clean out and inspect
	Finger holder improperly adjusted	Adjust to proper setting
	Broken fingers	Replace fingers and/or springs as required
	Planting too slowly	Increase planting speed to within recommended range
Planting too many doubles	Planting too fast	Stay within recommended speed range
	Loose finger holder	Adjust to specs.
	Worn brush in finger pick-up	Replace brush

Feed Cup Meter

Problem	Possible Cause	Probable Remedy
One row not planting seed	Drive release not engaged	Engage drive release mechanism
	Pin sheared in drive release sprocket	Replace pin—inspect for obstructions in meter
	Foreign material in hopper	Inspect hopper & meter for foreign material (such as paper)

Feed Cup Meter

(continued)

Problem	Possible Cause	Probable Remedy
Drive release parts breaking	Drive coupler not aligned properly with feed cup shaft	Align drive mechanism by shifting hopper support
	Feed cup not turning freely	Inspect feed cup and bushings carefully
Planting lower rate than desired	Worn feed cup	Replace feed cup
	Obstruction in feed cup or hopper	Clean and inspect
	Wrong feed cup	Replace with proper feed cup for seed being planted
	Seed treatment building up in feed cup	Clean thoroughly
	Wrong seed guide plate used with bean cup	Replace with proper guide/ cup combination
	Improper number of shims used with low-rate sorghum feed cup	Adjust number of shims as required
Planting higher rate than desired	Wrong feed cup	Replace with proper feed cup
	Feed cup housing not installed correctly	Inspect feed cup installation Check for proper seating of feed cup housing
	Improper number of shims used with low-rate sorghum feed cup	Adjust number of shims as required
Bunching of seed	Drive coupler not aligned properly	Align drive mechanism by shifting hopper support
	Feed cup housing not seated properly	Check installation of feed cup housing
	Weak idler spring	Replace as required
	Obstruction in hopper	Clean hopper and meter of all foreign material

Feed Cup Meter

(continued)

Problem	Possible Cause	Probable Remedy
Feed cup meters hard driving	Build up of seed treatment in feed cups	Clean feed cups and housings
	Drive not properly aligned with meter input shaft	Align drive mechanism by shifting hopper support
	Planter drive rusty and dirty	Clean and lubricate or replace drive chain

MAINTENANCE

Mounting Bolts and Hardware

Before operating the planter bar for the first time, check to be sure all nuts and bolts are tight. Check all nuts and bolts again after approximately the first 50 hours of operation and at the beginning of each planting season thereafter.

All bolts used on Kinze planter bars are Grade 5 (high strength) as indicated by three radial dashes on the bolt head. Refer to the torque valve chart in the "Assembly" Section of this manual when tightening bolts.

NOTE: Overtightening bolts can cause as much damage as undertightening. Tightening a bolt beyond the recommended range can reduce its shock load capacity.

Chain Tension Adjustment

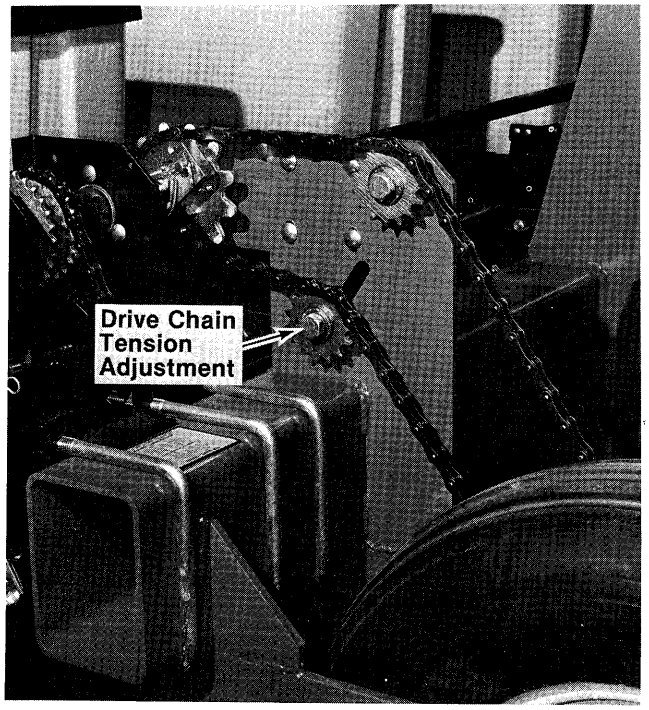
All drive chains with the exception of the drive chain between the drive gauge wheel are equipped with spring tensioned idlers.

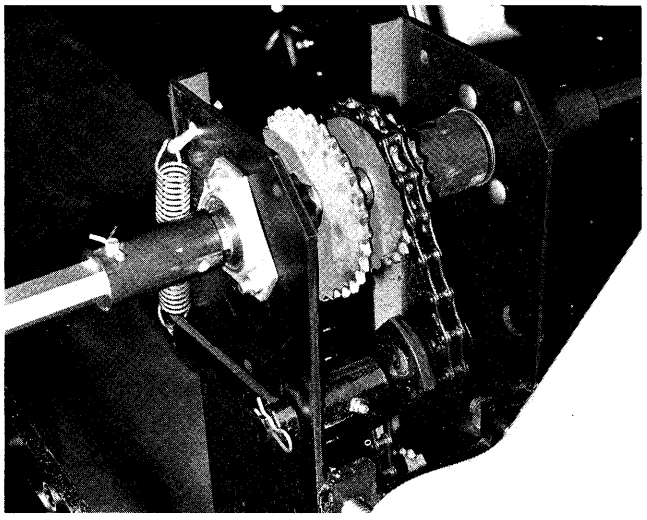
To tighten the transmission drive chain, use a 15/16" wrench to loosen the idler attachment bolt. Then move it against the chain to obtain a deflection of approximately 1" on the longest span and retighten.

To increase the tension on spring tensioned idlers, proceed as follows.

1. Remove clip pin from tightener assembly shaft and remove spring arm.
2. Rotate arm counterclockwise to the next notch for increased tension. The arm can be turned over for half notch increments.
3. Replace arm and spring clip and reconnect tension spring to check chain tension.

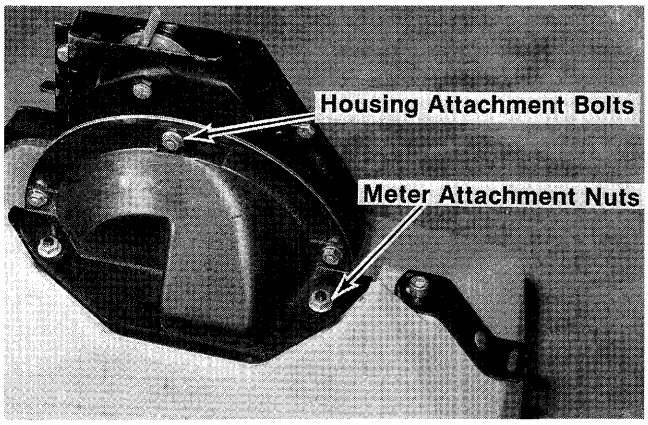
CAUTION: Do not attempt to shorten the drive chains between the drive wheels and drive shaft on the pull type planter bar. If the chain is being replaced, ensure replacement is the same length. If a shorter chain is used, there is a possibility that the drive shaft could be bent or drive chain broken when the planter bar is fully raised.



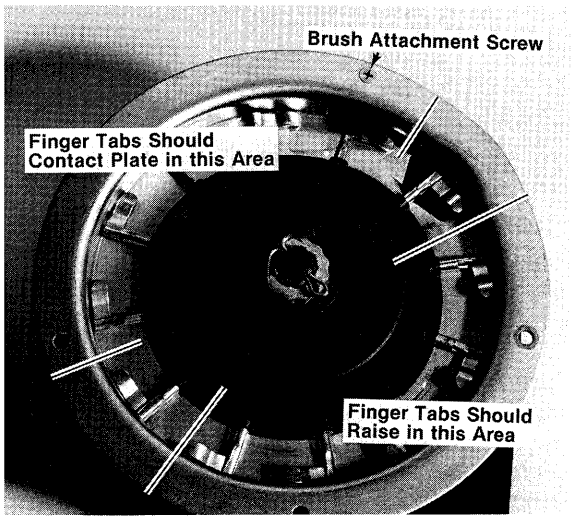


Corn Meter Inspection/Cleaning

To inspect or service the finger pickup corn meter, remove the meter from the seed hopper by removing the two 5/16" nuts which secure the mechanism to the hopper. Remove the housing from the meter assembly by removing three ¼"x5/8" cap screws. This will permit access to the finger pickup.



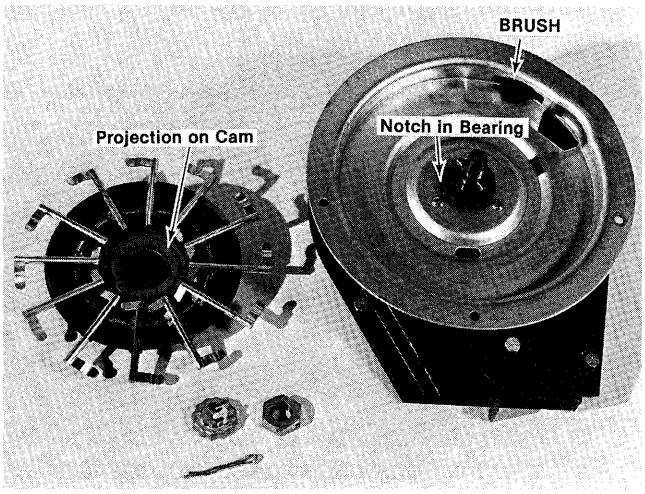
Rotate the seed meter drive by hand to ensure that the springs are holding the tabs of the fingers against the carrier plate where indicated in the photo and that the fingers are being raised in the correct area.



A build-up of debris or chaff may prevent proper finger operation and will require disassembly and cleaning of the corn meter as follows:

1. Remove cotter pin, lock nut and adjusting nut from drive shaft.

2. Carefully lift finger holder, along with fingers and cam off of the shaft and clean.

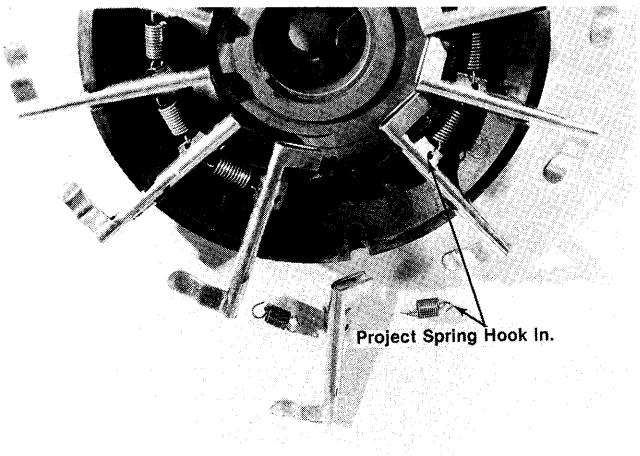


3. Check brush for wear and replace if necessary or following every 100 hours of operation.

NOTE: It is not necessary to remove finger holder to remove brush at prescribed intervals.

4. To replace fingers or springs, remove springs from fingers and remove finger from holder by lifting it out of the friction fit slot.

5. After cleaning and/or replacing defective parts, reassemble the meter in the reverse order. When replacing fingers, make sure the open end of the spring loop is toward the inside of the finger holder.



6. Make sure fingers are installed in holder so that holder will be positioned flush with the carrier plate when assembled. A projection on the cam is designed to align with a notch in the bearing to insure proper operation when assembled.

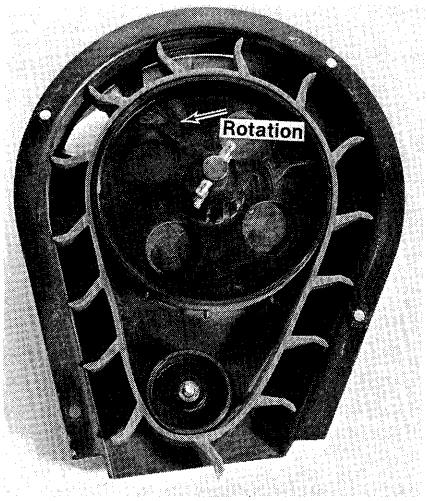
7. With finger holder flush against the carrier, install adjusting nut until it contacts the finger holder with a slight resistance. Continue to turn the nut an additional ⅓ turn.

8. Turn finger holder by hand to make sure it is positioned firmly against the carrier, but is not overtighted and can be rotated with moderate force.

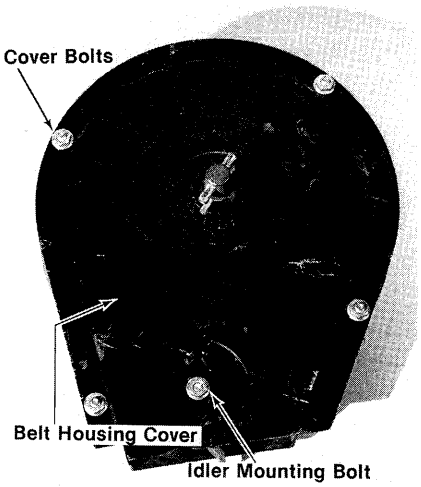
9. Install lock nut and cotter pin and reinstall housing.

SEED BELT

To inspect or replace the seed belt, remove the four ¼"x½" cap screws around the edge of the housing cover and the nut from the belt idler mounting bolt.



If the belt is being replaced, make sure it is reinstalled to correctly orient the paddles as shown. A diagram molded into the drive wheel also illustrates the correct orientation.

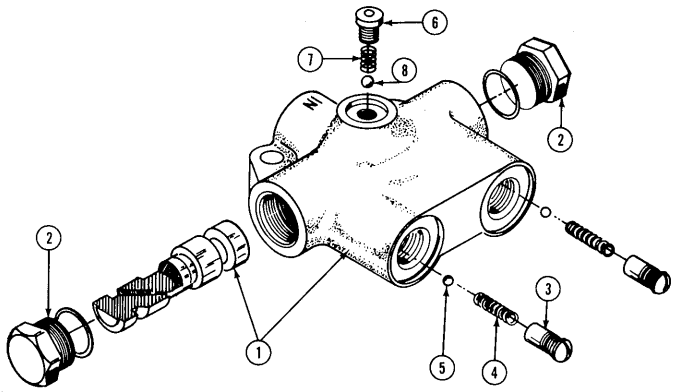


SEQUENCING VALVE INSPECTION

The sequencing valve consists of a chambered body containing a spool and a series of check valves to direct hydraulic flow. Should the valve malfunction, the components may be removed for inspection. The spool is accessable by removing either side plug and one check valve is accessable from the top of the valve body. It is necessary to disconnect the outlet hoses from the back of the valve to gain access to the remaining retainers and check valves. Inspect all parts for pitting, contamination or foreign material. Also check seating surfaces inside the valve. Replace any parts found to be defective.

IMPORTANT: Make sure correct check ball and spring are installed in each check valve bore upon reassembly.

SEQUENCING VALVE

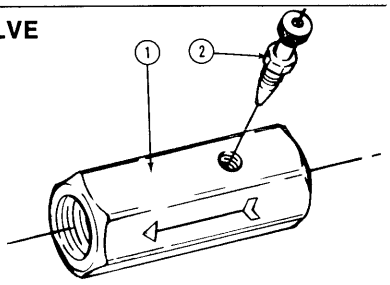


ITEM	PART NO.	DESCRIPTION
1.	R272	Valve Body and Spool
2.	R271	Plug Assembly, O-Ring Boss
3.	R273	Retainer, Check Valve
4.	R277	Spring, Check Valve
5.	R275	Ball, Check, 3/16" Diameter
6.	R274	Plug Assembly, O-Ring Boss
7.	R278	Spring
8.	R276	Ball, ¼" Diameter

FLOW CONTROL VALVE INSPECTION

The flow control valves should be adjusted for raise and lower speed as part of the assembly procedure or upon initial operation (see page 42) If the valve fails to function properly or requires frequent adjustment, the needle valve should be removed for inspection. Check for foreign material and contamination on both the valve and the seating area of the valve body. Replace any components found to be defective.

FLOW CONTROL VALVE



ITEM	PART NO.	DESCRIPTION
1.	A270	Flow Control Valve Assembly, 3/8" NPT (KLF 375)
2.	R103	Needle Valve Assembly

Wheel or Marker Bearing Lubrication or Replacement

1. Jack tire clear of ground and remove wheel or marker disk.
2. Remove hub cap from hub.
3. Remove cotter pin, axle nut, and washer.
4. Slide hub from axle or spindle.
5. Remove bearing cups and discard if bearings are being replaced. Clean hub and dry.
6. Press in new bearing cups with thickest edge facing in.
7. Pack bearings with heavy duty wheel bearing grease thoroughly forcing grease between roller cone and bearing cage. Also fill the space between the bearing cups in the hub with grease.
8. Place inner bearing in place and press in new grease seal.
9. Clean axle or spindle and install hub.
10. Install outer bearing, washer, or outer seal and slotted hex nut. Tighten slotted hex nut while rotating hub until there is some drag. This assures that all bearing surfaces are in contact. Back off slotted nut to nearest locking slot and install cotter pin.
11. Fill hub caps approximately ¾ full of wheel bearing grease and install on hub.
12. Install wheel or disk on hub and tighten evenly and securely.

Storage

Store the planter bar in a dry sheltered area if possible.

Remove all trash that may be wrapped on sprockets or shafts and remove dirt that can draw and hold moisture.

Clean all drive chains and coat with a rust preventative spray, or better yet, remove chains and submerge in oil.

Lubricate planter bar and row units at all lubrications points.

If possible, remove weight from all tires particularly if the unit is stored outdoors, in which case it is best to remove wheels and tires for storage in a cool dry area.

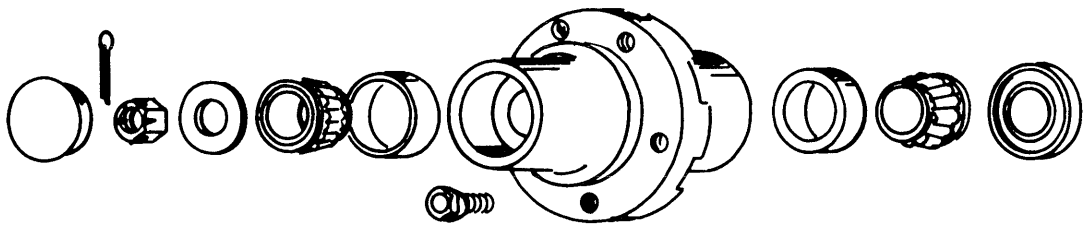
Inspect the planter bar and row units for parts that are in need of replacement and order during the "off" season.

If the planter bar is equipped with a dry fertilizer attachment, clean the fertilizer hoppers, openers and all rubber spouts.

Make sure all seed, herbicide and insecticide hoppers are empty and clean.

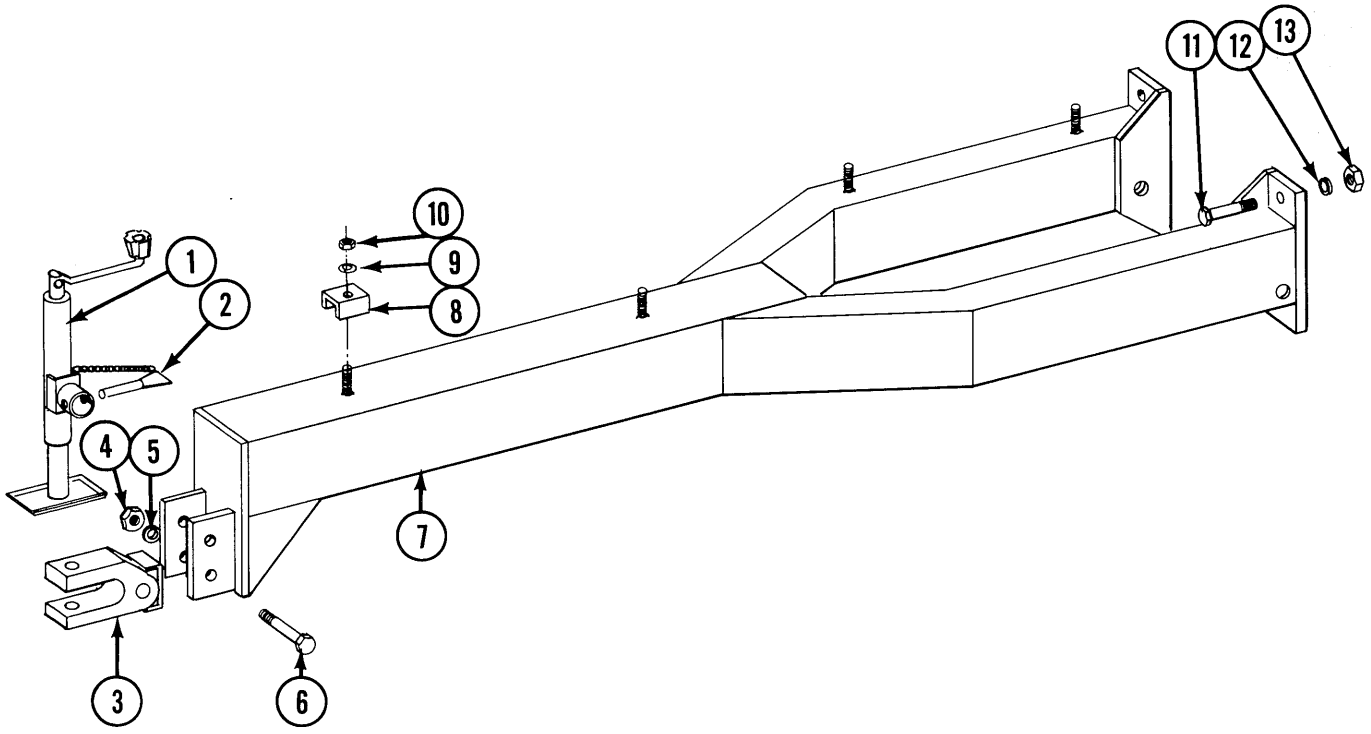
If the planter bar is equipped with a liquid fertilizer attachment, open the shut off valve and flush water through the system.

Clean plateless seed meters and store in a dry area.



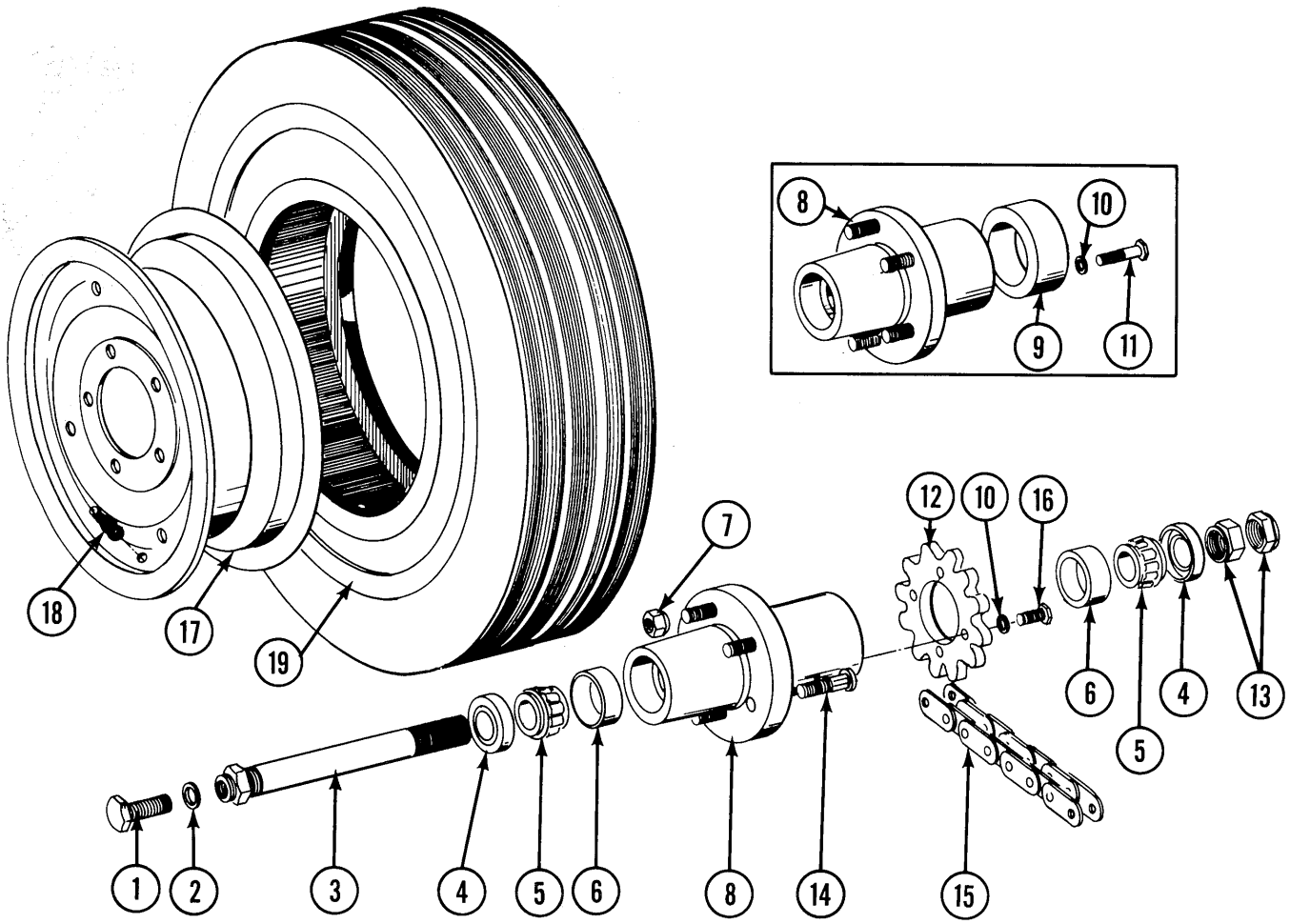
PARTS LIST INDEX

DOUBLE FRAME TONGUE ASSEMBLY



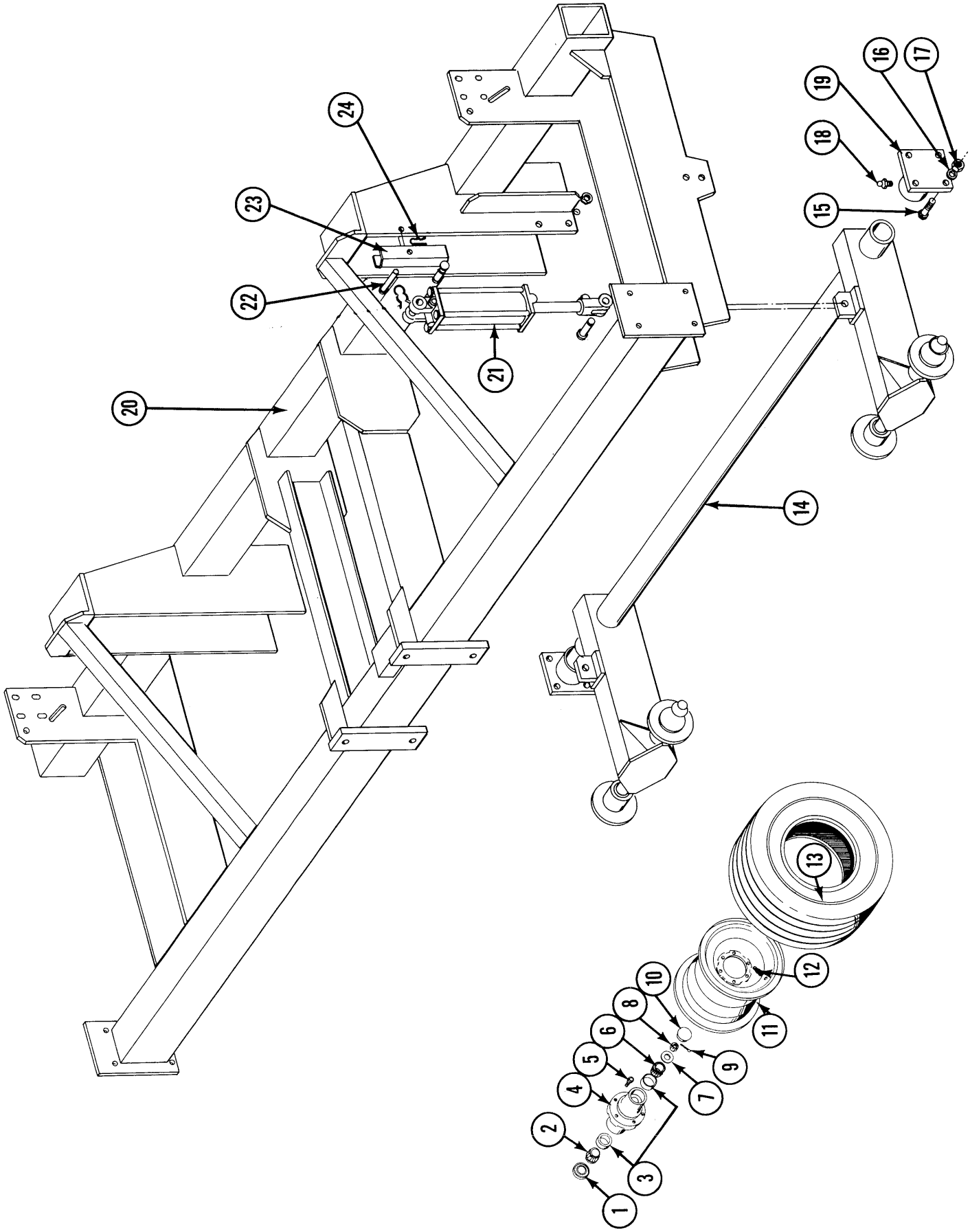
ITEM	PART NO.	DESCRIPTION
1.	4100-2	Jack
2.	R255	Repair Kit (Chain and Pin)
3.	A223	Clevis, Hitch
4.	10506	Hex Nut, 1¼"-7"
5.	10236	Lockwasher, 1¼"
6.	10042	HHCS, 1¼"-7"x6½"
7.	A752	Tongue
8.	D1656	Clamps, Hydraulic Hose
9.	10229	Lockwasher, 3/8"
10.	10101	Hex Nut, 3/8"-16
11.	10076	HHCS, 1"-8x3½"
12.	10118	Lockwasher, 1"
13.	10117	Hex Nut, 1'-8

DRIVE GAUGE WHEEL ASSEMBLY



ITEM	PART NO.	DESCRIPTION
1.	10026	HHCS, ¾"-10x2
2.	10231	Lockwasher, ¾"
3.	A652	Spindle Weld
4.	A252	Seal, Grease
5.	A251	Bearing
6.	R190	Cup
7.	R267	Nut, Wheel, ½"-20 UNF
8.	A255	Hub, W Cups and Studs (requires spacer)
	A547	Hub, W Cups and Studs
9.	D915	Spacer
10.	10232	Lockwasher, 5/16"
11.	10031	HHCS, 5/16"-18x1 ¾"
12.	2500-17	Sprocket, Bolt-on, 12 Tooth
13.	D831	Nut, Shoulder, 1¼"
14.	R204	Stud, Wheel, ½"-20 UNF x 1 7/8"
15.	3200-67	Chain No. 2050, 67 Pitch, Include Connector link and offset link
	3200-6	Chain, No. 2050 (Add to chain when using extended drill sprocket)
	R195	Connector Link, No. 2050
	R200	Offset Link, No. 2050
16.	10019	HHCS, 5/16"-18x1"
17.	A241	Wheel, 15"x5, 5 bolt
18.	D1166	Valve Stem
19.	D844	Tire, 7.60x15", 4 ply
A.	A269	Drive Hub Assembly (Items 1-14)
	A683	Drive Hub Asembly (Items 1-8, 10, 12-14 and 16)
B.	A374	Tire and Rim Assembly, 7.60x15" (Items 17-19)

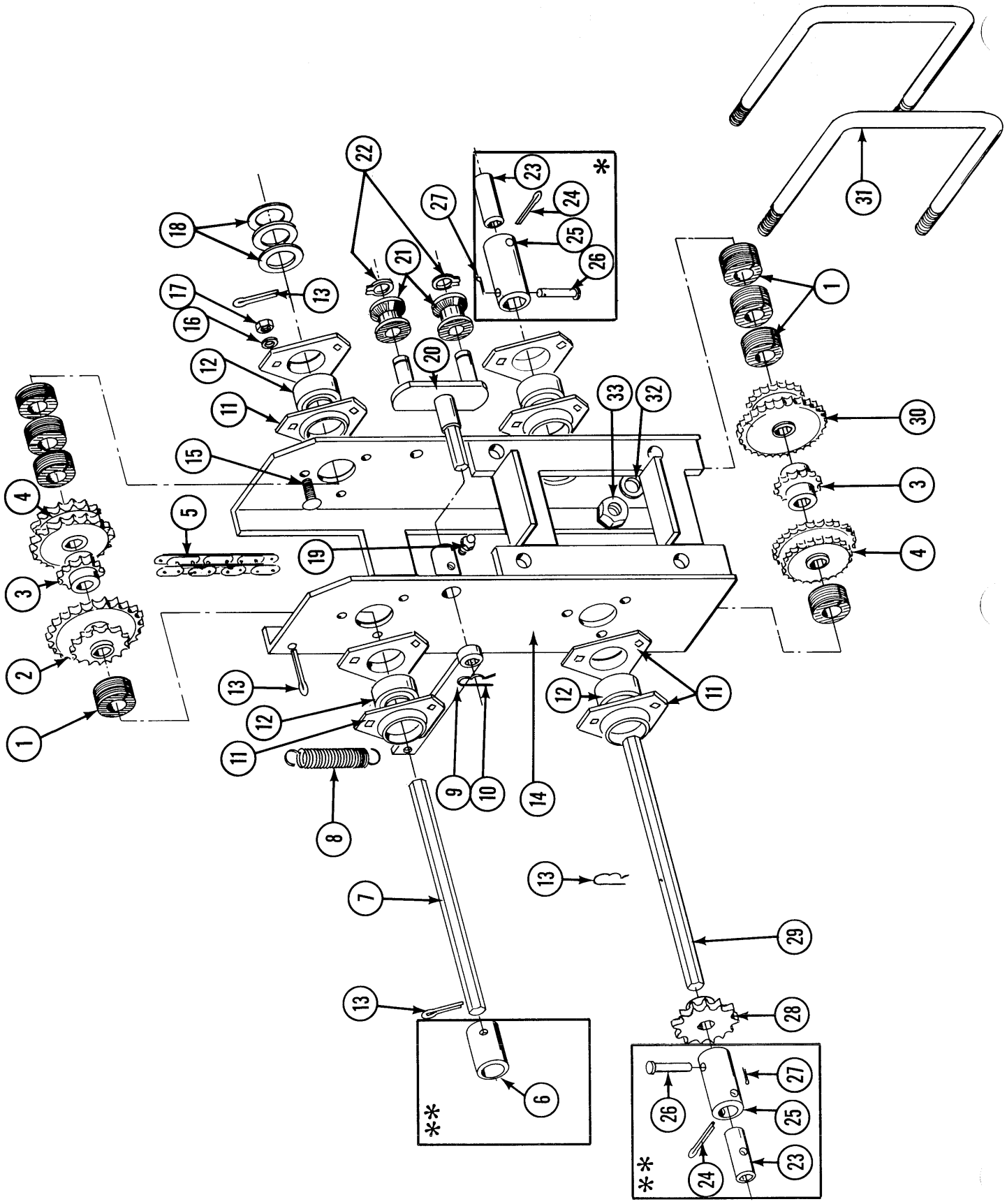
DOUBLE FRAME TRANSPORT AXLE ASSEMBLY



DOUBLE FRAME TRANSPORT AXLE ASSEMBLY

ITEM	PART NO.	DESCRIPTION
1.	A239	Grease Seal
2.	A238	Wheel Bearing, Inner
3.	R189	Bearing Cup, Inner
	R188	Bearing Cup, Outer
4.	2700-7	Wheel Hub w/bearing cups, 6 bolt
5.	R270	Hub Bolt
6.	A237	Wheel Bearing, outer
7.	10224	Spindle Washer ¾"
8.	10723	Slotted Hex Nut, ¾"-16
9.	10459	Cotter Pin, 3/16"x1½"
10.	2800-1	Hub Cap
11.	A240	Wheel, 14"x8", 6 bolt
12.	D1165	Valve Stem
13.	D839	Tire, 11Lx14", 4 RW, 6 R's, 8's,
	D1896	Tire, 9.5Lx14", 6 ply, 4R30
14.	A850	Transport Axle Assembly w/Hubs, 4R30
	A514	Transport Axle Assembly w/Hubs, 4RW
	A515	Transport Axle Assembly w/Hubs, 6R30, 8R30
	A835	Transport Axle Assembly w/Hubs, 6RW
	A516	Transport Axle Assembly w/Hubs, 8RW
	A817	Axle Weld Less Hub Assembly, 4R30, 71¼"
	A373	Axle Weld Less Hub Assembly, 4RW, 87½"
	A222	Axle Weld Less Hub Assembly, 6R30 & 8R30, 101¼"
	A818	Axle Weld Less Hub Assembly, 6RW, 125 ¼"
	A375	Axle Weld Less Assembly, 8RW, 163¼"
15.	10027	HHCS, ¾"-10x2½"
16.	10231	Lockwasher, ¾"
17.	10105	Hex Nut ¾"-10
18.	10641	Grease Fitting, 1/8" NPT
19.	A307	Axle Pivot
20.	A754	Main Frame Weld, 4R30
	A755	Main Frame Weld, 4 RW
	A756	Main Frame Weld, 6R30
	A757	Main Frame Weld, 6RW
	A758	Main Frame Weld, 8R30
	A759	Main Frame Weld, 8RW
21.	A215	Cylinder, Lift, 3½x10 (see page 72)
	A746	Cylinder, Lift, 3½x10 (see page 71)
22.	10561	Clevis Pin, ½"x3"
23.	D987	Safety Lock-up
24.	10670	Hair Pin Clip No. 3
A.	A541	Transport Wheel and Tire, 11Lx14" (Items 11, 12, 13) 4 RW, 6R's, 8R's
B.	A942	Transport Wheel and Tire, 9.5Lx14" (Items 11, 12, 13) 4R30

TRANSMISSION

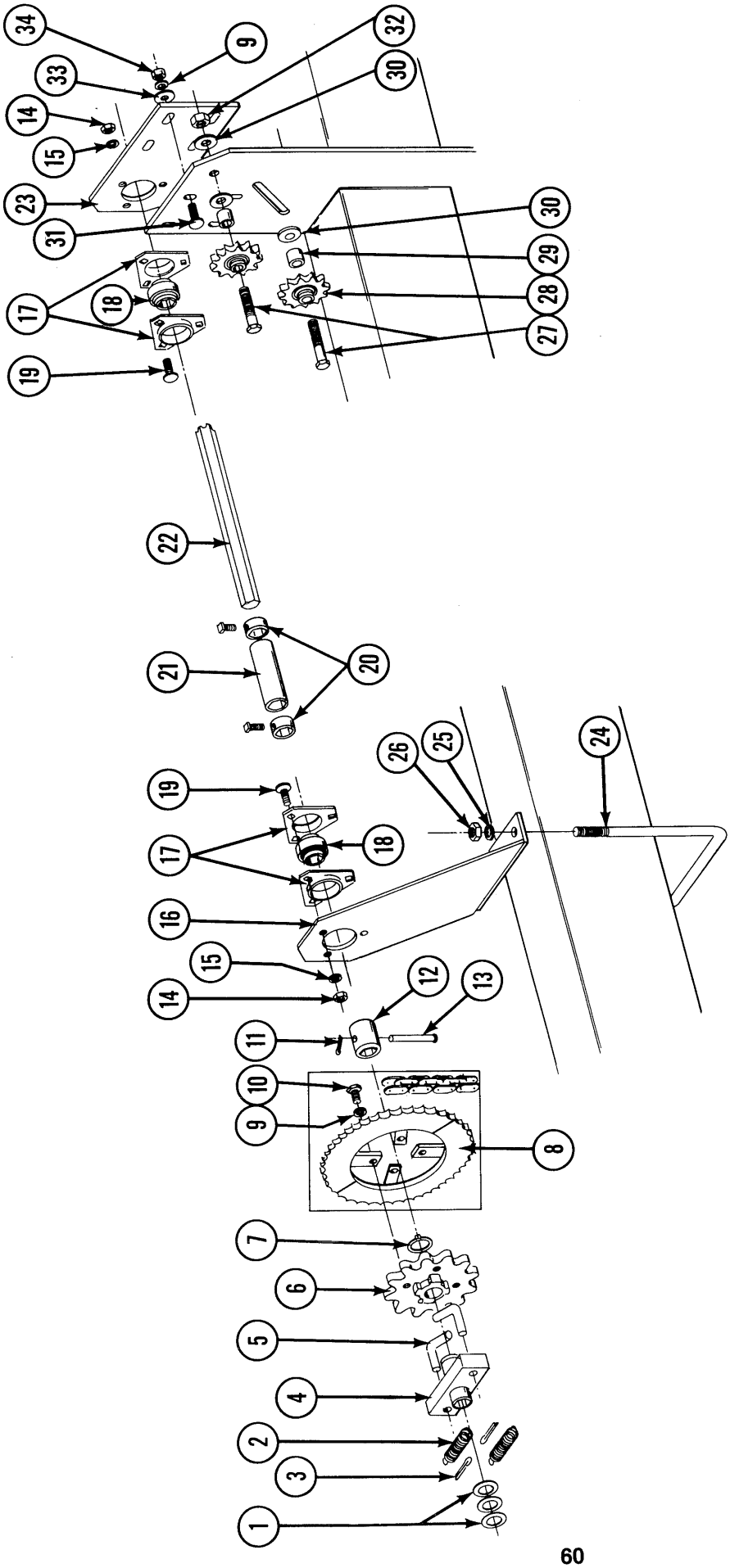


TRANSMISSION

ITEM	PART NO.	DESCRIPTION
1.	D832	Spacer
2.	2500-3	Sprocket, 16T-30T
3.	2500-1	Sprocket, 14T
4.	2500-2	Sprocket, 22T-26T
5.	3300-40	Drive Chain, No. 2040, 40 Links including connector link
	R194	Connector Link, No. 2040
6.	D1649	Coupler
7.	D925	Shaft, Upper
8.	D913	Spring
9.	A272	Idler Arm
10.	10670	Hairpin Clip, No. 3
11.	3400-1	Flangette
12.	2100-3	Bearing, 7/8" Hex Bore
13.	10463	Cotter Pin, ¼"x1½"
14.	A177	Transmission Case
15.	10303	Carriage Bolt, 5/16"-18x1"
16.	10232	Lockwasher, 5/16"
17.	10106	Hex Nut 5/16"-18
18.	10233	Machinery Bushing (as required)
19.	10640	Grease Fitting, ¼"-28
20.	A242	Idler, Bracket
21.	D1067	Spool, Idler
22.	10435	Ring, Retainer
23.	D747	Drill Shaft Driver, 9/16" Hex
24.	10462	Cotter Pin, 3/16"x2"
25.	D748	Coupler, Drill Shaft Driver
26.	10548	Clevis Pin, ¼"x1¾"
27.	10455	Cotter Pin, 1/16"x½"
28.	2500-19	Sprocket, 19T (used on L.H. only)
29.	D924	Shaft, Lower, L.H. Trans, 4R30, 6R30, 8R's
	D926	Shaft, Lower, R.H. Transmission
	D1687	Shaft, Lower, L.H. Trans, 4 RW, 6 RW
30.	2500-6	Sprocket, 18T-28T
31.	D1113	U-Bolt 5"x7"x 5/8"-11
32.	10230	Lockwasher, 5/8"
33.	10104	Hex Nut, 5/8"-11
A.	A503	Idler Assembly (Items 20-22)
B.	A783	Trans. Assembly L.H., 4R30, 6R30, 8R's (Items 1-5, 7-17, 20-30)
C.	A784	Trans. Assembly, R.H., All Models (Items 1-5, 7-17, 20-27, 29 and 30)
D.	A823	Trans. Assembly, L.H., 4 RW and 6 RW (Items 1-5, 7-17, 20-30)

* Used On R.H. Transmissions
**Used On L.H. Transmissions

DRIVE LINE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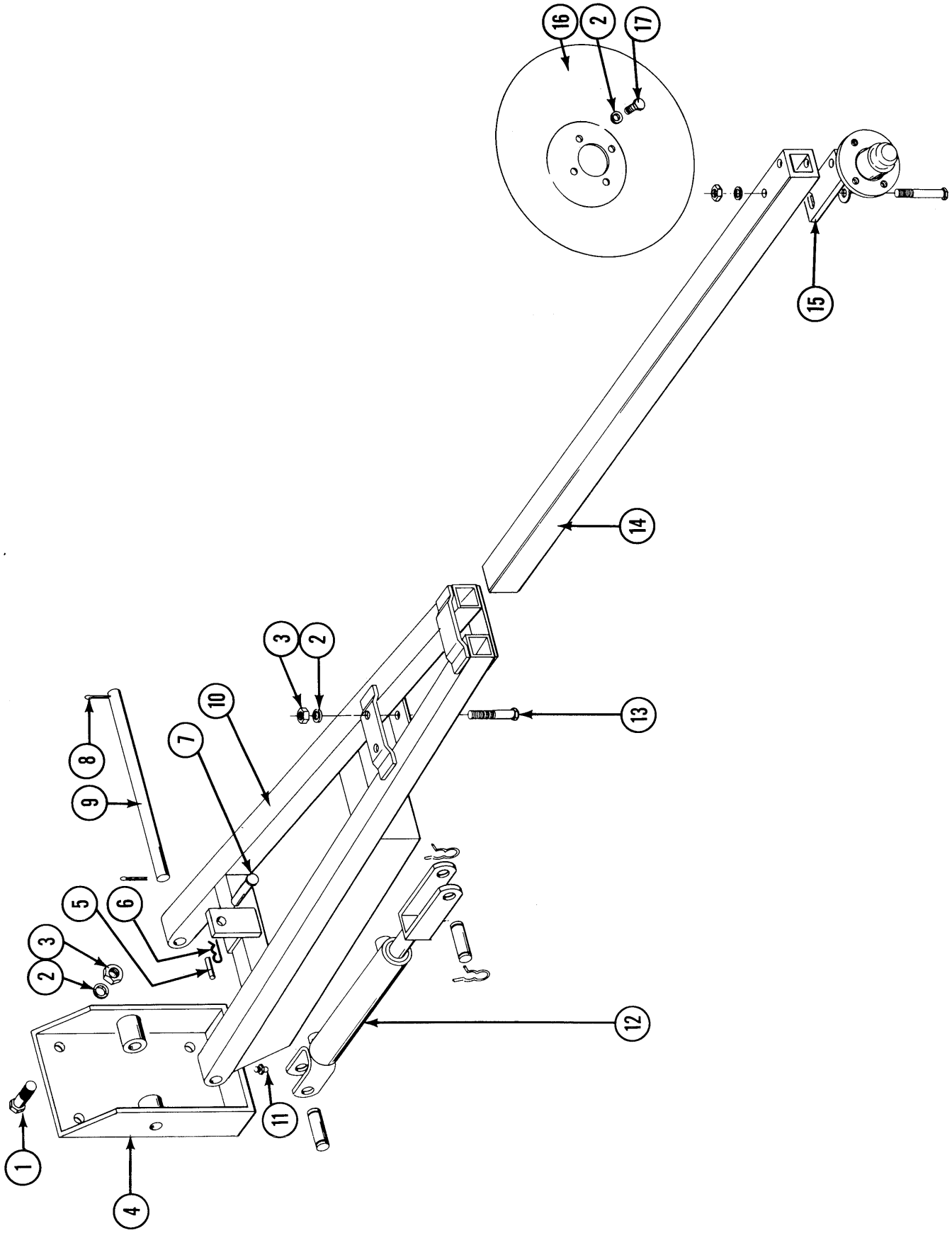
DRIVE LINE

ITEM	PART NO.	DESCRIPTION
1.	10233	Machinery Bushing, As required
2.	D1256	Spring
3.	10464	Cotter Pin, 3/16" x 1"
4.	A378	Block and Hub Assembly
5.	D1255	"L" Pin
6.	A376	Hub/Sprocket Assembly
7.	10430	Retaining Ring, 1¼"
8.	R460	Sprocket, 48T
9.	10229	Lockwasher, 3/8"
10.	10002	HHCS, 3/8"-16x3/4"
11.	10456	Cotter Pin 1/8"x3/4"
12.	D1649	Coupler
13.	10558	Clevis Pin 5/16"x1 3/4"
14.	10106	Hex Nut, 5/16" -8
15.	10232	Lockwasher, 5/16"
16.	A787	Bracket, Drive Shaft Support
17.	3400-1	Flangette
18.	2100-3	Bearing, 7/8", Hex Bore
19.	10303	Carriage Bolt, 5/16"-8x1"
20.	A271	Lockcollar
21.	D1719	Coupler (8R Wide)
22.	D914-102	Hex Drive Shaft, 4R30, 101.5"
	D914-129.5	Hex Drive Shaft, 4RW, 129.5"
	D914-161.5	Hex Drive Shaft, 6R30, 161.5"
	D914-205.5	Hex Drive Shaft, 6RW, 205.5"
	D914-221.5	Hex Drive Shaft, 8R30, 221.5"
	D914-138	Hex Drive Shaft, 8RW, 138" (2 used)
23.	D1663	Bearing Plate
24.	D1134	U-Bolt, 5/8"-11x7"x5"
25.	10230	Lockwasher, 5/8"
26.	10104	Hex Nut, 5/8"-11
27.	10009	HHCS, 5/8"-11x2½"
28.	A262	Sprocket, Idler, 15 Tooth
29.	B123	Bushing
30.	10205	Flat Washer 5/8" SAE
31.	10301	Carriage Bolt, 3/8"-16x1½"
32.	10107	Locknut, 5/8"-11
33.	10210	Washer, 3/8" USS
34.	10101	Hex Nut, 3/8"-16
A.	A261L	Ratchet Clutch Assembly Complete - L.H. (Items 2-7)
	A261R	Ratchet Clutch Assembly Complete, R.H. (Items 2-7)

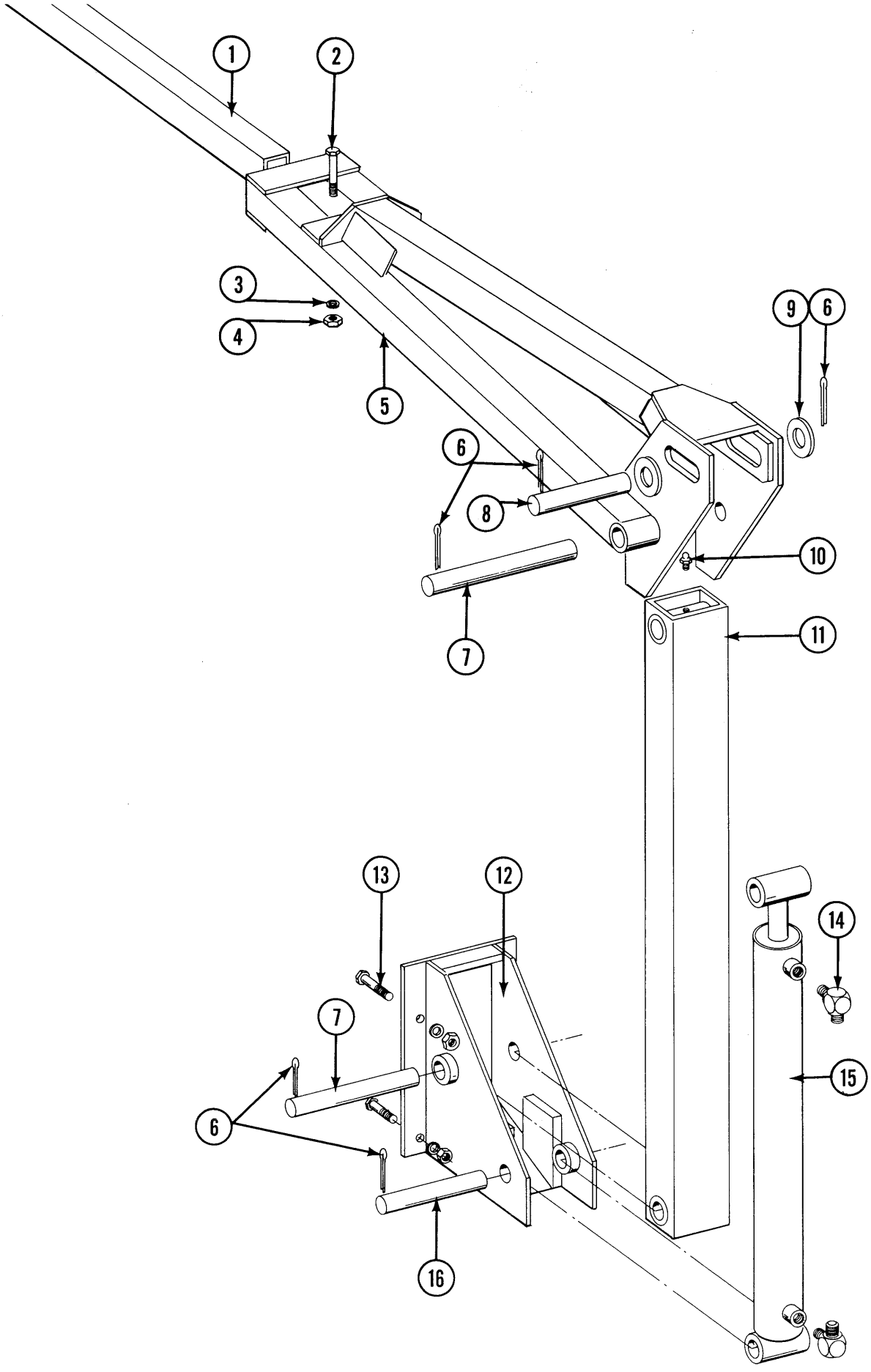
CONVENTIONAL MARKER ASSEMBLY



CONVENTIONAL MARKER ASSEMBLY

ITEM	PART NO.	DESCRIPTION
1.	10039	HHCS, ½"-13x1¾"
2.	10228	Lockwasher, ½"
3.	10102	Hex Nut, ½"-13
4.	A224	Marker Mount
5.	10609	Roll Pin, 5/32"x1"
6.	10670	Hair Pin Clip, No. 3
7.	D462	Marker Lockup Pin
8.	10460	Cotter Pin, ¼"x2"
9.	D438	Shaft
10.	A225	Marker Arm Weld, 45", 4R30 and 4RW
	A538	Marker Arm Weld, 64"x 6R30
11.	10640	Grease Fitting, ¼"-28
12.	A211	Cylinder Assembly, 2x8 (see page 74)
	A745	Cylinder Assembly, 2x8 (see page 73)
13.	10033	HHCS, ½"-13x3½"
14.	D453-1	Extension Tube, 20", 4R30
	D453-2	Extension Tube, 40", 6R30
	D453-3	Extension Tube, 50", 4RW
15.	A305	Marker Hub Assembly, L.H. (Includes Hardware)
	A306	Marker Hub Assembly, R.H. (Includes Hardware)
16.	D746	Disc, 16"
17.	10722	HHCS, ½"-20x1"
A.	A563	Lockup Pin Assembly (Includes Items 5, 6, and 7)

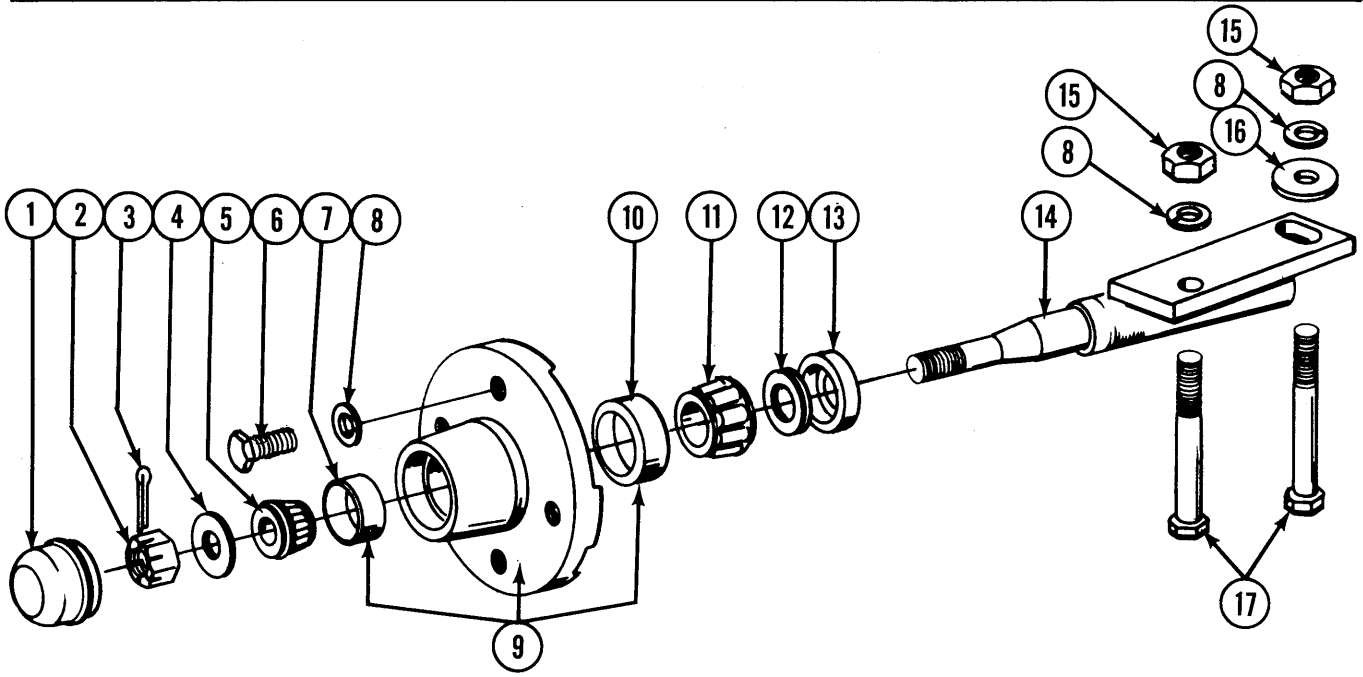
LOW PROFILE - DOUBLE FOLD MARKER ASSEMBLY



LOW PROFILE - DOUBLE FOLD MARKER ASSEMBLY

ITEM	PART NO.	DESCRIPTION
1.	D453-3	Extension Tube, 50", 8R30
	D453-4	Extension Tube, 60", 8RW
	D453-5	Extension Tube, 55", 6RW
2.	10033	HHCS, ½"-13x3½"
3.	10228	Lockwasher, ½"
4.	10102	Hex Nut, ½"-13
5.	A831	Marker Arm, 34", 6RW
	A832	Marker Arm, 45", 8R30
	A833	Marker Arm, 66', 8RW
6.	10460	Cotter Pin, ¼"x2"
7.	D1702	Pivot Pin
8.	D1701	Pin, Cylinder, Upper
9.	10226	Washer, 1¼" SAE
10.	10641	Grease Fitting, 1/8" NPT
11.	A828	Arm, First Stage
12.	A827	Marker Mount
13.	10039	HHCS, ½"- 13x1¾"
14.	2501-8-8	Elbow, 90°, ½" NPT to 37°¾"-16JIC
15.	A233	Cylinder, 2½"x20" (see page 75)
16.	D653	Pin, Cylinder, Lower

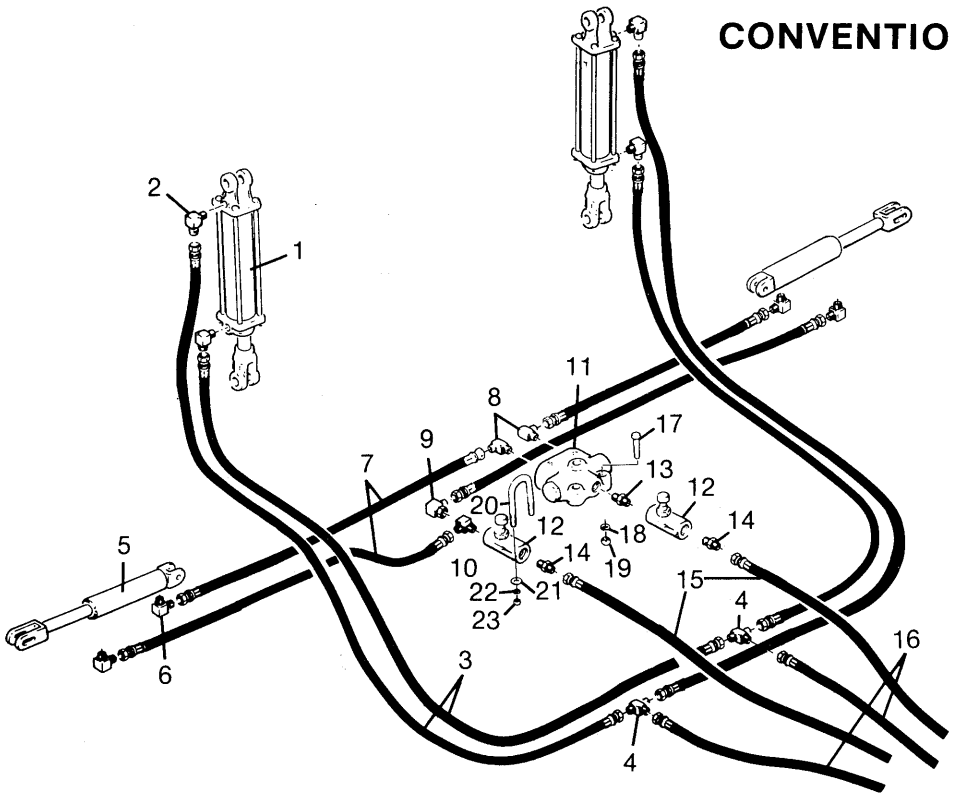
MARKER HUB ASSEMBLY CONVENTIONAL AND LOW PROFILE



ITEM	PART NO.	DESCRIPTION
1.	D840	Hub Cap
2.	10725	Hex Nut, Slotted, 5/8"-18
3.	10470	Cotter Pin, 5/32"x1"
4.	10724	Washer, 5/8"
5.	A257	Bearing, Outer
6.	10722	HHCS, ½"-20x1"
7.	R151	Cup, Outer
8.	10228	Lockwasher, ½"
9.	A167	Hub w/cups
10.	R150	Cup, Inner
11.	A245	Bearing, Inner
12.	A899	Seal, Rubber
13.	A243	Seal, Grease
14.	A172L	Spindle Assembly, L.H. (shown)
	A172R	Spindle Assembly, R.H.
15.	10102	Hex Nut, ½"-13
16.	10216	Washer, ½" USS
17.	10033	HHCS, ½"-13x3½"
A.	A305	Hub and Spindle Assembly L.H.
	A306	Hub and Spindle Assembly R.H.

HYDRAULIC SYSTEM 4R30, 4RW, 6R30 DUAL VALVE

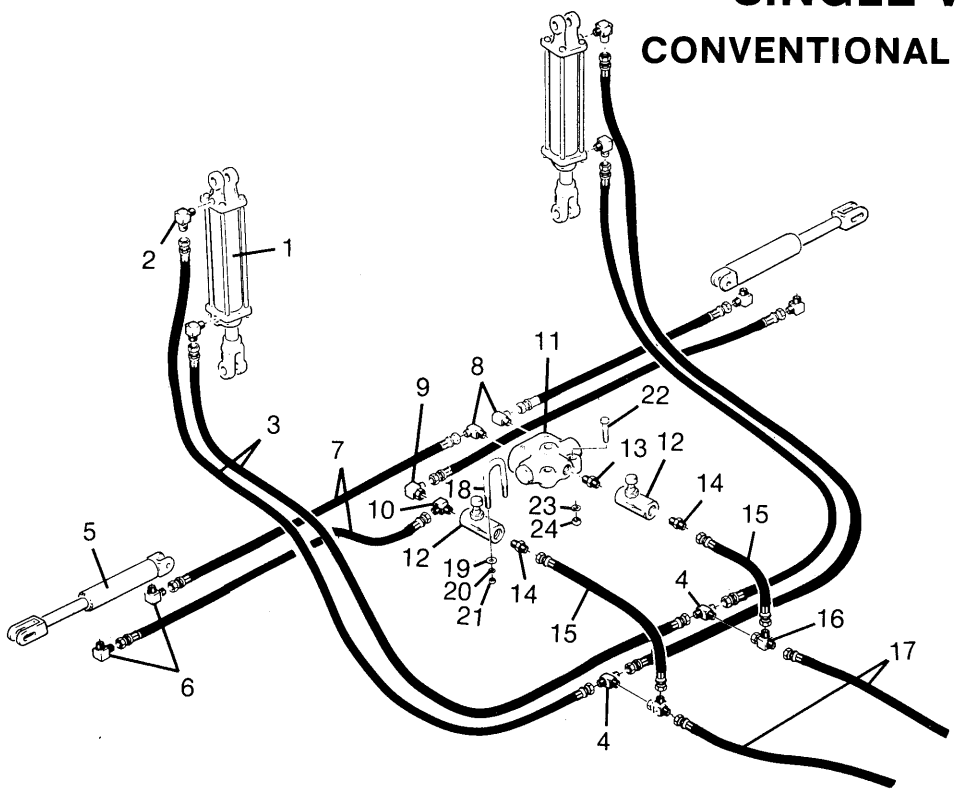
CONVENTIONAL MARKERS



ITEM	PART NO.	DESCRIPTION
1.	A215	Cylinder, Lift, 3½"x10 (see page 71)
	A746	Cylinder, Lift, 3½x10 (see page 72)
2.	2501-8-8	Elbow, 90°
3.	A1006	Hose Assembly, 3/8"x90"x 4RW, 4R30 and 6R30
4.	2603-8	Tube, Tee
5.	A211	Cylinder, Marker, 2"x8" (see page 74)
	A745	Cylinder, Marker, 2"x8" (see page 73)
6.	2501-6-6	Elbow, 90°
7.	A1102	Hose Assembly, ¼"x95" 4R30
	A1103	Hose Assembly, ¼"x110", 4RW
	A1105	Hose Assembly, ¼"x125", 6R30
8.	6801-6-8	Elbow, 90°
9.	6500-6	Elbow 90°
10.	2605-6-6	Run Tee, Male
II.	A282	Valve, Seq.
12.	A270	Valve, Flow Control
13.	6401-8-6	Adapter, Straight
14.	2404-6-6	Adapter,Straight
15.	A1108	Hose Assembly, ¼"x140"
16.	A1012	Hose Assembly, 3/8"x140"
17.	10048	HHCS, 3/8"-16x2"
18.	10229	Lock Washer, 3/8"
19.	10101	Hex Nut, 3/8"-16
20.	D1253	U-bolt, 5/16"-18x2¼x1½"
21.	10219	Flat Washer, 5/16"
22.	10232	Lock Washer, 5/16"
23.	10106	Hex Nut, 5/16"-18
	D1512	Tie Strap, 6" (Now Shown)
	D1162	Tie Strap, 28" (Not Shown)

HYDRAULIC SYSTEM -4R30, 4RW, and 6R30

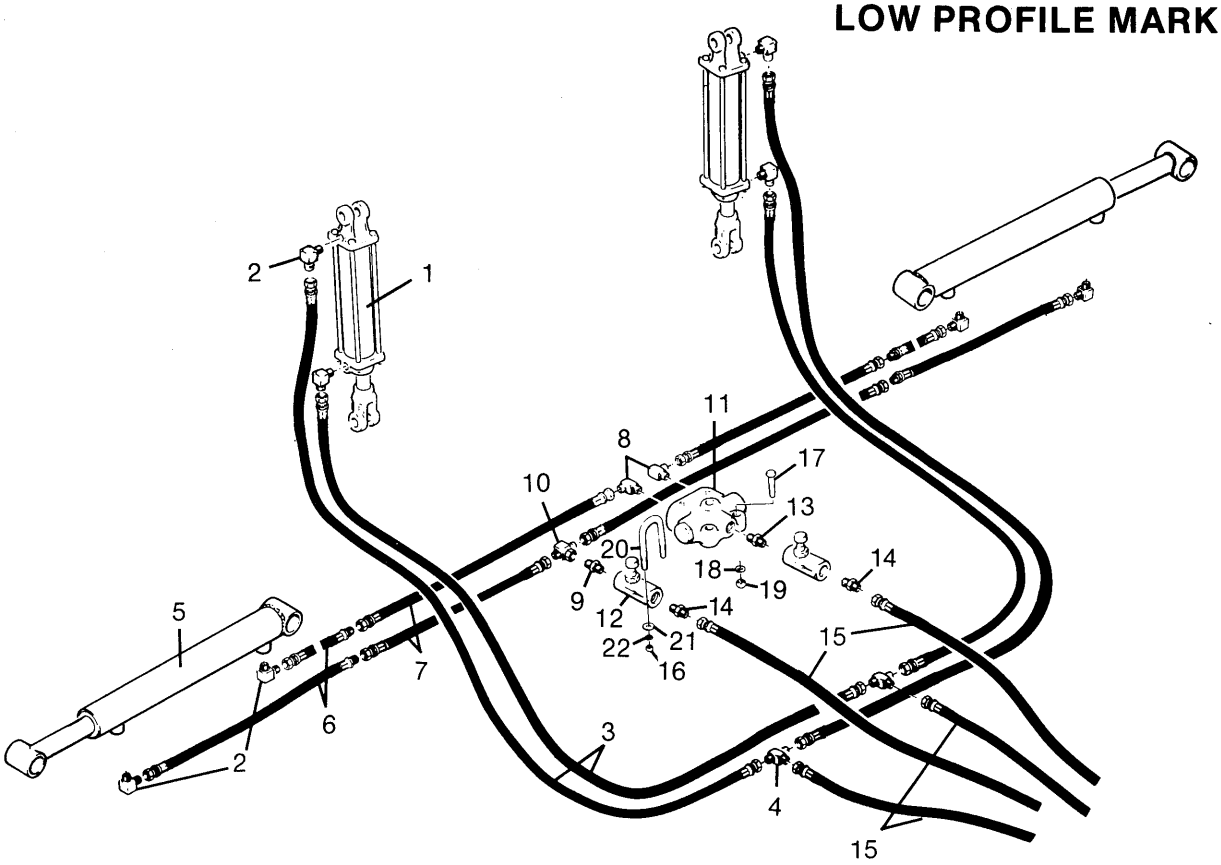
SINGLE VALVE - CONVENTIONAL MARKER



ITEM	PART NO.	DESCRIPTION
1.	A215	Cylinder, Lift, 3½x10 (see page 71)
	A746	Cylinder, Lift, 3½x10 (see page 72)
2.	2501-8-8	Elbow, 90°
3.	A1006	Hose Assembly, 3/8"x90", 4R30, 4RW and 6R30
4.	2603-8	Tube, Tee
5.	A211	Cylinder, Marker, 2"x8" (see page 74)
	A745	Cylinder, Marker, 2"x8" (see page 73)
6.	2501-6-6	Elbow, 90°
7.	A1102	Hose Assembly, ¼"x95"4R30
	A1103	Hose Assembly, ¼x110, 4RW
	A1105	Hose Assembly, ¼x125, 6R30
8.	6801-6-8	Elbow, 90°
9.	6500-6	Elbow, 90°
10.	2605-6-6	Run Tee, Male
11.	A282	Valve, Seq.
12.	A270	Valve, Flow Control
13.	6401-8-6	Adapter, Straight
14.	2404-8-6	Adapter, Straight
15.	A1000	Hose Assembly , 3/8"x15'x4R30, 4RW and 6R30
16.	6602-8	Swivel Tee
17.	A1012	Hose Assembly, 3/8"x140", 4R30, 4RW and 6R30
18.	D1253	U-Bolt, 5/16"-18x 2¼"x1½"
19.	10219	Flat Washer, 5/16"
20.	10232	Lockwasher, 5/16"
21.	10106	Hex Nut, 5/16"-18
22.	10048	HHCS, 3/8"-16x2"
23.	10229	Lock Washer, 3/8"
24.	10101	Hex Nut, 3/8"-16
	D1512	Tie Strap, 6" (Not Shown)
	D1162	Tie Strap, 28" (Not Shown)

HYDRAULIC SYSTEM 6 RW, 8R30, 8RW DUAL VALVE

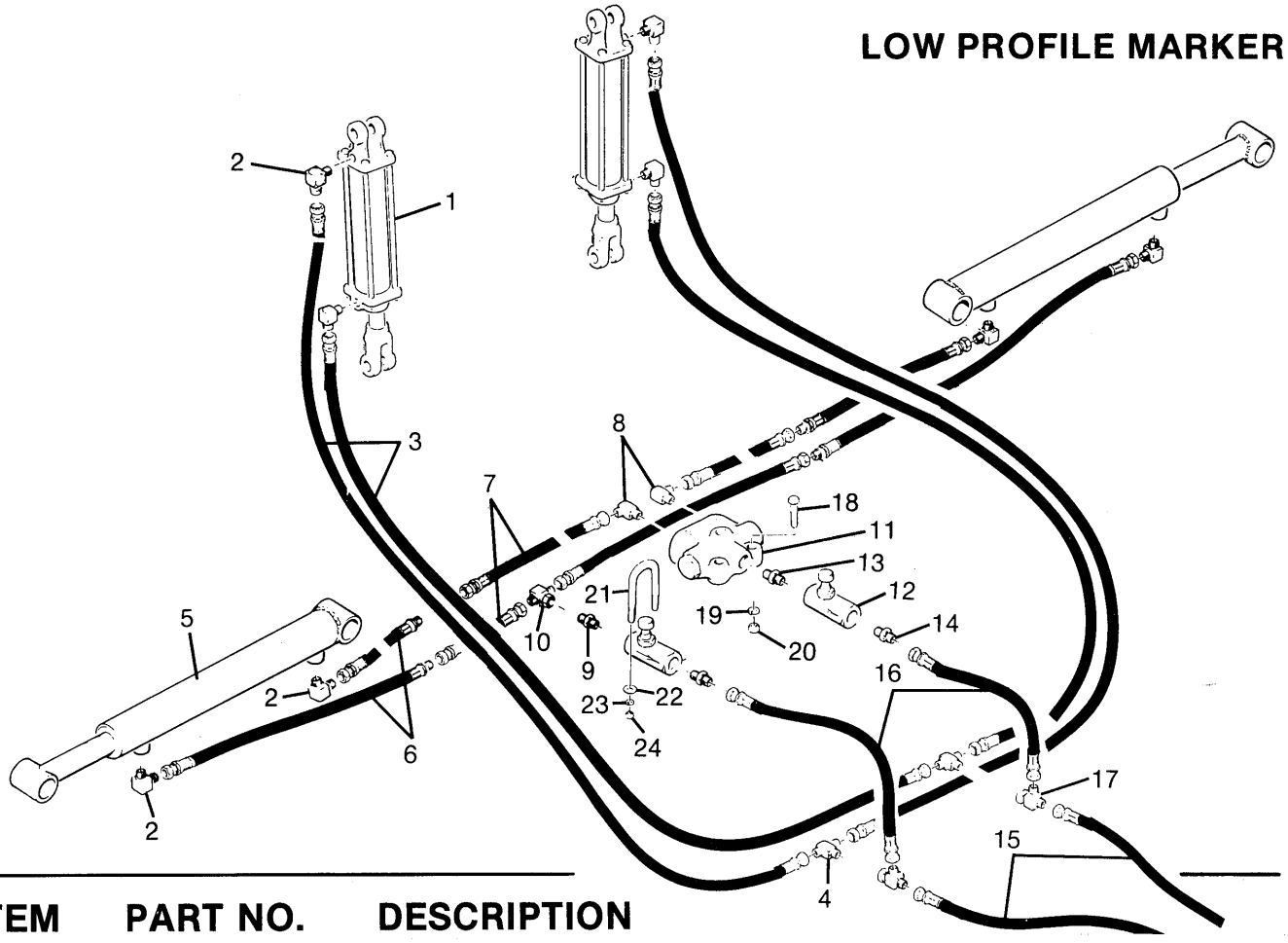
LOW PROFILE MARKER



ITEM	PART NO.	DESCRIPTION
1.	A215	Cylinder, Lift, 3½"x10" (see page 71)
	A746	Cylinder, Lift, 3½"x10" (see page 72)
2.	2501-8-8	Elbow, 90°
3.	A1008	Hose Assembly, 3/8"x110", 6 RW
	A1006	Hose Assembly, 3/8"x90", 8 R30
	A1011	Hose Assembly, 3/8"x125", 8 RW
4.	2603-8	Tube, Tee
5.	A233	Cylinder, Marker 2½x20" (see page 75)
6.	A1004	Hose Assembly, 3/8"x36", 8 RW (4 Used)
7.	A1013	Hose Assembly, 3/8'x150", 8 RW (4 Used) 6 RW (4 Used), 8R30 (2 Used)
	A1049	Hose Assembly, 3/8"x160", 8R30 (2 Used)
8.	6801-8	Elbow, 90°
9.	5404-6-6	Pipe Coupling, Male
10.	2602-8-6	Side Tee, Female
11.	A282	Valve, Seq.
12.	A270	Valve, Flow Control
13.	6401-8-6	Adapter, Straight
14.	2404-8-6	Adapter, Straight
15.	A1012	Hose Assembly, 3/8"x140"
16.	10106	Hex Nut, 5/16"-18
17.	10048	HHCS, 3/8"-16x2"
18.	10229	Lock Washer 3/8"
19.	10101	Hex Nut, 3/8"-16
20.	D1253	U-Bolt, 5/16"-18x2¼"x1½"
21.	10219	Flatwasher, 5/16"USS
22.	10232	Lockwasher, 5/16"
	D1512	Tie Straps, 6" (Not Shown)
	D1162	Tie Straps, 28" (Not Shown)

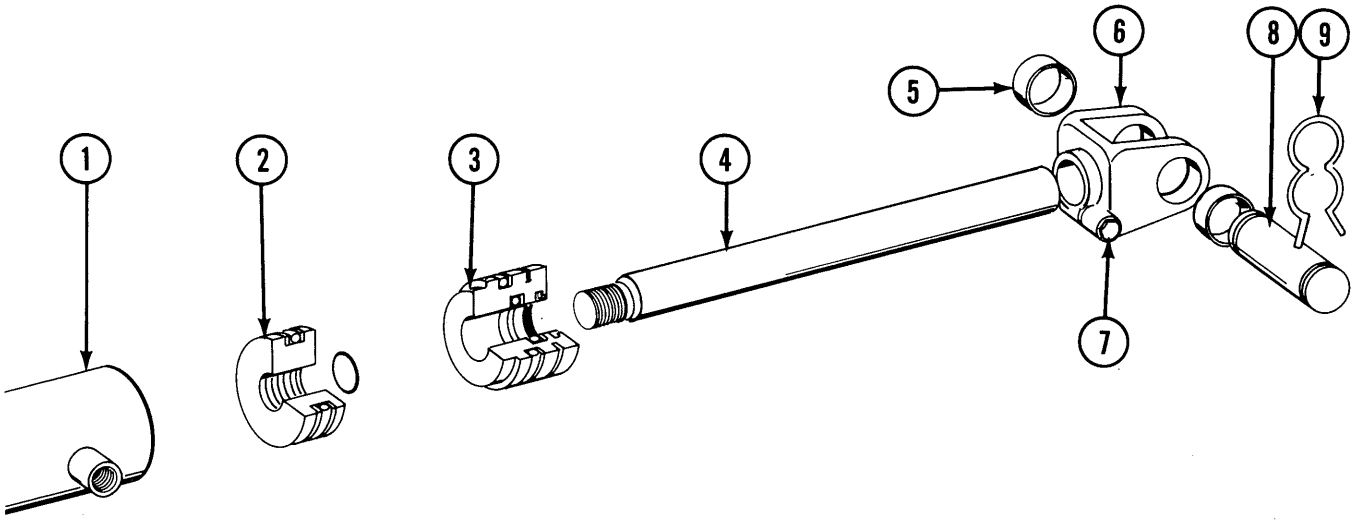
HYDRAULIC SYSTEM 6 RW, 8R30, 8RW SINGLE VALVE

LOW PROFILE MARKER



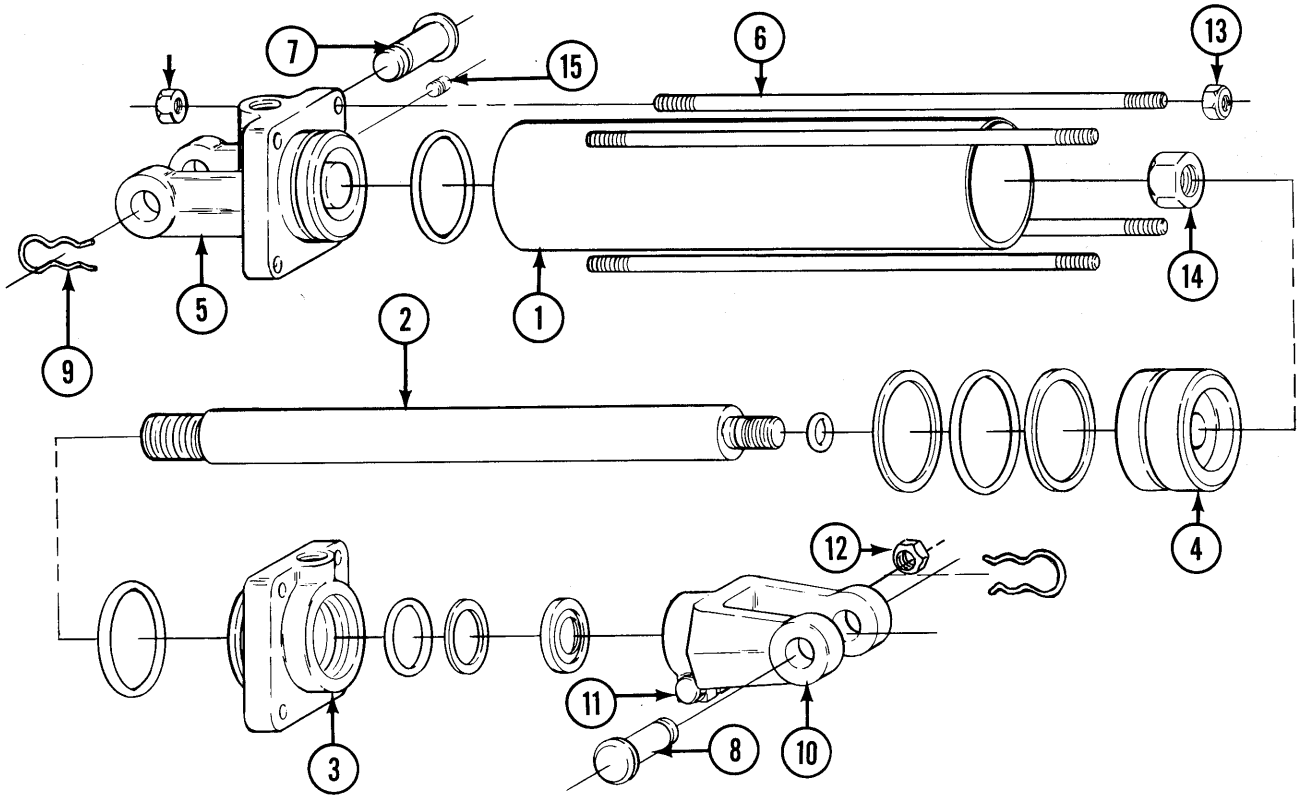
ITEM	PART NO.	DESCRIPTION
1.	A215	Cylinder, Lift, 3½x10 (see page 71)
	A746	Cylinder, Lift, 3½x10 (see page 72)
2.	2501-8-8	Elbow, 90°
3.	A1008	Hose Assembly, 3/8"x110", 6RW
	A1006	Hose Assembly, 3/8"x90", 8R30
	A1011	Hose Assembly, 3/8"x125"x 8 RW
4.	2603-8	Tube, Tee
5.	A233	Cylinder, Marker 2½x20" (see page 75)
6.	A1004	Hose Assembly, 3/8"x36"x8RW (4 Used)
7.	A1013	Hose Assembly, 3/8"x150", 8RW (4 Used) 6RW (4 Used), 8R30 (2 Used)
	A1049	Hose Assembly, 3/8"x160", 8R30 (2 Used)
8.	6801-8	Elbow, 90°
9.	5404-6-6	Pipe Coupling, Male
10.	2602-8-6	Side Tee, Female
11.	A282	Valve, Seq.
12.	A270	Valve, Flow Control
13.	6401-8-6	Adapter, Straight
14.	2404-8-6	Adapter, Straight
15.	A1012	Hose Assembly, 3/8"x140"
16.	A1000	Hose Assembly, 3/8"x15"
17.	6602-8	Swivel Tee
18.	10048	HHCS, 3/8"-16x2"
19.	10229	Lock Washer 3/8"
20.	10101	Hex Nut, 3/8"-16
21.	D1253	U-Bolt, 5/16"-18x2¼"x1½"
22.	10219	Flatwasher, 5/16" USS
23.	10232	Lock Washer, 5/16"
24.	10106	Hex Nut, 5/16"-18
	D1512	Tie Straps, 6" (Not Shown)
	D1162	Tie Straps, 28" (Not Shown)

LIFT CYLINDER



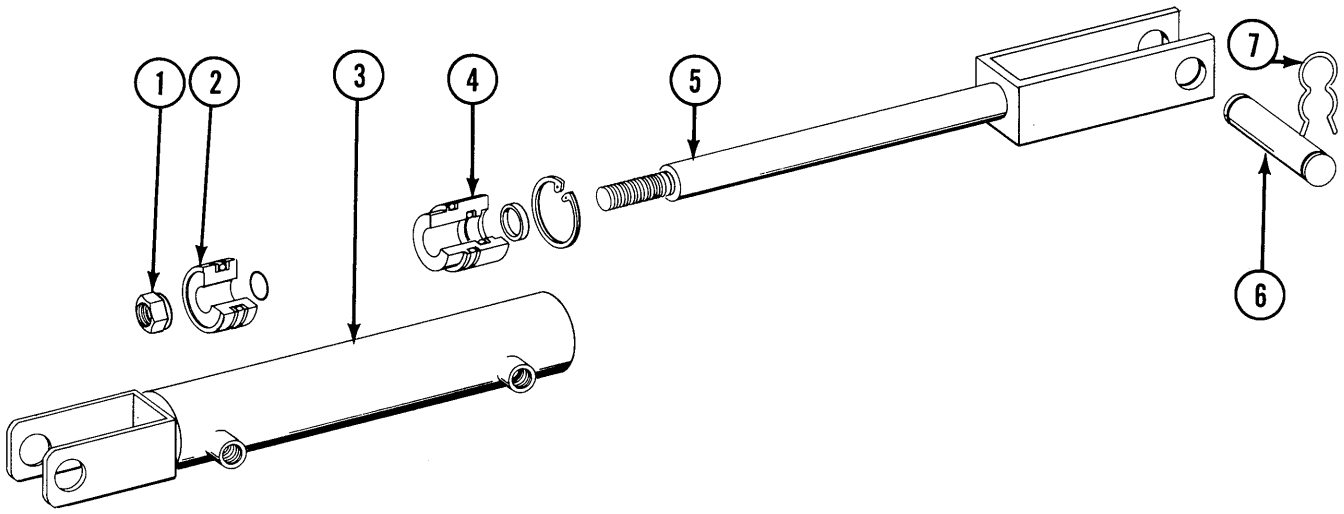
ITEM	PART NO.	DESCRIPTION
1.	R369	Tube Assembly
2.	R372	Piston
3.	R371	Head Gland
4.	R370	Shaft Assembly
5.	R374	Bushing, Steel
6.	R373	Clevis
7.	10075	Clevis Bolt 3/8"-24x1¾"
8.	R375	Clevis Pin
9.	R193	Clip, Hair Pin
A.	A746	Cylinder, Lift, Complete, 3½x10
	R376	Seal Kit Includes (1) O-Ring 1.14 I.D.x1.254.O.D. (1) O-Ring 1.475 I.D.x1.895 O.D. (2) O-Ring 3.10 I.D.x3.52 O.D. (1) Back Up Washer 1½ I.D.x1 7/8 O.D. (3) Back Up Washer 3 1/8 I.D. x 3½ O.D. (1) Rod Wiper (1) Retaining Ring, Int. 3½"

LIFT CYLINDER



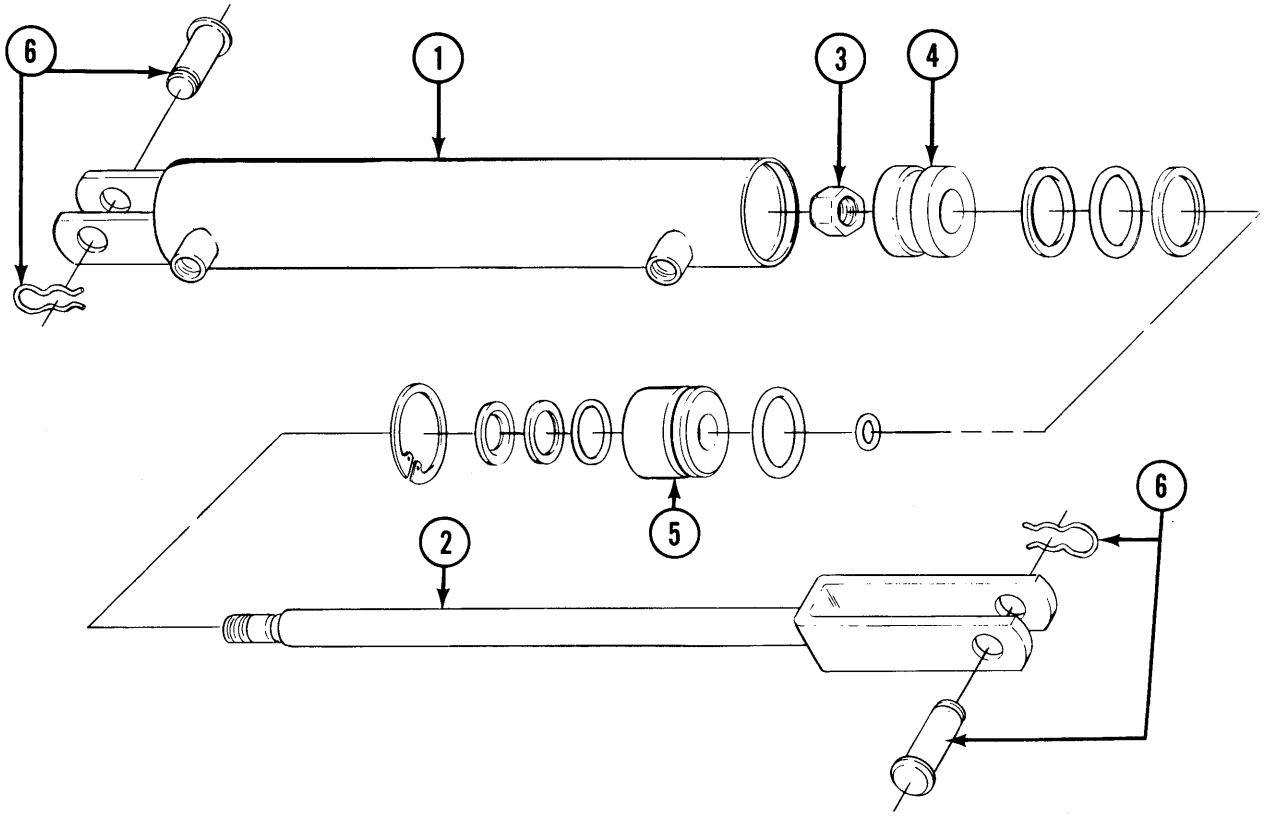
ITEM	PART NO.	DESCRIPTION
1.	R182	Tube Assembly
2.	R183	Shaft Assemply
3.	R175	Guide, Piston Rod
4.	R184	Piston
5.	R185	Clevis, Bottom
6.	R186	Tie Rod
7.	R179	Clevis Pin, w/Clips
8.	R180	Clevis Pin, w/Clips
9.	R193	Clip, Hair Pin
10.	R456	Clevis, Shaft End
11.	10047	Screw, Hex Head Cap, 3/8"-16x1¾"
12.	10101	Hex Nut, 3/8"-16
13.	R181	Hex Nut, ½"-13, Grade 5
14.	R159	Hex Lock Nut, 7/8"-14 UNF, Grade 5
15.	R187	Pipe Plug, ½" NPT
A.	A215	Cylinder, Lift, Complete, 3½"x10"
	R152	Seal Kit Includes (1) Rod Wiper - 1½" (2) Back Up Washer, 31/8 I.D.x3½ O.D. (1) Back Up Washer, 1½ I.D.x1 7/8 O.D. (3) O-Ring, 3 1/8 I.D.x 3½ O.D. (1) O-Ring, 1½ I.D.x1 7/8 O.D. (1) O-Ring, 3/4 I.D. x 7/8 O.D.

CONVENTIONAL MARKER CYLINDER



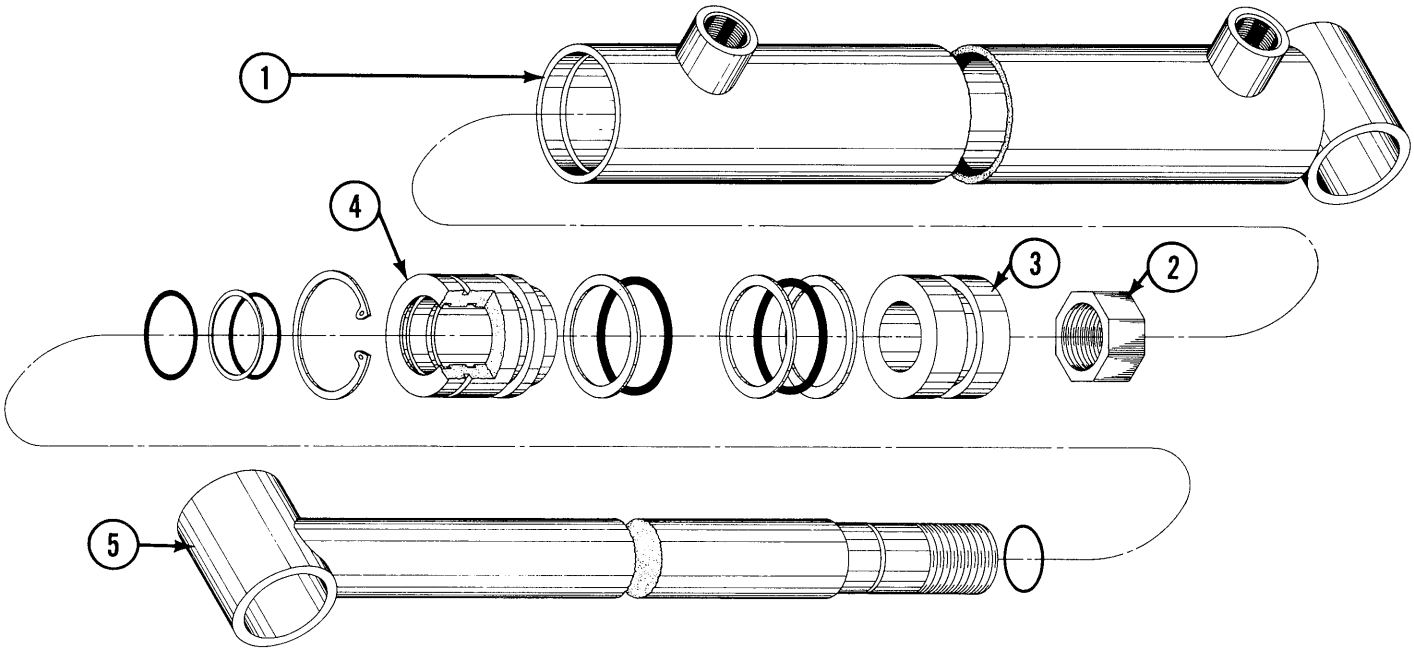
ITEM	PART NO.	DESCRIPTION
1.	R366	Hex Nut, ¾" NF
2.	R365	Piston
3.	R362	Tube Assembly
4.	R364	Head Gland
5.	R363	Shaft Assembly
6.	R367	Clevis Pin
7.	R193	Clip, Hair Pin Ony
	R368	Seal Kit Includes (1) O-Ring .614 I.D. x .754 O.D. (1) O-Ring 1.109 I.D. x 1.387 O.D. (2) O-Ring 1.600 I.D. x 2.200 O.D. (1) Back Up Washer 1 1/8" I.D. x 1 3/8" O.D. (1) Rod Wiper 2" I.D. (1) Retaining Ring Internal 2" (2) Back Up Washer 1 5/8 I.D. x 2 O.D.
A.	A745	Cylinder, Complete, 2"x8"

CONVENTIONAL MARKER CYLINDER



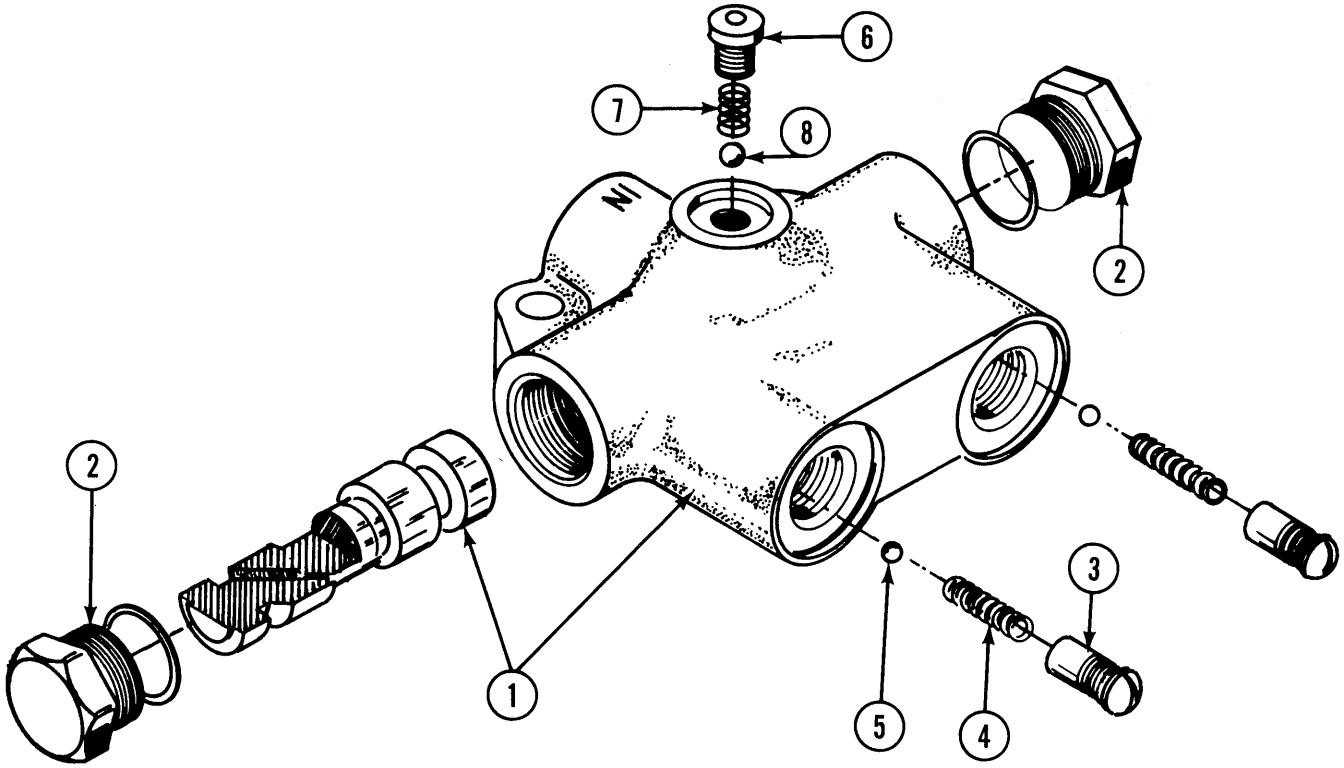
ITEM	PART NO.	DESCRIPTION
1.	R157	Cylinder Body
2.	R158	Piston Rod
3.	R159	Hex Nut, 7/8" UNF
4.	R160	Piston
5.	R161	Piston Rod Guide
6.	R162	Clevis Pin W/Clip
	R193	Clip, Hair Pin, Only
	R154	Seal Kit Includes (1) O-Ring, ¾" I.D x 7/8" O.D. (1) O-Ring, 1 1/8" I.D. x 1 3/8" O.D. (1) Back Up Washer (1) Rod Wiper (2) Back Up Washer (2) O-Ring, 1 5/8" I.D. x 2" O.D. (1) Retaining Ring
A.	A211	Cylinder - Complete 2"x8"

LOW PROFILE - DOUBLE FOLDING MARKER CYLINDER



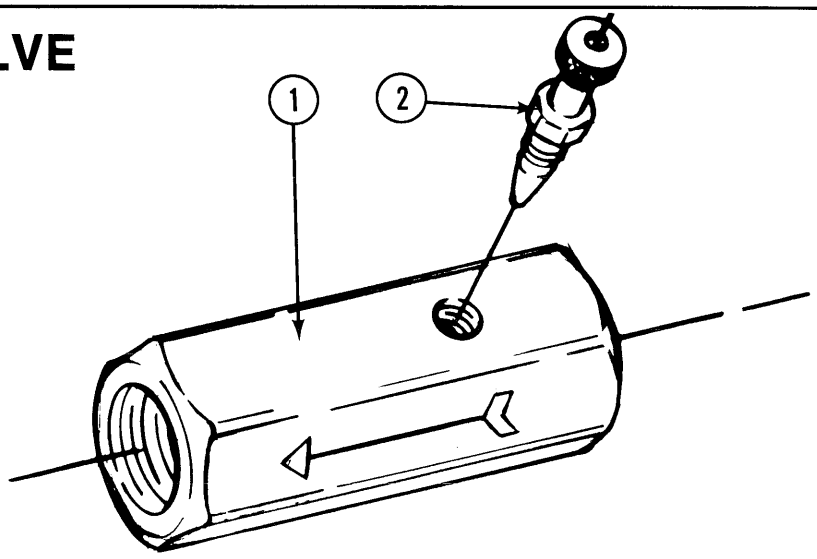
ITEM	PART NO.	DESCRIPTION
1.	R134	Cylinder Tube Assembly
2.	R138	Hex Nut, 7/8" UNF
3.	R137	Piston
4.	R136	Head Gland
5.	R135	Shaft Assembly
A.	A233	Cylinder Assembly, Complete, 2½" x 20"
	R139	Seal Kit Includes (1) Lock Ring (1) O-Ring (018) (1) O-Ring (218) (1) Back Up (23) (2) O-Ring (330) (3) Back Up (33) (1) Wiper

SEQUENCING VALVE



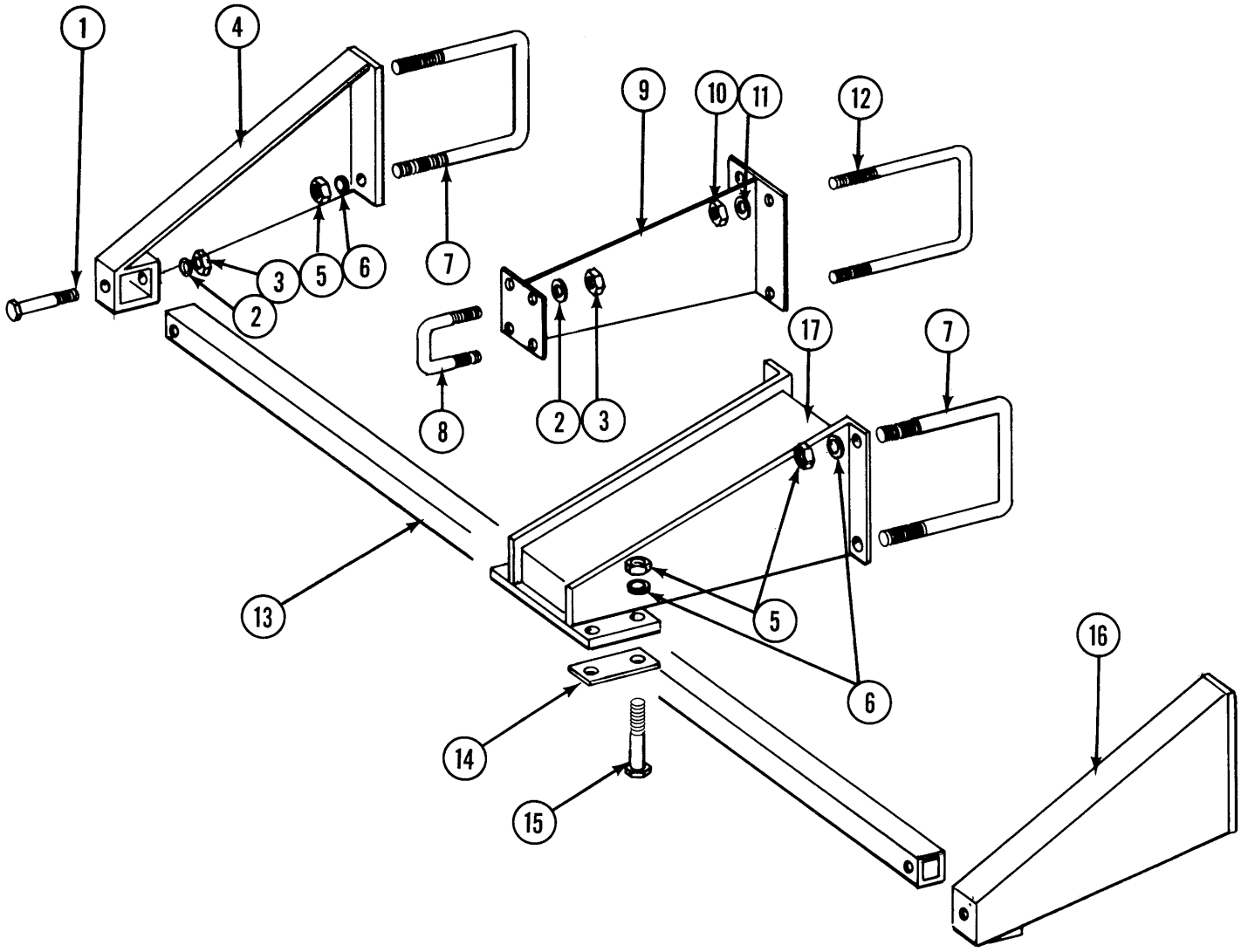
ITEM	PART NO.	DESCRIPTION
1.	R272	Valve Body and Spool
2.	R271	Plug Assembly, O-Ring Boss
3.	R273	Retainer, Check Valve
4.	R277	Spring, Check Valve
5.	R275	Ball, Check, 3/16" Diameter
6.	R274	Plug Assembly, O-Ring Boss
7.	R278	Spring
8.	R276	Ball, ¼" Diameter
A.	A282	Sequencing Valve, Complete

FLOW CONTROL VALVE



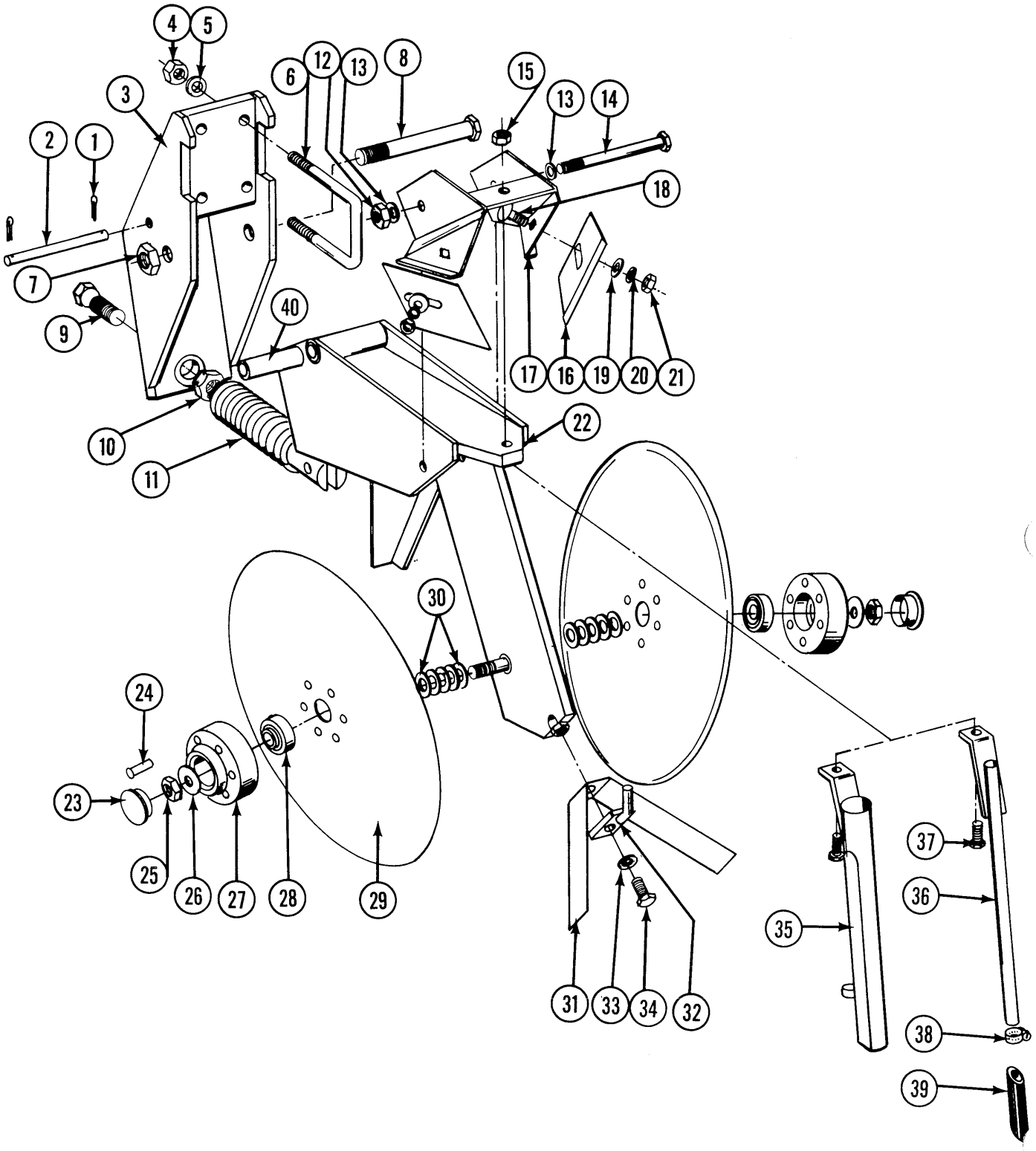
ITEM	PART NO.	DESCRIPTION
1.	A270	Flow Control Valve Assembly, 3/8" NPT (KLF 375)
2.	R103	Needle Valve Assembly

FERTILIZER BAR



ITEM	PART NO.	DESCRIPTION
1.	10032	HHCS, ½"-13x3 ¾"
2.	10228	Lockwasher, ½"
3.	10102	Hex Nut, ½"-13
4.	A812	Bracket, Fertilizer Bar R.H.
5.	10105	Hex Nut, ¾"-10
6.	10231	Lockwasher, ¾"
7.	D1747	U-Bolt, 5"x7"x ¾"-10
8.	D1138	U-Bolt, 2½"x2½"x½"-13
9.	A925	Fertilizer Bar Support, 8R30 and W Optional 6R models
10.	10104	Hex Nut, 5/8"-11
11.	10230	Lockwasher, 5/8"
12.	D1113	U-Bolt, 5"x7"x5/8"-11
13.	D1685-1	Fertilizer Bar, 4R30, 112"
	D1685-2	Fertilizer Bar, 4RW, 136"
	D1685-3	Fertilizer Bar, 6R30, 172"
	D1685-4	Fertilizer Bar, 6RW, 212"
	D1685-5	Fertilizer Bar, 8R30, 232"
	D1685-6	Fertilizer Bar, 8RW, 288"
14.	D1749	Bar
15.	10029	HHCS, ¾"-10x4½"
16.	A813	Bracket, Fertilizer Bar, L.H.
17.	A814	Center Brace Weld

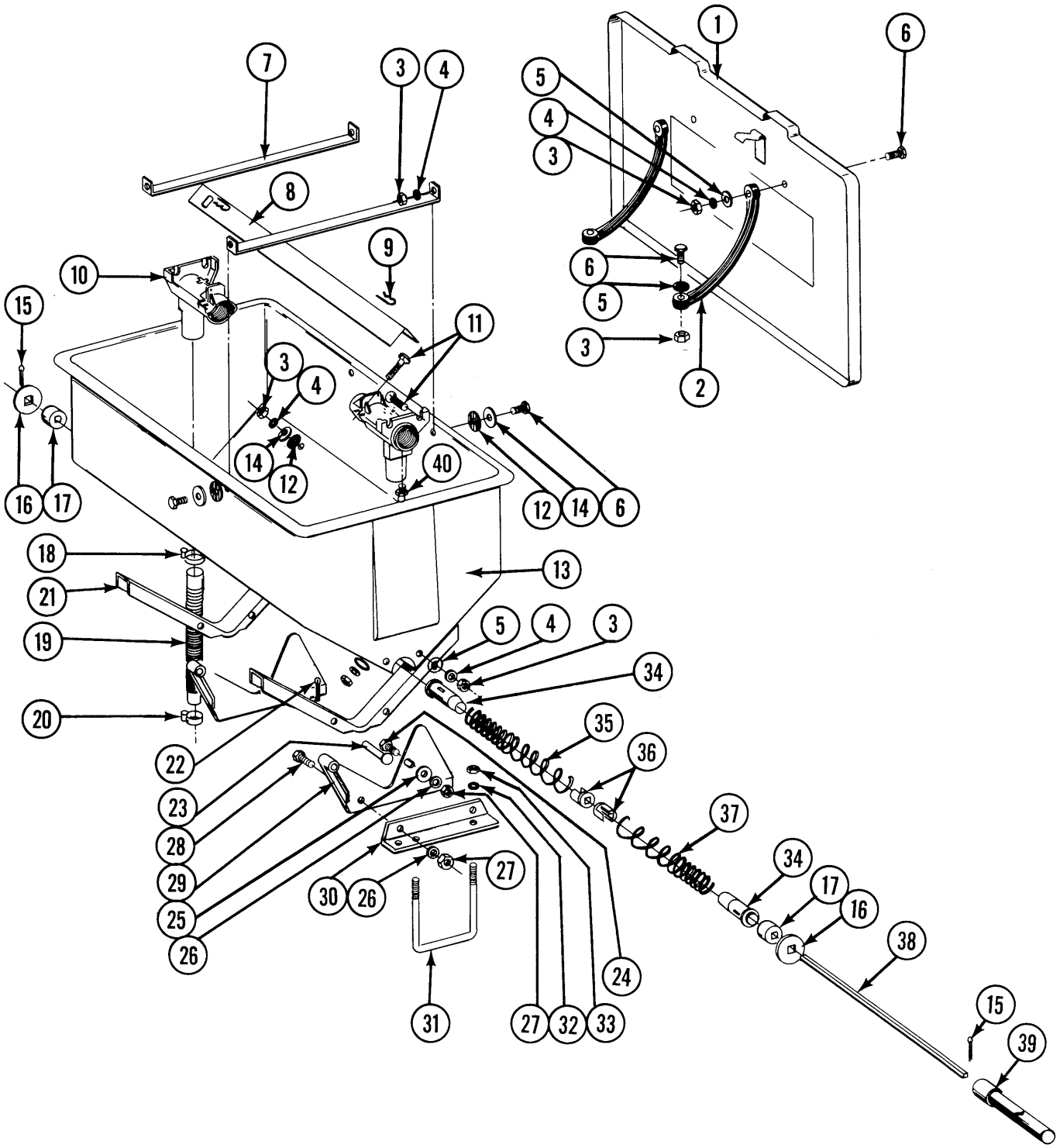
DOUBLE DISK FERTILIZER OPENER



DOUBLE DISK FERTILIZER OPENER

ITEM	PART NO.	DESCRIPTION
1.	10451	Cotter Pin, 1/8"x1"
2.	D1657	Lock Up Pin
3.	A785	Mounting Bracket Weld
4.	10102	Hex Nut, ½"-13
5.	10228	Lockwasher, ½"
6.	D1138	U-Bolt, 2½"x2½"x½"-13
7.	10107	Hex Lock Nut, 5/8"—11
8.	10046	HHCS, 5/8"-11x5"
9.	D962	Hex Head Adjusting Bolt, 5/8"-18
10.	10499	Jam Nut, 5/8"-18
11.	A328	Spring
12.	10111	Lock Nut, ½"-13
13.	10216	Flatwasher ½"
14.	10045	HHCS, ½"-13x4½
15.	10109	Hex Lock Nut, 5/16"-18
16.	D1673	Sraper
17.	A810	Sraper Mount
18.	10305	Carriage Bolt, 3/8"-16x1"
19.	10210	Flat Washer, 3/8" USS
20.	10229	Lockwasher, 3/8"
21.	10101	Hex Nut, 3/8"-16
22.	A308	Fertilizer Opener Weld
23.	D1132	Hub Cap
24.	10651	Rivet, ¼"x13/8"
25.	10503	Jam Nut, R.H. 5/8"-11
	10504	Jam Nut, L.H. 5/8"-11
26.	10217	Washer, 5/8" USS
27.	B134	Bearing Hub
28.	A2014	Bearing
29.	D1030	Disk Blade
30.	10213	Machine Bushing, 1 3/64x11/16x .030
31.	D1163	Scraper, Inner
32.	A312	Mount, Tube, Weld
33.	10232	Lockwasher, 5/16"
34.	10019	HHCS, 5/16"-18x1"
35.	A310	Drop Tube, Dry Fertilizer
36.	A318	Drop Tube, Liquid Fertilizer
37.	10133	HHCS, 5/16"-18x1 ½"
38.	10673	Hose Clamp
39.	D1797	Drop Tube Extension
40.	D487	Bushing
A.	A320	Disk and Brg. Assembly (Items 25, 27 - 29)
B.	A786	Double Disk Fertilizer Opener, Less drop tubes and U-Bolts

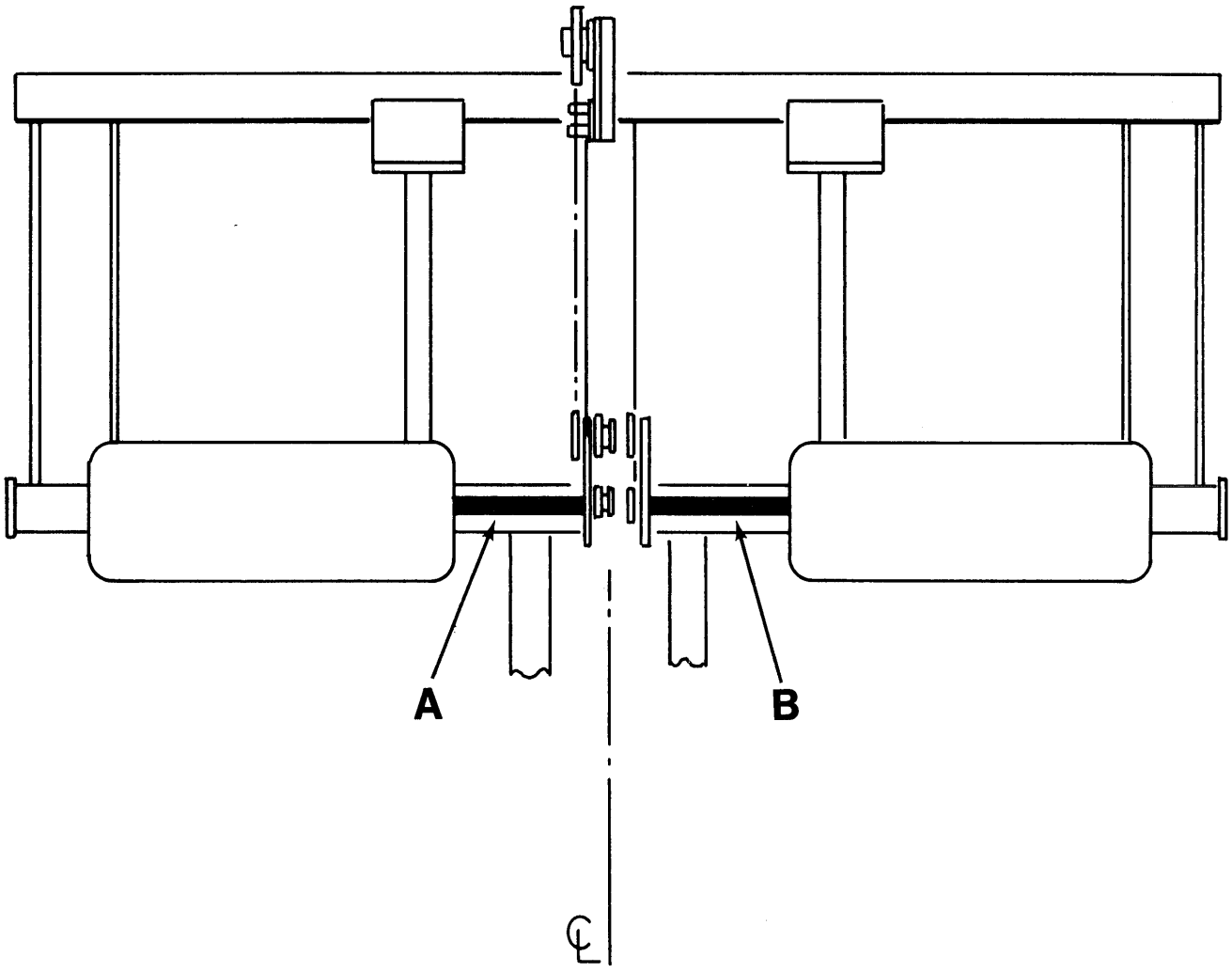
DRY FERTILIZER HOPPER AND MOUNT



DRY FERTILIZER HOPPER AND MOUNT

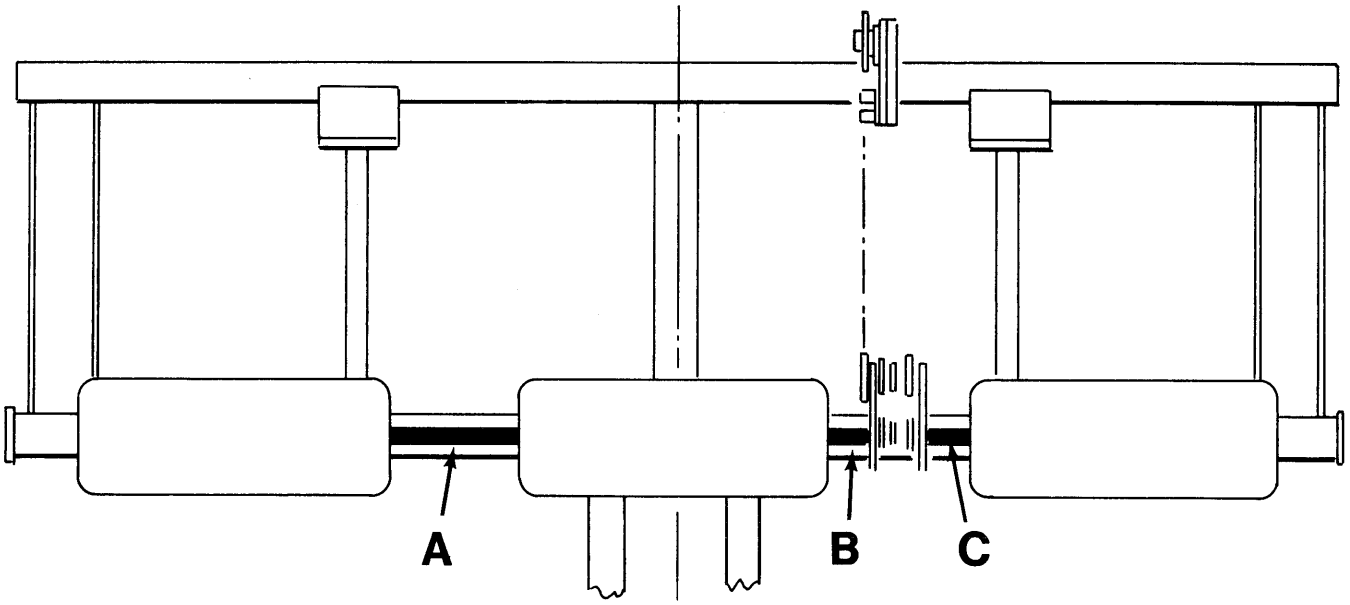
ITEM	PART NO.	DESCRIPTION
1.	A2101	Lid, Includes clips and pop rivets
	D1380	Clip
	10655	Pop rivet, 3/16"x13/32"
2.	D1210	Strap, Rubber
3.	10106	Hex Nut, 5 1/16"-18
4.	10232	Lockwasher, 5/16"
5.	10219	Washer, 5/16" USS
6.	10019	HHCS, 5/16"-18x1"
7.	D1209	Strap, Reinforcing
8.	D1207	Baffle
9.	10670	Hair Pin Clip, No. 3
10.	D1200	Housing, Outlet
11.	10303	Carriage Bolt, 5/16"-18x1"
12.	D1213	Washer, Rubber
13.	D1379	Hopper, Dry Fertilizer
14.	10201	Washer Special
15.	10464	Cotter Pin, 3/16"x1"
16.	D1212	Washer, Special
17.	D1206	Bearing, Shaft
18.	10676	Hose Clamp, No. 36
19.	D1214	Tube, Rubber
20.	10675	Hose Clamp, No. 20
21.	D1208	Saddle
22.	10456	Cotter Pin, 1/8"x¾"
23.	10562	Clevis Pin, 7/16"x3"
24.	10037	HHCS, ½"-13x1¼"
25.	10206	Washer, ½" SAE
26.	10228	Lockwasher, ½"
27.	10102	Hex Nut, ½"-13
28.	10017	HHCS, ½"-13x1½"
29.	A839	Mount, Hopper L.H.
	A840	Mount Hopper R.H.
30.	D1707	Angle, L.H.
	D1706	Angle, R.H.
31.	D1134	U-Bolt, 7"x5" x 5/8"-11
32.	10230	Lockwasher, 5/8"
33.	10104	Hex Nut, 5/8"-11
34.	D1202	Guide, Auger
35.	D1204	Spring, Auger, R.H.
36.	D1203	Plug, Spring
37.	D1205	Spring, Auger, L.H.
38.	D1201	Shaft, Auger
39.		Drive Coupler
40.	10641	Grease Fitting, 1/8" NPT x 45°
A.	A896	Hopper Assembly, Dry Fertilizer (Items 3, 4, 5, 9 - 14 and 21)
B.	A581	Auger Assembly, Complete (Items 15, 16, 17, and 34 - 38)

4 Row 30", 4 Row Wide Dry Fertilizer Couplers



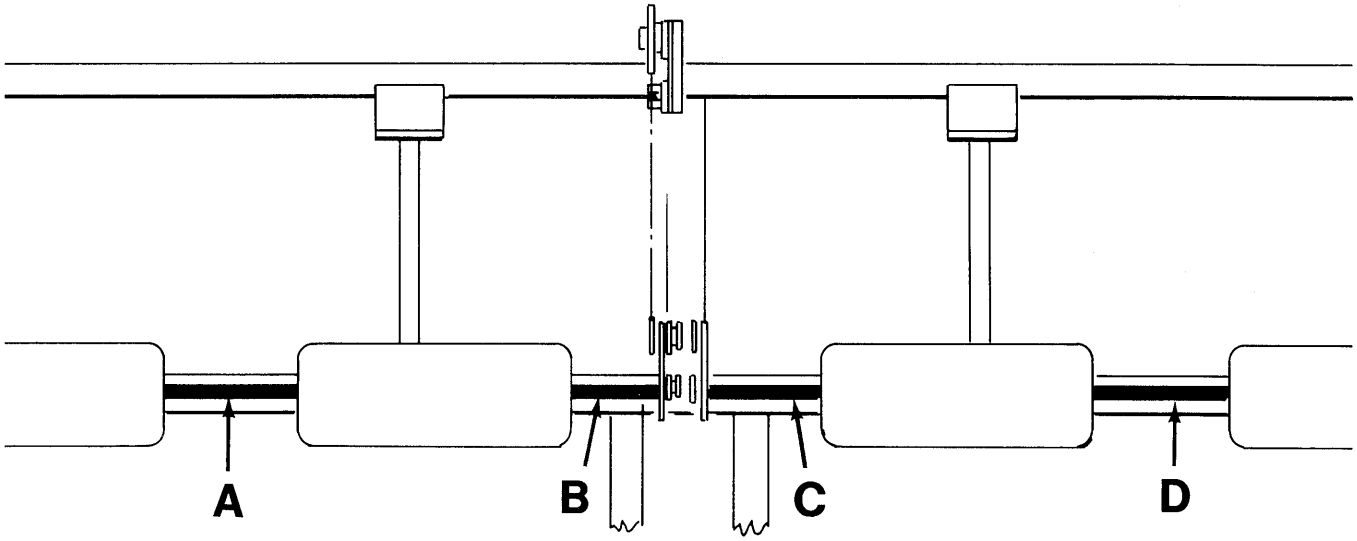
	Coupler A	Coupler B
4 Row 30"	A554-4 5/8"	A555-16 1/8"
4 Row Wide	A554-4 5/8"	A555-16 1/8"

6 Row 30", 6 Row Wide Dry Fertilizer Couplers



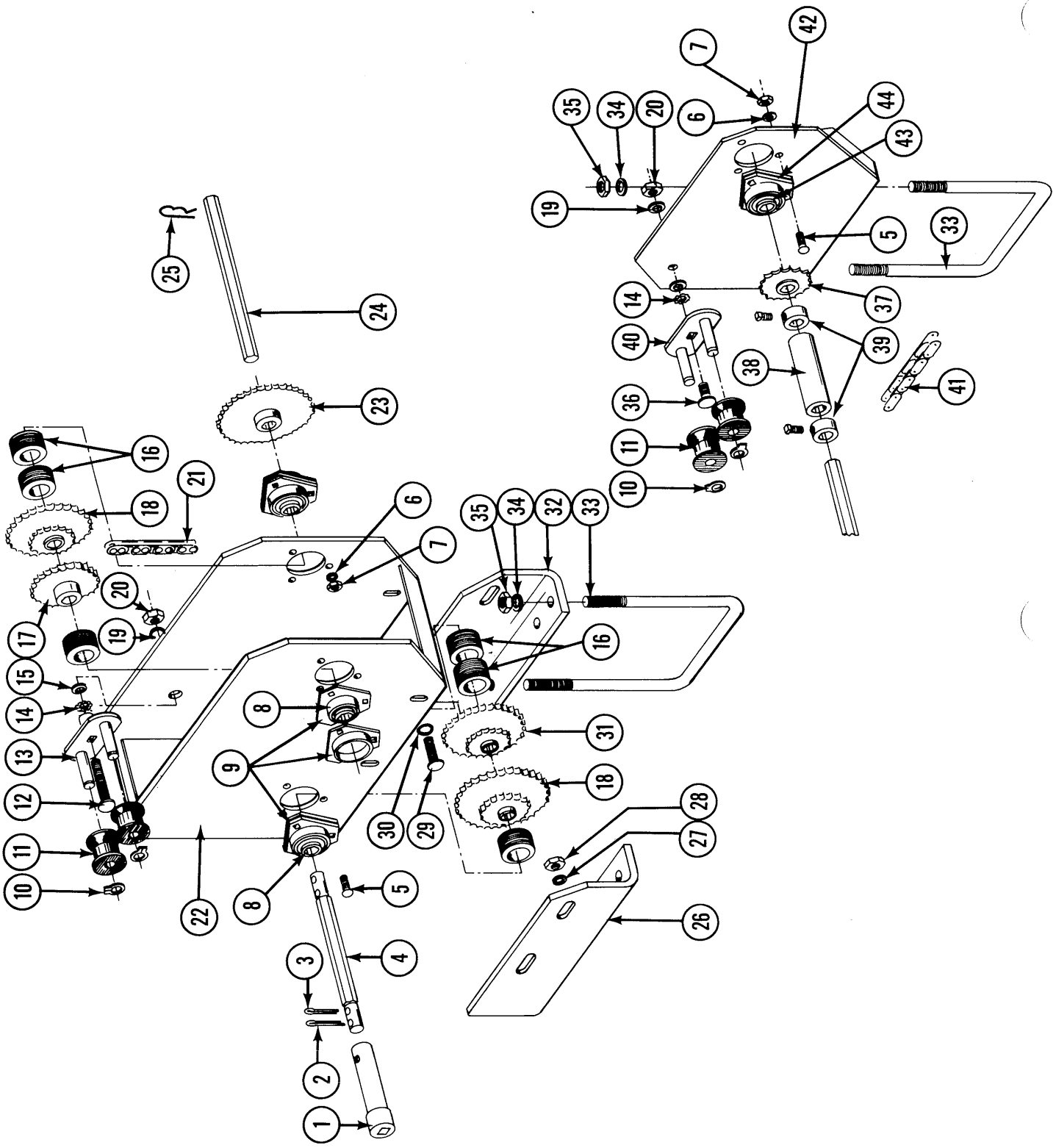
	Coupler A	Coupler B	Coupler C
6 Row 30"	A555-16 1/8"	A554-4 5/8"	A554-4 5/8"
6 Row Wide	A561-30 5/8"	A554-4 5/8"	A560-18 5/8"

8 Row 30", 8" Row Wide Dry Fertilizer Couplers



	Coupler A	Coupler B	Coupler C	Coupler D
8 Row 30"	A555-16 1/8"	A554-4 5/8"	A554-4 5/8"	A555-16 1/8"
8 Row Wide	A561-30 5/8"	A555-16 1/8"	A555-16 1/8"	A561-30 5/8"

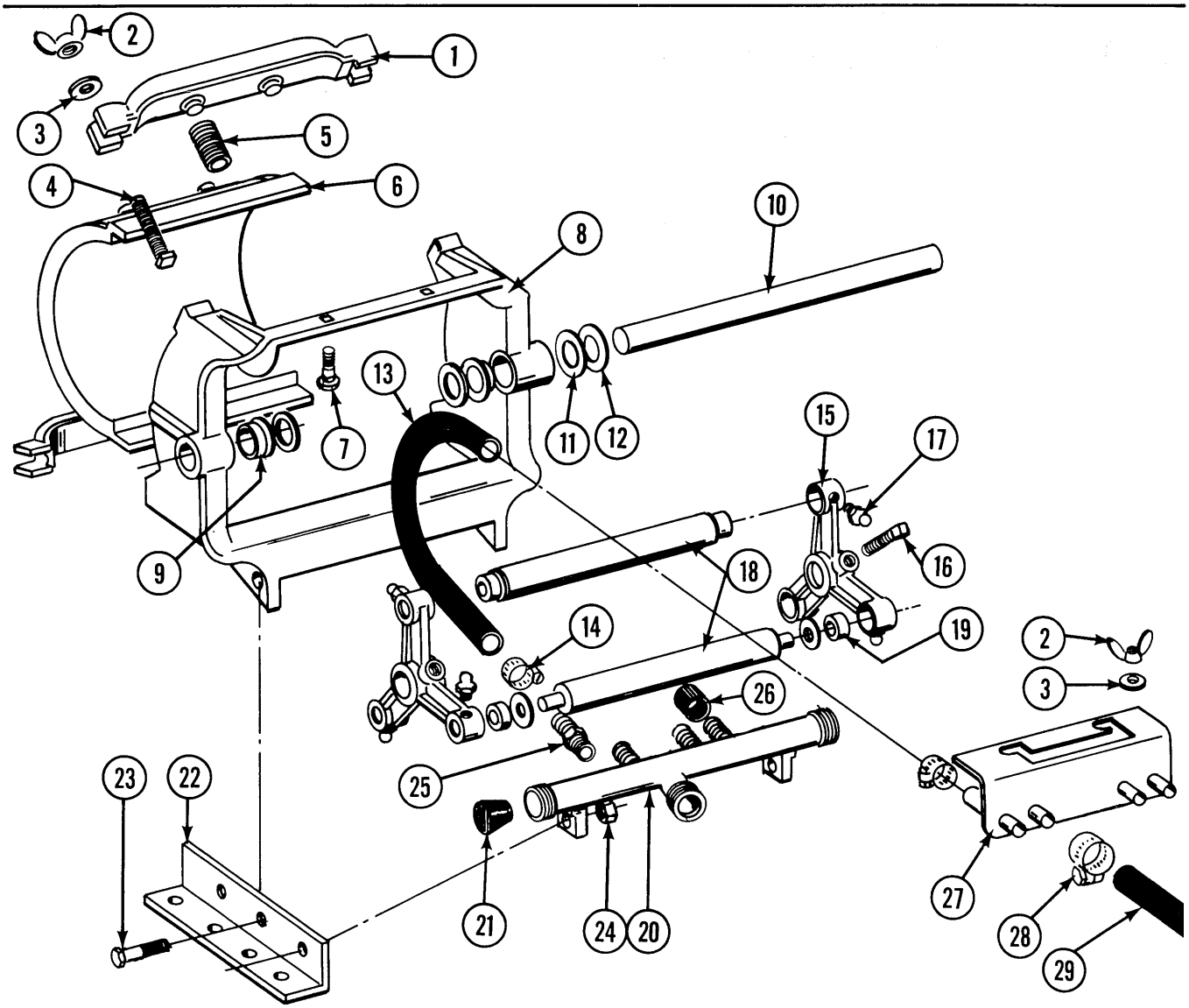
DRY FERTILIZER TRANSMISSION



DRY FERTILIZER TRANSMISSION

ITEM	PART NO.	DESCRIPTION
1.		Drive Coupling (See pages 82-83)
2.	10462	Cotter Pin, 3/16"x2"
3.	10459	Cotter Pin, 3/16"x1½'
4.	D943	Shaft, Driven
5.	10312	Carriage Bolt, 5/16"-18x¾"
6.	10232	Lockwasher, 5/16"
7.	10106	Hex Nut, 5/16"-18
8.	2100-3	Bearing 7/8" Hex Bore
9.	3400-1	Flangette
10.	10435	Ring, Retainer
11.	D1067	Spool, Idler
12.	10314	Carriage Bolt, ½"-13x3"
13.	A285	Bracket, Idler
14.	10527	Lock Washer, Internal/External, ½"
15.	10216	Washer, ½"
16.	D832	Spacer, Rubber
17.	2500-14	Sprocket, 24 Tooth
18.	2500-12	Sprocket, 18-36 Tooth
19.	10228	Lockwasher, ½"
20.	10102	Nut, ½"-13
21.	3300-43	Chain, No. 2040, 43 Links includes Conn. and Offset Link
	R194	Conn. Link, No. 2040
	R199	Offset Link, No. 2040
22.	A249	Transmission Case
23.	2500-15	Sprocket, 32 Tooth
24.	D942	Shaft, Drive
25.	10465	Cotter Pin, ¼"x1¼"
26.	D1715	Angle Support, L.H.
27.	10210	Flat Washer, 3/8" USS
28.	10101	Hex Nut, 3/8"-16
29.	10301	Carriage Bolt, 3/8"-16x1½
30.	10229	Lockwasher, 3/8"
31.	2500-3	Sprocket, 16-30 Tooth
32.	D1716	Angle Support, R.H.
33.	D1134	U-Bolt, 7"x5"x5/8"-11
34.	10230	Lockwasher, 5/8"
35.	10104	Hex Nut, 5/8"-11
36.	10313	Carriage Bolt, ½"-13x1½"
37.	2500-16	Sprocket, 16 Tooth
38.	D1719	Coupler
39.	A271	Lock Collar
40.	A288	Bracket, Idler
41.	3300-107	Chain, No. 2040, 107 Links, includes conn. and offset
	R194	Conn. Link, No. 2040
	R199	Offset Link, No. 2040
42.	A326	Bracket, Brg. Support
43.	2100-3	7/8 Hex Bore Brg.
44.	3400-1	Flangette
A.	A284	Idler Assembly (Items 10, 11 and 13)
B.	A289	Idler Assembly (Items 10, 11 and 40)
C.	A848	Transmission Assembly, Dry Fertilizer. (Items 3 thru 32)

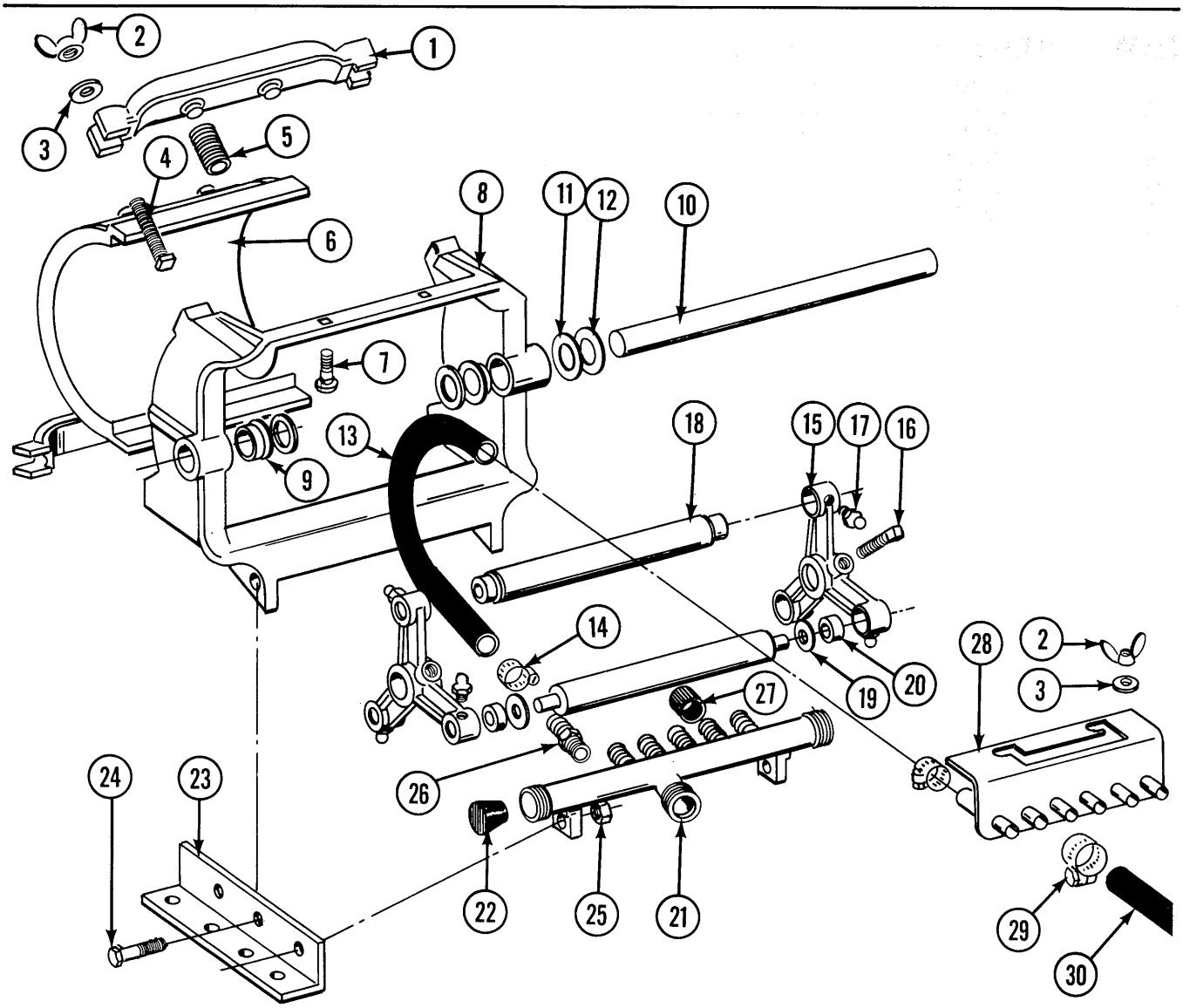
LIQUID FERTILIZER SQUEEZE PUMP - 4 ROW MODEL



LIQUID FERTILIZER SQUEEZE PUMP - 4 ROW MODEL

ITEM	PART NO.	DESCRIPTION
1.	R216	Spring Anchor Bar
2.	10144	Wing Nut, 5/16"-18
3.	10219	Flat Washer, 5/16" USS
4.	10130	Sq. Head Machine Bolt, 5/16"-18x1 ¾"
5.	R214	Back Spring
6.	R212	Back Plate
7.	10303	Round Head Machine bolt, 5/16"-18x1"
8.	R208	Pump Frame
9.	R207	Bushing (Nylon)
10.	R210	Pump Shaft
11.	R225	Shim 1/32"
12.	R226	Shim, 3/64"
13.	R215	Metering Hose, ½"x13"
14.	10681	Hose Clamp
15.	R223	Roller Arm
16.	10131	Set Screw, 5/16"-18x ¾"
17.	10640	Grease Fitting, ¼"-28
18.	R209	Roller
19.	R227	Bushing, Nylon
20.	R228	Intake Manifold
21.	R217	Manifold Plug
22.	R213	Base Angle
23.	10004	HHCS, 3/8"-16x1 ¼"
24.	10101	Hex Nut, 3/8"-16
25.	R232	Hose Adapter
26.	R211	Rubber Cap
27.	R224	Discharge Manifold
28.	10673	Hose Clamp, No. 8
29.	4400-1	Hose, ½"x30'
A.	A321	Squeeze Pump Complete

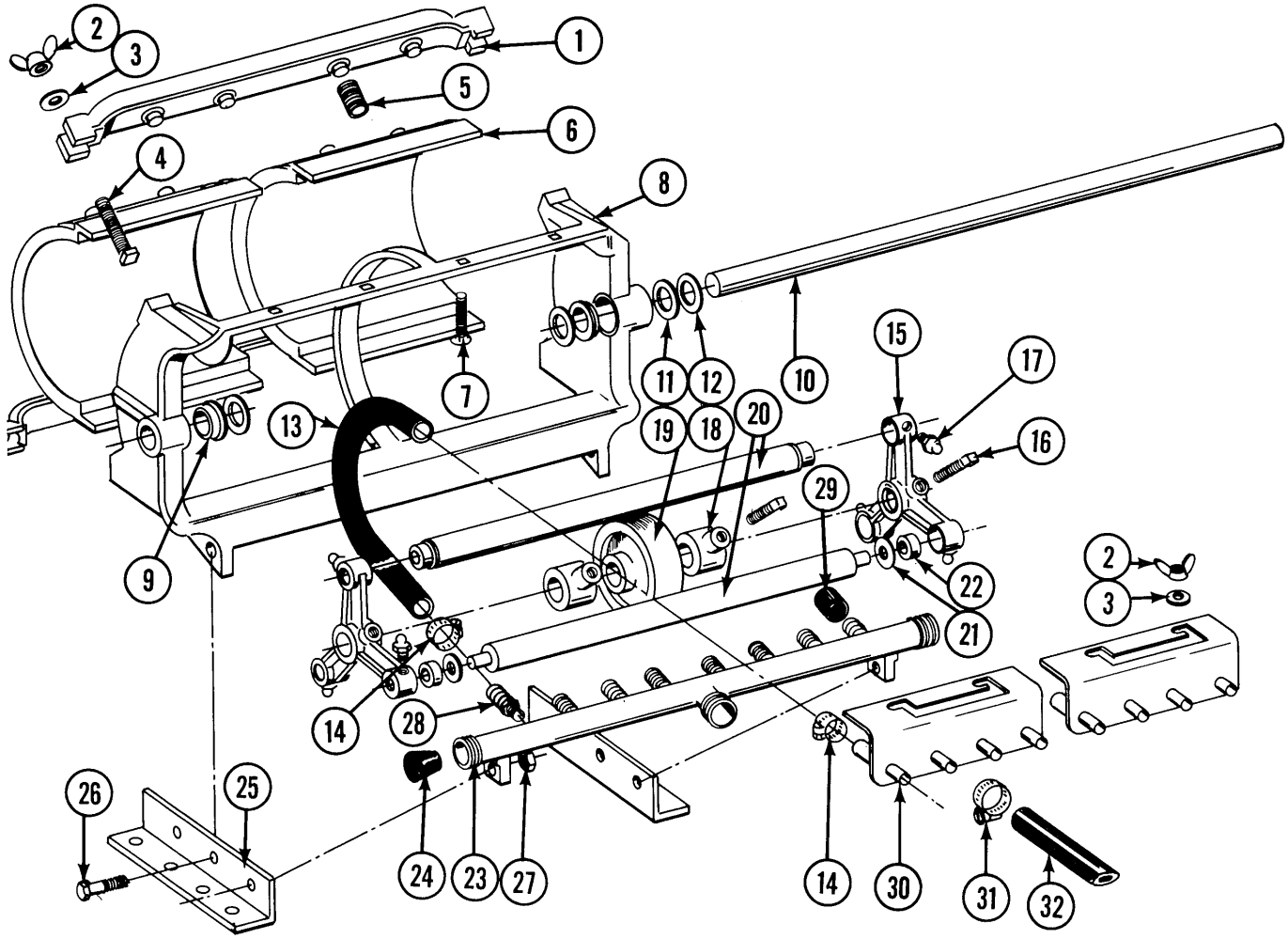
LIQUID FERTILIZER SQUEEZE PUMP - 6 ROW MODEL



LIQUID FERTILIZER SQUEEZE PUMP - 6 ROW MODEL

ITEM	PART NO.	DESCRIPTION
1.	R216	Spring Anchor Bar
2.	10144	Wing Nut, 5/16"-18
3.	10219	Flat Washer, 5/16"
4.	10130	Square Head Machine Bolt, 5/16"-18x1¾"
5.	R214	Back Spring
6.	R212	Back Plate
7.	10303	Round Head Machine Bolt, 5/16"-18x1"
8.	R208	Pump Frame
9.	R207	Bushing, Nylon
10.	R210	Pump Shaft
11.	R225	Shim, 1/32"
12.	R226	Shim, 3/64"
13.	R215	Metering Hose, ½"x13"
14.	10681	Hose Clamp
15.	R231	Roller Arm
16.	10131	Set Screw, 5/16"-18x¾"
17.	10640	Grease Fitting, ¼"-28
18.	R233	Roller
19.	R229	Washer, nylon
20.	R230	Bearing, roller
21.	R228	Intake Manifold
22.	R217	Manifold Plug
23.	R213	Base Angle
24.	10004	HHCS, 3/8"-16x1¼"
25.	10101	Hex Nut, 3/8"-16
26.	R232	Hose Adapter
27.	R211	Rubber Cap
28.	R224	Discharge Manifold
29.	10673	Hose Clamp, No. 8
30.	4400-2	Hose, ½"x50
A.	A322	Squeeze Pump Complete

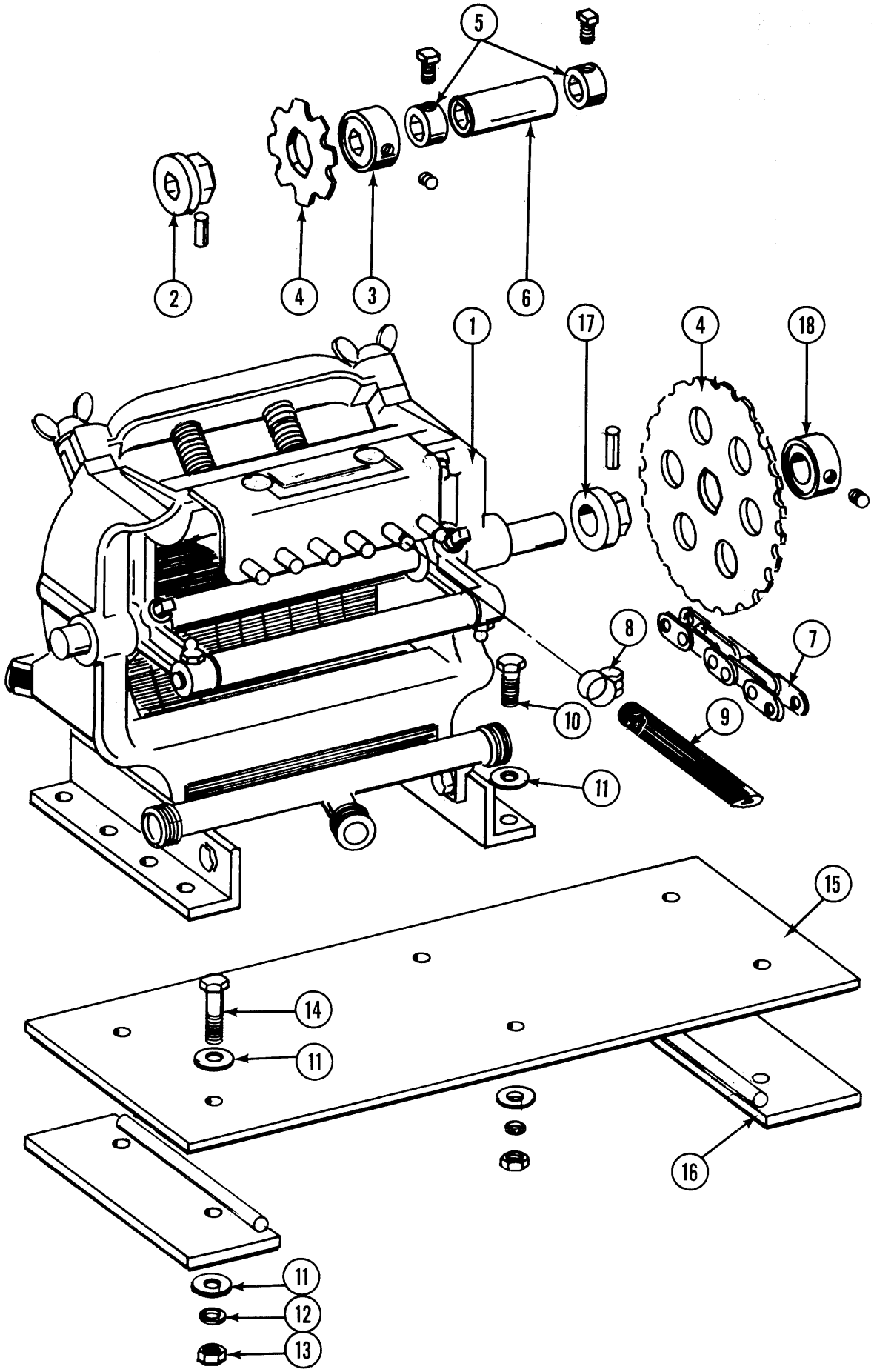
LIQUID FERTILIZER SQUEEZE PUMP - 8 ROW MODEL



LIQUID FERTILIZER SQUEEZE PUMP - 8 ROW MODEL

ITEM	PART NO.	DESCRIPTION
1.	R221	Spring Anchor Bar
2.	10144	Wing Nut, 5/16"-18
3.	10219	Flat Washer, 5/16"
4.	10130	Square Head Machine Bolt, 5/16"-18x1 3/4"
5.	R214	Back Spring
6.	R212	Back Plate
7.	10303	Round Head Machine Bolt 5/16"-18x1"
8.	R222	Pump Frame
9.	R207	Bushing, Nylon
10.	R220	Pump Shaft
11.	R225	Shim, 1/32"
12.	R226	Shim, 3/64"
13.	R215	Metering Hose, ½"x13"
14.	10681	Hose Clamp
15.	R231	Roller Arm
16.	10131	Set Screw, 5/16"-18x 3/4"
17.	10640	Grease Fitting, ¼"-28
18.	R282	Set Collar
19.	R281	Back Up Roller
20.	R283	Roller
21.	R229	Washer, Nylon
22.	R230	Bearing, Roller
23.	R284	Intake Manifold
24.	R217	Manifold Plug
25.	R279	Base Angle, Left
	R280	Base Angle, Right
26.	10004	HHCS, 3/8"-16x1 ¼"
27.	10101	Hex Nut, 3/8"-16
28.	R232	Hose Adapter
29.	R211	Rubber Cap
30.	R236	Discharge Manifold
31.	10673	Hose Clamp, No. 8
32.	4400-3	Hose, ½"x100'
A.	A323	Squeeze Pump Complete

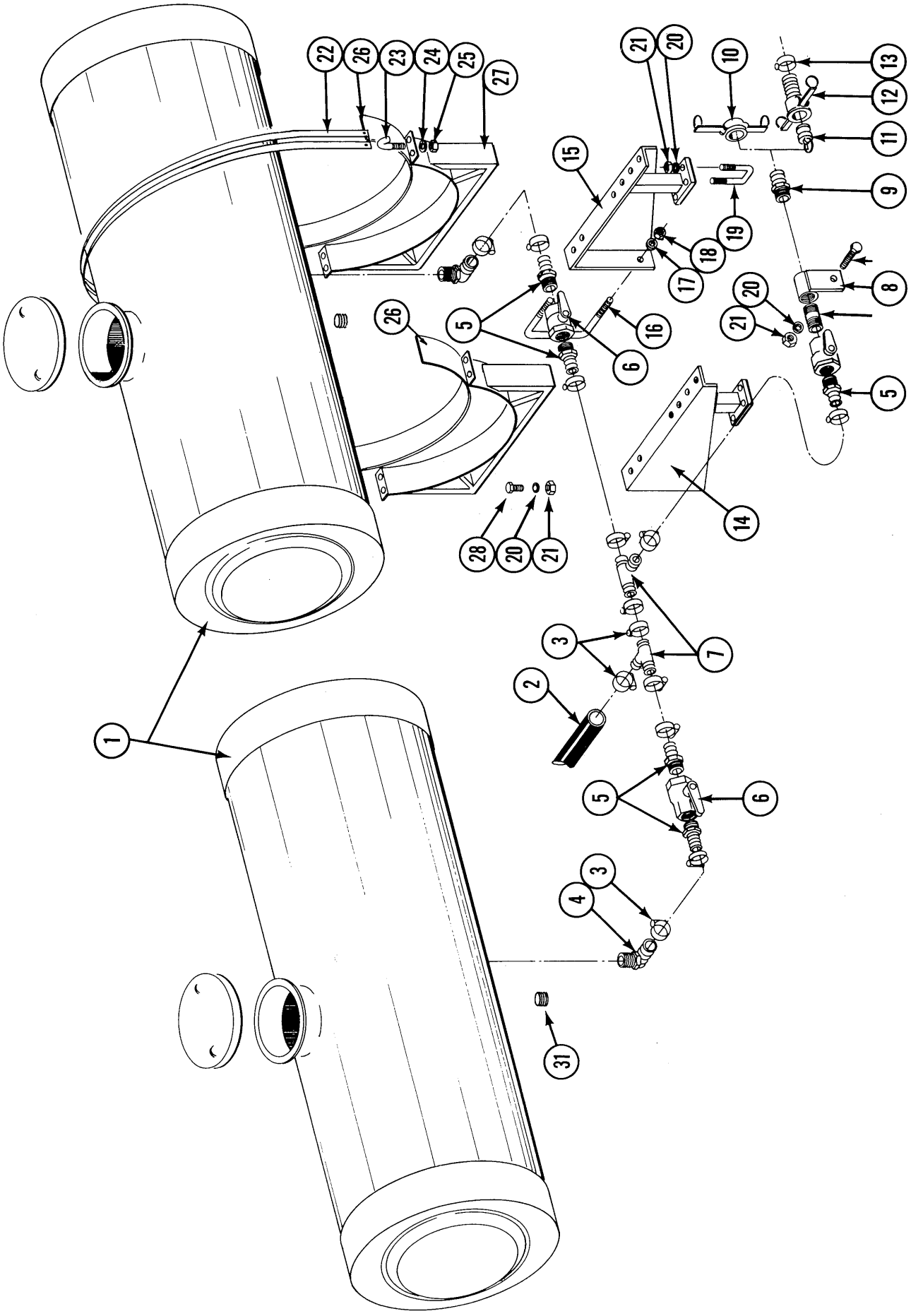
SQUEEZE PUMP MOUNTING BRACKET AND ADAPTER PACKAGE



SQUEEZE PUMP MOUNTING BRACKET AND ADAPTER PACKAGE

ITEM	PART NO.	DESCRIPTION
1.	A321	Squeeze Pump, 4 Row
	A322	Squeeze Pump, 6 Row
	A323	Squeeze Pump, 8 Row
2.	D1720	Sprocket Adapter
	10600	Roll Pin, 5/16"x2¼"
3.	D1724	Roll Pin, Retainer Less Roll Pin
4.	D1217	Sprocket, 8 Tooth
	D1218	Sprocket, 9 Tooth
	D1219	Sprocket, 10 Tooth
	D1220	Sprocket, 15 Tooth
	D1221	Sprocket, 22 Tooth
	D1222	Sprocket, 23 Tooth
	D1223	Sprocket, 26 Tooth
	D1224	Sprocket, 30 Tooth
	D1225	Sprocket, 31 Tooth
5.	A271	Lock Collar Assembly
6.	D1719	Coupler
7.	3300-75	Chain, No. 2040, 75 Pitch Including Conn. and Offset Link
	R194	Conn. Link, No. 2040
	R199	Offset Link, No. 2040
8.	10673	Hose Clamp
9.	4400-1	Hose, ½"x30', 4R
	4400-2	Hose, ½"x50', 6R
	4400-3	Hose, ½"x100', 8R
10.	10001	HHCS, 3/8"-16x1"
11.	10210	Flat Washer, 3/8" USS
12.	10229	Lock Washer, 3/8"
13.	10101	Hex Nut, 3/8"-16
14.	10047	HHCS, 3/8"-16x1¾"
15.	D1714	Plate, Squeeze Pump Mount
16.	A846	Clamp, Squeeze Pump Bracket Weld
17.	D1216	Sprocket Adapter (Less Roll Pin)
	10600	Roll Pin
18.	D1215	Sprocket Retainer
A.	A886	Sprocket and Adapter Package (Items 2, 3, 4, 17, and 18)

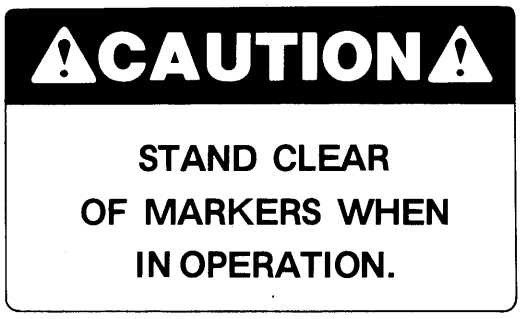
LIQUID FERTILIZER TANKS AND MOUNTING BRACKETS



LIQUID FERTILIZER TANKS AND MOUNTING BRACKETS

ITEM	PART NO.	DESCRIPTION
1.	D1808	Tank w/lid and 1¼ Pipe Boss, 24"x100 Gal., Used on 4R Models
	R511	1¼ Pipe Boss
	R512	Lid, 13"
	D1812	Tank w/lid and 1¼ Pipe Boss 30" x 150 Gal., Used on 6 and 8R Models
	R513	¾ Nylon E-Fitting
	R508	1¼ Nylon E-Fitting
	R509	Fillwell (Flat)
	R510	Lid
2.	4200-1	Hose, 1¼"x22', 4R
	4200-2	Hose, 1¼"x27', 6R
	4200-3	Hose, 1¼"x32' 8R
3.	10674	Hose Clamp, No. 24
4.	10742	Elbow, 90°, 1¼" NPT to 1¼" Barb
5.	10745	Adapter, 1¼" NPT to 1¼" Barb Fitting
6.	A499	Ball Valve, 1¼" Nylon
7.	10750	Tee, 1¼", Plastic
8.	A918	Quick Fill Adapter Mount
9.	D1514	Q Cam, 1¼"
10.	D1515	Dust Cap, 1¼"
11.	D1517	Dust Plug
12.	D1516	QCHB, 1½"
13.	10672	Hose Clamp, No. 28
14.	A844	Tank Mounting Bracket, R.H.
15.	A843	Tank Mounting Bracket, L.H.
16.	D1113	U-Bolt, 5/8"-11x5"x7"
17.	10230	Lock Washer, 5/8"
18.	10104	Hex Nut, 5/8"-11
19.	D1339	U-Bolt, ½"-13x3"x2½"
20.	10228	Lock Washer, ½"
21.	10102	Lock Washer, ½"-13 Nut
22.	D1335	Tank Band, 24", 4R Models
	D1520	Tank Band, 30", 6 and 8 R Models
23.	D1337	J-Bolt, 5/16"
24.	10232	Lock Washer, 5/16"
25.	10106	Hex Nut, 5/16"-18
26.	D1807	Tank Pad, 6" width (14' Roll) 4R Models
	D1862	Tank Pad, 8" width (14' Roll) 6 and 8 R Models
27.	A919	Tank Saddle, 24", 4R Models
	A937	Tank Saddle, 30" 6 and 8 R Models
28.	10017	HHCS, ½"-13x1½"
29.	10032	HHCS, ½"-13x3¾"
30.	10094	Pipe Nipple, 1¼"x3"
31.	10096	Pipe Plug, ¾" Nylon
	D1162	28" Tie Strap (Not Shown)
	D1512	6" Tie Strap (Not Shown)
	D2117	14½" Tie Strap (not shown)

DECALS AND REFLECTORS



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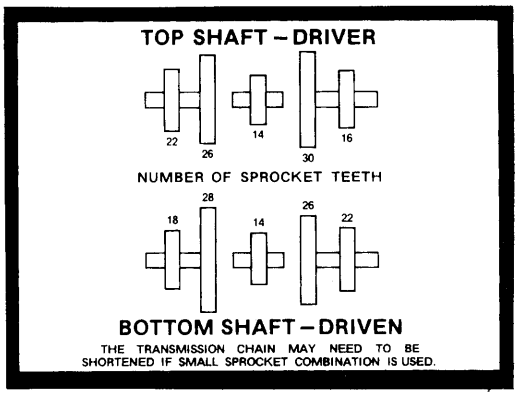

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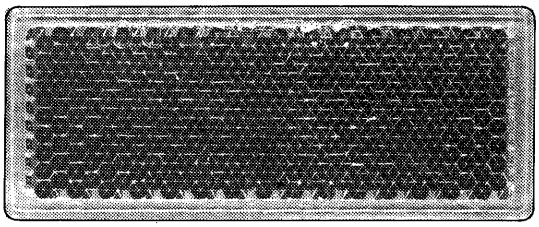

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ITEM	PART NO.	DESCRIPTION
1.	7100-4	Decal, Caution-Markers
2.	7100-3	Decal, Warning - Hitch
3.	7100-6	Decal, Sprocket Combination - Seed Drive Transmission.
4.	7100-1	Kinze Decal
5.	7200-1	Reflector, Red (Used on Rear of Planter Box)
	7200-2	Reflector, Amber (Used on Front of Toolbar)
6.	D937	Serial Number Plate

NUMERICAL INDEX