

**RIGID FRAME PULL TYPE PLANTER**

**OPERATOR & PARTS  
MANUAL**

**M0109**


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# TO THE OWNER

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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:

Rigid Frame Pull Type Planter Bar-Model Number PT.

Serial Number 11210 thru 11289

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

Date Purchased \_\_\_\_\_

Serial Number \_\_\_\_\_

Model Number \_\_\_\_\_

## 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.

## 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.



# NEW MACHINE WARRANTY

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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 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 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, restrictions 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 or 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 obligations.

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

**Kinze New Machine Warranty applies  
only to those products sold and  
located within the boundaries of the  
United States and Canada.**

# ASSEMBLY

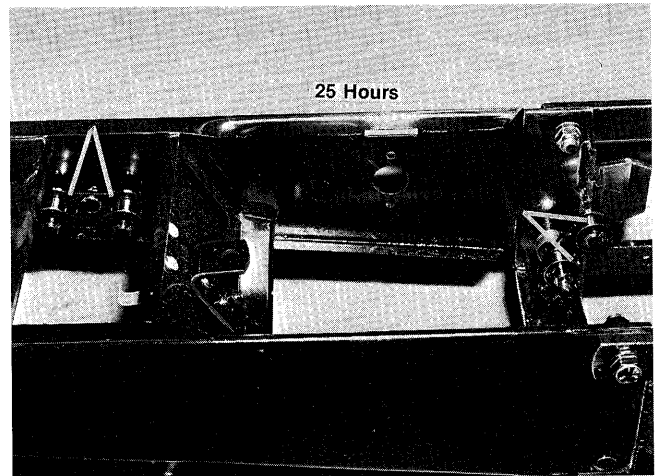
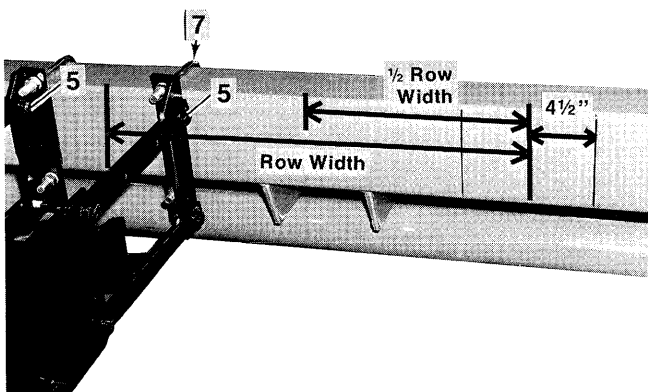
## Row Unit Assembly and Installation

The frame on all of the Kinze planter bars is constructed of 7"x7" square tubing to accept most popular types of row units.

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.
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 1¾" 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.

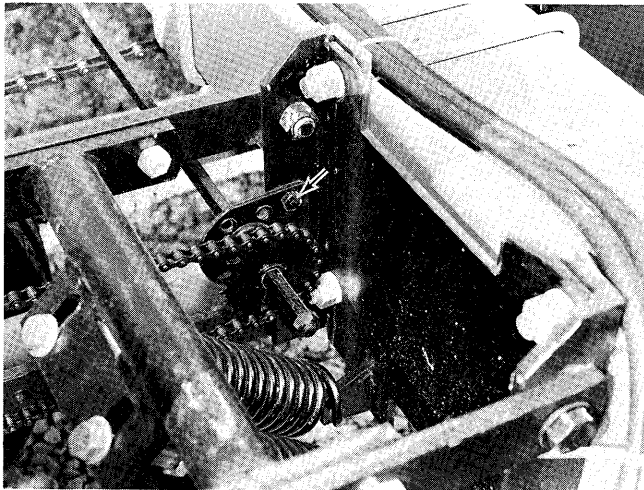
**IMPORTANT: If heavy duty down pressure springs are to be installed, the front support plate must be installed on the U-bolts directly behind the row unit support angles prior to installing lock washers and nuts.**

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.



9. Attach drive bearing and sprocket to inside of left support bracket with 3/8" x 1" cap screws provided. Do not tighten at this time.
10. Turn all chain idler spools to break loose any paint that may restrict movement.
11. Remove bolts which extend into bearing support on plateless drive and reuse to attach drive to left side panel of hopper support.

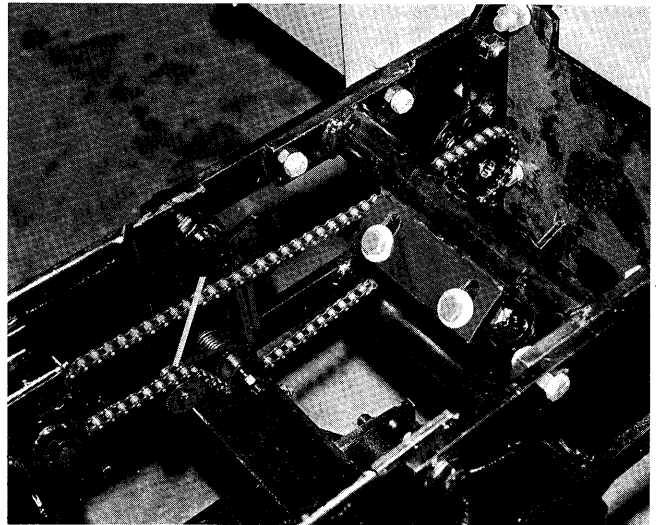
# ASSEMBLY



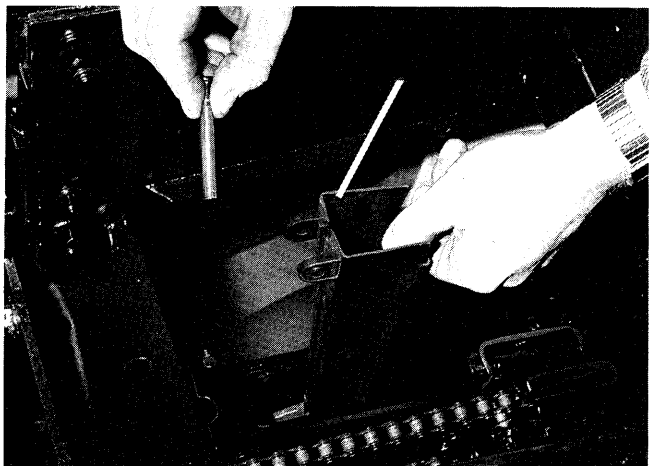
12. Slide drill shafts (hole end first) through the drive bearing/sprocket assemblies on each side of the transmission beginning with the outside row unit on each side.

13. 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 coupler. Align the hole in all three components and install 3/16" x 2" cotter pin.

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



15. 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.
16. Route insecticide hopper drive chain around planter drive sprocket and connect with link.
17. Remove hold down latch clip from shipping position on inside of seed hopper and reattach to outside of hopper with 3/8" x 3/4" socket head cap screw, flat washer, lock washer, hex nut...and 1/4" x 3/4" 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.



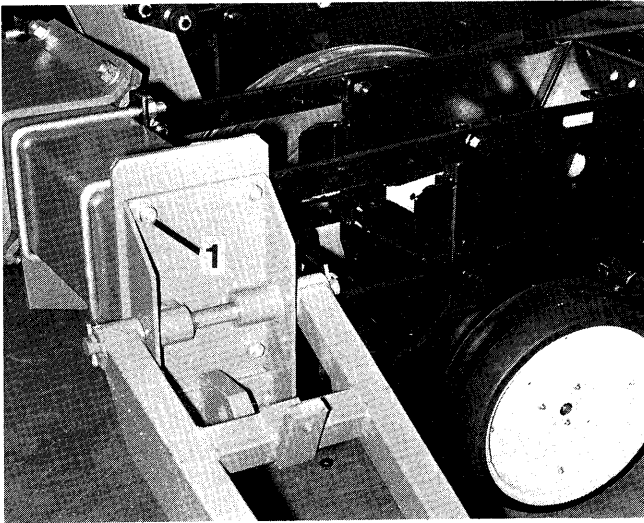
# ASSEMBLY

## MARKER ASSEMBLY INSTALLATION

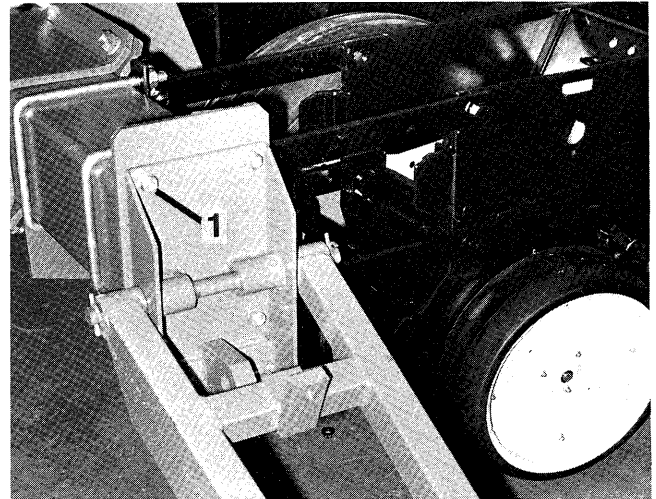
Depending upon the size of the planter bar, the marker assemblies will be either a conventional or double folding low profile design. Refer to model configurations following "Introduction" for the type of marker used on each model.

### 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  $\frac{1}{2}$ "x $1\frac{3}{4}$ " cap screws, lock washers and hex nuts.

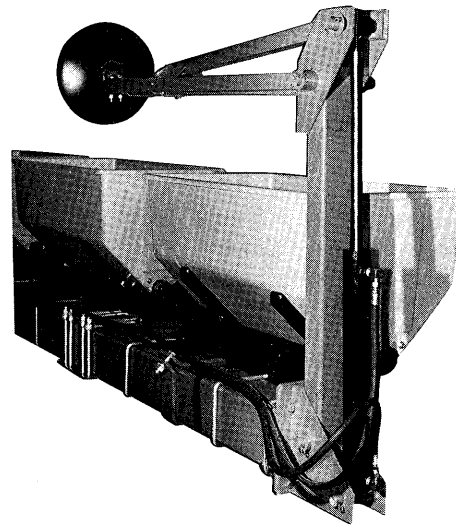


2. Using the bolts pre-installed in the hub, attach the 16" disk to throw dirt out away from the hub and grease seals. Be sure to alternate bolts while tightening to avoid distorting the disk's shape or breaking the marker hub. The spindle bracket has slotted mounting holes which allow the angle of the 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  $\frac{1}{2}$ "x $1\frac{3}{4}$ " cap screws, lock washers and hex nuts. This assembly is interchangeable between the right and left sides.



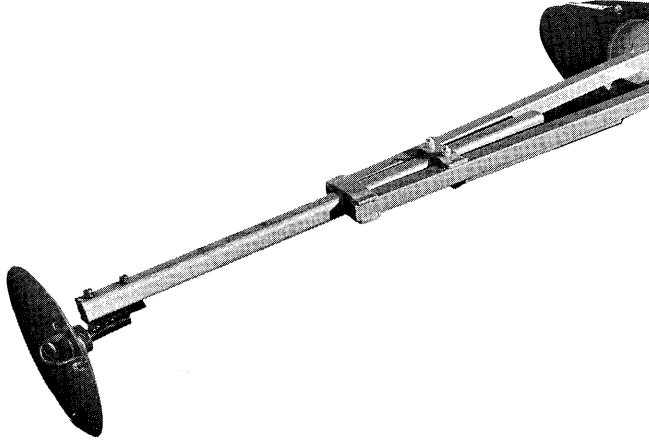
2. Attach pre-assembled second stage of marker with extension and hub to first stage with pivot pin and cotter pins.

**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.



# ASSEMBLY

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



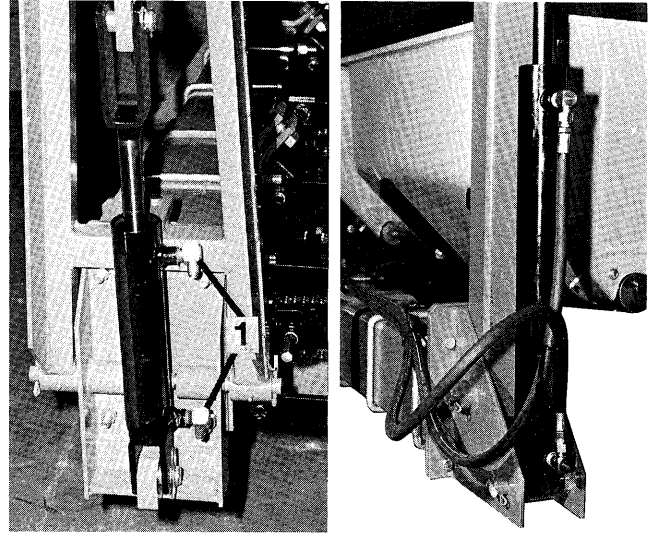
- Refer to the "Marker Hydraulics" section which follows for connection of the marker cylinders, hoses and additional hydraulic components.
- Install amber reflector to front lower portion of marker arm on each side.

## Marker Hydraulics

Both the single and double folding marker assemblies are hydraulically operated. All pull type 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 cylinder and hydraulic hoses and fittings using the illustrations and instructions which apply.

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



- Install 90° 3/8" male pipe x 9/16"-18JIC elbow in each port of 2" x 8" conventional hydraulic cylinder...or 90° 1/2" NPT x 3/4"-16JIC elbow in each port of 2 1/2" x 20" low profile hydraulic cylinder.
- Attach base end of cylinder to marker mounting bracket. Then turn elbow fittings, if necessary, to project rearward and down.
- 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 of marker arm.
- Attach sequencing valve and flow control valve mounting bracket to planter bar frame with four 5/16" x 1" cap screws, lock washers and hex nuts.
- Assemble all valves, fittings and hoses as shown for your particular unit. Due to the variations between single and dual valve systems, refer to the appropriate illustration for correct assembly of all hydraulic hardware.
- Secure all 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.**

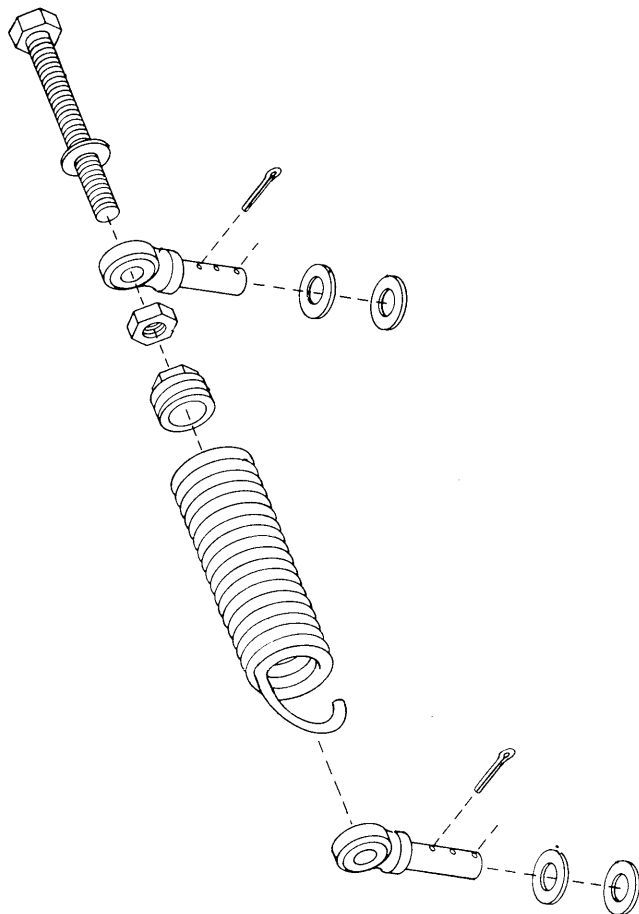
# OPTIONAL EQUIPMENT ASSEMBLY

## 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.



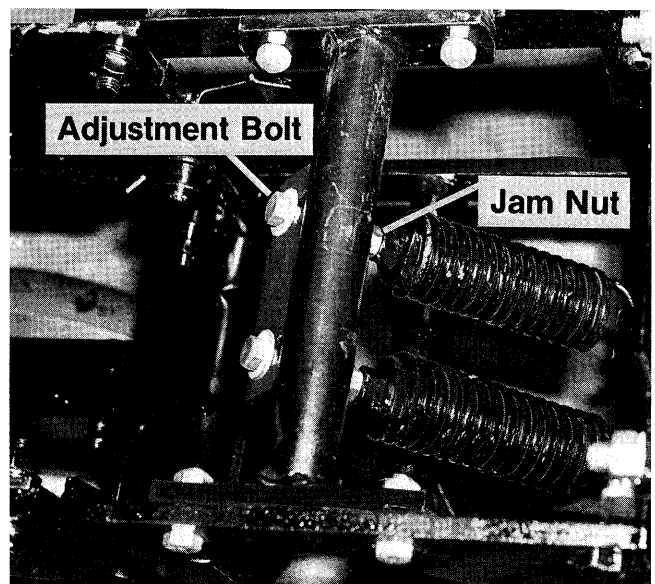
## Heavy Duty Down Pressure Springs

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-1/2" x 1 1/2" cap screws and locknuts.
3. Hook tension springs to support plates. Then install 1/2" x 3" 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 may actually lift the planter bar to the point that the drive wheels do not contact the ground sufficiently for proper operation.



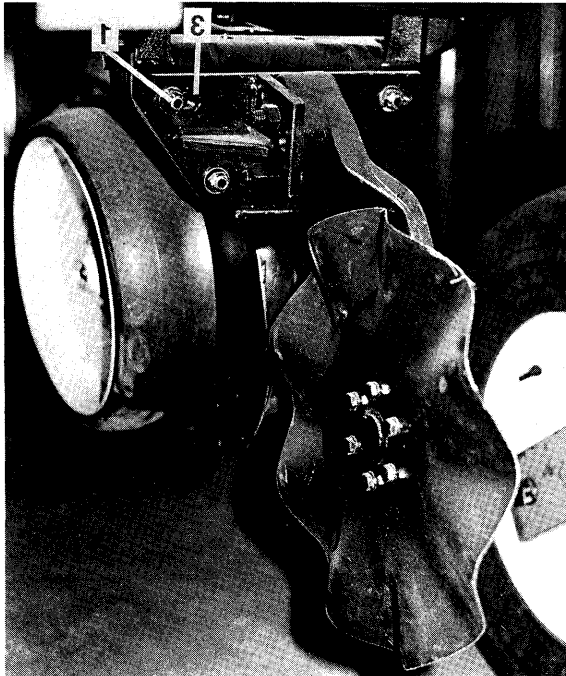
# ASSEMBLY

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## Coulters

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

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



# LUBRICATION

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The following pages show the location of all lubrication points. Proper lubrication of all moving parts will help insure efficient operation of your Kinze planter 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

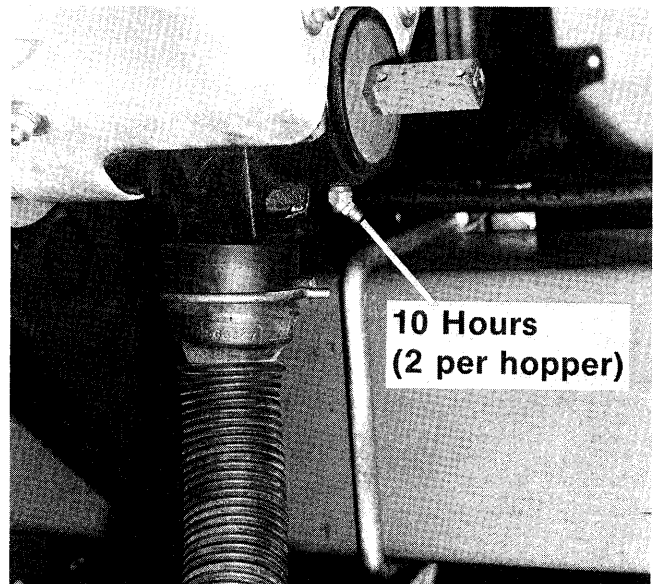
To provide efficient operation of the finger type plateless corn meters and extend the life of the components, sprinkle a teaspoon of powdered graphite over the top of the seed each day. The graphite will filter down into the seed pickup mechanism and insure lubrication.

## 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 lubrication. 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.

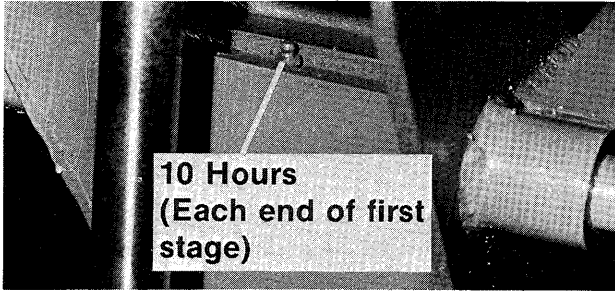
## Wheel Bearings

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 may require less frequent service depending upon amount of road travel. Following the procedure outlined for wheel bearing replacement with the exception that bearings and bearing caps are reused.

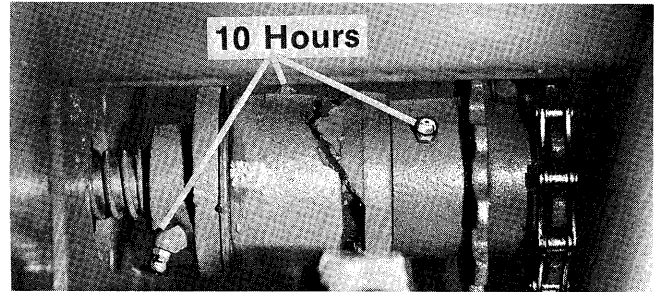


Dry Fertilizer Hopper

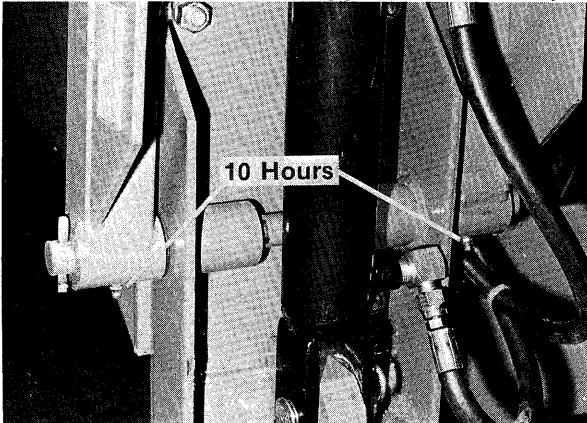
# LUBRICATION



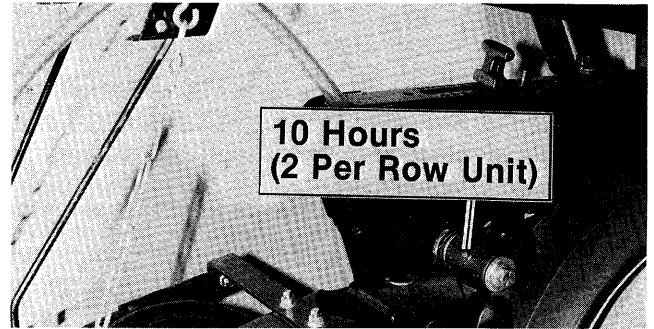
**Double Folding Low Profile Marker  
(All Applicable Models)**



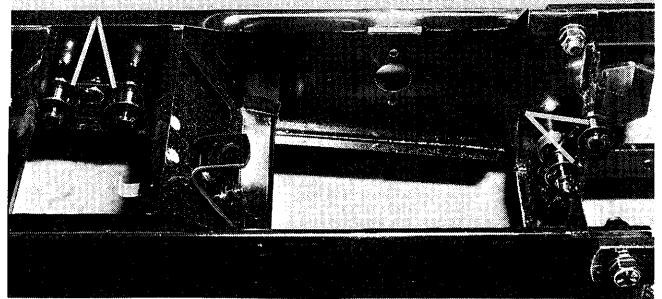
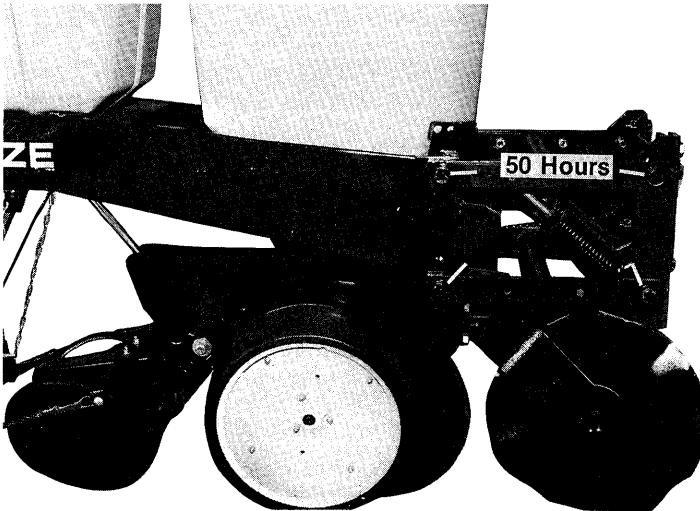
**Clutch Assembly**



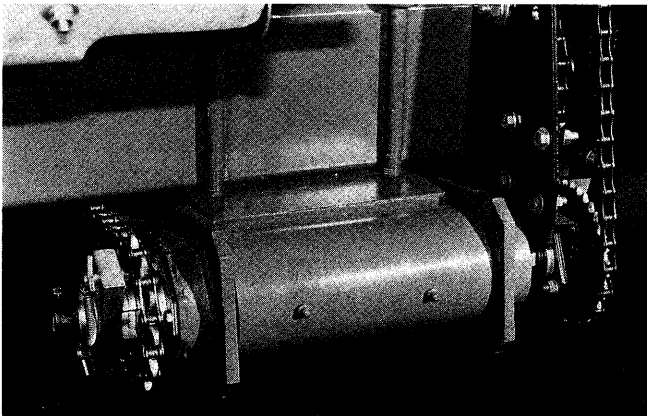
**Conventional Marker Assembly  
(All applicable models)**



**Gauge Wheel Pivot**



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.



**Wheel Bracket Supports**

# OPERATION

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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.

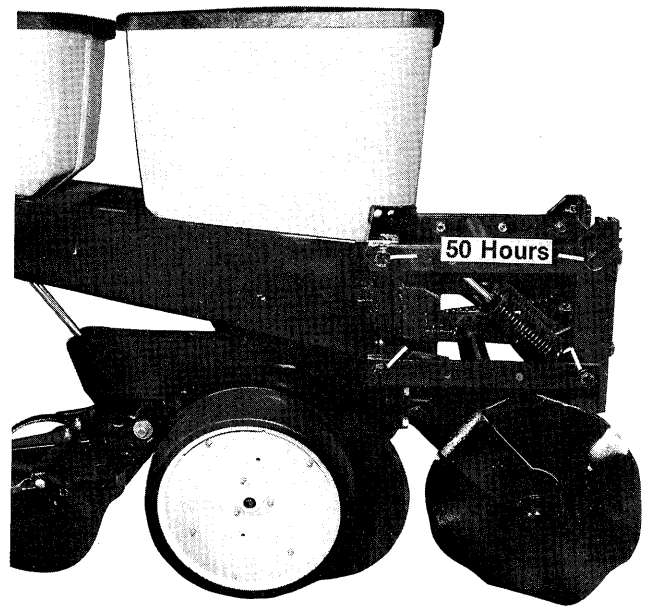
Check all drive chains for proper tension and lubrication.

## 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 on side of planter bar tongue.
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.**

The pull type planter bar is equipped with a clutch that disconnects the drive when the unit is raised for transportation. However, for safety and to decrease wear, the drive chains should be removed to the side of the drive wheel sprocket prior to towing the machine for any distance.

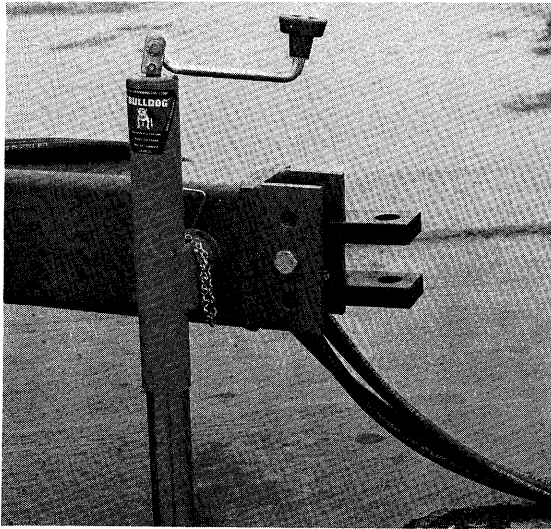
# OPERATION

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## Leveling The Planter Bar

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

Unless the tractor drawbar is adjustable for height, the fore and aft level adjustment must be maintained by the position of the hitch clevis. Three holes in the tongue hitch bracket allow the clevis to be raised or lowered. 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.

## 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.

## Tire Pressure

Tire pressure should be checked regularly and maintained as follows:

Drive Gauge - 11L-14 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 11L-14 tires inflated to 40 PSI.**

# OPERATION

## Hydraulic Marker Operation

The pull type 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.**

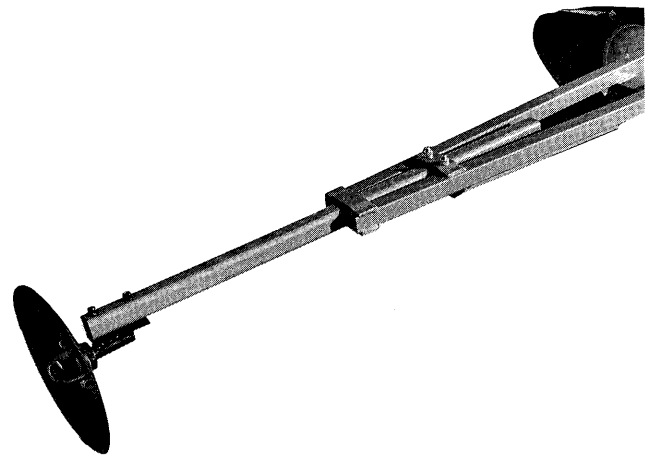
To properly match the marker cylinder speed to your tractor's hydraulic system, loosen the lock nut which secures the knurled adjustment knob in place. The raise or lower time is increased by closing the valve (clockwise). This restricts oil flow and slows the speed of the marker cylinder. To increase 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:



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  $\frac{1}{2}$ " x  $3\frac{1}{2}$ " capscrews and move the bracket as required. Then tighten bolts to the specified torque.



# OPERATION

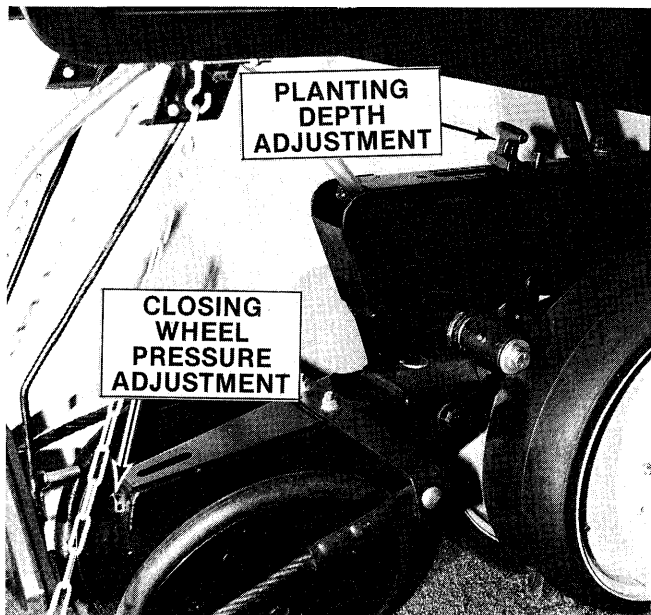
## Tractor Speed

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 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 consistent 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.

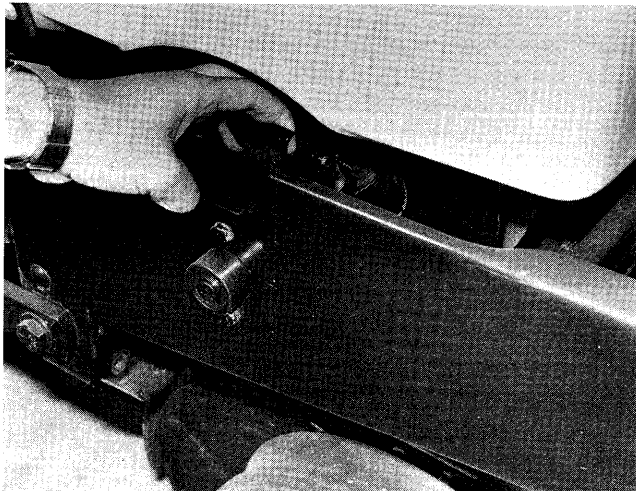
For heavy soil and average planting depths of 2 to 3 inches, set the bolt dimension at approximately 1".

**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.

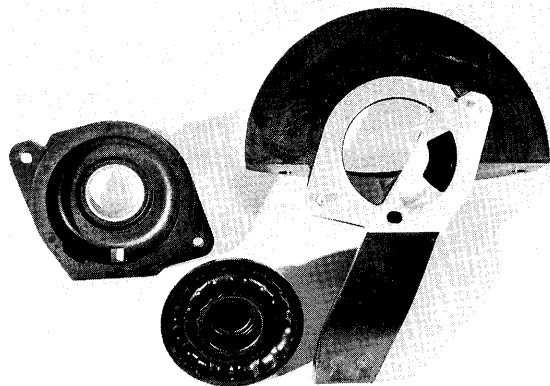
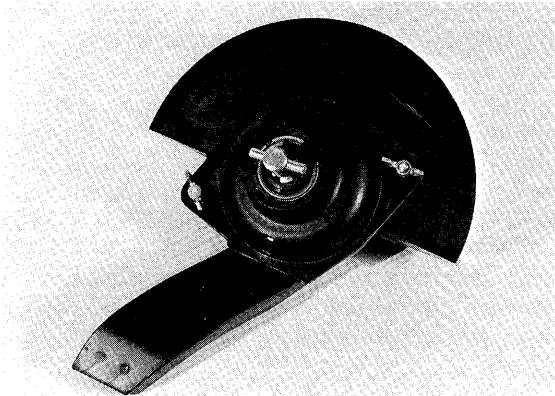
To disengage the drive, lift the release handle and pull outward until the handle locks in the slot in the side of the hopper side panel. To engage the row unit, simply lift and unlatch the handle. Spring tension will return the mechanism to the drive position.



# OPERATION

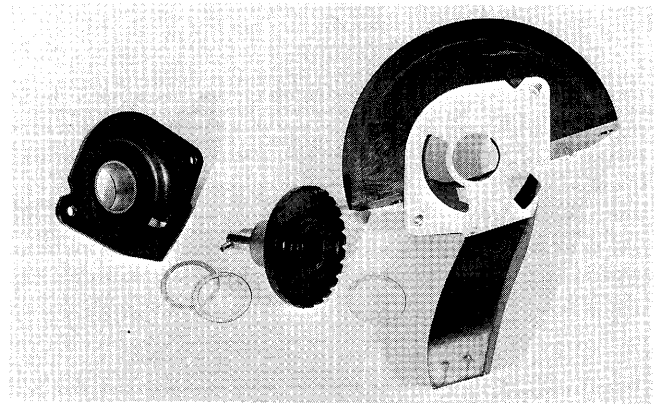
## Feed Cup Meters

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 the planting rate chart for recommended seed drive transmission sprocket combinations.

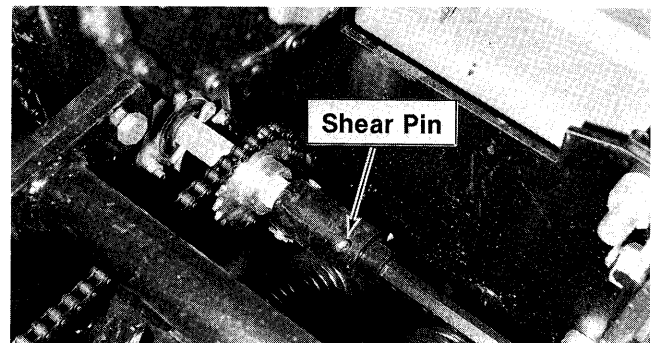
### Shear Pin Protection

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.



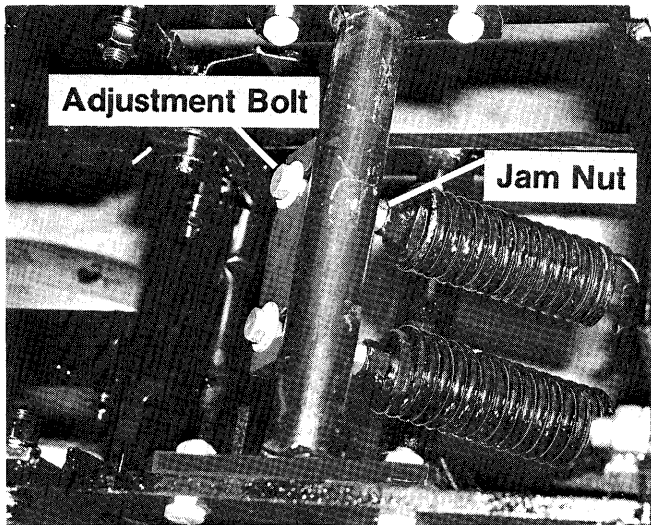
# OPERATION

## 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.

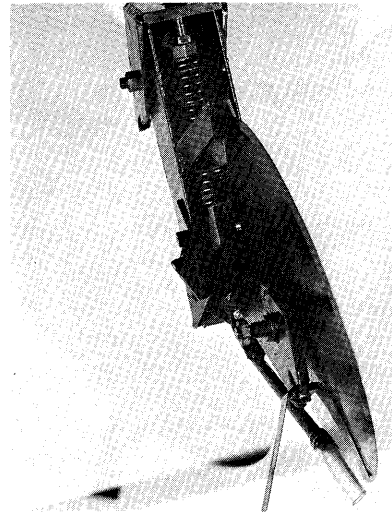
To increase down pressure with either type of system, loosen the jam nuts and turn the adjusting bolts clockwise. Tighten lock nuts as soon as desired down pressure is obtained to maintain setting.

**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.



**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.

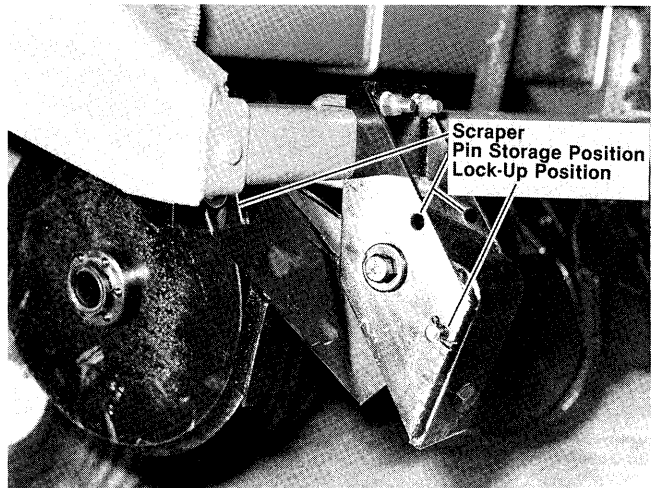


The opener assembly is designed to be locked in a raised position when the fertilizer attachment is not in use or during storage. To lock the opener, first raise the planter and place blocks under the openers. Then lower the planter until the hole in the pivot section aligns with the hole in the mounting 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.

## 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.

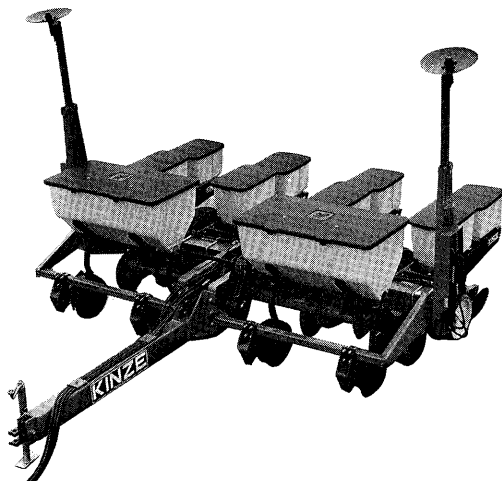
The down pressure springs are factory preset at 250 pounds down pressure but may be adjusted for various soil conditions. To adjust spring tension, loosen the jam nut with a 15/16" wrench and use a 1" wrench to turn the adjustment bolt clockwise to increase tension or counterclockwise to decrease tension. Securely tighten the jam nut upon completion of tension adjustment.



# OPERATION

## 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 3 row models, four hoppers on the 8 row models, 5 row hoppers on the 5 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.**

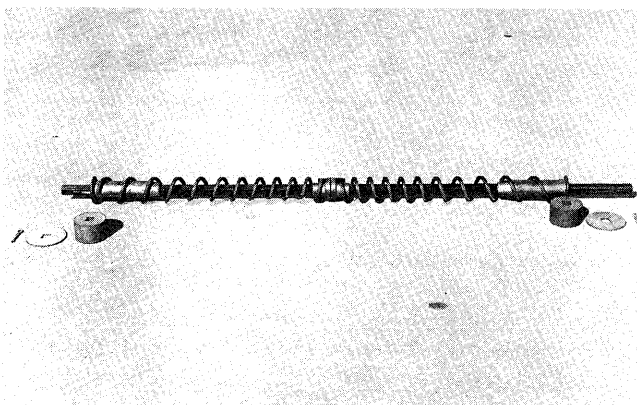
## Cleaning

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 center of the hopper when rotated in the direction of rotation they turn on the planter.**

# OPERATION

## Planting Rate for Plateless Corn Meter

Seed Populations Per Acre			Average Seed Placement In Inches	Sprocket Combinations		Recommended Speed Range In MPH
60 Inch Rows	36 Inch Rows			Drive Sprocket	Driven Sprocket	
28,100	46,800		3-3/4	30	14	2 to 3
24,350	40,600		4-1/4	26	14	2 to 3 1/2
21,850	36,400		4 3/4	30	18	3 to 4
20,650	34,400		5 1/8	22	14	3 to 4 1/2
18,900	31,600		5 1/2	26	18	3 to 4 1/2
17,850	29,800		5 7/8	30	22	3 to 5
16,050	26,800		6 1/2	22	18	3 to 5 1/2
15,350	25,800		6 3/4	26	22	3 to 6
15,050	25,200		7	30	26	3 to 6
14,975	24,950		7 1/8	16	14	3 to 6
13,900	23,200		7 1/2	30	28	4 to 6 1/2
13,100	21,900		8	22	22	4 to 7
12,150	20,300		8 5/8	26	28	4 to 7
11,650	19,400		9	16	18	4 to 7
11,100	18,500		9 1/2	22	26	4 to 7
10,350	17,200		10 1/8	22	28	4 to 7
10,200	16,900		10 1/4	14	18	4 to 7
9,550	15,900		11	16	22	4 to 7
8,350	13,950		12 5/8	14	22	4 to 7
8,100	13,500		13	16	26	4 to 7
7,475	12,500		14	16	28	4 to 7
7,100	11,800		14 7/8	14	26	4 to 7
6,600	10,950		16	14	28	4 to 7

Above chart for planters equipped with 11L-14 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 incidents of doubles and triples, particulary with small flat seeds.

**FERTILIZER RATES — KG./HA.  
36 Inch Rows**

Sprockets		Planting Speed - Miles Per Hour									
Driven	Drive	1	2	3	4	5	6	7	8	9	10
36	18	142	142	142	142	142	142	142	142	142	142
30	18	171	171	171	171	171	171	171	171	171	171
36	24	190	190	190	190	190	190	190	190	190	181
30	24	228	228	228	228	228	228	228	217	217	217
18	18	285	285	285	285	285	285	271	271	258	258
36	36	285	285	285	285	285	285	271	271	258	258
16	18	320	320	320	320	320	305	305	290	290	290
30	36	342	342	342	342	342	325	309	309	309	309
18	24	380	380	380	380	362	362	343	343	343	325
16	24	427	427	427	427	407	386	386	386	366	366
18	36	569	569	569	542	515	515	488	488	461	461
16	36	641	641	610	580	580	549	549	519	519	519

**FERTILIZER RATES — KG./HA.  
60 Inch Rows**

Sprockets		Planting Speed - Miles Per Hour									
Driven	Drive	1	2	3	4	5	6	7	8	9	10
36	18	171	171	171	171	171	171	171	171	171	171
30	18	205	205	205	205	205	205	205	205	205	205
36	24	228	228	228	228	228	228	228	228	228	217
30	24	273	273	273	273	273	273	273	260	260	260
18	18	342	342	342	342	342	342	325	325	309	309
36	36	342	342	342	342	342	342	325	325	309	309
16	18	384	384	384	384	384	366	366	348	348	348
30	36	410	410	410	410	410	390	371	371	371	371
18	24	456	456	456	456	434	434	412	412	412	390
16	24	513	513	513	513	488	464	464	464	439	439
18	36	683	683	683	651	618	618	586	586	553	553
16	36	769	769	732	696	696	659	659	622	622	622

**FERTILIZER RATES - KG/HA.  
90 Inch Rows**

Sprockets		Planting Speed - Miles Per Hour									
Driven	Drive	1	2	3	4	5	6	7	8	9	10
36	18	114	114	114	114	114	114	114	114	114	114
30	18	137	137	137	137	137	137	137	137	137	137
36	24	152	152	152	152	152	152	152	152	152	145
30	24	182	182	182	182	182	182	182	174	174	174
18	18	228	228	228	228	228	228	217	217	206	206
36	36	228	228	228	228	228	228	217	217	206	206
16	18	256	256	256	256	256	244	244	232	232	232
30	36	273	273	273	273	273	260	247	247	247	247
18	24	304	304	304	304	289	289	275	275	275	260
16	24	342	342	342	342	325	309	309	309	293	293
18	36	456	456	456	434	412	412	390	390	369	369
16	36	513	513	488	464	464	439	439	415	415	415

# SEED METER TROUBLESHOOTING

## Finger Pick-Up Meter

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

## Feed Cup Meter

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

## Feed Cup Meter

(continued)

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



## Feed Cup Meter

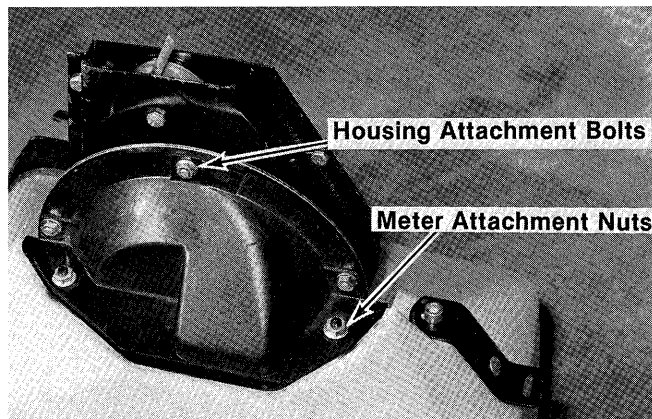
(continued)

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

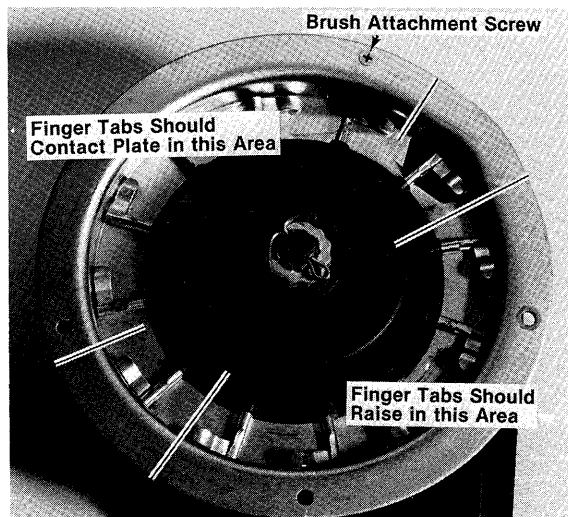
# MAINTENANCE

## 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 1/4"x5/8" cap screws. This will permit access to the finger pickup.

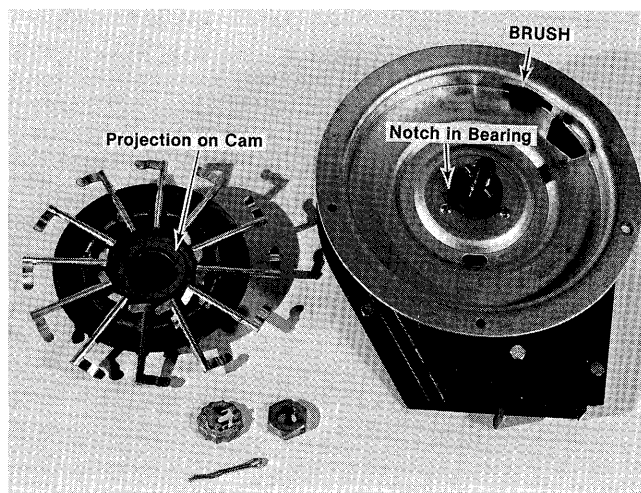


Rotate the seed meter drive by hand to ensure that the springs are holding the tabs of the fingers against the carrier plate where indicated in the photo and that the fingers are being raised in the correct area.



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

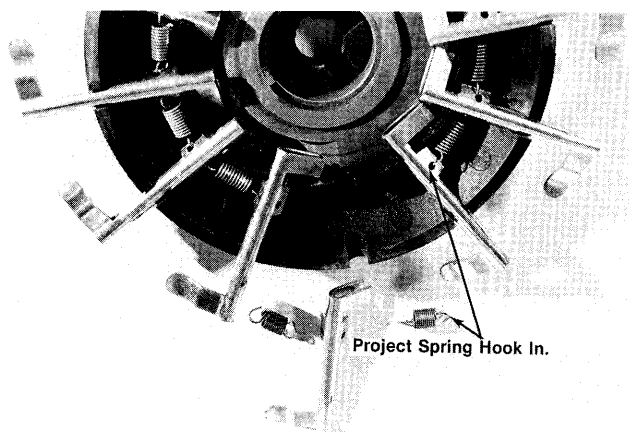
1. Remove cotter pin, lock nut and adjusting nut from drive shaft.
2. Carefully lift finger holder, along with fingers and cam off of the shaft and clean.



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.



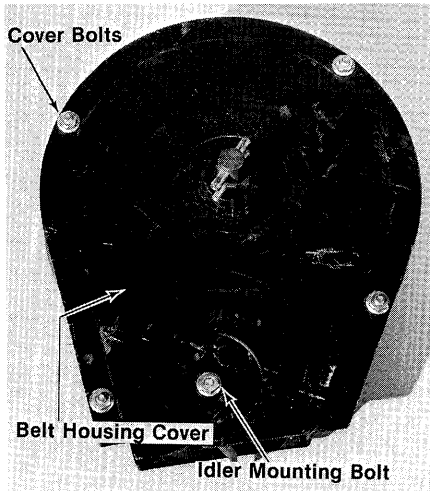
6. Make sure fingers are installed in holder so that holder will be positioned flush with the carrier plate when assembled. A projection on the cam is designed to align with a notch in the bearing to insure proper operation when assembled.

# MAINTENANCE

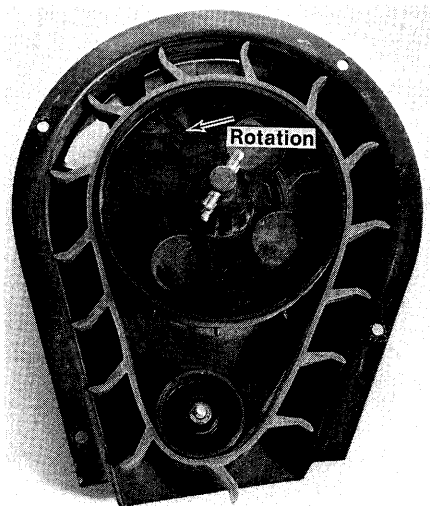
7. With finger holder flush against the carrier, install adjusting nut until it contacts the finger holder with a slight resistance. Continue to turn the nut an additional 1/8 turn.
8. Turn finger holder by hand to make sure it is positioned firmly against the carrier, but is not overtightened and can 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 1/4"x1/2" 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.

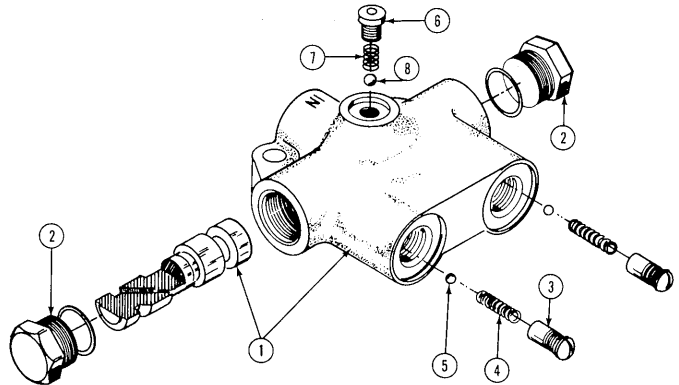


## SEQUENCING VALVE INSPECTION

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 accessible by removing either side plug and one check valve is accessible 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

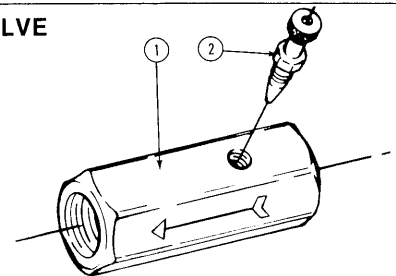


ITEM	PART NO.	DESCRIPTION
1.	R272	Valve Body and Spool
2.	R271	Plug Assembly, O-Ring Boss
3.	R273	Retainer, Check Valve
4.	R277	Spring, Check Valve
5.	R275	Ball, Check, 3/16" Diameter
6.	R274	Plug Assembly, O-Ring Boss
7.	R278	Spring
8.	R276	Ball, 1/4" Diameter

## 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. 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



PART NO.	DESCRIPTION
A270	Flow Control Valve Assembly, 3/8" NPT (KLF 375)
A248	Flow Control Valve Assembly 1/2" NPT (KLF 500)

# MAINTENANCE

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## 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  $\frac{3}{4}$  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.

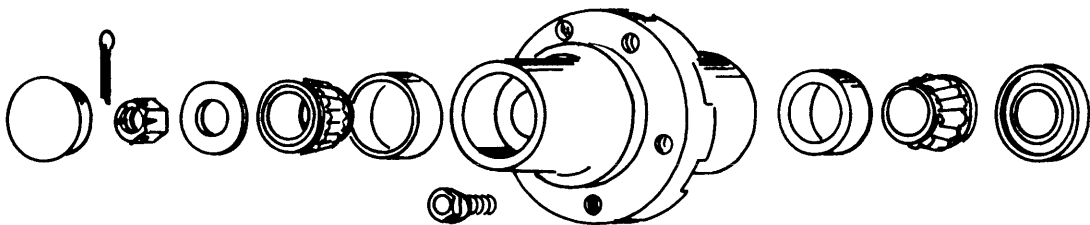
Inspect the planter bar and row units for parts that are in need of replacement and order during the "off" season.

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.

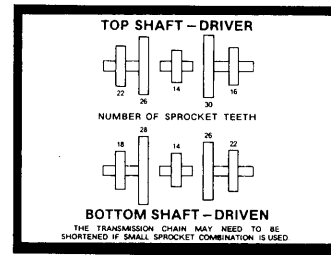
Clean plateless seed meters and store in a dry area.



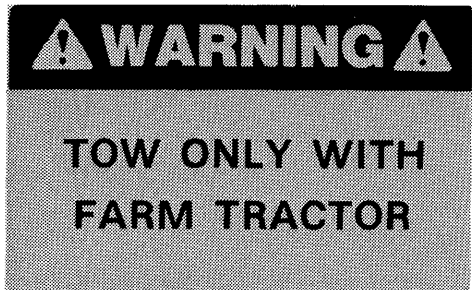
# DECALS AND REFLECTORS



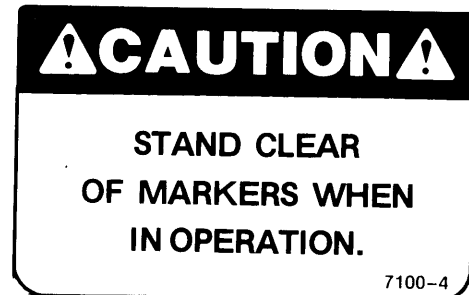
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④



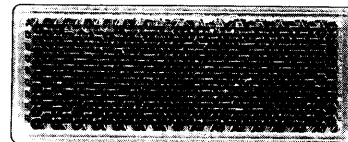
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⑤



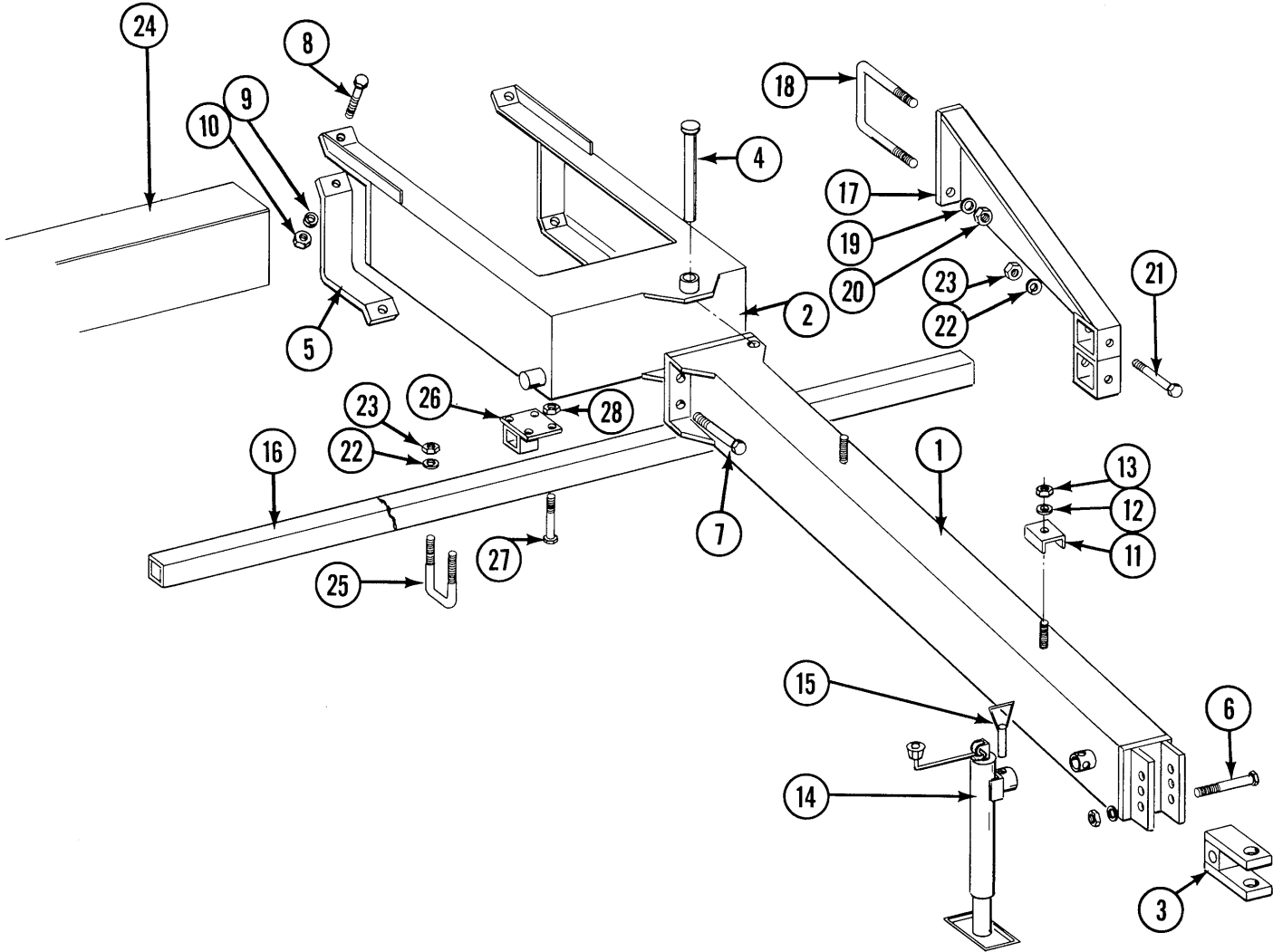
③



⑥

ITEM	PART NO.	DESCRIPTION
1.	7100-1	Decal - KINZE
2.	7100-3	Decal - Warning
3.	D937	Serial Number Plate
4.	7100-6	Decal, Sprocket Combination - Seed Drive Transmission
5.	7100-4	Decal, Caution - Markers
6.	7200-1	Reflector, Red
	7200-2	Reflector, Amber

# BAR AND HITCH ASSEMBLY

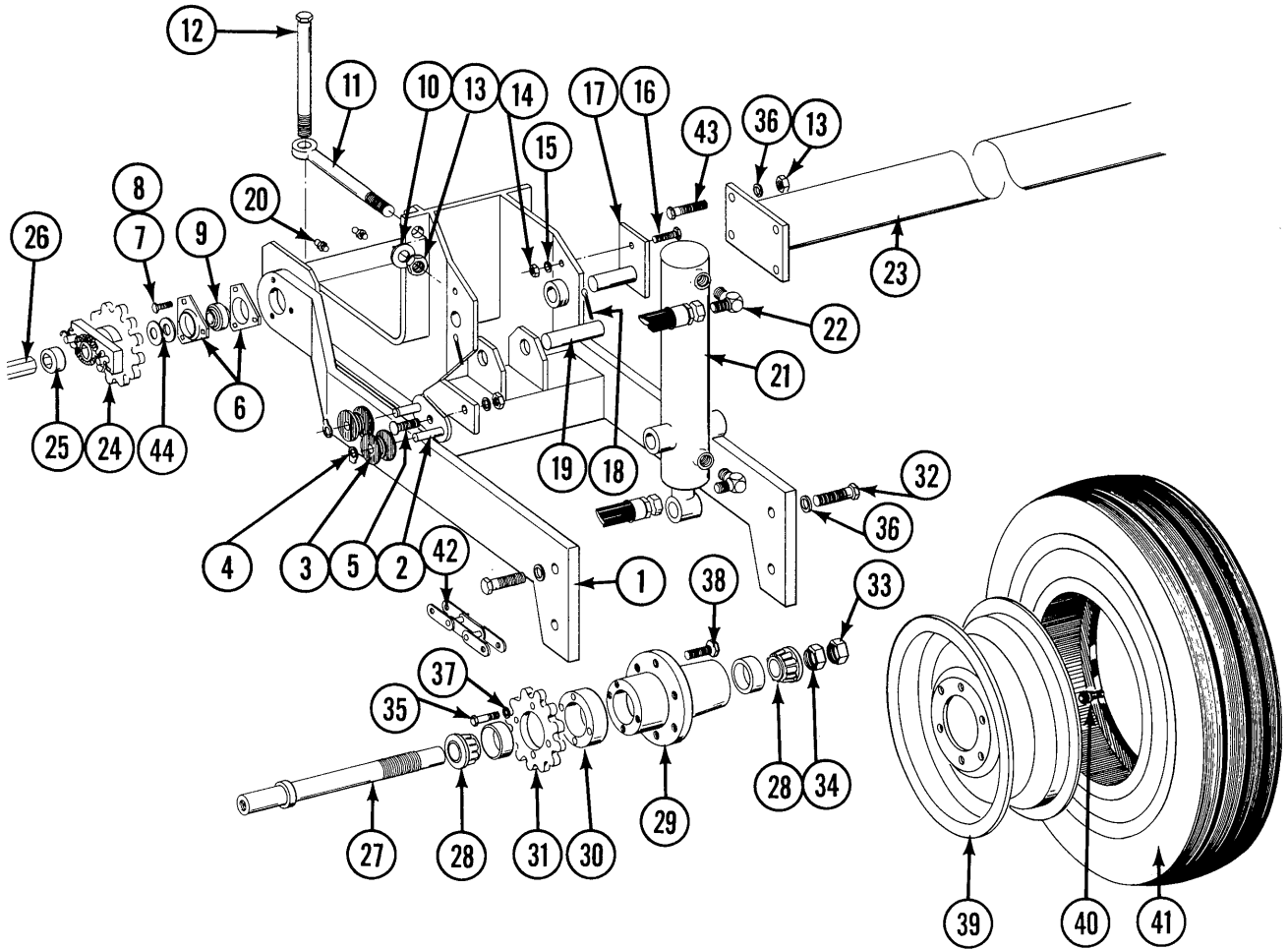


# BAR AND HITCH ASSEMBLY

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ITEM	PART NO.	DESCRIPTION
1.	A1276	Tongue Tube Weld
2.	A1275	Hitch Mount Weld
3.	A346	Clevis Weld
4.	A1277	Pivot Pin, Hitch
5.	D457	Clamp, Half
6.	10050	HHCS, 3/4"-10x5"
7.	10026	HHCS, 3/4"-10x2"
8.	10027	HHCS, 3/4"-10x2 1/2"
9.	10231	Lock Washer, 3/4"
10.	10105	Hex Nut, 3/4"-10
11.	D1656	Clamp
12.	10229	Lock Washer, 3/8"
13.	10101	Hex Nut, 3/8"-16
14.	4100-1	Jack Assembly
15.	R255	Pin Kit
16.	D1685-9	Fertilizer Opener Mounting Bar, 3R60, 154"
	D1685-10	Fertilizer Opener Mounting Bar, 5R60, 274"
17.	A1329	Fertilizer Bar Support L.H. (shown)
	A1328	Fertilizer Bar Support R.H.
18.	D1748	U-Bolt, 7"x7"x 3/4"-10
19.	10231	Lock Washer, 3/4"
20.	10105	Hex Nut, 3/4"-10
21.	10032	HHCS, 1/2"-13x3 3/4"
22.	10228	Lock Washer, 1/2"
23.	10102	Hex Nut, 1/2"-13
24.	A1241	Bar Weld, 3R60, 164"
	A1242	Bar Weld, 5R60, 284"
25.	D1138	U-Bolt, 2 1/2"x2 1/2"x 1/2"-13
26.	A1379	Spacer Weld
27.	10035	HHCS 1/2"-13x4"
28.	10111	Hex Lock Nut 1/2"-13
29.	D2370	Shim (Tongue)(Not Shown)
30.	10460	Cotter Pin, Used with A1277 Pin (Not Shown)

# WHEEL MOUNT ASSEMBLY



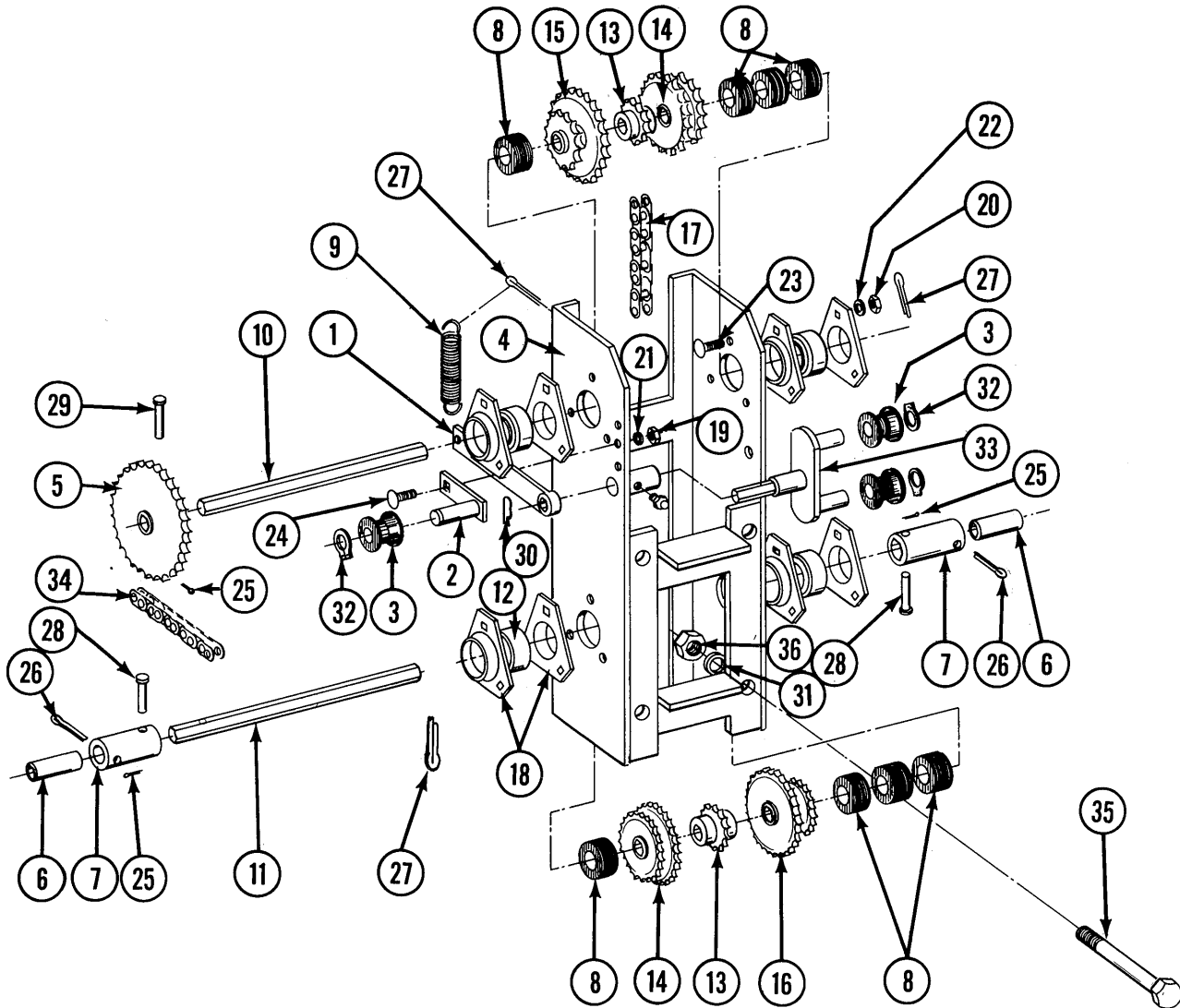


# WHEEL MOUNT ASSEMBLY

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ITEM	PART NO.	DESCRIPTION
1.	A907	Wheel Mount Weld, L.H. (shown)
	A908	Wheel Mount Weld, R.H.
2.	A288	Idler Weld
3.	D1067	Idler Spool
4.	10435	Ring Retaining
5.	10313	Carriage Bolt 1/2"-13x1 1/2" on R.H. side with 10228 Lock Washer and 10102 Nut.
	10088	Carriage Bolt 1/2"-13x1 1/2" on L.H. Side with 10228 Lock Washer and 10086 Nut.
6.	3400-1	Flangette
7.	10019	HHCS, 5/16"-18x1"
8.	10232	Lock Washer, 5/16"
9.	2100-3	Bearing
10.	10231	Lock Washer, 3/4"
11.	D830	Eyebolt
12.	10030	HHCS, 3/4"-10x9"
13.	10105	Hex Nut, 3/4"-10
14.	10102	Hex Nut, 1/2"-13
15.	10228	Lock Washer, 1/2"
16.	10017	HHCS, 1/2"-13x1 1/2"
17.	A1285	Trunion Cylinder Pin
18.	10460	Cotter Pin, 1/4"
19.	D535	Lower Pin, Trunion Cylinder
20.	10641	Grease Fitting
21.	A921	Cylinder Lift, 3"x10"
22.	2501-8-8	Elbow, 90°
23.	A909	Tie Bar Weld
24.	A261L	Ratchet Clutch Assembly, L.H.
	A261R	Ratchet Clutch Assembly, R.H.
25.	A271	Lock Collar
26.	D914-84	Hex Drive Shaft, 3R60, 84"
	D914-204	Hex Drive Shaft, 5R60, 204"
27.	A894	Spindle
28.	A895	Bearing Cone
29.	A926	6 Bolt Hub w/cups
	R434	Cups
30.	D915	Spacer
31.	2500-17	Sprocket
32.	10026	HHCS, 3/4"-10x2"
33.	10087	Jam Nut, 1 1/2"-12
34.	10092	Hex Nut, 1 1/2"-12
35.	10031	HHCS, 5/16"-18x1 3/4"
36.	10231	Lock Washer, 3/4"
37.	10232	Lock Washer, 5/16"
38.	R435	Lug Bolt, 9/16"-18x1 1/4"
39.	A240	Rim, 14"x8"
40.	D1165	Valve Stem
41.	D839	Tire, L11-14
42.	3200-78	Chain, No. 2050, 78 Pitch, Including Connector Link
	R195	Connector Link, No. 2050
43.	10027	HHCS 3/4"-10x2 1/2"
44.	10233	Machinery Bushing, As required
A.	A289	Idler Assembly, (Items 2, 3, and 4)
B.	A932	Drive Hub Assembly, 6 Bolt (Items 27 thru 38)
C.	A541	Tire and Rim Assembly (Items 39 thru 41)

# TRANSMISSION ASSEMBLY

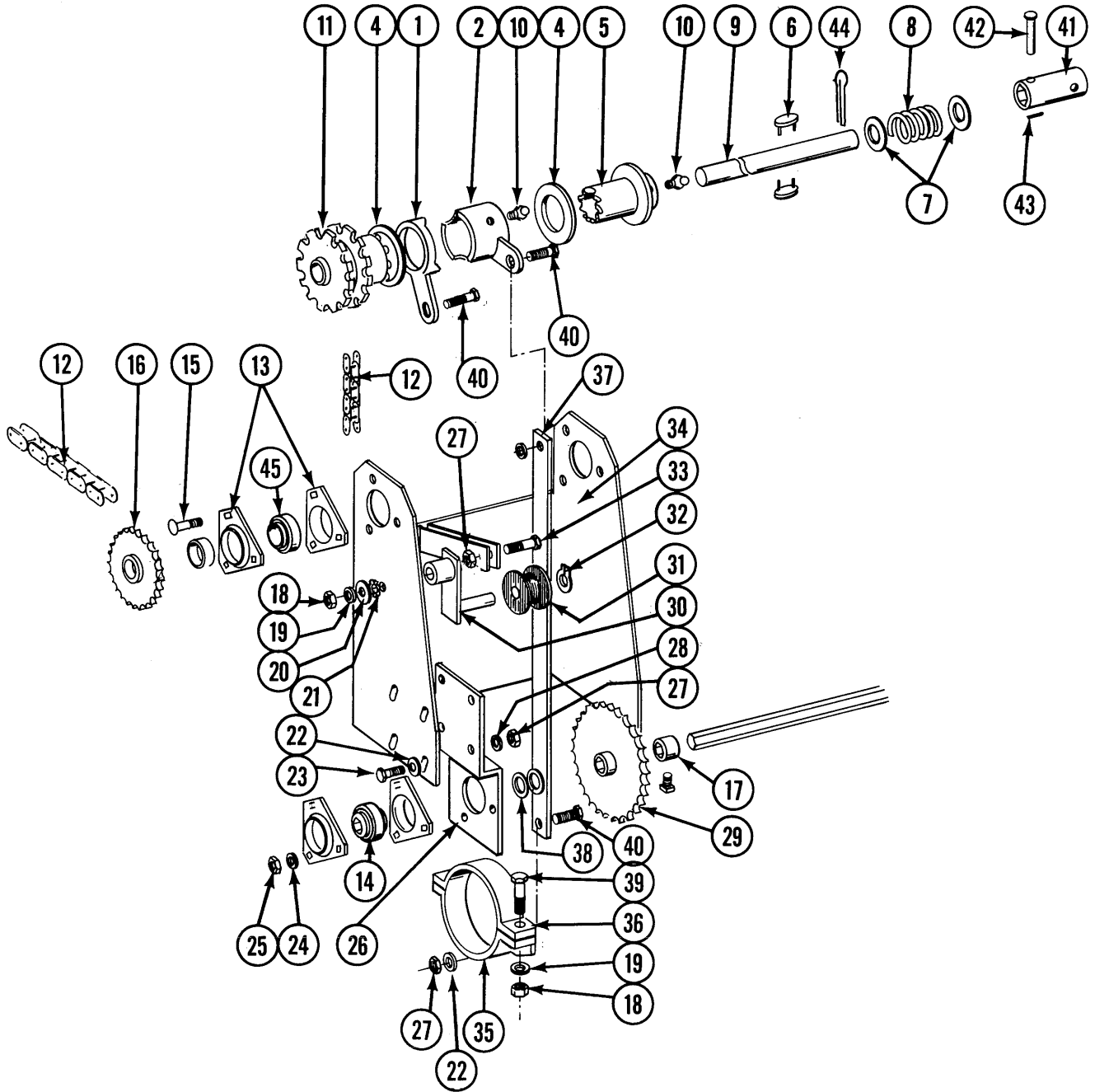


# TRANSMISSION ASSEMBLY

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ITEM	PART NO.	DESCRIPTION
1.	A272	Idler Arm
2.	A1247	Idler Arm Weld
3.	D1067	Idler Spool
4.	A1248	Transmission Case
5.	B146	Sprocket
6.	D747	Drill Shaft Driver, 9/16" Hex
7.	D748	Coupler, Drill Shaft Driver
8.	D832	Spacer
9.	D913	Spring
10.	D925	Upper Shaft
11.	D2236	Lower Shaft
12.	2100-3	Bearing, 7/8" Hex Bore
13.	2500-1	Sprocket, 14 Tooth
14.	2500-2	Sprocket, 22-26 Tooth
15.	2500-3	Sprocket, 16-30 Tooth
16.	2500-6	Sprocket, 18-28 Tooth
17.	3300-40	Chain, No. 2040, Included Connector Link
	R194	Connector Link, No. 2040
18.	3400-1	Flangette
19.	10101	Hex Nut, 3/8"-16
20.	10106	Hex Nut, 5/16"-18
21.	10229	Lock Washer, 3/8"
22.	10232	Lock Washer, 5/16"
23.	10303	Carriage Bolt, 5/16"-18x1"
24.	10305	Carriage Bolt, 3/8"-16x1"
25.	10455	Cotter Pin, 1/16"x1/2"
26.	10462	Cotter Pin, 3/16"x2"
27.	10463	Cotter Pin, 1/4"x1 1/2"
28.	10548	Clevis Pin, 1/4"x1 3/4"
29.	10558	Clevis Pin, 5/16"x1 3/4"
30.	10671	Hair Pin Clip, No. 3
31.	10230	Lock Washer, 5/8"
32.	10435	Retaining Ring
33.	A242	Tightener Weld
34.	3300-44	Chain, No. 2040, 44 Pitch, Includes Connector Link
	R194	Connector Link, No. 2040
35.	10093	HHCS 5/8"-11x8 1/2"
36.	10107	Lock Nut 5/8"-11
37.	D739-26	Hex Drill Shaft, 3R60, R.H., 26" (Not Shown)
	D739-84	Hex Drill Shaft, 3R60, L.H. 84" (Not Shown)
	D739-86	Hex Drill Shaft, 5R60, R.H., 86" (Not Shown)
	D739-143	Hex Drill Shaft, 5R60, L.H., 143" (Not Shown)
A.	A1245	Transmission Assembly Complete
B.	A503	Idler Assembly (Items 3, 32, and 33)
C.	A1246	Idler Assembly, (Items 2, 3, and 32)

# CLUTCH THROWOUT ASSEMBLY



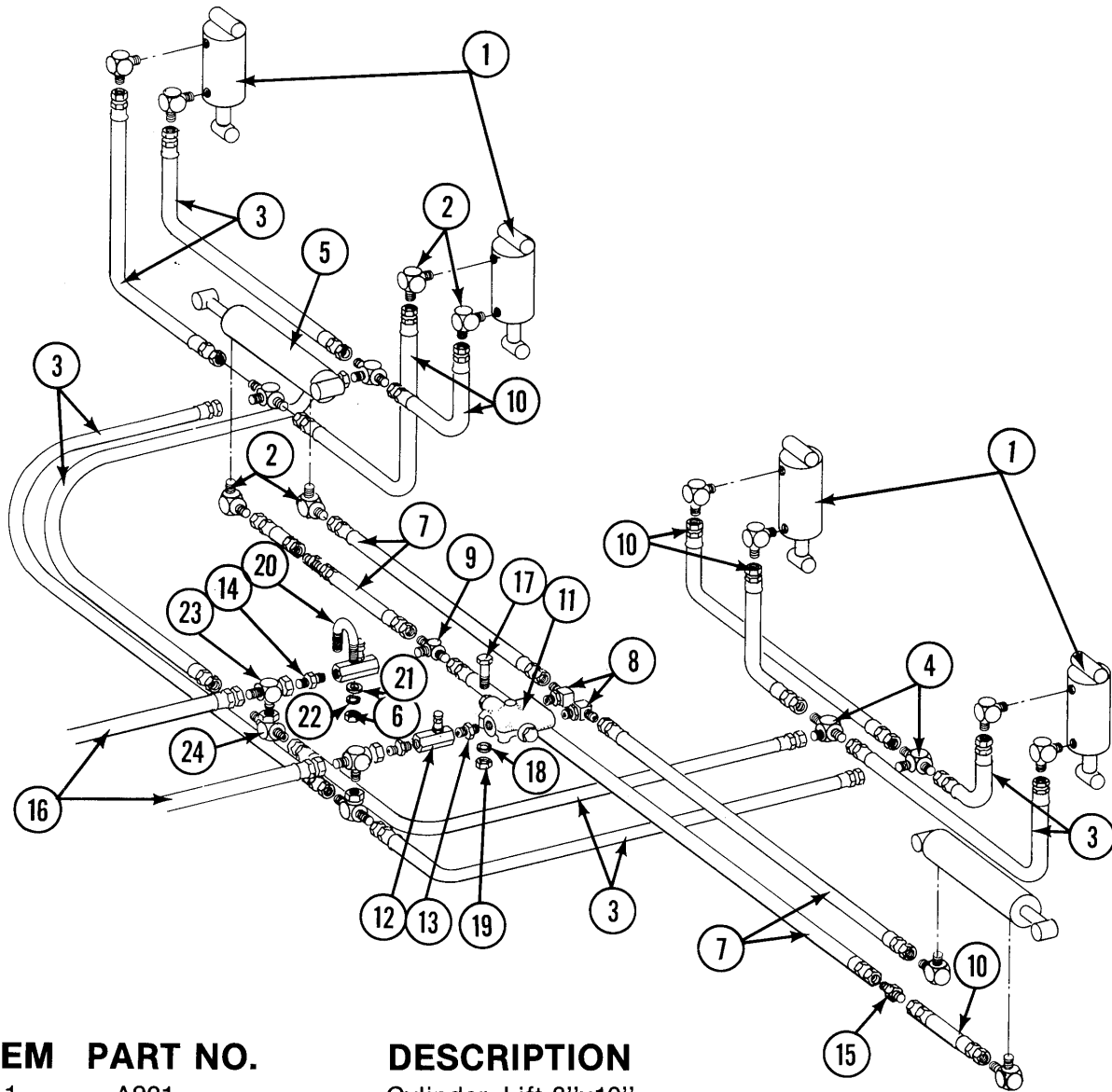
# CLUTCH THROWOUT ASSEMBLY

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ITEM	PART NO.	DESCRIPTION
1.	B130	Cam, Fixed
2.	B129	Cam, Floating
3.	10047	HHCS, 3/8"-16x1 3/4"
4.	10234	Washer
5.	B128	Hub, Clutch
6.	D1107	Key
7.	10235	Bushing - 7/8"
8.	D1133	Spring
9.	D2333	Shaft, Clutch
10.	10640	Grease Zerk
11.	B152	Sprocket/Hub, 12T
12.	3300-44	2040 Chain
13.	3400-1	Flangette
14.	2100-3	Bearing
15.	10312	Carriage Bolt, 5/16"-18x 3/4"
16.	B147	Sprocket 24T (Round Bore)
17.	A271	Lock Collar
18.	10102	Hex Nut, 1/2"-13
19.	10228	Lock Washer, 1/2"
20.	10216	Flat Washer, 1/2"
21.	10527	Lock Washer, Int., Ext. -1/2"
22.	10210	Flat Washer, 3/8"
23.	10001	HHCS, 3/8"-16x1"
24.	10232	Lock Washer, 5/16"
25.	10106	Hex Nut, 5/16"-18
26.	D2224	Clutch Mounting Bracket
27.	10101	Hex Nut, 3/8"
28.	10229	Lock Washer, 3/8"
29.	B146	Sprocket, 36T
30.	A302	Idler Weld
31.	D1067	Idler Spool
32.	10435	Retaining Ring
33.	10314	Carriage Bolt, 1/2"-13x3"
34.	A1239	Case Weld
35.	A1238	Clamp Weld
36.	A579	Clamp Half
37.	D2228	Clutch Throwout Lever
38.	10233	Machinery Bushing
39.	10016	HHCS, 1/2"-13x2"
40.	10048	HHCS, 3/8"x2"
41.	D1653	Coupler
42.	10456	Cotter Pin, 1/8"x 3/4"
43.	10565	Clevis Pin, 5/16"x2"
44.	10465	Cotter Pin 1/4"x1 1/4"
45.	2400-1	Bearing 7/8" ID w/Lock Collar
A.	A1240	Clutch Throwout Assembly Complete
B.	A582	Idler Assembly (Items 30-32)

# HYDRAULIC SYSTEM

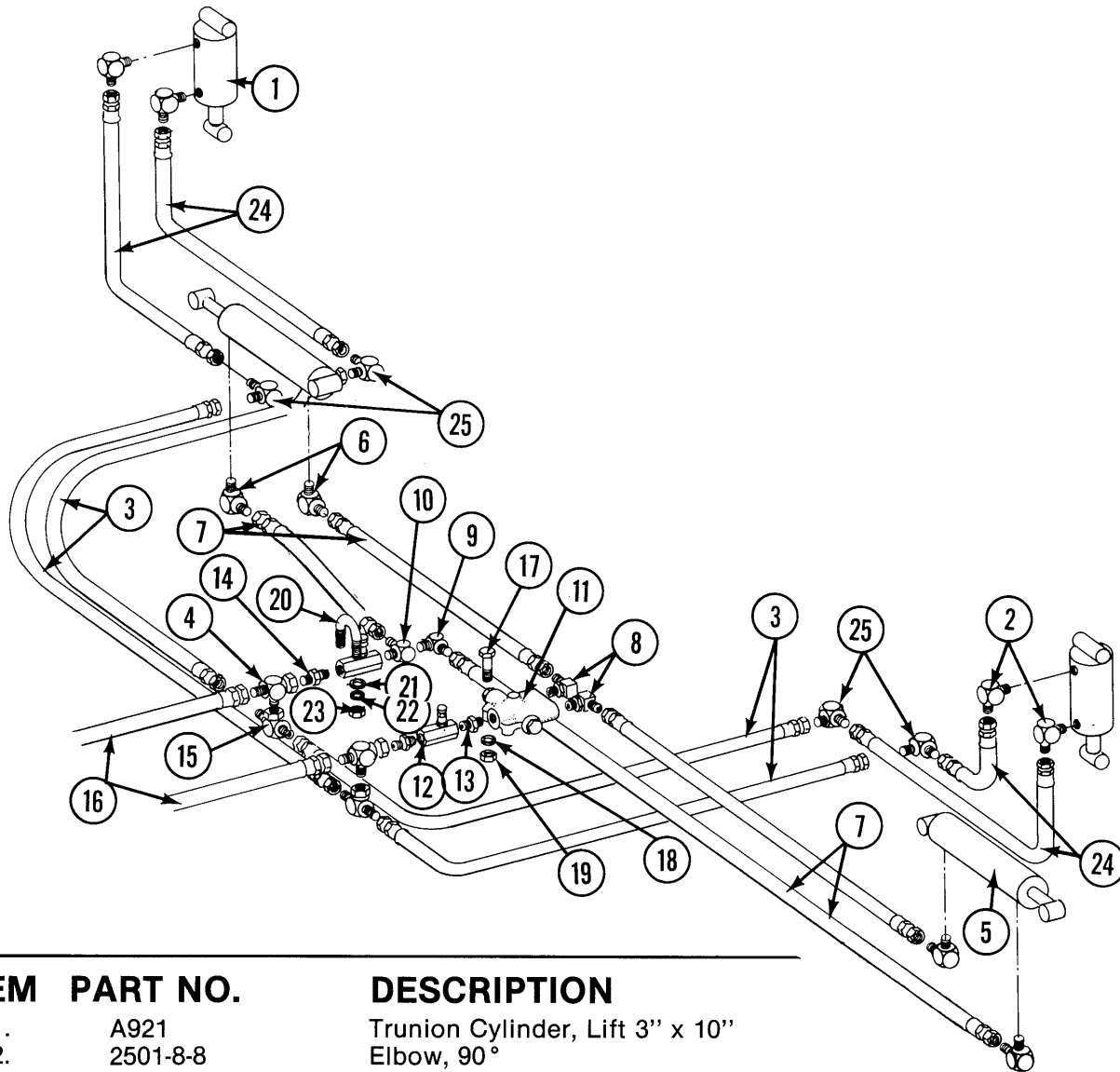
## 5R60 LOW PROFILE MARKERS



ITEM	PART NO.	DESCRIPTION
1.	A921	Cylinder, Lift 3"x10"
2.	2501-8-8	Elbow, 90°
3.	A1022	Hose Assembly, 3/8"x60"
4.	2603-8	Tube, Tee, 37°
5.	A233	Cylinder, Marker, 2½"x20"
6.	10106	Hex Nut, 5/16"-18
7.	A1029	Hose Assembly, 3/8"x190"
8.	6801-8	Elbow, 90°
9.	2601-8-8	Side Tee
10.	A1002	Hose Assembly, 3/8"x20"
11.	A282	Valve, Sequence
12.	A248	Valve, Flow Control, KLF 500
13.	6401-8-8	Adapter, Straight
14.	2404-8-8	Adapter, Straight
15.	2403-8	Male Adapter
16.	A1014	Hose Assembly, 3/8"x120"
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	Flat Washer, 5/16"
22.	10232	Lock Washer, 5/16"
23.	6602-8	Run, Tee
24.	6600-8	Swivel, Tee

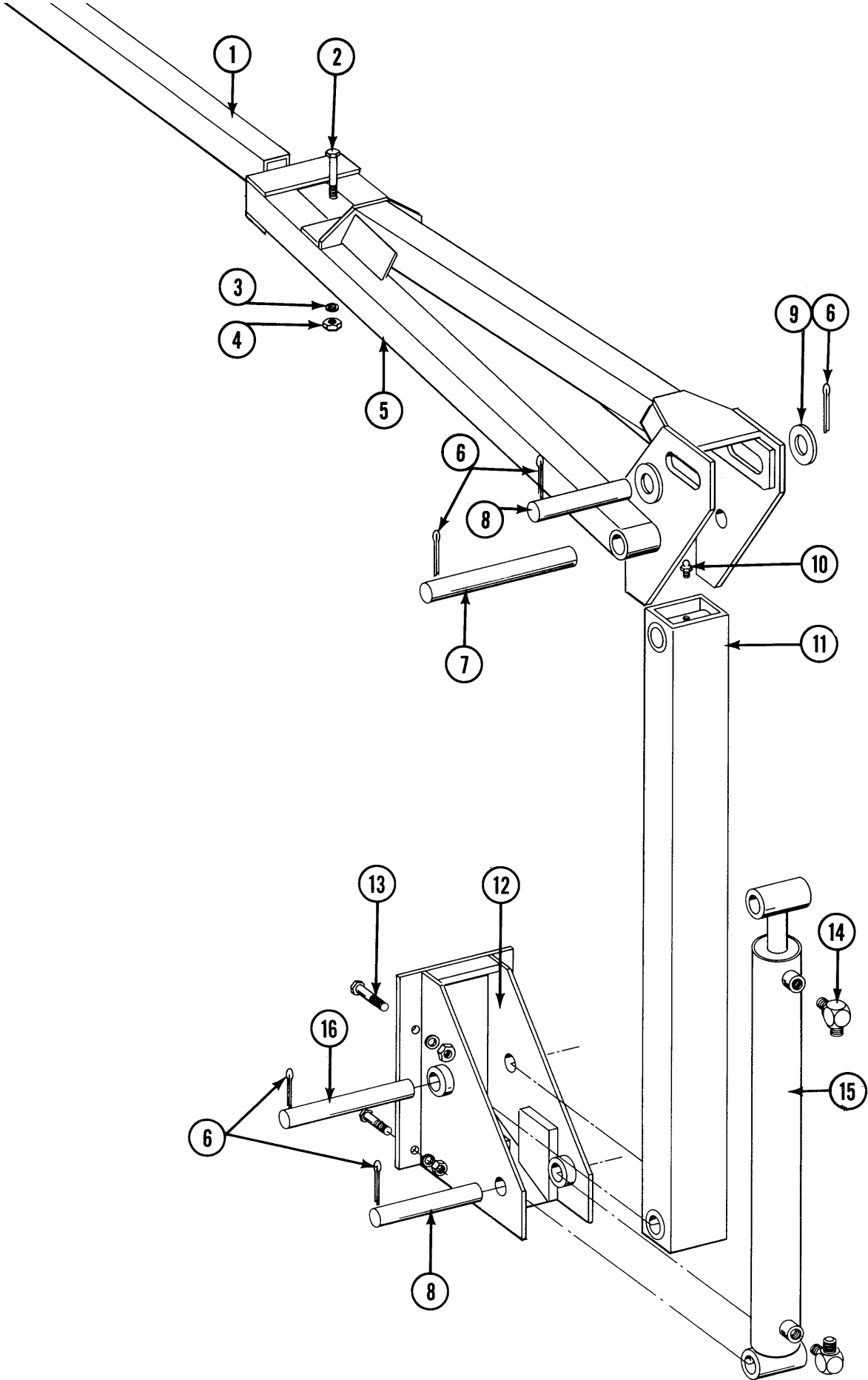
# HYDRAULIC SYSTEM

# 3R60 CONVENTIONAL MARKERS



ITEM	PART NO.	DESCRIPTION
1.	A921	Trunion Cylinder, Lift 3'' x 10''
2.	2501-8-8	Elbow, 90°
3.	A1022	Hose Assembly, 3/8''x60''
4.	6602-8	Run, Tee
5.	A211	Cylinder, Marker, 2''x8''
	A745	Cylinder, Marker, 2''x8''
6.	2501-6-6	Elbow, 90°
7.	A1109	Hose Assembly, 1/4''x145''
8.	6801-6-8	Elbow, 90°
9.	6500-6	Elbow, 90°
10.	2605-6-6	Run Tee, Male
11.	A282	Valve, Sequence
12.	A270	Valve, Flow Control
13.	6401-8-6	Adapter, Straight
14.	2404-8-6	Adapter, Straight
15.	6600-8	Swivel, Tee
16.	A1014	Hose Assembly, 3/8''x120''
17.	10048	HHCS, 3/8''-16''x2''
18.	10229	Lock Washer, 3/8''
19.	10101	Hex Nut, 3/8''-16
20.	D1253	U-Bolt, 5/16''-18x2 1/4''x1 1/2''
21.	10219	Flat Washer, 5/16''
22.	10232	Lock Washer, 5/16''
23.	10106	Hex Nut, 5/16''-18
24.	A1002	Hose Assembly, 3/8''x20''
25.	2500-8	Elbow, 90°

# LOW PROFILE - DOUBLE FOLD MARKER ASSEMBLY





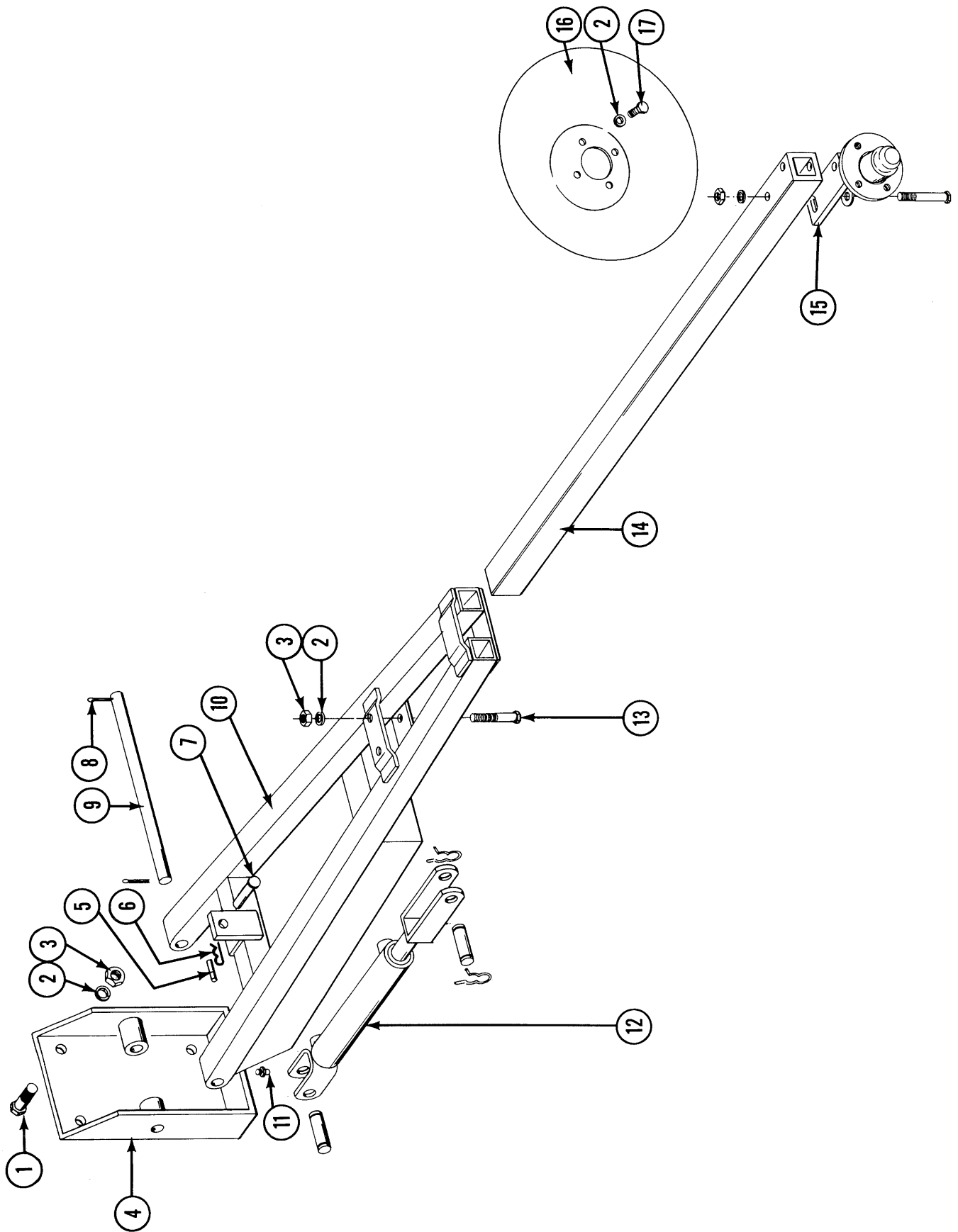
# LOW PROFILE - DOUBLE FOLD MARKER ASSEMBLY

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ITEM	PART NO.	DESCRIPTION
1.	D453-4	Extension Tube, 60", 5R60
2.	10033	HHCS, 1/2"-13x3 1/2"
3.	10228	Lockwasher, 1/2"
4.	10102	Hex Nut, 1/2"-13
5.	A831	Marker Arm, 34", 5R60
6.	10460	Cotter Pin, 1/4"x2"
7.	D1702	Pivot Pin
8.	D1701	Pin, Cylinder, Upper
9.	10226	Washer, 1 1/4" SAE
10.	10641	Grease Fitting, 1/8" NPT
11.	A828	Arm, First Stage
12.	A827	Marker Mount
13.	10039	HHCS, 1/2"- 13x1 3/4"
14.	2501-8-8	Elbow, 90°, 1/2" NPT to 37° 3/4"-16JIC
15.	A233	Cylinder, 2 1/2"x20"
16.	D653	Pin, Cylinder, Lower

# CONVENTIONAL MARKER ASSEMBLY

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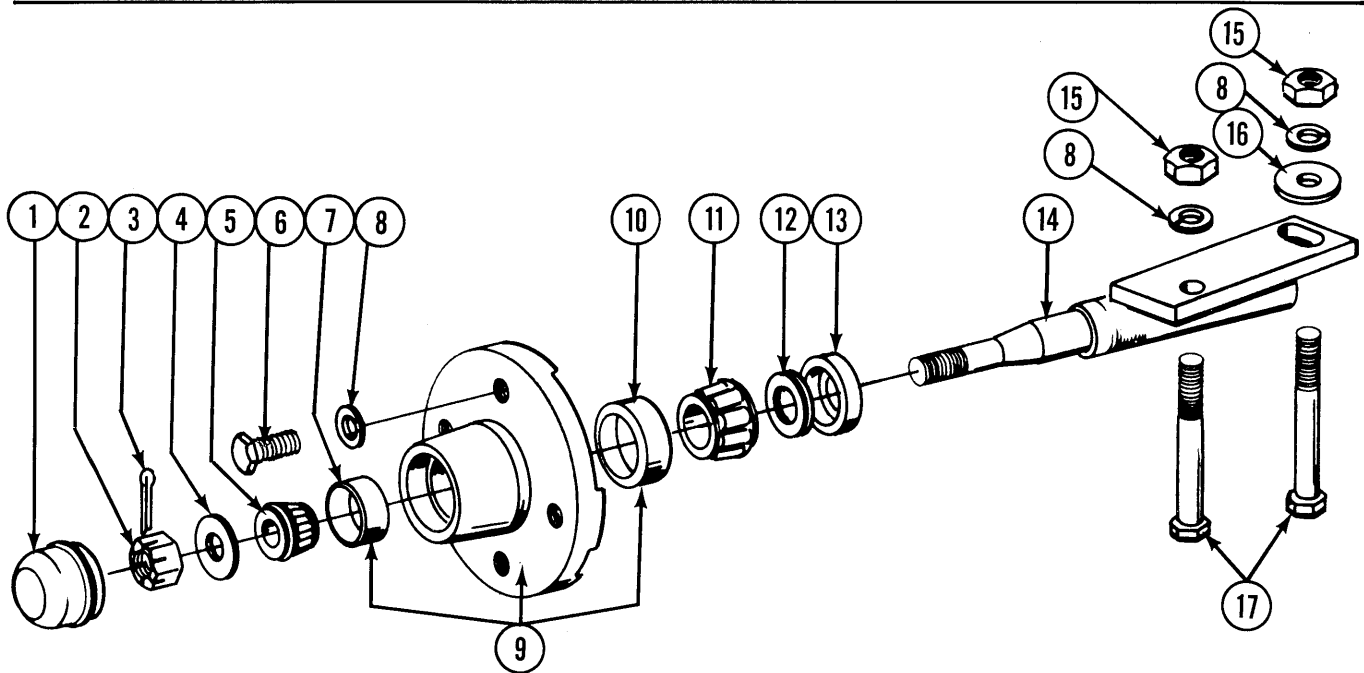


# CONVENTIONAL MARKER ASSEMBLY

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ITEM	PART NO.	DESCRIPTION
1.	10039	HHCS, 1/2"-13x1 3/4"
2.	10228	Lockwasher, 1/2"
3.	10102	Hex Nut, 1/2"-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, 1/4"x2"
9.	D438	Shaft
10.	A538	Marker Arm Weld, 64"x3R60
11.	10640	Grease Fitting, 1/4"-28
12.	A211	Cylinder Assembly, 2x8
	A745	Cylinder Assembly, 2x8
13.	10033	HHCS, 1/2"-13x3 1/2"
14.	D453-2	Extension Tube, 40", 3R60
15.	A305	Marker Hub Assembly, L.H. (Includes Hardware)
	A306	Marker Hub Assembly, R.H. (Includes Hardware)
16.	D746	Disc, 16"
17.	10722	HHCS, 1/2"-20x1"
A.	A563	Lockup Pin Assembly (Includes Items 5, 6, and 7)

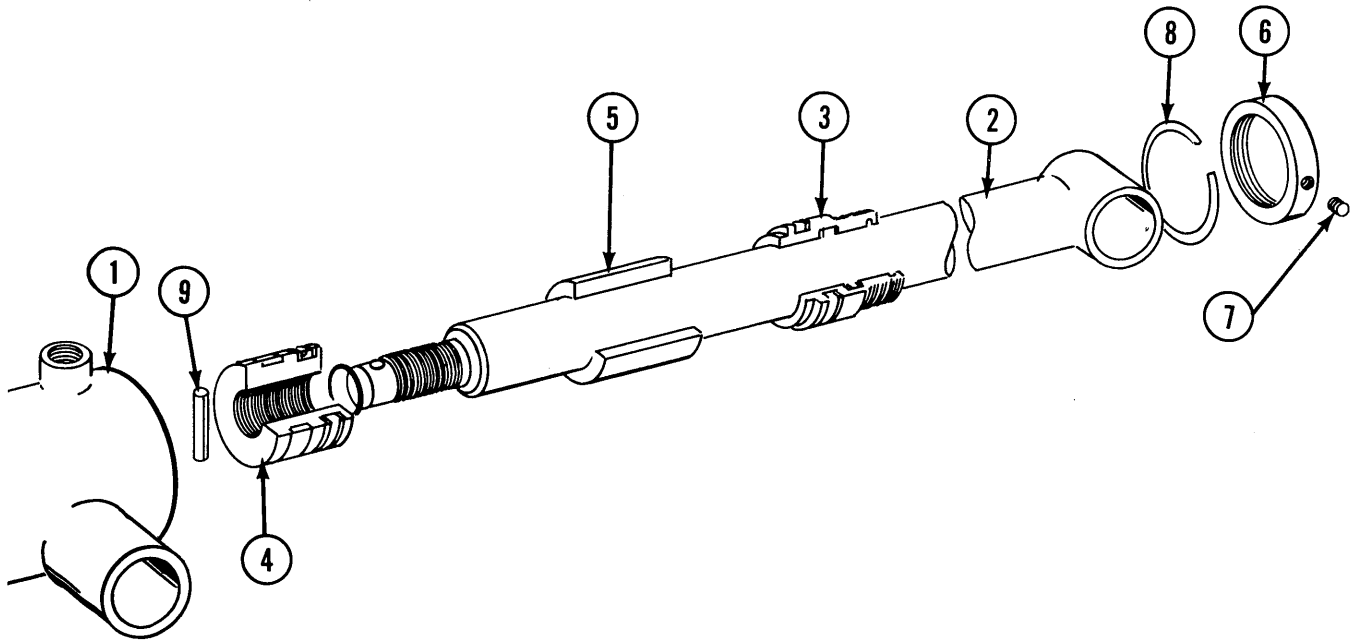
# MARKER HUB ASSEMBLY CONVENTIONAL AND LOW PROFILE



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, 1/2"-20x1"
7.	R151	Cup, Outer
8.	10228	Lockwasher, 1/2"
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, 1/2"-13
16.	10216	Washer, 1/2" USS
17.	10033	HHCS, 1/2"-13x3 1/2"
A.	A305	Hub and Spindle Assembly L.H.
	A306	Hub and Spindle Assembly R.H.

# LIFT CYLINDER

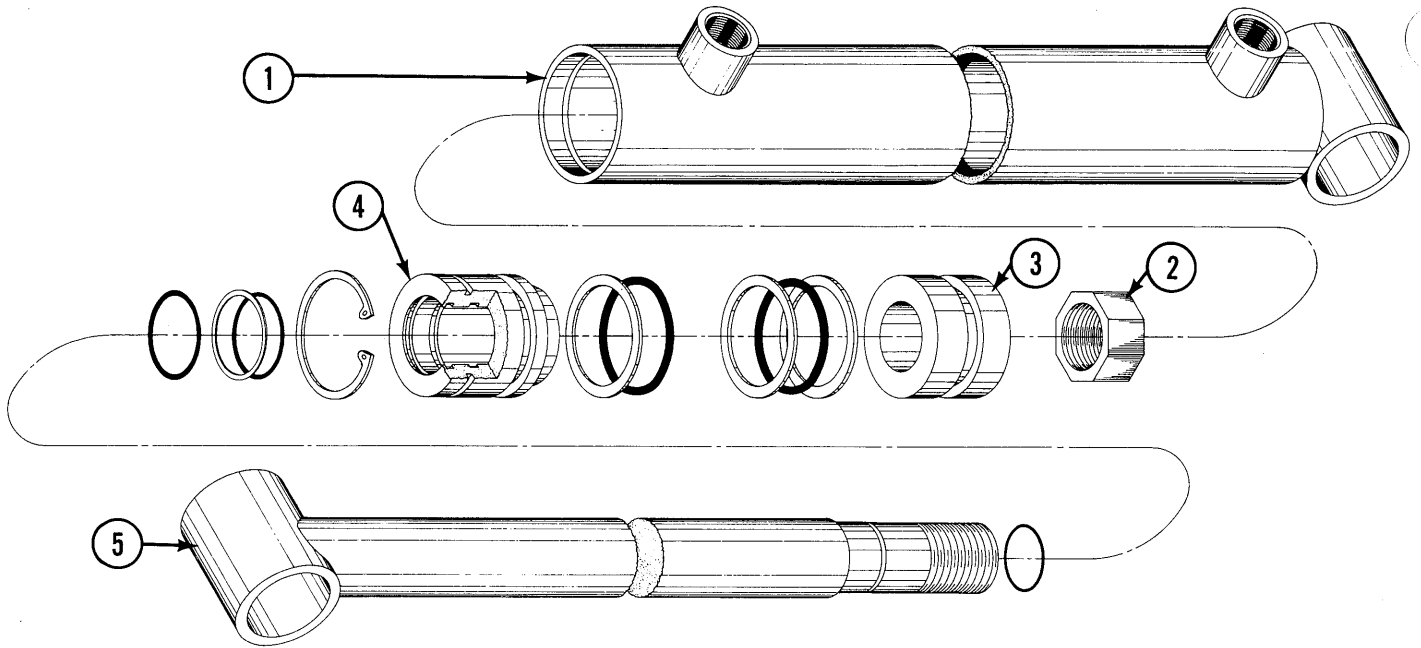
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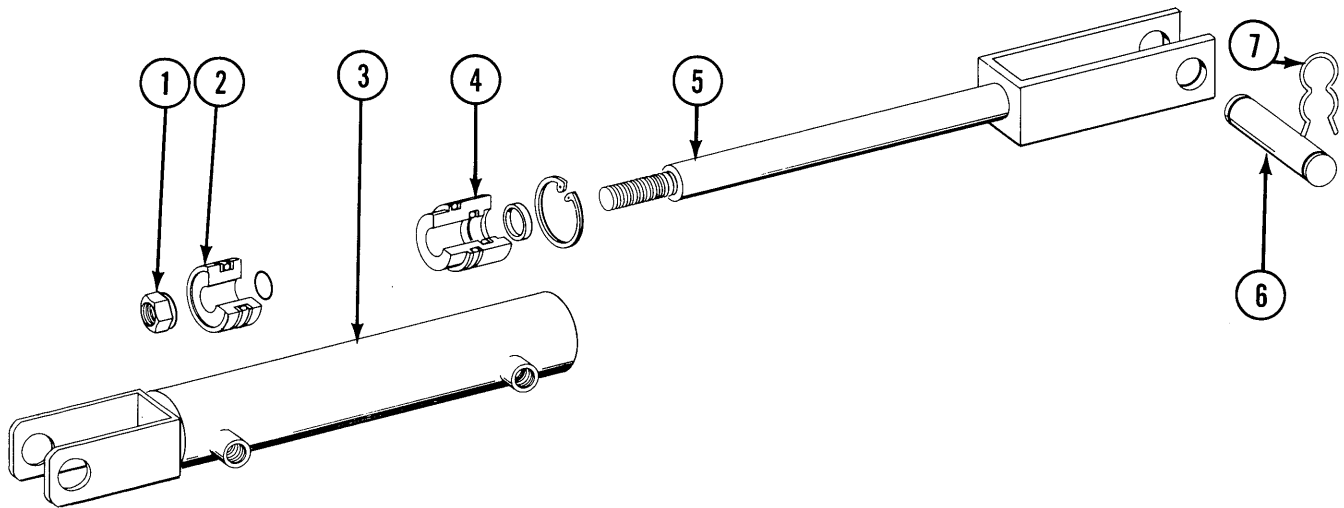
ITEM	PART NO.	DESCRIPTION
1.	R521	Tube Assembly
2.	R520	Shaft Assembly
3.	R128	Head Gland
4.	R129	Piston
5.	R130	Stroke Collar
6.	R131	Head Gland Nut
7.	10114	Set Screw, No. 10-32 x 1/4
8.	R132	Wire Ring
9.	10604	Roll Pin
	R133	Seal Kit
A.	A921	Cylinder Assembly Complete, 3"x10"

# LOW PROFILE - DOUBLE FOLDING MARKER CYLINDER



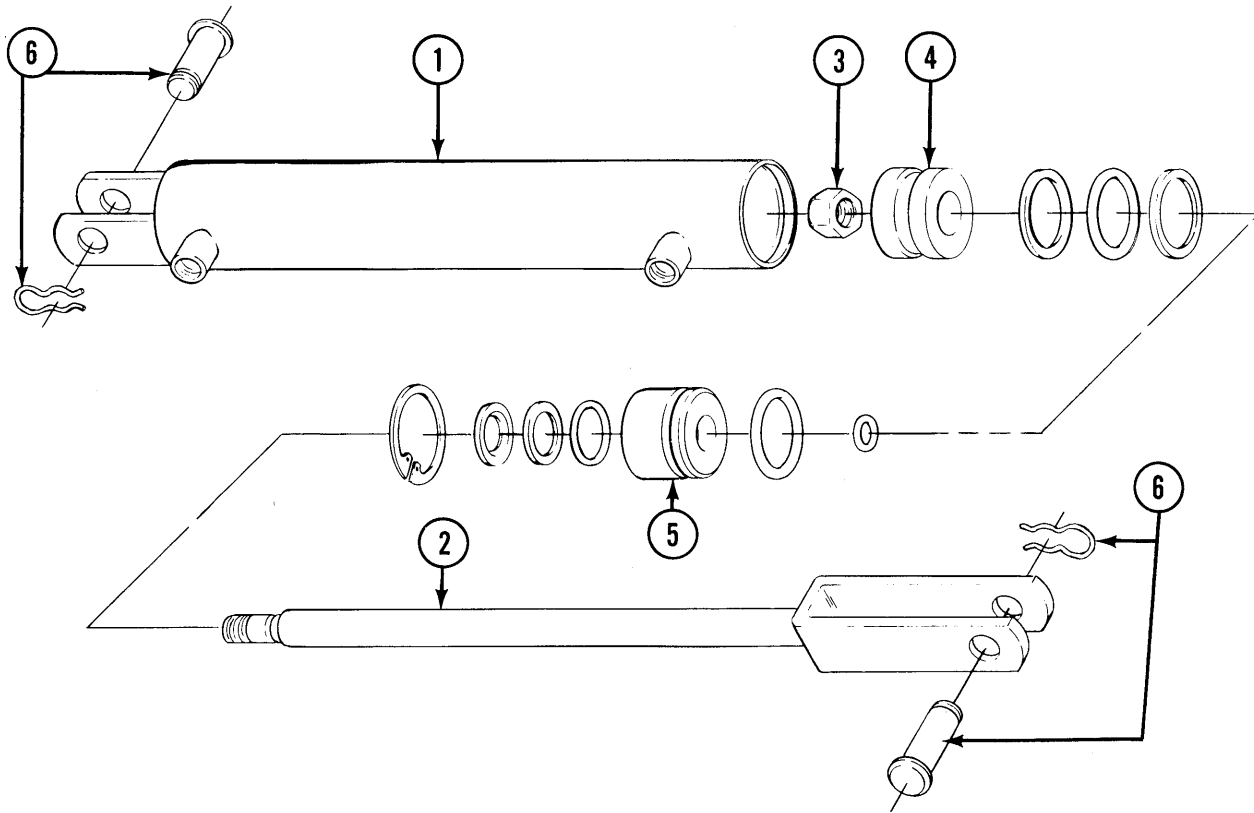
ITEM	PART NO.	DESCRIPTION
1.	R134	Cylinder Tube Assembly
2.	R138	Hex Nut, 7/8" UNF
3.	R137	Piston
4.	R136	Head Gland
5.	R135	Shaft Assembly
A.	A233 R139	Cylinder Assembly, Complete, 2½" x 20" Seal Kit Includes (1) Lock Ring (1) O-Ring (018) (1) O-Ring (218) (1) Back Up (23) (2) O-Ring (330) (3) Back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

# CONVENTIONAL MARKER CYLINDER



ITEM	PART NO.	DESCRIPTION
1.	R366	Hex Nut, 3/4" 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

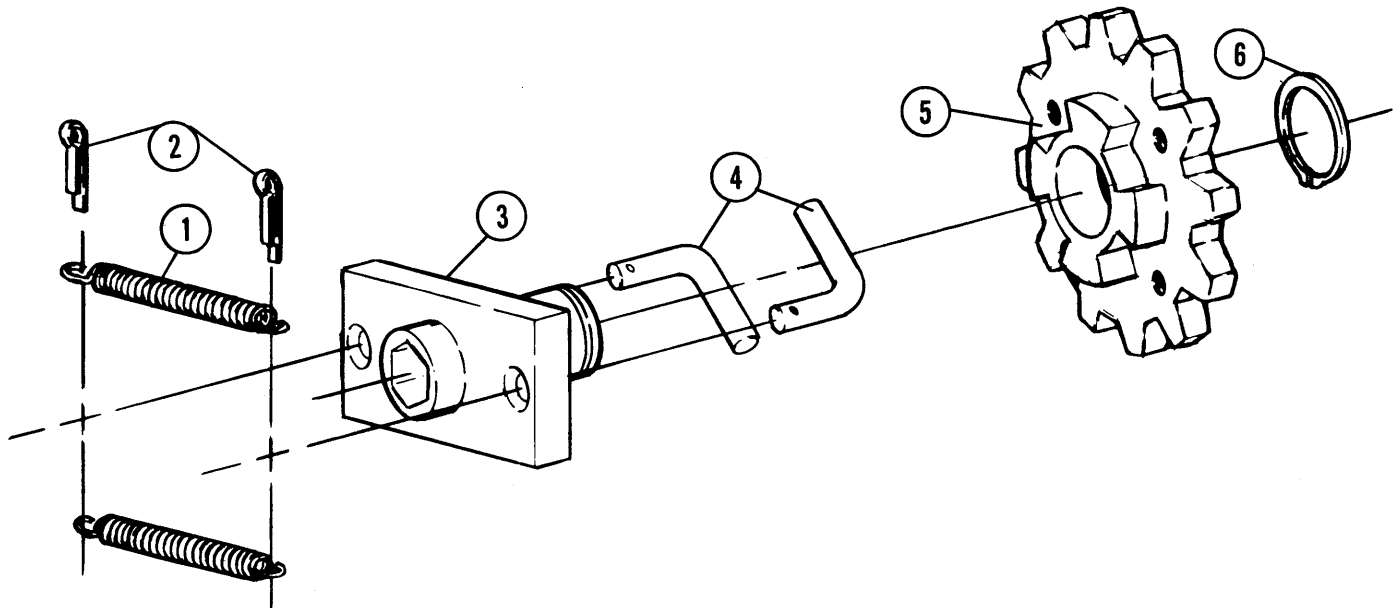


ITEM	PART NO.	DESCRIPTION
1.	R157	Cylinder Body
2.	R158	Piston Rod
3.	R159	Hex Nut, 7/8" UNF
4.	R160	Piston
5.	R161	Piston Rod Guide
6.	R162	Clevis Pin W/Clip
	R193	Clip, Hair Pin, Only
	R154	Seal Kit
		Includes
		(1) O-Ring, 3/4" I.D x 7/8" O.D.
		(1) O-Ring, 1 1/8" I.D. x 1 3/8" O.D.
		(1) Back Up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



# RATCHET AND SPROCKET ASSEMBLY

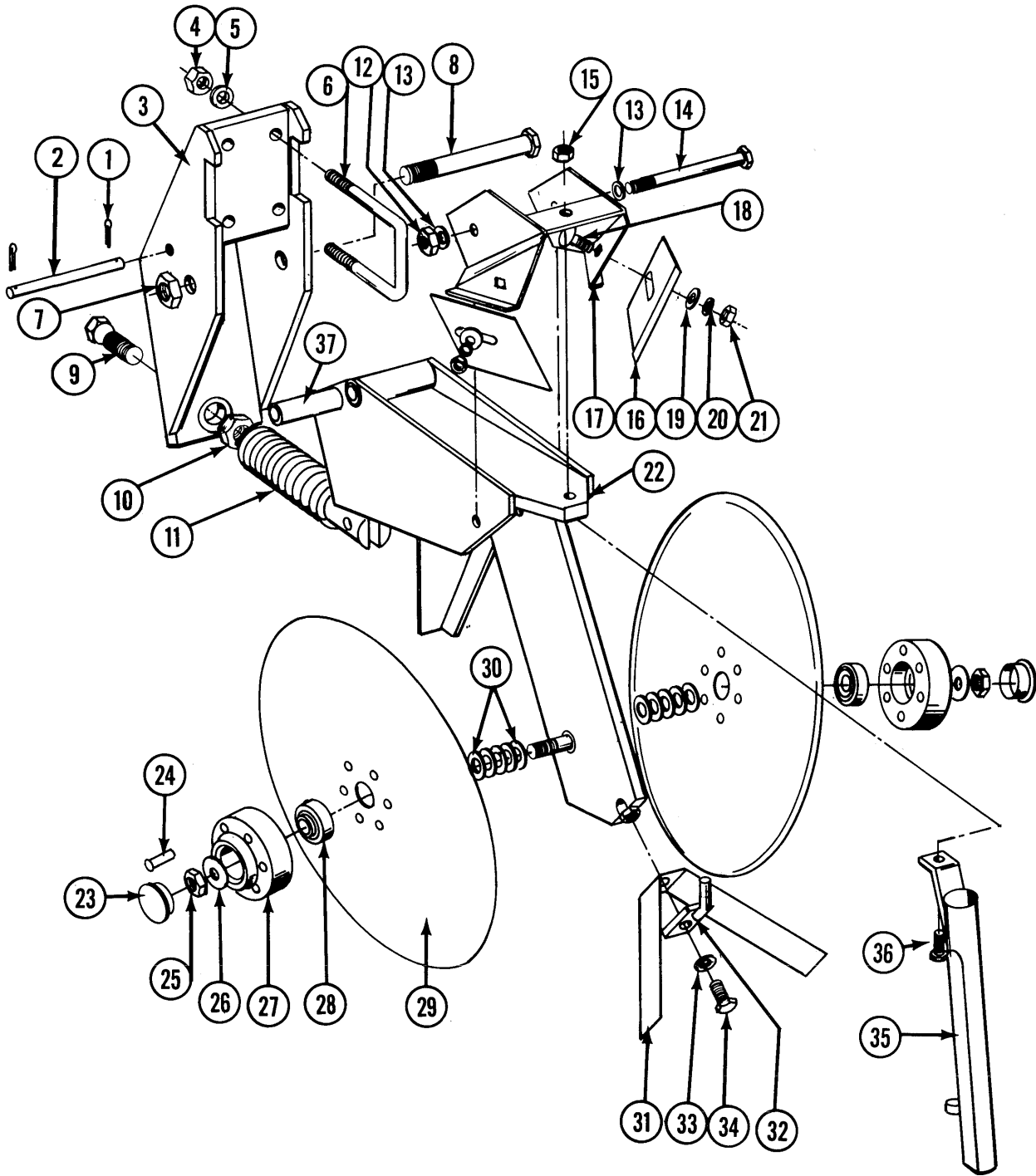
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ITEM	PART NO.	DESCRIPTION
1.	D1256	Spring
2.	10464	Cotter Pin, 3/16"x1"
3.	A378	Block and Hub Assembly
4.	D1255	"L" Pin
5.	A376	Hub/Sprocket Assembly
6.	10430	Retaining Ring, 1 1/4"
A.	A261L	Ratchet Clutch Assembly Complete - Left
	A261R	Ratchet Clutch Assembly Complete - Right

# DOUBLE DISK FERTILIZER OPENER

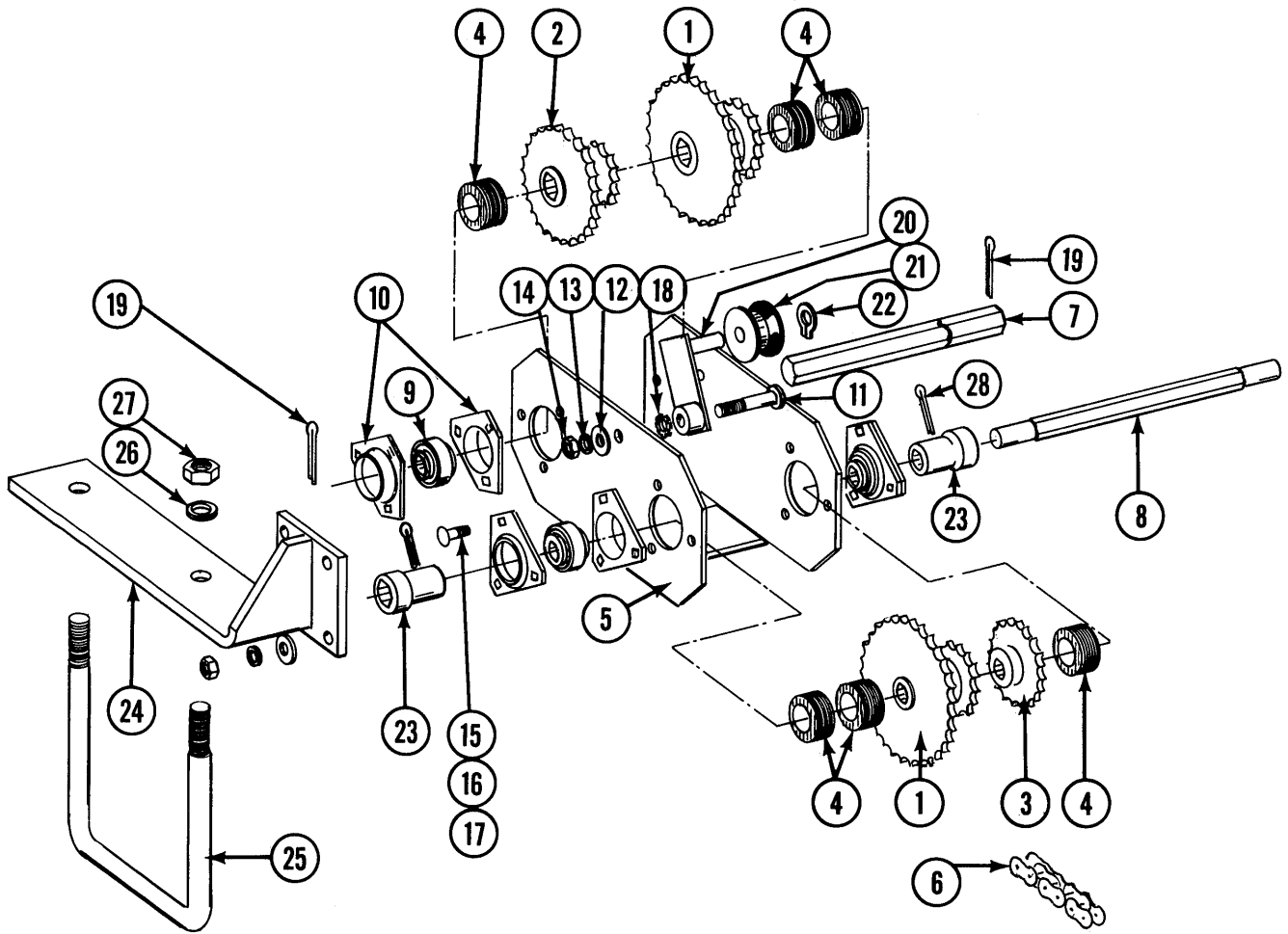


# DOUBLE DISK FERTILIZER OPENER

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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, 1/2"-13
5.	10228	Lockwasher, 1/2"
6.	D1138	U-Bolt, 2 1/2"x2 1/2"x1 1/2"-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, 1/2"-13
13.	10216	Flatwasher 1/2"
14.	10045	HHCS, 1/2"-13x4 1/2"
15.	10109	Hex Lock Nut, 5/16"-18
16.	D1673	Scraper
17.	A810	Scraper Mount
18.	10305	Carriage Bolt, 3/8"-16x1"
19.	10210	Flat Washer, 3/8" USS
20.	10229	Lock Washer, 3/8"
21.	10101	Hex Nut, 3/8"-16
22.	A308	Fertilizer Opener Weld
23.	D1132	Hub Cap
24.	10651	Rivet, 1/4"x1 3/8"
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.	A1369	Drop Tube, Dry Fertilizer
36.	10133	HHCS, 5/16"-18x1 1/2"
37.	D487	Bushing
A.	A320	Disk and Brg. Assembly (Items 24, 27 - 29)
B.	A786	Double Disk Fertilizer Opener, Less Drop Tubes and U-Bolts

# DRY FERTILIZER TRANSMISSION ASSEMBLY

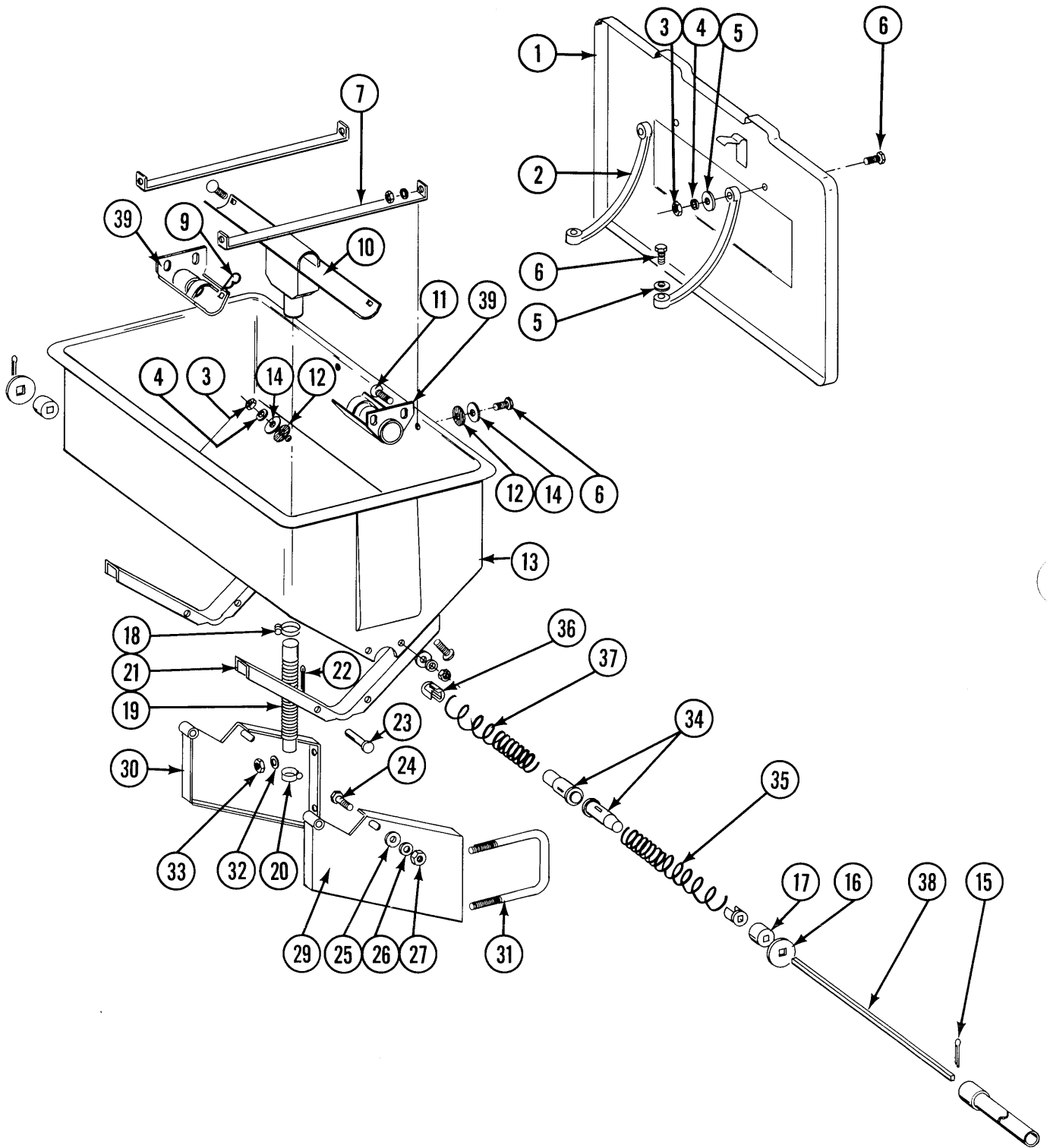


# DRY FERTILIZER TRANSMISSION ASSEMBLY

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ITEM	PART NO.	DESCRIPTION
1.	2500-12	Sprocket, 18-36 Tooth
2.	2500-3	Sprocket, 16-30 Tooth
3.	2500-14	Sprocket, 24 Tooth
4.	D832	Rubber Spacer
5.	A1364	Case Weld
6.	3300-32	Chain, No. 2040, 32 Pitches Including Connector Link
	R194	Connector Link, No. 2040
7.	D2321	Shaft
8.	D2317	Shaft
9.	2100-3	Bearing
10.	3400-1	Flangette
11.	10314	Carriage Bolt, 1/2"-13x3"
12.	10216	Washer, 1/2" USS
13.	10228	Lockwasher, 1/2"
14.	10102	Hex Nut, 1/2"-13
15.	10303	Carriage Bolt, 5/16"-18x1"
16.	10232	Lock Washer, 5/16"
17.	10106	Hex Nut, 5/16"-18
18.	10527	Lockwasher, Int. Ext. 1/2"
19.	10463	Cotter Pin, 1/4"x1 1/2"
20.	A302	Idler Weld
21.	D1067	Idler Spool
22.	10435	Retaining Ring
23.	A1338	Drive Coupler, 2 1/8", 3R60 and 5R60
	A1339	Drive Coupler, 12 5/8", 3R60, and 5R60
	A1340	Drive Coupler, 15 5/8", 5R60 Only
24.	A1362	Mount Weld, Fertilizer Transmission
25.	D1114	U-Bolt, 7"x7"x5/8"-11
26.	10230	Lockwasher, 5/8"
27.	10104	Hex Nut, 5/8"-11
28.	10462	Cotter Pin, 3/16"x2"
A.	A1365	Fertilizer Transmission (Items 1 thru 22)
B.	A582	Idler Assembly (Items 20 thru 22)

# DRY FERTILIZER HOPPER AND MOUNT



# DRY FERTILIZER HOPPER AND MOUNT

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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, 5/16"-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 (Not Shown)
9.	10670	Hair Pin Clip, No. 3
10.	A1366	Center Drop, Dry Fertilizer
11.	10303	Carriage Bolt, 5/16"-18x1"
12.	D1213	Washer, Rubber
13.	D2329	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.	D1925	Tube, Rubber
20.	10675	Hose Clamp, No. 20
21.	D1208	Saddle
22.	10456	Cotter Pin, 1/8"x 3/4"
23.	10562	Clevis Pin, 7/16"x3"
24.	10037	HHCS, 1/2"-13x1 1/4"
25.	10206	Washer, 1/2" SAE
26.	10228	Lockwasher, 1/2"
27.	10102	Hex Nut, 1/2"-13
28.	10640	Grease Fitting for Auger Bearing (Not Shown)
29.	A863	Mount, Hopper L.H.
30.	A864	Mount Hopper R.H.
31.	D1114	U-Bolt, 7"x7"x5/8"-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.	A1368	Auger Bearing
A.	A1371	Auger Assembly, Complete (Items 15, 16, 17 & 34 thru 38)

