

# ***PARMA***<sup>®</sup>

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**Model 180 & 144**  
**Beet Defoliator**  
**OPERATOR'S/PARTS MANUAL**

Manual Number 022504-180MAN

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## ***PARMA COMPANY***

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# INTRODUCTION

This manual has been prepared to acquaint you with the operation and maintenance of your **PARMA Defoliator**, and to provide important safety information. We urge you to read this manual carefully. The recommendations will help assure the safe and trouble free operation of your machine.

When it comes to service, keep in mind that your dealer knows your Defoliator well and is interested in your complete satisfaction. Your dealer invites you to call him for your service needs both during and after the warranty period.

We thank you for choosing a PARMA product and want to assure you of our continuing interest in your satisfaction. You have purchased a very good machine and with proper care it will give you good service.



## **SAFETY: THE MOST IMPORTANT SUBJECT OF ALL....YOU CAN LIVE WITH IT!**

The Following safety instructions are provided to help assure that all operators of this equipment are trained in its operation and are familiar with the importance of safety in its use.



## **WITH OWNERSHIP COMES RESPONSIBILITY!**

Many times the owner of this equipment is not the operator. The manufacturer delivers the equipment to a dealer, who in turn sells it to an owner. The owner may then assign another person to operate it. With each of these steps it is the duty of the one in possession of the equipment to be sure that the safe operation of the machine is fully explained to the person, or persons, actually operating it. **Do not allow this machine to be used until the following safety material has been reviewed.**

**REMEMBER:** One of the most common cause of injury or death around this type of equipment is because the operator does not shut the tractor engine off and remove the key when maintenance, adjustments, or cleaning of the machine is conducted!



## **SAFETY.... YOU CAN LIVE WITH IT!**

# SAFETY PRECAUTIONS

**TAKE NOTE! THIS SAFETY ALERT SYMBOL FOUND THROUGH OUT THIS MANUAL IS USED TO CALL YOUR ATTENTION TO INSTRUCTIONS INVOLVING YOUR PERSONAL SAFETY AND THE SAFETY OF OTHERS. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH.**



**THIS SYMBOL MEANS**

**-ATTENTION!**

**-BECOME ALERT!**

**- YOUR SAFETY IS INVOLVED!**

## **SIGNAL WORDS:**

Note the use of the signal words **DANGER**, **WARNING** and **CAUTION** with the safety messages. The appropriate signal word for each has been selected using the following guidelines:

**DANGER:** Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations typically for machine components for which functional purposes cannot be guarded.

**WARNING:** Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

**CAUTION:** Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

If you have questions not answered in this manual or require additional copies or the manual is damaged, please contact your dealer.

**SAFETY.... YOU CAN LIVE WITH IT**



## **SAFETY.... YOU CAN LIVE WITH IT**



### **EQUIPMENT SAFETY GUIDELINES**

Safety of the operator is one of the main concerns in designing and developing a new piece of equipment. Designers and manufacturers build in as many safety features as possible. However, every year many accidents occur which could have been avoided by a few seconds of thought and a more careful approach to handling equipment. You, the operator, can avoid many accidents by observing the following precautions in this section. To avoid personal injury, study the following precautions and insist those working with you, or for you, follow them.

In order to provide maximum safety to the operator or other persons around this machine, various shields and covers have been installed. Keep all shields and covers in place. If shield removal becomes necessary for repairs or any other reason, replace the shield prior to use.

Replace any CAUTION, WARNING, DANGER or instruction safety decal that is not readable or is missing. Location of such decals is indicated in this manual.

Do not attempt to operate this equipment under the influence of drugs or alcohol.

Review the safety instructions with all users annually.

This equipment is dangerous to children and persons unfamiliar with its operation. The operator should be a responsible adult familiar with farm machinery and trained in this equipment's operations. **Do not allow persons to operate or assemble this unit until they have read this manual and have developed a thorough understanding of the safety precautions and of how it works.**

Do not paint over, remove or deface any safety signs or warning decals on your equipment. Observe all safety signs and practice the instructions on them.

Never exceed the limits of a piece of machinery. If its ability to do a job, or to do so safely is in question – **DON'T TRY IT.**



### **LIGHTING AND MARKING**

It is the responsibility of the customer to know the lighting and marking requirements of the local highway authorities and to install and maintain the equipment to provide compliance with the regulations. Add extra lights when transporting at night or during periods of limited visibility.

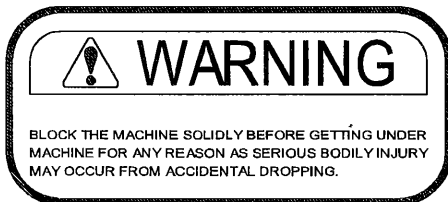
Lighting kits are available from your dealer or from the manufacturer.

## SAFETY SIGN LOCATIONS

The types of Safety Sign on the equipment are shown below. Their locations are shown on in the parts section of this manual. Good safety requires that you familiarize yourself with the various Safety Signs, the type of warning and the area, or particular function related to that area that requires your SAFETY AWARENESS.



Part #1 00409



Part #1 00404



Part #1 00564



Part #1 00406



Part #1 00311



Part #1 00405



Part #1 00565

**REMEMBER:** If Safety Signs have been damaged, removed, become illegible or parts replaced without decals, new decals must be applied. New decals are available from your authorized dealer or manufacturer.



### **SAFETY SIGN CARE**

- Keep safety signs clean and legible at all times
- Replace safety signs that are missing or have become illegible
- Replaced parts that displayed a safety sign should also display the current sign
- Safety signs are available from your Dealer Parts Department or the Manufacturer

### **How to Install Safety Signs:**

- Be sure that the installation area is clean and dry
- Decide on the exact position before you remove the backing paper
- Remove the smallest portion of the split backing paper
- Align the decal over the specified area and carefully press the small portion with the exposed sticky backing in place
- Slowly peel back the remaining paper and carefully smooth the remaining portion of the decal in place
- Small air pockets can be pierced with a pin and smoothed out using the piece of decal backing paper



### **REMEMBER!**

**Your best assurance against accidents is a careful and responsible operator. If there is any portion of this manual or function you do not understand, contact your local authorized dealer or the manufacturer.**



### **BEFORE OPERATING:**

- Carefully study and understand this manual
- Do not wear loose-fitting clothing which may catch in moving parts
- Always wear protective clothing and substantial shoes
- Assure that agricultural implement tires are inflated evenly
- Inspect the unit for any loose bolts, worn parts or cracked welds, and make necessary repairs. Follow the maintenance safety instructions included in this manual
- Be sure that there are no tools lying on or in the equipment
- Do not use the unit until you are sure that the area is clear, especially children and animals

- Don't hurry the learning process or take the unit for granted. Ease into it and become familiar with your new equipment
- Practice operation of your equipment and its attachments. Completely familiarize yourself and other operators with its operation before using



### **DURING OPERATION:**

- **NO PASSENGERS ALLOWED** – Do not allow any passengers to ride on the equipment at any time
- Keep hands and clothing clear of moving parts
- Do not clean, lubricate or adjust your equipment while it is in motion
- When halting operation, even periodically, disengage the PTO, **shut off the tractor engine and remove the ignition key**
- Be especially observant of the operating area and terrain – watch for holes, rocks or other hidden hazards.
- Do work under raised components or attachments unless securely positioned and blocked
- Keep all bystanders, pets and livestock clear of the work area
- As a precaution, always recheck the hardware on equipment following every 100 hours of operation. Correct all problems. Follow the maintenance safety procedures



### **FOLLOWING OPERATION:**

- Following operation, or when unhitching, stop the tractor, set the brakes, disengage the PTO, **shut off the engine and remove the ignition keys**
- Store the unit in an area away from human activity
- Do not permit children to play on or around the stored unit
- Make sure all parked machines are on a hard, level surface and engage all safety devices



### **HIGHWAY AND TRANSPORT OPERATIONS:**

- Adopt safe driving practices:

Always drive at a safe speed relative to local conditions and ensure that your speed is low enough for an emergency to stop to be safe and secure. Keep speed to a minimum

Reduce speed prior to turns to avoid the risk of overturning



## **Highway and Transport Operations Cont....**

Always keep the tractor in gear to provide engine braking when going downhill. Do not coast

### **Do not drink and drive!**

- Comply with state and local laws governing highway safety and movement of farm machinery on public roads
- Use approved accessory lighting flags and necessary warning devices to protect operators of other vehicles on the highway, during daylight and nighttime transport, in accordance with State Department of Transportation specifications. Various safety lights and devices are available from your Dealer
- The use of flashing amber lights is acceptable in most localities. However, some localities prohibit their use. Local laws should be checked for all highway lighting and marking requirements
- Be a safe and courteous driver. Always yield to oncoming traffic in all situations, including narrow bridges, intersections, etc
- Be observant of bridge loading ratings. Do not cross bridges rated lower than the gross weight at which you are operating
- Watch for obstructions overhead and to the side while transporting
- Always operate equipment in a position to provide maximum visibility at all times.



## **PERFORMING MAINTENANCE:**

- Good maintenance is your responsibility. Poor maintenance is an invitation to trouble
- Before working on this machine, disengage the PTO, **shut off the tractor engine and remove the ignition keys**
- Be certain all moving parts have come to a complete stop before attempting to perform maintenance
- **Always** use a safety support. Never use a jack to support the machine
- Always use the proper tools or equipment for the job at hand
- Use extreme caution when making adjustments
- Follow the torque chart in this manual when tightening bolts and nuts
- Never use your hands to locate a hydraulic leak on attachments. Use a small piece of cardboard or wood. Hydraulic fluid escaping under pressure can penetrate the skin
- When disconnecting hydraulic lines, shut off hydraulic supply and relieve all hydraulic pressure



### **Performing Maintenance Cont....**

- Openings in the skin and minor cuts are susceptible to infection from hydraulic fluid. **If injured by escaping hydraulic fluid, see a doctor at once. Gangrene can result. Without immediate medical treatment, serious infection and reactions can occur**
- Replace **all shields and guards** after servicing and before moving
- After servicing, be sure all tools, parts and service equipment are removed
- Never replace hex bolts with less than grade five bolts unless otherwise specified. Refer to bolt torque chart for head identification marking
- Where replacement parts are necessary for periodic maintenance and servicing, genuine factory replacement parts are recommended to restore your equipment to original specifications. The manufacturer will not claim responsibility for use of unapproved parts and/or accessories and other damages as a result of their use
- If equipment has been altered in any way from original design, the manufacturer does not accept any liability for injury or warranty

## **CUSTOMER AND DEALER CHECKLIST**

After the machine has been completely assembled, inspect it thoroughly to be certain it is in operating condition before delivering it to a customer. The following checklist is a reminder of points to inspect. Check off each item as it is found satisfactory or after proper adjustment is made.

### **PRE-DELIVERY:**

- \_\_\_ Check all bolts and nuts to be sure they are tight
- \_\_\_ Make sure all bearing lock collars are set correctly and tightened
- \_\_\_ Inspect and, if necessary, grease all lubrication points; making sure all bearings are taking grease and check gearbox oil level (See Lubrication & Service Schedule)
- \_\_\_ Check all moving parts for smooth operation
- \_\_\_ Check to see that all hydraulic fittings and cylinders are tight and free of leaks

### **DELIVERY:**

- \_\_\_ Complete the Delivery and Warranty Registration Forms, listing serial number of machine
- \_\_\_ Have the dealer and customer sign the form. Explain warranty policy on the Warranty Registration Form, and return to Parma Company.
- \_\_\_ Show the customer how to operate the Defoliator
- \_\_\_ Explain adjustments
- \_\_\_ Explain the importance of proper lubrication
- \_\_\_ Give the operator's manual to the customer and ask him to familiarize himself with all sections of it.

**DELIVERY CHECKLIST** continued:

**BEFORE EACH SEASON:**

- \_\_\_ Check all adjustable components for correct setting
- \_\_\_ Perform complete lubrication of machine
- \_\_\_ With equipment operating, observe operation of moving parts. Watch for faulty operation, overheated bearings, and unusual sounds
- \_\_\_ Read the safety precautions
- \_\_\_ Read the operating instructions
- \_\_\_ Perform daily checklist

**DAILY CHECKLIST:** (see Lubrication & Service Schedule)

- \_\_\_ Lubricate (as instructed) all lubrication points
- \_\_\_ Check Belt Tension (see Belt Tensioning)
- \_\_\_ Check flails for wear and damage. Replace as necessary
- \_\_\_ Lift top covers and clean inside of machine as necessary
- \_\_\_ Look for loose bolts and tighten as necessary
- \_\_\_ Check scalper settings and adjust if necessary

## WARRANTY POLICY

PARMA COMPANY warrants to each purchaser from an authorized dealer of new equipment manufactured by PARMA COMPANY, that such equipment is, at the time of delivery to such purchaser, free from defects in material and workmanship under normal use, if serviced in accordance with the recommendations of the Operator's Manual. All PARMA COMPANY'S *harvesting equipment products* are warranted for 120 days from the first day of use or 800 acres, whichever occurs first. All PARMA COMPANY *soil preparation* products are warranted for 120 days from first day of use or 1600 acres, whichever occurs first. All PARMA COMPANY *water and waste pump products* are warranted for one year from date of purchase. ALL PARMA COMPANY *forage products* are warranted for one year from date of purchase. Warranty on defective parts purchased by PARMA COMPANY or produced by other manufacturers for PARMA COMPANY may be allowed only after the approval of the vendor or manufacturer.

PARMA COMPANY'S obligation under this warranty is limited to repairing, or at it's option, replacing any part, that in PARMA COMPANY'S judgment, proved defective. Under the terms of the warranty, PARMA COMPANY assumes no responsibility for labor or travel costs involved in removal of defective parts, of installation of new parts, or of any shop supplies or service charges.

All warranty claims are to be initiated through the authorized PARMA COMPANY dealer and **must be submitted within 30 days of the date of failure**. PARMA COMPANY may ask for defective parts to be returned to the factory; therefore, hold all warranty claim parts until advised if the parts are needed by your dealer.

To make the warranty effective, the owner's **Warranty Registration Form** must be on file at PARMA COMPANY, Parma, Idaho at the time of receipt of the warranty claim.

## DISCLAIMER OF ALL OTHER WARRANTIES AND CONSEQUENTIAL DAMAGES

THE FOREGOING IS IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND THERE ARE NO WARRANTIES, WHICH EXTEND BEYOND THE DESCRIPTION OF THE PRODUCTS. THE LIABILITY OF PARMA COMPANY IS EXPRESSLY LIMITED TO REPAIRING, OR AT ITS OPTION, REPLACING ANY PART THAT IS RETURNED, TRANSPORTATION PREPAID, TO PARMA COMPANY, PARMA, IDAHO, THAT IN PARMA'S JUDGEMENT PROVED DEFECTIVE DURING THE WARRANTY PERIOD. NO REPRESENTATIVE OF PARMA COMPANY, NO DEALER OR DEALER'S REPRESENTATIVE OR ANY OTHER PERSON HAS AUTHORITY TO WAIVE, ALTER, VARY OR ADD TO THE TERMS HEREOF WITHOUT PRIOR APPROVAL IN WRITING SIGNED BY AN OFFICER OF PARMA COMPANY. PARMA COMPANY WILL NOT BE LIABLE FOR ANY OTHER EXPENSE, INJURY, LOSS OR DAMAGE WHETHER DIRECT OR CONSEQUENTIAL, ARISING IN CONNECTION WITH THE SALE OR USE OF OR INABILITY TO USE, ANY PRODUCT OF THE COMPANY FOR ANY PURPOSE.

## MAINTENANCE/SERVICE INFORMATION

### Gear Box Service and Lubrication

- The oil level should be maintained at a level to the top of the check hole in the side of the box. Check this level every 100 hours of operation
- Recommended replacement oil is 80W-90 Gear Lube or equivalent

### Bearings and Drive Line

- Inspect bearings for wear and heat every 100 hours
- **The Pillow Block and Flanged bearing units are factory pre-lubricated and, therefore, do not require supplemental grease before service life begins. Re-lubrication, when administered correctly, can increase the life of a bearing substantially. Bearing manufacturers recommend that all these bearings are greased daily to weekly, considering the environmental condition that these harvesters are exposed to. NOTE: Over lubrication is a major cause of bearing failures. Please re-lubricate conservatively. When selecting a bearing lubricant, use any lithium-based NLGI #2 grease**
- Inspect all couplers and shafts for a tight secure fit



**Always perform maintenance with machine stopped, the tractor engine shut off and the ignition key removed!**

## LUBRICATION & SERVICE SCHEDULE

	Every 10 Hrs		Every 100 hrs		Seasonal	
Bearings	O			X	O	X
Gear Box				X	O	X
Driveline		X	O	X	O	X
All Bolts & Fasteners				X		X
Wheel Nuts		X				X
Wheel Bearings					O	X
Hydraulic Cylinders				X		X
Lights & Wires		X				X
Hydraulic Lines						X
Belt Tension	O	X				X
U-Joints	O			X	O	X
Flail Loss & Damage		X				
Scalpers	O	X			O	X
Tire Pressure			O	X		
Guards		X				X

O = Service and lubricate as recommended

X = Inspect for wear or damage



**AVOID INJURY: Never service machine while running!** Follow safety procedures in this manual for service and maintenance

# BOLT TORQUE



Factory recommends that **ALL BOLTS AND FASTENERS BE RE-TORQUED AFTER THE FIRST 20 HOURS OF USE**

## Checking Bolt Torque

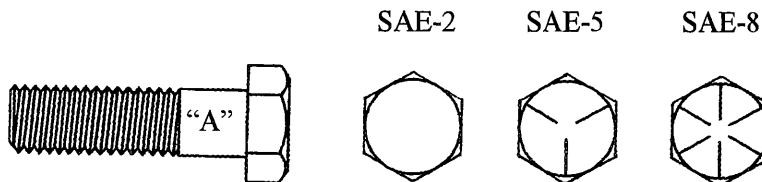
The table shown below gives correct torque values for various bolts and cap screws. Tighten all bolts to the torques specified in the chart unless otherwise noted. Check tightness of bolts periodically, using bolt torque chart as a guide. Replace hardware with the same strength bolt

## Torque specifications

Bolt Size	SAE 2	SAE 5	SAE 8
"A"	Torque lb/ft	Torque lb/ft	Torque lb/ft
1/4	6	9	12
5/16	10	19	27
3/8	20	33	45
7/16	30	53	75
1/2	45	80	115
9/16	70	115	15
5/8	95	160	220
3/4	165	290	400
7/8	170	410	650
1	225	630	970

Torque figures indicated above are valid for non-greased or non-oiled threads and heads unless otherwise specified. Therefore, do not grease or oil bolts or cap screws unless otherwise specified in this manual. When using locking elements, increase torque values by 5%

- Torque value for bolts and cap screws are identified by their head markings



## SET-UP PROCEDURE

The Parma Defoliator, commonly, is shipped from the factory completely assembled. If not, the following information will show the usual way the machine is set-up for field use. In any case, even if the machine is factory assembled, be sure to check the machine to be sure the settings are correct for your customer application.



**AVOID SERIOUS INJURY – EXERCISE CARE WHEN LIFTING HEAVY PARTS AND MACHINERY DURING THE ASSEMBLY PROCESS**

1. Lift the rear end of the defoliator by centering a forklift on the rear 6 x 4 frame tube. Attach the carrier wheel struts to the 6 x 4 tube. If steerable struts are used, attach the strut with the front cylinder arm on the LH hand side. See Figure 1 for proper spacing (Note the difference between 24" wheels and 15" wheels. Install the steering cylinder bracket on the 6 x 4 frame tube (15" wheels only) as shown (see opposite page). Install the tie-rods and make the necessary adjustments to align the axles with the frame by turning the tie rod ends. Extra care in making this alignment may save time in the field later. Lower the machine and connect the hydraulic hoses from the cylinder to the hydraulic lines on the frame. With the frame level to the ground, adjust the height of the wheels to obtain approximately 3" from the tip of the #3 rotor flail to the ground. This setting is preliminary and may have to be changed in the field (See Field Adjustments).
2. Attach the tool bar mounting arms to the 6 x 4 strut tube using  $\frac{3}{4}$  x 8½ hex bolts and  $\frac{3}{4}$  x 6½ eyebolts. See opposite page for spacing. Next, attach the cylinder ears to the 6 x 4 strut tube using  $\frac{3}{4}$  x 8½ hex bolts and  $\frac{3}{4}$  x 6½ eyebolts. (See the Scalper Tool Bar Assembly page in the parts book section of this manual for additional reference.)
3. Slide the tool bar bearing supports onto the scalper tool bars (see opposite page). Lift the tool bar assemblies with a forklift and attach the support bearings to the tool bar mounting arms. A common initial setting for the support bearings is shown in Figure 1. The location will vary depending on the water row depth. **Try to maintain 23"-24" from the top of the beet row to the center of the tool bar.** It's important that the scalper arm has a downward angle from front to rear as shown in Figure 1. Next, attach the lift cylinder arms to the tool bars. Be sure the cylinder arms align with the cylinder ears that are mounted to the rear strut tube (15" wheels), or the cylinder ear on the tool bar support (24" wheels).

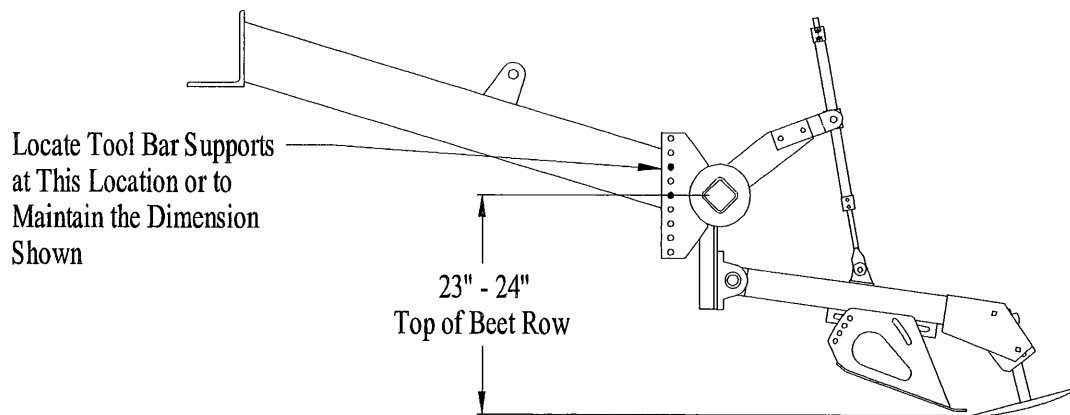
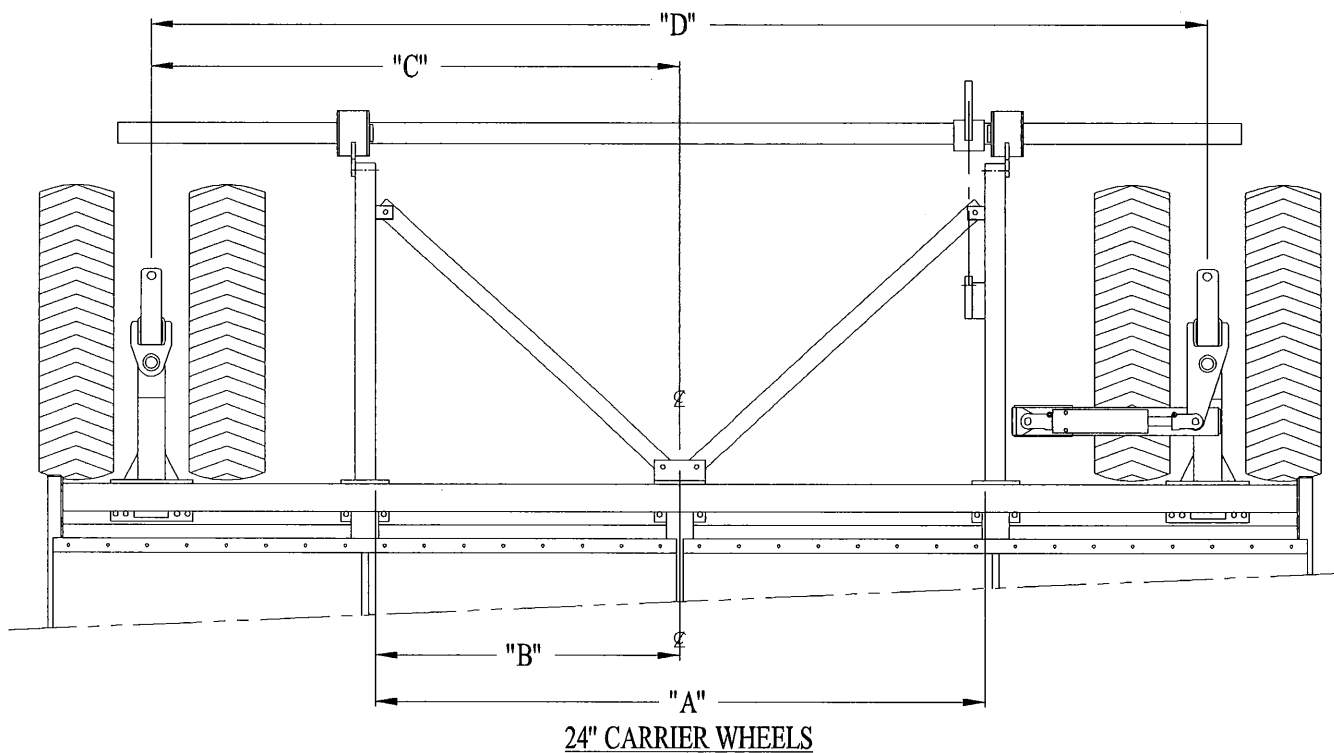
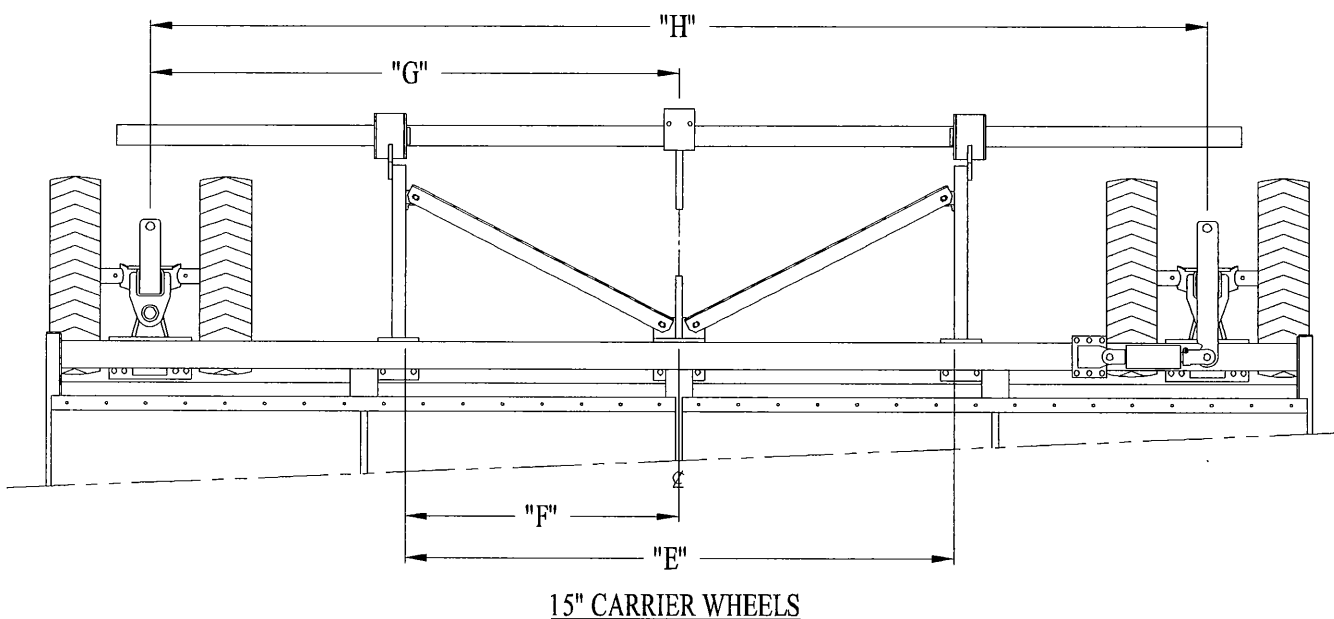


Figure 1.

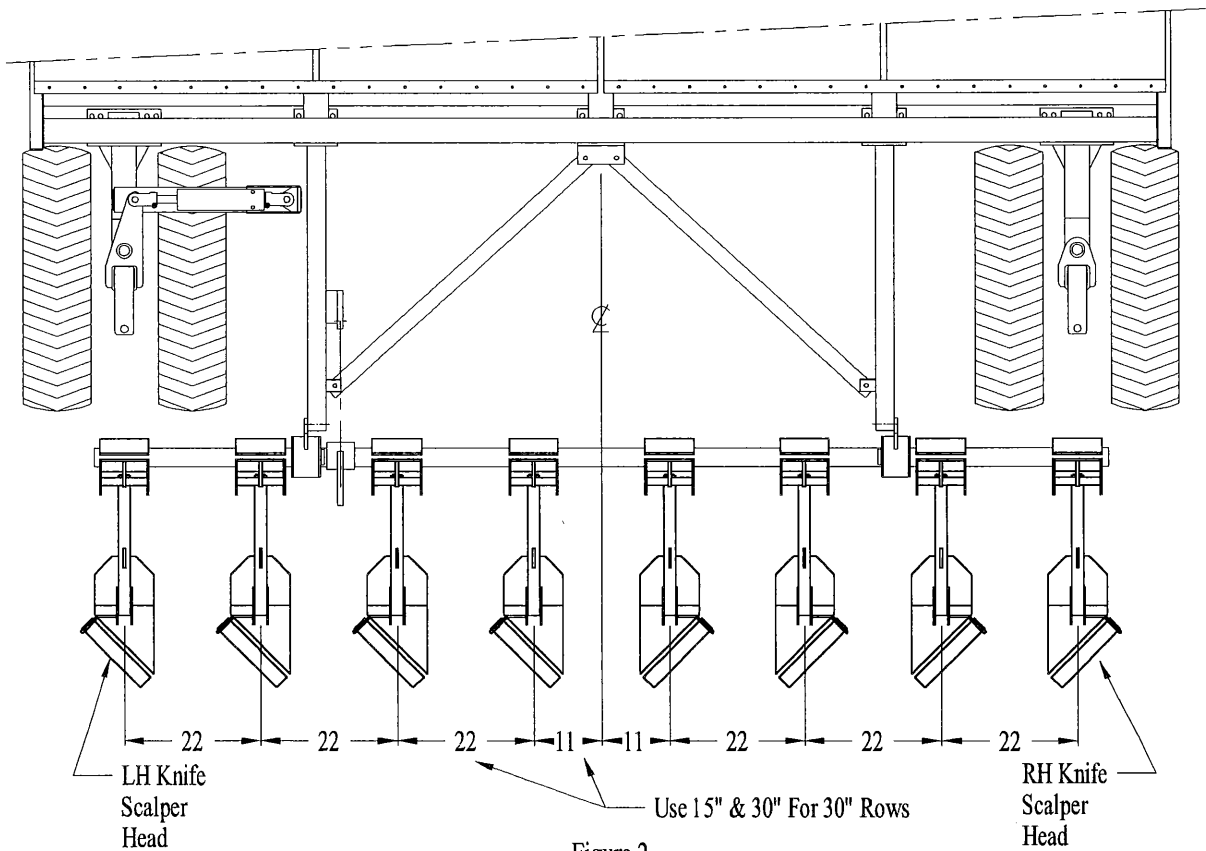


Model	Wheels & Row Spacing	Dim "A"	Dim "B"	Dim "C"	Dim "D"	Dim "E"	Dim "F"	Dim "G"	Dim "H"
180	24" Wheels & 22" Row Spacing	89	44 1/2	77	154				
180	24" Wheels & 30" Row Spacing	69	34 1/2	75	150				
180	15" Wheels & 22" Row Spacing					80	40	77	154
180	15" Wheels & 30" Row Spacing					65	32 1/2	75	150
144	24" Wheels & 24" Row Spacing	50	25	60	120				
144	15" Wheels & 24" Row Spacing					45	22 1/2	60	120



### Setup Procedure Cont....

4. Bolt the scalper head assemblies to the tool bars. Figure 2 shows the correct position (knife scalpers are illustrated). Note the position of the LH & RH knife scalpers.



5. Install the front tongue and pivot pins, as well as the PTO driveline and lift cylinder.

## **DEALER TEST RUN AND FINAL CHECK**

1. Check oil in the gearbox. See the Maintenance and Service section of this manual for the recommended oil
2. Attach defoliator to tractor drawbar using a suitable pin and the tractor hammer strap.
3. Attach PTO to the tractor 1000 RPM PTO shaft
4. Connect hydraulic hoses to the tractor
5. Be sure all persons are clear of machine, and then slowly engage PTO. Check for proper rotation of flails. See Figure 3. Run defoliator for 15-20 minutes and then disengage PTO
6. **With the tractor engine shut off and the ignition key removed**, check the tension of all belts. See Belt Tensioning.
7. Check wheel strut spacing (Page 14.) and check flail spacing for match with row spacing
8. Check to see that all bolts are tight. Refer to the Bolt Torque Page in this manual for recommended tightness. Particular attention should be placed on the flail clamps, scalper mounts, and bearing bolts.



**SAFETY... YOU CAN LIVE WITH IT**

# FIELD ADJUSTMENTS

## Flail Height Adjustment

NOTE: Height adjustments are approximate starting points. Final adjustments may differ from those listed below, depending upon field conditions. See Figure 3 for reference.

1. With Scalpers:
  - Adjust the frame height until the rubber flails clear the ground by approximately one inch
  - Adjust front drum height until the steel flails just cut or clear the high beets
2. Without Scalpers:
  - Adjust the frame height until the rubber flails clear the ground by approximately one inch
  - Adjust the front drum height until the steel flails cut off the desired amount of beet crown

NOTE: 1000 RPM on the tractor PTO may not be necessary for proper topping. This may be the case if the beet tops are small. However, in heavy tops or weedy conditions, full 1000 RPM is recommended for the steel flails to cut properly and not “lay back” while spinning.

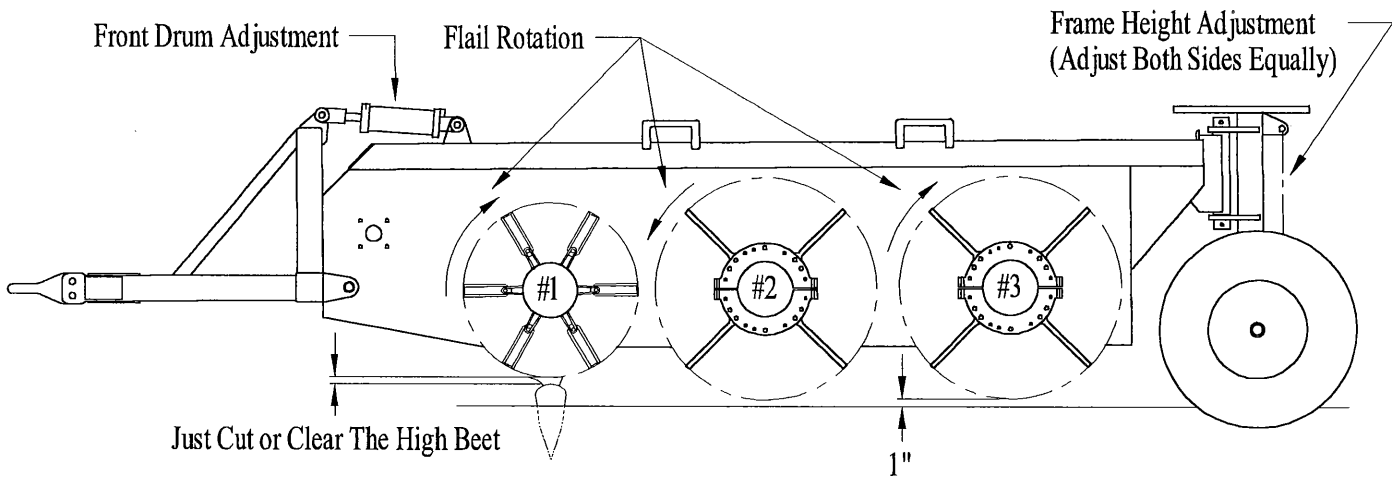


Figure 3.

## Scalper Adjustments



**AVOID INJURY.** Take care when working around scalper knives or disks. They are very sharp.

1. Knife Scalpers (Figure 4):
  - The required adjustments on the disk scalper will vary depending on crop conditions. Make the following adjustments to one scalper head completely, then adjust the remaining heads the same.
  - Adjust the shoe angle so the bottom of the shoe is level when touching the ground. Adjust the knife to the dimensions shown, and straight and level with the shoe. Set the adjusting collar for the down pressure spring so it touches the spring with just a small amount of pressure when the scalper head is touching the top of the row.
  - If this setting needs to be changed, adjust only one scalper until the correct setting is obtained. Then set the other scalpels the same as the first.
  - Now the preliminary adjustments are complete. If these settings need to be changed, adjust only one scalper until the correct setting is obtained. Then set the other scalpels the same as the first. If the angle of cut on the beet is not straight and level, adjust the tilt of the knife. Tilt the knife slightly toward the shoe if the cut on the beet is uphill. Tilt the knife slightly away from the shoe if the cut on the beet is downhill (reset the position of the knife to the shoe).

### Scalper Adjustments cont....

- As the knives wear, they can be reversed from the left side to the right side to double the life of the knife.
- If the scalper is bouncing too much and cutting is inconsistent, apply more down pressure by adjusting the spring adjusting collar up a little at a time. If the scalper shoe tends to push beets over, release down pressure by adjusting the spring adjusting collar accordingly.
- Check to be sure the scalper shoes are located over the center of each beet row. Adjust if necessary.

**NOTE:** The quality of the scalping of the beets is affected greatly by how well the defoliator is cleaning the top of the beet and clearing the row ahead of the scalper unit. Keep the defoliator, as well as the scalper unit, adjusted and maintained and you will experience satisfaction in your topping operation.

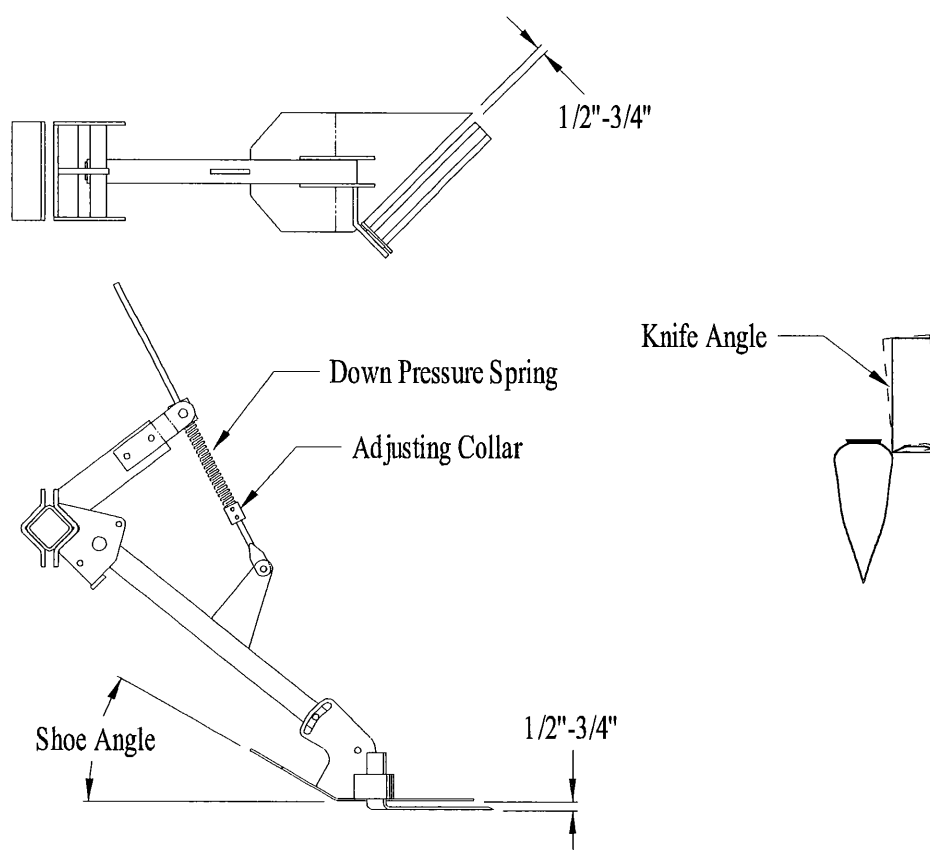


Figure 4.

#### 2. Unpowered Disk Scalper (Figure 5):

- The required adjustments on the disk scalper will vary depending on crop conditions. Make the following adjustments to one scalper head completely, then adjust the remaining heads the same.
- Adjust the shoe angle so the bottom lip of the shoe is level when touching the ground and the bottom of the shoe is approximately 12" from the top of the scalper arm (see Figure 5).
- Adjust the vertical height of the disk to the dimensions shown by loosening the bearing collars on the disk shaft and moving it up or down. Reset the collars when finished.

### Scalper Adjustments cont....

- Adjust the horizontal position of the shoe by slightly loosening the shoe mounting bolts, and then tap the shoe with a suitable tool forward or backward to the dimension shown (be sure to maintain the set angle of the shoe).
- Adjust the disk to have a slight angle toward the shoe as illustrated in Figure 5. Remove the top bolt holding the disk assembly and only loosen the bottom bolt. Move the disk to the desired angle, and then reinstall the bolts (tighten securely). **Note: The relationship between the tip of the disk and the shoe will remain the same when the angle of the disk is changed.**
- Set the adjusting collar for the pressure springs so they touch the springs with just a very small amount of pressure when the scalper head is touching the top of the row. The top spring will apply up pressure to the head and the bottom spring will apply down pressure to the head. Adjustments to either or both springs can be made.
- Now the preliminary adjustments are complete. If these settings need to be changed, adjust only one scalper until the correct setting is obtained. Then set the other scalpers the same as the first.
- If the angle of cut on the beet is not straight and level, adjust the tilt of the disk. Tilt the disk slightly toward the shoe if the cut on the beet is uphill. Tilt the disk slightly away from the shoe if the cut on the beet is downhill. **Remember, the relationship between the disk and the shoe will remain the same when the angle of the disk is changed.**
- If the scalper bouncing too much and cutting is inconsistent, apply more down pressure by adjusting the spring adjusting collar up a little at a time. If the scalper shoe tends to push beets over, release down pressure by adjusting the spring adjusting collar accordingly, or adjust the angle of the shoe (reset the horizontal position of the shoe to the disk).
- Check to be sure the scalper shoes are located over the center of each beet row. Adjust if necessary.

**NOTE:** The quality of the scalping of the beets is affected greatly by how well the defoliator is cleaning the top of the beet and clearing the row ahead of the scalper unit. Keep the defoliator, as well as the scalper unit, adjusted and maintained and you will experience satisfaction in your topping operation.

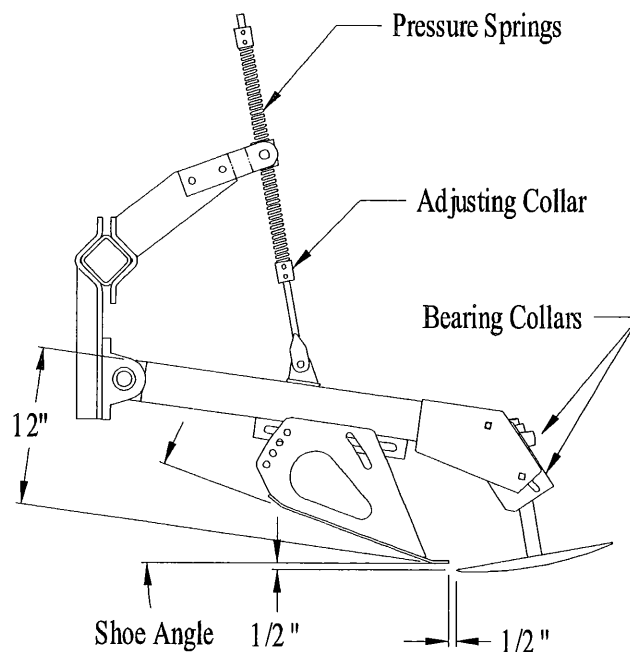


Figure 5.

## Scalper Adjustments cont....

### 3. Hydraulic Driven Disk Scalper (Figure 6):

- The required adjustments on the hydraulic disk scalper will vary depending on crop conditions. Make the following adjustments to one scalper head completely, then adjust the remaining heads the same. **Before any adjustments are made to the Hydraulic Driven Disk Scalper, be sure the tractor engine is shut off and the ignition key is removed.**



### AVOID INJURY - SAFETY... YOU CAN LIVE WITH IT

- Adjust the shoe angle so the bottom lip of the shoe is level when touching the ground and the bottom of the shoe is approximately 12" from the top of the scalper arm (see Figure 6). Tighten the shoe mounting bolts to a "snug" position only.
- Now adjust the horizontal and vertical positions of the shoe by tapping the shoe with a suitable tool into position to the dimension shown.
- Adjust the disk to have a slight angle toward the shoe as illustrated in Figure 6. Remove the top bolt holding the disk assembly and only loosen the bottom bolt. Move the disk to the desired angle, and then reinstall the bolts (tighten securely). **Note: The relationship between the tip of the disk and the shoe will remain the same when the angle of the disk is changed.**
- Set the adjusting collar for the bottom pressure spring so it touches the spring with just a very small amount of pressure when the scalper head is touching the top of the row, and then adjust the collar for the top pressure spring so it is compressed approximately 1 1/2".
- Now the preliminary adjustments are complete. If these settings need to be changed, adjust only one scalper until the correct setting is obtained. Then set the other scalpers the same as the first.
- If the angle of cut on the beet is not straight and level, adjust the tilt of the disk. Tilt the disk slightly toward the shoe if the cut on the beet is uphill. Tilt the disk slightly away from the shoe if the cut on the beet is downhill. **Remember, the relationship between the disk and the shoe will remain the same when the angle of the disk is changed.**
- If the scalper is bouncing too much and cutting is inconsistent, apply more down pressure by moving the adjusting collar the bottom up a little at a time. If the scalper tends to push over beets, reduce the down pressure and increase the up pressure on the springs accordingly, or adjust the angle of the shoe (reset the position of the shoe to the disk).
- Check to be sure the scalper shoes are located over the center of each beet row. Adjust if necessary.

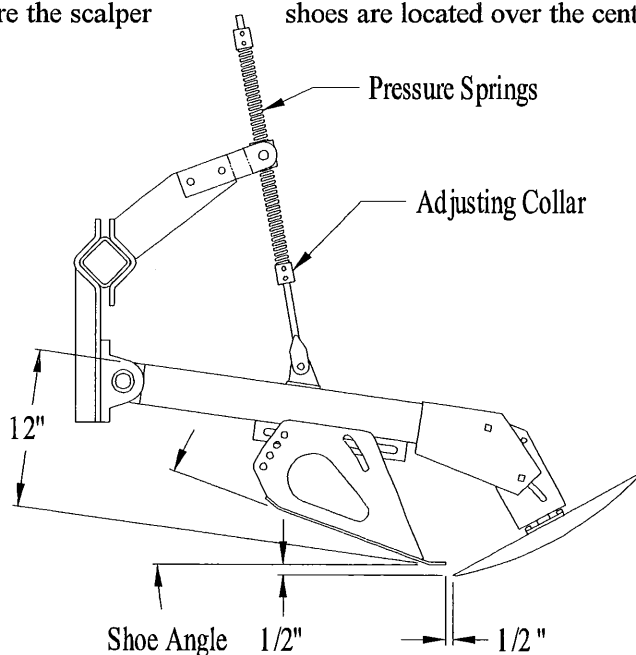


Figure 6.



## **SAFETY... YOU CAN LIVE WITH IT**

### **Belt Tensioning**

Check belt tensions often. Adjust the tension springs on all the rotor drives to the approximate dimension shown in Figure 7. This will give the proper tension on the drive belts. A good rule of thumb is to adjust the tension so that a quarter or nickel just passes through the coils of the spring. **DO NOT ADJUST THE TENSION SO THAT THE SPRING COILS ARE TIGHT TOGETHER.** This will permanently damage the spring and the spring force will be limited.

### **IMPORTANT!**

The drive belts on this unit must be re-tensioned **after the first half hour of operation** or they may slip and be damaged. If the belts heat up after the proper adjustments have been made, then the ground speed is too fast or the defoliator is too low to the ground.

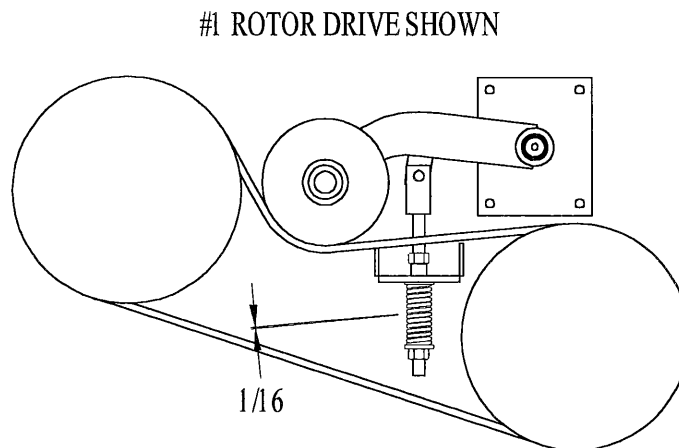


Figure 7.



# ***PARMA***<sup>®</sup>

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**Model 144 & 180**

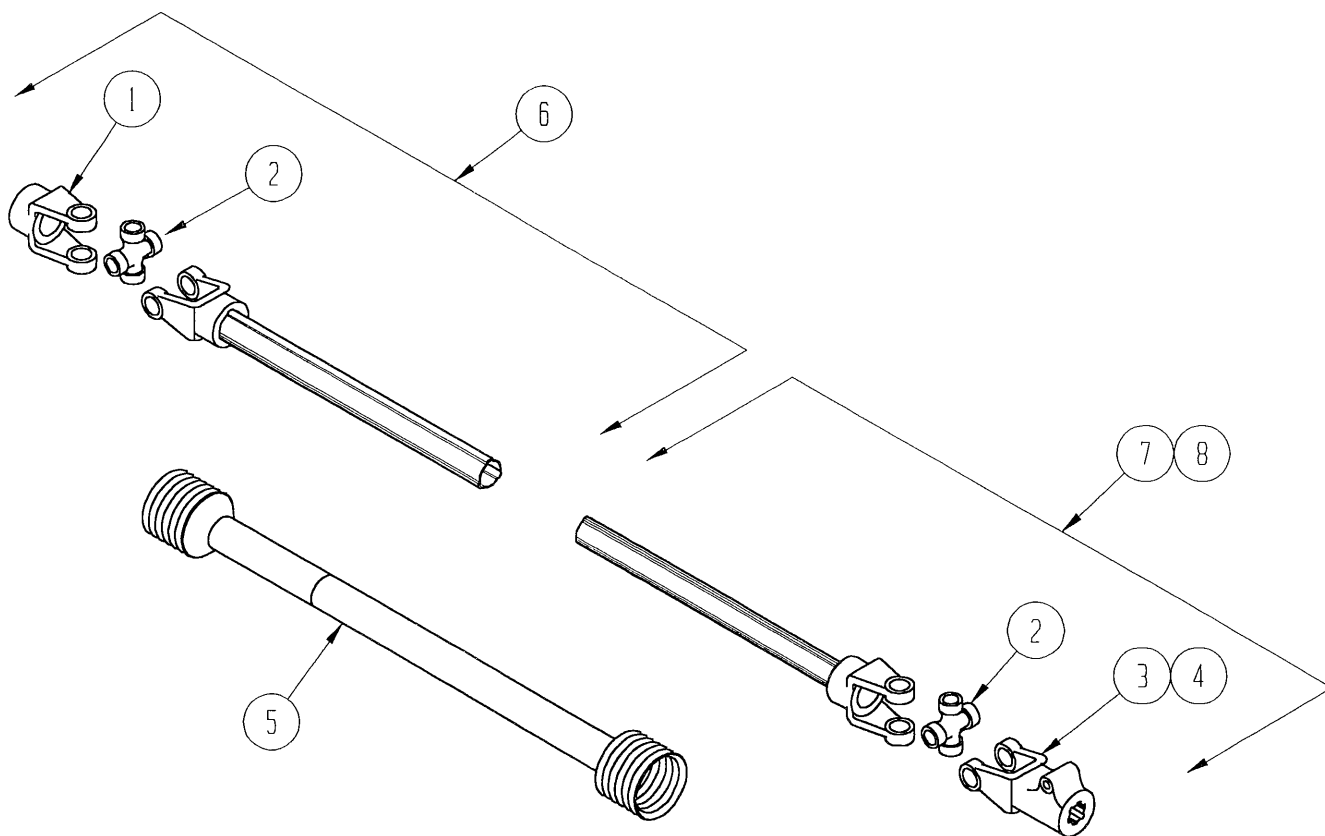
**Beet Defoliator**

**PARTS SECTION**



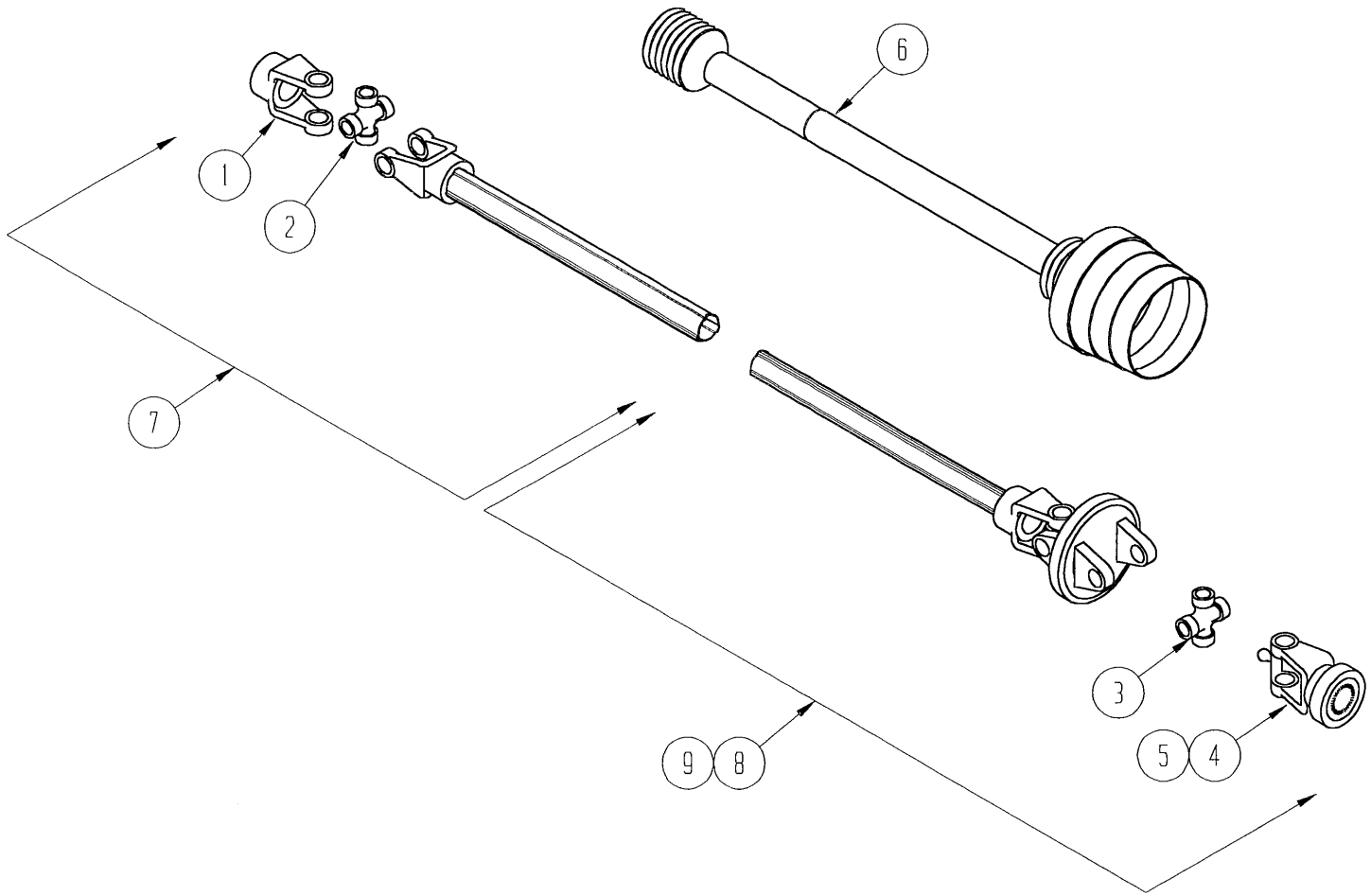
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**PTO DRIVELINE ASSEMBLY**  
 #990809 (1 3/8-21") #991060 (1 3/4-20")

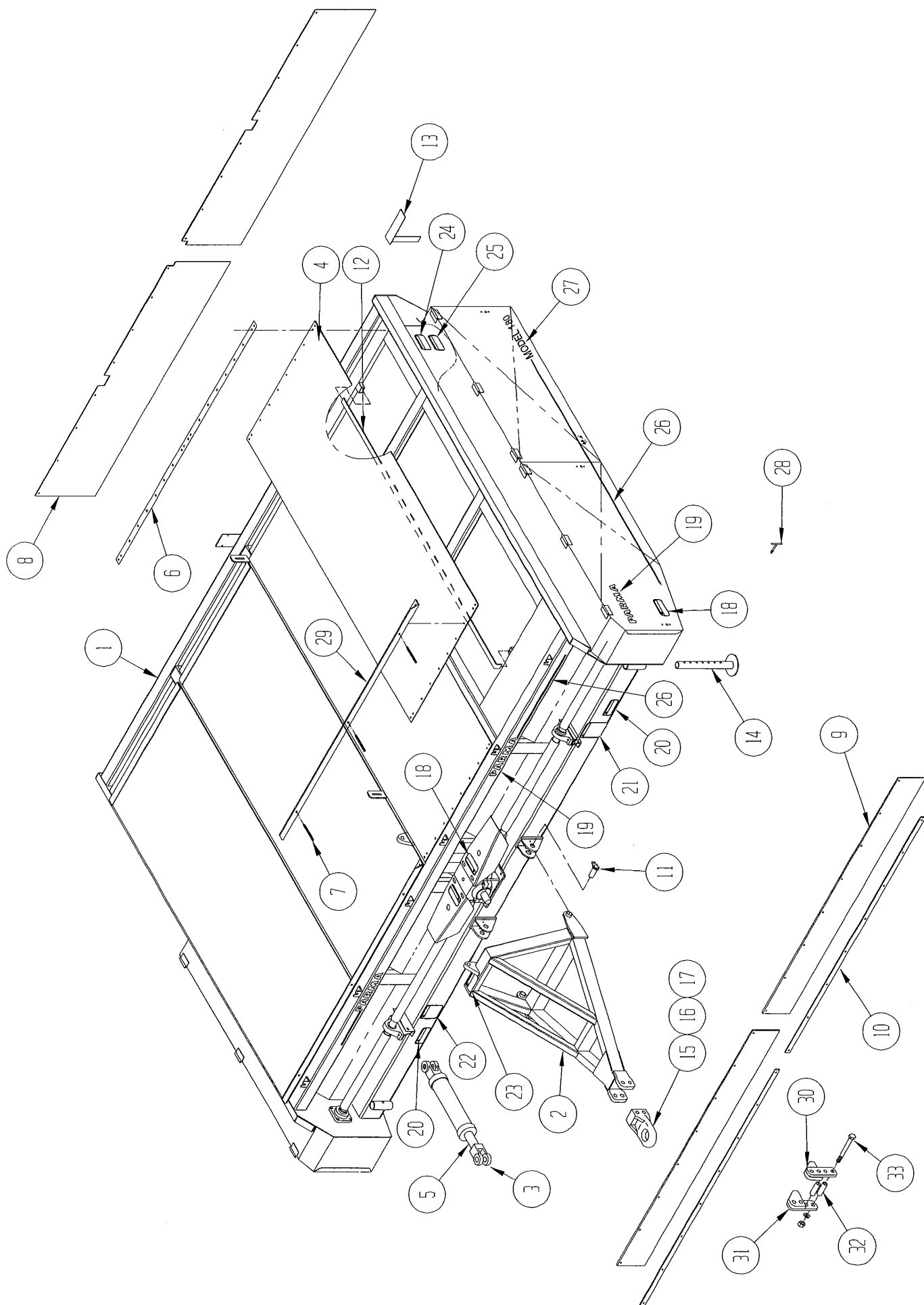
ITEM NO.	QUANTITY	PART NO.	DESCRIPTION
1	1	990847	Yoke, 1 3/4 Round Bore
2	2	990824	Cross & Bearing Kit
3	1	990813	Yoke, 1 3/8-21 Splined, QD
4	1	990814	Yoke, 1 3/4-20 Splined, QD
5	1	991072	Shield Assembly
6	1	990438	Driveline Implement Half w/ Shield
7	1	990434	Driveline Tractor Half w/ Shield (1 3/8")
8	1	990435	Driveline Tractor Half w/ Shield (1 3/4")



### CONSTANT VELOCITY DRIVELINE ASSEMBLY

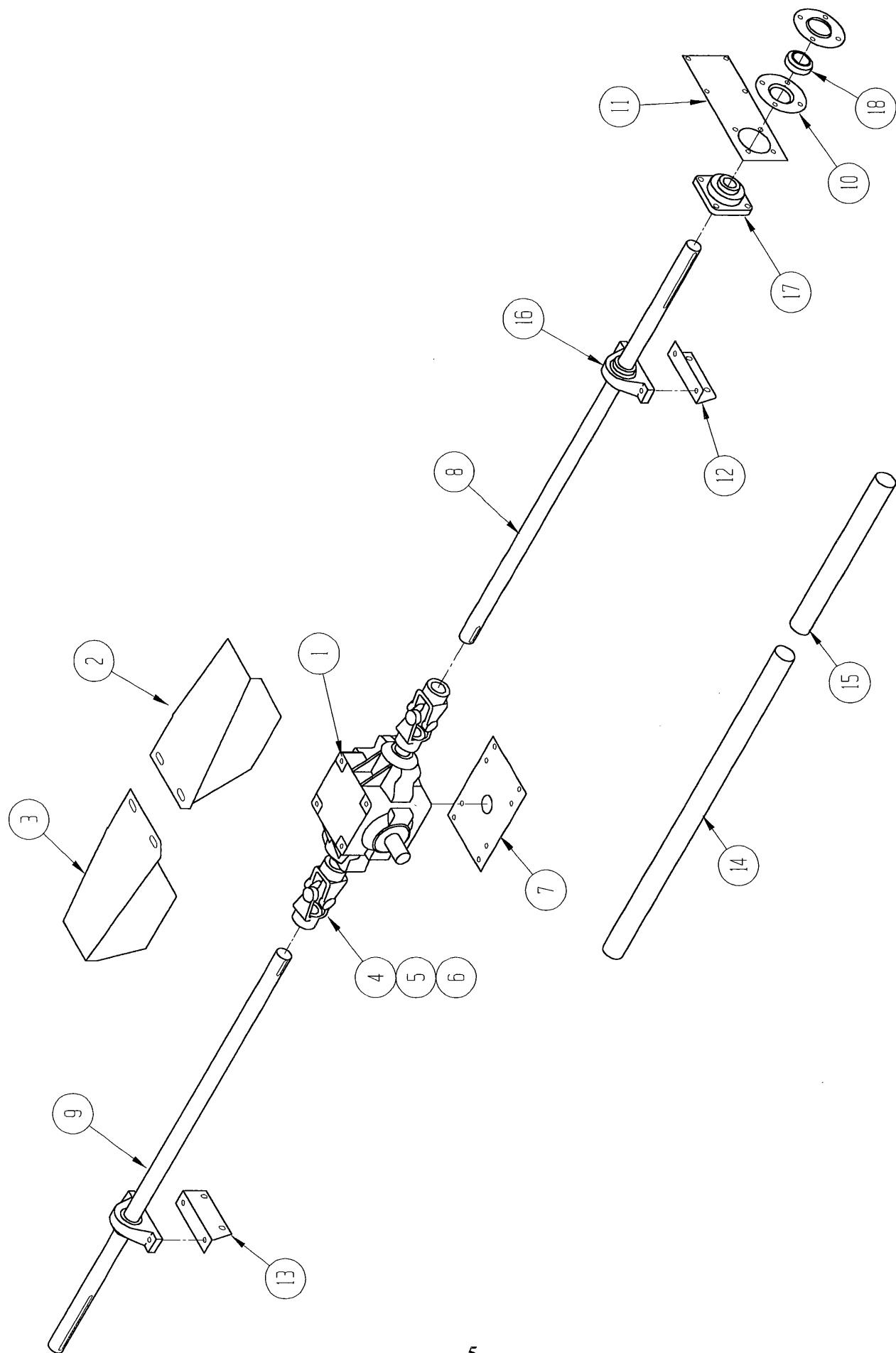
#281372 (1 3/8-21") #991061 (1 3/4-20")

ITEM NO.	QUANTITY	PART NO.	DESCRIPTION
1	1	990847	Yoke, 1 3/4 Round Bore
2	1	990824	Cross & Bearing Kit (Implement End)
3	1	281375	Cross & Bearing Kit (Tractor End)
4	1	281376	Yoke, 1 3/8-21 Splined, QD
5	1	990435	Yoke, 1 3/4-20 Splined, QD
6	1	991095	Shield Assembly
7	1	281374	Driveline Implement Half w/ Shield
8	1	281373	Driveline Tractor Half w/ Shield (1 3/8")
9	1	990435	Driveline Tractor Half w/ Shield (1 3/4")



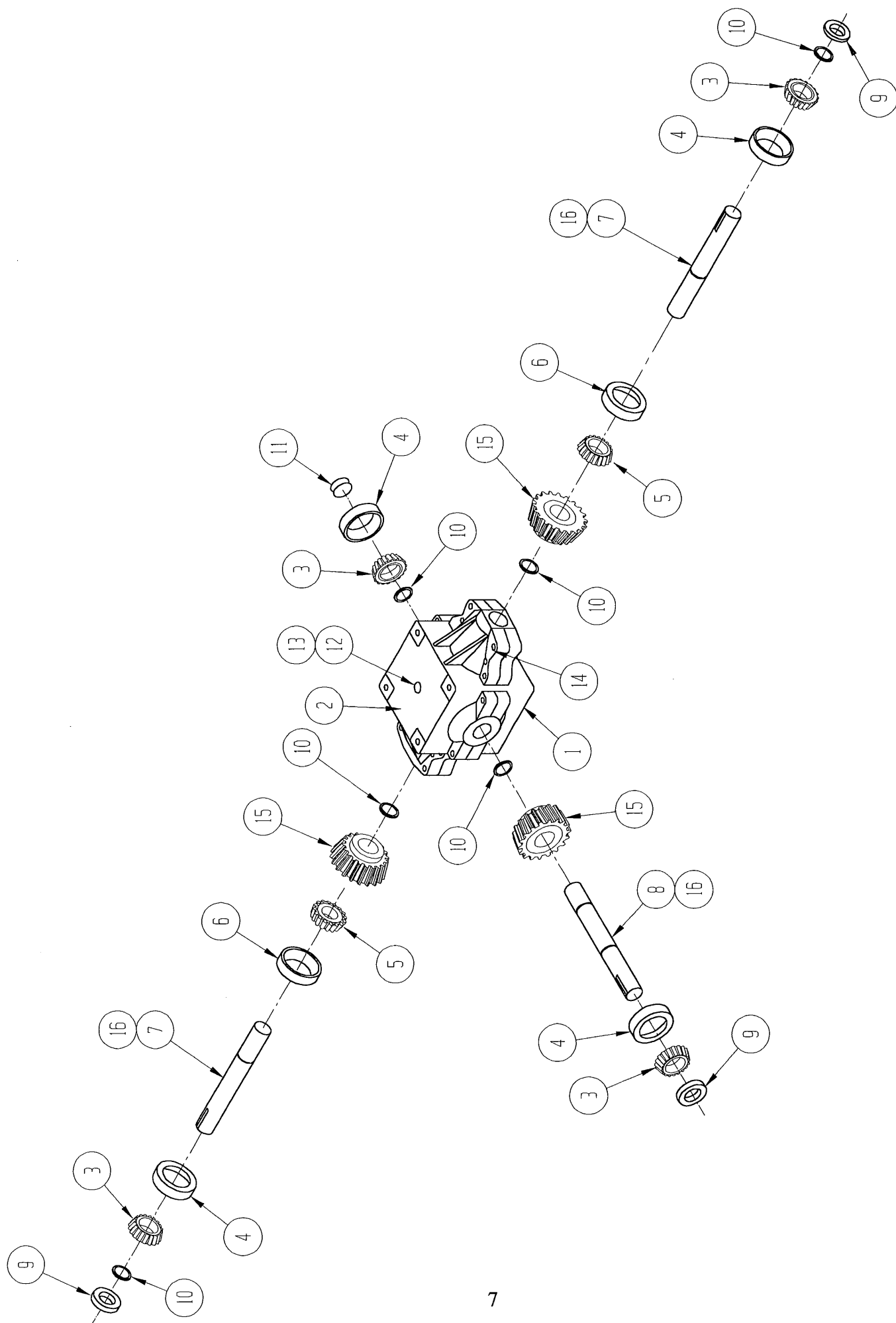
## OUTER FRAME PARTS

ITEM NO.	QTY.	PART NO MODEL 180	PART NO MODEL 144	DESCRIPTION
1	1	282219	282300	Main Frame
2	1	281435	281435	Tongue
3	1	282206	282206	Hydraulic Cylinder, 3 1/2" x 10"
4	4	282228		Top Cover
	2		282308	Top Cover
5	1	522012	522012	Stroke Control Kit
6	2	282229	282309	Cover Backup Bar
7	6			Threaded Rod, 1/2" x 6"
8	2	282230	282310	Rear Belt Flap
9	2	282231	282311	Front Belt Flap
10	2	282232	282312	Flap Backup Bar
11	2	282218	282218	Tongue Pin
12	4	282174	282174	Support Bar
13	1	281890	281890	Warning Light Kit
14	2	230211	230211	Jack Stand
15	1	521104	521104	Ring Hitch, Cat III
16	2			Hex Bolt, 1 x 8, Grade 8
17	2			Hex Nut, 1"
18	4	100409	100409	Decal, Keep Guards In Place
19	4	264797	264797	Decal, Parma
20	2	100404	100404	Decal, Block Machine
21	1	100406	100406	Decal, Caution
22	1	100311	100311	Decal, Rotating Parts
23	1	100405	100405	Decal, Operation
24	1	100564	100564	Decal, Caution
25	2	100565	100565	Decal, Caution
26	As Req'd	264798	264798	Double Stripe Tape
27	2	282234		Decal, Model 180
	2		282313	Decal, Model 144
28	1	700398	700398	Latch Key
29	2	282233	282314	Belting Angle
30	1	281996	281996	Hitch Extension, LH (Optional)
31	1	281997	281997	Hitch Extension, RH (Optional)
32	2	281998	281998	Spacer (Optional)
33	4			Hex Bolt, 1 x 9 Grade 5 (Optional)



## MAIN DRIVE PARTS

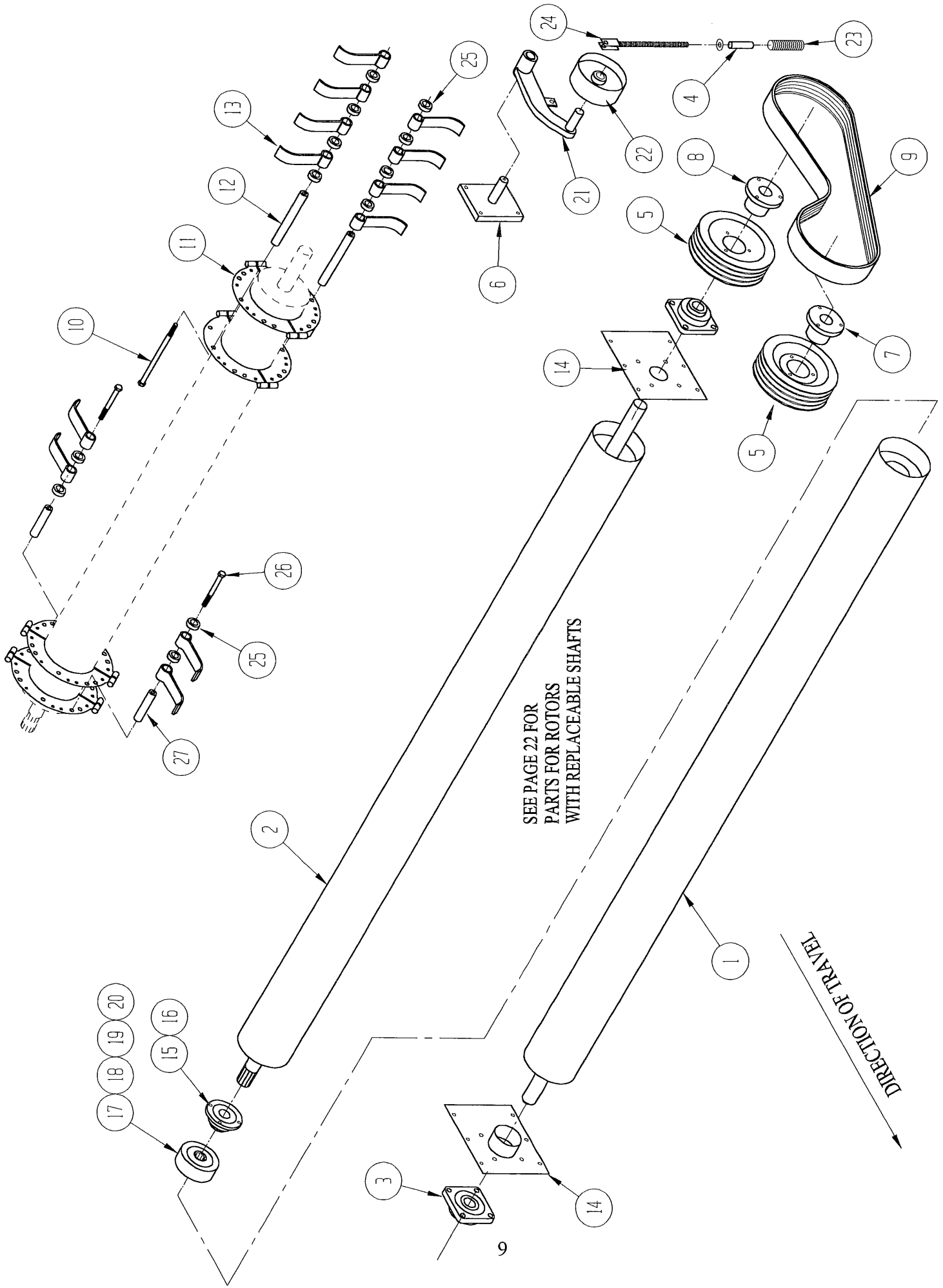
ITEM NO.	QTY.	PART NO MODEL 180	PART NO MODEL 144	DESCRIPTION
1	1	999171	999171	Gear Box, 1:1 Ratio
2	1	230077	230077	Gear Box Cover, LH
3	1	230078	230078	Gear Box Cover, RH
4	2	990672	990672	Universal Joint Assembly (See Items #5 & #6
5	4	990613	990613	Yoke, 35N 1 3/4 Bore
6	2	990653	990653	Cross & Bearing Kit
7	1	281474	281474	Gear Box Mount Plate
8	1	282237	282317	Cross Drive Shaft, LH
9	1	282239	282318	Cross Drive Shaft, RH
10	2	290035	290035	Flangette Pair, 85 MM
11	2	281499	281499	Bearing Mounting Plate
12	1	281445		Bearing Mount, LH
13	1	281444		Bearing Mount, RH
14	2	282337	282338	Shaft Cover
15	2	282336		Shaft Cover
16	2	980028		Bearing, 1 3/4 Pillow Block
17	2	980033	980033	Bearing, 1 3/4 4 Hole Flanged
		980165	980165	Bearing Insert, 1 3/4 (For Above)
18	2	980104	980140	Bearing, 1 3/4



**GEAR BOX ASSEMBLY**

(#999171)

<b>ITEM NO.</b>	<b>QUANTITY</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>
1	1	999461	Gear Box Housing (Threaded Holes)
2	1	999463	Gear Box Housing (Thru Holes)
3	4	990947	Bearing Cone
4	4	990001	Bearing Cup
5	2	990946	Bearing Cone
6	2	990025	Bearing Cup
7	2	999462	Pinion Shaft
8	1	999465	Cross Shaft
9	3	999470	Seal
10	6	999518	Retaining Ring
11	2	999464	Shaft End Plug
12	1	999117	Pressure Relief Vent
13	1	290644	Pipe Bushing
14	16	-----	Socket Head Cap Screw, 3/8-16 x 2 1/4
15	3	999460	Gear
16	3	999519	Key

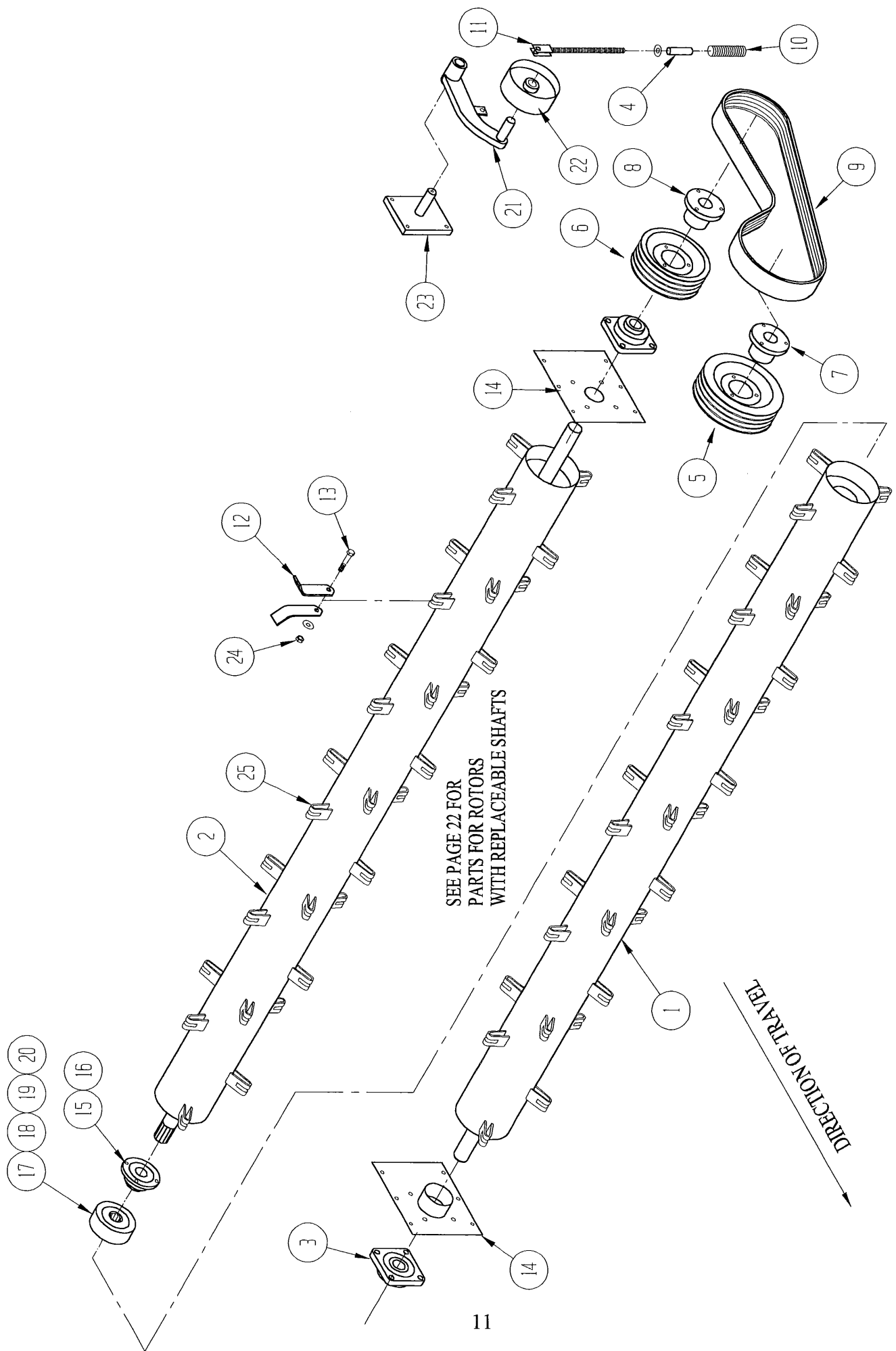


**ROTOR ASSEMBLY #1, CUP- KNIFE**

Model 180

(Welded Rotor Shafts)

<b>ITEM NO.</b>	<b>QUANTITY</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>
1	1	281872	#1 Rotor Weldment, Driven End
2	1	281873	#1 Rotor Weldment, Drive End
3	2	980034	Bearing, 2 3/16 4 Hole Flanged
		980153	Bearing Insert, 2 3/16 (For Above)
4	1	281604	Spring Tube
5	2	982370	Sheave, 4-5V 14.0"
6	1	282144	Idler Bracket
7	1	980384	Bushing, E-1 3/4
8	1	980391	Bushing, E-2 3/16
9	1	282282	Power Band Belt, 4-5VX-1060
10	28	282086	Hex Bolt, Grd-5
11	36	281722	Half Clamp
12	28	281785	Hardened Bushing
13	120	282199	Steel Cup Flail, 5/16
14	2	281908	Bearing Plate
15	1	281563	Bearing Housing
16	1	281975	Bearing Insert, 1 15/16 (No Substitute Please)
17	1	281829	Coupler
18	2	281828	Snap Ring
19	6		Socket Head Cap Screw, 3/8 x 3
20	1	281575	O-Ring
21	1	282147	Idler arm
22	1	282088	Idler Pulley Assembly
23	1	281605	Spring
24	1	282091	Take-up Bolt
25	120	282083	Spacer
26	4	282085	Hex Bolt, 5/8 x 7 1/2 Grd-5
27	4	282084	Hardened Bushing

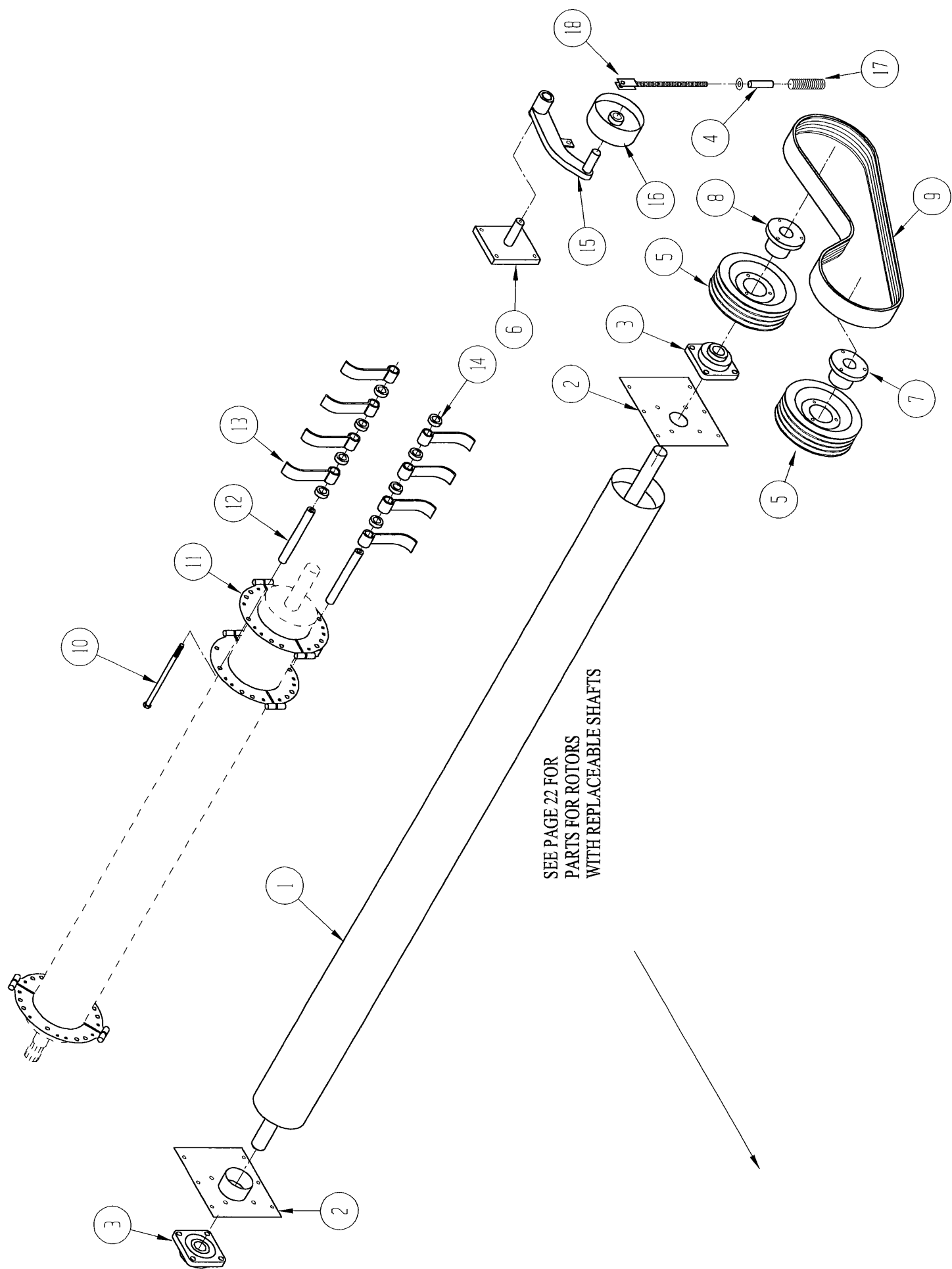


**ROTOR ASSEMBLY #1, "L" KNIFE**

Model 180

(Welded Rotor Shafts)

<b>ITEM NO.</b>	<b>QUANTITY</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>
1	1	281946	#1 Rotor Weldment, Driven End
2	1	281945	#1 Rotor Weldment, Drive End
3	2	980034	Bearing, 2 3/16 4 Hole Flanged
		980153	Bearing Insert, 2 3/16 (For Above)
4	1	281604	Spring Tube
5	1	982370	Sheave, 4-5V 14.0"
6	1	282279	Sheave, 4-5V 10.9"
7	1	980384	Bushing, E-1 3/4
8	1	980391	Bushing, E-2 3/16
9	1	282285	Power Band Belt, 4-5VX-1000
10	1	281605	Spring
11	1	282091	Draw Bolt
12	96	281569	L-Knife
13	48		Hex Cap Screw, 5/8 x 3 1/2 Grd-8
14	2	281908	Bearing Plate
15	1	281563	Bearing Housing
16	1	281975	Bearing Insert, 1 15/16 (No Substitute Please)
17	1	281829	Coupler
18	2	281828	Snap Ring
19	6		Socket Head Cap Screw, 3/8 x 3
20	1	281575	O-Ring
21	1	282147	Idler Arm
22	1	282088	Idler Pulley Assembly
23	1	282144	Idler Bracket
24	48		Lock Nut, 5/8
25	48	281871	Flail Clip

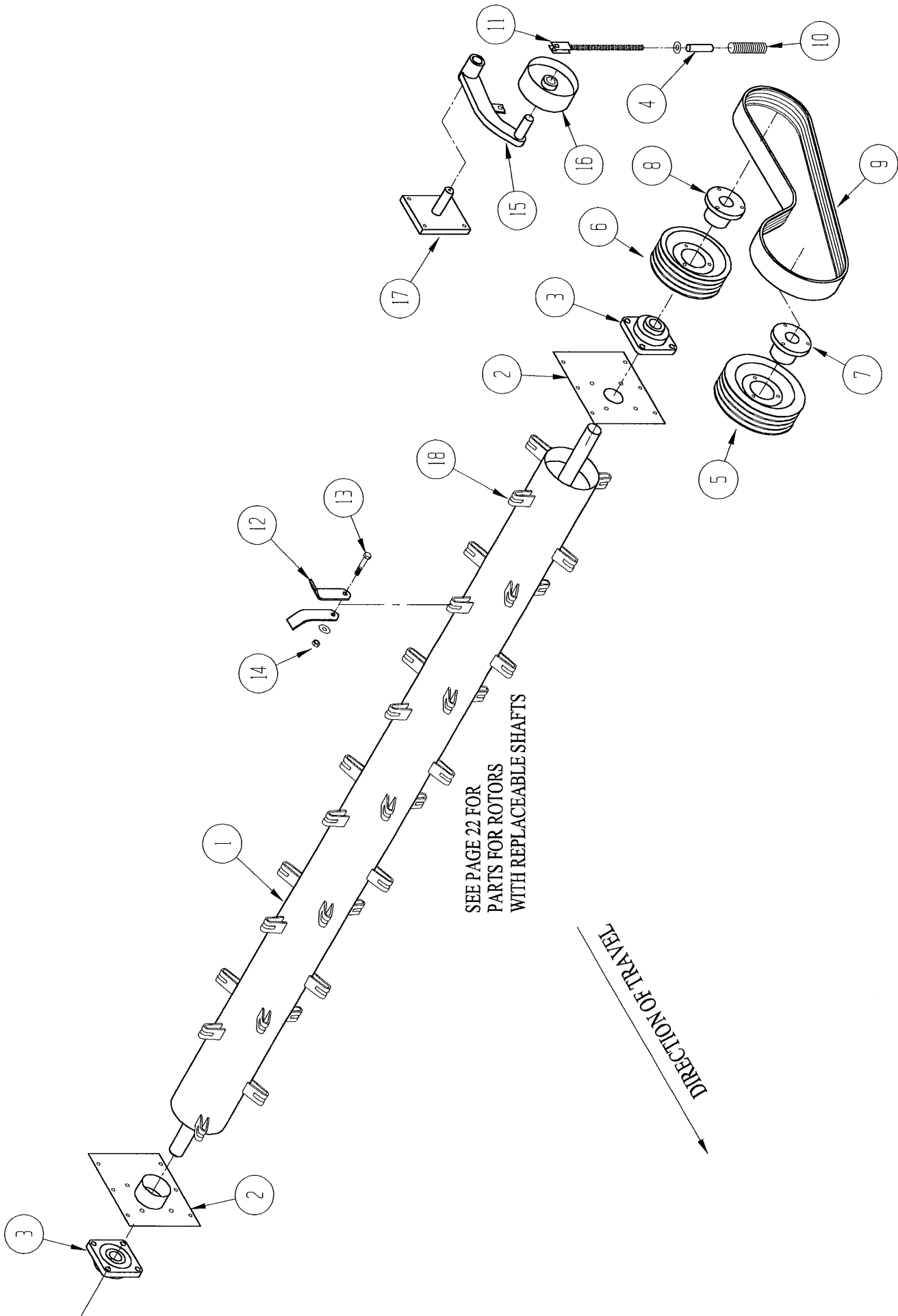


**ROTOR ASSEMBLY #1, CUP- KNIFE**

Model 144

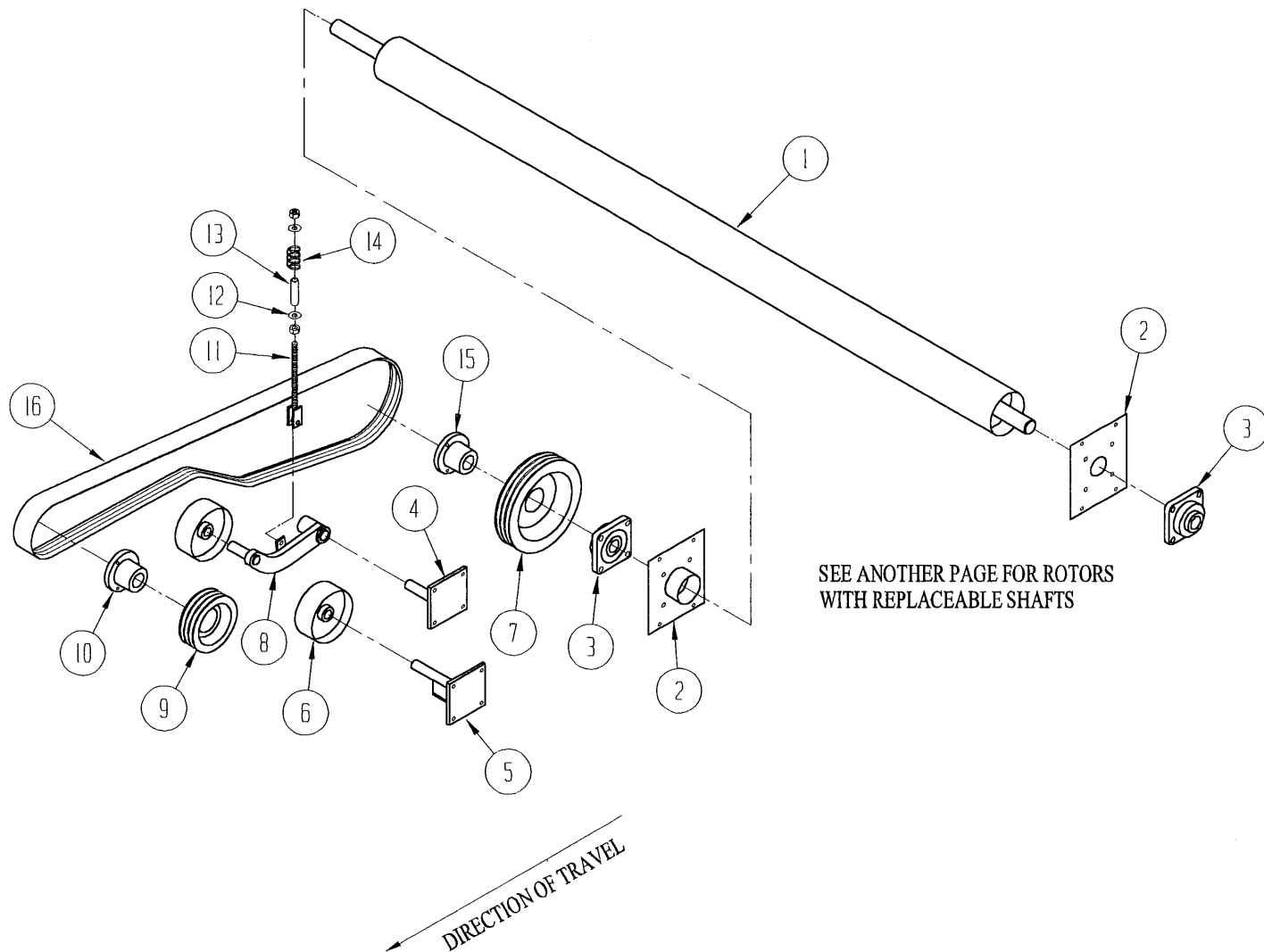
(Welded Rotor Shafts)

<b>ITEM NO.</b>	<b>QUANTITY</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>
1	1	281958	#1 Rotor Weldment
2	2	281908	Bearing Plate
3	2	980034	Bearing, 2 3/16 4 Hole Flanged
		980153	Bearing Insert, 2 3/16 (For Above)
4	1	281604	Spring Tube
5	2	982370	Sheave, 4-5V 14.0"
6	1	282144	Idler Bracket
7	1	980384	Bushing, E-1 3/4
8	1	980391	Bushing, E-2 3/16
9	1	282282	Power Band Belt, 4-5VX-1060
10	24	281786	Hex Bolt, Grd-5
11	26	281722	Half Clamp
12	24	281785	Hardened Bushing
13	96	282199	Steel Cup Flail, 5/16
14	96	282083	Spacer
15	1	282147	Idler arm
16	1	282088	Idler Pulley Assembly
17	1	281605	Spring
18	1	282091	Take-up Bolt



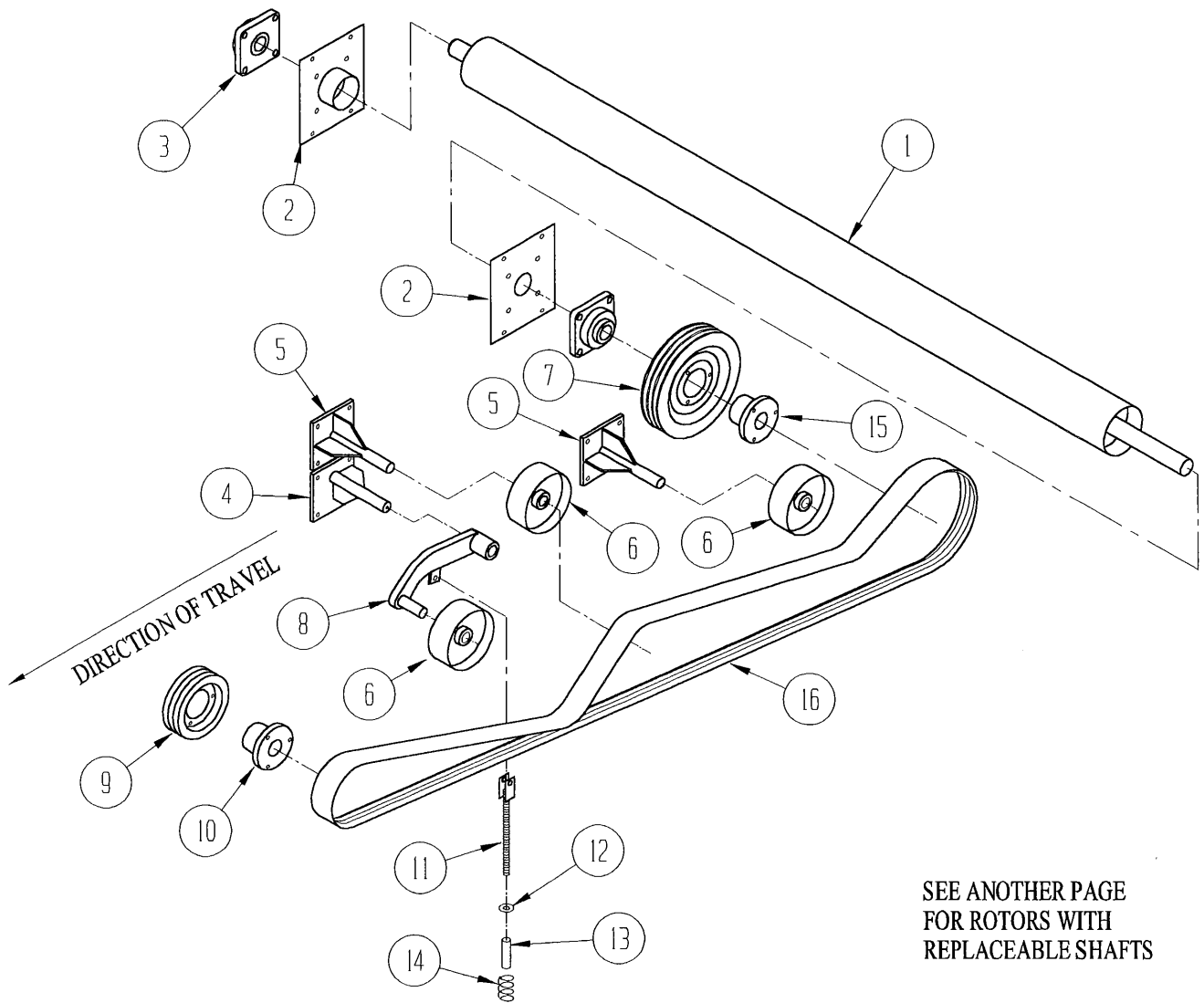
**ROTOR ASSEMBLY #1, "L" KNIFE**  
**Model 144**  
**(Welded Rotor Shafts)**

<b>ITEM NO.</b>	<b>QUANTITY</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>
1	1	281957	#1 Rotor Weldment
2	2	281908	Bearing Plate
3	2	980034	Bearing, 2 3/16 4 Hole Flanged
		980153	Bearing Insert, 2 3/16 (For Above)
4	1	281604	Spring Tube
5	1	982370	Sheave, 4-5V 14.0"
6	1	282279	Sheave, 4-5V 10.9"
7	1	980384	Bushing, E-1 3/4
8	1	980391	Bushing, E-2 3/16
9	1	282285	Power Band Belt, 4-5VX-1000
10	1	281605	Spring
11	1	282091	Draw Bolt
12	84	281569	L-Knife
13	42		Hex Cap Screw, 5/8 x 3 1/2 Grd-8
14	42		Lock Nut, 5/8
15	1	282147	Idler Arm
16	1	282088	Idler Pulley Assembly
17	1	282144	Idler Bracket
18	42	281871	Flail Clip



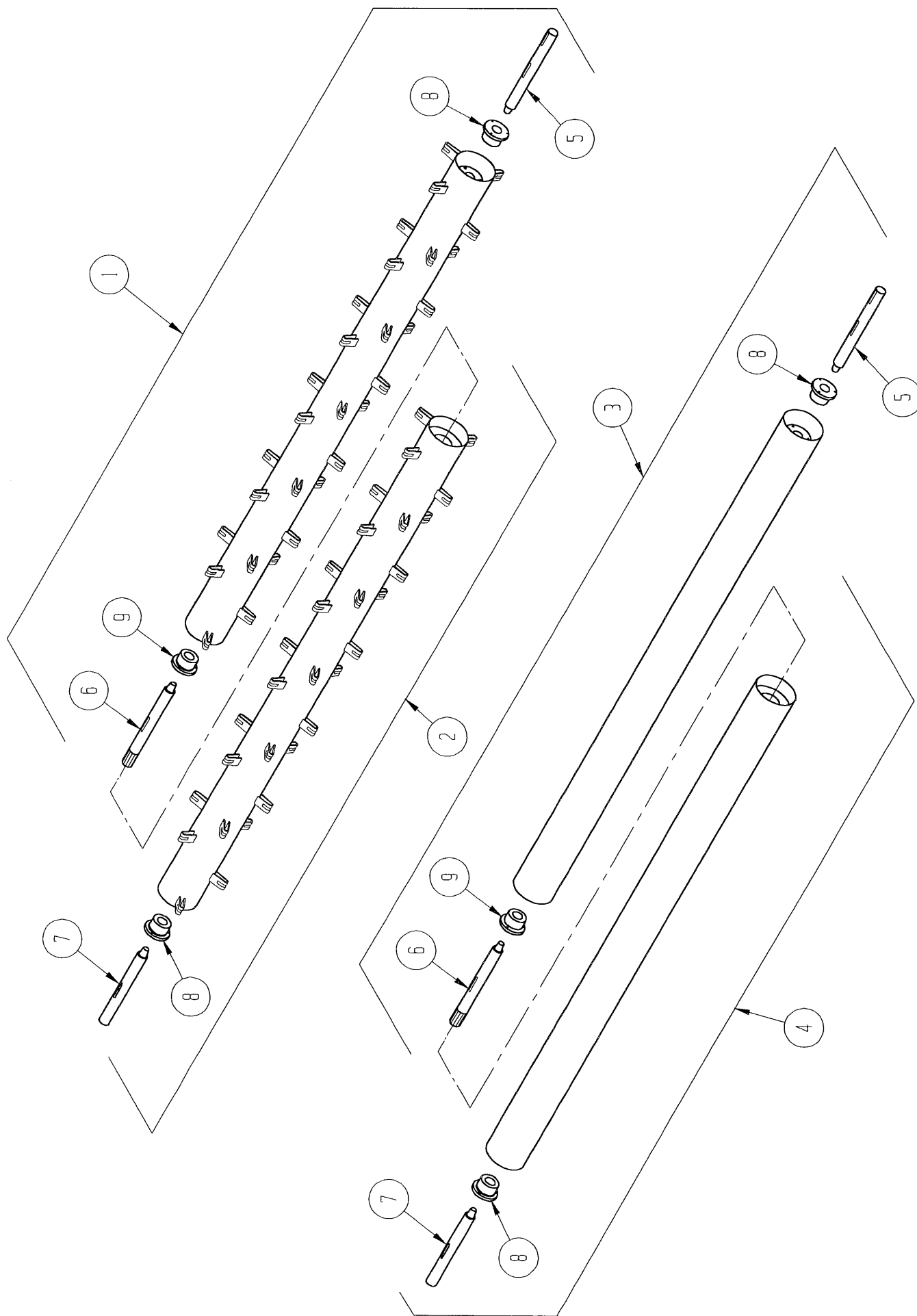
**ROTOR ASSEMBLY #2**  
(Welded Rotor Shafts)

ITEM NO.	QTY.	PART NO MODEL 180	PART NO MODEL 144	DESCRIPTION
1	1	281763	281766	#2 Rotor
2	2	281909	281909	Rotor Bearing Plate
3	2	980034	980034	Bearing, 2 3/16 4-Hole Flanged
4	1	282158	282158	Idler Arm Bracket
5	1	282152	282152	Idler Bracket
6	2	282088	282088	Idler Pulley Assembly
7	1	282281	282281	Sheave, 3-5V 16.0" E
8	1	282147	282147	Idler Arm
9	1	282280	282280	Sheave, 3-5V 8.0" SF
10	1	990350	990350	Bushing, SF-1 3/4
11	1	282091	282091	Draw Bolt
12	2			Washer, 3/4 SAE
13	1	281604	281604	Spring Tube
14	1	281605	281605	Spring
15	1	980391	980391	Bushing, E-2 3/16
16	1	282283	282283	Power Band Belt, 3-5VX 1700



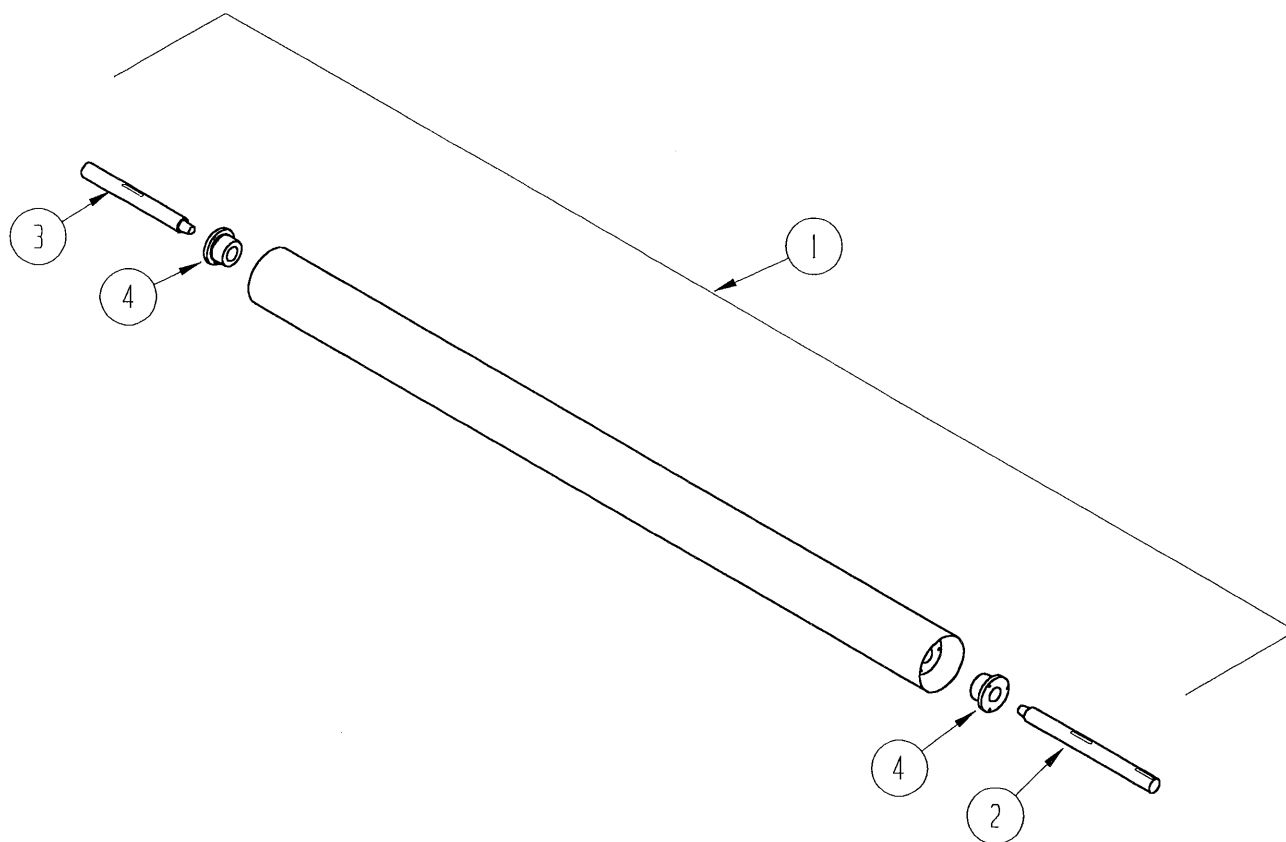
**ROTOR ASSEMBLY #3**  
(Welded Rotor Shafts)

ITEM NO.	QTY.	PART NO MODEL 180	PART NO MODEL 144	DESCRIPTION
1	1	281763	281766	#3 Rotor
2	2	281909	281909	Rotor Bearing Plate
3	2	980034	980034	Bearing, 2 3/16 4-Hole Flanged
4	1	282155	282155	Idler Arm Bracket
5	2	282152	282152	Idler Bracket
6	3	282088	282088	Idler Pulley Assembly
7	1	282281	282281	Sheave, 3-5V 16.0" E
8	1	282147	282147	Idler Arm
9	1	282280	282280	Sheave, 3-5V 8.0" SF
10	1	990350	990350	Bushing, SF-1 3/4
11	1	282091	282091	Draw Bolt
12	2			Washer, 3/4 SAE
13	1	281604	281604	Spring Tube
14	1	281605	281605	Spring
15	1	980391	980391	Bushing, E-2 3/16
16	1	282284	282284	Power Band Belt, 3-5V 2500



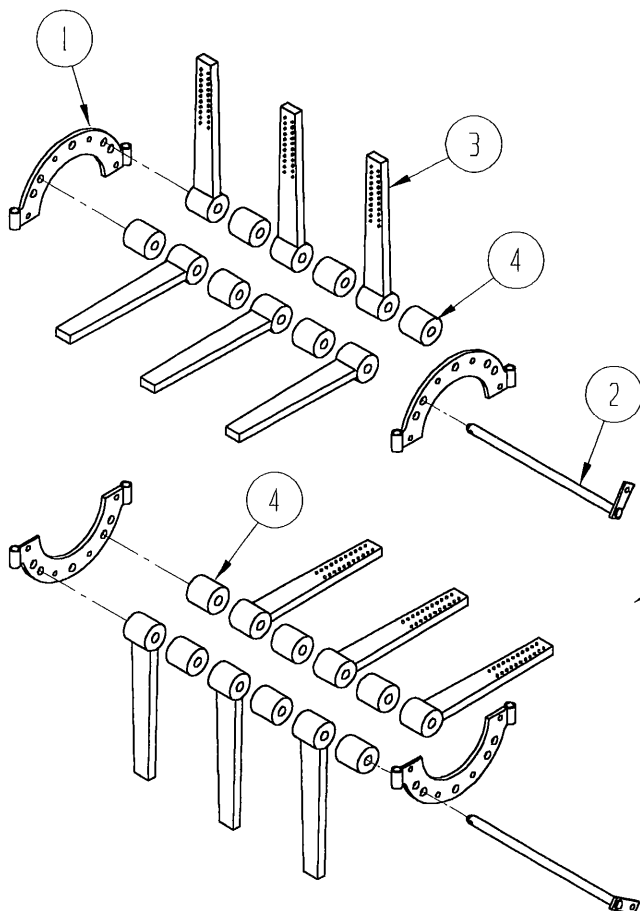
**ROTOR PARTS #1**  
(For Replaceable Shafts)

<b>ITEM NO.</b>	<b>QTY.</b>	<b>PART NO MODEL 180</b>	<b>PART NO MODEL 144</b>	<b>DESCRIPTION</b>
1	1	282251		#1 Rotor Asm, L-Knife, Drive End
	1		282328	#1 Rotor Asm, L-Knife
2	1	282252		#1 Rotor Asm, L-Knife, Driven End
3	1	282247		#1 Rotor Asm, Cup Knife, Drive End
	1		282322	#1 Rotor Asm, Cup Knife
4	1	282248		#1 Rotor Asm, Cup-Knife, Driven End
5	1	282054	282054	Tapered Shaft, Drive End
6	1	282056		Tapered Shaft, Splined
7	1	282067	282067	Tapered Shaft, Driven End
8	2	282058	282058	Bushing, R1-2 3/16 Split Tapered
9	1	980219		Bushing, Q1-1 15/16 Split Tapered

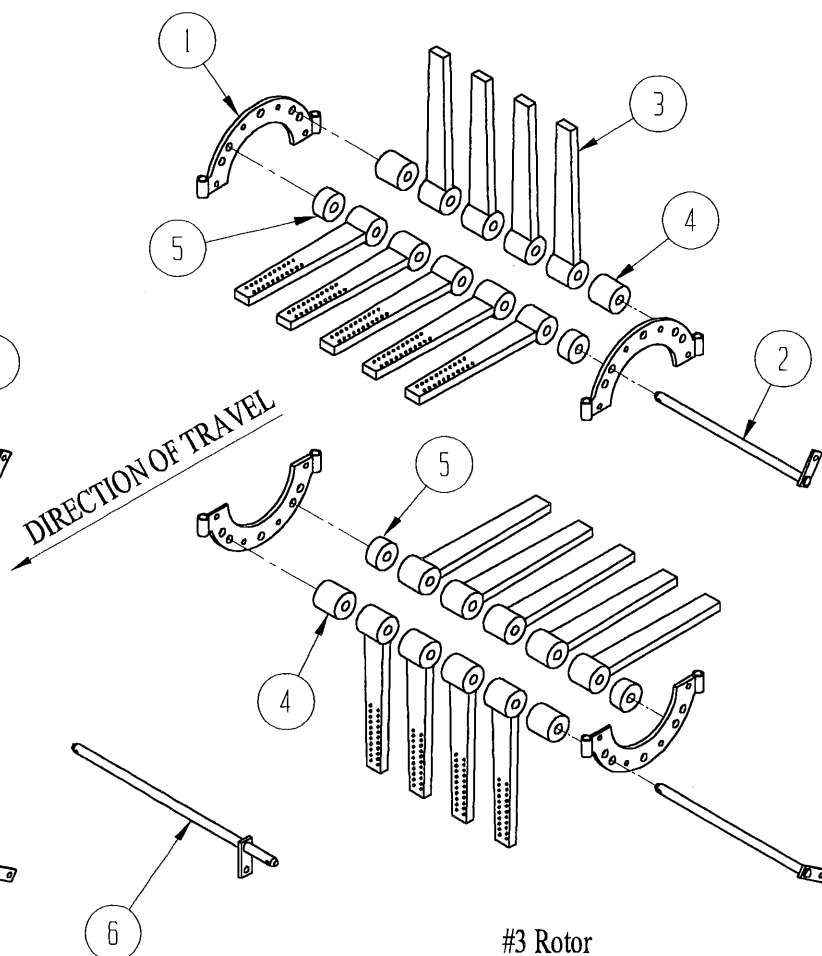


**ROTOR PARTS #2 & #3**  
(For Replaceable Shafts)

ITEM NO.	QTY.	PART NO MODEL 180	PART NO MODEL 144	DESCRIPTION
1	1	282323	282324	#2 & #3 Rotor Assembly
2	1	282072	282072	Tapered Shaft, Drive End
3	1	282067	282067	Tapered Shaft, Driven End
4	2	282058	282058	Bushing, R1-2 3/16 Split Tapered



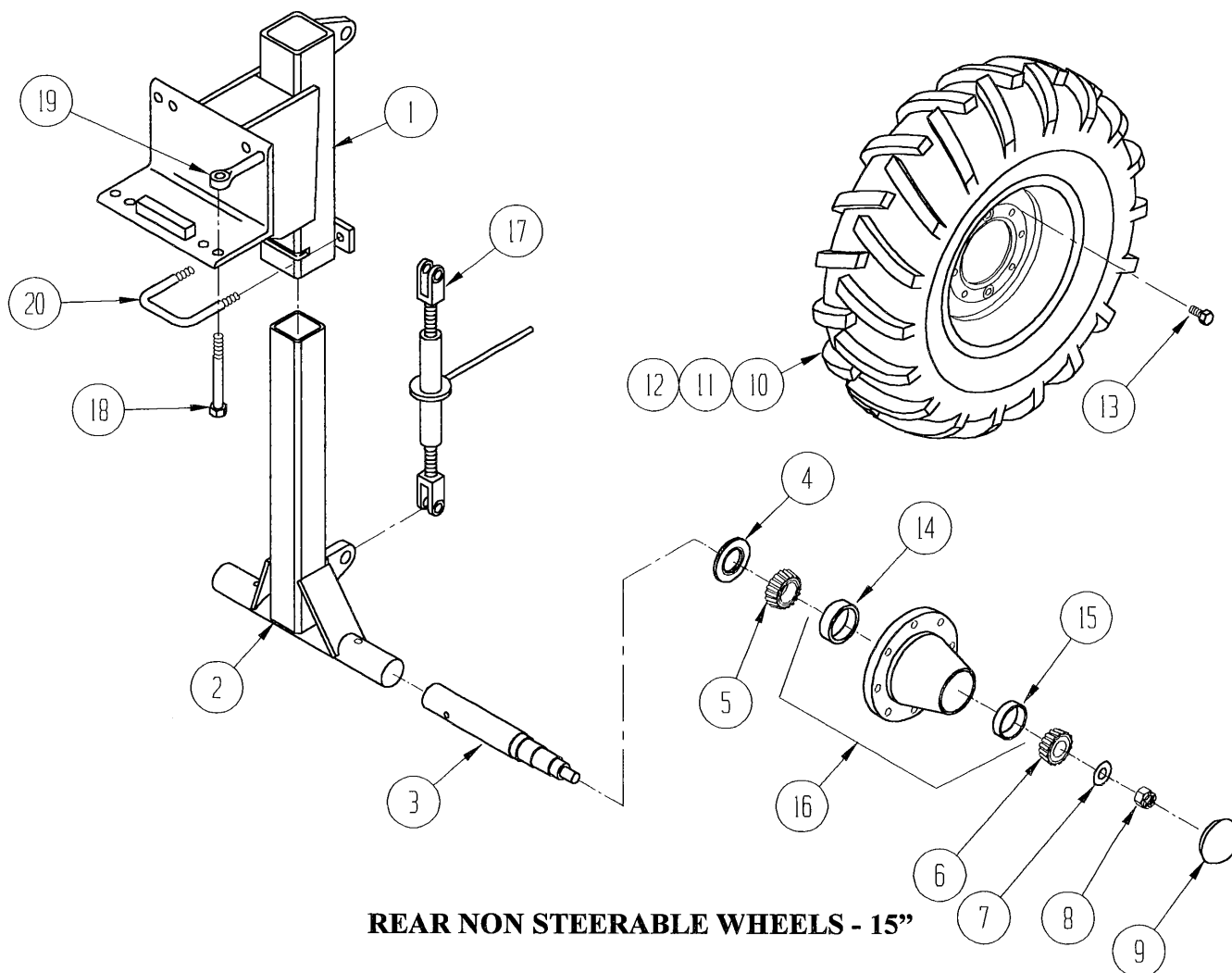
#2 Rotor  
Cluster Assembly #281581



#3 Rotor  
Cluster Assembly #281580

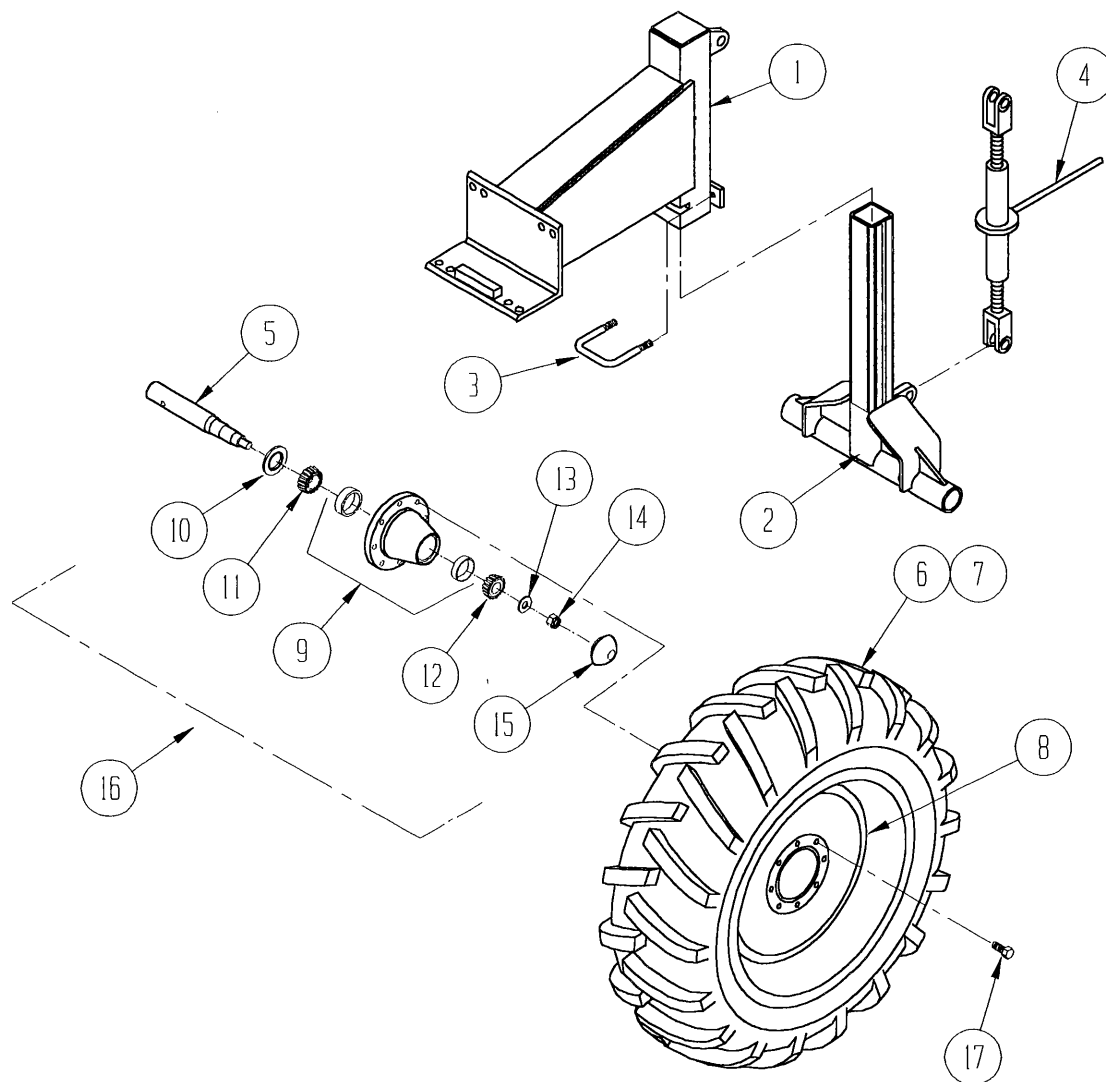
### FLAIL CLUSTER ASSEMBLIES (#2 & #3 Rotors)

ITEM NO.	QUANTITY PER CLUSTER	PART NO.	DESCRIPTION
1	4	281477	Half Clamp
2	4	281558	Flail Pin
3	12	281520	Rubber Flail (#2 Rotor)
	18	281520	Rubber Flail (#3 Rotor)
4	12	990588	Flail Spacer, 2" (#2 Rotor)
	4	990588	Flail Spacer, 2" (#3 Rotor)
5	4	281574	Flail Spacer, 1" (#3 Rotor Only)
6	As Req'd	281560	Flail Pin, Extended (For Extra Flails)



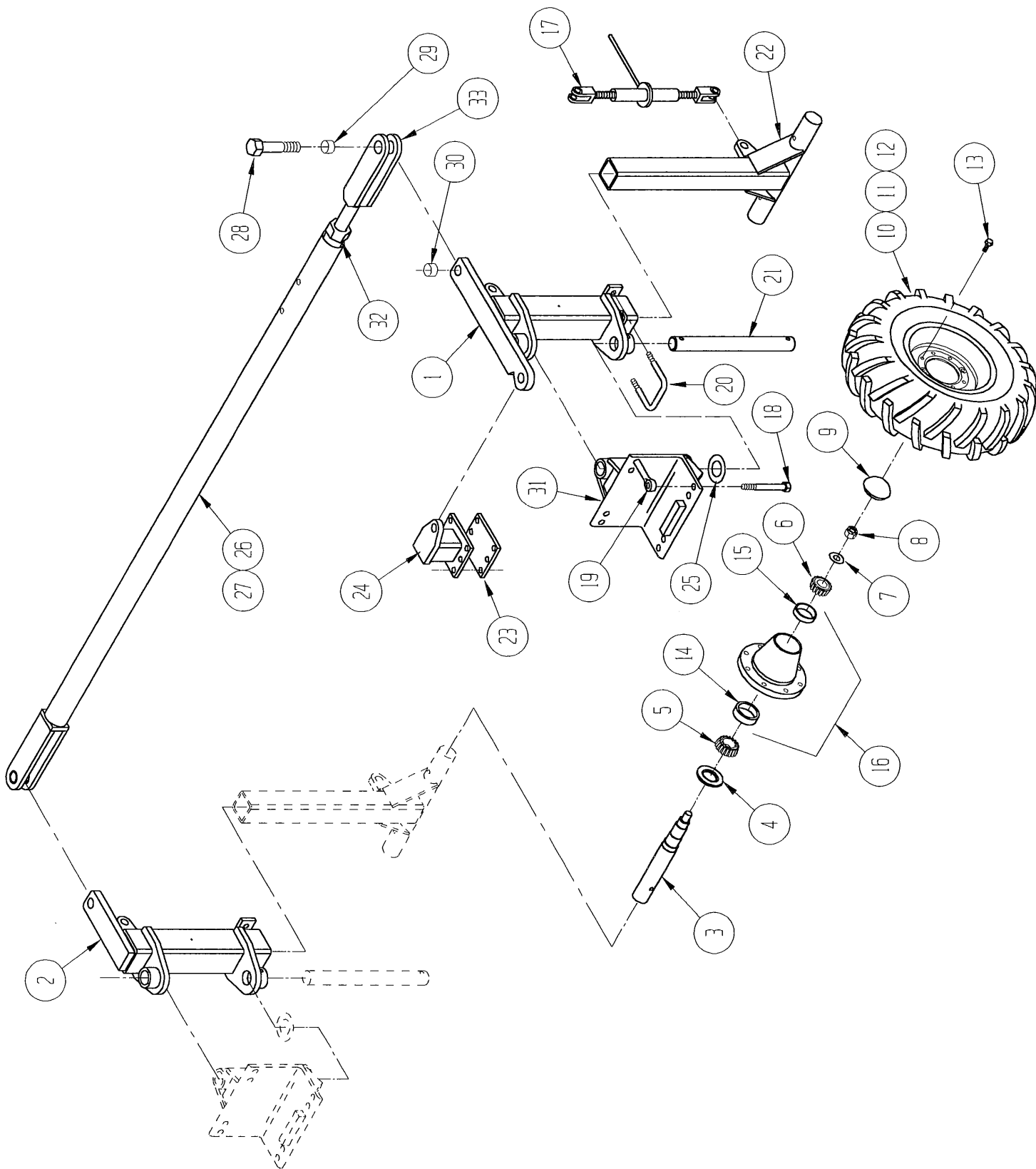
### REAR NON STEERABLE WHEELS - 15"

ITEM NO.	QUANTITY	PART NO.	DESCRIPTION
1	4	281845	Rigid Strut
2	4	281521	Strut Bottom
3	8	999992	Spindle
4	8	990099	Seal
5	8	990004	Bearing Cone, Inner
6	8	990006	Bearing Cone, Outer
7	8	999965	Flat Washer, 7/8
8	8	999960	Slotted Nut, 7/8
9	8	999951	Hub Cap
10	8	999953	Wheel Rim, 15" (6 Hole)
11	8	281140	Tire, 7.5 x 15 Traction Lug
12	8	999978.3	Tube, 7.5 x 15
13	48	999955	Lug Bolt
14	8	990005	Bearing Cup, Inner
15	8	990007	Bearing Cup, Outer
16	8	999995	Wheel Hub w/Cups (6 Bolt)
17	4	990700	Screw Jack
18	16		Hex Bolt, $\frac{3}{4}$ x 6 $\frac{1}{2}$ NC
19	16	997903	Eye Bolt, $\frac{3}{4}$ x 6 $\frac{1}{2}$
20	4	281840	U-Bolt



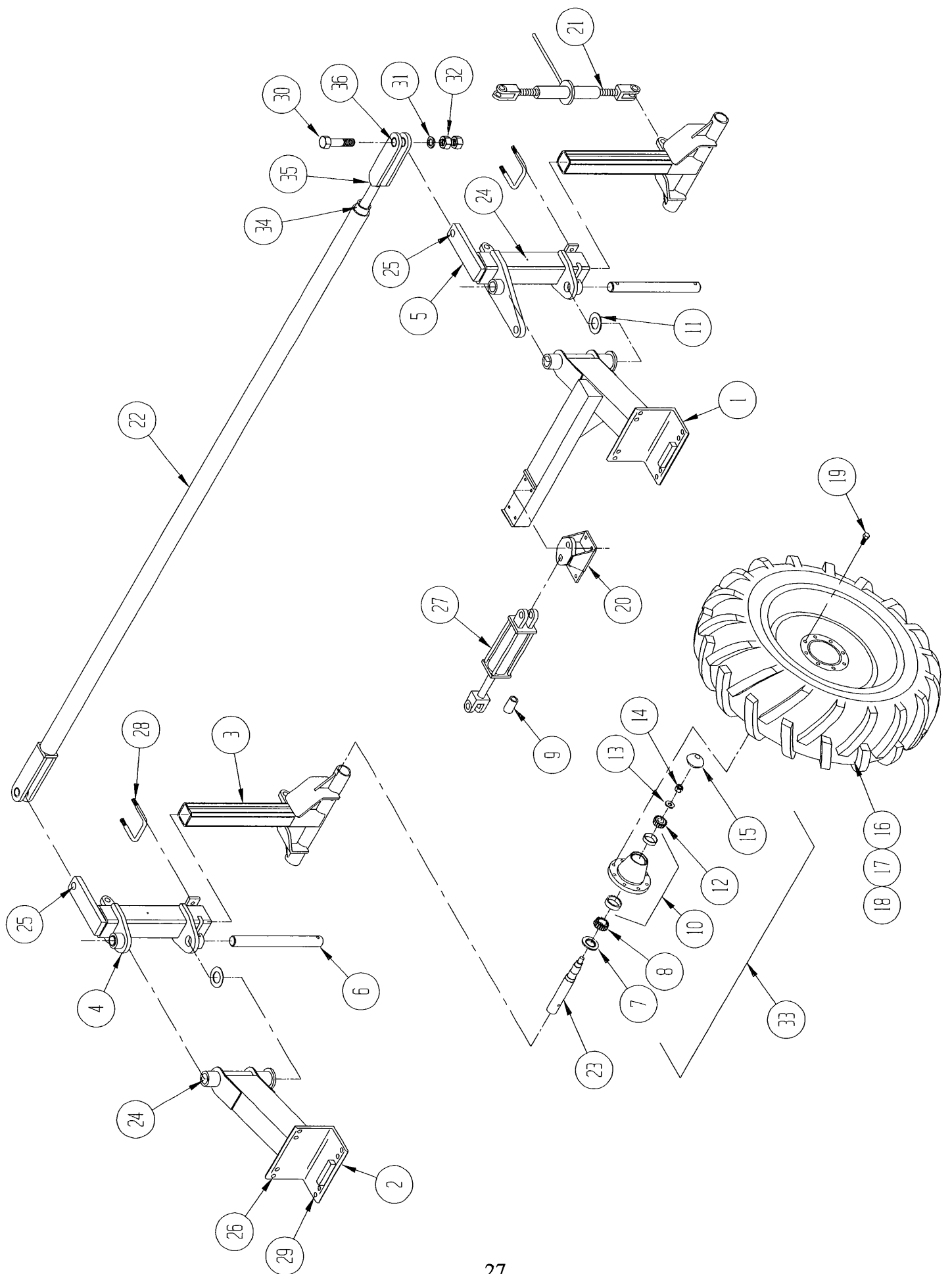
### REAR NON STEERABLE WHEELS - 24"

ITEM NO.	QUANTITY	PART NO.	DESCRIPTION
1	2	282183	Rigid Strut
2	2	282211	Bottom Strut
3	2	282208	U-Bolt
4	2	990700	Screw Jack
5	4	999956	Spindle
6	4	331224	Tire, 11.2" x 24"
7	4	300045	Tube, 24"
8	4	300046	Wheel, 24"
9	4	999964	Wheel Hub w/ Cups
10	4	990094	Seal
11	4	990004	Inner Cone
12	4	999002	Outer Cone
13	4	999965	Flat Washer, 7/8"
14	4	999960	Castle Nut, 7/8-14
15	4	999952	Hub Cap
16	4	999981	Hub Assembly (Complete w/ Lug Bolts)
17	32	997905	Lug Bolt



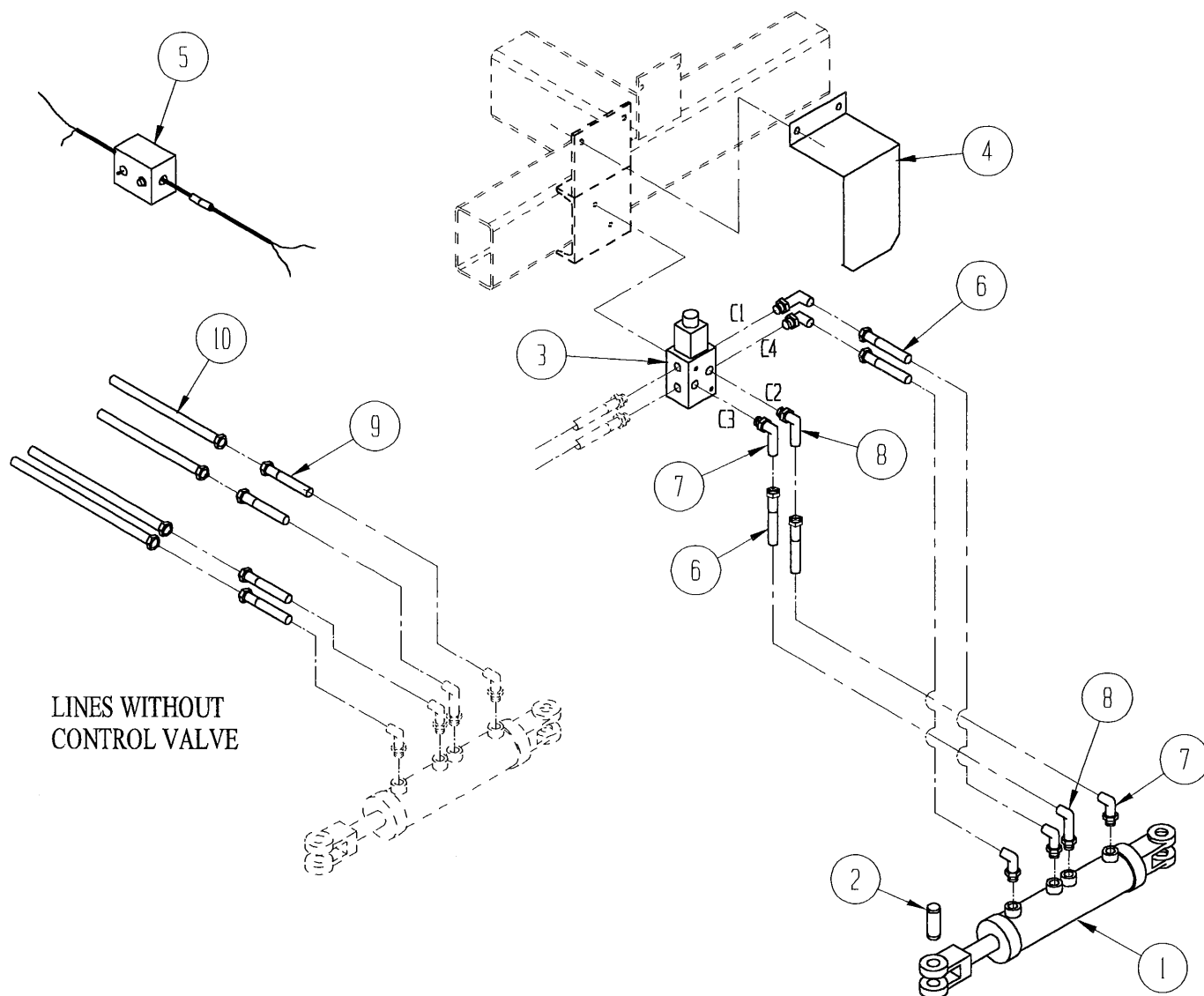
# **REAR STEERABLE WHEELS – 15”**

<b>ITEM NO.</b>	<b>QUANTITY</b>	<b>PART NO.</b>	<b>DESCRIPTION</b>
1	1	281842	Top Steering Strut
2	1	281841	Top Standard Strut
3	4	999992	Spindle
4	4	990099	Seal
5	4	990004	Bearing Cone, Inner
6	4	990006	Bearing Cone, Outer
7	4	999965	Flat Washer, 7/8
8	4	999960	Slotted Nut, 7/8
9	4	999951	Hub Cap
10	4	999953	Wheel Rim, 15” (6 Hole)
11	4	281140	Tire, 7.5 x 15 Traction Lug
12	4	999978.3	Tube, 7.5 x 15
13	24	999955	Lug Bolt
14	4	990005	Bearing Cup, Inner
15	4	990007	Bearing Cup, Outer
16	4	999995	Wheel Hub w/Cups
17	4	990700	Screw Jack
18	8		Hex Bolt, ¾ x 6 ½ NC
19	8	997903	Eye Bolt, ¾ x 6 ½
20	2	281840	U-Bolt
21	2	281537	Pivot Pin
22	2	281521	Strut Bottom
23	1	281519	Base Plate
24	1	281517	Cylinder Mount
25	2	281717	Wear Disk
26	1	264404	Tie Rod Weldment
27	1	282103	Tie Rod Assembly Complete (Model 180)
	1	267211	Tie Rod Assembly Complete (Model 144)
28	2		Hex Bolt, 1 x 6 NC
29	4	990250	Hardened Bushing
30	3	990251	Hardened Bushing
31	2	281524	Strut Clamp
32	1	264406	Extension Pipe (Model 180)
	1	267210	Extension Pipe (Model 144)
33	1	250098	Ear Weldment



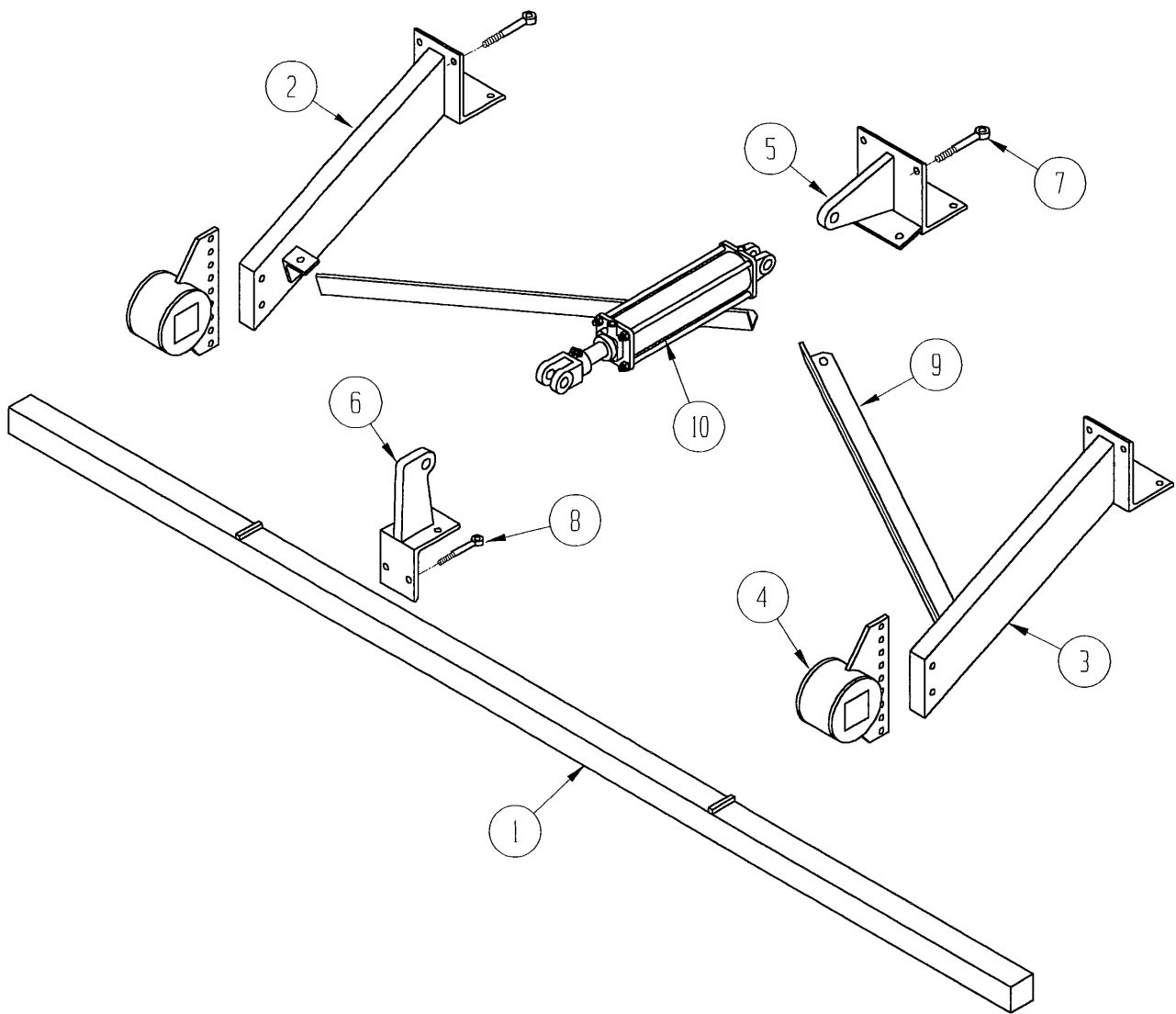
## REAR STEERABLE WHEELS - 24"

ITEM NO.	QUANTITY	PART NO.	DESCRIPTION
1	1	281793	Steering Strut
2	1	281794	Standard Strut
3	2	282211	Bottom Strut
4	1	282100	Top Strut
5	1	282102	Top Steering Strut
6	2	281537	Pivot Pin
7	4	990094	Seal
8	4	990004	Inner Cone
9	1	265012	Cylinder Stop
10	4	999964	Wheel Hub w/ Cups
11	2	282178	Wear Disk
12	4	999002	Outer Cone
13	4	999965	Flat Washer, 7/8"
14	4	999960	Castle Nut, 7/8-14
15	4	999952	Hub Cap
16	4	331224	Tire, 11.2" x 24"
17	4	300045	Tube, 24"
18	4	300046	Wheel, 24"
19	32	997905	Lug Bolt
20	1	265233	Cylinder Ear
21	2	990700	Screw Jack
22	1	282103	Tie Rod Assembly
23	4	999956	Spindle
24	2		Grease Zerk, 1/4-28
25	3	990251	Hardened Bushing
26	8	997903	Eye Bolt, 3/4" x 6 1/2"
27	1	998943	Hydraulic Cylinder, 3" x 6" Stroke
28	2	282208	U-Bolt
29	8		Hex Bolt, 3/4" x 9"
30	2		Hex Bolt, 1" x 3"
31	2		Lock Washer, 1"
32	4		Hex Nut, 1"
33	4	999981	Hub Assembly (Complete w/ Lug Bolts)
34	1	282106	Extension Pipe
35	1	250098	Ear Weldment
36	4	990250	Hardened Bushing



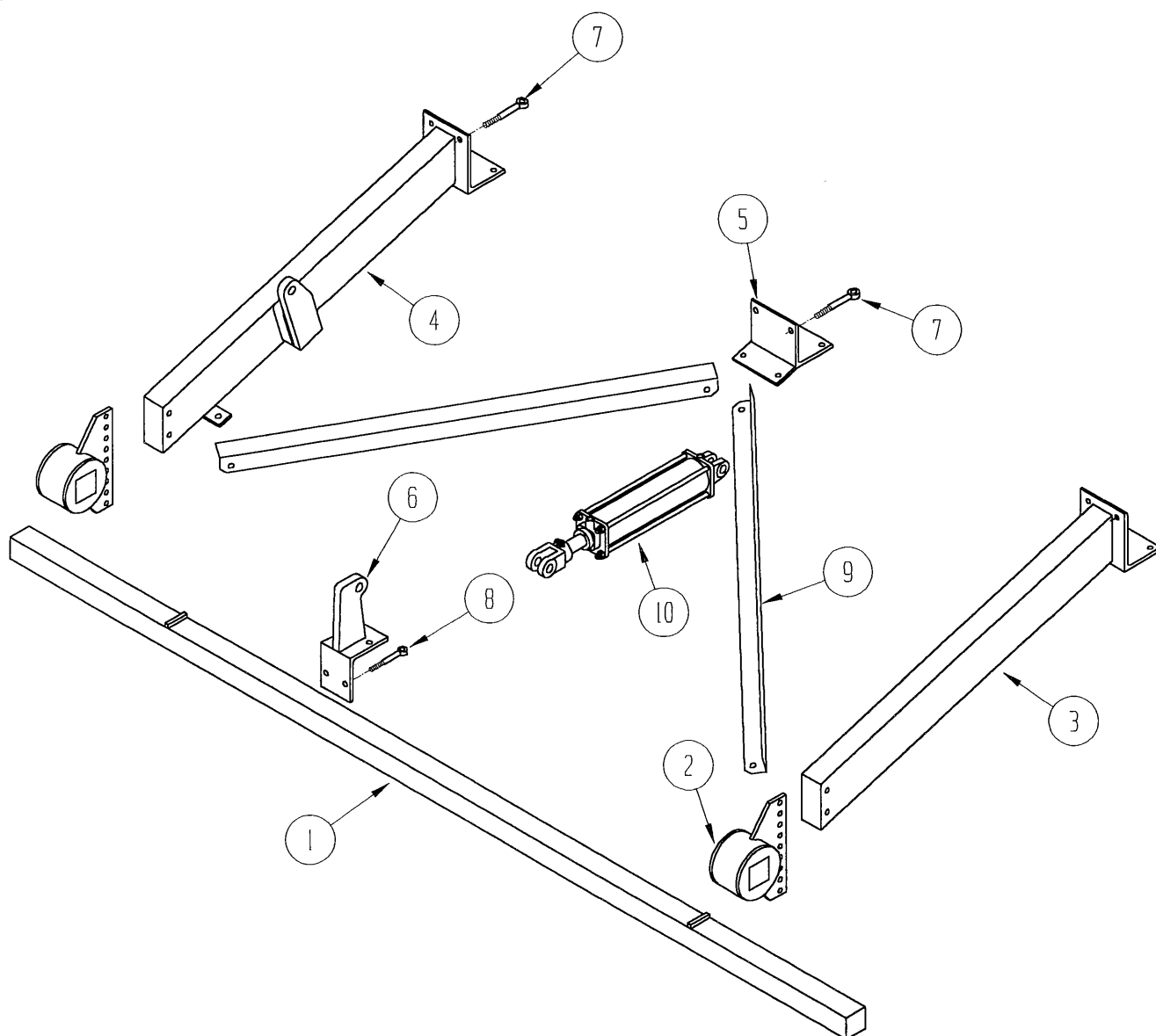
## TWO WAY STEERING

ITEM NO.	QUANTITY	PART NO.	DESCRIPTION
1	1	265226	Hydraulic Cylinder, Double Rod
2	2	265254	Cylinder Pin
3	1	265237	Selector Valve
4	1	281285	Valve Cover
5	1	999077	Switch Box Assembly
6	4		Hydraulic Hose, 1/2 x 50"
7	5	2503-8-8	90° Short Elbow
8	3	5603-8-8	90° Long Elbow
9	4		Hydraulic Hose, 1/2 x 60"
10	4		Hydraulic Tube Assembly, 5/8 x 96"



**SCALPER TOOL BAR ASSEMBLY**  
(For Unit With 15" Rear Carrier Wheels)

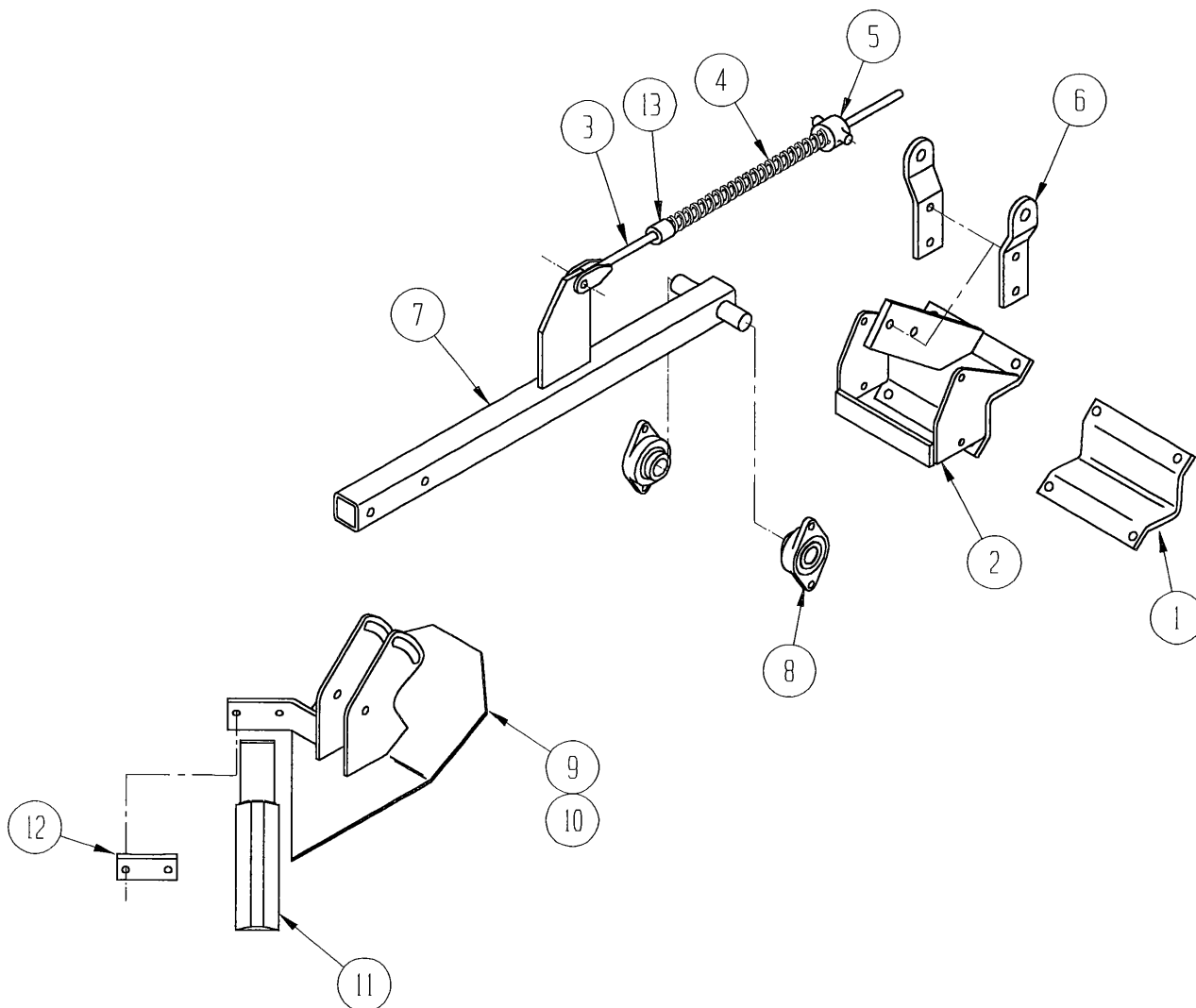
ITEM NO.	QTY.	PART NO MODEL 180	PART NO MODEL 144	DESCRIPTION
1	1	282289	282331	Tool Bar
2	1	282297	282297	Tool Bar Mount, LH
3	1	282298	282298	Tool Bar Mount, RH
4	2	281089	281089	Tool Bar Support
5	1	282295	282295	Brace Bracket
6	1	281553	281553	Lift Arm
7	6	997903	997903	Eye Bolt, 3/4 x 6 1/2
8	2	281987	291978	Eye Bolt, 5/8 x 5
9	2	282296	282333	Tool Bar Brace
10	1	998903	998903	Hydraulic Cylinder, 3" x 8" Stroke



### SCALPER TOOL BAR ASSEMBLY

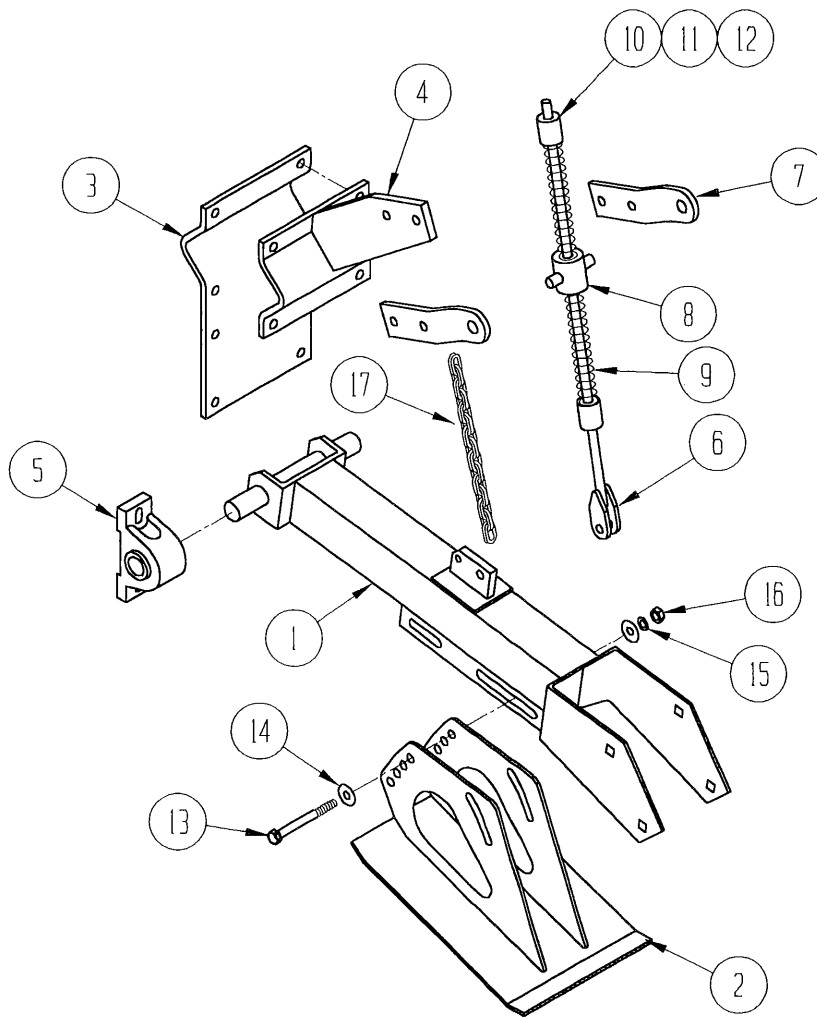
(For Unit With 24" Rear Carrier Wheels)

ITEM NO.	QTY.	PART NO MODEL 180	PART NO MODEL 144	DESCRIPTION
1	1	282289	282331	Tool Bar
2	2	281089	281089	Tool Bar Support
3	1	282335	282335	Tool Bar Support, RH
4	1	281809	281809	Tool Bar Support, LH
5	1	282109	282109	Brace Bracket
6	1	281553	281553	Lift Arm
7	6	997903	997903	Eye Bolt, 3/4 x 6 1/2
8	2	281987	281987	Eye Bolt, 5/8 x 5
9	2	282110	282332	Tool Bar Brace
10	1	998903	998903	Hydraulic Cylinder, 3" x 8" Stroke



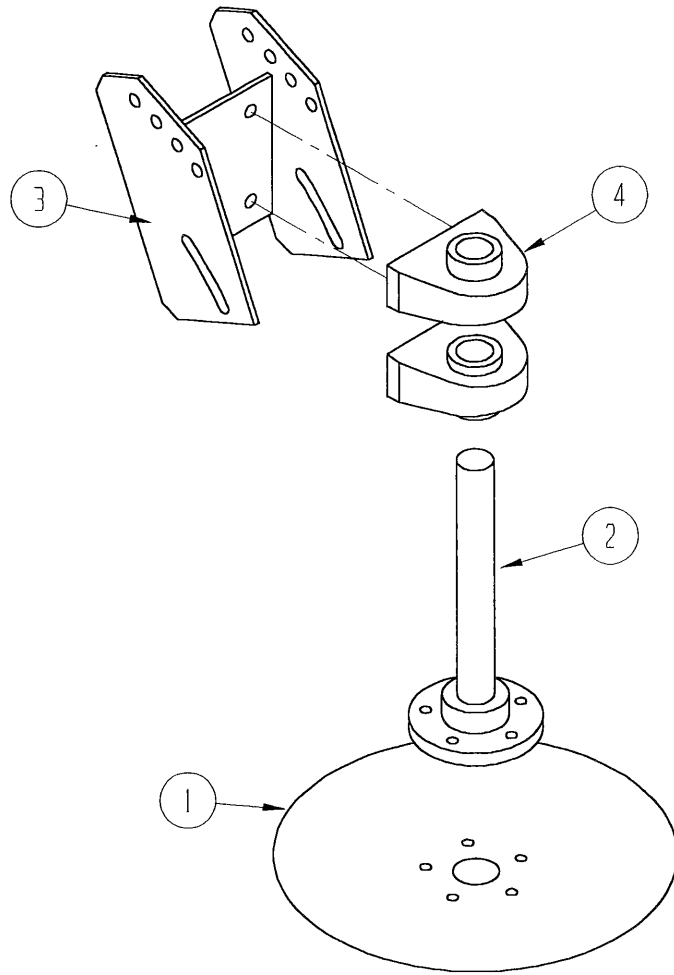
**KNIFE SCALPER HEAD ASSEMBLY**  
(LH # 282179, RH #282180)

ITEM NO.	QUANTITY	PART NO.	DESCRIPTION
1	1	281108	Half Clamp
2	1	282182	Mount Weldment
3	1	281121	Adjustment Bar
4	1	990742	Spring
5	1	281096	Trunnion
6	2	281095	Trunnion Ear
7	1	281352	Scalper Arm
8	2	980185	Bearing, 1 1/8 2 Bolt Flanged
9	1	281120	LH Scalper Shoe (Shown)
10	1	281123	RH Scalper Shoe (Opposite)
11	1	281116	Knife Blade
12	1	281129	Blade Clamp
13	1	281114	Set Collar



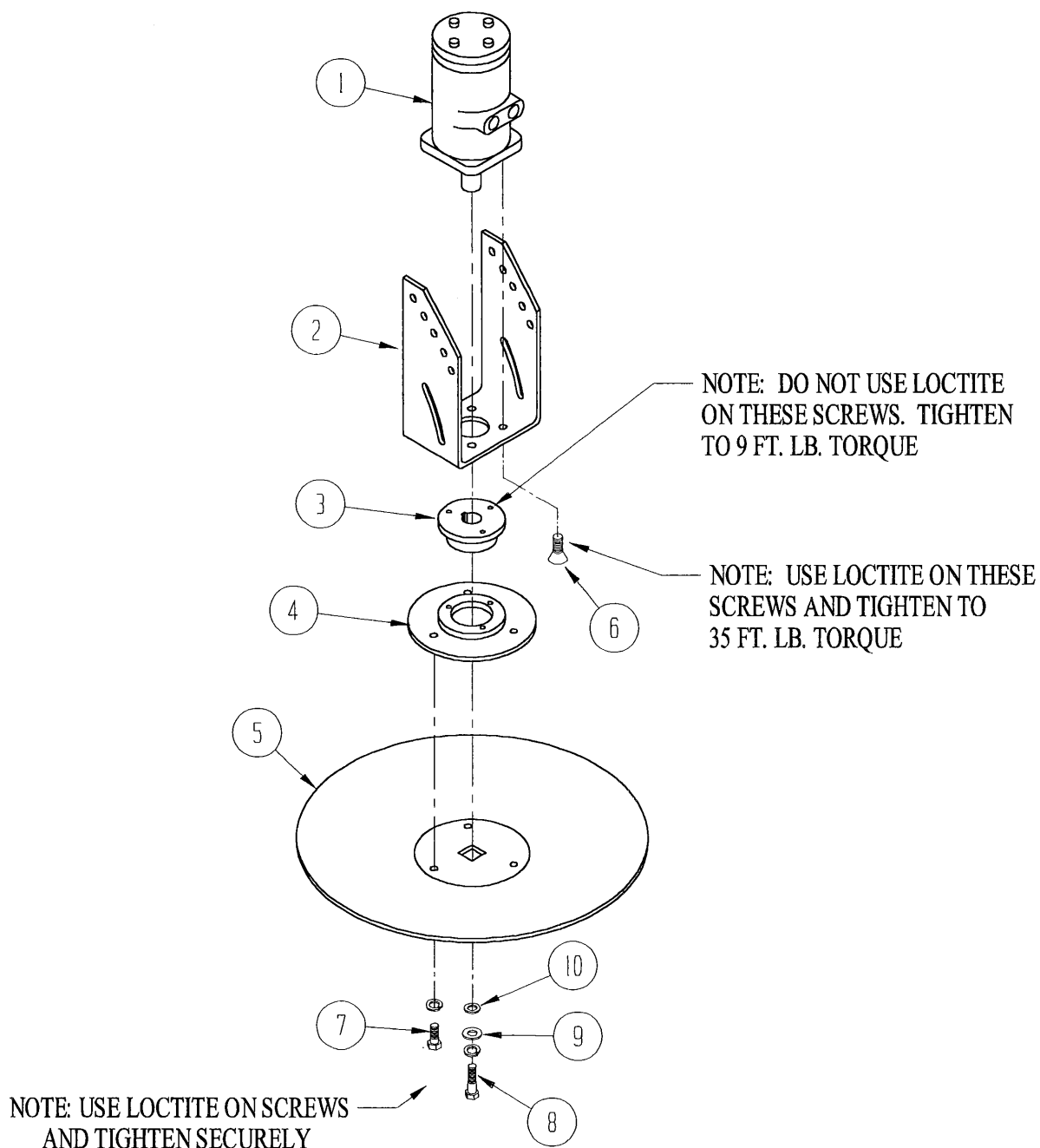
**SCALPER ARM ASSEMBLY**  
(Ground Driven & Hydraulic Driven Scalpers)

ITEM NO.	QUANTITY	PART NO.	DESCRIPTION
1	1	282113	Scalper Arm
2	1	282119	Scalper Shoe
3	1	281318	Bearing Hanger
4	1	282128	Rear Clamp
5	2	980022	Pillow Block Bearing, 1 3/16"
6	1	281121	Adjustment Bar
7	2	281095	Trunnion Ear
8	1	281096	Trunnion
9	2	281912	Spring
10	2	281114	Set Collar
11	2		Square Head Set Screw, 3/8" x 1"
12	2		Jam Nut, 3/8"
13	2		Hex Cap Screw, 1/2 x 4 1/2
14	2		Flat Washer, 1/2
15	2		Lock Washer, 1/2
16	2		Hex Nut, 1/2
17	1		Log Chain, 3/16 x 15"



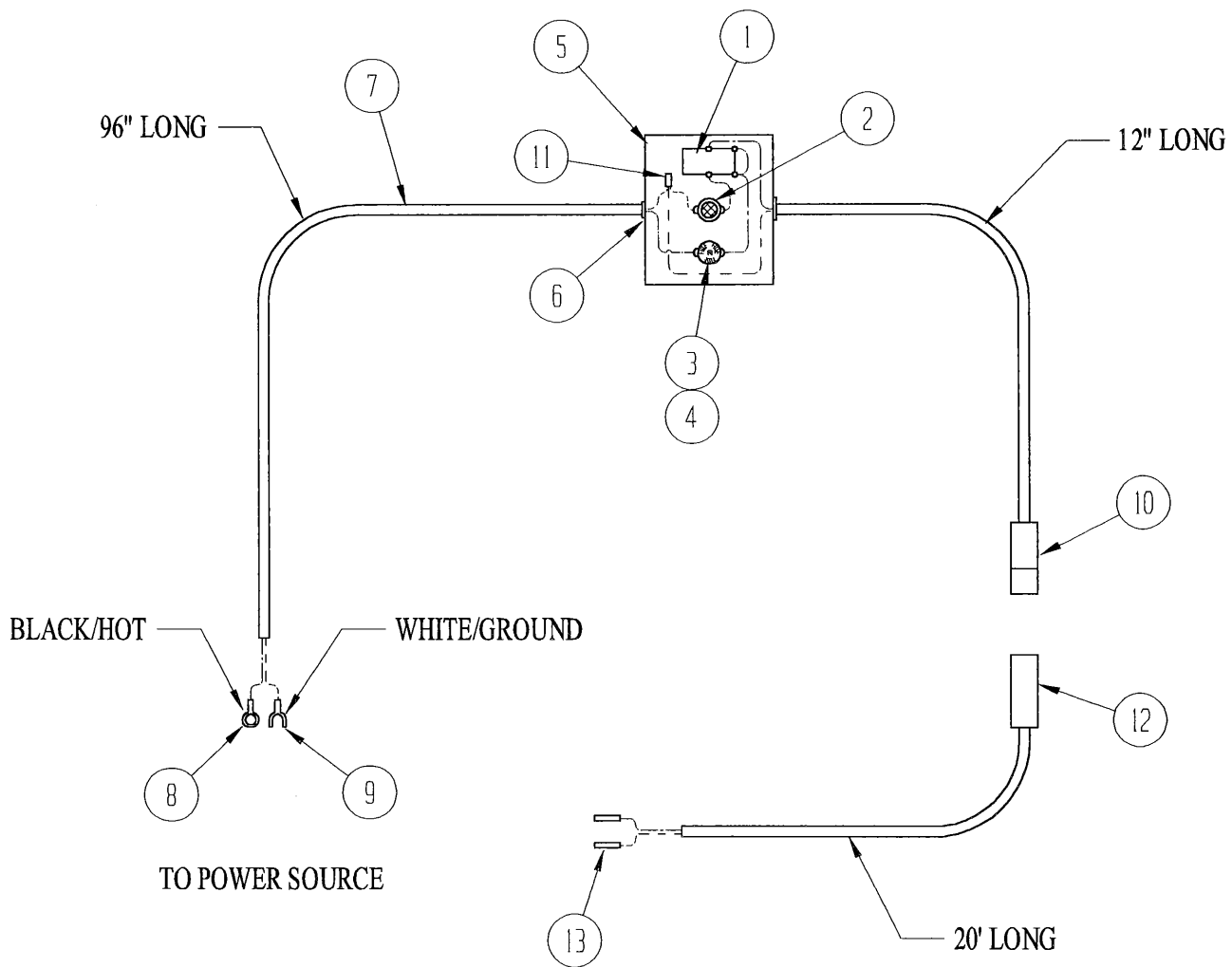
### GROUND DRIVEN DISK ASSEMBLY

ITEM NO.	QUANTITY	PART NO.	DESCRIPTION
1	1	282138	Disk
2	1	282140	Disk Shaft
3	1	282141	Disk Mounting Bracket
4	2	980200	Bearing, 1 3/16" Tapped Base



### HYDRAULIC DRIVEN DISK ASSEMBLY

ITEM NO.	QUANTITY	PART NO.	DESCRIPTION
1	1	990456	Hydraulic Motor
2	1	281321	Motor Mount
3	1	980278	Bushing, SDS 1"
4	1	281286	Disk Mount
5	1	990921	Disk
6	4	281360	Flat Socket Head Cap Screw, 3/8" x 3/4"
7	3		Hex Cap Screw, 3/8" x 3/4"
8	1		Hex Cap Screw, 1/4" x 1"
9	1		Fender Washer, 1/4"
10	1		Flat Washer, 1/4"



**ELECTRICAL SWITCH BOX ASSEMBLY**  
(#999077)

ITEM NO.	QUANTITY	PART NO.	DESCRIPTION
1	1	999145	Toggle Switch, 3A.125V
2	1	100150	Light
3	1	999146	Fuse Holder
4	1	999152	Fuse, 20 AMP
5	1	999154	Box Chassis
6	3	999151	Rubber Grommet
7	29 Ft.	999274	Wire, 16/2 Type SJ
8	1	999270	Ring Terminal, 16 Ga.
9	1	999271	Spade Terminal, 16 Ga.
10	1	999148	Female Connector Half, 2 Wire
11	1	999316	Wire Nut, 14-22
12	1	999149	Male Connector Half, 2 Wire
13	2		Butt Connector, 16/2

## NOTES