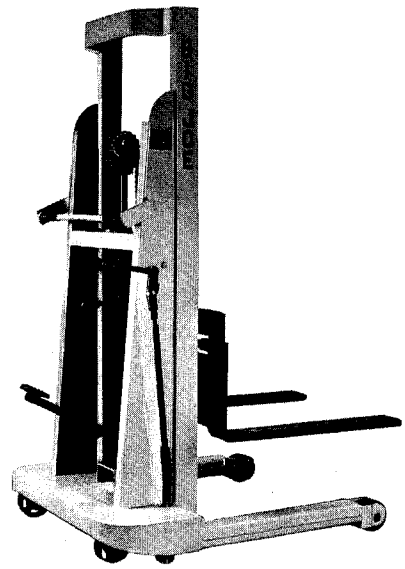
# Operation • Maintenance • Repair parts list

SERIES • MANUAL PRICE $5.00



BIG JOE® Manufacturing Company • Lincolnwood, IL 60646

# TECHNICAL MANUAL

BIG JOE MANUFACTURING COMPANY
7225 NORTH KOSTNER AVENUE
LINCOLNWOOD, ILLINOIS 60646

**IBH MANUAL**
**LIFT TRUCKS**
**SERIES 14A, 14P**
**14S, 21A, 21P, 21R**

*Model No.* _____ *Serial No.* _____

*Contract* _____
*Publication Number:* *IBH (M) 1177*

*Date of Issue* _____

## TABLE OF CONTENTS



## LIST OF ILLUSTRATIONS

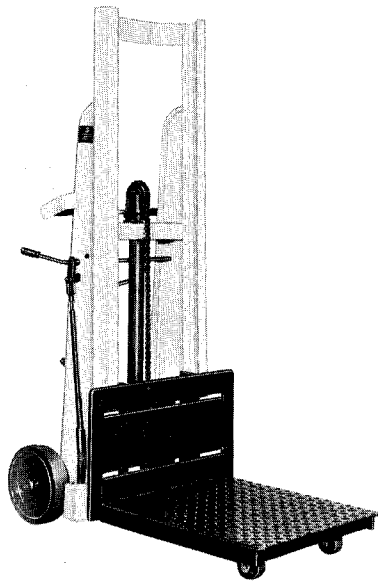


## PREPARATION FOR USE

The manual lift truck normally is shipped mobile and ready for use with a cardboard carton placed over the top for protection. Upon receipt of the lift truck, perform the following inspection after unpacking:

1. Inspect the lift truck for physical damage.
2. Check that the lift chain is secure and taut. Refer to paragraph 3-14 to adjust tension.
3. Check for hydraulic oil leakage.

Immediately report any damage to the carrier and to your Big Joe dealer.



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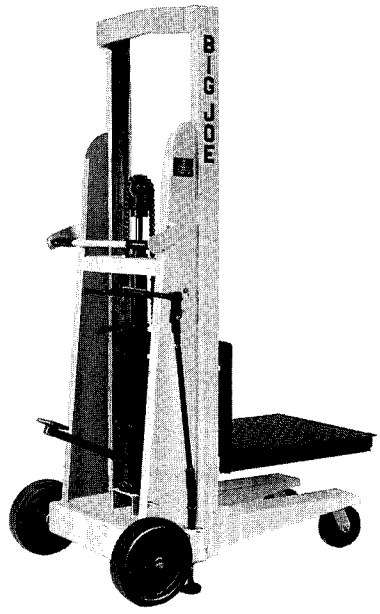
Series 14A

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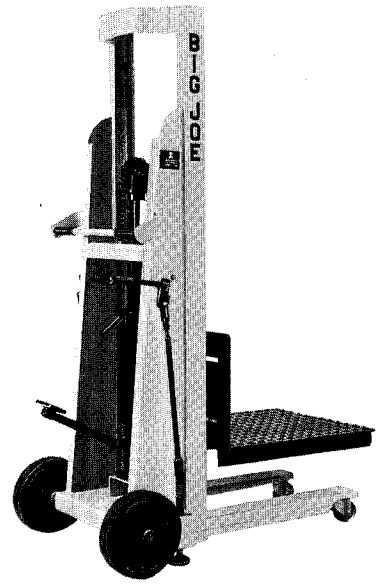
Series 14S

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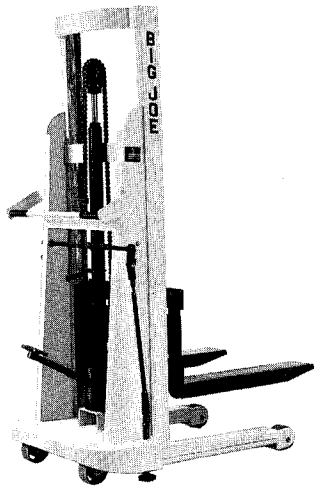
Series 14P

FRONT SWIVEL SERIES

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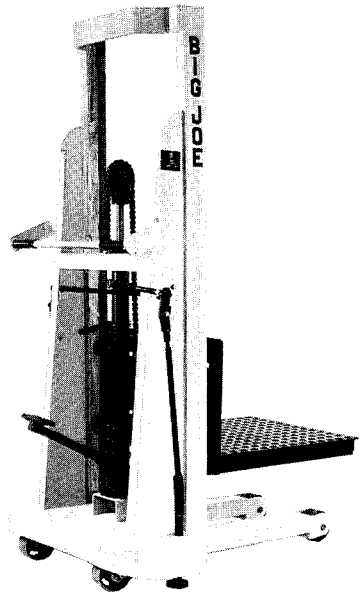
Series 21R

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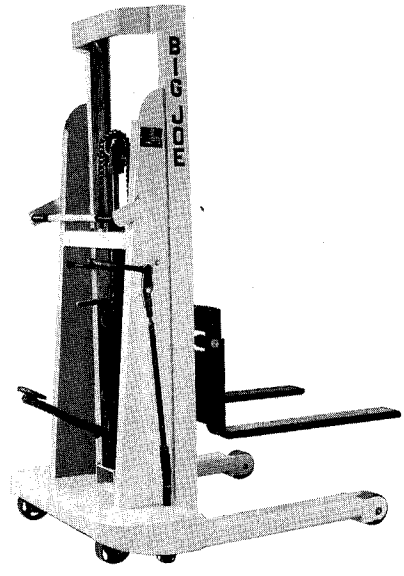
Series 21P

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Series 21A

REAR SWIVEL SERIES

Figure 1-1. Manual Hydraulic Lift Truck Basic Configurations

# SECTION I

# DESCRIPTION

## 1-1. INTRODUCTION.

This publication describes the IBH Manual Lift Truck Series 14A, 14S, 14P, 21R, 21P, and 21A, manufactured by Big Joe Manufacturing Company Lincolnwood, Illinois 60646. Included are instructions for operation, lubrication, adjustment, and repair. Also included are repair parts list which provide the part number for all maintenance parts.

## 1-2. DESCRIPTION (Figure 1-1)

The lift truck is equipped with a horizontal handrail with two handle grips for manual propelling and steering. A lever with a handle grip actuates the simple floor brakes. Raising the brake lever to the horizontal position locks the brakes for parking.

Raising and lowering the load is achieved manually through a hydraulic unit. The unit contains a hydraulic oil reservoir, cylinder, ram, release valve, hydraulic pump, and check valve.

Lifting action is achieved by operating a piston-type hydraulic pump with a foot pedal. The pump forces hydraulic oil from the reservoir into the cylinder, raising the hydraulic ram. A chain fitted to the ram head assembly provides lift action as the ram rises. To lower the load, a release pull rod with handle grip opens the release valve, permitting the hydraulic oil to return to the reservoir from the cylinder. As the cylinder oil level decreases, the ram lowers, permitting the load to descend.

# SECTION II

# OPERATION

## 2-1. GENERAL.

This section gives detailed operating instructions for the IBH Manual lift trucks. The instructions are divided into the various phases of operations, such as propelling, stopping, turning and operating the lift. Routine precautions are included to guarantee safe operation.

## 2-2. OPERATING PRECAUTIONS.

Improper use of the lift truck can cause injury to personnel and/or damage to the load. Always observe the following precautions.

1. Leave the load in the down position for overnight storage.

2. Set the brakes before leaving the lift truck, especially when it is loaded.

3. Center the load back on the forks (or platform) as far as possible toward the hydraulic unit. NEVER LIFT A LOAD ON THE TIP OF THE FORKS, ON ONE FORK, OR ON THE EDGE OF THE PLATFORM.

4. Do not attempt to lift loads heavier than the rated capacity of the lift truck.

5. Check for obstructions before raising or lowering a load.

6. Lower the load before traveling. If it is necessary to move the load in a raised position to stack pallets, travel cautiously and use extra care in turning.

7. Use only hydraulic oil in the hydraulic system. Never use brake fluid.

## 2-3. PROPELLING AND STOPPING THE LIFT TRUCK.

1. Check that the load is down.

2. Release the brake.

3. Grasp the two control handle (1, figure 2-1) grips. Push evenly with both hands to move the lift truck forward; pull evenly with both hands to move the lift truck backwards.

4. For normal stopping, slowly pull up on the brake lever (2). For emergency or abrupt stops, sharply pull up on the brake lever.

## 2-4. TURNING THE LIFT TRUCK.

Front-swivel and rear-swivel lift trucks require different techniques in turning. The following two paragraphs give the correct procedures for turning front swivel and rear swivel lift trucks, respectively.

**a. Front Swivel Truck.**

A front-swivel lift truck pivots around the rear wheels and is turned in the following manner:

1. Release the brakes.

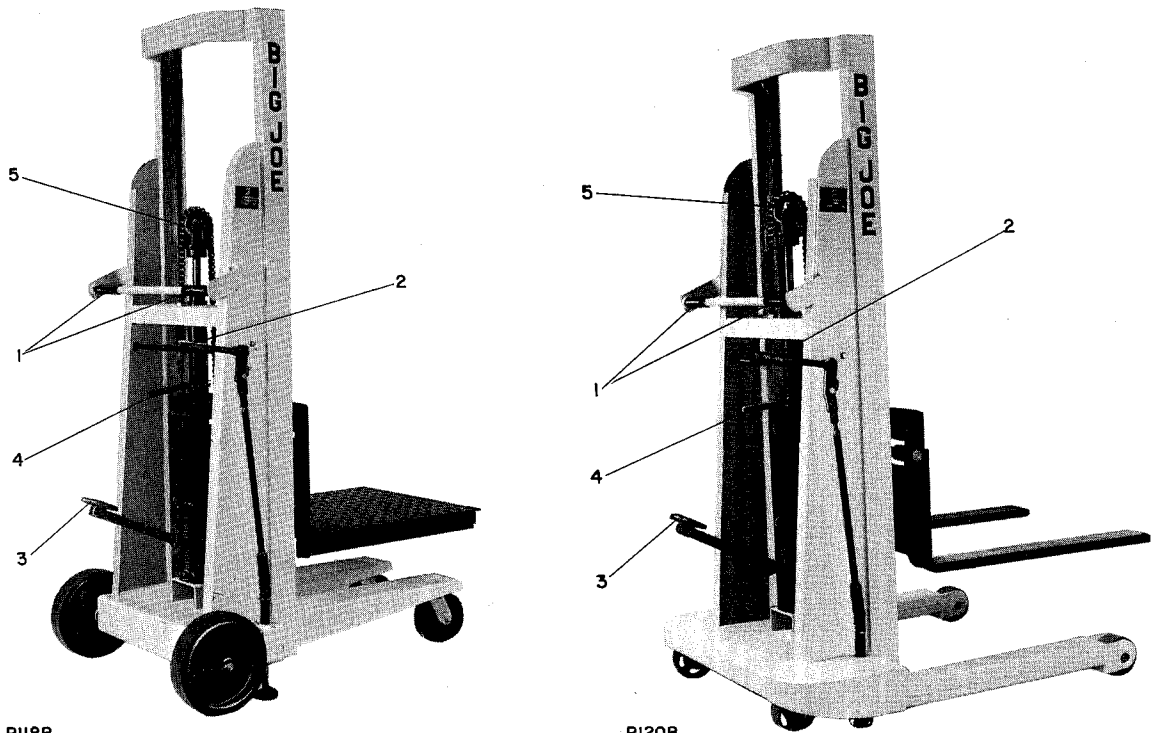


**Figure 2-1. Operating Controls**

2. To turn left, grasp the control handle grips and simultaneously push forward with the right hand and pull backward with the left hand.

3. To turn right, grasp the control handle grips and simultaneously push forward with the left hand and pull backward with the right hand.

**b. Rear Swivel Truck.**

A rear swivel lift truck pivots around the front wheels and is turned in the following manner:

1. Release the brake.

2. To turn left, grasp the control handle grips and push the handrail to the right with both hands.

3. To turn right, grasp the control handle grips and push the handrail to the left with both hands.

## 2-5. RAISING THE LOAD.

Lifting action is achieved by operating the foot pedal (3); thus the rate of ascent depends upon the speed at which the foot pedal is operated.

**CAUTION:** Overhead or nearby obstructions may tip or damage the load.

1. Check the space above and near the load for adequate clearance.

2. Position the lift truck for lifting and set the brakes.

3. If the foot pedal is in the vertical (storage) position, lower the foot pedal to normal operating position.

4. Check that the release pull rod lever (4) is down.

5. Pump the foot pedal through its full stroke at an even pace until the load reaches the proper height.

## 2-6. LOWERING THE LOAD.

The rate of descent depends upon both the amount the release valve is opened and the weight of the load.

1. Slowly open the release valve.

2. When the load is down or reaches the desired height, close the release valve.

# SECTION III.

# MAINTENANCE AND MAINTENANCE PARTS

## 3-1. GENERAL.

This section contains information and procedures for preventive and corrective maintenance of the Manual Lift Truck. Preventive maintenance includes cleaning and lubrication. Corrective maintenance includes adjustment, repair, and troubleshooting. Complete information is given on overhauling the hydraulic unit, which comprises the entire hydraulic system of the lift truck.

This section also contains parts lists and illustrations identifying maintenance parts. The callouts on each illustration correspond to the index numbers in the accompanying parts list. Each parts list provides the Big Joe Manufacturing Company part number, the part description, and the quantity of the part required in the assembly.

When identifying each part to be ordered, visually compare the part in the illustration with the actual part needed. To assure proper identification of each part being ordered, include your truck model number, your truck serial number (check nameplate), the part number description, and quantity of the part(s) needed.

## 3-2. PART NUMBER IDENTIFICATION.

To determine the part number of a replacement part, identify the assembly in which the part is used and locate the illustration of the applicable assembly. Find the index number of the part on the illustration and refer to that index number in the parts list. If the part number is NP, order the next higher assembly. If the part number is VAR, order by part name with truck model number, capacity, lift height, and serial number.

If the part is listed with more than one part number, select the proper part number by comparing the description in the parts list with the specifications of your truck. Refer to the Data Plate to determine application to your truck.

## 3-3. PREVENTIVE MAINTENANCE.

### 3-4. Cleaning.

As frequency of use requires, remove all surface dirt or grease from the:

1. Lifting surface of the forks or platform.

2. Friction surface of the brake shoes (1, figure 3-1). Replace these if damaged (paragraph 3-17).

3. Control and propelling bar handle grips.

### 3-5. Lubrication. (Figure 3-1)

Lubricate the lift truck every six months or 100 hours of use, whichever comes first. Always clean the lift truck before lubricating and wipe away excess grease or oil after lubricating.

1. Apply grease to the fittings on the load wheels (2), caster wheels (3), and the caster swivels (4).

2. Add grease to the fitting at the pulley on the ram head assembly (5).

3. Grease the pallet rollers (6) and apply grease to their fittings.

4. Lightly grease the inside of the mast channels (7).

5. Apply a light coat of oil to the lift chain (8).

6. Oil couplings (9) and other moving parts of the brakes.

7. Oil moving parts of the hydraulic unit (10).

8. Check hydraulic oil level and, if needed, fill hydraulic unit oil reservoir until the oil level is even with or slightly below the filler hole (see paragraph 3-9).

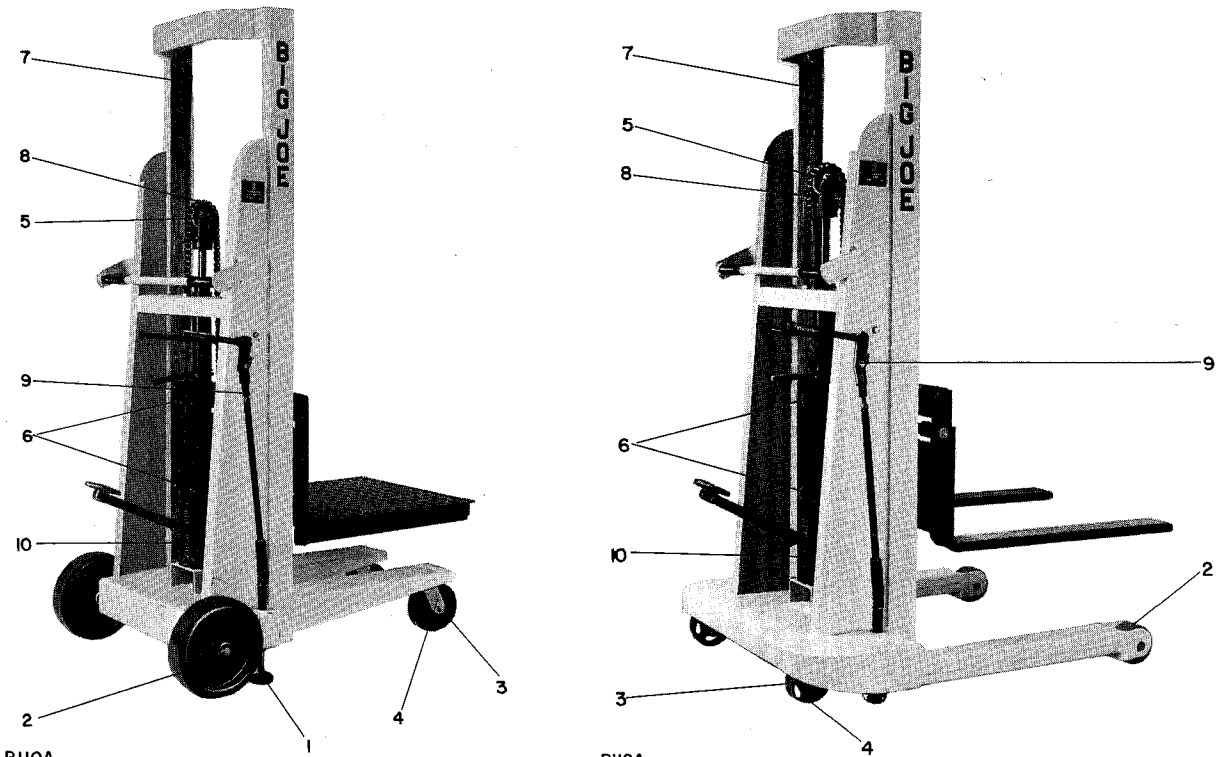


**Figure 3-1. Lubrication and Cleaning**

## 3-6. TROUBLESHOOTING.

The simplified design of the lift truck makes diagnosing troubles relatively simple. Table 3-1 is a troubleshooting guide which lists some possible troubles along with the probable cause and suggested remedy for each.

**Table 3-1. Troubleshooting Chart**

| MALFUNCTION | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|
| **TROUBLE WITH LIFTING OR LOWERING** | | |
| 1. Load will not rise. | a. Low hydraulic oil. | a. Add oil as required (para 3-9). |
| | b. Release valve not closed. | b. Check that release pull rod is in the down position or that release valve is properly adjusted (para 3-10). |
| | c. Defective hydraulic pump. | c. Check pump and replace or repair as necessary (para 3-11). |
| | d. Broken or defective foot pedal connections. | d. Check all pivots, springs, and connecting parts. Replace as necessary. |

Table 3-1. Troubleshooting Chart (Cont.)

| MALFUNCTION | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|
| 2. Load will not lift to the top. | Hydraulic oil level too low. | Add oil (para 3-9). |
| 3. Load rises but will not lower. | a. Defective release valve. | a. Check and adjust the release valve (para 3-10). |
| | b. Release pull rod stuck or disconnected. | b. Check pull rod for free movement and all pivot points and connections. |
| | c. Hydraulic system obstructed. | c. Check for obstructions. |
| 4. Load creeps down when in a raised position. | Leak in hydraulic system. | a. Check and adjust release valve (para 3-10). |
| | | b. Look for loose fittings in the hydraulic unit. |
| | | c. Check pump unit for leakage back into reservoir. |
| 5. Load does not rise or move smoothly. | a. Hydraulic oil level too low. | a. Check oil level and add as necessary (para 3-9). |
| | b. Defective release valve. | b. Check release valve and adjust or replace as necessary (para 3-10). |
| | c. Defective hydraulic pump unit. | c. Check pump pressure and adjust or replace as necessary (para 3-11). |
| | d. Defective hydraulic cylinder. | d. Repair or replace as necessary (para 3-13). |
| | e. Load larger than rated capacity. | e. Reduce load. |
| | f. Dry pallet rollers or mast channels. | f. Lubricate rollers or inside of mast channels (para 3-5). |
| | g. Damaged pallet roller. | g. Replace roller (para 3-15). |
| **OTHER TROUBLES** | | |
| 6. Oil sprays or flows from top of the inside cylinder. | Defective packing in inside cylinder. | Overhaul the inside cylinder and install new packing and O-ring (para 3-13). |
| 7. Truck does not stop when brakes are applied. | a. Brakes are loose. | a. Tighten (para 3-17). |
| | b. Brake shoe pad friction surface is oily. | b. Clean. |
| | c. Brake shoe pad friction surface is worn. | c. Replace brake shoe plunger assembly. |

## 3-7. ADJUSTMENT AND REPAIR.

The following procedures cover adjustments, replacement procedures, and repair of assemblies. The replacement procedures include reassembly where the procedures are not obvious from the disassembly procedures. The procedures are independent of each other unless specifically referenced.

## 3-8. Hydraulic Unit Removal and Installation. (Figure 3-2)

The hydraulic unit is a self-contained hydraulic system. The compact design and easy accessibility of the unit within the lift truck permits fast removal of the unit to a workbench for repair. Periodic maintenance tasks such as lubrication, or routine adjustments such as release valve adjustment can be accomplished without removing the unit from the lift truck. When removal does become necessary, follow the procedure given below.

1. Check that there is no load on the lift truck and that the lift truck is positioned on a solid, level floor.

2. Set the brake and block the wheels to guard against accidental rolling.

3. Raise the forks (or platform) about 12 inches and position strong, 10-inch-high supports (the automotive type is recommended) under the forks. Lower the forks onto the supports and check that the forks are securely positioned before proceeding.

4. Hold the release valve (11) open and press down on the ram head assembly until the ram (3) is in the lowest position.

5. Remove the chain from the ram head assembly. Lay the chain aside.

6. Lift the ram head assembly from the ram.

7. Raise the foot pedal to the vertical, or storage, position and remove the screws (13) securing the hydraulic unit to the lift truck.

8. Pull the base of the unit towards the rear of the truck until the top of the unit slips free of the retaining hole in the lift truck frame.

## 3-9. Hydraulic Oil Draining and Refilling. (Figure 3-2)

### a. Draining

1. Remove the hydraulic unit from the lift truck (see paragraph 3-8).

2. With the hydraulic unit at a workbench, use a vise or other suitable means to secure the unit with the base (8) elevated slightly above the top (6) and with the filler plug (4) turned up.

3. Place a clean container of at least a one-quart capacity beneath the top of the hydraulic unit to catch the draining oil.

4. Hold the release valve (11) open and press down on the chrome ram (3) to make certain that the ram is down as far as possible.

5. Unscrew and remove the filler plug and then loosen the top cap (6) to drain the hydraulic oil.

### b. Refilling.

1. Check that the top cap is secure and that the release valve is fully closed.

2. If the filler plug is installed, remove it from the side of the reservoir.

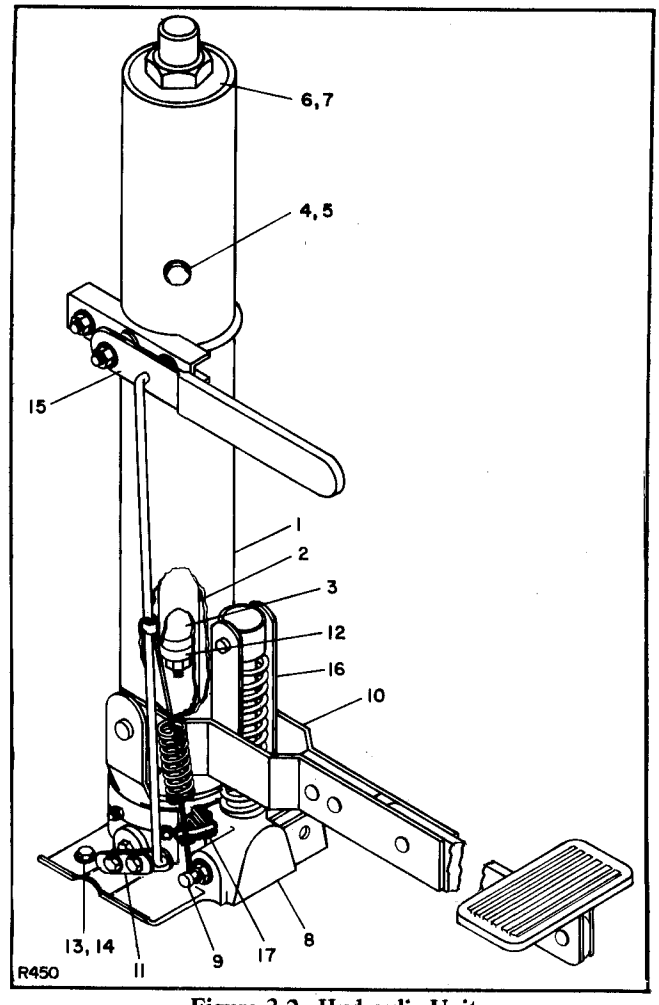


Figure 3-2. Hydraulic Unit

| INDEX NO. | PART NO. | PART NAME | NO. REQD. |
|---|---|---|---|
| | 039104 | Hydraulic Unit - 25 in. stroke, 12 oz oil capacity (for models 21P54, 21R54, 21A50, 14S57, 14A54, and 14P54 only) | 1 |
| 1 | 900046 | Reservoir | 1 |
| 2 | 900073 | Inside Cylinder | 1 |
| 3 | 900074 | Chrome Ram | 1 |
| | 039105 | Hydraulic Unit - 32 in. stroke, 16 oz oil capacity (for models 21P68, 21R68, 21A64, 14S71, 14A68, and 14P68 only) | 1 |
| 1 | 900048 | Reservoir | 1 |
| 2 | 900077 | Inside Cylinder | 1 |
| 3 | 900079 | Chrome Ram | 1 |
| | 039106 | Hydraulic Unit - 37 in. stroke, 19 oz oil capacity (for models 21P80, 21R80, 21A76, 14S83, 14A80, and 14P80 only) | 1 |
| 1 | 900049 | Reservoir | 1 |

Hydraulic Unit (Cont.)

| INDEX NO. | PART NO. | PART NAME | NO. REQD. |
|---|---|---|---|
| 2 | 900078 | Inside Cylinder | 1 |
| 3 | 900080 | Chrome Ram | 1 |
| 4 | 900052 | Filler Plug | 1 |
| 5 | 900038 | Filler Plug Gasket | 1 |
| 6 | 900072 | Top Cap (with O-ring) | 1 |
| 7 | 900041 | O-ring | 1 |
| 8 | 900351 | Base | 1 |
| 9 | 900032 | Ball Section (see figure 3-5) | 1 |
| 10 | --- | Foot Pedal Pump and Linkage (see figure 3-4) | 1 |
| 11 | --- | Release Valve and Linkage (see figure 3-3) | 1 |
| 12 | --- | Hydraulic Ram Packing (see figure 3-6) | 1 |
| 13 | 063555 | Hex Head Cap Screw, 5/16-18 x 1 | 2 |
| 14 | 077210 | Washer, 5/16 | 2 |
| 15 | 900155 | Lever Operated Release Valve and Linkage Kit (see figure 3-3) | 1 |
| 16 | 900028 | Pump Linkage Kit (see figure 3-4) | 1 |
| 17 | 900352 | Gasket | 1 |
| | 900027 | Minor Repair Kit, consisting of | |
| | 900031 | Pump Seal Kit (see figure 3-4) | 1 |
| | 900035 | 7/32 in. Ball | 2 |
| | 900036 | 5/16 in. Ball | 1 |
| | 900039 | Cotter Pin | 4 |
| | 900040 | Release Valve Packing | 1 |
| | 900041 | O-ring | 1 |
| | 900042 | Valve Ring Gasket | 1 |
| | 900043 | Ball Spring | 1 |
| | 900044 | Leather Washer | 1 |
| | 900054 | Release Valve Packing Nut | 1 |
| | 900057 | Plunger Cup | 1 |
| | 900058 | Grommet | 1 |
| | 900071 | Pal Nut | 1 |
| | 900026 | Major Repair Kit, Consisting of | |
| | 900028 | Pump Linkage Kit (see figure 3-4) | 1 |
| | 900030 | Release Valve Arm Kit (see figure 3-3) | 1 |
| | 900032 | Ball Section Kit (see figure 3-5) | 1 |
| | 900033 | Release Valve Unit Kit (see figure 3-3) | 1 |
| | 900034 | Ram Plunger Packing Kit (see figure 3-6) | 1 |
| | 900067 | Pump (see figure 3-4) | 1 |

**NOTE:** It is recommended that the hydraulic unit be filled with Big Joe Hydraulic Jack Oil, part number 055779 (1 qt.).

3. With the unit in an upright position, use a small funnel or other means to add hydraulic oil. Fill until the oil level is even with or slightly below the filler hole.

4. Install and tighten the filler plug. Wipe away any hydraulic oil that may have spilled during filling.

5. Return the lift truck to operating condition.

## 3-10. Release Valve. (Figure 3-3)

### a. Adjustment.

Perform the following procedure to adjust the hydraulic unit release valve.

1. Remove the release return spring (14, figure 3-3).

2. Loosen retaining screw (19) sufficiently to move release valve arm (18).

3. Slide the release valve arm down (clockwise) while holding the release valve arm extension (17) up to obtain 1/8 to 1/2 inch clearance between base and arm when release valve spindle (20) is tightened firmly with the fingers. If, when performing this operation, a 1/8-inch minimum clearance cannot be obtained, perform steps a through d below.

(a) Remove retaining screw (19) and washer (16).

(b) Remove release valve arm from the hex head of the release valve spindle and, with the spindle tightened firmly with the fingers, index the slotted hole in the release valve arm one notch counterclockwise and reinstall on the spindle head.

(c) Reinstall retaining screw and washer but do not tighten.

(d) Perform step 3 above.

4. Tighten retaining screw.

5. Reinstall release return spring.

### b. Disassembly.

Perform the following procedure when repair of the release valve is necessary.

1. Remove the hydraulic unit from the lift truck and drain the hydraulic oil (paragraphs 3-8 and 3-9).

2. Secure the unit in a vise and remove cotter pin (15); then pull the lower end of the release pull rod (11) free of the release valve arm extension (17).

3. Remove the release return spring (14).

4. Remove retaining screw (19) and washer (16) and pull the release valve arm (18) from the hexagonal head of release valve spindle (20). Detach release valve arm extension (17).

5. Remove the release valve packing nut (21), which also removes pal nut (22) and the release valve spindle. Separate the three parts if replacement is necessary.

6. Turn the unit over and shake out the leather washer (23), release valve packing (24), and steel ball (25). If necessary, use a small screwdriver or similar tool to work the parts out.

### c. Assembly.

**NOTE:** It is recommended that certain parts (indicated in figure 3-3) be replaced each time the equipment is dismantled. These parts are available separately or as part of Release Valve Arm Kit, No. 900030.

Reverse the procedure of paragraph b to assemble the release valve and linkage.

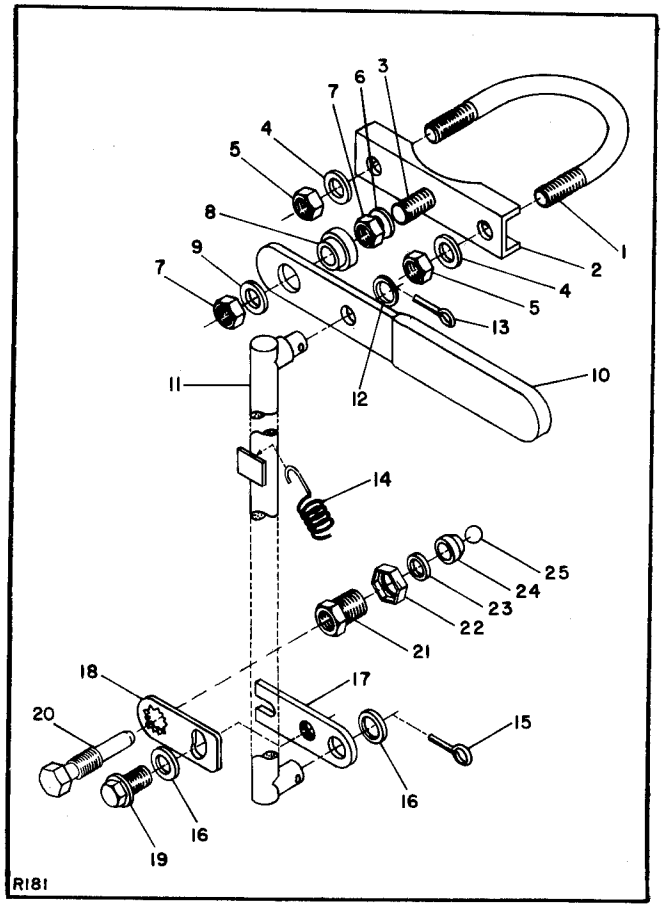


Figure 3-3. Release Valve and Linkage

| INDEX NO. | PART NO. | PART NAME | NO. REQD. |
|---|---|---|---|
| | | Release Valve and Linkage<br>The following parts are available individually or as part of Lever Operated Release Valve and Linkage Kit, No. 900155 | |
| | 900087 | Clamp Assy | 1 |
| 1 | NP | U-Bolt | 1 |
| 2 | NP | Clamp Bracket | 1 |
| 3 | NP | Cap Screw | 1 |
| 4 | NP | Lock Washer | 2 |
| 5 | NP | Hex Nut | 2 |
| 6 | 900093 | Washer | 1 |
| 7 | 900090 | Hex Nut | 2 |
| 8 | 900092 | Spacer | 1 |
| 9 | 900091 | Lock Washer | 1 |
| 10 | 900088 | Release Pull Rod Lever | 1 |
| 11 | 900086 | Release Pull Rod | 1 |
| 12 | 900059 | Washer | 1 |
| 13 | 060403† | Cotter Pin | 1 |
| | | The following parts are available individually or as part of Release Valve Arm Kit, No. 900030* | |
| 14 | 900053 | Release Return Spring | 1 |
| 15 | 060403† | Cotter Pin | 1 |
| **16 | 900059 | Washer | 2 |
| **17 | 900083 | Release Valve Arm Extension | 1 |
| **18 | 900082 | Release Valve Arm | 1 |
| 19 | 900084 | Sems Screw | 1 |
| | | The following parts are available individually or as part of Release Valve Unit Kit, No. 900033* | |
| 20 | 900085 | Release Valve Spindle | 1 |
| 21 | 900054† | Release Valve Packing Nut | 1 |
| 22 | 900071† | Pal Nut | 1 |
| 23 | 900044† | Leather Washer | 1 |
| 24 | 900040† | Release Valve Packing | 1 |
| 25 | 900035† | 7/32 in. Ball | 1 |

†Included in Minor Repair Kit, No. 900027 (see figure 3-2 parts list)
*Included in Major Repair Kit, No. 900026 (see figure 3-2 parts list)
**Should be replaced when equipment is dismantled

## 3-11. Hydraulic Pump and Foot Pedal. (Figure 3-4)

### a. Disassembly

1. Remove the hydraulic unit from the lift truck and drain the hydraulic oil (see paragraphs 3-8 and 3-9).

2. Remove the left and right foot pedal weldments (20, 21) by removing four screws and washers (22,23).

3. Remove cotter pins (15) securing foot pedal (18) to pump linkages (10); then detach the foot pedal.

4. Remove the cotter pin (14) to remove clevis pin (12), pump linkages and washers (13).

5. Lift off spring retainer (11), pump link spring (16), and pump cover (17).

6. Remove the pump assembly (1) by unscrewing the assembly from the base of the hydraulic unit.

7. Unscrew pump cap (2) and remove pump packing (7) from the cap.

8. Remove pump housing (3).

9. Carefully place pump plunger (4) in a vise and remove nut (6).

10. Slip off brass retainer (5), leather washers (8), and O-ring (9).

### b. Assembly.

**NOTE:** It is recommended that certain parts (indicated in figure 3-4) be replaced each time the equipment is dismantled. These parts are available separately or as part of Minor Repair Kit, No. 900027.

Reverse the procedure of paragraph a to assemble the hydraulic pump and foot pedal. Place sealer on the pump threads when installing the pump assembly into the base.

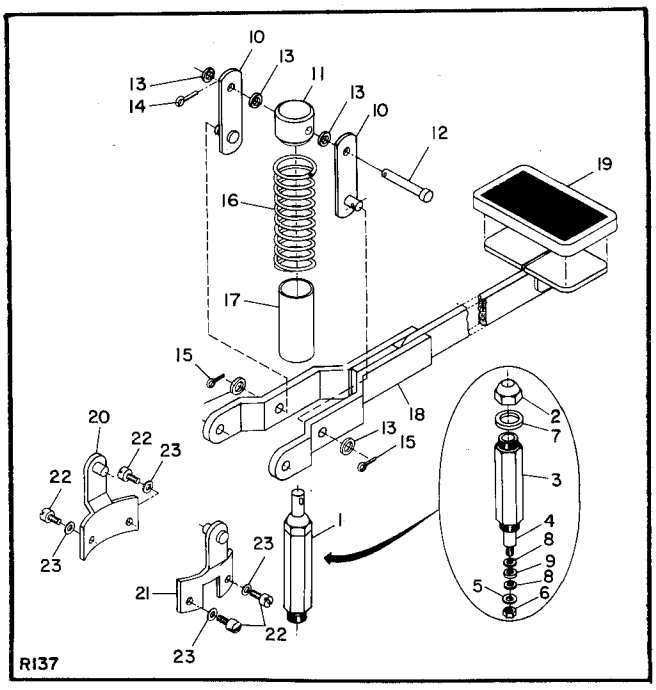


**Figure 3-4. Pump, Pump Linkage and Foot Pedal**

| INDEX NO. | PART NO. | PART NAME | NO. REQD. |
|---|---|---|---|
| | --- | Pump, Pump Linkage, and Foot Pedal | |
| 1 | 900067* | Pump (Complete) | 1 |
| 2 | NP | Pump Cap | 1 |
| 3 | NP | Pump Housing | 1 |
| 4 | NP | Pump Plunger | 1 |
| 5 | NP | Brass Retainer | 1 |
| 6 | NP | Nut | 1 |
| | | The following parts are available as Pump Seal Kit, No. 900031† | |
| | | For 1/2-in. Pumps: | |
| **7 | 900359† | Pump Packing | 1 |
| **8 | 900360† | Backup Washer | 2 |
| **9 | 900361† | O-ring | 1 |
| | | For 9/16-in. Pumps: | |
| **7 | 900068† | Pump Packing | 1 |
| **8 | 900069† | Backup Washer | 2 |
| **9 | 900070† | O-ring | 1 |
| | --- | Pump Linkage | |
| | | The following parts are available as Pump Linkage Kit, No. 900028* | |
| 10 | 900045 | Pump Link | 2 |
| 11 | 900060 | Spring Retainer (for 9/16 in. pumps) | 1 |
| | 900278 | Spring Retainer (for 1/2 in. pumps) | REF |
| 12 | 900076 | Clevis Pin | 1 |
| 13 | 900055 | Washer | 5 |
| 14 | 900039† | Cotter Pin | 1 |
| 15 | 060403† | Cotter Pin | 2 |
| 16 | 900062 | Pump Link Spring | 1 |
| 17 | 900061 | Pump Cover | 1 |
| | --- | Foot Pedal | |
| | | The following parts are available as Foot Pedal and Weldment Kit, No. 900029 (see note) | |
| 18 | 900064 | Foot Pedal | 1 |
| 19 | 900075 | Pedal Pad | 1 |
| | | The following parts are available as Weldment Kit No. 900283 | |
| 20 | 900285 | Foot Pedal Weldment (right) | 1 |
| 21 | 900286 | Foot Pedal Weldment (left) | 1 |
| 22 | 900284 | Cap Screw | 4 |
| 23 | 900287 | Lock Washer | 4 |

Note: 900029 also includes 2 each of Items 900039 and 900055

*Included in Major Repair Kit, No. 900026 (see figure 3-2 parts list)

†Included in Minor Repair Kit, No. 900027 (see figure 3-2 parts list)

**Should be replaced when equipment is dismantled

## 3-12. Ball Section. (Figure 3-5)

**a. Disassembly.**

1. Remove the hydraulic unit from the lift truck and drain the hydraulic oil (see paragraphs 3-8 and 3-9).

2. Use a wrench to remove valve plug (5).

3. Use a small screwdriver or pointed tool to remove valve ring gasket (4) and the ball spring (3).

4. Tilt the unit over and shake out the 5/16-inch ball (2) and 7/32-inch ball (1). If necessary, tap unit lightly on the workbench to dislodge two balls.

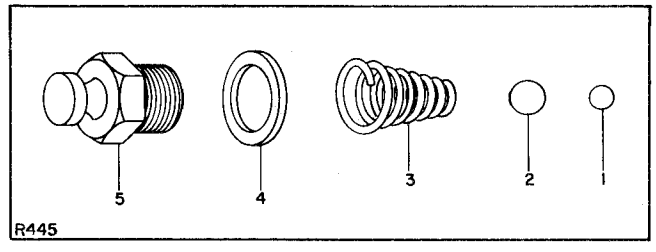


**Figure 3-5. Ball Section Kit**

| INDEX NO. | PART NO. | PART NAME | NO. REQD. |
|---|---|---|---|
| | | The following parts are available individually or as Ball Section Kit No. 900032* | |
| 1 | 900035† | 7/32-in. Ball | 1 |
| 2 | 900036† | 5/16-in. Ball | 1 |
| 3 | 900043† | Ball Spring | 1 |
| **4 | 900042† | Valve Ring Gasket | 1 |
| 5 | 900056 | Valve Plug | 1 |

*Included in Major Repair Kit, No. 900026 (see figure 3-2 parts list)

†Included in Minor Repair Kit, No. 900027 (see figure 3-2 parts list)

**Should be replaced when equipment is dismantled

**b. Assembly.**

**NOTE:** It is recommended that certain parts (indicated in figure 3-5) be replaced each time the equipment is dismantled. These parts are available separately or as part of Minor Repair Kit, No. 900027.

Reverse the procedure given in paragraph a to assemble the ball section.

## 3-13. Chrome Ram and Inside Cylinder. (Figure 3-6)

**a. Disassembly**

1. With the hydraulic unit out of the lift truck and drained of hydraulic oil (see paragraphs 3-8 and 3-9), lay the unit on a workbench and remove the top cap by unscrewing it with a wrench.

**NOTE:** If the top cap comes off alone, proceed with step 5. If the inner cylinder and chrome ram come free with the top cap, perform steps 2 through 4.

2. Withdraw the combination of top cap, inner cylinder, and chrome ram from the reservoir.

**CAUTION:** Excessive pressure may damage the inner cylinder.

3. Carefully clamp the inner cylinder in a vise and use a wrench to remove the top cap. Remove the O-ring from inside the top cap.

**CAUTION:** The highly polished chrome ram may be damaged if dropped or brought into sharp contact with metal objects.

4. Carefully withdraw the chrome ram from the inner cylinder.

**NOTE:** If steps 2 through 4 were performed, go to step 8.

5. If the top cap comes off alone, remove the O-ring inside the top cap.

**CAUTION:** The highly polished chrome ram may be damaged if dropped or brought into sharp contact with metal objects.

6. Secure the base of the unit in a vise and carefully remove the chrome ram from the inner cylinder.

**NOTE:** For (all newer) lift trucks with lever operated release pull rod, it is necessary to loosen the clamp and U-bolt securing the release valve linkage to the reservoir before continuing with the next step.

7. Break the reservoir free of its bond to the base and withdraw it a sufficient distance to permit access to the lower portion of the inner cylinder; then unscrew the inside cylinder from the base. Remove the inner cylinder and the gasket (17, figure 3-2) from the unit.

8. Disassemble the chrome ram by removing plunger cup nut spreader (1, figure 3-6).

9. Remove the grommet (2) and plunger cup (3).

10. Remove the ram limit ring (4) by using a pointed tool or small screwdriver to work the ring from the retaining groove.

**b. Assembly**

**NOTE:** It is recommended that certain parts (indicated in figure 3-6) be replaced each time the equipment is dismantled. These parts are available separately or as part of Minor Repair Kit, No. 900027.

1. Install the ram limit ring (4) by fitting the ring into the retaining groove on the chrome ram.

2. Install the plunger cup (3) and grommet (2).

3. Install and tighten the plunger cup nut spreader (1).

**NOTE:** Inner cylinder must be installed with threaded end at bottom of assembly (toward base).

4. Secure the base of the hydraulic unit in a vise and insert the inner cylinder into the reservoir. Hold the bottom of the reservoir a sufficient distance fromthe base to permit access to the lower end of the inner cylinder, then screw the inner cylinder into the base.

5. Carefully insert the chrome ram into the inner cylinder. Push the ram as far in as possible.

**CAUTION:** When mating the reservoir and base, the mating surfaces must be sealed tightly.

6. Generously apply gasket cement or adhesive such as Armstrong Industrial Adhesive N-171 to shoulder and side of base (the surface that mates with bottom and side of reservoir.)

**NOTE:** The adhesive container may have special instructions for using the adhesive.

7. Allow adhesive to get tacky and check that none has spread or run below the shoulder.

8. Set replacement gasket and reservoir into base and align properly.

9. Install replacement O-ring in top cap.

10. Grease mating threads of top cap and reservoir.

11. Install and tighten top cap (115 to 120 ft-lbs of torque recommended). Be certain to maintain reservoir alignment while tightening top cap.

**NOTE:** For (all newer) lift trucks with lever operated release pull rod, it is necessary to tighten the clamp and U-bolt which secures the release valve linkage to the unit.

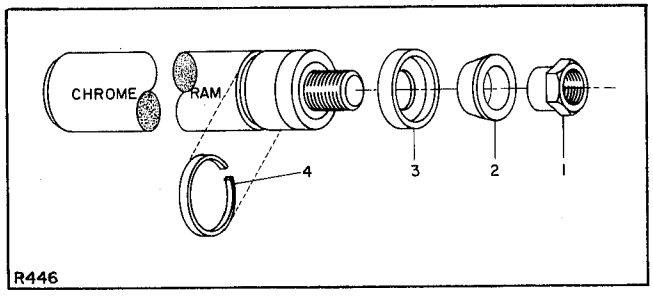


**Figure 3-6. Chrome Ram and Packing Material**

| INDEX NO. | PART NO. | PART NAME | NO. REQD. |
|---|---|---|---|
| | 900034* | Ram Plunger Packing Kit | REF |
| 1 | 900037 | Plunger Cup Nut Spreader | 1 |
| **2 | 900058† | Grommet | 1 |
| 3 | 900057† | Plunger Cup | 1 |
| 4 | 900050 | Ram Limit Ring | 1 |
| ** | 900041 | Top Cap O-ring (see figure 3-2) | 1 |

*Included in Major Repair Kit, No. 900026 (see figure 3-2 parts list)

†Included in Minor Repair Kit No. 900027 (see figure 3-2)

**Should be replaced when equipment is dismantled

## 3-14. Lift Chain. (Figure 3-7)

### a. Adjustment.

1. With the lift carriage (1) fully lowered, open the release valve and press down on the ram head assembly (8) until the ram is as far down as possible.

2. Loosen the upper nut (18) of the chain adjusting assembly.

3. Use a wrench to tighten the lower nut (17) until there is no appreciable slack in the lift chain.

4. Tighten the upper nut.

### b. Removal.

1. With no load on the lift truck, set the brakes and block the wheels to guard against accidental rolling.

2. Raise the lift carriage about 12 inches and position strong, 10-inch high supports (the automotive type is recommended) under the forks. Lower the forks onto the supports and check that the position is secure.

3. Hold the release valve open and press down on the ram head assembly until the lift chain (13) can be slipped free of the ram head pulley (9).

4. Remove the cotter pin (15) and clevis pin (14) securing each end of the chain.

5. Remove the chain.

### c. Installation

To install the lift chain, perform the steps of paragraph 3-14b in reverse order. After installation, check the lift chain tension and adjust as necessary according to paragraph a.

## 3-15. Pallet Roller. (Figure 3-7)

### a. Removal.

1. Disconnect the lift chain from the lift carriage.

2. Remove the lift carriage from the lift truck. This is accomplished by using an overhead hoist to lift the carriage free or by laying the lift truck over backward and rolling the lift carriage out of the mast channels.

**NOTE:** Note the location of the thrust washers so that they can be replaced in the same position.

3. With the lift carriage out of the lift truck, the pallet rollers (6) and thrust washers (7) can be slipped free of the spindles (20).

### b. Installation.

Replace a pallet roller by reversing the procedure of paragraph a. New rollers may require refitting of thrust washers. Use appropriate thicknesses to achieve snug fit of rollers to mast channels with minimum sideplay yet allowing rollers to roll free.

## 3-16. Adjustable Fork Removal. (Figure 3-7)

1. Remove the retaining ring (5) at the end of the shaft (4) on which the fork to be removed is located.

2. Pull the shaft out from the opposite end until the fork is free.

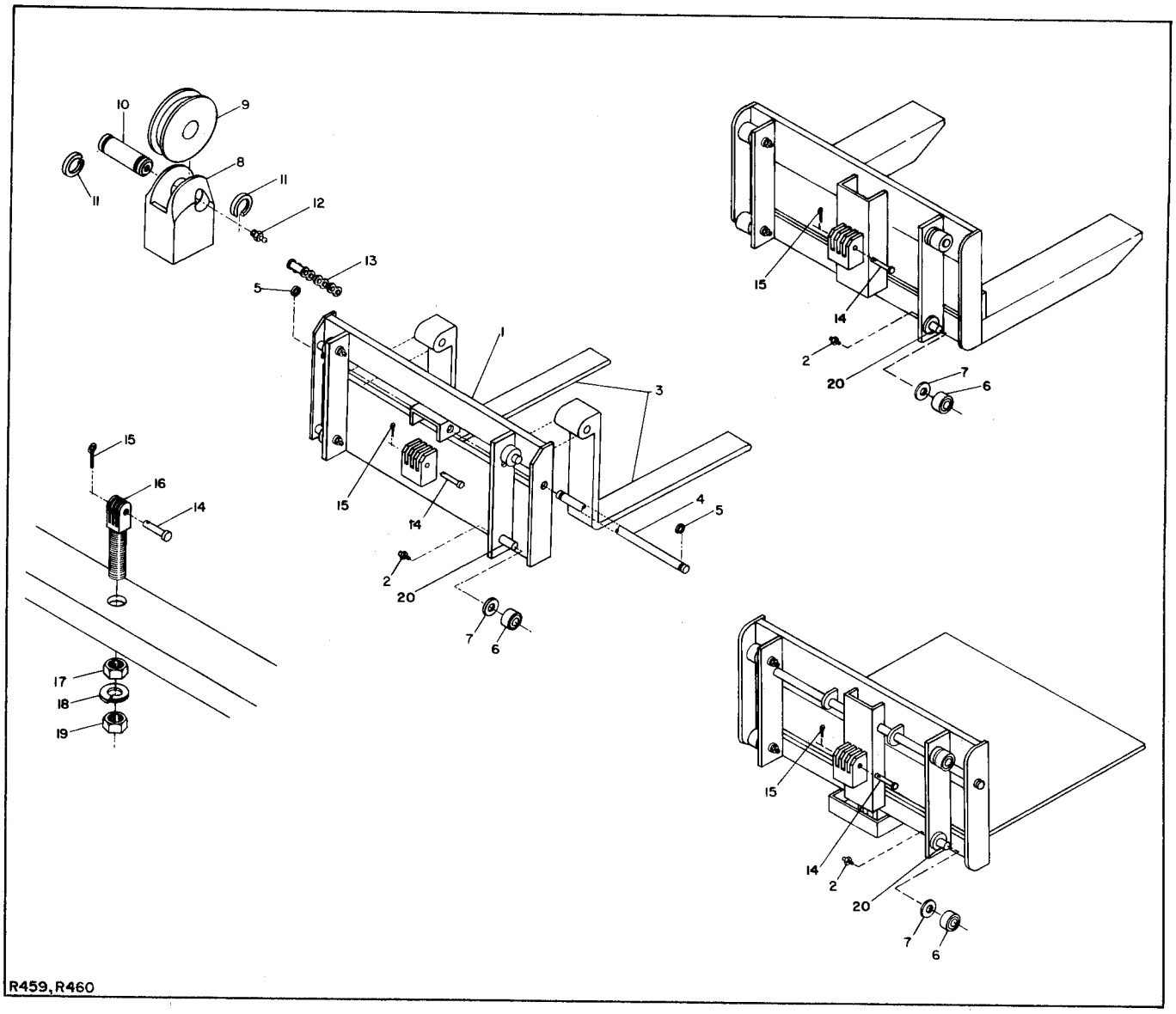


**Figure 3-7. Lift Carriage**

| INDEX NO. | PART NO. | PART NAME | NO. REQD. |
|---|---|---|---|
| | ——— | Lift Carriage and Associated Parts | |
| 1 | 500035 | Lift Carriage (Platform type, for Series 14S and 21P) | 1 |
| | 500036 | Lift Carriage (Platform type, for Series 14P) | 1 |
| | 500038 | Lift Carriage (Fork type, for Series 21R) | 1 |
| | 500037 | Lift Carriage (Adjustable fork type, for Series 14A and 21A) | 1 |
| 2 | 025712 | Grease Fitting | 4 |
| | | For Series 14A only: | |
| 3 | 500924 | Adjustable Fork | 2 |
| 4 | 296401 | Shaft | 1 |
| 5 | 061725 | Retaining Ring | 2 |
| | | For Series 21A only: | |
| 3 | 500055 | Adjustable Fork | 2 |
| 4 | 240603 | Shaft | 1 |
| 5 | 061719 | Retaining Ring | 2 |
| 6 | 062308 | Pallet Roller | 4 |
| 7 | 053000 | Spacer Thrust Washer 3/32" | A/R |
| | 053001 | Spacer Thrust Washer 1/8" | A/R |
| | 053002 | Spacer Thrust Washer 5/32" | A/R |
| | 053003 | Spacer Thrust Washer 3/16" | A/R |
| | 500034 | Ram Head Assy | |
| 8 | 800096 | Ram Head | 1 |
| 9 | 800107 | Sheave | 1 |
| 10 | 060203 | Sheave Pin | 1 |
| 11 | 061722 | Retaining Pin | 2 |
| 12 | 025712 | Grease Fitting | 1 |
| 13 | VAR | Chain (308200) | A/R |
| 14 | 060303 | Chain Pin | 2 |
| 15 | 060403 | Cotter Pin | 2 |
| 16 | 052752 | Chain Adjusting Lug | 1 |
| 17 | 059445 | Hex Nut | 1 |
| 18 | 059545 | Jam Nut | 1 |
| 19 | 077215 | Lock Washer | 1 |
| 20 | NP | Spindle | 4 |

## 3-17. Brakes. (Figure 3-8)

**a. Adjustment.**

1. Release the brakes.

2. To tighten, turn adjustment rod (12) clockwise to expose more threads at clevis (8).

3. To loosen, turn adjustment rod counterclockwise.

**b. Disassembly.**

1. Release the brakes.

2. At the left-hand side of the lift truck, opposite the brake handle, loosen set screw (4) securing the brake arm (3) and handle assembly (1).

3. Pull brake arm free of handle assembly and remove woodruff key (5).

4. Remove cotter pins (10) and clevis pins (9) from both sides of the brake assembly.

5. Unscrew the clevis (8) on each side and lift off two adjustment rods (12).

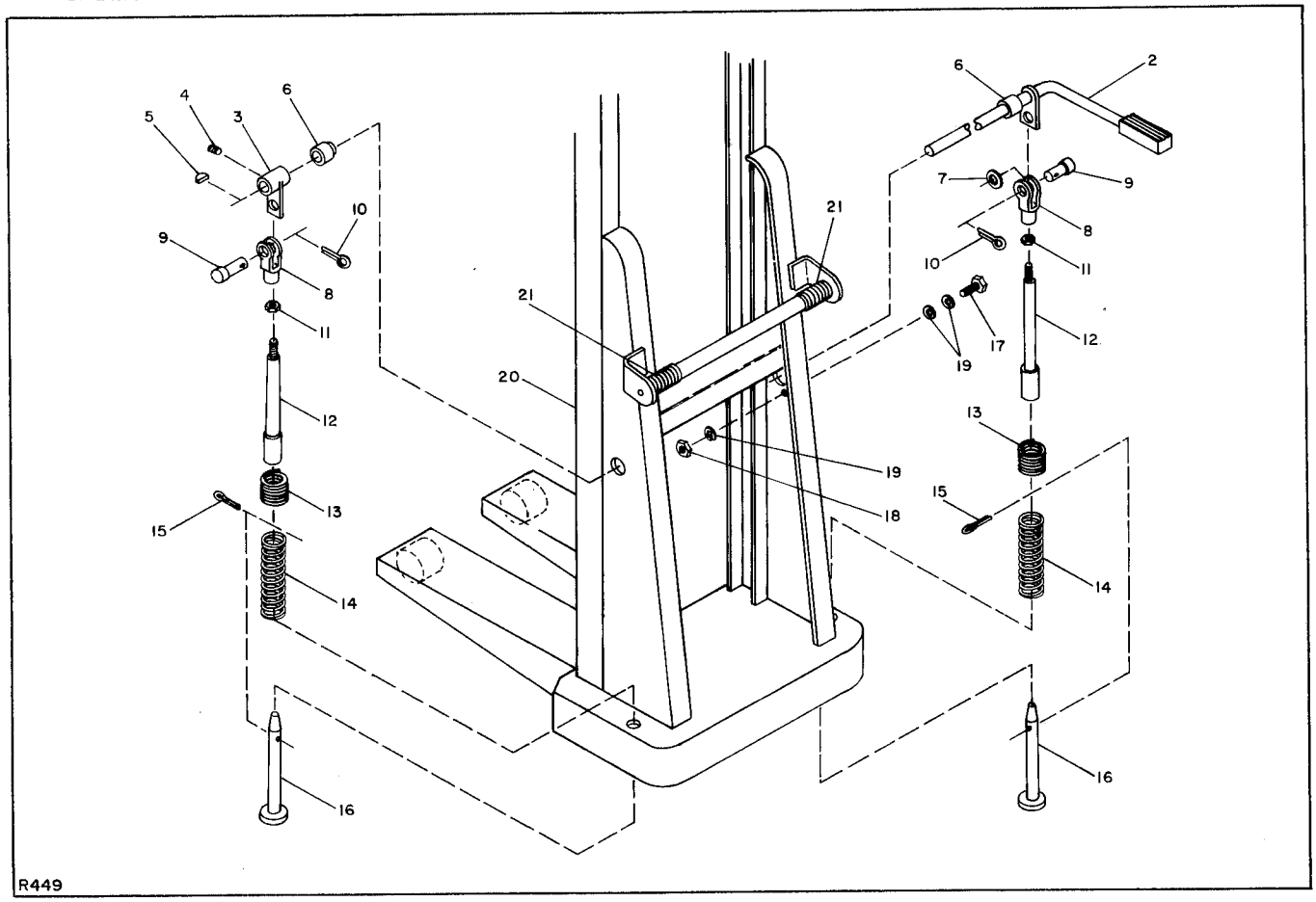


**Figure 3-8. Brake Assembly**

| INDEX NO. | PART NO. | PART NAME | NO. REQD. |
|---|---|---|---|
| | 501662 | Brake Module Assembly (all models except Series 14P) | 1 |
| | 501663 | Brake Module Assembly (for Series 14P only) | 1 |
| 1 | 500030 | Brake Handle (all models except Series 14P) | 1 |
| | 500124 | Brake Handle (for Series 14P only) | 1 |
| 2 | 057500 | Brake Handle Grip | 1 |
| 3 | 050601 | Brake Arm | 1 |
| 4 | 073474 | Set Screw | 1 |
| 5 | 057901 | Woodruff Key | 1 |
| 6 | 053110 | Brake Spacer Bearing | 2 |
| 7 | 077054 | Clevis Spacer | 1 |
| 8 | 056201 | Brake Clevis | 2 |
| 9 | 060302 | Clevis Pin | 2 |
| 10 | 060417 | Cotter Pin | 2 |
| 11 | 059433 | Hex Nut, 7/16-10 thin | 2 |
| 12 | 500032 | Brake Rod | 2 |
| 13 | 075005 | Upper Spring | 2 |
| 14 | 075006 | Brake Lifter Spring | 2 |
| 15 | 060448 | Cotter Pin | 2 |
| 16 | 500108 | Brake Plunger with Molded-On Pad (all models except Series 14S) | 2 |
| | 500477 | Brake Plunger with Molded-On Pad (for Series 14S only) | 2 |
| 17 | 063552 | Hex Head Cap Screw, 5/16-18 x 5/8 | 2 |
| 18 | 059426 | Hex Nut, 5/16-18 | 2 |
| 19 | 077210 | Lock Washer, 5/16 | 6 |
| 20 | VAR | Main Frame | 1 |
| 21 | 057501 | Control Handle Grip | 2 |

6. Lift off upper springs (13) and remove cotter pins (15). This permits the two brake lifter springs (14) to be lifted off.

**NOTE:** Lift truck must be tilted, raised on blocks or otherwise raised sufficiently to permit slipping brake plungers (16) out at bottom of lift truck.

7. Remove brake plungers.

8. Work brake handle assembly out of lift truck, removing spacers (6) as handle assembly comes free.

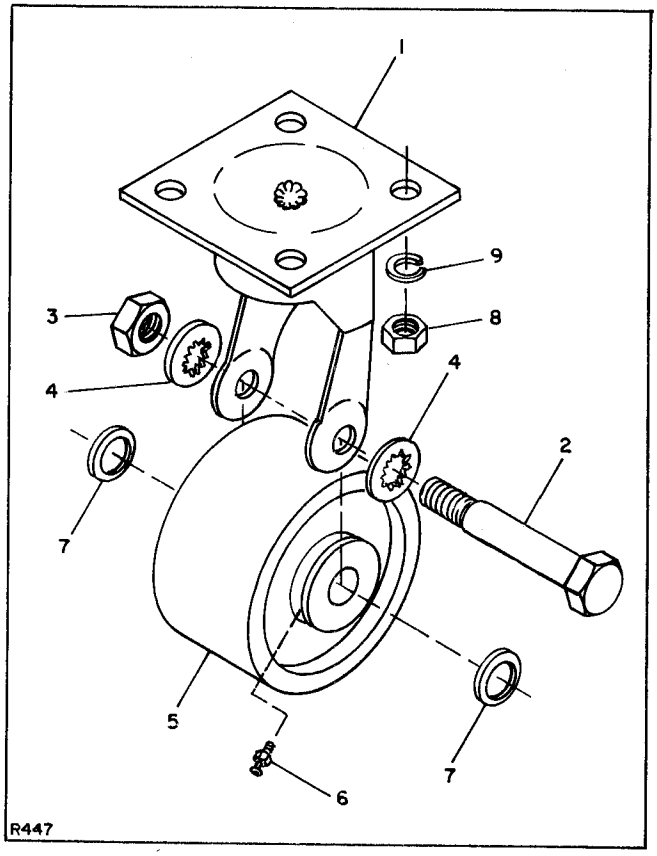


**Figure 3-9. Caster Wheel Assembly**

| INDEX NO. | PART NO. | PART NAME | NO. REQD. |
|---|---|---|---|
| | 054300 | 3-in. Steel Caster and Wheel Assy (for Series 14A and 14P) | 2 |
| | 054301 | 3-in. Rubber Caster and Wheel Assy | 2 |
| | 054304 | 3-in. Phenolic Caster and Wheel Assy | 2 |
| 1 | 054325 | Caster | 1 |
| 2 | 063580 | Axle | 1 |
| 3 | 059427 | Axle Nut | 1 |
| 4 | 077515 | Lock Washer | 2 |
| 5 | 078206 | 3-in. Steel Wheel and Bearing Assy | 1 |
| 5 | 078207 | 3-in. Rubber Wheel and Bearing Assy | 1 |
| 5 | 078211 | 3-in. Phenolic Wheel and Bearing Assy | 1 |
| | 054400 | 4-in. Steel Caster and Wheel Assy (for Series 21A, 21P, and 21R) | 2 |
| | 054401 | 4-in. Rubber Caster and Wheel Assy | 2 |
| | 054402 | 4-in. Phenolic Caster and Wheel Assy | 2 |
| | 054406 | 4-in. Polyurethane Caster and Wheel Assy | 2 |
| 1 | 054425 | Caster | 1 |
| 2 | 050698 | Axle | 1 |
| 3 | 059438 | Axle Nut | 1 |
| 5 | 078400 | 4-in. Steel Wheel and Bearing Assy | 1 |
| 5 | 078401 | 4-in. Rubber Wheel and Bearing Assy | 1 |
| 5 | 078404 | 4-in. Phenolic Wheel and Bearing Assy | 1 |
| 5 | 078408 | 4-in. Polyurethane Wheel and Bearing Assy | 1 |
| 6 | 025712 | Grease Fitting | 1 |
| 7 | 077058 | Thrust Washer | 2 |
| | 054600 | 6-in. Steel Caster and Wheel Assy (for Series 14S) | 2 |
| | 054601 | 6-in. Rubber Caster and Wheel Assy | 2 |
| | 054603 | 6-in. Phenolic Caster and Wheel Assy | 2 |
| | 054623 | 6-in. Polyurethane Caster and Wheel Assy | 2 |
| 1 | 054602 | Caster | 1 |
| 2 | 050698 | Axle | 1 |
| 3 | 059438 | Axle Nut | 1 |
| 5 | 078600 | 6-in. Steel Wheel and Bearing Assy | 1 |
| 5 | 078601 | 6-in. Rubber Wheel and Bearing Assy | 1 |
| 5 | 078652 | 6-in. Phenolic Wheel and Bearing Assy | 1 |
| 5 | 078654 | 6-in. Polyurethane Wheel and Bearing Assy | 1 |
| 6 | 025712 | Grease Fitting | 1 |
| 7 | 077058 | Thrust Washer | 2 |
| 8 | 059426 | Hex Nut | 8 |
| 9 | 077210 | Lock Washer | 8 |

## 3-18. Wheel Removal and Installation. (Figure 3-9 and 3-10)

Before removing a wheel, slightly raise the side of the lift truck to which the wheel is fixed. This is done most quickly by pushing on the upper part of the lift truck frame to tilt the lift truck. Place blocks of sufficient height beneath the chassis to support the truck and allow the wheel to rotate free of the ground. Check that the arrangement is secure before proceeding. Use figure 3-9 or 3-10, as applicable, as a guide for continuing the procedure.

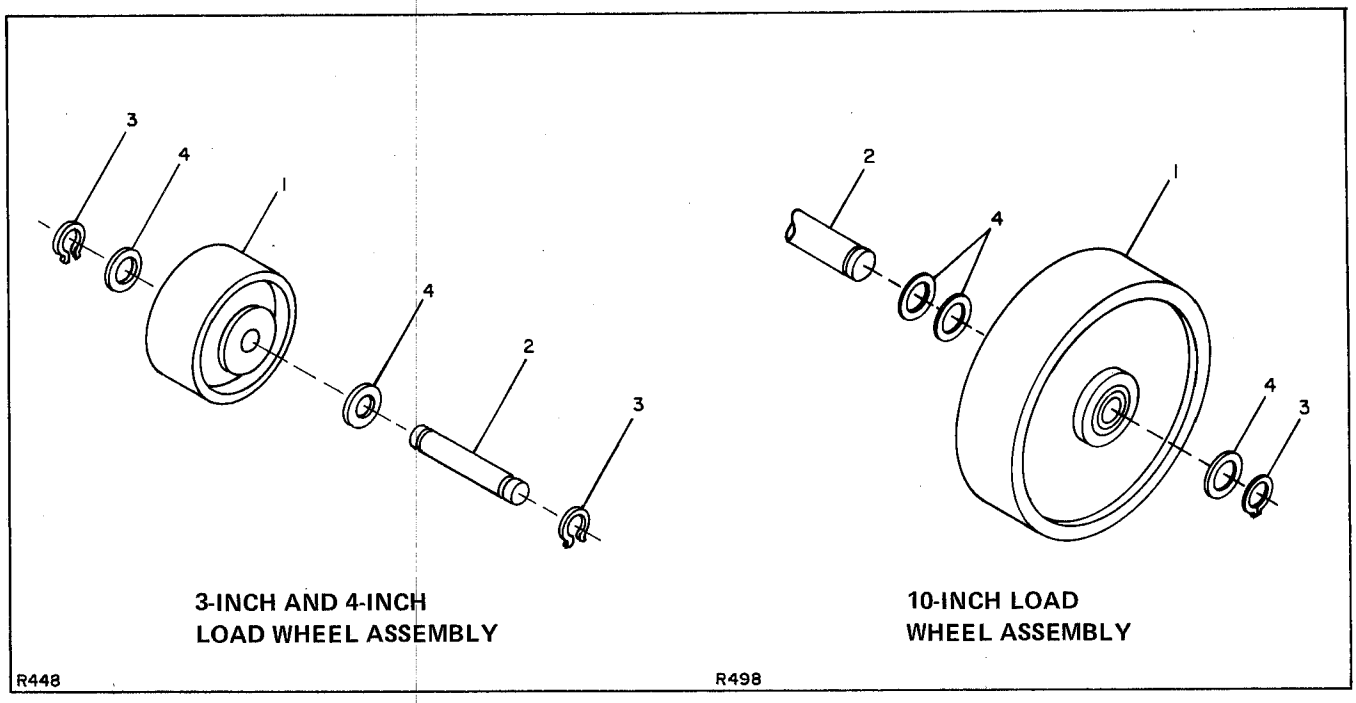


**Figure 3-10. Load Wheel Assembly**

| INDEX NO. | PART NO. | PART NAME | NO. REQD. |
|---|---|---|---|
| 1 | 078250 | 3-in. Steel Load Wheel and Bearing Assy (for Series 21A, 21P, and 21R) | 2 |
| 1 | 078252 | 3-in. Rubber Load Wheel and Bearing Assy | 2 |
| 1 | 078253 | 3-in. Phenolic Load Wheel and Bearing Assy | 2 |
| 1 | 078251 | 3-in. Polyurethane Load Wheel and Bearing Assy | 2 |
| 1 | 078450 | 4-in. Steel Load Wheel and Bearing Assy (for Series 21A, 21P, and 21R) | 2 |
| 1 | 078401 | 4-in. Rubber Load Wheel and Bearing Assy | 2 |
| 1 | 078404 | 4-in. Phenolic Load Wheel and Bearing Assy | 2 |
| 1 | 078408 | 4-in. Polyurethane Load Wheel and Bearing Assy | 2 |
| | | For 3-in. and 4-in. Load Wheels: | |
| 2 | 294501 | Axle | 2 |
| 3 | 061719 | Retaining Ring | 4 |
| 4 | 077010 | Thrust Washer | 4 |

| INDEX NO. | PART NO. | PART NAME | NO. REQD. |
|---|---|---|---|
| 1 | 079105 | 10-in. Rubber Load Wheel and Bearing Assy (for Series 14A, 14P, and 14S) | 2 |
| 2 | 240601 | 29-in. Axle (for Series 14A and 14S) | 1 |
| 2 | 240603 | 25-1/4-in. Axle (for Series 14P) | 1 |
| 3 | 061719 | Retaining Ring | 2 |
| 4 | 077010 | Thrust Washer | 6 |
| 1 | 079151 | 10-in. Phenolic Load Wheel and Bearing Assy (for Series 14A, 14P, and 14S) | 2 |
| 2 | 240620 | 28-in. Axle (for Series 14A and 14S) | 1 |
| 2 | 240621 | 24-in. Axle (for Series 14P) | 1 |
| 3 | 061719 | Retaining Ring | 2 |
| 4 | 077010 | Thrust Washer | 6 |

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