



SUMMERS[®]

Operator's Manual

MODEL 400, 410 & 500
Fork Type Rockpicker

MODEL 600
Rotary Rockpicker, Hydraulic Chain Drive

MODEL 610
Rotary Rockpicker, Ground Drive

MODEL 700
Rotary Rockpicker, Hydraulic Direct Drive

SUMMERS MANUFACTURING CO., INC.
MADDOCK, NORTH DAKOTA 58348 (701) 438-2855
DEVILS LAKE, NORTH DAKOTA 58301 (701) 662-5391



Warranty

Summers warrants only products of its manufacture against operational failure caused by defective materials or workmanship which occur during normal use within 12 months from the date of purchase by the end user from Summers' dealer.

Summers' obligation is to replace free of charge any part of any product that Summers inspection shows to be defective excluding transportation charges to Maddock, ND or Devils Lake, ND and return and also excluding all transportation costs from Summers' dealer to the dealer's customer and all other costs such as removal and installation expense.

Summers shall not be liable for loss of time, manufacturing costs, labor, material, loss of profits, consequential damages, direct or indirect, because of defective products whether due to rights arising under the contract of sale or independently thereof, and whether or not such claim is based on contract, tort or warranty.

Written permission for any warranty claim return must be first obtained from authorized Summers' personnel. All returns must be accompanied with a complete written explanation of claimed defects and the circumstances of operational failure.

Written warranty for all component parts used in the manufacture of Summers products is available upon request. Warranty of such component parts will be determined by said component manufacturer upon their inspection of the claimed defective part.

This express warranty is the sole warranty of Summers. There are no warranties which extend beyond the warranty herein expressly set forth. The sales for products of Summers under any other warranty or guarantee express or implied is not authorized. This warranty voids all previous issues.

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GENERAL INFORMATION

This book is composed of two basic sections: Operation and Parts Breakdown.

The operation section provides information for proper operation and maintenance of your Summers Rockpicker.

The parts breakdown section provides a complete parts breakdown for each model rockpicker.

Reference to "Right" or "Left" in this book is determined when machine is viewed from the rear.

It is the policy of the company to improve its products whenever possible and practical to do so. We reserve the right to make changes or improvements in the design or construction of parts at any time without incurring obligation to install such changes on products previously delivered.

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All hose sizes are given as inside diameters unless otherwise specified.

Abbreviations used in this manual:

NPT-M -- National Pipe Thread, Male

NPT-F -- National Pipe Thread, Female

ORB -- O-Ring Boss

NC -- Unified National Coarse Thread

NF -- Unified National Fine Thread

NSS -- Not Service Separately

NAP -- Not Available As Parts

INITIAL SET-UP AND MAINTENANCE

ROAD TOWING

If rockpicker is to be towed extended distances on the road, reverse hitch so rockpicker trails straight behind. Check that all wheel bearings are well greased and remove the drive chain on ground drive models.

HITCH AND SPINDLE SET-UP

Install hitch at offset position, attach hitch jack and set up hydraulic hose stand. On the model 400 rockpicker, attach rope (not supplied) to selector valve lever.

400 & 410 Models Only: Attach spindle w/hub to frame using bottom set of holes for 7/60 x 15" tires. If equipped with optional 11L x 15" tires, attach spindles to frame using top set of holes.

500, 600 & 700 Models Only: Attach spindles w/hub to frame with spindle down for 11L x 15" tires. If equipped with optional 14L x 16.1" tires, attach special heavy duty spindle (triple gussets) to frame such that single gusset is on top.

610 Models Only: Attach spindle w/hub to right side of frame with spindle down for 11L x 15" tires. If equipped with optional 14L x 16.1" tire, attach special heavy duty spindle (triple gussets) to frame such that single gusset is on top. The left side only can use an 11L x 15" tire.

CHARGING HYDRAULIC SYSTEM

400, 410 & 500 Models Only: Do not make any adjustments on cylinder threaded stroke controls until hydraulic lines and cylinders have been filled with oil.

600, 610 & 700 Models Only: Remove safety holding blocks located under rake lifting arms after hydraulic lines and cylinders have been filled with oil.

GROUND DRIVE CLUTCH SERVICE

610 Models Only: The reel clutch and spring are greased and painted over at the factory. This part must be thoroughly cleaned and lightly lubricated with dry graphite before operation. The clutch and spring must be kept free of dust and dirt at all times.

BEFORE INITIAL OPERATION

1. After receiving your rockpicker, it is a good idea to double check the entire machine so that all bolts are securely tightened.
2. Make sure all grease fittings are in place and greased properly.
3. Inflate all lift tires to the recommended inflation pressure (see chart on next page) and check wheel lug bolts.

FIELD OPERATION

CAUTION: ALL MODELS . . . NEVER run machine into a buried rock in an effort to dig rocks. Pry the rock loose first. These machines are not designed to dig rocks. To do so will void the warranty.

ADJUSTMENTS FOR PICKING: MODEL 400 AND 410 FORK TYPE

Adjust front fork to desired picking depth by using threaded stroke control adjustment on fork hydraulic cylinder. To dump rear bucket on model 400, activate hydraulic selector valve by means of rope and lever. This diverts oil flow to bucket hydraulic cylinder. The model 410 utilizes dual tractor hydraulics for individual control of fork and bucket.

ADJUSTMENTS FOR PICKING: MODEL 500 FORK TYPE

DEPTH ADJUSTMENT

There is a mechanical fork stop located on the right side of the fork. This is set at the factory for maximum depth as provided by the fork cylinders. The cylinders are also

equipped with threaded mechanical depth stops. **IT IS VERY IMPORTANT THAT ALL THREE STOPS ARE SET AT THE SAME DEPTH.**

Improper adjustment of the fork cylinder attachment (1-1/4" threaded rod) will cause damage to the hydraulic cylinder. After any adjustments are made, check for interference when the cylinder is fully extended. The cylinder depth control nut must not contact the front fork cylinder attachment.

ADJUSTMENTS FOR PICKING: MODEL 600, 610 AND 700 ROTARY ROCKPICKERS

Lower picking rake and check level of hitch . . . the first points of the picking tines must approach the ground first. Adjust by resetting tongue height of rockpicker. The picking rate should be set at a depth to skim the rocks off the ground. Tractor and reel speed should be such that rocks are thrown to the upper rear section of the bucket. Field conditions should be reasonably dry and firm.

MAINTENANCE AND SERVICE

MODEL 400, 410 & 500 FORK TYPE ROCKPICKERS

1. Grease, daily, the 8 grease fittings on rockpicker.
2. Grease, seasonally, the 2 grease zerks located on back side of wheel hubs.

MODELS 600 & 610 ROTARY ROCKPICKERS

1. Grease, daily, the 16 grease fittings on hydraulic drive and 18 fittings on ground drive.
2. Grease, seasonally, the 2 grease fittings located on the back side of the wheel hubs.
3. Oil drive chain daily.
4. Alignment of sprockets and tension of drive chain should be checked and adjusted as necessary. Some slack should be allowed in drive chain. If chain becomes too loose to be corrected with tightener, remove one whole link and replace with half link.
5. Tighten nuts of rake retaining rods if rake tines become loose.
6. The clutch and spring of ground drive must be kept free of dust and dirt at all times. Lubricate lightly with dry graphite.

MODEL 700 ROTARY ROCKPICKER

1. Grease, daily, the 15 grease fittings on direct drive rockpicker.
2. Grease, seasonally, the 2 grease fittings located on back side of wheel hubs.
3. Check set screws on reel periodically for tightness.
4. The gear case is filled at the factory with 90 weight gear lube. Maintain gear lube at approximately 2/3 full (to top plug when level) with 90 weight gear lube.
5. Tighten nuts of rake retaining rods if rake tines become loose.

TIRE INFLATION

Recommended tire inflations pressures are as follows:

| | |
|------------------|--------|
| 7.60 x 15" Tire | 40 PSI |
| 11L x 15" Tire | 36 PSI |
| 14L x 16.1" Tire | 24 PSI |

IMPORTANT

HYDRAULIC REQUIREMENTS FOR MODEL 600 & 700 ROTARY ROCKPICKERS

1. Closed center hydraulic systems such as John Deere usually work very well.
2. Open center hydraulic systems require sufficient oil flow to operate both the hydraulic reel motor and rake lift cylinders simultaneously. Because open center systems vary so greatly in their performance it is difficult to specify a minimum flow requirement. For example some open center systems work perfectly. On others the reel will slow or even pause while the rake is being raised. And on still other open center systems the rake can be raised only after stopping the reel.

Therefore, when purchasing a rockpicker to be used on either a closed or open center hydraulic system we strongly recommend that the tractor or tractors to be used on the rockpicker be tested for acceptable operation before the machine is put into field use. It is the responsibility of the dealer and purchaser to make this determination.

ADJUSTING CUSHION VALVE RELIEF PRESSURE ON MODEL 600 & 700 HYDRAULIC DRIVE ROCKPICKERS

The cushion valve relief pressure is set at the factory at 2000 PSI on all hydraulic drive rockpickers. A setting lower than this can cause inadequate reel torque. To check, follow this procedure:

1. Determine tractor hydraulic system relief pressure by installing pressure gauge at remote outlet.
2. Next install a 1/2" pipe tee in the hydraulic line leading from the right side of the flow control valve to the left side of the cushion block. Install tee between outside fitting (Ref. #38) and hydraulic hose (Ref. #18) on page 18 for the model 600. Install tee between outside fitting (Ref. #5) and hydraulic hose (Ref. #11) on page 17 for model 700.
3. Install pressure gauge into tee, activate tractor hydraulic system so reel turns in picking direction, and check pressure with reel stalled. Insert a post between a batt and rake to stall reel.

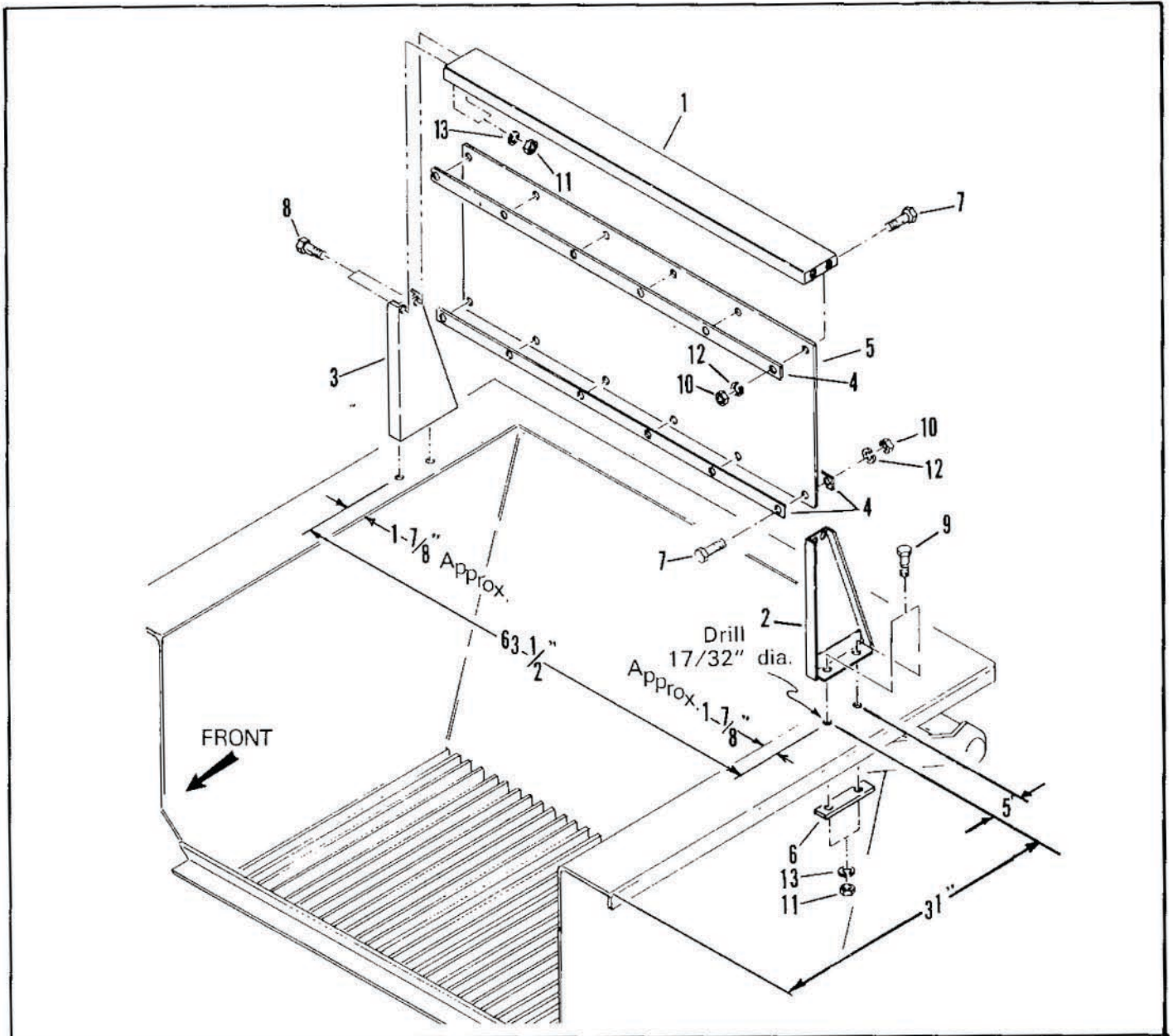
CAUTION: Stand Clear of reel at all times while tractor engine is running.

4. Pressure should read about 2000 PSI, however, pressure here will never be higher than tractor pressure read in step #1. If stalled reel pressure is less than pressure in step #1 and less than 2000 PSI, adjust by removing pressure relief valve cap from left side of cushion block and placing shims behind spring. Add shims until desired pressure is reached. Order Summers PN 8R7048 for each additional shim.

TROUBLESHOOTING

| NO. | PROBLEM | CAUSE | CORRECTION | PAGE |
|-----|---|--|--|----------------------------------|
| 1. | Reel runs too fast or too slow on hyd. drive models. (Models 600 & 700) | Flow control valve improperly adjusted. | Adjust flow control valve on rockpicker for desired reel speed. Flow control valve adjusts speed of reel only in the picking direction of rotation -- not in reverse. | Page 2 - Adjustments For Picking |
| 2. | Rake raises slowly while reel is turning. (Models 600 & 700) | Insufficient oil flow to rake lift cylinders. | Inherent problem with certain model tractors - see Hydraulic Requirements on Page 2. On tractors with adjustable flow controls for each hydraulic circuit. (Ex. JD Tortoise-Hare control), set rockpicker flow control to a maximum setting and adjust reel speed with tractor flow control. This should divert extra oil to hydraulic circuit used for lifting rake. | Page 2 |
| | | | Installation of optional electric solenoid lift solves problem by using return oil from hydraulic motor to power rake lift cylinders. See installation & operation instructions on page 6 for more details. | Page 6 |
| 3. | Inadequate reel torque on hydraulic driven models. (Models 600 & 700) | Tractor hydraulic system. Rockpicker cushion valve relief pressure set too low | Check oil level, oil filter & tractor hydraulic pressure. See Adjusting Cushion Valve Relief Pressure on Page 2. | Page 2 |
| 4. | Blown seal on planetary gear box on direct drive models. (Model 700) | Almost always caused by blown shaft seal on hyd. motor. Oil from tractor hyd. system enters gear box through motor and this pressure forces seal out. Most times gear box seal is not damaged and can be reused. | Remove hydraulic motor from planetary gear box and replace shaft seal (Order Summers PN 8R7406 for complete kit.) | Page 8 |
| 5. | Rocks do not slide off fork into bucket on small fork type models. (Models 400 & 410) | Fork dump angle is not adequate for picking conditions. | The fork dump angle can be increased by adding spacer washers between the cylinder attach block (Ref. 15) and the channel with collars (Ref. 16 on page 8). Adding 5/8" of washers increases the dump angle 7°. This should be sufficient for most applications. Adding more spacers will further improve the dump angle, but will also decrease the max. picking depth. | Page 8 |

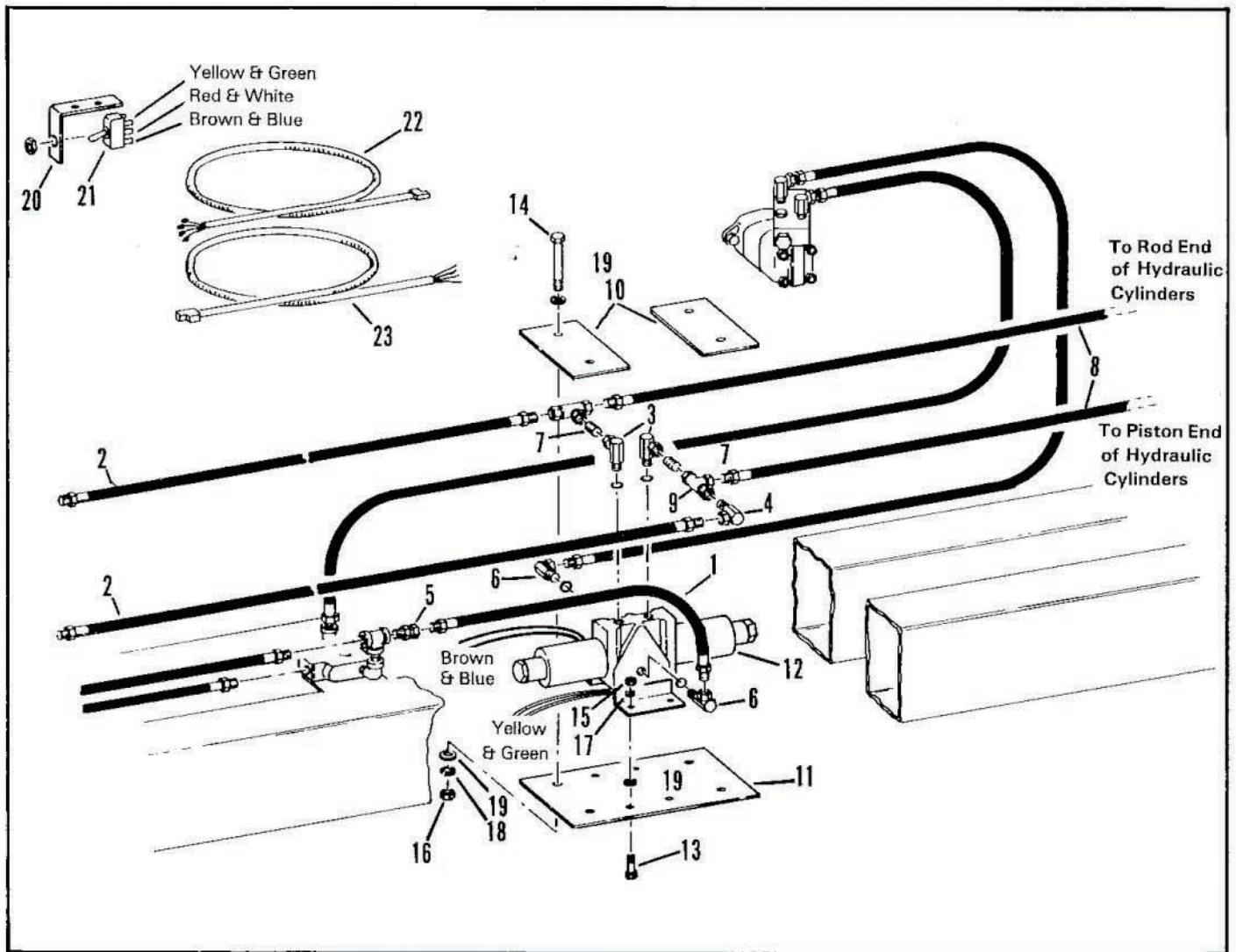
Assembly Instructions Optional Rock Deflector For Rotary Rockpickers



1. Drill four $17/32$ " dia. holes in top of rockpicker bucket (if not pre-drilled from factory). Location of each hole is illustrated in above diagram.
2. Attach side plates (ref. 2 & 3) and reinforcement plates (ref. 6) to rockpicker bucket using $1/2 \times 1-1/2$ " bolts. Position side plates with slanted edge toward rear of bucket (as shown). Do not completely tighten nuts at this time to insure alignment of step #3.
3. Attach mounting channel-beltting assembly to the side plates using $1/2 \times 1-1/4$ " bolts. Position channel so that beltting hangs towards rear of rockpicker (as shown). Tighten all attachment bolts.

| Ref. | Part No. | Description | Qty. |
|------|----------|---|-------------|
| | 8R6500 | Rock Deflector, Complete (includes ref. 1-13) | |
| 1 | 8R6410 | Mounting Channel | Deflector 1 |
| 2 | 8R6420 | Side Plate, L | Deflector 1 |
| 3 | 8R6422 | Side Plate, R | Deflector 1 |
| 4 | 8R6430 | Strap | Deflector 3 |
| 5 | 8R6440 | Beltting, 30 x 24-58" | Deflector 1 |
| 6 | 8R6450 | Plate, Reinforcement | Deflector 2 |
| 7 | 8X0005 | Bolt, $3/8$ " NC x $1-1/2$ " | 12 |
| 8 | 8X0061 | Bolt, $1/2$ " NC x $1-1/4$ " | 4 |
| 9 | 8X0063 | Bolt, $1/2$ " NC x $1-1/2$ " | 4 |
| 10 | 8X0201 | Nut, $3/8$ " NC | 12 |
| 11 | 8X0240 | Nut, $1/2$ " NC | 8 |
| 12 | 8X0301 | Lockwasher, $3/8$ " | 12 |
| 13 | 8X0303 | Lockwasher, $1/2$ " | 8 |

8R7800 ELECTRIC SOLENOID LIFT OPTION



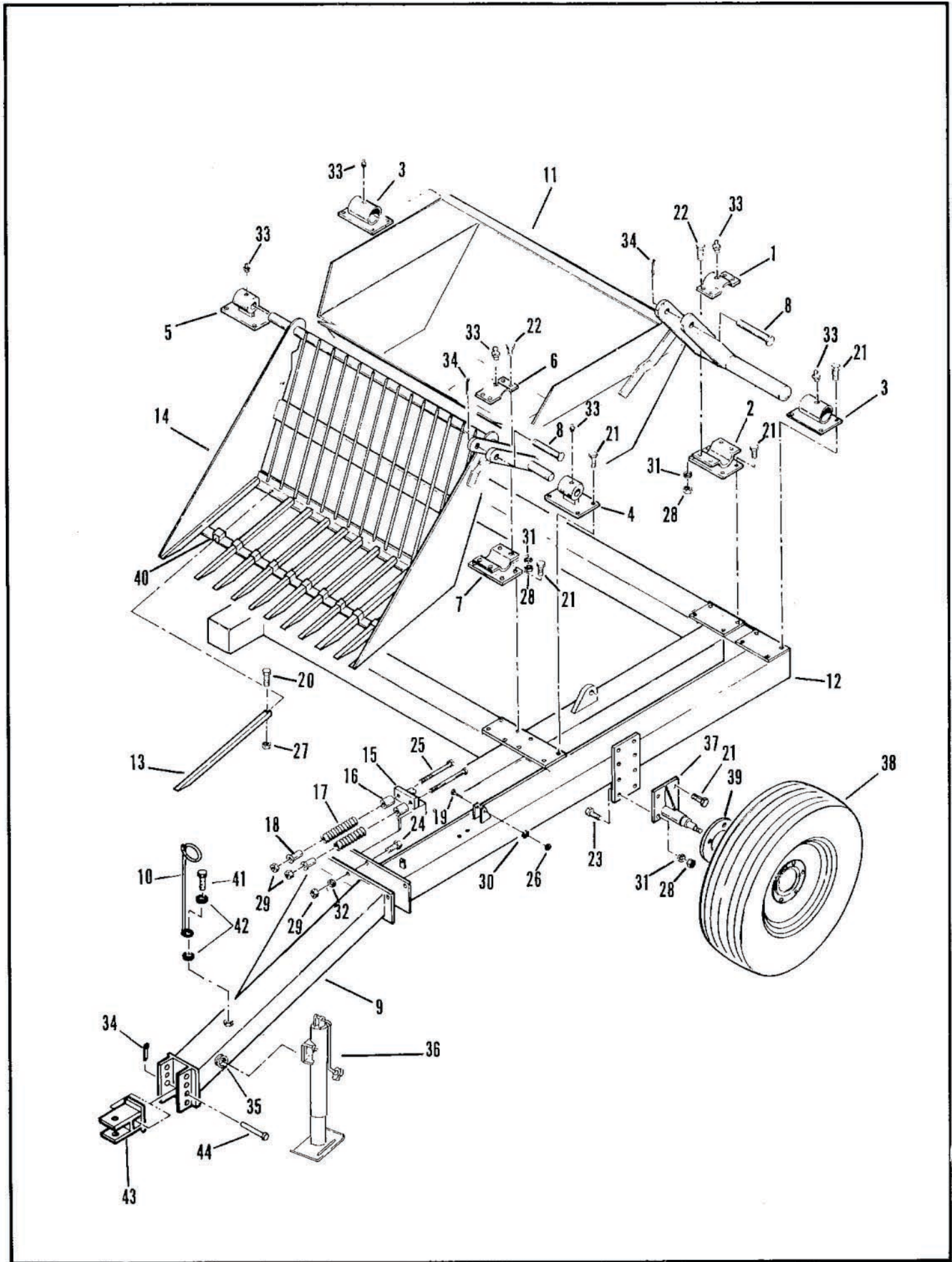
| REF. | PART NO. | DESCRIPTION | QTY. |
|------|----------|---------------------------------|------|
| 1 | 8D3070 | 1/2" R1 x 12" Hyd. Hose | 1 |
| 2 | 8D3087 | 3/8" R1 x 124" Hyd. Hose | 2 |
| 3 | 8D3097 | 3/4" x 16-ORB/3/8" FPX 90° Adp. | 2 |
| 4 | 8R6853 | Adapter 90° 3/8" MPT-M/3/8" FPT | 1 |
| 5 | 8R6854 | 1/2" MP/1/2" FPX Swivel | 1 |
| 6 | 8R6859 | 3/4" - 16 ORB/1/2" FPX 90° Adp. | 2 |
| 7 | 8R6860 | 3/8" Close Nipple | 2 |
| 8 | 8R6865 | 3/8" R1 x 57" Hyd. Hose | 2 |
| 9 | 8R6942 | 3/8" FPT Tee, 3 Swivels | 2 |
| 10 | 8R7650 | Flat 1/4" x 3" - 7-1/4" | 2 |
| 11 | 8R7660 | Plate 1/4" x 7-1/4" - 10" | 1 |
| 12 | 8R7680 | Solenoid Valve, 2 pos., 4-way | 1 |
| 13 | 8X0002 | Bolt, 3/8" x 1" | 4 |
| 14 | 8X0046 | Bolt, 7/16" x 7" | 4 |
| 15 | 8X0201 | Nut, Hex 3/8" NC | 4 |
| 16 | 8X0232 | Nut, Hex 7/16" NC | 4 |
| 17 | 8X0301 | Lockwasher, 3/8" | 4 |
| 18 | 8X0302 | Lockwasher, 7/16" | 4 |
| 19 | 8X0331 | Washer, 1/25" x 29/64" ID Z | 12 |
| 20 | 8R7670 | Mounting Bracket, Switch | 1 |
| 21 | 8A1928 | Pressure Adjust Switch | 1 |
| 22 | 8R7672 | Wire Harness, Switch | 1 |
| 23 | 8R7674 | Wire Harness, Solenoid Valve | 1 |

INSTALLATION INSTRUCTIONS FOR ELECTRIC SOLENOID LIFT OPTION

1. Mounting the switch.
Mount the switch to a secure support in a convenient location on the tractor. Route the red and white battery wires to a 12-volt battery. Attach the white battery wire to the NEGATIVE (-) terminal, and the red battery wire to the POSITIVE (+) battery terminal. A 20-amp in-line fuse should be installed in the red battery wire to protect the system.
2. Mounting the solenoid valve.
 - a. Disconnect the 1/2" x 48" hydraulic hose from the 1/2" tee on the flow control valve on the rockpicker. Turn this hose into the 1/2" swivel fitting on the opposite side of the 1/2" x 12" hydraulic hose on the valve.
 - b. Remove the two 3/8" swivel tees (finger tight) from the top of the solenoid valve.
 - c. Lift the valve up between the rockpicker frame tubes directly behind the flow control valve and secure with the two plates and four 7/16" x 7" bolts, washers, lockwashers and nuts.
 - d. Connect the 1/2" x 12" hose on the solenoid valve to the 1/2" tee on the flow control valve on the rockpicker.
 - e. Replace the fittings on top of the solenoid valve as removed in step "b".
 - f. Remove the two 3/8" x 180" hydraulic hoses from the rockpicker and discard (tractor to cylinder hoses). Replace the 180" hoses with 57" hoses. Route the 124" hoses along the reel drive hoses already on machine.
 - g. Tighten all fittings.
 - h. Route the wires from the valve to the tractor and connect to the wires from the switch assembly.

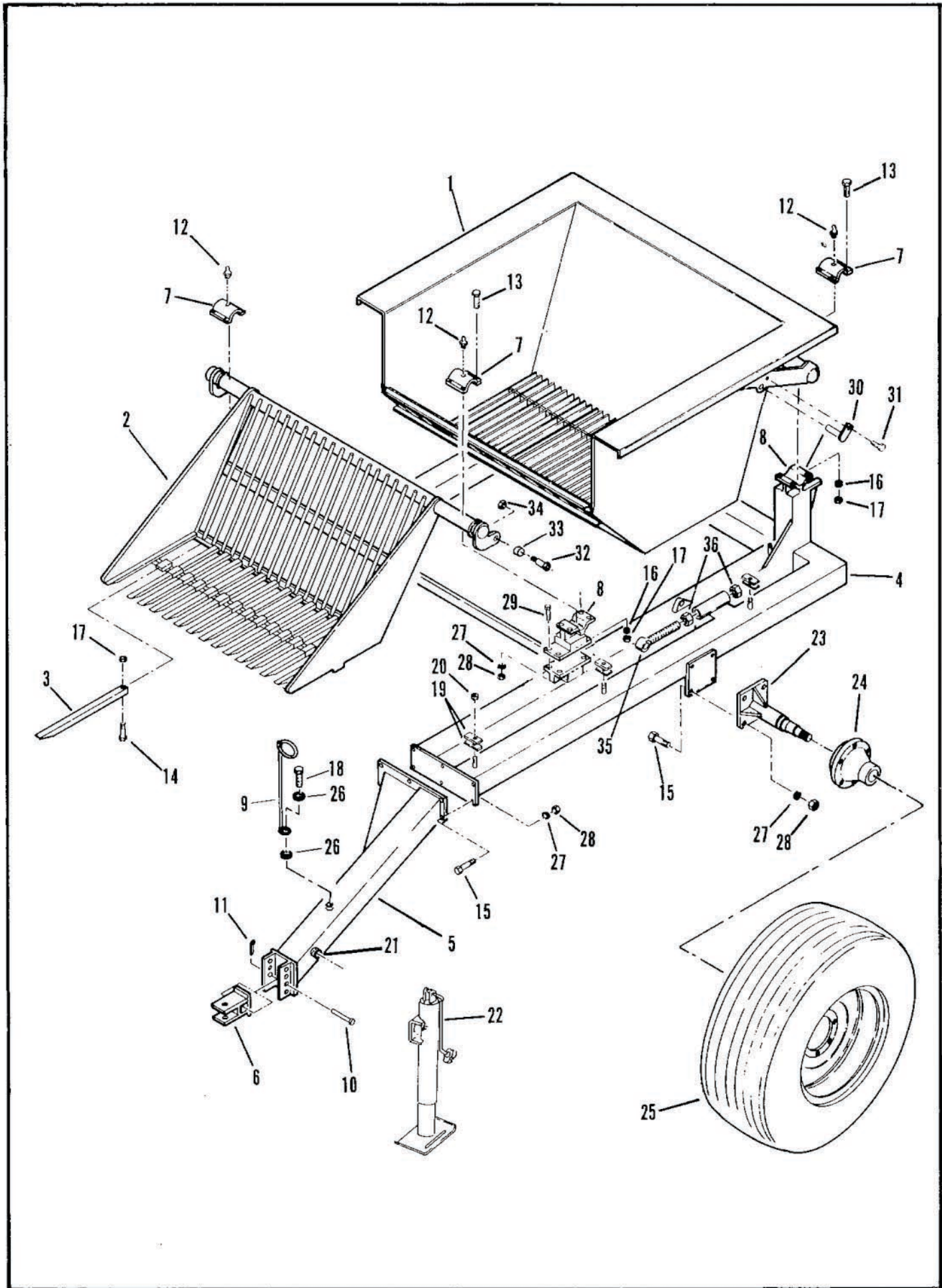
OPERATING INSTRUCTIONS FOR ELECTRIC SOLENOID LIFT OPTION

1. Read installation instructions thoroughly before operating the electric solenoid lift option. CAUTION: Follow operating instructions and warning decals whenever operating the rockpicker.
2. With reel turning, rake may now be raised and lowered by moving the switch up or down. If switch movement doesn't correspond to rake movement, rotate switch 1/2 turn.
3. Rake may be raised and lowered the conventional way or by using the switch.
4. Reel must be turning in order to raise or lower the rake with the switch. When raising the rake with the switch, the reel will stop when the rake cylinders have reached the end of their travel (until the switch is returned to its neutral position).



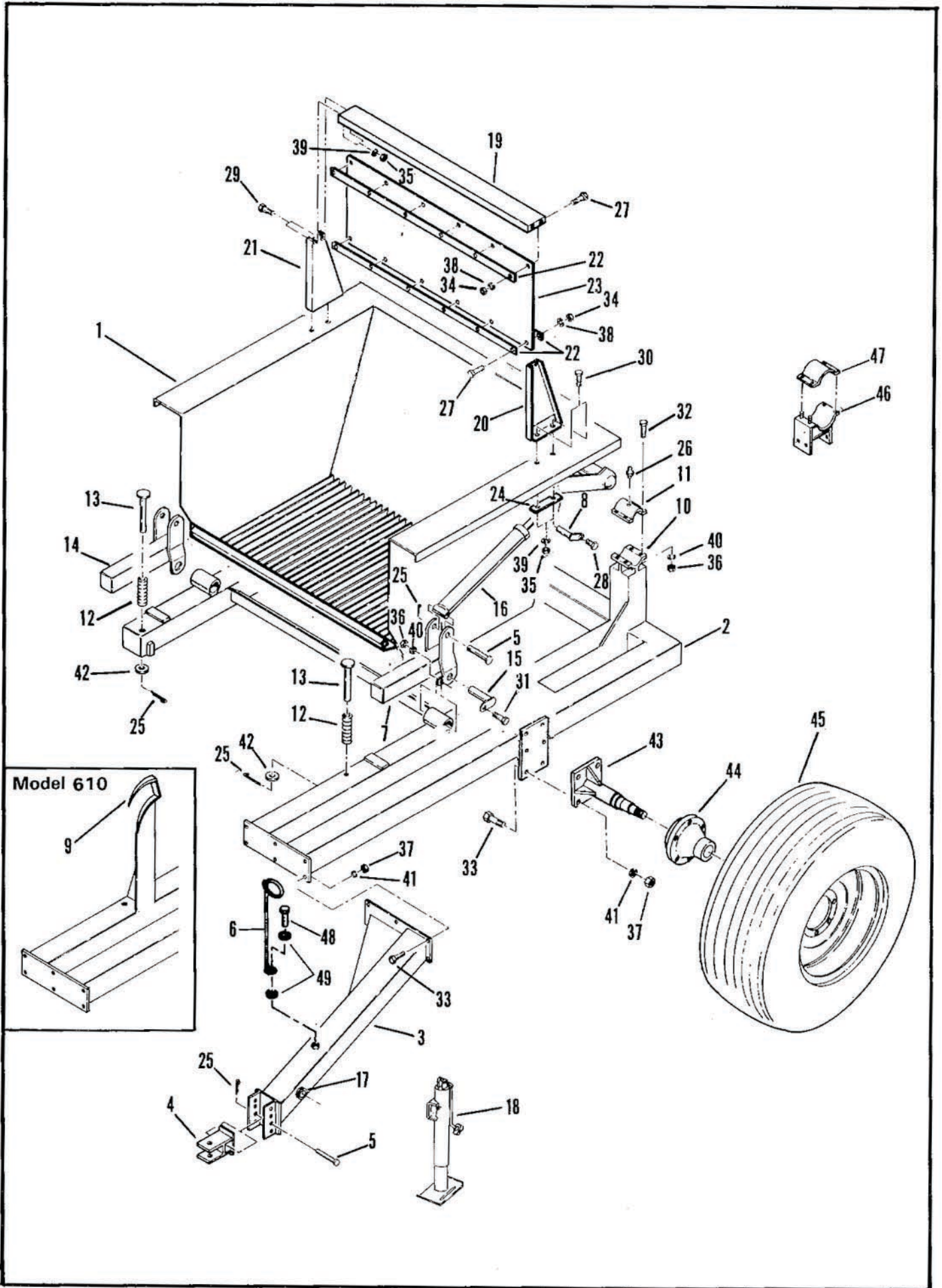
MAIN FRAME
(Models 400 and 410)

| Ref. | Part No. | Description | Qty. |
|------|----------|---|------|
| 1 | 8R6060 | PILLOW BLOCK, top half | 1 |
| 2 | 8R4030 | PILLOW BLOCK, bottom half | 1 |
| 3 | 8R4040 | PILLOW BLOCK, bucket | 2 |
| 4 | 8R4050 | PILLOW BLOCK, rake (Left) | 1 |
| 5 | 8R4060 | PILLOW BLOCK, rake (Right) | 1 |
| 6 | 8R4070 | PILLOW BLOCK, top half (Rake) | 1 |
| 7 | 8R4080 | PILLOW BLOCK, bottom half (Rake) | 1 |
| 8 | 8R4100 | PIN, 1" dia. x 6-3/4" | 2 |
| 9 | 8R6020 | TONGUE | 1 |
| 10 | 8D8500 | STAND, hose loop | 1 |
| 11 | 8R4250 | BUCKET | 1 |
| 12 | 8R4260 | FRAME | 1 |
| 13 | 8R4240 | TINE | 10 |
| 14 | 8R4225 | RAKE, less tines | X |
| | 8R4230 | RAKE, complete w/tines | 1 |
| 15 | 8R4160 | BLOCK, cylinder attachment | 1 |
| 16 | 8R4170 | BASE, channel w/collars | 1 |
| 17 | 8R6885 | SPRING, shock | 2 |
| 18 | 8R4165 | BUSHING | 2 |
| 19 | 8X0009 | CAP SCREW, hex hd., 1/4" NC x 2" | 1 |
| 20 | 8X0067 | CAP SCREW, hex hd., 1/2" NC x 2-1/4" | 10 |
| 21 | 8X0085 | CAP SCREW, hex hd., 5/8" NC x 1" | 28 |
| 22 | 8X0087 | CAP SCREW, hex hd., 5/8" NC x 1-1/2" | 8 |
| 23 | 8X0093 | CAP SCREW, hex hd., 5/8" NC x 2" | 4 |
| 24 | 8X0112 | CAP SCREW, hex hd., 3/4" NC x 2-1/4" | 6 |
| 25 | 8X0125 | CAP SCREW, hex hd., 3/4" NC x 10" | 2 |
| 26 | 8X0220 | NUT, hex, 1/4" NC | 1 |
| 27 | 8X0240 | NUT, hex, 1/2" NC | 10 |
| 28 | 8X0250 | NUT, hex, 5/8" NC | 12 |
| 29 | 8X0260 | NUT, hex, 3/4" NC | 8 |
| 30 | 8X0308 | LOCKWASHER, 1/4" | 1 |
| 31 | 8X0304 | LOCKWASHER, 5/8" | 12 |
| 32 | 8X0306 | LOCKWASHER, 3/4" | 6 |
| 33 | 8X0721 | FITTING, grease, 5/16" - 24 NF | 6 |
| 34 | 8X0414 | PIN, cotter, 1/4" dia. x 2" | 3 |
| 35 | 8D8520 | SWIVEL, jack mounting | X |
| 36 | 8D8531 | JACK, hitch (2000# Capacity) | X |
| 37 | 8R4152 | SPINDLE, for H611 hub | 2 |
| | 8R4155 | SPINDLE ASSY., complete w/H611 hub | X |
| 38 | 8D3030 | WHEEL, 15 x 6" - 6 bolt | X |
| | 8D3035 | WHEEL, 15 x 8" - 6 bolt | X |
| | 8D3031 | WHEEL & TIRE, 7.60 x 15" tire mt. on 15 x 6 x 6 wheel | X |
| | 8D3037 | WHEEL & TIRE, 11L x 15" tire mt. on 15 x 8 x 6 wheel | X |
| 39 | | HUB ASSEMBLY (Breakdown Page 16) | X |
| 40 | 7R4420 | CLIP, tine holddown | X |
| 41 | 8X0110 | CAP SCREW, hex head 3/4" NC x 1-1/4" | 1 |
| 42 | 8X0318 | WASHER, flat 3/4" | 2 |
| 43 | 8R6030 | CLEVIS, tongue | 1 |
| 44 | 8R6040 | PIN, 1" dia. x 5-1/2" | 1 |



MAIN FRAME
(Model 500)

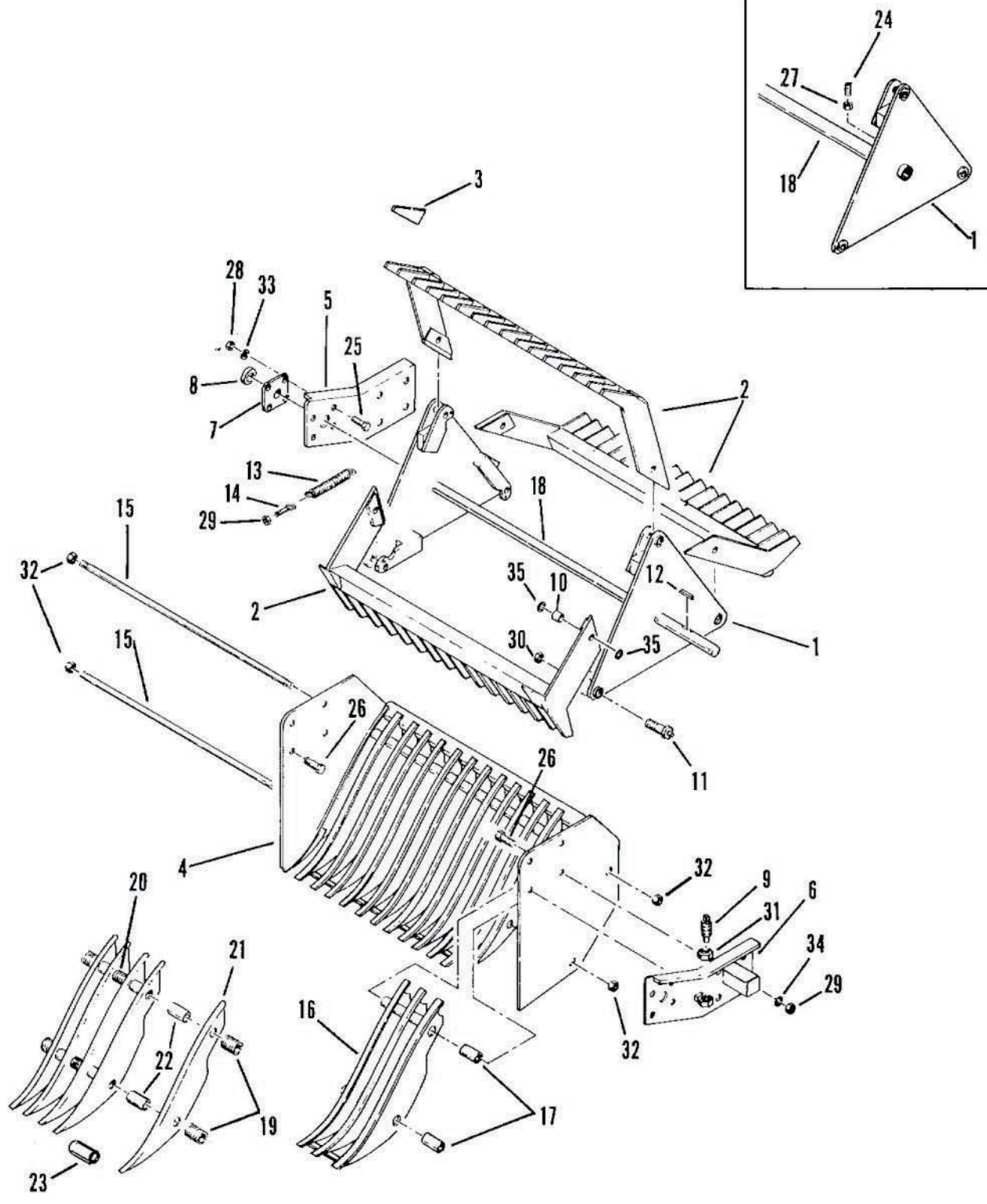
| Ref. | Part No. | Description | Qty. |
|------|-----------|---|------|
| 1 | 8R5003 | BUCKET | 1 |
| 2 | 8R5090 | FORK, less tines | 1 |
| | 8R5095 | FORK, w/tines | X |
| 3 | 8R5100 | TINE | 13 |
| 4 | 8R5012 | FRAME | 1 |
| 5 | 8R6020 | TONGUE | 1 |
| 6 | 8R6030 | CLEVIS, tongue | 1 |
| 7 | 8R6060 65 | PILLOW BLOCK, top (Cast) | 4 |
| 8 | 8R6075 | PILLOW BLOCK, base (Cast-Weld On) ← 8R5060 ADD | 4 |
| 9 | 8D8500 | STAND, hose loop | 1 |
| 10 | 8R6040 | PIN, 1" dia. x 5-1/2" | 1 |
| 11 | 8X0414 | PIN, cotter, 1/4" dia. x 2" | 1 |
| 12 | 8X0721 | FITTING, grease 5/16" - 24 NF | X |
| 13 | 8X0093 | CAP SCREW, hex head 5/8" x 2" | 16 |
| 14 | 8X0094 | CAP SCREW, hex head 5/8" x 2-1/2" | 13 |
| 15 | 8X0112 | CAP SCREW, hex head 3/4" x 2-1/4" | 14 |
| 16 | 8X0304 | WASHER, lock 5/8" | 16 |
| 17 | 8X0250 | NUT, hex 5/8" NC | 29 |
| 18 | 8X0110 | CAP SCREW, hex head 3/4" x 1-1/4" | 1 |
| 19 | 8D4310 | CLAMP, hose hold down | 14 |
| 20 | 8X0202 | NUT, hex lock 3/8" NC, nylon | 7 |
| 21 | 8D8520 | SWIVEL, jack mounting | 1 |
| 22 | 8D8531 | JACK, hitch (2000 lb. Capacity) | 1 |
| 23 | 8R6200 | SPINDLE ASSEMBLY, 2" dia. x 9-1/2" (For 11L Tire - Not Shown) | X |
| | 8R6201 | SPINDLE ASSEMBLY, 2" dia. x 11-1/2" (For 14L Tire - Shown) | X |
| | 8R6202 | SPINDLE ASSEMBLY, complete (W/614 Hub for 11L Tire) | X |
| | 8R6203 | SPINDLE ASSEMBLY, complete (W/614 Hub for 14L Tire) | X |
| 24 | | HUB ASSEMBLY (See Breakdown, Page 16) | X |
| 25 | 8D3035 | WHEEL, 15 x 8", 6 bolt | X |
| | 8D3040 | WHEEL, 16.1 x 11", 6 Bolt | X |
| | 8D3037 | WHEEL & TIRE, 15 x 8", 6 Bolt (W/11L x 15" Tire Mounted, Tubeless) | X |
| | 8D3042 | WHEEL & TIRE, 16.1 x 11", 6 bolt (W/14L x 16.11 Tire Mounted, Tubeless) | X |
| 26 | 8X0318 | WASHER, flat 3/4" | 2 |
| 27 | 8X0306 | WASHER, lock 3/4" | 22 |
| 28 | 8X0260 | NUT, hex 3/4" NC | 22 |
| 29 | 8X0111 | CAP SCREW, hex head 3/4" x 2-1/2" | 8 |
| 30 | 8R6080 | PIN, keeper 1" dia. x 6-1/2" | 2 |
| 31 | 8X0060 | CAP SCREW, hex head 1/2" x 1" | 2 |
| 32 | 8R6800 | GREASE PIN | 2 |
| 33 | 8R6810 | BUSHING, split steel | 2 |
| 34 | 8X0282 | NUT, hex lock 1" NF | 2 |
| 35 | 8G1590 | ADJUSTMENT BOLT, cyl. | 2 |
| 36 | 8X0284 | NUT, hex 1-1/4" NC | 4 |



MAIN FRAME
(Model 600, 610 & 700)

| Ref. | Part No. | Description | Qty. |
|------|------------------|--|------|
| 1 | 8R6003 | BUCKET | 1 |
| 2 | 8R6010 | FRAME, ground drive | 1 |
| | 8R6012 | FRAME, hydraulic drive | 1 |
| 3 | 8R6020 | TONGUE | 1 |
| 4 | 8R6030 | CLEVIS, tongue | 1 |
| 5 | 8R6040 | PIN, 1" diameter x 5-1/2" | 3 |
| 6 | 8D8500 | STAND, hose loop | 1 |
| 7 | 8R6160 | LIFT ARM, left | 1 |
| 8 | 8R6080 | PIN, keeper 1" diameter x 6-1/2" | 2 |
| 9 | 7R8090 | GUIDE, clutch (Weld-On, Model 610 Only) | 1 |
| 10 | 8R6075 | PILLOW BLOCK, base (Cast-Weld On) | X |
| 11 | 8R6060 <i>65</i> | PILLOW BLOCK, top (Cast) | 2 |
| 12 | 8R6885 | SPRING, depth control | 2 |
| 13 | 8R6310 | PIN, depth control | 2 |
| 14 | 8R6165 | LIFT ARM, right | 1 |
| 15 | 8R6170 | PIN, keeper 1-3/4" diameter x 8" | 2 |
| 16 | 8R6870 | CYLINDER, hyd. 3 x 31", 3/4" - 16 ORB ports (1985 & Later - Breakdown Page 28) | 2 |
| | 8R6869 | CYLINDER, hyd. 3 x 31", 3/8" NPT-F ports (Breakdown Page 28) | X |
| 17 | 8D8520 | SWIVEL, jack | 1 |
| 18 | 8D8531 | JACK, hitch (2000 Lb. Capacity) | 1 |
| 19 | 8R6410 | CHANNEL, mounting | 1 |
| 20 | 8R6420 | SIDE PLATE, left | 1 |
| 21 | 8R6422 | SIDE PLATE, right | 1 |
| 22 | 8R6430 | STRAP | 3 |
| 23 | 8R6440 | BELTING, rock deflector .30" x 24" x 58" | 1 |
| 24 | 8R6450 | PLATE, reinforcing | 2 |
| 25 | 8X0414 | PIN, cotter 1/4" diameter x 2" | 5 |
| 26 | 8X0721 | FITTING, grease 5/16" - 24 NF | X |
| 27 | 8X0007 | CAP SCREW, hex hd. 3/8" NC x 1-1/2" | 12 |
| 28 | 8X0060 | CAP SCREW, hex hd. 1/2" NC x 1" | 2 |
| 29 | 8X0061 | CAP SCREW, hex hd. 1/2" NC x 1-1/4" | 4 |
| 30 | 8X0063 | CAP SCREW, hex hd. 1/2" NC x 1-1/2" | 4 |
| 31 | 8X0087 | CAP SCREW, hex hd. 5/8" NC x 1-1/2" | 2 |
| 32 | 8X0093 | CAP SCREW, hex hd. 5/8" NC x 2" | 8 |
| 33 | 8X0112 | CAP SCREW, hex hd. 3/4" NC x 2-1/4" | 14 |
| 34 | 8X0201 | NUT, hex 3/8" NC | 12 |
| 35 | 8X0240 | NUT, hex 1/2" NC | 8 |
| 36 | 8X0250 | NUT, hex 5/8" NC | 10 |
| 37 | 8X0260 | NUT, hex 3/4" NC | X |
| 38 | 8X0301 | WASHER, lock 3/8" | 12 |
| 39 | 8X0303 | WASHER, lock 1/2" | 8 |
| 40 | 8X0304 | WASHER, lock 5/8" | 10 |
| 41 | 8X0306 | WASHER, lock 3/4" | X |
| 42 | 8X0327 | WASHER, 1-1/4" | 2 |
| 43 | 8R6200 | SPINDLE ASSEMBLY, 2" dia. x 9-1/2" (For 11L Tire) | X |
| | 8R6201 | SPINDLE ASSEMBLY, 2" dia. x 11-1/2" (For 14L Tire - Shown) | X |
| | 8R6202 | SPINDLE ASSEMBLY COMPLETE w/614 hub for 11L tire | X |
| | 8R6203 | SPINDLE ASSEMBLY COMPLETE w/614 hub for 14L tire | X |
| 44 | | HUB ASSEMBLY (See Breakdown Page 16) | X |
| 45 | 8D3035 | WHEEL, 15" x 8" - 6 bolt | X |
| | 8D3040 | WHEEL, 16.1" x 11" - 6 bolt | X |
| | 8D3037 | WHEEL & TIRE, 15" x 8" - 6 bolt (W/11L x 15" Tire Mounted - Tubeless) | X |
| | 8D3042 | WHEEL & TIRE, 16.1" x 11" - 6 bolt (W/14L x 16.1" Tire Mounted - Tubeless) | X |
| 46 | 8R6070 | PILLOW BLOCK, bottom left (Old Style) | X |
| | 8R6072 | PILLOW BLOCK, bottom right (Old Style) | X |
| 47 | 8R6060 | PILLOW BLOCK, cap (Steel) | X |
| 48 | 8X0110 | CAP SCREW, hex hd. 3/4" NC x 1-1/4" | 1 |
| 49 | 8X0318 | WASHER, flat 3/4" | 2 |

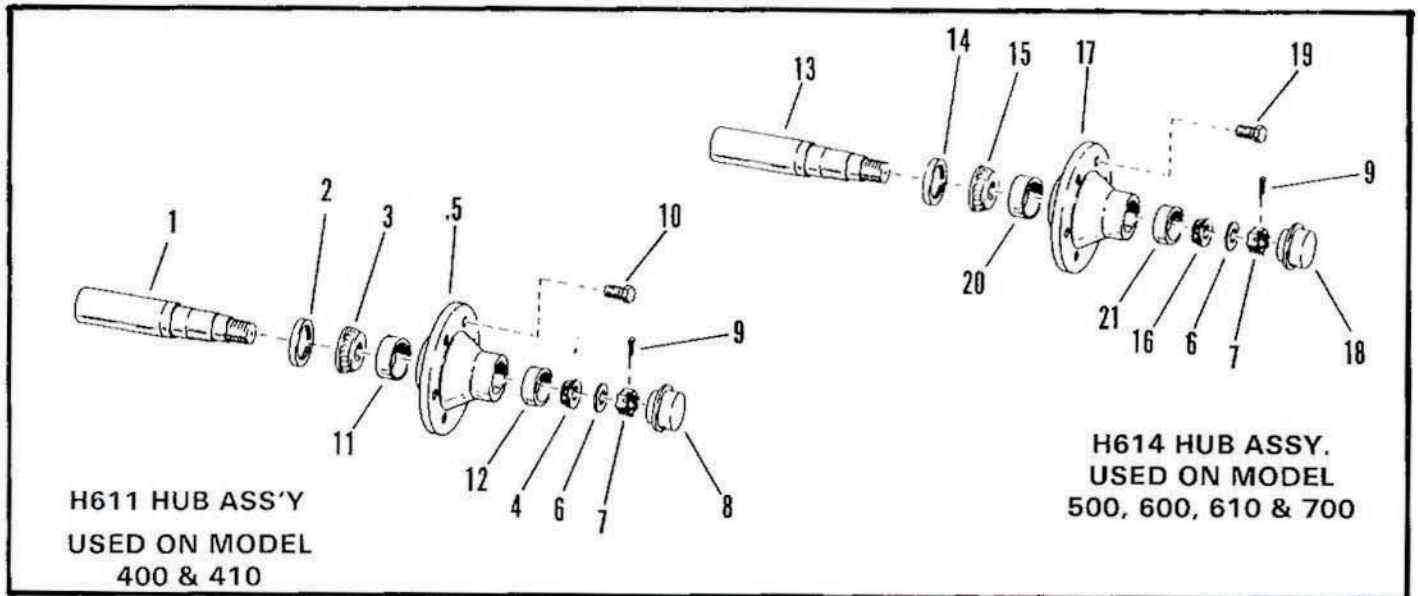
Model 700 Only



NOTE: Units manufactured in 1981 and later by Summers Mfg. Co., Inc., have no springs between rake tines.

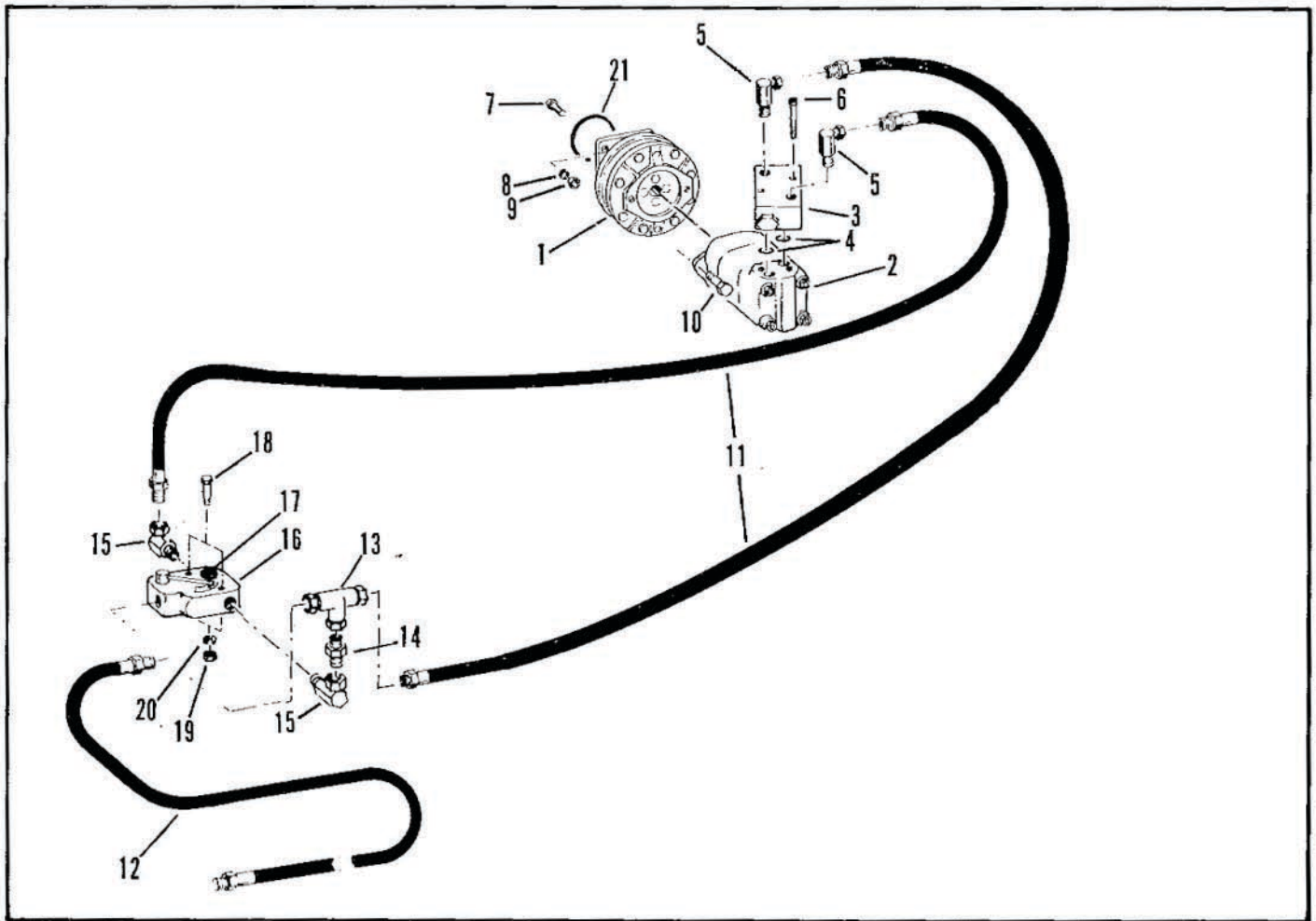
RAKE AND REEL ASSEMBLY
(Models 600, 610 & 700)

| Ref. | Part No. | Description | Qty. |
|------|----------|---|------|
| 1 | 8R6130 | REEL, hydraulic drive (Model 600) | 1 |
| | 8R6132 | REEL, ground drive (Model 610) | 1 |
| | 8R6134 | REEL, hydraulic direct drive (Model 700) | 1 |
| | 8R6148 | REEL W/BATTS, assembled (Model 600 Hyd. Drive) | |
| | 8R6149 | REEL W/BATTS, assembled (Model 610 Grnd. Drive) | |
| | 8R6147 | REEL W/BATTS, assembled (Model 700 Hyd. Direct Drive) | |
| 2 | 8R6140 | BATT | 3 |
| 3 | 7R6610 | BATT TOOTH, hard surfaced | X |
| 4 | 8R6090 | FRAME, rake | 1 |
| 5 | 8R6150 | STABILIZING ARM, right (Hyd. & Ground Drive) | 1 |
| 6 | 8R7010 | STABILIZING ARM, left (Model 600 Hyd. Drive) | 1 |
| | 8R7012 | STABILIZING ARM, left (Model 700 Hyd. Direct Drive) | 1 |
| | 8R8005 | STABILIZING ARM, left (Model 610 Ground Drive) | 1 |
| 7 | 8R6825 | FLANGED BEARING, w/collar 2" | 2 |
| | 8R6822 | BEARING ONLY, 2" | X |
| 8 | 8R6820 | COLLAR, bearing retaining | 2 |
| 9 | 8R6300 | BOLT, depth control | 2 |
| 10 | 8R6810 | BUSHING, split steel | 6 |
| | 8R6812 | BUSHING, oilite (Early Models) | 6 |
| 11 | 8R6800 | GREASE PIN | 6 |
| | 8R6802 | BATT BOLT, (Early Models) | 6 |
| 12 | 8R7095 | KEY, reel 1/2" x 2-1/8" (Model 600 Hyd. Drive) | 1 |
| | 8R8050 | KEY, reel 1/2" x 2-1/2" (Model 610 Grnd. Drive) | 1 |
| 13 | 8R6880 | SPRING, batt | 6 |
| 14 | 8R6145 | BOLT, eye | 6 |
| 15 | 8R6100 | ROD, retaining | 2 |
| 16 | 8R6123 | GANG, 3-tine unit | 5 |
| 17 | 8R6114 | TINE SPACER, 2-9/16" | 4 |
| 18 | 7R7080 | SHAFT ONLY, reel (Model 600 Hyd. Drive) | 1 |
| | 7R7540 | TUBE ASSEMBLY, reel (Model 700 Hyd. Direct Drive) | X |
| | 7R8130 | SHAFT ONLY, reel (Model 610 Grnd. Drive) | X |
| 19 | 8R6890 | SPRING, rake (Short 3-3/16") Replace W/Ref. No. 22 | 4 |
| 20 | 8R6895 | SPRING, rake (Long 3-7/8") Replace W/Ref. No. 23 | 4 |
| 21 | 8R6120 | TINE | 15 |
| 22 | 8R6110 | TINE SPACER, 3" | X |
| 23 | 8R6112 | TINE SPACER, 3-3/4" | X |
| 24 | 8X0632 | SET SCREW, 7/16" NC x 1-1/2" (Socket Hd. - Model 700 Hyd. Direct Drive) | 2 |
| 25 | 8X0093 | CAP SCREW, hex hd. 5/8" NC x 2" | 8 |
| 26 | 8X0112 | CAP SCREW, hex hd. 3/4" NC x 2-1/4" | 8 |
| 27 | 8X0232 | NUT, hex 7/16" NC (Model 700 Hyd. Direct Drive) | 2 |
| 28 | 8X0250 | NUT, 5/8" NC | 8 |
| 29 | 8X0260 | NUT, 3/4" NC | 14 |
| 30 | 8X0282 | NUT, hex lock 1" NF | 6 |
| 31 | 8X0287 | NUT, jam 1-1/2" NC | 2 |
| 32 | 8X0285 | NUT, 1-1/2" NC | 4 |
| 33 | 8X0304 | WASHER, lock 5/8" | 8 |
| 34 | 8X0306 | WASHER, lock 3/4" | 8 |
| 35 | 8X0327 | WASHER, flat | 12 |



HUBS & SPINDLES

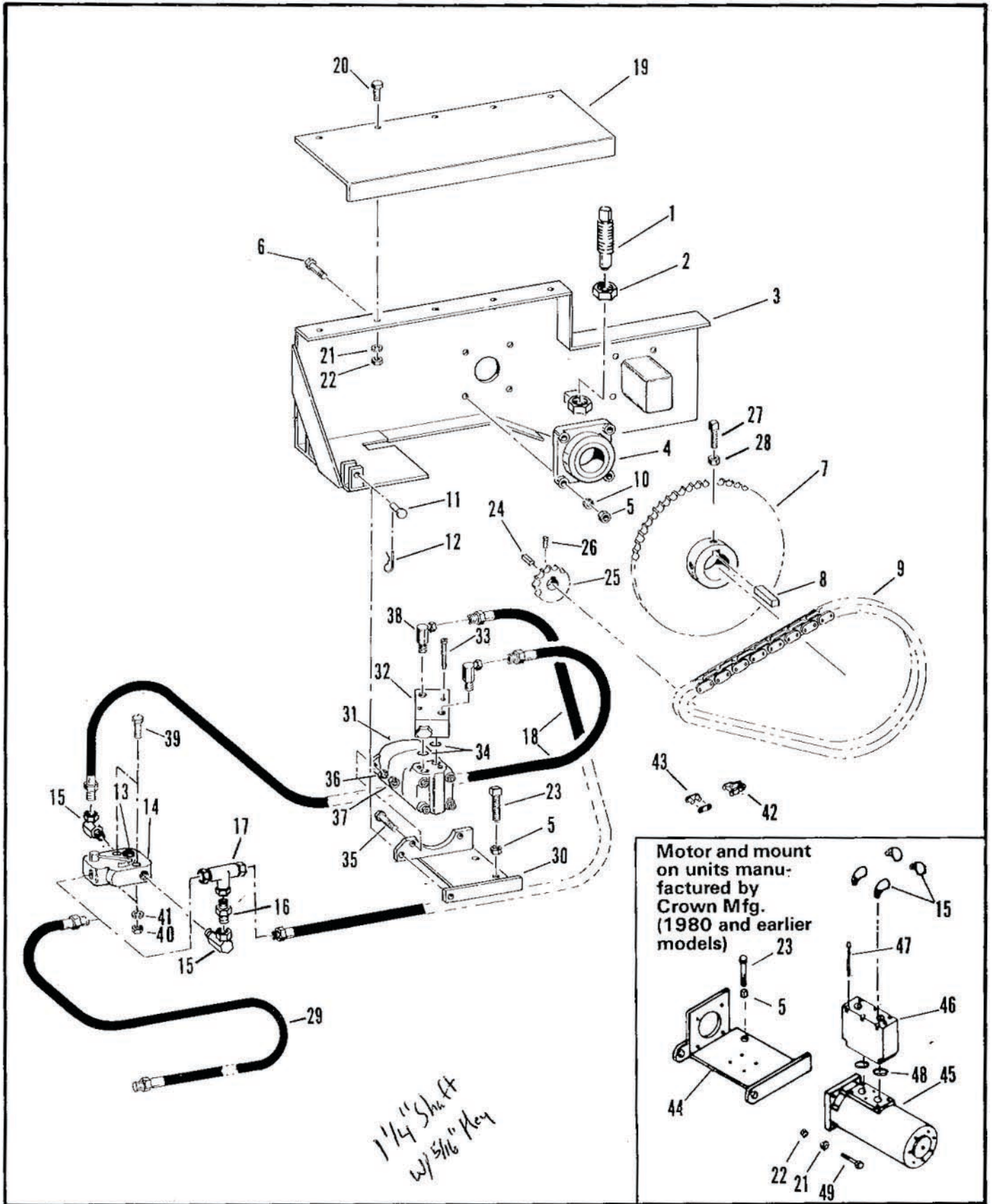
| Ref. | Part No. | Description |
|------|----------|---|
| 1 | 8D1160 | AXLE ONLY, for H611 Hub (1-3/4" dia. x 9") |
| 2 | 8D5220 | SEAL, 1-3/4" (SE13) |
| 3 | 8D5317 | BEARING, (LM29749) |
| 4 | 8D5117 | BEARING, (LM67048) |
| 5 | 8D5311 | HUB, 6 bolt (H611 w/Races & Grease Fitting) |
| 6 | 8D5319 | WASHER, axle 1" ID |
| 7 | 8D5312 | NUT, axle 1" NF |
| 8 | 8D5213 | CAP, hub |
| 9 | 8X0415 | PIN, cotter 3/16" dia. x 1-3/4" |
| 10 | 8D5114 | BOLT, wheel 1/2" NF |
| 11 | 8D5334 | RACE, inner bearing (LM29710) |
| 12 | 8D5336 | RACE, outer (LM67010) |
| 13 | 8R6900 | AXLE ONLY, for H614 Hub - 2" dia. x 9-1/2" |
| | 8R6902 | AXLE ONLY, for H614 Hub - 2" dia. x 11-1/2" |
| 14 | 8R6920 | SEAL, 2" (SE16) |
| 15 | 8R6917 | BEARING (LM603049) |
| 16 | 8D5217 | BEARING (LM48548) |
| 17 | 8R6911 | HUB, 6 bolt (H614 W/Races & Grease Fitting) |
| 18 | 8R6913 | CAP, hub |
| 19 | 8R6914 | BOLT, wheel 9/16" NF |
| 20 | 8R6925 | RACE, inner (LM603012) |
| 21 | 8D5332 | RACE, outer (LM48510) |



HYDRAULIC DRIVE SYSTEM

(Model 700 Direct Drive)

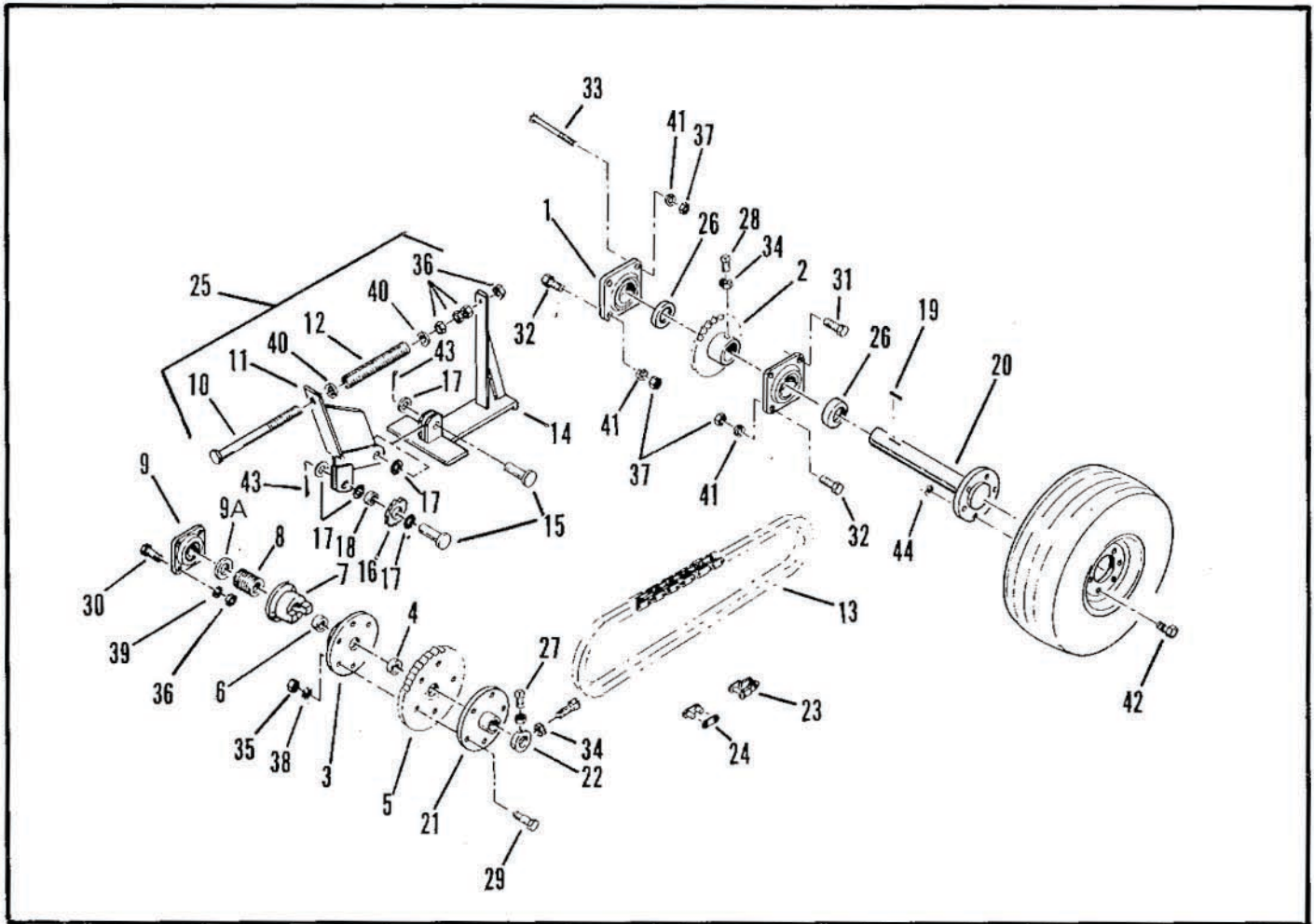
| Ref.. | Part No. | Description | Qty. |
|-------|----------|---|------|
| 1 | 8R7700 | POWER WHEEL, planetary gear reduction | 1 |
| 2 | 8R7032 | MOTOR, hydraulic splined shaft (2000 Series) | 1 |
| | 8R7406 | SEAL KIT, motor (2000 Series) Not Shown | X |
| 3 | 8R7041 | VALVE, cushion 7/8" - 14 ORB ports | 1 |
| | 8R7048 | SHIM, cushion valve pressure relief (2000 Series) Not Shown | X |
| 4 | 8R7043 | O-RING | 2 |
| 5 | 8R6856 | ADAPTER, 90° (7/8" - 14 ORB x 1/2" FPT) | 2 |
| 6 | 8X0028 | CAP SCREW, socket head 3/8" NC x 2" | 2 |
| 7 | 8X0067 | CAP SCREW, hex hd. 1/2" NC x 2-1/4" | 4 |
| 8 | 8X0303 | WASHER, lock 1/2" | 4 |
| 9 | 8X0240 | NUT, hex 1/2" NC | 4 |
| 10 | 8X0063 | CAP SCREW, hex hd. 1/2" NC x 1-1/2" | 2 |
| 11 | 8R7092 | HOSE, hydraulic 1/2" R1 x 60" | 2 |
| 12 | 8D3075 | HOSE, hydraulic 1/2" R1 x 100" | 2 |
| 13 | 8R6944 | SWIVEL TEE, 1/2" FPX | 1 |
| 14 | 8D3107 | NIPPLE, hex 1/2" NPT-M | 1 |
| 15 | 8R6852 | ADAPTER, 90°, 1/2" NPT-M x 1/2" FPX | 2 |
| 16 | 8R7050 | VALVE, flow control | 1 |
| 17 | 8R7052 | BOLT W/KNOB | 1 |
| 18 | 8X0013 | CAP SCREW, 1/4" NC x 2-1/2" | 2 |
| 19 | 8X0220 | NUT, hex 1/4" NC | 2 |
| 20 | 8X0308 | WASHER, lock 1/4" | 2 |
| 21 | 8R7720 | OIL SEAL, power wheel | X |



HYDRAULIC DRIVE SYSTEM
(Model 600)

| Ref. | Part No. | Description | Qty. |
|------|----------|---|------|
| 1 | 8R6300 | BOLT, depth control | 1 |
| 2 | 8X0287 | NUT, hex jam 1-1/2" NC | 1 |
| 3 | 8R7010 | STABILIZING ARM, left (Hydraulic Drive) | 1 |

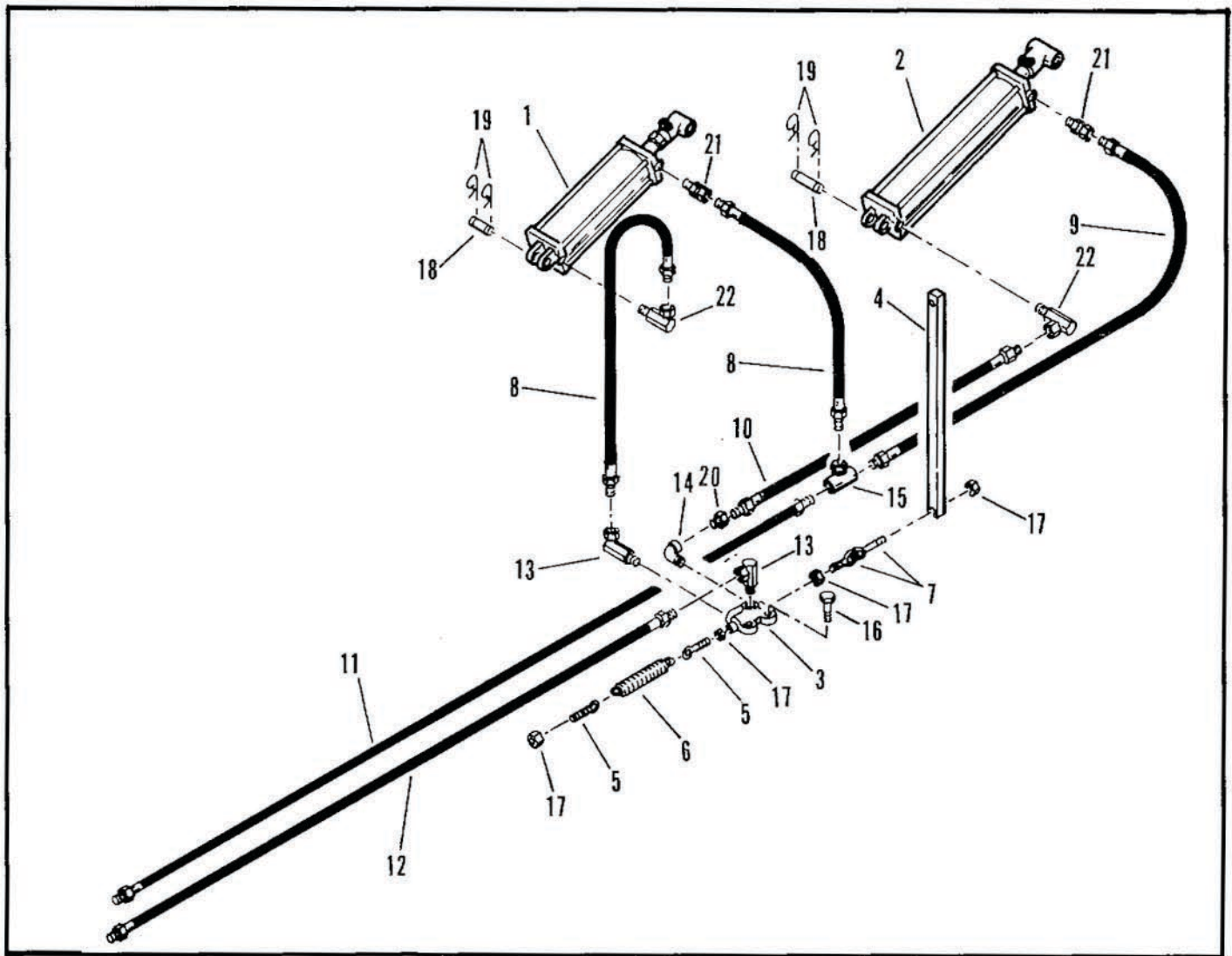
| Ref. | Part No. | Description | Qty. |
|---|----------|---|------|
| 4 | 8R6825 | FLANGED BEARING W/COLLAR, 2" | 1 |
| | 8R6820 | COLLAR, retaining | X |
| 5 | 8X0250 | NUT, hex, 5/8" NC | 6 |
| 6 | 8X0093 | CAP SCREW, hex hd., 5/8" NC x 2" | 4 |
| 7 | 8R7070 | REEL SPROCKET, 54 tooth | 1 |
| | 8R7069 | REEL SPROCKET, 45 tooth | X |
| 8 | 8R7095 | KEY, 1/2" x 2-1/8" | 1 |
| 9 | 8R7080 | CHAIN, #60 | 1 |
| 10 | 8X0304 | WASHER, lock 5/8" | 4 |
| 11 | 8X0422 | PIN, clevis 1/2" diameter x 2-1/4" | 2 |
| | 8X0430 | PIN, round head 1/2" diameter x 1-3/4" | X |
| 12 | 8X0400 | PIN, hair clip | 2 |
| 13 | 8R7052 | BOLT W/KNOB | X |
| 14 | 8R7050 | VALVE, flow control | 1 |
| 15 | 8R6852 | ADAPTER, 90°, 1/2" NPT-M x 1/2" FPX | 2 |
| 16 | 8D3107 | NIPPLE, hex 1/2" NPT-M | 1 |
| 17 | 8R6944 | SWIVEL TEE, 1/2" FPX | 1 |
| 18 | 8R7092 | HOSE, hydraulic 1/2" R1 x 60" | 2 |
| 19 | 8R7000 | HOOD, safety | 1 |
| 20 | 8X0002 | CAP SCREW, hex hd., 3/8" NC x 1" | 5 |
| 21 | 8X0301 | WASHER, lock 3/8" | 5 |
| 22 | 8X0201 | NUT, hex, 3/8" NC | 5 |
| 23 | 8X0618 | SET SCREW, 5/8" NC x 3" | 2 |
| 24 | 8R7055 | KEY, 5/16" x 1-1/4" | 1 |
| 25 | 8R7060 | DRIVE SPROCKET, 13 tooth | 1 |
| | 8R7059 | DRIVE SPROCKET, 11 tooth | X |
| 26 | 8X0600 | SET SCREW, 5/16" NC x 3/8" | 2 |
| 27 | 8X0606 | SET SCREW, 7/16" NC x 1-1/2" | 2 |
| 28 | 8X0232 | NUT, hex 7/16" NC | 2 |
| 29 | 8D3075 | HOSE, hydraulic 1/2" R1 x 100" | 2 |
| 30 | 8R7022 | BRACKET, motor mount | 1 |
| 31 | 8R7030 | MOTOR, hydraulic (2000 Series) | 1 |
| 32 | 8R7040 | VALVE, cushion (1/2" NPT ports) | 1 |
| | 8R7041 | VALVE, cushion (7/8" - 14 ORB ports) | 1 |
| 33 | 8X0028 | CAP SCREW, socket 3/8" NC x 2" | 3 |
| 34 | 8R7043 | O-RING | 2 |
| 35 | 8X0062 | CAP SCREW, hex hd., 1/2" NC x 2" | 2 |
| 36 | 8X0303 | WASHER, lock 1/2" | 2 |
| 37 | 8X0240 | NUT, hex 1/2" NC | 2 |
| 38 | 8R6852 | ADAPTER, 90° (1/2" MP x 1/2" FPT) | 2 |
| | 8R6856 | ADAPTER, 90° (7/8" - 14 ORB x 1/2" FPT) | 2 |
| 39 | 8X0013 | CAP SCREW, hex hd. 1/4" NC x 2-1/2" | 2 |
| 40 | 8X0220 | NUT, hex 1/4" NC | 2 |
| 41 | 8X0308 | WASHER, lock 1/4" | 2 |
| 42 | 8R7082 | OFFSET LINK, #60 | |
| 43 | 8R7084 | CONNECTOR LINK, #60 | |
| Motor & Valve Parts | | | |
| | 8R7048 | SHIM, cushion valve pressure relief (2000 Series) | |
| | 8R7406 | SEAL KIT, motor (2000 Series) | |
| | 8R7200 | SEAL KIT, motor (3000 Series) | |
| Motor and mount on units mfg'd. by Crown | | | |
| 44 | 8R7020 | BRACKET, motor mount | 1 |
| 45 | 8R7028 | MOTOR, hydraulic (3000 Series) | 1 |
| 46 | 8R7038 | VALVE, cushion (For 3000 Series Motor) | 1 |
| 47 | 8X0025 | CAP SCREW, socket hd., 5/16" NC x 3" | 6 |
| 48 | 8R7036 | O-RING | 2 |
| 49 | 8X0005 | BOLT, 3/8" NC x 1-1/2" | 4 |



DRIVE & WHEEL ASSEMBLY
(Model 610)

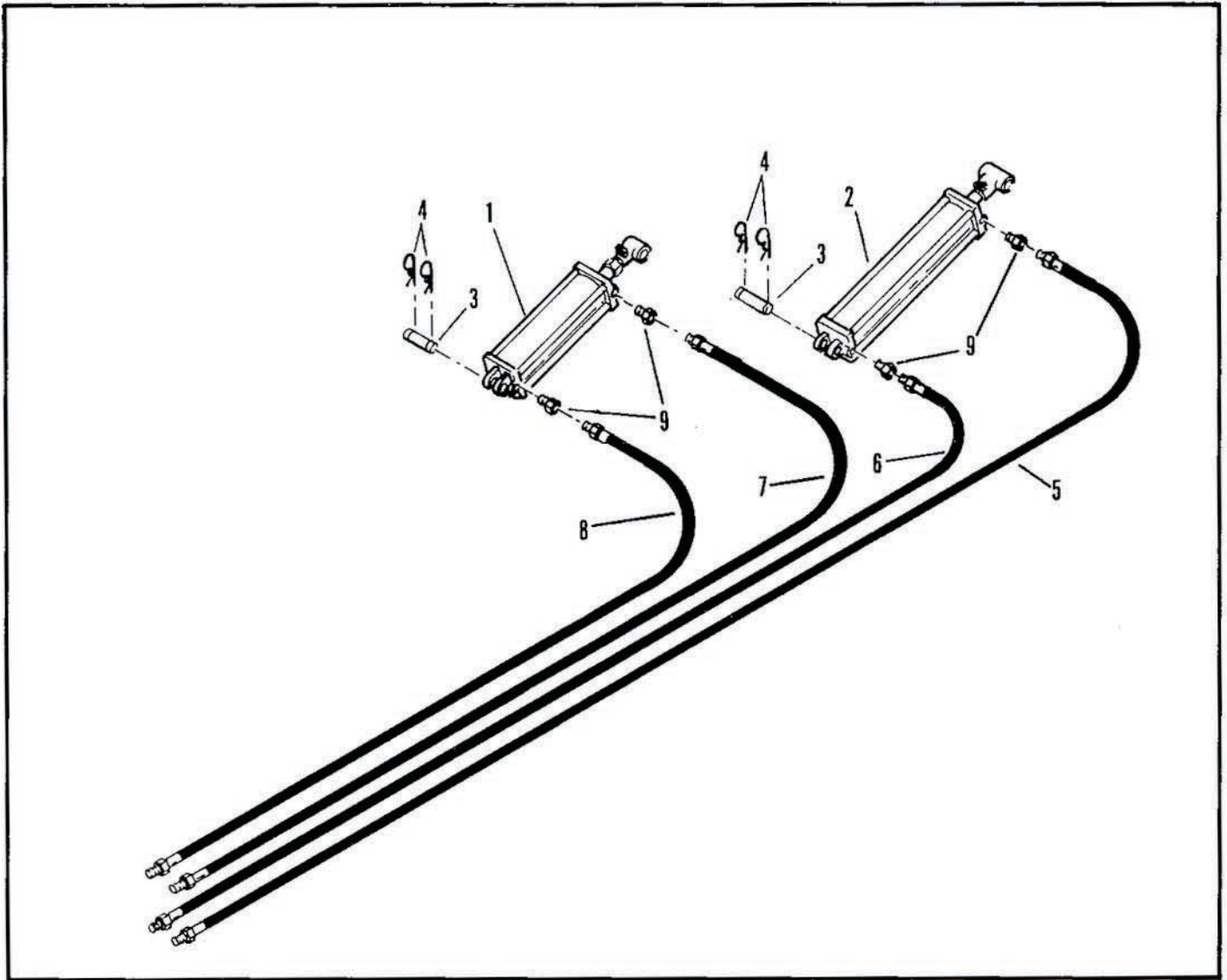
| Ref. | Part No. | Description | Qty. |
|------|----------|--|------|
| 1 | 8R8010 | FLANGED BEARING COMPLETE, 2-1/2" | 2 |
| | 8R8012 | BEARING ONLY, 2-1/2" | X |
| 2 | 8R8220 | DRIVE SPROCKET, 26 tooth | 1 |
| 3 | 8R8060 | SPROCKET CLUTCH PLATE, female (W/Oilite Bearing) | 1 |
| 4 | 8R8070 | BEARING, oilite | 2 |
| 5 | 8R8240 | REEL SPROCKET, 36 tooth | 1 |
| 6 | 8R8040 | SLIP RING, clutch | 1 |
| 7 | 8R8030 | CLUTCH, male | 1 |
| 8 | 8R8020 | SPRING, clutch | 1 |
| 9 | 8R6825 | FLANGED BEARING, 2" (W/Collar) | 1 |
| 9A | 8R6820 | COLLAR, retaining (2" Bearing) | 1 |
| 10 | 8R8100 | ROD, idler sprocket | 1 |
| 11 | 8R8110 | BRACKET, idler sprocket | 1 |
| 12 | 8R8025 | SPRING, chain tightener, 12" | 1 |
| | 8R8023 | SPRING, chain tightener, 30" (Older Models) | 1 |
| 13 | 8R8090 | DRIVE CHAIN, no. 80 | 1 |
| 14 | 8R8120 | BRACKET, idler frame | 1 |
| 15 | 8R8002 | PIN, 1" diameter x 2-1/4" | 2 |
| 16 | 8R8200 | IDLER SPROCKET, 13 tooth | 1 |
| | 8R8140 | IDLER SPROCKET, 13 tooth (Complete W/Bearing) | X |
| 17 | 8X0350 | BUSHING, machine 2" OD x 1" ID x 18 ga. | X |
| | 8X0351 | BUSHING, machine 2" OD x 1" ID x 14 ga. | X |
| 18 | 8R8130 | BEARING, idler sprocket | 1 |
| 19 | 8R8250 | KEY, 3/8" x 2" | 2 |

| Ref. | Part No. | Description | Qty. |
|------|----------|--|------|
| 20 | 8R8260 | MAIN DRIVE AXLE | 1 |
| 21 | 8R8065 | HUB, outer clutch (W/Oilite Bearing) | 1 |
| 22 | 8R8075 | COLLAR, lock | 1 |
| 23 | 8R8092 | OFFSET LINK, no. 80 chain | X |
| 24 | 8R8094 | CONNECTOR LINK, no. 80 chain | X |
| 25 | 8R8150 | CHAIN TIGHTENER, complete | X |
| 26 | 8R8015 | COLLAR, retaining 2-1/2" (Older Models Only) | 2 |
| 27 | 8X0605 | SCREW, set 7/16" NC x 1" | 2 |
| 28 | 8X0606 | SCREW, set 7/16" NC x 1-1/2" | 2 |
| | 8X0609 | SCREW, set 3/8" NC x 2" | X |
| | 8X0608 | SCREW, set 1/2" NC x 1-1/2" | X |
| 29 | 8X0062 | CAP SCREW, hex hd., 1/2" NC x 2" | 6 |
| 30 | 8X0093 | CAP SCREW, hex hd., 5/8" x 2" | 4 |
| 31 | 8X0110 | CAP SCREW, hex hd., 3/4" NC x 1-1/4" | 2 |
| 32 | 8X0111 | CAP SCREW, hex hd., 3/4" NC x 2-1/2" | 4 |
| 33 | 8X0117 | CAP SCREW, hex hd., 3/4" NC x 7" | 2 |
| 34 | 8X0232 | NUT, hex 7/16" NC | 4 |
| 35 | 8X0240 | NUT, hex 1/2" NC | 6 |
| 36 | 8X0250 | NUT, hex 5/8" NC | 7 |
| 37 | 8X0260 | NUT, hex 3/4" NC | 6 |
| 38 | 8X0303 | WASHER, lock 1/2" | 6 |
| 39 | 8X0304 | WASHER, lock 5/8" | 4 |
| 40 | 8X0324 | WASHER, flat 5/8" | 2 |
| 41 | 8X0306 | WASHER, lock 3/4" | 8 |
| 42 | 8X0080 | BOLT, wheel 9/16" NF x 2-1/4" | 6 |
| 43 | 8X0415 | PIN, cotter 3/16" diameter x 1-3/4" | 2 |
| 44 | 8X0248 | NUT, lock 9/16" NF | 6 |



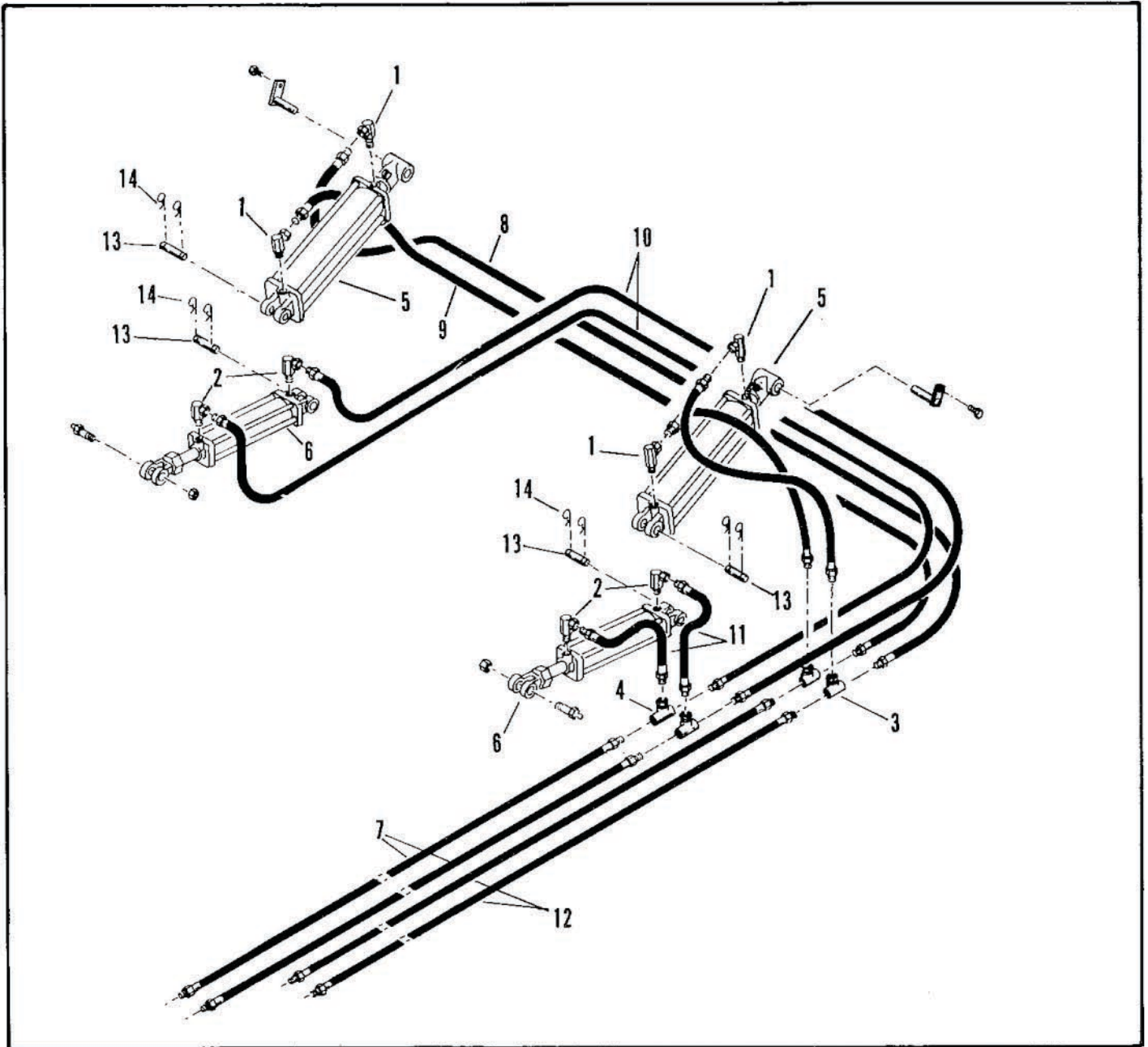
HYDRAULIC SYSTEM
(Model 400)

| Ref. | Part No. | Description | Qty. |
|------|----------|--|------|
| 1 | 8R4350 | CYLINDER, hyd. 3 x 10" w/depth control, 3/4" - 16 ORB ports (1985 & Later - Breakdown Page 26) | 1 |
| | 8R4349 | CYLINDER, hyd. 3 x 10" w/depth control, 1/2" NPT-F ports (Breakdown Page 26) | X |
| 2 | 8R4400 | CYLINDER, hyd. 3 x 14", 3/4" - 16 ORB ports (1985 & Later - Breakdown Page 26) | 1 |
| | 8R4399 | CYLINDER, hyd. 3 x 14", 1/2" NPT-F ports (Breakdown Page 26) | X |
| 3 | 8R4330 | VALVE, selector | 1 |
| 4 | 9R4325 | LEVER, selector | 1 |
| 5 | 8R4335 | EYE BOLT, 3/8" NC | 2 |
| 6 | 8R4190 | SPRING, selector | 1 |
| 7 | 8R4337 | EYE BOLT, double connected (3/8" NC) | 1 |
| 8 | 8D3106 | HOSE, hydraulic, 3/8" R1 x 18" | 2 |
| 9 | 8R6865 | HOSE, hydraulic, 3/8" R1 x 57" | 1 |
| 10 | 8D3084 | HOSE, hydraulic, 3/8" R1 x 48" | 1 |
| 11 | 8R6861 | HOSE, hydraulic 3/8" R1 x 110" | 1 |
| 12 | 8D3087 | HOSE, hydraulic, 3/8" R1 x 124" | 1 |
| 13 | 8D3095 | ADAPTER, 90° (1/2" MP x 3/8" FPT) | 4 |
| 14 | 8X0660 | ELBOW, street pipe 1/2" NPT-M x 1/2" NPT-F | 1 |
| 15 | 8R6942 | TEE, swivel 3/8" FPT | 1 |
| 16 | 8X0022 | CAP SCREW, hex hd. 5/16" NC x 1-1/2" | 2 |
| 17 | 8X0006 | NUT, hex 3/8" NC | 4 |
| 18 | 8R4436 | PIN, clevis 1" x 3-3/4" | 2 |
| 19 | 8D9110 | CLIP, hair pin | 4 |
| 20 | 8D3098 | BUSHING, steel 1/2" NPT-M x 3/8" NPT-F | 1 |
| 21 | 8R6858 | ADAPTER, str. 3/4" - 16 ORB x 3/8" FPX | 2 |
| 22 | 8D3097 | ADAPTER, 90°, 3/4" - 16 ORB x 3/8" FPX | 2 |



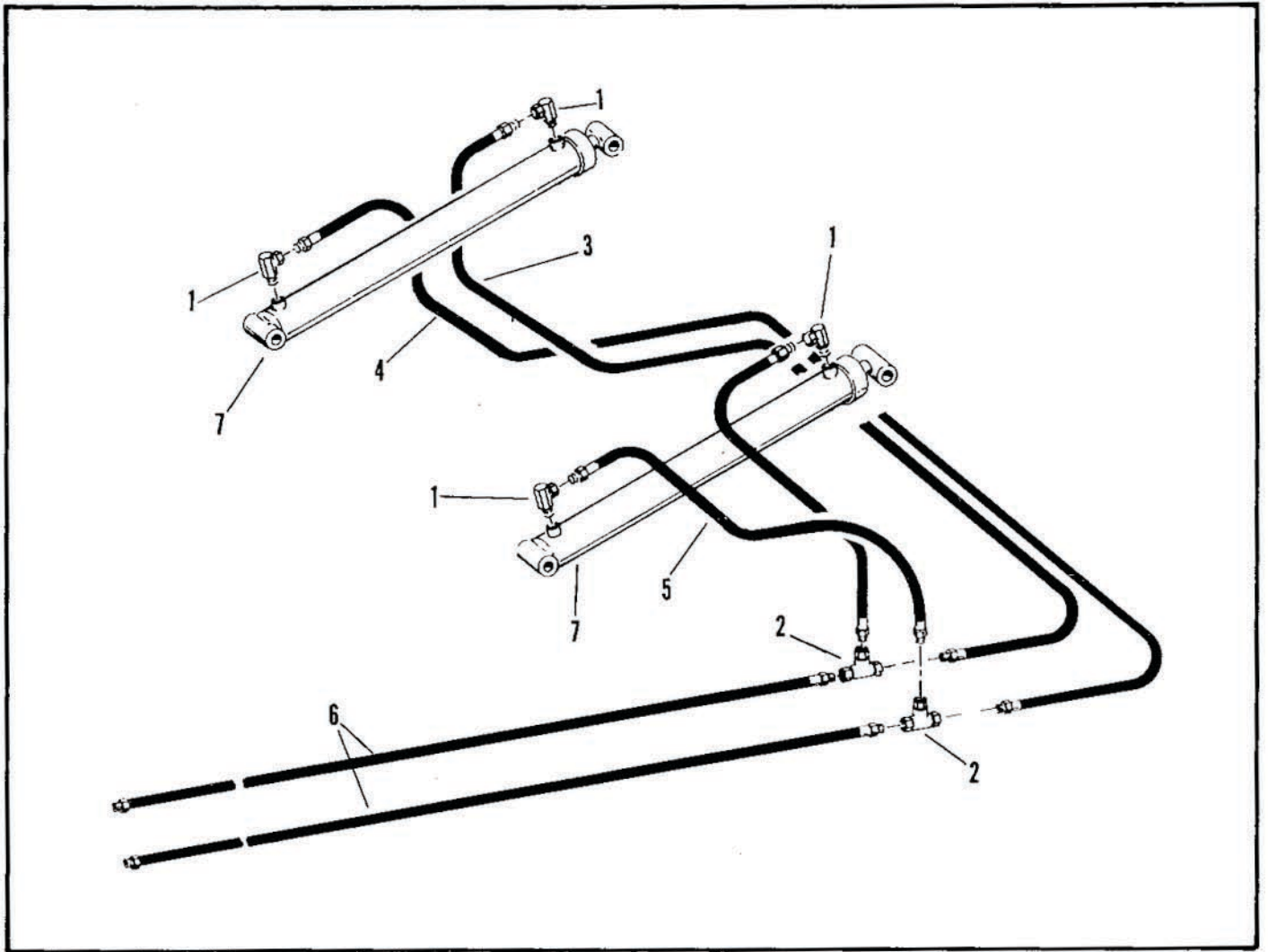
HYDRAULIC DUMP SYSTEM
(Model 410)

| Ref. | Part No. | Description | Qty. |
|------|----------|---|------|
| 1 | 8R4350 | CYLINDER, hyd. 3 x 10" w/depth control, 3/4" - 16 ORB ports (1985 & Later (Breakdown Page 26) | 1 |
| | 8R4349 | CYLINDER, hyd. 3 x 10" w/depth control, 1/2" NPT-F ports (Breakdown Page 26) | X |
| 2 | 8R4400 | CYLINDER, hyd. 3 x 14", 3/4" - 16 ORB ports (1985 & Later - Breakdown Page 26) | 1 |
| | 8R4399 | CYLINDER, hyd. 3 x 14", 1/2" NPT-F ports (Breakdown Page 26) | X |
| 3 | 8R4436 | PIN, clevis 1" x 3-3/4" | 2 |
| 4 | 8D9110 | CLIP, hair pin | 4 |
| 5 | 8D3093 | HOSE, hydraulic, 3/8" R1 x 204" | 1 |
| 6 | 8R6868 | HOSE, hydraulic, 3/8" x 180" | 1 |
| 7 | 8R6866 | HOSE, hydraulic, 3/8" R1 x 148" | 1 |
| 8 | 8D3087 | HOSE, hydraulic, 3/8" R1 x 124" | 1 |
| 9 | 8R6858 | ADAPTER, str. 3/4" - 16 ORB x 3/8" FPX | 4 |



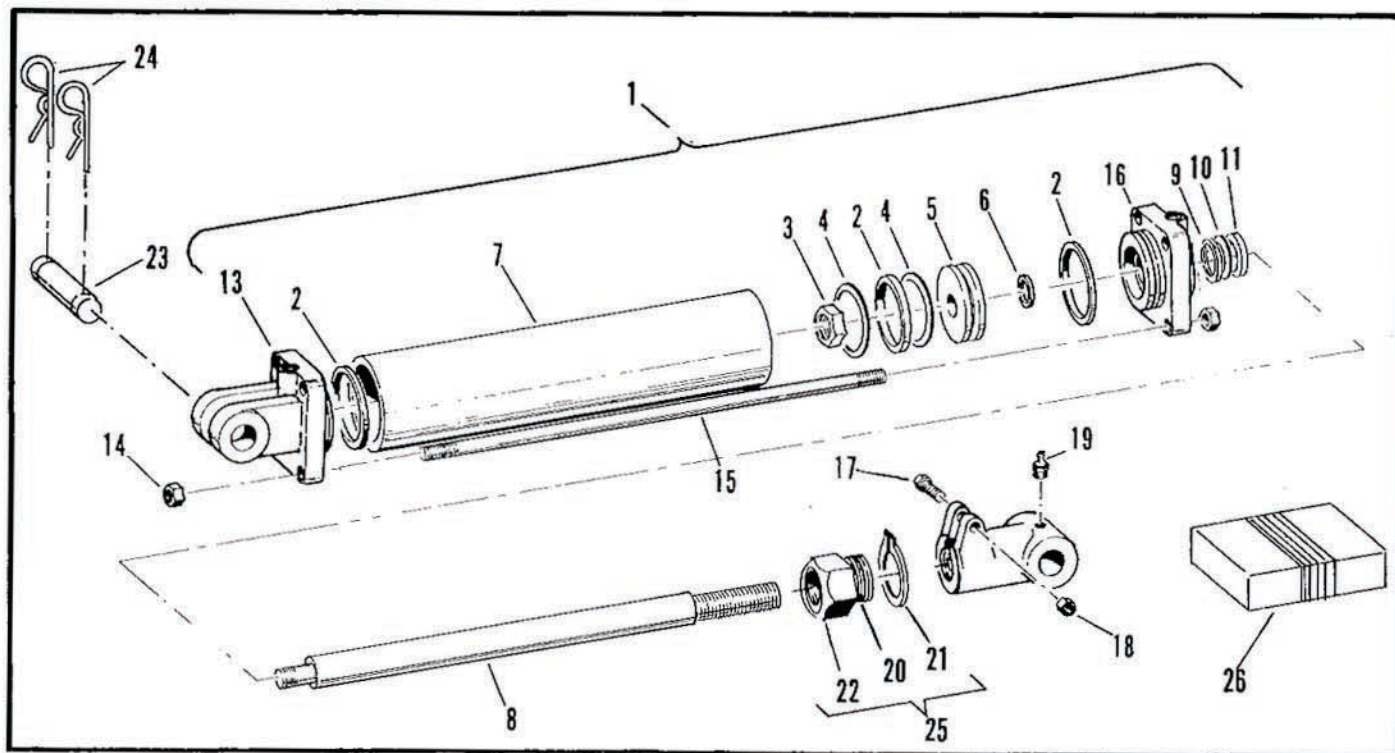
HYDRAULIC SYSTEM
(Model 500)

| Ref. | Part No. | Description | Qty. |
|------|----------|---|------|
| 1 | 8D3097 | ADAPTER, 90°, 3/4" - 16 ORB x 3/8" FPX | 4 |
| 2 | 8R6859 | ADAPTER, 90°, 3/4" - 16 ORB x 1/2" FPX | 4 |
| 3 | 8R6942 | TEE, swivel 3/8" FPX | 2 |
| 4 | 8R6944 | TEE, swivel 1/2" FPX | 2 |
| 5 | 8R5316 | CYLINDER, hyd. 3-1/2" x 16" (3/4" - 16 ORB Ports - Breakdown Page 27) | 2 |
| 6 | 8R5308 | CYLINDER, hyd. 3" x 8" (3/4" - 16 ORB Ports - Breakdown Page 27) | 2 |
| 7 | 8R6868 | HOSE, hydraulic 3/8" R1 x 180" | 2 |
| 8 | 8R6866 | HOSE, hydraulic 3/8" R1 x 148" | 1 |
| 9 | 8R6867 | HOSE, hydraulic 3/8" R1 x 158" | 1 |
| 10 | 8R5860 | HOSE, hydraulic 1/2" R1 x 148" | 2 |
| 11 | 8R5820 | HOSE, hydraulic 1/2" R1 x 28" | 2 |
| 12 | 8R5880 | HOSE, hydraulic 1/2" R1 x 200" | 2 |
| 13 | 8R4436 | PIN, clevis 1" x 3-3/4" | 4 |
| 14 | 8D9110 | PIN, hair clip | 8 |



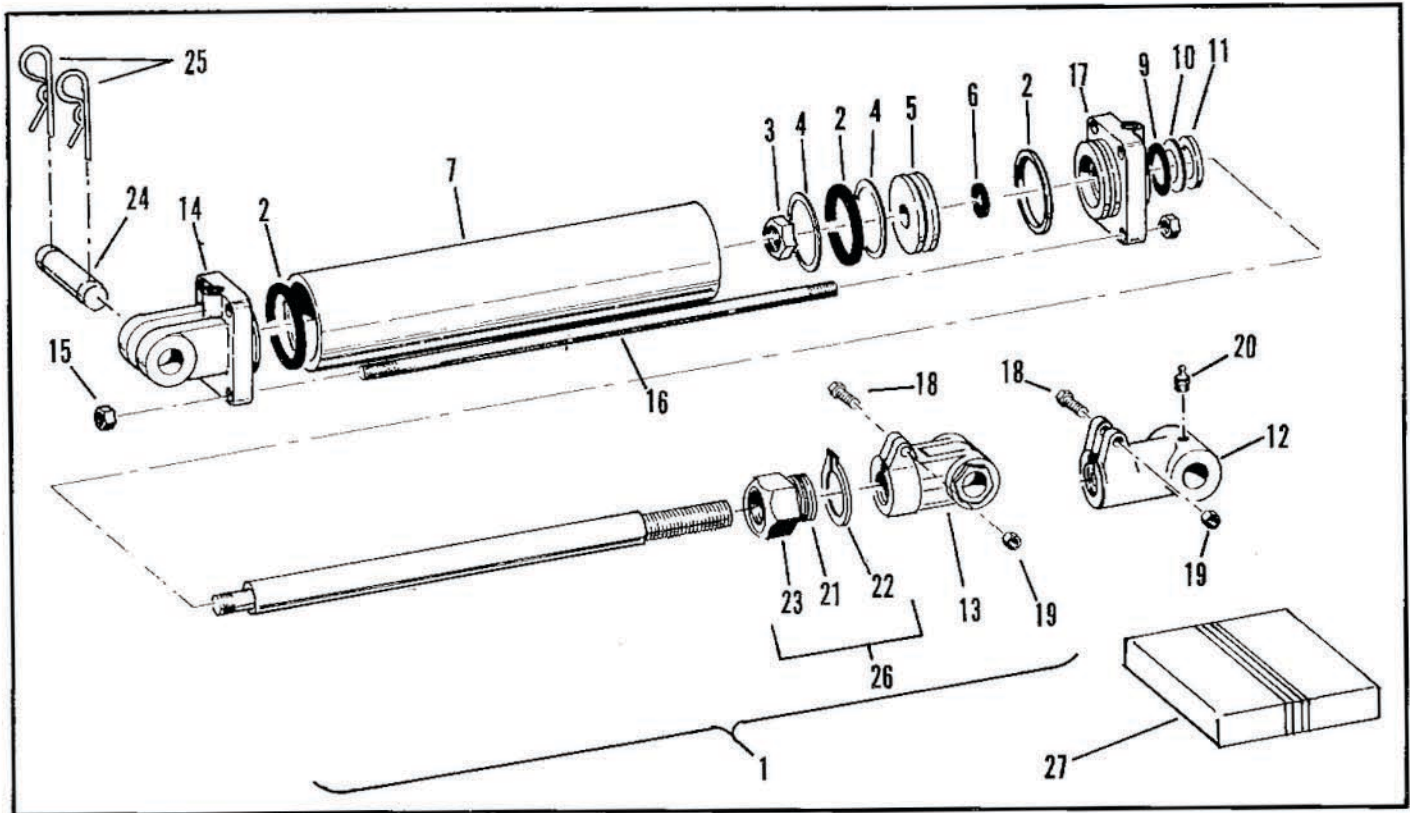
HYDRAULIC DUMP SYSTEM
(Models 600, 610 & 700)

| Ref. | Part No. | Description | Qty. |
|------|----------|--|------|
| 1 | 8D3097 | ADAPTER, 90° 3/4" - 16 ORB x 3/8" FPX | 4 |
| 2 | 8R6942 | TEE, swivel, 3/8" FPT | 2 |
| 3 | 8R6866 | HOSE, hydraulic 3/8" R1 x 148" | 1 |
| 4 | 8R6867 | HOSE, hydraulic 3/8" R1 x 158" | 1 |
| 5 | 8D3105 | HOSE, hydraulic 3/8" R1 x 32" | 2 |
| 6 | 8R6868 | HOSE, hydraulic 3/8" R1 x 180" | 2 |
| 7 | 8R6870 | CYLINDER, hyd. 3 x 31", 3/4" - 16 ORB ports (1985 & Later - Breakdown Page 28) | 2 |
| | 8R6869 | CYLINDER, hyd. 3 x 31", 3/8" NPT-F (Breakdown Page 28) | X |



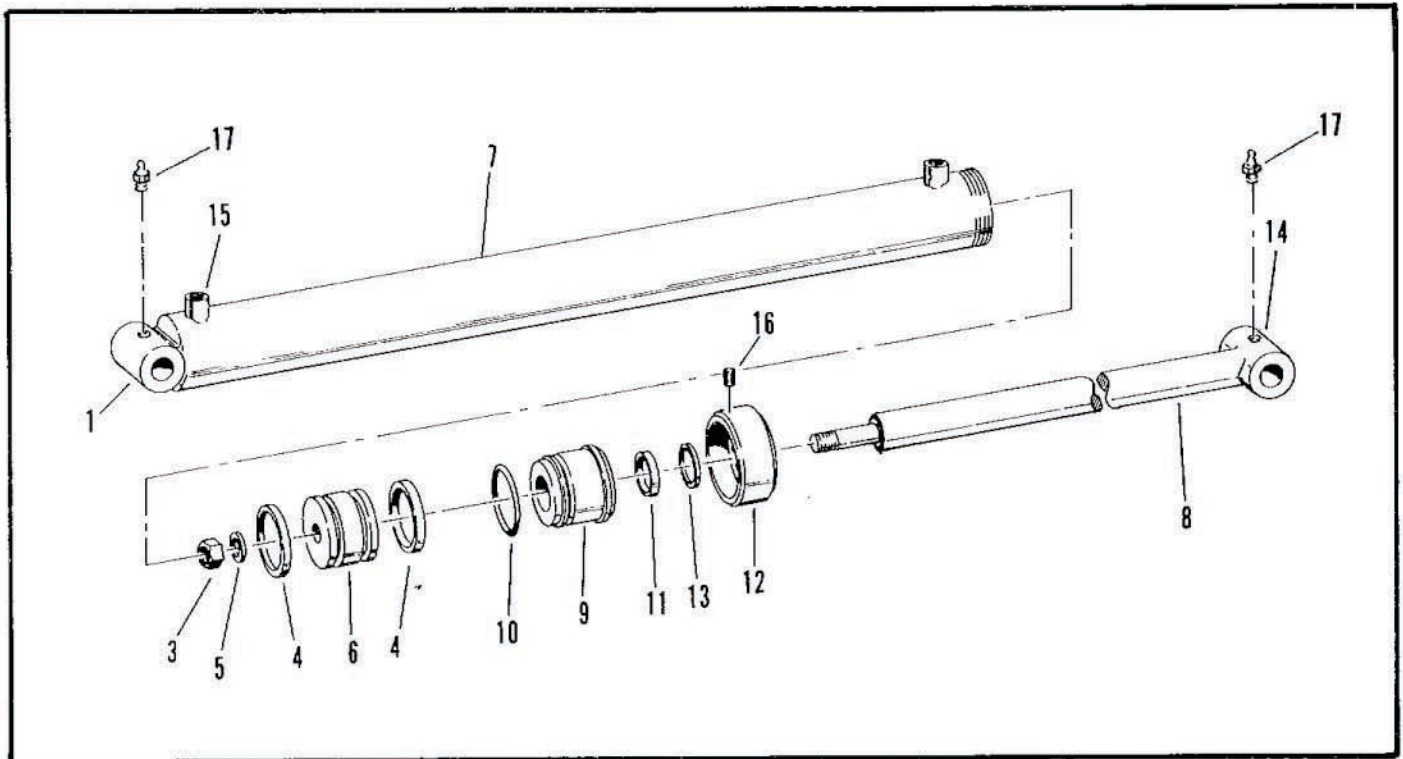
HYDRAULIC CYLINDERS
(Models 400 and 410)

| Ref. | Part No. | Description | Qty. | |
|------|-------------------------|---|--|---|
| | Rugby Model RT3010DE | Rugby Model RT3014 | | |
| 1 | 8R4350 | CYLINDER, hydraulic 3 x 10" w/depth control (3/4" - 16 ORB Ports) | 1 | |
| | 8R4400 | CYLINDER, hydraulic 3 x 14" (3/4" - 16 ORB Ports) | 1 | |
| 2 | NSS | O-RING | 3 | |
| 3 | 8D9248 | NUT, piston | 1 | |
| 4 | NSS | BACK-UP | 2 | |
| 5 | 8D9250 | PISTON | 1 | |
| 6 | NSS | O-RING | 1 | |
| 7 | 8R4370 | 8R4416 | TUBE | 1 |
| 8 | 8R4372 | 8R4418 | ROD | 1 |
| 9 | NSS | NSS | O-RING | 1 |
| 10 | NSS | NSS | BACK-UP | 1 |
| 11 | NSS | NSS | ROD WIPER | 1 |
| 12 | 8R4420 | 8R4420 | PINEYE | 1 |
| 13 | 8D9258 | 8D9258 | ANCHOR END CAP | 1 |
| 14 | 8D9253 | 8D9253 | NUT, tie rod | 8 |
| 15 | 8R4374 | 8R4426 | TIE ROD | 4 |
| 16 | 8D9244 | 8D9244 | ROD END CAP | 1 |
| 17 | 8R4430 | 8R4430 | CLEVIS CAP SCREW | 1 |
| 18 | 8R4432 | 8R4432 | NUT, clevis | 1 |
| 19 | 8X0725 | 8X0725 | FITTING, grease | 1 |
| 20 | 8R4376 | | DEPTH CONTROL ASSY., inner | 1 |
| 21 | 8R4378 | | SNAP RING | 1 |
| 22 | 8R4380 | | DEPTH CONTROL ASSY., outer | 1 |
| 23 | 8R4436 | 8R4436 | CLEVIS PIN, 1 x 3-3/4" | 1 |
| 24 | 8D9110 | 8D9110 | HAIR PIN | 2 |
| 25 | 8R4375 | | DEPTH CONTROL ASSY., complete (Includes Ref. 20, 21, 22) | 1 |
| 26 | 8D9240 | 8D9240 | SEAL KIT (Includes Ref. 2, 4, 6, 9, 10 & 11) | 1 |



HYDRAULIC CYLINDERS
(Model 500)

| Ref. | Part No. | | Description | Qty. |
|------|---------------------|-----------------------|---|--------|
| | Rugby Model 3x8" | Rugby Model 3½x16" | | |
| 1 | 8R5308 | | CYLINDER, hydraulic 3 x 10" w/depth control (3/4" - 16 ORB Ports) | 3x8 1 |
| | | 8R5316 | CYLINDER, hydraulic 3 x 14" (3/4" - 16 ORB Ports) | 3x16 1 |
| 2 | NSS | NSS | O-RING | 3 |
| 3 | 8D9248 | 8D9348 | NUT, piston | 1 |
| 4 | NSS | NSS | BACK-UP | 2 |
| 5 | 8D9250 | 8D9350 | PISTON | 1 |
| 6 | NSS | NSS | O-RING | 1 |
| 7 | 8R5416 | 8D9346 | TUBE | 1 |
| 8 | 8R5418 | 8R5518 | ROD | 1 |
| 9 | NSS | NSS | O-RING | 1 |
| 10 | NSS | NSS | BACK-UP | 1 |
| 11 | NSS | NSS | ROD WIPER | 1 |
| 12 | | 8R4420 | PINEYE | 1 |
| 13 | 8R5440 | | CLEVIS, w/washer (Left) | 1 |
| | 8R5442 | | CLEVIS, w/washer (Right) | 1 |
| 14 | 8D9258 | 8D9358 | ANCHOR END CAP | 1 |
| 15 | 8D9253 | 8D9353 | NUT, tie rod | 8 |
| 16 | 8R5426 | 8D9354 | TIE ROD | 4 |
| 17 | 8D9244 | 8D9344 | ROD END CAP | 1 |
| 18 | 8D9451 | 8D9451 | CLEVIS CAP SCREW | 1 |
| 19 | 8D9452 | 8D9452 | NUT, clevis | 1 |
| 20 | | 8X0725 | FITTING, grease | 1 |
| 21 | 8R4376 | | DEPTH CONTROL ASSY., inner | 1 |
| 22 | 8R4378 | | SNAP RING | 1 |
| 23 | 8R4380 | | DEPTH CONTROL ASSY., outer | 1 |
| 24 | 8R4436 | 8R4436 | CLEVIS PIN, 1 x 3-3/4" | 1 |
| 25 | 8D9110 | 8D9110 | HAIR PIN | 2 |
| 26 | 8R4375 | | DEPTH CONTROL ASSY., complete (Includes Ref. 20, 21, 22) | 1 |
| 27 | 8D9240 | 8D9340 | SEAL KIT (Includes Ref. 2, 4, 6, 9, 10 & 11) | 1 |



ROTARY ROCKPICKER CYLINDER BREAKDOWN
 (Rugby Hydraulic Cylinders for Models 600, 610 & 700)

| Ref. | Part No. | Description | Qty. |
|------|----------|---|------|
| | 8R6870 | CYLINDER, hydraulic 3 x 31" (3/4" - 16 ORB Ports) | |
| 1 | NSS | PINEYE, anchor end | 1 |
| 2 | NSS | BUTT PLATE | 1 |
| 3 | 8R9248 | NUT, piston | 1 |
| 4 | NSS | U-CUP | 2 |
| 5 | NSS | O-RING | 1 |
| 6 | 8R7610 | PISTON | 1 |
| 7 | 8R7618 | TUBE | 1 |
| 8 | 8R7620 | ROD | 1 |
| 9 | 8R7612 | GLAND | 1 |
| 10 | NSS | O-RING | 1 |
| 11 | NSS | U-CUP, Rod | 1 |
| 12 | 8R7614 | RETAINER RING | 1 |
| 13 | NSS | ROD WIPER | 1 |
| 14 | NSS | PINEYE, Rod End | 1 |
| 15 | NSS | HALF-COUPLING | 2 |
| 16 | 8R7616 | SET SCREW | 1 |
| | 8R6873 | SEAL KIT (Includes Ref. 4, 5, 10, 11, & 12) | 1 |
| | 8R6871 | SEAL KIT, Prince, 3 x 31" | |
| | 8R6872 | SEAL KIT, Cross, 3 x 31" | |
| 17 | 8X0725 | FITTING, grease | 2 |