INDUSTRIAL EQUIPMENT

FORD

Series 745 Loader

19-854, 19-855, 19-856
19-857 and 19-858

REPAIR MANUAL

40074510 Reprinted

FOREWORD

This manual contains service information for the Ford Series 745 Loader, Models 19-854, 19-855, 19-856, 19-857 and 19-858. Detailed information is provided on description and operation, trouble shooting, tests and adjustments, component overhaul, lubrication, and specifications.

Instructions for installing the loaders, loader components, or attaching kits are not covered in this manual. Refer to the appropriate operator's and assembly manuals for detailed information.

The loaders are similar in construction and operation. However, there are variances in dimensions and other specifications. Particular attention should be given to correct loader model identification when ordering parts or when servicing the unit.

Keep this manual, along with your other service literature, available for ready reference.

SAFETY PRECAUTION

Appropriate service methods and proper repair procedures are essential for the safe, reliable operation of all tractors and equipment as well as the personal safety of the individual doing the work. This Shop Manual provides general directions for accomplishing service and repair work with tested, effective techniques. Following them will help assure reliability.

There are numerous variations in procedures, techniques, tools, and parts for servicing vehicles, as well as in the skill of the individual doing the work. This Manual cannot possibly anticipate all such variations and provide advice or cautions as to each. Accordingly, anyone who departs from the instructions provided in this Manual must first establish that he compromises neither his personal safety nor the vehicle integrity by his choice of methods, tools or parts.

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DESCRIPTION AND OPERATION

DESCRIPTION AND OPERATION

Each loader package consists of a loader frame, loader lift arms, lift cylinders, bucket cylinders, float control valve, hydraulic pump and pump drive, hydraulic reservoir assembly, hydraulic tubes and hoses and attaching hardware. The Ford 545 Tractor may be fitted with Loader Models 19-854, 19-855, 19-856 or 19-858. The Ford 445 Tractor may be fitted with Loader Models 19-855, 19-856 or 19-857. Figure 1 illustrates the loader major components.

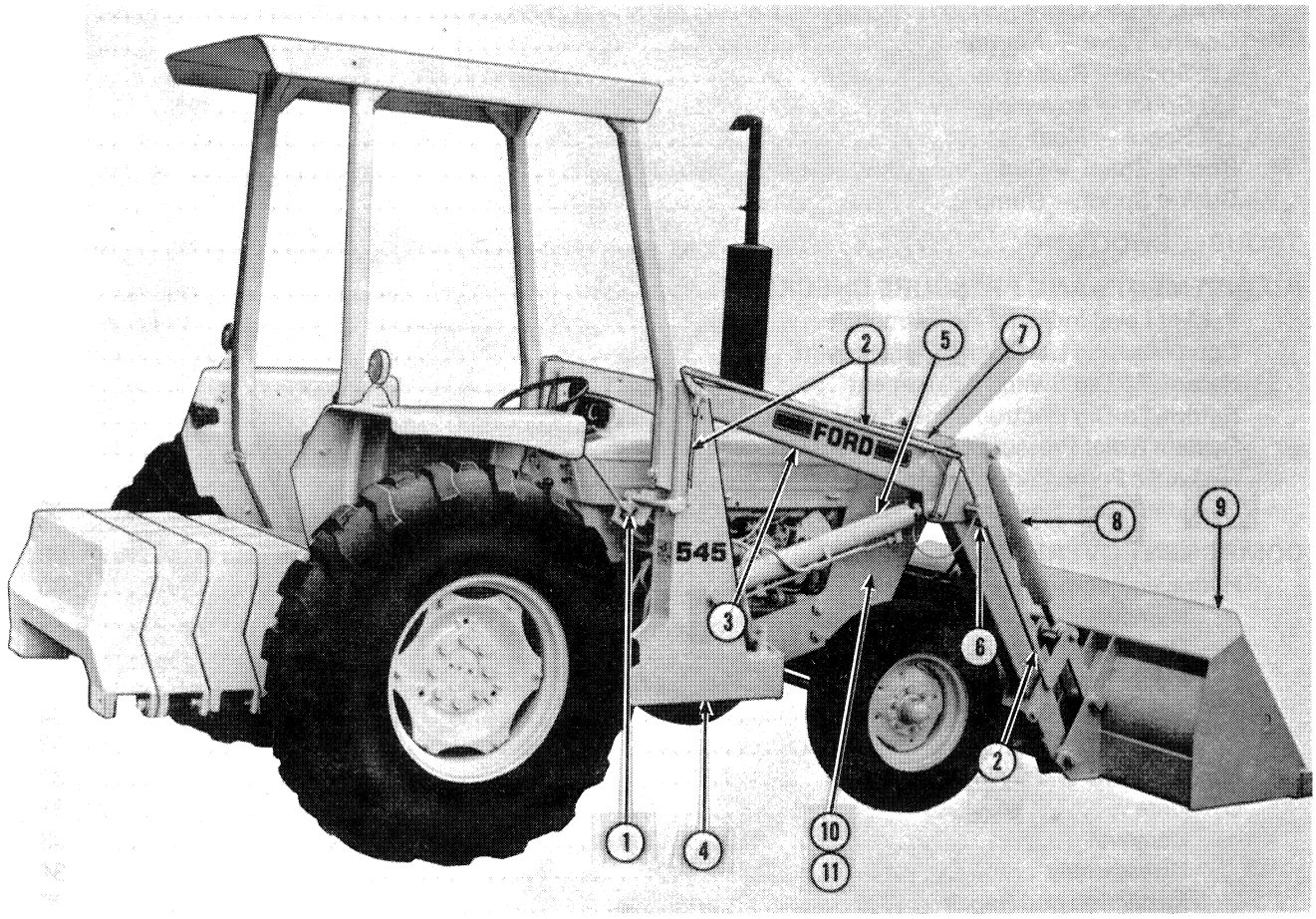

Figure 1
Loader Components

1. Control Valve
2. Compensating Lift Linkage
3. Lift Arm
4. Loader Frame
5. Lift Cylinder
6. Return-to-Dig Switch
7. Bucket Level Indicator Linkage
8. Bucket Cylinder
9. Bucket
10. Hydraulic Reservoir Location
11. Hydraulic Pump Location

DESCRIPTION AND OPERATION

LOADER FRAME

The loader frame is welded box type construction and consists of two frame members. Each frame member is secured at the engine front support casting and at the tractor rear axle. The loader lift arms are of one piece welded construction and pivot at the top of the loader frame posts.

HYDRAULIC SYSTEM

The Series 745 Loaders operate from a hydraulic system that is separate from the tractor hydraulic system. The hydraulic pump is mounted to the lower front support casting inside the radiator shell and is driven by the engine crankshaft. The hydraulic reservoir is mounted inside the top of the radiator shell and houses the hydraulic oil filter and breather element. When the tractor engine is running, the hydraulic pump draws oil from the reservoir and delivers it via steel tubing to the loader control valve which delivers the oil to the cylinders as desired.

HYDRAULIC PUMP

The gear type hydraulic pump, Figure 2, for the Ford 445 and 545 tractors is driven in a counterclockwise direction and delivers oil taken from the hydraulic reservoir to the control valve. Oil enters the pump at the inlet port (1) and is transported via the two gears (5) to the pump outlet (3). Pumping action takes place as the drive gear rotates the driven gear. As the gears unmesh, oil fills the spaces between the gear teeth and is carried to the outlet side of the pump. As the gears begin to mesh, the oil is forced from between the gear teeth, thus building pressure and forcing oil through the outlet port.

A small amount of oil that is being transported by the gears during pumping action is allowed to pass by the gears to lubricate the pump. The gear shafts and bearings are lubricated when oil is forced through ports in the high pressure side of the plate assemblies. This oil flows past the gear shafts and bearings and is returned to the low pressure pocket through the ports in the plate assemblies.

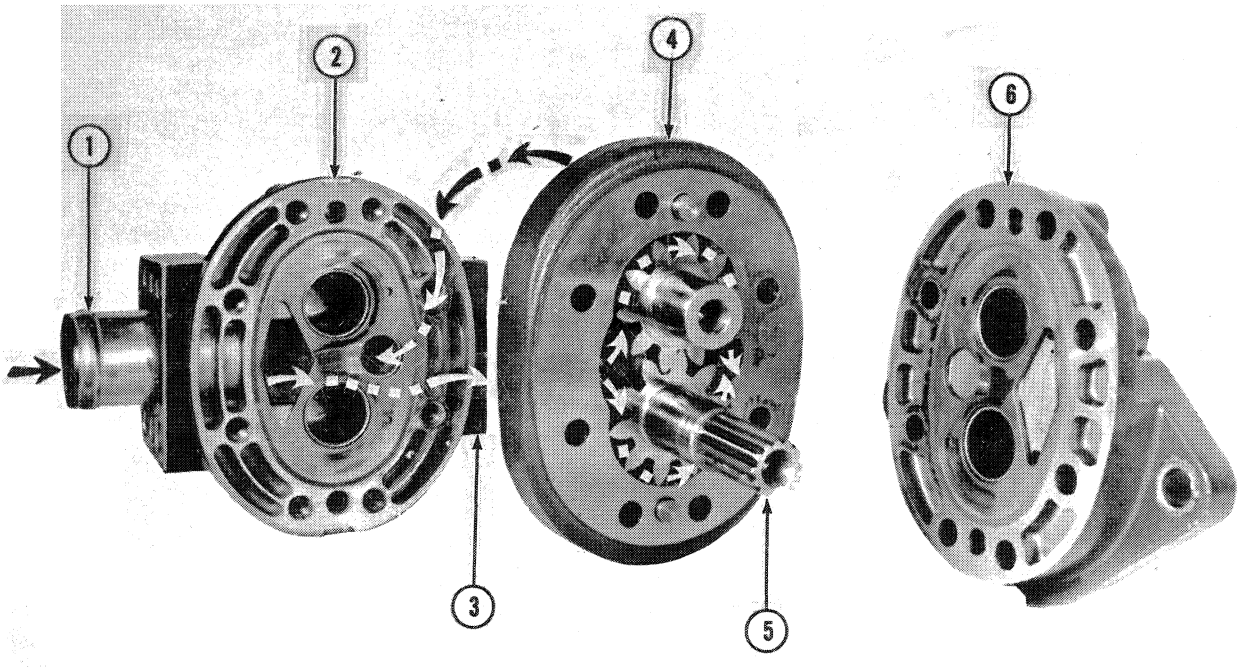

Figure 2
Hydraulic Pump Oil Flow

1. Pump Inlet
2. Back Plate Assembly
3. Pump Outlet
4. Gear Body
5. Gear Set
6. Front Plate Assembly

DESCRIPTION AND OPERATION

The hydraulic pump is available in two capacities — 22.0 gpm and 27.0 gpm. The pump capacity is determined by measuring the width of the gear body (4).

The body of the 22.0 gpm pump is 1.20 inches (30.5 mm) wide and the body of the 27.0 gpm pump is 1.46 inches (37.1 mm) wide.

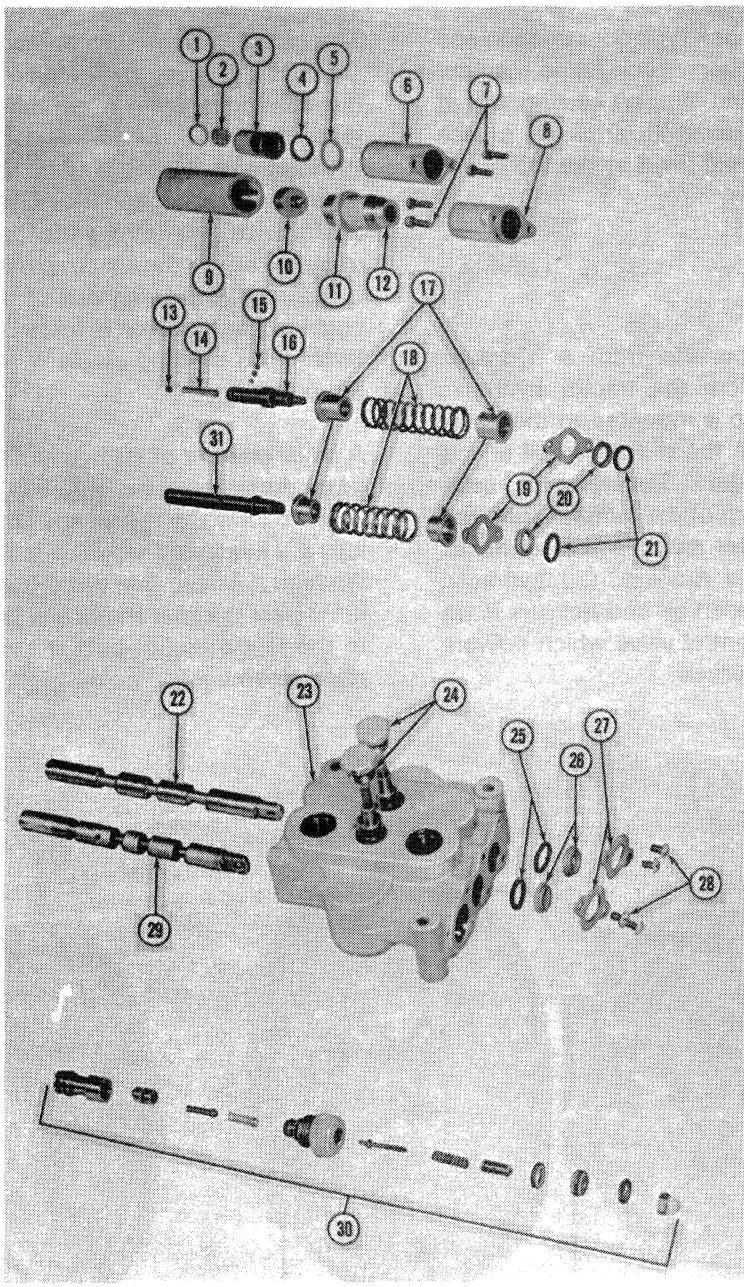

Figure 3
Control Valve Exploded View

1. Snap Ring
2. Plug
3. Detent Sleeve
4. Snap Ring
5. Retainer Ring
6. Spring Cap
7. Spring Cap Screws
8. Spring Cap
9. Tube Assembly
10. Clapper
11. Lock Nut
12. Plunger Sleeve
13. Detent Ball
14. Detent Spring
15. Radial Balls
16. Detent Plunger
17. Spring Collars
18. Centering Springs
19. Seal Retainers
20. Wiper Seals
21. O-Rings
22. Lift Spool
23. Valve Body
24. Check Valve Assemblies
25. O-Rings
26. Wiper Seals
27. Seal Retainers
28. Seal Retainer Screws
29. Bucket Spool
30. System Relief Valve Assembly
31. Positioner Stud

CONTROL VALVE

Refer to the Control Valve Exploded View, Figure 3, and the Control Valve Assembly Cutaway, Figure 4.

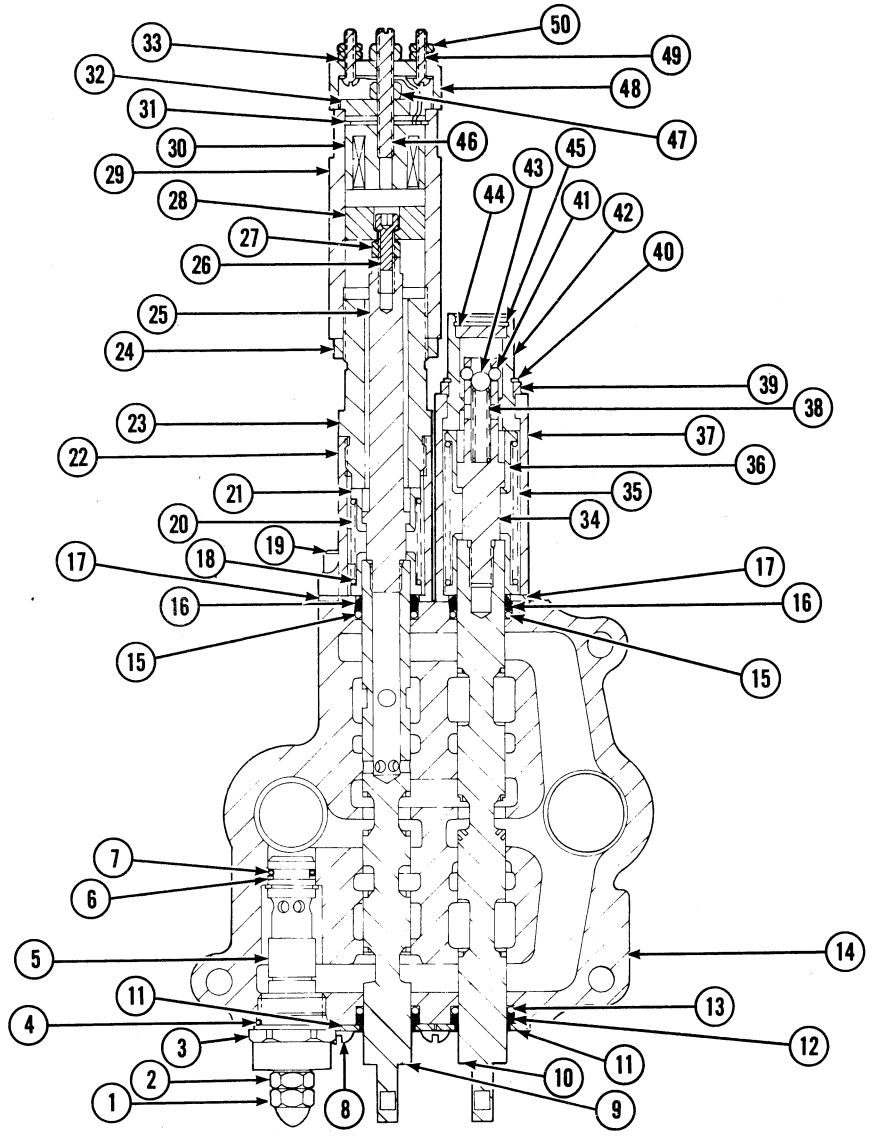

Figure 4
Control Valve Cutaway

1. Acorn Nut
2. Adjusting Screw Lock Nut
3. Plug
4. O-Ring
5. Relief Valve Assembly
6. Back-Up Ring
7. O-Ring
8. Seal Retainer Screw
9. Bucket Spool
10. Lift Spool
11. Seal Retainer
12. Wiper Seal
13. O-Ring
14. Valve Body
15. O-Ring
16. Wiper Seal
17. Seal Retainer
18. O-Ring
19. Spring Cap Screw
20. Centering Spring
21. Spring Collar
22. Spring Cap
23. Plunger Sleeve
24. Lock Nut
25. Plunger
26. Clapper Retaining Screw
27. Lock Nut
28. Clapper
29. Tube
30. Electromagnet
31. Snap Ring
32. Cap
33. Lock Washer
34. Detent Plunger
35. Centering Spring
36. Spring Collar
37. Spring Cap
38. Detent Spring
39. Retainer Ring
40. Snap Ring
41. Radial Balls
42. Detent Sleeve
43. Detent Ball
44. Cap
45. Snap Ring
46. Stud
47. Jam Nut
48. Plastic Cap
49. Screw Terminal
50. Nut

DESCRIPTION AND OPERATION

The control valve used on Series 745 Loader Models 19-854, 19-855, 19-856, 19-857 and 19-858 is a unit type valve with double acting lift and bucket spools. It also incorporates a "float" mechanism at the end of the lift spool. The double acting spools allow oil to travel to one end of a cylinder through one hose while oil being forced from the cylinder returns to the control valve through a separate hose. The position of the valve spool determines the direction of oil flow.

The cast iron control valve body houses all of the valve components and acts as an attaching point for the hydraulic tubes. The valve is bolted to a mounting bracket which is welded to the right hand loader frame post. The valve spools (22) and (29), Figure 3, are constructed of high carbon, ground, polished and chrome plated steel. The centering springs (18) and spring collars (17) are located at the ends of the spools and function to return them to the neutral position.

Each valve spool is selectively fitted to its respective spool bore. Because of this selective fitting, the spools cannot be serviced separately. If the spools are damaged, the control valve must be replaced as an assembly.

Float Mechanism

The "float" mechanism is engaged by moving the control lever "full forward". This action actuates a detent mechanism in which the radial balls (41), Figure 4, fall into the grooved portion of the detent sleeve (42). The detent spring (38) exerts pressure against the detent ball (43) holding the radial balls in position. When the float is engaged, the bucket will follow the contour of the working surface. To disengage the float mechanism, the control lever must be returned to the neutral position.

Check Valves

The check valve assemblies, Figure 5, are located in the control valve high pressure passages above each valve spool. When a hydraulic cylinder is under load and a valve spool is moved to actuate a cylinder, there would be a momentary tendency for oil to flow in the opposite direction. The check valves keep the circuits closed until there is sufficient flow and pressure to overcome the load on the cylinders.

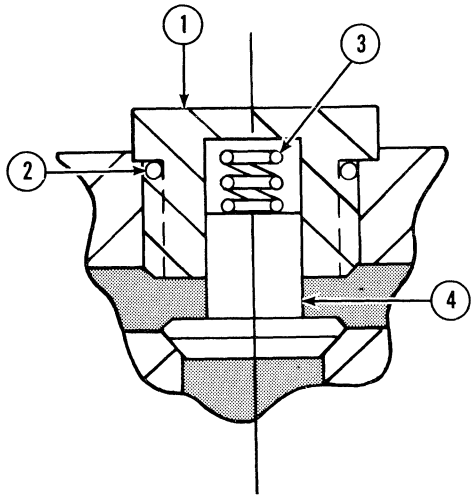

Figure 5
Check Valve Assembly

1. Plug
2. O-Ring
3. Spring
4. Poppet

When pressure and flow are sufficient to overcome the cylinder pressure, the poppet (4) is lifted from its seat allowing oil to pass through the high pressure ports of the control valve. When pressure is decreased, the check valve spring seats the poppet, thus stopping oil flow.

System Relief Valve

The system relief valve, Figures 6 and 7, in the control valve serves to protect the loader hydraulic components from damage by preventing excessive internal pressures in the system when the valve spools are activated. When a spool is actuated and the cylinder reaches the end of its stroke, or is physically prevented from moving, the system relief valve opens and directs pump oil to the low pressure return passage of the control valve. The system relief valve is located between the high pressure inlet port and the low pressure return passage of the control valve.

High pressure cylinder oil enters the relief valve through the end of the hollow poppet (12), Figure 7. This oil acts against the pilot valve (17) and the bottom end of the piston (14). When the pressure at the control valve inlet port exceeds the pressure exerted by the pilot valve spring (8), the pilot valve is unseated allowing oil to flow to the control valve return oil passage. This flow creates a lower pressure between the piston (14) and pilot valve (17) and allows the pop-

pet (12) to move and seat against the pilot valve. This stops oil flow to the area behind the piston so that pressure in that area remains low. The higher inlet pressure forces the piston off its seat and allows the high pressure oil to flow through the oil passages to sump.

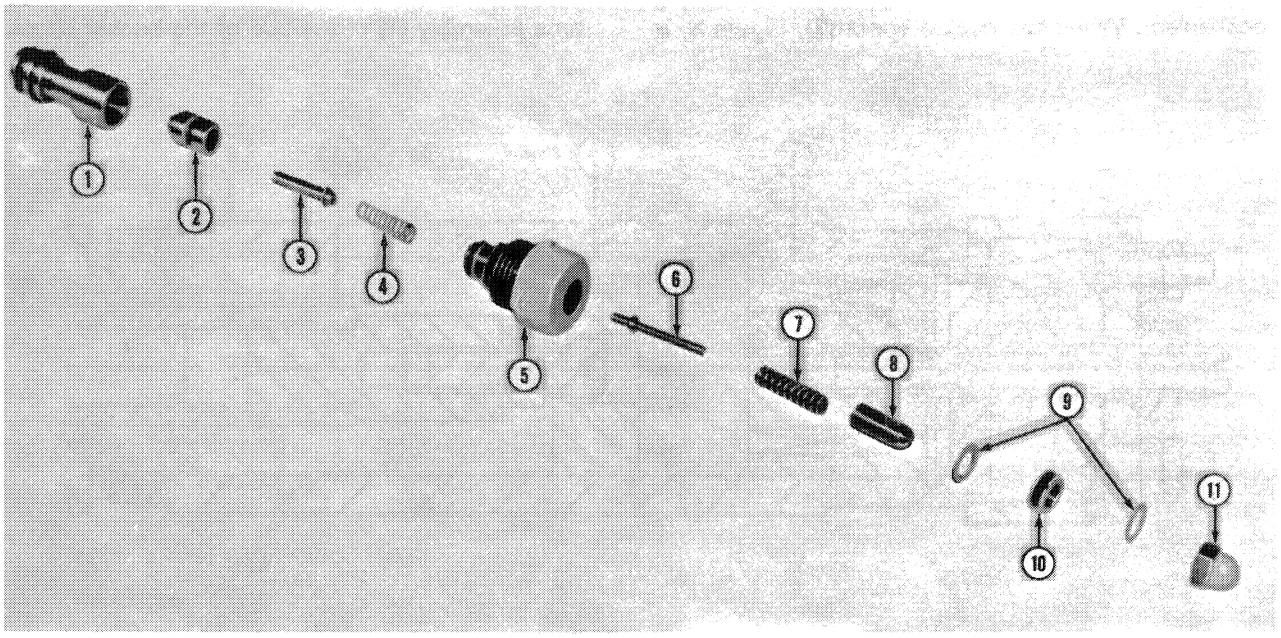

Figure 6
System Relief Valve Assembly

1. Sleeve
2. Piston
3. Poppet
4. Spring
5. Plug
6. Pilot Valve
7. Spring
8. Adjusting Screw
9. Washers
10. Lock Nut
11. Acorn Nut

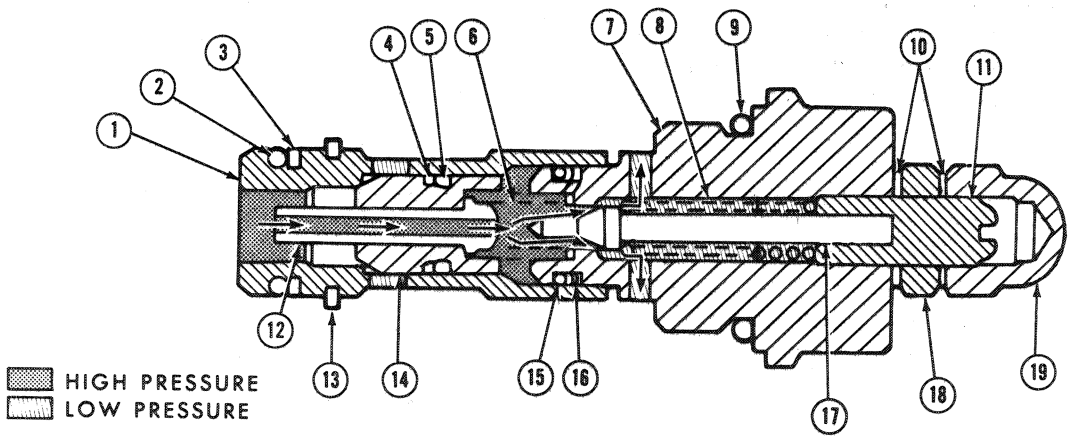

Figure 7
System Relief Valve Assembly

1. Sleeve
2. O-Ring
3. Back-Up Ring
4. Back-Up Ring
5. O-Ring
6. Spring
7. Plug
8. Spring
9. O-Ring
10. Washers
11. Adjusting Screw
12. Poppet
13. Snap Ring
14. Piston
15. O-Ring
16. Back-Up Ring
17. Pilot Valve
18. Lock Nut
19. Acorn Nut

Return-to-Dig

An optional feature on factory-installed Loader Models 19-856, 19-857 and 19-858 is a Return-to-Dig mechanism. When the bucket spool (3), Figure 8, is fully depressed after the dump cycle, the clapper (2) comes in contact with the electromagnet (1) inside the tube assembly (4) at the end of the bucket spool.

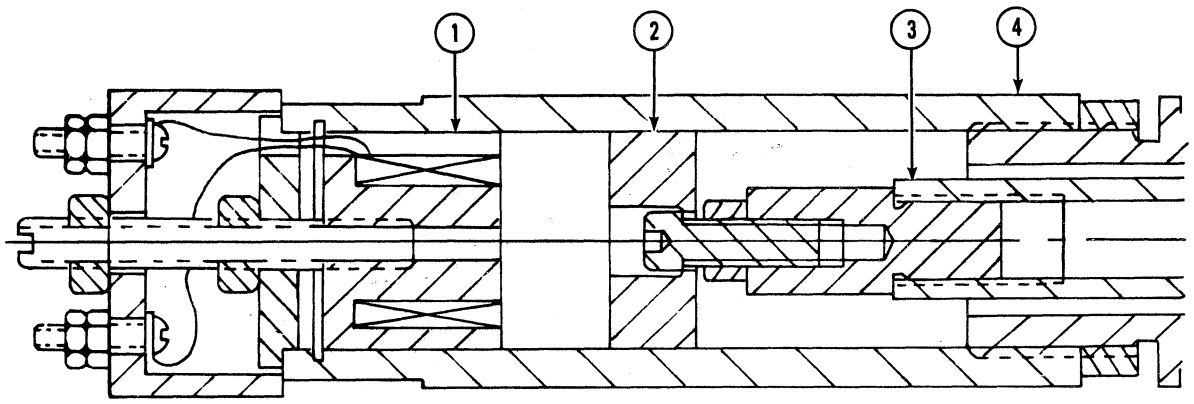

Figure 8
Return-to-Dig: Control Valve Components

1. Electromagnet
2. Clapper
3. Bucket Spool
4. Tube Assembly

A switch mounted on the compensating-lift linkage completes the electrical circuit causing current to flow to the electromagnet, thus holding the clapper against the magnet. When the bucket reaches the preset dig angle, the switch opens the circuit, thus stopping current flow to the electromagnet and releasing the bucket spool.

The return-to-dig switch may be adjusted for the desired bucket dig angle by moving it on the compensating-lift linkage. The tube assembly at the end of the bucket spool is also adjustable to maintain good contact between the clapper and electromagnet. A schematic of the return-to-dig system is shown in Figure 9.

Compensating-Lift Mechanism

The compensating-lift machanism (2), Figure 1, is an externally mounted mechanical linkage which runs from the loader bucket (direct bucket linkage) or bucket linkage (4-bar bucket linkage) to the bucket spool of the control valve.

When the loader is raised, the mechanical linkage actuates the bucket spool of the control valve maintaining a level bucket from approximately 44 inches above the ground to full lift height.

The linkage is adjustable for proper operation of the Compensating Lift.

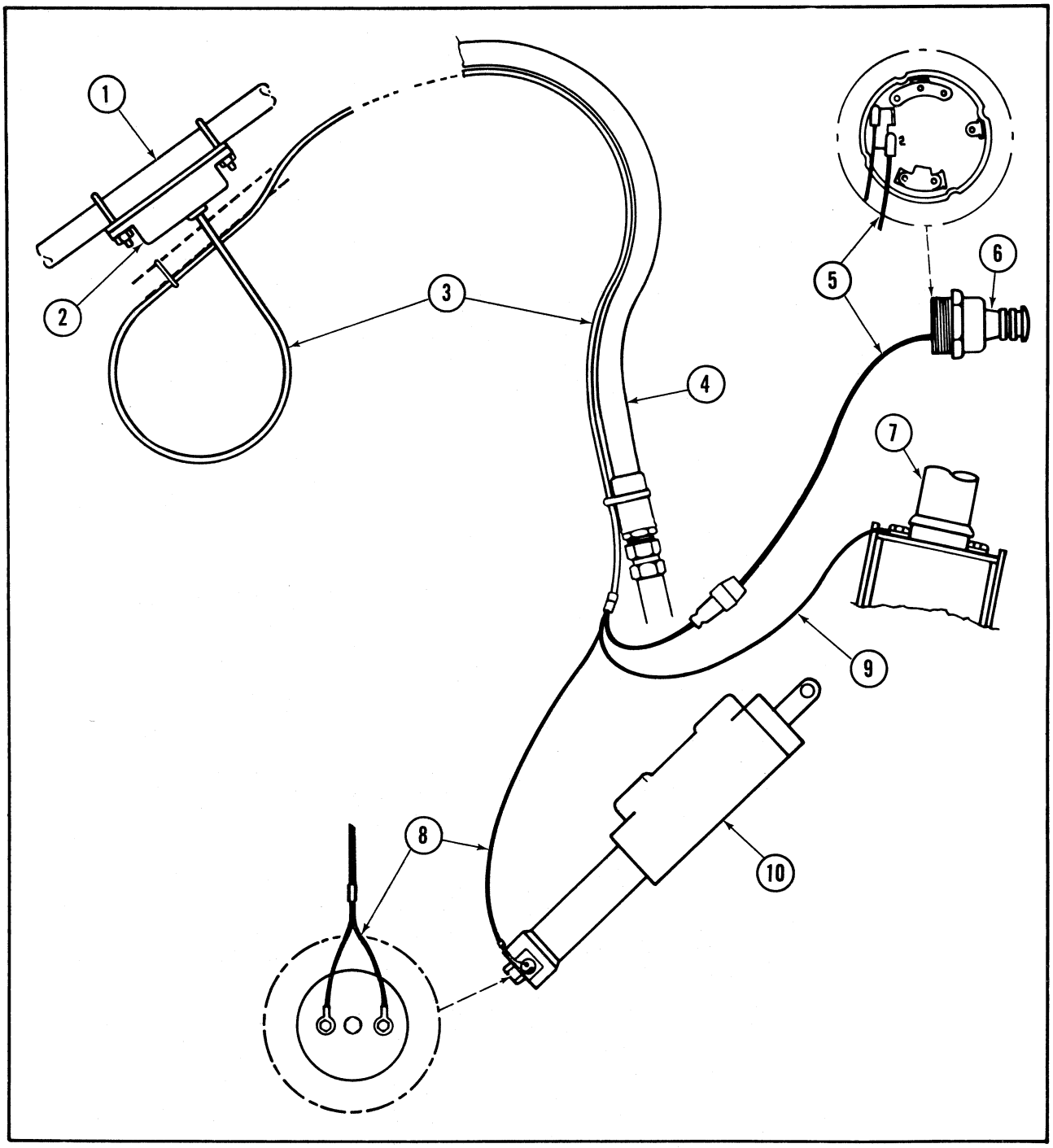

Figure 9
Return-to-Dig Wiring Harness

1. Compensating Lift Linkage
2. Return-to-Dig Switch
3. Wire Harness
4. Bucket Hydraulic Hose
5. Brown and White Wire to No. 2 Terminal of Ignition Switch
6. Ignition Switch
7. Steering Column
8. Black Wires to Control Valve Terminals
9. Ground Wire to Steering Column
10. Control Valve

CYLINDERS

All Series 745 Loaders use double-acting lift and bucket cylinders. Cylinder dimensions vary with loader capacity. Figures 10 and 11 illustrate the cylinder components. Refer to the "Specifications" section for cylinder dimensions and usage.

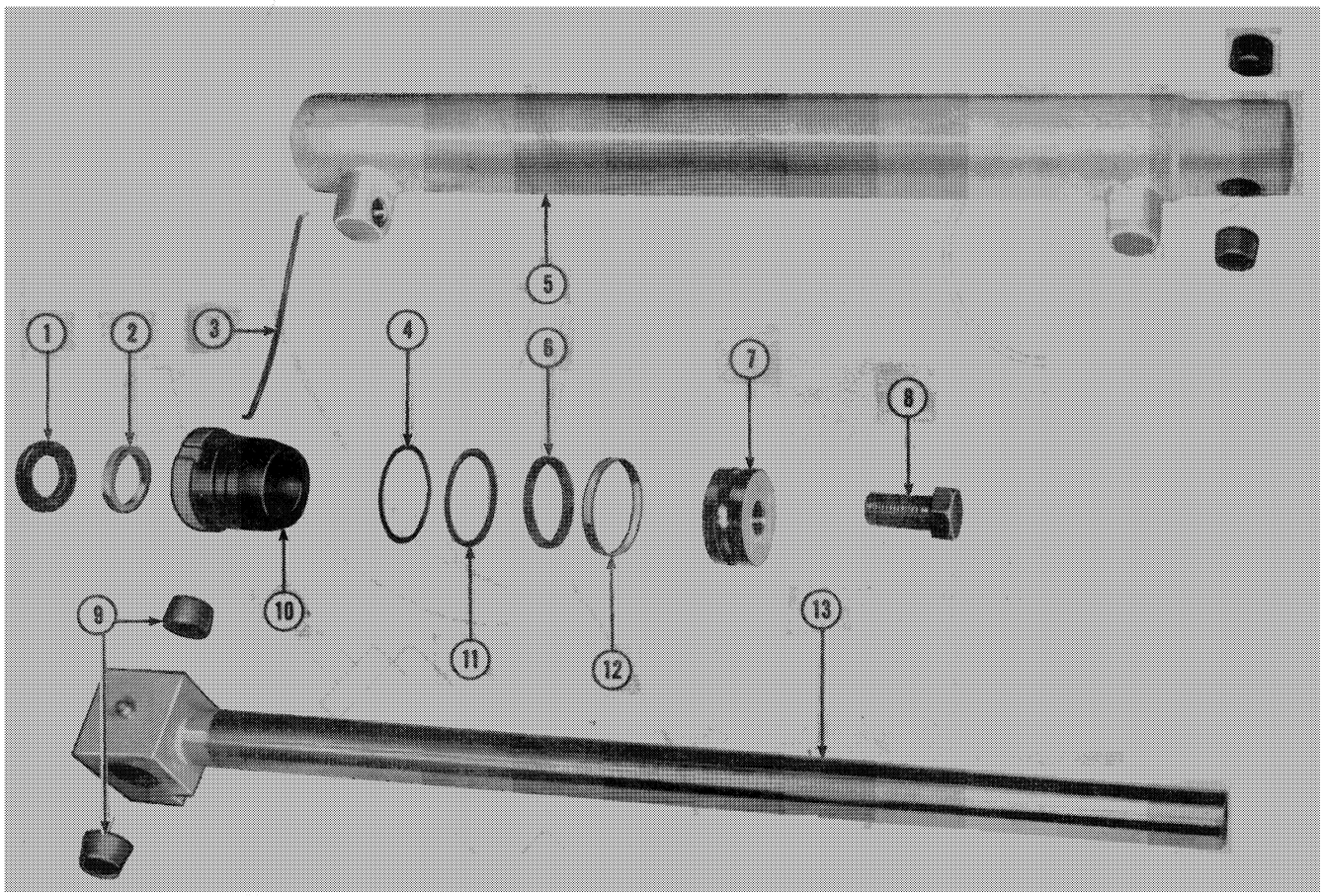

Figure 10
Cylinder Exploded View

1. Rod Wiper
2. U-Cup Seal
3. Retainer Wire
4. Gland Back-Up Ring
5. Cylinder Tube
6. Inner Piston Seal Ring
7. Piston
8. Piston Retaining Bolt
9. Bushings
10. Gland
11. Gland O-Ring
12. Outer Piston Seal Ring
13. Cylinder Rod

All cylinders on Models 19-854, 19-855, 19-856, 19-857 and 19-858 use the same type construction. Cylinder tubes are fabricated from tubings with the bore honed to a fine finish to prolong piston and seal life.

Cylinder rods are made of high-tensil die-drawn steel, polished and chrome plated. The trunnion end of the rod is arc welded to the cylinder rod and the piston end is threaded in order to secure the piston to the rod.

The piston assembly is made of leaded steal with a nylon compound coating to prevent cylinder bore damage. Sealing is accomplished by the use of a piston ring assembly consisting of two ring seals, one over the other as shown in Figure 11. The bottom seal is soft and is compressed when the cylinder is pressurized causing the rigid outer seal to be forced against the cylinder bore. The double-acting cylinder has oil ports on both ends of the piston. High pressure oil is directed to one end of the cylinder and return oil is allowed to flow from the other end to the reservoir.

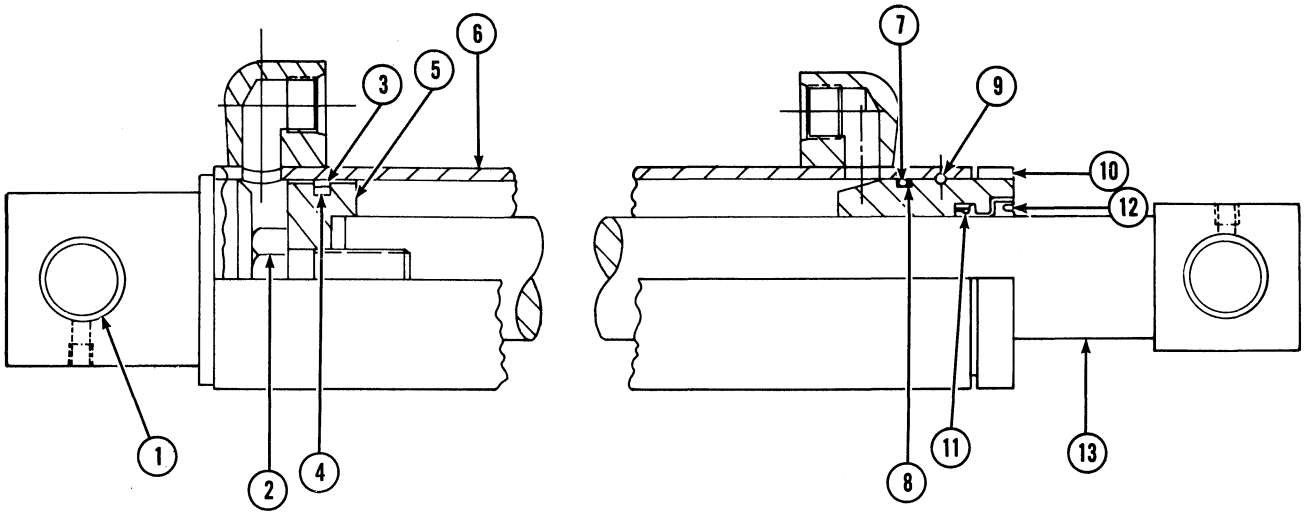

Figure 11
Hydraulic Cylinder Assembly

1. Bushing
2. Piston Retaining Bolt
3. Outer Piston Seal Ring
4. Inner Piston Seal Ring
5. Piston
6. Tube
7. O-Ring
8. Back-Up Ring
9. Retainer Wire
10. Gland
11. U-Cup Seal
12. Rod Wiper
13. Rod

During the time the control valve spool is in the neutral position, the oil is trapped in both ends of the cylinder.

The cylinder gland (10), Figure 10, uses an O-ring (11), back-up ring (4), and a U-cup seal (2) to achieve efficient sealing. A wiper (1) inset into the face of the gland removes dirt and debris from the cylinder rod as it enters the cylinder.

The gland (10), Figure 11, is held in place by a retainer wire (9) which fits into a machined groove, one half of which is in the gland and the other half machined into the cylinder bore.

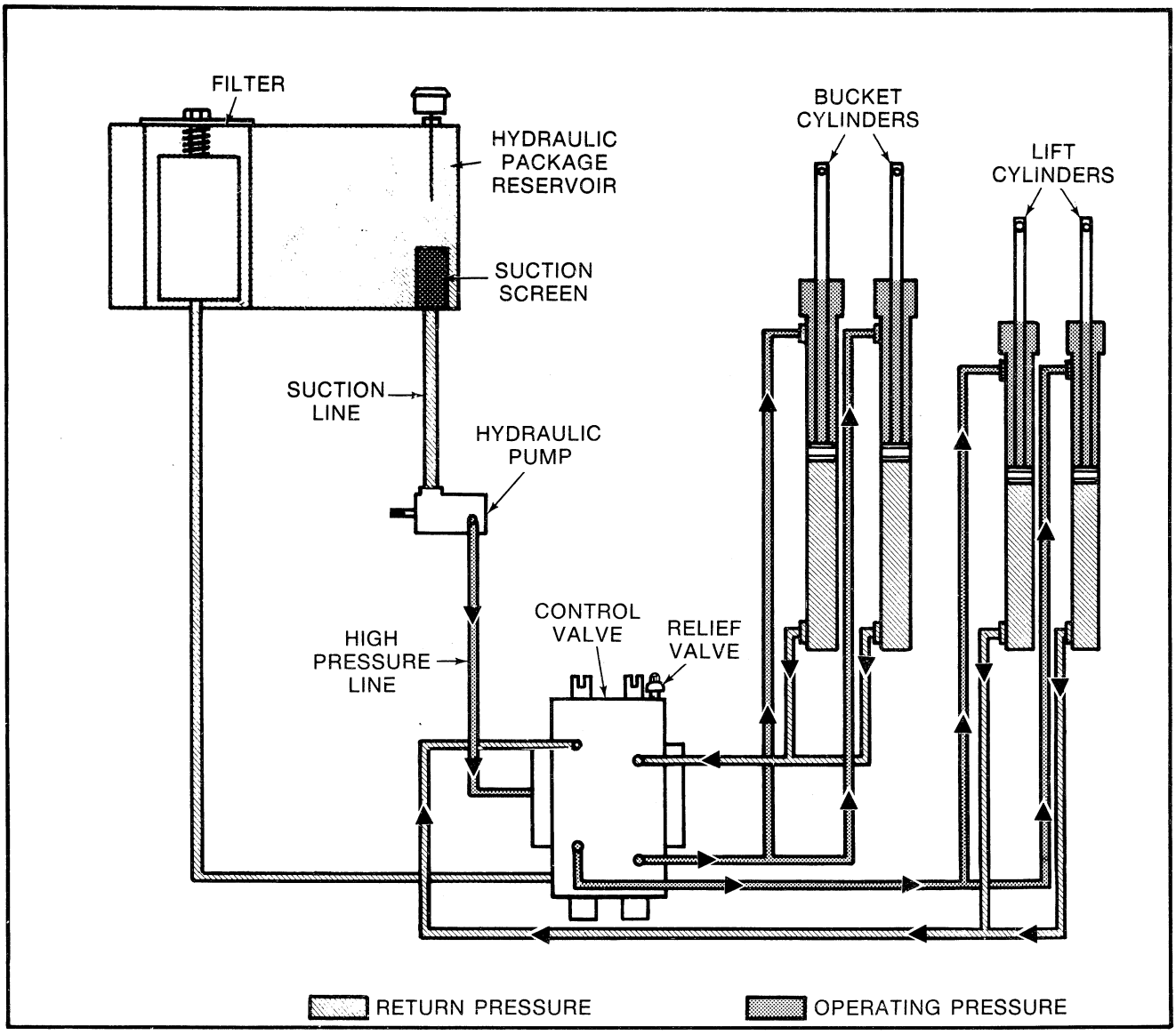

Figure 12
Oil Flow Schematic

GENERAL OIL FLOWS

Figure 12 illustrates the flow of hydraulic oil through the hydraulic system.

The oil for the loader is stored in the hydraulic reservoir. Oil flows to the internally mounted hydraulic pump from the reservoir. Oil is then pumped to the loader control valve where the direction of flow is determined by the position of the valve spools. With the spools in the neutral position, the oil flows through the control valve and directly back to the reservoir. As the control lever is activated, the valve spools function to direct oil to and away from the cylinders. All oil returning from a cylinder flows through the control valve, then to the hydraulic reservoir. All return oil to the reservoir flows through the hydraulic oil filter.

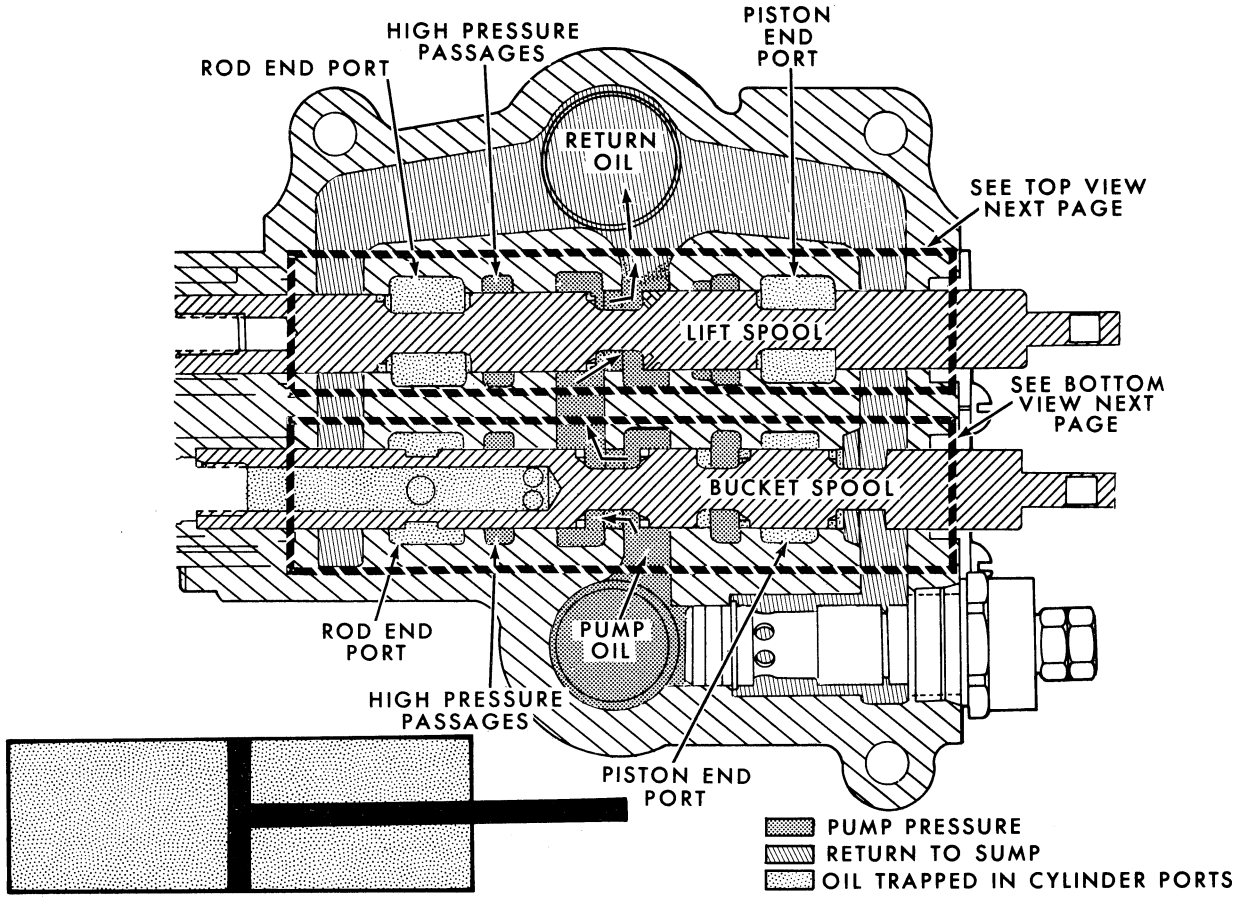

Figure 13
Control Valve — "Neutral" Position
(Horizontal Cutaway)

CONTROL VALVE — "NEUTRAL" POSITION

Figures 13 and 13A illustrate sectional views of the control valve. Oil flow through the valve open center with the spools in neutral, circulates freely to the reservoir. Oil in the cylinders is trapped because of the closing of the passages by the control valve spools. Pumped oil enters the valve at the inlet and flows through the open center, past the spools to the outlet, as shown.

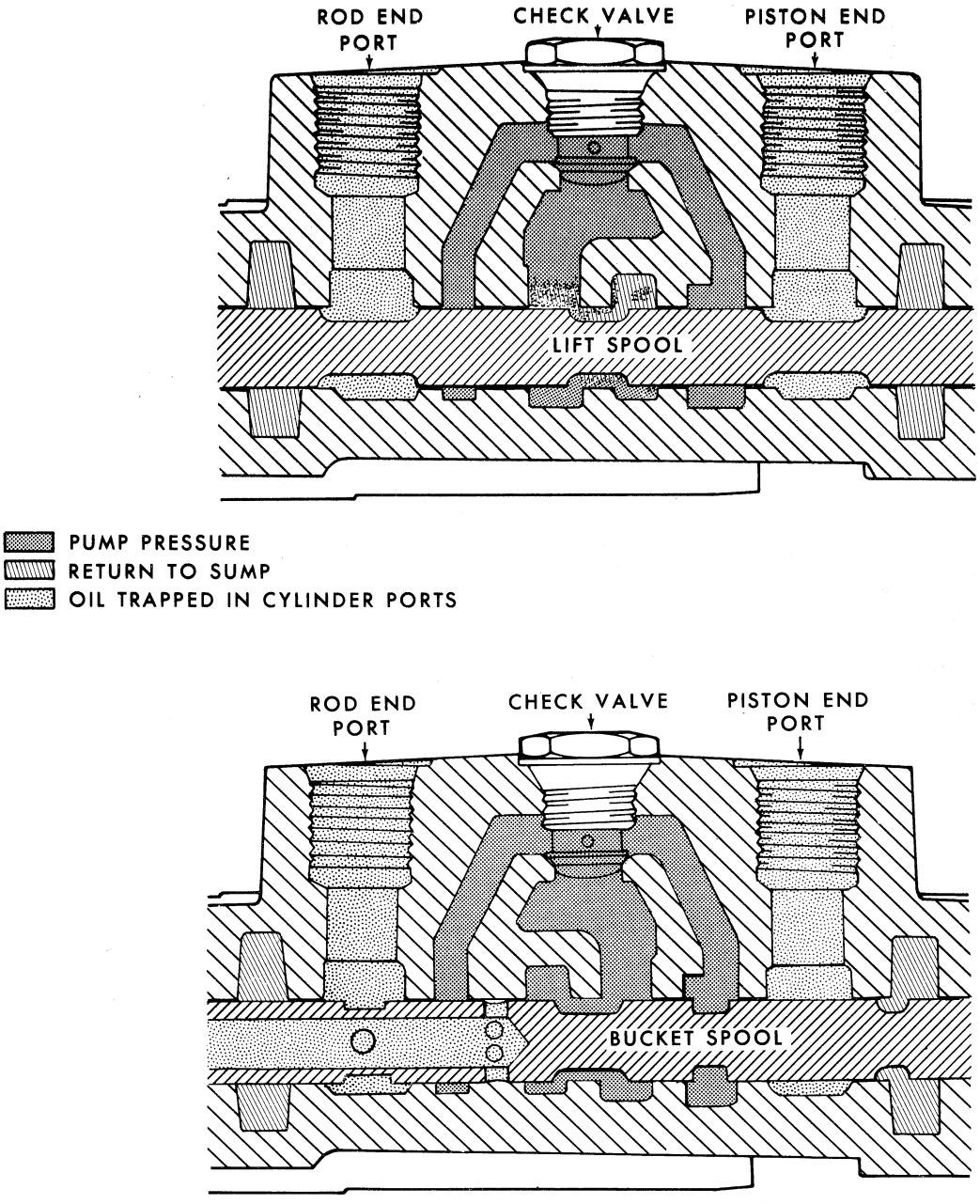

Figure 13A
Control Valve — "Neutral" Position
(Vertical Cutaway)

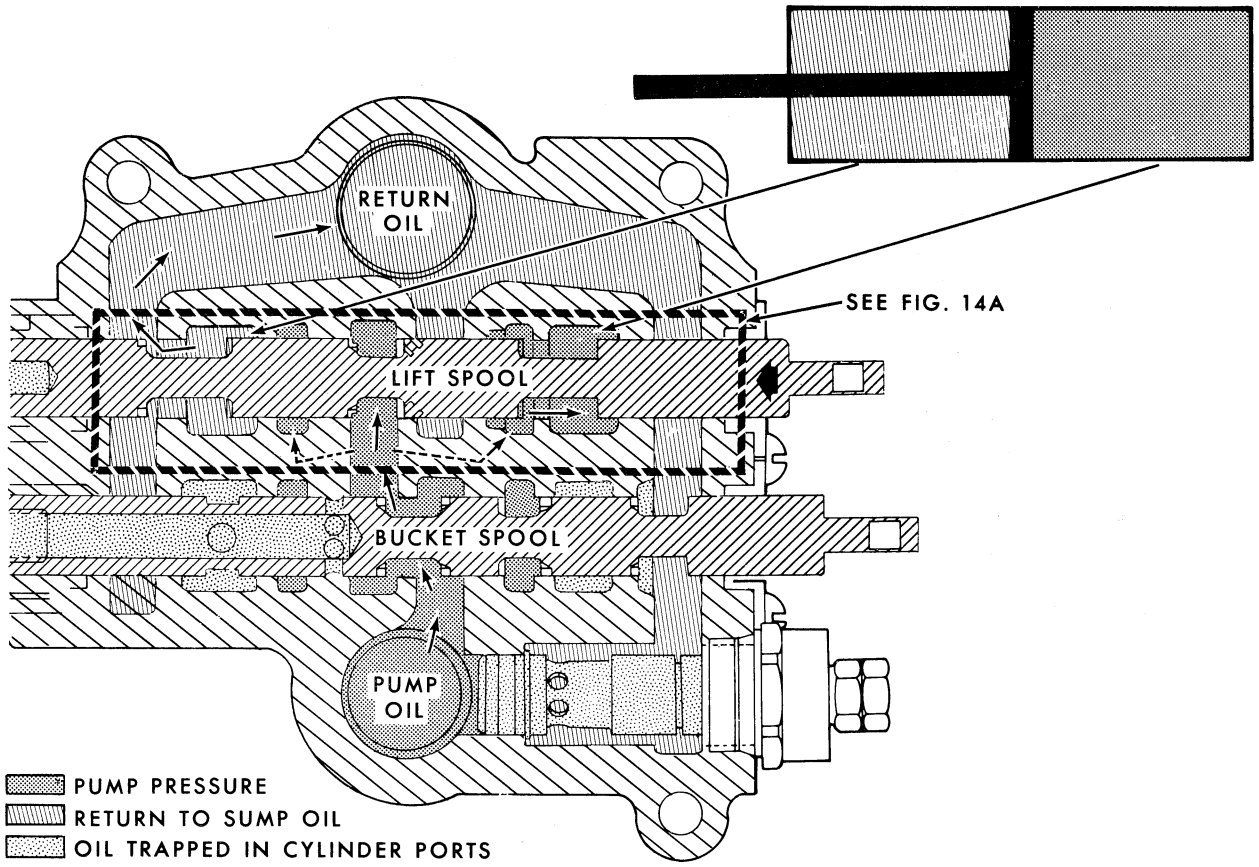

Figure 14
Lift Spool — "Raising"
(Horizontal Cutaway)

LIFT SPOOL — "RAISING" POSITION

Figures 14 and 14A illustrate oil flow through the control valve with the lift spool positioned to direct oil flow to the piston end of the lift cylinder. Oil entering the valve at the inlet port is directed past the bucket spool and up to the check valve. When sufficient pressure builds within the control valve, the check valve is lifted off its seat allowing oil to flow to the high pressure ports. The positioning of the lift spool allows oil to flow through the piston end port only, thus extending the cylinders. Return oil from the cylinder rod end is delivered to the control valve rod end port and back to sump.

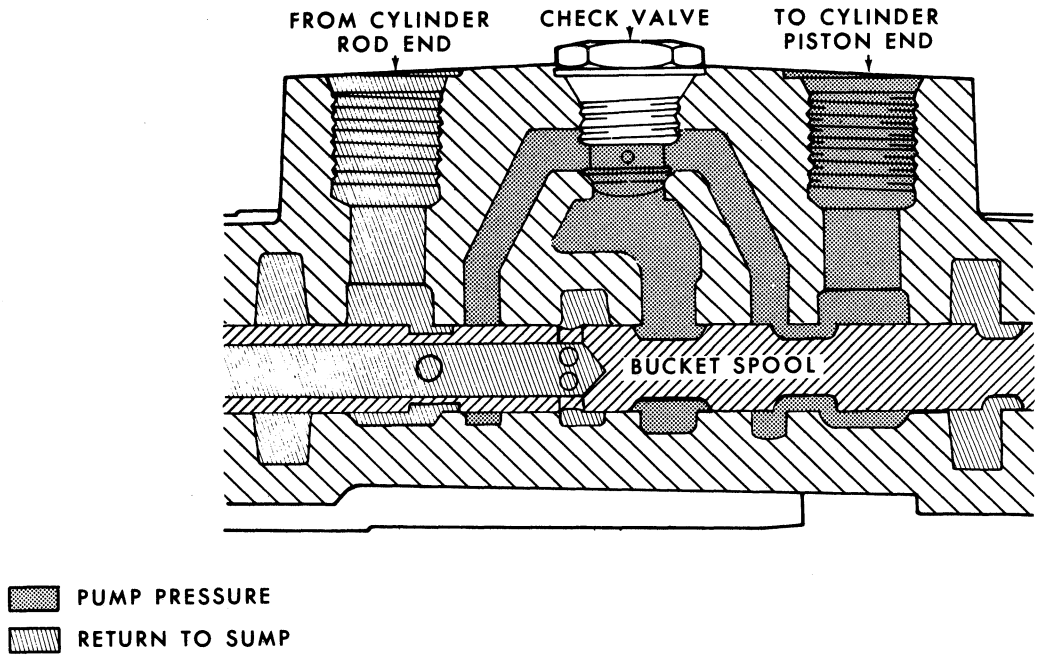

Figure 14A
Lift Spool — "Raising" Position
(Vertical Cutaway)

LIFT SPOOL — "LOWERING" POSITION

Figures 15 and 15A illustrate oil flow through the control valve with the lift spool positioned to direct oil to the rod end of the lift cylinder. Oil entering the valve at the inlet port is directed past the bucket spool and up to the check valve. When sufficient pressure builds within the control valve, the check valve is lifted off its seat allowing oil to flow to the high pressure ports. The positioning of the lift spool allows oil to flow through the rod end port only, thus retracting the cylinders. Return oil from the cylinder piston end is delivered to the control valve piston end port and back to sump.

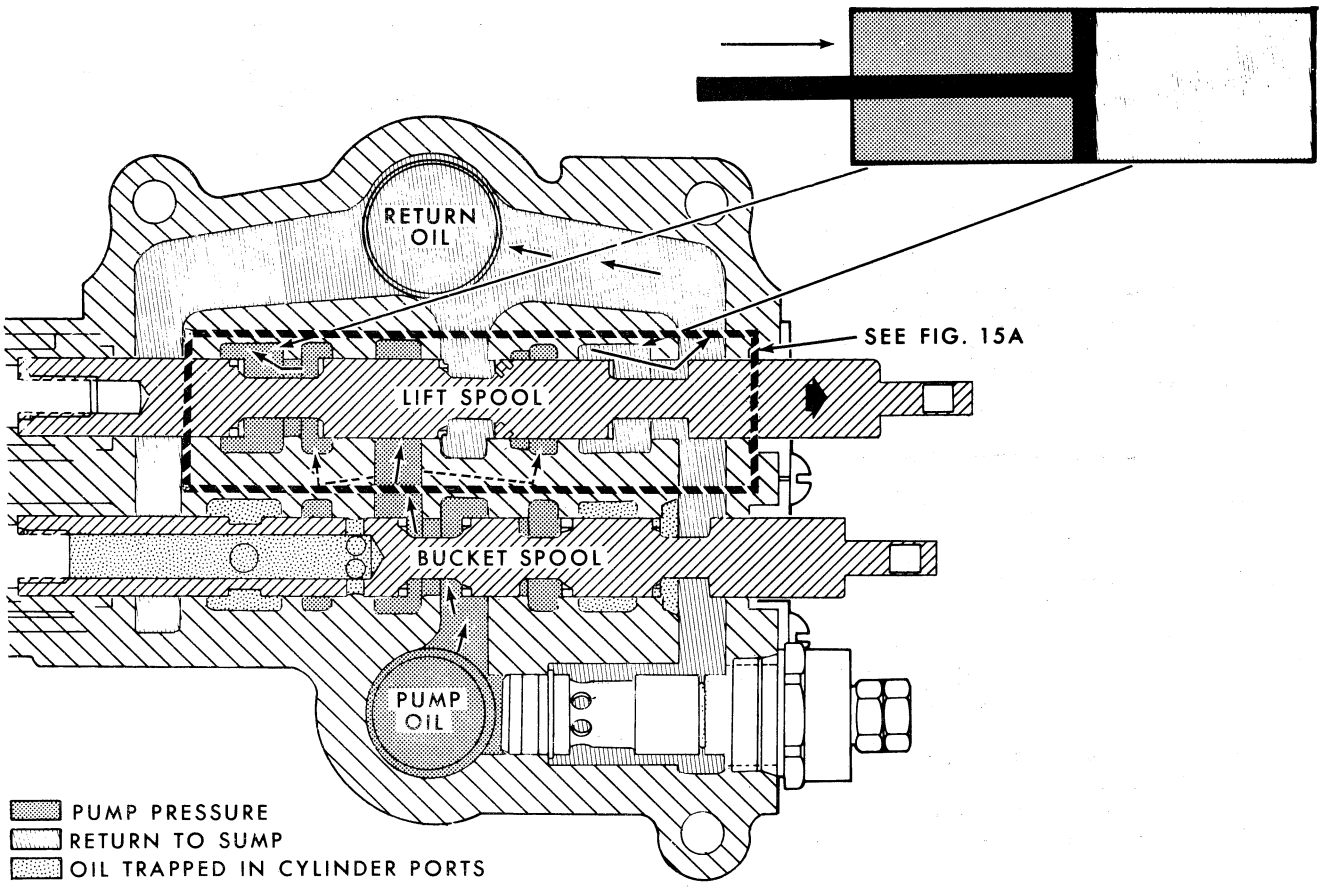

Figure 15
Lift Spool — "Lowering" Position
(Horizontal Cutaway)

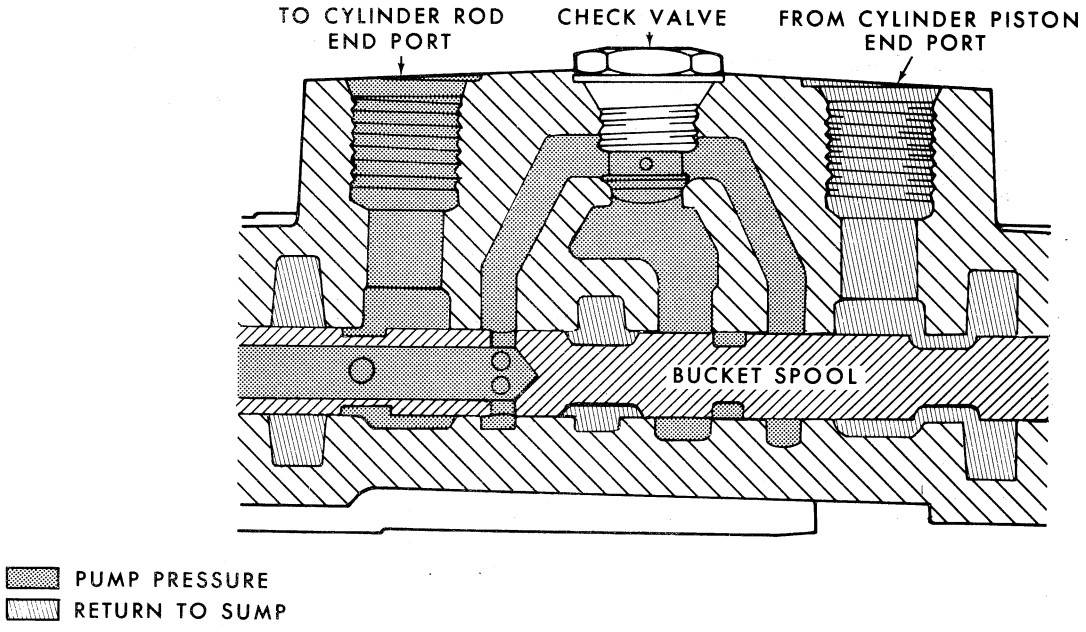

Figure 15A
Lift Spool — "Lowering" Position
(Vertical Cutaway)

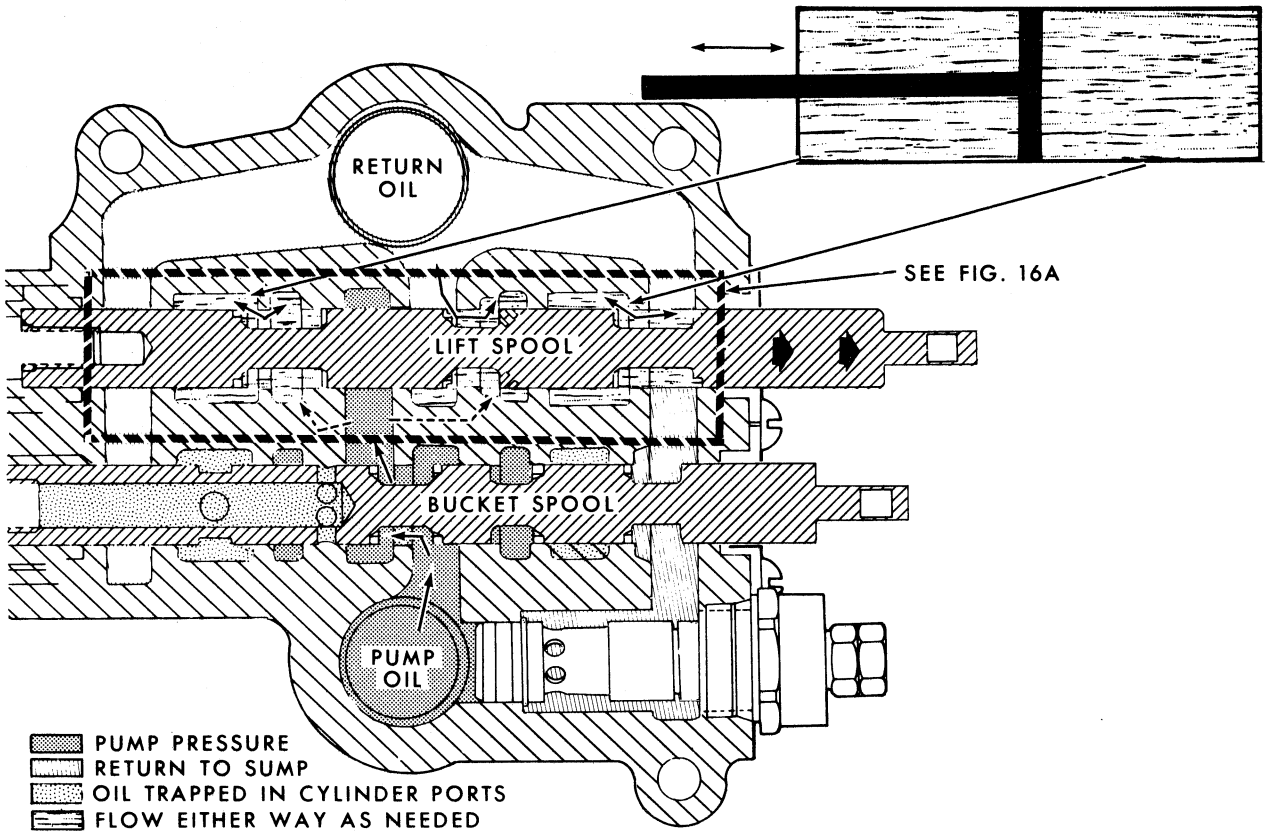

Figure 16
Lift Spool — "Float" Position
(Horizontal Cutaway)

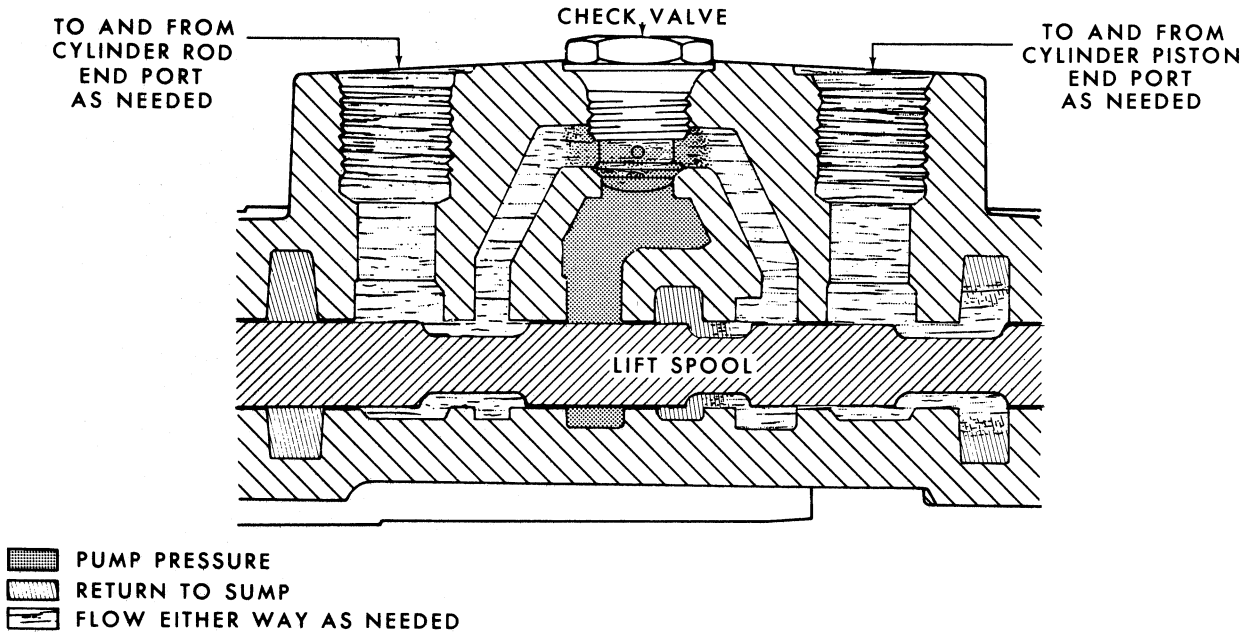

Figure 16A
Lift Spool — "Float" Position
(Vertical Cutaway)

LIFT SPOOL – "FLOAT" POSITION

When the lift spool, Figure 16 and 16A is positioned full left (fully extended), the float detent mechanism is engaged. Upon engagement of the float mechanism, the radial balls drop into the grooves in the detent sleeve holding the lift spool in the float position. Oil entering the valve at the inlet port is directed past the bucket spool and up to the load check valve. When sufficient pressure builds within the control valve, the check valve is lifted off its seat, oil then flows to the high pressure ports. Because of the positioning of the lift spool, oil is allowed to flow to both the piston and rod end ports of the cylinders. During operation, the loader bucket will follow the ground contour (float) and oil will be delivered to each end of the cylinders as needed. This oil is not of sufficient pressure to either raise or lower the lift arms because it is vented to the return oil passage.

BUCKET SPOOL – "CURL' POSITION

Figures 17 and 17A illustrate oil flow through the control valve with the lift spool positioned to direct oil to the rod end of the bucket cylinder. Oil entering the control valve at the inlet port is directed to the bucket spool check valve. When sufficient pressure builds within the control valve, the check valve is unseated and oil is delivered to the high pressure ports. The positioning of the bucket spool allows oil to flow from the rod end high pressure port only through the radial drilled holes in the spool, down the spool passage and through the spool outlet hole to the cylinder rod end port. Return oil is delivered from the cylinder piston end port and back to sump as shown.

BUCKET SPOOL – "DUMP" POSITION

Figures 18 and 18A illustrate oil flow through the control valve with the lift spool positioned to direct oil to the piston end of the bucket cylinder. Oil entering the control valve at the inlet port is directed to the bucket check valve. When sufficient pressure builds within the control valve, the check valve is unseated and oil is delivered to the high pressure ports. The positioning of the bucket spool allows oil to flow from the piston end high pressure port only to the piston end of the bucket cylinder. Return oil is delivered from the rod end port through the holes and passage of the bucket spool and back to sump.

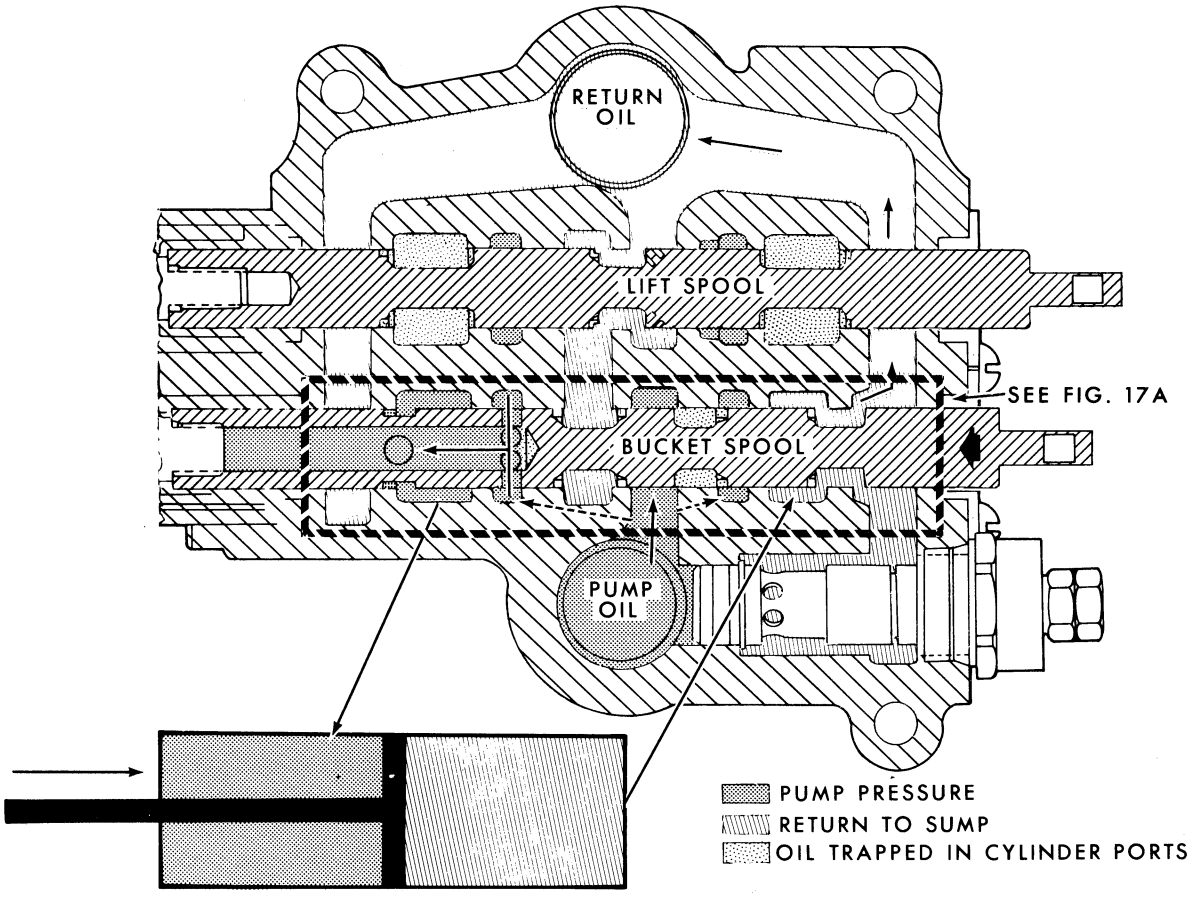

Figure 17
Bucket Spool — "Curl" Position
(Horizontal Cutaway)

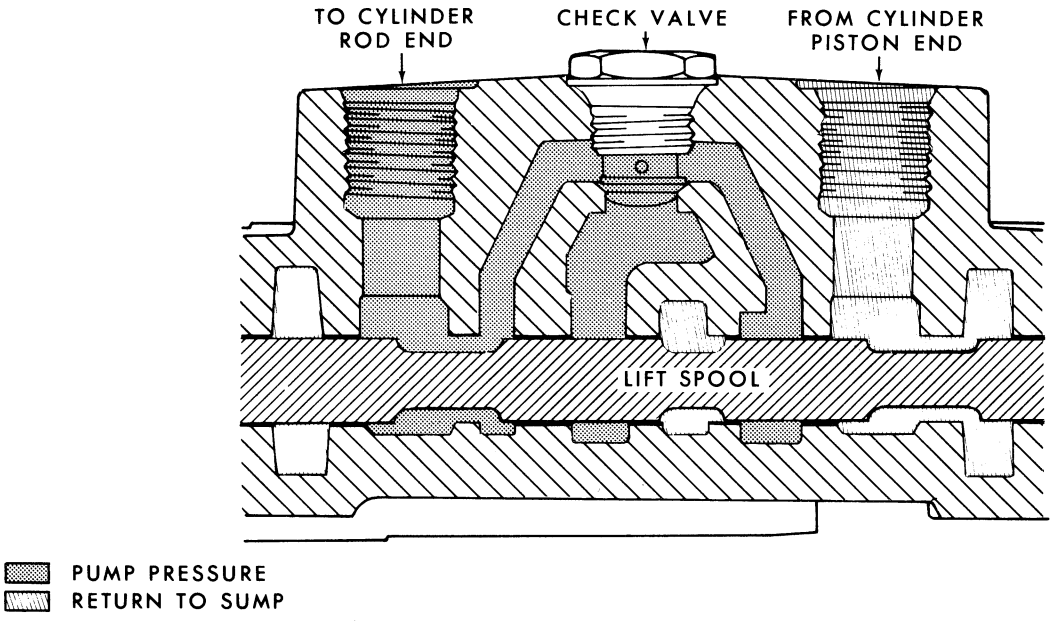

Figure 17A
Bucket Spool — "Curl" Position
(Vertical Cutaway)

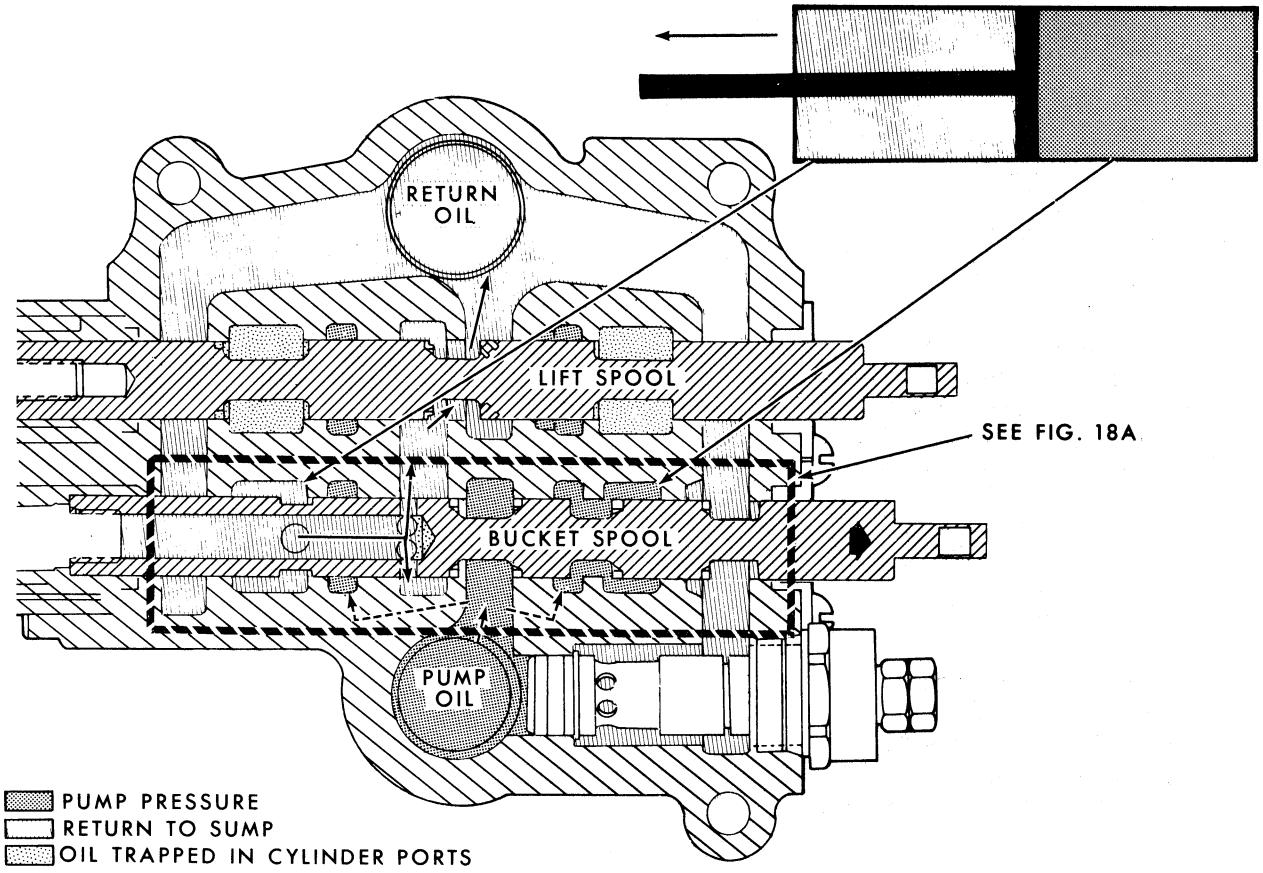

Figure 18
Bucket Spool — "Dump" Position
(Horizontal Cutaway)

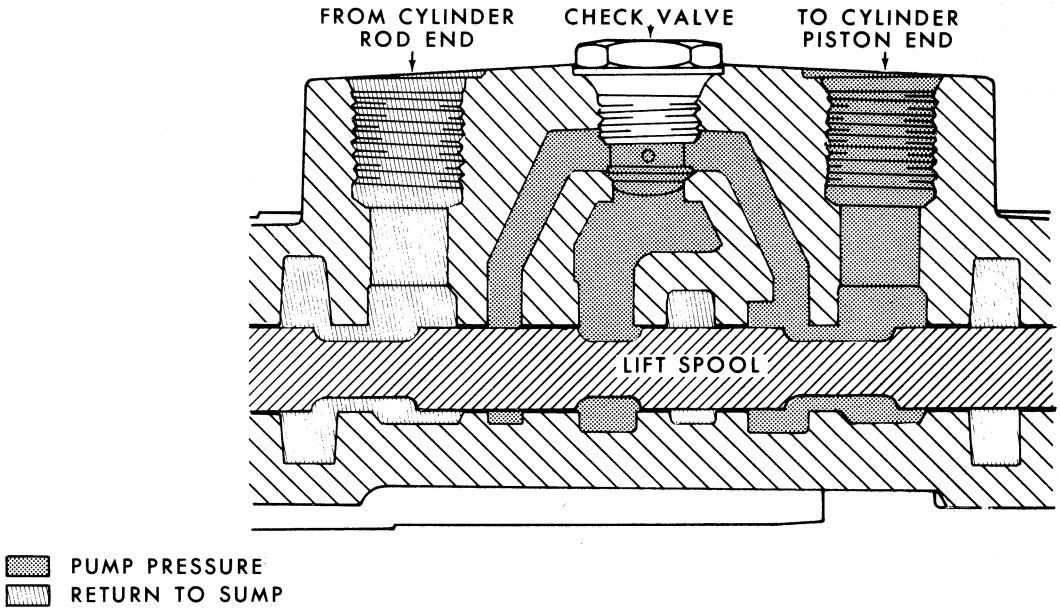

Figure 18A
Bucket Spool — "Dump" Position
(Vertical Cutaway)

TROUBLESHOOTING

TROUBLE SHOOTING

This portion of the manual is devoted to trouble shooting loader malfunctions. If trouble shooting is approached in a systematc manner, the malfunction can be diagnosed quickly and accurately. Follow the step-by-step procedures outlined below.

1. As a first step in the trouble shooting procedure, several preliminary checks should be made. These checks are essential in that once performed they need no longer be considered as a possible cause of the immediate malfunction.

   - Check for proper loader installation.
   - Check oil level.
   - Check for external oil leaks.
   - Check for external mechanical damage such as kinked hoses or tubes, damaged cylinders, bent or binding structural members.
   - Perform the system relief valve pressure check and adjust if necessary, as covered on page 27. If the pressures cannot be adjusted to specifications, refer to Step 2, below. Having performed the preliminary checks and failing to locate the cause of malfunctioning, the following procedures should be used.

2. If possible, operate the loader and make note of the operating characteristics. Cycle each control lever to operate each of the cylinders to both the extended and retracted positions.

Compare the operating characteristics observed in Step 2, above, with the problems listed in the Trouble Shooting Table.

- The column labeled "PROBLEM" lists the observed malfunctions when the loader is operated.
- The column labeled "POSSIBLE CAUSES" lists items in the circuit which could cause the observed malfunction.

Refer to the "ADJUSTMENTS AND PRESSURE CHECKS" section of this manual for adjustment, pressure checks and hydraulic test procedures.

PROBLEM	POSSIBLE CAUSES
Lift or bucket fails to operate, is slow, or has loss of power in one or more circuits.	Cylinder piston seal ring leakage. Valve spool leakage. Hydraulic pump drive defective. Hydraulic pump assembled incorrectly. Hydraulic pump worn. Aeration: Air entering the system between the reservoir and pump high pressure port. Cavitation: Restriction between the reservoir and high pressure port. System relief valve failure. System relief pressure set too low. System relief valve stuck open. Defective relief valve seals.

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSES
Cylinders leak down with control valve in neutral position.	Cylinder piston seal ring leakage. Control valve spool leakage.
Hesitation in lift or bucket when control lever is initially moved.	Cylinder cavitation. System relief valve stuck open. Check valve damaged or stuck open.
System noisy.	Aeration. Cavitation. Water in system. System relief valve chatter. Tubing vibration. Cold hydraulic oil (below 30° F. [−1° C]).
Oil exhausts from breather cap.	Aeration. Cavitation. System oil overfull.
Bucket over compensates or does not compensate during lift cycle.	Compensating lift linkage out of adjustment. Damaged bucket level linkage. Bucket cylinder piston seal leakage.
Float mechanism fails to operate or slips out of detent.	Excessive wear on detent components. Worn or broken detent spring. Foreign material in detent mechanism.

PROBLEM	POSSIBLE CAUSES
Valve spools return to neutral slowly.	Spring retaining screw, detent plunger or positioner stud (return-to-dig) loose. Weak or broken spool centering springs.
Return-to-Dig fails to operate.	Excessive electromagnet to clapper clearance adjustment. Open circuit in wiring harness or electromagnet lead wires. Defective switch assembly. Return-to-Dig switch misadjusted.
Bucket does not return to desired angle after Return-to-Dig is engaged.	Return-to-Dig switch misadjusted. Bucket level linkage damaged.
Control lever returns to neutral position prematurely (Return-to-Dig actuated).	Return-to-Dig switch misadjusted. Excessive clearance between electromagnet and clapper. Foreign material on face of electromagnet and/or clapper.

ADJUSTMENTS AND PRESSURE CHECKS

BUCKET LEVEL INDICATOR ADJUSTMENT

The bucket level indicator, Figure 19, should be positioned so that the level indicator (2) is aligned with the reference pointer (1) on the loader lift arm.

1. Position the tractor on a level surface and lower the bucket so that it rests flat on the ground. With the bucket in this position, the level indicator (2) should be aligned with the reference pointer (1).
2. If adjustment is necessary, remove the cotter pin (3) and clevis pin (4) and rotate the clevis (5).
3. Reinstall the clevis and check for proper adjustment.
4. Repeat this procedure as necessary to achieve the proper adjustment.

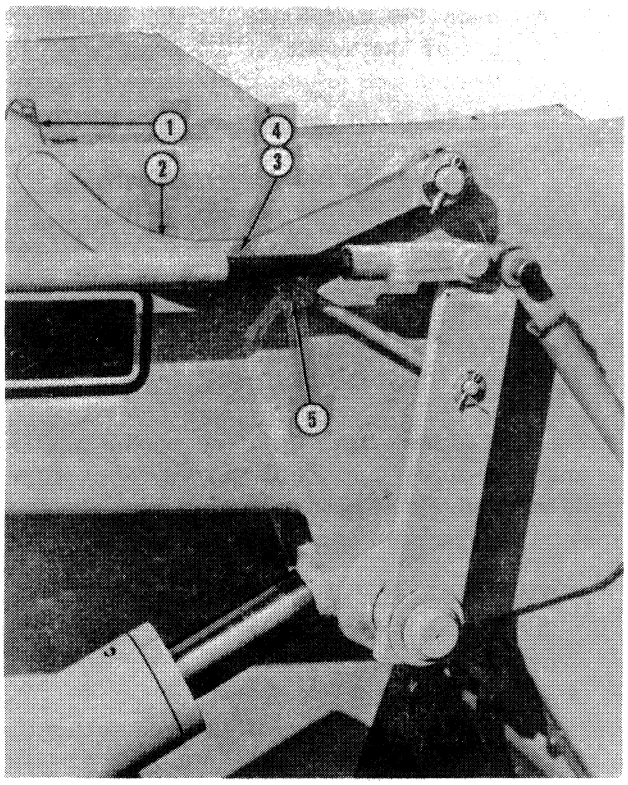

Figure 19
Bucket Level Indicator

1. Reference Pointer
2. Level Indicator
3. Cotter Pin
4. Clevis Pin
5. Clevis

ADJUSTING THE COMPENSATING—LIFT LINKAGE

This system provides bucket leveling action from the carrying position to maximum height by means of a mechanical feedback linkage which actuates the bucket dump spools of the loader control valve during the lift cycle.

Adjustment for the bucket compensating lift can be made through the mechanical feedback linkage located on the right hand loader post.

1. Remove clevis (2) and (4) from linkage (1) and (5), Figure 20.
2. Adjust the rod (3) and clevis (2) and (4) to the following length between (A):

   15-3/8 inches (391 mm) for Models 19-854, 19-857 and 19-858.

   15-1/2 inches (394 mm) for Models 19-855 and 19-856.

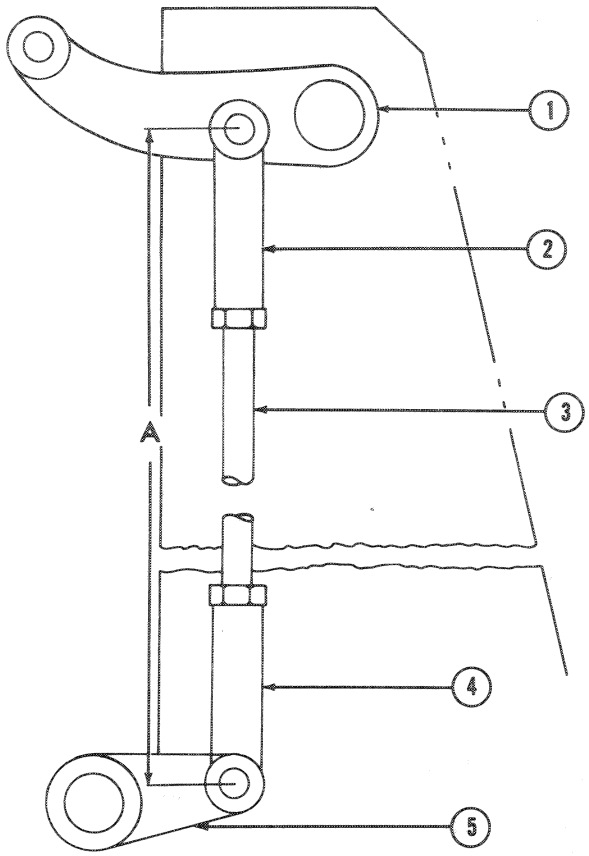

Figure 20
Compensating Lift Linkage

1. Arm
2. Clevis
3. Rod
4. Clevis
5. Arm

3. Tighten the lock nuts against both clevis (2) and (4).

4. Reinstall the rod and clevis assembly onto the linkage arms (1) and (5).

Starting with the bucket fully rolled back, at ground level, bucket leveling should begin when the bucket pivot pin has reached a height of 44 ± 3 inches (1120 ± 80 mm) above ground level.

RETURN-TO-DIG SWITCH ADJUSTMENT

Before making adjustments to the return-to-dig switch, be sure that the bucket level indicator is properly adjusted. The return-to-dig switch may be adjusted up and down the compensating lift linkage as well as side to side.

1. Start the tractor and raise the lift arms so that the bucket can be run through a complete cycle.
2. Activate the bucket spool to full dump.
3. Activate the bucket spool to curl and note the angle of the bucket at the time the control lever returns to the neutral position.
4. If desired, the bucket angle at which bucket curl stops may be adjusted as follows:
   a. Position the bucket on the ground at the desired angle and stop the tractor engine.
   b. Turn the ignition key to the "accessory" position.
   c. Loosen the U-bolt clamps (3), Figure 21, on the switch (1) and slide it off the raised portion of the lift arm gusset (6).

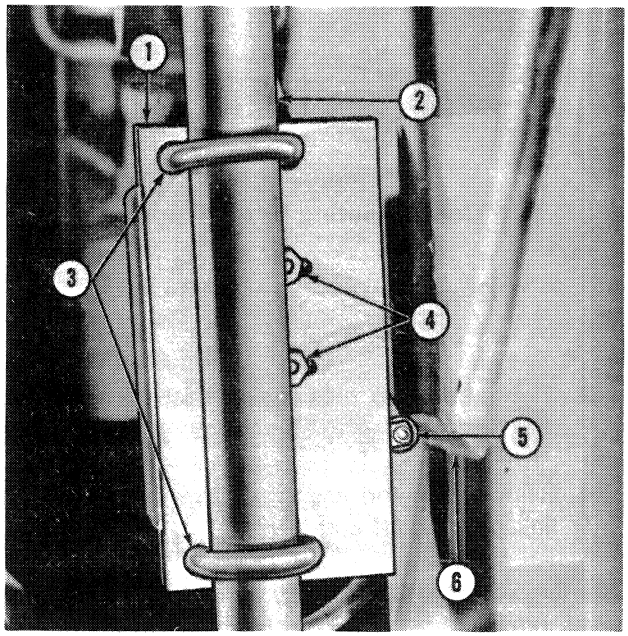

Figure 21
Return-to-Dig Switch

1. Switch
2. Bucket Level Indicator Linkage
3. Switch Adjustment (Vertical)
4. Control Arm Adjustment
5. Control Arm
6. Lift Arm Gusset

   d. Move the control lever fully left.
   e. Slide the switch (1) up the linkage (2). Secure the switch at the point which the control lever returns to the neutral position.
   f. To adjust the switch from side to side for fine adjustments, loosen the two nuts (4) and move the switch for best contact.
   g. Start the tractor and check the adjustment. Repeat if necessary.

ADJUSTING THE RETURN-TO-DIG ELECTROMAGNET CLEARANCE

If the control lever returns to the neutral position prematurely during bucket curl and the switch is properly adjusted, the electromagnet to clapper clearance may be adjusted for better contact.

1. With the tractor engine stopped and the key "off", loosen the lock nut (4), Figure 22, and back off the tube assembly (3).
2. Depress the bucket spool fully and secure the control lever in this position.
3. Adjust the tube assembly (3) so that the electromagnet (1) contacts the clapper (2).
4. Secure the tube with the locknut. Torque to 45 lbs. ft. (61 Nm).

HYDRAULIC TESTS

The hydraulic pump must deliver a specified amount of oil through the loader circuit within specified pressure limits as governed by the the system relief valve. If the pump flow and/or system pressure falls below that specified, the efficiency of the hydraulic pump will be impaired. If the system is not operating properly, trouble can usually be traced to a specific area of the system. The pump may be worn, the system pressure may be low due to a low setting or leakage or oil may be leaking around the valve spools, cylinder piston or valve seats.

The hydraulic tester may be used as an effective tool in determining hydraulic pump efficiency. The tester unit will:

- Measure the volume and temperature of oil passing through the tester.
- Provide a manually variable means of restricting oil flow through the tester and measure the resultant pressure.