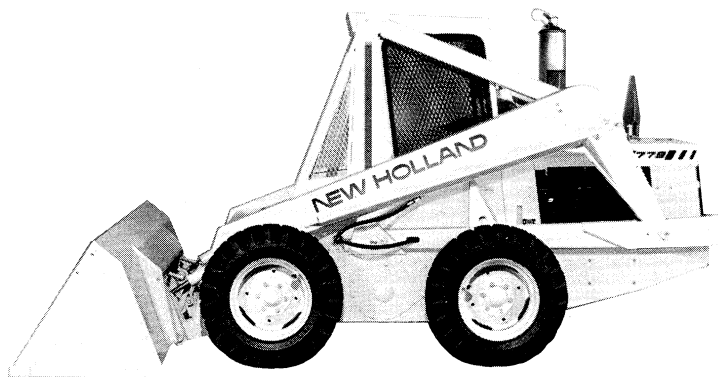
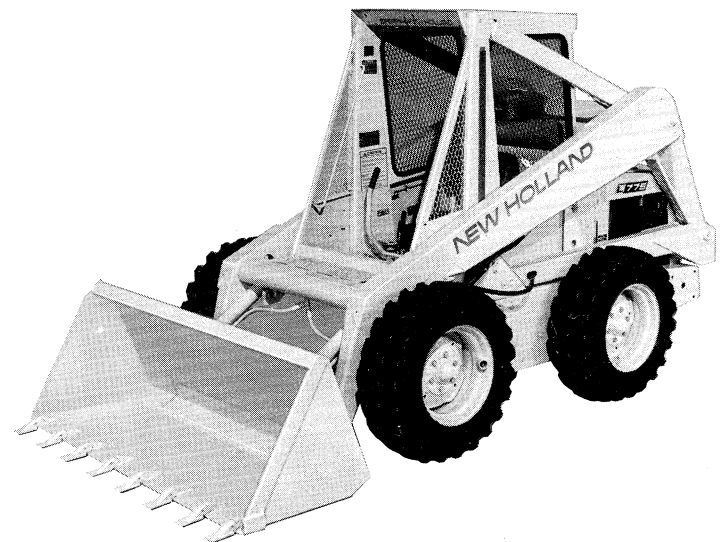


SERVICE MANUAL

SKID-STEER LOADER L-35, L-775, L-778, L-779

(CESSNA AND VICKERS-EQUIPPED)

SPERRY  NEW HOLLAND



Reprinted

40003531

FOREWORD

This manual provides in condensed form, service and maintenance information which will serve to guide a serviceman when repairing or rebuilding Sperry New Holland L-35, L-775, L-778 or L-779 skid-steer loaders in the shop and to help him when diagnosing and correcting service difficulties in the field.

The operator's manuals and assembly information provided with each machine should be used in conjunction with this manual, as much of the information contained in this manual is condensed or supplementary in nature.

For instructions on engine repair, refer to the manufacturer's repair manual.

ADDITIONAL SERVICE INFORMATION

The following service information can be found in the operator's manual for the specific skid-steer loader being repaired.

- A. Electrical wiring diagrams.
- B. Electrical system operation.
- C. Throttle and choke adjustments.
- D. Governor adjustments.
- E. Boom lock system adjustments.
- F. Oil recommendations for engine and hydraulic system.



CAUTION! THIS SYMBOL IS USED THROUGHOUT THIS BOOK WHENEVER YOUR PERSONAL SAFETY IS INVOLVED. TAKE TIME TO BE CAREFUL.



PLEASE READ CAREFULLY!

INCLUDED THROUGHOUT THIS MANUAL AND ON MACHINE DECALS YOU WILL FIND PRECAUTIONARY STATEMENTS SUCH AS “CAUTION”, “WARNING” AND “DANGER”, FOLLOWED BY SPECIFIC INSTRUCTIONS.

THESE PRECAUTIONS ARE INTENDED FOR THE PERSONAL SAFETY OF YOU AND THOSE WORKING WITH YOU. PLEASE TAKE THE TIME TO READ THEM.

PERSONAL SAFETY!

CAUTION: THE WORD “CAUTION” IS USED WHERE A SAFE BEHAVIORAL PRACTICE ACCORDING TO OPERATING AND MAINTENANCE INSTRUCTIONS AND COMMON SAFETY PRACTICES WILL PROTECT THE OPERATOR AND OTHERS FROM ACCIDENT INVOLVEMENT.

WARNING: THE WORD “WARNING” DENOTES A POTENTIAL OR HIDDEN HAZARD WHICH HAS A POTENTIAL FOR SERIOUS INJURY. IT IS USED TO WARN OPERATORS AND OTHERS TO EXERCISE EVERY APPROPRIATE MEANS TO AVOID A SURPRISE INVOLVEMENT WITH MACHINERY.

DANGER: THE WORD “DANGER” DENOTES A FORBIDDEN PRACTICE IN CONNECTION WITH A SERIOUS HAZARD.

ADDITIONAL PRECAUTIONARY STATEMENTS SUCH AS “ATTENTION” AND “IMPORTANT” ARE FOLLOWED BY SPECIFIC INSTRUCTIONS. THESE STATEMENTS ARE INTENDED FOR MACHINE SAFETY.

MACHINE SAFETY!

ATTENTION: THE WORD “ATTENTION” IS USED TO WARN THE OPERATOR OF POTENTIAL MACHINE DAMAGE IF A CERTAIN PROCEDURE IS NOT FOLLOWED.

IMPORTANT: THE WORD “IMPORTANT” IS USED TO INFORM THE READER OF SOMETHING HE NEEDS TO KNOW TO PREVENT MINOR MACHINE DAMAGE IF A CERTAIN PROCEDURE IS NOT FOLLOWED.

IMPORTANT!

FAILURE TO FOLLOW THE “CAUTION”, “WARNING”, AND “DANGER” INSTRUCTIONS MAY POSSIBLY RESULT IN SERIOUS BODILY INJURY.

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SAFETY INFORMATION

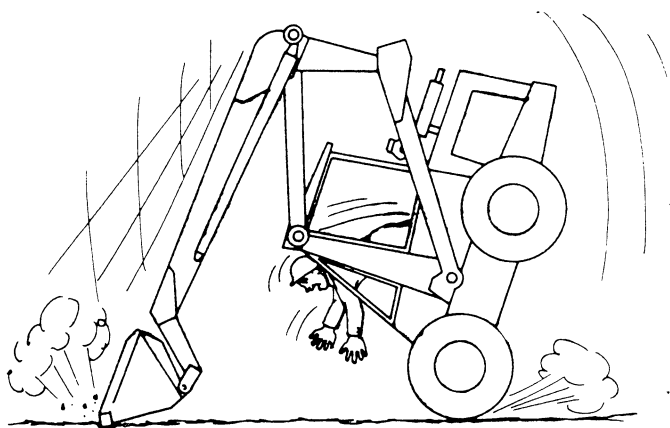
UNSAFE OPERATING PRACTICES AND IMPROPER USE OF THE LOADER AND ITS ATTACHMENTS ON THE PART OF THE OPERATOR CAN RESULT IN INJURIES. OBSERVE THE FOLLOWING SAFETY PRECAUTIONS AT ALL TIMES:

- 1. GIVE COMPLETE AND UNDIVIDED ATTENTION TO THE JOB AT HAND SO COMPLETE CONTROL OF THE LOADER IS MAINTAINED AT ALL TIMES.**
- 2. DRIVE SLOWLY OVER ROUGH GROUND AND ON SLOPES. KEEP ALERT FOR HOLES, DITCHES AND OTHER IRREGULARITIES THAT MAY CAUSE LOADER TO OVERTURN.**
- 3. AVOID STEEP HILLSIDE OPERATION WHICH COULD CAUSE LOADER TO OVERTURN.**
- 4. REDUCE SPEED WHEN TURNING SO THERE IS NO DANGER OF LOADER OVERTURNING.**
- 5. ALWAYS LOOK BEHIND YOU BEFORE BACKING UP.**
- 6. MAINTAIN PROPER TRANSMISSION OIL LEVEL TO PREVENT LOSS OF BRAKING CONTROL.**
- 7. DO NOT ALLOW CHILDREN TO OPERATE THE LOADER.**
- 8. DO NOT ALLOW ADULTS TO OPERATE LOADER WITHOUT PROPER INSTRUCTION.**
OSHA REQUIRES THAT ALL OPERATORS BE INSTRUCTED ON THE PROPER OPERATION OF THE MACHINE BEFORE THEY OPERATE THE UNIT.
- 9. DO NOT ALLOW PASSENGERS TO RIDE ON LOADER AT ANY TIME.**
- 10. DO NOT OPERATE LOADER IN ANY POSITION OTHER THAN WHILE IN THE OPERATOR'S SEAT WITH THE SEAT BELT SECURELY FASTENED.**
- 11. BEFORE STARTING ENGINE, BE SURE OPERATING CONTROLS ARE IN NEUTRAL.**
- 12. NEVER OPERATE LOADER ENGINE IN A CLOSED BUILDING WITHOUT ADEQUATE VENTILATION.**
- 13. RE-FUEL LOADER OUTDOORS WITH THE ENGINE SHUT OFF. REPLACE GAS CAP SECURELY. USE AN APPROVED GASOLINE OR DIESEL CONTAINER. DO NOT SMOKE WHEN HANDLING FUEL. AVOID SPILLING.**
- 14. AFTER OPERATING THE ENGINE, NEVER TOUCH MUFFLER, EXHAUST PIPE OR ENGINE UNTIL THEY HAVE HAD TIME TO COOL.**
- 15. DRESS APPROPRIATELY — WEAR RELATIVELY TIGHT FITTING CLOTHING WHEN OPERATING LOADER. LOOSE OR TORN CLOTHING CAN CATCH IN MOVING PARTS OR CONTROLS.**
- 16. PULL LOADS ONLY FROM REAR HITCH YOKE.**
- 17. BEFORE SERVICING THE LOADER OR ANY OF ITS ATTACHED EQUIPMENT, BE SURE THE ATTACHMENTS ARE LOWERED TO THE GROUND OR THAT THE BOOM ARMS ARE SUPPORTED BY THE BOOM LOCK PINS.**
- 18. DO NOT WORK UNDER OVERHANGS, ELECTRIC WIRES, OR WHERE THERE IS DANGER OF A SLIDE.**
- 19. WEAR AN APPROVED SAFETY HAT WHEN OPERATING THE MACHINE, AND WHILE IN ANY WORK AREA.**
- 20. WEAR A SUITABLE HEARING PROTECTIVE DEVICE SUCH AS EAR MUFFS OR EAR PLUGS IF YOU ARE EXPOSED TO NOISE WHICH YOU FEEL IS UNCOMFORTABLE.**
- 21. WHEN DRIVING THE LOADER ON A ROAD OR HIGHWAY, USE WARNING LIGHTS OR WARNING DEVICES AS MAY BE REQUIRED BY LOCAL OR STATE GOVERNMENTAL REGULATIONS. HEADLIGHTS AND WARNING LIGHT KITS ARE AVAILABLE THROUGH YOUR SPERRY NEW HOLLAND DEALER. SMV SIGNS ARE SUPPLIED AS STANDARD EQUIPMENT.**
- 22. KEEP THE LOADER CLEAN. DO NOT ALLOW TRASH, DEBRIS OR OTHER ARTICLES TO ACCUMULATE IN THE CAB OR FLOOR AREA THAT MAY HINDER SAFE MACHINE OPERATION.**

IMPORTANT

BE A SAFE OPERATOR. Before attempting to operate the loader, thoroughly acquaint yourself with:

1. The safety information in the Operator's Manual and the Skid-Steer Loader Safety Manual.
2. The operating instructions in the Operator's Manual.
3. The controls on the loader.



DANGER!

**FASTEN SEAT BELT
BEFORE STARTING ENGINE!**

THIS LOADER IS A VERY STABLE UNIT BUT IT CAN BE UPSET IF THE OPERATOR STOPS SUDDENLY WHEN BUCKET IS RAISED AND LOADED.

THEREFORE, DO NOT START ENGINE BEFORE SECURELY FASTENING THE SEAT BELT.

OSHA REQUIREMENTS NOW MAKE IT THE EMPLOYER'S RESPONSIBILITY TO FULLY INSTRUCT EACH OPERATOR IN THE PROPER AND SAFE OPERATION OF ALL OPERATIVE EQUIPMENT. BOTH EMPLOYER AND EMPLOYEE SHOULD THOROUGHLY FAMILIARIZE THEMSELVES WITH THE FOLLOWING SECTIONS.



CAUTION!

- 1. AVOID STEEP HILLSIDE OPERATION.**
- 2. KEEP BOOM AS LOW AS POSSIBLE WHILE OPERATING.**
- 3. REDUCE SPEED WHEN TURNING AND AVOID ABRUPT STARTS AND STOPS.**
- 4. BEFORE DISMOUNTING FROM LOADER.**
 - A. MOVE CONTROL LEVERS TO NEUTRAL POSITION.**
 - B. ENGAGE BOOM LOCK PINS IF BOOM IS RAISED.**
 - C. ENGAGE THE PARK BRAKE.**
 - D. REMOVE SEAT BELT**
 - E. SHUT OFF ENGINE AND REMOVE IGNITION KEY UNLESS OTHERWISE INSTRUCTED WHEN USING THE SPECIFIC ATTACHMENTS SET OUT IN THE "OPTIONAL EQUIPMENT AND REFERRAL ATTACHMENTS" SECTION OF THE OPERATOR'S MANUAL.**
- 5. BE CAREFUL WHEN GETTING ON AND OFF LOADER.**
- 6. ALWAYS USE SEAT BELT WHEN OPERATING.**
- 7. WHEN PARKING THE LOADER ON ANY SLOPE, ACTIVATE THE PARKING BRAKE AND BLOCK THE WHEELS.**
- 8. KEEP ALL SHIELDS AND GUARDS IN PLACE.**

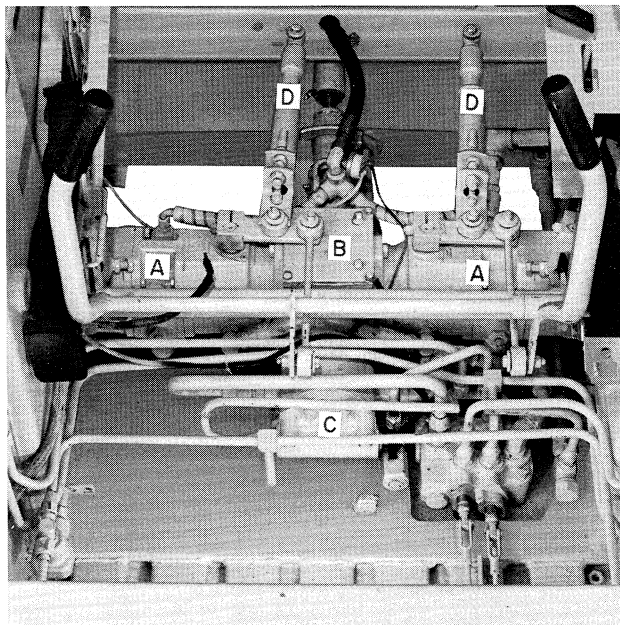
INTRODUCTION

Sperry New Holland skid-steer loaders feature a fully hydrostatic drive with an in-line back-to-back configuration. (All high pressure hydrostatic circuits are internal). Sandwiched between and driving the two hydrostatic transmissions, A, Figure 1, is a four-way gearbox, B, Figure 1. It receives power from the engine and drives both transmissions as well as the hydraulic system pump, C, Figure 1. The Cessna drive system is shown in Figure 1 but the Vickers unit is similar in operation.

The transmissions are controlled with two steering levers. The control levers are connected to two neutralizers, D, Figure 1. As the control levers are moved, the hydrostatic transmission pump pintle arms are stroked to the desired position. Hydrostatic pulsations and the torque feed-back generated by drive train loads are resisted by the internal shock absorber rather than by the operator's arms. This results in smoother operation and significantly less operator fatigue.

The operation of a skid-steer loader is typified by rapid changes of speed and direction, with accompanying low speeds at times of heavy loader power demands. It is under these conditions that a hydrostatic transmission is more efficient than a mechanical drive train.

When a loader digs into a pile of dirt the operator strives to exert maximum tractive effort with very little speed. The variable displacement hydrostatic units are de-stroked so they drive the motors at the required slow speed while generating maximum torque. Minimum power losses occur because input speeds are reduced drastically below levels attainable with slipping clutches used in mechanical drives.



SHIELDS SHOWN REMOVED FOR CLARITY.

FIGURE 1

SERVICING VICKERS-EQUIPPED LOADERS

SECTION 1 VICKERS TRANSMISSION REMOVAL

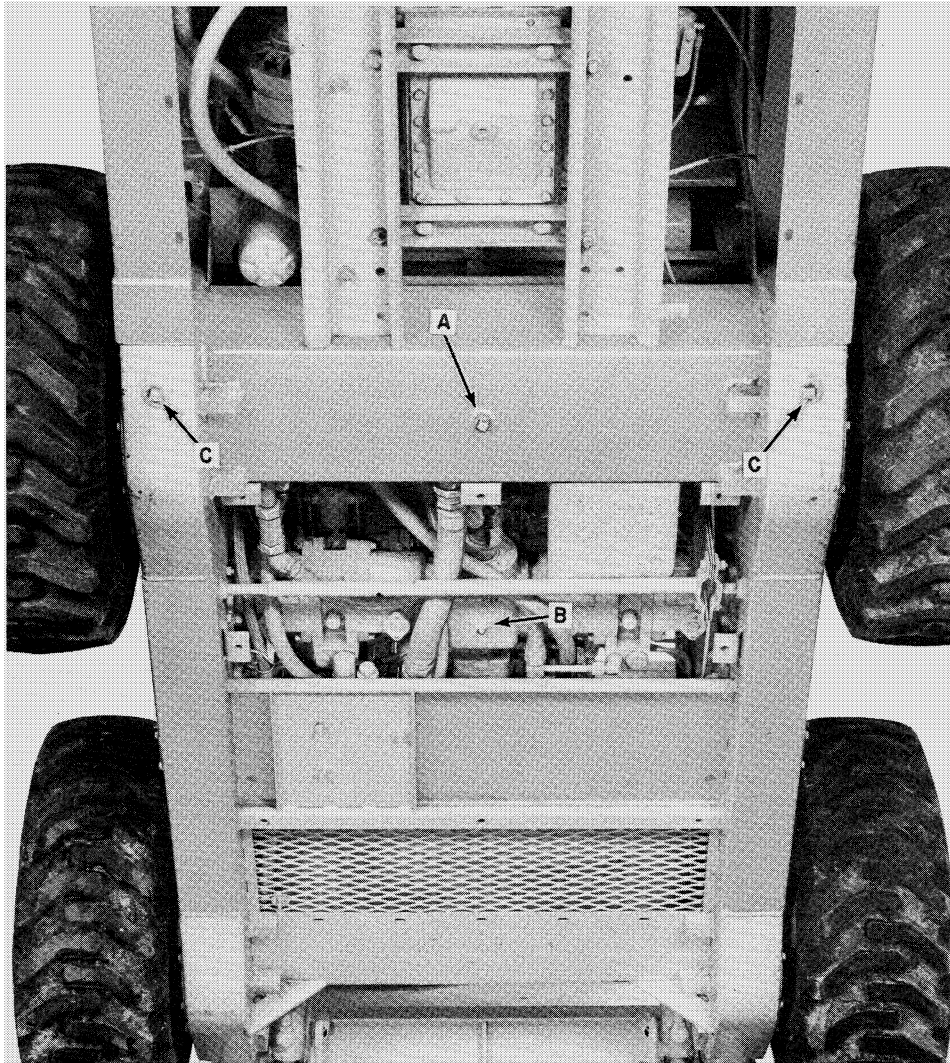


FIGURE 1



Before removing one or both transmissions from the loader, a complete check of the hydraulic system should be made to eliminate all other possible causes. If both transmissions must be removed, the right-hand transmission should be removed first because of easier access to the hardware. If, however, only **one** is to be removed, the same procedure applies to either side. **For easier access to the transmission areas, the boom should be raised and resting on the boom lock pins.**

WARNING: RAISE THE BOOM, EXTEND THE BOOM LOCK PINS AND LOWER THE BOOM DOWN ON THE PINS. STOP THE ENGINE AND WORK THE BOOM AND BUCKET PEDALS TO RELIEVE HYDRAULIC PRESSURE IN THE BOOM AND BUCKET SYSTEM BEFORE DISMOUNTING.

1. Drain the oil from the hydraulic oil reservoir, A, gear box, B, and both final drive chain cases, C, see Figure 1.
2. Remove the seat, safety covers, and the seat plate. Take out the four $\frac{1}{4}$ " cap screws and remove the shield.



WARNING

BEFORE SERVICING THE LOADER OR ANY OF ITS ATTACHED EQUIPMENT, BE SURE THE ATTACHMENTS ARE LOWERED TO THE GROUND OR THAT THE BOOM ARMS ARE SUPPORTED BY THE BOOM LOCK PINS.

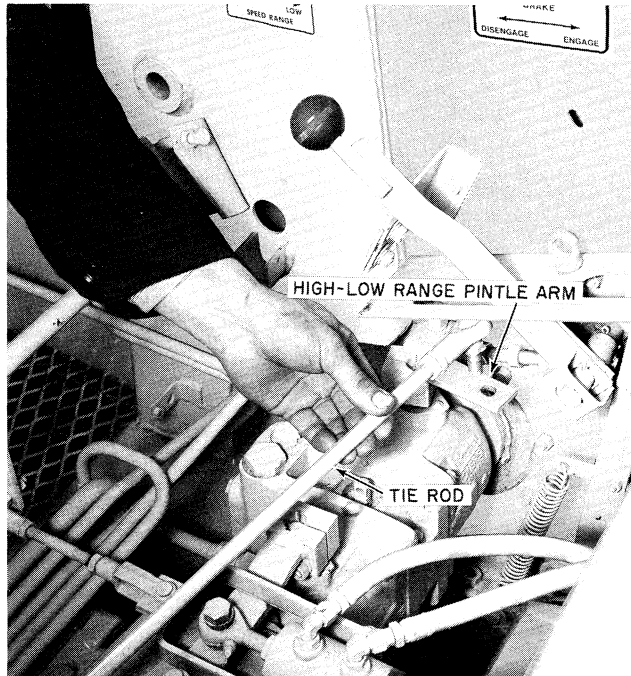


FIGURE 2

SHIELDS SHOWN REMOVED FOR CLARITY.

3. Disconnect the high-low range tie rod from the pintle arm at both ends and remove. See Figure 2.
4. Loosen the cap screw and nut on the high-low pintle arm and remove as shown in Figure 3.
5. Remove the servo-cylinder by disconnecting the two hydraulic lines, removing the cap screws, A, the cotter key and pin, B, loosening the cap screw and nut, C, and lifting the pintle arm and servo-cylinder out as a unit. See Figure 4.

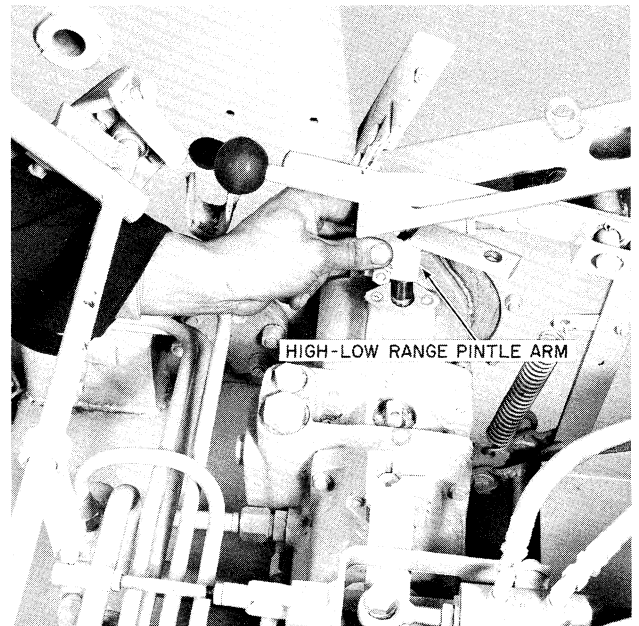


FIGURE 3

SHIELDS SHOWN REMOVED FOR CLARITY.

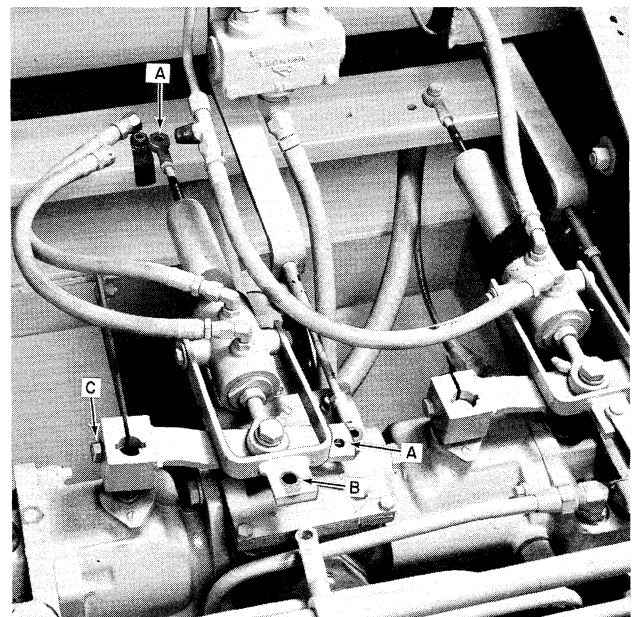
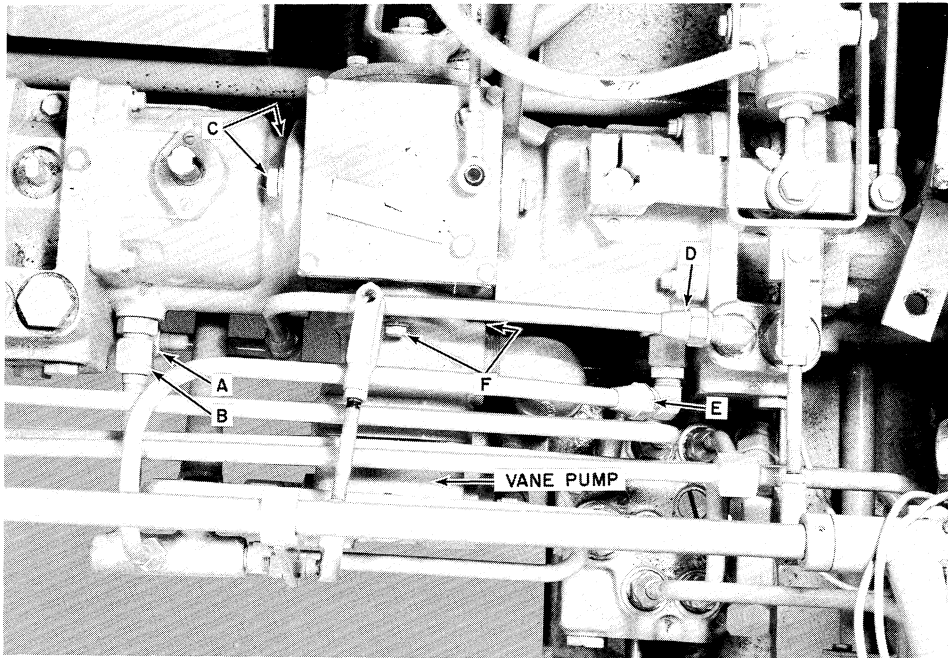


FIGURE 4

SHIELDS SHOWN REMOVED FOR CLARITY.



SHIELDS SHOWN REMOVED FOR CLARITY.

FIGURE 5

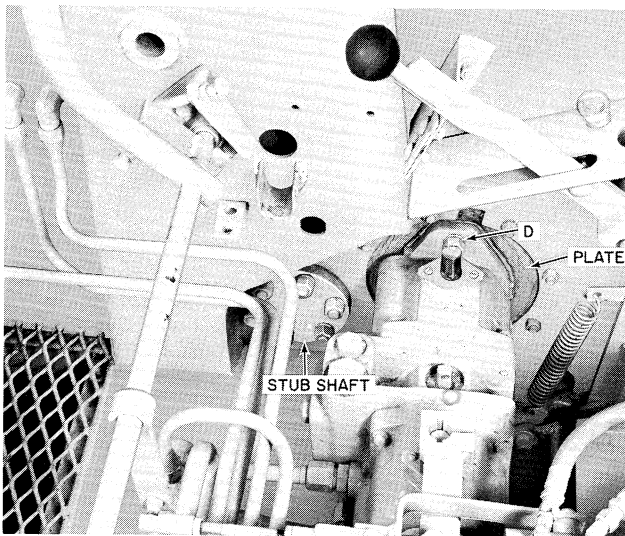
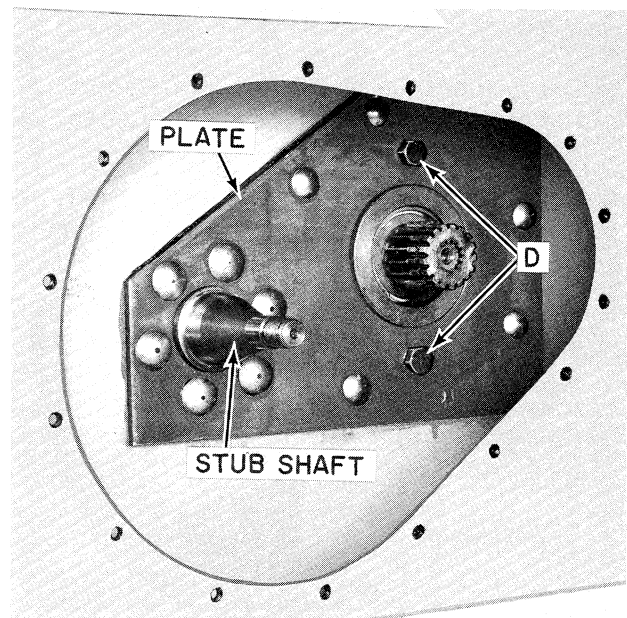


FIGURE 6

SHIELDS SHOWN REMOVED FOR CLARITY.

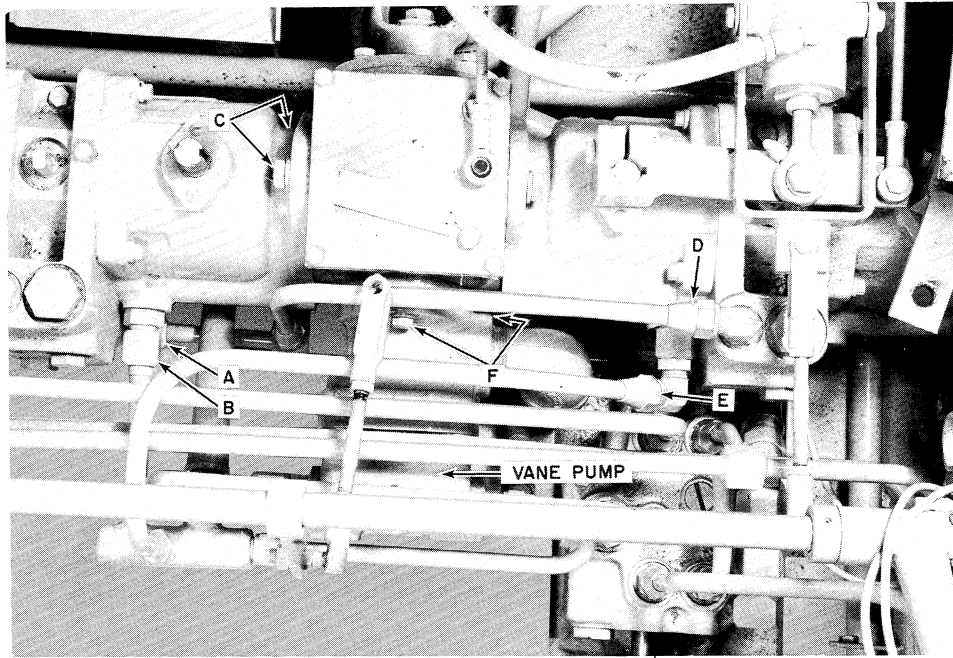
6. Disconnect the charge line, A, and the drain line, B. See Figure 5.
7. The final drive area on one side of the loader must be partially disassembled to gain clearance necessary for disengagement of the transmission from the gear box. For the necessary disassembly of the final drive see the first eight steps of the final drive disassembly, Section 2 "General Information". **(It is not necessary to remove the drive chain from the chain case for transmission removal.)**
8. Remove the carriage bolts holding the plate and stub shaft to the final drive. See Figures 6 and 7.

9. Remove the two ½" bolts at D, Figure 7, and C, Figure 5.
10. Using a rope or chain to support the transmission, move it away from the gear box and partially into the final drive.
11. After disengagement from the gear box, the transmission can be shifted around and taken out of the loader from the inside.
12. If the remaining transmission is to be removed, the other servo-cylinder should be removed as described in item 5.



PARTS SHOWN REMOVED FOR CLARITY.

FIGURE 7



SHIELDS SHOWN REMOVED FOR CLARITY.

FIGURE 8

13. Remove the other charge and drain line, D and E, Figure 8.
14. The vane pump is removed by disconnecting the suction line, see Figure 1, at the reservoir, the remaining lines of the head section of the vane pump and the two ½" cap screws, F, Figure 8.
15. Remove remaining lines necessary for pump disengagement. Remove ½" bolt securing drive shaft to gear box input shaft.
16. Rotate the pump body and gear box until the suction line will clear the control valve, then remove from the loader.
17. The remaining final drive chain should be disconnected and the brake disc removed. Then remove the two ½" cap screws and nuts which hold the transmission to the plate, same as D, Figure 7. No further disassembly of this final drive is necessary.
18. The transmission can now be removed.



CAUTION!

GIVE COMPLETE AND UNDIVIDED ATTENTION TO THE JOB AT HAND SO THAT COMPLETE CONTROL OF THE LOADER IS MAINTAINED AT ALL TIMES.

SECTION 2

VICKERS

HYDROSTATIC

TRANSMISSION

OPERATION

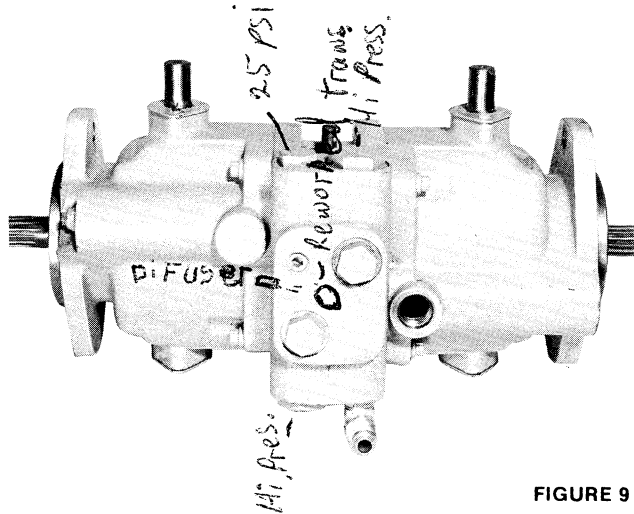


FIGURE 9

This section describes the basic operational characteristics and provides service and overhaul information for the Vickers T1515W transmission.

The complete hydrostatic transmission, shown in Figure 9, consists of these main components; the housings, pump and motor shafts, rotating groups, swash plates, yokes, and a valve block. The angle of the yoke and swash plate controls the effective stroke of each piston.

One valve block connects the pump to the motor. Oil passages and valves in this valve block carry high pressure oil from the pump to the motor. Low pressure oil from the motor flows through the valve block, back to the pump, to complete the "closed loop" circuit.

Figure 10 shows the internal oil flow through the transmission.

When the pump is in the neutral position, oil enters the inlet at a super charge pressure of 65 psi (4.4 bar). If the transmission is empty of oil the two relief and replenishing valves will open, filling the closed loop and then reseal.

When the closed loop has filled, the super charge oil opens the 25 psi (1.7 bar) relief-check valve and flows to the motor housing, through the valve block, into the pump housing, and out through the 15 psi (1 bar) relief valve and returns to the reservoir. The relief-replenishing valves will unseat to replenish oil lost from the pump and motor rotating groups.

When the pump yoke control is moved from neutral, oil is forced out one side of the pump, through the valve block and forces the motor to rotate. The other side of this loop becomes the low pressure circuit, returning the oil from the motor to the pump. The relief and replenishing valve in the low pressure side of the loop opens to supply oil back to the pump which was lost for lubrication purposes.

If the pump yoke is reversed, the low pressure circuit then becomes the high pressure circuit and high becomes the low pressure side of the loop.

When the transmission is loaded until it stalls, the pressure builds in the high pressure circuit to approximately 4500 psi (306 bar), then the relief valve opens and the oil flows into the super charge circuit. In this stalled position, the super charge oil which is being added to the circuit will open the other replenishing relief valve, and be recirculated to the pump. This happens due to the pressure differential.

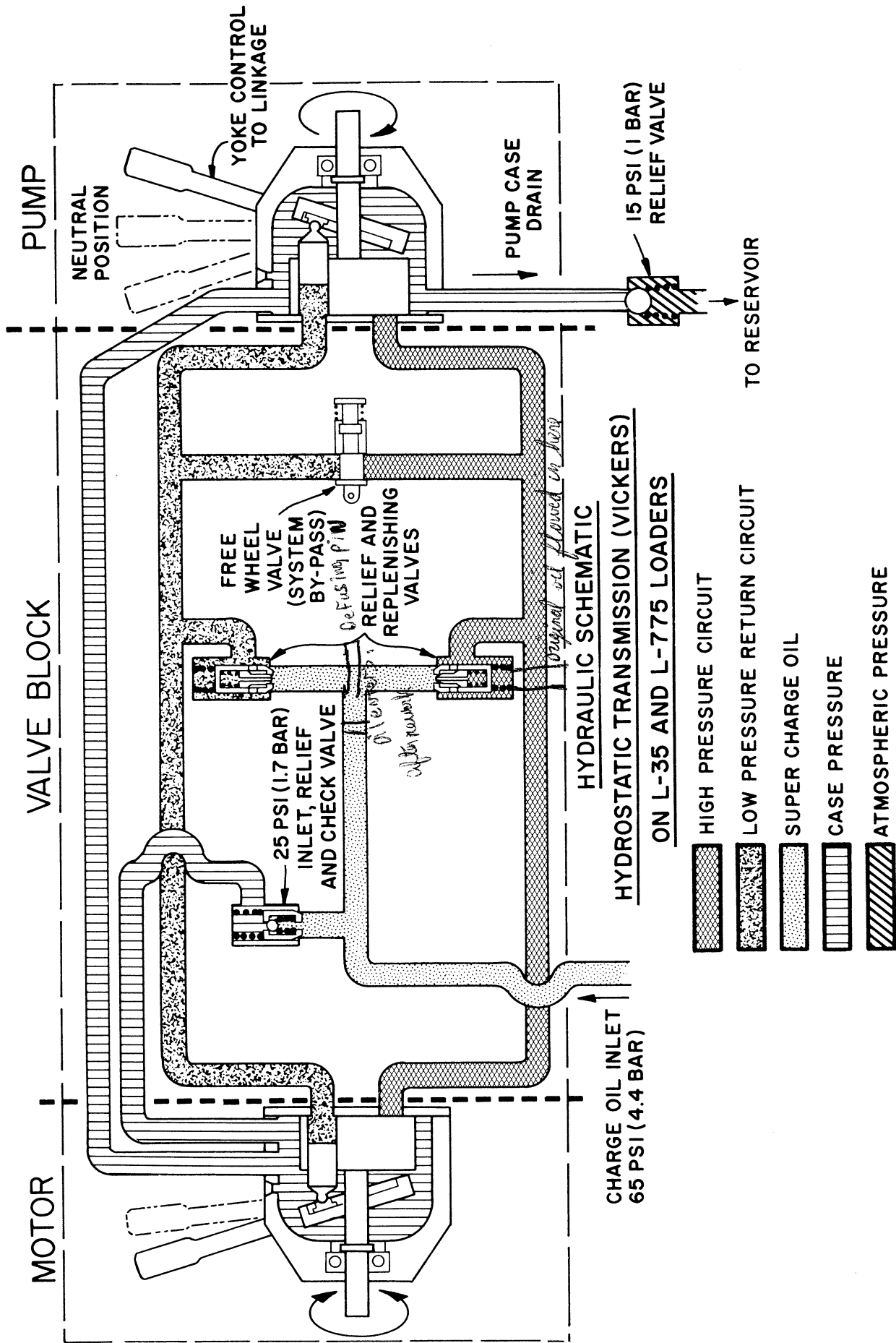


FIGURE 10

SECTION 3 VICKERS TRANSMISSION DISASSEMBLY

NOTE: Except for the limit screw control of the motor yoke, the procedure for disassembling the motor and the pump is the same and is done in the same sequence. **DO NOT INTERMIX PUMP AND MOTOR PARTS.**

1. Remove the four mounting bolts connecting the hydrostatic pump to the valve plate and the four bolts connecting the hydrostatic motor to the valve plate. See Figure 11.
2. Having removed the bolts from the pump and motor, you now have three separate subassemblies, the piston pump, valve plate and piston motor. See Figure 12.
3. Place the valve plate on a clean surface. Take out the plugs on the right and left sides of the valve block as shown in Figure 13. The springs and cartridges will follow.

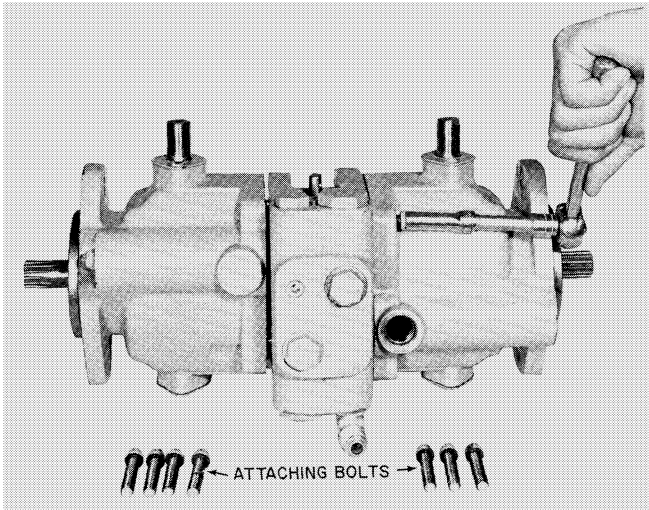


FIGURE 11

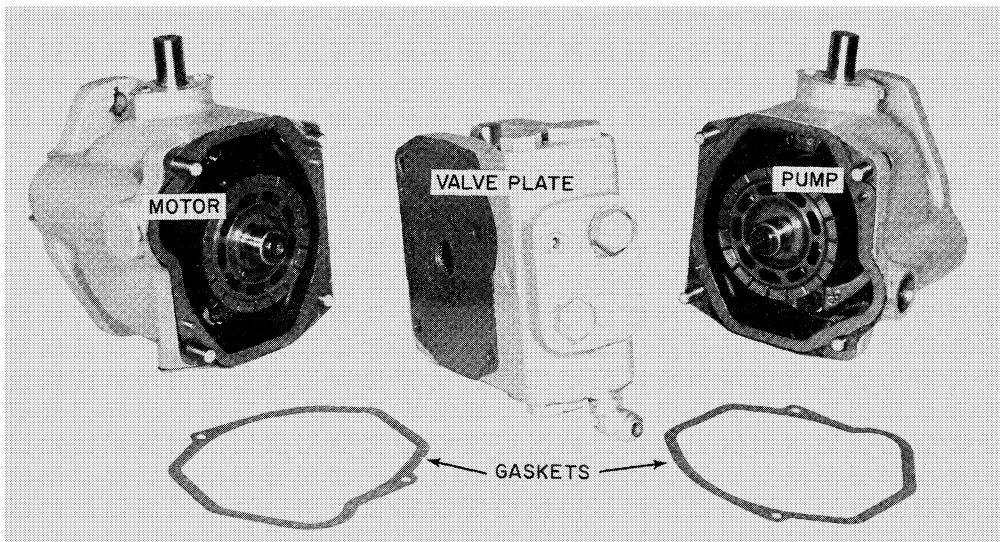


FIGURE 12

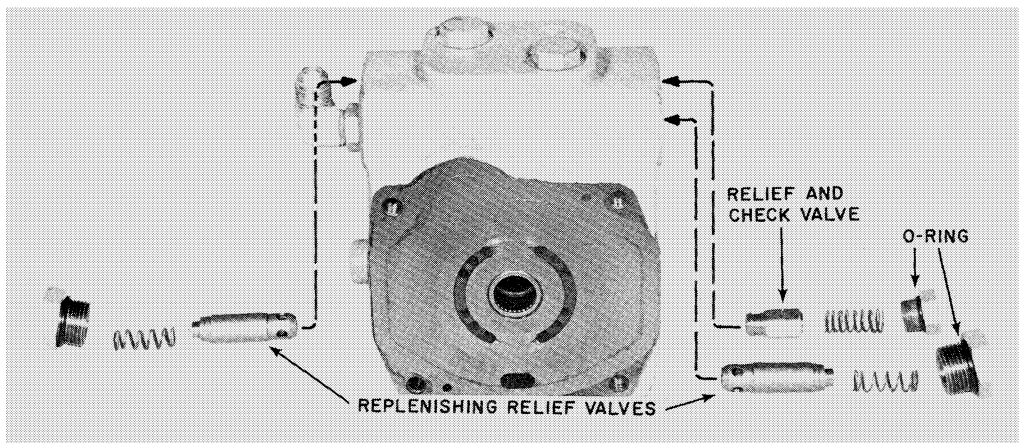


FIGURE 13



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NOTE: These cartridges are factory-assembled and the maximum pressure setting is pre-set and not adjustable. They cannot be repaired in the field. A new cartridge must be used for repair.

4. To remove the free-wheeling valve, remove the snap ring on the retainer cap, then lift off the cap and O-ring. Remove the small snap ring washer and spring from the spool. The spool can now be removed from either end. See Figure 14.

NOTE: The free wheeling valve spool can be installed from either direction. For convenience always have the valve spools up, in relationship to their use in the machine.

NOTE: To repair leaking O-rings at the free wheeling valve, it is not necessary to remove the transmission from the machine.

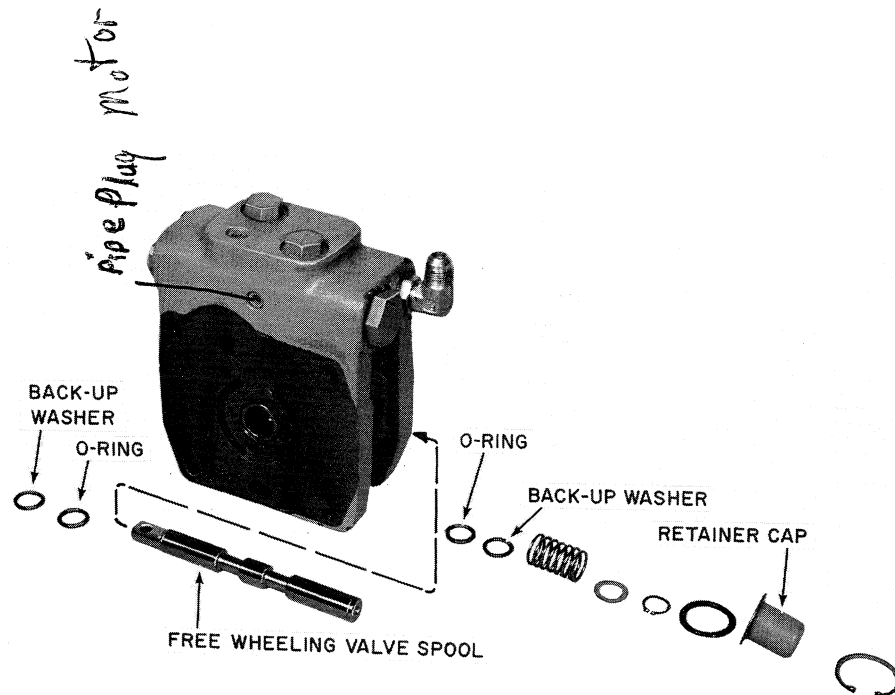


FIGURE 14



CAUTION: THIS SYMBOL IS USED THROUGHOUT THIS BOOK WHENEVER YOUR OWN PERSONAL SAFETY IS INVOLVED. TAKE TIME TO BE CAREFUL.

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