SERVICE MANUAL

Loader Backhoe

530

9-70011L

1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4

SERVICE MANUAL

Loader Backhoe

530

9-70011L

1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4

SERVICE MANUAL

Loader Backhoe

530

9-70011L

1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4

SERVICE MANUAL

Loader Backhoe

530

9-70011L

1. Trim along dashed line.
2. Slide into pocket on Binder Spine.

TYPE 1-4

The Loader-Backhoe hydraulic pump is attached to the front of the Tractor and is connected to the Tractor engine by means of a splined shaft and coupling.

REMOVING PUMP

Drain hydraulic oil from reservoir(s) as instructed under heading "Draining Hydraulic Oil."

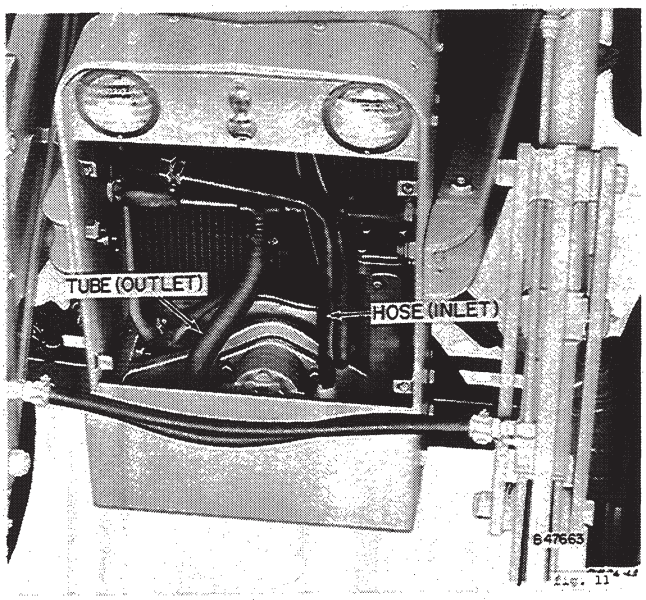


Figure 11 - Hydraulic Lines to Pump

REFERRING TO FIGURE 11: Clean exterior of pump thoroughly with solvent. Then remove hose and tube from pump and plug the ports. The pump shown is for Loader-Backhoe installation. The pump installation for Loader only is very similar, except it has a hose from R.H. hydraulic reservoir only, rather than from both R.H. and L.H. hydraulic reservoirs.

REMEMBER, DIRT IS THE ENEMY OF ANY HYDRAULIC SYSTEM. THE BEST WAY TO FIGHT THIS ENEMY IS TO PREVENT ITS ENTRY INTO THE HYDRAULIC SYSTEM. MAKE SURE YOU DISASSEMBLE AND REASSEMBLE THIS PUMP IN A SPOTLESSLY CLEAN WORK AREA.

Plug all openings and clean exterior of pump thoroughly with solvent.

IMPORTANT PRECAUTION TO OBSERVE BEFORE OPERATING NEW OR REBUILT HYDRAULIC PUMP

To avoid possible damage to new or rebuilt hydraulic pump due to excessive hydraulic pressure, back off the main relief valve adjusting screws on BOTH the Loader and Backhoe main relief valves before operating pump. Then, AFTER THE PUMP HAS RUN-IN FOR 30 MINUTES AT ZERO PRESSURE (all control levers in neutral position), adjust BOTH Loader and Backhoe main relief valve pressures. See "Adjusting Loader Main Relief Valve Pressure", also "Adjusting Backhoe Main Relief Valve Pressure."

Failure to observe this precaution can result in almost immediate failure of the hydraulic pump — if original relief valve pressure setting(s) were excessive.

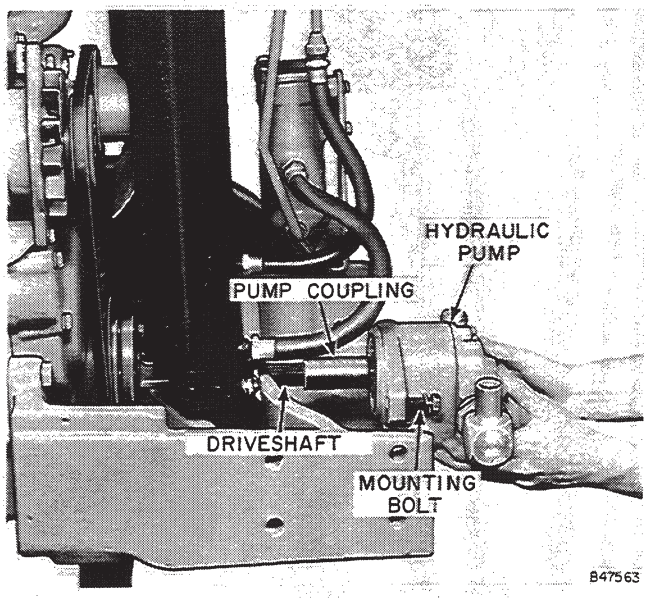


Figure 12 - Removing Pump

DISASSEMBLING PUMP

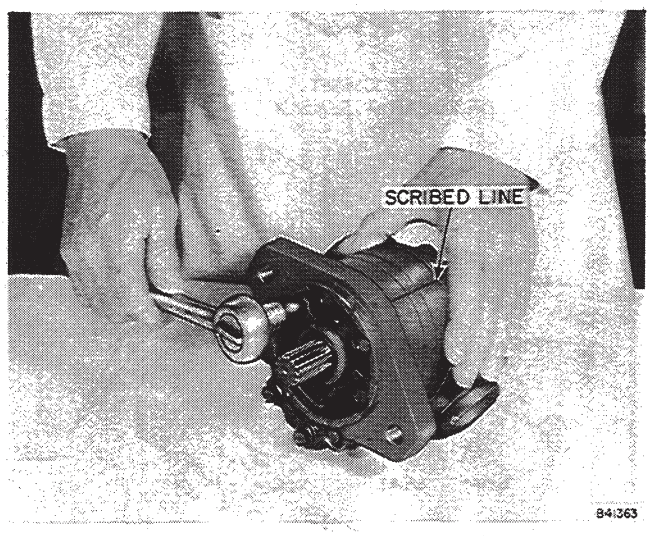


Figure 13 - Disassembling Pump Section

REFERRING TO FIGURE 13: After thoroughly cleaning the exterior of pump, scribe a line across the three sections of pump. The pump can easily be reassembled in the same position. Always reassemble the sections — front cover, rear cover and gear plate — in the same position.

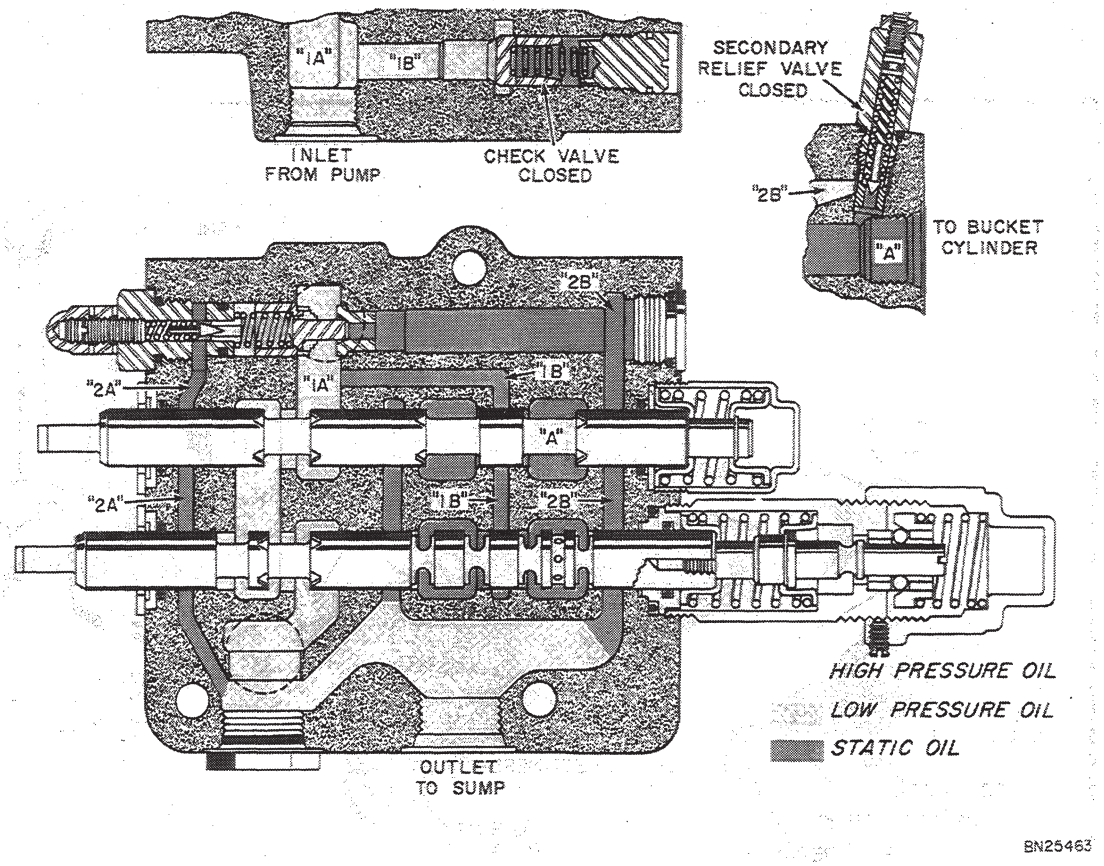


Figure 36 - Oil Flow Through Open Center (Loader Models)

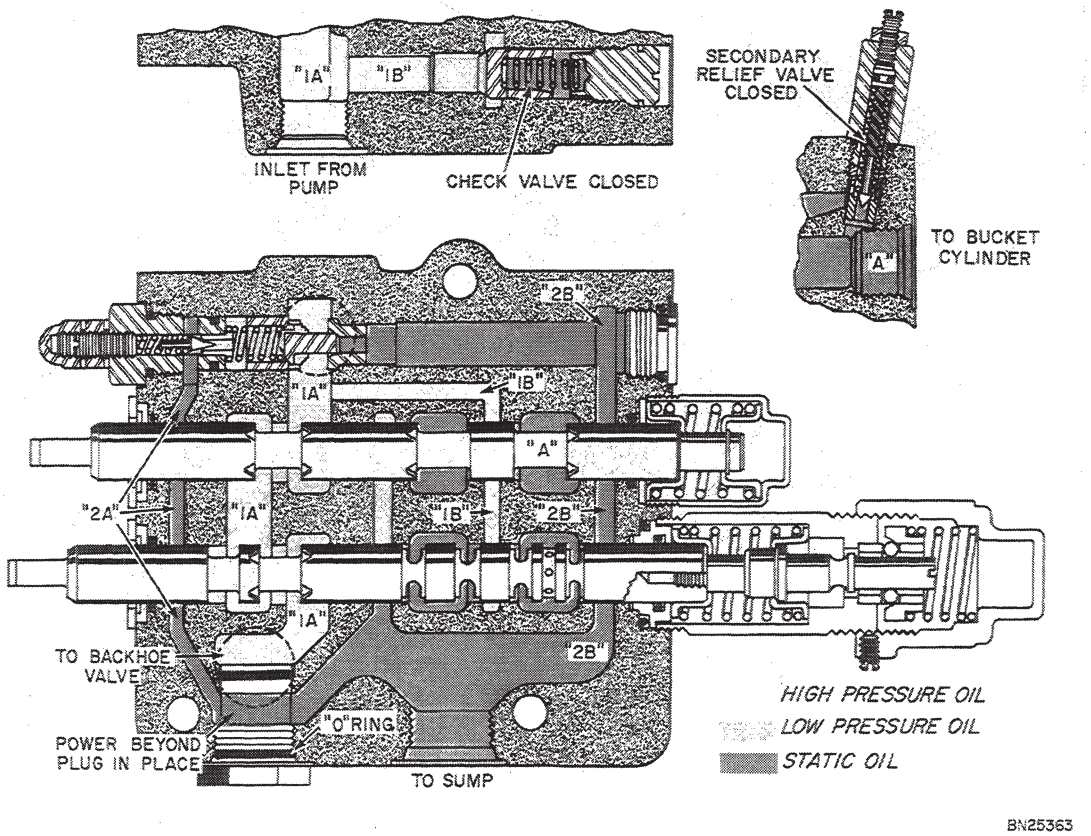


Figure 37 - Oil Flow Through Open Center (Loader - Backhoe Models)

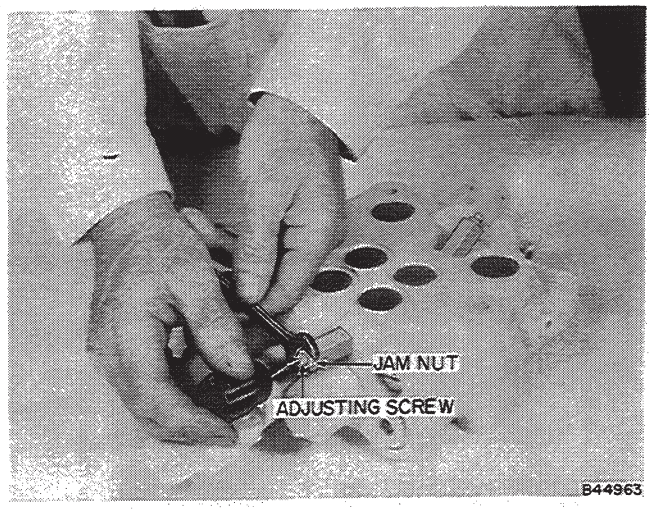


Figure 58 - Adjusting Secondary Relief Valve

SERVICING CHECK VALVES

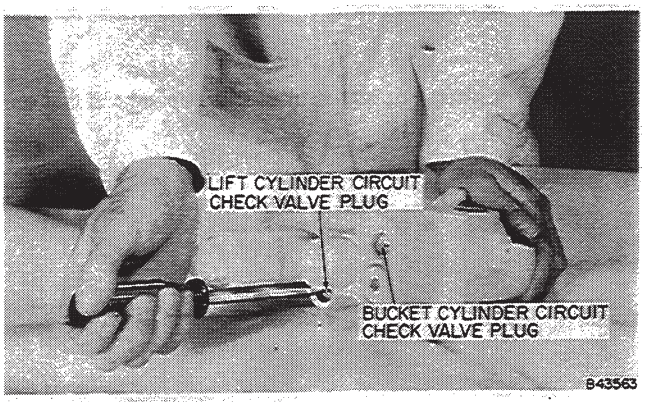


Figure 59 - Check Valve for Lift Cylinder Circuit

REFERRING TO FIGURE 59: Check valves are installed in both lift and bucket cylinder circuits to eliminate the possibility of the load dropping or bucket tipping as a control lever is feathered. As a lever is placed in the fully actuated position, the function of the check valve is overridden by hydraulic pressure.

Two check valves are used. Shown being removed is the check valve for the lift cylinder circuit. The other check valve is for the bucket cylinder circuit. When servicing check valves, always be sure parts are returned to original bore.

REFERRING TO FIGURE 60: After the plug has been removed, slip the spring and poppet from the bore. Inspect the plug "O" ring and replace if necessary.

The seat for the poppet is an integral part of the housing. Therefore, when a new poppet is installed, it must be lapped to its seating surface. Use standard fine valve grinding compound. Thoroughly flush the valve to remove all traces of the abrasive compound.

Replace all parts and securely tighten the plug.

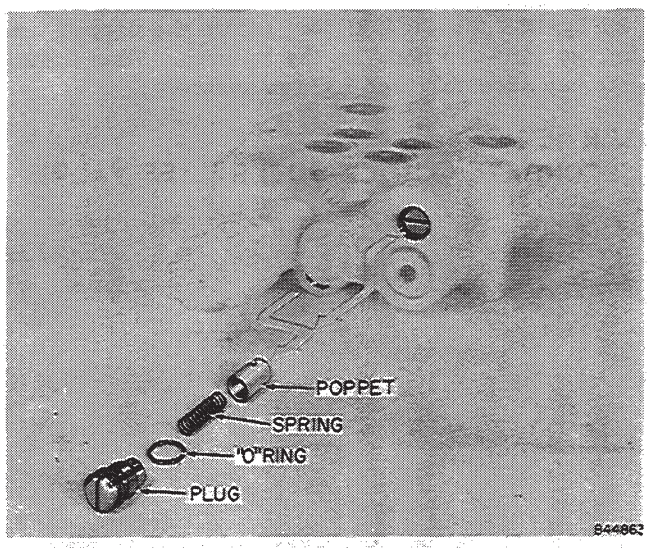


Figure 60 - Servicing Check Valves

SERVICING VALVE SPOOLS

All control valves have a selective fit between the spools and the body. For that reason, most bodys and spools are not serviced separately. However, the Parker valve used on the 530 Construction King is an exception.

If the spool is worn or scored and the housing is in good condition, a new spool of a slightly larger diameter may be ordered for replacement. Spools are identified either by a letter code stamped into the end of the spool or by a color code, a dab of paint.

The spools are coded as follows:

LETTER CODE	COLOR CODE	SPOOL SIZE
W	BLACK	.73700 to .73709
X	BLUE	.73710 to .73719
Y	YELLOW	.73720 to .73729
Z	GREEN	.73730 to .73740

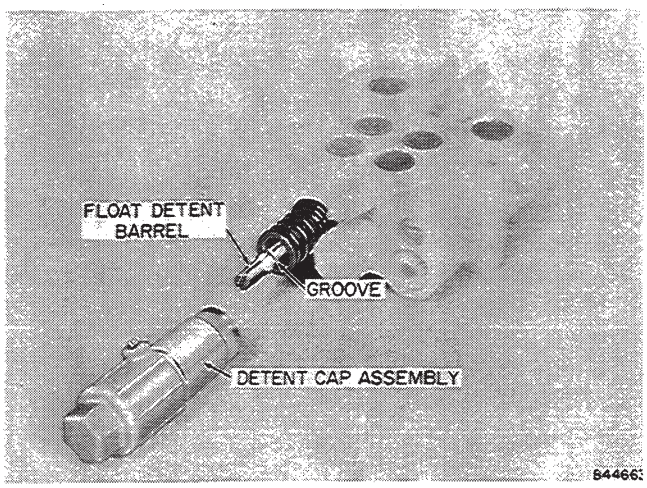


Figure 61 - Servicing Float Spool Cap Assembly

HYDRA-LEVELING CYLINDER

Before removing the cylinder, wash both the cylinder and hydraulic hose connections thoroughly with solvent.

Lower the bucket to ground level. Disconnect the hoses and remove the pins.

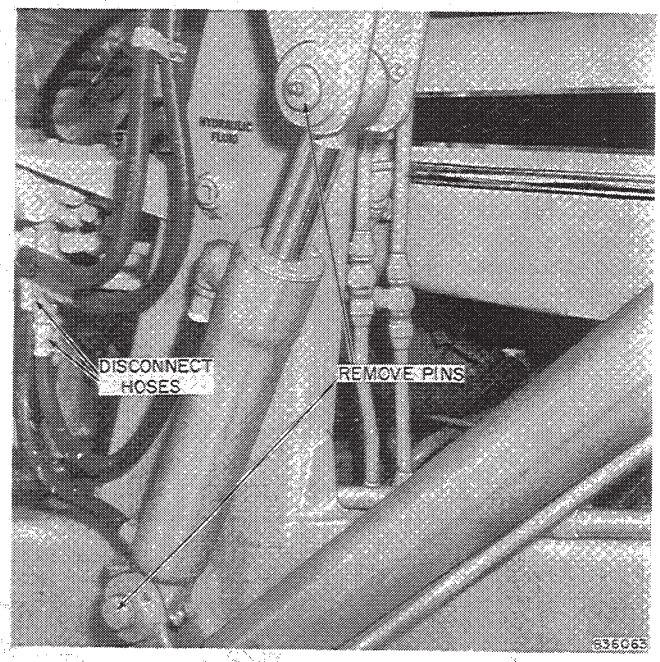


Figure 85 - Hydra-Leveling Cylinder

SERVICING LOADER CYLINDERS

The loader cylinders are similar in design to the backhoe cylinders. Refer to the section on Servicing a Typical Backhoe Cylinder for disassembly and reassembly procedures.

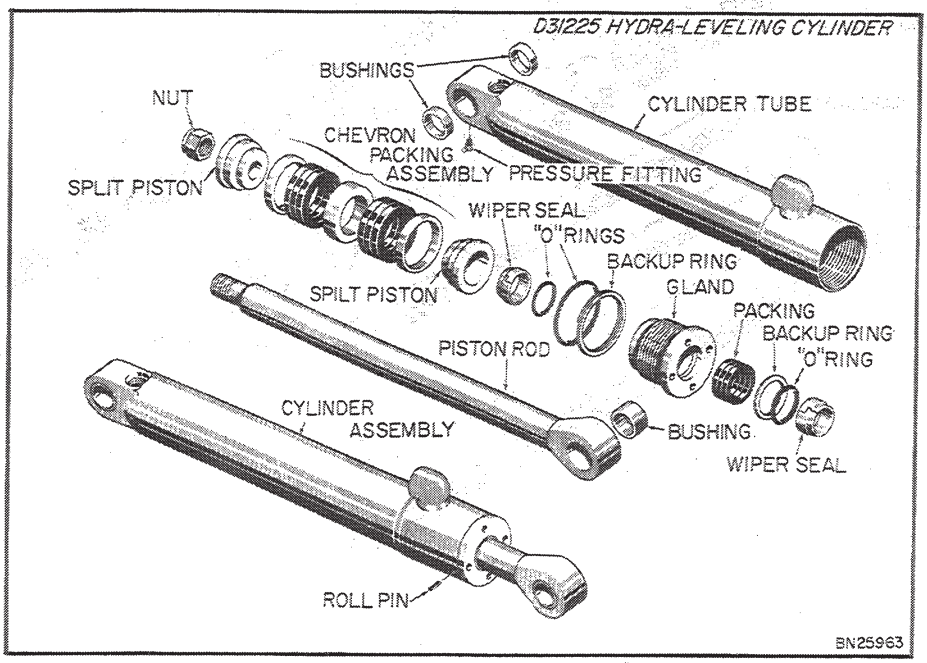


Figure 86 - Exploded View of Hydra-Leveling Cylinder

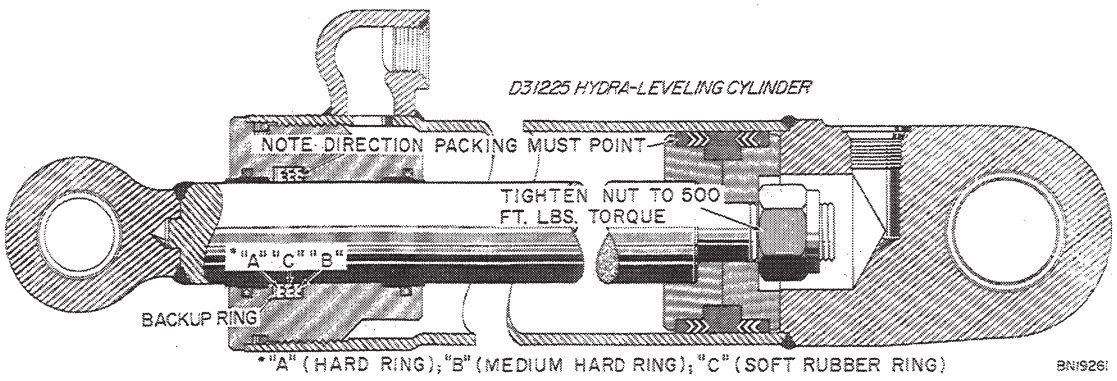


Figure 87 - Cross-Sectional View of Hydra-Leveling Cylinder

To prevent this, a relief valve circuit (Circuit 2A) has been added to the valve. When the pressure of the oil being supplied by the pump reaches the specified pressure (1800 P.S.I.), the relief valve spring compresses and allows the oil to return to sump, see Figure 9.

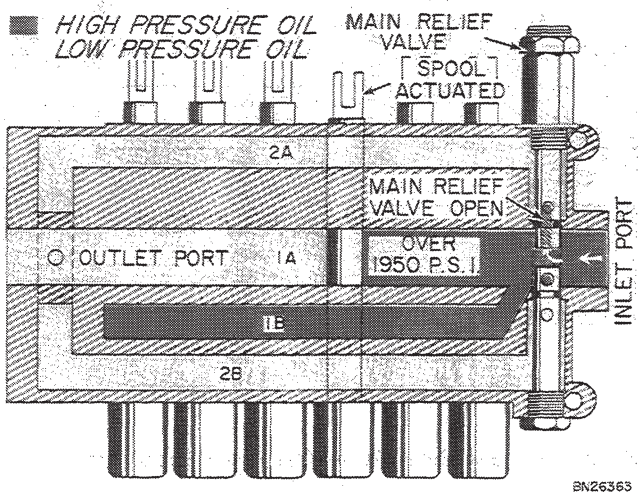


Figure 9 - Backhoe Valve — Main Relief Valve Circuit

When a cylinder is being actuated, oil from the opposite end is being returned via the relief valve circuit (2A) or the regeneration circuit (2B). If the cylinder movement on the applied side is faster than the pump can keep up with, a void is created in the applied side. This condition occurs when a weight on the end of the cylinder rather than the applied oil causes the piston to move. This condition is further complicated when the engine is running slowly because the pump output is in direct proportion to engine speed.

To prevent a void from forming in the cylinder and slowing the action of the Backhoe, the valve contains a built-in restrictor and check valve.

The restrictor in the valve creates a 200 P.S.I. back pressure on the oil returning to sump from the cylinder by restricting the flow. When the weight on the end of the cylinder causes the piston to move rather than the applied oil, there is a pressure drop in the circuit 1A. The 200 P.S.I. back pressure created by the sleeve then causes the check poppet to unseat and allows the oil returning from the cylinder to flow into circuit 1A to augment the pump output, see Figure 10.

HIGH PRESSURE SECONDARY RELIEF VALVES FOR DIGGING CYLINDERS

As one of the digging cylinders is actuated (boom, crowd, or bucket) when digging, "mechanical" pressure may be applied against one or both of the other cylinders. "Mechanical" pressure is created by the piston being forced against a solid column of oil when the spool is in neutral.

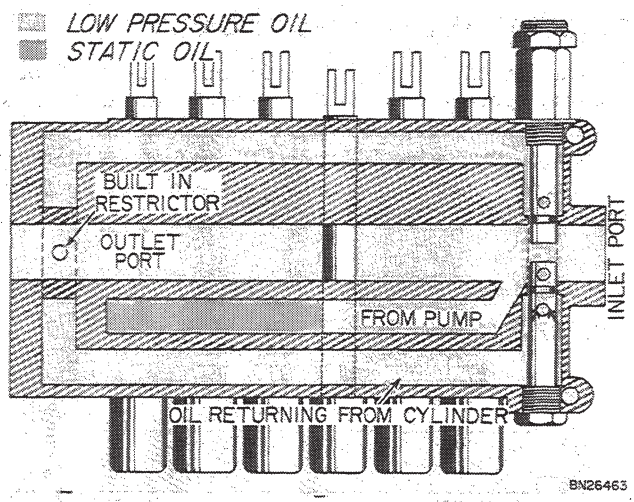


Figure 10 - Backhoe Valve — Regeneration Check Valve

To protect the digging cylinders against damage, high pressure secondary relief valves are located between the valve spool and the port leading to the cylinder to be protected. They allow the oil to flow only from the end of the cylinder into circuits 2A and 2B. These valves are set higher than the main relief valve and have a small orifice which allows the oil to bleed off slowly to prevent a sudden collapse of the cylinder.

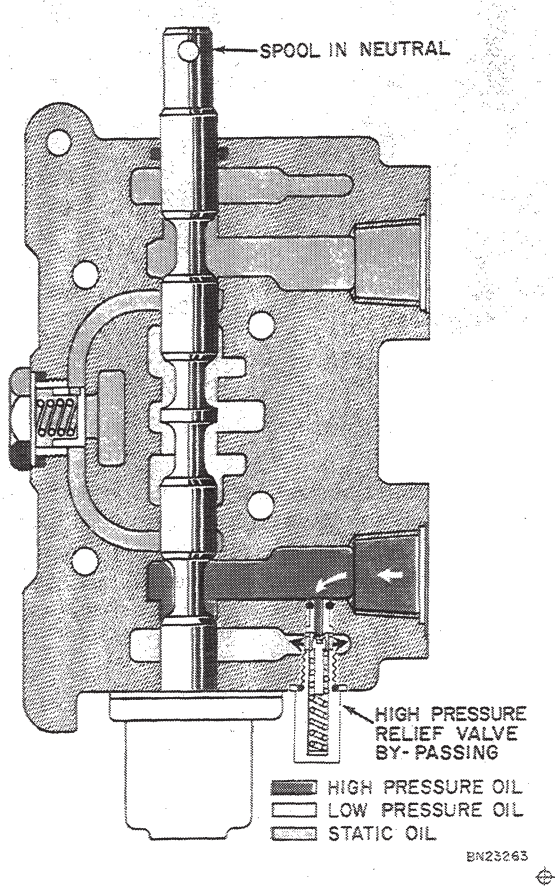


Figure 11 - High Pressure Secondary Relief Valve Actuated

Thoroughly lubricate assembly and install in valve, being careful not to damage "O" ring(s). Securely tighten assembly.

Before operating Backhoe, pressure setting must be adjusted, see "Checking Secondary Relief Valves". Secondary relief valves can be serviced with valve on or off of the Backhoe.

ASSEMBLING VALVE SECTIONS

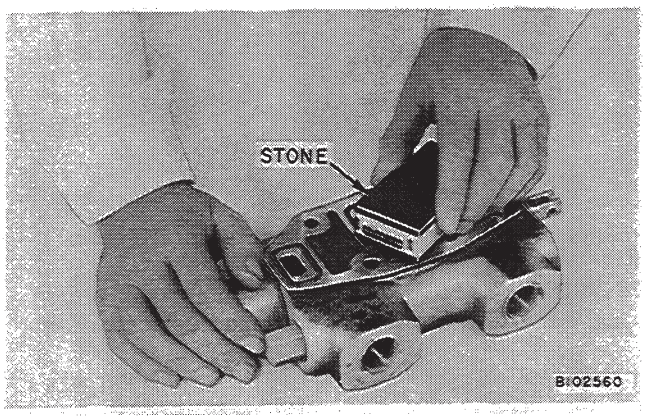


Figure 48 - Removing Nicks from Valve Section

REFERRING TO FIGURE 48: Using a flat, smooth, fine oil stone in a rotating motion, remove any nicks or burrs. If there are high spots, they can be detected by using the stone. Keep stone flat on valve at all times.

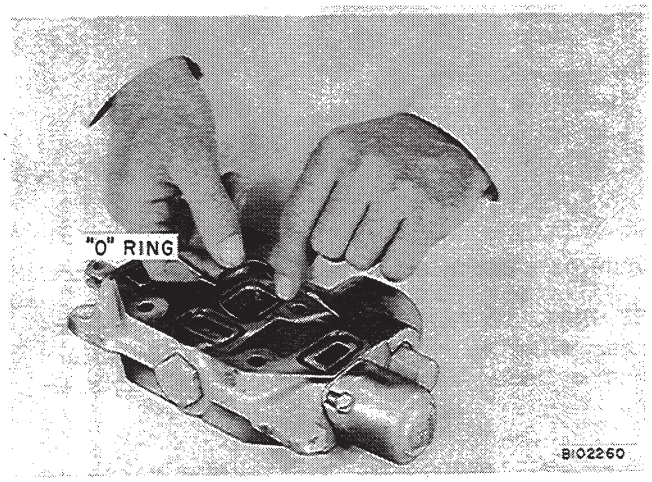


Figure 49 - Installing "O" Ring

REFERRING TO FIGURE 49: Carefully clean "O" ring grooves. If "O" rings were discarded, lubricate new "O" rings and install.

REFERRING TO FIGURE 50: Using a clean flat surface, place L.H. stabilizer section (ports down) on table. Slip tie rods through main relief valve (inlet) section.

Install greased "O" rings in inlet section and slip tie rods through stabilizer section, as the inlet section is moved into place. Check the "O" rings, making sure they are in place. Using the same procedure, assemble other sections in the sequence as shown. Be sure sections are kept together to prevent the "O" rings falling out. If tie rods are tightened with "O" ring partially out of groove, the "O" rings will be damaged, and the valve will leak.

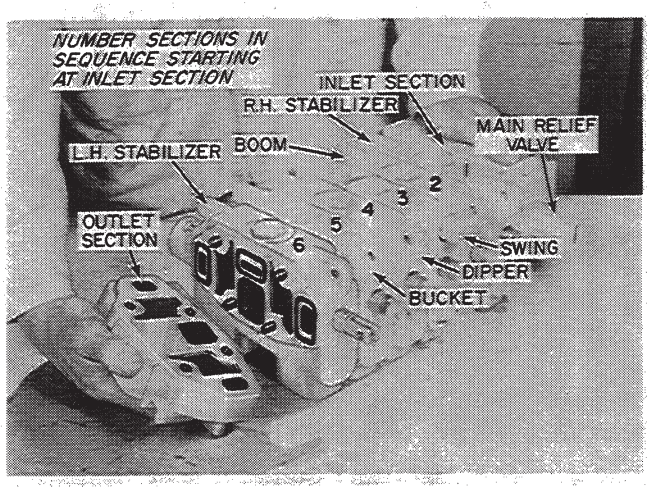


Figure 50 - Reassembling Backhoe Valve Sections

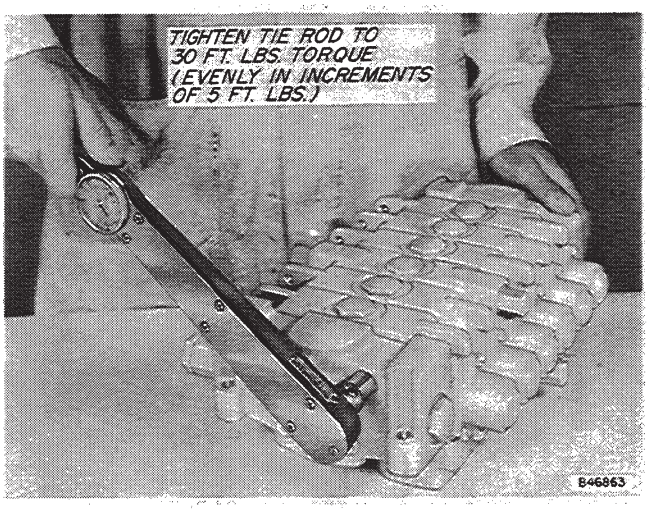


Figure 51 - Tightening Tie Rods

REFERRING TO FIGURE 51: Tighten tie rods to 30 ft. lbs. torque, evenly in increments of 5 ft. lbs. torque. The torque is very important. If too high, there may be spool bind; if too low, the valve may leak or cause the "O" rings to extrude.

BOOM DROP RESTRICTOR

REFERRING TO FIGURE 52: The boom drop speed is controlled by a restrictor installed in the bottom part of the boom spool. It is held in place by means of the hose fitting. Install restrictor with large diameter toward valve spool, then install hose.

REFERRING TO FIGURE 71: Place cylinder assembly in vise — USING CAUTION NOT TO DISTORT THE TUBE. Using a spanner wrench, unscrew the packing gland assembly.

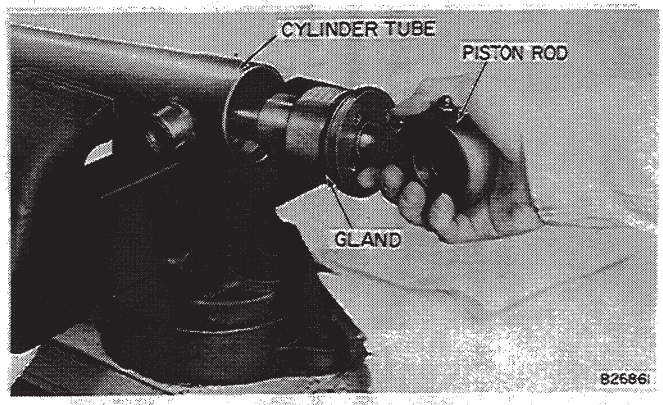


Figure 72 - Removing Piston Rod Assembly

REFERRING TO FIGURE 72: Carefully slip the piston rod and gland assemblies from the cylinder tube. Do not allow the rod to "cock" when it is removed, as the internal parts of the cylinder may be damaged.

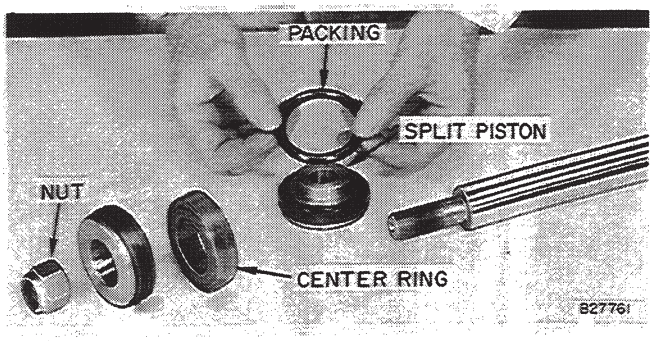


Figure 73 - Servicing Split Piston

REFERRING TO FIGURE 73: Remove the piston rod nut and discard. Using a twisting motion, separate the two halves. Then, remove the center ring. Remove the chevron packing one at a time. Inspect all parts for wear.

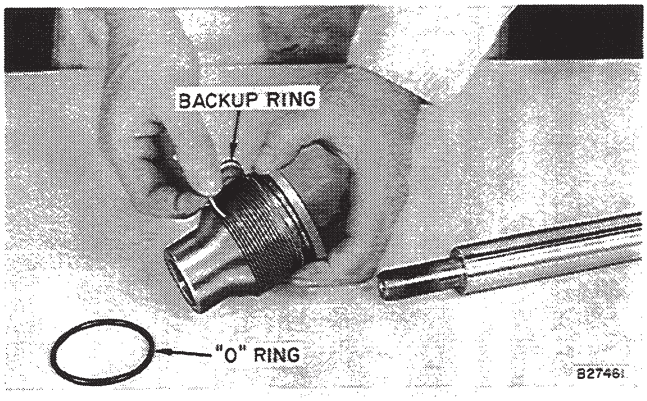


Figure 74 - Gland Assembly

REFERRING TO FIGURE 74: Slip gland assembly from piston rod. Remove "O" ring and back-up ring. Inspect for wear, nicks, and extrusion.

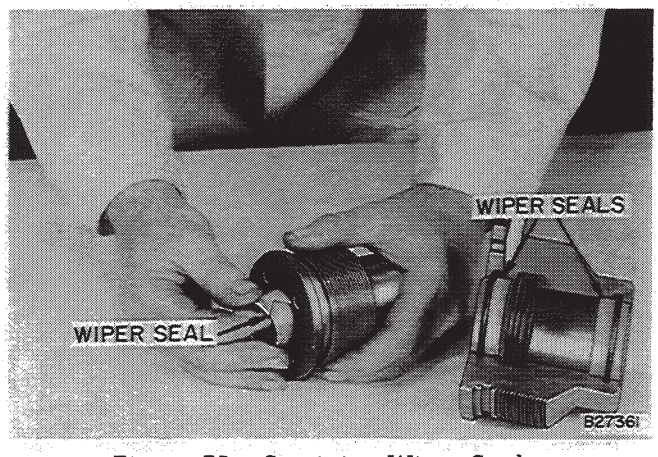


Figure 75 - Servicing Wiper Seals

REFERRING TO FIGURE 75: Remove the wiper seals, one from each end of the gland. Inspect for wear and score marks.

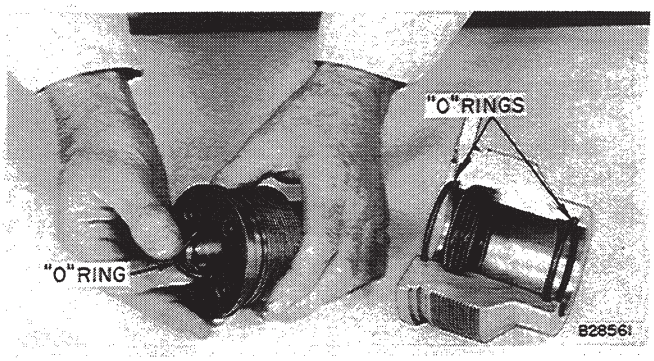


Figure 76 - Servicing Gland "O" Rings

REFERRING TO FIGURE 76: Remove an "O" ring from each end of the gland. Inspect for wear, nicks, flat spots, and extrusion.

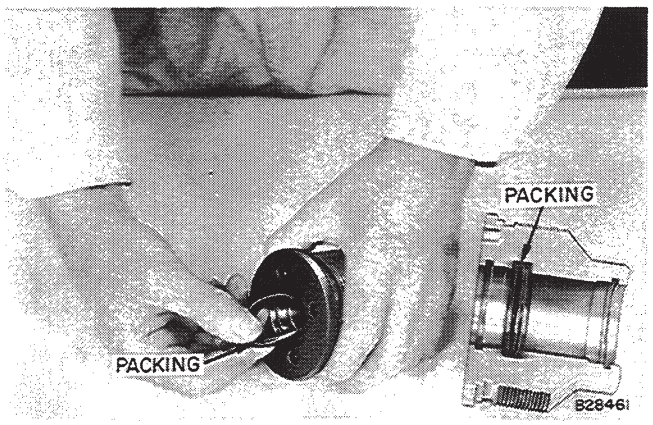


Figure 77 - Removing Packing Rings

REFERRING TO FIGURE 77: Using a screwdriver, remove the back-up ring and three (3) packing rings. The packing rings probably will be damaged when they are removed. Therefore, do not remove them unless new packing is to be installed.

Carefully wash all parts and place on clean paper.

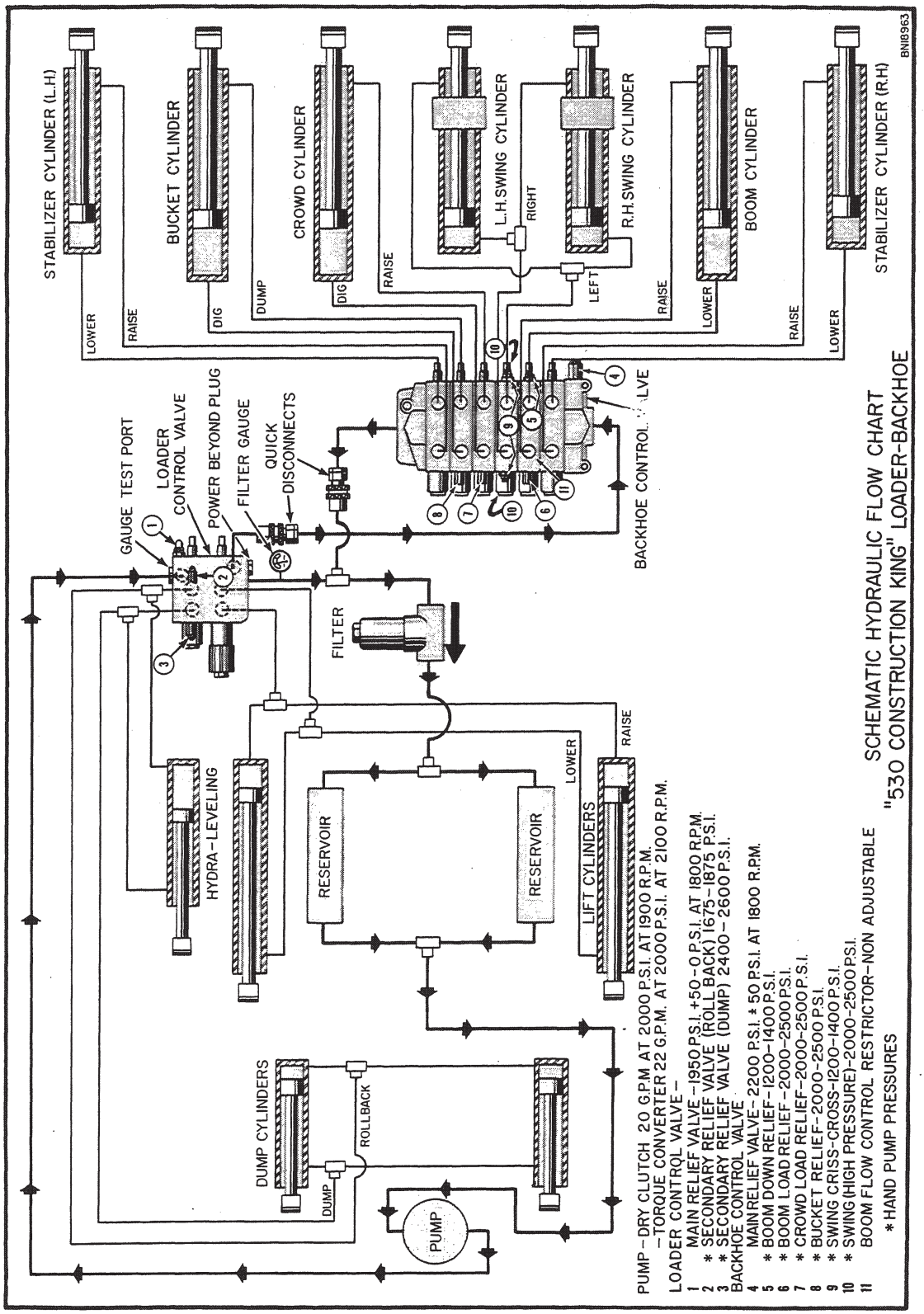


Figure 2 - Model 530 Construction King Wheel Tractor with Loader and Backhoe

SECTION

C

SPECIFICATIONS FOR 188 DYNACLONIC DIESEL AND 148 POWR-TORQ GASOLINE ENGINES

Crankshaft Main Bearing Journals
Should Be Ground to
2.863 to 2.864 Inches for .010 Inch Undersize Bearing
2.853 to 2.854 Inches for .020 Inch Undersize Bearing
2.843 to 2.844 Inches for .030 Inch Undersize Bearing

Undersize Connecting Rod Bearing
Shells Available for Service ----------.002, .010, .020, .030 Inch

Connecting Rod Crankshaft Journals Should
Be Ground to
2.0505-2.0515 Inches for .010 Inch Undersize Bearing
2.0405-2.0415 Inches for .020 Inch Undersize Bearing
2.0305-2.0315 Inches for .030 Inch Undersize Bearing

CAMSHAFT AND BUSHINGS

Number of Bearing Surfaces on Camshaft ----------5

Type Bushing ----------Replaceable, Precision, Steel Backed Babbitt

Diameter of Camshaft at Each Bearing Surface --- 1.749 to 1.750 Inches

Inside Diameter of Each Bushing
(Measured When in Place in Block) ----------1.752 to 1.753 Inches

No. 1 (Front) Bushing Length ---------- 1.213 to 1.223 Inches

No. 2 and 4 Bushing Length ----------.490 to .500 Inch

No. 3 Bushing Length ---------- .713 to .723 Inch

No. 5 Bushing Length ---------- 1.213 to 1.223 Inches

Camshaft End Play ----------Taken Up By Thrust Plate

Camshaft Thrust Plate Thickness ---------- .147 to .149 Inch

Camshaft End Clearance ---------- .003 to .007 Inch

TIMING GEARS

Total Gear Train Backlash (From Crankshaft to Injection Pump Drive Gear)-Measured at Injection Pump Drive Gear --- Max. .030 Inch

Backlash Between Oil Pump Drive Gear
and Crankshaft Gear ----------.003 to .007 Inch

VALVE PUSH ROD LIFTERS

Type ---------- Mushroom Type

Outside Diameter of End That Projects into Block-----.561 to .562 Inch

Diameter of Bore in Block for Lifter ---------- .5625 to .5635 Inch

VALVES

Valve Tappet Clearance

Intake and Exhaust ---------- .014 Inch, Engine Cold
Intake and Exhaust ---------- .014 Inch, Engine Hot
Hot Settings Are Made At Low Idle After The Engine Has Operated At Thermostat Control Temperature For At Least Fifteen Minutes.

Exhaust Valves

Angle of Valve Face ----------44 Degrees

Valve Length ---------- 6.339 to 6.364 Inches

Maximum Valve Face Runout -------.002 Inch as Determined With a Dial Indicator.

Diameter of Valve Stem --.3399 to .3409 Inch Install New Valve if There is More Than .002 Inch Difference in Diameter at any Point on Stem

Diameter of Valve Head ---------- 1.403 Inches

Exhaust Valve Seat Insert

Seat Angle ----------45 Degrees

Seat Width ----------.072 to .085 Inch

Insert Height ----------.2475 to .2525 Inch

Outside Diameter of Insert ---------- 1.445 to 1.4505 Inches

Inside Diameter of Insert ---------- 1.245 to 1.255 Inches

Maximum Allowable Seat Runout ---------- .002 Inch as Determined with a Dial Indicator

Exhaust Valve Guides

Length ----------3.125 Inches

Outside Diameter ----------.6565 to .6575 Inch

Inside Diameter ---------- .3429 to .3439 (After Assembly)

Valve Stem Clearance in Guide ----------.002 to .004 Inch

Distance Above Head Guide Must Protrude --------.875 Inch, Press Fit

Intake Valves

Angle of Valve Face ---------- 44 Degrees

Valve Length ---------- 6.334 to 6.369 Inches

Maximum Valve Face Runout ---------- .002 Inch as Determined with a Dial Indicator.

Diameter of Valve Stem ----------.3409 to .3419 Inch. Install New Valve if there is More Than .002 Inch Difference in Diameter at any Point on Stem.

Diameter of Valve Head ----------1.604 Inches

Intake Valve Seat

Seat Angle ---------- 45 Degrees

Seat Width ----------.082 to .094 Inch

Maximum Allowable Seat Runout ----------.002 Inch
As Determined With a Dial Indicator.

Intake Valve Guides

Length ----------3.250 Inches

Outside Diameter ----------.6565 to .6575 Inch

Inside Diameter ----------.3429 to .3439 Inch (After Assembly)

Valve Stem Clearance in Guide ----------.001 to .003 Inch

Distance Above Head Guide Must Protrude --------.875 Inch, Press Fit

VALVE SPRINGS

Free Length ---------- Approximately 2.375 Inches

Spring Pressure at Compressed Height of
1.516 Inches (Valve Open) ----------110-118 Pounds

Spring Pressure at Compressed Height of
1.875 Inches (Valve Closed) ---------- 53-59 Pounds

ROCKER ARM ASSEMBLY

Rocker Arm Bushing ----------Replaceable Precision Bronze Bushing

Number of Bushings ----------8

Lubrication ---------- Engine Lubricated

Outside Diameter of Rocker Arm Shaft ----------.622 to .623 Inch

Inside Diameter of Rocker Arm Bushing (Installed) ----.624 to .625 Inch

Rocker Arm Shaft Spring Pressure at Compressed Height of
1.750 Inches ---------- 8 Pounds; Install New Spring If Pressure is Less Than 7.500 Pounds.

OIL PUMP

Type ---------- Positive Displacement, Gear Type Pump; Driven Off Crankshaft.

Pressure Relief Valve ----------Maintains 50 to 75 Pounds Full Pressure (Oil Warm, Engine Operating at Full Governed Speed).

Relief Valve Spring Pressure At Compressed Height of
1.438 Inches ----------18.4 Pounds

Radial Clearance of Gears
(Clearance Between Gears and Housing) ----------.002 to .005 Inch

Gear End Clearance
(Clearance Between Gears and Cover) ---------- .0015 to .0055 Inch

CRANKING MOTOR CHECK AND SPECIFICATIONS

The test specifications listed below are listed according to the manufacturers number listed on the name plate. Make hook up per Figure F-7.

DELCO-REMY NO.	CASE NO.	BRUSH TENSION (OZ)		NO LOAD TEST AT 80°F			
				AMPS		RPM	
			VOLTS	MIN.	MAX.	MIN.	MAX.
1107583	A36583	35	9	50*	80*	5500	9000
1108670	G44881	24	11.8	40	70	6800	9200
1107516	G44927	35	9	50*	80*	5500	9000
1107584	A36582	35	9	50*	80*	5500	9000
1107874	A38413	35	9	40*	140*	8000	13000
Presto-Lite							
MDU-7102	G44880	32-48	10		50	5300	
MDU-7102A	A36581	32-48	10		50	5300	
MDU-7104	G44888	32-48	10		50	5300	

*Includes Solenoid Switch

SOLENOID SWITCH CHECK AND SPECIFICATIONS AT 80° F

Make hook up per Figure F-8. Slowly decrease load until specified voltmeter reading, ammeter should read specified amperage. Disconnect jumper wire, adjust until specified voltmeter reading, Ammeter should read specified hold in winding amperage. Replace solenoid if it does not meet these specifications.

DELCO-REMY NO.	CASE NO.	AMPERE DRAW BOTH WINDINGS	AMPERAGE HOLD IN WIND	VOLTAGE
1114251	G44891	47-54	15.5-17.5	10
1114289	A35350	47-54	15.5-17.5	10
PRESTO-LITE NO.			CLOSING VOLTAGE	OPENING VOLTAGE
SAW4201	A20145	2.75-3.0 at 12 volts	6.0-8.0	1.0-2.0
SAW4214	A40795	2.75-3.0 at 12 volts	6.0-8.0	1.0-2.0

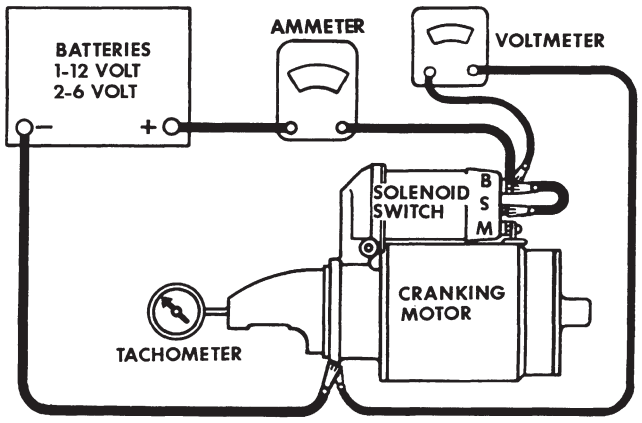


Figure 7
"Hook Up" Cranking Motor No Load Check

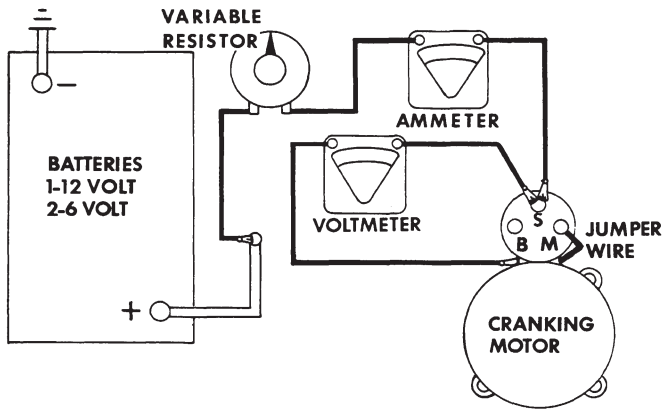


Figure 8
"Hook Up" For Solenoid Switch Check

DISTRIBUTOR CAP

Wipe the inside of the cap with a clean cloth and check for the following:

1. Cracks or carbonized paths which allow high tension leakage to ground. If this has been taking place, replace cap.

2. If corroded or burned brass inserts in the cap will not clean up by lightly filing them, replace cap.

3. Inspect the two vent holes in the cap. Some Prestolite caps have a rubber plug in one hole do not remove it. Be sure they are open and clean.

4. Inspect the carbon brush and spring for free movement. Replace if carbon is worn excessively.

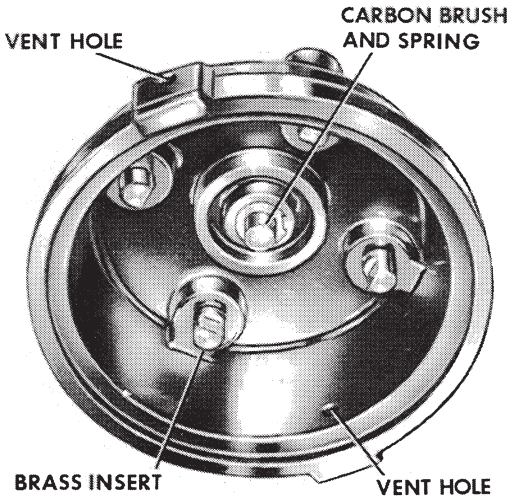


Figure F-21

DISTRIBUTOR ROTOR

1. Check for cracks and carbonized paths which cause high tension leakage to ground. Replace rotor if this is found.
2. Check rotor for black deposits at the spark end. This can be removed with a greaseless type cleaner such as carbon tetrachloride. Remove any corrosion from the rotor tip by filing with a pointed file. If this does not clean the rotor it should be replaced.

COIL POLARITY

In a negative grounded system the negative or primary terminal marked with a (-) should be connected to the distributor terminal. In a positive grounded system the positive or (+), terminal should go to the distributor terminal. Coil polarity refers to the direction of high tension current flow and should always be negative at the spark plugs. Reversed coil polarity is almost always traced to reversed leads at the coil. A simple way to check coil polarity to remove one spark plug wire at the plug and hold it about 1/4 of an inch away from the spark plug while the engine is idling. Insert the point of a wood lead pencil between the wire end and spark plug, Figure F-22 and F-23.

If the spark flares or feathers and has a slight orange color on the plug side of the pencil coil polarity is correct. If this occurs on the wire side of the pencil coil polarity is reversed. Reverse wires at the coil.

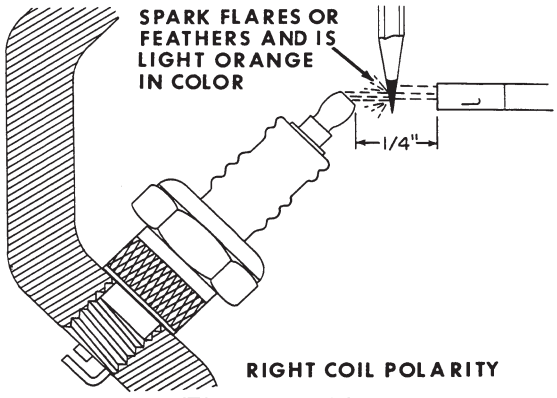


Figure F-22

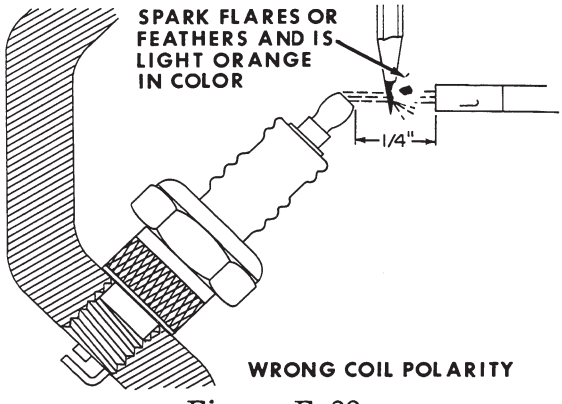


Figure F-23

CHECKING COMPRESSION PRESSURE (Continued)

9. Before installing the spark plugs, clean them thoroughly and check them for burned electrodes or cracked insulation. Replace them if necessary. Regap all plugs to .025" setting, Figure 3.

10. Replace all spark plug gaskets, Figure 3, before installing for proper seating and sealing. Install the spark plugs finger tight. Using the exact size spark plug wrench or a thin wall deep socket, torque the spark plugs 32 to 35 ft. lbs.

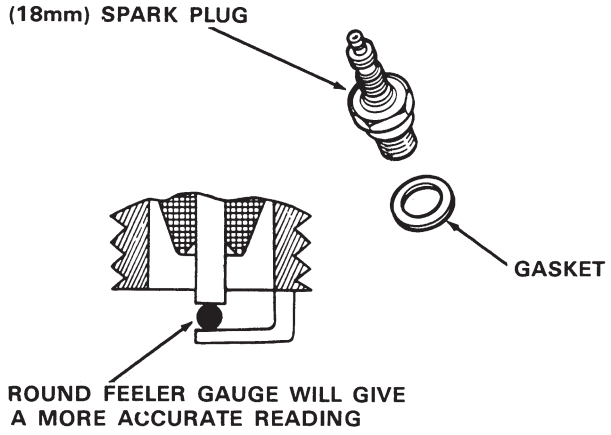


Figure 3

	ENGINE SPEED APPROXIMATELY	NORMAL COMPRESSION PRESSURE	ALLOWABLE VARIATION BETWEEN CYLINDERS
CRANKING	(148) 150 RPM	140 PSI*	20 PSI
	(159) 150 RPM	125 PSI*	20 PSI
	(188) 150 RPM	125 PSI*	20 PSI
	(201) 150 RPM	150 PSI*	20 PSI

*A 4% reduction in PSI must be allowed for every 1000 ft. above sea level.

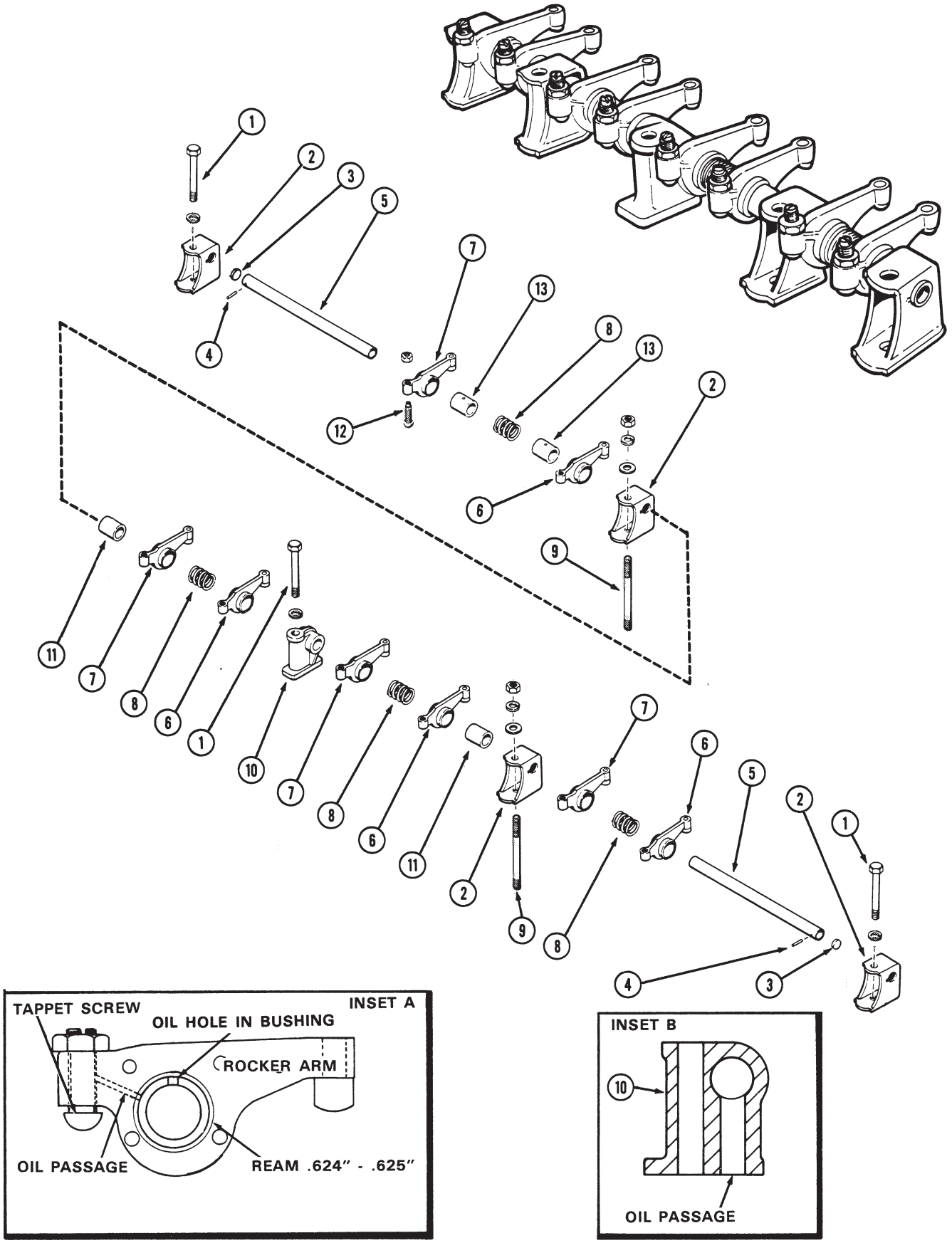

INSET A
TAPPET SCREW
OIL HOLE IN BUSHING
ROCKER ARM
OIL PASSAGE
REAM .624" - .625"
INSET B
OIL PASSAGE

Figure 8

GRINDING INTAKE AND EXHAUST VALVE SEATS

Always use a precision seat grinder. Take very light cuts with the grinding stones so just enough metal is removed to end up with a good smooth seat finish.

The proper angle of grind is 45° for exhaust valve seats and 30° for intake valve seats, Figure 25. The seat grinding angle of the stone should be dressed frequently on a stone dresser to maintain a clean accurate surface.

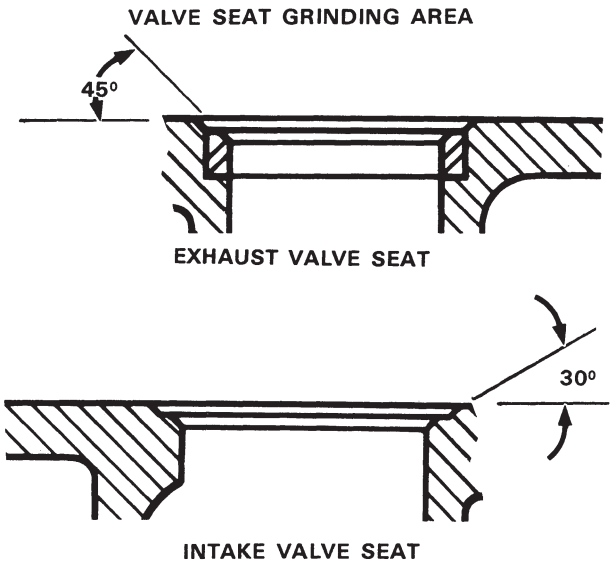


Figure 25

IMPORTANT: The valve seat runout should be checked after finish grinding with a dial indicator and seat grinding pilot, Figure 26. The runout of the valve seat must not exceed .002" .

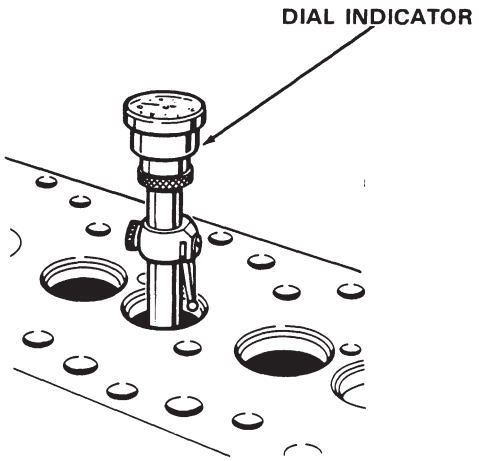


Figure 26

The valve seat contact area width and location can be changed by using 15°, 30° and 60° narrowing stones, Figure 27.

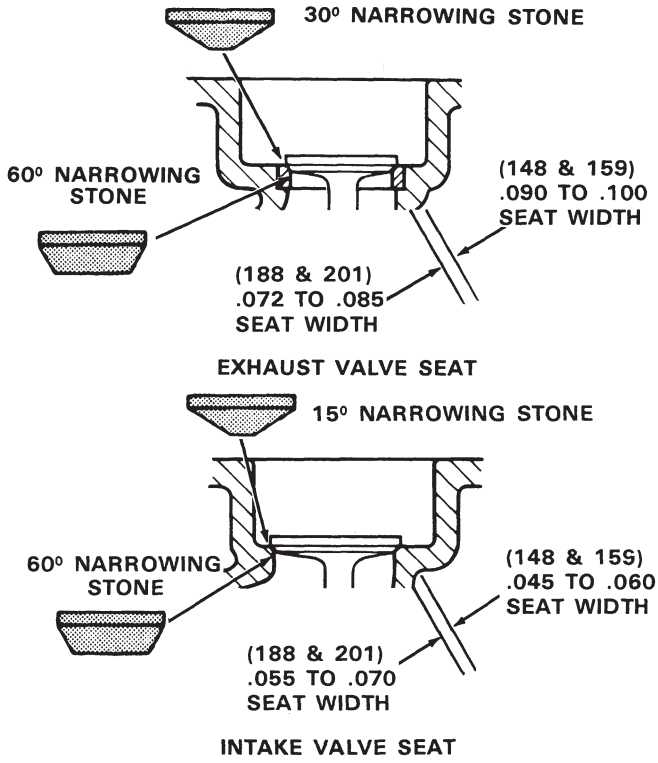


Figure 27

If the valve head has receded more than the "A" and "B" dimensions below the cylinder head surface, the valve, valve insert (exhaust) or cylinder head must be replaced. **NOTE:** Measure from the valve head edge to the cylinder head face using a depth micrometer.

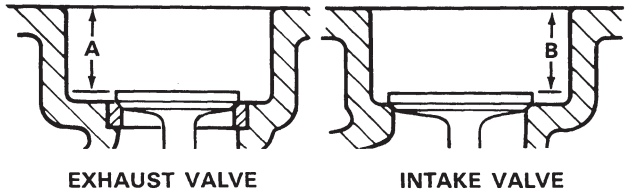


Figure 28

Engine	A	B
148 & 159	.940"	.940"
188 & 201	1.060"	1.000"

IMPORTANT: Do not attempt to salvage a cylinder head by installing inserts for intake valves.

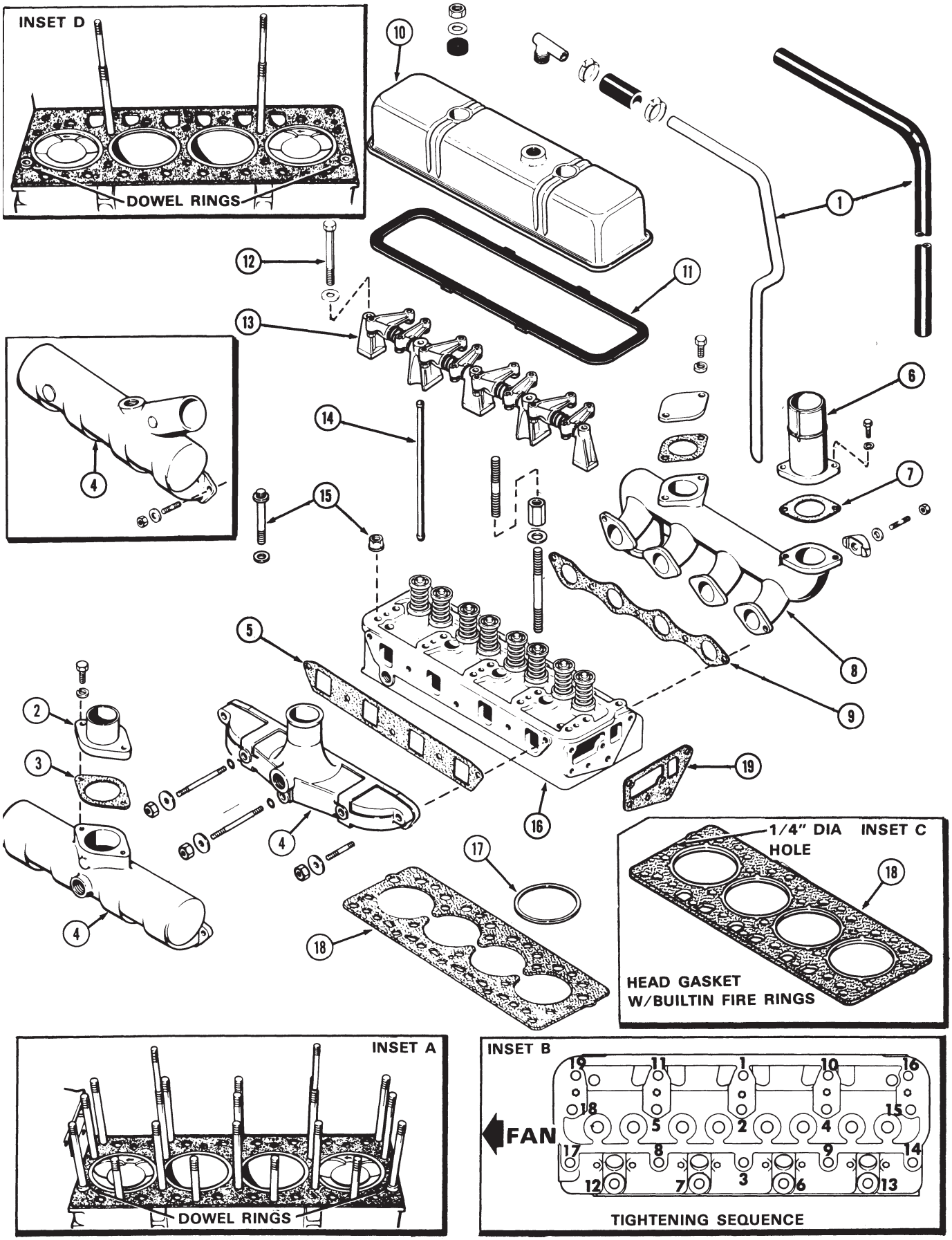

INSET D
DOWEL RINGS
10
1
12
11
13
6
14
7
4
15
5
8
9
2
3
19
4
16
17
18
1/4" DIA HOLE
INSET C
18
HEAD GASKET
W/BUILTIN FIRE RINGS
INSET A
DOWEL RINGS
INSET B
FAN
19 11 1 10 16
18 5 2 4 15
17 8 9 14
12 7 3 6 13
TIGHTENING SEQUENCE

Figure 7

ENGINE LUBRICATION

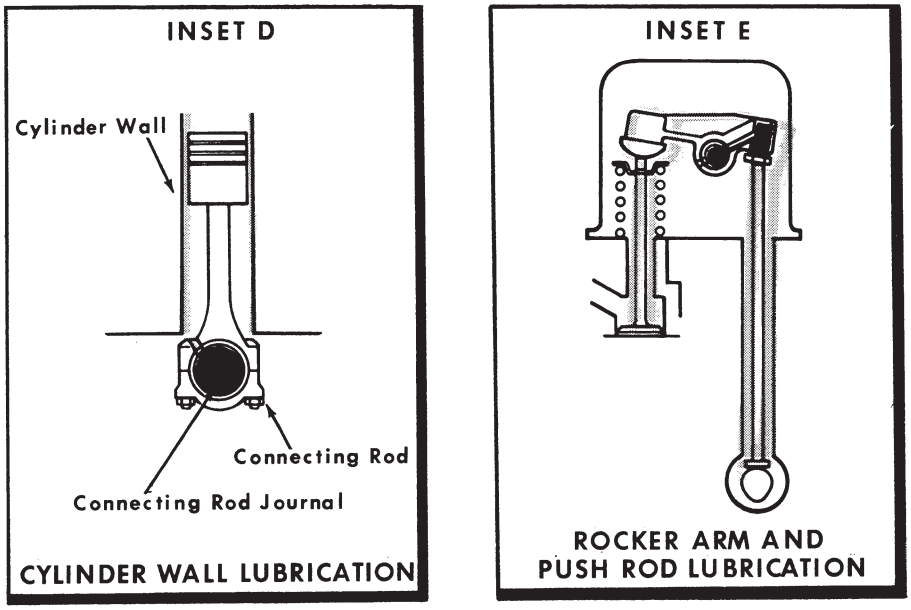
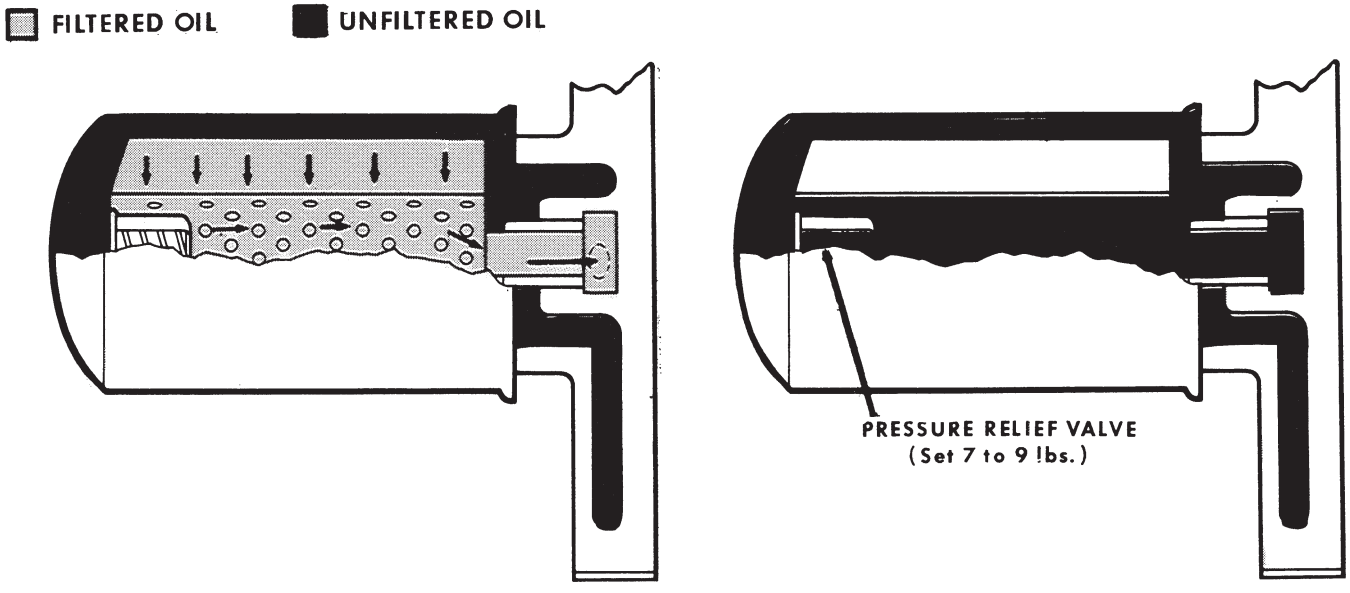


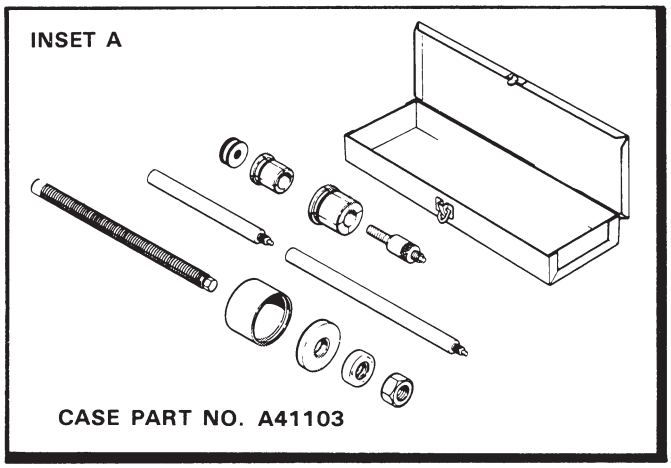
Figure 2

OIL FILTER



CLEAN OIL FILTER **PLUGGED OIL FILTER**

Figure 3


INSET A
CASE PART NO. A41103

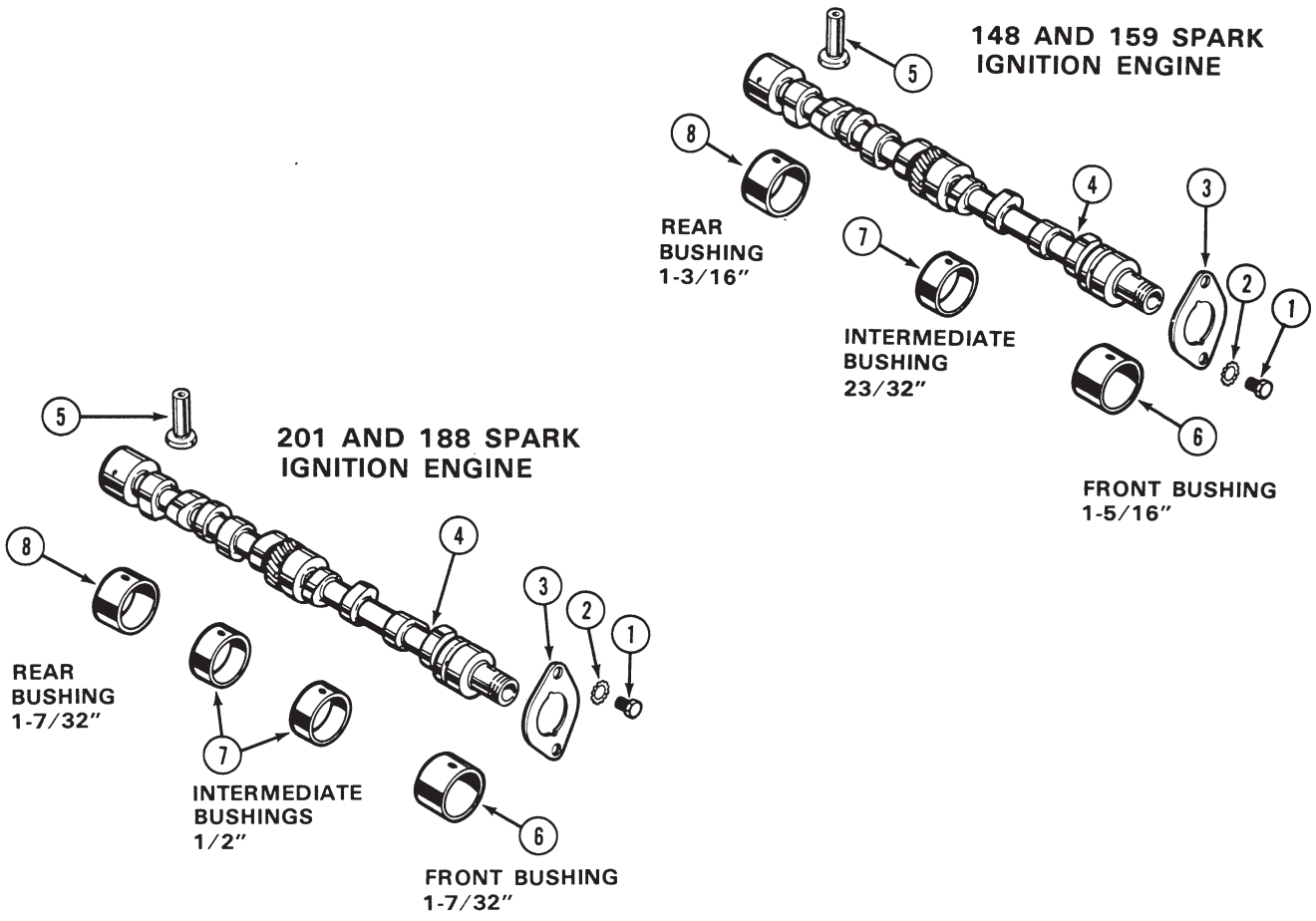

148 AND 159 SPARK IGNITION ENGINE
5
8
4
3
2
1
7
6
REAR BUSHING 1-3/16"
INTERMEDIATE BUSHING 23/32"
FRONT BUSHING 1-5/16"
201 AND 188 SPARK IGNITION ENGINE
5
8
4
3
2
1
7
6
REAR BUSHING 1-7/32"
INTERMEDIATE BUSHINGS 1/2"
FRONT BUSHING 1-7/32"

Figure 8

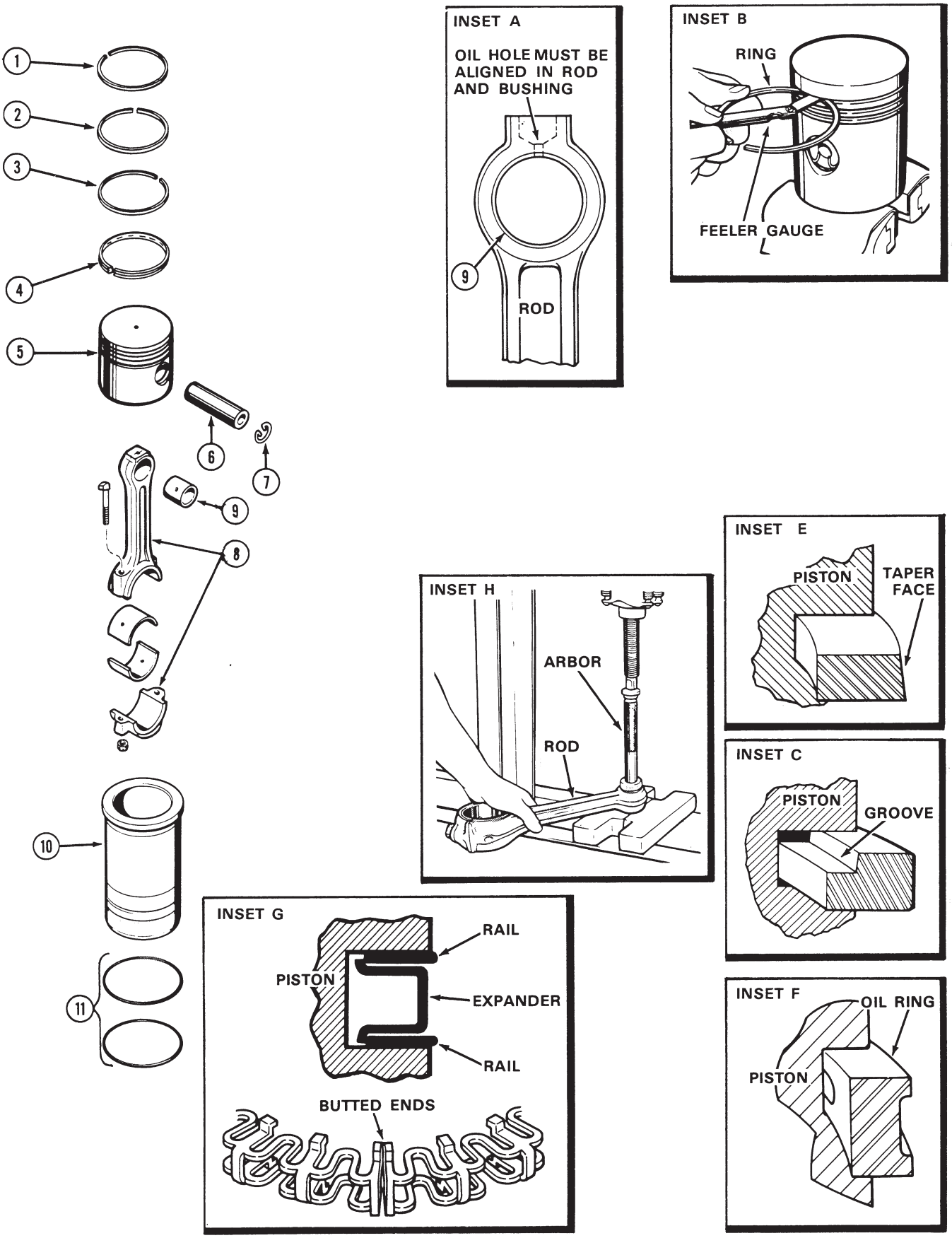
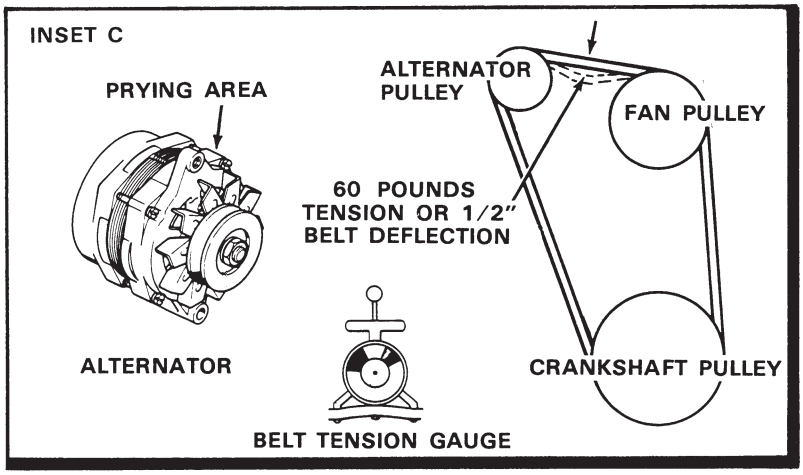

INSET A
OIL HOLE MUST BE ALIGNED IN ROD AND BUSHING
9
ROD
INSET B
RING
FEELER GAUGE
1
2
3
4
5
6
7
9
8
10
11
INSET H
ARBOR
ROD
INSET E
PISTON
TAPER FACE
INSET C
PISTON
GROOVE
INSET G
RAIL
PISTON
EXPANDER
RAIL
BUTTED ENDS
INSET F
OIL RING
PISTON

Figure 21


INSET C
PRYING AREA
ALTERNATOR PULLEY
FAN PULLEY
60 POUNDS TENSION OR 1/2" BELT DEFLECTION
ALTERNATOR
CRANKSHAFT PULLEY
BELT TENSION GAUGE

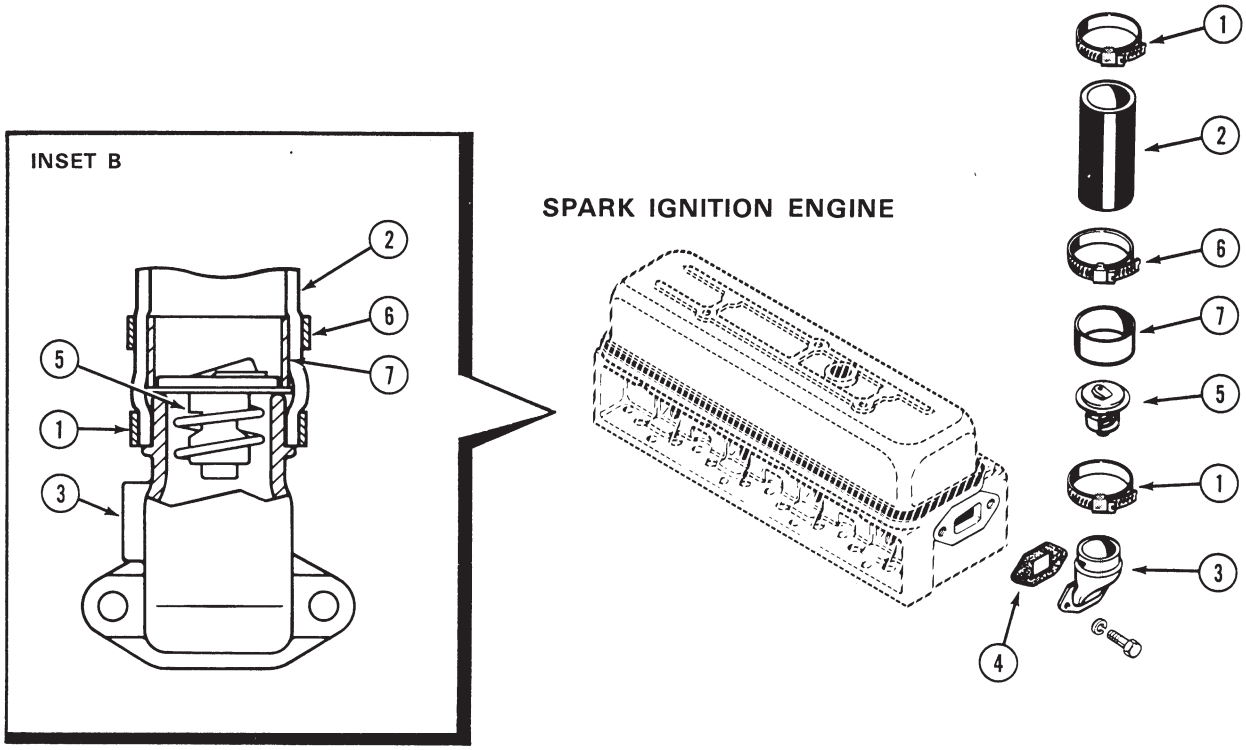

INSET B
SPARK IGNITION ENGINE
1
2
3
4
5
6
7

Figure 26

ENGINE LUBRICATION

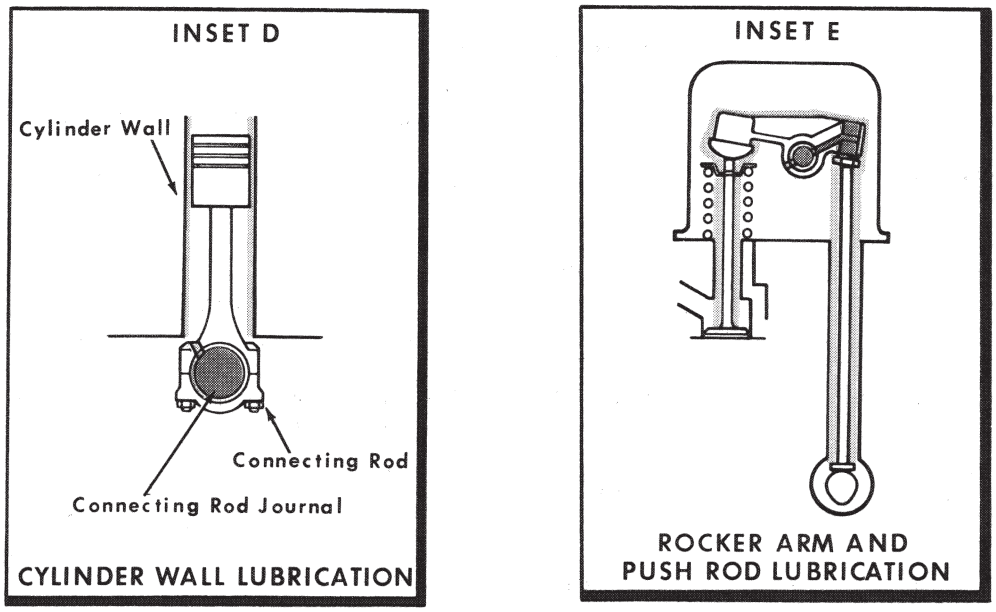


Figure 2

OIL FILTER

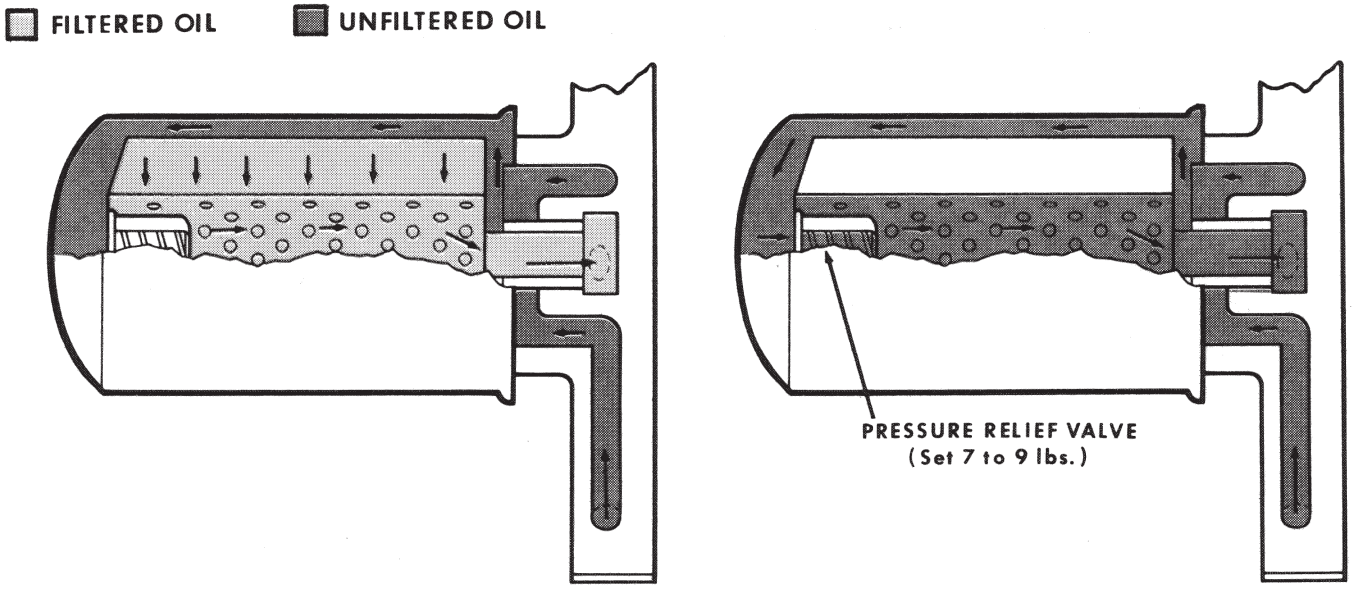


Figure 3

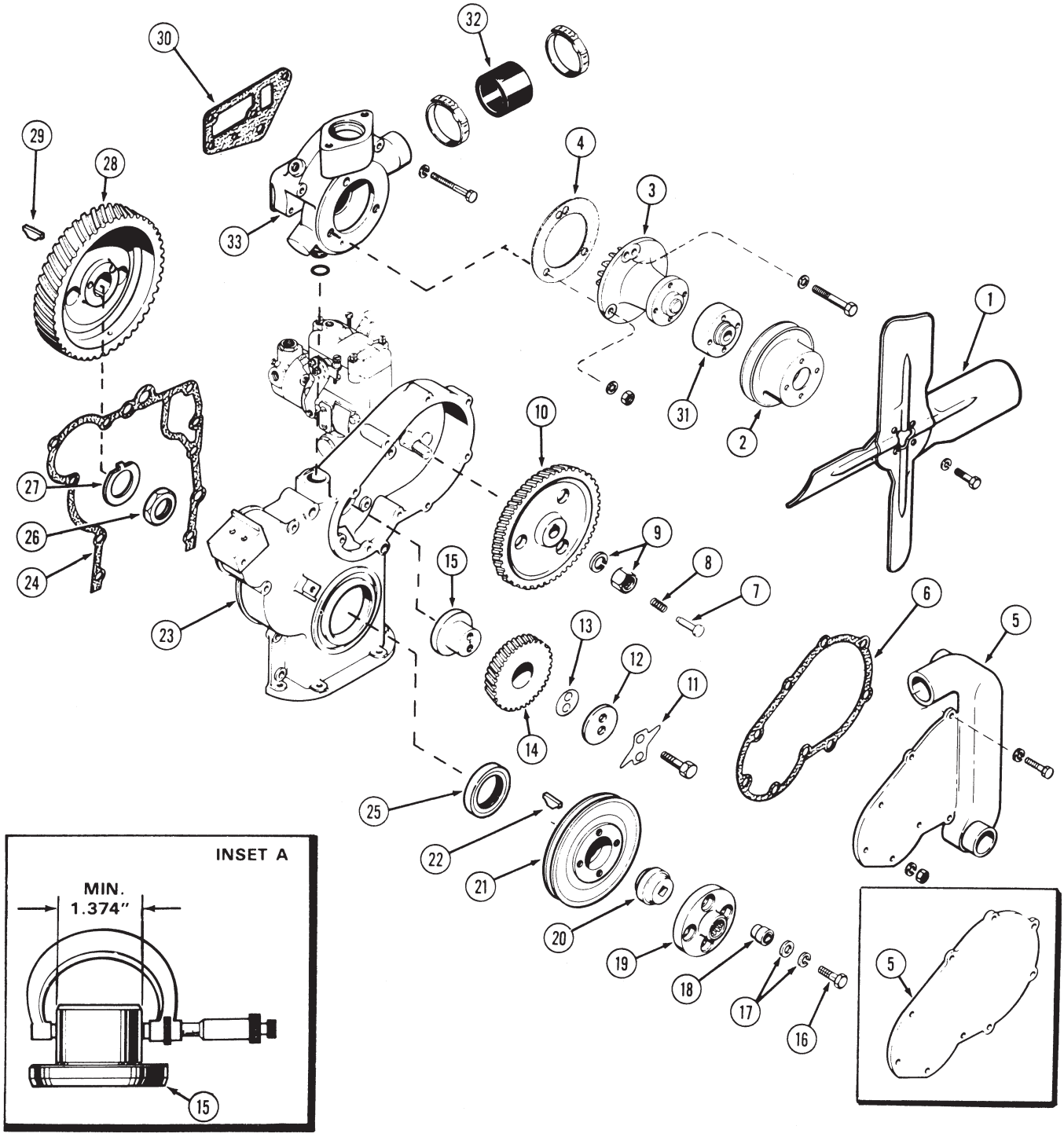

INSET A
MIN.
1.374"
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33

Figure 8

CYLINDER SLEEVES (Cont'd)

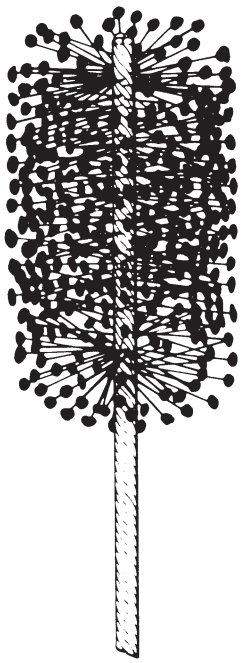
Deglazing

Figure 17 illustrates a self-centering power brush deglazer that can be used to remove the glaze formed on the inner surface of the cylinder sleeves.

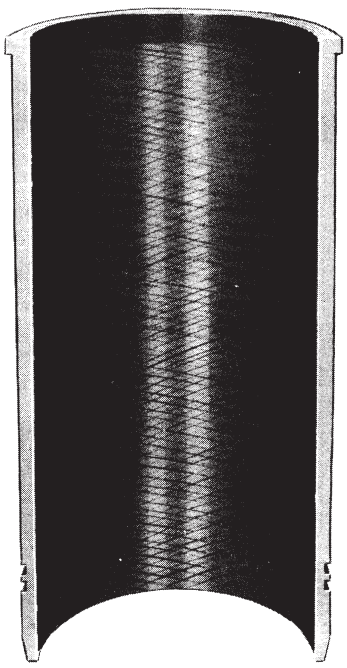
The glaze must be removed so that the piston rings can properly seat themselves within a reasonable period of run-in-time.

The necessary deglazing can be done by using 180 grit silicone carbide double spiral brush. The necessary size brush can be purchased from the J I Case Co. Service Parts Supply, Racine,Wisc.

Part No.	Bore Range
A42451	3.00″ thru 3.50″
A42452	3.50″ thru 4.00″



POWER BRUSH



CROSS HATCHED SLEEVE

Figure 17

Power the brush with a 3/8″ or 1/2″ drill with a 300 to 350 RPM speed and using a good grade of oil as a lubricant. The heavier the lubricant, the finer the finish.

The brush must be rotating before entering the cylinder sleeve and when removed to prevent scratches and to insure an even finish. This will also bring the cross hatching up and out on removal.

Actuating the brush up and down at a rate of 30 to 40 times per minute, a fast even and perfect cross hatch finish is obtained in 20 to 30 seconds, Figure 17.

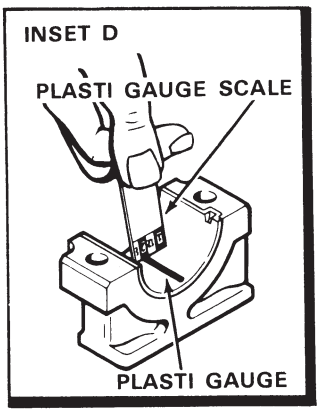
IMPORTANT: Use the following procedure to protect the engine from abrasives.

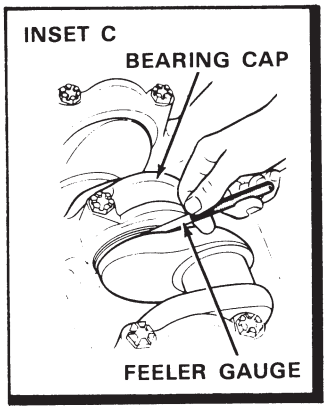
1. BEFORE BRUSH DEGLAZING:
   Cover the crankshaft journals with clean rags to prevent abrasives and dirt, resulting from the brushing operation, from dropping onto the crankshaft.

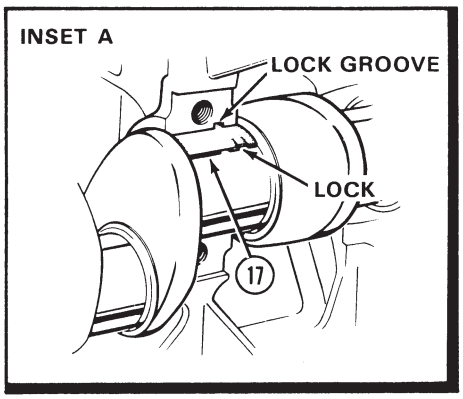
2. AFTER BRUSH DEGLAZING:
   Wipe as much of the abrasives from the cylinder sleeves as possible, then swab each sleeve with a clean cloth dampened in warm water and a mild detergent soap. After swabbing the sleeves with the damp cloth, wipe them out with SAE 10W engine oil.

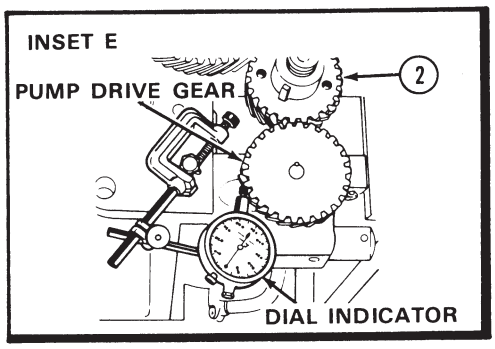
IMPORTANT: SWAB AND WIPE OUT THE CYLINDER SLEEVES UNTIL A CLEAN WHITE CLOTH WILL REMAIN ABSOLUTELY CLEAN WHEN IT IS RUBBED ON THE SLEEVE. ONE SWABBING - WIPING OPERATION IS NOT ENOUGH!

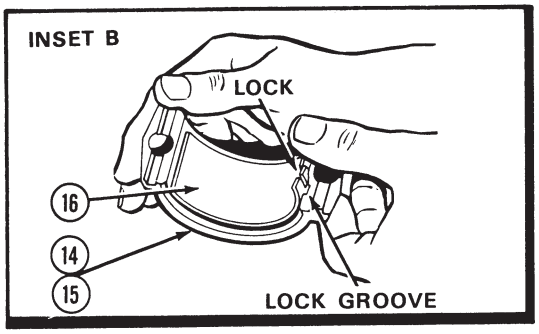
CAUTION: DO NOT USE GASOLINE, DIESEL FUEL OR KEROSENE TO CLEAN THE SLEEVES AS THIS WILL NOT REMOVE THE ABRASIVES FROM THE SURFACE OF THE SLEEVES.


INSET D
PLASTI GAUGE SCALE
PLASTI GAUGE


INSET C
BEARING CAP
FEELER GAUGE


INSET A
LOCK GROOVE
LOCK
17


INSET E
PUMP DRIVE GEAR
2
DIAL INDICATOR


INSET B
LOCK
16
14
15
LOCK GROOVE

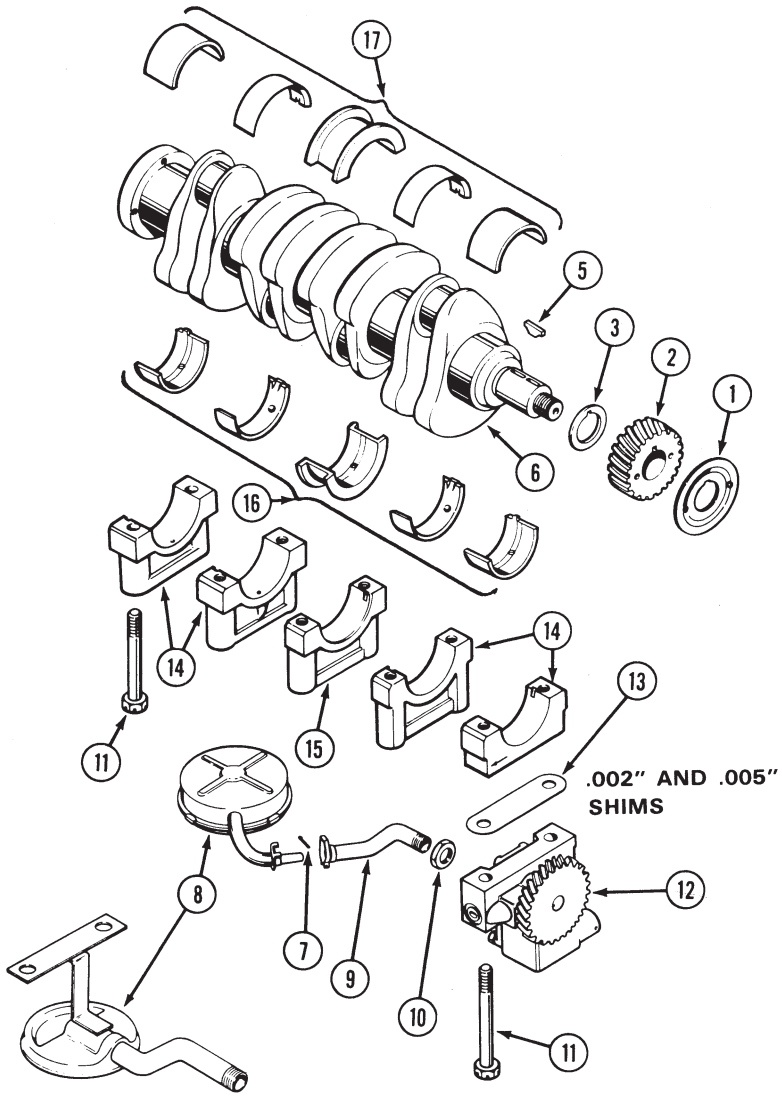

17
5
3
2
1
6
16
14
14
13
11
15
.002" AND .005"
SHIMS
8
12
7
9
10
11

Figure 26

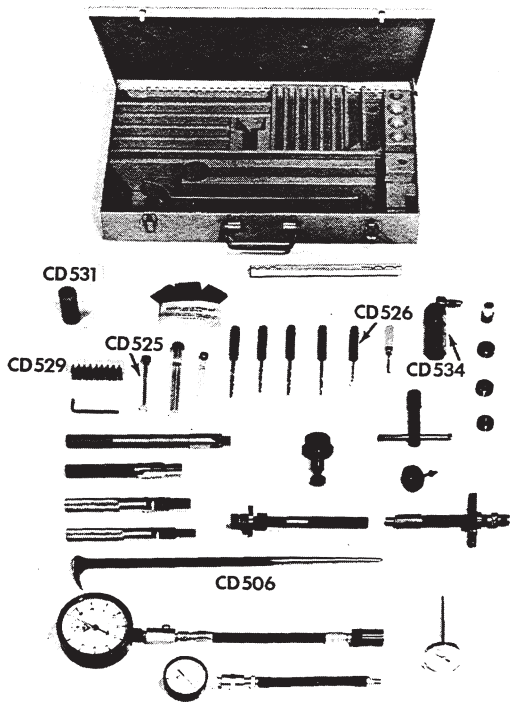


Figure I-2. Tools From CD 800 Tool Kit Required to Service C.A.V. Model BDLL-S Injectors

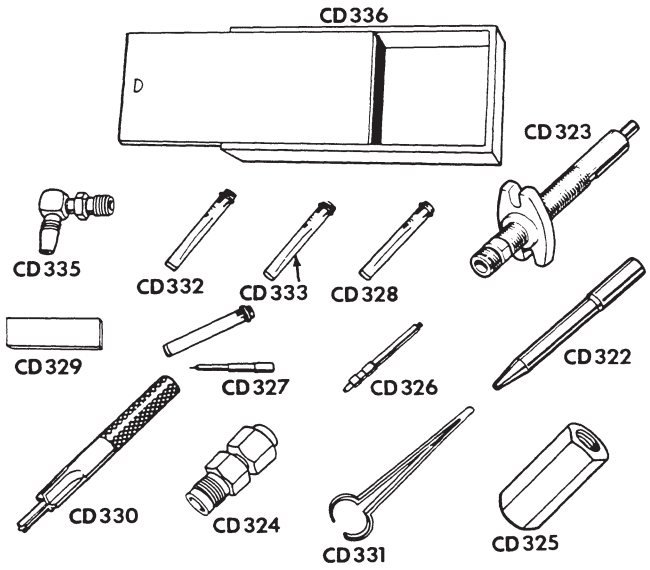


Figure I-3. CD 350 Tool Kit All Tools Required For Servicing C.A.V. Model BDLL-S Injectors and Roosa Master Model DB Injection Pump

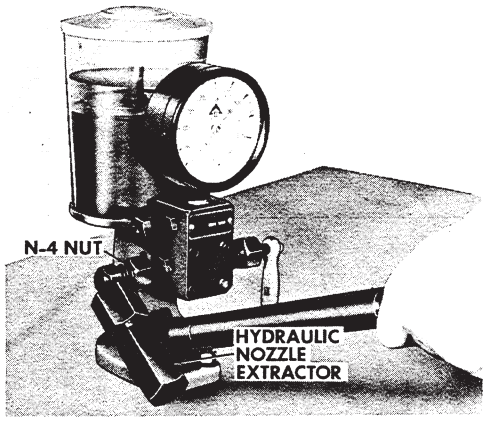


Figure I-18

IMPORTANT

If the Nozzle Valve cannot be freed by the 4500 to 5000 PSI developed by the test stand, the nozzle valve assembly should be discarded as the Nozzle Valve and Body are probably scored.

Cleaning Nozzle Assembly

1. Remove the nozzle valve from the nozzle body, Figure I-19, usually this can be done with the fingers. If it cannot, it will be necessary to soak nozzle assembly in some sort of a carbon solvent to loosen gum and carbon. Place nozzles on a felt pad in a container to prevent polished surfaces from contacting container.

NOTE Do not attempt to pull the valve out with pliers. This may damage valve and body beyond repair. ATTENTION: Each nozzle body and valve are a mated assembly, therefore be extra careful that nozzle bodies and valves are not mixed after disassembly.

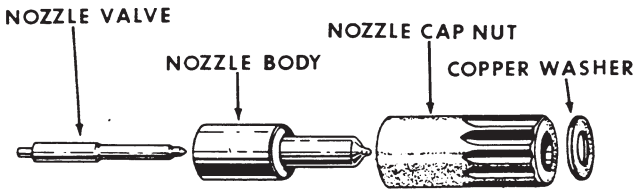


Figure I-19

2. Remove all carbon with a brass wire brush as shown in Figure I-20. Place body in solvent or fuel oil to loosen carbon if necessary.

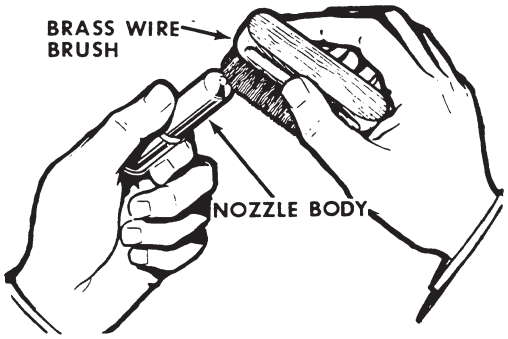


Figure I-20

NOTE Examine nozzle to see that it is not "blued" due to overheating. All polished surfaces must be relatively bright without scratches or dull patches. Nozzles that don't meet these requirements must be replaced.

3. Clean out the small feed channel with a small drill or wire, Figure I-21. These bores are rarely plugged, and insertion of a drill or wire by hand will be sufficient.

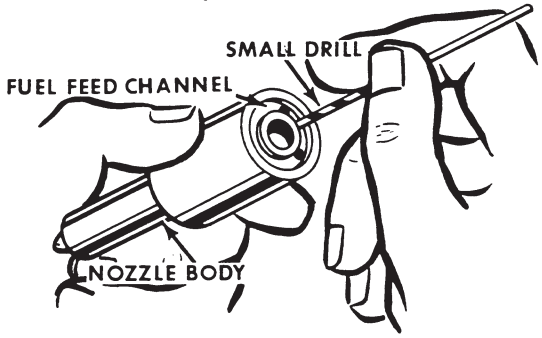


Figure I-21

Section

3022

ROOSA MASTER

MODEL DB FUEL INJECTION PUMPS

188 SERIES DIESEL ENGINES

TABLE OF CONTENTS

Special Torques

High pressure fuel line connection screws	35 ft. lbs.
Fuel inlet filter assembly	20 ft. lbs.

Section

3033

MODEL 267 SERIES ZENITH CARBURETOR FOR THE 188G AND 159G SPARK IGNITION ENGINES

Rac 9-77016

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CASE CORPORATION

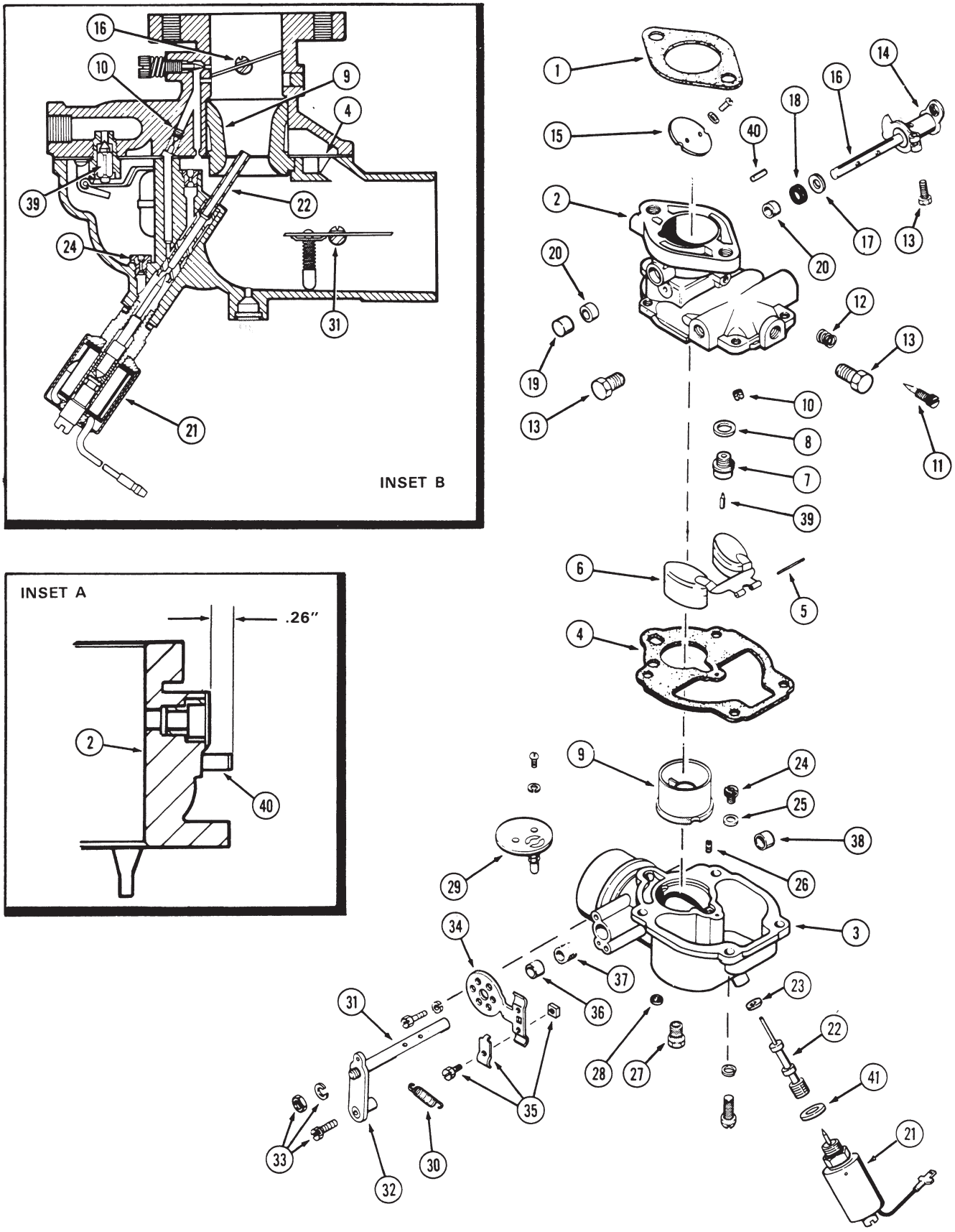

Figure 5

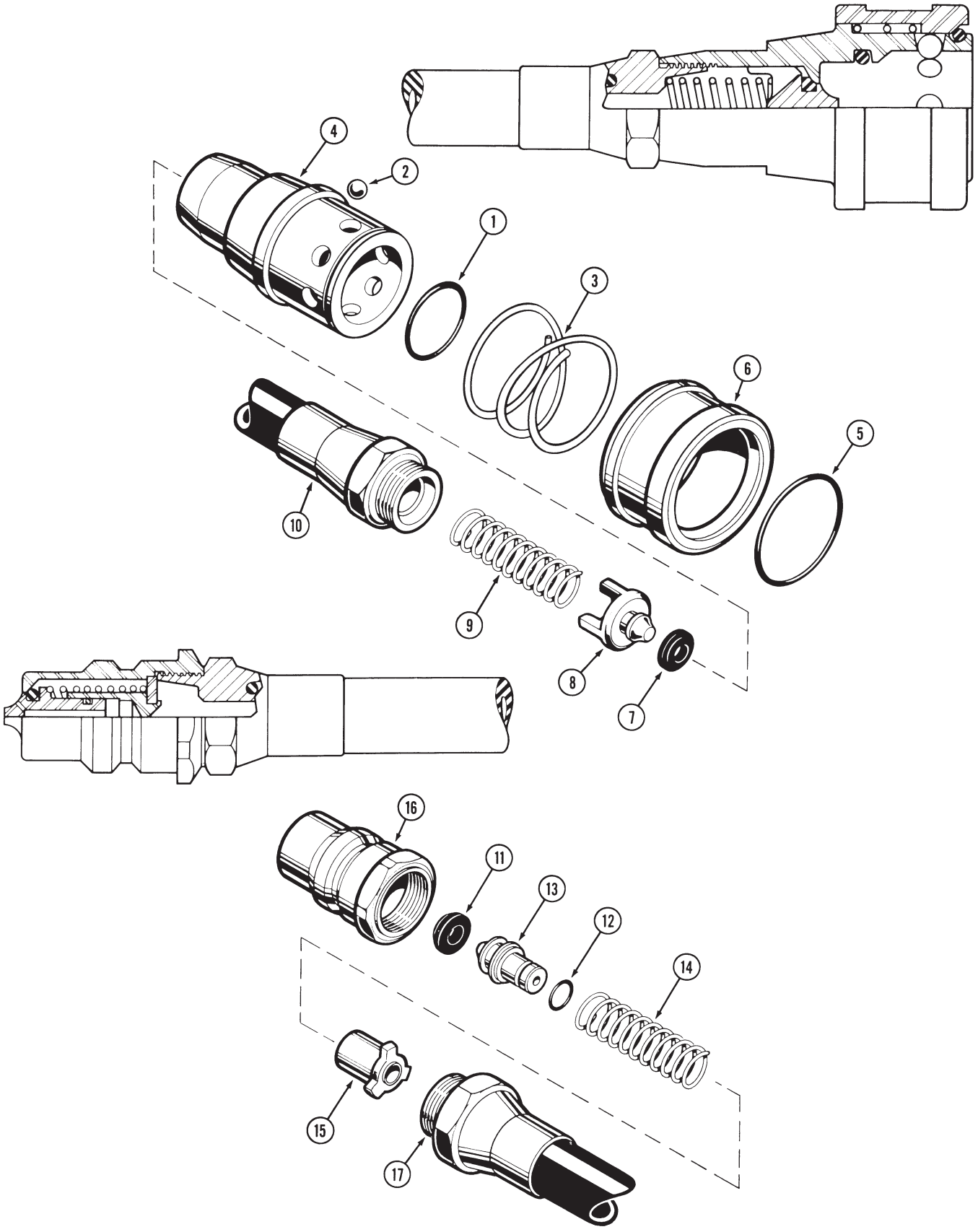

Figure 1

SECTION

D

SERVICING THE

REMOTE HYDRAULIC VALVES

Rac. Form 9-75521

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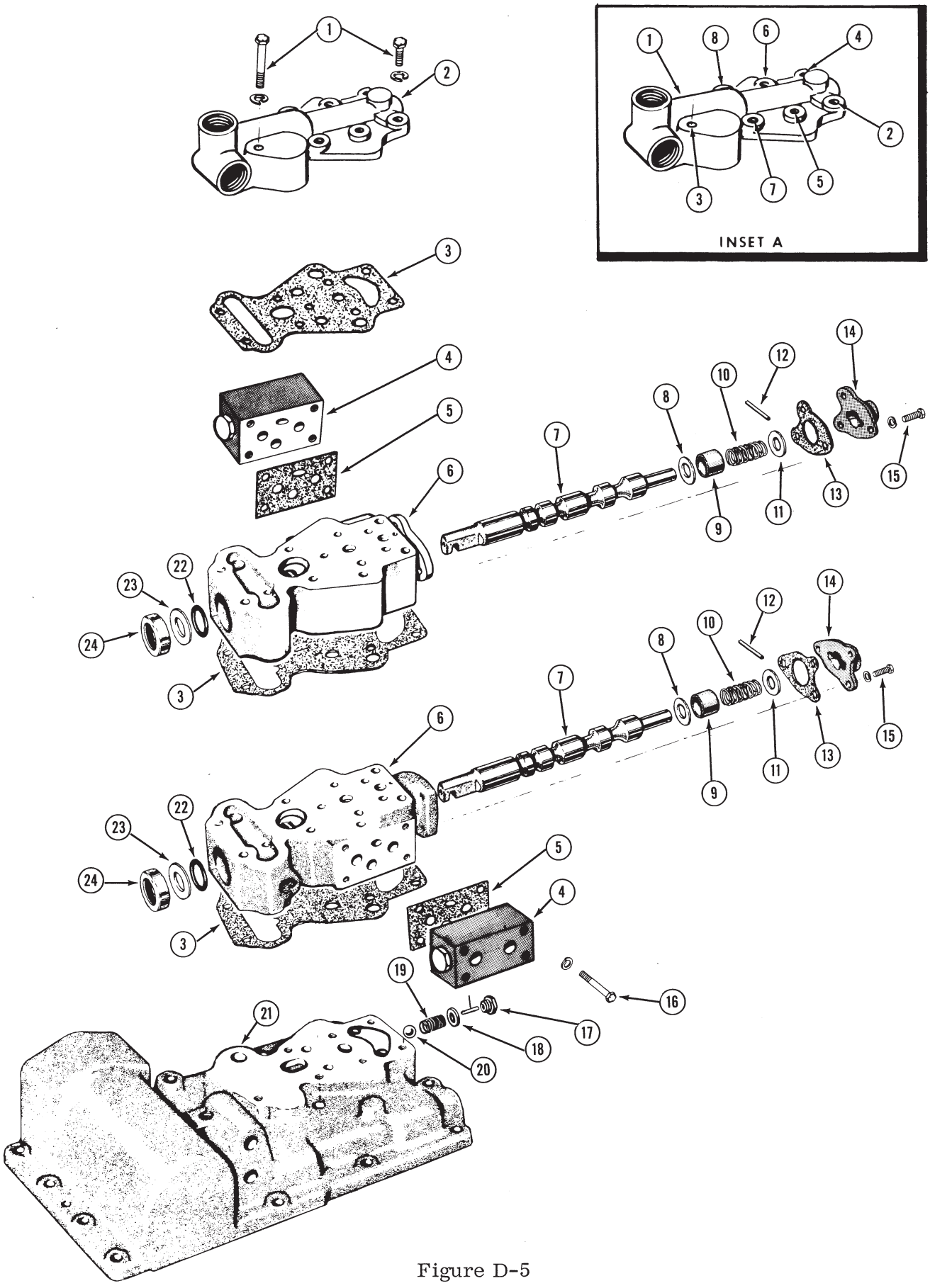


Figure D-5

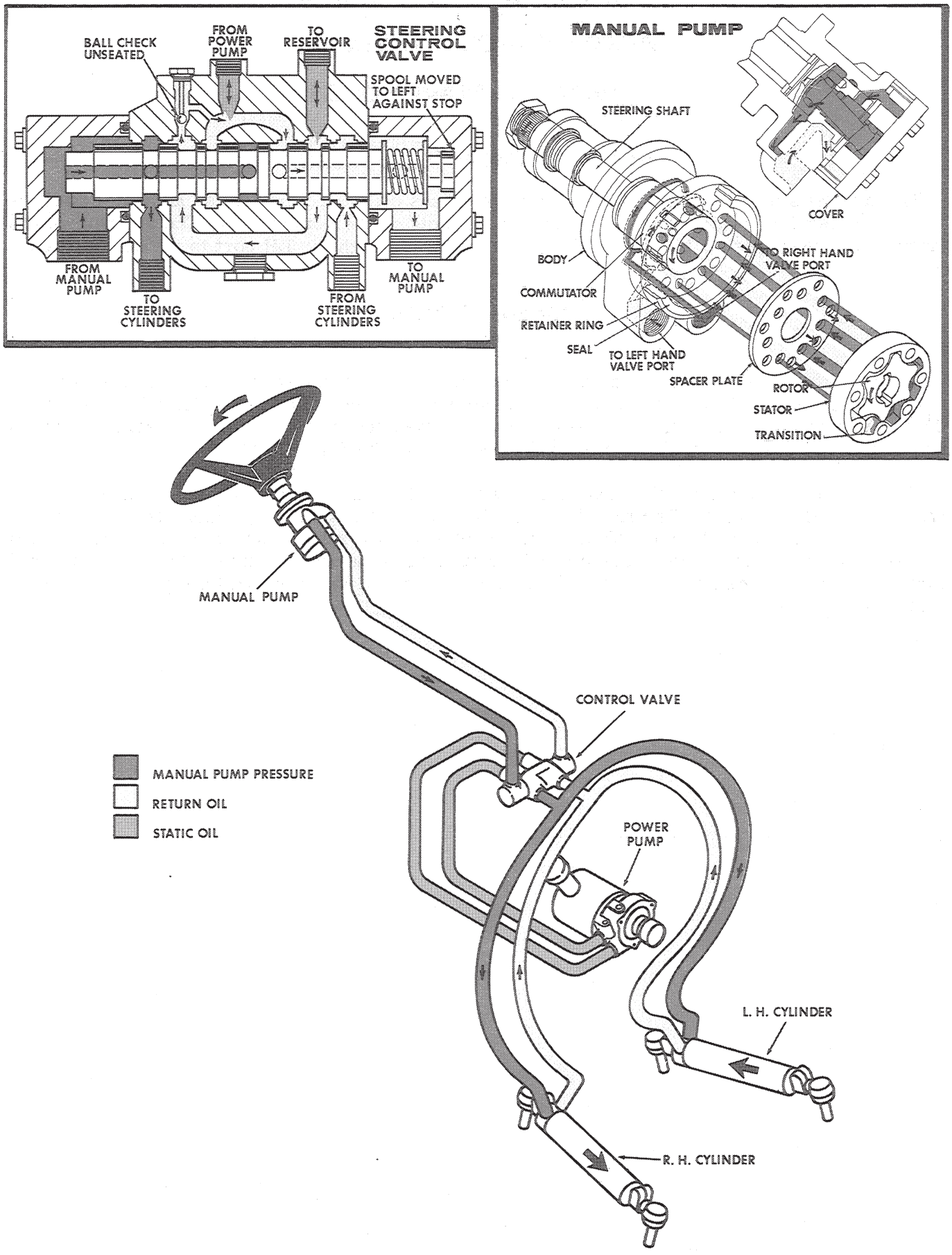

STEERING CONTROL VALVE
BALL CHECK UNSEATED
FROM POWER PUMP
TO RESERVOIR
SPOOL MOVED TO LEFT AGAINST STOP
FROM MANUAL PUMP
TO STEERING CYLINDERS
FROM STEERING CYLINDERS
TO MANUAL PUMP
MANUAL PUMP
STEERING SHAFT
COVER
BODY
TO RIGHT HAND VALVE PORT
COMMUTATOR
RETAINER RING
SEAL
TO LEFT HAND VALVE PORT
SPACER PLATE
ROTOR
STATOR
TRANSITION
MANUAL PUMP
CONTROL VALVE
MANUAL PUMP PRESSURE
RETURN OIL
STATIC OIL
POWER PUMP
L. H. CYLINDER
R. H. CYLINDER

Figure O-4

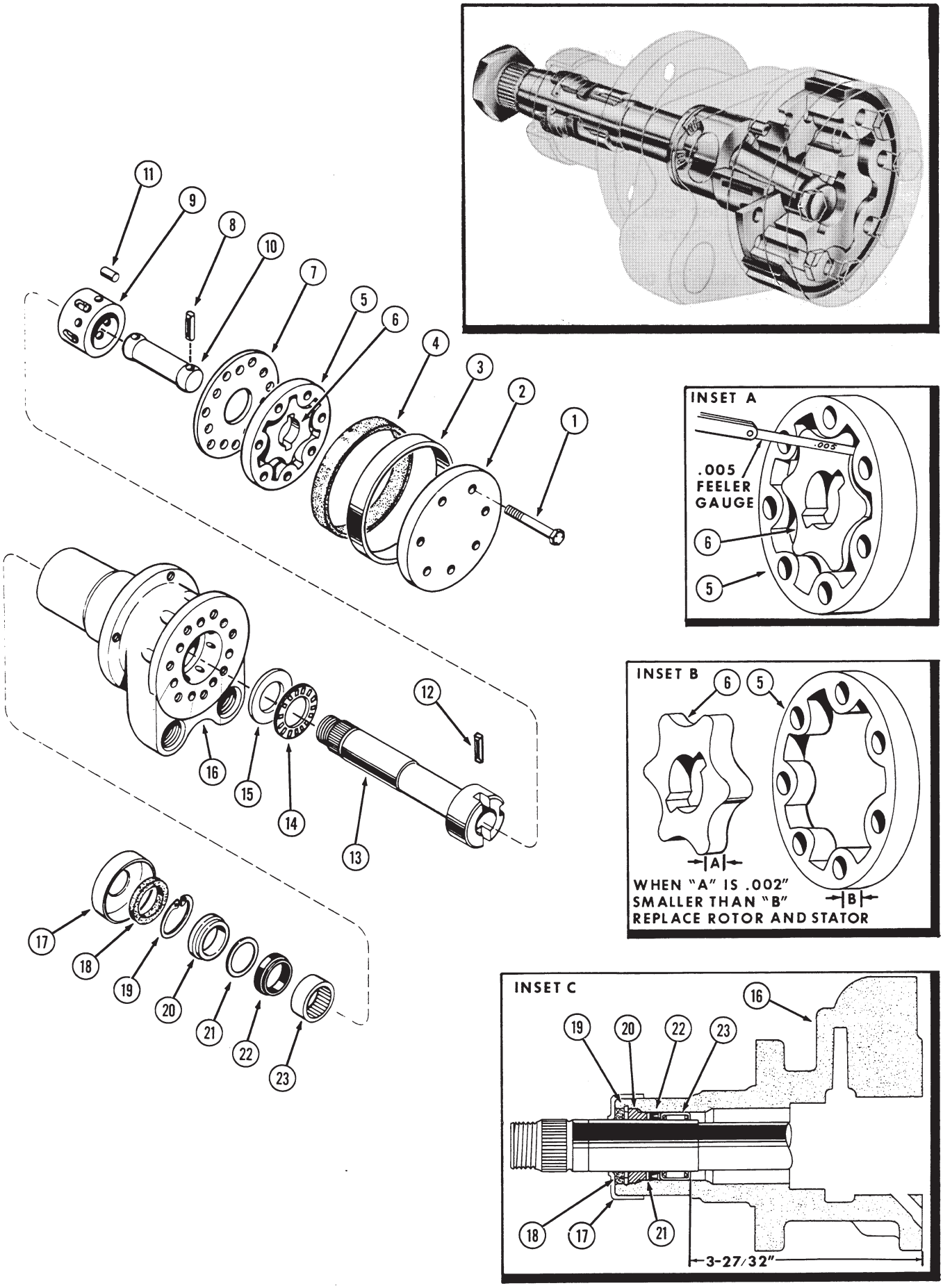
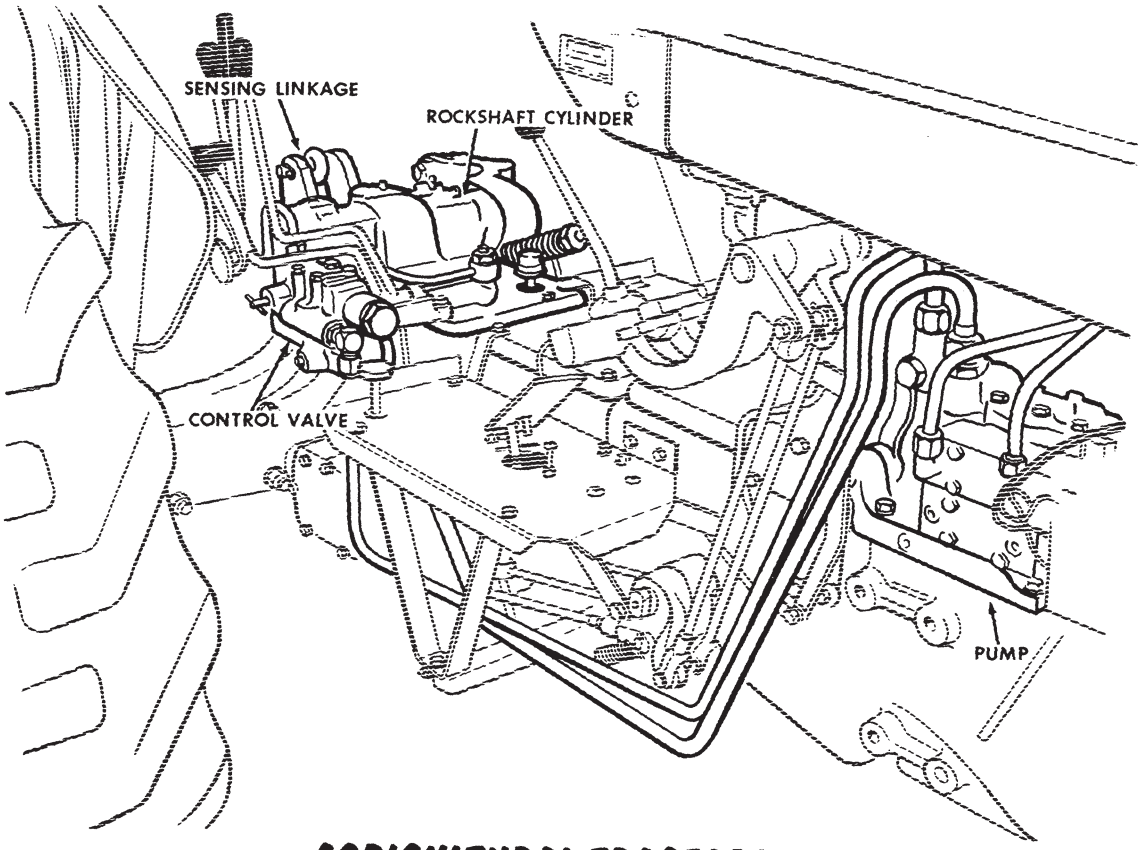

INSET A
.005
FEELER
GAUGE
INSET B
WHEN "A" IS .002"
SMALLER THAN "B"
REPLACE ROTOR AND STATOR
INSET C
3-27/32"

Figure O-9

CONSTRUCTION KING TRACTORS



AGRICULTURAL TRACTORS

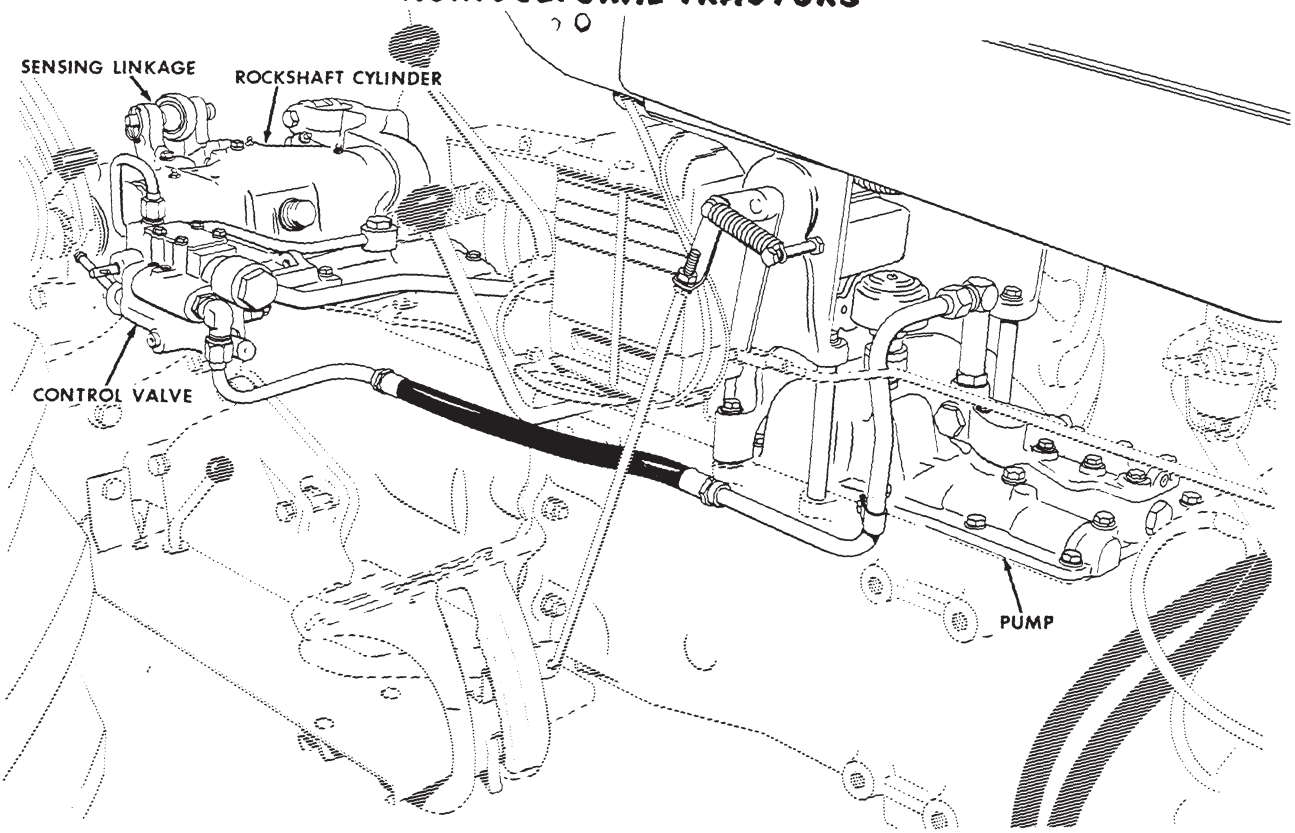


Figure R-2

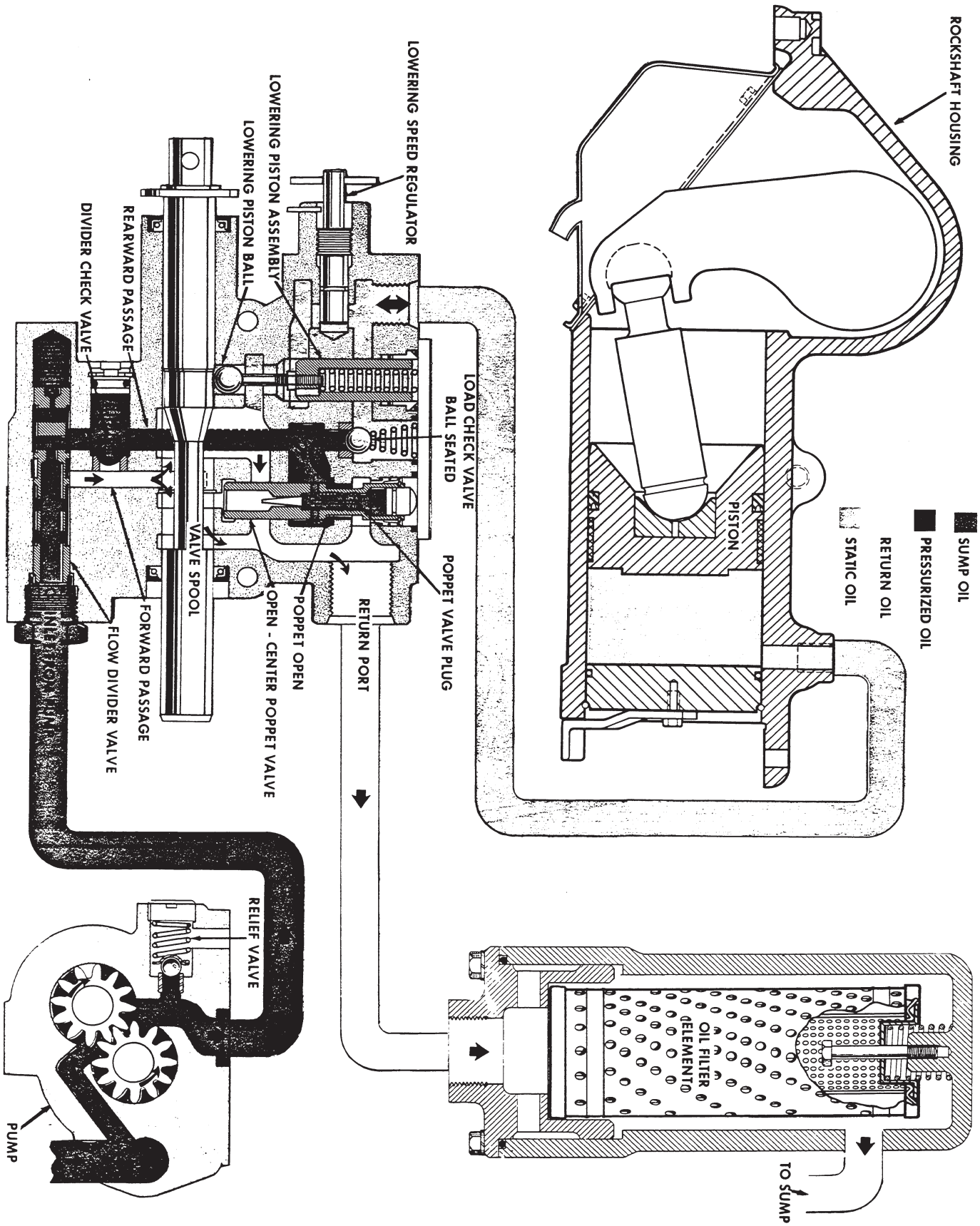
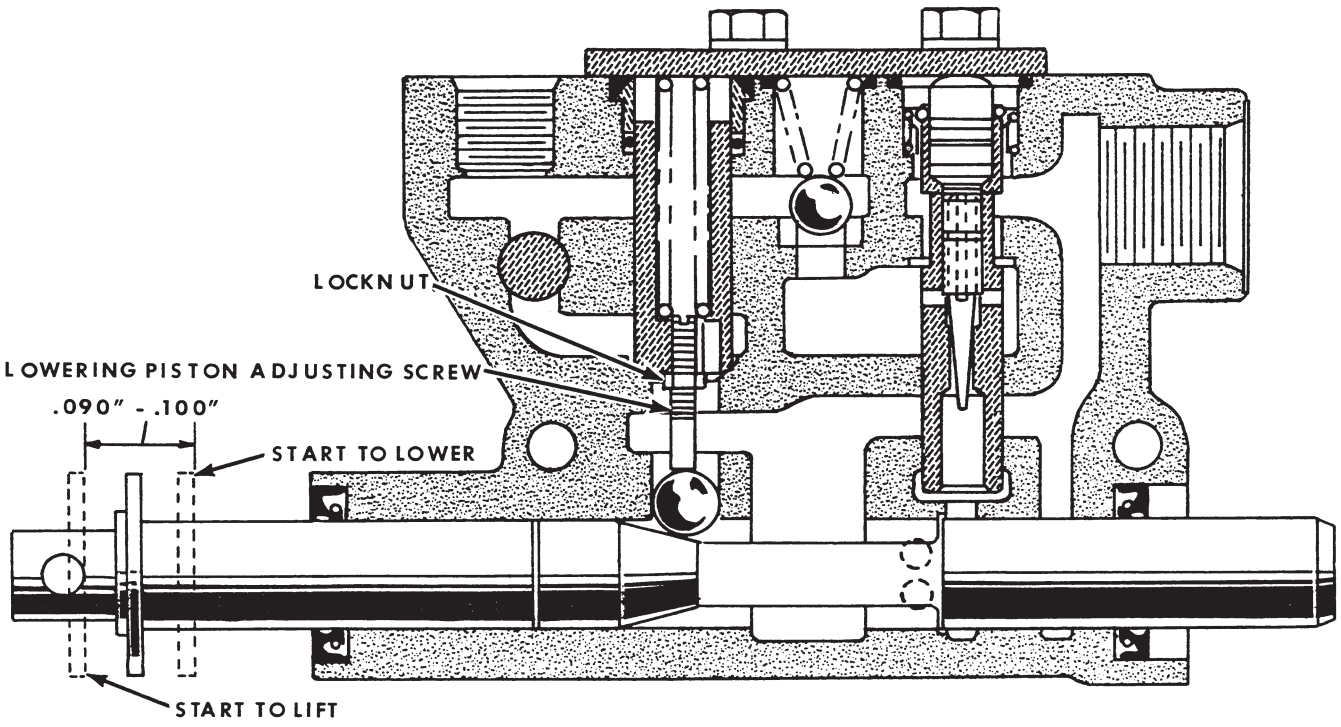

ROCKSHAFT HOUSING
SUMP OIL
PRESSURIZED OIL
RETURN OIL
STATIC OIL
PISTON
LOWERING SPEED REGULATOR
LOWERING PISTON ASSEMBLY
LOWERING PISTON BALL
REARWARD PASSAGE
DIVIDER CHECK VALVE
LOAD CHECK VALVE
BALL SEATED
POPPET VALVE PLUG
VALVE SPOOL
POPPET OPEN
OPEN - CENTER POPPET VALVE
RETURN PORT
FORWARD PASSAGE
FLOW DIVIDER VALVE
RELIEF VALVE
PUMP
OIL FILTER ELEMENT
TO SUMP

Figure R-7

VALVE LOWERING PISTON ADJUSTMENT



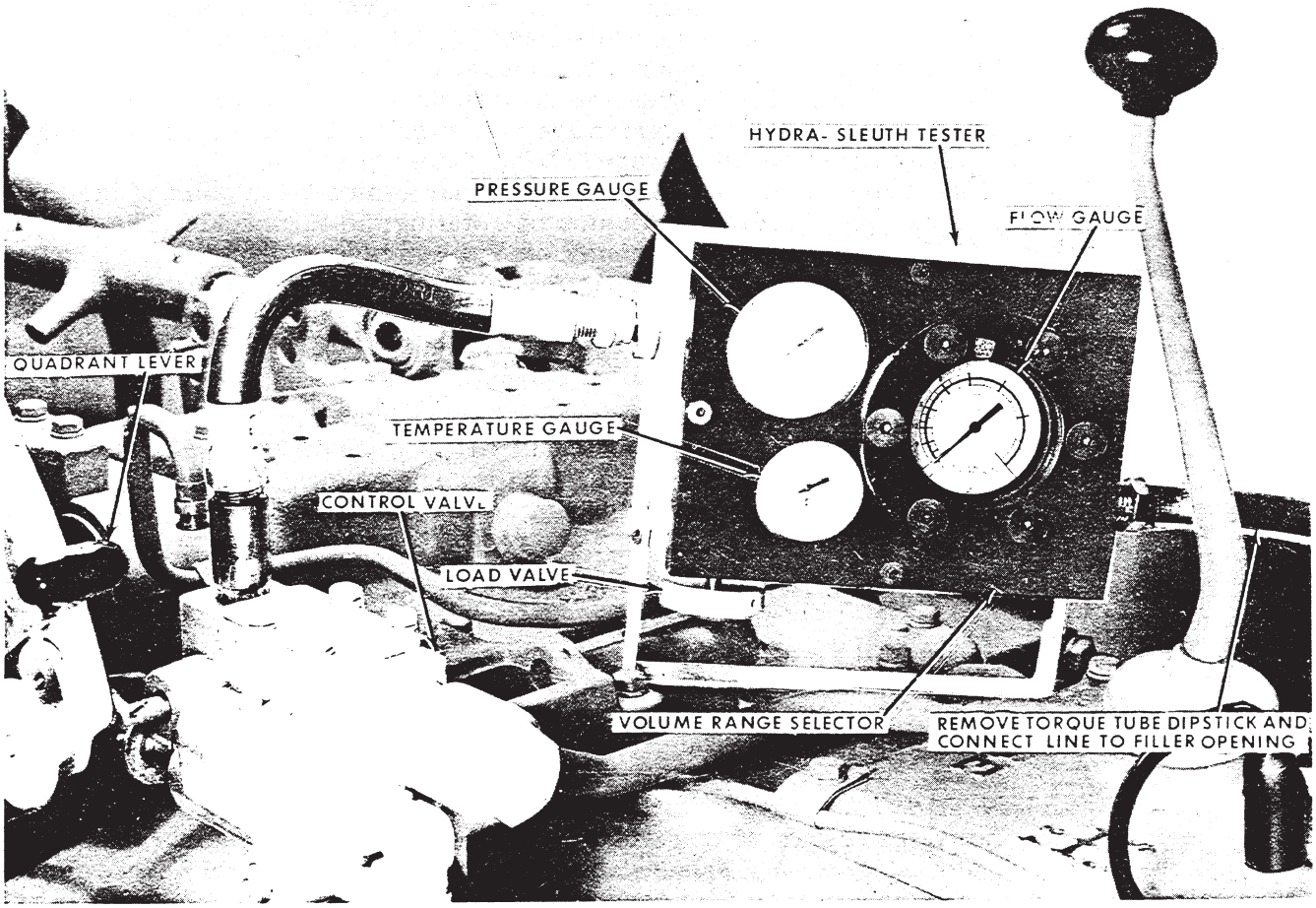


Figure R-11

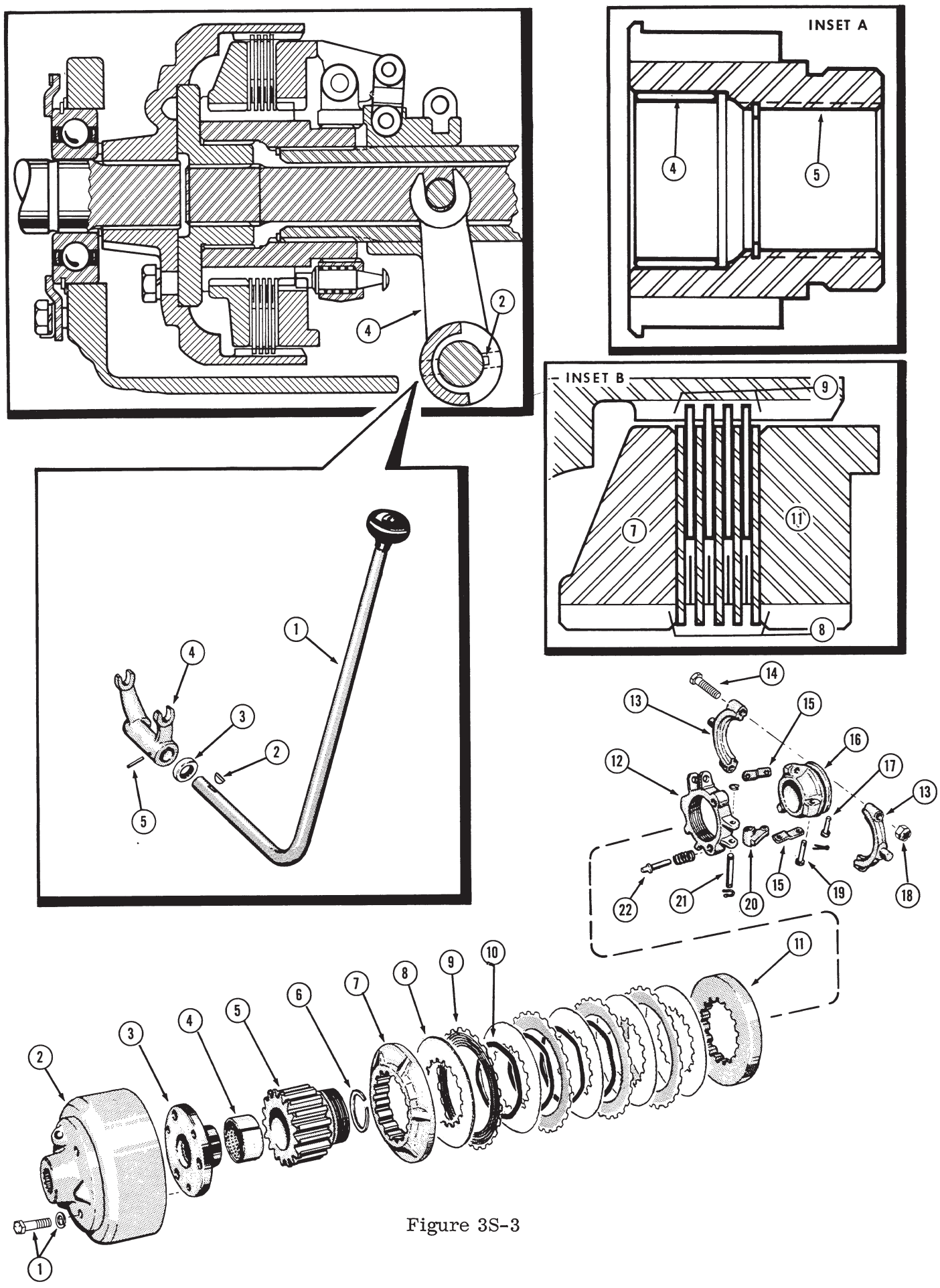


Figure 3S-3

FOUR SPEED SHUTTLE

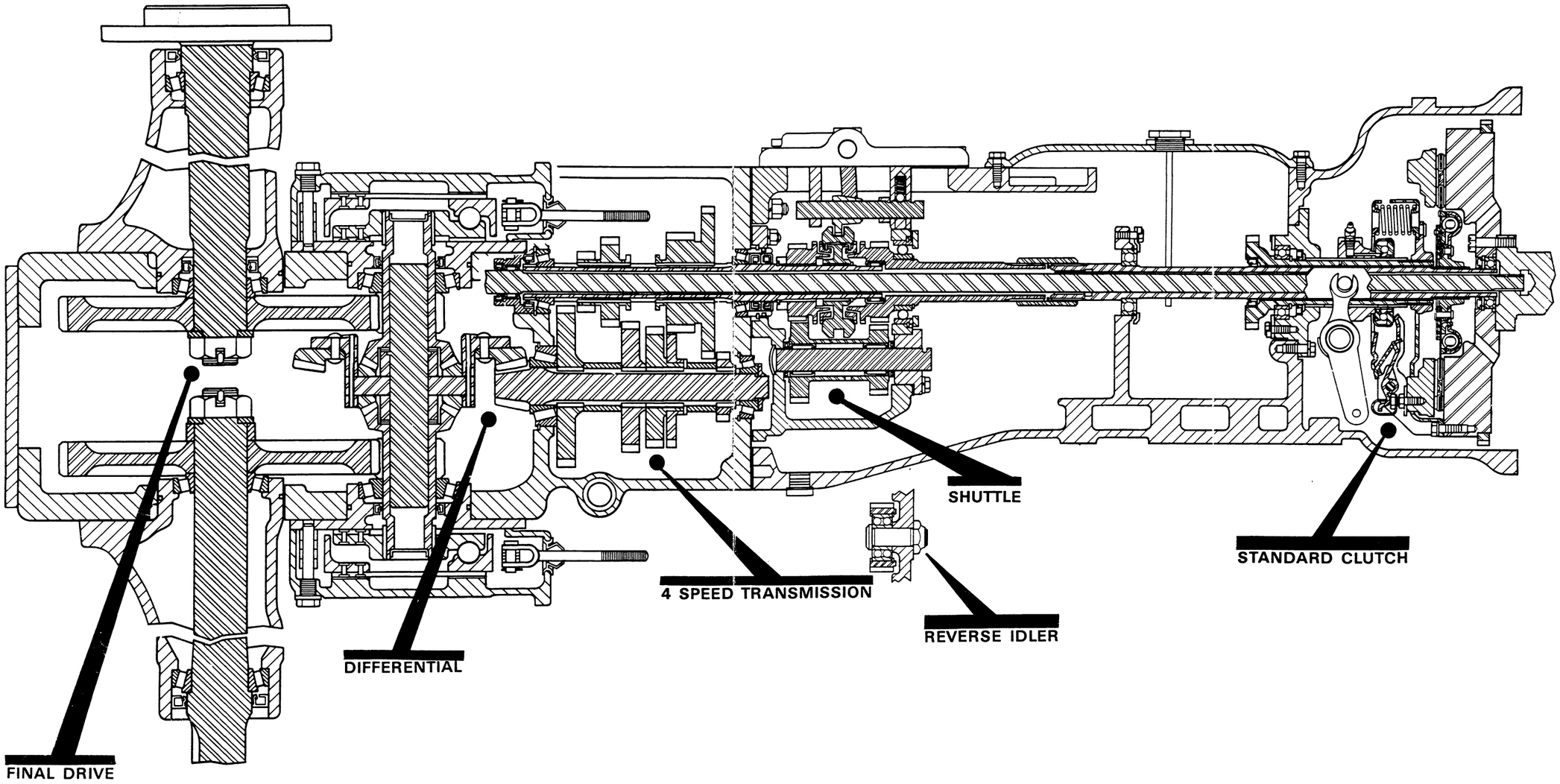


Figure 3

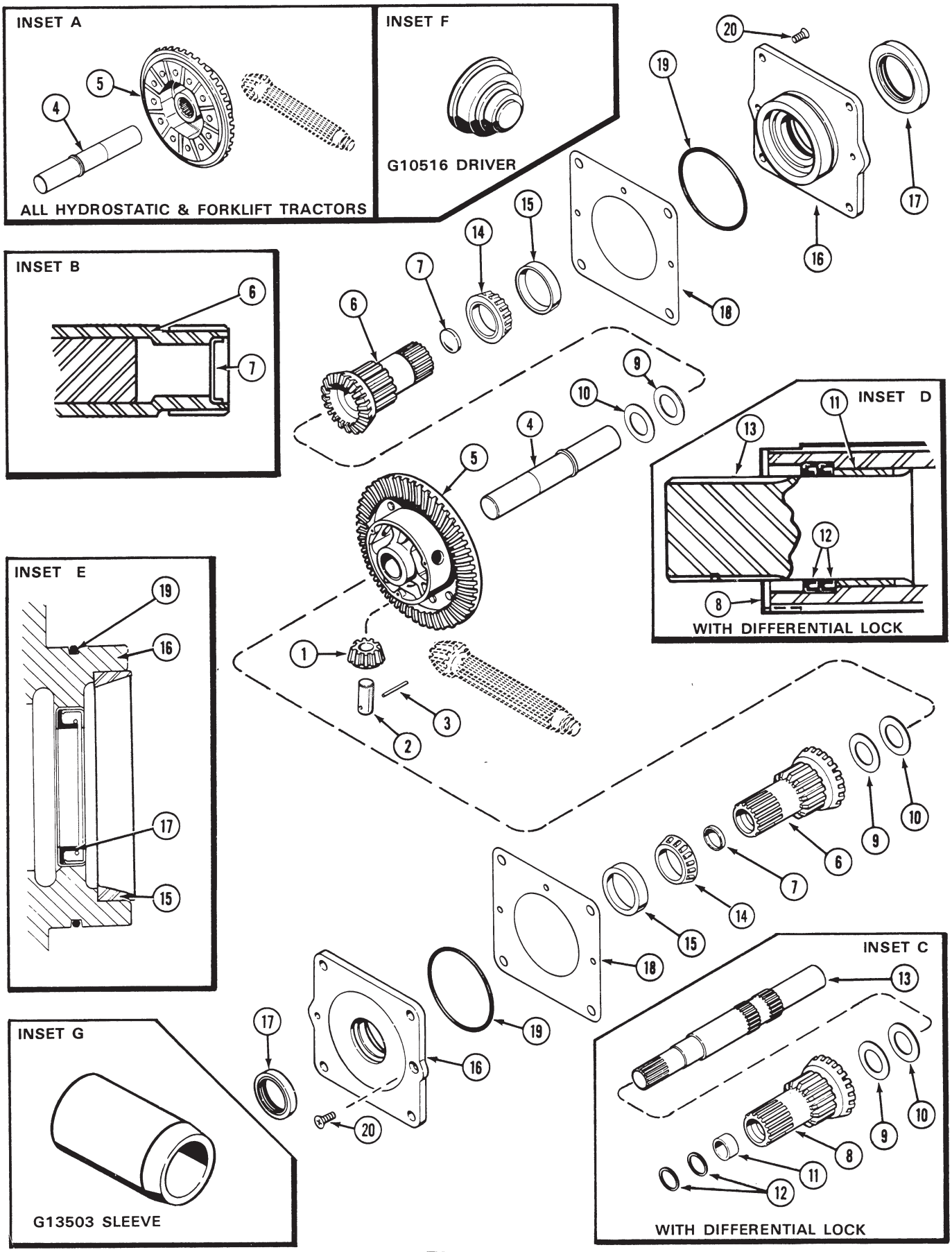
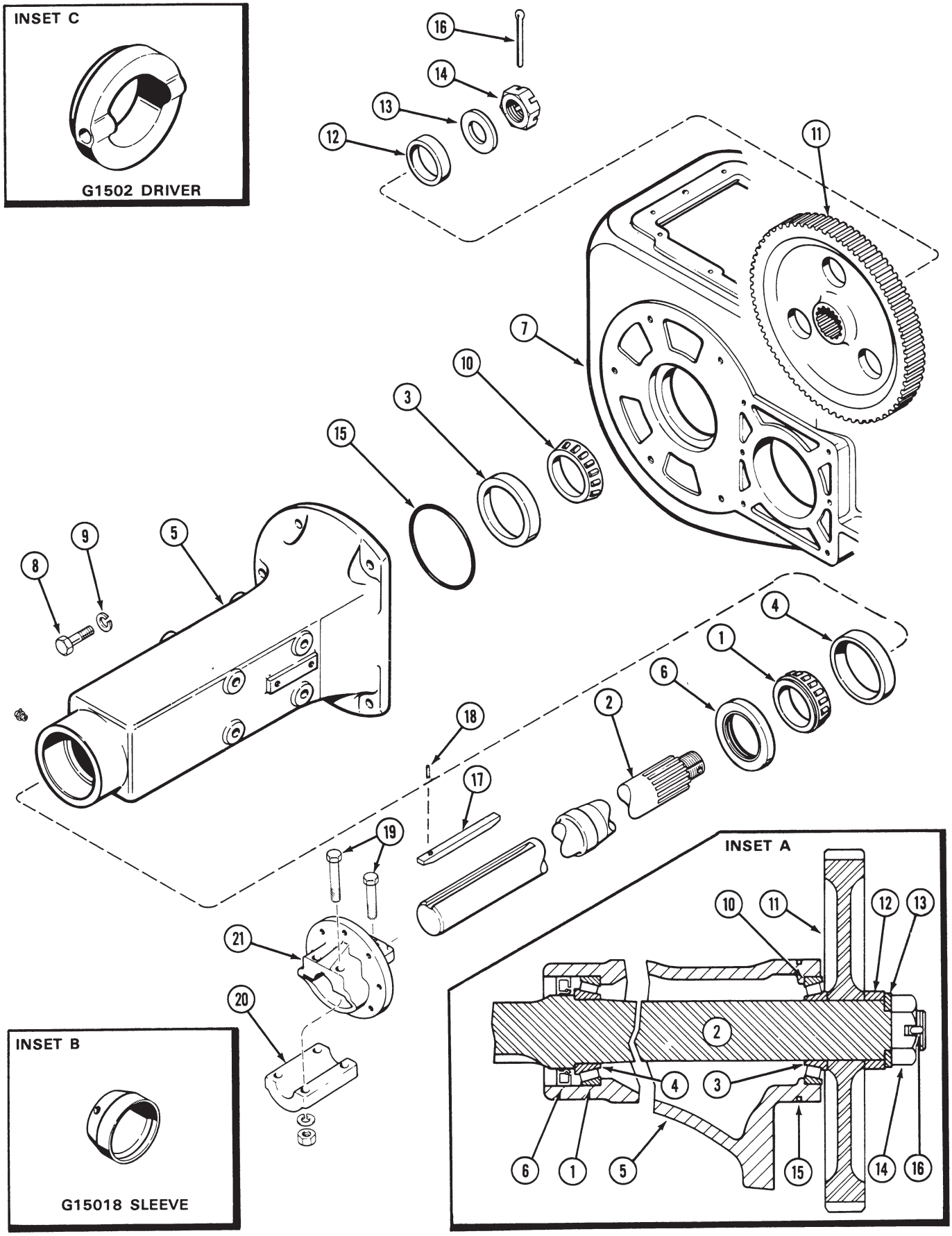

INSET A
ALL HYDROSTATIC & FORKLIFT TRACTORS
INSET F
G10516 DRIVER
INSET B
INSET D
WITH DIFFERENTIAL LOCK
INSET E
INSET G
G13503 SLEEVE
INSET C
WITH DIFFERENTIAL LOCK

Figure 8


INSET C
G1502 DRIVER
INSET B
G15018 SLEEVE
INSET A
16
14
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12
11
7
10
3
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9
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4
1
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14
16

Figure 13

GENERAL DESCRIPTION

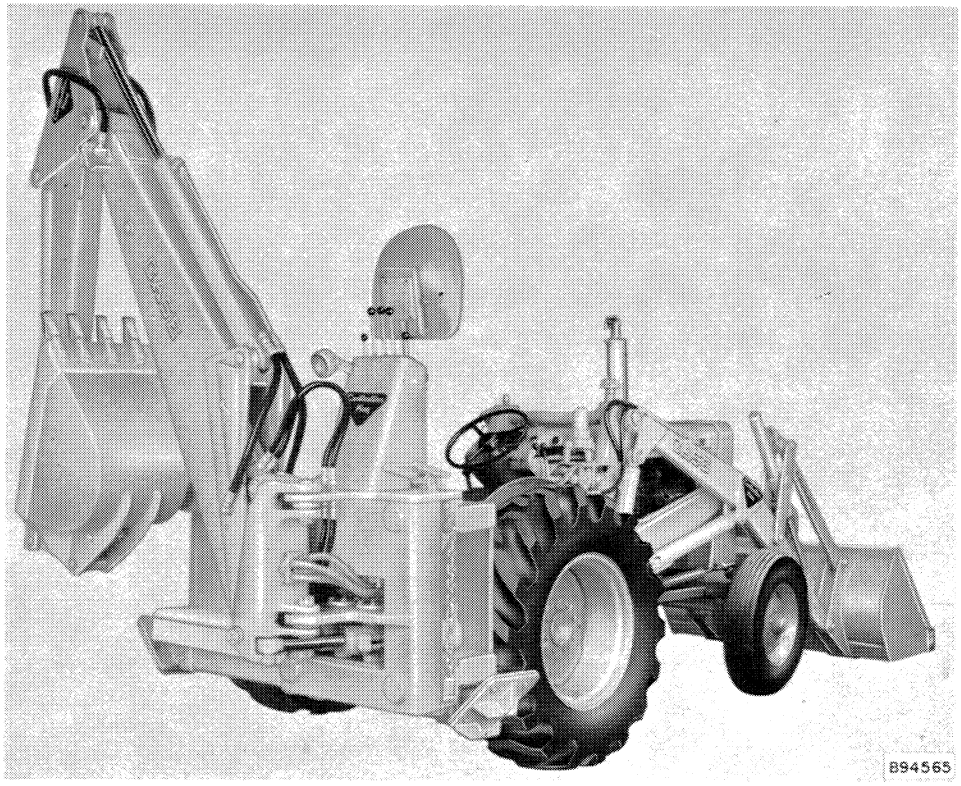

Figure 1 - Model 32S Side Shift Backhoe

This backhoe, in addition to its outstanding digging characteristics, can be shifted from side to side.

The backhoe can be shifted in either direction without the operator leaving his seat. The total amount of shift from one side to the other is 46 inches.

Once shifted, the backhoe is held in position by four hydraulic locks. The locks are pressurized when the bucket is extended. Thus the hydraulic locks are frequently repressurized during backhoe operation, virtually eliminating any possibility of slippage.

The sliding frame consists of two 6" x 6-7/8" "U" channels, braced at the top and center with 1" thick bracket weldments and at the bottom by a 3/4" support weldment.

The six-section control valve, located in the mounting frame, regulates and controls the hydraulic operation of the backhoe. This valve contains a regenerative system that eliminates cavitation (voids). Parts subject to high "mechanically" produced pressures are protected by secondary relief valves. Operation of this valve is explained on pages XIV-7 to XIV-11.

The J. I. Case Co. continually strives to improve the performance and dependability of its machines. Therefore, the right is reserved to change specifications given in this manual without notice or incurring any obligation relating to such changes.

IMPORTANT

The terms "right hand" and "left hand", whenever used in this manual, are determined by standing at the rear of the unit and facing in the forward direction of travel of the tractor.

swing circuit is blocked by the control valve spool. The criss-cross relief valves then open and allow oil to transfer to the other circuit, thus cushioning the stop of the boom and preventing a "void" of hydraulic oil in the oil returning to the reservoir. If the criss-cross valves cannot handle the surge of displaced oil, one of the high pressure relief valves also opens and allows oil to return to the reservoir.

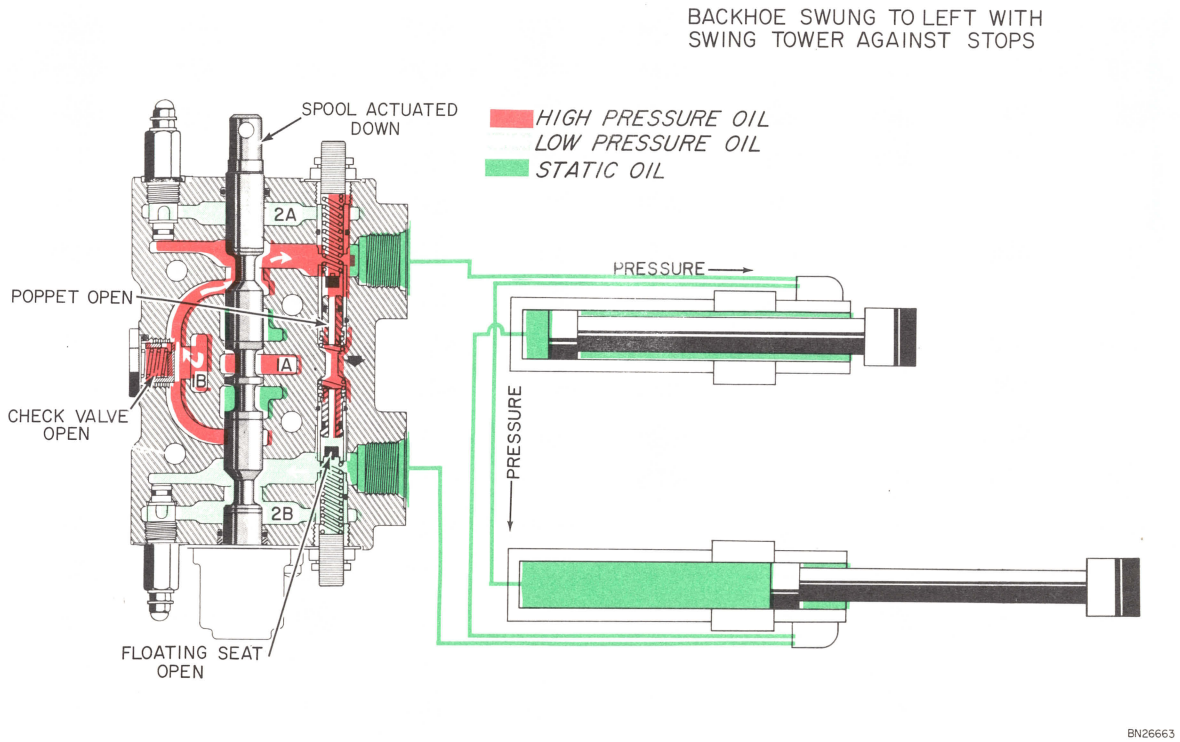

Figure 12 - Backhoe Swing Criss-Cross Relief Valves Actuated

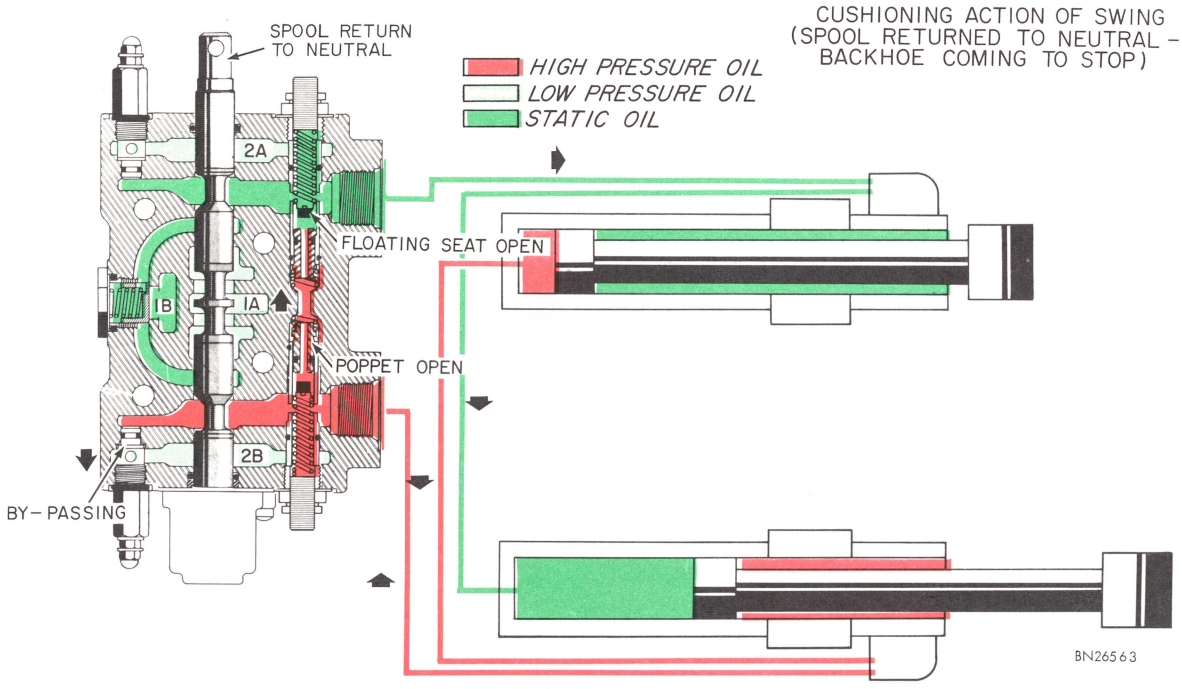

Figure 13 - Backhoe Swing High Pressure Relief Valves Actuated

POSSIBLE CAUSES	REMEDY

Spools Do Not Return to Neutral

1. Broken spring.	1. Replace spring.

Insufficient Boom Down Pressure

1. Secondary relief valve pressure setting too low.	1. Check relief valve pressure.
2. Backhoe main relief valve setting too low.	2. Check Backhoe relief valve pressure.
3. Defective cylinder packing.	3. Check cylinder packing.
4. Defective boom spool in control valve.	4. Replace valve or section.

Swing Cylinder Operates Incorrectly

1. Insufficient power.	1. Check secondary relief valve pressures.
2. Defective cylinder.	2. Check cylinders.
3. Defective "O" rings on secondary relief valves.	3. Service relief valves.
4. Broken springs in secondary relief valves.	4. Replace springs in secondary relief valves.

Abrupt Stopping of Backhoe Swing

1. Defective criss-cross secondary relief valves.	1. Check secondary relief valves.

Backhoe Boom Overswing

1. Secondary criss-cross relief valve setting too low.	1. Replace or adjust secondary relief valve.
2. Spool not returning to neutral position.	2. Check spool travel and linkage.
3. Secondary criss-cross relief valve held open.	3. Check relief valve for foreign matter.
4. Broken spring in secondary relief valve(s).	4. Replace spring.

TROUBLE SHOOTING

POSSIBLE CAUSE	REMEDY
Locking Cylinders Fail to Lock	
1. Locking valve improperly set.	1. Turn knob counterclockwise to lock cylinders. Refer to page XIV-13 which describes operation of this valve.
Locking Cylinders Will Not Hold In Lock Position	
1. Oil is leaking past "O" ring and backup ring in cylinder tube.	1. Pull piston out and replace "O" ring. Check condition of piston.
2. Oil is leaking from front cover.	2. Remove cover and replace "O" ring. Torque to 200 foot lbs.
3. Internal leakage in locking control valve.	3. Disassemble locking control valve. Check "O" rings and poppet.
4. Fitting(s) loose in locking hydraulic circuit.	4. Check fittings for tightness.
5. Leakage at some point in bucket circuit.	5. Check circuit for leak(s) and service as necessary.

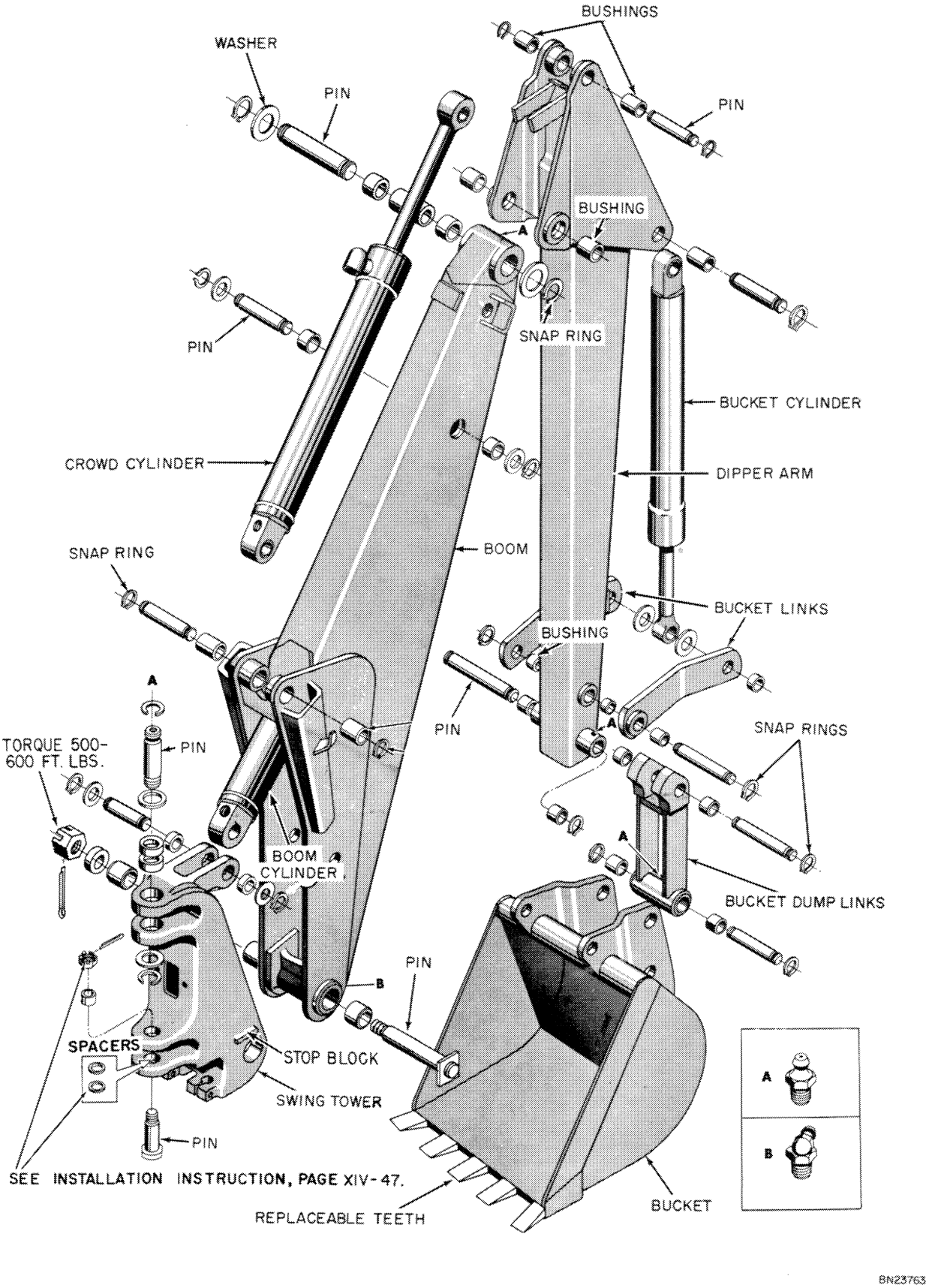

Figure 56 - Swing Tower, Boom, Dipper, and Bucket

Repairing Cracked Edge

For repairing a cracked cutting edge, a 45° chamfer to full depth is recommended at the edge of the crack. This may be done with a portable grinder. Preheating the blade to about 220° F. to 300° F. will reduce the possibility of further cracking when welded with the LH70 weld rod.

Replacing Teeth

These cutting edges are self-sharpening and will require no attention. If any cutting edge is broken or badly worn, it can be replaced by using a punch to raise the "peened down" edge, allowing the cutting edge to be pulled from the tooth shank.

This can be done without heating the tooth, but if a torch is available, heat the "peened down" portion cherry red and straighten the lip while hot. New teeth must always be held in place by peening down this lip into the depression in the side of the tooth shank.

A damaged tooth shank may be removed from the bucket by grinding or by use of a chisel. Grind the bucket smooth after tooth has been removed.

Use a weld rod meeting A.W.S. specifications E7018 to weld new shank to bucket.

NOTE: Heavy duty teeth are available for replacement (Part No. D36720).

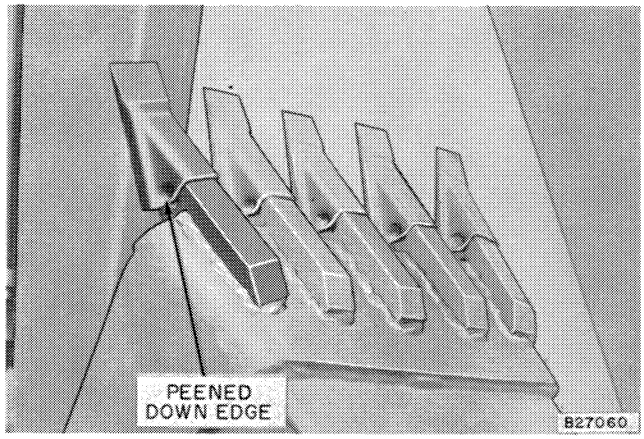

Figure 69 - Backhoe Bucket Teeth

Section
67

DUAL RANGE
ASSEMBLY

Rac. Form 9-80781

Section
68

11 INCH
TRACTION CLUTCH

CASE CORPORATION Rac. 9-80792 PRINTED IN U.S.A.

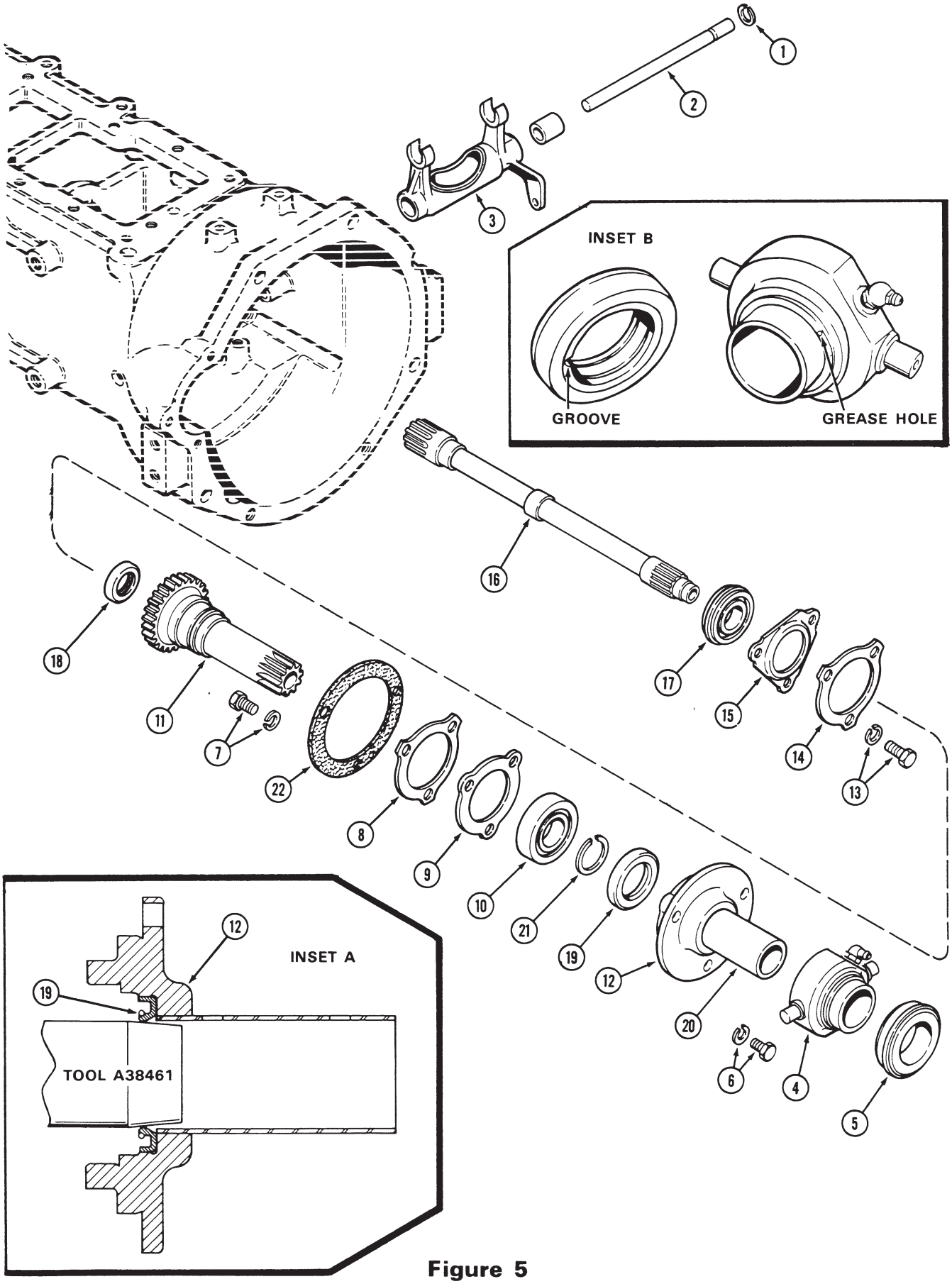
INSET B
GROOVE
GREASE HOLE
INSET A
TOOL A38461
1
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Figure 5

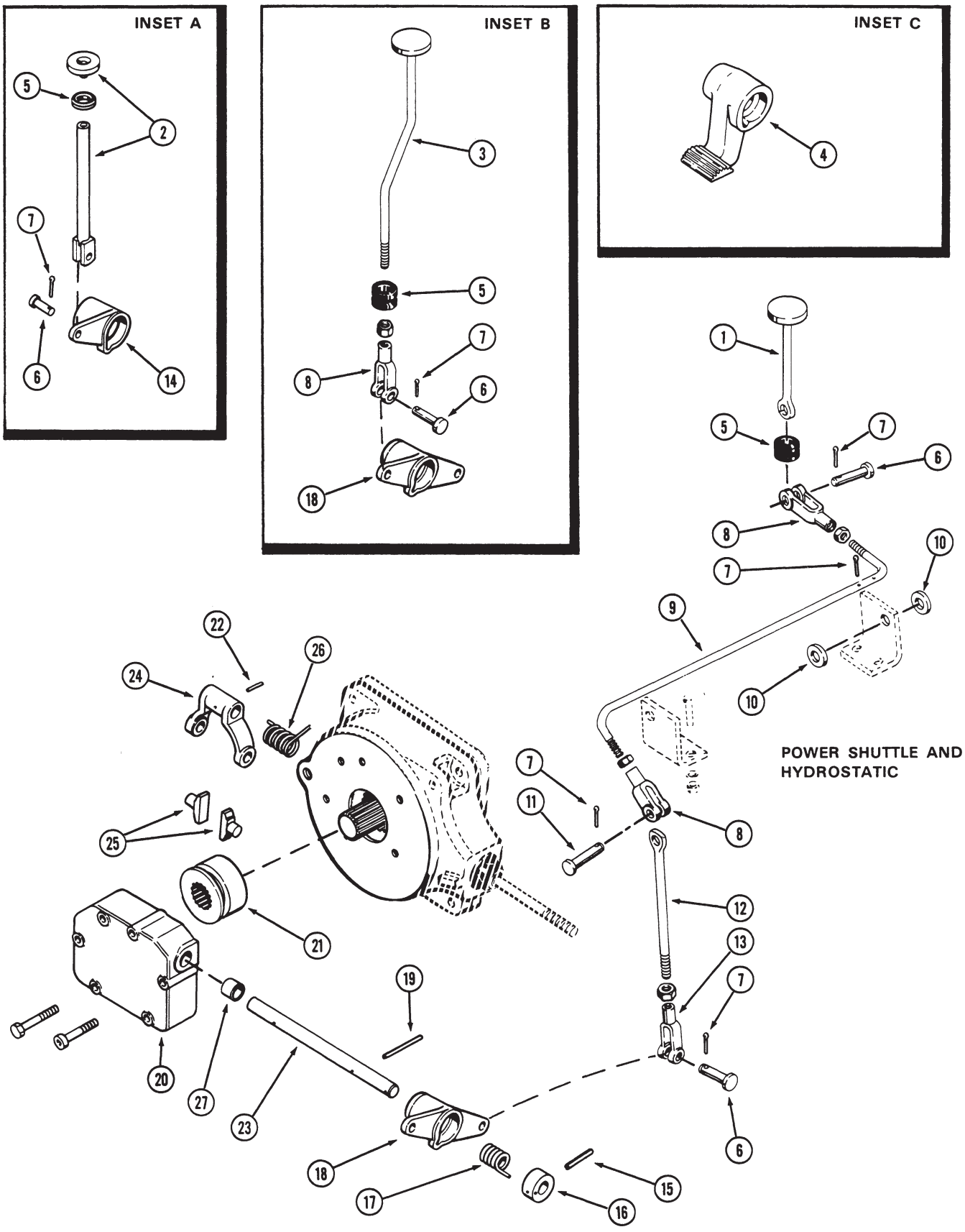


Figure 3

RECOMMENDED LUBRICANT

Pressure Fittings. . . . . Lithium "soap-base" grease

Grade Recommendations

Below 32° F.	#1
32° F. to 90° F.	#2
Above 90° F.	#3

PRESSURE FITTINGS

Before applying a grease gun to pressure fittings, wipe all accumulated dirt from each tip. Lubricate the Backhoe pressure fittings every 10 hours. If the Backhoe is operated in mud or water, lubricate immersed fittings more often.

SPECIFICATIONS

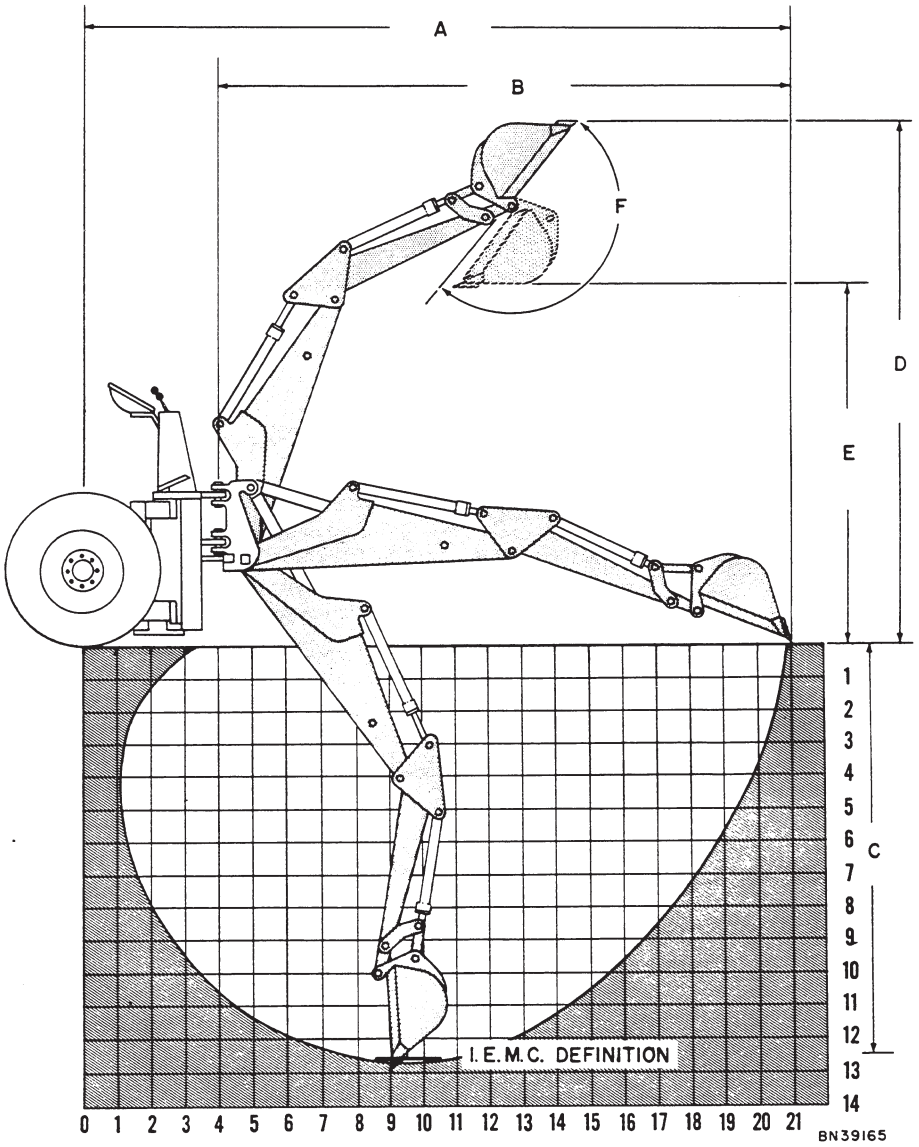


Figure 4 - Backhoe Specifications

HYDRAULIC LOCKING SYSTEM

General Description

The hydraulic locking system consists of a control or check valve mounted to the control tower and four single-acting type locking cylinders built into the sliding frame. These components are "teed" into the hydraulic line from the top port in the bucket section of the control valve.

The locking cylinders are the "brakes" of the sliding frame. Under hydraulic pressure, each locking cylinder piston forces a plate (or shoe) against the rails of the main frame, preventing any movement of the sliding frame along these rails of the main frame.

Three points to remember about the operation of this system are:

1. Extending the bucket pressurizes the locking cylinders.

2. Turning the control handle counterclockwise (up) permits oil to flow one way—INTO the locking cylinders.

3. Turning the control handle clockwise (down) permits oil to flow both ways—this releases the locking action.

Locking the Sliding Frame

As the bucket is extended, high pressure oil forces the check poppet off its seat and pressurizes all four locking cylinders. With the control handle in the "up" position, the high pressure oil against the locking cylinders is sealed in by the check poppet.

Every time the bucket is extended during the digging cycle, the locking cylinders are re-pressurized. This continual application of pressure to the locking cylinders assures the backhoe will hold its position.

With the control handle in the "down" position, the check poppet is forced to remain off its seat. This releases the locking cylinders because the poppet is unable to "seal in" pressurized oil.

SERVICING BACKHOE VALVE

Removing Control Valve

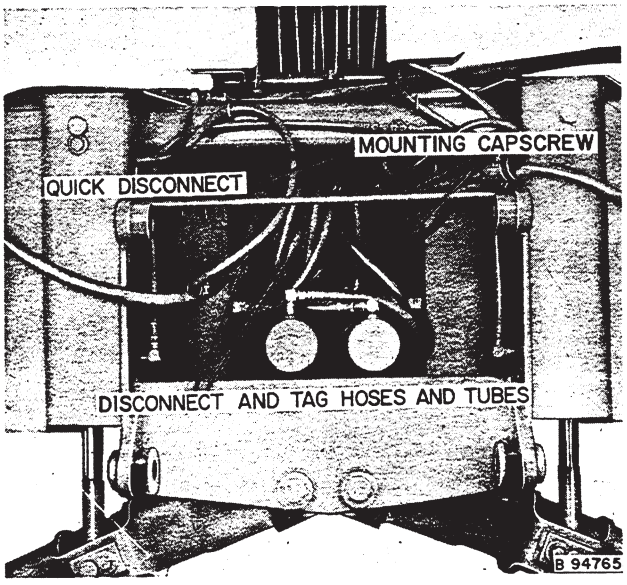


Figure 15 - Removing Control Valve

1. The control valve can be handled more easily if the backhoe is removed from the tractor (See page XIV-45). Use care when handling the control valve as it weighs approximately 100 lbs.

2. Clean the valve exterior to prevent entry of dirt into the hydraulic system.

3. Lower the backhoe bucket to the ground. With the engine shut off, move each control lever or pedal several times to equalize pressures.

4. Before removing the valve, tag and number the hoses that connect to the tubes at the valve, starting at the inlet end. Number the top port of the first section No. 1; the bottom port No. 2; the top port of the second section No. 3, etc.

5. Clean the tube ends and disconnect the tubes from the valve and hoses. Disconnect the swing cylinder hoses at the

BOOM DOWN RELIEF VALVE

This relief valve is located at the top port of the boom section. Its operation is explained on page XIV-9.

1. Install a 2000 P.S.I. gauge as shown in Figure 35.

2. Lower the loader bucket to ground level.

3. Lower stabilizers to normal digging position.

4. Fully extend the bucket and dipper arm. Lower the boom until the bucket touches ground directly behind the tractor at maximum reach.

5. Run the engine at 800 R.P.M. and apply down pressure to the boom until a steady gauge reading is obtained. The pressure should read 1150 to 1350 P.S.I. Adjust the relief valve if necessary (see page XIV-28).

SWING CRISS-CROSS RELIEF VALVES

These two relief valves are located at each port of the swing section. Their operation is explained on page XIV-9.

1. Install a 2000 P.S.I. gauge as shown in Figure 35.

2. Swing criss-cross valves are tested in the port OPPOSITE the side on which the valve is located. Run the engine at 800 R.P.M. when testing.

   a. To test the valve at the top ("A") port, swing the boom all the way to the right.

   b. To test the valve at the lower ("B") port, swing the boom all the way to the left.

3. Hold the foot pedal down until a steady gauge reading is obtained. The pressure should read 1200 to 1400 P.S.I. Adjust the valve(s) if necessary, page XIV-28.

weight of boom and dipper arm on block.

2. With engine shut off, move bucket control lever in both directions to equalize pressures.

3. Clean the cylinder exterior with solvent.

4. Disconnect hoses and cap all exposed immediately.

5. Remove the snap rings and the pins.

STABILIZER CYLINDERS

1. Lower the stabilizer to the ground in the retracted position.

2. With the engine shut off, move the control lever in both directions to equalize pressures.

3. Remove the capscrew, lockwasher, and keeper that secure the lower mounting pin. Remove the pin.

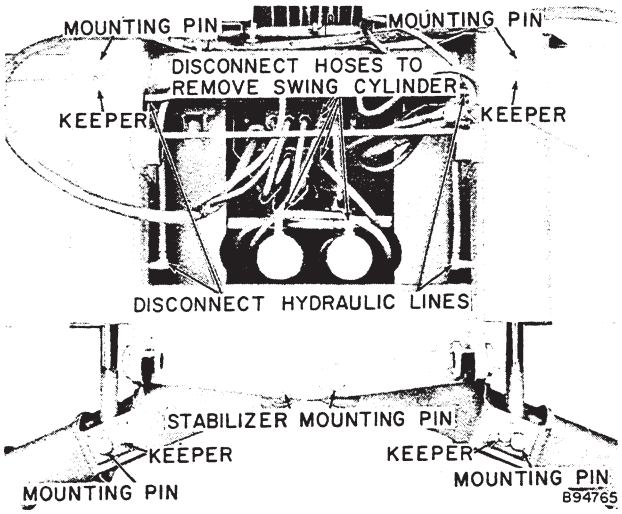


Figure 41 - Removing Stabilizer Cylinder

4. Disconnect the hydraulic lines. Tag the lines for identification purposes.

5. From the mounting frame, remove the capscrew, lock washer, and keeper for the upper mounting pin. Support the cylinder and remove the pin. Carefully work the cylinder from the mounting frame. If necessary, the stabilizer leg can be removed by removing the snap ring and washer and driving out the pivot pin.

SWING CYLINDERS

1. Extend the boom and dipper arm and lower the bucket to ground level.

2. With the engine shut off, move both swing pedals to equalize pressures.

3. Clean exterior of the cylinder(s) with solvent.

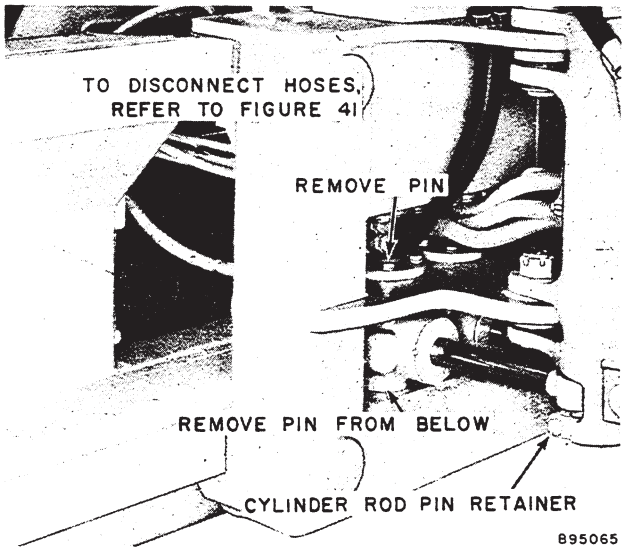


Figure 42 - Removing Swing Cylinders

4. Trace the hose leading from the rod end of the cylinder to the control valve and disconnect the hose at the control valve. Disconnect the other hose at the piston end of the opposite cylinder.

5. Remove the capscrew lock washer and nut from the bottom of the swing tower. This capscrew acts as a retainer for the cylinder rod pin. Drive the pin down from inside the swing tower and out the bottom.

6. The cylinder is trunnion mounted to the sliding frame. Two pins, bolted to the mounting frame, fit into the bores of the cylinder trunnion. Remove these pins (one is bolted from the underside of the mounting frame).

NOTE

It may be necessary to disconnect one or more hoses from the control valve to provide clearance when removing the top mounting pin in step 6.

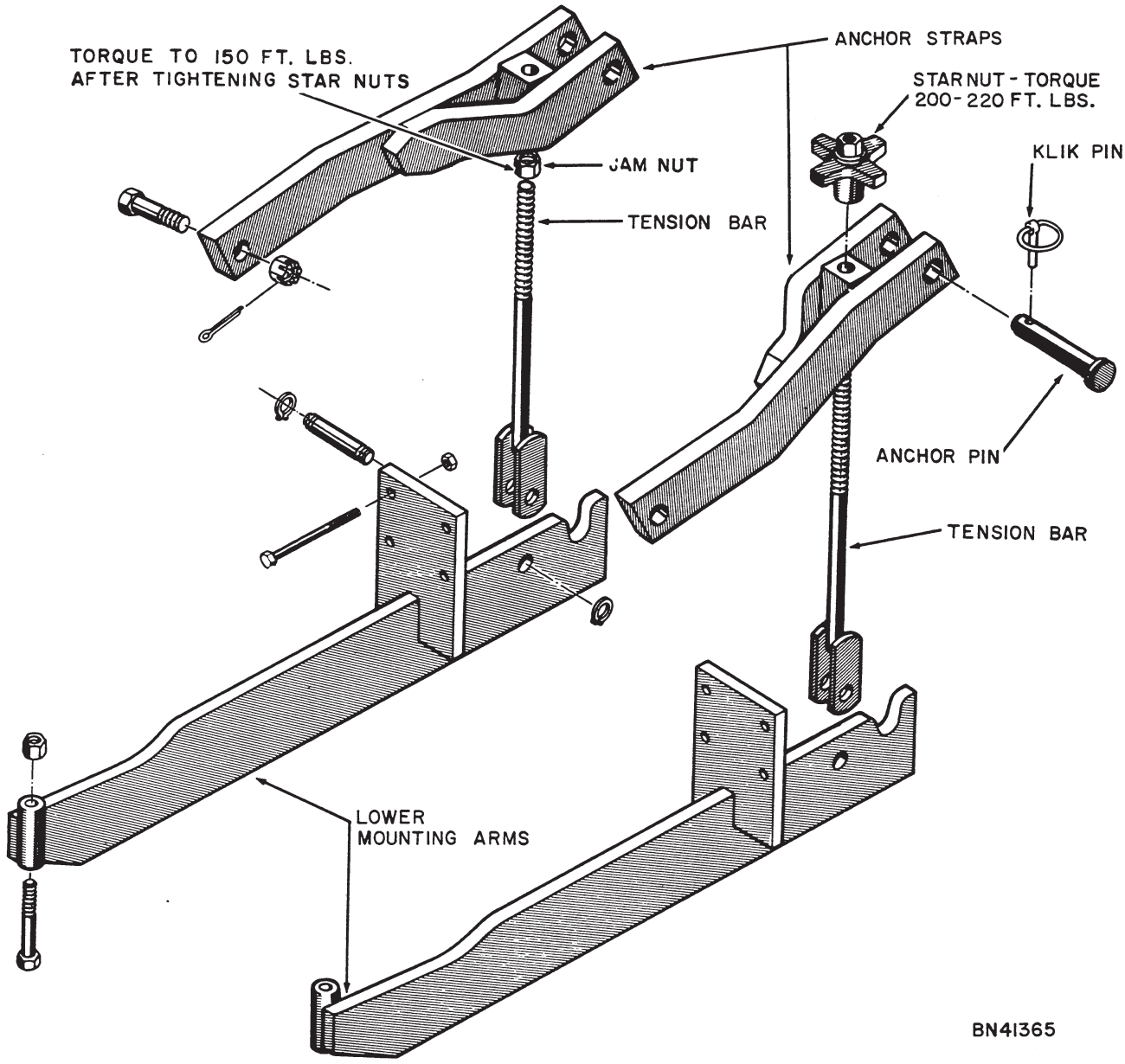


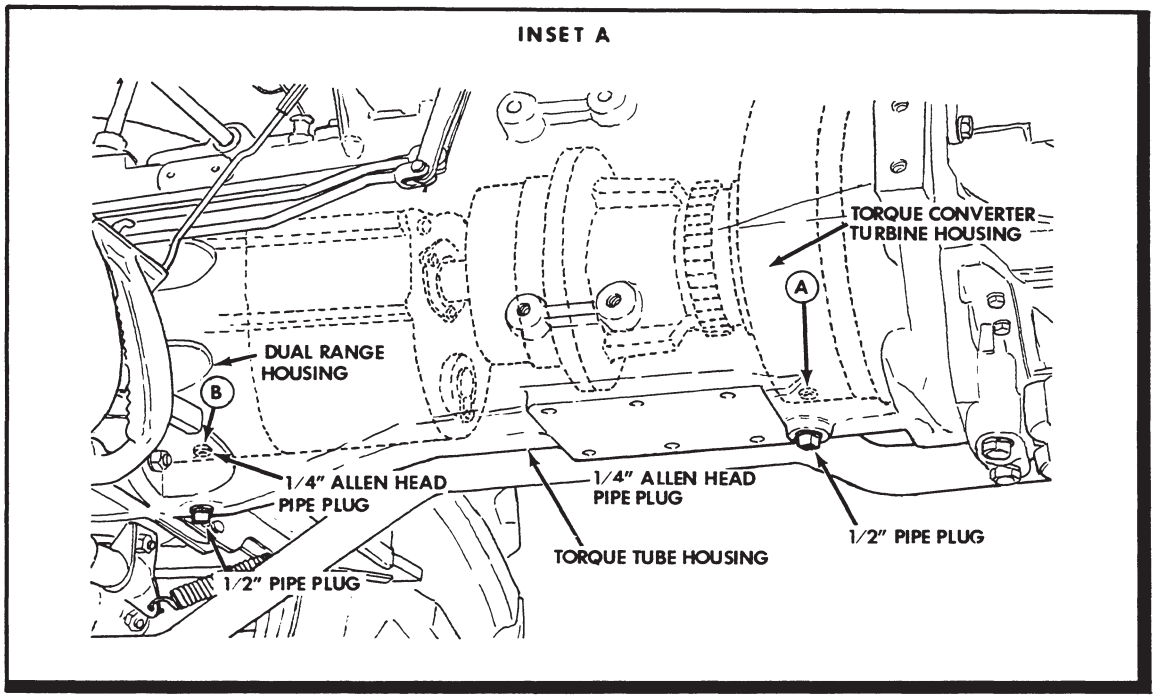
Figure 58 - Mounting the Main Frame to Tractor

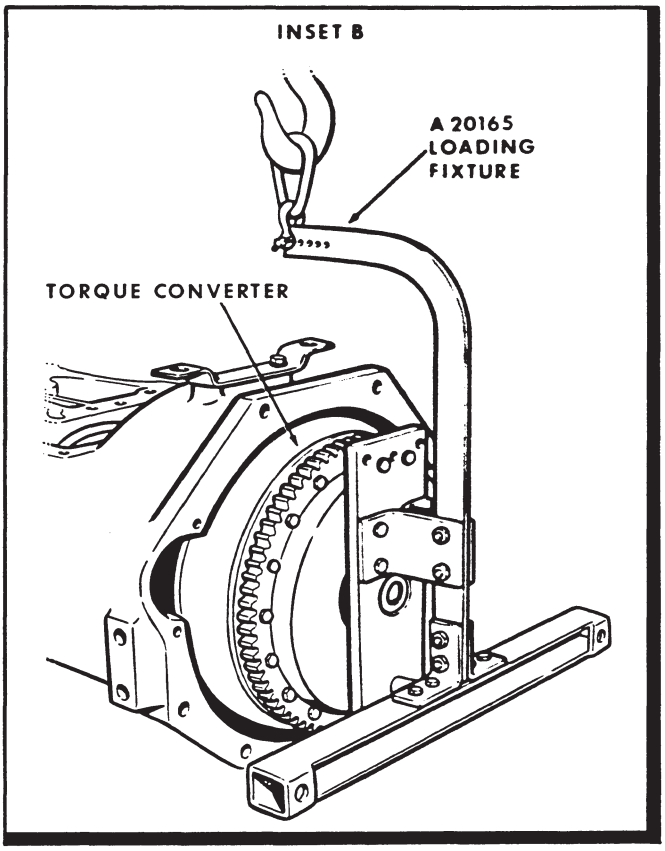
SECTION

X

SERVICING THE CASE-O-MATIC 11-INCH TORQUE CONVERTER CONTROL VALVE PRESSURE REGULATOR AND OIL PUMP

REMOVING THE TORQUE CONVERTER





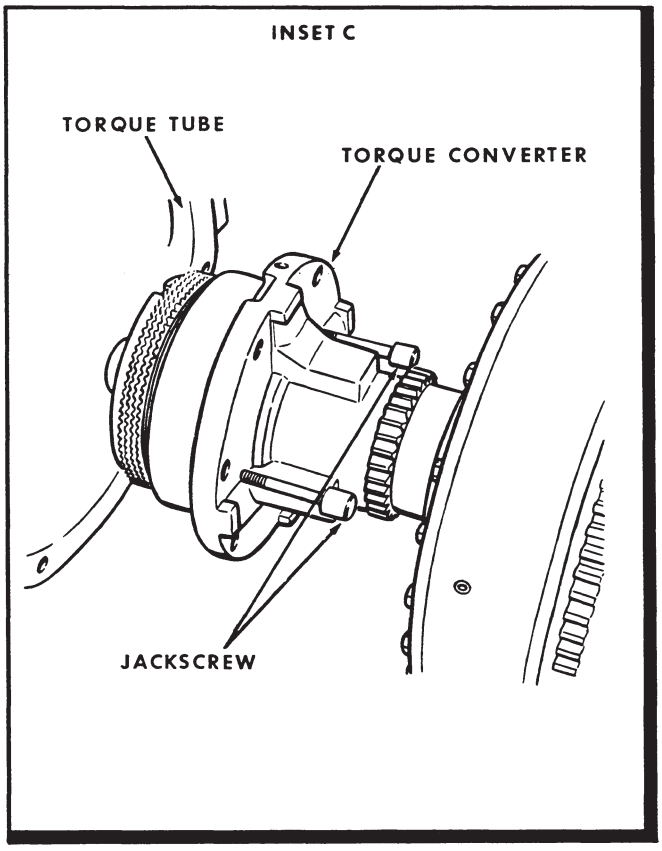
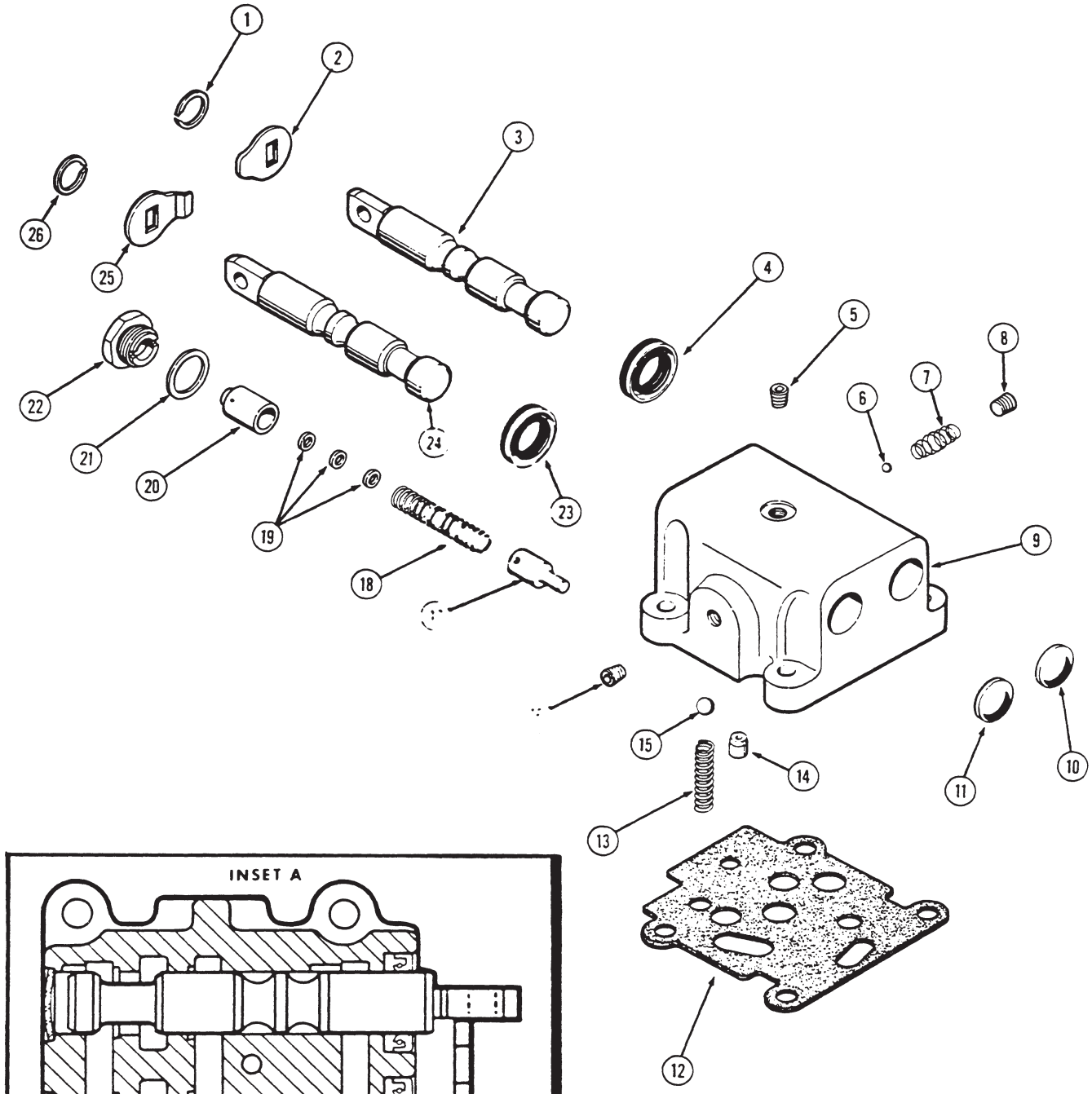


Figure X-5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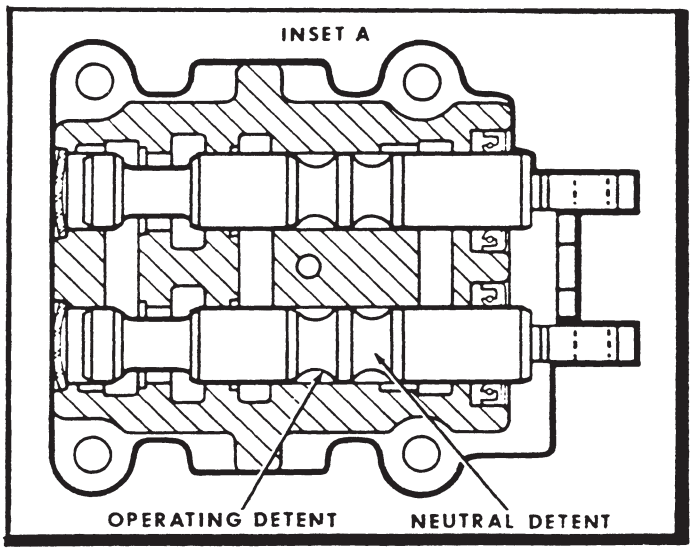
INSET A
OPERATING DETENT
NEUTRAL DETENT

Figure X-10