toward piston and do not overlap. See Fig. 137D. Install seal (11) over wave spring and work seal into place using a smooth wood dowel or other similar object. Repeat operation to install inner wave spring (14) and seal (13), then lubricate piston assembly and install it in carrier with flat side down. Install piston return spring (9) and retain with snap ring (8). If not already done, remove snap ring (6) from clutch hub (7) and install clutch hub over piston return spring. Lubricate clutch plates, then starting with a steel plate alternately install seven steel and seven sintered friction plates. Remove clutch hub, install snap ring (6), then reinstall clutch hub in clutch plates. Install the last steel plate and sintered friction plate and be sure O.D. of snap ring fits in I.D. of last steel plate. Install back-up plate (3) and retaining snap ring (2). Install seal rings (18) and be sure hooked ends are engaged.

Install "O" rings (25 and 26) in grooves of brake piston (27), lubricate "O" rings and install piston flat side up in piston carrier (28). Place brake plate (19) over piston with friction side up, place roll pins (23) in plate retaining holes and install return springs (22) over roll pins. Use Loctite 271 on threads of retainer cap screws (20), install cap screws with washers (21) and tighten to 18-25 ft.-lbs. torque.

Lubricate seal rings (18), and install brake housing assembly (28) over carrier (17) shaft with brake toward carrier. Place bearing cup (36) over carrier shaft, then heat bearing (37) and install on shaft. Install gear (38) on shaft, then heat bearing (39), install on shaft and install snap ring (41). Install two guide studs in housing (31). Be sure the two square cut "O" rings (29) and the 5/16-inch steel ball (30) are in place, then install carrier and brake assembly on guide studs. Use a soft faced hammer to bump carrier until bearing cup (36) is seated in housing (31), then install rear bearing cup (40) in housing (31). With no "O" ring on rear cover (44), install cover with original shim pack (42) and tighten the retaining cap screws to 35-42 ft.-lbs. torque. Bump carrier in both directions to insure that bearings are seated then check end play of unit which should be 0.001-0.003. If end play is incorrect, remove rear cover and vary the number of shims (42) which are available in thicknesses of 0.005, 0.007 and 0.010. When adjustment is correct, remove rear cover and install new "O" ring (43). Install modulator valve spool spring (35) in bore of housing (31), install spool (34) with long stem end first, then install plug (32) with new "O" ring (33).

Install snap rings (4—Fig. 138A) in inside groove of idler gears (3 and 4), then drive bearing cups (2) into idler gears until they bottom against snap ring. Bearing cup tapers should be facing away from each other (toward sides of gear). Place new "O" ring on upper gear pin (7). Place bearings (1) in upper idler gear (4) which has the identification groove cut in teeth, then place gear assembly in housing (5) and insert gear pin (7). Use original shims (8) and install retainer (9). Tighten retaining cap screw to 35-42 ft.-lbs. torque and check end play of idler gear pin which should be 0.000-0.003. If end play is incorrect, vary shims (8) as required. Shims are available in thicknesses of 0.005, 0.007 and 0.010. Repeat above operation for lower idler gear assembly.

NOTE: Lower idler gear (3) has no identification groove.

Heat bearing (15), install on output shaft (14), then install snap ring (13). Install bearing cup (10) in housing (5) with taper toward rear. Place front bearing (11) in cup (10), place output gear (12) in housing from bottom side, insert output shaft through output gear and into front bearing and drive output shaft into bearing. Install rear bearing cup (16) into housing bore and install snap ring (17). Bump output shaft both ways to seat bearings then measure shaft end play which should be 0.000-0.002. If shaft end play is incorrect, remove snap ring (17) and install one of the correct thickness. Snap ring (17) is available in thicknesses of 0.090, 0.094, 0.098, 0.102, 0.108 and 0.109. Recheck output shaft end play.

Lubricate lip of oil seal (18), place oil seal over output shaft with lip inward and drive seal into bore until outer face is flush with transmission case. Install tubular guard (19).

HYDRAULIC SYSTEM

The tractor hydraulic system provides power for steering, brakes, PTO clutch, differential lock, power shift clutches and valves, as well as for hydraulic lift and control of carried and towed implements. Refer to Fig. 139.

The dual hydraulic pump (6 and 7) attaches to right side of torque tube

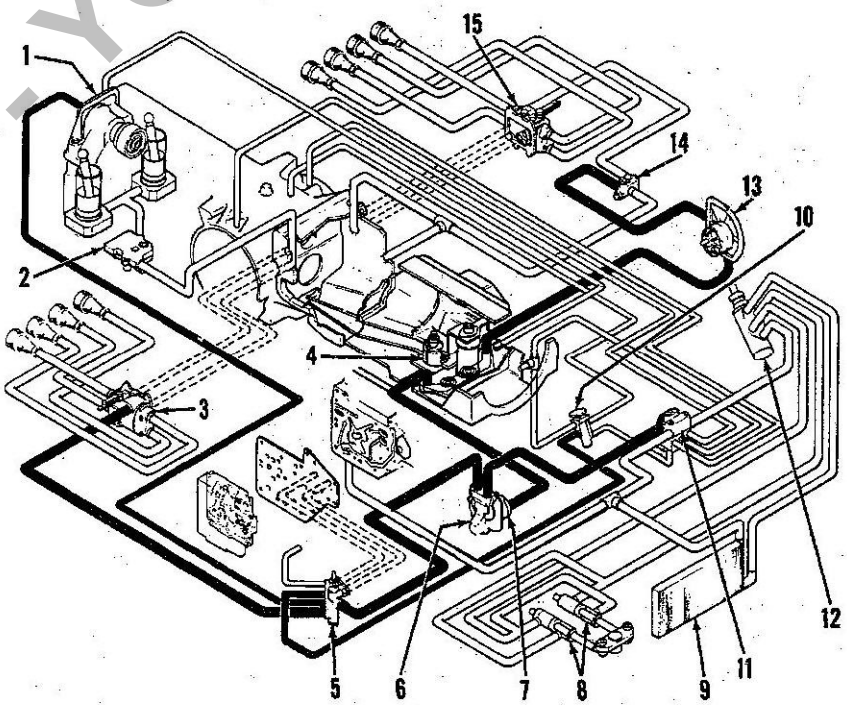


Fig. 139—Schematic view of tractor hydraulic system showing main components.

1. PTO clutch
2. Draft-O-Matic valve
3. R. remote valve
4. Charging pump
5. PTO flow divider
6. R. 20 gpm pump
7. 8 gpm pump
8. Steering cylinders
9. Oil cooler
10. Diff. lock valve
11. Brake valve
12. Steering valve
13. L. 20 gpm pump
14. Variable flow valve
15. L. remote valve

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On 1270 and 1370 models, bump pump drive shaft rearward from housing. Remove snap ring (12) on large (left) side of housing and remove gear (10) and bearings by pressing (driving) them out from the center of assembly as a unit. Remove input gear (16) and needle bearing and race. Remove charging pump drive gear (9), then remove right hand pump gear (7). Remove snap ring (3) and needle thrust bearing and races (5 and 4). Remove snap ring (21) and needle thrust bearing and races from charge pump drive. Renew all needle bearings and thrust bearings as a precaution against future failure. Install ALL needle bearings to a depth of 0.060 inch depth beyond edge of their respective bores. Three Case bearing drivers can be used for removal and renewal of needle bearings. Driver no. A9032 is for charging pump bearings (17). Driver no. A50807 is for right hand pump bearings (6), and driver no. A8346 is used on input drive bearing (13).

To renew bearings (11) on left hand pump drive, press bearings from left drive gear (10). Heat bearings on an electric bearing heater or in hot oil, not to exceed 300°F. Install heated bearings on drive gear (10).

Install right hand drive gear first, then charge pump gear. Install input gear needle bearing race (14), bearing (15) and gear (16). Install left hand gear and bearing assembly and snap ring (12). Tap left hand gear back against snap ring after snap ring is seated in its groove. Install input shaft from the rear and use a dial indicator to check backlash between input gear and all drive gears. Backlash should be 0.002-0.006 inch between all gears. Place dial indicator on gear to be checked and rock gear back and forth while holding input shaft and gear motionless. If any gear checks more or less than specifications, snap rings (3, 12 and 21) are available in three thicknesses, in 0.010 inch steps, and can be used to bring backlash within specifications.

Install pump drive assembly while observing torque limiter splines through left hand pump opening. Tighten cap screws to 35-42 ft.-lbs. torque.

88. **POWER SHIFT OVERHAUL.** Split tractor between torque tube and transmission as outlined in paragraph 86. If power shift is to be overhauled, but not removed for gear transmission repair, it is not necessary to remove carrier assembly (1—Fig. 93) from transmission housing. If power shift carrier must be renewed, the following steps must be taken to preserve countershaft (bevel pinion shaft) bearing preload and rolling torque:

Remove outer retaining nut and locking washer (33 and 32—Fig. 108) from under carrier assembly. Make a continuous mark on inner retainer (31) and countershaft (14). Count the number of turns required to remove nut and make a record of it so preload can be duplicated at the time of reassembly.

NOTE: Failure to observe the above

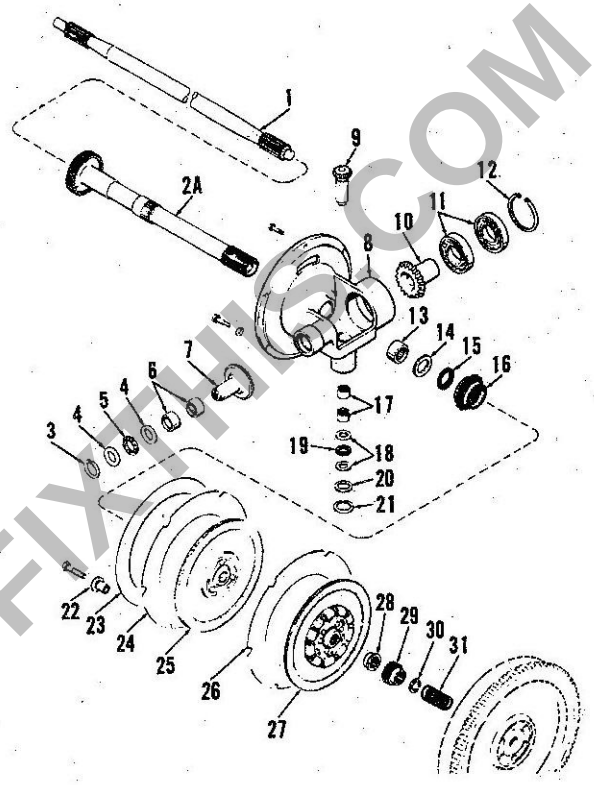


Fig. 92A—Exploded view of Model 1570 hydraulic pump drive and torque limiter clutch. Note that pump drive shaft is the planetary input shaft and remains with power shift unit when tractor is split.

1. PTO shaft
2A. Planetary input shaft
3. Snap ring
4. Bearing race
5. Thrust bearing
6. Roller bearing
7. R. bevel gear
8. Housing
9. Charge pump gear
10. L. bevel gear
11. Ball bearing
12. Snap ring
13. Roller bearing
14. Bearing race
15. Thrust bearing
16. Input gear
17. Roller bearing
18. Bearing race
19. Thrust bearing
20. Thrust washer
21. Snap ring
22. Spring retainer
23. Belleville spring
24. Pressure plate
25. Clutch disc
26. Pressure plate
27. Clutch disc
28. Bushing
29. Sleeve
30. Snap ring
31. Spring

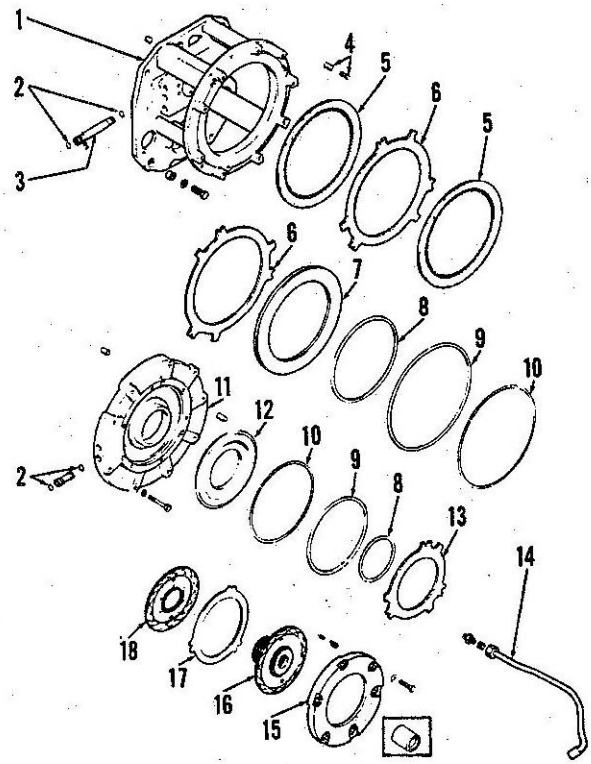


Fig. 93—Exploded view of C1 and C4 clutches used in 1270 and 1370 tractors. Item 1 is shown for comparison purposes. Item 14 is used only on late 1270 and 1370 models. Inset may be a bushing or a splined sleeve. Also see Fig. 93A.

1. Carrier assy.
2. "O" rings
3. Oil tubes
4. Return springs
5. C4 friction disc
6. Steel plate
7. C4 piston
8. Inner sealing ring
9. Outer sealing ring
10. Wire ring
11. Piston carrier
12. C1 piston
13. Steel plate w/tabs
14. C1 lube line
15. Reaction plate
16. Sun gear & plate
17. Steel plate
18. C1 friction disc

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Tightening torques are as follows. All torques are given in ft.-lbs.

Shuttle valve (1) (plug) 17-20
Pressure regulator (14) (plug) ..13-15
Selector valve (2) (cap screws) ...7-9
Reverse lockout (9) (sleeve) 22-25
Pilot valve (6) (plugs).....13-15

83. **LUBRICATION RELIEF VALVE.** The lubrication relief valve (Fig. 86) is located in lower right rear of torque tube housing, and is accessible after a rear tractor split is performed. Valve should be checked if lubrication operating pressure cannot be obtained when tested as outlined in paragraph 79. All parts of relief valve are available individually.

84. **REGULATING AND RELIEF VALVE.** Fig. 87 shows an exploded view of transmission regulating and relief valves contained in flow divider housing. Also contained in the housing is the PTO clutch control valve (4) which operates on the same closed circuit as the transmission control valve.

The regulated operating pressure can be checked and adjusted as outlined in paragraph 79. System relief pressure is controlled by relief valve (8), which functions only as a surge relief valve upon sudden clutch engagement in power shift transmission, and for cold oil starts. To check relief valve pressure, remove flow divider valve from tractor. Fabricate three metal plates and three gaskets, and bolt the three plates to valve to block all oil escape routes. Refer to Fig. 88 and leave a hole in one plate for relief valve to pop off. Use gasket as a template. Attach a hand pump and a suitable pressure gage into the pressure gage port, which is a 1/8 pipe threaded hole. Be sure the PTO clutch spool (4—Fig. 87) is pulled out (disengaged). Relief valve (8) should crack at 240 psi and be fully open at 280 psi. If it does not, inspect valve and seat (7) for damage, and renew spring (9) if necessary. Refer to paragraph 111 for description of valve operation.

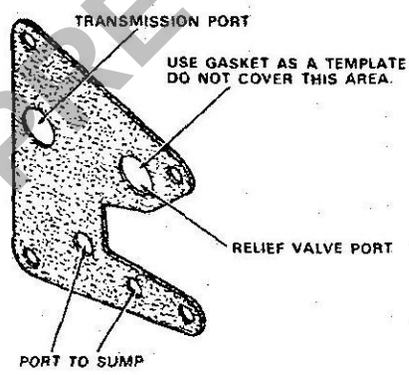


Fig. 88—Use gasket as a template to fabricate block-off plate for testing relief valve. Leave hole for relief oil as shown.

DRIVE TRAIN

OVERHAUL

All Models

Before overhauling torque limiter clutch, be sure problem is in that unit by performing the following stall test: With engine running approximately 1200 rpm, shift into 4th range, hold brakes and slowly release inching pedal. Engine should stall, unless torque limiter is slipping, which would allow hydraulic pump drive shaft to stop, thus losing the oil pressure to power shift. The torque limiter would then stop slipping since power shift clutch would slip. The pump would again be able to deliver pressure to power shift clutch and torque limiter would again slip, which would become a bucking action. If bucking does not occur, check for a slipping power shift clutch as outlined in paragraph 79.

85. **TORQUE LIMITER CLUTCH.** Tractor must first be split between engine and torque tube as outlined in paragraphs 12 and 13, but do not remove front axle assembly. Drive wedge blocks between axle and front support to prevent sideways tipping.

Remove and inspect torque limiter steel plates, discs and belleville spring. Fig. 89 shows torque limiter with dual discs (2) and three steel plates (3) which were used on early 1370 models with 12-inch discs. All later models used only two steel plates. Early 1270 models were equipped with one 14-inch disc and one plate.

Belleville spring (4) must be checked for free height with concave side down as shown in Fig. 90. A 12-inch OD spring is red color coded, and should measure 0.479-0.491 inch. A 13-inch OD spring is yellow color coded, and should measure 0.451-0.463 inch. Renew any spring that is not within specifications.

NOTE: If the discs (2—Fig. 89) show signs of slipping or wear, renew all discs, plates and Belleville spring. In all tractors except late models with single PTO shaft the torque limiter discs transmit all power to tractor AND PTO. Single PTO shaft is driven from a splined sleeve in flywheel.

Clean removed parts and friction surface of flywheel of all dirt and grease. Fill pilot cavity in rear of crankshaft 2/3 full of Molylube No. 2. On tractors with a two piece PTO shaft, use the front PTO shaft as a pilot and install discs, plate and belleville spring. Model 1370 tractors before serial no. 8727601 used two plates (3) between discs (2). Starting with serial no. 8727601, only one plate was used between discs.

NOTE: When dual discs are installed, make sure rivet heads of discs are not lined up with each other so as to avoid contact. Sides of discs with springs must face away from each other.

When installing torque limiter on models with a single PTO shaft, use a hydraulic pump drive shaft for a pilot, inserting shaft splines through discs and into splines in flywheel. If no pump shaft is available, a pilot shaft can be made from a planetary output shaft from 870 through 1070 tractors. Grind the front of output shaft down approximately 0.010 inch to 1.760 diameter

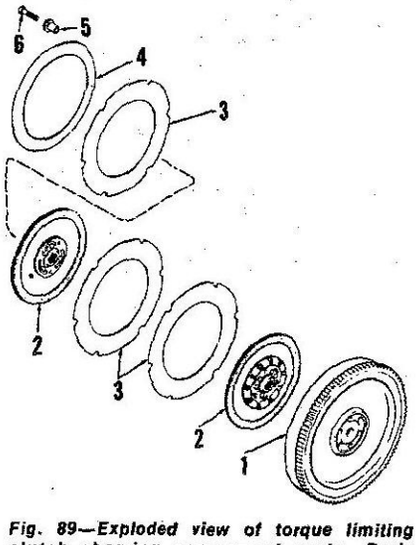


Fig. 89—Exploded view of torque limiting clutch showing component parts. Early model dual disc type shown with two plates between discs.

1. Flywheel
2. Clutch disc
3. Pressure plate
4. Belleville spring
5. Retainer
6. Cap screws

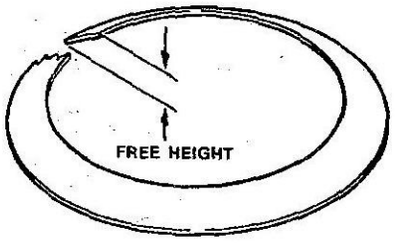


Fig. 90—Invert Belleville spring and measure dish as shown. Refer to paragraph 85 for dimensions.

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before using. Part numbers for output shaft are A58459 or A62186.

On all models, retainers (5) must engage the half circle notches in plates (3). Tighten cap screws to 80-90 ft.-lbs. in several steps in order to load belleville spring evenly. Dish in belleville spring must face outward. Install thrust control spring in cavity in center of flywheel.

TRANSMISSION SPLIT. To gain access to power shift transmission, gear transmission, or hydraulic pump drive, tractor must be split between torque tube and transmission housing. After split is made, either power shift unit or hydraulic pump drive may be overhauled without disturbing the other unit. To overhaul gear transmission, the power shift unit must first be removed as an assembly.

86. To split tractor between torque tube and transmission housing, first remove cap screws holding louver hood side panels, pull panels outward at bottom and remove with a downward pull. Remove muffler and cap screws holding hood, lift hood at front to clear grille, slide slightly forward and remove hood. Remove decal panels and rear side panels. Drain transmission oil. On left side of tractor disconnect hydraulic pump outlet hose, C1 lube tube, PTO lube oil tube, sump tube from "T" fitting and flow divider valve flex control shaft. Disconnect remote valve linkage rods from their bellcranks.

On right side of tractor, disconnect range shift rods from shift levers, all lines to PTO clutch control valve, and remove valve from tractor. Remove inching pedal and selector linkage from power shift control valve. Remove the two outside lower cap screws from control valve and install two studs in their places. This will aid in removing control valve and manifold plate. Remove control valve and cover, taking care not to lose detent ball and spring between cover and body. Remove manifold plate, and remove the five oil distributor tubes from transmission by threading a ½-inch N.C. cap screw into tube and pull on cap screw to remove tube (refer to Fig. 91). Disconnect both brake cylinder lines. Remove wires to neutral start switch and disconnect Draft-O-Matic control cables at rear of tractor. Disconnect wire from transmission temperature sender and disconnect differential lock valve-to-transmission tube. Install a suitable support under torque tube and rolling support under transmission and final drive unit. Remove cap screws between torque tube and transmission housing and roll rear section away, making sure all wiring and lines are clear.

Reconnect by reversing removal procedures and tighten transmission to torque tube cap screws to 150-180 ft.-lbs. torque.

NOTE: Engine may have to be rotated to align hydraulic pump shaft splines with planetary sun gear.

Install new "O" rings on oil distributor tubes, lubricate generously and install tubes until they bottom in transmission. Use studs in two outer lower holes for control valve and install manifold plate first, tightening cap screws to 30-35 ft.-lbs. torque. Install control valve housing, install detent ball and then install control valve cover and gasket, making sure detent spring is installed in cover. After installing cap screws in control valve finger tight, remove studs and tighten all cap screws to 30-35 ft.-lbs. torque, using sequence shown in Fig. 84.

Adjust inching pedal and shift linkage as outlined in paragraph 78. Range shift linkage must be installed with lever in center of slot on console and levers on transmission in neutral. Range shift lever should not contact ends of slot when shifted. Adjust PTO valve spool as outlined in paragraph 112.

87. **HYDRAULIC PUMP DRIVE OVERHAUL.** Split tractor as outlined in paragraph 86. Remove right hand four gear hydraulic pump by disconnecting outlet tube to PTO clutch and flow divider valve and tube to brake valve. Remove cap screws and pull pump away from housing. Remove cap screws on bottom of torque tube holding charging pump and work pump down out of drive gear splines. If tractor is equipped with left hand two gear hydraulic pump, remove batteries and tray, disconnect pump outlet hose and inlet tube. Remove cap screws to pump and pull pump from housing. Remove the six cap screws from inside of torque tube and pull rearward on pump drive assembly. Early 1270 and 1370 tractors will have a short shaft protruding from rear of pump drive, while late 1270 and 1370 tractors will have the long one piece PTO shaft sticking through pump drive shaft. Pull pump drive assembly over long PTO shaft to remove. Refer to Fig. 92. Inset shows early PTO front shaft, which is also pump drive shaft. On late 1270 and 1370 tractors, long PTO shaft (1) will stay in flywheel splines while outer shaft (2) will be removed with pump drive. Be sure bushing inside shaft (2) does not fall out and get lost. On 1570 tractors, PTO shaft will remain in flywheel while the planetary input shaft will remain with the power shaft unit.

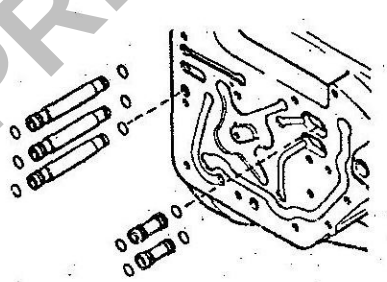


Fig. 91—Five oil distributor tubes are shown in their respective locations. Refer to paragraph 86 for method of removal and reinstallation.

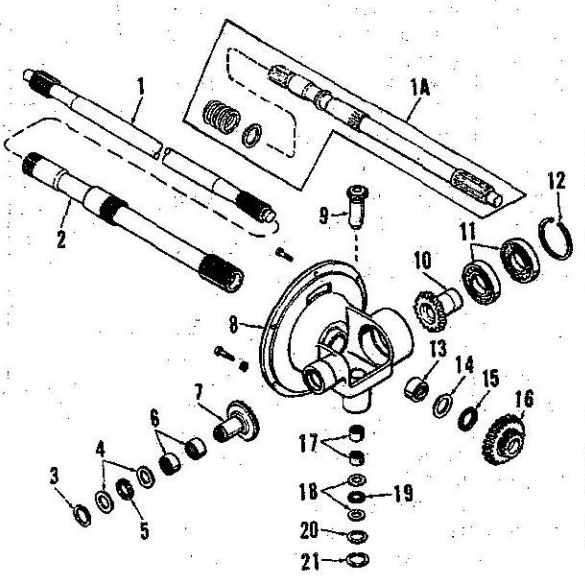


Fig. 92—Exploded view of hydraulic pump drive with dual input shafts used in 1270 and 1370 tractors. Early model single input shaft and spring shown in inset 1A. Rear of shaft 1A may have long splines. Also see Fig. 92A.

1. Single PTO shaft
2. Pump drive shaft
3. Snap ring
4. Bearing race
5. Thrust bearing
6. Roller bearing
7. R. bevel gear
8. Housing
9. Charge pump gear
10. L. bevel gear
11. Ball bearing
12. Snap ring
13. Roller bearing
14. Bearing race
15. Thrust bearing
16. Input gear
17. Roller bearing
18. Bearing race
19. Thrust bearing
20. Thrust washer
21. Snap ring

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the steering system can generally be ignored unless sufficient to cause slow or erratic steering.

Leakage at recirculating check valve ball in manual pump will not affect manual steering but can cause loss of power assist.

Internal leakage in manual pump will not materially affect power steering but may not allow the tractor to be steered manually.

SYSTEM OPERATING PRESSURE

All Models

5. The power steering operating pressure is controlled by a relief valve contained in brake valve housing. Relief pressure should be 2000-2300 psi for 1270, 1370 and early Model 1570 tractors, or 2200-2400 psi for late Model 1570 tractors.

Recommended test method is by use of a Hydra-Sleuth flow meter as outlined in paragraph 120, or by teeing a suitable test gage in pressure line between brake valve and steering manual pump. Turn steering wheel to either lock and hold against lock ONLY long enough to read relief pressure with engine at 2000 rpm. Adjustment for 1270, 1370 and early 1570 tractors is accomplished by adding or removing shims (S—Fig. 7). Shims are available in thickness of 0.010.

Adjustment for late Model 1570 tractors is accomplished by loosening jam nut (2—Fig. 7A) and turning adjusting screw (1) as required. Turning adjusting screw clockwise will increase pressure. Turning adjusting screw counter-clockwise will decrease pressure. Seal kits are available for brake valves.

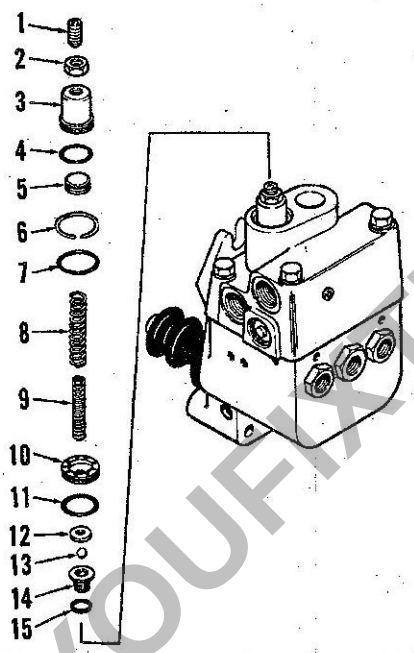


Fig. 7A—Power brake valve used on late 1570 tractors showing steering relief valve.

1. Adjusting screw
2. Jam nut
3. Spring retainer
4. "O" ring
5. Piston
6. Retaining ring
7. "O" ring
8. Outer spring
9. Inner spring
10. Spring guide
11. "O" ring
12. Washer
13. Ball (5/16)
14. Seat
15. "O" ring

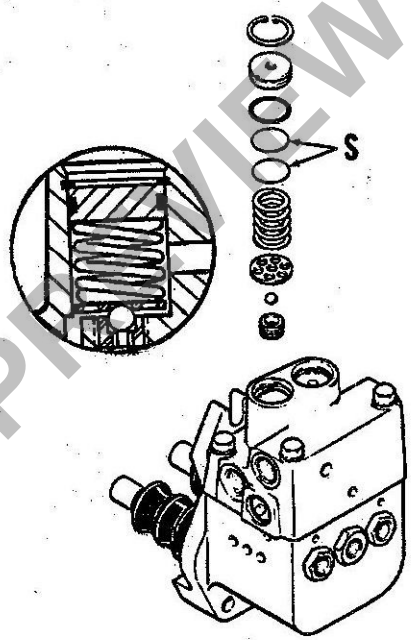


Fig. 7—Power brake valve housing showing steering relief valve. Pressure adjusting shims are (S).

HYDRAULIC PUMP

All Models

6. The eight gallon per minute side of dual hydraulic pump is used as the power source. Refer to paragraph 120 for testing, paragraph 122 for removal and installation and to paragraph 123 for pump overhaul.

MANUAL PUMP

All Models

7. **REMOVE AND REINSTALL.** To remove the manual steering pump, first loosen steering lock knob on steering wheel, disconnect manual pump hydraulic hoses and remove the four cap screws securing manual pump to steering column bracket. Disconnect the pump body from "U"-joint connector by removing "E" clip from pin and removing pin. Plug all holes and cap all lines to prevent dirt from entering system. Install pump by reversing disassembly procedures. With steering wheel in the lowest tilt position, rotate steering wheel as pump is tightened to mounting bracket to be sure pump is not binding. Bleed system as outlined in paragraph 3.

8. **OVERHAUL.** To disassemble the removed manual pump, refer to Fig. 9 and proceed as follows: Install a fitting in one of the four ports in housing (25), then clamp fitting in a vise so that input shaft (17) is pointing downward. Remove cap screws and end cover (44).

NOTE: Lapped surfaces of end cover (44), commutator set (39 and 40), manifold (38), stator-rotor set (35, 36 and

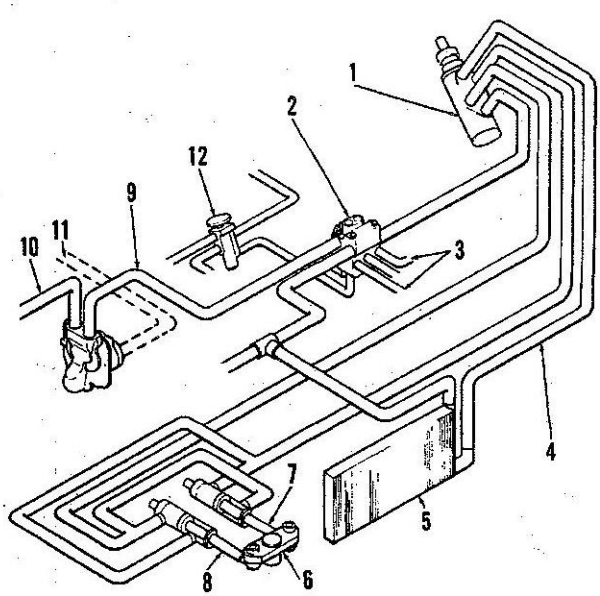


Fig. 8—Schematic view of steering hydraulic circuit. Steering relief valve is located in brake valve 2.

1. Manual pump
2. Brake valve
3. Brake lines
4. Line to cooler
5. Oil cooler
6. Steering arm
7. L. steering cylinder
8. R. steering cylinder
9. 8 GPM line
10. 20 GPM line
11. Charging oil
12. Diff. lock valve

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Piston Dia. Bottom of Skirt
(including wear) 4.3678-4.3698
Piston Skirt Clearance.....0.004-0.006
Sleeve Bore Diameter
(including wear) 4.3750-4.3833
Max. Out-Of-Round.....0.002
Max. Taper.....0.007
Piston Pin Diameter 1.6244-1.6246
Clearance In Piston 0.0005-0.002
Clearance In Rod 0.0008-0.0014
Top Compression Ring End Gap
(including wear) 0.015-0.035
Side Clearance .....Keystone Ring
Second Compression Ring
End Gap (Keystone).....0.013-0.023
(Square type).....0.013-0.025
Side Clearance.....0.0025-0.004
Oil Control Ring
Rail End Gap 0.010-0.020
Rail Side Clearance 0.0035-0.0065
One Piece End Gap 0.010-0.035
One Piece Side Clearance .0.001-0.005
Series 1370-1570
Piston Material .....Aluminum Alloy
Piston Dia. Bottom of Skirt
(including wear) 4.6178-4.6198
Piston Skirt Clearance....0.0045-0.0055
Sleeve Bore Diameter
(including wear) 4.6250-4.6363
Max. Out-Of-Round.....0.002
Max. Taper.....0.007
Piston Pin Diameter 1.7994-1.7996
Clearance In Piston 0.0005-0.0011
Clearance In Rod 0.0008-0.0014
Top Compression Ring
End Gap
(including wear) 0.015-0.035
Side Clearance .....Keystone Ring
Second Compression Ring
End Gap
(including wear) 0.015-0.035
Side Clearance
(Square type only) ...0.0035-0.0055
Oil Control Ring (1370)
End Gap 0.010-0.035
Side Clearance
(including wear) 0.001-0.005
Rail End Gap 0.010-0.020
Rail Side Clearance 0.0035-0.0065
Oil Control Ring (1570)
End Gap 0.016-0.026
Max. allowable.....0.036
Side Clearance.....0.0015-0.003
Max. allowable.....0.005

CYLINDER SLEEVES

All Models

31. **REFINISHING.** If cylinder sleeves are to be re-used, sleeve bore should be refinished using a 180-220 grit rigid hone or 180 grit silicone carbide double spiral brush. Move deglazing tool up and down in cylinder at the correct speed to provide an approximately 45° crosshatch pattern. Clean the finished sleeve thoroughly with a cloth dampened in warm detergent suds until a white cloth will remain clean when rubbed on the finished surface.

NOTE: Diesel fuel, oil or solvent will NOT remove abrasives from sleeves. Oil sleeves immediately after drying bore.

Recheck sleeve after honing. If out-of-round or taper exceeds specifications, or if maximum diameter exceeds specifications, renew the sleeve.

32. **REMOVE AND REINSTALL.** The wet-type cylinder sleeves can be removed with a suitable puller after removing rod and piston units as outlined in paragraph 29. Cover crankshaft to prevent dislodged particles from falling on crankshaft journals as sleeve is removed.

Thoroughly clean upper and lower grooves in cylinder block and remove and discard sealing rings. If sleeve is to be reinstalled, clean outside of sleeve. No attempt should be made to re-use sealings rings.

Install the sleeve without sealing rings. Sleeve should enter block bore to full depth and turn freely by hand.

Install sealing rings on sleeve grooves, making sure rings are not twisted or cut. Lubricate with vaseline or water soluble grease. Insert sleeves by hand and carefully press into place without turning sleeve. Sleeve protrusion must be 0.000-0.006 above block. The use of a driver should not be necessary.

PISTON PINS AND BUSHINGS

All Models

33. The full floating piston pins are retained in piston bosses by snap rings and are available in standard size only.

Pin bushings in connecting rod should be removed with a press, and new bushing installed with a piloted arbor with oil hole in rod and bushing aligned. Bushing must be finish reamed or honed after installation. Refer to tables following paragraph 30 for specifications.

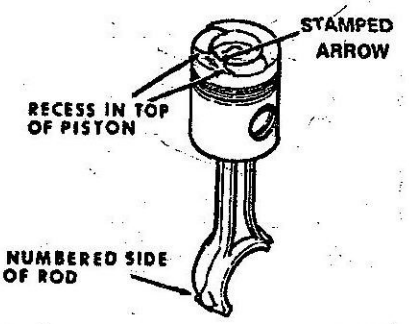


Fig. 33—View showing piston and connecting rod correctly assembled.

CONNECTING RODS AND BEARINGS

All Models

34. Connecting rod caps are retained by self-locking cap screws and rod and cap mating surfaces are grooved so that cap can be installed in correct position only.

Standard crankpin diameter is 2.748-2.749 for Series 1270 and 2.998-2.999 for Series 1370 and 1570. Desired bearing clearance is 0.0013-0.0038; maximum allowable clearance is 0.005. Regrind or renew crankshaft if out-of-round exceeds 0.0005, or taper exceeds 0.0015. Bearing liners are available in undersizes of 0.002, 0.010, 0.020 and 0.030 as well as standard. Connecting rod side clearance should be 0.007-0.016.

When reinstalling, bearing caps should be away from camshaft, which will place stamped cylinder numbers down and to camshaft side as shown in Fig. 33. Tighten the self-locking cap screws to a torque of 95-105 ft.-lbs.

CRANKSHAFT AND MAIN BEARINGS

All Models

35. The crankshaft is supported in seven main bearings. Crankshaft end play is controlled by bronze thrust washers on each side of fifth main bearing.

Standard main bearing journal diameter is 2.998-2.999 for Series 1270 and 3.498-3.499 for Series 1370 and 1570. Main bearing caps are numbered 1 through 7 and caps must be reinstalled in correct position. Desired main bearing diametral clearance is 0.0016-0.0046 with a maximum allowable clearance of 0.006 for all models. Upper and lower bearing shells are not interchangeable; be sure the half containing the oil hole is installed in block and that oil holes properly align.

Desired crankshaft end play is 0.003-0.012 for all models. Maximum allowable crankshaft end play is 0.020 for all engines. Thrust bearing standard thickness is 0.176-0.186 for Series 1270; 0.147-0.157 for Series 1370 and 0.155-0.157 for Series 1570. Thrust washers of 0.006 oversize thickness are available for service in all engines.

Main bearing liners can be renewed after removing oil pan, oil pump and bearing caps.

Main bearing liners are available in undersizes of 0.002, 0.010, 0.020 and 0.030 as well as standard. Main bearing cap screws are self-locking type and can be re-used. When installing front

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to 0.010-0.030. Shims are available in thicknesses of 0.036, 0.060 and 0.135. Make sure spindle does not bind after retaining cap screw is tightened.

2. **TIE-RODS AND TOE-IN.** To adjust the tie-rods, refer to Fig. 4. Turn steering wheel to right until left spindle stop contacts axle stop as shown at (A); then adjust left tie rod until clearance (B) between center steering arm and cross member plate is 1/8-inch. Turn steering wheel fully left and repeat the adjustment on right tie-rod.

NOTE: It may be necessary to adjust steering cylinder anchor nuts (C) if cylinders reach limit of their travel before 1/8-inch clearance (B) is obtained.

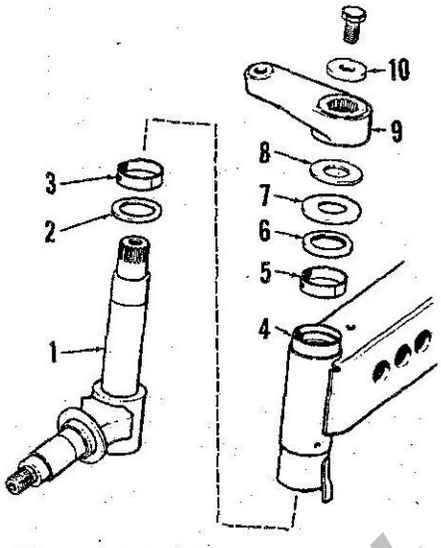


Fig. 3—Exploded view of right knee and associated parts.

1. Spindle
2. Thrust bearing
3. Lower bushing
4. Axle section
5. Upper bushing
6. Oil seal
7. Dust shield
8. Selective shim
9. Steering arm
10. Washer

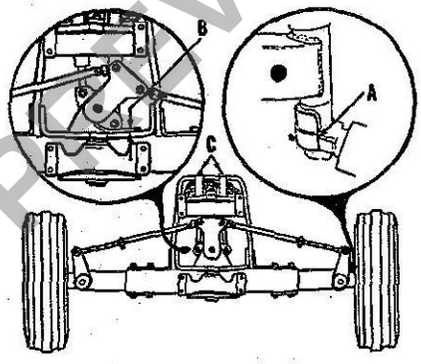


Fig. 4—Toe-in is correct when spindle is against stop as shown at (A) and distance (B) between lower center arm and cross member measures 1/8-inch. Adjust anchor nuts (C) if cylinders bottom when fully retracted or extended.

Toe-in should be 1/8-1/2-inch when adjustment is completed.

On all models, tighten tie-rod jam nuts to a torque of 150 ft.-lbs. and tie-rod clamp bolts securely.

POWER STEERING SYSTEM

All models are equipped with hydrostatic power steering using a Ross steering unit and a section of the main hydraulic system pump as the power source. Turning power is delivered to the wheels by two double acting cylinders through a center steering arm and tie rods.

LUBRICATION AND BLEEDING

All Models

3. The transmission and hydraulic system fluid is used, and sight gages located on right side of transmission indicates fluid level; refer to Fig. 6. Use only CASE TFD fluid or equivalent. Fill to at least the halfway mark on "FULL" gage. Refer to CONDENSED SERVICE DATA tables for reservoir capacity and to paragraph 118 for additional hydraulic system information.

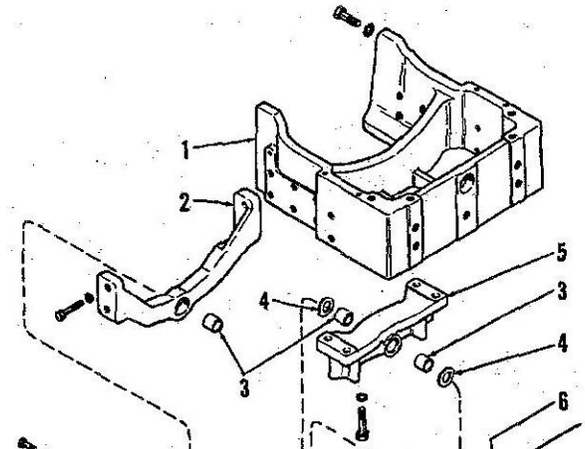


Fig. 6—Sight glasses are used on right side of transmission to indicate fluid level.

Fig. 5—Exploded view of front axle center member and associated parts.

1. Support
2. Rear pivot
3. Bushing (3)
4. Thrust washer
5. Front pivot
6. Axle section
7. Shoulder bolt (4)
8. Washer
9. Spacer
10. Front pivot pin
11. Center section
12. Locknut (4)
13. Rear pivot pin

Steering hydraulic circuit is combined with brake circuit and dual filter unit is located on bottom of torque tube housing. Tractors are provided with a dash-mounted warning light, and filter element should be renewed when warning light flashes, using a 10 micro element.

To bleed the steering hydraulic system, run engine at half throttle and turn steering wheel from lock to lock several times until steering action is firm and solid. Brake hydraulic system may also need to be bled as outlined in paragraph 106. Do not hold front wheels against steering stops unncessarily when bleeding system.

TROUBLESHOOTING

All Models

4. **LEAKAGE.** Internal leakage in

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steps will necessitate removal of rear axles and differential to obtain correct pinion preload. Make sure that alignment marks on retainer nut and pinion shaft are matched exactly and exact number of turns are used on retainer nut when reassembled.

CAUTION: Small cap screw in power shift carrier must be removed from shift rail before carrier is removed from transmission housing.

89. To disassemble C1 and C4 clutches, remove C1 clutch lube oil line (14—Fig. 93) (late models only) and cap screws retaining C1 reaction plate (15). Remove reaction plate and springs, then remove sun gear (16) and clutch plates. Remove cap screws to C1 and C4 piston carrier (11) and remove carrier, clutch return springs (4) and C4 clutch plates (5 and 6). Use an air hose and blow gun in both piston carrier oil tube holes to remove C1 piston (12) and C4 piston (7) as shown in Fig. 94.

90. To remove planet carrier from ring gear, hold ring gear and rotate planetary until the three holes in rear of carrier align with three socket head retainer cap screws (Fig. 95). Insert a 5/32 inch Allen wrench through holes and remove screws. Using two screwdrivers or other suitable levers, pry planetary assembly carefully from ring gear. After planetary is out, remove needle thrust bearing and washer (7 and 8—Fig. 99) from hub of ring gear and on early models, remove mainshaft sealing ring (Fig. 96). Remove snap ring (6—Fig. 99) retaining ball bearing (5) to mainshaft. Install three 10-24x1 inch cap screws in ball bearing retainer and use cap screws as jack screws to force bearing from mainshaft. Loosen all six cap screws inside ring gear which retain C2 clutch hub (17—Fig. 98) but do not remove them. Using two levers at rear of ring gear assembly, pry against power shift carrier to remove ring gear assembly from mainshaft (Fig. 97). Inspect oil distributor ring bore in rear of power shift carrier after ring gear assembly is removed. Bore must be smooth and free of grooves or burrs.

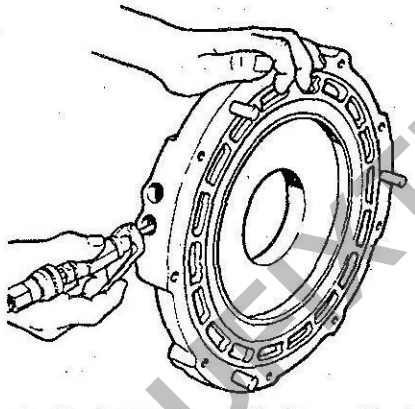


Fig. 94—Remove C1 and C4 pistons with air in both oil tube holes.

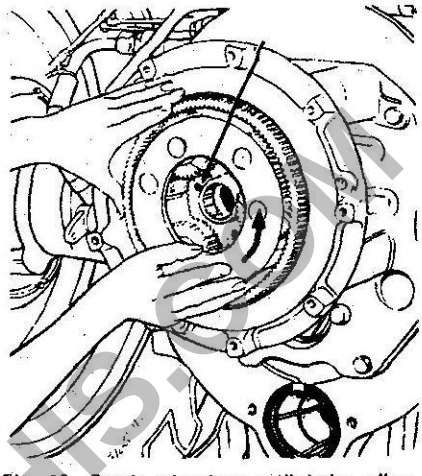


Fig. 95—Rotate planetary until holes align with socket head cap screws. Use a 5/32-inch Allen wrench to remove cap screws.

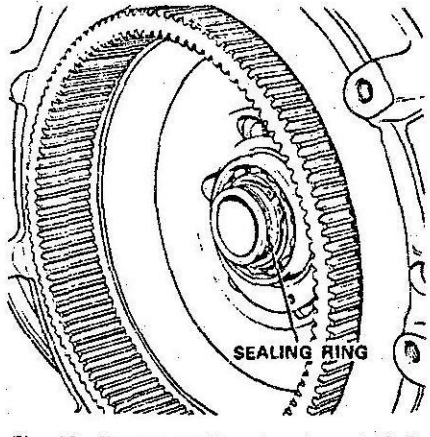


Fig. 96—Remove sealing ring on mainshaft so that snap ring may be removed.

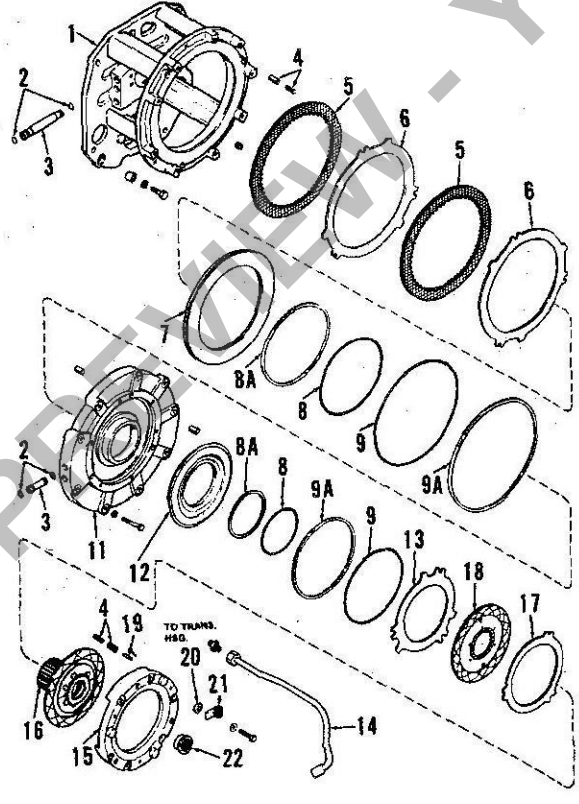


Fig. 93A—Exploded view of C1 and C4 clutches used in 1570 tractors (Transmission serial number 10057502 and up). Note difference in the seals for pistons (7 and 12). Refer also to Fig. 93.

1. Carrier assy.
2. "O" rings
3. Oil tubes
4. Return springs
5. C4 friction disc
6. Steel plate
7. C4 piston
8. "O" ring
8A. Inner sealing ring
9. "O" ring
9A. Outer seal ring
11. Piston carrier
12. C1 piston
13. Steel plate w/tabs
14. C1 lube tube
15. Reaction plate
16. Sun gear & plate
17. Steel plate
18. C1 friction plate
19. Roll pin
20. Spacer
21. Clamp
22. Bushing

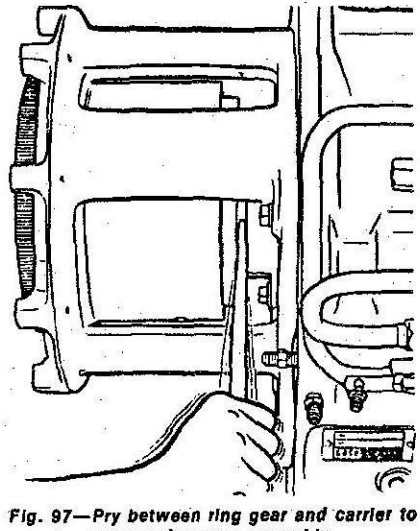


Fig. 97—Pry between ring gear and carrier to remove ring gear assembly.

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