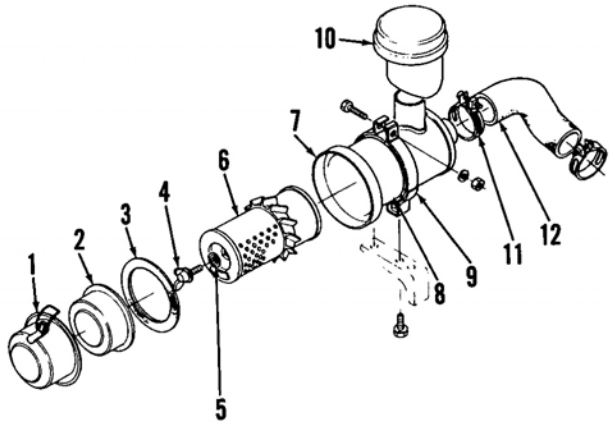

Fig. 33—Exploded view of a typical air filter assembly.

1. Cover
2. Baffle
3. Gasket
4. Wing screw
5. Gasket
6. Element
7. Housing
8. Cushion
9. Band
10. Cap
11. Clamp
12. Inlet hose

after cleaning to neutralize the solvent and prevent etching of polished surfaces.

Clean nozzle spray hole from inside using a pointed hardwood stick or wood splinter as shown in Fig. 29. Scrape all carbon from pressure chamber using hooked scraper as shown in Fig. 30. Clean valve seat using brass scraper as shown in Fig. 31, then polish seat using wood polishing stick and mutton tallow as in Fig. 32.

Back flush nozzle using reverse flusher adapter. Reclean all parts by rinsing thoroughly in clean diesel fuel or calibrating oil and assemble while parts are wet. Make sure adjusting shim pack is intact. Tighten nozzle retaining nut (10—Fig. 28) to a torque of 58.8-78.4 N·m (43-58 ft.-lbs.). Do not overtighten, distortion may cause valve to stick and no amount of overtightening can stop a leak caused by scratches or dirt. Retest assembled injector as previously outlined.

GLOW PLUGS

All Models

45. Glow plugs are parallel connected with each individual glow plug grounding through mounting threads like a spark plug. Turn key switch to preheat position. Indicator light will glow after about 10 seconds if unit is operating satisfactorily and will fail to glow if circuit is open. It will take at least 20 seconds until the preheating coil in the combustion chamber is fully heated.

Glow plugs are rated at 10 volt, 20 ampere capacity. If indicator light fails to glow after key switch is turned to preheat position and 10 seconds have elapsed, then check for loose connections at switch, indicator lamp, glow plug and ground. Using an ohmmeter, check resistance of each glow plug in turn. Resistance between glow plug terminal and cylinder head should be 1.35-1.65 ohms.

AIR FILTER

All Models

46. **INSPECTION.** All models are equipped with a dry type renewable air filter element as shown in Fig. 33. Manufacturer recommends blowing out filter after every 100 hours of operation and renewing filter every year or after six cleanings.

COOLING SYSTEM

All Models

47. All engines are liquid cooled and use a thermo-siphon type cooling system. Note that cooling fan (1—Fig. 34) is mounted on alternator (2). Recommended pressure rating for radiator cap is 88.25 kPa (13 psi).

Recommended fan belt deflection under a load of 98 N (22 lbs.) applied at mid-point between fan pulley and tension pulley should be 10 mm (25/64-inch). Relocate tension pulley (10) to obtain desired belt tension.

ELECTRICAL SYSTEM

ALTERNATOR

All Models

48. Alternator is mounted on water outlet and drives cooling fan. Refer to Fig. 35 for an exploded view of alternator assembly.

Alternator should produce 14 volts maximum with a minimum charging current of 8½ amperes at alternator speed of 4250 rpm.

ELECTRIC STARTER

All Models

49. Refer to Fig. 36 for an exploded view of Nippon Denso electric starter used on all models. Minimum brush

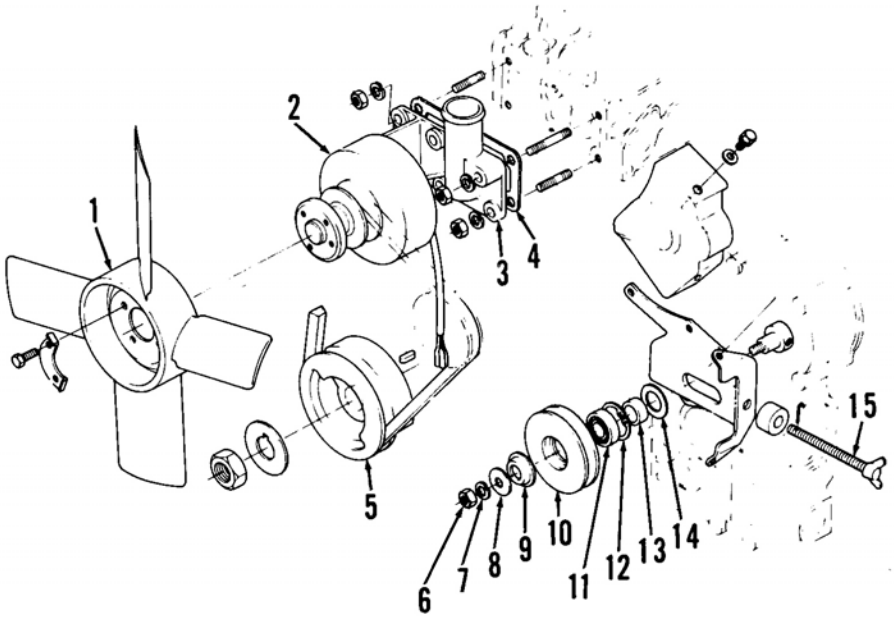

Fig. 34—View of alternator and tensioner pulley.

1. Fan
2. Alternator
3. Water outlet
4. Gasket
5. Crankshaft pulley
6. Nut
7. Lockwasher
8. Washer
9. Collar
10. Tensioner pulley
11. Bearing
12. Snap ring
13. Sleeve
14. Washer
15. Belt tension adjusting screw

length is 10.7 mm (0.4213 inch) while wear limit of commutator is 29.7 mm (1.1693 inches) diameter. With no load imposed on starter and using an 11 volt source, the starter shaft should rotate at 5000 rpm or more while drawing 50 or less amperes current.

Pinion engagement depth is adjusted by turning hook (H – Fig. 36). With starter pinion in engaged position, distance between collar (8) and pinion should be 0.1-0.4 mm (0.0039-0.0157 inch). Turn hook (H) so pinion engagement depth is correct.

ENGINE CLUTCH

LINKAGE

All Models

51. **ADJUSTMENT.** Clutch pedal free play should be 2-4 mm (5/64-5/32 inch). Clutch pedal travel should not exceed 8 mm (5/16-inch). Safety switch (1 – Fig. 39) should not be engaged until clutch pedal is depressed past the recommended free play setting, placing clutch in disengaged position.

If clutch pedal free play is too little, then shorten intermediate rod (7). If clutch is difficult to disengage, then lengthen intermediate rod (7). To adjust intermediate rod (7) length, unhook spring (8), remove cotter key (3), withdraw pin (4), loosen locknut (6) and turn clevis (5) until desired setting is attained, then retighten locknut (6). Reassemble using a new cotter key (3).

Adjust clutch pedal travel by loosening locknut (9 – Fig. 40) and turning adjusting screw (10) until correct travel distance is attained, then retighten locknut.

Safety switch (1 – Fig. 39) is adjusted on some models by loosening locknuts (11), then screwing switch in or out of mounting bracket. On other models, an adjusting screw positioned in lever arm is used.

ENGINE/CLUTCH HOUSING SPLIT

All Models

52. Drain engine oil and transmission/hydraulic system fluid into suitable containers. Detach negative battery terminal from battery post. Remove air cleaner assembly, muffler and left and right side covers. Detach drag link from steering arm. Disconnect positive battery terminal from battery post. Disconnect electrical wiring at engine starter, oil pressure sending unit, headlights, glow plugs, alternator and safety switch. If needed, loosen front-wheel drive shaft protective cover band at joint case, then withdraw drive shaft from joint case. Disconnect throttle linkage and compression release cable. Disconnect fuel leak-off line from rear injector. Remove heat insulator plate located at rear of engine. Close fuel shut-off valve at fuel filter, then disconnect fuel supply line from fuel pump. Remove line con-

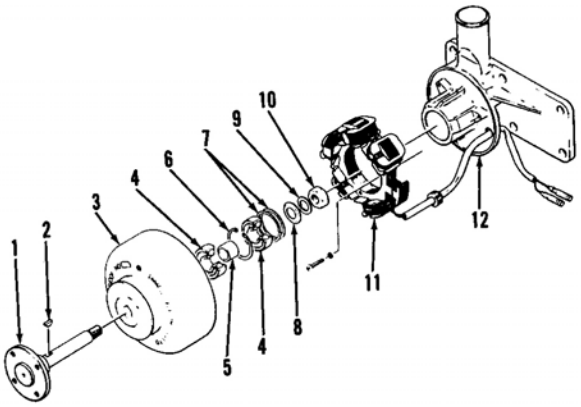

Fig. 35 – Exploded view of alternator assembly.

1. Fan shaft
2. Key
3. Rotor
4. Bearing
5. Spacer
6. Snap ring
7. Shim(s)
8. Washer
9. Lockwasher
10. Nut
11. Stator
12. Water outlet & mounting base

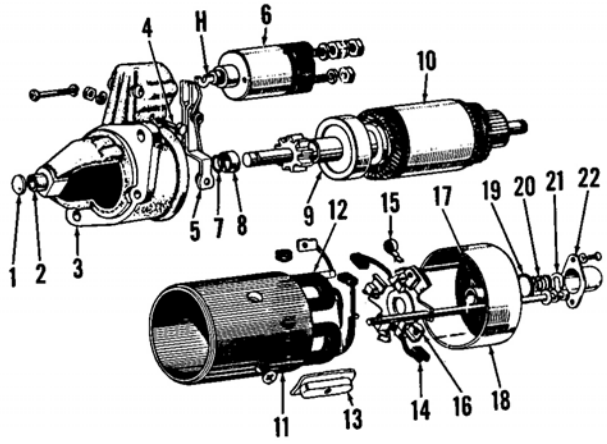

Fig. 36 – Exploded view of electric starter.

1. Cap
2. Bushing
3. Drive housing
4. Pivot bolt
5. Fork
6. Solenoid
7. Snap ring
8. Collar
9. Starter drive
10. Armature
11. Frame
12. Field coils
13. Field magnets
14. Brush
15. Brush spring
16. Brush plate
17. Bushing
18. End frame
19. Packing
20. Spring
21. Spring retainer
22. Cap

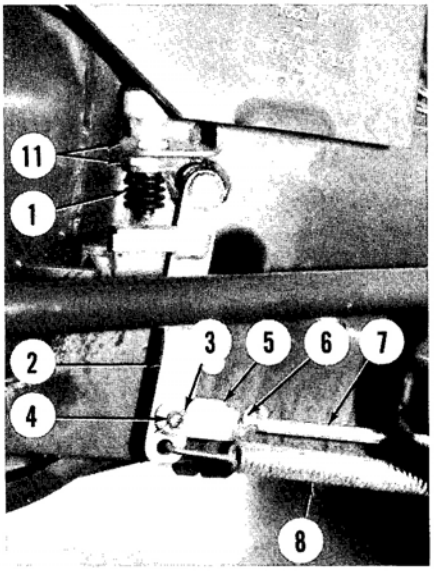

Fig. 39 – View of clutch linkage used on Models B6100HST-D, B6100HST-E, B7100HST-D and B7100HST-E. Other models are similar.

1. Safety switch
2. Lever
3. Cotter key
4. Pin
5. Clevis
6. Locknut
7. Intermediate rod
8. Spring
11. Locknuts

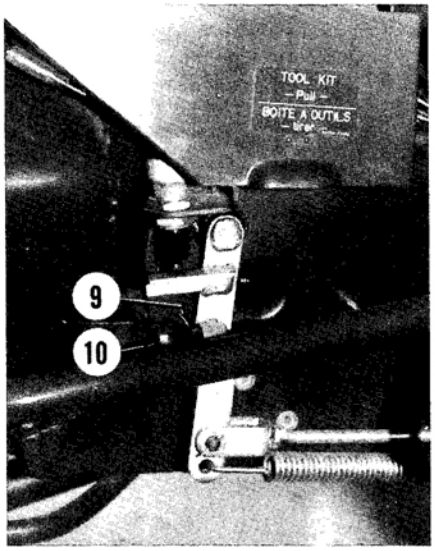

Fig. 40 – View of locknut (9) and adjusting screw (10), used for adjusting clutch pedal travel.

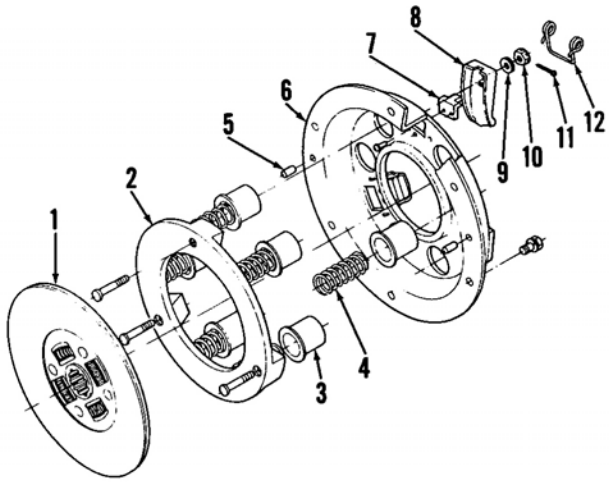

Fig. 41—Exploded view of clutch assembly used on all models.

1. Clutch disc
2. Pressure plate
3. Cap
4. Spring
5. Pin
6. Cover
7. Lever seat
8. Release lever
9. Washer
10. Castle nut
11. Cotter key
12. Return spring

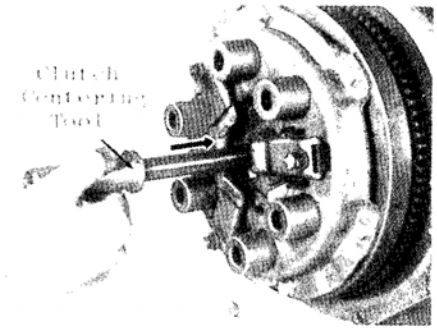

Fig. 42—Install clutch centering tool as shown.

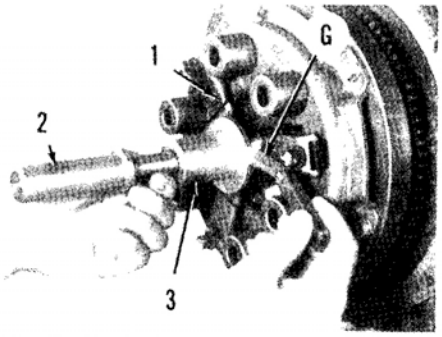

Fig. 43—To check release lever (1) height, install clutch centering tool (2) with measuring tool (3), then measure clearance between release lever (1) and measuring tool (3) with feeler gage (G). Refer to text.

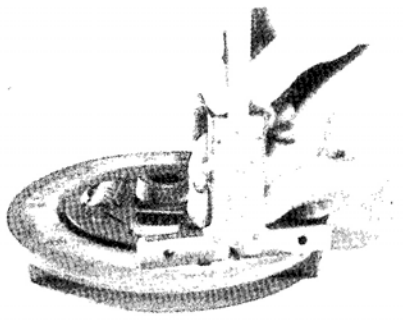

Fig. 44—View showing procedure for measuring clutch disc wear. Refer to text.

necting fuel tank to fuel filter at filter port and plug openings to prevent fuel spillage. Remove fuel filter assembly and fuel tank. Remove hydraulic fluid supply lines. Note copper washers and "O" rings when disassembling. Attach a suitable hoist or holding fixture to engine assembly and support rear of tractor with a suitable jack. Remove the eight cap screws connecting engine to clutch housing. Pull engine and front end assembly along with clutch assembly straight forward to separate engine from clutch housing.

Reinstall in reverse order of removal. Tighten the eight cap screws securing engine to clutch housing to 19.7-29.5 N·m (15-22 ft.-lbs.) torque. Replenish engine oil and transmission/hydraulic fluid with quantity and grade of lubricant as noted in CONDENSED SERVICE DATA TABLE. Bleed fuel system as outlined in paragraph 36.

CLUTCH

All Models

53. **REMOVE AND REINSTALL.** To remove clutch assembly for service, first split tractor between engine and clutch housing as outlined in paragraph 52. Insert clutch centering tool into clutch disc as shown in Fig. 42. Remove cap screws securing cover (6-Fig. 41) and pressure plate (2) assembly to flywheel, then withdraw pressure plate assembly. Remove clutch centering tool along with clutch disc (1).

Reinstall clutch assembly in reverse order of removal. Align clutch disc to engine crankshaft pilot bearing hole using clutch centering tool as shown in Fig. 42, then securely tighten cap screws mounting pressure plate assembly to flywheel.

Height of release levers should be 44.8-46.2 mm (1.764-1.819 inches) measured from flywheel to surface. Allowable difference between release lever heights is 0-0.3 mm (0-0.012 inch). Check lever heights by installing clutch centering tool (2-Fig. 43) along with measuring tool (3), then using feeler gage (G), measure clearance between release lever (1) and measuring tool (3). Adjust release lever height by removing cotter key (11-Fig. 41) and turning castle nut (10).

54. **OVERHAUL.** Remove clutch assembly as outlined in paragraph 53. Remove cotter keys (11-Fig. 41), then exercising caution, remove castle nuts (10). Complete disassembly with reference to Fig. 41. Cover (6) and pressure plate (2) are renewable only as parts of the complete assembly.

Measure clutch disc wear using a suitable depth gage as shown in Fig. 44. Renew clutch disc if distance from clutch disc surface to top of rivet head is not at least 0.1 mm (0.004 inch). Inspect pressure plate (2-Fig. 41) surface for cracks, scoring, heat discoloration and excessive wear. Surface grind or renew as needed. Inspect springs (4) for cracks, weakness, warpage and any other damage. Inspect all other parts for excessive wear or any other damage. Renew all parts as needed.

Reassembly is reverse order of disassembly.

RELEASE BEARING

All Models

55. Release bearing may be serviced after separation of engine from clutch housing as outlined in paragraph 52. Renew bearing if outer race does not turn smoothly without noise or excessive play is noticed when outer race is tilted forward or backward.

Extract release bearing from holder to renew.

HYDROSTATIC TRANSMISSION

Models B6100HST-D, B6100HST-E, B7100HST-D and B7100HST-E are equipped with a hydrostatic transmission and a range transmission. Refer to RANGE TRANSMISSION section for service on that unit.

OPERATION

All Models So Equipped

56. Hydrostatic transmission consists of variable displacement piston pump, fixed displacement piston motor, charge trochoid pump and valve system. Two

types of hydrostatic transmissions are used, TYPE 1 and TYPE II. Refer to the following chart for tractor model and hydrostatic transmission match up.

TYPE I

Model	(Prior to Serial No.)
B6100HST-D	50127
B6100HST-E	11140
B7100HST-D	51742
B7100HST-E	11906

TYPE II

Model	(Serial No. and Later
B6100HST-D	50127
B6100HST-E	11140
B7100HST-D	51742
B7100HST-E	11906

Engine power is transferred to the input shaft (7 – Fig. 45 or 46) which drives the trochoid rotor assembly (5) and variable displacement piston pump (24). Trochoid rotor assembly (5) is located in charge pump case (6) and is used to supply low pressure oil to the charge system. Cylinder block (27) within the variable displacement piston pump (24) is rotated against variable swashplate (29) surface. If the swashplate is moved in the forward or reverse direction, oil will be pumped to the fixed displacement piston motor (21) to turn the output shaft (19). The higher the volume of oil the faster the output shaft will turn. Volume of oil is controlled by the variable swashplate degree of tilt. Fluid direction and pressure regulation is governed by valves contained within the circuits.

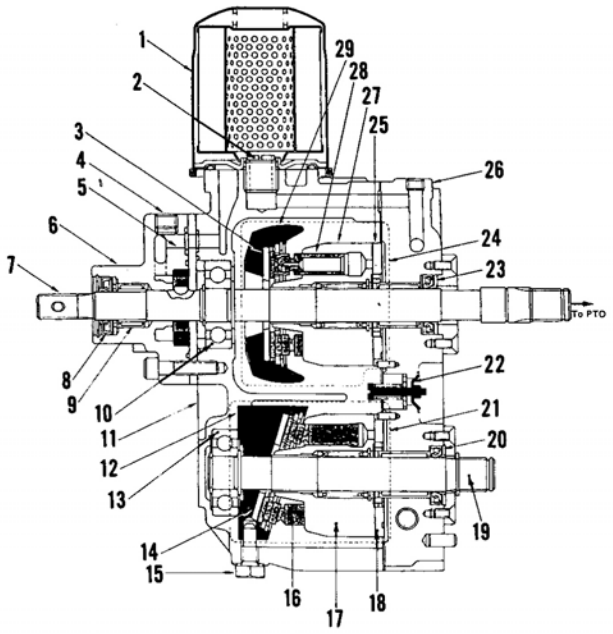

Fig. 45 – Cross-sectional view of Type I hydrostatic transmission.

1. Filter
2. Joint
3. Thrust plate
4. Charge pressure check port
5. Trochoid rotor assy.
6. Charge pump case
7. Input shaft
8. Oil seal
9. Needle bearing
10. Ball bearing
11. Case
12. Fixed swashplate
13. Ball bearing
14. Thrust plate
15. Stop bolt
16. Piston
17. Cylinder block
18. Valve plate
19. Output shaft
20. Oil seal
21. Fixed displacement piston motor
22. Case relief valve
23. Oil seal
24. Variable displacement piston pump
25. Valve plate
26. Port block
27. Cylinder block
28. Piston
29. Variable swashplate

PRESSURE TEST

All Models So Equipped

57. Pressure tests may be performed after removing hydrostatic transmission protective cover as follows: Remove speed control knob, left and right hood latch, front and rear mounting cap screws, then withdraw cover.

Refer to the following paragraphs for case pressure, charge pressure, high relief pressure (forward and reverse) and vacuum test procedures.

58. **CASE PRESSURE.** Remove plug from port (B – Fig. 47) and install a low pressure gage. Position high-low gear shift and speed control pedal in neutral. Engage parking brake, then run engine at 2800 rpm. Recommended reading is 165.6-220.8 kPa (24-32 psi) with an allowable limit of 144.9-248.4 kPa (21-36 psi). Low case pressure could cause transmission overheating, resulting from oil not being circulated to oil cooler. A high pressure reading could indicate that the pipe to the oil cooler or the oil cooler itself is clogged, which could cause oil seal damage.

59. **CHARGE PRESSURE.** Prior to charge pressure testing, check case pressure as outlined in previous section. To check charge pressure, remove plug from port (A – Fig. 47) and install a low pressure gage. Position high-low gear shift and speed control pedal in neutral. Engage parking brake, then run engine at 2800 rpm. To calculate correct charge pressure, deduct case pressure reading (paragraph 58) from measured charge pressure. Recommended reading is 441.6-579.6 kPa (64-84 psi) with an allowable limit of 414-607.2 kPa (60-88 psi). Low pressure could cause a lack of power or noise and vibration.

60. **HIGH RELIEF PRESSURE. (Forward or Reverse).** Remove plug from port (D – Fig. 47) to test forward circuit or port (C) to test reverse circuit. Install a high pressure gage that will read at least 27.6 MPa (4000 psi). Start engine and allow transmission fluid to warm up to operating temperature. Engage parking brake, then set engine speed at 2800 rpm. Depress speed control pedal approximately 10 mm

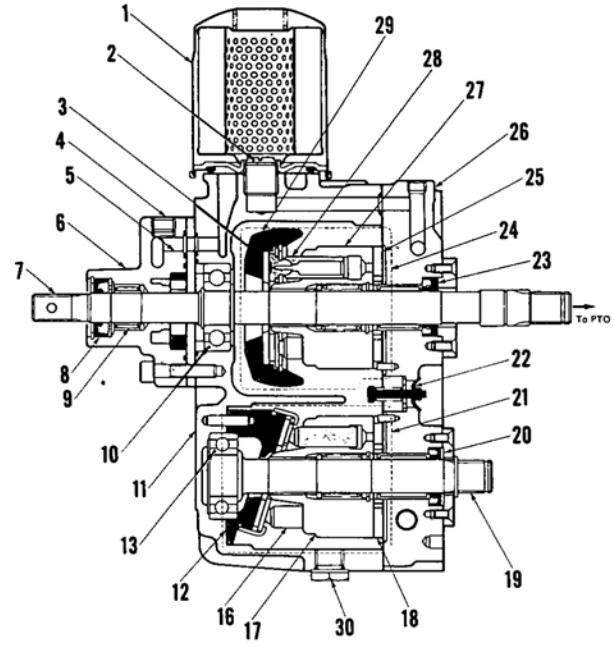

Fig. 46 – Cross-sectional view of Type II hydrostatic transmission. Refer to legend in Fig. 45 for parts identification except for drain plug (30).

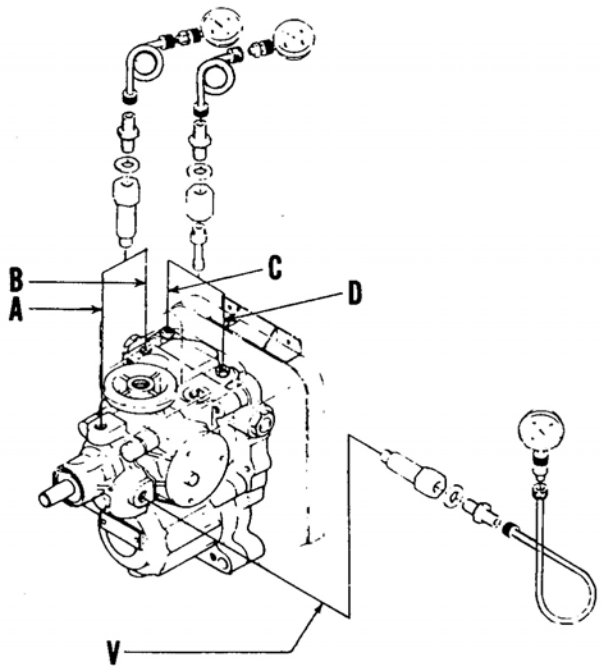

Fig. 47—View showing locations for pressure testing hydrostatic transmission.
A. Charge pressure
B. Case pressure
C. High relief pressure (Reverse)
D. High relief pressure (Forward)
V. Vacuum

(25/64-inch) in direction of circuit being tested (forward or reverse). Record gage reading as quickly as possible.

NOTE: Depressing speed control pedal more than 10 mm (25/64-inch) will give an incorrect high reading. DO NOT hold speed control pedal down longer than 10 seconds.

Recommended high relief pressure is 21.6-25.5 MPa (3130-3700 psi).

61. **VACUUM.** Remove plug from port (V—Fig. 47) and install a vacuum gage with maximum capability of 762 mm Hg (30 in. Hg). Engage parking brake, then run engine at 2800 rpm. Recommended maximum vacuum gage readings are as follows; readings will vary according to oil temperature:

Oil Temperature	Gage Reading
30°C (86°F)	120 mm Hg (4.7 in. Hg)
50°C (122°F)	60 mm Hg (2.4 in. Hg)
80°C (176°F)	35 mm Hg (1.4 in. Hg)

A high vacuum reading indicates incorrect oil type or a clogged strainer. A fluctuating reading indicates a faulty or loose connection on the suction side.

LINKAGE

All Models So Equipped

62. **OPERATION.** View of linkage is shown in Fig. 48. Neutral holder (5—Fig. 48) is connected to transmission trunnion shaft which controls the angle of variable swashplate. Neutral holder (5) is connected to rod guide (3) via speed control rod (4). Depressing pedal (9) causes rod guide (3) to rotate. Forward travel speed may be set by engaging speed control linkage (1, 2 and 11 through 15). Speed control linkage must be disengaged manually. Neutral adjuster (6) is used to correctly position needle bearing (7) in center position of neutral holder (5) when pedal (9) or speed control linkage is released, thus placing transmission in neutral position. Spring (25) is used to return neutral holder arm (8). Damper (10) slows pedal return rate to prevent tractor from stopping too quickly and to prevent transmission damage due to fast pedal direction changeover.

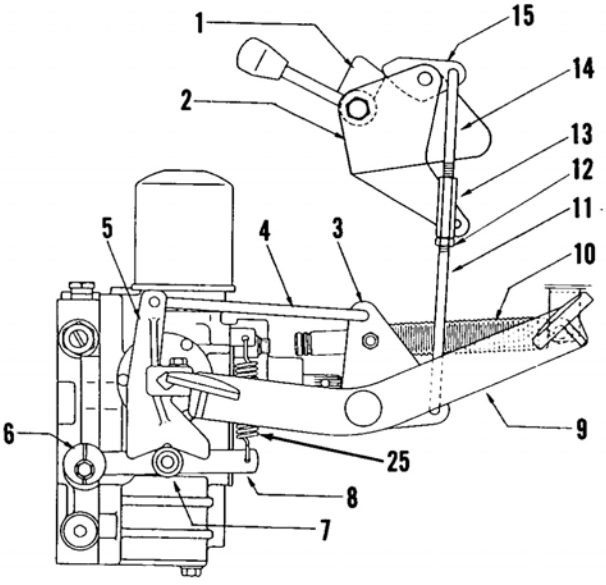

Fig. 48—View showing hydrostatic transmission control linkage.
1. Lever
2. Lever support
3. Rod guide
4. Speed control rod
5. Neutral holder
6. Neutral adjuster
7. Needle bearing
8. Neutral holder arm
9. Speed control pedal
10. Damper
11. Lower rod
12. Locknut
13. Turnbuckle
14. Upper rod
15. Cam
25. Spring

63. **ADJUSTMENT.** Before performing adjustments, be sure mechanism moves freely without binding. Dirt, grit or other foreign material may cause false adjustment settings.

To adjust neutral position proceed as follows: Place selector lever in two-wheel drive, raise rear wheels off the ground, then start engine and set engine speed at low idle.

Loosen cap screw (16—Fig. 49) and turn slot (18) counterclockwise so the rear wheels rotate in forward direction. Turn slot (18) clockwise until the rear wheels completely stop. Mark position (X) of slot (18) on clutch housing (17) where rear wheel rotation stopped.

Continue to turn slot (18) clockwise until the rear wheels rotate in the reverse direction, then turn slot (18) in counterclockwise direction until rear wheels completely stop. Mark position (Y) of slot (18) on clutch housing (17) where rear wheel rotation stopped.

Position neutral adjuster (6) so slot (18) is centered between marks X and Y, then tighten cap screw (16) to 19-32 N·m (14-24 ft.-lbs.) torque while securely holding slot (18) in position.

After lowering rear wheels, check that wheels stop automatically after forward-reverse pedal is released from either direction. If the wheels continue to turn in the forward direction, turn slot (18) clockwise in small increments. If the wheels continue to turn in the reverse direction, turn slot (18) counterclockwise in small increments. Continue adjustment procedure until neutral position is obtained when pedal is released from both directions.

If true neutral position cannot be found by adjustment procedure, move neutral holder arm (8—Fig. 48) by hand to determine if true neutral position can be obtained. If neutral cannot be found, problem may be located in the neutral valve.

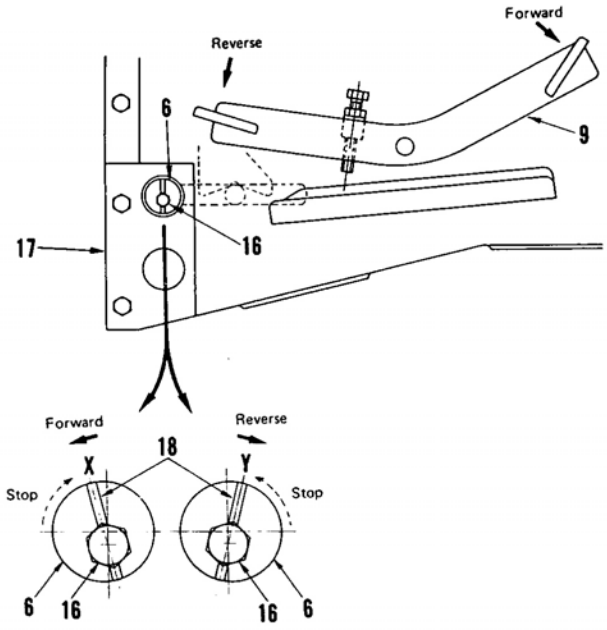

Fig. 49—View showing procedure for adjusting neutral position. Refer to text.

6. Neutral adjuster
9. Speed control pedal
16. Cap screw
17. Clutch housing
18. Slot

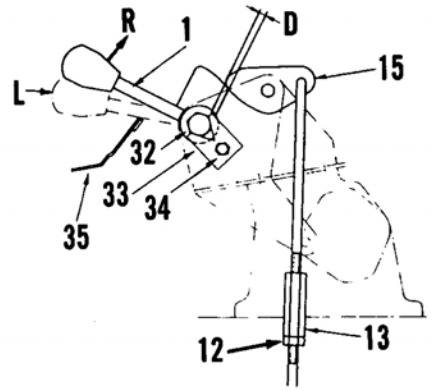

Fig. 50—Side view of forward speed control components. Refer to text.

1. Lever
12. Locknut
13. Turnbuckle
15. Cam
32. Bolt
33. Retainer plate
34. Cap screw
35. Cover

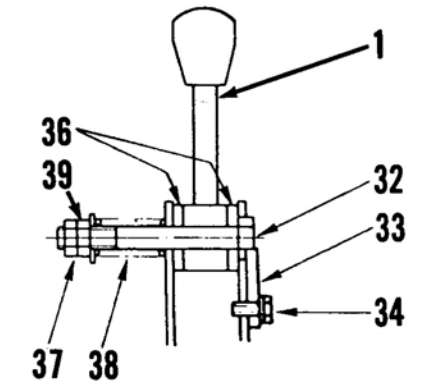

Fig. 51—Rear view of forward speed control components. Refer to text.

1. Lever
32. Bolt
33. Retainer plate
34. Cap screw
36. Plates
37. Locknut
38. Spring
39. Adjuster nut

To adjust forward speed control components proceed as follows: Loosen locknut (12—Fig. 50) and turn turnbuckle (13) until dimension (D) is 6-8 mm (15/64-5/16 inch), then retighten locknut (12). Loosen locknut (37—Fig. 51) and turn adjuster nut (39) to adjust tension on spring (38) until force required to operate lever (1—Fig. 50) in "R" direction is 25-30 N (5.5-6.6 lbs.), then retighten locknut (37—Fig. 51).

If excessive play is noted in lever (1—Fig. 50), adjust as follows: Loosen screw (34) and reposition retainer plate (33) until play is reduced and head of bolt (32) does not rotate when lever (1) is operated.

After installing cover (35), place lever (1) in position "L", then depress reverse side of speed control pedal. Observe linkage to make sure that cam (15) does not contact lever (1).

64. **OVERHAUL.** Overhaul of neutral position linkage components is evident after referral to Fig. 52. During reassembly, apply a thin coat of suitable grease around surface of bushing (24—Fig. 52). After reassembly, refer to paragraph 63 for adjustment of linkage.

CLUTCH HOUSING/ TRANSMISSION CASE SPLIT

All Models So Equipped

65. Drain transmission/hydraulic system fluid into a suitable container. Remove hydrostatic transmission protective cover as follows: Remove speed control knob, left and right hood latch, front and rear mounting cap screws, then withdraw cover. Remove hydrostatic transmission oil filter and joint. Raise hood and disconnect negative battery cable from battery post. Detach hydraulic lines as needed. Disconnect speed control rod (4—Fig. 48) from rod guide (3). Remove right and left brake pedal rods. Remove differential lock shaft. On four-wheel drive models,

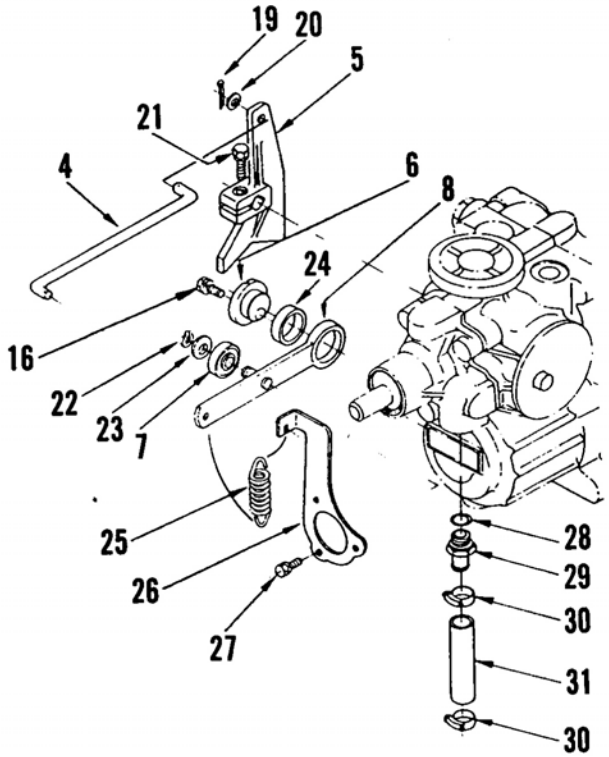

Fig. 52—Exploded view of neutral holder assembly and charge pump inlet hose.

4. Speed control rod
5. Neutral holder
6. Neutral adjuster
7. Needle bearing
8. Neutral holder arm
16. Cap screw
19. Cotter key
20. Washer
21. Cap screw
22. Snap ring
23. Washer
24. Bushing
25. Spring
26. Spring holder
27. Cap screw
28. "O" ring
29. Nipple fitting
30. Clamp
31. Hose

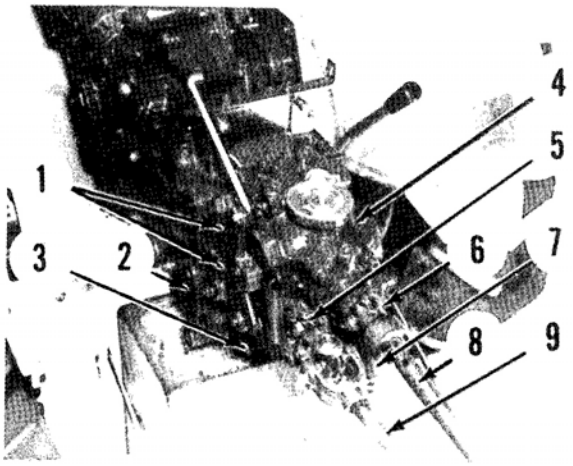

Fig. 53—Refer to text for removal of components shown in view.

1. Nuts
2. Transmission case
3. Cap screw
4. Hydrostatic transmission
5. Pin (4WD Models)
6. Pin
7. Hose
8. Propeller shaft
9. Drive shaft (4WD Models)

loosen drive shaft protective cover band at joint case, then withdraw drive shaft from joint case. Remove bolts and nuts securing step plates to fenders. Remove clutch housing and transmission case connecting plate from underneath side. Support rear of tractor. Attach a hoist with suitable holding fixtures to clutch housing. Remove bolts and nuts securing clutch housing to transmission case, then separate components.

Reassembly is reverse order of splitting procedure. Tighten bolts and nuts securing clutch housing to transmission case to 61-107 N·m (45-79 ft.-lbs.) torque. Refill transmission/hydraulic system with 13.5 liters (3.6 U.S. gallons) of the following hydrostatic transmission fluid or a suitable equivalent: Kubota UDT hydrostatic transmission fluid, Shell Donax-TD or TM, Mobil Fluid 350, Exxon Torque Fluid 56.

REMOVE AND REINSTALL

All Models So Equipped

66. Split clutch housing from transmission case as outlined in paragraph 65. Remove pin (6—Fig. 53), then separate propeller shaft (8) from transmission. On models equipped with front-wheel drive, remove pin (5), then separate drive shaft (9) from transmission. Remove nuts (1) and cap screw (3) from each side of hydrostatic transmission, then separate hydrostatic transmission from range transmission case.

Installation procedure is reverse order of removal. Tighten nuts (1) and cap screw (3) to 48-56 N·m (35-41 ft.-lbs.) torque.

OVERHAUL

All Models So Equipped

Before disassembly, plug all port openings, then thoroughly clean outside of transmission case. Make sure that a clean work bench or table is used. Construct a work table as shown in Fig. 54 if no suitable work bench is available. All parts should be cleaned separately in clean solvent and blown dry with clean compressed air to avoid nicks and burrs. Caution must be used to avoid damage to components; do not force parts.

67. Disassemble neutral holder assembly shown in Fig. 52. Place alignment marks on neutral adjuster (6) and neutral holder arm (8), so neutral position can be determined after reassembly. Remove snap ring (3—Fig. 55), then withdraw gear (2) and bearing (4). Remove snap ring (7), then withdraw gear (6). On models so equipped, extract front-wheel drive shaft (5) out front of transmission. Remove nipple fitting (1) and gasket (8).

Remove screws (1 and 3—Fig. 56) from port block (4), then separate port block (4) from case (2). Note that valve plates (7 and 8—Fig. 57) may remain with port block (4) during separation, be

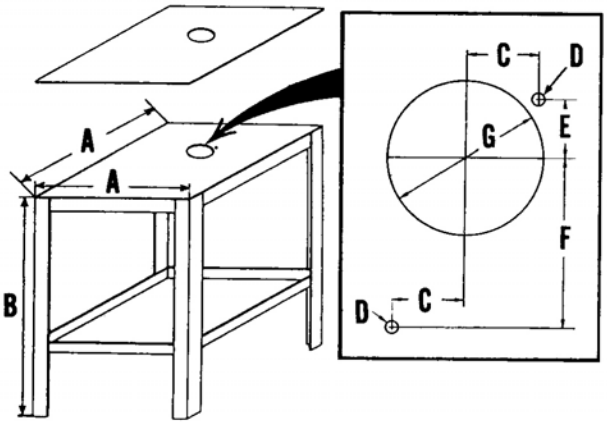

Fig. 54—View showing dimensions for constructing a work table to facilitate hydrostatic transmission disassembly and reassembly.

A. 500 mm (20 inches)
B. 1000 mm (40 inches)
C. 55 mm (2-11/64 inches)
D. 10 mm (25/64 inch)
E. 45 mm (1-49/64 inches)
F. 130 mm (5-1/8 inches)
G. 120 mm (4-23/32 inches)

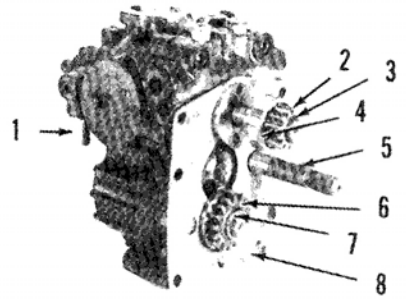

Fig. 55—Rear view of hydrostatic transmission.

1. Nipple fitting
2. Pto gear
3. Snap ring
4. Bearing
5. Front-wheel drive shaft (models so equipped)
6. Output shaft gear
7. Snap ring
8. Gasket

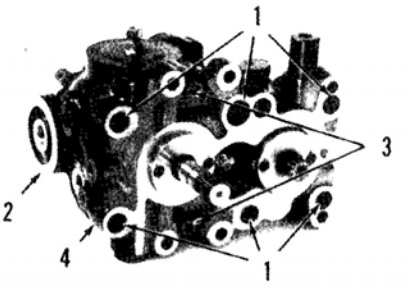

Fig. 56—Remove screws (1 and 3) to separate port block (4) from transmission case (2).

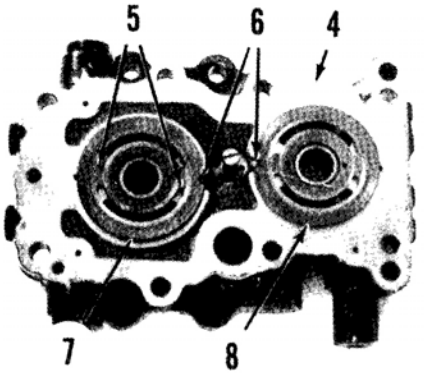

Fig. 57—View showing pump side valve plate (7) and motor side valve plate (8) located in port block (4). Valve plate (7) with two notches (5) is assembled on pump side. Note anchor pins (6).

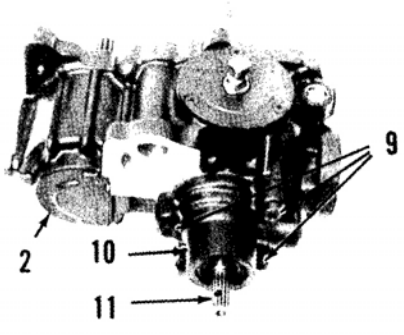

Fig. 58— Remove screws (9) and tap on rear of input shaft (11) with a suitable mallet to separate charge pump case (10) from transmission case (2).

careful not to allow plates to fall free. Remove valve plates (7 and 8). Note that valve plate (7) with two notches (5) is located on pump side, while valve plate (8) with no notches is located on motor side. Remove screws (9 – Fig. 58) securing charge pump case (10) to transmission case. Tap on rear of input shaft (11) with a suitable mallet to break charge pump case (10) loose from transmission case, then withdraw charge pump assembly along with the two dowel pins. Withdraw pump cylinder block (13 – Fig. 59) from case (2). Remove circlip (18), then extract pistons (15) and retainer plate (17). Remove thrust plate which is attached to variable swashplate (16). Remove stop bolt (19) (Type I transmission only), hold output shaft (14) and tap case (2) with a soft mallet to extract motor cylinder block assembly (12). Remove screws securing left and right trunnion shaft covers and remove covers, then remove variable swashplate.

Separate input shaft from charge pump case, then inspect shaft for excessive wear and any other damage. Check pistons for smooth movement through cylinder block bores. Examine piston barrel (21 – Fig. 61) and cylinder block bores for scratches, burrs, excessive wear and any other damage. Inspect slipper (22) for excessive wear; minimum allowable thickness is 2.90 mm (0.114 inch).

NOTE: Pistons and cylinder blocks are matched sets and must be renewed as such. Components are identified as follows: Marked with X, group X; No mark, group Y; Marked with Z, group Z.

If clogged, blow lubricant hole (23) clear with compressed air. Inspect polished face of cylinder block (12 and 13 – Fig. 59) for scratches and any other damage. Examine internal spring of cylinder block for cracks and broken coils. Inspect valve plates (7 and 8 – Fig. 57) for scratches, corrosion, excessive wear and any other damage. Inspect charge pump case (10 – Fig. 62) and trochoid rotor assembly (24) for scratches, excessive wear and any other damage. Examine needle bearing (25) for cracked and missing rollers, excessive wear and any other damage.

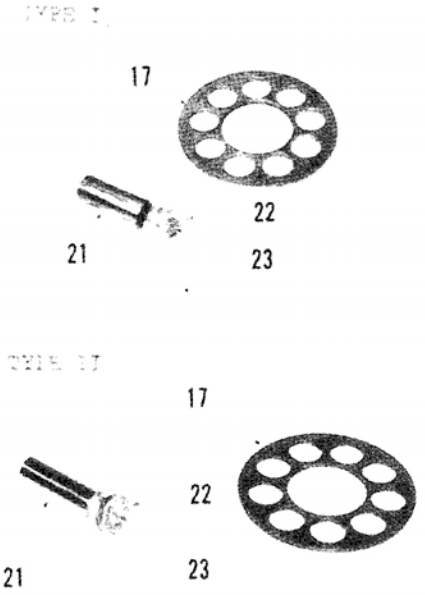

Fig. 61— View showing Type I and Type II piston barrel (21), slipper (22), lubricant hole (23) and retainer plate (17).

NOTE: Except for seals, charge pump must be renewed as a complete unit.

Recommended side clearance (C – Fig. 63) between trochoid rotor (24) and straightedge (S) measured as shown should be 0.030-0.045 mm (0.0012-0.0018 inch).

Remove forward and reverse neutral and check valves as shown in Fig. 64. Be sure that check valve (31 – Fig. 64) moves unrestricted along valve body (33). Inspect all components for heavy scratches, burrs, corrosion, excessive wear and any other damage. If clogged, blow passages of neutral valve (34) and valve body (33) clear with compressed air. Inspect springs (32 and 35) for any deformities and broken coils.

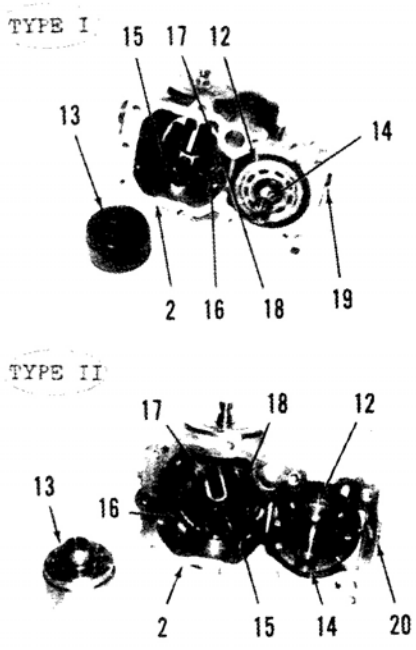

Fig. 59— View showing rear of hydrostatic transmission with port block removed.

2. Case
12. Motor cylinder block
13. Pump cylinder block
14. Output shaft
15. Pistons
16. Variable swashplate
17. Retainer plate
18. Circlip
19. Stop bolt (Type I only)
20. Drain plug (Type II only)

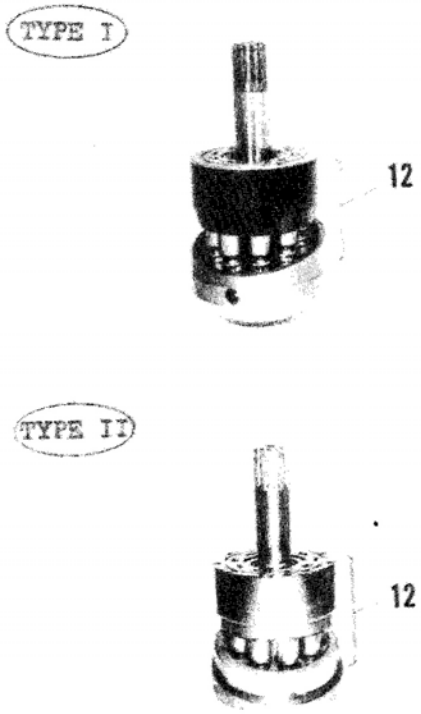

Fig. 60— View showing Type I and Type II motor cylinder block assembly (12).

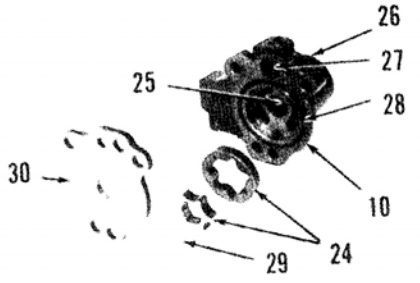

Fig. 62— View showing charge pump assembly.

10. Case
24. Trochoid rotor assy.
25. Needle bearing
26. Oil seal
27. "O" ring
28. "O" ring
29. Woodruff key
30. End plate

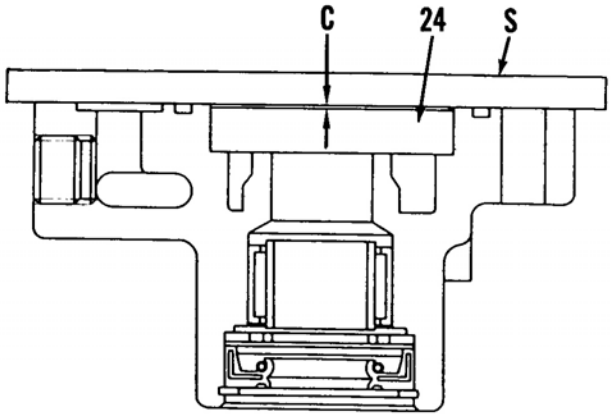

Fig. 63 – View showing procedure for measuring side clearance (C) between trochoid rotor (24) and straightedge (S). Refer to text.

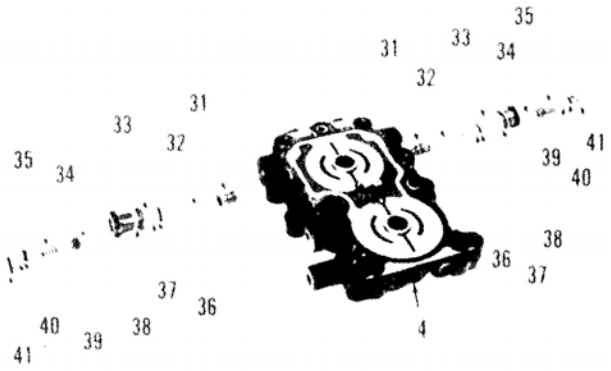

Fig. 64 – Exploded view showing neutral and check valve assemblies (forward and reverse) located in port block (4).

31. Check valves
32. Springs
33. Valve bodies
34. Neutral valves
35. Springs
36. "O" rings
37. Backup ring
38. Seals
39. "O" rings
40. Caps
41. Pins

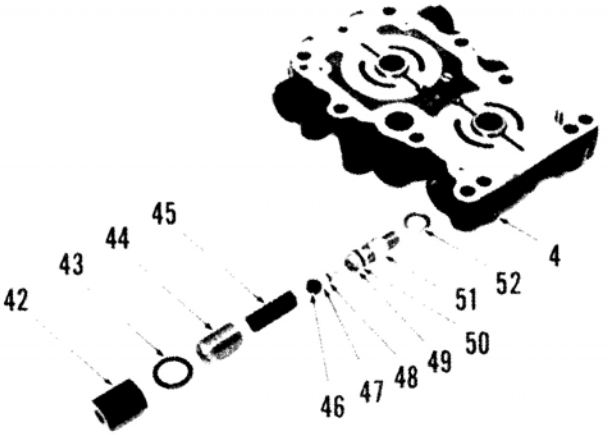

Fig. 65 – Exploded view showing high pressure relief valve located in port block (4).

42. Cap nut
43. Seal
44. Plug
45. Spring
46. Poppet valve
47. Backup ring
48. "O" ring
49. Backup ring
50. "O" ring
51. Valve seat
52. Gasket

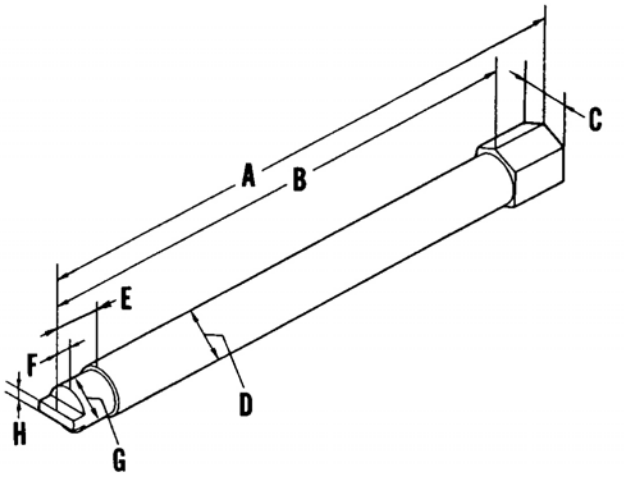

Fig. 66 – View showing dimensions needed for constructing special valve seat (51 – Fig. 65) removal tool.

A. 160 mm (6.3 inches)
B. 144 mm (5.7 inches)
C. 16.75-17.00 mm (0.659-0.669 inch)
D. 16.8-17.0 mm (0.661-0.669 inch)
E. 14 mm (0.55 inch)
F. 4 mm (0.16 inch)
G. 15.3-15.5 mm (0.602-0.610 inch)
H. 2.9-3.0 mm (0.114-0.118 inch)

Remove high pressure relief valve shown in Fig. 65. Note that to maintain set pressure of relief valve, height of plug (44) must be measured and alignment marks placed on plug (44) and port block (4) before plug (44) is removed. To remove seat (51), Kubota special tool 07916-60841 or a suitable equivalent must be used. Tool may be constructed using dimensions shown in Fig. 66. Inspect all components for heavy scratches, burrs, corrosion, excessive wear and any other damage. If clogged, blow valve passages clear with compressed air. Inspect spring (45 – Fig. 65) for any deformities and broken coils.

Remove charge relief valve shown in Fig. 67. Inspect valve (53 – Fig. 67) for heavy scratches, burrs, corrosion, excessive wear and any other damage. Inspect spring (54) for any deformities and broken coils.

Inspect trunnion shaft covers and bushings for excessive wear and any other damage. Inspect pump side needle bearing (59 – Fig. 68) and motor side needle bearing (60) located in port block (4) for cracked or missing rollers, excessive wear and any other damage.

Renew all parts as needed. Renew all seals, gaskets and "O" rings. Oil seals must be installed using suitable tools to prevent seal damage and ensure proper seating. Lubricate all working components with the following hydrostatic transmission fluid or a suitable equivalent during reassembly: Kubota UDT hydrostatic transmission fluid, Shell Donax-TD or TM, Mobil Fluid 350, Exxon Torque Fluid 56.

Reassembly is reverse order of disassembly. Observe the following during reassembly. Needle bearings (59 and 60 – Fig. 69) should be installed with marked side protruding 3.5 mm (9/64 inch) above port block (4) machined surface as shown.

Install pump side oil seal in port block (4 – Fig. 68) so top of seal surface is 3 mm (1/8-inch) below machined surface. Install motor side oil seal in port block (4) so top of seal surface is 0.5 mm (1/64-inch) above machined surface. Apply a thin coat of suitable grease to lip surface of oil seals.

Install trunnion shaft oil seal in cover so top of seal surface is 1 mm (3/64-inch) below outside surface. Apply a thin coat of suitable grease to lip surface of oil seal.

Install snap ring (57 – Fig. 67) with its square edge (opposite edge is rounded) facing out.

Cap nut (42 – Fig. 65) should be tightened to 59-69 N·m (43-51 ft.-lbs.) torque. Tighten screws securing trunnion shaft covers to 2-2.5 N·m (17-23 in.-lbs.) torque.

Install charge pump oil seal (26 – Fig.

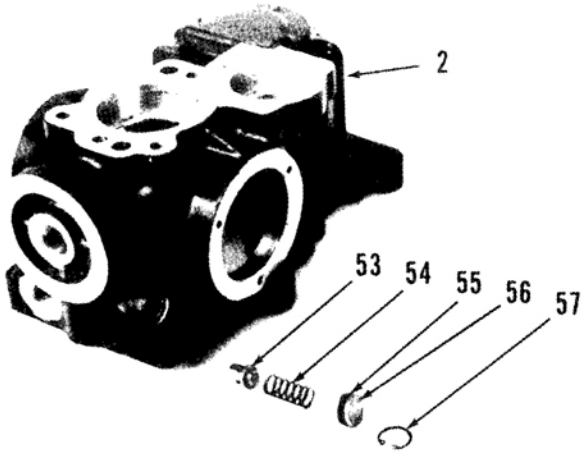

Fig. 67—Exploded view showing charge relief valve located in transmission case (2).
53. Valve
54. Spring
55. "O" ring
56. Plug
57. Snap ring

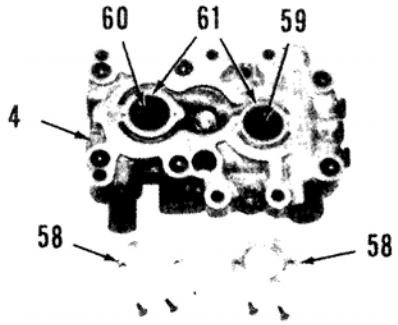

Fig. 68—View showing port block (4) with flange covers (58) removed. Note pump side needle bearing (59), motor side needle bearing (60) and oil seals (61).

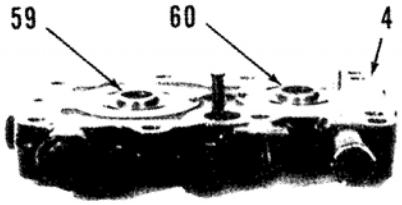

Fig. 69—Install pump side needle bearing (59) and motor side needle bearing (60) with marked side protruding 35 mm (9/64 inch) above port block (4) machined surface.

62) in case (10) so end of seal is 4 mm (5/32-inch) below outside surface. Install snap ring retaining oil seal (26) so square edge of snap ring faces out. Tighten screws securing case (10) to 11-14 N·m (8-10 ft.-lbs.) torque.

Cylinder block and pistons are assembled in reverse order of disassembly. Be sure to lubricate entire unit with clean hydrostatic fluid. Pump side circlip (18—Fig. 59) is installed with flat side or undistorted side towards retainer plate (17).

Observe the following during installation of output shaft and motor cylinder block assembly in case (2). On Type I models, be sure stop bolt hole in fixed swashplate aligns with hole in case (2). Install stop bolt (19) and tighten to 16-21 N·m (12-15 ft.-lbs.) torque. On Type II models, align hole of fixed swashplate with dowel pin in case (2).

Install pump side valve plate and motor side valve plate as shown in Fig. 57. During assembly of case components to port block assembly a protective cover should be used over input shaft and output shaft to protect seal lips. Note that port block floats over case assembly and should separate from case when holding hand pressure is released. Tighten screws securing port block to case to 23-27 N·m (17-20 ft.-lbs.) torque. Be sure input shaft and output shaft rotate smoothly.

Note that square edge of snap rings securing gears and/or bearings should face towards the component it is retaining.

RANGE TRANSMISSION

Models B6100HST-D, B6100HST-E, B7100HST-D and B7100HST-E are equipped with a two-speed range transmission. On Models B6100HST-D and B7100HST-D, power for the front-wheel drive system is derived from the range transmission.

OPERATION

All Models So Equipped

68. All models are equipped with a range shift lever for high-low speed selection. Models B6100HST-D and B7100HST-D are equipped with a front-wheel drive select lever for engagement and disengagement of front-wheel drive unit.

In high range position, shift lever (2—Fig. 70) is pushed completely down. Power is transmitted from hydrostatic transmission output shaft and gear to gear (14—Fig. 71 and 72), to shaft and gear assembly (22), to gear (2), to shaft (7), to high range gear (8), to smaller side of gear (27) and then to bevel pinion (34).

In low range position, shift lever (2) is pulled completely up. Power is transmitted from hydrostatic transmission output shaft and gear assembly (22) to gear (2), to shaft (7), to low range gear (5), to larger side of gear (27) and then to bevel pinion (34).

Neutral position is located mid-way between high and low position. Gear (27) is positioned in between low range gear (5) and high range gear (8), so no power is transmitted to bevel pinion (34).

On Models B6100HST-D and B7100HST-D, front-wheel drive select lever (12—Fig. 70) is used to mesh gear (54—Fig. 72) with gear (57) to engage front-wheel drive unit or to slide gear (54) away from gear (57) to disengage front-wheel drive unit.

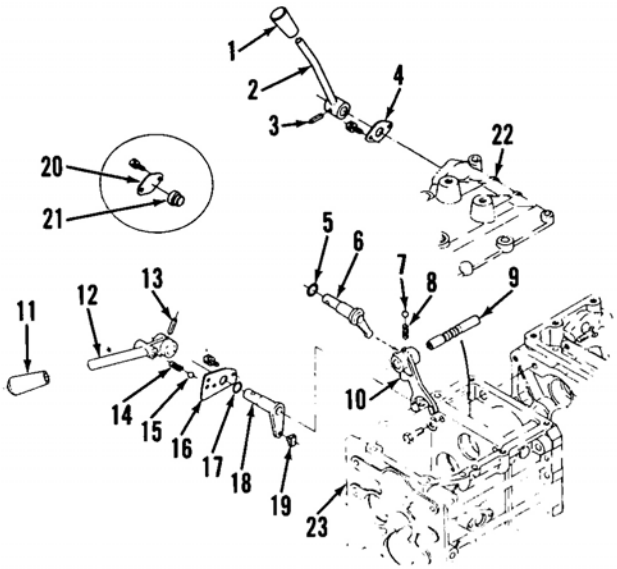

Fig. 70—View showing high-low range shift lever and shift linkage used on all hydrostatic drive models. Front-wheel drive select lever and linkage used on Models B6100HST-D and B7100HST-D. Inset shows cover plate (20) and plug (21) used on Models B6100HST-E and B7100HST-E.
1. Grip
2. Range shift lever
3. Pin
4. Plate
5. "O" ring
6. Arm
7. Ball
8. Spring
9. Rail
10. Fork
11. Grip
12. Front-wheel drive select lever
13. Pin
14. Spring
15. Ball
16. Plate
17. "O" ring
18. Arm
19. Shoe
20. Cover plate
21. Plug
22. Top cover
23. Transmission housing

REMOVE AND REINSTALL

All Models So Equipped

69. Remove hydrostatic transmission unit from front of gear transmission assembly as outlined in paragraph 66. Remove top cover (22–Fig. 70). Remove hydraulic lift cover as outlined in paragraph 99. Remove cap screws and nuts securing range transmission case to center housing. Separate assemblies, then withdraw transmission assembly while being careful not to allow any components to fall free.

Installation is reverse order of removal. Install a new gasket between center housing and transmission case. Tighten securing cap screws to 19-32 N·m (14-24 ft.-lbs.) torque and nuts to 25-39 N·m (18-29 ft.-lbs.) torque. Install top cover (22–Fig. 70) and securely tighten retaining cap screws. Refer to paragraphs 99 and 66 to complete reassembly.

OVERHAUL

All Models So Equipped

70. Disassembly is evident after reference to Fig. 70 and Fig. 71 or 72. Inspect all components for damage and excessive wear.

Shift fork (10–Fig. 70) width should be 6.8-6.9 mm (0.268-0.272 inch). Shift groove width in gear (27–Fig. 71 or 72) should be 7.0-7.1 mm (0.276-0.280 inch). Side clearance between shift fork (10–Fig. 70) and groove width in gear (27–Fig. 71 or 72) should be 0.1-0.3 mm (0.004-0.012 inch) with an acceptable limit of 0.6 mm (0.024 inch). Spring (8–Fig. 70) free length should be 22 mm (0.866 inch) with an acceptable minimum length of 20 mm (0.787 inch). Renew all parts as needed.

Reassembly is reverse order of disassembly. Gear backlash should be 0.1-0.2 mm (0.004-0.008 inch) with an acceptable limit of 0.4 mm (0.016 inch). Backlash between gear splines and shaft splines should be 0.030-0.078 mm (0.0012-0.0031 inch) with an acceptable limit of 0.2 mm (0.008 inch).

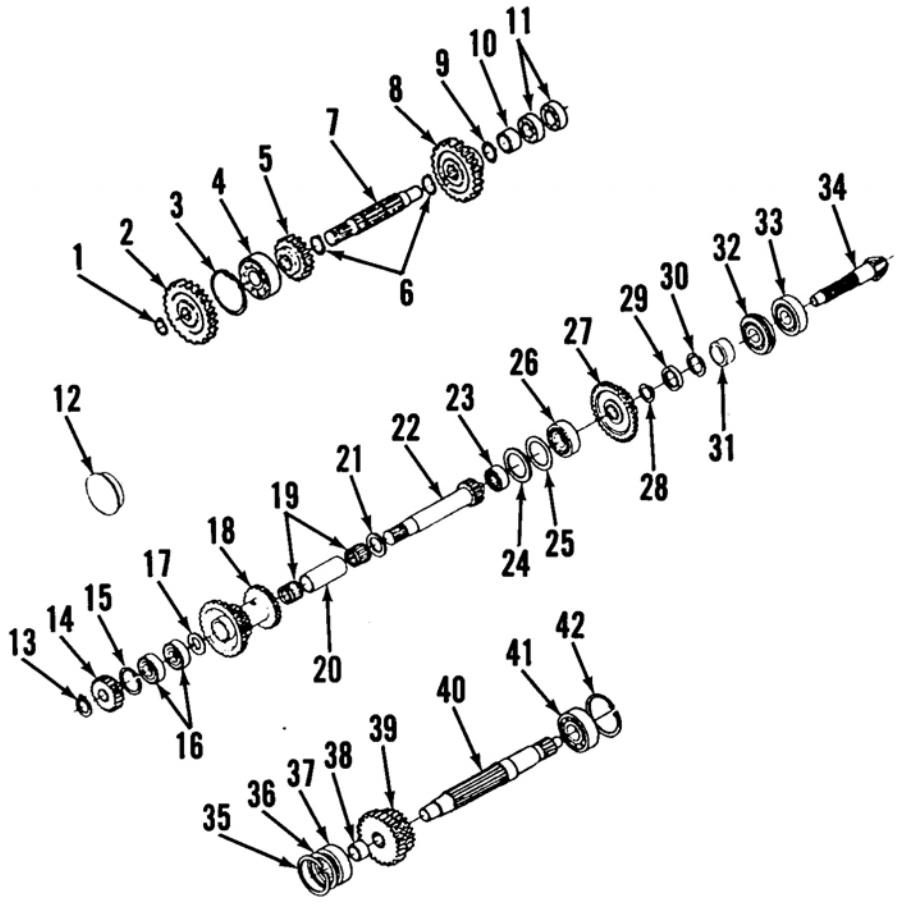

Fig. 71–Exploded view of transmission gears and shafts used on Models B6100HST-E and B7100HST-E.

1. Snap ring
2. Gear
3. Snap ring
4. Bearing
5. Low range gear
6. Snap rings
7. Shaft
8. High range gear
9. Shim (As equipped)
10. Spacer
11. Bearings
12. Cap
13. Snap ring
14. Gear
15. Snap ring
16. Bearings
17. Spacer
18. Pto cluster gear
19. Needle bearings
20. Spacer
21. Spacer
22. Shaft & gear assy.
23. Bearing
24. Spacer
25. Shim
26. Bearing
27. Gear
28. Snap ring
29. Spacer
30. Stop collar
31. Spacer
32. Bearing
33. Bearing
34. Bevel pinion
35. Snap ring
36. Shim
37. Bearing
38. Spacer
39. Pto gear
40. Pto shaft
41. Bearing
42. Snap ring

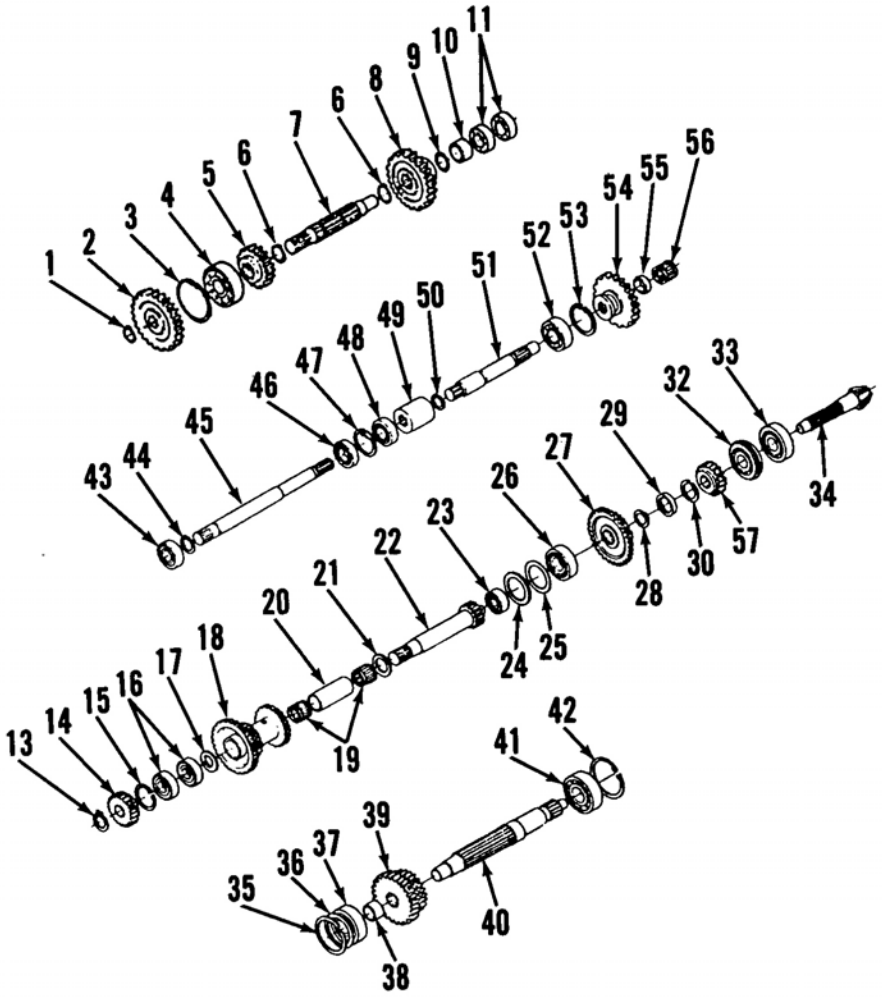

Fig. 72—Exploded view of transmission gears and shafts used on Models B6100HST-D and B7100HST-D. Refer to legend in Fig. 71 for identification of parts except for the following.

43. Bearing
44. Snap ring
45. Shaft
46. Bearing
47. Snap ring
48. Bearing
49. Coupler
50. Snap ring
51. Shaft
52. Bearing
53. Snap ring
54. Gear
55. Spacer
56. Needle bearing
57. Drive gear

SIX-SPEED TRANSMISSION

OPERATION

All Models So Equipped

71. Main shift lever (2–Fig. 73 or Fig. 74) selects gear positions through an H-pattern as shown in Fig. 75. When range shift lever (33–Fig. 73 or 74) is placed in the low range position (up position), reverse one and forward one, two and three are attainable. When range shift lever (33) is placed in the high range position (down position), reverse two and forward four, five and six are attainable.

CLUTCH HOUSING/ TRANSMISSION CASE SPLIT

All Models So Equipped

72. Drain transmission/hydraulic system fluid into a suitable container. Raise hood and disconnect battery cable from negative battery post. Remove air cleaner assembly and right side cover. Disconnect throttle linkage. Close fuel shut-off valve at fuel filter, then disconnect fuel supply line from fuel pump. Remove line connecting fuel tank to fuel filter at filter port and plug openings to prevent fuel spillage. Remove fuel filter assembly. Detach hydraulic lines as needed. Remove bolts and nuts connecting step plates to fenders. Detach brake pedal rod and differential lock rod from under step plate. If so equipped, disconnect flasher lamp wiring at rear fenders. Support rear of tractor. Attach a hoist with suitable holding fixtures to clutch housing. Remove nuts securing clutch housing to tranmission case, then separate components.

Reassembly is reverse order of splitting procedure. Tighten nuts securing clutch housing to transmission case to 61-107 N·m (45-79 ft.-lbs.) torque. Capacity of transmission/hydraulic system is 8.5 liters (2.21 U.S. gallons) on Models B5100D and B5100E and 11.5 liters (3 U.S. gallons) on Models B6100D, B6100E and B7100D. Refill with the following transmission/hydraulic fluid or a suitable equivalent: Kubota