Two contracting-band-type brakes, which operate independently of one another, are used to supplement the action of the steering clutch or to stop the tractor. Either or both brakes can be held in the locked position by the brake lock pawls (1). These pawls are actuated by a single hand lever.

The operation of both brakes is the same. When pedal (5) is depressed, control linkage (9) moves control lever (7) forward. Shaft (6) and lever (10) rotate and pull up on link (11). This flattens toggle links (15) and causes strut support lever assembly (13) and lever assembly (17) to rotate about lever shafts (12) and (16). Struts (14) are forced against lugs on band (18), causing band to contract on drum.

When pedal is released, spring (8) returns pedal, linkage and brake band to brake released position.

The parking brake is engaged by depressing either or both pedals and pushing parking brake lever (4) down. This moves parking brake linkage (2) forward, engaging pawl (1) with ratchet (3). The brakes are held in applied position by the pawls that hold linkage in engaged position.

**CAUTION**

To prevent damage to ratchet or pawl, pedals should be depressed before lever (4) is pulled upward to release brakes.

**BRAKE ENGAGING MECHANISM**

**Removal and Installation**

1. Remove seat and seat frame, floor plates, fuel tank and rear cross member. See covering topics.
band struts will disengage from lugs. Engaging mechanism weighs approximately 80 lbs.

INSTALLING BRAKE ENGAGING MECHANISM
11-Strut, 12-Lug.


Disassembly and Assembly
1. Remove brake lever shaft (1). This shaft joins lever assembly (14) and strut support lever assembly (15) and secures them to linkage support assembly (2).

2. Remove snap ring (9). Pull pin (6) securing toggle links (5) and (7) to link (4).

3. Remove brake toggle link (7) and brake front lever assembly (8) as a unit.

4. Guide links (5) between the two support assembly braces and lift off support assembly.

PREPARING TO REMOVE BRAKE ENGAGING MECHANISM
Remove
3-Bolt (four), 10-Braze engaging mechanism.

3. Attach a suitable hoist and remove engaging mechanism (10) by lifting it straight up. Brake
7. Remove bolt securing wedge support (19) to adjustment wedge (21). Back off adjusting screw (17) until support (19), adjusting screw spring (20), and wedge (21) are free and can be removed as a unit from bottom of lever assembly (14). Remove adjusting screw from top of lever assembly.

8. Inspect bearings (18).

NOTE
An arbor press can be used to facilitate all bearing removal and installation.

6. Inspect bearing (11).

5. Remove snap rings on pins (10) and (16) and inspect the bearings.

4-Link, 5-Toggle link, 6-Pin, 7-Toggle link, 8-Lever assembly, 9-Snap ring.

10-Pins, 11-Bearing.

SEPARATING LEVER ASSEMBLIES
Remove

12-Socket assembly, 13-Pin, 14-Lever assembly, 15-Strut support lever assembly, 16-Pin.

PREPARING TO REMOVE BRAKE LINKAGE FROM CLUTCH COVER
Remove
22-Bolt.

23-Shaft, 24-Key, 25-Lever, 26-Wedge.

ADJUSTING MECHANISM
(Shown in Assembled Position for Purpose of Illustration)
9. Drive wedge (25) into the slot in lever (25) and slide shaft (23) out of lever far enough to remove key (24).

10. Remove shaft (23) and lever (25).

5. Brake pedal (4) is adjusted by disengaging parking brake and adjusting the brake linkage (5) to dimension (B), which is the distance between front face of seat support and rear face of brake pedal. See topic, SPECIFICATIONS.

11. Inspect bearings (29) and (31).

12. Inspect seal (30). The seal is installed with spring-loaded sealing lip toward bearing (31).

ADJUSTMENTS

1. Install support assembly and steering clutch cover assembly.

2. Turn adjusting screw socket assembly (1) until brake band is tight on drum. Back off socket assembly the number of turns given in topic, SPECIFICATIONS.

3. Install remaining brake linkage.

4. Parking brake lever (3) is adjusted by disengaging parking brake and adjusting parking brake linkage (2) to obtain dimension (A), which is the distance between front face of seat arm rest support and centerline of parking brake lever. See topic, SPECIFICATIONS.
Steering Clutches

The multiple disc, oil-type steering clutches are held in engagement by springs, and are disengaged hydraulically.

The steering clutch disc assemblies have teeth on the outer diameter which mesh with splines in the outer drum. The steering clutch driving discs have lugs on the inside diameter which interlock with the tapered recesses on the inner drum.

The steering clutches are disengaged by oil pressure acting behind piston (1) which causes the piston to move outward against spring retainer (3). This moves pressure plate (2) out of contact with the discs to disengage the clutch.

Drum to the flange can be removed, replaced, and tightened through the opening in the side of the steering clutch and bevel gear case, after removing the plug. Rotate the steering clutch assembly after each bolt is removed to gain access to the next one.

PREPARING TO REMOVE STEERING CLUTCH ASSEMBLY
1-Bolt, 2-Driving hub, 3-Driven drum flange, 4-Bolt.

2. Attach a hoist and sling to the brake band and pry the outer drum away from the flange.

3. Remove the two bolts securing the inner drum to the hub, pry the drum away from the hub, and remove the steering clutch assembly.

CAUTION
Keep the steering clutch assembly level since the clutch is free to slide out of the outer drum.

REMOVAL AND INSTALLATION
1. Remove the fuel tank, rear crossmember, and brake engaging mechanism as outlined in the covering topics.

NOTE
To prevent the possibility of the outer drum slipping off driven drum flange (3) and the inner drum slipping off the driving hub (2), causing steering clutch assembly to drop, leave two bolts (1) securing the inner drum to the hub until a sling is attached. The bolts holding the outer

REMOVING STEERING CLUTCH ASSEMBLY

4. Before installing the clutch assembly, inspect the splines of the outer drum and the teeth of the discs for roughness and excessive wear.
10. Compress the springs with the same tool arrangement used to disassemble the clutch assembly, and tighten the retaining bolts.

11. Remove the compressor tools and guide pins and install the remaining bolts. After tightening all the bolts securely, bend the metal locks.

12. Using a suitable lifting hook, remove steering clutch assembly (12) from outer drum. Remove forcing screws (2), invert the outer drum and place it on the clutch assembly.

13. Install the brake band.

STEERING CLUTCH DRIVING HUB

Removal and Installation

1. Install two 5/16" - 18 NC bolts approximately 3" long in clutch piston (1). Remove piston by pulling toward the outside of the tractor.

NOTE

To facilitate retaining nut removal, with both steering clutches removed, install two 5/8" - 11 NC bolts (6), approximately 3" long, into the opposite clutch hub clearance holes and insert a bar to retain steering clutch shaft (3). Using wrench (7), remove the retaining nut. This procedure can be used when installing the retaining nut, after placing the opposite clutch hub on the clutch shaft temporarily, and inserting bolts (6) to retain the clutch shaft. With one steering clutch removed, the clutch shaft can be retained by applying the opposite brake.

3. Remove the lock and retainer washer (5).
4. Remove piston pilot (14) by inserting a screwdriver in machined groove (17) and prying against the end of the clutch shaft.

5. Install retaining nuts (4) on the clutch shaft so there is approximately 3/6" clearance between the nut and clutch hub.

8. Remove the puller tools and the nut and remove the hub.

9. Inspect the following: seal rings (12), (13) and (15) and O-ring seal (16).

10. Place the hub on the clutch shaft.

11. Align the dowel in retainer washer (5) with the dowel hole in the hub. Install the washer.

12. Bolt 1S6561 Adapter (20) to 1S4233 Hydraulic Puller (21) with 8F1156 Bolt (22) and install adapter (20) on the clutch shaft.

13. Place 8M9008 Spacer (19) over the adapter.

14. Press the hub onto the shaft to the pressure given in the topic, SPECIFICATIONS. Measure the distance (A), from the shoulder on the clutch shaft to the face of the clutch hub. See the topic, SPECIFICATIONS, for the correct dimension.

15. Install pilot (14), lock (18), nut (4) and piston (1) in reverse order of removal.
OPERATION

Filtered oil is delivered by the steering clutch hydraulic oil pump to the steering clutch control valve housing. A relief valve is provided to protect the system from excessive pressure.

(Fig. 1), the oil flows through cored passages in the housing, around the lands on the valves, and through outlet port (6) to the transmission oil manifold on direct drive models. An orifice (3) allows a portion of the oil to be bled off for lubrication of the hydraulic control operating mechanism. The level in the operating mechanism compartment is maintained by a standpipe (4), and the overflow oil lubricates the bevel gear and pinion and the bevel gear bearings.

NOTE

The following illustrations are of the direct drive model control valve. The power shift control valve has no outlet port (6). The operating characteristics of the valve are the same for both models. The only oil flowing through the valve when the steering clutches are engaged is oil to lubricate the bevel gear and pinion and the bevel gear bearings.

The outlet ports (1) and (5) connect to lines leading to the steering clutch hubs. The oil in these lines is inactive and under no pressure when the clutches are engaged.

FLOW OF OIL

Oil enters the control valve housing through port (2). When both steering clutches are engaged

FIG. 1

FLOW OF OIL—BOTH CLUTCHES ENGAGED—
SCHEMATIC
1—Outlet port to left steering clutch, 2—Inlet port, 3—Orifice, 4—Standpipe, 5—Outlet port to right steering clutch, 6—Outlet to transmission oil manifold.

When the right control lever is pulled back to disengage the right steering clutch, plunger (11) and valve (10) move to the rear, compressing the light spring (8), opening port (5) and directing all the oil behind the right steering clutch control piston (Fig. 11). The outlet port (6) is momentarily blocked by the first land on valve (10) while the clutch is being released. Oil displaced by the movement of plunger (11) and valve (10) returns to the sump through orifice (9) and standpipe (7).
As the right steering clutch springs are compressed, the oil pressure rises. When the pressure in the chamber (12) becomes high enough to overcome the force of spring (13), the valve moves forward until the throttling slots open to outlet port (6), and the oil again is directed to the transmission (Fig. III). Thus, the control valve stem acts as a pressure relief valve, maintaining the proper oil pressure to hold the steering clutch in the released condition.

As pressure rises, valve (10) moves forward against spring (13) and enlarges the opening to port (6) until the oil pressure and spring pressure are balanced (Fig. IV). The pressure existing in the system is established by the position of the plunger (11). This determines the amount the spring must be compressed in order for the first land of the valve (10) to correctly throttle flow to port (6). The pressure at which the clutches begin slipping is determined by the load applied to the tractor.

Either or both steering clutches may be partially released by pulling the control levers part way back. When the right control lever is pulled part way back, the opening to outlet port (6) is restricted, causing a pressure rise to the right steering clutch control piston which compresses the clutch springs.

When the right clutch control lever is moved forward to engage the clutch, the force against spring (13) is released. The pressure in chamber (12), created by the clutch springs in the right steering clutch, then moves valve (10) forward against the force of spring (13), opening port (14) and allowing the oil to flow through the clutch.
behind the control piston to return to the sump through standpipe (7) (Fig. V). As the oil empties from behind the control piston, the pressure lessens and valve (10) returns to the NEUTRAL position.

When the left control lever is pulled part way back while the right clutch is fully released, the pressure in the system, due to the position of the right valve is more than enough to cause the left clutch to slip. Therefore, as pressure in chamber (16) behind the left valve (17) builds up, the left valve moves forward until port (15) opens enough to maintain oil pressure at the desired level (Fig. VI). Otherwise, the operation of both control valves is the same.

If either control valve should stick in the bore of the housing, the oil pressure could reach a point that would cause damage to the oil pump, filter, or other parts. To prevent this, a pressure relief valve is provided on the direct drive model. This valve allows the oil to bypass the steering clutch hydraulic controls when the oil pressure reaches a value given in the topic, SPECIFICATIONS. The power shift model operates at the pressure regulated by the sequence relief valve at all times.

**REMOVAL AND INSTALLATION**

Remove the seat and seat frame.

Remove the bolts that secure the hydraulic control (2) to the steering clutch and bevel gear case and remove it from the machine.

Install in the reverse order of removal. Inspect the seals and replace if worn or damaged.

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**PREPARING TO REMOVE THE HYDRAULIC CONTROL**

1. Steering clutch control rods. 2-Hydraulic control. 3-Pressure oil line. 4-Pressure relief valve. 5-Oil line. 6-Elbow. 7-Elbow.

**FIG. VI**

FLOW OF OIL — LEFT CLUTCH SLIPPING. RIGHT CLUTCH RELEASED — SCHEMATIC

15-Port. 16-Chamber. 17-Valve.

**DISASSEMBLY AND ASSEMBLY**

1. Remove the front cover plate.
2. Loosen the bolt (3) clamping the lever (6) to the shaft (5).
3. Remove the pin (4) from the shaft (5).
4. Drive the shaft to the left to force the plug (1) out of the housing.
5. Drive the shaft back to the right until the lever (6) can be removed.
6. Remove the key that held the lever on the shaft.
7. Remove the shaft from the housing.

NOTE
The tube and washer on the shaft will come off the shaft; be sure they are replaced at assembly. The washer should be installed between the tube and the bearing.

8. The bearing and lip-type seal can be removed from the housing after the shaft is removed.

NOTE
When installing the seal, be sure the lip faces inward.

9. Remove the remaining shaft and lever in the same manner as the first.

10. Remove the ring (11) from the plunger (7) through the front of the housing.

11. Remove the retaining ring (10) holding the stop plug (9) in the housing.

12. Remove the stop plug (9) using a puller consisting of a 3/8" - 16 NC bolt, a nut, and a flat washer with approximately 1 3/4" O.D. Thread the nut on the bolt and place the washer on the bolt. Screw the bolt into the stop plug and tighten the nut against the washer while holding the head of the bolt to keep it from turning.

13. Remove spring (12), valve (8) and plunger (7) from the rear of the housing.

14. Remove retainer ring (13) from bore in valve (8) and remove plunger (7) and spring (14).

15. Remove the piston (15) from the valve (8).

NOTE
To remove the retaining ring (13) from the bore in the valve (8), plunger (7) must be pushed into valve (8) compressing the spring (14). A vise or press can be used if care is exercised not to damage parts.

16. To remove the plunger bushing, remove the bolt and the bushing retaining plate, and remove the bushing through the opening in the front of the housing.

17. Assemble in the reverse order of removal. Lubricate the O-ring seals with liquid soap to avoid damaging them during assembly.