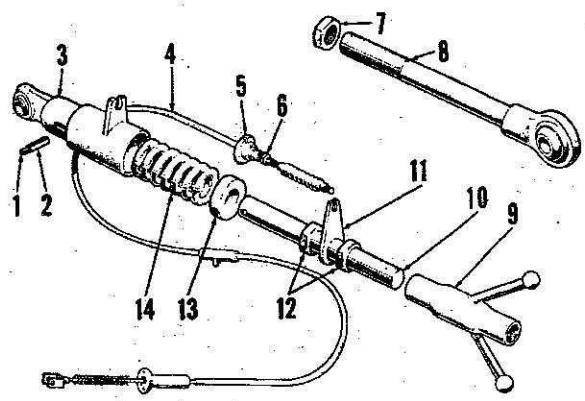


Fig. 164 — Exploded view of early type single acting draft sensitive top link assembly; refer to Fig. 165 for components of later top link that is draft sensitive when under either tension or compression.

1. Inner spring pin
2. Outer spring pin
3. End assembly
4. Flexible control cable
5. Cable adjuster
6. Lock nut
7. Nut
8. End assembly
9. Turnbuckle
10. Threaded shaft
11. Cable bracket
12. Nuts
13. Spacer
14. Draft control spring

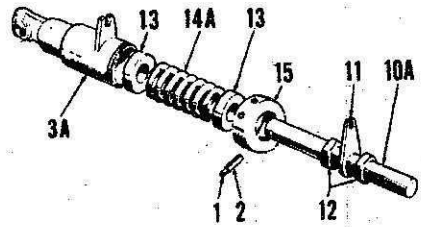


Fig. 165 — Exploded view of front end assembly of double acting (draft sensitive under both tension and compression) top link.

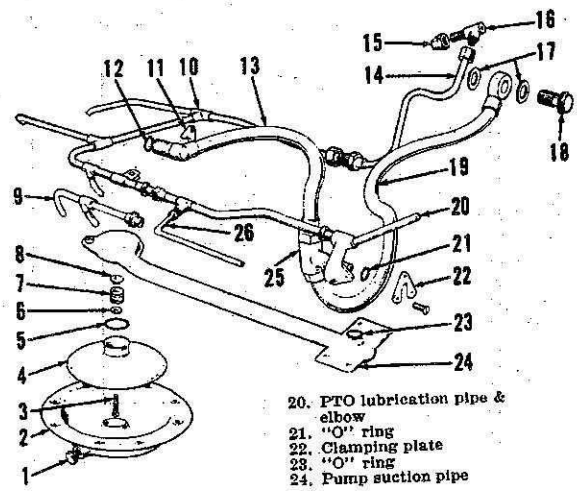
1. Inner spring pin
2. Outer spring pin
3A. Front end assembly
10A. Threaded shaft
11. Cable bracket
12. Nuts
13. Spacers
14A. Draft control spring
15. Adjusting nut

The transmission and PTO drive gears are lubricated by oil by-passed by the hydraulic pump valves; lubrication pipe (20) is attached to pump valve body.

Pressure line (13) to rockshaft ram cylinder and pressure line (19) to control valve body are connected to pressure outlet of pump at "T" connector (25).

Fig. 166 — Exploded view of implematic hydraulic lines and suction filter.

1. Drain plug
2. Filter cover
3. Screw
4. Suction screen
5. "O" ring
6. Spacer
7. Magnet
8. Shoulder washer
9. Transmission lubrication pipe (6-speed)
10. Transmission lubrication pipe (12-speed)
11. Clamping plate
12. "O" ring
13. Ram cylinder pressure pipe
14. Lubrication pipe (12-speed trans.)
15. Special nut
16. Special union
17. Sealing washers
18. Banjo bolt
19. Pressure pipe to control valve



20. PTO lubrication pipe & elbow
21. "O" ring
22. Clamping plate
23. "O" ring
24. Pump suction pipe

SELECTAMATIC HYDRAULIC SYSTEM

The Selectamatic hydraulic system incorporates four types of hydraulic control; depth (draft) control, height (position) control, traction control (T.C.U.) and control of remote external hydraulic cylinders. Hydraulic power is supplied by a front mounted, crankshaft driven pump on model 1200, and by a pump mounted in PTO housing and driven from PTO gear input shaft on all other models.

For explanation of system operation, refer to the following paragraphs 221 through 224. Schematic diagram of the system is shown in Fig. 167 and Figs. 168, 169 and 170 show views of the hydraulic system controls. NOTE: To move selector dial (B—Fig. 168) to different position, the control lever (A) must be held fully rearward against spring pressure.

HYDRAULIC SYSTEM OPERATING PRINCIPLES

All Selectamatic Models

221. **DEPTH (DRAFT) CONTROL.** Depth control is used to maintain desired operating depth of implement when operating ground engaging implements not equipped with gage wheels.

For depth control operation, selector dial is set at position shown at B1 in Fig. 169. This moves the rocker lever (20—Fig. 167) to position shown in schematic view so that rear end of lever is under push rod (24) and front end contacts spool valve (15); lever then pivots on control lever cam (28). Moving control lever rearward to contact, but not compress, return spring (position A—Fig. 169) places spool valve in raising position. Moving control lever forward as shown by dotted arrow in Fig. 169 lowers the implement until force transmitted by top link of the 3-point hitch compresses draft control spring (23—Fig. 167) and moves spool valve to hold position. The farther forward that control lever is moved, the greater the force required on draft control spring to return valve spool to hold position. Thus, deeper penetration of implement is obtained by moving control lever forward. Guides (C—Fig. 169) may be set to desired position so that implement can be returned to same depth after being raised from ground.

222. **HEIGHT (POSITION) CONTROL.** Height control is used where lift linkage is required to be maintained in a certain position.

For height control, selector dial is set at position shown at B2 in Fig. 169. This positions rear end of rocker lever (20—Fig. 167) under rockshaft push rod (22) and front end of rocker lever against spool valve (15); lever pivots on control lever cam (28). When control lever is moved to position "A" shown in Fig. 169, spool valve is placed in raise position until rockshaft turns, forcing push rod (22) downward and returning spool valve to hold position. Moving control lever forward places spool valve in lowering position, then linkage will lower until rockshaft push rod is lifted, returning spool valve to hold position. Thus, for any position of control lever within range shown by dotted arrow in Fig. 169, the lift linkage will be moved to a relative position. When control lever is fully forward, lift linkage will be fully lowered.

223. **TRACTION CONTROL (T.C.U.).** Traction control is used with implements equipped with gage wheels and provides for transfer of implement weight to tractor rear wheels for increased traction.

For traction control, selector dial is set at T.C.U. position (B3—Fig. 170).

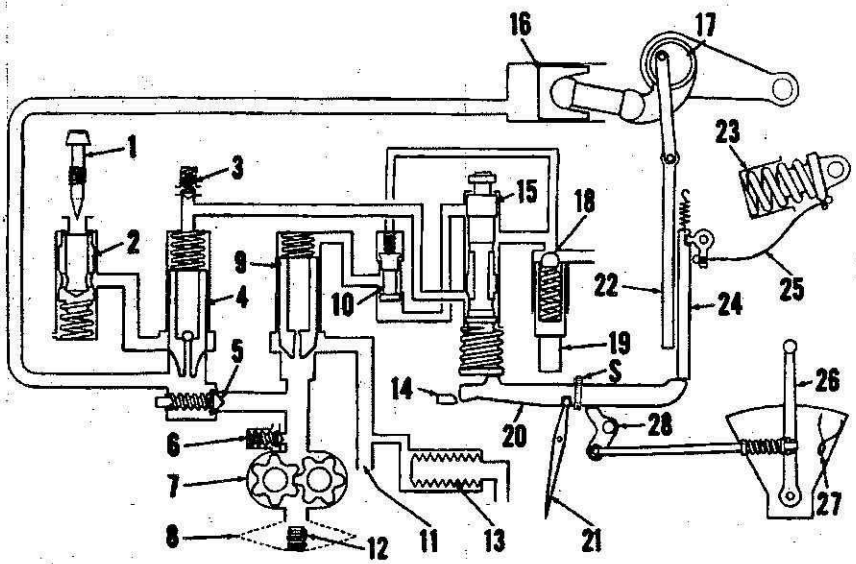


Fig. 167 — Schematic diagram of "Selectamatic" hydraulic system. Selector lever (21) moves rocker arm (20) to different positions for depth (draft) control, height (position) control or for traction control (T.C.U.). Traction control position is also used for operating external ram cylinder. Rocker arm (20) is shown in depth control position. Note that though selector lever actually moves rocker arm sideways, it is shown in the schematic view that rocker arm is moved endways; this is for simplification of diagram only. Some later models use full flow suction filter instead of by-pass filter (13).

1. Lowering rate adjuster
2. Flow control valve
3. Cylinder relief (safety) valve
4. Hold valve plunger
5. Non-return (check) valve
6. Pump relief valve
7. Hydraulic filter
8. Suction screen filter
9. By-pass valve plunger
10. Latching valve plunger
11. Lubrication pipe
12. Magnetic filter
13. By-pass filter (not all models)
14. Abutment plate
15. Spool valve
16. Ram cylinder
17. Ram cylinder rockshaft
18. Traction control valve ball
19. Traction control valve plunger
20. Rocker lever
21. Selector dial
22. Height control pushrod
23. Sensing unit
24. Depth control pushrod
25. Depth (draft) sensing cable
26. Control lever
27. Lever return spring
28. Control lever cam

This moves rocker lever (20—Fig. 167) so that front end of lever rests on abutment plate (14), screw (S) in lever is below traction control valve and rear end of lever is moved away from both the depth control push rod (24) and height control push rod (22). Lever then pivots on abutment plate and is controlled only by the control lever cam (28). Moving control lever fully rearward to a position (1—Fig. 170) compressing quadrant spring (27—Fig. 167) places control valve spool in raising position. When lift linkage is raised and the control lever released, quadrant spring will return the lever and spool valve to hold position. Moving lever forward from hold position (2—Fig. 170) will place spool valve in lowering position. To locate minimum traction control position (3) of control lever, lower the lift linkage and without any weight or implement on linkage, slowly move control lever forward from lowering position. When control lever reaches position where lift arms just start to raise, move upper guide (C) to this position. Moving control lever forward from minimum traction control position will increase traction control pressure as the screw in rocker lever is pushing upward against traction control valve plunger (19). Maximum traction control pressure is with control lever fully forward. Position for proper traction control pressure can be determined only with implement in working position in ground and with tractor moving at desired speed; when this position is found, move lower guide (C) in alignment with lever so that lever may be returned to proper position after lifting implement at end of field.

224. **EXTERNAL (REMOTE CYLINDER) CONTROL.** For operating single acting remote cylinders, selector dial is set at T.C.U. position and control lever is used in raising and lowering position. Fluid pressure is directed to remote cylinder instead of rockshaft ram cylinder by means of a three-way valve shown in Figs. 216 and 217.

A remote control valve (refer to paragraph 264) for operating remote cylinders independently from lift control system is available for most models.

FLUID CONTROL VALVES

All Selectamatic Models

225. **PUMP RELIEF VALVE.** The pump relief valve (6—Fig. 167) is

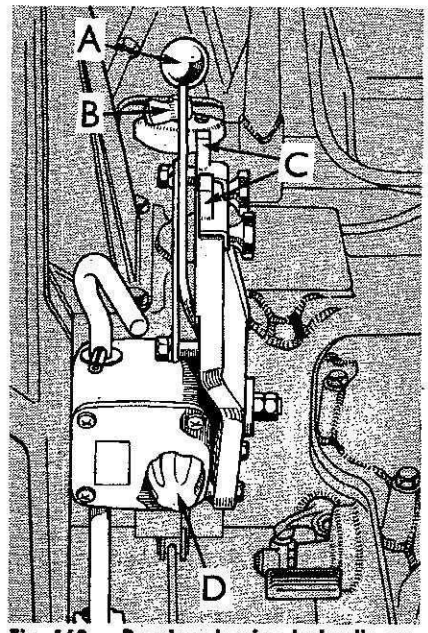


Fig. 168 — Drawing showing hydraulic system controls. Refer also to Fig. 169 and 170.

A. Control lever
B. Selector dial
C. Control lever stop guides
D. Rate of lowering adjustment

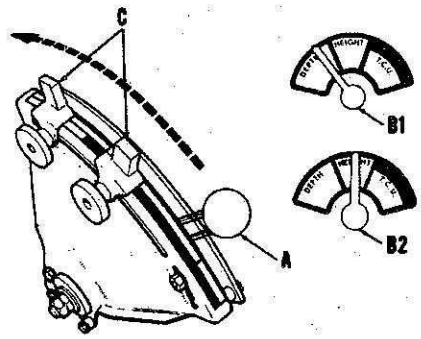


Fig. 169 — Control lever (A) is shown in lift position for both depth and height control. Dotted line shows range of implement depth variation when selector dial is set for depth control (B1) or range of lift arm height variation when selector dial is set for height control (B2). Lever position guides are (C).

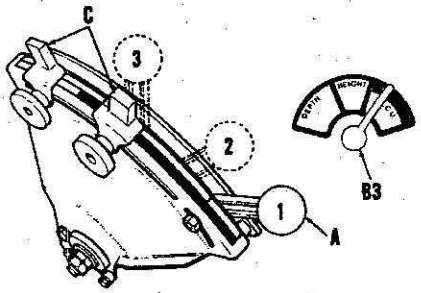


Fig. 170 — When selector dial is set at T.C.U./external position (B3), control lever must be pulled rearward against spring pressure to position (1) to raise lift linkage or pressurize external cylinder. When released, control lever will return to hold position (2). Minimum traction control pressure is obtained with lever approximately as shown at (3).

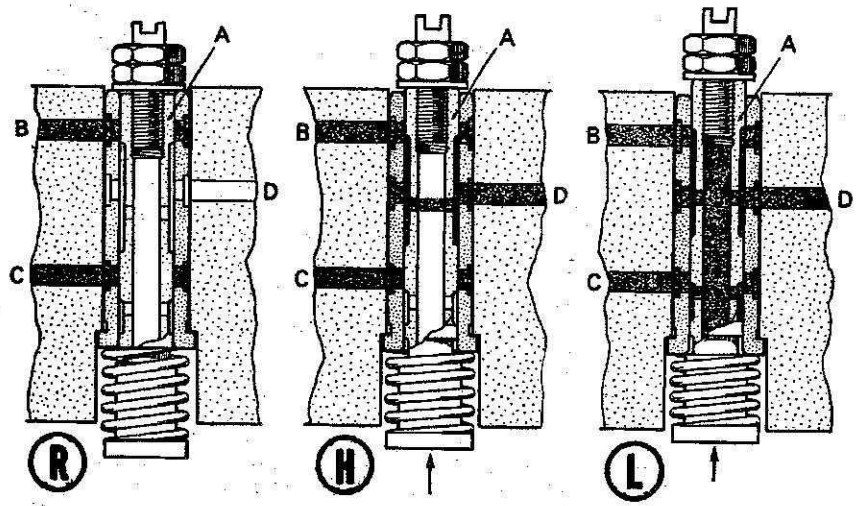


Fig. 171 — Views showing control valve spool (A) in raise (R), hold (H) and lower (L) positions. In raise position, passages (B & C) from hold and by-pass valves are blocked, closing the valves (see Figs. 172 & 173). In hold position, passage (B) from by-pass valve is open, allowing by-pass valve plunger to open and unload hydraulic pump; hold valve passage (C) remains blocked, holding hold valve closed and retaining fluid in ram cylinder. When in lowering position, both passages (B & C) are open allowing fluid in ram cylinder to return to sump. Spool valve discharge passage is (D). Refer also to Fig. 167.

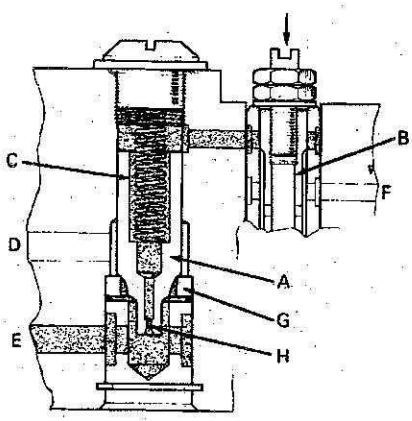


Fig. 172 — View showing pressure balanced valve operation. With spool valve (B) blocking passage from top side of valve plunger (A), pressure above valve is maintained via orifice (H) to same pressure as below valve in passage (E), thus spring (C) holds plunger on seat (G) closing outlet passage (D).

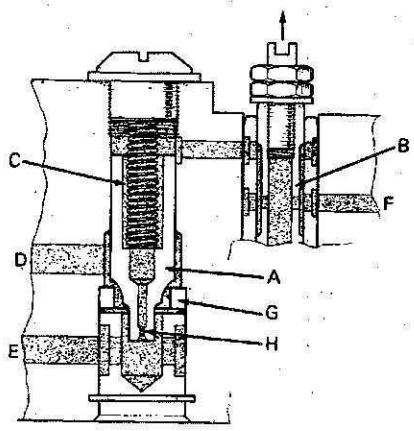


Fig. 173 — View showing pressure balanced valve operation. With spool valve (B) passage (F) open, fluid pressure above valve is lowered as flow through metering hole (H) is not sufficient to overcome loss through open spool valve. Thus, pressure in passage below valve pushes plunger (A) away from seat (G) allowing oil to flow out passage (D). Fluid flowing through metering hole flows out through passage (F).

mounted on pump cover plate and is factory adjusted, then sealed, to open at 2000 psi.

226. **CONTROL (SPOOL) VALVE.** The spool valve (15—Fig. 167) is located in control valve housing and handles only the fluid flow required to operate the pressure balanced hold and by-pass valves described in following paragraph 227. Refer to Fig. 171 for views showing spool valve in raise (R), hold (H) and lower (L) positions. In raise position, the spool valve blocks passages from both the by-pass and hold valves, retaining these valves in closed position. In hold position, spool valve blocks passage from hold valve, retaining this valve closed, but opens passage from by-pass valve, allowing by-pass valve to direct fluid from pump to lubrication circuit. In lowering position, both the passages from hold and by-pass valves are open, allowing fluid in rockshaft ram cylinder to return to sump and also by-passing fluid from pump to lubrication circuit.

227. **HOLD AND BY-PASS (PRESSURE BALANCED) VALVES.** The by-pass valve (9—Fig. 167) controls flow to hydraulic fluid from pump, directing the flow to rockshaft cylinder when necessary to raise lift linkage and directing flow to lubrication circuit at all other times. The hold valve (4) retains fluid in rockshaft cylinder until necessary to lower the lift linkage, then opens to allow fluid in cylinder to return to sump. Refer to Fig. 172 and Fig. 173 for flow diagram of pressure balanced valve unit typical of both the hold and by-pass valves.

228. **LATCHING VALVE.** The latching valve (10—Fig. 167) is interposed in the passage between the by-pass valve (9) and the spool valve (15). When lift arms are in raised position and weighted with implement, any leakage in ram cylinder circuit will allow linkage to lower slowly and gradually place spool valve in raising position. The latching valve will then snap closed, providing a sharp response of by-pass valve.

229. **TRACTION CONTROL (T.C.U.) VALVE.** The spring loaded traction control valve ball (18—Fig. 167) is used to increase the back pressure on the hold and by-pass valves, thus causing a low pressure rise in ram cylinder circuit. This provides a light lifting pressure on ground engaging implements, adding weight to tractor rear wheels and increasing traction. Traction control lifting pressure is regulated by movement of the spring plunger (19); plunger is actuated by screw in rocker lever contacting plunger when dial selector is moved to forward part of quadrant.

230. **HOLD (RAM CYLINDER SAFETY) RELIEF VALVE.** The hold relief valve (3—Fig. 167) is adjusted to open at 2500 psi, thus allowing hold valve (4) to open whenever pressure in ram cylinder circuit exceeds this relief pressure. Very high hydraulic pressure in the ram cylinder circuit could occur from shock loads imposed by heavy implements; however, the hold relief valve prevents these pressures from exceeding that which could cause damage to the ram cylinder or related parts.

231. **RATE OF LOWERING VALVE.** The rate of lowering valve (2—Fig. 167) is a flow control valve regulated by opening or closing needle valve (1), thus regulating the flow of oil returning from ram cylinder to sump. The rate of lowering of lift linkage can then be controlled to desired speed, regardless of implement weight.

232. **NON-RETURN (CHECK) VALVE.** The non-return valve (5—Fig. 167) prevents oil in ram cylinder from returning to pump outlet passage when hold valve (4) is closed and by-pass valve (9) is open.

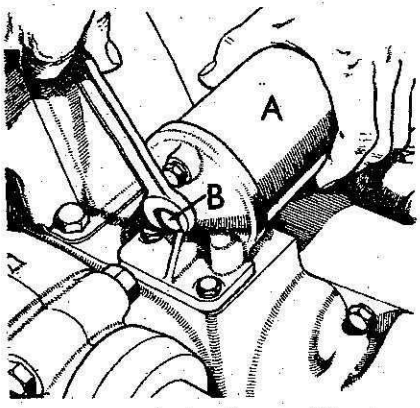


Fig. 174 — Removing by-pass filter housing (A) by unscrewing bolt (B). On later models with by-pass filter, filter base is mounted on an oil return block for external cylinders rather than being bolted directly to axle housing as shown.

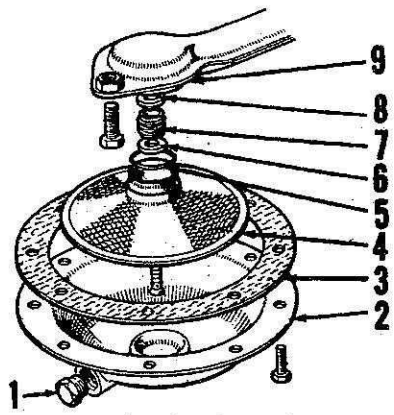


Fig. 175 — View showing early type suction screen, cover and magnetic filter; refer to Fig. 176 for late models using full flow filter element instead of by-pass filter as shown in Fig. 174.

1. Drain plug
2. Cover
3. Gasket
4. Suction screen
5. "O" ring
6. Spacer washer
7. Magnetic filter
8. Spacer washer
9. Pump intake tube

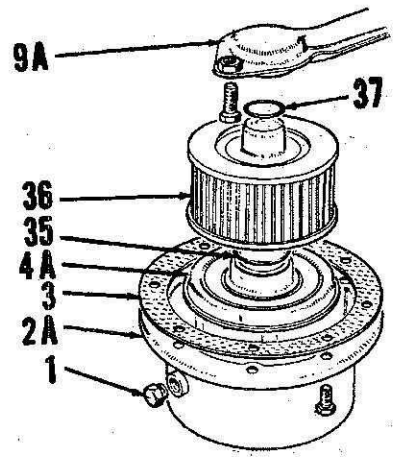


Fig. 176 — Exploded view of late type full flow pump intake filter, suction screen and cover. Refer to Fig. 175 for earlier type unit used with by-pass type filter.

1. Drain plug
2A. Cover
3. Gasket
4A. Suction filter
35. "O" ring
36. Filter element
37. "O" ring
9A. Pump intake tube

HYDRAULIC FLUID

All Selectamatic Models

234. Transmission lubricating oil is utilized for the hydraulic system fluid. Recommended lubricant is SAE 20W-30 or SAE 20W-40 motor oil. To coincide with alternate service intervals of the hydraulic system filters as outlined in paragraph 235, lubricant should be discarded after 1000 hours of use and the system refilled with new clean oil.

Refill capacity is 24 quarts for all models except model 1200. On early model 1200, refill capacity was 38 quarts; however, capacity was changed to 43 quarts by changing length of dipstick sleeve. On model 1200 prior to serial No. 705026, a new sleeve (part No. 923725) may be installed to raise dipstick so that full mark will indicate the increased capacity.

CAUTION: On model 1200, air will be admitted to suction side of hydraulic pump when transmission oil is drained. If control lever is in "raise" position when engine is restarted, pump may fail to prime and become damaged due to oil starvation. Be sure to place model 1200 hydraulic control lever in forward (lowering) position before restarting engine after refilling transmission. When engine is restarted, run at minimum idling speed for ½-minute, then move control lever to "raise" position. If no response is noted, stop engine, return lever to "lower" position and loosen pressure line connections between pump and relief valve(s). Restart engine and tighten the connections when oil starts to flow, then recheck to be sure hydraulic lift is operative.

HYDRAULIC SYSTEM FILTERS

All Selectamatic Models

235. The transmission lubricant should be drained and the suction screen, magnetic filter and control valve by-pass plunger screen cleaned and the paper filter element renewed after each 500 hours of operation. After 1000 hours of use, the transmission oil should be discarded and system refilled with new oil; refer to paragraph 234. Oil with 500 hours use may be reused providing that it is drained into a clean container, allowed to settle and when being poured back into transmission, the last gallon in container retained so that any foreign material settled to bottom will not be returned to transmission. Add new oil to bring level to full mark on dipstick.

On early models 770, 880 and 990 with by-pass type filter (see Fig. 174), remove suction screen cover (2—Fig. 175), screen (4) and magnet (7). Clean the screen in kerosene, allow kerosene to drain off and wipe magnet free of any adhering particles. Reinstall screen, magnet and cover and renew the by-pass filter element (Fig. 174). Refill system with oil.

On models 780, 3800 and 4600, and late models 770, 880 and 990 with full flow filter (Fig. 176), filter element should be renewed as suction screen (4A) and magnet (attached to cover) are cleaned. A warning light on instrument panel indicates low pressure in pump suction tube (9A), thus indicating a clogged filter element (36). Note: The oil filter warning light may come on when transmission oil is cold or when engine is operating at speeds above 1800 RPM; however, this does not indicate that filter is plugged. Filter should be renewed if light comes on when transmission oil is at

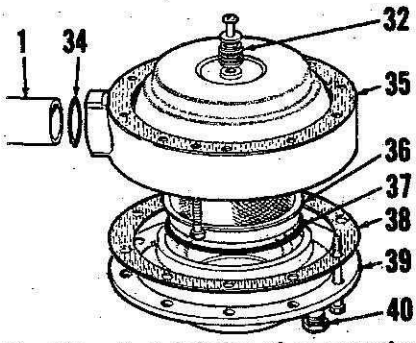


Fig. 177 — Exploded view of pump suction screen, housing and cover for model 1200 with dual pump and early model 1200 with single pump. On late model 1200 with single pump, a full flow element similar to that shown in Fig. 176 is incorporated into the assembly.

1. Pump intake tube
32. Magnetic filter
34. "O" ring
35. Housing
36. Suction screen
37. "O" ring
38. Gasket
39. Cover
40. Drain plug

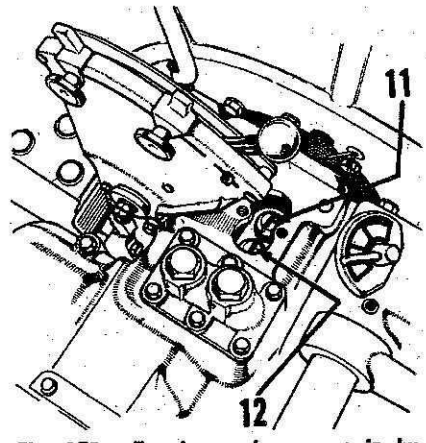


Fig. 178 — To clean nylon screen in by-pass valve plunger, remove plug (11) and withdraw the spring and by-pass plunger assembly. For exploded view of by-pass plunger, refer to items 5, 6, 7 and 8 in Fig. 198. Hold valve plunger retaining plug is (12).

operating temperature and engine is operating at speeds below 1800 RPM, regardless of time interval since filter element was last renewed.

On model 1200 with dual hydraulic pump and on early model 1200 with single hydraulic pump, a by-pass type filter (Fig. 174) and suction screen and magnetic filter (Fig. 177) are used. On late model 1200 with single pump, a full flow filter element similar to that shown in Fig. 176 is incorporated with the suction screen and cover assembly. On model 1200 with full flow filter, a warning light as described in previous paragraph for other models is used to indicate a clogged filter element.

On all models, clean the nylon screen in control valve by-pass plunger as follows: Refer to Fig. 178 and remove cover plate or dump valve from axle housing, exposing the control valve plugs (11 & 12). Remove by-pass valve plug (11) and remove spring and valve plunger; refer to Fig. 198 showing exploded view of control valve. Unscrew plug from inside plunger and remove the orifice washer and nylon screen. Clean the orifice and screen using compressed air, then reinstall screen, orifice washer and retaining plug. Install valve plunger, spring and plug (11) using new gasket. Reinstall cover plate or dump valve.

TROUBLE SHOOTING

All Selectamatic Models

236. When trouble shooting problems encountered with Selectamatic hydraulic system, refer first to paragraphs 221 through 235 to be sure problem is not with misunderstanding the operation of the system or is not caused by improper maintenance. With knowledge of how the system should operate, refer to the following list of malfunctions and possible causes as an aid in locating source of trouble:

A. FAILURE TO LIFT UNDER ALL CONDITIONS; PUMP IS QUIET. Could be caused by:

1. By-pass valve plug seal leaking, valve plunger stuck open or plunger orifice plugged.
2. Hold valve plug seal leaking, hold valve plunger stuck open, plunger orifice plugged or hold relief (cylinder safety) valve is faulty.
3. Faulty pump relief valve.
4. Faulty hydraulic pump.
5. Pump drive failure.
6. Faulty "O" ring seals or ruptured high pressure pipe.

B. FAILURE TO LIFT UNDER ALL CONDITIONS; PUMP IS NOISY. Could be caused by:

1. Low oil level in transmission.
2. Pump suction filter is plugged.
3. Non-return (check) valve seat loose.

C. FAILURE TO LIFT EXCEPT WITH SELECTOR DIAL IN TRACTION CONTROL (T.C.U.) POSITION. Could be caused by:

1. Faulty depth/height control linkage.
2. Spool valve stuck in open (lower) position; will lift light load with control lever fully forward to maximum traction control position.
3. Spool valve not properly adjusted; will lift light load when control lever is fully forward in maximum traction control position.

D. FAILURE TO LIFT UNDER LOAD. Could be caused by:

1. Faulty pump relief valve.
2. Faulty or worn hydraulic pump.
3. Faulty "O" ring seals on high pressure connections or on ram cylinder piston.
4. Faulty hold (cylinder safety) relief valve.

E. WILL NOT HOLD AFTER RAISING. Could be caused by:

1. Quadrant (control lever return) spring not properly adjusted.
2. Faulty sensing unit or depth control cable, or cable not properly adjusted.
3. Leaking sealing washer on hold valve plug.
4. Faulty hold (cylinder safety) relief valve.
5. Hold valve plunger sticking.
6. Ram cylinder piston seals leaking.
7. Faulty non-return (check) valve.
8. Leaking "O" ring seals at high pressure pipe connections or pipe leaking.

F. ERRATIC OR INCORRECT TRACTION CONTROL OPERATION. Could be caused by:

1. Sticking latching valve.
2. Hold plunger ball missing.
3. Incorrect control lever adjustment.
4. Incorrect setting of traction control adjusting screw in rocker lever.
5. Incorrect adjustment of traction control valve retainer.
6. Weak traction control valve spring.

G. ERRATIC OR INCORRECT DEPTH CONTROL. Could be caused by:

1. Incorrect adjustment of implement.
2. Loose control lever pivot.
3. Seized or incorrectly adjusted sensing cable.
4. Seized or faulty sensing unit.
5. Sticking hold valve or by-pass valve plungers.
6. Sticking latching valve.

H. LIFT LINKAGE LOWERS TOO SLOWLY. Could be caused by:

1. Lowering control not fully open.
2. Incorrect grade of transmission lubricant.
3. Incorrect control lever adjustment.
4. Hold valve plunger sticking.
5. Incorrectly adjusted traction control cable.
6. Incorrectly adjusted spool valve.
8. Flow control valve plunger sticking.

SYSTEM CHECKS AND ADJUSTMENTS

All Selectamatic Models

237. **HYDRAULIC PRESSURE CHECK.** Pump relief pressure on all models is 2000 psi. Method of checking pressure will depend upon model being serviced; refer to the following procedure.

237A. MODEL 770. Connect pressure gage to plug in the connector at front end of rockshaft ram cylinder (at front left side of axle housing) or to remote cylinder valve if so equipped. Pressurize the rockshaft cylinder by holding control lever fully rearward against spring pressure with selector lever set at "T.C.U." position. Observe gage reading with transmission oil at normal operating temperature and with engine running at 1800 RPM. If no pressure reading is observed, difficulty may be in faulty or sticking control valves. If gage pressure reading is below 2000 psi, remove top link sensing unit and observe pump relief valve through opening in PTO housing; if oil flow is noted from relief valve shield with gage pressure below 2000 psi, the relief valve is faulty and should be renewed.

238. MODELS, 780, 880, 990, 3800 & 4600. On these models, the pump relief valve can be checked directly as follows: Refer to Fig. 179, remove axle connection plate (C) and install a special plug (P) (David Brown tool No. 961977) as shown, then reinstall connection plate with sealing rings. Connect a 3000 psi hydraulic pressure gage (G), then start engine and observe gage reading. CAUTION: It is important that this test be carried out with engine running at slow idle speed only and with transmission oil temperature above 75° F. With top link sensing unit removed, it can be observed whether low pressure reading is due to faulty pressure relief

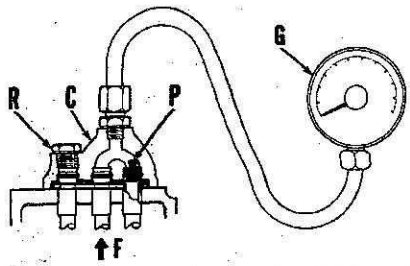


Fig. 179 — View showing installation of gage for checking hydraulic pump relief pressure on models 880, 990 and 4600. Axle cover plate (C) must be removed and a special plug (P) installed to block passage to control valve. Flow (F) is then closed except to gage (G). Return port (R) is for external hydraulic use.

valve or other failure. Renew relief valve if pressure is not approximately 2000 psi and oil is observed running from relief valve shield.

239. MODEL 1200. To directly check model 1200 hydraulic pump relief pressure, remove remote control valve cover plate (F—Fig. 180) and install test plate (David Brown tool No. 962234). Hydraulic pressure gage can then be connected to port in plate. Start engine and run at slow idle speed only; oil temperature must be above 75° F. Gage reading should then be 2000 psi. If gage reading is low, check relief valve (or valves) at bottom of transmission housing. If valves are hot or "buzzing", renew the relief valve. Low pressure gage reading with no noticeable by-pass through relief valve indicates faulty pump.

If test plate is not available, connect pressure gage to one of the remote control valve cylinder ports (A or B) and pressurize port by operating control lever (C). If control valve is not faulty, gage reading will be pump pressure. Note: Control valve lever will return to neutral position if not held to pressurize port.

240. **CHECK FOR RAM CYLINDER LEAKAGE.** If a 3-way control valve is installed at front end of rockshaft ram cylinder (left front side of axle housing), raise lift linkage with heavy implement attached, then close valve to ram cylinder. If linkage lowers with valve closed, ram cylinder seal rings are leaking.

On models not equipped with 3-way valve (except on model 1200), remove connector at front side of ram cylinder and install special connector with shut-off valve (David Brown tool No. 961821). With valve open, lift linkage with heavy implement attached, then close the valve; if linkage lowers, piston ring seals are faulty.

241. **BLEED HYDRAULIC SYSTEM.** To bleed the front mounted hydraulic pump on model 1200, refer to paragraph 234. To bleed the control valves and ram cylinder on all models, proceed as follows:

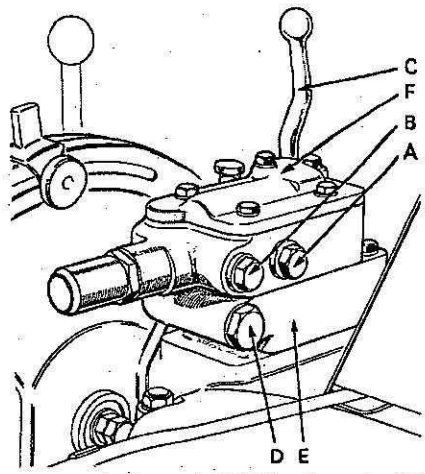


Fig. 180 — On model 1200, where special test plate which is installed in place of control valve cover (F) is not available, check pressure by connecting test gage to remote port (A or B) and pressurizing that port. Control lever must be held to keep it from returning to neutral when detent release pressure is reached. Plug (D) in adapter plate (E) seals external hydraulic return port.

Remove plate from rear axle housing to expose the hold and by-pass valve plunger plugs (Q—Fig. 181). Start engine and, except on models 770 and 1200, loosen plug (P) in axle housing plate. Pull control lever fully rearward against spring pressure and hold in this position until oil free of any air bubbles runs from loosened plug, then push lever forward and tighten plug. On all models, loosen hold and by-pass valve plugs (Q) and pull control lever fully rearward against spring pressure until flow of bubble free oil is obtained, then push lever forward and tighten plugs. Loosen the ram cylinder bleed plug and again pull control lever fully rearward against spring pressure. When lift linkage is fully raised and bubble free oil is running from bleed screw, tighten the screw. Note that the ram cylinder bleed screw has the appearance of a grease fitting.

242. **EXTERNAL ADJUSTMENTS.** The control lever and the sensing unit cable can be adjusted without disassembly of any unit; refer to following paragraphs 243 and 244.

243. CONTROL LEVER ADJUSTMENT. The control lever should move without binding, yet have sufficient tension to hold a set position without moving due to vibration. To adjust control lever tension, loosen the pivot nuts (U—Fig. 182), tighten inner nut to desired tension, then hold inner nut while tightening outer nut.

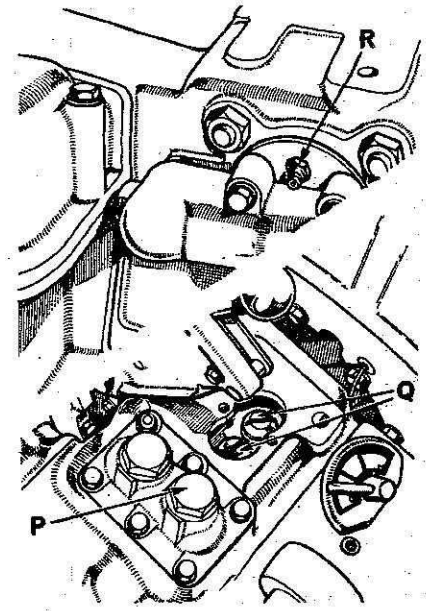


Fig. 181—Views showing bleeding points for hydraulic system; refer to text for procedure.

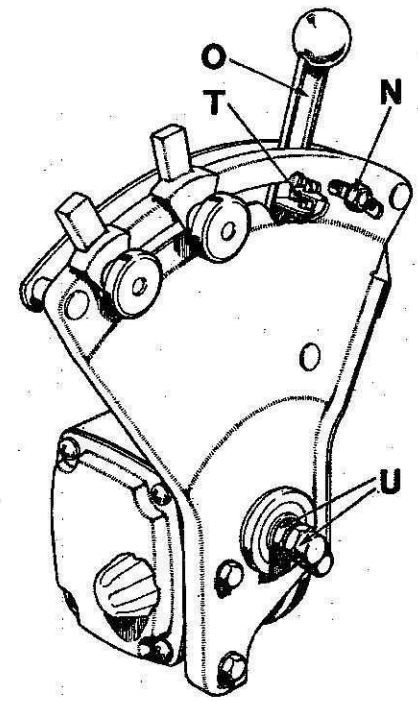


Fig. 182 — Hydraulic system control lever adjusting points; refer to text for procedure.

To check adjustment of quadrant ("select" position return) spring (T), loosen spring carrier nut (N), move lever fully rearward and turn selector dial to "Height" position. Engage lift linkage latch, start engine and hold control lever fully rearward. When linkage is fully raised and relief valve

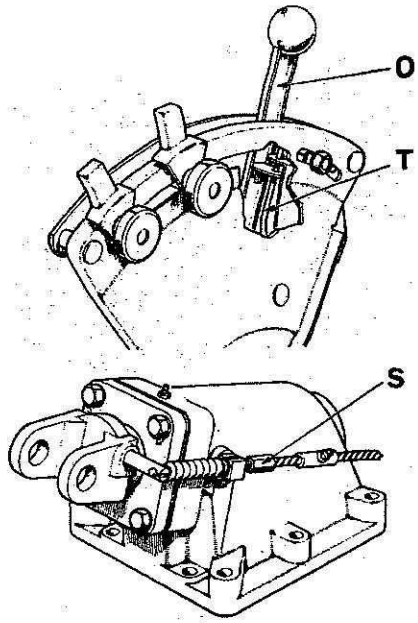


Fig. 183 — Adjusting points for top link sensing unit flexible cable; refer to text for procedure.

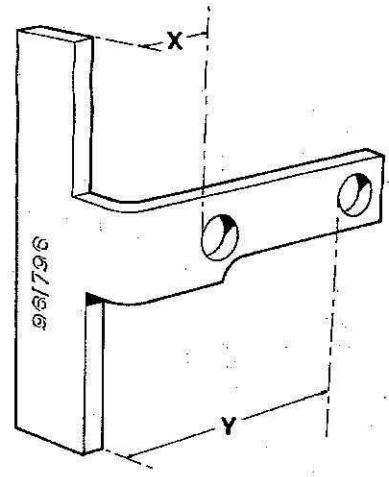


Fig. 184 — Adjusting gage (David Brown part No. 961796) for hydraulic control mechanism. Dimension "X" is 0.437; dimension "Y" is 1.580.

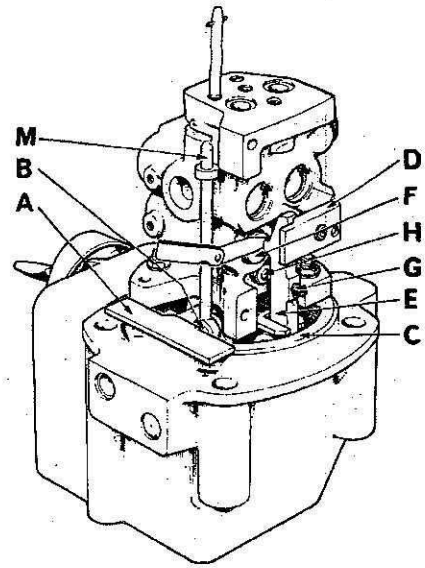


Fig. 185—Using adjusting gage to check setting of abutment plate (D); refer to text for procedure.

A. Adjusting gage
B. Rocker shaft
C. Bracket face
D. Abutment plate
E. Rocker lever
F. Spool valve
G. T.C.U. screw
H. T.C.U. valve
M. Connecting link

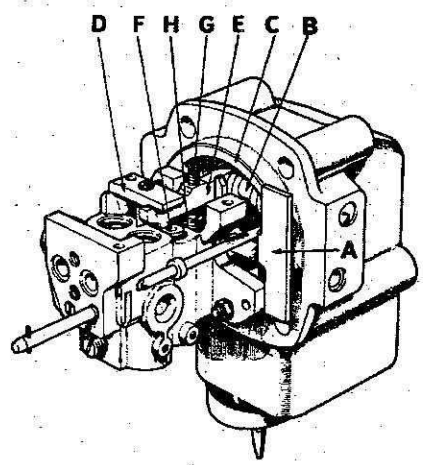


Fig. 186 — Using adjusting gage to check setting of traction control valve screw in rocker lever. Refer to text for procedure. Refer to Fig. 185 for legend.

opens, slowly move lever forward until pump unloads and relief valve stops making noise. Move the spring carrier forward until spring just touches, but does not move, the control lever, then tighten nut (N). As overheating of oil and wear of pump will occur if pump relief valve is in continuous operation, be sure relief valve operates only when control lever is held rearward against spring pressure and ceases to operate when control lever is released and spring moves lever forward. Readjust carrier if necessary.

244. ADJUST SENSING UNIT CABLE. On model 770 prior to serial No. 583396 (with single acting sensing unit), mount implement on 3-point hitch. With engine stopped, loosen lock nut and turn cable adjuster (S—Fig. 183) fully inward to be sure cable is slack. Move control lever (O) rearward until it contacts quadrant spring (T), start engine and allow linkage to raise to full height and reach hold position, then stop engine. With control lever still touching quadrant spring, screw adjuster (S) outward until linkage starts to creep downward, then turn adjuster back inward 1½ turns. Hold adjuster in this position and tighten locknut. If insufficient control lever movement is obtained when shallow plowing, increase setting from creep down position to 2½ turns.

On all other models with double acting sensing unit, adjust cable as follows: With weight on lower links and top link disconnected, place selector dial in "Depth" position. Loosen lock nut and turn adjuster (S) fully inward so that cable is slack. Move control lever (O) rearward until it contacts quadrant spring (T), start engine and allow lift linkage to raise fully and reach hold position, then stop engine. With control lever still touching quadrant spring, slowly turn adjuster out until linkage starts to creep downward, then turn adjuster back in 9¼ turns on models 770, 780, 880, 3800 and 4600, and 5¼ turns on models 990 and 1200. While holding adjuster in this position, retighten lock nut.

245. SYSTEM INTERNAL ADJUSTMENTS. When installing new control valve assembly or right rockshaft bracket on which the valve mounts, it will be necessary to adjust the abutment plate as outlined in paragraph 246 and the traction control (T.C.U.) valve as outlined in paragraph 247. Rockshaft cam is adjusted as outlined in paragraph 248 and connecting link nut as in paragraph 249. For adjustment of spool valve, traction control valve and hold relief valve, refer to paragraph 256.

246. SHIMMING ABUTMENT PLATE. To position the abutment plate when installing new control valve and/or rockshaft right bracket, proceed as follows:

After bolting control valve assembly to bracket, turn selector dial to T.C.U. position. Engage inner hole of adjusting gage (see Fig. 184) on rocker shaft pin (B—Fig. 185) and hold base of gage against boss on bracket as shown at A in Fig. 185. With abutment plate (D) tightly bolted in position, check clearance between rocker lever (E) and spool valve (F) with feeler gage. Clearance should be 0.001-0.003; if not, remove abutment plate and add or remove shims under plate as required to obtain proper clearance.

247. ADJUST TRACTION CONTROL VALVE ACTUATING SCREW. After adjusting abutment plate as outlined in paragraph 246, adjust traction control valve as follows:

With selector dial at T.C.U. position, engage outer hole of adjusting gage (Fig. 184) on rocker shaft pin (B—Fig. 186) and hold base of gage against boss on bracket as shown in Fig. 186. Loosen locknut on traction

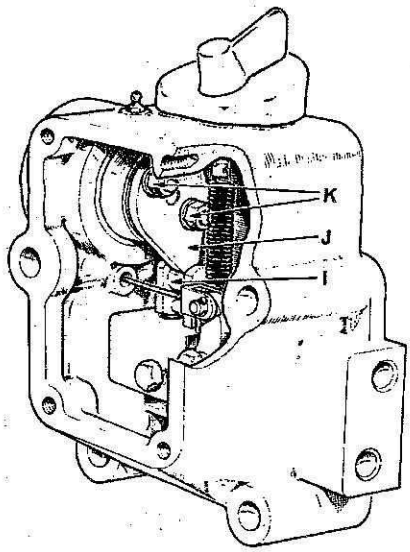


Fig. 187 — Adjusting rocker shaft cam; refer to text for adjustment procedure and specifications.

I. Push rod roller
J. Rockshaft cam
K. Cam retaining nuts

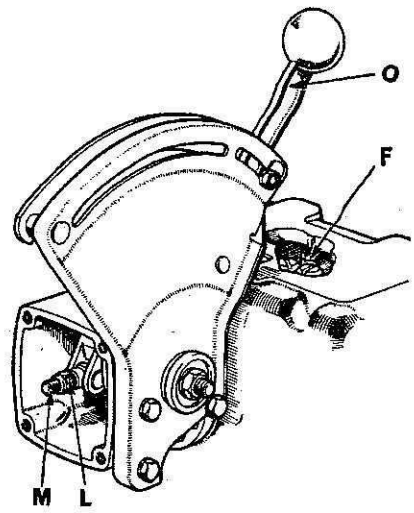


Fig. 188 — Adjusting points for connecting rod nut (L); refer to text for adjusting procedure.

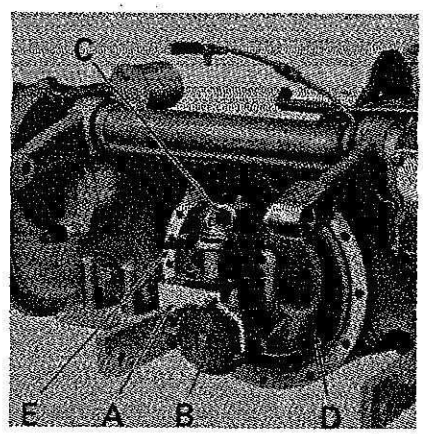


Fig. 189 — View with PTO housing and gear assembly removed showing early type (Dowty) pump (A).

A. Pump assembly
B. Pump drive gear
C. PTO cardan shaft
D. Pump mounting plate
E. Lubrication pipe

control screw (G) in rocker lever (E), then turn screw in or out until it just contacts traction control valve (H), but does not compress spring. On model 770, turn screw 1¼ turns further in; on all other models, turn screw one additional turn from where it just contacts valve. As point at which valve spring starts to compress is not easy to determine, adjustment should be done with assembly inverted and with a 0.002 thick feeler gage inserted between valve plunger and adjusting screw. When screw is turned in far enough to start holding feeler gage, withdraw gage and turn screw in farther as required.

248. ADJUST ROCKSHAFT CAM. On all models except model 770 prior to serial No. 583396, proceed as follows to adjust rockshaft cam:

With tractor and hydraulic system assembled, but with cover plate removed from right rockshaft support bracket, lift linkage by hand and engage locking latch to hold the linkage in raised position. Then, refer to Fig. 187 and check to see that push rod roller (I) is seated in cam indentation (J). If cam is not in this position, loosen nuts (K) and turn cam by inserting lever under end of rockshaft and holding push rod down against its spring until roller engages cam indentation, then retighten nuts and install cover plate.

249. ADJUST CONNECTING LINK NUT. With tractor and hydraulic system assembled, but with cover removed from front side of control lever housing and with axle housing plate or dumping valve removed to expose hold and by-pass valve plugs as shown in Fig. 188, proceed as follows:

With lift linkage in lowered position and engine not running, unscrew nut (L) until nut is flush with end of rod (M). Loosen quadrant spring carrier nut and move control lever to extreme rear position of quadrant. Place a small wrench or other spacer between control lever and rear quadrant guide, move the guide rearward to where it holds control lever fully rearward and tighten guide nut. Place finger on top of control valve spool (F), then switch selector dial back and forth between T.C.U. and Height control positions, noting that spool valve will lift each time selector dial is moved. Then, tighten nut (L) one turn at a time and recheck for spool valve movement, noting that spool valve movement will be reduced as nut is tightened. Continue to tighten nut until no spool valve movement can be noted as selector dial is moved from T.C.U. to Height control position, then back to T.C.U. position.

Later models have a plug at rear of axle housing cover plate so that a dial indicator may be used to detect spool valve movement. Position dial indicator so that plunger rests on top of valve spool, then proceed with adjustment as previously described. Dial indicator reading will be the same when selector dial is in either T.C.U. or Height control when adjustment of nut (L) is correct. Note that dial indicator needle may "flick" as selector dial is moved, but this is not an indication of spool valve mvement.

With connecting rod nut properly adjusted, reinstall cover plate on control lever housing and the plate or dump valve on axle housing. Readjust quadrant spring as outlined in paragraph 243.

R&R AND OVERHAUL PUMP
All Models Except 1200

250. To remove hydraulic pump, first remove PTO housing and gear assembly as outlined in paragraph 192. The pump and relief valve assembly can then be unbolted and removed from mounting plate; refer to Fig. 189. Two different makes of pumps have been used; refer to paragraph 251 for Dowty pump used on early models 770, 880 and 990, and to paragraph 252 for information on Plessey pump used on all later models.

251. **DOWTY PUMP.** Refer to Fig. 190 for exploded view of early type Dowty hydraulic pump assembly Later Dowty pumps were changed to incorporate pressure balanced inner bushings; see Fig. 192. Pumps with pressure balanced inner bushings have a different body requiring only one sealing "O" ring (18—Fig. 190) between pump and relief valve plate (17), whereas early Dowty pump requires two "O" rings (11 and 18). A later change incorporated a sealed pressure relief assembly that bolted directly to pump body; the sealed valve assembly can be installed on earlier pumps with pressure balanced inner bushings. Early and late type Dowty pumps are interchangeable as an assembly, providing the mating pressure relief valve and/or plate is also installed. Also, the complete pump, relief valve and gear assembly may be renewed using later type Plessey assembly (refer to paragraph 252).

To disassemble pump, remove nut (1—Fig. 190) and using suitable pullers, remove gear (2). Remove relief

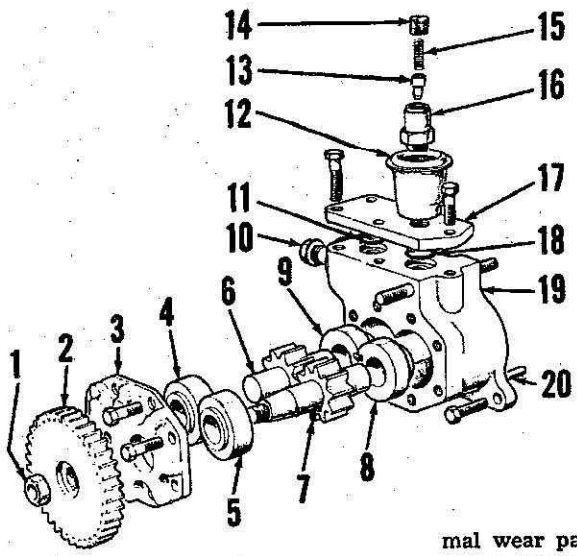


Fig. 190 — Exploded view of early type (Dowty) hydraulic pump assembly. Later relief valve for Dowty pump bolted directly to pump body instead of using separate mounting plate (17).

1. Gear retaining nut
2. Pump drive gear
3. Pump end plate
4. Bearing
5. Bearing
6. Idler rotor
7. Drive rotor
8. Bearing
9. Bearing
10. Plug
11. "O" ring
12. Shield
13. Valve plunger
14. Adjusting plug
15. Relief valve spring
16. Valve body
17. Valve mounting plate
18. "O" ring
19. Pump body
20. Locating dowel

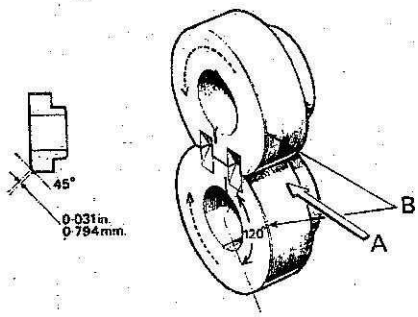


Fig. 191—When installing new bearings in worn pump, inlet (A) side of inner bearings should be chamfered at (B) as shown in inset.

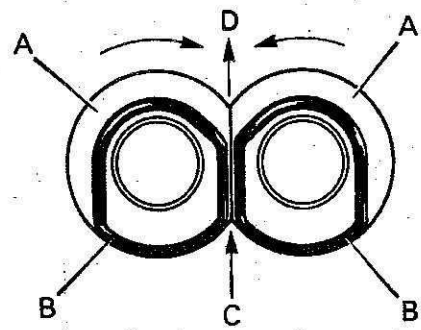
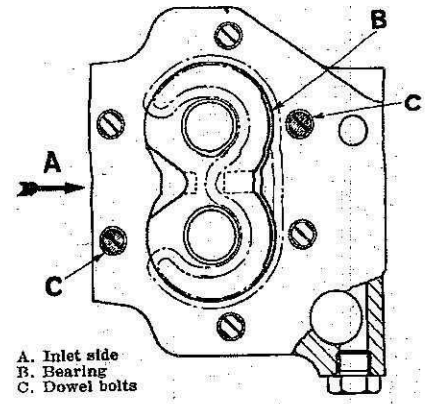


Fig. 192 — "O" ring (B) installation on late Dowty pressure balanced bearings. Bearings must be installed with pressure area (A) to outlet (D) side of pump. Inlet side of pump is (C).

valve plate (17) and/or the valve assembly. Remove bolts retaining cover (3) and remove cover. If the rotors (6 & 7) and bushings (4, 5, 8 & 9) will not slide out of body, tap body on wood block. Note location of bushings so they can be reinstalled in same position. Discard all "O" rings.

Thoroughly clean and inspect all parts. Examine inside of body for wear in gear track, especially at intake side of pump. The rotor teeth contact body at intake side and will produce a normal wear pattern, however the wear or scoring must not be excessive. Any burrs at edges of gear track should be removed to prevent interference to balancing action of bushings. If new bushings are being installed in used pump body, inner bushings should be chamfered as shown in Fig. 191. Usually, bushings should be renewed in sets of four; however, inner bushings and outer bushings are available in matched sets of two bushings.

When reassembling pump, coat inner bushing "O" rings with grease and lubricate all other parts with motor oil. On later type pumps with pressure balanced inner bushings, be sure the bushings and "O" rings are installed in correct position illustrated in Fig. 192. With cover resting on outer bushings, there should be at least 0.015 clearance between cover and pump body to produce sufficient pressure on inner bushing "O" rings. Tighten cover retaining bolts to a torque of 38-40 Ft.-Lbs. and gear retaining nut to a torque of 45 Ft.-Lbs. Be sure that pump can be turned by hand; there should be a steady drag on rotors without any binding or rough spots. Tighten relief valve or plate retaining cap screws to a torque of 25 Ft.-Lbs.



A. Inlet side
B. Bearing
C. Dowel bolts

Fig. 194 — Cross-sectional view of Plessey hydraulic pump; refer to Fig. 193 for exploded view.

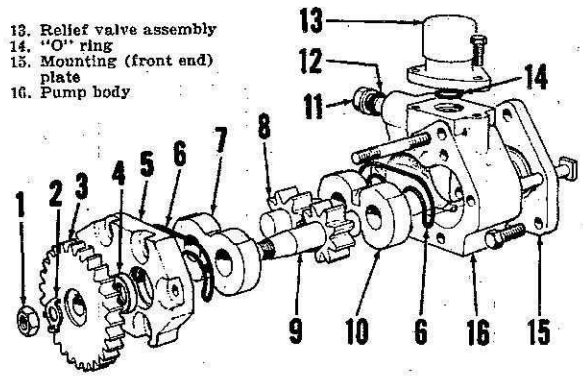
252. **PLESSEY PUMP.** Exploded view of Plessey pump assembly is shown in Fig. 193. Note that the Plessey pump has a one-piece inner (10) and outer (7) bushing, whereas Dowty pump (see Fig. 190) is fitted with two-piece inner and outer bushings.

Before disassembling pump, scribe a mark across mounting plate, pump body and cover to aid in reassembly. Unscrew retaining nut and remove pump drive gear with suitable puller. Remove the bolts, nuts and washers retaining pump cover and mounting plate and separate mounting flange from pump body. Tap flange with mallet if difficult to remove. CAUTION: Do not attempt to pry the pump apart. Remove the "O" ring from mounting flange and, noting position of gears (rotors) and bushings in pump body, withdraw gears and bushings. Remove end cover from body and remove "O" ring from cover. Remove oil seal from end cover and blanking plug from pump body. Discard "O" rings and shaft seal as new rings and seal must be used on reassembly.

Carefully clean and inspect all parts. If bearings are not excessively worn, they may be lightly polished by lapping on O grade emery paper lubricated with kerosene; be sure emery

Fig. 193—Exploded view of Plessey hydraulic pump assembly. Refer also to Fig. 194 for cross-sectional view of pump.

1. Gear retaining nut
2. Tab washer
3. Drive gear
4. Oil seal
5. End plate
6. Sealing ring
7. Outer bearing
8. Idler rotor
9. Drive rotor
10. Inner bearing
11. Plug
12. Sealing ring
13. Relief valve assembly
14. "O" ring
15. Mounting (front end) plate
16. Pump body



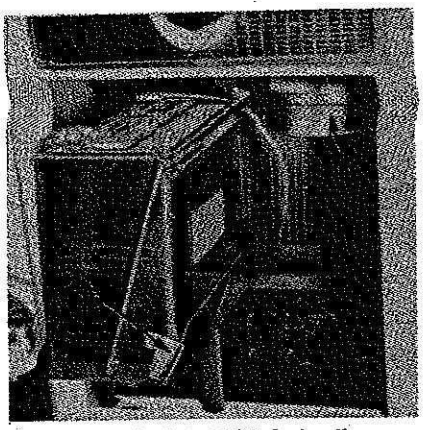


Fig. 195 — Model 1200 hydraulic pump (C) is accessible after removing grille and swinging battery tray outward. Oil cleaner is (B); battery tray latch is (A).

paper is on an absolutely flat surface. Note: Thickness of bearing must not vary more than 0.002. The outer face of bearing may be lightly polished to obtain free movement in pump body. Inspect gear track in pump body for scoring or excessive wear, especially at intake side of pump. It is normal for gears to cut a light track at intake side of body. If body is reusable, remove any burrs at edge of gear track with fine emery cloth. Inspect gears for scoring or wear of teeth, side faces or journals. The gear journals must be within 0.0005 of each other and gear widths equal within 0.0002. Overall length of gears and bushing assembly should be 0.003 to 0.007 less than depth of gear pocket in pump body. Be sure that the scroll lubricating grooves in bushings are free from damage and foreign material.

When reassembling, lubricate seal with grease and all metal parts with clean motor oil. Refer to Fig. 194 and to previously applied scribe marks for assembly guides. Spring side of shaft seal must face out. Tighten assembly bolts to a torque of 40 to 50 Ft.-Lbs. and tighten gear retaining nut to a torque of 40 Ft.-Lbs. Be sure that pump can be turned by hand; pump should have a light even drag with no tight or rough spots.

Model 1200

253. To remove model 1200 hydraulic pump, first remove the radiator grille. The pump is accessible through grille opening; refer to Fig. 195. Thoroughly clean pump, lines and surrounding area, then disconnect inlet and pressure lines from pump. Unbolt mounting bracket (7—Fig. 196) from tractor frame and remove the pump and bracket assembly. Straighten tab washer and remove nut retaining coupling (6) to pump shaft, then using

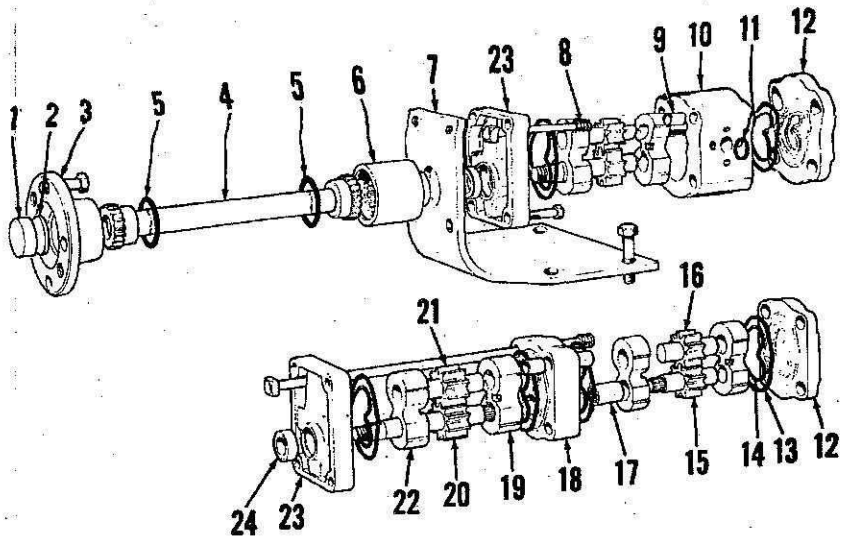


Fig. 196 — Exploded view showing construction of both the single and dual pump assemblies for Model 1200. Pump drive components and mounting bracket are also shown; pump is mounted in front of radiator (see Fig. 195) and is driven from engine crankshaft through shaft (4).

1. Rubber disc
2. Metal disc
3. Drive flange
4. Drive shaft
5. "O" rings
6. Drive coupling
7. Mounting bracket
8. Bearings
9. Hollow dowels
10. Pump body
11. "O" ring
12. End plate
13. "O" ring
14. Sealing ring
15. Dual pump drive rotor
16. Dual pump idler rotor
17. Drive connector
18. Separator plate
19. Bearing
20. Drive rotor
21. Idler rotor
22. Bearing
23. Flange end plate
24. Oil seal

suitable pullers, remove coupling and Woodruff key from shaft. Unbolt pump flange (23) from bracket.

Prior to disassembly of pump, scribe a mark across pump flange (23), body (10) or bodies and center spacer (18) and end plate (12) to aid in reassembly of unit. Remove the through bolts (8) and separate pump components on bench and lay them out in position as they are removed. Carefully clean and inspect the pump body (10). If body of single pump or either body of dual pump has excessive wear or scoring in gear track, it will be necessary to renew the complete pump assembly as body, end cover, flange and on the dual pump, the spacer are not serviced separately.

Reassemble using all new "O" rings (13 and 14) and new shaft seal (24). Install seal with lip to inside of flange (23). Reassemble using new bushings or matched gear sets as required, referring to exploded view in Fig. 196 and to previously affixed scribe marks as reassembly guides.

R&R CONTROL VALVE ASSEMBLY

All Models

254. To remove control valve assembly, first remove rockshaft and right hand bracket assembly with control valve attached as follows: Remove cover, complete with lowering control knob, from front of control lever housing and remove nut from connecting rod. On all models except models 770, 780 and 3800, disconnect

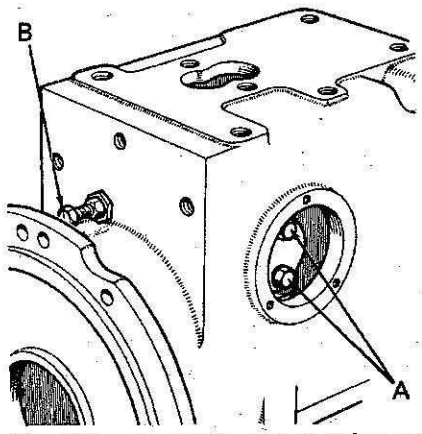


Fig. 197 — To remove control valve assembly, unbolt pressure line at (A) and unscrew lubrication line retaining set screw (B) 9 turns.

brake linkage from lower end of hand brake lever. Unbolt and remove control lever housing from front of rear axle housing; it may be necessary to loosen or remove quadrant to remove all four housing bolts. With control lever housing removed, remove the two cap screws (A—Fig. 197) retaining pressure pipes to control valve housing. Loosen locknut while holding set screw (B), then back set screw out nine turns. Note: Do not turn set screw out more than 9 turns as lubrication pipe will be disengaged. Disconnect flexible cable from top link sensing unit, then remove sensing unit and place temporary cover over opening in PTO housing to prevent dirt from entering system. Disconnect

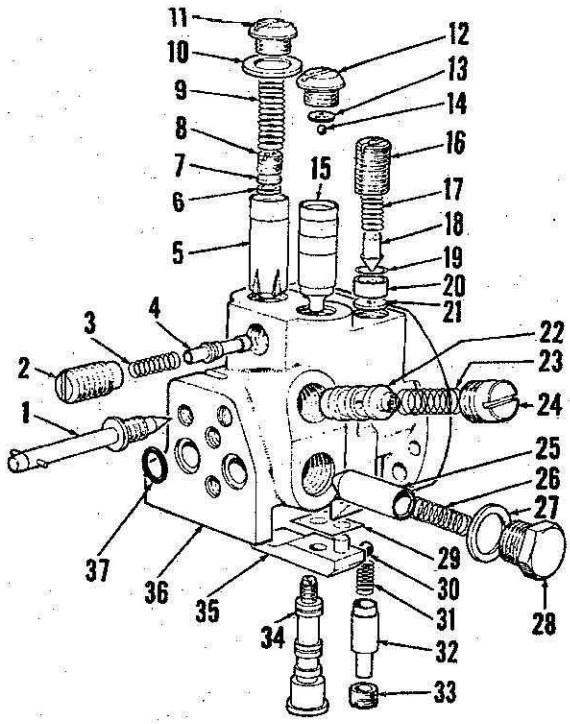


Fig. 198—Exploded view of Selectamatic control valve assembly.

1. Lowering valve needle
2. Latching valve plug
3. Latching valve spring
4. Latching valve
5. By-pass valve plunger
6. Nylon filter
7. Orifice washer (0.020)
8. Retaining plug
9. Valve plunger springs (2)
10. Sealing washer
11. Retaining plug
12. Hold valve plug
13. Ball retainer
14. Steel valve ball
15. Hold valve plunger
16. Relief valve retainer
17. Relief valve spring
18. Relief valve poppet
19. Adjusting shims
20. Relief valve seat
21. Orifice washer
22. Lowering valve
23. Lowering valve spring
24. Retaining plug
25. Non-return (check) valve
26. Non-return valve spring
27. Sealing washer
28. Retaining plug
29. Shims
30. T.C.U. valve ball
31. T.C.U. valve spring
32. T.C.U. valve plunger
33. Retaining plug
34. Spool valve
35. Abutment plate
36. Valve body
37. "O" ring

lift and leveling links from rockshaft arms and remove cover from right hand rockshaft bracket. Unbolt cover from rear end of ram cylinder housing (rockshaft left bracket). Note: About 1 quart of oil will run out as ram cylinder housing cover is removed. Unbolt right hand rockshaft bracket from axle housing and support rockshaft so that it will remain level, then remove rockshaft and right hand support bracket (with control valve attached) from rear axle housing.

With rockshaft and bracket assembly removed, unbolt and remove control valve from right hand bracket. Valve housing may be a tight fit on the locating dowels. To reinstall control valve, reverse removal procedure. Note: If set screw (B—Fig. 197) does not turn fully back into same position (9 turns) as before, loosen the set screw and relocate lubrication pipe. Refer to paragraphs 242 through 249 for necessary readjustments and to paragraph 241 for bleeding the system after reassembly.

OVERHAUL CONTROL VALVE ASSEMBLY

All Models

255. With control valve assembly removed as outlined in paragraph 254, refer to Fig. 198 and proceed as follows: Remove lowering control valve needle (1) and abutment plate (35), taking care not to lose any of the shims (29) located between plate and valve body. Remove the two lock nuts (not shown) from spool valve (34) and withdraw the valve. **Do not** attempt to remove the spool valve sleeve. Remove the two plugs (11 & 12) from top of valve body, lift out the springs (9) (hold valve spring is not shown) and turn valve body upside down so that hold and by-pass valve plungers will fall out. Note: The small steel ball (14) inside hold valve plunger (15) will also fall out when valve body is inverted. If the plungers do not fall out, insert a ½-inch wood dowel into the plungers to withdraw them. Remove plugs (8) from by-pass valve plunger (5) and remove the orifice washer (7) and nylon screen (6); early models did not have screen, but screen may be fitted in service. Remove relief valve plug (16) and remove the spring (17), plunger (18), shims (19), seat (20) and restrictor (21); take care not to lose any of the shims. Remove the two plugs (24 & 28) from side of valve body and remove the non-return (check) valve plunger (25) and spring (26) and the lowering valve plunger (22) and spring (23). Remove plug (2) from front of body and remove the latching valve spring (3) and plunger (4). Unscrew the retainer (33) from bottom of valve and allow the traction control plunger (32), spring (31) and valve ball (30) to fall out. **Do not** disturb the remaining plugs and seats in valve body.

Thoroughly clean valve body in kerosene and clean with compressed air; **do not** use rags or shop towels to wipe the valve body or any component as lint from cloth will cause malfunction of valve. Clean all plungers and spools and be sure they are free to slide and rotate in their bores with light finger pressure. If there are any signs of binding or sticking, the plungers may be polished using jeweler's rouge or diesel injector lapping compound. If the plungers or bores are scored, or if any of the seat faces (except the non-return valve seat) are worn or damaged, the valve is not suitable for further service and should be renewed with complete new valve assembly. The plungers are match ground to the bores and cannot be supplied separately. If all parts of the valve body except the non-return (check) valve seat are serviceable, renew seat as follows:

Using tool fabricated to dimensions shown in Fig. 199, remove the damaged check valve seat. Check fit of new seat in bore after cleaning all traces of Loctite sealant from valve body. If standard size seat (identifiable by one groove around outside) fits loosely, use a new 0.001 (two identification grooves) or 0.002 (three identification grooves) seat. Treat the bore and outside of new seat with Locquic primer, then apply a small amount of Loctite to outside diameter of seat and press seat into position. Be sure to clean any excess Loctite from valve body.

With all valve parts cleaned in kerosene, air dried and lubricated with clean oil, reassemble as follows: Fit spring (not shown) on lower end of spool valve (34—Fig. 198). Push valve into position against spring and install the flat washer and two lock nuts, finger tight, on upper end of valve.

Install nylon screen (6) and orifice washer (7) in by-pass plunger (4) and secure with retainer (8). On early models without filter screen (6), a screen may be installed by using new, shorter retainer (8). Install plunger in bore, then install spring (9) and plug (11) with new gasket (10).

Install hold valve plunger (15), drop steel ball (14) into plunger, then install retainer washer (13), spring (not shown) and plug (12) with new gasket. Early models were not fitted with retainer washer (13); however, a new washer can be installed between ball (14) and spring on these models.

Install latching valve plunger (4) and spring (3), then install plug (2) tightly. Place restrictor washer (21) in relief valve bore, then install seat (20), same shims (19) as removed, valve (18), spring (17) and retainer (16). Note: New relief valve assembly has correct number of shims for

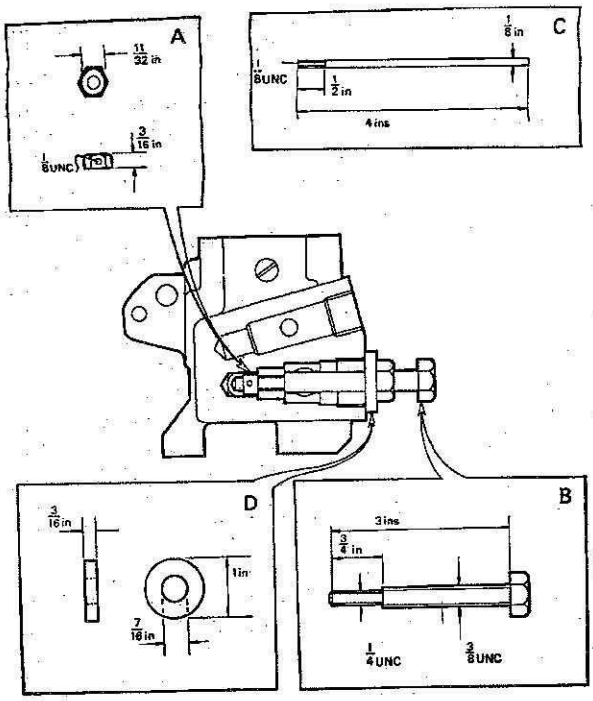


Fig. 199—To renew non-return (check) valve seat, a tool can be fabricated to dimensions shown. Cross-sectional drawing of valve body in center view shows tool in position to remove valve seat. Pin (C) is used to position small nut (A) while puller bolt (B) is threaded into nut, then pin is unscrewed from nut. Hold bolt and turn outer (large) nut to remove seat.

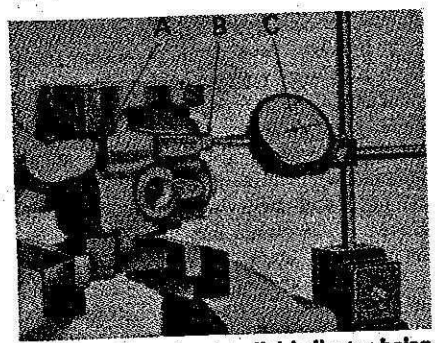


Fig. 200—View showing dial indicator being used to adjust spool valve; refer to text for procedure.

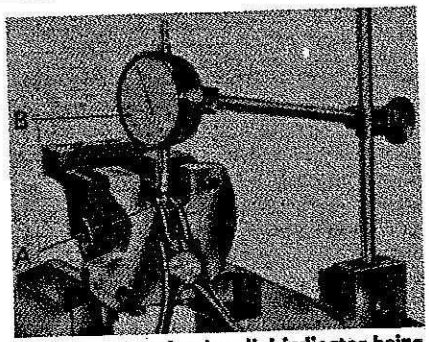


Fig. 201—View showing dial indicator being used to adjust traction control valve; refer to text for procedure.

proper pressure setting. Install non-return valve plunger (25), spring (26) and plug (28) with new gasket (27). Invert valve body and drop traction control valve ball (30) into bore, then install spring (31), plunger (32) and retainer (33); do not tighten retainer at this time. Adjust spool valve, traction control valve and hold relief valve as outlined in following paragraph.

ADJUST CONTROL VALVE ASSEMBLY

All Models

256. With valve assembled as outlined in paragraph 255, adjust assembly as follows:

Clamp control valve assembly in soft jawed vise and mount dial indicator plunger against adjusting nut end of spool valve as shown in Fig. 200. Push opposite end (A) of spool valve inward to fully compress thrust spring and zero dial indicator with valve at this position. Release spool valve and observe dial indicator reading. Adjust inner nut so that total movement of spool valve is within 0.001 of dimension etched on the valve, then tighten outer nut. Recheck movement of spool valve to be sure dial indicator reading is still within 0.001 of setting dimension and readjust nuts if necessary.

With spool valve properly adjusted, remove control valve assembly from vise and turn retainer (33—Fig. 108) on traction control valve plunger (32) in until plunger free movement is restricted to 0.002, then back retainer out ⅔-turn. Mount control valve in soft jawed vise as shown in Fig. 201 and set dial indicator plunger on top of the traction control valve plunger (A). With valve plunger resting on spring, zero the dial indicator. Then, using needle nose pliers as shown, lift valve plunger up against retainer and observe dial indicator reading. If reading is not within limits of 0.034 to 0.040, readjust traction control valve retainer until correct movement of valve plunger is obtained. Stake the retainer to hold it in the correct position.

With the spool valve and traction control valve properly adjusted, valve assembly can be bench tested for hold valve relief pressure and excessive leakage as follows: Fabricate an adapter to dimensions shown in Fig. 202 so that a hydraulic hand pump (with pressure gage) can be attached to control valve assembly as shown in Fig. 203. Apply pump pressure and allow all passages of control valve to fill with oil. Note: New, clean transmission lubricant (SAE 20W-30 or 20W-40 motor oil) should be used in test pump. Build up pressure until gage reading is 2000 psi and observe for leakage past hold valve, non-return (check) valve and spool valve. Slight leakage at openings (A, B & C) is normal; however, excessive flow at any of these openings will indicate a faulty valve. Leakage at hold valve plunger will allow oil to escape past flow control valve and appear at (A). Incorrect seating of non-return valve will allow oil to escape at hole (B) in adapter block. Sticking or incorrectly adjusted spool valve will allow oil to leak out small drilled hole (C) in valve body.

If only slight seepage of oil occurs at each of the points, valve can be considered serviceable. Check hold relief pressure by building up gage pressure until oil appears at valve plug

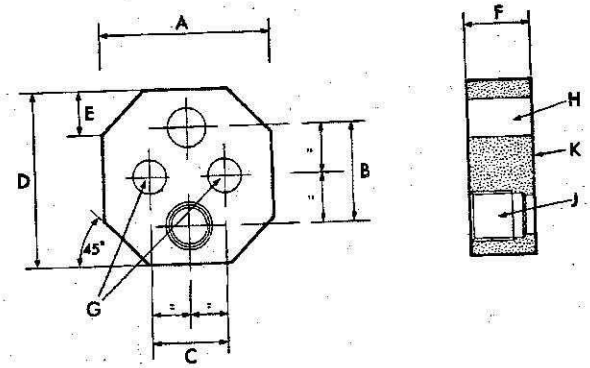


Fig. 202 — View showing adapter that can be made to connect a hand hydraulic pump to control valve assembly for testing purposes. Dimensions are given in legend.

A. 2 inches
B. 1¼ inches
C. ⅞-inch
D. 2 inches
E. ½-inch
F. ¾-inch
G. 13/32-inch diameter
H. 7/16-inch diameter
J. Drill and tap suitable diameter for available connector
K. Surface grind this face

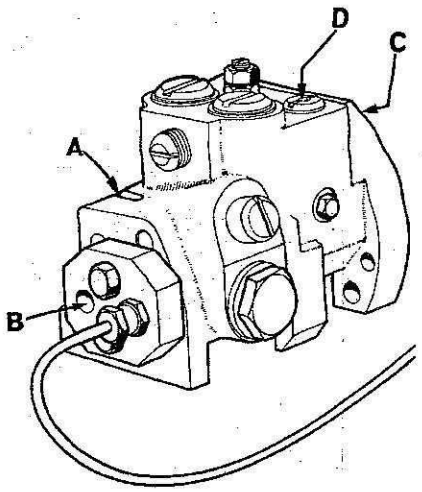


Fig. 203 — View showing adapter connecting pressure line to control valve assembly. Very slight leakage from valve openings is normal. If excessive leakage shows at any of the openings (A, B, C or D), refer to text for location of faulty valve.

(D); gage pressure should then be approximately 2500 psi. If hold relief valve pressure is not correct, shims (19—Fig. 198) may be added or removed between retainer (16) and valve seat; removing shims will increase relief pressure. Shims are available in thicknesses of 0.003, 0.007 and 0.015.

R&R AND OVERHAUL CONTROL MECHANISM

All Models

257. Remove control lever housing and rockshaft with right hand bracket as outlined in paragraph 254. Refer to Fig. 204 for disassembly and reassembly guide to overhaul control lever housing assembly; procedure for doing so is evident from inspection of unit and with reference to exploded view.

To remove and disassemble control mechanism from rockshaft bracket, proceed as follows: Disconnect flexible cable (C—Fig. 206) and withdraw cable from bracket. Remove guide bracket (61—Fig. 205) and push rods (52 & 53), then unbolt and remove control valve assembly from bracket. Unbolt and remove cam (56) and withdraw rockshaft from bracket. Remove snap ring (40) and connecting rod (13) from rocker shaft (37). Drive spring pin (35) from selector fork (34) and remove expansion plug (63) from right hand side of bracket by drilling hole through plug and prying it out. Drive selector rod (41) out and remove fork (34), catching detent ball (36) as rod is removed from bracket. Extract spring (42) with wire hook.

Remove rocker shaft locating screw (38) (screw may be hid by gasket)

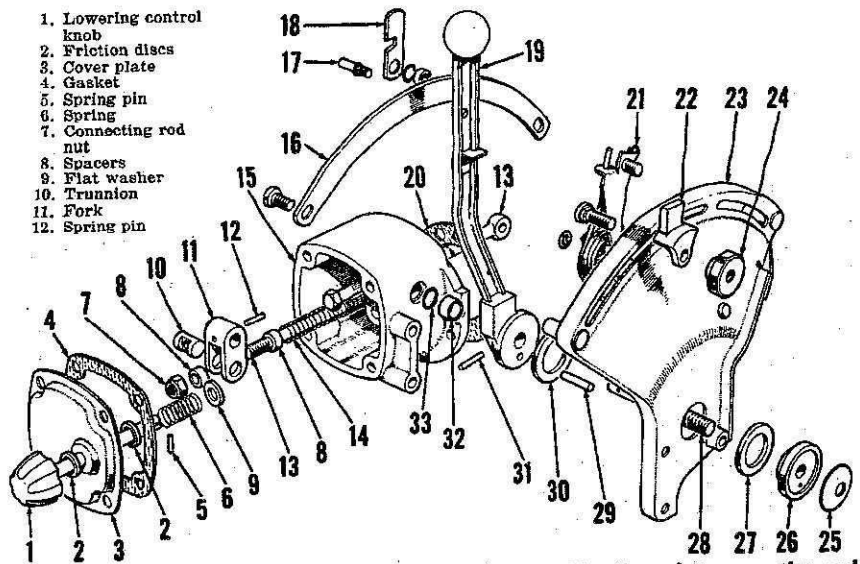


Fig. 204 — Exploded view of control lever housing assembly. Note that connecting rod (13) is also shown in exploded view of control mechanism (rockshaft right hand support bracket) housing. Refer also to assembly drawing in Fig. 206.

13. Connecting rod
14. Spring
15. Control lever housing
16. Quadrant plate
17. Special stud (optional)
18. Lever latch (optional)
19. Control lever
20. Gasket
21. Quadrant spring & bracket
22. Re-set guide
23. Quadrant
24. Knurled nut
25. Belleville washer
26. Friction plate
27. Friction washer
28. Control lever shaft
29. Dowel pin
30. Friction washer
31. Spring pin
32. Plastic bushing
33. "O" ring

and slide rocker arm (66) from shaft. Turn rocker shaft so that arm pin is to center of bracket, then slide shaft from bore. It is not necessary to remove expansion plug (39). Remove pin (47) and pull selector dial pointer (46) from shaft. Remove dial (48), breather pad (49) and "O" ring (45). If rockshaft bushing (50) is worn, drive bushing from bracket.

258. To reassemble control mechanism, reverse disassembly procedure and note the following: Be sure that rockshaft bushing (50) is installed in bracket so that grease hole is aligned with grease fitting (F) and with split in bushing to rear side of bracket. Fit new "O" ring (62) on rockshaft before installing shaft through bushing. Hold detent ball (36) in with pin

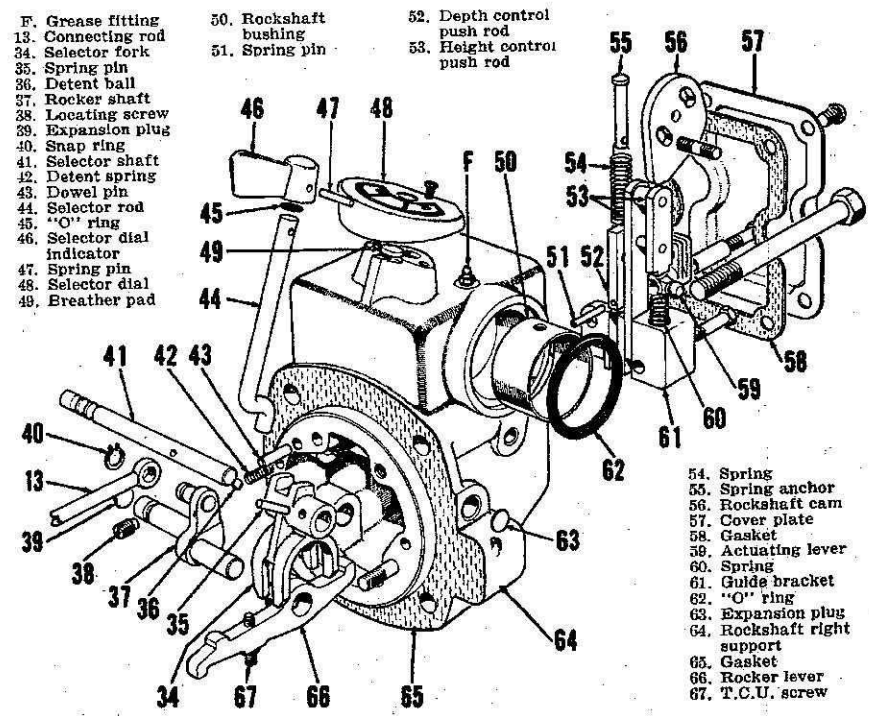


Fig. 205—Exploded view of hydraulic system control mechanism that is mounted in rockshaft right hand support bracket (64). Note that connecting rod (13) is also shown in Fig. 204. Refer also to the assembly view in Fig. 206.

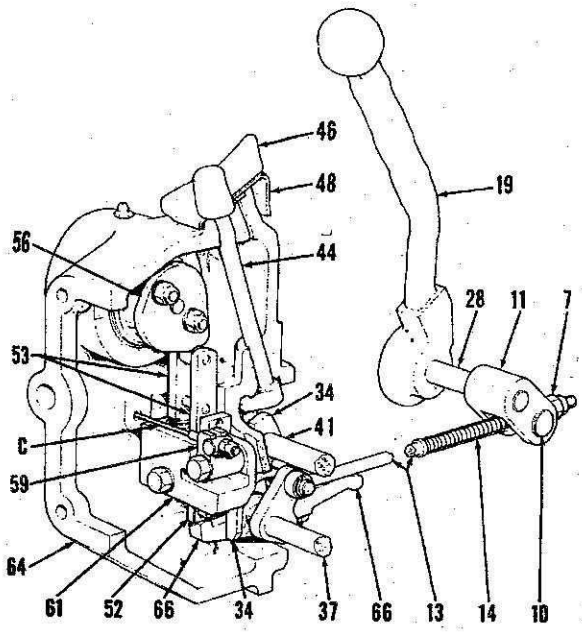


Fig. 206—Assembly view of control lever and control mechanism. Refer to Figs. 204 and 205 for exploded view of control lever and mechanism.

C. Flexible cable
7. Connecting rod nut
10. Trunnion
11. Fork
13. Connecting rod
14. Spring
19. Control lever
28. Control lever shaft
34. Selector fork
37. Rocker shaft
41. Selector shaft
44. Selector rod
46. Selector indicator
48. Selector dial
52. Depth control push rod
53. Height control push rod
56. Rockshaft cam
59. Actuating lever
61. Guide bracket
64. Rockshaft right support
66. Rocker lever

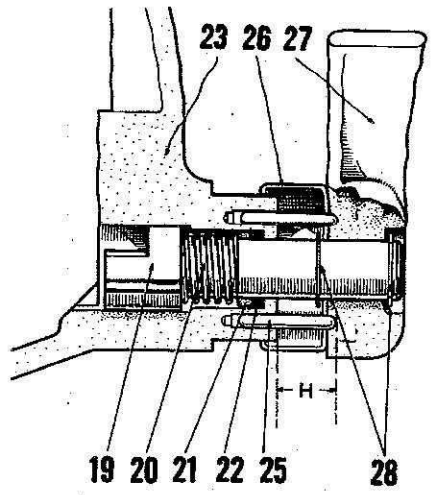


Fig. 208—Cross-sectional view of lift linkage latch located in ram cylinder cover (23). Refer also to Fig. 207.

19. Lift linkage latch
20. Spring
21. Spacer
22. "O" ring
23. Ram cylinder cover
25. Pins
26. Dust shield
27. Latching lever
28. Snap rings

punch when inserting selector rod in bracket.

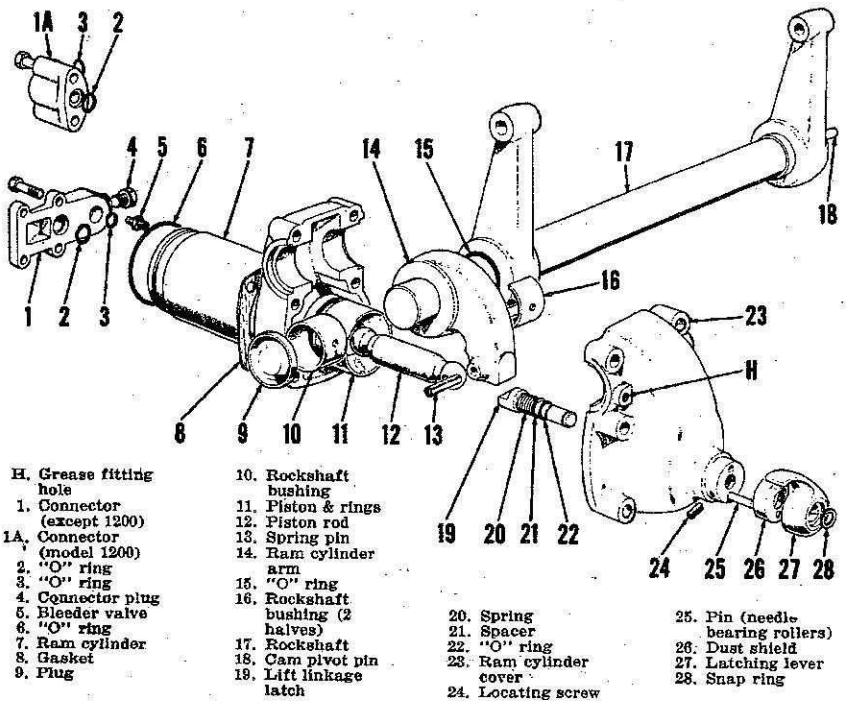
After unit is reassembled and installed on tractor, refer to paragraphs 242 through 249 and make necessary adjustments for proper performance of hydraulic system.

R&R AND OVERHAUL ROCKSHAFT CYLINDER

All Models

259. The ram cylinder piston can be removed without removing ram cylinder from axle case. Support lift linkage in fully raised position by blocking up or wiring up rear end of lift links. Remove ram cylinder cover (rockshaft left support bracket) and drive pin from ram arm, then remove connecting rod. Remove the three-way valve or connector from front end of ram cylinder and insert a small diameter rod through oil feed hole to push piston rearward out of cylinder. Inspect piston and cylinder for scoring and renew piston rings as follows: Soak new leather back-up ring in thin oil for one-half hour prior to installation. Remove old leather and rubber rings from piston, then install new leather ring with rough side towards front (closed) end of piston. Install rubber "O" ring at front side of leather ring, then let piston set for about one-half hour until leather ring settles into groove. Lubricate piston and cylinder bore wtih clean motor oil, then reinstall piston. Cylinder bore is chamfered to compress the rings as piston is pushed into cylinder.

If piston and cylinder bore are scored, the cylinder may be renewed or honed to 0.020 oversize and a new, oversize piston installed. To remove cylinder, first remove rockshaft and right support assembly as outlined in paragraph 254. Then, remove connector or three-way valve from front end of ram cylinder and bump cylinder rearward out of rear axle housing. If cylinder bore is being honed oversize, it must be finish honed to prevent excessive wear of piston rings. To reinstall honed cylinder or install new cylinder, reverse removal procedure using new gasket and "O" ring.



H. Grease fitting hole
1. Connector (except 1200)
1A. Connector (model 1200)
2. "O" ring
3. "O" ring
4. Connector plug
5. Bleeder valve
6. "O" ring
7. Ram cylinder
8. Gasket
9. Plug
10. Rockshaft bushing
11. Piston & rings
12. Piston rod
13. Spring pin
14. Ram cylinder arm
15. "O" ring
16. Rockshaft bushing (2 halves)
17. Rockshaft
18. Cam pivot pin
19. Lift linkage latch
20. Spring
21. Spacer
22. "O" ring
23. Ram cylinder cover
24. Locating screw
25. Pin (needle bearing rollers)
26. Dust shield
27. Latching lever
28. Snap ring

Fig. 207 — Exploded view of typical rockshaft cylinder and rockshaft assembly. Connector (1A) is used on model 1200, connector (1) on all other models. Refer to Fig. 208 for cross-sectional view of rockshaft latch assembly. No attempt should be made to remove or reposition the rockshaft lift arms. Rockshaft ram cylinder arm (14) is renewable by splitting old arm, then pressing arm from shaft. Heat new arm to expand to fit, press into position and allow to shrink fit to shaft.

ROCKSHAFT AND SUPPORT LATCH

All Models

260. The rockshaft is supported in renewable bushings. Refer to paragraph 257 for information on renewing bushing in right hand support bracket (control mechanism housing).

The bushings (10 & 16—Fig. 207) at left end of rockshaft can be renewed after removing ram cylinder cover (27). Bushings are aligned with grease fitting holes (H) in cover.

Refer to Fig. 208 for cross-sectional view showing lift linkage latch assembly. During normal operation of hydraulic system, the latch (19) is withdrawn by lever (27) riding on ends of the steel pins (25). When it is desired to latch lift linkage in raised position, turn lever (27) so that pins enter recesses in lever allowing spring (20) to push latch forward to engage ram cylinder arm. Linkage can be disassembled after removing ram cylinder cover (23) by holding latch rearward against spring pressure while removing the snap rings (28). A guide screw (24—Fig. 207) engages slot in latch plunger (19) to keep it from turning. The pins (25) are actually needle bearing rollers; thus if broken, are too hard to be drilled out. Ram cylinder cover can be salvaged if pin is broken by drilling new pin holes offset slightly from the original holes.

TOP LINK SENSING UNIT

All Models

261. Refer to Fig. 209 for exploded view of top link sensing unit typical of all models except early model 770 with single acting sensing unit.

Disassembly and reassembly of unit is obvious from examination of unit and with reference to Fig. 209. Sleeve (13) is secured to shaft (18) with Loctite. Spacer (17) is used only on models 990 and 1200. Spring (12) end play on assembled shaft should not exceed 0.010. If end play of spring is more than 0.010, install a thicker thrust washer (11); thrust washers are available in thicknesses of 0.355 to 0.405 in steps of 0.010. When unit is being assembled, check end play of shaft assembly as end plate (15) retaining cap screws are being tightened. End play should be at minimum when cap screws are fully tightened. If end play decreases as cap screws are tightened, then starts to increase when cap screws are fully tightened, shim (14) thickness is not sufficient and shims must be added. If end play is at minimum when cap screws are fully tightened, but exceeds 0.010, shim thickness is too great and shims equal to excessive end play must be removed. Shims are available in thicknesses of 0.005, 0.010 and 0.030.

After unit is reinstalled, check and adjust flexible cable as outlined in paragraph 244.

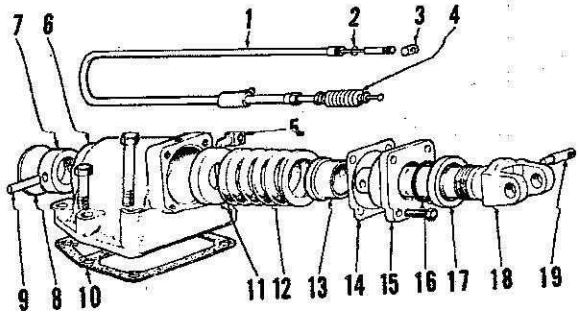


Fig. 209—Exploded view of top link sensing unit typical of all models except model 770 with single acting sensing unit. Spacer (17) is used on models 990 and 1200 only.

1. Flexible cable
2. [illegible]
3. Actuating arm pin
4. Boot
5. Cable support, outer
6. Housing
7. Collar
8. Expansion plug
9. Pin
10. Gasket
11. Thrust washer (variable thickness)
12. Sensing spring
13. Sleeve
14. Shims
15. End plate
16. "O" ring
17. Spacer
18. Top link yoke shaft
19. Cable support, inner

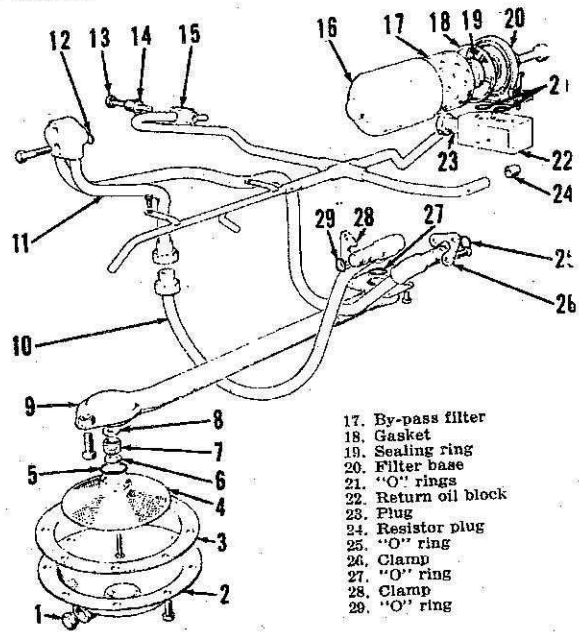


Fig. 211—Exploded view of hydraulic lines and filters for early model 770. By-pass filter mounting block (22) was introduced to provide a return port for external hydraulic unit return oil and may be installed on earlier units where needed. Refer to Fig. 212 for model 770 and model 780 using full flow suction filter element instead of by-pass filter (16 to 20).

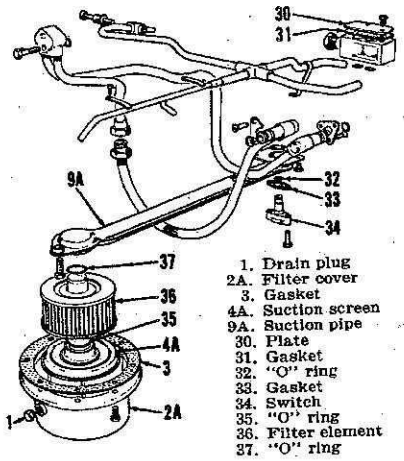
1. Drain plug
2. Filter cover
3. Gasket
4. Suction screen
5. "O" ring
6. Washer
7. Magnet
8. Washer
9. Pump suction line
10. Ram cylinder pipe
11. Control valve pipe
12. "O" ring
13. Set screw
14. Bushing
15. Lubrication pipe
16. Filter cover
17. By-pass filter
18. Gasket
19. Sealing ring
20. Filter base
21. "O" rings
22. Return oil block
23. Plug
24. Resistor plug
25. "O" ring
26. Clamp
27. "O" ring
28. Clamp
29. "O" ring

HYDRAULIC LINES AND FILTERS

All Models Except Model 1200

262. Refer to Figs. 211, 212 and 213 for exploded views showing typical internal hydraulic line installations, suction filter units and for early models 770, 880 and 990, the external by-pass type filter. All later models have a full flow element type suction filter (36—Fig. 212) and are not equipped with a by-pass filter. When the filter element (36) becomes clogged, oil starvation to pump could occur; thus, a vacuum switch (34) is incorporated in the suction line (9A) to activate a warning light on instrument panel if vacuum in line becomes excessive. Note that it is normal for warning light to be on when transmission lubricant is cold or when operating at engine speeds above 1800 RPM. Suction filter must be renewed whenever light stays on with transmission lubricant at normal operating temperature and with engine running below 1800 RPM.

On early model 770, by-pass filter is bolted directly to axle housing. To provide a return port for oil when there is a continuous flow to an external valve or motor, a block (22—Fig. 211) was installed between filter and axle housing. Plug (23) can be



1. Drain plug
2A. Filter cover
3. Gasket
4A. Suction screen
9A. Suction pipe
30. Plate
31. Gasket
32. "O" ring
33. Gasket
34. Switch
35. "O" ring
36. Filter element
37. "O" ring

Fig. 212—On late model 770 and models 780, a full flow filter element (36) is used. Warning light switch (34) is actuated when filter becomes clogged. Other components of hydraulic lines are similar to that shown in Fig. 211.

The bushings (10 & 16—Fig. 207) at left end of rockshaft can be renewed after removing ram cylinder cover (23). Be sure that grease hole in bushings are aligned with grease fitting holes (H) in cover.

Refer to Fig. 208 for cross-sectional view showing lift linkage latch assembly. During normal operation of hydraulic system, the latch (19) is withdrawn by lever (27) riding on ends of the steel pins (25). When it is desired to latch lift linkage in raised position, turn lever (27) so that pins enter recesses in lever allowing spring (20) to push latch forward to engage ram cylinder arm. Linkage can be disassembled after removing ram cylinder cover (23) by holding latch rearward against spring pressure while removing the snap rings (28). A guide screw (24—Fig. 207) engages slot in latch plunger (19) to keep it from turning. The pins (25) are actually needle bearing rollers; thus if broken, are too hard to be drilled out. Ram cylinder cover can be salvaged if pin is broken by drilling new pin holes offset slightly from the original holes.

TOP LINK SENSING UNIT

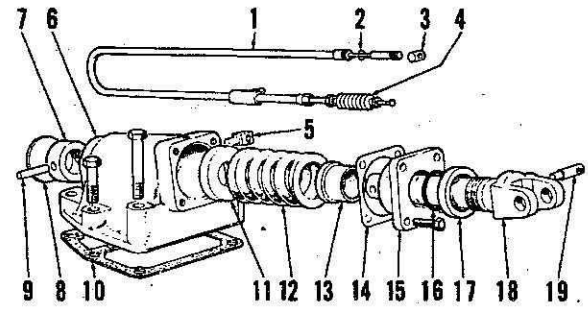
All Models

261. Refer to Fig. 209 for exploded view of top link sensing unit typical of all models except early model 770 with single acting sensing unit.

Disassembly and reassembly of unit is obvious from examination of unit and with reference to Fig. 209. Sleeve (13) is secured to shaft (18) with Loctite. Spacer (17) is used only on models 990 and 1200. Spring (12) end play on assembled shaft should not exceed 0.010. If end play of spring is more than 0.010, install a thicker thrust washer (11); thrust washers are available in thicknesses of 0.355 to 0.405 in steps of 0.010. When unit is being assembled, check end play of shaft assembly as end plate (15) retaining cap screws are being tightened. End play should be at minimum when cap screws are fully tightened. If end play decreases as cap screws are tightened, then starts to increase when cap screws are fully tightened, shim (14) thickness is not sufficient and shims must be added. If end play is at minimum when cap screws are fully tightened, but exceeds 0.010, shim thickness is too great and shims equal to excessive end play must be removed. Shims are available in thicknesses of 0.005, 0.010 and 0.030.

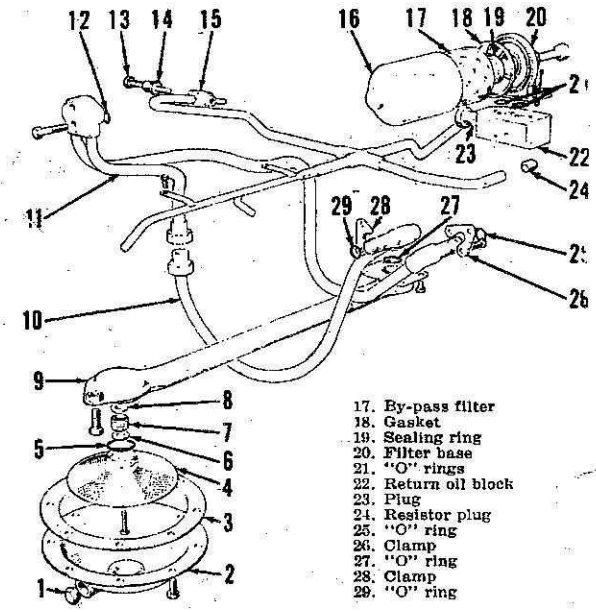
After unit is reinstalled, check and adjust flexible cable as outlined in paragraph 244.

Fig. 209—Exploded view of top link sensing unit typical of all models except model 770 with single acting sensing unit. Spacer (17) is used on models 990 and 1200 only.



1. Flexible cable
2. "O" ring
3. Actuating arm pin
4. Boot
5. Cable support, outer
6. Housing
7. Collar
8. Expansion plug
9. Pin
10. Gasket
11. Thrust washer (variable thickness)
12. Sensing spring
13. Sleeve
14. Shims
15. End plate
16. "O" ring
17. Spacer
18. Top link yoke shaft
19. Cable support, inner

Fig. 211—Exploded view of hydraulic lines and filters for early model 770. By-pass filter mounting block (22) was introduced to provide a return port for external hydraulic unit return oil and may be installed on earlier units where needed. Refer to Fig. 212 for model 770 and model 780 using full flow suction filter element instead of by-pass filter (16 to 20).



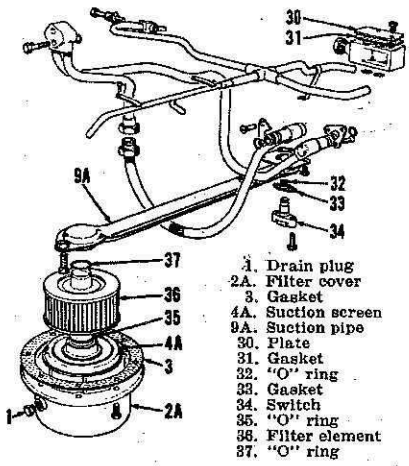
1. Drain plug
2. Filter cover
3. Gasket
4. Suction screen
5. "O" ring
6. Washer
7. Magnet
8. Washer
9. Pump suction line
10. Ram cylinder pipe
11. Control valve pipe
12. "O" ring
13. Set screw
14. Bushing
15. Lubrication pipe
16. Filter cover
17. By-pass filter
18. Gasket
19. Sealing ring
20. Filter base
21. "O" rings
22. Return oil block
23. Plug
24. Resistor plug
25. "O" ring
26. Clamp
27. "O" ring
28. Clamp
29. "O" ring

HYDRAULIC LINES AND FILTERS

All Models Except Model 1200

262. Refer to Figs. 211, 212 and 213 for exploded views showing typical internal hydraulic line installations, suction filter units and for early models 770, 880 and 990, the external by-pass type filter. All later models have a full flow element type suction filter (36—Fig. 212) and are not equipped with a by-pass filter. When the filter element (36) becomes clogged, oil starvation to pump could occur; thus, a vacuum switch (34) is incorporated in the suction line (9A) to activate a warning light on instrument panel if vacuum in line becomes excessive. Note that it is normal for warning light to be on when transmission lubricant is cold or when operating at engine speeds above 1800 RPM. Suction filter must be renewed whenever light stays on with transmission lubricant at normal operating temperature and with engine running below 1800 RPM.

On early model 770, by-pass filter is bolted directly to axle housing. To provide a return port for oil when there is a continuous flow to an external valve or motor, a block (22—Fig. 211) was installed between filter and axle housing. Plug (23) can be



1. Drain plug
2A. Filter cover
3. Gasket
4A. Suction screen
9A. Suction pipe
30. Plate
31. Gasket
32. "O" ring
33. Gasket
34. Switch
35. "O" ring
36. Filter element
37. "O" ring

Fig. 212 — On late model 770 and models 780, a full flow filter element (36) is used. Warning light switch (34) is actuated when filter becomes clogged. Other components of hydraulic lines are similar to that shown in Fig. 211.

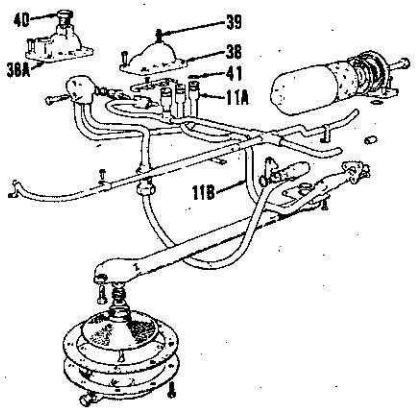


Fig. 213 — View showing hydraulic lines and filters for early models 880 and 990. On model 4600 and late models 880 and 990, a full flow filter element (see Fig. 212) is used instead of the by-pass type filter assembly.

11A. Control valve pipe
11B. Ram cylinder pipe
38. Axle cover (early)
38A. Axle cover (late)
39. Bleed plug (early)
40. Pressure passage plug
41. "O" rings

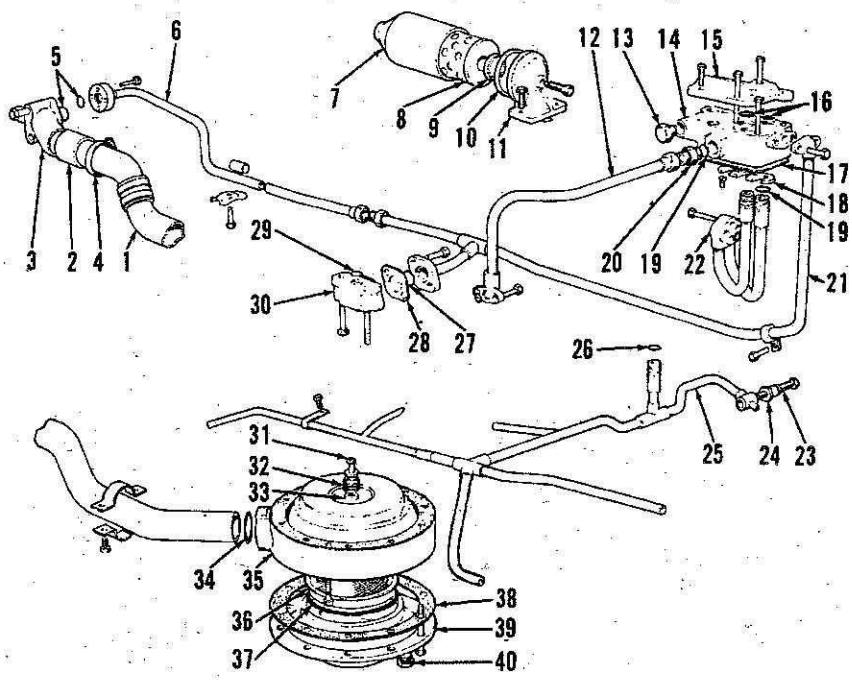


Fig. 214 — Exploded view of hydraulic lines and filters for model 1200 with single hydraulic pump. Late models with single pump have a full flow suction filter similar to that shown in Fig. 212.

1. Pump suction pipe
2. Hose connector
3. Elbow
4. Hose clamps
5. "O" rings
6. Pump pressure pipe, front
7. Filter cover
8. By-pass filter
9. Sealing ring
10. Gasket
11. Filter base
12. Ram cylinder pipe
13. Return port plug
14. Adapter plate
15. Control valve cover
16. "O" rings
17. Gasket
18. Clamp
19. "O" ring
20. Connector
21. Pump pressure pipe, rear
22. Control valve pipe
23. Set screw
24. Bushing
25. Lubrication pipe
26. "O" ring
27. "O" ring
28. Gasket
29. "O" ring
30. Pump relief valve
31. Screw
32. Magnet
33. Washer
34. "O" ring
35. Suction screen housing
36. Suction screen
37. "O" ring
38. Gasket
39. Cover
40. Drain plug

removed to provide a return port for oil so that oil will be fed through transmission and PTO lubrication pipes. On later models without by-pass filter, block is fitted with a cover plate. On models 880, 990 and 4600, return oil port is located in plate (38A —Fig. 213) bolted to axle housing. Note: On early 880 and 990, plate (38) did not have return opening; late plate (38A) may be installed on these models if needed.

Model 1200

263. Refer to Figs. 214 and 215 for views showing hydraulic lines and filters for model 1200. All hydraulic lines except control valve to adapter plate line (22—Fig. 214 or 19—Fig. 215) and lubrication pipes (25—Fig. 214) are located externally. Remote control valve(s) (not shown) are fitted between adapter plate and cover plate (15—Fig. 214 or 11—Fig. 215).

On models with dual hydraulic pump (see Fig. 215), a combining valve (14) allows oil from both pumps to be used for remote control valve or separates flow with oil from one pump section being used to operate tractor lift system and from second pump section being available for remote control usage.

Late model 1200 with single pump assembly (Fig. 214) is equipped with a full flow suction filter and warning light as described for other models in paragraph 262.

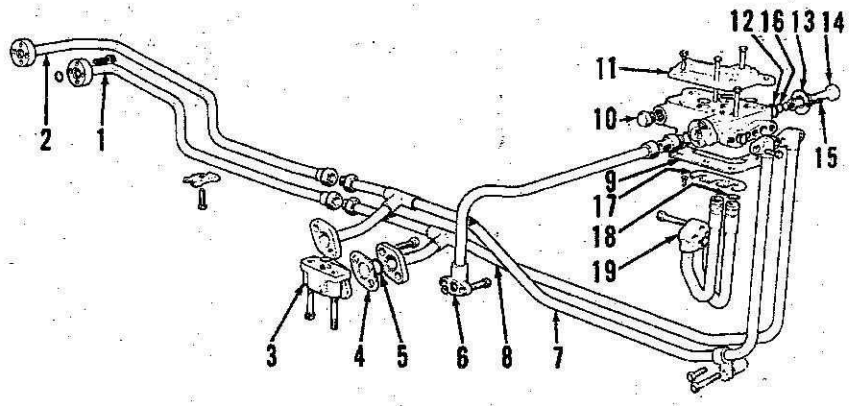


Fig. 215 — Exploded view of high pressure hydraulic lines for model 1200 with dual hydraulic pump; pump suction lines, filters, and lubrication line are as shown in Fig. 214 for models with single hydraulic pump. Combining valve (14) separates flow of one pump to tractor hydraulic piston and flow of second pump to remote control valve, or combines flow of both pumps to remote control valve.

1. Rear pump pressure line
2. Front pump pressure line
3. Relief valves (2)
4. Gaskets
5. "O" rings
6. Ram cylinder line
7. Front pump rear line
8. Rear pump rear line
9. Gasket
10. Plug
11. Remote valve cover
12. "O" ring
13. Retainer
14. Combining valve
15. Screws
16. "O" ring
17. Clamp
18. "O" rings
19. Control valve pipe

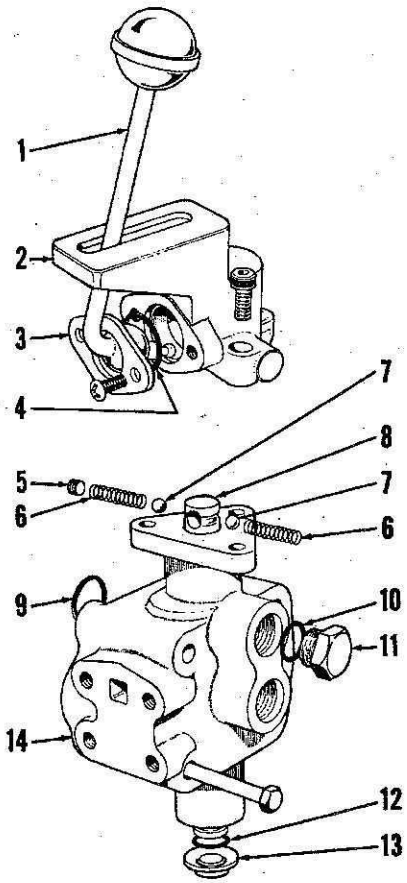


Fig. 216 — Exploded view of late type three-way valve assembly.

1. Control lever
2. Lever bracket
3. Retainer
4. "O" ring
5. Plug
6. Detent springs
7. Detent balls
8. Valve spool
9. "O" ring
10. "O" ring
11. Plug
12. "O" ring
13. Breather
14. Valve body

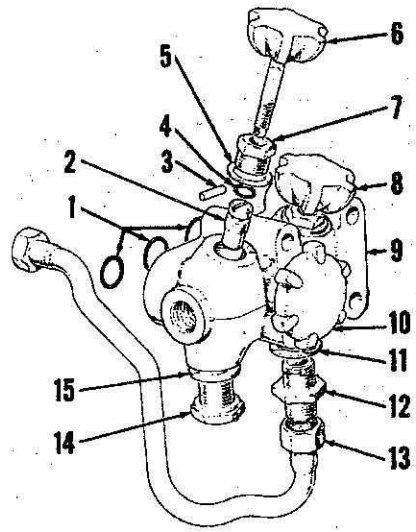


Fig. 217 — Exploded view of early type three-way valve assembly used on early models 770, 880 and 990.

1. "O" rings
2. Valve plungers (3)
3. Pins
4. "O" rings (3)
5. Sealing washers
6. Remote port valve knob
7. Bushing
8. Remote port valve knob
9. Valve body
10. Ram cylinder valve knob
11. Sealing washer
12. Special union
13. Pipe to remote coupling
14. Plug (when port is not used)
15. Sealing washer

REMOTE (EXTERNAL) CONTROL VALVES

Three-way Valve Assembly, All Models

264. Refer to Fig. 216 for exploded view of three-way valve used on all late models and to Fig. 217 for early type three-way valve. The valve mounts on front end of rockshaft ram cylinder and is used to control flow of oil to ram cylinder or to a remote cylinder by closing passage to ram cylinder and opening passage to remote cylinder port.

On late type valve (Fig. 216), valve spool (8) and valve body (14) are not serviced except as a complete assembly which includes all parts shown except port sealing plugs and mounting bolts. All other parts are available separately. Be sure that breather (13) is clean and not damaged in any way. Detent balls (7) and springs (6) are located in bore of lever bracket (2); install one spring and ball in blind hole and hold ball depressed with pin when installing lever bracket on valve and valve body assembly. Then, install second detent ball and spring and retain with plug (5).

On early type valve (Fig. 217), valve plungers (2) are available separately from valve body (9); however, renewal of plunger sealing "O" rings (4) will correct external leakage past plunger. If, when closed, oil to ram cylinder or remote cylinder is not completely stopped, examine both the plungers and seats in valve body. If seats are damaged, complete valve assembly must be renewed.

Two-Way Remote Control Valve, All Models So Equipped

265. Refer to Fig. 218 for exploded view of remote control valve that can be used to operate remote cylinders independently of tractor hydraulic lift system. Valve cover plate is not shown; refer to Fig. 214 or 215.

Valve spool (24—Fig. 218) and valve body (29) are not serviced except as a complete valve assembly which includes all parts shown except operating lever (18).

Disassembly and reassembly of unit is evident from inspection of unit and with reference to exploded view. Be sure not to lose any of the shims (14); shims are used to adjust pressure at which the detent valve (17) opens, releasing the detent balls (9) and allowing valve spool to return to neutral (hold) position. Note that the detent release pressure must be lower than the hydraulic pump relief pressure, otherwise the detent relief valve will not operate.

When reassembling valve unit, clean the threads on detent spring retainer (10) and inner end of control valve spool and secure with Loctite compound. Use all new sealing "O" rings when reassembling unit.

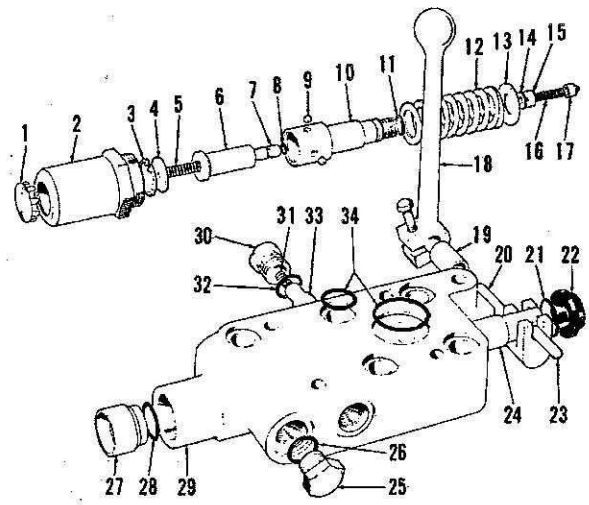


Fig. 218 — Exploded view of remote control valve assembly available for all models and standard equipment on model 1200 imported to U.S. Refer to Fig. 214 or 215 for adapter plate and valve cover.

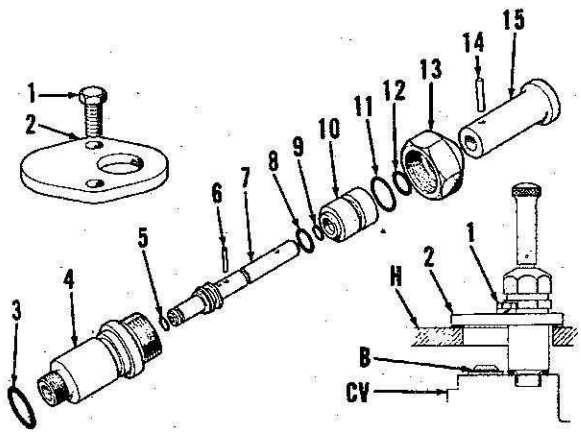
1. Plug
2. Detent cap
3. Snap ring
4. Washer
5. Detent piston spring
6. Detent release plunger
7. Detent piston
8. "O" ring
9. Detent balls
10. Centering spring retainer
11. "O" ring
12. Centering spring
13. Washer
14. Shims
15. Spring guide
16. Poppet valve spring
17. Poppet valve
18. Operating lever
19. Bushing
20. Lever shaft
21. "O" ring
22. Wiper seal
23. Pin
24. Valve spool
25. Plug (when port is not used)
26. "O" ring
27. Bushing
28. "O" ring
29. Valve body
30. Plug
31. Spring
32. "O" ring
33. Check valve
34. "O" rings

Dump Valve, All Models So Equipped

266. Refer to Fig. 219 for exploded view of dump valve assembly; inset shows installation of valve in rear axle housing. To operate the dump valve, first place Selectamatic control lever in lowering position, then twist dump valve knob to release valve and pull knob upward. When remote cylinder is lowered, return dump valve to closed position and lock in place by twisting knob. Valve should not be used to lower 3-point lift linkage unless there is no load on the lift links.

Disassembly and reassembly of dump valve is obvious from inspection of unit and with reference to exploded view in Fig. 219. Reassemble using new "O" rings, lubricating the rings with light grease prior to reassembly. When reinstalling valve, tighten cap screws (1) snug, but not tight, then start engine and pull control lever fully rearward against quadrant spring pressure until all air is expelled, then tighten valve retaining cap screws to a torque of 40 Ft.-Lbs.

Fig. 219 — Exploded view of dump valve. Valve is installed to obtain faster return of oil from remote cylinders than can be obtained through standard tractor hydraulic lift system circuit. The dump valve is fitted in place of the axle cover plate over Selectamatic control valve and also replaces the hold valve release plug; refer to cross-sectional view in inset.



B. By-pass valve plug
CV. Control valve
H. Axle housing
1. Cap screw
2. Valve mounting plate
3. "O" ring
4. Valve body
5. "O" ring
6. Pin
7. Valve plunger
8. "O" ring
9. "O" ring
10. Bushing
11. "O" ring
12. "O" ring
13. Special nut
14. Pin
15. Valve knob

NOTES